



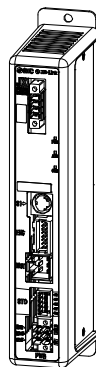
ORIGINAL INSTRUCTIONS

Instruction Manual

Step Motor Controller – IO-Link

(24 VDC Servo) with STO Sub-function

Series JXCLF#



IMPORTANT

When supplied in the European Union or the United Kingdom this document does not contain the necessary safety instructions as required by the Machinery Directive 2006/42/EC or the UK Machinery Safety Regulations 2008.

It is mandatory to refer to the Operation Manual, Document No. JXC#-OMY0009 supplied with the product by your local SMC subsidiary for such safety instructions before using this product.

The EU or UKCA Declaration of Conformity is supplied by your local subsidiary with the product.

For other territories the Operation Manual and Declaration of Conformity may be downloaded from the SMC website (URL <https://www.smcworld.com>).

The intended use of the step motor controller is to control the movement of an electrical actuator whilst connected to the IO-Link protocol.

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.

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.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

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

Warning

- 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.

- Special products (-X) might have specifications different from those shown in the specifications section. Contact SMC for specific drawings.

2 Specifications

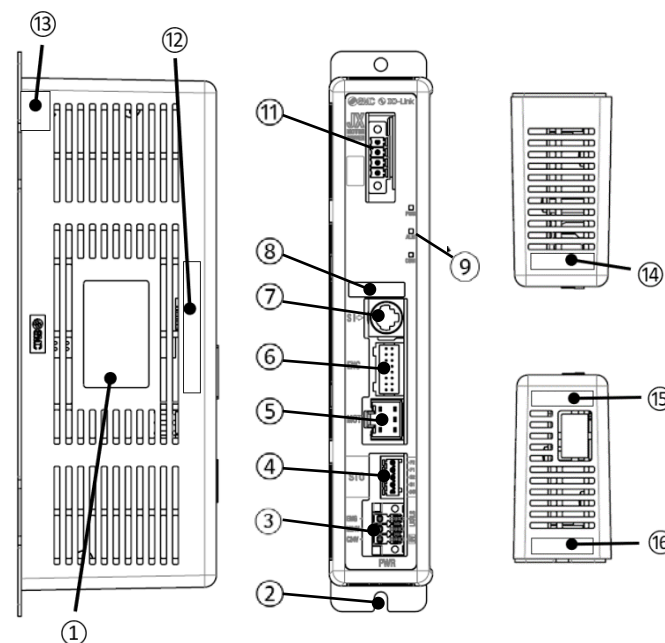
2.1 General specifications

Item	Specifications
Compatible motor	Step motor (servo 24 VDC)
Power supply (M24V, C24V)	24 VDC +/-10% (certified SELV / PELV power supply).
Current consumption	200 mA or less (Controller). Refer to actuator specification for total power consumption.
Compatible encoder	Incremental A/B phase (800 pulses / rotation) Battery-less absolute A/B phase (4096 pulse/rotation)
Memory	EEPROM
Lock control	Forced lock release terminal
Cable length	Power supply cable: 30 m max. Actuator cable: 20 m max.
Cooling method	Natural air-cooling
Operating temperature	0°C to 55°C (no freezing)
Storage temperature	-10°C to 60°C (No freezing)
Humidity range	90% RH or less (no condensation)
Insulation resistance	50 MΩ (500 VDC) between the external terminals and case
Weight	220 g (Direct mounting type) 240 g (DIN rail mounting type)

2.2 IO-Link specifications

Item	Specifications
Protocol	IO-Link (version 1.1)
Communication speed	COM3 (230.4 kbps)
Communication cable	4 wire unshielded cable (conductor resistance 3 ohms or less, line capacitance 3 nF or less, length 20 m or less).
IO-Link port Class	Class A
Process data length	Input 14 bytes / Output 22 bytes
Process data minimum cycle time	2.4 ms
Vendor ID	0x0083
Device ID	0x00013E
Network topology	1:1
SIO mode	Not applicable
IODD configuration file	SMC-JXCL-*****-IODD1.1.xml

