



Instruction Manual

Support Software

ESA-SXX

<<For safe use of product>>

Wrong operation of the product may result in unavailability of exhibition of full performance of the product or lead to a serious accident. To prevent occurrence of an accident, be sure to read the Instruction Manual of the product carefully to completely understand the contents given therein before operating the product. If you find any unclear point, contact us.

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1. Preface	3
2. FOR SAFE USE	3
3. Overview.....	4
3.1. Features of ESA-S01.....	4
4. System Requirements	4
5. Handling Procedures and Cautions	5
5.1. Connection between Actuator and Controller	5
5.2. Installation Guide.....	6
5.2.1. Installation	6
5.2.2. Uninstallation.....	8
5.3. Screen.....	9
5.3.1. Full Screen	9
5.4. Starting Support Software.....	13
5.4.1. Creating New File	13
5.4.2. Connecting to Controller.....	14
5.5. Editing Parameters	15
5.5.1. Dialog for Initial Parameter Settings	15
5.5.2. Dialog for Editing Operation Parameters	16
5.5.3. Dialog for Editing Original Position Parameters.....	16
5.6. Editing Point Data.....	17
5.6.1. Positioning Dialog.....	17
5.6.2. Copying Multiple Point Data	17
5.6.3. Canceling Selected Point Data	18
5.7. Operating the Actuator.....	19
5.7.1. Movement to the Specified Point	19
5.7.2. Repetitious Operation 1.....	21
5.7.3. Repetitious Operation 2.....	22
5.7.4. Inching Operation	22
5.8. Saving, Transferring, and Checking Data	24
5.8.1. Writing Data.....	24
5.8.2. Reading Data.....	25
5.8.3. Checking Data.....	26
5.8.4. Saving Data.....	27
5.9. Assigning Address	27
5.10. Displaying I/O Signal Status	29

5.11. System	30
5.11.1. Initializing Point Data.....	30
5.11.2. Initializing Parameters.....	31
5.11.3. Displaying Alarm History	32
5.11.4. Configuring Communication Port	32
5.12. Connection to Actuator	33
5.12.1. Connection of controller	33
5.13. Adjustment Communication Timing	34
5.13.1. Adjusting Communication Timing with Controller	34
5.13.2. Before Adjusting Communication Timing with Controller.....	34
5.14. Printing Point Data.....	35

1. Preface

Thank you for purchasing our ESG1 Series Electric Gripper. The ESA-S01 is software that has been designed to support edit of parameters and point data for SG1-series controllers. With use of this software, you can easily edit the special parameters or point data (position, operation mode, speed, and force) for actuator, and save the edited data as a file or print the saved files. In addition, you can check for the correct movement operations of the gripper according to the edited point data, display the current position, and check operational status before operating the gripper using a sequencer or other devices.

2. For safe use

Cautionary descriptions given here are for correct use of the products and for prevention of hazard on you and other people in vicinity and damage with equipment. Strictly observe the instructions described in the Controller and Gripper Operation Manuals for safety use.

3. Overview

3.1. Features of ESA-S01

Feature	Detail
Edit Point Data	Edits point data Edits parameters
Backup Point Data	Saves point data Saves controller data
Operate Actuator	Moves to the specified point Continuously moves between two points/ Displays the current position
Monitor	Displays I/O signal status Displays alarm history

4. System Requirements

Windows98SE, Windows2000, WindowsXP

· Computer system

Computer Personal computer with Pentium CPU

Free memory space 32MB minimum

Free hard-drive space 4MB or more

*Required space of memory and hard drive may differ depending on your system environment.

Display Resolution 800 x 600 minimum (1024 x 768 recommended)

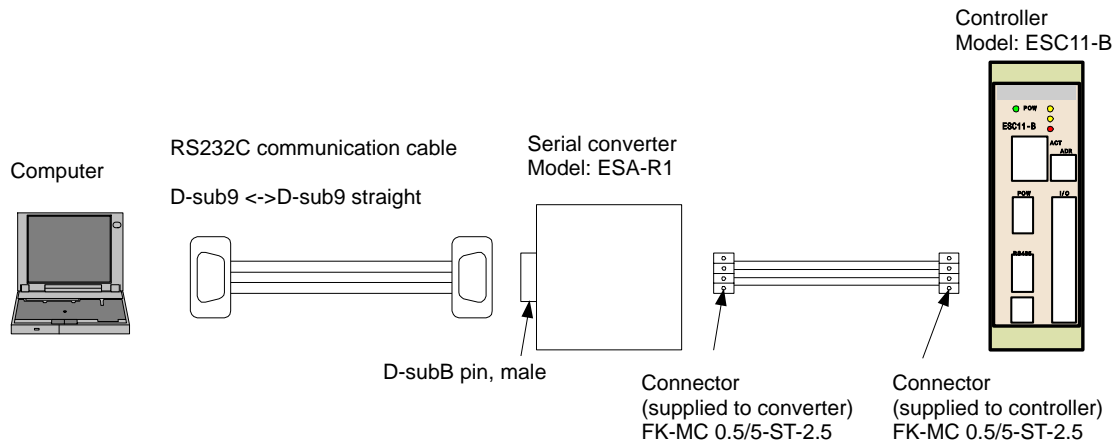
Serial port Any of RS-232C serial ports (COM1-9) must be unoccupied.

5. Handling Procedures and Cautions

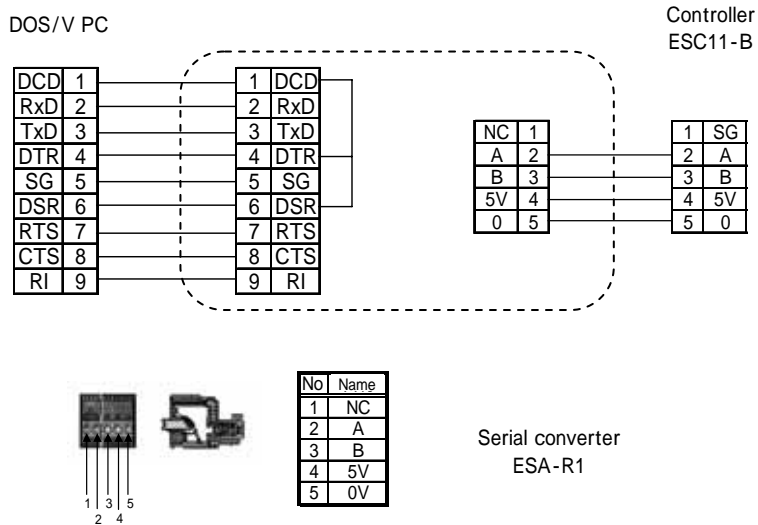
5.1. Connection between Actuator and Controller

To connect between the computer and controller, a communication cable and RS232C-RS485 converter (optional) is needed.

