JX-T1--TF225-040EN

SMC

ORIGINAL INSTRUCTIONS

Instruction Manual
Electric Actuator – Teaching Box
Series JX-T1

The intended use of the Electric Actuator Teaching box is to connect to SMC electric actuators or controllers to input / change settings.

1 Safety Instructions

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

[*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: Robotics - Safety requirements - Part 1: Industrial robots.
• Refer to the product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
• Keep this manual in a safe place for future reference.

⚠ 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

• **Always ensure compliance with relevant safety laws and standards.**
• **All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.**
• For further Safety instructions for the Teaching box, Actuators and Controllers refer to the relevant operation manual for each product on the SMC website (URL: https://www.smcworld.com).
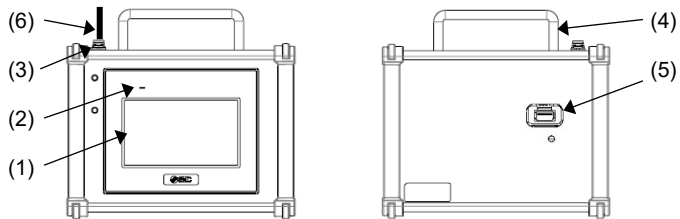
2 Specifications
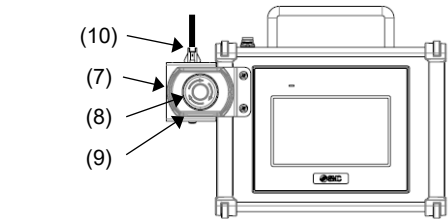
2.1 Teaching box specifications

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, Analogue resistive touch panel
Power consumption	6.9 W maximum
Languages supported	Japanese, English
Data storage	USB flash memory (FAT32)
Communication cable length	3 m (purchased separately)
Operating temperature range	0 ~ 45°C
Operating humidity range	90% R.H. or less (no condensation)
Storage temperature range	-10 to 60°C (no condensation or freezing)
Storage humidity range	10 to 90% R.H. (no condensation)
Protective structure	IP20 (IEC 60529) or equivalent
Standards	CE / UKCA
Weight	Teaching box: 890 g Teaching box with Stop switch: 1060 g
Accessories	None supplied. The Communication cable JX-T1C-* for connecting to the actuator / controller, and the Stop switch unit JX-T1U, must be purchased separately.

3 Name and function of parts

3.1 Teaching box (without Stop switch)

3.2 Teaching box (with Stop switch)

Item	Name	Description
1	Display	Touch panel input LCD 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 indicators	Green: Teaching box energized, software running. Orange (Flashing): Loading Teaching box software. Red: Energized (internal software not running). OFF: Teaching box not energized.

3 Name and function of parts (continued)

Item	Name	Description
3	Communication connector	Connector to connect the Teaching box communication cable.
4	Handle	Handle for carrying the Teaching box.
5	USB interface	Interface to connect a USB memory device.
6	Communication cable	The following 3 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).
7	Stop switch unit	Unit to connect when an optional Stop switch is required (for JXC series only). * When installing the stop switch unit, be sure to connect the Communication cable for Teaching box and Stop switch (JX-T1C-CG) before use.
8	Stop switch	When the Stop switch is pressed, the actuator decelerates to a stop, the servo turns OFF and the Stop switch locks. The switch is unlocked by turning it clockwise.
9	Stop switch guard	Guard to prevent unintended operation of the stop switch.
10	Stop switch connector	Connector to connect the Stop switch unit communication cable.

4 Operation

4.1 Operation

⚠ Warning

• Do not operate the product unless the Safety instructions have been read and understood.
• Do not use the product outside of its allowable specification.

