Document No.DOC1136247-1

Operation Manual

Product name

Teaching Box for Electric Actuator

Model / Series / Part No.

JX-T1 Series

Connectable actuator/controller
EQ series
JXC∗1/JXC∗H/JXC∗F Series

SMC Corporation

Table of Contents

JX-T1 Series/Teaching Box
1. Safety precautions

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 and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1:Robots
etc.

*2) Industrial Safety and Health Law, etc.

Danger	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
Warning	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
Caution	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate 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.
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. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

JX-T1 Series/Teaching Box Safety Precautions

⚠ Caution

SMC develops, designs, and manufactures products to be used for automatic control equipment, and provides them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not allowed.
Products SMC manufactures and sells cannot be used for the purpose of transactions or certification specified in the Measurement Act of each country.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

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 regulations 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 Overview

This Teaching box is a device used to connect to SMC electric actuators or controllers to input / change settings.

Compatible actuators/controllers:

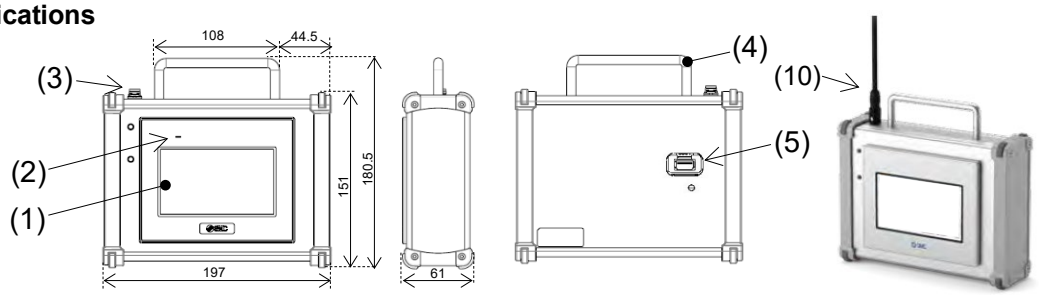
EQ series electric actuator (parallel I/O type)

JXC∗1/∗H/∗F series controller

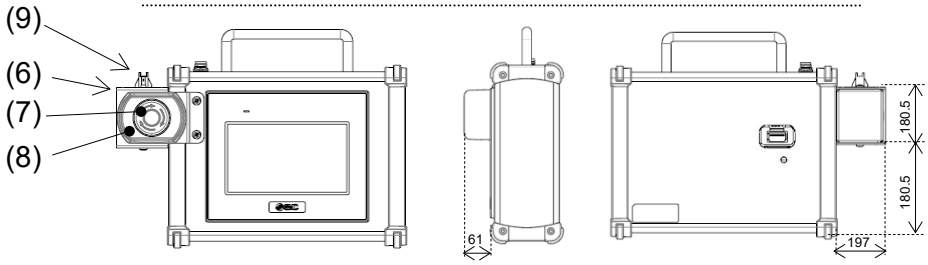
The setting range and contents vary depending on the specifications of the electric actuator or controller used. When making settings, refer to the instruction manual and technical data of the actuator or controller used. For the latest information on the instruction manuals, technical data, and the software for this Teaching box, refer to the SMC website.

2.1 Product Specifications

(1) Part Names / Outdimension



Without stop switch unit



With stop switch unit

No.	Name	Function
1	Display	Touch panel input type screen display (Automatically turns off when there is no operation for 10 minutes, and turns back on when the touch panel is pressed)
2	LED's	Green: Teaching box energized, software running Orange (Flashing): Loading software of Teaching box Red: Energizing (internal software not running) OFF: Teaching box not energized
3	Communication Connector	Connector to connect the dedicated Teaching box communication cable
4	Handle	Handle for carrying the Teaching box
5	USB interface	Interface to connect a USB memory
6	Stop switch unit (Option)	Unit to connect when a stop switch is required. Available only when connected to JXC∗1/∗H/∗F controller (7) Stop switch: When the switch is pressed, the switch locks, the actuator decelerates to a stop, and the servo turns off. The switch is unlocked by turning it to the right. (8) Stop switch guard: Guard to prevent malfunction of the stop switch. (9) Stop switch unit connector: Connector to connect the stop switch unit and communication cable. ∗When installing the stop switch unit, be sure to connect the stop switch unit, communication cable (JX-T1C-CG) and Teaching box before use.
10	Communication cable (Option)	Length 3 m The following three types of cables are available. For connection to EQ series (JX-T1C-E) For connection to JXC series without stop switch unit (JX-T1C-C) For connection to the JXC series with stop switch unit (JX-T1C-CG)

(2) Hardware Specifications

Item	Description
Applicable Actuators and Controllers	EQ series parallel I/O type electric actuator (EQ∗-B5, EQ∗-B6) JXC∗1/JXC∗H/JXC∗F series controller
Screen specifications	TFT colour LCD / 4.3 inch / 488x272 / 16 million colours Analog resistive touch panel
Power consumption	6.9 W or less
Languages supported	Japanese, English
Data storage	USB flash memory (FAT32)
Communication cable length	3 m (Communication cable must be purchased separately)
Operating temperature range	0～ 45℃
Operating humidity range	90% RH or less (no condensation)
Storage temperature range	-10 to 60°C (no condensation or freezing)
Storage humidity range	10 to 90% RH or less (no condensation)
Protective structure	Equivalent to IP20 (IEC 60529)
Standards	CE / UKCA
Weight	Main unit: 890 g Main unit with stop switch: 1060 g
Accessories	None Communication cable JX-T1C-∗ for connecting to the controller must be purchased separately. ∗Please purchase the JX-T1S or JX-T1U stop switch unit separately.

(3) Common indication

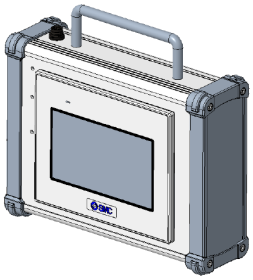
Item	Description
Alarm	The outer frame of the screen flashes red. ∗Note that the flashing red frame during an alarm is not displayed on the Main Menu screen, Maintenance screen, Common settings screen, and Device ID settings screen.
Stop switch activated	The outer frame of the screen turns red. ∗Note that the red frame during an alarm is not displayed on the Main Menu screen, Maintenance screen, Common settings screen, and Device ID settings screen.
Warning occurred	The outer frame of the screen flashes yellow. ∗Note that the red frame during an alarm is not displayed on the Main Menu screen, Maintenance screen, Common settings screen, and Device ID settings screen.

⚠ Caution

When using the Teaching box, be careful not to drop it.
When using the Teaching box and stop switch, be careful not to damage the edge surfaces.
Be careful not to touch the internal parts of the Teaching box. There is a risk of electric shock.
Do not use the Teaching box in a place where dust, powder, water, chemicals, or oil may be splashed.

2.2 Model Indication

Teaching box main unit **JX-T1**

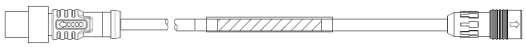


Communication cable **JX-T1C-E**

Cable type

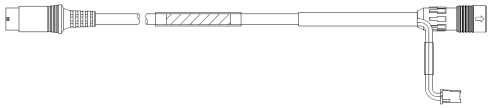
Symbol	Description
E	For EQ series connection
C	For JXC∗1/H/F connection (Stop switch not supported)
CG	For JXC∗1/H/F connection (Stop switch supported)

Communication cable for EQ connection: JX-T1C-E



Communication cable for JXC connection (Stop switch not supported): JX-T1C-C

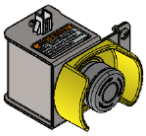
Communication cable for JXC connection (Stop switch supported): JX-T1C-CG



Stop switch unit **JX-T1S**

Switch color

Symbol	Description
S	Gray
U	Red



*Mounting screws for the Stop switch unit are included.
*This stop switch does not have an emergency stop function. Use it only as a stop function.

⚠Warning

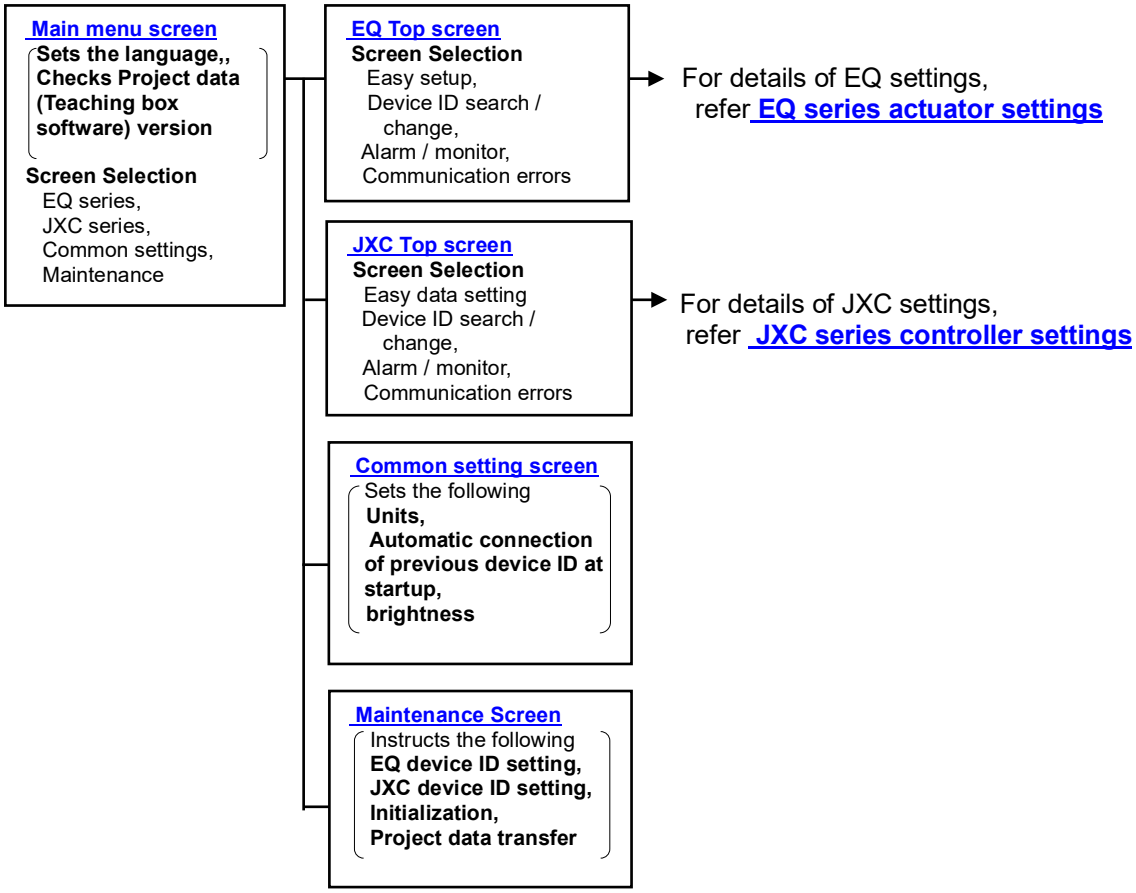
When installing the stop switch unit to the Teaching box, be sure to use the communication cable for JXC connection (Stop switch unit supported): JX-T1C-CG and connect the stop switch unit and communication cable before using the Teaching box. If the stop switch unit and communication cable are not connected, the stop switch cannot be operated.

2.3 Teaching Box Functions

(1) List of Functions

Function name	Function Description
EQ series setting	Easy startup setting Set the operation data Driving conditions setting Set conditions for operation data Parameter Setting Set various parameters Jog / Inching Instructs Jog, Inching, and return to origin. Test operation Test operation by specifying the operation data. Status Monitor Displays current position, speed, thrust, target position, and I/O signal status. Forced output Forced output of signals on the status monitor screen. Alarm Displays and clears alarms in progress. Displays alarm history and alarm deletion history. File saving / loading Save the step data, parameters, test operation and alarm history to a file. Reads step data and parameters from a file ∗For details, see 3.2 EQ series Functions
JXC series settings	Step data setting Set step data. Parameter setting Set various parameters. Teaching Jog, Inching, and Return to origin instructions. Test operation Test operation by specifying up to 5 step data. Status Monitor Displays current position, speed, thrust, target position, and I/O signal status. Forced Output Forced output signal ON on the status monitor screen. Alarm Displays and clears alarms in progress . Displays alarm history and alarm deletion history. File saving / loading Save the step data, parameters, Test operation data and alarm history to a file. Reads step data and parameters from a file ∗For details, see 4. 2 JXC series functions
Common settings	Unit setting Automatic connection setting of previous device ID at startup Omit device ID setting when connecting a Teaching box. Brightness setting ∗For details, see 5.2 Common Settings screen
Maintenance	EQ device ID setting JXC device ID setting Initialization Reset language, units, and previous ID auto-connection settings to factory defaults. Project data transfer Used to update the Teaching box software. For details, see 5. 3Maintenance screen

(2) Teaching box screen transition diagram

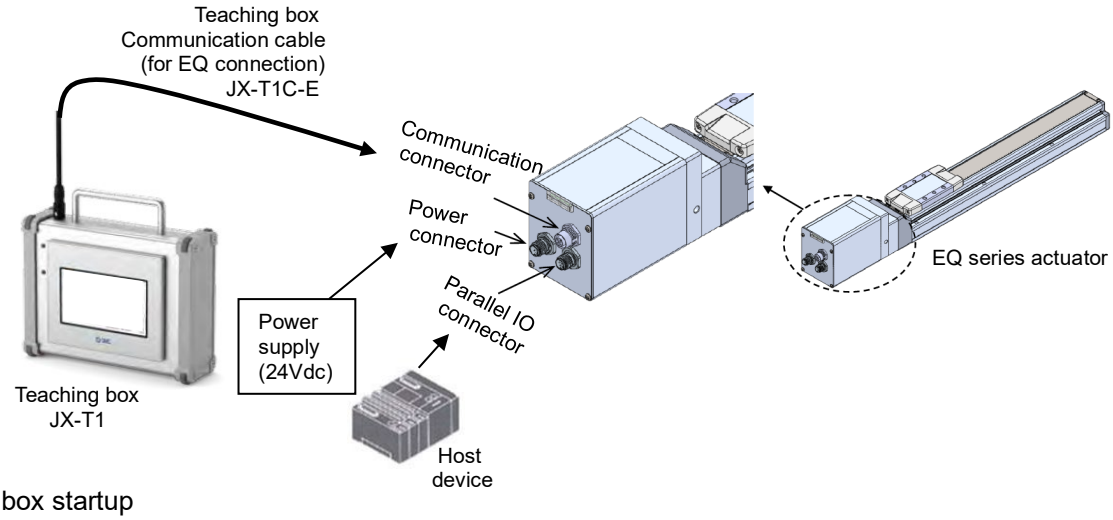


3. EQ series Actuator settings

3.1 Connection

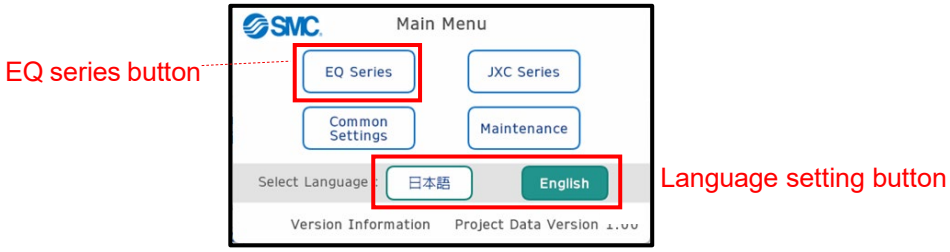
(1) Teaching box connection

Connect the 24 VDC power supply and host device to the EQ series actuator.
(Refer to the EQ series actuator instruction manual for details on how to connect the 24 VDC power supply and host device).
Connect the Teaching box JX-T1 to the Communication connector on the EQ series actuator using the Teaching box communication cable (for EQ connection) JX-T1C-E.
Refer to the EQ series actuator instruction manual, to check that there are no problems with the connection and wiring, and then turn on the power.



