X-SEL

PC Software for X-SEL

IA-101-X-MW IA-101-X-MW-J IA-101-XA-MW
IA-101-X-USB IA-101-X-USBMW

Operation Manual
1st Edition

IAI America Inc.

Support Models

Model Name	Various data file extensions						Support Started Version
	Program (Individually)	Program (Batch)	Position	Parameter	Symbol	Global data	
X-SEL-J/K	xpg	xpa	Xpt	xpm	xsm	xgd	V1.0.0.0
X-SEL-JX/KX	spg	spa	spt	spm	ssm	sgd	V2.0.0.0
X-SEL-P/Q	x2pg	x2pa	x2pt	x2pm	x2sm	x2gd	V3.0.0.0
TT	tpg	tpa	tpt	tpm	tsm	tgd	V4.0.0.0
X-SEL-PX/QX	s2pg	s2pa	s2pt	s2pm	s2sm	s2gd	V5.0.0.0
SSEL	sspg	sspa	sspt	sspm	sssm	ssgd	V6.0.0.0
ASEL	aspg	aspa	aspt	aspm	assm	asgd	V7.0.0.0
PSEL	pspg	pspa	pspt	pspm	pssm	psgd	V7.0.0.0

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[6] Please note that the version or edition number printed on the face of this manual does not correspond to the software version number.
[7] The content of this manual is subject to change without notice.
[8] This software runs on Windows shown below. This manual has been written on the assumption that the user already has a basic understanding of Windows operations.
(However, this software does not contain Windows.)

Port used	Type	Operable Windows
RS-232C	IX-101-X-MW-J IX101-X-MW IX-101-XA-MW	Windows 98, Windows Me, Windows 2000, Windows XP *1
USB	IX-101-X-USB IX-101-X-USBMW	Windows 98SE、Windows Me、Windows 2000、Windows XP

*1: Supported by software version 7.0.0.0 or later.

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1. Before You Begin

1.1 Items Supplied with This Software (Product Components)

Please check to make sure that the following items are included in your software package.

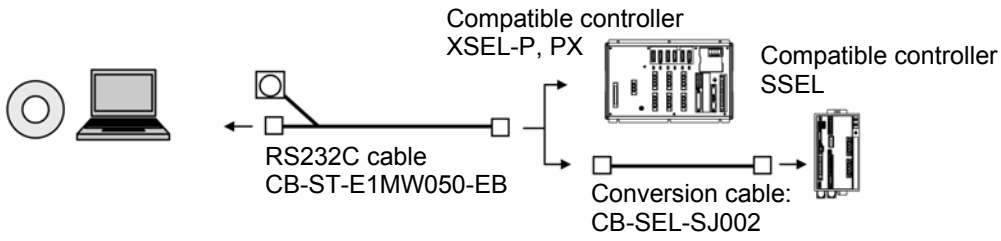
[1] Operation manual (1)

[2] CD-ROM containing the software (1)

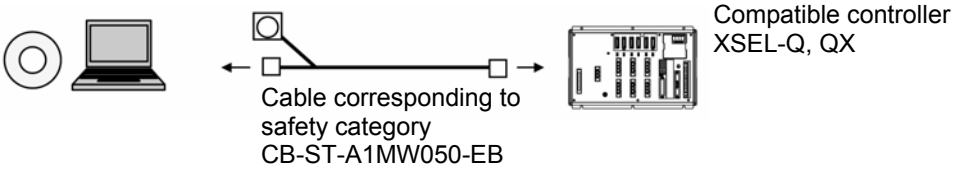
[3] External connection cables

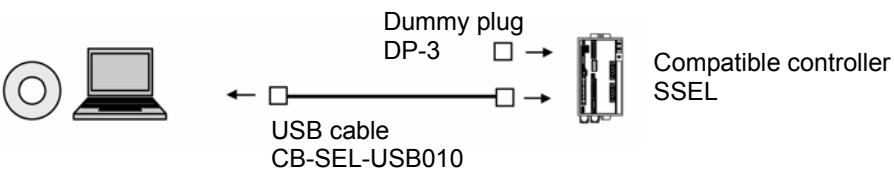
External connection cables vary depending on the PC interface software type.

The types and external connection cables are shown in the table below.

Type	External Connection Cable
IA-101-X-MW-J	RS232C cable (CB-ST-E1MW050-EB): 1 cable Conversion cable (CB-SEL-SJ002): 1 cable
IA-101-X-MW	RS232C cable (CB-ST-E1MW050-EB): 1 cable
Connection Configuration	

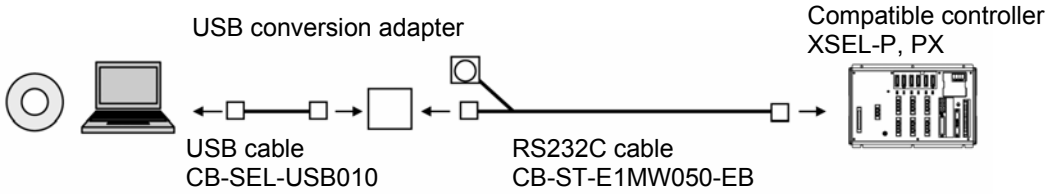
When an NEC computer is used, some models may require an adapter separately for the RS232C cable.

Type	External Connection Cable
IA-101-X-MW	Cable Conforming to Safety Category 4 (CB-ST-A1MW050-EB): 1 cable
Connection Configuration	

Type	External Connection Cable
IA-101-X-USB	USB cable (CB-SEL-USB010): 1 cable Dummy plug (DP-3)
Connection Configuration	

Type	External Connection Cable
IA-101-X-USBMW	USB conversion adapter (IA-CV-USB): 1 unit USB cable (CB-SEL-USB010): 1 piece Dummy plug (DP-3)

Connection Configuration



1.2 What You Will Need (System Requirements)

The following PC and peripherals will be necessary to run this software program.

[1] PC and compatible keyboard
A PC *1 running Windows and a compatible keyboard.
(*1: Personal computer. Abbreviated as “PC” throughout this manual.)

[2] Memory
Enough memory to run Windows.

[3] Display: VGA or higher-resolution monitor
(XGA or better is recommended)

[4] Mouse or other pointing device and mouse driver
The mouse or other pointing device with which you can operate this software comfortably, and an applicable driver.

[5] Windows
Windows 95, Windows 98, Windows NT, Windows 2000, Windows Me or Windows XP.

[6] CD-ROM drive unit

[7] Hard disk
The hard disk should have 5 MB or more of free disk space. (The software is run from the hard disk.)

[8] Serial port: Type IA-101-X-MW-J, IA-101-X-MW or IA-101-XA-MW
An RS232C serial port. (Only a 9-pin port is supported.)

[9] USB port: Type IA-101-X-USB or IA-101-X-USBMW

([10] Printer
A printer compatible with the PC.)

1.3 Installing the Software

This software is run from the hard disk. This section explains how to install the software.

1.3.1 How to Install the PC Interface Software for X-SEL

When the PC interface software of software version 6.0.0.0 or earlier is preinstalled, uninstall it before installing the PC interface software for X-SEL.

[1] Insert the CD-ROM containing this software into your CD-ROM drive.
[2] The installed data selection screen (Fig. 1.1) will be displayed.
Click the data to install.

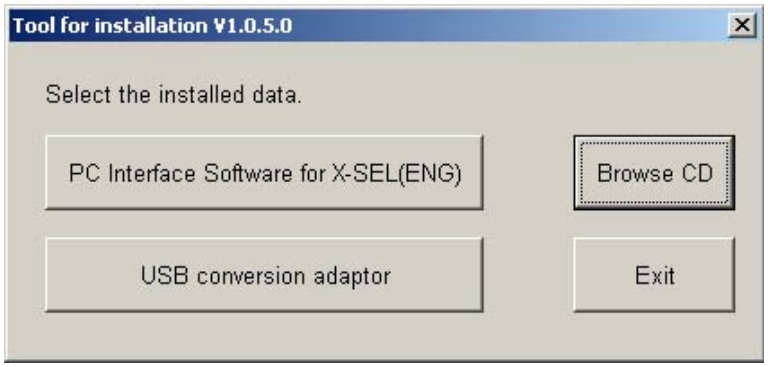


Fig. 1.1 Installed Data Selection Screen
(The displayed screen may vary depending on the version, data in the CD or other factor.)

[3] The screen will change to the installation screen for PC interface software for X-SEL.
Click **Next >**.

Fig. 1.2 Installation Screen

[4] The Customer Information registration screen (Fig. 1.3) will be displayed. Enter your information and click **Next >**.

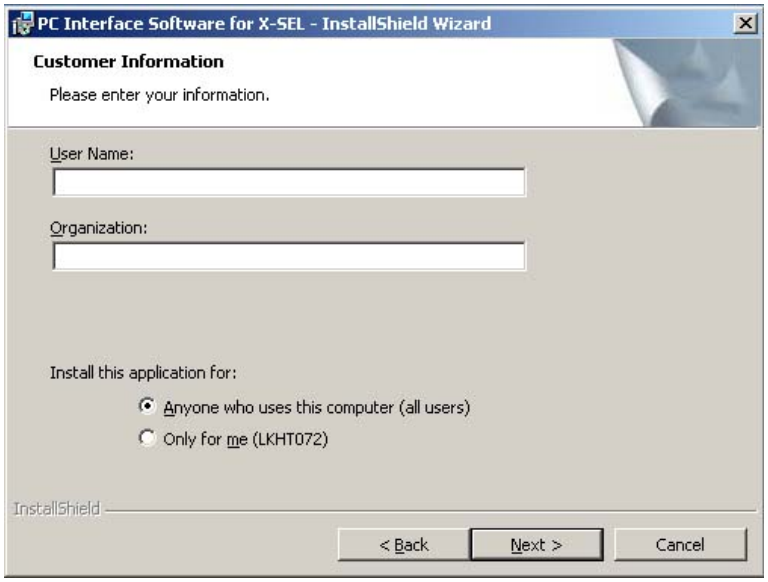


Fig. 1.3 Customer Information Registration

[5] Specify a destination folder to install the PC interface software for X-SEL. (Fig. 1.4)
Normally, you can install it to the displayed folder.
After specifying it, click **Next >**.

Fig. 1.4 Specification of Destination Folder

[6] The wizard is ready to begin installation. Clicking **Install** will begin actual installation.

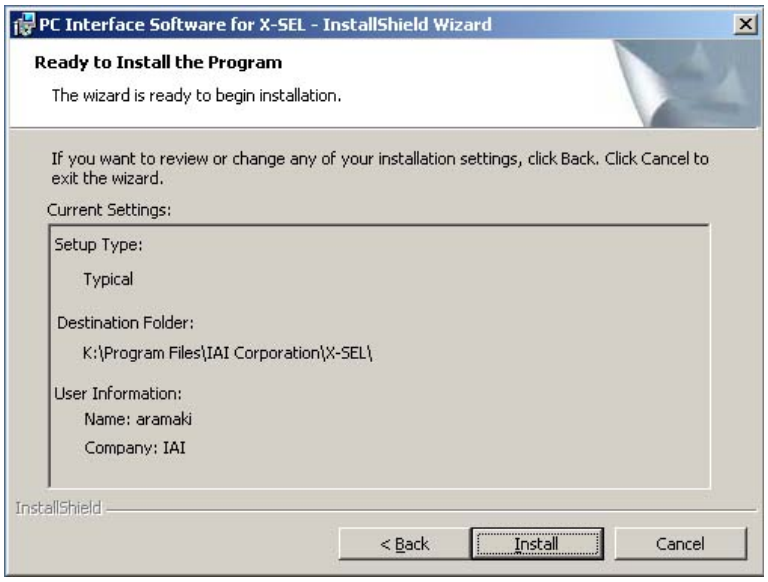


Fig. 1.5 Installation Preparation

The screen shown in Fig. 1.6 will be displayed during installation.

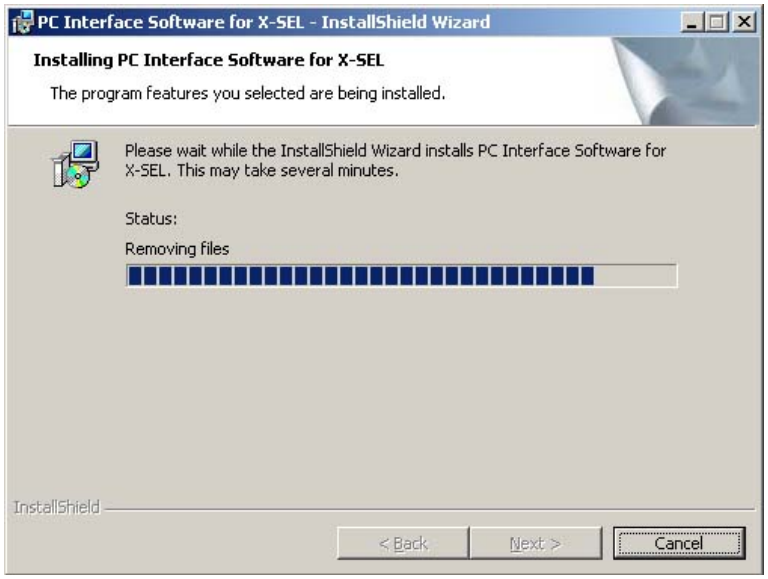


Fig. 1.6 Installation Progress

[7] When the installation is completed, the screen shown in Fig. 1.7 will be displayed.

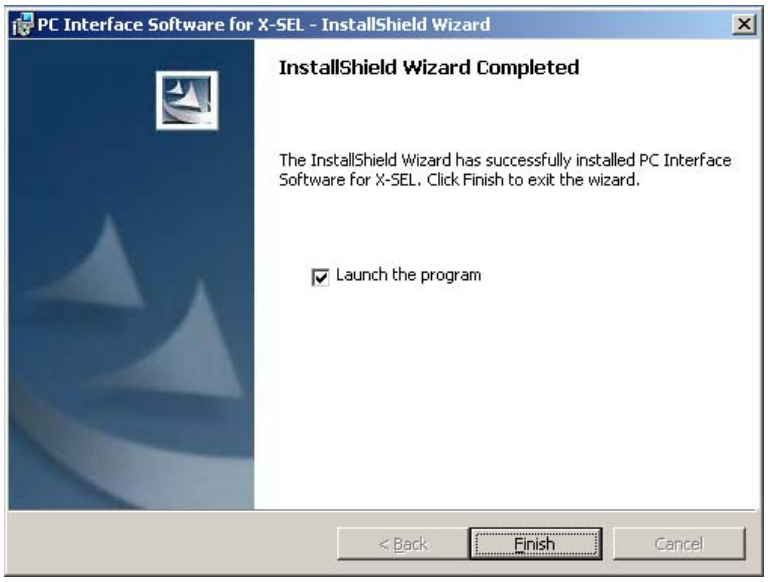


Fig. 1.7 Installation Completion

[8] Once the installation program is completed, the items of IAI, X_SEL, and PC Interface PC Software will be displayed in this order from **Program (P)** in the **Start** menu. Selecting these items will start this software.

[9] Remove the CD-ROM.

[10] After starting the program, click **Help** in the menu to confirm that the version corresponds to the version of the CD-ROM.
If it does not, uninstall the program and install the program from the CD-ROM.

1.3.2 How to Install the USB Conversion Adapter Driver Software

When a USB port is used, it is required to install USB conversion adapter driver software.
[Compatible software]
- IA-101-X-USB (with USB cable)
- IA-101-X-USBMW (with USB conversion adapter + cable)

[1] Insert the CD-ROM of this software into your CD-ROM drive.
[2] The installed data selection screen (Fig. 1.8) will be displayed.
Click **USB Conversion Adapter**.

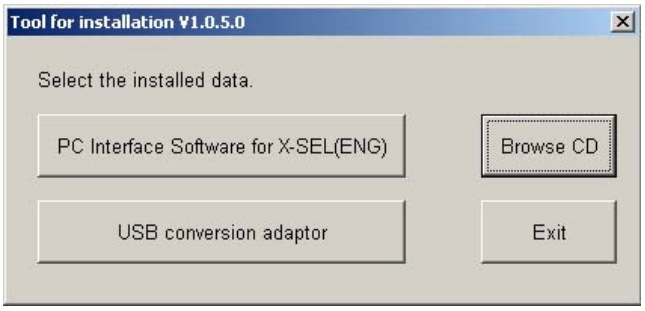


Fig. 1.8 Installed Data Selection Screen
(The displayed screen may vary depending on the version, data in the CD or other factor.)

[3] You are prompted to set the folder of the copy destination. If you use the displayed folder as it is, click **Copy**. To change it, enter it manually or click **Browse** to set the folder of the copy destination.
On the browse for folder screen (Fig. 1.10), click the folder of the copy destination to select it and then click **OK**.
Once you have clicked **OK**, the browse for folder screen (Fig. 1.10) will disappear and the selected folder path will be displayed on the screen to specify the folder of the copy destination (Fig. 1.9).

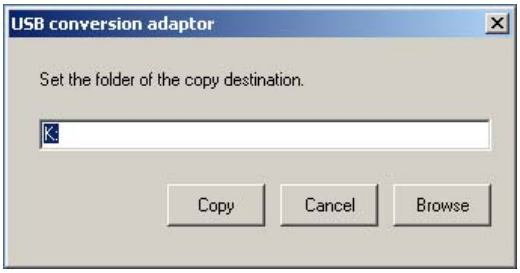


Fig. 1.9 Screen to Specify Folder of Copy Destination

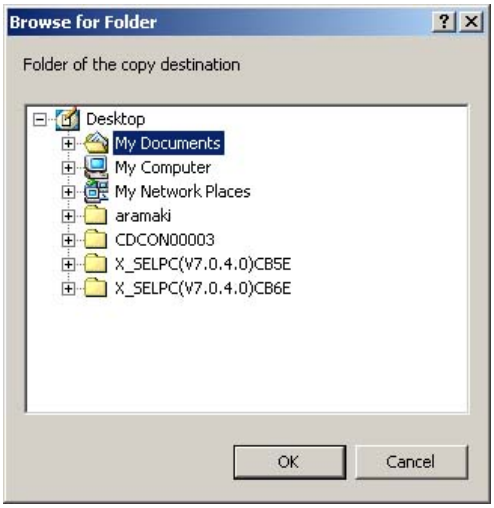


Fig. 1.10 Browse for Folder Screen

[4] When the folder of **IAI USB** (copy data) already exists in the copy destination, you are prompted to overwrite it. Click **OK** to overwrite it, or click **Cancel** to stop copying.

Fig. 1.11 Overwrite Confirmation Screen

[5] The complete screen (Fig. 1.12) will be displayed.

Fig. 1.12 Complete Screen

[6] Once the complete screen (Fig. 12) has been displayed, click **OK**. The complete screen (Fig. 1.12) will disappear. Then, click Cancel on the screen to specify the folder of the copy destination (Fig. 1.9). The screen to specify the folder of the copy destination will disappear.
Finally, click **Exit** on the data selection screen (Fig. 1.8). The data selection screen (Fig. 1.8) will disappear.

[7] Remove the CD-ROM.

[8] Then, insert the USB conversion adapter (IA-CV-USB) into the USB port of your PC.
In the case of the SSEL/ASEL/PSEL controller or TT (table top actuator), connect the PC and SSEL/ASEL/PSEL controller or TT with the attached USB cable.

[9] Windows will open the Welcome to the Found New Hardware Wizard.
Click Next >.

Fig. 1.13 Welcome to Found New Hardware Wizard Screen

[10] The Install Hardware Device Drivers screen will open.
Select Search for a suitable driver for my device [recommended].
Click Next >.

Fig. 1.14 Install Hardware Device Drivers Screen

[11] The **Locate Driver Files** screen will open.
Select **Specify a location**.
Click **Next >**.

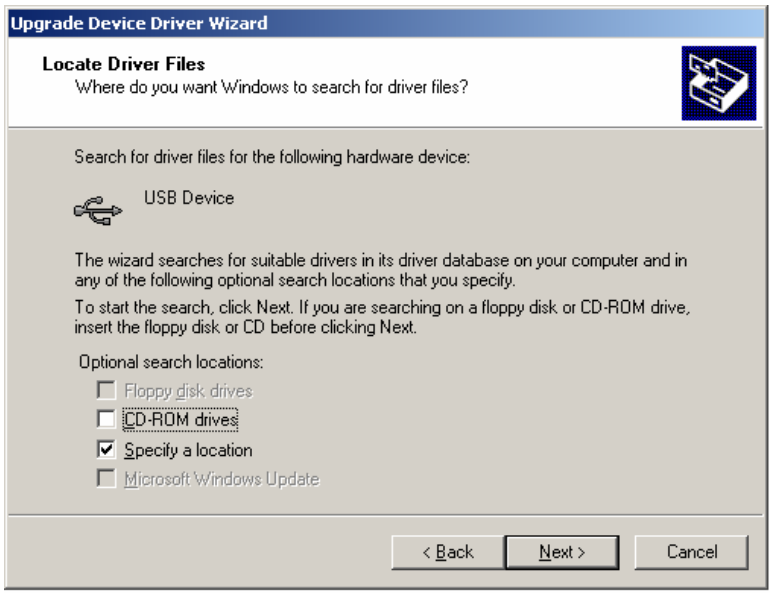


Fig. 1.15 Locate Driver Files Screen

[12] The driver installation file setup screen will open.
Click **Browse...** and find **C:¥IAI USB¥MCU¥CP210x¥WIN** and set it.
Click **OK**.

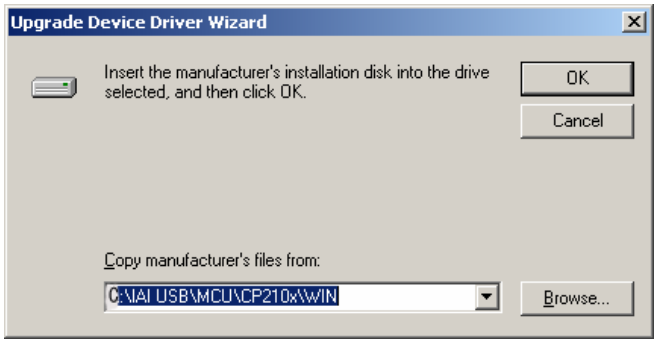


Fig. 1.16 Driver Installation File Setup Screen

[13] The **Driver Files Search Results** screen will open.
Click **Next >**.
The installation of the **IAI USB Composite Device** driver will start.

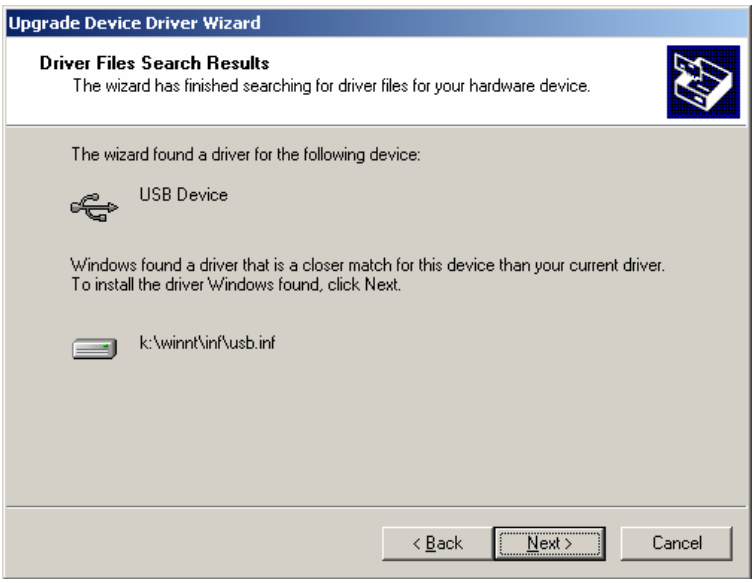


Fig. 1.17 Driver Files Search Results Screen

[14] When the **IAI USB Composite Device** driver installation finish is displayed, the installation of the driver is completed.
Click **Finish**.

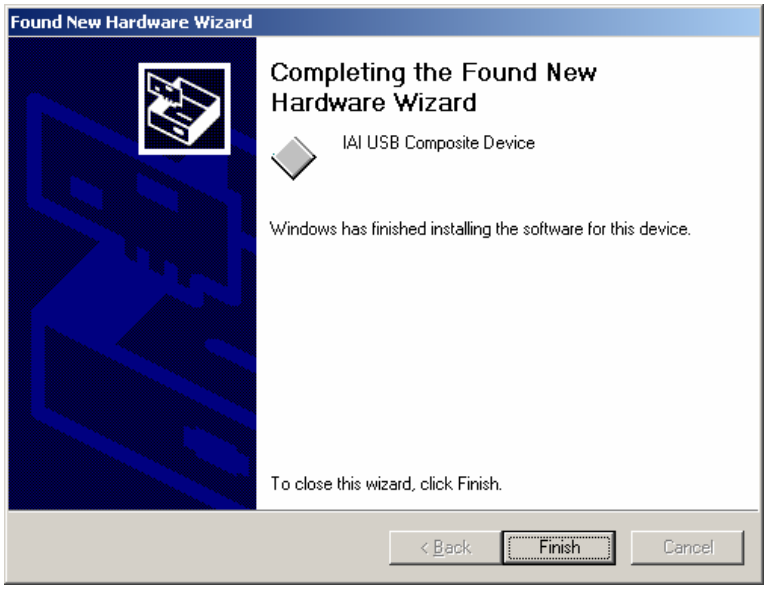


Fig. 1.18 IAI USB Composite Device Installation Finish Screen

[15] Subsequently, the **Welcome to the Found New Hardware Wizard** screen will open.
Click **Next >**.

Fig. 1.19 Welcome to the Found New Hardware Wizard Screen

[16] The Install Hardware Device Drivers screen will open.
Select the Search for a suitable driver for my device [recommended].
Click Next >.

Fig. 1.20 Install ¥Hardware Device Drivers Screen

[17] The Locate Driver Files screen will open.
Select Specify a location.

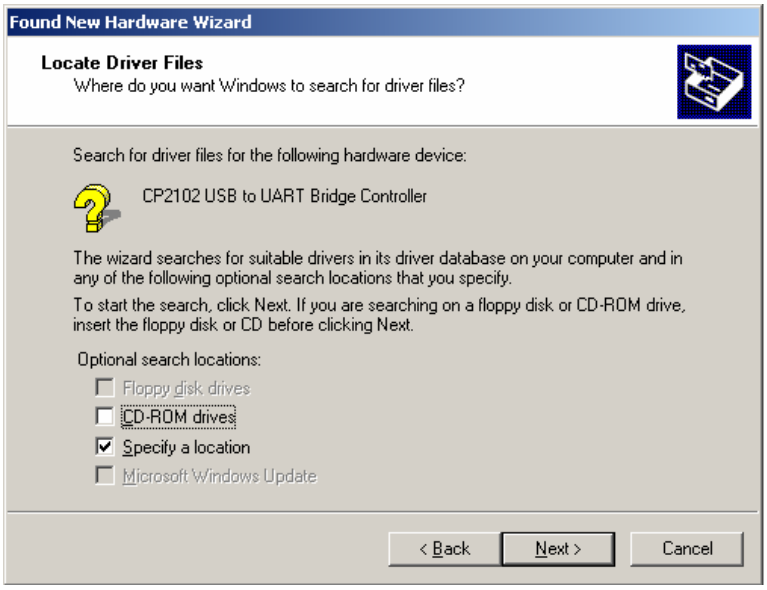


Fig. 1.21 Locate Driver Files Screen

[18] The driver installation file setup screen will open.
Click **Browse** and find **C:¥IAI USB¥MCU¥CP210x¥WIN** and set it.
Click **OK**.

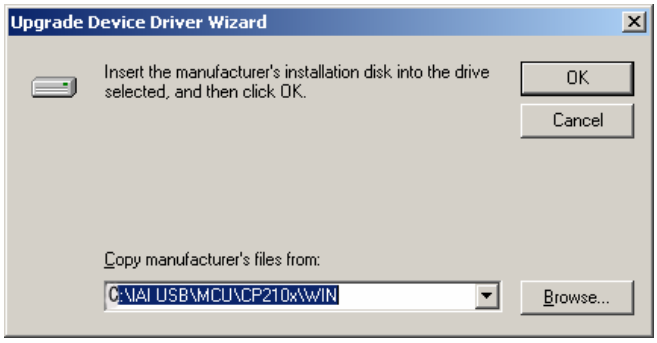


Fig. 1.22 Driver Installation File Setup Screen

[19] The **Driver Files Search Results** screen will open.
Click **Next >**.
The installation of the **IAI USB to UART Bridge Controller** driver will start.

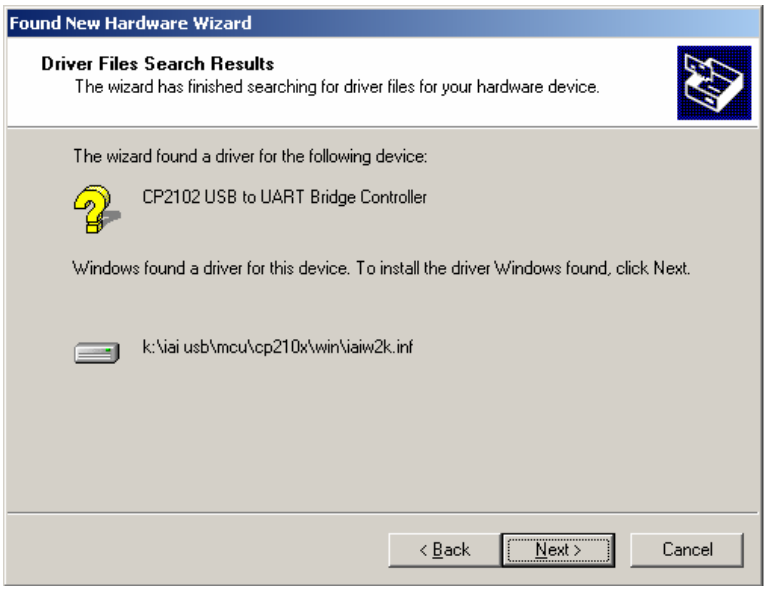


Fig. 1.23 Driver File Search Results Screen

[20] When the **IAI USB to UART Bridge Controller** driver installation finish is displayed, the driver installation is completed.
Click **Finish**.

Fig. 1.24 IAI USB to UART Bridge Controller Installation Finish Screen

[21] The installation of all drivers is completed.

[22] Click **Start** on the Windows taskbar, **Settings**, and then **Control Panel** to open Control Panel.
Double-click **System** to open **System Properties**.
Click the **Hardware** tab in **System Properties** to open it.
Click **Device Manager** in **Hardware** to open it.
Double-click **Ports (COM&LPT)** in **Device Manager** to expand the folder tree.
If there is **IAI USB to UART Bridge Controller (COM?)** under **Ports (COM&LPT)** in **Device Manager**, the driver has normally been installed and operated.
(Note) The number added to the end of COM? becomes the number of the inserted COM port.

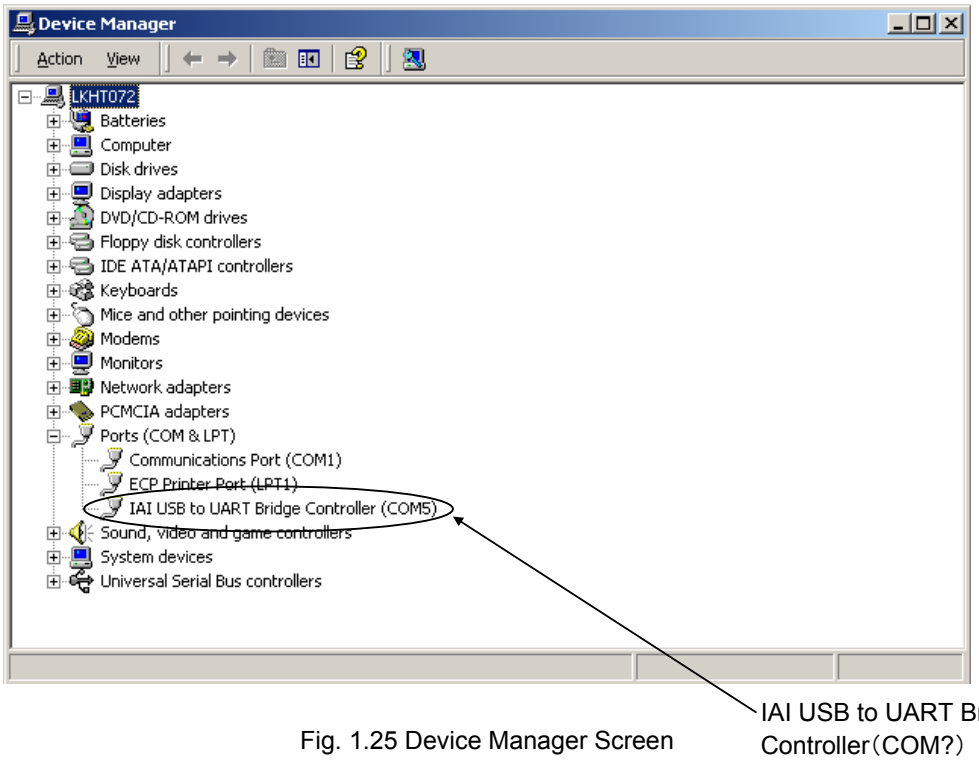


Fig. 1.25 Device Manager Screen

1.4 Connection to Controller

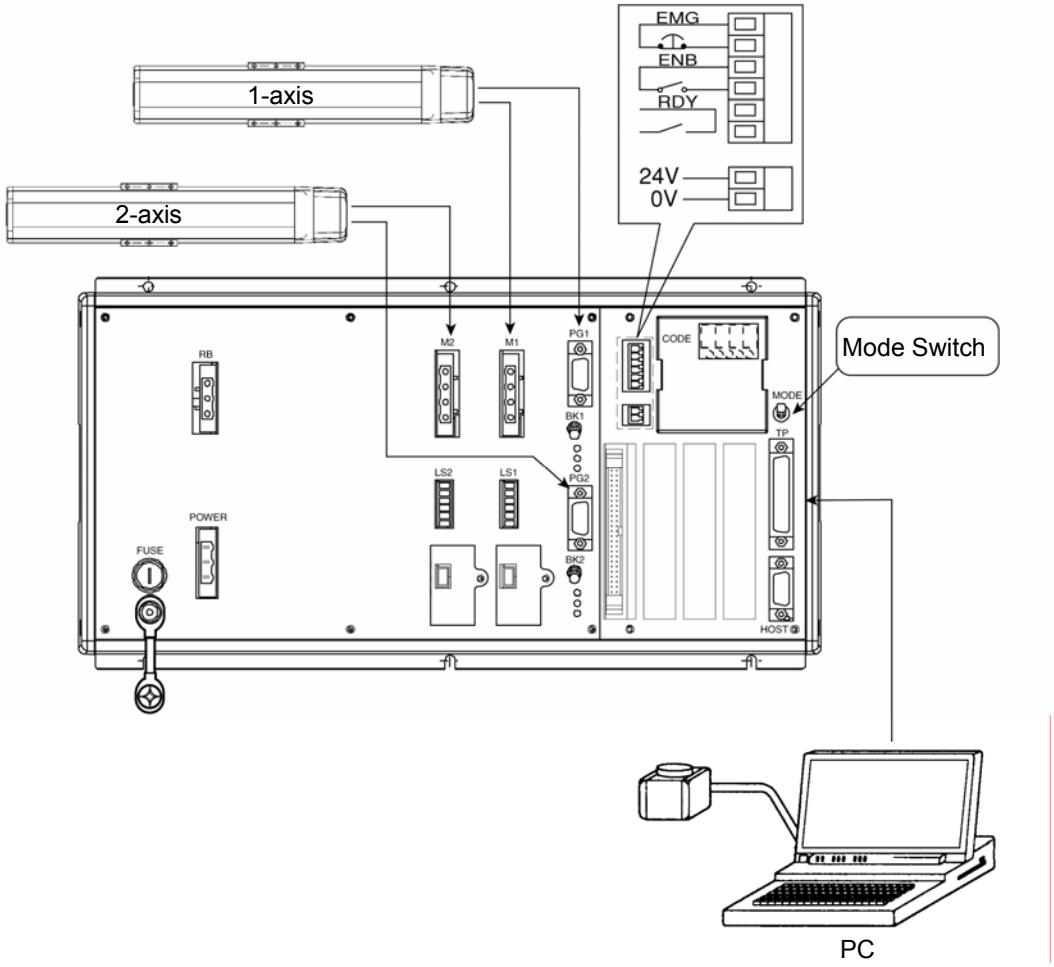


Fig. 1.23 X-SEL-K (J) Type Controller

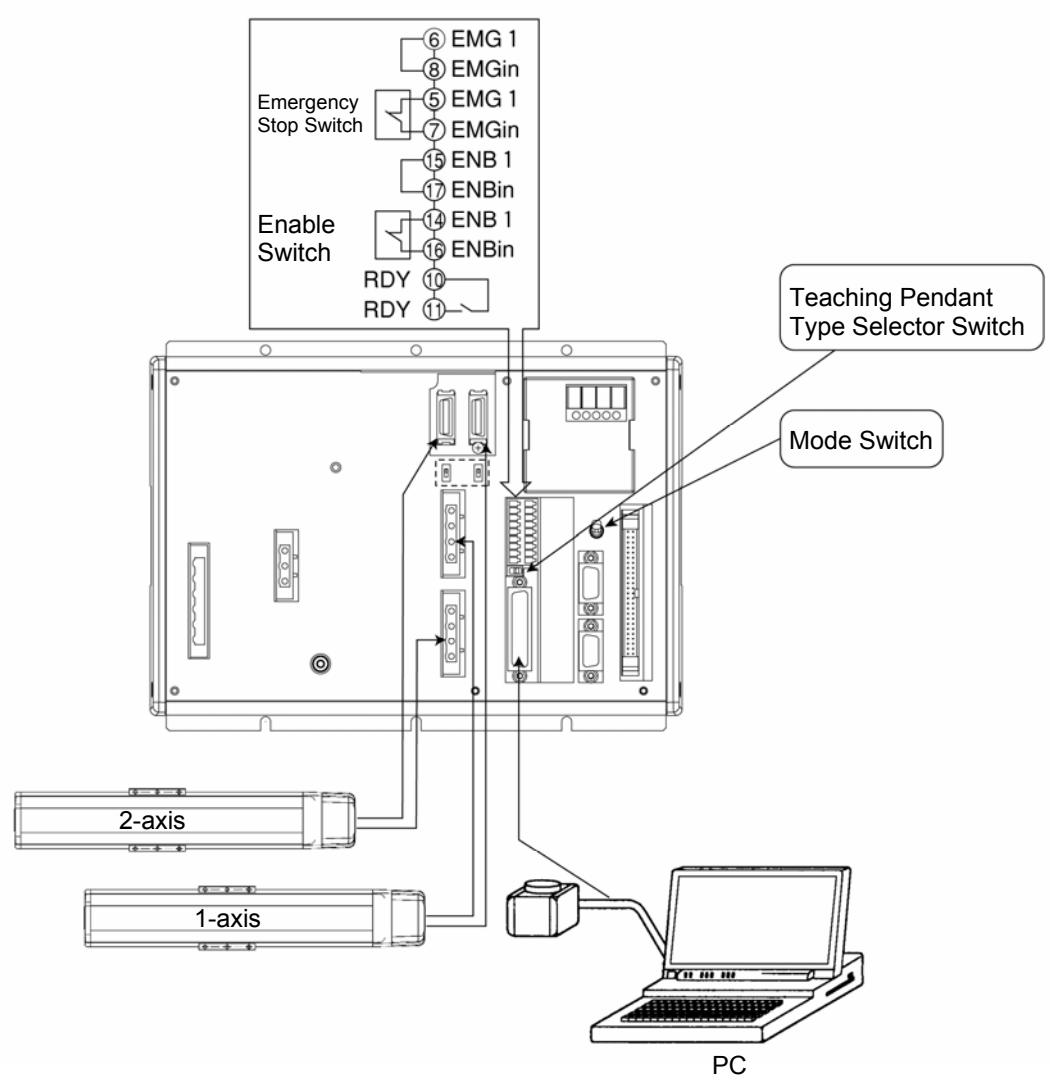


Fig. 1.24 X-SEL-P (Q) Type Controller

Caution:
Set the teaching pendant type selector switch to the right.

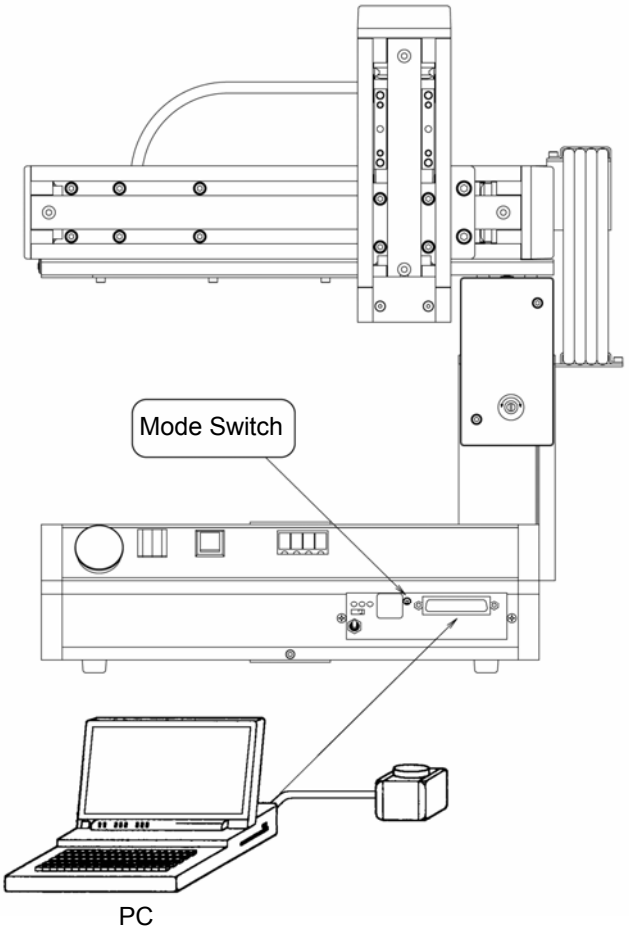


Fig. 1.25 Table Top Actuator (TT)

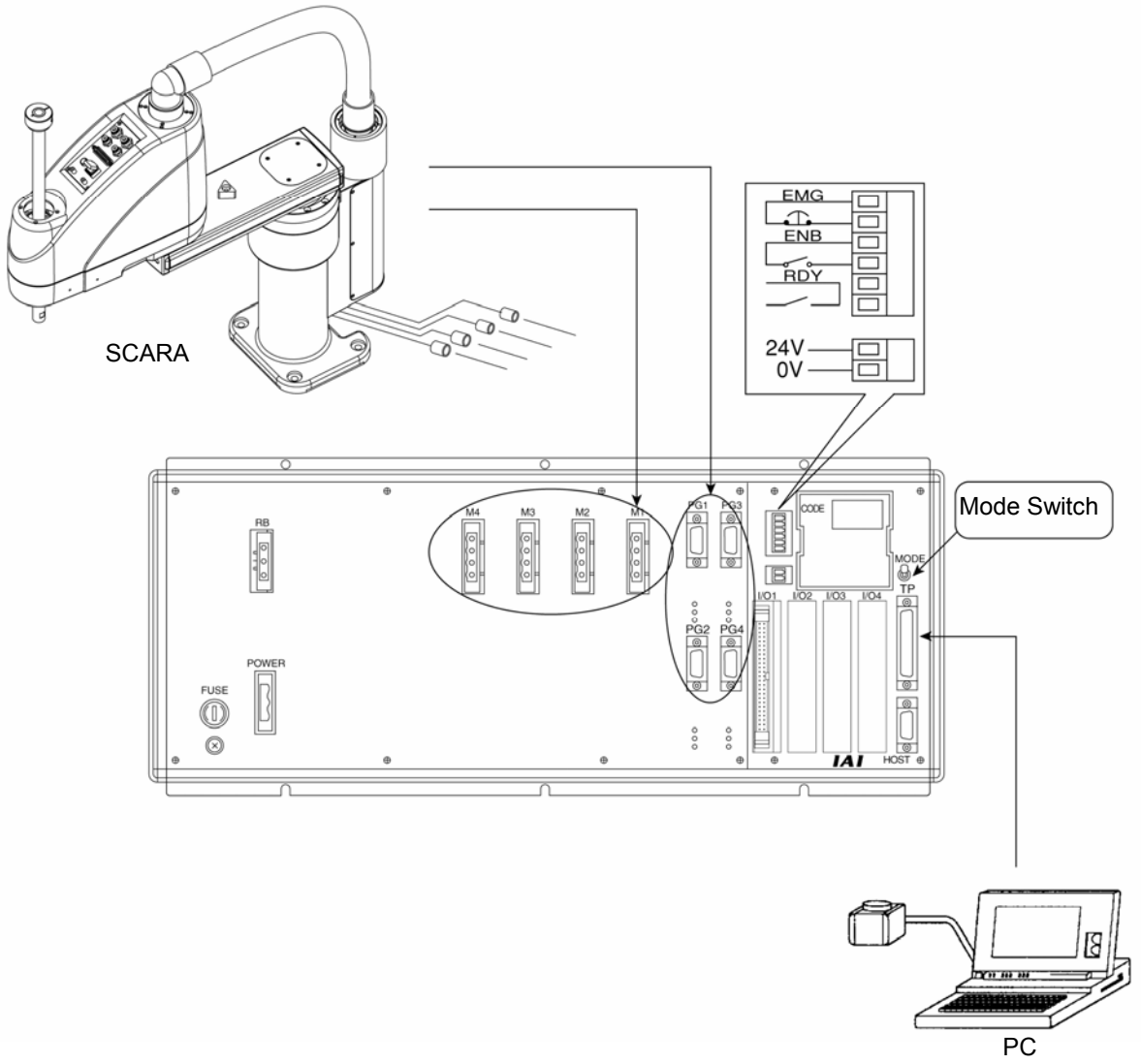


Fig. 1.26 X-SEL-KX (JX) Type Controller

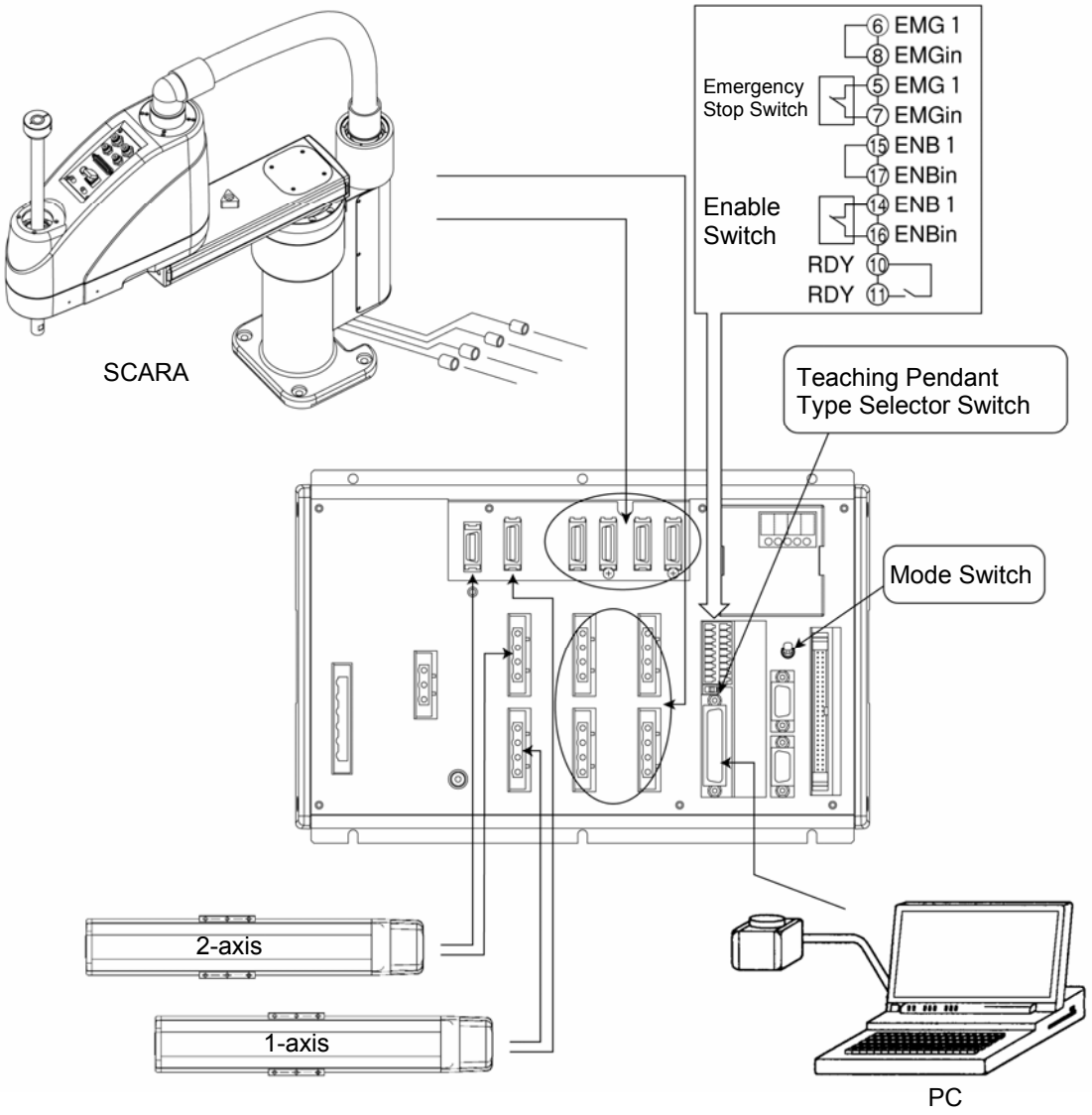


Fig. 1.27 X-SEL-PX (QX) Type Controller

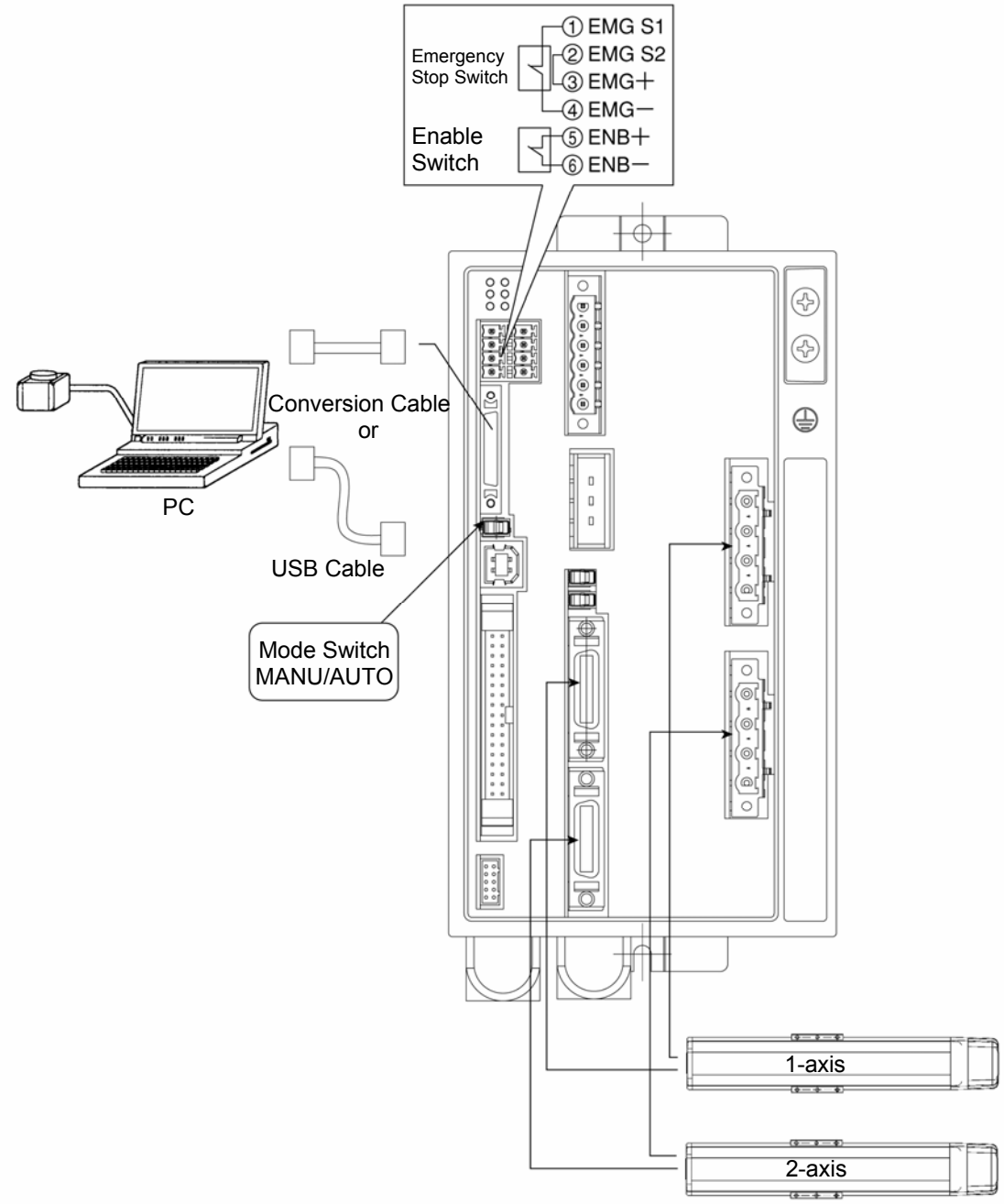


Fig. 1.28 SSEL Type Controller

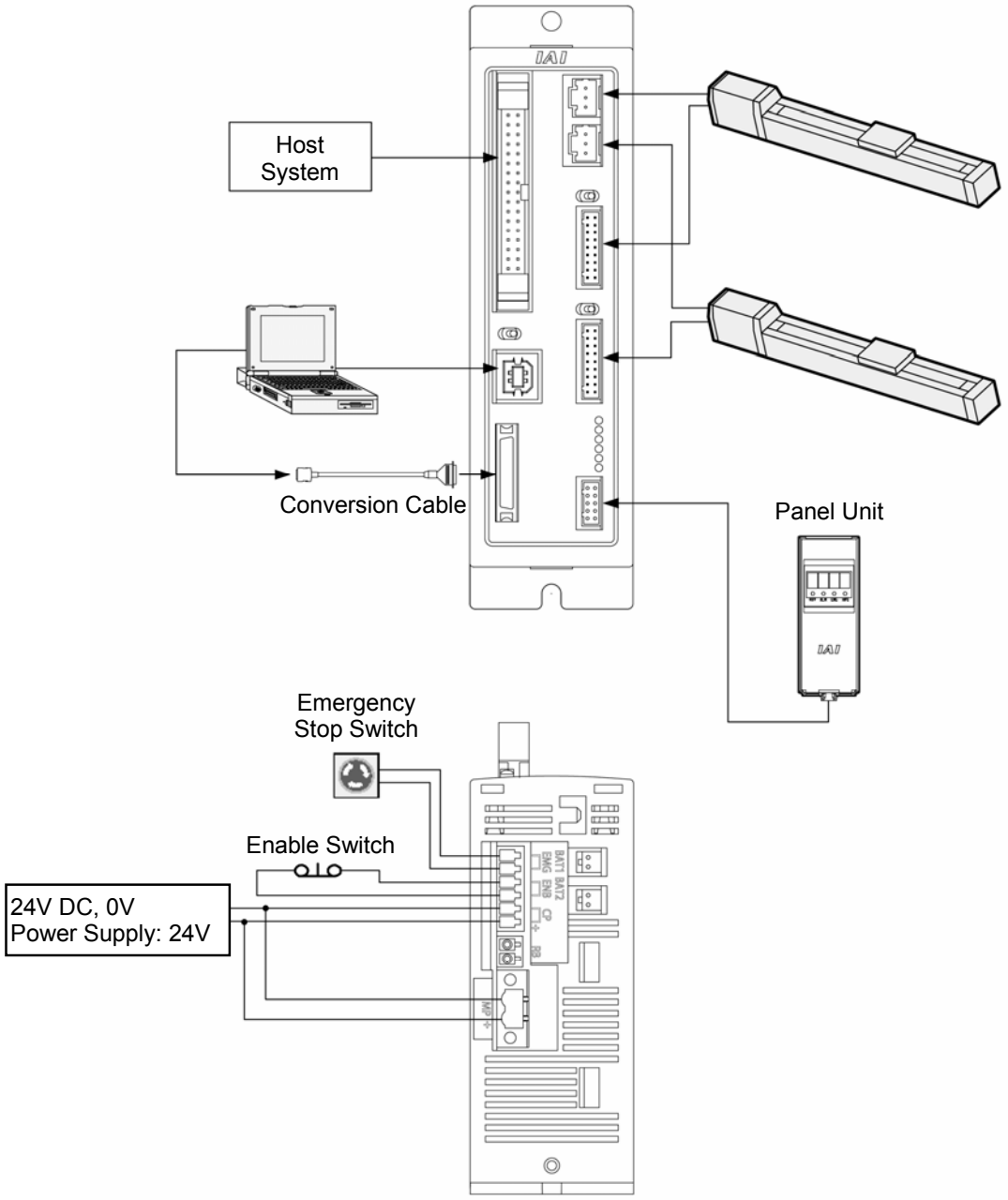


Fig. 1.29 ASEL Type Controller

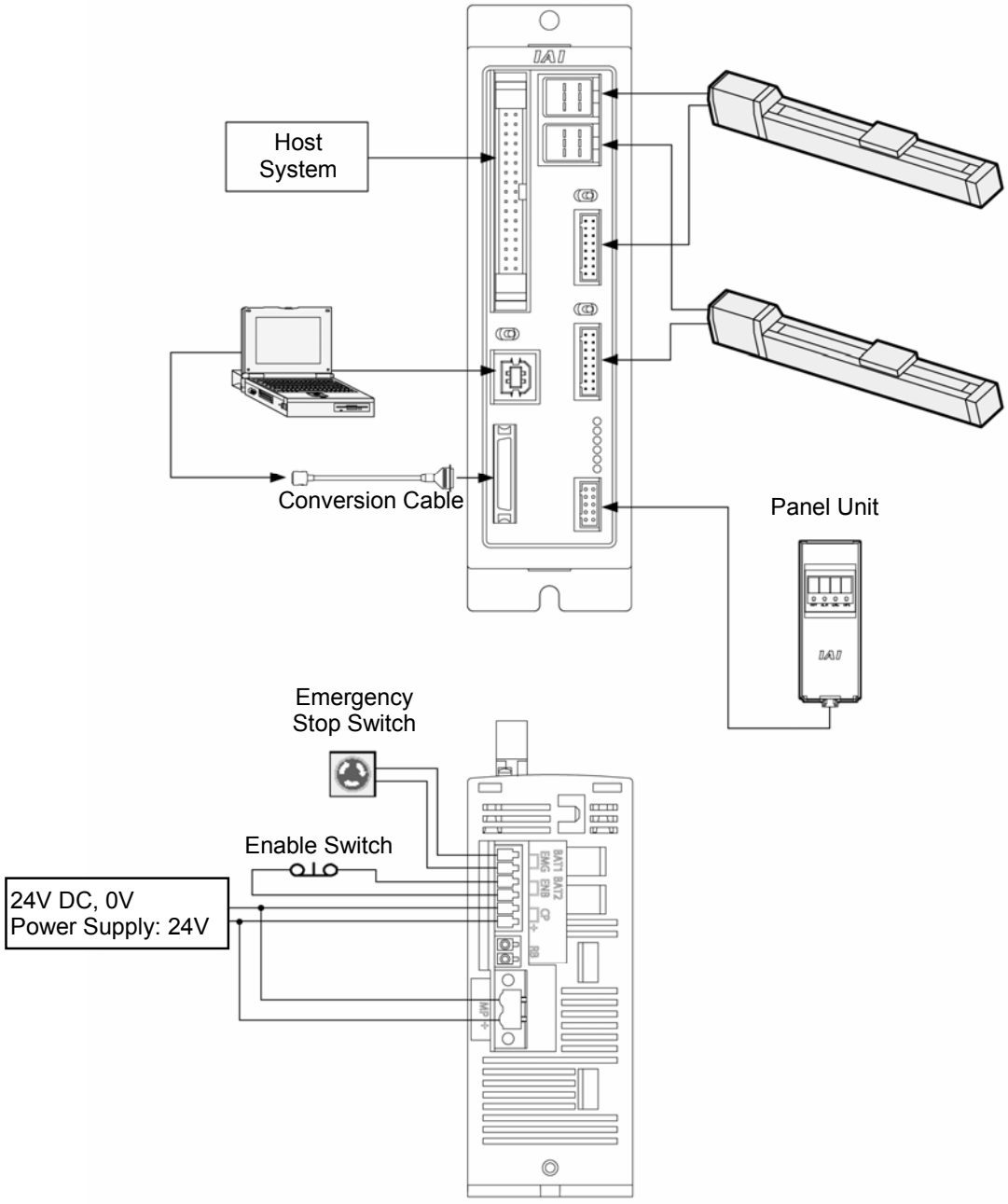


Fig. 1.30 PSEL Type Controller

1.5 Starting the Software

[1] Turn off the power to the controller and PC, and connect the controller to the PC using the standard RS232C cable or USB cable that comes with the software.
Set the mode switch on the controller to the MANU side.

