Doc. no. LEC-OM08801

Operation Manual

PRODUCT NAME

Data Writing Software for Blank Controller

(LECP/A-BC)

MODEL / Series/Product Number

LEC-BCW



This software is a tool which is required to use the blank controller.
Please download the latest software from the SMC website
http://www.smcworld.com/

SMC Corporation

Contents

1.Safety Instructions 3

2. Outline of Product 5

2.1 What is the data writing software (LEC-BCW)? 5

2.2 What is the blank controller? 5

2.3 Required devices when using the data writing software 5

2.4 System structure when using the data writing software 6

2.5 Operating environment 6

3. Preparation 7

3.1 Procedure before use 7

3.2 Installation 8

3.3 Uninstallation 8

3.4 Software update 8

4. Function 9

4.1 List of functions 9

4.2 Software start-up 10

4.3 Communication settings 11

4.4 Main menu 16

4.4.1 Write by selecting ACT(actuator) 18

(1)Actuator selecting window 18

(2)Name and function 19

(3)How to use writing function by selecting ACT (actuator) 20

4.4.2 Writing by specifying files 24

(1)Window 24

(2) Name and function 24

(3)How to use writing function by specifying files 25

4.4.3 Backup 28

(1)Backup window 28

(2)Names and functions 28

(3)How to use backup function 28

4.4.4 Help 30

(1)Help screen 30

(2)Names and functions 30

(3)How to use SV No. check “Read SV Number” buttton.....31

4.5 Software completion 31

5. Alarm 32

7. Wiring of cables/Common precautions..... 33

8. Electric actuators/Common precautions 34

8.1 Design and selection 34

8.2 Mounting.....35

8.3 Handling.....36

8.4 Operating environment.....37

8.5 Maintenance 38

8.6 Precautions for actuator with lock 38

9. Precautions:Controller and its peripheral devices Electric actuators/Common precautions 39

9.1 Design and selection 39

9.2 Handling.....39

9.3 Installation 40

9.4 Wiring of cables/Common precautions.....41

9.5 Power supply.....41

9.6 Grounding.....41

9.7 Maintenace 42

LEC-BCW/ Data writing software

1.Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage.
These instructions indicate the level of potential danger 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), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

*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)
ISO 10218-1992: Manipulating industrial robots -- Safety
JIS B 8370: General rules for pneumatic equipment.
JIS B 8361: General rules for hydraulic equipment.
JIS B 9960-1: Safety of machinery – Electrical equipment for machines. (Part 1: General requirements)
JIS B 8433-1993: Manipulating industrial robots – Safety, etc.

*2) Labor Safety and Sanitation Law, etc.

⚠ **Caution**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
⚠ **Warning**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Danger**	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠Warning

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.

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.

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.

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, 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, 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 a double interlock for possible failure caused by using a mechanical protective function, and periodical checks to confirm proper operation.



LEC-BCW/ Data writing software Safety Instructions

⚠ Caution
The product is provided for use in manufacturing industries. The product herein described is basically provided for peaceful use in manufacturing industries. If use of this product in other industries is being condered, consult SMC beforehand and exchange specifications or make a contract if necessary. If anything is unclear, contact your nearest sales branch.

Indemnification

When using the data writing software: LEC-BCW (hereinafter referred to as "this software"), the "indemnification" below will be applied.

Read and accept them before using the product.

This agreement comes into effect when the user installs this software to a computer. The user cannot install, use or copy this software unless they agree to this agreement.

License Agreement

Article 1 (Consent)
1. This software is to be used in accordance with this Agreement non-exclusively for the limited purpose of writing data to the controller for SMC electric actuators.
2. This software can be installed and saved on a PC for the sole purpose specified in the preceding paragraph.

Article 2 (Restrictions)
1. This software is not to be copied except as specified in Article 1-2.
2. This software license is not to be transferred or lent wholly or in part to a third party, whether for payment or free of charge.
3. Modification, translation, adaptation or reverse engineering and recompiling of this software is not permitted.

Article 3 (Precautions)
1. When using any equipment contained in this Software, please read the "Safety Instructions", "Precautions", "Specific Product Precautions" and "Specifications" described in the manual for the equipment.
2. This Software or the equipment contained in it are subject to change without prior notice.

Article 4 (Exemption of liability)
1. SMC is not responsible for any damage incurred in the use of this Software.

Article 5 (Termination)
1. If there is any breach of this Agreement, or when SMC decides to terminate this Agreement, it will be terminated.
2. When this Agreement is terminated, please destroy this Software and any copies.

Article 6 (Rights of this Software)

The copyright and any other rights of this Software are owned by SMC, and protected by Japanese copyright laws and international treaty provisions.

2. Outline of Product

2.1 What is the data writing software (LEC-BCW)?

This software is a tool which writes the parameters and step data of a specified actuator to the blank controller of the motor controller series (LECP/A series).

It is possible to write default parameters and step data to the controller models below.

Step Motor Controller	LECP6*-BC
Servo Motor Controller	LECA6*-BC
Pulse Input Type Driver	LECPA*-BC
CC-Link Direct Input Type Controller	LECPMJ-BC

Please download this software from the SMC website（http://www.smcworld.com/）

⚠ Caution

This software is only applicable to the blank controller model (LEC*-BC).

It is not possible to write parameter or step data into any model of controller other than the blank controller (LEC*-BC).

2.2 What is the blank controller?

Most models of the motor controller series (LECP/A) have the specific combination of actuator data (parameter and step data) already written into the controllers. This data is specific to the combination of the controller and actuator model (that has already been specified). For blank controller model (LEC*-BC), no actuator specific data has been written to the controller.

Therefore, when using the blank controller, the combined actuator specific data needs to be written by using this software. Once the data has been written, the blank controller can be used in accordance with the operation manual of the motor controller (LECP/A series).

⚠ Caution

- The blank controller (LEC*-BC) will operate properly only after the writing of the specific combination of actuator data (parameter and step data) has completed by using this software.

Please verify that the correct actuator part number has been selected prior to writing the data to the controller using this software.

- Use this software for writing the actuator specific data (parameter and step data) to the blank controller (LEC[*-BC).

2.3 Required devices when using the data writing software

(1) Data writing software（LEC-BCW）

(2) Communication cable, and USB cable

Prepare a communication cable LEC-W2-C, and an USB cable LEC-W2-U.

(These cables are included in the controller setting kit LEC-W2.)

(3) PC (Personal Computer)

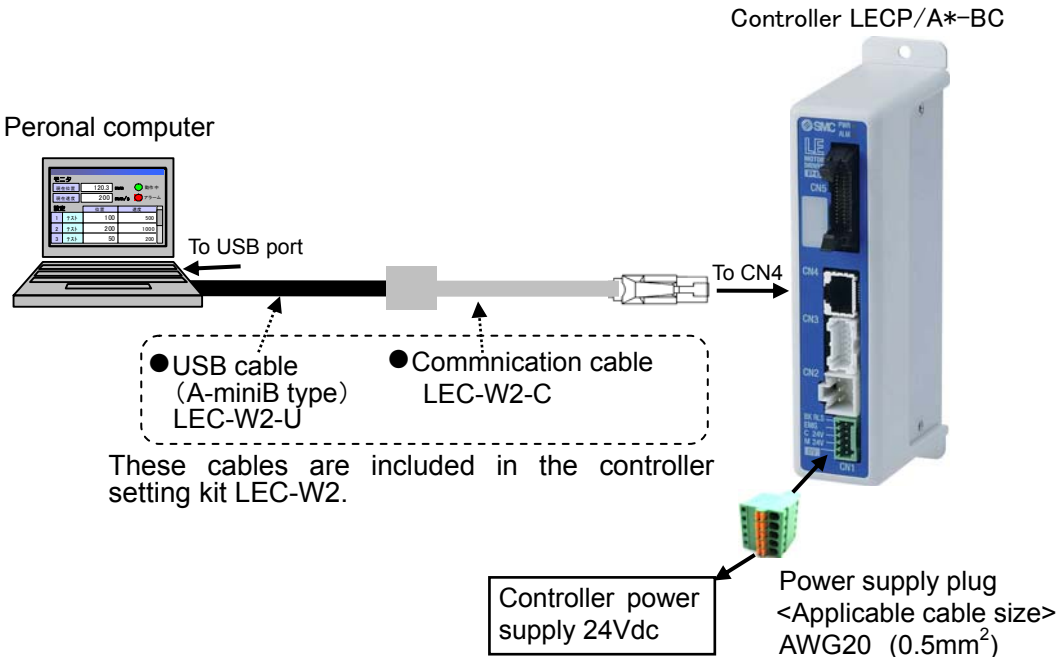
Refer to 2.5 Operation environment for the required PC specifications.

(4) Blank controller（LEC*-BC）

(5) Power supply (24 VDC)

2.4 System structure when using the data writing software

The system strucure when using the data writing software is described below.



⚠Caution

Refer to the operation manual of the Controller for power supply plug wiring of the controller.

Refer to 6. Common Precautions for wiring and cables when handling the wiring and cables.

Do not connect the PC and controller directly with the general LAN cable.
If the LAN cable is directly connected to the controller (CN4), the controller might be broken.

2.5 Operating environment

Equipment	Description	
Corresponding OS	Windows® 7 (32bit version), Windows® 7 (64bit version) Windows®8.1(32bit version),Windows®8.1(64bit version)	
CPU, Memory	More than CPU & Memory specification that OS used recommends	
Window specification	Windown resolution: 1024 x 768 or more Number of window colors: full-color (24bit or more)	
Hard disk capacity	50MB or more of the hard disk space is requred	
Interface	USB port (USB1.1 or USB2.0) (Communication cable LEC-W2 is connected.)	
Applicable controller	Step Motor Controller Servo Motor Controller Pulse Input Type Driver CC-Link Direct Input Type Controller	LECP6*-BC LECA6*-BC LECPA*-BC LECPMJ*-BC

3. Preparation

3.1 Procedure before use

(1) Preparation of devices

Prepare required devices with reference to 2.3 Required devices when using the data writing software.

Note) When the communication cable and USB cable are used with the PC for the first time, a driver needs to be installed. Please refer to the operation manual of the controller setting kit (LEC-W2) for installation of the driver.

(2)Installation

Install this software to the PC with reference to 3.2 Installation.

(3)Preparation of devices

Connect the devices with reference to 2.4 System structure when using the data writing software.

(4)Start-up of data writing software

Start-up this software with reference to 4.2 Software start-up.

(5)Communication setting

Perform the communication setting with reference to 4.3 Communication setting.

(6)How to use each function

Use each function with reference to 4.4 Main menu.

(7)Completion of data writing software

Complete this software with reference to 4.5 Software completion.

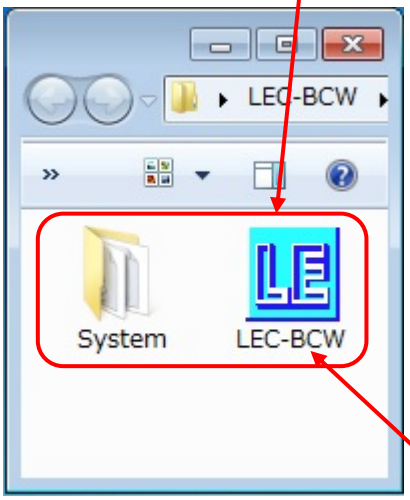
3.2 Installation

(1)Save the compressed file of the downloaded application from SMC website (http://www.smcworld.com/) to an arbitrary location and decompress it.

(2)Copy the decompressed application folder to an arbitrary location.

(3)Installation is complete after confirming that the folder and file shown below are included in the copied application folder.

(It is not necessary to install the software from "Add or Remove Programs".)



The software starts-up when LEC-BCW exe is double-clicked.

3.3 Uninstallation

Delete the application folder which was copied during installation.

∗ It is not necessary to delete it from "Add or Remove Programs"

3.4 Software update

The latest software is available on the SMC website (http://www.smcworld.com/). Please use the latest version all the time.

When updating the software to the latest version, uninstall the already installed software first, then install the latest version.

4. Function

4.1 List of functions

Function	Description
Writing function by selecting ACT (actuator)	Specify the applicable actuator based on the specifications and product part numbers, and program the actuator data into the connected controller.
Writing function by specifying files	Specify the backup file (bkp) previously created with the backup function, and program the content into the connected controller.
Backup function	Read the data registered in the connected controller and saves it as a backup file (bkp).

