ROBO CYLINDER

PC Software

RCM-101-MW, RCM-101-USB

Operation Manual

Thirtieth Edition

IAI Corporation

Please Read Before Use

Thank you for purchasing our product.

This Operation Manual explains the handling methods, structure and maintenance of this product, among others, providing the information you need to know to use the product safely.

Before using the product, be sure to read this manual and fully understand the contents explained herein to ensure safe use of the product.
The DVD that comes with the product contains operation manuals for IAI products.
When using the product, refer to the necessary portions of the applicable operation manual by printing them out or displaying them on a PC.

After reading the Operation Manual, keep it in a convenient place so that whoever is handling this product can reference it quickly when necessary.

[Important]

- This Operation Manual is original.
- The product cannot be operated in any way unless expressly specified in this Operation Manual. IAI shall assume no responsibility for the outcome of any operation not specified herein.
- Information contained in this Operation Manual is subject to change without notice for the purpose of product improvement.
- If you have any question or comment regarding the content of this manual, please contact the IAI sales office near you.
- Using or copying all or part of this Operation Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

Disconnection of the Teaching Pendant from the PCON, ACON, DCON, SCON ERC2, ERC3, ROBONET, PSEP, ASEP, DSEP, MSEP, MSCON, MCON, RCON Controller and ELECYLINDER

* After disconnecting the Teaching Pendant from the PCON, ACON, DCON, SCON, ROBONET, MSEP, MSCON, MCON or RCON controller with the AUTO/MANU switch, always turn the AUTO/MANU switch to AUTO.

* For the PCON, ACON, ERC2, ERC3, PSEP, ASEP, DSEP controller and ELECYLINDER without AUTO/MANU switch, always set the MANU operation mode to "Monitor Mode 2" on the main window before disconnecting the Teaching Pendant from the controller. (Refer to 3.2, "Operations Using the Toolbar Buttons.")

(Note) When connected to the controller without AUTO/MANU switch, the conditions shown below occur. When the controller is set by connecting the Teaching Pendant to the gateway unit/SIO converter, the conditions shown below occur.

- If the Teaching Pendant is disconnected while the setting of "Teach 1" or "Teach 2" remains, I/O will become invalid and control from PLC will become impossible.
- If the Teaching Pendant is disconnected while the setting of "Monitor 1" remains, the maximum speed will become the safety speed set for the parameter regardless of a command from PLC.

MEMO

Software License Agreement

Before opening this product, read the software license agreement (hereinafter referred to as “Agreement”). This Agreement applies to the PC software that comes with this product (hereinafter referred to “Software”). By using this software, you are deemed to have agreed to the terms of this Agreement. You may not use this software if you do not agree to the terms of this Agreement.
If you do not agree to the terms of this Agreement, please return your product in the original, unused condition, and IAI will refund the price you paid for the product.

IAI Corporation (hereinafter referred to as “IAI”) shall grant to the user (hereinafter referred to as “the User”), and the User shall accept, a non-transferable, non-exclusive right to use the software program supplied with this Agreement (hereinafter referred to as “the Licensed Software”), based on the following terms and conditions.

Witnesseth

1. Term of Agreement
This Agreement shall take effect when the User opens this software and remain effective and in force until this Agreement is terminated upon a written request made by the User to IAI or pursuant to the provision of Section 3.

2. Right of Use
The User may use this software on a computer on the condition that an external equipment communication cable manufactured and sold by IAI (hereinafter referred to as “Dedicated Connection Cable”) is used. The User or a third party may use this software on multiple computers on the condition of using dedicated connection cables.

3. Termination of Agreement
If the User violates any of the provisions specified in this Agreement or any material reason arises that makes continuation of this Agreement difficult, IAI may terminate this Agreement immediately without serving any notice. If this Agreement is terminated, the User shall destroy this software, dedicated connection cable or cables, and all copies of this software, within ten (10) days from the date of termination of this Agreement.

4. Scope of Protection
IAI may change any and all specifications regarding this software without prior notice. IAI shall also provide no warranty in connection with this software.
Neither the User nor any third party may demand compensation for any loss suffered by the User or third party as a result of use of this software by the User or third party.

Supported Models

The PC software RCM-101-MW and RCM-101-USB supports the following controller models of the specified versions and later.

Table 1 List of Supported Models

Model Name	Initial Supported Version	Model Name	Initial Supported Version
RCP *1	V1.00.00.00	MSCON	V9.02.00.00
RCS *1	V3.00.00.00	MSEP (with 3D or T included in model code) *3	V9.06.00.00
E-Con *1	V3.00.05.00	SCON-CAL/CGAL	V9.07.00.00
RCP2 *1	V4.00.00.00	ACON-CB	V10.00.00.00
ERC *1	V4.00.00.00	DCON-CB	V10.00.00.00
ERC2	V6.00.00.00	SCON-CB	V10.00.00.00
ERC3	V8.03.00.00	MCON	V10.00.00.00
PCON (other than PCON-CA, PCON-CB, CYB, PLB, POB)	V6.00.00.00	PCON-CB	V10.02.00.00
		RCP6S	V10.02.00.00
PCON-CA	V8.03.00.00	RCM-P6PC	V12.00.00.00
ACON (other than ACON-CA, ACON-CB, CYB, PLB, POB)	V6.00.00.00	RCM-P6AC	V12.00.00.00
		RCM-P6DC	V12.00.00.00
ACON-CA	V9.05.00.00	PCON-CB, CYB, PLB, POB	V10.03.00.00
DCON-CA	V9.05.00.00	ACON-CB, CYB, PLB, POB	V10.03.00.00
SCON-C	V6.00.00.00	DCON-CB, CYB, PLB, POB	V10.03.00.00
SCON-CA	V8.00.00.00	MCON (MECHATROLINK-Ⅲ: with ML3 included in model code) (SSCNETⅢ/H: with SSC included in model code) (EtherCAT Motion: with ECM included in model code)	V10.04.00.00
ROBONET	V6.00.04.00		
ASEP *2	V7.00.00.00		
PSEP *2	V7.00.00.00		
DSEP *2	V8.04.00.00	ELECYLINDER	V12.00.00.00
MSEP (without 3D or T included in model code) *3, MSEP-LC*3	V9.01.00.00	RCON-PC/PCF, RCON-AC, RCON-DC SCON-CB (with RC included in model code)	V13.00.00.00

Model Code of MSEP 3D (3W, Brush-less DC Electric Motor), T (High-thrust Setting Type)

*1: This PC software also supports the RCP, RCS, E-Con, RCP2, and ERC controllers.

(Note) Confirm the connected model and version of this application. If any unsupported model is connected, it may operate unexpectedly.

(Note) ERC2, ERC3, PCON, ACON, SCON or MSCON cannot be used by linking with any model shown in *1, *2 and *3. Models in *1, *2 and *3 cannot be linked with each other.

The software reset function is effective for models corresponding to V4.00.00.00 or later of the supported version.

A Word of Caution

[1] This software is copyrighted by IAI Corporation (IAI).

[2] The software and the manual can only be used upon the software license agreement.

[3] IAI cannot assume responsibility for any damage or loss resulting from the use of this software or the manual.

[4] Please note that the version or edition number printed on the face of this manual does not correspond to the software version number.

[5] The content of this manual is subject to change without notice.

[6] 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	Supported Operating Systems
RS-232C	RCM-101-MW	Windows 7 *1, Windows8, 8.1 *2, Windows 10 *3
USB	RCM-101-USB	Windows 7 *1, Windows8, 8.1 *2, Windows 10 *3

*1 Supported by software version V9.00.00.00 or later
*2 Supported by software version V9.08.00.00 or later
*3 Supported by software version V11.00.00.00 or later

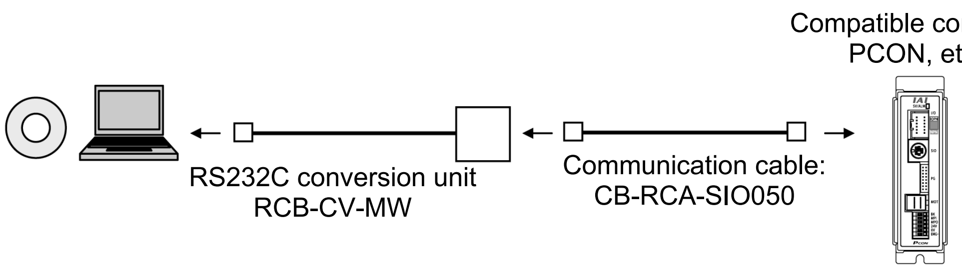
Table of Contents

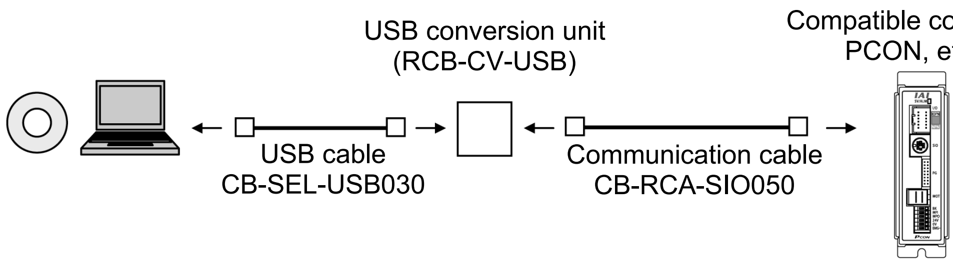
1. Preparation Before Use

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 (1)
[3] Customer registration card (1)
[4] External connection cables (1)
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
RCM-101-MW	RS232C conversion unit (RCB-CV-MW): 1 cable Communication cable (CB-RCA-SIO050): 1 cable
Connection Configuration	

Type	External Connection Cable
RCM-101-USB	USB conversion unit (RCB-CV-USB): 1 cable Communication cable (CB-RCA-SIO050): 1 cable USB cable (CB-SEL-USB030): 1 cable
Connection Configuration	

*1 ROBONET Gateway Parameter Setting Tool is stored in the CD-ROM.
Refer to ROBONET Operation Manual for the how to use the tool.

1.2 Operating Environment

You need the following environment to run this software.

Applicable operating systems	Model number	Supported operating systems
	RCM-101-MW	Windows 7 *1, Windows 8, 8.1 *2, Windows 10 *3
	RCM-101-USB	Windows 7 *1, Windows 8, 8.1 *2, Windows 10 *3
	*1 Supported by software version V9.00.00.00 or later *2 Supported by software version V9.08.00.00 or later Applicable for 32 bit and 64 bit versions of the OS. *3 Supported by software version V11.00.00.00 or later	
Computer	Personal computer running an applicable operating system (Windows)	
Keyboard	Keyboard compatible with a personal computer running an applicable operating system (Windows)	
Memory	Enough memory needed to run an applicable operating system (Windows)	
Display	XGA or higher	
Pointing device	Mouse and other compatible driver	
Memory-medium reading drive	CD-ROM drive	
Hard disk	Hard disk with at least 20 MB of free space (This software must be installed on the hard disk.)	
Serial port RS232C (compatible with EIA-S74)	An applicable serial port is required if the model number of your PC software is as follows: Model number: RCM-101-MW	
USB port	An applicable serial port is required if the model number of your PC software is as follows: Model number: RCM-101-USB	

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 RC

[1] Insert the CD-Rom containing this software into your CD-ROM drive.
[2] The installed data selection window (Fig. 1.1) will be displayed.
Select the version you wish to install from these choices: **PC Interface Software for RC (ENG)** and **PC Interface Software for RC (EUR).** Then click the corresponding button to begin the installation. (Some items are not indicated depending on the version.)

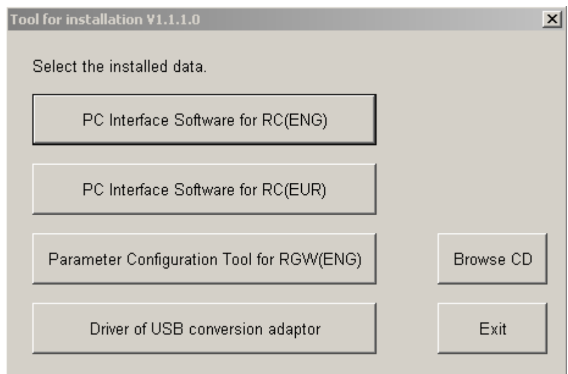


Fig. 1.1 Installed Data Selection Window
(The displayed window may vary depending on the version or other factor.)

* What to do when the Installed Data Selection window (Fig. 1.1) does not appear
If the Installed Data Selection window (Fig. 1.1) does not appear after inserting the CD-ROM, follow the procedure below to display the Installed Data Selection window.

a. Use Explorer, etc., to display a list of folders and files in the CD-ROM.
The window should display the icons shown in Fig. 1.2.

Fig. 1.2 Icons

b. Double-click  among the icons displayed. The Installed Data Selection window (Fig. 1.1) will appear.

[3] A previous version install check window (Fig. 1.3) is displayed.
Click **Yes** if no previous version has been installed.
Click **No** if any previous version has been installed.
Installation is interrupted, then uninstall using the Program add/remove icon on the control panel.

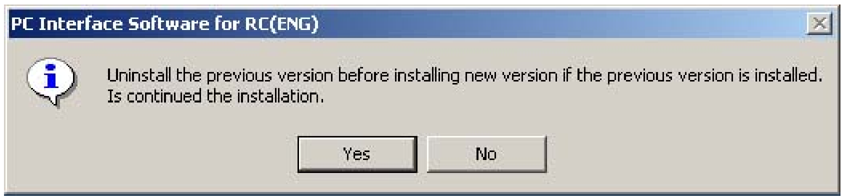


Fig. 1.3 Previous Version Install Check Window

If the installer still detects that a previous version is installed after you have clicked **Yes**, the previous version detection window (Fig. 1.4) appears. If this window appears, uninstall the previous version and then repeat the installation process from the beginning.

Fig. 1.4 Previous Version Install Check Window

* How to uninstall is described at the end of how to install PC Interface Software for RC. Refer to it.

[4] The installation window (Fig. 1.5) for PC Interface Software for RC
Click **Next**.

Fig. 1.5 Installation Window

[5] Customer information register window (Fig. 1.6) is displayed. Enter customer information and click **Next**.

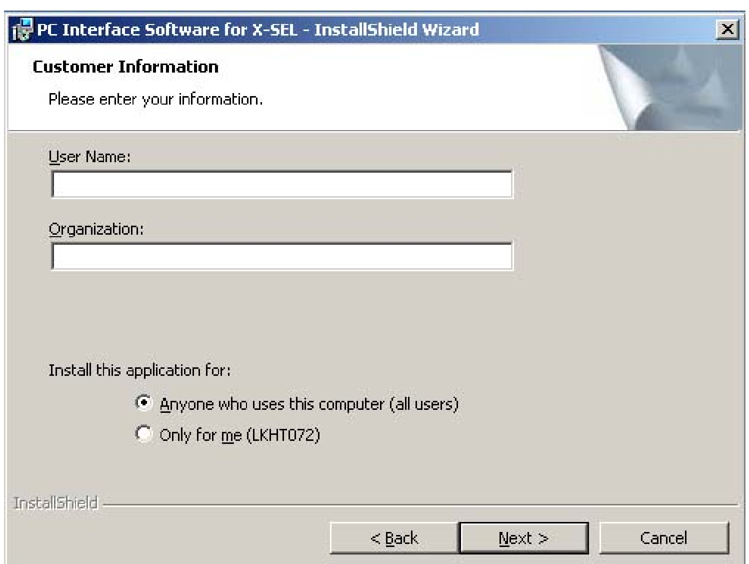


Fig. 1.6 Customer Information Registration

[6] Specify a destination folder to install the PC interface software for RC. (Fig. 1.7)
Normally, you can install it to the default location.
After specifying it, click **Next**.

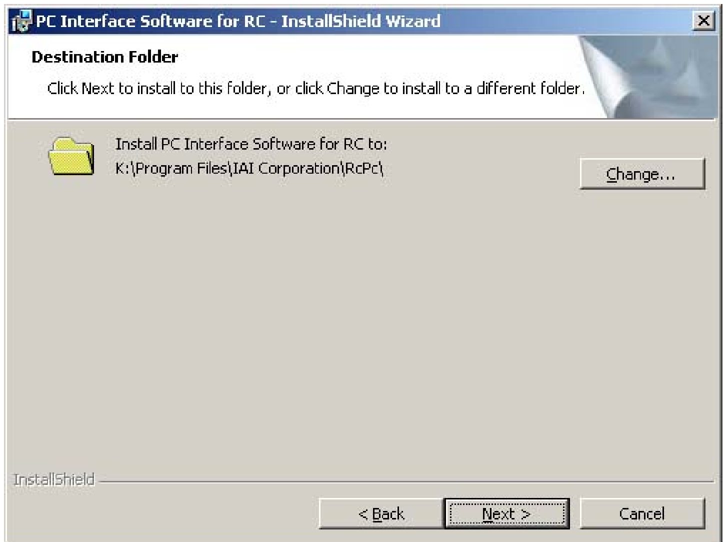


Fig. 1.7 Specification of Destination Folder

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

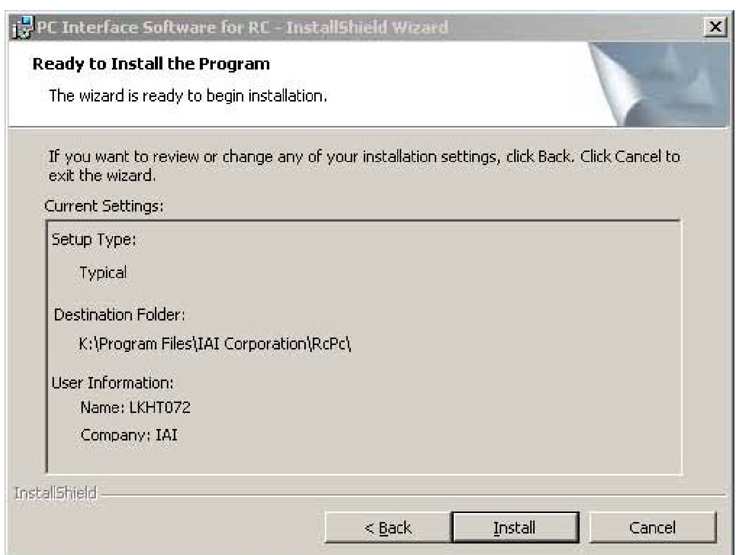


Fig. 1.8 Installation Preparation

The window shown in Fig. 1.9 will be displayed during installation.

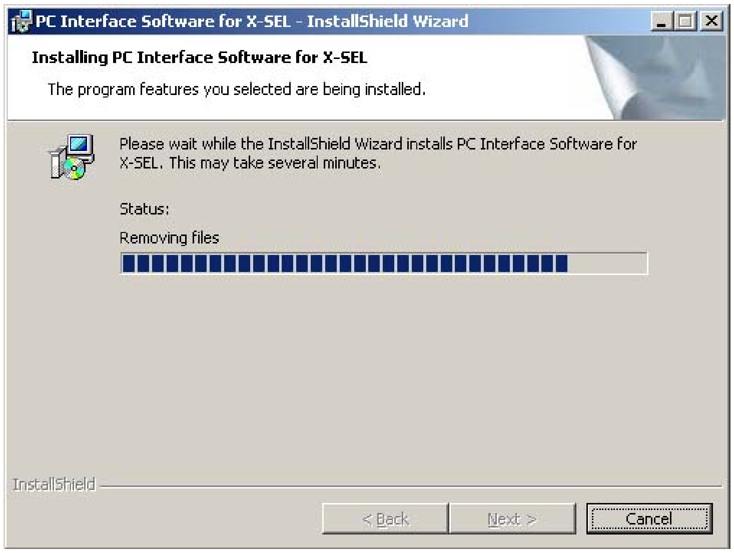


Fig. 1.9 Installation Progress

[8] When installation is completed, the window shown in Fig. 1.10 will be displayed.

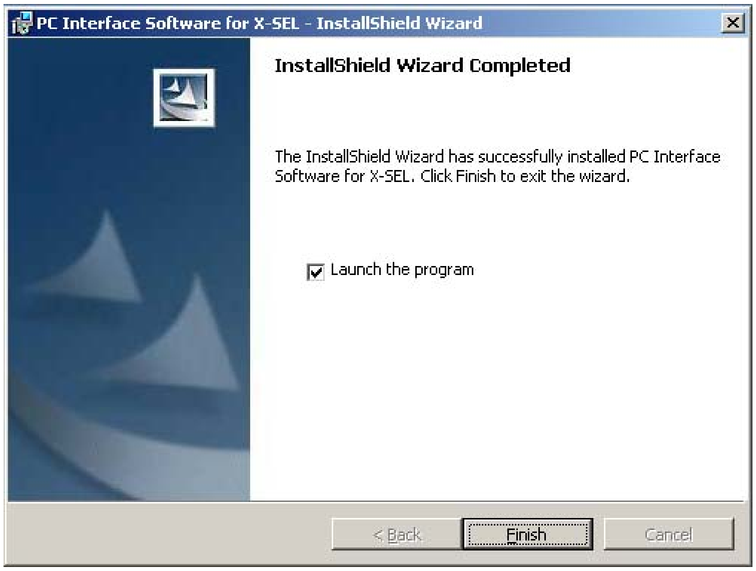


Fig. 1.10 Installation Completion

[9] When the install program is ended, a shortcut in Program → IAI → ROBO Cylinder → PC Interface Software for RC is displayed on the start menu. This software starts by selecting this item.

[10]Remove the CD-ROM.

* If install is completed with the previous version installed, two shortcuts may be located in Program → IAI → ROBO Cylinder on the start menu. In this case, only the short cut corresponding to the present version is deleted when uninstalled. Right click the shortcut for the previous version (PC Interface software for RC&E-Con) click **Delete** to manually delete it.

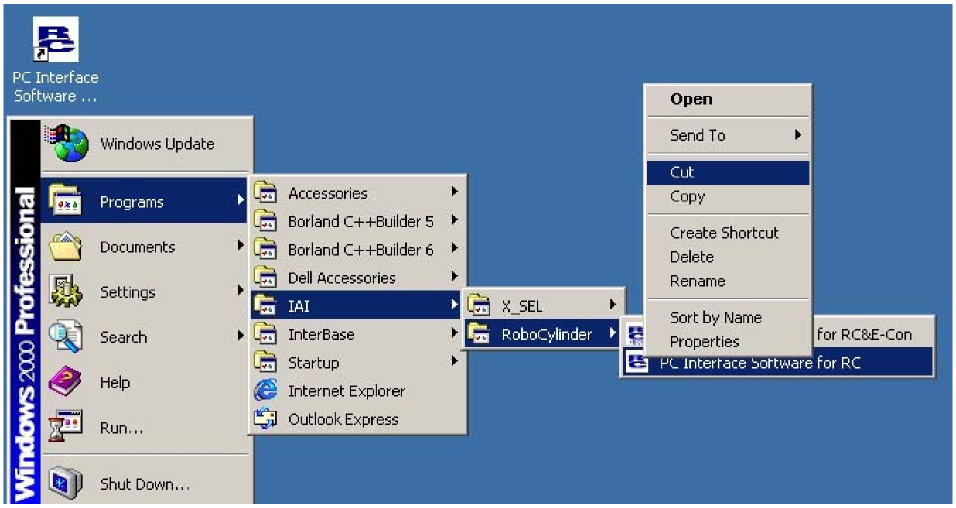


Fig. 1.11 Shortcut Delete Window for Previous Version

1.3.2 How to Uninstall PC Interface Software for RC

[1] Open the application add and delete window on the control panel.

[2] Select **RcPc** on the application add and delete window, and click **Change/Remove**.

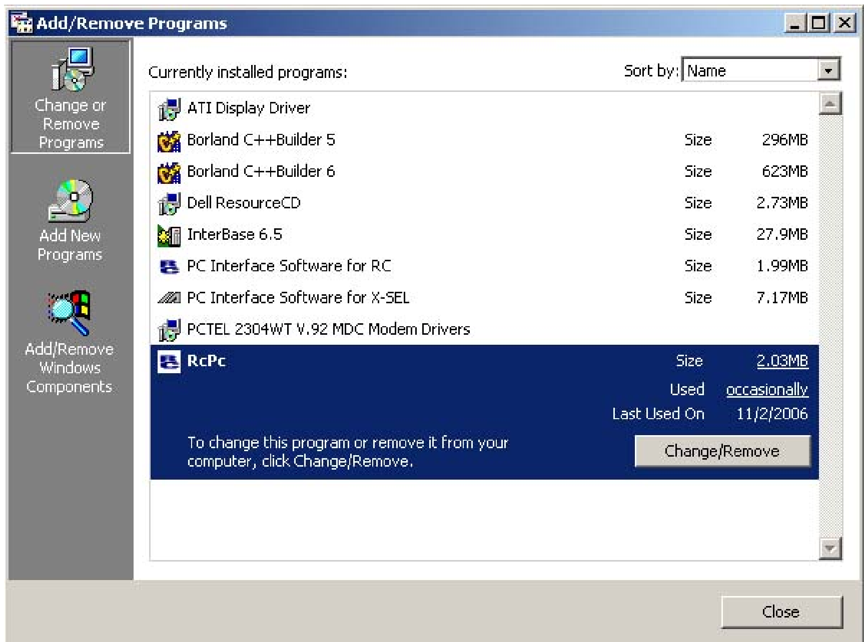


Fig. 1.12 Application Add and Delete

[3] When a file delete check window (Fig. 1.13) is displayed, click **Yes**.

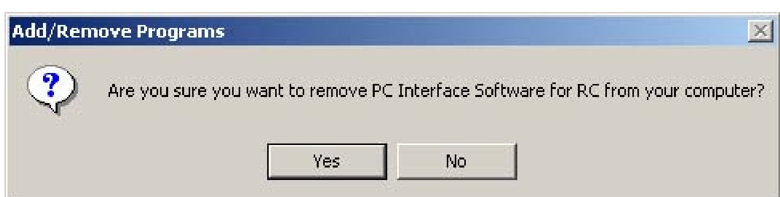


Fig. 1.13 File Delete Check

1.3.3 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]
▪ RCM-101-USB (with USB conversion adaptor + cable)

(1) Windows XP and Windows 2000
For Windows XP and Windows 2000 follow the steps below to install the software.
[For how to install in Windows 7 and Windows Vista, refer to (2) Windows Vista.]
(Note) PC software version V9.08.00.00 or later is not applicable for Windows 2000.

[1] Insert the CD-ROM of this software into your CD-ROM drive.

[2] The installed data selection window (Fig. 1.14) will be displayed.
Click [USB conversion adapter].

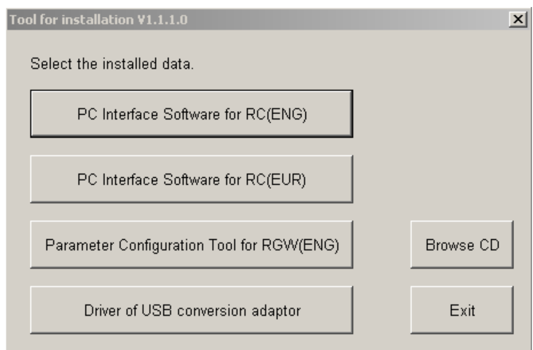


Fig. 1.14 Installed Data Selection Window
(The displayed window may vary depending on the version, data in the CD or other factors.)

[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 window (Fig. 1.16), click the folder of the copy destination to select it and then click **OK**. Once you have clicked **OK**, the browse for folder window (Fig. 1.16) will disappear and the selected folder path will be displayed on the window to specify the folder of the copy destination (Fig. 1.15).

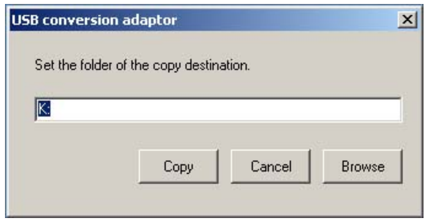


Fig. 1.15 Window to Specify Folder of Copy Destination

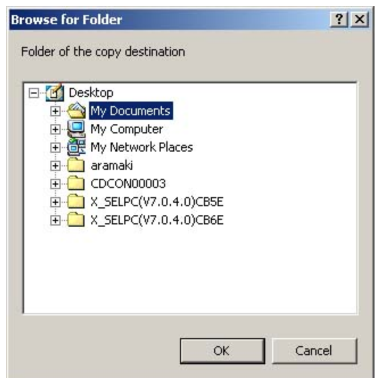


Fig. 1.16 Browse for Folder Window

[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. 1.17 Overwrite Confirmation Window

[5] The complete window (Fig. 1.18) will be displayed.

Fig. 1.18 Complete Window

[6] Once the complete window (Fig. 1.18) has been displayed, click **OK**. The complete window (Fig. 1.18) will disappear. Then, click **Cancel** on the window to specify the folder of the copy destination (Fig. 1.15).
The window to specify the folder of the copy destination (Fig. 1.15) will disappear.
Finally, click **Exit** on the data selection window (Fig. 1.14). The data selection window (Fig. 1.14) will disappear.

[7] Remove the CD-ROM.

[8] Then, insert the USB conversion adapter (RCB-CV-USB) into the USB port of your PC.

[9] Windows will open the **Found New Hardware Wizard**.
Click **Next**.

Fig. 1.19 Found New Hardware Wizard Start Window

[10]The driver search select window will open.
Check the **Search for a suitable driver for my device (recommended)**.
Click **Next**.

Fig. 1.20 Driver Search Select Window

[11]The locate driver files window will open.
Select **Specify a location**.
Click **Next**.

Fig. 1.21 Specify the Locate Driver Files Window

[12]The “Copy manufacturer’s files from:” window will open.
Click **Browse** and find **K: \IAI USB** (the folder you have specified in [3] of 1.3.3) and set it.
Click **OK**.

Fig. 1.22 Specify the Copy Manufacturer’s Files from Window

[13]The driver files search results window will open.
Click **Next**.

Fig. 1.23 Driver Files Search Results Window

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

Fig. 1.24 IAI USB Composite Device Installation Finish Window

[15]Subsequently, the found new hardware wizard window will open.
Click **Next**.

Fig. 1.25 Found New Hardware Wizard Window

[16]The install hardware device drivers window will open.
Select the **Search for a suitable driver for my device recommended**.
Click **Next**.

Fig. 1.26 Driver Search Select Window

[17]The locate driver files window will open.
Select **Specify a location**.
Click **Next**.

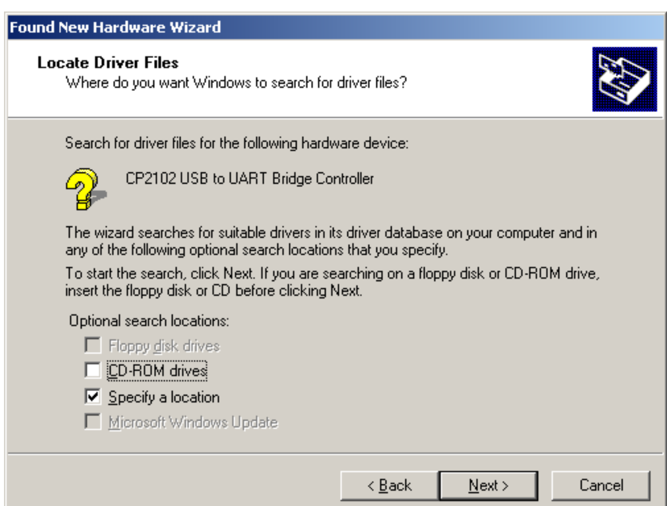


Fig. 1.27 Locate Driver Files Window

[18]The copy manufacturer's files from window will open.
Click **Browse** and find **K:\IAI USB** (the folder you have specified in [3] of 1.3.3) and set it.
Click **OK**.

Fig. 1.28 Specify the Copy Manufacturer's Files from Window

[19]The driver files search results window will open.
Click **Next**.

Fig. 1.29 Driver Files Search Results Window

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

Fig. 1.30 IAI USB to UART Bridge Controller Installation Finish Window

[21]The installation of all drivers is completed.

[22]Click **Start** on the Windows taskbar, **Settings**, and then **Control Panel** to open the Control Panel.
Double-click **System** to open System Properties.
Click the **Hardware** tab in **System**.
Click **Device Manager** in **Hardware**.
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.

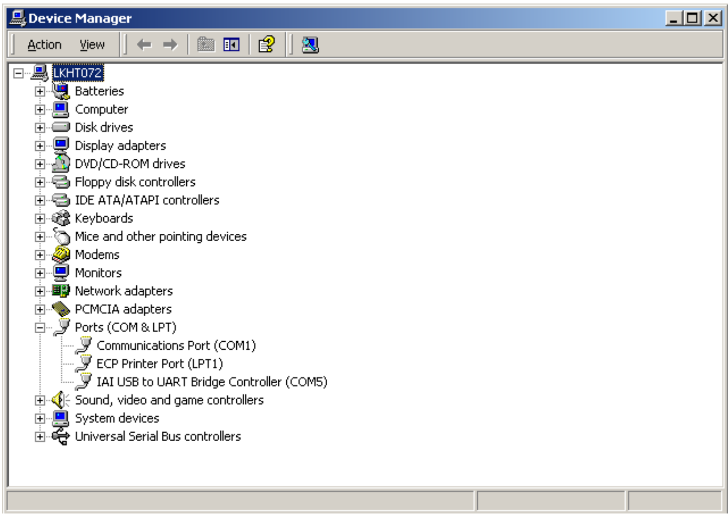


Fig. 1.31 Device Manager Window

(2) Windows 7, Windows Vista, Windows 8, 8.1, Windows 10
For Windows 7, follow the steps below to install the software.
You shall follow the same steps for Windows Vista and Windows 8, 8.1, Windows 10.

[1] Insert the CD-ROM of this software into your CD-ROM drive.

[2] Click on **Driver of USB conversion adapter** in the window to select what to install.

[3] A previous version install check window is displayed.
Click **Yes** if no previous version has been installed.
Click **No** if any previous version has been installed.
Installation is interrupted, then uninstall using the Program add/remove icon on the control panel.

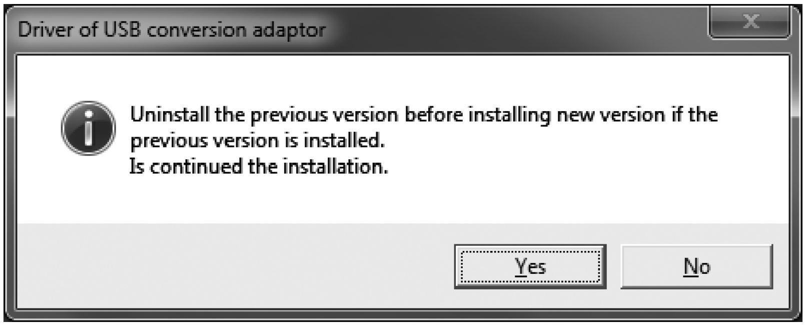


Fig. 1.32 Previous Version Install Check Window

[4] IAI Corporation USB to UART Bridge Controller Driver Installer window appears. Click **Next>**.

Fig. 1.33 IAI Corporation USB to UART Bridge Controller Driver Installer Window

[5] The drivers are now installing... window appears.

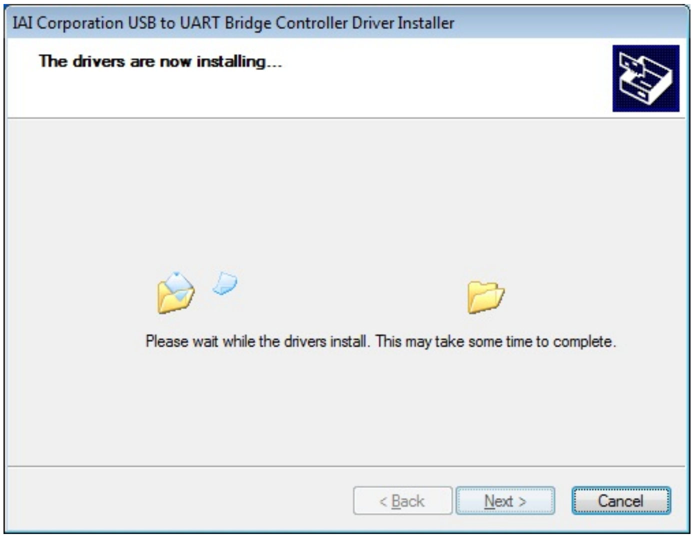


Fig. 1.34 The drivers are now installing... window

[6] Once the installation is completed, “The drivers were successfully installed on this computer.” is shown on IAI Corporation USB to UART Bridge Controller Driver Installer window. Click **Finish**.

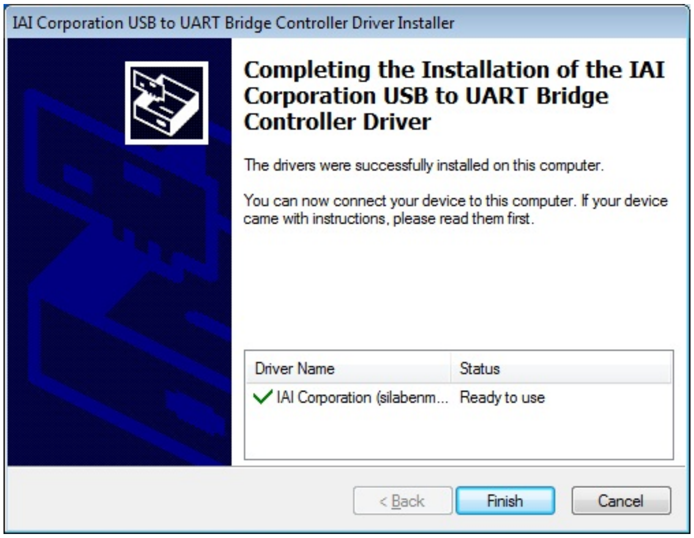


Fig. 1.35 IAI Corporation USB to UART Bridge Controller Driver Installer Window

[7] Connect the PC and USB conversion adapter using a USB cable.

[8] Installation of the driver is complete.

If the installation does not complete, follow the instruction from [9].

[9] Open Device Manager.
Right-click on **CP2102 USB to UART Bridge Controller**, and then left-click on **Update Driver Software.**

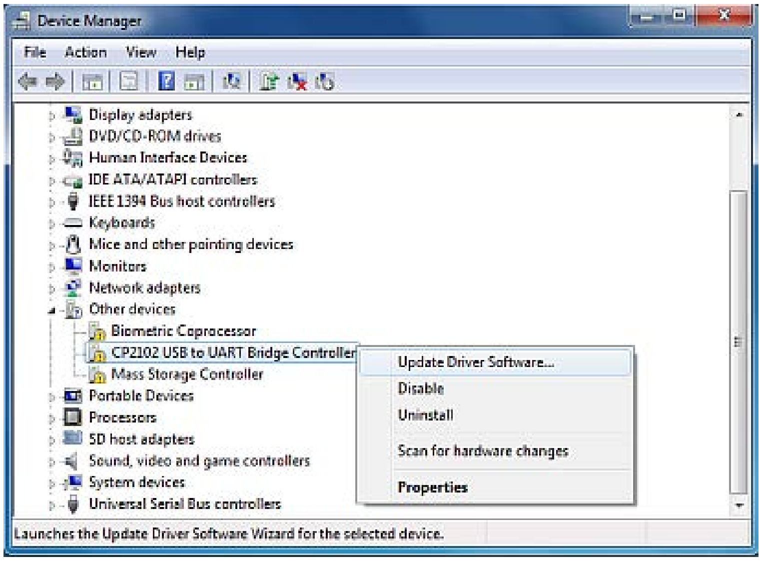


Fig. 1.36 Device Manager Window

[10]Update window for the driver software opens. Click on **Browse my computer for driver software** button in Update Driver Software window.

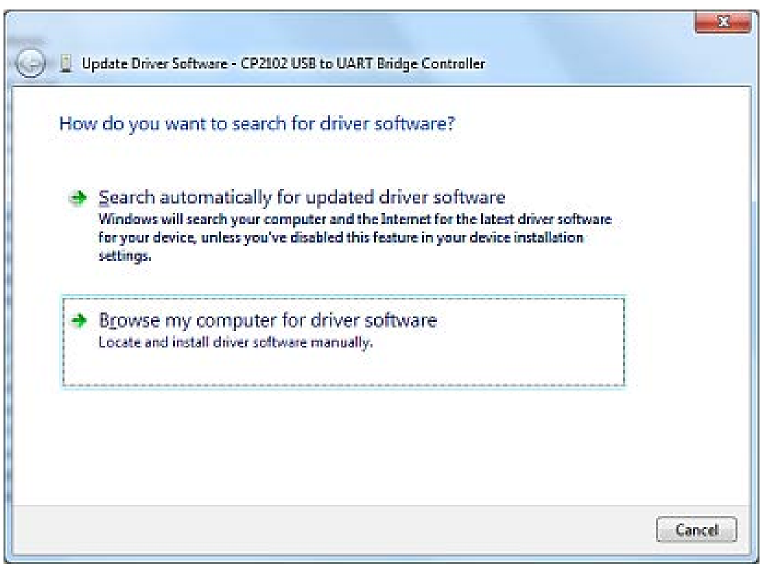


Fig. 1.37 Update Driver Software Window

[11]Update window for the driver software opens.
In the box circled in Update Driver Software window, input the directory “C:Program Files\IAI\IAI USBv4\Vista-8”. Click **Next>**.

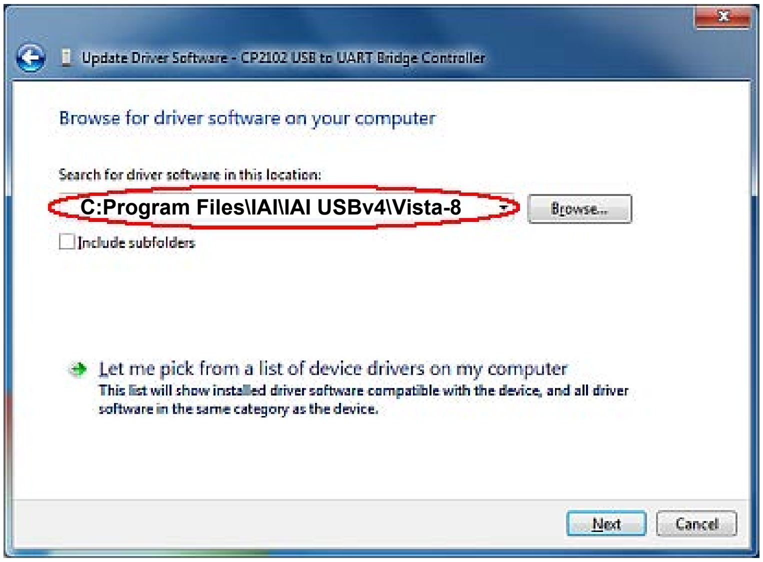


Fig. 1.38 Update Driver Software Window

[12]Driver software update complete (IAI USB to UART Bridge Controller) window opens. Click **Close** in the Update Driver Software window.

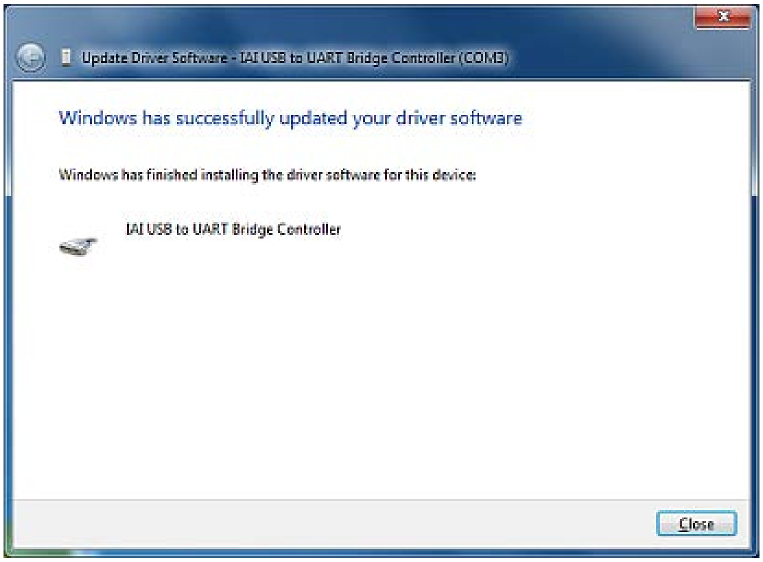


Fig. 1.39 Update Driver Software Complete (IAI USB to UART Bridge Controller) Window

[13]Installation of the driver is complete.

1.3.4 How to Install Driver Software for USB Connection of RCON

It is necessary to install the driver software when using USB by connecting to USB connector.
It is not necessary to have work processes from [1] to [5] for Windows 10. Go on to Step [6].
(Note) In the conditions below, press Install button in "RC PC Software (in each language)" or Install button in "Gateway Parameter Setting Tool (in each language)", and confirmation window for installation of RCON USB Driver will appear.
Click "Yes" and the installation wizard for device driver in Procedure [3] should appear.
Execute Procedure [3] and after, and the driver software for RCON USB connection should get available to install.

(1) The installation tool for RC PC software was opened in an OS earlier than Windows 10.
(2) RCON USB driver is not installed.

Fig. 1.40 USB driver for IAI Controller (for RCON) Screen

[1] Insert the DVD-ROM containing this software into your DVD-ROM drive.

[2] The installed data selection screen will be displayed. Click the "USB driver for IAI Controller (for RCON)".

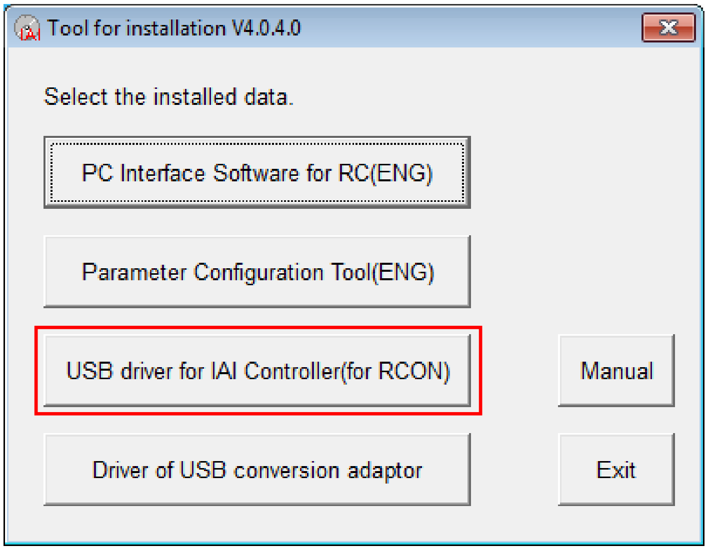


Fig. 1.41 Installed Data Selection Screen

[3] The Device Driver Install Wizard will be displayed. Click **Next >**.

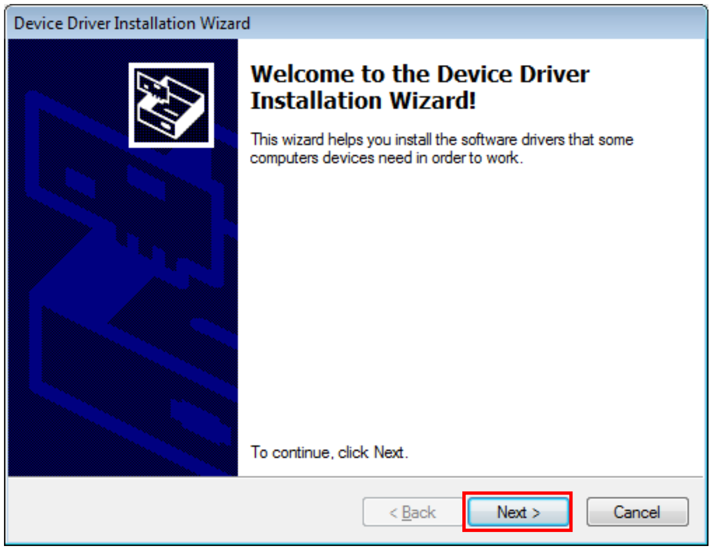


Fig. 1.42 Device Driver Install Wizard Start Screen

[4] The installation of the driver will begin. The window shown below appears during the process. Continue operation in the steps shown in the figure. (The contents of the display may differ depending on the OS.)

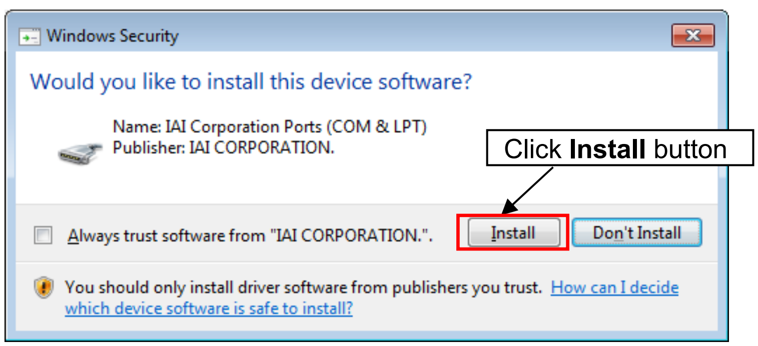


Fig. 1.43 Install Start Screen (for Windows 7/8)

[5] After the install, the following window will open. Click **Finish.**

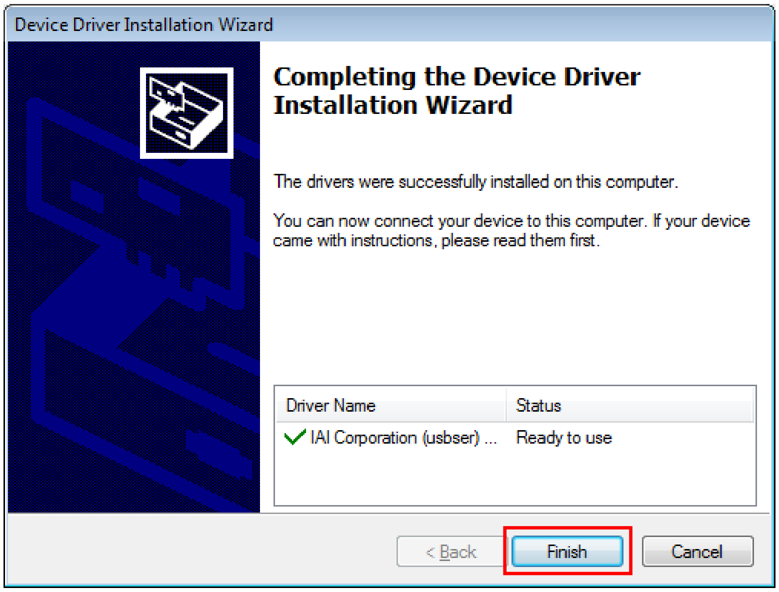


Fig. 1.44 Device Driver Install Wizard Complete Screen

[6] Connect the personal computer to the controller using the USB cable. After connection being established, turn on the power to the controller if it is not on.

[7] Installation process of the driver software automatically starts.

[8] The following window may appear in some cases depending on the OS or PC environment. Continue operation in the steps shown in the figure.

(a) For Windows 7
Although the following operation is not mandatory, without doing the operation, installation requires longer time.

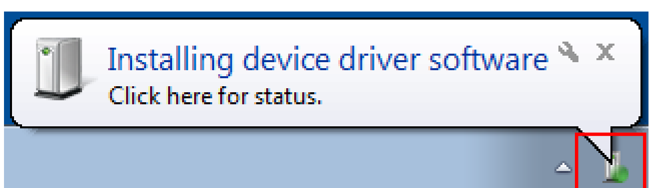


Fig. 1.45 Taskbar of Windows

Click this icon to skip the acquirement process of the driver software from the Windows update.
(The icon appears automatically once the controller gets connected with a USB cable.)

[9] Driver Software Installation install complete. (The contents of the display may differ depending on the OS)
Click **Close** or **Complete**.

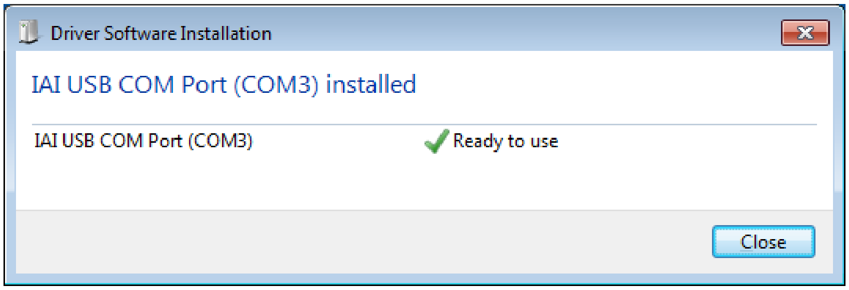


Fig. 1.46 Driver Software Installation Complete Screen (For Windows 7)

[10] The driver installation is now complete.

[Remarks]
Once the installation of the USB driver is complete, COM port gets automatically added.
[The way to change the COM port, refer to 1.3.5 How to Change the IAI USB COM Port]
(The name of the COM port is differ from the one on USB converter adapter)

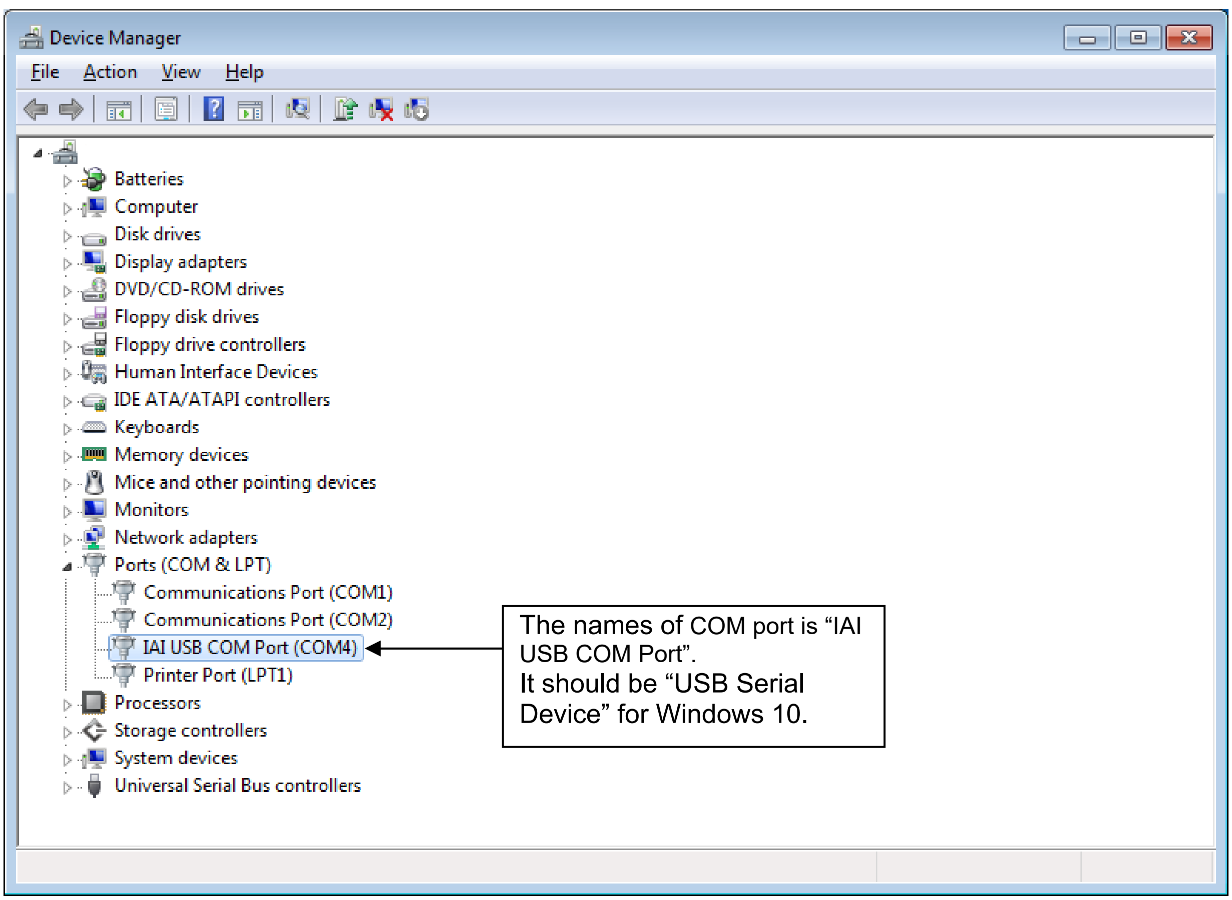


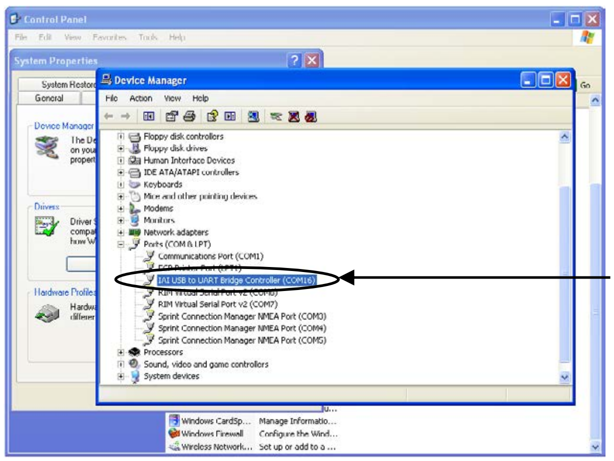
Fig. 1.47 Device Manager Screen

1.3.5 How to Change the IAI USB COM Port

The COM port set during the installation of the USB conversion adapter driver software can be changed by following the procedure below:

[1] Click **Start** on the Windows taskbar, **Settings**, and then **Control Panel** to open the Control Panel.
Double-click **System** to open System Properties.
Click the **Hardware** tab in **System**.
Click **Device Manager** in **Hardware**.
Double-click **Ports (COM & LPT)** in **Device Manager** to expand the folder tree.

[2] Double-click **IAI USB to UART Bridge Controller (COM?)**.
(Note) "COM?" indicates the current COM port before change.



IAI USB to UART Bridge Controller (COM?)

Fig. 1.48 Device Manager Dialog Box

[3] The IAI USB to UART Bridge Controller (COM?) Properties dialog box appears.
Click **Advanced...** in the properties dialog box.

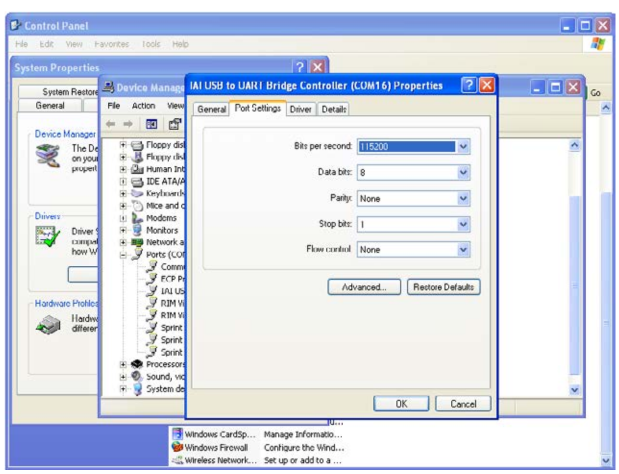


Fig. 1.49 Properties Dialog Box

[4] The COM? Port Advanced Settings dialog box appears.
Change the COM port number currently selected under COM Port Number:, to a desired number.
After the COM port number has been changed, click **OK**.

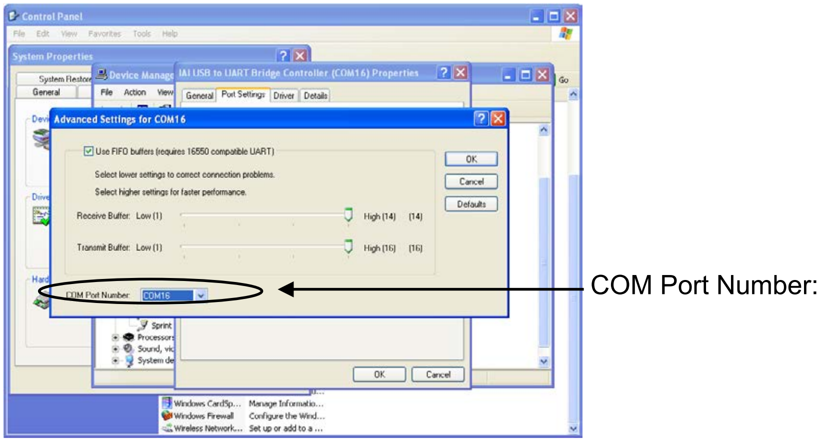


Fig. 1.50 COM? Port Advanced Settings Dialog Box

[5] The COM? Port Advanced Settings dialog box closes.
Click **OK** in the Properties dialog box (Fig. 1.49), and the COM port will be changed.

[6] Close the Device Manager dialog box and then open it again. You should now see the new COM port number.
After confirming the new COM port number, close the Device Manager dialog box and all other dialog boxes currently open.

1.4 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.
[2] Turn on the power to the controller and PC, and start Windows.
[3] If your controller has a port switch, turn the port switch ON before starting this software.
* This software judges whether the mode is online or offline depending on whether the controller and personal computer are connected or not. A controller equipped with a PORT switch does not operate in the online mode even if the port switch of the controller is turned ON after this software is started. In this case, the online mode is turned on by performing [Reconnect] (Refer to 3.1 (5) [2] [Setting of controller]).
[4] A check for connected axis appears and a check for connected axis is started. (Refer to 2. Checking for Connected Axes).

[In the case of PCON, ACON, DCON, SCON, ERC2, ERC3, ROBONET, ASEP, PSEP, DSEP, MSEP, MSCON, MCON, RCON and ELECYLINDER]

Before the connected axis is checked, the setting of communication window (Fig. 1.53) appears, but only when the software is started for the first time after its installation. [Refer to 1.5, “Setting of Communication Window.”]

[5] When a check for the connected axis is completed, the main window is displayed, and at the same time, a window to select Manual operation mode shown in Fig. 1.51 is displayed.
Select the operation mode according to the purpose and press **OK**.
Hereinafter, select the operation mode according to the purpose of operation.

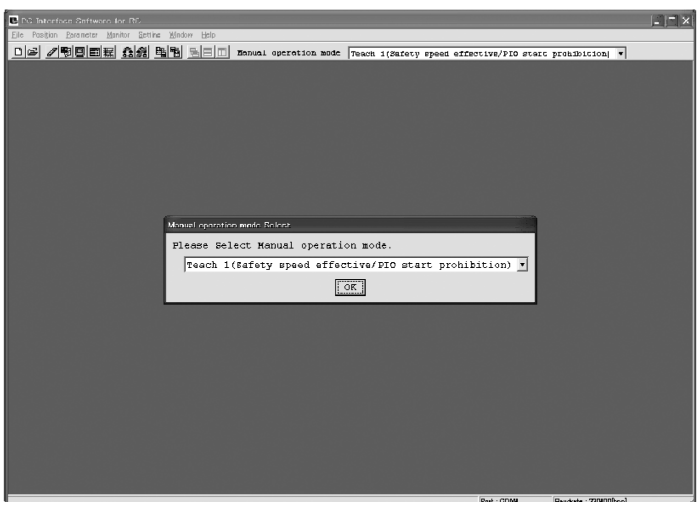


Fig. 1.51 Manual Operation Mode Select Window

Select the manual operation mode from the following four choices.

- Teach mode 1 (Safety speed effective/PIO start prohibition)
  PIO start prohibition: Position data and parameter, etc., are allowed to be written in the controller and actuator operation is commanded by the PC software (I/O ineffective).
  Safety speed effective: Maximum speed becomes safety speed (set by a parameter) regardless of speed designation of position data.
- Teach mode 2 (Safety speed ineffective/ PIO start prohibition)
  PIO start prohibition: Position data and parameter, etc., are allowed to be written in the controller and actuator operation is commanded by the PC software (I/O ineffective).
  Safety speed ineffective: Allows operation at the speed set in the speed designation of the position data table (safety speed or higher).

- Monitor mode 1 (Safety speed effective/PIO start permission)
  PIO start permission: Monitoring is only allowed. Position data and parameter, etc., are not allowed to be written in the controller and actuator operation is not commanded by the PC Software. Operation command (jog, home return, etc.) cannot be performed from the PC Interface software.
  Safety speed effective: Maximum speed becomes safety speed (set by a parameter) regardless of speed designation of position data.
- Monitor mode 2 (Safety speed ineffective/PIO start permission)
  PIO start permission: Monitoring is only allowed. Position data and parameter, etc., are not allowed to be written in the controller and actuator operation is not commanded by the PC Software. Operation command (jog, home return, etc.) cannot be performed from the PC Interface software.
  Safety speed ineffective: Allows to operate at a speed (safety speed or higher) as commanded from the PLC.

If a warning of "Baud rate of personal computer is not supported" is given and connection with the controller cannot be performed, select other baud rate.
- Click setting of main menu, and select "Application".
- Change baud rate on the "Setting of application" window (Fig. 10.1).

● When PCON, ACON, DCON, SCON, MSCON, ERC2, ERC3, MCON, RCON and ELECYLINDER are connected, the operation mode is in "Safety speed effective (with safety limit speed)" when this software is started. In other words, the maximum speed attained in any position movement operation performed from the PC software (in the test operation mode) will correspond to the safety speed set by the applicable parameter. To operate the actuator with speed commands specifying any speed greater than the safety speed set in the position data table, you must change the operation mode to "Safety speed ineffective (without safety limit speed)."
For switching between with safety speed and without safety speed, refer to 3.2, "Operations using toolbar buttons."

It is necessary to change the parameters when the parameter in a driver unit such as RCON-AC is set to the index mode in the motion type of RCON (EtherCAT Motion, MECHATROLINK-III and SSCNET III/H).
Therefore in case of the index mode, a message to check whether to change all the parameters at the same time should appear.

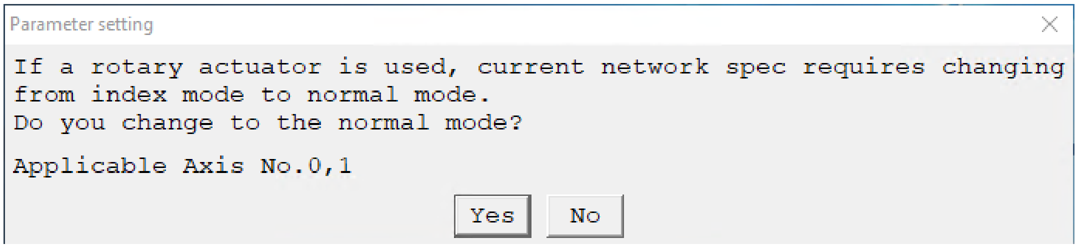


Fig. 1.52 Parameter Setting Confirmation Window

Press Yes and the parameters should be converted as shown below, and the driver unit should get rebooted.

Name	Setting
Software Stroke Limit Positive Side	36030
Software Stroke Limit Negative Side	-30
Axis Operation Type	ATYP-MODE:0
Zone Boundary 1 Positive Side	36030
Zone Boundary 1 Negative Side	-30
Zone Boundary 2 Positive Side	36030
Zone Boundary 2 Negative Side	-30

[In the case of RCP, RCS, E-Con, RCP2 and ERC2]

[5] When checking if the connected axis is completed, a warning window is displayed. When **OK** is clicked, a main window is displayed.

Fig. 1.53 Warning

1.5 Setting of communication Window

The “Setting of communication” window (Fig. 1.53) is displayed only at the initial start after the software has been installed. In this window, setting for communication with the controller is made.

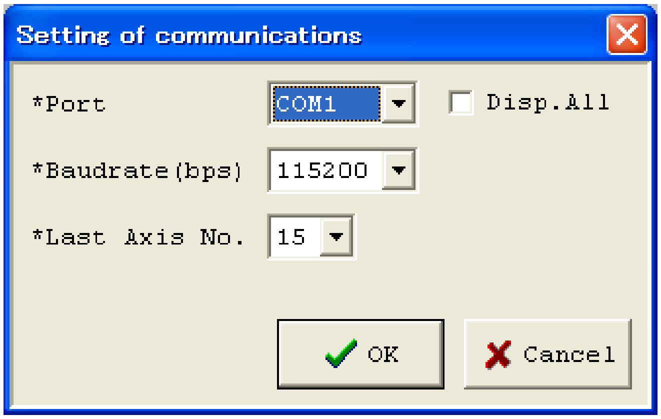


Fig. 1.54 Setting of Communication Window

[1] Port
From the list, select the serial port to be used to communicate with the controller.

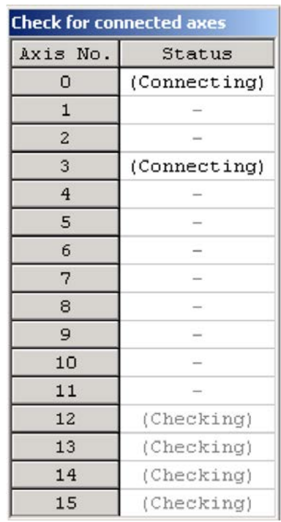
[2] Baud rate
From the list, select the baud rate.
* The baud rate selected here is used only in the communication between this application and controller. It does not affect the communication speed parameters of the controller.
* If baud rate is not supported by the port selected in [1], an error occurs when connection is checked.

[3] Last axis No.
Select the axis number of the last axis to be checked for connection.
* Axes of numbers greater than the value selected here will not be checked for connection. Select an appropriate axis number after checking the axis numbers of the connected axes.

After setting the above items, click the **OK** button, then checking for connected axes is performed. (From the next start, checking for connected axes will be automatically performed by this setting.)
* Contents set here can be changed on the setting of application window (Fig. 10.1).
If the **Cancel** button is clicked, application is ended without performing checking for connected axes (this setting of communication window will be displayed again.)

2. Checking for Connected Axes

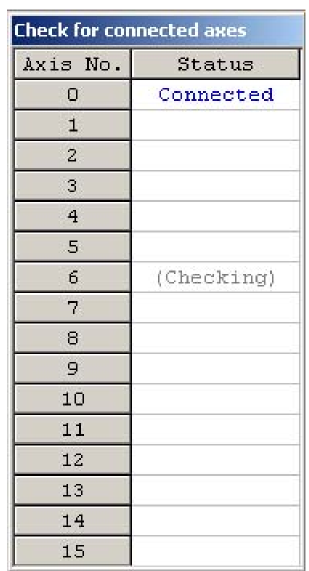
The software checks for connection of all axes up to the axis specified in the Last Axis NO. box of the “Setting of communication” window (Fig. 1.53) or “Setting of application” window (Fig. 10.1).
After the check, “(Connecting)” will be shown for those axes whose connection has been confirmed, while “-” will be shown for all other axes.



Check for connected axes

Axis No.	Status
0	(Connecting)
1	–
2	–
3	(Connecting)
4	–
5	–
6	–
7	–
8	–
9	–
10	–
11	–
12	(Checking)
13	(Checking)
14	(Checking)
15	(Checking)

Fig. 2.1 Check for Connected Axes Window (Checking for Connection)



Check for connected axes

Axis No.	Status
0	Connected
1	
2	
3	
4	
5	
6	(Checking)
7	
8	
9	
10	
11	
12	
13	
14	
15	

Fig. 2.2 Check for Connected Axes Window (Connection Check Completed)

Check for connected axes can be cancelled by pressing the [ESC] key. (In this case, offline mode is set.)

◎ Connecting a controller whose enable function is enabled
If you have connected a controller whose enable function is enabled by the applicable parameter, a window appears with the message asking if you want to disable the enable function.
If the enable function remains enabled, the servo cannot be turned ON in the teaching mode.

3. Main Window

(1) PCON, ACON, DCON, SCON, ROBONET, ASEP, PSEP, DSEP, MSEP, MSCON, MCON, RCON controllers, ERC2, ERC3 and ELECYLINDER

As shown in Fig. 3.1, the main window consists of main menu, toolbar buttons, tree view and status bar. The tree view on the left side of the window can be displayed by operation of “Window” → “Tree view” on the menu. (Initial window: Main menu)

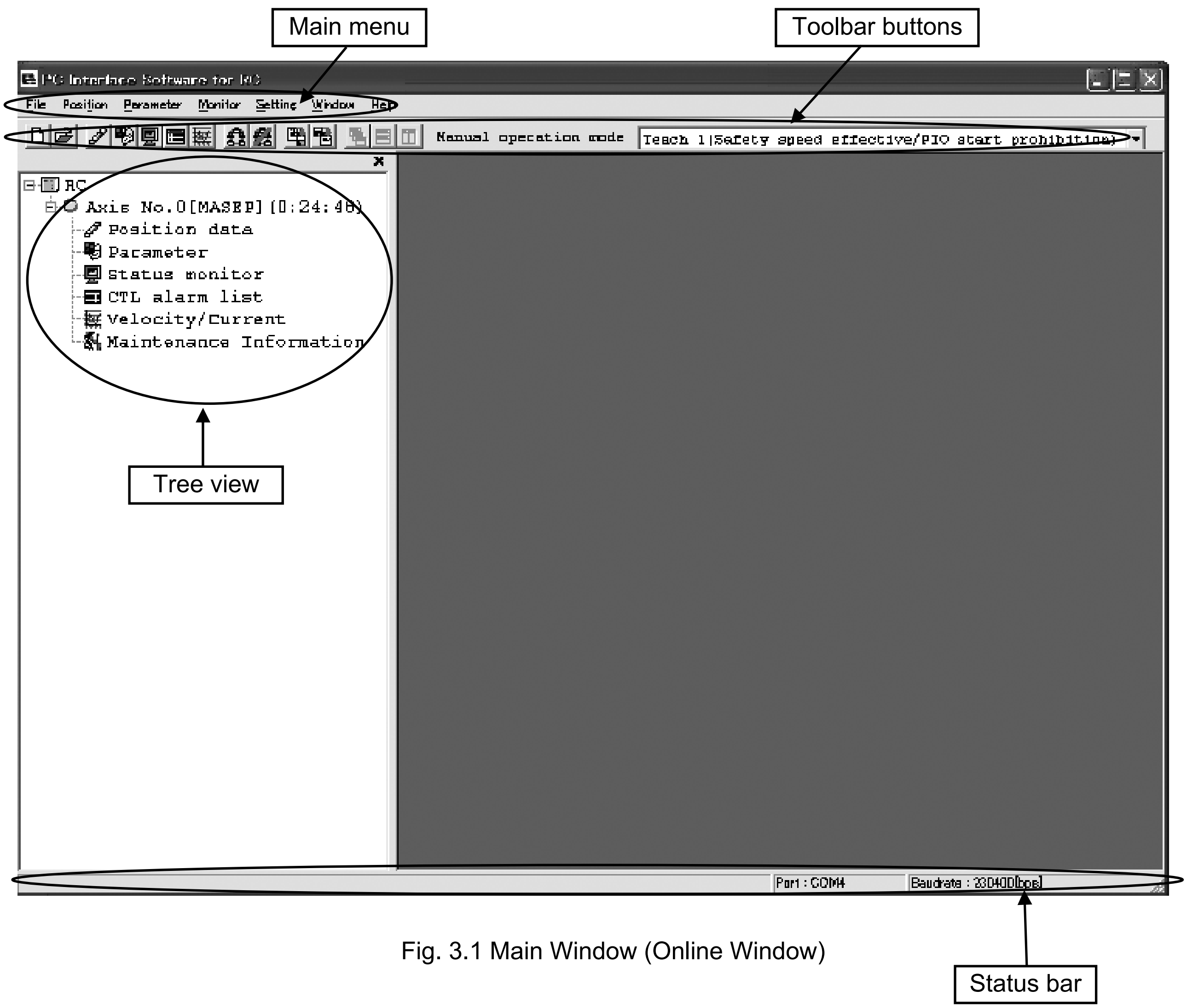


Fig. 3.1 Main Window (Online Window)

Select each item explained in 3.1, “Operating from the Main Menu” or 3.2, “Operations Using the Toolbar Buttons” from the main menu in the main window (Fig. 3.1) or by clicking the corresponding tool button.

(2) RCP, RCS, E-Con, RCP2 controller and ERC

As shown in Fig. 3.2, the main window consists of main menu, toolbar buttons, tree view, and status bar. The tree view on the left side of the window can be displayed by operation of “Window” → “Tree view” on the menu. (Initial window: Main menu)

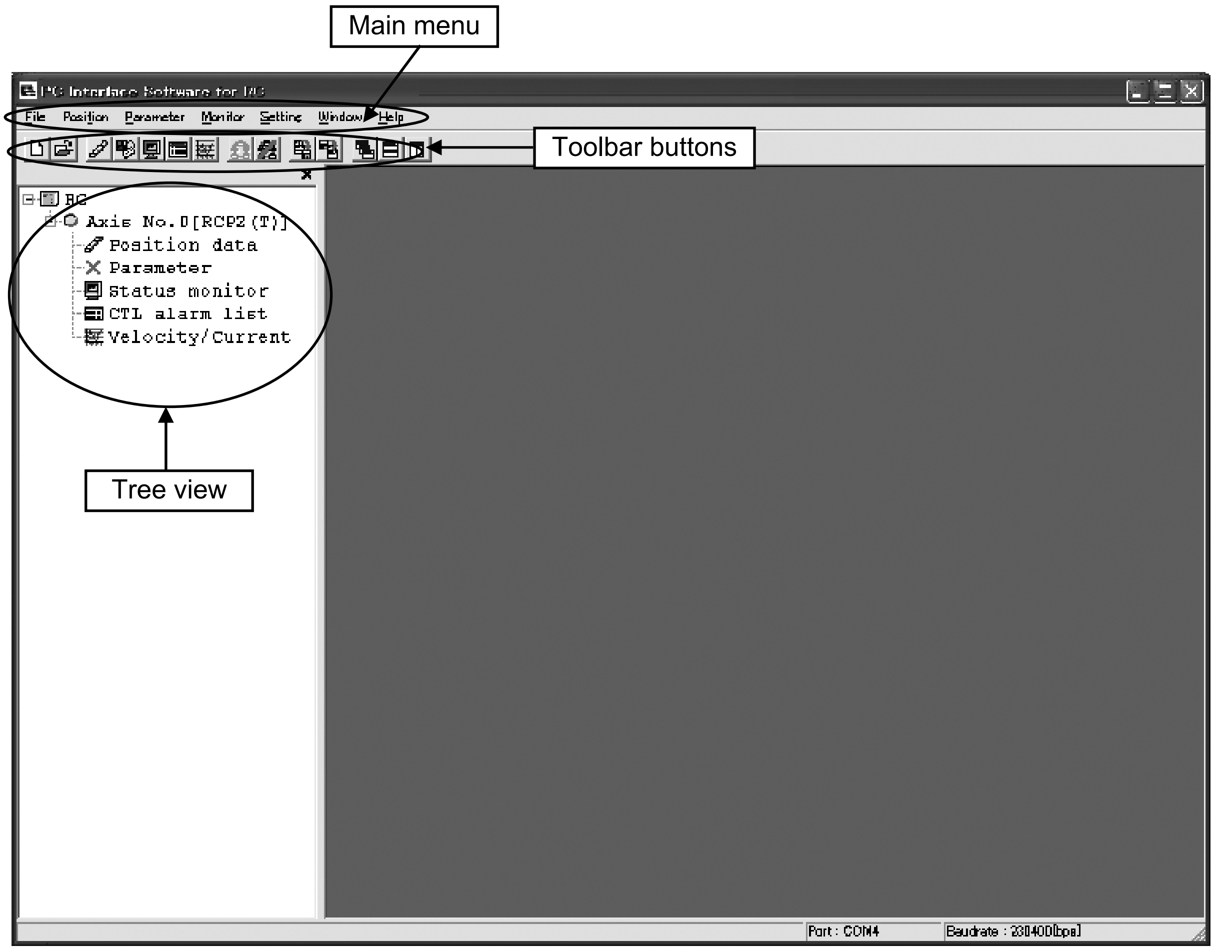


Fig. 3.2 Main Window (Online Window)

Select each item explained in 3.1, “Operating from the Main Menu” or 3.2, “Operations Using the Toolbar Buttons” from the main menu in the main window (Fig. 3.2) or by clicking the corresponding tool button.

3.1 Operating from the Main Menu

(1) File

[1] [New File]
Create new position data.

[2] [Open...]
Load position data or parameters from a file.

[3] [Close]
Close the active file.

[4] [Load to CTL] (Available in the online mode)
[Position]
Write position data in a file to the controller.
[Parameter]
Write parameters in a file to the controller.

* The transfer done by selecting [Transfer to Controller], [Position Data] and then [Parameter] in the main menu should enable to transfer the position data and parameters of another model without changing the extension.
Open the position data and parameters in the controller to transfer from and transfer them to the controller of destination.

- Position data
  It is not able to have a transference between an SEP system controller such as ASEP and a CON system controller such as ACON, but is able between SEP system controllers. Transference between CON system controllers is available.
  MSEP position data can be transferred to MCON.
- Parameters
  Transference between following controllers is available.

Transference Source		Transference Destination	Transference Source		Transference Destination
RCP2-C	→	PCON-CA	RCP6S	→	RCM-P6PC
ERC(T)	→	ERC3	RCM_P6PC	→	RCP6S
ACON	→	ASEP	MPSEP	→	RCON-PC
PCON	→	PSEP	MPSEP (with T included in model code)	→	RCON-PC
PCON-CA	→	PCON-CB	MPCON	→	RCON-PC
MPSEP	→	MPCON	MASEP	→	RCON-AC
MPSEP (with T included in model code)	→	MPCON (with T included in model code)	MACON	→	RCON-AC
MASEP	→	MACON	MDSEP	→	RCON-DC
MDSEP	→	MDCON	MDCON	→	RCON-DC

(Note) In case of transferring MSEP data to MCON, follow the instructions below.
* Make sure to change the parameters in GW in advance to transferring position data and parameters.
* If position data and parameters are to be transferred individually, transfer the parameters first.
* Back the data up in the controller to transfer from before transferring MSEP data.
* There are some limitations as follows when transferring the position data.
- There should be six PIO patterns when the MSEP position data is saved in the controller to transfer from.
- MCON User Parameter “Pressing System [0: CON System, 1: SEP System]” in the destination controller should be set to 1: SEP System.

(1) File (Continuation)

[5] [Backup] (Available in the online mode)

[Save all data]
Save all position data and parameters in the controller to a file.

[Load all data]
Send all position data and parameters in a file to the controller.

[Print Backup Data]
Print backup data.

The following menus are added from V8.2.0.0.

[Edit parameter]
Editing is available in the parameter edit window from the backup file.

[Edit position data]
Editing is available in the position data edit from the backup file.

[Backup multi axes]
The position parameter data of the axes selected from the connected multiple axes can be stored at once to the individual file.

[Restore multi axes]
The position parameter data of the files exist in the selected folders can be transferred to the controller at once.

* The transfer done by selecting [Backup], [Transfer from File to Controller] and then [Lumping Backup] in the main menu should enable to transfer the position data and parameters of another model without changing the extension.
Transfer the backup data in the controller to transfer from to the destination controller.
Transference between following controllers is available.

Transference Source		Transference Destination	Transference Source		Transference Destination
MPSEP	→	MPCON	MPSEP (with T included in model code)	→	RCON-PC
MPSEP (with T included in model code)	→	MPCON (with T included in model code)	MPCON	→	RCON-PC
MASEP	→	MACON	MASEP	→	RCON-AC
MDSEP	→	MDCON	MACON	→	RCON-AC
RCP6S	→	RCM-P6PC	MDSEP	→	RCON-DC
RCM-P6PC	→	RCP6S	MDCON	→	RCON-DC
MPSEP	→	RCON-PC	—	→	—

(Note) In case of transferring MSEP data to MCON, follow the instructions below.
* Back the data up in the controller to transfer from before transferring MSEP data.
* There are some limitations as follows when transferring the backup data.
- There should be six PIO patterns when the MSEP position data is saved in the controller to transfer from.
- MCON User Parameter “Pressing System [0: CON System, 1: SEP System]” in the destination controller should be set to 1: SEP System.

[6] [Recent Files...]
History of recently read files are displayed, and you can select file name from these to read.

[7] [Exit]
Exit this application.

(2) Position (Available in the online mode)

[1] [Edit/Teaching]
Load position data from the controller for editing or use in teaching.
* In the case of pulse sequence mode of PCON-PL/PO, ACON-PL/PO, SCON-C, SCON-CA, SCON-CB, PCON -CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB and ERC3 position data cannot be entered. For this reason the simple program line, teach position button, step move, play button, etc. are not displayed.
[Refer to 5. “Editing Position Data on CON Controllers and Older Models.”]
[Refer to 6.2. “Editing Position Data.”]
[Refer to 7. “ELECYLINDER Simple Data Setting”]

[2] [Load to CTL]
Transfer (write) edited position data to the controller.
* In the case of pulse sequence mode of PCON-PL/PO, ACON-PL/PO, SCON-C, SCON-CA, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB and ERC3 position data cannot be sent to the controller.
Even when you attempt to send position data to the controller, it is not displayed as a selectable controller on the “select axis number” window.

[3] [Print]
Print the position data you are currently editing.
* In the case of pulse sequence mode of PCON-PL/PO, ACON-PL/PO, SCON-C, SCON-CA, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB and ERC3 position data cannot be printed.

(3) Parameter (Available in the online mode)

[1] [Edit]
Load parameters from the controller for editing.
[Refer to 8. “Editing Parameters.”]

[2] [Load to CTL]
Transfer (write) edited parameter to the controller.

[3] [Print]
Print the parameter you are currently editing.

[4] [SEP Controller Setting Information]
In here, shows the details of the initial settings done to SEP controller.

[5] [Control system parameter setting]
• Smart Tuning
Trial run and cycle time calculation of the smart tuning can be conducted.
[Refer to 12, “Smart Tuning Function (Version V8.03.00.00 or Later).”]
• Offboard Tuning
Offboard tuning can be conducted.
* Only on SCON-CA, SCON-CAL/CGAL, SCON-CB, ACON-CA, ACON-CB, MSCON and MCON (Servo motor)
[Refer to 13, “Off Board Tuning Function on SCON-CA and MSCON Controller.”]
• Frequency Analysis for Vibration Control
Calculate the vibration frequency of the load whose vibration you want to suppress, and set appropriate parameters.
* Only on SCON-CA, SCON-CAL/CGAL, SCON-CB, ACON-CA, ACON-CB, MSCON and MCON (Servo motor)
[Refer to 14, “Frequency Analysis for Vibration Control Function.”]

(3) Parameter (Available in the online mode) (Continuation)

[6] [SCON Parameter-File convert tool]

* Software Version 11.00.02.00 and later

The following SCON controller parameter files (converting source files) can be changed into the converted files.

The extension of converted files will have $$, not like an extension created in a PC software.

Converting Source File	Converted File
Parameter file (.prsc) for SCON-C	Parameter file (.$$prsa) for SCON-CA
Parameter file (.prsc) for SCON-C	Parameter file (.$$prsb) for SCON-CB
Parameter file (.prsa) for SCON-CA	Parameter file (.$$prsb) for SCON-CB
Parameter file (.$$prsa) for SCON-CA	Parameter file (.$$prsb) for SCON-CB
Parameter file (.prsam) for SCON-CA (MECHATROLINK-Ⅲ: with ML3 included in model code)	Parameter file (.$$prsbm) for SCON-CB (MECHATROLINK-Ⅲ: with ML3 included in model code)

The converted files can be transferred to the following controllers.

Converted File	Controller Available for Transfer
Parameter file (.$$prsa) for SCON-CA	SCON-CA
Parameter file (.$$prsb) for SCON-CB	SCON-CB
Parameter file (.$$prsbm) for SCON-CB (MECHATROLINK-Ⅲ: with ML3 included in model code)	SCON-CB (MECHATROLINK-Ⅲ: with ML3 included in model code)

[Operation]

1) From the main menu, click Parameter (P), and then select SCON Parameter File Converter Tool (S).
The main window of the parameter converter tool is displayed.

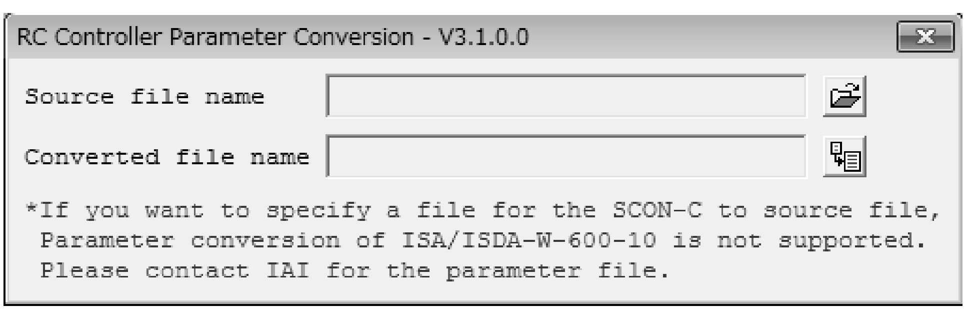


Fig. 3.3 Parameter Converter Tool Main Window

(3) Parameter (Available in the online mode) (Continuation)

2) Select Converting Source File

To select a source file for converting, pick a file that you would like to convert and drag and drop in the main window, or click the browse button( ) and open the folder that the file you would like to convert is stored and select the file in the “Open File ”dialog box.
The name of the selected file will be shown in the “Source file name” box if the correct file is chosen.
If a file that the parameter converting tool is not applicable to is selected, a message stating “This tool is not applicable for the selected extension.” will be displayed.

3) Convert a File

To convert a file, click the conversion button( ). As “Save As” dialog box will be displayed, indicate the place and file name to save the file and click “Save” button. A message stating “Conversion Complete” will be displayed if the conversion finishes with no problem, and the file name that was saved will be shown in the “Converted file name” box.

(Note) For SCON-C parameter files (.prsc), there are two types object to conversion against one converting source file. In this case, switch the type object to conversion in the file type box and select the file type for output.

[7] I/O customize

When selecting PIO pattern 5 (user selection mode) of PCON-CYB, ACON-CYB and DCON-CYB controllers, set the I/O signal on the “I/O customize” screen.
Select your desired position number from “Number of positioning points” (4 positions, 8 positions, 16 positions, 32 positions and 64 positions). So the following necessary signals, “Command position No. signal PC*”, “Completion position No. signal PM*”, “Start signal CSTR” and “Positioning complete signal PEND” are allocated to the I/O (input/output) signals. You can select other signals from the specified ones.
* Software Version 10.03.00.00 and later

[Operation]

Select [I/O customize], and the “I/O customize” window is displayed.
Allocate the functions to the I/O signals on the I/O Customize window.
After allocating to the I/O signals, click to transfer the data to the controller.

Position number

Input port
/Output port
setting

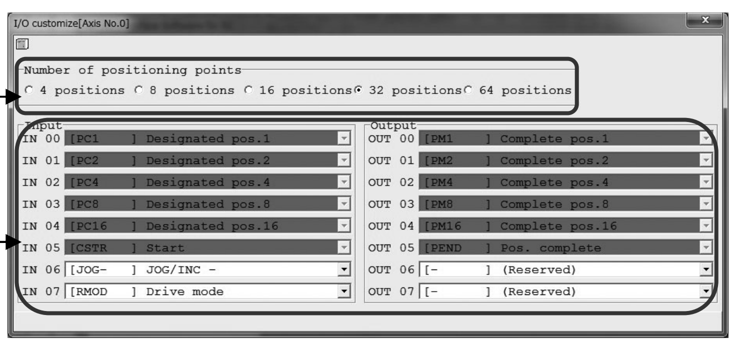
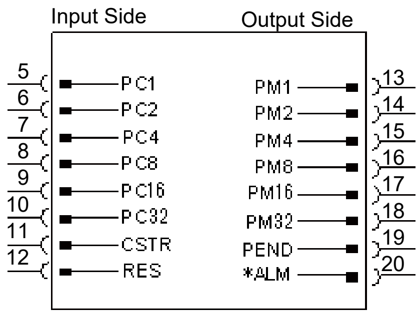


Fig. 3.4 I/O Customize Window

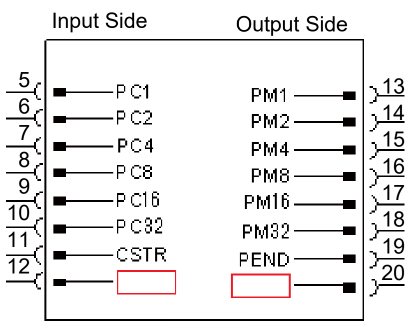
[Number of positioning points]

Select from 4, 8, 16, 32 and 64 points. It is set to 64 points at the delivery.

a) Initial Assignment at Delivery

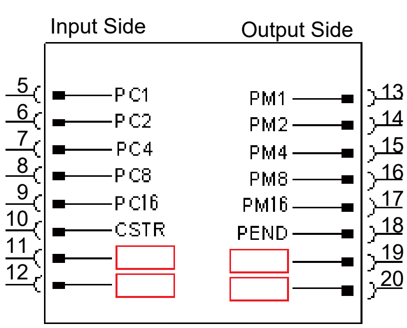


b) Select 64 points and one signal can be selected and assigned to each input and output.



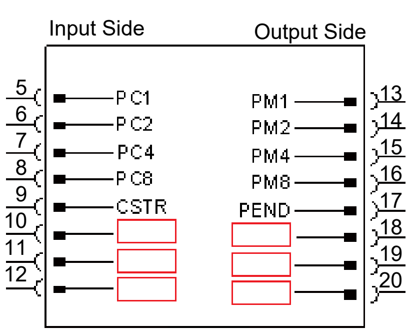
←□: Signal selectable

c) Select 32 points and two signals can be selected and assigned to each input and output.



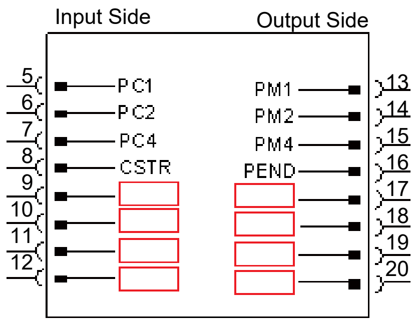
←□: Signal selectable

d) Select 16 points and three signals can be selected and assigned to each input and output.



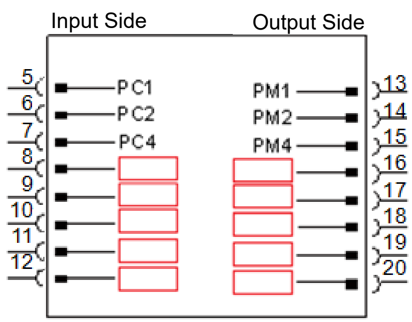
←□: Signal selectable

e) Select 8 points and four signals can be selected and assigned to each input and output.



←□: Signal selectable

f) Select 4 points and five signals can be selected and assigned to each input and output.



←□: Signal selectable

[Selection of signal for input port/output port
Select signals optionally from those shown in the tables below.
[For details of signals, refer to the instruction manual of each controller.]

Input

*STP	Pause: Turn off to issue pause command
SON	Servo-ON Command: Turn on to turn servo on
HOME	Home return: Turn on to issue home-return command
RES	Reset: Turn on to execute reset
JISL	Jog/inching switch: Turn off for JOG operation, on for Inching operation
JVEL	Switchover between JOG velocity / Inching distance: Turn off to use setting in Parameter No. 26 “JOG Velocity” and “Parameter No. 48 “Inching Distance” Turn on to use setting in Parameter No. 47 “JOG Velocity 2” and “Parameter No. 49 “Inching Distance 2”
JOG+/JOG-	JOG: JOG+: Turn on to move opposite home direction JOG-: Turn on to move to home direction *The direction to move is opposite for reversed type.
RMOD	Operation Mode: Turn off for AUTO Mode, on for MANU Mode
BKRL	Brake Control Release: Turn on to release brake
NC	Function is not allocated.

(Note) * in symbols above shows that it is in active low.

Output

MOVE	Moving Signal: Turns on while actuator in movement
SV	Preparation End: Turns on when servo turns on
HEND	Home Return Completion: Turns on when home-return operation completed
*ALM	Alarm: Turns off when alarm issued
ZONE1	Zone 1: Turns on when current position is in zone setting
ZONE2	Zone 2: Turns on when current position is in zone setting
PZONE	Position Zone: Turns on when current position is in position zone setting
*EMGS	Emergency Stop: Turns off during emergency stop status
RMDS	Operation Mode Status: Turns off when current status is in AUTO Mode, and on when MANU Mode
LOAD	Load output judgment: Turns on when reached and off when not
TRQS	Torque level: Turns on when reached and off when not
PSFL	Miss-Pressing: Turns on when miss-pressing occurred
PWR	Controller Standby: Turns on when ready
CM1 to CM8	* All from CM1 to CM8 need to be assigned. Therefore, only four or eight points can be selected for the number of positioning points. In PCON-CYB, the current load current is output at intervals of 6.25%. In ACON-CYB and DCON-CYB, the current load current is output at intervals of 18.75%.
PUSH	In Pressing Process: Turns on during pressing operation
GHMS	In Home-Return Process: Turns on during home-return operation
MEND	Turns on when either of positioning complete or pressing is complete or miss-pressing, and turns off when movement started
*ALML	Light Malfunction Status: Turns OFF when light level alarm generated which is possible to continue operation
*OVLW	Overload Warning Signal: Turned OFF when the presumed motor temperature exceeds the set value, and turned ON when it is below the set value.
*ALMC	Critical Malfunction Status: Turned OFF when an alarm indicating that continuous operation is not possible has occurred. (It is necessary to turn on the power again.)
NC	Function is not allocated.

(Note) * in symbols above shows that it is in active low.

(3) Parameter (Available in the online mode) (Continuation)

[8] [Encoder Cable Length Setup]

The value set in User Parameter No. 73 “Encoder Voltage Level” should be selected from the cable length corresponding to the encoder type.

* Software version V13.00.04.00 or later

[Operation]

Encoder cable windows appears.
Click on the applicable encoder cable length (m), and click [Transfer].
The parameter should be set up in User Parameter No. 73 “Encoder Voltage Level”.