Connect the computer and controller as shown in the following connection diagram.



The following diagram shows pin arrangement of the connectors.



! CAUTION

- When connecting the communication cable to the controller or removing the cable from the controller, always turn off the controller power first. Failure to do so may result in product damage.
- Do not turn off the controller power during communication between the controller and computer.
- Connect the controller and computer through a serial converter (ESA-R1, optional).

- Use the straight RS232C cable (commercially available) to connect between the controller and computer.
- Be sure to install an emergency-stop circuit in a readily accessible external position so that the device can be stopped and power supply to the controller can be shut down immediately upon occurrence of a dangerous situation during operation.
- Specifications of communication cable (recommended)
CO-SPEV-SB(A) 4P × 0.3SQ LF , Hitachi Cable

5.2. Installation Guide

5.2.1. Installation

In order to use the ESA-S01 support software on your PC, you need to install it on your hard drive. Install the software by following the procedure below.

Installing Using CD-ROM

Double-click the “setup.exe” file in the “Main folder” in the CD-ROM .

After the setup program starts, the setup screen is displayed.



Click the **Next** button to continue.

License agreement is displayed on the screen. Read it, and if you agreed the terms and conditions of this agreement, click the **Agree** button and the **Next** button to continue.

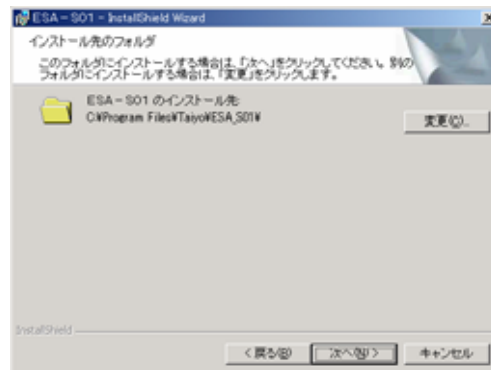


Enter your User Information.

Enter user information and click the **Next** button to continue.

Accept the default installation folder by clicking the **Next** button.

If you wish to install the software to a different folder, click the desired folder.



Verify the setting information.

Verify that the current setting information displayed is correct.

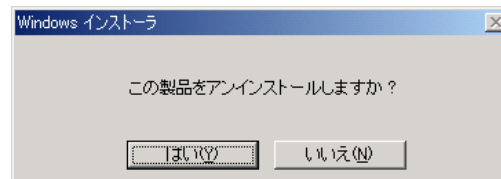
Click the **Install** button to continue.

After installation completed, the install completion message is displayed. Click the **End** button.



5.2.2. Uninstallation

If you wish to uninstall the software, select **Program > TAIYO-ESA-S01** from the **START** menu and select “Uninstallation”.



5.3. Screen

5.3.1. Full Screen

When you start the support software, the following opening screen is displayed.

The screenshot shows the ERA-501 software interface. On the left, a vertical sidebar contains several buttons: Edit, Operation, Parameter, Point, Address, I/O, System, Connect, and Adjust. Each button is labeled with a green text label and an arrow pointing to it. The main window is divided into several sections:

- Menu bar:** Located at the top, containing File, Edit, System, View, Window, and Help.
- Tool bar:** Located below the menu bar, containing icons for file operations and help.
- Parameter Table:** A table displaying various parameters and their values. The text "List of parameters is displayed." is overlaid on this section.

Actuator type	SS20	
(+)Soft limit	7.6 mm	(0.0 - 999.9)
(-)Soft limit	0.0 mm	(-999.9 - 0.0)
Stroke	7.6 mm	(0.0 - 999.9)
Positioning completed distance	0.01 mm	(0.00 - 655.35)
Timing adjustment	200 mSec	(1 - 65535)
Time of Movement		
Acceleration		
Program maximum speed	100 %	(20 - 100)
Gripping speed	20 %	(20 - 50)
The movement distance of the constant speed	2.00 mm	(0.01 - 99.99)
Limit width	2.00 mm	(0.01 - 99.99)
Return direction to origin	OPEN	
Return to origin speed	20 %	(20 - 50)
origin shift	0.00 mm	(-99.99 - 99.99)
Origin detection method	Stroke-end and Encoder Z	
- Point Data List:** A list of point numbers and their corresponding data. The text "List of point data is displayed." is overlaid on this section.

Point number	Movement mode	Movement distance(mm)	Speed(%)	Gripping force(%)	Zone boundary1(mm)	Zone boundary2(mm)
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
- Communication status bar:** Located at the bottom of the main window, displaying various status indicators like OnLine, Movement, Uncomplet, Servo, On, Alarm, Normal, InPosition, Out range, Command, Normal, Tu/fix, Normal.
- Status bar:** Located at the very bottom of the window, displaying the date (2007/06/29) and time (13:15).

Menu Bar

Descriptions of each menu are listed as follows:

File

- Create a new file
 - Opens new file
- Open
 - Opens selected file
- Close
 - Closes file without terminating application
- Save
 - Saves file to the same location without changing the file name
- Save as
 - Saves file to name and location specified
- Print
 - Prints parameters and point data
- Print Preview
 - Displays file as it will appear when printed
- Printer Setup
 - Make the printer settings
- Files recently used
 - Displays files most recently used
- Exit
 - Exits the support software

Edit

- Undo
 - Retrieves last action. Clicking this button twice undo the last two actions.
- Cut
 - Cuts selected point data and copy them
- Copy
 - Copies selected point data
- Paste
 - Pastes copied point data to specified location
- Insert
 - Inserts data in selected row
- Edit
 - Edits selected point data

System

- Initialize point data
 - Initializes point data
- Initialize parameters
 - Initializes parameters
 - Enter connected actuator number
- Display alarm history
 - Displays a list of alarm history
 - This function is activated while controller and PC are connected online.
- Setup communication port
 - Setups communication port on PC
 - Normally COM1 port is selected.
- Adjust timing
 - Adjusts communication timing
 - Normally you don't have to change the default setting value.

