SigmaWin100
Online Manual

YASKAWA ELECTRIC CORPORATION

YASKAWA

Safety-Related Symbols

The following symbols are used in this manual according to the safety-related content.

Be sure to observe text annotated with these safety symbols as their content is important.

⚠ WARNING	Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.
⚠ CAUTION	Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

Furthermore, items marked with ⚠ CAUTION may have important consequences depending on the situation.

Warning-related symbols differ between ISO and JIS standards.

ISO Standards	JIS Standards
	

This manual uses ISO standard symbols.

Product warning labels may use either the ISO or JIS standards. Treat either in the same manner.

Manual Outline

This manual explains the following areas for SigmaWin100 users.

- Outline of SigmaWin100 Functions and Operation
- SigmaWin100 Installation/Removal

Related Manuals

Be sure to refer to the corresponding technical materials regarding related devices, modules, and other equipment.

Use this product only with a full understanding of its specifications, service life, and other important information.

Document Number	Document Name
SIE-S800-31.1	Σ-II Series SGM□H/SGDM User's Manual Servo Selection and Data Sheets
SIE-S800-31.2	Σ-II Series SGM□H/SGDM User's Manual Design and Maintenance
SIE-S800-32.1	Σ-II Series SGM□H/SGDH User's Manual Servo Selection and Data Sheets
SIE-S800-32.2	Σ-II Series SGM□H/SGDH User's Manual Design and Maintenance
SIE-S800-33.1	Σ-II PLUS Series SGM□H/SGDP User's Manual Servo Selection and Data Sheets
SIE-S800-33.2	Σ-II PLUS Series SGM□H/SGDP User's Manual Design and Maintenance

How to Use this Manual

Meaning of Basic Terms

This manual applies the following meanings to the terms below unless otherwise specified.

- Servomotor : Σ-II Series or Σ-II PLUS Series Servomotor
- SERVOPACK : Σ-II Series or Σ-II PLUS Series SERVOPACK
- Servodrive : A servomotor integrated with a SERVOPACK
- Servo System : A complete servo control system in which a servodrive is integrated with an upper level controller and peripheral devices.

Notes on the PC Communication Function

Σ-II Series or Σ-II PLUS Series SERVOPACK Operator Panel and SigmaWin100
• Either the Σ-II series/ Σ-II PLUS series Operator Panel or SigmaWin100 is enabled at all times. The operator panel will be disabled when using SigmaWin100. The LEDs on the panel display will all be out, and input by the panel switches is not accepted. The operator panel reactivates in the following situations. • SigmaWin100 is closed correctly. • More than three minutes have elapsed since SigmaWin100 was closed incorrectly.

Regarding Software

Usage Notes

- Use this software on one specified PC. Request a separate license to use this software on another computer.
- Copying of this software for purposes other than use as backup copies is strictly prohibited.
- Carefully store the CD-ROM (original medium) upon which this software is written.
- Reverse compiling or assembly of this software is strictly prohibited.
- Use of this software in whole or in part by a third party through transfer, exchange, resale, and so forth, is strictly prohibited without the prior agreement of Yaskawa Electric Corporation.
- Copyright and all other rights for this software are reserved by Yaskawa Electric Corporation.

Operating Systems and Registered Trademarks

Windows 95, Windows 98, Windows NT, Windows 2000 and Windows Me are registered trademarks of Microsoft Corporation in the United States.

Safety Notes

The following are important cautionary items that must be observed in the wiring and use of this product.

Notes on Wiring

⚠ CAUTION
• Insertion and removal of communication cables should be done with the power off in both the SERVOPACK and PC. Insertion and removal of cables with the power on may result in damage to both or either of the units. • Never change cables while SigmaWin100 is running. Always close SigmaWin100 before changing connections. The operation of both or either the PC or SERVOPACK cannot be assured if this is not observed.

Usage Notes

⚠ CAUTION
• Always be sure to close SigmaWin100 before turning the SERVOPACK power off or on. The operation of both or either the PC or SERVOPACK cannot be assured if this is not observed.

1 System Outline

This section includes an outline of the SigmaWin100 system, and explains its advantages and preparation prior to use.

1.1 Outline and Advantages of SigmaWin100

SigmaWin100 is a software tool for setup of Yaskawa Σ-II/Σ-II PLUS SERVOPACKs.

This product provides uniform features and functions enabling even beginners to easily perform connections, test runs, and simple tuning right out of the box.

Main Functions

- Parameter editing and help displays appropriate for each parameter
- Display and release of generated alarms (help displays appropriate to the cause and resolution method)
- Display of SERVOPACK data, such as I/O signals and the internal status, and product data
- Various setup functions such as those for the absolute encoder, and offset adjustment
- Graph displays for torque reference, speed feedback, and so on

1.2 Compatible Devices

SigmaWin100 is compatible with the following SERVOPACKs in the Σ-II series and in the Σ-II PLUS series.

- SGDM-□□□D
- SGDM-□□□DA
- SGDH-□□□E
- SGDP-□□□P
- SGDP-□□□PA
- SGDJ-□□□S
- SGDJ-□□□P

Note: Some SigmaWin100 functions may be unusable depending on the SERVOPACK type. Unusable functions will appear dimmed on the selection menu.

1.3 System Requirements

SigmaWin100 requires the following minimum system configuration.

Personal Computer (PC)	PC/AT DOS/V-compatible device * Operation cannot be assured on the NEC PC9821 series.
Processor	Pentium 133MHz
Main Memory	32MB (64MB recommended)
Free Hard Disk Space	50MB (100MB recommended at installation)
Monitor	Super VGA (800×600 or greater using a small font)
Number of Colors	256 colors (65536 colors recommended)
Operating System (OS)	• Windows 95 OSR2 or later (IE4.01 Service Pack 2 or later) • Windows 98 • Windows NT4.0 Service Pack 3 or later (IE4.01 Service Pack 2 or later) • Windows 2000 • Windows Me
Communication Cables for SERVOPACK to PC Connection	The JZSP-CMS02 (D-SUB 9-pin connector-compatible) cable is available from Yaskawa. Contact Yaskawa if necessary. For cable wiring, see Appendix A.
Other	One node or more RS-232C or RS-422A I/F CD-ROM drive (for installation only)

1.4 Installing SigmaWin100

To install SigmaWin100, run the setup file for SigmaWin100. And the installation process will begin. In this process, SigmaWin100 and the related files will be installed, or stored on the hard disk.

Operating conflicts may arise with the other programs during installation. Be sure to close all other programs before installing SigmaWin100.

Install the program using the following procedure.

NOTE

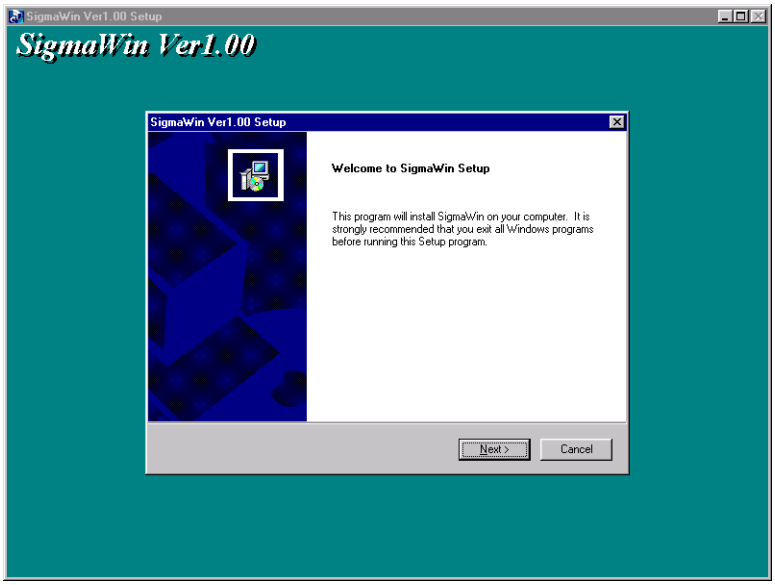
If the SigmaWin100 or the SigmaWin200 is already installed, the existing program is overwritten.

1. Insert the CD-ROM into the CD-ROM drive (the D-drive for example).
2. If "Autoplay" is enabled, the installation program will automatically start when the CD-ROM is inserted.

   If "Autoplay" is not enabled, either of the following methods may be used.

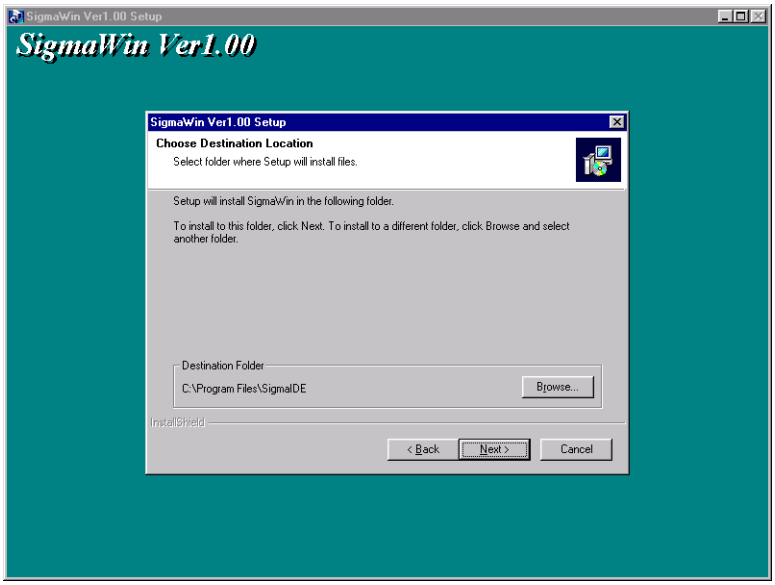
   - On the Start menu, select **Run**. Type "D:\SigmaWin\SETUP", and then click **OK**.
   - Open the Explorer, load the CD-ROM contents, and double click "D:\SigmaWin\SETUP.EXE".

A welcoming screen will appear as shown in the following figure, and the installation process will start.

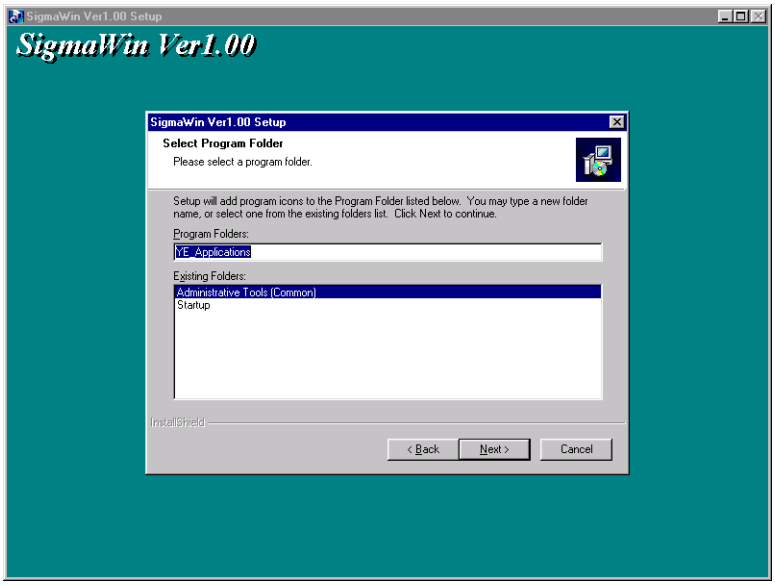


A message will appear, welcoming you to the SigmaWin program.

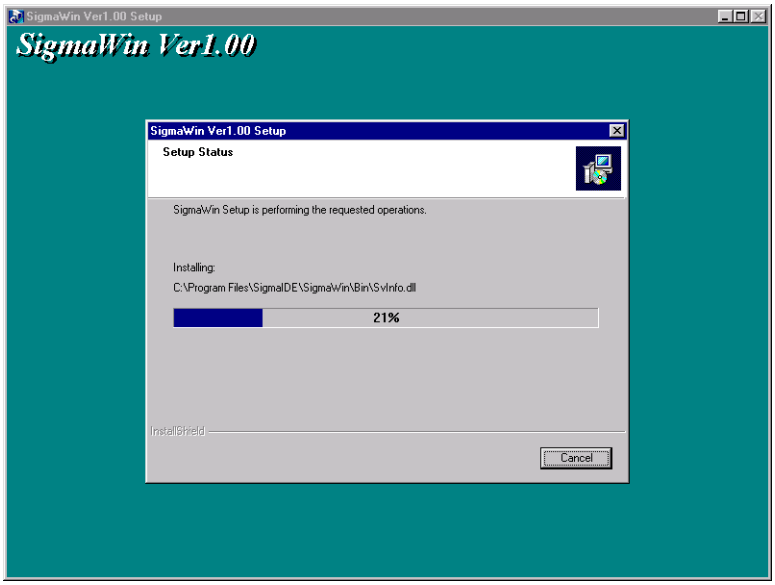
3. Click **Next** to continue.



4. Follow the onscreen instructions to choose a destination folder to copy the SigmaWin100 file to, and click **Next** to continue.



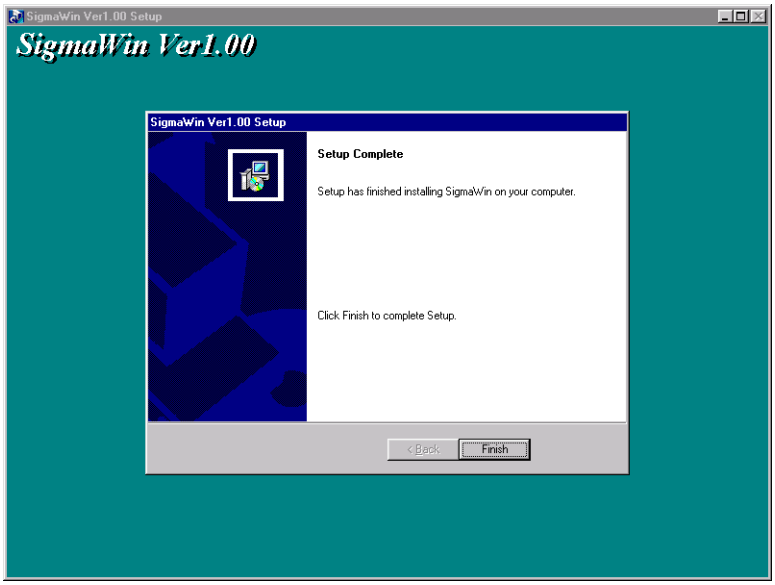
5. Select the program group to create the SigmaWin100 icon. "YE_Applications" is the default setting. After selecting the program group or folder, click **Next** to continue.



Then the PC files are copied from the CD-ROM. The percentage of the copying that has been completed is shown.

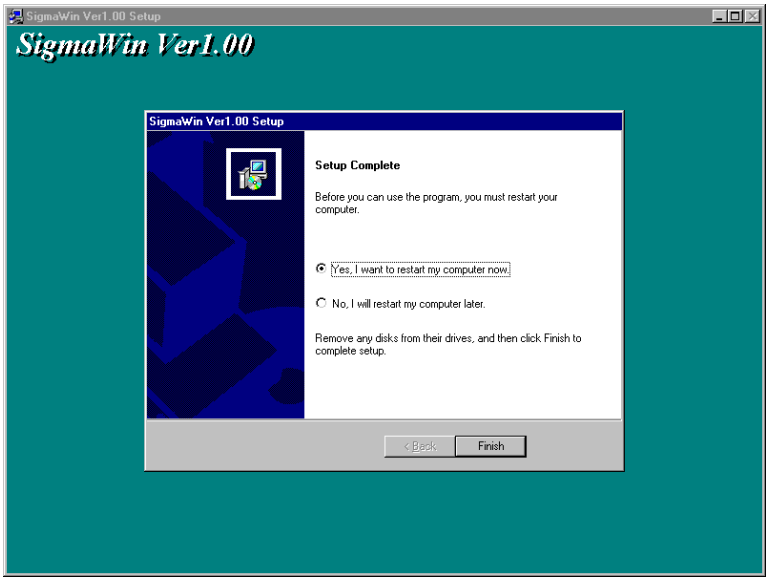
Note: If new versions of the PC support files are needed to install SigmaWin100, a window will appear asking whether to overwrite the current version or to cancel the installation. SigmaWin100 may not run correctly if the new versions of the support files are not installed.

If SigmaWin100 has been successfully installed, one of two dialog boxes is displayed.



(a)

6. If dialog box (a) is displayed, click **Finish** to complete the setup.



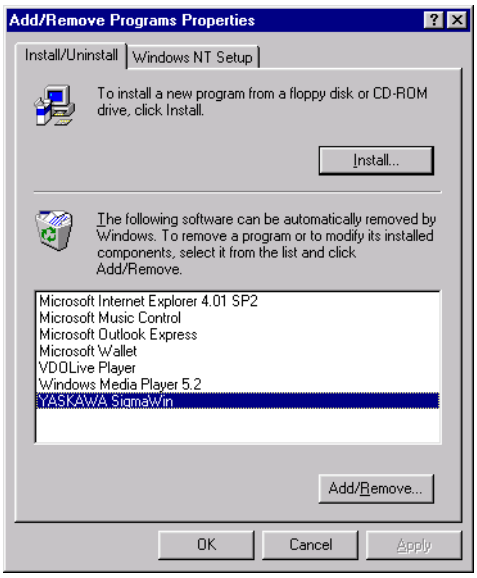
(b)

7. If dialog box (b) is displayed, select **Yes** when asked if you want to restart the computer and then click **Finish** to complete the setup.

1.5 Removing SigmaWin100

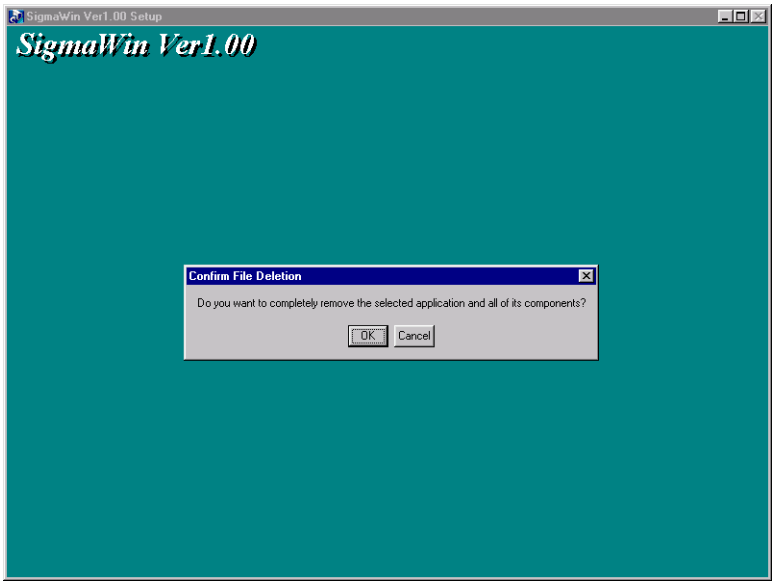
Remove the SigmaWin100 program using the following procedure.

1. Click the **Start** button, point to **Settings** and click **Control Panel**.
2. Click the **Add/Remove Programs** icon. The Add/Remove Programs Properties box appears.

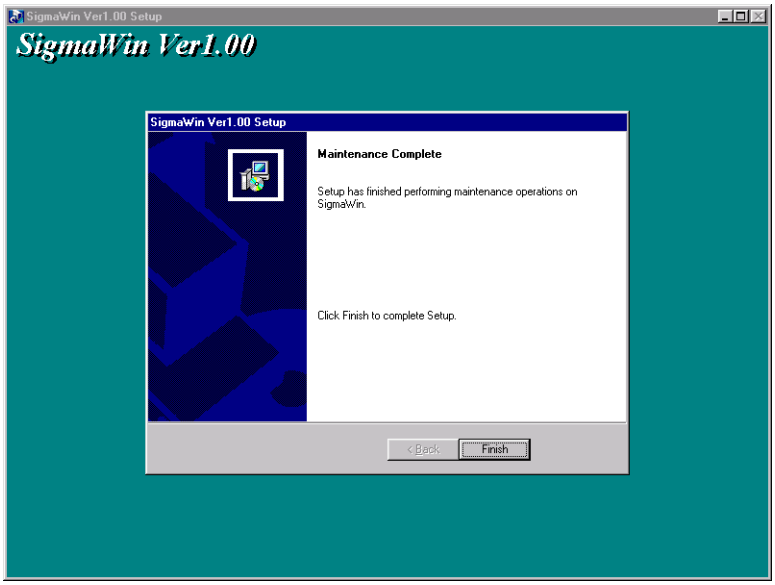


3. Click the Install/Uninstall tab if it is not already selected. Click **YASKAWA SigmaWin** as the program to be removed, and then click **Add/Remove**.

   A confirmation message will appear asking if you are sure you want to remove the program.



4. Click **OK** to start removing the program. When the program has been successfully removed, the following window will appear telling you that maintenance is complete.



5. Click **Finish** to complete the removal process.

2 Starting SigmaWin200

Start SigmaWin200 using the following method.

2.1 Starting SigmaWin200

Start SigmaWin200:

- from the Start menu
- from a shortcut

2.1.1 From the Start Menu

To start SigmaWin200 from the **Start** menu:

1. Click the **Start** button, and point to **Programs**.
2. Open the **YE_Applications** folder.
3. Click **SigmaWin**.

2.1.2 From a Shortcut

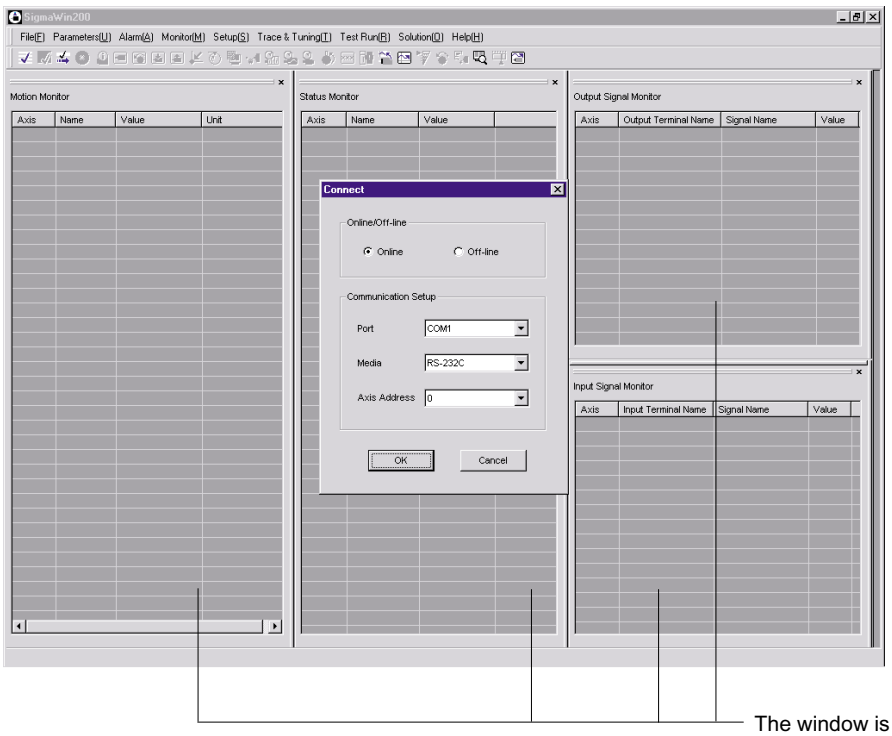
To start SigmaWin200 from a shortcut on the desktop:

1. Open the YE_Applications folder on the desktop.
2. Click **SigmaWin**.

SigmaWin200 Startup Screen

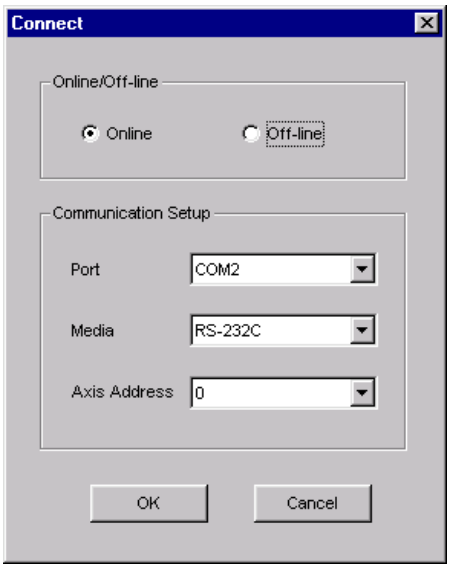
2.2 Connecting Communication Port

When SigmaWin200 is in initially started, the following screen appears.



The window is divided into four panes, one for each type of monitor. Individual panes can be closed. The panes that are open when you quit SigmaWin200 will still be open the next time SigmaWin200 is started.

Enter the settings for communications between SigmaWin200 and the SERVOPACK by means of a serial port.



Communications Settings

1. Select the method to set up the SERVOPACK: online or offline.

   Online: Select when setting up or tuning the servo drive with the SERVOPACK connected

   Off-line: Select when editing parameters or checking screens for tracing or mechanical analysis without the SERVOPACK connected

2. When **Online** is selected, enter the necessary settings for communication setup.

   Port (COM1 to COM8)

   Select the communications (COM) port. In the Port list, you can see a list of all the ports that your PC has.

   Media (RS-232C/RS-422A)

   Select the protocol suitable to the type of PC communications port.

   Select RS-422A when two or more SERVOPACKs are connected to a single serial port. See Appendix A for the connection method for multi-axis communications.

   Axis Address/Final Axis Address

   Select the axis addresses where the SERVOPACKs are set. When RS-422A is used, select the final axis address.

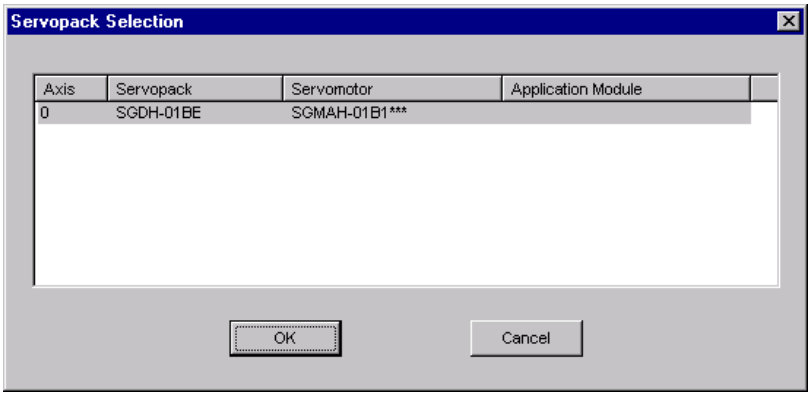
   Set the axis address in the SERVOPACK parameter Pn000.2.

3. When all the settings have been made, click **OK**.

   After the SERVOPACKs have been successfully connected to SigmaWin200, a list of the connected SERVOPACKs will appear on the screen.

2.3 Selecting a SERVOPACK

When SigmaWin200 is started, the SERVOPACKs that are connected will be scanned through the serial ports. The results of this scan will be displayed in the SERVOPACK Selection box.



SERVOPACK Selection Box

Note: When RS-232C is used, only one SERVOPACK will be displayed.

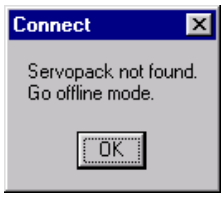
Use the following procedure to select the SERVOPACK to be connected.

Either select the SERVOPACK to be connected and then click **OK**, or just double-click the SERVOPACK to be connected.

Click **Cancel** to close the dialog box and the system will enter offline mode.

< If the SERVOPACK Selection Box is not Displayed >

If no SERVOPACK is found, the following message will appear, and the system will enter offline mode.



If the aforementioned message is displayed regardless of whether a SERVOPACK is connected or not, problems may occur in communications.

Check the following items if the SERVOPACK Selection box is not displayed:

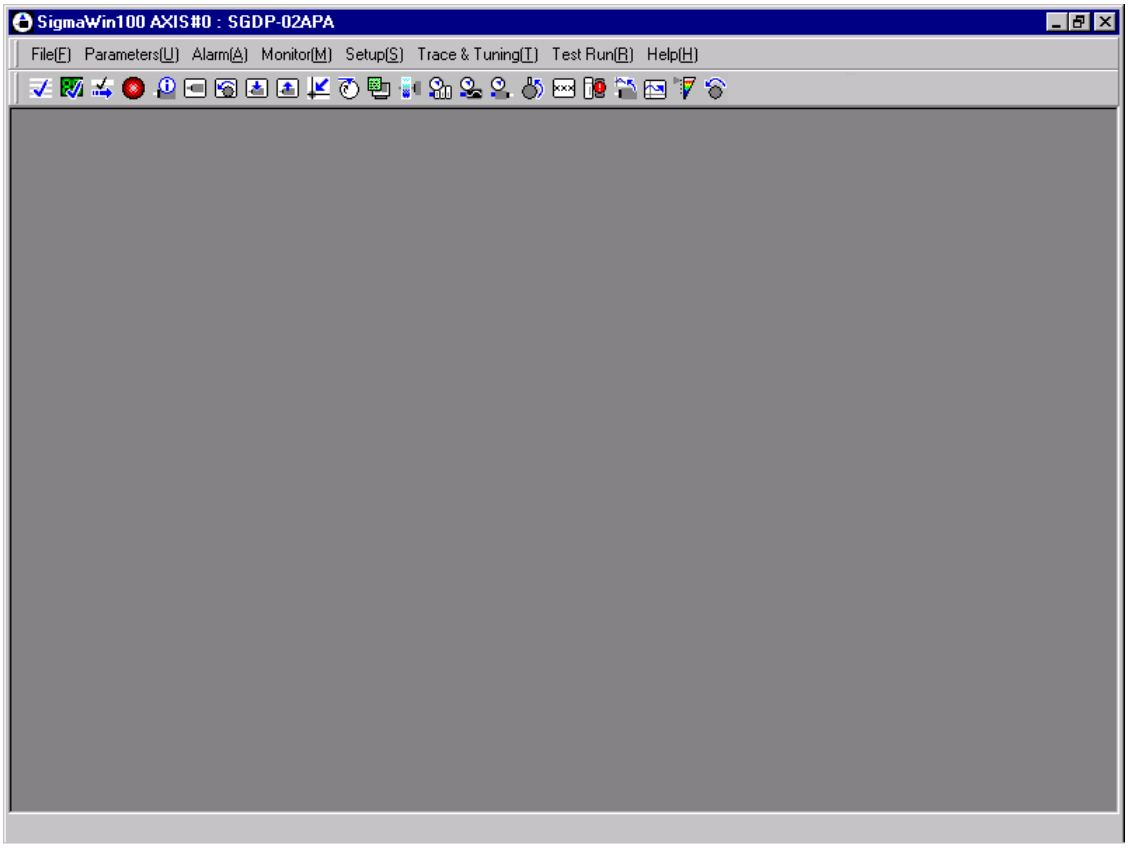
Check Item	Note
Is the power on?	
Are the connections loose?	Fasten all communication cable connectors securely.
Was the correct port selected?	Make sure that the port connected to the communication cable is the same as the port selected during connection.
Is the axis address correct?	<RS-232C: Single Axis Connection> Make sure the setting for the axis address in the SERVOPACK (2nd digit of Pn000) is the same as the axis address selected during connection. <RS-422A:Multi-axis Connection> Make sure that the axis address of the connected SERVOPACK: • Does not use "0" in the address. • Is not duplicated.
Is the RS-232C port enabled?	To save energy, it is possible to select the option of not feeding power to the RS-232C port in the PC. Check this setting. See the manual for the PC for details on how to select this function.
Is a battery being used to power the PC?	Problems in communications may occur if the PC is running on batteries. Use AC power.
Is the wiring correct?	Check the communication cable wiring. See Appendix A or the SERVOPACK user's manual for more information on the wiring.
Is the communication cable the recommended length?	Shorten the cable length as much as possible. Recommended Lengths of Communication Cables RS-232C: Maximum 2m RS-422A: Maximum 30m (total)

If the SERVOPACK selection box still does not appear even after checking the above items:
The SERVOPACK uses RS-422A specifications for standard communications. Sometimes the RS-232C cannot be used, depending on the type of PC.
Moreover, communication may be impossible due to external environmental influences such as noise.
Execute the following if communications cannot be performed even after verifying the aforementioned items:

- Use a different PC.
- If using RS-232C, change to an RS-422A connection.

3 SigmaWin100 Main Window

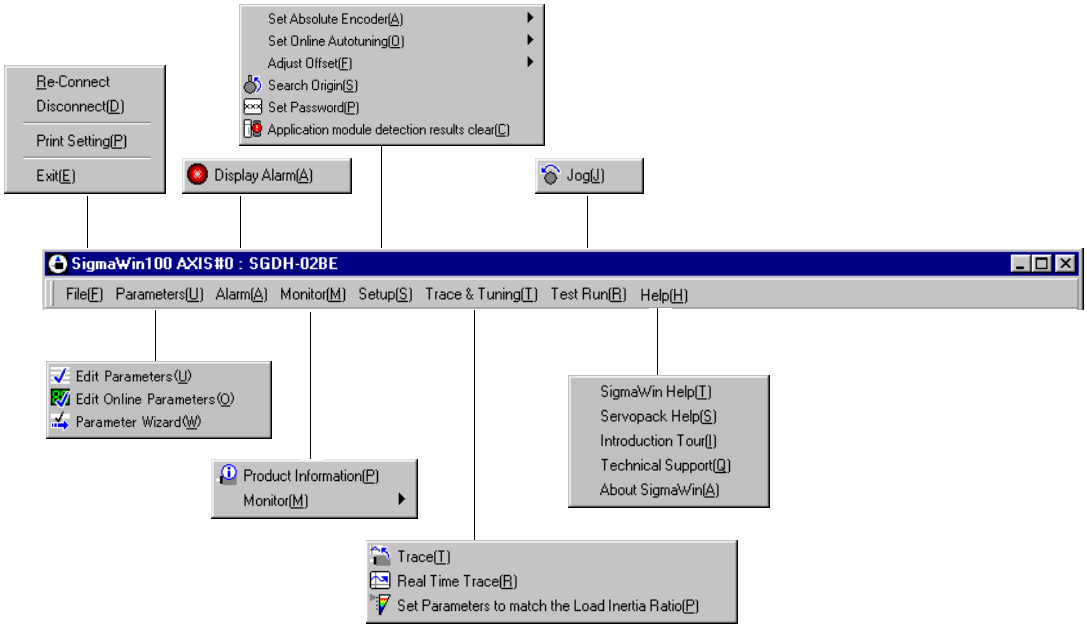
The SigmaWin100 main window has a menu bar and a toolbar as shown in the following figure.



SigmaWin100 Main Window

All application functions can be accessed from the menu bar or the toolbar.

■ Menu Bar and Menus



SigmaWin100 Menu Bar

File menu

Connect: Switches between Online and Offline modes or between the connected SERVOPACKs.

Disconnect: Switches to Offline mode.

Print Setting: Select your preferences for printing the information seen on the screen. See "Print Setting" for details on the setting method.

Exit: Quits SigmaWin100.

Help menu

SigmaWin Help: Displays a help window for SigmaWin.

SERVOPACK Help: Displays a help window for the SERVOPACK.

Introduction Tour: Introduces main functions of SigmaWin100.

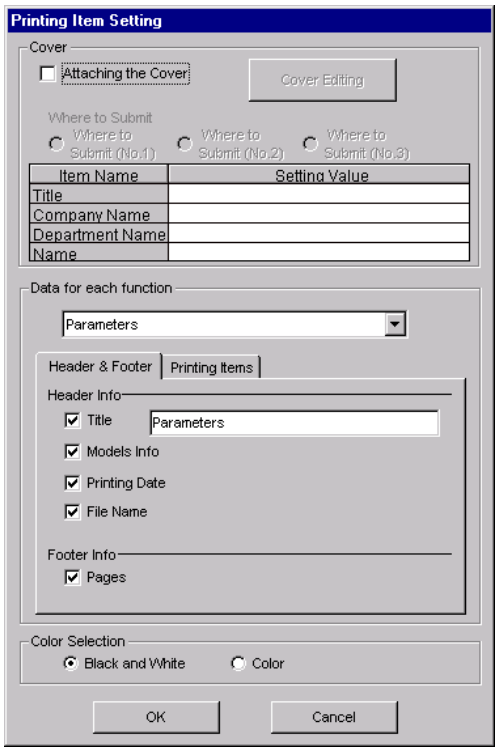
Technical Support: Lists local contacts.

About SigmaWin: Displays version information of SigmaWin100.

There are also function menus. For details, see Chapter 4.

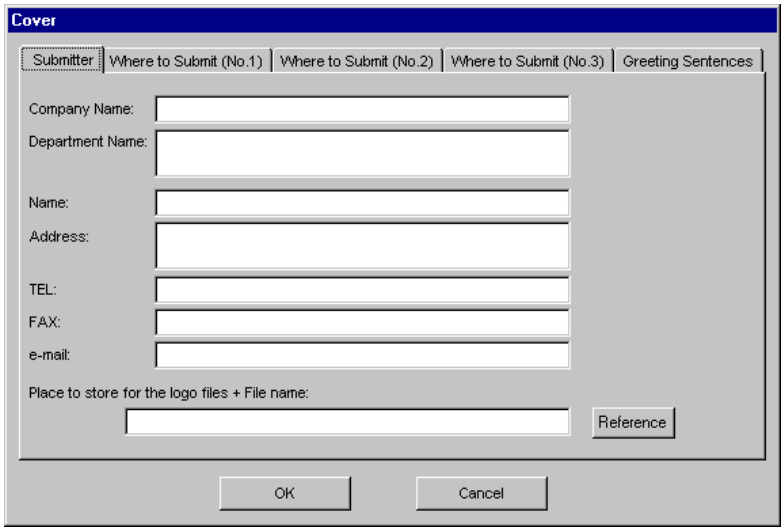
Print Setting

In the SigmaWin100 main window, click **File**, and then click **Print Setting**. The Printing Item Setting box appears.

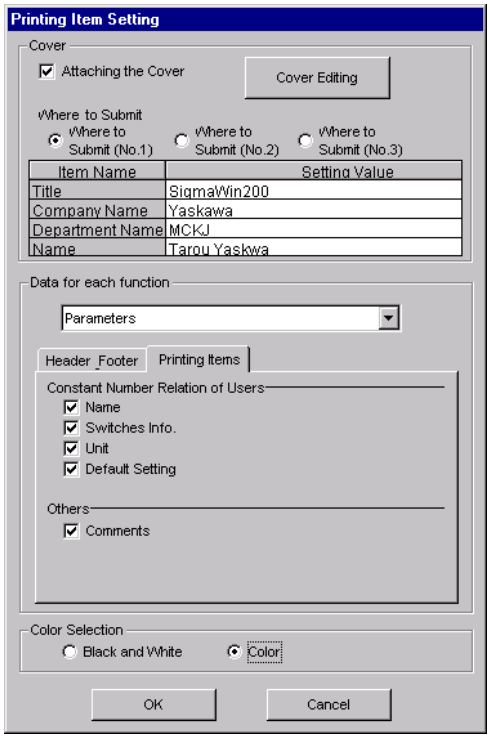


Cover

Select **Attaching the Cover**, and then click **Cover Editing**.

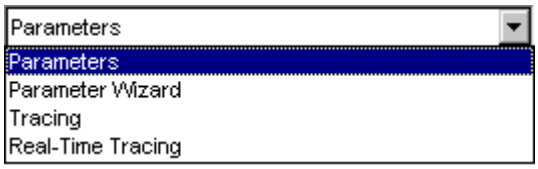


The Cover box appears, displaying the Submitter tab in front. Use the formatting options on the tabs to control the content of the cover, such as the greeting sentences and where to submit the information. After the setting is finished, click **OK**.

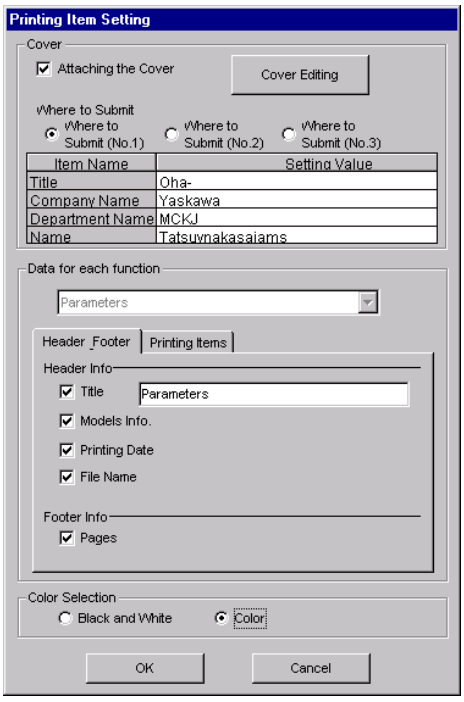


Data for each function

Depending on which one of the six functions you select, the items that you can print will differ.



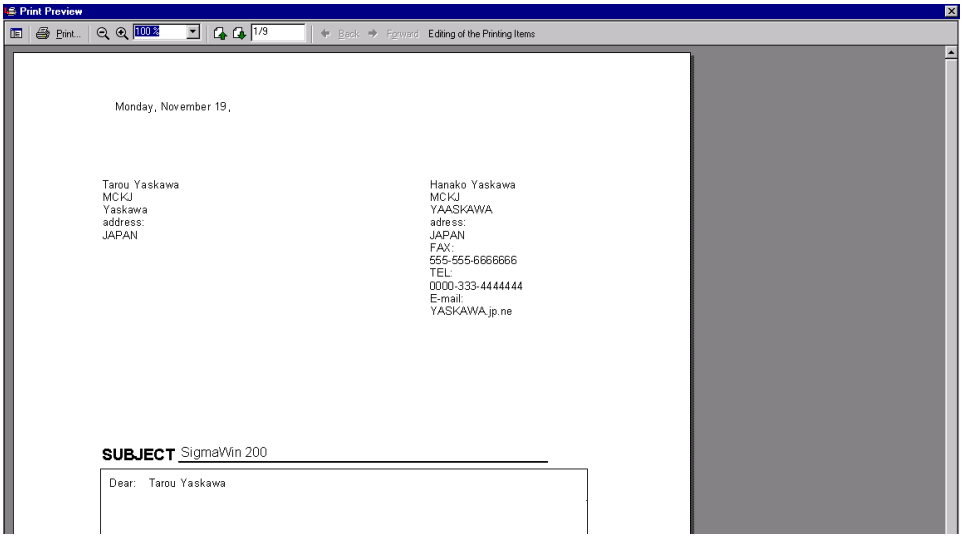
To enter your printing preferences or specifications, click the tab whose options you want to enter or change, and enter the desired settings.



Color Selection

Documents can be printed in color or black and white. Select your preference.

Click **OK**. The document appears on the screen the way it will appear in print.



To print the document as is without any changes, click **Print**.

To return to the Printing Item Setting box and change some settings, click **Editing of the Printing Items**.

■ Toolbar

Click an icon on the toolbar to directly select its corresponding function.

SigmaWin100 Toolbar

Toolbar Button	Function Name
	Parameter Editing
	Parameter Online Editing
	Parameter Wizard
	Alarm Display
	Product Information
	Status Monitor
	Motion Monitor
	Input Signal Monitor
	Output Signal Monitor
	Absolute Encoder Reset
	Multi-Turn Limit Setting
	Rigidity Setting
	Save Inertia Ratio Setting
	Speed/Torque Reference Offset Adjustment
	Analog Monitor Output Adjustment
	Motor Current Detection Offset Adjustment

Toolbar Button	Function Name
	Origin Search
	Password Setting
	Application Module Detection Results Clear
	Trace
	Real Time Trace
	Automatic Parameter Setting to Match Load Inertia Ratio
	JOG Operation

4 Operation

4.1 Editing Parameters

The following three methods exist for editing parameters.

- Using the Parameter Editing window
- Using the Online Parameter Editing window
- Using the Parameter Wizard window

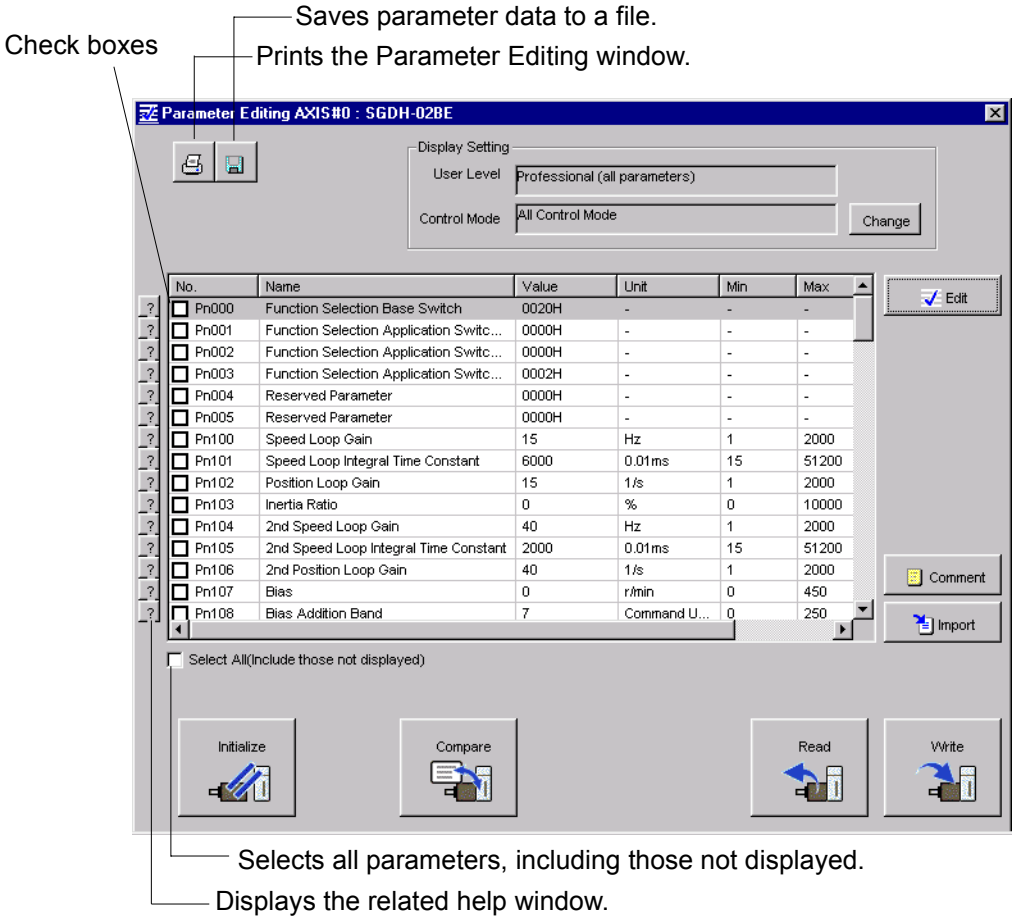
4.1.1 Editing Parameters

Parameters can be displayed or edited in the Parameter Editing window.

The windows differ in the Online and Offline modes.

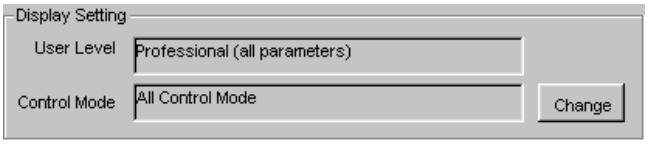
Parameter Editing when Online

In the SigmaWin100 main window, click **Parameters** and then click **Edit Parameters**. The Parameter Editing window for the online mode appears.

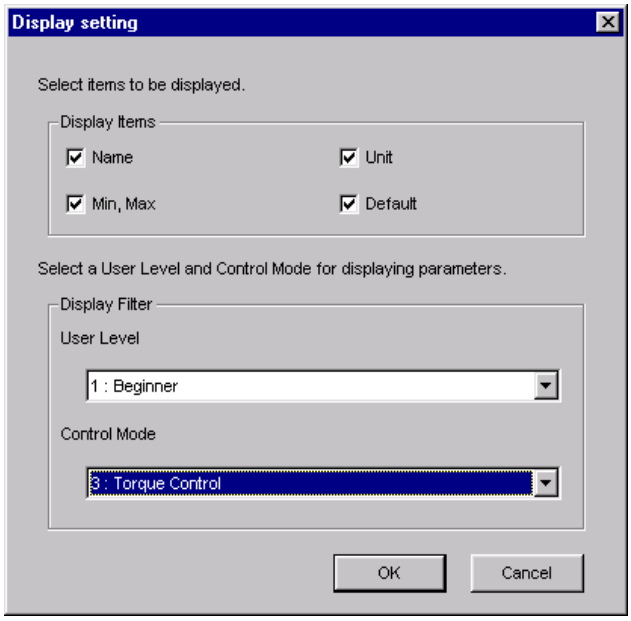


Parameter Editing Window (Online Mode)

Display Setting



Click **Change** to view the Display setting box. Select the information to be displayed, the user level, and the control mode.



Display Setting Box

Display Items

Select the information to be displayed.

Display Filter

The number of parameters displayed is determined by the user level and the control mode.

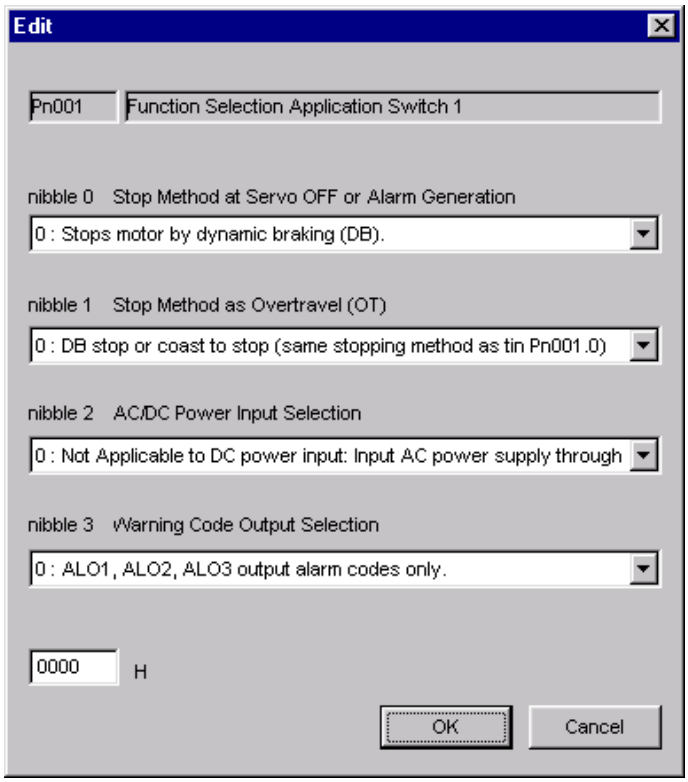
User Level: Beginner
Expert
Professional (all parameters)

Control Mode: 13 modes

Click **OK** to save the changes in the display settings and to return to the Parameter Editing window. Click **Cancel** to return to the Parameter Editing window without changing the display settings.

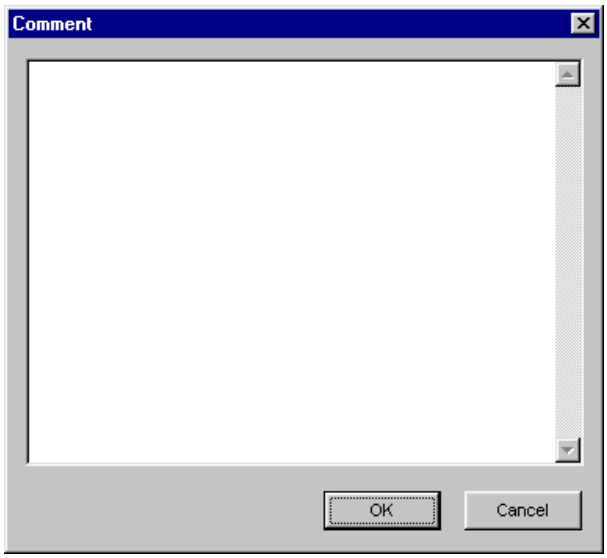
Edit

The selected parameter can be viewed and then changed in the Edit box. The Edit box differs according to the parameter selected. Click **Edit**, and the Edit box appears.