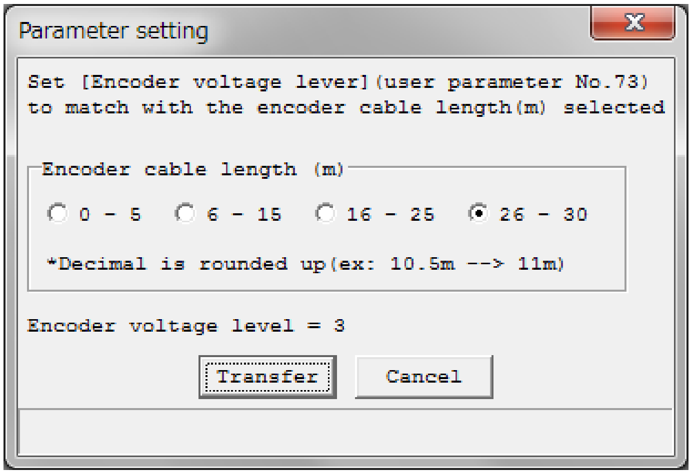


Fig. 3.5 Encoder Cable Length Setup Window

(4) Monitor (Available in the online mode)

[1] [Status]
You can check the various statuses of each axis (axis status, internal flags and I/O ports).
[Refer to 9.1, "Status Monitor Window."]

[2] [CTL Alarm List]
Display the CTL alarm list window.
[Refer to 9.2, "CTL Alarm List."]

[3] [Velocity/Current]
Display the velocity/current monitor window.
* RCP, RCS and E-Con cannot use this function.
Refer to "Supported Models."
[Refer to 9.3, "Velocity/Current Monitor Window."]

[4] [Servo Monitor]
Display the servo monitor window.
* This window can use this function only with SCON-CA, PCON-CA, ERC3 (Software Version V8.03.00.00 or later) and SCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, PCON-CB, MSCON, MCON, RCON controllers.
[Refer to 9.4, "Servo Monitor Window."]

[5] [Maintenance Information]
Display the maintenance information window.
* This window is available only with SCON-CA, PCON-CA, PCON-CB, ERC3 (Software Version V8.03.00.00 or later) and SCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, MSCON, MCON, SCON-CAL/CGAL, ELECYLINDER, RCON controllers.
[Refer to 9.5, "Maintenance Information Window."]

[6] [Gateway Data Monitor]
Driving source current consumption can be monitored.
* It can be displayed only on RCP6S Gateway Unit.
[Refer to 9.6, "Gateway Data Monitor."]

[7] [Network Data Monitor]
Data received by the host PLC and the fieldbus can be monitored.
* This feature is not applicable for the controllers in following types.
  • Motion type fieldbus such as MECHATROLINK-Ⅲ
  • Multiple-axis controllers : MCON-C/CG, MSEP-C, MSCON-C, RCON
  • Controllers with PLC features : MCON-LC/LCG, MSEP-LC, SCON-LC/PCG
[Refer to 9.7, "Network Data Monitor."]

[8] [Power Supply Unit information window]
It displays the PSA-24 Power Supply Unit information window. (Software Version V13.00.00.00 or later)
* It should be displayed when communication with Modbus gets available after connection is established with RCON Gateway Unit and PSA-24 Power Supply Unit.
[Refer to 9.8, "Power Supply Unit information window."]

(5) Setup

[1] [Application]
Set up the application (baud rate and ports).
[Refer to 10.1, "Setting of application Window."]

[Controller Other than ASEP, PSEP, DSEP and MSEP]
You can separately change the system passwords needed to open the position data edit window and parameter setting window. Note that if the password for the position data edit window is "0000" (factory-set password), you need not enter any password to open the position data edit window.
[Refer to 5. "Editing Position Data on CON Controllers and Older Models."]

[ASEP, PSEP, DSEP and MSEP Controller]
You can change the passwords needed to open the parameter setting window and initial setting window. With ASEP, PSEP, DSEP and MSEP controllers, the password for the position data edit window is set by parameter No. 20. Note that if the password for the position data edit window is "0000" (factory-set password), you need not enter any password to open the position data edit window.
[Refer to 6.1. "Initial Setting.", 6.2. "Editing Position Data."]

(5) Setup (Continuation)

[2] [Controller Setup]

[Check for connected axes] : Reconnect the axes.

If the software connects to multiple controllers linked by controller link cables, always select Reconnect after cycling power to a connected controller to which the teaching pendant is not connected directly.

[Disconnect] : Cuts the communication with all the connected axes.

[Addressing axis number] : Available only for types not equipped with axis number setup rotary SW. The last axis number will be the axis number set for the last axis number* on the setting of application window.
[Refer to 10.2, "Assigning an Axis Number."]

[Software reset] : Reset (restart) the software.
* RCP, RCS and E-Con cannot reset the software.

[Initial Setting for SEP Controller] : Select the operation pattern of your SEP controller (from PIO patterns 0 to 6) and set the operation mode (single-solenoid, double-solenoid, etc.), among others.
[Refer to 6.1, "Initial Setting."]

[Time setting] : Set the time for SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB and ERC3 PIO Converter.
*The time for SCON-CA, PCON-CA and ERC3 PIO Converter (Software Version 8.03.00.00 or later) can be set.
[Refer to 10.3, "Time Setting."]

[Load cell calibration] : Perform the load cell calibration on actuator equipped with load cell.
[Refer to 10.4, "Load Cell Calibration."]

[Actuator Replacement] : Reset the counter to 0 for the total travel times and total driving distance [km] in the maintenance information. Input the password 5119 and press OK.

[FAN Replacement] : Reset the counter to 0 for the total fan driving time [days] in the maintenance information. Input the password 5119 and press OK.

[All Press Program Initialization] : Initialize all the press programs.

[Load Cell Inactivation] : Use this when required to inactivate the load cell in such a case as in alarm occurrence.
In order to activate it again after made invalid, have a reboot by conducting such as software reset. It will be activated again.

[Pairing I.D. Clear] : The pairing I.D. of the controller applicable for the battery-less absolute encoder is to be cleared.
Input the password 5119 and press OK.
(Note) When the motor of the actuator is replaced, do not clear the pairing I.D., but make sure to conduct the home-return operation.
Without the home-return operation being conducted, the home position will not be established.

[Lubrication data and time renewal] : "Last time lubricated" displayed on the maintenance information window in RCON should be updated to the current time, and the travel distance after lublication should be reset to 0.
(Note) It should be applicable when both the controller and the actuator support the actuator recognition feature.
(Software Version V13.00.00.00 or later)

(6) Window

[1] [Cascade]
Rearrange all open windows in such a way that they are cascaded (staggered) on top of each other.

[2] [Vertical]
Rearranges all open windows as vertical tiles.

[3] [Horizontal]
Rearranges all open windows as horizontal tiles.

[4] [Arrange icons]
Arrange all window icons (minimized windows).

[5] [Minimizing]
Minimize all open windows.

[6] [Normalizing]
Restore all window icons (minimized windows) to their original size.

[7] [Close all]
Close all the windows that are open.

[8] [Tree View]
Show/hide the tree view (Fig. 3.8).

[9] [Font size]
Change font size on the position data edit window (Fig. 5.5, Fig. 5.6, Fig. 6.12) and the parameter edit window (Fig. 8.7), etc.
Select font size from largest, large, medium, small and smallest.

(7) Help

[1] [Help]
Display the help file.

[2] [Version Information]
Display the version information of this application.
[Refer to 11, “Version Information.”]

* The menu items shown in gray cannot be selected.

3.2 Operations Using the Toolbar Buttons

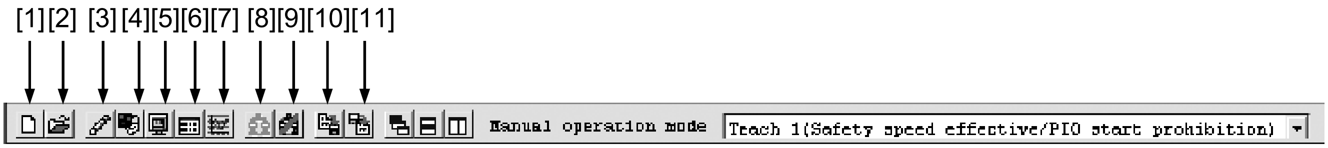


Fig. 3.6 Toolbar Buttons

[1] New position data
Same as clicking **File**, pointing to **New**, and then selecting **Position Data**.

[2] Open file
Same as clicking **File**, and then selecting **Open**.

[3] Edit/teach position data
Same as clicking **Position**, and then selecting **Edit/Teach**.
* In the case of pulse sequence mode of PCON-PL/PO, ACON-PL/PO, SCON-C, SCON-CA, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB and ERC3 position data cannot be entered. For this reason, the JOG window (Fig. 5.7) in which the position input part, tool buttons and simple program are not displayed is displayed.
(Note) You cannot open the position data edit window and parameter edit window at the same time.

[4] Edit parameters
Same as clicking **Parameter**, and then selecting **Edit**.

[5] Monitor
Same as clicking **Monitor**, and then selecting **Status**.

[6] CTL alarm list
Display the CTL alarm list window.
Same as clicking **Monitor**, and then selecting **CTL Alarm List**.
Content of CTL alarm list is stored by battery backup.
Even if power is turned off, content of controller alarm list is not erased.
(ERC2, ERC3, SCON, ACON, PCON, DCON, ASEP, PSEP, DSEP, MSEP, ROBONET, MSCON, MCON, RCON and ELECYLINDER)

[7] Display the current/velocity current/velocity monitor window.
Same as clicking **Monitor**, and then selecting **Velocity/Current**.
* RCP, RCS and E-Con cannot use this function.
Refer to "Supported Functions."

[8] Reconnect
Same as clicking **Setup**, pointing to **Controller Setup**, and then selecting **Reconnect**.

[9] Disconnect
Same as clicking **Setup**, pointing to **Controller**, and then selecting **Disconnect**.

[10]Save all data
Same as clicking **File**, pointing to **Backup**, and then selecting **Save from Controller to File**.

[11]Send all data
Same as clicking **File**, pointing to **Backup**, and then selecting **Send from File to Controller**.

* The menu items shown in gray cannot be selected.

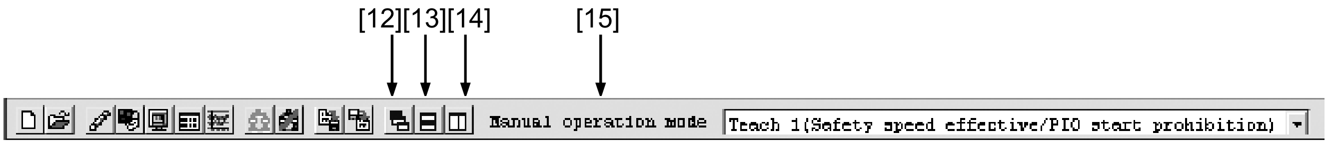


Fig. 3.7 Toolbar Buttons

[12]Cascade windows
Same as clicking **Window**, and then selecting **Cascade**.

[13]Tile windows vertically
Same as clicking **Window**, and then selecting **Tile Vertical**.

[14]Tile windows horizontally
Same as clicking **Window**, and then selecting **Tile Horizontal**.

[15]Select manual operation mode. Select from the following four menus.
* <u>Menus are not displayed in case of RCP, RCS, E-Con, RCP2 controllers and ERC.</u>

- Teach mode 1 (Safety speed effective/PIO start prohibition)
  PIO start prohibition: Position data and parameter, etc., are allowed to be written in the controller and actuator operation is commanded by the PC software.
  Safety speed effective: Maximum speed becomes safety speed (set by a parameter) regardless of speed designation of position data.
- Teach mode 2 (Safety speed ineffective/ PIO start prohibition)
  PIO start prohibition: Position data and parameter, etc., are allowed to be written in the controller and actuator operation is commanded by the PC software.
  Safety speed ineffective: Allows operation at the speed set in the speed designation of the position data table (safety speed or higher).
- Monitor mode 1 (Safety speed effective/PIO start permission)
  PIO start permission: Monitoring is only allowed. Position data and parameter, etc., are not allowed to be written in the controller and actuator operation is not commanded by the PC Software. Operation command (jog, home return, etc.) cannot be performed from the PC Interface software.
  Safety speed effective: Maximum speed becomes safety speed (set by a parameter) regardless of speed designation of position data.
- Monitor mode 2 (Safety speed ineffective/PIO start permission)
  PIO start permission: Monitoring is only allowed. Position data and parameter, etc., are not allowed to be written in the controller and actuator operation is not commanded by the PC Software. Operation command (jog, home return, etc.) cannot be performed from the PC Interface software.
  Safety speed ineffective: Allows operation at a speed (safety speed or higher) as commanded from the PLC.

If the controller has an MANU/AUTO switch, the menus become available when the switch is set to the MANU.

3.3 Tree View

From the main menu, click **Window**, and then select **Tree View**.

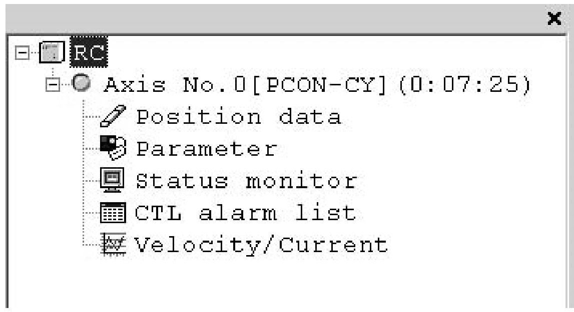


Fig. 3.8 Tree View

[1] Axis No. 0 [PCON-CY]
The axis number of each axis and the corresponding controller model are shown.
A light blue icon is shown if the controller is normal. If the controller is in an error state, a red icon is shown.

* The axis name set instead of the axis number can be displayed in Application Setting Window. Also, it is able to show the axis number and the axis name at the same time.
* The controller model name can be shown and hidden.
* The time passed since the controller has started up can be shown and hidden.
(Software version V10.00.00.00)
[Refer to 10.1 Setting of Application Window]

[2] Position data
You can double-click this item to open the position data edit window.

* In the case of pulse sequence mode of PCON-PL/PO, ACON-PL/PO, SCON-C, SCON-CA, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB and ERC3 position data cannot be entered. For this reason, the JOG window (Fig. 5.7) in which position input part, tool buttons and simple program line are not displayed is displayed.

(Note) You cannot open the position data edit window and parameter edit window at the same time.

[3] Parameter
You can double-click this item to open the parameter edit window.

[4] Status monitor
You can double-click this item to open the status monitor window.

[5] CTL alarm list
You can double-click this item to open the CTL alarm list window.

[6] Velocity/Current
You can double-click this item to open the velocity/current monitor window.

* The specific tree view will vary depending on the model of the connected controller.

3.4 Status Bar

Fig. 3.9 Status Bar

[1] Tool tip
Moving the mouse cursor over a toolbar button will display the tool tip on the button.

[2] Port name
The serial port currently in use is indicated.

[3] Baud rate
The baud rate (bps) of the current communication is indicated.

4. Selecting an Axis

To perform any of the following operations, select the axis number of the target axis in the “Select axis number” window (Fig. 4.1).

[1] Open the position data edit window in the online mode. Refer to 5.1 and 6.2 (Note)
[2] Send position data edited in the offline mode to the controller. Refer to 5.2 and 6.3 (Note)
[3] Open the parameter edit window in the online mode. Refer to 6 (Note)
[4] Send parameters edited in the offline mode to the controller. Refer to 6 (Note)
[5] Collectively save all data from the main window: Refer to 3.1 (Note)
[6] Collectively send all data from the main window: Refer to 3.1 (Note)
[7] Open the status monitor window of the monitor from the main window: Refer to 3.1
[8] Open the CTL alarm list window of the monitor from the main window: Refer to 3.1
[9] Open the velocity/current monitor window of the monitor from the main window: Refer to 3.1
[10] Open the servo monitor window of the monitor from the main window. Refer to 3.1.
[11] Reset the software: Refer to 3.1
[12] Set the time: Refer to 3.1.
[13] Display maintenance information: Refer to 3.1.

Before the software switches to the applicable mode in each of the above operations, the “Select axis number” window appears.
The axis numbers corresponding to the connected axes are shown in the box under **Connected axes**.
Move the cursor to the axis you want to operate, click to **>** select the axis, and then click **OK**. To select all axes, click **>>**, and then click **OK**.

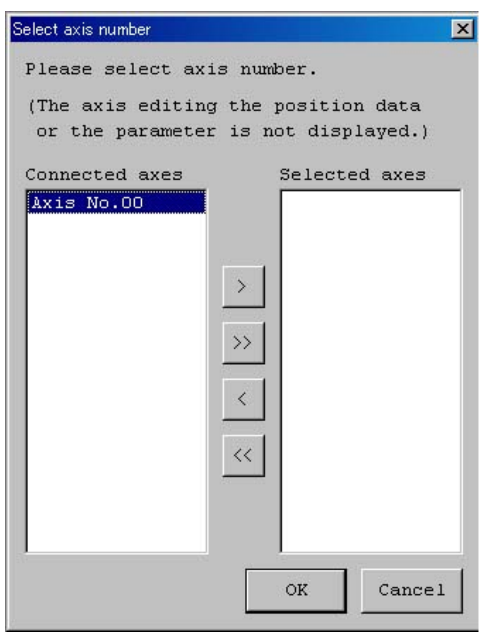


Fig. 4.1 Select Axis Number Window

Note:	The axes for which the “Position data edit window” or “Parameter edit window” is currently open in the online mode are not shown. To select any such axis, close the applicable edit window first.

5. Editing Position Data on CON Controllers and Older Models

Edit position data online or offline on the following controller series:
CON controllers: ERC2, ERC3, PCON, ACON, DCON, SCON, ROBONET, MSCON, MCON and RCON
Older models: RCP, RCS, E-Con, RCP2, ERC

5.1 Online Mode

This mode reads data from the controller to edit.
For ERC2, ERC3, PCON, ACON, DCON, SCON, ROBONET, MSCON, MCON and RCON Fig. 5.5 or Fig. 5.6 are displayed.
However, for pulse sequence mode of the PCON-PL/PO, ACON-PL/PO, SCON-C, SCON-CA, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB and ERC3 controller, position data cannot be entered.
The JOG window in which the position input part, tool buttons and simple program are not displayed is displayed. (Fig. 5.7)

For RCP, RCS, E-Con, RCP2 and ERC, Fig. 5.8 is displayed.

Click **Position** and then select **Edit/Teach** from the main menu, or click in the toolbar.
In the select axis number window, select the axis number corresponding to the axis whose position data you want to edit. Refer to 4, "Selecting an Axis."

If the password is not "0000," the input password window appears. Enter the applicable password.

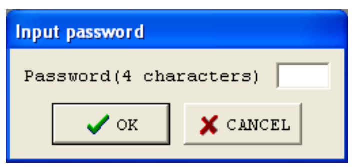


Fig. 5.1 Input Password Window

To change the password, perform the operations explained below.

[How to Set Password for Position Data Edit Window]

[1] From the main menu, click **Setup** and then select **Setting of application**.
Click the **Change Password** button.

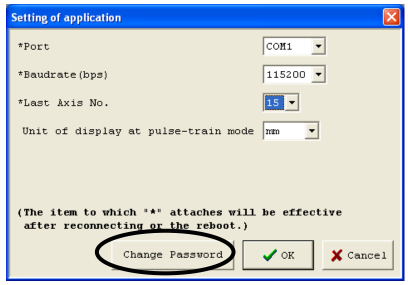


Fig. 5.2 Setting of Application Window

[2] Select the Position data edit password, and then click the **OK** button.

Fig. 5.3 Select Password Window

[3] Enter the current password, new password, and new password again (for confirmation), and then click the **OK** button.
Once the new password has been set, you must enter the new password to edit position data.

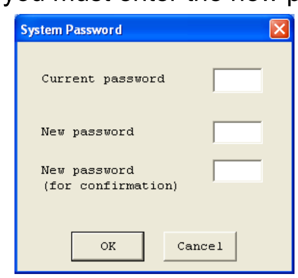
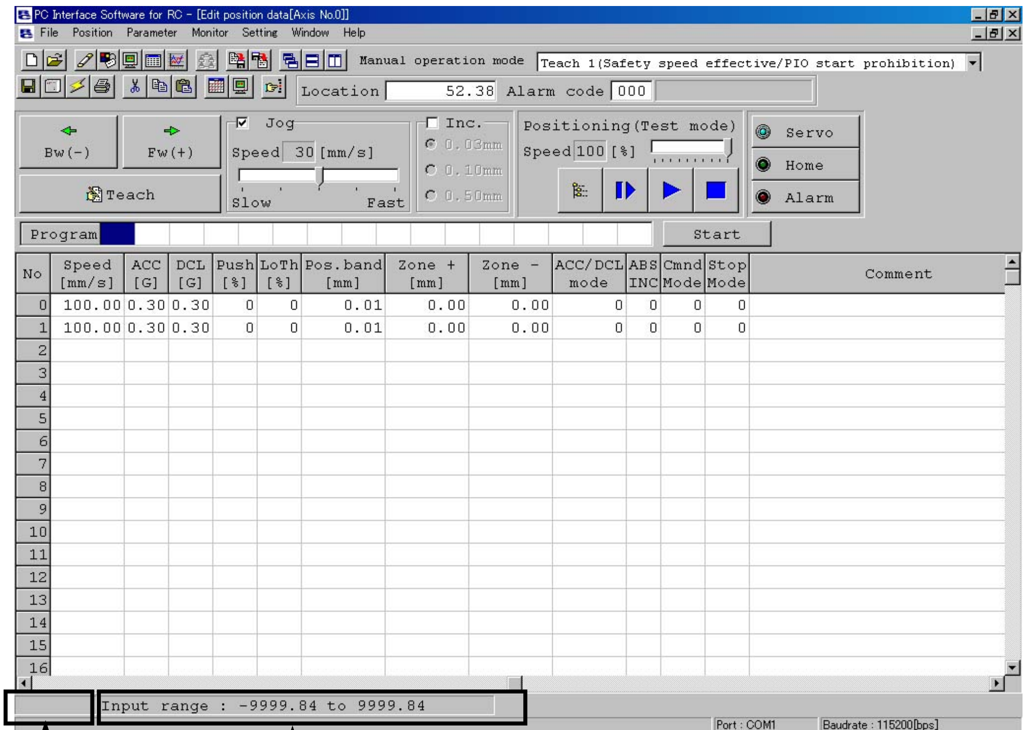


Fig. 5.4 System Password Window

In the position data edit window, you can create position data by “MDI (Mathematical Direct Input),” “Direct Teaching,” “Jogging” or “Inching” operation.
Created/edited position data will become effective after it has been sent to the controller.
To send position data to the controller, click **Position** from the main menu and then select **Send to Controller**, or click in the position data edit window.
You can also check the teaching positions in two test operation modes: “Positioning” and “Program.”



“Modified” is shown if a change has been made to the loaded data.

The input range of each item is shown.

* The input range is determined by soft limit + side and soft limit – side of the parameter.
(Refer to 8, “Editing parameters.”)

Fig. 5.5 Position Data Edit Window (Detail Display in Online Mode): PCON, ACON, SCON, ERC2 and ROBONET
(excluding the PCON-CA, PCON-CB, ACON-CA, ACON-CB, SCON-CA, SCON-CAL/CGAL and SCON-CB)
(Versions older than V8.00.00.00)

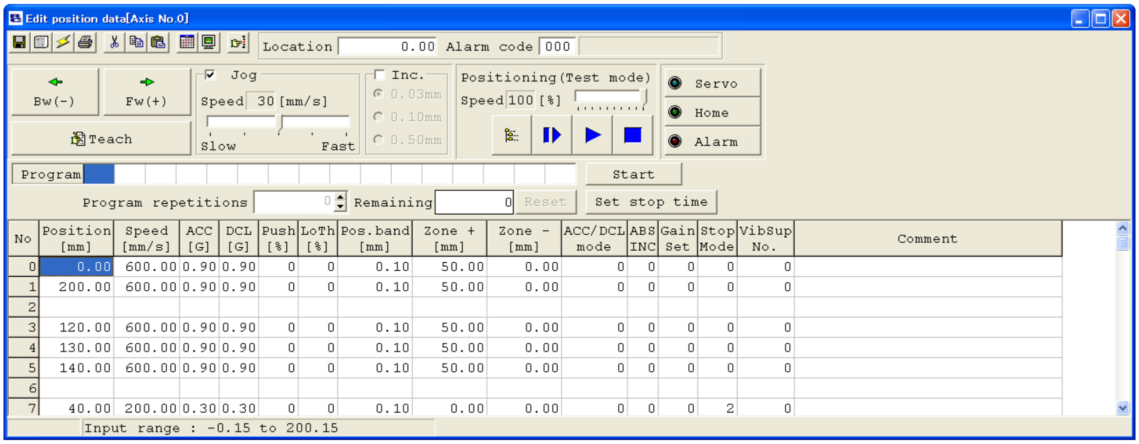


Fig. 5.6 Edit position data Window: PCON, ACON, SCON, ERC2, ERC3, ROBONET (Software Version V8.00.00.00 or later),
PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB,
SCON-CA, SCON-CAL/CGAL, SCON-CB, MSCON, MCON, RCON

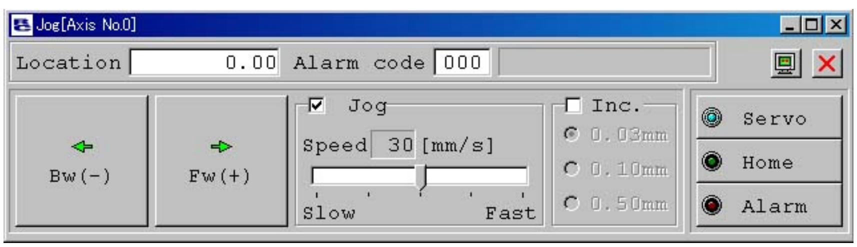


Fig. 5.7 Jog Window (Online Display) : PCON-PL/PO, ACON-PL/PO, SCON-C, SCON-CA, SCON-CB,
PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA,
DCON-CB or ERC3 in Pulse-train Mode

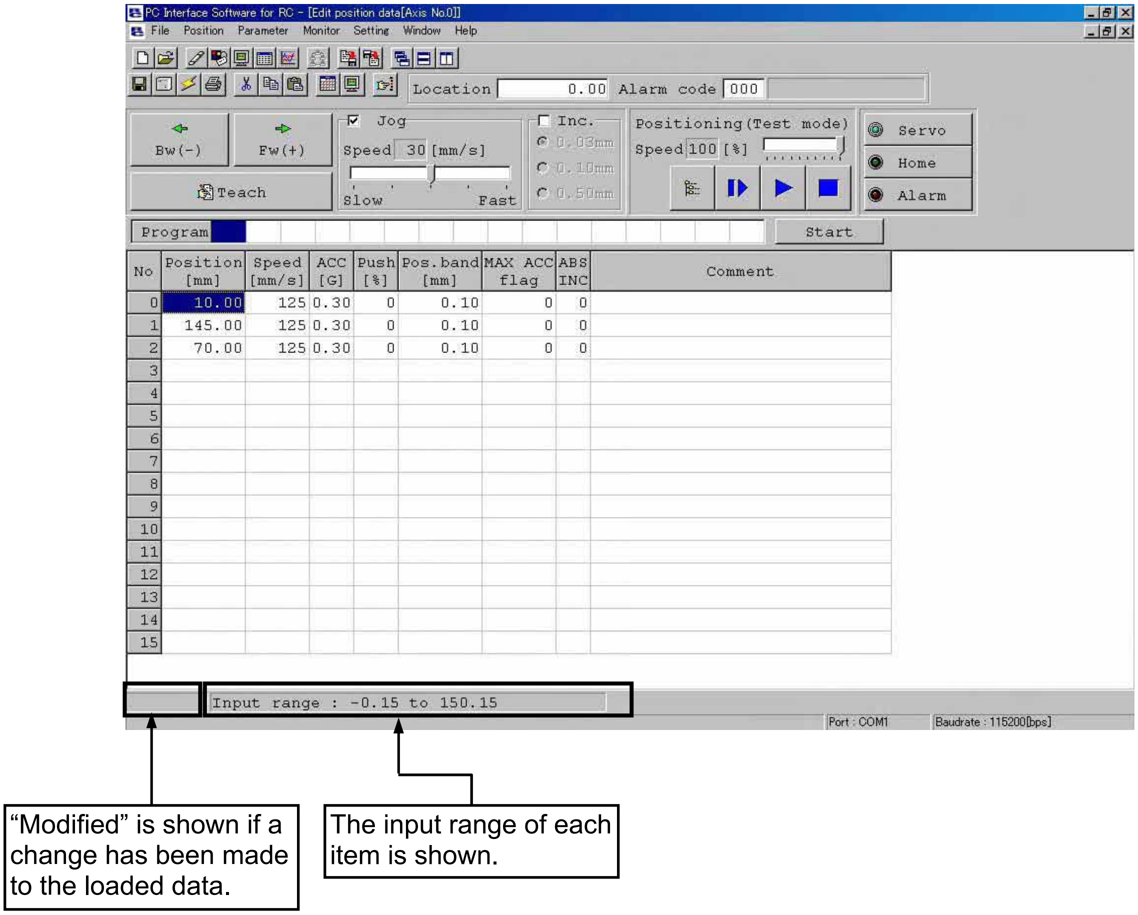


Fig. 5.8 Position Data Edit Window (Detail Display in Online Mode): RCP, RCS, E-Con, RCP2 and ERC

* While the position data edit window of a given axis is open in the online mode, the parameter edit window of the same axis cannot be opened. (You can open the parameter edit window of any other axis.)
* When the MANU operation mode on the main window is monitor mode 1 or monitor mode 2, this online mode cannot be executed.
Operations of writing into the controller, jog and home return cannot be performed.

The operating methods of buttons and input controls available in this window are explained below.

(1) Toolbar buttons

[1] [2] [3] [4] [5] [6] [7] [8] [9] [10]

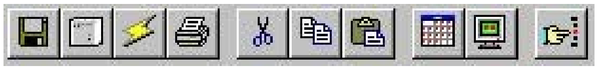


Fig. 5.9 Toolbar in Position Data Edit Window

[1] Save to file
Save data to a file.

[2] Send to controller
Send (write) data to the controller.

[3] Reload position data
Reload position data from the controller and then refresh the displayed data.
If the position data has been changed in the position data edit window (when “Modified” is shown in the status bar), clicking this button will display the warning message shown in Fig. 5.10.

* Take note that if you select **Yes** in this window, data that have been edited but not yet been written to the controller will be lost.

Fig. 5.10 Warning Message

[4] Print
Output position data to the printer.
Print setting window is displayed. Set top, left and row margins (mm) and printing orientation, and then print.

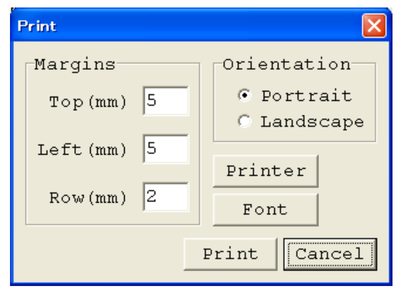


Fig. 5.11 Print Setting Window

[5] Cut
Cut the range of data selected in the position data input area and save it to the clipboard.

* You can select data in units of rows.

[6] Copy
Copy to the clipboard the range of data selected in the position data input area.

* You can select data in units of rows.

[7] Paste
Paste the data that has been cut or copied from the position data input area, to the selected position.

[8] Switch display
Change the display mode of the position data input area from normal to detail (or vice versa).
(Fig. 5.24, Fig. 5.25) or (Fig. 5.27, Fig. 5.28)

[9] Show status monitor window
Display the status monitor window of the axis you are currently editing.
This window is the same as the one you can open by selecting **Status** from **Monitor** in the main menu of the main window.

[10]Divide position data equally
Clicking this button will display the window shown in Fig. 5.12.
Set appropriate values in **Start Position No.** and **End Position No.**, select an appropriate option under **Fraction processing**, and then click **OK**. The distance between the specified two position data will be divided equally. (This function is called “Equal division function”)
When the check box for “Also divide the velocity” is selected, the velocity between the two specified position tables will also be divided equally. (The “Also divide the velocity” check box is available in Ver. V6.00.04.00 or later.)

* Clicking this button while multiple rows are selected in the position data input area will cause the software to automatically populate the **Start Position No.** and **End Position No.** field.
  Start Position No.: First position in the selected range
  End Position No.: Last position in the selected range

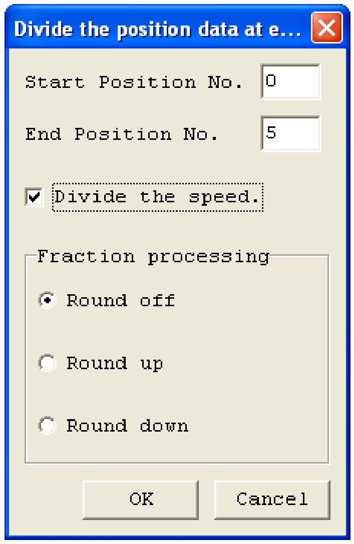


Fig. 5.12 Divide Position Data at Equal Intervals Window

If data has been input between the specified two positions, the warning message in Fig. 5.13 will be displayed.

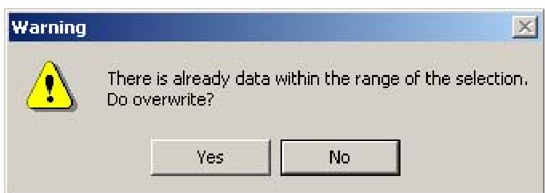


Fig. 5.13 Warning Message

<u>The input fields of position data generated by the equal division function, other than Position and Comment, will be populated by the corresponding values for the position specified in Start Position No. The Comment field will be cleared.</u>

* The equal division function can also be implemented from the pop-up menu (Fig. 5.14) displayed by right-clicking the position data input area.

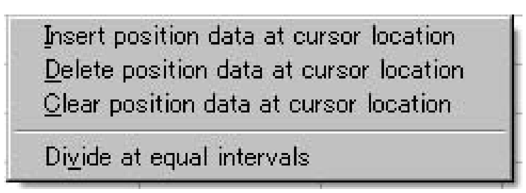


Fig. 5.14 Pop-up Menu

(2) Current position/alarm code

The current position of the axis you are editing (unit: mm) and the associated alarm code, if any, are shown.

Fig. 5.15 Current Position/Alarm Code

For stop, "Stop" is displayed on the current position and alarm code displaying part.

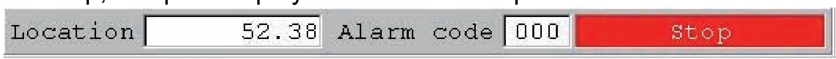


Fig. 5.16 Stop Indication

When motor voltage lowers, "Motor volt. low" is displayed on the current position and alarm code displaying part.

Fig. 5.17 Motor Voltage Low Indication

* When the motor voltage low is displayed, it means a state that the motor drive power is shut off.

(3) Jogging/Inching operation controls

Select **Jog** or **Inc.** (by adding a check mark to the corresponding checkbox) and use the **Fw (+)** ・ **Bw (-)** buttons to move the axis.
Select the jogging speed from "1," "10," "30," "50" and "100" [mm/sec] using the track bar.
In the inching mode, select the feed pitch from "0.03," "0.10" and "0.50" [mm] using the applicable radio button. A click will move the axis by the specified pitch, while holding down the mouse button will cause the axis to jog at 1 mm/sec after 2 second. If the mouse button is held continuously, the jogging speed will increase from "10" to "30" and to "100" [mm/sec] every second.
If home return has been completed, clicking **Teach** will load the current position to the point data input area.
* In the position data input area, the loaded data will be input to the row where the cursor is located. Check the cursor position before clicking **Teach**.

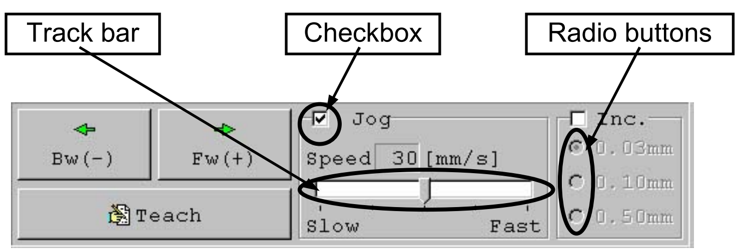


Fig. 5.18 Jogging/Inching Operation Controls

(4) Positioning (test operation mode)

You can move the axis to the position corresponding to the cursor row in the position data input area.
The moving speed is calculated by multiplying the speed set in the position data input area with the speed factor. (The speed factor can also be set by the track bar.)

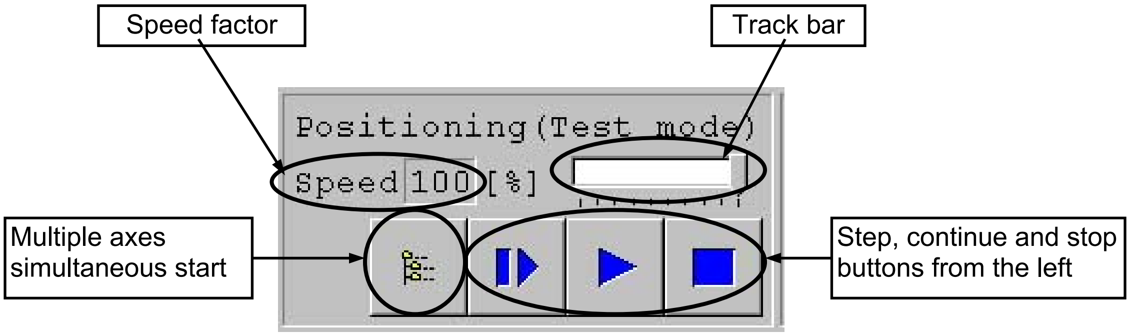


Fig. 5.19 Positioning

Clicking ▮▶ (step) will move the axis by one position, while clicking ▶ (continuous move) will cause the axis to move continuously by looping within the block of specified position data.
Clicking ▶ again while the axis is moving continuously will stop the axis when it reaches the next position.
Clicking ■ will stop the axis (the axis will start decelerating the moment the button is clicked and continue to decelerate until it finally stops.)

* What is a continuous move?
If a continuous move command is issued at position No. 2 when the position table is set as follows, the actuator will operate continuously through a group of positions where data is available (= until the position immediately before one where no data is registered (whose data fields are empty)), starting from the position at which the command is issued. In this example, the actuator will operate from position No. 2 → No. 3 → No. 1 → No. 2, and so on.

No.	Position [mm]	Velocity [mm/sec]	Acceleration [G]	Deceleration [G]
0				
1	100.00	20.00	0.05	0.05
2	200.00	33.00	0.11	0.11
3	333.33	100.00	0.22	0.22
4				
5	555.55	333.00	0.22	0.22
6	666.66	444.00	0.11	0.11
7	777.77	777.00	0.07	0.07

* If the data loaded from the controller has been changed, write the modified data again to the controller beforehand.

* While this mode is active, data cannot be entered in the jogging/inching control groups or point data input area.

● When PCON, ACON, DCON, SCON, MSCON, MCON, RCON, ERC2 and ERC3 are connected, the maximum speed becomes the safety speed of 250 mm/sec or less if the MANU operation mode is set to the teach mode 1 (safety speed effective).

Simultaneous Movement of Multiple Axes

(Note) MCON and RCON Controller is not applicable.

Multiple axes simultaneous start button

You can use this button to simultaneously move the selected axes, from among the multiple axes currently connected by link cables.

Click the multiple axes simultaneous start button in the positioning setting area.

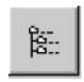


Fig. 5.20 Multiple Axes Simultaneous Start Button

The “Start multiple axes simultaneously” window will open.

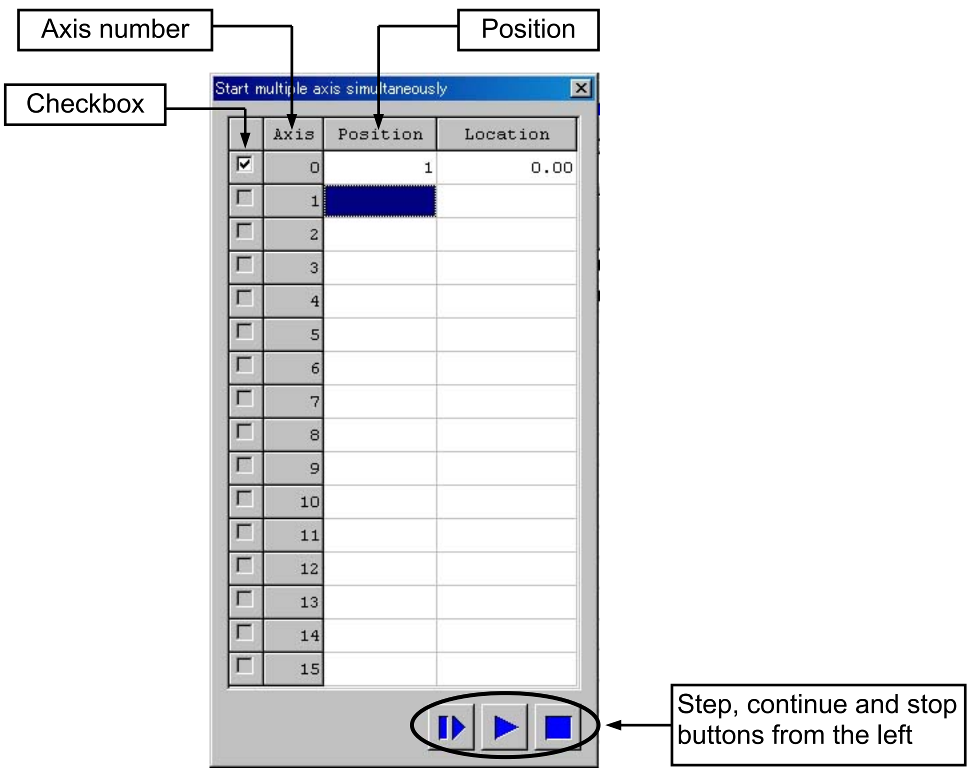


Fig. 5.21 Start Multiple Axes Simultaneously Window

Checkbox: The axes with a check mark in this box will move. The selectable checkboxes are those of axes whose point edit window is currently open.

Axis: Axis number.

Position: Set a position number in one field. This position determines the movement range for each specified axis based on a routine similar to continuous movement, and the axis will move over the determined range. All selected axes will move to this position. (If no position data is set, the axes will not move.)

Location: The current position of each axis is shown.

Step movement button: Clicking this button will move the axes to the next position and complete the movement.

Continuous move button: Move the axes continuously. If this button is clicked during continuous movement, the axes will stop moving after they have reached the current positions.

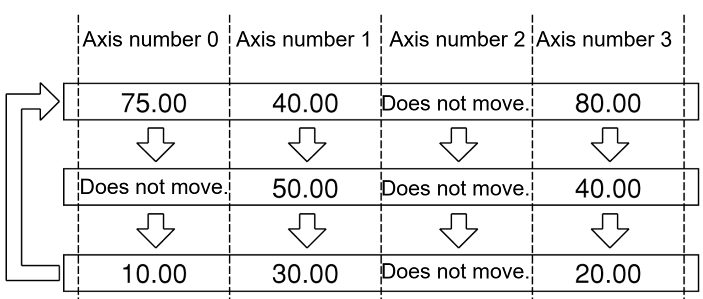
Stop button: Clicking this button will cancel the current movement and stop the axes on the spot.

* Step movement and continuous movement are activated at a speed set with the position data of each axis.

Example of use) When the “Start multiple axes simultaneously” window is set as shown in Fig. 5.21 and position data for each axis is set as follows

Position \ Axis number	0	1	2	3
0	0.00	0.00	0.00	0.00
1	25.00	*	*	10.00
2	10.00	30.00	60.00	20.00
3	75.00	40.00	20.00	80.00
4	*	50.00	30.00	40.00
5	*	*	50.00	10.00
6	*	*	40.00	25.00

Clicking ▶ (continuous movement) will move the actuators as follows.



After all specified axes have completed their movement, they will move to the next positions.

- The actuator corresponding to axis number 2 does not move, because its checkbox is not selected.
- The actuators do not move if position data is not set for the corresponding axes.

(5) Program

Just like positioning, this is also a test operation mode. In the program mode, however, you can set a desired sequence of movement.
In the position number input area, enter position numbers (0 to maximum numbers of positions), or if repeated execution is required, input “R” (a symbol specifying a repeat of the preceding numbers) at the end, and then click **Start**.
The stop time of “T1” to “T5” is able to be input between position number from the Version V8.03.00.00 and later.
Up to 16 steps can be specified, including “R.”
If a blank field exists, all subsequent steps are considered invalid. The simple program stops. All steps after “R” are also considered invalid.

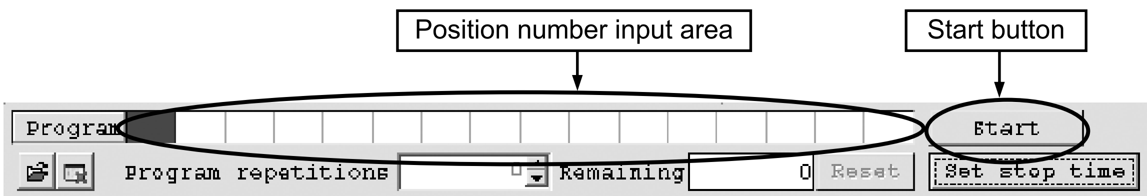


Fig. 5.22 Program Mode

Clicking **Start** will start the specified movement, and the button text will change to **Stop.** The button text will change back to **Start** when the movement ends or the button is clicked again. The sequence set in the program mode will not be saved to the controller or a file. (for the versions before V9.00.00.00)
For Version V9.00.00.00 and later, the files can be stored.

The stop time of “T1” to “T5” can be set if clicking on “Stop Time Setting” (clicking on icon for new version). (V8.03.00.00 or later)

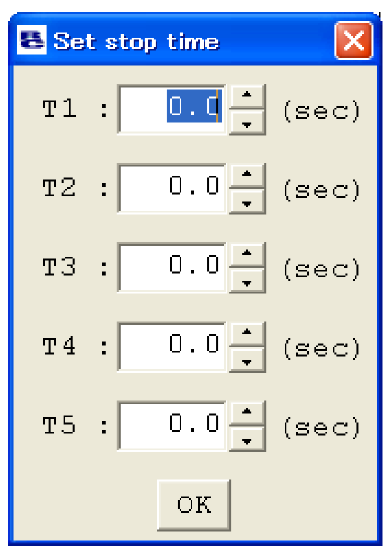


Fig. 5.23 Stop Time Setting

If a repeat of “R” is set and “Number of Program Execution” is 0, it continuously moves until it stops.
If the number is indicated, the move is executed up to the indicated number. The remaining times is displayed in Remaining. “Number of Program Execution” would not be set if a repeat of “R” is not set. (V8.03.00.00 or later)

(6) **Servo**, **Home**, **Alarm** and **Force brk release** buttons

Fig. 5.24 Servo, Home and Alarm Buttons

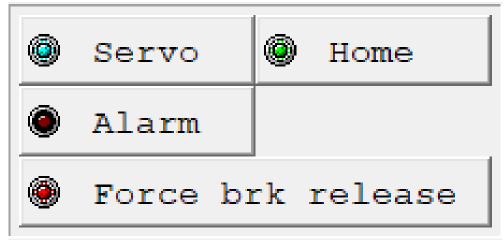


Fig. 5.25 Servo, Home, Alarm and Force brk release Buttons (Software Version V13.02.00.00 or later)

[1] **Servo** button
This button lets you turn on/off the servo.
When the servo is on, a blue lamp illuminates on the button.
After home return, you can turn off the servo, move the actuator manually and then click **Teach** to capture a desired position.

Note: Closing the software when the servo is off will keep the servo in the off state, thus disabling the PIO operation.
To reset the servo, restart the software with the controller connected, or reconnect the controller power.

[2] **Home** button
This button lets you perform home return.
Once home return is complete, a green lamp will illuminate on the button.
Press the home-return button and the confirmation message should appear. Press Yes and the home-return operation should start.
* V13.03.00.00 and later

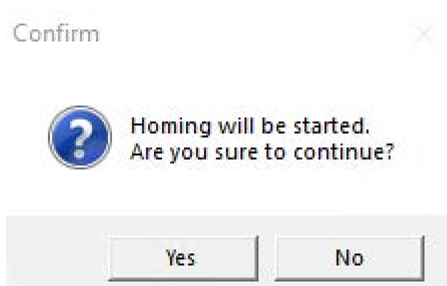


Fig. 5.26 Confirmation Window

[3] **Alarm** button
This button lets you reset an alarm.
Note that an alarm can be reset only when the servo is off and the cause of the alarm has been removed.
While an alarm is present, a red lamp remains lit on the button.

The **Force brk release** button is added in the software versions from V13.02.00.00 and later.

[4] **Force brk release** button

For an actuator equipped with a brake, chick on the **Force brk release** button while the servo is OFF, and the brake can be released compulsorily. The display should turn on.

Click on the **Force brk release** button again, and the brake gets activated. The display should turn off.

(Note) While the servo is ON, the **Force brk release** button would not response even if it is clicked as the brake is kept released. The display should also be kept on.

⚠ **Note:** When the actuator is installed vertically, pay attention to a slider or rod so it would not drop down when releasing a brake.
Dropping down of a slider or rod may cause personal injury or damage on the actuator, workpiece or equipment.
Hold the slider (workpiece) or rod (workpiece) externally so it would not drop down.
After finishing a work, make sure to have the brake worked.
Do not attempt to set the controller to AUTO Mode while the brake is released.

(7) Position data input area: PCON, PCON-CA, PCON-CB, ACON, ACON-CA, ACON-CB, DCON-CA, DCON-CB, SCON-C, SCON-CA, SCON-CAL/CGAL, SCON-CB, ERC2, ERC3, ROBONET, MSCON, MCON and RCON

Input the position data.
It is normally possible to input five items of Position, Speed, Acceleration (ACC), Deceleration (DCL) and Comment, however, it becomes further possible to input items of Push, Threshold (LoTh), Positioning Band, Zone+, Zone-, Acceleration and deceleration (Acc/Dcl) mode, Incremental (ABS/INC), Command (Cmnd) mode and Stop mode by switching to detailed indication with the Indication switching button .
In Version V8.03.00.00, "Command Mode" changes to "Gain Set" and "Vib. Sup. No." is also added. (Refer to (8), "Position data input area: SCON-CA, SCON-CB, SCON-CAL/CGAL, PCON-CA, ACON-CA, ACON-CB, DCON-CA, DCON-CB, ERC3, MSCON, MCON and RCON.")

As shown in the table, the zone+, zone-, acceleration and deceleration mode, stop mode are enabled or disabled depending on the type of controller.

List of ON/OFF of Position Table According to Model

Position Table	Zone +/-		AccDcl Mode			Stop Mode		Gain Set	Vib. Sup. No.
			Trapezoid	S-shape	First-order Delay	Full Servo	Auto Servo OFF		
ERC2	○	PIO pattern: 3	○	×	×	○	○	×	×
ERC2-SE	○	-	○	×	×	○	×	×	×
ERC3	○	PIO pattern: 3	○	○	○	○	○	×	×
ERC3 PIO Converter	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○	○	○	×	×
PCON-C/CG/CF	○	PIO pattern: 0, 1, 2, 4, 5	○	×	×	○	○	×	×
PCON-CA	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○	○	○	×	×
-CY	○	PIO pattern: 1	○	×	×	○	○	×	×
-SE	○	-	○	×	×	○	×	×	×
PCON-CB	○	PIO pattern: 0, 1, 2, 4, 5, 6, 7	○	○	○	○	○	×	×
PCON-CYB	○	PIO pattern: 0, 2, 3, 4, 5	○	○	○	○	○	×	×
RPCON	○	PIO pattern: 0, 1, 2, 4, 5	○	×	×	○	×	×	×
ACON-C/CG	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○	/	○	×	×
-CY	○	PIO pattern: 1	○	○	○	/	○	×	×
-SE	○	-	○	○	○	/	×	×	×
RACON	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○	/	×	×	×
ACON-CA	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○	/	○	○	○
ACON-CB	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○	/	○	○	○
ACON-CYB	○	PIO pattern: 0, 2, 3, 4, 5	○	○	○	/	○	○	○

Position Table	Zone +/-		AccDcl Mode			Stop Mode		Gain Set	Vib. Sup. No.
			Trapezoid	S-shape	First-order Delay	Full Servo	Auto Servo OFF		
DCON-CA	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○		○	×	×
DCON-CB	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○		○	×	×
DCON-CYB	○	PIO pattern: 0, 2, 3, 4, 5	○	○	○		○	×	×
SCON-C positioner	○	PIO pattern: 0, 1, 2, 4, 5	○	○	○		○	×	×
SCON-CA positioner	○	PIO pattern: 0, 1, 2, 4, 5, 6, 7	○	○	○				
SCON-CAL/CGAL	○	PIO pattern: 0, 1, 2, 4, 5, 6, 7	○	○	○				
SCON-CB positioner	○	PIO pattern: 0, 1, 2, 4, 5, 6, 7	○	○	○				
MSCON	○	-	○	○	○				
MCON, RCON (Pulse motor type)	○	-	○	○	○	○		Transported load	
MCON, RCON (Servo motor type)	○	-	○	○	○				
MCON, RCON (Brushless DC motor)	○	-	○	○	○				

No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Comment
0	0.00	100.00	0.30	0.30	
1	50.00	100.00	0.30	0.30	
2					
3					
4					
5					
6					
7					
8					

Fig. 5.27 Position Data Input Area (Normal Mode)

[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13]

No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Push [%]	LoTh [%]	Pos.band [mm]	Zone + [mm]	Zone - [mm]	ACC/DCL mode	ABS INC	Cmnd Mode	Stop Mode	Comment
0	10.00	125	0.30	0.30	0	0	0.01	0.00	0.00	0	0	0	0	
1	145.00	125	0.30	0.30	0	0	0.01	0.00	0.00	0	0	0	0	
2	70.00	125	0.30	0.30	0	0	0.01	0.00	0.00	0	0	0	0	
3														
4														

Fig. 5.28 Position Data Input Area (Detail Mode)

[1] No.: Indicates the position data number.

> ⚠ Warning: In the case of a PCON-C/CG/CF, PCON-CA, PCON-CB, ACON-C/CG, ACON-CA, ACON-CB, DCON-CA, DCON-CB, SCON-C, SCON-CA, SCON-CAL/CGAL, SCON-CB, ROBONET, ERC3 PIO Converter, MSCON (remote I/O mode) or MCON (remote I/O mode) controller operating in solenoid mode 2 or PCON-CY or ACON-CY controller operating in solenoid mode 0, be sure to use absolute coordinates. If relative coordinates are used, position data errors will occur.
> Also note that if relative coordinates are used on any of these controllers operating the specified push mode, completion of push operation cannot be determined.

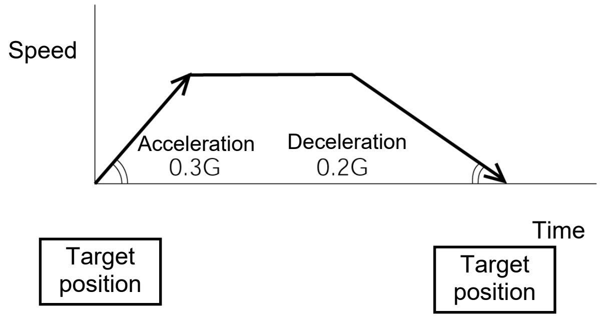
[2] Position: Input the target position to move the actuator to, in [mm].

- Absolute Coordinates (Incremental:0) : Input the target location by determining the distance between the original point and target position. No negative value can be input.
- Relative Coordinates (Incremental:1) : Input the target location by determining the distance between the current position and target position. Any negative value can be input (if coordinates are in the negative direction).

[3] Vel:

- Input the speed at which the actuator will be moved, in [mm/sec].
  The initial value will depend on the actuator type.
  (Note) For SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, ERC3, MSCON, MCON and RCON, an alarm will be displayed if the set value is lower than the minimum velocity.

[4] Acc/Dcl: Input the acceleration/deceleration at which the actuator will be moved, in [G].
Basically, use acceleration/deceleration within the catalog rated value range.
The input range allows larger value input than the catalog rated values, on the assumption that the cycle time will be reduced if the transfer mass is significantly smaller than the rated value.
Make the numeric value smaller if transferred work part vibrates and causes trouble during acceleration/deceleration.



The acceleration will become sudden if the numeric value is made larger, and it will become gradual if the numeric value is made smaller.

(Note) For SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, ERC3, MSCON, MCON and RCON an alarm will be displayed if the set value exceeds the rated acceleration/deceleration.

Caution:

(1) Enter appropriate values for Vel and Acc/Dcl in such a way as to prevent excessive impact or vibration from being applied to the actuator in consideration of the installation conditions and the shape of transferred work part by referring to the “List of Actuator Specifications” in the Appendix of the operation manual for each controller.
Increasing such values largely relates to the transfer mass and the actuator characteristics vary depending on the model, consult IAI regarding the input-limiting values.

(2) Establish the setting as the datum on one finger for Gripper Type. Therefore, the relative speed and relative acceleration/deceleration between two fingers should be counted double.

(3) For rotary actuators and lever type grippers, the values are to be treated as an angle. [mm] becomes [deg].
For acceleration/deceleration, the values are defined 1G = 9800deg/^{S2} as the standard. e.g. 0.3G should be taken as 2940deg/^{S2}.

[5] Push:

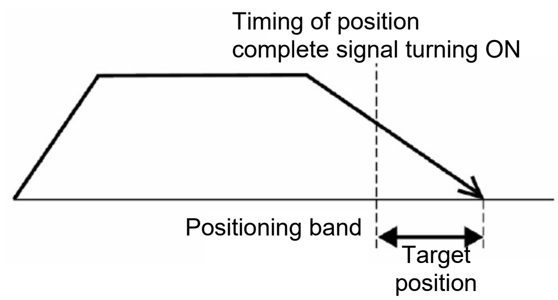
- Select the positioning operation or push operation.
The default value is “0.”
0 : Normal positioning operation
Other than 0: Indicates the current-limiting value and indicates the push operation.

[6] LoTh : ▪ In the case of a SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CF, PCON-CFA, and PCON-CFB controller, the load output signal (PI0) will be output when the command torque exceeds the value set in the "LoTh" field (%) within the certification range.
The certification range is set by "Zone+/-."
Use this signal to determine if a press-fit operation has been successful.
* For details, refer to the operation manual for your applicable controller.

[7] Positioning band : ▪ The "positioning operation" and "push operation" have different meanings.
Positioning operation:
It defines the distance to the target position from a position at which the position complete signal turns ON. The default value is 0.1 mm.

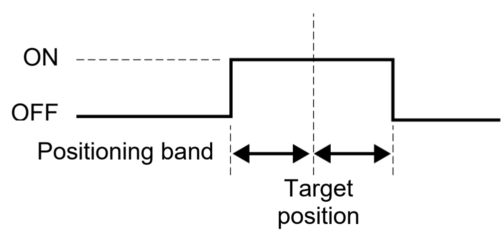
Standard type

Since increasing the positioning band value hastens the next sequence operation, it becomes a factor for cycle time reduction. Set the optimum value by considering the balance of the entire equipment.



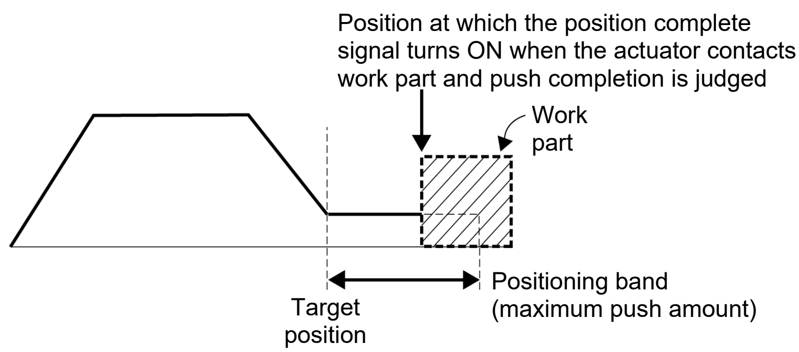
Note that with a PCON-C/CG/CF, PCON-CA, PCON-CB, ACON-C/CG, ACON-CA, ACON-CB, DCON-CA, DCON-CB, SCON-C, SCON-CA, SCON-CAL/CGAL, SCON-CB, ERC3 PIO Converter, MSCON (remote I/O mode) or MCON (remote I/O mode)controller operating in solenoid mode 2 or PCON-CY or ACON-CY operating in solenoid mode 1, you should define the band within which the complete signal will turn ON.

PCON-C/CG/CF, PCON-CA, PCON-CB, ACON-C/CG, ACON-CA, ACON-CB, DCON-CA, DCON-CB, SCON-C, SCON-CA, SCON-CAL/CGAL, SCON-CB, ERC3 PIO Converter, MSCON (remote I/O mode) or MCON (remote I/O mode)controller operating in solenoid mode 2 or PCON-CY or ACON-CY operating in



Position complete signal

Push operation:
It defines the maximum push amount from the target position in the push operation. Set the positioning band in such a way as to prevent positioning completion before the actuator contacts work part by considering mechanical variations of work part.



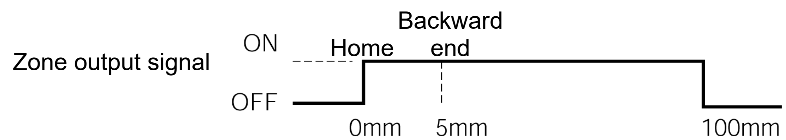
(Note) For PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB and ERC3, a smaller value than the minimum positioning band width cannot be set.

[8] Zone +: ▪ It defines the zone where the zone output signal of the standard type turns ON.
[9] Zone -: ▪ Individual setting is available for each target position to give flexibility.

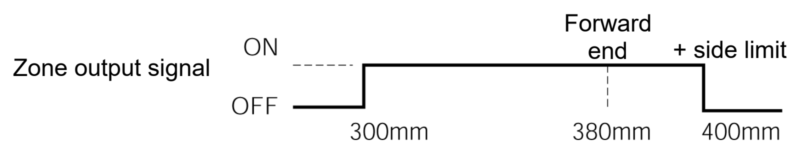
[Setting example]

No.	Position [mm]	Zone+ [mm]	Zone- [mm]	Note
0	5.00	100.00	0.00	Backward end
1	380.00	400.00	300.00	Forward end
2	200.00	250.00	150.00	Midpoint

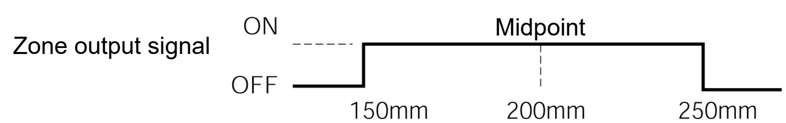
Movement command to Position No. 0 (backward end)



Movement command to Position No. 1 (forward end)



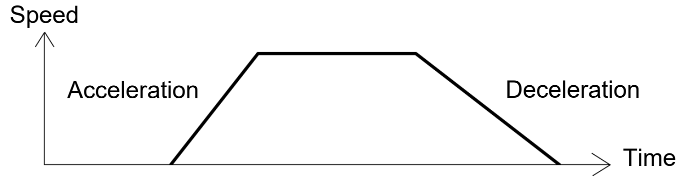
Movement command to Position No. 2 (midpoint)



[10] Acc/Dcl Mode:

- It defines the acceleration/deceleration characteristics.
  The default value is 0.
  0: Trapezoid pattern
  1: S-shaped motion
  2: First-order delay filter

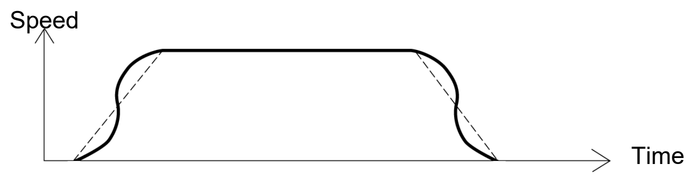
Trapezoid pattern



* Set the acceleration and deceleration in the “Acc” and “Dcl” fields of the position table.

S-shaped motion

A curve, which is gradual at the beginning of acceleration but rises sharply halfway, is drawn.
Use it in the applications for which you want to set the acceleration/deceleration high due to cycle time requirement but desire a gradual curve at the beginning of movement or immediately before stop.

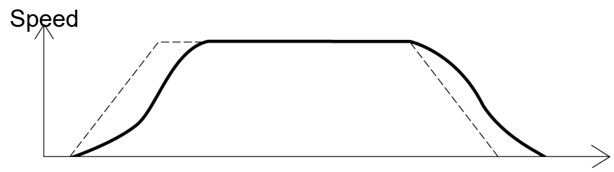


* Set the degree of the S-shaped motion with the parameter No. 56 [S-shaped motion ratio setting]. The setting unit is % and the setting range is between 0 and 100.
(The above is the image graph when 100% setting is made.)
If “0” is set, the S-shaped motion becomes invalid.
However, it will not be reflected in jogging/increment movement by PC or Teaching Pendant operation.

(Note) It cannot be set for the ERC2, PCON-C or RPCON controller. The parameter No. 56 is reserved.

First-order delay filter

More gradual acceleration/deceleration curves are drawn than the linear acceleration/deceleration (trapezoid pattern).
Use this in the applications by giving micro vibrations to work part during acceleration/deceleration not desired.



* Set the degree of the first-order lag with the parameter No. 55 (constant for the position command first-order filtering). The setting unit is 0.1 msec and the setting range is between 0.0 and 100.0.
If "0" is set, the first-lag filter will become invalid.
However, it will not be reflected in jogging/increment movement by PC or Teaching Pendant operation.
(Note) It cannot be set for the ERC2, PCON or RPCON controller. The parameter No. 55 is reserved.

[11] ABS/INC: ▪ Select either the absolute or incremental positioning.
The factory setting is 0.
0: Absolute positioning
1: Incremental positioning

Warning:	In the case of a PCON-C/CG, PCON-CA, PCON-CB, ACON-C/CG, ACON-CA, ACON-CB, DCON-CA, DCON-CB, SCON-C, SCON-CA, SCON-CAL/CGAL, SCON-CB, ERC3 PIO Converter, MSCON (remote I/O mode) or MCON (remote I/O mode) controller operating in solenoid mode 2 or PCON-CY or ACON-CY controller operating in solenoid mode 0, be sure to use absolute coordinates. If relative coordinates are used, position data errors will occur.

[12] Cmnd Mode: ▪ This field is invalid.
The factory setting is 0.

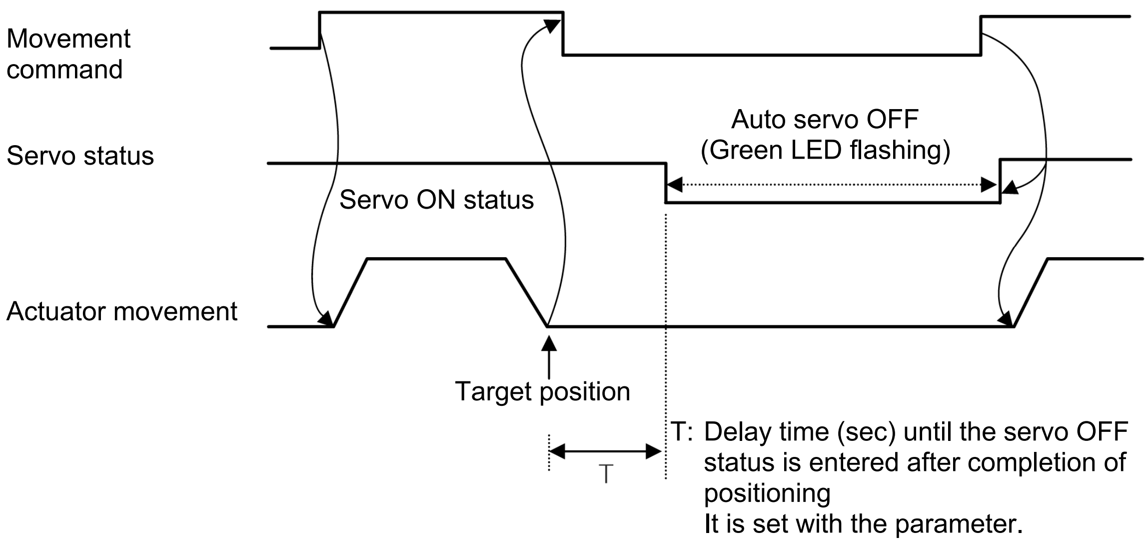
[13] Stop Mode: ▪ It defines the power saving method on standby after completion of positioning to the target position set in the "Position" field of the position number.
0: No power saving method * The default setting is 0 (none).
1: Auto servo OFF method. Delay time defined with the parameter No. 36
2: Auto servo OFF method. Delay time defined with the parameter No. 37
3: Auto servo OFF method. Delay time defined with the parameter No. 38
4: Full servo control method

Full servo control method

The holding current can be reduced by servo-controlling the pulse motor.
The degree of reduction varies depending on the actuator model, load condition, etc., but the holding current decreases approximately by a factor of 1/2 to 1/4.
No displacement occurs since this method maintains the servo ON status.
The actual holding current can be checked on the monitoring window of PC software.

Auto servo OFF method

When a given length of time has elapsed after completion of positioning, the servo OFF status is automatically entered.
(Since the holding current does not flow, the power consumption can be saved by the same amount.)
When a movement command is subsequently given from PLC, the status returns to the servo ON and the actuator starts to move.



(8) Position data input area

On the SCON-CA (Software Version V8.00.00.00 or later), SCON-CB, ACON-CA, ACON-CB, MSCON, SCON-CAL/CGAL, MCON and RCON the following input items have been changed or added.
These items are effective only on SCON-CA, SCON-CAL/CGAL, SCON-CB, ACON-CA, ACON-CB, MSCON, MCON (Servo motor type) and RCON (Servo motor type) controllers:

[1] Gain Set "Cmnd Mode" has been changed to "Gain Set."
[2] Vib. Sup. No. "Vib. Sup. No." has been added.

(Note) For PCON, ACON, SCON-C, DCON-CA, DCON-CB, ERC2 and ROBONET as well as SCON-CA, SCON-CB, SCON-CAL/CGAL, ACON-CA, ACON-CB, MSCON and MCON, Version V8.00.00.00 and later show the following screen display.

[1] [2]

No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Push [%]	LoTh [%]	Pos.band [mm]	Zone + [mm]	Zone - [mm]	ACC/DCL mode	ABS INC	Gain Set	Stop Mode	VibSup No.	Comment
0	200.00	800.00	1.00	0.90	0	0	0.10	0.00	0.00	0	0	0	0	0	
1	0.00	800.00	1.00	0.90	0	0	0.10	0.00	0.00	0	0	0	0	0	

Fig. 5.29

The changed/added items are explained below.

[1] Gain Set ········· Six parameters needed to adjust the servo gain are put together as one set. Four different sets can be registered, so you can switch the servo gain for each positioning operation.
[Parameters constituting one set]
- Servo gain number (position gain)
- Position feed-forward gain
- Speed loop proportional gain
- Speed loop integral gain
- Torque filter time constant
- Current control band number

Setting	Operation after completion of position	Parameter number
0	Gain set 0	7, 71, 31 to 33, 54
1	Gain set 1	120 to125
2	Gain set 2	126 to131
3	Gain set 3	132 to137

[2] Vib. Sup. No. ···· You can suppress the vibration (resonance) of the load installed on the actuator.
Three levels of vibration can be suppressed.
Four parameters are provided for each vibration level, where all four parameters constitute one set.
Set the position number requiring vibration suppression, and applicable parameter set, in the position table.

Setting	Suppressing vibration frequency (characteristic vibration frequency)	Parameter number
0	Normal position control (No control)	–
1	Parameter set for vibration suppression control 1	97 to 100
2	Parameter set for vibration suppression control 2	101 to 104
3	Parameter set for vibration suppression control 3	105 to 108

⚠ Warning:
(1) Vibration frequencies that can be controlled (target characteristic vibration frequencies) are from 0.5 Hz to 30 Hz.
(2) Only the vibration of the load induced by the actuator connected to this controller is suppressed. No other vibration can be controlled.
(3) Vibration can be suppressed only in the same direction as the moving direction of the actuator. Vibration in no other direction can be controlled.
(4) Vibration cannot be suppressed during home return or push-motion operation.
(5) This function is not available in the pulse-train input mode.
(6) When the set characteristic vibration frequency is low, the cycle time may become longer. As a guide, the positioning settling time becomes 150 ms or longer when the characteristic vibration frequency is approx. 6 Hz or below.

(9) Position data input area of RCON

For RCON-PC/PCF, RCON-AC, RCON-DC and SCON-CB (RCON Connection Types which include RC in the model code), the input items should be changed and added (Software Version V13.00.00.00 or later).

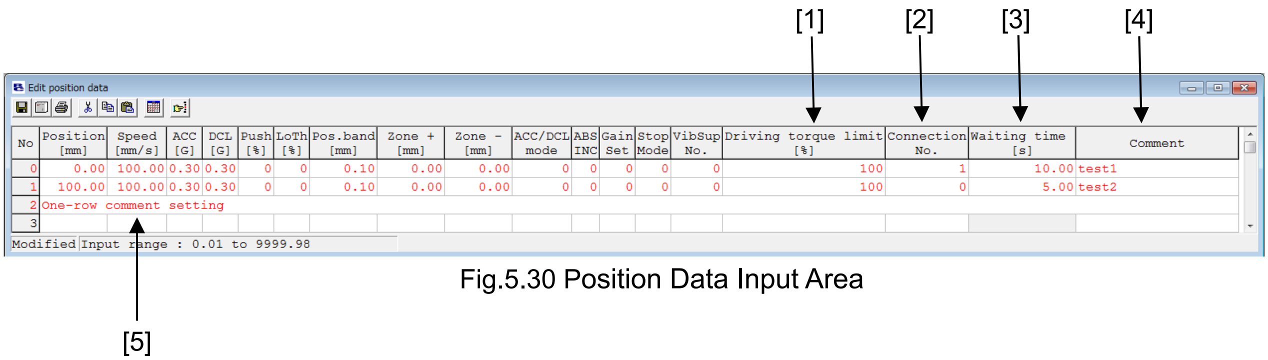


Fig.5.30 Position Data Input Area

[1] Parameter Selection Area

In accordance with the setting in User Parameter No. 191 [Position Data Extension Feature Settings], the setting items can be switched over.

Setting value	Displayed contents
0	Items to hide
1	Driving torque limit
2	Push speed

Driving torque limit : The movement current limit value at position movement can be set.
Push speed : The pressing velocity limit value at position movement can be set.

(Note) In create new offline, Parameter Selection Area Setting Window should be displayed after the select window for the position data format. Items to hide, driving torque limit and push speed should be selected in Parameter Selection Area Setting Window.
It is because the controller is not connected and User Parameter No. 191 [Position Data Extension Feature Settings] cannot be read out.
[Refer to 5.2.1, "Creating New Position Data."]

5. Editing Position Data on CON Controllers and Older Models

[2] Connection No.

Position number to move to after the movement complete can be set.

Continuous link should get invalid by having it blank.

* This feature is effective only in AUTO Mode. In case you require to have a continuous movement in the RC PC software, utilize the simple program function.
[Refer to (5) Simple program]

[3] Waitng time

Waitng time after movement complete can be set.

Setting can be established up to 600 seconds at the maximum.

* This feature is effective only in AUTO Mode. In case you require to have a continuous movement in the RC PC software, utilize the simple program function.
[Refer to (5) Simple program]

[4] Comment

Comment can be set in 20 characters in half-size font at the maximum.

(In RCON, it is available to save a comment in the controller.)

[5] One-row comment

Comment can be set in 56 characters in half-size font at the maximum.

Right-click on the position data and execute [One-row comment enable/disable] to set it.

(The data already input should be cleared when switched over between enable and disable)

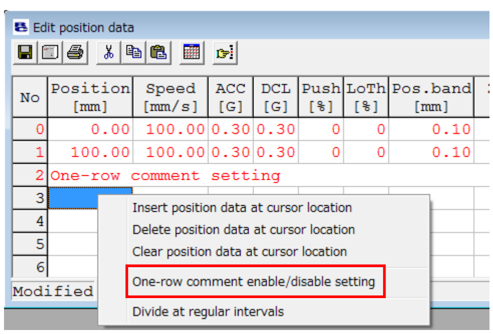


Fig. 5.31 One-row comment enable/disable setting

When it is required to edit the one-row comment data, have a key input on the one-row comment data and the setting window for the one-row comment should appear. Input a comment.

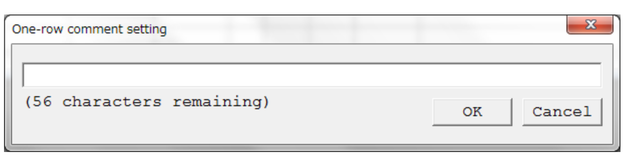


Fig. 5.32 One-row comment setting window

(10) Position data input area: RCP, RCS, E-Con, RCP2 and ERC

Enter position data in this area.
It is normally possible to input four items of “Position,” “Speed,” “ACC” and “Comment,” however, it becomes further possible to input items of “Push,” “Pos. band,” “MAX ACC,” “ABS INC” by switching to detailed indication with the “Indication switching” button .

No	Position [mm]	Speed [mm/s]	ACC [G]	Comment
0	10.00	125	0.30	
1	145.00	125	0.30	
2	70.00	125	0.30	
3				
4				
5				
6				
7				
8				

Fig. 5.33 Position Data Input Area (Normal Mode)

[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	
No	Position [mm]	Speed [mm/s]	ACC [G]	Push [%]	Pos.band [mm]	MAX ACC flag	ABS INC	Comment
0	10.00	125	0.30	0	0.10	0	0	
1	145.00	125	0.30	0	0.10	0	0	
2	70.00	125	0.30	0	0.10	0	0	
3								
4								
5								
6								
7								
8								

Fig. 5.34 Position Data Input Area (Detail Mode)

[1] No.: Shows position data No.

[2] Position: The desired move location from home in millimeters.

- Absolute Positioning: (Incremental:0) Moves the actuator to the desired location in reference to the home location. Inputting negative values is not possible.
- Relative Positioning: (Incremental:1) Moves the actuator to the desired position in reference to the current position. Inputting negatives values is possible. (during negative direction of the display coordinate)

> Caution: There are cases when the input value may be rounded off to the least common denominator multiple of the controller. (when data is acquired from the controller).

[3] Vel: ▪ The speed when moving the actuator (mm/sec).
The default value will depend on the actuator type.

[4] Acc/Dcl: ▪ The acceleration/deceleration setting for the move to the corresponding position (in G's).
The default value will depend on the actuator type.

[5] Push: ▪ Selects the positioning mode or push mode.
The default value is set as 0.
0: Positioning Mode (normal movement)
Besides 0: Push Mode (%)
▪ In the case of push mode, data number is the motor current limiting value during push.
Uses a value that matches the actuator type with a maximum value of 70%.

[6] Positioning band :
▪ In positioning mode, the position complete detection band (distance to the target position).
▪ The distance to the target position refers to the distance before the value entered here reaches the target position and the position complete signal is output once the actuator enters that range.
The default value will depend on the actuator type. (see diagram A)
▪ The push mode uses the maximum push amount (distance from the target position). [mm] (see diagram B)
▪ When the push direction is negative direction of display coordinates, a "minus" sign should be placed in the input value.

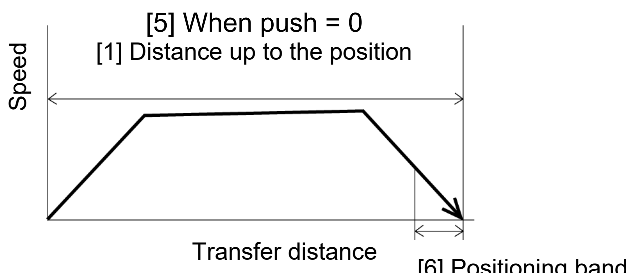


Diagram A

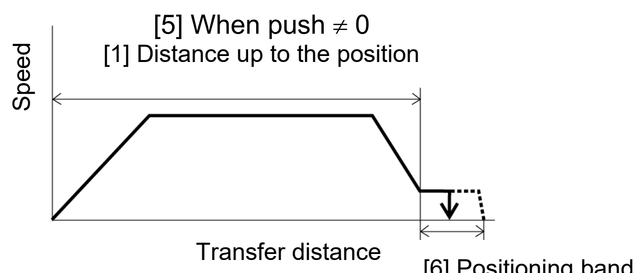
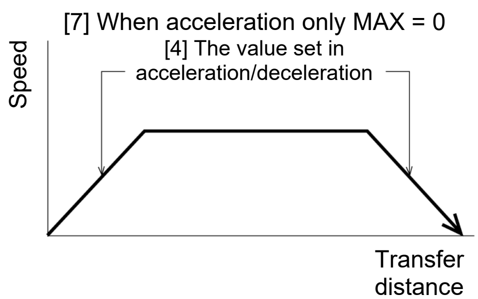
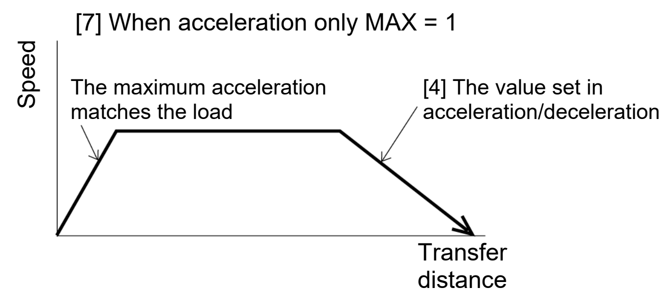


Diagram B

[7] MAX Acceleration:

- Selects either the assigned acceleration or the maximum acceleration. Inputs are either 1 or 0. The default value is set as 0.
  0: Assigned acceleration
    The value placed in [4] will be used as the actual acceleration value and deceleration value.
  1: Maximum acceleration
    This will automatically utilize the maximum acceleration matched to the load. Deceleration remains as the assigned value in [4].





[8] ABS/INC Select either the absolute or incremental positioning.
0: Absolute positioning
1: Incremental positioning

5.2 Offline Mode

When editing data after creating new data or loading data from a file, you are editing the data in the offline mode.
In this mode, the window controls relating to axis operation are grayed out, and only the toolbar buttons and position data input area become active. Items that cannot be operated offline are grayed out.

5.2.1 Creating New Position Data

To create new position data, click **File** from the main menu, and then select **New**.

[1] When the position data format selection window appears, select the controller whose position data you want to create, and then click **OK**.

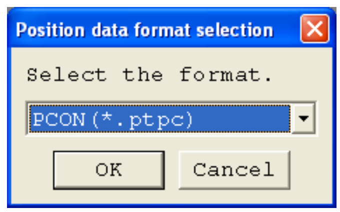


Fig. 5.35 Position Data Format Selection Window

When RCON-PC/PCF, RCON-AC, RCON-DC or SCON-CB (RCON Connection Types which include RC in the model code) is selected in Position Data Format Selection Window, Parameter Selection Area Setting Window should be shown.
The items available to select in this window should be the three types, [0: Not Set], [1: Driving Torque Limit] and [2: Push Speed], which are the same as User Parameter No. 191 [Position Data Extension Feature Settings].
It should be the items to be displayed in the parameter selection area in Position Edit window.
[Refer to (9) Position data input area]
Select one out of three and click OK.

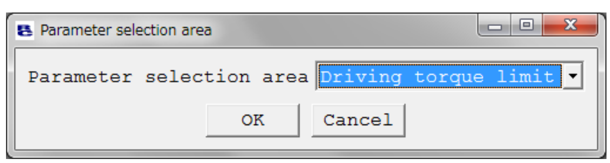


Fig.5.36 Parameter Selection Area Setting window

[2] The position data input window appears.
Enter position data in the position data input area.

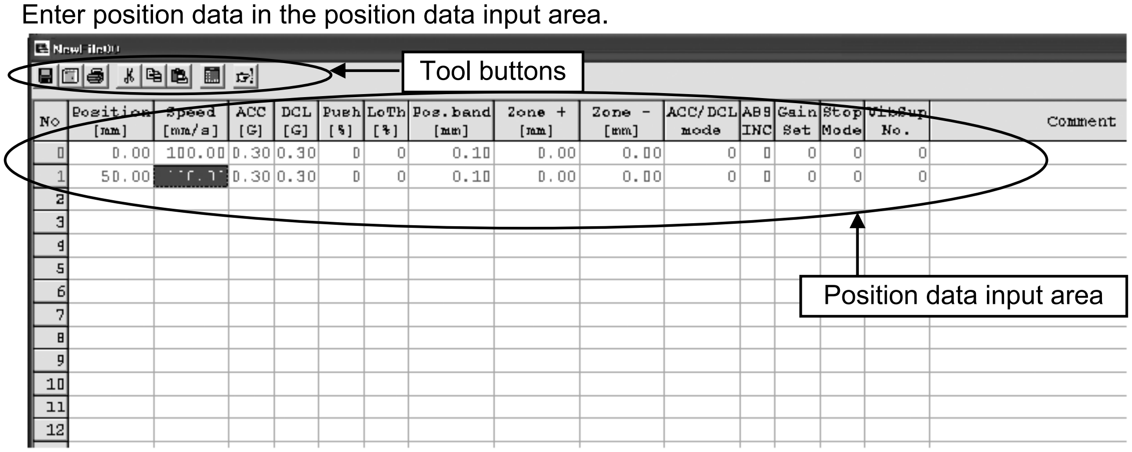


Fig. 5.37 Position Data Edit Window (Offline Mode – New)

[3] The created position data can be saved to a file or sent to the connected controller.
(Saving the position data to a file)
To save the position data to a file, click the tool button .
The save as window appears.
Enter a desired file name and click the **Save** button, and the position data will be saved to a file under the specified name.

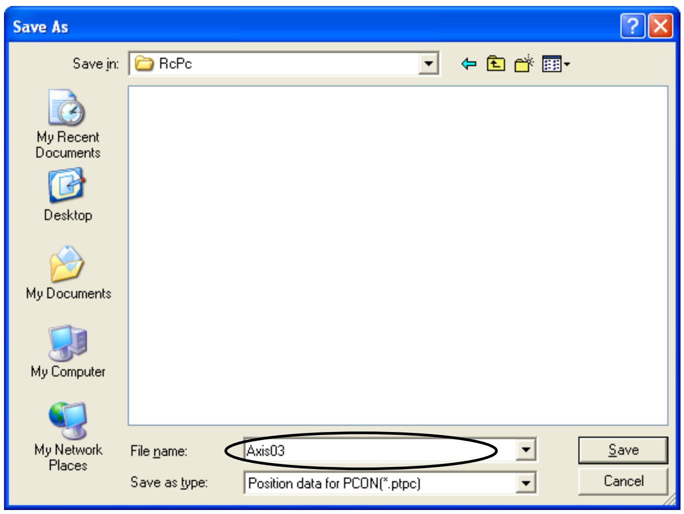


Fig. 5.38 Save As Window

(Sending the position data to the connected controller)
Connect the controller and PC.
Click **Position** and select **Send to Controller**, or click the tool button .
When the axis selection window appears, select the axis number of the controller to send the position data to. (Refer to 4, “Selecting an Axis.”)

* “Comments” can be saved only to files. They cannot be saved to controllers.

5.2.2 Reading a File

To read position data from a file, click **File** and then select **Open** to open the “Open” window. Alternatively, you can click **File**, point to **Send to Controller** and then select **Position** to open the “Open” window.

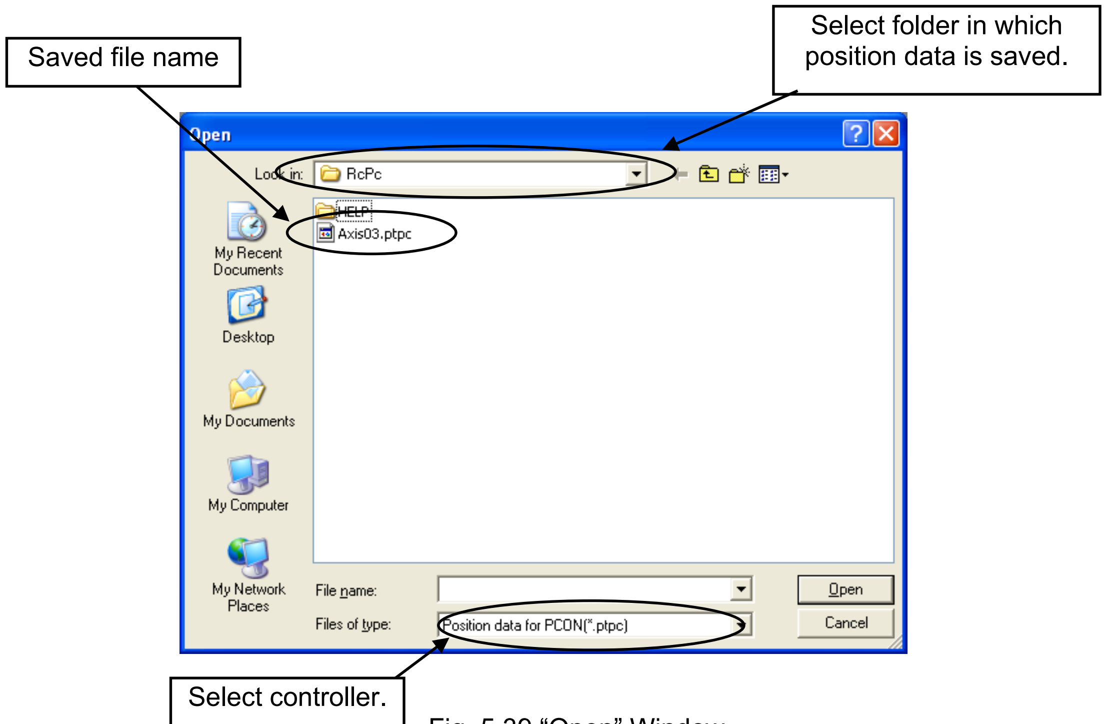


Fig. 5.39 “Open” Window

Select (click) “File name” you want to open, and click **Open** on the “Open” window, then the position data edit window is displayed.
Position data can be edited offline.

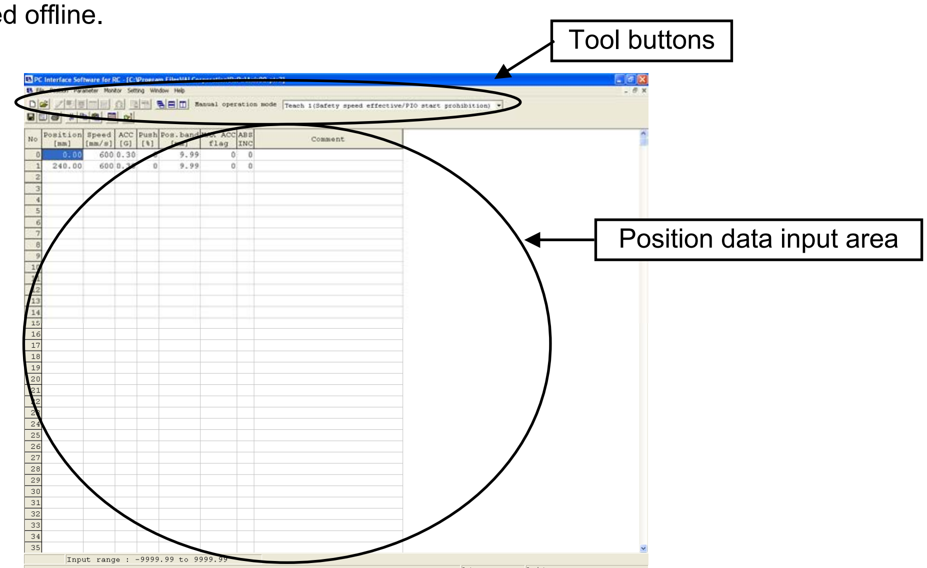


Fig. 5.40 Position Data Edit Window (Offline Mode)

The edited position data can be saved to a file or sent to the connected controller.
(Saving the position data to a file)
To save the position data to a file, click the tool button .
The save as window appears.
Enter a desired file name and click the **Save** button, and the position data will be saved to a file under the specified name.

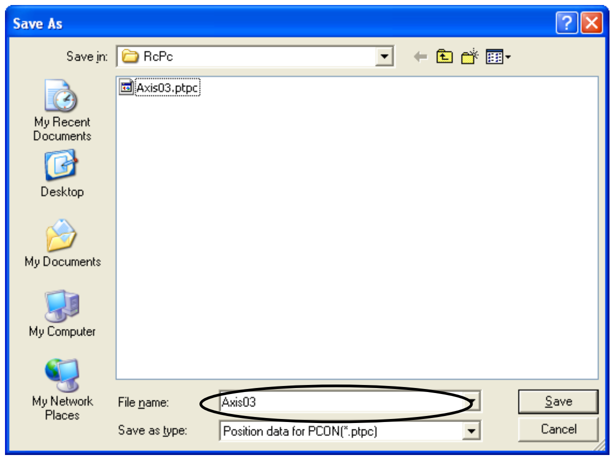


Fig. 5.41 Save As Window

(Sending the position data to the connected controller)
Connect the controller and PC.
Click **Position** and select **Send to Controller**, or click the tool button .
When the axis selection window appears, select the axis number of the controller to send the position data to. (Refer to 4, “Selecting an Axis.”)

* “Comments” can be saved only to files. They cannot be saved to controllers.

* It is available to transfer the position data of another model without changing the extension.
Open the position data in the controller to transfer from and transfer them to the controller of destination.
It is not able to have a transference between an SEP system controller such as ASEP and a CON system controller such as ACON, but is able between SEP system controllers. Transference between CON system controllers is available.
MSEP position data can be transferred to MCON.

(Note) In case of transferring MSEP data to MCON, follow the instructions below.
* Make sure to change the parameters in GW in advance to transferring position data.
* If position data and parameters are to be transferred individually, transfer the parameters first.
* Back the data up in the controller to transfer from before transferring MSEP data.
* There are some limitations as follows when transferring the position data.
▪ There should be six PIO patterns when the MSEP position data is saved in the controller to transfer from.
▪ MCON User Parameter “Pressing System [0: CON System, 1: SEP System]” in the destination controller should be set to 1: SEP System.

6. Initial Setting and Position Data Editing for SEP Controllers

SEP controllers: ASEP, PSEP, DSEP and MSEP

6.1 Initial Setting

Select a desired operation pattern (PIO pattern) (from 0 to 5) and set the necessary operation parameters (such as selecting the single-solenoid or double-solenoid mode).

(Note) For Fieldbus Type MSEP Controllers, Positioner Mode of Operation Pattern (PIO Pattern) 6 can be selected. The initial setting is not necessary if Positioner Mode is selected.

Click **Setup** from the main menu, point to **Controller Setup**, and then select **Initial Setting for SEP Controlle**r.

If the input password window appears, enter the password.

* On the versions V7.00.03.00 or later, the default password is “0000”, so the input password window will not appear.
* On the versions V7.00.01.00/V7.00.02.00, the default password is “5119.” Enter “5119” and click the **OK** button.

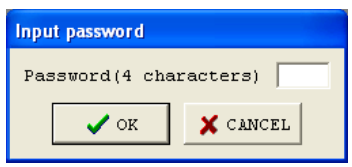


Fig. 6.1 Input Password Window

To change the password, perform the operations explained below.

[How to Set Initial Password]

* The password should be the same as the one used for editing parameters.
When the password set here is changed, the parameter edit password will also change to the new password.

[1] From the main menu, click **Setting** and then select **Application**.
Click the **Change Password** button.

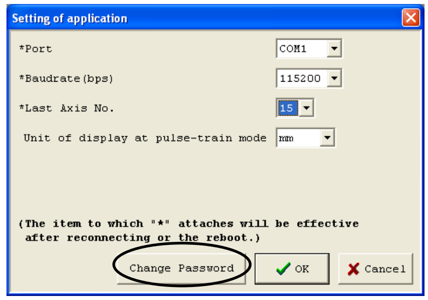


Fig. 6.2 Setting of Application Window

[2] Enter the current password, (the default password is “0000” for Version V7.00.03.00 or later, or "5119" for Version V7.00.01.00/V7.00.02.00), new password, and new password again (for confirmation), and then click the **OK** button.

Fig. 6.3 System Password Window

Select a desired operation pattern in the IO pattern select window, and then click **OK**.

(Note) When connected to MSEP Controllers, 6: Positioner Mode is displayed. If 6: Positioner Mode is selected, it is not necessary to have the initial setting process. The initial setting window would not appear.

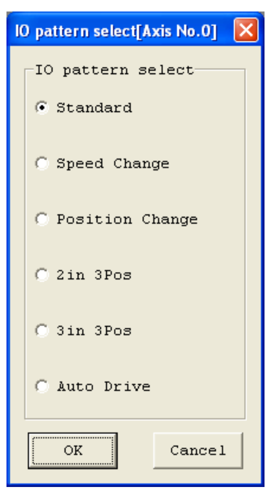


Fig. 6.4 IO Pattern Select Window

In the initial setting for SEP controller window, set the necessary operation parameters (such as selecting the single-solenoid or double-solenoid mode), and then click **OK**.
The operation parameters to be set vary depending on the operation pattern (PIO pattern). Those parameters that need not be set are grayed out.

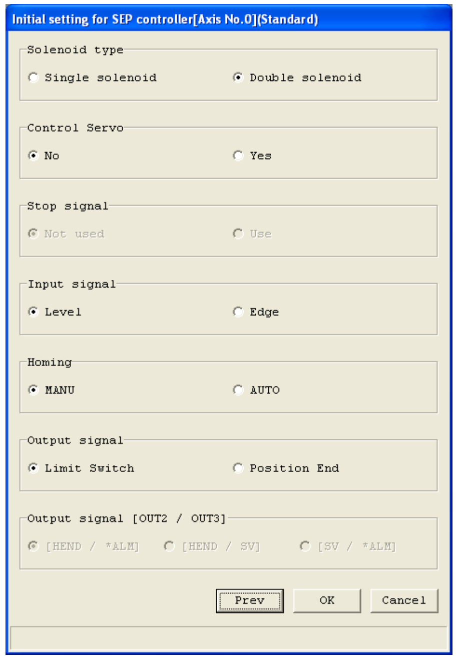


Fig. 6.5 Initial Setting for SEP Controller Window

In the confirmation window for restarting the controller (resetting the software), click **Yes**.

