Product Name

Controller Setting Software
(For 4-axis Step Motor Controller)

MODEL/ Series/ Product Number

JXC-W1
(JXC#3 Series)
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JXC*3 Series/Controller Setting Software

1. Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1, and other safety regulations.

*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.
ISO 4413: Hydraulic fluid power -- General rules relating to systems.
IEC 60204-1: Safety of machinery -- Electrical equipment of machines .(Part 1: General requirements)
e tc.

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
   Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.
   The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.
   This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
   The product specified here may become unsafe if handled incorrectly.
   The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions:
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.
1. Safety Instructions

Caution

1. The product is provided for use in manufacturing industries.
   The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and provide specifications or a contract, if necessary. If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited Warranty and Disclaimer” and “Compliance Requirements”.
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. *2) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) Vacuum pads are excluded from this 1 year warranty.
   A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
   Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.
2. Product Specifications

The 4-axis step motor controller controls the electrical actuator operation using a predefined set of step data, which combines all operation commands such as position and speed, and will start the operation after step data is entered into the controller using external equipment.

This setting software is for inputting and changing the setting of the controller using a PC.

2.1 Features of the Setting software

The main functions of the controller setting software are shown below:

- Parameter setting
  It is possible to set the exclusive parameter of the each connected actuator to the controller.
  It is possible to set and change the parameters of the controller itself.

- Step data setting
  It is possible to set and change the step data which combines all operation commands to the actuator (up to 4 axes).
  It is possible to operate the actuator by the contents set, by defining the step data number and providing a command for each operation.

- Teaching
  It is possible to set a target position for a positioning operation using the jog operation (Jog teaching) or using the manual operation (Direct teaching).

- Monitor
  It is possible to monitor the operating conditions such as the current position and speed, input and output signal conditions, and alarm conditions for each actuator.

- Test drive
  It is possible to test the step data set in a specified order.

- Alarm detection function
  It is possible to check the details of the alarm when the alarm is generated.
  If the alarm is generated, the history is stored in the controller. (Maximum 16 records from the previous alarm.)

⚠️ Caution

When it actually sets up or when failure are found, it is also necessary to refer to the manual of the actuator and the controller.
Keep “this manual” and “the manual of the actuator and the controller” accessible for reference.

2.2 Applicable PC

Prepare the PC according to the following operating environment.

<table>
<thead>
<tr>
<th>OS Note 1</th>
<th>Windows®7 (32bit / 64bit) Microsoft .NET Framework 2.0 is necessary.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Windows® 8.1 (32bit / 64bit) Microsoft .NET Framework 3.5 is necessary.</td>
</tr>
<tr>
<td>Hard disk space</td>
<td>50 MB or more</td>
</tr>
<tr>
<td>Communication interface</td>
<td>USB port (USB1.1 or USB 2.0)</td>
</tr>
</tbody>
</table>

Note 1: If Microsoft.NET Framework is not installed during the installation, install Microsoft.NET Framework.

2.3 Applicable controller

This setting software is suitable for use with the JXC+3 series 4-Axis Step Motor Controller.
3. Start-up

3.1 Preparation
Prepare a USB cable.
The USB cable is included in the controller setting kit (JXC-W1).
Or, it is possible to purchase the USB cable as a separate item (Part No.: JXC-W1-2).

When using this product for the first time, perform items (1) and (2) as follows:

(1) Software installation
Install the controller setting software (JXC Controller) and driver software to the PC, according to instructions in the Installation Manual (No. SFOD-OMT0008) supplied with the CD-ROM.

(2) Installation and wiring
Perform installation and wiring of the controller according to the Controller Operation Manual (No. SFOD-OMT0010).

3.2. Start-up
(1) Supply of power
Supply power for the main control and the motor control, and then supply power for the motor drive.

<table>
<thead>
<tr>
<th>LED description</th>
<th>Color</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR</td>
<td>Green</td>
<td>ON: Power supply is ON.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: Power supply is OFF.</td>
</tr>
<tr>
<td>RUN</td>
<td>Green</td>
<td>ON: Normal operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flashing:During operation by the setting software</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: Operation stopped</td>
</tr>
<tr>
<td>USB</td>
<td>Green</td>
<td>ON: USB is connected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: USB is not connected.</td>
</tr>
<tr>
<td>ALM</td>
<td>Red</td>
<td>ON: Alarm is generated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF: No alarm is generated.</td>
</tr>
</tbody>
</table>

Make sure that the PWR LED is ON green.
If the green PWR LED is not ON, check the power supply wiring and the power supply voltage.

(2) Start-up of the Controller setting software
Once the controller setting software has been installed on the PC, select "SMC / JXC Controller" from "Start / All programs" to start-up the setting software.
A short-cut icon will be created on the desk top if the controller setting software is installed using the default settings. The setting software starts by selecting this short-cut.
When the setting software starts, the communication between the controller and the PC is confirmed.
When the controller can communicate with the PC normally, the following window will be displayed.
However, when the setting software is started for the first time, this window will not appear. When power is supplied for the first time, the title window will be displayed.

After setting the controller parameters and the connected actuator the following window will be displayed.

When "Yes" is selected, the following title window will be displayed while the step data and parameters are uploaded (read) from the controller.

In addition, when left-clicking while displaying the following window, it will disappear, and then, it shifts to the next step.

When "No" is selected, the following window will be displayed without uploading (reading) the step data or parameters from the controller.

When the PC cannot communicate with the controller, the following window will be displayed.

By selecting "OK", the title window will be displayed.

In this case, the communication between the controller and the PC is not established. Please confirm the following points again.

a) Check that power is supplied to the connected controller at the correct voltage.
b) Check that the controller and the PC are connected to each other via the USB cable.
c) Check that the USB driver is installed correctly.

<table>
<thead>
<tr>
<th>Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>If this software starts up without uploading the parameters, or in the off-line state, the contents shown in the status window and the teaching window will not be correct. Make sure to upload the parameters when referring to the status window or when operating the actuator. Otherwise, it may cause injury; or damage to the actuator or the user's system.</td>
</tr>
</tbody>
</table>

After the title window is displayed, the following main window will be displayed.
The communication status between the controller and the PC is displayed at the bottom of the main window.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offline</td>
<td>Communication is not established.</td>
</tr>
<tr>
<td>Online</td>
<td>Communication is established.</td>
</tr>
</tbody>
</table>

Even if the communication status shows the off-line state, it will change to the on-line state (green) automatically when the communication is correctly established.

(3) Alarm check

When an alarm is generated in the controller, the “Alarm” button flashes red at the top of the setting software main window.

It is possible to check the details of the alarm generated by selecting the “Alarm” button. Refer to section "4.8 (3) Alarms and countermeasures" for details of the alarms and countermeasures, and reset the alarm.
4. Setting Software Functions

4.1 Various windows

(1) Main window

It is possible to control all functions in this window.

e.g. Display/Non-display of other windows, selection of modes, servo ON/OFF commands, and operation stop commands.

Details of each function are explained in section (1-1) to (1-8) below:

(1-1) Menu

Menu is used to display each kind of window, printing, etc.

There are four commands: "File", "View", "Window" and "Help".

(1-1-1) File (F)

This is used to print the screen, save the alarm, and close the setting software.

There are three commands: "Print", "Alarm save" and "Software Exit".

(1-1-1-1) Print

This selects the object to be printed.

[How to print]

a) Select the object to be printed from "Step Data", "Parameter", "Test Drive" or "Alarm".
<table>
<thead>
<tr>
<th>Items</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step Data</td>
<td>Step data in which “Movement mode” is set will be printed.</td>
</tr>
<tr>
<td></td>
<td>Step data in which “Movement mode” is not set will not be printed.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Parameters are printed.</td>
</tr>
<tr>
<td>Test Drive</td>
<td>The line in which “Step No.” is set will be printed.</td>
</tr>
<tr>
<td></td>
<td>The line in which “Step No.” is not set will not be printed.</td>
</tr>
<tr>
<td>Alarm</td>
<td>The alarm currently generated and the alarm history for each axis are selected and printed.</td>
</tr>
</tbody>
</table>

b) Select the "Properties" of the printer.
Set the details for printing such as sheet size and number of copies.

When the setting is completed, select “Print”.
The print preview is displayed as shown below to check the contents to be printed before actual printing. (The preview screen shown below is an example of printing Step Data).

Printing is started by selecting the print button on the upper left of the print preview screen.

(1-1-1-2) Alarm save
The alarm status is saved into a CSV file.
The alarm currently generated and the alarm historys for each axis are saved together.
(1-1-1-3) Software Exit
Completing the setting software.

[How to complete]
a) When “Software Exit” is selected, the following confirmation window will be displayed.

b) When “Yes” is selected, the software setting will be closed.

(1-1-2) View (V)
When View (V) is selected, a sub window is displayed.
It is possible to control Display/Non-display of sub window such as “Status”, “Teaching”, “Parameter”, “Step Data”, “Alarm” and “Test Drive”.