Comment

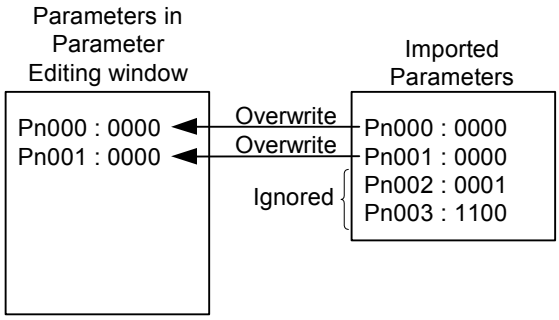
Comments can be typed or edited in the Comment box. Click **Comment**, and the Comment box appears.



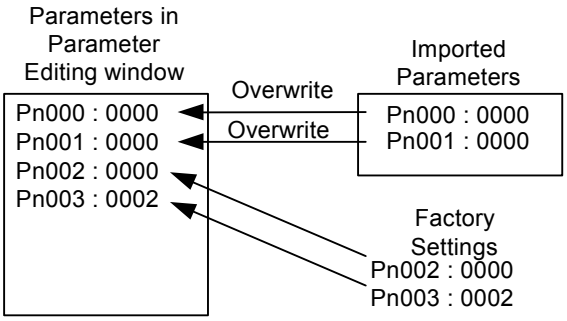
Import

Parameter settings can be transferred or imported from a stored file with the Import function. If the imported parameters differ in number from the on-screen parameters (including parameters not currently displayed), the following processing takes place.

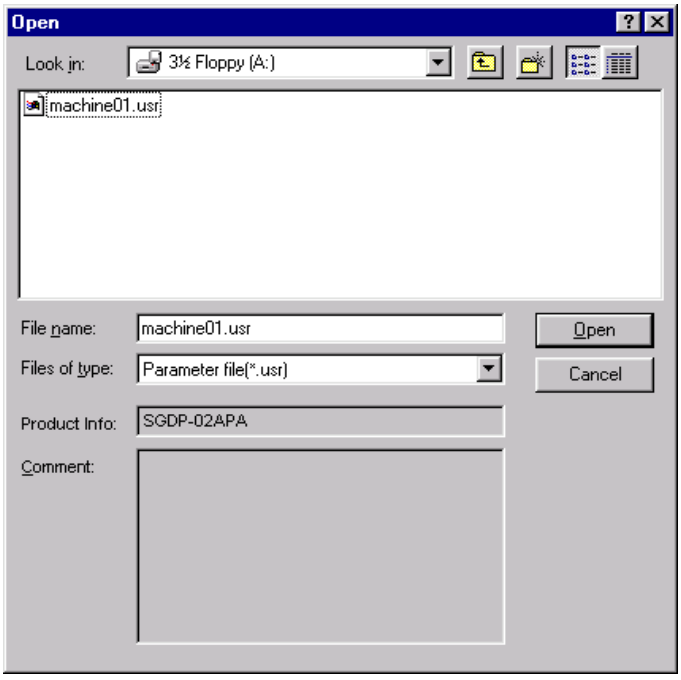
- If the number of imported parameters is greater



- If the number of imported parameters is fewer



1. Click **Import**, and the Open box appears.

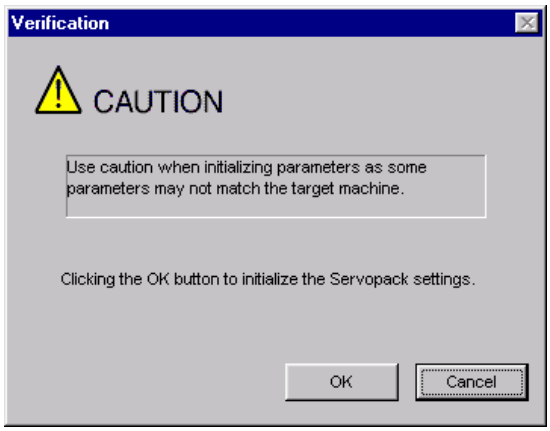


2. Select the file to be transferred, and click **Open**.

Initialize

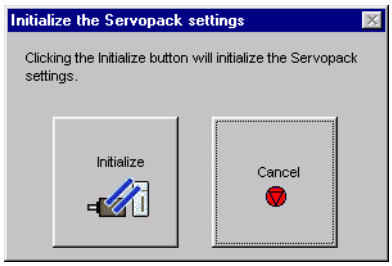
The settings of the SERVOPACK can be returned to the factory settings with the Initialize function. Return to the initial settings using the following procedure.

1. Click **Initialize**, and the Verification box appears.



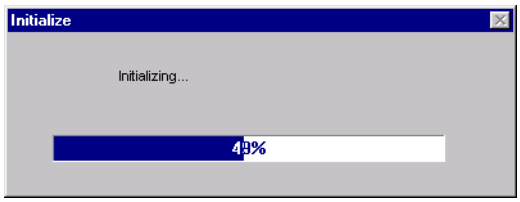
   Click **Cancel** to return to the main window without changing the SERVOPACK settings.

2. Click **OK**, and the dialog box to initialize the SERVOPACK settings appears.

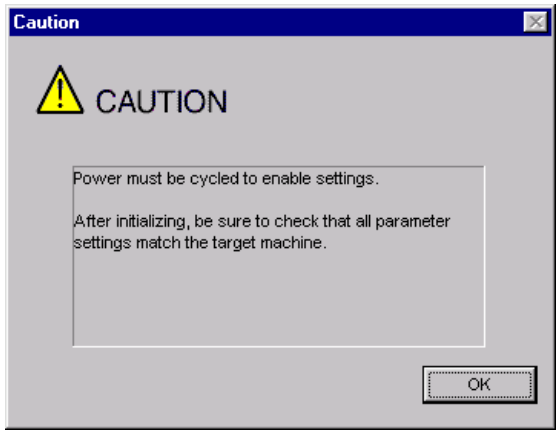


   Click **Cancel** to return to the main window without changing the SERVOPACK settings.

3. Click **OK** to start initialization, and the percentage of the progress completed is shown.



When the settings are successfully initialized, you will be prompted to verify that all parameter settings are correct for the target machine.

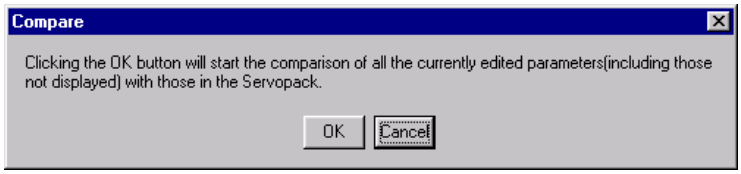


4. Click **OK**.

Compare

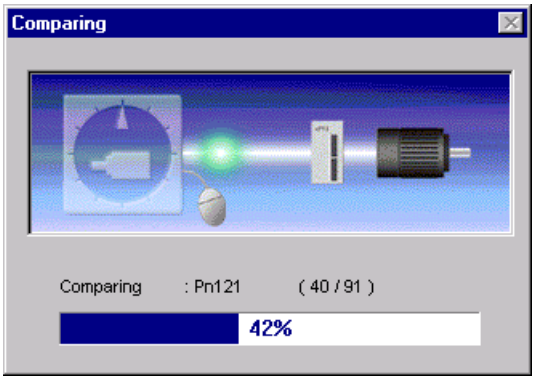
The edited parameter settings can be compared with the values in the SERVOPACK for all parameters, including those not displayed, with the Compare function. Check the settings using the following procedure.

1. Click **Compare** and a message appears, comfirming if you want to compare all parameter settings.

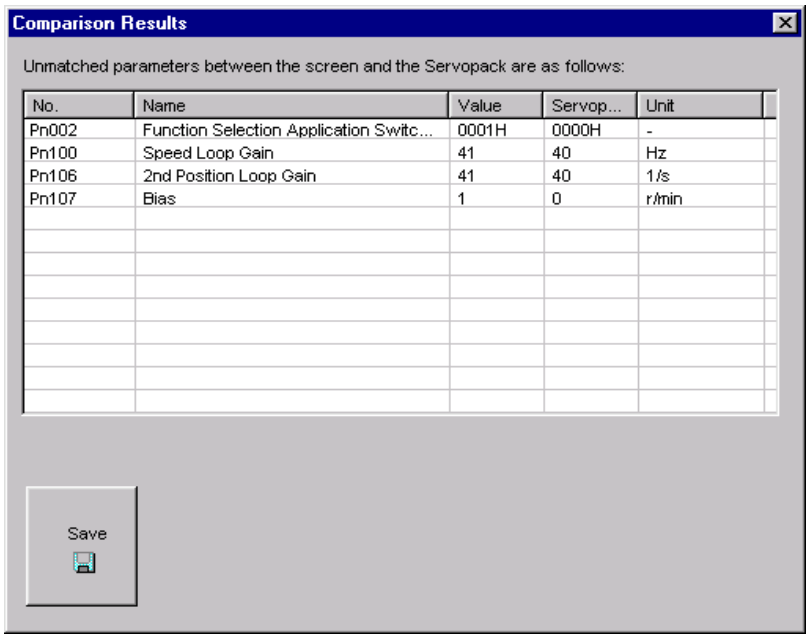


   Click **Cancel** to return to the main window without comparing the settings.

2. Click **OK** to start the comparison, and the percentage of the progress completed is shown.



When the comparison has been successfully completed, the Comparison Results box appears.



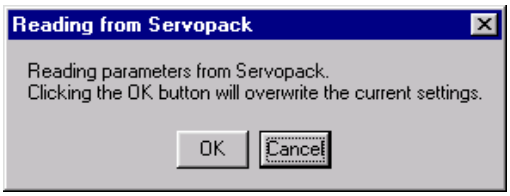
3. Click **Save** to save the results of the comparison.

Read

Selected parameter settings from the SERVOPACK can be read and then changed by overwriting them with the Read function. Select the check boxes of the parameters to be read. Click the **Select All (including those not-displayed)** button to select all the parameters to be read, including those not currently displayed.

Read the parameters using the following procedure.

1. Click **Read** and a message appears, confirming if you want to read the parameter settings.



   Click **Cancel** to return to the main window without reading the settings.

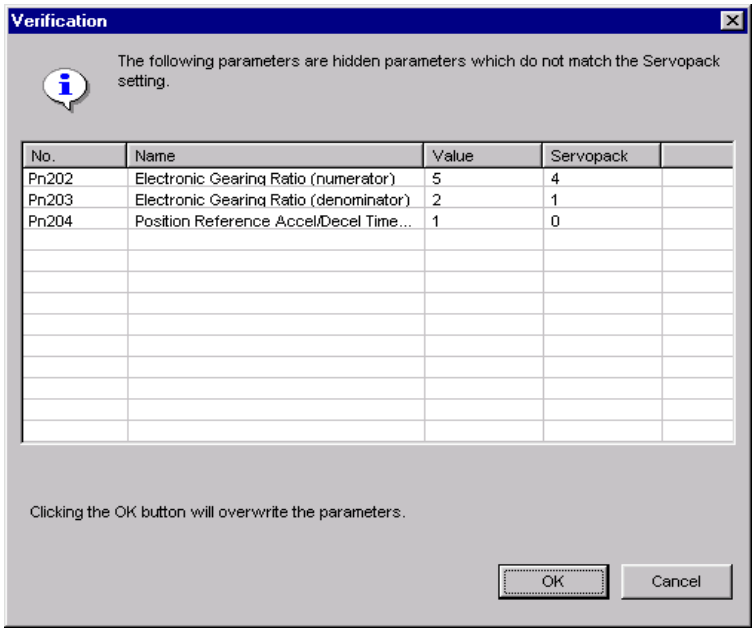
2. Click **OK** to start reading and overwriting the settings.

Write

Selected parameter settings can be saved with the Write function. Select the check boxes of the parameters to be saved. Click the **Select All (including those not-displayed)** button to select all the parameters to be saved, including those not currently displayed. Save the settings if the parameters using the following procedure.

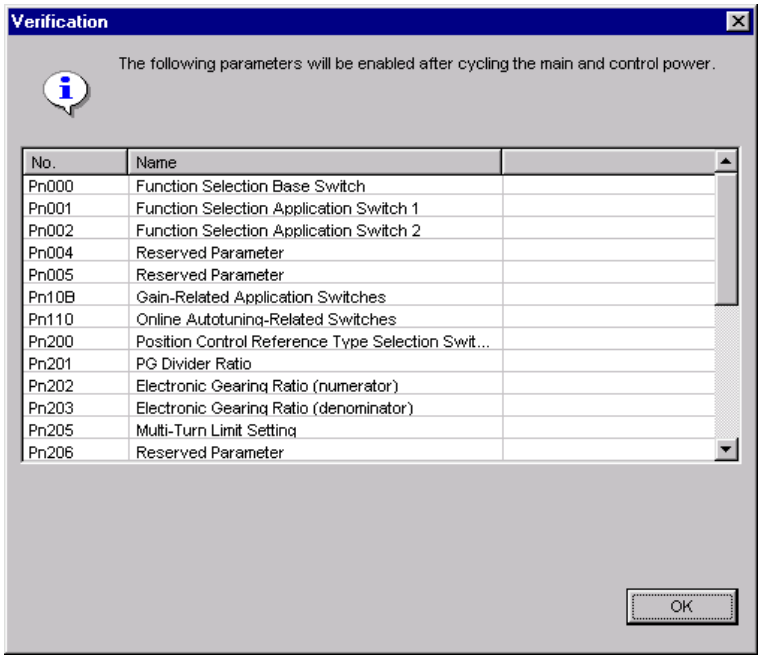
1. Click **Write** to save the parameter settings.

   A Verification box asking you to confirm overwriting will be displayed when the settings of the non-displayed parameters differ from the settings of the current SERVOPACK.



   Click **OK** to continue and overwrite the previous settings. Click **Cancel** to return to the main window without overwriting the parameters.

2. A Verification box listing the saved parameters will be displayed after they have been successfully saved.

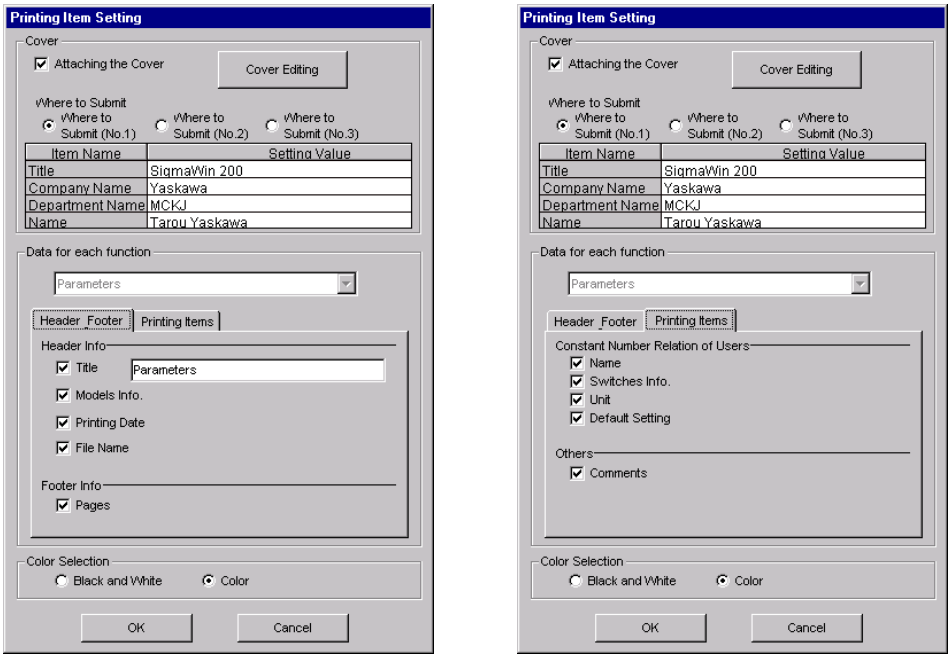


3. Click **OK**, and restart the SERVOPACK.
   The new settings will now be valid.

(Print) Button

The data on the Parameter Editing window can be printed.

Click the button, and the Printing Item Setting box appears.



Header Footer Tab　　Printing Items Tab

Printing Item Setting Box

Cover

Select **Attaching the Cover**, and the click **Cover Editing**. For details, see Chapter 4.

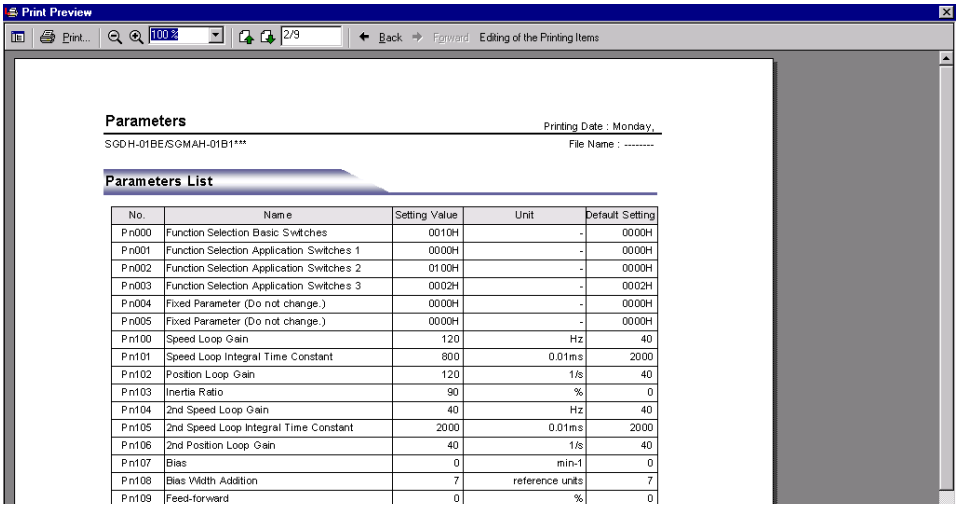
Data for each function

To enter your printing preferences or specifications, click the tab whose options you want to enter or change, and enter the desired settings.

Color Selection

Documents can be printed in color or black and white. Select your preference.

After setting is finished, click **OK**. The document appears on the screen the way it will appear in print.



No.	Name	Setting Value	Unit	Default Setting
Pn000	Function Selection Basic Switches	0010H	-	0000H
Pn001	Function Selection Application Switches 1	0000H	-	0000H
Pn002	Function Selection Application Switches 2	0100H	-	0000H
Pn003	Function Selection Application Switches 3	0002H	-	0002H
Pn004	Fixed Parameter (Do not change.)	0000H	-	0000H
Pn005	Fixed Parameter (Do not change.)	0000H	-	0000H
Pn100	Speed Loop Gain	120	Hz	40
Pn101	Speed Loop Integral Time Constant	800	0.01ms	2000
Pn102	Position Loop Gain	120	1/s	40
Pn103	Inertia Ratio	90	%	0
Pn104	2nd Speed Loop Gain	40	Hz	40
Pn105	2nd Speed Loop Integral Time Constant	2000	0.01ms	2000
Pn106	2nd Position Loop Gain	40	1/s	40
Pn107	Bias	0	min-1	0
Pn108	Bias Width Addition	7	reference units	7
Pn109	Feed-forward	0	%	0

To print the document as is without any changes, click **Print**.

To return to the Printing Item Setting box and change some settings, click **Editing of the Printing Items**.

Parameter Editing when Offline

In the SigmaWin100 main window, click **Parameters** and then click **Edit Parameters**. The Edit Parameters box appears.

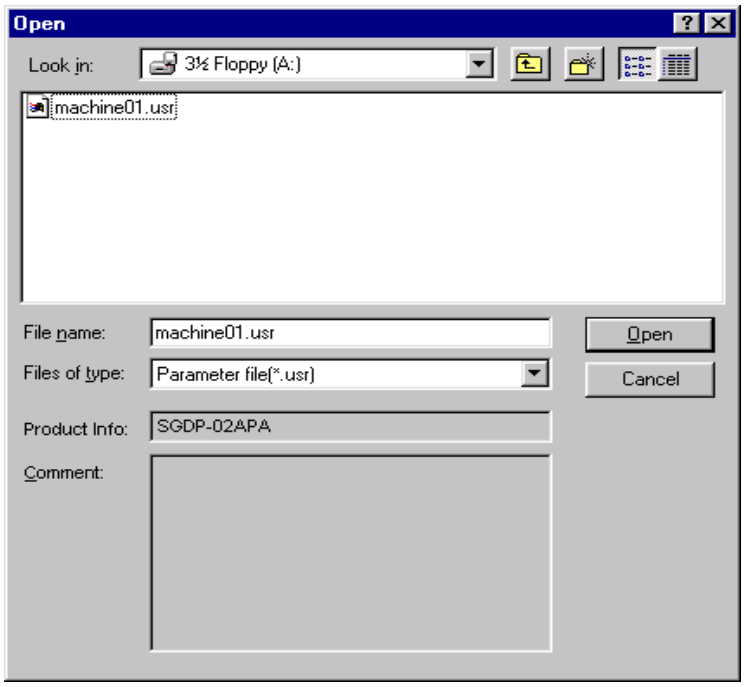
Load From File: Reads in existing parameters.

Select New SERVOPACK: Creates new settings for parameters.

Select the desired command and click **OK**.

< When "Load from File" is Selected >

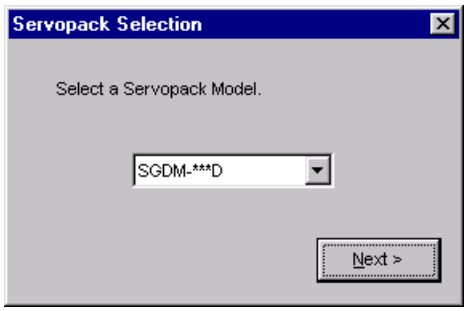
When “Load from File” is selected, the Open box appears.



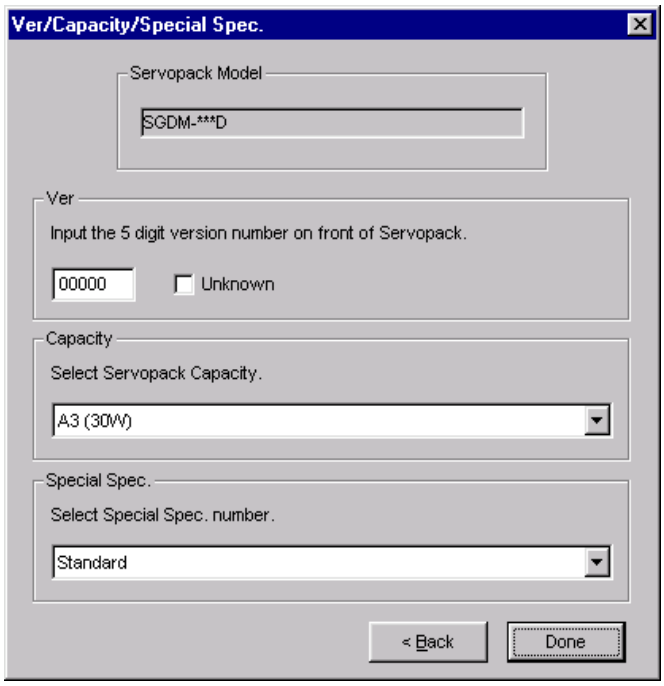
Select the file to be imported, and click **Open**.

< When "Select New SERVOPACK" is Selected >

When “Select New SERVOPACK” is selected, the SERVOPACK Selection box appears.

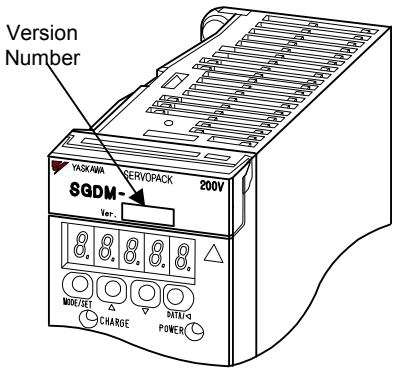


Select the model of SERVOPACK, and click **Next** to continue.

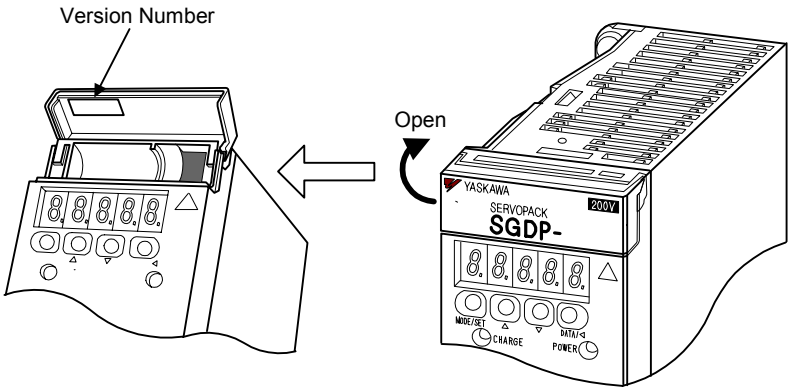


Ver.

Type the version number of the SERVOPACK. The location of the version number varies according to the type of SERVOPACK.

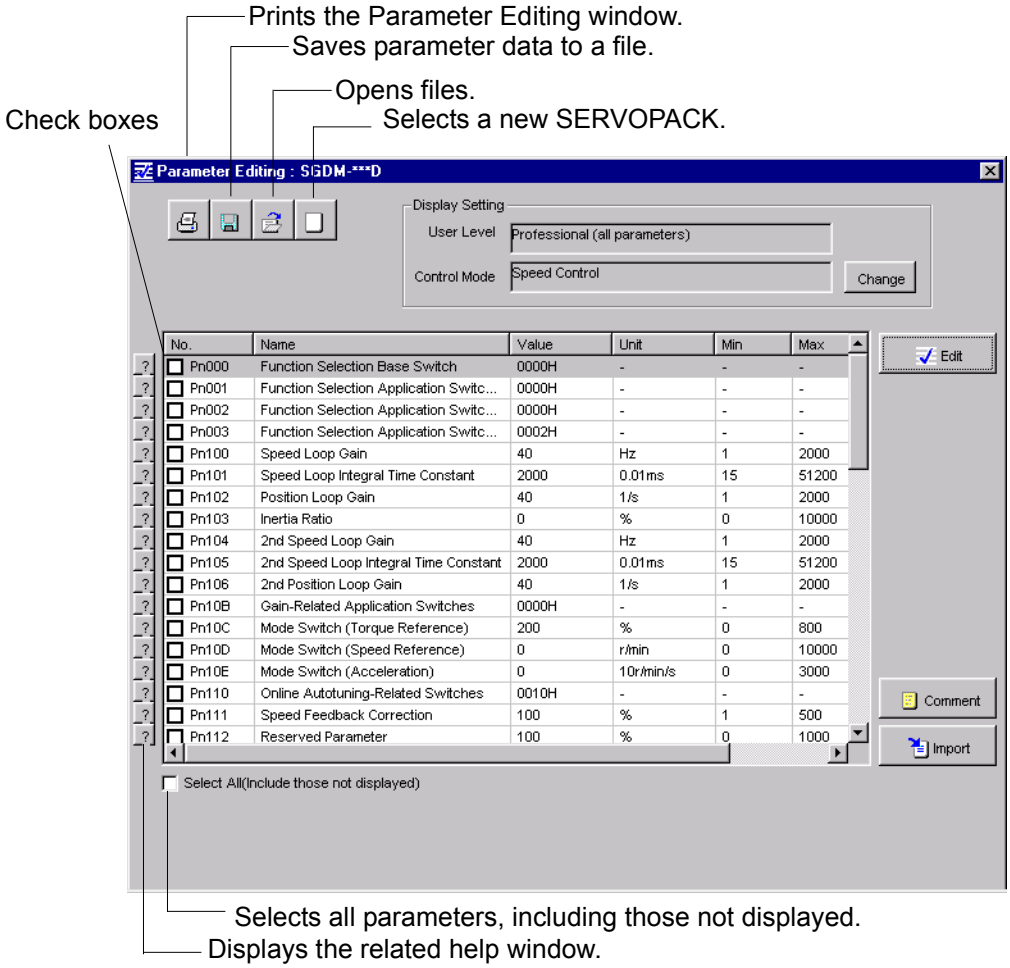


Version Number on SGDM and SGDH



Version Number on SGDP

Select the particular types and capacities, and then click **Done**. The data will be imported, and the Parameter Editing window will appear.

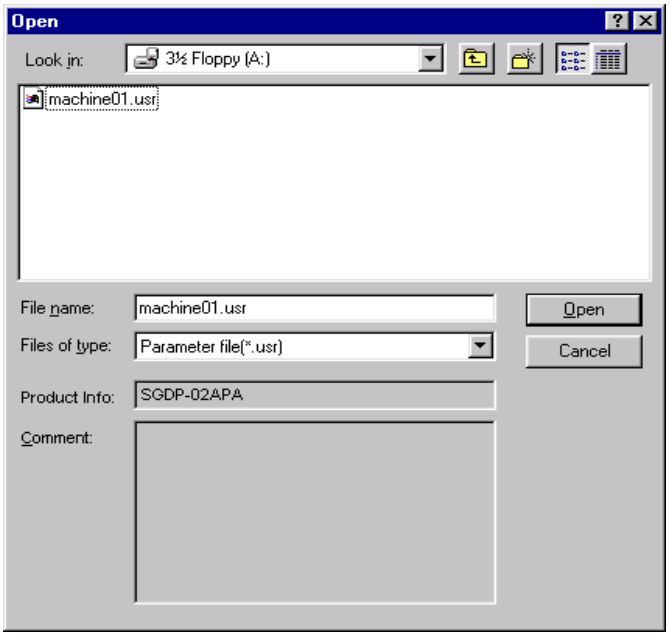


Parameter Editing Window (Offline Mode)

(Open) Button

The parameters file can be loaded in the Open box. To load the file, use the following procedure.

1. Click the button, and the Open box appears.

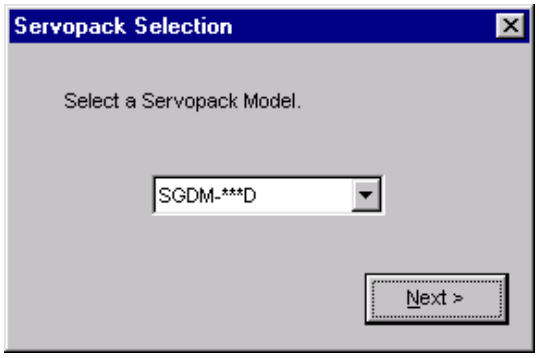


2. Select the name of the parameter file to be imported, and click **Open**.

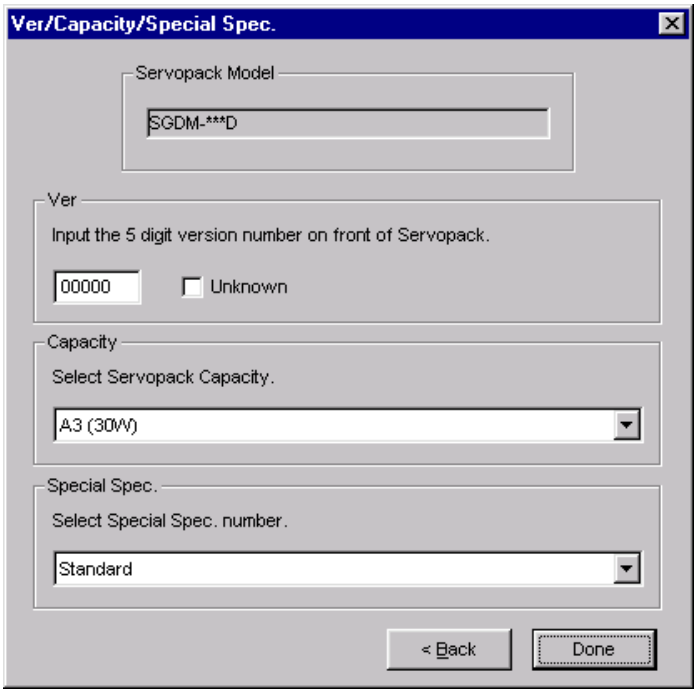
(New) Button

A new SERVOPACK can be selected in the SERVOPACK Selection box using the New command. To change to a different SERVOPACK, use the following procedure.

Click the button, and the SERVOPACK Selection box appears.

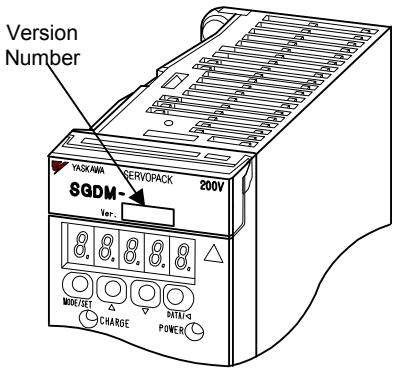


Select the model of SERVOPACK and click **Next** to continue.

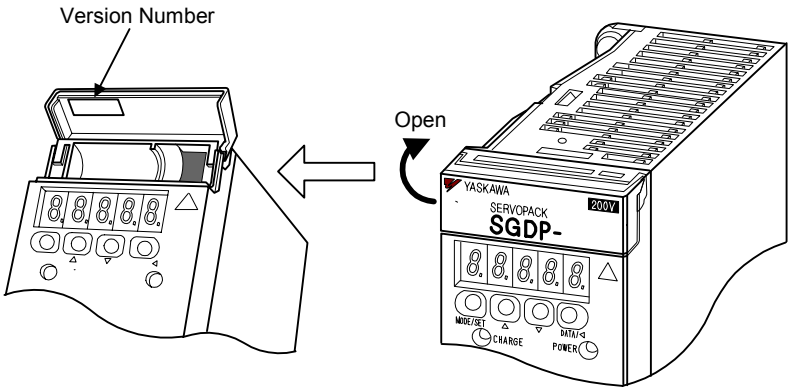


Ver.

Type the version number of the SERVOPACK. The location of the version number varies according to the type of SERVOPACK.



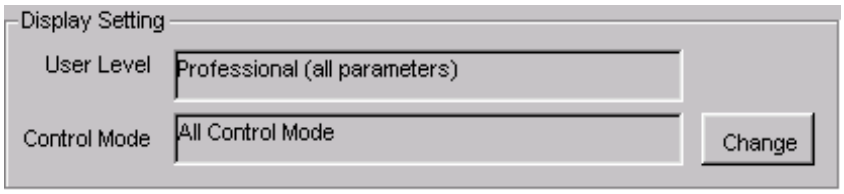
Version Number on SGDM and SGDH



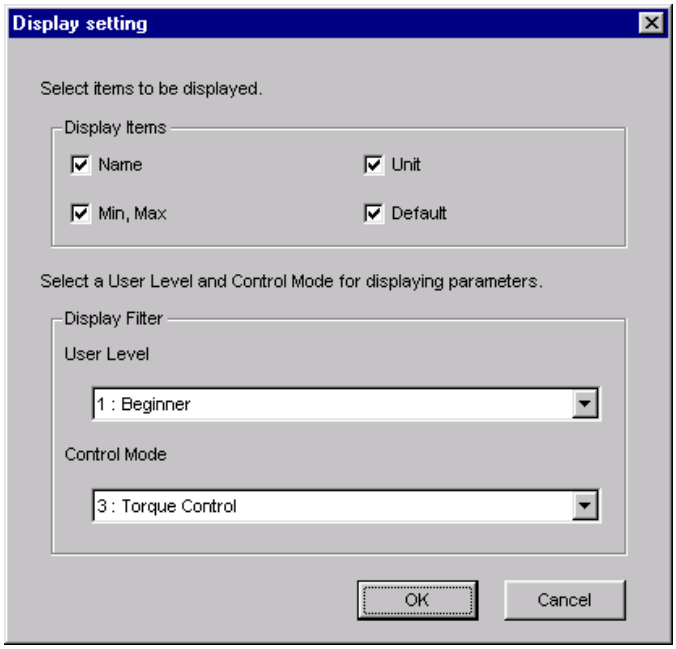
Version Number on SGDP

Select the particular types and capacities, and then click **Done**. The data will be imported, and the Parameter Editing window will appear.

Display Setting



Click **Change** to view the Display setting box. Select the information to be displayed, the user level, and the control mode.



Display Setting Screen

Display Items

Select the information to be displayed.

Display Filter

The number of parameters displayed is determined by the user level and the control mode.

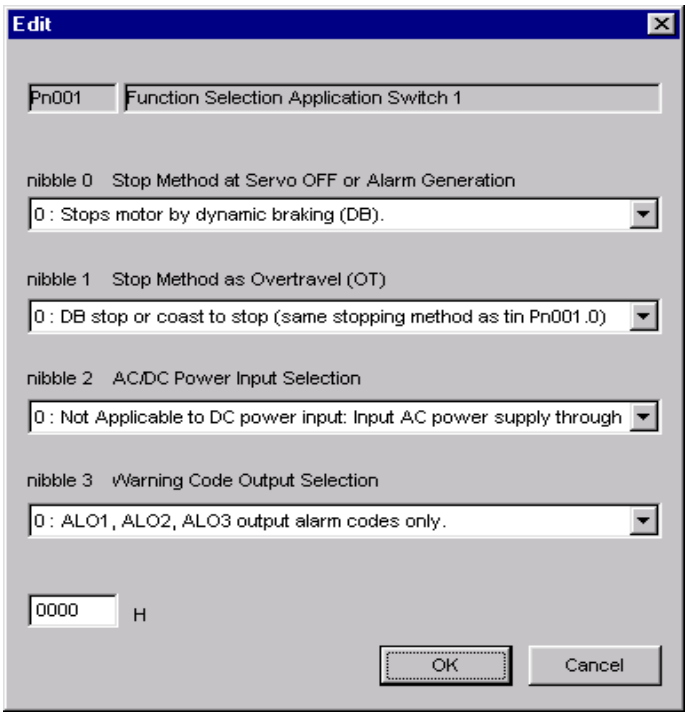
User Level: Beginner
Expert
Professional (all parameters)

Control Mode: 13 modes

Click **OK** to save the changes in the display settings and to return to the Parameter Editing window. Click **Cancel** to return to the Parameter Editing window without changing the display settings.

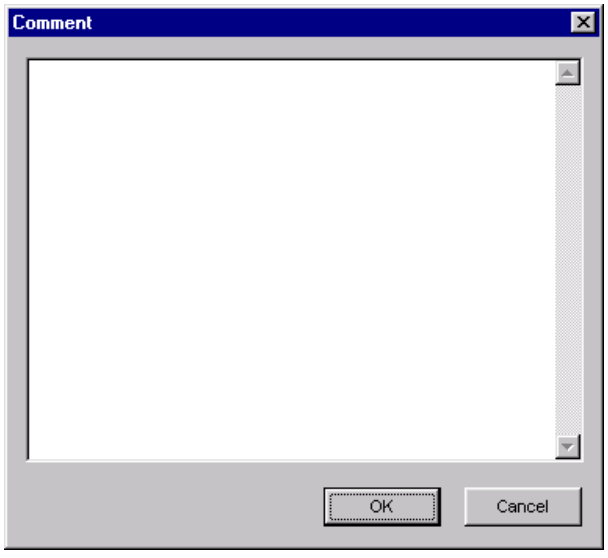
Edit

The selected parameter can be viewed and then changed in the Edit box. The Edit box differs according to the parameter selected. Click **Edit**, and the Edit box appears.



Comment

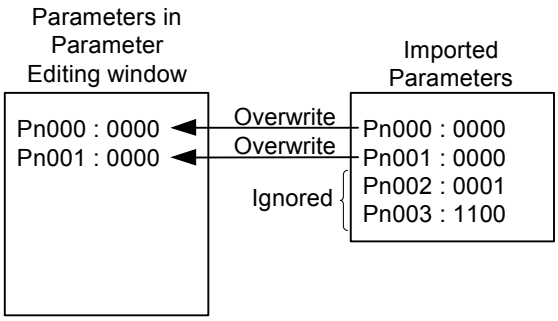
Comments can be typed or edited in the Comment box. Click **Comment**, and the Comment box appears.



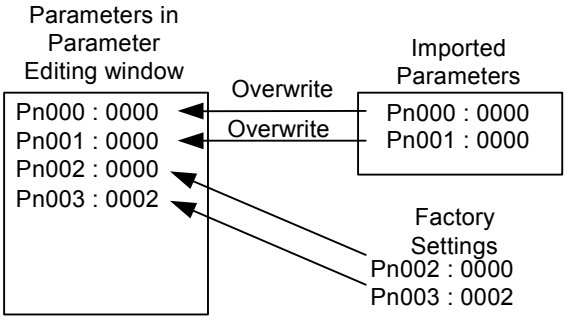
Import

Parameter settings can be transferred or imported from a stored file with the Import function. If the imported parameters differ in number from the on-screen parameters (including parameters not currently displayed), the following processing takes place.

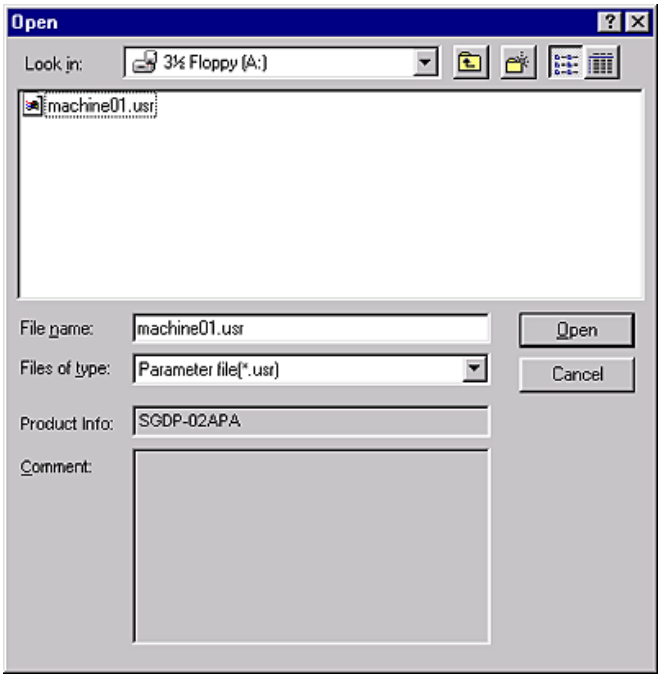
- If the number of imported parameters is greater



- If the imported parameters is fewer



1. Click **Import**, and the Open box appears

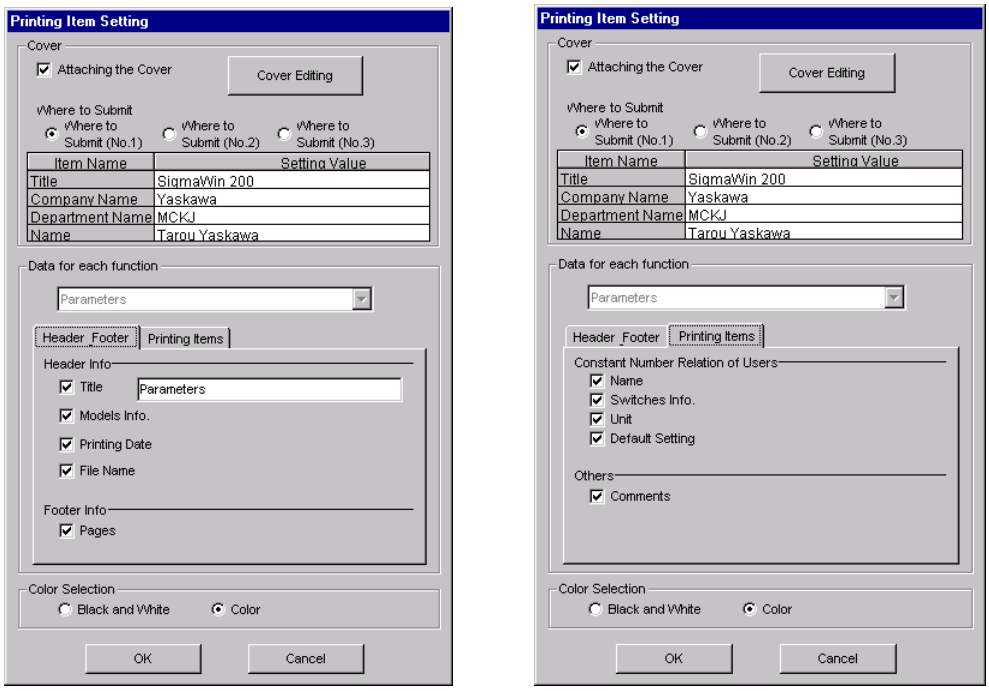


2. Select the file to be transferred, and click **Open**.

(Print) Button

The data on the Parameter Editing window can be printed.

Click the button, and the Printing Item Setting box appears



Header Footer Tab Printing Items Tab

Printing Item Setting Box

Cover

Select **Attaching the Cover**, and the click **Cover Editing**. For details, see Chapter 4.

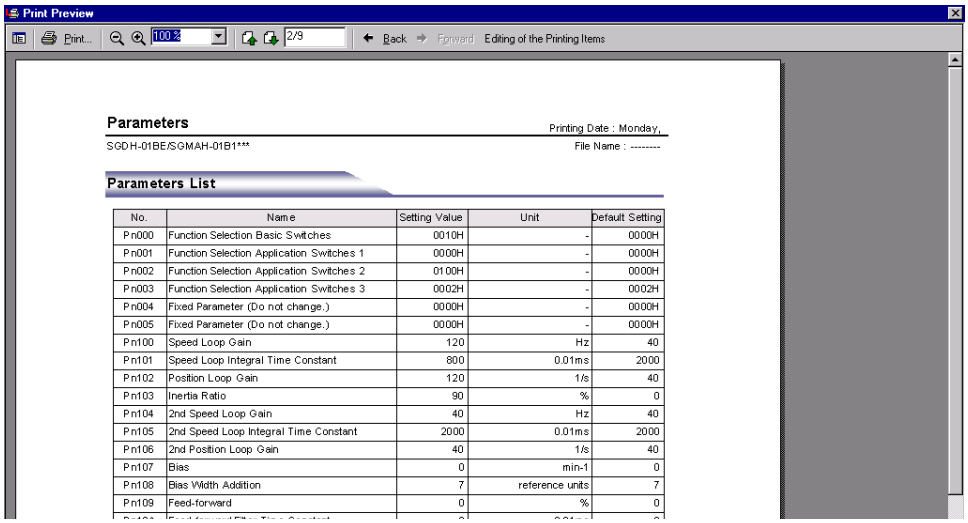
Data for each function

To enter your printing preferences or specifications, click the tab whose options you want to enter or change, and enter the desired settings.

Color Selection

Documents can be printed in color or black and white. Select your preference.

After setting is finished, click **OK**. The document appears on the screen the way it will appear in print.



No.	Name	Setting Value	Unit	Default Setting
Pn000	Function Selection Basic Switches	0010H	-	0000H
Pn001	Function Selection Application Switches 1	0000H	-	0000H
Pn002	Function Selection Application Switches 2	0100H	-	0000H
Pn003	Function Selection Application Switches 3	0002H	-	0002H
Pn004	Fixed Parameter (Do not change.)	0000H	-	0000H
Pn005	Fixed Parameter (Do not change.)	0000H	-	0000H
Pn100	Speed Loop Gain	120	Hz	40
Pn101	Speed Loop Integral Time Constant	800	0.01ms	2000
Pn102	Position Loop Gain	120	1/s	40
Pn103	Inertia Ratio	90	%	0
Pn104	2nd Speed Loop Gain	40	Hz	40
Pn105	2nd Speed Loop Integral Time Constant	2000	0.01ms	2000
Pn106	2nd Position Loop Gain	40	1/s	40
Pn107	Bias	0	min-1	0
Pn108	Bias Width Addition	7	reference units	7
Pn109	Feed-forward	0	%	0

To print the document as is without any changes, click **Print**.

To return to the Printing Item Setting box and change some settings, click **Editing of the Printing Items**.

4.1.2 Editing Parameters Online

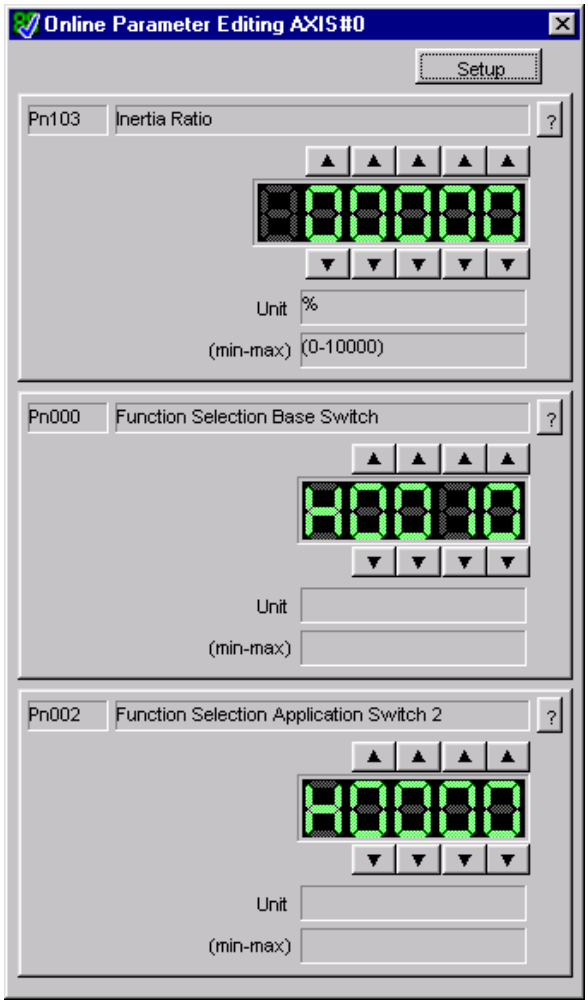
Parameters can be viewed or edited in the Online Parameter Editing window.

NOTE

Values edited in the Online Parameter Editing box are also immediately changed in the SERVOPACK.

Edit parameters online using the following procedure.

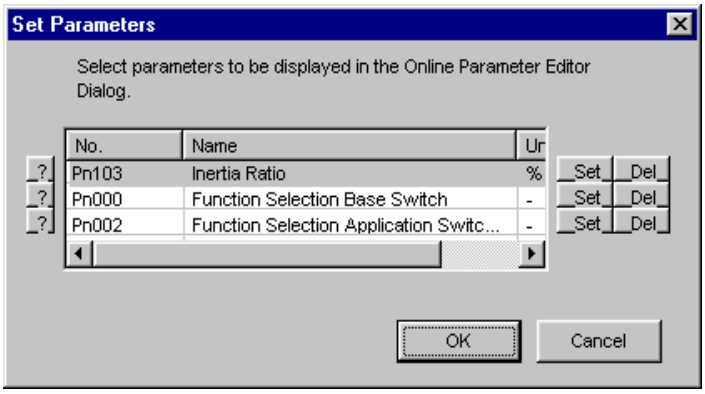
1. In the SigmaWin100 main window, click **Parameters** and then click **Edit Online Parameters**. The Online Parameter Editing box appears. The previously saved parameter settings will be displayed.