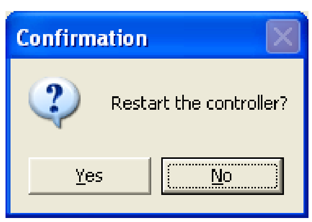


Fig. 6.6 Confirmation Window for Restarting Controller

If the actuator servo is currently ON, a warning window appears with the message saying that you must turn OFF the servo. Click **Yes.**

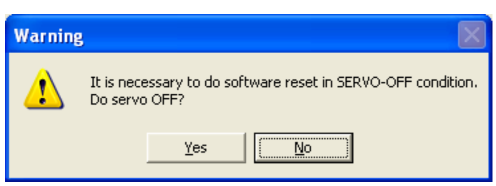


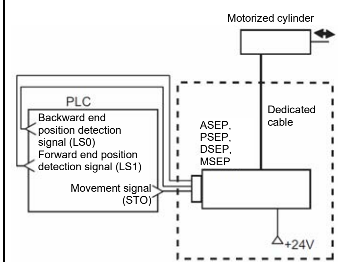
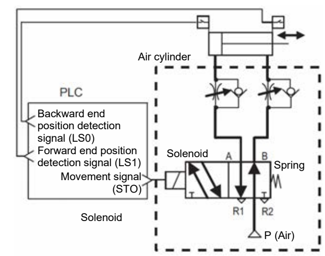
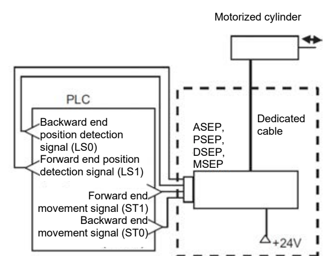
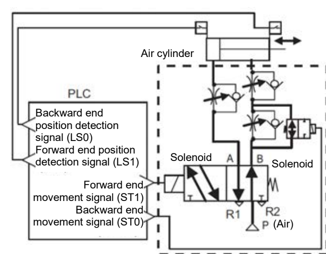
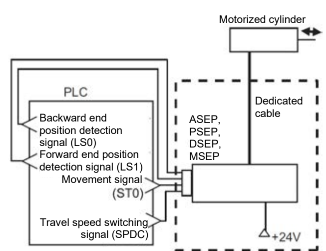
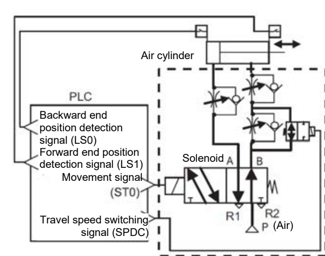
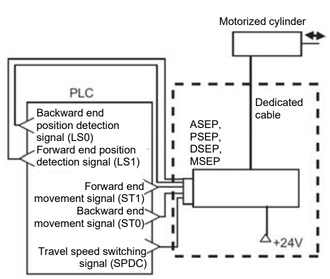
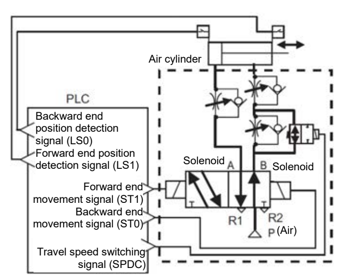
Fig. 6.7 Warning Window

The controller will be restarted and the operation parameters you have set will be applied to the controller.

Six types of operation patterns (PIO patterns) are available on ASEP, PSEP, DSEP and MSEP controllers.
Set each item according to the selected operation pattern (PIO pattern).
(Note) For MSEP Controllers, Positioner Mode of Operation Pattern (PIO Pattern) 6 can be selected in addition to the 6 types. The initial setting is not necessary if Positioner Mode is selected.

Operation pattern

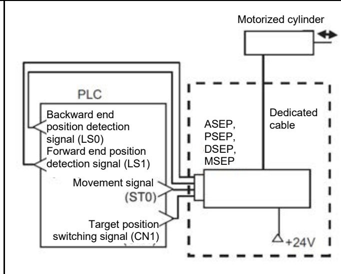
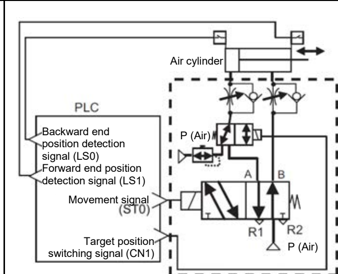
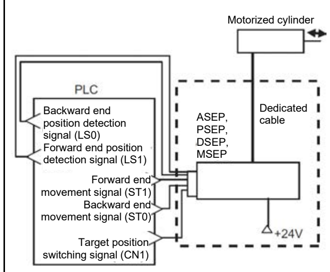
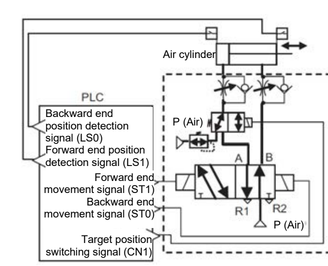
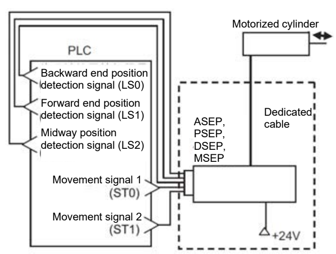
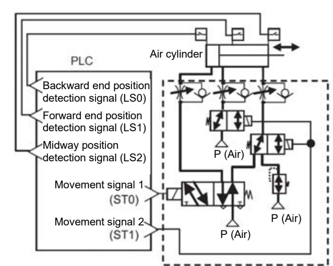
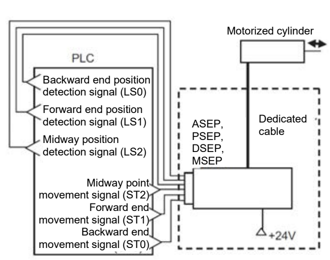
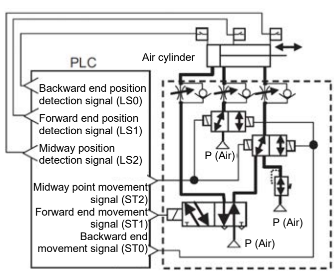
Equivalent air cylinder circuits are shown for your reference.

<table>
<tr><th>Operation pattern</th><th>Description</th><th>Motorized cylinder connection method</th><th>Air cylinder circuit (reference)</th></tr>
<tr><td>PIO pattern 0
Single solenoid type
(Standard movement between 2 points)</td><td rowspan="2">The actuator can be moved between two points using the same control you normally use with an air cylinder.
The target position (forward end, backward end) can be set.
The travel speed and acceleration/deceleration can be specified.
Push-motion operation can also be performed.</td><td>
</td><td>
</td></tr>
<tr><td>PIO pattern 0
Double solenoid type
(Standard movement between 2 points)</td><td>
</td><td>
</td></tr>
<tr><td>PIO pattern 1
Single solenoid type
(Movement between two points)
(Change travel speed)</td><td rowspan="2">The actuator can be moved between two points using the same control you normally use with an air cylinder.
The speed can be changed during movement.
The target position (forward end, backward end) can be set.
The travel speed and acceleration/deceleration can be specified.
Push-motion operation can also be performed.</td><td>
</td><td>
</td></tr>
<tr><td>PIO pattern 1
Double solenoid type
(Movement between two points)
(Change travel speed)</td><td>
</td><td>
</td></tr>
</table>

(Note) The air cylinder circuits are drawn with signal symbols corresponding to those used by ASEP, PSEP, DSEP and MSEP controllers.
For details on signal symbols, refer to “ASEP/PSEP/DSEP Operation Manual” and “MSEP Operation Manual”.

Operation pattern

Equivalent air cylinder circuits are shown for your reference.

Operation pattern	Description	Motorized cylinder connection method	Air cylinder circuit (reference)
PIO pattern 2 Single solenoid type (Movement between two points) (Position data change)	The actuator can be moved between two points using the same control you normally use with an air cylinder. You can switch between positioning operation and push-motion operation during operation. The target position (forward end, backward end) can be set. The travel speed and acceleration/deceleration can be specified. Push-motion operation can also be performed.		
PIO pattern 2 Double solenoid type (Movement between two points) (Position data change)			
PIO pattern 3 Single solenoid type (Movement by 2 inputs among 3 points)	The actuator can be moved among three points using the same control you normally use with an air cylinder. The target position (forward end, backward end) can be set. The travel speed and acceleration/deceleration can be specified. Push-motion operation can also be performed.		
PIO pattern 4 Double solenoid type (Movement by 3 inputs among 3 points)	The actuator can be moved among three points using the same control you normally use with an air cylinder. The target position (forward end, backward end) can be set. The travel speed and acceleration/deceleration can be specified. Push-motion operation can also be performed.		
PIO pattern 5 (Continuous back-and-forth operation)	The actuator moves back and forth between the two points of forward end and backward end. The target position (forward end, backward end) can be set. The travel speed and acceleration/deceleration can be specified. Push-motion operation can also be performed.		

(Note) The air cylinder circuits are drawn with signal symbols corresponding to those used by ASEP, PSEP, DSEP and MSEP controllers.
For details on signal symbols, refer to “ASEP/PSEP/DSEP Operation Manual” and “MSEP Operation Manual”.

[Types of Operation Parameters]

- Solenoid
  Select either the single-solenoid operation mode or double-solenoid operation mode.

- Servo control
  Select whether or not to use servo control (IN3 input signal SON (servo ON/OFF control)).

- Stop signal
  Select whether or not to use the pause signal *STP (input to IN2) when the single-solenoid type and operation pattern 5 are selected.

- Input signal mode
  Select continuous current flow (level) or instantaneous current flow (edge) as the double-solenoid ON condition when the double-solenoid type and operation pattern 4 are selected.

- Home operation
  Select a desired home return method.

  - AUTO: Home return commences when the power is input.

  - MANU: Home return commences when the ST0 signal is input for the first time after the power has been input.

- Output signal type
  Select the signal to be output after the actuator has moved and positioning is completed.
  Select either the limit switch (LS) or positioning (PE) signal.

- Output signal
  - When operation pattern 0, 1, 2 or 5 is selected:
  - Select one of the following options.

	Selection 1	Selection 2	Selection 3
OUT2	HEND (home return complete signal)	SV (servo ON output signal)	HEND (home return complete signal)
OUT3	*ALM (alarm output signal)	*ALM (alarm output signal)	SV (servo ON output signal)

  - When operation pattern 3 or 4 is selected:
    Select either *ALM (alarm) or SV (servo ON output signal) for the OUT3 output signal.

- Intermediate position move mode
  Select whether the ST0 and ST1 signals must be both ON or both OFF for the actuator to move to the intermediate position when operation pattern 3 is set.

The operation parameters to be set vary depending on the operation pattern (PIO pattern).

Setting item

Operation pattern	Operation mode	Midway position Movement method	Double solenoid type	Pause Signal *STP	Control Servo SON	OUT2, OUT3	OUT3	Home return	DO signal
	Single solenoid/ double solenoid	Both OFF/ Both ON	Level Edge	Not used Use	Non-use Control	HEND,*ALM/ SV,*ALM/ HEND,SV	*ALM/ SV	MANU/ AUTO	Limit switch LS/ Positioning PE
PIO pattern 0 Standard movement between 2 points	○		Double solenoid is selected ○	Single solenoid is selected ○	○	○		○	○
PIO pattern 1 Change travel speed	○		Double solenoid is selected ○	Single solenoid is selected ○	○	○		○	○
PIO pattern 2 Position data change	○		Double solenoid is selected ○	Single solenoid is selected ○	○	○		○	○
PIO pattern 3 Movement by 2 inputs among 3 points		○			○		○	○	○
PIO pattern 4 Movement by 3 inputs among 3 points			○		○		○	○	○
PIO pattern 5 Continuous back-and-forth operation				○	○	○		○	○

For details on each setting item, refer to “ASEP/PSEP/DSEP Operation Manual” and “MSEP Operation Manual”.

6.2 Editing Position Data

6.2.1 Online Mode

In this mode, data is read from the controller and edited.
The window is different according to each operation pattern.

Click **Position** from the main menu and select **Edit/Teach**, or click the button.
In the axis selection window, select the axis number corresponding to the position data you want to edit. Refer to 4, "Selecting an axis."

If the position data edit password is not "0000," the input password window appears. Enter the password.

* The factory-set password is "0000." If the factory-set password is valid, the input password window does not appear.

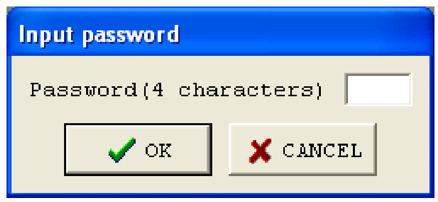


Fig. 6.8 Input Password Window

To change the password, perform the operations explained below.

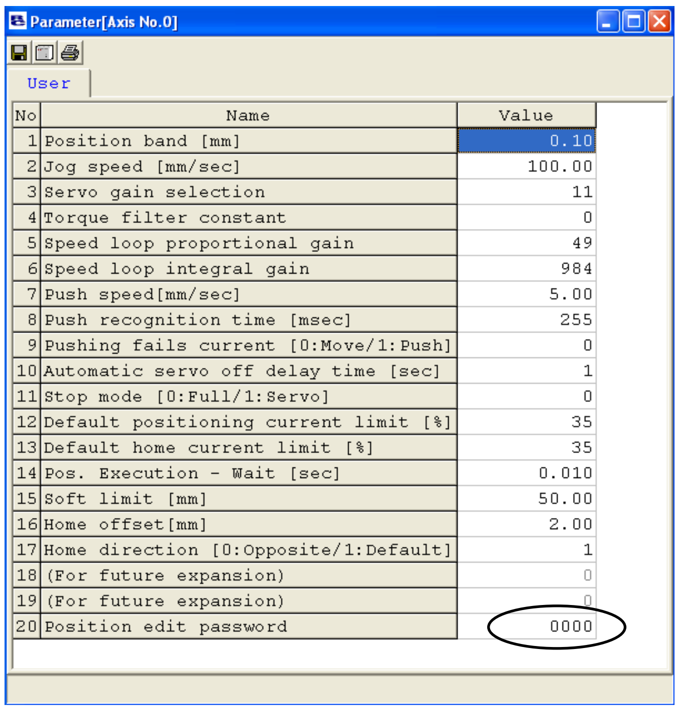
[How to Set Password for Edit Position Data Window]

[1] Click **Parameter** from the main menu, and then select **Edit**.

[2] In the axis selection window, select the axis number corresponding to the parameters you want to edit. (Refer to 4, "Selecting an Axis.)

[3] Enter the password in the input password window. (The factory-set password is "0000.")

[4] Set the password under the Parameter No. 20, "Position data edit password."



No	Name	Value
1	Position band [mm]	0.10
2	Jog speed [mm/sec]	100.00
3	Servo gain selection	11
4	Torque filter constant	0
5	Speed loop proportional gain	49
6	Speed loop integral gain	984
7	Push speed[mm/sec]	5.00
8	Push recognition time [msec]	255
9	Pushing fails current [0:Move/1:Push]	0
10	Automatic servo off delay time [sec]	1
11	Stop mode [0:Full/1:Servo]	0
12	Default positioning current limit [%]	35
13	Default home current limit [%]	35
14	Pos. Execution - Wait [sec]	0.010
15	Soft limit [mm]	50.00
16	Home offset[mm]	2.00
17	Home direction [0:Opposite/1:Default]	1
18	(For future expansion)	0
19	(For future expansion)	0
20	Position edit password	0000

Fig. 6.9 Edit Parameter Window

[5] Click **Parameter** from the main menu, and then select **Send to Controller**.

[6] When the axis selection window appears, select the axis number of the controller to send the parameter(s) to.
(Refer to 4, "Selecting an Axis.")

[7] When **OK** is clicked in the axis selection window, the following warning window appears. Click **Yes**, and the parameters will be sent to the controller.

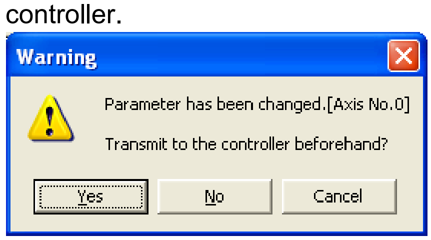


Fig. 6.10 Warning

[8] After the parameters have been sent, a confirmation window appears asking if you want to restart the controller (execute a software reset). Click **Yes** to execute a software reset.

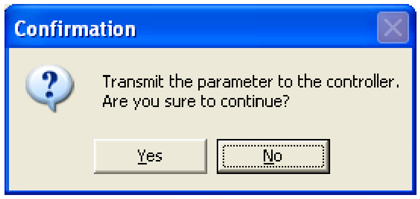
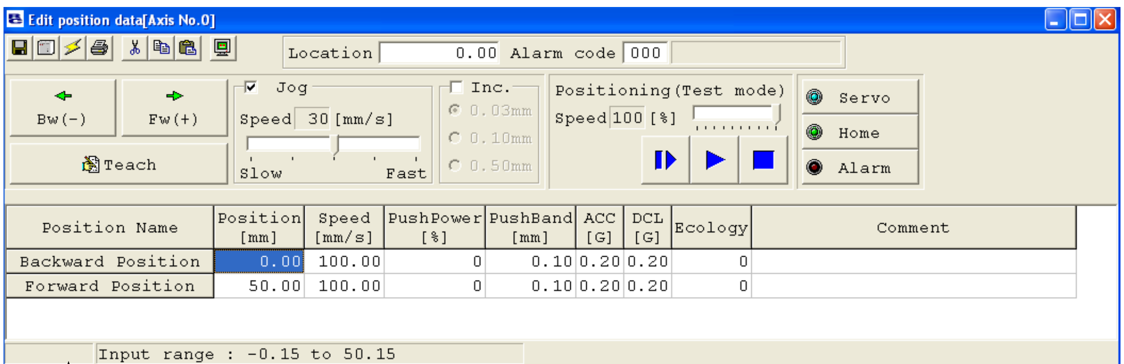


Fig. 6.11 Confirmation Window for Restarting Controller

[9] Once a password has been set, you must enter the password to edit position data.

In the position data edit window, you can create position data by “MDI (Mathematical Direct Input),” “Direct Teaching,” “Jogging” or “Inching” operation.
Created/edited position data will become effective after it has been sent to the controller.
To send position data to the controller, click **Position** from the main menu and then select **Send to Controller**, or click in the position data edit window.
You can also check the teaching positions by “Positioning” operations.
The position data edit window varies depending on the operation pattern (PIO pattern).
(Note) If Operation Pattern 6: Positioner Mode is selected in MSEP Controllers, 256 points of position data can be established.
“Position Name” in the window changes to “Position Number” and 0 to 255 are shown.



If the data originally read has been modified, “Modified” is shown.

The input range of each item is shown.

* The input range is determined by the applicable soft limit parameters. (Refer to 8, “Editing Parameters.”)

Fig. 6.12 Edit Position Data Window (Detailed Online View): Display Example for Operation Pattern 0

(Note) While the edit position data window is open in the online mode, the edit parameter window cannot be opened for the same axis. (You can open the parameter edit window for a different axis.)
(Note) You cannot write data to the controller, perform jogging or home return, or carry out certain other operations when the MANU operation mode selected in the main window is monitor mode 1 or monitor mode 2.

Clicking either the , Fw(-), Fw(+), , , Servo or Home button opens a confirmation window with the message, “Data editing is prohibited while not in a MANU teaching mode. Do you want to switch the MANU operation mode?” Click **Yes**, and the current MANU operation mode will change to the applicable teaching mode.

Monitor mode 1 will change to teaching mode 1.
Monitor mode 2 will change to teaching mode 2.

How the respective buttons and input areas are operated is explained below.

(1) Tool buttons

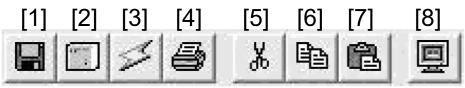


Fig. 6.14 Tool Buttons

[1] Save to file
Save data to a file.

[2] Send to controller
Send (write) data to the controller.

[3] Read position data again
Read position data from the controller again, and then refresh the data display.
If position data has been modified in the edit window (= “Modified” is shown in the status bar), the warning message shown in Fig. 6.15 appears.
* Take note that selecting **Yes** will clear the data that has been edited (but not yet written to the controller).

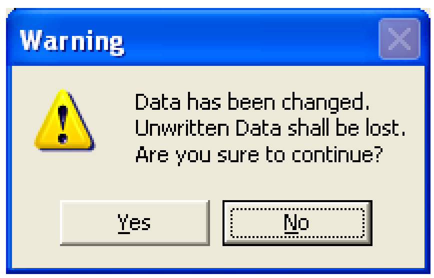


Fig. 6.15 Warning Message

[4] Print
Output position data to the printer.
The print setup window appears where you can set the top, left and row margins (in mm) as well as print orientation.
When all settings are complete, click **Print**.

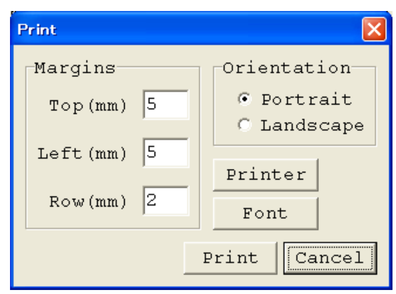


Fig. 6.16 Print Setting Window

[5] Cut
Cut the data inside the range selected in the position data input area.
* Data can be selected in units of rows.

[6] Copy
Copy the data inside the range selected in the position data input area.
* Data can be selected in units of rows.

[7] Paste
Paste the data that has been cut or copied from the position data input area, to the selected position.

[8] Show status monitor window
Show the status monitor window of the axis you are currently editing.
The window displayed by clicking this button is the same as the one that appears when you click **Monitor** from the main menu in the main window and then select **Status**.

(2) Current position/alarm code

The current position of the axis you are editing (unit: mm) and the associated alarm code, if any, are shown.

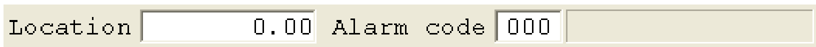


Fig. 6.17 Current Position/Alarm Code

For stop, “Stop” is displayed on the current position and alarm code displaying part.

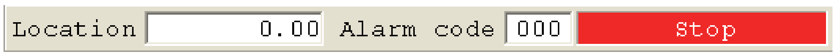


Fig. 6.18 Stop Indication

When motor voltage lowers, “Motor volt. low” is displayed on the current position and alarm code displaying part.

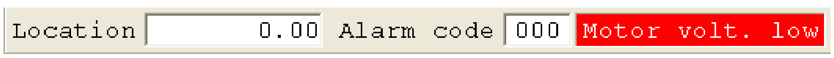


Fig. 6.19 Motor Voltage Low Indication

* When the motor voltage low is displayed, it means a state that the motor drive power is shut off.

(3) Jogging/Inching operation controls

Select **Jog** or **Inc.** (by adding a check mark to the corresponding checkbox) and use the [Fw (+)] [Bw (-)] buttons to move the axis.
Select the jogging speed from “1,” “10,” “30,” “50” and “100” [mm/sec] using the track bar.
In the inching mode, select the feed pitch from “0.03,” “0.10” and “0.50” [mm] using the applicable radio button.
A click will move the axis by the specified pitch, while holding down the mouse button will cause the axis to jog at 1 mm/sec after 2 second. If the mouse button is held continuously, the jogging speed will increase from “10” to “30” and to “100” [mm/sec] every second.
If home return has been completed, clicking **Teach** will load the current position to the point data input area.
* In the position data input area, the loaded data will be input to the row where the cursor is located. Check the cursor position before clicking **Teach**.

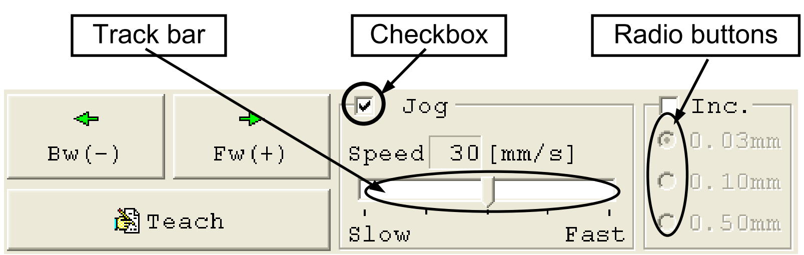


Fig. 6.20 Jogging/Inching Operation Controls

(4) Positioning (test operation mode)

You can move the axis to the position corresponding to the cursor row in the position data input area.
The moving speed is calculated by multiplying the speed set in the position data input area with the speed factor. (The speed factor can also be set by the track bar.)

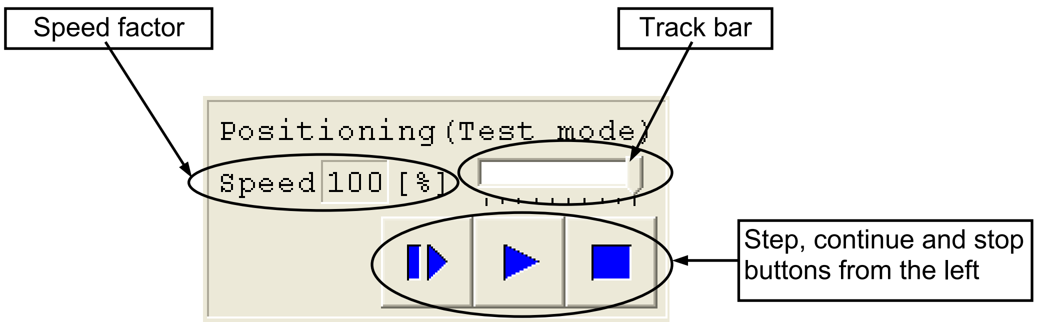


Fig. 6.21 Positioning

Use the ▶ (step move) button to move the actuator by one position, or use the ▶ (continuous move) button to move the actuator continuously by looping a series of successive positions.
Click the ■ (stop) button to stop the actuator. (The actuator starts decelerating the moment the button is clicked, and continues to decelerate until it stops.)

* If the data loaded from the controller has been changed, write the modified data again to the controller beforehand.
* While this mode is active, data cannot be entered in the jogging/inching control groups or point data input area.

● If the MANU operation mode is set to teaching mode 1 (safety speed effective), the maximum speed is limited to the safety speed set by the applicable parameter.

(5) **Servo**, **Home** and **Alarm** buttons

Fig. 6.22 Servo, Home and Alarm Buttons

[1] **Servo** button
This button lets you turn on/off the servo.
When the servo is on, a blue lamp illuminates on the button.
After home return, you can turn off the servo, move the actuator manually and then click **Teach** to capture a desired position.

[2] **Home** button
This button lets you perform home return.
Once home return is complete, a green lamp will illuminate on the button.
Press the home-return button and the confirmation message should appear. Press Yes and the home-return operation should start.
* V13.03.00.00 and later

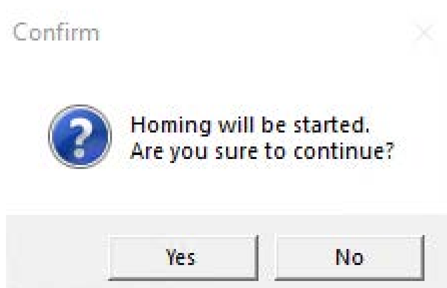
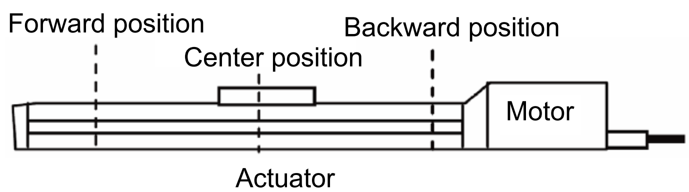


Fig. 6.23 Confirmation Window

[3] **Alarm** button
This button lets you reset an alarm.
Note that an alarm can be reset only when the servo is off and the cause of the alarm has been removed.
While an alarm is present, a red lamp remains lit on the button.

(6) Position input area

Set the position data needed to operate the actuator.



Position Name	Position [mm]	Speed [mm/s]	PushPower [%]	PushBand [mm]	ACC [G]	DCL [G]	Energy-saving Mode	Comment
Backward Position	0.00	100.00	0	0.10	0.20	0.20	0	
Forward Position	50.00	100.00	0	0.10	0.05	0.05	0	
Intermediate Position	10.00	100.00	0	0.10	0.20	0.20	0	

Fig. 6.24 Position Data Input Area

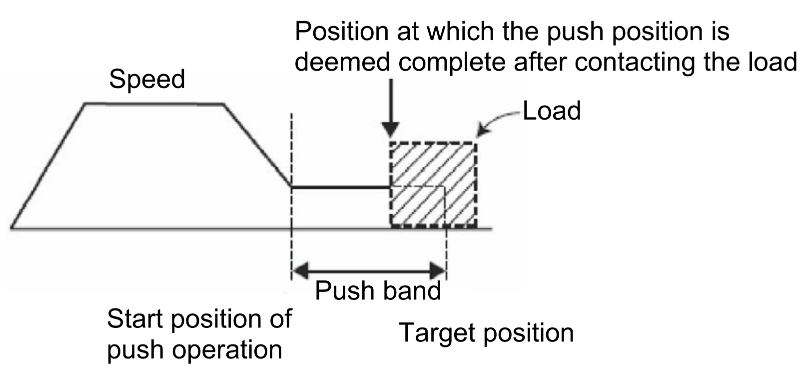
[1] Position ····················Set the position to move the actuator to.

Operation pattern	Move	Set position		
		Forward position	Backward position	Center position
Standard move between 2 points: 0	Move between 2 points	○	○	
Speed change: 1	Move between 2 points	○	○	
Position data change: 2	Move between 2 points	○	○	
Move among 3 points with 2 inputs: 3	Move between 3 points	○	○	○
Move among 3 points with 3 inputs: 4	Move between 3 points	○	○	○
Continuous back-and-forth operation: 5	Move between 2 points	○	○	

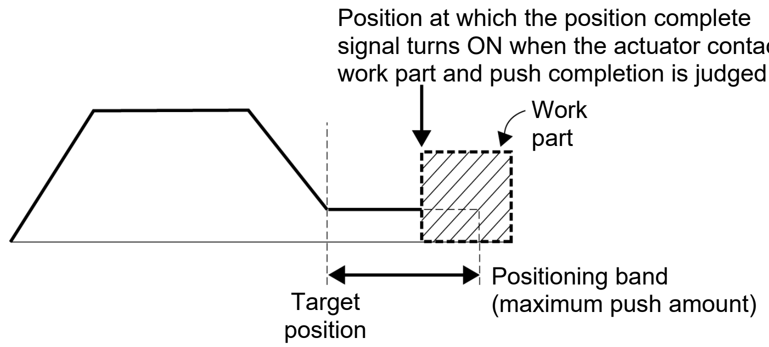
[2] Speed ······················Set the actuator speed.

[3] Push power ···············Set a desired current-limiting value (%) other than 0 when performing push operation. If 0 is set, positioning operation will be performed.

[4] Push band ················Except for CON method pressing in Fieldbus Type MSEP Controllers, the band for the pressing operation up to the movement target position is to be set.
Push operation will start from the position forward of the target position of move (forward position or backward position) by the distance corresponding to the push band.



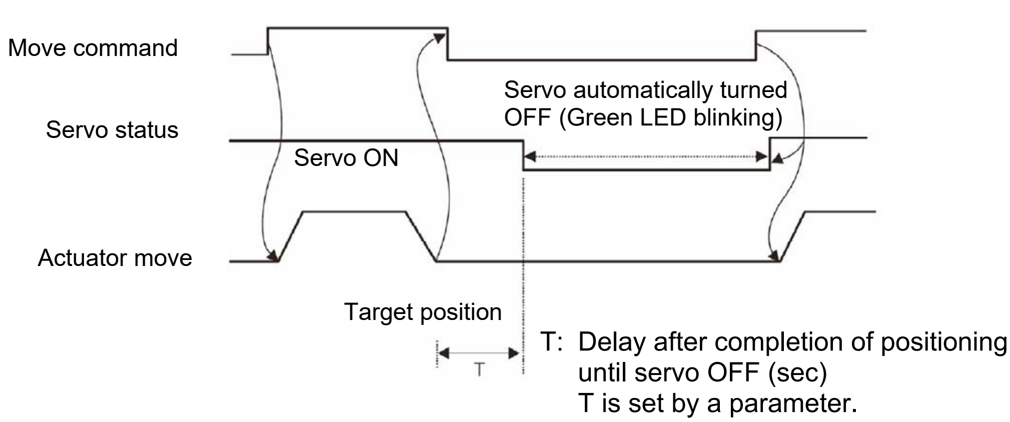
If CON method pressing is selected in MSEP Controllers, the maximum pressing amount in the pressing operation from the target position needs to be defined in Positioner Mode.
While considering the mechanical inconsistency of the work piece, set the positioning band so the positioning would not end before the work piece gets pressed towards the target.



[5] ACC ········· Set the actuator acceleration.
The input range permits entry of a value greater than the value specified in the catalog. However, you should set a value not exceeding the rated acceleration in the catalog.

[6] DCL ········· Set the actuator deceleration.
The input range permits entry of a value greater than the value specified in the catalog. However, you should set a value not exceeding the rated deceleration in the catalog.

[7] Energy-saving Mode… When 1 "Enable" is set in the Energy-saving Mode field, the actuator will turn OFF the servo automatically after elapse of a specified time. Since the holding current does not flow while the actuator is stopped, the current consumption can be saved. Once a move command is issued, the servo will turn ON again and the actuator will start moving.



The time until the servo turns OFF is set by the parameter for auto servo OFF delay time.

When changing the speed in operation pattern (PIO pattern) 1, set the position at which to change the speed, and new speed, in addition to position data.

Position Name	Position [mm]	Speed [mm/s]	PushPower [%]	PushBand [mm]	ACC [G]	DCL [G]	Energy-saving Mode	Speed Chg Pos [mm]	Speed Chg Vel [mm/s]	Comm
Backward Position	0.00	50.00	0	0.10	0.20	0.20	0	20.00	30.00	
Forward Position	50.00	50.00	0	0.10	0.20	0.20	0	30.00	30.00	

Fig. 6.25 Position Data Input Area: Operation Pattern 1

[8] Speed Chg Pos··········Set the position at which to switch the speed while the actuator is moving to the forward position or backward position.

[9] Speed Chg Vel···········Set the speed to change to.

When changing the position data in operation pattern (PIO pattern) 2, set the position data to be changed at the forward or backward, in addition to the forward position or backward position data.

- When CN1 (operation switching signal) is OFF, the forward position data corresponds to Forward Position 1.
  When this signal is ON, the forward position data corresponds to Forward Position 2.
- When CN1 (operation switching signal) is OFF, the backward position data corresponds to Backward Position 1.
  When this signal is ON, the backward position data corresponds to Backward Position 2.

Position Name	Position [mm]	Speed [mm/s]	PushPower [%]	PushBand [mm]	ACC [G]	DCL [G]	Energy-saving Mode	Comment
Backward Position1	0.00	50.00	0	0.10	0.20	0.20	1	
Forward Position1	50.00	50.00	70	1.00	0.20	0.20	1	
Backward Position2	10.00	100.00	0	0.10	0.20	0.20	1	
Forward Position2	25.00	100.00	60	1.00	0.20	0.20	1	

Fig. 6.26 Position Data Input Area: Operation Pattern 2

6.2.2 Offline Mode

When editing data after creating new data or loading data from a file, you are editing the data in the offline mode.
In this mode, the window controls relating to axis operation are grayed out, and only the tool buttons and position data input area become active. Items that cannot be operated offline are grayed out.

(1) Creating new position data

To create new position data, click **File** from the main menu, and then select **New**.

[1] When the position data format selection window appears, select the controller whose position data you want to create, and then click **OK**.

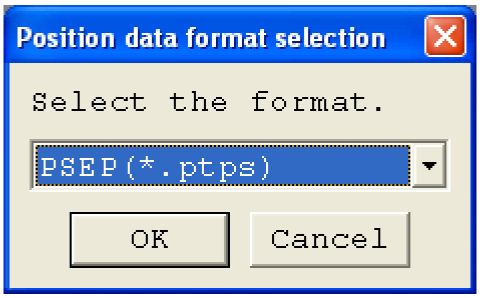


Fig. 6.27 Position Data Format Selection Window

[2] The IO pattern select window appears.
Select the operation pattern in which to create new position data.

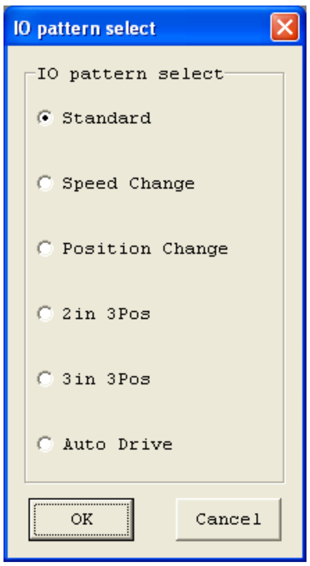


Fig. 6.28 IO Pattern Select Window

[3] The position data input window corresponding to the selected operation pattern appears.
Enter desired position data in the position data input area.

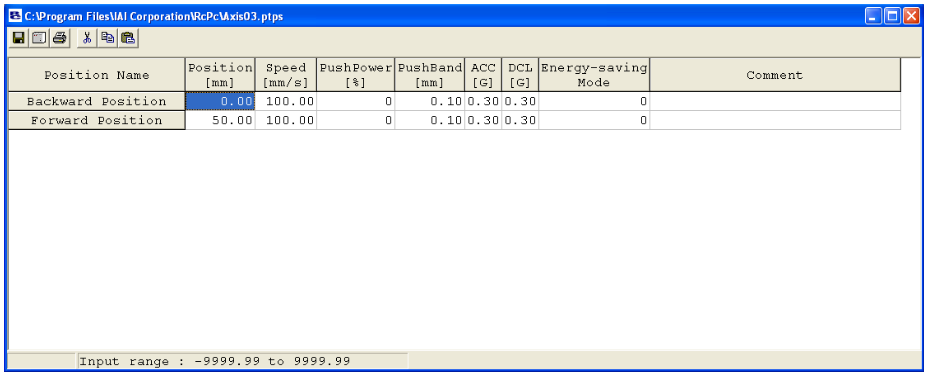


Fig.6.29 Position Data Edit Window (Offline Mode – New)

[4] The created position data can be saved to a file or sent to the connected controller.
(Saving the position data to a file)
To save the position data to a file, click the tool button.
The save as window appears.
Enter a desired file name and click the **Save** button, and the position data will be saved to a file under the specified name.

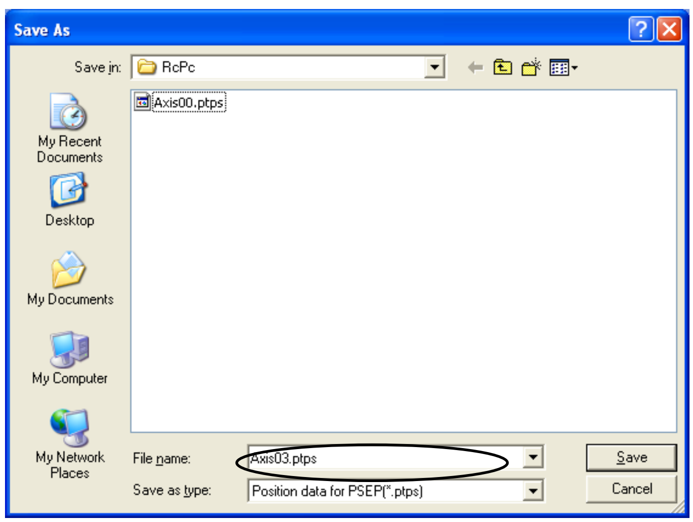


Fig.6.30 Position Data Edit Window (Offline Mode – New)

(Sending the position data to the connected controller)
Connect the controller and PC.
Click **Position** and select **Send to Controller**, or click the tool button.
When the axis selection window appears, select the axis number of the controller to send the position data to. (Refer to 4, "Selecting an Axis.")

* "Comments" can be saved only to files. They cannot be saved to controllers.

[5] Reading a File
To read position data from a file, click **File** and then select **Open** to open the "Open" window. Alternatively, you can click **File**, point to **Send to Controller** and then select **Position** to open the "Open" window.

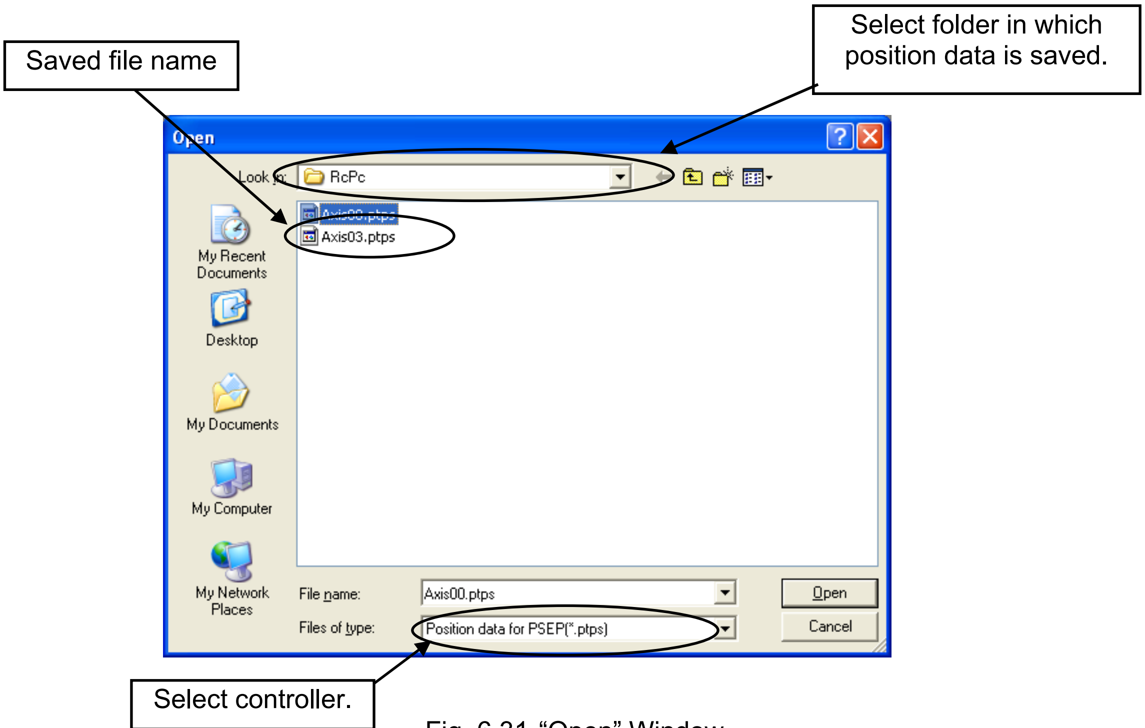


Fig. 6.31 "Open" Window

Select (click) "File name" you want to open, and click **Open** on the "Open" window, then the position data edit window is displayed.

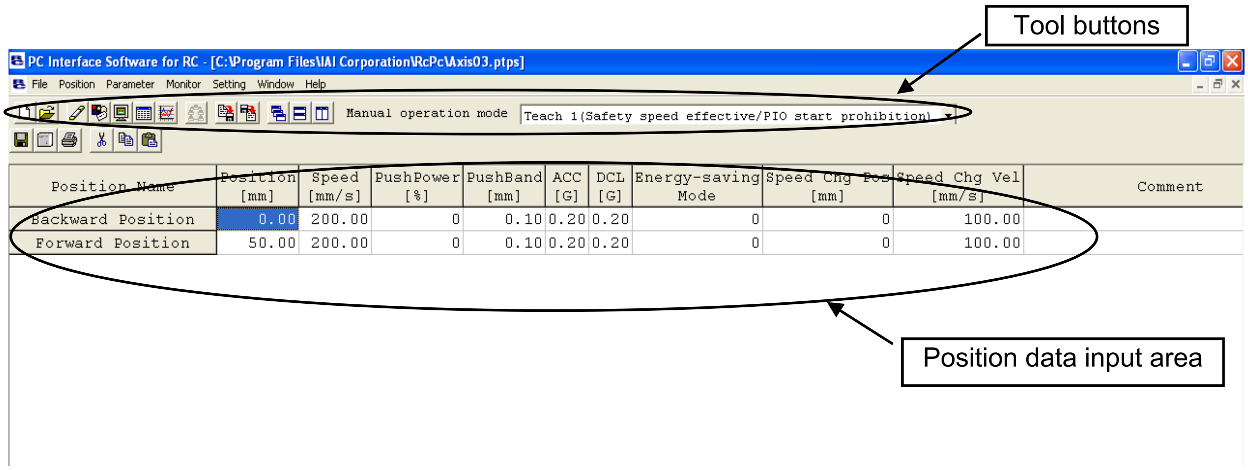


Fig. 6.32 Position Data Edit Window (Offline Mode)

The edited position data can be saved to a file or sent to the connected controller.
(Saving the position data to a file)
To save the position data to a file, click the tool button .
The save as window appears.
Enter a desired file name and click the **Save** button, and the position data will be saved to a file under the specified name.

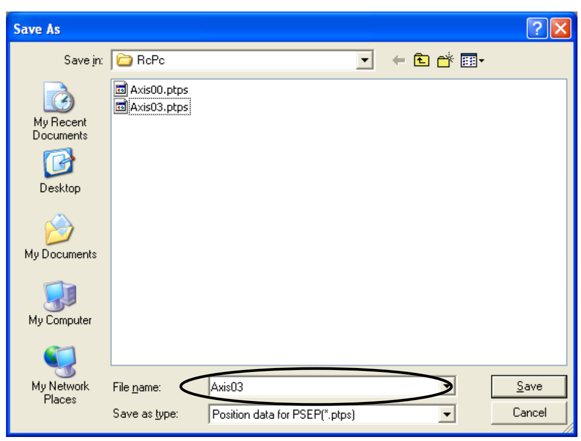


Fig. 6.33 Save As Window

(Sending the position data to the connected controller)
Connect the controller and PC.
Click **Position** and select **Send to Controller**, or click the tool button .
When the axis selection window appears, select the axis number of the controller to send the position data to.
(Refer to 4, “Selecting an Axis.”)

* “Comments” can be saved only to files. They cannot be saved to controllers.

7. ELECYLINDER Simple Data Setting

Position data can be edited online or offline.

7.1 Online Mode

This mode reads data from the controller to edit.

Click **Position** and then select **Edit/Teach** from the main menu, or click in the toolbar.

When the position edit password is set to other than ‘0000’, the password input window will appear. Input the password.

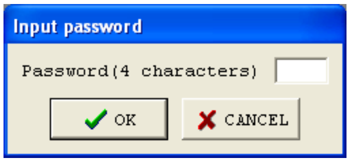


Fig. 7.1 Input Password Window

If it is necessary to change the position edit password, conduct the process explained in [How to Set Password for Position Data Edit Window] in the next page.

Simple Data Setting window will be shown.

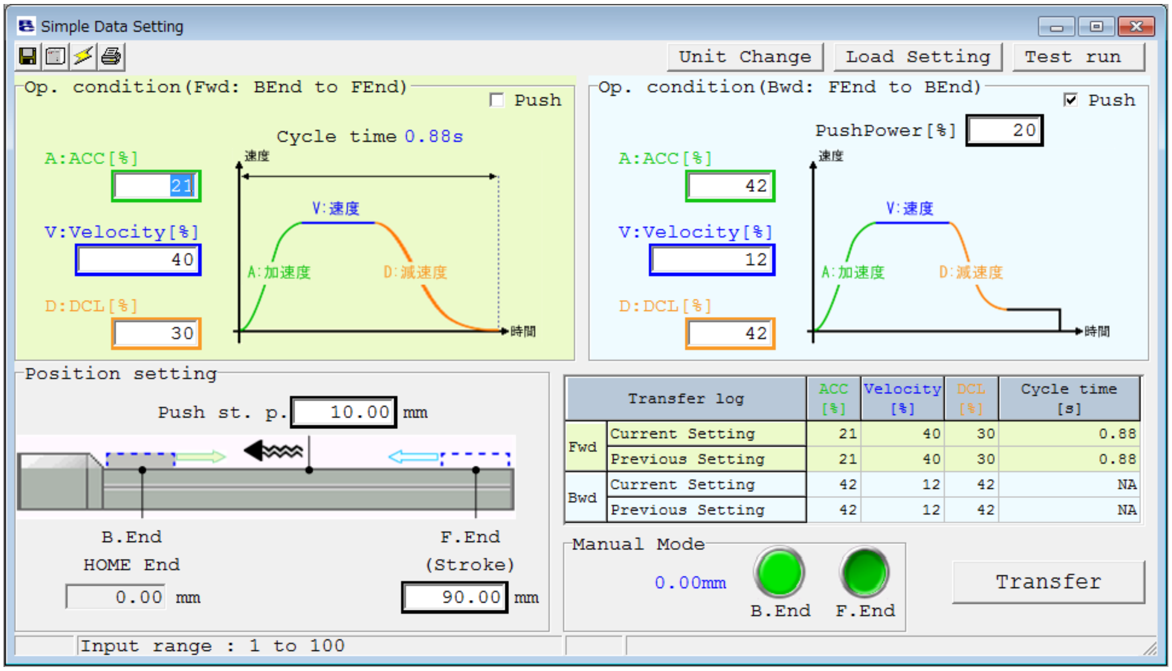


Fig.7.2 Simple Data Setting Window

[How to Set Password for Position Data Edit Window]

[1] From the main menu, click **Setup** and then select **Setting of application**.
Click the **Change Password** button.

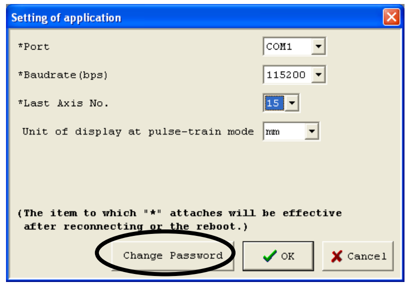


Fig. 7.3 Setting of Application Window

[2] Select the Position data edit password, and then click the **OK** button.

Fig. 7.4 Select Password Window

[3] Enter the current password, new password, and new password again (for confirmation), and then click the **OK** button.
Once the new password has been set, you must enter the new password to edit position data.

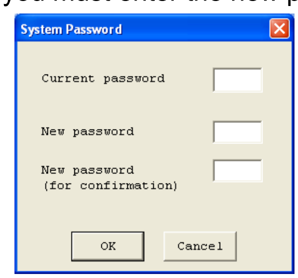
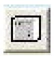


Fig. 7.5 System Password Window

In Simple Data Setting window, setting of the operational conditions (velocity, acceleration / deceleration and pressing force) and position setting (forward end, backward end and pressing start point) can be conducted and also display of the current position, cycle time and setting dialog, and manual operation can be conducted.

The operational condition data and the position setting data set in this window should be activated after it is transferred to the controller.
Conduct either operation from the followings in order to transfer the data.

[1] Click **Transfer** button in the bottom right of the window.

[2] Click  icon in the top left.

[3] Select [Position] -> [Transfer to Controller] from the main menu.

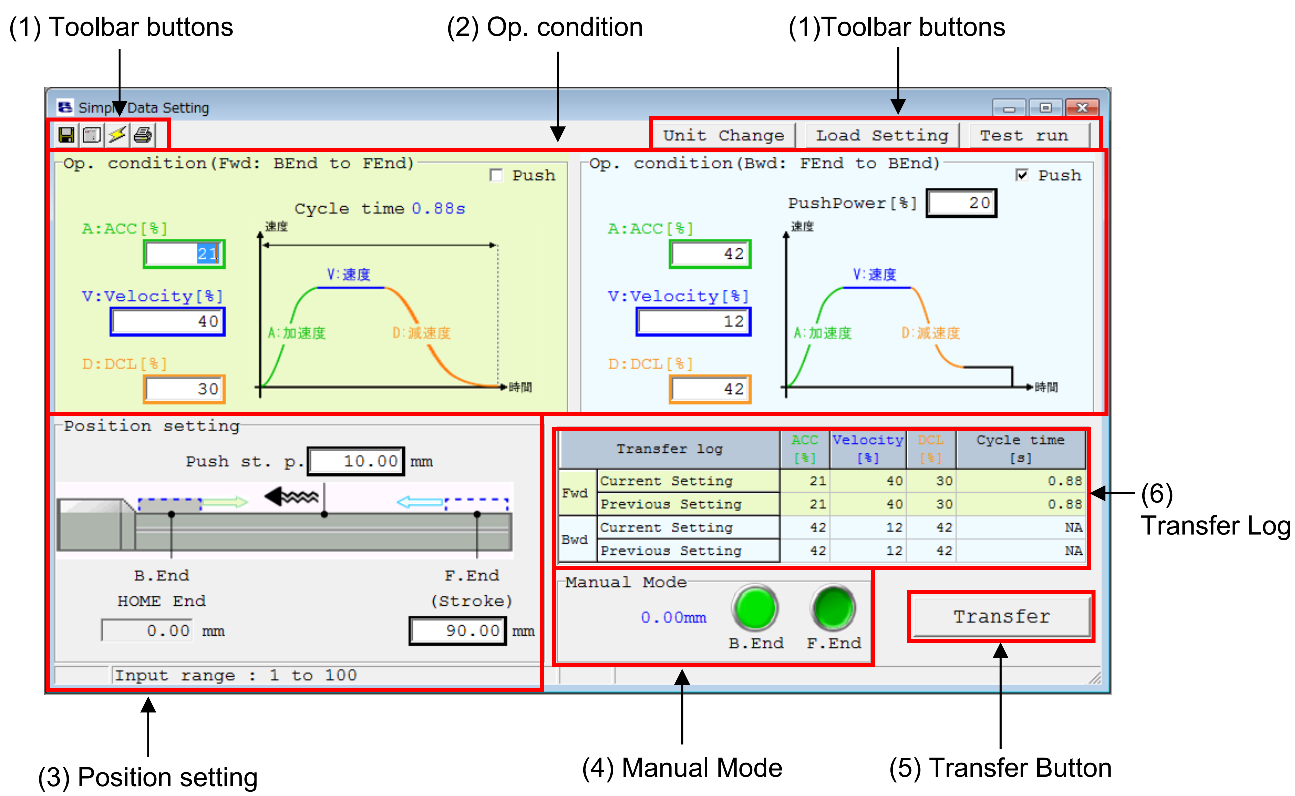


Fig. 7.6 Features of Simple Data Setting Window

It is also necessary to transfer data to the controller when manual operation is to be conducted.

The operating methods of buttons and input controls available in this window are explained below.

(1) Toolbar buttons

[1] [2] [3] [4] [5] [6] [7]

Fig. 7.7 Toolbar in Simple Data Setting Window

[1] Save to file
Displayed data gets saved in a file.

[2] Send to controller
Send (write) data to the controller.

[3] Reload position data
Data display will be updated after all the data in the screen gets reloaded from the controller.

[4] Print
Output data to the printer.
Printout setting window appears. Setting of margins on top, left and between lines (mm) and direction of printing can be adjusted.
Click **Print** button to start printing.

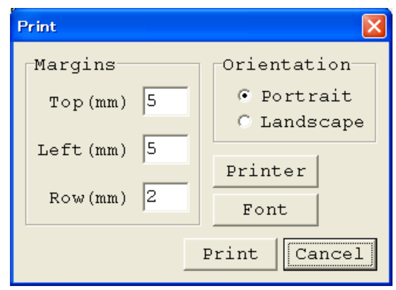


Fig. 7.8 Print Setting Window

[5] Unit Change
The unit of the setting items and displayed items can be switched over as shown below.

Velocity : % ⇔ mm/s
ACC / DCL : % ⇔ G
Push power : % ⇔ N (Reference)

[6] Load Setting
Payload setting window is displayed.

[7] Test run
Trial Operation Window is displayed.

(2) Op. condition, (3) Position setting

[Positioning Operation]

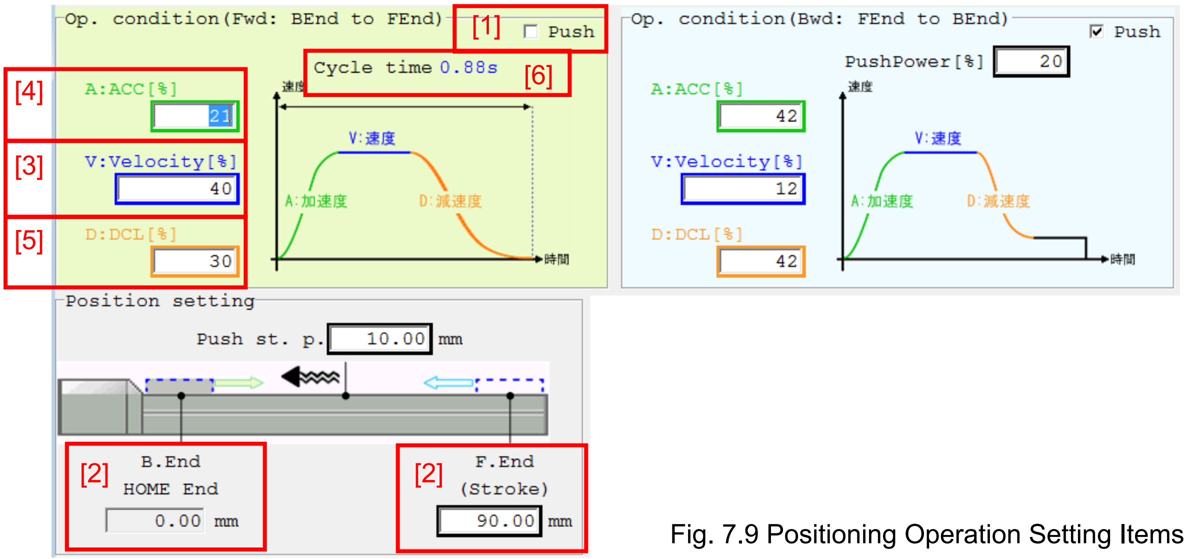


Fig. 7.9 Positioning Operation Setting Items

[1] Push Select------------------- If there is no check mark (✓) in the check box (☐) for pressing operation, positioning operation will be performed.

[2] Position setting [mm]------- Position of the backward end and forward end can be input.
It is the coordinate of positioning and should be the position from the home to be input.
The unit is mm, and a number can be input down to two decimal places.
The unit of the EC rotary type is deg/s and is available to input up to the second digit.

[3] Velocity [% or mm/s] ------- Setup of positioning operation velocity can be conducted.
Set a number between 1% and 100%.
The unit can be switched with **Unit Change** button to mm/s unit.
For mm/s unit, a number can be input down to two decimal places.
The unit of the EC rotary type is deg/s and is available to input up to the second digit.

* Note 1 Calculate the minimum velocity using the following formula.
Minimum Velocity [mm/s] = Lead Length [mm] / 800 / 0.001 [sec]

[4] ACC [% or G] ---------------- Setup of acceleration at start of operation can be conducted.
Set a number between 1% and 100%.
The unit can be switched with **Unit Change** button to G unit.
For G unit, a number can be input down to two decimal places.

[5] DCL [% or G]----------------- Setup of deceleration at stop of operation can be conducted.
Set a number between 1% and 100%.
The unit can be switched with **Unit Change** button to G unit.
For G unit, a number can be input down to two decimal places.

[6] Cycle time [s]----------------- Cycle time can be figured out from the setting velocity, acceleration and deceleration, and displayed.

[Pressing Operation]

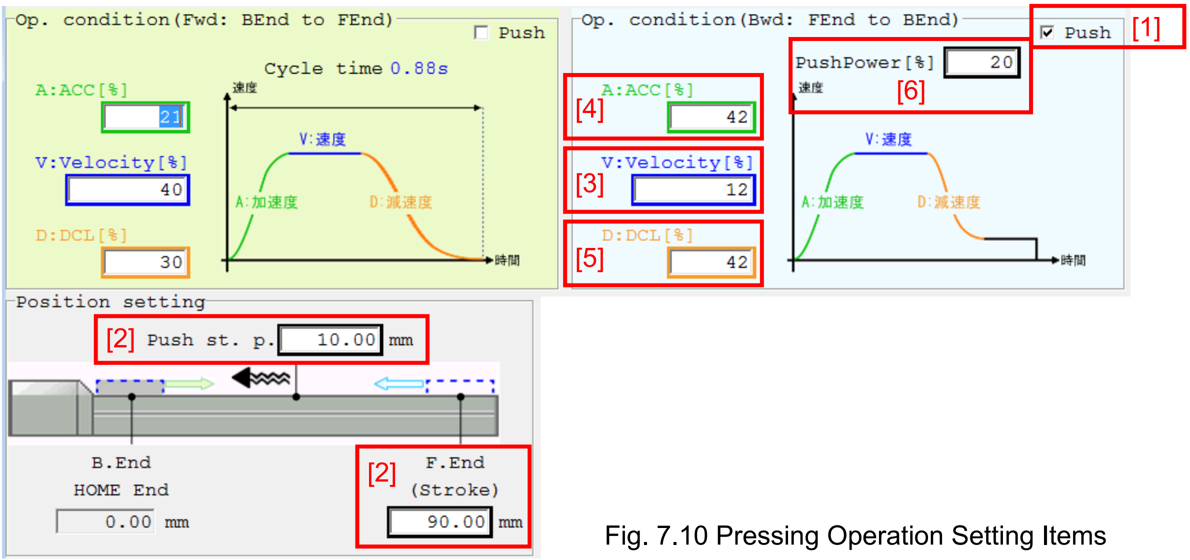


Fig. 7.10 Pressing Operation Setting Items

[1] Push Select------------------- If there is a check mark (✓) in the check box (☐) for pressing operation, pressing operation will be performed.

[2] Position setting [mm]------- Setting of the operation start point (backward end or forward end) and the pressing start point can be conducted.
It is the coordinate of positioning and should be the position from the home to be input.
The unit is mm, and a number can be input down to two decimal places.
The unit of the EC rotary type is deg/s and is available to input up to the second digit.

[3] Velocity [% or mm/s] ------- Setup of the operation velocity from the operation start point (backward end or forward end) to the pressing start point can be conducted.
Set a number between 1% and 100%.
The unit can be switched with **Unit Change** button to mm/s unit.
For mm/s unit, a number can be input down to two decimal places.
The unit of the EC rotary type is deg/s and is available to input up to the second digit.

* Note 1 Calculate the minimum velocity using the following formula.
Minimum Velocity [mm/s] = Lead Length [mm] / 800 / 0.001 [sec]

[4] ACC [% or G] ---------------- Setup of acceleration at start of operation can be conducted.
Set a number between 1% and 100%.
The unit can be switched with **Unit Change** button to G unit.
For G unit, a number can be input down to two decimal places.

[5] DCL [% or G]----------------- Setup of the operation deceleration from the operation start point to the pressing start point can be conducted.
Set a number between 1% and 100%.
The unit can be switched with **Unit Change** button to G unit.
For G unit, a number can be input down to two decimal places.

[6] Push Power [% or N]------- Setting of the pressing torque (current limit) can be conducted in %.
The pressing velocity should be 20mm/s. It should be 20 deg/s for the EC rotary type.
If the velocity is set to 20mm/s or lees (20 deg/s or less for the EC rotary type), pressing operation will be performed in the setting velocity.
The unit can be switched with **Unit Change** button to N (Reference) unit.

(4) Manual Mode
(JOG operation)

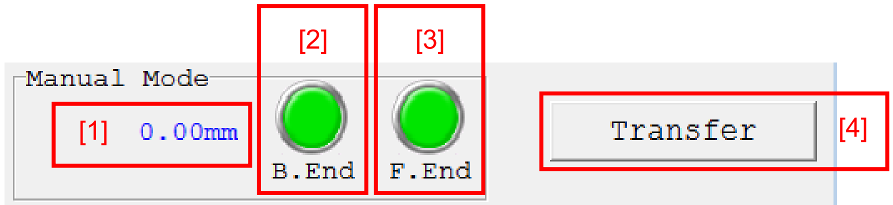


Fig. 7.11 Manual Operation Display, Operation Buttons

[1] Current Position [mm]------ The current position should be displayed.

[2] B.End button ---------------- Click and hold and the actuator moves towards the backward end while it is held.
The operation stops if stop clicking or LS Signal of the backward end turns on.

[3] F.End button ---------------- Click and hold and the actuator moves towards the forward end while it is held.
The operation stops if stop clicking or LS Signal of the forward end turns on.

(Note) Operation is available when the backward button and forward button are activated in green. If they are not in green, the setting parameters are not yet transferred. Transfer the setting parameters to the controller with (5) Transfer Button in advance.

(5) Transfer Button

[4] Transfer Button ------------ The data which a change has been made to the setting can be transferred.

(6) Transfer Log

Transfer log		ACC [%]	Velocity [%]	DCL [%]	Cycle time [s]
Fwd	Current Setting	30	60	30	0.572
	Previous Setting	30	50	30	0.620
Bwd	Current Setting	30	75	30	0.536
	Previous Setting	30	30	30	0.856

Fig. 7.12 Transference History Display

Make a change to the operational condition (velocity, acceleration / deceleration or pressing force) on either the way forward or backward and transfer the data to the controller, and the old parameter settings will be displayed in the previous setting lines and the new parameter settings in the current setting lines, and the cycle time figured out from these settings will also be displayed.

In case that the pressing operation is selected in the operational condition, the previous setting and the current setting are not to be displayed.

[Reference] Here in below, explains acceleration. The idea is the same for deceleration.
$1G = 9800mm/s^2$: Acceleration can be performed with 9800mm/s in 1 second
0.3G: 9800mm/s in 1 second $\times$ 0.3 = Acceleration can be performed with 2940mm/s

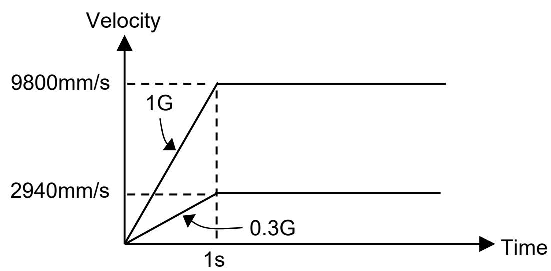


Fig. 7.13 ACC

⚠ Caution: Consider to decrease the acceleration / deceleration in case of any impact or vibration being applied to an actuator or a workpiece.
Continuing operation in such a condition will shorten the life of the actuator drastically.

7.2 Offline Mode

When editing data after creating loading data from a file, you are editing the data in the offline mode. When this mode is activated, parts related to axis operation will not function, and only the tool buttons and simple data setting part will be valid. Items that cannot be operated offline are grayed out.

7.2.1 Creating New Position Data

It is not available to create a new file.

7.2.2 Reading a File

To read position data from a file, click **File** and then select **Open** to open the “Open” window. Alternatively, you can click **File**, point to **Send to Controller** and then select **Position** to open the “Open” window.

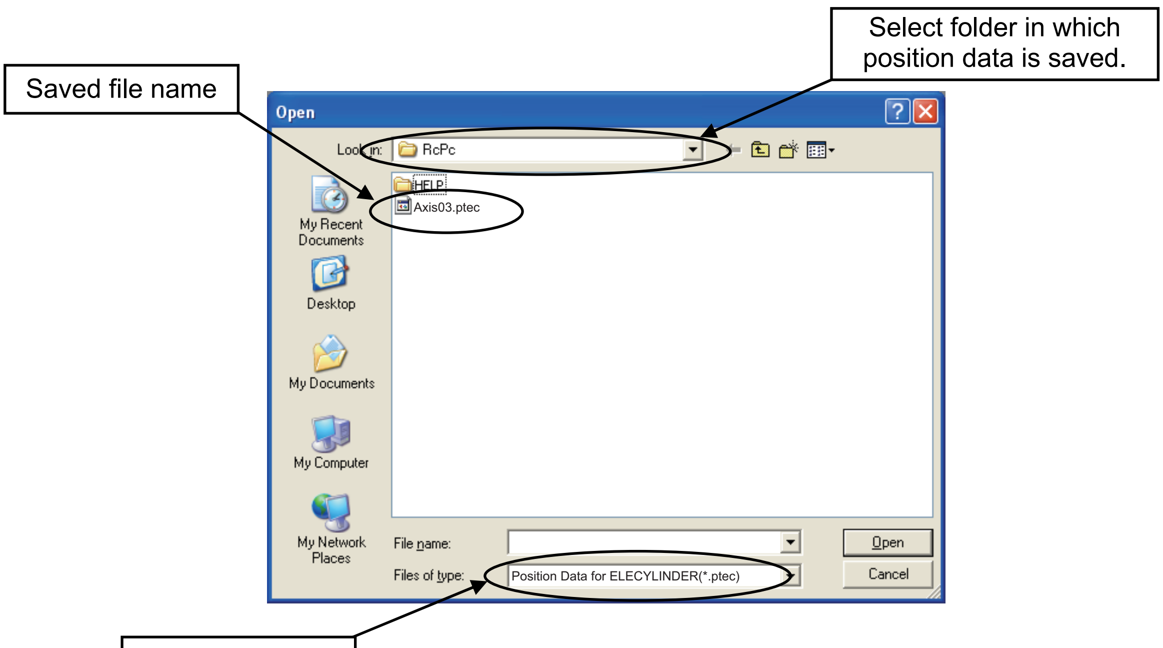


Fig. 7.14 “Open” Window

Select (click) “File name” you want to open, and click **Open** on the “Open” window, then the simple data setting window is displayed.
Operating condition and position setting can be edited offline.

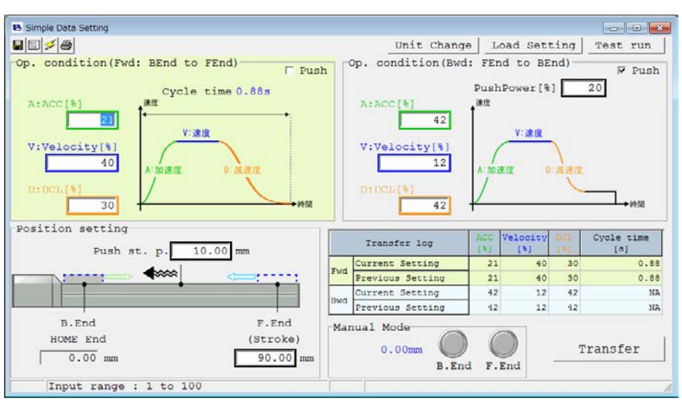


Fig. 7.15 Simple Data Setting Window (Offline Mode)

The edited operating condition and position setting can be saved to a file or sent to the connected controller.
(Saving the position data to a file)
To save the position data to a file, click the tool button .
The save as window appears.
Enter a desired file name and click the **Save** button, and the position data will be saved to a file under the specified name.

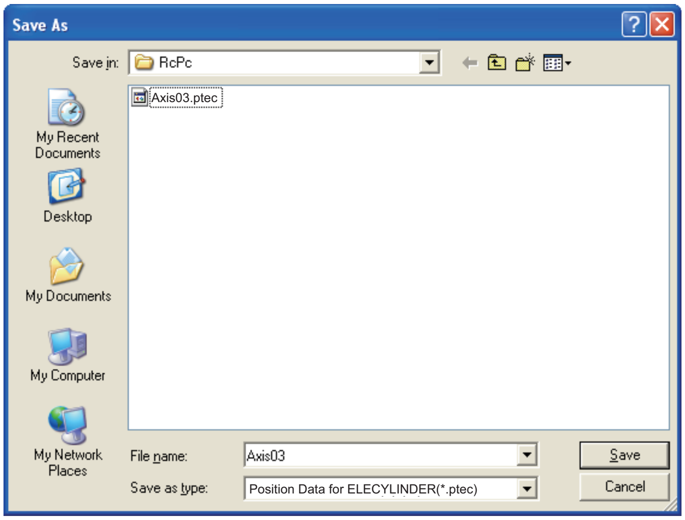


Fig. 7.16 Save As Window

(Sending the position data to the connected controller)
Connect the controller and PC.
Click **Position** and select **Send to Controller**, or click the tool button .
When the axis selection window appears, select the axis number of the controller to send the position data to. (Refer to 4, “Selecting an Axis.”)

* “Comments” can be saved only to files. They cannot be saved to controllers.

8. Editing Parameters

To load parameter data from the controller, click **Parameter (P)** and then select **Edit (E)** from the main menu, or click  in the toolbar. In the “Select axis number” window, select the axis number corresponding to the axis whose parameters you want to edit. (Refer to 4, “Selecting an Axis.”)

* On the versions V7.0.3.0 or later, the default password is “0000”, so the input password window will not appear.
* On the versions V7.00.1.00/V7.00.2.00, the default password is “5119.” Enter “5119” and click the **OK** button.

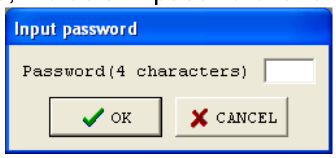


Fig. 8.1 Input Password Window

To change the password, perform the operations explained below.

[How to Set Password]

[1] From the main menu, click **Setting** and then select **Application**.
Click the **Change Password** button.

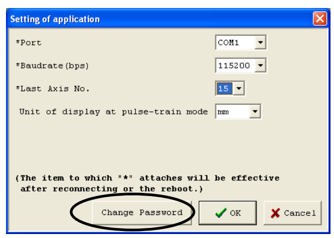


Fig. 8.2 Setting of Application Window

[2] If you are using a CON controller, select “System Password” and then click the **OK** button.
This window does not appear if you are using a SEP controller.

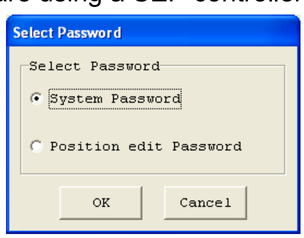


Fig. 8.3 Select Password Window

[3] Enter the current password, new password, and new password again (for confirmation), and then click the **OK** button.
Once the new password has been set, you must enter the new password to edit parameter data.

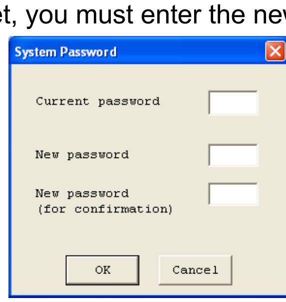


Fig. 8.4 System Password Change Window

To read a parameter from the file, click **File** and then select **Open** to display a “File open” window. Or click **File**, point to **Send to controller** and then select **Parameter**, to display the “Open” window.

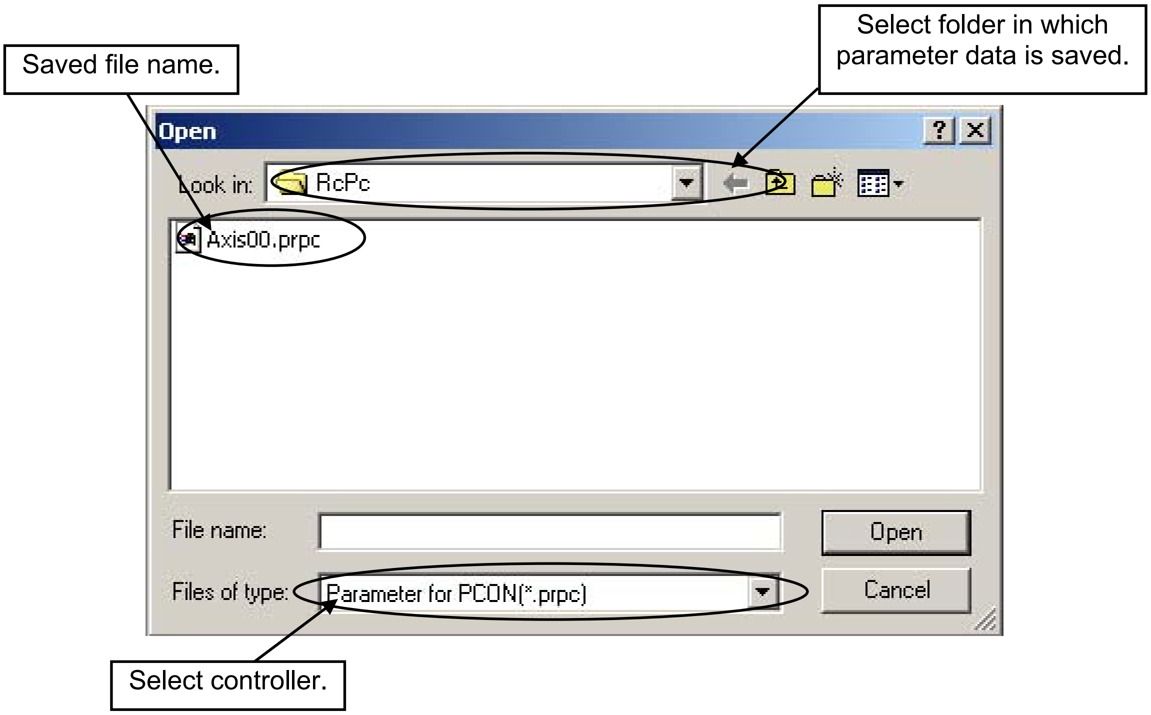


Fig. 8.5 “Open” Window

Select (click) “File name” you want to open, and click **Open** on the “File Open” window, then the parameter edit window is displayed.
You can load data from the controller or a file and edit the loaded data.
Fig. 8.8 is a display example when the PCON-CY controller is connected.
You can also print the loaded data.
Edited data can be sent to the controller or saved to a file.
Edited parameters that have been sent to the controller will become effective after the controller power is reconnected.

To send parameter read from the file to the controller, click **Parameter** and then select **Send to controller**, or click the button on the parameter edit window.
Select axis number window is displayed, then select axis No. of the controller.
(Refer to “4. Selecting an axis.”)
Click **OK** on the select axis number window, then the following warning window is displayed. Click **Yes**, then the parameter is sent to the controller.

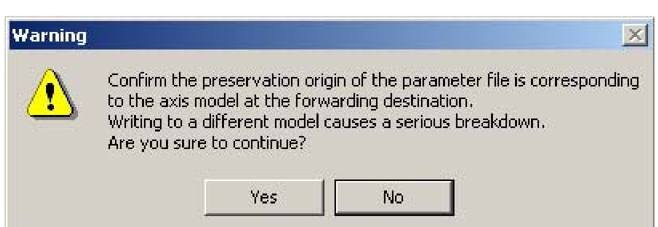


Fig. 8.6 Warning

When a driver of the motion type (EtherCAT Motion, MECHATROLINK-III and SSCNET III/H) is to be rebooted, confirmation about rebooting of the gateway should be added to the confirmation window.
Subject Controllers: MCON Motion Type Driver, RCON Motion Type Driver

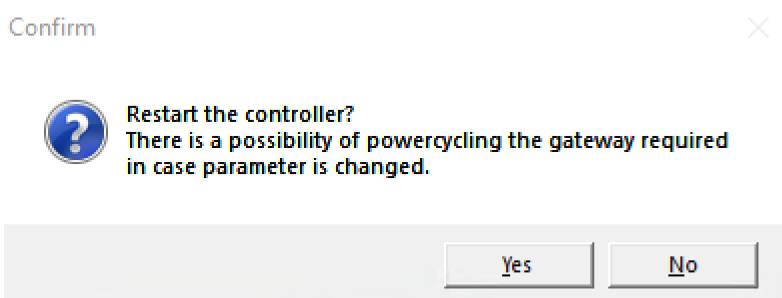
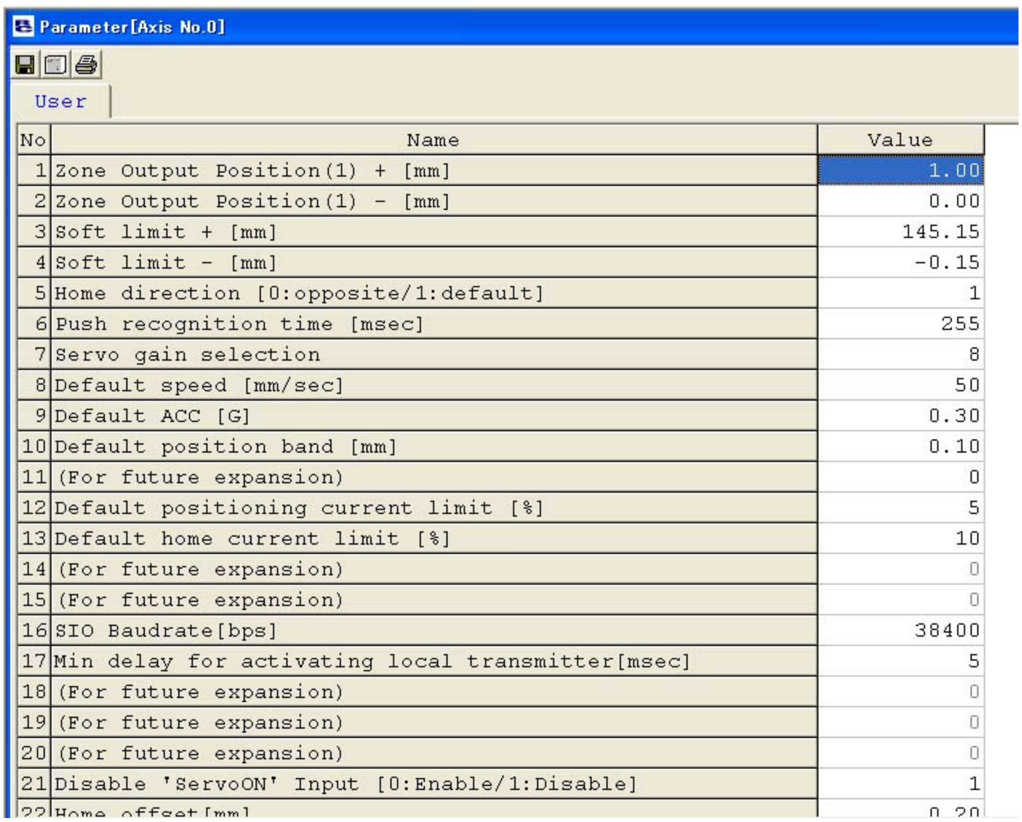


Fig. 8.7 Confirmation Window


Parameter[Axis No.0]

User

No	Name	Value
1	Zone Output Position(1) + [mm]	1.00
2	Zone Output Position(1) - [mm]	0.00
3	Soft limit + [mm]	145.15
4	Soft limit - [mm]	-0.15
5	Home direction [0:opposite/1:default]	1
6	Push recognition time [msec]	255
7	Servo gain selection	8
8	Default speed [mm/sec]	50
9	Default ACC [G]	0.30
10	Default position band [mm]	0.10
11	(For future expansion)	0
12	Default positioning current limit [%]	5
13	Default home current limit [%]	10
14	(For future expansion)	0
15	(For future expansion)	0
16	SIO Baudrate[bps]	38400
17	Min delay for activating local transmitter[msec]	5
18	(For future expansion)	0
19	(For future expansion)	0
20	(For future expansion)	0
21	Disable 'ServoON' Input [0:Enable/1:Disable]	1
22	Home offset[mm]	0.20

Fig. 8.8 Parameter Edit Window

The contents of display may be different depending on the controller model type.

Note: While the position data edit window is open, the parameter edit window cannot be opened.
When the button is clicked, the select axis number window is displayed, but axis to be selected is not displayed.

* It is available to transfer the parameters of another model without changing the extension.
Open the parameters in the controller to transfer from and transfer them to the controller of destination.
Transference between following controllers is available.

Transference Source		Transference Destination
RCP2-C	→	PCON-CA
ERC(T)	→	ERC3
ACON	→	ASEP
PCON	→	PSEP
PCON-CA	→	PCON-CB
MPSEP	→	MPCON
MPSEP (with T included in model code)	→	MPCON (with T included in model code)
MASEP	→	MACON
MDSEP	→	MDCON

Transference Source		Transference Destination
RCP6S	→	RCM-P6PC
RCM_P6PC	→	RCP6S
MPSEP	→	RCON-PC
MPSEP (with T included in model code)	→	RCON-PC
MPCON	→	RCON-PC
MASEP	→	RCON-AC
MACON	→	RCON-AC
MDSEP	→	RCON-DC
MDCON	→	RCON-DC

(Note) In case of transferring MSEP data to MCON, follow the instructions below.
* Make sure to change the parameters in GW in advance to transferring parameters.
* If position data and parameters are to be transferred individually, transfer the parameters first.
* Back the data up in the controller to transfer from before transferring MSEP data.

ELECYLINDER Parameter Setting Window

In the ELECYLINDER parameter setting window, an explanation of the setting items will be shown in the bottom of the window.
Also, for the items to select a value, click on the right of the item and the candidate list will be shown in pulldown. Select a candidate and click it.

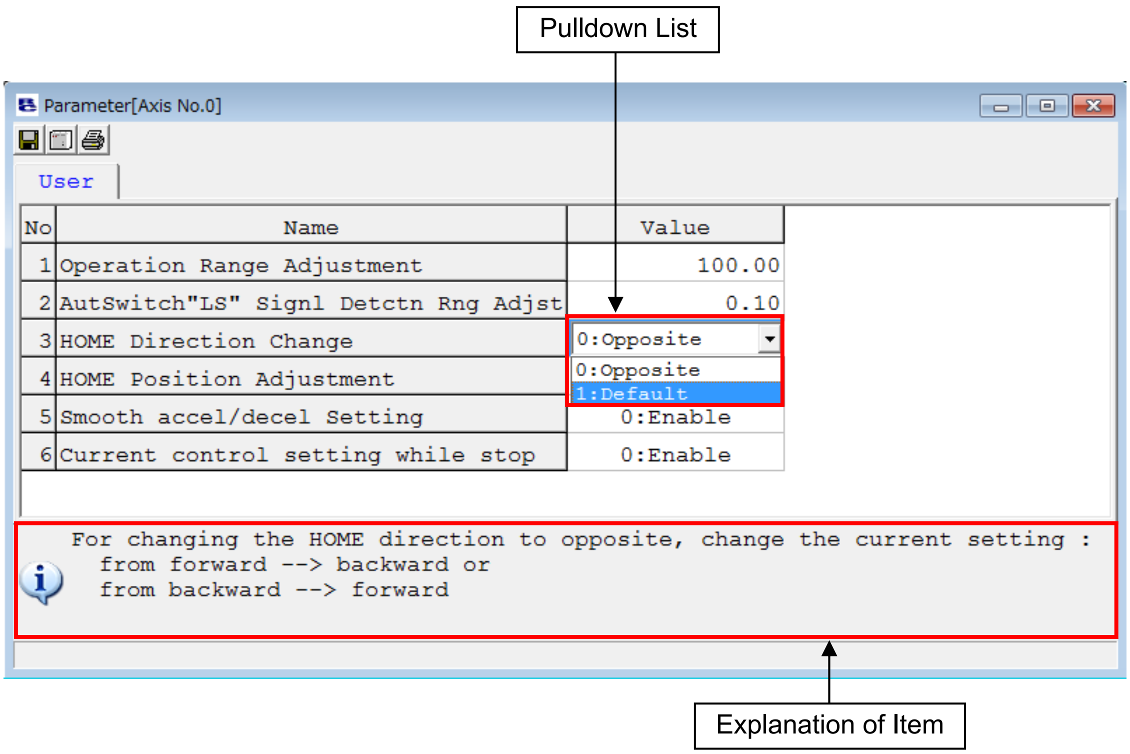


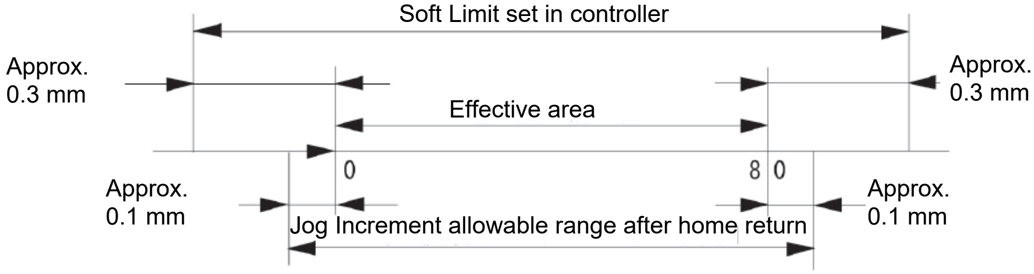
Fig. 8.9 Parameter Setting Window (ELECYLINDER)

Depending on the controller model, a confirmation window (Fig. 8.10) may be displayed after parameters have been sent to the controller, asking if you want to restart the controller (execute a software reset).
(<u>This window appears only when the controller to which data has been written supports the software reset function.</u> (Except RCP, RCS and E-Con controllers.))

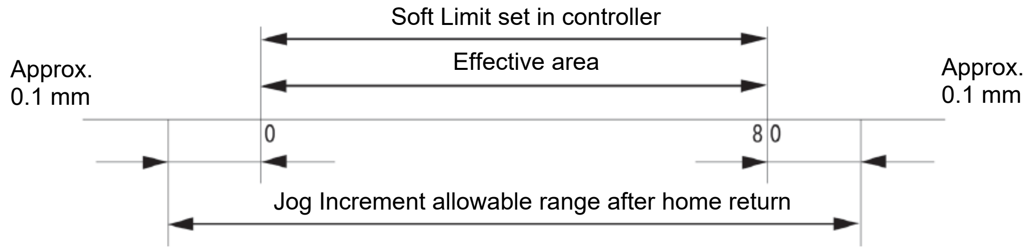
Fig. 8.10 Controller Restart Confirmation Window

- If you want to change the soft limits, set values corresponding to 0.3 mm outside of the desired effective range.

Example 1) CON controllers and older models
To set the effective range to 0 to 80 mm
+ soft limit: 80.3
- soft limit: -0.3



Example 2) SEP controllers
To set the effective range to 0 to 80 mm
soft limit: 80.0



- In the case of the RCP, RCS, E-Con, RCP2 and ERC controller, if the home return direction is changed, all position data currently input will be cleared. Before changing the home return direction, therefore, back up the data, if necessary.

- In the case of rod-type actuators (excluding the RCP2-RA3C, 4C and 6C), the home return direction cannot be reversed only by changing the factory-set parameter.

Note:	After parameters have been changed, reconnect the controller power or execute a software reset (if the controller supports the software reset function). Parameters will be rewritten simply by turning the stop switch or PORT switch to OFF and then ON again, but the new value may not become effective depending on the parameter.

9. Monitoring

Various statuses, controller error lists, and velocity/current waveforms (other than RCP, RCS and E-CON models), can be monitored.

9.1 Status Monitor Window

To monitor various statuses, click **Monitor** and then select **Status** in the main menu, or click in the toolbar. In the “Select axis number” window, select the axis number corresponding to the axis whose statuses you want to monitor. (Refer to 4, “Selecting an Axis.”) (Fig. 9.1 shows an example of the display when a PCON-C controller is connected. Fig. 9.9 shows an example of the display when a RCP2 controller is connected. Fig. 9.10 is an example of display when ELECYLINDER is connected. The displayed information will vary depending on the controller type.)

[In the case of PCON, ACON, DCON, SCON, ERC2, ERC3, ROBONET, ASEP, PSEP, DSEP, MSEP, MSCON, MCON and RCON]

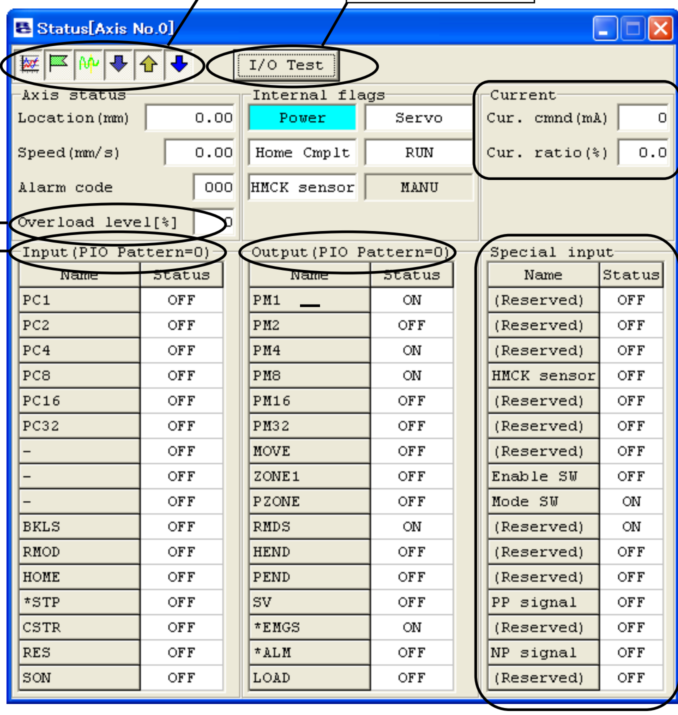
<table>
<tr><td>Axis status
▪ Location
▪ Speed (moving speed)
▪ Alarm code</td><td rowspan="2">▪ MANU: Status (MANU or AUTO) of the manual switch is displayed. Even some machine types which are not equipped with manual switch, such as PCON-CY, indicate MANU.
▪ Stop, motor voltage low indication
* As shown in Fig. 9.5 and 9.6, this is displayed in the case of stop and motor voltage low. Motor voltage low means a status in which the motor drive source is shut off.
▪ STO/SS1-t indication
For SCON-CB/CGB (3000W and 3300W excluded) STO Type and SS1-t Type, it displays, as shown in Fig. 9.7, when there is a request of safety feature operation with Safety Request Input Signal 1 (/SRI1) and Safety Request Input Signal 2 (/SRI2) being OFF.</td></tr>
<tr><td>Internal flags
▪ Power: Main controller power ON/OFF status
▪ Servo: Servo command status
▪ Home Cmplt: Home return completion flag ON/OFF status
▪ Run: Actual servo status
▪ Home check sensor: Indicates that the home check sensor is ON. This is displayed when the actuator is provided with a home check sensor.</td></tr>
<tr><td>Inputs
The ON/OFF status of each PIO input port is shown.</td><td>Outputs
The ON/OFF status of each PIO output port is shown.</td></tr>
</table>

(Note) The status monitor window cannot be displayed for SCON-CB□F, CGB□F, LC□F and LCG□F equipped with the servo pressing feature.
The display of those such as the axis status is to be shown in the pressing program operation / monitor window.
[Refer to 15.2.3 Press Program Operation / Monitor Window]

(Note) For a controller equipped with PLC feature such as SCON-LC/LCG, the internal resister for axis operation is displayed for the input and output. It may be different from the status of the I/O signal communicating directly with the host PLC as it does not display it.
Also, even though the internal relay (M) assigned to the input and output will not be updated when the ladder program is stopped, the monitor display of input and output will be updated.

Indication ON/OFF button (axis status, internal flags, current, input, output, special input port)

I/O Test button



Indicates ratio to the present current command and rated value.

* With the pulse motor type, the command value reflects the compensation for motor ripple. In other words, the "Cur. cmnd" value may become greater than the execution current depending on the motor type.

Indicates status of mode SW etc.
(Indicated content depends on machine type.)

Note) The following outputs are not shown even when the controller supports these functions:
- Moving
- Battery alarm

The currently selected PIO pattern number is displayed only when the controller supports the "PIO pattern selection function" (parameter).
* The displayed input and output port names will vary depending on the value set in the PIO pattern selection parameter.

Overload level is displayed with %. Reach 100% and the overload error will be issued (Error Code 0E0). If a value smaller than 100% is set to the overload level ratio [%] in Parameter No. 143 of SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, ERC3, MSCON, MCON and RCON, an alarm is generated when it reaches that value.

Fig. 9.1 Axis Status Monitor Window (Force Control Function Not Supported)

* Output port number is displayed in the version V10.00.00.00 and later.
The background color is yellow-green only in "ON" display.

The link status should be displayed if connection is established with the host controller such as PLC in the field network.
Fig. 9.2 is an example of MECHATROLINK-I and II.
The display will be shown with white for the background and black for the letters when connection is established with the host controller such as PLC.

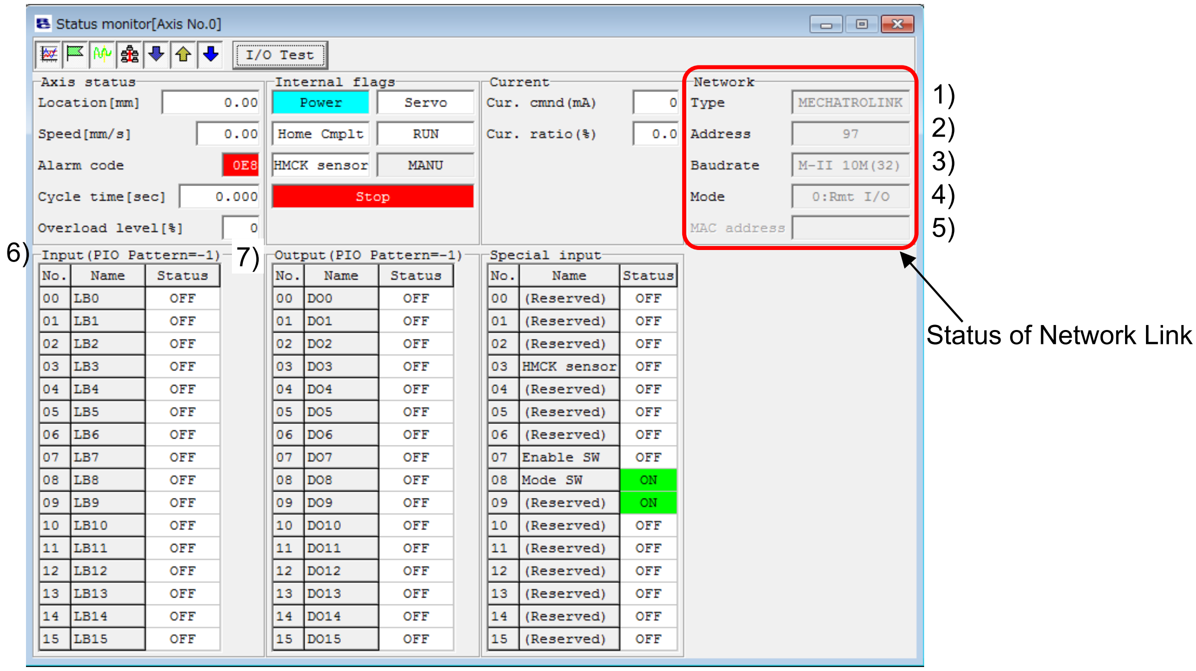


Fig. 9.2 Axis Status Monitor Window (Field Network Type)

1)	Type	: The type of the network such as MECHATROLINK-I and II which is under connection is displayed.
2)	Address	: Items such as node address are displayed.
3)	Baudrate	: Baud rate is displayed.
4)	Mode	: Operation mode of the controller such as Remote I/O and Simple Direct Mode is displayed.
5)	MAC address	: MAC address is displayed for those such as EtherNet.