(2) Teaching box startup

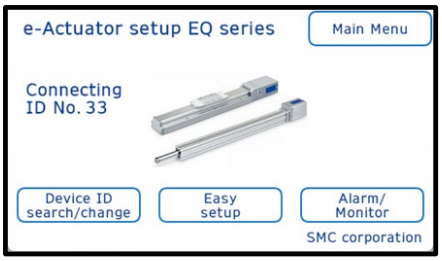
If the connection with the EQ series actuator is established correctly, the main menu screen will be displayed (shown below).
To change the screen language, press the required language using the screen language setting buttons. (Each screen is displayed in the language of the language setting button, which has a green background).
In this section.
Press the EQ Series button for the EQ Series actuator settings.



[Main Menu screen]

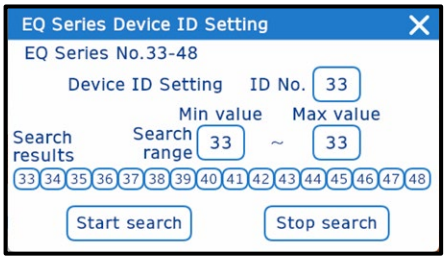
(3) Communication Confirmation

Press the EQ series button on the Main Menu screen.
When communication is established between the Teaching box and the EQ series actuator, the EQ top screen will be displayed (shown below).
Press each button to move to the required function screen.
For details on each function screen, refer to 3.2 EQ Series .Functions



[EQ top screen]

∗If communication cannot be established, check that the device ID has not been changed to anything other than 33 or that there is nothing wrong with the communication cable, then press the Start Search button, without changing the default setting for the device ID No. (33) on the EQ series device ID setting screen (shown below). To move to the EQ series device ID setting screen, press the Maintenance button on the Main menu screen to move the maintenance screen first, then press the EQ series device ID setting button on the Maintenance screen.



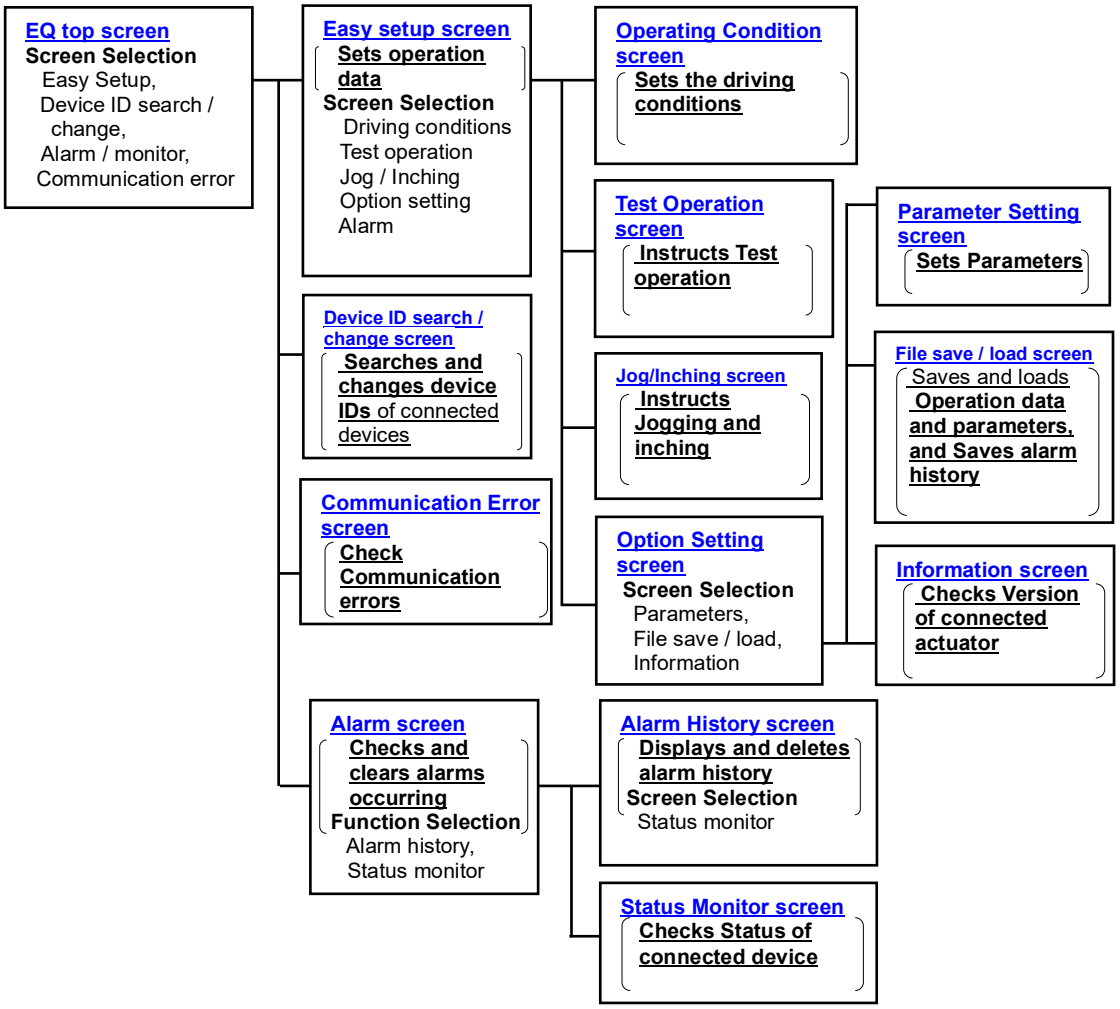
[EQ series Device ID setting screen]

3.2 EQ Series Functions

(1) List of EQ series functions

Function	Description
Easy setting	After setting conditions on the Driving Conditions screen, this function sets the operation data on the Easy Setup screen.
Parameter setting	Sets various parameters on the Parameter setting screen.
Jog/Inching	Instructs Jog and inching on the Jog/Inching screen.
Test Operation	Specifies operation data on the Test Operation screen and tests the connected actuator.
Status Monitor	Displays the current position, speed, thrust, and I/O signal status on the Status monitor screen.
Forced Output	Forces ON output signals on the status monitor screen.
Alarm	Displays and clears alarms currently occurring on the Alarm screen. Also, displays alarm history and alarm history deletion on the alarm history screen.
File Save/Load	Saves and loads operation data, parameters, to and from a file on the File Save/Load screen. Saves Alarm history to a file.

(2) EQ screen transition diagram



Caution

If communication with the connected EQ series actuator is not established, the Teaching box cannot be used.

Press the Search/Change Device ID button on the Device ID search / change screen to reconnect the communication.

If communication is not established, check that the device ID has not been changed to anything other than 33 and that there is nothing wrong with the communication cable.

3.3 EQ series screen

Each screen of the EQ series actuator setting is described below.

3.3.1 EQ Top screen

The EQ top screen allows the selection of screens for each function of the EQ series actuator (Easy setup screen and alarm / status monitor screen).

[EQ Top screen]

Screen Description

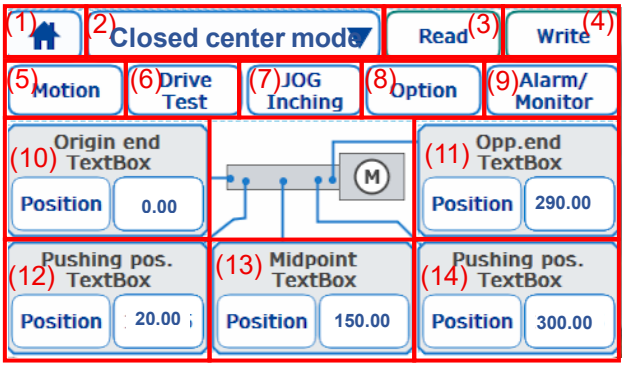
No.	Name	Function
1	Easy setup button	Moves to the Easy setup screen.
2	Alarm / Monitor button	Moves to the Alarm screen/Status monitor screen.
3	Communication Error button	Moves to the Communication error screen. ∗When communication cannot be established, the button turns to red background. Communication error
4	Device ID search / change button	Moves to the Device ID Search/Change screen.
5	Connected device ID screen	Displays the connected device ID No. When communication with the EQ series actuator is established, the device ID is displayed as 33.
6	Main Menu button	Moves to the main menu screen.
7	Connected EQ actuator	Displays the part number of the connected EQ actuator.

3.3.2 Easy setup screen

On the Easy setup screen, the operation mode, operating conditions, operating data, test operation, and options can be set.

This screen can also be used to move to the test operation screen, jog / inching screen, option setting (parameter setting) screen, and alarm screen.

(1) Easy setup screen



[Easy setup screen (Closed Center Mode)]

Screen description

No. Name	No. Name	Function
1	Home button	Moves to the EQ top screen.
2	Operation Mode selection	The following operation modes can be selected: Closed center mode / Single solenoid mode / Double solenoid mode
3	Read button	Reads operation data from the connected actuator
4	Write button	Writes operation data to the connected actuator
5	Motion button	Moves to the Driving condition setting screen (Driving condition screen for positioning operation, Operating condition screen for pushing operation)
6	Test operation button	Moves to the Test operation screen.
7	Jog / Inching button	Moves to the Jog/Inching screen.
8	Option setting button	Moves to the option setting screen.
9	Alarm button	Moves to the alarm screen. When an alarm occurs, the button background turns red.
10	Origin end button	Sets the origin end position. ∗The position where the actuator is operated by jog / inching, and the stopped position can be set with the Position button.
11	Opposite end button	Sets the opposite end position. ∗The position where the actuator is operated by jog / inching, and the stopped position can be set with the Position button.
12	Pushing position button (origin end side)	Sets the starting position of the pushing on the origin end side. ∗The position where the actuator is operated by jog / inching, and the stopped position can be set with the Position button.
13	Midpoint position setting	Set the midpoint position. ∗The position where the actuator is operated by jog / inching, and the stopped position can be set with the Position button.
14	Pushing position button (opposite end side)	Sets the starting position of pushing on the opposite end. ∗The position where the actuator is operated by jog / inching, and the stopped position can be set with the Position button.

(2) How to set operation data

Follow the procedure below to set the operation data.

Step 1 Selection of operation mode →3.2.2(2-1)
Closed center mode Double solenoid mode Single solenoid mode

↓

Step 2 Setting of operating conditions	
Positioning operation	→3.2.2(2-1)
Pushing operation	→3.2.2(2-2)

↓

Step 3 Confirmation of operation	
Test operation	→3.2.4

(2-1) Operation mode setting

In the EQ series (e-Actuator), the following three operation modes can be selected on the easy setup screen.

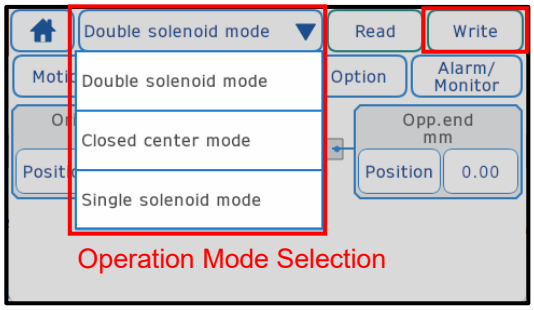
Double solenoid mode : Operation can be directed to the origin end and the opposite end with two input signals.

Single solenoid mode : Movement instructions can be given to the origin end and the opposite end with a single input signal.

Closed center mode : Operation can be directed to the origin end, opposite end and intermediate point with 2 input signals.

When changing the operation mode, press the Write button to write to the actuator.

When the operation mode is changed, the power must be turned off and on again after writing to the actuator.



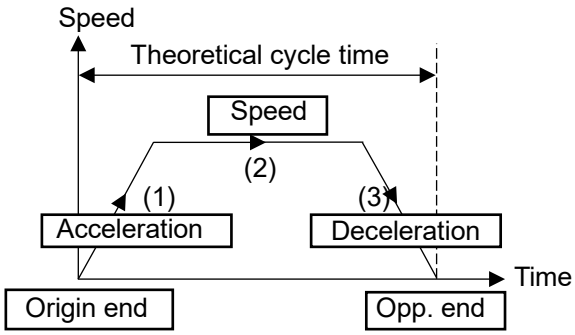
[Easy setup screen / Operation mode setting]

⚠ Caution

When the operation mode is changed, the power must be turned off and on after writing to the actuator.
For details of the operation mode, refer to the EQ series (e-Actuator) instruction manual.

(2-2) How to set the operation data for positioning operation

Positioning operation moves toward the target position and stops at the target position.
The figure below shows the setting items and operation.



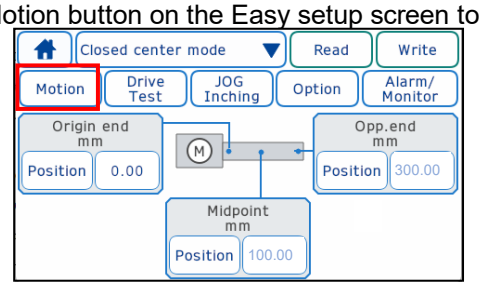
The items enclosed with ☐ must be set in the operating condition screen and the Easy setup screen

Setting items

Setting item	Details
Speed	Movement speed to the target position.
Acceleration	Acceleration at the start of movement The greater the value, the more rapid the acceleration
Deceleration	Deceleration when stopping. The greater the value, the more rapid the stop.
Origin end	Target position of the origin end of the actuator
Opp. end	Target position of the opposite end of the actuator

Setting Procedure

Step 1: Press the Motion button on the Easy setup screen to move to the Operating Condition screen.



[Easy setup screen]

Step 2: Press the button to select the operating condition to be set.

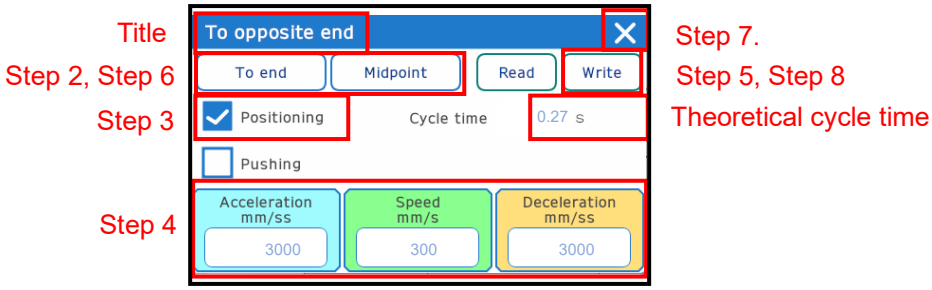
∗Check if the title of the operating condition screen is the operation to the end or midpoint required.