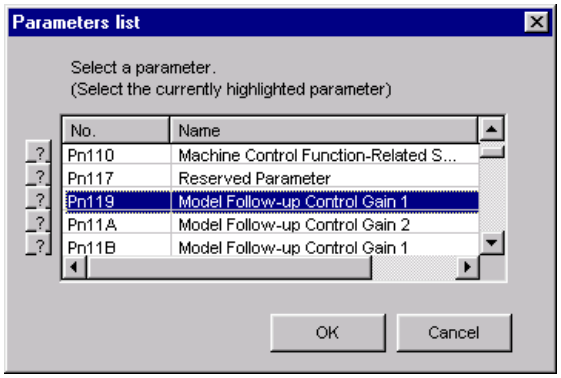
Online Parameter Editing Box

2. To change the values of the settings, click the setting arrows to raise or lower the value. If an upper or lower limit is displayed, make sure that the setting is within the limit.

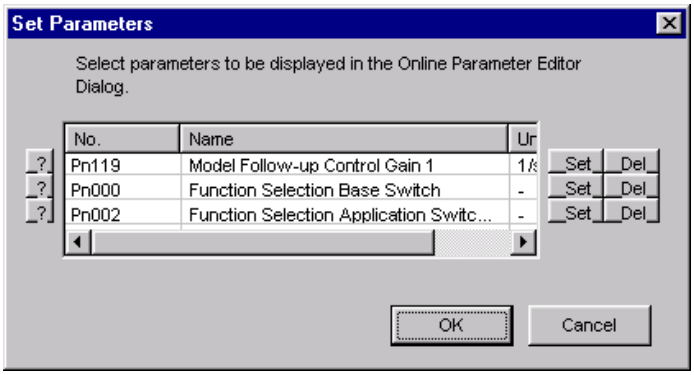
Modified values are also immediately changed in the SERVOPACK. Click **Setup** to view different parameters.



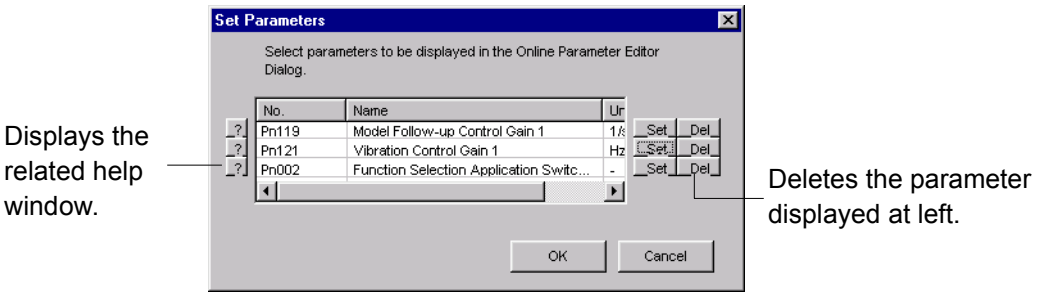
3. Click **Set** to view a parameter other than the "Inertia Ratio".



4. Select the parameter to be edited, and click **OK**.

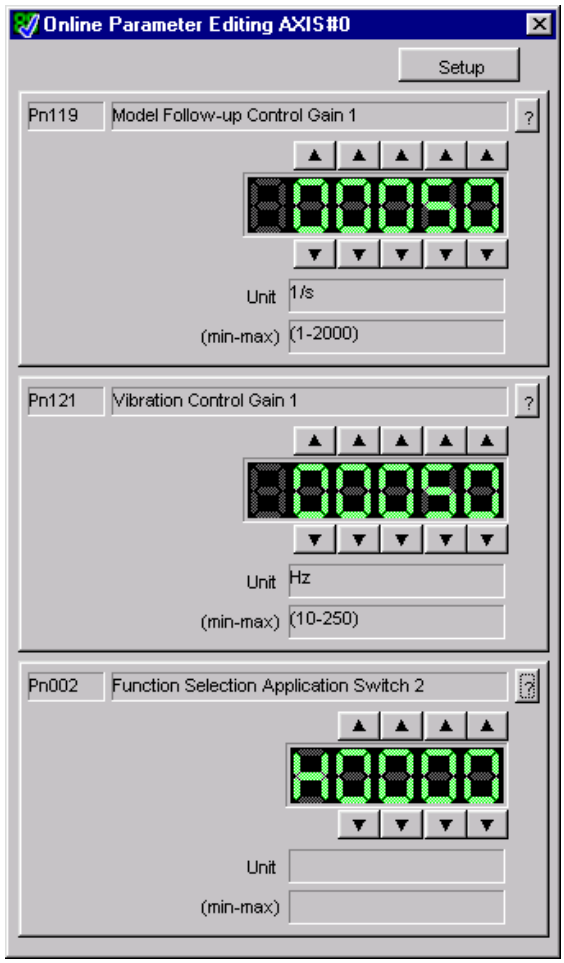


5. If there are still parameters to be edited, click **Set** for a second or third time and set these in the same manner as the first parameter.



   To view other parameters, click **Del** to delete the currently displayed parameter and then click **Set**.

6. Click **OK** when parameter display is complete.



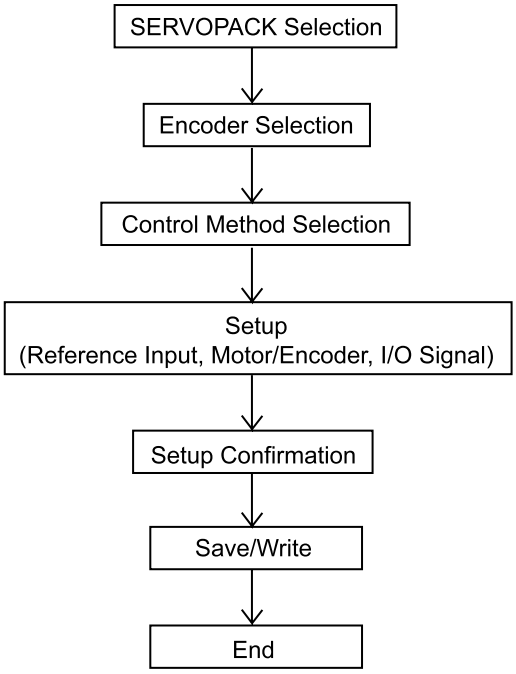
7. To change the values of the settings, click the setting arrows to raise or lower the value. If an upper or lower limit is displayed, make sure that the setting is within the limit. Modified values are also immediately changed in the SERVOPACK.

4.1.3 Parameter Wizard

The parameter wizard is a function which carries out the setting of parameters using a dialog method. By following instructions on the screen to select the control method and the I/O settings, those settings which are necessary for an operation are automatically completed.

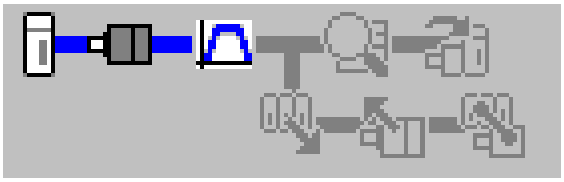
The parameter wizard has the following features.

- Parameters can be set easily and quickly, even if you are using the SERVOPACK for the first time.
- It is possible to calculate the electronic gears automatically using the mechanical characteristics and the desired reference units.
- It is possible to select the I/O assignments while visually confirming them.



To indicate the present stage of processing, an abbreviated flowchart is shown in the lower left corner of each window.

Example

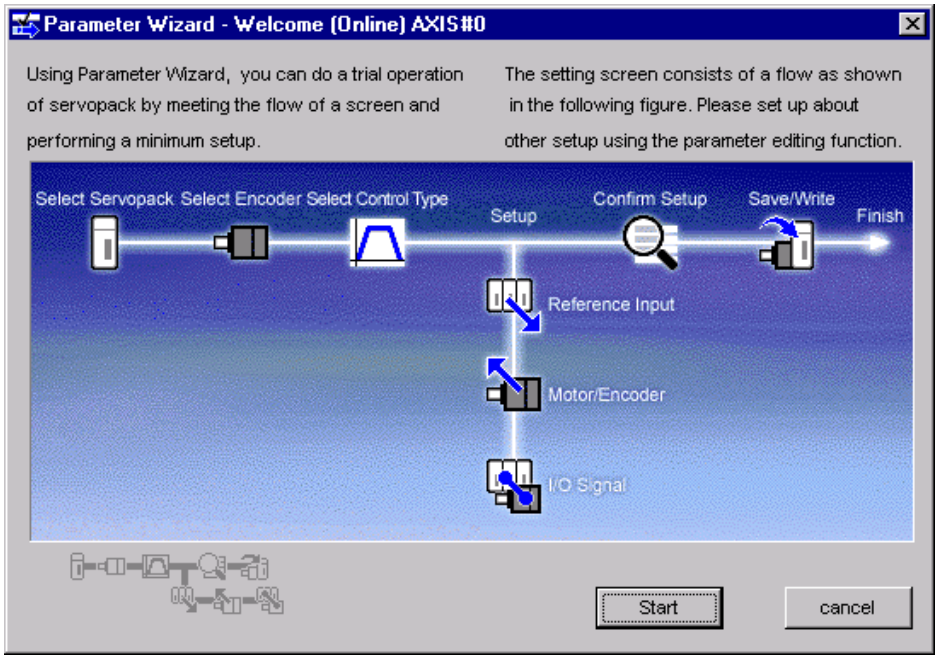


This chart shows that the control method is now being selected.

The wizard display varies in accordance with the specifications of the SERVOPACK that was selected. The screen shots used in this manual are only one example.

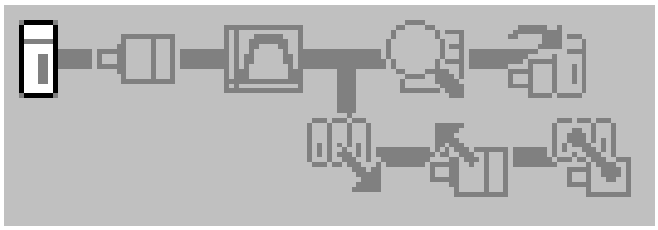
Follow these steps to use the parameter wizard.

1. In the SigmaWin100 main window, click **Parameters** and then click **Parameter Wizard**. The Parameter Wizard window appears.



2. Click **Start**.

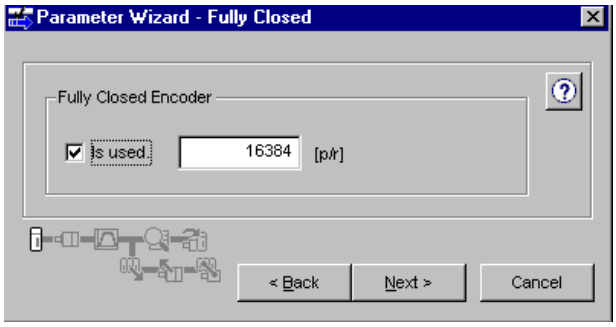
■ Selecting a SERVOPACK



This flowchart appears when selecting a SERVOPACK.

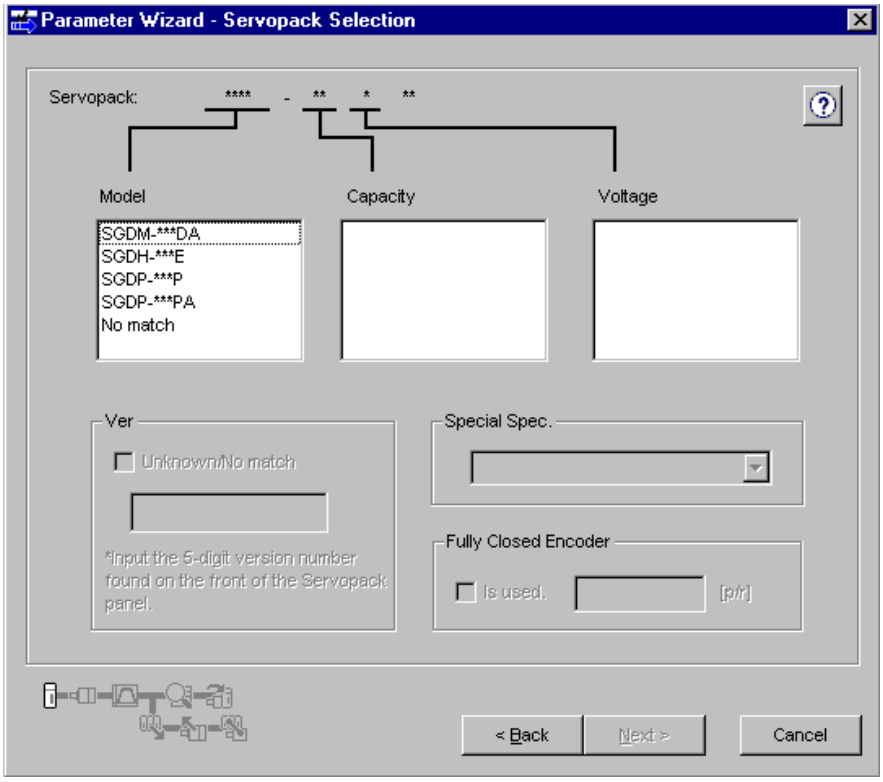
The windows differ in the Online and Offline modes.

<When Online>

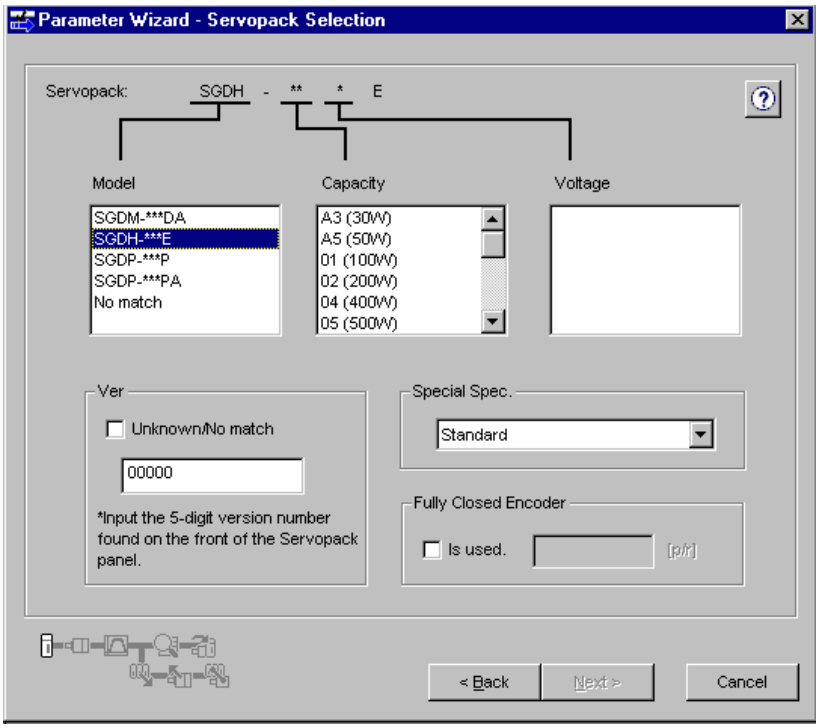


If the connected SERVOPACK is a model in which a fully closed encoder can be used, the Fully Closed box appears. Select to use or not use the fully closed encoder and then click **Next**.

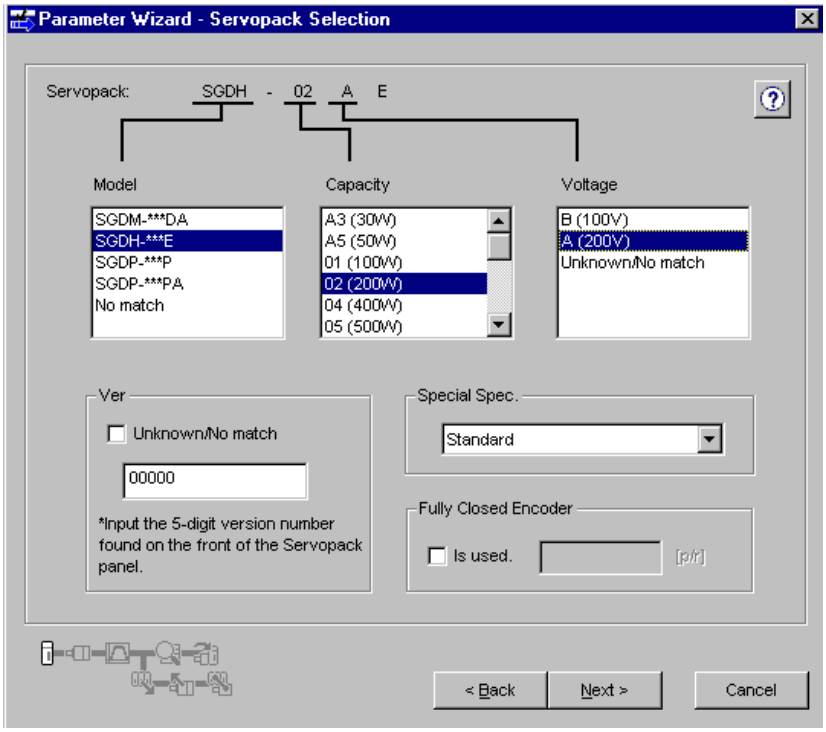
<When Offline>



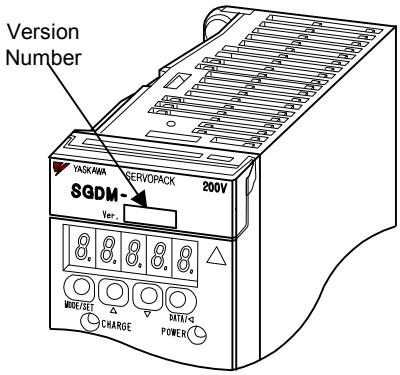
(1) Select the SERVOPACK model. A list of SERVOPACK capacities is displayed.



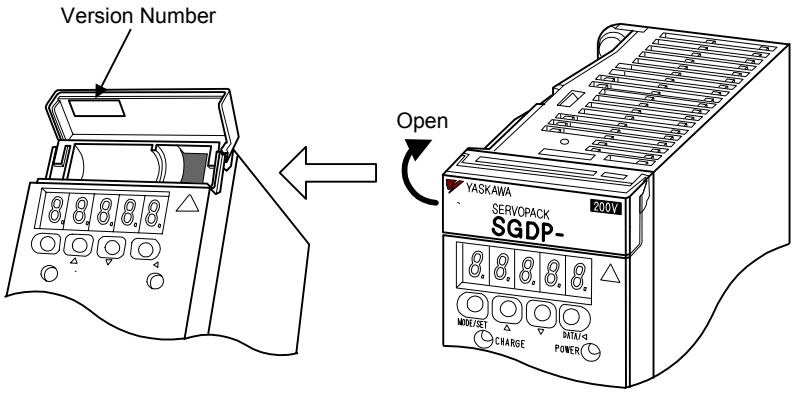
(2) Select the SERVOPACK capacity and voltage.



(3) Type the version number of the SERVOPACK. The location of the version number varies according to the type of SERVOPACK.



Version Number on SGDM and SGDH

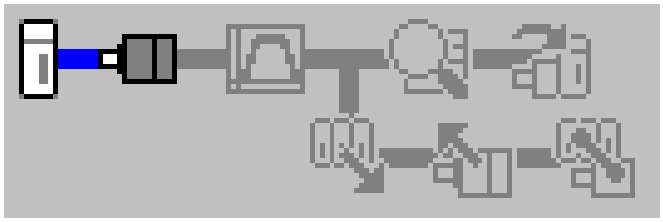


Version Number on SGDP

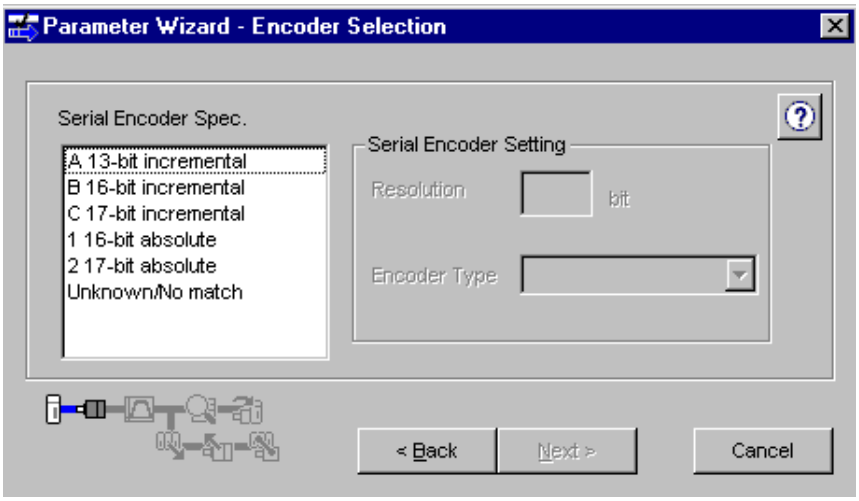
If the version number is unknown, select **Unknown/No match**.

(4) Select the specifications of the SERVOPACK. Select to use or not use the fully closed encoder, and then click **Next**.

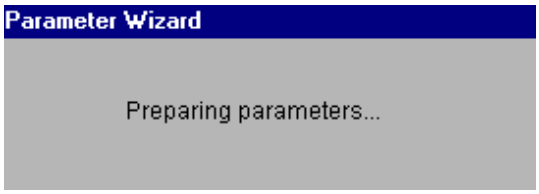
■ Selecting an Encoder



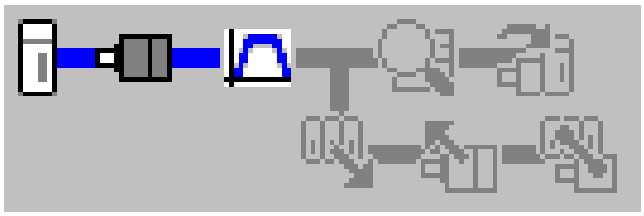
This flowchart appears when selecting an encoder.



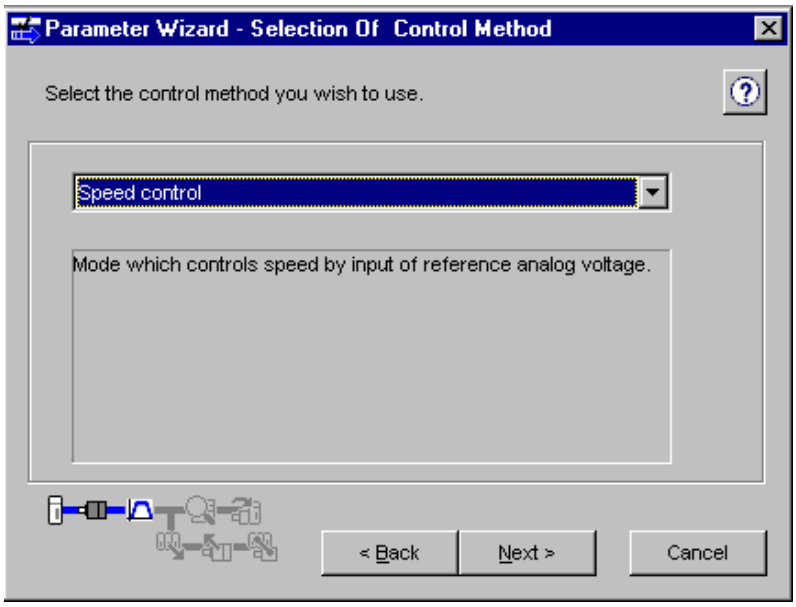
Select the specifications of the serial encoder. If a special or new serial encoder is used, first select **Unknown/No match**. Then, make the settings for the serial encoder. After an encoder has been selected, click **Next**.



■ Selecting a Control Method

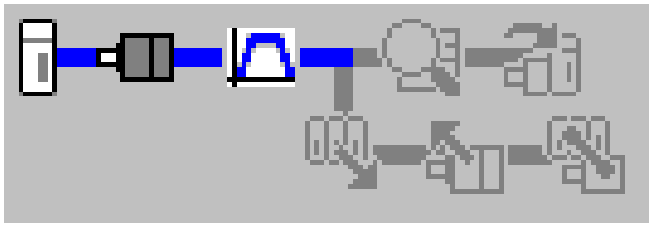


This flowchart appears when selecting a control method. Twelve kinds of control methods are available.



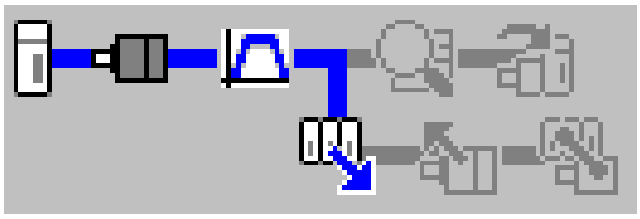
Select the control method, and then click **Next**.

■ Other Settings



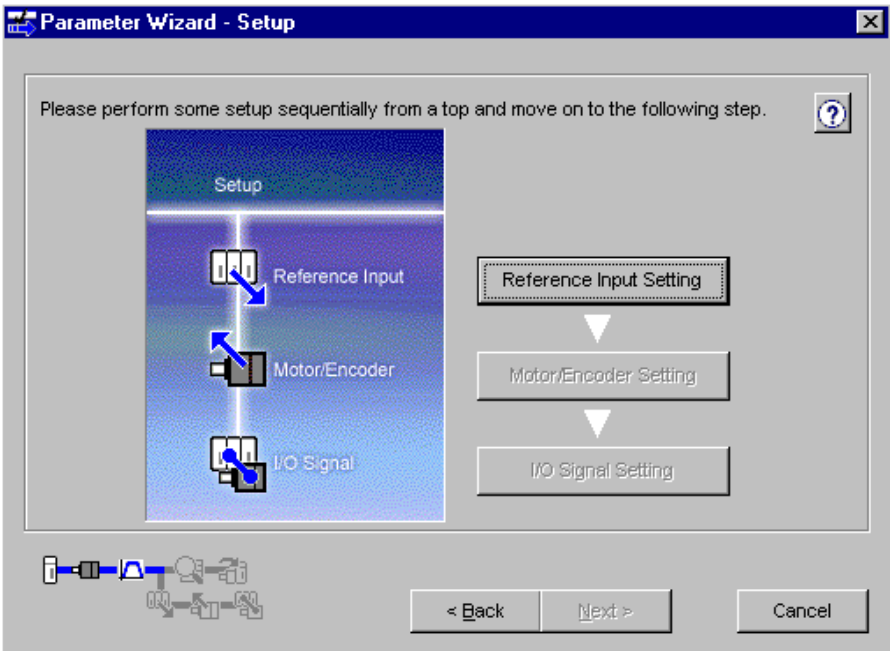
This flowchart appears when making other settings, such as those for reference input, the motor and encoder, and I/O signals. Set the reference input, the motor and encoder, and the I/O signals.

Reference Input Setting

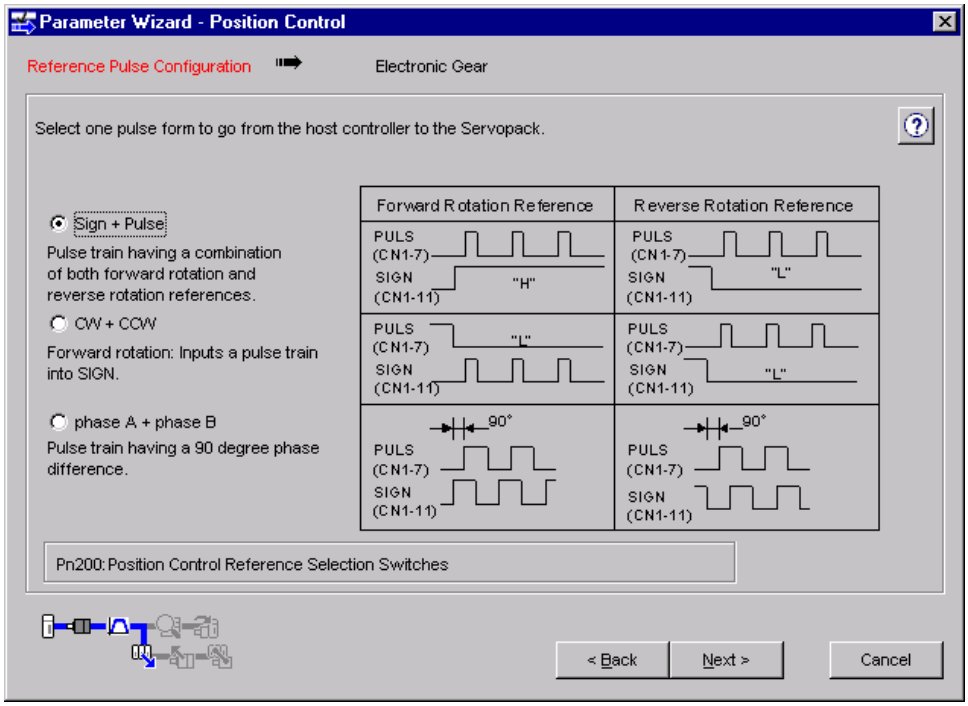


This flowchart appears when setting the references. The windows varies according to the control method.

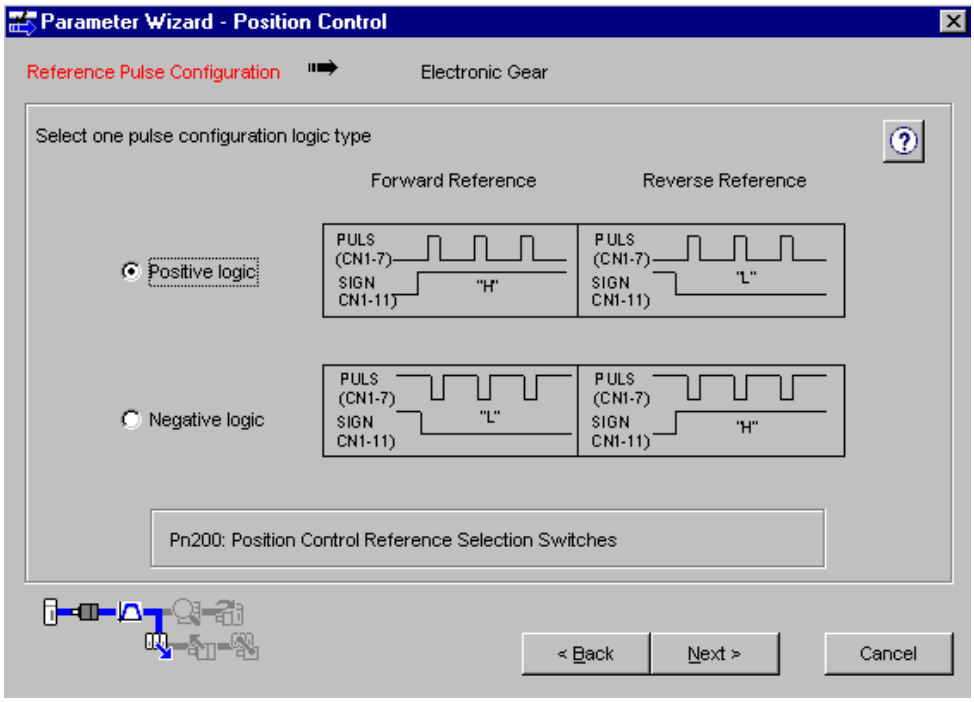
The following screen shot shows the flowchart that appears when the position control has been selected.



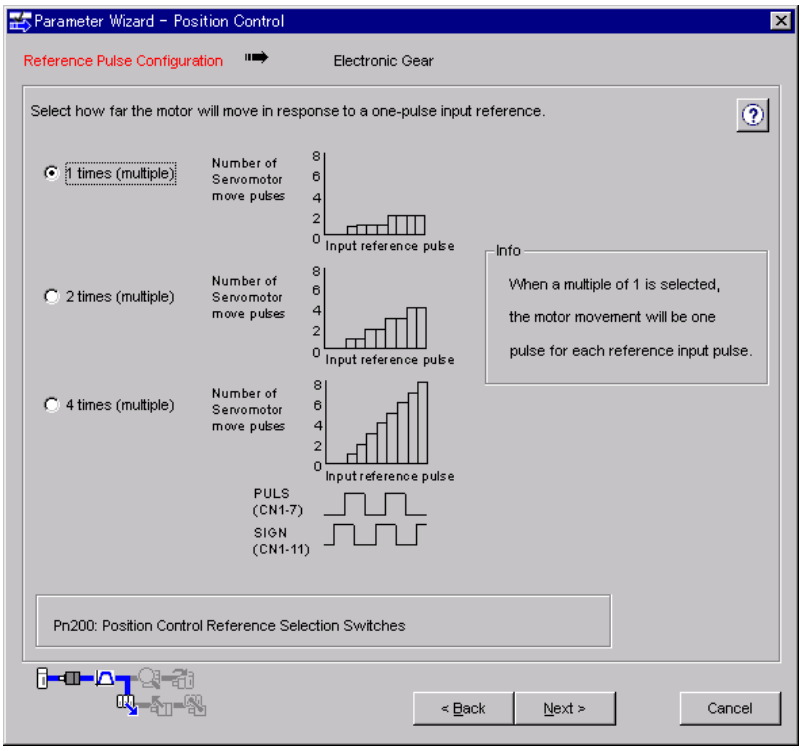
1. Click **Reference Input Setting**.



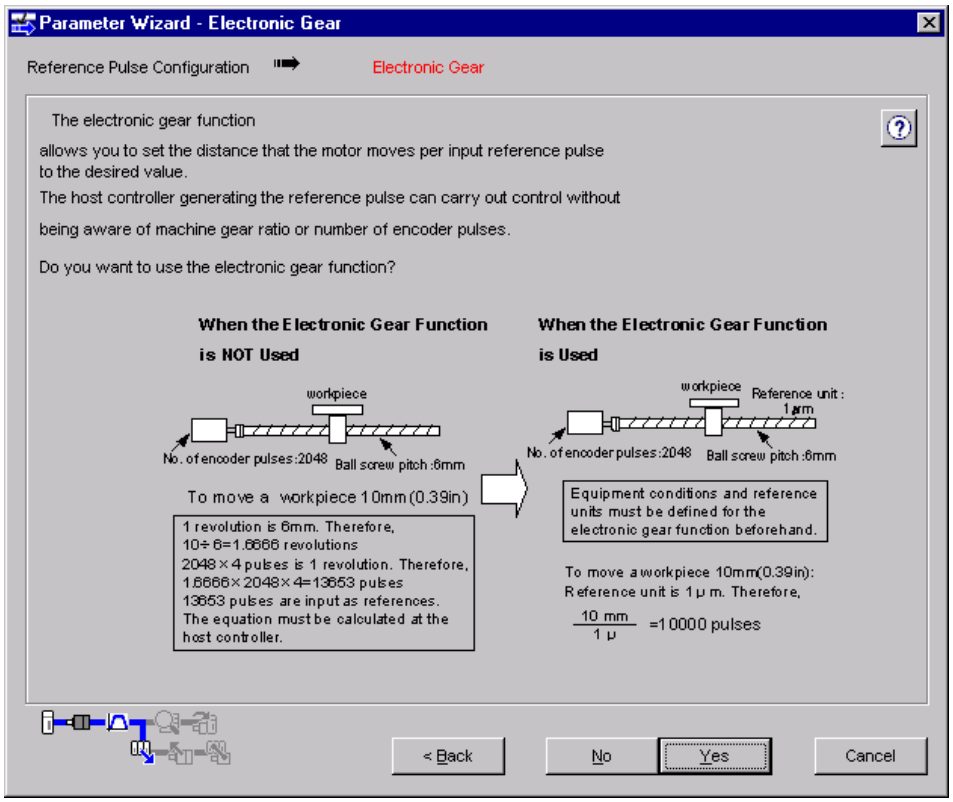
2. Select the pulse configuration of the SERVOPACK, and then click **Next**.



3. Select the logic type of the pulse configuration, and then click **Next**.

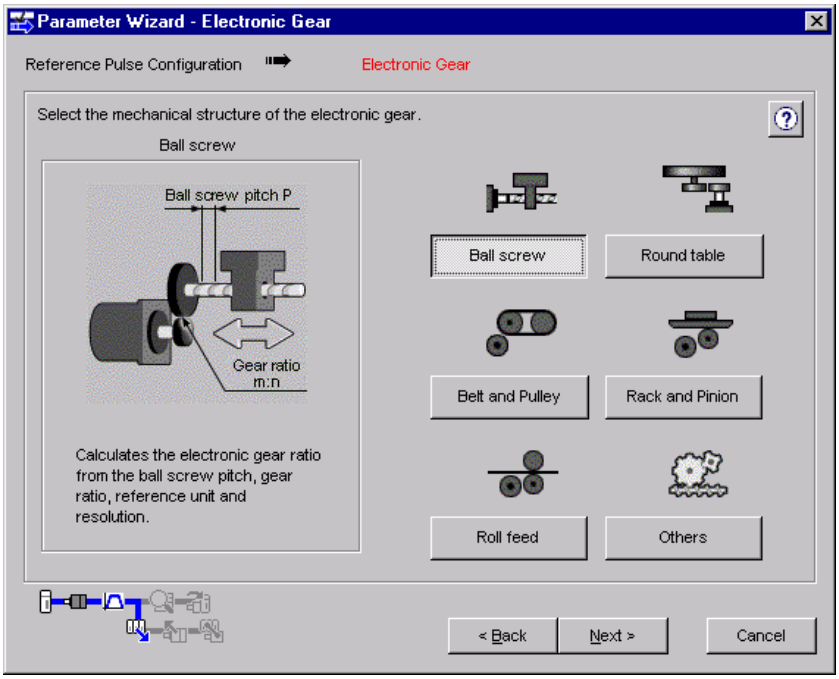


4. Select the motor movement per reference input pulse, and then click **Next**.



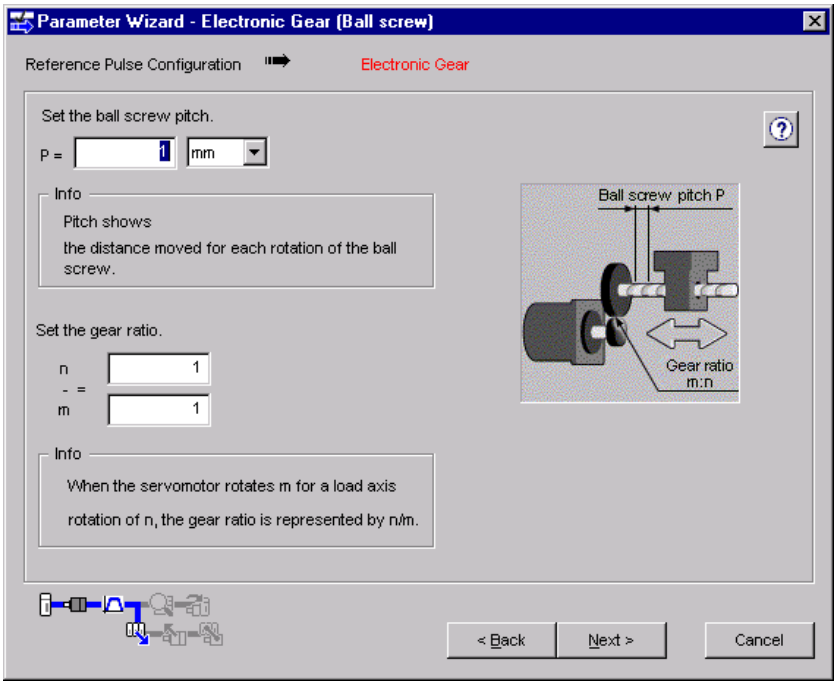
5. When the electronic gear function is to be used, click **Yes**.

   When the electronic gear function is not to be used, click **No**. In this case, the Motor/ Encoder Setting window will appear.

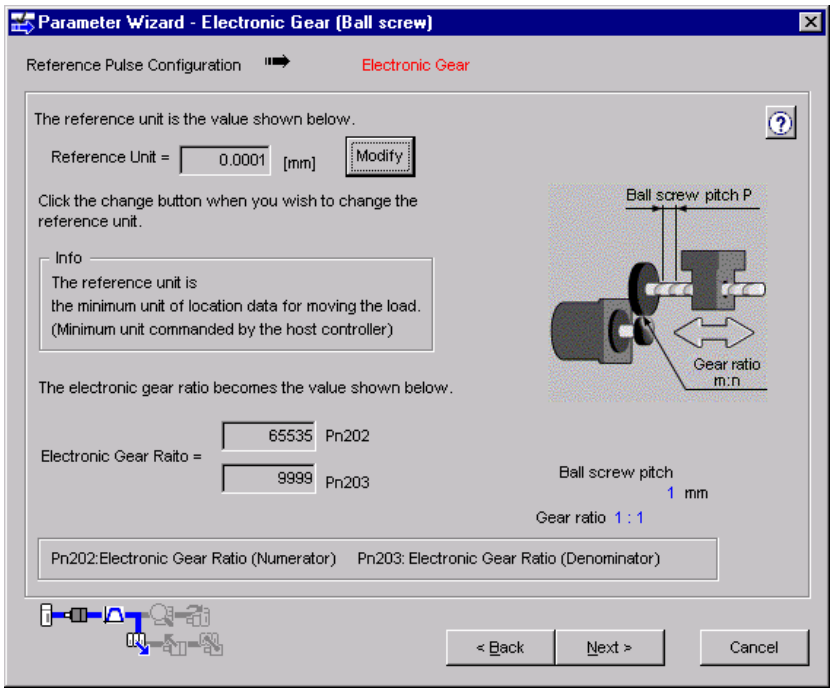


6. Select the mechanical structure of the electronic gear, and then click **Next**.

   The following screen shot shows the flowchart that appears when the ball screw has been selected.

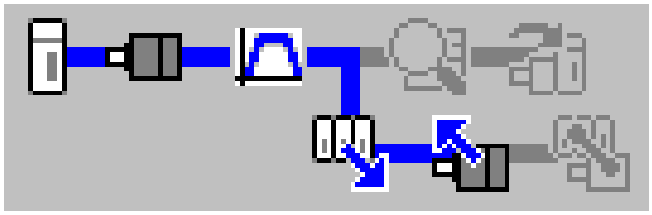


7. Set the ball screw pitch and the gear ratio, and then click **Next**.

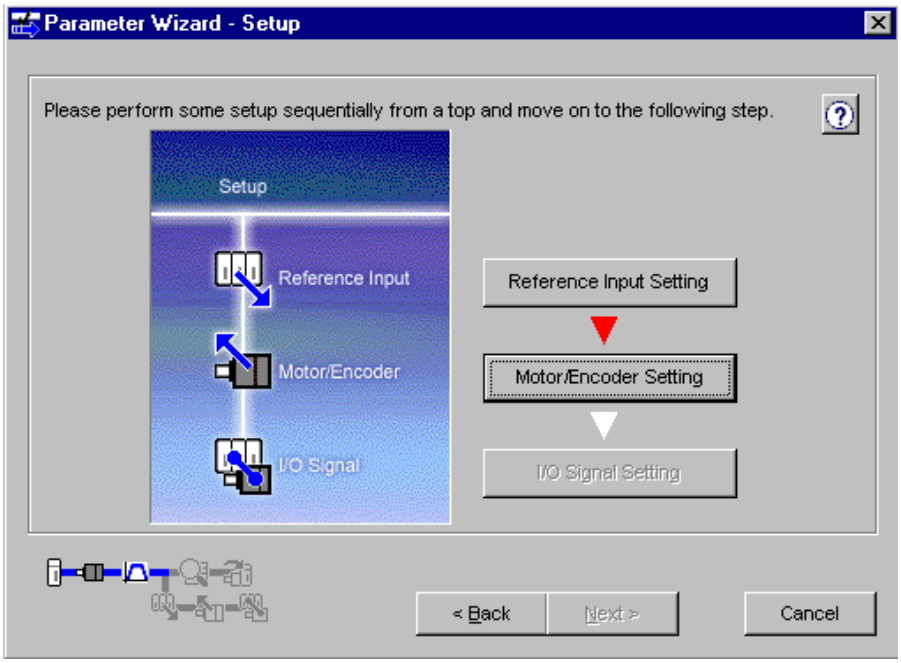


8. Confirm the reference unit and the electronic gear ratio, and then click **Next**.

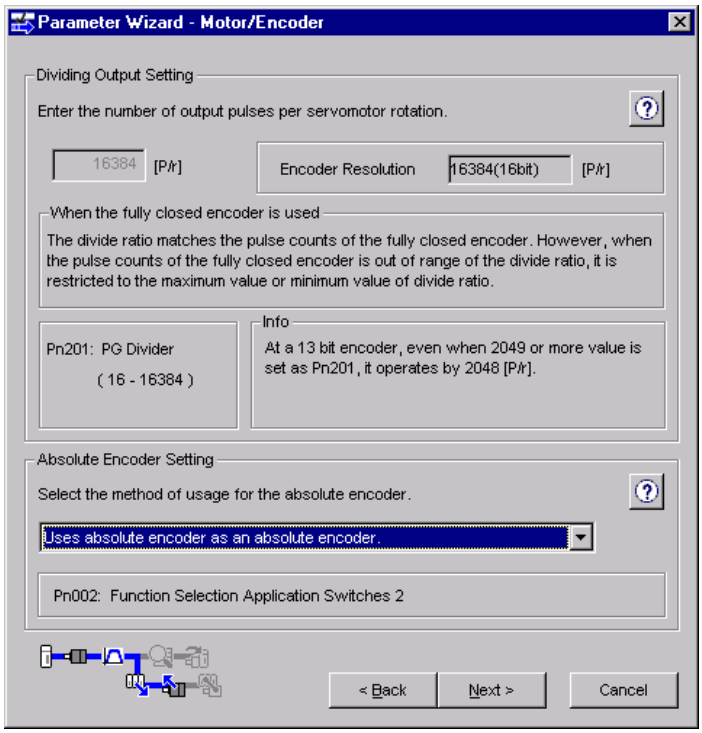
Motor/Encoder Setting



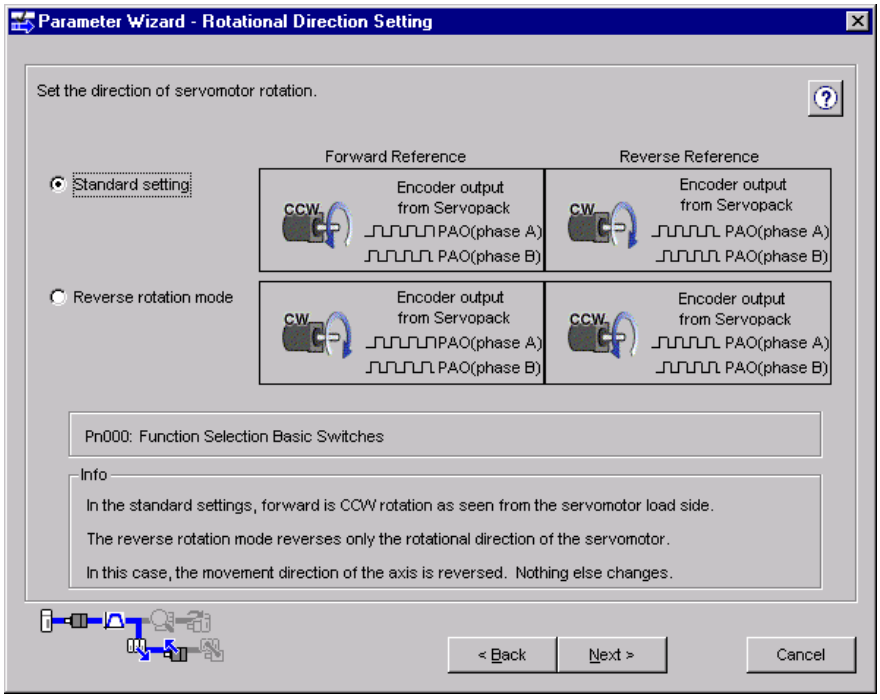
This flowchart appears when selecting the motor and encoder.



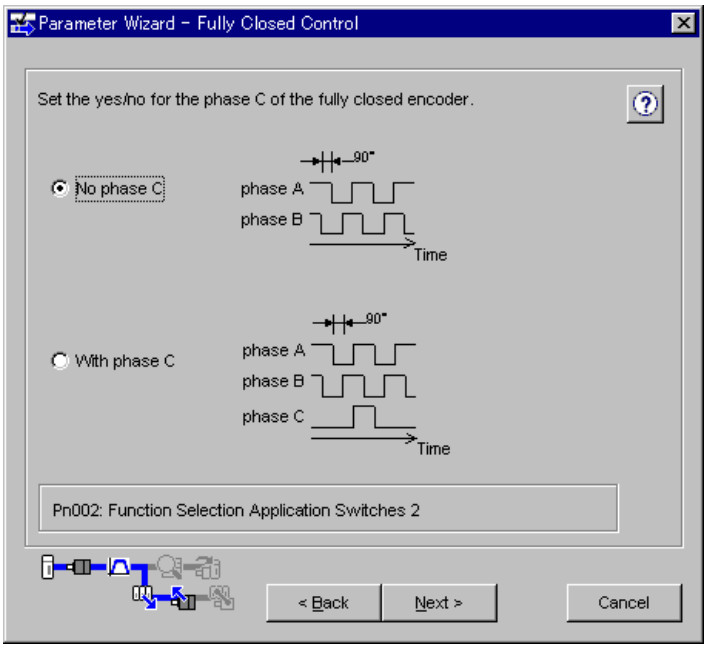
1. Click **Motor/Encoder Setting**. The Motor/Encoder window appears.



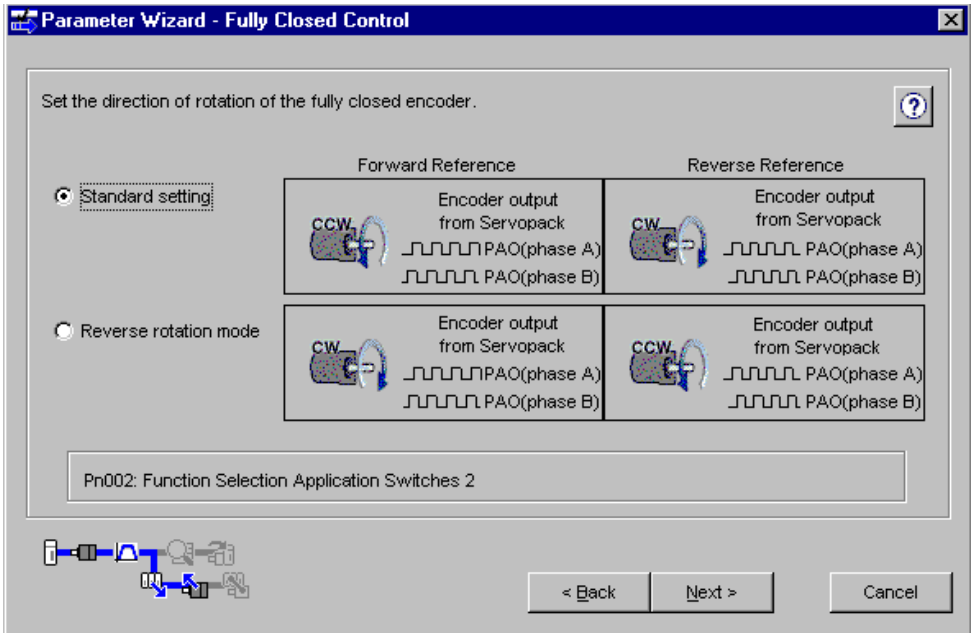
2. Select the specifications of the motor and the encoder, and then click **Next**. The Rotation Direction Setting window appears.