- When this software is started, the “safety velocity” mode is enabled (enable the safety velocity limit). In this mode, in the case of orthogonal axis, the maximum velocity is limited to 250 mm/sec or below in programs started from the PC software. In the case of SCARA axes, the maximum velocity during CP operation is limited to 250 mm/sec or below (PTP operation: 3% or below). To operate programs according to their programmed velocity commands, the safety velocity mode must be disabled. Refer to 3.3, “Explanation of the Toolbar,” for how to enable/disable the safety velocity mode.

[2] Turn on the power to the controller and PC, and start Windows.

[3] Start this software.
When the application is started, the Connection Confirmation window (Fig. 1.31) will open first. In the list boxes of **Port Name** and **Baud Rate (bps)**, select the communication port (*1) to which the X-SEL, TT, SSEL, ASEL, or PSEL controller is connected and an applicable baud rate (*2), and then click OK.

(*1) Only the communication ports that are available when the application is started can be selected.
(*2) “57600” and “115200” bps are supported only by the P/Q controllers.

Fig. 1.31 Connection Confirmation Window

[4] If XSEL-P/Q (application version 0.36 or later), XSEL-PX/QX (application version 0.17 or later), SSEL, ASEL, or PSEL (application version 0.01 or later) is connected, the **Two or more programs start permission/prohibition** setting screen (Fig. 1.32) will be displayed.
Set whether you prohibit or permit the simultaneous starting of multiple programs during the manual mode, and click the **OK** button.
[Two or more programs start prohibition (MANU)]
It prohibits the simultaneous starting of multiple programs during the manual mode.
[Two or more programs start permission (MANU)]
It permits the simultaneous starting of multiple programs during the manual mode.

Fig. 1.32 Two or More Programs Start Permission/Prohibition Setting Screen

If **Don't Show this window from next time on** is checked, connection will be established with the settings at the last connection time without displaying the screen in Fig. 1.32.
To remove this check, select the checkbox **In Connect, Check Setting of Two or more programs start** on the Environment Setup (Online) screen (Fig. 14.2) or Environment Setup (Offline) screen (Fig. 14.1). The screen in Fig. 1.32 will be displayed at the next startup time to remove the check.
For the Environment Setup (Online) screen and Environment Setup (Offline) screen, refer to "14. Tool."

If you set **Two or more programs start prohibition (MANU)** when multiple programs have already started, the warning message will be displayed.
To prohibit the simultaneous starting of multiple programs, click the **Yes** button to stop all the programs.

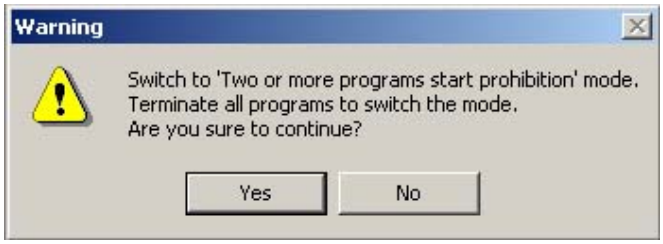


Fig. 1.33 Warning Message

[5] Once the controller connection is confirmed, the application will start in the offline mode. If the controller cannot be recognized or the **CANCEL** button is clicked in this window, the application will start in the offline mode. (Even after the application has started in the offline mode, you can use the "Reconnect" function explained later to switch the application to the online mode.)

If **Don't Show this window from next time on** is selected, the software will automatically select the port name and baud rate that were in use the last time the application was closed and check the controller connection based on these settings.

⚠ Important

With J/K type X-SEL controllers, executing the command “OPEN 1” (channel 1 is shared with the PC software) in a SEL program in the MANU (manual) mode will forcibly switch the right of control over serial port channel 1 to the SEL program and disconnect the communication link between the controller and PC software. The program will continue to run. (* Error No. A5D “SCIF open error in non-AUTO mode” will occur.)

To stop the actuator operation, always use the emergency-stop button. (In particular, exercise due caution when stopping a jogging actuator.)

* This error code is applicable in main controller application version 0.16 or earlier.

In the case of a P/Q controller, a J/K controller running main controller application version 0.16 or later or a table top model robot, opening the TP port (teaching connector) may result in the following conditions depending on whether or not the servo is in use.

<MANU mode/Servo not in use>

	Before the OPEN command	After the OPEN command
TP port connection	Connected to the PC software. ⇨	Forcibly switched to SEL program connection (message error). The program continues to run.

Error No. A50 “SCIF open error in non-AUTO mode” will occur following the OPEN command.

<MANU mode/Servo in use>

	Before the OPEN command	After the OPEN command
TP port connection	Connected to the PC software. ⇨	Connected to the PC software (cold start error). The program ends.

Error No. E89 “SCIF open error in non-AUTO mode” will occur following the OPEN command. (Servo in use)

The channel number assigned to the TP port will vary depending on the controller type.

J/K type Table top actuator (TT): Channel 1 (“OPEN 1”)

P/Q type, PX/QX type, SSEL, ASEL, PSEL: Channel 0 (“OPEN 0”)

The “Important” information provided in the above box applies to a condition where the controller is in the MANU mode and I/O parameter No. 90 is not set to “2” (IAI protocol).

2. How to Save Data

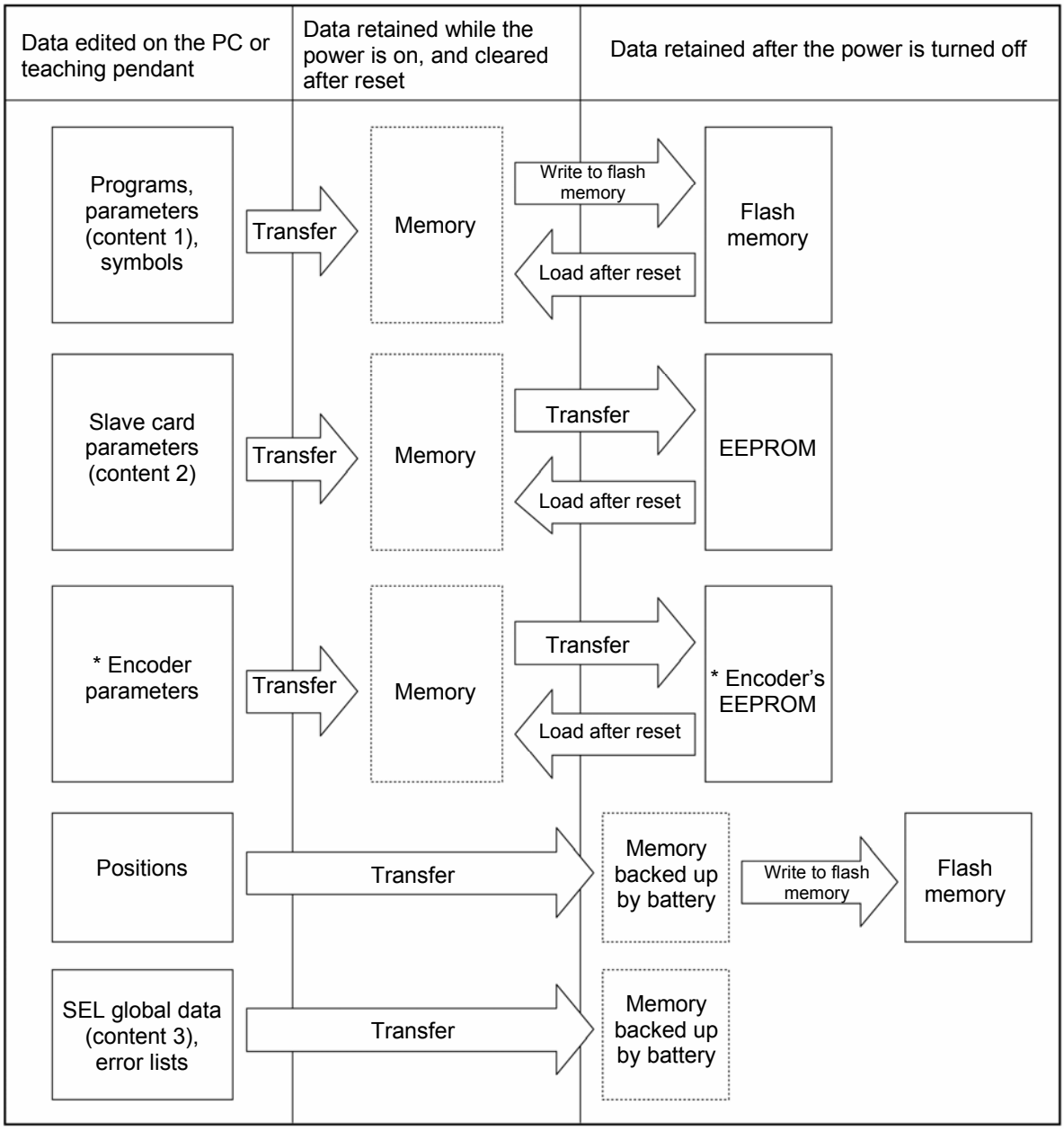
The controller adopts a flash memory. Accordingly, some data is stored in the memory areas backed up by a battery, while other data is stored in the flash memory areas.

Also note that transferring data from the PC software or teaching pendant to the controller will only write the data in the controller's memory, as illustrated below, and the data will be cleared once the controller power is turned off or the controller is reset.

To save important data, always write it in the flash memory.

2.1 Factory Setting – When a Backup Battery Is Used (When the X-SEL controller is shipped)

(Other parameter No. 20 = "2" (Backup battery installed))



* Encoder parameters are stored in the EEPROM of the actuator's encoder, not in the controller's EEPROM. Therefore, encoder parameters will be loaded to the controller every time the controller power is turned on or a software reset is executed.

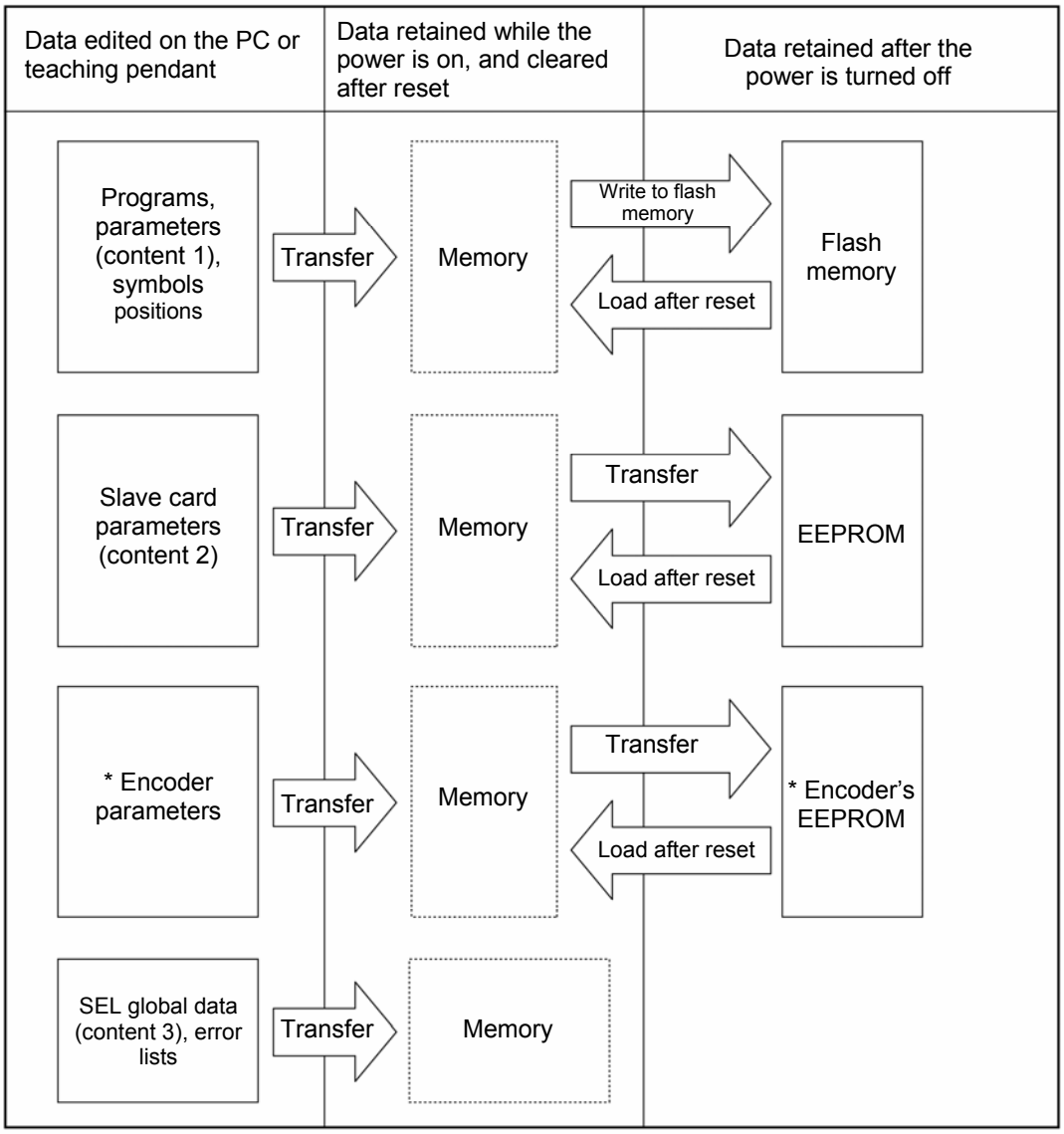
Programs, parameters and symbols are loaded from the flash memory after the controller is restarted. Unless written to the flash memory, therefore, edited programs, parameters and symbols will return to the original data once the controller is restarted.

The controller always operates according to the data (excluding parameters) stored in its memory (indicated by dotted lines).

Content 1: All parameters other than those specified under Content 2
Content 2: Driver card, I/O slot card, (power-supply card) parameters (X-SEL-J/K, JX/KX, TT)
I/O slot card, (power-supply card) parameters (X-SEL-P/Q, PX-QX, SSEL, ASEL, PSEL)
Content 3: Flags, variables, strings and error lists

2.2 When a Backup Battery Is Not Used (Table Top Actuator [TT], SSEL, ASEL, PSEL)

(Other parameter No. 20 = “0” (Backup battery not installed))



Programs, parameters and symbols are loaded from the flash memory after a restart. Unless written to the flash memory, therefore, edited programs, parameters and symbols will return to the original data once the controller is restarted.

The controller always operates according to the data (excluding parameters) stored in its memory (indicated by dotted lines).

Note: SEL global data cannot be retained when a backup battery is not installed.

2.3 Notes

Note on transferring data and writing it to the flash memory

Never turn off the main power while data is still being transferred or written to the flash memory. The data may be lost and the controller operation may be disabled.

Note on saving parameters to a file

Encoder parameters are saved in the EEPROM of the actuator's encoder (unlike other parameters, they are not stored in the controller's EEPROM). Therefore, encoder parameters are loaded from the encoder's EEPROM to the controller after the controller power is turned on or a software reset is executed.

For this reason, saving controller parameters to a file after the controller power has been turned on (or software reset has been executed) without the actuator (encoder) connected to the controller will create a file containing invalid encoder parameters.

Note on transferring a parameter file to the controller

When a parameter file is transferred to the controller, the encoder parameters in the file will be transferred to the encoder's EEPROM (excluding manufacture information and function information).

Therefore, transferring to the controller a parameter file that has been read from the controller after the controller was started without the actuator connected will write invalid encoder parameters to the encoder's EEPROM. (This applies when the file is transferred to the controller to which the actuator is currently selected.)

When saving parameters to a file, therefore, do so in a condition where the controller is connected to the actuator.

3. Menu Window

3.1 Explanation of the Menu

3.1.1 Online Screen

(1) X-SEL-J/K or TT controller

When this software has been started, the main window in Fig. 3.1 will open showing the menu items with icons on the tool bar in the case of the X-SEL-J/K or TT controller.

The tree view appearing on the left side of the window can be displayed by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**. (Initial window: Main menu)

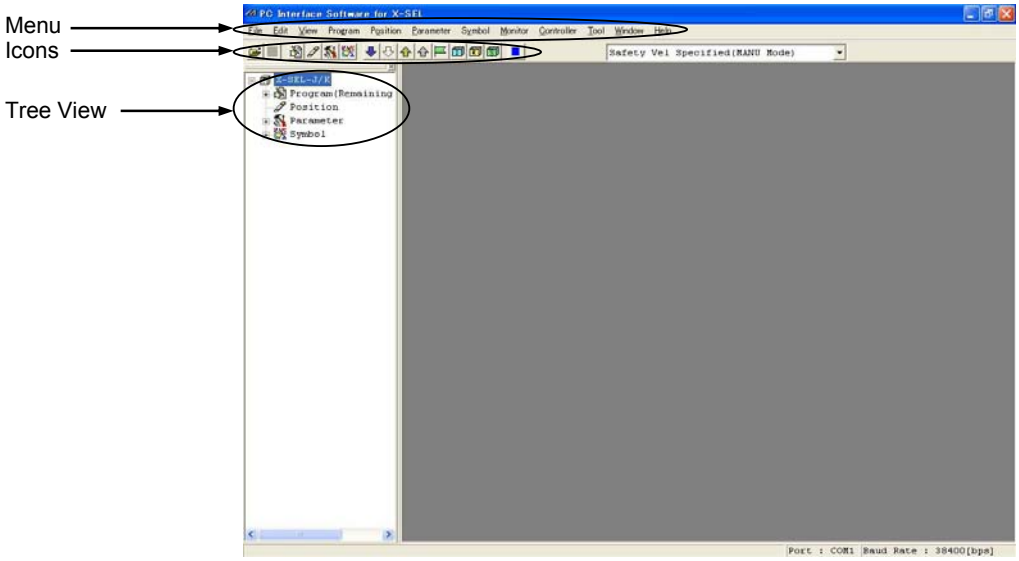


Fig. 3.1 Online Screen (X-SEL-J/K or TT Controller)

(2) X-SEL-P/Q controller

When this software has been started, the main window in Fig. 3.2 will open showing the menu items with icons on the tool bar in the case of the X-SEL-P/Q controller.

The tree view appearing on the left side of the window can be displayed by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**. (Initial window: Main menu)

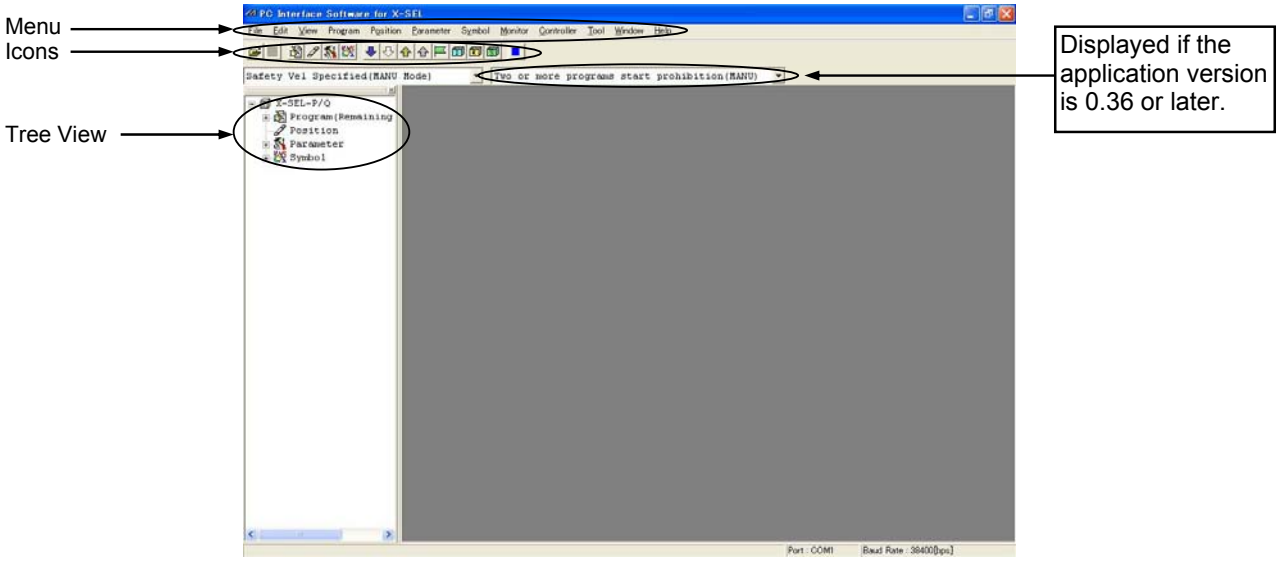


Fig. 3.2 Online Screen (X-SEL-P/Q Controller)

(3) X-SEL-JX/KX controller

When this software has been started, the main window in Fig. 3.3 will open showing the menu items with icons on the tool bar in the case of the X-SEL-JX/KX controller.

The tree view appearing on the left side of the window can be displayed by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**. (Initial window: Main menu)

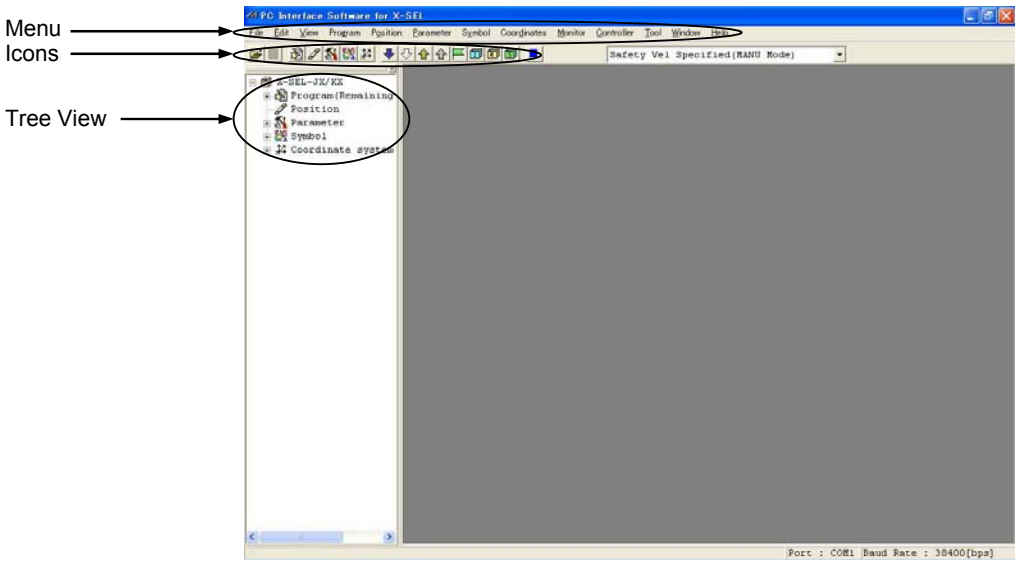


Fig. 3.3 Online Screen (X-SEL-JX/KX Controller)

(4) X-SEL-PX/QX controller
When this software has been started, the main window in Fig. 3.4 will open showing the menu items with icons on the tool bar in the case of the X-SEL-PX/QX controller.
The tree view appearing on the left side of the window can be displayed by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**. (Initial window: Main menu)

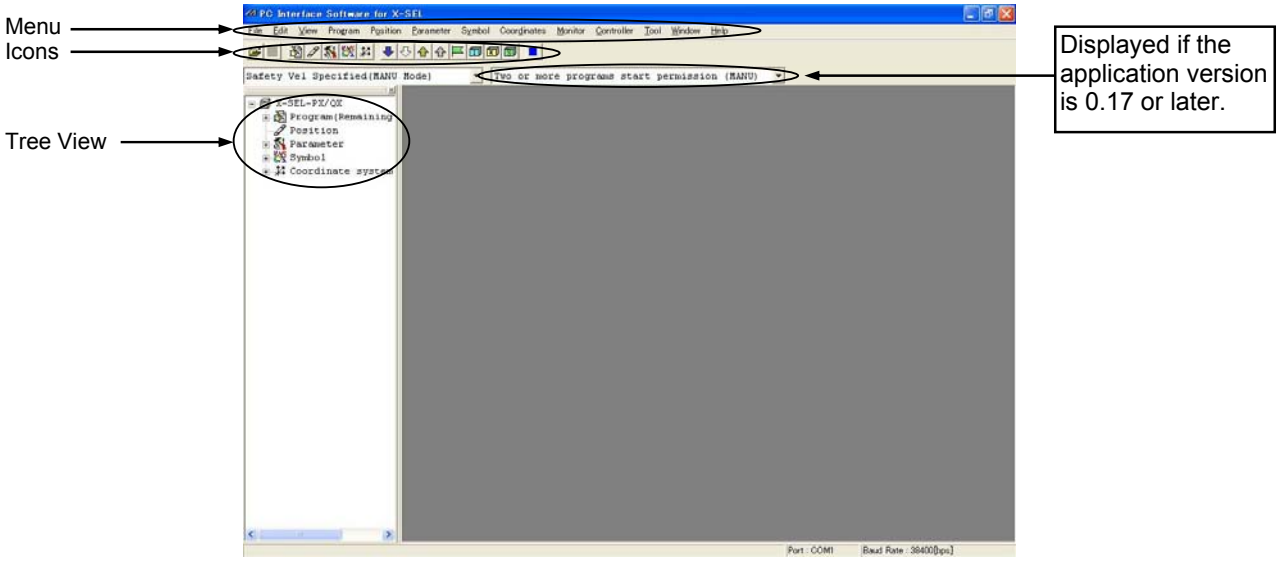


Fig. 3.4 Online Screen (X-SEL-PX/QX Controller)

(5) SSEL controller in the program mode
When this software has been started, the main window in Fig. 3.5 will open showing the menu items with icons on the tool bar in the case of the SSEL controller in the program mode.
The tree view appearing on the left side of the window can be displayed by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**. (Initial window: Main menu)

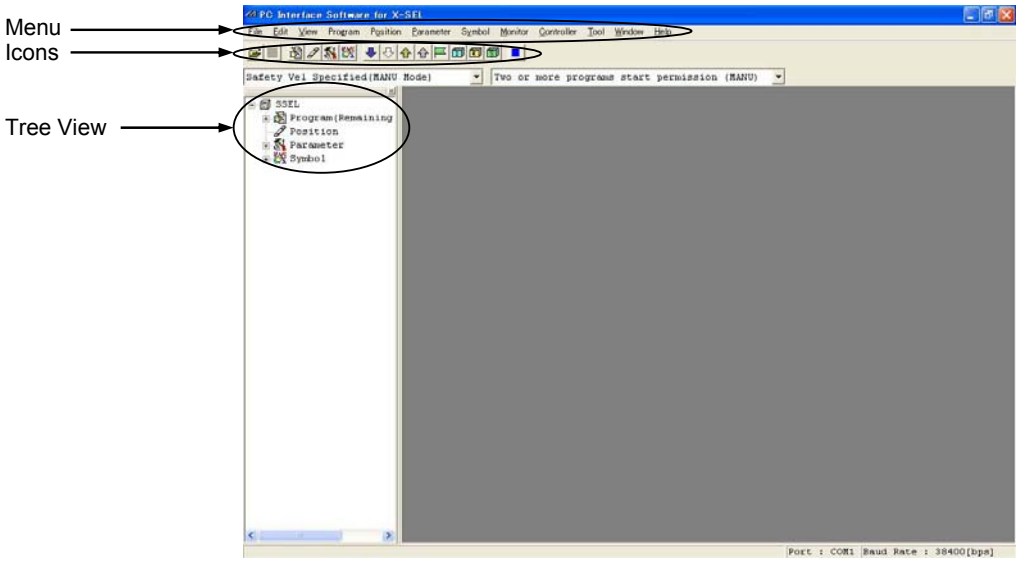


Fig. 3.5 Online Screen (SSEL Controller in the Program Mode)

(Note) In the case of the SSEL controller, 2-type selection is possible between the program mode and positioner mode. Set the selection to the other parameter No. 25 “Operation mode type.”
For details, refer to the operating manual of the SSEL controller.

(6) SSEL controller in the positioner mode

When this software has been started, the main window in Fig. 3.6 will open showing the menu items with icons on the tool bar in the case of the SSEL controller in the positioner mode.

The tree view appearing on the left side of the window can be displayed by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**. (Initial window: Main menu)

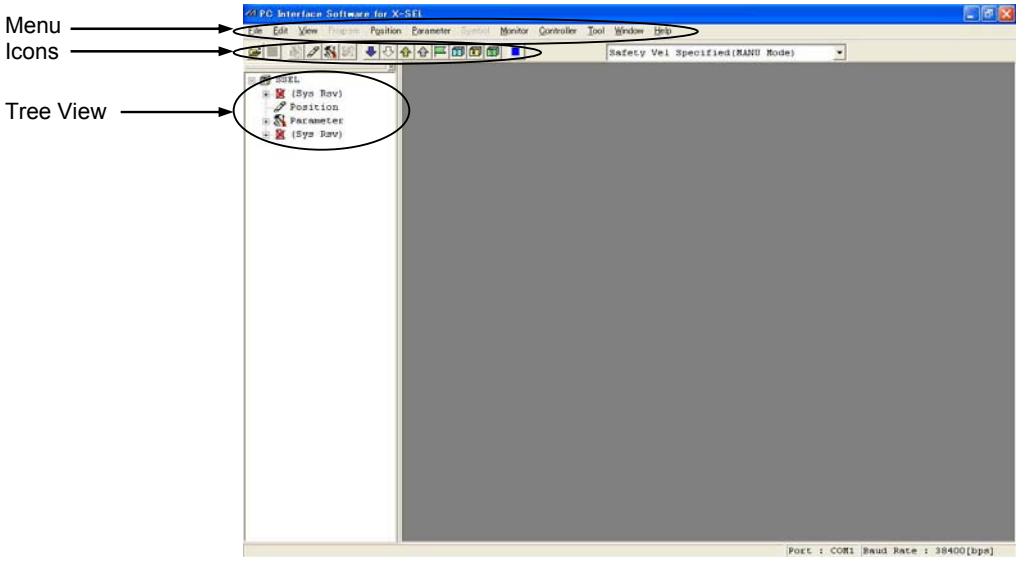


Fig. 3.6 Online Screen (SSEL Controller in the Positioner Mode)

However, “program edit” or “symbol edit” using the menu or tool bar will become unavailable. Icons will also become faint-colored.

Two or more programs start prohibition will not be displayed, either.

(7) ASEL controller

When this software has been started, the main window in Fig. 3.7 will open showing the menu items with icons on the tool bar in the case of the ASEL controller.

The tree view appearing on the left side of the window can be displayed by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**. (Initial window: Main menu)

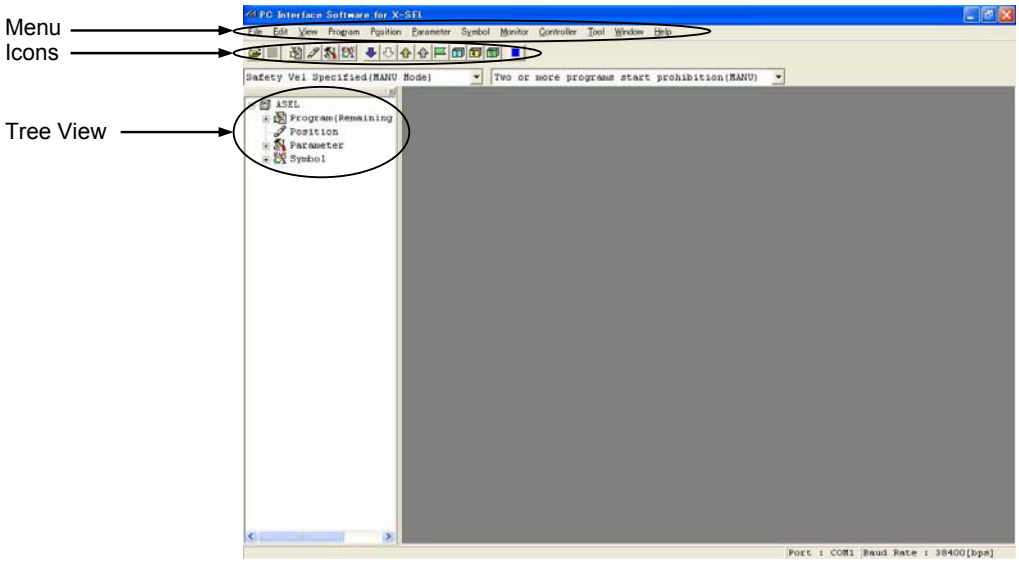


Fig. 3.7 Online Screen (ASEL Controller)

(8) PSEL controller

When this software has been started, the main window in Fig. 3.8 will open showing the menu items with icons on the tool bar in the case of the PSEL controller.

The tree view appearing on the left side of the window can be displayed by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**. (Initial window: Main menu)

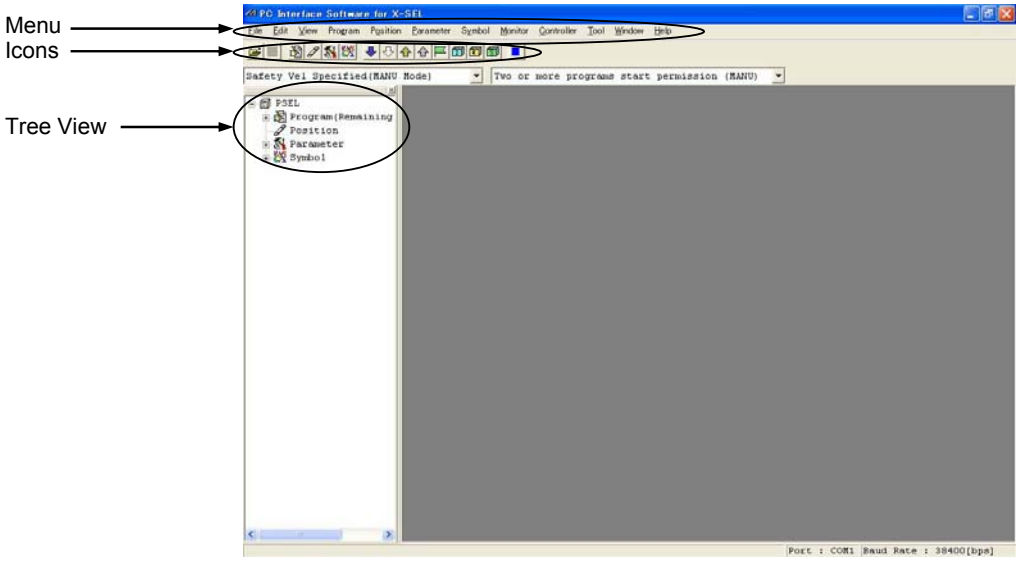


Fig. 3.8 Online Screen (PSEL Controller)

3.1.2 Offline Screen

When this software has been started with no connection to any controller, the screen in Fig. 3.9 will be displayed. The items that cannot be operated offline will be displayed as faint-colored icons.

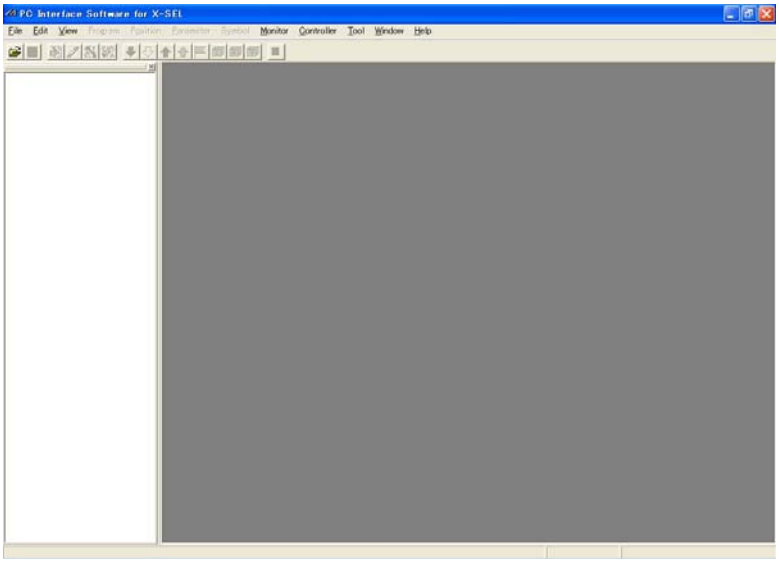


Fig. 3.9 Offline Screen

3.2 Explanation of the Commands

(1) File (F)

[1] New (N) Create new SEL data.

- Program (S) — Open the edit window for creating a new program.
- Position (O) — Open the edit window for creating new position data.
  This menu item will become faint-colored and render the command inoperable in the case of the SSEL, ASEL, or PSEL controller in the positioner mode.
- Symbol (Y) — Open the edit window for creating new symbol data.
  This menu item will become faint-colored and render the command inoperable in the case of the SSEL, ASEL, or PSEL controller in the positioner mode.
- Coordinate System (D)
  Open the edit window for the new coordinate system definition data.

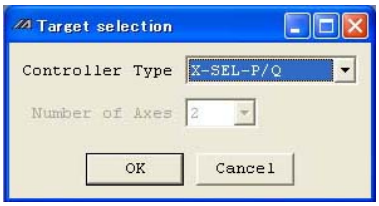


Fig. 3.10 Target Selection Window

In the case of the X-SEL-J/K, P/Q, TT, SSEL, ASEL, or PSEL controller, the target selection window (Fig. 3.10) will be displayed to select the controller type and the number of axes (required to select it only when position data is created).

* The created data can be saved only in the file formant according to the target selected here (refer to the list of support models in the preliminary section of this manual).

[2] Open (O) — Load data currently saved in a file.

(Note) In the case of the SSEL, ASEL, or PSEL controller in the positioner mode, the program file or symbol file cannot be open.
If the file is open, the **ABB File Type Error** will be displayed.

Fig. 3.11 ABB File Type Error

[3] Close (C) — Close the currently active window.

[4] Save (S) — Save the data in the active edit window by overwriting the corresponding file.

[5] Save As (A) — Save the data in the active edit window to a different file under a desired name.

[6] Print Setup (P) Set the print font and printer.

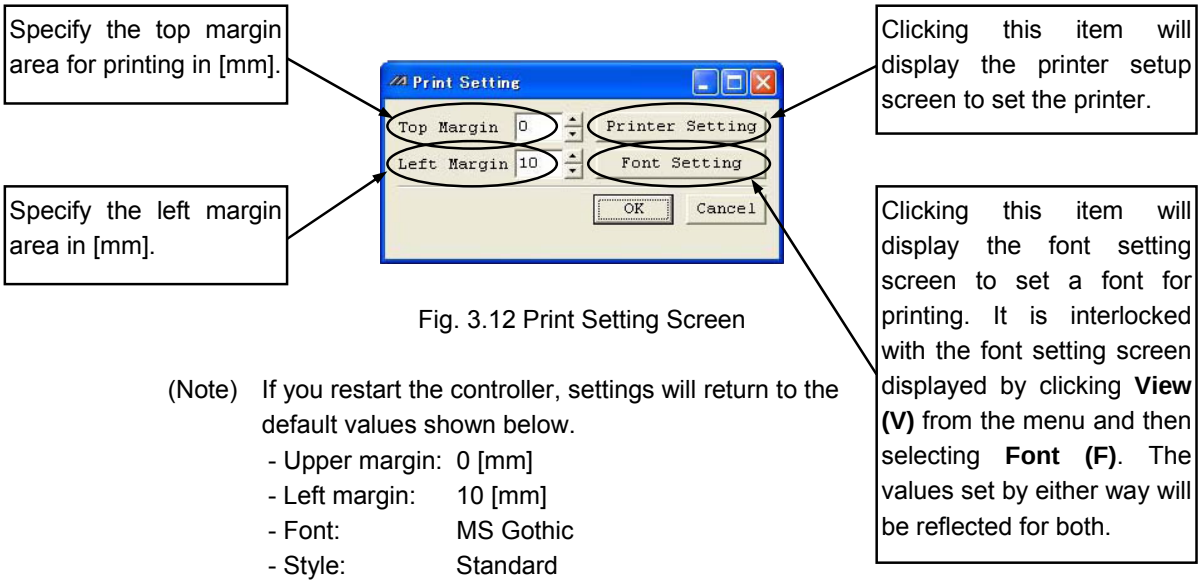


Fig. 3.12 Print Setting Screen

(Note) If you restart the controller, settings will return to the default values shown below.
- Upper margin: 0 [mm]
- Left margin: 10 [mm]
- Font: MS Gothic
- Style: Standard
- Size: 10

[7] Most Recently Opened Files (D)

Selecting this menu item will display a list of files most recently loaded to the software, where you can select and load desired files.

[8] Exit (X) Close the application.

(2) Edit (E)

This menu lets you perform operations used in editing data.

[1] Undo (U)

Up to the most recent 10 operations can be canceled.
However, they cannot be canceled when you perform any of the following operations:

- Transfer of data on the editing screen such as the program edit window to the controller
- Saving of data on the editing screen such as the program edit window in a file
- Closing of the editing screen such as the program edit window

The following are the operations for which this function is enabled:

	Input	Line Insertion	Line Deletion	Cut	Paste
Program Edit Window	O	O	O	O	O
Position Edit Window	O	–	–	O	O
Symbol Edit Window	O	–	–	O	O
Parameter Edit Window	O	–	–	–	–
Coordinate System Data Edit Window	O	–	–	–	–

When this operation is performed, the warning screen in Fig.3.13 will be displayed.
Clicking **Yes** will cancel the operation executed immediately before.

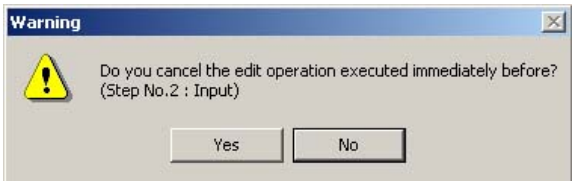


Fig. 3.13 Warning

[2] Cut (T)

Cut the data corresponding to the cursor line in the edit window and save the data to the clipboard.

[3] Copy (C)

Copy to the clipboard the data corresponding to the cursor line in the edit window.

[4] Paste (P)

Paste the data on the clipboard to the cursor line in the edit window.

[5] Find (F)

Find a specified character string.

[6] Find Next (S)

Find the character string specified in [4] again, starting from the cursor line position.

(3) View (V)

This menu lets you set options relating to screen views.

[1] Tree View (T)

Show/hide the tree view that appears on the left side of the main window.

[2] Font (F)

Set the font of text shown in the windows.

(4) Program (S)

This menu lets you perform operations relating to programs. (Available only in the online mode.)
(Refer to “4. Program Edit Window.”)

[1] Edit (E) Load a selected program from the controller for editing.

[2] Copy/Move (C) Copy/move (cut & paste) a program.

[3] Clear (L) Clear a program.

[4] Save to File (S) Save a selected program or all programs to a file under a desired name.

[5] End All Operations (T) End all programs and operations that are currently running/being performed.

(5) Position (O)

This menu lets you operate position data. (Available only in the online mode.)
(Refer to “6. Position Data Edit Window.”)

[1] Edit (E) Load position data from the controller for editing.

[2] Copy/Move (C) Copy/move (cut & paste) position data.

[3] Clear (L) Clear position data.

(6) Parameter (P)

This menu lets you operate parameters. (Available only in the online mode.)
(Refer to “8. Parameter Edit Window.”)

[1] Edit (E) Load parameters from the controller for editing.

(7) Symbol (Y)

This menu lets you operate symbol data. (Available only in the online mode.)
(Refer to “9. Symbol Edit Window.”)

[1] Edit (E) Load symbol data from the controller for editing.

[2] Clear All (C) Clear all symbol data.

(8) Coordinate System (8D)

This item is displayed for X-SEL-JX/KX and PX/QX controllers.

Edit the coordinate system definition data. (This is available only in the online mode.)
(Refer to “10. Coordinate System Definition Data edit Window.”)

[1] Edit [E] Read the coordinate system definition data from the controller and edit the data.

[2] Clear (L) Clear the coordinate system definition data.

(9) Monitor (M)

This menu lets you monitor various statuses, global variables, port statuses, and so on. (Available only in the online mode.) (Refer to “11. Monitor.”)

[1] Task Status (T) Open the task status monitor window.

[2] System Status (S) Open the system status monitor window.

[3] Axis Status (A) Open the axis status monitor window.

[4] Input Port (I) Open the input port monitor window.

[5] Virtual Input Port (N) Open the virtual input port monitor window.

[6] Output port (O) Open the output port monitor window.

[7] Virtual Output Port (U) Open the virtual output port monitor window.

[8] Global Flag (F) Open the global flag monitor window.

[9] Global Integer (L) Open the global integer monitor window.

[10] Global Real (R) Open the global real variable monitor window.

[11] Global String (G) Open the global string monitor window.

[12] Detailed Error Information (E)

Open the detailed error information monitor window.
If you click **Monitor (M)** from the main menu and then selecting **Detailed Error Information (E)**, the Error number Select screen will be displayed.
After setting the number of displayed errors, click **OK**. The detailed error information screen will be displayed.

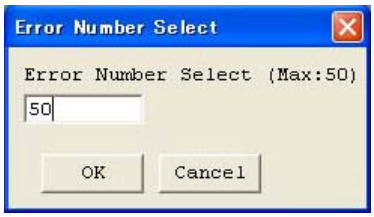


Fig. 3.14 Error Number Select Screen

[13] Monitoring Data (M) Open the monitoring data window.
This item is displayed only when the connected controller supports the function.

(10) Controller (C)

This menu lets you perform operations relating to the controller, such as executing a software reset or resetting controller errors.
(Refer to “13. Supplementary Information in Controller Menu Items.”)

[1] Reconnect (C) Reestablish communication with the controller. If the software is currently in the offline mode but is able to establish communication with the controller, selecting this menu item will switch the software to the online mode.

[2] Change Baud Rate (B) Change the baud rate used for communication between the controller and PC.

[3] SEL Global Data Backup

Save to File — Can save global flags, global integer variables, global real variables, and global strings.

Transfer to Controller — Can transfer global flags, global integer variables, global real variables, and global strings to the controller.

[4] All Data Backup (X)

- Save to File(S) — Save all program and position data in the controller.
- Transfer to Controller (L)

  Transfer saved program and position data to the controller.

(Note) Files collected by the SSEL, ASEL, or PSEL controller in the program mode cannot be transferred to the controller in the positioner mode. In the same way, files collected in the positioner mode cannot be transferred to the controller in the program mode. If any different file is transferred, the following message will be displayed:

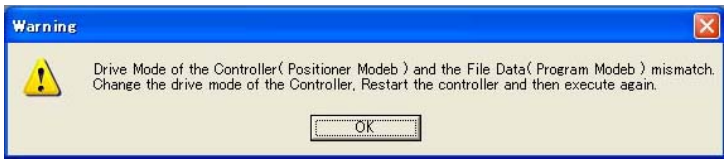


Fig. 3.15 Message

[5] Positioner Mode — This mode can be used when the SSEL, ASEL, or PSEL controller is under the manual mode and positioner mode.