Step 3: Specify "Positioning" on the operating condition screen.

Step 4: Press and set Speed, Acceleration, and Deceleration.

∗After setting each "position" on the Easy setup screen, the theoretical cycle time value based on the set speed and acceleration / deceleration is displayed in "Cycle Time" for reference. Note, however, that this theoretical value does not include the settling time.

Step 5: After setting the operating conditions, press the Write button to write data to the actuator.



[the operating condition screen]

Step 6 : Set the operating conditions for other end points or a midpoint.

Step 7: Press the X button to move to the Easy setup screen and set the origin end and opposite end positions.

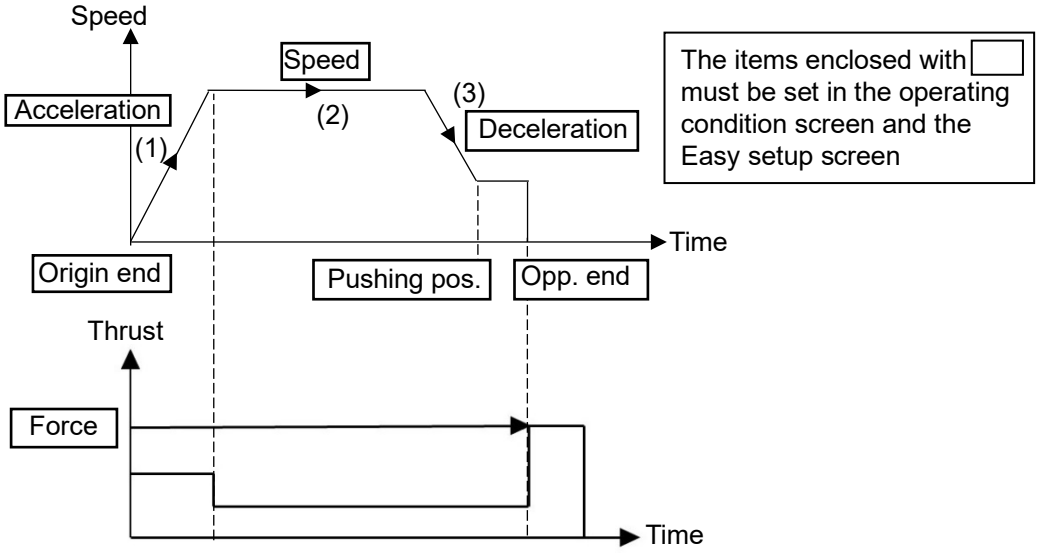
∗The position where the actuator is operated by jog / inching, and the stopped position can be set using the Position button. Refer to the Jog / Inching screen for Jog / Inching.

Step 8: After setting each position, press the Write button to write data to the actuator (Completed).

(2-3) How to set the operation data for a Pushing operation

The Pushing operation moves towards the target position and performs a pushing operation with the thrust set from the target position.

The figure below is a diagram showing the setting items and operation.

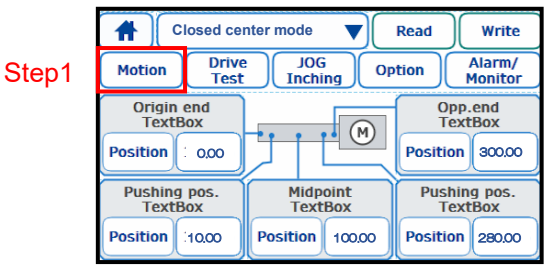


Setting items

Item	Details
Speed	Speed of movement to target position
Acceleration	Acceleration at the start of movement The greater the value, the more rapid the acceleration
Deceleration	Deceleration when stopping. The greater the value, the more rapid the stop.
Force	The ratio of thrust when pushing. ∗Since the setting range varies depending on the type of electric actuator, refer to the instruction manual for the EQ series (e-Actuator) used.
Origin end	The maximum movement position at the origin end of the actuator during a pushing operation.
Opp. end	The maximum movement position at the opposite end of the actuator during a pushing operation.
Pushing pos.	The position at which the pushing operation starts.

Setting Procedure

Step 1: Press the Operating Condition button on the Easy setup screen to move to the Operating Condition screen.



[Easy setup screen]

Step 2: Press the button to select the operating condition to be set.
∗Check if the title of the operating condition screen is the operation to the end or midpoint required.

Step 3: Specify "Pushing" on the operating condition screen.

Step 4: Press and set the thrust, speed, acceleration, and deceleration.
Theoretical cycle time value is not displayed during a pushing operation.

Step 5: After setting the operating conditions, press the Write button to write data to the actuator.

[Operating condition screen]

Step 6：Set the operating conditions for the other end point or a midpoint.

Step 7: Press the X button to move to the Easy setup screen and set the origin end and opposite end positions.
∗The position where the actuator is operated by jog / inching, and the stopped position can be set with the Position button. Refer to the Jog / Inching screen for Jog / Inching.

Step 8: After setting each position, press the Write button to write data to the actuator (Completed).

⚠ Caution
In the closed center mode, a pushing operation to the midpoint cannot be set.

3.3.3 Jog / Inching screen

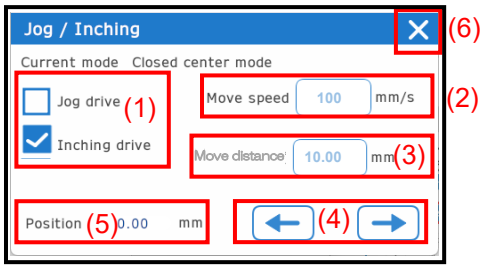
On the Jog / Inching screen, a Jog and Inching operation of the connected actuator can be performed.

*When moving to this screen, communication with the host device will be disabled, and the servo will automatically be turned ON.

Jog operation : When the operation instruction button is pressed, the actuator operates at the speed set in the movement speed setting.
The actuator stops when the operation indicator button is released.

Inching operation : When the operation instruction button is pressed, the actuator moves at the speed set in the travel speed setting for the distance set in the fixed distance setting.

When setting the operation data, the position moved by a jog or inching operation can be set numerically by checking the current position displayed, or the current position can be set by pressing the current position capture button.



[Jog / Inching screen]

Screen Description

No.	Name	Function
1	Operation Selection	Select Jog or Inching operation
2	Move speed setting	Set the travel speed for the jog or inching operation. *The setting range depends on the connected actuator.
3	Move distance	Set the travel distance for the inching operation. *This setting is displayed only when the inching operation is selected.
4	Operation instruction button	Jog operation: The actuator operates while the operation instruction button is pressed. (the actuator stops when the button is released) : When the button is pressed, the actuator moves to the origin end. : When the button is pressed, the actuator moves to the opposite end. Inching operation: When the operation instruction button is pressed, the actuator moves to the distance set in the Move distance setting and at the speed set in the Move speed setting. : Moves to the origin end : Moves to the opposite end.
5	Current position	Displays the current position of the connected actuator
6	Close X button	Moves to the previous screen

⚠ Caution

Jog and inching operate within the setting range from the origin end to the opposite end. To perform jog or inching outside of the set range of the origin end and opposite end, change the set values of the origin end and opposite end (write them to the connected EQ actuator) before performing a jog or inching operation.

If the current position is outside of the range of the set origin and opposite end, an alarm (code 52) will be generated. After resetting the alarm, the jog and inching operation are as follows.

Jog operation:

If the current position is - side from the origin end, pressing the [←] button will move to the origin end.

If the current position is - side from the origin end, pressing the [→] button will move to the + side.

If the current position is on the + side from the opposite end, pressing the [→] button will move to the opposite end.

If the current position is on the + side, pressing the [←] button will move to the - side.

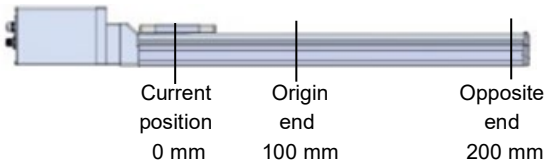
Inching Operation:

If the inching operation is performed outside of the setting range on the - side from the origin end, the inching operation will move to the origin end.

If an inching operation is performed outside of the setting range on the + side from the opposite end, the inching operation will move to the opposite end.

If an inching operation is performed within the setting range, between the origin end and the opposite end, the inching operation will move at the distance set in the Move distance setting.

Example)



Move distance: 150 mm

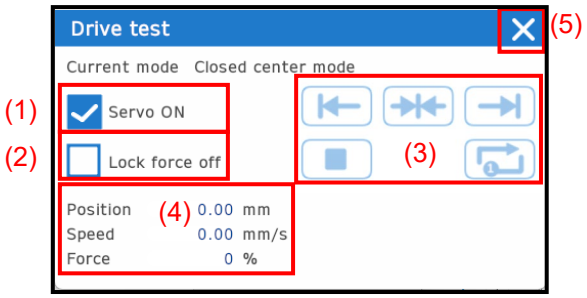
When → button is pressed, it moves to the position of 150 mm.

When ← button is pressed, it moves to the origin end (100 mm).

3.3.4 Test Operation screen

On the Drive test operation screen, a test operation of the connected actuator can be performed.

*When moving to this screen, communication with the host device will be disabled, and the servo will automatically be turned ON.



[Test Operation screen]

Screen description

No.	Name	Function
1	Servo ON instruction	Instructs servo-ON or servo-OFF switching of the motor in the connected actuator. ☑ : Servo ON instruction ☐ : Servo OFF instruction *Note that if Servo OFF is selected, take care that the actuator will drop under its own weight when installed vertically.
2	Lock force off instruction	Instructs a forced release of the lock (brake) of the connected actuator. ☑ : Instructs forced release of lock. ☐ : No instructions to the lock (automatic control by controller) *The connected actuator with lock is automatically worked when the servo is turned OFF.
3	Test operation instruction buttons	Test operation instructions: : Test operation instruction to the origin end. : Test operation instruction to the midpoint (available only in closed center mode). : Test operation instruction to the opposite end. : Test operation instruction for one cycle travel. (Origin end → Opposite end → Origin end) *When pushing operation, this button will be gray out and cannot be pressed. : Stop the test operation.
4	Status screen	Displays current position, speed, and thrust during the test operation.
5	Close X button	Moves to the previous screen.

⚠ Caution

In all modes, if one-cycle travel operation is instructed at a position other than the origin end or opposite end, the connected actuator will return to the origin end once and then performs one-cycle travel operation from the origin end to the opposite end.

When the closed center mode is selected and one-cycle travel operation is instructed, the actuator does not stop at the midpoint.

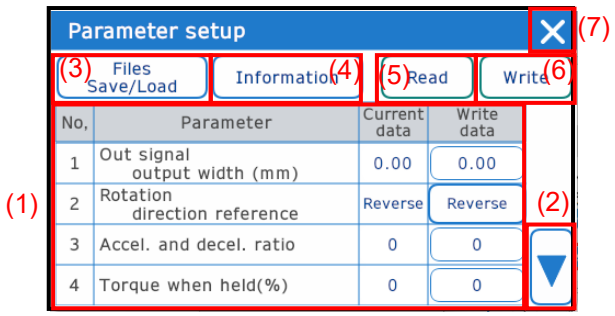
There is no button on the EQ setting screen of the Teaching box to instruct the return to origin. In the EQ series actuator, when an alarm that cannot be cleared by the reset button is cleared by turning off the power, or when the "rotation direction reference" is changed in the parameter settings, pressing any button on the test operation instruction will automatically return to the origin.

If an alarm occurs during the test operation, the test operation is cancelled. To resume the test operation, instruct the test operation again after resetting the alarm.

If pushing fails during the pushing operation, the operation will be incomplete. Press the stop instruction button to stop the operation, and then instruct the next test operation.

3.3.5 Parameter Setting screen

On the parameter setting screen, parameters can be checked and changed.
This screen can also be used to move to the file Save / Load screen and the Information screen.



[Parameter Setting screen]

Screen description

No.	Name	Function
1	Parameter Setting	Check or edit parameters ∗Check the "Current data" value for the current setting of each parameter. ∗To change a parameter, change the value of "Write data" for each parameter. After changing parameters, press the Write button to save them to the actuator. Note that some parameters will take effect after the actuator is turned off and on again. For details and initial values of each parameter, refer to the instruction manual of the connected actuator.
2	Up / Down Scroll Button	Scrolls up and down the parameter items.
3	Files Save / Load button	Moves to the file save / load screen Saves or loads a parameter file.
4	Information button	Moves to the information screen. Checks the information of the connected actuator.
5	Read button	Reads parameters from the connected actuator. ∗The current data of each parameter is reflected in the "Current data".
6	Write button	Writes the set parameters to the connected actuator. Writes the "Write data" of each parameter to the connected actuator.
7	Close X button	Moves to the previous screen.

⚠ Caution

When parameters are changed, some parameters will take effect when the connected EQ actuator power is turned off and on again.

3.3.6 Files Save / Load screen

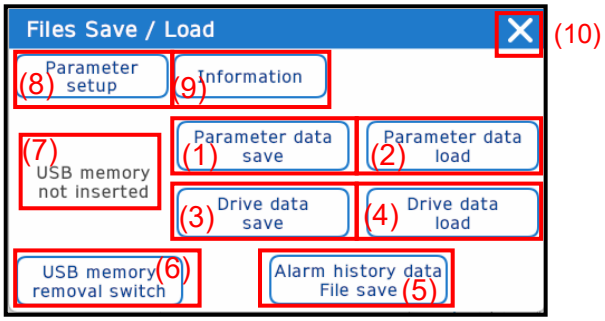
On the Files Save / Load screen, parameter data and operation data files can be saved to or loaded from a USB memory device.

Alarm history files can also be saved to USB memory (but not Read).

In addition, this screen can be used to move to the parameter setting screen and the information screen.

To save and read each data file, insert a USB memory device (FAT32 format) into the USB interface on the back of the Teaching box.

To remove the USB memory from the Teaching box, press the "USB memory removal switch" button and remove the USB memory device when "USB memory not inserted" is displayed.



[Files Save / Load screen]

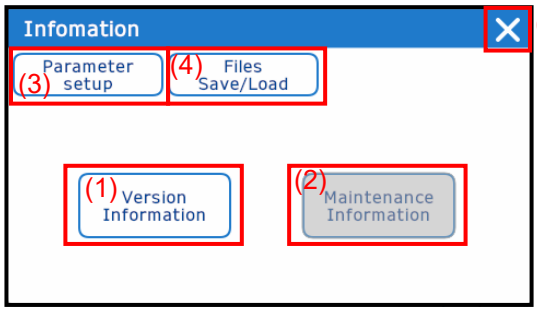
Screen description

No.	Name	Function
1	Parameter data save button	Saves parameter data to a file. ∗**The file name is fixed.** Save the file to USB memory with the name "00001_EQ_Parameter_Data_Export.csv". ∗Be careful not to overwrite previous files. ∗Note that the file cannot be read if it is renamed.
2	Parameter data load button	Reads parameters from the saved parameter data file and writes them to the connected actuator. ∗Place the parameter data file to be read in the root directory of the USB memory (If the file is in any other location, it cannot be read).
3	Drive data Save button	Saves operation data to a file. ∗**The file name is fixed.** Save the file to USB memory with the name "00002_EQ_Drive_Data_Export.csv". ∗Be careful not to overwrite previous files. ∗Note that the file cannot be read if it is renamed.
4	Drive data load button	Reads operation data from the saved operation data file and writes it to the connected actuator. ∗Place the parameter data file to be read in the root directory of the USB memory (If the file is in any other location, it cannot be read).
5	Alarm history data File save button	Saves alarm history to a file. ∗**The file name is fixed.** Save the file to USB memory with the name "00003_EQ_Alarm_History_Export.csv". ∗Be careful not to overwrite previous files. ∗Note that the file cannot be read if it is renamed.
6	USB memory removal switch button	Press to remove the USB memory. ∗When "USB memory not inserted" appears on the USB memory status, the USB memory device can be safely removed.
7	USB memory status	When a USB memory device is inserted into the USB interface on the back of the Teaching box, "USB memory inserted" is displayed. When the USB memory is not inserted into the Teaching box or the "USB memory removal switch" button is pressed, "USB memory not inserted" is displayed.
8	Parameter setup button	Moves to the parameter setting screen.
9	Information button	Moves to Information screen.
10	Close X button	Moves to the previous screen.