[How to display the sub window]
Select the check box of the sub windows to be displayed.
The selected windows will then be displayed.

The available sub windows and the descriptions are shown in the table below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>It is possible to monitor the current position of the connected axis, speed, and input/output signals. Refer to section “4.1 (2) Status window” for details.</td>
</tr>
<tr>
<td>Teaching</td>
<td>It is possible to monitor the current position of the connected axis, and to operate the JOG and inching of each axis. Refer to section “4.1 (3) Teaching window” for details. (Available only in the on-line state, not available in the off-line state).</td>
</tr>
<tr>
<td>Parameter</td>
<td>It is possible to set the parameter of the controller and the connected axis, and to write the parameter to the controller, and to read the parameter from the controller. Refer to section “4.1 (4) Parameter window” for details.</td>
</tr>
<tr>
<td>Step Data</td>
<td>It is possible to set the step data, and to write the step data to the controller, and to read the step data from the controller. Refer to section “4.1 (5) Step Data window” for details.</td>
</tr>
<tr>
<td>Alarm</td>
<td>It is possible to display and reset the alarm currently generated. Also, it is possible to display the alarm history for each axis. Refer to section “4.1 (6) Alarm window” for details.</td>
</tr>
<tr>
<td>Test Drive</td>
<td>It is possible to test the step data setting in a specified order. Refer to section “4.1 (7) Test Drive window” for details.</td>
</tr>
</tbody>
</table>
(1-1-3) Window (W)

When Window is selected, a sub window will be displayed. There are two commands available: “All Close” and “Position Init”.

These commands and the descriptions are shown below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Close</td>
<td>All of the displayed sub windows will be closed.</td>
</tr>
<tr>
<td>Position Init</td>
<td>The upper left corner of all the displayed sub windows are aligned with the upper left corner of the display area of the main window.</td>
</tr>
</tbody>
</table>

(1-1-4) Help (H)

Select “Help” to confirm the version of the setting software. It is possible to change the display language. There are three commands: “Version”, “Language” and “Password”.

(1-1-4-1) Version

The following title window is displayed to show the version information.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application version</td>
<td>Version of this setting software.</td>
</tr>
<tr>
<td>Controller version</td>
<td>Firmware version of the connected controller.</td>
</tr>
<tr>
<td>&quot;--------&quot; will be indicated when no controller is connected.</td>
<td></td>
</tr>
</tbody>
</table>

(1-1-4-2) Language

It is possible to change the language and units for this application (The changes are made effective after restarting the setting software).

<table>
<thead>
<tr>
<th>Items</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current language</td>
<td>The current language setting is indicated.</td>
</tr>
<tr>
<td>New language</td>
<td>The language to be changed is selected.</td>
</tr>
<tr>
<td>&quot;ja, Japanese,日本語&quot;: The language is changed to Japanese.</td>
<td></td>
</tr>
<tr>
<td>&quot;en, English,英語&quot;: The language is changed to English.</td>
<td></td>
</tr>
<tr>
<td>Length unit of measure selection</td>
<td>The unit of length is selected.</td>
</tr>
<tr>
<td>&quot;0: (mm)”: The unit is set to &quot;mm&quot;.</td>
<td></td>
</tr>
<tr>
<td>&quot;1: (inch)”: The unit is set to &quot;inch&quot;.</td>
<td></td>
</tr>
</tbody>
</table>

(1-1-4-3) Password

For production use only (not available for users).
(1-2) Sub window buttons

The sub window buttons offer the same functions as the View (V) menu.

By selecting the sub window buttons, it is possible to display the sub window such as “Status”, “Teaching”, “Parameter”, “Step Data”, “Alarm” and “Test Drive”.

The displayed sub window buttons will turn blue.

(1-3) SVON

It is possible to set the all connected axes to be the status of servo ON/OFF.

<table>
<thead>
<tr>
<th>Items</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVON: OFF</td>
<td>All axes are the status of servo OFF.</td>
</tr>
<tr>
<td>SVON: ON</td>
<td>All axes are the status of servo ON.</td>
</tr>
</tbody>
</table>

(1-4) Mode selection

It is possible to select the operation mode according to the purpose of use of the setting software.

When power is first supplied, this will be set to **Normal mode as default**.

When this setting software is closed, the operation mode will switch to Normal mode automatically.

(1-4-1) Mode descriptions

There are three modes of operation as shown below:

<table>
<thead>
<tr>
<th>Operation mode</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal mode</td>
<td>It is possible to monitor the normal operating status by operating the connected axes using the connected external equipment.</td>
</tr>
<tr>
<td>Remote</td>
<td>It is possible to test Test Drive, JOG and Inching, in the setting software.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>It is possible to output forcibly the output signal of the controller, and monitor the input/output signal condition of the controller. Note that, in the maintenance mode, even if the input signal is ON or OFF, the command from the input is not performed.</td>
</tr>
<tr>
<td>(Off-line)</td>
<td>Offline is indicated by no buttons highlighted. This means communication between the controller and PC is not established.</td>
</tr>
</tbody>
</table>
(1-4-2) Operation mode details

The available contents of each operation mode are shown in the table below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Normal mode</th>
<th>Remote</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring, setting and reading of step data and controller parameters.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Monitoring of operation and parallel I/O input/output signals.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Alarm check.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Enable the operation of parallel I/O input signals.</td>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Enable the operation of setting software commands</td>
<td>×</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>(Drive test is available)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forcible output of the parallel I/O output signals</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Output the controller status to the parallel I/O output signals.</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
</tbody>
</table>

✓: Possible  ×: Impossible

[How to change the mode]

a) Select the operation mode to be changed.

The switch of the selected operation mode becomes a solid light and the color of the background will change to light blue.

(The following figure shows an example for when Remote mode is selected.)

Switch

Switch

The color of background

b) Before changing the operation mode

When changing the operation mode, the following safety confirmation windows will be displayed.

When the parallel I/O enable/disable status is switched depending on the change to the operation mode, the actuator operation may stop suddenly, immediately after switching the status.

Please confirm the safety thoroughly before selecting "OK".

Confirmation window when changing to normal mode

Confirmation window when changing to remote mode

Confirmation window when changing to maintenance mode

⚠️ Caution

Do not change the operation mode while the actuator is operating.
Make sure that the actuator operation stops before changing the operation mode.
Otherwise, this may cause an unexpected malfunction.

⚠️ Caution

Do not touch the actuator when in operation.
Please take a measure so that the controller stop (ENGx) terminal can be shut off immediately while the actuator is operating or a test run is performing. (Refer to the controller Operation Manual [Document No. SFOD-OMT009] for the EMGx input terminal and the wiring).
Otherwise, this may cause injury and/or an accident.
(1-5) STOP button
When the "STOP" button at the top of the main window is selected while the actuator is operating, all of the connected actuators will stop by reducing the speed.

However, the operation is not stopped when the "Stop" button is selected in the cases shown in the following "Caution".

![STOP button]

**Caution**

Please take appropriate measures so that the controller stop (ENGx) terminal can be turned off immediately during the test. (Refer to the controller Operation Manual [Document No. SFOD-OMT009] for the EMGx input terminal and the wiring).

The operation is not stopped when the "Stop" button is selected in the following cases.
- The actuator is stopping during the pushing operation.
  (In this case, the pushing status is not released when the "Stop" button is selected.)
- The actuator is stopping during the positioning operation due to an obstacle.
- The actuator is operating at slow speed as the positioning is interfered.
- The actuator is performing a Return to origin operation.

It may cause injury; or breakage of the actuator or user's system.

(1-6) Actuator operation status
The names of the connected axes and the operation status will be indicated at the bottom of the main window display.
The displayed names will have been specified in the parameters (profile).
The color of the background shows the operation status of each axis.


<table>
<thead>
<tr>
<th>Color of background</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Actuator is stopped.</td>
</tr>
<tr>
<td>Yellowish green</td>
<td>Actuator is operating.</td>
</tr>
</tbody>
</table>

(1-7) Current step data
The current step data number or the step data number which was previously used is indicated at the bottom of the main window display.

Current Step data No.: 0

(1-8) Communication status
The communication status between the controller and the PC is indicated at the bottom of the main window display.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offline</td>
<td>Communication is not established.</td>
</tr>
<tr>
<td>Online</td>
<td>Communication is established.</td>
</tr>
</tbody>
</table>

Even if the communication status shows the off-line state, it will change to the on-line state (yellowish green) automatically when communication is correctly established.
(2) Status window

It is possible to monitor the current position of the connected axes, speed, and input/output signals. The details of each indication are explained in (2-1) to (2-3) below.