For the field network connection, the input port is shown for 6) Input Data in Remote I/O Mode.
The control signal is displayed in a mode such as Remote I/O Mode.
The output port is shown for 7) Output Data in Remote I/O Mode.
The status signal is displayed for Simple Direct Mode.

On models supporting the force control function, Force FB and Calibration are displayed.
(Note) These items are displayed only on SCON-CA (of Version V8.00.00.00 or later), SCON-CB controllers.

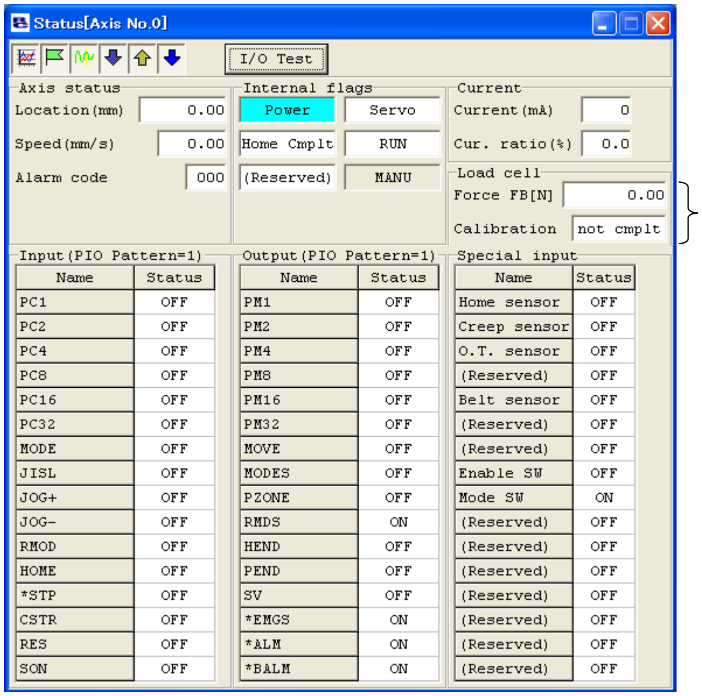


Fig. 9.3 Axis Status Monitor Window (Force Control Function Supported)

[DO output test button]
Clicking the DO output button opens the I/O Test window.
Here, you can click a desired port and add a check mark to forcibly turn ON the applicable signal.

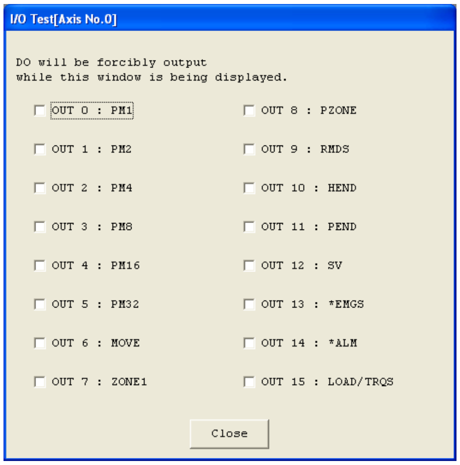


Fig. 9.4 DO Test Window

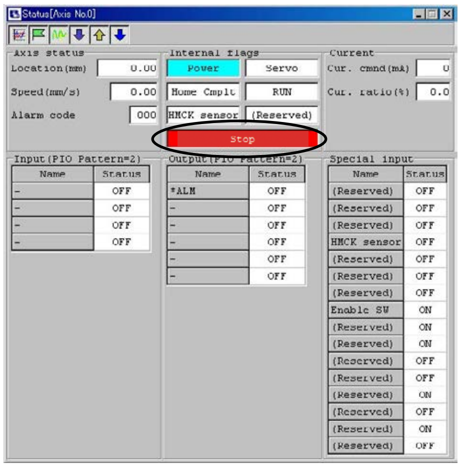


Fig. 9.5 Stop Indication

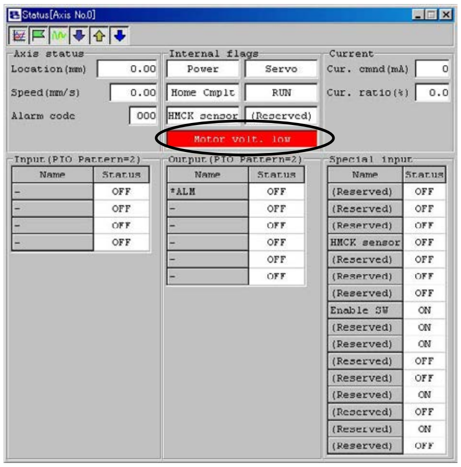


Fig. 9.6 Motor Voltage Low Indication

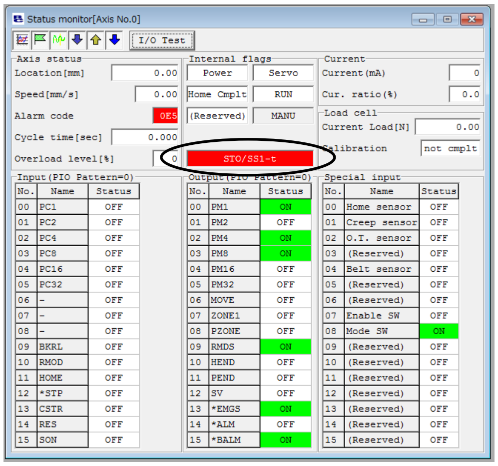


Fig. 9.7 STO/SS1-t Indication

[Switching Current Display in Status Window]

There are two types of display as follows for the current in the pulse motor status window.

- With Ripple Compensation : Command value with motor ripple compensated should be displayed. For some motor types, it could show a value higher than the execution current.
- Without Ripple Compensation : Command value with motor ripple compensated being subtracted should be displayed. It should show a value close to the motor execution current.

* Applicable in version V13.00.04.00 or later

Following controllers are available for switching.

Controller	Version
PCON-CB/CFB	V0006 or later
EC	V0006 or later
RCON-PC	V0004 or later
MPCON	V0007 or later
MPCON (with T included in model code)	V0007 or later

Controller	Version
MPCON (with ML3, SSC or ECM included in the model code)	V0004 or later
MPCON (with T included in model code) (with ML3, SSC or ECM included in the model code)	V0004 or later
RCP6/RCM-P6PC	V0003 or later
PCON-CYB/PLB/POB	V0003 or later
–	–

Click on Without Ripple Compensation to show a check mark, and the current without ripple compensation should be displayed.
Click again to remove the check mark, and the current with ripple compensation should be displayed.

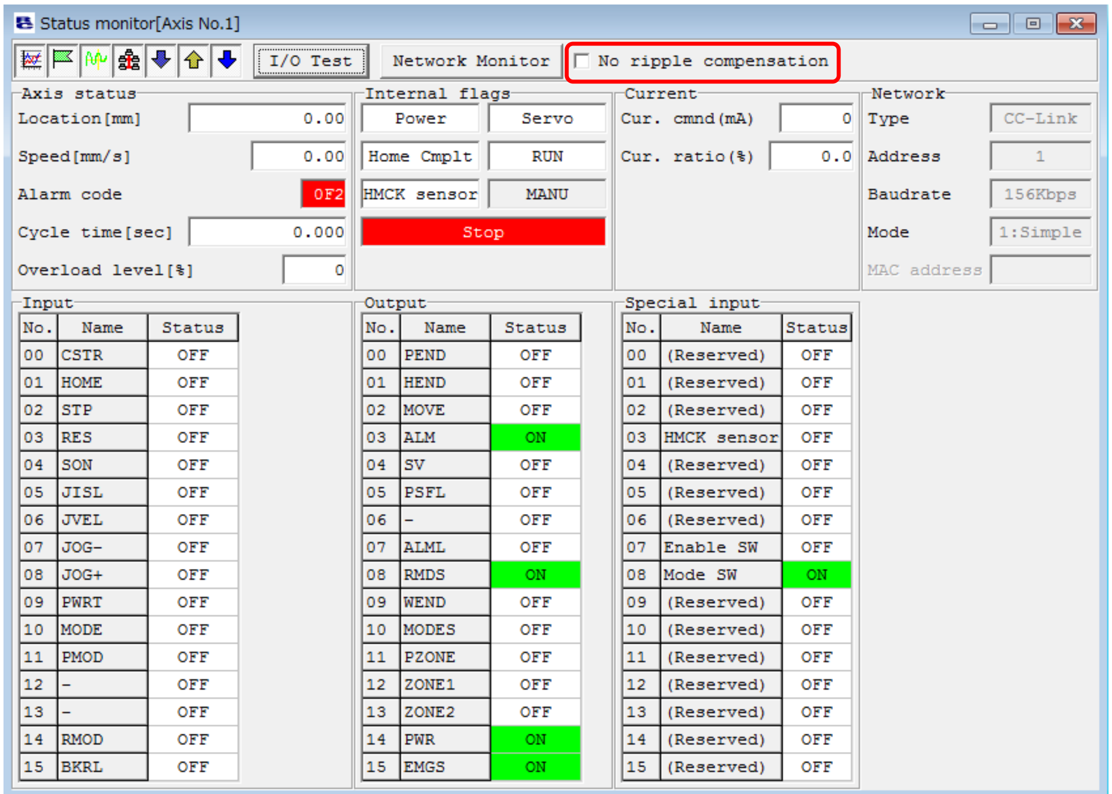


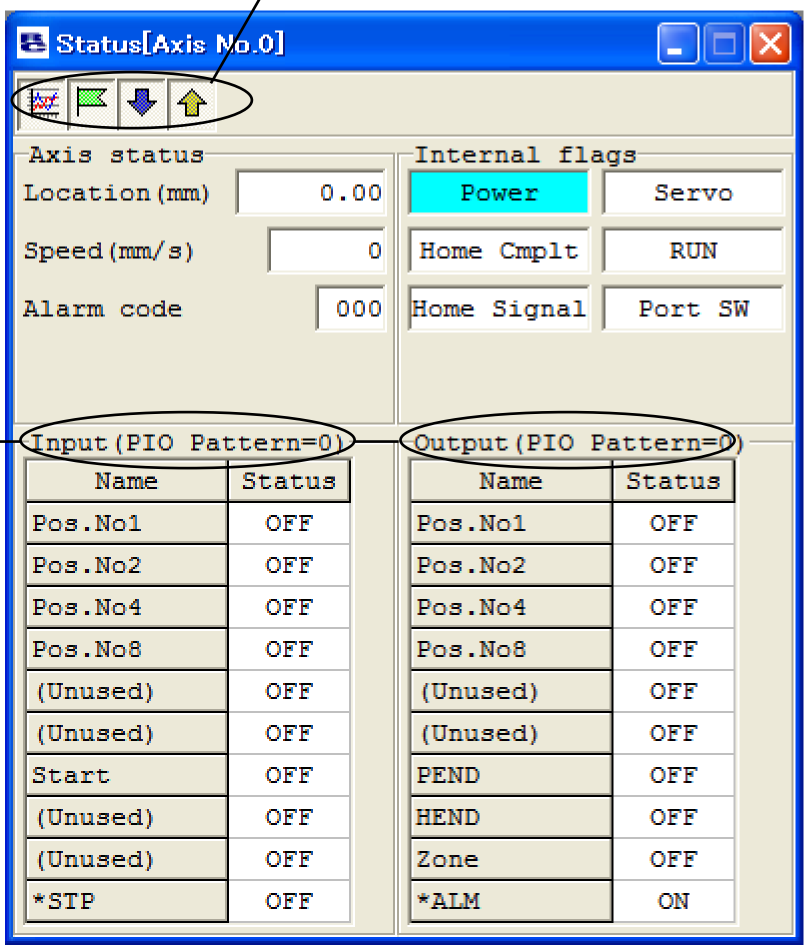
Fig. 9.8 Status Monitor Window
(Check Box for With Ripple Compensation / Without Ripple Compensation)

Whether to have the default with ripple compensation (no check mark) or without ripple compensation (with check mark on) should be set up in the application setting window.
[Refer to 10.1 Setting of Application Window]

[In the case of RCP, RCS, E-Con, RCP2 and ERC]

Axis status ・ Location ・ Speed (moving speed) ・ Alarm code	Internal flags ・Power : Main controller power ON/OFF status ・Servo : Servo command status ・Home Cmplt : Home return complete flag ON/OFF ・Run : Actual servo status
Inputs The ON/OFF status of each PIO input port is shown.	Outputs The ON/OFF status of each PIO output port is shown.

Indication ON/OFF button (axis status, internal flags, input, output)



Note) The following outputs are not shown even when the controller supports these functions:
- Stop
- Moving
- Battery alarm

Fig. 9.9 Status Monitor

The currently selected PIO pattern number is displayed only when the controller supports the "PIO pattern selection function" (parameter).
* The displayed input and output port names will vary depending on the value set in the PIO pattern selection parameter.

[In the case of ELECYLINDER]

Axis status ▪ Location ▪ Speed (moving speed) ▪ Alarm code ▪ Cycle time ▪ Overload level	Internal flags ▪ Power : Main controller power ON/OFF status ▪ Servo : Servo command status ▪ Home Cmplt : Home return complete flag ON/OFF ▪ Run : Actual servo status
Inputs The ON/OFF status of each PIO input port is shown.	Outputs The ON/OFF status of each PIO output port is shown.

Display ON/OFF Button (From left, Axis Status, Internal Flag, Current, Input and Output)

DO Output Test Button

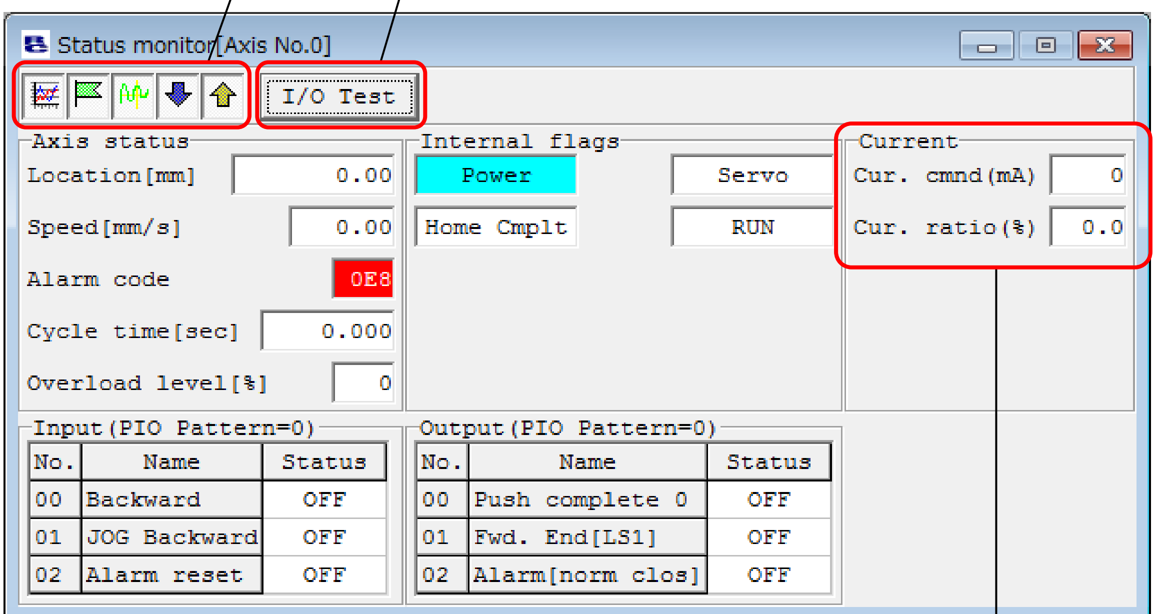


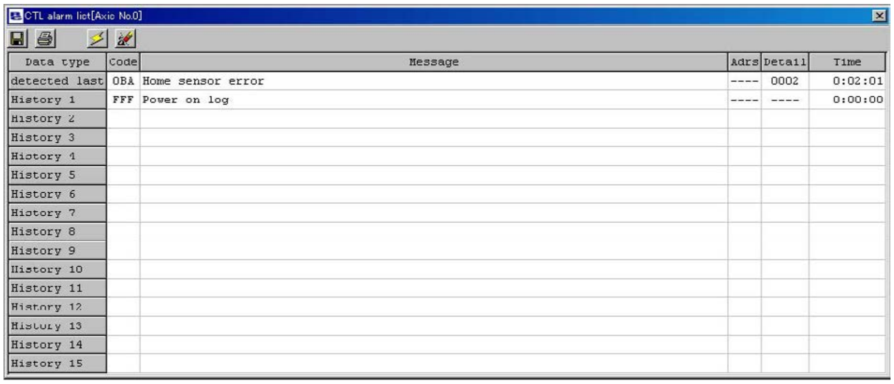
Fig. 9.10 Status Monitor (ELECYLINDER)

Current rates to the current command value and rating are displayed.

* For the pulse motor, as it should be the command value to compensate the motor ripple, this value could show a number larger than the execution current for some motor types.

9.2 CTL Alarm List

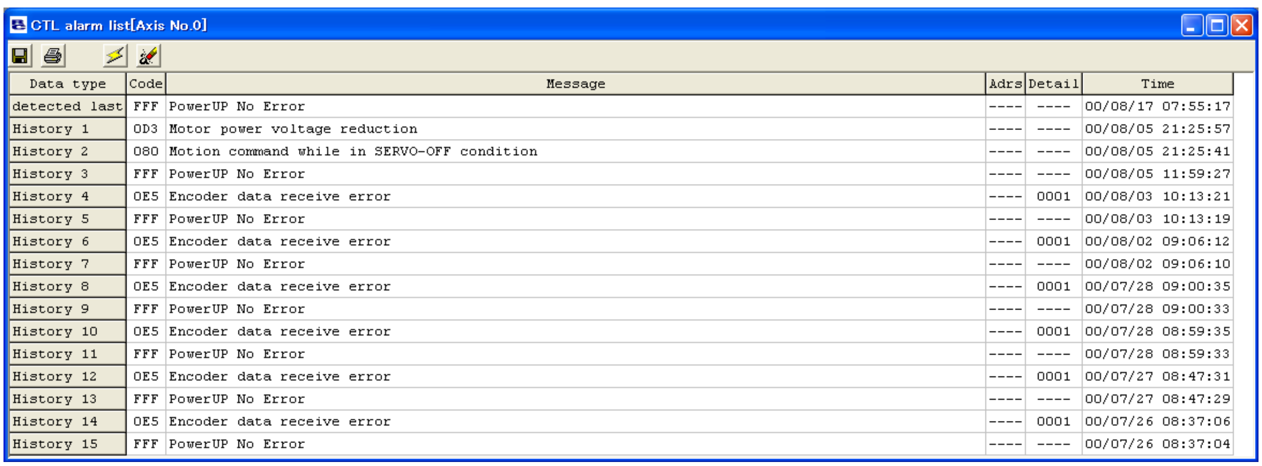
To monitor the controller error list, click **Monitor** and then select **CTL alarm list** from the main menu, or click in the toolbar. In the “Select axis number” window, select the axis number corresponding to the axis whose controller error list you want to monitor. (Refer to 4. Selecting an Axis.)



CTL alarm list[Axis No.0]

Data type	Code	Message	Adrs	Detail	Time
detected last	0BA	Home sensor error	----	0002	0:02:01
History 1	FFF	Power on log	----	----	0:00:00
History 2					
History 3					
History 4					
History 5					
History 6					
History 7					
History 8					
History 9					
History 10					
History 11					
History 12					
History 13					
History 14					
History 15					

Fig. 9.11 Controller Alarm List Window



CTL alarm list[Axis No.0]

Data type	Code	Message	Adrs	Detail	Time
detected last	FFF	PowerUP No Error	----	----	00/08/17 07:55:17
History 1	0D3	Motor power voltage reduction	----	----	00/08/05 21:25:57
History 2	080	Motion command while in SERVO-OFF condition	----	----	00/08/05 21:25:41
History 3	FFF	PowerUP No Error	----	----	00/08/05 11:59:27
History 4	0E5	Encoder data receive error	----	0001	00/08/03 10:13:21
History 5	FFF	PowerUP No Error	----	----	00/08/03 10:13:19
History 6	0E5	Encoder data receive error	----	0001	00/08/02 09:06:12
History 7	FFF	PowerUP No Error	----	----	00/08/02 09:06:10
History 8	0E5	Encoder data receive error	----	0001	00/07/28 09:00:35
History 9	FFF	PowerUP No Error	----	----	00/07/28 09:00:33
History 10	0E5	Encoder data receive error	----	0001	00/07/28 08:59:35
History 11	FFF	PowerUP No Error	----	----	00/07/28 08:59:33
History 12	0E5	Encoder data receive error	----	0001	00/07/27 08:47:31
History 13	FFF	PowerUP No Error	----	----	00/07/27 08:47:29
History 14	0E5	Encoder data receive error	----	0001	00/07/26 08:37:06
History 15	FFF	PowerUP No Error	----	----	00/07/26 08:37:04

Fig. 9.12 Controller Alarm List Window (SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, ERC3 PIO Converter, MSCON, MCON and RCON)

(1) Alarm list

Indicates detected warning code, alarm codes for past 16 times (eight times on older models) and address in which data error occurred in execution (for maker investigation), detail code and occurred time.

(Note) “Power ON log (no error)” indicates the controller power was turned on. It does not indicate an error. The “Occurrence time” field indicates the elapsed time after the time of this “Power ON log (no error).”

(Note) The occurrence time is displayed only on SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, ERC3 PIO Converter, MSEP, MSCON, MCON and RCON controllers (Version V8.03.00.00 or later, V9.01.00.00 or later for MSEP, V9.02.00.00 or later for MSCON, V9.07.00.00 or later for SCON-CAL/CGAL, V10.00.00.00 or later for SCON-CB, ACON-CB, DCON-CB and MCON, V10.02.00.00 or later for PCON-CB, V13.00.00.00 or later for RCON).

(Note) For SCON-CB (servo press), when the alarm code is [094: Press Program Alarm Detected], the contents of the detail code can be confirmed by double-clicking on the detail code part in the list. (Software version V10.00.00.00 or later)

(2) Toolbar

[1] [2] [3] [4]

Fig. 9.13 Toolbar

[1] Save as
Save the error list to a file (CSV format).
* The saved file cannot be read in this application.

[2] Print
Print the error list.

[3] Refresh
Acquire the error list from the controller again to refresh the information displayed in the window.

[4] Alarm list clear
Content of the alarm list is not deleted even if the power is turned OFF (ERC2, ERC3, SCON, ACON, PCON, DCON, ROBONET, ASEP, PSEP, DSEP, MSEP, MSCON, MCON and RCON). For this reason, content of the alarm list is deleted by using the alarm list clear. When the alarm list clear is pressed, a warning in Fig. 9.14 is displayed. When **Yes** is clicked, the content of the alarm list is deleted.

Fig. 9.14 Warning

9.3 Velocity/Current Monitor Window

To monitor velocity/current, click **Monitor** and then select **Velocity/Current** from the main menu, or click in the toolbar. In the select axis number window, select the axis number corresponding to the axis whose velocity/current you want to monitor. (Refer to 4. Selecting an Axis.)
The software will start monitoring velocity/current when is clicked.

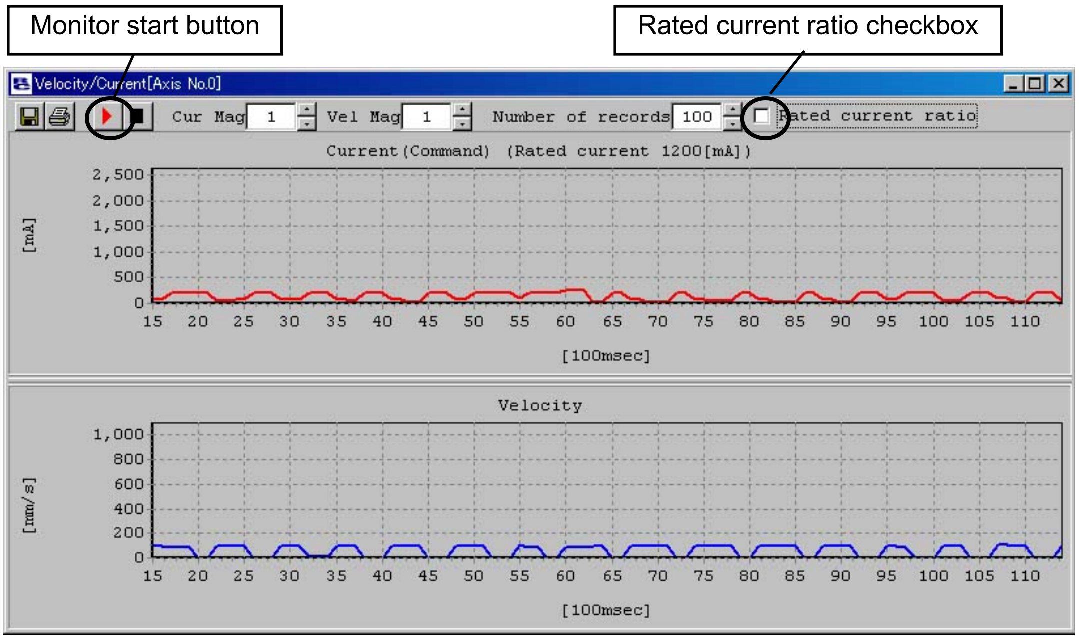


Fig. 9.15 Velocity/Current Monitor Window

* The RCP, RCS and E-Con series do not support this function.
It is supported by the RCP2, ERC, ERC2, PCON, ACON, SCON, ROBONET, ASEP, PSEP, DSEP, MSEP, MSCON, MCON, RCON and ELECYLINDER series.

(1) Current data display
[1] Current (command value) display (When the **Rated current ratio** checkbox is not selected)
The vertical axis represents current (command value) [mA], while the horizontal axis represents elapsed time after the start of monitoring [100 msec].
* With the pulse motor type, the command value reflects the compensation for motor ripple. In other words, the “Current (Command)” value may become greater than the “Rated current” value depending on the motor type.

[2] Rated current ratio display (When the **Rated current ratio** checkbox is selected)
The vertical axis represents rated current ratio [%], while the horizontal axis represents elapsed time after the start of monitoring [100 msec].

(2) Velocity data display
The vertical axis represents velocity [mm/s], while the horizontal axis represents elapsed time after the start of monitoring [100 msec].

* Current data and velocity data are acquired from the controller at the intervals of approx. 100 msec. (The data acquisition interval varies depending on the number of connected axes.)
Therefore, changes in current/velocity occurring within these intervals cannot be monitored accurately.
* Monitoring ends automatically as soon as the horizontal axis value reaches 65535.

(3) Toolbar

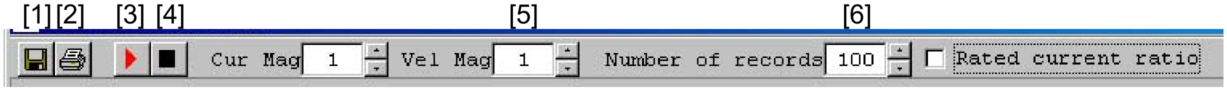


Fig. 9.16 Toolbar

[1] Save as
Save the displayed current data and velocity data to a file (CSV format).
* Only the range of data displayed in the data display area will be saved.
* The saved file cannot be read in this application.

[2] Print
Print the displayed current and velocity data.

[3] Monitor start button
Start monitoring.

[4] Monitor stop button
Stop monitoring.

[5] Vertical axis magnification change button (current)
Change the vertical axis magnification in the current data display area.

[6] Vertical axis magnification change button (velocity)
Change the vertical axis magnification in the velocity data display area.

[7] Current/speed horizontal axis record number change button
Changes horizontal axis record number of current data indicating part and speed data indicating part.

[8] Rated current ratio indicating check box
Changes data type indicated on the current data indicating part.
- When checked — Rated current ratio indication [%]
- When not checked — Current value (Command value) [mA]

[Switching between Deviation Display and Current Display in Speed / Current Monitor Window]
Deviation display is added to the speed / current monitor display.
* Applicable in version V10.01.00.00 or later

There are two types available to show for the current in the speed / current monitor window of the pulse motor.
- With Ripple Compensation : Command value with motor ripple compensated should be displayed. For some motor types, it could show a value higher than the execution current.
- Without Ripple Compensation : Command value with motor ripple compensated being subtracted should be displayed. It should show a value close to the motor execution current.

* Applicable in version V13.00.04.00 or later

Following controllers are available for switching.

Controller	Version
PCON-CB/CFB	V0006 or later
EC	V0006 or later
RCON-PC	V0004 or later
MPCON	V0007 or later
MPCON (with T included in model code)	V0007 or later

Controller	Version
MPCON (with ML3, SSC or ECM included in the model code)	V0004 or later
MPCON (with T included in model code) (with ML3, SSC or ECM included in the model code)	V0004 or later
RCP6/RCM-P6PC	V0003 or later
PCON-CYB/PLB/POB	V0003 or later
–	–

⊙ Deviation Display
Deviation is a difference between the actual command pulse and the feedback pulse (actual position).
The vertical axis shows the deviation [pulse] and the horizontal axis shows the time since start [100msec].
* The data should be acquired in every 100 [msec] cycle. (Number of connected axes may change the duration of the cycle for data acquirement.)
  Therefore, it is not capable to monitor the fluctuation of the current / speed occurred between periods of the cycle.
* Monitoring automatically stops once the horizontal axis reaches 65535.

⊙ Switching Current Display
Click on Without Ripple Compensation to show a check mark, and the current without ripple compensation should be displayed.
Click again to remove the check mark, and the current with ripple compensation should be displayed.

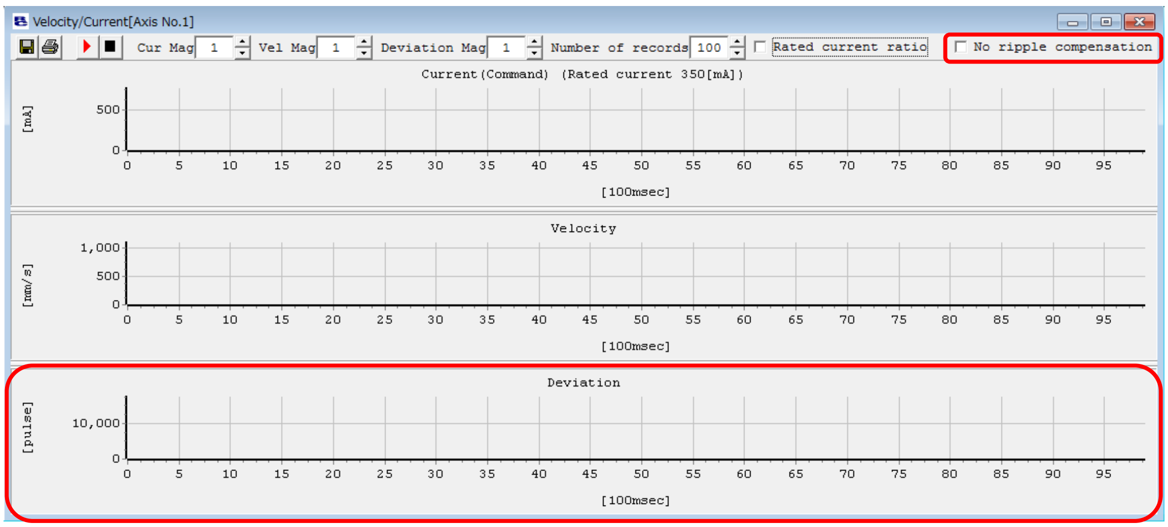


Fig. 9.17 Speed / Current Monitor Window
(Check Box for With Ripple Compensation / Without Ripple Compensation)

Whether to have the default with ripple compensation (no check mark) or without ripple compensation (with check mark on) should be set up in the application setting window.
[Refer to 10.1 Setting of Application Window]

9.4 Servo Monitor Window

(Note) This window can be displayed only on SCON-CA, PCON-CA, ACON-CA, DCON-CA and ERC3 (of Software Version V8.03.00.00 or later), SCON-CB, PCON-CB/CYB/PLB/POB, ACON-CB/CYB/PLB/POB, DCON-CB/CYB/PLB/POB, MSCON, MCON and RCON controllers.

To monitor the amount of velocity operation, etc., click **Monitor** from the main menu and then select **Servo Monitor**. On the axis selection window, select the target axis number. [Refer to 4, "Axis Selection."]

Press Fixed next. (Version V9.02.00.00 or later)

Press ▶ and monitoring starts.

Among others, the following items can be monitored:

[1] Current Position (unit: [mm] or [pls])
[2] Amount of velocity operation (unit: [mm/sec] or [pls/sec])
[3] Actual velocity instruction (unit: [mm/sec] or [pls/sec])
[4] Present speed (unit: [mm/sec]) or [pls/sec])
[5] Current instruction (unit: [mA] or [%] (percentage of the rated current))
[6] Feedback current value [mA] or [%]
[7] Force feedback data [N] (SCON-CA)
[8] Deviation (unit: [pls])
[9] Command pulse counter (unit: [pls])

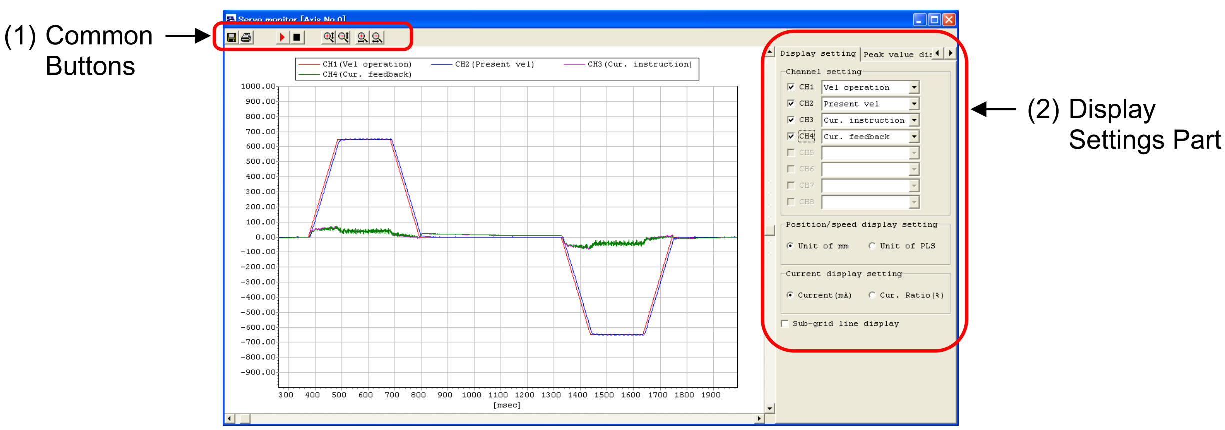


Fig. 9.18 Servo Monitor Window (General) (before Version V9.02.00.00)

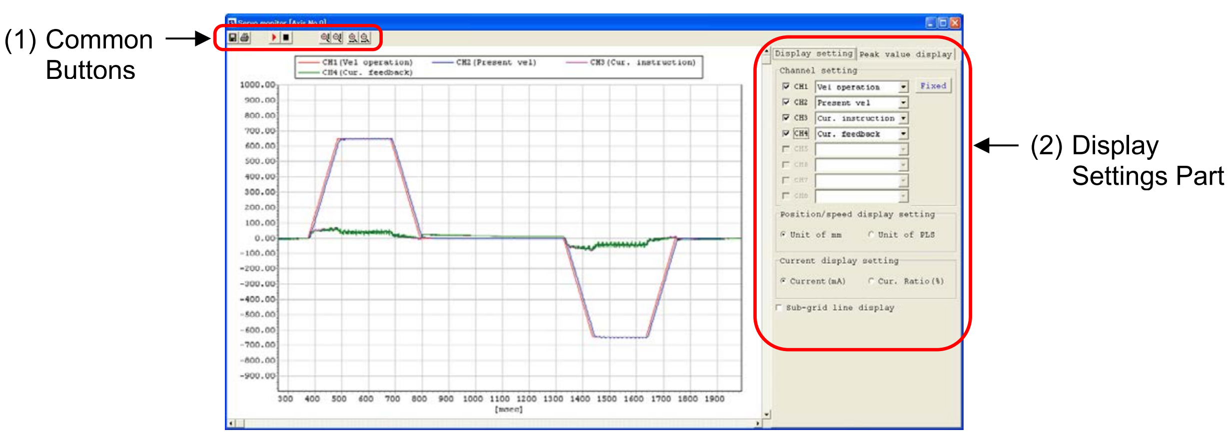


Fig. 9.19 Servo Monitor Window (General) (Version V9.02.00.00 or later)

[Servo Monitor Window for SCON-CB, ACON-CB/CYB/PLB/POB, DCON-CB/CYB/PLB/POB, PCON-CB/CYB/PLB/POB, MCON and RCON (Version V10.00.00.00 and later, except, version V10.02.00.00 or later for PCON-CB, version V10.03.00.00 or later for ACON-CYB/PLB/POB, DCON-CYB/PLB/POB, PCON-CYB/PLB/POB, version V13.00.00.00 or later for RCON)]

- Set the trigger and monitoring can be started.
  [Refer to (1) Common Buttons for how to operate]
  [Refer to (4) Trigger Setting Part for how to set the trigger]
- The sampling period can be changed by the operation on the screen.
  [Refer to (2) Display Settings Part]
- Left-click on the graph, and a crosshair cursor and the X coordinate and the Y coordinate values [msec] at the clicked point are shown.

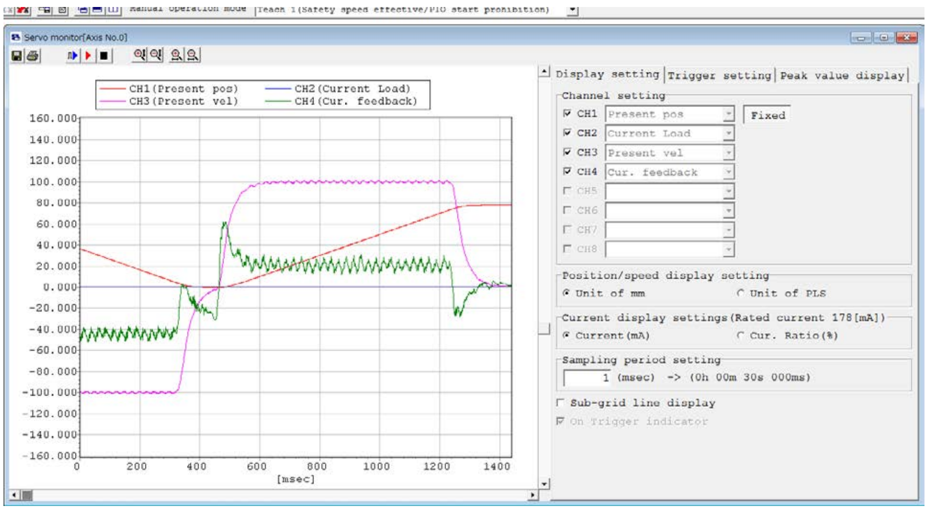


Fig. 9.20 Servo Monitor Window (General)
(SCON-CB, PCON-CB/CYB/PLB/POB, ACON-CB/CYB/PLB/POB, DCON-CB/CYB/PLB/POB, MCON, RCON)

[Number of channels]

The number of channels is 4 or 8. (MSCON, MCON, RCON, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB is 2, 4 or 8.)

A desired number can be selected using user parameter No. 112, “Monitoring mode selection.” (Setting: “0” = 0 channel (This function is not used), “1” = 4 channels, “2” = 8 channels) (MSCON, MCON, RCON, SCON-CA, SCON-CB, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB is “3” = 2 channels.)

[Monitoring period]

For the monitoring period of ACON-CA, DCON-CA, PCON-CA, ERC3, SCON-CA, MSCON, SCON-CB a desired value between 1 and 1,000 [msec] can be set using user parameter No. 113, “Monitoring period.” (Setting: “1” to “1,000” [msec])

The monitoring frequency of PCON-CB, PCON-CYB, PLB, POB, ACON-CB, ACON-CYB, PLB, POB, DCON-CB, DCON-CYB, PLB, POB, MCON and RCON is 1 to 60000 [msec].

[Number of records that can be monitored]

When the SCON-CA, the number of records that can be monitored is 30,000 in the 4-channel mode and 15,000 in the 8-channel mode.

When the SCON-CB, the number of records that can be monitored is 60,000 in the 2-channel mode, 30,000 in the 4-channel mode and 15,000 in the 8-channel mode.

When the MSCON, the number of records that can be monitored is 30,000 in the 2-channel mode, 15,000 in the 4-channel mode and 7,500 in the 8-channel mode.

When the PCON-CA and ERC3, the number of records that can be monitored is 3,072 in the 2-channel mode, 1,536 in the 4-channel mode and 768 in the 8-channel mode.

When the PCON-CB, ACON-CA, ACON-CB, DCON-CA and DCON-CB the number of records that can be monitored is 8,192 in the 2-channel mode, 4,096 in the 4-channel mode and 2,048 in the 8-channel mode.

When the MCON and RCON the number of records that can be monitored is 4,096 in the 2-channel mode, 2,048 in the 4-channel mode and 1,024 in the 8-channel mode.

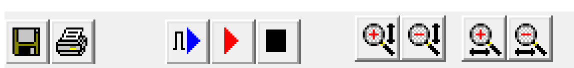
When using the PCON-CYB/PLB/POB, ACON-CYB/PLB/POB and DCON-CYB/PLB/POB, the number of records that can be monitored is 4096 in the 4-channel mode and 2048 in the 8-channel mode.

(1) Common buttons

[1] [2] [3] [4] [5] [6] [7] [8]

Fig. 9.21 Servo Monitor Window (Common Buttons)
(Except for SCON-CB, ACON-CB, DCON-CB, MCON)

[1] **Save As** button
Save the monitored data to a file (*.bsmrc).
[2] **Print** button
Print the graph.
[3] **Start Monitor** button
Start monitoring.
[4] **End Monitor** button
End monitoring.
[5] **Zoom In along Vertical Graph Axis** button
Zoom in along the vertical axis of the graph.
[6] **Zoom Out along Vertical Graph Axis** button
Zoom out along the vertical axis of the graph.
[7] **Zoom In along Horizontal Graph Axis** button
Zoom in along the horizontal axis of the graph.
[8] **Zoom Out along Horizontal Graph Axis** button
Zoom out along the horizontal axis of the graph.



[9] [3] [4]

Fig. 9.22 Servo Monitor Window (Common Buttons)
(SCON-CB, ACON-CB, DCON-CB, MCON, RCON)

[9] **Trigger Start** button
Press the start button and the status becomes the trigger standby, and monitoring starts once the trigger is detected.
To start monitoring without using the trigger, press the [3] **Start Monitor** button. To finish monitoring, press [4] **End Monitor** button.

(2) Display setting area

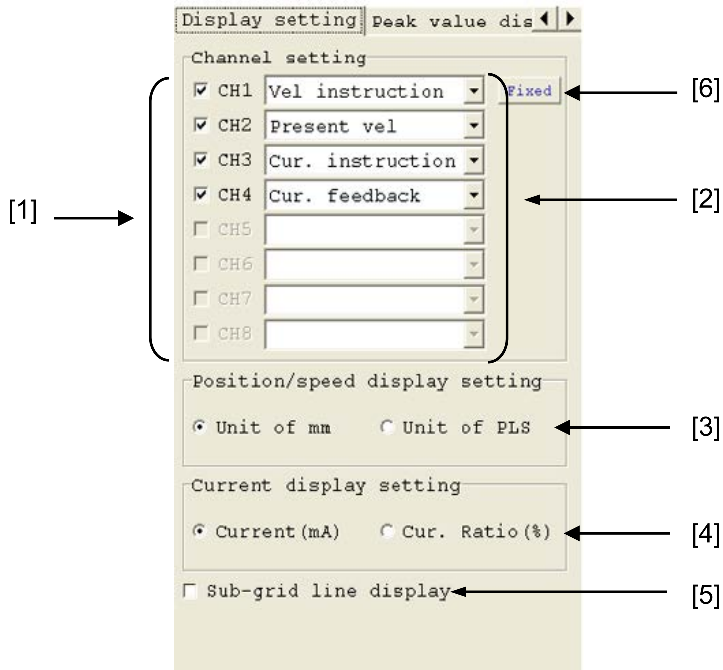


Fig. 9.23 Servo Monitor Window (Display Setting Area)

[1] Show/hide selection check boxes
Selecting each check box displays a graph of the corresponding channel.
When the check box is cleared, the graph disappears.

[2] Data type selection combo boxes
Select the type of each data you want to monitor.

[3] **Position/speed display setting** radio buttons
Select the display unit of position/speed data (mm or pls).

[4] **Current display setting** radio button
Select the display unit of current data ([mA] or [% of rated current]).

[5] Show/hide sub-grid line selection check box
Selecting this check box shows sub-grid lines.
When the check box is cleared, sub-grid lines become hidden.

[6] Fixed (Version V9.02.00.00 or later)
Determine the data type in the channel setting. After the confirmation, monitoring becomes available.

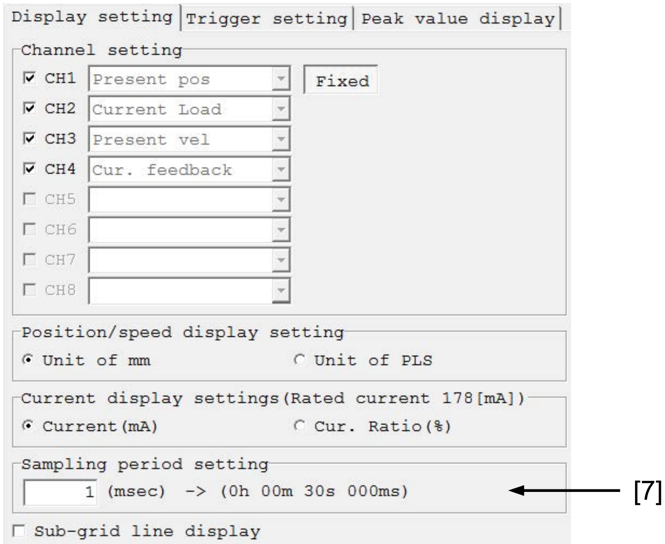


Fig. 9.24 Servo Monitor Window (Display Setting Area)
(SCON-CB, ACON-CB, DCON-CB, MCON, RCON)

[7] Sampling period setting

For SCON-CB, PCON-CB, DCON-CB, MCON and RCON, the time frequency (sampling period) to acquire data can be changed in Display Setting Window.

The minimum settable value should be the value set in Parameter No. 113 (Monitoring Period).

The maximum value should be the maximum value settable to Parameter No. 113 (Monitoring Period).

(Note) For the controllers other than SCON-CB, PCON-CB, DCON-CB, MCON and RCON, the sampling period setting part is not displayed. It is necessary to change Parameter No. 113 (Monitoring Period) when it is required to change the sampling period.

(3) Peak value display area

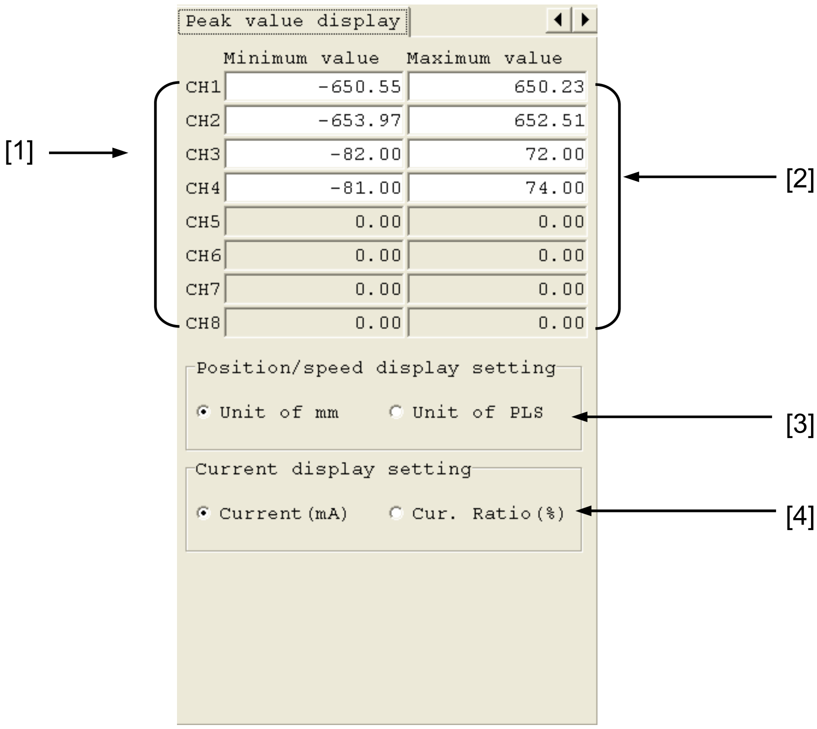


Fig. 9.25 Servo Monitor Window (Peak Value Display Area)

[1] Minimum value
The minimum value of data monitored on each channel is shown.

[2] Maximum value
The maximum value of data monitored on each channel is shown.

[3] **Position/speed display setting** radio buttons
Select the display unit of position/speed data (mm or pls).

[4] **Current display setting** radio buttons
Select the display unit of current data ([mA] or [% of rated current]).

(4) Trigger Setting Part

For SCON-CB, PCON-CB, DCON-CB, MCON and RCON, trigger setting is available to start monitoring. Set the trigger in the trigger setting part. (Version V10.00.00.00 and later)

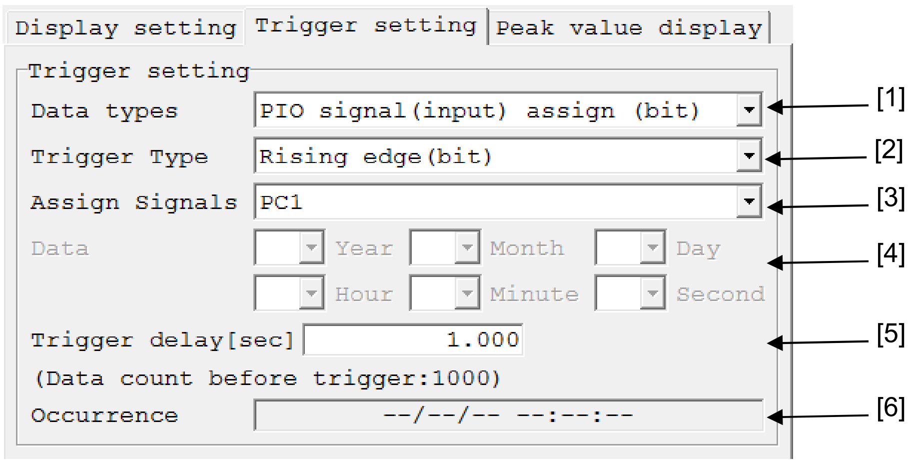


Fig. 9.26 Servo Monitor Window (Trigger Setting) (Version V10.00.00.00 and later)

[1] Data types
The following data types can be selected.
- PIO signal (input) allocation (bit)
- PIO signal (output) allocation (bit)
- Clock

[2] Trigger Type
When PIO signal (input) assign (bit) or PIO signal (output) assign (bit) is selected, select either Rising edge (bit) or Falling edge (bit).
It is not necessary to select any if Clock is selected.

[3] Assign Signals
When PIO signal (input) assign (bit) is selected, select from the PIO input port signals.
When PIO signal (output) assign (bit) is selected, select from the PIO output port signals.
It is not necessary to select any if Clock is selected.

[4] Data
When Clock is selected, the current time in the controller is shown first.
With that time as the standard, set the time that trigger is required at.
For example, if you would like to trigger in one minute, forward the minute setting for one minute.

[5] Trigger delay [sec]
In case that the data before having a trigger is required to be acquired, set the time [sec] in Trigger delay [sec]. It enables to acquire the data before the time of trigger being conducted.

[6] Occurrence
The controller clock when trigger is conducted is displayed.
When Clock is selected, the same time as the set trigger time is displayed.

[Servo Monitor Window for SCON-CB, ACON-CB/CYB/PLB/POB, DCON-CB/CYB/PLB/POB, PCON-CB/CYB/PLB/POB (Version V10.02.00.00 and later, except, version V10.03.00.00 or later for ACON-CYB/PLB/POB, DCON-CYB/PLB/POB, PCON-CYB/PLB/POB)]

- It is available to monitor PIO signals.

◎ How to Monitor PIO Signals

(1) Display Settings Part

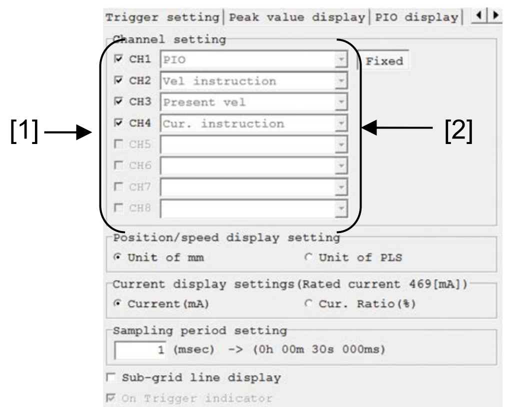


Fig. 9.27 Servo Monitor Window (Display Settings Part)

[1] Show/hide selection check boxes
Selecting each check box displays a graph of the corresponding channel.
When the check box is cleared, the graph disappears.
[2] Data type selection combo boxes
Select the type of each data you want to monitor.
In order to display PIO, touch ▼ to show the pull-down menu and select PIO. And touch Fixed next. PIO display tag should appear.

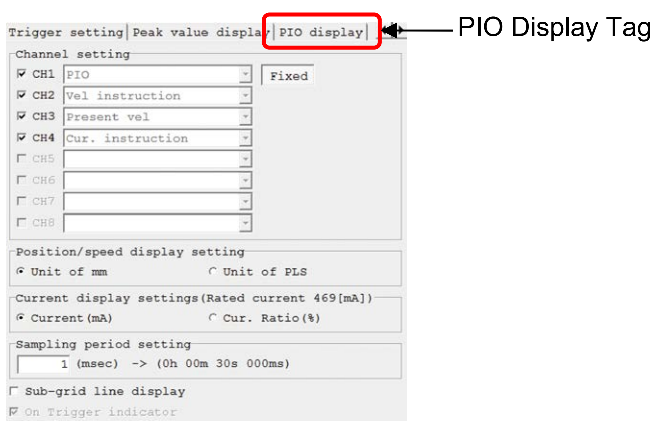


Fig. 9.28 Servo Monitor Window (In Display Settings Part PIO Setting)

Click the PIO display tag.
PIO Display Settings Part should appear.

(2) PIO Display Settings Part

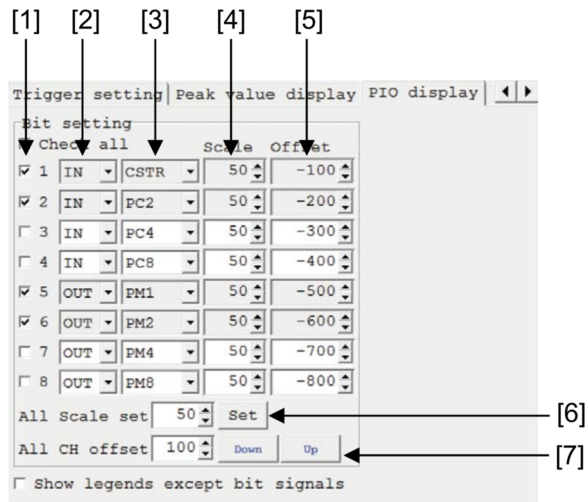


Fig. 9.29 Servo Monitor Window (PIO Display Settings Part)

[1] Show/hide selection check boxes
Selecting each check box displays a graph of the corresponding channel.
When the check box is cleared, the graph disappears.
Put a check mark on Select All and all channels from 1 to 8 should get checked and show ✓.

[2] IN/OUT selection combo boxes
IN/OUT for Data type to be monitored should be selected.

[3] Data type selection combo boxes
Select the type of each data you want to monitor.
Touch ▼ to show the pull-down menu.

[4] Scale set combo boxes
The vertical axis display position on the high level graph for PIO signals should be set.
The graph should be displayed above the display position set in [5] Offset Set Combo Boxes for the amount set in the scale setting.

[5] Offset set combo boxes
The vertical axis display position on the low level graph for PIO signals should be set.

[6] All Scale set combo boxes
The vertical axis display position on the high level graph for PIO signals should be set for all the channels at once.

[7] All CH offset set combo boxes
The vertical axis display position on the low level graph for PIO signals should be set for all the channels at once.
For example, if set to 100, 1 goes -100 and 2 goes -200. Numbers get smaller by -100.

[Relation of Vertical Axis Display Position on Graph between Offset Setting and Scale Setting]
Low level should be displayed in the position set in offset.
In the example shown in the figure below, the low level of the signal (red) in 1 is shown at -100 in the vertical axis and the low level of the signal (blue) in 2 is shown at -200 in the vertical axis.
The high level should be shown above the low level position by the amount set in the scale.
In the example shown in the figure below, the high level of the signal (red) in 1 is shown at -50.
* Only the signals with a check mark put in Show/Hide Selection Check Box show be displayed.

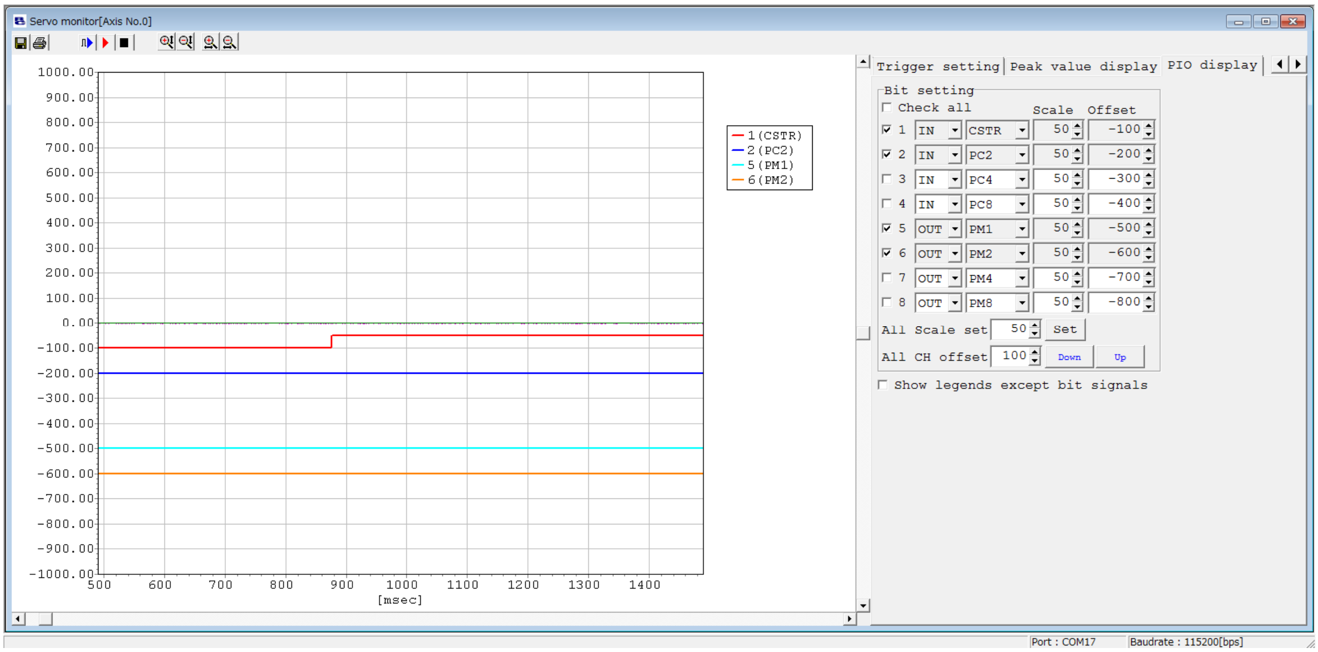


Fig. 9.30 Servo Monitor Window (PIO Display)

9.5 Maintenance information Window

(Note) This window is available only with SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, ERC3, MSEP, MSCON, MCON and RCON controllers (Version V8.03.00.00 or later, V9.01.00.00 or later for MSEP, V9.02.00.00 or later for MSCON, V9.07.00.00 or later for SCON-CAL/CGAL, V10.00.00.00 or later for SCON-CB, ACON-CB, DCON-CB, MCON, V10.02.00.00 or later for PCON-CB, V13.00.00.00 or later for RCON).

* Refer to the next page for ELECYLINDER.

The total number of movements of the actuator, and total distance traveled, are displayed.

- Total number of movements   The cumulative number of times the actuator has moved is displayed.
- Total distance traveled   The cumulative distance the actuator has traveled is displayed. The total operation distance can be switched between km and m.

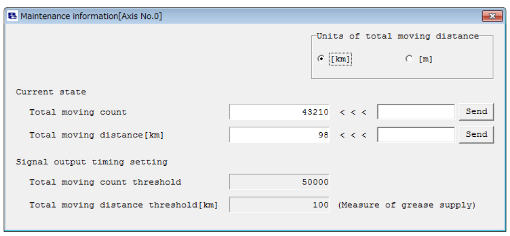


Fig. 9.31 Maintenance information Window
km display (Except for PCON-CFA, CFB)

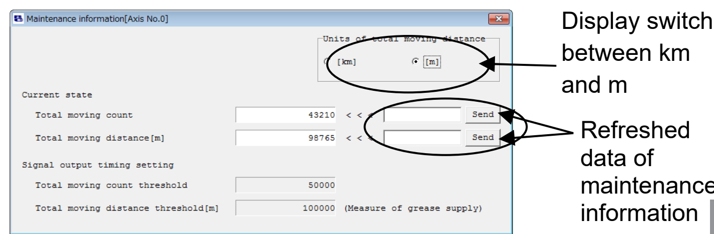


Fig. 9.32 Maintenance information Window
m display (Except for PCON-CFA, CFB)

For PCON-CFA Controller, the following items are displayed in addition.

- Total driving time of fan   Shows the total driving time of the fan on the controller.

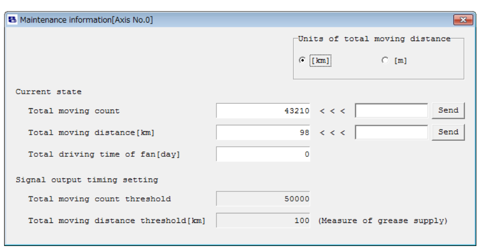


Fig. 9.33 Maintenance information Window
km display (PCON-CFA, CFB)

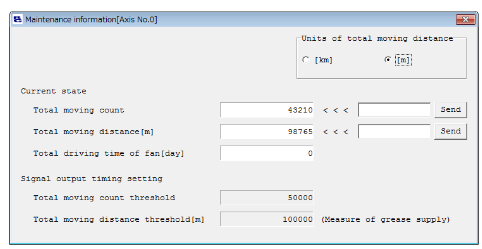


Fig. 9.34 Maintenance information Window
m display (PCON-CFA, CFB)

(1) Changing the total number of movements and total distance traveled
Set a desired value in the refreshed maintenance information data field of total number of movements or total distance traveled, and then click **Send**. The total number of movements or total distance traveled, as applicable, will be refreshed. (Password is required.)
(Note) Change cannot be made to the total number of movements and total distance traveled by user. When reset to '0' (zero), go to [Setting] - [Controller] - [Actuator replacement] in the main menu. Input 5119 to the password, click OK and the value gets reset to '0'.

(2) Thresholds for total number of movements and total distance traveled
You can set thresholds for total number of movements and total distance traveled so as to generate an alarm if the thresholds are exceeded.
The thresholds you have set will be stored in the following parameters:

Parameter No.	Name
147	Threshold for total number of movements
148	Threshold for total distance traveled

Message-level Alarms

Alarm code	Name	Description
4E	Movements threshold exceeded	This alarm generates when the total number of movements has exceeded the threshold set in parameter No. 147.
4F	Traveled distance threshold exceeded	This alarm generates when the total number of movements has exceeded the threshold set in parameter No. 148.

⊙For ELECYLINDER (Software Version V12.00.00.00 and later)

The total number of movements and the total driving distance should be displayed.

- Total moving count — The sum total of the number of the actuator movements should be displayed.
- Total moving distance — The sum total of the actuator driving distance should be displayed. The unit of the total driving distance can be switched over between km and m.
  * For the EC rotary type, it should be the number of rotating back and forth (round trip between 0deg and 180deg).

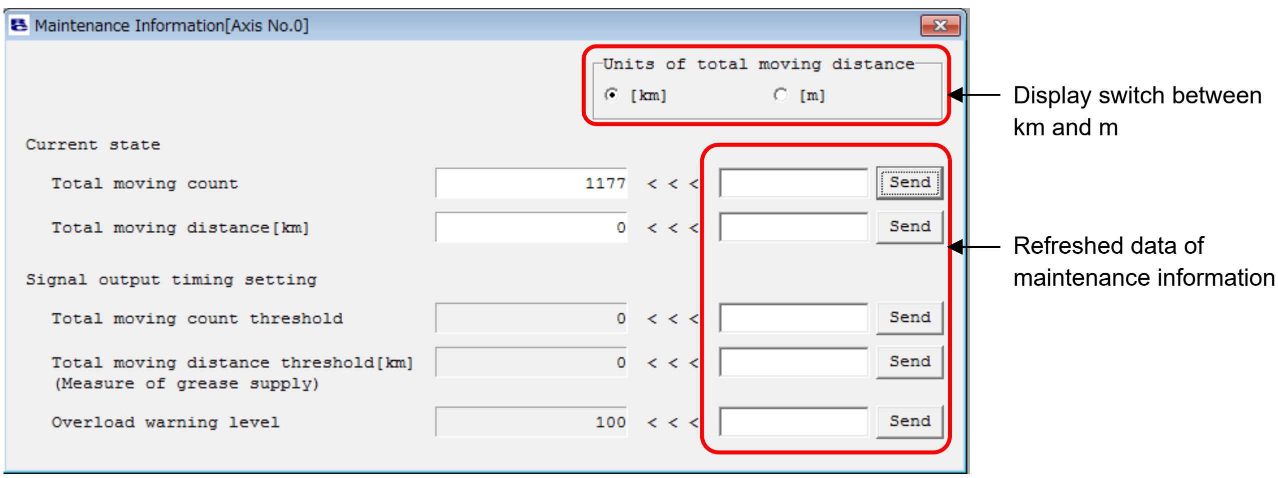


Fig. 9.35 Maintenance information Window (ELECYLINDER)

[1] Change of Total Number of Movements and Total Driving Distance
Set a number to the maintenance information update data of the total number of movements or the total driving distance and click **Update** button, and a change will be made to the total number of movements or the total driving distance. (Password is required.)

[2] About Target Value for Total Number of Movements and Total Driving Distance
Set a target value other than 0 to the total number of movement and the total driving distance, and a message level alarm (Maintenance Alert 1 / Maintenance Alert 2) will get displayed when the number exceeds the target.
In order to set the target value, set a number to the maintenance information update data and click Update button.

Overload Warning Load Level Ratio

With the motor raising temperature assumed to generate the overload alarm set as 100%, when the motor temperature exceeds the rate set in this window, the LED lamp gets turned on in green as the overload warning, and notification will be made in Maintenance Alert 3 window at the same time.

Overload warning level setting
Set a number to the maintenance information update data of the overload warning level and click **Update** button, and the setting can be established.
Set it to 100, and judgement will not be conducted.

[Example of use for Total Drive Distance Times]
For an instance, it is recommended to have a grease supply on the scraper area every 300km in the regular inspections when the drive distance exceeds 300km within 3 months for RCPW Rod Type Actuator.
(Have a supply every 3 months for those which do not exceed it.)
In this case, set '300' in Parameter No. 148 at the start of the first run, and an alarm notifies that grease supply is required when the drive distance exceeds 300km.
After the grease supply, set multiple numbers of 300, such like 600, 900, in Parameter 148, and the notification continues to be made for the timings of grease supply.

⦿ For ELECYLINDER (Software Version V13.02.00.00 and later for 200V AC Servo Motor and Software Version V13.02.02.00 and later for Pulse Motor)
The Operating noise adjustment feature is added to the Maintenance window.
Click on the **Operating noise adjustment** button, and the Operating noise adjustment window should open.
In the Operating noise adjustment window, the level setting from 0 to 14 is available.
When there is noise occurred, especially during stopping or in low speed (50mm/sec or less), set the level up by one and click on the **Setting** button. Set the level up one by one. It could improve the noise.
However, setting the level too high might generate vibration.

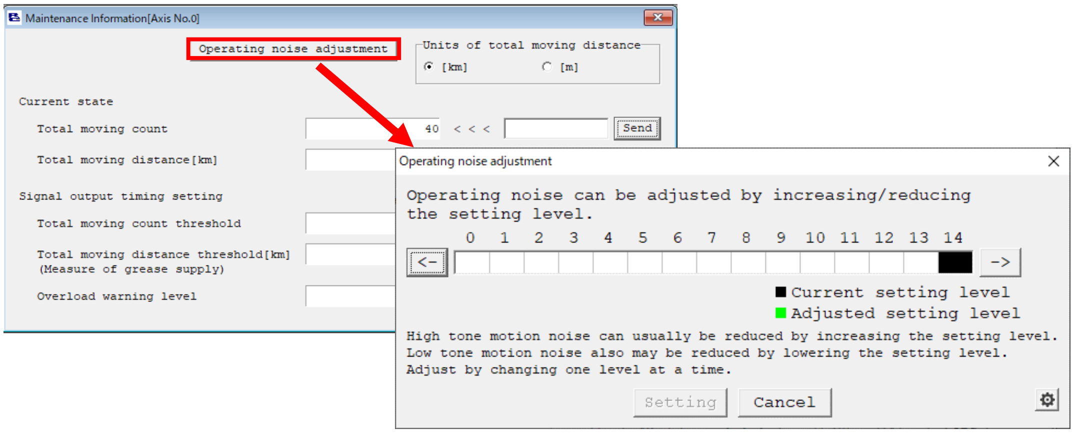


Fig. 9.36 Operating noise adjustment Window

◎For RCON (Software Version V13.00.00.00 and later)
In addition to the display of ELECYLINDER in the previous page, travel distance after lublication, Last time lubricated and actuator replacement time should also be displayed when both controller and actuator support the actuator recognition feature.
Set values in each item, click Update button and the values in each item should be changed.

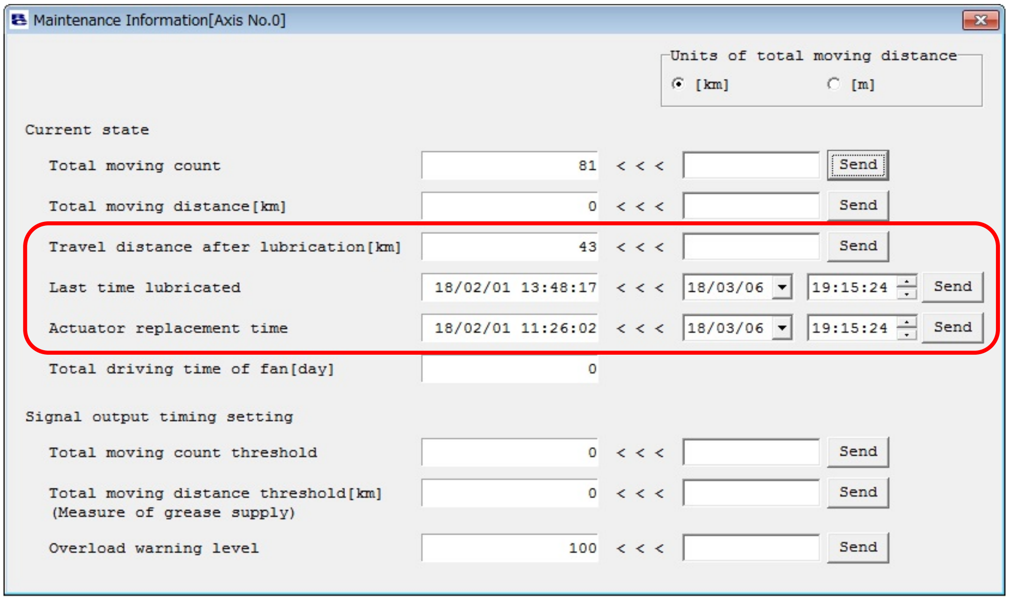


Fig. 9.37 Maintenance information Window (RCON)

Also, “Last time lubricated” displayed on the maintenance information window can be updated to the current time, and the travel distance after lublication can be reset to 0. It can be executed by selecting [Setting] - [Controller] - [Lubrication data and time renewal] menu in the main window.

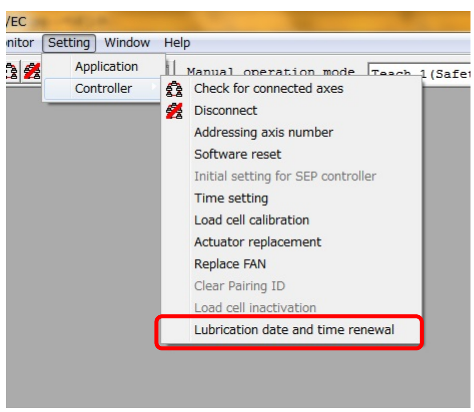


Fig. 9.38 Lubrication data and time renewal menu

9.6 Gateway Data Monitor

(Note) It can be displayed only on RCP6S Gateway Unit.

Driving source consumption current should be displayed for versions from V10.02.00.00 before V11.00.00.00.
Monitoring of driving source consumption current became available from V11.00.00.00.

Select [Monitor] → [Gateway Data Monitor] in the main menu when monitoring is required.

(1) Versions from V10.02.00.00 before V11.00.00.00
Current value [A] should be displayed since the screen is turned on.
The peak values are unbuffered data acquired in the acquirement cycles (approx. 80msec) of the PC software.

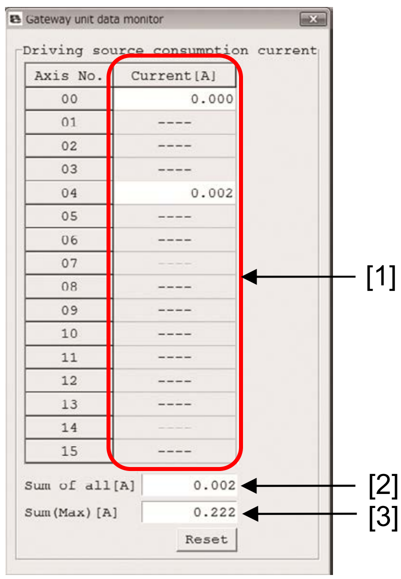


Fig. 9.39 Driving source consumption current Window

[1] Current [A]
It shows the peak values of driving source consumption current on each axis.
[2] Sum of all [A]
It shows the peak values of the total driving source consumption current on all the axes.
[3] Sum (Max) [A]
It shows the sum of peak values on all axes since the power was turned on.
Data can be cleared by pressing Reset button.

(2) Versions after V11.00.00.00
A monitoring window was added on the left to show driving source consumption current.
The displays of current [A], sum of all [A] and Sum (Max) [A] are the same as those before V11.00.00.00.
Monitoring starts by pressing the monitoring start button ▶ .
Display of driving source consumption current also starts once the monitoring start button ▶ is pressed.
Recording can be performed for ten minutes at maximum regardless of number of axes.

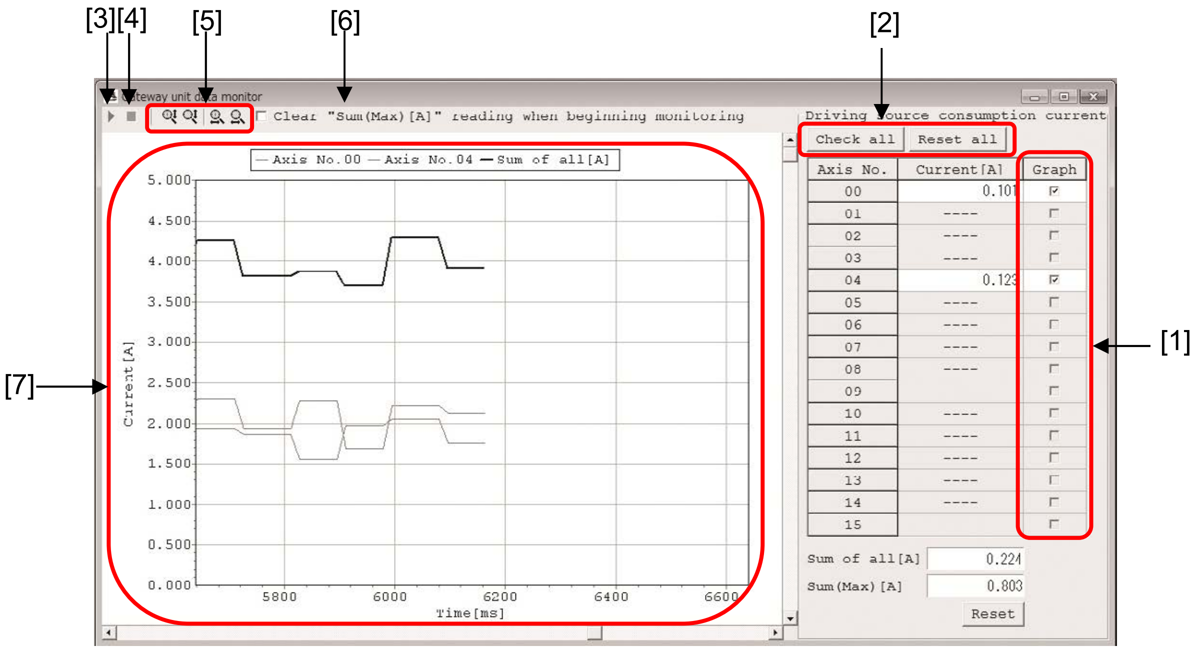


Fig. 9.40 Driving source consumption current monitor Window

[1] Graph
Select the axis number to be displayed in [7] Chart. Click in a box □ at the axis number to be monitored to put a check mark ✓. Monitor display will be performed on the axis numbers with a check mark ✓.

[2] Check all / Reset all
Click Check all button and all the axis numbers will be selected. A check mark ✓ will be put on every axis number.
Click Reset all button and all the axis numbers will be cancelled. All the check marks ✓ will be removed from the axis numbers and the boxes will become blank.

[3] Monitoring Start Button ▶
Display of monitoring and driving source consumption current gets started.
If a check mark (✓) is put on [Clear "Sum (Max)[A]" reading when beginning monitoring], the "Sum (Max)[A]" will be cleared before monitoring is started.

[4] Monitoring Stop Button ■
Monitoring gets stopped.

[5] Vertical / Horizontal Zoom-in / Zoom-out Buttons
Zooming in and out of vertical or horizontal axes continues while a buttons is held down and stops once it is released.

[6] [Clear “Sum (Max)[A]” reading when beginning monitoring] Click box.
If a check mark (✓) is put, the Sum (Max)[A] will be cleared before monitoring is started.

[7] Chart
The current [A] of the selected axis number should be displayed in waveform.
The current [A] is the drive source consumption current [A] on each axis.
Vertical axis shows the current [A] and the horizontal shows the time [msec].
The colors of the lines for the waveforms are as shown below.

— Axis No.00	— Axis No.01	— Axis No.02	— Axis No.03
— Axis No.04	— Axis No.05	— Axis No.06	— Axis No.07
--- Axis No.08	--- Axis No.09	--- Axis No.10	--- Axis No.11
--- Axis No.12	--- Axis No.13	--- Axis No.14	--- Axis No.15
— Sum of all[A]			

9.7 Network Data Monitor

* Applicable versions: V11.00.00.00 and later
- This feature is not applicable for the controllers in following types.
- Multiple-axis controllers : MCON-C/CG, MSEP-C, MSCON-C, RCON
- Controllers with PLC features : MCON-LC/LCG, MSEP-LC, SCON-LC/LCG

The data received by the host PLC and the fieldbus can be monitored when the following parameter settings are established in the controllers applicable for the fieldbus.
Monitoring window will be closed once the software reset gets conducted while the monitoring window is in display.

User Parameter No.	Name	Setting value (Note 1)
84	Fieldbus Operation Mode	Any number but 0
87	Network Type	Any number but 0

Note 1 Values available for setting differ depending on controllers.

9.7.1 How to Display Monitoring Window

The monitoring window can be displayed in the following way.
Also, when 0A3 Error (Position Indication Information Data Error) is occurred, the monitoring window will be displayed automatically if the controller is in AUTO Mode.

No.	Way to Display
1	Display from main menu in main window
2	Display from tree view in main window
3	Display from axis status window
4	Display from network information window
5	Displayed automatically if the controller is in AUTO Mode when 0A3 Error (Position Indication Information Data Error) is occurred

[Display from main menu in main window]

[1] Select [Monitor] -> [Network Data Monitor] from the main menu.

(Note) It is available to select while online.

(Note) A message showing “There is no selected axis” will be displayed when controllers that are not to be shown in the monitoring window are connected, such as a controller not applicable for the fieldbus or a controller with the parameters in No. 84 and 87 set to 0.

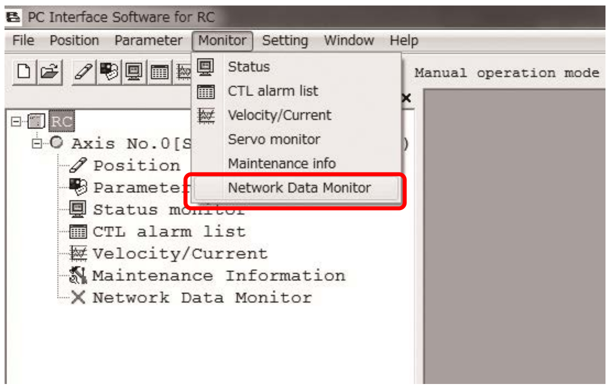


Fig. 9.41 Main menu Window

[2] When there is one axis that is applicable for the fieldbus and the parameters in No. 84 and 87 are set to a number other than 0, the monitoring window will be displayed.
When a controller possesses multiple axes, the axis select window opens.
Select axes to be shown in the monitoring window. The monitoring window gets displayed.

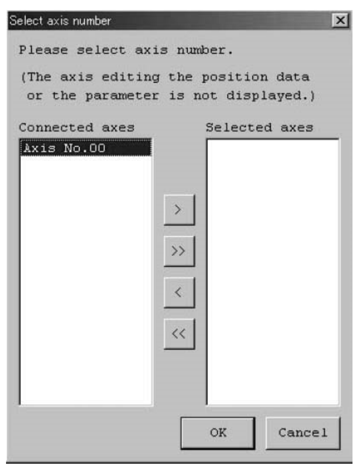


Fig. 9.42 Select axis number Window

[Display from tree view in main window]

Select the network data monitor in the tree view.

The monitoring window gets displayed.

(Note) “Network Data Monitor” will be shown in the tree view if the controller is applicable for the fieldbus.

(Note) When the parameters in No. 84 and 87 are set to 0, the monitoring window will not be displayed even if selected.

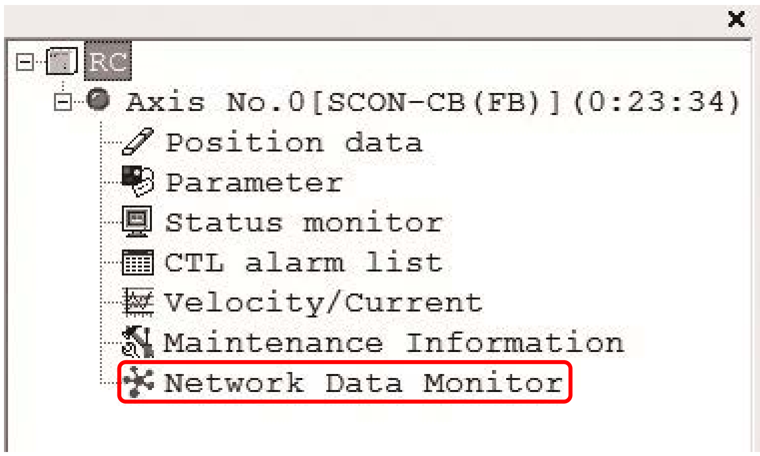


Fig. 9.43 Tree view Window

[Display from axis status window]

Select the network monitor in the axis status window.

Select the network data monitor in the tree view.

(Note) “Network Monitor” tab will not be displayed when controllers that are not to be shown in the monitoring window are connected, such as a controller not applicable for the fieldbus or a controller with the parameters in No. 84 and 87 set to 0.

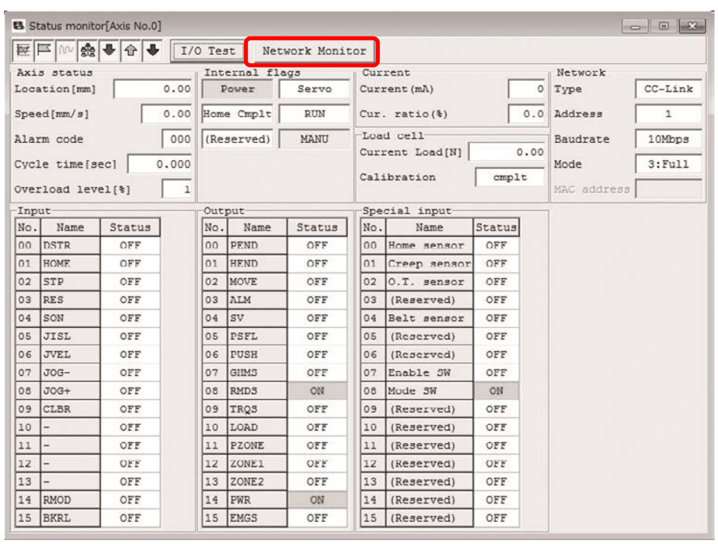


Fig. 9.44 Axis status monitor Window

9. Monitoring

[Display from network information window]

Select the network monitor in the network information window.
Select the network data monitor in the tree view.

(Note) "Network Monitor" tab will not be displayed when controllers that are not to be shown in the monitoring window are connected, such as a controller not applicable for the fieldbus or a controller with the parameters in No. 84 and 87 set to 0.

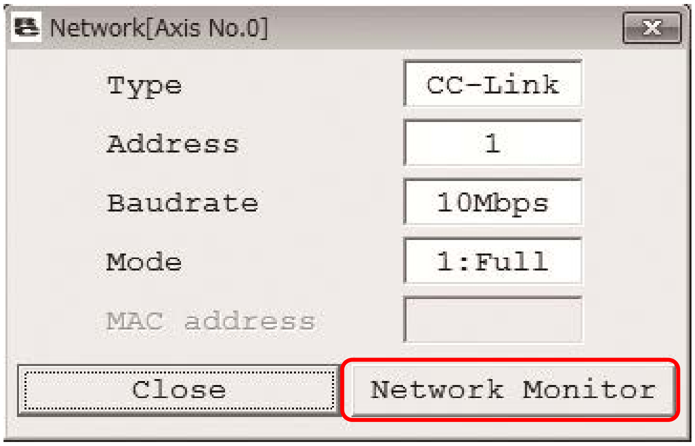


Fig. 9.45 Network information Window

9.7.2 Monitoring Window

Following monitoring windows will be displayed.

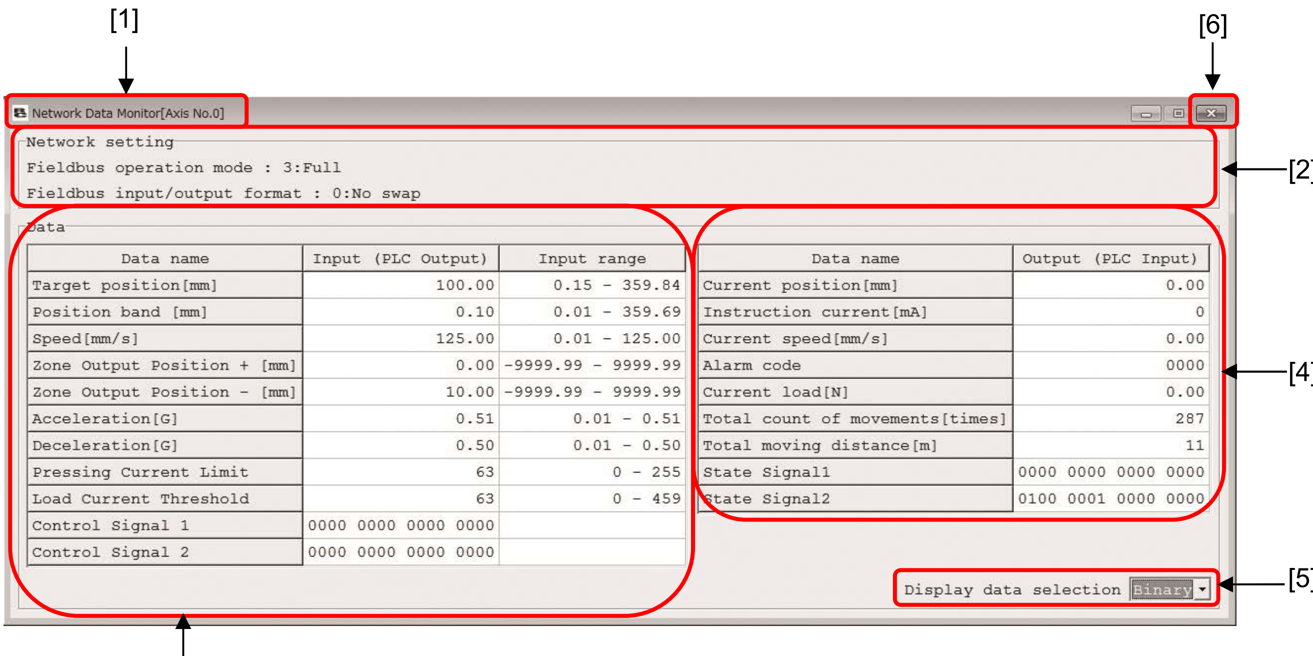


Fig. 9.46 Network Data Monitor Window

[1] Screen Caption

It is shown as Network Data Monitor [X].
In the part expressed with "X" should be replaced with the display of either the axis number, axis name or axis number + axis name depending on the applicable controller and tool setting.

[2] Network Setting Part

Monitoring information and the setting status of the related parameters should be displayed.

Displayed Contents

No.	Contents	Remarks
1	Fieldbus Operation Mode	
2	Fieldbus Output Format	
3	Velocity Unit in Semi Direct Mode	It is not displayed in any mode except for Semi Direct Mode

[3] Input Data Monitoring Part
Contents, values and input range of the received data (from PLC to controller) should be displayed. The values should be displayed in the swapped form or converted unit, not in the real data forms of the received data.
The data to be displayed should be the contents in relation to the applicable controllers and operation modes. Refer to the sections for the input and output signal assignments in the instruction manual for the network to be used.
In those above, the occupation information should not be displayed.

[4] Output Data Monitoring
Contents and values of the sent data (from controller to PLC) should be displayed. As well as the input monitoring, the values should be displayed in the swapped form or converted unit.
As well as the input data monitoring part, the data to be displayed should be the contents in relation to the applicable controllers and operation modes.
In those above, the occupation information should not be displayed.

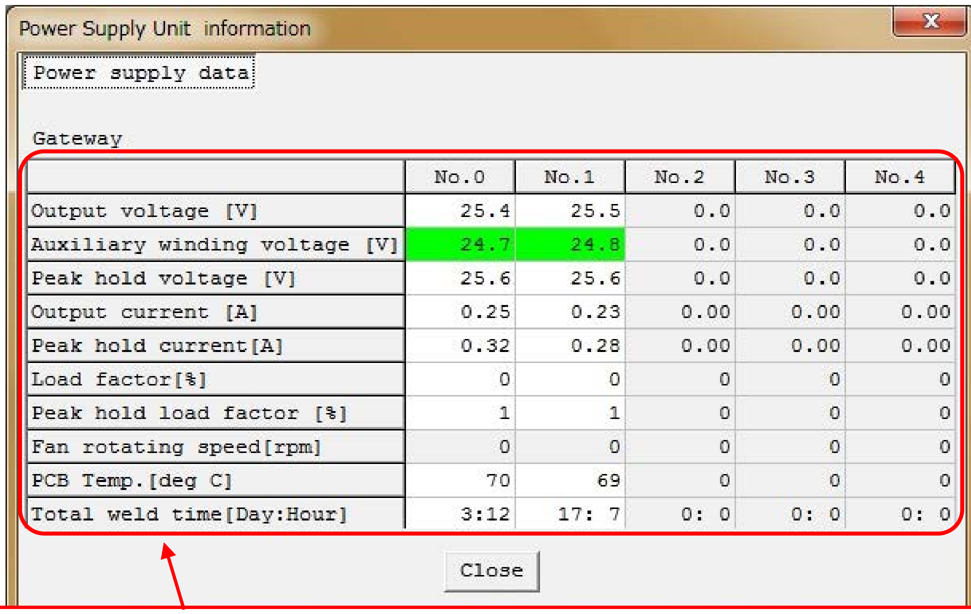
[5] Signal Data Display Format Part
Display of the control signals and status signals can be selected from binary numbers and hexadecimal numbers.

[6] Close Button
Click this button and this window closes.

9.8 Power Supply Unit information window

Select [Monitor] → [Power Supply Unit] in the main window and PSA-24 Power Supply Unit Information window will be displayed. (Software Version V13.00.00.00 or later)
When RCON Gateway Unit and PSA-24 Power Supply Unit are connected and communication with Modbus is available, power supply unit and power source data should be displayed.

[Displayed contents]
Output voltage, Auxiliary winding voltage, Peak hold voltage, Output current, Peak hold current, Load factor, Peak hold load factor, Fan rotating speed, PCB Temp., Total weld time



	No.0	No.1	No.2	No.3	No.4
Output voltage [V]	25.4	25.5	0.0	0.0	0.0
Auxiliary winding voltage [V]	24.7	24.8	0.0	0.0	0.0
Peak hold voltage [V]	25.6	25.6	0.0	0.0	0.0
Output current [A]	0.25	0.23	0.00	0.00	0.00
Peak hold current[A]	0.32	0.28	0.00	0.00	0.00
Load factor[%]	0	0	0	0	0
Peak hold load factor [%]	1	1	0	0	0
Fan rotating speed[rpm]	0	0	0	0	0
PCB Temp.[deg C]	70	69	0	0	0
Total weld time[Day:Hour]	3:12	17: 7	0: 0	0: 0	0: 0

The background color should change depending on the status of the acquired status of the power supply unit.

Auxiliary winding voltage	: Yellowish green when 15V or more and white when 10V or less
Load factor	: Yellowish green when 330W with fan equipped and white when 220W with no fan equipped
Fan rotating speed	: Gray when no fan equipped, white when fan in normal operation, yellow when in warning and red when error

Fig. 9.47 Power Supply Unit information window - Power Supply data

10. Setup

10.1 Setting of application Window

Click **Setting** from the main menu, and then select **Application**.

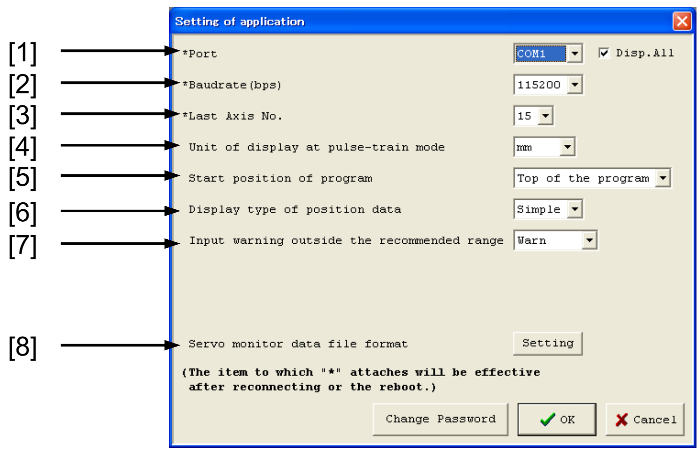


Fig. 10.1 Setting of application Window

[1] Port
When is clicked, the serial port list to communicate with the controller is displayed. Select port from the list. If there is not check mark in the box of "Show All", the COM ports detected automatically are shown. With check mark, all the COM ports are shown.

[2] Baud rate
When is clicked, the communication baud rate the serial port list is displayed. Select baud rate from the list.
* The baud rate selected here is used only in the communication between this application and controller. It does not affect the communication speed parameters of the controller.

[3] Last axis No.
When is clicked, the axis No. list is displayed. Select axis No. intended for connected axis check.
* Axes of numbers greater than the value selected here will not be checked for connection. Select an appropriate axis number after checking the axis numbers of the connected axes.

[4] Unit of display at pulse-train mode
When is clicked, units of display [mm], [pulse] in pulse-train mode are displayed. For pulse sequence input controller such as PCON-PL/PO, units such as the current position on the status monitor window (Fig. 9.1) can be changed.

[5] Start position of program (V8.03.00.00 or later)
When is clicked, it can be selected whether the simple program is to be started from the cursor position or the top of the program.

[6] Display type of position data (V8.03.00.00 or later)
When is clicked, the way to show the position data when the position data edit window is displayed can be selected whether it should be shown with the simple display or normal display.

[7] Input warning outside the recommended range (V8.03.00.00 or later)
When is clicked, the display can be selected from show/not to show of the alarm issued when the input value is out of the recommended range and may cause an abnormal noise or vibration at the time of parameter or position data input.

[8] Servo monitor data file format (V8.03.00.00 or later)
When is clicked, the file format to save the data monitored in the servo monitoring window can be set.

Changing any of the items in [1] to [3] and then clicking **OK** will display the re-connection confirmation window shown in Fig. 10.2. To reflect the change, click **Yes** to reconnect the axes.

* The change will become effective once the application is restarted or the axes are reconnected.