3.3.7 Information screen

On the Information screen, screens can be selected for checking various information on the connected EQ series actuators (Version Information screen and Maintenance Information screen).

The maintenance information screen may not be supported depending on the model of the connected EQ series actuator . If it is not supported, the maintenance information button is greyed out and disabled.



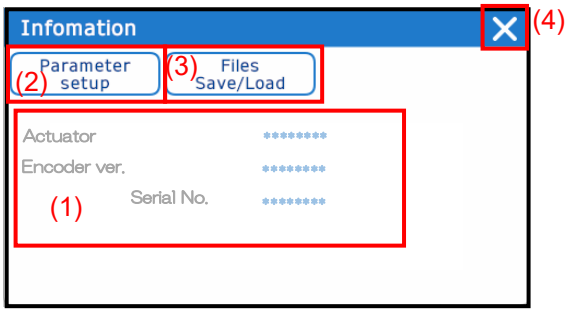
【Information screen】

Screen description

No.	Name	Function
1	Version Information button	Moves to the Version Information screen.
2	Maintenance Information button	Moves to the maintenance information screen. This button is enabled/disabled depending on the EQ Actuator model connected.
3	Parameter setup button	Moves to the Parameter setting screen.
4	Files Save / Load button	Moves to the File Save / Load screen.
5	Close X button	Moves to the previous screen.

3.3.8 Version Information screen

On the Version information screen, the product information of the connected EQ actuator can be checked.
In addition, this screen can be used to move to the Parameter setup screen and the Files Save / Load screen.



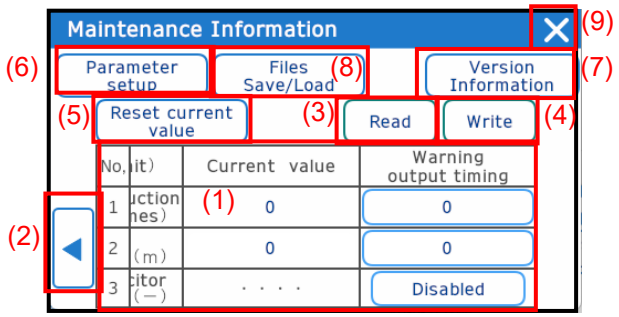
[Version Information screen]

Screen description

No.	Name	Function
1	Version information	Displays the following information. Connected EQ actuator version Encoder version Encoder serial No.
2	Parameter setup button	Moves to the parameter setup screen.
3	Files Save / Load button	Moves to the Files save / load screen.
4	Close X button	Moves to the previous screen.

3.3.9 Maintenance Information screen

On the Maintenance Information screen, the maintenance information of the connected EQ actuator can be checked.
This screen can be used to move to the Parameter setup screen, Files Save / Load screen, and the Version Information screen.
∗The Maintenance Information screen may not be supported depending on the connected EQ actuator model.



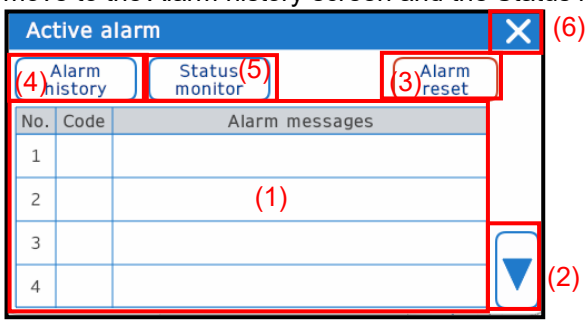
[Maintenance Information screen]

Screen description

No.	Name	Function
1	Maintenance Information	Displays the following warning occurrences and setting of warning occurrence values. Total number of instructions Total distance Electrolytic capacitor warning
2	Left / Right scroll button	Scrolls to the left / right of the maintenance information items. Displays columns of maintenance information setting values.
3	Read button	Reads maintenance information from the connected EQ actuator.
4	Write button	Writes the maintenance information setting to the connected EQ actuator.
5	Reset current value button	Resets the set value (displayed in the current value) of the selected maintenance information to 0.
6	Parameter Setting button	Moves to the parameter setting screen.
7	Version information button	Moves to the Version Information screen.
8	Files Save / Load button	Moves to the Files Save / Load screen.
9	Close X button	Moves to the previous screen.

3.3.10 Alarm screen

On the Alarm screen, currently active alarms can be checked.
This screen can also be used to move to the Alarm history screen and the Status monitor screen.

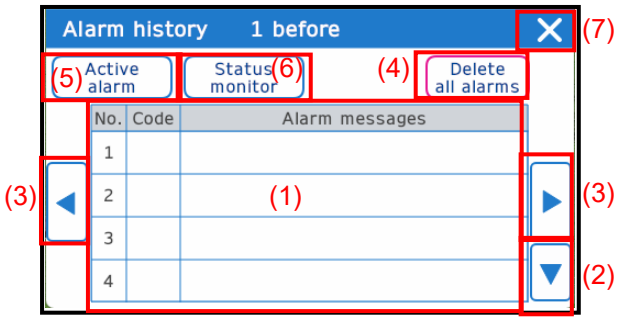


[Alarm screen]

No.	Name	Function
1	Alarms currently active	Displays alarms currently occurring at the connected EQ actuator. Press the alarm message to check the details and countermeasures. ∗For details on alarms that have occurred, refer to the instruction manual for the EQ series actuator used.
2	Up / Down scroll button	When 5 or more alarms occur at the same time, the 5th and subsequent alarms are displayed.
3	Alarm reset Button	Resets the currently occurring alarms that can be cleared.
4	Alarm history button	Moves to the alarm history screen.
5	Status monitor button	Moves to the status monitor screen.
6	Close X button	Moves to the previous screen.

3.3.11 Alarm History screen

On the Alarm history screen, the alarm history (alarms that have occurred in the past) can be checked.
This screen can also be used to move to the Active alarm screen and the Status monitor screen.



[Alarm History screen]

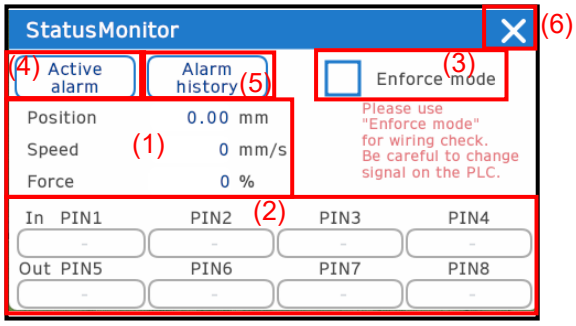
Screen description

No.	Name	Function
1	Alarm history screen	Displays the history of alarms that have occurred in the connected EQ actuator. Press the alarm message to check the details and countermeasures. For details of the alarms that have occurred, refer to the instruction manual of the EQ series actuator used.
2	Up / Down scroll button	When 5 or more alarms occur at the same time, the 5th and subsequent alarms are displayed.
3	Left / Right scroll button	Left scroll button: Displays the previous alarm history. Right scroll button: Displays the next alarm history. ∗Check the title to see how many previous alarms are displayed.
4	Delete all alarms button	Deletes all alarm history data.
5	Active alarm button	Moves to the Active Alarm screen.
6	Status Monitor button	Moves to the Status monitor screen.
7	Close X button	Moves to the previous screen.

3.3.12 Status Monitor screen

On the Status Monitor screen, the signal status of the connected EQ series actuator can be checked and the forced output of signals can be performed.

This screen can also be used to move to the Active alarm screen and the Alarm history screen.



Status Monitor screen

Screen description

<table>
<tr><th>No.</th><th>Name</th><th>Function</th></tr>
<tr><td>1</td><td>Connected actuator status</td><td>Displays the current position, speed, and thrust.</td></tr>
<tr><td>2</td><td>Input / output signal status screen</td><td>Displays I/O signal status
: Signal OFF state
: Signal ON state
<table>
<tr><th>Display name</th><th>Connector Pin No.</th><th colspan="2">Signal name</th><th>Function</th></tr>
<tr><td>PIN1</td><td>Pin No. 1</td><td rowspan="4">Input signal</td><td>IN0</td><td><u>Double solenoid mode,
Closed center mode:</u>
Driving instruction to home end with only IN0 ON.
<u>Closed center mode:</u>
IN0 and IN1 turn ON simultaneously to indicate operation to the midpoint.
*Not used in single solenoid mode.</td></tr>
<tr><td>PIN2</td><td>Pin No.2</td><td>IN1</td><td><u>Single solenoid mode:</u>
ON: driving instruction to the opposite end
OFF: Driving instruction to the origin end
<u>Double solenoid mode,
Closed center mode:</u>
Driving instruction to the opposite end when only IN0 is ON
<u>Closed center mode:</u>
Driving instruction to the mid point when IN0 and IN1 are turned ON simultaneously</td></tr>
<tr><td>PIN3</td><td>Pin No.3</td><td>RESET</td><td>Alarm reset.
Some alarms cannot be cleared by RESET.
Check the instruction manual of the connected actuator.</td></tr>
<tr><td>PIN4</td><td>Pin No.4</td><td>Not used</td><td>Not used</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Function</th></tr>
<tr><td>2</td><td>Input / output signal status</td><td>
<table>
<tr><th>Display name</th><th>Connector Pin No.</th><th colspan="2">Signal name</th><th>Function</th></tr>
<tr><td>PIN5</td><td>Pin No.5</td><td rowspan="4">Output signal</td><td>OUT0</td><td>On when origin end is reached / completion of origin end pushing</td></tr>
<tr><td>PIN6</td><td>Pin No.6</td><td>OUT1</td><td>On when origin end is reached / completion of origin end pushing</td></tr>
<tr><td>PIN7</td><td>Pin No.7</td><td>OUT2</td><td>On when midpoint is reached.</td></tr>
<tr><td>PIN8</td><td>Pin No.8</td><td>ALARM (Negative logic)</td><td>On when no alarm. OFF when alarm occurs.</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>Forced output ON instruction</td><td>Instructs forced output of signals.
When the forced output is instructed, pressing the output signal forces that signal to be ON.
☑ : Instructs forced output instruction
☐ : No forced output instruction
When an alarm occurs, forced output cannot be used.</td></tr>
<tr><td>4</td><td>Active alarm button</td><td>Moves to the Active Alarm screen.</td></tr>
<tr><td>5</td><td>Alarm history button</td><td>Moves to the Status monitor screen.</td></tr>
<tr><td>6</td><td>Close X button</td><td>Moves to the previous screen.</td></tr>
</table>

4. JXC Series Controller settings

4.1 Connection

(1) Teaching box preparation

When connecting the Teaching box to the JXC series controller, there is an option to install the JX-T1S or JX-T1U stop switch unit on the Teaching box.

When installing the stop switch unit on the Teaching box

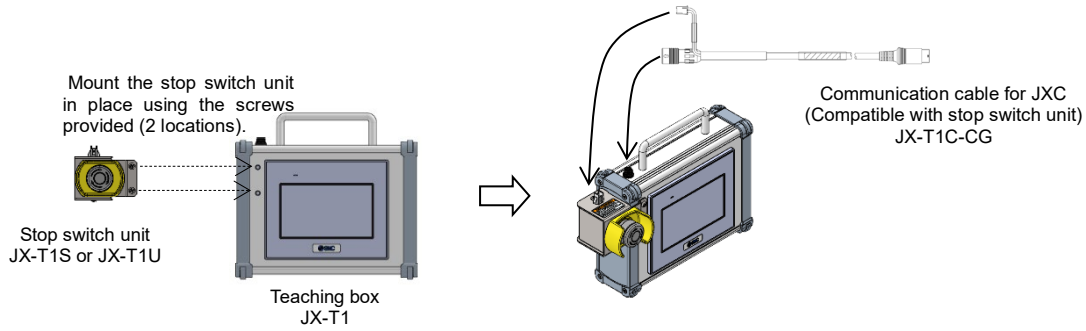
Prepare the following:

Teaching box : JX-T1

Communication cable for JXC connection (stop switch unit supported): JX-T1C-CG

Stop switch unit: JX-T1S or JX-T1U

After installing the stop switch unit on the Teaching box, connect the communication cable for JXC (stop switch unit supported) to the Teaching box.



⚠ Warning

When installing the Stop switch unit on the Teaching box, be sure to use the JX-T1C-CG communication cable for JXC (stop switch unit supported) and connect the stop switch unit and communication cable before using the Teaching box.

If the communication cable is not connected to the stop switch unit, the stop switch unit cannot be operated.

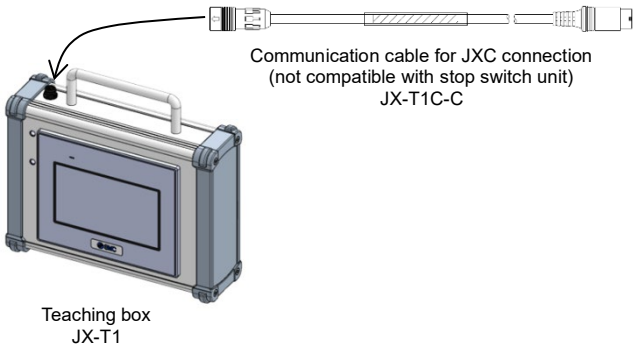
When the Stop switch unit is not installed on the Teaching box

Prepare the following:

Teaching box main unit: JX-T1

Communication cable for JXC (stop switch unit not supported): JX-T1C-C

Connect the JX-T1C-C communication cable for JXC (stop switch unit not supported) to the Teaching box.