(2-1) Status of the connected actuators

The status of the connected actuators is indicated. The contents to be indicated are as follows:

<table>
<thead>
<tr>
<th>Items</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit name</td>
<td>The Axis names which have been specified in the parameters (profile) are indicated.</td>
</tr>
<tr>
<td>Current coordinate</td>
<td>The current position is indicated.</td>
</tr>
<tr>
<td>Current speed</td>
<td>The current speed is indicated.</td>
</tr>
<tr>
<td>Current pushing force</td>
<td>The current pushing force is indicated.</td>
</tr>
<tr>
<td>Target position</td>
<td>The position specified in the step data which has instructed the operation is indicated.</td>
</tr>
</tbody>
</table>

(2-2) I/O type

The I/O type of the controller is indicated. The contents to be indicated are as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel I/O (NPN)</td>
<td>NPN type controller</td>
</tr>
<tr>
<td>Parallel I/O (PNP)</td>
<td>PNP type controller</td>
</tr>
<tr>
<td>Parallel I/O is not connected</td>
<td>The communication between the controller and PC is not established.</td>
</tr>
</tbody>
</table>
(2-3) Status of Input and Output signals
The status of the input and output signals of each or all axes is indicated.

(2-3-1) Output signal of each axis
The output signals of each axis are indicated as follows:

<table>
<thead>
<tr>
<th>Output signal name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSY1 - BUSY4</td>
<td>The BUSY output signal status of each axis is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>AREA1 - AREA4</td>
<td>The AREA output signal status of each axis is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>INP1 - INP4</td>
<td>The INP output signal status of each axis is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>*ALARM1 - *ALARM4</td>
<td>The ALARM output signal (negative logic) status of each axis is indicated.</td>
</tr>
<tr>
<td></td>
<td>Red: OFF (Alarm generated) Grey: ON (No alarm)</td>
</tr>
</tbody>
</table>

(2-3-2) Output signal of all axes
The output signals of all axes are indicated as follows:

<table>
<thead>
<tr>
<th>Output signal name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT0 - OUT10</td>
<td>The OUT0 - OUT10 output signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td></td>
<td>The Step data No. converted from OUT0-OUT10 is indicated at the bottom of the Status window.</td>
</tr>
<tr>
<td></td>
<td>However, the alarm group is indicated with a numerical value when an alarm is being generated.</td>
</tr>
<tr>
<td></td>
<td>The alarm groups indicated by numerical values are described as follows:</td>
</tr>
<tr>
<td></td>
<td>&quot;2&quot;: Alarm group B</td>
</tr>
<tr>
<td></td>
<td>&quot;4&quot;: Alarm group C</td>
</tr>
<tr>
<td></td>
<td>&quot;8&quot;: Alarm group D</td>
</tr>
<tr>
<td></td>
<td>&quot;0&quot;: Alarm group E</td>
</tr>
<tr>
<td></td>
<td>Display/Non-display of OUT9 and OUT10 are switched depending on the set maximum number of step data in the parameter (profile).</td>
</tr>
<tr>
<td></td>
<td>Maximum number of step data is 512: OUT9 and OUT10 are not displayed.</td>
</tr>
<tr>
<td></td>
<td>Maximum number of step data is 2048: OUT9 and OUT10 are displayed.</td>
</tr>
<tr>
<td>BUSY</td>
<td>The BUSY output signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td></td>
<td>The BUSY status will be displayed or not displayed depending on the set maximum number of steps in the parameter (profile). Maximum number of step data is 512:  BUSY is displayed.</td>
</tr>
<tr>
<td></td>
<td>Maximum number of step data is 2048: BUSY is not displayed.</td>
</tr>
<tr>
<td>AREA</td>
<td>The AREA output signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td></td>
<td>The AREA output will be displayed or not displayed depending on the set maximum number of steps in the parameter (profile). Maximum number of step data is 512:  AREA is displayed.</td>
</tr>
<tr>
<td></td>
<td>Maximum number of step data is 2048: AREA is not displayed.</td>
</tr>
<tr>
<td>SETON</td>
<td>The SETON output signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>INP</td>
<td>The INP output signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>SVRE</td>
<td>The SVRE output signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
</tbody>
</table>
### Output signal name

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*ALARM</td>
<td>The ALARM output signal (negative logic) status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Red: OFF (Alarm generated) Grey: ON (No alarm)</td>
</tr>
<tr>
<td>*ESTOP</td>
<td>The ESTOP output signal (negative logic) status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Red: OFF (Stopped by EMGx) Grey: OFF (Stop released by EMGx)</td>
</tr>
</tbody>
</table>

"*ALARM" and "*ESTOP" are displayed in negative logic.

### (2-3-3) Input signal of all axes

The indications of the input signal of all axes are as follows:

<table>
<thead>
<tr>
<th>Input signal name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN0 - IN10</td>
<td>The IN0 - IN10 input signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td></td>
<td>Step data number is indicated according to the IN0-IN10 input signal status.</td>
</tr>
<tr>
<td>SETUP</td>
<td>The SETUP input signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>HOLD</td>
<td>The HOLD input signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>DRIVE</td>
<td>The DRIVE input signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>RESET</td>
<td>The RESET input signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
<tr>
<td>SVON</td>
<td>The SVON input signal status is indicated.</td>
</tr>
<tr>
<td></td>
<td>Blue: ON Grey: OFF</td>
</tr>
</tbody>
</table>
(3) Teaching window

The teaching window can only be displayed in Remote mode. (It is not available in other modes).
It is possible to operate “JOG”, “Inching”, and “Return to Origin” for the connected axis.
The details of each function are explained in (3-1) to (3-3) below.

(3-1) JOG

The JOG operation will move the actuator in the specified direction at the specified speed by selecting
the operation command “+/-” button. The operation will stop when the operation command “+/-” button
is released.

[How to JOG]

a) Change the mode to Remote mode in the main window.

b) From the main window select View (V), select the Teaching window and select the “JOG” tab.
   Refer to section "4.1 (1-1-2) View (V)" for how to display the Teaching window.

   ![Teaching window diagram]
   “JOG” tab
   Current coordinate

   - Current coordinate
     - Axes 1: 0.00 mm
     - Axes 2: 0.00 mm
     - Axes 3: 0.00 mm
     - Axes 4: 0.00 mm
   - Speed
     - 10.0 mm/s
     - 10.0 mm/s
     - 10.0 mm/s
     - 10.0 mm/s
   - +: Movement in the positive direction
   - -: Movement in the negative direction

   c) Specify the Speed.
   d) The applicable actuator will operate at the specified speed while the “+/-“ buttons for each axis are
      being selected.
      The operation will stop when the “+/-” buttons are released.
      - +: Movement in the positive direction
      - -: Movement in the negative direction
   e) After completing the movement, it is possible to check the position of each axis in the “Current
      coordinate” area.

   [Caution]
   The movement direction (positive/negative) is specified depending on the actuator type.
   Make sure to refer to the actuator Operation Manual before performing the JOG operation to
   confirm the movement direction.
   Otherwise, it may cause injury or damage to the user's system.
(3-2) Inching

Inching is an operation to move the actuator in a specified direction at the speed and distance specified in “Speed” and “Moving”.

It is possible to stop the actuator during operation by selecting the “Stop” button on the main window, or turning off the “EMGx” input.

[How to operate Inching]

a) Change the mode to **Remote mode** in the main window.

b) From the main window, select View(V), then select the Teaching window and select the “Inching” tab. Refer to section "4.1 (1-1-2) View(V)" for how to display the Teaching window.

c) Specify the “Speed”.

d) Specify the “Moving (distance)”. 

e) By selecting the “+/-” buttons for each axis, the applicable actuator will operate at the specified speed and moves for the distance specified in the Moving column.

+: Movement in the positive direction

-: Movement in the negative direction

It is possible to stop the actuator by selecting the “STOP” button on the main window.

**The operation is not stopped when the “Stop” button is selected in the following cases.**

- The actuator is stopping during the pushing operation.

  (In this case, the pushing status is not released when the “Stop” button is selected.)

- The actuator is stopping during the positioning operation due to an obstacle.

- The actuator is operating at slow speed as the positioning is interfered.

- The actuator is performing a Return to origin operation.

If it is necessary to stop the actuator during inching operation, turn off the EMGx input to each axis.

f) After completing the movement, it is possible to check the position of each axis in the Current coordinate area.

⚠️ Caution

The movement direction (positive/negative) is specified depending on the actuator type.

Make sure to refer to the actuator Operation Manual before performing Inching to confirm the movement direction.

Otherwise, it may cause injury or damage to the user's system.

(3-3) Return to Origin

The Return to origin command will return each axis or all axes simultaneously to the origin position.

**The actuator cannot be stopped during performing a Return to origin operation, even when the “Stop” button on the main window is selected.**

If it is necessary to stop the actuator during performing a Return to origin operation, turn off the EMGx input to each axis.

[How to Return to Origin]

a) Change the mode to **Remote mode** in the main window.
b) From the main window select View (V), then select the Teaching window and select “Return to Origin” tab.
Refer to section "4.1 (1-1-2) View (V)" for how to display the Teaching window.

c) How to command a Return to Origin operation.
   c-1) To perform a Return to Origin for each axis
       Select the “●” button for the axis to be operated.
   c-2) To perform a Return to Origin for all axes
       Select the “All axes Return to Origin” button.

d) The Return to Origin operation is completed when SETON is turned on. (It is possible to monitor SETON signal output in the Status window).

