



ORIGINAL INSTRUCTIONS

Instruction Manual
Step Motor Controller – DeviceNet
(24 VDC Servo)
Series JXCD1##-#



The intended use of the step motor controller is to control the movement of an electrical actuator whilst connected to the DeviceNet 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.

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	100 mA or less (controller) Refer to the actuator specifications for total power consumption.
Compatible encoder	Incremental A/B phase (resolution: 800 pulses / rotation)
Memory	EEPROM
Locking	Unlocking terminal (applicable to non-excitation magnetizing lock)
Cable length	Actuator cable: 20 m maximum
Cooling method	Air-cooling type
Operating temperature	0°C to 40°C (version S1./S2./V1./V2.) 0°C to 55°C (version S3./V3.* or later) 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 the external terminals and case
Weight	210 g (Direct mounting type) 230 g (DIN rail mounting type)

2 Specifications (continued)

2.2 DeviceNet communication specifications

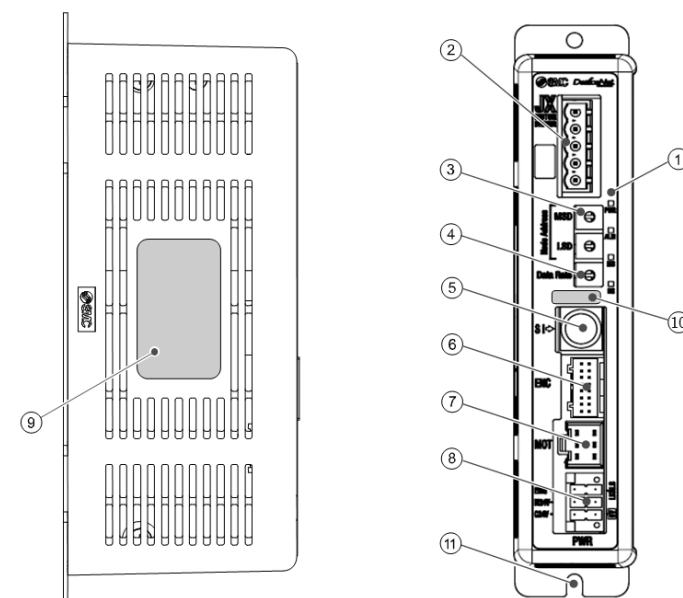
Item	Specifications
Protocol	DeviceNet (conformance test version CT-27) Volume 1: Common Industrial Protocol (CIP) Edition 3.14 Volume 3: DeviceNet Adaption of CIP Edition 1.13
Node address	0 to 63
Communication speed	125 / 250 / 500 kbps
Slave type	Group 2 only server
Number of bytes received	4, 12, 20, 36 bytes (default setting is 4 bytes)
Number of bytes sent	4, 10, 20 bytes (default setting is 4 bytes)
Corresponding message	Polled I/O message Explicit message
Vendor ID	07h (SMC Corporation)
Product type	43h (Generic Device)
Product code	DDh
Setup file	EDS file.

The EDS set up file can be downloaded from the SMC website (URL: <https://www.smcworld.com>).

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



3 Name and function of individual parts (continued)

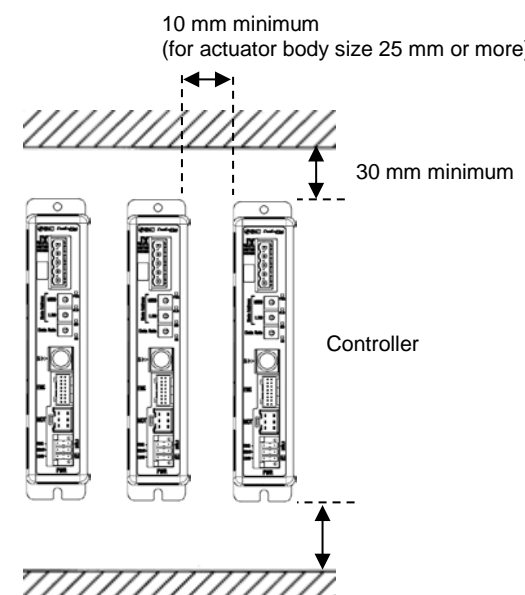
No.	Name	Description
1	Display	LED's to indicate the controller status.
2	Communication connector	Connect to the DeviceNet communication line.
3	Node address switch	Switches to set the DeviceNet communication node address (0 to 63) by X1 (LSD) and X10 (MSD).
4	Switch for setting communication speed	Switch to set the DeviceNet communication speed.
5	Serial I/O connector (8 pin) SI	Connector for the teaching box (LEC-T1) or the controller communication cable (JXC-W2A-C).
6	Encoder connector (16 pin) ENC	Connector for actuator cable.
7	Motor drive connector (6 pin) MOT	
8	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 (-)
9	Controller part number label	Label indicating the controller part number.
10	Applicable actuator model number label	Label indicating the electric actuator part number which can be connected to the controller.
11	FE	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 within the specified operating temperature. 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 JXCD17#) using screws or mounted on a DIN rail (model JXCD18#).
- 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