3 Name and function of parts



3 Name and function of parts (continued)

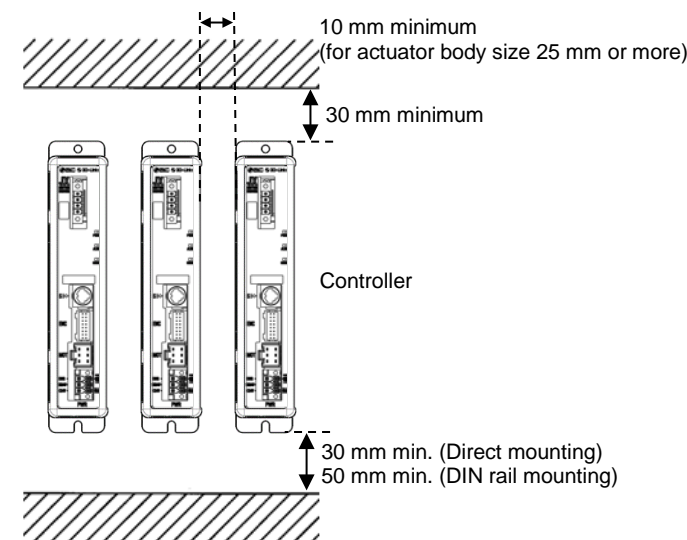
No.	Name	Description
1	Controller label	Label indicating the controller model number.
2	FE	Functional Earth. (when the controller is mounted, tighten screws and connect the grounding cable).
3	PWR	Power supply connector (5 pin). Connector for controller power supply (24 VDC) using the power supply plug.
4	STO	STO Connector (5 pin). Connector for controller responsible for STO sub-function control.
5	MOT	Motor drive connector (6 pin). Connector for actuator cable.
6	ENC	Encoder connector (16 pin). Connector for actuator cable.
7	SI	Serial I/O connector (8 pin). Connector for teaching box (LEC-T1) or controller communication cable (JXC-W2A-C).
8	Applicable electric actuator model number label	Label indicating the electric actuator part number which can be connected to the controller.
9	LED display	LED's to indicate the controller status.
10	-	-
11	Communication connector	Connector for IO-Link network.
12	MAC address label	Not applicable for IO-Link product.
13	Security label	Label to prevent tampering of product.
14	Safety HW version label	Label indicating the safety HW version.
15	Non- safety version label	Label indicating the Non-safety version.
16	Serial number label	Label indicating the serial number.

4 Installation

4.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Design the installation so that the temperature surrounding the controller is 55°C max. Leave enough space between the controllers so that the operating temperature of the controllers remains within the specification range.
- Mount the controller vertically with 30 mm minimum space on the top and bottom of the controller as shown below.
- Allow 60 mm minimum space between the front of the controller and a door (lid) so that the connectors can be connected and disconnected.



4 Installation (continued)

4.2 Mounting

- The controller can be direct mounted (model JXCLF7#) using screws or mounted on a DIN rail (model JXCLF8#).
- When using DIN rail mounting, hook the controller on the DIN rail and press the lever down to lock it.

Caution

If the mounting surface for the controller is not flat or is uneven, excessive stress may be applied to the enclosure, which can cause failure. Be sure to mount on a flat surface.

4.3 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. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.
- Avoid mounting the controller near a vibration source, such as a large electromagnetic contactor or circuit breaker on the same panel.
- Do not use in an environment with strong magnetic fields present.

5 Wiring

Caution

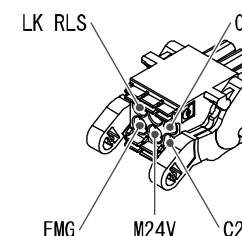
- Do not perform wiring while the power is on.
- Confirm proper insulation of wiring.
- Do not route wires and cables together with power or high voltage cables.
- Keep wiring as short as possible to prevent interference from electromagnetic noise and surge voltage.
- Do not use an inrush current limited type of power supply for the controller.

- Do not connect multiple wires to one connector terminal.

5.1 Power Supply Connector

Wire the power supply cable to the power supply plug connector, then insert it into connector PWR on the controller.

- Use special screwdriver (Phoenix Contact No. SZS0.4x2.0) to open / close lever and insert the wire into the connector terminal.