⚠️ Caution

The actuator cannot be stopped during a Return to origin operation, even when the “Stop” button on the main window is selected.
Take measures so that the controller stop (ENGx) terminal can be turned off immediately during a Return to Origin. (Refer to the controller Operation Manual [Document No. SFOD-OMT0010] for details of the EMGx input terminal and the wiring).
Otherwise, this may cause injury and/or an accident.
(4) Parameter window

In the Parameter window, it is possible to set the parameters of the connected actuators and the controller. Also the parameters are possible to be written to the controller and be read from the controller.

Table (4-1) lists the button functions available in the Parameter window.

Refer to section "4.2 Parameter setting" for the exclusive parameter setting for each actuator and how to change the parameters.

(4-1) Parameter window functions

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>The parameters are read from a specified file and displayed in the setting software.</td>
</tr>
<tr>
<td>Save</td>
<td>The parameters displayed on the setting software are saved to a specified file.</td>
</tr>
</tbody>
</table>
| Actuator selection | Another window is appeared.  
|                  | The connected actuators are selected, then the exclusive parameters of the actuators are displayed in the setting software.  
|                  | Refer to section "4.2 Parameter setting" for how to set the parameter.      |
| Upload JXC→PC    | All parameters are read from the controller and displayed in the setting software.  
|                  | **Available only in the on-line state.**                                    
|                  | (Not available in the off-line state).                                     |
| Download PC→JXC  | The parameters displayed in the setting software are written to the controller.  
|                  | **Available only in the on-line state.**                                    
|                  | (Not available in the off-line state).                                     |
(5) Step Data window

In the Step Data window, it is possible to set the step data. Also the Step Data is possible to be written to the controller and be read from the controller.

Table (5-1) lists the button functions available in the Step Data window.

Refer to section "4.3 Step Data setting" for how to edit the step data.

Refer to section "4.6 Test Drive" for how to perform a test operation using the specified step data number in the Step Data window.

![Step Data window diagram]

### (5-1) Step Data window functions

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>The step data are read from a specified file and displayed in the setting software.</td>
</tr>
<tr>
<td>Save</td>
<td>All step data displayed in the setting software are saved to a specified file.</td>
</tr>
<tr>
<td>Upload JXC→PC</td>
<td>The step data are read from the controller and displayed in the setting software. <strong>Available only in the on-line state.</strong> (Not available in the off-line state.)</td>
</tr>
<tr>
<td>Download PC→JXC</td>
<td>All step data displayed in the setting software are written to the controller. <strong>Available only in the on-line state.</strong> (Not available in the off-line state.)</td>
</tr>
<tr>
<td>Copy</td>
<td>The selected step data are copied to the clip board.</td>
</tr>
<tr>
<td>Delete</td>
<td>The selected step data are deleted.</td>
</tr>
<tr>
<td>Cut</td>
<td>The selected step data are cut.</td>
</tr>
<tr>
<td>Paste (Insert)</td>
<td>The step data copied are inserted in the selected line of the step data window.</td>
</tr>
<tr>
<td>Paste (Overwrite)</td>
<td>The step data copied are overwritten from the selected line of the step data window.</td>
</tr>
<tr>
<td>Insert</td>
<td>A blank line is inserted in the selected step data.</td>
</tr>
<tr>
<td>Specified step No.</td>
<td>The step data number is specified to be used for the test operation. <strong>Available only in Remote mode.</strong> (Not available in Normal mode or Maintenance mode.)</td>
</tr>
<tr>
<td>Start Test “ ”</td>
<td>The test operation of the step data number specified in &quot;Specified step No.&quot; is started. <strong>Available only in Remote mode.</strong> (Not available in Normal mode or Maintenance mode.)</td>
</tr>
<tr>
<td>All axes Return to Origin</td>
<td>The Return to origin operation for all available axes is performed. <strong>Available only in Remote mode.</strong> (Not available in Normal mode or Maintenance mode.)</td>
</tr>
</tbody>
</table>
(6) Alarm window
The alarm currently generated is displayed.
It is possible to reset the current alarm.
It is possible to check the Alarm history for each axis.

(6-1) Current Alarm
It is possible to display the Current alarm by selecting the “Current Alarm” tab in the Alarm window.
The current alarm list is displayed.

The driver alarm and the controller alarm are displayed in separated frames.
If there is no indication in the Current Alarm, no alarm is currently generated.
The driver alarm is recorded in the Alarm History.
However, the controller alarm is NOT recorded in the Alarm History.
The descriptions of the items in the Current Alarm in the Alarm window are listed below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>The number of the alarm which is currently generated.</td>
</tr>
<tr>
<td></td>
<td>When alarms are generated, they are displayed by axis.</td>
</tr>
<tr>
<td></td>
<td>The smallest number is the most recently generated alarm.</td>
</tr>
<tr>
<td>Axis</td>
<td>The axis number in which the alarms are generated.</td>
</tr>
<tr>
<td>Code</td>
<td>Current alarm code.</td>
</tr>
<tr>
<td></td>
<td>Refer to section &quot;4.8 (3) Alarms and countermeasures&quot; for details.</td>
</tr>
<tr>
<td>Comments</td>
<td>Contents of the current alarm.</td>
</tr>
<tr>
<td></td>
<td>Refer to section &quot;4.8 (3) Alarms and countermeasures&quot; for details.</td>
</tr>
<tr>
<td>Reset Button</td>
<td>When the alarms are generated, it is possible to reset by selecting the “Reset” button.</td>
</tr>
<tr>
<td></td>
<td>However, some alarms can only be reset when the power is turned off and on again.</td>
</tr>
<tr>
<td></td>
<td>Refer to section &quot;4.8 (3) Alarms and countermeasures&quot; for details.</td>
</tr>
<tr>
<td></td>
<td>Available only in Remote mode.</td>
</tr>
</tbody>
</table>
(6-2) Alarm History

It is possible to display the Alarm history for each axis by selecting the appropriate “Axis x: Alarm History” tab in the Alarm window.

Select the tab for the axis to be displayed.

**Only the driver alarms which have been generated** for each axis are displayed.

**The controller alarms are NOT recorded or displayed in Alarm History.**

![Alarm History tab for each Axis]

The descriptions of the items in the Alarm History in Alarm window are shown below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>The alarm number indicated in chronological order. No. 1_1 is the most recently generated alarm.</td>
</tr>
<tr>
<td>Code</td>
<td>Code of the alarms which have been generated. Refer to section &quot;4.8 (3) Alarms and countermeasures&quot; for details.</td>
</tr>
<tr>
<td>Comments</td>
<td>Contents of the alarms which have been generated. Refer to section &quot;4.8 (3) Alarms and countermeasures&quot; for details.</td>
</tr>
</tbody>
</table>

**Caution**

The controller alarms are NOT recorded or displayed in the Alarm History.

Details of Controller alarms:

- DRIVE is ON when SVRE is OFF (Code: 098)
- DRIVE is ON when SETON is OFF (Code: 099)
- Failed to achieve position in set time limit (Code: 149)
- Parameter is not registered (Code: 901)
- Step data is not registered (Code: 902)
- System Error (Code: 910)
- SDRAM Error (Code: 911)
- FROM Error (Code: 912)
- Modbus Error (Code: 913)
- Module Error (Code: 914)
(7) Test Drive window

In Test Drive window, it is possible to test the set step data in a specified order.

![Test Drive window](image)

The descriptions of the items in the "Test drive list" are listed below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>The item number of the test list.</td>
</tr>
<tr>
<td>Step No.</td>
<td>The Step data number to be tested. It is possible to delete the contents of the line by entering &quot;-1&quot;.</td>
</tr>
<tr>
<td>Wait time</td>
<td>The wait time after the actuator has been operated with the step data. Units are msec. The setting range is 0 to 32767 msec.</td>
</tr>
<tr>
<td>Comments</td>
<td>It is possible to enter the comments about the test. (Half-width comma &quot;,&quot; cannot be used.)</td>
</tr>
</tbody>
</table>

