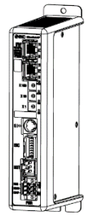
JXC9H-TF2Z031EN

ORIGINAL INSTRUCTIONS

Instruction Manual
Step Motor Controller (24 VDC Servo)
High Performance type for EtherNet/IP
Series JXC9H*-*



The intended use of the step motor controller is to control the movement of an electric actuator in response to step data and electrical inputs.

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.

2 Specifications

2.1 General specifications

Item	Specifications
Compatible motor	Step motor (servo 24 VDC)
Power supply	Power supply voltage: 24 VDC +/-10%
Current consumption	200 mA maximum (controller) Refer to the actuator specifications for total power consumption.
Compatible encoder	Incremental A/B phase (800 pulse/rotation)
Memory	Eeprom
Lock control	Forced lock release terminal
Cable length	Actuator cable: 20 m maximum
Cooling method	Natural air-cooling
Operating temperature	0ºC to 40ºC (No freezing)
Operating humidity	90% RH or less (no condensation)
Storage temperature	-10ºC to 60ºC (no freezing)
Operating humidity	90% RH or less (no condensation)
Insulation resistance	50 MΩ (500 VDC) between external terminals and case
Weight	250 g (Direct mounting type) 270 g (DIN rail mounting type)

2 Specifications (continued)

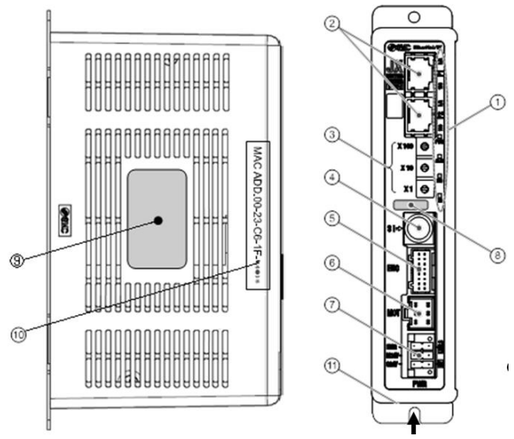
2.2 EtherNet/IP specifications

Item	Specification
Protocol	EtherNet/IP™ (Conformance test version CT-17)
Communication speed	10 / 100 Mbps
Communication method	Full duplex/ Half duplex (automatic negotiation)
Communication cable	Standard Ethernet cable (STP, CAT5 or higher, 100BASE-TX)
Setup file	EDS file (jxc9H_v10.eds)
Occupied area	Input 36 byte / Output 36 byte
Vendor ID	7h (SMC Corporation)
Product type	2Bh (Generic Device)
Product code	0100h

⚠ Warning

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

3 Name and function of individual parts



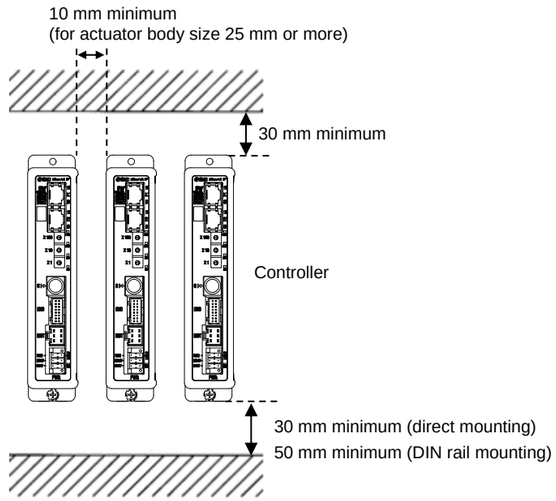
No.	Name	Description
1	Display	LED to indicate the controller status.
2	Connector P1/P2	Connect to the EtherNet/IP network
3	IP address	Switches to set the EtherNet/IP communication IP address.
4	Serial I/O connector (8 pin) SI	Connector for the teaching box (LEC-T1) or the controller communication cable (JXC-W2A-C).
5	Encoder connector (16 pin) ENC	Connections for actuator cable.
6	Motor power connector (6 pin) MOT	
7	Power supply connector (6 pin) PWR	Connector for controller power supply (24 VDC) using the power supply plug. Control power (+), Stop signal (+), Motor power (+), Lock release (+), Common power (-)
8	Applicable electric actuator model number label	Label indicating the electric actuator model number which can be connected to the controller.
9	Controller label	Label indicating the model number of the controller.
10	MAC address	Label to indicate MAC address
11	FE connection	Functional Ground (When the controller is mounted, tighten screws and connect the grounding cable).

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 40ºC 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.



4.2 Mounting

- The controller can be direct mounted (model JXC9H7*) using 2 x M4 screws or mounted on a DIN rail (model JXC9H8*).
- 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.

4.4 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.

4 Installation (continued)

- Do not connect multiple wires to one connector terminal.