Display

- Tool bar
 - Shows/Hides the tool bar
- Status bar
 - Shows/Hides the status bar

Window

- Open a new window
 - Opens a new window
- Displays layered windows
 - Displays layered multiple windows

Help

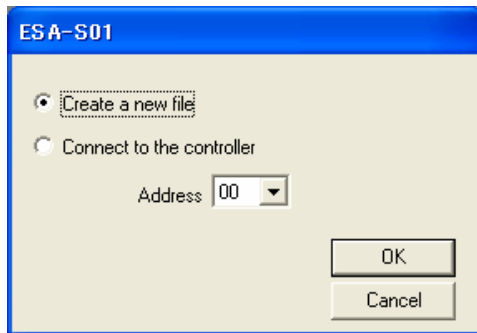
- Displays ESA-S01ESA-S01version information
 - Displays version information of support software
 - Displays version information of connected controller
- Display help
 - Displays help information of support software
- Display ESG1_AR support manual
 - Displays the ESG1_AR support manual
- Display ESG1_AR operation manual
 - Displays the ESG1_AR operation manual
- Display ESG1_AR controller operation manual
 - Displays ESG1_AR controller operation manual
- Display ESG1_RS485 communication manual
 - Displays the ESG1_RS485 communication manual

5.4. Starting Support Software

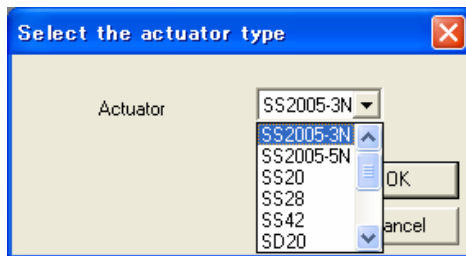
To start the support software:

5.4.1. Creating New File

Select **Create a New File** and click the **OK** button.



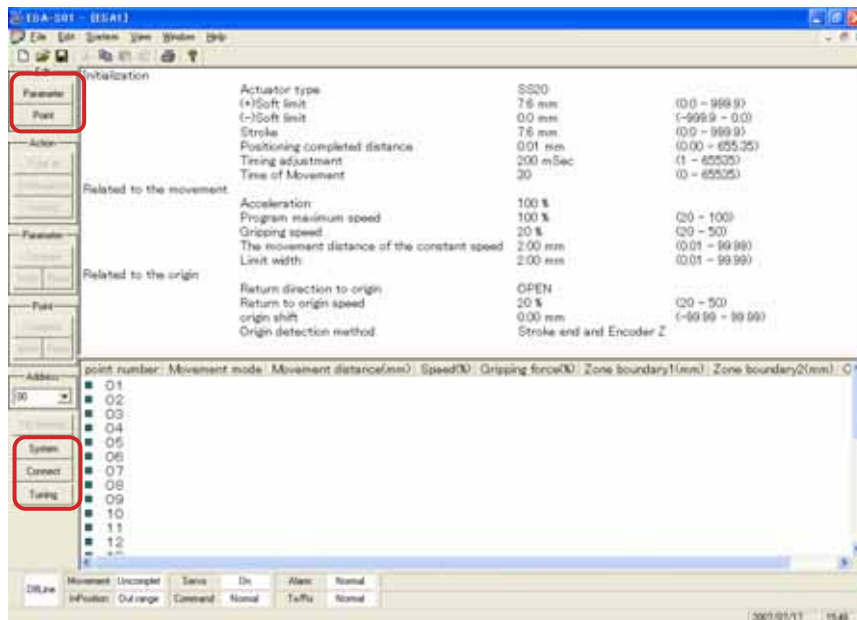
Select the actuator type from the drop-down list and the **OK** button.
Initial parameter values of the selected actuator type are displayed.



The screen for editing parameters and point data is displayed.

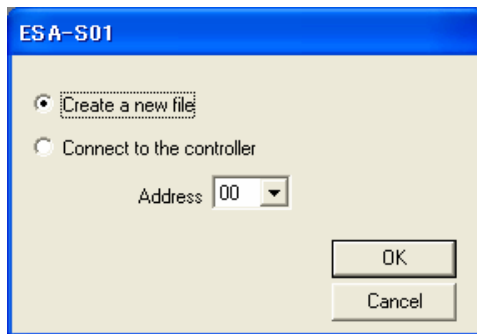
Edit parameters and point data at this step.

Only the buttons that are used for editing parameters and point data are activated.



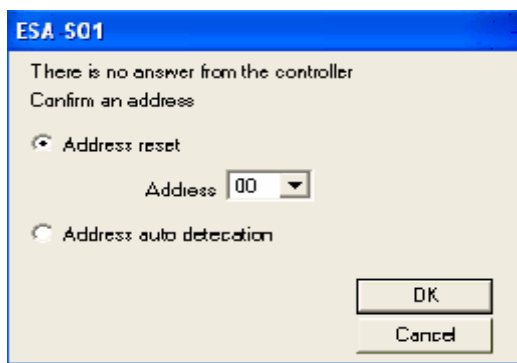
5.4.2. Connecting to Controller

Select **Connect to the controller** and click the **OK** button.



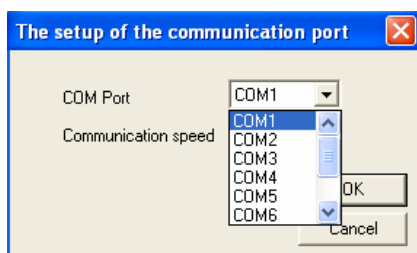
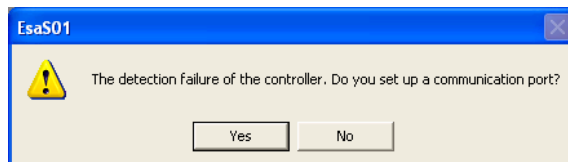
Check connection status of the controller to make sure that the controller and your PC are surely connected. If connected, the computer starts reading parameter data parameter data and point data from the controller and displays the read data on the screen

If not connected, select **Address reset** or **Address auto detection** and click the **OK** button.