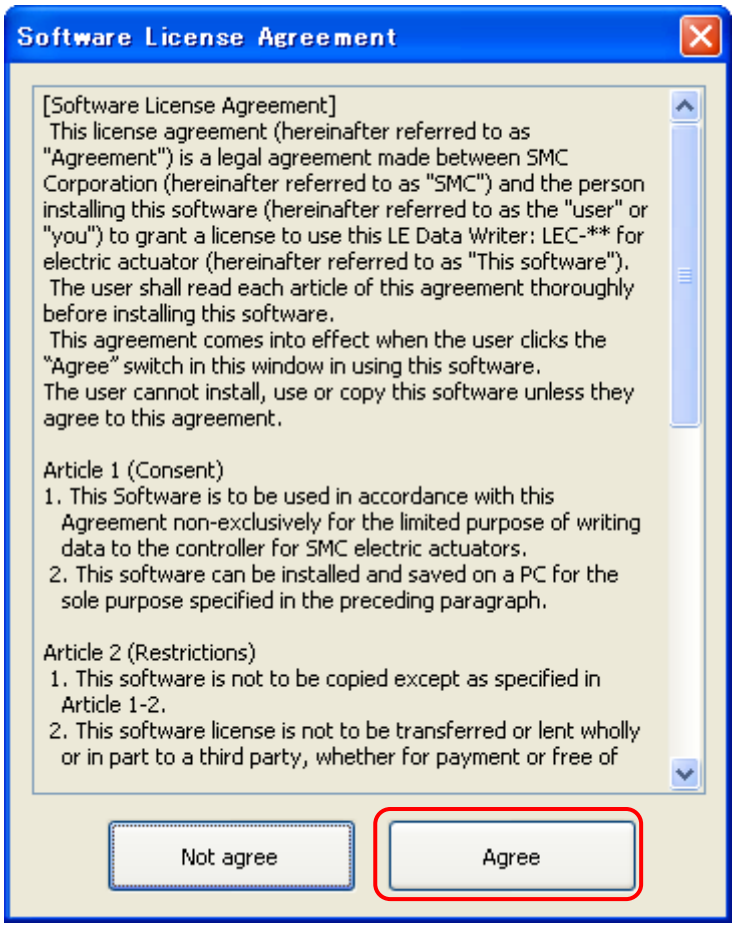
4.2 Software start-up

This software starts up when double clicking the "LEC-BCW.exe" file.

At starts up, a software license agreement window appears, which confirms the use of this software (see the image below).

After clicking the "Agree" button, the communication setting window is displayed.

Refer to 4.3 Communication setting for how to set communication.

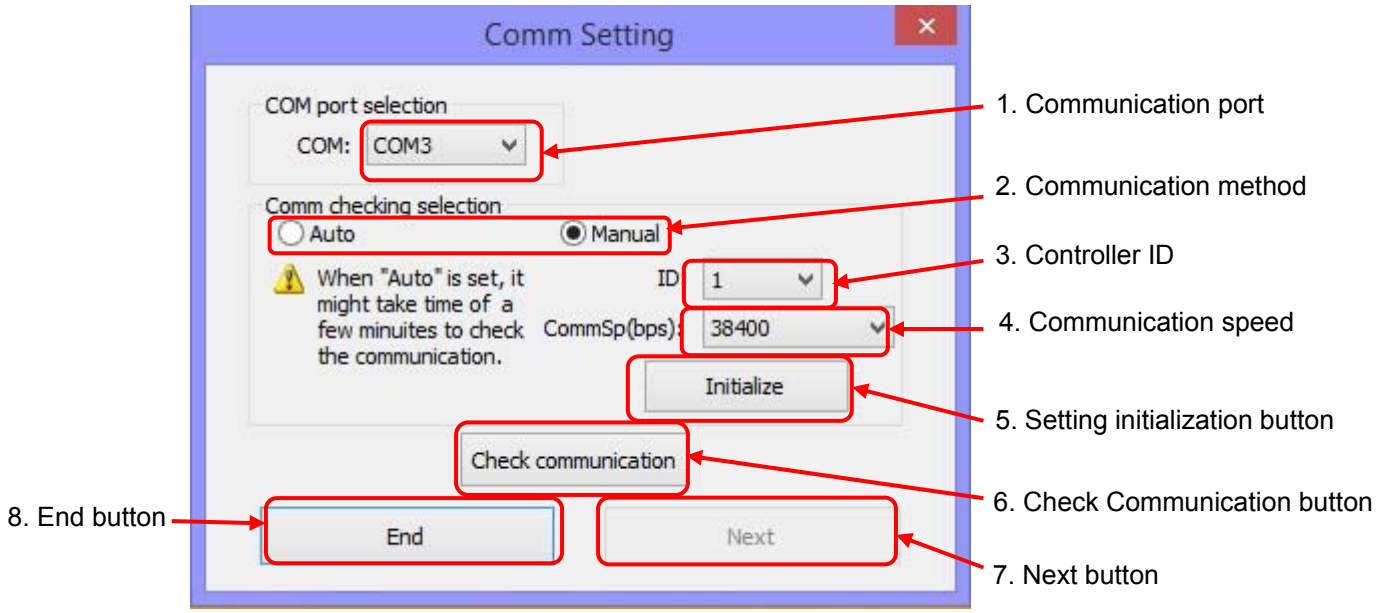


Software License Agreement window

4.3 Communication settings

When communication is established with the controller, the communication setting window appears.
Communication check can be selected from "auto" or "manual" method

(1)Communication settings window



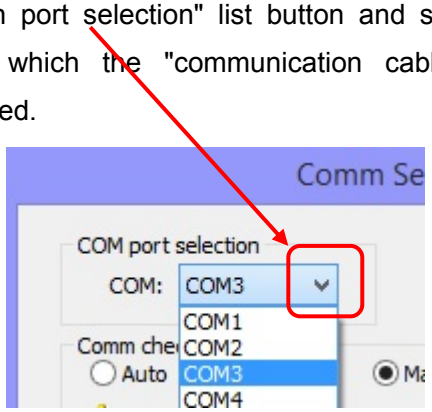
(2) Communication setting window

No.	Description	Function
1	Communication port	Select the communication port (COM port number) of the PC to which the communication cable is connected. The COM port number can be checked using the Device Manager. Refer to 4.3 (3) How to perform communication setting for details.
2	Communication method	Select the communication check method from "Auto" or "Manual". - Auto (Automatic): The communication check is performed without setting the ID and communication speed which are set in the controller. Note) If the controller ID and communication speed are unknown, select the automatic setting. Note) It may take a few minutes for the communication confirmation. - Manual: The communication check is performed with setting the ID and communication speed which are set in the controller. Note) If the controller ID and communication speed are already known, select the manual setting. It may reduce the time for communication confirmation.
3	Controller ID	For "manual" communication confirmation, the ID which has been set in the controller can be selected. The range of IDs are from 1 to 32.

4	Communication speed	For "manual" communication confirmation, the communication speed which has been set in the connected controller can be selected. The range of communication speeds are 9600, 19200, 38400, 57600, 115200 and 230400[bps].
5	Setting initialization button	Manually set ID and communication speed are initialized to the default values that are stated below. (These values are the same as the default values of the blank controller.) ・ID：1 ・Communication speed：38400[bps]
6	Check Communication button	The communication check is performed by the already selected communication check method.
7	End button	“End”: Terminate the software "Return": The window is returned to the previous page.
8	Next button	When the communication to controller is confirmed to be available, it is possible to move to the main menu by clicking this button.

(3) How to perform communication setting

a) Click the "communication port selection" list button and select the COM port number of the communication port to which the "communication cable (LEC-W2-C)" and "USB cable (LEC-W2-U)" are connected.



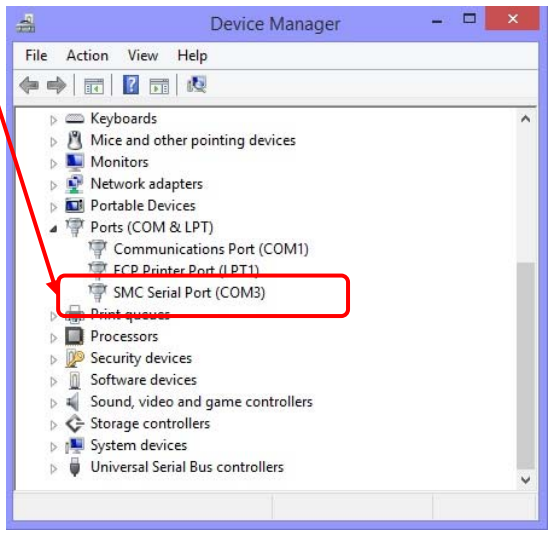
⚠Caution

Be sure to set the COM port number of the communication port regardless of "Automatic" or "Manual" communication check method.

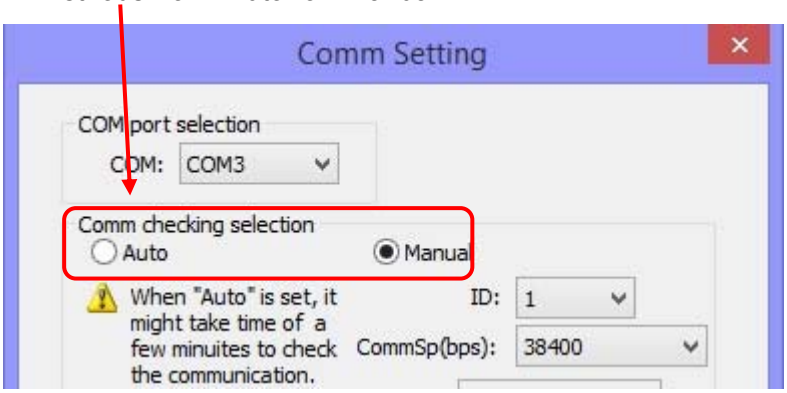
<How to Confirm the Communication Port Number>

Using the start menu, open the "Control panel", then select "Hardware and sound" and then select "Device manager". (This start-up method is an example for Window®7. Please start the device manager in accordance with the operation environment of the PC.)

Confirm the COM port number of the SMC Serial Port from the devices displayed in "Port (COM & LPT)". In this example, it is shown as COM3.

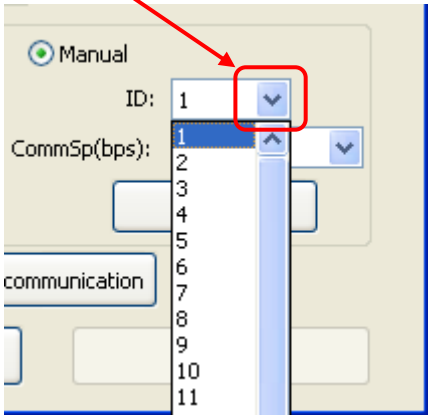


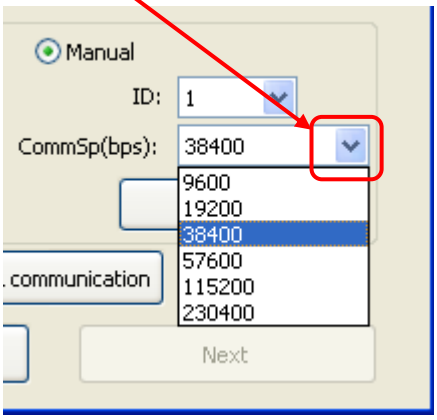
b) Click the "communication method" selection button and select the communication setting methods from "Auto" or "Manual".



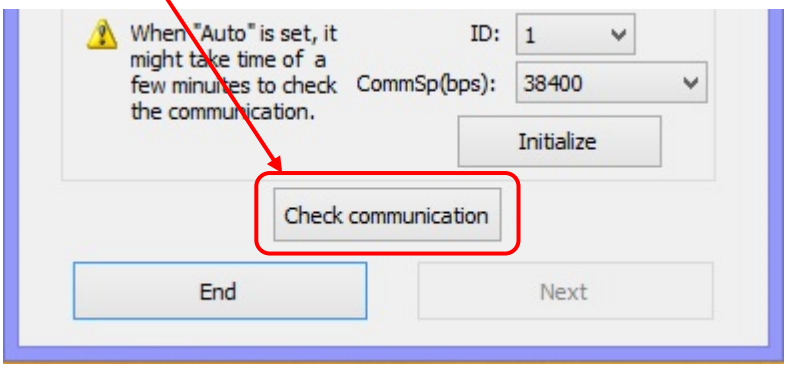
<Manual setting>

Click the "Controller ID" list button and "communication speed" list button and select the controller ID and communication speed that has been set in the connected controller.