3. Select the direction of the motor rotation, and then click **Next**. The Fully Closed Control window appears.

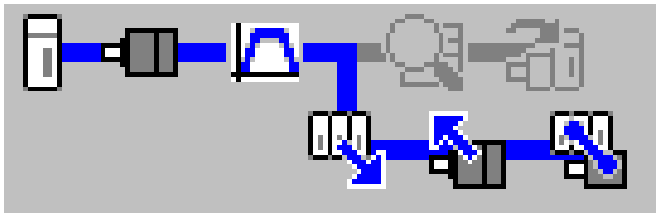


4. Select the phase C of the fully closed encoder, and then click **Next**.

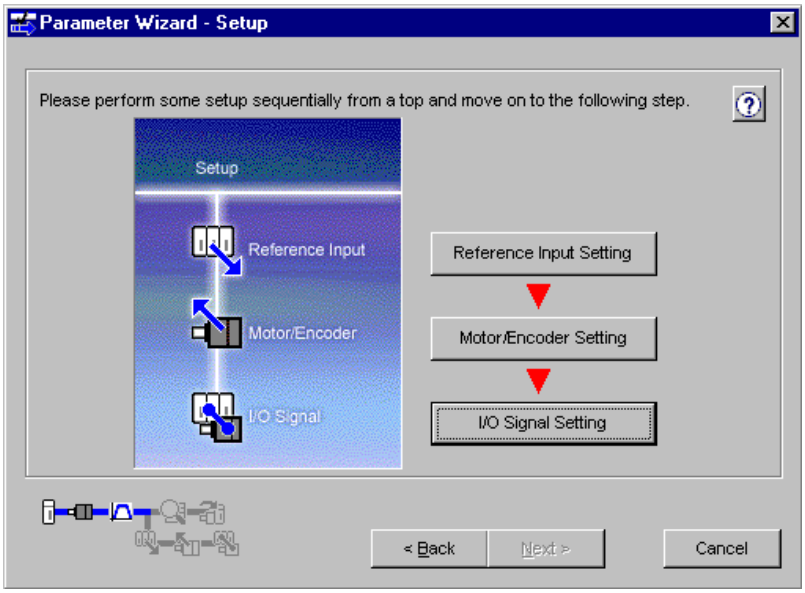


5. Select the direction of rotation of the fully closed encoder, and then click **Next**.

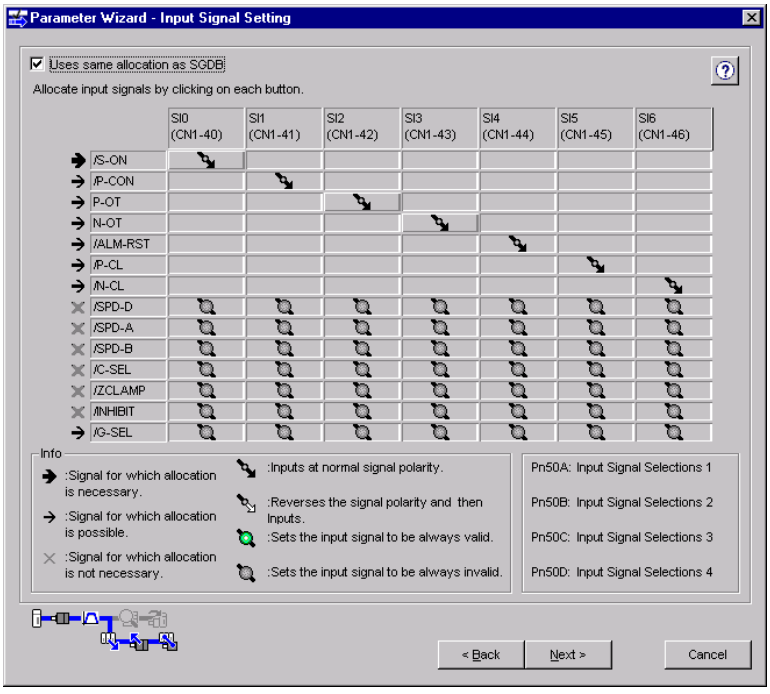
I/O Signal Setting



This flowchart appears when setting the I/O signal.



1. Click **I/O Signal Setting**. The Input Signal Setting window appears.



If "Uses same allocation as SGDB" has been selected, the settings cannot be changed.

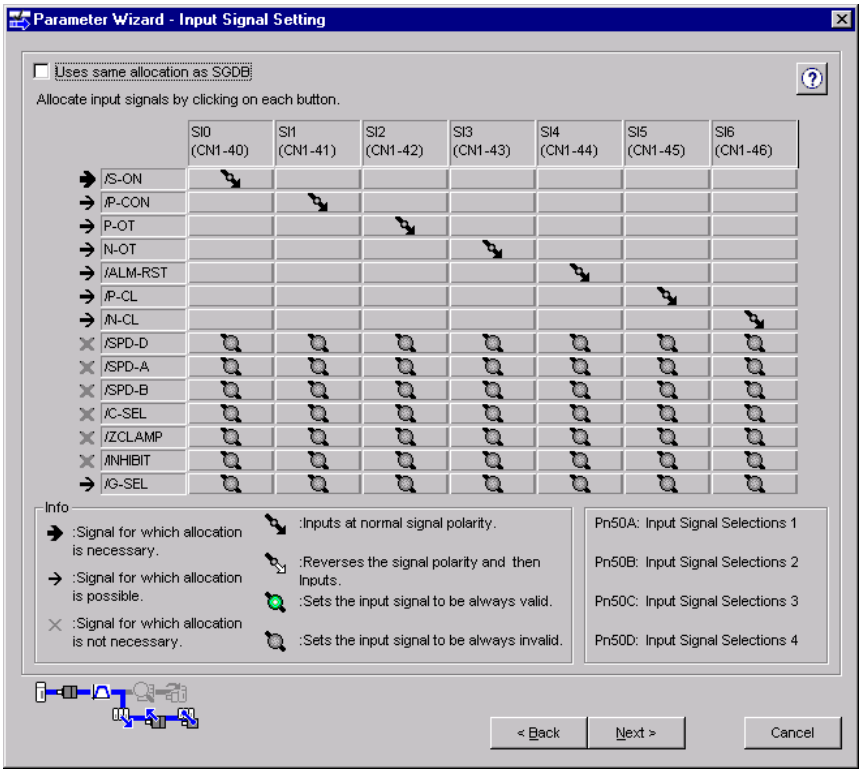
2. Set the input signals.

<If making the settings the same as that of the SGDB>

Click **Next**. The Output Signal Setting window appears.

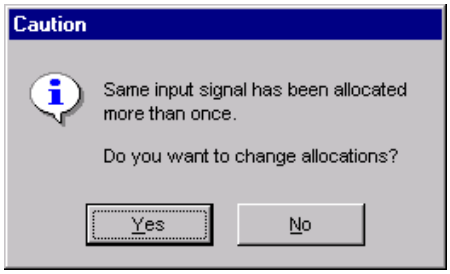
<If changing the settings>

If already selected, click "Uses same allocation as SGDB" box to cancel that selection. Now, it is possible to set the input signals.

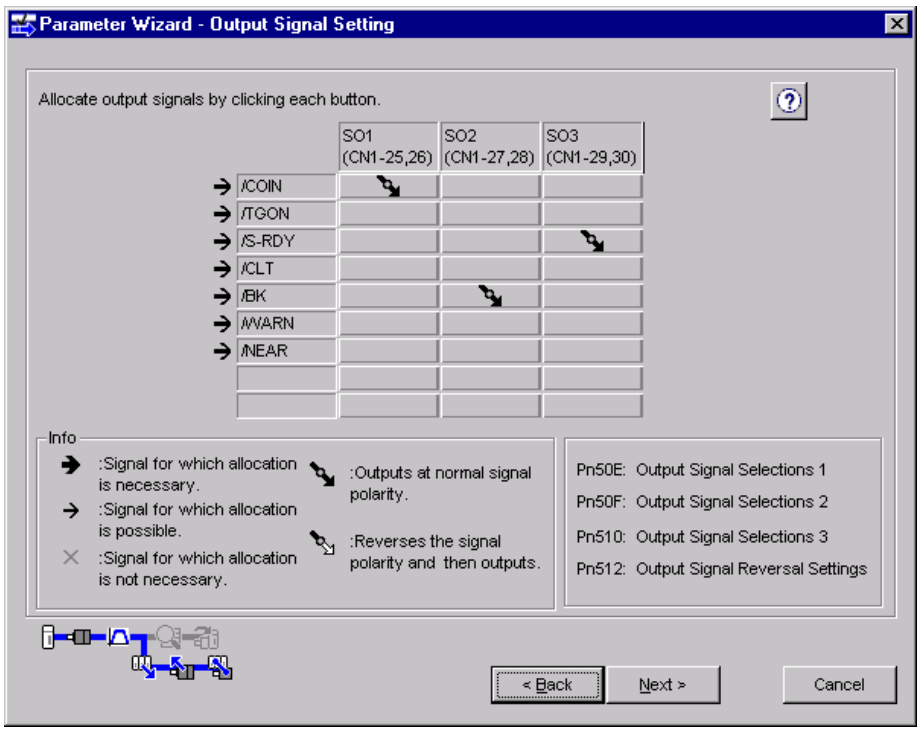


Allocate the input signals. Each time a box in the table is clicked, the signal which can be selected is displayed. After the signals have been allocated, click **Next**.

If an input signal has been assigned more than once, a warning message appears asking if you want to change the allocations.

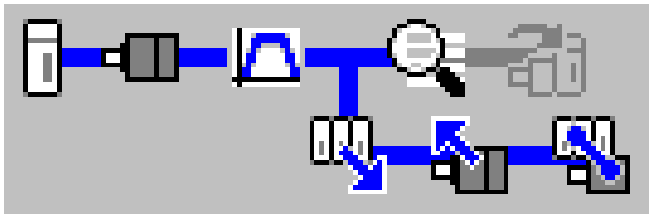


To change the allocations, click **Yes**. To keep the allocations without changing it, click **No**. The Output Signal Setting window appears.

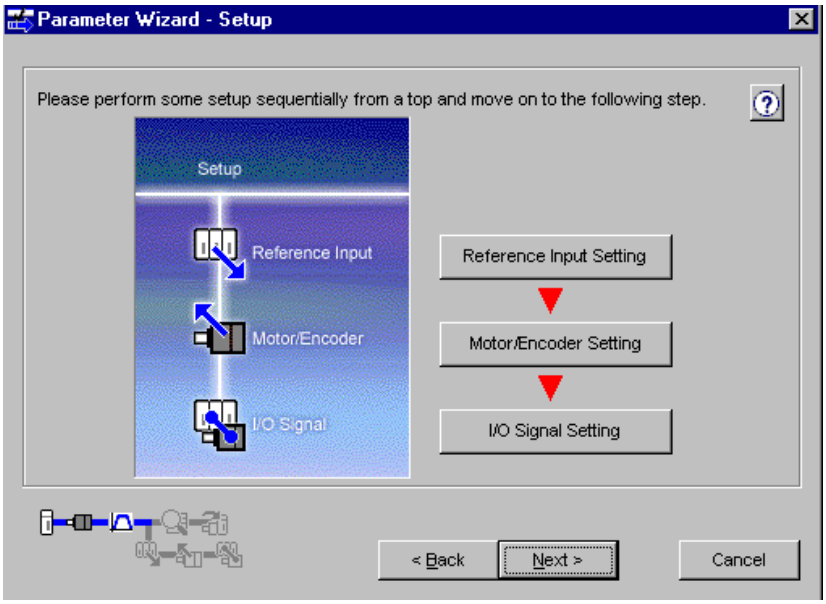


3. Allocate the output signals. After the signals have been allocated, click **Next**.

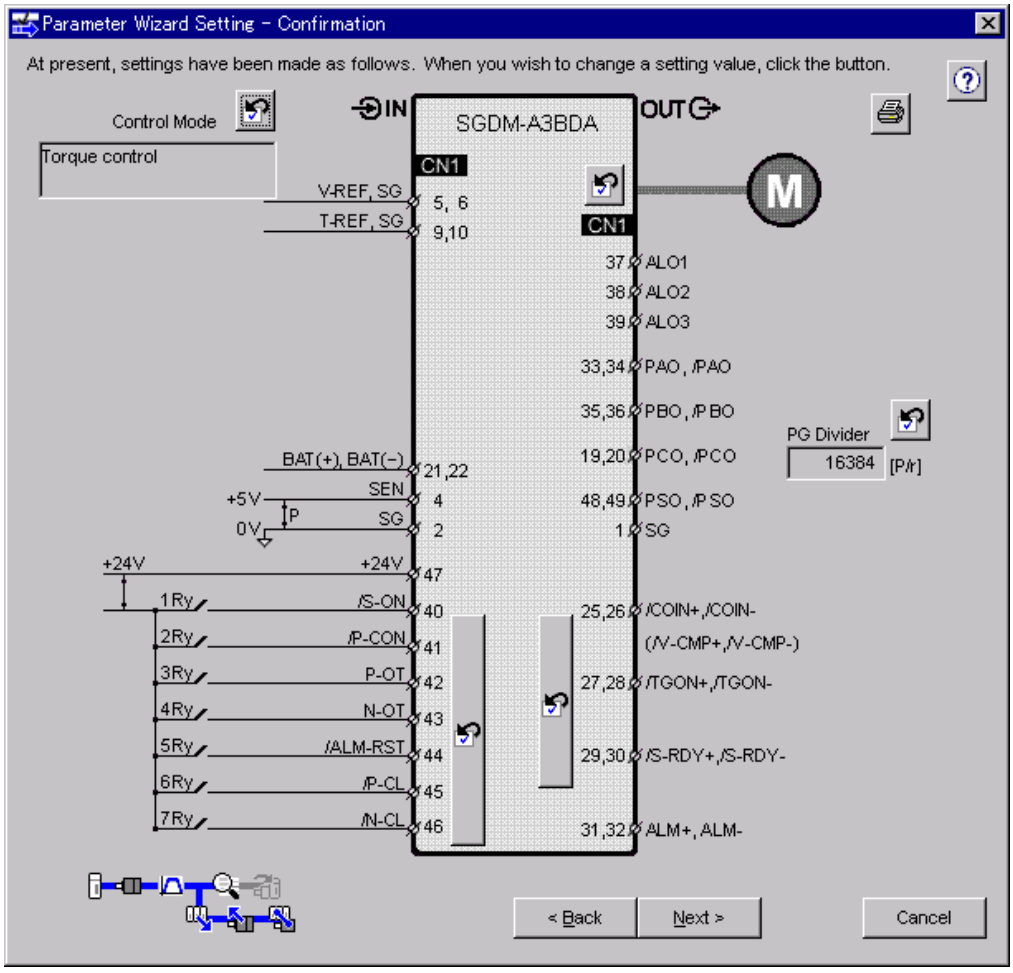
■ Confirming Settings



This flowchart appears when confirming the settings.



Click **Next**. The Confirmation window appears.



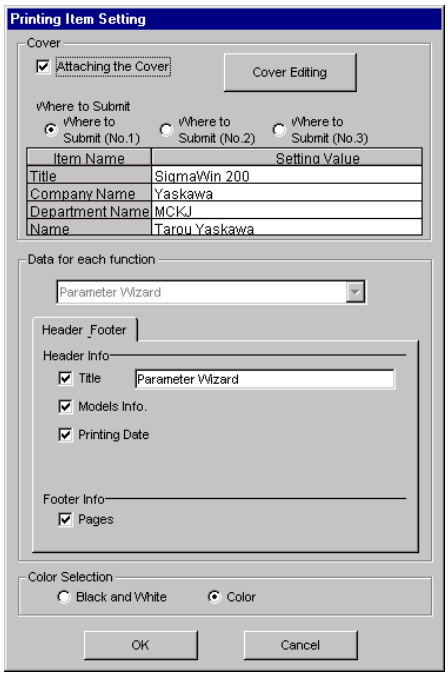
<If changing the settings>

Click the  button of the corresponding location. The window will revert to that of the corresponding location.

<To print the Parameter Wizard Setting window>

The data on the Parameter Wizard Setting window can be printed.

Click the  button, and the Printing Item Setting box appears.



Printing Item Setting Box

Cover

Select **Attaching the Cover**, and the click **Cover Editing**. For details, see Chapter 4.

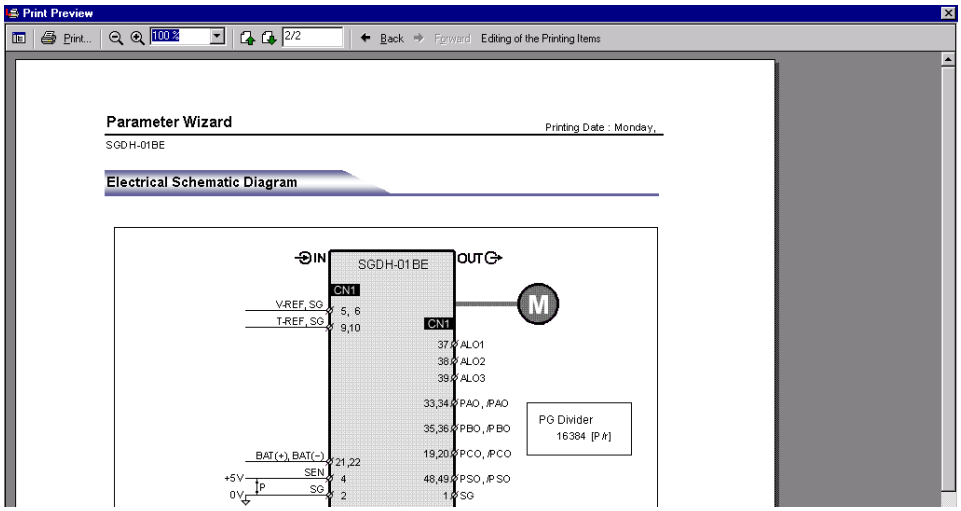
Data for each function

To enter your printing preferences or specifications, click the tab whose options you want to enter or change, and enter the desired settings.

Color Selection

Documents can be printed in color or black and white. Select your preference.

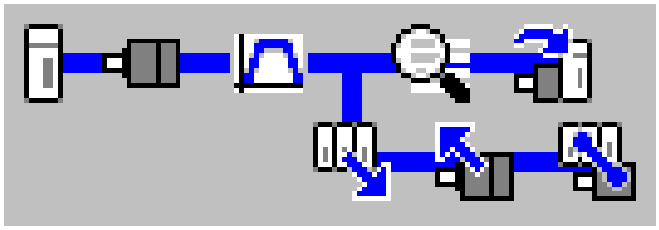
After setting is finished, click **OK**. The document appears on the screen the way it will appear in print.



To print the document as is without any changes, click **Print**.

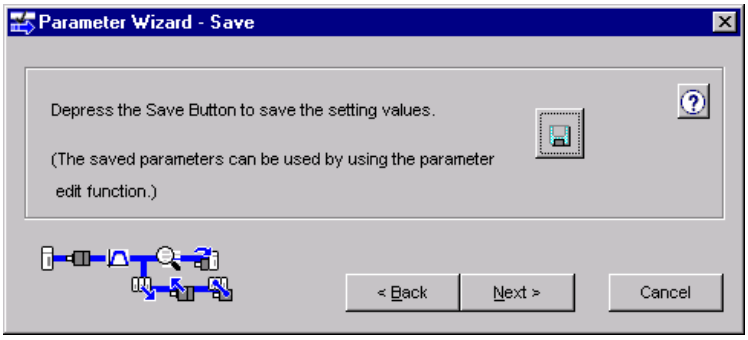
To return to the Printing Item Setting box and change some settings, click **Editing of the Printing Items**.

■ Save



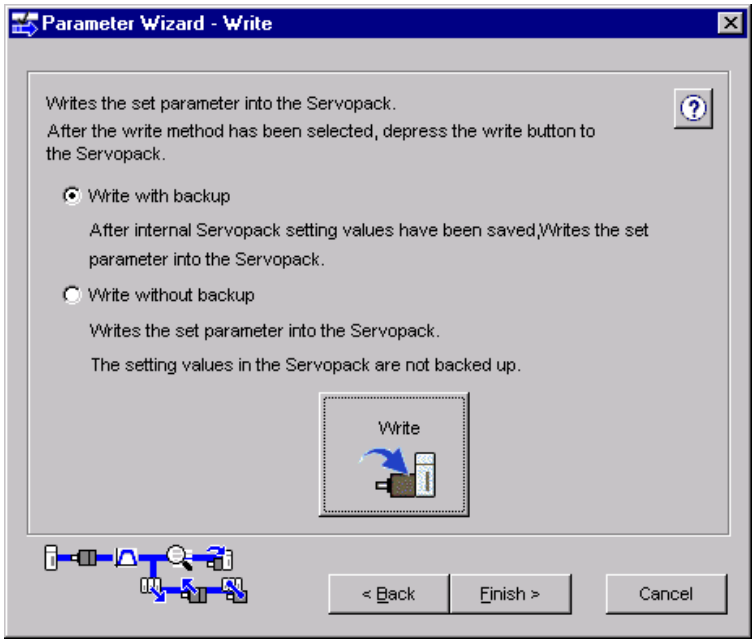
This flowchart appears when saving the settings.
The windows differ in the Online and Offline modes.

<When Online>



(1) To save the settings, click the  button.

After the settings have been saved or when you do not want to save the settings, click **Finish**.



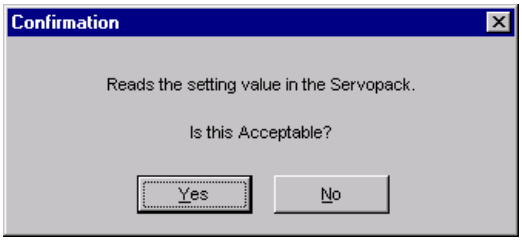
(2) Select the method to write the parameters into the SERVOPACK.

When you do not want to write the parameters into the SERVOPACK, click **Finish**.

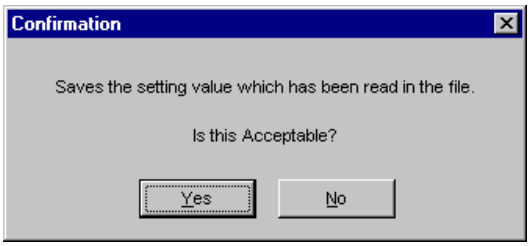
Write with backup: After the settings of the SERVOPACK which is connected have been saved, writes the parameters which have just been set into the SERVOPACK.

Write without backup: Writes the current parameters to the SERVOPACK without saving the settings of the SERVOPACK which is connected.

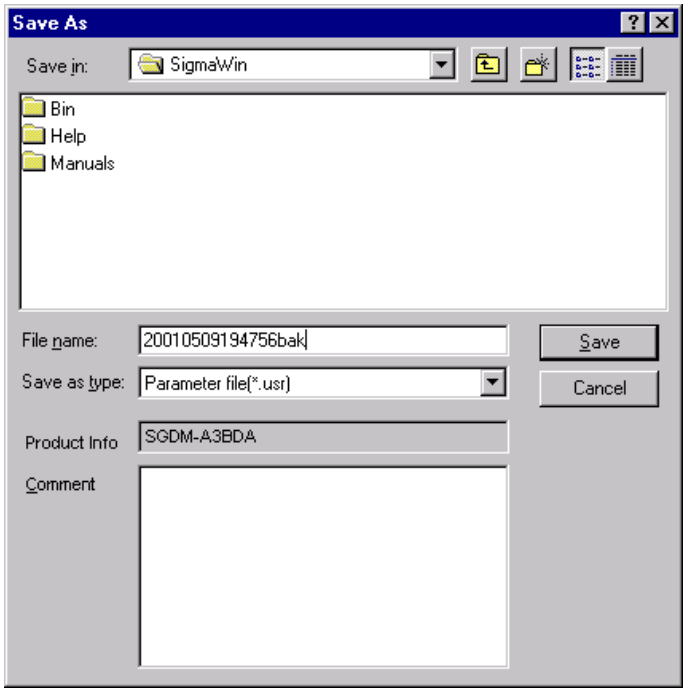
Select either one, and then click **Write**.



(3) Click **Yes**.

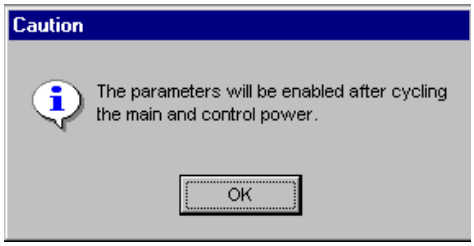


(4) Click **Yes**.



(5) Select the file name and save location. Then click **Save**.

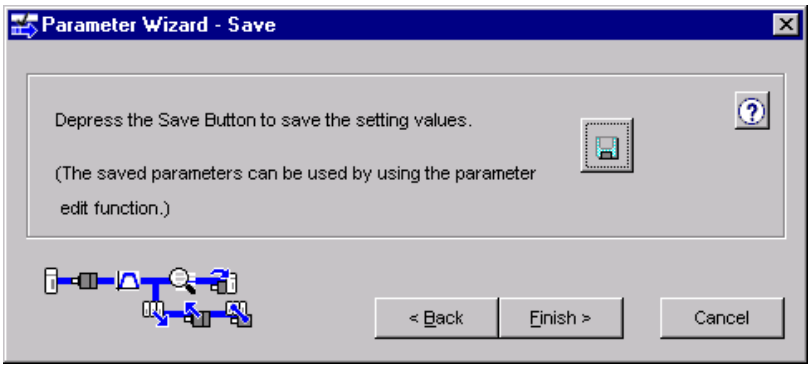
(6) Click **Yes**.



(7) Click **OK**.

(8) Click **Finish**.

<When Offline>



(1) To save the settings, click the  button.

When you do not want to save, click **Finish**.

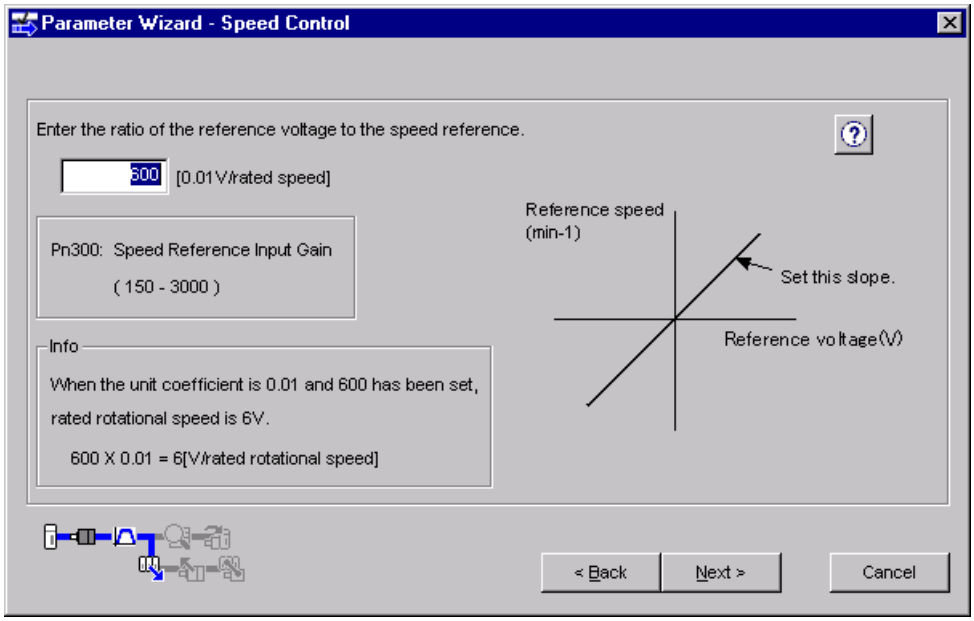
(2) Click **Finish**.

■ Additional Notes

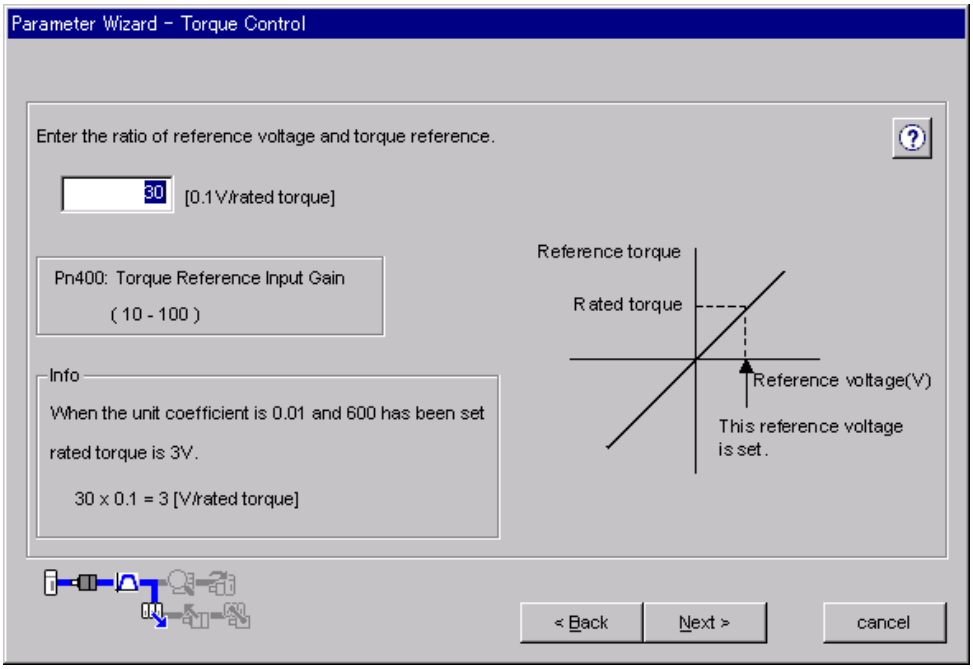
Depending on the control method and the mechanical structure of the electronic gear, the window will differ.

Control Method

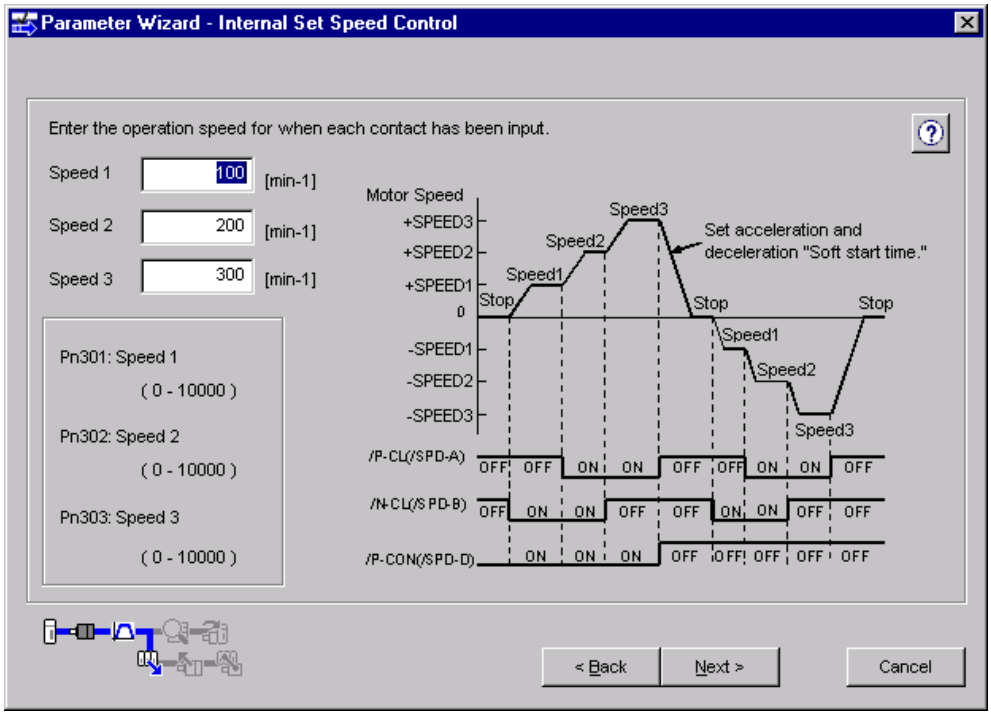
<When Speed Control has been selected>



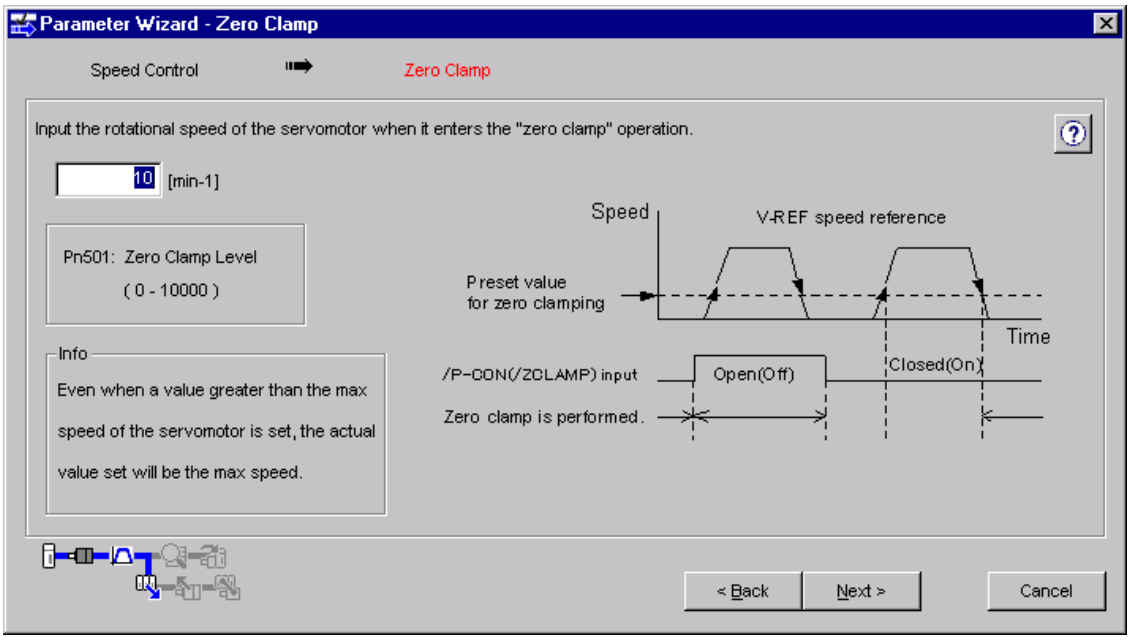
<When Torque Control has been selected>



<When Internal Setting Speed Control has been selected>

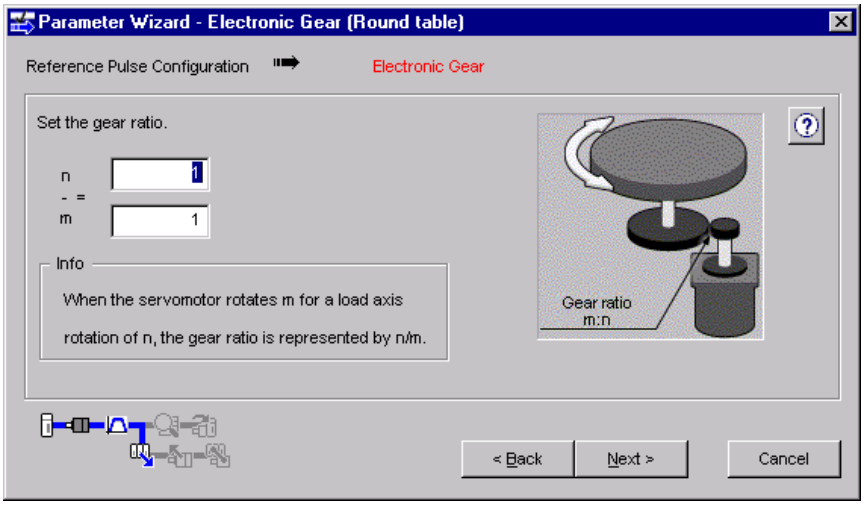


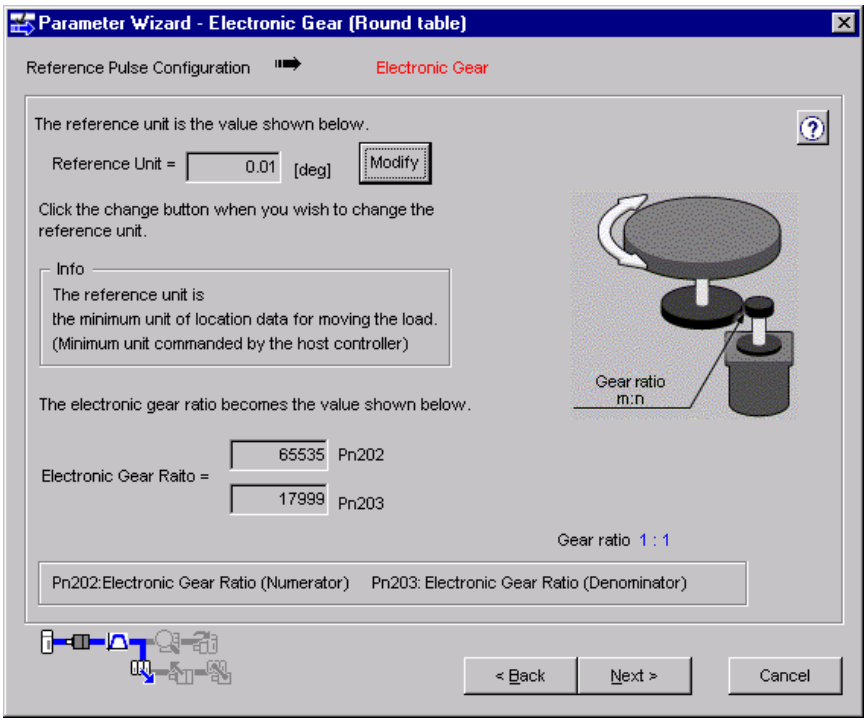
<When Speed Control and Zero Clamp have been selected>



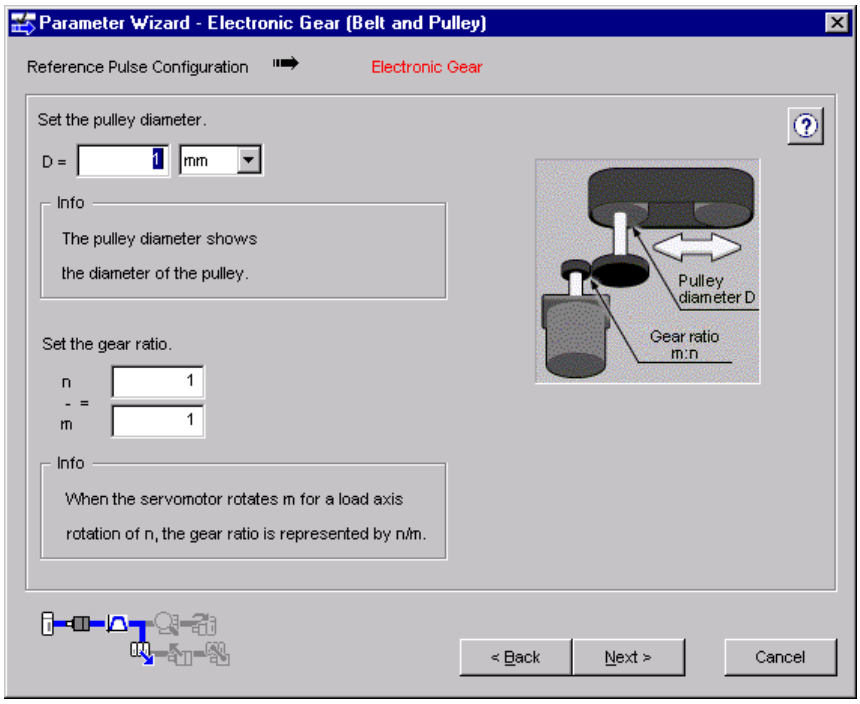
Mechanical Structure of the Electronic Gear

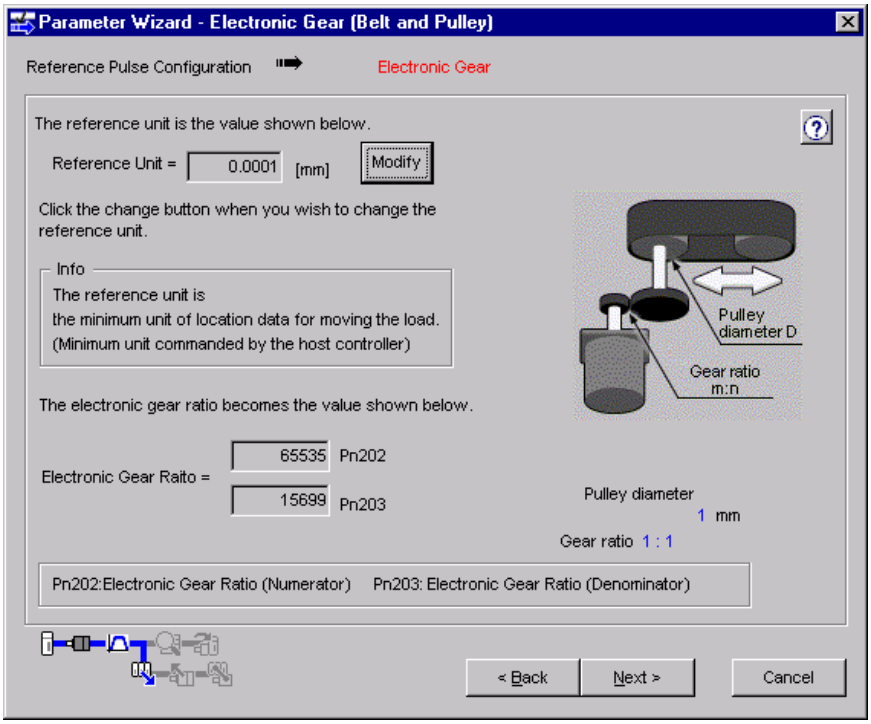
<When Round Table has been selected>



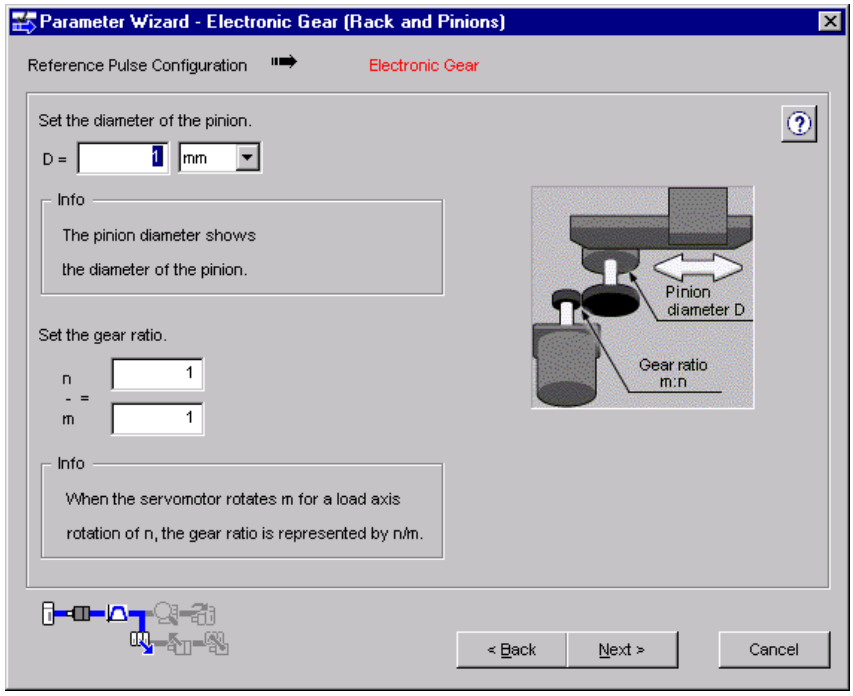


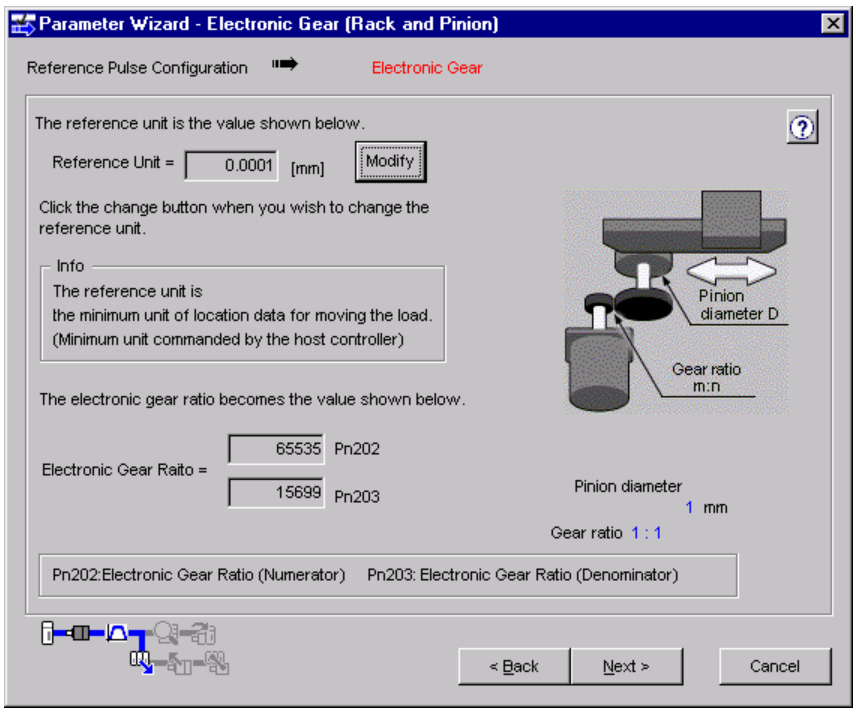
<When Belt and Pulley has been selected>



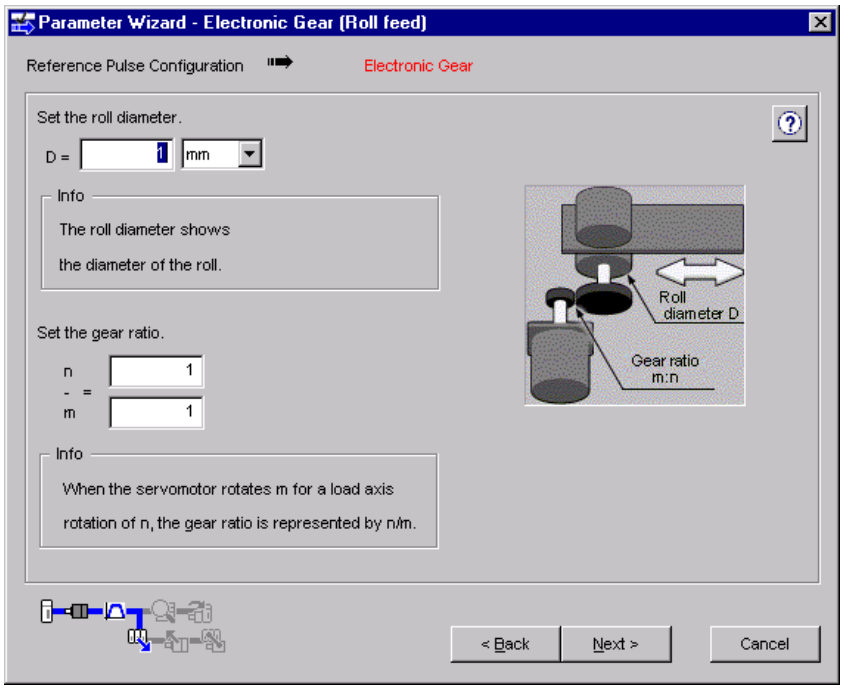


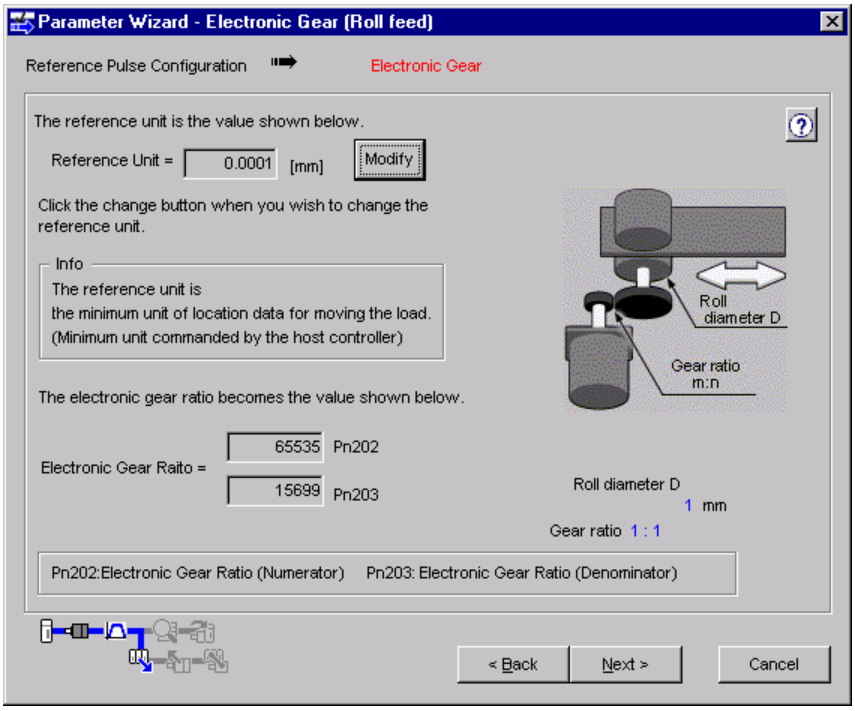
<When Rack and Pinion has been selected>



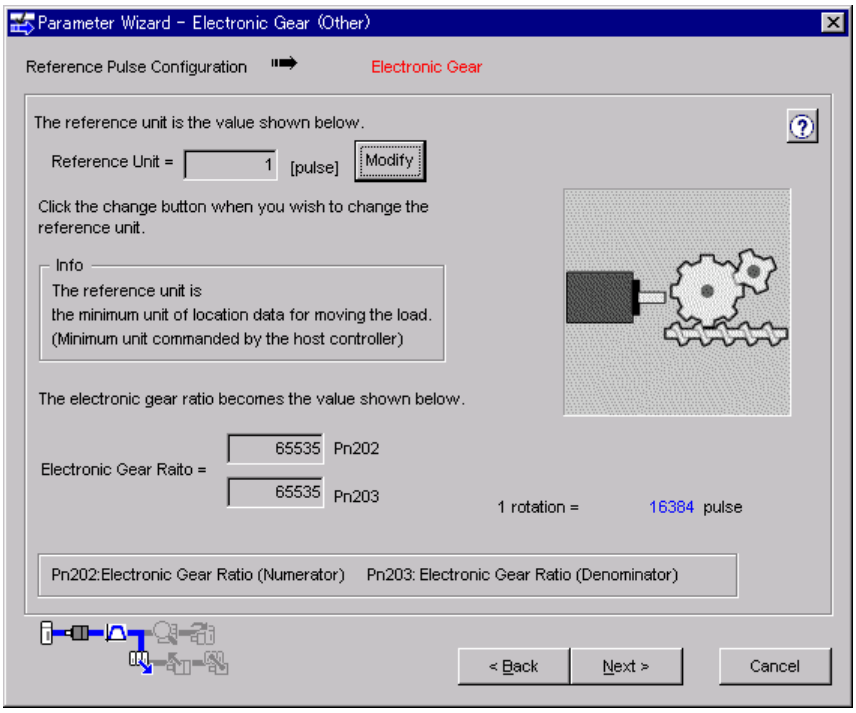


<When Roll Feed has been selected>





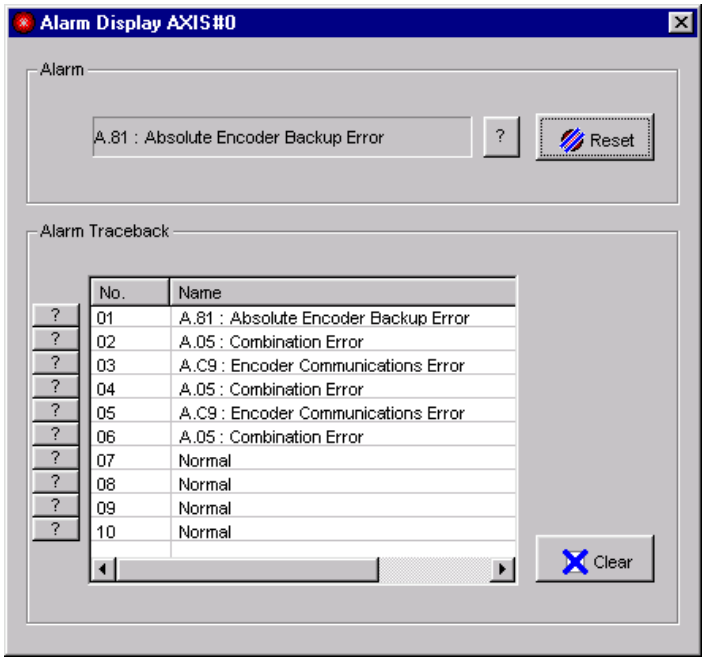
<When Other has been selected>



4.2 Alarm Display

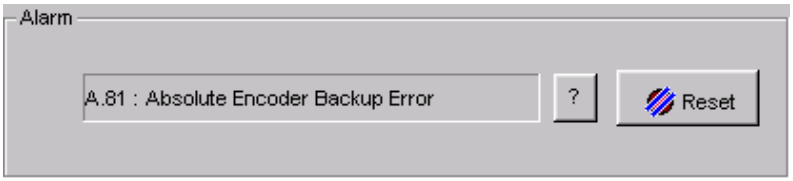
Alarms can be viewed in the Alarm Display.