Fig. 10.2 Re-connection Confirmation Window

In the version V10.00.00.00 and later, the axis number can be displayed in the axis display in Application Setting Window such as in the tree view.

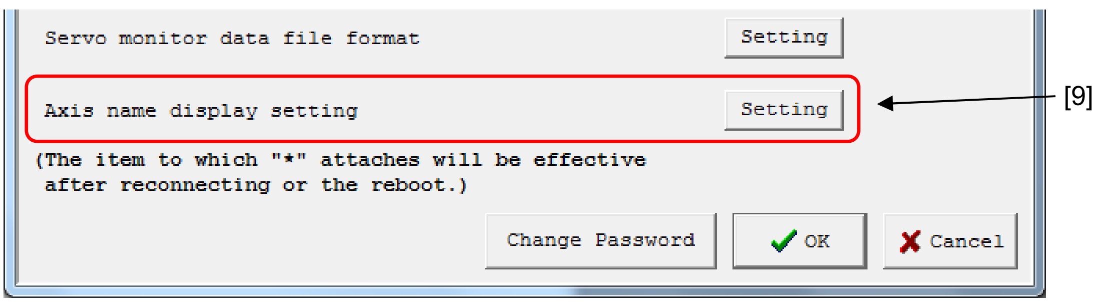
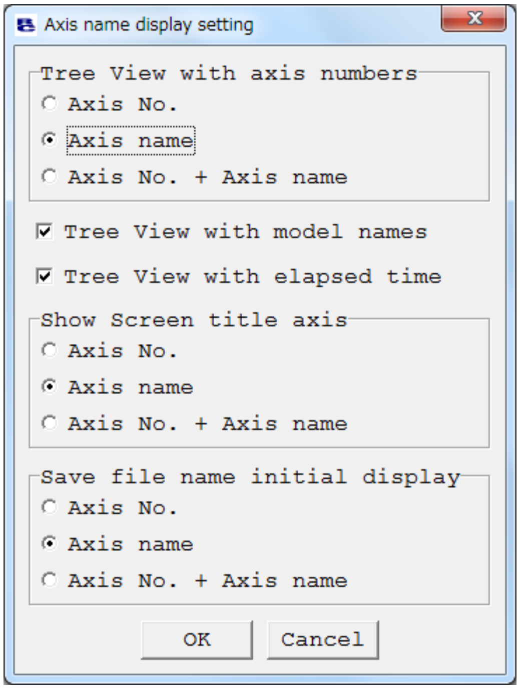


Fig. 10.3 Setting of application Window (Axis name display setting) (Version V10.00.00.00 or later)

[9] Axis name display setting
Press this button and Axis Display Window is displayed.
Setting for axis display shown in tree view and so on can be conducted.

[Axis display setting]



■ Setting details

[1] Tree View with axis numbers: The way to display each axis in the tree view in Main Window can be selected from the Axis No., Axis name and combination with axis No..

[2] Tree View with model names: To display or hide the controller name can be selected.

[3] Tree View with elapsed time: To display or hide the time passed since the controller has started up can be selected.

[4] Show Screen title axis: The way to display axis number added in the window titles at the start of each window such as Edit Parameter Window and Edit Position Data Window can be selected from the axis number, axis name and combination with axis number.

[5] Save file name initial display: The file name displayed initially when saving files for parameters and position data can be selected from the axis number, axis name and combination with axis number.

Fig. 10.4 Axis name display setting Window

[Axis name setting/editing]

To set or edit the axis name can be conducted by opening Axis name display setting window from the popup menu displayed when right-clicking on the tree view in Main Window.

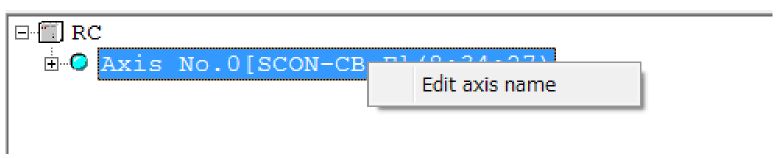


Fig. 10.5 Right-click axis display part in tree view in Main Window

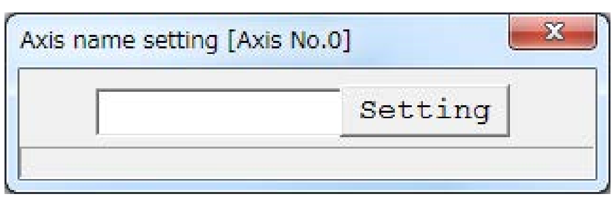


Fig. 10.6 Axis name setting Window

The settable number of characters in the axis name is 12 in half-size font (6 in full-size font). Axis No. will be shown when no setting is conducted.

In the version V10.00.00.00 and later, only in SCON-CB controller, setting to make the data acquirement of the servo monitor in high speed is available in Application Setting Window.
By setting it in high speed, the graph display (update) in the servo monitor becomes fast.

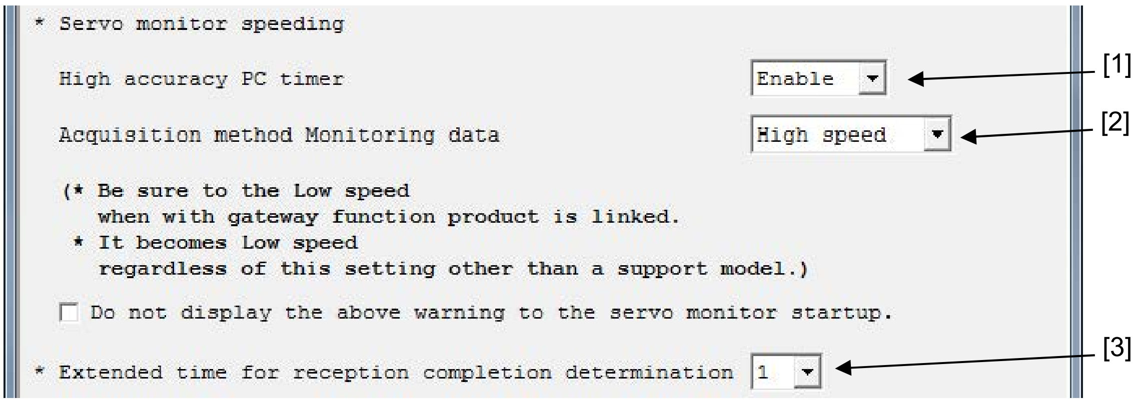


Fig. 10.7 Application Setting Window (High-Speed Servo Monitor)

[1] High accuracy PC timer: Select whether to make the timer operation in the PC to high precision at the servo monitor startup. Have SCON-CB and the models other than SCON-CB also set effective.

[2] Acquisition method Monitoring data:
Select from low / mid / high speed for data acquirement at monitoring. Setting to high speed makes the servo monitor display (update) fast. Regardless of the setting, operation should be in low speed for the models other than SCON-CB.

[3] Extended time for reception completion determination:
Set it for adjustment in case standard communication cannot be held in normal condition in the settings of [1] and [2]. (Unit is [msec].)
Make the value bigger little by little in case connection between the PC and controller cannot be established and try to reconnect.

In the version V13.00.04.00 and later, whether to have the default with ripple compensation (no check mark) or without ripple compensation (with check mark on) can be set up in the application setting window.

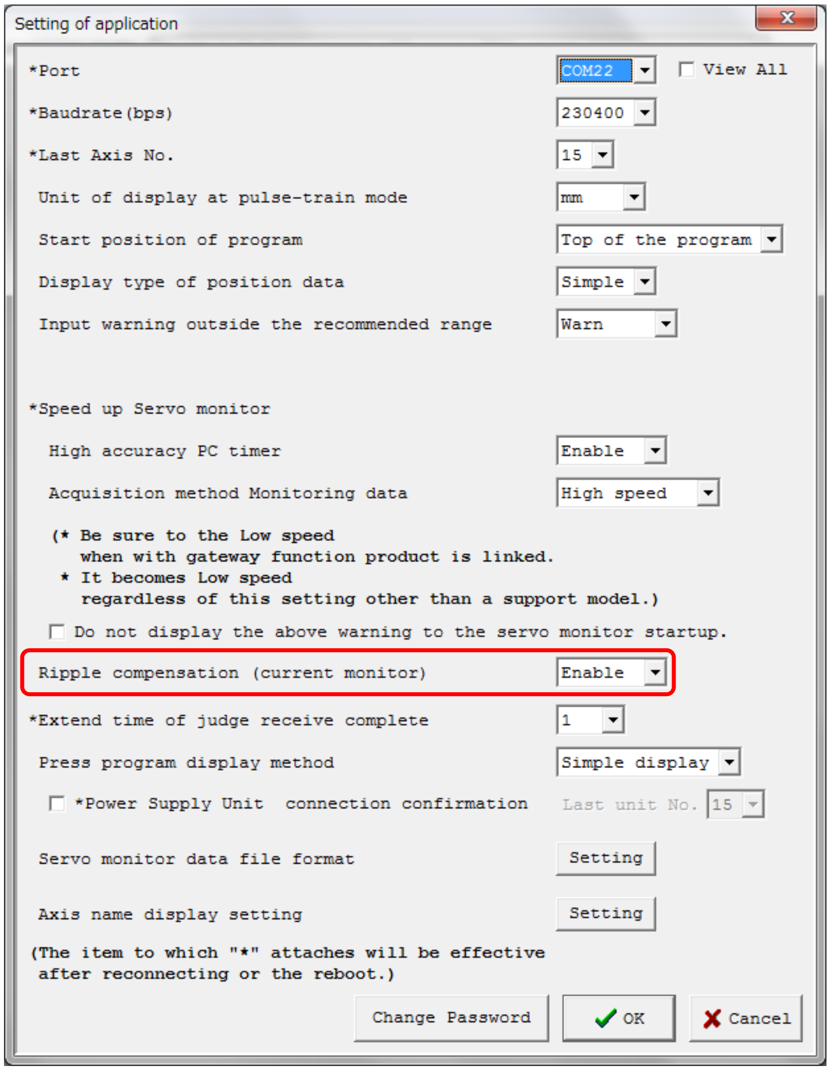


Fig. 10.8 Application Setting Window (with Ripple Compensation (Current Monitor))

[1] Ripple Compensation (Current Monitor)

Setting	Default of Ripple Compensation in Status Window and Speed / Current Monitor Window	
Enable	With Ripple Compensation	With no check mark
Disable	Without Ripple Compensation	With check mark on

⚠ Caution:

1. Exercise precaution to the following when using the high-speed servomotor feature.

(1) When SCON-CB (controller applicable servomotor acceleration) or a controller equipped with the gateway feature *1 is connected, servomotor acceleration cannot be utilized.
Have either [1] or [2] below conducted.
Utilizing servomotor acceleration without conducting either of them may disable normal communication.
[1] Set the monitoring data acquirement to “Low Speed” in Application Setting. (Set the high-speed servomotor feature invalid.)
[2] Do not attempt to connect a controller equipped with the gateway feature *1 when the servomotor is accelerated in SCON-CB.

*1 Products equipped with gateway feature: XSEL RC Gateway, ROBONET Gateway, MSCON, MOCON, etc.

(2) If a communication error occurs while in use of the high-speed servomotor feature, try the following step.
Set the monitoring data acquirement to “Low Speed” in Application Setting.
(Set the high-speed servomotor feature invalid.)

2. In cause of communication error occurrence such as “check sum error” during communication with a controller, try following countermeasures and the situation could be improved.
[1] Change “Extended Time for Reception Completion Determination” in Application Setting Window.
Increase the value gradually like 16, 32, 48 … to see if improvement can be confirmed.
Try [2] if no improvement can be confirmed even if increased to 128.
[2] Make “High accuracy PC timer” inactivated in Application Setting Window.

* By having countermeasures in [1] and [2], the communication period with a controller becomes longer.

10.2 Assigning an Axis Number

To assign an axis number to any model without axis number setting rotary switches, click **Setting** from the main menu and then select Controller → **Addressing axis number**.

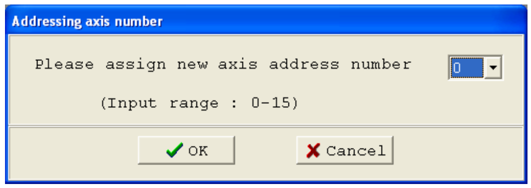


Fig. 10.9 Addressing Axis Number Window

In the axis number assignment window (Fig. 10.9), select a desired axis number and then click **OK**.
When the warning window (Fig. 10.10) appears, click **OK**. The axis number will change.

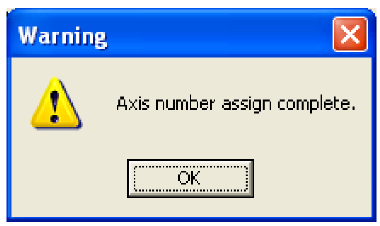


Fig. 10.10 Warning Window

In the addressing axis number window (Fig. 10.9), click **Cancel** to close the window.

10.3 Time Setting

(Note) This setting is available only with SCON-CA, SCON-CAL/CGAL, SCON-CB, PCON-CA, PCON-CB, ACON-CA, ACON-CB, DCON-CA, DCON-CB, ERC3 PIO Converter, (Version V8.03.00.00 or later, Version V9.07.00.00 or later for SCON-CAL/CGAL, Version V10.00.00.00 or later for SCON-CB, ACON-CB, DCON-CB, Version V10.02.00.00 or later for PCON-CB).

(Note) Establish the settings on Gateway Parameter Setting Tool for MSEP, MSCON, MCON and RCON.

From the main menu, click **Setting**, point to **Controller Setup**, and then select **Time setting**. On the axis selection window, select the target axis number. Refer to 4, "Axis Selection."

If a warning message appears when setting the axis number, switch the controller and PC software settings according to the message, and then click **Setting**, point to **Controller Setup**, and select **Time setting** to repeat setting from the beginning.

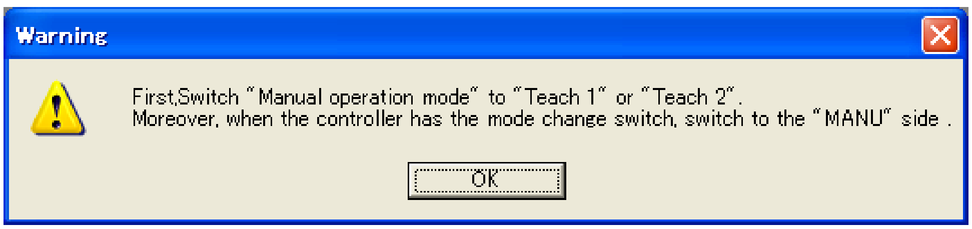


Fig. 10.11 Warning Message

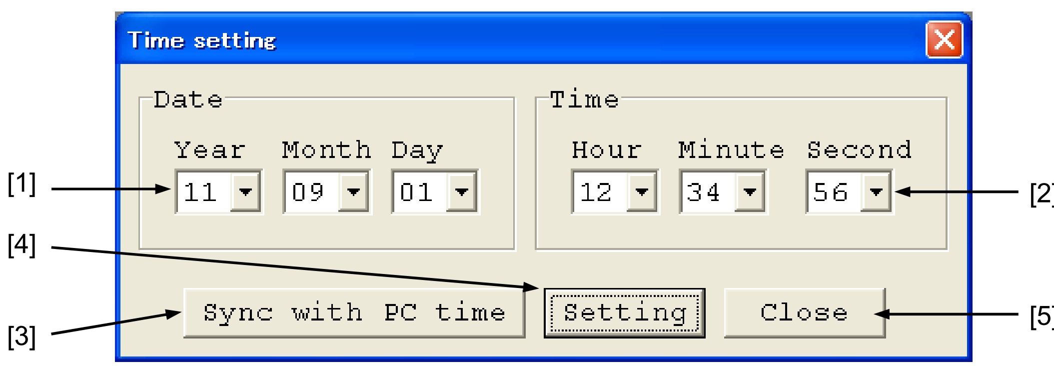


Fig. 10.12 Time setting Window

[1] Date setting area
Set the last two digits of the year (2010 → "10"), month, and day.

[2] Time setting area
Set the hours, minutes and seconds.

[3] Synchronizing to PC Clock
The date and time on the PC is set to the controller.
When the setting is complete, the message “The time setting was completed” (Fig. 10.13) appears.

Fig. 10.13 Time Setting Completion Message

If the setting was not successful, the message “It failed in the time setting” (Fig. 10.14) appears.

Fig. 10.14 Time Setting Failure Message

[4] **Setting** button
Clicking this button sets the date and time set in [1] and [2] to the controller.
When the setting is complete, the message “The time setting was completed” (Fig. 10.15) appears.

Fig. 10.15 Time Setting Completion Message

If the setting was not successful, the message “It failed in the time setting” (Fig. 10.16) appears.

Fig. 10.16 Time Setting Failure Message

[5] **Close** button
Clicking this button closes the time setting window.

10.4 Load Cell Calibration

(Note) This setting is available only with SCON-CA, SCON-CB controllers (Version V8.00.00.00 or later for SCON-CA).

From the main menu, click **Setting**, point to **Controller Setup**, and then select **Load Cell Calibration**. On the axis selection window, select the target axis number. Refer to 4, “Axis Selection.”

If a warning message appears when setting the axis number, switch the controller and PC software settings according to the message, and then click **Setting**, point to **Controller Setup**, and select **Load Cell Calibration** to repeat setting from the beginning.

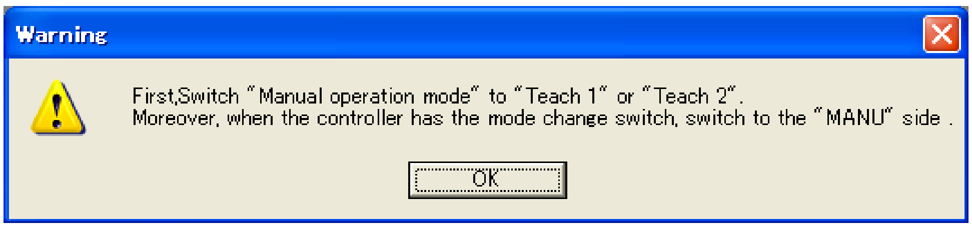


Fig. 10.17 Load Cell Calibration Axis Selection Window

(1) The message “Load cell calibration executing…” (Fig. 10.18) appears and the calibration is performed.

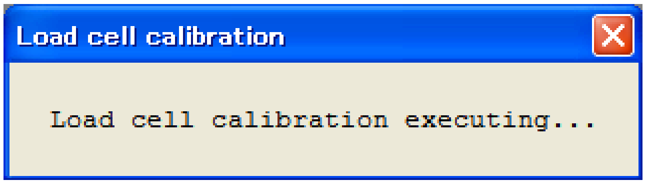


Fig. 10.18 Load Cell Calibration In-Progress Message

(2) When the calibration is complete, the message “The load cell calibration was completed” (Fig. 10.19) appears.

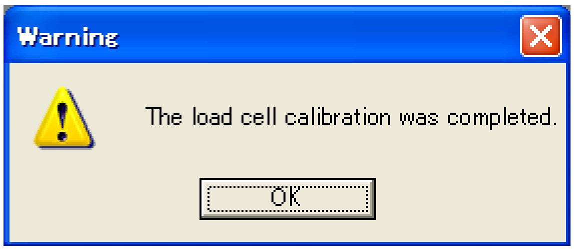


Fig. 10.19 Load Cell Calibration Completion Message

If the calibration was not successful, the message “It failed in the load cell calibration” (Fig. 10.20) appears. If this message appears, check the cable connection of the load cell, etc., and then perform the calibration again.

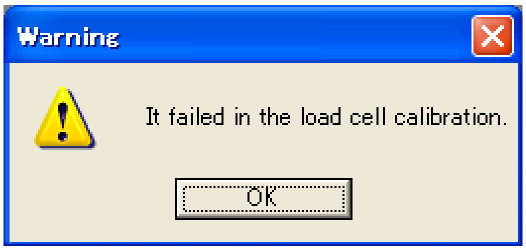


Fig. 10.20 Load Cell Calibration Failure Message

11. Version Information

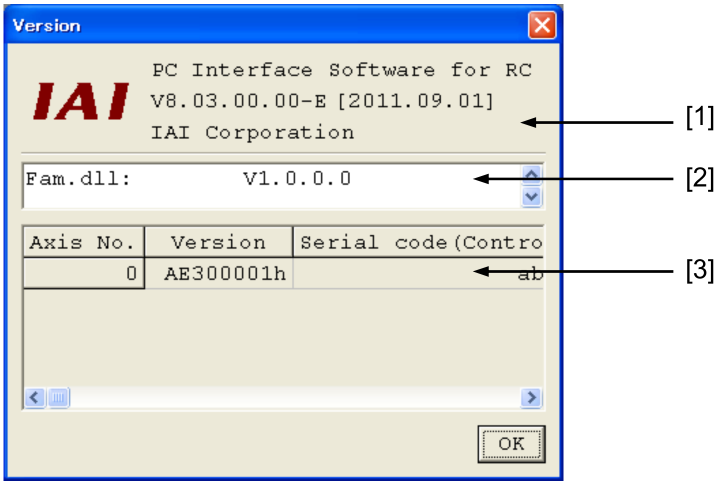


Fig. 11.1 Version Information

[1] Application version
The version of this application is shown.

[2] Version Information of each Function DLL (V8.03.00.00 or later)
In here, shows the version information of each function DLL.
Nothing will be shown if the DLL file does not exist in the same folder as the program executable file.

[3] Controller version
The software version and manufacturing information of each connected controller are shown.
(Manufacturing information may not be displayed depending on the controller type.)

In software version V13.00.00.00 or later more information should be displayed in Version Information window. Also, actuator information that is applicable for the administration information feature should also be displayed. The system identifies if both the actuator and the controller support the actuator recognition feature, and only when both of them support the feature, the available items (such as user memo) should be displayed. If not support, "----" should be displayed.
The user memo can be edited by inputting the system password set in the RC PC software.

The information should be displayed separately for the controller and the actuator.
Each item to be displayed is as shown below;

[Controller]
・Axis No.
・Version
・Controller (core) Ver.
・Serial code (Controller)
・PCB Type
・M-Info.
・ABU Ver.
・PIO converter
・ELECYLINDER I/F Ver.
・RCON Connection Ver.

[actuator]
・Axis No.
・Serial code (Controller)
・Function Ver.
・Actuator model number
・User memo

The construction of Version Information window for RCON is as shown below.

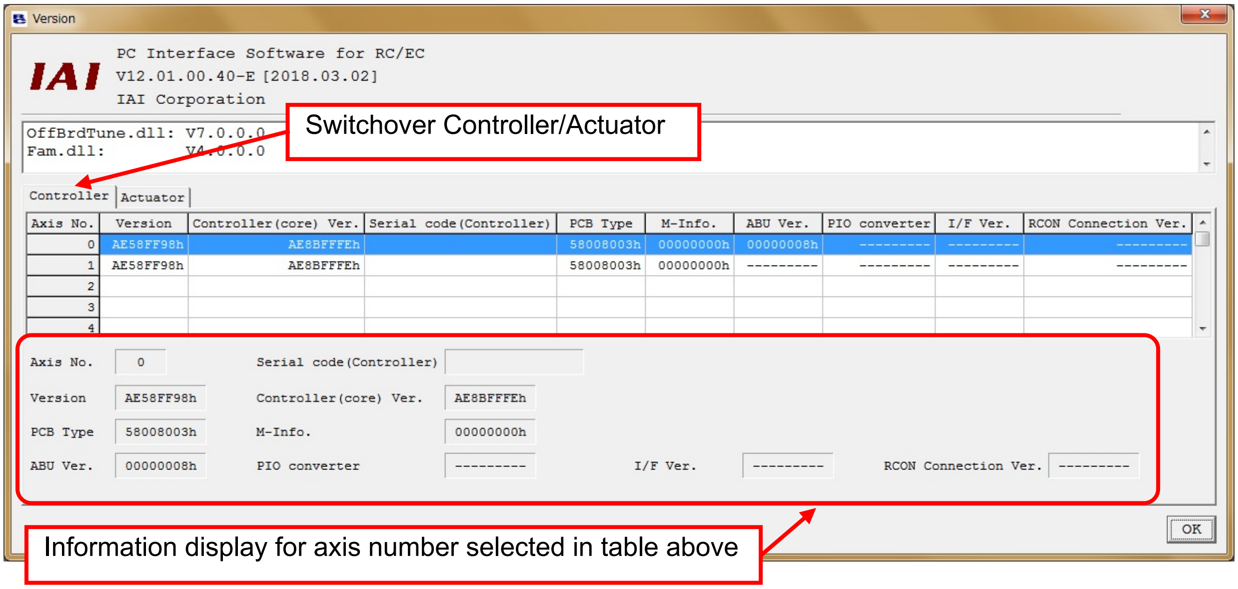


Fig. 11.2 Version Information Window (Controller Information Display)

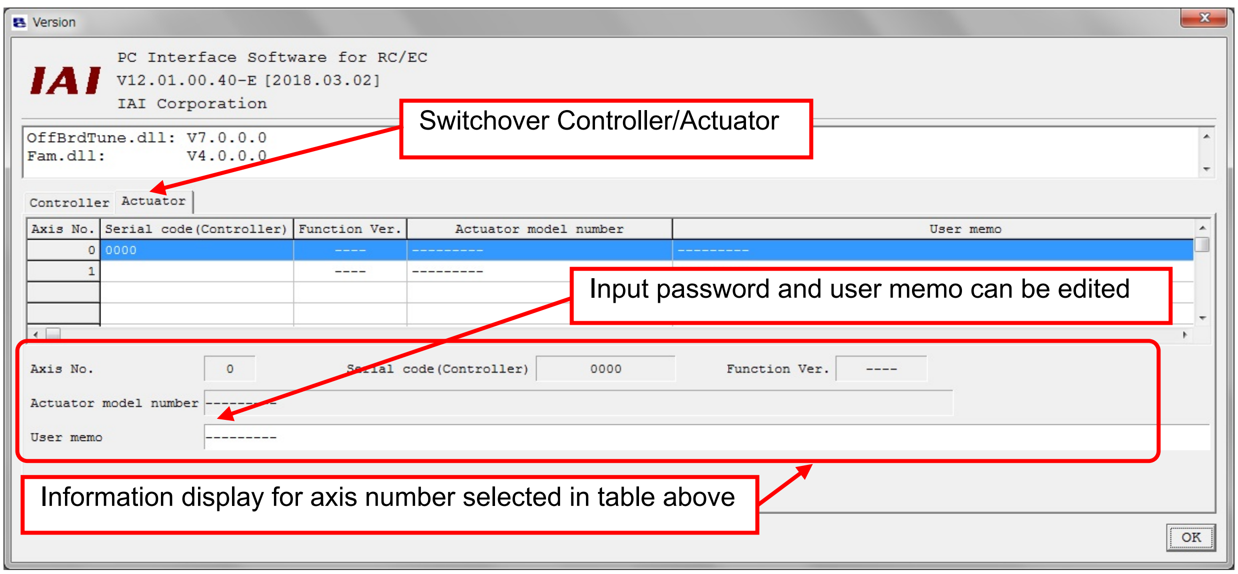


Fig. 11.3 Version Information Window (Actuator Information Display)

12. Smart Tuning Function (Version V8.03.00.00 or Later)

If RC PC software (Version V8. 03. 00. 00 or later) is installed, the key file (OffBrdTune.dll file) and such as AtrDatActuator_24V_PM_BU.oact that are required for the smart tuning function are also installed.

They are installed in the folder that the executable file for ‘RcPc PC PC software’ is stored.
Example of storage folder: C:\Program Files\IAI\RoboCylinder

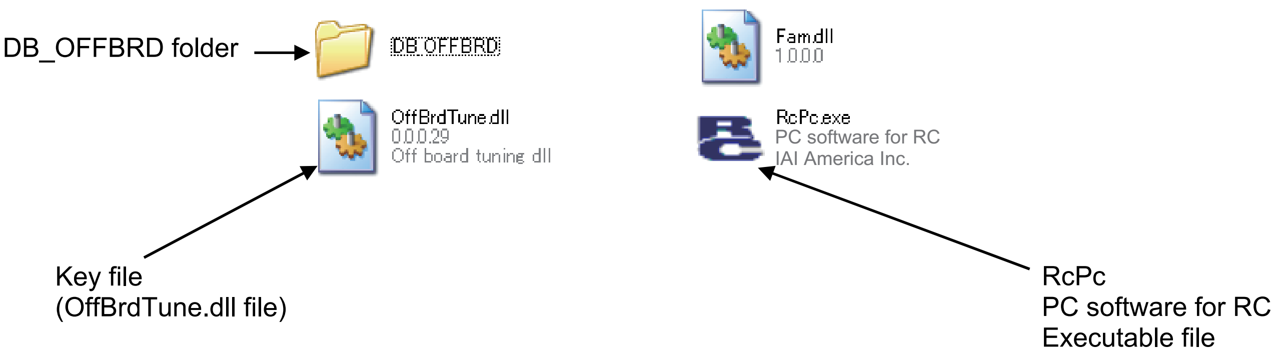


Fig. 12.1 Folder with RC PC Software Executable File Stored

In DB_OFFBRD folder, files listed below etc. are to be stored;
- AtrDatActuator_24V_PM_BU.oact
- DatRcrdAdjsted_24V_PM_BU.ocrd
- TblDatAdjstManuEasily.omnu
- DatLimtrAdjst.olmt

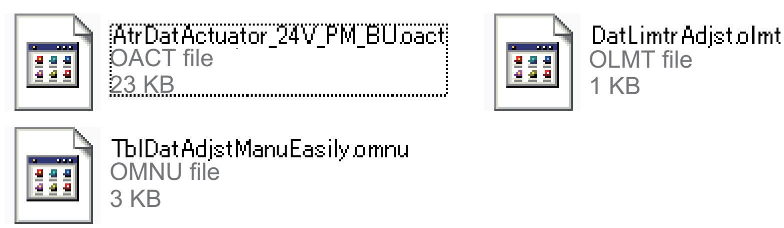


Fig. 12.2 Data Stored to DB_OFFBRD Folder

12.1 Restrictions

12.1.1 Actuator Applicable for Smart Tuning Function

Smart Tuning Function is available only on the actuators registered in the actuator attribute data (AtrDatActuator_24V_PM_BU.oact etc.).

12.1.2 Parameter Setting

Smart Tuning Function is available only when the parameters are set as shown below:

[1] User Parameter No.152 High Output Setting : 1 (Enabled)
[2] User Parameter No.144 Gain scheduling Upper Limit Multiplying Ratio (%) :
100 or less (gain scheduling function inactivated)

(Note) Gain scheduling is the function to change the gain in accordance with the number of motor rotation.
Gain scheduling function becomes activated when the value is set more than 100.

12.2 Outline of Smart Tuning Function

With the Smart Tuning Function, the following 5 operations can be performed.

[1] Setting of maximum acceleration/deceleration speed considering the indicated carrier load and velocity
[2] Setting of acceleration/deceleration speed to provide the shortest operation time figured out from the indicated carrier load and moving distance
[3] Overshoot judgment on S motion operation
[4] Test Run
[5] Cycle time calculation

The table below shows the screens that each function can be used.

List of Windows Each Function is supported

Function	[1]	[2]	[3]	[4]	[5]
Edit Position Data Window	○	○	○		
Test Run and Cycle Time Calculation Operation Window				○	
Cycle Time Calculation Window					○

12.2.1 Setting of maximum acceleration/deceleration speed considering the indicated carrier load and velocity

It is the function to set the maximum acceleration/deceleration speed available at the indicated carrier load and velocity.

12.2.2 Setting of acceleration/deceleration speed to provide the shortest operation time figured out from the indicated carrier load and moving distance

It is the function to set the combination of velocity and acceleration/deceleration that provide the shortest operation time for the indicated moving distance in several patterns of selectable combinations of the velocity and acceleration/deceleration with accordance with the carrier load.

When 12.0 [Kg] is indicated for the carrier load, for an instance, the combination of the velocity and acceleration/deceleration to provide the shortest operation time for each moving distance is as shown below:
[1] When 30.00 [mm] is indicated
⇒ Velocity and acceleration for shortest operation time : 250.00 [mm/sec], 0.70 [G]
[2] When 40.00 [mm] is indicated
⇒ Velocity and acceleration for shortest operation time : 300.00 [mm/sec], 0.50 [G]
(Note) The search of the combination of velocity and acceleration/deceleration for the shortest operation time refers to the test run plan time.

For a reference, the following table shows the list of the operation time for each moving distance.

List of Operation Time for Each Moving Distance

Carrier load [Kg]	Travel [mm]	Velocity [mm/sec]	Acceleration/Deceleration [G]	Operation Time [msec]
12.0	30.00	**250.00**	**0.70**	**156**
		300.00	0.50	161
	40.00	250.00	0.70	196
		300.00	**0.50**	**195**

12.2.3 Overshoot judgment on S motion operation

It is the function to judge if the indicated operation setting has the risk of overshooting.
In the S motion operation, there is a risk of overshooting in an operation setting with no enough acceleration (deceleration) time.
To avoid this, it is necessary to judge if the time setting has a risk of overshooting or not with a calculation of the acceleration (deceleration) time in the test run plan.

12.2.4 Test run

It is the function to have the actuator run for a trial with the indicated operation settings.
For the test run, the operation mode can be selected from trapezoid and S motion operations. Also, it is able to check the time spent from the operation start till PEND is issued.

12.2.5 Cycle time calculation

In this, the value figured out by the cycle time calculation with the indicated operation settings can be checked.

12.3 Operation in Edit position data Window

In this section, explains the following operations performed in Edit position data window.

[1] Setting of maximum acceleration/deceleration speed considering the indicated carrier load and velocity
[2] Setting of acceleration/deceleration speed to provide the shortest operation time figured out from the indicated carrier load and moving distance
[3] Overshoot judgment on S motion operation

12.3.1 Explanation of Window Screen

(1) Edit position data Window

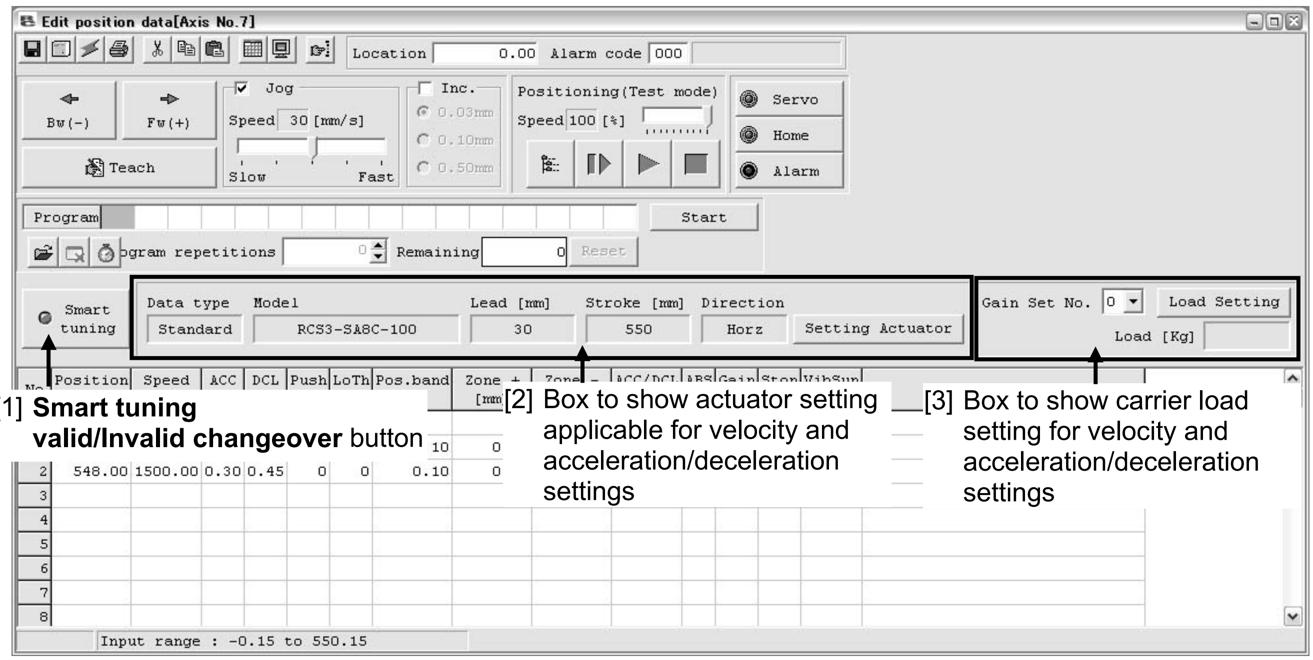


Fig. 12.3 Overall View of Edit position data Window

[1] **Smart tuning valid/Invalid changeover** button
This button can switch between valid and invalid of the smart tuning function in the position data edit process.
When the smart tuning is set invalid, the display is turned OFF.
The display is on when the setting is valid.
When it is set invalid, the shortest smart tuning setting display area gets shaded and setting is disabled.

Fig. 12.4 **Smart tuning valid/Invalid changeover** button (Invalid)

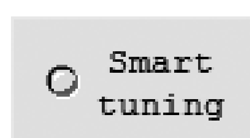


Fig. 12.5 **Smart tuning valid/Invalid changeover** button (Valid)

Fig. 12.6 Smart Tuning Setting Window (Function Invalid)

[2] Box to show actuator setting applicable for velocity and acceleration/deceleration settings

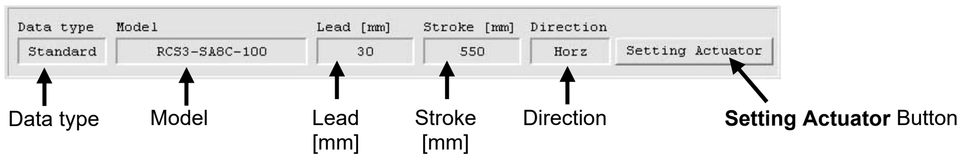


Fig. 12.7 Box to show actuator setting applicable for velocity and acceleration/deceleration settings

<u>Data Type</u> (Version V9.02.00.00 or later)
Data type can be selected from the standard and the special order if there is the actuator attribute data file for the special order.

<u>Model</u>
In here, shows the model code of the actuator currently set to the controller.

<u>Lead [mm]</u>
In here, shows the actuator lead [mm] currently set to the controller.

<u>Stroke [mm]</u>
In here, shows the actuator stroke [mm] currently set to the controller.

<u>Direction</u>
In here, shows the posture of the actuator currently set to the controller.

<u>**Setting Actuator** Button</u>
Click here and “Actuator setting for Vel and Acc setting” window (Fig. 12.9) opens.

[3] Box to show carrier load setting for velocity and acceleration/deceleration settings

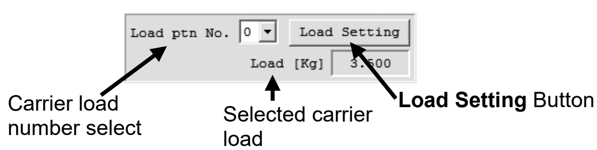


Fig. 12.8 Box to show carrier load setting for velocity and acceleration/deceleration settings

<u>Carrier load pattern number select</u>
Select the carrier load to be used for the velocity and acceleration/deceleration settings.
There are 4 options from 0 to 3 available to choose from.

<u>Selected carrier load</u>
In here, shows the carrier load set to the carrier load pattern number selected in the carrier load pattern number select.
Fig. 11.8 shows the case of 3.500 [Kg] being set to Carrier Load No. 0.

<u>**Load Setting** Button</u>
Click here and “Load Setting for Vel and Acc setting” window (Fig. 12.10) opens.

(2) Actuator setting for Vel and Acc setting

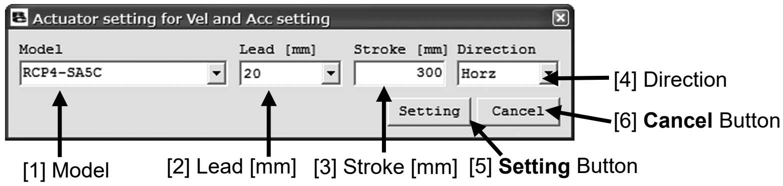


Fig. 12.9 Actuator setting for Vel and Acc setting Window

[1] Model
Select the actuator model code that is applicable for the velocity and acceleration/deceleration settings.
(Note) The models available to select from are only the ones registered in “Actuator Attribute Data File”.

[2] Lead [mm]
Select the lead of the actuator that is applicable for the velocity and acceleration/deceleration settings.
(Note) The lead available to select from is one listed up in the selected model code.

[3] Stroke [mm]
Select the stroke of the actuator that is applicable for the velocity and acceleration/deceleration settings.
(Note) The stroke available to select from is one from the stroke range listed up in the selected model code.

[4] Direction
Select the posture (horizontal or vertical) of the actuator that is applicable for the velocity and acceleration/deceleration settings.
(Note) The posture that can be selected is limited only to those supported in the selected model.

[5] **Setting** Button
Click this button and the settings of 1) to 4) are written to the controller and the window will close.

[6] **Cancel** Button
Click this button and the window will close without writing the settings of 1) to 4) to the controller.

(3) Carrier load setting for Smart tuning function

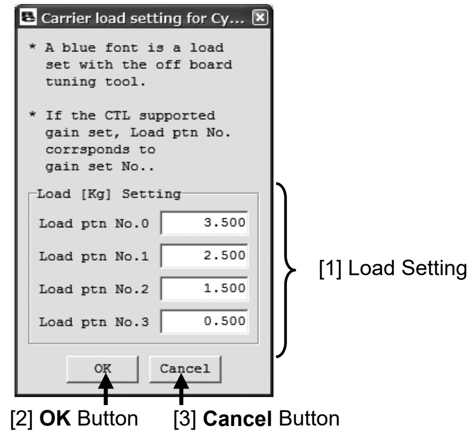


Fig. 12.10 Carrier load setting for Smart tuning function Window

[1] Load Setting
Input the carrier load to be set to Carrier Load Pattern No.0 to 3.
The range available to input is from 0 to the value of the maximum carrier load.
(Input the values in [kg] unit for the straight axis type and [kgm^2] for the rotary axis.)

[2] **OK** Button
Click this button and the setting of 1) is written to the controller and the window will close.

[3] **Cancel** Button
Click this button and the window will close without writing the setting of 1) to the controller.

(Note) Even if a change is made to the carrier load settings in this window, the acceleration/deceleration speed in the position data that is already set will not be changed to the speed suitable for the carrier load.

12.3.2 Explanation of Each Operation

(1) The way to operate the maximum acceleration/deceleration speed setting function against the indicated carrier load and velocity

[1] Click **Smart tuning** button to activate the smart tuning.
The display turns on and the function turns available.

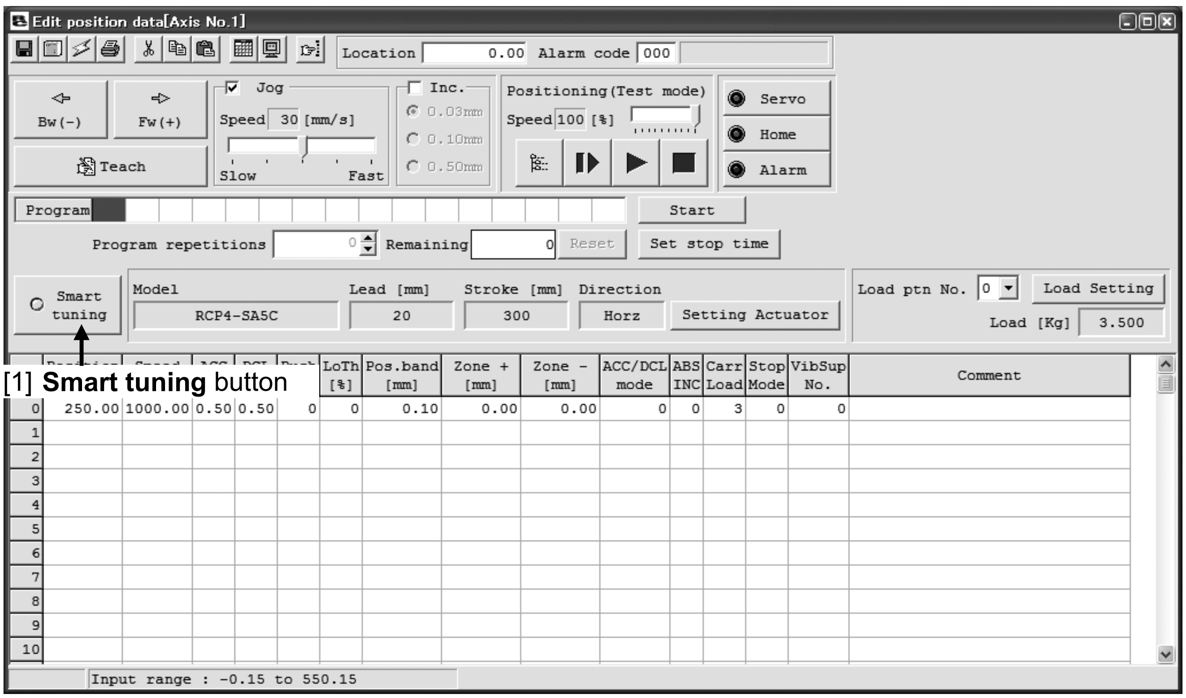


Fig. 12.11 **Smart tuning** button

[2] Click **Setting Actuator** button at the setting display of the actuator applicable for velocity and acceleration/deceleration settings.

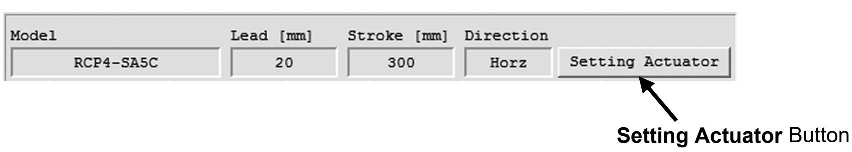


Fig. 12.12 Box to show actuator setting applicable for velocity and acceleration/deceleration settings

[3] Set the model code, lead stroke and the posture of the applicable actuator in "Actuator setting for Vel and Acc setting" window.
Click **Setting** button.

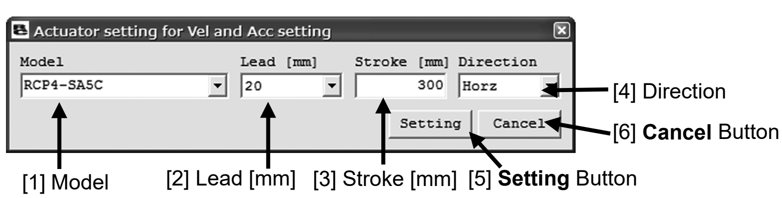


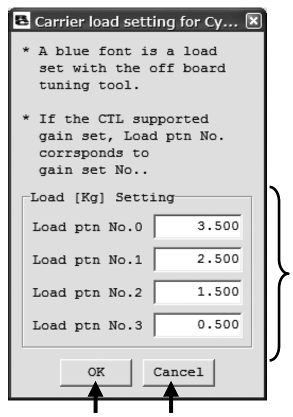
Fig. 12.13 Actuator setting for Vel and Acc setting Window

[4] Click **Load Setting** button at the setting display of the actuator applicable for velocity and acceleration/deceleration settings.

Load Setting Button

Fig. 12.14 Box to show carrier load setting for velocity and acceleration/deceleration settings

[5] Set the carrier load in “Carrier load setting for Smart tuning function” window.
Click **OK** button.



[1] Load Setting

[2] **OK** Button [3] **Cancel** Button

Fig. 12.15 Carrier load setting for Smart tuning function Window

[6] Select the carrier load number.

Load pattern No. select

Fig. 12.16 Box to show Carrier load setting for Smart tuning function

[7] Set the position and velocity in the blank position numbers.
(Note) In the position numbers with data already set, this function cannot be used.

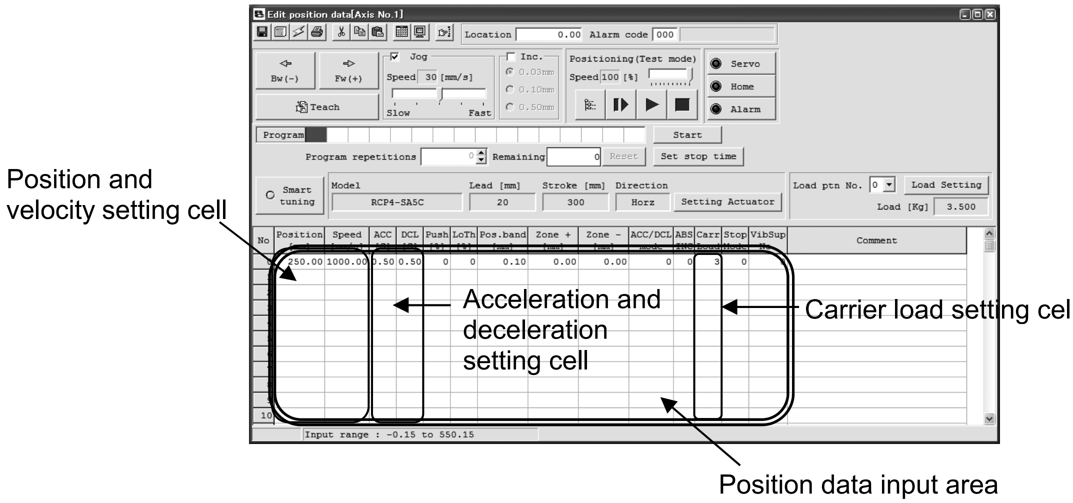


Fig. 12.17 Edit position data Window

(Note) If the set velocity exceeds the maximum velocity for the carrier load, overwrite the set velocity with the maximum speed for the carrier load.

(Note) If there is no value set in the velocity cell, the speed shown below will be set in the velocity cell. This value will also be used as the maximum acceleration speed in Step [9]. If a value is set in the acceleration and deceleration cells, they will be overwritten in Step [9].

Adoptable Speed for Each Condition

Conditions	Velocity set in the speed cell Speed used for max. acceleration/deceleration speed setting
Default speed ≤ Max. speed for carrier load	Default speed
Default speed > Max. speed for carrier load	Max. speed for carrier load

[8] “Smart tuning method select” window will appear. Select “Auto-configure Acc depend Carrier load and Vel.” and click **OK** Button.

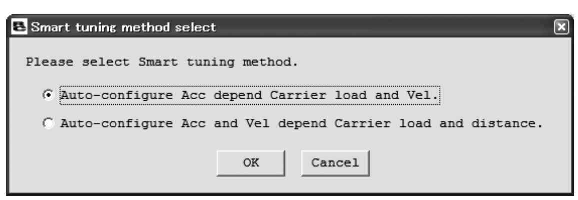


Fig. 12.18 Smart tuning method select Window
(Auto-configure Acc depend Carrier load and Vel being selected)

[9] The maximum acceleration and deceleration speed for the carrier load and velocity are set to the acceleration and deceleration.

(2) The way to operate the velocity and acceleration/deceleration speed setting function to figure out the shortest operation time from the indicated carrier load and moving distance

[1] Click **Smart tuning** button to activate the smart tuning.
The display turns on and the function turns available.

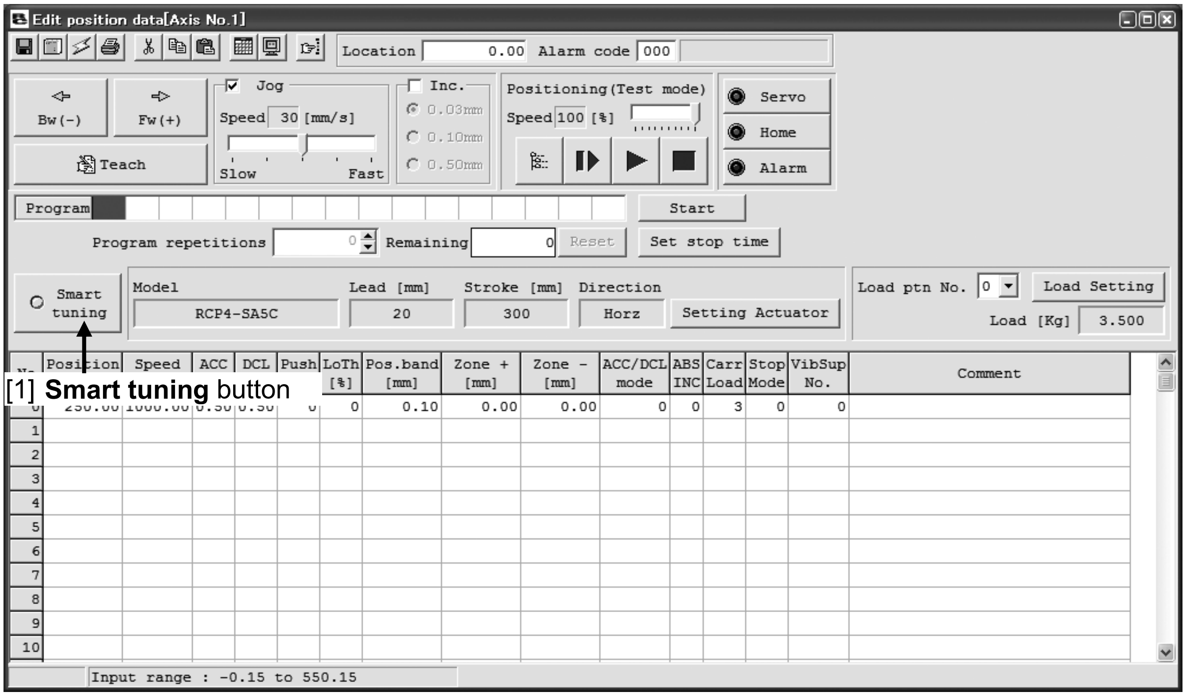


Fig. 12.19 **Smart tuning** button

[2] Click **Setting Actuator** button at the setting display of the actuator applicable for velocity and acceleration/deceleration settings.

Fig. 12.20 Box to show actuator setting applicable for velocity and acceleration/deceleration settings

[3] Set the model code, lead stroke and the posture of the applicable actuator in “Actuator setting for Vel and Acc setting” window.
Click **Setting** button.

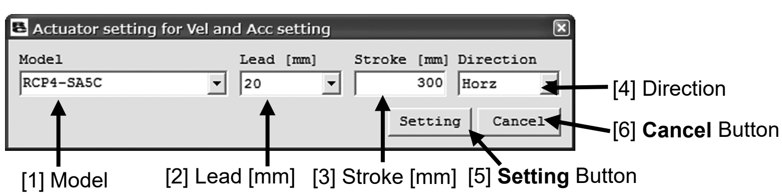


Fig. 12.21 Actuator setting for Vel and Acc setting Window

[4] Click **Load Setting** button at the setting display of the actuator applicable for velocity and acceleration/deceleration settings.

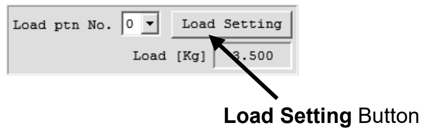


Fig. 12.22 Box to show carrier load setting for velocity and acceleration/deceleration settings

[5] Set the carrier load in “Load setting for Vel and Acc setting” window.
Click **OK** button.

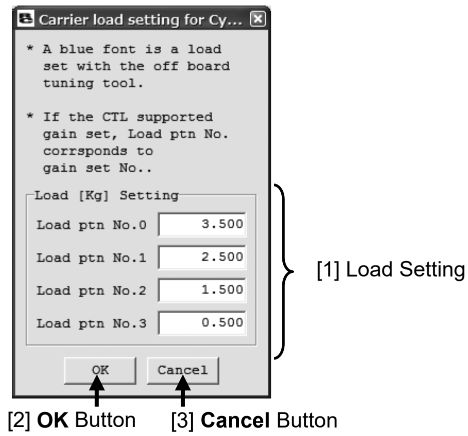


Fig. 12.23 Carrier load setting for Smart tuning function Window

[6] Set the position and velocity in the blank position numbers.
(Note) In the position numbers with data already set, this function cannot be used.

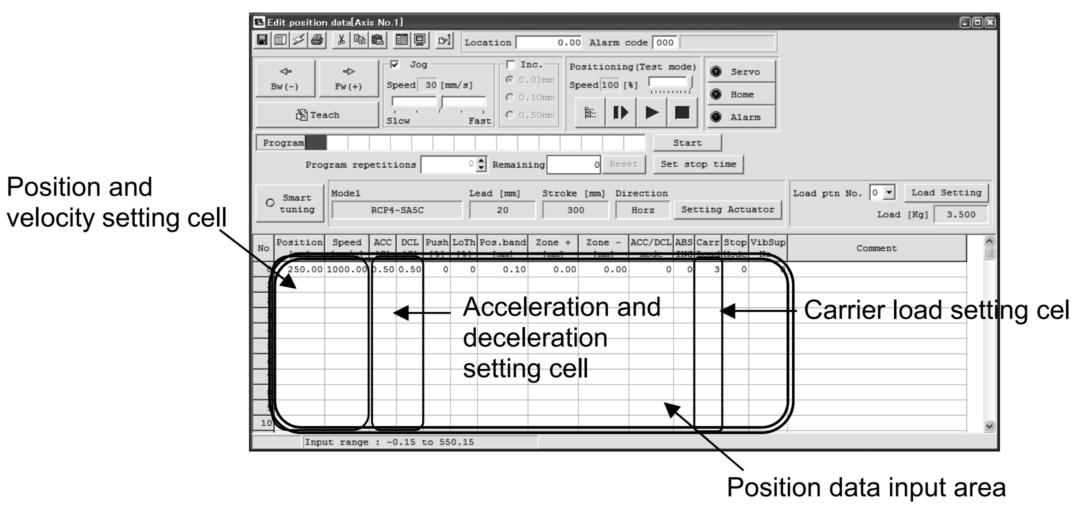


Fig. 12.24 Edit position data Window

(Note) The value set to the cells that is to be set automatically with this function, such as the velocity cell, can also be overwritten.

[7] “Smart tuning method select” window will appear. Select “Auto-configure Auto-configure Acc and vel depend Carrier load and distance.” and click **OK** Button.

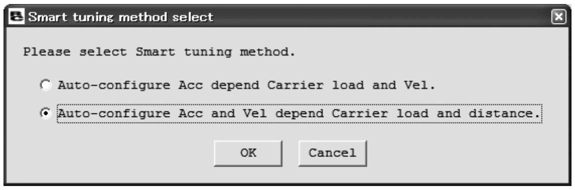


Fig. 12.25 Smart tuning method select Window
(Auto-configure Acc and Vel depend Carrier load and distance being selected)

[8] “Moving Distance Setting” window appears. Select the way to indicate the moving distance.

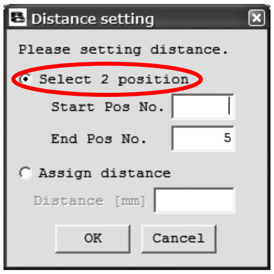


Fig. 12.26 Distance setting Window
(Select 2 position)

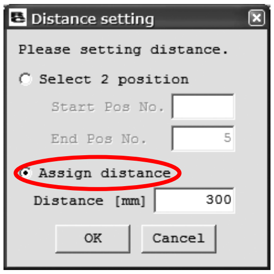


Fig. 12.27 Distance setting Window
(Assign distance)

For the following sections, the operation differs for the cases when indicating 2 points of positions and when indicating the moving distance.

● When indicating 2 points of positions

[9] Set the start position number setting box and click on **OK** button.

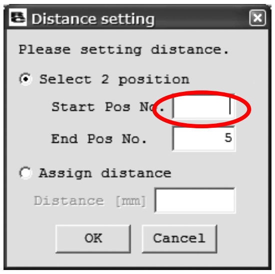


Fig. 12.28 Distance setting Window
(Select 2 position)

(Note) The position number set in Step [6] will be shown in End Position box.
It is able to change End Position. However, if End Position is changed, the velocity, acceleration and deceleration are figured out based on the distance between the set start position and end position, and set to the position that the position was set in Step [6].

[10] The velocity and acceleration/deceleration speed to provide the shortest operation time are set to the position that the position was set in Step [6] under the condition that the distance from the point of the start position number to the point at the end position number is considered as the movement distance.

(Note) The following message may appear depending on the combination of the velocity and acceleration/deceleration speed. It is displayed when the acceleration mode is S-shape Mode and the acceleration time is 2.0 [sec] or longer in the operation plan. The message will no longer appear if the setting is changed to that with acceleration time less than 2.0 [sec] for the velocity and acceleration/deceleration.

Fig. 12.29 Compulsory Trapezoid Operation Message

● When indicating moving distance

[9] Set the moving distance setting box and click on **OK** button.

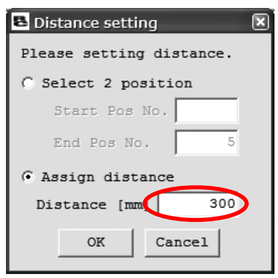


Fig. 12.30 Distance setting Window
(Assign distance)

[10] The velocity and acceleration/deceleration speed to provide the shortest operation time which are figured out from the set movement distance are set to the position that the position was set in Step [6].

(Note) The following message may appear depending on the combination of the velocity and acceleration/deceleration speed. The message will no longer appear if the setting is changed to that with acceleration time less than 2.0 [sec] for the velocity and acceleration/deceleration.

Fig. 12.31 Compulsory Trapezoid Operation Message

(3) The way to operate the overshoot judgment function at S motion operation

[1] Click **Smart tuning** button to activate the smart tuning.
The display turns on and the function turns available.

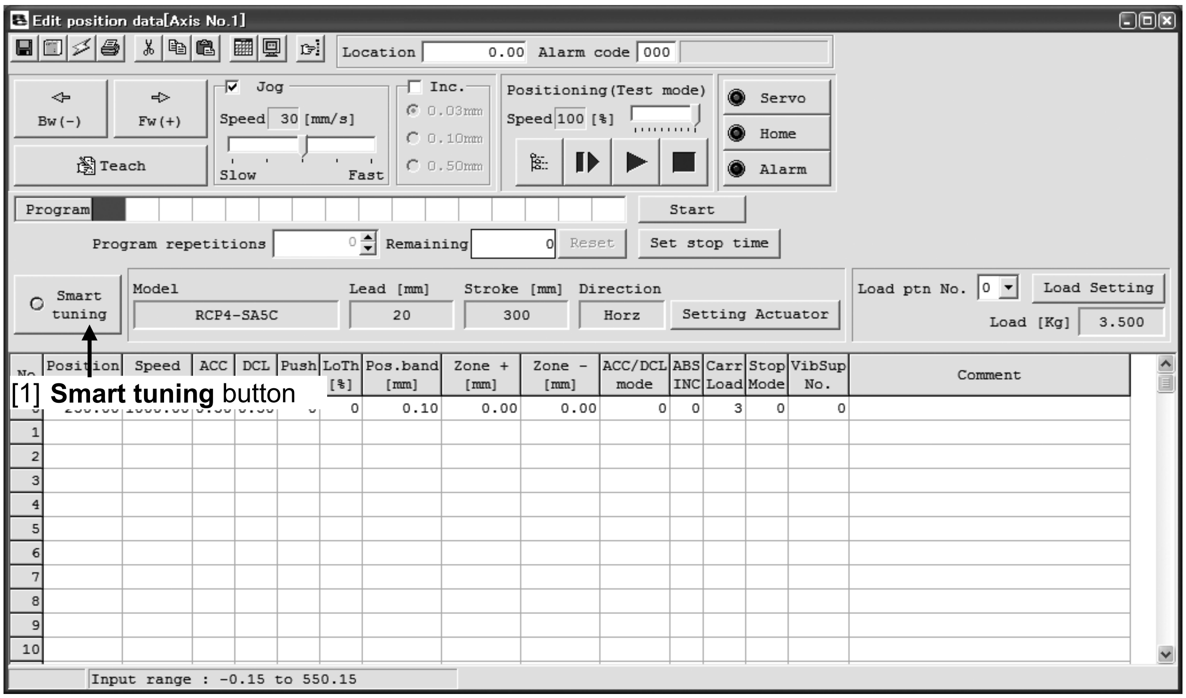


Fig. 12.32 **Smart tuning** button

[2] Click **Setting Actuator** button at the setting display of the actuator applicable for velocity and acceleration/deceleration settings.

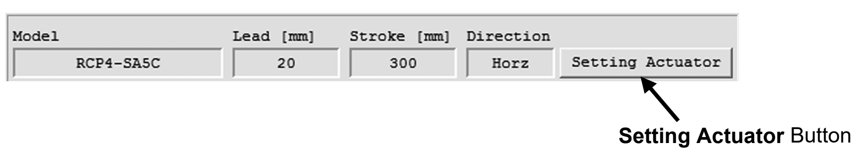


Fig. 12.33 Box to show actuator setting applicable for velocity and acceleration/deceleration settings

[3] Set the model code, lead stroke and the posture of the applicable actuator in "Actuator setting for Vel and Acc setting" window.
Click **Setting** button.

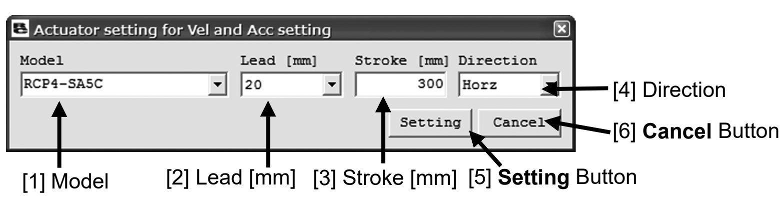


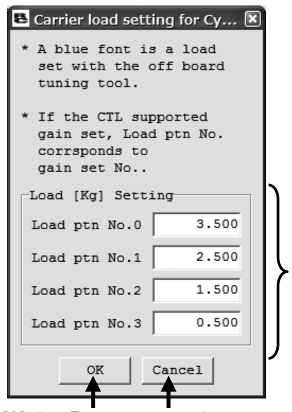
Fig. 12.34 Actuator setting for Vel and Acc setting Window

[4] Click **Load Setting** button at the setting display of the actuator applicable for velocity and acceleration/deceleration settings.

Load Setting Button

Fig. 12.35 Box to show carrier load setting for velocity and acceleration/deceleration settings

[5] Set the carrier load in “Carrier load setting for Smart tuning function” window.
Click **OK** button.



[1] Load Setting

[2] **OK** Button [3] **Cancel** Button

Fig. 12.36 Carrier load setting for Smart tuning function Window

[6] Right-click on the position data cell that the overshoot judgment is desired, and select “Check risk overshoot, when drive S motion.”.

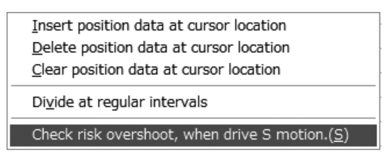


Fig. 12.37 Popup Menu
(Check risk overshoot, when drive S motion.)

[7] “Distance setting” window appears. Select the way to indicate the moving distance.

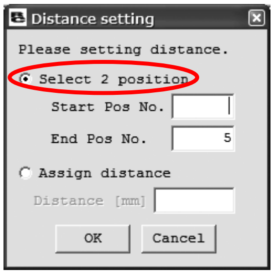


Fig. 12.38 Distance setting Window
(Select 2 position)

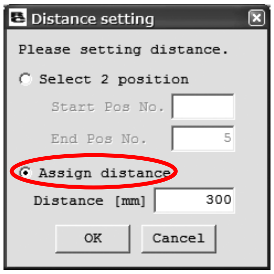


Fig. 12.39 Distance setting Window
(Assign distance)

For the following sections, the operation differs for the cases when indicating 2 points of positions and when indicating the moving distance.

● When indicating 2 points of positions
[8] Set the start position number setting box and click on **OK** button.

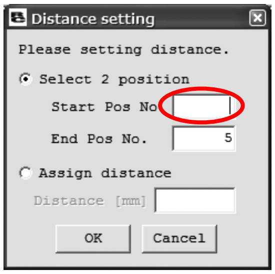


Fig. 12.40 Distance setting Window
(Select 2 position)

[9] With the position set in the start position number and position set in the end position number as the moving distance, overshoot judgment is conducted regarding the position set in the end position. When the risk of overshooting is high, the message shows “Risk High”, while when it is low, shows “Risk Low”.

Fig. 12.41 Overshoot Judgment Message
(Risk High)

Fig. 12.42 Overshoot Judgment Message
(Risk Low)

● When indicating moving distance

[8] Set the moving distance setting box and click on **OK** button.

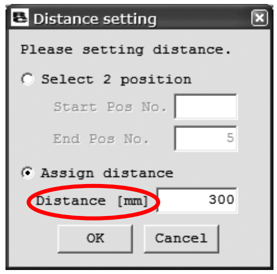


Fig. 12.43 Distance setting Window
(Assign distance)

[9] In the position where the cursor showed the popup menu (background color: blue), the overshoot judgment is conducted at the set moving distance.
When the risk of overshooting is high, the message shows “Risk High”, while when it is low, shows “Risk Low”.

Fig. 12.44 Overshoot Judgment Message
(Risk High)

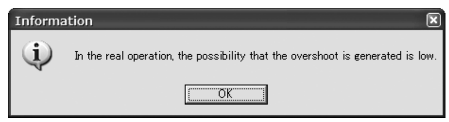


Fig. 12.45 Overshoot Judgment Message
(Risk Low)

12.4 Operation on Test Run and Cycle Time Calculation

This section explains how to operate the test run and cycle time calculation.

To open the operation window for test run and cycle time calculation, select [Main Menu] ⇒ [Parameter] ⇒ [Control Parameter Setting] ⇒ [Offboard Tuning].
Select actuator window (Fig. 12.46) will be displayed.
(Note) “Takt Time” is changed to “Cycle Time” from the software version V9.05.00.00.

12.4.1 Outline of Test Run Operation

In the test run operation, the setting work is to be done in the order of following windows.
By clicking on **Next** button on the bottom of the screen, the window forwards to the next one.

[1] Select Actuator
↓
[2] Carrier Load Select
↓
[3] Test Run
↓
[4] Adjustment Record Save

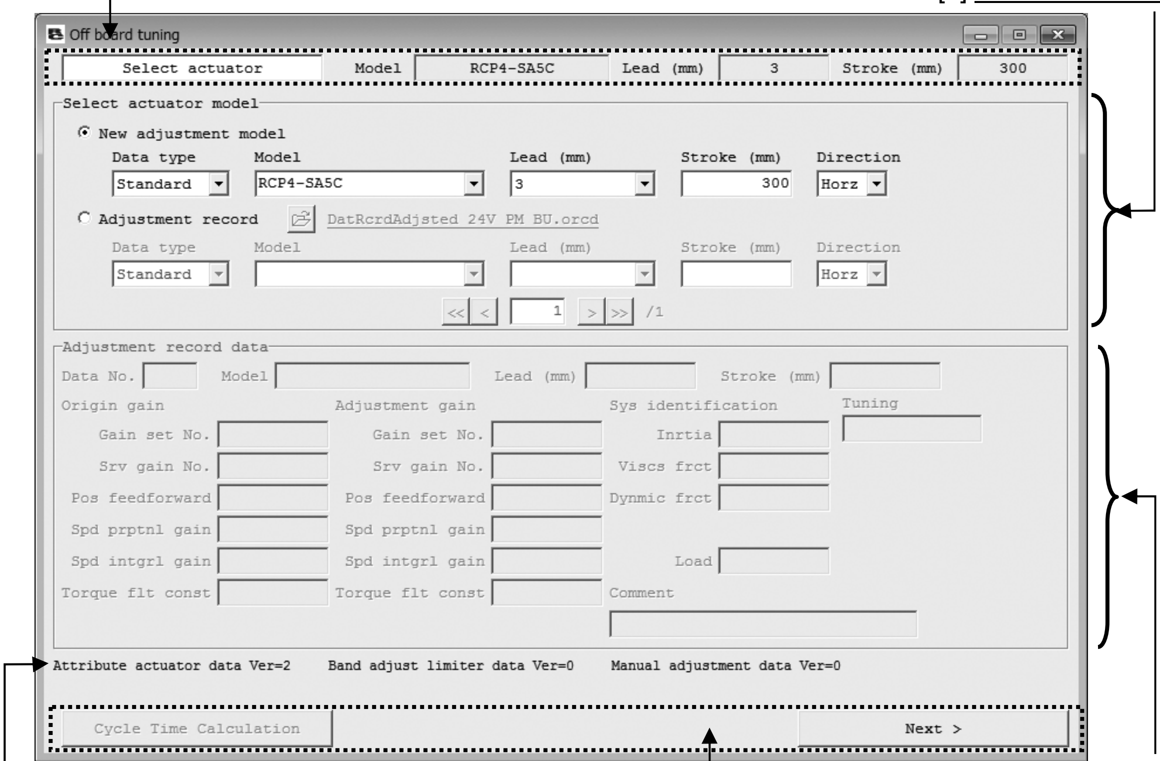
In the following pages, shows how to operate in each window.

12.4.2 Explanation of Each Window for Test Run Operation

(1) Select actuator Window
Select the model in this window. Select the model in [2] Select actuator model, and click **Next**.

[1] Displayed Window/Model Information Display Area

[2] Select actuator model



[5] Database File Version Display Area

[4] Common Buttons Area

[3] Adjustment record data Display Area

Fig. 12.46 Select actuator Window

[1] Displayed Window/Model Information Display Area

Displayed Window Information

Model Information

Fig. 12.47 Displayed Window/Model Information Display Area

Displayed Window Information
The name of the window currently displayed is shown.

Model Information
The information of actuator selected in “Select actuator” window is shown.

[2] Select actuator model

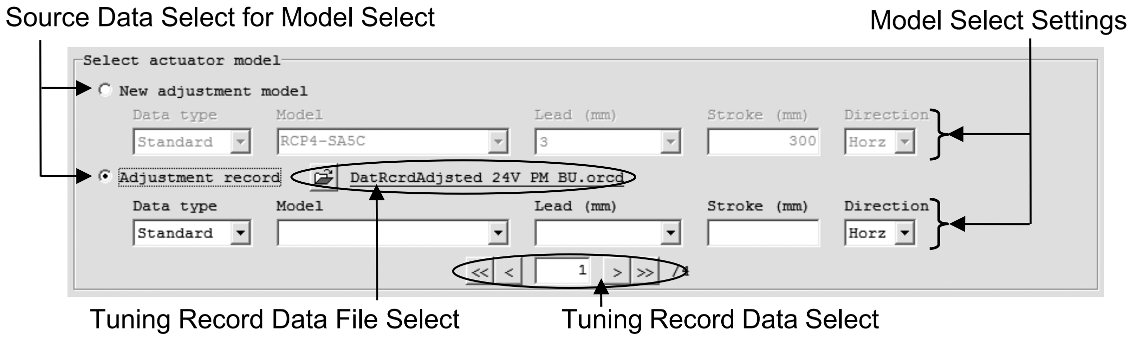


Fig. 12.48 Select actuator model

Source Data Select for Model Select
Select whether creating a “new adjustment model” or “choosing from the adjustment record”.
If creating a “new adjustment model” is selected, select a model to have a test run and cycle time calculation from the models registered in the actuator attribute data file.
If “choosing from the adjustment record”, select a model to have a test run and cycle time from the models registered in the adjustment record data stored in the past.
(Note) “Adjustment record” is not available to select unless there is adjustment record data.

Model Select Settings
Set the data type, model code, lead stroke and posture of actuator installation of the model that will have a test run and cycle time calculation.
(Note) The model code, lead or stroke that is not registered in the actuator attribute data file cannot be selected.

Adjustment Record Data File Select

Fig. 12.49 Adjustment Record Data File Select

By clicking on button, the adjustment record data file to be used can be changed. The name of the adjustment record data file being used is shown on the right of the button with an under line.

(Note) Selecting the adjustment record data file is only available when Source Data Select for Model Select is set to “Select from Adjustment Record”.
(Note) The file initially selected when the Test run and Cycle Time Calculation Operation Window is open is “\[RC PC Software Save Folder]\DB_OFFBRD\DatRcrdAdjsted_24V_PM_BU.orcd”.
(Note) If there is no Adjustment Record Data File, or failed to open the file, the display of the adjustment record data file select changes to the following display.

Fig. 12.50 Adjustment Record Data File Select (File not selected)

<u>Adjustment Record Data Select</u>

This is used when switch over the adjustment record data. Number of selectable adjustment record data is shown on the right side.

It is able to narrow down the search of the adjustment record data by model select setting. The item with blank in the model select setting gets excluded from the search conditions.

Example) If set as: Model Code = RCP4-RA5C, Lead = 3mm
⇒ The search result is narrowed down from the adjustment record data to those for RCP4-RA5C with 3mm lead.

Example) If set as: Model Code = RCP4-RA5C, Lead = Blank
⇒ The search result is narrowed down from the adjustment record data to those for RCP4-RA5C no matter the lead length.

Click on **<<** or **>>** button and the data on the very end can be selected from the selectable adjustment record data.

Click **<** or **>** button and the cursor moves from 1 record to the next in the selected adjustment record data.

Putting a number to Edit lying between **<** and **>** buttons will let select the indicated adjustment record data directly.

[3] Adjustment Record Data Display Area
In here, shows the details of the adjustment record data selected in “Select from Adjustment Record” in the actuator select actuator.

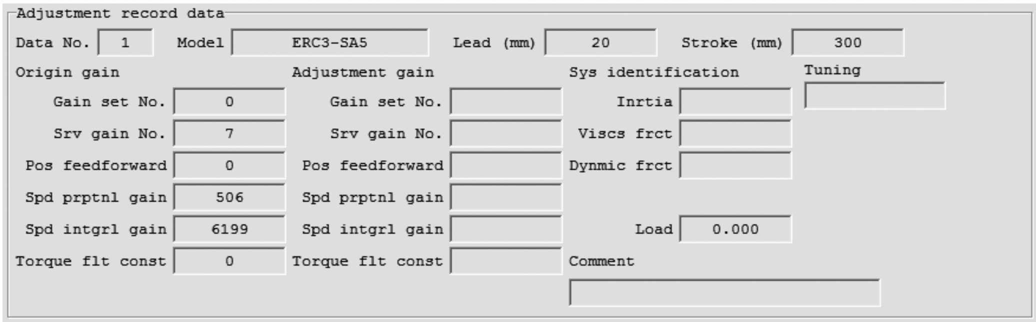


Fig. 12.51 Adjustment record data Display Area (Select actuator Window)

<u>Data No.</u>
It shows the data number of the displayed adjustment record.

<u>Model, Lead (mm), Stroke (mm)</u>
It shows the information of actuator selected in “Select actuator” window.

<u>Origin gain</u>
In here, shows the origin gain if the origin gain is the stored adjustment record data.
For the adjustment record data without the stored origin gain, it is shown with blank.

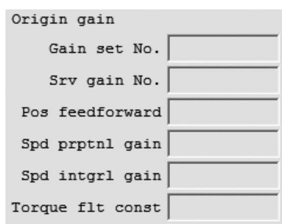


Fig. 12.52 Origin gain (Select actuator Window) (Not stored)

<u>Adjustment gain</u>
Since it is not applicable for PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor) gain tuning, adjustment gain display is shown with blank.

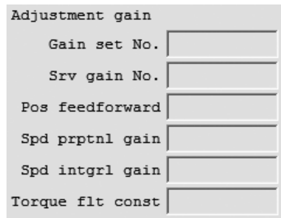


Fig. 12.53 Adjustment gain (Not stored)

<u>Sys identification</u>
Since PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor) are not applicable for system identification, a blank is displayed here.

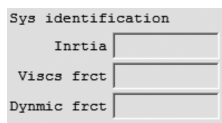


Fig. 12.54 Sys identification (Not stored)

<u>Load</u>
In “Carrier load select” window, the carrier load which was indicated is displayed.

<u>Tuning</u>
Since PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor) are not applicable for gain tuning, a blank is displayed here.

<u>Comment</u>
The comment, if any left in “Adjustment record data save” when the adjustment record was saved, is displayed.

[4] Common Buttons Area

Fig. 12.55 Common Buttons Area (Condition of all buttons displayed)

Next Button

Click this button and the next window is displayed.
In “Adjustment record data save” window, this button changes to the following.

Fig. 12.56 Display in Adjustment record data save Window

(Note) When a setting process in the currently displayed window to move onto the next window is incomplete, a message will be displayed and cannot go to the next window.

Back Button

Click this button and the screen goes back to the window shown before the currently displayed window.
(Note) This button is not shown in “Select actuator” window.

Cycle Time Calculation Button

Click this button and the cycle time calculation window is displayed.
(Note) This button is available to click only when showing “Test run” window or “Adjustment record data save” window.

[5] Database File Version Display Area

In here, shows the file version of the database file necessary for the test run and cycle time calculation.

(2) Carrier Load Select Window
Set the carrier load in this window. After setting, click **Next**.

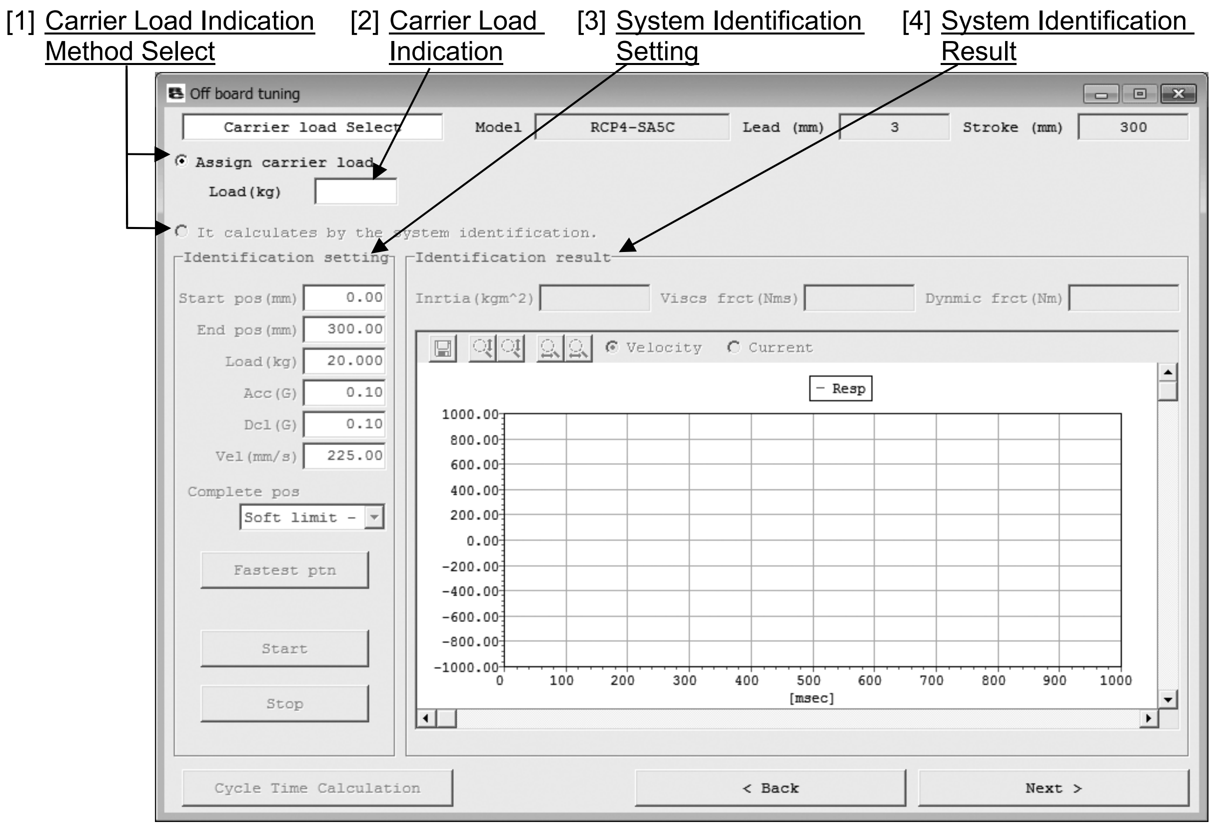


Fig. 12.57 Carrier load Select Window

[1] Carrier Load Indication Method Select
<u>Assign carrier load</u>
Indicate the carrier load with the value directly input.
This is the only way to select for PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor).

<u>It calculates by the system identification.</u>
This cannot be used for PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor).

[2] Carrier Load Indication
Input a value to set the carrier load.

[3] System Identification Setting
This cannot be used for PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor).

[4] System Identification Result
This cannot be used for PCON-CA, PCON-CB, 1ERC3, MCON (Pulse motor) and RCON (Pulse motor).

(3) Test run

Indicate the operation settings in this window, and the actuator can have a test run.

(Note) The test run function is available only in the online work. When it is offline the screen shows as shown in the next page and the test run function cannot be used.

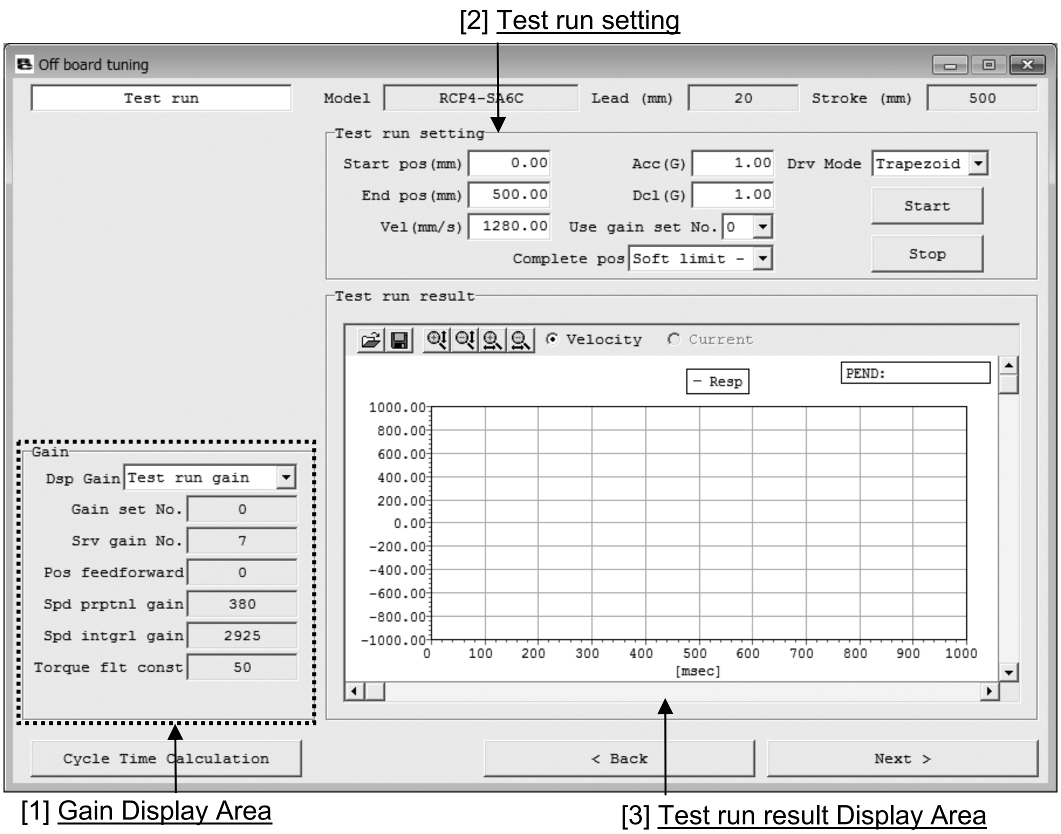


Fig. 12.58 Test run Window (in online work)

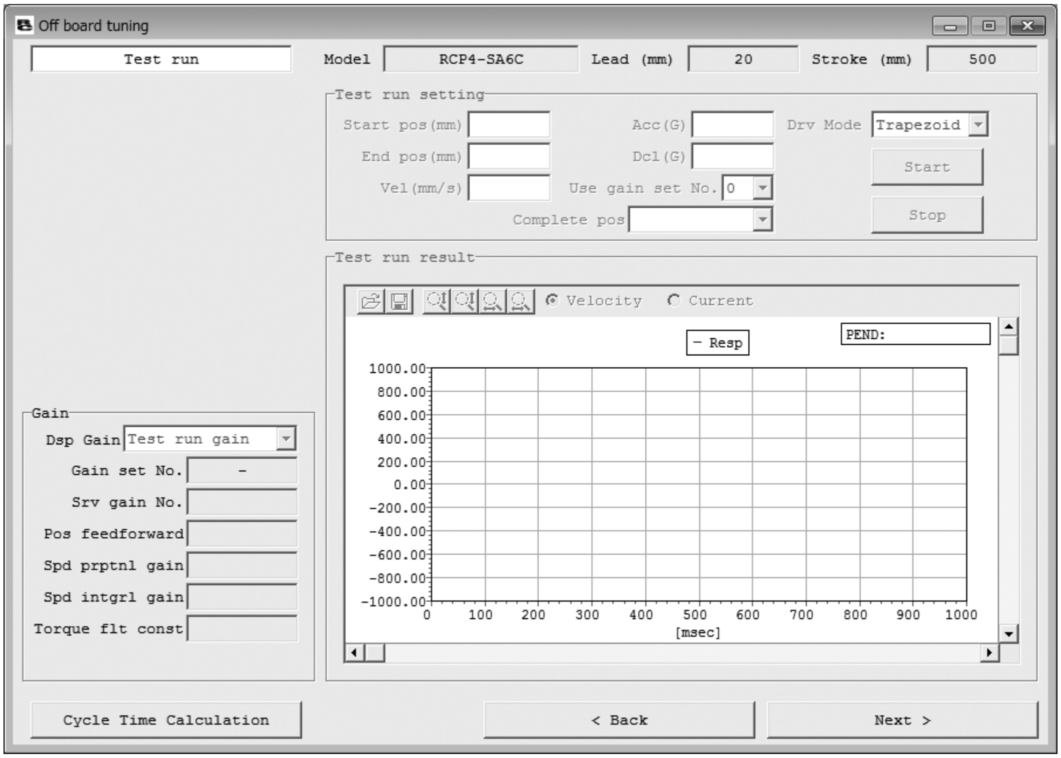


Fig. 12.59 Test run Window (in online work)

[1] Gain Display Area
The servo gain used in the test run is shown.

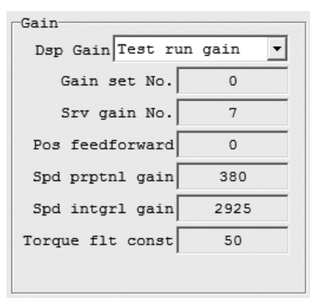


Fig. 12.60 Gain Display Area

[2] Test run setting

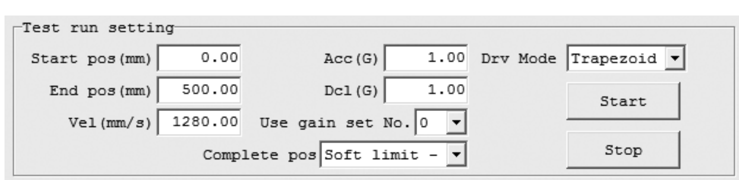


Fig. 12.61 Test run setting

Start pos (mm)
Set the test run start position of the actuator.

End pos (mm)
Set the test run end position of the actuator.

Vel (mm/s)
Set the test run velocity of the actuator.

Acc (G)
Set the test run acceleration of the actuator.

Dcl (G)
Set the test run deceleration of the actuator.

Use gain set No.
Set the gain set number used in the test run.
* No. 0 is only available for PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor).

Complete pos
Set the actuator stop position after operation complete from the start position to the end position.
The following two items can be selected for the stop position.
- Soft limit -
- Start pos

Drv Mode
Set the operation mode during test run.
The operation mode can be selected from the following two items.
- Trapezoid
- S-shape

* The following message may appear after clicking Start button depending on the parameter setting. Select Yes and the following user parameters are changed as described, and the test run starts executed.

<Parameters to be changed>

Name	Set value	
	Trapezoid	S-shape
No.56 “Sigmoid motion ratio setting [%]”	Original Setting*1	100
No.71 “Position feed-forward gain”	Original Setting*1	90

*1 If a change has made to the S motion operation parameter in “Cycle time calculation” window, the parameter for the trapezoid operation is changed from the original values to that of S motion operation.

Select **No** and the test run is cancelled with no change to the parameters.

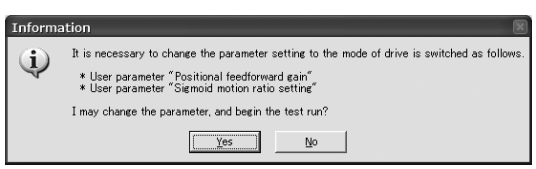


Fig. 12.62 Confirmation message for Change to S motion Operation Parameter

Operation Start Button

Click this button to start the test run.

(Note) Without clicking on **Stop** button, the test run automatically finishes at the end.

(Note) In some cases of start position and end position settings, the following message may appear. In the case this message is displayed, change the start position and end position so the moving distance can be long enough.

Fig. 12.63 Operation Unable Message due to Moving Distance too short

(Note) The following message may appear depending on the combination of velocity and acceleration/deceleration settings when “S Motion” is selected for the operation mode. The message will no longer appear if the setting is changed to that with acceleration time less than 2.0 [sec] for the velocity and acceleration/deceleration.

Fig. 12.64 Compulsory Trapezoid Operation Message

(Note) The following message may appear depending on the operation settings when “S Motion” is selected for the operation mode. Select **Yes** and the test run operation can be executed. To make the warning not to appear, change the operation setting so the acceleration time becomes longer.

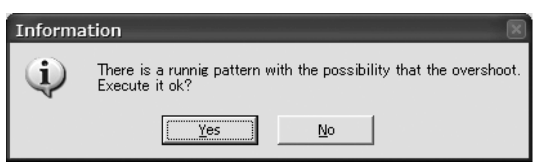


Fig. 12.65 Overshoot Warning Message

Stop Button

Click this button and the test run is cancelled.

[3] Test run Result Display

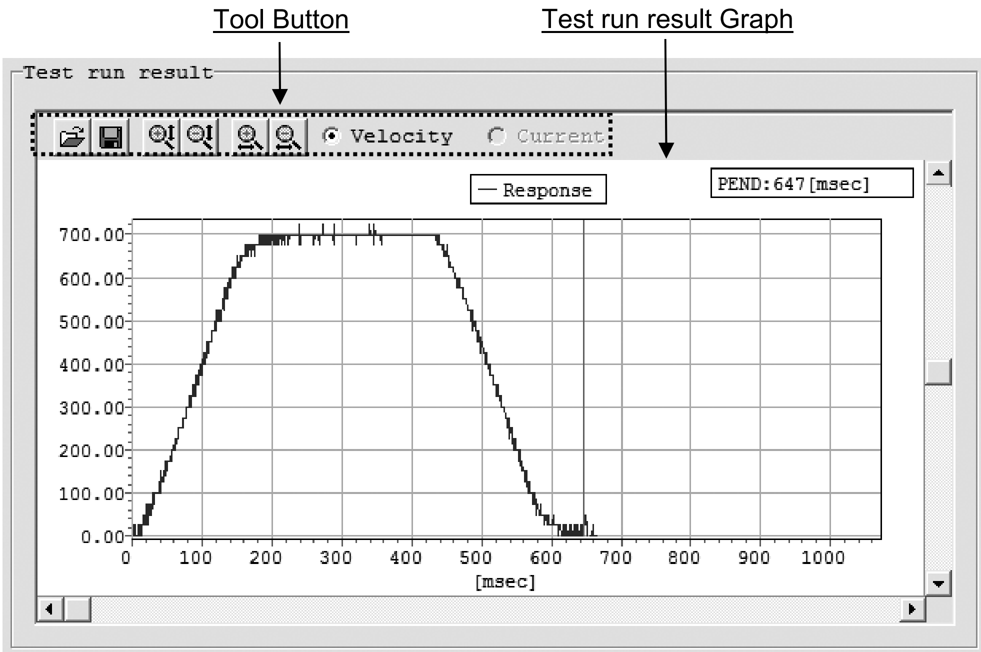


Fig. 12.66 Test run result Display Area

Tool button

Fig. 12.67 Tool button (Test run Window)

Open the comparison file

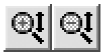
Click this button, and comparison file to be shown with the test run result.
Comparison file is a file in the servo monitor format.

Save with a new name

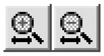
Click this button to save the wave formed data of the test run result with the data format described below.

- bsmrc format (file format available for comparison file)
- csv format

(Note) Multiple formats can be selected.

 Zoom in/out of Vertical Axis

Click these buttons to zoom in and out the vertical axis of the test run result.

 Zoom in/out of Horizontal Axis

Click these buttons to zoom in and out the horizontal axis of the test run result.

Displayed Data Switchover

The data (velocity/current) shown on the test run result graph can be switched over with this radio button.

* Only the velocity is available to show for PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor).

(4) Adjustment record data save window
Save the adjustment record in this window.

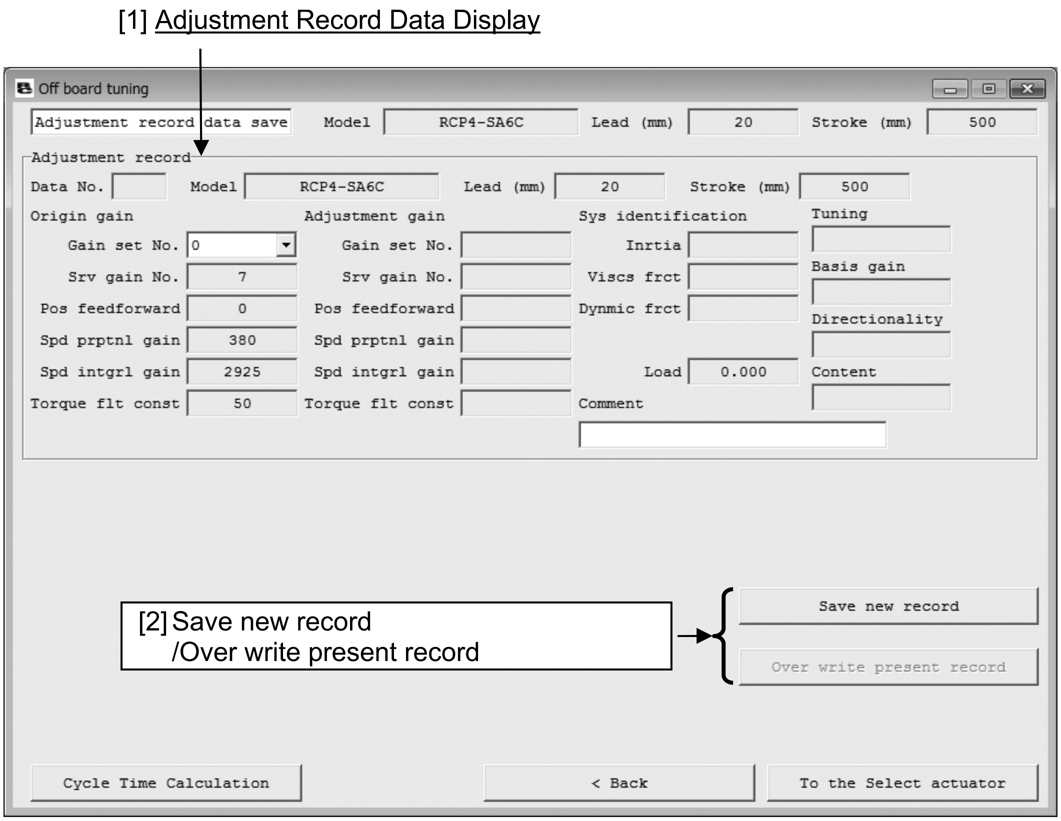


Fig. 12.68 Adjustment record data save Window

[1] Adjustment Record Data Display
Data saved as the adjustment record can be displayed. For the two items shown below, the display and function change from the adjustment record data display in “Select actuator” window.