Start — Start the positioner mode.

Stop — Stop the positioner mode.

Acquire Positioner Mode Information

Acquire maintenance information (system data) in the positioner mode.
This item is displayed for SSEL, ASEL, and PSEL controllers.

[6] Write to Flash ROM (W)

Clear the data areas in the flash ROM and then write the data saved in the controller's RAM to the flash ROM.

[7] Initialize Memory (I)

- Global Variable and Flag (V)

  Clear all global variables and flags to zero.
- Parameter (at the time of shipment) (S)

  Can return parameters to the ones at the time of shipment.
  This item is not displayed normally. It is a function which will become available by inputting a password. (Refer to "8.4 How to Initialize SSEL/ASEL/PSEL Parameters (at the time of shipment).") It is a function of SSEL, ASEL, and PSEL controllers.

[8] Absolute Reset (A) — Reset absolute data.
This item is not displayed for XSEL-PX/QX controllers.

[9] Absolute Reset (Orthogonal Axis) (A)

Reset the absolute data of the orthogonal axis of the XSEL-PX/QX controller.
This item is displayed for XSEL-PX/QX controllers.

[10] Absolute Reset (SCARA Axis) (Y)

Reset the absolute data of the SCARA axis of the X-SEL-PX/QX controller.
This item is displayed for XSEL-PX/QX controllers.

[11] Software Reset (R) Execute software reset of the controller.

[12] Reset Error (E) Reset errors present in the controller.

[13] Drive-source Recovery Request (P)

Issue a drive-source recovery request to the controller.

[14] Operation-pause Reset Request (L)

Issue an operation-pause reset request to the controller.

[15] About ROM Version (V)

Show the various ROM version information regarding the controller.

[16] Control Constant Table Management Information (Z)

Show the control constant table management information.
This item is displayed for X-SEL-P/Q, PX/QX, and SSEL controllers.

[17] Positioner Mode Management information

Show the operation mode and management number with regard to the positioner mode of SSEL, ASEL, and PSEL controllers.
This item is displayed for SSEL, ASEL, and PSEL controllers.

(11) Tool (T)

This menu lets you specify settings relating to this application.

[1] Environment Setup (S) Set items that define how the application is run.

(12) Window (W)

This menu lets you change how the windows are displayed.

[1] Cascade (C) Cascade all open windows diagonally from top to bottom.

[2] Tile Vertically (V) Arrange all open windows vertically without overlapping.

[3] Tile Horizontally (H) Arrange all open windows horizontally without overlapping.

[4] Minimize All (M) Minimize all open windows (reduce them to icons).

[5] Arrange Icons (A) Arrange minimized windows (window icons).

(13) Help (H)

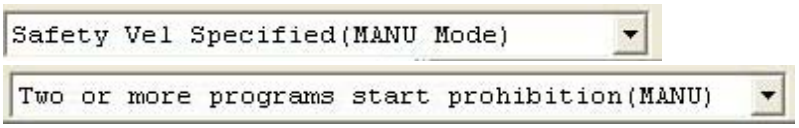
[1] About This Software (A)

Show the version information of this software.

3.3 Explanation of the Toolbar

This section explains the toolbar (Fig. 3.16) shown at the top of the main window (below the menu bar).

Fig. 3.16 Toolbar



 Open File — Same as clicking File (F) and then selecting Open (O).

 Save — Same as clicking File (F) and then selecting Save (S).

 Edit Program — Same as clicking Program (S) and then selecting Edit (E).

 Edit Position — Same as clicking Position (O) and then selecting Edit (E).

 Edit Parameter — Same as clicking Parameter (P) and then selecting Edit (E).

 Edit Symbol — Same as clicking Symbol (Y) and then selecting Edit (E).

 Edit Coordinate System Definition Data

Same as clicking Coordinate System (D) and then selecting Edit (E).
This item is displayed for X-SEL-JX/KX and PX/QX controllers.

 Monitor Input Port — Same as clicking Monitor (M) and then selecting Input Port (I).

 Monitor Virtual Input Port

Same as clicking Monitor (M) and then selecting Virtual Input Port (N).

 Monitor Output Port — Same as clicking Monitor (M) and then selecting Output Port (O).

 Monitor Virtual Output Port

Same as clicking Monitor (M) and then selecting Virtual Output Prot (U).

 Monitor Global Flag — Same as clicking Monitor (M) and then selecting Global Flag (F).

 Monitor Global Integer Variable

Same as clicking Monitor (M) and then selecting Global Integer (L).

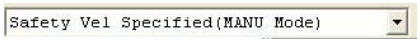
 Monitor Global Real Variable

Same as clicking Monitor (M) and then selecting Global Real (R).

 Monitor Global String Variable

Same as clicking Monitor (M) and then selecting Global String (G).

 End All Operations Same as clicking Program (S) and then selecting End All Programs (T).



This list box is used to enable/disable the safety velocity limit in the manual mode.
Safety Vel Specified (MANU Mode) --- Enable the safety velocity limit.
(The maximum speed during CP operation will be limited to 250 mm/sec or below [PTP operation: 3% or below] regardless of program or parameter settings.)
Safety Vel Not Specified (MANU Mode) --- Disable the safety velocity limit.

This list box is used to permit/prohibit the simultaneous starting of multiple programs in the manual mode.
Two or more programs start prohibition (MANU) --- Prohibit the simultaneous starting of multiple programs in the manual mode.
Two or more programs start permission (MANU) --- Permit the simultaneous starting of multiple programs in the manual mode.
(Supported by software version 5.0.2.0 or later)
This item is displayed for X-SEL-P/Q (application version 0.36 or later), X-SEL-PX/QX (application version 0.17 or later), SSEL, ASEL and PSEL controller in the program mode.

3.4 Tree View

You can display various data edit windows in the online mode by double-clicking the corresponding items displayed in the tree view (Fig. 3.4) that appears on the left side of the main window.

You can show or hide the tree view by clicking **View (V)** from the menu bar and then selecting **Tree View (T)**.

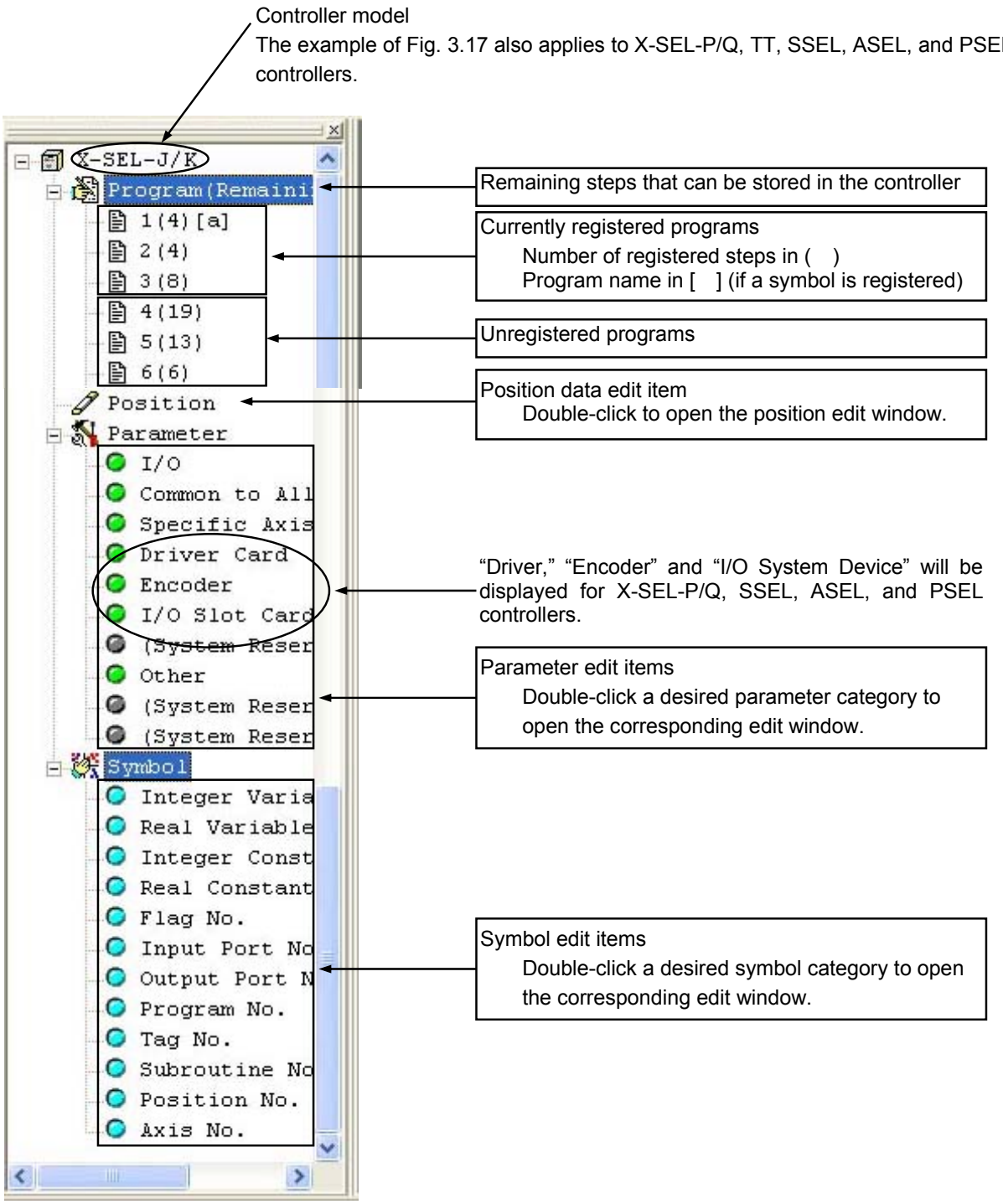


Fig. 3.17 Tree View (X-SEL-J/K)

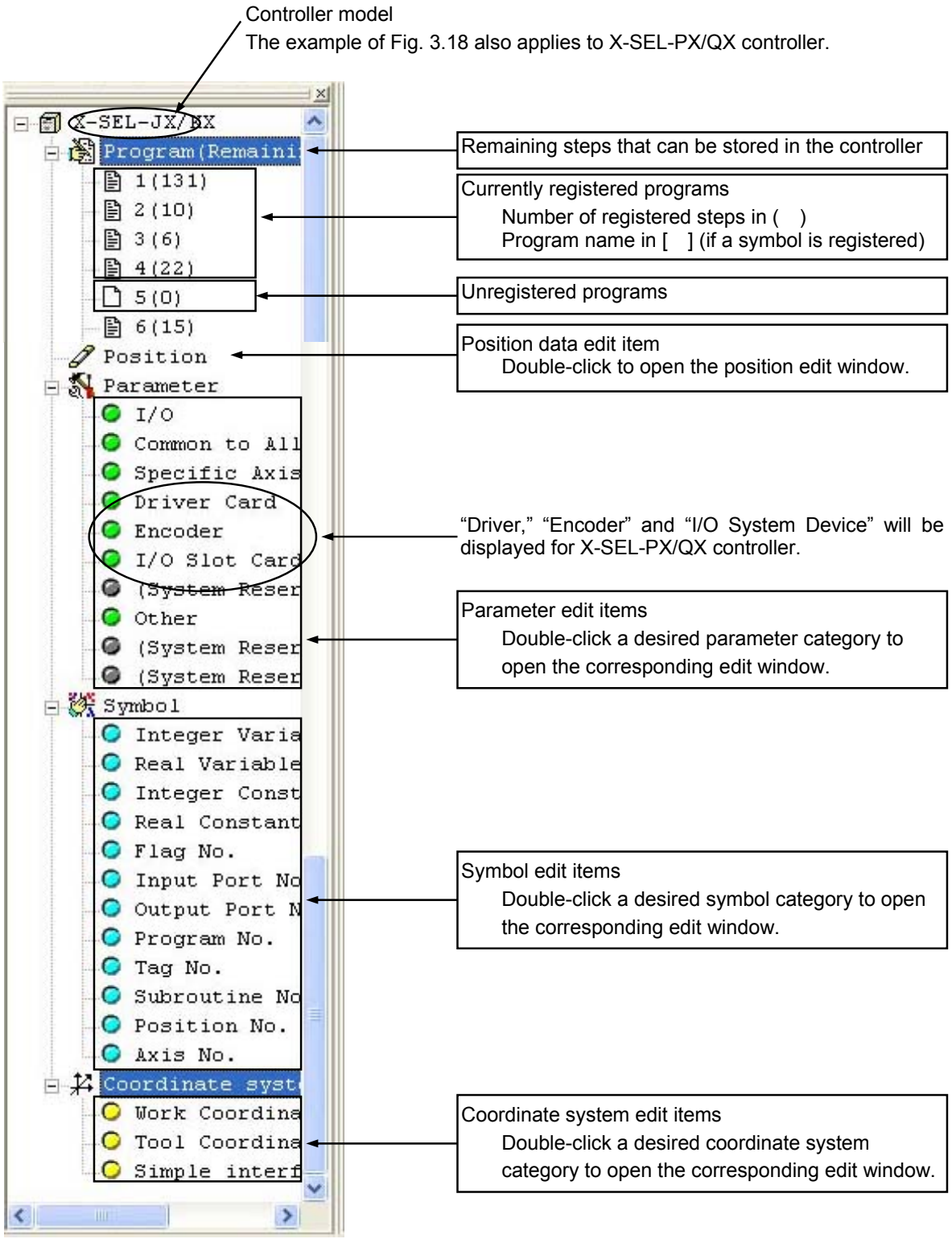


Fig. 3.18 Tree View (X-SEL-J/K)

4. Program Edit Window

4.1 Explanation of the Items Displayed in the Program Edit Window

(1) Click **Program (S)** from the menu bar, and then select **Edit (E)**.

(2) When the program number selection window opens, select the program you want to edit, and then click Load.

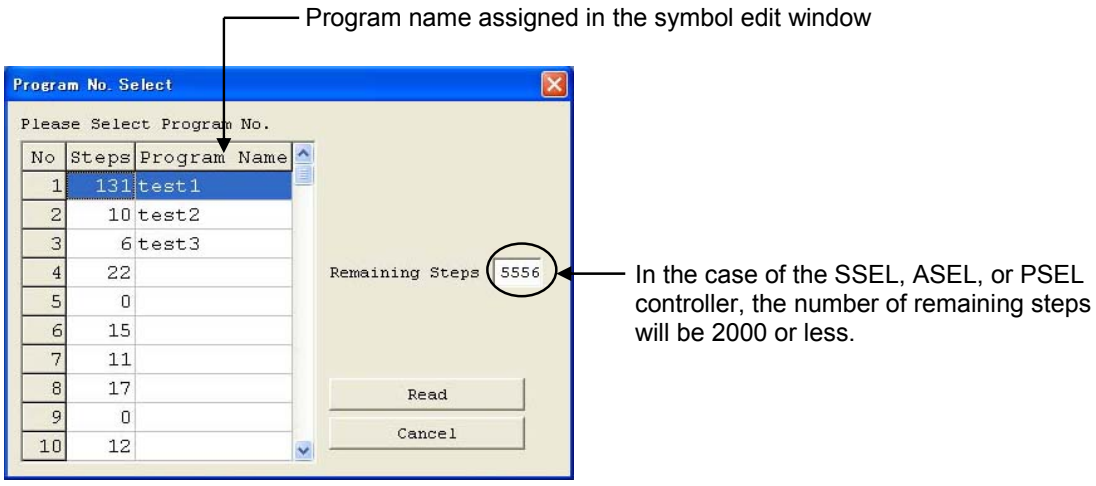


Fig. 4.1 Program Number Selection

(3) The program edit window will open. This window has the following controls and fields.

No.	Step number.
B	Use this field to set a breakpoint. (Supported only in the online edit mode.) Click the “B” field in the line you want to set a breakpoint for. Once a breakpoint is set, “B” will be shown in the field.
E	Enter a desired extended condition.
N	Specify reversing “N” of the input condition.
Cnd *	Enter a desired input condition.
Cmnd	Enter a desired SEL command. Double-clicking this field or pressing the F1 key will open the SEL Command Explanation window (Fig. 4.5). This window provides an explanation of each SEL command. You can select a desired command in this window and input it to the step data.
Operand 1 *	Enter desired operand 1.
Operand 2 *	Enter desired operand 2.
Pst *	Enter a desired output (operand 3).
Comment	Enter a command, if necessary (using up to 18 single-byte characters). You can also double-click this field to modify a part of the comment currently entered.

* Press F11 to find a specific symbol in the input condition/operand fields.

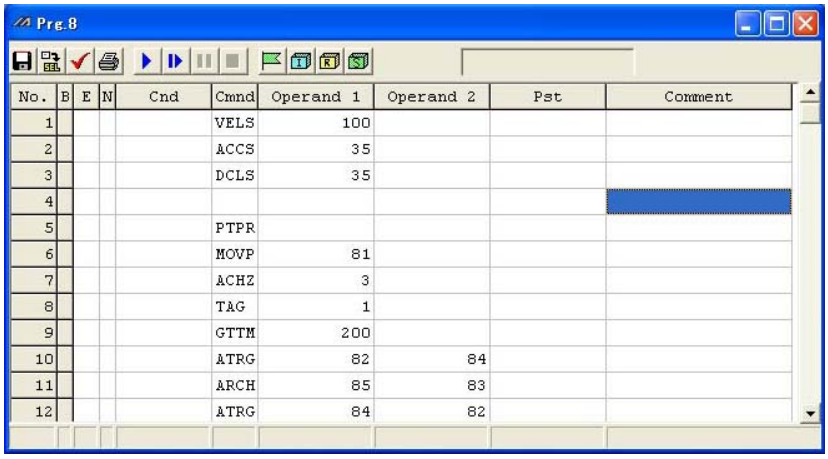


Fig. 4.2 Program Edit

If even one line is changed, all step numbers will be displayed in red.
Right-clicking a desired input item in each line will display a pop-up menu (Fig. 4.3). The items in the pop-up menu are explained below.

Cut (T)	Same as clicking **Edit (E)** from the menu bar and then selecting **Cut (T)**.
Copy (C)	Same as clicking **Edit (E)** from the menu bar and then selecting **Copy (C)**.
Paste (P)	Copy the entire cursor line. Same as clicking **Edit (E)** from the menu bar and then selecting **Paste (P)**. The step data saved on the clipboard will be inserted into the cursor line.
Insert 1 Line (I)	Insert one line at the cursor line.
Delete Selected Lines (D)	Delete the lines in the selected range.
Set Comment (S)	Set the entire cursor line as a comment (invalid step). If a valid step has been set as a comment by mistake, you can select Release Comment explained below to return the line to a valid step. Executing Release Comment on a line containing character strings will clear all character strings in the line.
Release Comment (R)	Return the selected comment line to a step.

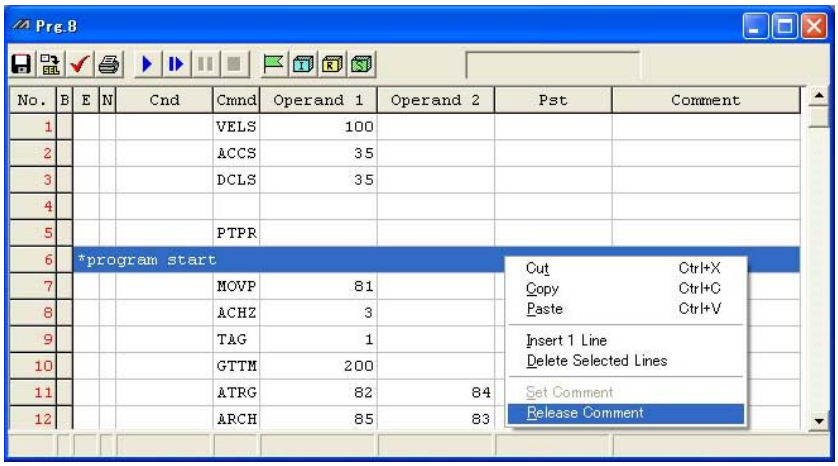


Fig. 4.3 Pop-up Menu

In the program edit window, selecting **Edit (E)** from the menu and then **Undo (U)** can cancel up to the most recent 10 operations.
Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.
However, the cancel function will become disabled when any of the following operations is performed:
- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 4.4 will be displayed.
Clicking Yes will cancel the operation executed immediately before.

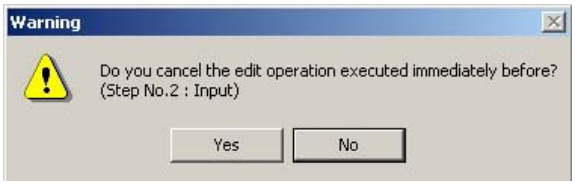


Fig. 4.4 Warning

Double-clicking the Cmnd field or pressing the F1 key will open the SEL Command Explanation window. Use this window as a reference when editing data.

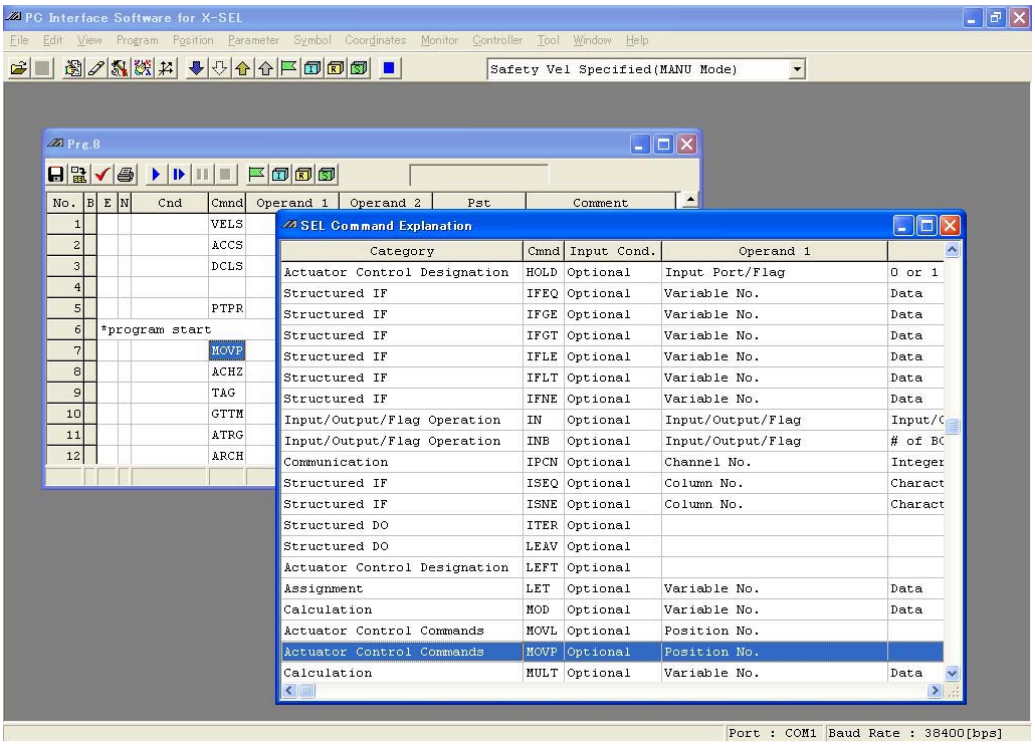
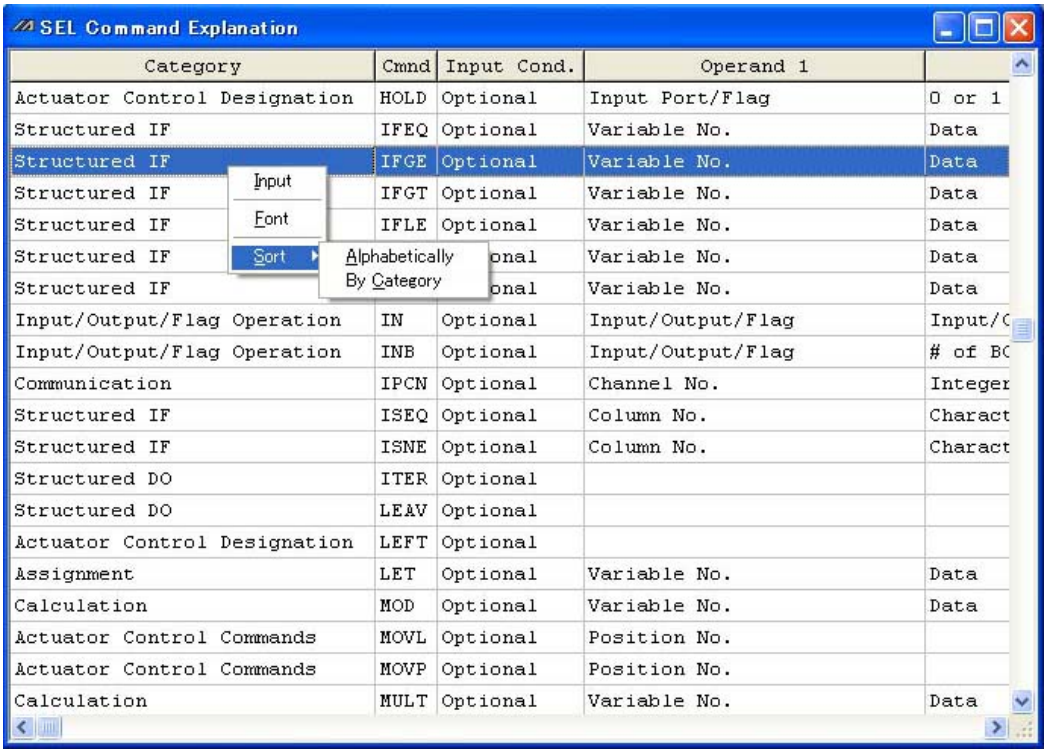


Fig. 4.5 SEL Command Explanation (Example for in the case of X-SEL-J/K)

Pressing the F2 key can change data in the cell partially.
(Example: MOVP → MOVL)

Right-clicking on the SEL Command Explanation window will open a pop-up menu containing the following items.

Input (I)	Input the command in the cursor line to the step data (into the cursor line in the program edit window).
Font (F)	You can set a desired font for displaying the SEL command explanations.
Sort (S)	You can sort the command list alphabetically or by command category.



Category	Cmnd	Input Cond.	Operand 1	
Actuator Control Designation	HOLD	Optional	Input Port/Flag	0 or 1
Structured IF	IFEQ	Optional	Variable No.	Data
Structured IF	IFGE	Optional	Variable No.	Data
Structured IF	IFGT	Optional	Variable No.	Data
Structured IF	IFLE	Optional	Variable No.	Data
Structured IF		onal	Variable No.	Data
Structured IF		onal	Variable No.	Data
Input/Output/Flag Operation	IN	Optional	Input/Output/Flag	Input/C
Input/Output/Flag Operation	INB	Optional	Input/Output/Flag	# of BC
Communication	IPCN	Optional	Channel No.	Integer
Structured IF	ISEQ	Optional	Column No.	Charact
Structured IF	ISNE	Optional	Column No.	Charact
Structured DO	ITER	Optional		
Structured DO	LEAV	Optional		
Actuator Control Designation	LEFT	Optional		
Assignment	LET	Optional	Variable No.	Data
Calculation	MOD	Optional	Variable No.	Data
Actuator Control Commands	MOVL	Optional	Position No.	
Actuator Control Commands	MOVP	Optional	Position No.	
Calculation	MULT	Optional	Variable No.	Data

Fig. 4.6 Pop-up Menu

(4) This window has the various buttons shown below.

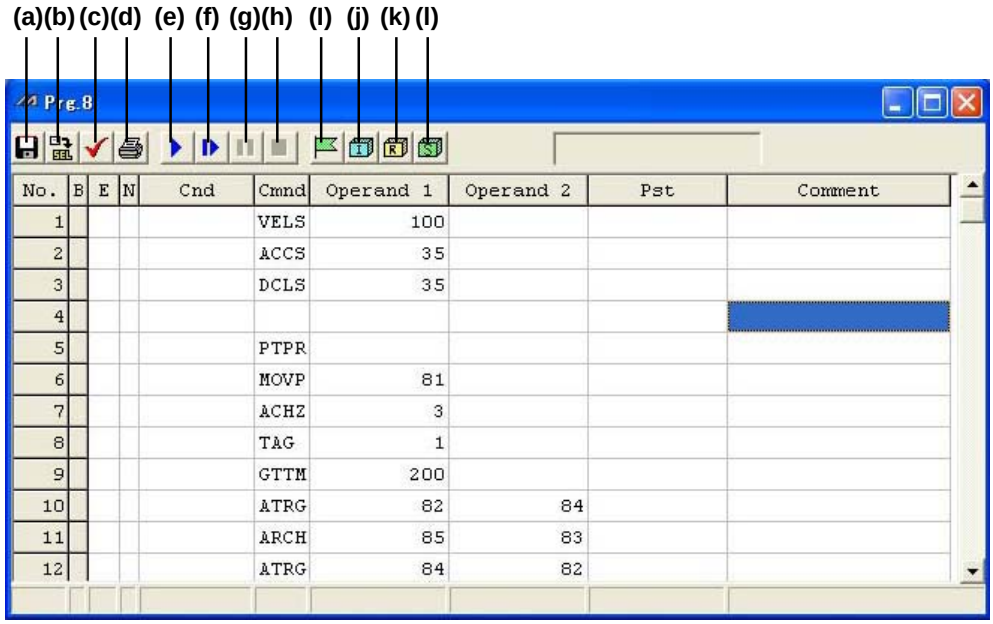


Fig. 4.7 Buttons

(a) Save to File
Clicking this button will open a dialog box where you can save the current program to a file under a desired name.

(b) Transfer to Controller
Clicking this button will prompt the software to check the program data for syntax errors and transfer the program data to the controller if no errors have been found.

(c) Check Program
Clicking this button will display information regarding syntax errors found in the program you have created, as well as operands used in the program.

(d) Print
Clicking this button will print the program.

(e) Run
Clicking this button will run the program. If the program has not yet been saved after editing, you must transfer the program to the controller beforehand.

Caution: Since the controller's processing speed is faster than the PC's communication speed, the cursor position in the program edit window may not always correspond to the actual movement of the actuator.

(f) Run 1 Step
The program will run one step every time this button is clicked.

(g) Pause
Clicking this button will pause the program currently running.

(h) End
Clicking this button will end the program currently running.

(i) Show Local Flag
Clicking this button will show the local flag window for the program currently running.

(j) Show Local Integer Variable
Clicking this button will show the local integer variable window for the program currently running.

(k) Show Local Real Variable
Clicking this button will show the local real variable window for the program currently running.

(l) Show Local String Variable
Clicking this button will show the local string variable window for the program currently running.

(5) Checking the program

The software will check the program you have created, for SEL syntax errors.

[1] Click the Check Program button in the program edit window.

[2] If any error is found, the error list will be displayed.

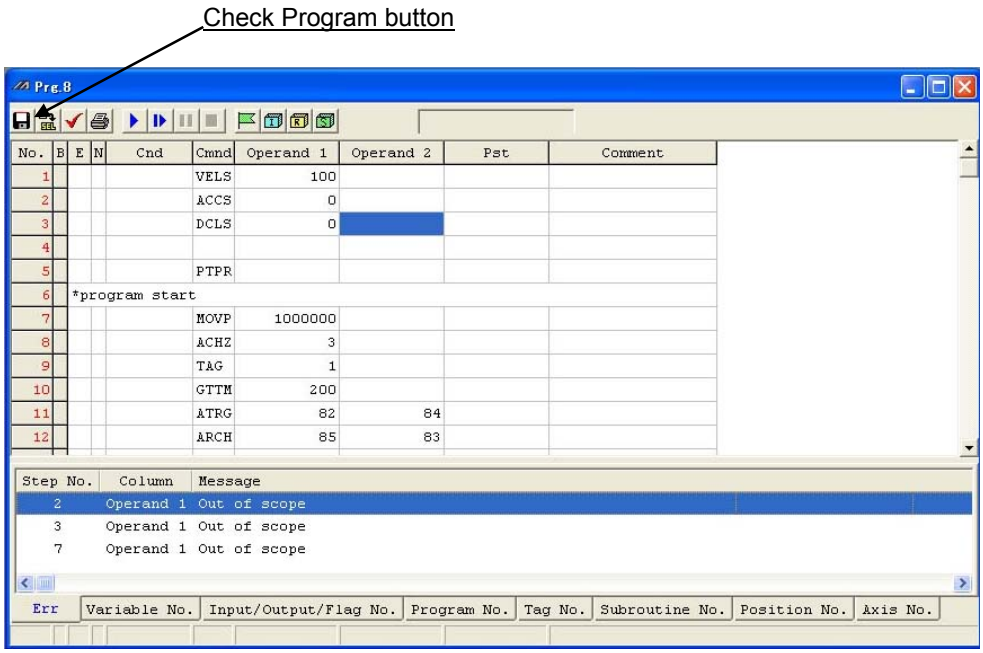


Fig. 4.7 Error List

The error list has the Step No., Column and Message fields. Double-clicking an error line will move the cursor to the location of the corresponding error.

[3] Information regarding the operands (Cnd, Operand 1, Operand 2 and Pst) in the program you are editing is displayed.

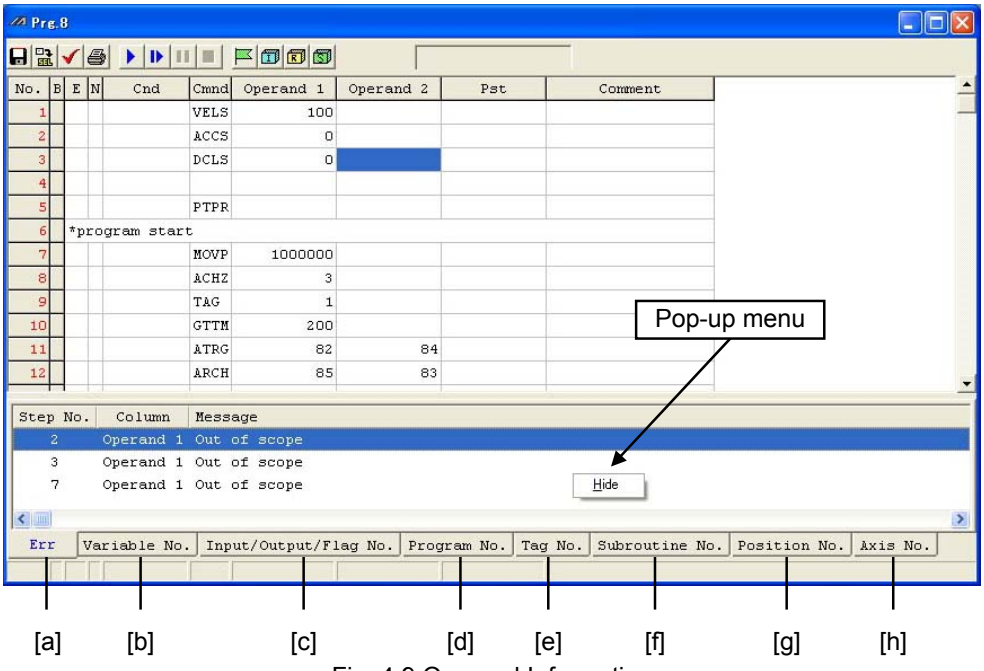


Fig. 4.9 Operand Information

[a] Syntax Error

Message (error content)

[b] Variable No. Use Condition

Variable No.
Category (Integer, real number)
Scope (Global, local)

* If the applicable variable number is specified indirectly, the Category and Scope fields will show "Unknown.

[c] Input/Output/Flag No.

Port/Flag No.
Category (Input Port No., Output Port No. or Flag No.)
Scope (Global or Local)

* If the applicable port/flag number is specified indirectly, the Category and Scope fields will show "Unknown."

[d] Program No. Use Condition

Program No.

[e] Tag No. Use Condition

Tag No. (Tag number in use)
Declaration/Call

[f] Subroutine No. Use Condition

Subroutine No.
Declaration/Call

[g] Position No. Use Condition

Position No.

[h] Axis No. Use Condition

Axis No.

* If a symbol is used in any of the numbers in **[b]** through **[h]**, the corresponding definition value will be displayed in the margin.

The above information is displayed in an itemized list at the bottom of the program edit window. You can double-click a desired item to move the cursor to the corresponding program.

You can also right-click the list to display a pop-up menu and hide the list or sort the records.

4.2 Saving a Program and Closing the Edit Window

(1) Saving to a file the program data you are editing
Click the Save to File button in the program edit window. This is the same as clicking File (F) and then selecting Save As (A).

(2) Transferring to the controller the program data you are editing
You can save the program data you are editing to the controller's memory.
Click the Transfer to Controller button in the program edit window.
This button is selectable only in the online edit mode.

Caution If the program contains any error, the error will be displayed and the program will not be transferred to the controller.

(3) Writing to the flash ROM
Once the program has been transferred to the controller, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.

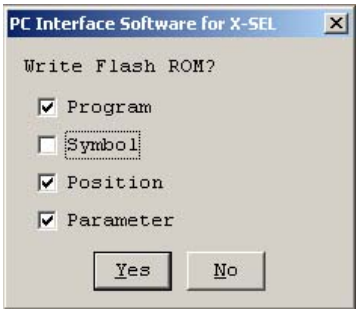


Fig. 4.10 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL)

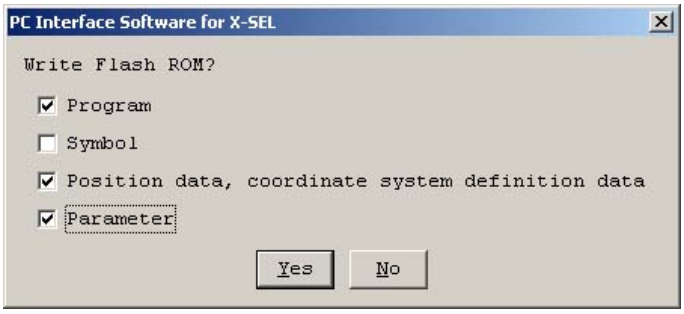


Fig. 4.11 Confirmation
(X-SEL-JX/KX, PX/QX)

Click and select a desired item (Program, etc.) to write to the flash ROM.
Click Yes (Y) → The memory data will be written to the flash ROM.
Click No (N) → The memory data will not be written to the flash ROM.
If No (N) is selected, the controller will clear all data in its memory after a reset (i.e., after the controller power is reconnected or a software reset is executed), and then load the data from the flash ROM. (The controller will operate in accordance with the transferred data until a reset is executed.)

(4) Closing the program edit window
Attempting to close the program edit window will display the following confirmation dialog box with the message, "Save edited data in the Controller?"

Fig. 4.12 Confirmation

Yes (Y) The edited data will be transferred to the controller → (3), "Writing to the flash ROM"
No (N) The software will close the program edit window without saving the edited data.
Cancel The software will cancel the operation and return to the program edit window.

4.3 Saving All Programs to a File

(1) Saving all programs to a file
You can save program Nos. 1 to 64 in the controller to a single file (.xpa).

[1] Click Program from the menu bar, and then select Save to File.
[2] In the program number selection window, click Save All. Specify a desired file name and folder, and then click Save.

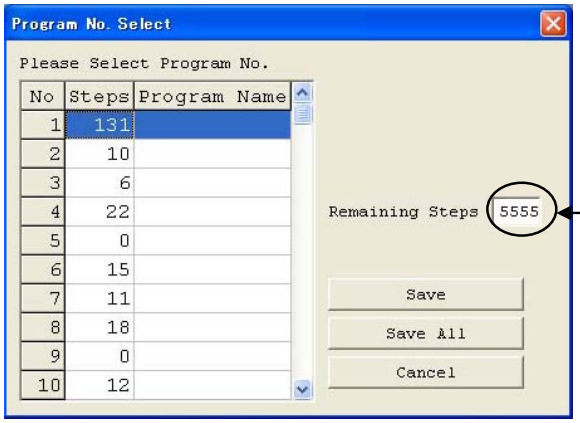


Fig. 4.13 Program Save

(2) Opening the all programs file
[1] Click File from the menu bar, and then select Open.
[2] In the file open window, select the file you want to open and then click Open.
[3] The program No. selection window will be displayed. Select a desired program No. to read and click the Read button.
If you want to transfer all programs to the controller, select Load All Program. If you want to select programs in the all programs file and transfer them individually, select desired program numbers and then click Load a Program to transfer the corresponding programs to the controller.

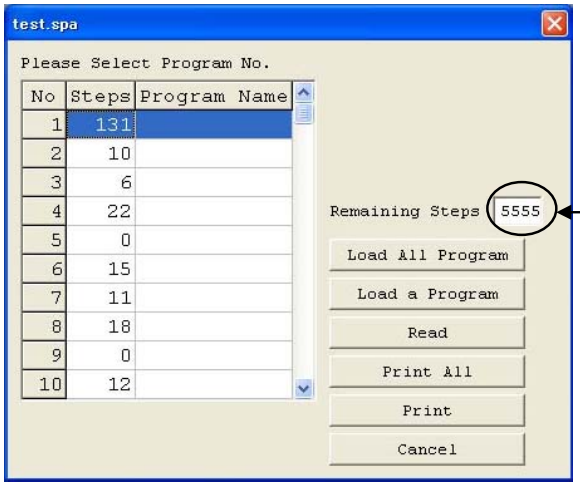


Fig. 4.14 Program Transfer (Online)

Print All button: Print all programs (excluding the program with 0 steps).
Print button: Print only the program selected from the list at the left of the button.

(3) Important note on transferring an all programs file to the controller

[1] Transferring an all programs file to the controller with Load All Program will clear the existing programs of Nos. 1 to 64 in the controller. If necessary, back up all current programs in the controller beforehand.

[2] If the all programs file includes any program that contains symbols and the symbols are not defined in the controller's memory, an error will occur when the applicable program is transferred to the controller. If an error occurs, none of the programs will be transferred to the controller.
Therefore, if the applicable symbol data is saved to a file, transfer the symbol definition file first.
If there is no symbol definition file, define the applicable symbols in the symbol edit window and then transfer the definitions to the controller, before transferring the all programs file again.

[3] If the all programs file contains any error, the error window will be displayed and none of the programs will be transferred to the controller. In this case, double-click the error shown in the error window to open the program file that contains the applicable error. Correct the error, and then save the file by overwriting. If multiple errors exist, correct all errors. When all errors have been corrected, transfer the programs to the controller again.
The procedure in [3] provides an important recovery method for program files containing errors.

(4) Saving the all programs file

[1] If the program files read from the all programs file are saved as the all programs file, click Save (S).

[2] If the program files are saved individually, click Save as (A).

4.4 Running the Program

You can run the program in the program edit window.
To run the program you are editing, transfer it to the controller first.

Note) Once transferred to the controller, the program can be run without being written to the flash ROM first. If the program is not written to the flash ROM, however, it will be lost once the controller power is reconnected or a software reset is executed.

Run: Clicking this button will run the program.
Run 1 Step: The program will run one step every time this button is clicked.
Pause: Clicking this button will pause the program currently running. Clicking it again will resume the program.
Clicking Run or Run 1 Step will resume the program.
End: Clicking this button will end the program currently running.
Breakpoint: You can pause the program in a desired step. “B” will appear/disappear every time the field is clicked.
Note) A breakpoint will be cleared once the controller power is reconnected or a software reset is executed.

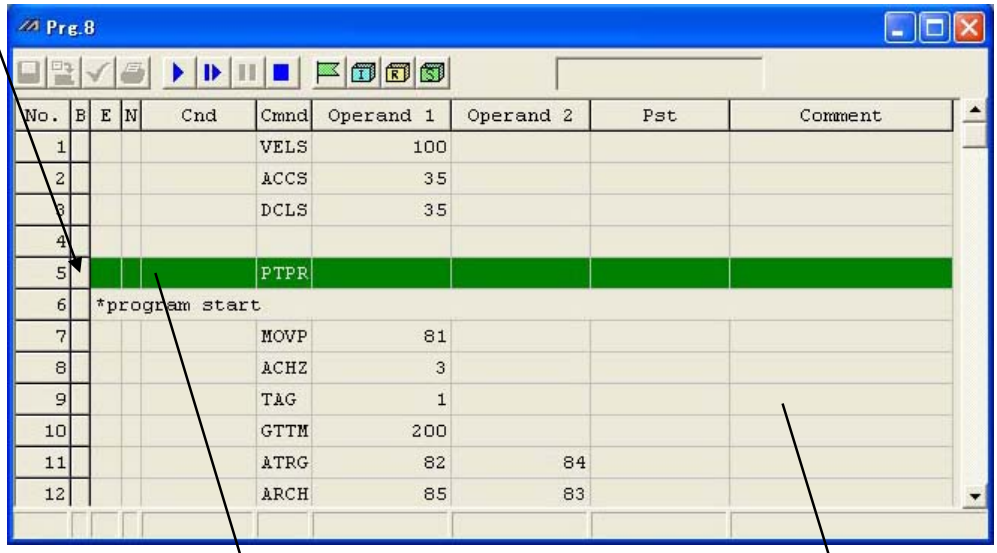


Fig. 4.15 Program Run

Cursor colors
Green: The program is paused (by step operation, by a breakpoint, by the pause button, by the SSPG command, etc.).
Red: The program is waiting (in response to the TIMW, WTxx, WZxx, WRIT or READ command, waiting for a servo command to be completed, etc.).
Blue: Any condition other than those represented by a green or red cursor.

Background colors
Gray: The program is running.
White: The program is not running.

5. Copying/Moving/Clearing a Program

5.1 Program Copy/Move Window

The steps to copy or move a program to other program number are explained below.

(1) Click Program (S) from the menu bar, and then select Copy/Move (C).

(2) The program copy/move window will open.

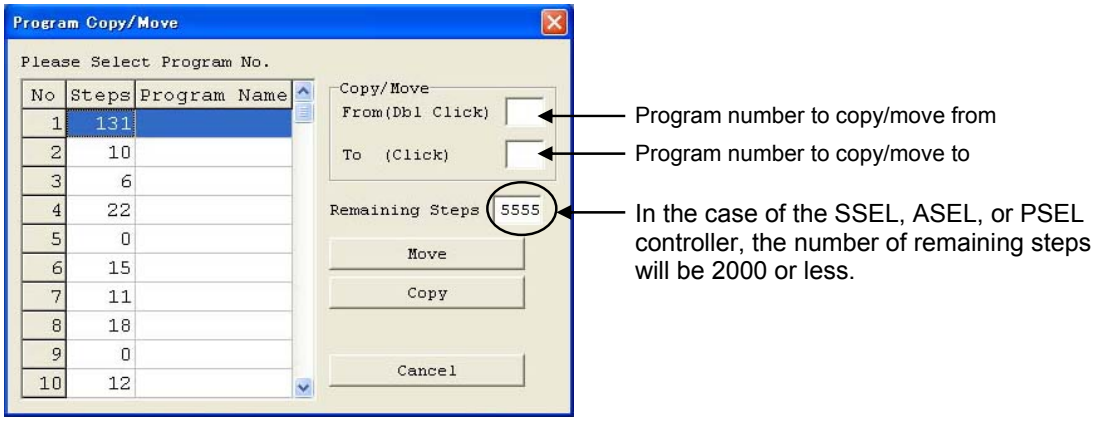


Fig. 5.1 Program Copy/Move

Double-click the source program you want to copy or move.
Click the destination program you want to copy or move the source program to.

To copy the program, click Copy. To move the program, click Move. Both operations are done in the memory.
Clicking Cancel will cancel the selected operation.

(3) Writing to the flash ROM

When the copy or move is completed, the following confirmation dialog box with the message, “Write Flash ROM?” will be displayed.

Fig. 5.2 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL)

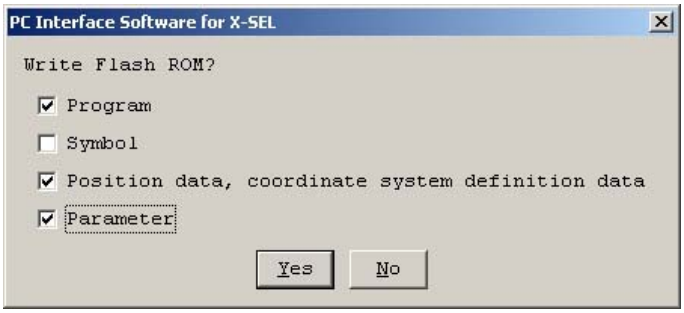


Fig. 5.3 Confirmation
(X-SEL-JX/KX, PX/QX)

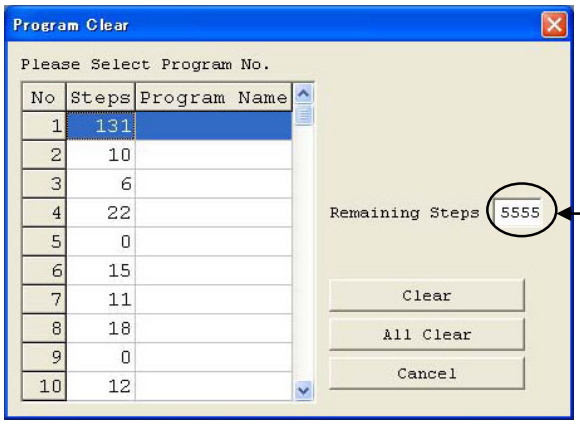
Click and select a desired item (Program, etc.) to write to the flash ROM.
Click Yes (Y) → The memory data will be written to the flash ROM.
Click No (N) → The memory data will not be written to the flash ROM.
Once the controller is reset (the controller power is reconnected or a software reset is executed), the original program arrangement before the copy or move will be restored.

5.2 Program Clear Window

The steps to clear a program are explained below.

(1) Click Program (S) from the menu bar, and then select Clear (L).

(2) The program clear window will open.



In the case of the SSEL, ASEL, or PSEL controller, the number of remaining steps will be 2000 or less.

Fig. 5.4 Program Clear

Click the program you want to clear.
You can select multiple programs by dragging the mouse or pressing the Ctrl key and ↑ ↓ key simultaneously.
Next, click Clear.
(This operation is done in the memory.)
Clicking Cancel will cancel the operation.
When clearing all programs in the controller, click the All Clear button.

(3) Writing to the flash ROM

When the clear is completed, the following confirmation dialog box with the message, “Write Flash ROM?” will be displayed.

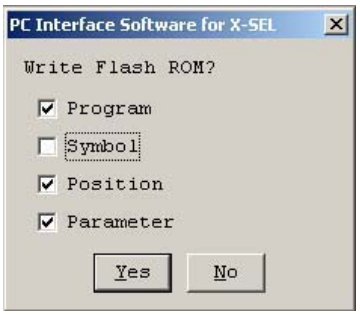


Fig. 5.5 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL)

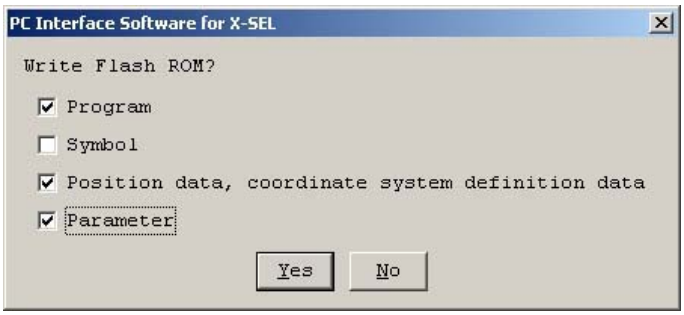


Fig. 5.6 Confirmation
(X-SEL-JX/KX, PX/QX)

Click and select a desired item (Program, etc.) to write to the flash ROM.

Click Yes (Y) → The memory data will be written to the flash ROM.

Click No (N) → The memory data will not be written to the flash ROM.
Once the controller is reset (the controller power is reconnected or a software reset is executed), the cleared program will be restored.

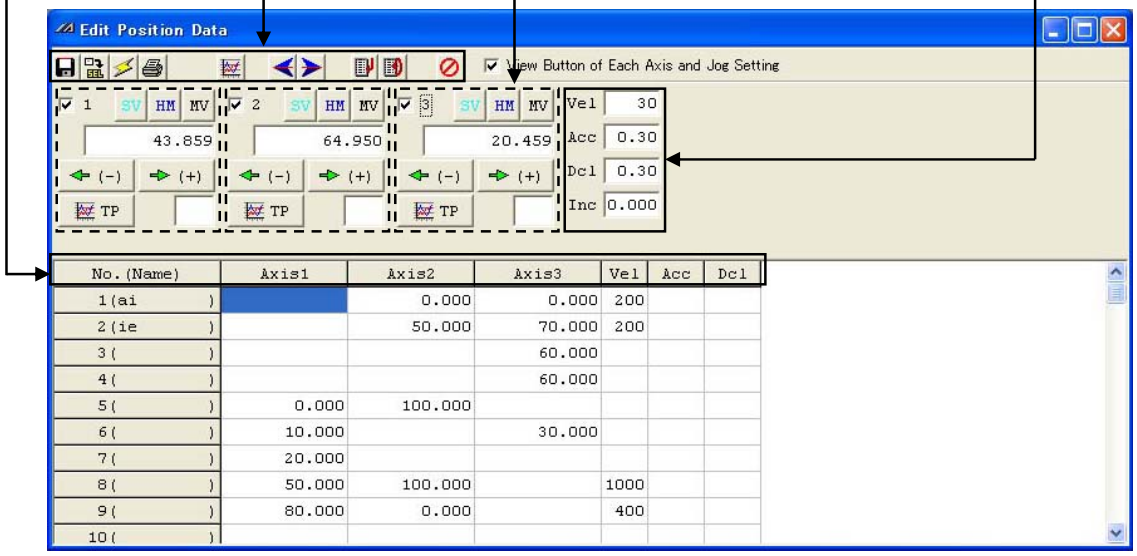
6. Position Data Edit Window

6.1 Explanation of the Items Displayed in the Position Data Edit Window

(1) Click **Position (O)** from the menu bar, and then select **Edit (E)**.

(2) The position data window (Edit Position Data) will open. This window has the following controls and fields.

(A) Position data (B) Common buttons (D) Axis-specific buttons (Orthogonal axis) (E) Setting functions



Data in the change line will be displayed in red.