In the SigmaWin100 main window, click **Alarm** and then click **Display Alarm**.



Alarm Display

Alarm

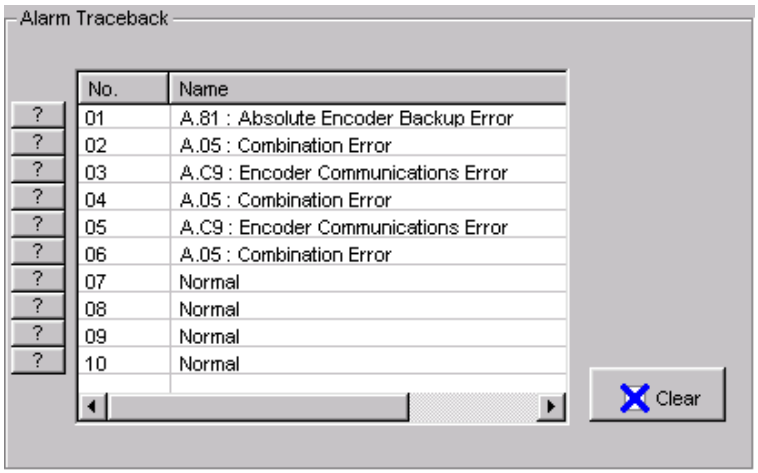


The current alarm is displayed

To clear an alarm, click **Reset** after removing the cause of the alarm. The alarm will continue until the cause is removed, and then the information on the screen will be subsequently updated.

Click the ? button to display details concerning a specific alarm and its corrective measures.

Alarm Traceback



The SERVOPACK stores a history of the 10 most recent alarms. These are displayed in the Alarm Traceback window, and are shown in order of occurrence with their alarm codes and details about the type of alarm, such as name.

When a new alarm occurs, it is stored as number 1, and the numbers of the other alarms are raised starting from the top of the list. For example, what was alarm number 1 now becomes number 2. The last alarm is eliminated. These numbers are changed immediately by SigmaWin100 when an alarm occurs. However, alarm traceback data is not updated when alarms with the same alarm number occur consecutively.

Click **Clear** to delete or clear the alarm history.

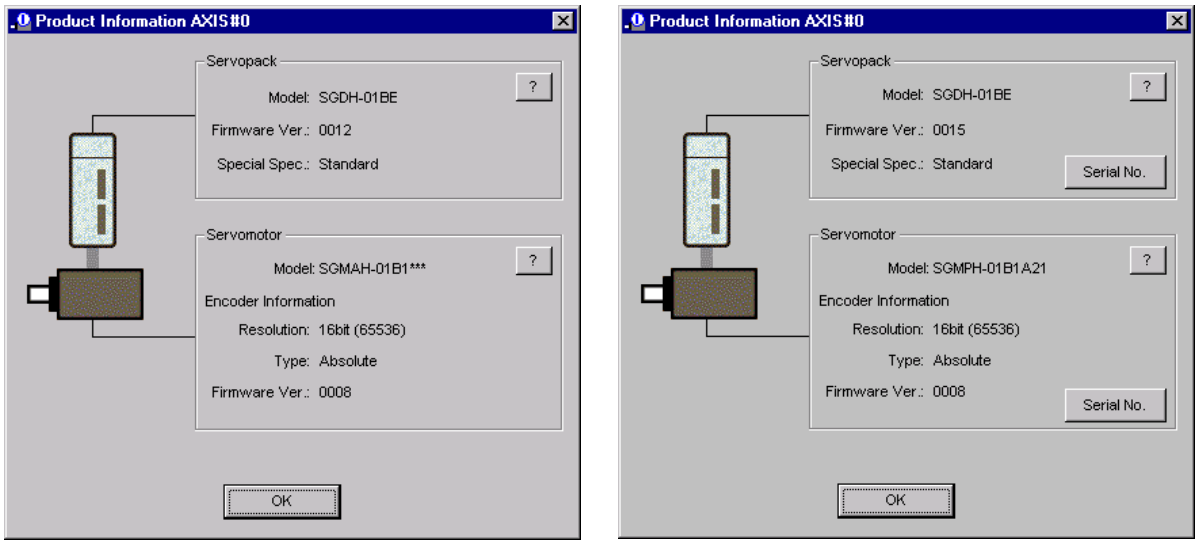
Click the ? button to display details concerning a specific alarm and its corrective measures.

4.3 Monitor

4.3.1 Product Information

Information about the SERVOPACK and the motor can be viewed in the Product Information window.

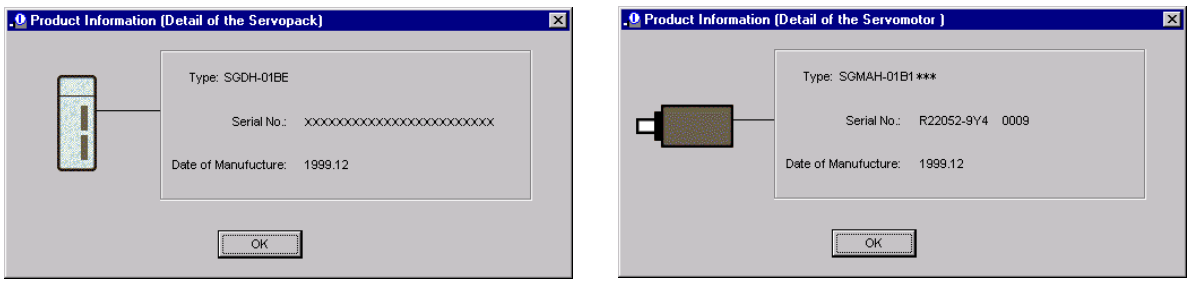
In the SigmaWin100 main window, click **Monitor** and then click **Product Information**. Information about the SERVOPACK and the motor will be displayed. The windows differ in SERVOPACK types.



Product Information Window

Click the ? button to display the specifications for the respective product models.

Click **Serial No.** to display the details of the respective product information.



Product Information (Detail) Window

Click **OK** to return to the SigmaWin100 main window.

4.3.2 Monitor

The SERVOPACK's status, movement, and I/O signal status, can be monitored on the computer screen.

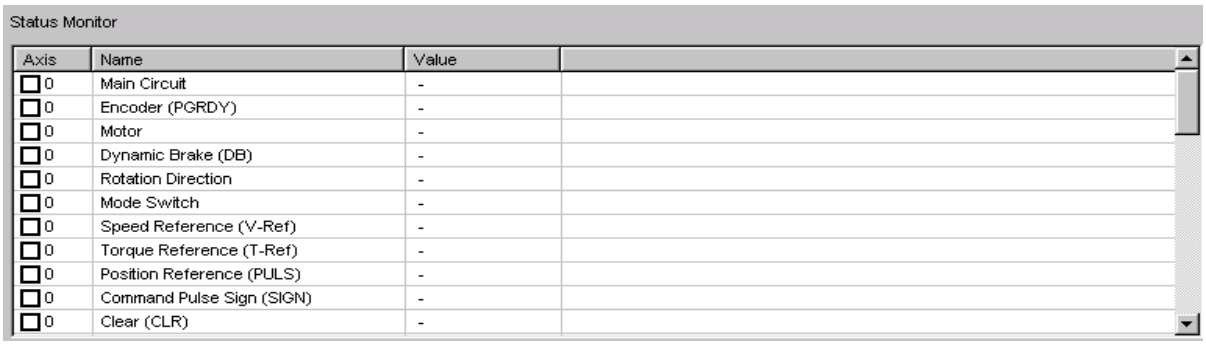
There are four types of monitor windows: Status Monitor, Motion Monitor, Input Signal Monitor, and the Output Signal Monitor.

The monitor windows are independent of each other, but several windows can be displayed at the same time.

Status Monitor

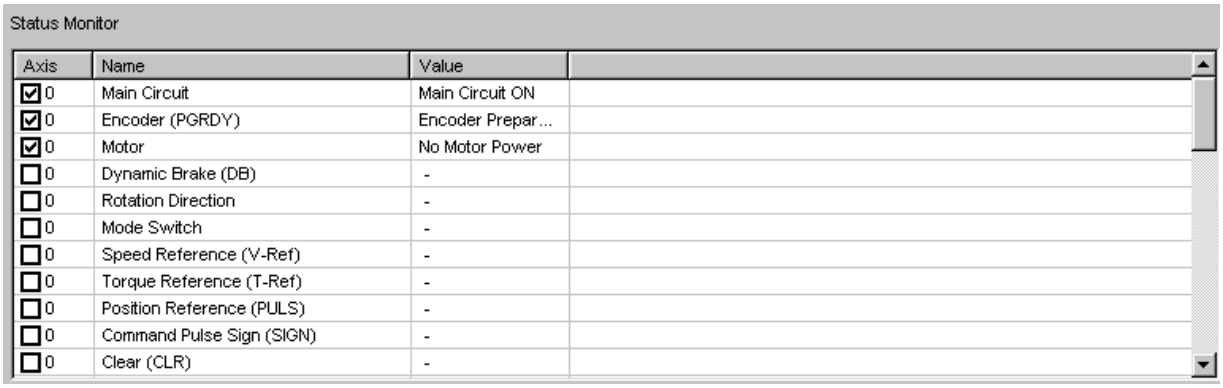
To monitor the status of the SERVOPACK, use the following procedure.

1. In the SigmaWin100 main window, click **Monitor**, point to **Monitor** and click **Status Monitor**.



   The items which can be monitored are listed.

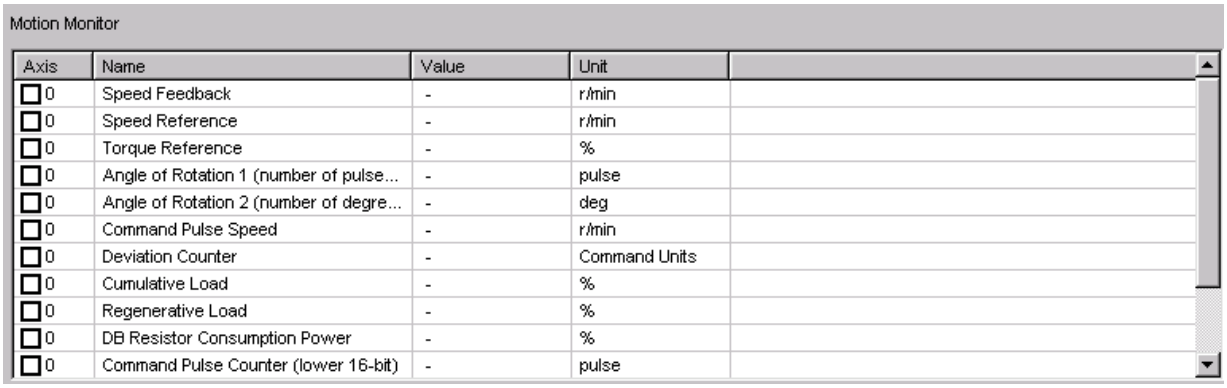
2. Select the items to be monitored. The current status of a selected item is displayed in the "Value" column.



Motion Monitor

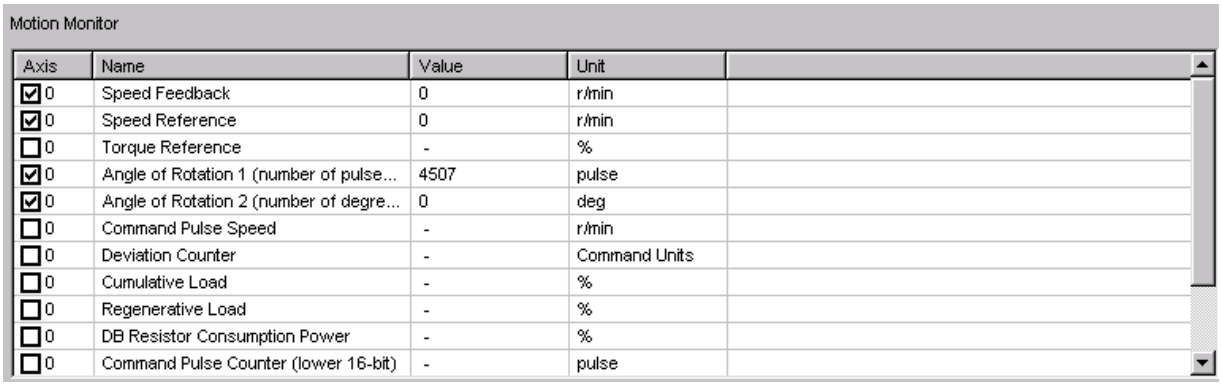
To monitor the motions of the SERVOPACK, use the following procedure.

1. In the SigmaWin100 main window, click **Monitor**, point to **Monitor** and click **Motion Monitor**.



The items which can be monitored are listed.

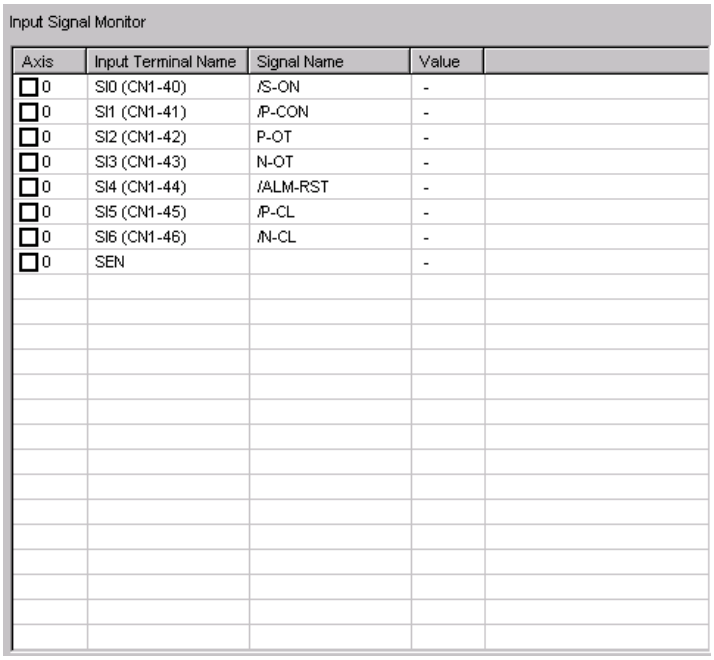
2. Select the items to be monitored. The current status of a selected item is displayed in the "Value" column.



Input Signal Monitor

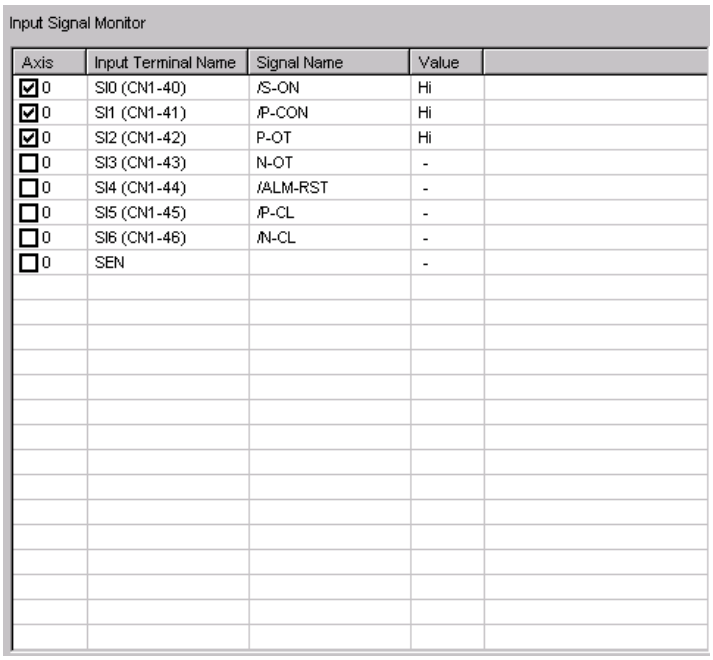
To monitor the input signal of the SERVOPACK, use the following procedure.

1. In the SigmaWin100 main window, click **Monitor**, point to **Monitor** and click **Input Signal Monitor**.



   The items which can be monitored are listed.

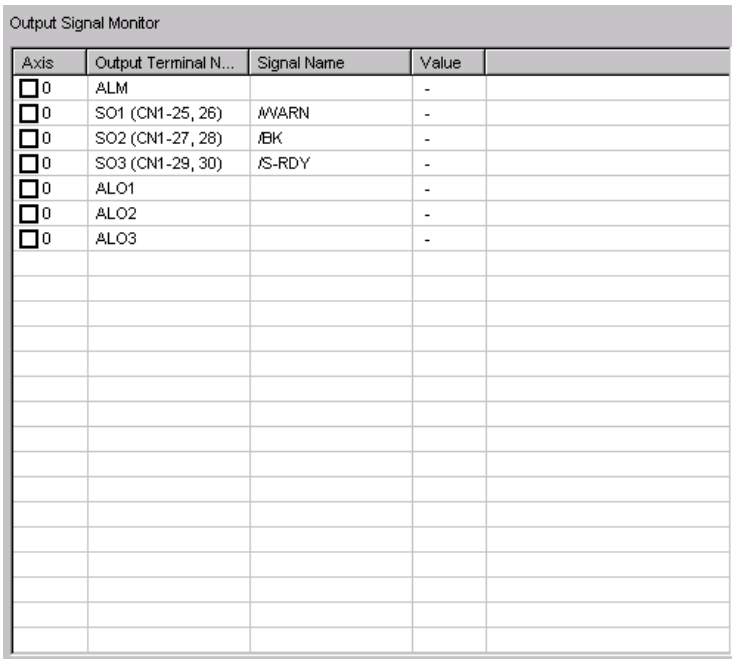
2. Select the items to be monitored. The current status of a selected item is displayed in the "Value" column.



Output Signal Monitor

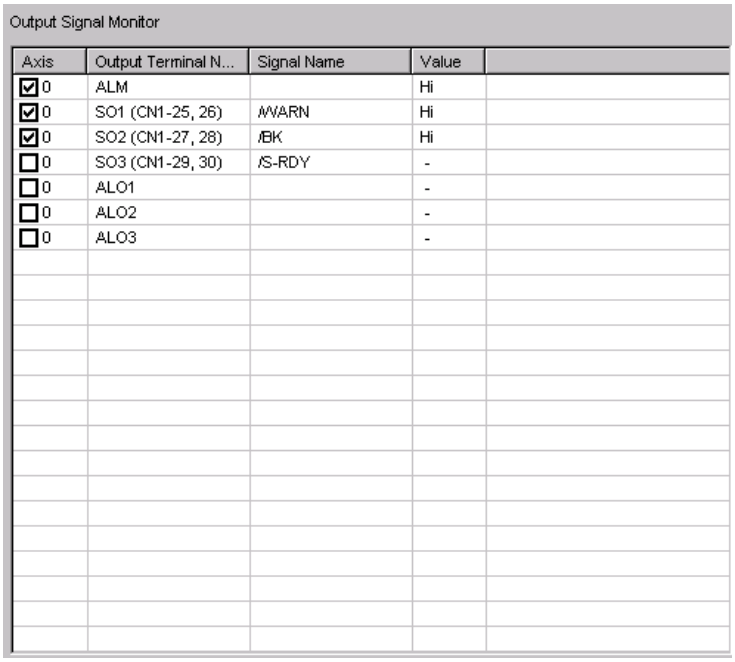
To monitor the output signal of the SERVOPACK, use the following procedure.

1. In the SigmaWin100 main window, click **Monitor**, point to **Monitor** and click **Output Signal Monitor**.



   The items which can be monitored are listed.

2. Select the items to be monitored. The current status of a selected item is displayed in the "Value" column.



4.4 Setup

4.4.1 Setting the Absolute Encoder

■ Initializing the Absolute Encoder

⚠ WARNING
The absolute encoder setup function resets the multi-turn counter and the encoder alarms for a connected serial absolute encoder. If the absolute encoder's multi-turn counter is reset to zero, the previously defined mechanical system will change to a different coordinate system. Operating the machine in this state is extremely dangerous. Failure to observe this warning may result in personal injury and/or damage to the machine. Be sure to reset the zero point for the mechanical system after the encoder has been successfully set up.

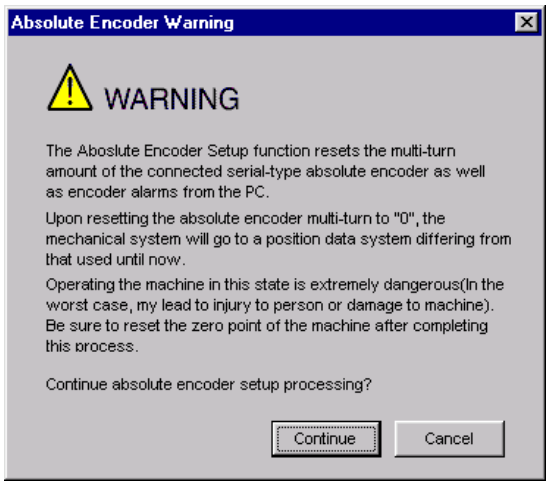
Set up the absolute encoder in the following cases:

- At initial machine startup
- When an "Encoder Backup Alarm" has occurred
- When the SERVOPACK power has been turned off, and the encoder cable removed.

The absolute encoder can only be set up while the servo is off. Turn the power back on after the encoder has been successfully set up.

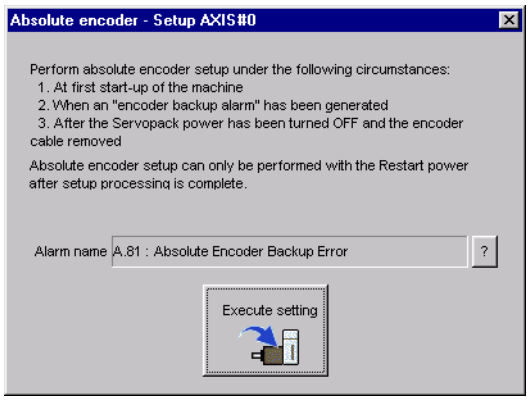
Set up the absolute encoder using the following procedure.

1. In the SigmaWin100 main window, click **Setup**, point to **Set Absolute Encoder** and click **Reset Absolute Encoder**. A warning message appears confirming if you want to continue the processing.



Click **Cancel** to return to the main window without resetting the absolute encoder.

2. Click **Continue**, and the Absolute encoder Setup box appears.

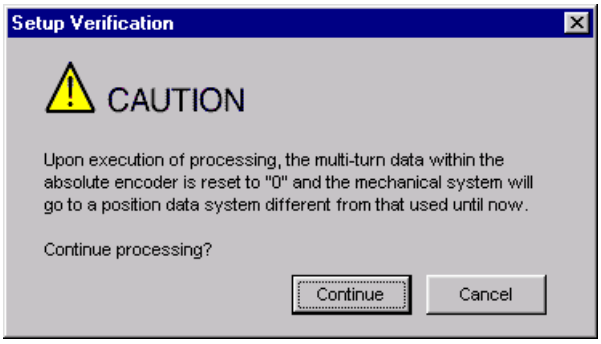


The Alarm Name box displays the code and name of the alarm that is occurring now.

Click the ? button to display details concerning a specific alarm and its corrective measures.

Click ✕ button to return to the main window without resetting the absolute encoder.

3. Click **Execute setting**, and a verification message appears confirming if you want to continue although the coordinate system will change.



Click **Cancel** to return to the previous window without resetting the absolute encoder.

4. Click **Continue** to set up the encoder.

< If Setup is Unsuccessful >

If setting up is attempted with the servo ON, a reset conditions error occurs, and the processing is aborted.

Click **OK** to return to the main window.

< If Setup Completes Normally >

If the encoder is set up successfully, a warning message will appear reminding you that the coordinate system has changed and must also be reset.

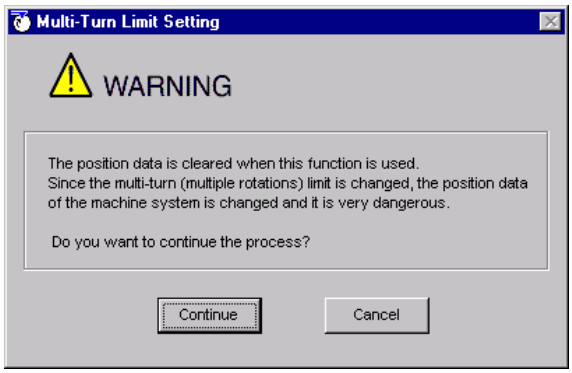
5. Click **OK** to return to the main window. Restart the servo, and perform an origin search for the upper-level controller.

■ Setting the Multi-Turn Limit

If using an absolute detection system for machines, such as round tables, that turn in response to the number of times that the load shaft turns, reset the multi-turn data from the encoder to zero after a set number of rotations (referred to as "m"). The load shaft of the machine turns "n" times, and the motor turns "m" times.

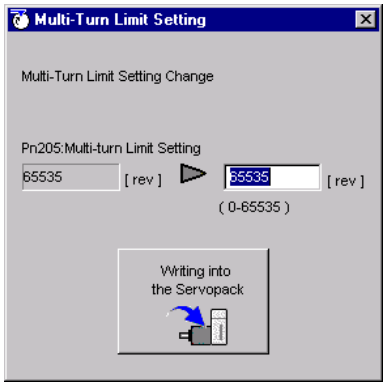
Set the multi-turn limit to the SERVOPACK and the servomotor using the following procedure.

1. In the SigmaWin100 main window, click **Setup**, print to **Set Absolute Encoder** and click **Multi-Turn Limit Setting**. A verification message appears confirming if you want to continue although the position data will change.

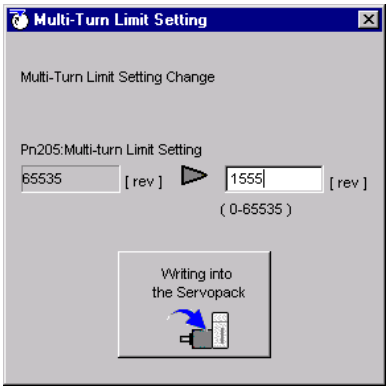


Click **Cancel** to return to the main window without setting the multi-turn limit.

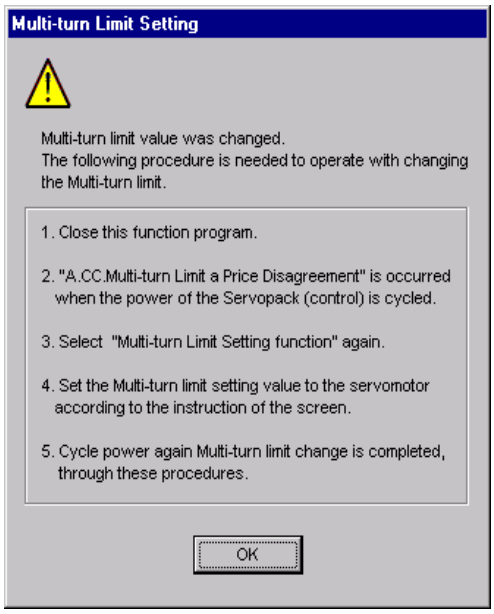
2. Click **Continue**, and the Multi-Turn Limit Setting box appears.



3. Change the setting to the desired number of revolutions.

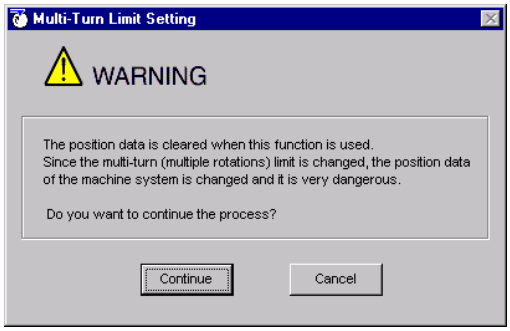


4. To save the settings, click **Writing into the Servopack**, and a warning message appears.

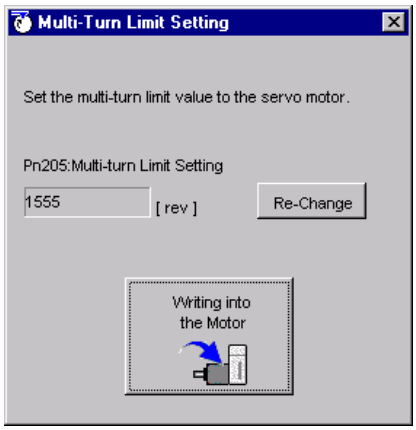


5. Click **OK** and the settings are changed to the new ones.
6. After turning off the power, restart the SERVOPACK. Because only the settings for the SERVOPACK were made, the settings for the motor are still imcomplete and an alarm occurs.

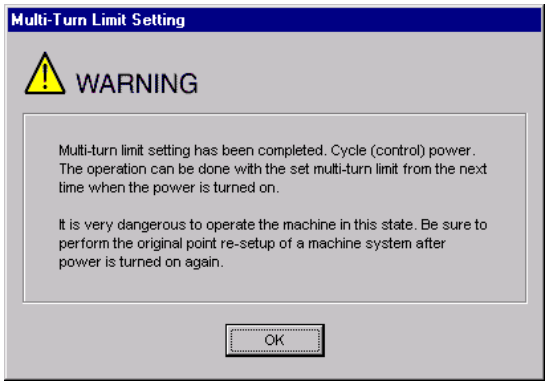
7. Return to the SigmaWin100 main window. To make the settings for the motor, click **Setup** and then click **Multi-Turn Limit Setting** again. A verification message appears confirming if you want to continue although the position data will change.



8. Click **Continue**, and the Multi-Turn Limit Setting box appears. To change the settings, click **Re-Change**.



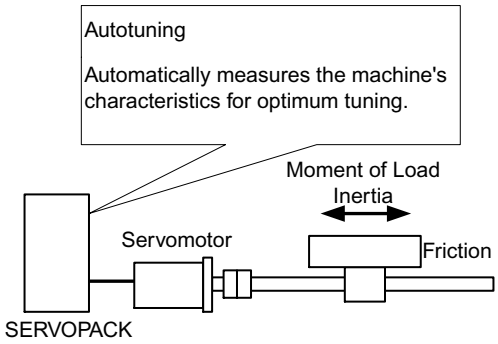
9. To save the settings, click **Writing into the Motor**, and a warning message appears.



10. Click **OK**.

4.4.2 Online Autotuning

Incorrect settings for the speed loop gain, position loop gain, in the servo system are often the causes of slow performance when positioning. Set these servo gains to match the machine's configuration and rigidity.

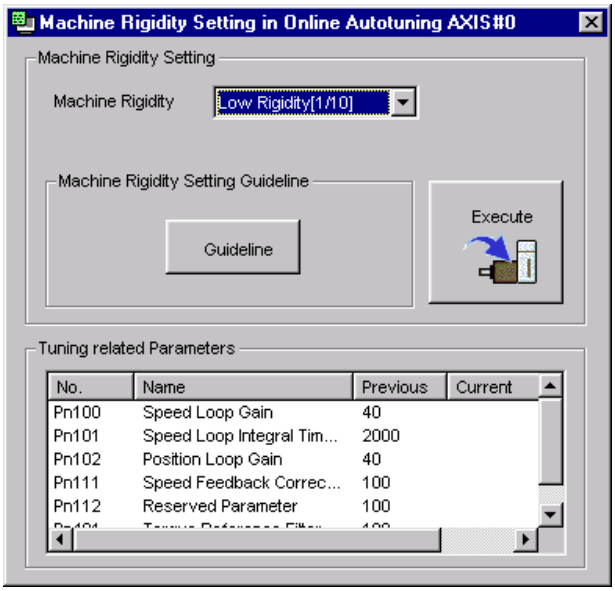


The SERVOPACK has an autotuning function which automatically measures the mechanical characteristics of the system and sets the necessary servo gains. Using this function makes it easy, even for beginners, to tune servo gains. The servo gains are set in the parameters.

■ Setting Machine Rigidity in Online Autotuning

Select the target values for the speed loop gain and position loop gain for the servo system in the Machine Rigidity Setting box during online autotuning.

In the SigmaWin100 main window, click **Setup**, point to **Set Online Autotuning** and click **Set Rigidity**, and the Machine Rigidity Setting box appears.



Rigidity Setting box during Online Autotuning

Machine Rigidity

Select the machine's rigidity from the data boxes. Increasing the machine rigidity setting will increase the loop gains and shorten the positioning time of the servo system. If the setting is too high, however, machine excitation may result. If excitations occur, lower the setting.

Select the machine's rigidity according to the recommendations in the following table. However, these settings may not be appropriate for all machines.

Drive Type	Machine Rigidity
Direct connection to ball screw	4 to 10
Ball screw with gearbox	3 to 4
Timing belt	1 to 4
Chain	1 to 3
Harmonic gears	1 to 3

Click **Guideline** to view details on the rigidity setting guidelines.

Execute

When **Execute** is clicked, the tuning-related parameters will automatically change according to the rigidity setting. The changed settings are displayed in the "Current" column.

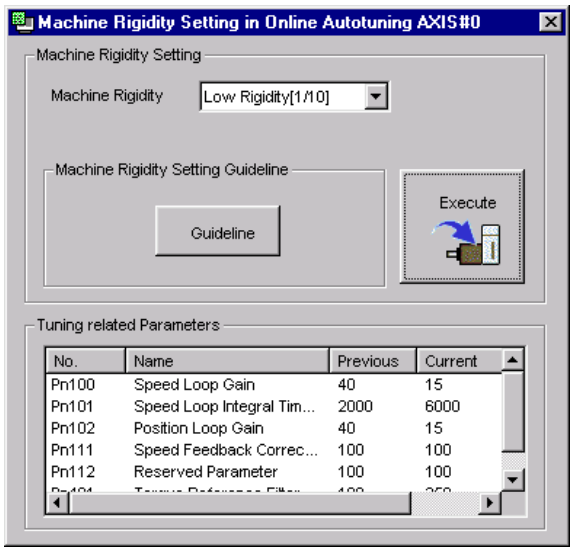
Tuning related Parameters

Lists the parameters needed for autotuning.

Previous: Lists the settings that were used before the rigidity was changed.

Current: Lists the settings that are changed based on the rigidity setting.

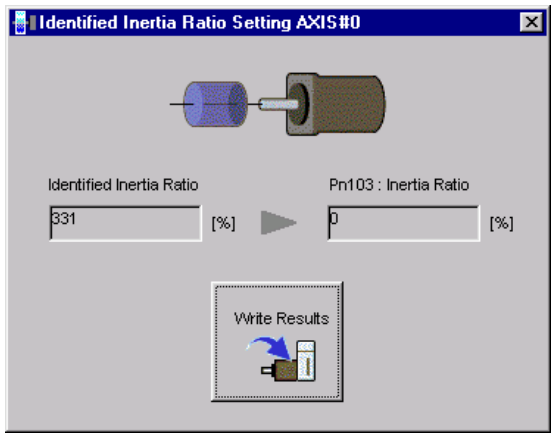
Click **Execute**, and the new changed values are displayed in the "Current" column.



■ Saving Autotuning Results

Online autotuning constantly calculates the latest moment of inertia and updates the data so that the speed loop gain meets the target value. The autotuning results must be saved in the Identified Inertia Ratio Setting box so that the settings can be used the next time that the servo is turned on.

In the SigmaWin100 main window, click **Setup**, point to **Set Online Autotuning** and click **Set Identified Inertia Ratio** and the Identified Inertia Ratio Setting box appears.



Identified Inertia Ratio

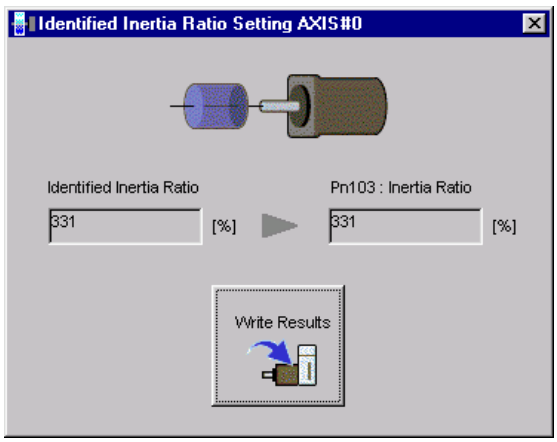
Shows the latest load inertia ratio. This value constantly changes as the servomotor accelerates or decelerates.

Write Results

Assign the currently displayed load inertia to the SERVOPACK parameter Pn103.

Pn103: Inertia Ratio

Shows the load inertia ratio that was just assigned to parameter Pn103 when the **Write Results** was clicked.



4.4.3 Offset Adjustment

There are three types of offset adjustments.

- Speed/Torque reference offset adjustment
- Analog monitor output adjustment
- Motor current detection offset adjustment

■ Adjusting Speed and Torque Reference Offset

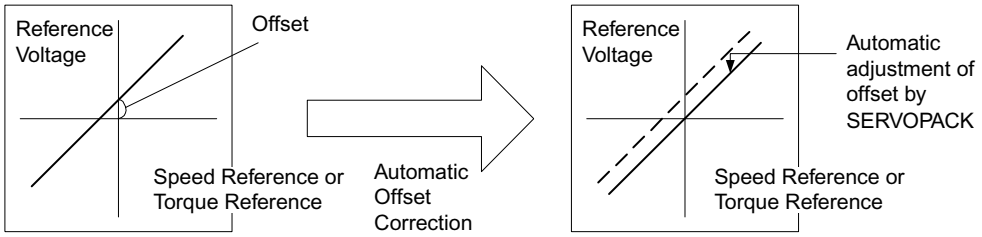
There are two types of speed/torque reference offset adjustment: Automatic and Manual.

Automatic Adjustment

When using the speed/torque control mode, the motor may turn slightly even if the analog reference voltage is set to 0V. This occurs when there is a slight (in units of mV) offset in the reference voltage of the upper-level controller or external circuit.

With this function, you can measure the offset and automatically adjust the reference voltage. Both the speed and torque references can be adjusted.

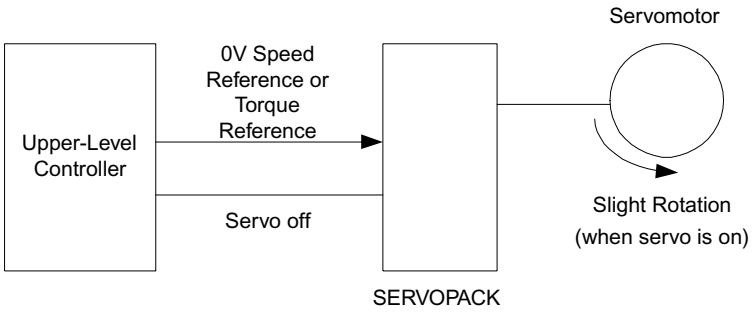
Automatically adjust the offset as follows when a voltage reference (offset) exists in either the upper-level controller or external circuit.



Once the offset has been automatically adjusted, the offset is recorded within the SERVOPACK.

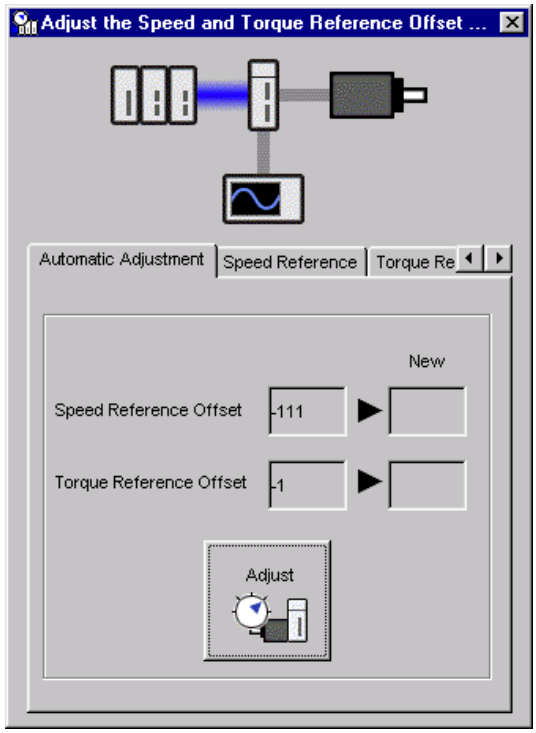
Automatically adjust the offset using the following procedure.

1. Check that the power of the SERVOPACK is turned off.
2. Set the reference voltage so that it will be regarded as 0V by the upper-level controller or external circuit.

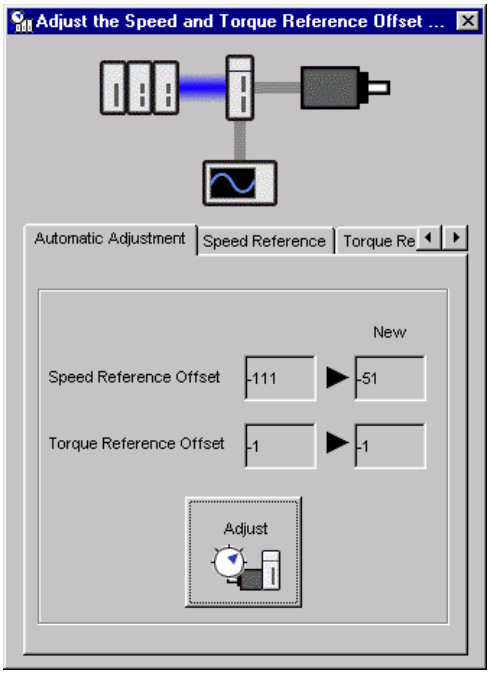


3. In the SigmaWin100 main window, click **Setup**, point to **Adjust Offset** and click **Adjust the Speed and Torque Reference Offset**, and the Adjust the Speed and Torque Reference Offset box appears.

4. Click the **Automatic Adjustment** tab.



5. Click **Adjust**.



The automatically adjusted values are displayed in the "New" box.

Manual Adjustment

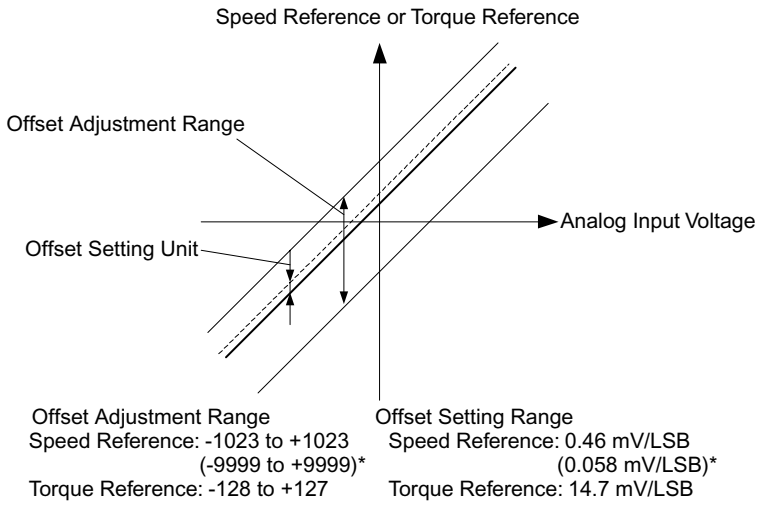
Manual adjustment of the speed/torque reference offset is a function that can be used in the speed and torque control modes. Use under the following conditions.

- When the position loop is closed in the upper-level controller and the error pulse is zero at servo lock stop
- When an offset has been purposefully set

This function may also be used when checking the offset data that had been automatically adjusted.

Although the basic functions are the same as those for the reference offset automatic adjustment mode, the adjustment must be done while directly inputting the offsets. Offsets can be set in both the speed reference and the torque reference.

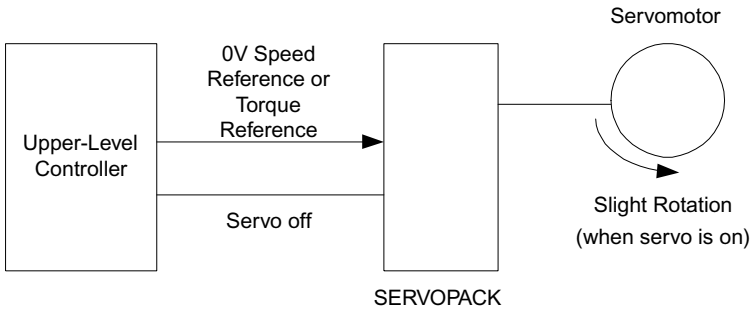
The following diagram shows the range and setting units of the offset adjustment.



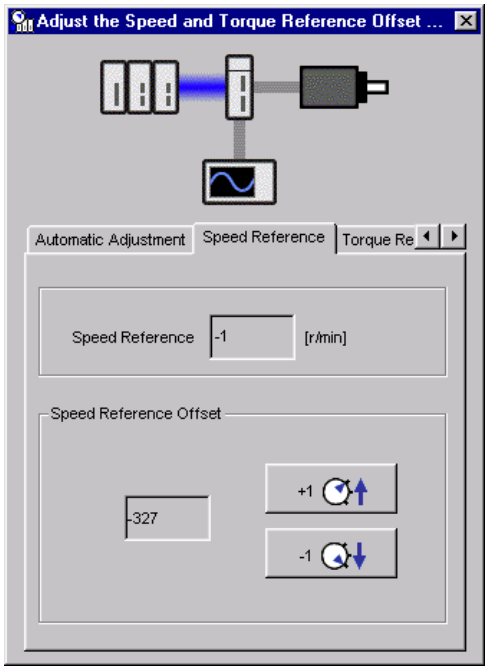
*Items in parentheses ( ) are values for the SGDM-□DA, and SGDM-□D (version 0006 and later).

Manually adjust the offset using the following procedure.

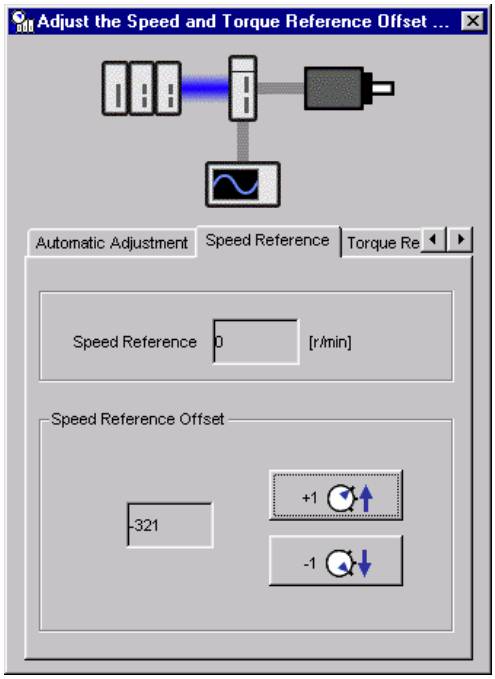
1. Set the reference voltage so that it will be regarded as 0V by the upper-level controller or external circuit.



2. In the SigmaWin100 main window, click **Setup**, point to **Adjust Offset** and click **Adjust the Speed and Torque Reference Offset**, and the Adjust the Speed and Torque Reference Offset box appears. Click the **Speed Reference** tab to adjust the speed reference; click the **Torque Reference** tab to adjust the torque reference. The **Speed Reference** tab is clicked, the following box appears.



3. Use the **+1** and **-1** buttons to adjust the settings so that the value in the "Speed Reference" box becomes zero.



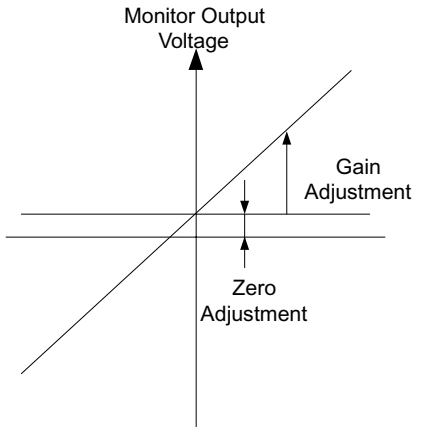
The settings for the torque reference can also be adjusted using the same procedure after clicking the **Torque Reference** tab.

■ Adjusting Analog Monitor Output

With this function, you can monitor the motor speed, torque reference, position error, and so on by the analog monitor output.

There are two types of analog monitor output adjustment: Zero Adjustment and Gain Adjustment.

Perform zero adjustment when correcting a error in output voltage caused by drift, or a error from the zero point caused by noise on the monitoring system. Also, perform adjust the gains when matching the sensitivity to the measurement system.

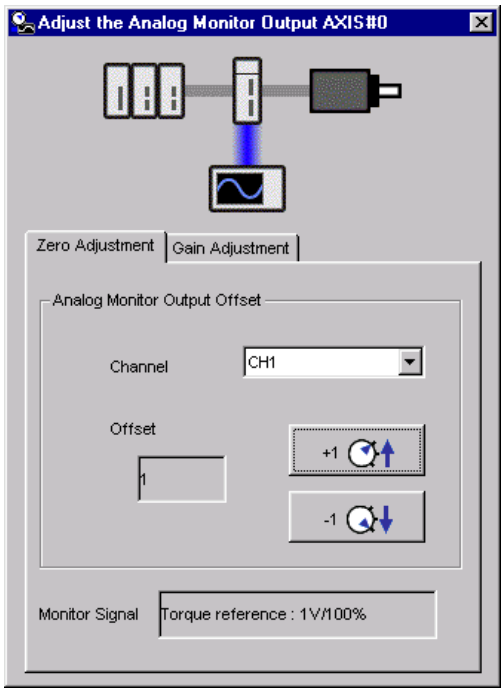


	Setting Unit
Zero Adjustment Range: ± 2V	17mV/LSB
Gain Adjustment Range: 50% to 150%	0.4% LSB

Zero Adjustment

Adjust the zero position using the following procedure.

1. In the SigmaWin100 main window, click **Setup**, point to **Adjust Offset** and click **Adjust the Analog Monitor Output**, and the Adjust the Analog Monitor Output box appears. Click the **Zero Adjustment** tab.



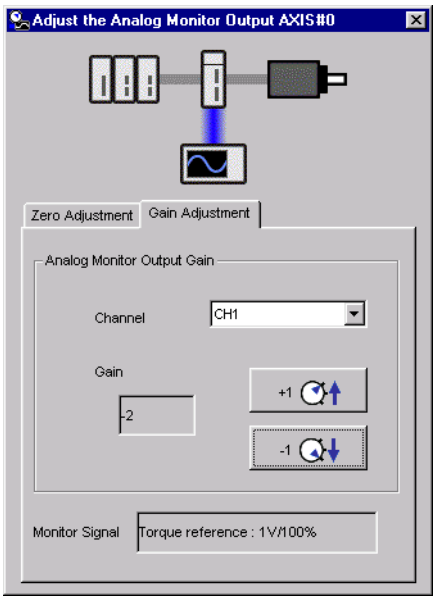
There are two channels: CH1 and CH2.