The functions of the buttons in the Test Drive window are listed below.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety speed</td>
<td>The speed in the test drive operation is restricted. <strong>Available only in Remote mode.</strong></td>
</tr>
<tr>
<td>Unlock</td>
<td>The locks of all axes are released. This is only available in <strong>Remote mode</strong> and can be used only when SVRE is OFF (The Servo is OFF).</td>
</tr>
<tr>
<td>Delete</td>
<td>The selected line in the test drive list is deleted.</td>
</tr>
<tr>
<td>Addition</td>
<td>A new line in the test drive list is added.</td>
</tr>
<tr>
<td>Up</td>
<td>The selected line in the test drive list is moved up by one line. (The line above is replaced).</td>
</tr>
<tr>
<td>Down</td>
<td>The selected line in the test drive list is moved down by one line. (The line below is replaced).</td>
</tr>
<tr>
<td>Load</td>
<td>The test drive list is read from a file.</td>
</tr>
<tr>
<td>Save</td>
<td>The test drive list is saved to a specified file.</td>
</tr>
<tr>
<td>All axes return to Origin</td>
<td>Return to origin is performed for all of the activated axes. <strong>Available only in Remote mode.</strong></td>
</tr>
<tr>
<td>Repeat</td>
<td>The test operation of the test drive list is performed repeatedly when the check box of the &quot;Repeat&quot; is selected. <strong>Available only in Remote mode.</strong></td>
</tr>
<tr>
<td><strong>Go</strong></td>
<td>The set step data are performed from the top of the test drive list in turn. However, the lines on the list where step number is not input into are ignored. When all the BUSY output of the activated axes turns OFF, the step data which is testing is completed. Then, the next step data in the list is performed after the operation is stopped for the set Wait time.  <strong>Available only in Remote mode.</strong></td>
</tr>
<tr>
<td><strong>Step Stop</strong></td>
<td>Stops the test drive after the step data operating is completed.  <strong>Available only in Remote mode.</strong></td>
</tr>
</tbody>
</table>
4.2. Parameter setting

The parameters should be set when using the controller for the first time, or after changing the connected actuator, or after changing the setting of the controller or connected actuator.

The setting methods are shown below.

(1) Exclusive parameter setting for the connected actuator

This setting is necessary when the controller is used for the first time and when the connected actuator is changed.

a) Display of Parameter window and Actuator selection window

From the View (V) menu in the main window, select the Parameter window.

Refer to section "4.1 (1-1-2) View (V)" for how to display the Parameter window.

![Parameter window](image)

Select the “Actuator selection” button.

The Actuator selection window will be displayed.

b) Actuator selection

Search for the connected actuator using the Search on the condition or Search from Part No.

b-1) Search on the condition

![Actuator selection window](image)

Select the “conditions” of the actuator to be connected for the Model, Motor mounting, Lead, and Stroke as much as possible.

A list of Part numbers of the actuators matching the conditions will be displayed by selecting the “▼” button in the Result area. Select the actuator to be connected from the Result.
b-2) Search from Part no.

Enter a part of or the entire actuator part number in the Search from Part No. area. A list of Part numbers of the actuators matching the conditions will be displayed by selecting the “▼” button in the Result area.

Select the actuator to be connected from the Result.

If the actuator part number is already known, it is possible to enter the part number and stroke. (When the LER series is used, enter the part number including the rotation angle).

  e.g. 1) For LEY16RA-100BML, enter "LEY16RA-100".
  e.g. 2) For LERH30K-3L, enter "LERH30K-3".

When there is no result even when the stroke has been entered, the possible causes are as follows:

- No applicable stroke
  Enter the part number without the stroke and select the model with the stroke which is closest and longer than the actuator used.
  e.g.) For LEY16RA-75, enter "LEY16RA" and select LEY16RA-100.

- For LEFSH (High precision type)
  Enter "LEFS" to search without the High precision specification.
  e.g.) For LEFSH25RH-300, enter "LEFS25RH-300" and select LEFS25RH-300.

- For clean type (11-) or secondary battery (25A-) type actuator
  Search without entering 11- or 25A-, and select the actuator for which the part number after 11- or 25A- matches.
  e.g.) For 11-LEFSH16A-100BR, enter "LEFS16A-100" and select LEFS16A-100.

⚠️ Caution

When the parameter is selected for stroke which is longer than that of the actuator to be used, the Position entered in the step data must not exceed the actual actuator stroke range.

When there is no part number result, please contact SMC.
c) Parameter display

Select the check box for the required Axis in the “Execute area” for which parameters are to be entered (It is possible to select one or more Axes).

Select the “Execute” button.

The parameters are displayed in the appropriate axes frames in the each axis parameter area.

Repeat steps b) and c) above to enter parameters for all Axes.

**Note that the values entered here are only for display, and are not written to the controller.**

Select the “Apply” button when all of the parameters have been entered.

The parameters are copied to the table in the Parameter window.

**Note that the parameters copied here are only for display, and are not written to the controller.**

⚠️ **Caution**

When the “Apply” button is selected, the parameters are NOT written to the controller.

Make sure to download the parameters by following the procedure "d) Parameter writing to the controller“ shown below to write the parameters to the controller.

d) Writing Parameters to the controller

To write the parameters to the controller, select the “Download” button in the Parameter window.

The Parameters displayed in the Parameter window will be written to the controller.

e) Completion

Writing is completed when the progress bar disappears.

**Turn off the power supply and turn on again to make the written parameter effective.**
(2) Change of controller and actuator settings

a) Parameter window
   From the View (V) menu in the main window, select the Parameter window. Refer to section "4.1 (1-1-2) View (V)" for how to display the Parameter window.

b) Parameter change
   Select the tab for the Parameter group to be changed to display the applicable parameter group. Change the parameter to be used.
   The input range and the details of the parameter setting are shown in the "comment area" for reference.

"Parameter" group tab

---

d) Writing Parameters to the controller

To write the parameters to the controller, select the "Download" button in the Parameter window. The Parameters displayed in the Parameter window will be written to the controller.

e) Completion
   Writing is completed when the progress bar disappears.
   **Turn off the power supply and turn on again to make the written parameter effective.**
(3) Change of the parameter protect setting

After the parameters and step data are set, it protects from changing the parameters and step data by “Para protect” from third person.

a) Display the Parameter window and select “Profile” parameter group

From the View (V) menu in the main window, select the Parameter window.

Refer to section “4.1 (1-1-2) View (V)” for how to display the Parameter window.

Then, select the “Profile” tab to display the profile parameter group.

b) Right-click the cell of the “Para protect” setting.

When “Edit” is displayed, select it to display the parameter protect window shown below.

c) Select “▼” button in the parameter protect window to display the list of data that it is possible to change.

Select the protecting level from this list, and select “OK”.

d) Writing Parameters to the controller

To write the parameters to the controller, select the “Download” button in the Parameter window.

The Parameters displayed in the Parameter window will be written to the controller.

e) Completion

Writing is completed when the progress bar disappeared.

**Turn off the power supply and turn on again to make the written parameter effective.**
4.3 Step data setting

The controller performs operations by selecting the positioning data, called step data, which has been pre-defined in the controller using external equipment such as a PLC.

(Step data: A set of operation information such as operation method, position, and speed.)

(1) Step data setting

It is possible to set the step data using the following two methods (See 1-1 and 1-2).

(1-1) Setting using the Step Data window

(a) Step Data window

From the View (V) menu in the main window, select the Step Data window. Refer to section "4.1 (1-1-2) View (V)" for how to display the Step Data window.

(b) Movement mode selection

Select the "▼" button in the movement mode column for the axis of the step number to be set. Select the required movement mode from the list.

Only one movement mode can be selected for one step data.

If multiple movement modes are selected, the movement mode cell for the applicable step data will turn red, indicating an input error. Please select one movement mode.

c) Input numerical data for each item

Enter the required numerical data according to the selected movement mode.

If numerical data outside of the input range is entered, for example, the Rotation centre is set to (0,0) for circular interpolation movement, the applicable cell will turn red to indicate an input error. Refer to the controller Operation Manual (No. SFOD-OMT0010) for setting the appropriate step data values.

d) Writing Step data to the controller

Select the "Download" button in the Step data window. Step data writing to the controller will begin.

e) Completion

Writing is completed when the progress bar disappeared.

Turn off the power supply and turn on again to make the written parameter effective.
(1-2) Setting using the Edit window

a) Step Data window display

From the View (V) menu in the main window, select the Step Data window.
Refer to section "4.1 (1-1-2) View (V)" for how to display the Step Data window.

b) Edit window display

Right-click the cell of the movement mode for the axis to be set, for the applicable step number, in
the Step data window.
When "Edit" is displayed, select it.
The step data edit window shown below will be displayed.

c) Movement mode tab selection

Select the Movement mode tab to be set from the range available.

d) Enter the numerical data for each item according to the movement mode used.

When the required values have been entered, and the set values are as required, select the "OK"
button.
Refer to the controller Operation Manual (Document No. SFOD-OMT0010) for the items and details
settings required.
To input the current position using the Teaching function, refer to section "4.5 Teaching".
When the value out of the range is entered, for example, the Rotation centre is set to (0,0) for circular
interpolation movement, the applicable cell will turn red to indicate an input error.
Refer to the controller Operation Manual (No. SFOD-OMT0010) to set the appropriate values.

e) Writing Step data to the controller

Select the Download button in the Step Data window after setting the necessary step data.
Step data writing to the controller will begin.
f) Completion

Writing is completed when the progress bar disappeared.