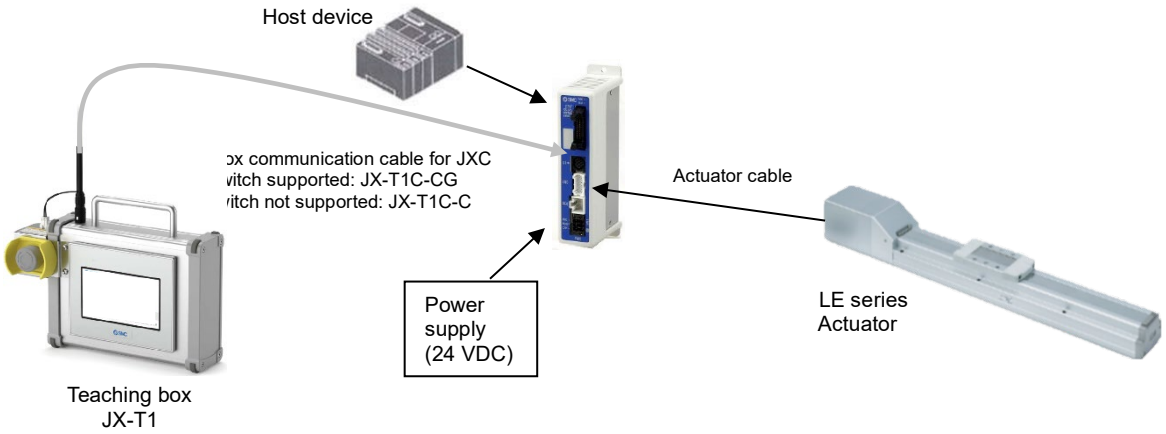


(2) Teaching box connection

Connect the JXC series controller to a compatible electric actuator, 24 VDC power supply, and host device. (Refer to the JXC series controller instruction manual for details on how to connect the electric actuator, 24 VDC power supply, and host device).

Connect the Teaching box JX-T1 to the Communication connector (CN4) on the JXC series controller using the Teaching box communication cable JX-T1C-C∗ for JXC.

Refer to the JXC series controller instruction manual, to check that there are no problems with connections and wiring, and then turn on the power.

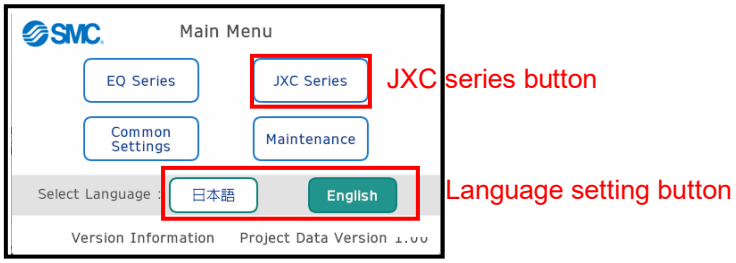


(3) Teaching box startup

If the connection with the JXC series controller is established correctly, the main menu screen will be displayed (shown below).

To change the display language, press the language required using the “Language Setting” button. (Each screen is displayed in the language of the setting button which has a green background).

Press the JXC series button for JXC series actuator settings.



[Main Menu screen]

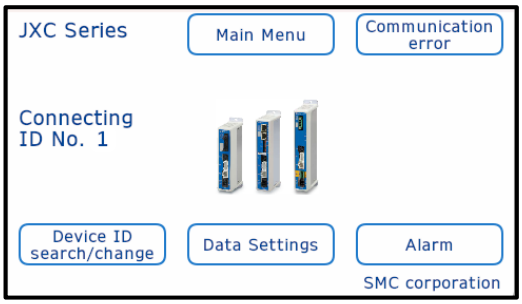
(4) Communication Confirmation

Press the JXC series button on the Main Menu screen.

When communication is established between the Teaching box and the JXC series controller, the JXC top screen is displayed (shown below).

Press each button to move to the required function screen.

Refer to 4.2 JXC Series Functions for details of each function.

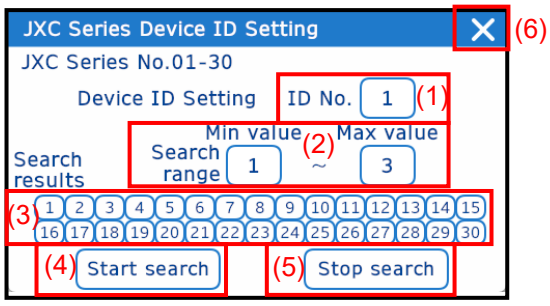


[JXC series Top screen]

*If communication cannot be established, check that the Device ID has not been changed to anything other than 1 and that there is nothing wrong with the communication cable, then press the Start Search button, without changing the default setting for the device ID No. (1) on the JXC series device ID setting screen.

To move to the JXC series device ID setting screen, press the Maintenance button on the Main menu screen to move the maintenance screen first, then press the JXC series device ID setting button on the Maintenance screen.

*If the basic parameters / Device ID of the connected JXC controller have been changed, change the search range to a range including the changed device ID and press the Start search button. When the search result shows the changed device ID number with a white background, set the ID No. in the device ID setting to the shown device ID.



[JXC series Device ID setting screen]

Screen description

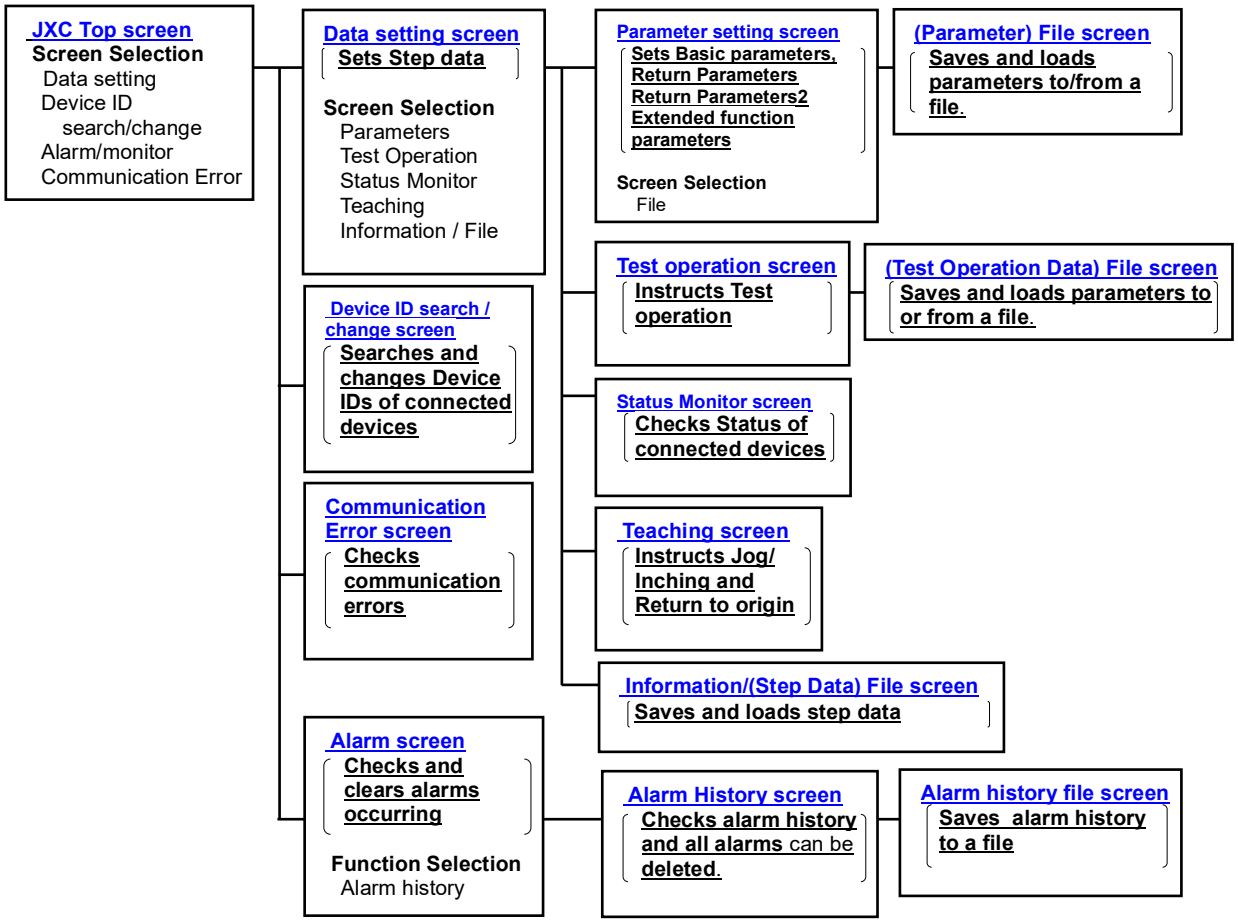
No.	Name	Function
1	Device ID setting	Sets the device ID No. for which communication was confirmed in the search results. After the screen is closed, communication is established with the controller with the set device ID No., and settings can be set.
2	Search range setting	Sets the search range for device ID's. A wider search range will take longer.
3	Search results	Displays search results for device ID's. Number of device ID's for which communication was confirmed are displayed with a white background. Number of device ID's for which communication could not be confirmed are displayed with a blue background.
4	Start search button	Starts searching for a device ID.
5	Stop search button	Stops searching for a device ID.
6	Close X button	Moves to the previous screen. Starts communication with the controller using the No. set in the device ID setting.

4.2 JXC Series Functions

(1) List of JXC series functions

Function	Description
Step data setting	Set the step data on the data setting screen.
Parameter setting	Various parameters can be set on the parameter setting screen.
Teaching	Instructs Jog and inching on the teaching screen.
Test operation	Specifies step data and test operations on the test operation screen
Status Monitor	Displays current position, speed, thrust, and I/O signal status on the status monitor screen.
Forced Output	Forces ON output signals on the status monitor screen.
Alarm	Displays and clears alarms currently occurring on the Alarm screen. Also, displays alarm history and alarm history deletion on the alarm history screen.
File Save / Load	Saves and loads parameters to and from a file on the (Parameter) File screen. Saves and loads step data to and from a file on the (Parameter) File screen Saves and loads test operation data to and from a file on the (Parameter) File screen Saves Alarm history to a file.

(2) JXC screen transition diagram



Caution

The Teaching box cannot be used if communication with the connected JXC controller is not established.

Press the Device ID search / change button on the Device ID search / change screen to re-establish communication.

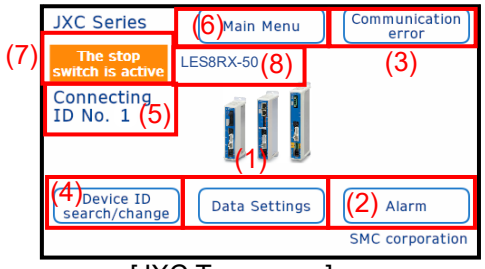
If communication is not established, check that the Device ID of the connected JXC controller has not been changed or if there is anything wrong with the communication cable.

4.3 JXC series screens

Each screen of the JXC series controller settings is described below.

4.3.1 JXC Top screen

This screen can be used to select the screen for each function of the JXC series controller.



[JXC Top screen]

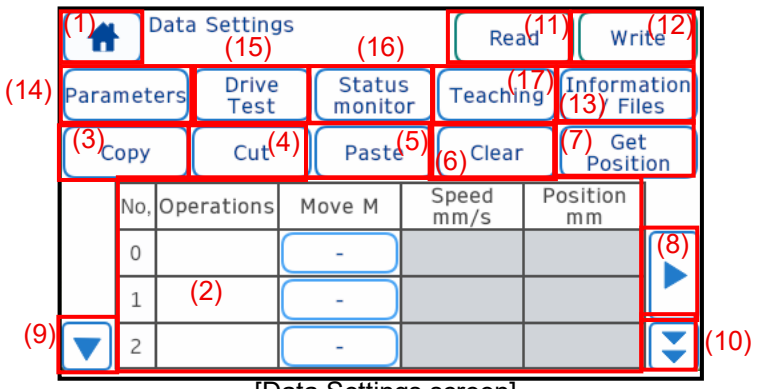
Screen description

No.	Name	Function
1	Data Settings button	Moves to the Data setting screen.
2	Alarm button	Moves to the Alarm screen.
3	Communication error button	Moves to the Communication error screen. When communication cannot be established, the button turns to red background. Communication error
4	Device ID search / change button	Moves to the Device ID search/change screen.
5	Connected device ID	Displays the ID No. of the connected device. Displays the device ID No. when communication with the connected JXC controller is established.
6	Main Menu button	Moves to the Main menu screen.
7	Stop switch screen	While the stop switch is activated, the screen displays "The Stop switch is activated". No display when the stop switch is not activated.
8	Connected Actuator	Displays the part number of the connected actuator.

4.3.2 Data Settings screen

Step data can be set on the Data Settings screen.

(1) Data Settings screen



[Data Settings screen]

Screen description

No.	Name	Function
1	Home button	Moves to the JXC top screen.
2	Step data setting	Displays and sets step data.
3	Copy button	Copy selected step data. *Press "No." to select the step data.
4	Cut button	Cuts out the selected step data. *Press "No." to select the step data.
5	Paste button	Pastes the copied or cut step data to the selected line. *Press "No." to select the step data.
6	Clear button	Changes the contents of the selected step data to default values. *Press "No." to select the step data.
7	Get Position button	Sets the current position of the connected actuator to the "position" to the selected step number. *Press "No." to select the step data. ∗The current position of the connected actuator can also be set to the position where the actuator stops after operating the actuator using the Teaching screen by pressing the button for capturing the current position.
8	Left / Right Scroll Button	Scrolls left / right through the step data items.
9	Up / down scroll button (1 line)	Scrolls up / down one line of step data.
10	Scroll up / down button (1 page)	Scroll up / down one page of step data.
11	Write button	Writes step data to the connected controller.
12	Read button	Reads step data from the connected controller.
13	Information / File button	Moves to the Information/(Step Data) File screen.
14	Parameters button	Moves to the Parameter Setting screen.
15	Drive Test button	Moves to the Test operation screen.
16	Status Monitor button	Moves to the Status monitor screen.
17	Teaching button	Moves to the Teaching screen.

(2) Step data setting method

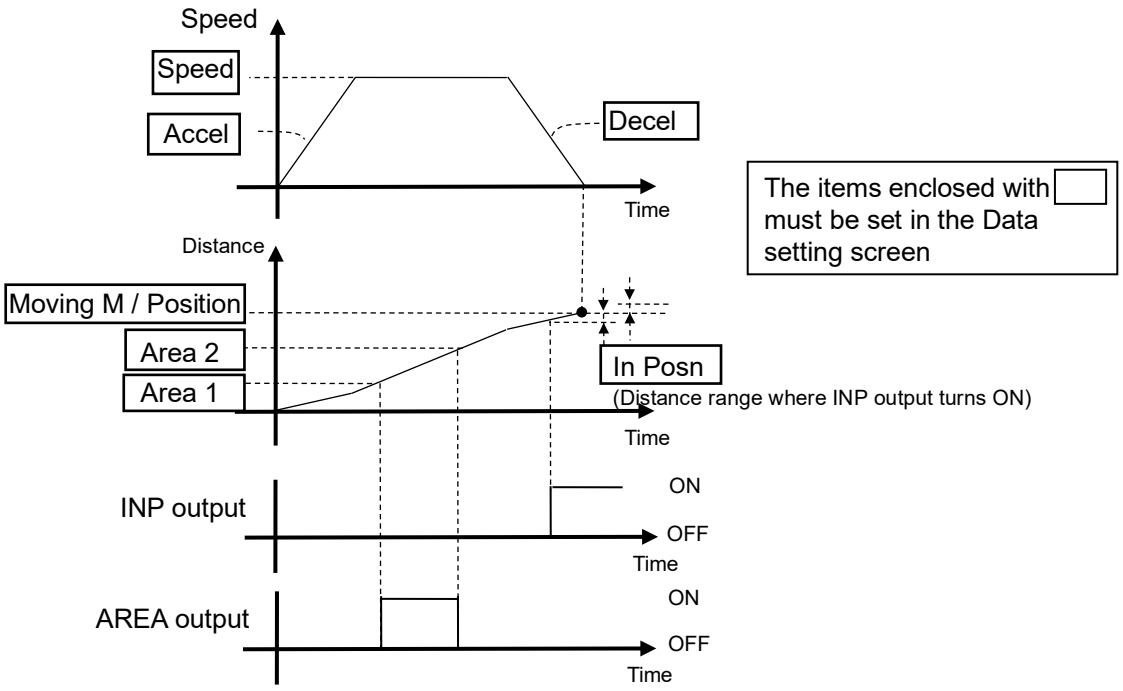
Step data includes positioning and pushing operations.
Follow the procedure below to set the step data.