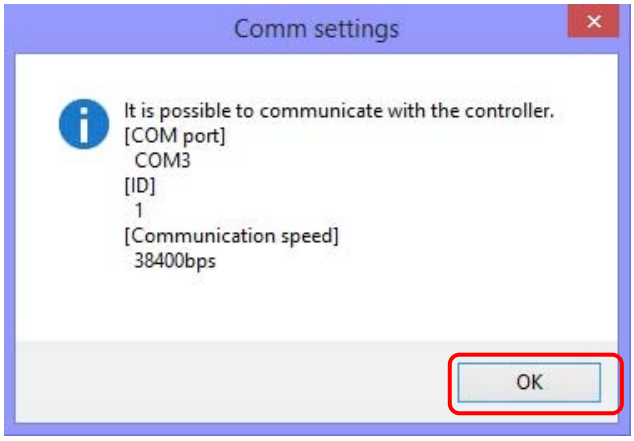




c) Click the "Check communication" button and confirm whether the set communication method establishes communication to the controller.

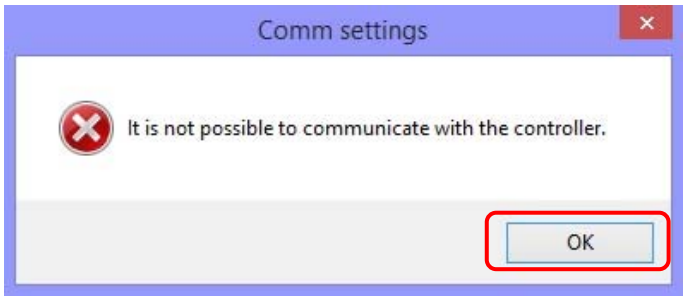


Once the communication is acceptable, the window below is displayed, and controller ID and communication speed during communication are displayed. Click the "OK" button after confirmation



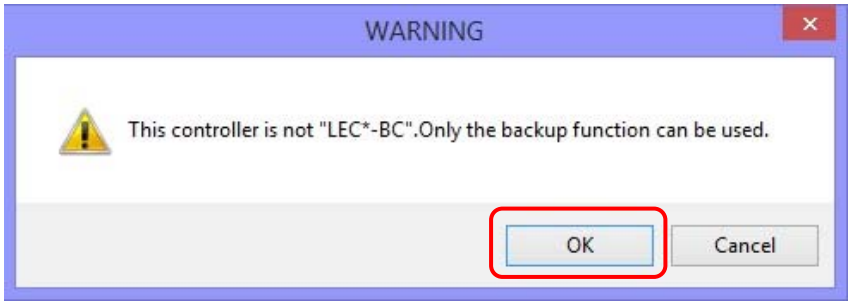
When communication is established.

The window below is displayed if the communication cannot be established.
In this case, click the "OK" button on the window; confirm the communication setting, communication cable connection, and the controller power supply. Then check the communication method again.



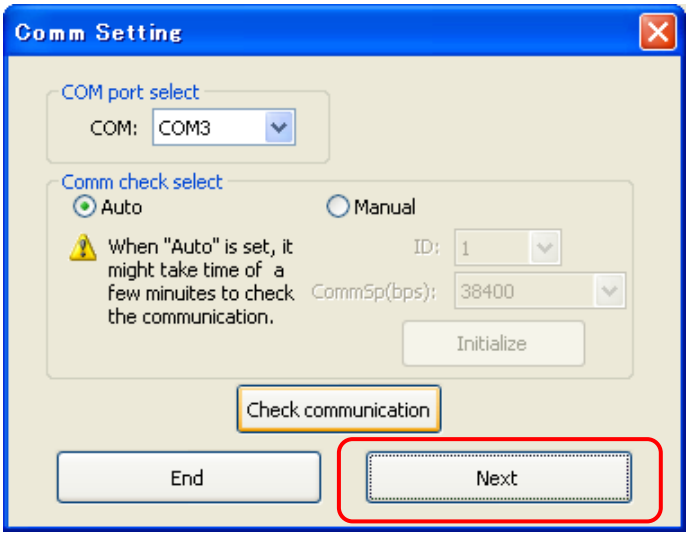
“Communication not confirmed” window

If the controller connected is not the blank controller (LEC[]-BC), the window below is displayed. When the "OK" button is clicked, the window is returned to the communication setting screen.



⚠ Caution
This software is only applicable to the blank controllers (LEC*-BC). It is not possible to write into the any controllers models other than the blank controllers. (For the controllers other than the blank controller, "backup" is only displayed on the menu window.)

d) After communication has been established, click the "Next" button. The main menu window then be displayed. Refer to 4.4 Main menu.

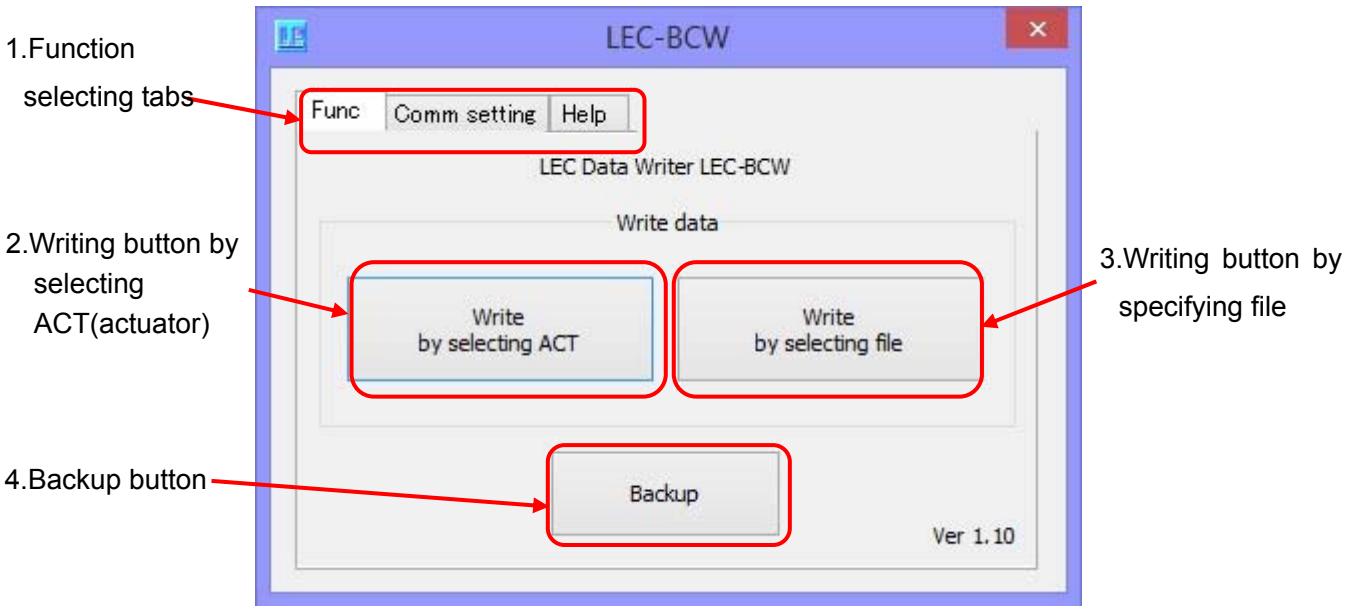


4.4 Main menu

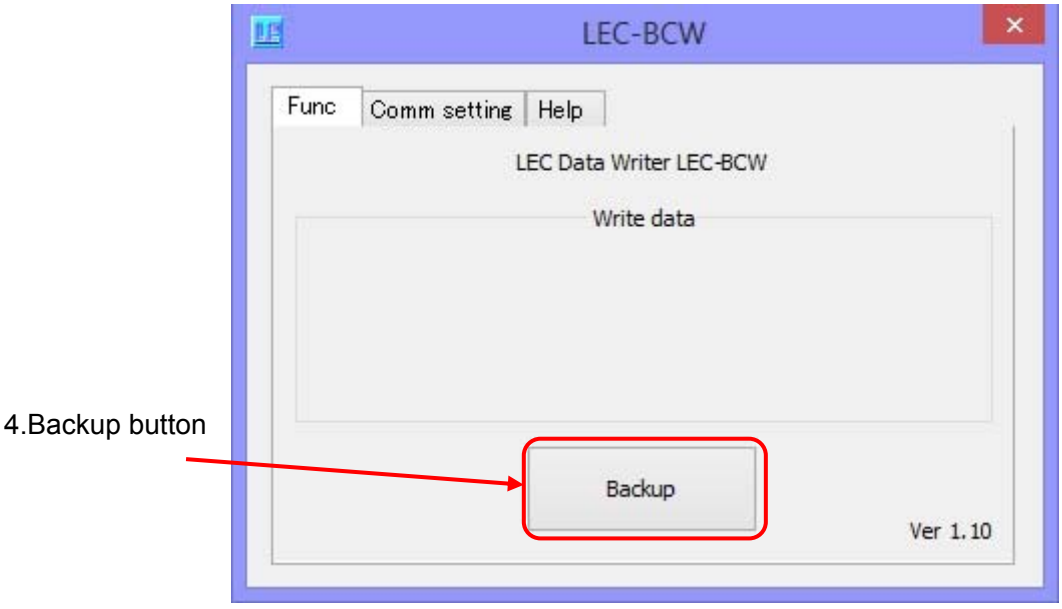
"Func (function)", "Comm (communication) setting" and "Help" can be selected on the main menu.

On "Func"tab, the data writing by selecting ACT or selecting file functions and the "Backup" function can be selected.

(1)Main menu window



* When connecting to the controller models other than the blank controller, “Backup is the only function that can be selected.



(2)Name and function

No.	Description	Function
1	Function selecting tabs	"Func", "Comm setting" and "Help" windows can be selected. Refer to 4.3 Communication setting for how to set up communication to the controller. Refer to 4.4 Help for "help".
2	Writing button by selecting ACT (actuator)	Select the product number of the actuator based on the specifications and part number of the actuator. Then write the specific data of the applicable actuator into the controller. Refer to 4.4.1 Writing after selecting actuators for details.
3	Writing button by specifying file	Write the data of the specified file into the controller. Refer to 4.4.2 Writing by specifying files for details.
4	Backup button	Reads the data registered in the connected controller and saves it as a backup file (bkp). Refer to 4.4.3 Backup for details.

(3)How to use each function

Click the button or tab of the required function.

Refer to the description below for how to use each function

- Communication setting : 4.3 Communication setting
- Help: 4 4.4 Help
- Data writing (writing by selecting ACT actuator: 4 4.1 Writing after selecting actuators
- Data writing (writing by specifying files :4 4.2 Writing by specifying files
- Backup: 4 4.3 Backup