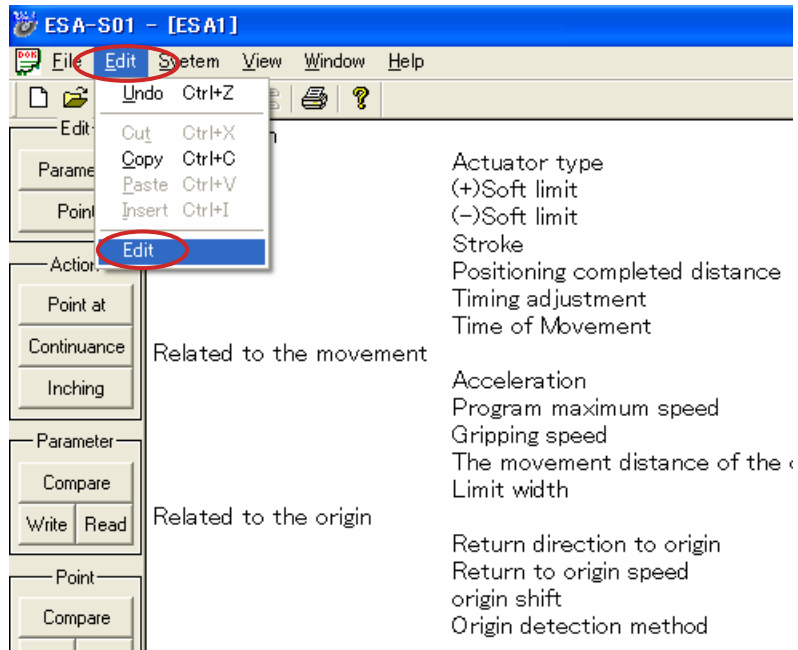
If controller address cannot be confirmed (the controller is located far away from the PC to which the support software is installed), choose **Address auto detection** that is a convenient function to detect address.

In addition, if wrong communication port is specified, choose correct one.



5.5. Editing Parameters

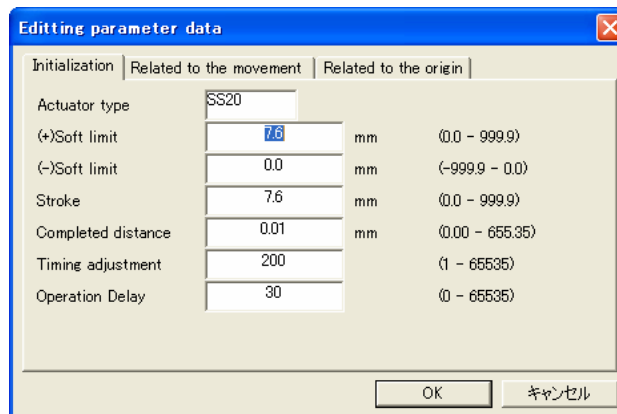
Click **Edit** in the menu bar and choose **Edit**, or choose **Parameter** in the Edit area.



A **parameter edit** dialog box is displayed. Refer to Controller Instruction Manual for details. Only double-clicking the **Parameter** button pops up the **parameter edit** dialog box. Move the cursor to the desired item to edit the parameter.

5.5.1. Dialog for Initial Parameter Settings

Edit Parameters of Actuator type, Soft Limit, Stroke, Positioning Completed Distance, Timing Adjustment, and Operation Delay.



To change an actuator type, perform initial process first.

5.5.2. Dialog for Editing Operation Parameters

Edit parameters of acceleration, program maximum speed, gripping speed, constant -speed movement distance, limit width.

The screenshot shows a dialog box titled "Editing parameter data" with a close button (X) in the top right corner. It has three tabs: "Initialization", "Related to the movement", and "Related to the origin". The "Related to the movement" tab is selected. The dialog contains the following parameters:

Parameter	Value	Unit	Range
Acceleration	100	%	
Program max speed	100	%	(20 - 100)
Gripping speed	20	%	(20 - 50)
Constant speed	2.00	mm	(0.01 - 99.99)
Limit width	2.00	mm	(0.01 - 99.99)

At the bottom of the dialog are two buttons: "OK" and "キャンセル" (Cancel).

5.5.3. Dialog for Editing Original Position Parameters

Edit parameters of return direction to original position, movement speed to original position, shift of original position, and method for original position return

The screenshot shows the same "Editing parameter data" dialog box, but with the "Related to the origin" tab selected. The parameters are:

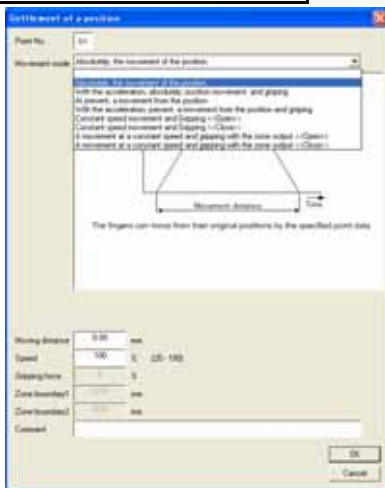
Parameter	Value	Unit	Range
Return org direction	<input checked="" type="radio"/> OPEN <input type="radio"/> CLOSE		
Return org speed	20	%	(20 - 50)
Origin shift	0.00	mm	(-99.99 - 99.99)
Origin detection	<input type="radio"/> Stroke end <input checked="" type="radio"/> Stroke end and Encoder Z		

At the bottom of the dialog are two buttons: "OK" and "キャンセル" (Cancel).

5.6. Editing Point Data

After moving the cursor to the desired point number, click **Edit** in the menu bar and choose **Edit** from the drop-down list. The **positioning** dialog box appears. Double-click the desired point data to edit.