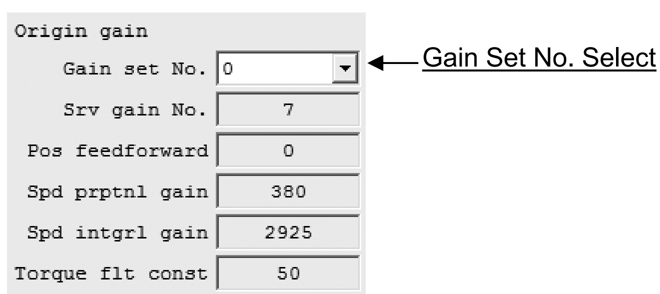


Fig. 12.69 Display of Origin gain (Adjustment record data save Window)

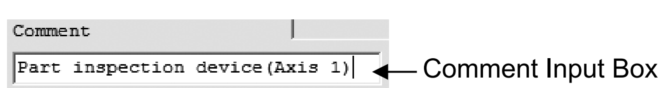


Fig. 12.70 Comment Box (Adjustment record data save Window)

Gain Set No. Select
Select the gain set number that is to be saved as the origin gain. The gain which is set to the controller at the startup of the Test run and Cycle time Calculation Operation Window can be saved.
Since PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor) are not applicable for the gain setting, the only number being able to choose for Gain Set Number is ‘0’.
When “Select from Adjustment Record” is selected in “Select actuator” window, and if the adjustment record data before the gain is saved, the origin gain that was saved in the origin gain record can be saved by selecting “*” in the gain set number window shown below. The gain set to the controller cannot be saved.

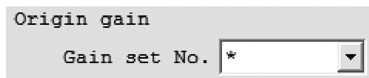


Fig. 12.71 Gain Set Number Select
(When origin gain is saved in adjustment record)

(Note) “*” can be displayed only when the origin gain is saved in the adjustment record data.

(Note) The display of the gain set No. select changes to the one as shown below when it is offline.

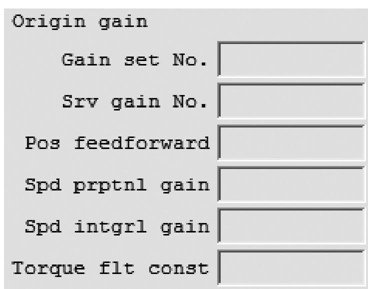


Fig. 12.72 Display of Origin gain (Adjustment record data save Window) (with no origin gain)

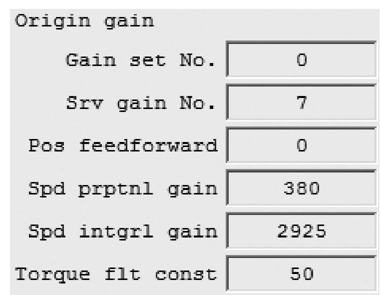


Fig. 12.73 Display of Origin gain (Adjustment record data save Window) (with origin gain)

Comment Input Box
A comment to save in the adjustment record can be input. The comment can be made with 32 half-sized characters at the maximum.

[2] **Save new record**/**Over write present record** Button
Save new record Button
Click this button and the adjustment record that is displayed in the adjustment record data display can be saved as another file.

Over write present record Button
Click this button and the adjustment record at the data number in the adjustment record data display is overwritten.
(Note) Overwriting is available only after the adjustment record currently displayed is already saved at least once, or when “Adjustment record” is chosen in “Select actuator” window.

12.4.3 Explanation of Cycle Time Calculation Window

Cycle time calculation can be performed in this window.

* Click the **Cycle Time Calculation** button in “Test Run” or “Adjustment Record Save” window.

Fig. 12.74 Common Buttons Area in Smart tuning Window

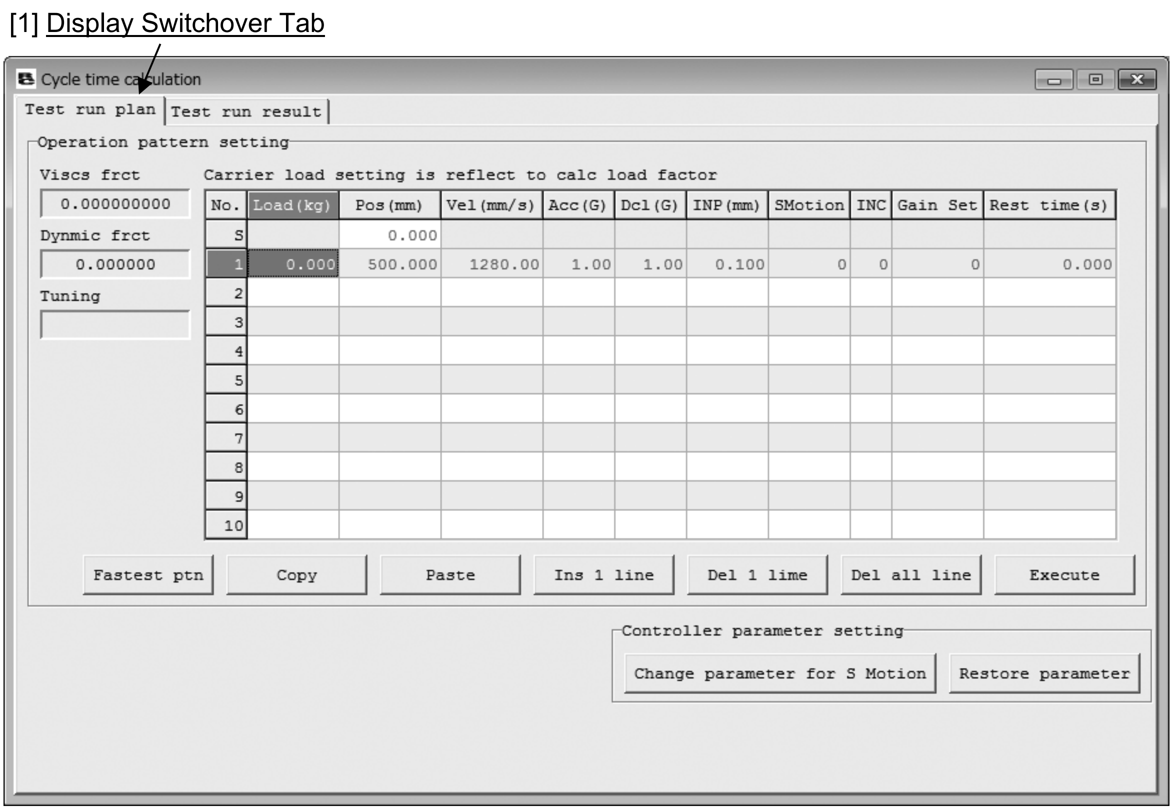


Fig. 12.75 Cycle time calculation Window (Test run plan Setting Window)

[1] Display Switchover Tab

With these tabs, the displays of “Test run plan setting” window and “Test run result Display” window can be switched over.

(1) Test run plan

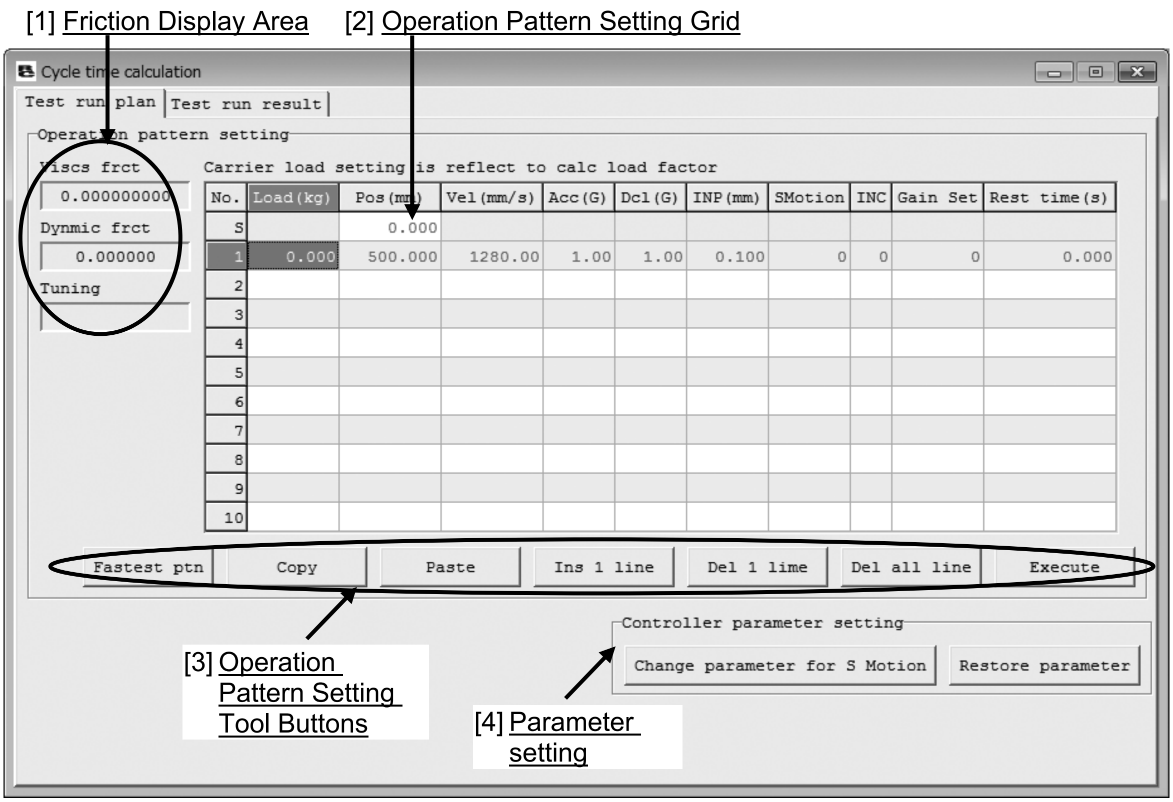


Fig. 12.76 Test run plan Setting Window

The settings of operation pattern to be held for cycle time calculation can be conducted in this window. The maximum operation patterns available to set are 10 patterns.

[1] Friction Display

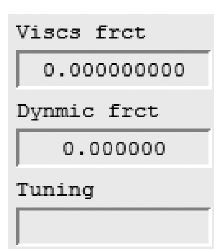


Fig. 12.77 Friction Display Area

Viscs frct
In here, shows the coefficient of viscous friction. The setting unit is [Nms].
(Note) Since PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor) are not complied with system identification, "0.000000000" is displayed in the box.

Dynmic frct
In here, shows the kinetic friction torque. The setting unit is [Nm].
(Note) Since PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor) are not complied with system identification, "0.000000" is displayed in the box.

Tuning
For a controller applicable for gain tuning, the way to tune is displayed.
* Since PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor) are not applicable for gain tuning, a blank is displayed here.

[2] Operation Pattern Setting Grid
Set the operation patterns to have cycle time calculation. Once the cycle time calculation is complete, the operation pattern can be copied and pasted to Position Data Edit window.

Carrier load setting is reflect to calc load factor

No.	Load(kg)	Pos(mm)	Vel(mm/s)	Acc(G)	Dcl(G)	INP(mm)	SMotion	INC	Gain Set	Rest time(s)
S		0.000								
1	0.000	500.000	1280.00	1.00	1.00	0.100	0	0	0	0.000
2										
3										
4										
5										
6										
7										
8										
9										
10										

Fig. 12.78 Operation Pattern Setting Grid

Load (kg)
Set the carrier load.
(Note) The settings of carrier load are reflected to the limitations of velocity and acceleration/deceleration.

Pos (mm)
Set the position.
The top line (No.S) is the start position setting cell.

Vel (mm/s)
Set the velocity.

Acc (G)
Set the acceleration.

Dcl (G)
Set the deceleration.

INP (mm)
Set the positioning width.

SMotion
Set the operation type from trapezoid and S motion operations, which is to be used for the cycle time calculation. The numbers corresponding to the trapezoid and S motion operations are as shown below.
• Trapezoid : 0
• S Motion : 1

INC
Set the movement type from absolute move and incremental move, which is to be used for the cycle time calculation. The numbers corresponding to the absolute and incremental moves are as shown below.
• Absolute : 0
• Incremental : 1

Gain Set
Set the gain set number used for the cycle time calculation.
* For PCON-CA, PCON-CB, ERC3, MCON (Pulse motor) and RCON (Pulse motor), only Gain Set No. 0 is available.

Rest time (s)
Set the rest time.

[3] Operation Pattern Setting Tool Buttons

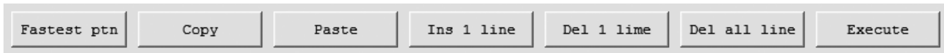


Fig. 12.79 Operation Pattern Setting Tool Buttons

Fastest ptn Button
Click this button to set the operation pattern that provides the shortest operation time considering the moving distance.
(Note) Fastest Operation Setting cannot be set unless the settings for the carrier load and moving distance are complete.

Copy Button
Click this button to copy the content of selected cell.

Paste Button
Click this button to paste the copied content to the selected cell.

Ins 1 line Button
Click this button to insert a blank line to the selected cell.

Del 1 line Button
Click this button to delete the content of the selected line and let the lines below the deleted line go up by one line.

Del all line Button
Click this button to delete all the settings in the operation pattern setting grid.

Execute Button
Click this button to execute the cycle time calculation with the operation pattern set to the operation pattern setting grid.

[4] Parameter Setting

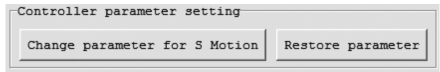


Fig. 12.80 Parameter Setting

<u>Change parameter for S Motion</u>
Click this button to change the following parameters for the gain set indicated in the operation pattern that the cycle time calculation is already complete with S motion operation.

<Parameters to be changed>

Name	Set value
No.56 “Sigmoid motion ratio setting [%]”	100
No.71 “Position feed-forward gain”	90

<u>Restore parameter</u>
This returns to the parameter settings displayed in the test run window for the gain set that the parameters were **Change parameter for S Motion** button.

(2) Test run result

[1] Test run result Time Display Area [2] Test run result Graph Display Area

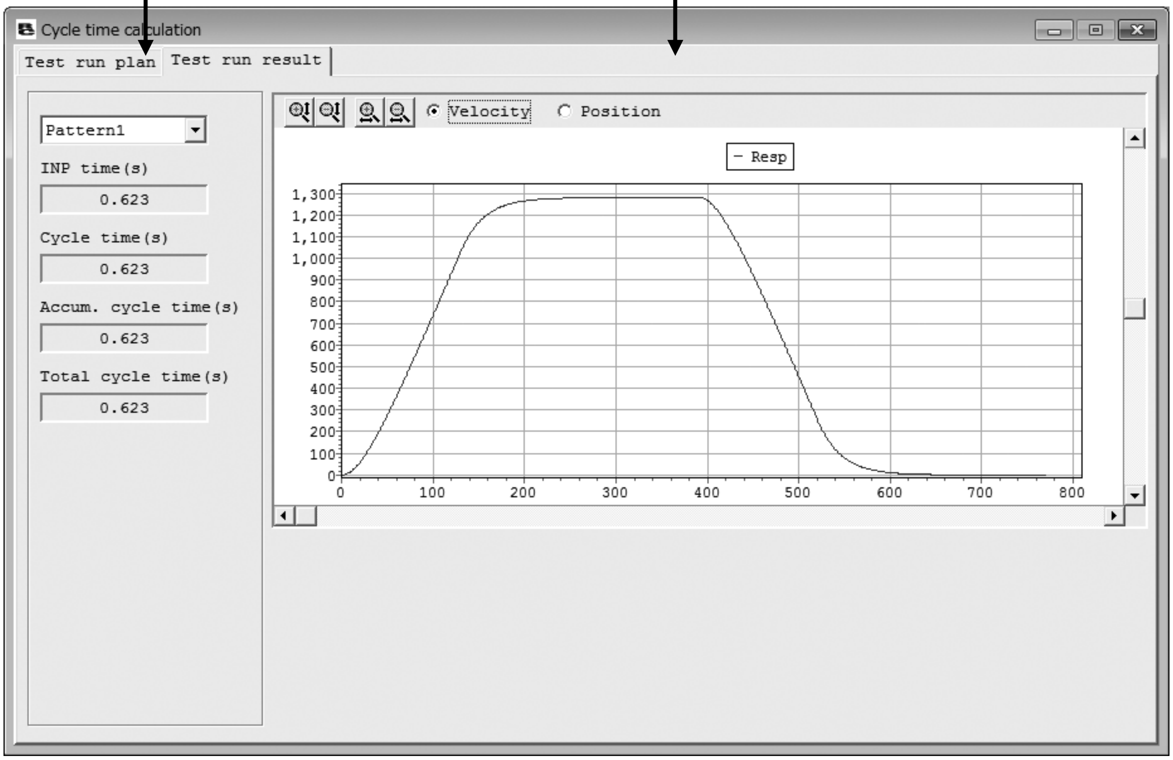


Fig. 12.81 Test run result Display Window

[1] Test run result Time Display Area

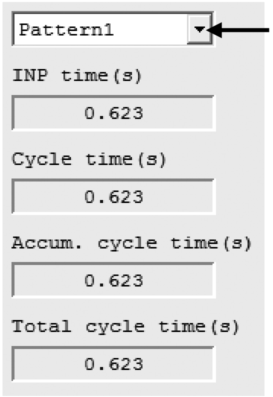


Fig. 12.82 Test run result Time Display Area

Operation pattern selection
Select the pattern to be displayed in the cycle time calculation result graph with this combo box. The operation pattern numbers that the cycle time calculation was held with are available to choose.

INP time (s)
In here, shows the positioning time of the operation pattern selected in the pattern select in "Test run result Time Display Area".

Cycle time (s)
In here, shows the cycle time of the operation pattern selected in the pattern select in "Test run result Time Display Area".
Cycle time is the sum of positioning time and pause time.

Accum. cycle time (s)
In here, shows the cumulative total cycle times from Pattern 1 to the pattern selected in the pattern select in "Test run result Time Display Area".

Total cycle time (s)
In here, shows the total cycle time of all the patterns included in the cycle time calculation.

[2] Test run Result Graph Display Area

Tool button   Test run result Graph

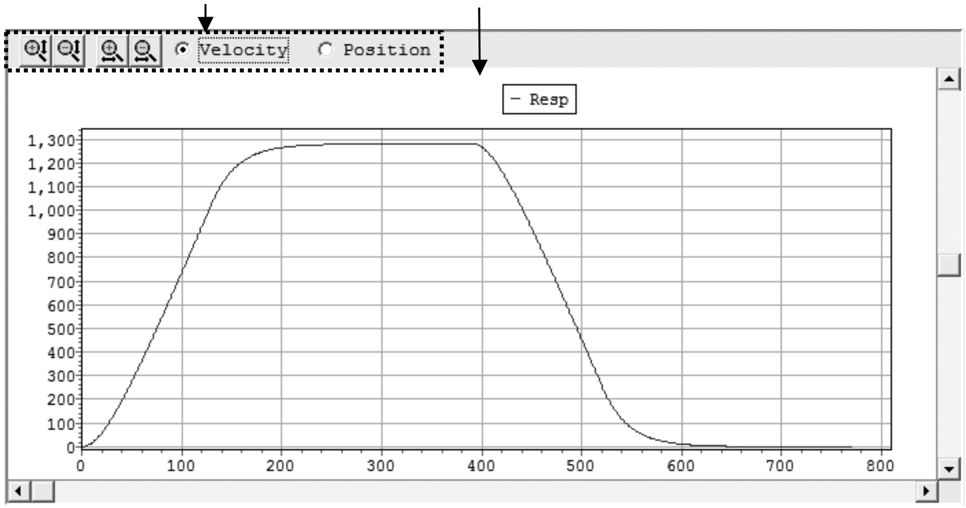


Fig. 12.83 Test run result Graph Display

Tool Button

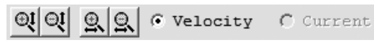
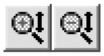
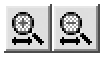


Fig. 12.84 Tool Button (Cycle Time Calculation Window)

 Zoom in/out of Vertical Axis

Click this button to zoom in/out the vertical axis of the operation graph.

 Zoom in/out of Horizontal Axis

Click this button to zoom in/out the horizontal axis of the operation graph.

Displayed Data Switchover

The data (velocity/position) shown on the cycle time calculation result graph can be switched over with this radio button.

Test run Result Graph

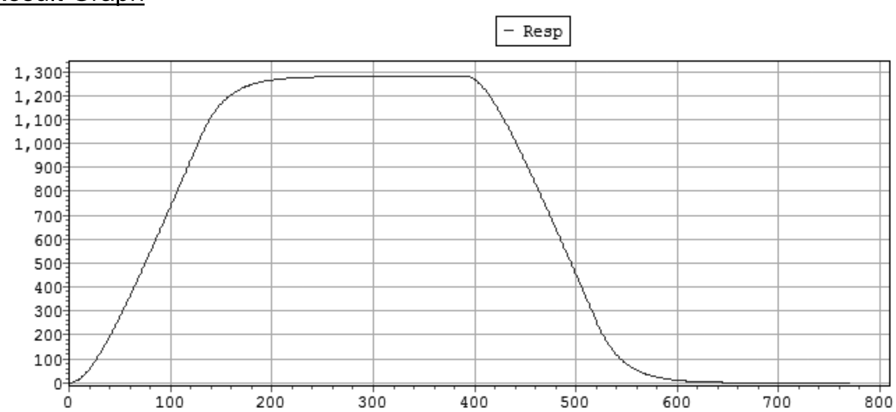


Fig. 12.85 Test run result Graph (Velocity response)

The data selected with the check box on the displayed data switchover radio button can be shown.

13. Off Board Tuning Function

(Note)	The following features cannot be performed on SCON-CAL/CGAL as the servo monitoring cannot be performed. • Method by system identification to actually operate an actuator • Display of result after trial run

If RC PC software (Version V8. 05. 00. 00 or later, V9.02.00.00 or later for MSCON, V9.07.00.00 or later for SCON-CAL/CGAL, Version V10. 00. 00. 00 or later for SCON-CB, Version V13. 01. 00. 00 or later for RCON-SC) is installed, the key file (OffBrdTune.dll file), and an actuator attribute data file (such as AtrDatActuator_200V_AC.oact) that are required for the off board tuning function are also installed, the off board tuning function can be used.

They are installed in the folder that the executable file for 'RcPc PC software' is stored.
Example of storage folder : C:\Program Files\IAI\RoboCylinder

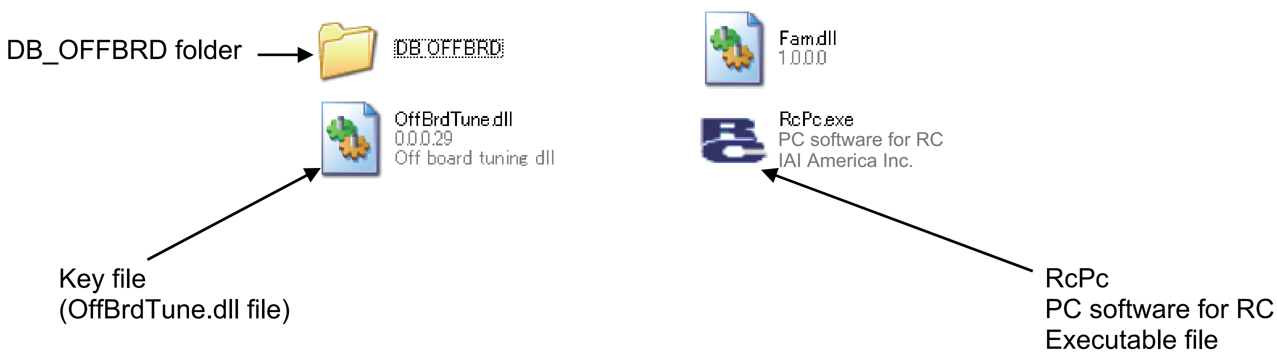


Fig. 13.1 Folder with RC PC Software Executable File Stored

In DB_OFFBRD folder, files listed below etc. are to be stored;
- AtrDatActuator_200V_AC.oact
- DatRcrdAdjsted_200V_AC.orcd
- TblDatAdjstManuEasily.omnu
- DatLimtrAdjst.olmt

(Note) The directory for the database files except for the adjustment record data is to be fixed. Changing the directory will make the system judge that the files do not exist.

(Note) The file name of the adjustment record data is initially selected when the off board tuning window opens. Only this file is allowed to change the file to be used. (For the details, refer to Adjustment Record Data File Select.)

13.1 Restrictions

13.1.1 Actuators Applicable for Off Board Tuning Function

The Off Board Tuning Function is only available for the actuators registered in the actuator attribute data file (AtrDatActuator_200V_AC.oact etc.).
The gain calculation is conducted based on the actuator attribute data file. The gain calculation for the actuator not registered in the actuator attribute data file cannot be conducted.

13.1.2 Restrictions in Operation

1) The Off Board Tuning Function is not available when any of the following windows are activated:
   - "Parameter edit" Window
   - "Servo monitoring" Window
   - "Frequency analysis for anti-vibration control"

2) The following windows cannot be activated during the use of Off Board Tuning Function:
   - "Parameter edit" Window
   - "Servo monitoring" Window
   - "Frequency analysis for anti-vibration control"

3) Parameter setting to the controller using Off Board Tuning Function cannot be performed if it is offline.

13.1.3 Caution Regarding Gain Set No. 0

The home-return operation is conducted using the gains in Gain Set No. 0. Follow the cautions stated below and have the settings of Gain Set No. 0 set up.

(1) When the carrier load is lighter than the rated carrier load;
   1) Set either one of the following gains to Gain Set No. 0.
      • The gain set up in the condition when the product was shipped out
      • Adjustment gain suited to the rated carrier load
   2) Adjustment gain should be set to Gain Set No. 1, 2 or 3, not to Gain Set No. 0.
   If the adjustment gain is set to Gain Set No. 0, it may cause a problem such as vibration in the home-return operation.

(2) When the carrier load is heavier than the rated carrier load;
   Set the adjustment gain to Gain Set No. 0.
   With the gain set before the product is shipped out, it may not be able to perform the home-return operation since the load is heavier than the rated carrier load.

13.2 Guideline of Off Board Tuning Function

Off Board Tuning Function is a function aiming for the optimum gain calculation considering the carrier load.
The following 6 types of gains are calculated:

[1] Servo-Motor Gain Number
[2] Position Feed Forward Gain
[3] Speed Loop Proportional Gain
[4] Speed Loop Integral Gain
[5] Torque Filter Time Constant
[6] Current Control Band Number

There are 4 gain sets to store the 6 types of gain stated above to the parameters in the controller. The calculated gain can be written to the indicated gain set.

13.3 How to Start up

Select
[Parameter (P)] ⇒ [Control Parameter Setting (C)] ⇒ [Off Board Tuning (T)]
from the main menu.

13.4 Operation to Select Target Axis Number for Off Board Tuning

13.4.1 Explanation of Each Item Shown in Window

Select the axis number to conduct the off board tuning in this window.
If online work is desired for off board tuning, select Online work, select the axis number, and click on the **OK** button.
If offline is desired for off board tuning, select Offline work, select the motor type, and click on the **OK** button.
Offline work (only to calculate the gain, not to send the parameters to the controller) is also available.

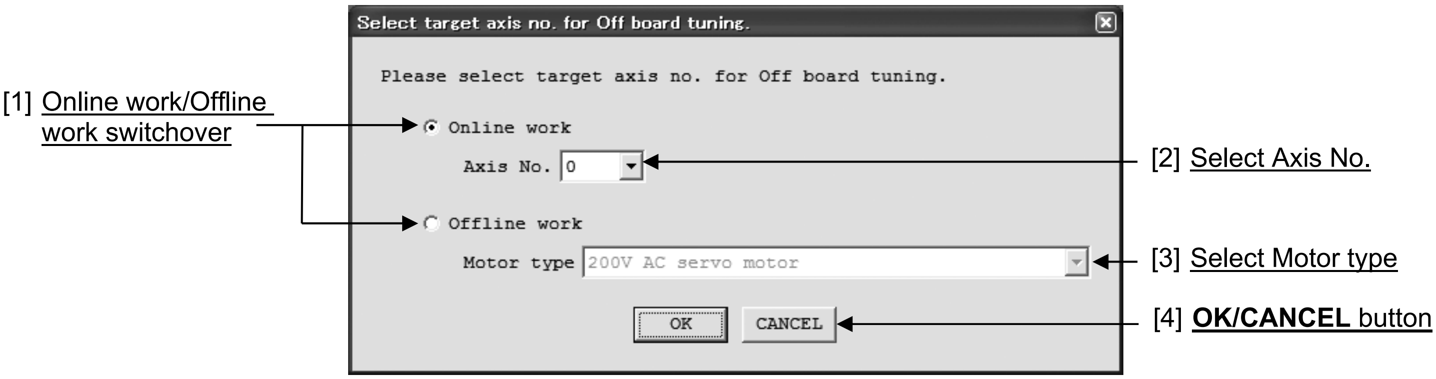


Fig. 13.2 Select target axis no. for off board tuning.

[1] Online work/Offline work switchover

Online work

Select this radio button and activate the “Select actuator” window to enable the online tuning.
(Note) System identification, test run and data sending of the calculated gain to the controller is available online.
(Note) Online work is only available when connected to a controller that supports the off board tuning function.

Offline work

Select this radio button and activate the “Select actuator” window to enable the offline tuning.
(Note) System identification, test run and data sending of the calculated gain to the controller are not available if it is offline.
(Note) Offline work is available even when not connected to a controller.

Gain calculation and cycle time calculation can be performed both online/offline.

[2] Select Axis No.

Select the axis number that tuning is to be conducted.
(Note) This item can be set only when Online work is selected.
(Note) Only axis numbers for actuators supporting the off board tuning function are selectable.

[3] Select Motor type
Select the motor type of the actuator for the tuning in the offline work.

[4] **OK/CANCEL** button
OK button
Click on the **OK** button to close “Select target axis no. for off board tuning” window and activate “Select actuator” window.
There may be a case the following message box opens after clicking **OK**. Follow the message and select the appropriate answer.

Fig. 13.3 Confirmation for MANU Operation Mode Change (at the start of Off board tuning window)

(Note) The off board tuning window would not start unless the mode is changed from MANU Mode to Teach Mode.

(Note) If clicking **Yes** to change the setting of MANU Operation Mode, the following message will show up at the end Off board tuning window. Close the message box and the settings of MANU Operation Mode and Safety Speed will be changed back as they were before changing.

Fig. 13.4 Confirmation for MANU Mode and Safety Speed Changes (at the end of Off board tuning window)

CANCEL button
Click on the **Cancel** button and “Off board tuning target axis no. select” window will close, and the activation of “Select actuator” window will be cancelled.

13.5 Operation on Off Board Tuning

13.5.1 Outline of Operation

The off board tuning is to be conducted in the process shown below:

[1] Set the model in Select actuator window.
Click **Next** and the step forwards to Carrier load select window.

↓

[2] Set the load in Carrier load Select window.
There are 2 ways to set the load as shown below.
• To indicate the carrier load
• To identify the system that actually moves the actuator
(This operation cannot be conducted on SCON-CAL/CGAL.)
Click **Next** and the step forwards to Select adjustment method window.

↓

[3] Select the method to adjust the gain in Select adjustment method window.
There are 3 types for the adjustment.
• Set the Base Control Band
• Set the Simple Tuning
• Set the Manual
Except for the Manual Adjustment setting, click **Next** and the gain adjustment starts.
Once the gain adjustment is complete, a message box asking whether setting the calculated gain to the parameter opens.
Click **OK** and the calculated gain is set to the parameter, and the step forwards to the test run.

↓

[4] For the Manual Adjustment setting, gain is to be adjusted manually in the Manual window.
Click **Next** and the gain adjustment starts.
Once the gain adjustment is complete, a message box asking whether setting the calculated gain to the parameter opens.
Click **OK** and the calculated gain is set to the parameter, and the step forwards to the test run.

↓

[5] Have a test run of the adjusted gain in the test run window to check the operation.
(SCON-CAL/CGAL can perform a trial run, but the result cannot be displayed.)
Click **Next** and Adjustment record save window opens.

↓

[6] The result of the gain adjustment can be stored in Adjustment record save window.

The following pages, provide the explanations for the operations in each window.

13.5.2 Explanations for each Item in Select actuator Window

Select the model of the actuator for tuning in this window.

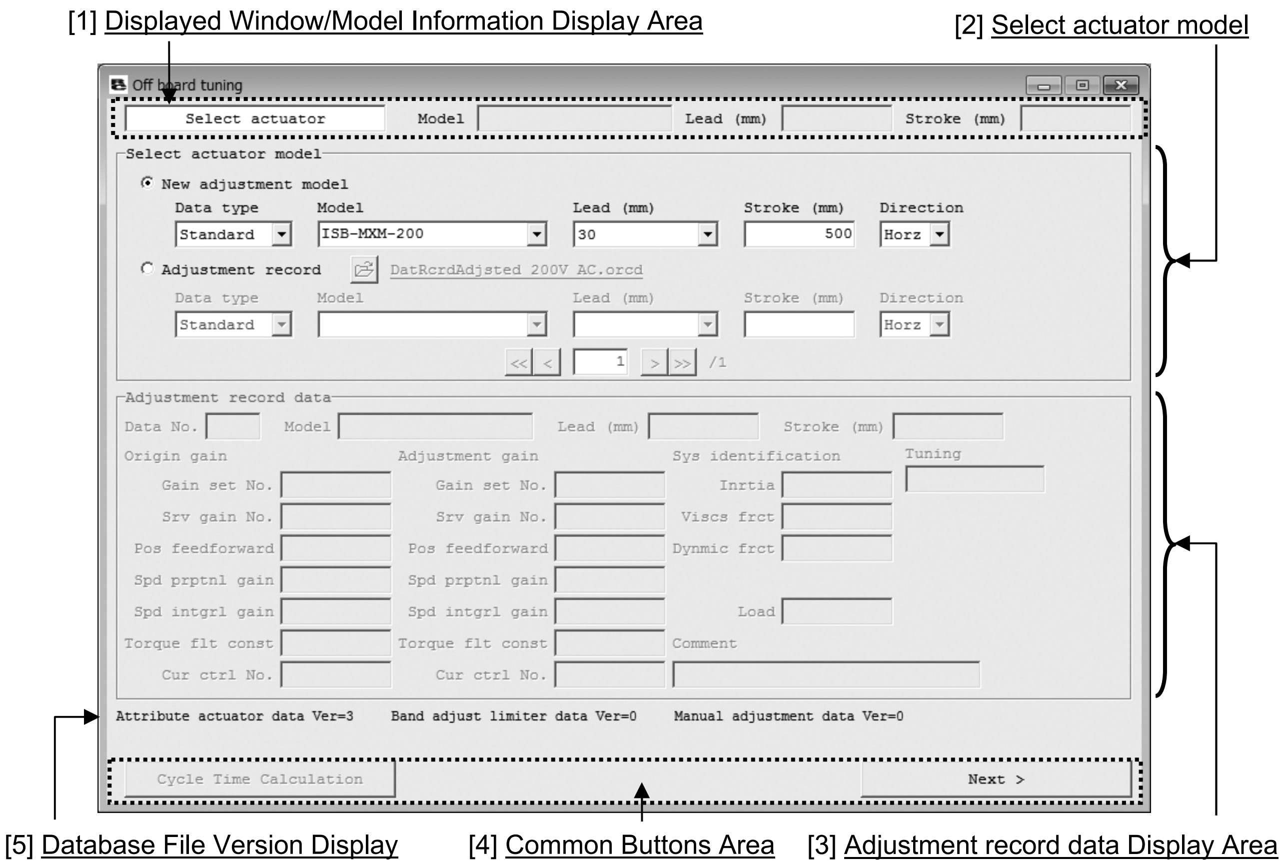


Fig. 13.5 Select actuator Window

[1] Displayed Window/Model Information Display

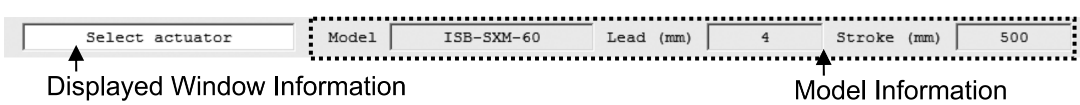


Fig. 13.6 Displayed Window/Model Information Display

Displayed Window Information

The name of the window currently displayed is shown.

Model Information

The information of actuator selected in “Select actuator” window is shown.

[2] Select actuator model

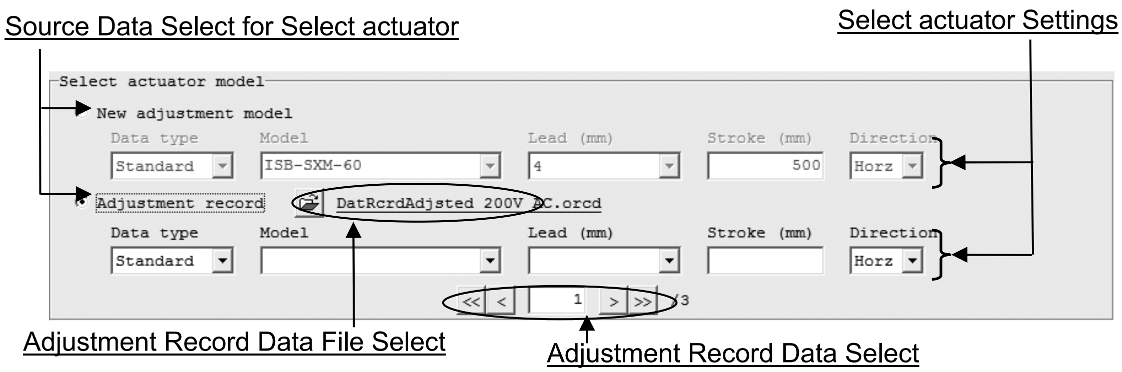


Fig. 13.7 Select actuator model

Source Data Select for Select actuator
Select the source data for the model selection.
If choosing “New adjustment model”, select the model to tune from the models registered in the actuator attribute data file.
If choosing “Adjustment record”, select the model to tune from the models registered in the adjustment record data saved in the past.
(Note) “Adjustment record” is not available to select unless there is adjustment record data.

Select actuator Settings
Set the data type, model code, lead, stroke and actuator installed orientation for the model to be tuned.
(Note) The model code, lead or stroke not registered in the source data for select actuator cannot be set.

Adjustment Record Data File Select

Fig. 13.8 Adjustment Record Data File Select

By clicking on  button, the adjustment record data file to be used can be changed.
The name of the adjustment record data file being used is shown on the right of the button and is underlined.
(Note) Selecting the adjustment record data file is only available when Source Data Select for Select actuator is set to “Adjustment record”.
(Note) The file initially selected when the Off board tuning window is open is “\[RC PC Software Save Folder]\DB_OFFBRD\DatRcrdAdjsted_200V_AC.orcd”.
(Note) If there is no adjustment Record Data File, or failed to open the file, the display of the adjustment record data file select changes to the following display.

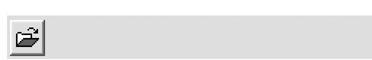


Fig. 13.9 Adjustment Record Data File Select (File not selected)

Adjustment Record Data Select

This is used when switch over the adjustment record data. Number of selectable adjustment record data is shown on the right side.

It is able to narrow down the search of the adjustment record data by select actuator setting. The item with blank in the select actuator setting gets excluded from the search conditions.

Example) If set as: Model Code = ISB-SXM-60, Lead = 4mm

⇒ The search result is narrowed down from the adjustment record data to those for ISB-SXM-60 with 4mm lead.

Example) If set as: Model Code = ISB-SXM-60, Lead = Blank

⇒ The search result is narrowed down from the adjustment record data to those for ISB-SXM-60 no matter the lead length.

Click on **<<** or **>>** button and the data on the very end can be selected from the selectable adjustment record data.

Click **<** or **>** button and the cursor moves from 1 record to the next in the selected adjustment record data.

Putting a number between **<** and **>** buttons will select the indicated adjustment record data directly.

[3] Adjustment record data Display

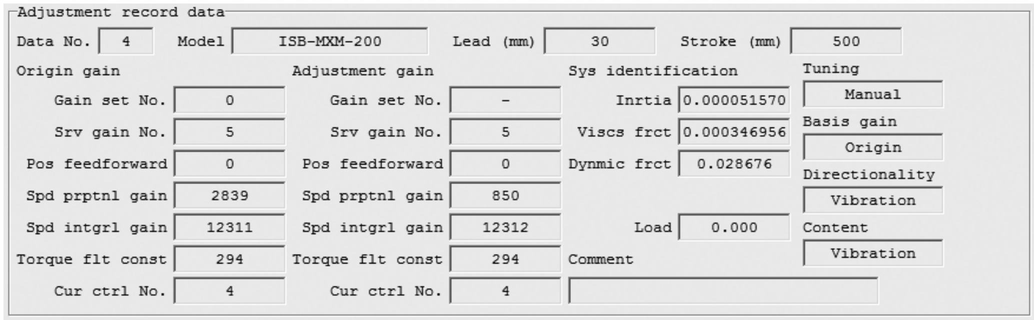


Fig. 13.10 Adjustment record data Display (Select actuator Window)

The details of the adjustment record data selected in Adjustment record data select is displayed.

<u>Data No.</u>
It shows the data number of the displayed adjustment record.

<u>Model, Lead (mm) and Stroke (mm)</u>
It shows the information of actuator selected in “Select actuator” window.

<u>Origin gain</u>
In here, shows the origin gain if the origin gain is the stored adjustment record data.
For the adjustment record data without the stored origin gain, it will be as shown below.

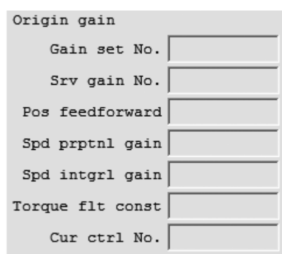


Fig. 13.11 Origin gain (Select actuator Window)
(Origin gain not stored)

Adjustment gain
The gain after tuning is displayed. For the adjustment record the adjustment gain is sent to the controller, the gain set number that the gain is set to is shown in Gain Set No., and "-" is shown if not sent.

Sys identification
The result of the system identification is displayed for the adjustment record the system identification is conducted.
Nothing is displayed as shown below for the adjustment record data saved with no system identification.

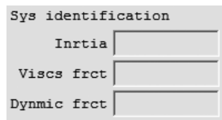


Fig. 13.12 Sys identification (Not stored)

Load
In "Carrier load Select" window, the carrier load which was indicated is displayed.
For the record, the carrier load calculated backwards from the synthetic inertia is displayed.

Tuning
The method of adjustment selected in "Select adjustment method" window is shown. The display is switched as shown below depending on the selected method.

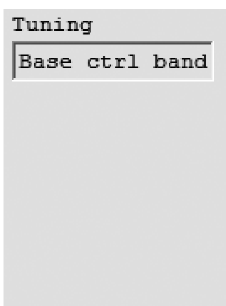


Fig. 13.13 Tuning display
(When the Base ctrl band)

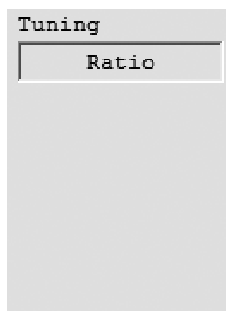


Fig. 13.14 Tuning display
(When the simple tuning)

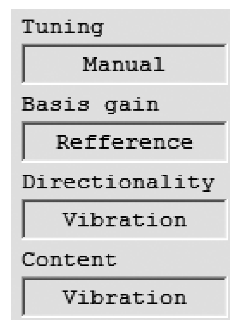


Fig. 13.15 Tuning display
(When the Manual)

Comment
The comment is shown for the adjustment record data saved with a comment.

[4] Common Buttons Area

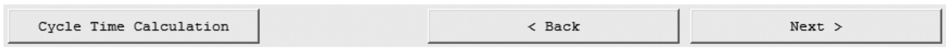


Fig. 13.16 Common Buttons Area (Condition of all buttons displayed)

Next button
Click this button and the next window is displayed.
In “Adjustment Record Save” window, this button changes to the following.

Fig. 13.17 Display in Adjustment Record Save Window

(Note) When a setting process in the currently displayed window to move onto the next window is incomplete, a message will be displayed and cannot go to the next window.

Back button
Click this button and the screen goes back to the window shown before the currently displayed window.
(Note) This button is not shown in “Select actuator” window.

Cycle Time Calculation button
Click this button and the cycle time calculation window is displayed.
(Note) This button is available to click only when showing “Test Run” window or “Adjustment Record Save” window.

[5] Database File Version Display Area
In here, shows the file version of the database file necessary for the tuning.

13.5.3 Explanations for each Item in Carrier load Select Window

Set the carrier load in this window.
There are 2 ways for the selection of the carrier load, one is to indicate the carrier load and the other is to figure out from the system identification, and selection can be made from these 2 ways.
(Note) The system identification is available to select only in the system identification model, such as SCON-CA. In the online work of SCON-CAL/CGAL and offline work of SCON-CA, SCON-CB and SCON-CAL/CGAL, the window switches to the one as shown in Fig. 13.19.

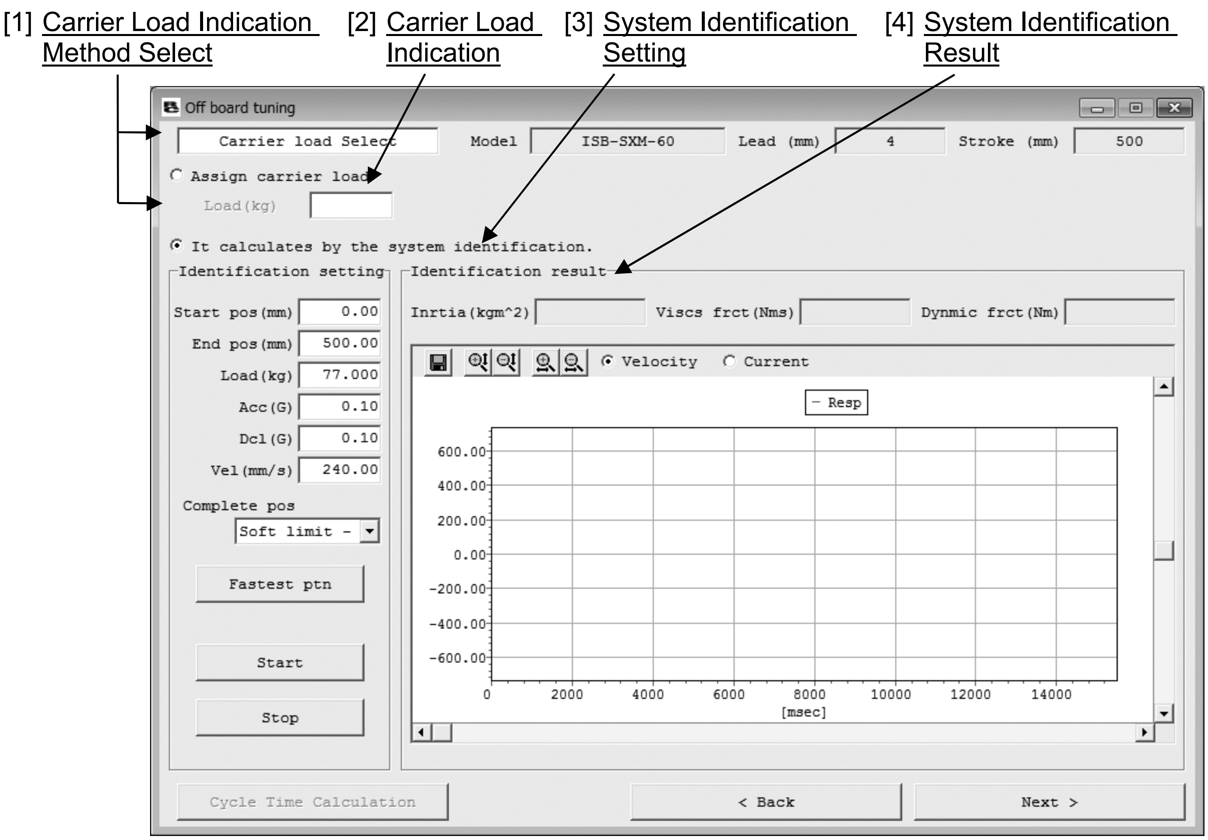


Fig. 13.18 Carrier load Select Window (in online work of SCON-CA)

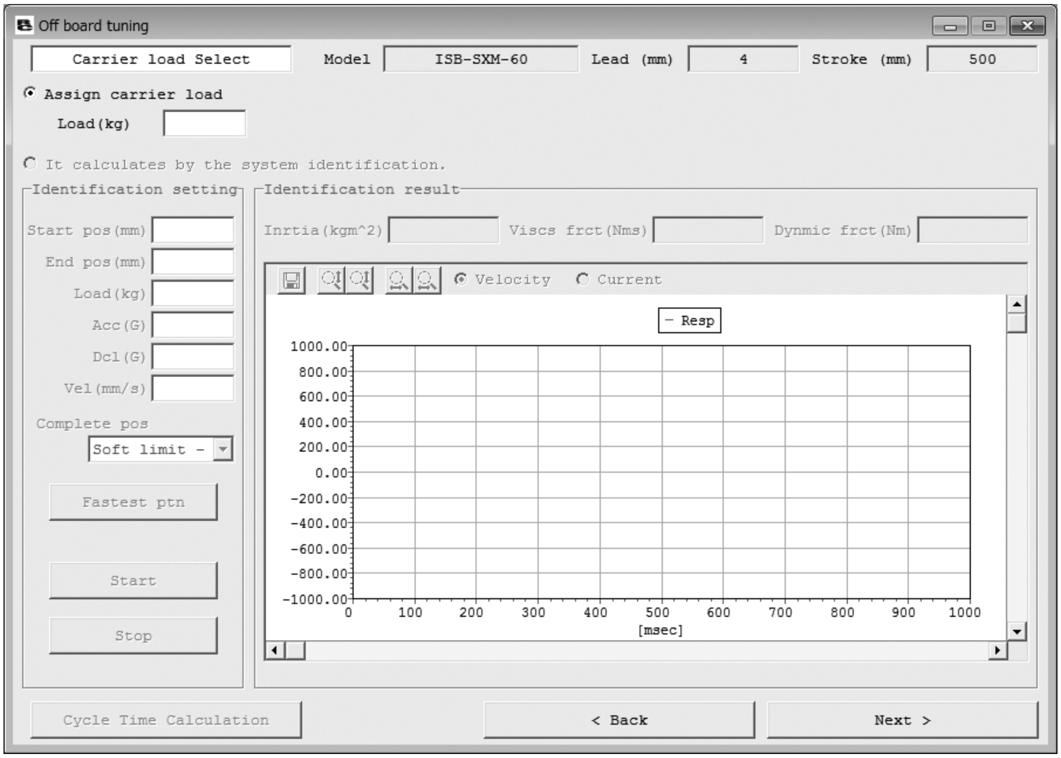


Fig. 13.19 Carrier load Select Window (In the online work of SCON-CAL/CGAL and in the offline work of SCON-CA, SCON-CB and SCON-CAL/CGAL)

[1] Carrier Load Indication Method Select

Assign carrier load

Select this radio button and the indicated carrier load can be set.

It calculates by the system identification.

Select this radio button and the actuator actually operates in back and forth directions to estimate the carrier load from the speed and current data obtained from the controller.

[2] Carrier Load Indication

Carrier load can be set with the numeric value input in Edit in Carrier load Select window 2.

[3] System Identification Setting

Operation setting for the system identification can be conducted.

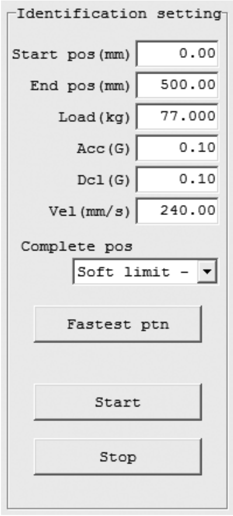


Fig. 13.20 System Identification Setting

<u>Start pos (mm)</u>

The start position for the back and forth operation can be set.

(Note) In the operation for the system identification, the actuator moves back and forth between the start position and end position.

<u>End pos (mm)</u>

The end position for the back and forth operation can be set.

(Note) In the operation for the system identification, the actuator moves back and forth between the start position and end position.

<u>Load (kg)</u>

Set the carrier load.

(Note) This is the value used for the system identification calculation and the maximum speed operation setting.
Set the size of the load roughly even if you do not know the accurate load size.
It is not necessary to change the value from the initial setting if you do not know the load size at all.

Example) In the case you have the information that the load size is approximately 2 [kg], but you do not know exactly;
⇒ Set “2.000” in Carrier load (kg).

Acc (G)
Set the acceleration speed for back and forth operation.

Dcl (G)
Set the deceleration speed for back and forth operation.

Vel (mm/s)
Set the velocity for back and forth operation.

Complete pos
Set the data at what coordinates the actuator is to be stopped after the back and forth operation for system identification is complete.
The selection is to be made from the following two;

- Soft limit – : Stops on the soft limit – side (origin side)
- Start Position : Stops at the start position set in the identification setting

(Note) An operation suitable for the system identification is that with the acceleration time, constant velocity time and deceleration time evenly divided, and the current condition that the peak equals to the rated current.

Fastest ptn button
Click this button and the operation setting that provides the maximum load applied to the motor is calculated from the start position, end position and carrier load, and set to the system identification setting.
(Note) For the fastest ptn setting, the information of the start position, end position and carrier load is necessary.

Start button
Click this button and the actuator starts to operate back and forth with the provided operation setting.
(Note) The operation of the actuator automatically stops once the buffering of 30,000 records is finished.

Stop button
Click this button to interrupt the system identification.
(Note) If clicking **Stop** button before obtaining the number of data necessary for the system identification from the controller (at least 15,000 data for each velocity and current), the system identification calculation would not be carried out.
(Note) Even if not clicking **Stop** button, it will automatically stop once the maximum obtainable number of data (30,000 data) is obtained from the controller.

[4] System Identification Result

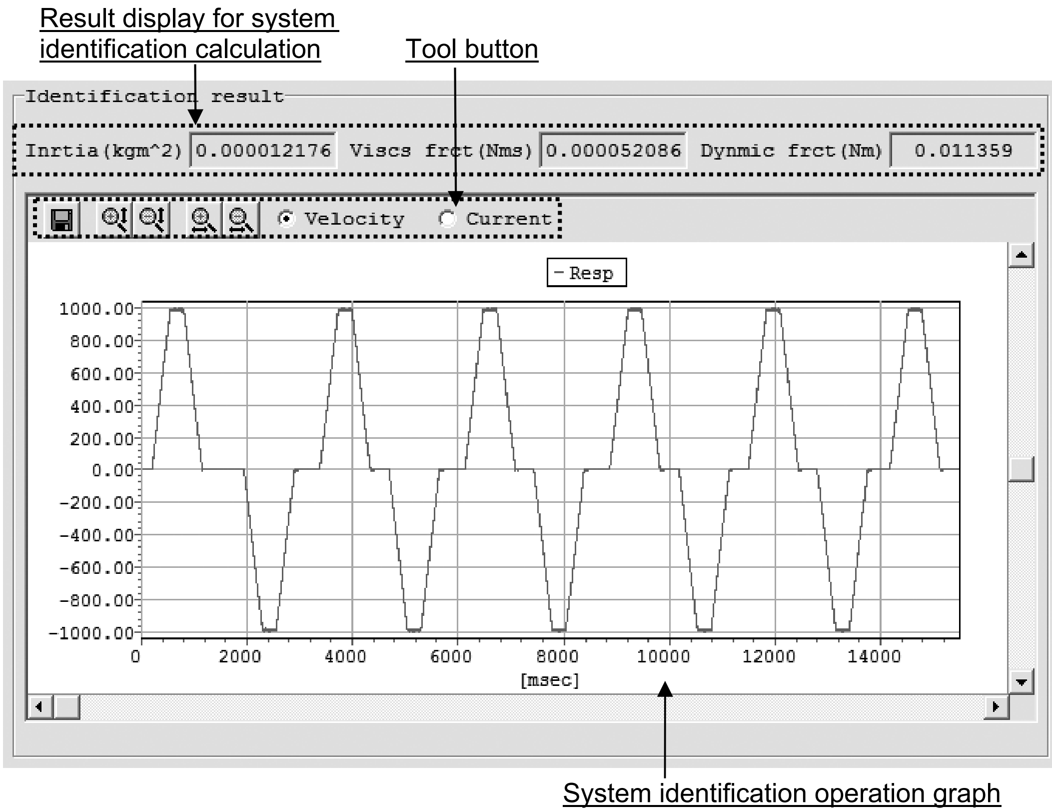


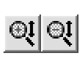
Fig. 13.21 System Identification Result Display

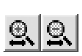
Result display for system identification calculation
In here, shows the result of the system identification calculation.

Tool button

Fig. 13.22 Tool button (Carrier load Select Window)

 Save with a new name
Click this button and the data of the waveforms for the velocity and current shown in the system identification test run result graph is saved as a csv file.

 Zoom in/out of Vertical Axis
Click this button to zoom in/out the vertical axis of the system identification operation graph.

 Zoom in/out of Horizontal Axis
Click this button to zoom in/out the horizontal axis of the system identification operation graph.

Displayed Data Switchover
The data (velocity/current) shown on the test run result graph can be switched over with this radio button.

System identification operation graph

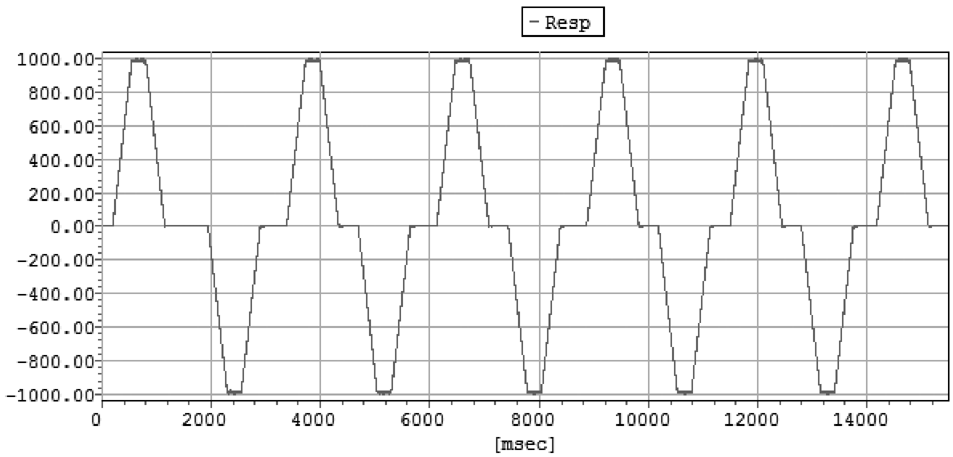


Fig. 13.23 System Identification Result Graph (Velocity (Resp))

The graph for the data selected with the displayed data switchover radio button is shown.

13.5.4 Explanations for each Item in Select adjustment method Window

Set the gain adjustment method in this window.

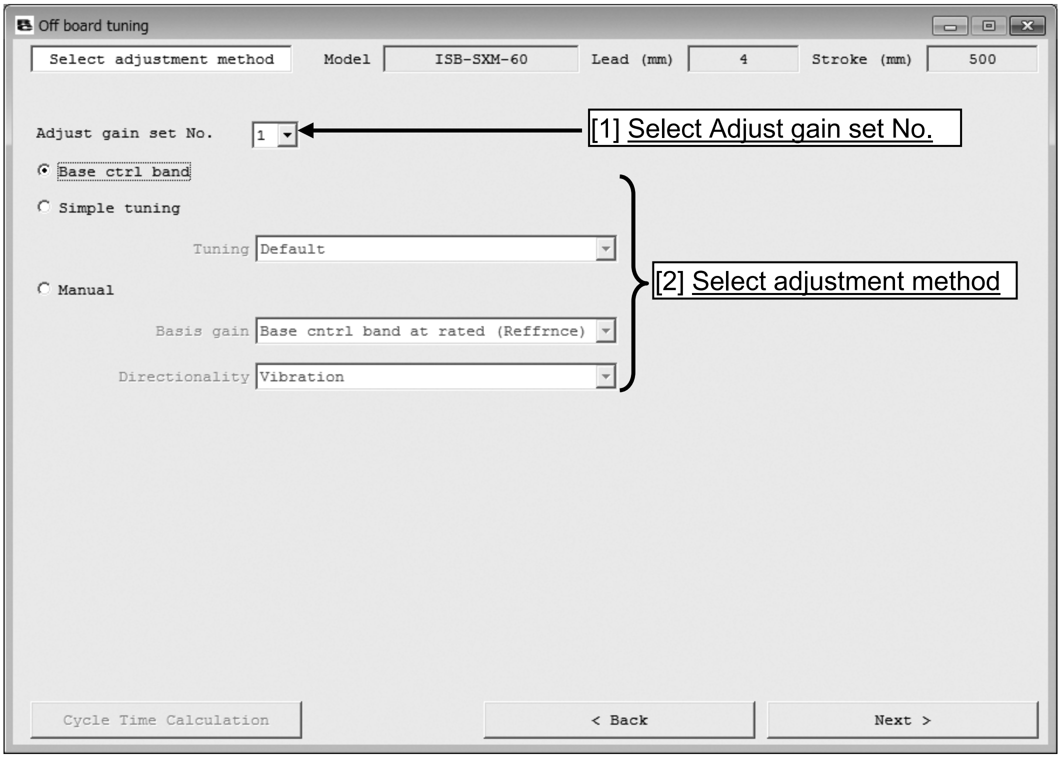


Fig. 13.24 Select adjustment method Window

[1] Select Adjust gain set No.
Select the gain set number which the adjusted gain is to be sent. The relation of the gain set numbers and the parameters where the gain is sent to is as shown below.
(Note) The gain set number where the gain is adjusted to would not be shown when in the offline work.

Table for Gain Set Number and Parameter No.

Parameter Name	Parameter No.			
	Set No.0	Set No.1	Set No.2	Set No.3
Servo-Motor Gain Number	7	120	126	132
Position Feed Forward Gain	71	121	127	133
Speed Loop Proportional Gain	31	122	128	134
Speed Loop Integral Gain	32	123	129	135
Torque Filter Time Constant	33	124	130	136
Current Control Band Number	54	125	131	137

[2] Select adjustment method

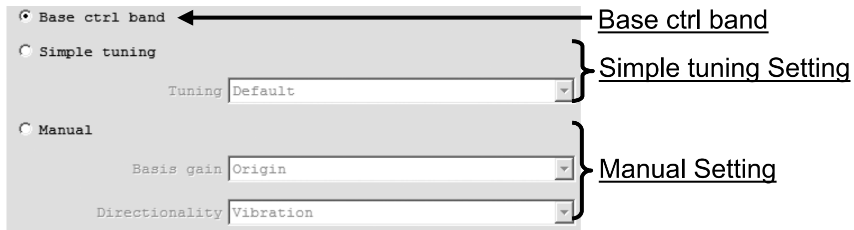


Fig. 13.25 Select adjustment method

Base ctrl band
Select this radio button and click on **Next** button to perform the gain adjustment by the base control band.
The base control band setting suits to a case when the automatic calculation of the gain considering the carrier load is required, but it is not necessary to increase the responsiveness.

Simple tuning Setting

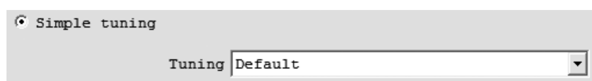


Fig. 13.26 Simple tuning Setting

Select this radio button and click on **Next** button to perform the gain adjustment based on the selected tuning.
The simple tuning suits to a case when the automatic calculation of the gain considering the carrier load is required, and the increase of the responsiveness is also necessary.
The tuning can be selected from the following four items;

Tuning and Explanation

Tuning	Explanation
Default	The optimum rule for the selected actuator is selected, and adjustment is made based on the selected rule. (Note) Optimum rule : This is a rule that considers the generation the vibration and noise, selected from the three rules, Tight, Ratio and Stiff, and also the responsiveness is increased as much as possible at the same time.
Tight	This rule possesses the highest increase of the responsiveness among the three, but has the highest risk of vibration and noise generations.
Ratio	The increase of the responsiveness is higher than Stiff, but lower than Tight. The risk of vibration and noise is lower than Tight, but higher than Stiff.
Stiff	This rule possesses the lowest risk of the generation of vibration and noise among the three, but has the lowest increase of the responsiveness.

(Note) The explanations of Tight, Ratio and Stiff stated above are the tendency when the carrier load is smaller than the rated transportable weight. The tendency flows the other way around when the carrier load is larger than the rated transportable weight.

Manual Setting

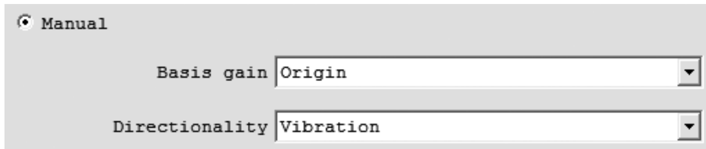


Fig. 13.27 Manual Setting

Select this radio button and click the **Next** button, and then the Manual window will show up.
The manual suits to a case when it is necessary to set the value which the gain calculation is based on individually considering the target (directionality of the adjustment).

Basis gain
Select the gain that the adjustment is based on in the Manual window. The basis gain can be selected from the following seven items.

- Origin gain
- Adjustment record gain
- Base control band (basis gain) at rated load
- Simple tuning gain (Default)
- Simple tuning gain (Tight)
- Simple tuning gain (Ratio)
- Simple tuning gain (Stiff)

(Note) Origin gain is selectable only when the adjustment record data which the origin gain has been stored was selected in “Select actuator” window, or while in the online work and when the new adjustment model is selected.
(Note) Adjustment record gain is selectable only when the adjustment record data is selected in “Select actuator” window.
The band setting used in the calculation of the adjustment gain stored in the adjustment record data selected in the model select window will be the initial value in the manual adjustment window of this time.

Directionality
Directionality for the adjustment in the Manual window can be selected. The directionality can be selected from the following four items.

- Control vibration
- Control noise
- Increase responsiveness
- Increase external disturbance suppression

[Parameter Transfer]
In the online work a message box appears in the following timings;

- When “Base control band” is selected and the **Next** button is clicked in the Select adjustment method window
- When “Simple tuning” is selected and the **Next** button is clicked in the Select adjustment method window

Fig. 13.28 Confirmation of Parameter Transfer

When **Yes** is clicked : The adjusted gain is sent to the set adjustment gain set number and the test run window is displayed.
When **No** is clicked : The test run window is displayed without the adjusted gain being sent.
When **Cancel** is clicked : The adjusted gain is not sent and the test run window is also not displayed.

If the adjusted gain is sent, a message box asking you to reboot the controller will show up. (The message box for the confirmation of servo-off at reboot is displayed only when the servo is on.)
Click on **Yes** button in each box to reboot the controller.

(Note) The sent parameters will be reflected to the setting after the reboot of the controller. Reboot the controller first if a test run is desired with the sent parameters.

Fig. 13.29 Confirmation for Controller Reboot

Fig. 13.30 Confirmation for Servo-off at Reboot

13.5.5 Explanations for each Item in Manual Window

Perform the gain adjustment with operating each adjustment switches in this window.

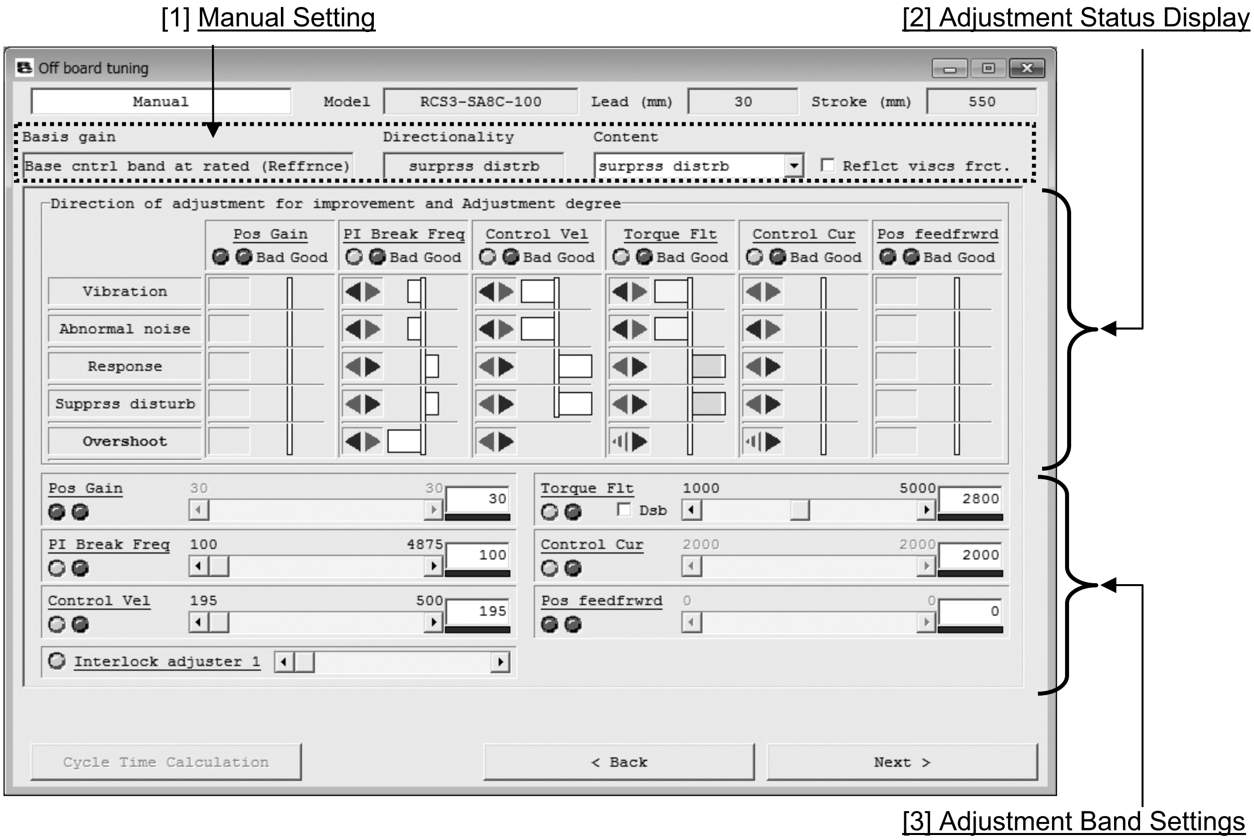


Fig. 13.31 Manual Window

[1] Manual Setting

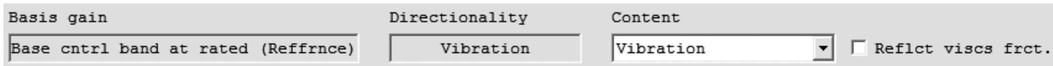


Fig. 13.32 Manual Setting

Basis gain
The basis gain for the adjustment set in “Select adjustment method” window is displayed.

Directionality
The directionality for the adjustment set in “Select adjustment method” window is displayed.

Content
Select the content of the adjustment. The content can be selected from the following four items. Select an appropriate content if an improvement is required at the same time in addition to the directionality of the adjustment.
- Control vibration
- Control noise
- Increase responsiveness
- Increase external disturbance suppression

(Note) The main frame of the adjustment is what is selected as the directionality for the adjustment. If an adjustment with the adjustment content as the main frame is required, make a change to the setting of the directionality for the adjustment.

Reflct viscs frct.
Put a check mark in this check box to add a consideration of the viscous friction to the gain calculation.

[2] Adjustment Status Display

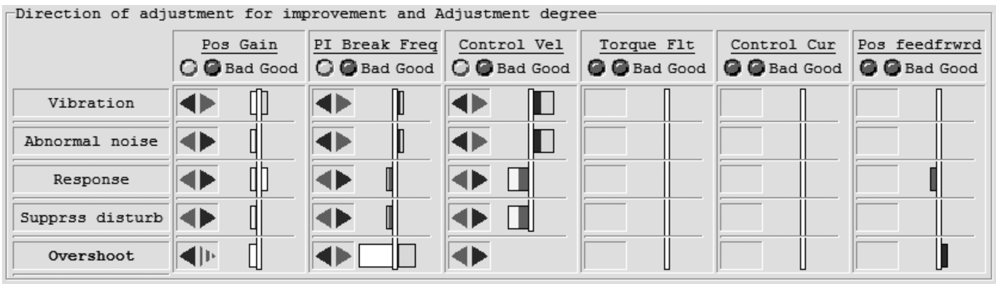


Fig. 13.33 Adjustment Status Display

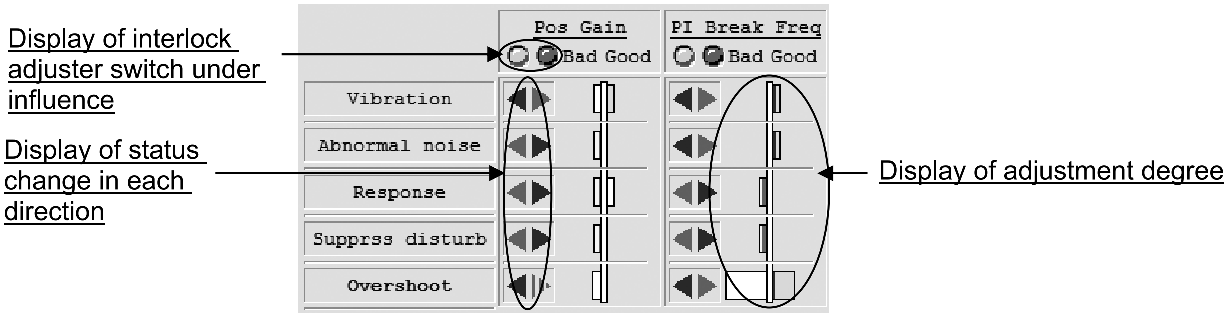


Fig. 13.34 Adjustment Status Display

Display of status change in each direction
This shows the change of the status from the current ones in each adjustment direction for the five items listed on the left side of the window. The meanings of the displayed arrows are as explained in the following table;

Status Change in each Adjustment Direction and Arrow Displays

Status Change	Adjustment Direction	
	Left	Right
No impact	▬ (blue)	▬ (blue)
Improved	◀ (blue)	▶ (blue)
Worsened	◀ (red)	▶ (red)
Possibly worsened	◂‖ (red)	‖▸ (red)

If taking PI Break Frequency in Figure 13.31 as an example, it can be defined that;
- the vibration, abnormal noise and overshoot can be improved if an adjustment is made to the left (to make the setting smaller),but the remaining items would not be improved.

Display of adjustment degree
This shows the degree of the adjustment against the initial condition of each adjustment switch for the five items listed on the left side of the window. The left side of the gauge extends if it is worsened and the right side extends when there is an improvement.
The gauge for the adjustment degree is displayed in 2 steps. The worsened gauge changes as “yellow ⇒ red” while improved gauge goes “light blue ⇒ blue”.

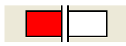


Fig. 13.35 Adjustment Degree (Improved)
(most worsened condition)

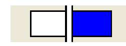


Fig. 13.36 Adjustment Degree (Improved)
(most improved condition)

Only red in the worsened gauge is the most worsened condition while only blue in the improved gauge is the most improved condition that can currently be improved the most.

If taking PI Break Frequency in Figure 13.31 as an example, it can be defined that;
- the vibration, abnormal noise and overshoot are improved from the initial condition, and
- the response and suppress disturb are worsened from the initial condition.

(Note) The display of the adjustment degree is a relative display compared with the initial conditions at the start when the Manual window is opened.
(Note) If an adjustment is made to the control velocity band, it will give an impact to the overshooting degrees for the position gain, PI break frequency, control current band and torque filter.

Display of interlocked adjustment switch under influence
This shows the adjustment switches which are influenced by the adjustment degree and overshooting degree when the interlocked adjustment switches are operated.
An influence is given when Interlock adjuster 1 is operated if  is displayed.
An influence is given when Interlock adjuster 2 is operated if  is displayed.
(Note) The number of interlock adjuster may differ depending on the directionality, content and the manual data version.

[3] Adjustment Band Settings

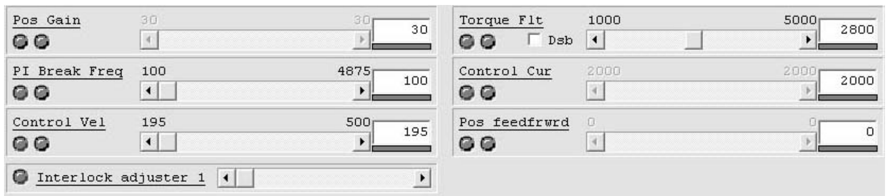


Fig. 13.37 Adjustment Band Settings

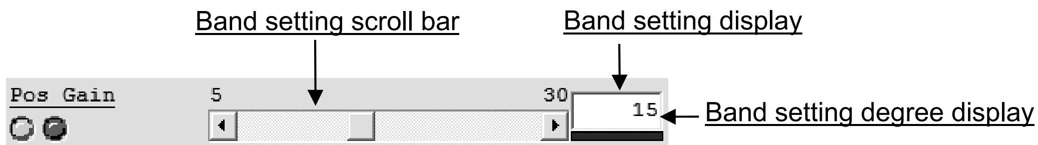


Fig. 13.38 Adjustment Band Settings (Pos Gain)

Band setting scroll bar
By operating this scroll bar, the band setting of the switch can be changed.
(Note) The operation is available only on the switches that are available for adjustment only.

Band setting display
In here, displays the current band setting.

Band setting degree display
In here, displays the degree of the current band setting. The gauge changes in the order of blue ⇒ light blue ⇒ yellow ⇒ red. Higher the setting gets, the closer the color of the gauge comes to red.

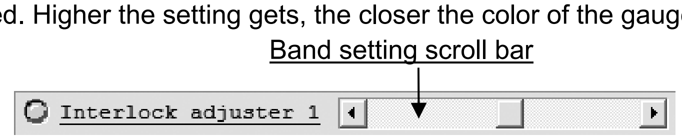


Fig. 13.39 Interlock adjuster Band Setting

Torque filter bandwidth inactivated (Version V9.02.00.00 or later)

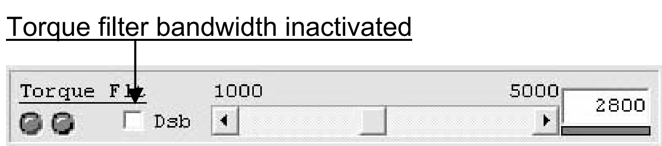


Fig. 13.40 Torque filter bandwidth inactivated

The settings are as shown below for when there is a tick in the checkbox for the torque filter bandwidth inactivated and there is no check.

Check	Adjustment Gain Torque Filter Time Constant
When there is a tick (✓)	0
When there is no tick (blank)	Value calculated from torque filter bandwidth setting

(Note) Even when there is a tick in the checkbox, changes can be made in the torque filter bandwidth itself and the setting in the torque filter bandwidth by the interlocking adjuster.
(Note) When the manual adjustment window is shown from the adjustment method select window, and when the torque filter constant in the adjustment gain is 0, the tick in the checkbox is kept (✓).

Band setting scroll bar
By operating this scroll bar, the band setting can be changed by the interlock adjuster.
By utilizing the interlock adjuster, the band setting for a several switches can be changed at the same time.
(Note) The combinations of the interlock adjuster the band setting is changed at the same time may differ depending on the directionality and content.
(Note) The operation is available only on the interlock adjuster that are available for adjustment only.

[Parameter Transfer]
In the offline work a message box appears in the following timings;
- When **Next** button is clicked in the Manual window

Fig. 13.41 Confirmation of Parameter Transfer

When **Yes** is clicked : The adjusted gain is sent to the set adjustment gain set number and the test run window is displayed.
When **No** is clicked : The test run window is displayed without the adjusted gain being sent.
When **Cancel** is clicked : The adjusted gain is not sent and the test run window is also not displayed.

If the adjusted gain is sent, a message box asking you to reboot the controller will show up. (The message box for the confirmation of servo-off at reboot is displayed only when the servo is on.)
Click on **Yes** button in each box to reboot the controller.

(Note) The sent parameters will be reflected to the setting after the reboot of the controller. Reboot the controller first if a test run is desired with the sent parameters.

Fig. 13.42 Confirmation for Controller Reboot

Fig. 13.43 Confirmation for Servo-off at Reboot

13.5.6 Explanations for each Item in Test run Window

A test run of the actuator is available with using the adjusted gain in this window.
(Note) The test run function is available only in the online work. When it is offline the screen shows as shown in the Fig. 13.46 and the test run function cannot be used.
(Note) SCON-CAL/CGAL can perform a trial run, but the result cannot be displayed. (Fig. 13.45)

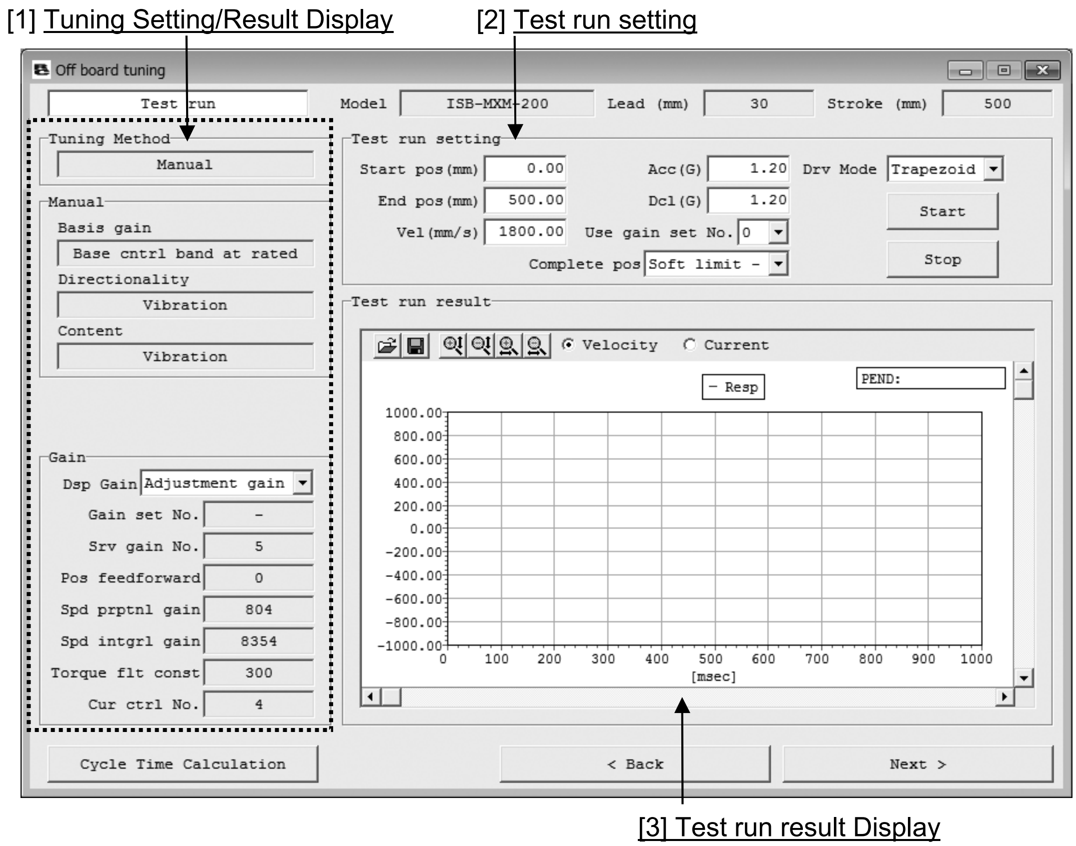


Fig. 13.44 Test run Window (in online work)

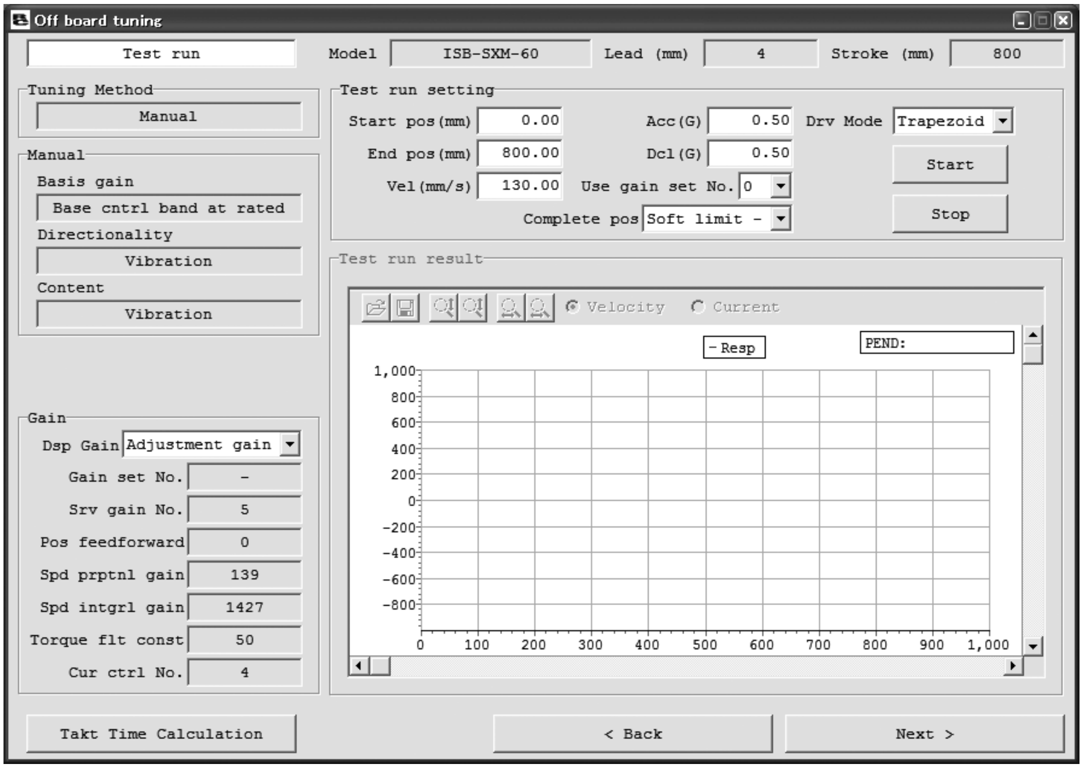


Fig. 13.45 Test run Window (in online work of SCON-CAL/CGAL)

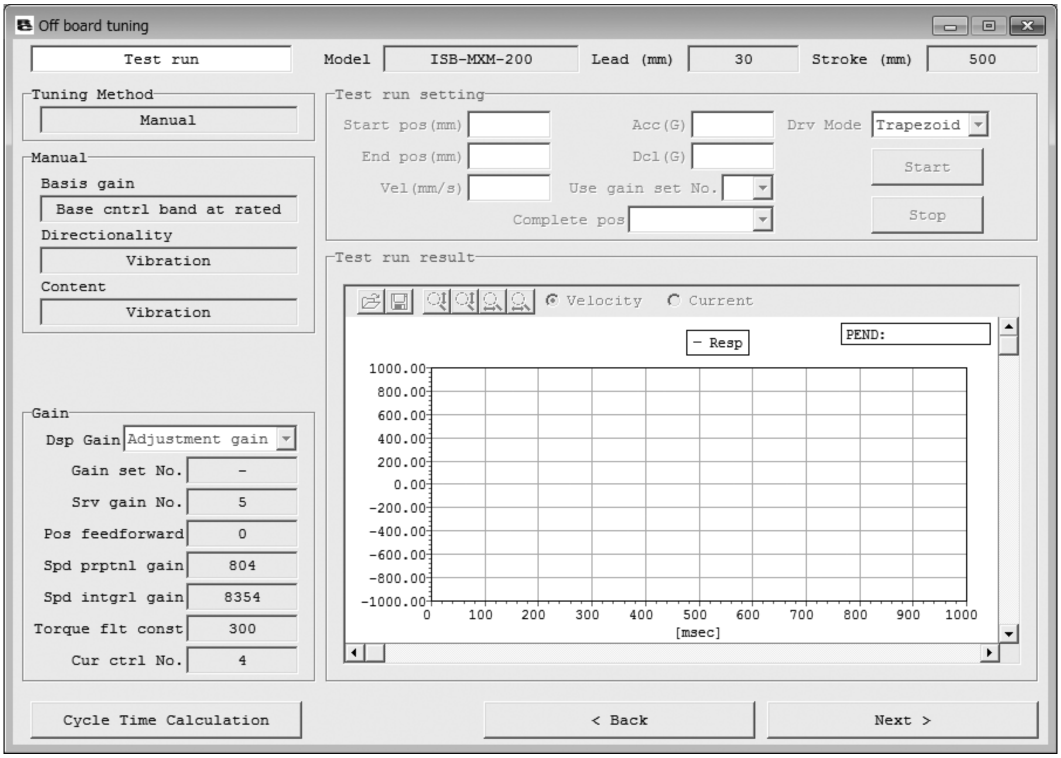


Fig. 13.46 Test run Window (in offline work)

[1] Tuning Setting/Result Display

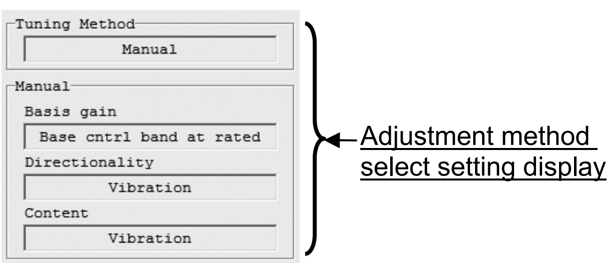


Fig. 13.47 Tuning Setting (When Manual)

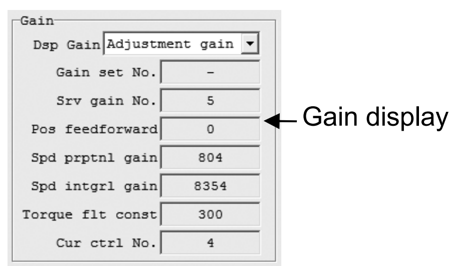


Fig. 13.48 Gain display (Test run Window)

Adjustment method select setting display
The tuning method set in “Select Tuning Method” window is displayed.
(Note) The display differs depending on the selected tuning method. The display for the modes other than the Manual is as shown below.

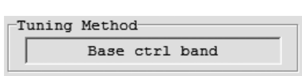


Fig. 13.49 Tuning Setting
(at base ctrl band)

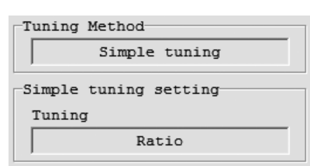


Fig. 13.50 Tuning Setting
(at Simple tuning)

Gain display
Shows the gain indicated in the used gain set number for the test run setting. The selection is to be made from the following two;

- Adjustment gain : Shows the adjustment gain. The gain set number shows “-” as shown in the figure below when the adjustment gain is not sent to the controller.
- Test run gain : Shows the gain indicated in the used gain set number for the test run setting.

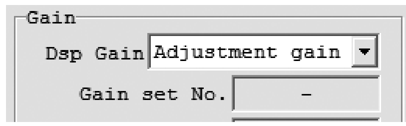


Fig. 13.51 Adjustment Gain Display (Test run Window) (not sent)

[2] Test run setting

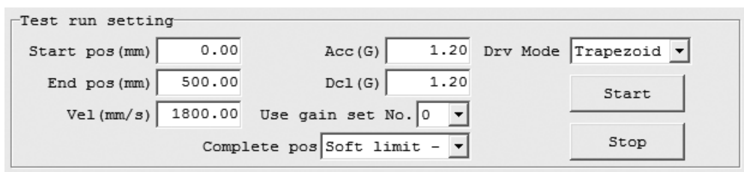


Fig. 13.52 Test run setting

Start pos (mm)
Set the test run start position.
(Note) In the test run, the actuator runs through between the start position and end position once.

End pos (mm)
Set the test run end position.
(Note) In the test run, the actuator runs through between the start position and end position once.

Vel (mm/s)
Set the test run velocity.

Acc (G)
Set the test run acceleration.

Dcl (G)
Set the test run deceleration.

Use gain set No.
Set the gain set number used in the test run.

Complete pos
It can be set at what coordinates the actuator is to be stopped after the back and forth operation for the test run.
The selection is to be made from the following two;

- Soft limit – : Stops on the soft limit – side (origin side)
- Start Position : Stops at the start position set in the identification setting

<u>Drv Mode</u>
Set the operation mode during test run.
The following two items can be selected for the operation mode.

- Trapezoid
- S motion

(Note) When **Operation Start** button is clicked, a message box may open to confirm the change to the S motion parameter depending on the parameter settings.
Select **Yes** and the following user parameters are changed as described, and the test run starts executed.

<Parameters to be changed>

Name	Set value	
	Trapezoid	S-shape
No.56 “Sigmoid motion ratio setting [%]”	Original Setting (Note 1)	100
No.71 “Position feed-forward gain”	Original Setting (Note 1)	90

(Note 1) If a change has made to the S motion operation parameter in “Cycle time calculation” window, the parameter for the trapezoid operation is changed from the original values to that of S motion operation.

Select **No** and the test run is cancelled with no change to the parameters.

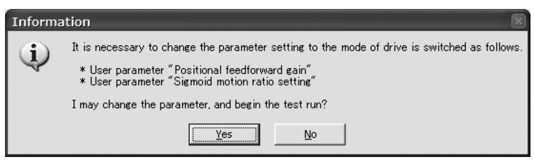


Fig. 13.53 Confirmation message for Change to S motion Operation Parameter

Start button
Click this button to start the test run.
(Note) Without clicking on **Stop** button, the test run automatically finishes at the end.
(Note) In some cases of start position and end position settings, the following message may appear. In the case this message is displayed, change the start position and end position so the moving distance can be long enough.

Fig. 13.54 Operation Unable Message due to Moving Distance too short

(Note) The following message may appear depending on the combination of the velocity and acceleration/deceleration. The message will no longer appear if the setting is changed to that with acceleration time less than 2.0 [sec] for the velocity and acceleration/deceleration.

Fig. 13.55 Compulsory Trapezoid Operation Message

(Note) A message box may open for the overshooting alarm depending on the operation settings. Select **Yes** and the test run operation can be executed. To make the warning not to appear, change the operation setting so the acceleration time becomes longer.

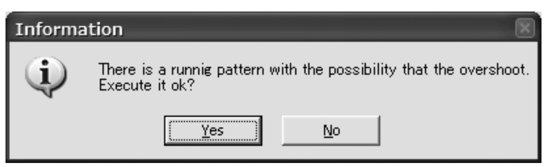


Fig. 13.56 Overshoot Warning Message

Stop button
Click this button and the test run is cancelled.

13. Off Board Tuning Function

[3] Test Run Result Display

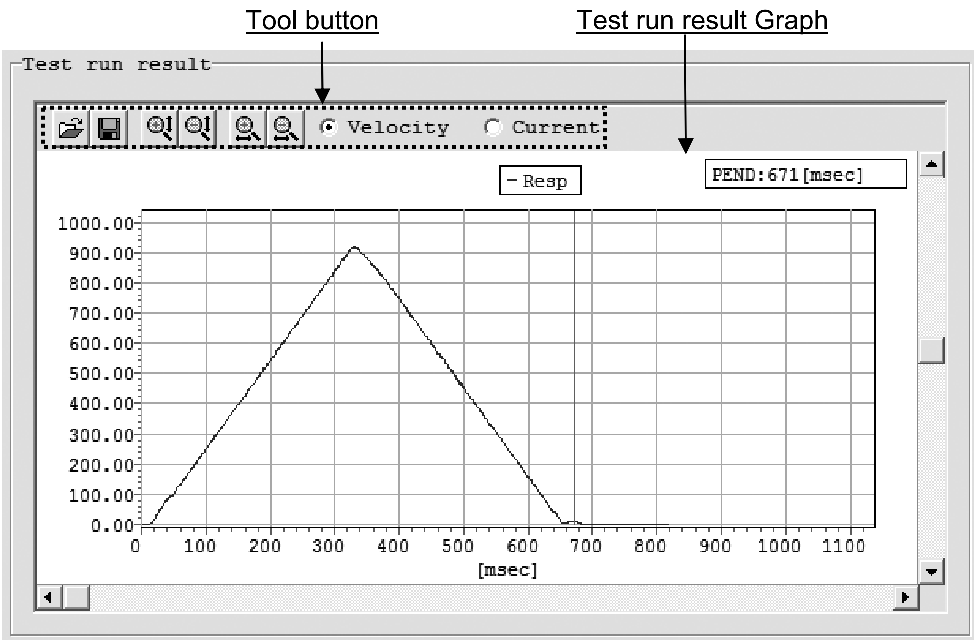


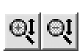
Fig. 13.57 Test run result Display

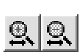
Tool button

Fig. 13.58 Tool button (Test run Window)

 Reading File for Comparison
Click on this button and a file is read and drawn on the same graph to compare with the test run result.