Power supply connector. SMC Part No. JXC-CPW.

Phoenix Contact Part No: DFMC1, 5/3-ST-LR

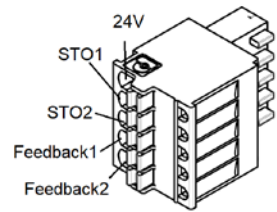
Pin No.	Terminal	Function	Description
1	C24V	Power supply (+)	Positive control power.
2	M24V	Motor power (+)	Positive power for the actuator motor supplied via the controller.
3	EMG	Stop (+)	Positive power for emergency stop signal
4	0V	Common power (-)	Negative common power for M24V, C24V, EMG and LK RLS.
5	-	NC	N/A
6	LK RLS	Unlocking (+)	Positive power for lock release.

Applicable wire size: AWG20 (0.5 mm²). Wire O/D to be ø2.5 mm max. Stripped wire length – 8 mm.

5 Wiring (continued)

5.2 STO Sub-function Connector

Wire the cable for the STO function to the STO plug connector, then insert it into connector STO on the controller.



Pin No.	Signal	Type	Description
1	24V	Output	Power supply output (internally connected to C24V).
2	STO1	Input	IEC 61131-2 Type 3 input to control STO demand on Channel 1.
3	STO2	Input	IEC 61131-2 Type 3 input to control STO demand on Channel 2.
4	Feedback 1	Output	Channel 1 feedback signal.
5	Feedback 2	Output	Channel 2 feedback signal.

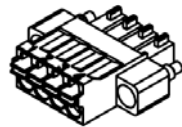
5.3 Communication Connector

Wire the IO-Link communication cable to the communication plug connector, then insert it into the communication connector on the controller.

- Use special screwdriver (Phoenix Contact No. SZS0.6x3.5) to tighten the connector terminal screws. Tightening torque = 0.5 to 0.6 Nm.

IO-Link connector (part number JXC-CL-S)

Phoenix Contact Part No. FMC1,5/4-STF-3,5 or equivalent.



No	Terminal	Description
1	L+	+24 VDC power supply for IO-Link communication. IO-Link communication starts when the power supply L+/L- and C24V control power are supplied to the JXC controller.
2	N.C.	Not connected
3	L-	0 VDC for IO-Link communication power supply
4	C/Q	IO-Link signal.

Applicable wire size: AWG20 (0.5 mm²). Wire O/D to be ø2.5 mm max. Stripped wire length – 8 to 10 mm.

5.4 Ground connection

- Place a ground cable with crimped terminal under one of the M4 mounting screws with a shakeproof washer and tighten the screw.

Caution

The M4 screw, cable with crimped terminal and shakeproof washer must be prepared by the user.

The controller must be connected to Ground to reduce noise. If higher noise resistance is required, ground the 0 V (signal ground). When grounding the 0 V, avoid flowing noise from ground to 0 V.

- A dedicated Ground connection must be used. Grounding should be to a D-class ground (ground resistance of 100 Ω maximum).
- The cross-sectional area of the ground cable shall be 2 mm² minimum.
- The Grounding point should be as near as possible to the controller. Keep the grounding cable as short as possible.

6 Setting

6.1 IO-Link configuration

- It is necessary to connect the JXC controller to the IO-Link master. First, supply power to the IO-Link master and the power supply L+/L- for communication with IO-Link. Then, install the IODD (I/O Device Description) file for JXCLF in the IO-Link master configuration tool for setting the JXC controller to the master.
- The IODD configuration file can be downloaded from the SMC website (URL: <https://www.smcworld.com>). Documents / Download → Instruction Manuals → SMC-JXCL_*****.zip

- Contents of zip file

IODD file	SMC-JXCL-*****-IODD1.1.xml
Device symbol	SMC-JXCLF7JXCLF8-pic.png
Device icon	SMC-JXCLF7JXCLF8-icon.png
Vendor logo	SMC-logo.png