Fig. 6.1 Position Data Edit (X-SEL-J/K, P/Q, TT)

(A) Position data

No.(Name)	Axis1	Axis2	Axis3	Vel	Acc	Dcl

Fig. 6.2 Position data (X-SEL-J/K, P/Q, TT)

(A) Position data (C) Common buttons (F) Axis-specific buttons (SCARA axis) (G) Setting functions (H) Movement selection

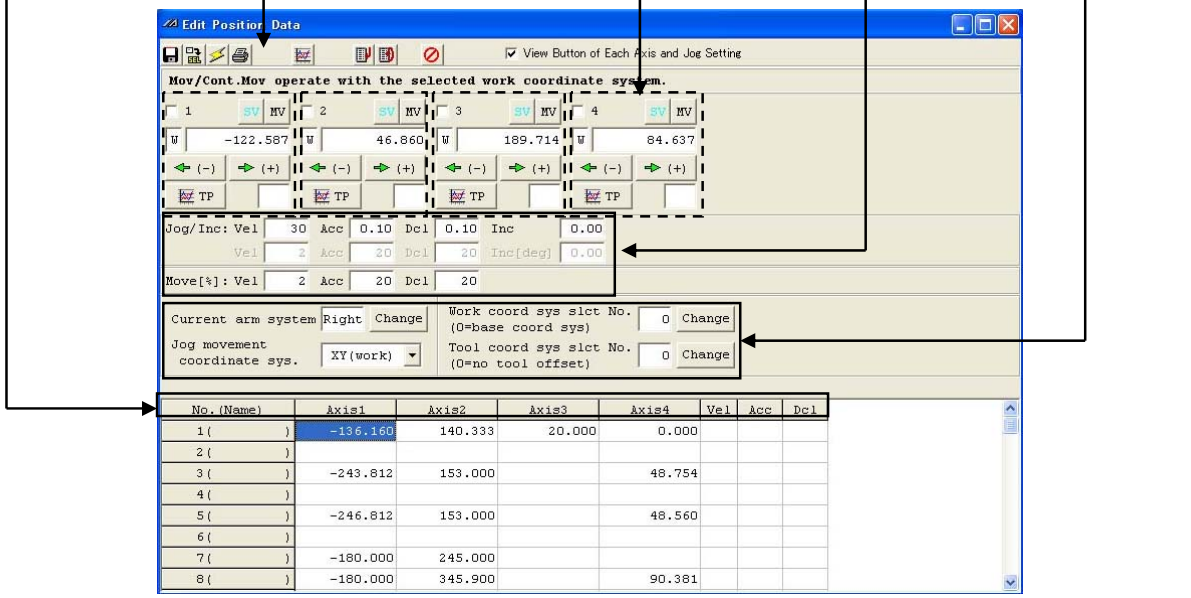


Fig. 6.3 Position Data Edit (X-SEL-JX/KX)

(A) Position data

Fig. 6.4 Position Data (X-SEL-JX/KX)

(A) Position data (B) Common buttons (F) Axis-specific buttons (SCARA axis) (G) Setting functions (SCARA axis) (H) Movement selection

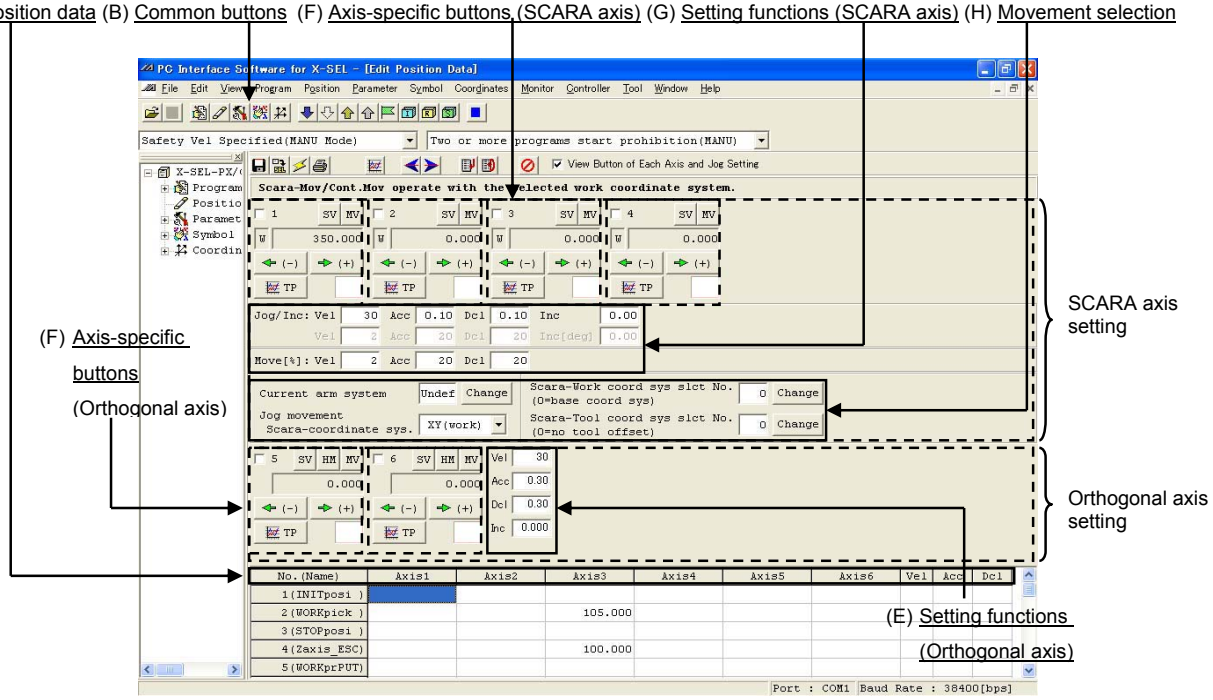


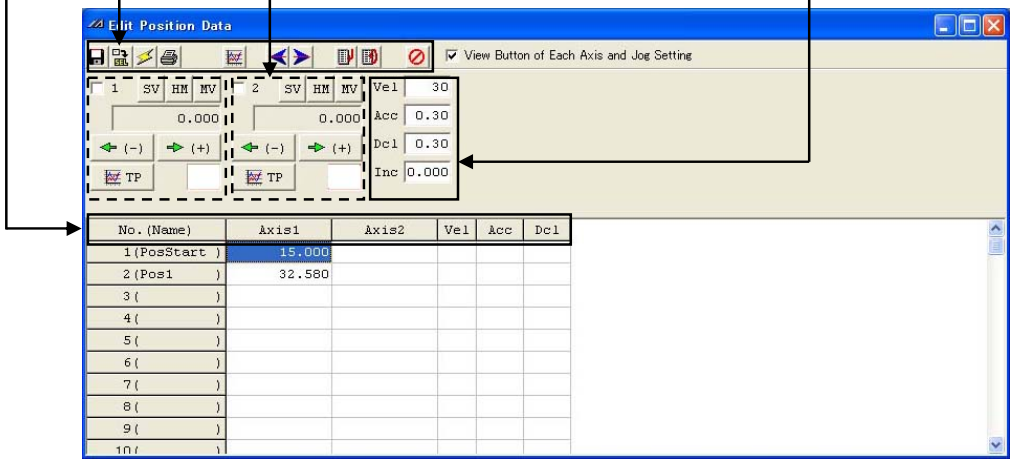
Fig. 6.5 Position Data Edit (X-SEL-PX/QX)

(A) Position data

Fig. 6.6 Position Data (X-SEL-PX/QX)

(B) Common buttons

(A) Position data (D) Axis-specific buttons (Orthogonal axis) (E) Setting functions (Orthogonal axis)



Data in the change line will be displayed in red.

Fig. 6.7 Position Data Edit (SSEL, ASEL and PSEL Controller in the Program Mode)

(A) Position data

Fig. 6.8 Position data (SSEL, ASEL and PSEL)

No. (Name)

The position number and corresponding symbol are displayed.

You can press the F11 key to open the symbol edit window where you can edit the symbol assigned to the applicable position number. Pressing the F11 key on the symbol edit window will return the input focus to the applicable position data in the edit window.

* You can press the F11 key to return the input focus from the symbol edit window to the position data edit window only when the position data edit window is currently open.
* To show or hide symbols, do so in the Environment Setup window accessible from Tool. (For the switching method, refer to “14. Tool.”)

The symbol assigned to the applicable position data No. will not be displayed in the case of the SSEL, ASEL or PSEL controller in the positioner mode.

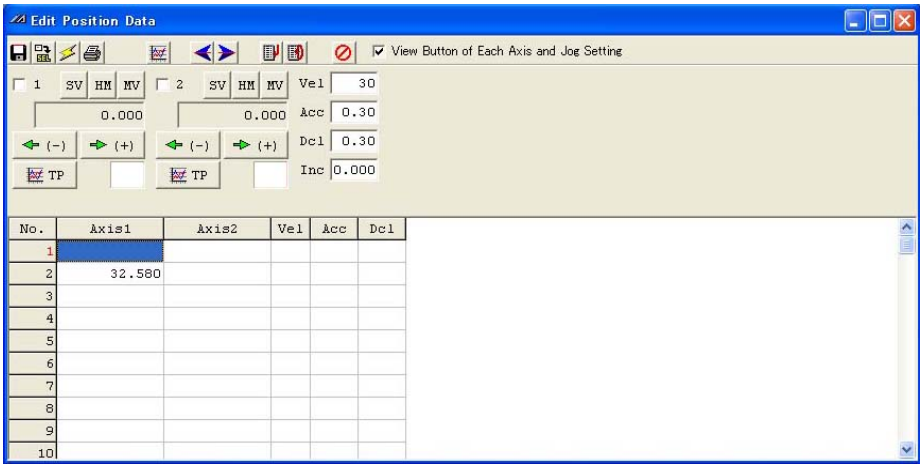


Fig. 6.9 Position Data Edit (SSEL Controller in the Positioner Mode)

Axis 1 to 4

Specify each desired position for Axis 1 to Axis 4.
In the case of the JX/KX or PX/QX controller, specify a desired position for each SCARA axis.
The setting range is from –99999.999 to 99999.999.

Axis 5, 6

Specify a desired position for Axis 5 and Axis 6.
The setting range is from -99999.999 to 99999.99.

Vel

Specify a desired velocity.
The setting range is from 1 to the value set in All-axis common parameter, No. 21 “Operating velocity MAX (orthogonal axis), CP velocity MAX (SCARA axis).”

Acc

Specify a desired acceleration.
The setting range is from 0.01 to the value set in All-axis common parameter, No. 22 “Acceleration MAX (orthogonal axis), CP acceleration MAX (SCARA axis).”

Dcl

Specify a desired deceleration.
The setting range is from 0.01 to the value set in All-axis common parameter, “Deceleration MAX (orthogonal axis), CP deceleration MAX (SCARA axis).”

In the position edit window, clicking Edit (E) from the menu bar and then selecting Undo (U) can cancel the most recent 10 operations excluding line insertion and line deletion.
Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.
However, the cancel function will become disabled when any of the following operations is performed:
- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 6.10 will be displayed.
Clicking Yes will cancel the operation executed immediately before.

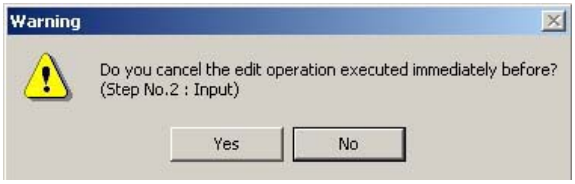


Fig. 6.10 Warning

(B) Common buttons (X-SEL-J/K, P/Q, PX/QX, TT, SSEL, ASEL, PSEL)

Fig. 6.11 Common Buttons (X-SEL-J/K, P/Q, PX/QX, TT, SSEL, ASEL, PSEL)

(C) Common buttons (X-SEL-JX/KX)

Fig. 6.12 Common buttons (X-SEL-JX/KX)

Save to File

Clicking this button will open a dialog box where you can save the position data to a file under a desired name.

Transfer to Controller

Clicking this button will transfer the position data to the controller.

Refresh Position Data

After a program that rewrites position data has been run, click this button to refresh the position data display.

Print

Clicking this button will print the position data.

Capture Current Position

Clicking this button will capture the current position into the position number corresponding to the cursor position for all axes indicated by ☑. (The captured position is not yet transferred to the controller.)

Jog – This button is not displayed for X-SEL-JX/KX

The axes specified as the ones to be operated by the common buttons and whose servo is ON will jog backward while this button is pressed. However, axis specification has limitations.

Jog + This button is not displayed for X-SEL-JX/KX.

Axes specified as the ones to be operated by the common buttons and whose servo is ON will jog forward while this button is pressed. However, axis specification has limitations.

- Orthogonal axes
  Orthogonal axes can be selected simultaneously for simultaneous jog movement.
- SCARA axes of X-SEL-PX-QX
  This button enables jog movement when only one axis is specified as the one to be operated by the common buttons.
  (Note) The SCARA axis and orthogonal axis of the X-SEL-PX/QX controller cannot be specified simultaneously.

Move

Clicking this button will move all axes indicated by ☑ (in the case of the SCARA axis, the 1st arm, 2nd arm and R-axis are interlocked) to the position of the position number corresponding to the cursor position.

(Note) The SCARA axis and orthogonal axis cannot move simultaneously.

* If there is changed position data, transfer the data to the controller first.

Move Continuously

Clicking this button will move all axes indicated by ✔ (in the case of the SCARA axis, the 1st arm, 2nd arm, and R-axis are interlocked) to the position of the position number corresponding to the cursor position. Thereafter, each axis will continue to move to the position set by the data in next position number.

(Note) The SCARA axis and orthogonal axis cannot be moved simultaneously.

* If any of the applicable position data has been changed, transfer the latest position data to the controller first.

Stop All Axes

Clicking this button will stop all axes currently moving.

☑ View Button of Each Axis and Jog Setting

If a checkmark is placed in the checkbox of this button, the axis-specific button/setting screen (Fig. 6.3 [example of X-SEL-JX/KX]) will be displayed.
If the checkmark is not placed, the position data will only be displayed (Fig. 6.14 [example of X-SELJX/KX]).

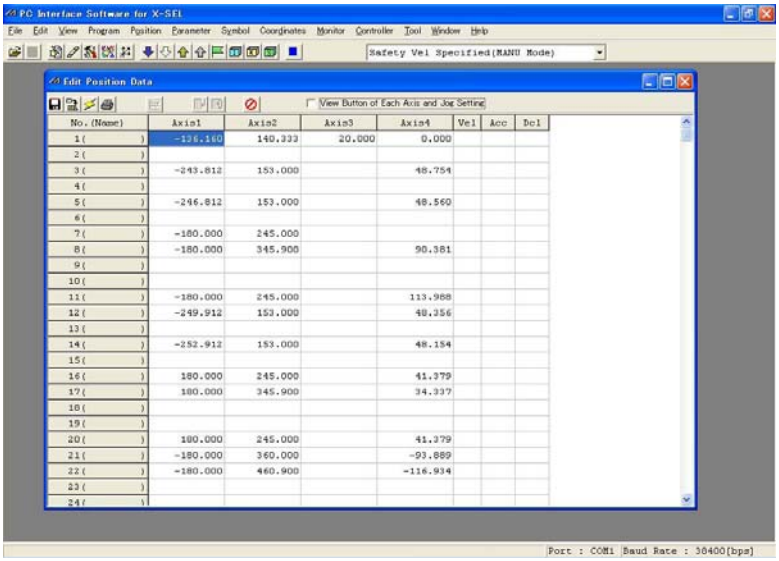


Fig. 6.13 Screen of Position Data Only (Example of X-SEL-JX/KX)

(D) Axis-specific buttons (Orthogonal axis)

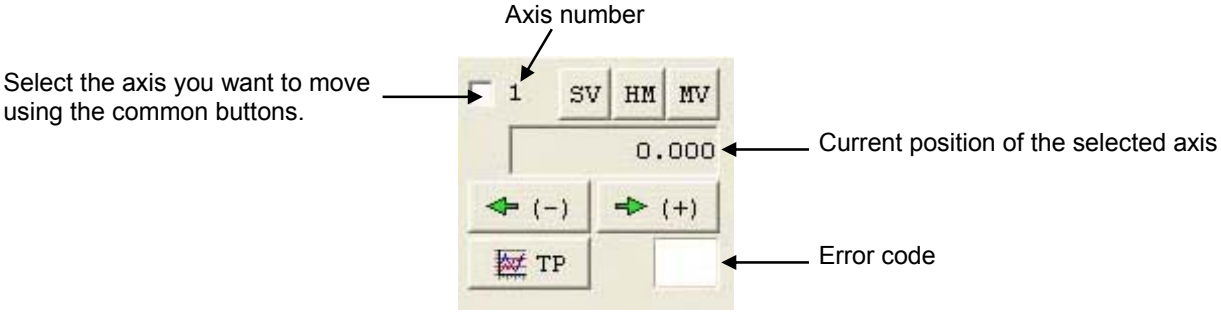


Fig. 6.14 Axis-specific buttons (Orthogonal axis)

SV Clicking this button will turn the servo of the selected axis OFF if it is currently ON, or turn the axis servo ON if it is currently OFF.
(The button is shown in light blue when the servo is ON.)

HM Clicking this button will perform homing if the servo of the selected axis is ON.
(The button will be shown in light blue after homing.)

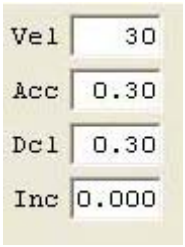
MV Clicking this button will move the selected axis to the position specified by the data in the position number corresponding to the cursor position, if the axis servo is ON.
(The button remains yellow while the axis is moving.)

(+) The selected axis will jog forward while this button is clicked, if the axis servo is ON.
If a value (0.001 to 1) is entered in the Inc. field in the setting function group, the axis will perform inching. In this case, one click will move the axis by one inching distance.

(-) The selected axis will jog backward while this button is clicked, if the axis servo is ON.
If a value (0.001 to 1) is entered in the Inc. field in the setting function group, the axis will perform inching. In this case, one click will move the axis by one inching distance.

TP Clicking this button will capture the current position of the selected axis into the position number corresponding to the cursor position. (The captured position is not yet transferred to the controller.)

(D) Setting functions (Orthogonal axis)



Set the velocity (Vel), acceleration (Acc), deceleration (Dcl) and inching distance (Inc.) to be used when the actuator is operated using the various buttons.
If a value is entered in any of the Vel, Acc and Dcl fields in the position data area, the value in the applicable position data field will be given priority for movement to the corresponding position number.

Fig. 6.15 Settings of Velocity, Acceleration, Deceleration and Inching Distance

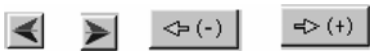


Fig. 6.16 Jog Buttons

These jog buttons can also be used to jog those axes that have not yet completed homing. However, coordinate values have no meaning for these axes, so pay due attention to avoid contact with the stroke end.
If a value (0.001 to 1) is entered in the Inc. field in the setting function group, the jog buttons will function as inching buttons.

Continue to click an inching button will change the operation to jogging. Specifically, the axis will start jogging approx. 1 second after the inching button is clicked. If the button is held continuously, the jogging velocity will change approx. every second thereafter in the order of 1 → 10 → 30 → 50 → 100 [mm/sec].

Note

Operating any selectable jog button for an operating axis will jog the axis, and the axis will stop once the button is released. (If the next operation command is input, the axis will perform the specified operation.)

(F) Axis-specific buttons (SCARA axis)

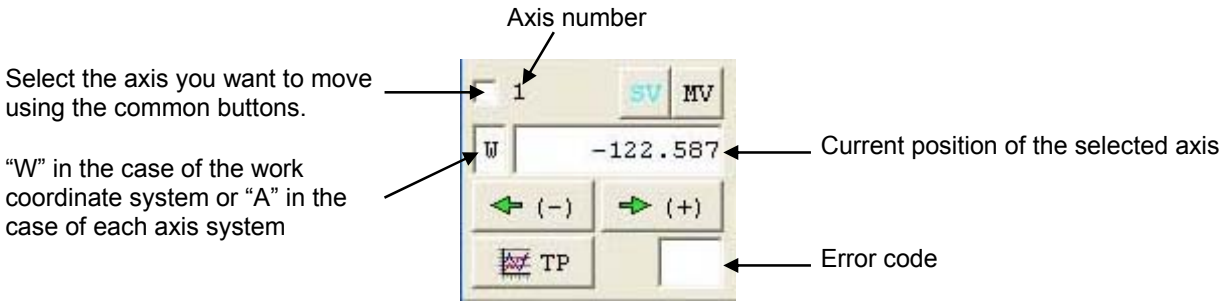


Fig. 6.17 Axis-specific buttons (SCARA axis)

SV Clicking any axis button will turn the servo of all axes ON/OFF.
(The button is shown in light blue when the servo is ON.)

Caution **Clicking this button will turn the servo of all axes ON when the axis servo is OFF, or turn the servo of all axes OFF when the axis servo is ON.**

MV Clicking this button will move the selected axis to the position specified by the data in the position number corresponding to the cursor position, if the axis servo is ON. (The button remains yellow while the axis is moving.)

(+) The selected axis will perform jogging while this button is pressed, if the axis servo is ON.
If a value (0.01 to 1.00) is entered in the Inc field under Setting Function, the axis will perform inching. In this case, one click will move the axis by one inching distance.

(-) Clicking this button will capture the current position of the selected axis into the position number corresponding to the cursor position. (The captured position is not yet transferred to the controller.)

TP Clicking this button will capture the current position of the selected axis into the position number corresponding to the cursor position. (The captured position is not yet transferred to the controller.)

(G) Setting functions (SCARA axis)

Set the velocity (Vel), acceleration (Acc), deceleration (Dcl) and inching distance (Inc.) to be used when the actuator is operated using the various buttons.

Separate sets of data are set for Jog/Inc and Move.
Vel, Acc, Dcl and Inc are set in two different units.

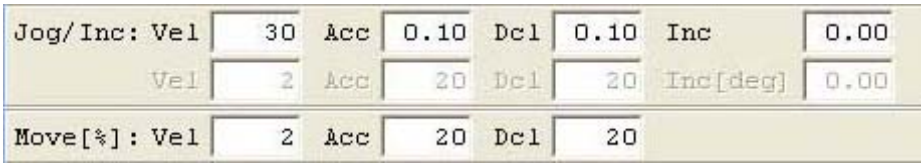


Fig. 6.18 Settings of Velocity, Acceleration, Deceleration and Inching Distance

Jog/Inc

Vel [mm/sec], Acc [G], Dcl [G], Inc [mm]
The above settings are effective on both the work and tool coordinate systems.
Vel [%], Acc [%], Dcl [%], Inc [deg]
The above settings are effective only when the “each Axis” system is selected.

The jog button functions as the incremental button, if a numeric value (0.01 to 1.00) is entered in the Inc field under Setting Function.

Move

Vel [%], Acc [%], Dcl [%]
Set the moving speed that applies when the MV button is clicked.

Movement occurs in the form of PTP operation.
Each percentage setting indicates a percentage with respect to a corresponding parameter setting.
Vel [%] (percentage with respect to “Axis Parameter No. 28: “PTP speed MAX”)
Acc [%] (percentage with respect to “Axis Parameter No. 134: “PTP acceleration MAX”)
Dcl [%] (percentage with respect to “Axis Parameter No. 135: “PTP deceleration MAX”)

(H) Movement Selection

Various buttons are provided to set Current arm system, Jog movement coordinate sys., Work coord sys slct No. and Tool coord sys slct No.

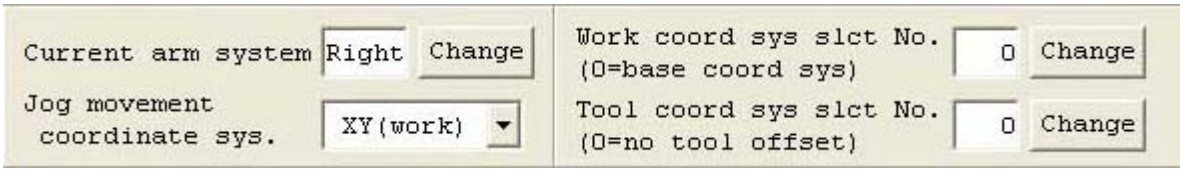


Fig. 6.19 Selection of Current Arm System and Various Coordinate Systems

Current arm system

The arm can be changed by clicking the Change button.

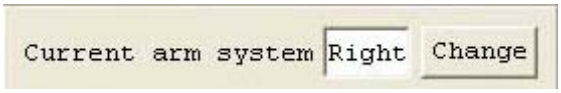


Fig. 6.20 Current Arm System Selection

Caution: If the arm system is changed for a stationary axis, the newly selected arm may move occasionally.

Jog movement coordinate sys.

The coordinate system can be changed by clicking the ▼ button.

XY work coordinate system (Can be offset using Work Coordinate System Selection No.)

XY tool coordinate system

Each axis system

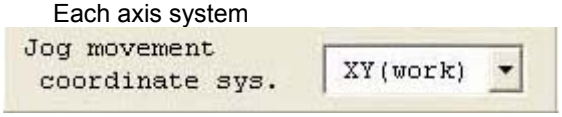


Fig. 6.21 Selection of Jog Movement Coordinate System

Work coord sys slct No.

A desired work coordinate system selection No. can be selected by clicking the Change button.

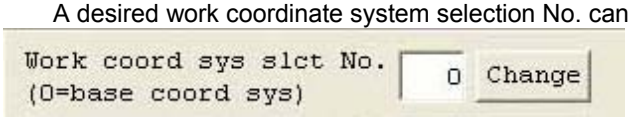


Fig. 6.22 Selection of Work Coordinate System

Tool coord sys slct No.

A desired tool coordinate system selection No. can be selected by clicking the Change button.

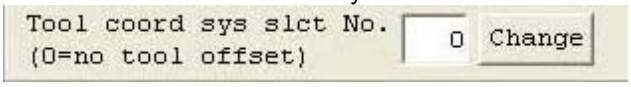


Fig. 6.23 Selection of Tool Coordinate System

6.2 Saving Position Data and Closing the Edit Window

(1) Saving to a file the position data you are editing
Click the Save to File button in the position edit window. This is the same as clicking File (F) and then selecting Save As (A).

(2) Transferring to the controller the position data you are editing
Click the Transfer to Controller button in the position edit window. The position data you are editing will be saved to the controller's memory.
This button is selectable only in the online edit mode.

(3) Writing to the flash ROM
Once the program has been transferred to the controller, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.

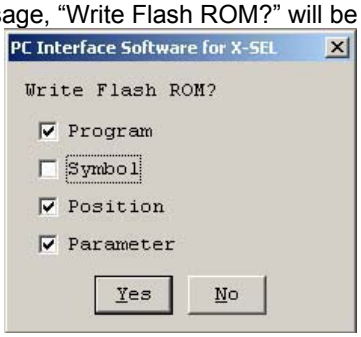


Fig. 6.24 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL)

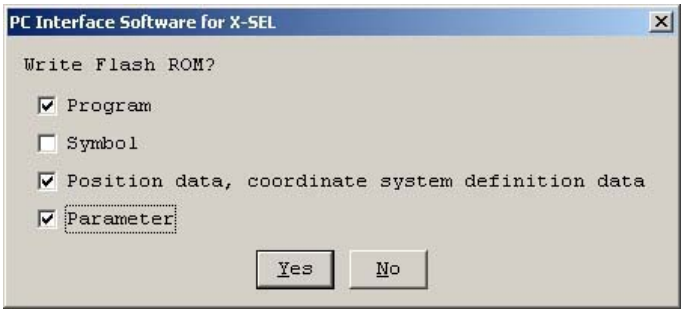


Fig. 6.25 Confirmation
(X-SEL-JX/KX, PX/QX)

Click and select a desired item (Position, etc.) to write to the flash ROM.
Click Yes → The memory data will be written to the flash ROM.
Click No → The memory data will not be written to the flash ROM.

(4) Closing the point edit window
Attempting to close the point edit window will open the following confirmation dialog box with the message, "Save edited data in the Controller?"

Fig. 6.8 Confirmation

Yes The edited data will be transferred to the controller → (3), "Writing to the flash ROM"
No The software will close the point edit window without saving the edited data.
Cancel The software will cancel the operation and return to the position edit window.

7. Copying/Moving/Clearing Position Data

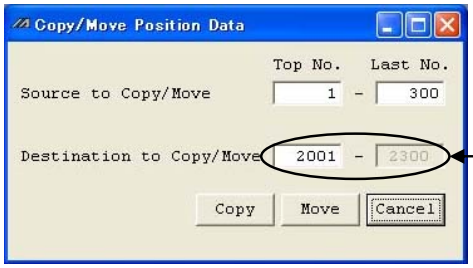
7.1 Copying/Moving Position Data

(1) Click Position (O) from the menu bar, and then select Copy/Move (C).

(2) The position data copy/move window (Copy/Move Position Data) will open.

Copying position data: In Source to Copy/Move, specify the Top No. and Last No. of the position range you want to copy or move.
Then, click Copy. The positions specified in Source to Copy/Move will be copied to the positions specified in Destination to Copy/Move.

Moving position data: Click Move.
The positions specified in Source to Copy/Move will move to the positions specified in Destination to Copy/Move.



In the case of the SSEL, ASEL, or PSEL controller, the number of remaining steps will be 1500 or less.

Fig. 7.1 Position Data Copy/Move

* Clicking Cancel will cancel the selected operation.

(3) Writing to the flash ROM
When the copy or move is completed, the following confirmation dialog box with the message, “Write Flash ROM?” will be displayed.

Fig. 7.2 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL)

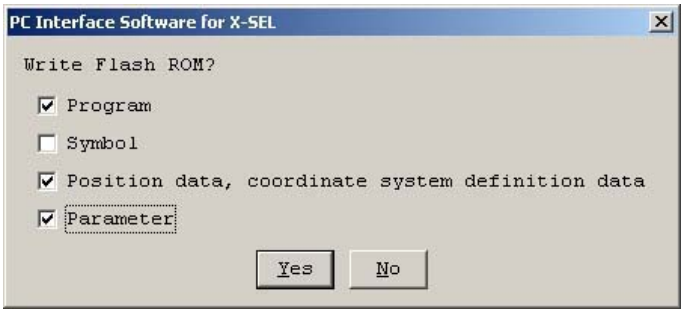


Fig. 7.3 Confirmation
(X-SEL-JX/KX, PX/QX)

Click and select a desired item (Position, etc.) to write to the flash ROM.
Click Yes → The memory data will be written to the flash ROM.
Click No → The memory data will not be written to the flash ROM.

7.2 Clearing Position Data

(1) Click Position (O) from the menu bar, and then select Clear (L).

(2) The position data clear window (Clear Position Data) will open.

Fig. 7.4Position Data Clear

In Clear Scope, specify the Top No. and Last No. of the position range you want to clear.
Then, click Clear.
Clicking Cancel will cancel the operation.

(3) Writing to the flash ROM
When the clear is completed, the following confirmation dialog box with the message, “Write Flash ROM?” will be displayed.

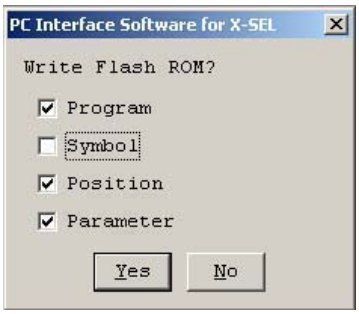


Fig. 7.5 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL)

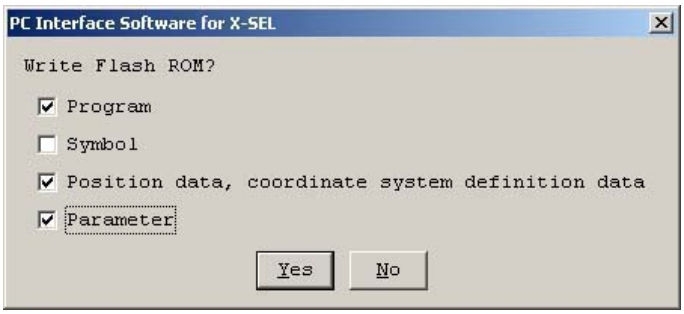


Fig. 7.6 Confirmation
(X-SEL-JX/KX, PX/QX)

Click and select a desired item (Position, etc.) to write to the flash ROM.
Click Yes → The memory data will be written to the flash ROM.
Click No → The memory data will not be written to the flash ROM.

8. Parameter Edit Window

8.1 Explanation of the Parameter Edit Window

(1) Click **Parameter (P)** from the menu bar, and then select **Edit (E)**.

(2) The parameter edit window (Edit Parameter) will open.
You can select a desired parameter and change the value.
Values that are grayed out are read-only and cannot be changed.

Save to File
Clicking this button will open a dialog box where you can save the parameter data to a file under a desired name.

Transfer to Controller
Clicking this button will transfer the parameter data to the controller.

Print
Clicking this button will print the parameter data.

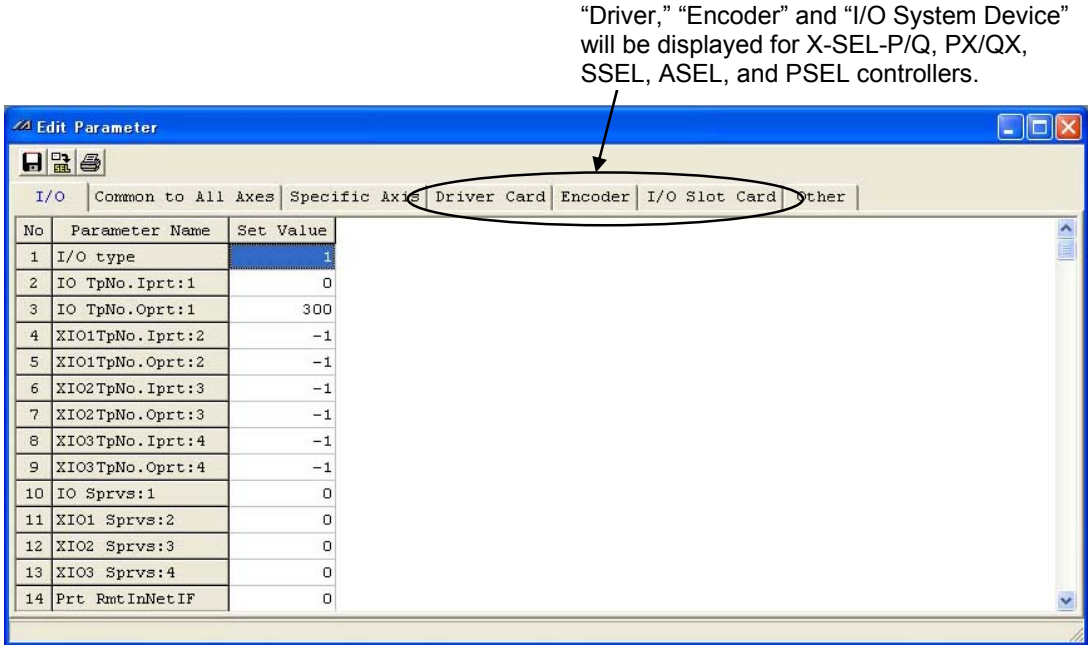


Fig. 8.1 Parameter Edit (X-SEL-J/K, JX/KX, TT)

* The above window shows I/O parameters. You can display other parameters by clicking each category tab.

In the parameter edit window, clicking **Edit (E)** from the menu bar and then selecting **Undo (U)** can cancel up to the most recent 10 input operations.
Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.
However, the cancel function will become disabled when any of the following operations is performed:
- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 8.2 will be displayed.
Clicking Yes will cancel the operation executed immediately before.

Fig. 8.2 Warning

8.2 Saving Parameter Data and Closing the Edit Window

(1) Saving to a file the parameter data you are editing
Click the Save to File button in the parameter edit window. This is the same as clicking **File (F)** and then selecting **Save As (A)**.

(2) Transferring to the controller the parameter data you are editing
You can save the parameter data you are editing to the controller's memory.
Click the Transfer to Controller button in the parameter edit window.

(3) Writing to the flash ROM

Once the program has been transferred to the controller, the following confirmation dialog box with the message, “Write Flash ROM?” will be displayed.

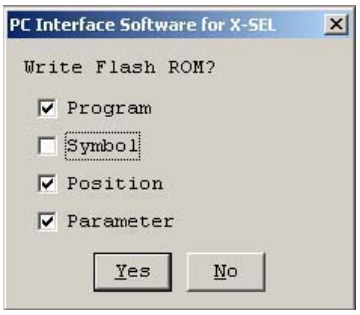


Fig. 8.3 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL)

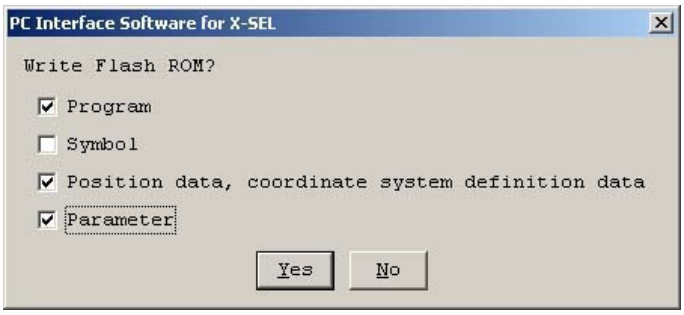


Fig. 8.4 Confirmation
(X-SEL-JX/KX, PX/QX)

Click and select a desired item (Parameter, etc.) to write to the flash ROM.

Click Yes → The memory data will be written to the flash ROM.

Click No → The memory data will not be written to the flash ROM.
If No (N) is selected, the controller will clear all data in its memory after a reset (i.e., after the controller power is reconnected or a software reset is executed), and then load the data from the flash ROM.

(4) Restarting the controller (software reset)

After the data has been written to the flash ROM, the following confirmation dialog box with the message, “Restart the controller” will be displayed.

Yes The new parameters will become effective.

No The new parameters will not become effective.
The parameters will become effective after the controller is restarted (software reset) or the controller power is reconnected.

Fig. 8.5 Confirmation

(5) Closing the parameter edit window

Attempting to close the parameter edit window will display the following confirmation dialog box with the message, “Save edited data in the Controller?”

Fig. 8.6 Confirmation

Yes The edited data will be transferred to the controller → (3), “Writing to the flash ROM”

No The software will close the parameter edit window without saving the edited data.

Cancel The software will cancel the operation and return to the parameter edit window.

- The user of the PC software is recommended to back up the parameters when the controller is delivered and also when the system into which the controller has been assembled is started.
  * There are many customizable parameters. It is recommended that you back up the parameters frequently just like you do the programs.

8.3 Transferring a Parameter File

Pay attention to parameter categories when transferring parameter data files to the controller. The controller is shipped with its axis-related parameters set, for each axis, to values appropriate for the type of the actuator connected.

There are three categories of axis-related parameters: axis-specific parameters, driver card parameters and encoder parameters.

Exercise due caution when using an existing file containing customized parameters.

Note) If parameter data is lost during parameter writing to the flash ROM due to main power OFF or any other factor, all parameters will be rewritten to initial values. In the case of the X-SEL-P/Q or PX/QX controller, an error will be detected after power reconnection or software reset since system-specific settings are lost immediately after parameter initialization.
Under such conditions, all parameters cannot be transferred to the controller together.
Handle the problem in accordance with the “Parameter Recovery Method for X-SEL-P/Q and PX/QX Controllers” in the Appendix at the back of this manual.

8.3.1 Selecting Categories of Parameters to Be Transferred

(1) Select **Open** from the **File** menu or click the corresponding button in the toolbar. In the file selection dialog box, select the parameter file (extension: .xpm) you want to transfer to the controller. Load the file into the PC software and open the parameter edit window.

(2) Click the Transfer to Controller button in the parameter edit window.

(3) The Select Parameter Category window (Fig. 8.7) will be displayed. In the case of X-SEL-JX/KX, the screen not showing Actuator specific parameters, transfer from axis # to axis # (Fig. 8.8) will be displayed. In the case of SSEL, the screen not showing Controller basic unit Transmit options (Fig. 8.9) will be displayed. This window has the following items: (The specific items will vary depending on the controller.)

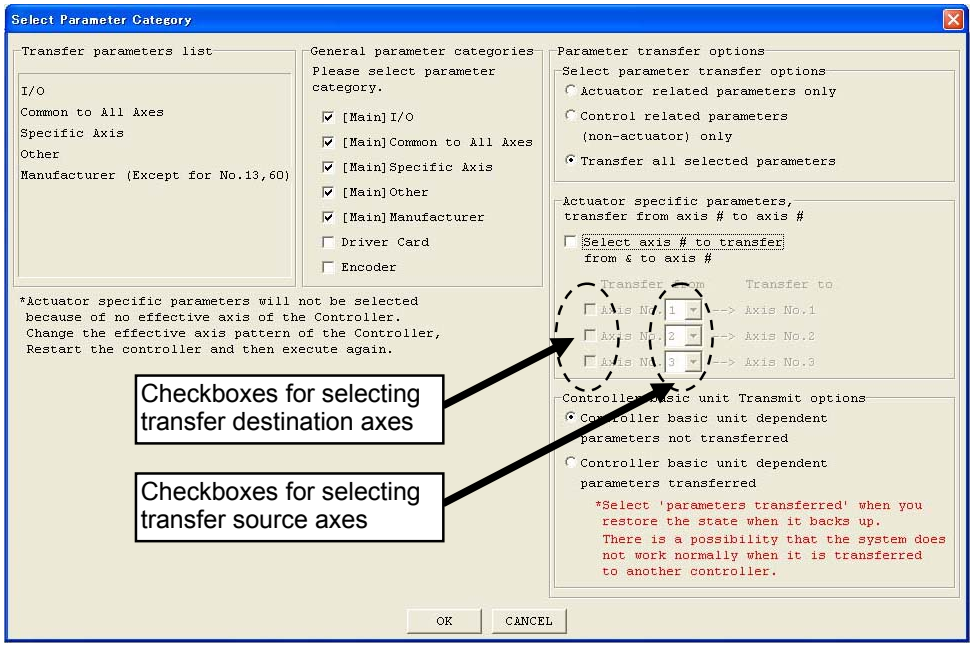


Fig. 8.7 Select Parameter Category Window
(This window is supported by PC software version 3.0.1.0 or later.)

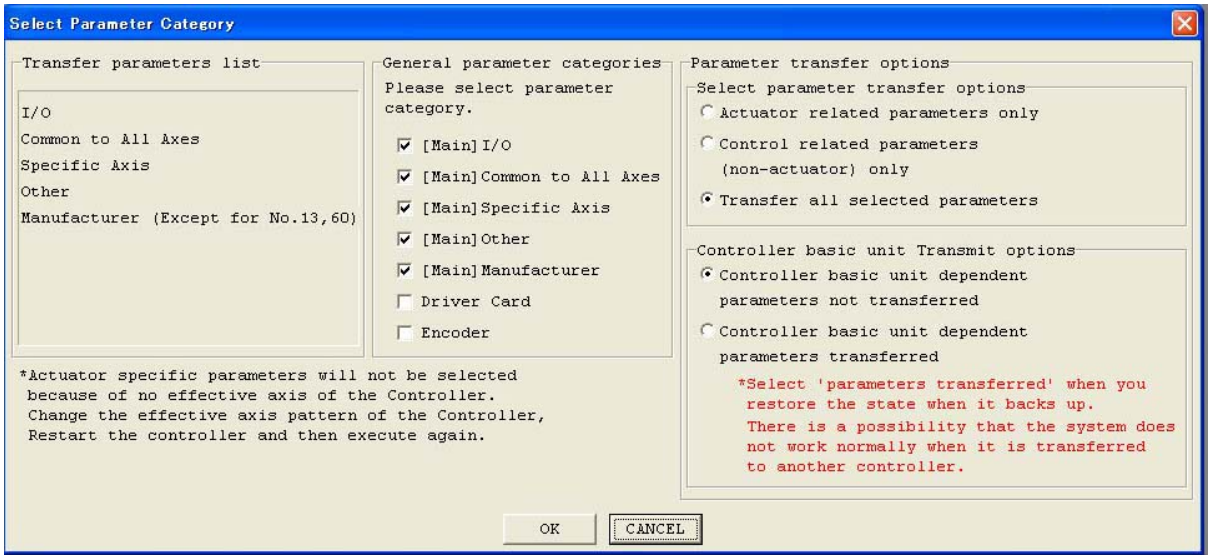


Fig. 8.8 Select Parameter Category Window (X-SEL-JX/KX)
(This window is supported by PC software version 3.0.1.0 or later.)

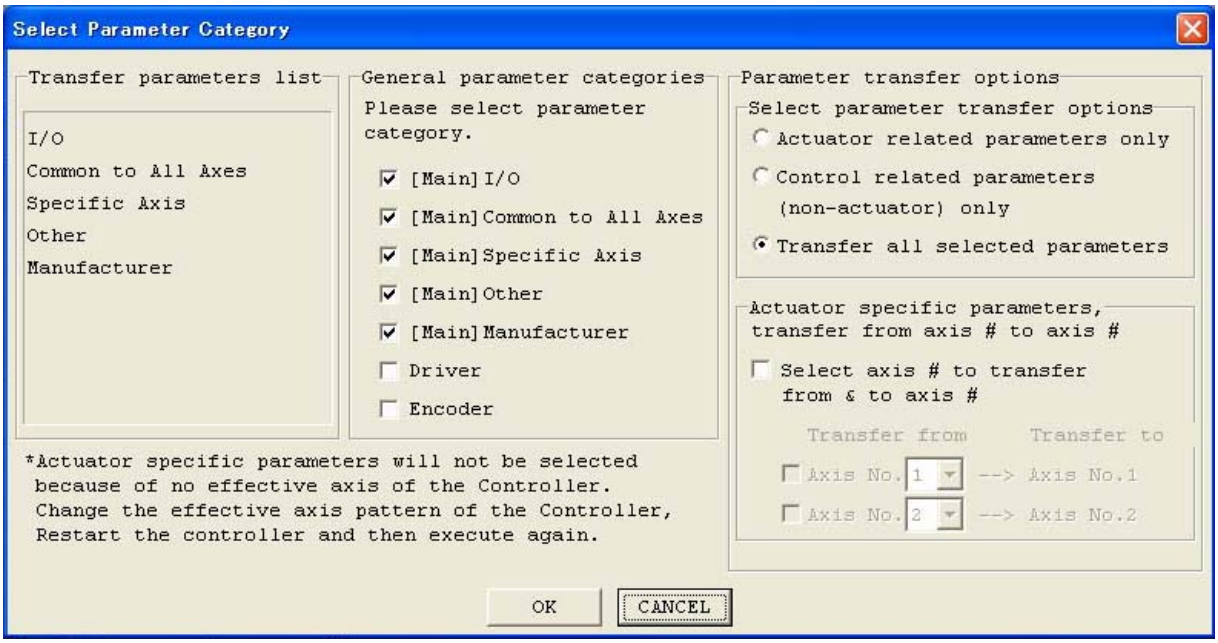


Fig. 8.9 Select Parameter Category Window (SSEL, ASEL, PSEL)
(This window is supported by PC software version 3.0.1.0 or later.)

[1] Transfer parameters list

The parameters to be transferred to the controller are displayed in accordance with the selections made in [2] through [5] explained below.

Before clicking OK, be sure to check the categories of parameters to be transferred.

[2] General parameter categories

Click the checkbox corresponding to each category of parameters you want to transfer (the clicked checkbox will be selected).

Only the parameters of the selected category or categories will be transferred to the controller.

[3] Parameter transfer options – Select parameter transfer options

Of the parameters selected in the General parameter categories group, select whether to transfer actuator-related parameters only, transfer non-actuator parameters (control-related parameters) only, or transfer all selected parameters.

In the following cases, no parameters will be transferred and the warning message, “Parameters will not be transferred” will be displayed.

- Actuator related parameters only is selected under Select parameter transfer options in the Parameter transfer options group when no actuator-related parameter category (Specific Axis, Driver Card or Encoder) is selected in the General parameter categories group.
- Control related parameters (non-actuator) only is selected under Select parameter transfer options in the Parameter transfer options group when no actuator-related parameter category is selected in the General parameter categories group.

[4] Parameter transfer options – Actuator specific parameters, transfer from axis # to axis #

This section will not be displayed for the X-SEL-JX/KX controller.

You can associate axis-related parameters in the source file with a given axis number in the destination controller and transfer them to the specified axis number.

Select ‘Select axis # to transfer from & to axis #.’

Select the checkboxes corresponding to the axes (under Transfer to) you want to transfer the parameters to. They are arranged in the order of axis 1, axis 2, and the like, on the controller side, from the top. Do not select the checkboxes corresponding to the axes you do not want to transfer the parameters to.

In each Transfer from checkbox, specify the axis number whose axis-related parameters in the file you want to transfer.

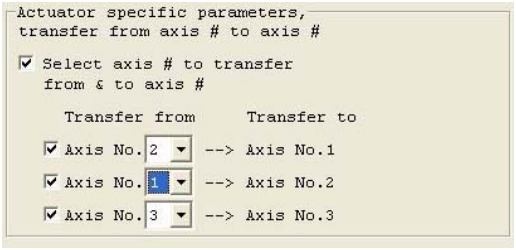


Fig. 8.10 Example of Transfer Source/Destination Specifications

In the specification example shown at the left, data for axis 2 in the file is sent to axis 1 in the controller, data for axis 1 in the file is sent to axis 3 in the controller, and data for axis 3 in the file is sent to axis 4 in the controller, respectively.

Note) Do not select Select axis # to transfer from & to axis # if you want to transfer the axis-related parameters for all axes without changing their axis numbers (i.e., to transfer all axis parameters to the axes of the same numbers), or if no axis-related parameters are transferred. This checkbox is normally notselected.
Note that the electrical circuit of each controller depends on the actuator connected to each axis. An attempt to change the axis configuration only by changing parameters may cause problems or errors.

Note) In the case of the X-SEL-PX/QX controller, axis 1 to axis 4 for SCARA are specified simultaneously. They cannot be specified individually, and the axis numbers cannot be selected either.
With regard to axis 5 and axis 6 for orthogonal axes, selection can be made between Axis No. 5 and No. 6.

[5] Parameter transfer options – Controller basic unit Transmit options

Select whether to enable transfer of controller basic unit dependent parameters.

If controller basic unit dependent parameters are not included in the selections made in [2], [3] and [4], selecting Controller basic unit type dependent parameters transferred will not transfer the applicable parameters.

Normally, select Controller basic unit dependent parameters not transferred.

Select Controller basic unit type dependent parameters transferred only in the following conditions:

- The flash ROM was corrupted, and the parameters must be rewritten.
- Parameters for a wrong controller type were written by mistake, and the parameters must be rewritten.

8.3.2 Default Specifications

In the Parameter transfer options group, you can set the default setting only for Select parameter transfer options in the window accessible by selecting **Environment Setup** from the **Tool** menu (Fig. 8.11).

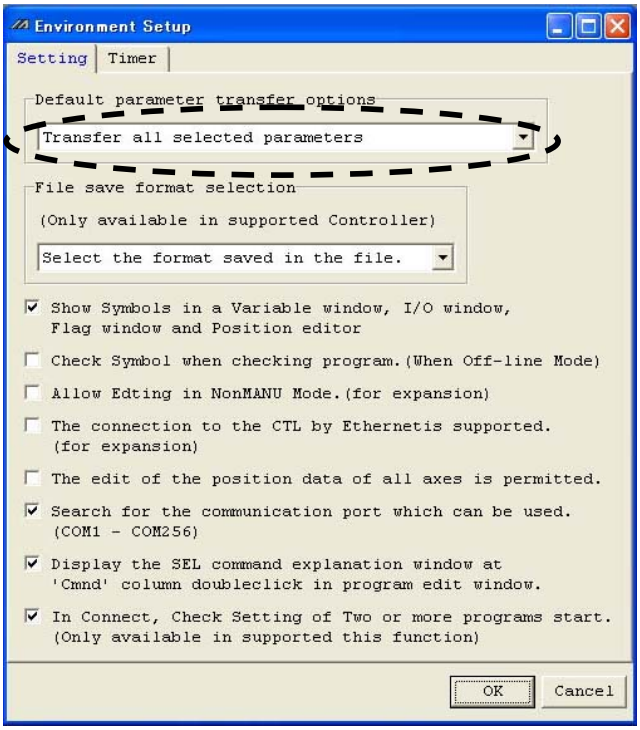


Fig. 8.11 Environment Setup

8.4 How to Initialize SSEL/ASEL/PSEL Parameters (at the time of shipment)

Note: Initialization of parameters (at the time of shipment) can be performed only for SSEL, ASEL and PSEL controllers.

(1) Right-click a blank space in the tool bar (refer to Fig. 8.12) while pressing the Ctrl button. The Input Password will be displayed.

Fig. 8.12 Menu Bar

Fig. 8.13 Input Password Screen

(2) Enter a password (5119) in the displayed Input Password screen. The Parameter of Shipping menu will be displayed in the Initialize Memory menu (Fig. 8.14).

*The password will be valid until the end of application once it has been entered.