 Saving Test run result File
Click this button and the data of the waveforms for the velocity and current for the test run result is saved as a bsmrc or csv file.

 Zoom in/out of Vertical Axis
Click these buttons to zoom in and out the vertical axis of the test run result.

 Zoom in/out of Horizontal Axis
Click these buttons to zoom in and out the horizontal axis of the test run result.

Displayed Data Switchover
The data (velocity/current) shown on the test run result graph can be switched over with this radio button.

Test run result Graph

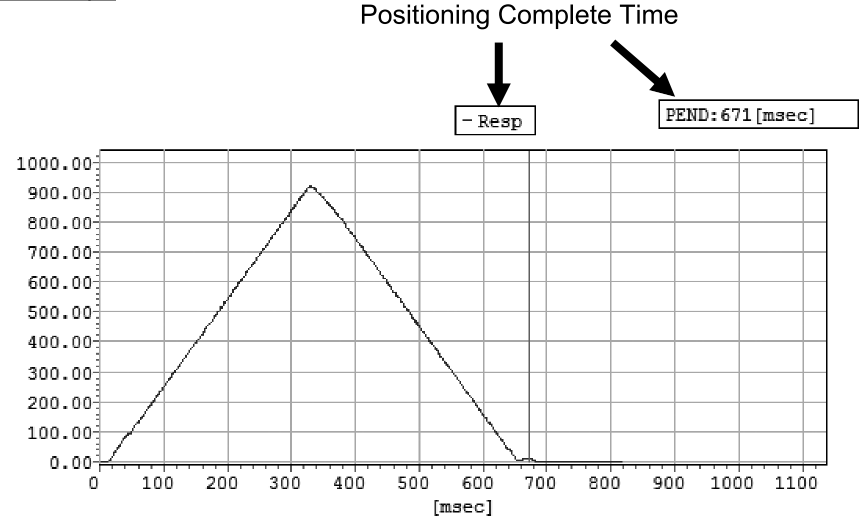


Fig. 13.59 Test run result Graph (Velocity (Resp))

The graph for the data selected with the displayed data switchover radio button is shown.
The vertical red line and PEND display on the top right indicated with the arrows show the positioning complete time.

13.5.7 Explanations for each Item in Adjustment record data save Window

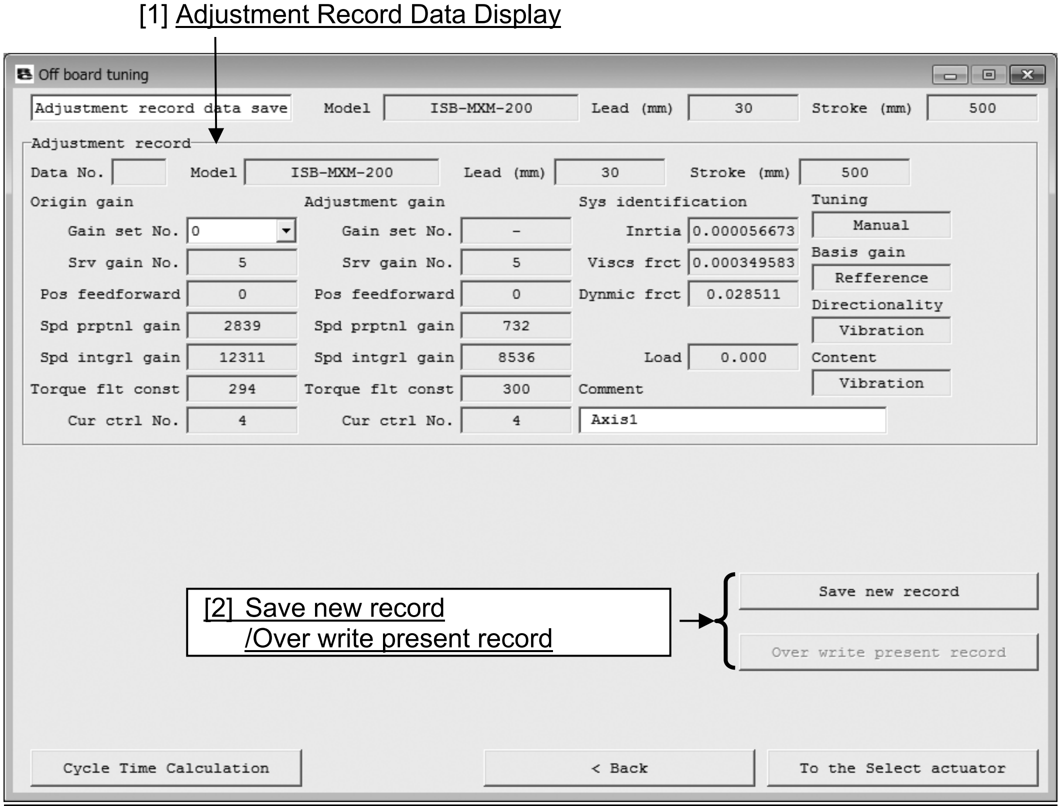


Fig. 13.60 Adjustment record save Window

[1] Adjustment Record Data Display
Data saved as the adjustment record can be displayed. For the two items shown below, the display and function change from the adjustment record data display in “Select actuator” window.

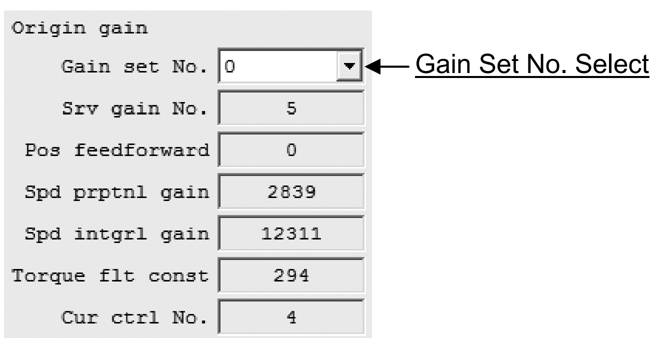


Fig. 13.61 Origin gain (Adjustment record data save Window)

Fig. 13.62 Comment Box (Adjustment record data save Window)

Gain Set No. Select
Select the gain set number that is to be saved as the origin gain. At the time the Off board tuning window is activated, the gain set selected from the gain sets No. 0 to 3 set to the controller can be saved.
If the origin gain is already saved to the adjustment record data at the time “Adjustment record” was chosen in “Select actuator” window, the origin gain saved in the adjustment record can be saved by selecting “*” in the gain set number in the following window.

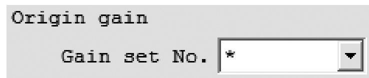


Fig. 13.63 Gain Set Number Select
(when origin gain is saved in adjustment record)

(Note) “*” can be displayed only when the origin gain is saved in the adjustment record data.

(Note) The display of the gain set No. select changes to the one as shown below when it is offline.

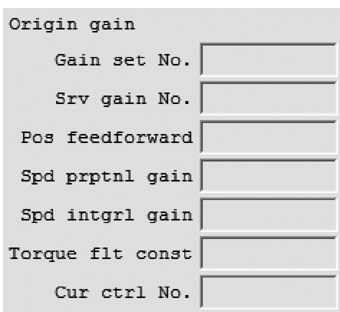


Fig. 13.64 Display of Origin gain
(Adjustment record data save Window)
(with no origin gain)

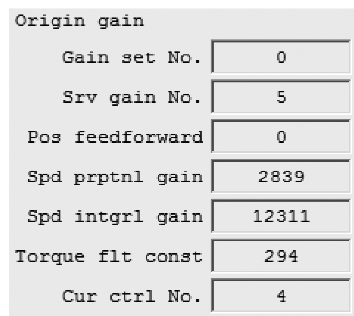


Fig. 13.65 Display of Origin gain
(Adjustment record data save Window)
(with origin gain)

Comment Input Box
A comment to save in the adjustment record can be input. The comment can be made with 32 half-sized characters at the maximum.

[2] **Save new record/Over write present record** button

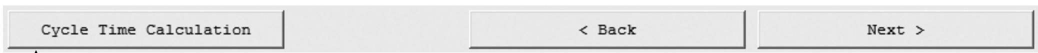
Save new record button
Click on this button and the adjustment record displayed on the Adjustment record data display ([1] in Adjustment record data save window) can be additionally saved.

Over write present record button
Click on this button and the file can be overwritten to the adjustment record of the data number in the Adjustment record data display ([1] in Adjustment record data save window).
(Note) Overwriting is available only after the adjustment record currently displayed is already saved at least once, or when “Adjustment record” is chosen in “Select actuator” window.

13.6 Operations in Cycle Time calculation

To conduct the cycle time calculation, click on the **Cycle Time Calculation** button in the Off board tuning window.

(Note) “Cycle time calculation” window can be opened from “Test run” window or “Adjustment record data save” window.



Cycle Time Calculation button

Fig. 13.66 Common Buttons Area in Off board tuning Window

13.6.1 Explanations for each Item in Cycle Time calculation Window

Cycle time calculation can be performed in this window.

[1] Display Switchover Tab

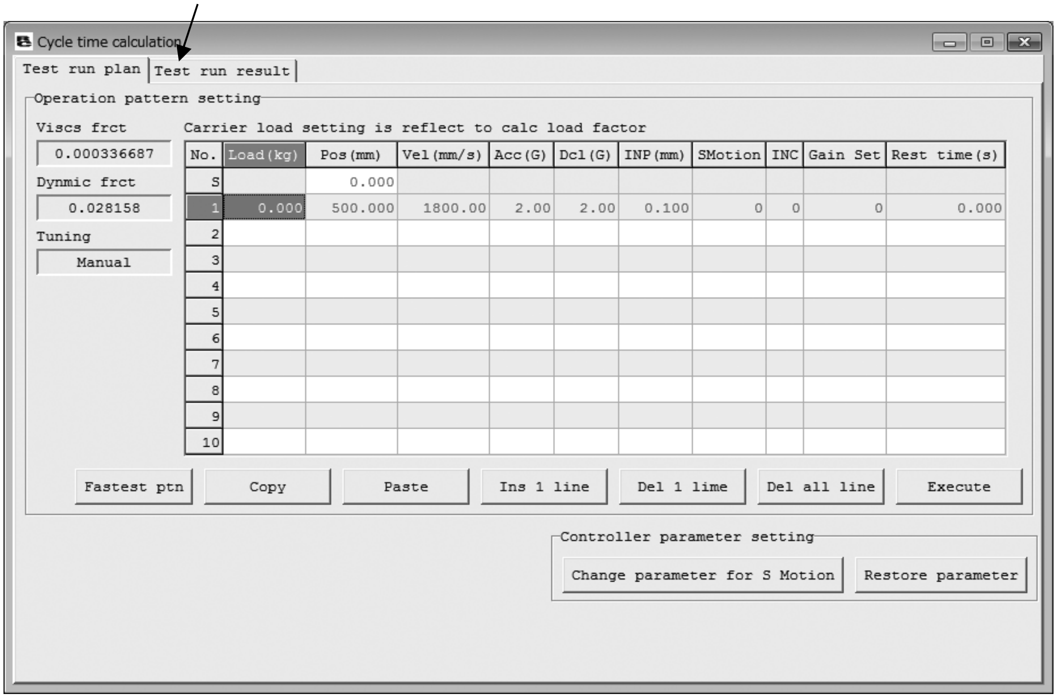


Fig. 13.67 Cycle time calculation Window (Test run plan Setting Window)

[1] Display Switchover Tab

With these tabs, the displays of “Test run plan Setting” window and “Test run result Display” window can be switched over.

13.6.2 Test run plan Setting Window

The settings of operation pattern to be held for cycle time calculation can be conducted in this window. The maximum operation patterns available to set are 10 patterns.

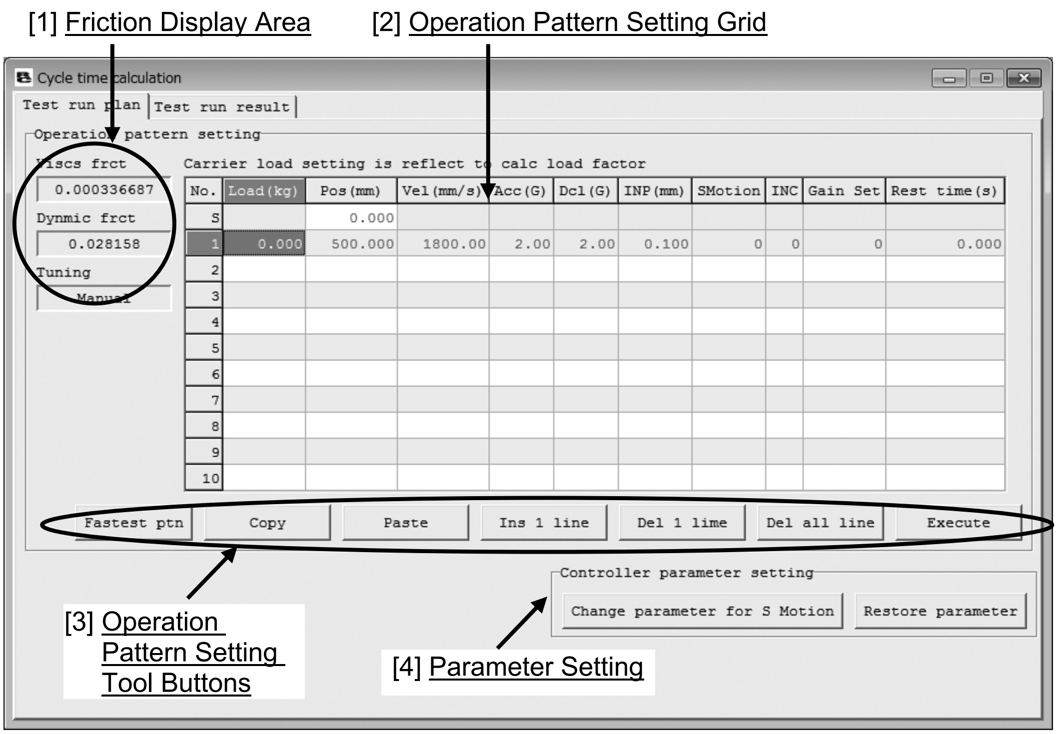


Fig. 13.68 Test run plan Setting Window

[1] Friction Display Area

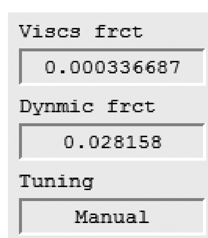


Fig. 13.69 Friction Display Area

Viscs frct
In here, shows the coefficient of viscous friction. The setting unit is [Nms].

Dynmic frct
In here, shows the kinetic friction torque. The setting unit is [Nm].

Tuning
The adjustment method used in the gain calculation is displayed.

[2] Operation Pattern Setting Grid
Set the operation patterns to have cycle time calculation. Once the cycle time calculation is complete, the operation pattern can be copied and pasted to Position Data Edit window.

Carrier load setting is reflect to calc load factor

No.	Load(kg)	Pos(mm)	Vel(mm/s)	Acc(G)	Dcl(G)	INP(mm)	SMotion	INC	Gain Set	Rest time(s)
S		0.000								
1	0.000	500.000	1800.00	2.00	2.00	0.100	0	0	0	0.000
2										
3										
4										
5										
6										
7										
8										
9										
10										

Fig. 13.70 Operation Pattern Setting Grid

Load (kg)
Set the carrier load.
(Note) Only the ratio of load can be reflected to the calculation for the setting of carrier load.

Pos (mm)
Set the position.
The top line (No. S) is the start position setting cell.

Vel (mm/s)
Set the velocity.

Acc (G)
Set the acceleration.

Dcl (G)
Set the deceleration.

INP (mm)
Set the positioning width.

SMotion
Set the operation type from trapezoid and S motion operations, which is to be used for the cycle time calculation. The numbers corresponding to the trapezoid and S motion operations are as shown below.

- Trapezoid : 0
- S Motion : 1

INC
Set the movement type from absolute move and incremental move, which is to be used for the cycle time calculation. The numbers corresponding to the absolute and incremental moves are as shown below.
- Absolute : 0
- Incremental : 1

Gain Set
Set the gain set number used for the cycle time calculation.

Rest time (s)
Set the rest time.

[3] Operation Pattern Setting Tool Buttons

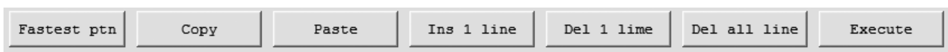


Fig. 13.71 Operation Pattern Setting Tool Buttons

Fastest ptn button
Click on this button and the operation pattern can be set in the selected line to maximize the load applied to the motor.
(Note) Fastest operation setting cannot be executed as long as the carrier load and movement distance settings are incomplete.

Copy button
Click this button to copy the content of selected cell.

Paste button
Click this button to paste the copied content to the selected cell.

Ins 1 line button
Click this button to insert a blank line to the selected cell.

Del 1 line button
Click this button to delete the content of the selected line and let the lines below the deleted line go up by one line.

Del all line button
Click this button to delete all the settings in the operation pattern setting grid.

Execute button
Click this button to execute the cycle time calculation with the operation pattern set to the operation pattern setting grid.

[4] Parameter Setting

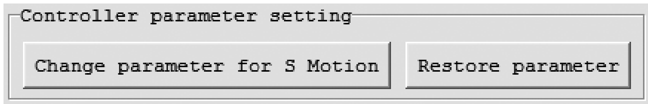


Fig. 13.72 Parameter Setting

<u>Change parameter for S Motion</u>
Click this button to change the following parameters for the gain set indicated in the operation pattern that the cycle time calculation is already complete with S motion operation.

<Parameters to be changed>

Name	Set value
No.56 “Sigmoid motion ratio setting [%]”	100
No.** “Position feed-forward gain”	90

** : The position feed-forward gain corresponding to the gain set number set to the operation pattern is to be applied.

<u>Restore parameter</u>
The gain set with the parameters changed can be returned to the parameter settings at the startup of the cycle time calculation window with **Change parameter for S Motion** button.

13.6.3 Test run result Display Window

[1] Test run result Time Display Area [2] Test run result Graph Display Area

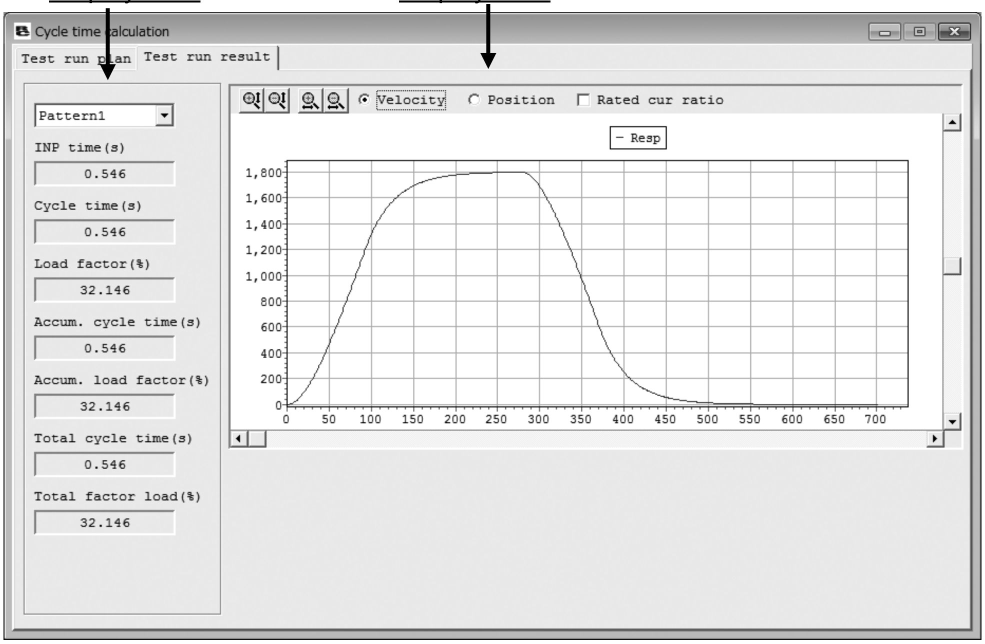


Fig. 13.73 Test run result Display Window

[1] Test run result Time Display Area

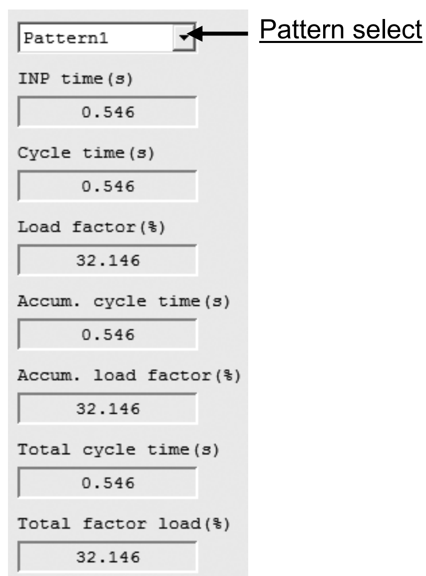


Fig. 13.74 Test run result Time Display Area

Pattern select
Select the pattern to be displayed in the cycle time calculation result graph with this combo box. The pattern numbers that the cycle time calculation was held with are available to choose.

INP time (s)
The positioning time for the pattern selected in the Pattern select is shown.

Cycle time (s)
The cycle time for the pattern selected in the Pattern select is shown.
Cycle time is the sum of positioning time and pause time.

Load factor (%)
The load factor for the pattern selected in the Pattern select is shown.

Accum. cycle time (s)
The accumulative cycle time for those from Pattern 1 to the pattern selected in the Pattern select is shown.

Accum. load factor (%)
The accumulative load factor for those from Pattern 1 to the pattern selected in the Pattern select is shown.

Total cycle time (s)
In here, shows the total cycle time of all the patterns included in the cycle time calculation.

Total factor load (%)
The total load factor for all the patterns the cycle time calculation is conducted on is shown.

[2] Test run result Graph Display Area

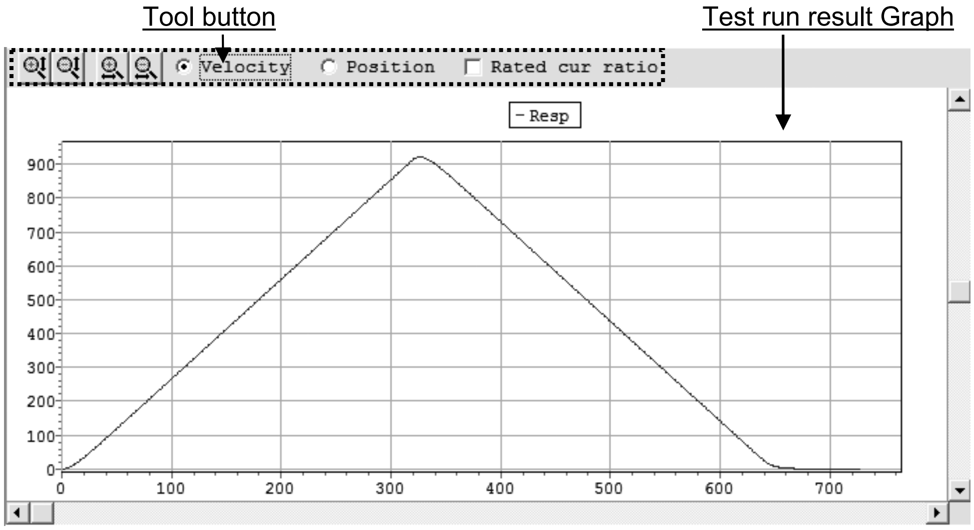
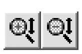


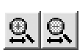
Fig. 13.75 Test run result Graph Display

Tool button

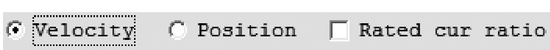
Fig. 13.76 Tool button (Cycle Time Calculation Window)

 Zoom in/out of Vertical Axis

Click this button to zoom in/out the vertical axis of the operation graph.

 Zoom in/out of Horizontal Axis

Click this button to zoom in/out the horizontal axis of the operation graph.



Displayed Data Switchover

The data (velocity/position) shown on the cycle time calculation result graph can be switched over with this radio button.

Also, by putting a check mark in Rated cur ratio check box, the waveform for the rated current ratio can be displayed on the cycle time calculation result graph.

Test run result Graph

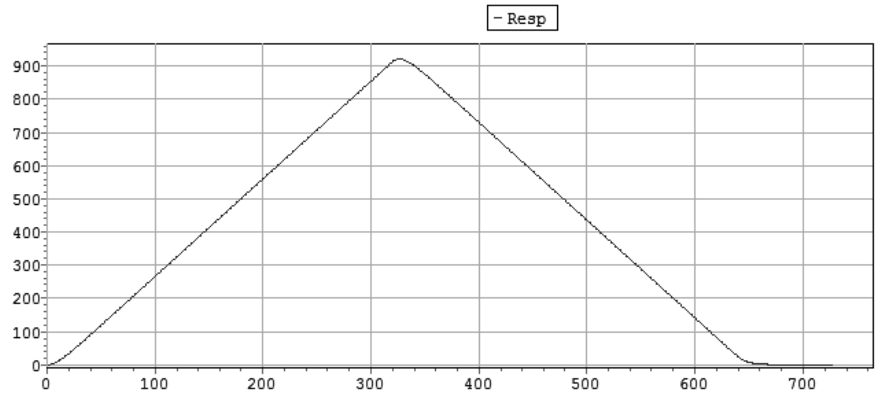


Fig. 13.77 Test run result Graph (Velocity Responsiveness)

The data selected with the check box on the displayed data switchover radio button can be shown.

14. Frequency Analysis for Vibration Control (Version V8.00.00.00 or later of SCON-CA, Version V9.02.00.00 or later of MSCON, Version V9.07.00.00 or later for SCON-CAL/CGAL, V10.00.00.00 or later for SCON-CB)

Note:	As servo monitoring cannot be performed on SCON-CAL/CGAL, it is not available to operate an actuator, take in the measurement data (sampling), and export the vibration frequency of the load. Import measurement data externally taken by a measurement device, have an FFT analysis and set the vibration control parameters.

(Note) To use the frequency analysis for vibration control function, you must install the key file (Fam.dll file). Contact IAI for information on how you can obtain the key file (Fam.dll file).

[Setting up the vibration suppression frequency analysis function]
Move the key file (Fam.dll file) you have obtained to the folder in which the execution file of the "RcPc RC PC Software" is stored.
Example of storage folder: C:¥Program Files¥IAI¥RoboCylinder

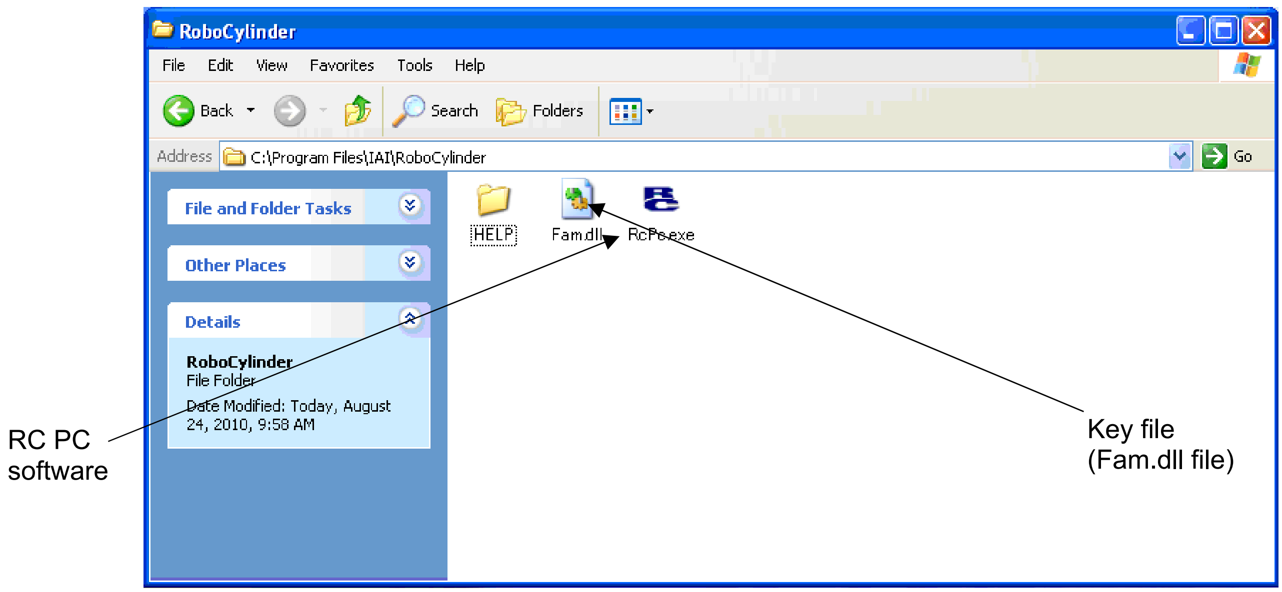


Fig. 14.1 RC PC Software Execution File Folder

After the key file has been moved, start the RC PC software and then click **Parameter (P)** menu and select **Control Parameter Setup (C)**. The "Frequency analysis for vibration control (F)" window will appear, where you can perform frequency analysis for vibration control.

14. Frequency Analysis for Vibration Control

14.1 Operation Overview

(Note) The following new controller data cannot be imported for SCON-CAL/CGAL.
Import measurement data externally taken by a measurement device, have an FFT analysis and set the vibration control parameters.

A general operation flow from measuring the vibration frequency of the load whose vibration you want to suppress, to setting the applicable parameters, is shown below.
[For each window, refer to 14.2, "Explanation of Each Window.]
[For the specific operations, refer to 14.3, "Operations"]

[1] Select the measurement data.
Select "Import new controller data" so that you can move the actuator and import vibration data to measure the vibration frequency of the load.
You can also read external measurement data to measure the vibration frequency of the load.

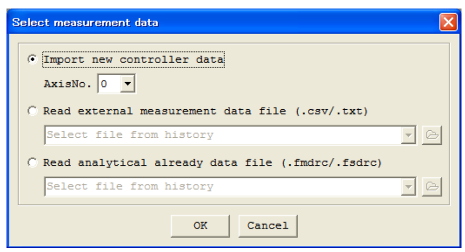


Fig. 14.2 Measurement Data Selection Window

[2] If you have selected "Import new controller data," move the actuator and import vibration data to measure the vibration frequency of the load. The imported vibration data is displayed under "Measurement Data."
FFT analysis must be performed to extract the vibration frequency of the load. As a preparation for this analysis, set the necessary items such as the range of FFT analysis using the measurement data you have just imported.

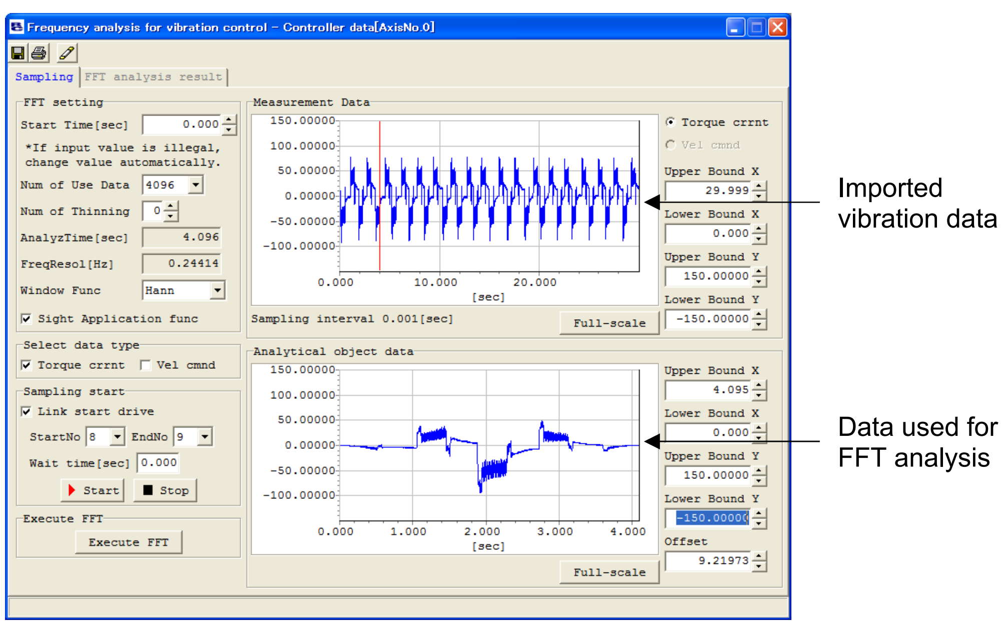


Fig. 14.3 Measurement Data Display/Analysis Details Setting Window

[3] Perform FFT analysis of the desired data to extract the vibration frequency of the load.

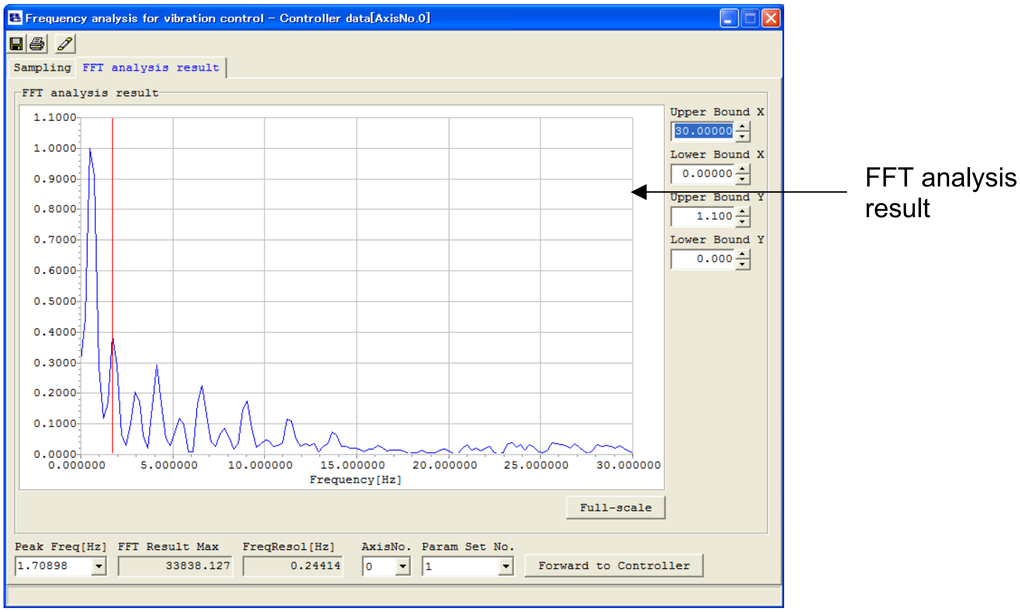


Fig. 14.4 Analysis Result Display Window

[4] Set the characteristic vibration frequency in the “Peak Freq [Hz]” field, and then select **Forward to Controller** and set the parameters.

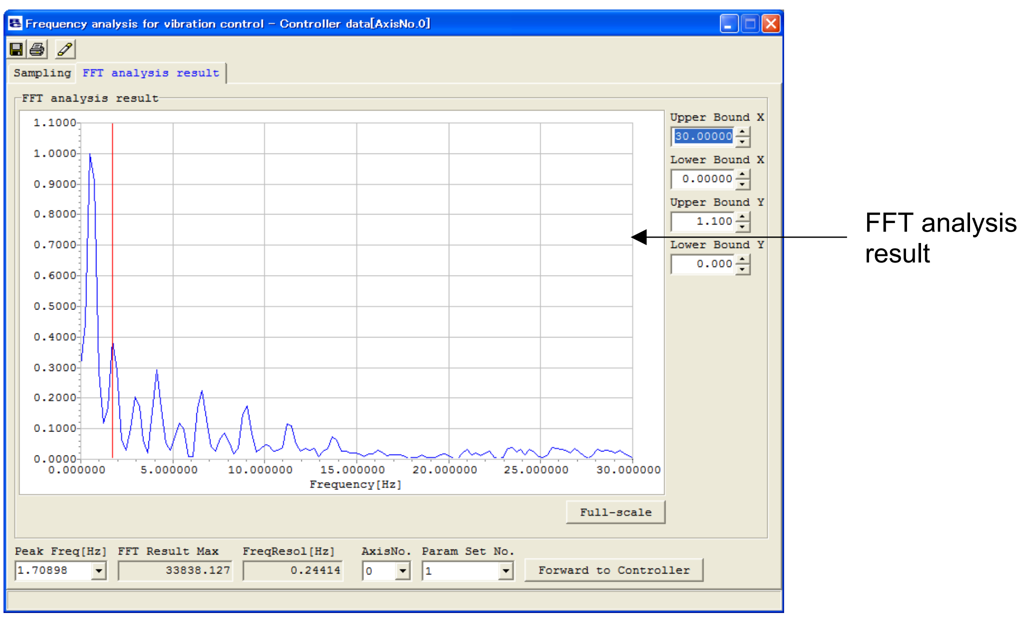


Fig. 14.5 Analysis Result Display Window

14.2 Explanation of Each Window

14.2.1 Measurement Data Selection Window

This window is used to select measurement data.
Click the **Parameter (P)** menu, point to **Controller Parameter Setup (C)**, and then select **Frequency Analysis for Vibration Control (F)**, and the measurement data selection window will appear.
(Note) [1] Import new controller data cannot be selected in SCON-CAL/CGAL.

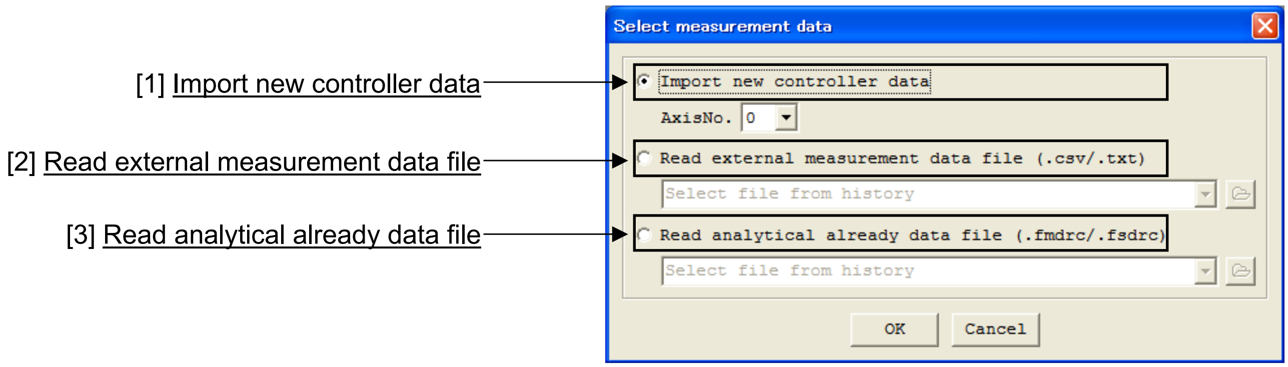


Fig. 14.6 Measurement Data Selection (“Import New Controller Data” Selected)

[1] Import new controller data
Select this option if you want to move the connected actuator and import (sample) measurement data to extract and set the vibration frequency of the load.
The frequency analysis for vibration control window (Fig. 14.10) appears where you can perform FFT analysis of the imported measurement data (sampled data).
Select the axis number under which to set the vibration frequency of the load.

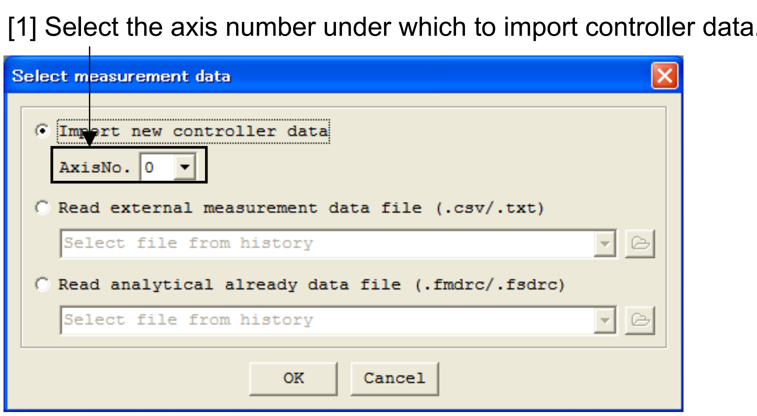


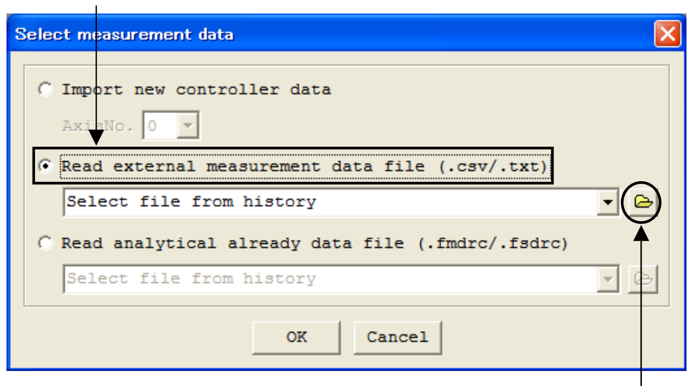
Fig. 14.7 Measurement Data Selection

[2] Read external measurement data file

Select this option if you want to read an external measurement data file containing data measured with a measuring equipment, etc., to perform FFT analysis and extract the vibration frequency of the load.
You can select a desired existing analysis file by clicking the file browse button. Or, enter the file name directly in the file path display/file history field.
When the file has been selected, click **OK**.
The frequency analysis for vibration control window (Fig. 14.10) appears where you can perform FFT analysis.
Any external measurement data file having the extension “csv” or “txt” can be read.
This option is selectable regardless of whether the controller is online or offline or regardless of the model of the connected actuator.

Clicking **Cancel** closes the measurement data selection window.

[1] Select a file in the file path display/file history field.



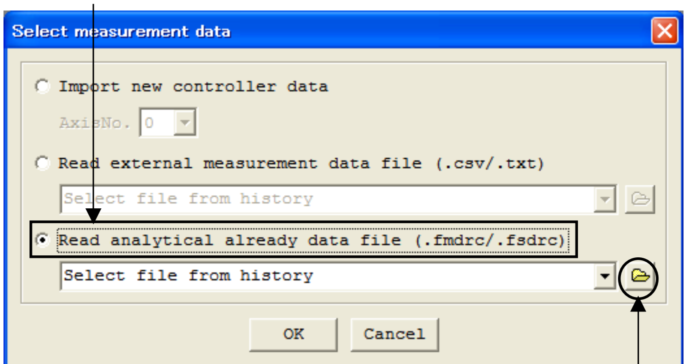
[2] File browse button

Fig. 14.8 Measurement Data Selection
(“Read External Measurement Data File” Selected)

[3] Read analytical already data file
Select this option if you want to read an existing analytical data file.
You can select a desired existing analytical data file by clicking the file browse button. Or, enter the file name directly in the file path display/file history field.
Click **OK**.
If the extension of the file you have read is “fmdrc,” the frequency analysis for vibration control window (Fig. 13.10) appears where you can perform FFT analysis.
If the file extension is “fds,” the “analysis result display” window (Fig. 14.10) appears where you can display the analysis result saved in the file.
This option is selectable regardless of whether the controller is online or offline or regardless of the model of the connected actuator.

Clicking **Cancel** closes the measurement data selection window.

[1] Select a file in the file path display/file history field.



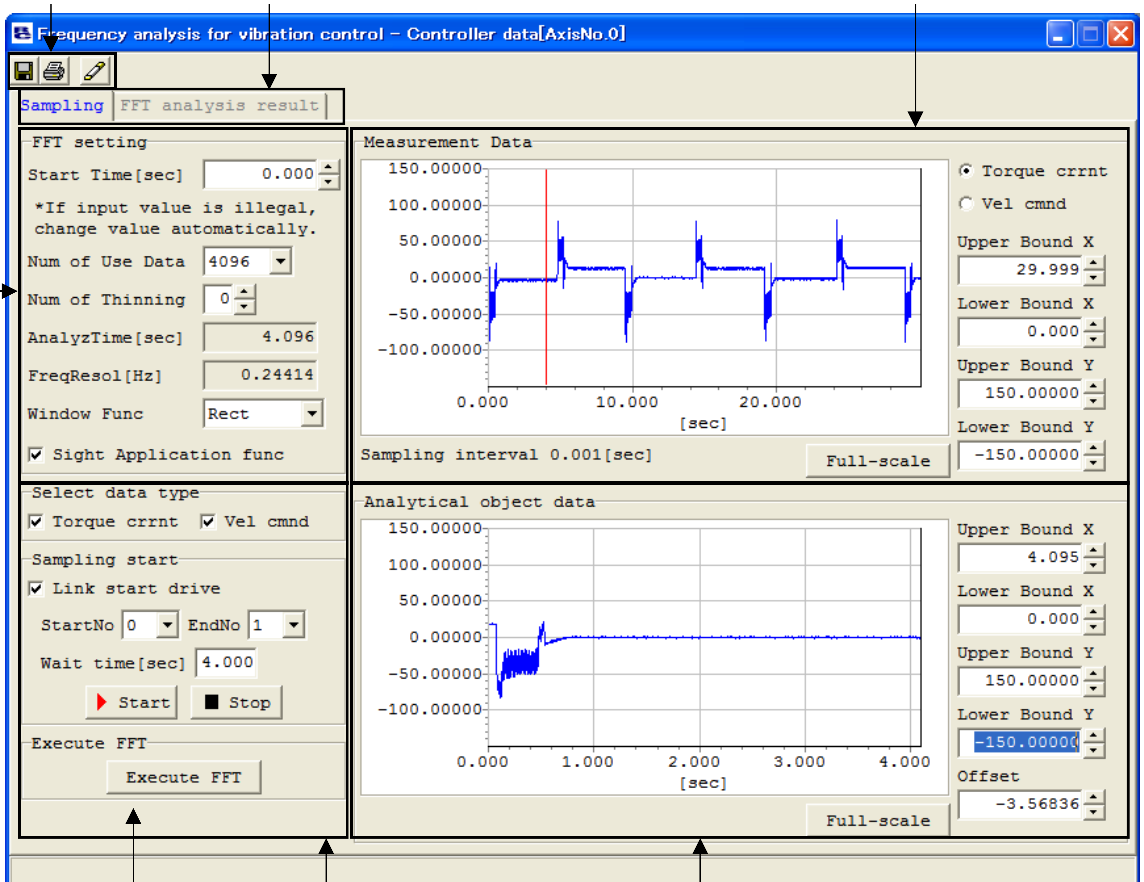
[2] File browse button

Fig. 14.9 Measurement Data Selection
(“Read Analytical Already Data File” Selected)

14.2.2 Sampling Window

This window is used to import vibration data from the controller by moving the actuator. (SCON-CAL/CGAL cannot import the vibration data by operating an actuator.)
You can also perform various operations in this window, such as setting the range of data used in FFT analysis after vibration data has been imported from the controller or external measurement data or existing analysis data (extension “fmd”) has been read.
When you select the “Import new controller data,” “Read external measurement data file” or “Read analytical already data file (extension “fmd”)” option in the measurement data selection window, the display switches to this window.

[1] Tool buttons [2] Sampling/FFT analysis result window switching [5] Measurement data



[7] Execute FFT analysis [4] Sampling setting [6] Data to be analyzed

[3] FFT analysis setting

Fig. 14.10 Sampling Window

[1] Tool buttons

Fig. 14.11 Tool Buttons

 Save As

Clicking this button opens the pop-up menu where you can select the type of data to be saved to a file.
Select the applicable data type in this menu and save the selected data to a file under a desired name.

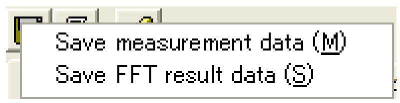


Fig. 14.12 File Save Data Type Selection Pop-up Menu

Only data of the supported data types can be saved.
For example, assume that measurement data is displayed but FFT analysis result is not yet displayed. In this case, the following conditions apply:

- Save measurement data: Selectable
- Save FFT result data: Not selectable

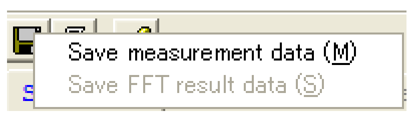


Fig. 14.13 File Save Data Type Selection (Only “Save Measurement Data” Selectable)

 Print

Clicking this button opens the “print setting” window where you can select desired print settings.
[For the print setting, refer to 14.2.4, “Print Setting Window.]

 Edit Position Data

Clicking this button launches the position data edit window (online edit window) where you can edit position data.
This button is selectable only when “Import new controller data” was selected in the “measurement data selection” window.

[2] Sampling/FFT analysis result window switching tabs

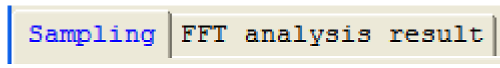


Fig. 14.14 Sampling/FFT Analysis Result Window Switching Tabs

You can click a desired tab to switch between the sampling window and FFT analysis result window. [For the FFT analysis result window, refer to 14.2.3, "Analysis Result Display Window."]

The selectable tab is shown with black text, while the text on the unavailable tab is grayed out. The currently selected tab is indicated by blue text.

[3] FFT setting

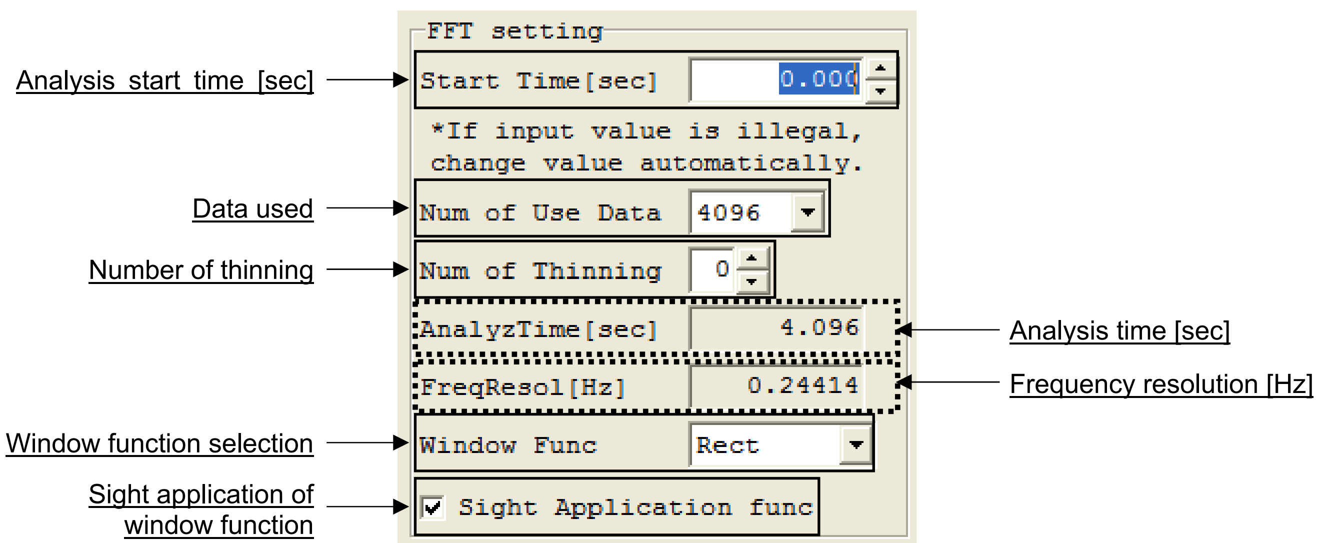


Fig. 14.15 Axis-specific Setting Items

Analysis Start Time [sec]
Specify the start position of the range of measurement data to be used for FFT analysis, in units of [sec]. Enter a value directly in the input field or click the buttons on the right side of the input field to change the current setting, to set the analysis start time.
You can also set a desired analysis time by dragging the mouse while holding down the right button over the measurement data graph to move the two red vertical lines displayed on the graph.
Note, however, that the end of the data to be analyzed cannot exceed the end of the measurement data.
Any change to the set analysis start time will not be reflected in the FFT analysis result unless FFT analysis is performed again.
If the data has been read from an existing analytical data file (file extension: fmd), the new setting will be saved when the file is saved.

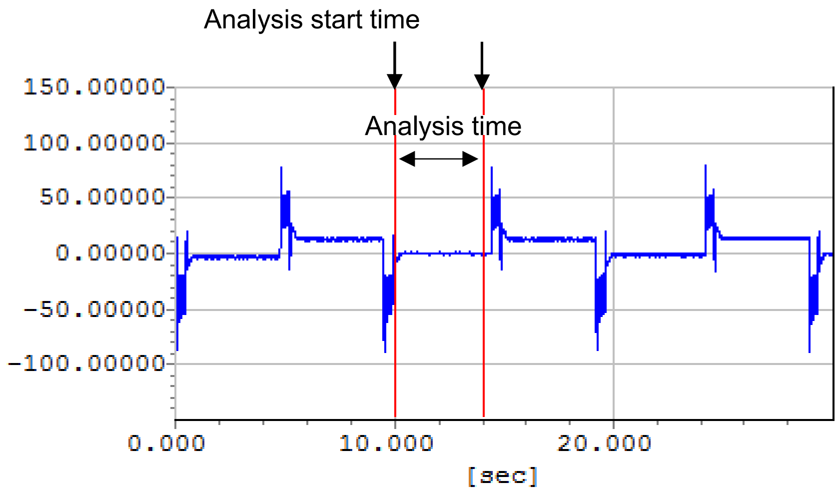


Fig. 14.16 Changing Analysis Start Time on Measurement Data Graph

Num of Use Data
Set the total number of data to be analyzed. Clicking the ▼ button on the right displays a list, where you can select a desired number. The following values can be set, but the set value cannot exceed the total number of data to be analyzed:

- 128
- 256
- 512
- 1024
- 2048
- 4096
- 8192
- 16384

Any change to the set number of use data will not be reflected in the FFT analysis result unless FFT analysis is performed again.
If the data has been read from an existing analytical data file (file extension: fmd/fsd), the new setting will be saved when the file is saved.
The default value of 4096 is set immediately after the PC software has been installed.

<u>Num of Thinning</u>

Set how many data will be skipped before the next analysis data is adopted when the data to be analyzed is generated from the measurement data. Enter a value directly in the input field or click the buttons on the right side of the input field to change the current setting.

Any value between 0 and 31 can be set, but the number of measurement data cannot exceed the total number of data to be analyzed that has been generated through thinning.

The following is the example of how data to be analyzed is generated when the number of thinning is set.

[Example] How data to be analyzed is generated when the number of thinning is set to “2”

- The number in each cell represents a measurement data number, where measurement data are arranged in the order of 0, 1, 2, 3...
- Generation of data to be analyzed starts from measurement data 0.

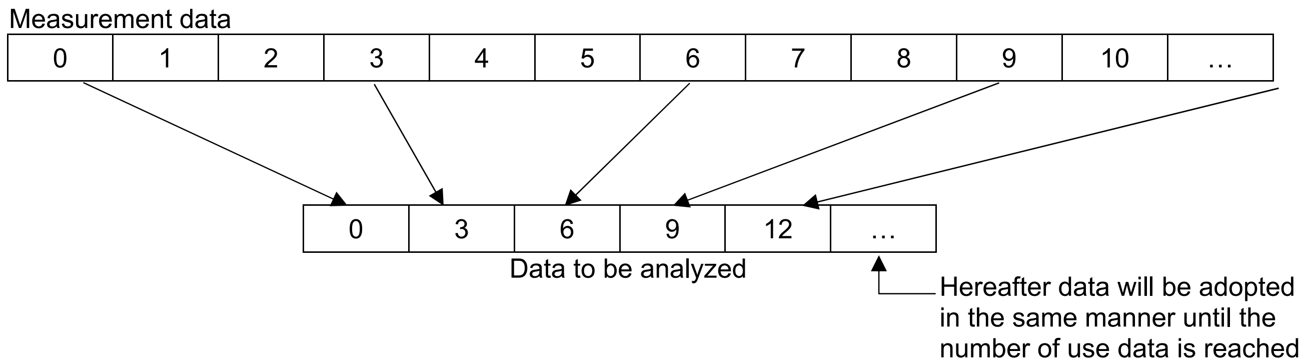


Fig. 14.17 Relationship of Measurement Data and Data to Be Analyzed

In the above example, the number of thinning is set to “2,” meaning that every third measurement data is adopted for analysis.

(Note) Any change to the set number of thinning will be reflected only when FFT analysis is performed. Unless FFT analysis performed, the change will not be reflected in the FFT analysis result.

(Note) If the data has been read from an existing analytical data file (file extension: fmd), the new setting will be saved when the file is saved.

(Note) The default value of 0 is set immediately after the PC software has been installed.

AnalyzTime [sec]
The range of data to be analyzed you have just set is indicated in [sec].
The analysis time is calculated from the number of use data and number of thinning.
If the data has been read from an existing analytical data file (file extension: fsd), the new setting will be saved when the file is saved.
In the measurement data, the range of data to be analyzed, which is determined from the analysis start time [sec], number of use data and number of thinning, is indicated by two red vertical lines on the measurement data graph (the two vertical lines indicated by the arrows in the figure below).

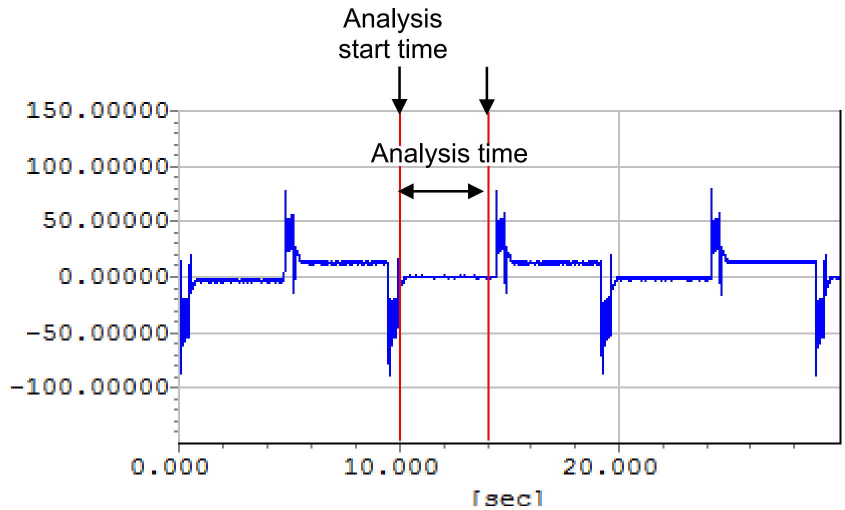


Fig. 14.18 Indication of Range of Data to Be Analyzed on Measurement Data Graph

The data in the set range is shown under “Analytical object data” at the bottom of the window.

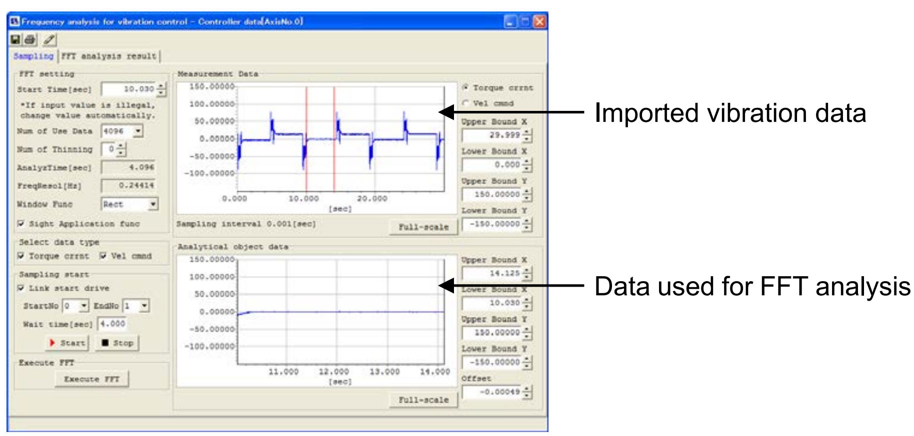


Fig. 14.19 Frequency Analysis for Vibration Control Window

FreqResol [Hz]
The effective frequency resolution of FFT analysis is indicated.
This value indicates the resolution of FFT analysis result. FFT analysis result data are integer multiples of the frequency resolution.

Window Func
Select the window function to be applied to the data to be analyzed in FFT analysis.
One of the following four window functions can be selected:

- Rectangle
- Hanning
- Humming
- Blackman

General shapes of window functions are shown below for your reference.

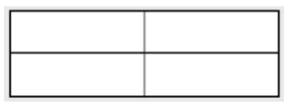


Fig. 14.20 Rectangle

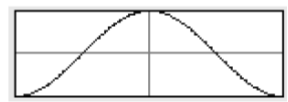


Fig. 14.21 Hanning

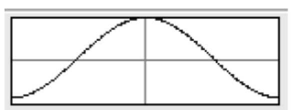


Fig. 14.22 Humming

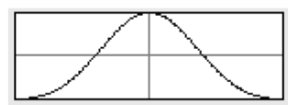


Fig. 14.23 Blackman

Any change to the set window function will not be reflected in the FFT analysis result unless FFT analysis performed again.
If the data has been read from an existing analytical data file (file extension: fmd), the new setting will be saved when the file is saved.
The default value of “Hanning” is set immediately after the PC software has been installed.

Sight Application Func
When this check box is selected, the window function is applied to the data to be analyzed and function-applied data is displayed. If the check box is cleared, the data to be analyzed to which window function is not yet applied is displayed.
Regardless of this setting, FFT analysis is performed on the data to which the window function has been applied.
The “Sight application function” box is cleared by default immediately after the PC software has been installed.

The “Sight application function” of number of use data, number of thinning, window function selection and window function saves the measurement axis settings which become the default value at the start next time onward.
Note however that if an existing analytical data file (file extension: fmd) is read, the number sent to the file is set.

[4] Sampling setting

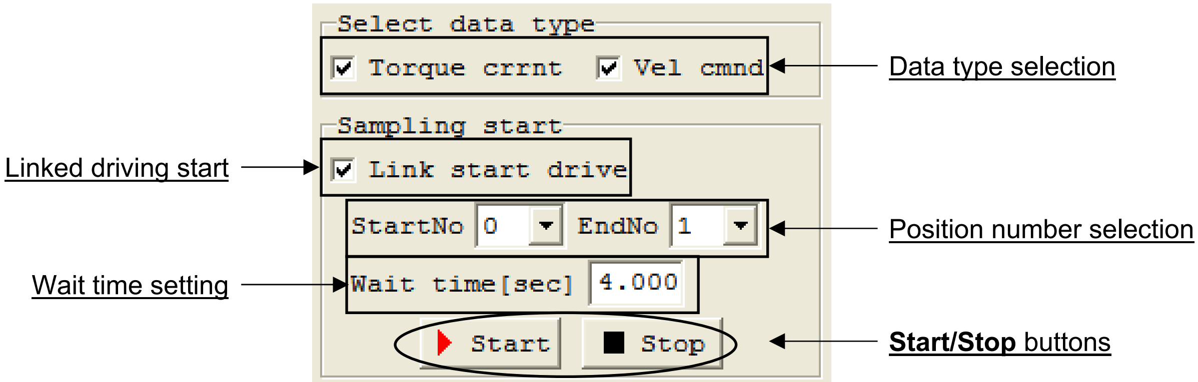


Fig. 14.24 All-axis Setting Items

These settings are available only when "Import new controller data" has been selected.

Select data type
When you move the actuator to import data, the type of data corresponding to the selected check box is imported.
Two data types of torque current response and velocity command response can be selected. Multiple data types can be selected.
Normally torque current response data is used to extract characteristic vibration frequencies.
This item can be set only when the actuator is moved to import data after selecting "Import new controller data."

Link start drive
When you move the actuator to import data, driving of the actuator will start simultaneously as sampling is started if this check box is selected.

Position number selection
If sampling is to be performed with the "Link start drive" check box selected, select the position numbers of two points between which the actuator will move back and forth.
(Note) These boxes can be set only when "Import new controller data" has been selected.
(Note) These boxes can be set only when the "Link start drive" check box is selected.
(Note) Position data must be already set under the position numbers selected here. If any position number is selected under which no position data is set, sampling will be cancelled.

Wait time [sec]
If sampling is to be performed with the "Link start drive" check box selected, set how long the actuator will wait after moving to the target position, before starting the next movement.
(Note) This box can be set only when "Import new controller data" has been selected.
(Note) This box can be set only when the "Link start drive" check box is selected.
(Note) An error of approx.0.0 to 0.1 [sec] may generate between the set wait time [sec] and wait time during actual operation.

If the wait time is set to a value other than "0.0" and sampling is performed, the actuator will wait for the specified time and then start moving to the next target position, unless the actuator operation is stopped. Accordingly, although the actuator may appear stopped because the set time has not elapsed, it is actually active and may start moving suddenly. Exercise caution.

Start/Stop buttons
When importing new controller data, use these buttons to start and stop sampling.
Clicking the **Start** button starts sampling, while clicking the **Stop** buttons stops sampling.
These buttons are available only when the actuator is moved to import data.

Execute FFT button
Clicking this button starts FFT analysis based on the settings you have made in the FFT setting area.
If the actuator is moved to import data, FFT analysis cannot be performed unless sampling is performed.

[5] Measurement Data

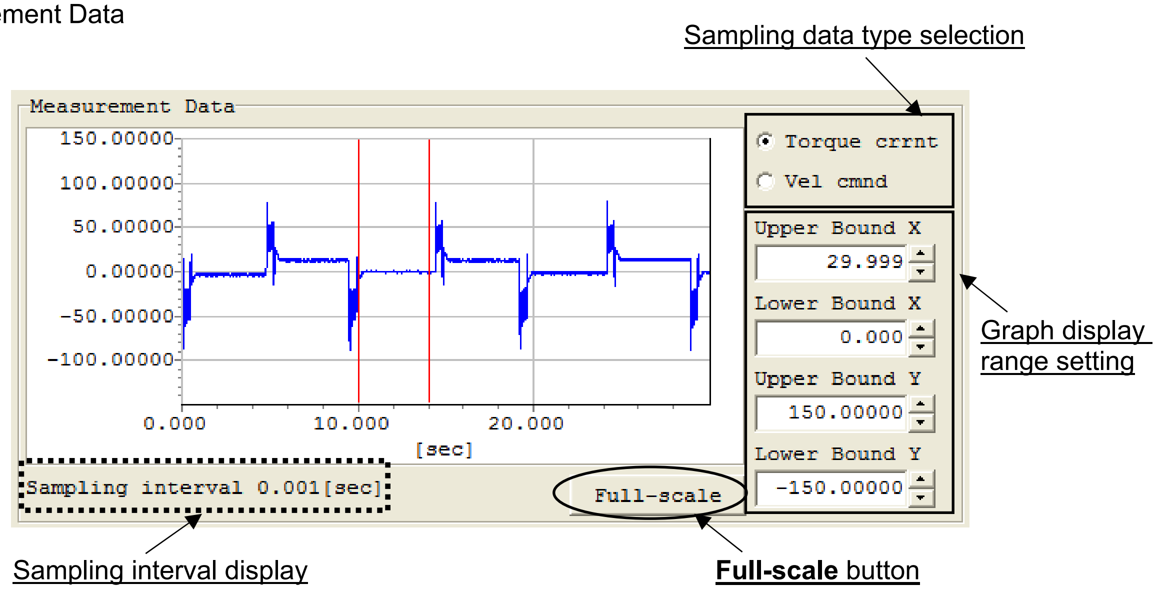


Fig. 14.25 Measurement Data

Measurement data graph
Imported measurement data is displayed in a graph. The vertical axis of the graph represents the amplitude of imported waveform, while the horizontal axis represents the time.

Sampling interval display
The sampling interval of the displayed measurement data of the measurement axis is indicated.

Graph display range setting
You can change the display area of the graph by changing the values set in the four input fields.
The value set in each input field can also be changed using the buttons on the right side of the field.
Note that a range wider than the scale effective when the **Full-scale** button is clicked cannot be displayed.

Full-scale button
You can click this button to display the entire measurement data in a graph.

Sampling data type selection
If new controller data is imported, you can use these radio buttons to switch the display mode between torque current response and velocity command response.
This area is not displayed unless “Import new controller data” has been selected.
Only the data type corresponding to the sampled data can be selected.

[6] Analytical object data

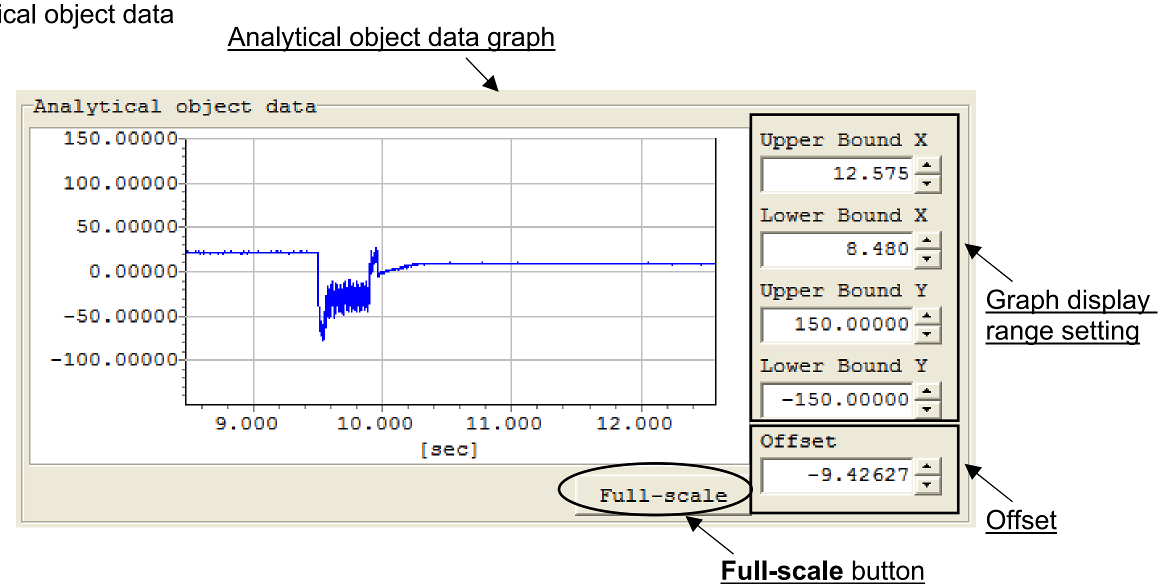


Fig. 14.26 Analytical Object Data

Analytical object data graph
The current analytical object data is displayed in a graph. The vertical axis of the graph represents the amplitude of waveform, while the horizontal axis represents the time.

Graph display range setting
You can change the display area of the graph by changing the values set in the four input fields.
The value set in each input field can also be changed using the buttons on the right side of the field.
Along the horizontal axis, a range wider than the scale effective when the Full-scale button is clicked cannot be displayed.

Full-scale button
You can click this button to display the entire analytical object data in a graph.

Offset
Use this field to move the center of amplitude of analytical object data.
The settable range is from -MAX to MAX, where "MAX" indicates the maximum absolute value of measurement data.
If the analysis start time, number of use data or number of thinning is changed, an appropriate offset will be calculated and set automatically.
If the data has been read from an existing analytical data file (file extension: fmd), the new setting will be saved when the file is saved.

[7] **Execute FFT** button
Click this button, and FFT analysis will be performed based on the settings you have made, for the axis set as the analysis target.

14.2.3 Analysis Result Display Window

Setting items common to all axes on the frequency analysis for vibration control window
Clicking the **Execute FFT** button performs FFT analysis and the display switches to this window.

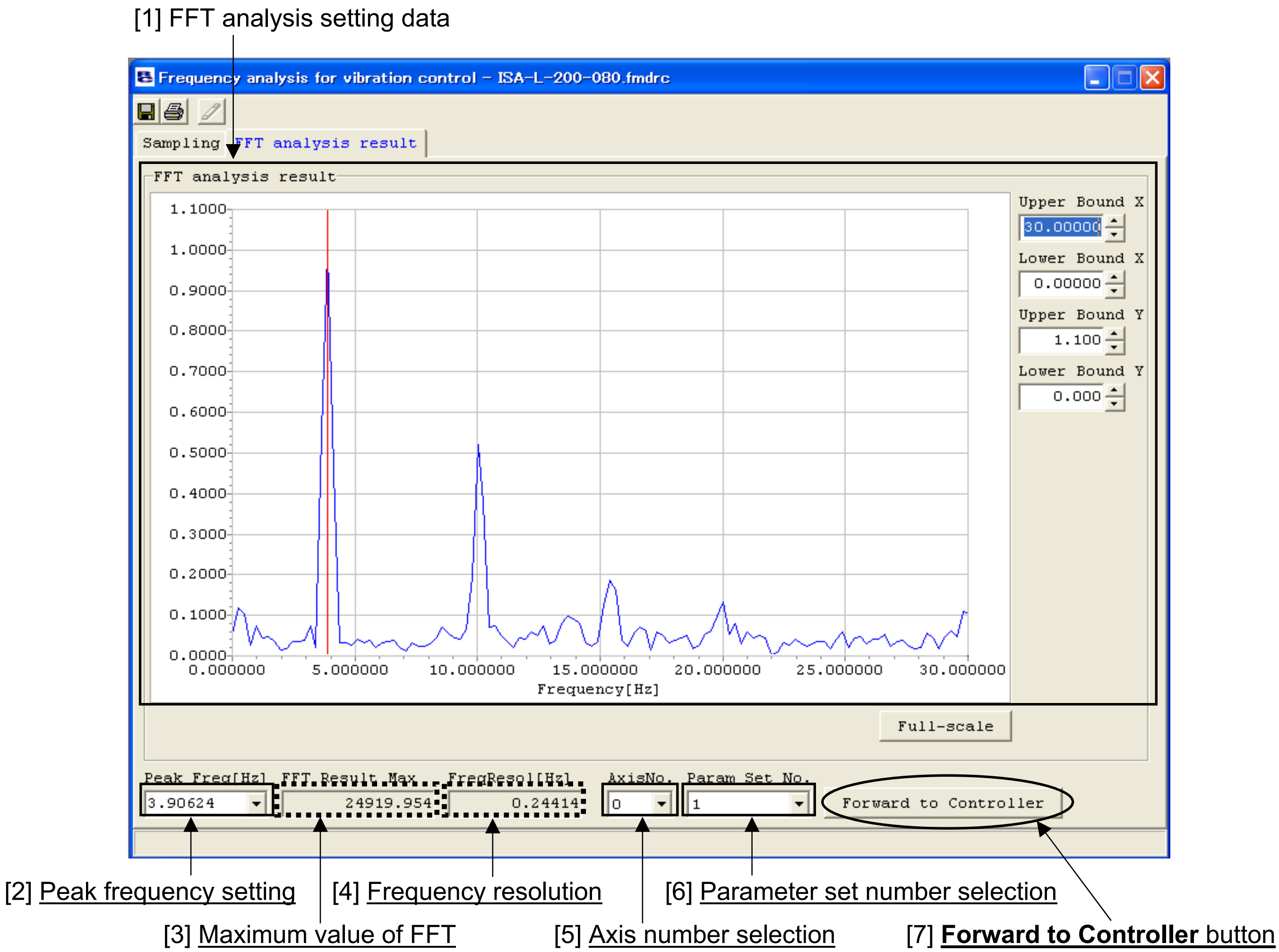


Fig. 14.27 FFT Analysis Result Win

[1] FFT analysis result data

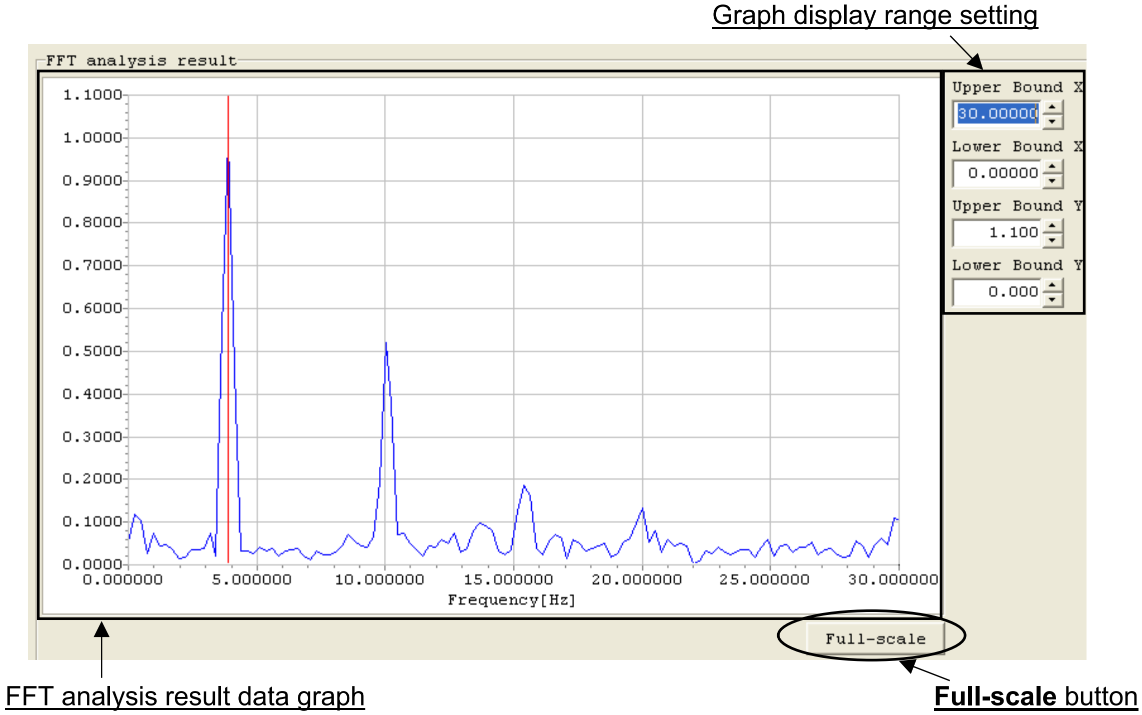


Fig. 14.28 FFT Analysis Result Data Graph

FFT analysis result data graph
FFT analysis result of the measured axis is displayed in a graph.
FFT analysis result data is displayed in a normalized pattern based on the maximum value of data being 1.

Graph display range setting
You can change the display area of the graph by changing the values set in the four input fields.
The value set in each input field can also be changed using the buttons on the right side of the field.
Note that a range wider than the scale effective when the **Full-scale** button is clicked cannot be displayed.

Full-scale button
Clicking this button lets you display in a graph all FFT analysis result data in the range from 0 to the maximum frequency [Hz] that permits forwarding of data to the controller.

[2] Peak frequency setting

Here, set the frequency you want to set in the applicable controller parameter. Any value between 0.5 and 30 [Hz] can be set.

Enter a value directly in the input field, or click the [▼] button on the right side of the input field, if candidate peak frequencies have been set, to select a desired setting from the displayed list.

The set frequency is indicated by a red vertical line on the FFT analysis result data graph.

(Note) Up to five candidate peak frequencies are identified based on the FFT analysis result and shown. Depending on the FFT analysis result, no candidate may be found, in which case the peak frequency may vary from the actual vibration frequency.

(Note) If the data has been read from an existing analytical data file (file extension: fsdrc), the new setting will be saved when the file is saved.

(Note) When the "FFT analysis result" window appears after the FFT analysis, the first candidate peak frequency is set by default. If the data has been read from an existing analytical data file (file extension: fsdrc), the value saved in the file is set.

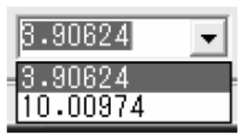


Fig. 14.29 Candidate Peak Frequency List

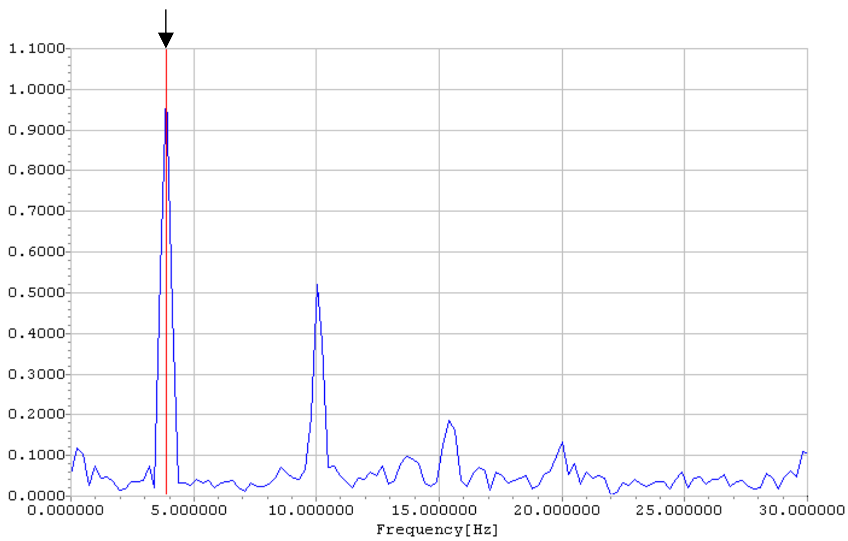


Fig. 14.30 Indication of Set Value on Graph

[3] Maximum value of FFT

The maximum value of FFT analysis result data before normalization is shown.

(Note) If the data has been read from an existing analytical data file (file extension: fsdrc), the new setting will be saved when the file is saved.

(Note) This value is determined by the FFT analysis result and will not change even when settings are changed on the "FFT analysis result" window.

[4] Frequency resolution
The frequency resolution of FFT analysis result is shown. The distance between adjacent plotting points on the FFT analysis result data graph is indicated visually in [Hz].
(Note) This value is determined by the analysis time, which in turn is determined in the “sampling” window, and will not change even when settings are changed on the “FFT analysis result” window.

[5] Axis number selection
Set the axis number to forward the parameters to.
When new controller data is imported, the axis number selected in the “measurement data selection” window is set. Otherwise, you can select any axis number to which data can be forwarded.

[6] Parameter set number selection
Select one of parameter sets 1 to 3 containing the parameter in which the set frequency will be set.

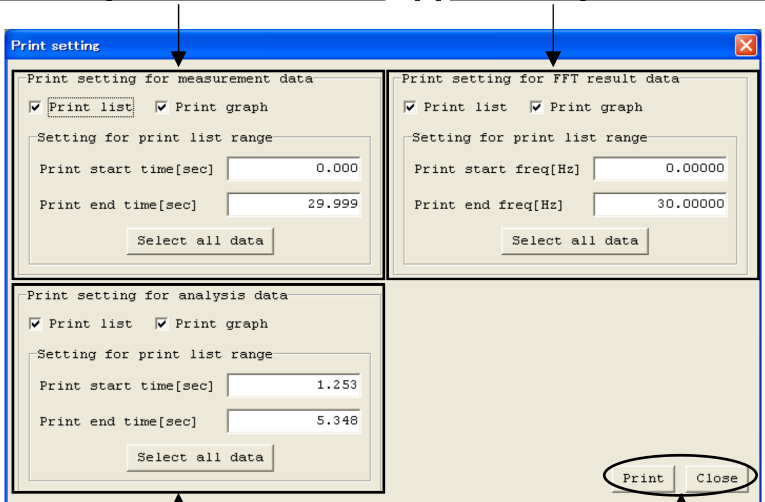
[7] **Forward to Controller** button
Clicking this button forwards the parameters to the controller.
(Note) If one of the following conditions applies, the parameters cannot be forwarded to the controller:
- The connected controller does not support the vibration control function.
- The system is offline.

14.2.4 Print Setting Window

Clicking the **Print** button in the measurement data display/analysis details setting window switches the display to this window.

Set the print options.

[1] Print setting for measurement data [3] Print setting for FFT result data



[2] Print setting for analysis data [4] **Print/Close** buttons

Fig. 14.31 Print Setting (for Both Data Types)

Print setting can be performed only for printable data types as of the time the print setting window opens. Display examples of windows where only print setting for measurement data is possible, and print setting for FFT result data is possible, are shown below.

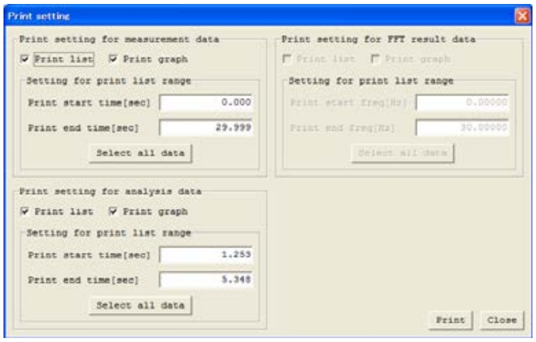


Fig. 14.32 Print Setting (for Measurement Data Only)

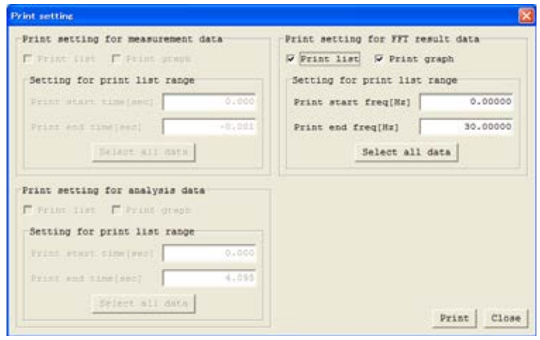


Fig. 14.33 Print Setting (for FTT Result Data Only)

[1] Print setting for measurement data

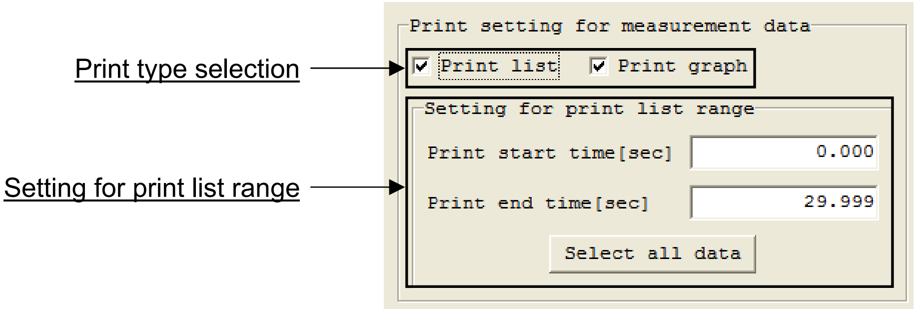


Fig. 14.34 Print Setting for Measurement Data

Print type selection
Only the type of printing corresponding to the selected check box is performed. Details of each setting are explained below.
(Note) If no check box is selected, data cannot be printed.

- Print list:
  Measurement data included in the range specified in the “Setting for print list range” area is printed in the format shown below.

Frequency analysis for vibration control - Measurement data list
[ISA-L-200-080.fmdrc] - Axis0

Measurement condition	Set value
Sampling interval[sec]	0.001

Time[s]	Data	Time[s]	Data
0.000	-3.00000	0.049	25.00000
0.001	9.00000	0.050	-15.00000
0.002	9.00000	0.051	-3.00000
0.003	130.00000	0.052	25.00000
0.004	103.00000	0.053	37.00000
0.005	103.00000	0.054	-3.00000
⋮	⋮	⋮	⋮
0.044	9.00000	0.093	90.00000
0.045	-3.00000	0.094	90.00000
0.046	103.00000	0.095	90.00000
0.047	25.00000	0.096	130.00000
0.048	25.00000	0.097	130.00000

Fig. 14.35 Printing Format of Measurement Data List

- Print Graph
  The measurement data graph currently displayed in the “sampling” window is printed in the format shown below.

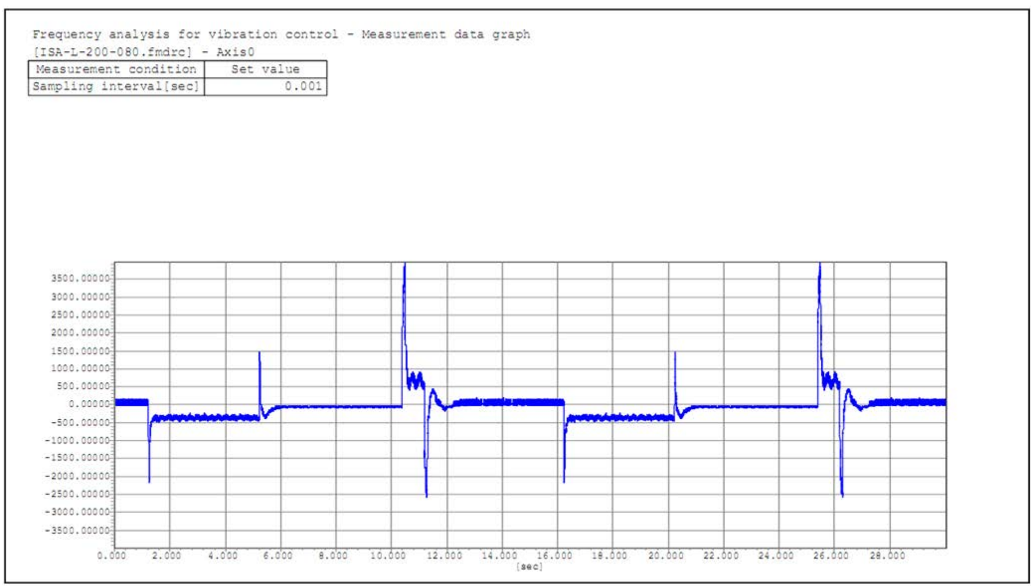


Fig. 14.36 Printing Format of Measurement Data Graph

Setting for print list range
Set the range of data rows you want to print by entering values in the “Print start time [sec]” and “Print end time [sec]” input fields.
Only the measurement data rows included in the range set here will be printed.
The setting unit of fields in the “Setting for print list range” area is [sec].

[2] Print setting for analysis data

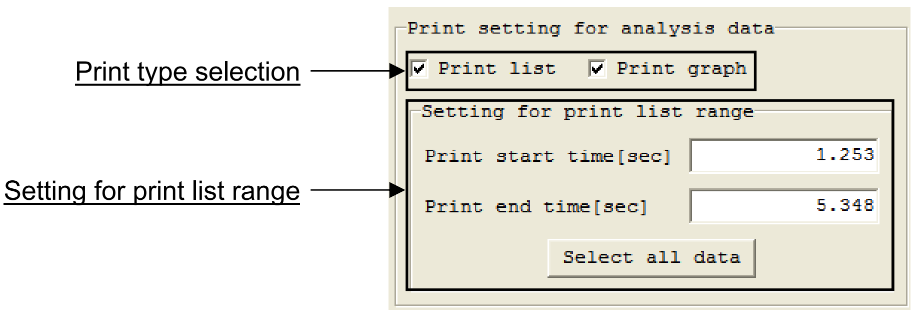


Fig. 14.37 Print Setting for Analysis Data

In this area, print setting for analysis data is performed.
Since the function of each setting item is the same as in [1], “Print setting for measurement data,” only the printing format of analysis data is shown in the figure below.

- Print list:
  Analysis data included in the range specified in the “Setting for print list range” area is printed in the format specified below.

Frequency analysis for vibration control - Analysis data list
[ISA-L-200-080.fmdrc] - Axis0

Analysis config	Set value
Sampling interval[sec]	0.001
Start Time[sec]	1.253
Num of Use Data	4096
Num of Thinning	0
AnalyzTime[sec]	4.096
Window Func	Hann

Time[s]	Data	Time[s]	Data
1.253	0.00000	1.297	-0.37805
1.254	-0.00060	1.298	-0.45856
1.255	-0.00231	1.299	-0.39824
1.256	-0.00497	1.300	-0.38065
1.257	-0.00842	1.301	-0.40786
1.258	-0.01273	1.302	-0.36993
⋮		⋮	
1.292	-0.29435	1.336	-0.38833
1.293	-0.27292	1.337	-0.35626
1.294	-0.29860	1.338	-0.36053
1.295	-0.32579	1.339	-0.37340
1.296	-0.38608	1.340	-0.40881

Fig. 14.38 Printing Format of Analysis Data List

- Print data graph
  The analysis data graph currently displayed in the “sampling” window is printed in the format specified below.

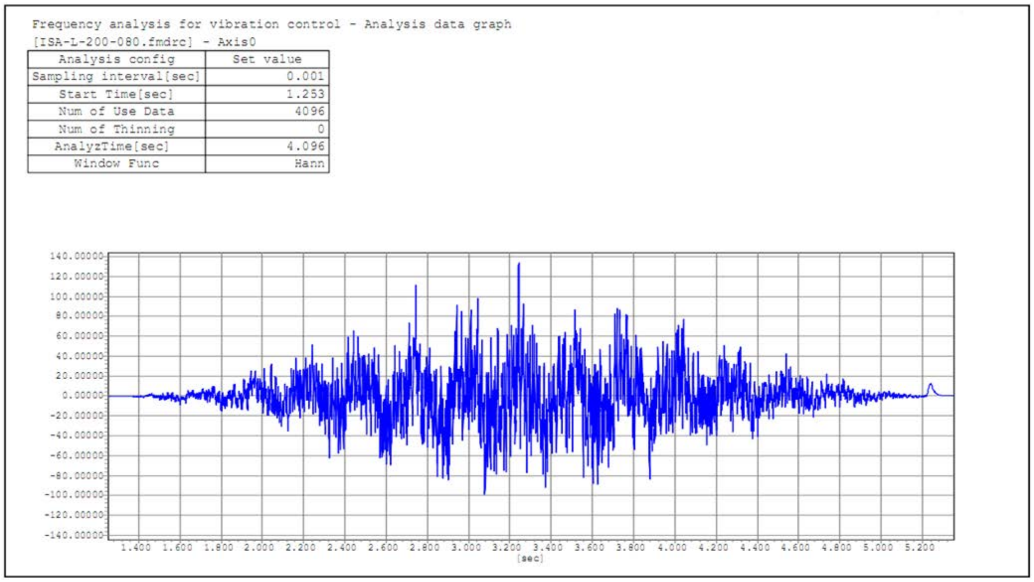


Fig. 14.39 Printing Format of Analysis Data Graph

(Note) Different options can be selected in the “Print setting for measurement data” area and “Print setting for analysis data” area, respectively.

[3] Print setting for FFT result data

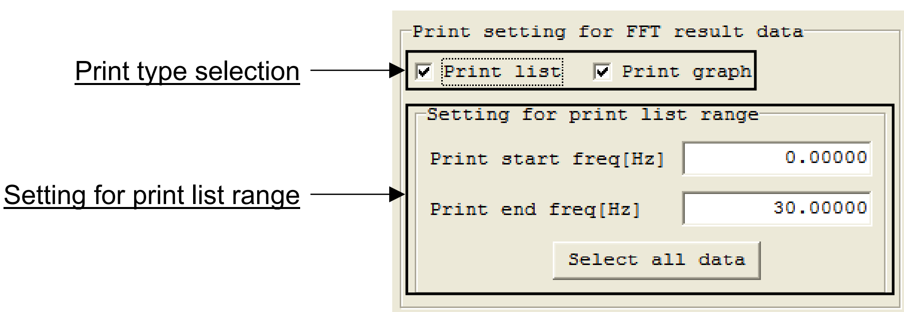


Fig. 14.40 Print Setting for FFT Analysis Result Data

In this area, print setting for FFT analysis result data is performed.
The printing format of FFT analysis result data is shown in the figure on the next page.
The function of each setting item is the same as in [1], “Print setting for measurement data” and [2], “Print setting for analysis data.”
The setting unit of fields in the “Setting for print list range” area is [Hz].

Frequency analysis for vibration control - FFT Result data list
[ISA-L-200-080.fmdrc] - Axis0

Analysis config	Set value
Sampling interval[sec]	0.001
AnalyzTime[sec]	4.096
FreqResol[Hz]	0.24414
FFT Result Max	24919.954

Frequency[Hz]	Data	Frequency[Hz]	Data
0.00000	0.05323	11.23044	0.03500
0.24414	0.11940	11.47458	0.02159
0.48828	0.10349	11.71872	0.04413
0.73242	0.02657	11.96286	0.04180
0.97656	0.07498	12.20700	0.05962
1.22070	0.04448	12.45114	0.05034

⋮

9.76560	0.19556	20.99604	0.06055
10.00974	0.52031	21.24018	0.04504
10.25388	0.37756	21.48432	0.05056
10.49802	0.07016	21.72846	0.04432
10.74216	0.07246	21.97260	0.00358
10.98630	0.05094	22.21674	0.00922

Fig. 14.41 Printing Format of FFT Result Data List

Frequency analysis for vibration control - FFT Result data graph
[ISA-L-200-080.fmdrc] - Axis0

Analysis config	Set value
Sampling interval[sec]	0.001
AnalyzTime[sec]	4.096
FreqResol[Hz]	0.24414
FFT Result Max	24919.954

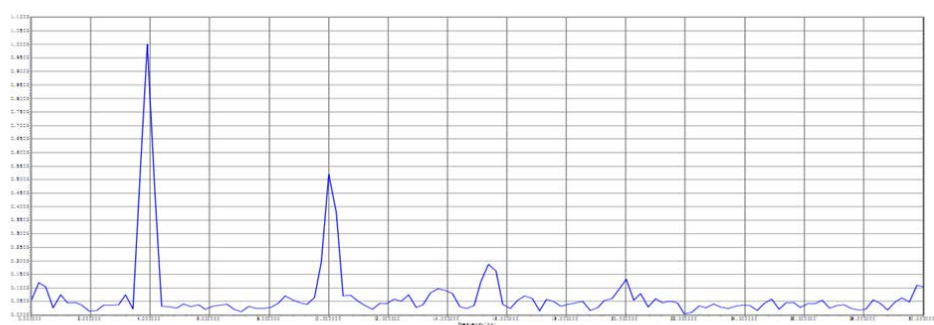


Fig. 14.42 Printing Format of FFT Result Data Graph

[4] Print/Close buttons
Clicking either button closes the print setting window.
If the **Print** button is clicked, data is printed based on the print setting options effective when the button is clicked.
If the **Close** button is clicked, data is not printed.

14.3 Operating Procedure

Perform operations according to the procedure specified below.

(1) Select measurement data.

[1] Click the **Parameter (P)** menu, point to **Control Parameter Setup (C)**, and then select **Frequency Analysis for Vibration Control (F)**.