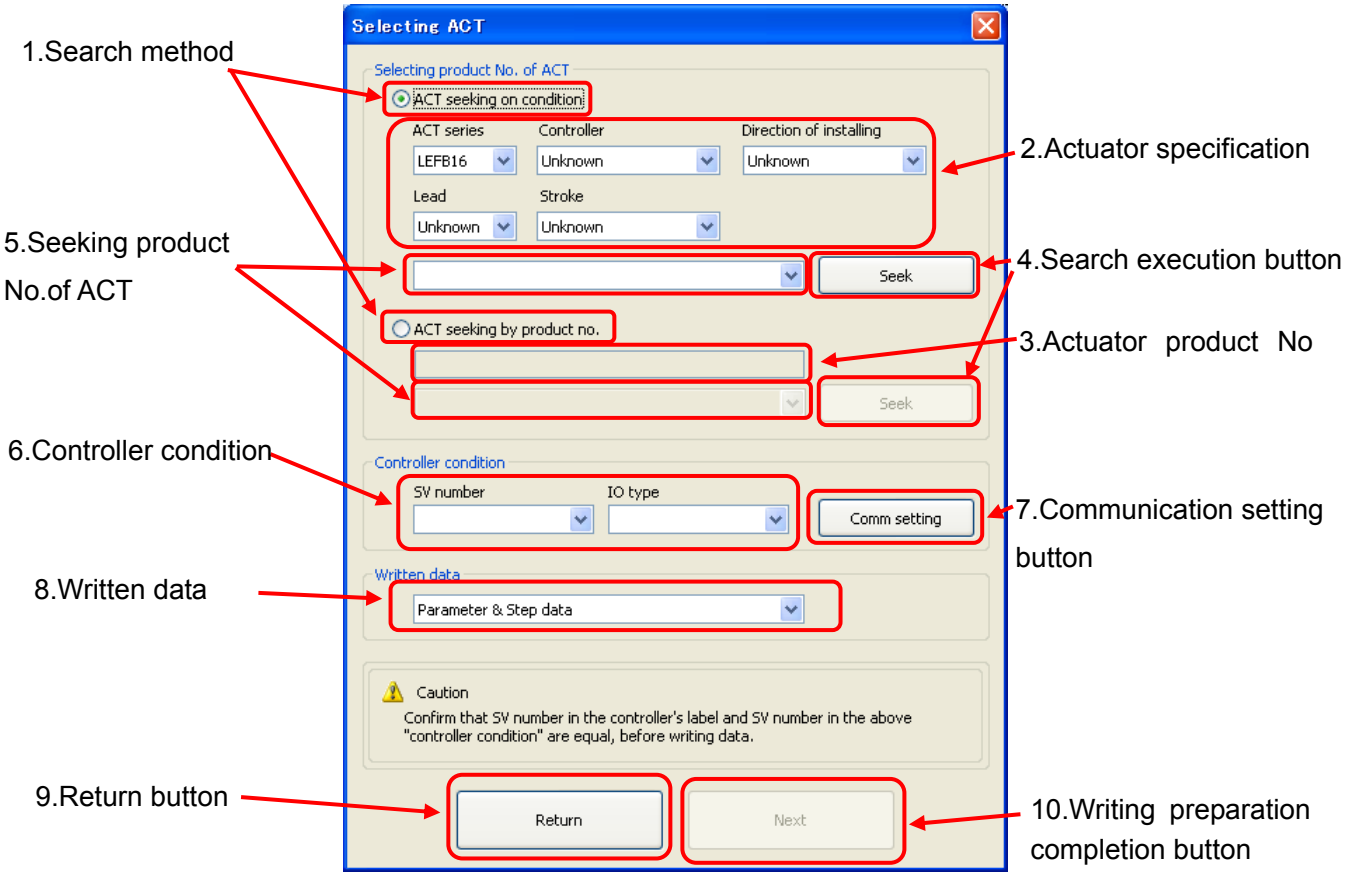
4.4.1 Write by selecting ACT(actuator)

Writing function by selecting ACT (actuator) is to specify the product No. of the actuator by setting the actuator specifications and controller model and condition, and write the specific data of the applicable actuator to the controller.

⚠ Caution

The actuator specific data written to the blank controller and the actuator model should be identical. Otherwise, a malfunction or failure could occur. Be sure to write the data which is compatible with the actuator being used.

(1)Actuator selecting window



(2)Name and function

No.	Description	Function
1	Search method	Actuators can be selected from "search on condition" or "search from product No.". ・Search on condition ：Select the "ACT series", "Controller", "Dir. of installing motor ", "Lead" and "Stroke" of the actuator to which parameter or step data is written, and search the product No. of the actuator. ・Search from Product No. ：Input a part of the product part number of the actuator to which parameter or step data is written, and search the product No. of the actuator.
2	Actuator specification	Before search on condition, select the "ACT series", "Controller", "Dir. of installing motor ", "Lead" and "Stroke" of the actuator to which parameter or step data is to be written
3	Actuator product No.	Input a part of the product part number of the actuator to which parameter or step data is written, and search the product No. of the actuator. e.g.1）LE e.g.2）-400 e.g.3）LE*-400
4	Search excution button	Search the product No. which is applicable to the set actuator from "search on condition" or "search from the product No.".
5	Seeking product No. of ACT	Product No. group searched from "search on condition" or "search from Product No." is displayed. Select the actuator to which parameter or step data is to be written from this product No. group.
6	Controller condition	Set the "SV No." and "IO type" of the controller. - SV No.: Controller software version A version label is attached to the side of the controller, showing SV*.**. Refer to 4.4.1 (3) How to use writing function by selecting ACT (actuator) for details. - IO type: Parallel I/O specifications of the controller. Can be selected from NPN or PNP. This is described on the label attached to the front of the controller. Refer to 4.4.1 (3) How to use writing function by selecting ACT (actuator) for details. Check the specifications of the connected controller.
7	Communication setting button	The communication setting window is displayed. Refer to 4.3 Communication setting for how to set communication.

8	Written data	Set the content written to the controller. The content can be selected from three options below. ・Parameters and step data ・Parameter only ・Step data only
9	Return button	Return to the main menu.
10	Writing preparation completion button	The data compatible with the set actuator and controller has been written to the controller.

(3)How to use writing function by selecting ACT (actuator)

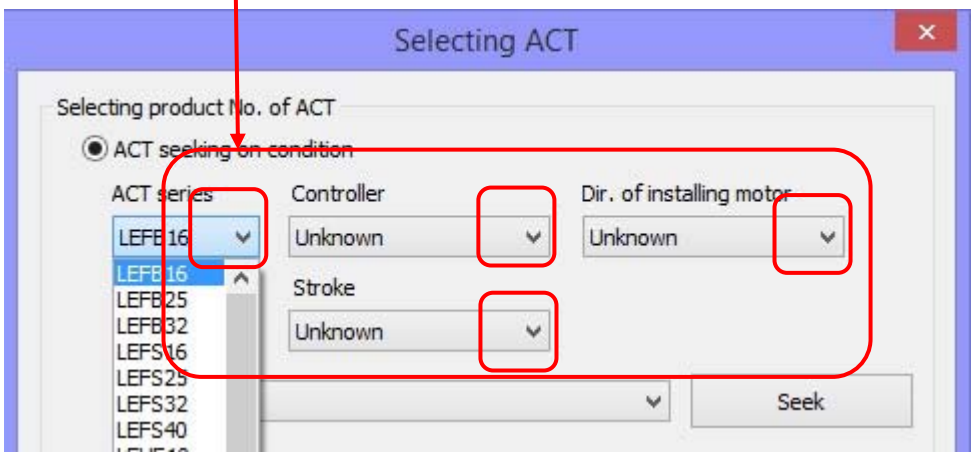
a) Select how to search the actuator. Select how to search the actuator from "search on condition" or "search from product No.".

b) Select the actuator to be applied.

<Search on condition>

Click the "ACT series" list button and select the applicable model, controller, motor installation direction, lead and stroke.

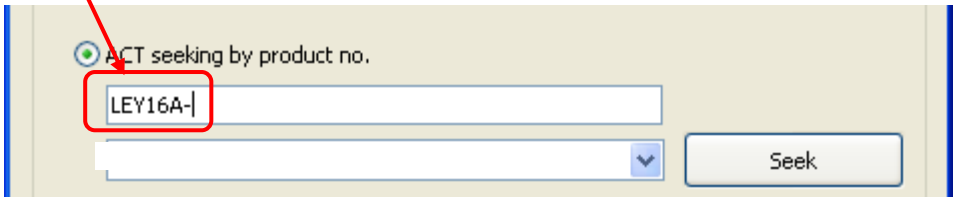
If items other than model are unknown, select unknown.



<Search from Product No.>

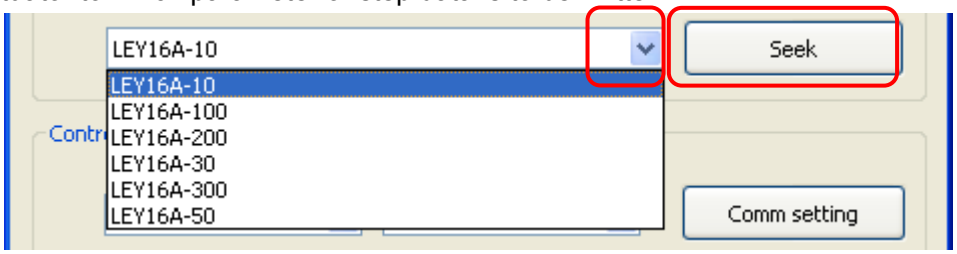
Input the product No. of the actuator to which the parameter and/or step data is written to "ACT Product No.".

The product No. can also be searched by inputting a part of the actuator product No.

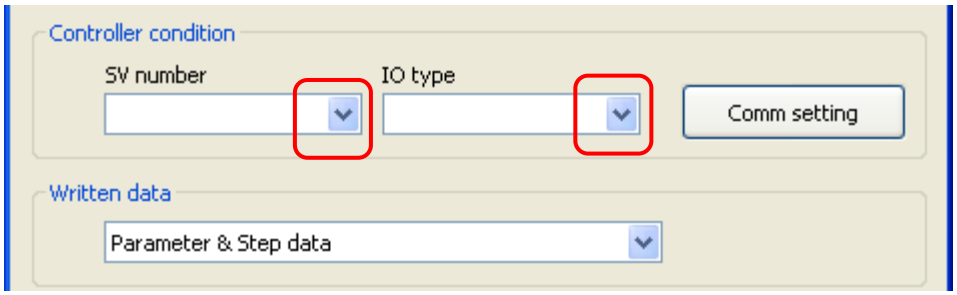


c) Click the "Seek" button. If a result applicable to the selected actuator is hit, the actuator product no. is displayed in the "Seeking product No. of ACT".

Click the "Seeking product No. of ACT" list button below and select the product No. of the actuator to which parameter or step data is to be written.



d) Click the list buttons in the "Controller condition" section to set "SV No." and "IO type" of the controller.

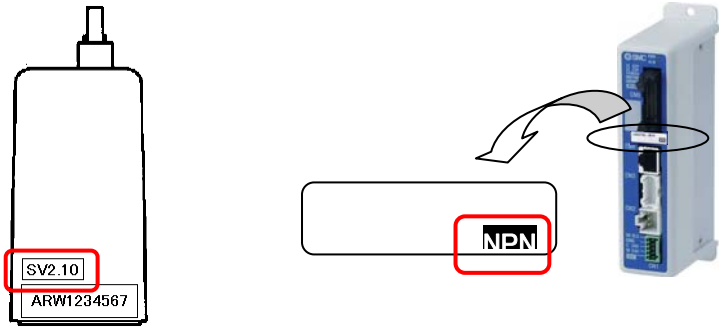


<How to check "SV No." and "IO type">

Check the version label on the side of the controller for "SV No." as shown below.

Or check the controller version (SV No.) on the help window. Refer to <u>4.4.4 Help</u> for details of how to use the help window.

Check the label on the front of the controller for "IO type" as shown below.

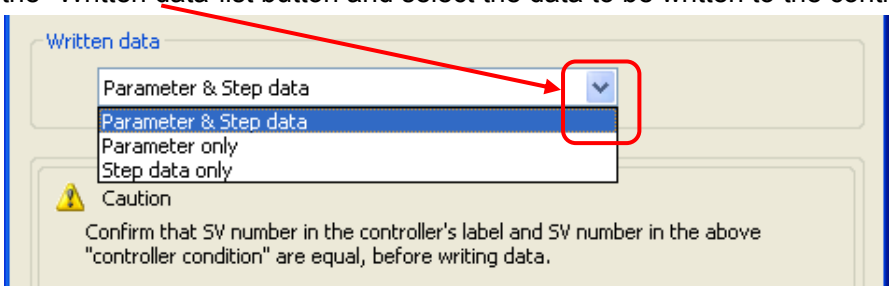


Version label SV No. IO type

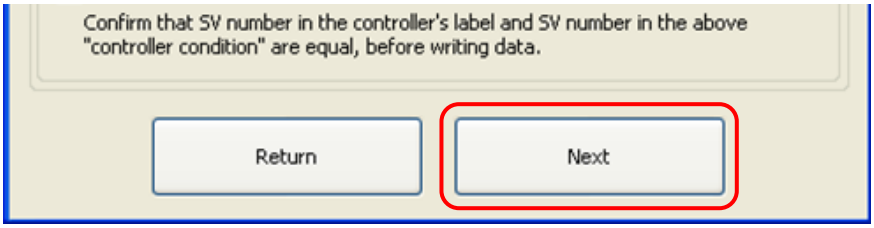
⚠Caution

Execute data writing after confirming the version label of the controller and SV No. set in the controller condition section are identical.

e) Click the "Written data"list button and select the data to be written to the controller.

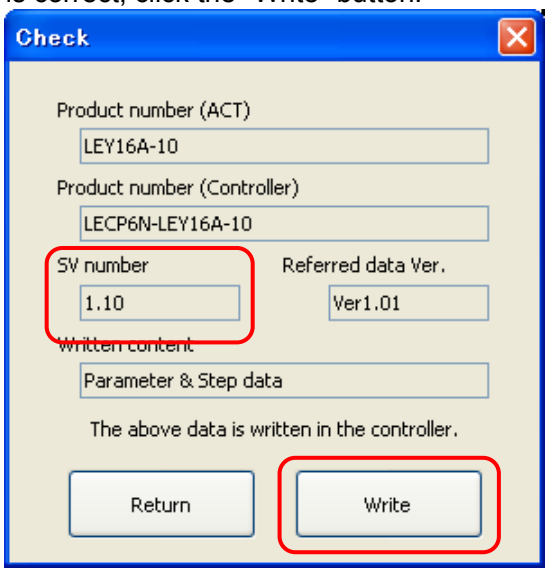


f) Click the Writing preparation completion “NEXT” button.