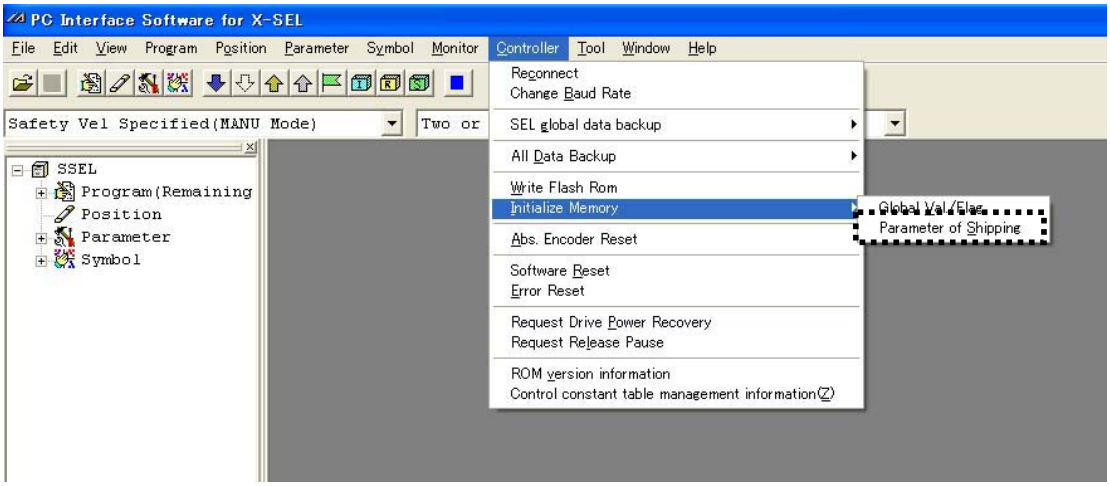


Fig. 8.14 Menu Bar (Parameter Initialization [Shipment Values]: Example of SSEL)

(3) Selecting the displayed menu **Parameter of Shipping** will display a dialog in Fig. 8.15. If you have no problem, click Yes.

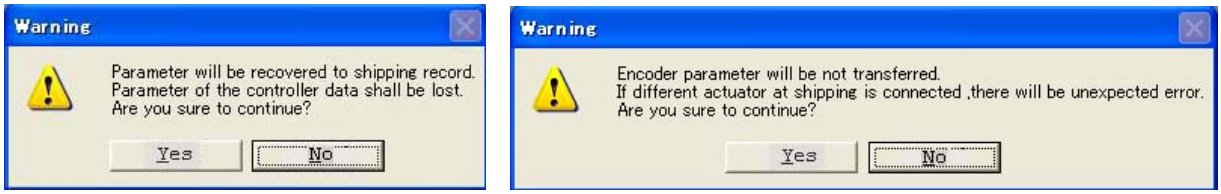


Fig. 8.15 Warning Dialog

(4) After completion of rewriting, write the parameters to the flash ROM

Note: Encoder parameters are not initialized. Because of this an unexpected error may be detected when the actuator different from the one at the time of shipment is connected.

9. Symbol Edit Window

9.1 About Symbols

In the X-SEL controller, variable numbers, flag numbers and other values can be treated as symbols.

(1) Values supporting symbol conversion
The following values can be treated as symbols:
Variable number, flag number, tag number, subroutine number, program number, position number, input port number, output port number, axis number, constant

(2) Symbol description rules
[1] First character: A single-byte alphabet or single-byte underscore.
[2] Second and subsequent characters: Any characters corresponding to ASCII codes 0x21 to 0x7e that can be entered from the keyboard.
[3] Maximum number of characters: 9 single-byte characters (or 8 single-byte characters in the case of a character string literal).
[4] Definition of the same symbol for two or more values within a given function is prohibited. (The same symbol can be defined for two or more local values that are each used in a different program.)
[5] Definition of the same symbol for two or more flag numbers, input ports and/or output ports is prohibited. (The same symbol can be defined for two or more local flags/ports that are each used in a different program.)
[6] Definition of the same symbol for two or more integer variable numbers and/or real variable numbers is prohibited. (The same symbol can be defined for two or more local variables that are each used in a different program.)
[7] Definition of the same symbol for two or more integer constants and/or real constants is prohibited.

(3) Number of symbol definitions: Up to 1,000 (Up to 500 for SSEL, ASEL and PSEL controllers)

(4) Number of symbol uses allowed in commands: Up to 5,000 times including character string literals (Up to 2,000 times for SSEL, ASEL and PSEL controllers)
* Defining the input condition, operands 1 and 2 and output in a step all using symbols is equivalent to four symbol uses in one step.

9.2 Explanation of the Symbol Edit Window

(1) Click Symbol (Y) from the menu bar, and then select Edit (E).

(2) The symbol edit window (Edit Symbol) will open.

Save to File

Clicking this button will open a dialog box where you can save the parameter data to a file under a desired name.

Transfer to Controller

Clicking this button will transfer the parameter data to the controller.

Print

Clicking this button will print the parameter data.

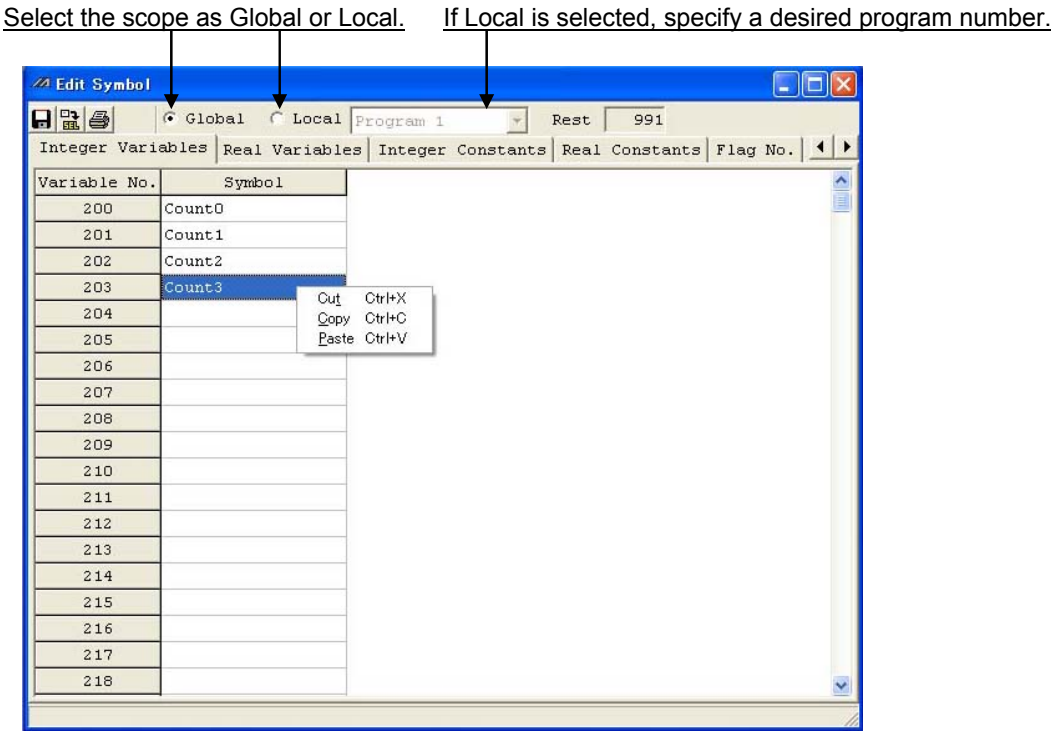


Fig. 9.1 Symbol Edit

* The above symbol edit window is for integer variables. You can display other symbols by clicking each category tab.

(3) Right-click in the symbol edit window will display the pop-up menu which has the options of Cut (T), Copy (C) and Paste (P).
The cut or copied data can be pasted only in the symbol edit window. (The data cannot be pasted in the other windows such as the program edit window and position data edit window.)
(Supported by software version 4.0.0.0 or later)

(4) A symbol character string can be dragged and dropped between the symbol edit window and program edit window.
By dragging a symbol character string on the symbol edit window while pressing the Ctrl key and then dropping it into any cell of Cnd, Operand 1, Operand 2 and Pst, the symbol character string can be copied.
The reverse operation (drag & drop operation from the program edit window to the symbol edit window) is also available.
(Supported by software version 4.0.0.0 or later)

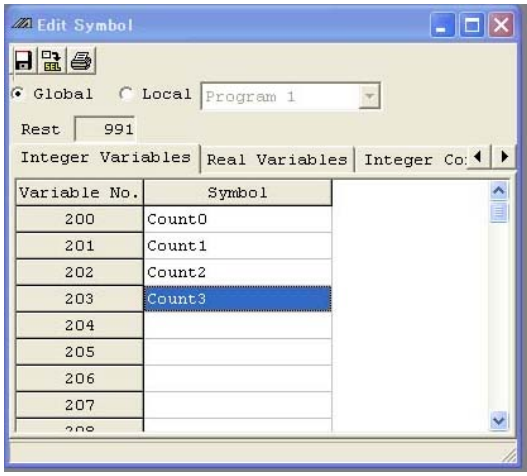


Fig. 9.2 Symbol Edit Window

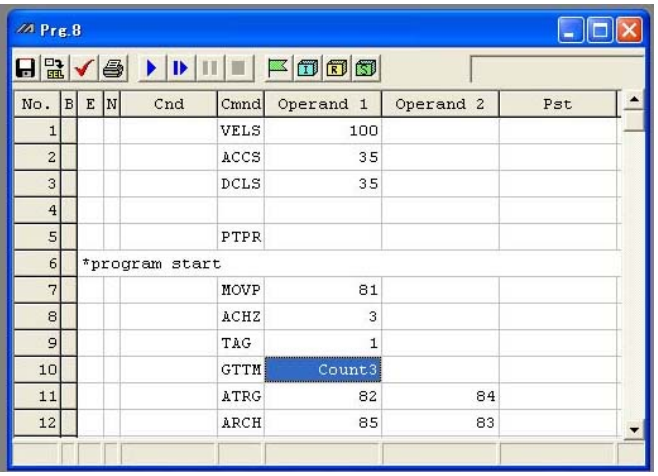


Fig. 9.3 Program Edit Window

In the coordinate system definition data edit window, clicking Edit (E) from the menu bar and then selecting Undo (U) can cancel up to the most recent 10 input operations.
Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.
However, the cancel function will become disabled when any of the following operations is performed:
- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 9.4 will be displayed.
Clicking Yes will cancel the operation executed immediately before.

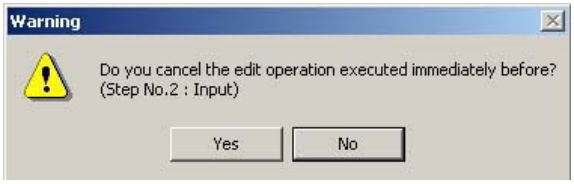


Fig. 9.4 Warning

9.3 Saving Symbol Data and Closing the Edit Window

(1) Saving to a file the symbol data you are editing
Click the Save to File button in the symbol edit window. This is the same as clicking **File (F)** and then selecting **Save As (A)**.

(2) Transferring to the controller the symbol data you are editing
You can save the symbol data you are editing to the controller's memory.
Click the Transfer to Controller button in the symbol edit window.
This button is selectable only in the online edit mode.

(3) Writing to the flash ROM
Once the program has been transferred to the controller, the following confirmation dialog box with the message, "Write Flash ROM?" will be displayed.

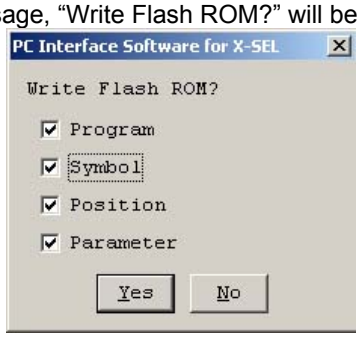


Fig. 9.5 Confirmation
(X-SEL-J/K, P/Q, TT, SSEL, ASEL, PSEL)

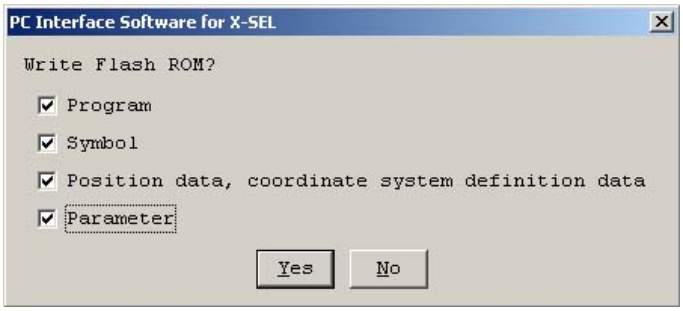


Fig. 9.6 Confirmation
(X-SEL-JX/KX, PX/QX)

Click and select a desired item (Symbol, etc.) to write to the flash ROM.

Click Yes → The memory data will be written to the flash ROM.

Click No → The memory data will not be written to the flash ROM.
If No (N) is selected, the controller will clear all data in its memory after a reset (i.e., after the controller power is reconnected or a software reset is executed), and then load the data from the flash ROM. (The controller will operate in accordance with the transferred data until a reset is executed.)

(4) Closing the symbol edit window
Attempting to close the symbol edit window will display the following confirmation dialog box with the message, "Save edited data in the Controller?"

Fig. 9.3 Confirmation

Yes The edited data will be transferred to the controller.

No The software will close the symbol edit window without saving the edited data.

Cancel The software will cancel the operation and return to the symbol edit window.

10. Coordinate System Definition Data Edit Window

10.1 Explanation of Coordinate System Definition data Edit Window

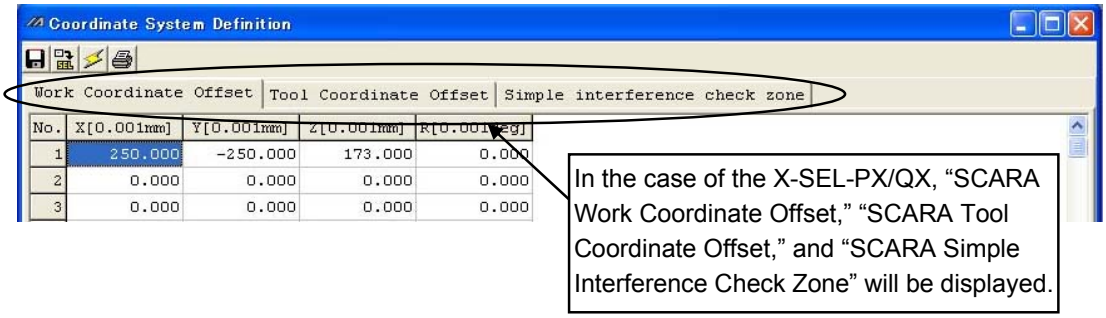


Fig. 10.1 Coordinate System Definition Data Edit Screen

(1) Click **Coordinate System (D)** from the menu bar, and then select **Edit (E)**.
In the coordinate system definition data edit window, clicking **Edit (E)** from the menu bar and then selecting **Undo (U)** can cancel up to the most recent 10 input operations.
Alternatively, pressing the Ctrl key and Z key simultaneously can cancel the operations.
However, the cancel function will become disabled when any of the following operations is performed:
- Transfer of data on the edit screen to the controller
- Saving data on the edit screen to a file
- Closing of the edit screen

When this operation is performed, the warning screen in Fig. 10.2 will be displayed.
Clicking Yes will cancel the operation executed immediately before.

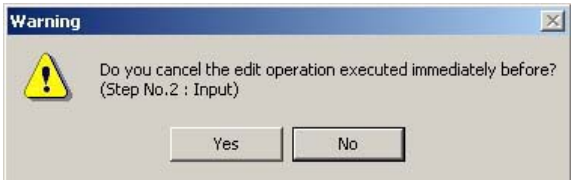


Fig. 10.2 Warning

(2) The coordinate system definition data edit window will be displayed. This window provides the following items:

A. Work Coordinate System Offset

No.	Indicate the work coordinate system No.
X [0.001 mm]	Enter the offset data for the X-axis.
Y [0.001 mm]	Enter the offset data for the Y-axis.
Z [0.001 mm]	Enter the offset data for the Z-axis.
R [0.001 deg]	Enter the offset data for the R-axis.

B. Tool coordinate System Offset

No.	Indicate the tool coordinate system No.
X [0.001 mm]	Enter the offset data for the X-axis.
Y [0.001 mm]	Enter the offset data for the Y-axis.
Z [0.001 mm]	Enter the offset data for the Z-axis.
R [0.001 deg]	Enter the offset data for the R-axis.

C. Simple Interference Check Zone

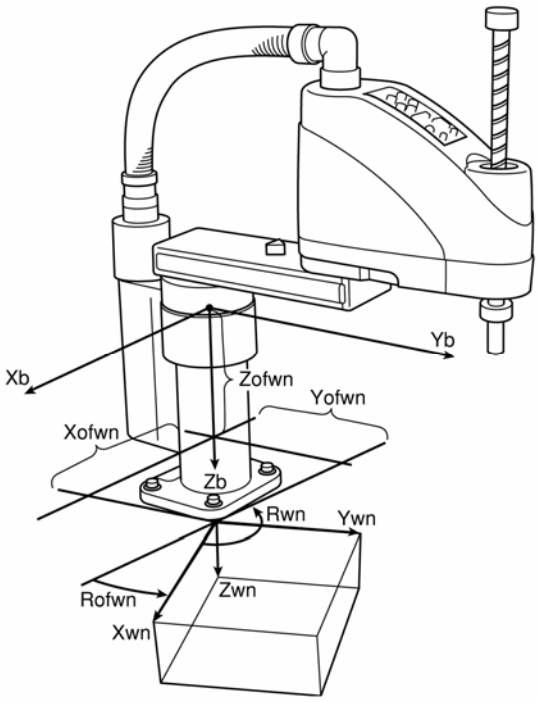
Zone No.	Indicate the zone No.
Coordinates No.	Indicate the coordinate No. Coordinates 1 and Coordinates 2 are available.
X [0.001 mm]	Enter the interference range data for the X-axis.
Y [0.001 mm]	Enter the interference range data for the Y-axis.
Z [0.001 mm]	Enter the interference range data for the Z-axis.
R [0.001 deg]	Enter the interference range data for the R-axis.

Physical output port No.

Global flag No.	Select the output number inside the check zone.
Error type	Select the error type. 0 = Error handling is not performed. 1 = Message level error is output. 2 = Movement release level error is output.

10.2 Work Coordinate System

A total of 32 different coordinates, provided as a combination of three-dimensional orthogonal coordinates and rotation axis coordinates, are defined by the offset of each axis with respect to the base coordinate system. Note that work coordinate system No. 0 is reserved in the system as the base coordinates (= work coordinate system offsets are 0).



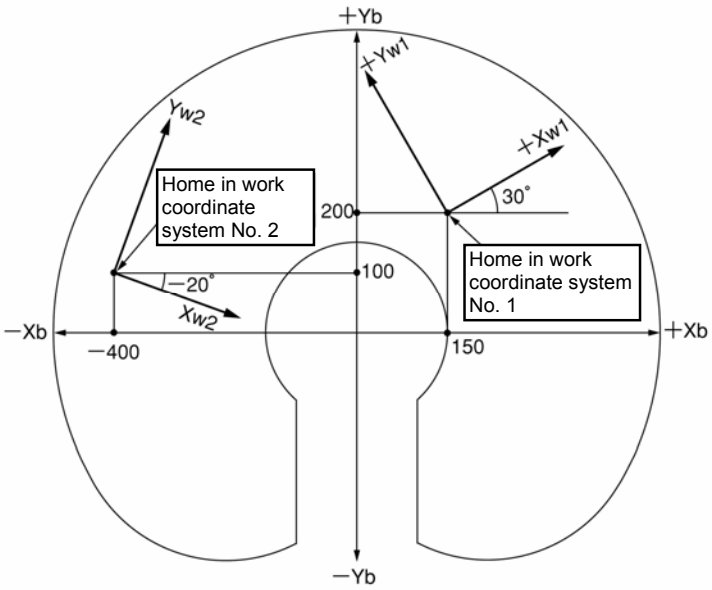
Xofwn: X work coordinate offset
Yofwn: Y work coordinate offset
Zofwn: Z work coordinate offset
Rofwn: R work coordinate offset

Xwn: Work coordinate system, X-axis
Ywn: Work coordinate system, X-axis
Zwn: Work coordinate system, X-axis
Rwn: Work coordinate system, X-axis

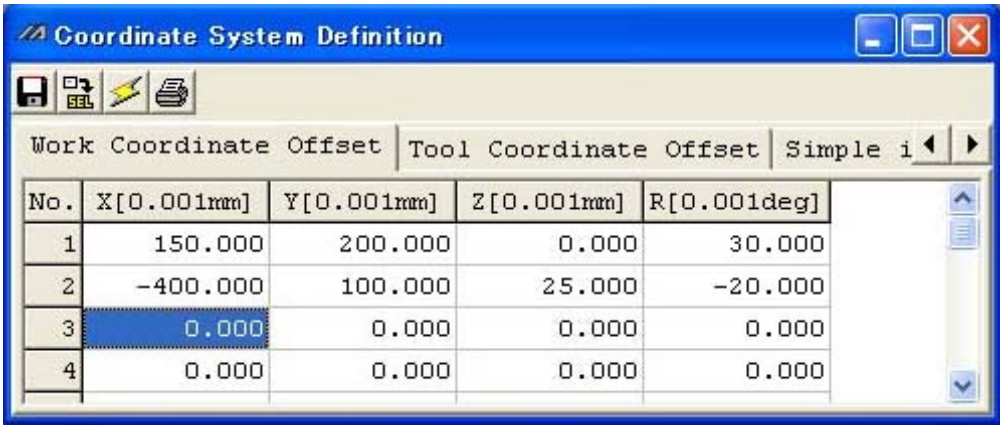
(n indicates work coordinate system No.)

(1) Setting of work coordinate system
Set the offsets with respect to the base coordinate system.

- Setting example of work coordinate system
When defining work coordinate system No. 1 and No. 2 as illustrated below.



Set the offsets for work coordinate system No. 1 as Xofw1 = 150, Yofw1 = 200, Zofw1 = 0 and Rofw1 = 30.
Set the offsets for work coordinate system No. 2 as Xofw2 = -400, Yofw2 = 100, Zofw2 = 25 and Rofw2 = -20.
Shown below is the work coordinate system definition data edit window when work coordinate system No. 1 and No. 2 are set.



No.	X[0.001mm]	Y[0.001mm]	Z[0.001mm]	R[0.001deg]
1	150.000	200.000	0.000	30.000
2	-400.000	100.000	25.000	-20.000
3	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000

Fig. 10.3 Work Coordinate System Offset Setup Screen

* Use the DFWK instruction to set the work coordinate system offsets in the SEL program.

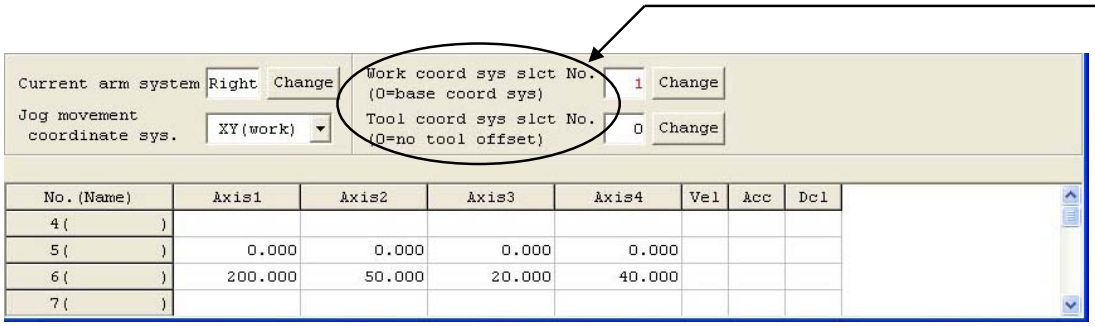
(2) Positioning in a work coordinate system

Perform positioning after selecting a desired work coordinate system.

Use the SLWK instruction to select a desired work coordinate system No. in the SEL program.

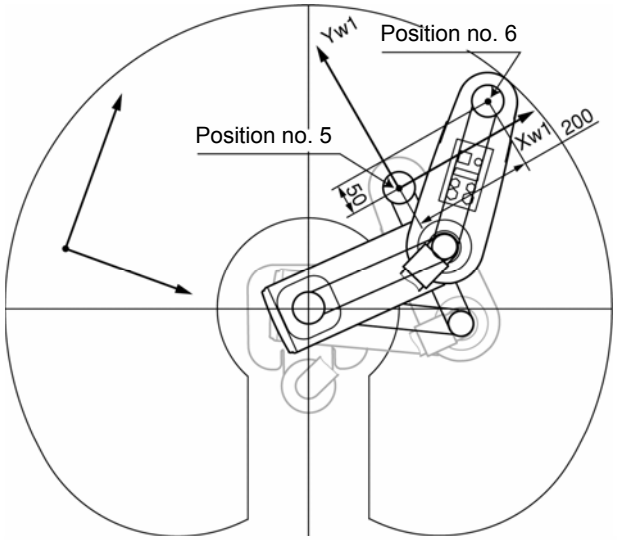
Once set, the work coordinate system selection No. will remain effective after the program ends, and even after the power is reconnected if the system memory backup battery is installed.

[1] When performing PTP positioning to position No. 5 and No. 6 in work coordinate system No. 1:



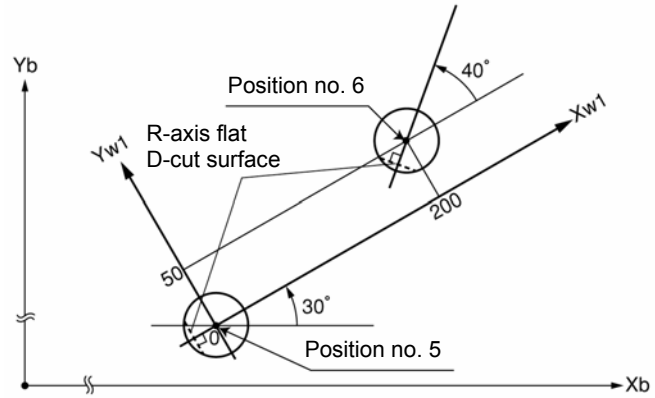
In the case of X-SEL-PX/QX, "SCARA work coord sys slct No" and "SCARA tool coord sys slct No." will be displayed.

Fig. 10.4 Position Data Screen: Work Coordinate System No. 1 Setting



Sample program

```
    :
    :
    :
SLWK   1   Select work coordinate system No. 1.
SLTL   0   Select tool coordinate system No. 0.
PTPR       Specify right arm as the PTP target arm.
MOVP   5   Move to position No. 5.
MOVP   6   Move to position No. 6.
    :
    :
    :
```



The R-axis position is shown at left (top view).

The Z-axis position is as follows:

Position No. 5 Zb = 0

Position No. 6 Zb = 20

[2] When performing PTP positioning to position No. 5 and No. 6 in work coordinate system.

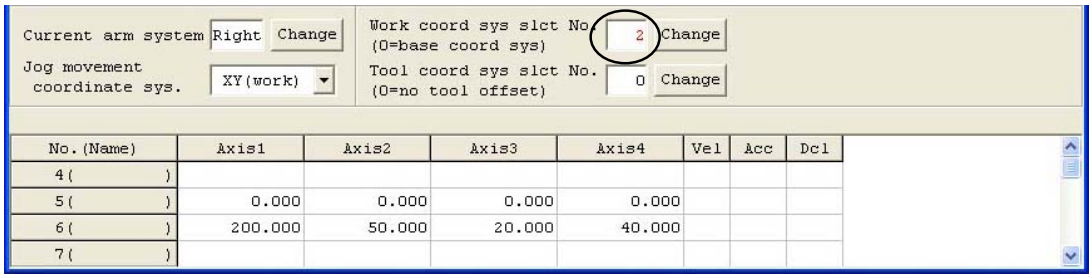
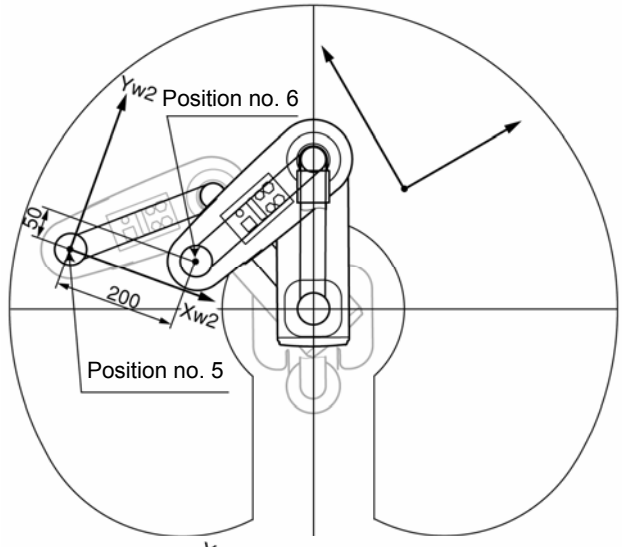
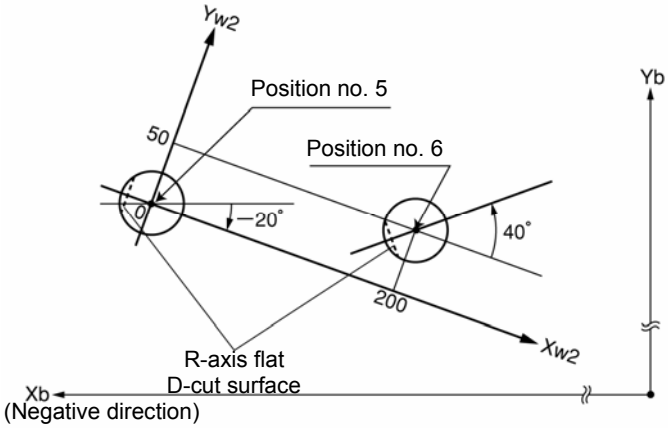


Fig. 10.5 Position Data Screen: Work Coordinate System No. 2 Setting



Sample program

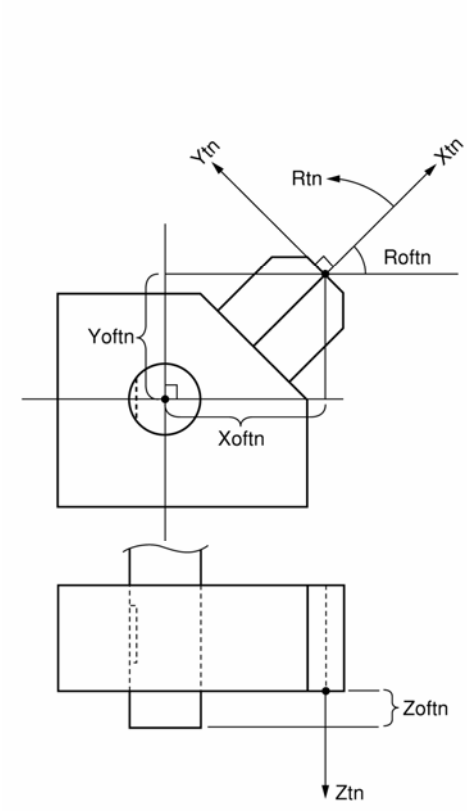
```
    :
    :
    :
SLWK   2   Select work coordinate system No. 2.
SLTL   0   Select tool coordinate system No. 0.
PTPR       Specify right arm as the PTP target arm.
MOVP   5   Move to position No. 5.
MOVP   6   Move to position No. 6.
    :
    :
    :
```

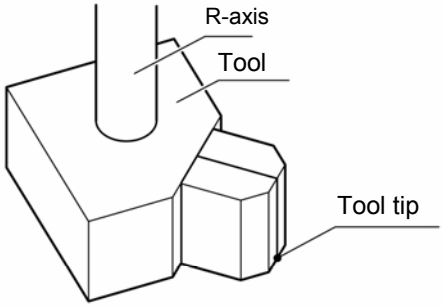


The R-axis position is shown at left (top view).
The Z-axis position is as follows:
Position No. 5 Zb = 25
Position No. 6 Zb = 45

10.3 Tool Coordinate System

A total of 128 different coordinates, provided as a combination of three-dimensional orthogonal coordinates and rotation axis coordinates, are defined by the dimensions (offsets) of the tool (hand etc.) installed on the tool installation surface. Note that tool coordinate system No. 0 is reserved in the system as the tool coordinate system with 0 offsets.
When a defined tool coordinate system No. is selected, the tool tip, not the center of the tool installation surface, is used as the positioning destination.



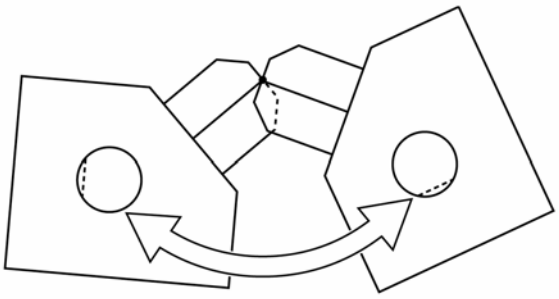


Xoftn: X tool coordinate offset
Yoftn: Y tool coordinate offset
Zoftn: Z tool coordinate offset
Roftn: R tool coordinate offset

Xtn: Tool Coordinate system, X-axis
Ytn: Tool Coordinate system, X-axis
Ztn: Tool Coordinate system, X-axis
Rtn: Tool Coordinate system, X-axis

(n indicate tool coordinate system No.)

Select a defined tool coordinate system and jog the R-axis, and the machine will operate as illustrated below:

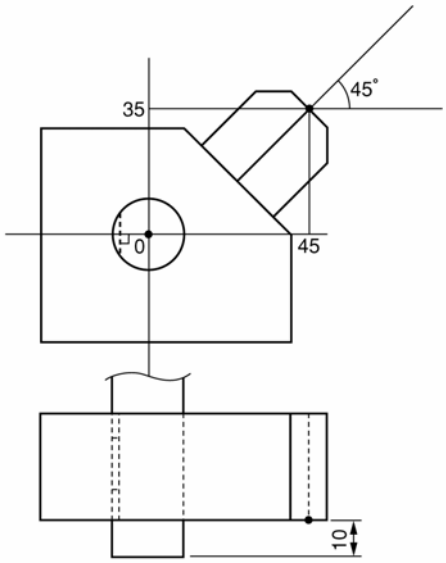


(1) Setting of tool coordinate system

Set the offsets from the center of tool installation surface to the tool tip.

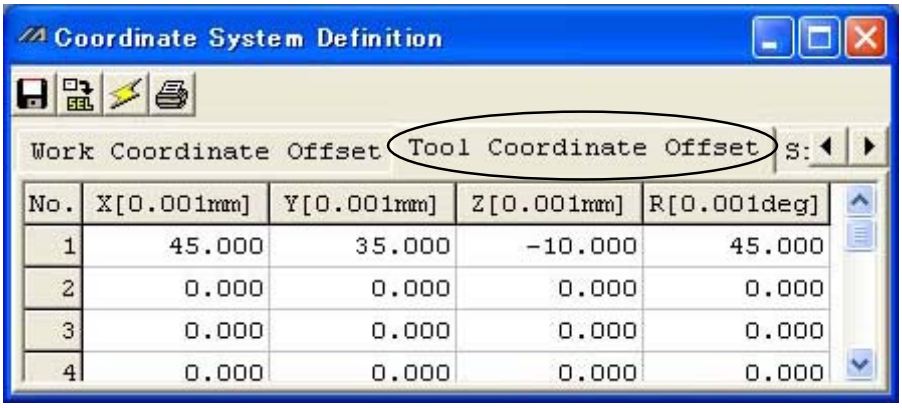
- Setting example of tool coordinate system

When defining tool coordinate system No. 1 as illustrated below:



Set the offsets for tool coordinate system No. 1 as Xoft1 = 45, Yoft1 = 35, Zoft1 = -10 and Roft1 =45.

Shown below is the tool coordinate system definition data edit screen when tool coordinate system No. 1 is set.



No.	X[0.001mm]	Y[0.001mm]	Z[0.001mm]	R[0.001deg]
1	45.000	35.000	-10.000	45.000
2	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000

Fig. 10.6 Tool Coordinate System Offset Setting Screen

*Use the DFTL instruction to set the tool coordinate system offsets in the SEL program.

(2) Positioning based on tool coordinate system offsets

Perform positioning after selecting a desired tool coordinate system.

Use the SLTL instruction to select a desired tool coordinate system No. in the SEL program.

Once set, the tool coordinate system selection No. will remain effective after the program ends, and even after the power is reconnected if the system memory backup battery is installed.

[1] When performing PTP positioning of the tool tip in tool coordinate system No. 1 to position No. 5 and No. 6 in work coordinate system No. 1:

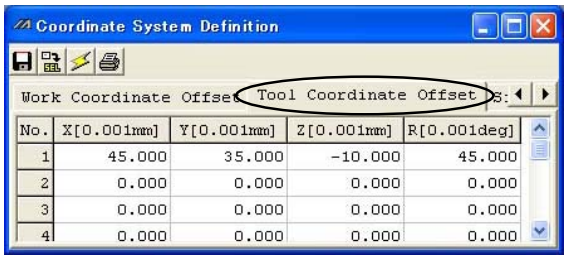


Fig. 10.7 Tool Coordinate System Offset Setting Screen

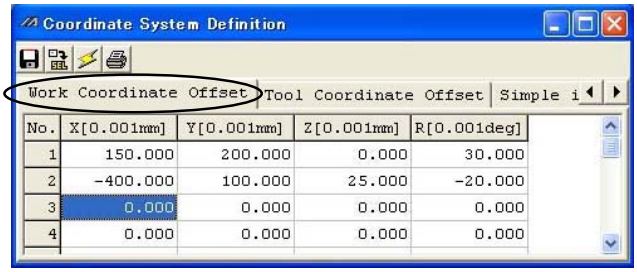


Fig. 10.8 Work Coordinate System Offset Setting Screen

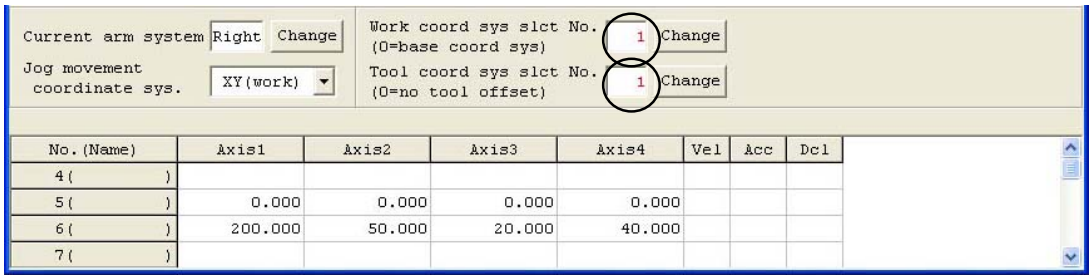
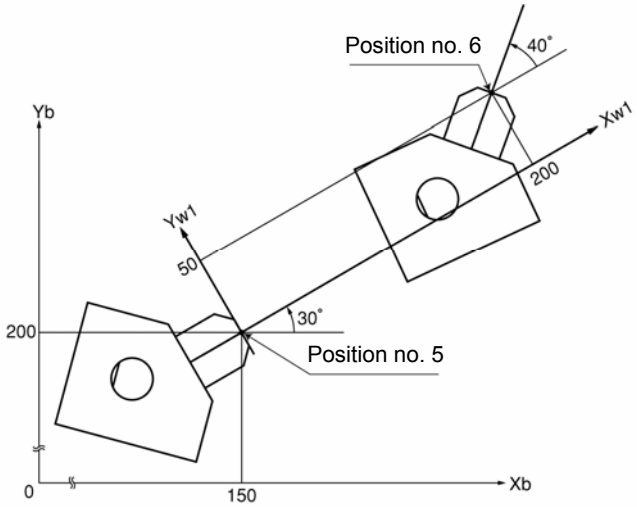


Fig. 10.9 Position Data Screen: Work Coordinate System No. 1 and Tool Coordinate System No. 1 Setting



Sample program

```
    :
    :
    :
SLWK   1   Select work coordinate system No. 1.
SLTL   1   Select tool coordinate system No. 1.
PTPR       Specify right arm as the PTP target arm.
MOVP   5   Move to position No. 5.
MOVP   6   Move to position No. 6.
    :
    :
    :
```

The Z-axis position at the tool tip is as follows:

Position No. 5 Zb = 0

Position No. 6 Zb = 20

A top view is shown at the left.

[2] When performing PTP positioning of the tool tip in tool coordinate system No. 1 to position No. 5 and No. 6 in work coordinate system No. 2:

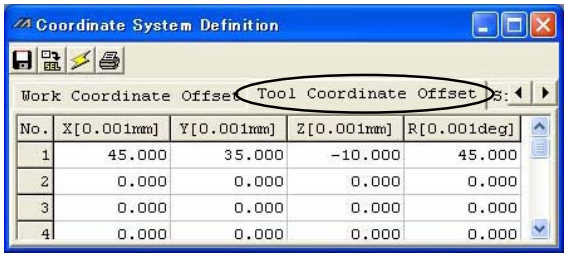


Fig. 10.10 Tool Coordinate System Offset Setting Screen

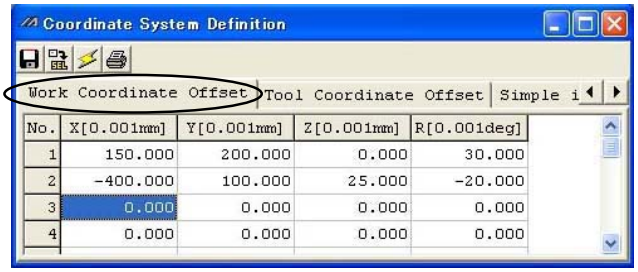


Fig. 10.11 Work Coordinate System Offset Setting Screen

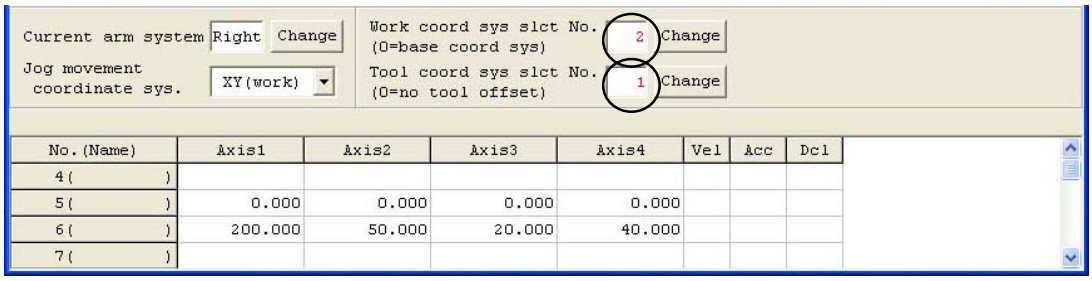
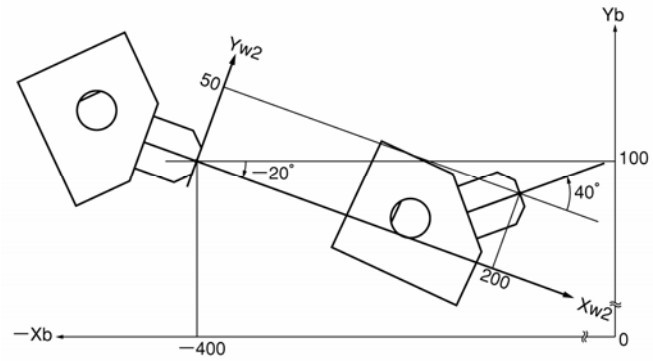


Fig. 10.12 Position Data Screen: Work Coordinate System No. 2 and Tool Coordinate System No. 1 Setting



Sample program

:
:
:

SLWK 2 Select work coordinate system No. 2.
SLTL 1 Select tool coordinate system No. 1.
PTPR Specify right arm as the PTP target arm.
MOVP 5 Move to position No. 5.
MOVP 6 Move to position No. 6.

:
:
:

The Z-axis position at the tool tip is as follows:
Position No. 5 Zb = 25
Position No. 6 Zb = 45

10.4 Simple Interference Check Zone

The simple interference check zone is an area set for the purpose of interference check between the robot and the peripherals. Entry of the center of tool installation surface into the simple interference check zone can be detected when tool coordinate system No. 0 (= tool coordinate system offsets are 0) is selected, while entry of the tool tip in the simple interference check zone can be detected when tool coordinate system No. 1 through 127 (= tool coordinate system offset is other than 0) is selected.

(1) Note on using the simple interference check zone

Entry of the center of tool installation surface (when tool coordinate system No. 0 is selected) or tool tip (when tool coordinate system No. 1 through 127 is selected) into the simple interference check zone is detected. Entry of the circumference of the R-axis or any part of the tool other than the tip is not detected.

This function does not prevent entry of the tool into the simple interference check zone. It only detects that the tool has entered the zone.

Entry cannot be detected reliably unless the applicable part of the tool remains inside the simple interference check zone for at least 5msec. Accordingly, this function is intended as a simple check during low-speed operation.

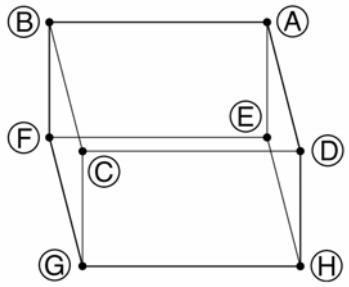
The actual motion differs between high-speed operation (actual operating condition) and low-speed operation. Provide a sufficient margin to prevent interference. (During high-speed operation, the tool tends to pass along a line further inward compared with low-speed operation.)

The defined coordinates of the simple interference check zone are always handled as data linked to the base coordinate system (work coordinate system selection No. 0). Therefore, the position of simple interference check zone does not change even when the work coordinate system is changed. Exercise caution.
If the defined coordinates of the simple interference check zone are changed, it takes 5msec before the check result reflects the new settings.

During PTP operation, the tool does not follow specified routes. When operating the tool near an obstacle (including the robot body), always perform test operation at low speed and confirm that interference does not occur. Thereafter, gradually increase the speed to an appropriate level.

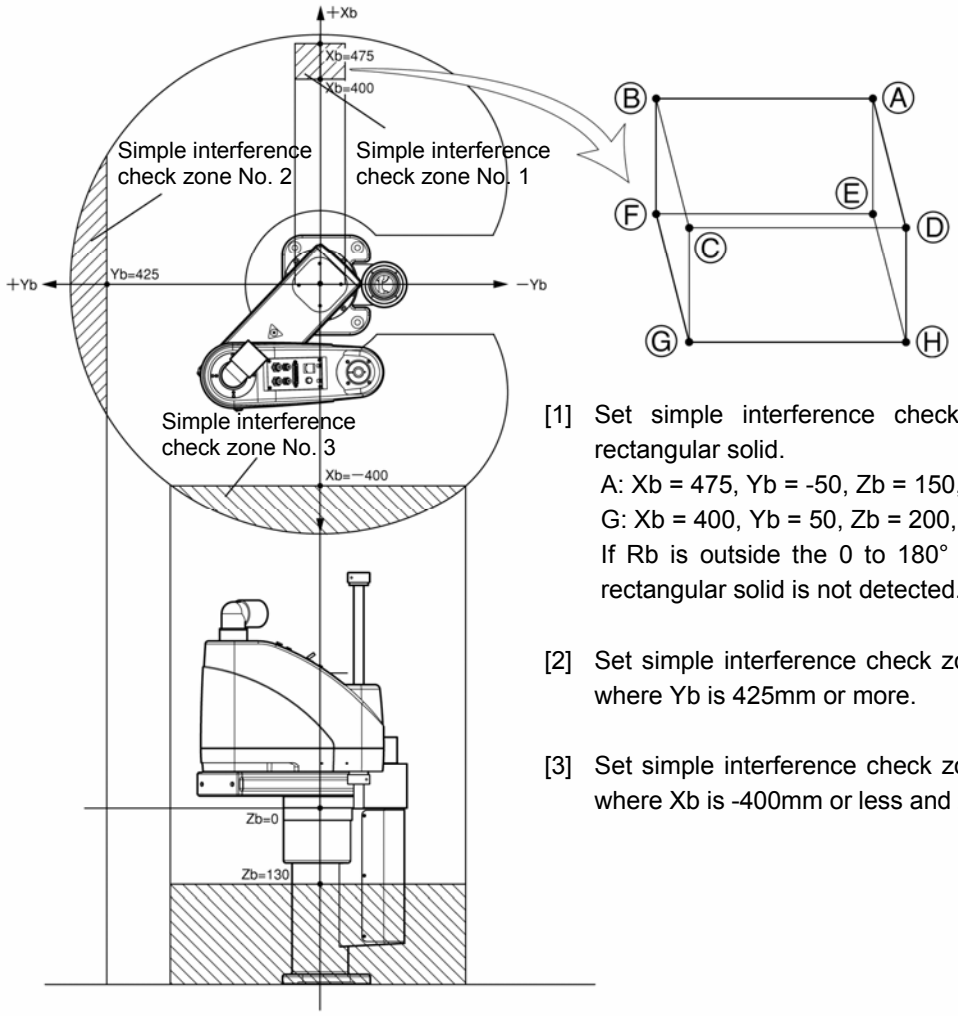
(2) Setting of simple interference check zone

Set the simple interference check zone using the position data in the base coordinate system.
Enter the maximum and minimum coordinates of the simple interference check zone.
Set the boundaries of the simple interference check zone parallel with the base coordinate axes.



To set the simple interference check zone as a rectangular solid like the one shown at the left, enter the coordinates of two points in any one of the four combinations of A-G, B-H, C-E or D-F.

Setting example of simple interference check zones
Define simple interference check zones No. 1, No. 2 and No. 3 as shown below:

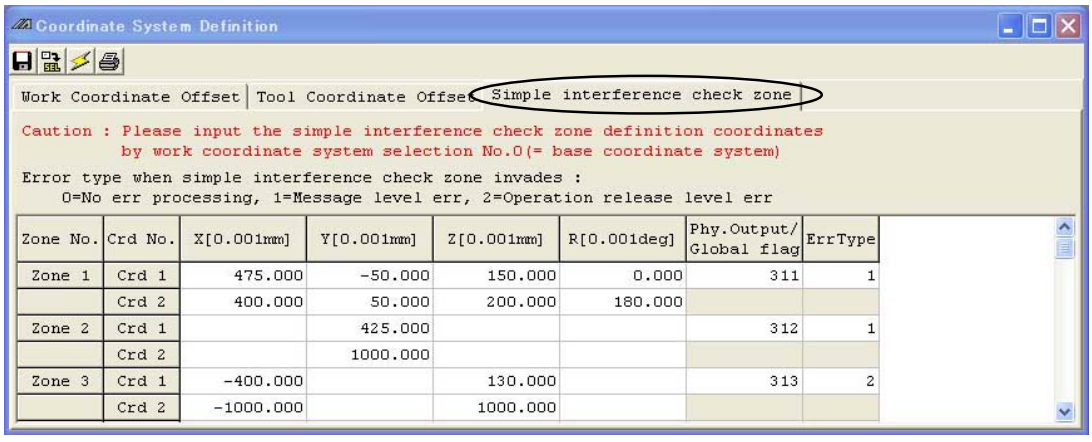


[1] Set simple interference check zone No. 1 as a rectangular solid.
A: Xb = 475, Yb = -50, Zb = 150, Rb = 0
G: Xb = 400, Yb = 50, Zb = 200, Rb = 180
If Rb is outside the 0 to 180° range, entry into this rectangular solid is not detected.

[2] Set simple interference check zone No. 2 as an area where Yb is 425mm or more.

[3] Set simple interference check zone No. 3 as an area where Xb is -400mm or less and Zb is 130mm or more.

Shown below is the data edit screen to define simple interference check zones when simple interference check zones No. 1, No. 2 and No. 3 are set respectively.



Zone No.	Crd No.	X[0.001mm]	Y[0.001mm]	Z[0.001mm]	R[0.001deg]	Phy.Output/ Global flag	ErrType
Zone 1	Crd 1	475.000	-50.000	150.000	0.000	311	1
	Crd 2	400.000	50.000	200.000	180.000		
Zone 2	Crd 1		425.000			312	1
	Crd 2		1000.000				
Zone 3	Crd 1	-400.000		130.000		313	2
	Crd 2	-1000.000		1000.000			

Fig. 10.13 Simple Interference Check Zone Definition Coordinates Setting Screen

When simple interference check zone No. 1 is selected, entry of the tool into the rectangular solid will not be detected if Rb is outside the 0 to 180° range. To enable detection regardless of the R-axis coordinate, leave Coordinate 1 and Coordinate 2 in the R column in the Zone 1 line blank.

With simple interference check zone No. 2 and No. 3, where either the maximum or minimum coordinate can be set to any value, enter a value outside the opening range for the maximum or minimum coordinate (1000 in zone 2, 1000 or -1000 in zone 3).

The maximum/minimum coordinate can be set in either Coordinate 1 or Coordinate 2.

The simple interference check zones are set so that output port No. 311 turns ON when entry into simple interference check zone No. 1 is detected, No. 312 turns ON when entry into simple interference check zone No. 2 is detected, and port No. 313 turns ON when entry into simple interference check zone No. 3 is detected.

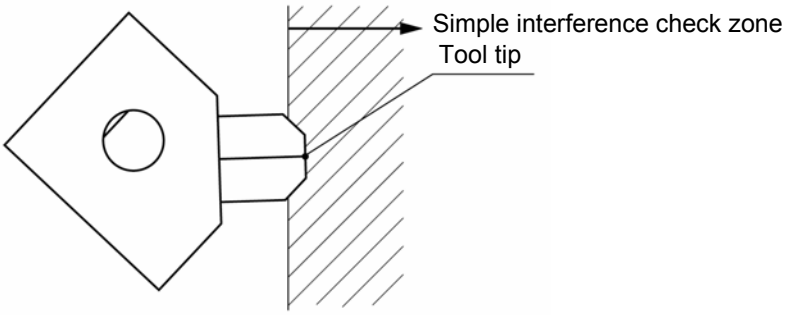
If physical output numbers and global flag numbers are duplicated, chattering will occur and the result will become unstable. Do not set overlapping numbers.

Use of the simple interference check zone function slows the CPU performance significantly. When the function is not used, set 0 in “Phy. Output/Global Flag” and “Err Type” to disable the function.

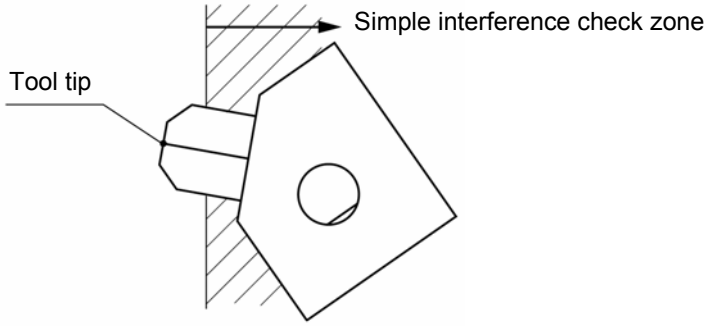
* Use the DFIF instruction to set the simple interference check zones in the SEL program.