[2] When the “measurement data selection” window appears, select the type of measurement data to be imported in the “measurement data display/analysis details setting/analysis result display” window under the frequency analysis for vibration control function.
(Note) [1] Import new controller data cannot be selected in SCON-CAL/CGAL.
Import measurement data externally taken by a measurement device by indicating [2] Read external measurement data file. Have this data analyzed on FFT and set the vibration control parameters.

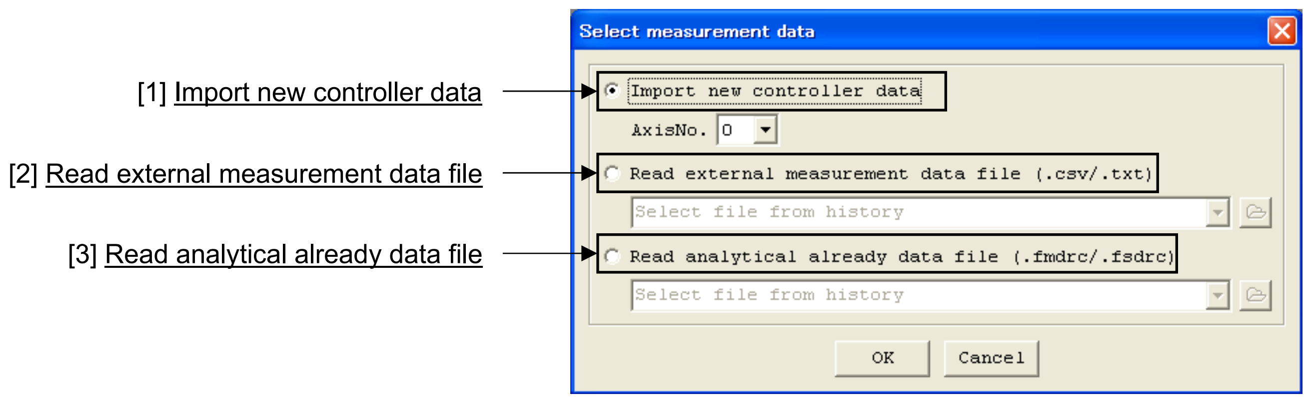


Fig. 14.43 Measurement Data Selection (“Import New Controller Data” Selected)

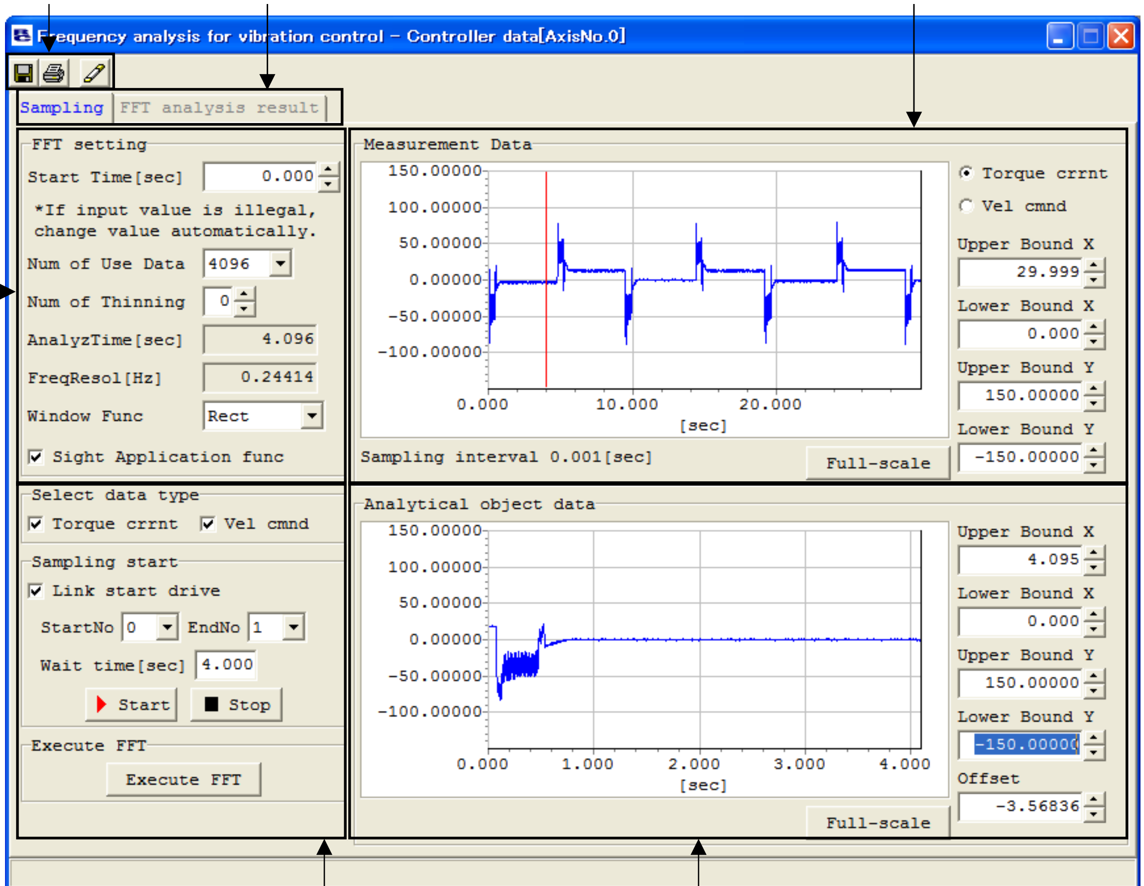
[3] If “Import new controller data” has been selected, select the axis number under which to set the load vibration frequency, and then click the **OK** button. If any other option has been selected, select the file to be read and click the **OK** button, and the “frequency analysis for vibration control” window will appear. If the **Cancel** button is clicked, the “frequency analysis for vibration control” window does not appear and the “measurement data selection” window closes.
(Note) If “Read external measurement data file” or “Read analytical already data file” has been selected, measurement data cannot be imported from the controller. If you want to import measurement data from the controller, select “Import new controller data.”

In the “sampling” window or “FFT analysis result” window opened by the aforementioned step, save the data type currently selected. This way, the saved data type will be automatically selected the next time the “measurement data selection” window opens.

If “Import new controller data” is selected for the data type currently saved, but the PC software connection status does not permit selection of “Import new controller data,” “Read external measurement data file” will be selected.
(Note) The default value of “Import new controller data” is selected immediately after the PC software has been installed.

(2) If "Import new controller data" has been selected, move the actuator to import analysis data.
[1] The "sampling" window (new controller data) appears.

[1] Tool buttons [2] Sampling/FFT analysis result window switching [5] Measurement data



[4] Sampling setting [6] Data to be analyzed

[3] FFT analysis setting

Fig. 14.44 Sampling Window

[2] Under "Select data type" on the "Sampling" tab, select the data type you want to import during sampling. Multiple data types can be selected.

[3] To start actuator operation simultaneously as sampling is started, select the "Link start drive" check box on the "Sampling" tab and set the position numbers of two points between which the actuator will move back and forth in the "Start No" and "End No" fields.

[4] Set the wait time in the "Wait time" field.
(Note) Steps [2] to [4] can be performed in any order.

[5] Clicking the **Start** button in the bottom left-hand corner of the window starts sampling.
While sampling is in progress, the display of the “sampling” window changes as shown below and the measurement data graph gets updated continuously.

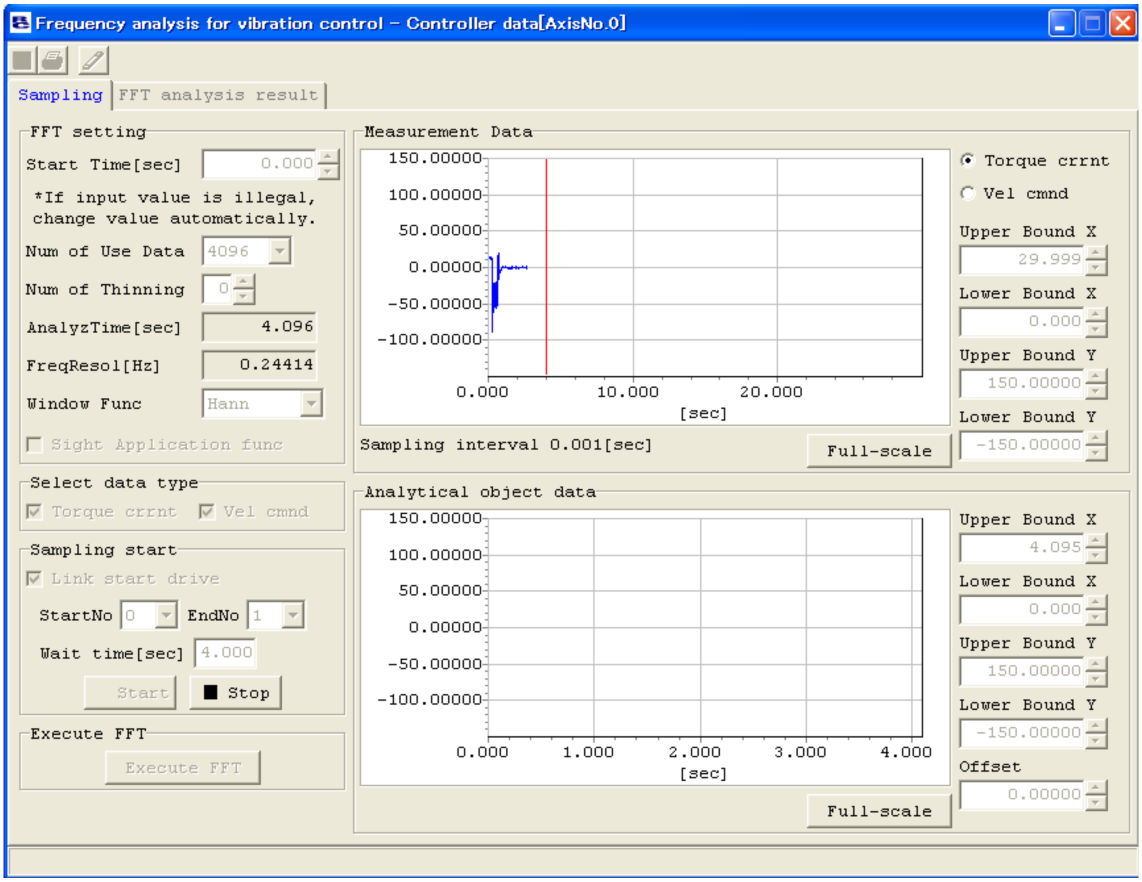


Fig. 14.45 Sampling Window (Sampling in Progress)

[6] When the maximum number of importable data have been sampled, sampling stops automatically.
To stop sampling at any point, click the **Stop** button.

(3) Perform FFT analysis.
Perform steps [1] to [6] in the sampling window. (Steps [1] to [4] can be performed in any order.)

[1] Set the analysis start time in the "FFT setting" area.

[2] Set the number of use data in the "FFT setting" area.

[3] Set the number of thinning in the "FFT setting" area.

[4] Set the window function in the "FFT setting" area.

[5] When all items in the "FFT setting" area have been set, click the Execute FFT button, and FFT analysis will be performed.
The FFT result is displayed.

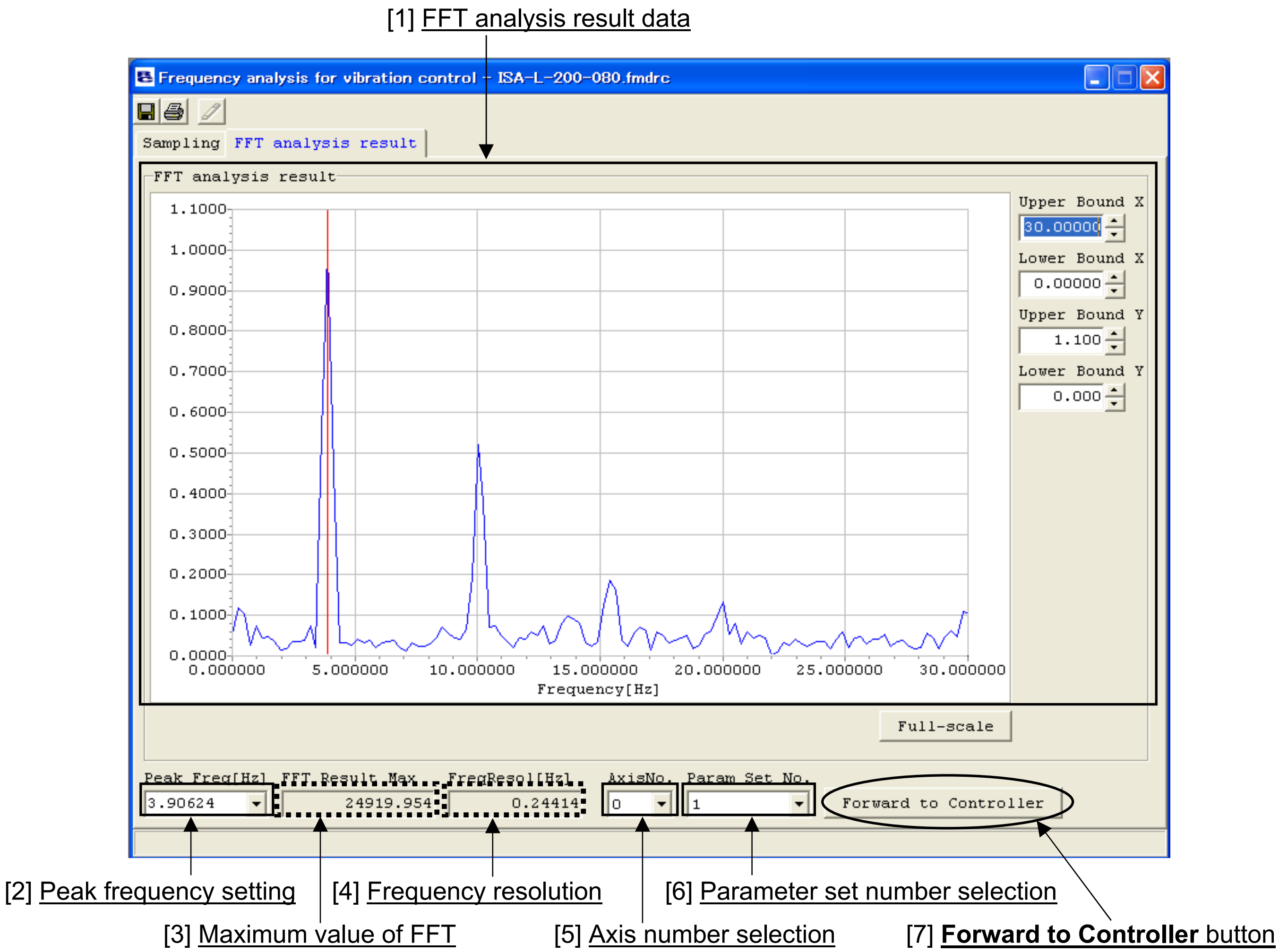


Fig. 14.46 FFT Analysis Result Win

(4) From the FFT result, select the setting of characteristic vibration frequency to be forwarded to the controller as a parameter set value, and forward to the controller.

[1] Set the value you want to forward to the controller, in the “Peak Freq” field. Set the axis number and parameter set number.

“Peak Freq” field

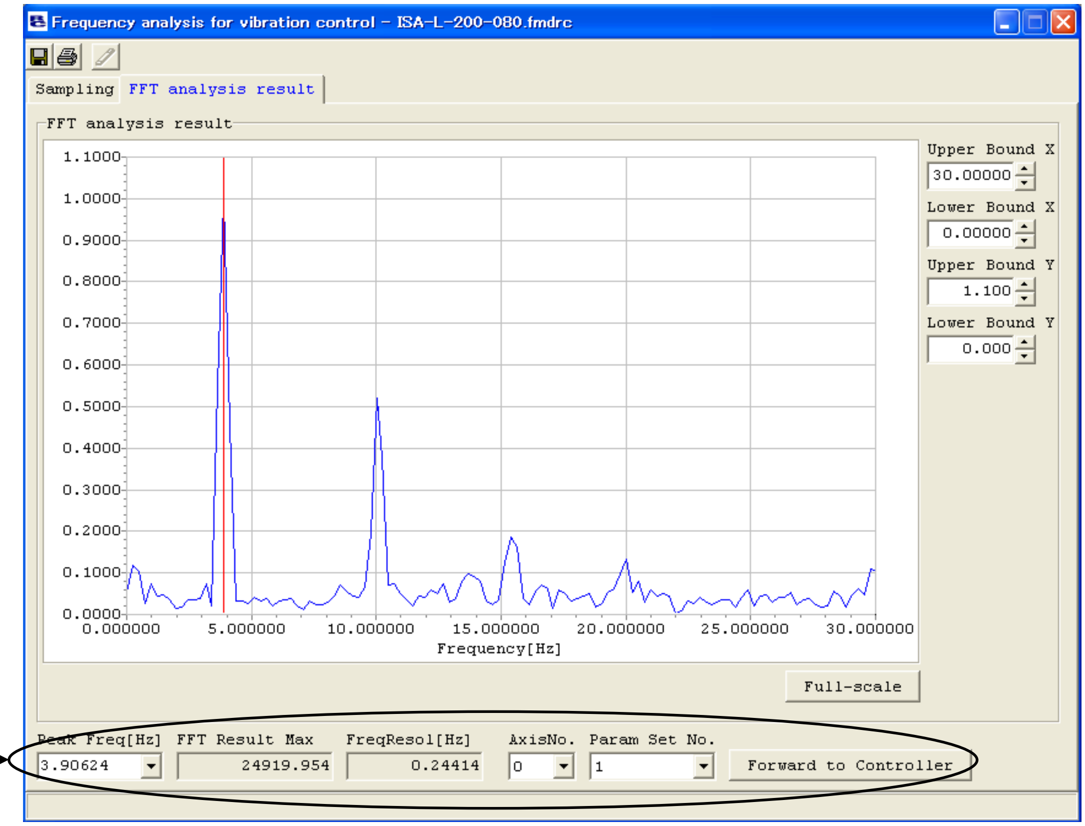


Fig. 14.47 FFT Analysis Result Window

[2] Click the **Forward to Controller** button.

[3] When the data has been forwarded to the controller, a confirmation message appears, asking if you want to restart the controller. Click the **Yes (Y)** button to restart the controller.
(Note) The values forwarded to the controller will not be reflected in the vibration control function unless the controller is restarted.

15. Press Program Editing and Operation of Servo Press (V10.00.00.00 or later for SCON-CB)

15.1 Operation Outline

Conduct the following steps to edit press program in the servo press.

[1] Select the press program number to show press program editing window. Press program editing window can be selected from either of show detail window or simple display window which enables minimum necessary settings. [Refer to 15.2.1 Press Program Editing Window]
Also, it is available to edit all press program at the same time in multi press program editing window [*1].
*1 It is what the individual press programs (Press program No. 0 to 63) are all shown in table form at once.

⇩

[2] Select from eight patterns of press motion modes in press program editing window.
[Refer to 15.2.1 Press Program Editing Window [1] (2) Press program Input for how to set up]
[Refer to SCON-CB controller instruction manual for each press motion mode]

[Press Motion Mode]
1 : Speed control - Keeping Position
2 : Speed control - Keeping Distance
3 : Speed control - Holding Load
4 : Speed control - Holding Incremental Load
5 : Force control - Keeping Position
6 : Force control - Keeping Distance
7 : Force control - Holding Load
8 : Force control - Holding Incremental Load
9 : Force control - Keeping Position 2

⇩

[3] Select the items correspond to the press motion mode set in press program editing window.
[Refer to 15.2.1 Press Program Edit Window for how to set up]
[Refer to SCON-CB Controller Instruction Manual for Speed control, Force control, Keeping position, Keeping Distance, Holding Load and Holding Incremental Load]
* The position can be read in by aligning the position of the rod in Trial Operation Window in the press program operation / monitor and returning to Press Program Editing Window. Right-click on the item to set the point for the end position (mm) of Approach Motion to read it in.
[Refer to 15.2.3 Press Program Operation / Monitor Window [2] Operation]
* By setting Continuous Prg. No. in press program editing window, continuous operation such as the two-step pressing can be conducted.
[Refer to 15.2.1 Press Program Editing Window]

⇩

[4] Check the operation by setting Start Prg. No. operated in press program operation window in the press program operation / monitor to move.
[Refer to 15.2.3 Press Program Operation / Monitor Window [2] Operation]
* Adjust the force gain in Gain Set No. by considering the hardness of an object to be pressed.
[Refer to SCON-CB controller instruction manual for the force gain]
[Refer to 8. Editing Parameters for how to set up parameters]
* Items such as Current Load Feedback (N) and Overload Level (%) can be checked in the axis status.
[Refer to 15.2.3 Press Program Operation / Monitor Window [3] Axis Status]
* Check current value and others in the servo monitor if necessary.
[Refer to 15.2.3 Press Program Operation / Monitor Window [4] Monitor]

⇩

Settings in the PC software is complete.
Have a trial operation with commands from the host controller such as PLC.

15.2 Outline of Operation in Each Window

15.2.1 Press Program Editing Window

It is a window to set and edit the servo press operation.

[1] Either select **Press Program (R)** → **Edit (E)** from the menu in main window or click on button on the toolbar in main window to show a window to select either of press program editing window or the multi press program editing window. It can also be started from the tree view.

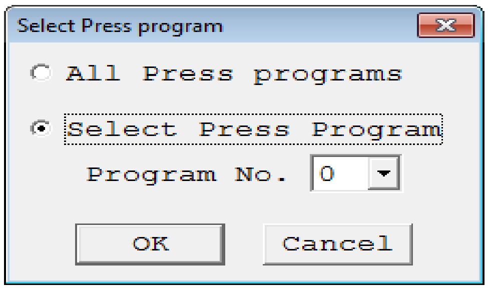


Fig. 15.1 Select Press Program Window

[2] Choose select press program, and select a press program number (0 to 63).
Click **OK**.
Simple display window in pres program editing window appears.
(Note) Setting in application setting window can make show detail window show up from the beginning. [Refer to sections related to the servo press in 15.3 Servo Press Related in Application Setting Window]

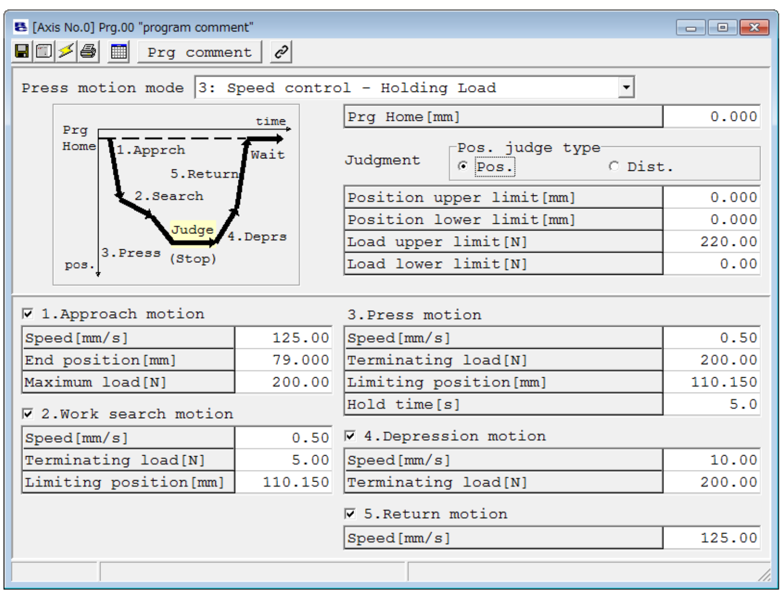


Fig. 15.2 Simple Display Window in Press Program Editing Window

[3] Click on button to set or edit the press program in show details window.

Show details window appears.

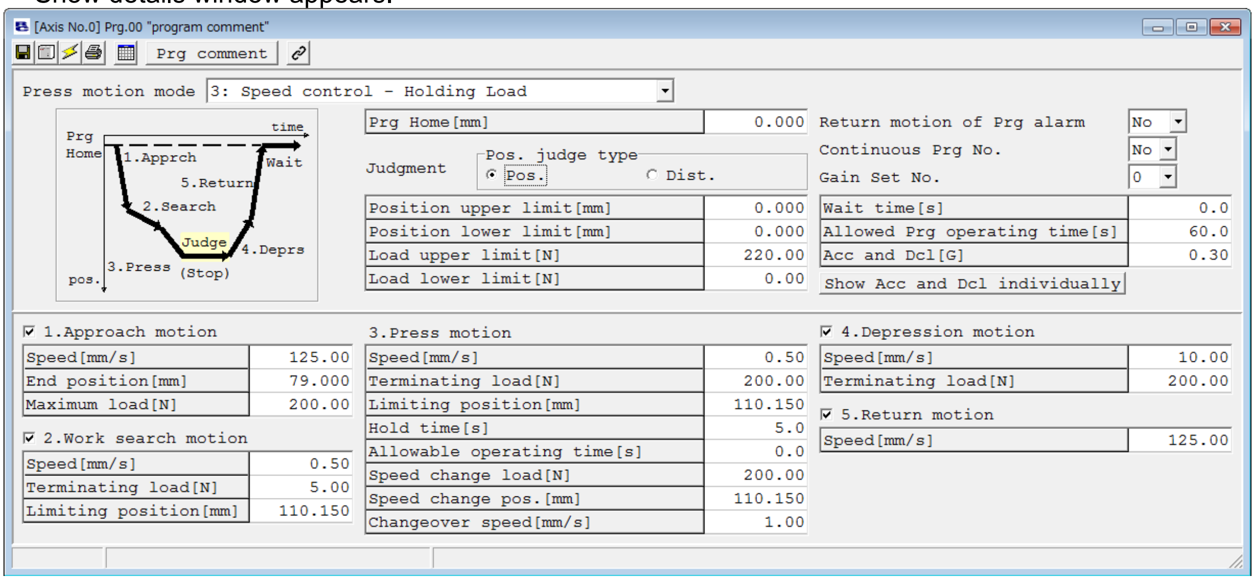


Fig. 15.3 Show Details Window in Press Program Editing Window

[1] Show Details Window in Press Program Editing Window

It is a window that enables detailed setting and editing of the servo press operation.

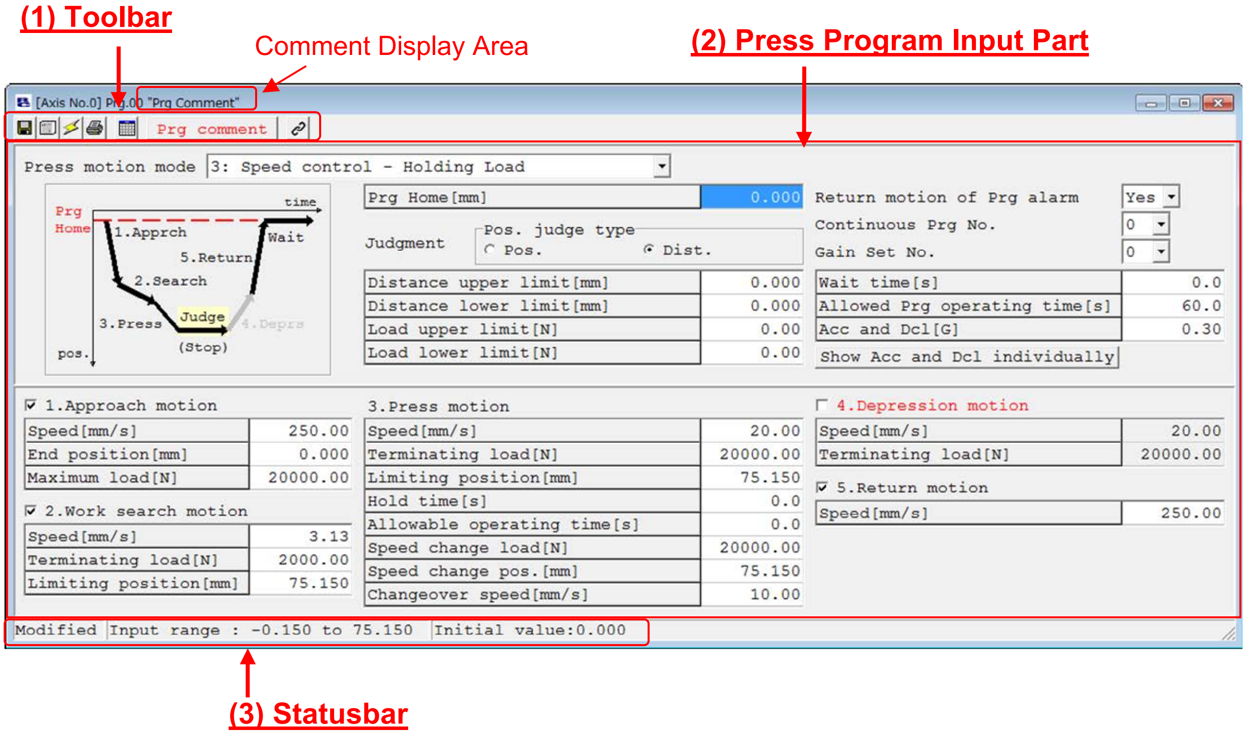


Fig. 15.4 Show Details Window in Press Program Editing Window

(1) Toolbar

Fig. 15.5 Toolbar in Press Program Editing Window

[1]	Save	: It saves data to a file.
[2]	Transfer	: It transfers (writes) the data to a controller.
[3]	Update	: It updates the data display after reading out a press program from a controller again.
[4]	Printout	: It makes an output of a press program to a printer.
[5]	Display switchover	: It switches over the display of the editing window between Simple Display and show details.
[6]	Prg comment	: It shows the editing window for Prg comment. Input a comment and click **OK**, and a comment shows up in " " in the comment display area.

Fig. 15.6 Prg Comment Input Window

[7] Continuous consolidated list : The continuous consolidated list for the press programs is displayed.
Select a press program number in searching program files, put a check mark by clicking on □ in Show, and only those related to the selected press program numbers are shown.

[Explanation of Displayed Contents]

- P ** : Program No.
- (T *** *.) : Prg No of standby time
  (The time set in Wait Time in the press program input part)
- R -> P ** : Return Prg No.
  For example, as Start Point Prg. No. 2 in the figure does, if 2 is set in Consolidated Prg. No. at Last Point Prg. No. 4 so it returns to No. 2, R -> P02 will be displayed.
  As Start Point Prg. No. 0 does, if **None** is set in Consolidated Prg. No. at Later Prg. No. 1, because the press program does not return, R -> P*** will not be displayed.

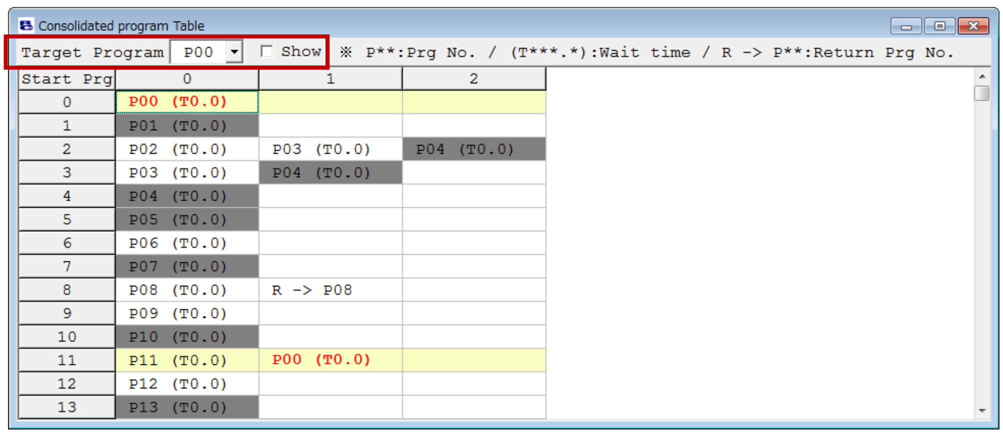


Fig. 15.7 Continuous Consolidated List Display

(2) Press Program Input Part
[Refer to SCON-CB instruction manual for the contents of settings in each item of each press motion mode]
* Right-click on a value of where the unit is [mm], such as distance upper limit [mm], read in **Current Position (T)** button appears. Click on read in **Current Position (T)** button and current position can be read in.
Axis movement by JOG / Inching can be conducted in Press Program Operation / Monitor Window. [Refer to 15.2.3 Press Program Operation / Monitor Window]

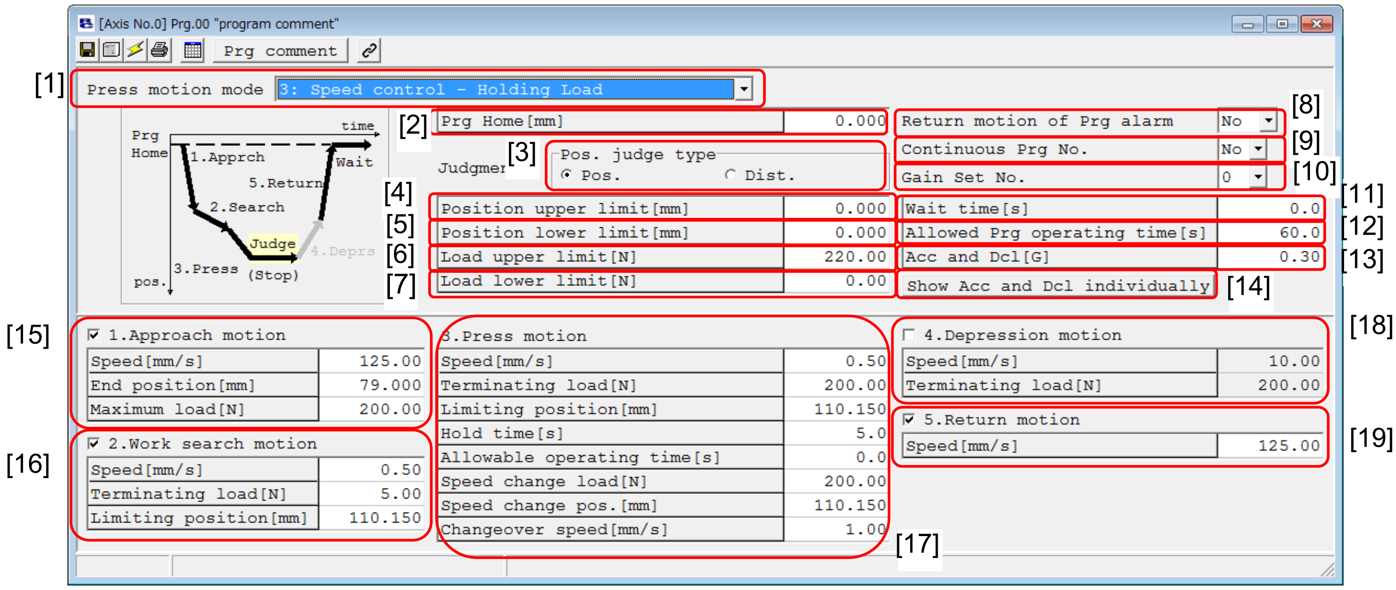


Fig. 15.8 Press Program Input Part in Press Program Editing Window

[1] Press motion mode : It switches over the press motion modes.
1 : Speed control - Keeping Position
2 : Speed control - Keeping Distance
3 : Speed control - Holding Load
4 : Speed control - Holding Incremental Load
5 : Force control - Keeping Position
6 : Force control - Keeping Distance
7 : Force control - Holding Load
8 : Force control - Holding Incremental Load
9 : Force control - Keeping Position 2

* Speed control : It is a control to perform pressing with the pressing speed kept constant. Positioning should be performed to the set position.
Therefore, the position after pressing completed is constant, but the pressing force may not be constant.

* Force control : It is a control to perform pressing with the pressing force kept constant to achieve the target load.
Pressing operation should be continued at stop. The pressing force after pressing completed is constant, but the position may not be constant.

[Refer to SCON-CB instruction manual for the contents in each item of each press motion mode]

[2] Prg home position: Set the start position for a press program.

[3] Position. decision type : Judgment can be made with the position (distance) and the load during a stop after pressing stage completed.
For the position (distance) judgment, select whether to have the position judgment or distance judgment.

[4] Position upper limit distance :
[5] Position lower limit distance
Set the upper limit and lower limit for the judgment range for the position (distance) judgment.
Setting Range : + soft limit ~ - soft limit

[6] Load upper limit :
[7] Load lower limit
Set the upper limit and lower limit for the judgment range for the load judgment.
Setting Range : 0.01 ~ Maximum pressing force

[8] Return movement of Press Prg alarm :
Select whether to return to the home position of the program and turn the servo OFF or stop at the position without returning to the home position and turn the servo OFF in case of press Prg. alarm being issued.

[9] Continuous Prg No. : Set the press program numbers to execute continuously.
[Refer to SCON-CB controller instruction manual for how to consolidate the press programs]

[10] Gain Set No. : Indicate the gain set number to be used from the four types of servo-motor gain registered in advance. The gain set can be switched over for each press program.

[11] Wait time : Set the wait time after a press program is finished will executing another.

[12] Allowed Prg operating time : Set the execution time for the whole press programs.

[13] Acceleration and deceleration : Set the acceleration and deceleration in actuator operation in a press program if [14] Show acceleration and deceleration Individually is not pressed. All the operation in the press program is performed with the acceleration and deceleration set here.

[14] Show Acceleration and deceleration individually :
Press Show acceleration and deceleration individually, and the acceleration and deceleration settings in each operation in a press program can be established.

[15] Approach motion : Approach motion can be set.
Approach motion is an operation to approach a work piece from the press program home position till a point before touching the work piece.
Approach motion will not be performed if a check mark is removed.
[Refer to SCON-CB controller instruction manual for how to set up Approach motion]

[16] Work search : Work search can be set.
Work search is an operation to confirm the touch to a work piece in low speed.
Search motion will not be performed if a check mark is removed.
[Refer to SCON-CB controller instruction manual for how to set up Work Search

[17] Press motion : Press motion can be set.
Press motion is an operation to perform pressing under the specified conditions.
There are some cases that the names for the setting items may differ depending on the press motion mode.
[Refer to SCON-CB controller instruction manual for how to set up Press motion]

[18] Depression operation : Depression Operation can be set.
Depression Operation is an operation to move away from a work piece in low speed.
Depression operation will not be performed if a check mark is removed.
[Refer to SCON-CB controller instruction manual for how to set up depression operation]

[19] Return movement : Return movement can be set.
Return movement is an operation to move away from a work piece in high speed and return to Prg. home position.
Return movement will not be performed if a check mark is removed.
[Refer to SCON-CB controller instruction manual for how to set up return movement]

(3) Statusbar

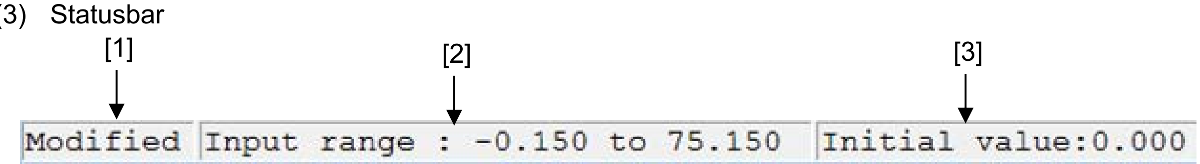
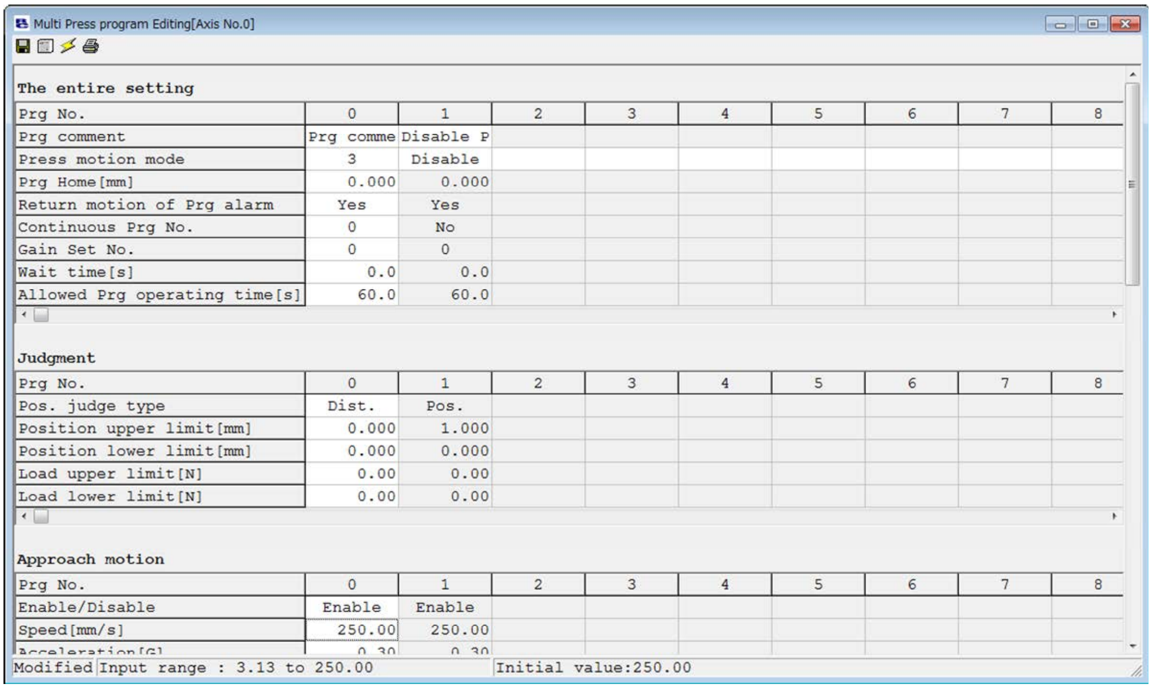


Fig. 15.9 Statusbar

[1] Modified or not : "Modified" is shown if any change has been made. "Not Modified" is shown if no change has been made.
[2] Input Range : The input range of an item that the cursor is placed on is displayed.
[3] Initial Value : The initial value of an item that the cursor is placed on is displayed.

15.2.2 Multi Press Program Editing Window

It is a window to set and edit all the operations of the servo press in the individual press programs (No. 0 to 63) at once.
It is displayed if **All Press Programs** is selected in the press program select.



Multi Press program Editing[Axis No.0]

The entire setting

Prg No.	0	1	2	3	4	5	6	7	8
Prg comment	Prg comme	Disable P							
Press motion mode	3	Disable							
Prg Home[mm]	0.000	0.000							
Return motion of Prg alarm	Yes	Yes							
Continuous Prg No.	0	No							
Gain Set No.	0	0							
Wait time[s]	0.0	0.0							
Allowed Prg operating time[s]	60.0	60.0							

Judgment

Prg No.	0	1	2	3	4	5	6	7	8
Pos. judge type	Dist.	Pos.							
Position upper limit[mm]	0.000	1.000							
Position lower limit[mm]	0.000	0.000							
Load upper limit[N]	0.00	0.00							
Load lower limit[N]	0.00	0.00							

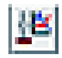
Approach motion

Prg No.	0	1	2	3	4	5	6	7	8
Enable/Disable	Enable	Enable							
Speed[mm/s]	250.00	250.00							
Acceleration[G]	0.30	0.30							

Modified Input range : 3.13 to 250.00 Initial value:250.00

Fig. 15.10 Multi Press program Editing Window

15.2.3 Press Program Operation / Monitor Window

Check of axis status (I/O, network setting, current position, current speed, press program status, etc.), teaching, trial operation, execution of servo monitor and display of results can be conducted.
Either select **Press Program (R)** → **Operation / Monitor (Z)** from the menu in Main Window or click on  button on the toolbar in Main Window, and Press Program Operation / Monitor Window appears.
It can also be started from the tree view.

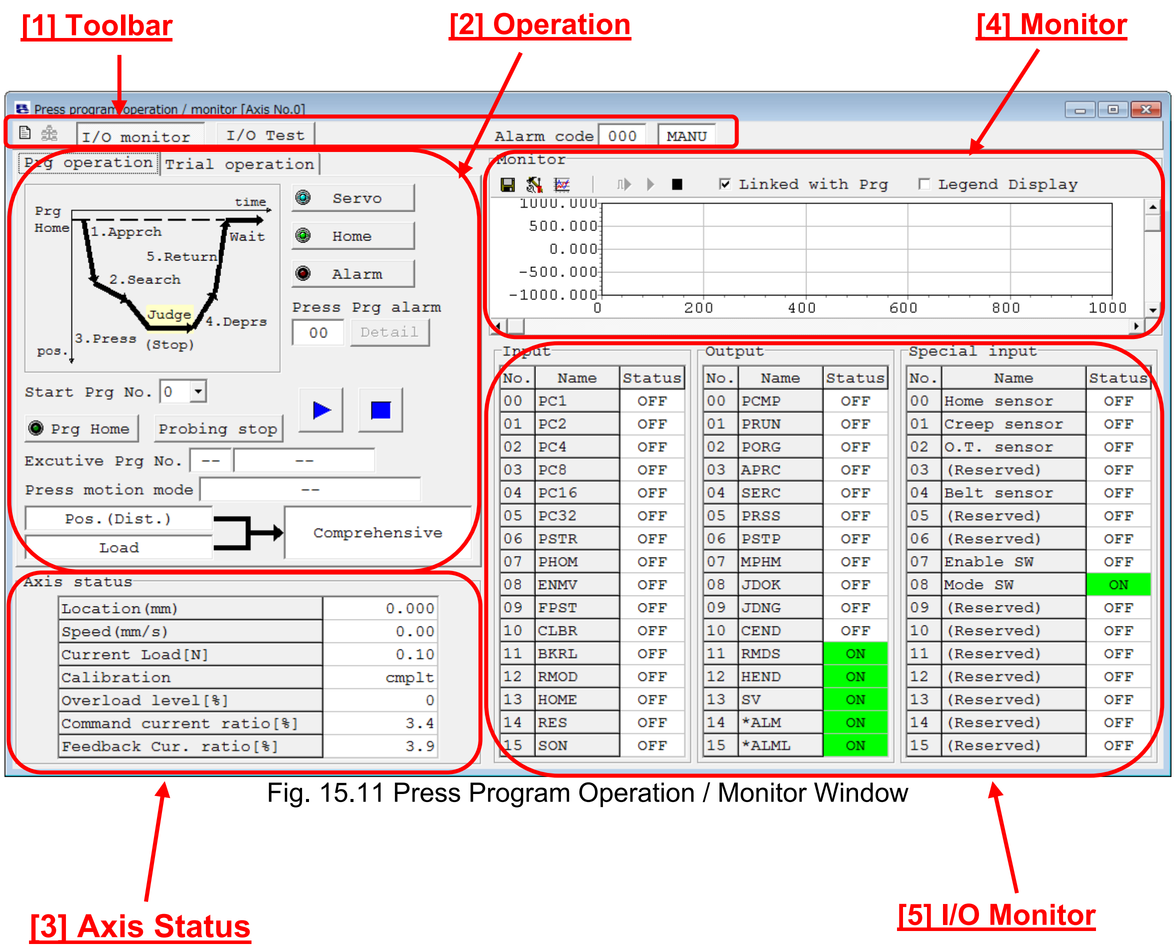


Fig. 15.11 Press Program Operation / Monitor Window

[1] Toolbar

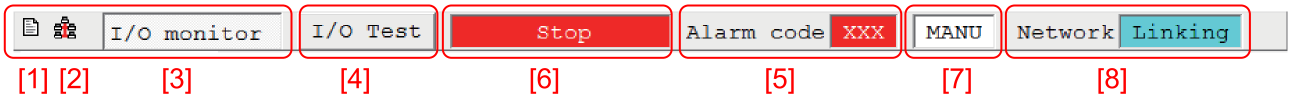


Fig. 15.12 Toolbar in Press Program Operation / Monitor Window

[1] Edit Press program :	Edit press program window gets shown in another window.
[2] Network :	Network status gets displayed.
[3] I/O monitor :	To show / hide input and output ports is switched over.
[4] DO Output Test:	DO output test window gets shown in another window. [Refer to 9.1 Status Monitor Window for DO output test window]
[5] Alarm :	Alarm codes get displayed. “000” is shown when no alarm is issued.
[6] Stop/Motor voltage drop :	It gets displayed at stop or motor voltage drop.
[7] MANU/AUTO :	The status of the MANU (manual) / AUTO (auto) gets displayed.
[8] Network (link) :	The status of the network link gets displayed.

[2] Operation
There are two types, Prg. operation and Trial operation. Change the window on the tabs.

(1) Prg operation
In Prg. operation, prepare for press program and execute it.

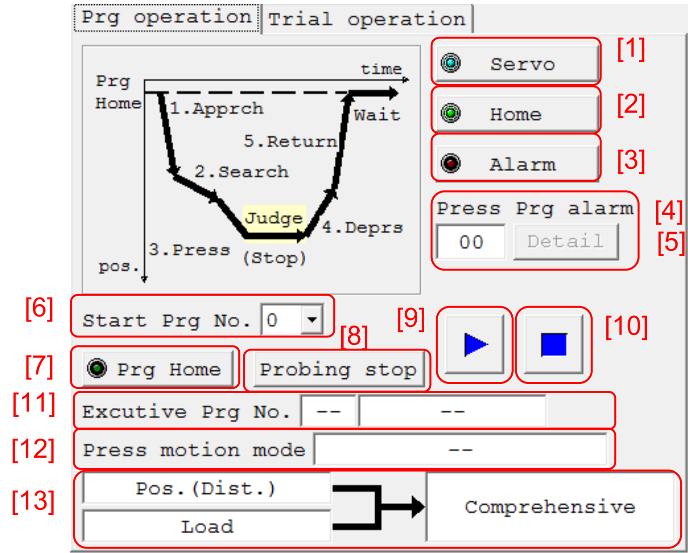


Fig. 15.13 Prg Operation Window

[1]	Servo :	Servo can be turned ON/OFF.
[2]	Home position :	Home-return operation can be held.
[3]	Alarm :	Alarm status can be released. Note that it can be released only when the cause of the alarm is already solved.
[4]	Press Prg alarm :	The press program alarm codes get displayed. [Refer to SCON-CB controller instruction manual for the alarm codes]
[5]	Press Prg alarm detail :	Contents of the press program alarms get displayed.
[6]	Start Prg No.:	The start press program is to be set up.
[7]	Prg Home position :	It enables to move to Prg. Home Positon.
[8]	Work search stop :	Press this before pressing  button to execute a program when it is required to finish the program at work search operation. Execute the program and it stops at work search stop.
[9]	Programs execution :	A program can be executed from the press program set in start program number. Once the program is finished in the normal condition, the result of position (distance) judgment and Load Judgment gets shown in [13] Judgment display. It will not be shown when judgment is invalid.
[10]	Program stop :	The press program being executed can be stopped.
[11]	Excutive Prg No. display :	Prg. No. being executed gets displayed. In the right column, the stage being executed, such as Approach, gets displayed.
[12]	Press motion mode display :	The press motion mode being executed, such as Speed Control – Keeping Position, gets displayed.

[13] Judgment display : The result of Position (distance) judgment and Load Judgment gets displayed.
Also, from the result of position (distance) and load, the result of comprehensive judgment gets displayed.
[Refer to SCON-CB Controller Instruction Manual for the judgment]

(2) Trial Operation

In Trial operation, axis movement by JOG and Inching and direct position move by indicating a position can be conducted. The position that the movement was made to can be read in by pressing **Edit Press Program** Button and opening edit press program window in another window.

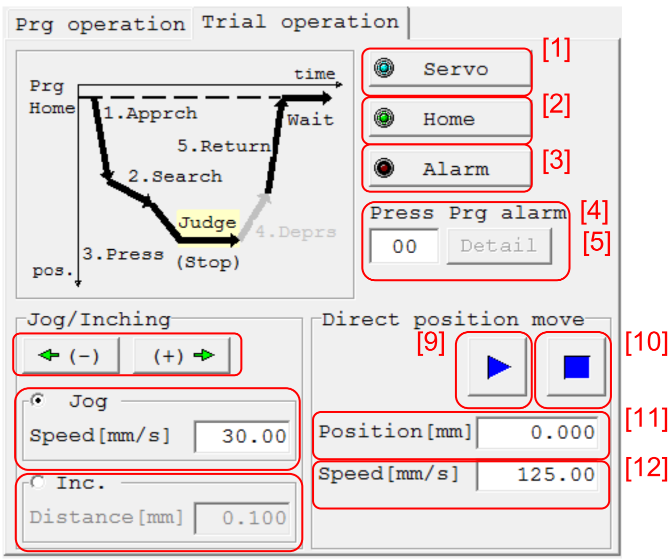


Fig. 15.14 Trial Operation Window

[1] Servo : Servo can be turned ON/OFF.

[2] Home position : Home-return operation can be held.

[3] Alarm : Alarm status can be released. Note that it can be released only when the cause of the alarm is already solved.

[4] Press Prg alarm : The press program alarm codes get displayed. [Refer to SCON-CB controller instruction manual for the alarm codes]

[5] Press Prg alarm detail : Contents of the press program alarms get displayed.

[6] JOG Key : Axis can be moved with JOG and Inching.

[7] JOG Select : JOG operation can be held by selecting JOG. JOG speed setting can be held.

[8] Inching Select : Inching operation can be held by selecting Inching. Setting of Inching distance can be conducted.

[9] Direct position move execution : With the speed set in [12] Speed, moves to the position set in [11] Position.

[10] Direct position move stop : An axis in move can be stopped.

[11] Direct position move setting : The position for direct position move can be set.

[12] Direct position move speed specified : The speed for direct position move can be set.

[3] Axis Status

The current status of an axis gets displayed.
The following items are shown.

- Current position [mm]
- Current speed [mm/s]
- Current load [N] (Note 1)
- Calibration (Note 1) : Complete / Incomplete
- Overload level [%]
- Command current ratio [%]
- Feedback current ratio [%]

Note 1 When the load cell is inactivated, “inactive” is displayed.

Axis status

Location(mm)	3.888
Speed(mm/s)	0.00
Current Load[N]	-0.05
Calibration	cmplt
Overload level[%]	0
Command current ratio[%]	1.1
Feedback current ratio[%]	1.7

Fig. 15.15 Axis Status Window

[4] Monitor

The status of an axis gets shown in the monitoring display. The following four items can be monitored.

- Current position [mm]
- Current load [N]
- Feedback current ratio [%] (Note 1)
- Current speed [mm/s] (Note 1)

Note 1 It is available to change to another item.

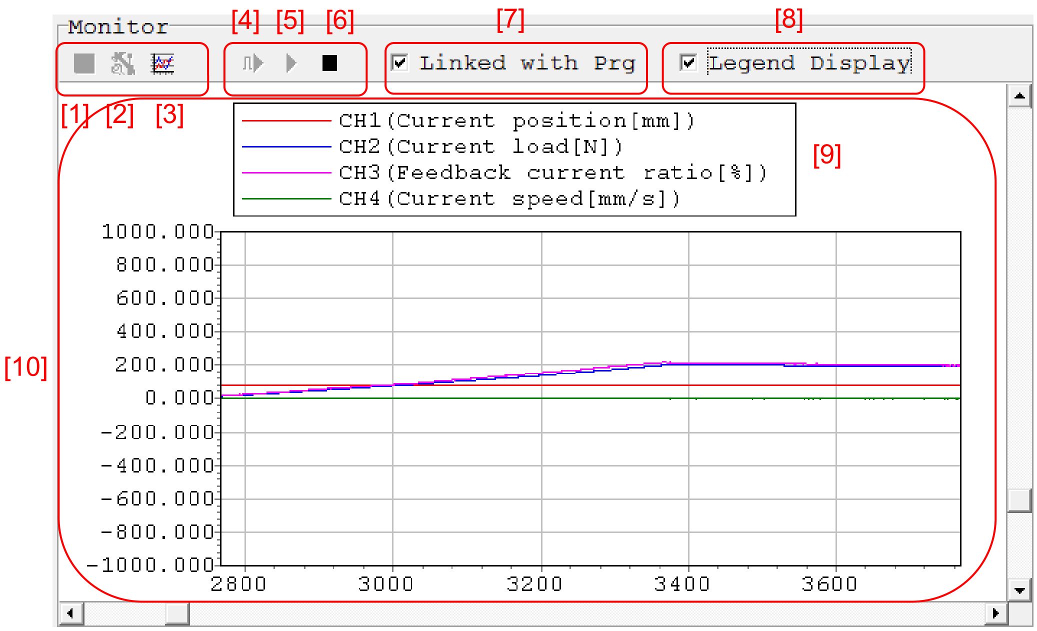


Fig. 15.16 Monitor Window

[1]	Save :	Monitor Data can be saved.
[2]	Monitoring setting :	Monitoring Setting Window gets displayed. [Refer to next page]
[3]	Detail monitor :	Servo Monitor Result Displayed Window gets displayed. [Refer to [6] Servo Monitor Result Window]
[4]	Trigger start :	Monitoring starts with the set trigger. Trigger setting can be held in Monitoring Setting Window. [Refer to next page]
[5]	Start :	Monitoring gets started.
[6]	Stop :	Monitoring gets stopped.
[7]	Linked with Prg. :	The start of monitoring and start of a program get linked with each other.
[8]	Legend Display / Hide Select :	Click in □ to put a check mark, and a legend for [9] gets displayed. Click again to remove the check mark, and the legend for [9] gets hidden.
[9]	Legend Display :	The line colors and their titles in the graph get displayed.
[10]	Monitoring Window :	Monitoring data gets updated and displayed. The number of records available to monitor is 30000.

(1) Monitoring setting

It gets displayed if **Monitoring Setting** Button in monitoring window is pressed.
Setting for displayed items in each channel, sampling period setting and trigger setting to be held in monitoring can be conducted.

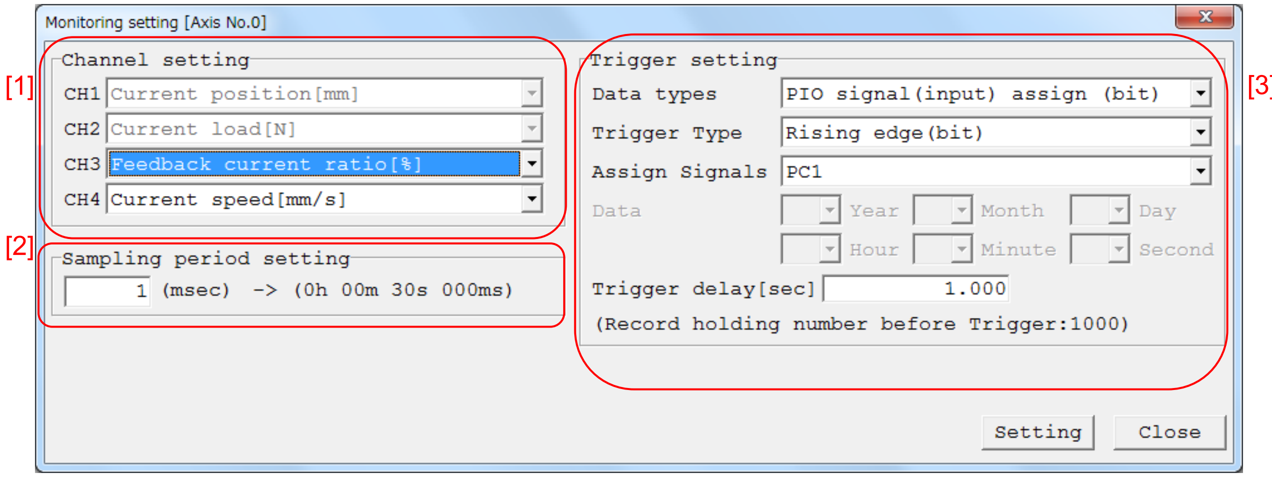


Fig. 15.17 Monitoring Setting Window

[1]	Channel setting :	Monitoring items can be set. CH1 and CH2 cannot be changed.
[2]	Sampling period setting :	Sampling period setting in monitoring can be changed. The settable value should be from 1msec to 1000msec.
[3]	Trigger setting :	Conditions for trigger start can be set. [Refer in the next page for how to set up]

[Trigger Setting]

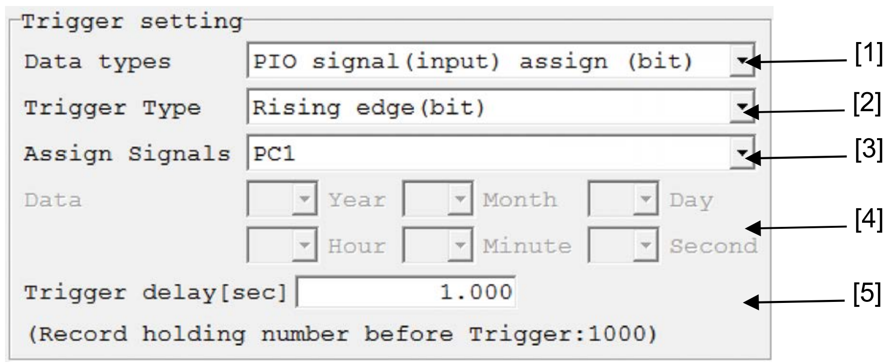


Fig. 15.18 Monitoring Setting Window (Trigger Setting)

[1] Data types
The following data types can be selected.
- PIO signal (input) allocation (bit)
- PIO signal (output) allocation (bit)
- Clock

[2] Trigger Type
When PIO feature input assignment (bit) or PIO feature output assignment (bit) is selected, select either Rising edge (bit) or Falling edge (bit).
It is not necessary to select any if Clock is selected.

[3] Assign Signals
When PIO feature input assignment (bit) is selected, select from the PIO input port signals. When PIO feature output assignment (bit) is selected, select from the PIO output port signals.
It is not necessary to select any if Clock is selected.

[4] Data
When Clock is selected, the current time in the controller is shown first. With that time as the standard, set the time that trigger is required at.
For example, if you would like to trigger in one minute, forward the minute setting for one minute.

[5] Trigger delay [sec]
In case that the data before having a trigger is required to be acquired, set the time [sec] in Trigger Delay [sec]. It enables to acquire the data before the time of trigger being conducted.

[5] I/O Monitor

Status of input ports, output ports and special input ports get displayed.

[1] Input

No.	Name	Status
00	PC1	OFF
01	PC2	OFF
02	PC4	OFF
03	PC8	OFF
04	PC16	OFF
05	PC32	OFF
06	PSTR	OFF
07	PHOM	OFF
08	ENMV	OFF
09	FPST	OFF
10	CLBR	OFF
11	BKRL	OFF
12	RMOD	OFF
13	HOME	OFF
14	RES	OFF
15	SON	OFF

[2] Output

No.	Name	Status
00	PCMP	OFF
01	PRUN	OFF
02	PORG	OFF
03	APRC	OFF
04	SERC	OFF
05	PRSS	OFF
06	PSTP	OFF
07	MPHM	OFF
08	JDOK	OFF
09	JDNG	OFF
10	CEND	OFF
11	RMDS	ON
12	HEND	ON
13	SV	ON
14	*ALM	ON
15	*ALML	ON

[3] Special input

No.	Name	Status
00	Home sensor	OFF
01	Creep sensor	OFF
02	O.T. sensor	OFF
03	(Reserved)	OFF
04	Belt sensor	OFF
05	(Reserved)	OFF
06	(Reserved)	OFF
07	Enable SW	OFF
08	Mode SW	ON
09	(Reserved)	OFF
10	(Reserved)	OFF
11	(Reserved)	OFF
12	(Reserved)	OFF
13	(Reserved)	OFF
14	(Reserved)	OFF
15	(Reserved)	OFF

Fig. 15.19 Ports Input and Output Window

[1] Input Ports : The status of being ON/OFF for the PIO input ports is displayed.
[2] Output Ports : The status of being ON/OFF for the PIO output ports is displayed.
[3] Special Input Ports : The status of being ON/OFF for the special input ports is displayed.

[6] Servo Monitor Result Window

Click on Detail Monitor Button  in **Press Program Operation / Monitor Window**, and the result of the executed monitoring can be confirmed in the dedicated result display window. Also, servo monitor files already saved can be confirmed.

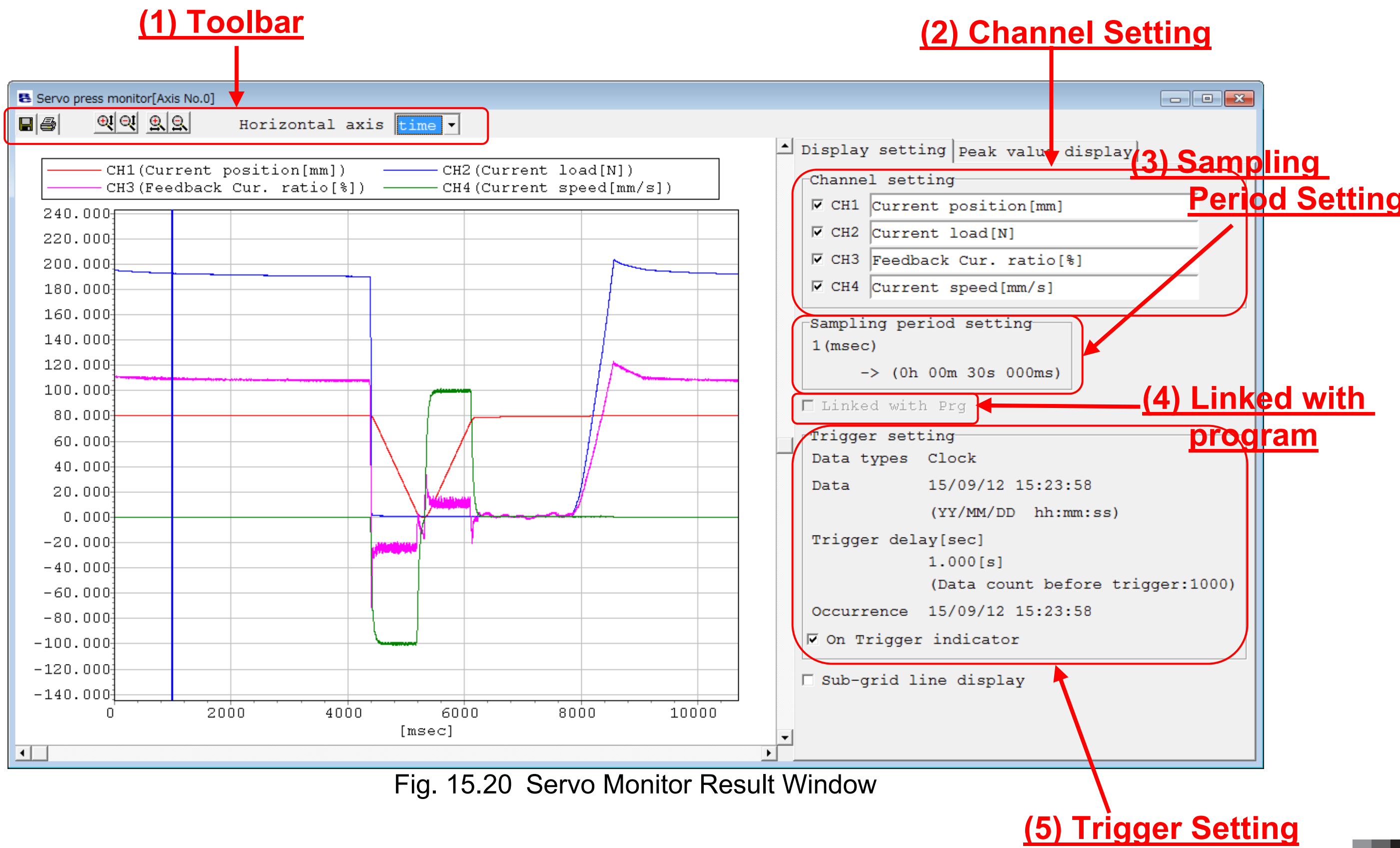


Fig. 15.20 Servo Monitor Result Window

(1) Toolbar

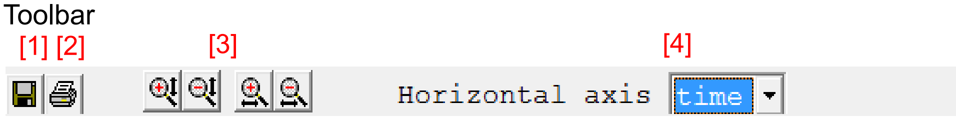


Fig. 15.21 Toolbar

[1] Save Prg File :	Data and settings are saved in a file if the displayed data is not from a file.
[2] Printout :	It makes an output of a monitoring result to a printer.
[3] Scale-up/down :	Display can be scaled up and down in each vertical direction and horizontal direction.
[4] Horizontal Axis Switchover :	The item to display on the horizontal axis can be selected from **Time** and **Position**. If it is switched over to **Position**, variation of force in each position can be confirmed.

(2) Channel setting
Monitored items can be displayed / hidden for each channel.

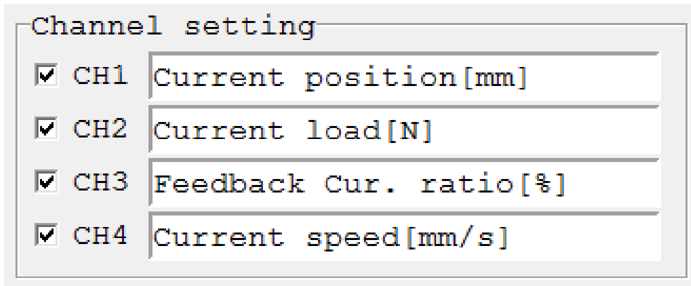


Fig. 15.22 Displayed Channel Setting

(3) Sampling period setting
Sampling Period Setting gets displayed.

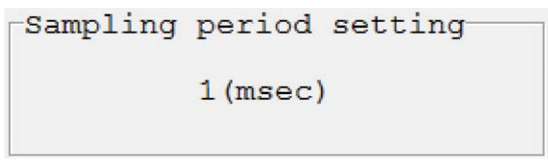


Fig. 15.23 Sampling period setting

(4) Linked with program
Status gets displayed if Monitoring Start and Program Start are linked with each other.

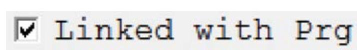


Fig. 15.24 Linked with Program

(5) Trigger setting
Trigger Setting gets displayed in case of monitoring with Trigger Start.

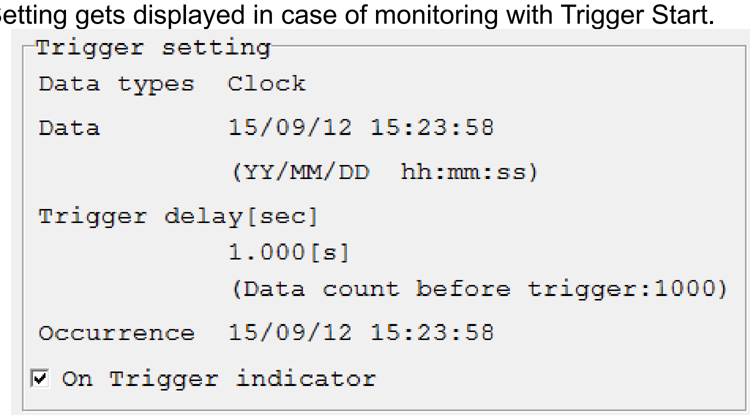


Fig. 15.25 Linked with Program

15.3 Servo Press Related in Application Setting Window

Select [**Setting**] → [**Application Setting**] from the menu in main window.

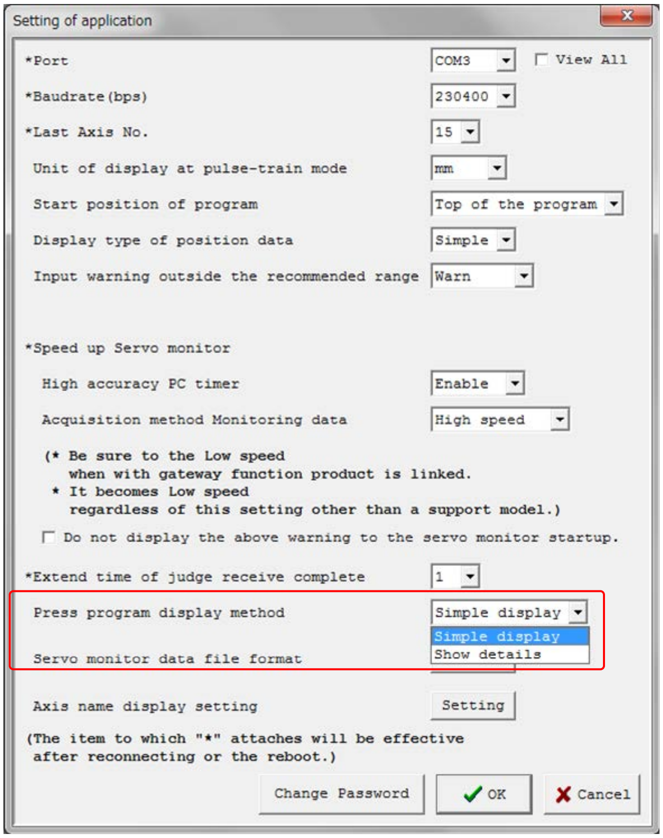


Fig. 15.26 Application Setting

The initial display type of Program Editing Window can be selected from **Simple Display** and **Show Details**.

16. Appendix

16.1 Parameter (Factory Default Setting) Initializing Method

Note:	Parameters (factory default setting) can be initialized only for PCON, ACON, SCON, ERC2, ERC3, ROBONET, ASEP, PSEP, DSEP, MSEP, MSCON, MCON and RCON controller.
:	Note that parameters set by user are changed to the factory default parameters when parameters (factory default setting) are initialized.

(1) Right click a blank part of the toolbar (Appendix Fig. 16.1) while pressing the **Ctrl** key, then input password window as shown in Fig. 16.2 is displayed.

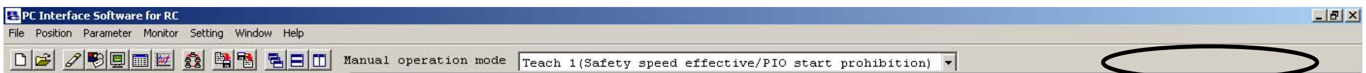


Fig. 16.1 Menu Bar

Right-click the blank part of the tool bar while pressing **Ctrl**.

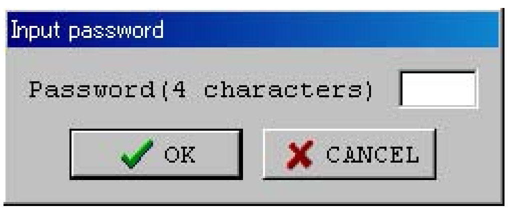


Fig. 16.2 Input Password Window

(2) Input the password (5119) on the displayed input password window, then the "Controller Initialization" (factory default setting) menu is displayed (Fig. 16.3).
(Note) The password inputted once is effective until the application ends.

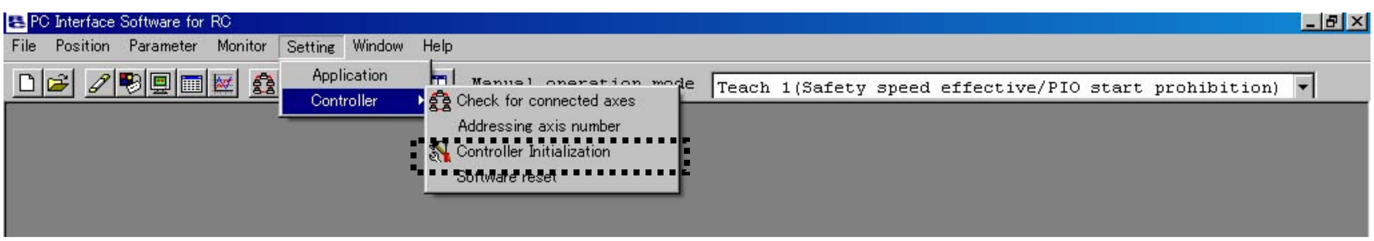


Fig. 16.3 Menu Bar (Parameter Initialization (Factory Default Setting))

(3) When the menu “Controller Initialization” (factory default setting) displayed in (2) is selected, a dialog box in appendix Fig. 16.4 is displayed. Click **OK** when one axis is connected. Set axis No. and click **OK** when multiple axes are connected.

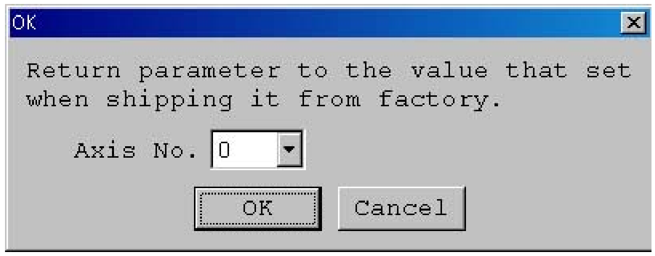


Fig. 16.4 Initialization Dialog Box

(4) Then, a warning dialog in Fig. 16.5 is displayed. If there is no problem, click **Yes**.

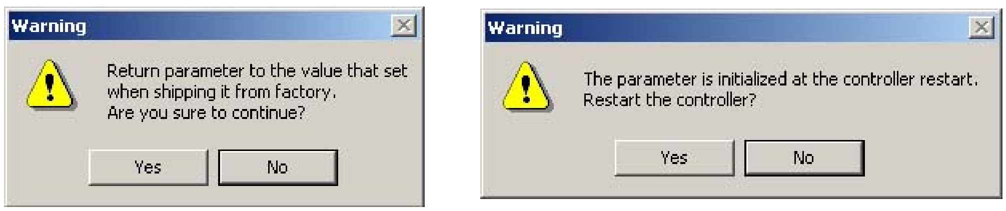


Fig. 16.5 Warning Windows

A warning dialog in Fig. 16.6 is further displayed when the servo is ON.
If there is no problem, click **Yes**.

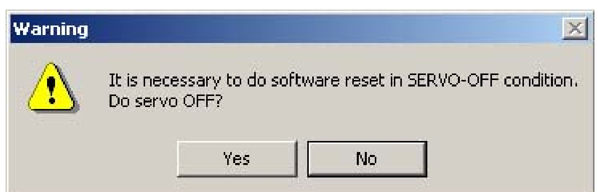


Fig. 16.6 Warning Window

Note: The encoder parameters cannot be initialized. For this reason, if any actuator different from the factory default setting is connected, an unexpected error may be detected.

16.2 PC Software Error List

These errors are specific to the PC software.
For the controller errors, refer to the operation manual for each controller.

Code	Message	Description
103	File write error	This error indicates that writing of one of various data files (position data files, parameter files, all data backup files, etc.) failed. The following causes are considered: ▪ The file to be written is read only. ▪ The current login account of the OS has no permission to modify the file.
104 105	Entered value too small Entered value too large	The entered value is smaller than the setting range. The entered value is larger than the setting range. Refer to the actuator specification or parameter list and enter an appropriate value again.
108	Teaching prohibited before home return	This error indicates that an attempt was made to write the current position when home return was not yet complete. Perform home return first.
10B	File open error (read)	This error indicates that the specified file could not be opened. The following causes are considered: ▪ The specified file does not exist. ▪ The specified file is already opened in other application.
10C	File open error (write)	This error indicates that the destination file could not be opened. The following causes are considered: ▪ The specified file is already opened in other application.
10D	File read error	This error indicates that the file could not be read. The following cause is considered: ▪ There is no enough memory to read the file.
10E	File type error	This error indicates that an attempt was made to send parameter files or all data backup files to a model different from the one which is the source of the applicable files.
10F	Incremental specification function not supported	This error indicates that an attempt was made to write position data containing data of incremental specification to a model not supporting the “incremental specification” function (move by relative position specification).
111	File data error	This error indicates that reading of a file failed. The following cause is considered: ▪ The specified file contains invalid data.
119	Multiple axes detected	This error indicates that “axis number assignment” was attempted when multiple axes were connected. Always assign an axis number when only one axis is connected.

Code	Message	Description
11A	No effective axis	This error indicates that "axis number assignment" was attempted when no axis was connected. Or, the axis number of controller may not have been recognized. Causes: [1] The controller is not operating properly. [2] The signal wire (SGA/SGB), and only the signal wire, is broken in the supplied cable. [3] If a SIO converter is used, the link cable is not connected although 24 V is supplied to the converter. [4] If multiple controllers are linked, two ADRS switches are setting the same number by mistake. Actions : [1] Check if the RDY lamp on the controller is lit. If not, the controller is faulty. [2] If a spare connection cable is available, try swapping the cable to see if the problem is resolved. [3] Eliminate duplicate ADRS switch settings. If the problem still persists, contact IAI.
122	Input data error	This error indicates that inappropriate data was entered. Check the entered data.
123	Inconsistent data version	This indicates that an attempt was made to send data which was saved on a controller of an incompatible version. Check the version of the source controller and that of the destination controller.
124	Data editing prohibited in non-MANU teaching mode	This error indicates that an attempt was made to write position data or parameters to the controller in the AUTO mode or any MANU monitor mode. The following causes are considered: ・ The controller's mode switch is set to "AUTO" (if the controller has a mode switch). ・ The PC software is in "MANU monitor mode 1" or MANU monitor mode 2."
125	Axis operation prohibited in non-MANU teaching mode	This error indicates that an attempt was made to perform axis operation (jogging, home return of an operation-prohibited axis, continuous move, etc.) in the AUTO mode or any MANU monitor mode. The following causes are considered: ・ The controller's mode switch is set to "AUTO" (if the controller has a mode switch). ・ The PC software is in "MANU monitor mode 1" or "MANU monitor mode 2."
20C	Start signal ON	This error indicates that the start signal (CSTR) was turned ON by the PLC while the actuator was moving, and duplication of move commands occurred as a result.
20D	STP signal OFF	This error indicates that the pause signal (*STP) was turned OFF by the PLC while the actuator was moving, and the actuator became no longer movable as a result.
20E	Soft limit exceeded	This error indicates that a move command to outside the soft limit range was issued while the actuator was moving.
211	HOME signal ON	This error indicates that the home return signal (HOME) was turned ON by the PLC while the actuator was moving, and duplication of move commands occurred as a result.

Code	Message	Description
212	JOG signal ON	This error indicates that the jog signal (JOG) was turned ON by the PLC while the actuator was moving, and duplication of move commands occurred as a result.
300	COM port open error	This error indicates that the COM port specified in the “application of setting window” could not be opened. The following causes are considered: ▪ The specified COM port does not exist. ▪ The specified COM port is already used in other application, etc.
301	Receive timeout error	This error indicates that a receive timeout error occurred while the PC software was communicating with the connected controller. Causes: [1] Communication fault due to poor connection between the PC and controller [2] Communication fault due to noise (data turning into garbage, etc.) [3] The controller power was cut OFF. Actions : [1] Check if the connectors on the PC-controller connection cable are firmly connected. [2] Readjust the wiring, equipment installation, etc., to eliminate noise. [3] Check if the controller power is supplied. If the problem still persists, contact IAI.
302	Receive buffer overflow	This error indicates that the receive buffer overflowed when a response message was received from the controller. Causes: [1] Communication fault due to poor connection between the PC and controller [2] Communication fault due to noise (data turning into garbage, etc.) Actions : [1] Check if the connectors on the PC-controller connection cable are firmly connected. [2] Readjust the wiring, equipment installation, etc., to eliminate noise. If the problem still persists, contact IAI.
303	Receive overrun	This error indicates that a receive overrun occurred at the COM port on the PC when a response message was received from the controller. Select a lower baud rate in the “application of setting window.”
304	Receive framing error	This error indicates that a receive framing error occurred when a response message was received from the controller. Causes: [1] Communication fault due to poor connection between the PC and controller [2] Communication fault due to noise (garbled data, etc.) Actions : [1] Check if the connectors on the PC-controller connection cable are firmly connected. [2] Readjust the wiring, equipment installation, etc., to eliminate noise. If the problem still persists, contact IAI.

Code	Message	Description
305	Communication error	A communication error not specified above occurred when a response message was received from the controller. Causes: [1] Communication fault due to poor connection between the PC and controller [2] Communication fault due to noise (garbled data, etc.) Actions : [1] Check if the connectors on the PC-controller connection cable are firmly connected. [2] Readjust the wiring, equipment installation, etc., to eliminate noise. If the problem still persists, contact IAI.
306	Checksum error	A checksum error occurred when a response message was received from the controller. Causes: [1] Communication fault due to poor connection between the PC and controller [2] Communication fault due to noise (garbled data, etc.) Actions : [1] Check if the connectors on the PC-controller connection cable are firmly connected. [2] Readjust the wiring, equipment installation, etc., to eliminate noise. If the problem still persists, contact IAI.
307	CRC error	A CRC error occurred when a response message was received from the controller. Causes: [1] Communication fault due to poor connection between the PC and controller [2] Communication fault due to noise (garbled data, etc.) Actions : [1] Check if the connectors on the PC-controller connection cable are firmly connected. [2] Readjust the wiring, equipment installation, etc., to eliminate noise. If the problem still persists, contact IAI.
308	Receive message error	This error indicates that the response message from the controller contains abnormal data. Causes: [1] Communication fault due to poor connection between the PC and controller [2] Communication fault due to noise (garbled data, etc.) Actions : [1] Check if the connectors on the PC-controller connection cable are firmly connected. [2] Readjust the wiring, equipment installation, etc., to eliminate noise. If the problem still persists, contact IAI.
310	Connected model not supported	This error indicates that connection of a model not supported by the PC software was detected. Check the version of the PC software and models supported by the software.
311	Baud rate specification error (PC COM port)	This error indicates that the port could not be opened at the baud rate specified in the “application of setting window.” The following cause is considered: ▪ The specified baud rate is not supported by the COM port on the PC. Change the baud rate to a supported setting.

17. File Extensions

List of File Extensions

Model name	Position data file	Parameter file	Backup file
RCP	*.ptr	*.pmr	*.bkr
RCS	*.ptr	*.prr	*.bur
E-Con	* pte	*.pre	*.bue
RCP2	*.ptr2	*.pmr2	*.bkr2
ERC	*.ptre	*.pmre	*.bkre
ERC2	*.ptre2	*.pmre2	*.bkre2
ERC3	*.ptre3	*.pmre3	*.bkre3
PCON, RPCON	*.ptpc	*.prpc	*.bkpc
PCON-CA	*.ptpa	*.prpa	*.bkpa
ACON, RACON	*.ptac	*.prac	*.bkac
ACON-CA	*.ptaa	*.praa	*.bkaa
ACON-CB/CGB	*.ptab	*.prab	*.bkab
ACON-CB (MECHATROLINK-Ⅲ: with ML3 included in model code)	-	*.prabm	*.bkabm
ACON-CYB, PLB, POB	*.ptacl	*.pracl	*.bkacl
DCON-CA	*.ptda	*.prda	*.bkda
DCON-CB/CGB	*.ptdb	*.prdb	*.bkdb
DCON-CB (MECHATROLINK-Ⅲ: with ML3 included in model code)	-	*.prdbm	*.bkdbm
DCON-CYB, PLB, POB	*.ptdcl	*.prdcl	*.bkdcl
SCON-C	*.ptsc	*.prsc	*.bksc
SCON-CA	*.ptsa	*.prsa	*.bksa
SCON-CA (MECHATROLINK-Ⅲ: with ML3 included in model code)	-	*.prsm	*.bksm
SCON-CAL/CGAL	*.ptscl	*.prscl	*.pkscl
SCON-CB	*.ptsb	*.prsb	*.bksb
SCON-CB (MECHATROLINK-Ⅲ: with ML3 included in model code)	-	*.prsbm	*.bksbm
SCON-CB (RCON Connected Type: Those which include RC in model code)	*.ptc2	*.prrsc	*.bkrsc
ASEP	*.ptas	*.pras	*.bkas
PSEP	*.ptps	*.prps	*.bkps
DSEP	*.ptds	*.prds	*.bkds
PCON-CB/CGB/CFB/CGFB	*.ptpb	*.ptpb	*.ptpb
PCON-CB (MECHATROLINK-Ⅲ: with ML3 included in model code)	-	*.prpbm	*.bkpbm
PCON-CYB, PLB, POB	*.ptpcl	*.prpcl	*.bkpcl

Model name	Position data file	Parameter file	Backup file
RCP6S	*.ptp6	*.prp6	*.bkp6
RCM-P6PC	*.ptp6pc	*.prp6pc	*.bkp6pc
RCM-P6AC	*.ptp6ac	*.prp6ac	*.bkp6ac
RCM-P6DC	*.ptp6dc	*.prp6dc	*.bkp6dc
MSEP (for servo motor)	*.ptma	*.prma	*.bkma
MSEP (for pulse motor)	*.ptmp	*.prmp	*.bkmp
MSEP (with D included in model code)	*.ptmd	*.prmd	*.pkmd
MSEP (with T included in model code)	*.ptmp2	*.prmp2	*.pkmp2
MSCON	*.ptms	*.prms	*.bkms
MCON (Servo Motor)	*.ptmac	*.prmac	*.bkmac
MCON (Pulse Motor)	*.ptmpc	*.prmpc	*.bkmpc
MCON (Brushless DC Motor)	*.ptmdc	*.prmdc	*.bkmdc
MCON (with T included in model code)	*.ptmpc	*.prmpc	*.bkmpc
MCON (Servo Motor) (MECHATROLINK-Ⅲ: with ML3 included in model code) (SSCNETⅢ/H : with SSC included in model code) (EtherCat Motion : with ECM included in model code)	-	*.prmacm	*.bkmacm
MCON (Pulse Motor) (MECHATROLINK-Ⅲ: with ML3 included in model code) (SSCNETⅢ/H : with SSC included in model code) (EtherCat Motion : with ECM included in model code)	-	*.prmpcm	*.bkmpcm
MCON (Brushless DC Motor) (MECHATROLINK-Ⅲ: with ML3 included in model code) (SSCNETⅢ/H : with SSC included in model code) (EtherCat Motion : with ECM included in model code)	-	*.prmdcm	*.bkmdcm
ELECYLINDER	*.ptec	*.prec	*.bkec
RCON-PC/PCF	*.ptc2	*.prrpc	*.bkrpc
RCON-AC	*.ptc2	*.prrac	*.bkrac
RCON-DC	*.ptc2	*.prrdc	*.bkrdc

Model name	Position data file	Parameter file	Backup file
SCON-CB (Servo Motor) (with F included in model code)	*.prg	*.prsbf	*.bksbf

18. Change History

Revision Date	Description of Revision
December 2009	Added descriptions of ASEP/PSEP controller operations.
February 2010	Change the default system password from “5119” to “0000.”
August 2011	Sixth edition Change in software license agreement
September 2011	Seventh edition P39 Added the PCON-CA position window. P58 Added PCON-CA in (8), “Position data input area” P97 Added the PCON-CA alarm display window. P101 to 104 Added 8.4, “Servo Monitor Window.” P105 8.5, “Maintenance Information Window” P109, 110 Added 9.3, “Time Setting.” P112 to 158 Added 11, “Smart Tuning Function” P159 Added PCON-CA to 12, “File Extensions.”
September 2011	Eighth edition P111 to 156 Contents changed in 11, Smart Tuning Function
September 2011	Ninth edition The contents of ERC3 are added
October 2011	Tenth edition DSEP added
November 2011	Eleventh edition The contents of SCON-CA are added
January 2012	Twelfth edition • Caution, Operational Environment and Applicable for Windows Vista and Windows 7 are added • Instruction how to install driver to Windows 7 and Windows Vista added to instructions to install USB conversion adapter • MSEP added
June 2012	Thirteenth edition Change in how to install Windows 7 and Windows Vista.
August 2012	Fourteenth edition MSCON added
April 2013	Fifteenth edition [3] “Appearance of Process to Test run Plan Display” deleted from (2) “Test run result” in 11.4.3 “Explanation of Takt Time Calculation Window”
July 2013	Sixteenth Edition P35 and 117 MSEP and MSCON deleted from clock setting section.

Revision Date	Description of Revision
October 2013	Seventeenth Edition P35 Note corrected Password 5119 → Password 6451
October 2013	Eighteenth Edition The contents of ACON-CA and DCON-CA added “Takt Time” changed to “Cycle Time” in 11. “Smart Tuning (Version V8.03.00.00 and later)” and 12. “Offboard Tuning Function on SCON-CA and MSCON Controller”
March 2014	Nineteenth Edition MSEP (with 3D or T included in model code) and MSEP-LC added to supported model
May 2014	Twentieth Edition P112 Correction made to contents of maintenance information
August 2014	Twenty-first Edition The contents of SCON-CAL/CGAL added
October 2014	Twenty-second Edition P35 Password for “Actuator Replacement” changed from 6451 to 5119 P112 Correction made on total operation distance in Maintenance Window to available to change between km and m
January 2015	Twenty-third Edition A Word of Caution, P2 Windows 8, 8.1 added Windows 2000 deleted
February 2015	Twenty-fourth Edition P20 to P23 Installation procedure of USB conversion adapter changed for Windows Vista, Windows 7, Windows 8 and 8.1
October 2015	Twenty-fifth Edition SCON-CB, ACON-CB, DCON-CB and MCON Controllers added 15. Press Program Editing and Operation of Servo Press added
February 2016	Twenty-sixth Edition PCON-CB Controllers added
March 2016	Twenty-seventh Edition PCON-CYB/PLB/POB, ACON-CYB/PLB/POB and DCON-CYB/PLB/POB are added to the supported models. P34 to P37 I/O customize” is added P115 The contents of PCON-CYB/PLB/POB, ACON-CYB/PLB/POB and DCON-CYB/PLB/POB are added. P285 to P286 File extensions for PCON-CYB/PLB/POB, ACON-CYB/PLB/POB and DCON-CYB/PLB/POB are added.
April 2016	27B Edition P36 to P37 Delete the CSTR and PEND from the table P59 to P60 Table to PCON-CYB, ACON-CYB and DCON-CYB added

Revision Date	Description of Revision
June 2016	27C Edition Supported Models Applicable versions added for MECHATROLINK-Ⅲ of MCON and SSCNETⅢ/H P115 The monitoring period of ACON-CA, DCON-CA, PCON-CA, ERC3, SCON-CA, MSCON, SCON-CB changed. 1 to 100 [msec] → 1 to 1,000 [msec] P286 File Extensions MECHATROLINK-Ⅲ of MCON and SSCNETⅢ/H added
July 2016	27D Edition P256, P262 9 : Force control - Keeping Position 2 added
July 2016	27E Edition P40 Contents added for pairing I.D. clear P107 Explanation added for status display for network link in the status monitor window
September 2016	Twenty-eighth Edition A Word of Caution P2 Windows 10 added Windows 7, Windows Vista, deleted P20 Windows 10 added
October 2016	28B Edition P40 Note added to state loadcell gets activated if rebooted with such as software reset 8.6 Gateway Data Unit and 8.7 Network Data Monitor added
November 2016	28C Edition P34, P35 The contents of SCON Parameter Converter Tool added
April 2017	Twenty-ninth Edition Became applicable for ELECYLINDER Became applicable for MCON-C/CG EtherCAT Motion
June 2017	29B Edition Supported Models, 17. File Extensions RCM-P6PC, RCM-P6AC and RCM-P6DC added
August 2017	29C Edition P57 Note added stating MCON Controller is not applicable
April 2018	30A edition Applicable for RCON and PSA-24 Power Supply Unit • RCON and SCON-CB (which includes RC in model code) added to supported models • Explanations added for items such as parameter select area which were added in position data input part of RCON • Explanations added for items such as driven distance after grease supply which were added to maintenance information from RCON • Explanation added for information window of power supply unit for monitor • Explanation added for version information window for RCON

Revision Date	Description of Revision
April 2018	30B edition 1.3.4 How to Install Driver Software for USB Connection of RCON added
June 2018	30C edition RCON added in areas with model names
August 2018	30D edition P24 Display added for when driver for RCON USB connection is not installed
November 2018	30E edition P127, 131 STO/SS1-t indication added Correction made from emergency stop to stop
December 2018	30F edition Servo Monitor How to Monitor PIO Signals added
January 2019	30G edition P331 Extension for PCON-CB ML3 added
August 2019	30H edition • Contents added regarding transference of position data, parameters and backup data from other models • Contents added regarding with / without ripple compensation added to status window and speed / current monitor window • Contents added regarding “Encoder Cable Length Setup” in “Parameter” in main menu
August 2019	30I edition P155 Description added telling users cannot make change to total number of movements and total distance traveled
November 2019	30J edition P117, 118 Correction made to the velocity, acceleration and deceleration 0% → 1%
June 2020	30K edition P69 Explanation of Force brk release button added P117, 118 Unit added for EC rotary P140 ELECYLINDER applicable added P157 Operating noise adjustment feature added
August 2020	30L edition P157 Pulse motor added as it got applicable for operating noise adjustment feature
November 2020	30M edition P32 Explanation added for parameter setting confirmation window for RCON motion type P71, 107 Explanation added for confirmation window for home-return operation P127 Explanation added for confirmation window in motion type P231 Note added stating RCON-SC applies to offboard tuning from versions V13.01.00.00 and later

Manual No.: ME0155-30M (November 2020)

IAI
Quality and Innovation

IAI Corporation

Head Office: 577-1 Obane Shimizu-KU Shizuoka City Shizuoka 424-0103, Japan
TEL +81-54-364-5105 FAX +81-54-364-2589
website: www.iai-robot.co.jp/

Technical Support available in USA, Europe and China

IAI America, Inc.

Head Office: 2690 W. 237th Street, Torrance, CA 90505
TEL (310) 891-6015 FAX (310) 891-0815
Chicago Office: 110 East State Parkway, Schaumburg, IL 60173
TEL (847) 908-1400 FAX (847) 908-1399
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066
TEL (678) 354-9470 FAX (678) 354-9471
website: www.intelligentactuator.com

IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany
TEL 06196-88950 FAX 06196-889524
website: www.iai-gmbh.de

IAI (Shanghai) Co.,Ltd.

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China
TEL 021-6448-4753 FAX 021-6448-3992
website: www.iai-robot.com

IAI Robot (Thailand) Co.,Ltd.

825 PhairojKijja Tower 7th Floor, Debaratana RD., Bangna-Nuea, Bangna, Bangkok 10260, Thailand
TEL +66-2-361-4458 FAX +66-2-361-4456
website: www.iai-robot.co.th

20.11.000