Note) Be sure to backup any previously programmed controller data before writing the data to the controller. Refer to 4.4.3 Backup for how to backup the data.

g) When the check window is dispalayed as shown below, verify that the displayed information is correct. If the information is correct, click the "Write" button.

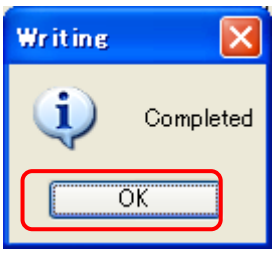


If the SV No. of the blank controller is not identical to the SV No. (SV No. of model data) displayed in the Check window, a WARNING is displayed as shown below. To cancel the writng of data, click "Cancel" button and return to the Selecting ACT window, and set the SV No. of the controller condition.



When the writing of data is complete, the Writing completed window is displayed. In this case, click the "OK" button and complete the data writing operation.

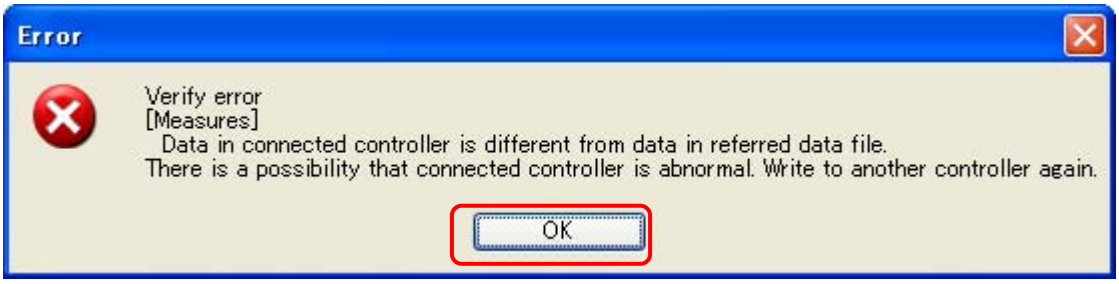
It is recommended to write the product part number of the actuator on the controller after data writing operation is completed.



⚠Caution

Do not remove the communication cable until the PWR light on the controller stops blinking.
At the same time, do not shut-off the controller power supply. This may cause abnormal data to be written to the connected controller.

If an error occurs during writing, an "Error" window will be displayed as shown below. In this case, click the "OK" button and take countermeasure. After that, attempt to write the data again.。



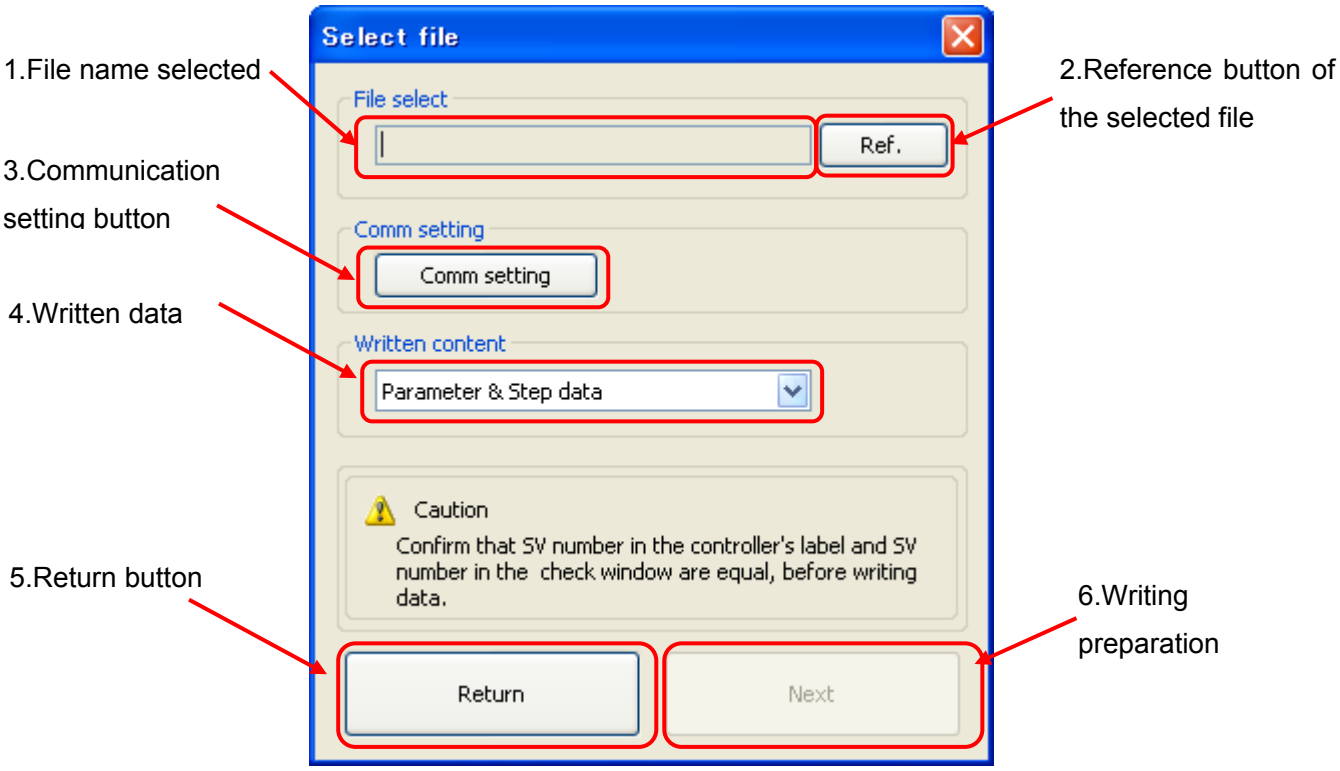
When an alarm occurs

4.4.2 Writing by specifying files

In the writing function by specifying files, the contents of the specified data file are written to the connected controller.

The data file that can be specified must be generated by the "Backup" function.

(1)Window

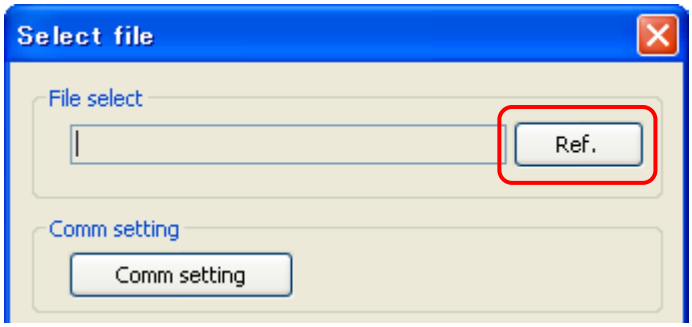


(2) Name and function

No.	Description	Function
1	File name selected	The file name and Storage folder of the selected data file are displayed.
2	Reference button of the selected file	Select the data file (bkp).
3	Communication setting button	The communication setting window is displayed. Refer to 4.3 Communication setting for how to set communication.
4	Written data	Set the data written to the controller. The written data can be selected from three options below. ・Parameters and step data ・Parameter only ・Step data only
5	Return button	Return to the main menu.
6	Writing preparation completion button	The data of the selected file has been written to the controller.

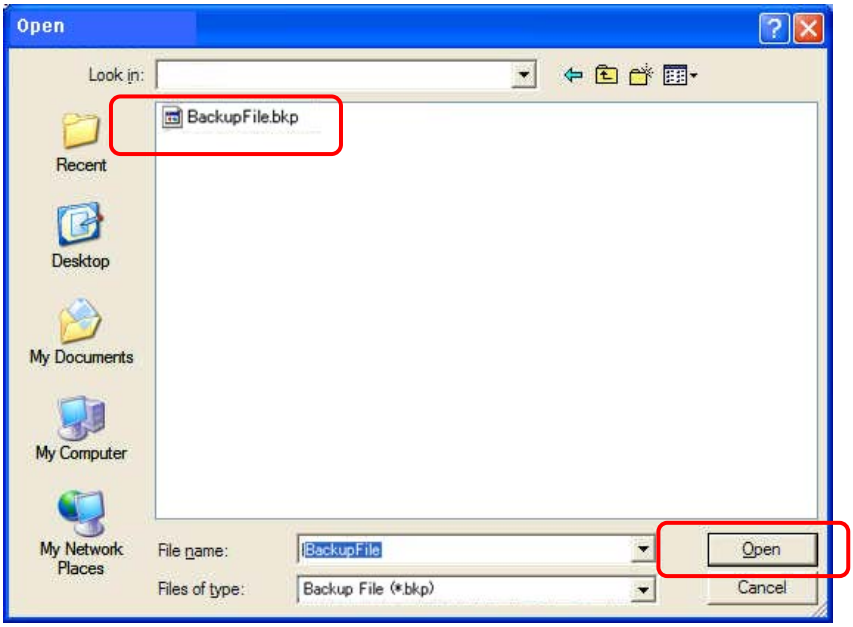
(3)How to use writing function by specifying files

a) When clicking "Ref." button, "Open" window is displayed.

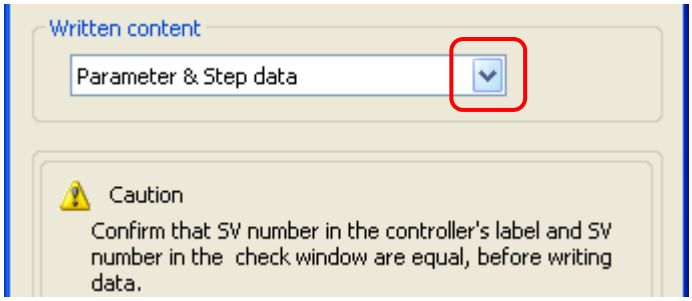


b) Select the backup file (data file with bkp extension) prepared by the backup function (refer to 4.4.3 Backup) and click the "Open" button.

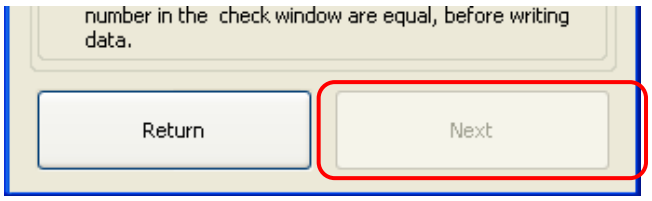
In the window example below, (BackupFile.bkp) is selected.



c) Click the written data “Written content” list button and select the data to be written to the controller.



d) When clicking the writing preparation completion“Next” button, the check window is displayed.

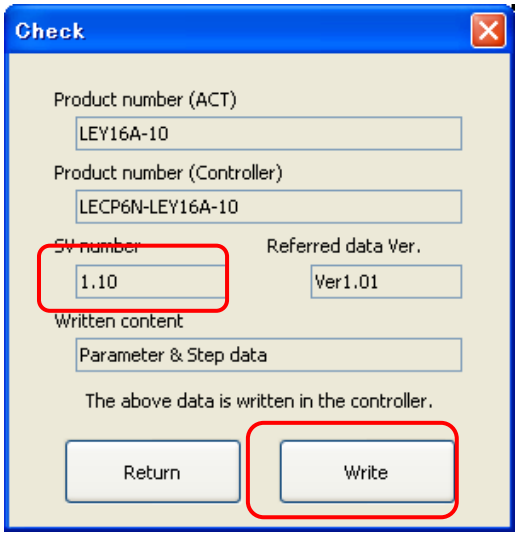


⚠Caution

Be sure to backup any previously programmed data in the controller before writing the data.

Refer to 4.4.3 Backup for how to backup.

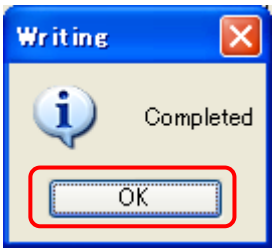
e) Verify the actuator product No., SV No. and written content data are correct. If the data is correct, cilck the "Write" button.



If the SV No. of the blank controller is not identical to the SV No. (SV No. of model data) displayed in the Check window, a WARNING is displayed as shown below. To cancel the writng of data, click "Cancel" button and check the SV No. of the blank controller.