4.2 Environment

⚠ Warning

• Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
• Do not use in an explosive atmosphere.
• Do not expose to direct sunlight.
• Do not use in a location subject to vibration or impact in excess of the product's specifications.
• Do not use in a location exposed to radiant heat that would result in temperatures in excess of the product specifications.
• Prevent foreign particles from entering the product.
• Avoid using in the following environments:
  a) Areas with large amounts of dust or cutting chips that could enter the product.
  b) Areas where the ambient temperature exceeds the specified range.
  c) Areas where the ambient humidity exceeds the specified range.
  d) Areas where strong magnetic or electric fields are generated.
  e) Areas where there are large amounts of dust or there is exposure to water/oil droplets.
  f) Areas at altitudes above 1000 m.
  Heat radiation performance and withstand voltage may decline as a result. For details, consult with SMC.
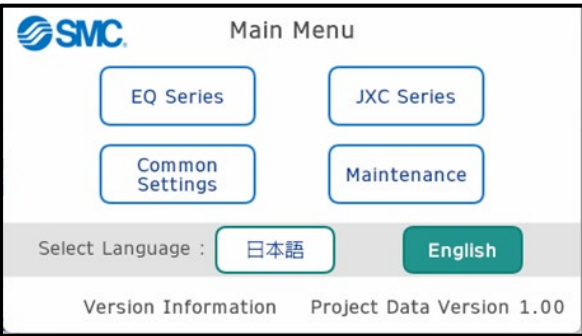
4.3 Wiring

⚠ Warning

• Adjustment, mounting or wiring changes should not be carried out before disconnecting the power supply to the product.
• Do not disassemble or modify the cables.
• Use only the specified cables.
• Confirm correct insulation.
  Poor insulation of wires, cables, connectors, terminals etc. can cause interference with other circuits.

5 Functions
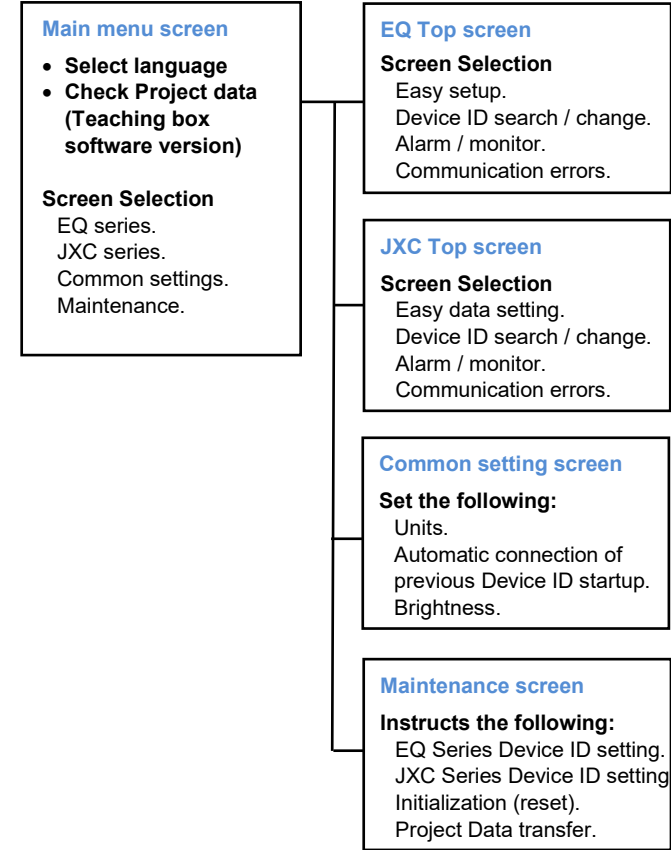
5.1 Teaching box Functions

Function name	Description
EQ series settings	• Easy startup setting. Set the driving data. • Driving conditions setting. Set conditions for driving data. • Parameter Setting. Set various parameters. • Jog / Inching. Instructs Jog, Inching, and return to origin. • Test operation. Test operation by specifying the driving 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, and alarm history to a file. Reads step data and parameters from a file.
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.
Common settings	• Units setting. Automatic connection setting of previous Device ID at startup. Omits the main menu screen when connecting a Teaching box. • Brightness setting.
Maintenance	• EQ device ID setting • JXC device ID setting • Initialization Reset language, Device ID settings, units, and previous ID auto-connection settings to factory defaults. • Project data transfer Used to update the Teaching box software.

5.2 Main Menu screen

5 Functions (continued)

5.3 Screen transition

Main menu screen
- **Select language**
- **Check Project data (Teaching box software version)**

Screen Selection
EQ series.
JXC series.
Common settings.
Maintenance.

EQ Top screen

Screen Selection
Easy setup.
Device ID search / change.
Alarm / monitor.
Communication errors.

JXC Top screen

Screen Selection
Easy data setting.
Device ID search / change.
Alarm / monitor.
Communication errors.