**Turn off the power supply and turn on again to make the written parameter effective.**

(2) Saving or Loading the Step data

![Image of Step Data window with "Load" and "Save" buttons highlighted]

(2-1) Saving the Step data

It is possible to save the data displayed in the Step Data window to a specified file.

a) Save the Step data to a file

   Select the "Save" button in the Step Data window

b) Specify the file

   Select the file in which the step data is to be saved and select the "Save" button.

c) Completion

   The data displayed in the Step Data window will be saved to the specified file.

(2-2) Loading the Step data

It is possible to read the saved step data and to display in the setting software.

a) Step data file loading

   Select the "Load" button in the Step Data window.

b) Specify the file

   Select the saved step data file (Filename extension: .dat) and select the "Open" button.

c) Completion

   The details of the selected step data will be displayed in the Step Data window.
4.4 Monitor function

It is possible to monitor the operating conditions of the connected actuator and the input/output signal of the controller in the Status window.

Refer to section "4.1 (1-1-2) View (V)" for how to display the Status window.

Refer to section "4.2 (2) Status window" for details of the items displayed in the Status window.

4.5 Teaching

It is possible to set the current position to a target position after the actuator is operated, when setting the step data, or when selecting the ABS or LIN-A for the Movement mode.

There are three Teaching methods as shown below.

It is possible to select the method as required.

1) JOG Teaching
2) Inch Teaching
3) Direct Teaching

Details are shown below.

[How to operate Teaching]

a) Change to Remote mode

Change the mode to Remote mode in the main window.

Confirm that the servo is ON. (Confirm the SVRE is ON in the status window.)

b) Teaching window

From the View (V) menu in the main window, select the Teaching window.

Refer to section "4.1 (1-1-2) View (V)" for how to display the Teaching window.

c) Return to origin

Select the “Return to Origin” tab.

After thoroughly confirming the safety, select the “All axes Return to Origin” button to command the Return to origin.

d) Teaching

It is possible to perform Teaching using three methods, JOG, Inching, or Direct (Manual movement).

It is possible to select the method as required.
d-1) JOG Teaching

Select the JOG tab.
Set the movement speed of the axis for teaching in the “Speed” column.
Press the “+/−” buttons of the axis for teaching to move the position in the “+ (positive)” or “− (negative)” direction as long as the button is pressed.

d-2) Inch Teaching

Select the “Inching” tab.
Set the movement speed of the axis for teaching in the “Speed” column.
Set the movement distance of the axis for teaching in the “Moving (distance)” column.
Press the “+/−” buttons of the axis for teaching to move the position in the “+ (positive)” or “− (negative)” direction according to the setting.

d-3) Direct Teaching

Turn OFF the SVON in the main window.

The servo will be turned OFF (Motor power supply is turned off), and then, the motor shaft is released.
As the actuator can be operated by hand, move it to the required position.
When the Direct Teaching is completed, return the SVON in the main window to ON.

---

**Caution**

1) Some actuators cannot be operated by hand even when the servo is turned OFF. It depends on the actuator type and the lead.
2) Direct Teaching cannot be performed on an actuator with lock as the lock is held even when the servo is turned OFF. To perform the Direct Teaching for the actuator with lock, release the lock with the LK RLS terminal of the motor control power supply connector (CI) after thoroughly confirming safety.
e) Position reading

From the View (V) menu in the main window, select the Step Data window. Refer to section "4.1 (1-1-2) View (V)" for how to display the Step Data window.

Right-click the item in the Movement mode column of the Step No. to be changed, and select Edit. The step data edit window shown below will be displayed.

Select the ABS or LIN-A tab for the movement mode and right-click the item in the Axis Position column to be read.

Select "Axis x Capture Position" or "All axes Capture Position".

The current position of the selected axis will be displayed in the Position column in the edit window.

⚠️ Caution

Do not disconnect the USB cable during Teaching.
If disconnected, the actuator will stop suddenly and the servo will be turned OFF.
This may cause damage to the actuator or the user's system.
4.6 Test Drive

There are three test drive methods available as shown below.

1) Test Drive
   It is possible to perform the test operation according to the set data by entering the step data number, order, and wait time for the test in the drive test list.

2) JOG, Inching, and Return to Origin functions in Teaching
   It is possible to test JOG, Inching, and Return to Origin functions in each axis.

3) Single step operation in the Step Data window
   It is possible to perform the test operation for one single specified step data.

Details for each method are shown below.

(1) Test Drive
   a) Test Drive window display
      From the View (V) menu in the main window, select the Test Drive window. Refer to section "4.1 (1-1-2) View (V)" for how to display the Test Drive window.
   b) The Test drive list setting
      Set the step data number in the Test drive list in the required order of operation. Set the Wait time as required. Refer to section "4.1 (7) Test Drive window" for details.

      The Wait time is the time delay until the next specified step data is conducted after the step data is completed. The units are [msec], and the setting range is 0 to 32767 [msec].

      When repeating the test in the "Test drive list", select the check box of the "Repeat".

      ![Test Drive window display](image)

      "Go" button

      b-1) Save the Test drive list
         It is possible to save the Test drive list entered to a specified file name by selecting the "Save" button.

      b-2) Load the Test drive list
         It is possible to display a previous the Test drive list saved in the past by selecting the "Load" button.

c) Change to Remote mode
   Change the mode to Remote mode in the main window.

   Confirm that the servo is ON. (Confirm that the SVRE is ON in the Status window.)
d) Start the Test drive
When the "Go" button is selected, the Test drive using the step data in line No. 0 of the drive test list is conducted, then the contents of the next step data are conducted.

e) Stop
When the "Step stop" button is selected, the Test drive is stopped after completing the operation of the current step data.
It is possible to use the "Stop" button in the main window only when the actuator is operating, in which case the operation of the actuator is decelerated and stopped. Then, the test drive will be canceled.

The "Stop" button is invalid when the actuator is stopped during a pushing operation; when the actuator is stopped during positioning due to an obstacle; when the actuator operates at slow speed as the positioning is interfered; or when the actuator is performing the Return to origin operation.

When the EMGx input terminal is turned OFF, the servo is turned OFF immediately after the operation of the actuator is decelerated and stopped, then the test drive will be canceled.

<table>
<thead>
<tr>
<th>Caution</th>
</tr>
</thead>
</table>

Please take appropriate measures so that the controller stop (ENGx) terminal can be turned off immediately during the test. (Refer to the controller Operation Manual [Document No. SFOD-OMT010] for the EMGx input terminal and the wiring).
The operation is not stopped when the "Stop" button is selected in the following cases.
- The actuator is stopping during the pushing operation.
- The actuator is stopping during positioning due to an obstacle; when the actuator operates at slow speed as the positioning is interfered; or when the actuator is performing the Return to origin operation.
It may cause injury; or breakage of the actuator or user's system.

(2) JOG, Inching, and Return to origin in the Teaching window

a) Teaching window display
From the View (V) menu in the main window, select the Teaching window.
Refer to section "4.1 (1-1-2) View (V)" for how to display the Teaching window.

b) Perform a test operation
Perform a test operation after selecting JOG, Inching, or Return to Origin.
Refer to section "4.5 Teaching".

c) Stop
JOG: When the "+/−" button is released, the actuator operation will be decelerated and stopped.

When the EMGx input terminal is turned OFF, the servo is turned OFF immediately after the actuator is decelerated and stopped, then, the JOG operation will stop.

Inching: When the actuator is operating, the operation will be decelerated and stopped by selecting the "Stop" button in the main window.

When the EMGx input terminal is turned OFF, the servo is turned OFF immediately after the actuator is decelerated and stopped, then, the Inching operation will stop.

Return to Origin: Only the EMGx input terminal is valid.
When it is turned OFF, the servo is turned OFF immediately after the actuator is decelerated and stopped, then, the Return to Origin will stop.

| Caution |
Please take appropriate measures so that the controller stop (ENGx) terminal can be turned off immediately during the test. (Refer to the controller Operation Manual [Document No. SFOD-OMT009] for the EMGx input terminal and the wiring).
The operation is not stopped when the “Stop” button is selected in the following cases.
- The actuator is stopping during the pushing operation.
- The actuator is stopping during positioning due to an obstacle; when the actuator operates at slow speed as the positioning is interfered.
- The actuator is performing a Return to origin operation.
It may cause injury; or damage to the actuator or the user's system.
(3) Single step operation in Step Data window

a) Step Data window
   From the View (V) menu in the main window, select the Step Data window.
   Refer to section "4.1 (1-1-2) View (V)" for how to display the Step Data window.

b) Change to Remote mode
   Change the mode to Remote mode in the main window.
   Confirm that SVRE is ON. (Confirm that SVRE is ON in the Status window).

c) Return to Origin
   After thoroughly confirming safety, select the "All axes Return to Origin" button to command the Return to origin.

d) Step data No. setting
   Specify the step data number to be used for the test operation in the Execute area.

d) Start the test
   When the "Start" button is selected, the operation of the specified step data number will begin.

e) Stop
   The test stops when operation of the specified step data number is completed.
   When the actuator is operating, the operation can be decelerated and stopped by selecting the "Stop" button in the main window.