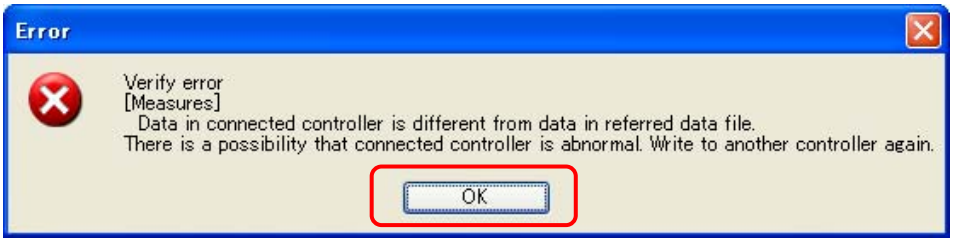
When the writing of data is complete, the Writing completed window is displayed.
In this case, click the "OK" button and complete the data writing operation.



⚠Caution
Do not remove the communication cable until the PWR light on the controller stops blinking. **At the same time, do not shut-off the controller power supply. This may cause abnormal data to be written to the connected controller.**

If an error occurs during writing, an "Error" window will be displayed as shown below. In this case, click the "OK" button and take countermeasure. After that, attempt to write the data again.

It is recommended to write the product part number of the actuator on the controller after data writing operation is completed.



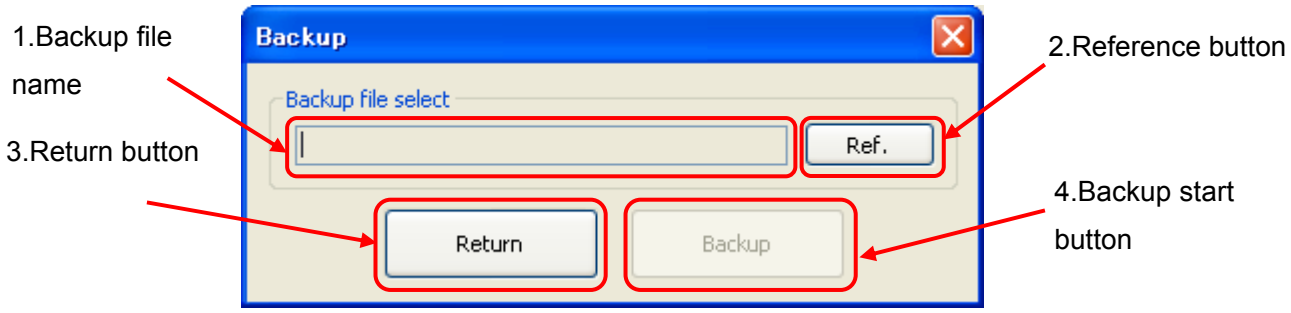
When an alarm occurs

4.4.3 Backup

In the backup function, read the data from the connected controller and prepare a backup file.

A backup file generated by this function can be written to a connected controller by specifying it in the "Writing by selecting files" function (Refer to 4.4.2 Writing by specifying files).

(1)Backup window

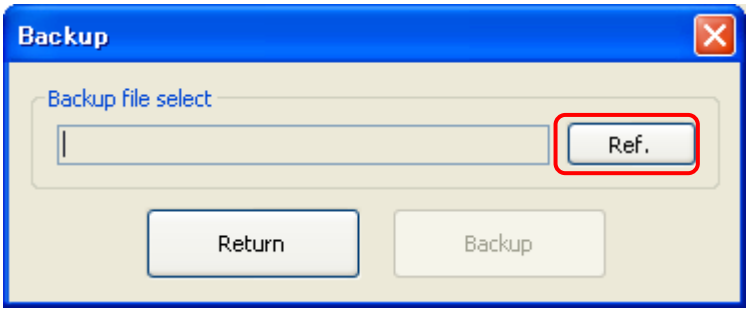


(2)Names and functions

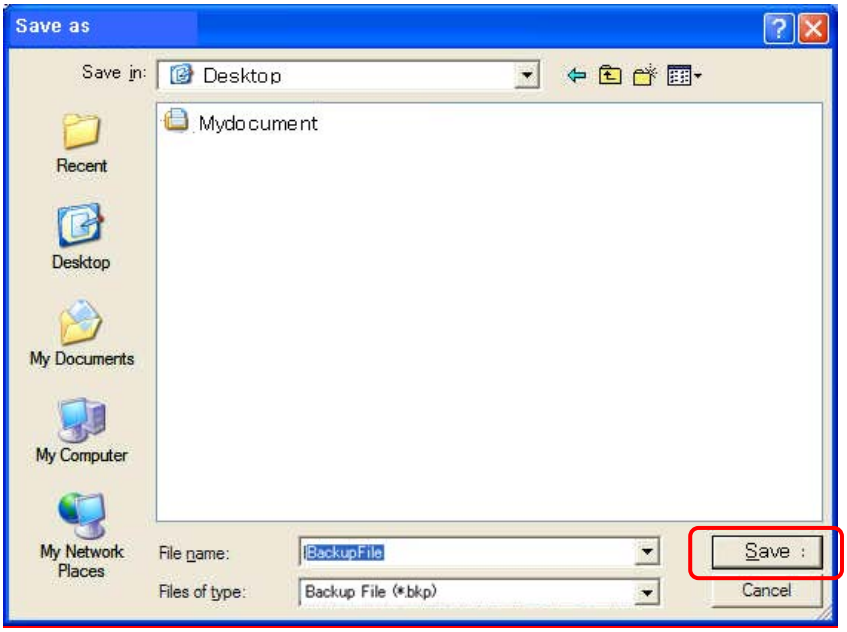
No.	Description	Function
1	Backup file name	The file name and Storage folder of the selected data file are displayed.
2	Reference button	Select the name and location of the backup file.
3	Return button	Return to the main menu.
4	Backup start button	Begin preparing a backup file of the connected controller.

(3)How to use backup function

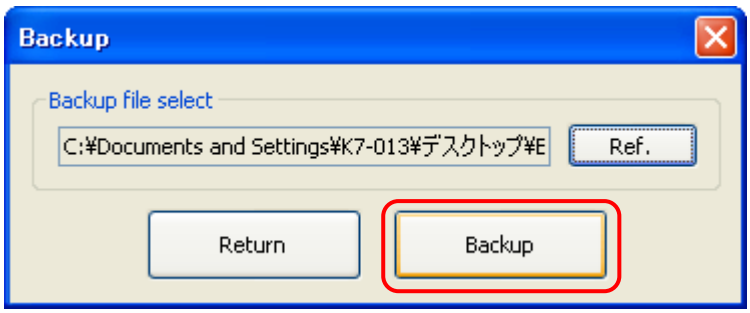
a) When clicking "Ref." button, "Save as" window is displayed.

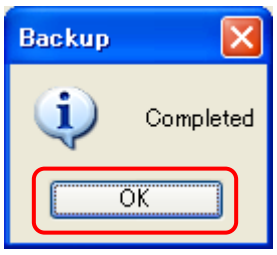


b) Select a location where the backup file is to be saved, input an arbitrary file name and click the "Save" button.



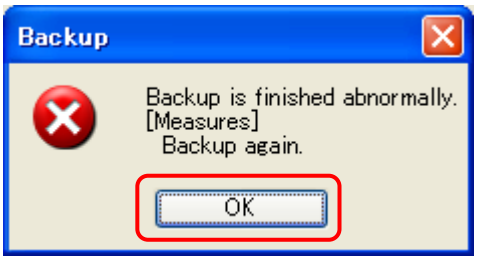
e) Click the "Backup" button. When the backup is complete, the backup completed window is displayed. In this case, click the "OK" button and complete the backup operation.





When backup completed

If an error occurs during backup, an "Error" window will be displayed as shown below. In this case, click the "OK" button and take countermeasure. After that, attempt backup operation again.

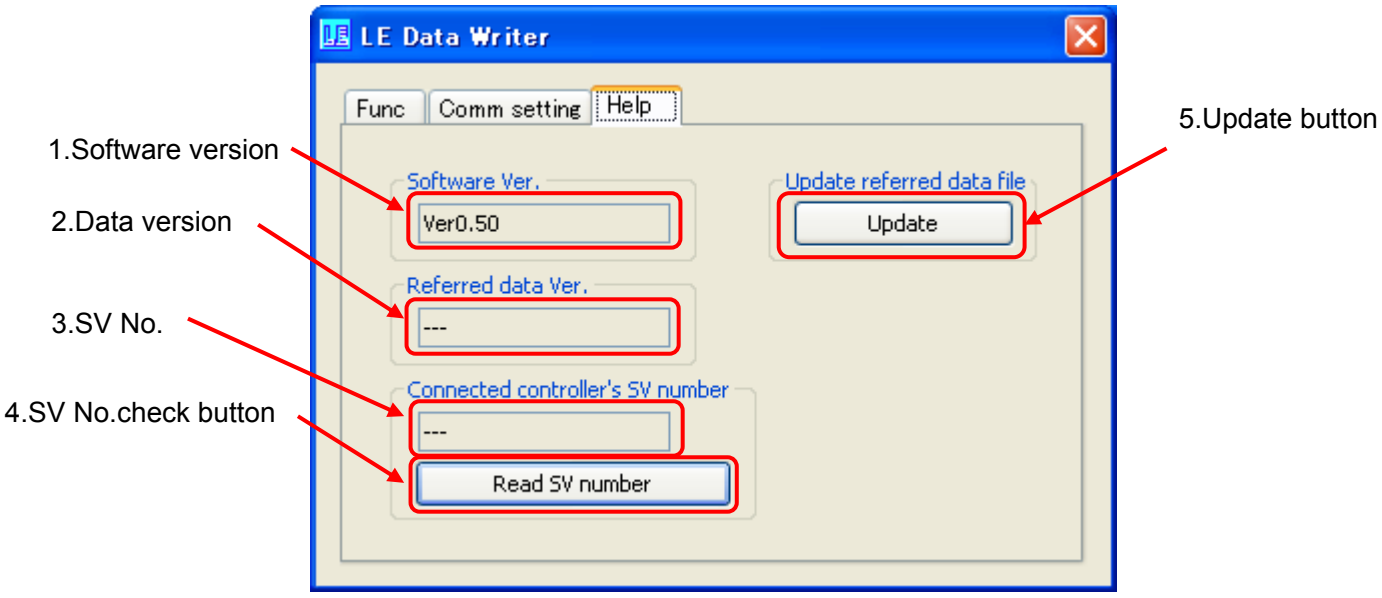


When an error occurs

4.4.4 Help

On the help window, software version, version of the referenced data file and SV No. of the connected controller can be confirmed. At the same time, the referenced data file can be updated.

(1)Help screen



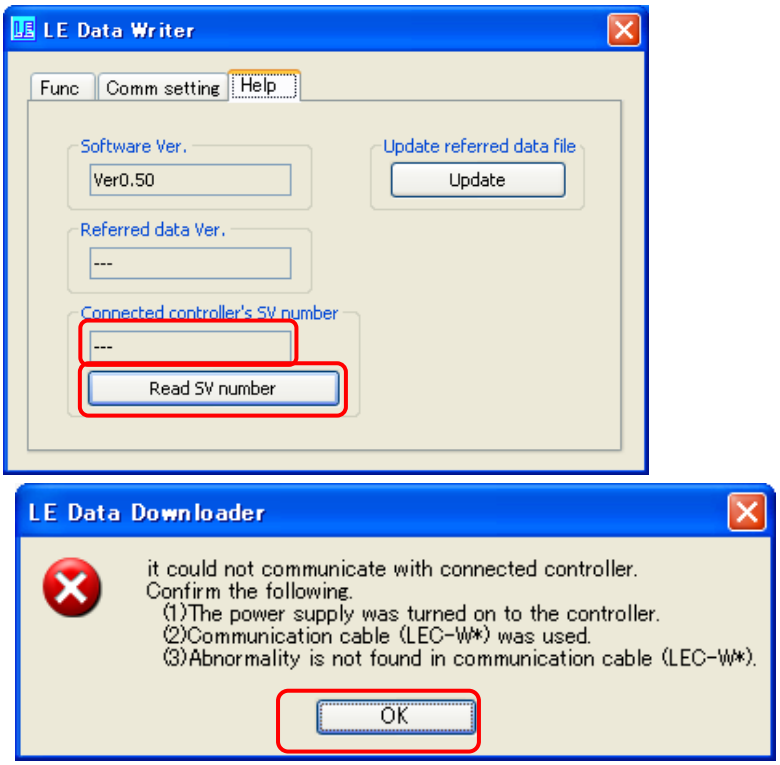
(2)Names and functions

No.	Description	Function
1	Software version	Display version of this data writing software.
2	Data version	Display the data file version which is referenced right before by parameter writing function.
3	SV No.	The SV No. of the connected controller is displayed after executing "Controller version check".
4	SV No. check button	The SV No. of the connected controller can be checked by clicking this button. The SV No. can only checked when communication is available.
5	Update button	Update the data file which is referenced during the data writing. [The update should be performed in accordance with the procedure which is supplied with the data file.]

