



Installation & Maintenance Manual EtherCAT Direct input type Step Motor Controller (Servo 24 VDC) Series JXCE1



1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

	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.

This product is class A equipment that is intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

Warning

- The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.
The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.
This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
- Only personnel with appropriate training should operate machinery and equipment.**
The product may become unsafe if handled incorrectly.
The assembly, operation and maintenance of machines or equipment must be performed by an operator who is appropriately trained and experienced.
- Do not attempt to service or replace product and machinery/equipment until safety is confirmed.**
 1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
 2. When the product is to be removed, confirm that the above safety measures are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
 3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

1 Safety Instructions (Continued)

Warning

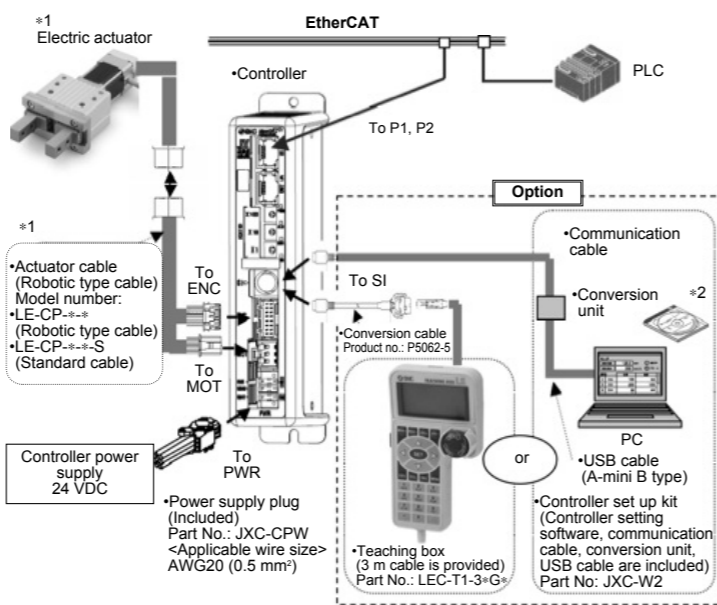
- Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions:**
 1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
 2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
 3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
 4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

- The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and provide specifications or a contract, if necessary.
If anything is unclear, contact your nearest sales branch.

Refer to the operation manual on the SMC website (URL <http://www.smcworld.com>).

2 Product configuration



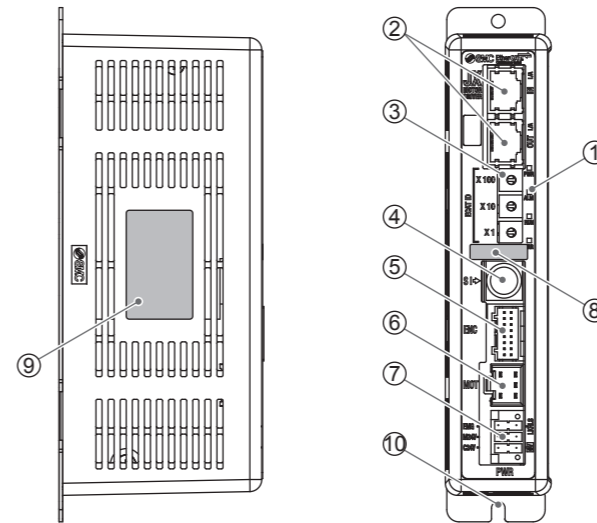
*1 These items are included when ordered using the part number for an actuator set.
*2 The latest version of the controller setting software must be used.
Upgrade software can be downloaded from SMC website.
<http://www.smcworld.com/>

Warning

The Communication cable must be connected to a PC using a USB cable through a conversion unit. Do not connect the teaching box to a PC, as this may cause damage to the personal computer.

3 Parts Description

Detail of the controller parts.



No.	Display	Name	Details
1	-	Display	LED's to indicate the controller status.
2	IN, OUT	EtherCAT communication connectors	Connect to the EtherCAT network.
3	ECAT ID	EtherCAT ID	Switches to set the slave EtherCAT communication ID (0 to 255) by X1, X10 and X100.
4	SI	Serial I/O connector (8 poles)	Connector for the teaching box (LEC-T1) or the setting software (LEC-W2).
5	ENC	Encoder connector (16 poles)	Connect to the actuator cable.
6	MOT	Motor driving connector (6 poles)	
7	PWR	Power supply connector (5 poles)	Connect to the controller power supply (24VDC) using the power supply plug. Control power (+), Stop signal (+), Motor power (+), Lock release (+), Common power (-)
8	-	Applicable actuator part number label	Label indicating the actuator part number which can be connected to the controller.
9	-	Controller part number label	Label indicating the controller part number.
10	-	FE	Functional Ground When the controller is mounted, tighten screws and connect the grounding cable.