   When the EMGx input terminal is turned OFF, the servo is turned OFF after the actuator is decelerated and stopped, then the Inching operation will be canceled.

   The "Stop" button is invalid when the actuator is stopped during a pushing operation; when the actuator is stopping during positioning due to an obstacle; when the actuator operates at slow speed as the positioning is interfered; or when the actuator is performing the Return to origin operation.

   Caution
   Please take appropriate measures so that the controller stop (ENGx) terminal can be turned off immediately during the test. (Refer to the controller Operation Manual [Document No. SFOD-OMT009] for the EMGx input terminal and the wiring).
   The operation is not stopped when the "Stop" button is selected in the following cases.
   - The actuator is stopping during the pushing operation.
   - The actuator is stopping during the positioning operation due to an obstacle.
   - The actuator is operating at slow speed as the positioning is interfered.
   - The actuator is performing a Return to origin operation.
   It may cause injury; or damage to the actuator or the user's system.

   Caution
   Do not disconnect the USB cable during the test operation.
   If disconnected, the actuator will stop suddenly and the servo will be turned OFF. This may cause damage to the actuator or the user's system.
4.7 Forced output function

The Forced output function can only be used in maintenance mode. It is possible to turn ON or OFF the output terminal of the parallel I/O. Using this forced output function, it is possible to check that the parallel I/O wiring and the PLC program are correct. Details of the forced output of the parallel I/O are shown below.

(1) Parallel I/O forced output

a) Step Data window
   Select the View (V) of the main window and select the Status window.
   Refer to section "4.1 (1-1-2) View (V)" for how to display the Status window.

b) Change to Maintenance mode
   Change the mode to Maintenance mode in the main window.

c) Command of output ON / OFF
   Select the output signal button to be forced ON or OFF.
   The conditions of the output signal buttons are shown below.
   ON: Blue
   OFF: Grey

   ![Output signal button ON (Blue)]
   ![Output signal button OFF (Grey)]

   d) Completion
   The forced output will be released when the mode is changed, and then, the parallel output status of the controller will return to the status before the forced output.
4.8. Alarm detection

The controller generates an alarm when an error is detected. The alarms are classified into groups of the controller alarm and the driver alarm. A driver alarm is recorded in the Alarm History, but the controller alarm is NOT recorded.

![Alarm detection diagram]

The following section, (1) describes how to distinguish an alarm group; (2) describes the parallel I/O signal output conditions and how to reset the alarms; and (3) lists the details of the alarms and their countermeasures.

(1) Alarm group distinction

When an alarm is generated the controller outputs the signals to distinguish the alarm group. The alarms are classified into four groups, and the alarm groups are output with the OUT0-3 signals. The table below lists the combination of the alarm group and the signal output.

<table>
<thead>
<tr>
<th>Alarm group</th>
<th>Signal output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ALARM</td>
</tr>
<tr>
<td>Alarm group B</td>
<td>OFF</td>
</tr>
<tr>
<td>Alarm group C</td>
<td>OFF</td>
</tr>
<tr>
<td>Alarm group D</td>
<td>OFF</td>
</tr>
<tr>
<td>Alarm group E</td>
<td>OFF</td>
</tr>
</tbody>
</table>

“*ALARM” is displayed in negative logic.

(2) Parallel I/O signal output when an Alarm is generated

When an alarm is generated, SVRE or SETON is output according to the contents of the alarm as listed below.

The table below also lists how to restart the operation.

<table>
<thead>
<tr>
<th>Alarm group</th>
<th>Signal output</th>
<th>How to restart</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SVRE</td>
<td>SETON</td>
</tr>
<tr>
<td>Alarm group B</td>
<td>No change</td>
<td>No change</td>
</tr>
<tr>
<td>Alarm group C</td>
<td>No change</td>
<td>No change</td>
</tr>
<tr>
<td>Alarm group D</td>
<td>OFF</td>
<td>No change</td>
</tr>
<tr>
<td>Alarm group E</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>
### (3) Alarms and countermeasures

#### (3-1) Controller alarm

<table>
<thead>
<tr>
<th>Name of the controller setting software (code)</th>
<th>Group</th>
<th>How to reset the alarm</th>
<th>Alarms and countermeasures</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRIVE is ON when SVRE is OFF (0-098)</td>
<td>C</td>
<td>Input RESET</td>
<td><strong>&lt; Details&gt;</strong> An alarm is generated when the Return to origin operation, the Drive operation, or the JOG operation is commanded while the servo is OFF. &lt;Countermeasure&gt; Command operation while the servo is ON (SVRE output is ON).</td>
</tr>
<tr>
<td>DRIVE is ON when SETON is OFF (0-099)</td>
<td>C</td>
<td>Input RESET</td>
<td><strong>&lt; Details&gt;</strong> An alarm is generated when the Return to origin operation, the Drive operation or the JOG operation is commanded before performing the Return to origin. &lt;Countermeasure&gt; Start operation after completion of the Return to origin.</td>
</tr>
<tr>
<td>Failed to achieve set position in set time limit (0-149)</td>
<td>D</td>
<td>Input RESET SVON</td>
<td><strong>&lt; Details&gt;</strong> The time to reach the target position is greater than the specified time. &lt;Countermeasure&gt; Remove the obstructions while the actuator moves. Also, make sure that the load, speed, acceleration and deceleration are within the range of the actuator.</td>
</tr>
<tr>
<td>Parameter is not registered (0-901)</td>
<td>E</td>
<td>Turn off the main control and motor control power supplies.</td>
<td><strong>&lt; Details&gt;</strong> An alarm is generated when the step data is executed without parameter settings. &lt;Countermeasure&gt; Download an appropriate parameter to the controller.</td>
</tr>
<tr>
<td>Step data is not registered (0-902)</td>
<td>E</td>
<td>Turn off the main control and motor control power supplies.</td>
<td><strong>&lt; Details&gt;</strong> An alarm is generated when the step data is executed without step data setting. &lt;Countermeasure&gt; Download the step data to the controller.</td>
</tr>
<tr>
<td>System Error (0-910)</td>
<td>E</td>
<td>Turn off the main control and motor control power supplies.</td>
<td><strong>&lt; Details&gt;</strong> System error occurred. There is a possibility of damage to the controller or a malfunction due to noise. &lt;Countermeasure&gt; If the alarm is still generated when the power is reapplied, please contact SMC.</td>
</tr>
<tr>
<td>SDRAM Error (0-911)</td>
<td>E</td>
<td>Turn off the main control and motor control power supplies.</td>
<td><strong>Descriptions</strong> Abnormality concerning SDRAM is confirmed. &lt;Countermeasure&gt; Please contact SMC.</td>
</tr>
<tr>
<td>FROM Error (0-912)</td>
<td>E</td>
<td>Turn off the main control and motor control power supplies.</td>
<td><strong>Descriptions</strong> Abnormality concerning FROM is confirmed. &lt;Countermeasure&gt; Please contact SMC.</td>
</tr>
<tr>
<td>Modbus Error (0-913)</td>
<td>E</td>
<td>Shut down the main control and motor control power supply.</td>
<td><strong>&lt; Descriptions&gt;</strong> An alarm is generated when an abnormality is found in the Modbus communication to the controller. There is a possibility that the motor control power supply is OFF or a malfunction occurred due to noise. &lt;Countermeasure&gt; If the alarm is still generated when the power is reapplied again, please contact SMC.</td>
</tr>
<tr>
<td>Module Error (0-914)</td>
<td>E</td>
<td>Shut down the main control and motor control power supply.</td>
<td><strong>&lt; Details&gt;</strong> An alarm is generated when an abnormality is found in internal circuit. There is a possibility of damage to the controller or a malfunction due to noise. &lt;Countermeasure&gt; If the alarm is still generated when the power is reapplied, please contact SMC.</td>
</tr>
</tbody>
</table>
### (3-2) Driver alarm