Common setting screen

Set the following:
Units.
Automatic connection of previous Device ID startup.
Brightness.

Maintenance screen

Instructs the following:
EQ Series Device ID setting.
JXC Series Device ID setting
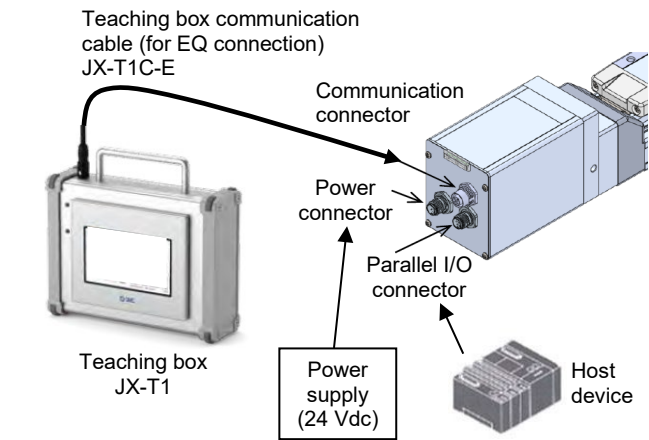Initialization (reset).
Project Data transfer.

6 EQ Actuator settings

6.1 Connection

(1) Teaching box connection
- Connect the 24 VDC power supply and host device (PLC) 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.

Teaching box communication cable (for EQ connection) JX-T1C-E

Communication connector

Power connector

Parallel I/O connector

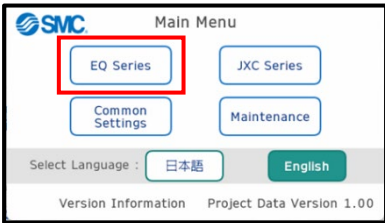Teaching box JX-T1

Power supply (24 Vdc)

Host device

(2) Teaching box startup
- If the connection with the EQ series actuator is established correctly, the Main Menu screen will be displayed (shown below).

6 EQ Actuator settings (continued)

- 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).
- Press the EQ Series button for the EQ Series actuator settings.

(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.

*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.

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.

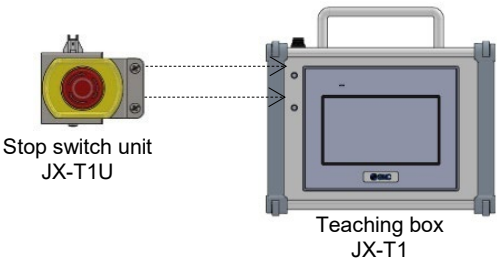For details on each setting and the function screens please refer to the Teaching box operation manual available on the SMC website (URL: https://www.smcworld.com).

7 JXC Controller settings

7.1 Connection
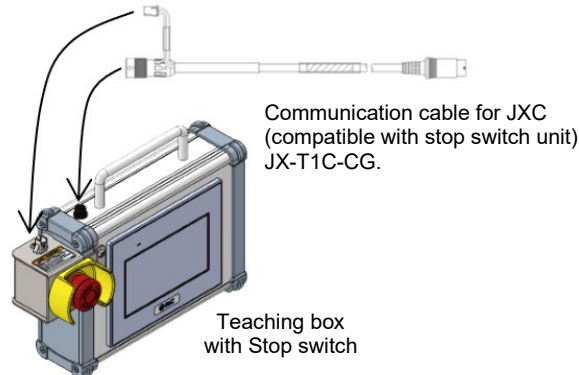
(1) Teaching box preparation
When connecting the Teaching box to the JXC series Controller, there is an option to install a Stop switch unit JX-T1U on the Teaching box.

- When installing the Stop switch unit on the Teaching box
  Teaching box : JX-T1
  Stop switch unit: JX-T1U
  Communication cable for JXC connection (stop switch unit supported): JX-T1C-CG
- Mount the Stop switch unit in place using the screws provided (2 places).