Positioning operation → (2-2) How to set step data for positioning operation
Pushing operation → (2-3) How to set step data for pushing operation

(2-2) How to set step data for positioning operation

Positioning operation moves toward the target position and stops at the target position.
Set the Moving M, Speed, Position, Accel, Decel, Position, Pushing F(0), Area 1/2, and In Posn within the setting range.
For positioning operation, set "Pushing F" to 0.
For details on the setting method, check the instruction manual of the connected controller.
For the setting range, check the instruction manual of the connected actuator.
The figure below is a diagram of the setting items and operation.

Step data setting items related to positioning operation



Setting items

Item	Details
Move M	Disable:The step data is ineffective. Absolute:The target position will be defined by the absolute coordination based on the zero point. Relative:The target position will be defined by the relative coordination based on the current position.
Speed	Speed of movement to target position.
Position	Target position of actuator.
Accel	Acceleration at the start of movement. The greater the value, the more rapid the acceleration
Decel	Deceleration when stopping. The greater the value, the more rapid the stop.
Pushing F	Set to 0 for positioning operation.
Moving F	No changes (100%)
Area 1/2	Sets the range where the AREA output turns ON. ∗AREA output turns ON when the actuator is positioned between Area 1 and Area 2.
In Posn	Sets the width at which the INP output turns ON. ∗The INP output turns ON when the actuator is within ± positioning range of the target position.

(2-3) How to set step data for a Pushing operation

The Pushing operation moves toward the set position and applies the set pushing speed, with the set thrust from the set position.

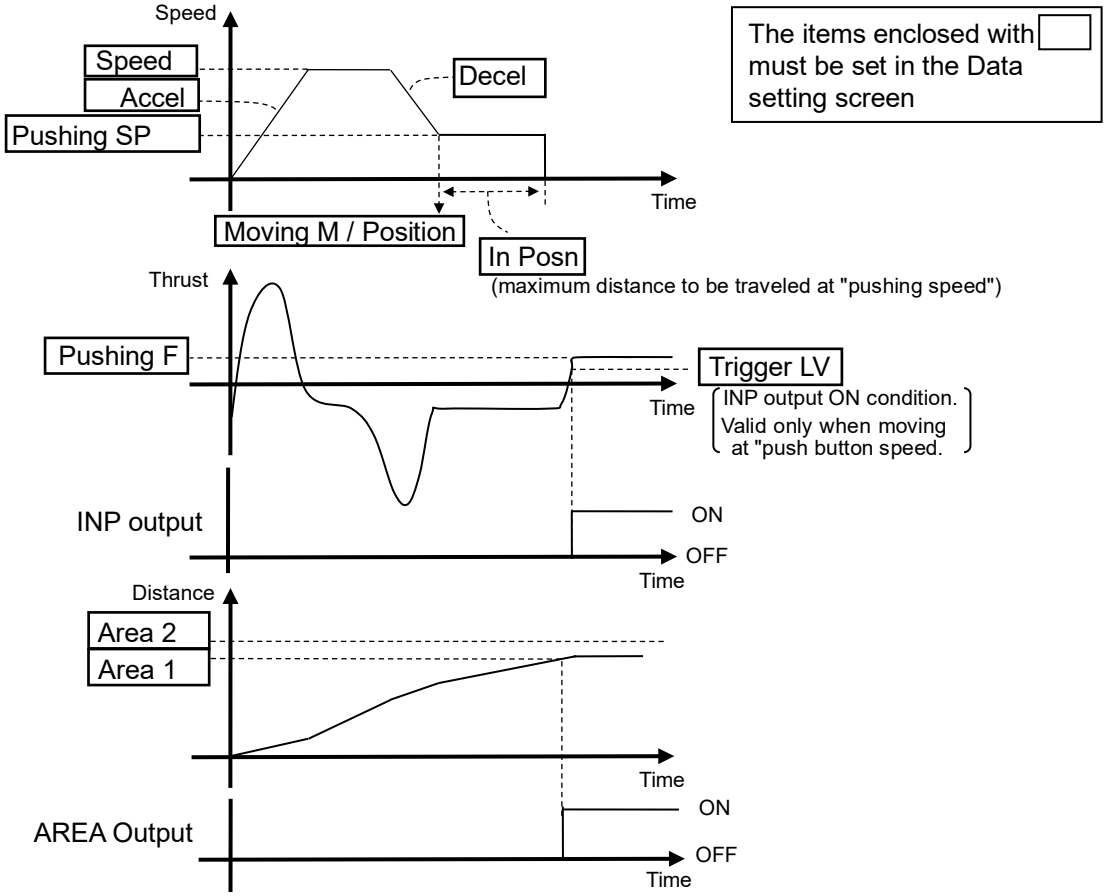
Set the Moving M, Speed, Position, Accel, Decel, Pushing F, Trigger LV, Pushing SP, Moving F, area 1/2, and In Posn width within the setting range.

To set the Pushing operation, set [Pushing F] to a value other than 0.

For the setting range, check the instruction manual of the connected actuator.

The figure below shows the setting items and operation.

Setting items of step data related to Pushing operation



Setting items

Item	Details
Move M	Disable:The step data is ineffective. Absolute:The target position will be defined by the absolute coordination based on the zero point. Relative:The target position will be defined by the relative coordination based on the current position.
Speed	Speed of movement to target position.
Position	The starting position of the pushing speed movement during a pushing operation (when "Thrust" is set to a value other than 0).
Accel	Acceleration at the start of movement. The greater the value, the more rapid the acceleration.
Decel	Deceleration until the pushing speed is reached during a pushing operation. (when "Pushing F" is set to a value other than 0). The greater the value, the more rapid the deceleration.
Pushing F	Specifies the ratio of thrust force during pushing. **When "Pushing F" is set to a value other than 0, the corresponding step data is used for the pushing operation.**
Trigger LV	This is the threshold at which the INP output turns ON. Specifies the thrust ratio.
Pushing SP	Speed of movement during pushing operation.
Moving F	No changes (100%)
In Posn	Maximum distance of pushing movement during a pushing operation (when "Thrust" is set to a value other than 0).
AREA 1/2	Set the range where the AREA output turns ON. AREA output turns ON when the actuator is positioned between Area 1 and Area 2.

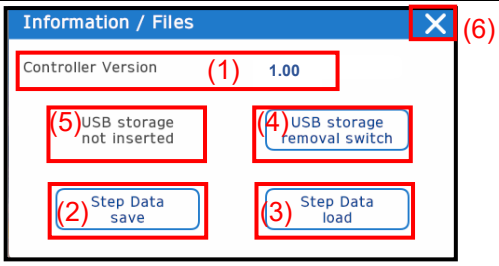
4.3.3 Information / (Step Data) Files screen

The software version of the connected JXC controller can be checked on the Information / (Step Data) Files screen.

In addition, step data files can be saved or loaded to a USB memory device.

To save / load a step data file, insert a USB memory device (FAT32 format) into the USB interface on the back of the Teaching box.

To remove the USB memory from the Teaching box, press the "USB memory removal switch" button and remove the USB memory device when "USB memory not inserted" is displayed.



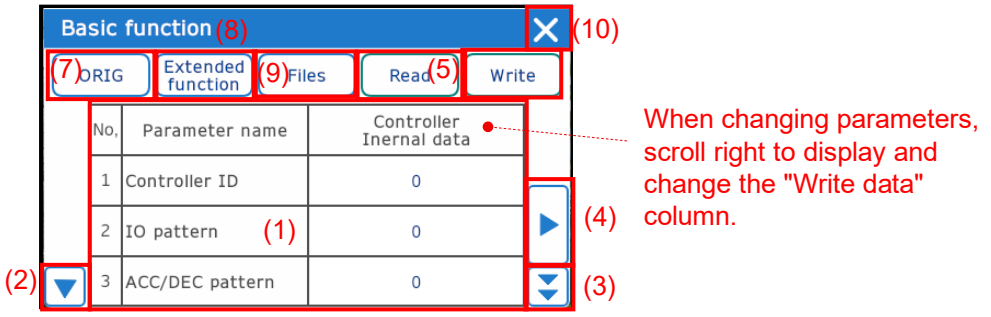
[Information / Files screen]

Screen description

No.	Name	Function
1	Controller Version	Displays the software version of the connected JXC controller.
2	Step Data save button	Saves the step data to a file. ∗**The file name is fixed.** Save the file to USB memory using the name "00001_JXC_step_Data_Export.csv". ∗Be careful not to overwrite previous files. ∗Note that the file cannot be read if it is renamed.
3	Step Data load button	Reads step data from the saved step data file and writes them to the connected JXC controller. ∗**Place the step data file to be read in the root directory of the USB memory**. (If the file is in any other location, it cannot be read.)
4	USB memory removal switch button	Press to remove the USB memory. ∗When "USB storage not inserted" is displayed on the USB memory status, the USB memory device can be safely removed.
5	USB memory status	When a USB memory device is inserted into the USB interface on the back of the Teaching box, "USB storage inserted" is displayed. When the USB memory is not inserted in the Teaching box or the "USB memory removal switch" button is pressed, "USB memory not inserted" is displayed.
6	Close X button	Moves to the previous screen.

4.3.4 Parameter Setting screen

On the Parameter (Basic Function) Setting screen, parameters can be checked and changed.
This screen can be used to move to the Files screen, Parameter (Return to origin) screen, Parameter (extended functions / Return to origin 2) screen, and the Information screen.



[Parameter setting screen]

Screen description

No.	Name	Function
1	Parameter setting	Checks or changes current parameters. ∗The current setting value of each parameter is checked in the "Controller Internal data" column. ∗To change a parameter, use the left / right scroll buttons to display the column of write values for each parameter and change the value. ∗After changing a parameter, press the Write button to write it to the actuator. ∗Note that some parameters take effect after the power of the controller is turned off and on again. ∗For details and initial values of each parameter, refer to the instruction manual of the connected controller.
2	Up / Down scroll button (1 line)	Scrolls up / down one line of step data.
3	Up / Down scroll button (1 page)	Scroll up / down one page of step data.
4	Left / Right scroll button	Scrolls left and right through the parameter columns, displaying " Controller internal data" or " Edit area". ∗Displays "Write data" when changing parameters.
5	Read button	Reads parameters from the connected controller. ∗The read data is reflected in the “Controller internal data” of each parameter.
6	Write button	Writes the set parameters to the connected actuator. ∗The data of the "Edit area" of each parameter is written to the connected controller.
7	ORIG/ORIG2 button	Moves to the parameter (Return to origin / Return to origin 2) screen. ∗The operation procedure is the same as the basic function parameter screen. ∗For details and initial values of each parameter, refer to the instruction manual of the connected JXC controller.
8	Extended function button	Moves to the parameter (Extended function) screen. *Return to origin 2 screen can be moved from the Extended function screen. The operating procedure is the same as that of the basic parameter screen. For details and initial values of each parameter, refer to the instruction manual of the connected controller.
9	Files button	Moves to the (Parameter) File screen.
10	Close X button	Moves to the previous screen.

⚠ Caution

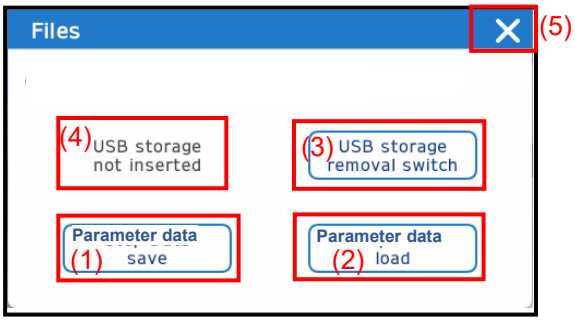
When parameters are changed, some parameters take effect when the connected JXC controller is turned off and on again.

4.3.5 (Parameter) Files screen

On the (parameter) Files screen, parameters can be saved and loaded,

To save / load parameter files, insert a USB memory device (FAT32 format) into the USB interface on the back of the Teaching box.

To remove the USB memory device from the Teaching box, press the "USB memory removal switch" button and remove the USB memory device when "USB memory not inserted" is displayed.



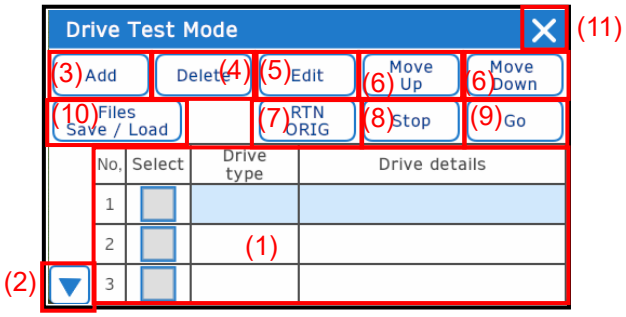
[(Parameter) Files screen】

Screen description

No.	Name	Function
1	Parameter data save button	Saves parameter data to a file. **The file name is fixed.** Save the file to USB memory with the name "00002_JXC_Parameter_Data_Export.csv". ∗Be careful not to overwrite previous files. ∗Note that the file cannot be read if it is renamed.
2	Parameter data load button	Reads parameters from the saved parameter data file and writes them to the connected JXC controller. ∗**Place the parameter data file to be read in the root directory of the USB memory** (If the file is in any other location, it cannot be read).
3	USB memory removal switch button	Press to eject the USB memory device. ∗When "USB storage not inserted" is displayed on the USB memory status screen, the USB memory device can be safely removed.
4	USB memory status	When a USB memory device is inserted into the USB interface on the back of the Teaching box, "USB memory inserted" is displayed. ∗When the USB memory device is not inserted into the Teaching box or the "USB memory removal switch" button is pressed, "USB memory not inserted" is displayed.
5	Close X button	Moves to the previous screen.

4.3.6 Test Operation screen

On the Drive Test operation screen, a Test operation of the connected actuator can be performed.
*When moving to this screen, communication with the host device will be disabled, and the servo will automatically be turned ON.



[Test Operation screen]

Screen description

No.	Name	Function
1	Test operation list	Up to 5 lines of test operations can be registered, one line is for each step data No., wait time, or jump command. The Step data transition condition can be specified as either INP signal, BUSY signal, or set time. A Wait time command is specified in msec unit (maximum 1000 msec). A Jump command is specified either continuous, repetitive, and a jump to a specified line. Press Select, and select a line in the list. When the "Go" button is pressed, the selected line in the list will be executed. ☑ : Selected ☐ : Unselected
2	Up / down scroll button	Scrolls up and down the test operation list.
3	Add button	Adds a one-line command to the bottom line of the test operation list.
4	Delete button	Deletes the selected line in the test operation list. *Press “Drive type” or “Drive details” to select the line in the test operation list.
5	Edit button	Edits the selected line in the test operation list. *Press “Drive type” or “Drive details” to select the line in the test operation list.
6	Move Up / Down button	Select one line above or below the selected line in the test operation list. *Press “Drive type” or “Drive details” to select the line in the test operation list.
7	RTN ORIG button	Instructs the Return to origin operation.
8	Stop button	Stops the test operation currently in progress.
9	Go button	Instructs the test operation to be executed according to the list.
10	Files Save / Load button	Moves to the (Test operation data) Files save / load screen.
11	Close X button	Moves to the previous screen.