5.6.1. Positioning Dialog

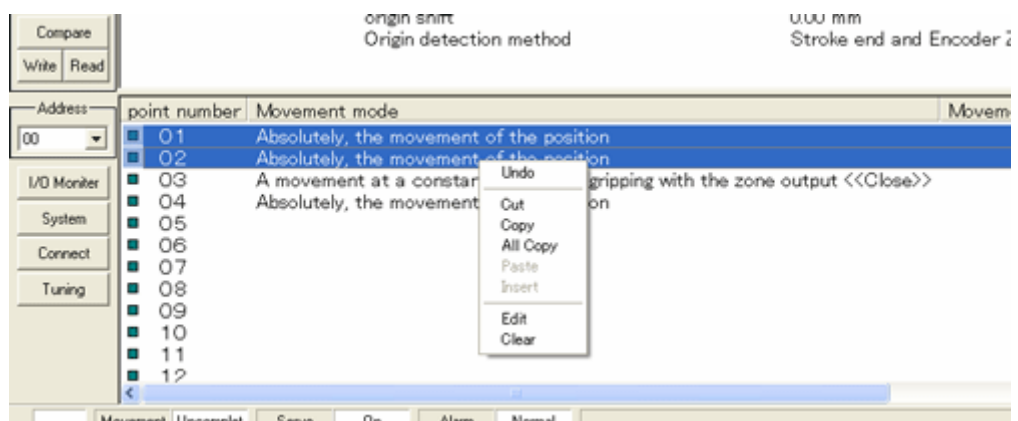


Refer to the Controller Instruction Manual for details of operation mode.

5.6.2. Copying Multiple Point Data

Click the first number of points you want to copy, and click the last number while holding down the Shift key. Choose **Copy** from the Edit menu. The selected point data are copied to the Clipboard. Click the numbers of points that you want to replace with the data copied to the Clipboard and select Paste from the Edit menu.

Note: If any data exist in the destination point, the existing data are replaced with the selected data.



5.6.3. Canceling Selected Point Data

Click the first number of points you want to cancel and click the last number while holding down the Shift key. Choose **Copy** from the Edit menu. The selected point data are cleared.

5.7. Operating Actuator

5.7.1. Movement to Specified Point

To move the fingers to the specified point number:

Select the desired point number from the drop-down list of registered point numbers.

Verify that the fingers completed returning to their original positions on the screen. If they failed to return to their original positions, click the **ORG** button to let the fingers return to their original positions.

Check the speed settings.

Initial speed parameter is set to 50%. This means that the fingers move at the speed dropped down by 50% in the speed setting saved as the specified point number. If you want to move the fingers at the speed saved as the specified point number, enter 100.

Click the **GO** button. The fingers start to move to the position of the specified point number.

Their current position is displayed in the **Current** position box.

If you want to stop the fingers in operation, click the **STOP** button.

If you operate the controller of another address, change the address number and click the **Connection** button to check if the controller is surely connected. If it is properly connected, the address setting will be updated. Refer to section 5.9, Assigning Address.

After changing the address, load parameter data and point data. Refer to section 5.8, Saving, Transferring, and Checking Data.

The screenshot shows a software dialog box titled "Point designated movement". It features a blue title bar with a close button (X) on the right. The main area is light gray and contains the following elements:

- An "Address" label above a text input field containing "00".
- A "PointNo" label above a dropdown menu showing "01".
- Three buttons: "GO", "STOP", and "ORG", arranged horizontally.
- A "Speed" label above a text input field containing "50" followed by a "%" symbol.
- A "Present position" label above a text input field containing "0.00" followed by "mm".
- An "Origin return condition" label above a text input field containing "Complete".
- A "Close" button at the bottom right.

5.7.2. Repetitious Operation 1

The fingers move between the specified points.

Movement interval between the points can be adjusted using the Timer.

Click the down arrow next to the **Point Number** box to display the pull-down list of the registered points numbers. The fingers repeatedly move between the points in the left box and the points in the right box one by one. They do not move to the unregistered point. Specify the point numbers in ascending order.

Verify if the fingers finished returning to their original positions on the screen or not. If they did not return to their original positions, click the **ORG** button to let the fingers return to their original positions.

Check the speed setting.

Specify timer parameter. Initial timer parameter has been set to 200ms.

Click the **GO** button. The fingers start moving to the specified point.

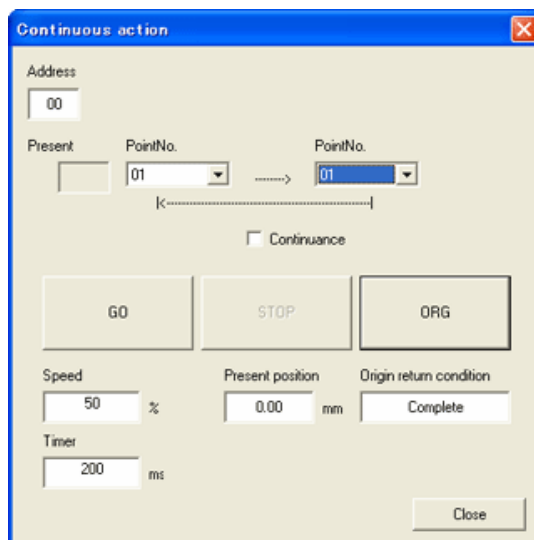
The current position of the fingers is displayed.

To stop the fingers during movement, click the **STOP** button.

If you wish to use a controller to which another address is assigned, change the address number and click the **Connection** button. Then, check connection status of the controller. If the controller is properly connected, the address setting will be updated. Refer to section 5.9, Assigning Address.

After the address was changed, read parameter data and point data.

See section 5.8, Saving, Transferring, and Checking Data.

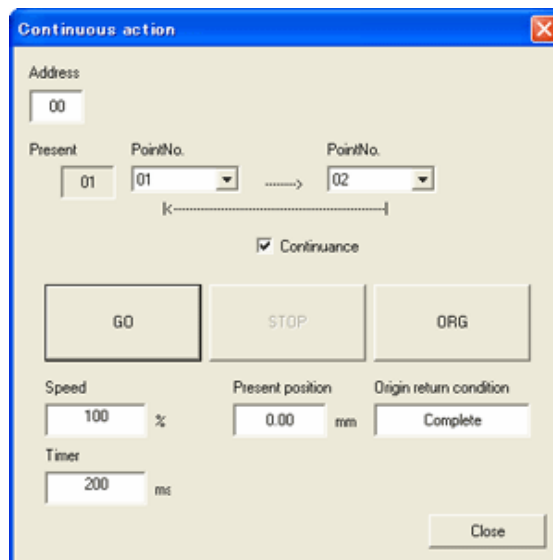


5.7.3. Repetitious Operation 2

The fingers repeatedly move between the specified points one by one.

To activate this function, check the **Continuance** check box.