<table>
<thead>
<tr>
<th>Name of the controller setting software (code)</th>
<th>Group</th>
<th>How to reset the alarm</th>
<th>Alarms and countermeasures</th>
</tr>
</thead>
</table>
| Step data value is wrong (1-048)              | B     | Input RESET            | **< Details >**<br>The step data and parameter are incorrect for the following conditions.<br>[Settable range]<br>1. Pushing force $\geq$ "Trigger level"
2. Pushing force of profile parameter $> 0$
3. Speed $\geq$ Pushing speed $\geq$ Minimum speed of the actuator
4. Pushing speed $\leq$ Maximum pushing speed of the actuator
5. Pushing force $\geq$ Minimum pushing force of actuator
6. The Basic parameter "Max pushing force" $\geq$ Minimum pushing force of the actuator
7. The Basic parameter "Max pushing force" $\geq$ "Trigger level". **<Countermeasure>**<br>Modify the step data, and basic or profile parameter settings. **Caution**<br>Please refer to the actuator manual or the catalogue for the max/min pushing force/speed for the actuator. |
| Parameter value is wrong (1-049)               | B     | Input RESET            | **< Details >**<br>The parameter is incorrect for the following conditions.<br>[Settable range]<br>1. Stroke(−)< Stroke (+)
2. Parameter "Max pushing force" $<$ Maximum pushing force of the actuator **<Countermeasure>**<br>Modify the basic parameter settings. **Caution**<br>Please refer to the actuator manual or the catalogue for the max/min pushing force/speed for the actuator. |
<p>| Set stroke is outside stroke limit (1-052)     | B     | Input RESET            | <strong>&lt; Details &gt;</strong>&lt;br&gt;An alarm is generated when an operation exceeds the basic parameter &quot;Stroke (+)“, &quot;Stroke (−)“. (Including JOG operation after a Return to origin) <strong>&lt;Countermeasure&gt;</strong>&lt;br&gt;Make sure that the actuator moving distance specified in the step data is within the range in the basic parameters &quot;Stroke (+)&quot; and &quot;Stroke (−)&quot;. <strong>Caution</strong>&lt;br&gt;If the step data operation method is a “relative movement”, note the location where the operation starts and the distance moved. If the location is outside the stroke range when power is supplied, this alarm will be generated. Move the table (or rod) to within the stroke range, and supply power. |
| Return to ORIG did not complete within the set time (1-097) | C     | Input RESET            | <strong>&lt; Details &gt;</strong>&lt;br&gt;The Return to origin was not completed within the set time. <strong>&lt;Countermeasure&gt;</strong>&lt;br&gt;- If the ORIG mode is &quot;0: Pushing Return to origin&quot;, the controller parameter &quot;model&quot; and the actual actuator model may not match. Check the parameters. Also, the motor shaft may be loose. Please refer to the actuator operation manual.&lt;br&gt;- If the ORIG mode is &quot;2, 3: Return to origin with sensor”, check that the sensor mounting and the cable connection of the sensor are correct. |</p>
<table>
<thead>
<tr>
<th>Name of the controller setting software (code)</th>
<th>Group</th>
<th>How to reset the alarm</th>
<th>Alarms and countermeasures</th>
</tr>
</thead>
</table>
| DRIVE is ON when SVRE is OFF (1-098)          | C     | Input RESET            | < Details >
|                                               |       |                        | An alarm is generated when the Return to origin instruction is made when the servo is OFF. |
|                                               |       |                        | <Countermeasure>            |
|                                               |       |                        | Start the operation when the servo motor is ON (SVRE output is ON). |
| ORIG switch direction (1-103)                 | C     | Input RESET            | < Details >
|                                               |       |                        | The origin sensor does not respond correctly when a Return to origin operation is performed with the origin sensor. An Alarm is generated depending on the set value of the Return to origin parameter. |
|                                               |       |                        |                              |
| Return to Origin parameter Set value          |       |                        | Alarm conditions |
| Return to Origin mode                         |       |                        | Set value | Origin sensor type | |
| 0: No sensor                                  | 0     | 0: Pushing Return to origin |
| 1: Sensor A contact                           | 1     | 1: Sensor A contact |
| 2: Sensor B contact                           | 2     | 2: Sensor B contact |
| 2,3:Sensor Return to origin                   | 2,3   | 2,3:Sensor Return to origin |
|                                               |       |                        | (No alarm will be generated) |
|                                               |       |                        | The end position is detected when the sensor has been off since the Return to origin operation started. |
|                                               |       |                        | The end position is detected when the sensor has been on since the Return to origin operation started. |
|                                               |       |                        | Immediately after inputting a command to the Return to origin. |
|                                               |       |                        | The end position is detected when the sensor has been off since the Return to origin operation started, or the end position is detected after the sensor ON is detected and before the Return to origin operation is completed. |
|                                               |       |                        | The end position is detected when the sensor has been on since the Return to origin operation started, or the end position is detected after the sensor OFF is detected and before the Return to origin operation is completed. |
| Speed exceeded set value (1-144)              | D     | Input RESET SVON       | < Details >
<p>|                                               |       |                        | The motor speed has exceeded the specified value, due to an external force, etc. |
|                                               |       |                        | &lt;Countermeasure&gt;            |
|                                               |       |                        | Make improvements such that the motor speed will not exceed the maximum speed of the actuator. |
|                                               |       |                        | &lt;Caution&gt;                   |
|                                               |       |                        | Please refer to the actuator manual or the catalogue for the maximum speed of the actuator. |</p>
<table>
<thead>
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</tr>
</thead>
</table>
| The motor drive power supply voltage is outside set range (1-145) | D     | Input RESET SVON       | < Details >
The motor drive power supply (M24V) voltage outside the specified range is detected. The controller will check the lower limit of the motor power supply voltage only when the servo turns ON.  

<Countermeasure>
Check the voltage supplied to the motor drive power supply (M24V).

⚠️ Caution
If the power supply is a type with "inrushcurrent protection", a voltage drop may cause an alarm during acceleration/deceleration.

< Details >
The alarm may be caused by regenerative power depending on the method of operation of the actuator.  

<Countermeasure>
Check if the operating condition of the actuator is within the specification range.

⚠️ Caution
Refer to the actuator manual or the catalogue for the method of operation of the actuator.

| Controller temperature exceeded set range (1-146) | D     | Input RESET SVON       | < Details >
The temperature of the controller is too high.  

<Countermeasure>
Make improvements so that the temperature around the controller is kept appropriate.

| Controller supply voltage is outside set range (1-147) | D     | Input RESET SVON       | < Details >
The motor control power supply voltage outside of the specified range is detected.  

<Countermeasure>
Check the motor control power supply voltage connected to the controller.

⚠️ Caution
If a single power supply is used for both the motor control power and the motor drive power, or the power supply is an "inrushcurrent protection type", a voltage drop may occur during acceleration/deceleration, which will generate an alarm.

< Details >
The alarm may be caused by regenerative power depending on the method of operation of the actuator.  

<Countermeasure>
Check if the operating condition of the actuator is within the specification range.

⚠️ Caution
Please refer to the actuator manual or the catalogue for the method of operation of the actuator.

| Current limit is exceeded (1-148) | D     | Input RESET SV ON      | < Details >
The total sum per unit time of output current has exceeded the specified value.  

<Countermeasure>
Remove the obstructions while the actuator moves. Also, make sure that the load, speed, acceleration and deceleration are within the specifications of the actuator.
<table>
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<tr>
<th>Name of the controller setting software (code)</th>
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<th>Descriptions and countermeasures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoder error (1-192)</td>
<td>Turn off the main control and motor control power supplies.</td>
<td>&lt; Details &gt; An Abnormality occurred in communication with the encoder.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;Countermeasure&gt; Check the actuator cable connection.</td>
</tr>
<tr>
<td>Unable to find motor phase within the set time. (1-193)</td>
<td>Turn off the main control and motor control power supplies.</td>
<td>&lt; Details &gt; Positioning of the polarity is not completed properly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;Countermeasure&gt; When the servo motor is turned on (SVON is ON) for the first time after the power is supplied, the actuator needs to move a little to find the motor phase. If this actuator movement is prevented, an alarm will be generated.</td>
</tr>
<tr>
<td>Output current limit exceeded set value (1-194)</td>
<td>Turn off the main control and motor control power supplies.</td>
<td>&lt; Details &gt; The Output current in the power supply circuit is abnormally high.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;Countermeasure&gt; Check if the actuator cable or connector is short-circuited. In addition, make sure that the actuator is compatible with the parameter set to the controller.</td>
</tr>
<tr>
<td>Current sensor abnormality has occurred (1-195)</td>
<td>Turn off the main control and motor control power supplies.</td>
<td>&lt; Details &gt; An abnormality with the current sensors is detected, which is recognized when the controller is initialized.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;Countermeasure&gt; Confirm the combination of the controller and the actuator is correct. If the alarm is still generated when the power is reapplied, please contact SMC.</td>
</tr>
<tr>
<td>Position error overflowed (1-196)</td>
<td>Turn off the main control and motor control power supplies.</td>
<td>&lt; Details &gt; The Position deviation counter in the controller has overflowed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;Countermeasure&gt; Remove the obstructions while the actuator moves. Also, make sure that the load, speed, acceleration and deceleration are within the specifications of the actuator.</td>
</tr>
<tr>
<td>Memory abnormality has occurred (1-197)</td>
<td>Turn off the main control and motor control power supplies.</td>
<td>&lt; Details &gt; Abnormality concerning EEPROM is confirmed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;Countermeasure&gt; Please contact SMC. (The write limit of the EEPROM is approximately 100,000 times)</td>
</tr>
<tr>
<td>CPU error (1-198)</td>
<td>Turn off the main control and motor control power supplies.</td>
<td>&lt; Details &gt; The CPU is not operating correctly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;Countermeasure&gt; If the alarm is still generated when the power is reapplied, please contact SMC.</td>
</tr>
</tbody>
</table>