⚠ Caution

When the test operation is not ready, the Return to origin button, Go button, and Stop button are greyed out and cannot be pressed.
If the above buttons are greyed out, check the following:
(1) Check that no alarms have occurred.
(2) Check that the stop switch is not activated.

If an alarm occurs during a test operation, the test operation is cancelled. To resume the test operation, instruct the test operation again after resetting the alarm.

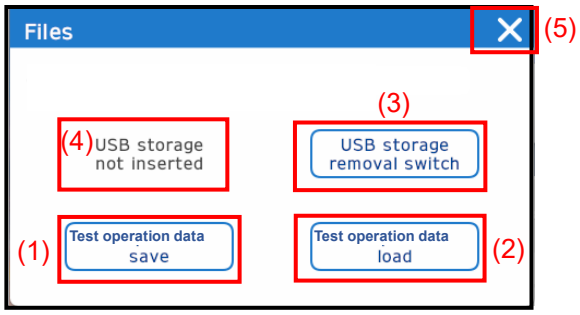
If the pushing fails during a pushing operation, the operation will be incomplete. Press the stop button to stop the operation, and then instruct the next test operation.

4.3.7 (Test Operation Data) Files screen

On the (Test operation data) Files screen, test operation data can be saved and loaded.

To save / read parameter files, insert a USB memory device (FAT32 format) into the USB interface on the back of the Teaching box.

To remove the USB memory device from the Teaching box, press the "USB memory removal switch" button and remove the USB memory device when "USB memory not inserted" is displayed.



[Parameter Setting screen]

Screen description

No.	Name	Function
1	Test operation data save button	Saves the test operation data to a file. **The file name is fixed.** Save the file to USB memory using the name "00004_JXC_TestDrive_Data_Export.csv". ∗Be careful not to overwrite previous files. ∗Note that the file cannot be read if it is renamed.
2	Test operation data load button	Reads test operation data from the saved parameter data file and writes them to the connected JXC controller. ∗**Place the parameter data file to be read in the root directory of the USB memory** (If the file is in any other location, it cannot be read).
3	USB memory removal switch button	Press to eject the USB memory. ∗When "USB storage not inserted" appears on the USB memory status screen, the USB memory device can be safely removed.
4	USB memory status	When a USB memory device is inserted into the USB interface on the back of the Teaching box, "USB memory inserted" is displayed. ∗When the USB memory device is not inserted into the Teaching box or the "USB memory removal switch" button is pressed, "USB memory not inserted" is displayed.
5	Close X button	Moves to the previous screen.

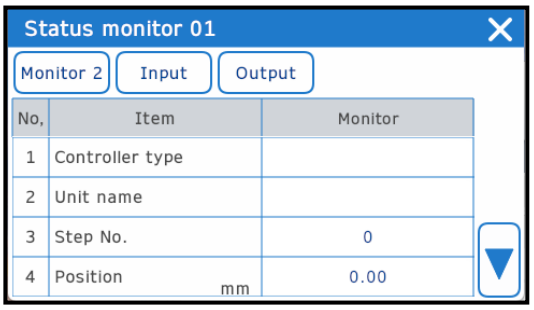
4.3.8 Status Monitor screen

The Status Monitor screen includes the Status monitor 01 screen, Status monitor 02 screen, Status monitor input screen, and Status monitor output screen, each of which allows the status of the controller, actuator, and input / output signals to be checked.

The Status Monitor output screen enables forced output of output signals.

(1) Status monitor 01 screen

The Status monitor 01 screen allows the status of the connected JXC series controllers to be checked.



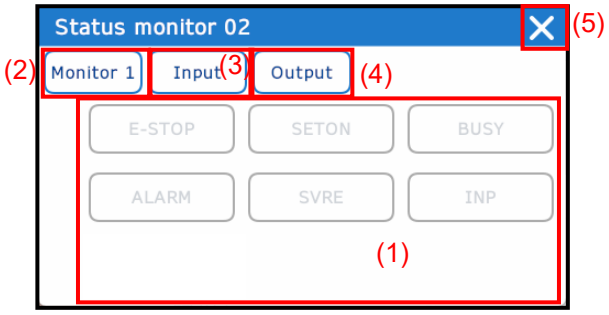
[Status monitor 01 screen]

Screen description

No.	Name	Function
1	Connected JXC controller status	Displays the Controller type, Unit name, Step No. (currently instructed step data No.), current position, speed, thrust, and target position. ∗For details of each item, check the instruction manual of the connected controller.
2	Up / Down Scroll button	Scrolls up and down the monitor items.
3	Monitor 2 button	Moves to the Status monitor 02 screen.
4	Input button	Moves to the Status Monitor Input screen.
5	Output button	Moves to the Status Monitor Output screen.
6	Close X button	Moves to the previous screen.

(2) Status monitor 02 screen

The status of the connected actuator can be checked on the Status monitor 02 screen.



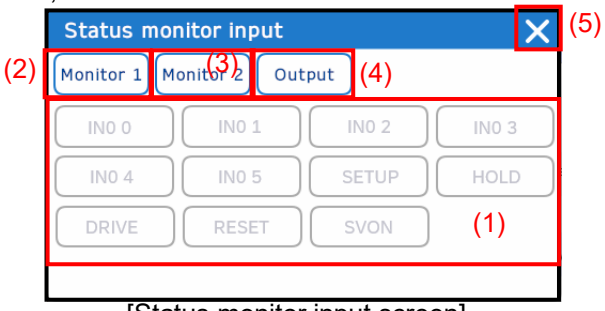
[Status Monitor 02 screen]

Screen description

No.	Name	Function
1	Connected actuator status	Displays the status of E-STOP, SETON, BUSY, ALARM, SVRE, INP. Displays the status of I/O signals. : Signal OFF state : Signal ON state For details of each signal, refer to the instruction manual of the connected controller.
2	Monitor 1 button	Moves to the Status Monitor 01 screen.
3	Input button	Moves to the Status Monitor Input screen.
4	Output Button	Moves to the Status Monitor Output screen.
5	Close X button	Moves to the previous screen.

(3) Status Monitor Input screen

On the Status monitor input screen, the status of the connected JXC series controller can be checked.



[Status monitor input screen]

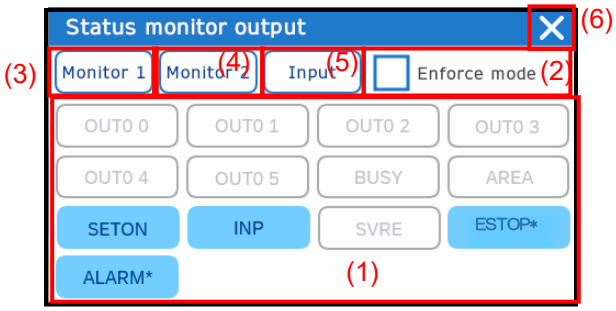
Screen description

No.	Name	Function
1	JXC controller input signal status	Displays the status of IN0-IN5, SETUP, HOLD, DRIVE, RESET, and SVON input signals. : Signal OFF state : Signal ON state For details of each signal, refer to the instruction manual of the connected controller.
2	Monitor 1 button	Moves to the Status Monitor 01 screen.
3	Monitor 2 button	Moves to the Status Monitor 02 screen.
4	Output button	Moves to the Status Monitor Output screen.
5	Close X button	Moves to the previous screen.

(4) Status Monitor Output screen

The status of output signals of the connected JXC series controllers can be checked on the status monitor output screen.

This screen can be used to force the output signal ON.



[Status monitor output screen]

Screen description

No.	Name	Function
1	JXC controller output signal status	Displays the status of OUT0 to OUT5, BUSY, AREA, SETON, INP, SVRE, ESTOP, and ALARM output signals. : Signal OFF state : Signal ON state For details of each signal, refer to the instruction manual of the connected controller.
2	Enforce mode	Enforce mode instructs the forced output of output signals. When the forced output is instructed, pressing the output signals force that signal to be ON. : Forced output instruction : No forced output instruction When an alarm has occurred, forced output cannot be used.
3	Monitor 1 button	Moves to the Status Monitor 01 screen.
4	Monitor 2 button	Moves to the Status Monitor 02 screen.
5	Input button	Moves to the Status Monitor Input screen.
6	Close X button	Moves to the previous screen.

4.3.9 Teaching screen

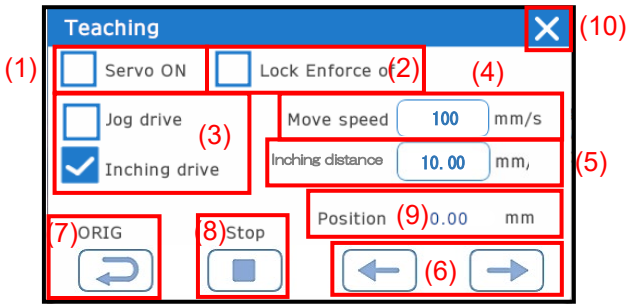
On the Teaching screen, servo ON/OFF, lock release, home return, jog operation, and inching operation of the connected actuator can be performed.

*When moving to this screen, communication with the host device will be disabled, and the servo will automatically be turned ON.

Jog operation: When the operation instruction button is pressed, the actuator moves at the speed set in the Movement speed setting. The actuator stops when the operation instruction button is released.

Inching operation: When the operation instruction button is pressed, the actuator moves at the speed set in the Movement speed setting and for the distance set in the Inching distance setting.

When setting the Step data, the position moved by a jog operation or inching operation can be set numerically by checking the current position displayed, or the current position can be set by pressing the “Get position” button.



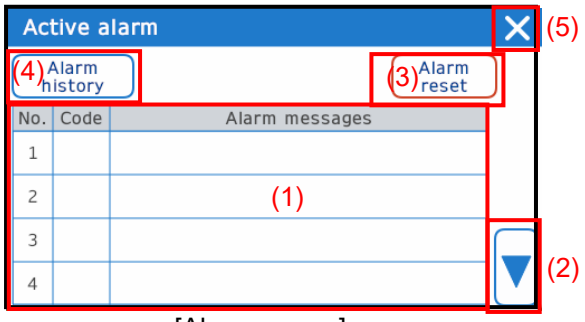
[Jog / Inching screen]

Screen description

No.	Name	Function
1	Servo ON instruction	Instructs servo-ON or servo-OFF switching of the motor of the connected actuator. ☑ : Servo ON instruction ☐ : Servo OFF instruction *Note that if Servo OFF is selected, take care that the actuator will drop under its own weight when installed vertically.
2	Lock enforced release instruction	Instructs forced release of the lock (brake) of the connected actuator. ☑ : Instructs forced release of lock. ☐ : No instruction to the lock (automatic control by controller) * The connected actuator with lock is automatically worked when the servo is turned OFF.
3	Operation Selection	Specifies Jog operation or Inching operation
4	Move speed setting	Sets the travel speed for the jog or inching operation. The setting range depends on the connected actuator.
5	Inching distance setting	Sets the travel distance for an inching operation. This setting is displayed only when inching operation is selected.
6	Operation instruction button	Jog operation: The actuator operates when the operation indicator button is pressed. (the actuator stops when the button is released). ← : When the button is pressed, the actuator moves to the origin end. → : When the button is pressed, the actuator moves to the opposite end. Inching operation: When the operation instruction button is pressed, the actuator moves at the distance set in the Movement distance setting and at the speed set in the Movement speed setting. ← : Moves to the origin end. → : Moves to the opposite end.
7	ORIG button	Instructs a Return to origin.
8	Stop button	Instructs to stop the operation during the Inching and Return to origin operation.
9	Position button	Displays the current position of the connected actuator.
10	Close X button	Moves to the previous screen.

4.3.10 Alarm screen

On the Alarm screen, currently active alarms can be checked.
This screen can also be used to move to the Alarm history screen.



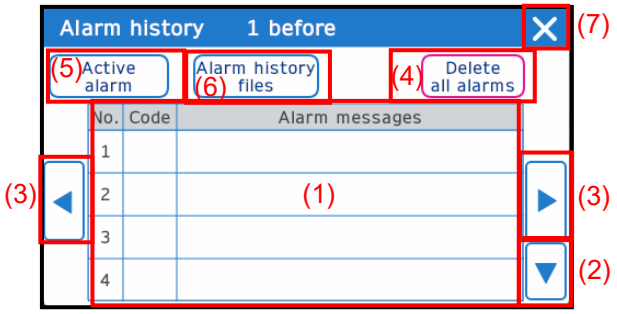
[Alarm screen]

Screen description

No.	Name	Function
1	Alarms currently active	Displays alarms currently occurring at the connected JXC controller. Press the alarm message to check the details and countermeasures. ∗For details on alarms that have occurred, refer to the instruction manual for the connected JXC controller.
2	Up / Down scroll button	When 5 or more alarms occur at the same time, the 5th and subsequent alarms are displayed.
3	Alarm reset button	Resets the currently occurring alarms that can be cleared.
4	Alarm history button	Moves to the Alarm history screen.
5	Close X button	Moves to the previous screen.

4.3.11 Alarm History screen

On the Alarm history screen, alarm history (alarms that have occurred in the past) can be checked.
This screen can also be used to move to the Active alarm screen and Alarm history files screen.



[Alarm History screen]

Screen description

No.	Name	Function
1	Alarm history screen	Displays the history of alarms that have occurred in the connected JXC controller. Press the alarm message to check the details and countermeasures. For details of the alarms that have occurred, refer to the instruction manual of the connected JXC controller.
2	Up / Down scroll button	When 5 or more alarms occur at the same time, the 5th and subsequent alarms are displayed.
3	Left / Right scroll button	Left scroll button: Displays the previous alarm history. Right scroll button: Displays the next alarm history. ∗Check the title to see how many previous alarms are displayed.
4	Delete all alarms	Delete all alarm history data.
5	Active alarm button	Moves to the Active Alarm screen.
6	Alarm history files button	Moves to the (Alarm history) File screen.
7	Close X button	Moves to the previous screen.

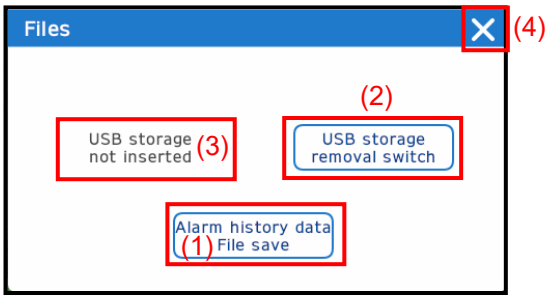
4.3.12. (Alarm History) Files screen

On the (Alarm History) Files screen, an alarm history file can be saved.

∗Alarm history files cannot be read.

To save the Alarm history file, insert a USB memory device (FAT32 format) into the USB interface on the back of the Teaching box.