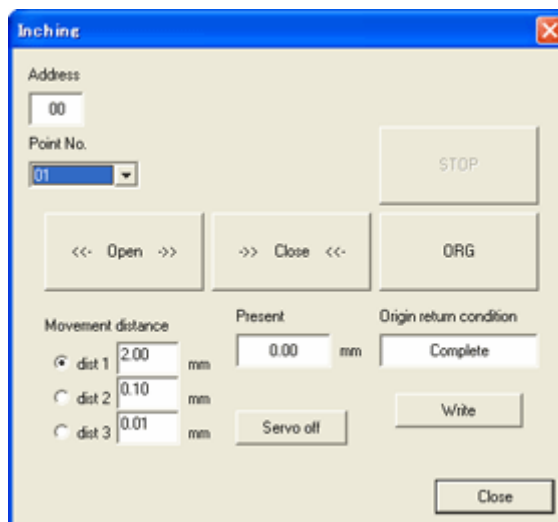
The setting and operating procedures are the same as those for Continuous Operation 1.



5.7.4. Inching Operation

This function is used for letting the actuator perform inching operation.

The distance that the fingers moved using the inching function can be added to the specified point data.



Select a point number. After performing inching operation, click the **Write** button to add the current position data to the specified point data.

Verify if the fingers finished returning to their original positions on the screen.

When they did not finish returning to their original positions, click the **ORG** button to let the fingers return to their original positions.

Check the setting for movement distance.

Single-Clicking the **OPEN** or **CLOSE** button changes movement distance of the fingers.

Dist.2: 1.00mm

Dist.2: 0.10mm

Dist.3: 0.01mm

Click the **OPEN** or **CLOSE** button to let the fingers move by the specified distance.

If you wish to set a point by directly moving the moving parts of actuator, click the **Servo off** button. After the motor of actuator entered in the non-excitation status, the moving parts can be moved by hand (for single cam type only).

Click the **Write** button to add the current position to the specified point data. If the number of point having no point data is specified, a dialog box for setting a point position will be appeared. Set the items required for setting point position and click the **Write** button.

Click the **CLOSE** button to close the inching dialog box.

5.8. Saving, Transferring, and Checking Data

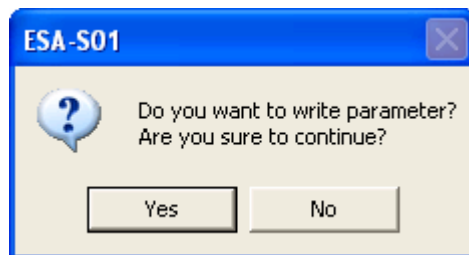
The point data edited on a PC are not updated until the **Write** command is executed. Whenever point data were edited, execute the **Write** command to determine.

5.8.1. Writing Data

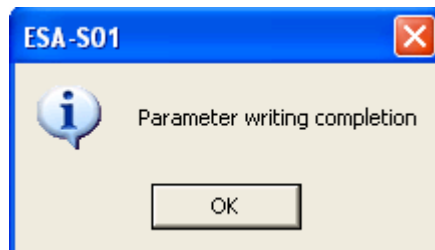
When clicking the **Write** button, the dialog box will appear



Click the **OK** button to continue.



After the data were successfully written, the following dialog box is displayed after writing a parameter.



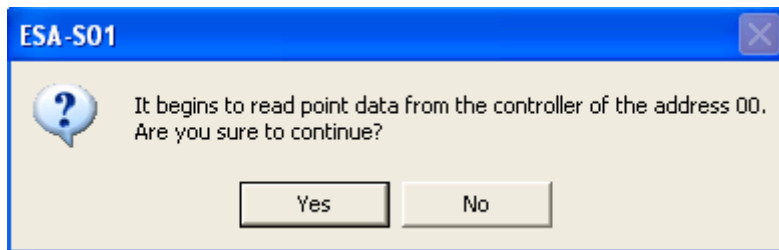
In the same procedure, point data are also written.

5.8.2. Reading Data

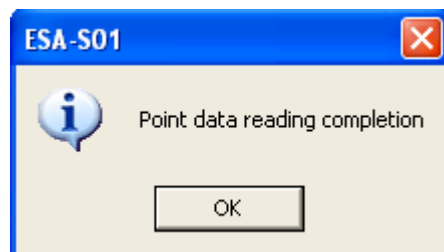
When clicking the Read button, the dialog box asking you to confirm that you really want to continue.



Click the **OK** to continue.



If the data are successfully read, the following dialog box will be displayed.

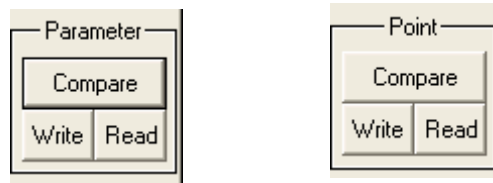


In the same procedure, point data are also read.

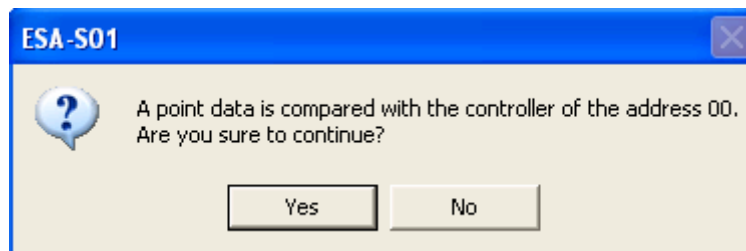
5.8.3. Checking Data

Check if the parameters and point data edited on a PC match the data saved as the specified controller.

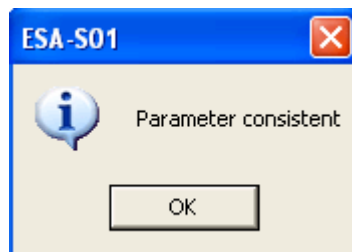
Click the **Check** button to display the dialog box asking you to confirm that you really want to continue.



lick the **Yes** button to continue.