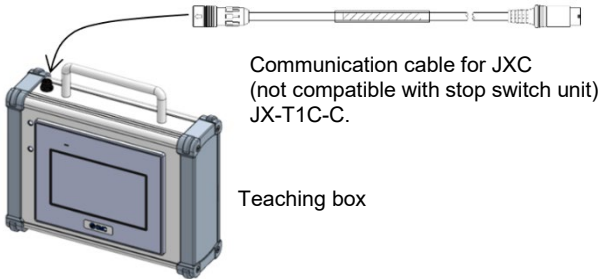Stop switch unit JX-T1U

Teaching box JX-T1

7 JXC Controller settings (continued)

- After installing the stop switch unit to the Teaching box, connect the communication cable to both the Teaching box and Stop switch.

Communication cable for JXC (compatible with stop switch unit) JX-T1C-CG.

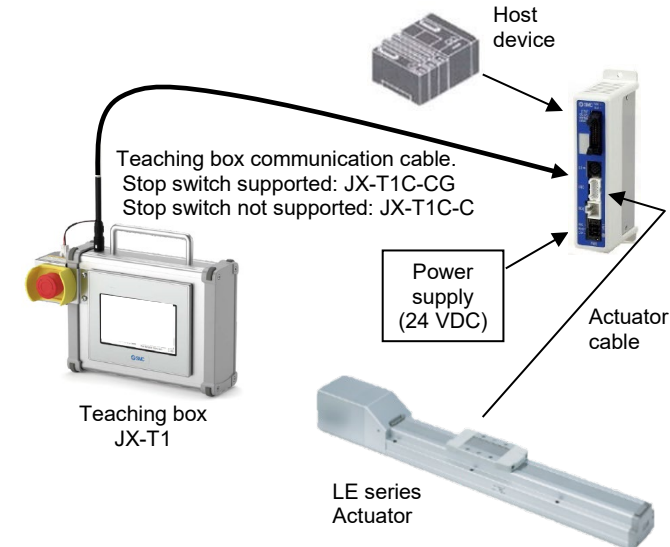Teaching box with Stop switch

- When the Stop switch unit is not installed on the Teaching box
  Teaching box : JX-T1
  Communication cable for JXC (stop switch unit not supported): JX-T1C-C.
- Connect the communication cable for JXC (stop switch unit not supported) JX-T1C-C to the Teaching box.

Communication cable for JXC (not compatible with stop switch unit) JX-T1C-C.
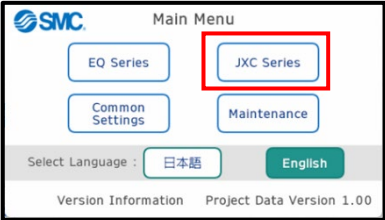
Teaching box

(2) Teaching box connection
- Connect the JXC series Controller to a compatible electric actuator, 24 VDC power supply and host device (PLC).
  Refer to the JXC series Controller operation 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*.
  Refer to the JXC series Controller operation manual to check that there are no problems with the connections and wiring, and then turn on the power.

Host device

Teaching box communication cable.
Stop switch supported: JX-T1C-CG
Stop switch not supported: JX-T1C-C

Power supply (24 VDC)

Actuator cable

Teaching box JX-T1

LE series Actuator

7 JXC Controller settings (continued)

(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.

(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.

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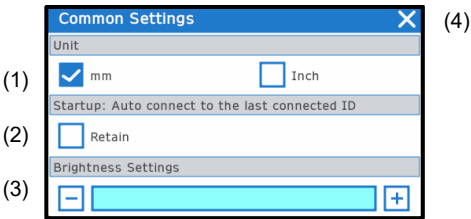
*If the basic parameters / Device ID of the connected JXC controller have been changed, change the search range to a range including the changed Device ID on the JXC Series Device ID setting and press the Start search button.
When the search result shows the changed Device ID number with a white background,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

For details on each setting and the function screens please refer to the Teaching box operation manual available on the SMC website (URL: https://www.smcworld.com).
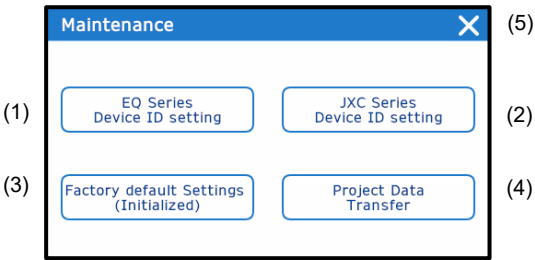
8 Common Settings screen

- On the Common Settings screen, settings that are common to both the EQ Settings and the JXC Settings can be set.
- The Units selection, previous ID auto-connection at startup setting and screen brightness can be set.