2. While watching the analog monitor, use the **+1** and **-1** buttons to adjust the offset.

Gain Adjustment

Adjust the gain using the following procedure.

1. In the SigmaWin100 main window, click **Setup**, point to **Adjust Offset** and click **Adjust the Analog Monitor Output**, and the Adjust the Analog Monitor Output box appears. Click the **Gain Adjustment** tab.



There are two channels: CH1 and CH2.

2. While watching the analog monitor, use the **+1** and **-1** buttons to adjust the gain.

■ Adjusting Motor Current Detection Offset

⚠ CAUTION
The offset of the motor current detection need not usually be adjusted because it is adjusted at delivery by Yaskawa. If the offset of the detection is carelessly or incorrectly set, the performance will be degraded. Use this function only when the torque ripple is obviously much larger than that of other SERVOPACKs.

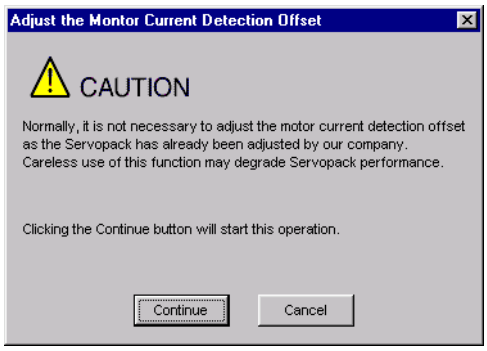
Usually, the offset of the motor current detection does not have to be adjusted because it is adjusted at delivery by Yaskawa. Adjust the offset only when higher precision is needed, such as if the torque ripple error is thought to be excessive based on the current offset or if there is a need for further reduction in torque ripple.

There are two types of motor current detection offset adjustment: Automatic and Manual.

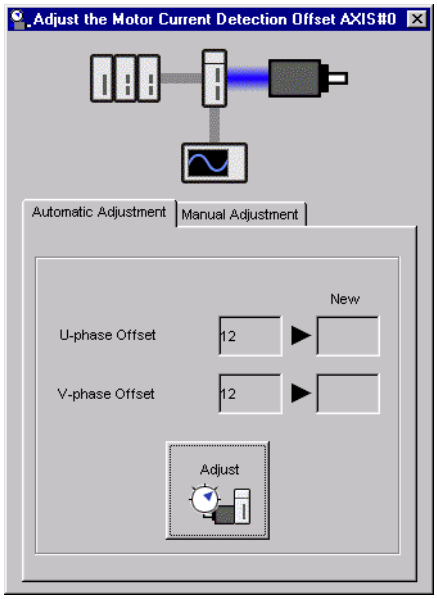
Automatic Adjustment

Automatically adjust the offset using the following procedure.

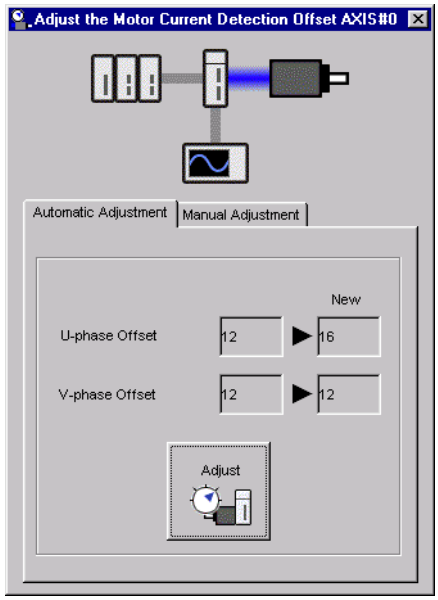
1. In the SigmaWin100 main window, click **Setup**, point to **Adjust Offset** and click **Adjust the Motor Current Detection Offset**. A warning message appears confirming if you want to continue although the SERVOPACK's performance will be affected if the function is used carefully or incorrectly.



2. Click **Continue**, and then click the **Automatic Adjustment** tab.



3. Click **Adjust**.

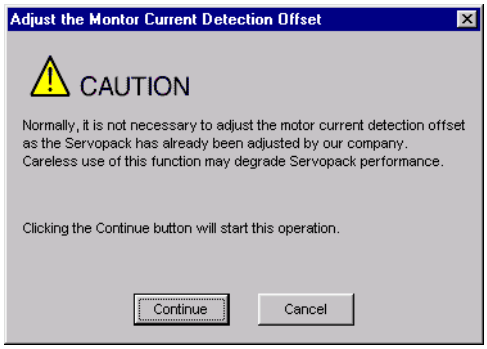


The automatically adjusted values are displayed in the "New" box.

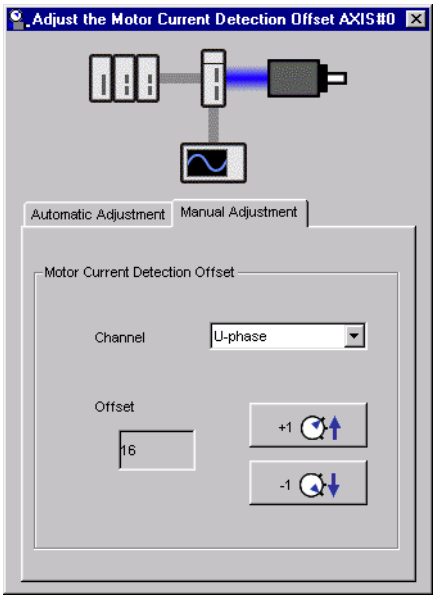
Manual Adjustment

Manually adjust the offset using the following procedure.

1. Turn the motor at 100 min^{-1}.
2. In the SigmaWin100 main window, click **Setup**, point to **Adjust Offset** and click **Adjust the Motor Current Detection Offset**. A warning message appears confirming if you want to continue although the SERVOPACK's performance will be affected if the function is used carefully or incorrectly.



3. Click **Continue**, and then click the **Manual Adjustment** tab.



4. While watching the analog monitor, use the **+1** and **-1** buttons to adjust the offset to minimize the ripple on the torque reference monitor. The U-phase and V-phase currents must be adjusted so that they balance. Repeat the adjustment alternately between them several times.

4.4.4 Origin Search

⚠ WARNING
Using the origin search function while the motor is running is dangerous. Be sure to check the user's manual before using this function. Pay particular attention to the following. • Check the safety of the area adjoining the drive unit. The motor runs at 60min^{-1} for about one minute, while the RUN button is pressed. Make sure that there is no danger in running the motor before actually using it. • The Forward Run Prohibit (P-OT) and Reverse Run Prohibit (N-OT) signals are disabled during the origin search. During operation, make sure to verify the actual operation and position of the motor or machine.

This function moves the motor to the origin and clamps at the position. Use this function when the motor shaft needs to be aligned with the machine.

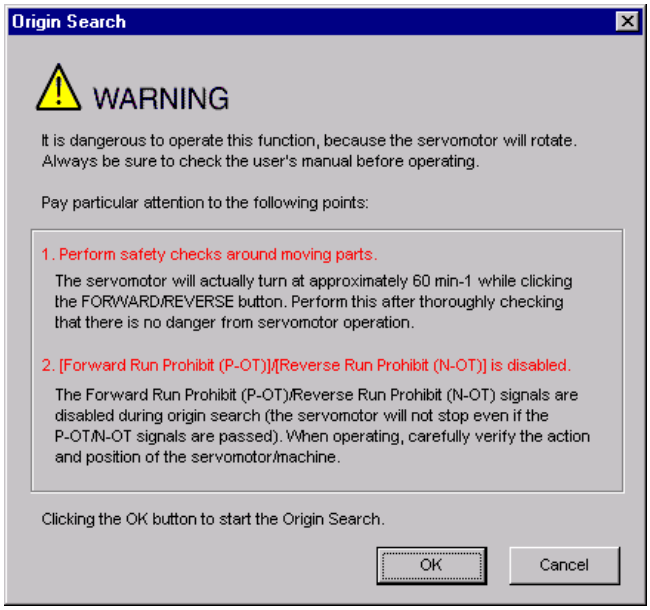
The following conditions must be satisfied to carry out an origin search.

1. The servo ON (/S-ON) input signal is OFF.
2. Parameter Pn50A.1 is set to any number other than "7", and the servo ON mask is released.
3. The password (parameter overwrite prohibition) is set to "0000" allowing overwrite (release of overwrite prohibitions).*

* The SERVOPACK must be restarted after this change to enable the settings.

Perform an origin search using the following procedure.

1. In the SigmaWin100 main window, click **Setup**, and then click **Search Origin**. A warning message appears reminding you of the dangers that are possible when using this function.



Click **Cancel** to return to the main window without performing origin search.

<When the Password Has Been Set>

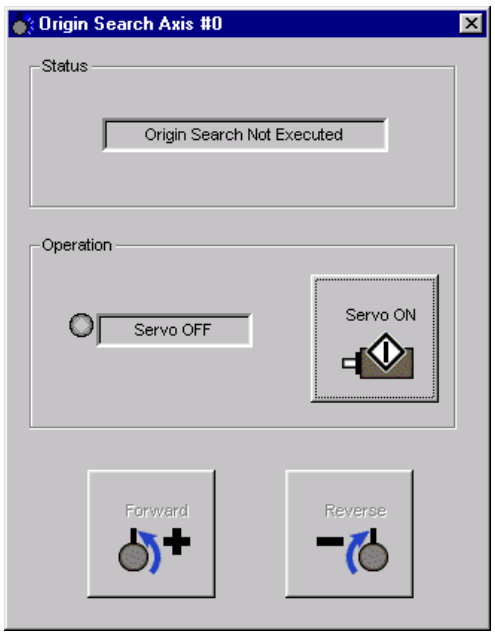
If the password has been set, the following message will appear.

Click **OK**, and cancel the password.

See "4.4.5 Setting the Password" for cancelling method.

2. Click **OK**, and the Origin Search box appears.

   If the servo is on, an error message will appear. Make sure that the servo is off.



Origin Search Box

Status

This displays the run status.

Origin Search not Executed:	The motor has not turned.
Origin Search Executing:	Searching for the origin by turning forward or in reverse.
Origin Search Stopped:	The Forward or Reverse button has been released during the origin search, so the motor stopped.
Origin Search Completed:	Origin found, and the motor stopped (clamped) at the point.

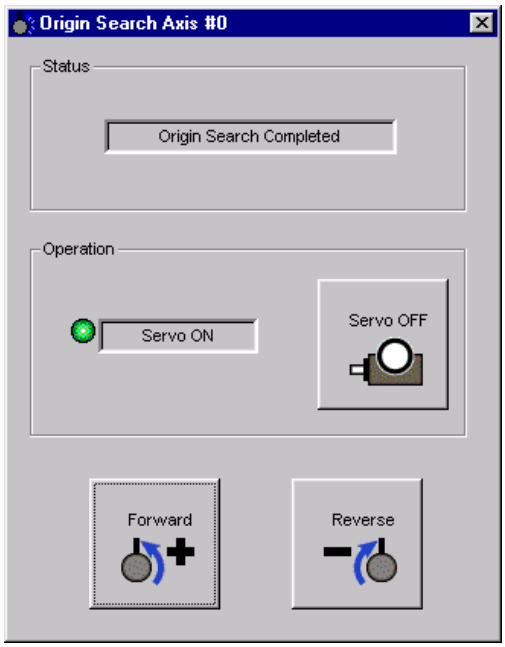
Close the Origin Search box to re-execute another origin search after a one search has been completed.

Operation

On the left, shows if the servo is on or off and the corresponding LED display.

On the right, the button changes according to the servo's status. When the servo is off, the **Servo ON** button appears; when the servo is on, the **Servo OFF** button appears.

3. Click **Servo ON**.



4. Press **Forward** or **Reverse**. The search is performed while one of these buttons is pressed. The axis stops when the search is complete.

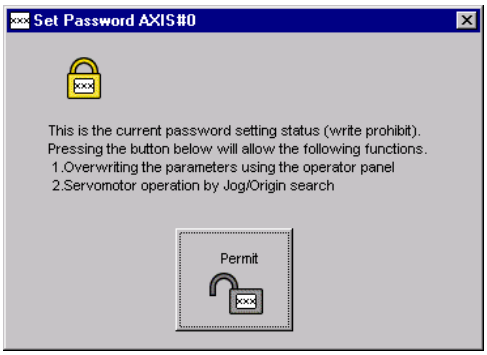
4.4.5 Setting the Password

The password setting function is used to prevent the inadvertent rewriting of the parameters.

Set or cancel the password using the following procedure.

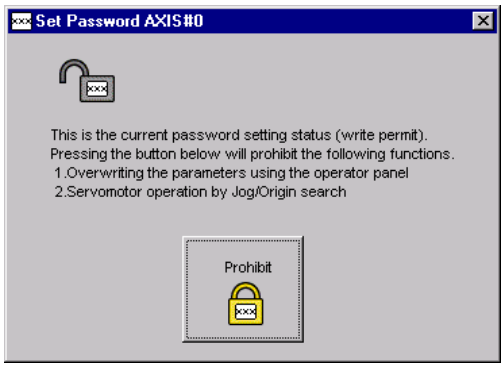
1. In the SigmaWin100 main window, click **Setup**, and then click **Password**. One of the following boxes will appear.

<If the Password Has Been Set>



Click **Permit** to cancel the password.

<If the Password Has Been Cancelled>



Click **Prohibit** to set the password.

2. A message appears, telling you that the password has been changed and will be effective the next time the SERVOPACK is restarted.

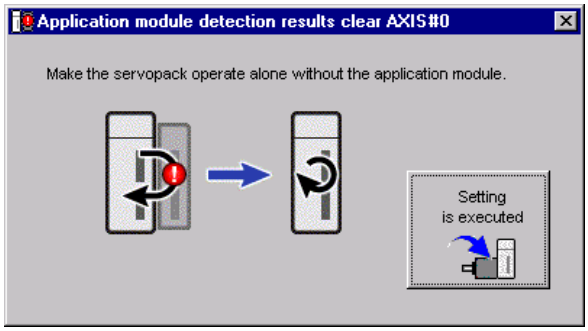
Click **OK** and restart the SERVOPACK.

4.4.6 Clearing the Detected Result of the Application Module

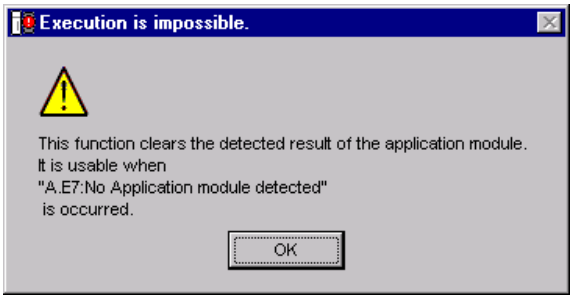
After the SERVOPACK has been used with an application module and then the module is removed, the alarm "A.E7: No Application module detected" occurs when the power is turned on for the first time that the SERVOPACK is used without the module.

Clear the alarm using the following procedure.

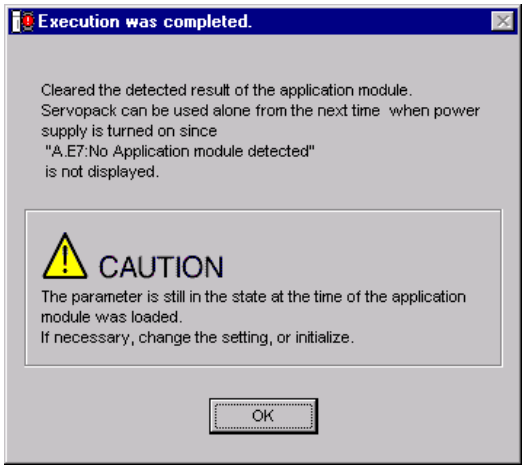
1. In the SigmaWin100 main window, click **Setup** and then click **Application module detection results clear**. The Clearing the detected result of the application module box appears.



If an alarm is not detected, the following box appears.



2. If an alarm is detected, click **Setting is executed**, and the following box appears.



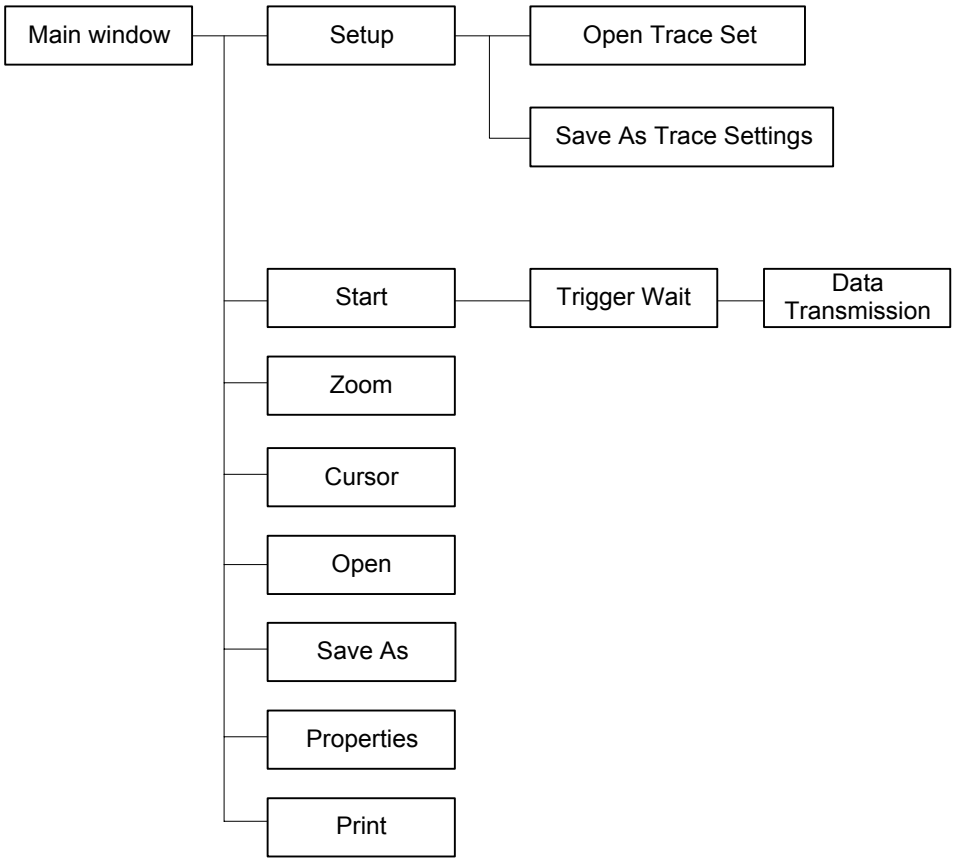
3. Click **OK**.

4.5 Tracing and Tuning

4.5.1 Trace Function

■ Structure

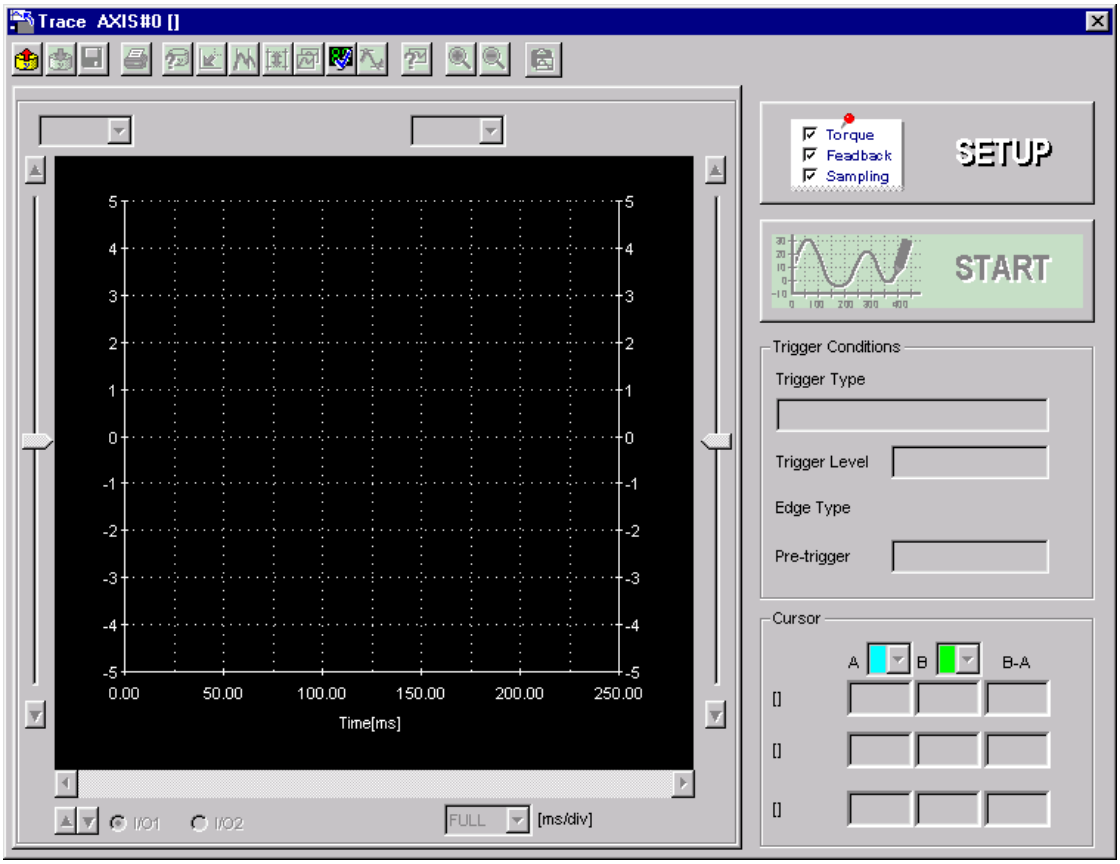
The following flowchart shows how the trace function works.



■ Data Trace

Main Window

In the SigmaWin100 main window, click **Trace** & **Tuning**, and then click **Trace**, and the Trace main window appears.

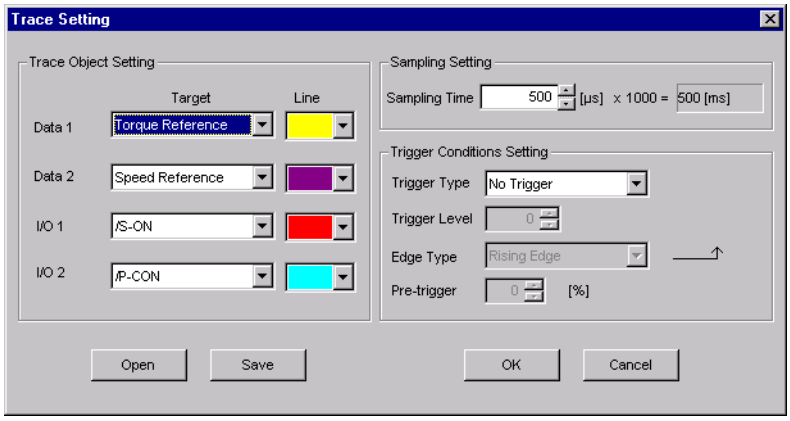


Trace Main Window

Trace Settings

In the Trace main window, click **SETUP**, and the Trace Setting box appears. Select the objects and conditions for the trace.

The settings from the previous trace, if any, are displayed.



Trace Setting Box

< Trace Object Settings >

The settings for the trace objects, or targets can be made here.

Data 1/Data 2

Select content such as "Torque Reference", "Speed Feedback", etc., identical to the analog monitor as trace objects from the data boxes.

I/O 1 / I/O 2

Select output signals such as "/COIN" or "ALM" and input signals such as "/C-SEL", "P-OT", or "N-OT" as trace objects.

Line

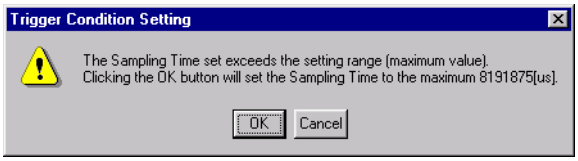
Select a line color for data 1 and 2 and I/O 1 and 2.

< Sampling Setting >

The setting for the allowable interval time for getting trace data can be made here. Data will be obtained every 250 µs if the sampling time is set to 250 µs. The total trace time is the sampling time multiplied by the number of data items. Use the spin button to set the time.

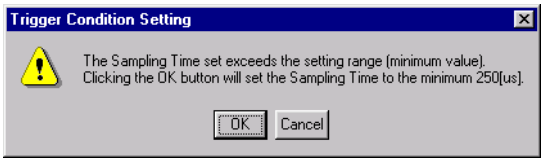
If direct input is attempted, and the value is outside the acceptable range, a warning message will appear telling you that the sampling time is incorrect. The warning will vary according to the error.

1. If the input data setting is larger than the maximum time:



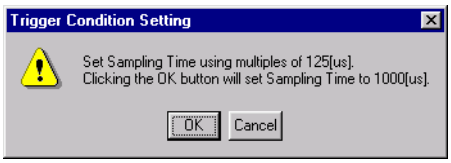
   Click **OK** to automatically adjust the sampling time to the maximum setting. Click **Cancel** to return to the Trace Setting box without setting the sampling time.

2. If the input data is smaller than the minimum setting time:



   Click **OK** to automatically adjust the sampling time to the minimum setting. Click **Cancel** to return to the Trace Setting box without setting the sampling time.

3. If the input data cannot be allocated in the time interval:



   Click **OK** to automatically adjust the sampling time. Click **Cancel** to return to the Trace Setting box without setting the sampling time.

< Trigger Condition Setting >

A trigger is a device for designating the timing of data access. For example, it is possible to set conditions such as "After /COIN signal goes ON" or "After the speed feedback exceeds 100 min^{-1}", and thereby make detailed reference of the servo operation at the time these conditions occur.

Trigger conditions are designated as any one of the following four items.

Trigger Type

Designate the object to which the trigger is applied. The selected objects can either be from the designated in Data 1 and 2, and I/O 1 and 2, or "No Trigger".

If "No Trigger" is selected, the trigger will be applied at the same time as the START button is pressed. Also the settings for "Trigger Level", "Edge Type" and "Pre-Trigger" will be unavailable.

Trigger Type box

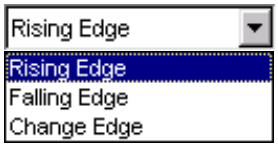
Trigger Level

Designate the standard for determining when the trigger starts. The units for the setting are the same as those of the trigger object selected.

The trigger level cannot be set if the trigger object is "I/O 1 / I/O 2" or "No Trigger".

Edge Type

Designate the direction of change when a trigger is applied. Select "Rising Edge", "Falling Edge", or "Change Edge" as the type of edge.



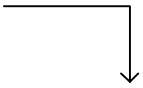
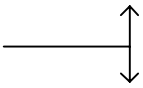
Edge Type Box

Rising Edge: The trigger is detected when the trigger object data rises from below the trigger level to above the trigger level.
When the change is from LO to HI in I/O

Falling Edge: The trigger is detected when the trigger object data falls from above the trigger level to below the trigger level.
When the change is from HI to LO in I/O

Change Edge: The trigger is detected if the trigger object crosses the "Trigger Level " in any way.
When the signal level changes in I/O

The miniature graph beside the Edge Type box shows how the selected edge will look.

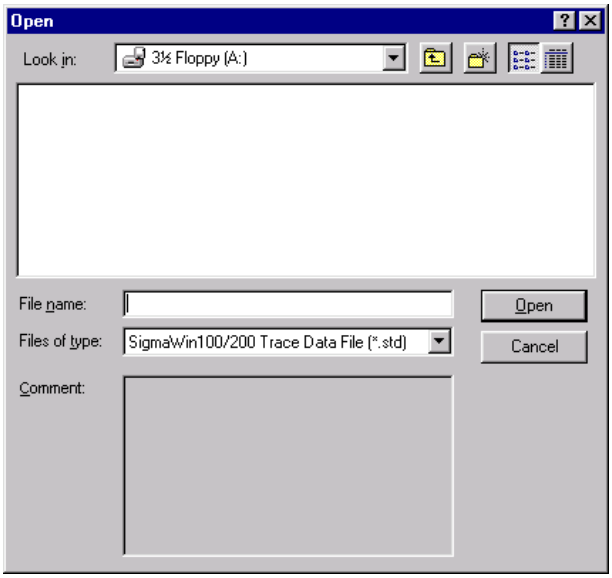
Rising Edge	Falling Edge	Change Edge
		

Pre-Trigger (0% to 99%)

Designate to what degree data is displayed in the graph before a trigger is applied.

Open

In the Trace Setting box, click **Open**, and the trace setting files for the currently connected SERVOPACK are displayed.

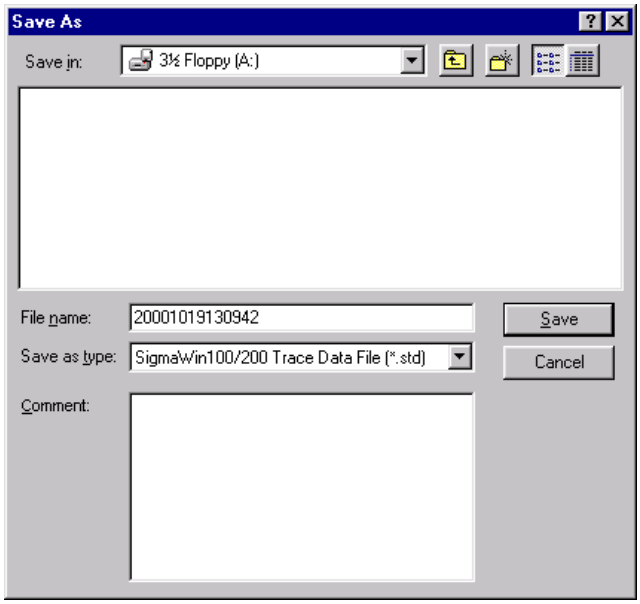


Open Dialog Box

Click **Open** to read the designated trace setting file. Click **Cancel** to return to the Trace Setting box without reading the file.

Save

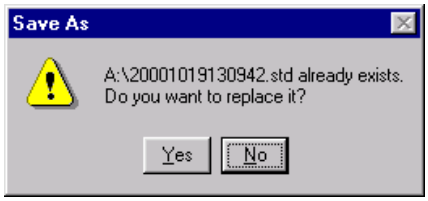
In the Trace Setting box, click **Save**, and then select the storage location for the setting file shown in the Trace Setting box.



Save Dialog Box

Click **Save** to store the file name designating the current trace settings. Click **Cancel** to return to the Trace Setting box without saving the file.

If the file name already exists or if an already existing file is loaded and then re-saved, a warning message appears, telling you that the file name already exists, and asks if you want to replace the existing file.



Click **Yes** to overwrite the already existing file. Click **No** to return to the Save dialog box without saving the file.

OK

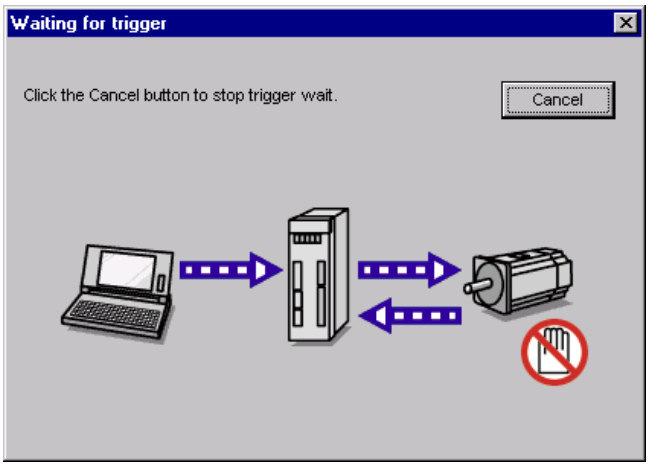
In the Trace Setting box, click **OK** to return to the Trace main window. The trace object and trigger are updated according to the settings.

Cancel

In the Trace Setting box, click **Cancel** to return to the Trace main window without changing the settings.

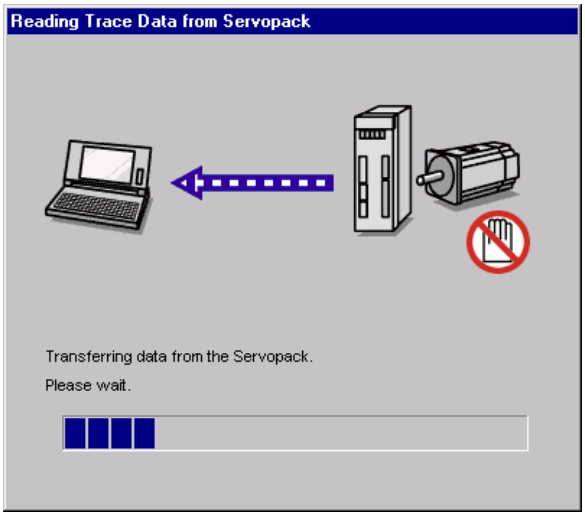
Starting the Trace

In the Trace main window, click **START**, and an illustration showing SigmaWin waiting for the trigger appears on the screen.



Waiting for the Trigger

The illustration is displayed until the set trigger conditions are met. Click **Cancel** to stop waiting for the trigger and to return to the Trace main window.



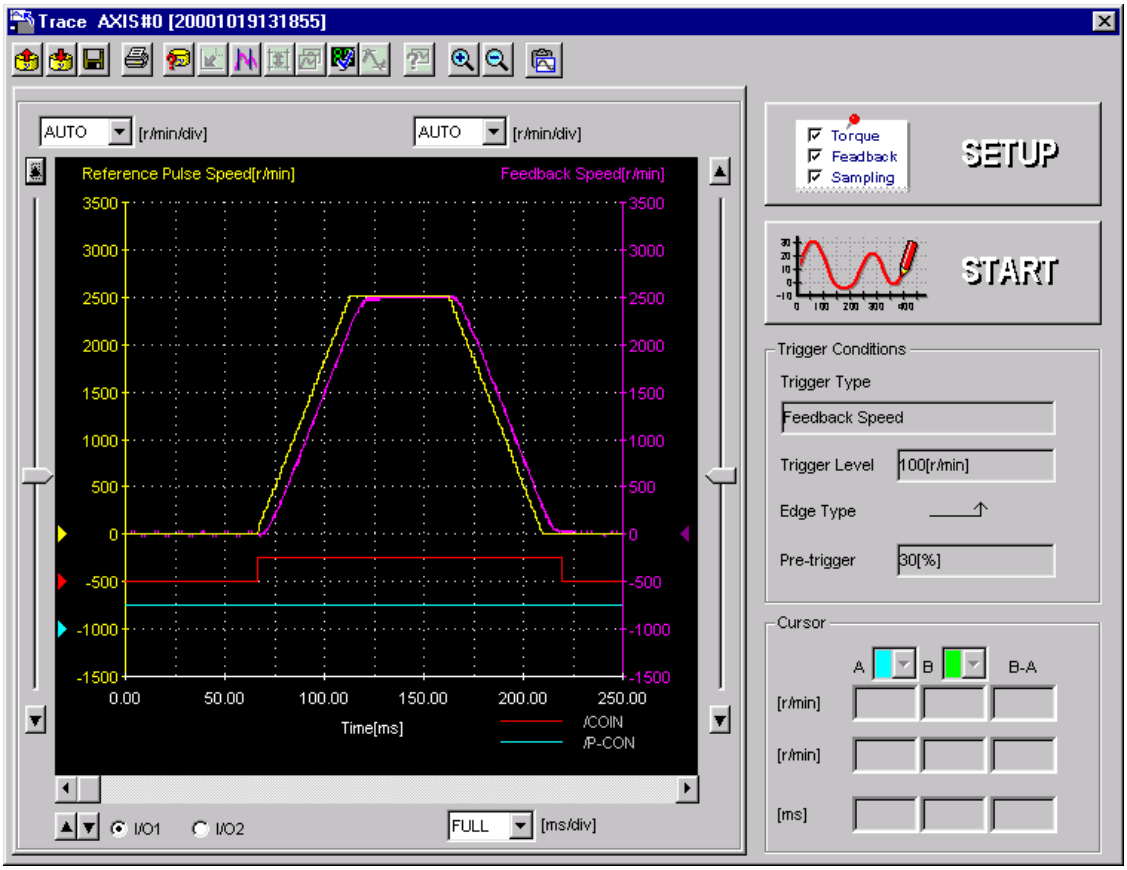
Reading Trace Data from the SERVOPACK

When the conditions are met and the trigger is applied, an illustration showing the progress of the data transmission appears on the screen. The Trace main window is displayed when the data transmission is complete.

Note: 1. The trigger sometimes cannot be detected in less than 2ms due to the relationship of the detection period.
2. If the sampling time is lengthened, SigmaWin may continue to wait for the trigger even after the trigger has been applied. SigmaWin waits because data for the sampling time is saved in the SERVOPACK after the trigger has been applied.

■ Main Window

This Trace main window displays a graph based on the trace settings.



Trace Main Window

Toolbar

The position of the toolbar can be adjusted, and the on-screen display type selected.

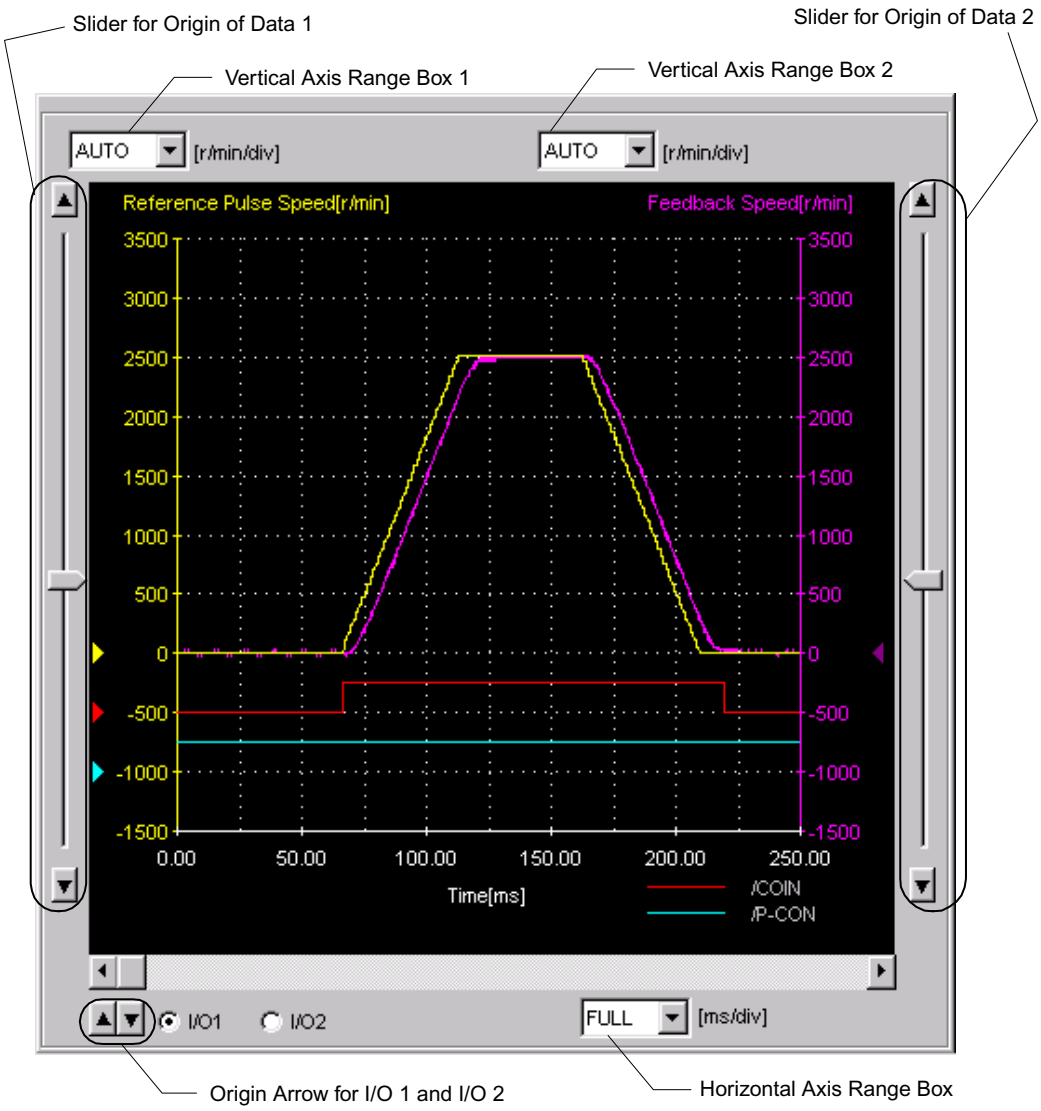
Trace Main Window Toolbar

Toolbar Button	Click this button to:
 Open	Load the trace data file.
 Save As	Save a copy of the on-screen trace graph to a specified file.
 Save	Save the data.
 Print	Print the Trace main window.
 Measurement Conditions	View the conditions to measure the trace.
 Cursor	View the information for the location where a cursor is shown.
 Parameter Online Editing	View the Parameter Online Editing box. For details, see Section 4.1.2.
 Zoom In	Enlarge the view of a selected area.
 Return	Restore the area shown in the window to its usual size.
 Clipboard Copy	Copy the displayed screen to the clipboard.

See "■ Toolbar Details" for details on the toolbar buttons.

Trace Object Graph

In the graph, you can view the trace objects designated in the Trace Setting box.



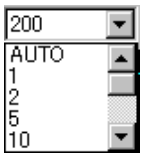
Trace Object Graph

Vertical Axis Range

Select a vertical axis range for both Data 1 and Data 2 from the corresponding box.

If AUTO is selected, the range widths will be automatically adjusted so that all of the data can be shown in the graph.

The range must be selected from the list.

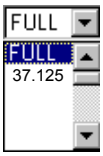


Vertical Axis Range Box

Horizontal Axis Range

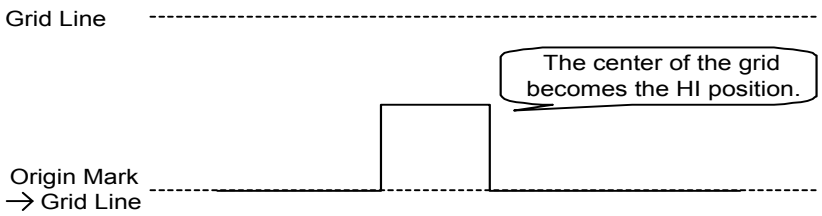
Select a horizontal axis range for the time axis from the box. The time is measured in "ms". The range must be selected from the list.

If FULL is selected, all of the data will be automatically adjusted so that the entire horizontal axis can be displayed. When the window is too small to show all of the horizontal axis, a horizontal scroll bar is displayed to allow you to view all of the axis. .



Horizontal Axis Range Box

Supplement: Regarding I/O Trace Graph



Trigger Conditions

This displays the trigger conditions in the Trace Setting box.

The trigger level is blank if an I/O trace is the trigger condition.

■ Toolbar Details

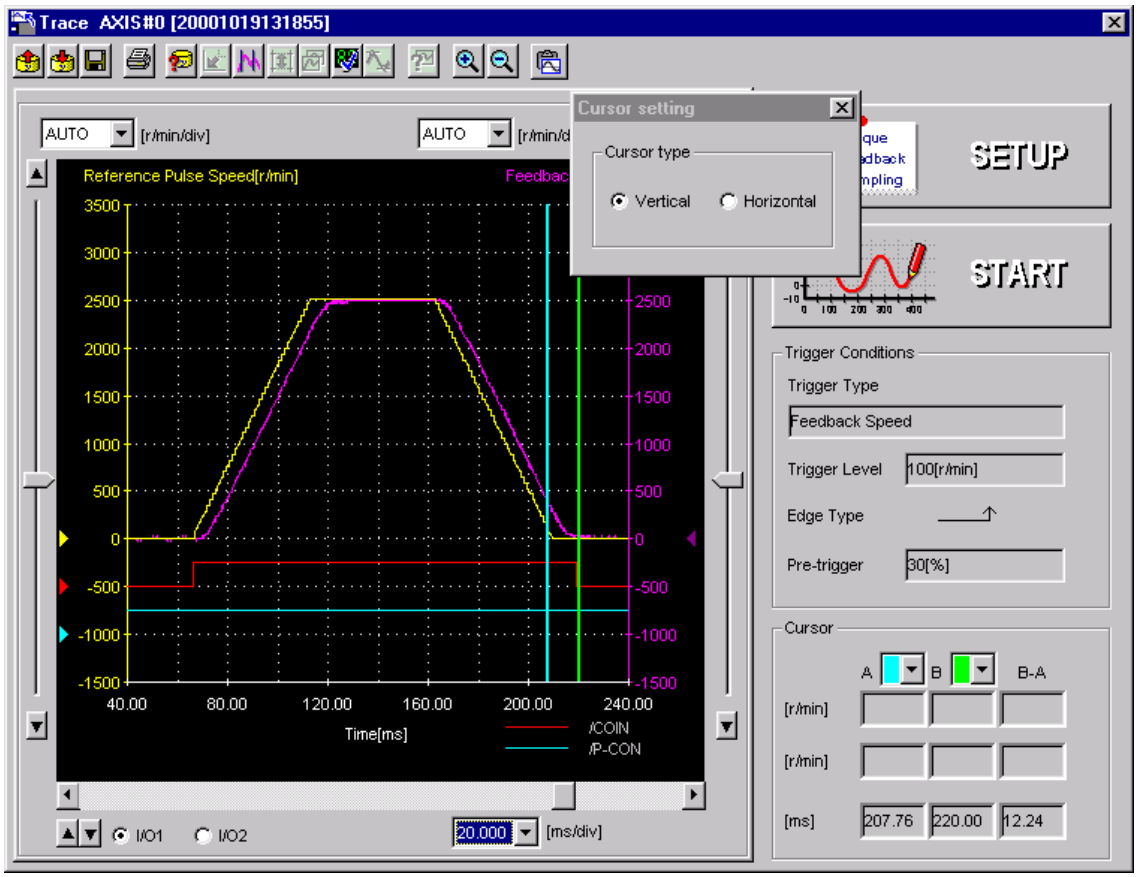
(Cursor) Button

The information for the location where a cursor is shown can be viewed. Information for the cursor locations A and B can be viewed.

The color of cursor locations A and B can be changed.

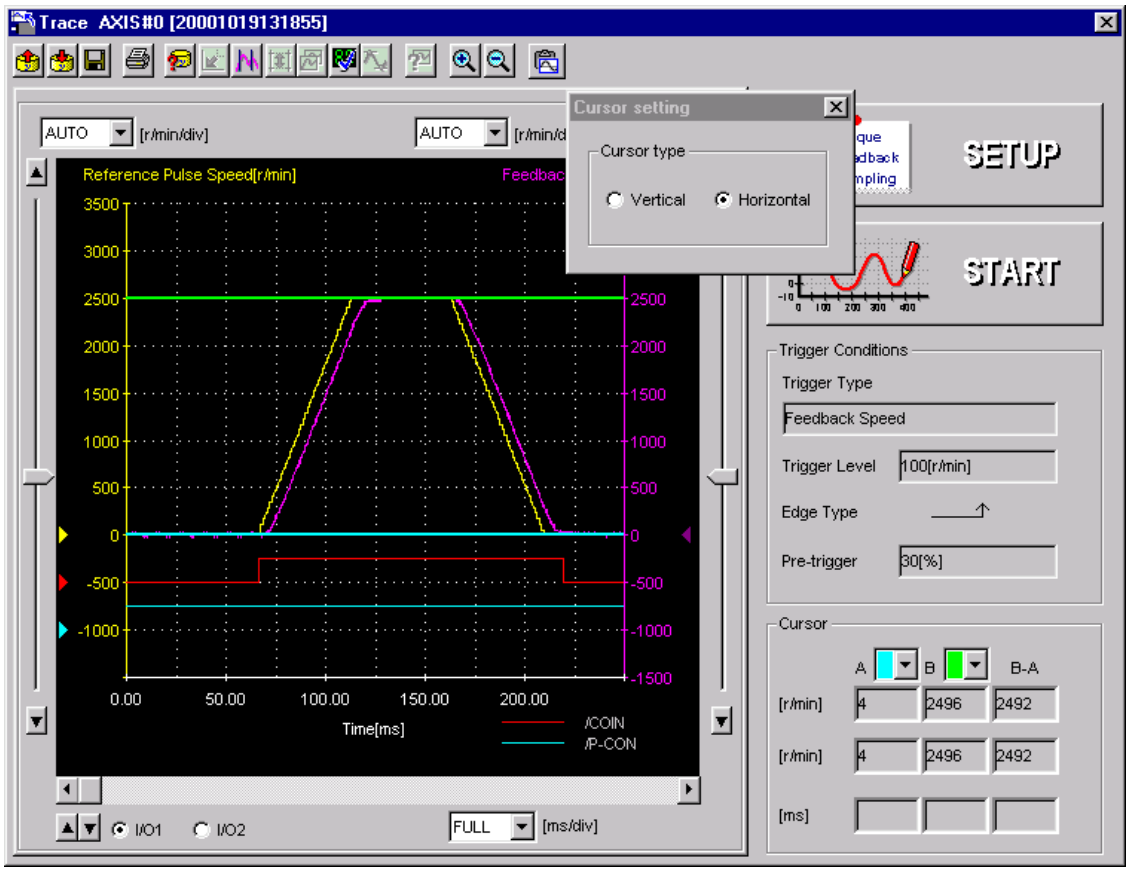
Display the data using the following procedure.

1. Click the button. Two vertical bars will be displayed.
2. Move each cursor. As you move each cursor, the data changes in the cursor box in the lower right of the window.



3. To view the speed data, select **Horizontal** in the Cursor Setting box. Two horizontal bars will be displayed.

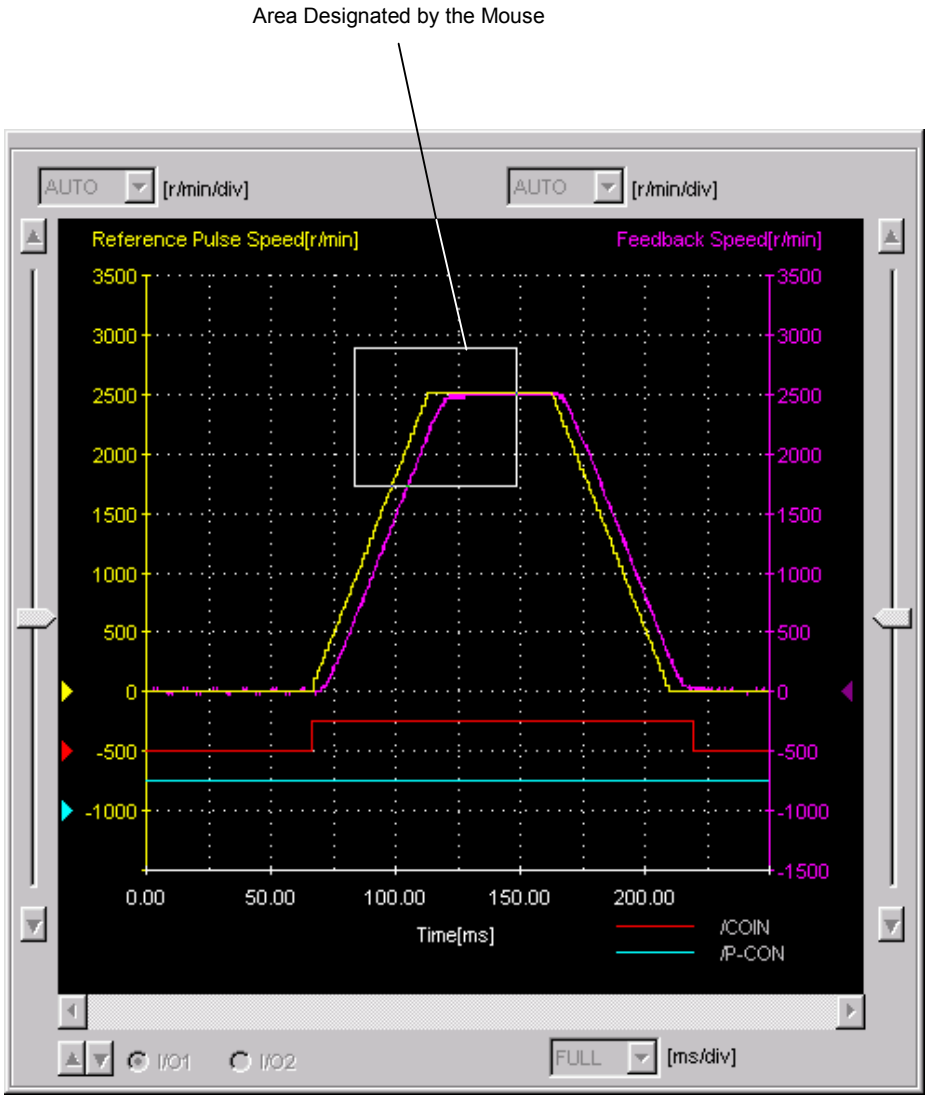
4. Move each cursor. As you move each cursor, the data changes in the cursor box in the lower right of the window.