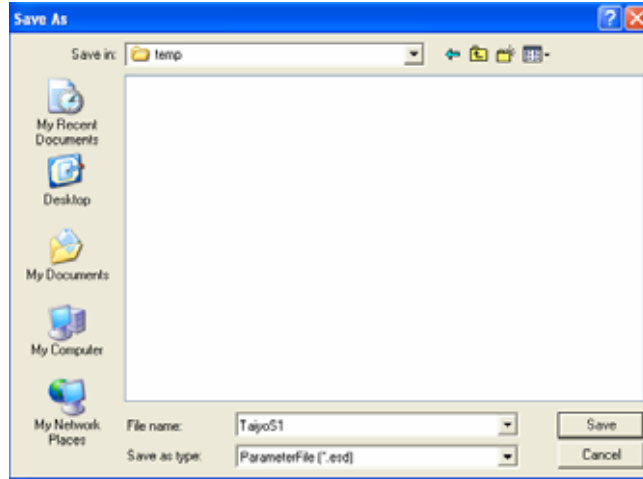
If the data are successfully written, the following dialog box telling that data consistency check has been completed.



In the same procedure, point data are also checked.

5.8.4. Saving Data

Save the edited parameters and point data as a file.

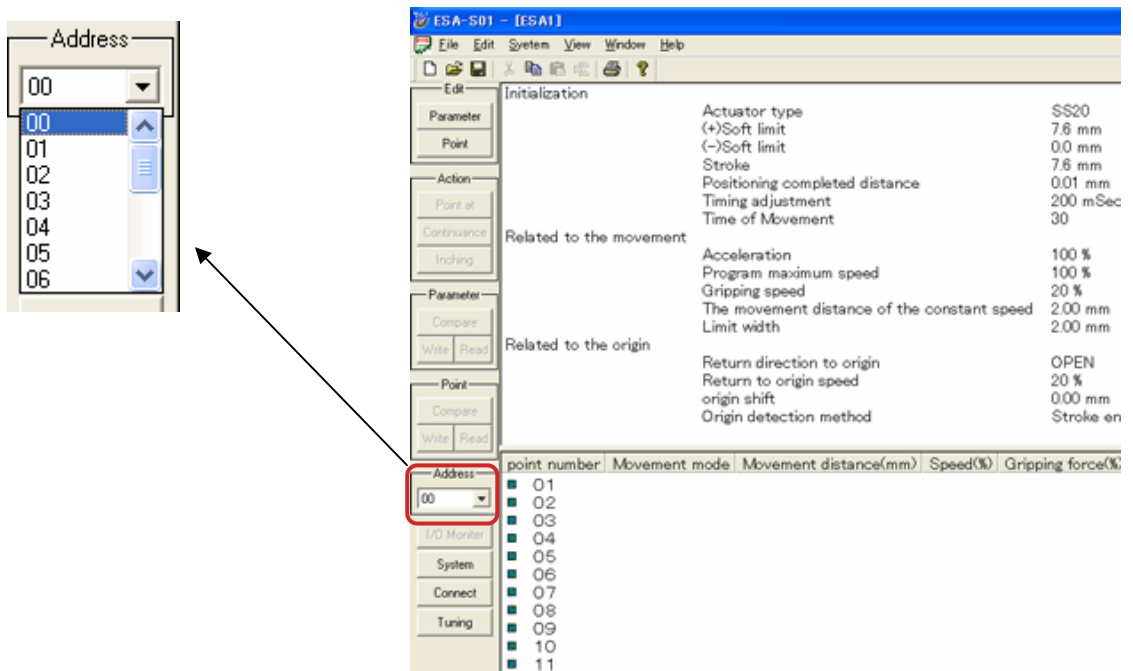


Create a new folder first and save a file with a new file name in the folder.

5.9. Assigning Address

To establish communication between PC and controller, address setting for the support software must be the same as that of controller.

Choose addresses of controller and the software from the drop-down list.



Assigning address to controller

Set address by using the rotary switch on the controller. Whenever setting address to the controller, turn off the power. To change the preset address, turn off the power first; otherwise, the address will not be changed.

5.10. Displaying I/O Signal Status

Input and output signal status for the controller is displayed.

The screenshot shows a window titled "Controller I/O" with a close button in the top right corner. At the top, there is an "Address" field containing the value "00". Below this, the window is divided into three columns of signal indicators:

- Input:** A vertical list of eight checkboxes. The first, "INLCK", is checked and has a green square next to it. The others are unchecked and have white squares: "APSEL", "START", "POS14", "POS13", "POS12", "POS11", and "POS10".
- Output:** A vertical list of eight checkboxes, all of which are unchecked and have white squares: "ZON", "RORG", "POS04", "POS03", "POS02", "POS01", and "POS00".
- Output:** A vertical list of eight checkboxes. The second, "LED RDY", is checked and has a green square next to it. The others are unchecked and have white squares: "LED ALM", "LED RUN", "HOLD", "INPOS", "ALRM", "BUSY", and "READY".

At the bottom of the window, there is a "Present" field with a text input box and the unit "mm". To the right of this field are two buttons: "Hidden" and "Close".

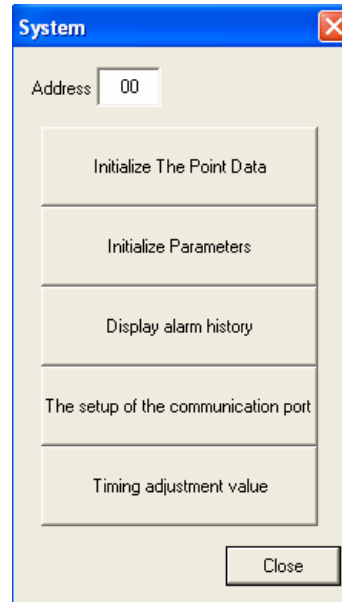
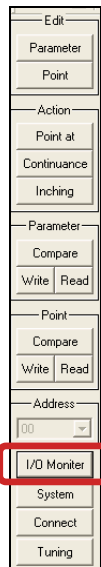
ON: Green

OFF: White

The displayed current position may be different depending on baud rate and data processing speed of your computer. In this case, set the timer between the specified points or use the displayed current position as a guide.

5.11. System

The SYSTEM window is used to initialize point data and parameter, display alarm history, and set communication port.

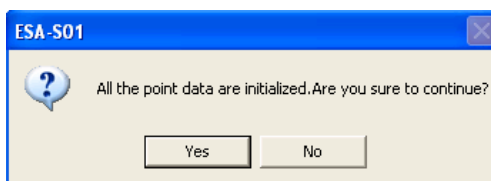


5.11.1. Initializing Point Data

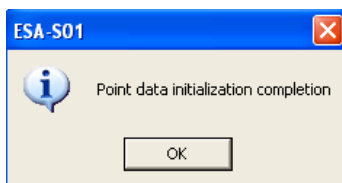
If point data are broken or you wish to clear all of the saved point data, perform initialization.