Common Settings		X (4)
Unit		
(1) ☑ mm	☐ Inch	
Startup: Auto connect to the last connected ID		
(2) ☐ Retain		
Brightness Settings		
(3) ➖ ▬▬▬▬▬▬▬ ➕		

No.	Name	Description
1	Units selection	Specifies units in "mm" or "Inch".
2	Startup instruction	When starting up the Teaching box and the EQ series button or JXC series button is pressed in the Main Menu, it sets whether to communicate using the device ID connected at the previous startup. ☑ : Communicate using the previous Device ID. ☐ : Communicate by setting the Device ID. * If the connected device is the same as the device before the Device ID setting screen can be skipped.
3	Brightness setting	Sets the screen brightness. ➕ : Increases brightness. ➖ : Decreases brightness.
4	Close X button	Go to the previous screen.

9 Maintenance screen

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

Maintenance		X (5)
(1) EQ Series Device ID setting	JXC Series Device ID setting	(2)
(3) Factory default Settings (Initialized)	Project Data Transfer	(4)

No.	Name	Description
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 settings=33, JXC ID Settings=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.

10 LCD and LED display

10.2 Common Indicators

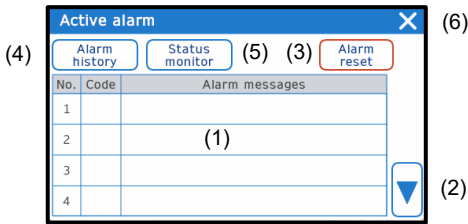| Item	Description
Alarm	The outer frame of the LCD screen flashes red. *Note that the flashing red frame during an alarm is not displayed on the Main Menu screen, Maintenance screen, Common settings screen, and Device ID settings screen.
Stop switch activated	The outer frame of the LCD screen turns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

10.3 Alarm

- 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.

e-Actuator setup EQ series	Main Menu
Connecting ID No. 33	(Frame flashing red)
Device ID search/change	Easy setup	Alarm/Monitor
	SMC corporation

10.3.1 Active 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 (for EQ series actuators only).
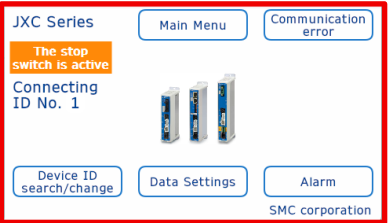
Active alarm			X (6)
(4) Alarm history	Status monitor	(5) (3) Alarm reset	
No. Code	Alarm messages		
1			
2	(1)		
3			
4		▼ (2)	

No.	Name	Description
1	Alarms currently active	Displays alarms currently occurring at the connected Actuator or 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 Actuator or Controller 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 (applicable to EQ series only).
6	Close X button	Moves to the previous screen.

10 LCD and LED display (continued)

10.4 Stop switch activated

- When the Stop switch unit is installed on the Teaching box and is connected via the communication cable, 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 clockwise to release it.
*Note that the red frame is not displayed on the Main Menu screen, Maintenance screen, Common settings screen, and Device ID settings screen.

JXC Series	Main Menu	Communication error
The stop switch is active		
Connecting ID No. 1		
Device ID search/change	Data Settings	Alarm
		SMC corporation

10.5 Warning

- 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.

EQ Series	Main Menu	Communication error
The stop switch is active		
Connecting ID No. 33		
Device ID search/change	Data Settings	Alarm
		SMC Corporation

11 How to Order

- For standard products, refer to the catalogue on the SMC website (URL: https://www.smcworld.com) for the How to order information.

12 Outline Dimensions

- For standard products, refer to the catalogue on the SMC website (URL: https://www.smcworld.com) for Outline dimensions.

13 Maintenance

13.1 General Maintenance

⚠ Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly electricity and compressed air can be dangerous.
- Maintenance of electromechanical and pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the power has been discharged and the air is released to atmosphere.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Incorrect handling can cause an injury, damage or malfunction of the equipment and machinery, so ensure that the procedure for the task is followed.

14 Limitations of Use

14.1 Limited warranty and disclaimer/compliance requirements

- Refer to Handling Precautions for SMC Products.

15 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

16 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.