4 LED display

LED display
Refer to the table below for details of 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
RUN	EtherCAT communication status.	OFF	INIT state
		Green LED is flashing	Pre-Operational state
		Green LED is single flashing	Safe-Operational state
ERR	EtherCAT communication error status.	Green LED is ON	Operational state
		OFF	No error in EtherCAT communication
		Red LED is flashing	Error in the setting of EtherCAT communication
L/A1	Link/Activity1	Red LED is double flashing	Error in the setting of EtherCAT communication (application watch dog timeout)
		OFF	"IN" port: No Link, No Activity
		Green LED is ON	"IN" port: Link, No Activity
L/A2	Link/Activity2	Green LED is flashing	"IN" port: Link, Activity
		OFF	"OUT" port: No Link, No Activity
		Green LED is ON	"OUT" port: Link, No Activity
		Green LED is flashing	"OUT" port: Link, Activity

LED and Controller Status

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

Controller status	LED description			
	PWR	ALM	RUN	ERR
When power is supplied	Green LED is ON	LED is OFF	-	-
When EtherCAT communication is normal	-	-	Green LED is ON	LED is OFF
Motor controller	Controller alarm 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	-	-

Caution

Do not turn OFF the power supply for the controller or disconnect and connect 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)

5 Specifications

Basic specifications

Item	Specifications	
Compatible motor	Step motor (servo 24 VDC)	
Power supply	Power supply voltage: 24 VDC±10%	
Current consumption	200 mA or less (Controller) Refer to the specification of actuator to be connected for total power consumption.	
Compatible encoder	Incremental A/B phase (800 pulse/rotation)	
Memory	EEPROM	
LED display	LED	
	L/A1	Link/Activity1
	L/A2	Link/Activity2
	PWR	Power supply
	ALM	Alarm status
	RUN	EtherCAT communication status.
	ERR	EtherCAT communication error status.
Locking	With unlocking terminal	
Cable length	Actuator cable: 20 m or less	
Cooling method	Air-cooling type	
Operating temperature range	0 °C to 40 °C (No freezing)	
Operating humidity range	90% RH or less (No condensation)	
Insulation resistance	Between the external terminals and case 50 MΩ (500 VDC)	
Weight	220 g (Direct mounting type) 240 g (DIN rail mounting type)	

EtherCAT communication

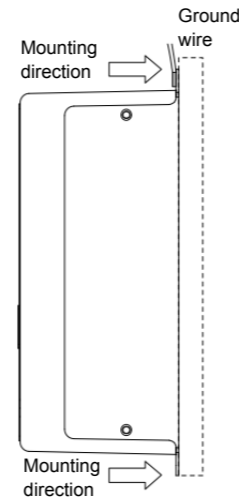
Item	Specifications
Protocol	EtherCAT (Conformance Test Record V1.2.6)
Communication speed	100 Mbps
Communication method	Full duplex/ Half duplex (automatic negotiation)
Communication cable	Standard Ethernet cable (STP, CAT5 or higher, 100BASE-TX)
Setup file	ESI file (Download from SMC web site).
Occupied area	Input 20 byte / Output 36 byte
Connectable nodes	Max. 65, 535 nodes
Vendor ID	0114h (276)
Network topology	Refer to the EtherCAT topology

6 Mounting

(1) Mounting

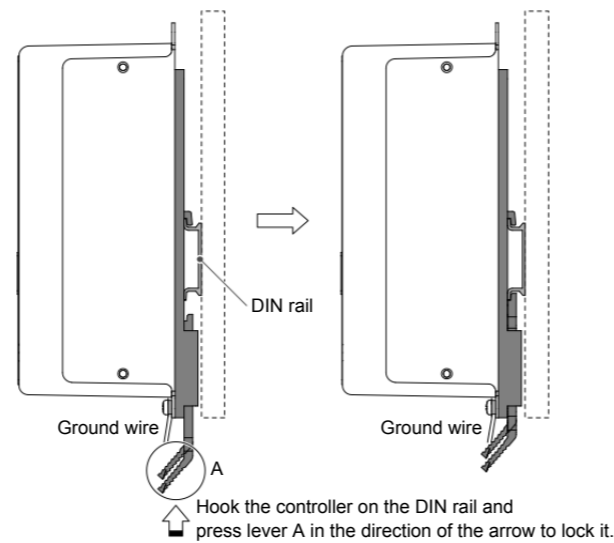
The controller can be direct mounted using screws or mounted on a DIN rail. Details of the controller mounting options are shown below.