After check the address, click the **Initialize point data** button. The point data editing window and saved point data are initialized.

Click the **Yes** button to continue.



After the data are successfully initialized, the following dialog box is displayed.



Note) Once you perform initialization, point data are completely cleared. It is recommended that you back up the point data as necessary.

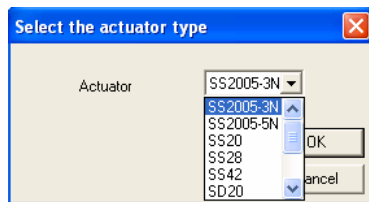
5.11.2. Initializing Parameters

In the case where the parameters specified to the controller are broken, the parameters need to be initialized. Once you initialize parameters, parameters are changed to initial parameters of initialized actuator type.

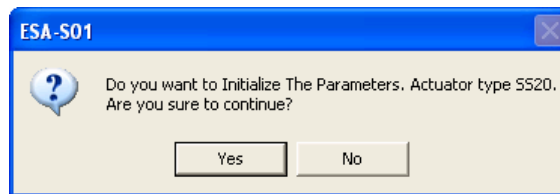
After checking the address, click the **Initialize parameters** button. The parameter editing window and controller parameters are initialized.

The actuator type selection window is displayed.

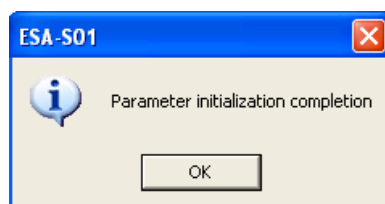
Select an actuator type.



The message box asking you to confirm that you really want to continue. Click the **Yes** button to continue.



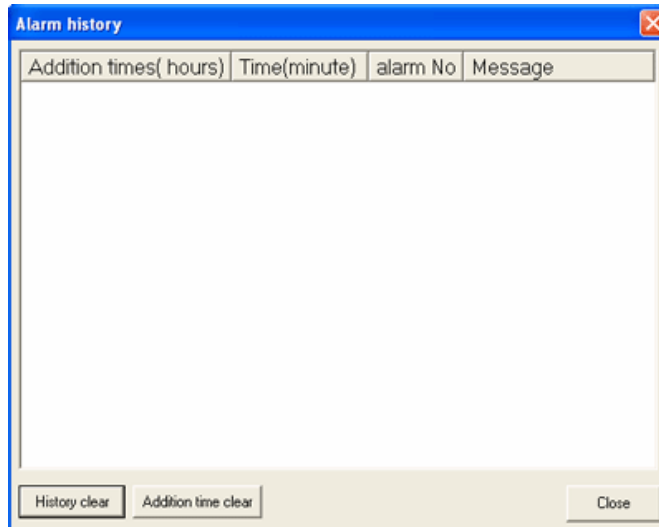
When initialization is successfully completed, the dialog box telling that initialization of parameters was done.



Note) Once you perform initialization, all point data are changed to initial parameters. It is recommended that you back up the point data as necessary.

5.11.3. Displaying Alarm History

After checking address, click the **Display alarm history** button. Alarm history is displayed.

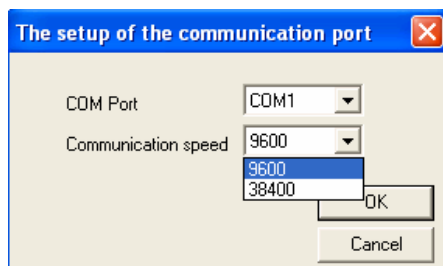


The last 10 alarms are displayed. The accumulated alarm time is also displayed. After reviewing the alarm information, take measures to eliminate the alarm error. For measures against alarm, refer to "Measures against Problems".

5.11.4. Configuring Communication Port

Configure communication port.

Configure the serial port on the PC connected to the controller.



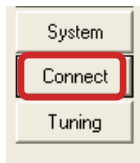
Settings for the communication port can be checked by selecting **START > Settings > Control Panel > System > Hardware Tab > Device Manager > Ports (COM & LPT) > Communication Port**. Controller ver. 1.09 or higher supports baud rate setting.

5.12. Connection to Actuator

To connect to the actuator:

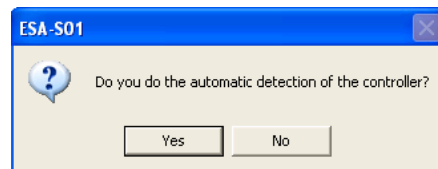
5.12.1. Connection of Controller

After creating a new file, click the **Connect** button to connect between the PC and controller.



The dialog box asking you to confirm that you really want to continue is displayed.

Click the **Yes** button to continue.

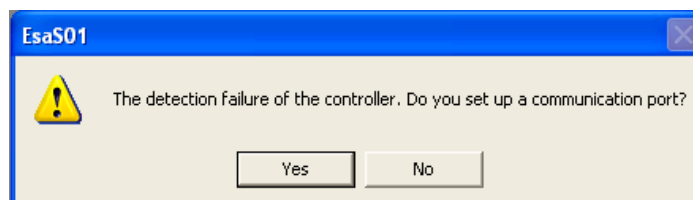


If the controller is successfully detected, the message telling the controller was detected is displayed.



If the controller was not detected, check for address and communication port settings.

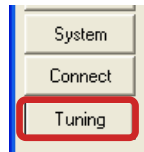
See section 5.11.4., [Configuring Communication Port](#).



5.13. Adjustment of Communication Timing

This function is used for adjusting communication timing with controller.

5.13.1. Adjusting Communication Timing with Controller



Initial value of communication timing with the controller is 200ms. To set the communication timing forward, click the **Adjust** button to adjust the timing. When setting the communication timing, take care so that timing parameter for the support software is always less than that for the controller. See the ESG1_RS485 communication manual for details of communication timing.

5.13.2. Before Adjusting Communication Timing with Controller

If communication timing is adjusted extremely fast, communication between the PC and controller may not be established. Click the **System** button to initialize parameters. Communication between the devices cannot be established until communication-timing parameter is initialized.

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