



ORIGINAL INSTRUCTIONS

**Instruction Manual**  
**Step Motor Controller - PROFINET**  
**(24 VDC Servo)**  
**High Performance type**  
**Series JXCPH\*.\***



The intended use of the step motor controller is to control the movement of an electric actuator while connected to the PROFINET communication 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.

<b>Caution</b>	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
<b>Warning</b>	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
<b>Danger</b>	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 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	0°C to 40°C (No freezing)
Storage temperature	-10°C to 60°C (no freezing)
Operating humidity	90% RH or less (no condensation)
Insulation resistance	50 MΩ (500 VDC) between external terminals and case
Weight	260 g (Direct mounting type) 280 g (DIN rail mounting type)

**2 Specifications (continued)**

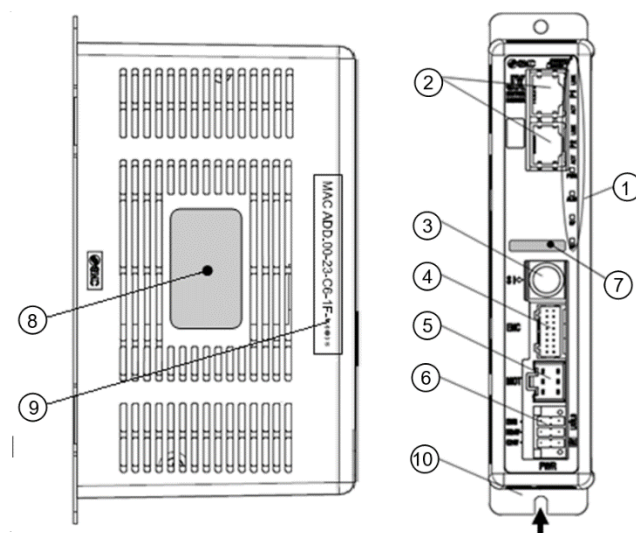
**2.2 PROFINET specifications**

Item	Specification
Protocol	PROFINET (Version 2.32)
IP address setting range	0.0.0.0 to 255.255.255.255 (set using DHCP server)
Communication speed	100 Mbps
Communication method	Full duplex/ Half duplex (automatic negotiation)
Communication cable	Standard Ethernet cable (STP, CAT5 or higher, 100BASE-TX)
Setup file	GSDML file
Occupied area	Input 36 byte / Output 36 byte
Connectable nodes	65,535 nodes maximum
Vendor ID	83h (SMC Corporation)
Device ID	52h

**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**



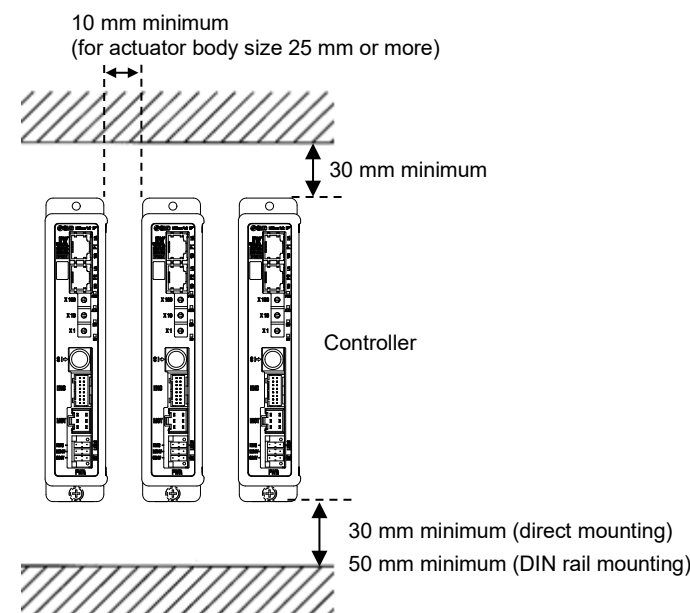
No.	Name	Description
1	Display	LED to indicate the controller status.
2	PROFINET P1/P2	Connect to the PROFINET network
3	Serial I/O connector (8 pin) SI	Connector for the teaching box (LEC-T1) or the controller communication cable (JXC-W2A-C).
4	Encoder connector (16 pin) ENC	Connections for actuator cable.
5	Motor power connector (6 pin) MOT	
6	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 (-)
7	Applicable electric actuator model number label	Label indicating the electric actuator model number which can be connected to the controller.
8	Controller label	Label indicating the model number of the controller.
9	MAC address	Label to indicate MAC address
10	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 40°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.



**4.2 Mounting**

- The controller can be direct mounted (model JXCPH7\*) using 2 x M4 screws or mounted on a DIN rail (model JXCPH8\*).
- 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.