[1] Direct mounting (JXCE17-*) (Mounting with two M4 screws)



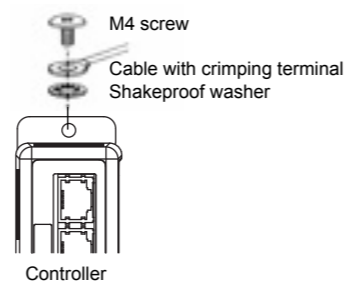
[2] DIN rail mounting (JXCE18-*) (Mounting with DIN rail)

Before locked onto DIN rail Locked onto DIN rail



(2) Grounding

Place the grounding cable with crimped terminal between the M4 screw and shakeproof washer as shown below and tighten the screw.



Caution

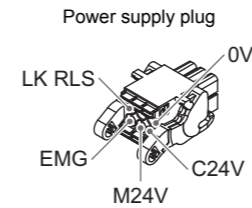
The M4 screw, cable with crimped terminal and shakeproof washer must be prepared by the user. The controller must be connected to Ground to reduce noise.

Refer to the operation manual on SMC website (URL <http://www.smcworld.com>).

7 Power Supply Plug

Power supply plug specifications

The specifications of the power supply plug supplied with the controller are shown below.



Terminal	Function	Description
0V	Common power (-)	The negative common power for M24V, C24V, EMG and LK RLS.
M24V	Motor power (+)	The positive power for the actuator motor to be supplied via the controller.
C24V	Power supply (+)	The positive control power.
EMG	Stop (+)	The positive power for Stop signal
LK RLS	Unlocking (+)	The positive power for lock release.

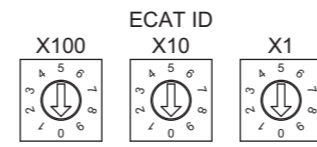
* Equivalent to Phoenix Contact: DFMC1, 5/3-ST-LR

8 Initial Setting

Switch setting (EtherCAT ID)

Set the EtherCAT ID to "000 - 999" using the combination of rotary switches.

The EtherCAT ID of the controller is set using the rotary switches. When the switches are set to "000", the EtherCAT ID of the controller can be set by the EtherCAT master device. To set the EtherCAT ID through the EtherCAT master device, refer to the manual of the EtherCAT master device. (An initial value of the EtherCAT ID is "0", when "000" is set by the rotary switches.)



EtherCAT ID: 0 ~ 999 (Factory default "001")

Setting			EtherCAT ID
X100	X10	X1	
0	0	0	Value that allows setting by EtherCAT master device (Initial value: "0")
0	0	1	1 (Factory default)
0	0	2	2
:	:	:	:
0	6	4	64
:	:	:	:
9	9	9	999

Refer to the operation manual on the SMC website (URL <http://www.smcworld.com>).

9 How to order

10 Outline with Dimensions (mm)

11 Maintenance

12 Troubleshooting

Refer to the operation manual on the SMC website (URL <http://www.smcworld.com>).

13 Contacts

AUSTRIA	(43) 2262 62280-0	LATVIA	(371) 781 77 00
BELGIUM	(32) 3 355 1464	LITHUANIA	(370) 5 264 8126
BULGARIA	(359) 2 974 4492	NETHERLANDS	(31) 20 531 8888
CZECH REP.	(420) 541 424 611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 7025 2900	POLAND	(48) 22 211 9600
ESTONIA	(372) 651 0370	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	ROMANIA	(40) 21 320 5111
FRANCE	(33) 1 6476 1000	SLOVAKIA	(421) 2 444 56725
GERMANY	(49) 6103 4020	SLOVENIA	(386) 73 885 412
GREECE	(30) 210 271 7265	SPAIN	(34) 945 184 100
HUNGARY	(36) 23 511 390	SWEDEN	(46) 8 603 1200
IRELAND	(353) 1 403 9000	SWITZERLAND	(41) 52 396 3131
ITALY	(39) 02 92711	UNITED KINGDOM	(44) 1908 563888

SMC Corporation

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

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