(3) Note on detection while a tool coordinate system is selected

While a tool coordinate system is selected, entry into the simple interference check zone is detected based on the tool tip, not the center of the installation surface.

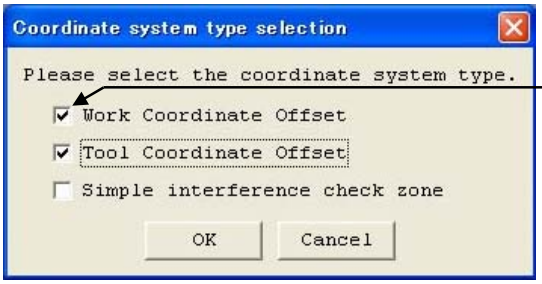


Depending on the moving track, a part of the tool other than the tip may enter the simple interference check zone, as illustrated below. In this case, detection will not occur until the tool tip enters the simple interference check zone. Exercise due caution.



10.5 Coordinate System Definition Data Clear Window

The procedure to delete coordinate system definition data is explained below:
[1] Click Coordinate System (D) from the menu bar, and then select Clear (L).
[2] The coordinate system definition data clear window will be displayed.



Click in the applicable checkbox to select the type of data you wish to delete.

Fig. 10.14 Coordinate System Definition Data Clear

Deletion of Coordinate Definition Data

Select the type of coordinate system data you wish to delete.
Next, click the OK button.
A warning message will be displayed to confirm if you really want to delete the data.
Click the OK button.
The data will be transferred to the controller.
Clicking the Cancel button will cancel the operation.

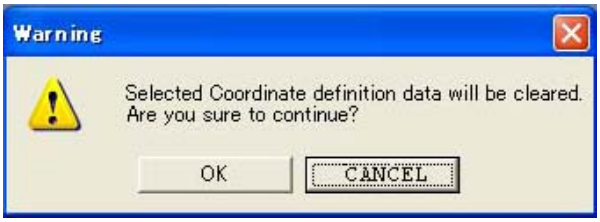
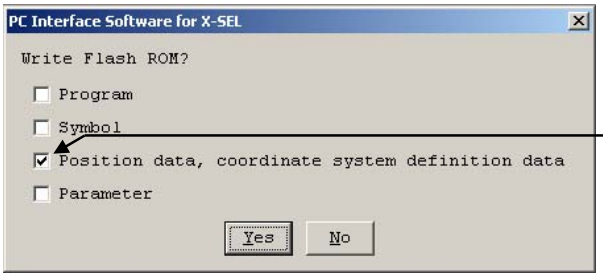


Fig. 10.15 Warning

[3] Write to the flash ROM.



Click in the applicable checkbox to select the type of data you wish to write.

Fig. 10.16 Confirmation

Click Yes → The memory data will be written to the flash ROM.
Click No → The memory data will not be written to the flash ROM.
Perform a reset (reconnect the power or reset the software), and the robot will return to the condition before the deletion.

10.6 Printing of Coordinate System Definition Data

The procedure to print coordinate system definition data is explained below.
[1] Click the [X] button in the menu if the coordinate system data definition edit window.
[2] Select whether to print all types or the coordinate system data being displayed.

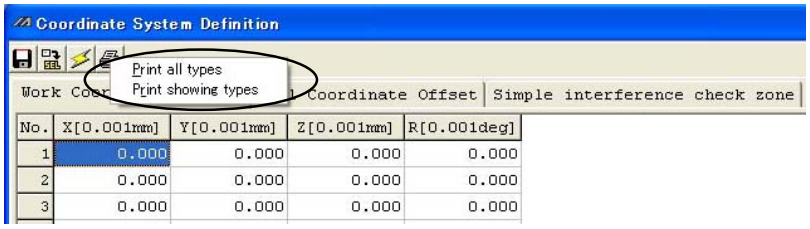


Fig. 10.17 Print Type Selection

[3] The coordinate system definition data will be printed in accordance with the selected content.

11. Monitor

You can check the current statuses of various items from the Monitor menu.

(1) Task status monitor window

This window shows the statuses of running programs.

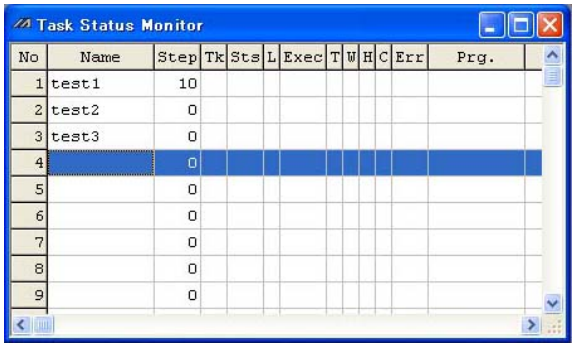


Fig. 11.1 Task Status

No.: Program No.
Name: Symbol
Sts: Task status
Task status managed by the internal OS.
(Main application version 0.14 or later)
(PC software version 0.0.7.2. or later)
L: Task level
Exec: Current step number
T: Paused (by step operation, by a breakpoint, by the pause button, by the SSPG command, etc.)
W: Waiting (in response to the TIMW, WTxx, WZxx, WRIT or READ command, waiting for a servo command to be completed, etc.)
(PC software version 1.1.0.5 or later)
H: HOLD input (main application version 0.26 or later) (PC software version 1.1.0.5 or later)
C: CANC input (main application version 0.26 or later) (PC software version 1.1.0.5 or later)
Err: Error number
Prg. and subsequent fields: Detailed error information

(2) System status monitor window

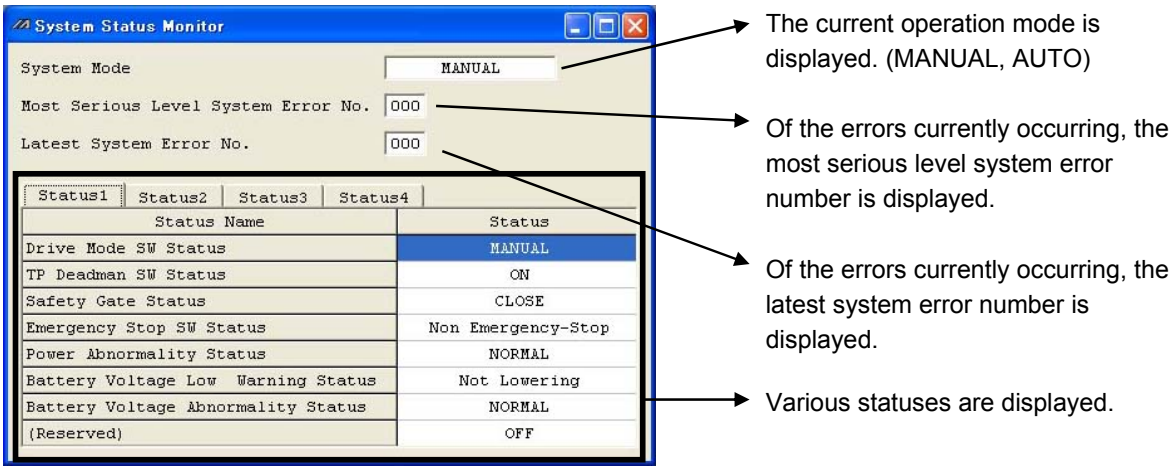


Fig. 11.2 System Status

In the case of the SSEL, ASEL or PSEL controller, the Status of Positioner Mode can be checked by Status 3.

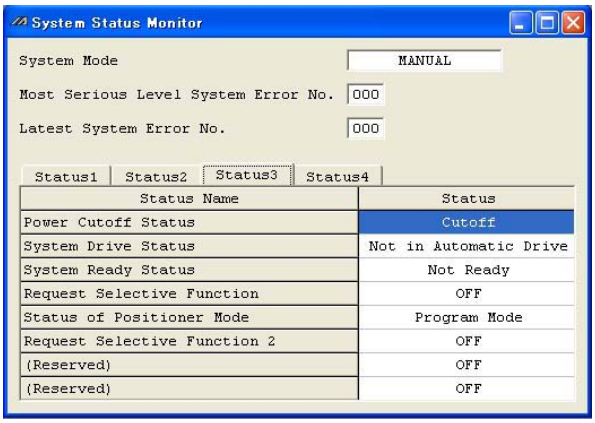


Fig. 11.3 Display in Program Mode

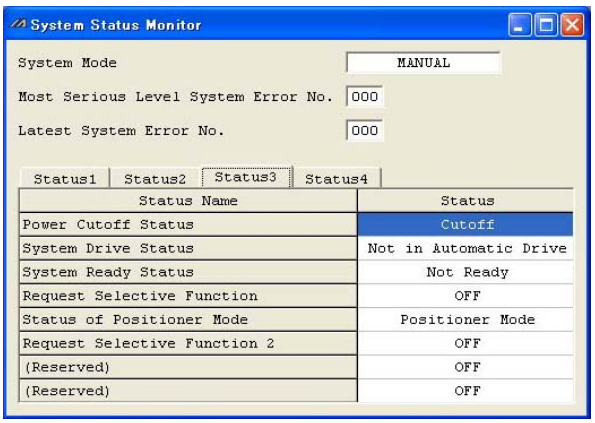


Fig. 11.4 Display in Positioner Mode

(3) Axis status monitor window

This window shows the status of each axis.

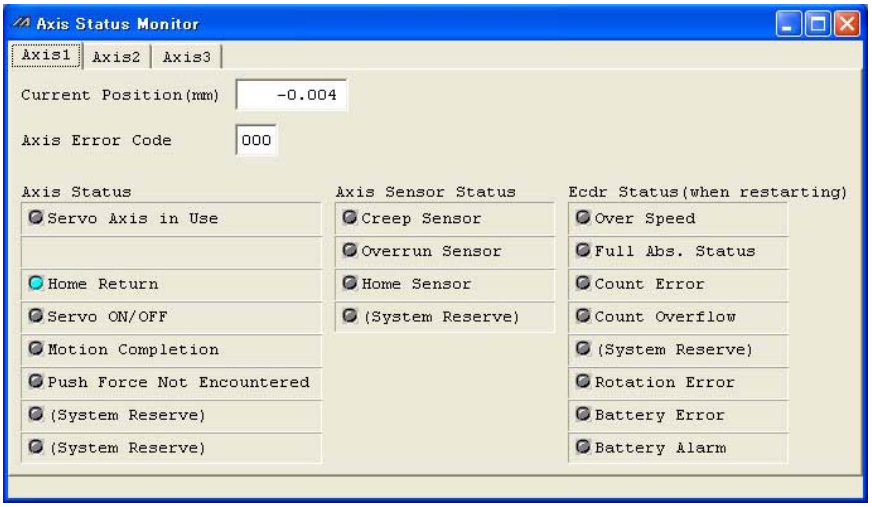


Fig. 11.5 Axis Status

(4) Input port, virtual input port, output port and virtual output port windows

These windows show the ON/OFF status of each input/output. 1: ON, 0: OFF

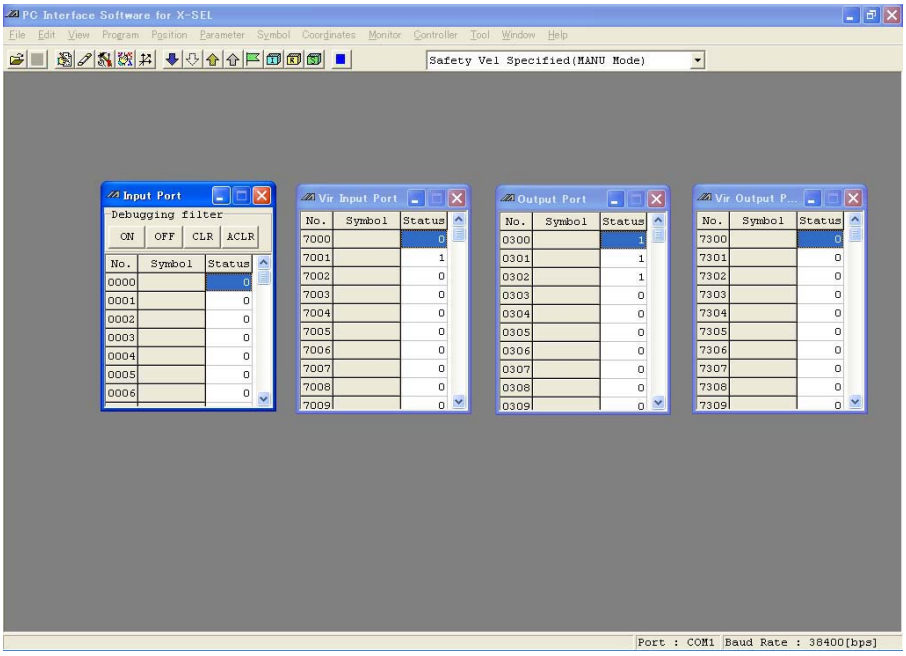


Fig. 11.6 Input/Output Ports

The 1/0 (ON/OFF) of output ports and virtual output ports can be switched by double-clicking the applicable port or pressing the Ctrl key and space key simultaneously.

In the case of the SSEL, ASEL or PSL controller in the positioner mode, no symbol will be displayed.

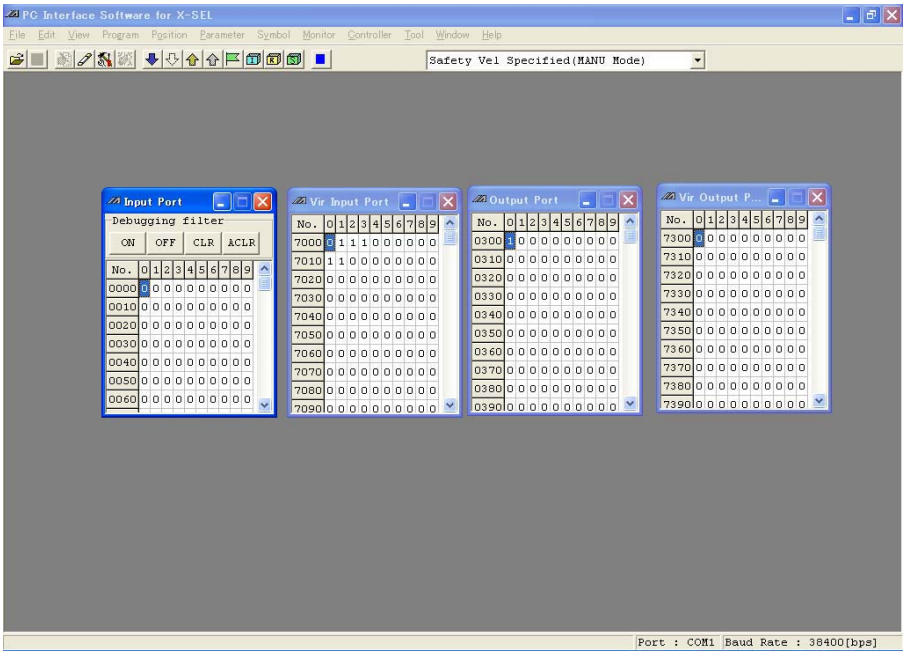


Fig. 11.7 Input/Output Ports (No Symbol)

In the input port window, you can set an input port debug filter.
“Input port debug filter” is a function that causes the controller to recognize a given physical input port as ON or OFF regardless of the actual input status of the physical input port.
(This function is supported by X-SEL PC software version 1.1.1.0 or later.)

To set a debug filter, use the following four buttons provided on the Debug filter setting panel in the input port window (available in the MANUAL mode).

[1] ON
Clicking this button will set an ON filter for the input port corresponding to the cursor position.
The controller will always recognize the specified port as ON.

[2] OFF
Clicking this button will set an OFF filter for the input port corresponding to the cursor position.
The controller will always recognize the specified port as OFF.

[3] CLR
Clicking this button will clear the debug filter currently set for the input port corresponding to the cursor position.

[4] ACLR
Clicking this button will clear the debug filters currently set for all physical input ports.

* While a debug filter is set, the status of the port (“0” or “1”) for which the ON or OFF filter is set will be shown in red (all ports for which a debug filter is not set will be shown in black).

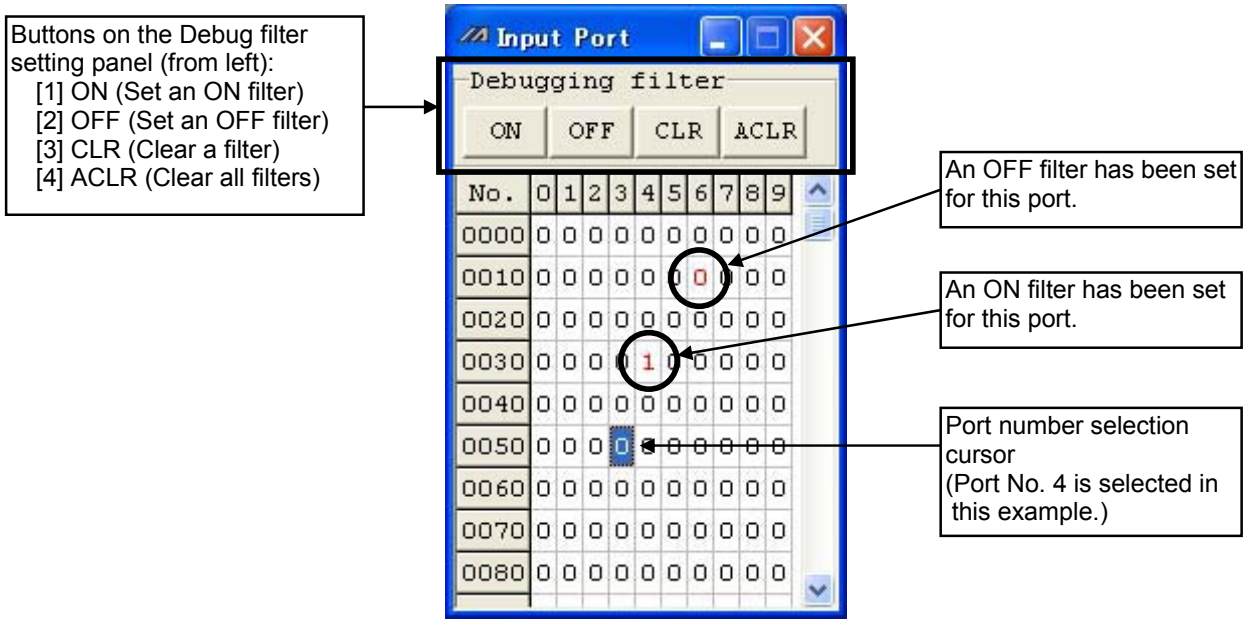


Fig. 11.8 Input Port Window

Clicking CLR or ACLR will display the warning message shown in Fig. 11.9.
Select Yes (clear the filter(s)) or No (cancel the clear) after carefully reading the content of the message.

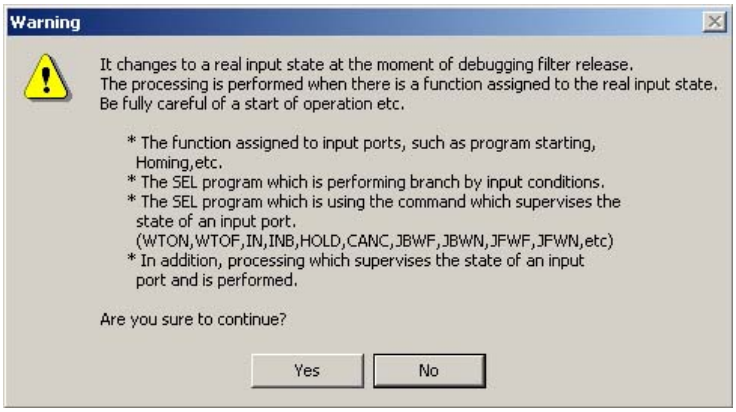


Fig. 11.9 Warning Message

The status (ON/OFF) of each input port as recognized by the controller changes the moment the debug filter is cleared or controller operation mode (MANUAL or AUTO) is changed.

(1) Upon clearing a filter

Actual input status / Filter type	ON	OFF
ON	————	ON → OFF
OFF	OFF → ON	————

(2) Upon switching the controller mode from MANUAL to AUTO

Actual input status / Filter type	ON	OFF
ON	————	ON → OFF
OFF	OFF → ON	————

(3) Upon switching the controller mode from MANUAL to AUTO and then back to MANUAL

Actual input status / Filter type	ON	OFF
ON	————	OFF → ON
OFF	ON → OFF	————

* Changing the controller mode (MANUAL or AUTO) will not clear debug filters. Accordingly, changing the controller mode back to MANUAL from AUTO will make effective again the debug filters that were set in the previous MANUAL mode.

If any function is assigned to an input port, the applicable process will be executed. Exercise due caution against start of the following operations and others.

- Functions assigned to input ports, such as program start and homing of all valid axes
- SEL programs that use branching based on input condition
- SEL programs that include commands for monitoring input port statuses (WTON, WTOF, IN, INB, HOLD, CANC, JBWF, JBWN, JFWE, JFWN, etc.)
- Other processes executed according to the input port statuses as monitored (recognized) by the controller

(5) Global flag, global integer variable, global real variable and global string windows

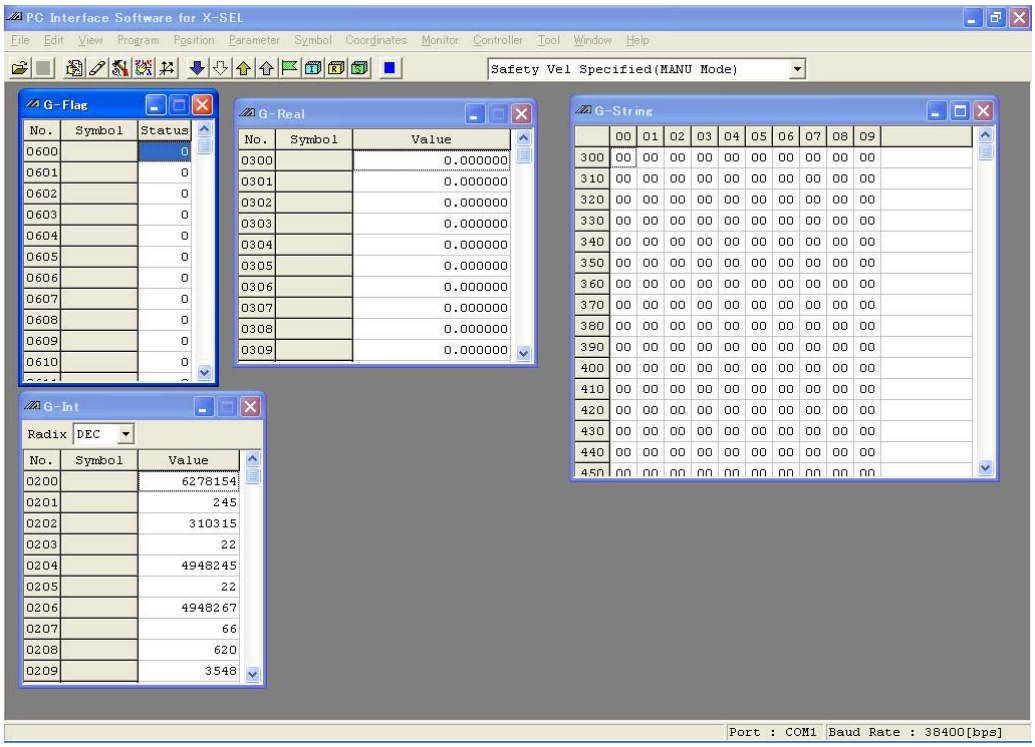


Fig. 11.10 Global

You can change the values in global variables or assign values to global variables.
You can also change the characters in global strings or assign characters to global strings.
The 1/0 (ON/OFF) of global flags can be switched by double-clicking the applicable global flag or pressing the Ctrl key and space key simultaneously.

In the integer variable monitor, select Decimal or Hexadecimal for the data radix.
(Select it from the combo box at the top of the window.)

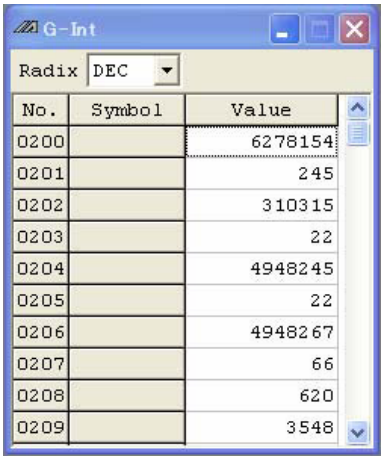


Fig. 11.11 Decimal Notation

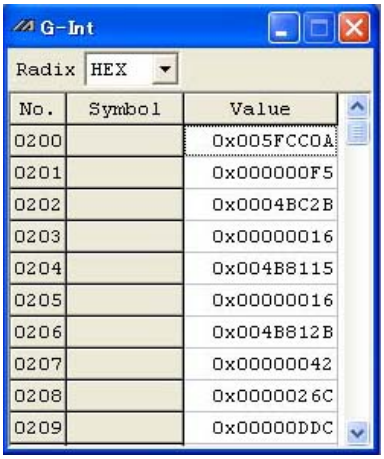


Fig. 11.12 Hexadecimal Notation

(6) Detailed error information

Clicking **Monitor (M)** from the main menu and then selecting **Detailed Error Information (E)** will display the Error Number Select screen.

Clicking OK after setting the Error Number Select will display the Detailed Error Information screen.

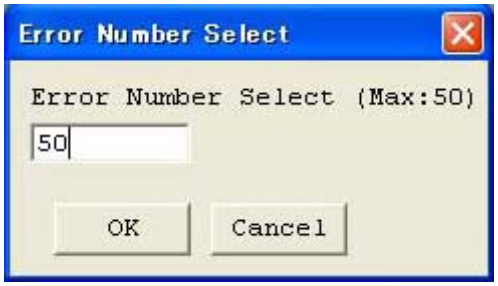


Fig. 11.13 Error Number Select Screen

When errors occur, error codes, messages and other information will be displayed.

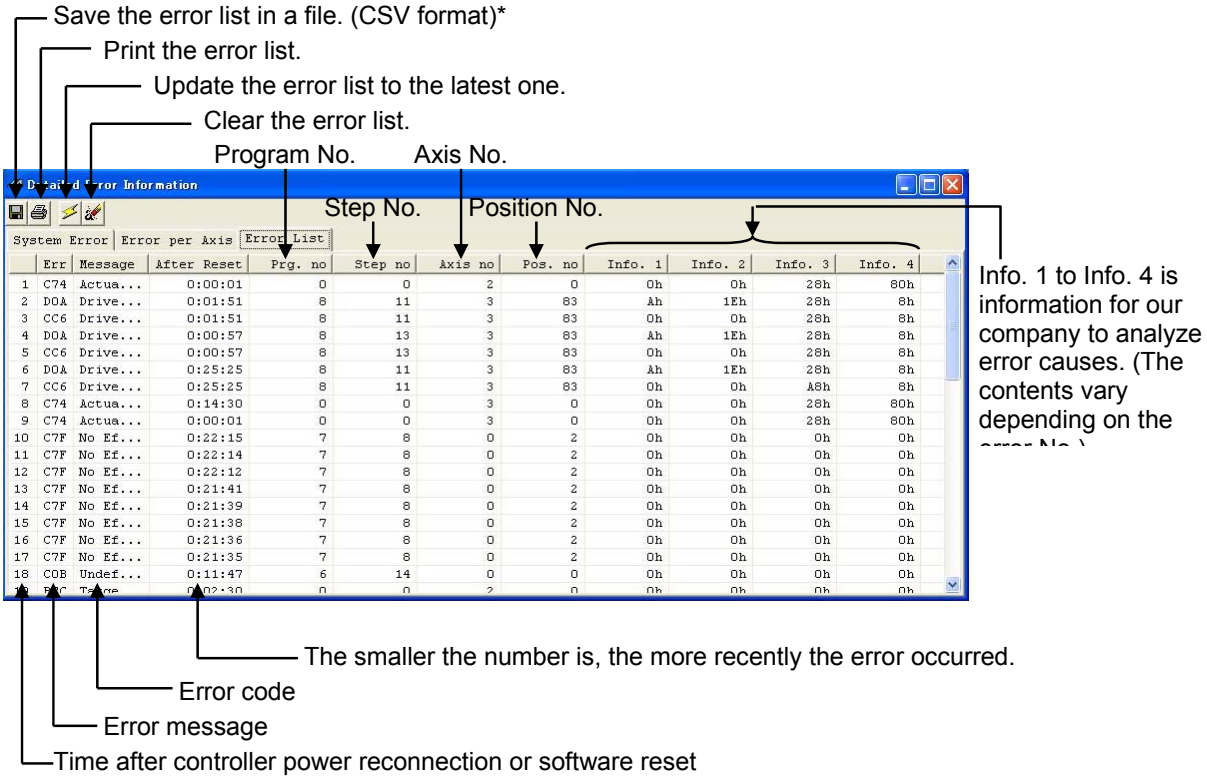


Fig. 11.14 Detailed Error Information

If the system memory backup battery is installed, the error list contents will not be cleared even if the power is turned OFF. When clearing the error list contents, click the alarm list clear key. A warning in Fig. 11.15 will be displayed. Clicking Yes will clear the error list contents.

Fig. 11.15 Confirmation

* When trouble occurs, you may be requested to send the error list saved in a file to resolve the problem at an early stage. The error list file cannot be opened by this PC interface software.

(7) Monitoring data This item cannot be displayed for X-SEL-JX/KX controllers.

With regard to the orthogonal axis selected for Target Axis, the operation amount, velocity instruction and feedback pulse can be displayed. Select the item you want to display for Data Type.

Clicking the key can save the acquired data in a file. The data will be stored as numeric data in CSV format.

(Note) This function is supported by software version 5.0.2.0 or later.
It is also effective only when the controller supports the function.

(Note) In the case of X-SEL-PX/QX, the operation amount, velocity instruction and feedback pulse cannot be monitored.

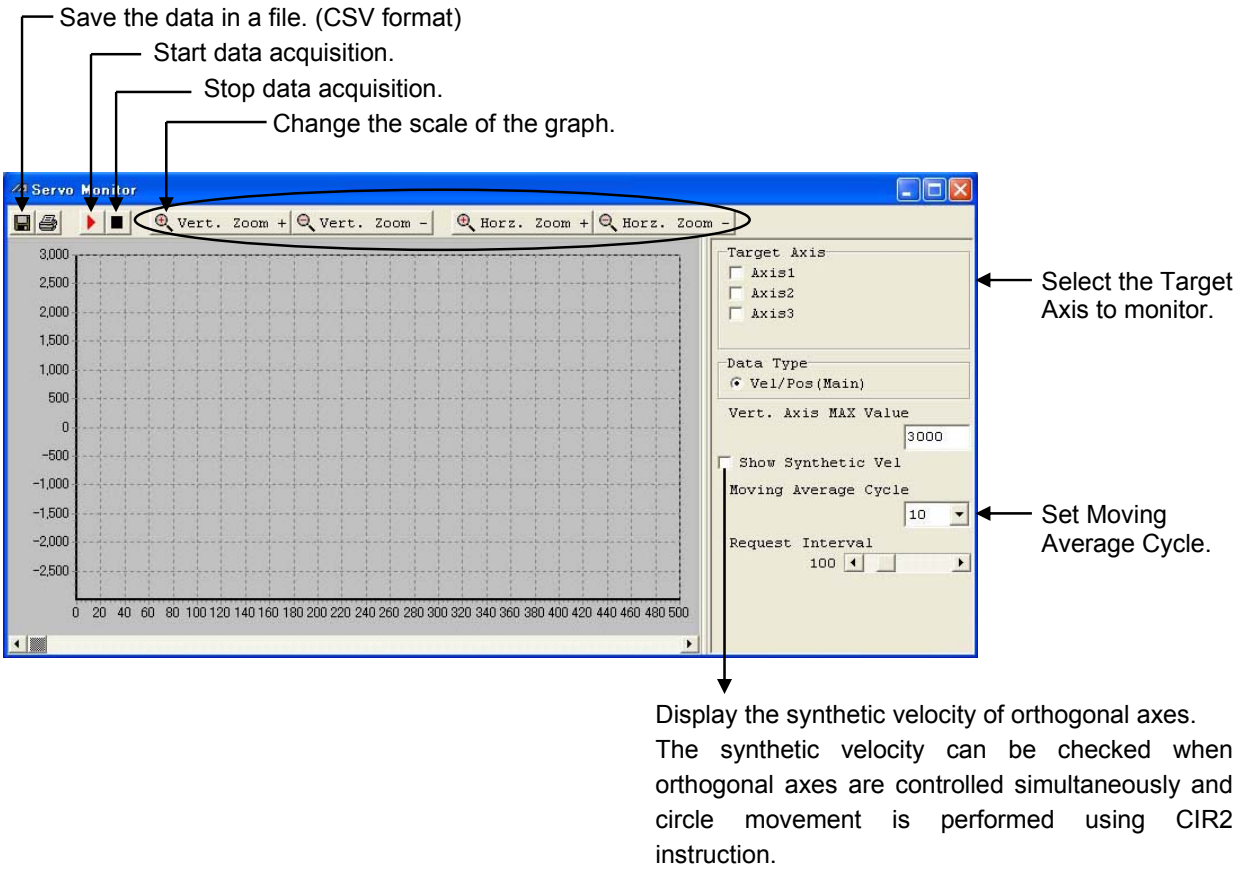


Fig. 11.16 Monitoring Data (Display Example of X-SEL-J/K and TT)

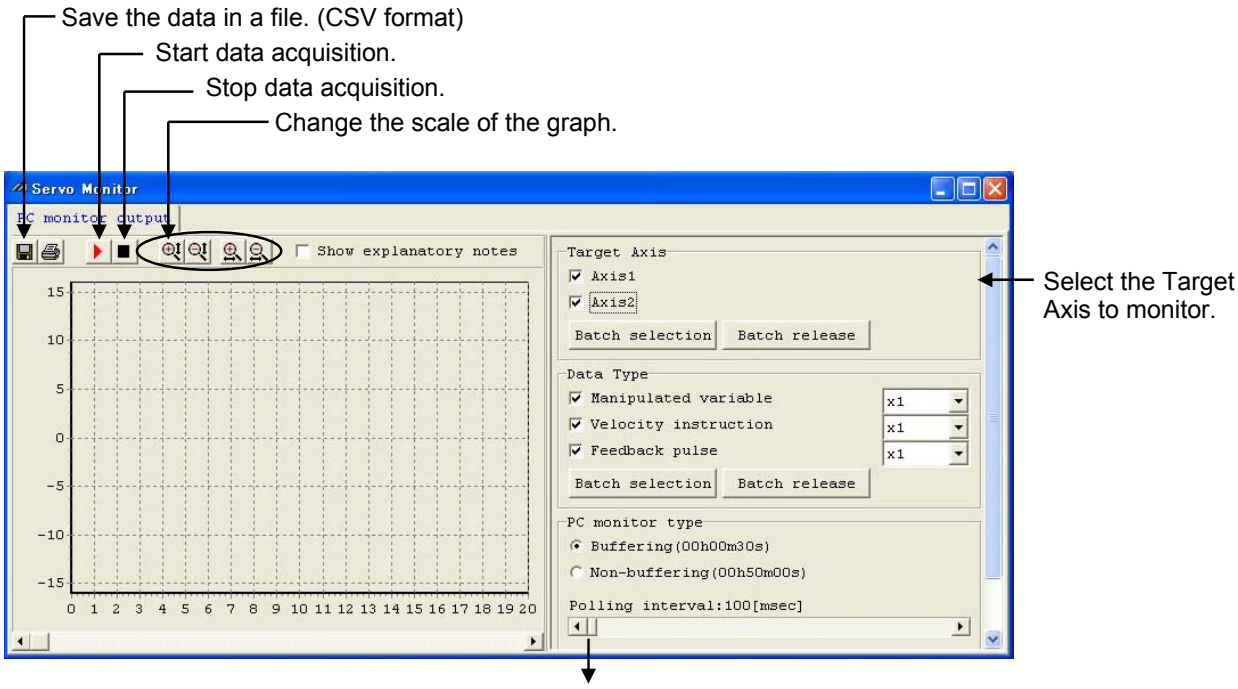


Fig. 11.17 Monitoring Data (Display Example of X-SEL-P/Q (Orthogonal axes) and PX/QX)

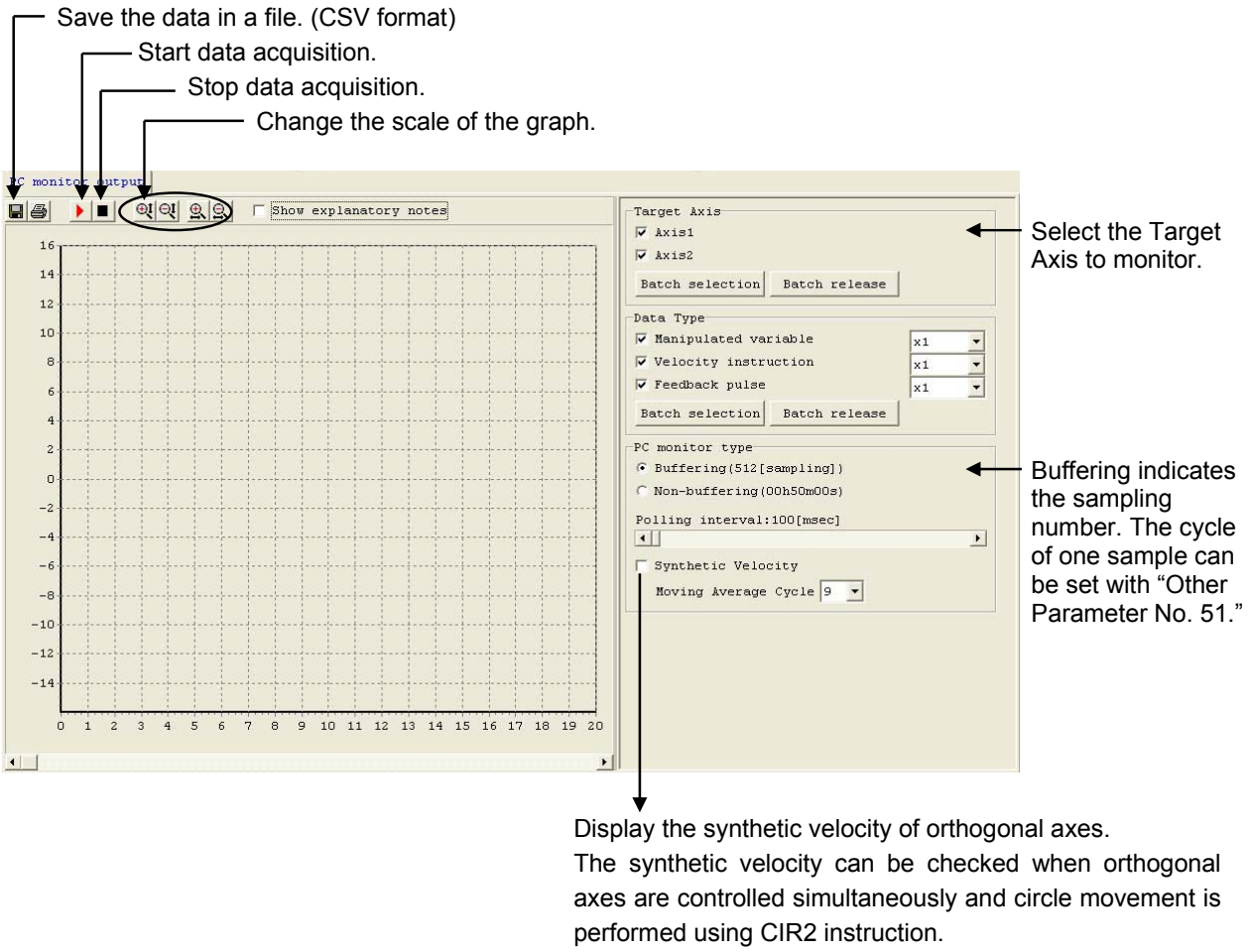


Fig. 11.18 Monitoring Data (Display Example of SSEL, ASEL and PSEL)

12. How to Reset an Absolute Encoder

12.1 Orthogonal axis

If the voltage of the absolute-encoder backup battery in the X-SEL controller becomes low or after the battery or encoder cable has been disconnected, an encoder battery error will occur. In this case, the absolute encoder must be reset.

(1) Click **Controller (C)** from the menu bar, and then select **Absolute Reset (A)**.
In the case of the X-SEL-PX/QX controller, select **Abs. Encoder Reset (Orthogonal axis) (A)**.

(2) When the following warning window appears, click OK.

Fig. 12.1 Warning

(3) The Abs. Encoder Reset window will open. Click here to select the axis you want to execute an absolute encoder reset for.

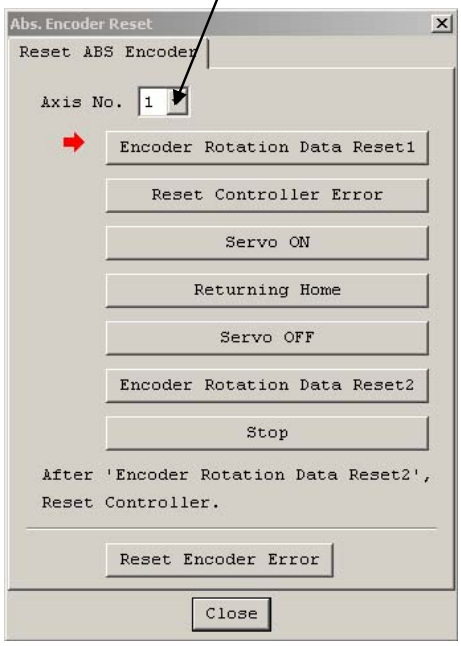


Fig. 11.1 Absolute Reset

(4) Clicking Encoder Rotation Data Reset1 will display the following warning window. Click Yes.

Fig. 11.3 Warning

(5) When the following warning dialog box appears, click Yes again.

Fig. 12.4 Warning

(6) After the Encoder Rotation Data Reset 1 process is completed, the red arrow will move to the next item below. Click the applicable button. Repeat this operation until all of the following processes are completed (every time a process is completed, the red arrow will move to the next item below):

1. Reset Controller Error
2. Servo ON
3. Returning Home
4. Servo OFF

   Note: If you are using PC software of version 1.1.0.0 or later and a driver with CPU version 0.23 or later, the Encoder Rotation Data Reset 2 process is performed with the servo ON. Accordingly, the servo OFF step is skipped.
5. Encoder Rotation Data Reset 2

(Note) With an earlier product, clicking Reset Controller Error may generate an error (No. D10: IPM error). If this error occurs, close the PC tool, reconnect the controller power, and then repeat from step (2). (If the encoder battery is normal, the error will no longer occur after the power is reconnected and “rdy” or “Ardy” will be shown on the controller’s 7-segment display. Take note that the axis has not yet completed homing in this state).

After the Encoder Rotation Data Reset2 process is completed, the red arrow will return to the position in (3). If you want to perform an absolute encoder reset for multiple axes, select each subsequent target axis and repeat the steps from (3). To end the reset operation, click Close to close the Abs. Encoder Reset dialog box.

(Note) If a need arises to perform an absolute encoder reset for multiple axes, be sure to complete steps (3) through (6) for all applicable axes before performing a software reset in step (7).

(7) When the following confirmation dialog box for software reset appears, click Yes to restart the controller.

(Note) After performing an absolute reset, always execute a software reset.

Fig. 12.5 Confirmation

(8) If no other error is present, the controller’s 7-segment display will show “rdy.”

(9) This completes the absolute encoder reset operation.
To repeat the reset operation, close the X-SEL PC software first, and then repeat the steps from the beginning.

12.2 Scara Axis

12.2.1 Absolute Reset Preparation

The following jigs are required to perform an absolute reset:

- Absolute Reset Adjustment jigs

Type	Remarks
JG-1	Arm length 500/600
JG-2	Arm length 250/300/350
JG-3	Arm length 700/800
JG-4	Arm length 500/600 high-speed type
JG-5	Arm length 120/150/180

Connect the cables of the actuator, controller and PC to make an operable status.
Always check operation of the EMG switch before performing work.
The absolute reset adjustment jig is always required to perform an absolute reset for the rotation axis and vertical axis, but not always required for arm 1 and arm 2.
(Rotation data can be reset as long as positioning accuracy of “center of positioning mark label ± 1 graduation” is ensured.)

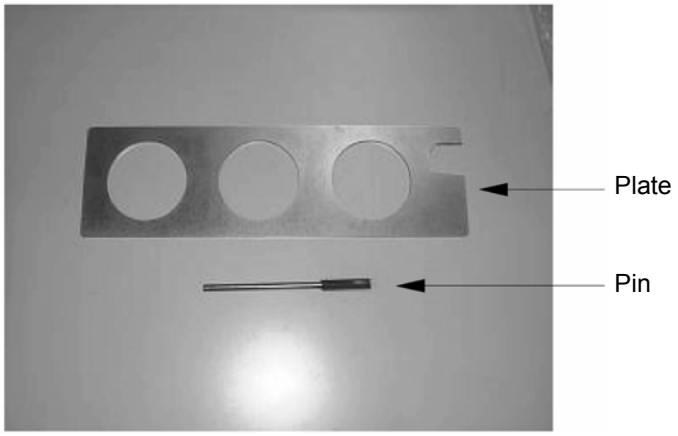


Fig. 12.6 Example of Absolute Reset Adjustment Jig (Type JG-1)

⚠ Warning

- Performing work without understanding inspection and maintenance work thoroughly may cause an accident resulting in injury or death.
- Post a sign “MEN WORKING” to prevent other workers from operating the controller, operation panel or other equipment.

12.2.2 Starting the Absolute Reset Menu

(1) Open the Abs. Encoder Reset window from PC software.
(Note) In the case of X-SEL-PX/QX, select **Abs. Encoder Reset (Scara Axis) (Y)**.

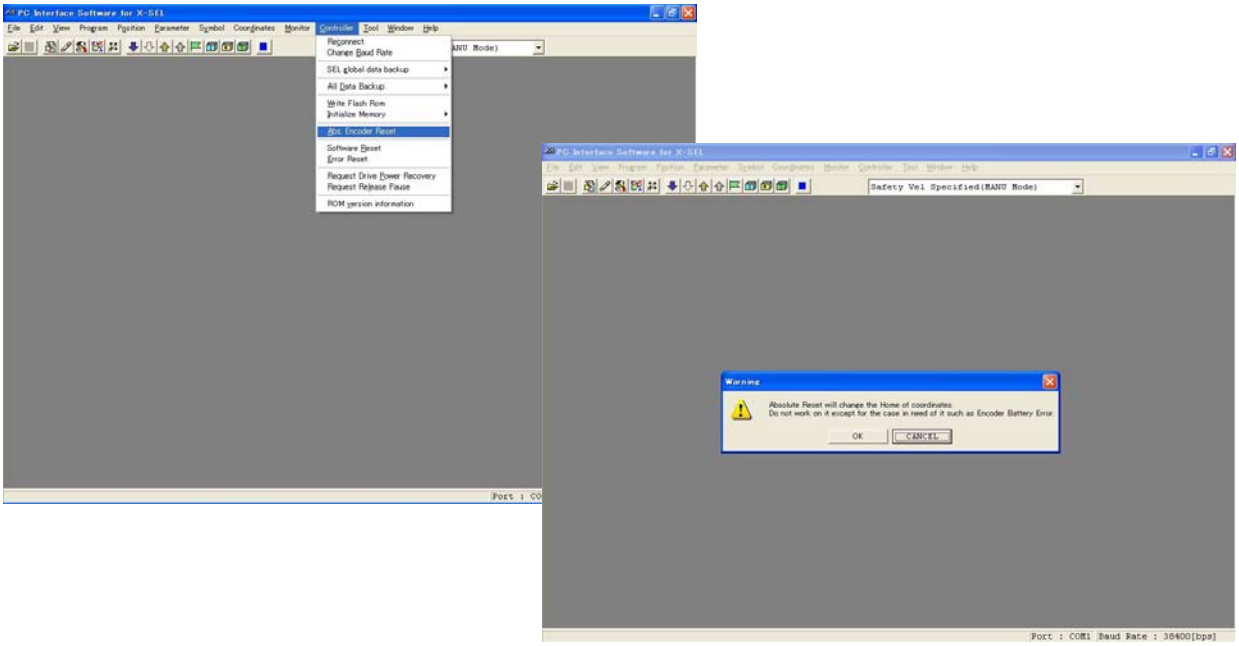


Fig. 12.7 Opening Operation of Abs. Encoder Reset Window

(2) The Abs. Encoder Reset window will open.
- One of three Abs. Encoder Reset screens - for Arm1 (A1c), Arm2 (A2c), Rot. Axis (Rc) + Vert. Axis (Zc) - is displayed when a corresponding tab is clicked.

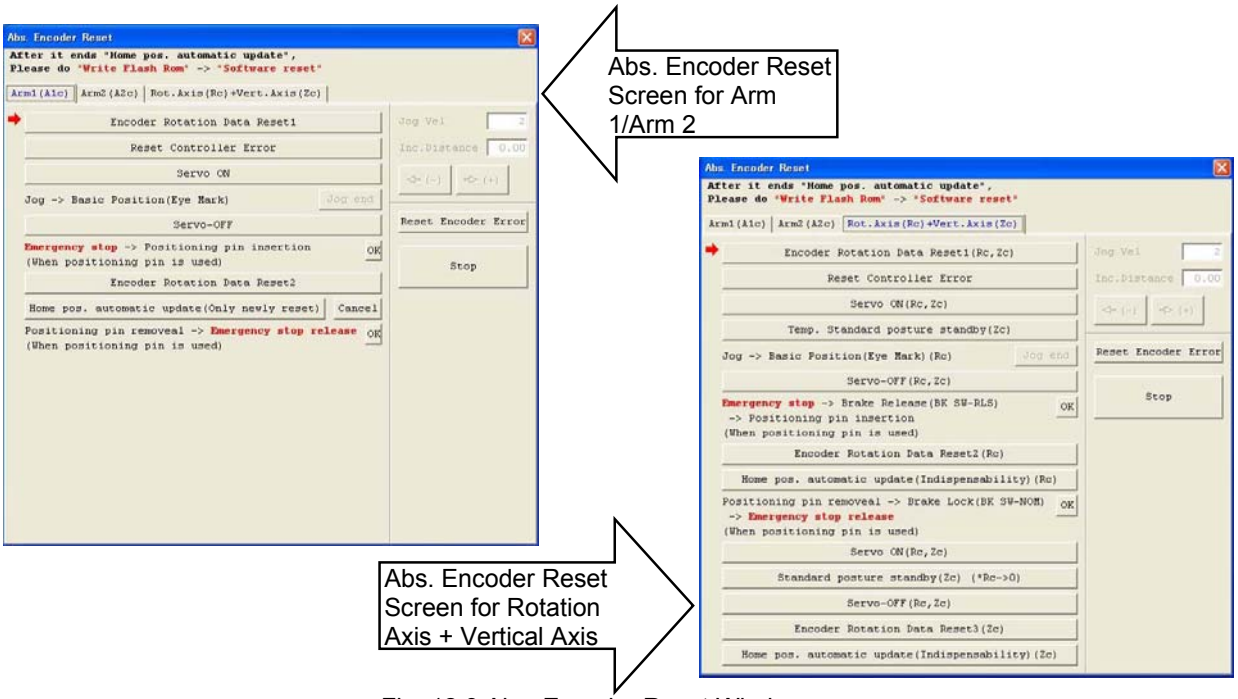


Fig. 12.8 Abs. Encoder Reset Window

12.2.3 Absolute Reset Procedure for Arm 1 or 2

(1) Click the Encoder Rotation Data Reset1 button.

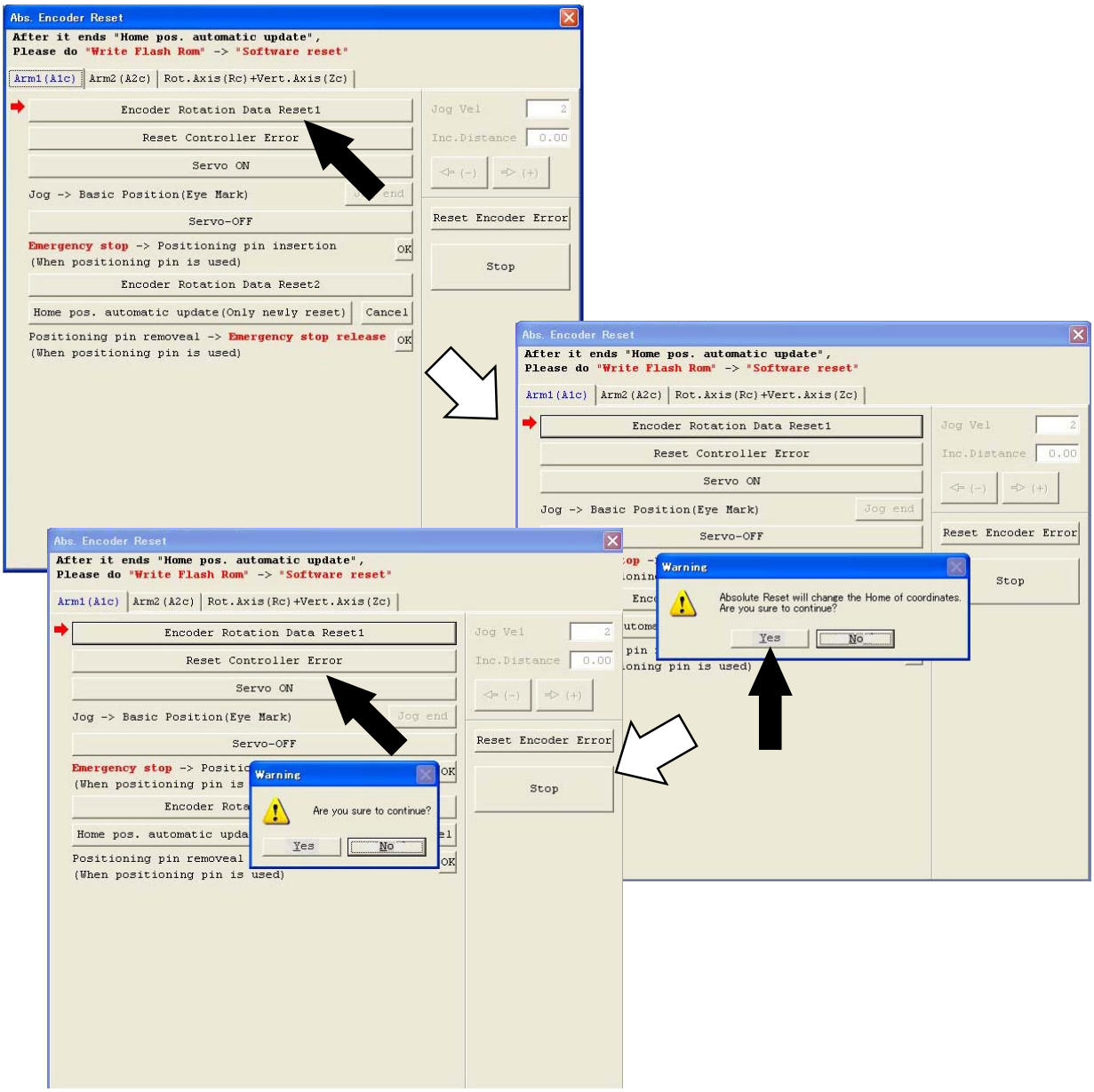


Fig. 12.9 Encoder Rotation Data Reset1 Operation

(2) Click the **Reset Controller Error** button.