To remove the USB memory from the Teaching box, press the “USB memory removal switch” button and remove the USB memory device when "USB memory not inserted" is displayed.



[Alarm History Files screen]

Screen description

No.	Name	Function No.
1	Alarm history data File save button	Saves the Alarm history to a file. ∗**The file name is fixed.** Save the file to USB memory using the name “00003_JXC_Alarm_History_Export.csv”. ∗Be careful not to overwrite previous files. ∗Note that the file cannot be read if it is renamed.
2	USB memory removal switch button	Press to remove the USB memory device. ∗When "USB memory not inserted" is displayed on the USB memory status, the USB memory device can be safely removed.
3	USB memory status	When a USB memory device is inserted into the USB interface on the back of the Teaching box, "USB memory inserted" is displayed. When the USB memory device is not inserted into the Teaching box or the "USB memory removal switch" button is pressed, "USB memory not inserted" is displayed.
4	Close X button	Moves to the previous screen.

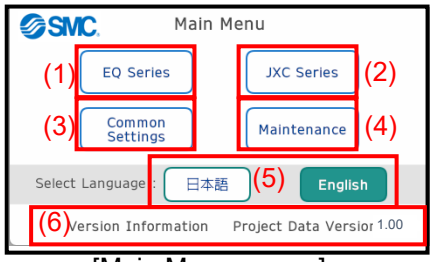
5. Common screen

5.1 Main Menu screen

The Main Menu screen is displayed when the Teaching box is connected to the EQ series actuator or JXC series controller and power is supplied to the Teaching box.

The Main Menu screen can be used to move to the EQ series top screen, JXC series top screen, Common settings screen, and Maintenance screen.

This screen can also be used to set the displayed language, and the Project Data Version (Teaching box software) can be checked.



[Main Menu screen]

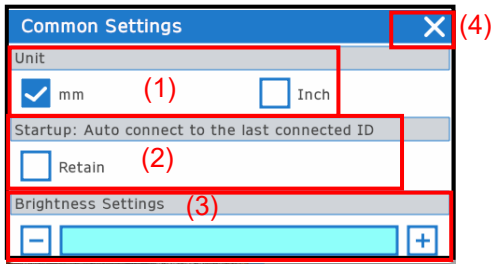
Screen description

No.	Name	Function
1	EQ series button	Moves to the EQ top screen where EQ series actuators can be configured.
2	JXC series button	Moves to the JXC top screen where JXC series controllers can be configured.
3	Common settings button	Moves to the Common setting screen.
4	Maintenance button	Moves to the Maintenance screen.
5	Language selection	Press the Japanese button to set the screen language to Japanese, or press the English button to set the screen language to English. (The button for the set language has a green background).
6	Project Data Version	Displays the version of the software in the Teaching box.

5.2 Common Settings screen

On the Common Settings screen, settings that are common to both the EQ Settings screens and the JXC Settings screens can be set.

On the Common Settings screen, units selection, previous ID auto-connection at startup setting and screen brightness can be set.



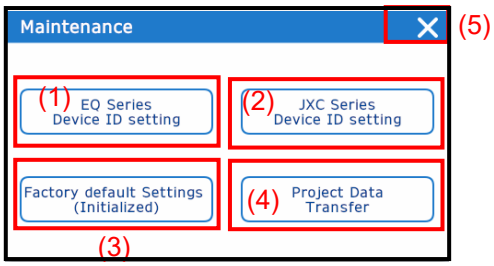
【Common Settings screen】

Screen description

No.	Name	Function
1	Unit selection	Specifies units in “mm“ or “Inch”.
2	Startup instruction	Settings to skip the Main menu screen when starting up the teaching box. *If the setting is ☑, it will communicate using the device ID when starting up the teaching box last. ☑ : Communicate using the previous device ID ☐ : Communicate by setting the device ID *If the connected device is the same, and if this setting is set to ☑, the main menu screen will be skipped.
3	Brightness setting	Sets the screen brightness. ⊞ : Increases brightness. ⊟ : Decreases brightness.
4	Close X button	Moves to the previous screen.

5.3 Maintenance screen

On the Maintenance screen, the EQ / JXC Device ID No. setting, Initialization, and Project Data Transfer (Update of Teaching box software) can be performed.



[Maintenance screen]

Screen description

No.	Name	Function
1	EQ series Device ID setting button	Moves to the EQ series device ID setting screen. Sets the device ID No. of the EQ series actuator to be connected.
2	JXC series Device ID setting button	Moves to the JXC series device ID setting screen. Sets the device ID No. of the JXC series controller to be connected.
3	Factory Default settings (Initialized) button	Changes language, Device ID Settings and common settings to the factory defaults (Language=Japanese / EQ Device ID=33, JXC Device ID=1 / Unit=mm / Startup setting=unchecked).
4	Project Data Transfer button	Moves to the Project data transfer screen. Used to update the Teaching box software.
5	Close X button	Moves to the previous screen.

5.3.1 Project Data Transfer screen

On the project data transfer screen, the Teaching box software can be updated according to the following procedure.

The version of the project data can be checked on the Main Menu.

Update Procedure

Step 1: Download the latest project data file for the Teaching box from the SMC website,

∗The name of the project data file is fixed as "package.BML" even if the version is different. Do not change the name of the file.

Step 2: Prepare a USB flash memory device (formatted FAT32) and copy the downloaded project data file "package.BML" in the root directory of the USB memory.

∗If the file is in any other location, it cannot be read.

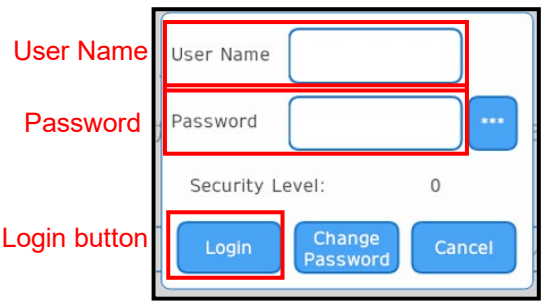
Step 3: Insert the USB memory device with the copied project data file into the USB interface on the back of the Teaching box.

Step 4: Connect the Teaching box to the EQ actuator or JXC controller and turn the power ON.

Step 5: Press the Maintenance button on the Main Menu screen.

Step 6: Press the Project Data Transfer button on the Maintenance screen.

Step 7: Input the User Name and Password and press the Login button.

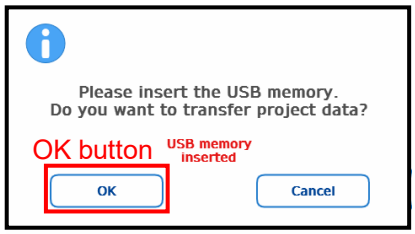


User Name	SMC
Password	SMC_dept5

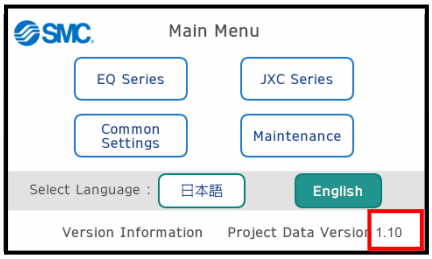
Enter the User Name and password in uppercase and lowercase letters.

[User Name and Password Entry screen]

Step 8: After entering the correct User Name and Password and logging in, the following confirmation screen will be displayed.
Press the OK button.



∗If the screen on the left is not displayed, the transfer has not been performed correctly.
Press the Cancel button and confirm that the USB flash memory device is inserted, or that the USB flash memory does not have any malfunction.



Project Data Version

Step 9: When the project data is correctly transferred, the Main menu screen will be displayed.
On the project data transfer screen, remove the USB flash memory, and confirm that the Project Data Version has been changed (Transfer complete).

5.4 Common screen

5.4.1 Screen when an Alarm occurs

When an alarm occurs in the connected EQ actuator or JXC controller, the frame of the Teaching box screen flashes red.

Check the contents of the alarm and remove the cause of the alarm.

∗Note that the red frame is not displayed on the Main Menu screen, Maintenance screen, Common setting screen, and Device ID setting screen.

[Screen when alarms active (Example of EQ top screen)]

5.4.2 Screen when the Stop switch is activated

When the stop switch unit (JX-T1S or JX-T1U) is installed on the Teaching box and the Teaching box and JXC controller are connected via the Teaching box communication cable for JXC supported stop switch unit (JX-T1C-CG), if the stop switch is pressed and activated, the frame of the Teaching box screen turns red.

In addition, "Stop switch is activated" is displayed on the JXC top screen.

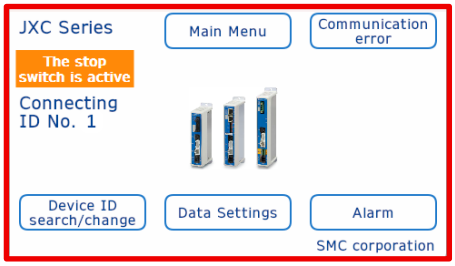
Check that there is no problem with the connected actuator or related system, and turn the stop switch to the right to release it.

∗Note that the red frame that the stop switch is activated is not displayed on the Main Menu screen, Maintenance screen, Common settings screen, and Device ID settings screen.

∗Note that the test operation, jog / inching operation, and other functions that involve actuator operation, cannot be used while the stop switch is activated.

∗If the Teaching box is used without connecting the stop switch unit (JX-T1S or JX-T1U) to the Teaching box communication cable for JXC supported stop switch unit (JXC-T1C-CG), the red frame that the stop switch is activated will be displayed. Also, pressing the stop switch will not function at this time. Be sure to connect the Teaching box communication cable for JXC supported stop switch unit (JXC-T1C-CG) and the stop switch unit to the Teaching box before using the Teaching box.

∗If the Teaching box communication cable for JXC not supported stop switch unit (JXC-T1C-C) is connected to the Teaching box even though a stop switch unit (JX-T1S or JX-T1U) is installed on the Teaching box, a red frame that the stop switch is activated will not be displayed. Be sure to connect the Teaching box communication cable and the stop switch unit to the Teaching box before using the Teaching box.



[Screen when Stop switch is activated (Example of the JXC top screen)]

5.4.3 Warning screen

When a warning occurs on the connected EQ actuator, the frame of the Teaching box screen flashes yellow. Check the warning, take action on the connected EQ actuator, and change the judgment value or reset the current value on the Maintenance information screen.

∗Note that the yellow frame is not displayed on the Main Menu screen, Maintenance screen, Common settings screen, and Device ID settings screen when a warning occurs.

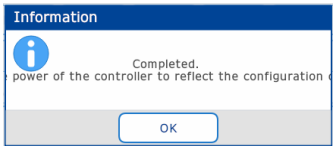
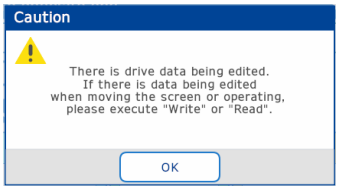
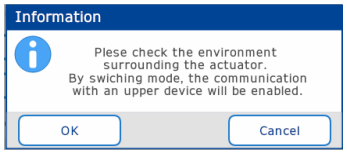
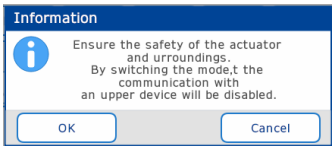
[Screen when warning occurs (Example of the JXC top screen)]

6. Troubleshooting

If an operation failure occurs, check the cause of the failure and the measures to be taken according to the information message and the phenomenon of the problem.

If the cause corresponding to the problem is not confirmed, contact SMC.

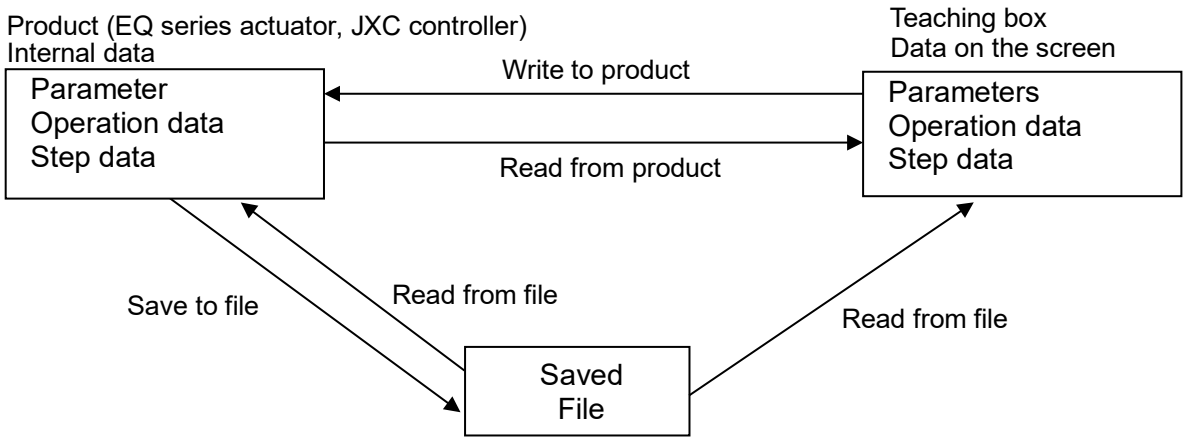
Information message:

No.	Information	Possible Cause	Countermeasures
1		EQ setting: This message is displayed when the operation mode is changed in the easy setup screen or when the parameters are changed. Also when the rotation direction reference is changed in the parameter setting on the option setting screen in closed center mode. JXC setting: This message is displayed when the parameters are changed.	Cycle the power to the product (on and off again).
2		EQ setting: This message is displayed when the drive data has not been written to the actuator after being changed on the easy setup screen. JXC setting: This message is displayed when the step data has not been written to the actuator after being changed on the data setting screen.	Press the Write button or Read button.
3		EQ setting: This message is displayed when moving from the Test operation screen and Jog / Inching screen to the Easy setup screen. JXC Setting: This message is displayed when moving from the Test operation screen and Teaching screen to the Data setting screen. *Note that pressing "OK" will enable communication with the host device.	Press "OK" to enable communication with the host device, or "Cancel" to disable it.
4		EQ Settings: This message is displayed when moving from the Easy setup screen to the Test operation screen and Jog / Inching screen. JXC Settings: This message is displayed when moving from the Data setting screen to the Test operation screen and Teaching screen. Note that pressing "OK" will disable communication with the host device.	Press "OK" to disable communication with the host device, or "Cancel" to disable it.

Troubleshooting:

No.	Problem	Possible cause	Investigation method	Countermeasures
1	Unable to communicate	Connection failure	Check the connection status.	Check that the connection is made properly. Communication cannot be established if the connector is damaged. Check that the power of the product is turned on. Communication is not possible when the power is turned off.
2	Data read from a file is incorrect.	Wrong file	Check if the file you tried to read is the file you expected.	The names of the files for saving operation data, step data, and parameters are fixed. Keep the file name unchanged and store it in a folder with a name that identifies the folder.
3	Saved operation data files, step data files and parameter files cannot be read.	Model mismatch between the connected product model and the saved file	Check if the model of the connected product and the model of the saved file match.	If the model of the connected product and the model of the saved file do not match, the file cannot be read. Make sure that the models of the product and the model of the saved file match.

State transition diagram of Teaching box setting data (parameters, operation data, and step data)



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Edition 1:Description changed [April 2026]

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