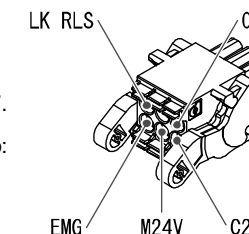
Caution

- 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.
- 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 mm²).



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

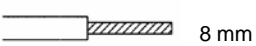
Phoenix Contact Part No:
DFMC1,5/3-ST-LR

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	N/A
6	LK RLS	Unlocking (+)	Positive power for lock release.

4 Installation (continued)

Power Supply Wire specifications

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

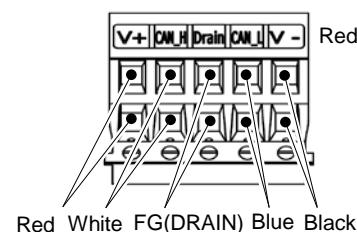
Item	Specifications
Applicable wire size	<ul style="list-style-type: none"> Single stranded wire AWG20 (0.5 mm²) Rated temperature of insulation should be 60°C or more. The OD should be ø2.5 mm or less.
Stripped wire length	 8 mm

Communication Connector

The wiring method of the special DeviceNet cable and the connection method of the DeviceNet communication connector are shown below.

- Use special screwdriver (Phoenix Contact No. SZS0.6x3.5) to tighten the connector terminal screws. Tightening torque = 0.5 to 0.6 N·m.
- Applicable wire size: 12 to 24 AWG (0.2 to 2.5 mm²)

Straight type (JXC-CD-T) Right angle type (JXC-CD-S)



Terminal	Wire colour	Description
V+	Red	(+) side of power supply for DeviceNet communication
CAN_H	White	(High) side of communication cable
FG (DRAIN)	-	Ground / Shield wire
CAN_L	Blue	(Low) side of communication cable
V-	Black	(-) side of power supply for DeviceNet communication

- DeviceNet compliant twisted pair shielded cables (special cable for DeviceNet) should be used for communication wiring. The maximum cable length depends on the transmission speed and the cable type used. Refer to the operation manual.
- Connect a terminating resistor to both ends of the DeviceNet main line. For the terminating resistor, connect a resistor of 121Ω +/-1% and 1/4 W between "CAN_H" and "CAN_L". Preparation of the terminating resistor should be made by the user.

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

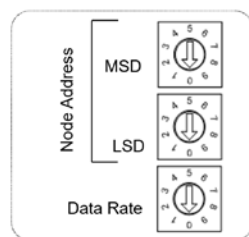
5.1 Switch setting

- Turn off the power supply while setting the switch.
- The rotary switch should be set with a small flat blade screwdriver.

The node address and communication speed of the DeviceNet communication are set using the setting switches.

The node address is set according to the combination of the MSD and LSD setting switches.

The communication speed is set using the Data Rate setting switch.



Node Address setting

Switch setting		Node address
MSD (x10)	LSD (x1)	
0	0	0 *2
0	1	1 (Default)
0	2	2
:	:	:
6	2	62
6	3	63
6	4	PGM *1
:	:	
9	9	

Communication speed setting

Data Rate	Communication speed
0	125 kbps (Default)
1	250 kbps
2	500 kbps
3	PGM *1
:	
9	

*1 When PGM is set, the setting is performed via the DeviceNet network.

*2 The default node address is "01" and the default communication speed is "0".

6 LED Display

Refer to the table below for details of the LED status.

	LED	Description
PWR	OFF	Power is not supplied
	Green LED is ON	Power is supplied
ALM	OFF	Normal operation
	Red LED is ON	Controller Alarm generated
MS	OFF	Controller operating voltage is not supplied
	Green LED is ON	Normal operation
	Red LED is flashing	Recoverable internal error. <ul style="list-style-type: none"> Rotary switches for node address and communication speed were changed after establishing communication
NS	OFF	Controller operating voltage is not supplied
	Green LED is ON	DeviceNet communication established.
	Green LED is flashing	DeviceNet communication not established.
	Red LED is flashing	DeviceNet connection time out.
	Red LED is ON	Node address duplicated or communication error.

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)
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