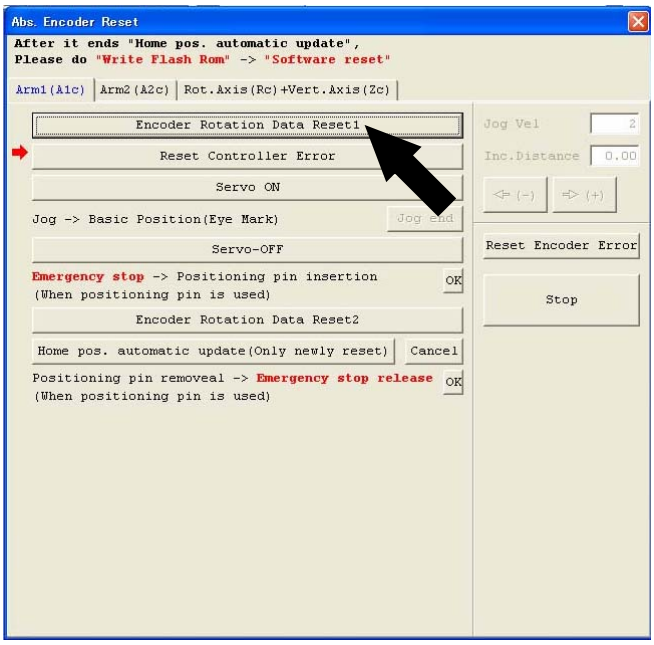


Fig. 12.10 Controller Reset Operation

(3) Click the **Servo ON** button.

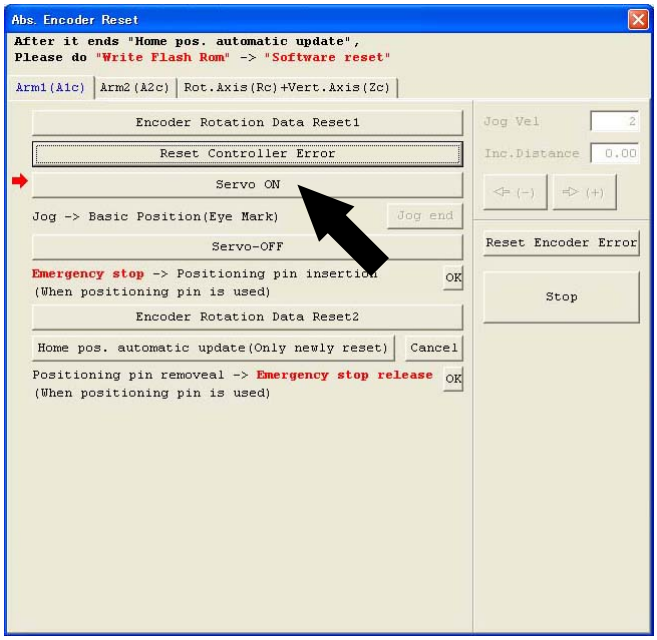


Fig. 12.11 Servo ON Operation

(4) Jog the arm to near the reference position (see reference position drawing in step 7), and click the **Jog end** button.

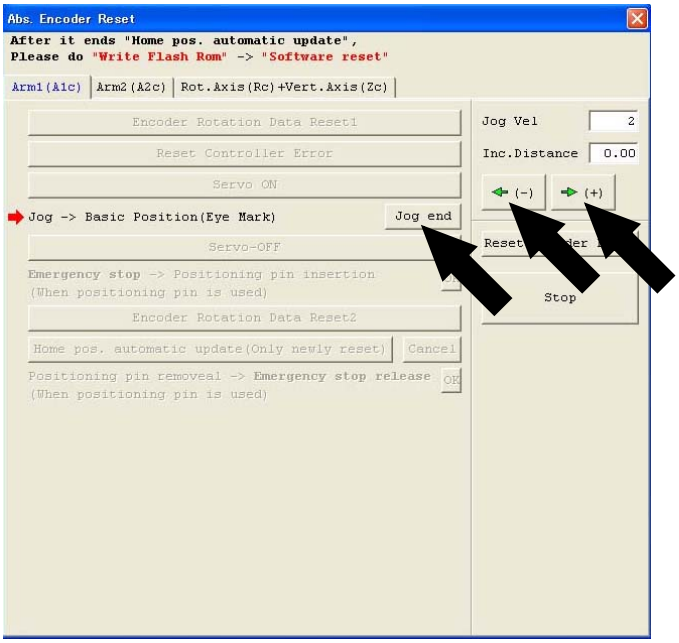


Fig. 12.12 Jog Operation

(5) Click the **Servo-Off** button.

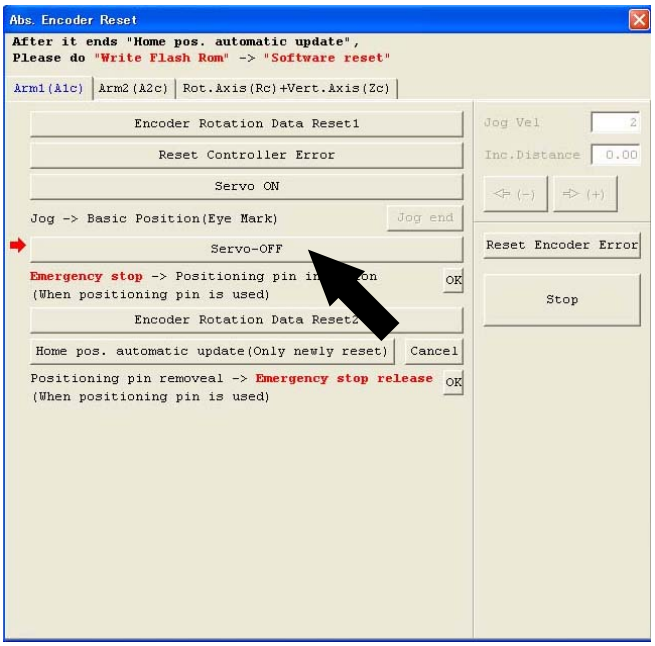


Fig. 12.13 Servo-OFF Operation

(6) Press the EMERGENCY STOP switch.

(7) When performing an absolute reset for arm 1, set an adjustment jig (pin) in arm 1 to fix the arm at the reference position.
When performing an absolute reset for arm 2, set an adjustment jig (pin) in arm 2 to fix the arm at the reference position.
- Set the jig after confirming that the EMERGENCY STOP switch is pressed.
- Set the jig after adjusting the arm to the reference position, using the positioning mark label as a guide.
- Only arm 1 has a cover, which is fixed with setscrews. Remove the setscrews and remove the cover before setting the jigs.
- It is recommended that an adjustment jig is used to perform an absolute reset. With arm 1 or 2, however, rotation data can be reset as long as positioning accuracy of “center of positioning mark label ± 1 graduation” is ensured.
- To perform an absolute reset for arm 2 with an arm length of 120, turn the arm at a right angle and set the jig as shown in the reference position drawing in Fig. 12.17.

Arm 1
(Arm length 500/600, 700/800)

Arm 2
(Arm length 500/600, 700/800)

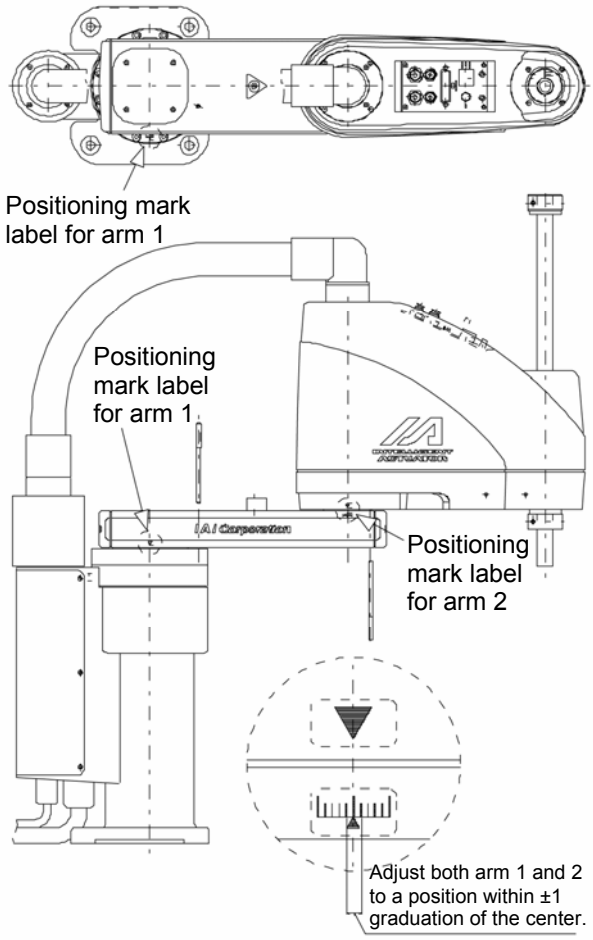
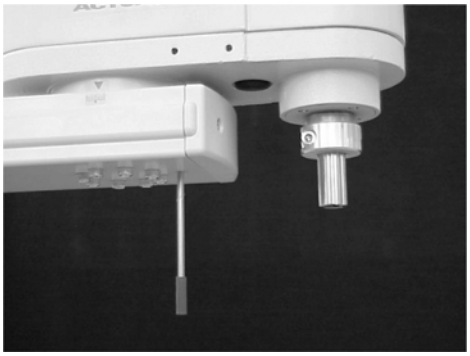


Fig. 12.14 Arm length 500/600, 700/800 Reference Position

⚠ Warning
- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.

Arm 1
(Arm length 250/300/350)



Arm 2
(Arm length 250/300/350)

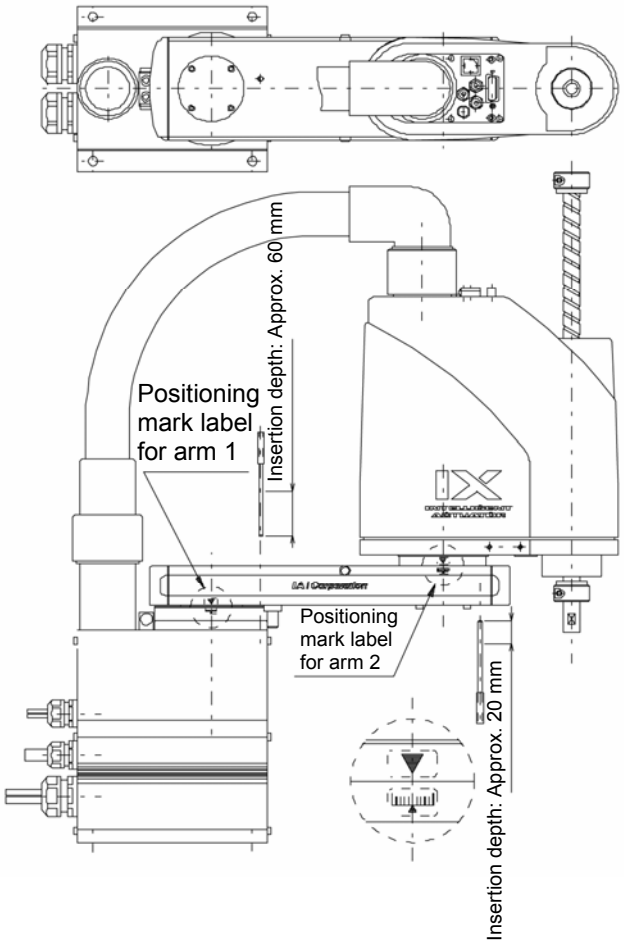
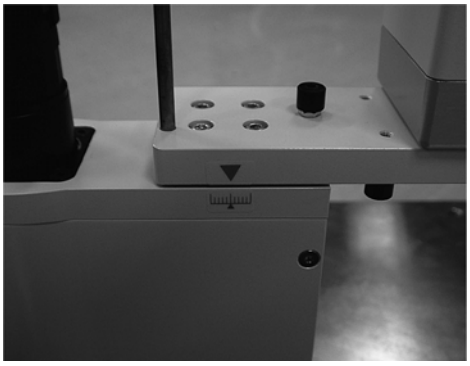


Fig. 12.15 Arm length 250/300/350 Reference Position

(Note) When performing an absolute reset for arm 1 of IX-NNN2515, rotate arm 2 slightly then set with an adjustment jig (pin) to set it.

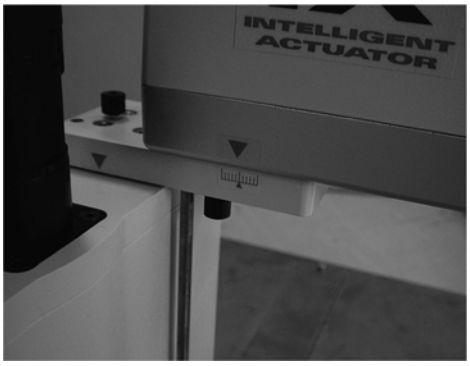
⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.



Arm 1 (Arm length 120/150/180)

Arm 2 (Arm length 150/180)



Arm 2 (Arm length 120)

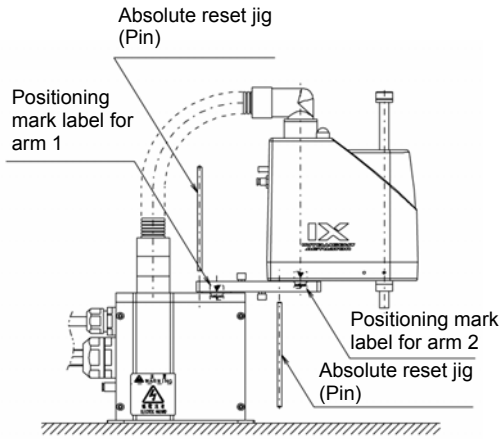
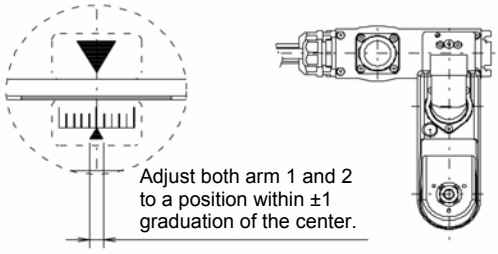


Fig. 12.16 Arm Length 120[*1]/150/180 Reference Position

*1: When an absolute reset is performed for arm 1 (arm length: 120)



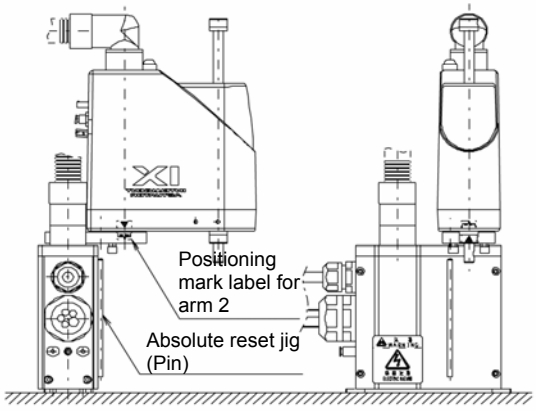


Fig. 12.17 Arm Length 120[*2] Reference Position

*2: When an absolute reset is performed for arm 2 (arm length: 120)

⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.

(8) Click the **OK** button.

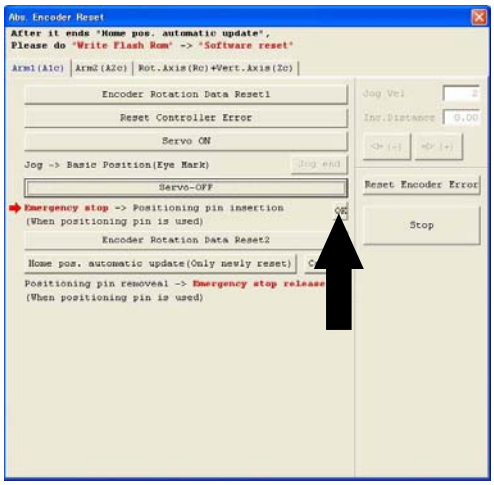


Fig. 12.18 Confirmation Operation

(9) Click the **Encoder Rotation Data Reset2** button.

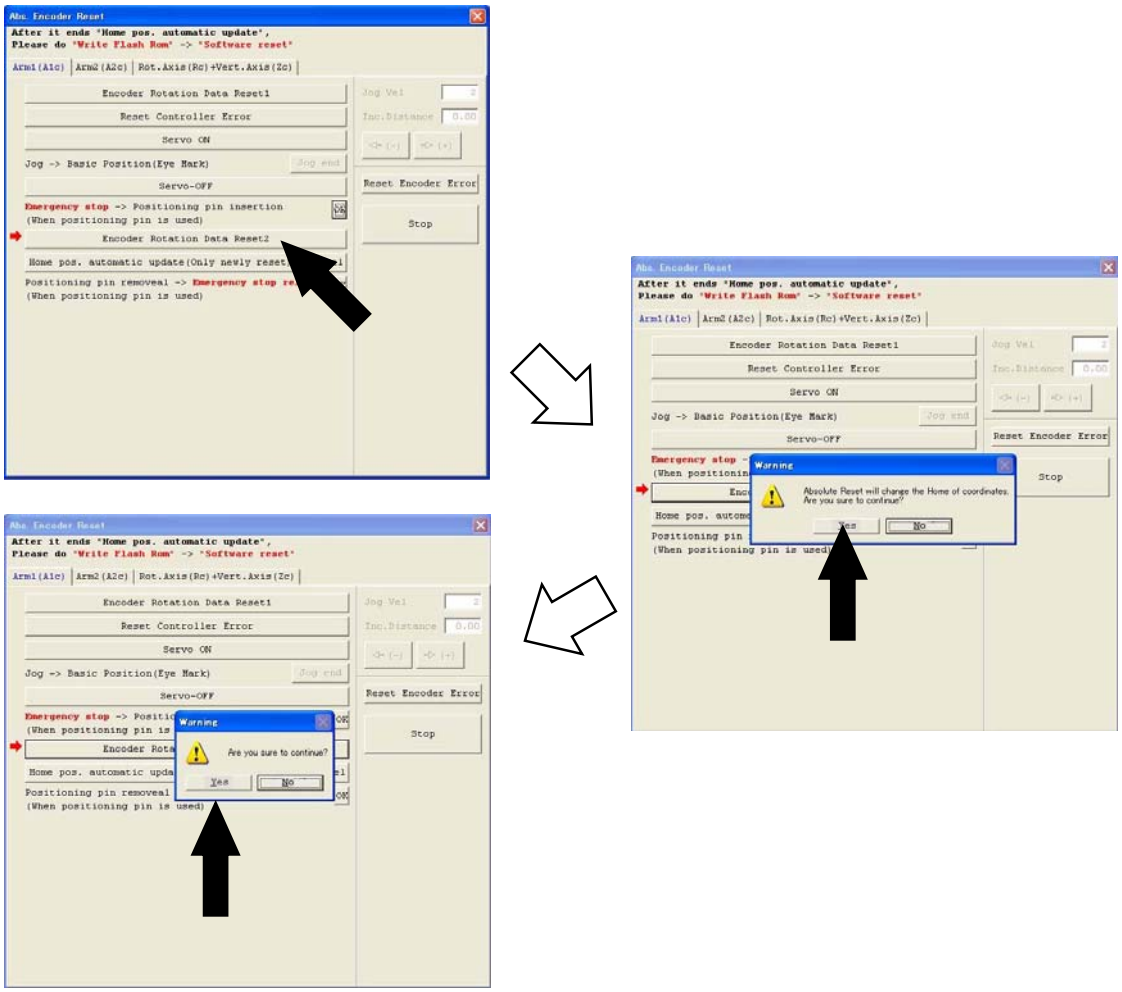


Fig. 12.19 Encoder Rotation Data Reset2 Operation

(10) Remove the adjustment jig.
- Install the cover and secure it with the setscrews for arm 1 only.

(11) Release the EMERGENCY STOP switch.

(12) Click the **OK** button.

- An arrow is shown next to the **Home pos. automatic update** button. Do not set this item. (In particular, be sure this item is not set when performing an absolute reset without using a jig.)
- If the home position has been updated by mistake, perform software reset without writing to the flash ROM. (The status will be the same as the one in which the home position automatic update is not performed.)
- Always click the **OK** button after removing the jig and releasing the EMERGENCY STOP switch.

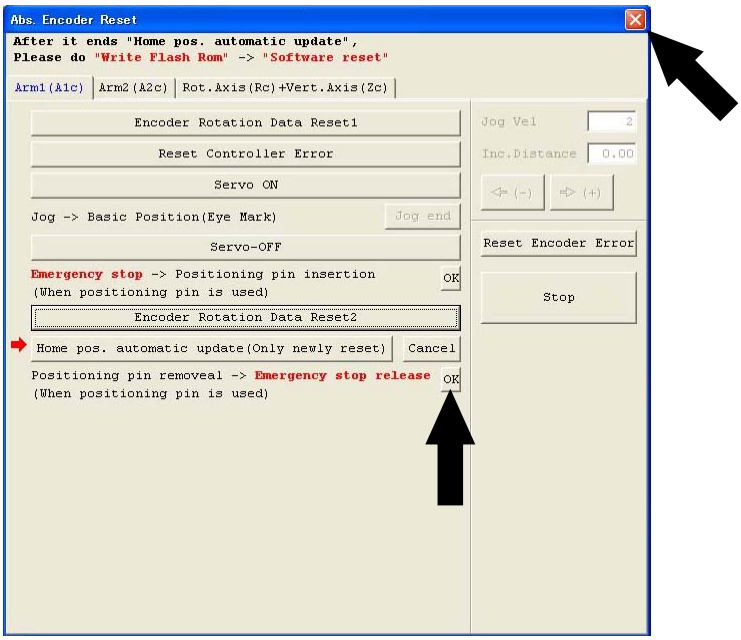


Fig. 12.20 Confirmation Operation

(13) Click **X** in the top right-hand corner to exit the Abs. Encoder Reset window.
- Once the absolute reset is completed, be sure to perform software reset.

⚠ Caution

- Be careful not to perform a reset using an incorrect sequence, since it may cause the arm position to become offset.
- Perform home pos. automatic update only when any mechanical change such as arm change has been made. (Joint part only)

12.2.4 Absolute Reset Procedure for Rotation Axis + Vertical Axis

(1) Click the **Encoder Rotation Data Reset1** button.

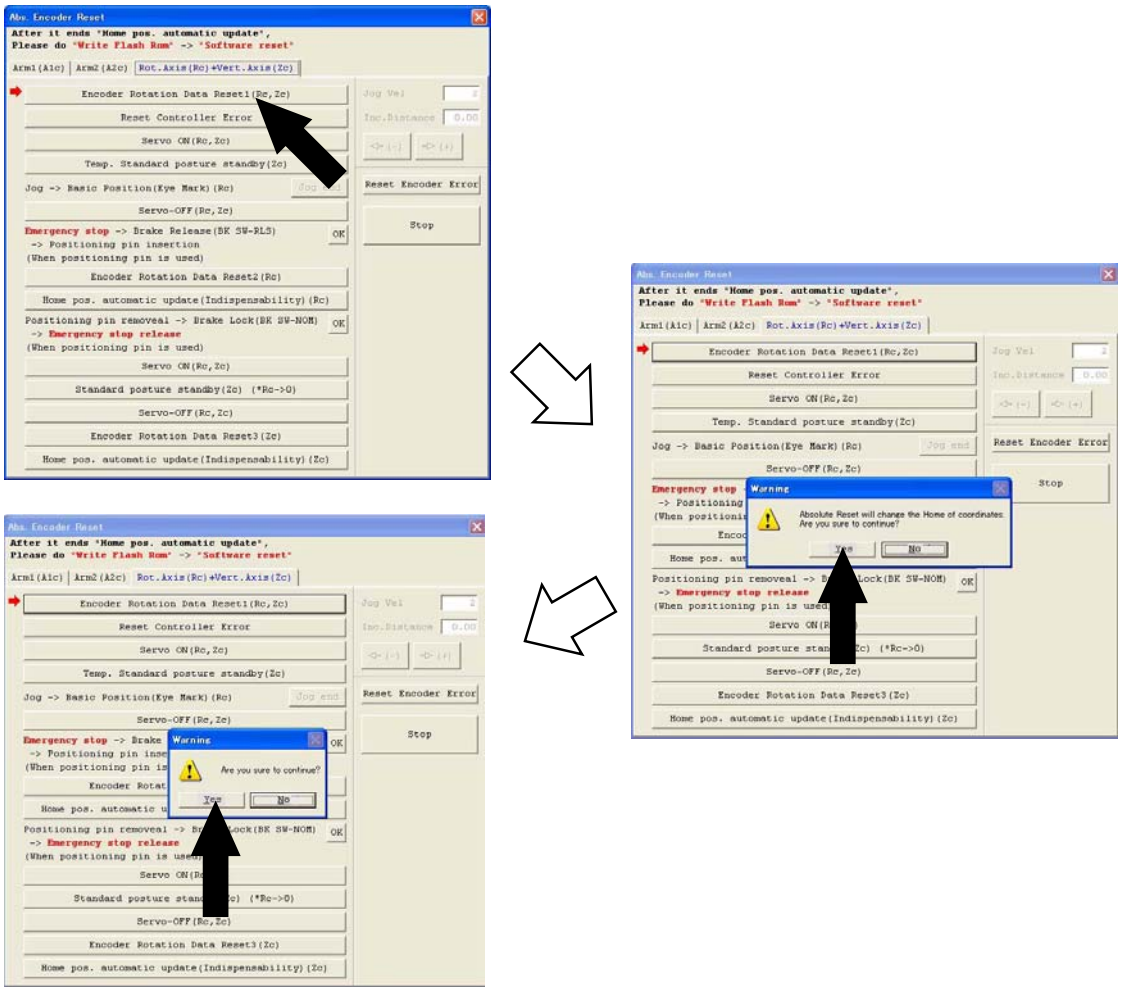


Fig. 12.21 Encoder Rotation Data Reset1 Operation

(2) Click the **Reset Controller Error** button.

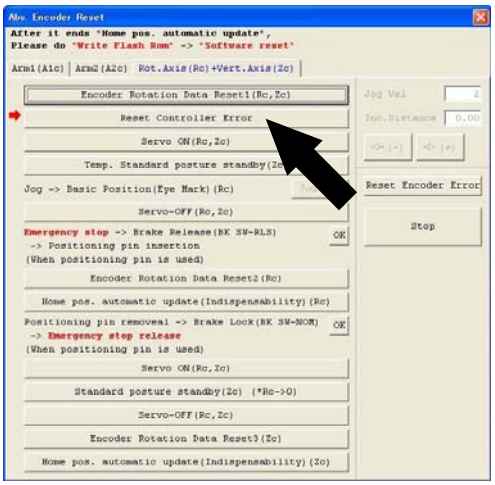


Fig. 12.22 Reset Controller Error Operation

(3) Click the **Servo ON** button.

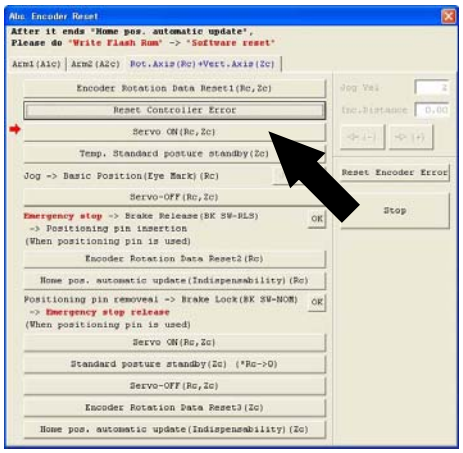


Fig. 12.23 Servo ON Operation

(4) Click the **Temp. Standard posture standby** button.
- Please note that the vertical axis returns to its home position.

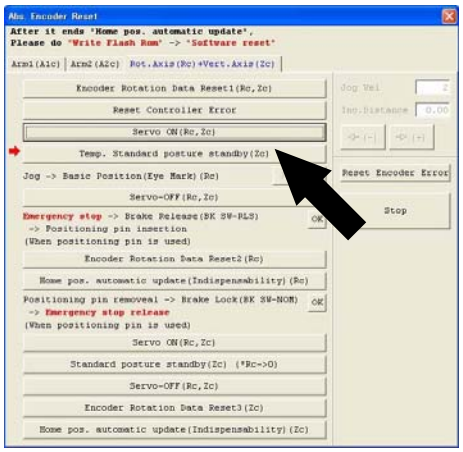


Fig. 12.24 Temp. Standard Posture Standby Operation

(5) Jog the rotation axis to the reference position (see reference position drawing in step 8), and click the **Jog end** button.

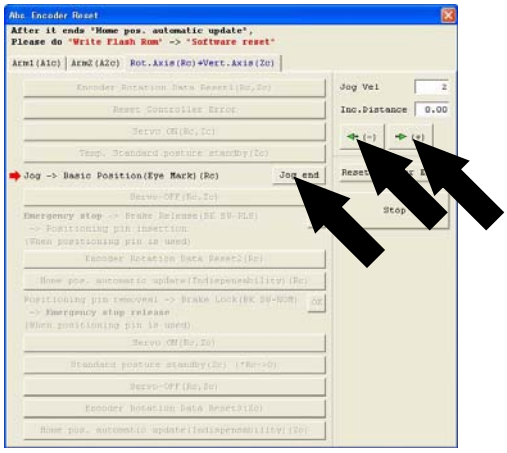


Fig. 12.25 Jog Operation

(6) Click the **Servo-OFF** button.

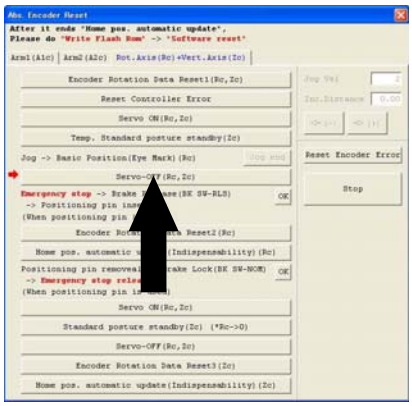
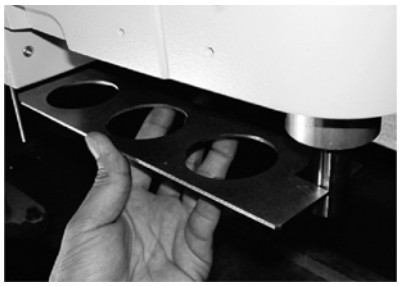


Fig. 12.26 Servo-OFF Operation

(7) Press the EMERGENCY STOP switch.

(8) Affix the rotation axis at the reference position by setting the plate and pin of the adjustment jig as illustrated below.
- Set the jig after confirming that the EMERGENCY STOP switch is pressed.
- Set the jig using the positioning mark as a guide.
- The top face of the stopper should roughly align with the bottom face of arm 2.



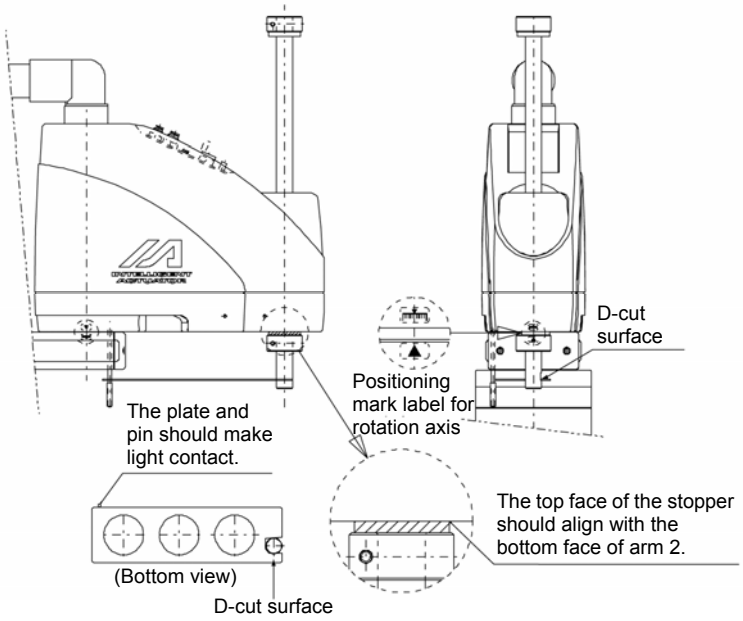
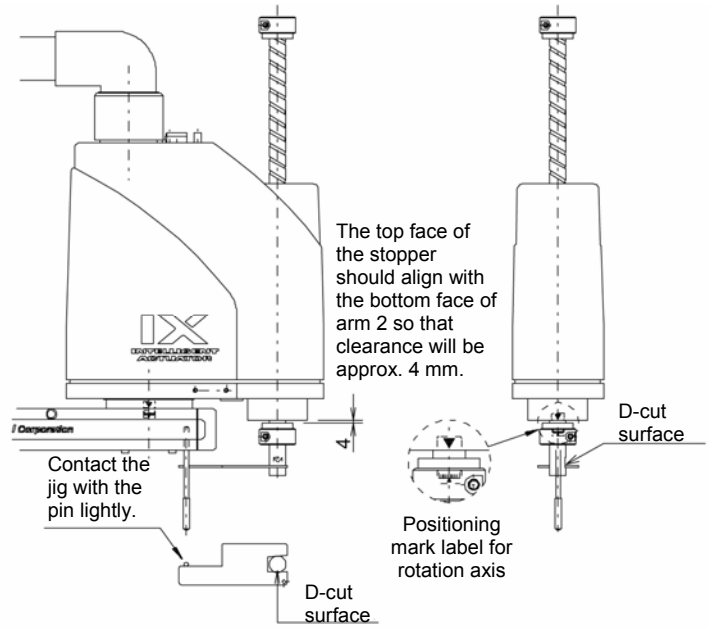


Fig. 12.27 Arm Length 500/600, 700/800 Reference Position

⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.
- Pay attention to the orientation of the D-cut surface of the plate jig.



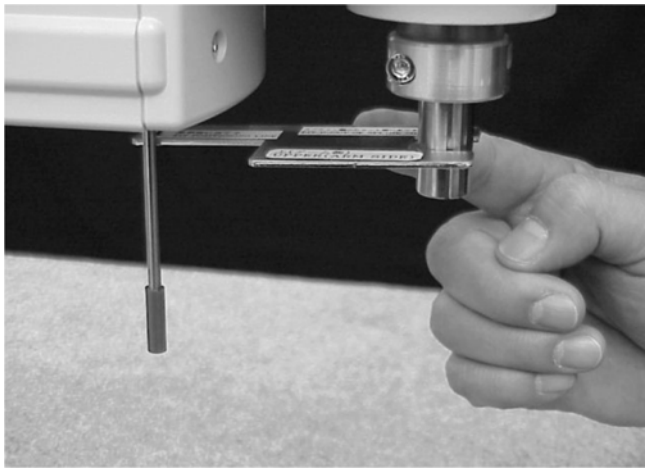


Fig. 12.28 Arm Length 250/300/350 Reference Position

⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.

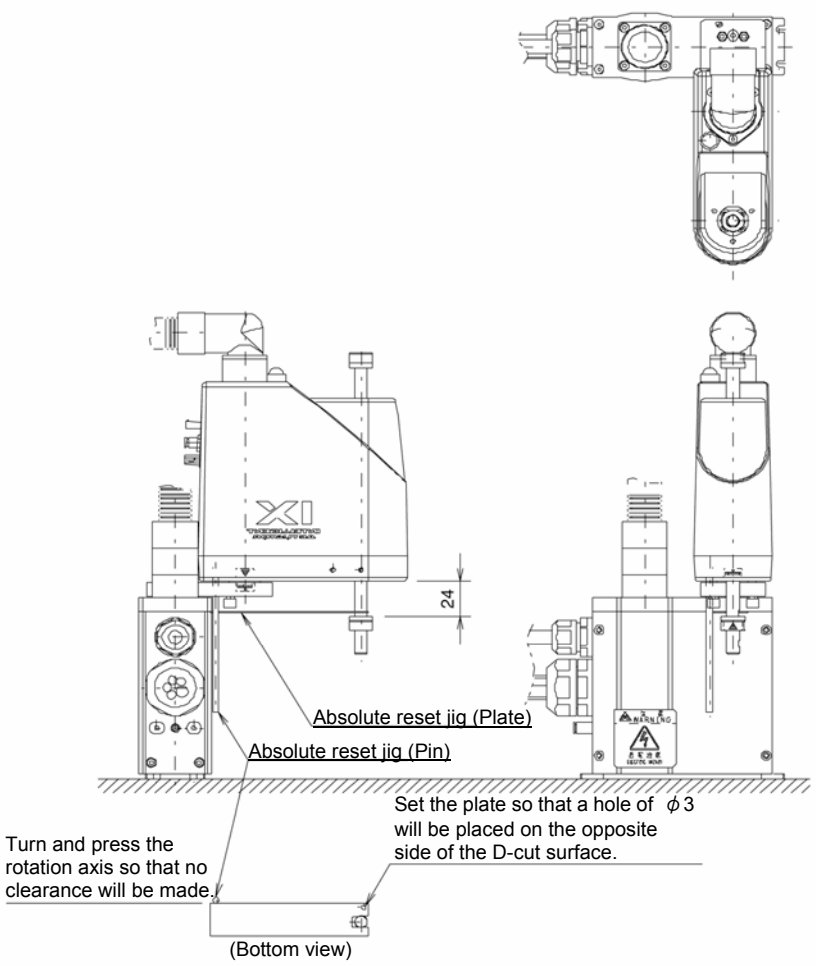


Fig. 12.29 Arm Length 120 Reference Position

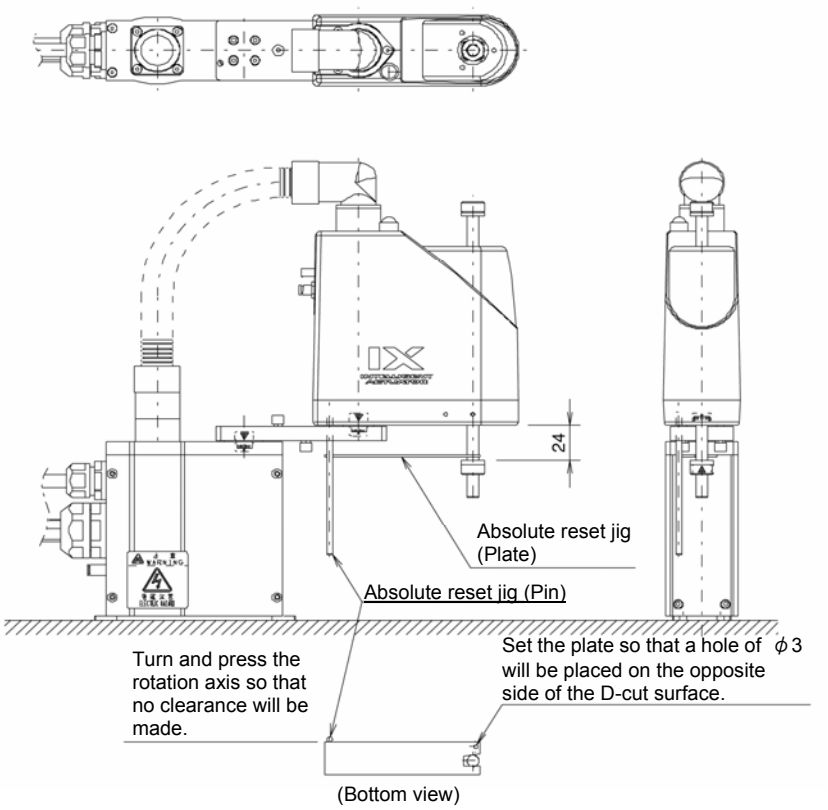


Fig. 12.29 Arm Length 120 Reference Position

⚠ Warning

- Always press the EMERGENCY STOP switch before setting an adjustment jig. Failure to do so may cause the actuator to malfunction and result in a serious accident.
- Pay attention to the orientation of the D-cut surface of the plate jig.

(9) Click the **OK** button.

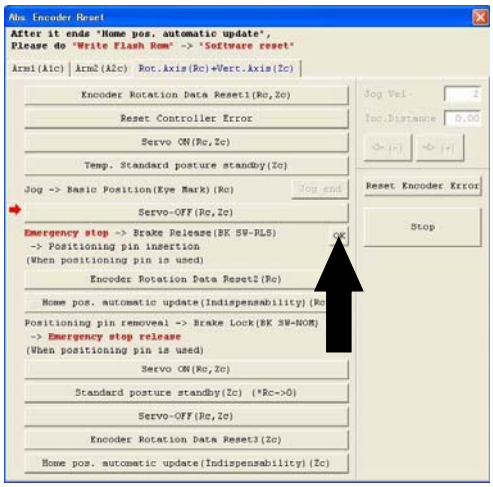


Fig. 12.31 Confirmation Operation

(10) Click the **Encoder Rotation Data Reset2** button.

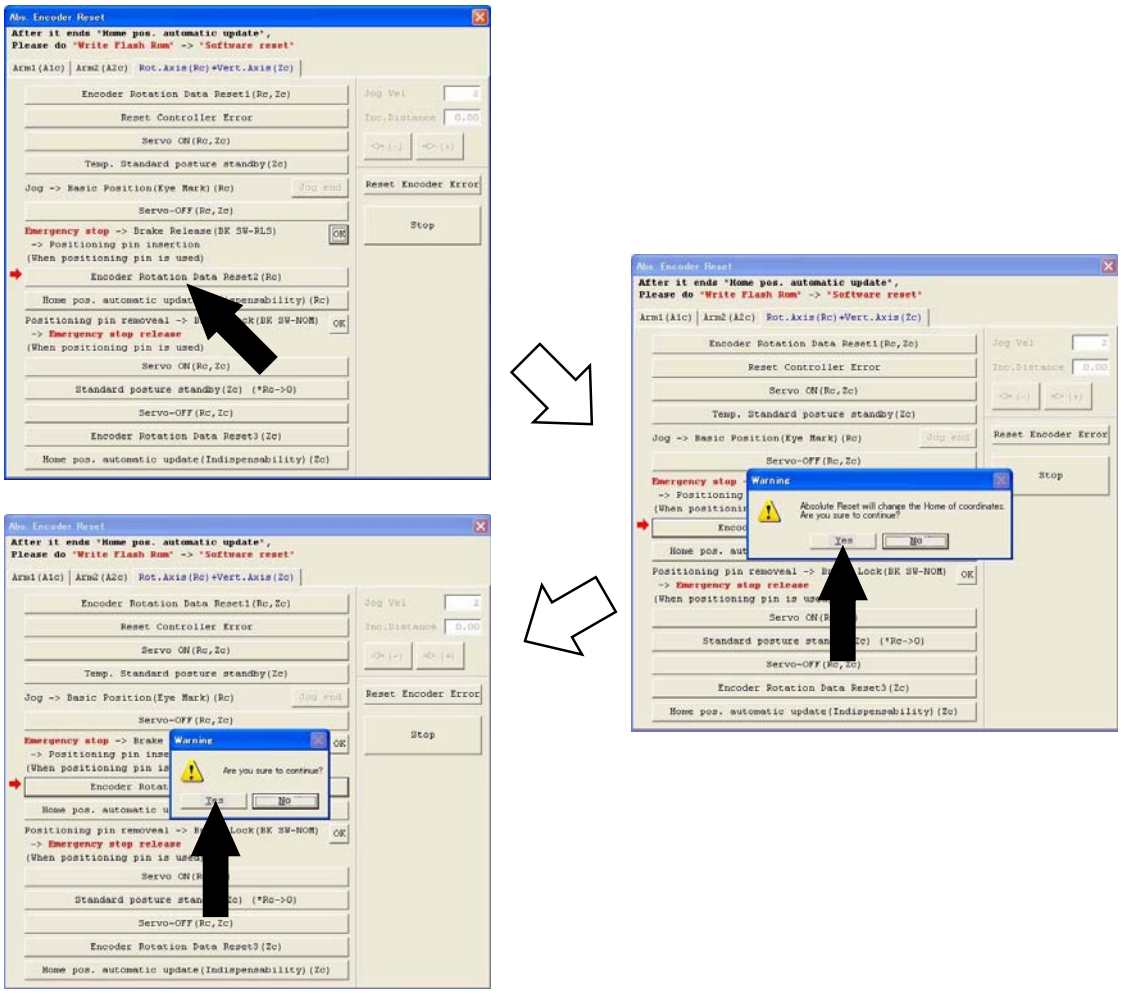


Fig. 12.32 Encoder Rotation Data Reset2 Operation

(11) Click the Home pos. automatic update button.

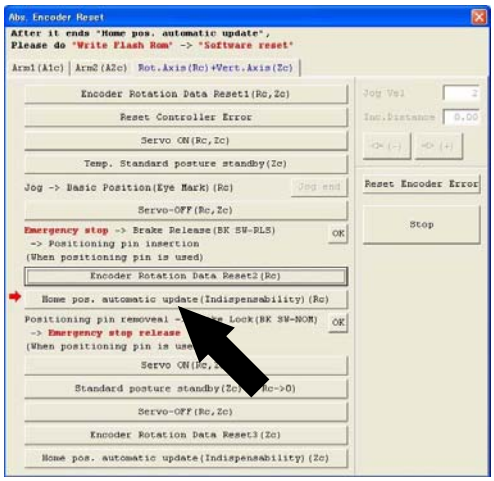


Fig. 12.33 Home Pos. Automatic Update Operation

(12) Remove the adjustment jig.

(13) Release the EMERGENCY STOP switch.

(14) Click the **OK** button.

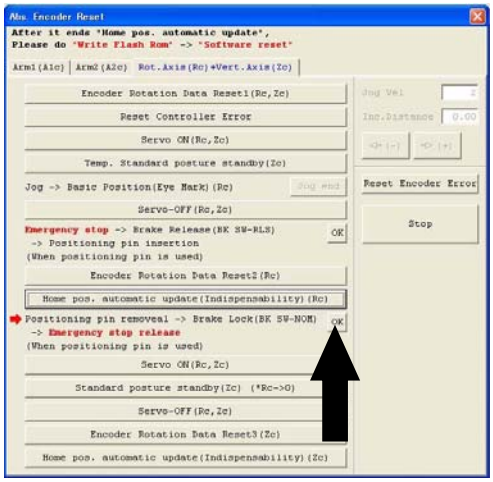


Fig. 12.34 Confirmation Operation

(15) Click the **Servo ON** button.

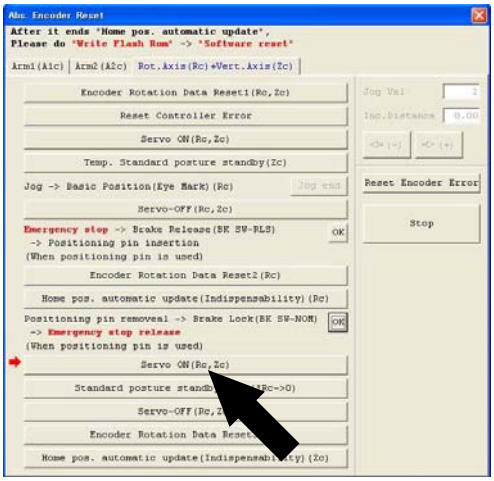


Fig. 12.35 Confirmation Operation

(16) Click the **Standard posture standby** button.

- Please note that the vertical axis returns to its home position.

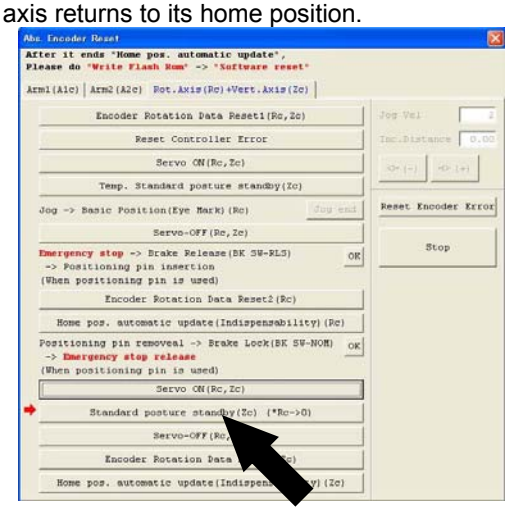


Fig. 12.36 Standard Posture Standby Operation

(17) Click the **Servo-OFF** button.

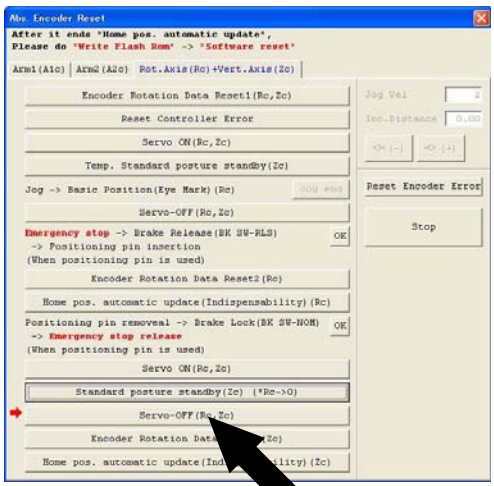


Fig. 12.37 Servo-OFF Operation

(18) Click the Encoder Rotation Data Reset3 button.

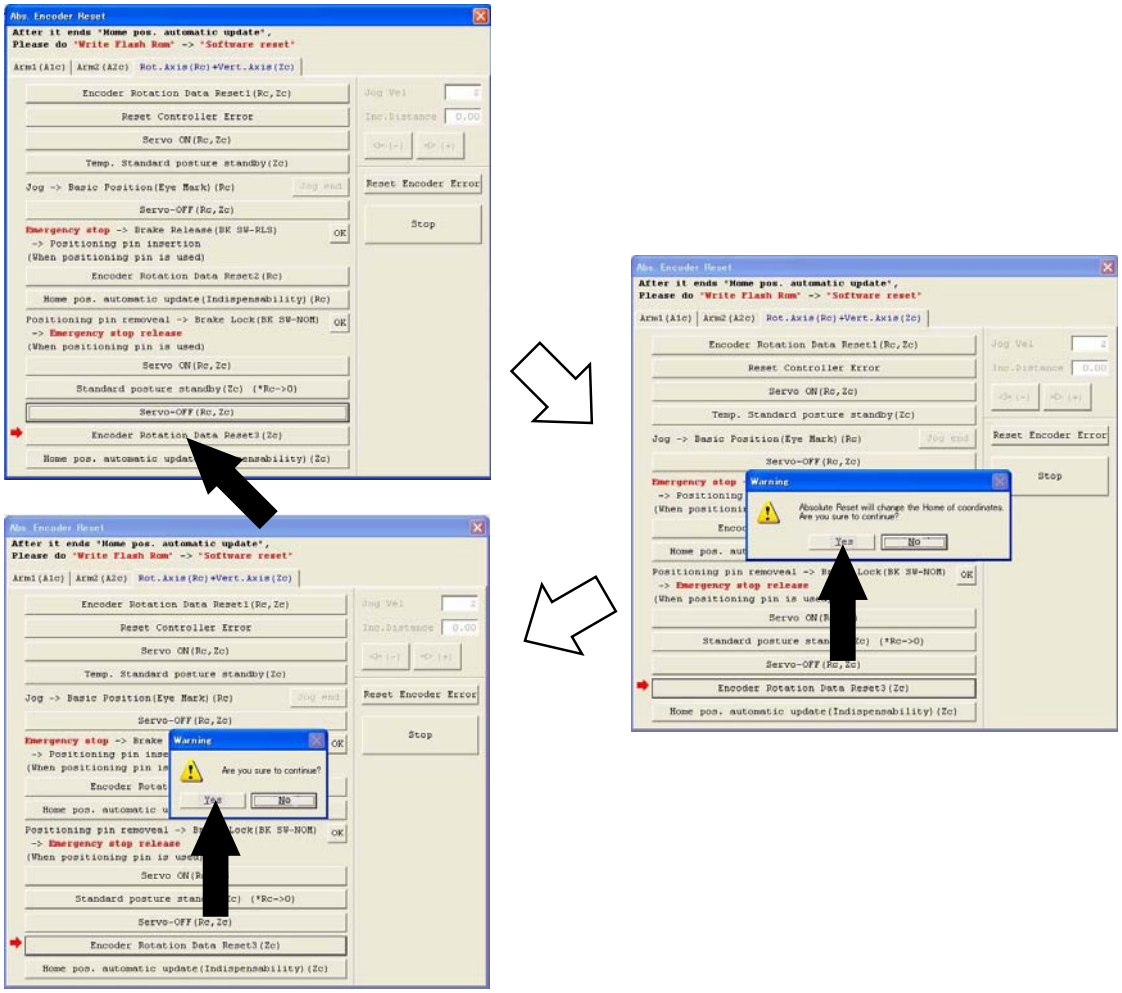


Fig. 12.38 Encoder Rotation Data Reset3 Operation

(19) Click the **Home pos. automatic update** button, and then click **X** in the top right-hand corner to exit the Abs. Encoder Reset window.