(3)How to use SV No. check “Read SV Number” buttton

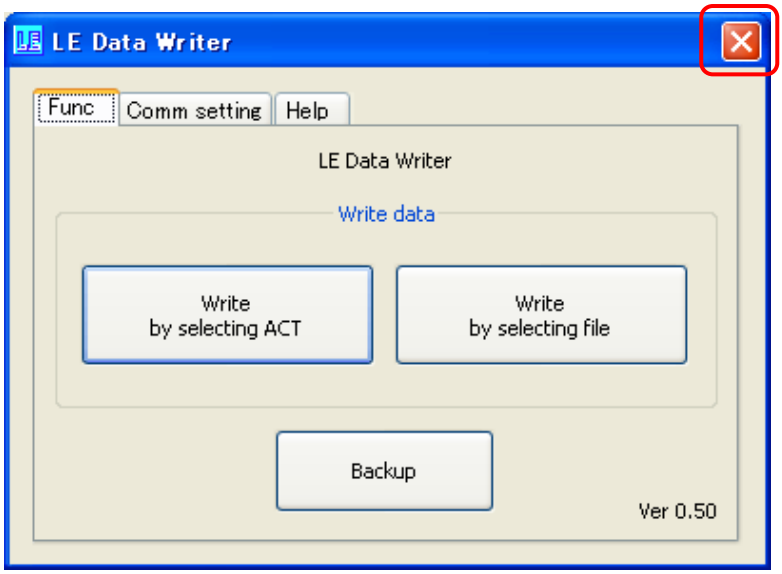
The SV No. of the connected controller is read by clicking the "Read SV Number" button, and is displayed as "SV No.".

If an error occurs, the “LE Data Downloader”error window will be displayed as shown below. In this case, click the "OK" button and take countermeasure. After that, check the SV No. again.



4.5 Software completion

When the "X" button on the main menu window is clicked, this software is finished.



5. Alarm

If an error occurs while the the software is used, an alarm window appears. The alarm name and countermeasures are displayed.

(1)List of alarms

Alarm name	Countermeasure
Communication error	Communication with the controller cannot be established. Please check the following points. (1)The power supply of motor controller (LEC) has been turned on. (2)LEC-W2 communication cable (LEC-W2-C) is used. (3)There was not a removal of or broken wire on the LEC-W2 communication cable (LEC-W2-C). (4)The USB driver of the communication cable has been correctly installed. (5)The communication setting of this software is correct.
Abnormal response	An error occurs in the communication data. Attempt to write data again.
This software is not compatible with the controller.	The software version (SV No.) of the controller is not compatible with this software. Please verify that the controller has SV2.10 software version or higher. Refer to <How to check "SV No." and "IO type"> in "4.4.1 Writing by selecting ACT (actuator)" for confirmation of the SV No.
No reference data file	With the selected actuator product No., there is an error with the parameter or step data of the software version of the connected controller. Install LEC-BCW again.
Error during verification	There is a difference between the sent data and the data registered in the controller. Prepare another controller and write data again.

(2)List of warnings

Alarm name	Countermeasure
This is not a blank controller. Backup function can only be used. (Do you want to execute backup?)	The connected controller is not a blank controller.。 When writing the data, prepare a blank controller.
The controller and the SV No. of the model data are not identical. Do you really want to write the data?	The model data and SV No. of the controller are not identical. The actuator is not compatible depending on the SV No. of the controller. When writing the nonidentical model data, please contact your SMC representative.

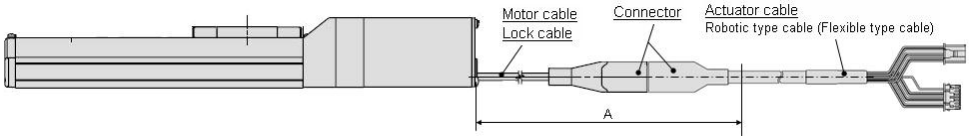
7. Wiring of cables/Common precautions

⚠ Warning

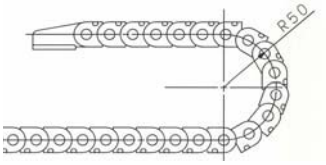
1. **Adjusting, mounting or wiring change should never be done before shutting off the power supply to the product.**
   Electrical shock, malfunction and damaged can result.
2. **Never disassemble the cable. Use only specified cables.**
3. **Never connect or disconnect the cable or connector with power on.**

⚠ Caution

1. **Wire the connector securely. Do not apply any voltage to the terminals other than those specified in the product manual.**
2. **Wire the connector securely.**
   Check for correct connector wiring and polarity.
3. **Take appropriate measures against noise.**
   Noise in a signal line may cause malfunction. As a countermeasure, separate high voltage and low voltage cables, and shorten wiring lengths, etc.
4. **Do not route wires and cables together with power or high voltage cables.**
   The product can malfunction due to interference of noise and surge voltage from power and high voltage cables to the signal line. Route the wires of the product separately from power or high voltage cables.
5. **Take care that actuator movement does not catch cables.**
6. **Operate with cables secured. Avoid bending cables at sharp angles where they enter the product.**
7. **Avoid twisting, folding, rotating or applying an external force to the cable.**
   Risk of electric shock, wire break, contact failure and lost of control for theproduct can happen.
8. **Fix the cable protruding from the product in place before using.**
   The motor and lock cables are not robotic type cables and can be damaged when moved. Therefore fix the cables and the connectors (part “A” in figure below) when setting up.



9. **Select “Robotic type cables” in case of bending the actuator-cable repeatedly and do not put cables into a flexible moving tube with a radius smaller than the specified value. (Min. 50mm).**
   Risk of electric shock, wire break, contact failure and loss of control for the product can happen if “Standard cables” are used in case of inflecting the cables repeatedly.



10. **Confirm proper wiring of the product.**
    Poor insulation (interference with other circuits, poor insulation between terminals and etc.) can apply excessive voltage or current to the product causing damage.
11. **The Speed / pushing force may vary, depending on the cable length, load and mounting conditions etc..**
    If the cable length exceeds 5m, the speed / pushing force will be reduced 10% per 5m as the maximum. (If cable length is 15m: 20% reduction as the maximum.)

[Transportation]

⚠ Caution

1. **Do not carry or swing the product by the motor or the cable.**

8. Electric actuators/Common precautions

8.1 Design and selection

⚠ Warning

1. **Be sure to read the Operation Manual (this manual and the one for the controller: LEC series).**
   Handling or usage/operation other than that specified in the Operation Manual may lead to breakage and operation failure of the product.
   Any damage attributed to the use beyond the specifications is not guaranteed.
2. **There is a possibility of dangerous sudden action by the product if sliding parts of machinery are twisted due to external forces, etc.**
   In such cases, human injury may occur, such as by catching hands or feet in the machinery, or damage to the machinery itself may occur. Design the machinery should be designed to avoid such dangers.
3. **A protective cover is recommended to minimize the risk of personal injury.**
   If a driven object and moving parts of the product are in close proximity, personal injury may occur. Design the system to avoid contact with the human body.
4. **Securely tighten all stationary parts and connected parts so that they will not become loose.**
   When the product operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.
5. **Consider a possible loss of power source.**
   Take measures to prevent injury and equipment damage even in the case of a power source failure.
6. **Consider behavior of emergency stop of whole system.**
   Design the system so that human injury and/or damage to machinery and equipment will not be caused, when it is stopped by a safety device for abnormal conditions such as a power outage or a manual emergency stop of whole system.
7. **Consider the action when operation is restarted after an emergency stop or abnormal stop of whole system.**
   Design the system so that human injury or equipment damage will not occur upon restart of operation of whole system.
8. **Disassembly and modification prohibited**
   Do not modify or reconstruct (including additional machining) the product. An injury or failure can result.
9. **Do not use stop signal,"EMG" of the controller and stop switch on the teaching box as the emergency stop of system.**
   The stop signal, "EMG" of controller and the stop switch on the teaching box are for decelerating and stopping the actuator. Design the system with an emergency stop circuit which is applied relevant safety standard separately.
10. **When using it for vertical application, it is necessary to build in a safety device.**
    The table may fall due to the weight of work. The safety device should not interfere with normal operation of the machine.

⚠ Caution

1. **Operate within the limits of the maximum usable stoke.**
   The product will be damaged if it is used with the stroke which is over the maximum stroke. Refer to the specifications of the product.
2. **When the product repeatedly cycles with partial strokes, operate it at a full stroke at least once a day or every 1000 strokes.**
   Otherwise, lubrication can run out.

3. **Do not use the product in applications where excessive external force or impact force is applied to it.**
   The product can be damaged. Each component that includes motor is made with accurate tolerance. So even slightly deformed or miss-alignment of component may lead operation failure of the product.
4. **Rerutning to origin cannot be done during the operation.**
   It cannot be done during positioning operation, pushing operation and pushing.
5. **Refer to a common auto switch /matter (Best Pneumatics No 2) when an auto switch is built in and used.**
6. **When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.**

8.2 Mounting

⚠ **Warning**

1. **Install and operate the product only after reading the Operation Manual carefully and under standing its contents. Keep the manual in a safe place future reference.**
2. **Observe the tightening torque for screws.**
   Tighten the screws to the recommended torque for mounting the product.
3. **Do not make any alterations to this product.**
   Alterations made to this product may lead to a loss of durability and damage to the product, which can lead to human injury and damage to other equipment and machinery.
4. **When using external guide, the guide axis should be parallel to the actuator axis.**
   There will be damage/excessive wear on the lead screw if the external guide is not parallel.
5. **When an external guide is used, connect the moving parts of the product and the load in such a way that there is no interference at any point within the stroke.**
   Do not scratch or dent the sliding parts of the slideways or finger assemblies etc., by striking or grasping them with other objects. Components are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation.
6. **Prevent the seizure of rotating parts.**
   Prevent the seizure of rotating parts (pins, etc.) by applying grease.
7. **Do not use the product until you verify that the equipment can operate properly.**
   After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted properly.
8. **Cantilever**
   When the actuator is operated at high speed while it is fixed at one end and free at the other end (flange type, foot type, double clevis type, direct mount type), a bending moment may act on the actuator due to vibration generated at the stroke end, which can damage the actuator. In such a case, install a support bracket to suppress the vibration of the actuator body or reduce the speed so that the actuator does not vibrate. Use a support bracket also when moving the actuator body or when a long stroke actuator is mounted horizontally and fixed at one end.
9. **When mounting the actuator or attaching to the work piece, do not apply strong impact or large moment.**
   If an external force over the allowable moment is applied, it may cause looseness in the guide unit, an increase in sliding resistance or other problems.
10. **Maintenance space**
    Allow sufficient space for maintenance and inspection.

8.3 Handling

⚠ Warning

1. **Do not touch the motor while in operation.**
   The surface temperature of the motor can increase to approx. 90oC to 100oC due to operating conditions. This temperature increase may also be caused by energizing alone. As it may cause burns, do not touch the motor when in operation.
2. **If abnormal heating, smoking or fire, etc., occurs in the product, immediately shut off the power supply.**
3. **Immediately stop operation if abnormal operation noise or vibration occurs.**
   In case abnormal operation noise or vibration occurs, the product may have been improperly mounted. Unless operation is stopped for inspection, machinery can be seriously damaged.
4. **Never touch the rotating part of the motor while in operation.**
5. **When installing, adjusting, inspecting or performing maintenance on the product, controller and related equipment, be sure to shut off the power supply to each of them. Then, lock it so that no one other than the person working can turn the power on, or implement measures such as a safety plug.**
6. **In the case of the actuator that has a servo motor (24VDC), the "motor phase detection step" is done by inputting the servo on signal just after the controller power is turned on. The "motor phase detection step" moves the table/rod for the distance of the one screw-lead as the maximum. (The motor rotates in the reverse direction if the table hits an obstacle such as the end stop damper.) Take the "motor phase detection step" into consideration for the installation and operation of this actuator.**

⚠ Caution

1. **Keep the controller and product combined as delivered for use.**
   The product is set in parameters for shipment. If it is combined with a different parameter, failure can result.
2. **Check the product for the following points before operation.**
   a) Damage to electric driving line and signal lines
   b) Looseness of the connector to each power line and signal line
   c) Looseness of the actuator/cylinder and controller/driver mounting
   d) Abnormal operation
   e) Emergency stop of the total system
3. **When more than one person is performing work, decide on the procedures, signals, measures and resolution for abnormal conditions before beginning the work. Also, designate a person to supervise work other than those performing work.**
4. **The product can operate at a different speed from the set speed depending on load and resistance.**
   When selecting a product, check the catalog for the instructions regarding selection and specifications.
5. **Do not apply a load, impact or resistance in addition to a transferred load during return to origin.**
   The product is made return to origin by pushing force, which causes the displacement of origin.
6. **Do not remove the name plate.**
7. **Operation test should be done by low speed. Start operation by predefined speed after confirming there is no trouble.**

[Earth]

⚠ Warning

1. **Please give the earth to the actuator.**
2. **The earth should be exclusive use. (Less than 100Ω)**
3. **The earth cable length should be as short as possible.**

[Unpackaging]

⚠ **Caution**

1. Check the received product is as ordered.

If a different product is installed from the one ordered, injury or damage can result.