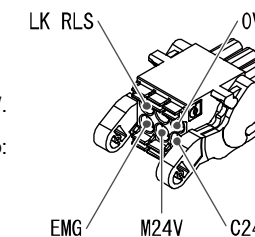
**4 Installation (continued)**

- 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. SZS0.4x2.0) to open / close lever and insert the wire into the connector terminal.
- Applicable wire size: 20 AWG (0.5 mm<sup>2</sup>).



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 mm <sup>2</sup> ) • The rated temperature of the insulation coating should be 60°C or more. The O.D. should be ø2.5mm or less.
Stripped wire length	 ø2.5mm or less, 8 mm

**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.

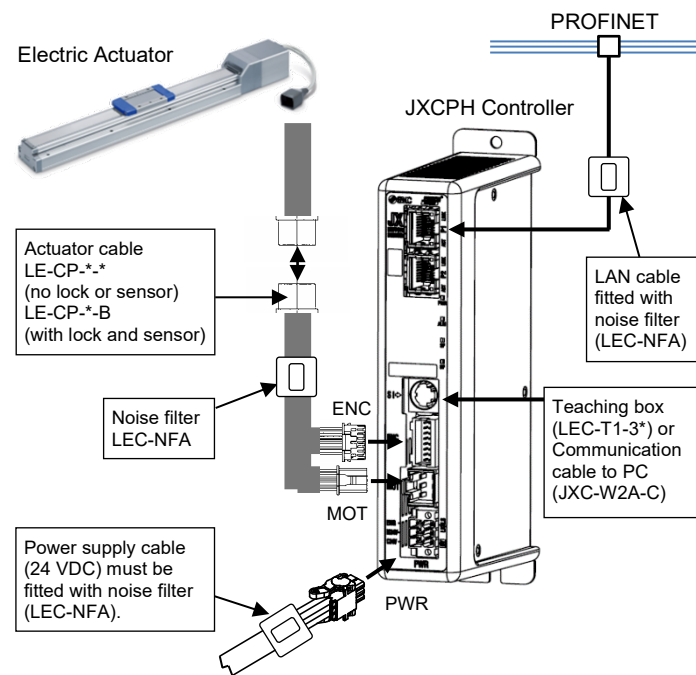
The controller must be connected to Ground to reduce noise. If higher noise resistance is required, ground the 0 V (signal ground). When grounding the 0 V, avoid flowing noise from ground to 0 V.

- 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 mm<sup>2</sup> minimum.
- The Grounding point should be as near as possible to the controller. Keep the grounding cable as short as possible.

## 4 Installation (continued)

### 4.6 EMC compliance

The controller and cable configuration shown below is necessary to meet the requirements of EMC compliance, based on the results of testing.



- For EMC conformity standards please refer to the declaration of conformity for the product on the SMC website (URL: <https://www.smcworld.com>).
- Noise filters must be fitted to the actuator cable, power cable and LAN cable to maintain EMC compliance.
- For details on how to install the noise filters, refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>).

- The electric actuator and controller are included when ordered using the order code for an actuator set.

#### Warning

The communication cable must be connected to the PC using a USB cable through a conversion unit.

Do not connect the teaching box to a PC as this may cause damage.

## 5 Setting

### 5.1 Initial Setting

- Appropriate setting is required in order to establish the communication of the controller (JXCPH) on the PROFINET network.
- Please refer to the PLC setting software "SIMATIC Manager Version 5.5 (STEP7) for the representative PROFINET master device.
- The required setting method such as the GSDML file installation varies depending on which setting software will be used, so if software other than STEP7 is used, please refer to the operation manual of the applicable setting software.

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.

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

### 5.2 Configuration

- A GSDML file and icons file are required to configure the controller. The latest GSDML file can be downloaded from the SMC website (URL: <https://www.smcworld.com>).

## 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
SF	Controller status.	OFF	Normal operation
		Red LED is ON	Alarm generated (Linked to ALM)
BF	PROFINET communication status	OFF	PROFINET communication is established.
		Red LED is flashing	PROFINET communication is not established.
		Red LED is ON	Both Port1 and Port2 are not connected.

Refer to the table below for the LED and controller status

Controller status	LED			
	PWR	ALM	SF	BF
When power is supplied	Green LED is ON	LED is OFF	-	-
When PROFINET communication is normal	-	-	LED is OFF	LED is OFF
Motor controller	Controller alarm generated	LED is OFF	Red LED is ON	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 or operation manual on the SMC website (URL: <https://www.smcworld.com>) for the How to Order information.

## 8 Outline Dimensions (mm)

Refer to the catalogue or 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](http://www.smcworld.com) or [www.smc.eu](http://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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 Specifications are subject to change without prior notice from the manufacturer.  
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