(Zoom) Button

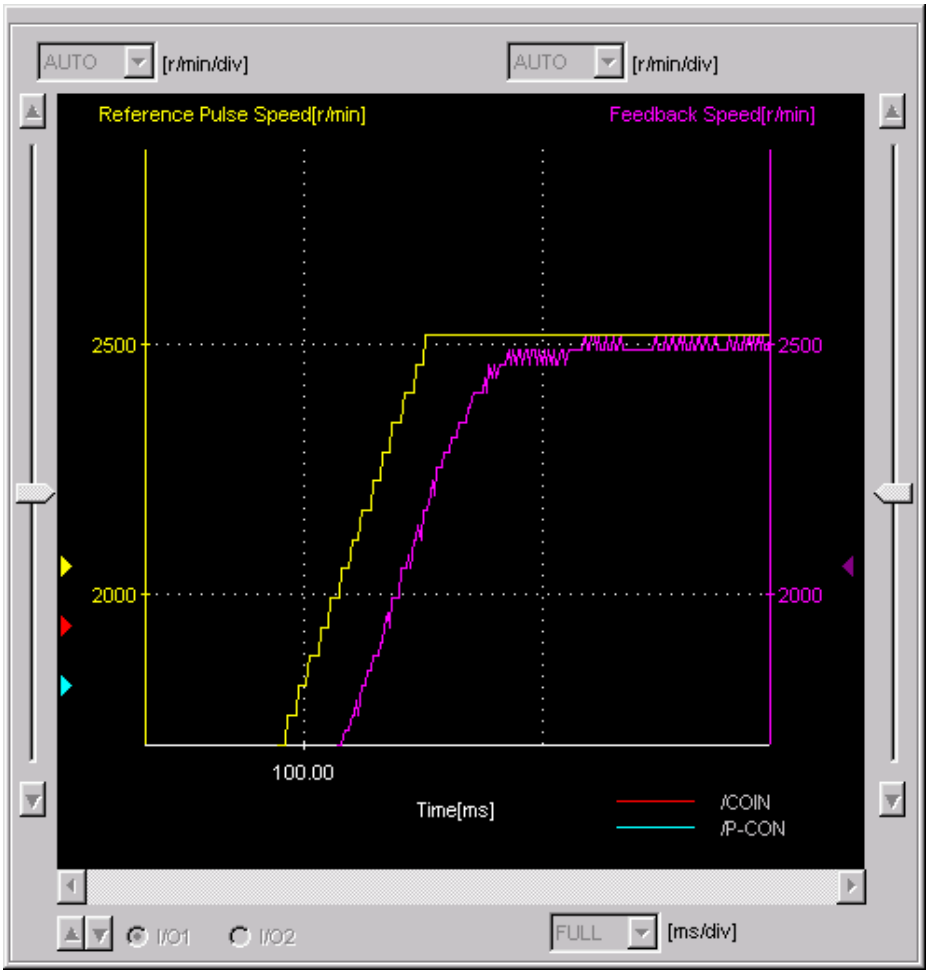
A view of an area selected by the mouse can be magnified. Zoom in on an area using the following procedure.

1. Click the button.
2. Position the mouse at one corner of the area you want to select, and drag to the opposite corner. A line will appear around the selected area.



Area to be Magnified

3. Release the left mouse button. The selected area of the graph is enlarged.

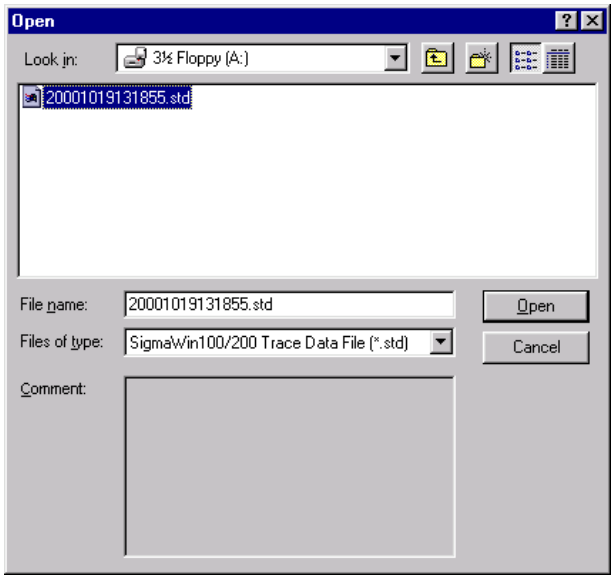


Magnified Area

4. Click the  button to view the original graph.

(Open) Button

The trace data file can be loaded in the Open dialog box. To load the file, click the button. The Open dialog box appears.



When the Button is Clicked in the Main Window

Open

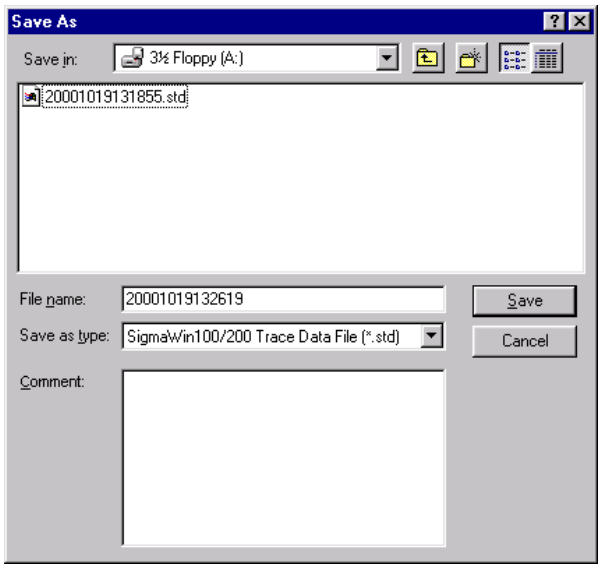
Click **Open** to load the selected trace file. Returns to the main window if nothing is selected.

Cancel

Click **Cancel** to return to the main window without loading the file.

(Save As) Button

The on-screen trace graph can be saved to a file. To save the graph, click the button. The Save As dialog box appears.



When the Button is Clicked in the Main Window

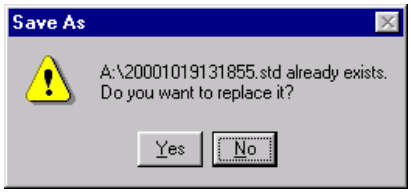
Up to 256 characters can be typed as a comment.

The default file name is the current time (yyyymmddhhmmss).

Save

Click **Save** to save the data to a designated trace file. Returns to the main window if nothing is selected.

If the file name already exists or if an already existing file is loaded and then re-saved, a warning message appears, telling you that the file name already exists, and asks if you want to replace the existing file.



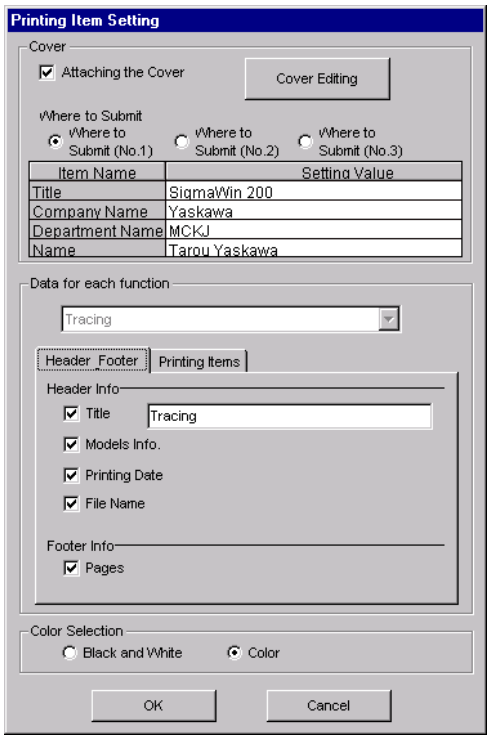
Click **Yes** to overwrite the already existing file. Click **No** to return to the Save As dialog box without saving the file.

Cancel

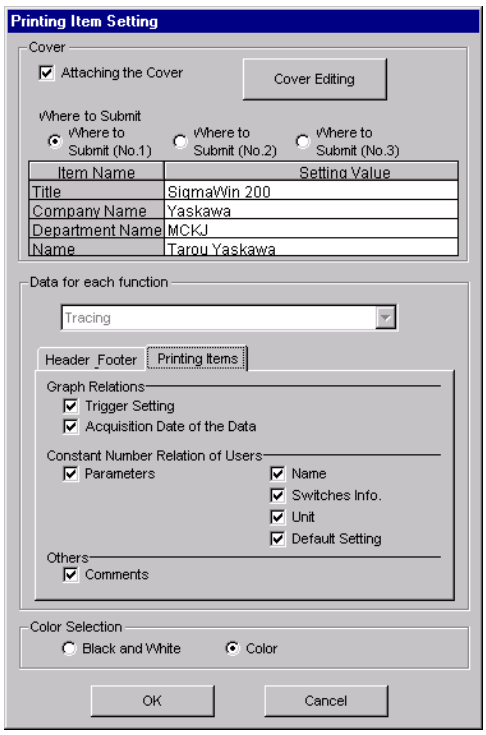
Click **Cancel** to return to the main window.

(Print) Button

The graph and data on the Trace main window can be printed. To print the graph and data, click the button. The Printing Item Setting dialog box appears.



Header Footer Tab



Printing Items Tab

Printing Item Setting Box

Cover

Select **Attaching the Cover**, and the click **Cover Editing**. For details, see Chapter 4.

Data for each function

To enter your printing preferences or specifications, click the tab whose options you want to enter or change, and enter the desired settings.

Color Selection

Documents can be printed in color or black and white. Select your preference.

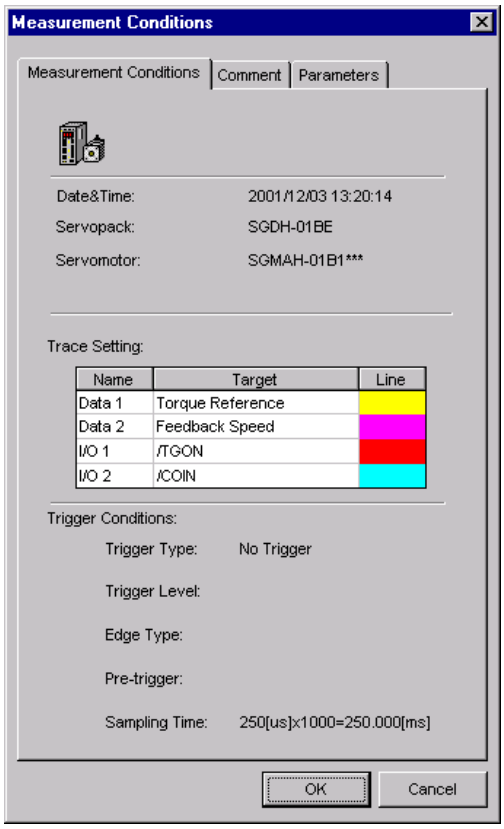
After setting is finished, click **OK**. The document appears on the screen the way it will appear in print.

To print the document as is without any changes, click **Print**.

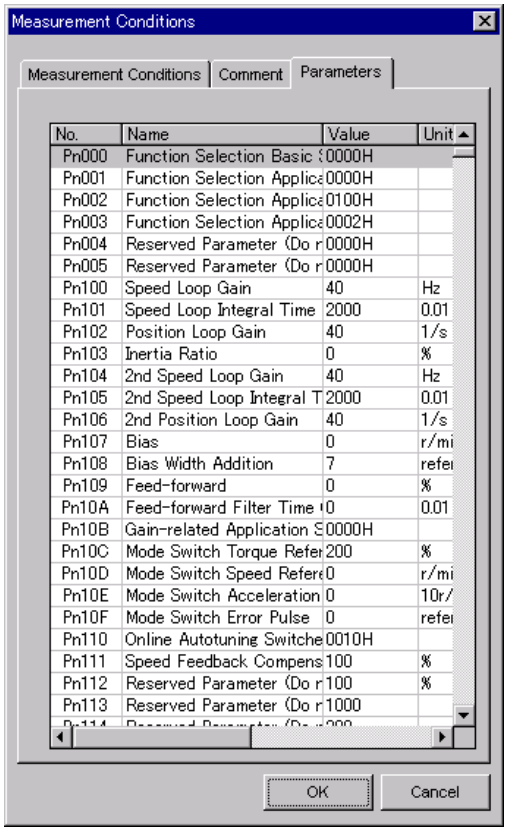
To return to the Printing Item Setting dialog box and change some settings, click **Editing of the Printing Items**.

(Measurement Conditions) Button

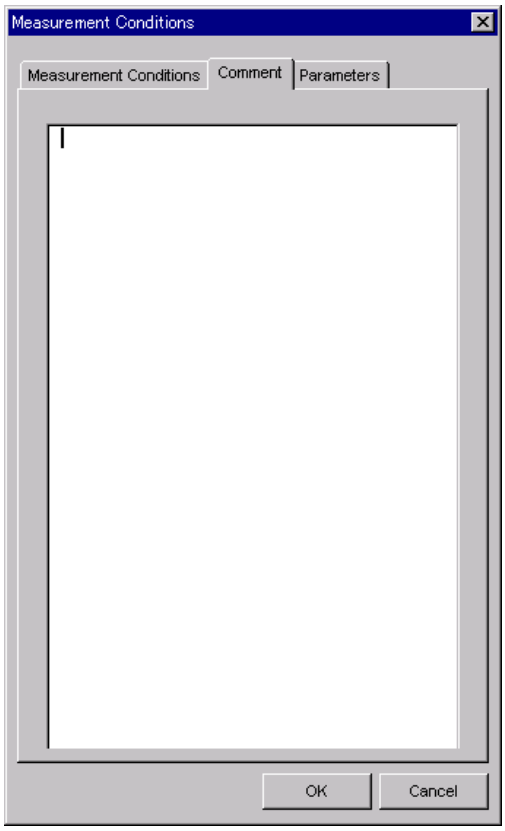
The conditions for measuring the trace can be viewed. To view the conditions, click the button. The Measurement Condition dialog box appears. If not already selected, click the **Measurement Conditions** tab to view the conditions for measuring the trace.



Measurement Conditions Tab



Parameters Tab



Comment Tab

Click the **Comment** tab and type any comments.

OK

Click **OK** to save comments and return to the Trace main window.

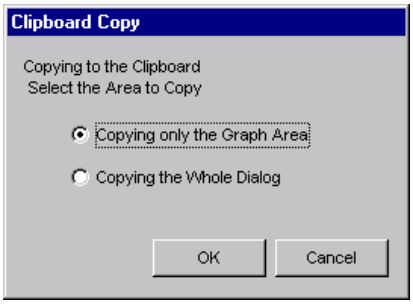
Cancel

Click **Cancel** to return to the Trace main window without saving the comments.

(Clipboard Copy) Button

The displayed screen can be copied to the clipboard. It can be exported to Word or Excel by using this button.

Click button, and the Clipboard Copy dialog box appears.



Clipboard Copy Dialog Box

Select the area to be copied to the clipboard.

OK

Click **OK** to copy the selected area to the clipboard.

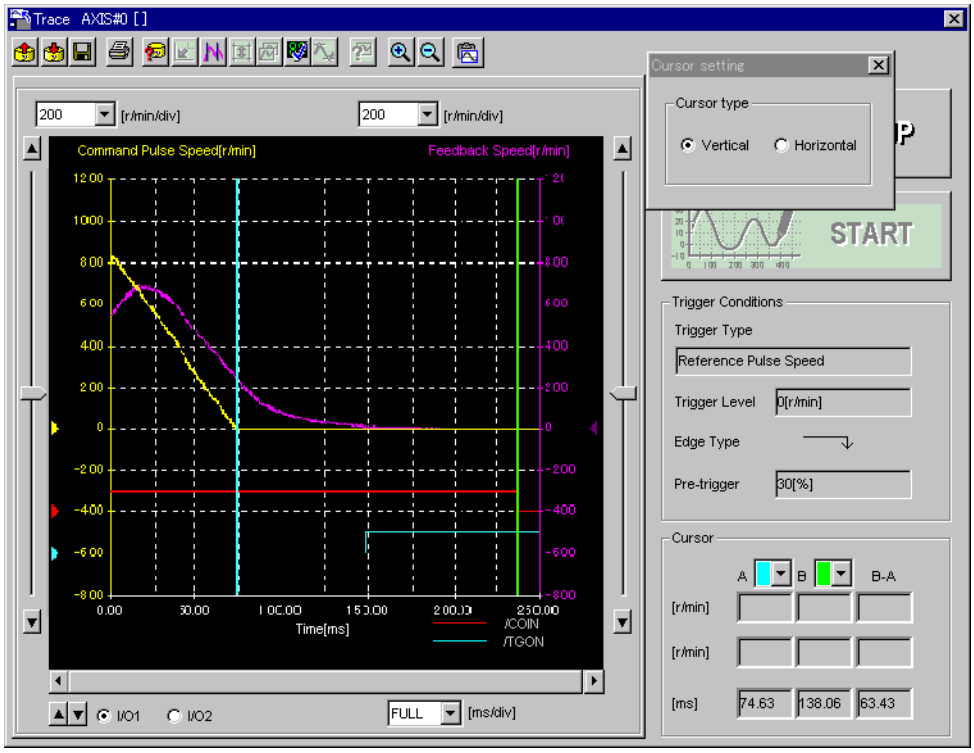
Cancel

Click **Cancel** to return to the main window.

■ An Example of Using the Trace Function

In this example of how to adjust the servo using the trace function, the positioning completed time is being reduced. The positioning completed time is the time from the completion of the command until the /COIN signal is formed.

1. Click the  button on the trace main window. Check the positioning completed time using the cursor.



This graph shows the results of a trace carried out using the factory settings. (Pn100: speed loop gain = 40 Hz; Pn101: speed loop integral time constant = 2000 ms; Pn102: positioning loop gain = 40 l/s)

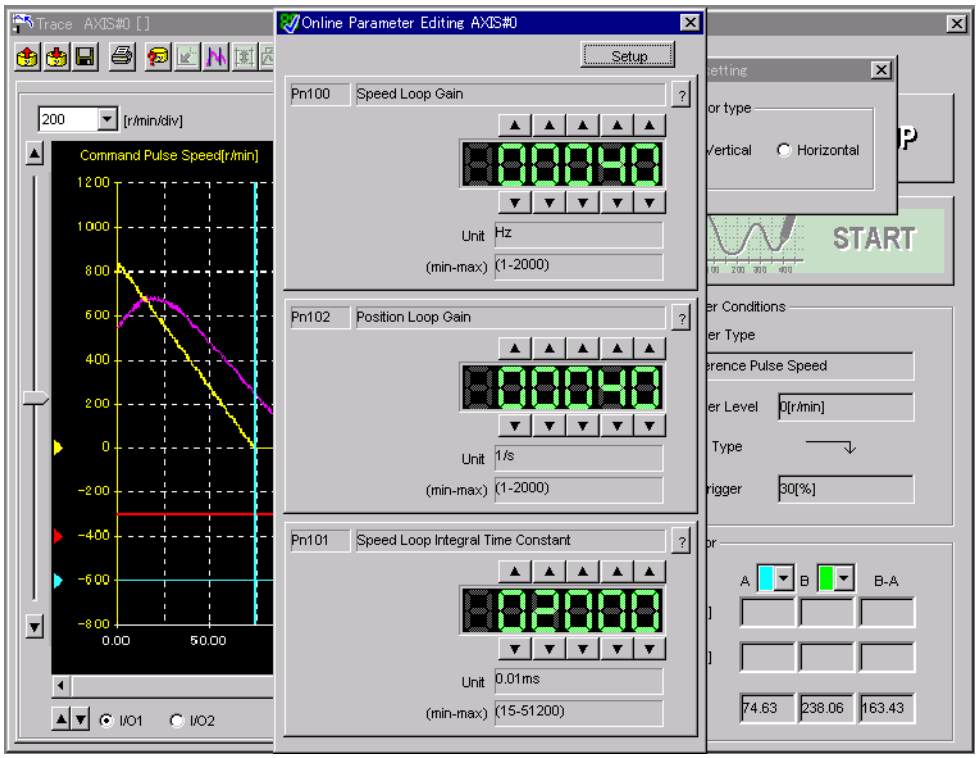
Trace object: Trace 1 = Reference pulse speed
Trace 2 = Speed feedback
I/O Trace 1 = /COIN signal (positioning completed)
I/O Trace 2 = /TGON signal (motor running)

Trigger conditions: Falling edge of reference pulse speed 0 min^{-1}
Pre-trigger: 30 %
(We are using this setting to trigger the completion of the command.)

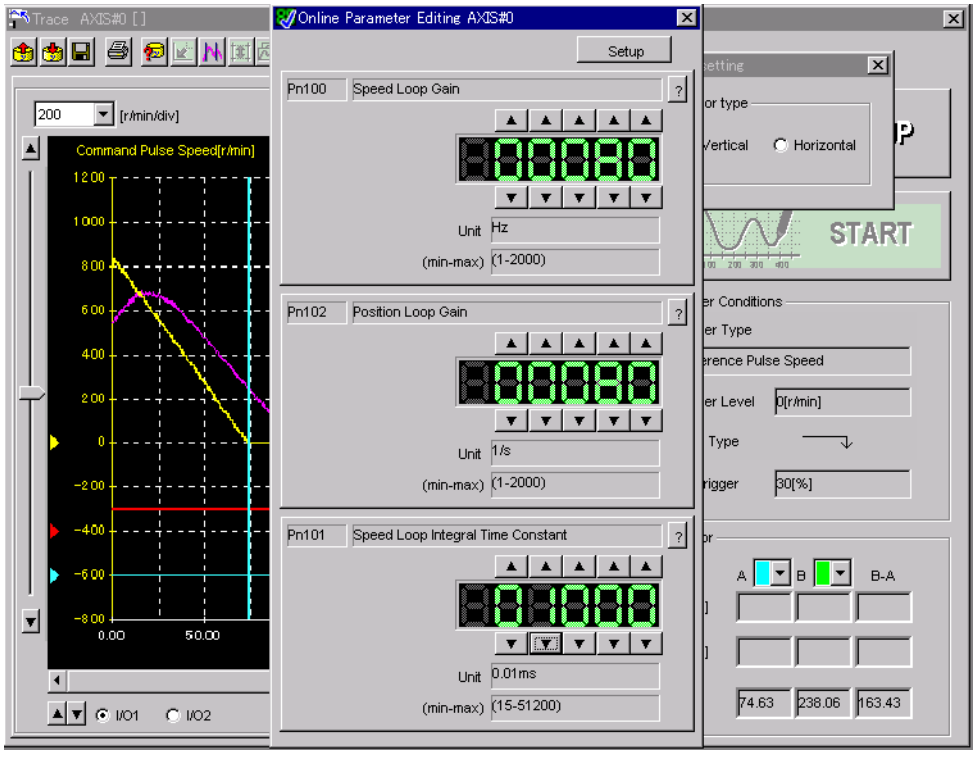
When in this condition, the positioning completed time is 163 ms.

2. To adjust the positioning completed time, modify the values of the parameters.

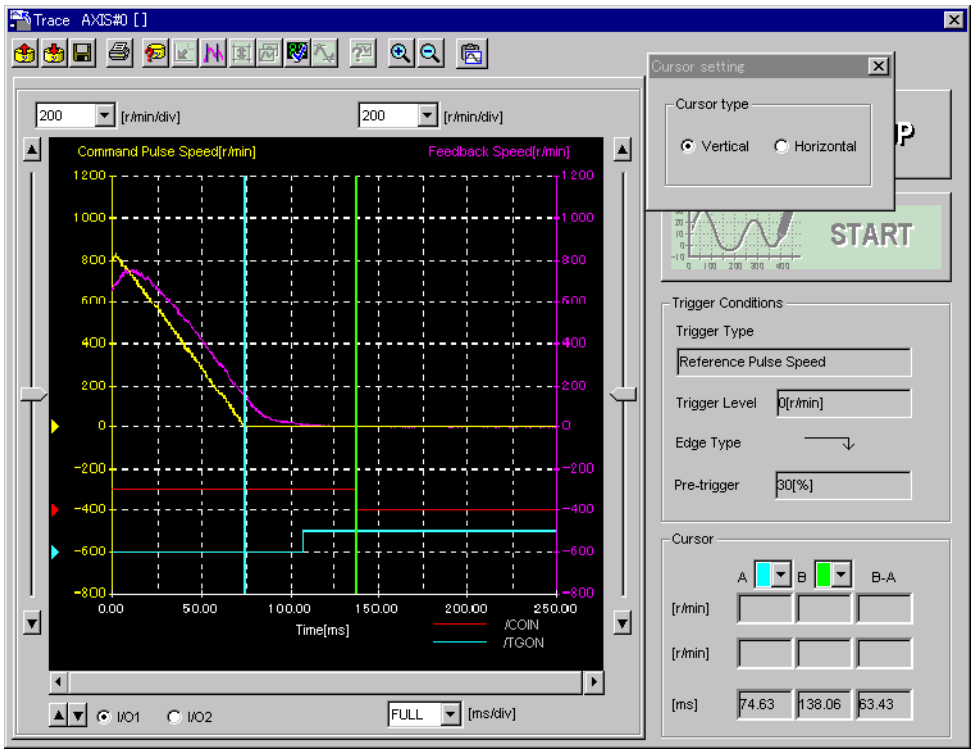
   Click the  button to view the Online Parameter Editing box.



3. To increase the gain, click the setting arrows to raise or lower the values. (Pn100 = 80, Pn102 = 80, and Pn101 = 1000)

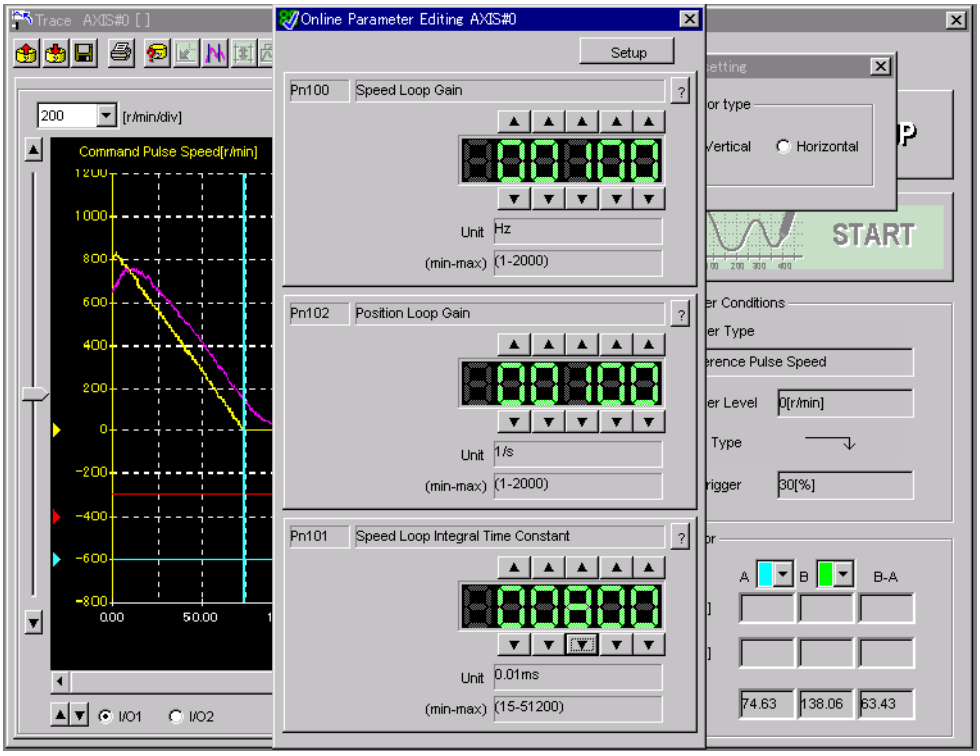


4. Confirm the positioning completed time on the trace main window.
   The positioning completed time has been reduced by 63 ms.

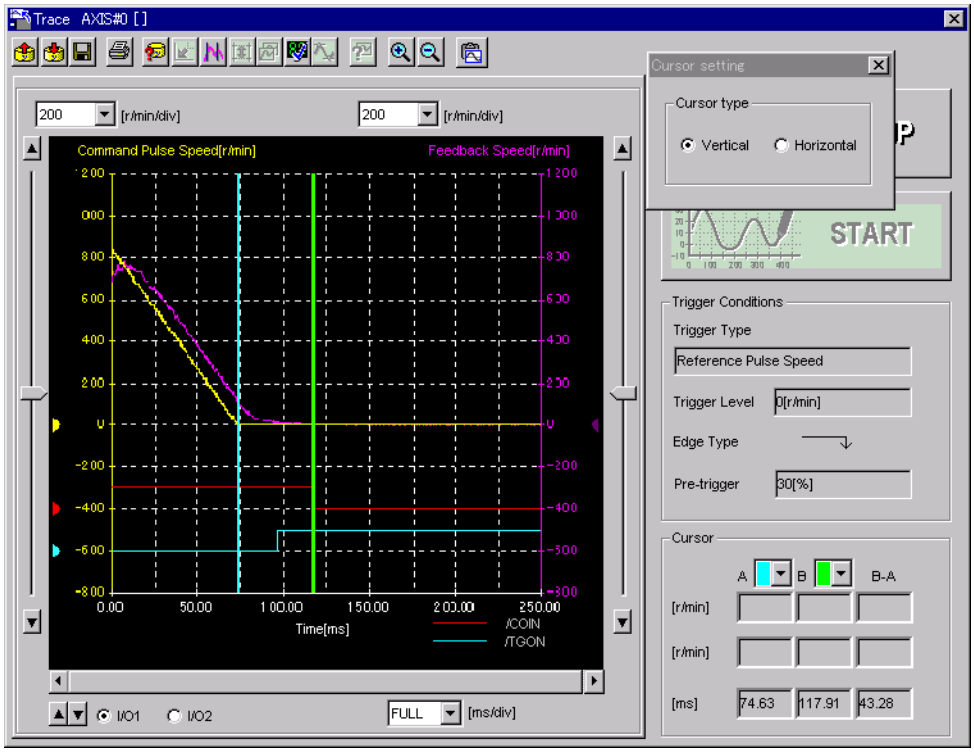


Because the machine is still not vibrating, increase the gain some more.

5. Click the  button to view the Online Parameter Editing box again and then change the values.
   (Pn100 = 100, Pn102 = 100, and Pn101 = 800)



6. Confirm the positioning completed time on the trace main window.
   The positioning completed time has been reduced by 43 ms.



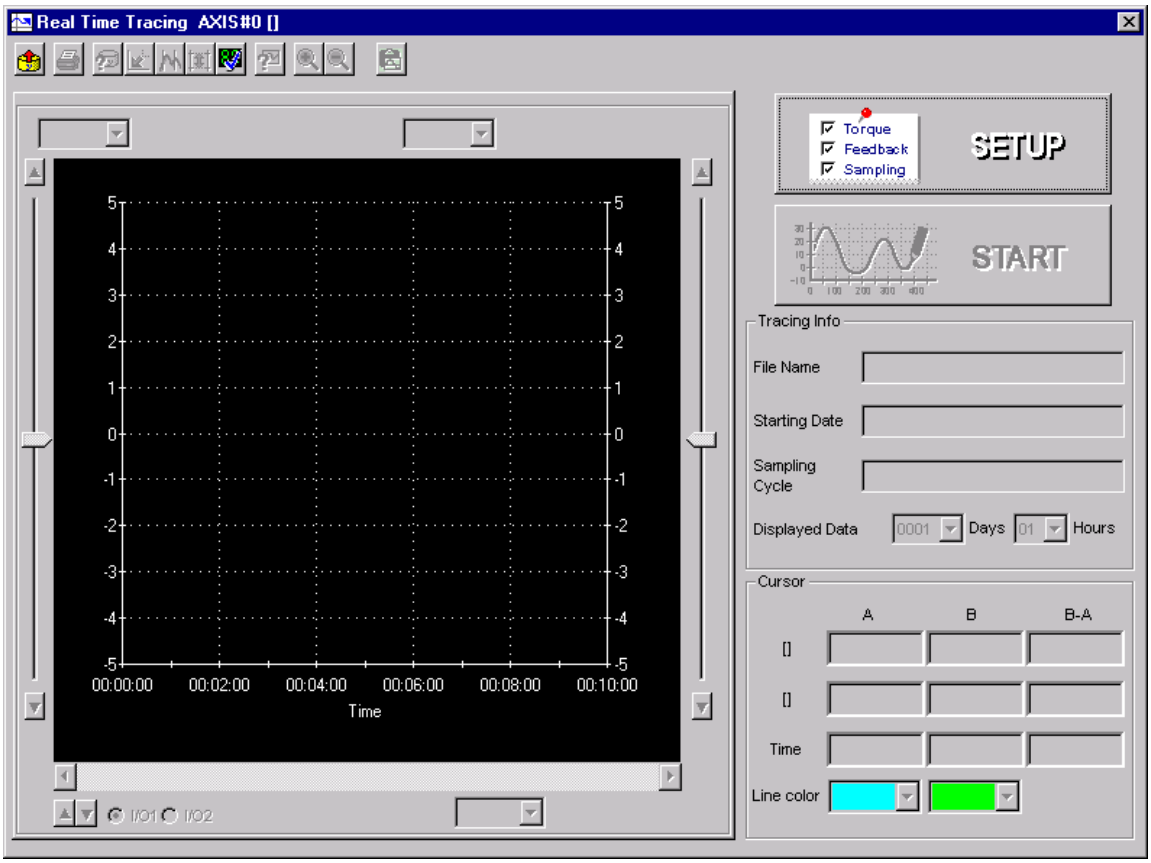
7. Repeat steps 2 to 4 until you get the target positioning completed time.

4.5.2 Real Time Trace Function

■ Data Trace

Main Window

In the SigmaWin100 main window, click **Trace** & **Tuning**, and then click **Real Time Trace**, and the Real Time Tracing main window appears.

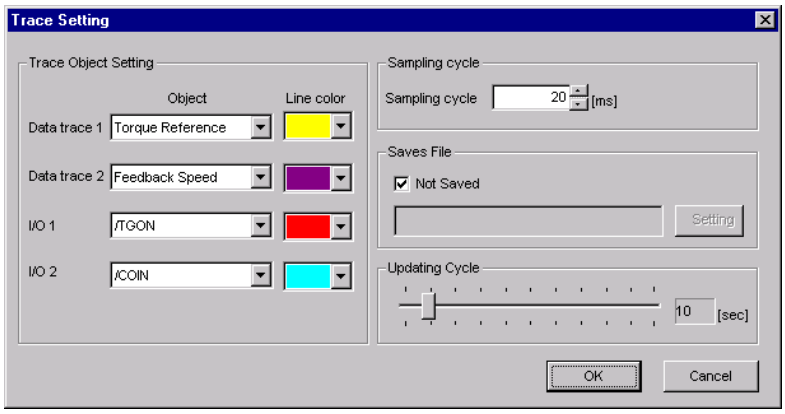


Real Time Tracing Main Window

Real Time Trace Settings

In the Real Time Tracing main window, click **SETUP**, and the Real Time Trace Setting box appears. Select the objects and conditions for the trace.

The settings from the previous trace, if any, are displayed.



Real Time Trace Setting Box

<Trace Object Settings>

The settings for the trace objects, or targets can be made here.

Data 1/Data 2

Select content such as "Torque Reference", "Speed Feedback", etc., identical to the analog monitor as trace objects from the data boxes.

I/O 1 / I/O 2

Select output signals such as "/COIN" or "ALM" and input signals such as "/C-SEL", "P-OT", or "N-OT" as trace objects.

Line

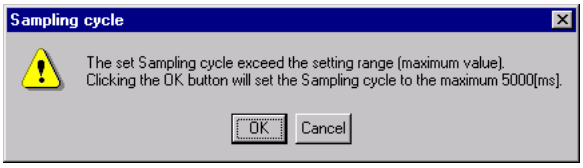
Select a line color for data 1 and 2 and I/O 1 and 2.

<Sampling Cycle>

The setting for the allowable interval time for getting trace data can be made here. Data will be obtained every 20 ms if the sampling cycle is set to 20 ms. Use the spin button to set the time.

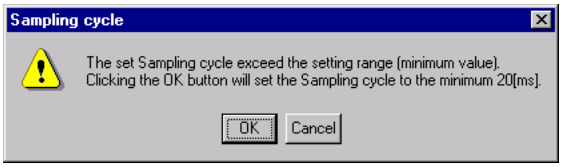
If direct input is attempted, and the value is outside the acceptable range, a warning message will appear telling you that the sampling time is incorrect. The warning will vary according to the error.

1. If the input data setting is larger than the setting range:



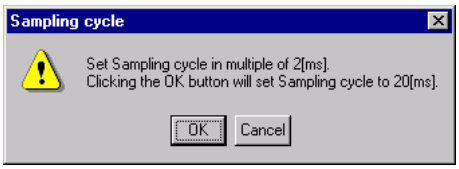
   Click **OK** to automatically adjust the sampling cycle within the setting range. Click **Cancel** to return to the Real Time Trace Setting box without setting the sampling cycle.

2. If the input data is smaller than the setting range:



   Click **OK** to automatically adjust the sampling cycle whitin the setting range. Click **Cancel** to return to the Real Time Trace Setting box without setting the sampling cycle.

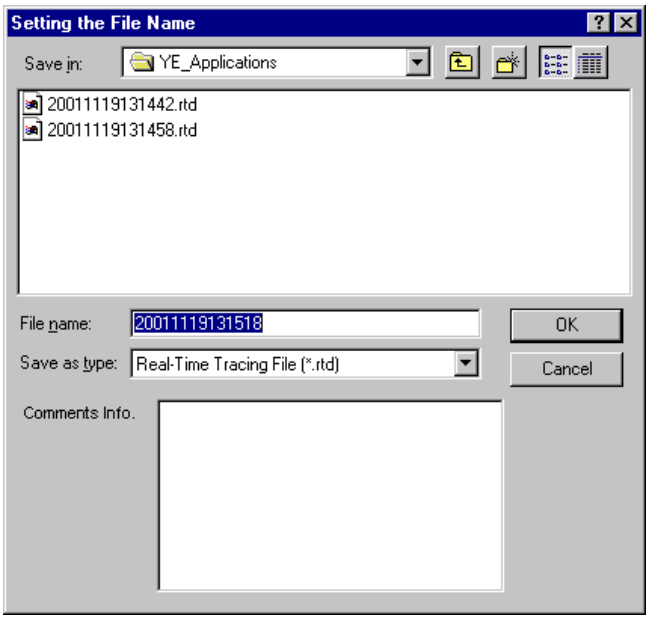
3. If the input data cannot be allocated in the time interval:



   Click **OK** to automatically adjust the sampling cycle. Click **Cancel** to return to the Real Time Trace Setting box without setting the sampling cycle.

<Saves File>

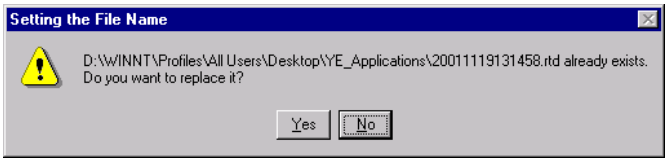
To save the traced file, select “Not Saved” box and click **Setting**. The Setting the File Name dialog box appears.



Setting the File Name Dialog Box

Click **OK** to store the file name designating the current trace settings. Click **Cancel** to return to the Real Time Trace Setting box without saving the file.

If the file name already exists or if an already existing file is loaded and then re-saved, a warning message appears, telling you that the file name already exists, and asks if you want to replace the existing file.



Click **Yes** to overwrite the already existing file. Click **No** to return to the Setting the File Name dialog box without saving the file.

OK

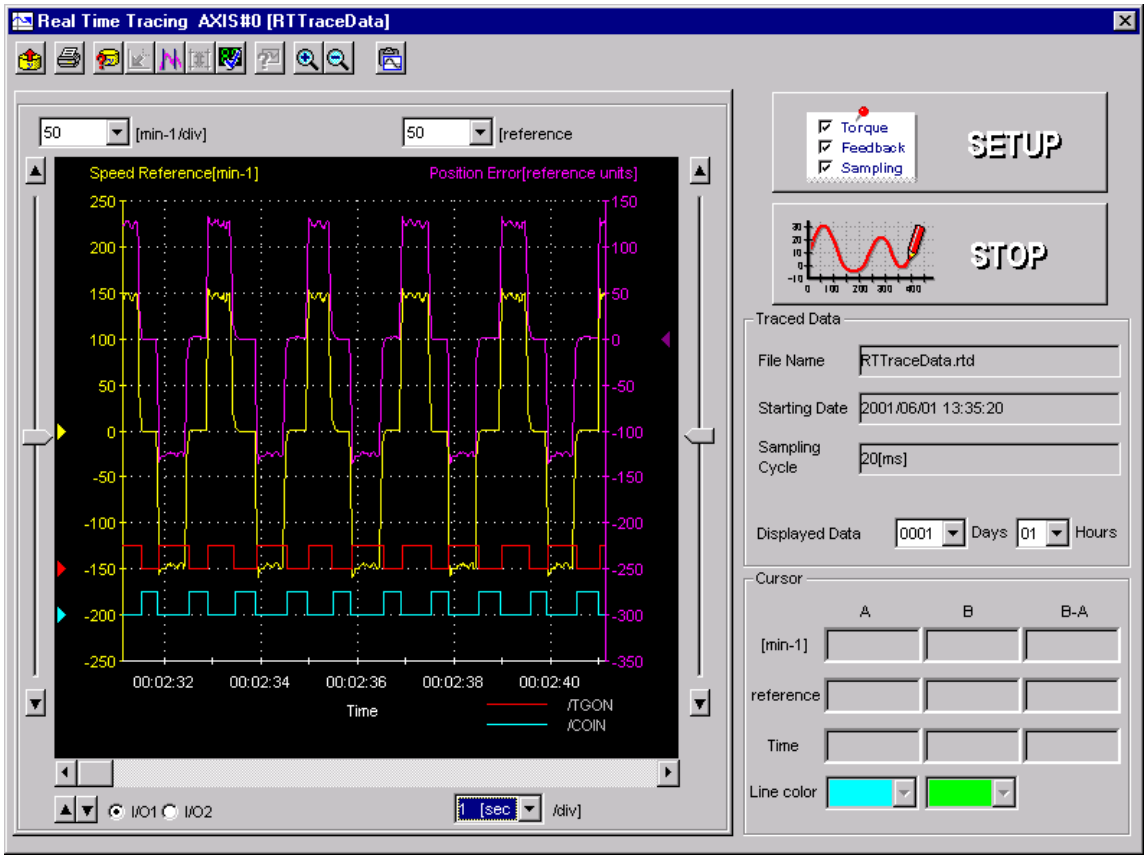
In the Real Time Trace Setting box, click **OK** to return to the Real Time Tracing main window. The trace object and trigger are updated according to the settings.

Cancel

In the Real Time Trace Setting box, click **Cancel** to return to the Real Time Tracing main window without changing the settings.

Starting the Trace

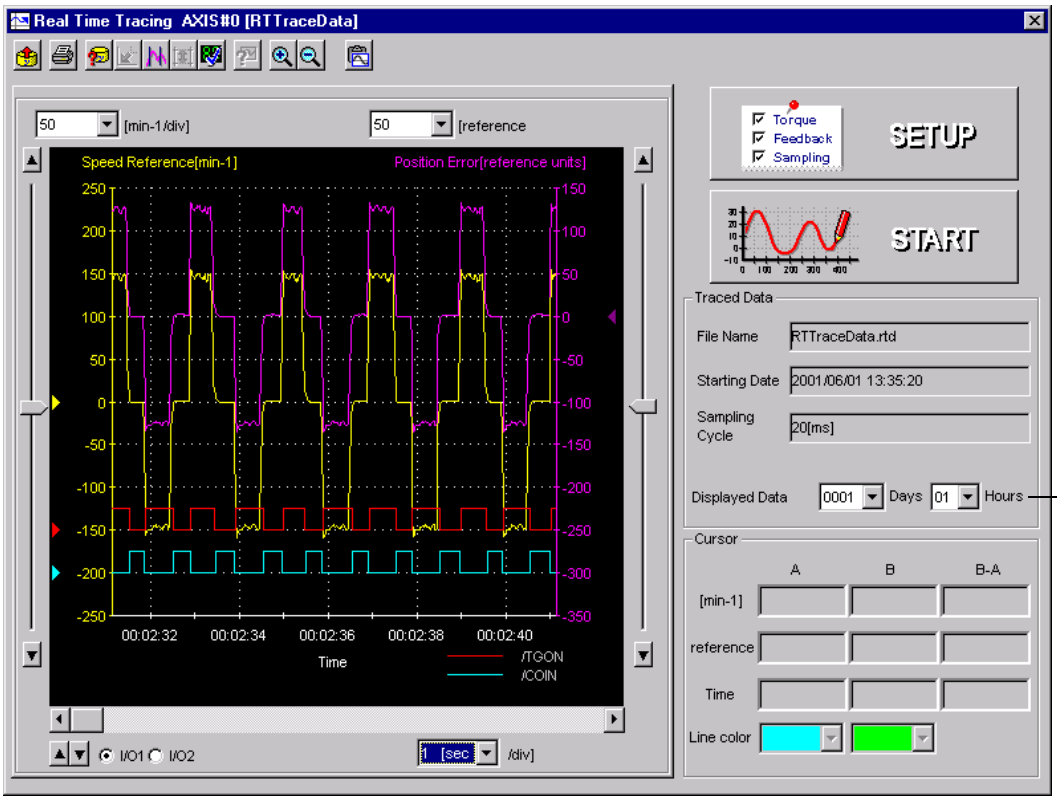
In the Real Time Tracing main window, click **START** to start trace.



To stop a trace, click **STOP**.

■ Main Window

This Real Time Tracing main window displays a graph based on the trace settings.



Displays information about when the trace started.
In this example for the displayed data, "0001" means that it is the first day of the trace and "01" means that the trace has been running for its first hour.

Real Time Tracing Main Window

Toolbar

The position of the toolbar can be adjusted, and the on-screen display type selected.

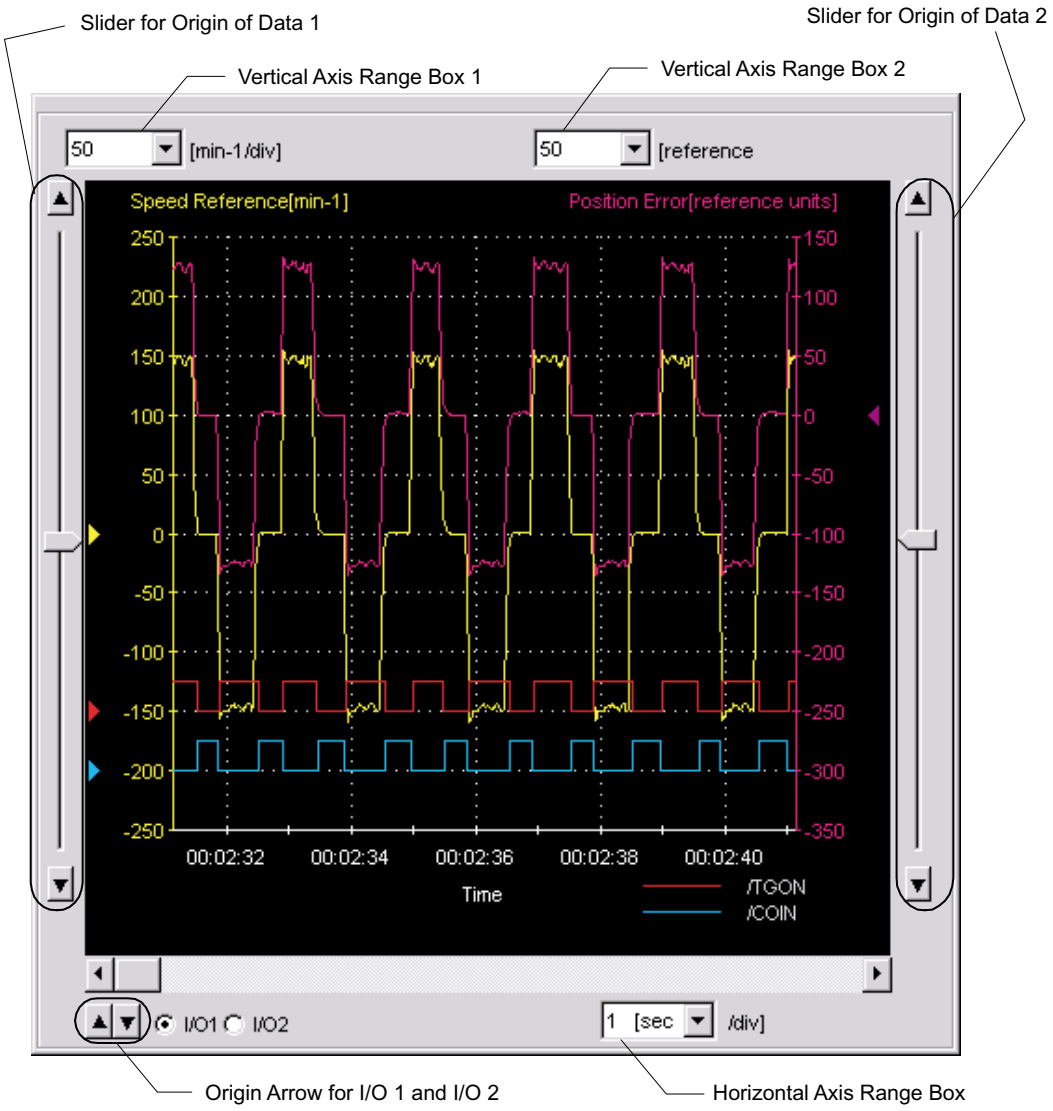
Real Time Tracing Main Window Toolbar

Toolbar Button	Click this button to:
 Open	Load the trace data file.
 Print	Print the Real Time Tracing main window.
 Measurement Conditions	View the conditions to measure the trace.
 Cursor	View the information for the location where a cursor is shown.
 Parameter Online Editing	View the Parameter Online Editing box. For details, see Section 4.1.2.
 Zoom In	Enlarge the view of a selected area.
 Return	Restore the area shown in the window to its usual size.
 Clipboard Copy	Copy the displayed screen to the clipboard.

See "■ Toolbar Details" for details on the toolbar buttons.

Trace Object Graph

In the graph, you can view the trace objects designated in the Real Time Trace Setting box.