8.4 Operating environment

⚠ **Warning**

1. Avoid use in the following environments.

a. Locations where a large amount of dusts and cutting chips are airborne.

b. Locations where the ambient temperature is outside the range of the temperature specification (refer to specifications).

c. Locations where the ambient humidity is outside the range of the humidity specification (refer to specifications).

d. Locations where corrosive gas, flammable gas, sea water, water and steam are present.

e. Locations where strong magnetic or electric fields are generated.

f. Locations where direct vibration or impact is applied to the product.

g. Areas that are dusty, or are exposed to splashes of water and oil drops.

h. Areas exposed to direct sunlight (ultraviolet ray).

i. Environment at an altitude of 1000 meters or higher

Heat radiation and withstand voltage will decrease. Contact SMC for details.

2. Do not use in an environment where the product is directly exposed to liquid, such as cutting oils.

If cutting oils, coolant or oil mist contaminates the product, failure or increased sliding resistance can result.

3. Install a protective cover when the product is used in an environment directly exposed to foreign matters such as dust, cutting chips and spatter.

Play or increased sliding resistance can result.

4. Shade the sunlight in the place where the product is applied with direct sunshine.

5. Shield the valve from radiated heat generated by nearby heat sources.

When there is a heat source surrounding the product, the radiated heat from the heat source can increase the temperature of the product beyond the operating temperature range. Protect it with a cover, etc.

6. Grease oil can be decreased due to external environment and operating conditions, and it deteriorates lubrication performance to shorten the life of the product.

[Storage]

⚠ **Warning**

1. Do not store the product in a place in direct contact with rain or water drops or is exposed to harmful gas or liquid.

2. Store in an area that is shaded from direct sunlight and has a temperature and humidity within the specified range (-10oC to 60oC and 35 to 90% no freezing or icing).

3. Do not apply vibration and impact to the product during storage.

8.5 Maintenance

⚠ Warning

1. **Do not disassemble or repair the product.**
   Fire or electric shock can result.
2. **Before modifying or checking the wiring, the voltage should be checked with a tester 5 minutes after the power supply is turned off.**
   Electrical shock can result.

⚠ Caution

1. **Maintenance should be performed according to the procedure indicated in the Operating Manual.**
   Improper handling can cause injury, damage or malfunction of equipment and machinery.
2. **Removal of product.**
   When equipment is serviced, first confirm that measures are in place to prevent dropping of work pieces and run-away of equipment, etc, and then cut the power supply to the system. When machinery is restarted, check that operation is normal with actuators in the proper positions.

[Lubrication]

⚠ Caution

1. **The product has been lubricated for life at manufacturer, and does not require lubrication in service.**
   When lubrication is applied, a special grease must be used.
   Please read the maintenance manual of each actuator.

8.6 Precautions for actuator with lock

⚠ Warning

1. **Do not use the lock as a safety lock or a control that requires a locking force.**
   The lock used for the product with a lock is designed to prevent dropping of work piece.
2. **For vertical mounting, use the product with a lock.**
   If the product is not equipped with a lock, the product will move and drop the work piece when the power is removed.
3. **"Measures against drops" means preventing a work piece from dropping due to its weight when the product operation is stopped and the power supply is turned off.**
4. **Do not apply an impact load or strong vibration while the lock is activated.**
   If an external impact load or strong vibration is applied to the product, the lock will lose it's pushing force and damage to the sliding part of the lock or shortening of lifespan can result. The same situations will happen when the lock slips due to a force over the thurst of the product, as this accelerates the wear to the lock.
5. **Do not apply liquid or oil and grease to the lock or its surrounding.**
   When liquid or oil and grease is applied to the sliding part of the lock, its pushing force will reduce significantly.
6. **Take measures against drops and check that safety is assured before mounting, adjustment and inspection of the product.**
   If the lock is released with the product mounted vertically, a work piece can drop due to its weight.
7. **When the actuator is operated manually (when SVRE output signal is off), supply 24DCV to the [BK RLS] terminal of the power supply connector.**
   If the product is operated without releasing the lock, wearing of the lock sliding surface will be accelerated, causing reduction in the holding force and the life of the locking mechanism.
8. **Do not supply 24VDC power supply constantly to the [BK RLS(Lock release)] terminal.**
   Stop supplying 24VDC power supply to the [BK RLS(Lock release) terminal during normal operation. If power is supplied to the [BK RLS] terminal continuously, the lock will be released, and workpieces may be dropped at stop (EMG).

/Refer to the operation manual of LEC (controller) for details of wiring.

9. Precautions:Controller and its peripheral devices Electric actuators/Common precautions

9.1 Design and selection

⚠Warning

1. **Be sure to apply the specified voltage.**
   Otherwise, a malfunction and breakage of the controller may be caused.
   If the applied voltage is lower than the specified, it is possible that the load cannot be moved due to an internal voltage drop. Please check the operating voltage before use.
2. **Do not operate beyond the specifications.**
   It may cause a fire, malfunction or actuator damage can result. Please check the specifications before use.
3. **Install an emergency stop circuit.**
   Please install an emergency stop outside of the enclosure so that it can stop the system operation immediately and intercept the power supply.
4. **In order to prevent danger and damage due to the breakdown and the malfunction of this product, which may occur at a certain probability, a backup system should be established previously by giving a multiple-layered structure or a fail-safe design to the equipment, etc.**
5. **If a fire or danger against the personnel is expected due to an abnormal heat generation, ignition, smoking of the product, etc., cut off the power supply for this product and the system immediately.**

9.2 Handling

⚠Warning

1. **The inside of the controller and its connector should not be touched.**
   It may cause an electric shock or damage to the controller.
2. **Do not perform the operation or setting of this equipment with wet hands.**
   It may cause an electric shock.
3. **Product with damage or the one lacking of any components should not be used.**
   It may cause an electric shock, fire, or injury.
4. **Use only the specified combination between the controller and electric actuator.**
   It may cause damage to the controller or the actuator.
5. **Be careful not to be caught or hit by the workpiece while the actuator is moving.**
   It may cause an injury.
6. **Do not connect the power supply or power on the product before confirming the area where the work moves is safe.**
   The movement of the work may cause accident.
7. **Do not touch the product when it is energized and for some time after power has been disconnected, as it is very hot.**
   It may lead to a burn due to the high temperature.
8. **Check the voltage using a tester for more than 5 minute after power-off in case of installation, wiring and maintenance.**
   There is a possibility of getting electric shock, fire and injury.

9. **Do not use in an area where dust, powder dust, water or oil is in the air.**
   It will cause failure or malfunction.
10. **Do not use in an area where a magnetic field is generated.**
    It will cause failure or malfunction.
11. **Do not install in the environment of flammable gas, corrosive gas and explosive gas.**
    It could lead to fire, explosion and corrosion.
12. **Radiant heat from strong heat sources such as a furnace, direct sunlight, etc. should not be applied to the product.**
    It will cause failure of the controller or its peripheral devices.
13. **Do not use the product in an environment subject to a temperature cycle.**
    It will cause failure of the controller or its peripheral devices.
14. **Do not use in a place where surges are generated.**
    When there are units that generate a large amount of surge around the product (e.g., solenoid type lifters, high frequency induction furnaces, motors, etc.), this may cause deterioration or damage to the product's' internal circuit. Avoid sources of surge generation and crossed lines.
15. **Do not install this product in an environment under the effect of vibrations and impacts.**
    It will cause failure or malfunction.
16. **If this product is used with a relay or solenoid valve, they should be the surge absorbing element built-in type.**
17. **After the screen has switched completely, operate the teaching-box according to the instruction on the screen.**
    It will cause malfunction or accident.

9.3 Installation

⚠Warning

1. **The controller and its peripheral devices should be installed on a fire-proof material.**
   A direct installation on or near a flammable material may cause fire.
2. **Do not install this product in a place subject to vibrations and impacts.**
   It may cause an electric shock, fire, or injury.
3. **Take measure so that the operating temperature of this controller and its peripheral devices are within the range of the specifications. Also, this controller should be installed with 50mm or larger spaces between each side of it and the other structures or components.**
   It may cause a malfunction of the controller and its peripheral devices and a fire.
4. **Do not mount this controller and its peripheral devices together with a large-sized electromagnetic contactor or no-fuse breaker, which generates vibration, on the same panel. Mount them on different panels, or keep the controller and its peripheral devices away from such a vibration source.**
5. **This controller and its peripheral devices should be installed on a flat surface.**
   If the mounting surface is distorted or not flat, an unacceptable force may be added to the housing, etc. to cause troubles.

9.4 Wiring of cables/Common precautions

⚠Warning

1. **Do not apply any excessive force to cables by repeated bending, tensioning or placing a heavy object on the cables.**
   It may cause an electric shock, fire, or breaking of wire.
2. **Connect wires and cables correctly.**
   Incorrect wiring could break he controller or its peripheral devices depending on the seriousness.
3. **Do not connect wires while the power is supplied.**
   It can break the controller or its peripheral devices could be damaged to cause a malfunction.
4. **Do not carry this product by holding its cables.**
   It may cause an injury or damage to the product.
5. **Do not connect power cable or high-voltage cable in the same wiring route as the unit.**
   Te wires to the controller or its peripheral devices can be interrupted with noise or induced surge voltage from power lines or high-voltage lines and malfunction could be caused.
   Separate the wiring of the controller and its peripheral device from that of power line and high voltage line.
6. **Verify the insulation of wiring.**
   Insulation failure (interference with other circuit, poor insulation between terminals and etc.) could introduce excessive voltage or current to the controller or its peripheral devices and damage them.

9.5 Power supply

⚠Caution

1. **Use a power supply that has low noise between lines and between power and ground.**
   In cases where noise is high, an isolation transformer should be used.
2. **The power supplys should be separated between the controller power and the I/O signal power and both of them should be the instantaneous output type.**
   If the power supplys are not the instantaneous output type, a voltage drop may be caused during the acceleration of the actuator.
3. **To prevent surges from lightning, an appropriate measure should be taken. Ground the surge absorber for lightning separately from the grounding of the controller and its peripheral devices.**

9.6 Grounding

⚠Warning

1. **Be sure to carry out grounding in order to ensure the noise tolerance of the controller.**
   It may cause an electric shock or fire.
2. **Dedicated grounding should be used.**
   Grounding should be to a D-class ground (Ground resistance of 100Ωor less.)

3. **Grounding should be performed near the unit as much as possible to shorten the grounding distance.**
4. **In the unlikely event that malfunction is caused by the ground, it may be disconnected.**

9.7 Maintenace

⚠Warning

1. **Perform a maintenance check periodically**
   Confirm wiring and screws are not loose.
   Loose screws or wires may cause unintentional malfunction.
2. **Conduct an appropriate functional inspection after completing the maintenance.**
   In case of any abnormities (in the case that the actuator does no move, etc.), stop the operation of the system. Otherwise, an unexpected malfunction may occur and it will become impossible to secure the safety.
3. **Do not disassemble, modify or repair this controller and the peripheral equipment.**
4. **Do not put anything conductive or flammable inside of this controller.**
   It may cause a fire and explosion.
5. **Do not conduct an insulation resistance test and withstand voltage test on this product.**
6. **Ensure sufficient space for maintenance activities. Provide space required for maintenance.**
   Design the system that allows required space for maintenance.

Revision history

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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