6.2 Initial setting

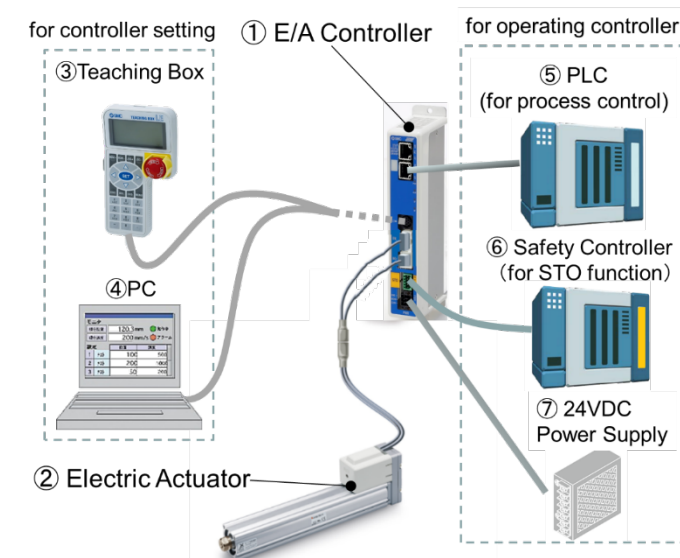
In order to move the electric actuator to a specific position, it is necessary to set up the patterns of operation with a PC using the controller setting software or by using a teaching box. This set up data will be recorded in the memory of the controller.

Caution

Do not turn OFF the power supply for the controller or connect / disconnect the cable while data is being written to EEPROM. This is to avoid the possibility of incorrect / corrupt data (step data, parameter).

Refer to the Operation Manual on the SMC website (URL: <https://www.smcworld.com>) for further setting details.

7 Product configuration



8 LED Display

Refer to the table below for the LED status.

LED	Description	
PWR	OFF	Power is not supplied Red ALM is on when an alarm is generated.
	Green LED is ON	Power is supplied
ALM	OFF	Normal operation
	Red LED is flashing	IO-Link communication power supply (L+/L-) is not connected
	Red LED is ON	Alarm generated.
COM	Green LED is ON	IO-Link communication is not established.
	OFF	IO-Link communication error, power supply L+/L- is not connected, or C24V power supply is not connected.

Refer to the table below for the LED and controller status.

Controller status	LED description		
	PWR	ALM	COM
When power is supplied	Green LED is ON	OFF	—
IO-Link	Normal communication	—	Green LED is flashing
	Communication not established	—	LED is OFF
	IO-Link communication error C/Q line not connected IO-Link communication failure	—	LED is OFF
	Power supply (L+/L-) not connected	—	Red LED is flashing
	Power supply C24V is not connected	LED is OFF	LED is OFF
Motor	Controller system error generated	LED is OFF	Red LED is ON
	Controller system error generated	Green LED is ON	Red LED is ON
	Writing to controller EEPROM	Green LED is flashing	—

9 How to Order

Refer to the catalogue on the SMC website (URL: <https://www.smcworld.com>) for the How to Order information.

10 Outline Dimensions (mm)

Refer to the drawings / operation manual on the SMC website (URL: <https://www.smcworld.com>) for outline dimensions.

11 Maintenance

11.1 General Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- Before performing maintenance, turn off the power supply. Check the voltage with a tester 5 minutes after the power supply is turned OFF.
- 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.
- Do not disassemble the product, unless required by installation or maintenance instructions.

Caution

- Maintenance should be performed according to the procedure indicated in the Operation Manual.
- When equipment is serviced, first confirm that measures are in place to prevent dropping of work pieces and run-away of equipment, etc, then cut the power supply to the system. When machinery is restarted, check that operation is normal with actuators in the correct position.

Warning

- Perform maintenance checks periodically.
- Confirm wiring and screws are not loose. Loose screws or wires may cause unexpected malfunction.
- Conduct an appropriate functional inspection and test after completing maintenance. In case of any abnormalities (if the actuator does not move, etc.), stop the operation of the system. Otherwise, an unexpected malfunction may occur and it will become impossible to ensure safety. Operate an emergency stop instruction to confirm safety.
- Do not put anything conductive or flammable inside of the controller.
- Ensure sufficient space around the controller for maintenance.

12 Limitations of Use

12.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

13 Product disposal

This product shall 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.

14 Contacts

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

SMC Corporation

URL: <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
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