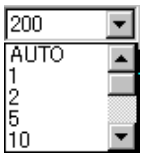
Trace Object Graph

Vertical Axis Range

Select a vertical axis range for both Data 1 and Data 2 from the corresponding box.

If AUTO is selected, the range widths will be automatically adjusted so that all of the data can be shown in the graph.

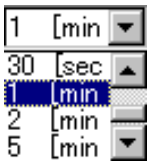
The range must be selected from the list.



Vertical Axis Range Box

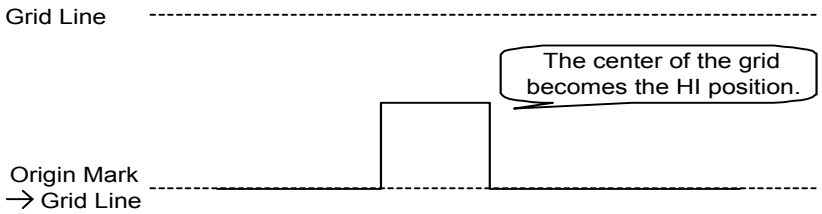
Horizontal Axis Range

Select a horizontal axis range for the time axis from the box. The time is measured in "sec" or "min." The range must be selected from the list.



Horizontal Axis Range Box

Supplement: Regarding I/O Trace Graph



■ Toolbar Details

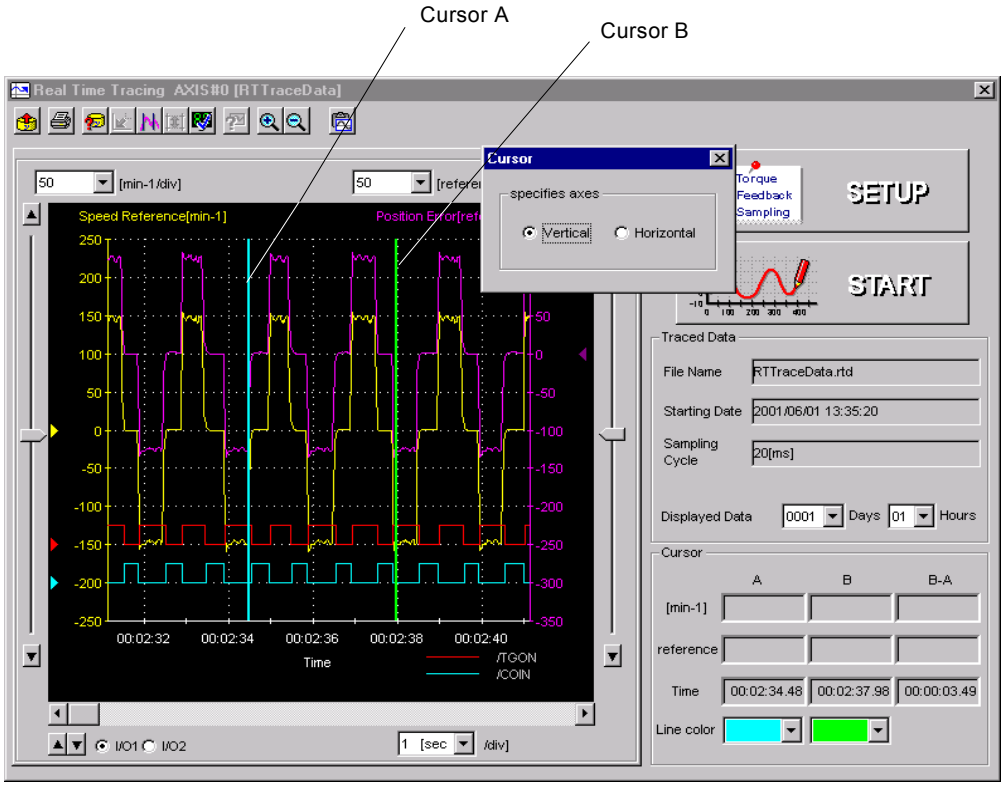
(Cursor) Button

The information for the location where a cursor is shown can be viewed. Information for the cursor locations A and B can be viewed.

The color of cursor locations A and B can be changed.

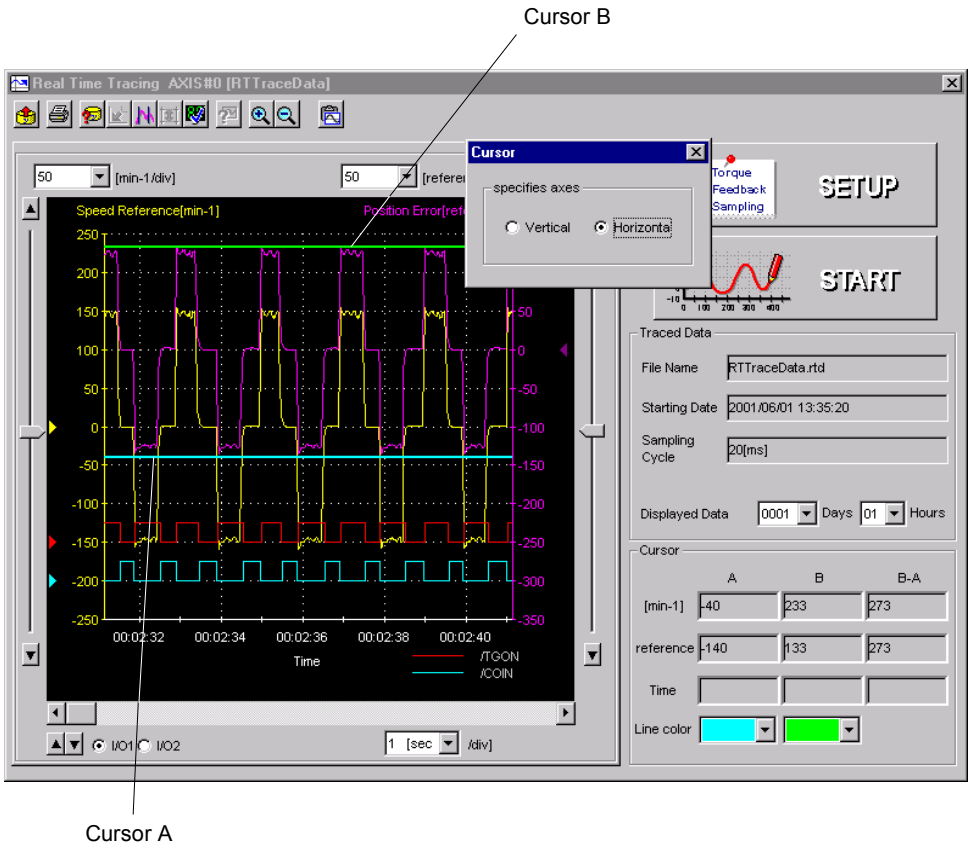
Display the data using the following procedure.

1. Click the button. Two vertical bars will be displayed.
2. Move each cursor. As you move each cursor, the data changes in the cursor box in the lower right of the window.



3. To view the speed data, select **Horizontal** in the Cursor Setting box. Two horizontal bars will be displayed.

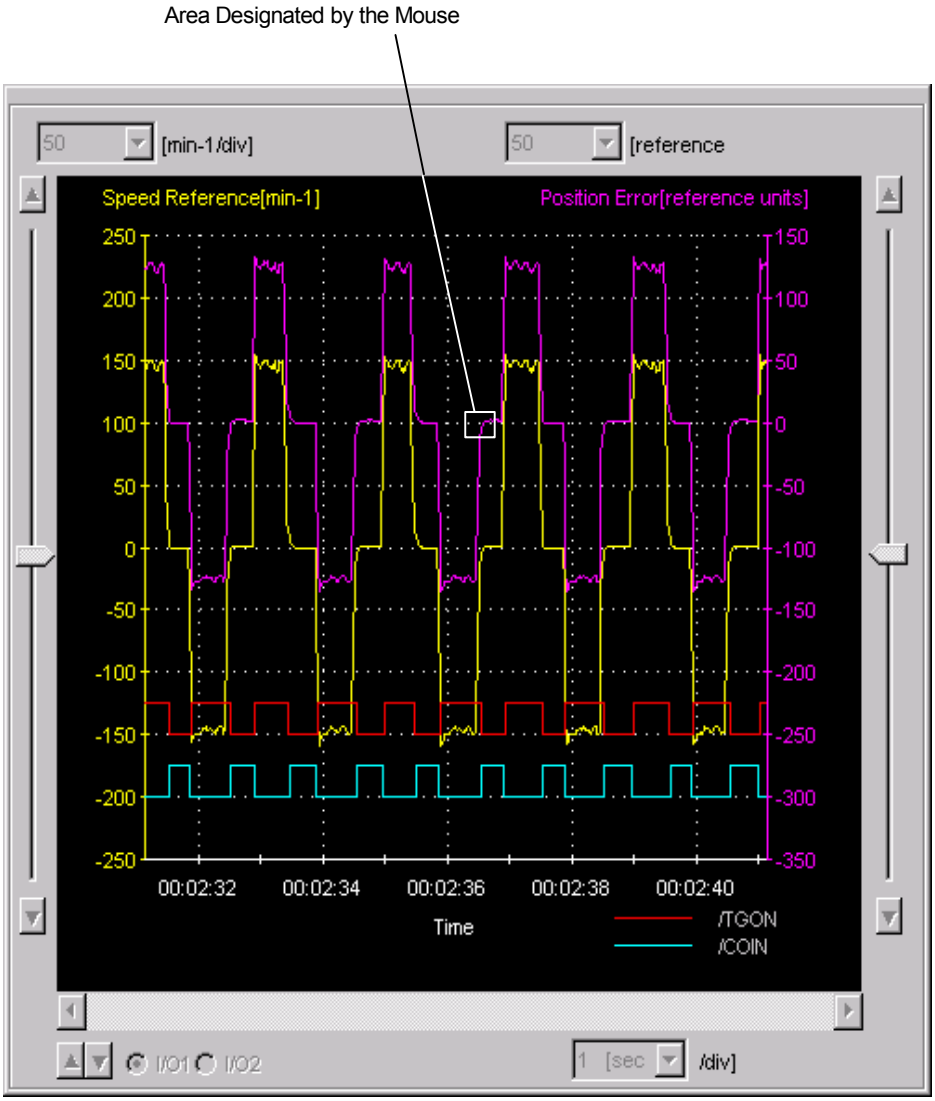
4. Move each cursor. As you move each cursor, the data changes in the cursor box in the lower right of the window.



(Zoom) Button

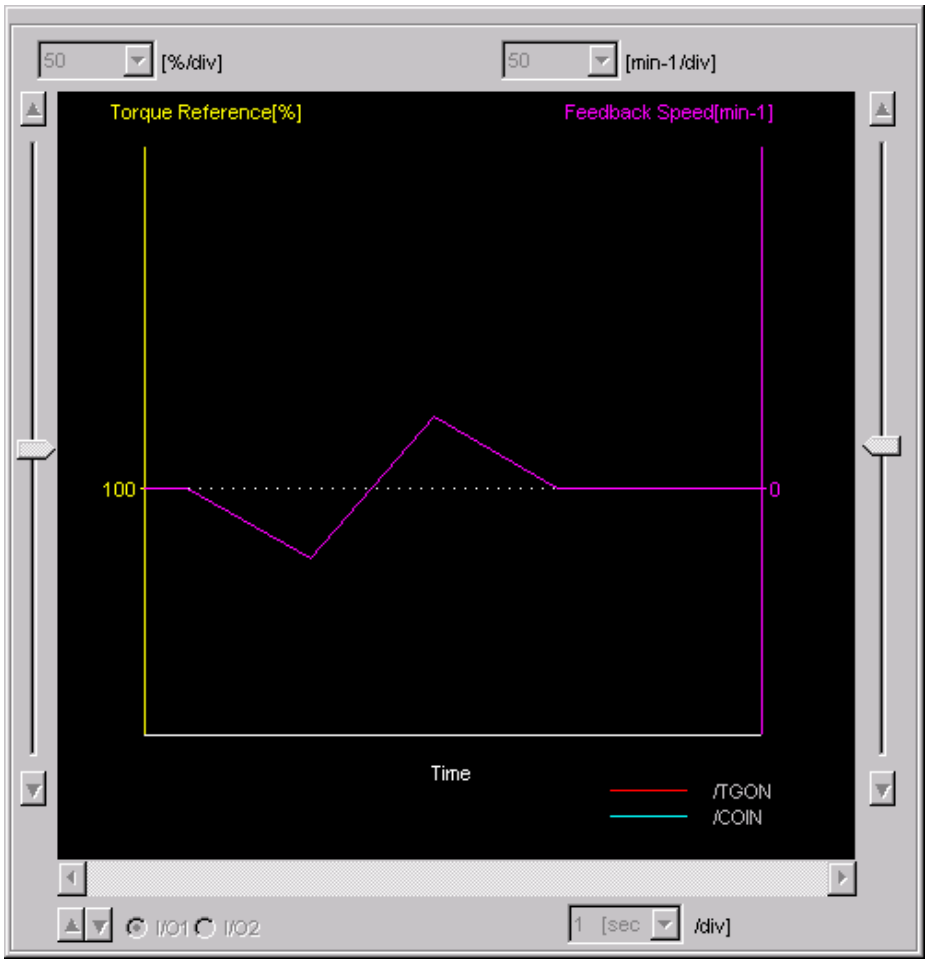
A view of an area selected by the mouse can be magnified. Zoom in on an area using the following procedure.

1. Click the button.
2. Position the mouse at one corner of the area you want to select, and drag to the opposite corner. A line will appear around the selected area.



Area to be Magnified

3. Release the left mouse button. The selected area of the graph is enlarged.

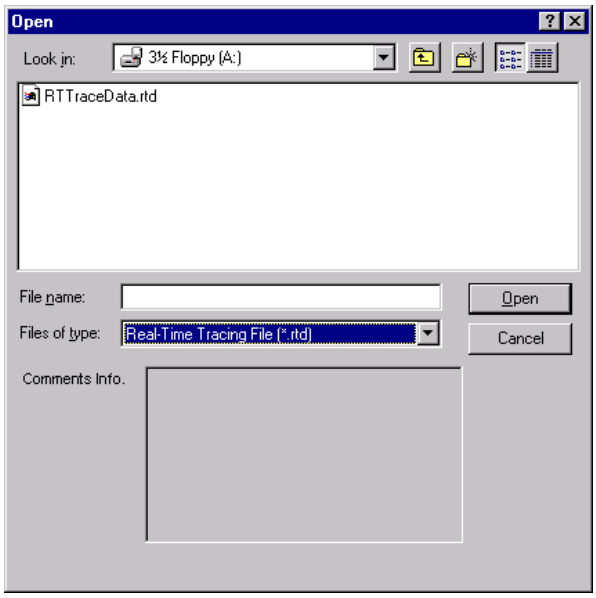


Magnified Area

4. Click the  button to view the original graph.

(Open) Button

The trace data file can be loaded in the Open dialog box. To load the file, click the button. The Open dialog box appears.



When the Button is Clicked in the Main Window

Open

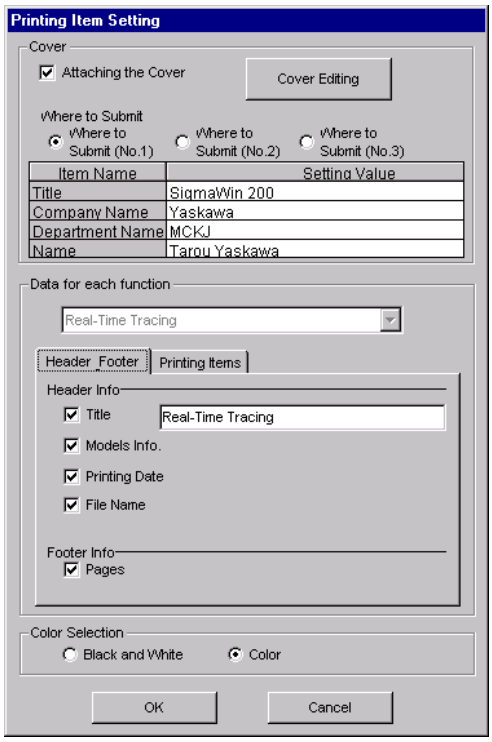
Click **Open** to load the selected trace file. Returns to the main window if nothing is selected.

Cancel

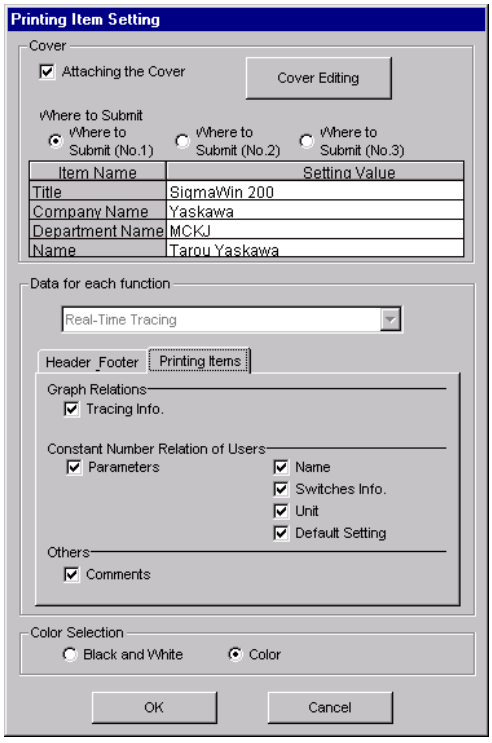
Click **Cancel** to return to the main window without loading the file.

(Print) Button

The graph and data on the Real Time Tracing main window can be printed. To print the graph and data, click the button. The Printing Item Setting dialog box appears.



Header Footer Tab



Printing Items Tab

Printing Item Setting Box

Cover

Select **Attaching the Cover**, and the click **Cover Editing**. For details, see Chapter 4.

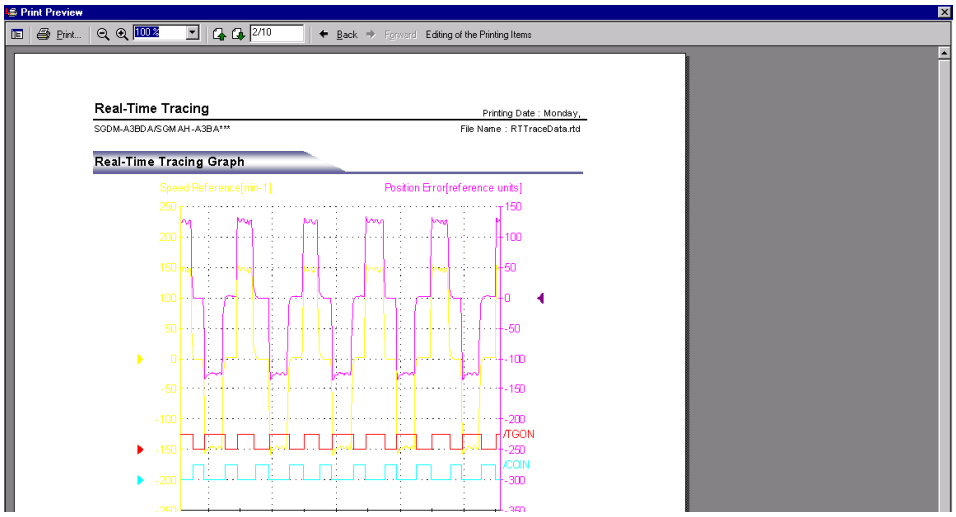
Data for each function

To enter your printing preferences or specifications, click the tab whose options you want to enter or change, and enter the desired settings.

Color Selection

Documents can be printed in color or black and white. Select your reference.

After setting is finished, click **OK**. The document appears on the screen the way it will appear in print.

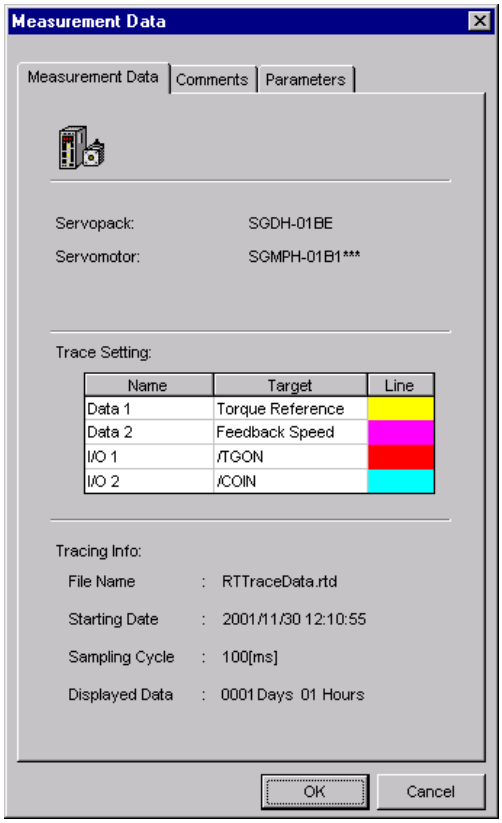


To print the document as is without any changes, click **Print**.

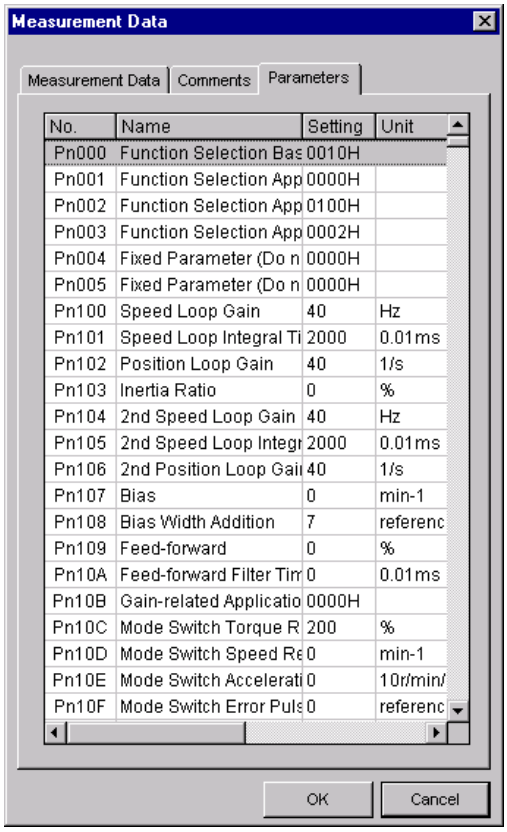
To return to the Printing Item Setting dialog box and change some settings, click **Editing of the Printing Items**.

(Measurement Conditions) Button

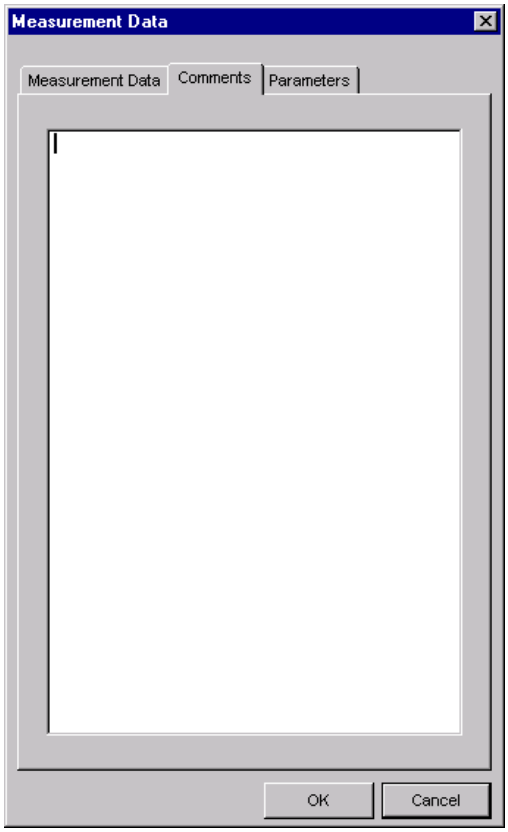
The conditions for measuring the trace can be viewed. To view the conditions, click the button. The Measurement Condition dialog box appears. If not already selected, click the **Measurement Conditions** tab to view the conditions for measuring the trace.



Measurement Conditions Tab



Parameters Tab



Comments Tab

Click the **Comments** tab and type any comments.

OK

Click **OK** to save comments and return to the Real Time Tracing main window.

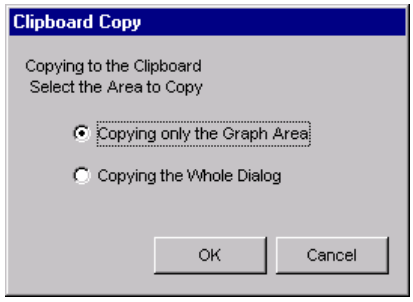
Cancel

Click **Cancel** to return to the Real Time Tracing main window without saving the comments.

(Clipboard Copy) Button

The displayed screen can be copied to the clipboard. It can be exported to Word or Excel by using this button.

Click button, and the Clipboard Copy dialog box appears.



Clipboard Copy Dialog Box

Select the area to be copied to the clipboard.

OK

Click **OK** to copy the selected area to the clipboard.

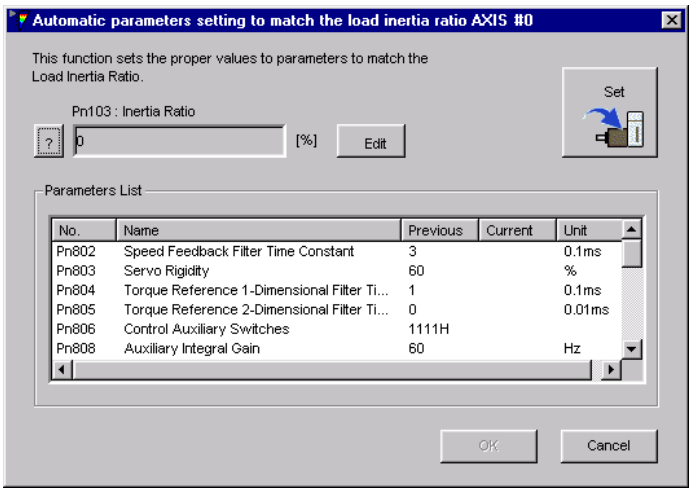
Cancel

Click **Cancel** to return to the main window.

4.5.3 Automatic Parameter Setting to Match the Load Inertia Ratio

Parameters can be automatically set to the best settings to match the load inertia ratio. This setting can be used to achieve responsiveness in most applications.

In the SigmaWin100 main window, click **Trace** & **Tuning**, and then click **Set Parameters to match the Load Inertia Ratio**, and the Automatic Parameters Setting to Match the Load Inertia Ratio box appears.



Automatic Parameters Setting to Match the Load Inertia Ratio Box

Pn103: Inertia Ratio

Displays the inertia ratio set in parameter Pn103.

Click the ? button to view the details of the parameter setting. Click **Edit** to change the inertia ratio.

Set

Click **Set** to automatically change the parameter settings used in tuning based on the inertia ratio that is displayed. The new settings are displayed in the "Current" column.

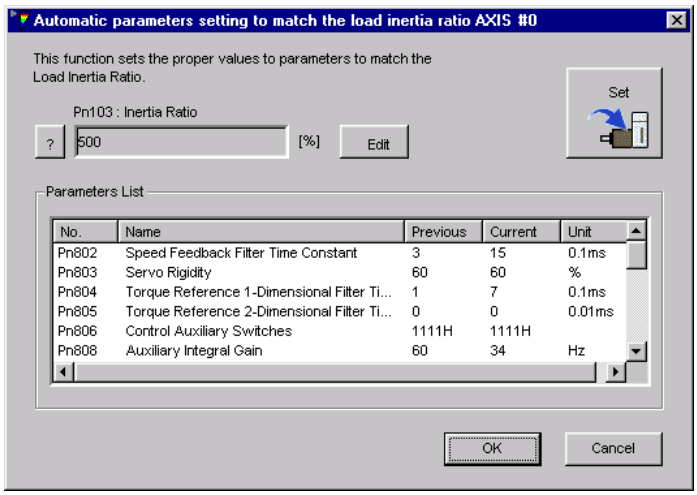
Parameter List

Lists the parameters requiring change based on the inertia ratio.

Previous:Lists the settings that were used before.

Current: Lists the settings that are changed based on the inertia ratio.

Click **Set**, and the new changed values are displayed in the "Current" column.

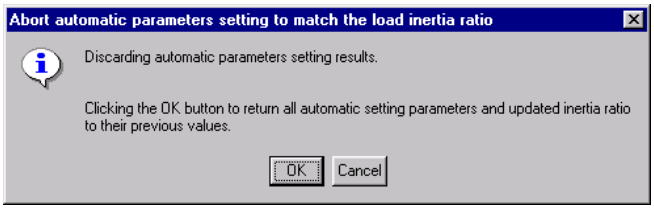


OK

Click **OK** to store the settings displayed in the "Current" column as the new parameter settings.

Cancel

Click **Cancel**, and a confirmation message appears asking if you want to discard all the new settings and return to the previous parameter settings and inertia ratio.



Click **OK** to return to the main window without changing the settings or ratio.

Click **Cancel** to return to the Automatic Parameters Setting to Match the Load Inertia Ratio box without saving the new settings or ratio.

4.6 JOG Operation

⚠ WARNING
Performing JOG operation while the motor is running is dangerous. Be sure to check the user's manual before executing. Pay particular attention to the following. • Check the safety of the area adjoining the drive unit. The motor runs at the JOG speed, while the RUN button is pressed. Make sure that there is no danger in running the motor before execution. • The Forward Run Prohibit (P-OT) and Reverse Run Prohibit (N-OT) signals are disabled during JOG operation. During operation, make sure to verify the actual operation and position of the motor or machine.

This function turns the motor at the set JOG speed. The rotational direction and the speed setting can be verified without connecting an upper-level controller.

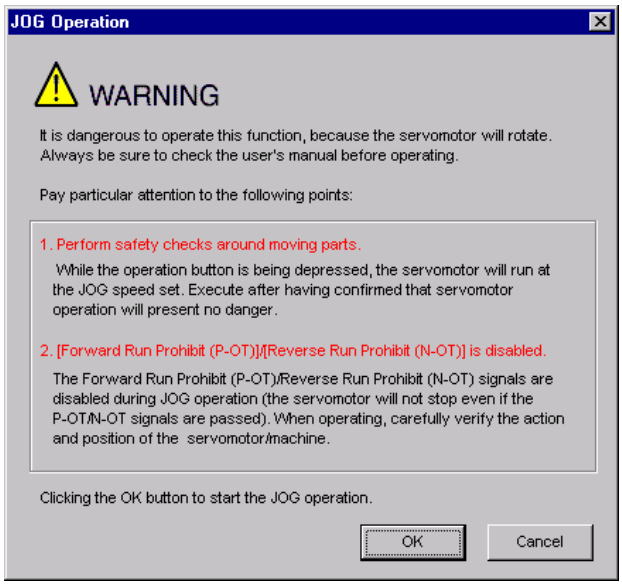
The following conditions must be satisfied to carry out a JOG operation.

1. The servo ON (/S-ON) input signal is OFF.
2. Parameter Pn50A.1 is set to any number other than "7", and the servo ON mask is released.
3. The password (parameter overwrite prohibition) is set to "0000" allowing overwrite (release of overwrite prohibitions).*

* The SERVOPACK power must be restarted after this change to enable the settings.

Perform a JOG operation using the following procedure.

1. In the SigmaWin100 main window, click **Test Run**, and then click **Jog**. A warning message appears reminding you of the dangers that are possible when using this operation.



Click **Cancel** to return to the main window without performing JOG operation.

<When the Password Has Been Set>

If the password has been set, the following message will appear.

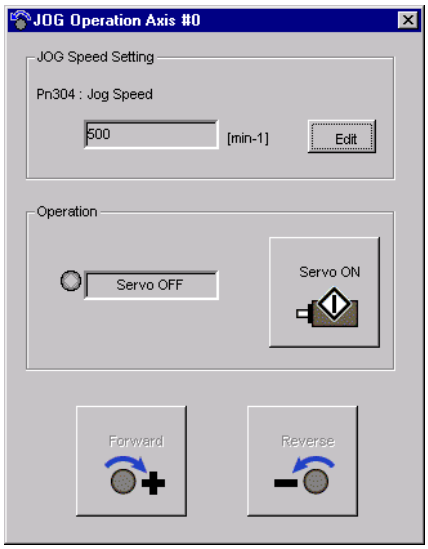
Click **OK**, and cancel the password.

See "4.4.5 Setting the Password" for cancelling method.

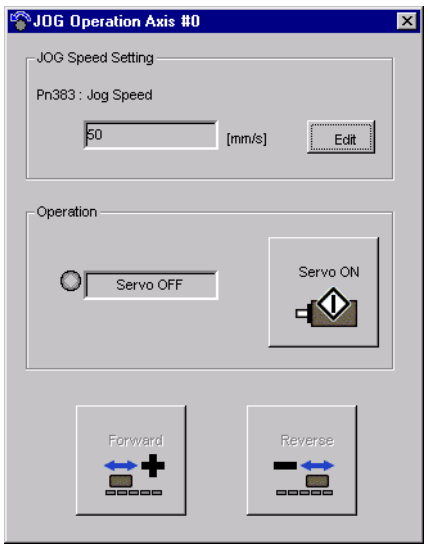
2. Click **OK**, and the JOG Operation box appears.

   If the servo is on, an error message will appear. Make sure that the servo is off.

   The Operation box differs on motor types.



For rotating motor



For linear motor

Pn304: JOG Speed (Pn383 for linear motor)

Parameter Pn304 (Pn383 for linear motor) displays the JOG speed. Click **Edit** to change the JOG speed.

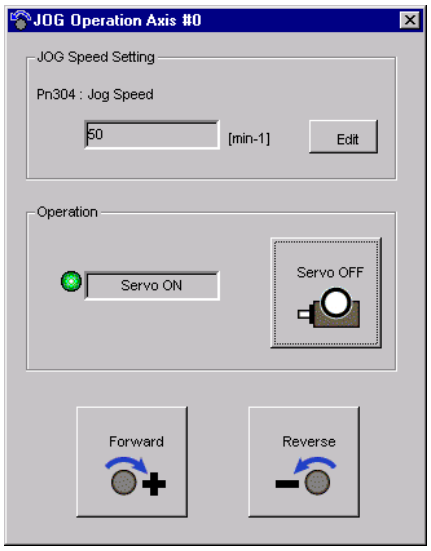
Operation

On the left, shows if the servo is on or off and the corresponding LED display.

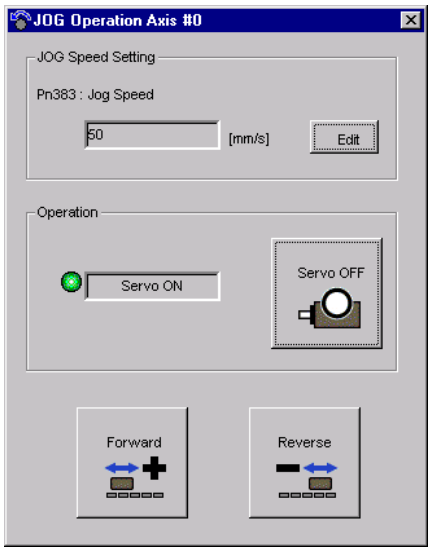
On the right, the button changes according to the servo's status. When the servo is off, the **Servo ON** button appears; when the servo is on, **Servo OFF** button appears.

3. Check the JOG speed. To change the JOG speed, click **Edit**.

4. Click **Servo ON**.



For rotating motor



For linear motor

5. Press **Forward** or **Reverse**. A JOG operation is performed only while one of these buttons is pressed.

5 Technical Support

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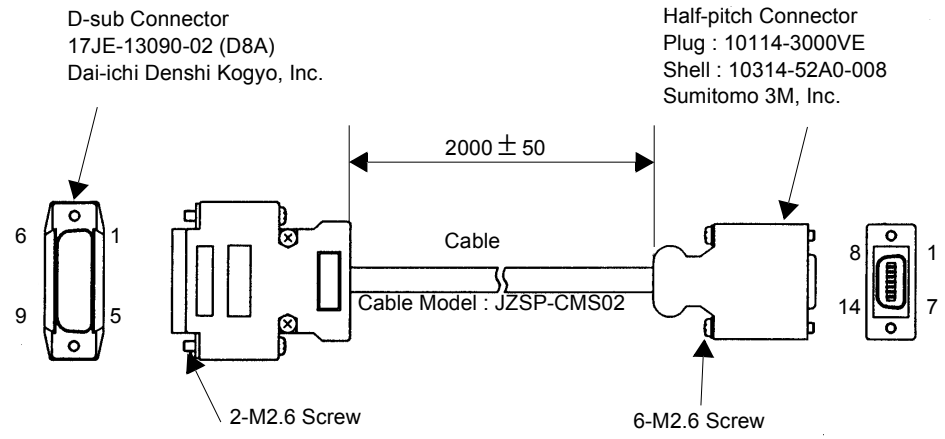
Appendix A: Cable Between the PC and SERVOPACK

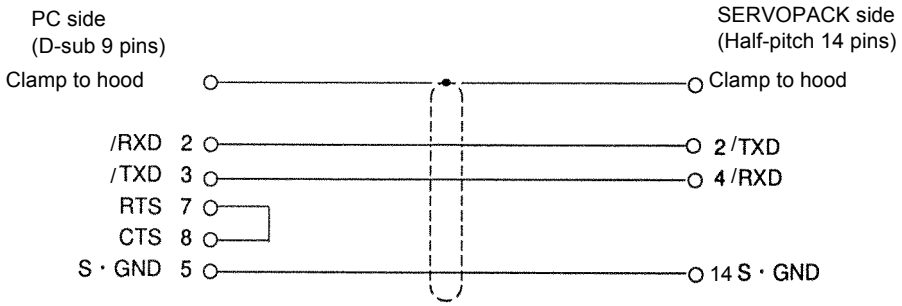
Prepare a dedicated cable for connecting the PC to the SERVOPACK. Contact Yaskawa for the dedicated cable.

Model : JZSP-CMS02 (D-sub 9 pins)

Cable Specifications



Connection Circuit



Communication Specifications

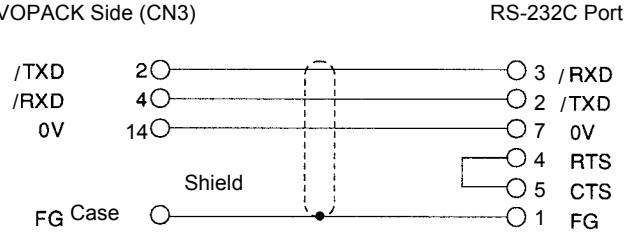
The communication specifications are:

- Baud Rate: 9600 bps
- Bit Structure: Start: 1 bit
Data: 7 bits
Stop: 1 bit
Odd Number Parity: 1 bit
- Synchronization Type: Start-stop synchronization
- XON/XOFF Control: None
- Shift Control: None
- Communication Type: Half-duplex communication

Connection Circuit

When Using an RS-232C port

The maximum cable length is 2m. The following diagram shows a connection circuit.

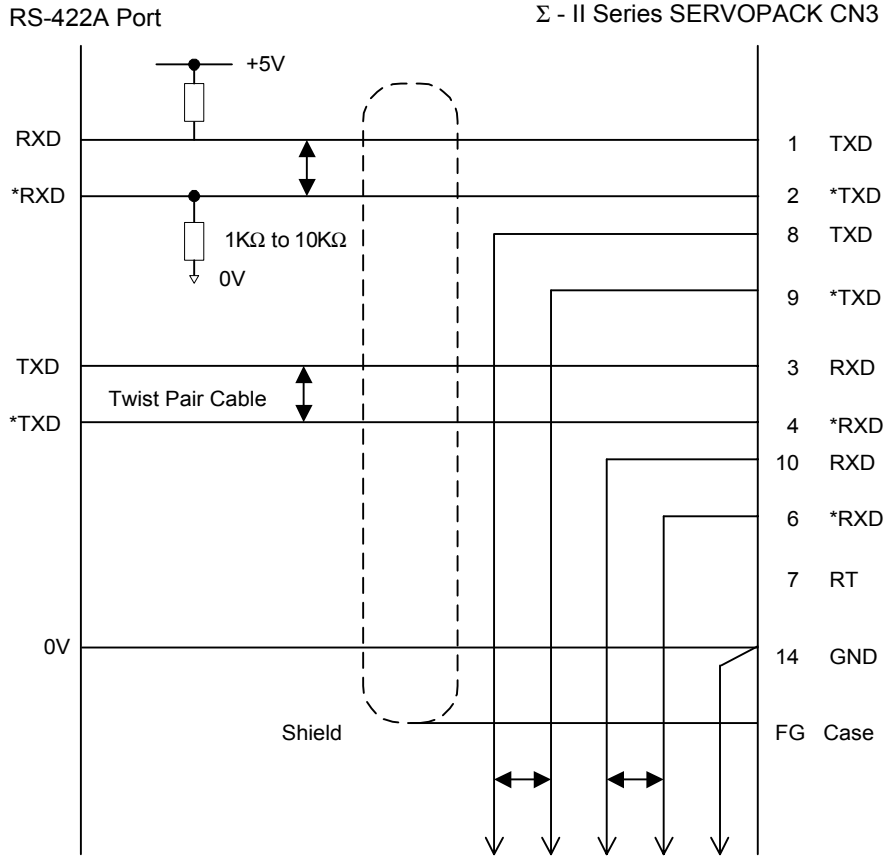


When Using an RS-422A port

The cable can also be connected using an RS-422A port. The following diagram shows a connection circuit.

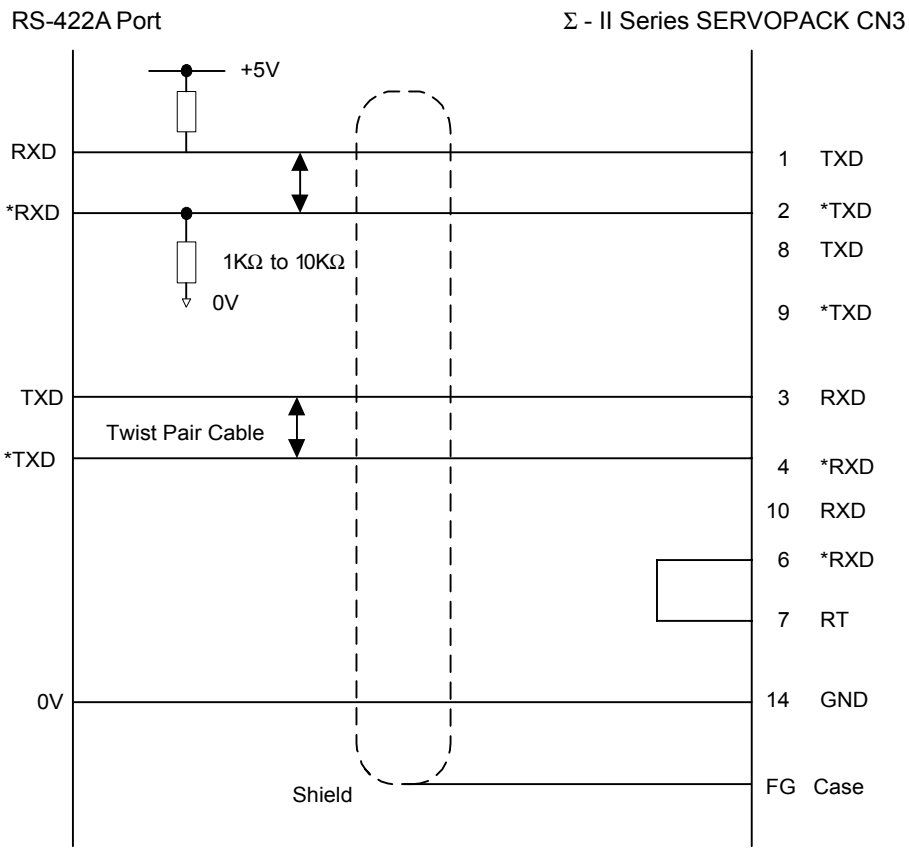
- Transmission Range : 30m maximum (the maximum cable length is 30m.)
- Transmission Type : RS422A

< Multi-Axis Connection (for non-terminal connection) >



< Multi-Axis Connection (for terminal connections) >

A 220Ω terminal resistor is inserted due to a short between pins 6 and 7.



Connector Terminals on the SERVOPACK Side

Pin Number	Signal Name	Signal Line Name	Signal Direction
1	TXD	Transmission Data (non-inverted side)	P *1 ← S *2
2	/TXD	Transmission Data (inverted side)	P ← S
3	RXD	Reception Data (non-inverted side)	P → S
4	/RXD	Reception Data (inverted side)	P → S
5	OPH	Reserved Terminal	-
6	/RXD	A 220Ω terminal resistor between RXD - *RXD is inserted if there is a short between pins 6 and 7.	
7	RT		
8	TXD	Transmission Data (non-inverted side)	P ← S
9	/TXD	Transmission Data (inverted side)	P ← S
10	RXD	Reception Data (non-inverted side)	P → S
11		Reserved Terminal	# *3
12		Reserved Terminal	# *3
13	5VPP	Reserved Terminal	-
14	GND	Signal 0V	-

Connector Pin Number and Signal Name

*1. P: PC
*2. S: SERVOPACK
*3. #: Reserved Terminal (always leave open)
Note: Peel back the cable shield on the end of each connector and affix it PPwith a clamp.

Appendix B: Install File List

SigmaWin100 installs the following files into two directories on the PC.

The application default installation directory is C:\PROGRAM FILES\SgmaIDE\SigmaWin.

Main Application Files

File Name	Function	Installation Directory
SIGMAWIN.exe	Executable Module (EXE)	Application Directory\Bin
YEPRN.exe	Executable Module (EXE)	Application Directory\Bin
BASELIB.dll	Executable Module (DLL)	Application Directory\Bin
CYELIB.dll	Executable Module (DLL)	Application Directory\Bin
SVADJUST.dll	Executable Module (DLL)	Application Directory\Bin
SVALARM.dll	Executable Module (DLL)	Application Directory\Bin
SVBASE.dll	Executable Module (DLL)	Application Directory\Bin
SVCHART.dll	Executable Module (DLL)	Application Directory\Bin
SVCONNECT.dll	Executable Module (DLL)	Application Directory\Bin
SVENCABS.dll	Executable Module (DLL)	Application Directory\Bin
SVGAINTUNE.dll	Executable Module (DLL)	Application Directory\Bin
SVGRAPH.dll	Executable Module (DLL)	Application Directory\Bin
SVINFO.dll	Executable Module (DLL)	Application Directory\Bin
SVJOG.dll	Executable Module (DLL)	Application Directory\Bin
SVLIB.dll	Executable Module (DLL)	Application Directory\Bin
SVLIBC.dll	Executable Module (DLL)	Application Directory\Bin
SVMECHA.dll	Executable Module (DLL)	Application Directory\Bin
SVMON.dll	Executable Module (DLL)	Application Directory\Bin
SVMULTITURN.dll	Executable Module (DLL)	Application Directory\Bin
SVPASSWORD.dll	Executable Module (DLL)	Application Directory\Bin
SVPRN.dll	Executable Module (DLL)	Application Directory\Bin
SVREALTRACE.dll	Executable Module (DLL)	Application Directory\Bin
SVSIM.dll	Executable Module (DLL)	Application Directory\Bin
SVTRACE.dll	Executable Module (DLL)	Application Directory\Bin
SVTUNEON.dll	Executable Module (DLL)	Application Directory\Bin
SVUPWIZARD.dll	Executable Module (DLL)	Application Directory\Bin
SVUSER.dll	Executable Module (DLL)	Application Directory\Bin
SVUSERDIRECT.dll	Executable Module (DLL)	Application Directory\Bin
SVUSERLIB.dll	Executable Module (DLL)	Application Directory\Bin

File Name	Function	Installation Directory
YEDBASE.dll	Executable Module (DLL)	Application Directory\Bin
YESIGMA.dll	Executable Module (DLL)	Application Directory\Bin
IDEINFOJ.mdb	Database File	Application Directory\Bin
SIGMAIDE.atb	SigmaWin Menu File	Application Directory\Bin
ASETTEN.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
BSETTEN.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM1.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM1J.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM1JAC.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM2.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM2J.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM2JAC.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM3.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM3J.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM3JAC.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM4.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM4J.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
CONFIRM4JAC.bmp	Bitmap File for UPWizard	Application Directory\Bin\Dat\bmp
MCMDL1.bmp	Bitmap File for SVSim	Application Directory\Bin\Dat\bmp
MCMDL2.bmp	Bitmap File for SVSim	Application Directory\Bin\Dat\bmp
ORG_BLUE_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_BLUE_LEFT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_BLUE_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_BLUE_RIGHT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_DARKGREEN_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_DARKGREEN_LEFT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_DARKGREEN_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_DARKGREEN_RIGHT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_GREEN_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_GREEN_LEFT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_GREEN_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp

File Name	Function	Installation Directory
ORG_GREEN_RIGHT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PERPLE_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PERPLE_LEFT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PERPLE_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PERPLE_RIGHT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PINK_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PINK_LEFT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PINK_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PINK_RIGHT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PRINT_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_PRINT_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_RED_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_RED_LEFT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_RED_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_RED_RIGHT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_SYAN_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_SYAN_LEFT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_SYAN_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_SYAN_RIGHT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_YELLOW_LEFT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_YELLOW_LEFT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_YELLOW_RIGHT.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
ORG_YELLOW_RIGHT_PRINTC.bmp	Bitmap File for SvTrace	Application Directory\Bin\Dat\bmp
SERVOPACK.chm	Help File	Application Directory\Help
SIGMAWIN.chm	Help File	Application Directory\Help
SIGMATOUR.chm	Help File	Application Directory\Help

Microsoft Foundation Support Files

File Name	Function	Installation Directory
MFC42.dll	MFC Core Code	Application Directory\Bin Windows System Directory
MSVCIRT.dll	C Runtime Library	Application Directory\Bin Windows System Directory
MSVCRT.dll	C Runtime Library	Application Directory\Bin Windows System Directory
ODBC32.dll	MFC DLL	Application Directory\Bin
MSVCRT40.dll	C Runtime Library	Windows System Directory
VBAJET32.dll	VBA Jet Expression Service	Windows System Directory
VBAR332.dll	VBA Runtime	Windows System Directory
OLEPRO32.dll	Microsoft OLE Property Support DLL	Windows System Directory
OLEAUT32.dll	Automation Support DLL	Windows System Directory

DAO, Jet Support Files

File Name	Function	Installation Directory
DAO350.dll	DAO DLL	DAO Directory\Bin
DAO2535.tbl	DAO TBL File	DAO Directory\Bin
MSJET35.dll	DAO DLL	Windows System Directory
MSRD2X35.dll	DAO DLL	Windows System Directory
EXPSRV.dll	DAO DLL	Windows System Directory
MSJINT35.dll	DAO DLL	Windows System Directory
MSJTER35.dll	DAO DLL	Windows System Directory

Tool OCX

File Name	Function	Installation Directory
SPR32X30.ocx	Spreadsheet OCX	Windows System Directory
OLCH2X32.ocx	Olectrachart 2D	Windows System Directory
SSTBARS2.ocx	Active Tool Bar	Windows System Directory
ACTRPT.dll	Active Report DLL	Windows System Directory
FPSPR30.ocx	Spreadsheet OCX	Windows System Directory

Visual Basic Runtime Library

File Name	Function	Installation Directory
MSVBVM60.dll	Visual Basic Runtime Library	Windows System Directory
TABCTL32.ocx	Tab Control OCX	Windows System Directory
COMDLG32.ocx	Common Dialog OCX	Windows System Directory

User's Manual

File Name	Function	Installation Directory
SigmaWin100.pdf	SigmaWin100 User's Manual	Application Directory\Manuals

The program file can be found on the Windows start menu. The default name of the file is YE_Applications. The SigmaWin program can be found in this file.