- Once the absolute reset is completed, be sure to perform software reset.

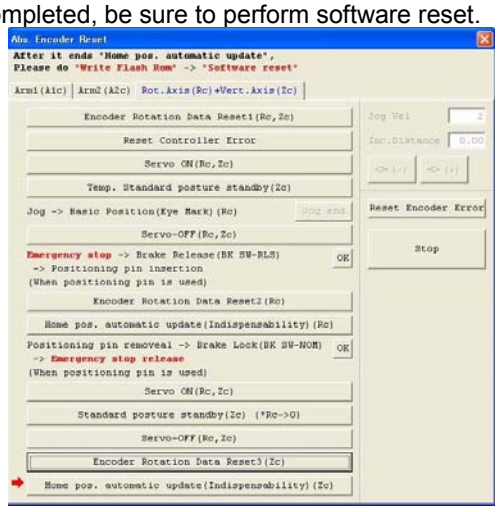


Fig. 12.39 Home Pos. Automatic Update Operation

13. Supplemental Information on Controller Menu Items

13.1 Software Reset

Selecting this menu item will restart the controller.
Caution is required because data that is not yet written to the flash ROM will be lost after this operation.
Click **Controller (C)** from the menu bar, and then select **Software Reset (R)**.

13.2 Reset Error

Selecting this menu item will reset message level errors and operation-cancellation level errors. Even after selecting Reset Error, those errors whose cause has not been removed will occur again.
Click **Controller (C)** from the menu bar, and then select **Reset Error (E)**.

13.3. Drive-source Recovery Request and Operation-pause Reset Request

13.3.1 In the cases of Controllers Other Than SSEL, ASEL or PSEL Controllers

(1) Drive-source recovery request

[1] How to issue a drive-source recovery request

A drive-source recovery request is required only in the following case:

- When you set I/O parameter No.44 to 1, drive power cut-off occurs. - > Recovery after the main cause of cut-off is solved.

[2] How to issue a drive-source recovery request

A drive-source recovery request can be issued using one of the following methods:

- Set I/O parameter No.44 to 1 (input selection function 014 = Drive-source cut-off reset input), and then input the ON edge on input port No. 14
- From the software menu, execute **Controller (C)** - > **Request Drive Power Recovery (P)**.

(2) Operation pause release request

[1] Case where an operation pause release request is required

An operation pause release request is required in any of the following cases:

- When you set other parameter No.9 to 2, (Deadman SW recovery release according to type = continuous operation release [during automatic operation only], stop according to Deadman SW during automatic operation - > recovery after release stop (operation pause release).
- When you set other parameter No.10 to 2, (emergency stop recovery according to type = continuous operation recovery during automatic operation only), emergency stop during automatic operation - > recovery after emergency stop release (operation pause release).
- When you set other parameter No.11 to 2, (according to recovery type during safety gate open recovery = continuous operation recovery (during automatic operation only), safety gate OPEN during automatic operation - > recovery after safety gate CLOSE (operation pause release).
- When you set I/O parameter No.36 to 1, (input selection function 006 = pausing operation signal), OFF level input on input port No.6 at automatic operation (pausing operation) - > recovery after ON level input on input port No.6 (operation pause release).

[2] How to issue an operation pause release request

An operation pause release request can be issued using one of the following methods:

- Set I/O parameter No.35 to 1 (input selection function 005 = operation pause release signal), and then input the ON edge on input port No.5.
- From the software menu, execute **Controller (C)** - > **Request Release Pause (L)**.

Note) If the case in [2] of (1) and any of the cases in [2] of (2) are present at the same time, a drive-source recovery request must be issued first, followed by an operation-pause reset request.

13.3.2 In the cases of SSEL, ASEL or PSEL Controllers

(1) Drive-source recovery request

[1] Case where a drive-source recovery request is required

A drive-source recovery request is required only in the following case:

- When you specify any input port for the drive power cut-off release input signal (dedicated function), drive power cut-off occurs. - > recovery after the main cause of cut-off is solved.

[2] How to issue an operation pause release request

An operation pause release request can be issued using one of the following methods:

- Set the I/O parameter (No.30 - No.45, No.251 - No.258) corresponding to the input port No. to 17 (specified input function value). (Refer to the list of I/O functions and I/O parameters in the SSEL, ASEL or PSEL controller operation manual.)
  Input the ON edge on the specified input port No.
- From the software menu, execute **Controller (C)** - > **Request Drive Power Recovery (P)**.

(2) Operation pause release request

[1] An operation pause release request is required in any of the following methods:

Only the following case requires executing Request Release Pause:

- When you set other parameter No.10 to 2, (emergency stop recovery release according to type = continuous operation release [during automatic operation only], emergency stop during automatic operation - > recovery after release of emergency stop (operation pause release).
- When you set other parameter No.11 to 2, (Deadman SW/Enable SW recovery according to type = continuous operation recovery during automatic operation only), stop by Deadman SW or Enable SW during automatic operation - > recovery after emergency stop release (operation pause release).
- Specify any input port for the operation pause release signal (dedicated function). Set the I/O parameter (No.30 - No.45, No. 251 - No.258) corresponding to the input port No. to 8 (specified input function value). (Refer to the list of I/O functions and I/O parameters.)
  OFF level input on the input port No. specified at automatic operation (pause operation) - > recovery after ON level input on the input port No. (operation pause release).

[2] How to issue an operation pause release request

An operation pause release request can be issued using one of the following methods:

- Specify any input port for the operation pause release signal (dedicated function). Set the I/O parameter (No.30 - No.45, No.251 - No.258) input port No. corresponding to the input port No. to 7 (specified input function value). (Refer to the list of I/O functions and I/O parameters.)
  Input the ON edge on the specified input port No.
- From the software menu, execute **Controller(C)** - > **Request Release Pause (L)**.

Note) If the case in [1] of (1) and any of the cases in [1] of (2) are present at the same time, a drive-source recovery request must be issued first, followed by an operation pause release request.

13.4 SEL Global Data Backup

[1] Saving to a file

Global flags, global integer variables, global real variables and global strings can be saved.

Select **SEL global data backup** from the **Controller** pop-up menu and then click **Save File AS**.

The SEL global data backup screen (Save File AS) will be displayed.

Clicking  will save the global data.

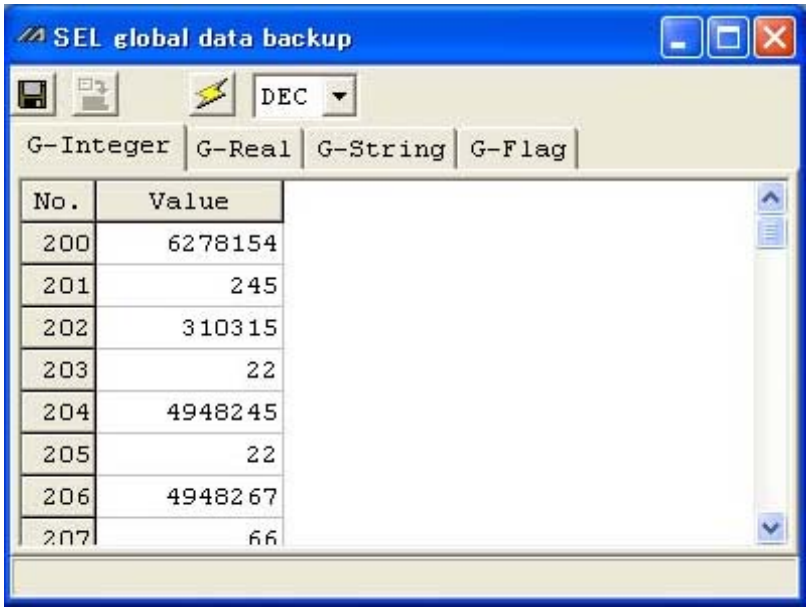


Fig. 13.1 SEL Global Data Backup Screen (Save File AS)

[2] Transmitting to the controller

Global flags, global integer variables, global real variables and global strings can be transmitted to the controller.
Select **SEL global data backup (G)** from the **Controller (C)** pop-up menu and then click **Transmit to Controller(L)**.
The SEL global data backup screen (Transmit to Controller) will be displayed.
If an error occurs, focus will move to the Detailed Error Information tag to display the error description.

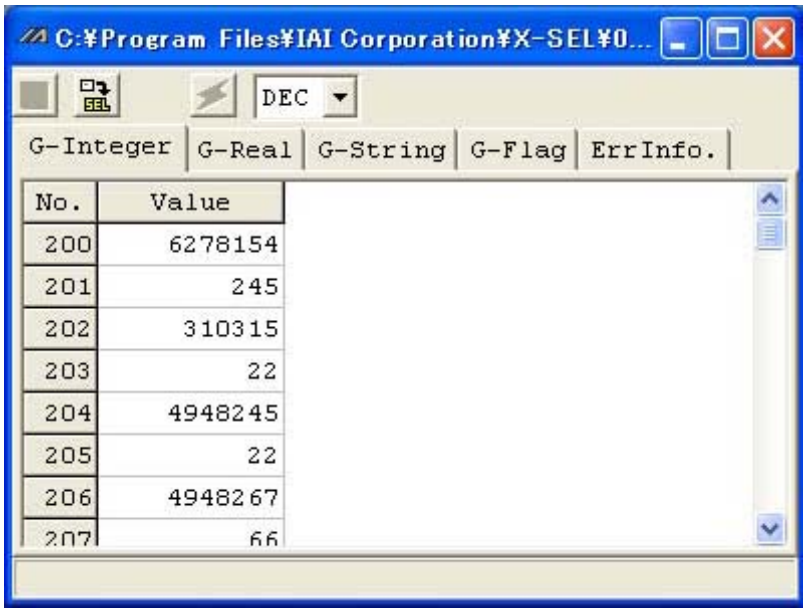


Fig. 13.2 Global Data Backup Screen (Transmit to Controller)

Clicking  will display the SEL global data type select screen.
Select a desired data type and click **OK**. The data will be transmitted to the controller.

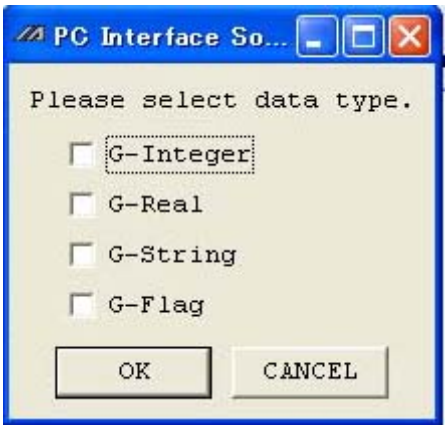


Fig. 13.3 SEL Global Data Type Select Screen

13.5 Control Constant Table Management Information

The versions of control constant tables for the encoder and motor can be checked.
Select **Controller (C)** from the menu tool bar and then click **Control constant table management information (Z)**.
(Supported by X-SEL-P/Q, PX/QX, SSEL, ASEL and PSEL only.)

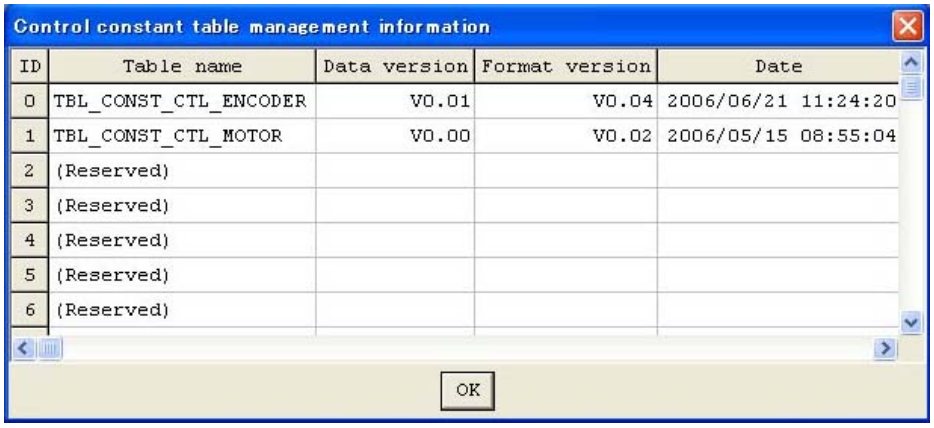


Fig. 13.4 Control Constant Table Management Information

13.6 Execution Stop of Positioner Mode of SSEL, ASEL or PSEL Controller

If you select Execute when the SSEL, ASEL or PSEL controller is in the manual mode and positioner mode, the positioner mode can be executed from your PC.
(The 7-segment display will show “PN##.” ## indicates the positioner mode No.)
Executing the positioner mode manually enables a test run at safe speed, monitoring of I/O ports and others.
Select **Positioner Mode (O)** from the **Controller** pop-up menu and then click **Execute (E)**.

Pressing the EMERGENCY STOP button or **Stop** in the screen of Fig. 13.5 will stop the positioner mode.
Select **Positioner Mode (O)** from the **Controller** pop-up menu and then click **Stop (S)**.

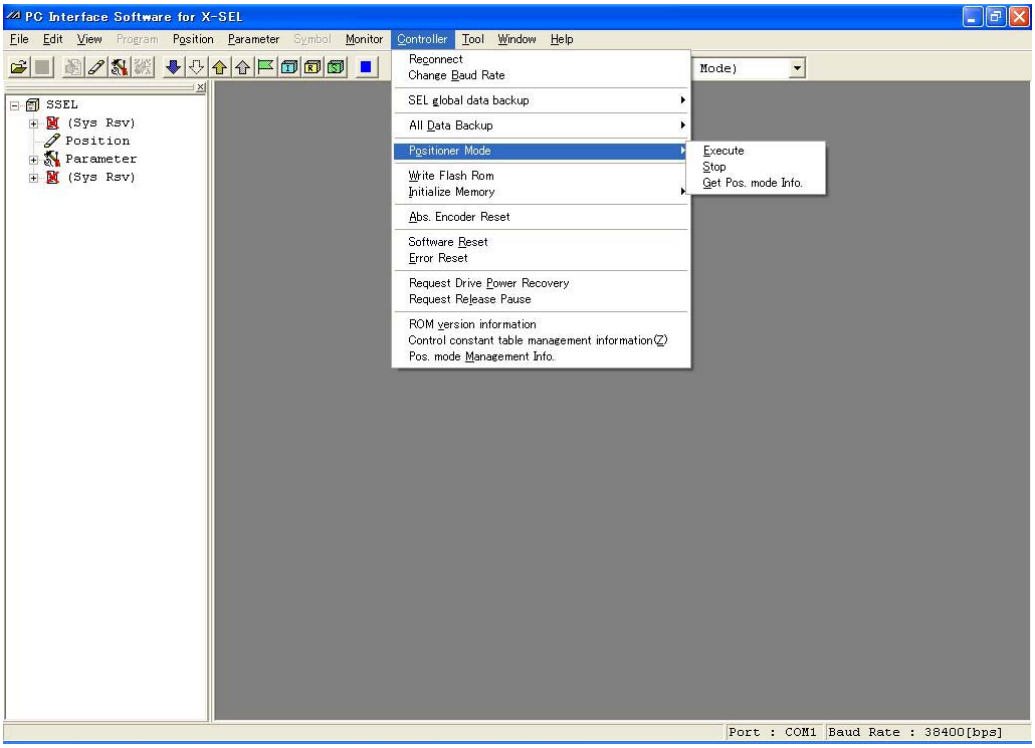


Fig. 13.5 Execue or Stop of Positioner Mode

13.7 Getting Positioner Mode Information from SSEL, ASEL or PSEL Controller

Positioner mode maintenance information (system data) can be collected from the SSEL, ASEL or PSEL controller. After the dialog indicating “Getting Pos. mode data” has been displayed, select the “Pos. mode sys1 data for PSEL” and click the **Save (S)** button. The system data can be saved.
This function is used when making inquiries for support regarding the positioner mode.
Select **Positioner Mode (O)** from the **Controller** pop-up menu and then click **Get Pos. mode Info (G)**.

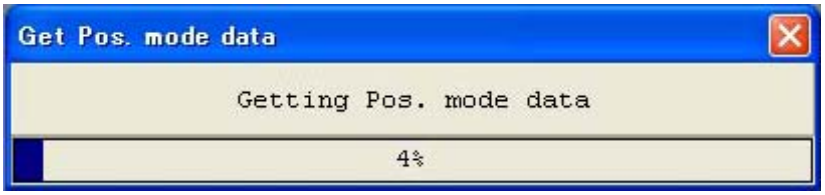


Fig. 13.6 Diagram Indicating Getting Pos. Mode Data

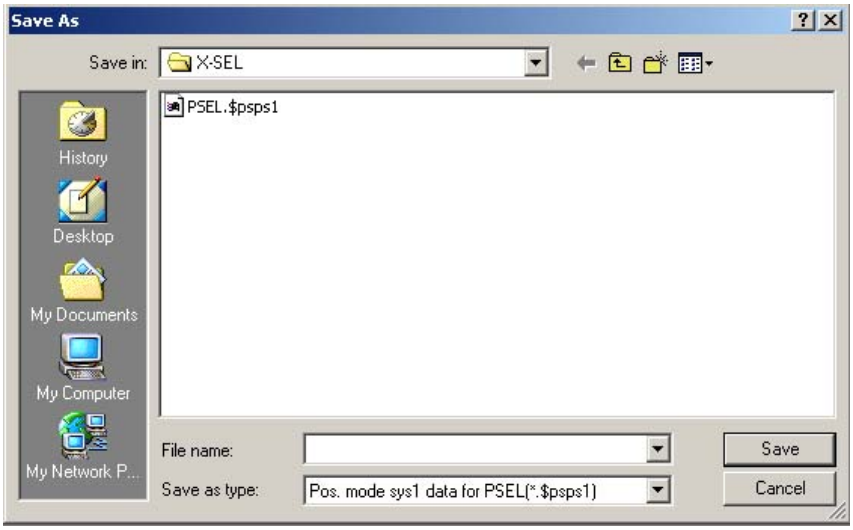


Fig. 13.7 Saving the System Data

13.8 Positioner Mode Management Information for SSEL, ASEL or PSEL Controller

The operation mode and management information as to the positioner mode will be displayed. This information is intended for manufacturers.

[1] Mng. Info. Tab
- Mode: Display a specified positioner mode.
- Management Info. 1, 2: Display the management information of system data.

[2] Detail tab
Display the mode name and management information for each system data.

Click **Pos. mode Management Info (M).** from the **Controller** pop-up menu.

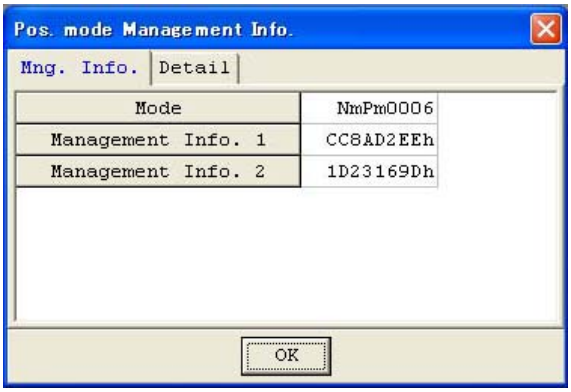


Fig. 13.8 Pos. Mode Management Info.
Management Info. Tab

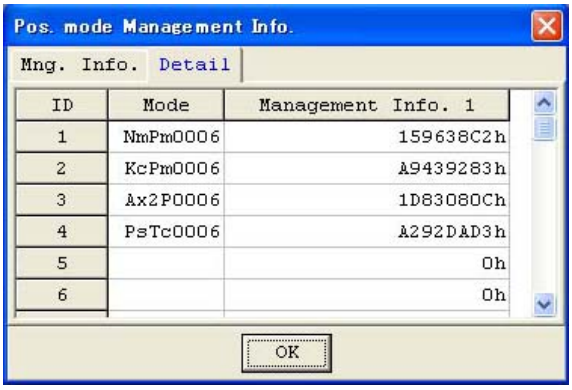


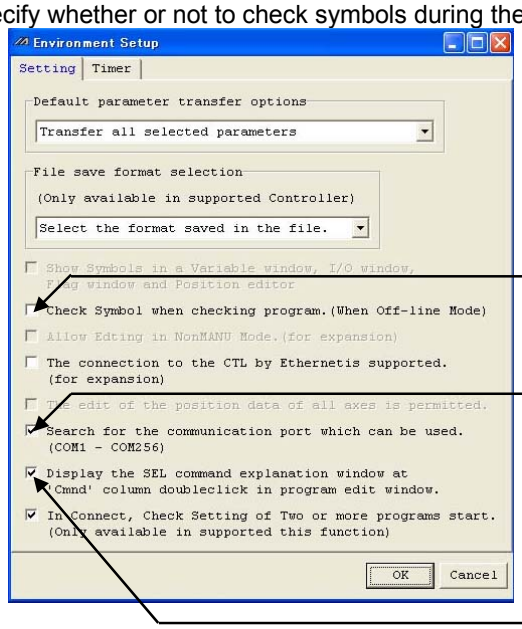
Fig. 13.9 Pos. Mode Management Info.
Detail Tab

14. Tool

The Environment Setup window accessible from the Tool menu consists of the Setting and Timer tabs.

(1) Setting

Specify whether or not to check symbols during the program error check.

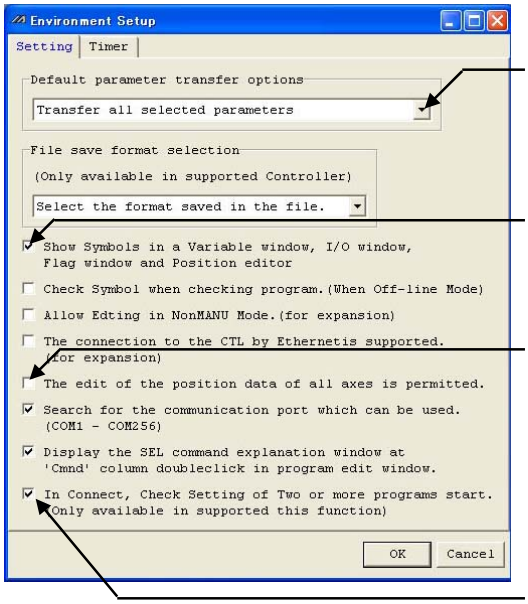


If this checkbox is not selected, symbol errors will not be checked.

If this checkbox is not selected, the communication port which can be used will not be checked. However, selectable communication ports are extended to COM1 to COM256 in the communication check window.
If the selected communication port cannot be used, the "EC5: communication port open error" will occur.

If this checkbox is not selected, partial correction will be possible when the 'Cmnd' column is double-clicked.

Fig. 14.1 Setting (Offline)



Specify the default parameter transfer option.

If this checkbox is selected, symbols will be shown in the variable window, I/O window, flag monitor window and position data edit window.

Position data editing is permitted for four axes in the case of X-SEL J/K controllers, and six axes in the case of the P/Q and PX/QX controllers.

This function is not supported by the X-SEL-J/K, JX/KX, TT, XSEL-P/Q (application version 0.01 - 0.35) or X-SEL-PX/QX controller (application version 0.01 - 0.16).

Fig. 14.2 Setting (Online)

(2) Timer

You can set the times required for the controller to make reference to the various data. Normally the settings need not be changed.

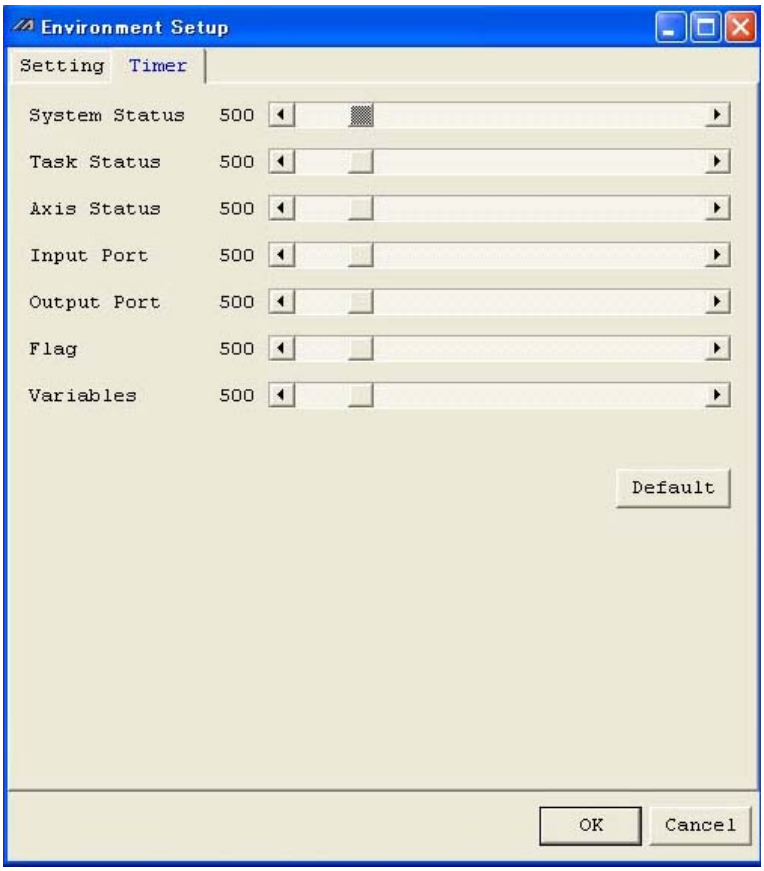


Fig. 13.3 Timer

Appendix

Parameter Recovery Method for X-SEL-P/Q and PX/QX Controllers

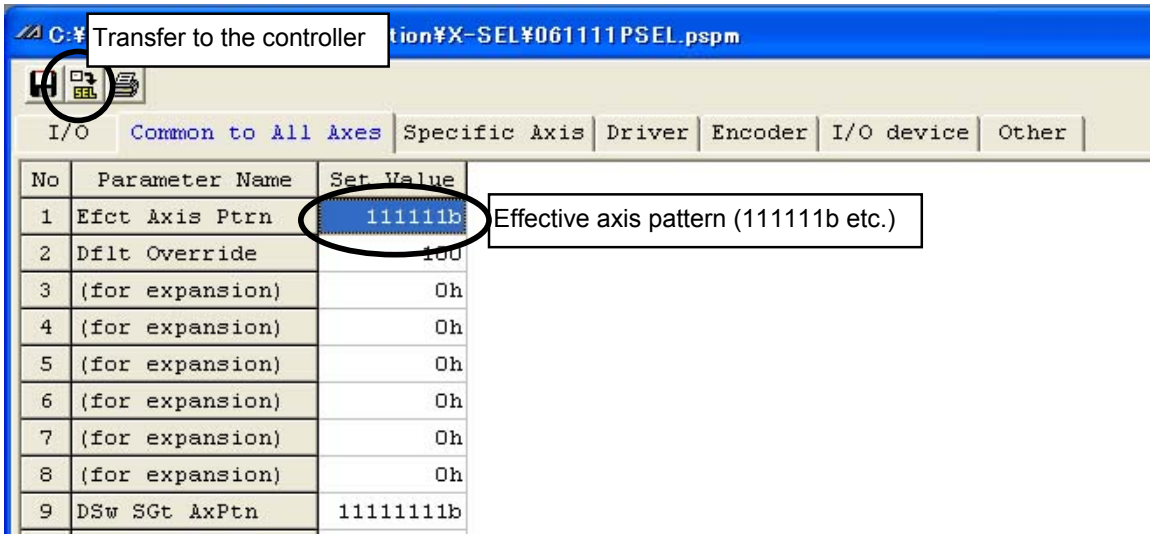
If parameter data is lost during parameter writing to the flash ROM due to main power OFF or any other factor, all parameters will be rewritten to initial values. In the case of the X-SEL-P/Q or PX/QX controller, an error will be detected after power reconnection or software reset since system-specific settings are lost immediately after parameter initialization.
Under such conditions, all parameters cannot be transferred to the controller.
The recovery method in that case is explained below.

Note: This method is intended to write the parameter data back to the controller for recovery. Please note that serious effects such as **home displacement, inoperability and error occurrence** may result when recovery parameters are transferred to any controller other than the target one, even if the model is the same.

1. Setting of Effective Axis Pattern of the Controller

Note: Prepare a parameter file for recovery. Check that the prepared parameter file for recovery is the file of the target controller.

Match the parameter No.01 (effective axis pattern) of Common to All Axes to the effective axis pattern of the parameter file data for recovery (111111b etc.). (Appendix Fig. 1)
If the effective axis patterns of the controller and the parameter file to transfer mismatch, the parameter file cannot be transferred. (A warning dialog in Appendix Fig. 2 will be displayed during file transfer.)



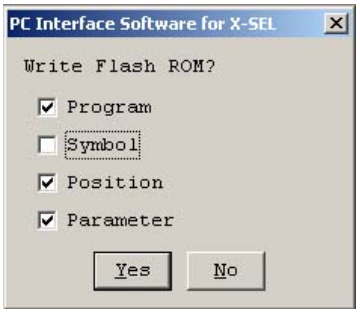
Appendix Fig. 1 Effective Axis Pattern Immediately after Initialization

Appendix Fig. 2 Parameter Transfer when Effective Axis Patterns Mismatch

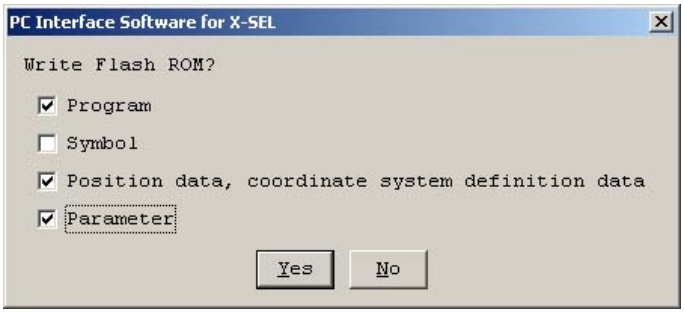
Clicking the transfer to the controller button (see Appendix Fig. 1) after changing the parameters will display the transfer confirmation dialog (Appendix Fig. 3). Click **Yes** to transfer the changed parameters to the controller.

Appendix Fig. 3 Transfer Confirmation Dialog

Once the transfer has been completed, the flash ROM write confirmation dialog will be displayed (Appendix Fig. 4). After confirming that **Parameter** is selected, click **Yes** to write the parameters to the flash ROM.



P/Q Controller



PX/QX Controller

Appendix Fig. 4 Flash ROM Write Confirmation Dialog.

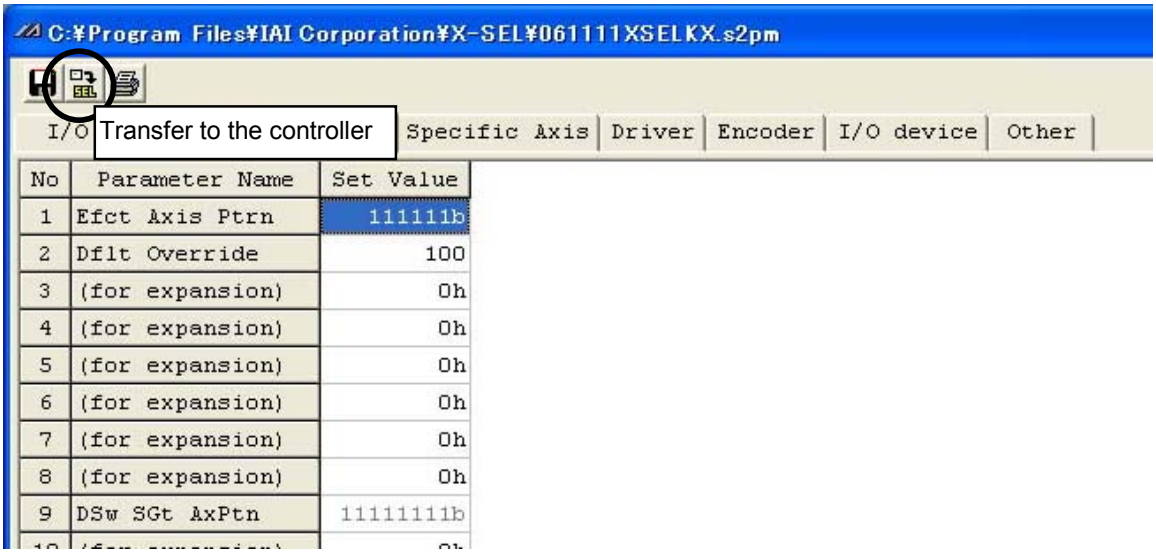
Once the parameters have been written to the flash ROM, the software reset confirmation dialog (Appendix Fig. 5) will be displayed. Click **Yes** to execute software reset.

Appendix Fig. 5 Software Reset Confirmation Dialog

Since the system-specific setting is still lost, an error will be detected after power reconnection or software reset. Even if an error is detected, perform the next step as it is.

2. Transfer of Actuator Non-specific Parameters

First, open a parameter file for recovery.
Clicking the transfer to the controller button will display the Select Parameter Category form.



Appendix Fig. 6 Parameter File Form for Recovery

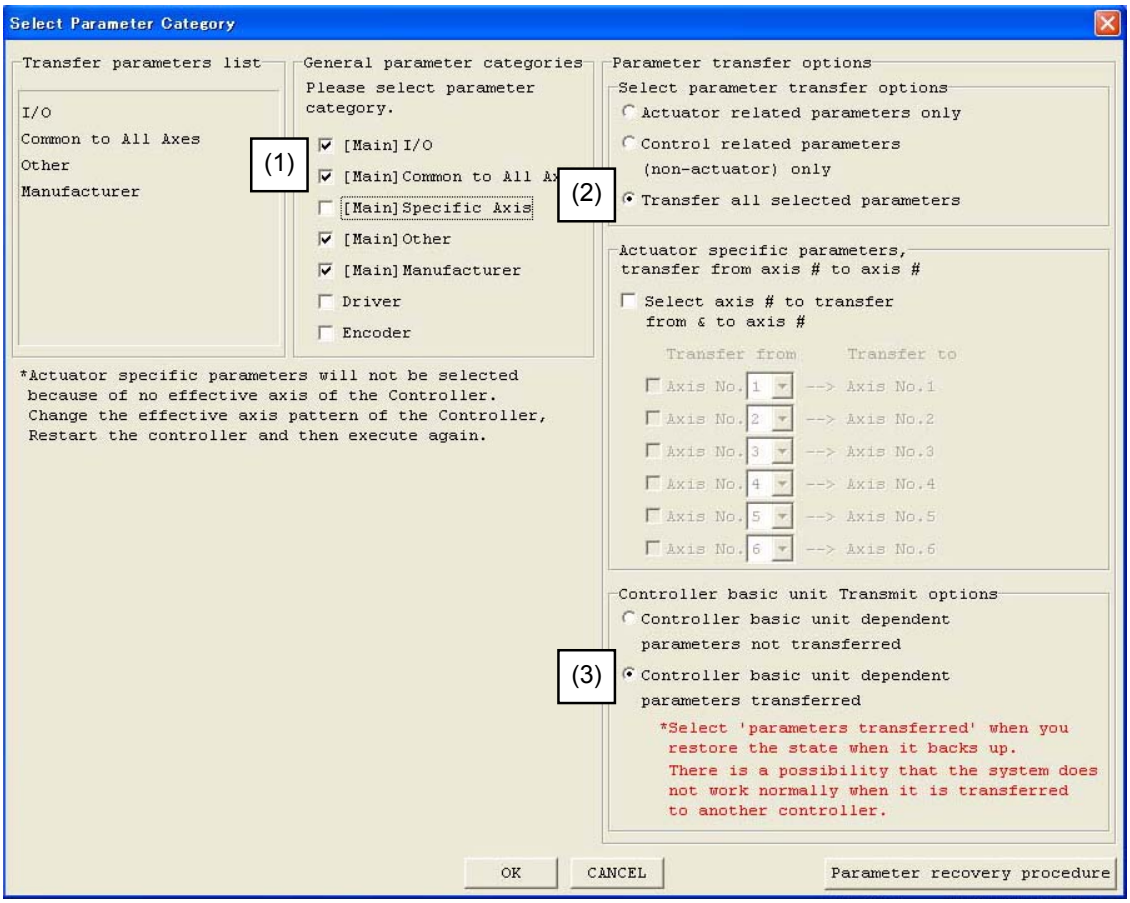
Make settings in the Select Parameter Category form (Appendix Fig. 7) as shown below.

[1] Select I/O, Common to All Axes, Other and Manufacturer in the General parameter categories group.

[2] Select **Transfer all selected parameters** under the **Select parameter transfer options**.

[3] Select **Controller basic unit dependent parameters transferred** under **Controller basic unit transmit options**.
In the initial condition, **Controller basic unit dependent parameters transferred** is selected.)

After completing the above settings, click the **OK** button.
Parameter transfer will start.



Appendix. Fig. 7 Transfer of Actuator Non-specific Parameters

After performing this procedure, always write the parameters to the flash ROM and reset software.

Since the data specific to each axis of the actuator has not been set, an error may be detected after power reconnection or software reset. Even if an error is detected, perform the next step as it is.

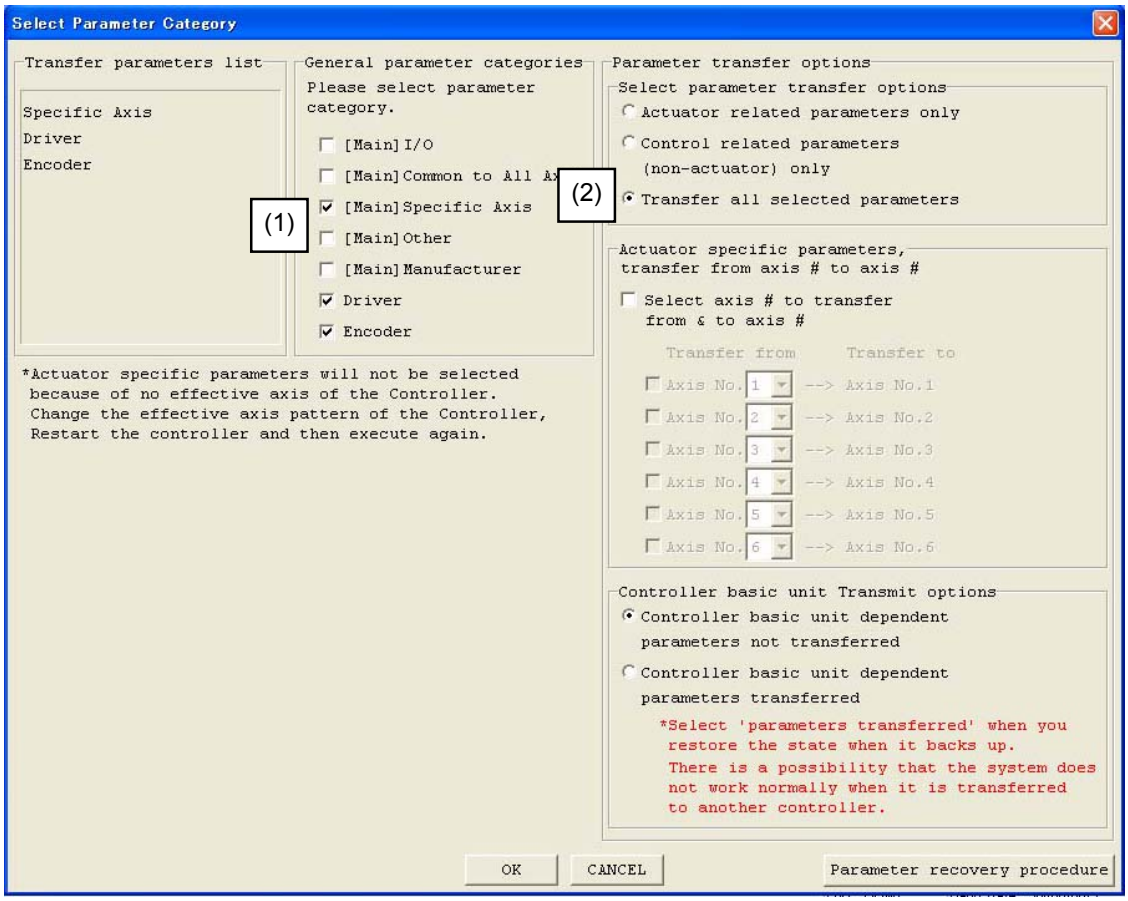
3. Transfer of Actuator Specific Parameters

Display the Select Parameter Category form from the parameter file for recovery in the same way as the previous section. Then, make settings in the Select Parameter Category form (Appendix Fig. 8) as shown below.

[1] Select Specific Axis, Driver and Encoder in the General parameter categories group.

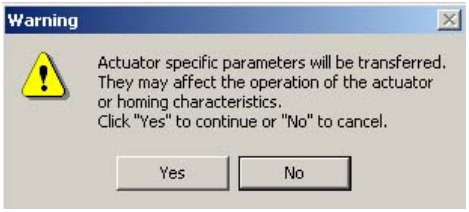
[2] Select **Transfer all selected parameters** under **Select parameter transfer options**.

After completing the above settings, click the **OK** button.



Appendix Fig. 8 Transfer of Actuator Specific Parameters

Once the **OK** button has been clicked, a dialog in Appendix Fig. 9 will be displayed. Select **Yes** to execute parameter transfer.



Appendix Fig. 9 Warning Dialog before Transfer of Actuator Specific Parameters

After performing this procedure, always write the parameters to the flash ROM and reset software.

This completes transfer of all parameter data.
Confirm that parameters are recovered to the conditions at backup time.

◎ Error Level Control

Error level	System error origin	Error No. (HEX)	Display (7SEG, DISPLAY, etc.)	Error list	Error LED output	Program run		Error reset	Remarks
						When Para-Othe No. 4 is 0	When Para-Othe No. 4 is 1		
Secret level	Main application part	800 - 88F		○					Special error level for maintenance
	Main core part	890 - 8AF							
	PC	8B0 - 8DF							
	TP	8E0 - 8FF							
Message level	Main application part	900 - 93F	○	△ (Battery-related and field-path-related errors are registered in the error list.)				Yes	Status display, input errors, etc.
	Main core part	940 - 97F							
	PC	980 - 9AF							
	PC (Update tool)	9B0 - 9BF							
	TP	9C0 - 9FF							
	Flash ACK time-out	A00 - A6F							
	Main core part	A70 - A9F							
	PC	AA0 - ACF							
	TP	AD0 - AFF							
Action reset level	Main application part	B00 - B9F	○	○		Reset the program at the source. (Errors other than axis-related errors become reset factors only in an error-occurring moment.)	Reset all the programs except for the “I/O processing program at action-abort time.” (Errors other than axis-related errors become reset factors only in an error-occurring moment.)	Yes	Errors interfering with action. For a minor errors with a level lower than this, error reset is attempted with the auto-reset function at the external active command (SIO/PIO) receipt.
	Main core part	BA0 - BBF							
	PC	BC0 - BDF							
	TP	BE0 - BFF							
	Main application part	C00 - CCF							
	Main core part	CD0 - CDF							
	PC	CE0 - CEF							
	TP	CF0 - CFF							
Cold start level	Main application part	D00 - D8F	○	○		Reset the program at the source. * However, reset all the programs except for the “I/O processing program at action-abort time” when driving-power-down requiring errors (initialization error, power error, etc.) occur.	Reset all the programs except for the “I/O processing program at action-abort time.”	No	It is required turn on the power again. (Normal execution for CPU and OS)
	Main core part	D90 - DAF							
	PC	DB0 - DCF							
	PC (Update tool)	DD0 - DDF							
	TP	DE0 - DFF							
	Main application part	E00 - E8F							
	Main core part	E90 - EBF							
	PC	EC0 - EDF							
	TP	EE0 - EFF							
System down level	Main application part	FF0 - FBF	○	○	○	Reset all		No	It is required turn on the power again. (Execution is impossible for CPU and OS)
	Main core part	FC0 - FCF							
	PC	FD0 - FDF							
	TP	FE0 - FEF							

PC: PC-compatible software, TP: Teaching Box

X-SEL PC Software Error Table

(Errors specific to the PC Software are listed below. See the X-SEL Controller Operation Manual for controller errors.)

Error No.	Error name	Special note
980	Cannot Copy, Move, Clear Program being edited on-line.	Program copy/move/clear was performed while the online program edit window was open. Close the online program edit window first.
981	Cannot transmit the program file being edited on-line.	Program file transfer was performed to/from the program being edited online. Close the online edit window for the target program first.
982	Cannot Copy, Move, Clear Position data being edited on-line.	Position data copy/move/clear was performed while the online position data edit window was open. Close the online position data edit window first.
983	Cannot transmit the Position data being edited on-line.	Position data file transfer was performed while the online position data edit window was open. Close the online position data edit window first.
984	Cannot transmit the Parameter file being edited on-line.	Parameter file transfer was performed while the online parameter edit window was open. Close the online parameter edit window first.
985	Cannot Clear Symbol data being edited on-line.	Symbol data clear was performed while the online symbol data edit window was open. Close the online symbol data edit window first.
986	Cannot transmit Symbol data file being edited on-line.	Symbol data file transfer was performed while the online symbol data edit window was open. Close the online symbol data edit window first.
987	Cannot initialize memory being edited on-line.	Memory initialization was performed while the program/symbol/position data online edit window was open. Close the applicable online edit window first.
988	Cannot Jog when Servo OFF.	Jogging was performed for an axis whose servo was OFF. Turn ON the servo first.
989	Acceleration specification error for jog, move or continuous move.	The specified acceleration during jog, move or continuous move exceeds the allowable range or is invalid. Check the specified acceleration.
98A	Deceleration specification error for jog, move or continuous move.	The specified deceleration during jog, move or continuous move exceeds the allowable range or is invalid. Check the specified deceleration.
98B	Cannot edit while running program. (PC)	Write, copy, move, clear or other edit operation was performed for the program currently running. End the program you wish to edit, and then try again.
98C	Lacking Empty Step (PC)	There are not enough empty steps in the controller.
98D	Data editing prohibited in non-manual mode	Data edit operation (write, copy, move, clear, etc.) was performed in non-manual mode.
98E	Cannot read so many data from the file.	The number of data sets in the file (number of steps, number of positions, etc.) exceeds the allowable value.
98F	Cannot write so many data to the file.	The number of data sets written to the file (number of steps, number of positions, etc.) exceeds the allowable value.
990	Baud rate specification error.	The specified baud rate is invalid (at connection check, when changing the baud rate, etc.).
991	File data transfer prohibited during data transmission.	Data read from a file cannot be transferred to the controller during data transmission (i.e. while data is being read or written).

Error No.	Error name	Special note
992	Clear of coordinate system definition data prohibited while being edited on-line	Coordinate system definition data cannot be cleared while the online edit window for coordinate system definition data is open. Close the online edit window first.
993	Arm change prohibited when servo OFF	Arm cannot be changed while the servo is OFF.
994	Transfer of a coordinate system data file prohibited while being edited on-line	The coordinate system definition data file was transferred while the online edit window for coordinate system definition data is open.
995	Effective axis pattern mismatch error in 'Crd1' and 'Crd2'	Close the online edit window first.
996	Output port/flag error type specification prohibited when the effective axis pattern is 0 for 'Crd1' and 'Crd2'	The specified axis patterns for Coordinate 1 and Coordinate 2 of the simple interference check zone definition data do not match.
997	Can not select so many axes for monitoring	Coordinate values are not entered in the simple interference check zone definition data.
998	Read-protected data read error	Certain operations, such as read, copy and move, cannot be performed for read-protected data.
999	Write-protected data write error	Certain operations, such as read, copy, move and clear, cannot be performed for write-protected data.
99A	Protection setting parameter error	An invalid value is set in protection setting parameters (Other Parameter Nos. 36 - 39).
99B	Position No. specification error	The specification of the number of point data is abnormal.
99C	Port No. specification error	The specification of the communication socket number is abnormal.
99E	Function unsupport rejection error (PC)	Unsupported function.
AA0	Input data error	A value outside the allowable range or invalid character has been input.
AA1	Password Error.	The entered password is invalid. Enter the correct password.
AA2	Failed in writing file.	
AA3	Data edit prohibited in operating mode	Data edit was performed in operating mode. Check the type of manual operation (Other Parameter No. 21 and the type of manual PC Software operation currently selected).
AA4	Data write prohibited during flash ROM write	Data write was performed while the flash ROM was written. Data edit cannot be performed while the flash ROM is written.
AA5	File data error	The data read from a file is abnormal.
AA6	Jog/move/continuous move speed too low	
AA7	Jog/move/continuous move speed too high	
AA8	Data transmission not possible offline	Data transmission cannot be performed while the communication with the controller is cut off. Try again after starting the application in online mode.
AA9	Teaching prohibited before completion of homing	Teaching operation (current position capture) was performed for an axis whose homing was not yet complete. Complete homing first.
AAA	Memory initialization prohibited in operating mode	Memory initialization was performed in operating mode. Check the type of manual operation (Other Parameter No. 21 and the type of manual PC Software operation currently selected).

Error No.	Error name	Special note
AAB	Flash ROM write prohibited in operating mode	The flash ROM was written in operating mode. Check the type of manual operation (Other Parameter No. 21 and the type of manual PC Software operation currently selected).
AAC	Error list clear prohibited in operating mode	The error list was cleared in operating mode. Check the type of manual operation (Other Parameter No. 21 and the type of manual PC Software operation currently selected).
AAD	Slave unit type not entered	
AAE	Slave unit type error	
AAF	Slave device No. not entered	
AB0	Slave device No. error	
AB1	Slave command ID not entered	
ZB2	Slave command ID error	
AB3	Prohibited slave command issued	
AB4	Prohibited slave command issued before completion of homing	A slave command was issued whose use is prohibited before completion of homing.
AB5	Prohibited slave command issued during servo ON	A slave command was issued whose use is prohibited when the servo is ON.
AB6	Prohibited slave command issued before completion of homing	A slave command was issued whose use is prohibited before completion of homing.
AB7	Re-homing not complete	The absolute encoder rotation data was reset when re-homing was not yet complete. Regardless of whether or not a prior homing had been completed, fresh homing operation must always be performed when resetting the absolute encoder rotation data.
AB8	File read error	The file format is wrong or abnormal data is contained.
AB9	Too many breakpoints	The number of breakpoints exceeds the settable range. Cancel unnecessary breakpoints and then try again.
ABA	File open error	The file cannot be opened. Check if the file is being used by other application.
ABB	File type error	The file type is invalid. Check the file type (extension).
ABC	Data not entered	Data is not entered in a mandatory field or fields. Enter data.
ABD	Symbol first character error	The first character of the symbol is invalid.
ABE	Symbol character string error	The symbol character string contains an invalid character or characters.
ABF	Symbol multiple definition error	The same symbol is defined more than once.
AC0	Program name multiple definition error	The same program name is defined more than once.
AC1	Encoder type error	Check the encoder ABS/INC type (Axis Parameter No. 38), etc. of the target axis.
AC2	Monitoring axis not selected	

Error No.	Error name	Special note
AC3	Date entry error	(For future extension)
AC4	Time entry error	(For future extension)
AC5	Inching distance excessive	
AC6	Window closing prohibited during data transmission	The edit window whose data is being transmitted cannot be closed. Close the window after the transmission is complete.
AC7	Too many symbol definitions	The number of symbol definitions exceeds the allowable range. Create empty area by deleting unnecessary symbols, and then try again.
AC8	Entered value too large	
AC9	Entered value too small	
ACA	Parameter initialization prohibited during online edit	Parameter initialization was performed while the online parameter edit window was open. Close the online parameter edit window first.
ACB	SEL program/symbol/position data initialization prohibited during online edit	SEL program/symbol/position data initialization was performed while the program/symbol/position data online edit window was open. Close the applicable online edit window first.
ACC	Symbol not defined	An undefined symbol or symbols is/are used in the program step data.
ACD	File not found	The specified file cannot be found. Check the file name.
ACE	File not supported	The specified file format is not supported by the application. Check the file type.
ACF	No available axis	There is no available axis that can be edited/operated. Check the available axis pattern (All-Axis Common Parameter No. 1).
EC0	Received message string error (PC)	The received message contains error. If the error persists after reconnection, contact IAI.
EC1	Controller not connected	Communication may not yet be established or the connected controller may not be supported. Check the physical connection with the controller and then perform “Reconnection.”
EC2	Receive time out. (PC)	Communication error. Check the cable connection, short, noise, etc.
EC3	Receive Length Error. (PC)	Communication error. Check the cable connection, short, noise, etc.
EC5	Com Port Open Error.	The COM port cannot be opened. Check if the COM port is available.
EC6	Sum Check Error. (PC)	Communication error. Check the cable connection, short, noise, etc.
EC7	Receive Buffer Overflow. (PC)	The receive buffer (PC) overflowed. Perform “Reconnection.”
EC8	Receive Buffer Overflow Error (PC) (OS)	The receive buffer overflowed. Perform “Reconnection.”
EC9	Receive Overrun Error (PC)	Receive overrun occurred. Perform “Reconnection.”

Error No.	Error name	Special note
ECA	Framing Error (PC)	Framing error occurred. Perform “reconnection.”
ECB	Communication Error (PC) (OS)	Communication error occurred. Perform “reconnection.”
ECC	Unsupported controller connection error	The connected controller is not supported.
ECD	Ethernet Receive Timeout Error (PC)	Communication error. Check the HUB, cable connection, short, noise, etc.
ECE	Disconnection Error (PC)	Communication error. Check the HUB, cable connection, short, noise, etc.
ECF	Socket Error (PC)	Communication error. The cable may be removed or disconnected.
ED0	Service Port No. Being Used (PC)	The specified port number may be being used by another connection. Change the port number.
ED1	Cannot connect so many sockets (PC)	This error occurs when 64 or more controllers are connected.

MEMO

MEMO

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