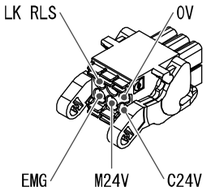
Power Supply Connector

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. SZS0.4×2.0) to open / close lever and insert the wire into the connector terminal.
- Applicable wire size: 20 AWG (0.5 mm²).

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

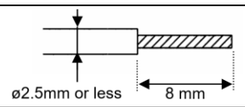
Phoenix Contact Part No:
DFMC1,5/3-ST-LR



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	Not connected
6	LK RLS	Unlocking (+)	Positive power for lock release.

Wiring specifications

Prepare the electrical wiring according to the following specifications (to be prepared by the user).

Item	Specifications
Applicable wire size	Single, stranded wire → AWG20 (0.5 mm²) • The rated temperature of the insulation coating should be 60ºC or more. The O.D. should be ø2.5mm or less.
Stripped wire length	

4.5 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.

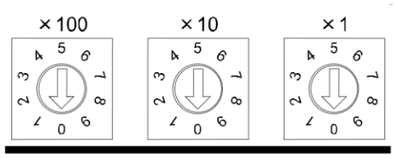
The controller must be connected to Ground to reduce noise. If higher noise resistance is required, ground the 0 V (signal ground). When grounding the 0 V, avoid flowing noise from ground to 0 V.

- 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.

5 Setting

5.1 Switch Setting

- Switch settings should be carried out with the power OFF.
- The switches should be set using a small flat blade screwdriver.



IP address 192.168.1. ***

Setting			Description
x100	x10	x1	
0	0	0	Remote Control (DHCP) *1
0	0	1	1 (default)
0	0	2	2
:	:	:	: *2
2	5	4	254
2	5	5	DHCP mode *3
2	5	6	Not used
:	:	:	
9	9	9	

***1 Remote control**

The mode to respond to the commands of BOOTP/DHCP server provided by Rockwell Automation.

- Enable DHCP
  Information including the IP address can be obtained from BOOTP/DHCP Server. If the power is supplied again in this state, the controller tries to obtain the information including IP address again.
- Disable BOOTP/DHCP
  Information including IP address is not obtained from BOOTP/DHCP Server. Previous setting can be held if power is supplied under this condition.
- If the controller IP address is unknown, change to DHCP mode and re-assign the correct IP address. When the DHCP server has assigned the correct address, turn off the power supply and return the unit to Remote control mode.
  Upon power-up, the JXC9H will now be available using the address that was set whilst in DHCP mode.

∗2 Manual setting of IP address

IP address is set within the range of 192.168.1.1 to 192.168.1.254.

∗3: DHCP mode

Obtain IP address from DHCP Server. Obtained IP address is lost when power supply is cut.

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.

5.2 Configuration

- An EDS file is required to configure the controller.
  Furthermore, icons are necessary for the display icon of the controller on the configurator.
  The latest EDS file can be downloaded from the SMC website (URL: https://www.smcworld.com).

  Informative documents → Operation manual --> jxc9H_v10.zip
  Contents of jxc9H_v10.zip EDS file jxc9H_v10.eds
  Icon xc9H_1.ico

6 LED Display

Refer to the table below for the LED status.

LED	Details		
PWR	Power supply status	OFF	Power is not supplied
		Green LED is ON	Power is supplied
ALM	Controller alarm status	OFF	Normal operation
		Red LED is ON	Alarm generated
MS	Controller status.	OFF	The controller operating voltage is not supplied.
		Green LED is ON	Operating normally
		Green LED is flashing	Communication standby
		Red LED is flashing	Recoverable error
		Red LED is ON	Unrecoverable error
NS	EtherNet/IP status.	OFF	The controller operating voltage is not supplied or the IP address is not set.
		Green LED is ON	EtherNet/IP communication established.
		Green LED is flashing	EtherNet/IP communication not established.
		Red LED is flashing	EtherNet/IP connection time out
		Red LED is ON	IP address duplicated
L/A1	Link/Act	OFF	BUS IN side (P1): No Link, No Activity
		Green LED is ON	BUS IN side (P1): Link, No Activity
		Green LED is flashing	BUS IN side (P1): Link, Activity
L/A2	Link/Act	OFF	BUS OUT side (P2): No Link, Activity
		Green LED is ON	BUS OUT side (P2): Link, No Activity
		Green LED is flashing	BUS OUT side (P2): Link, Activity

Refer to the table below for the LED and controller status

Controller status		LED			
		PWR	ALM	MS	NS
When EtherNet/IP communication is normal		-	-	Green LED is ON	Green LED is ON
Motor controller	Controller alarm generated	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	-	-	-

Caution

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

7 How to Order

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

8 Outline Dimensions (mm)

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

9 Maintenance

9.1 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.

10 Limitations of Use

10.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

11 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.

12 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)
SMC Corporation, Akihabara UDX15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101 0021

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