# Step Motor Controller $C\epsilon$ $_c$🅤$_{US}$ RoHS

**New** EtherCAT® Type  **New** PROFINET® Type  **New** DeviceNet™ Type  EtherNet/IP™ Type



## ◎Two types of operation command

**Step no. defined operation**: Operate using the preset step data in the controller.

**Numerical data defined operation**: The actuator operates using values such as position and speed from the PLC.

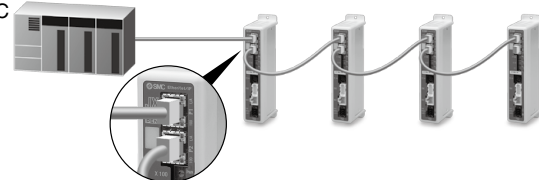## ◎Numerical monitoring available

Numerical information, such as the current speed, current position, and alarm codes, can be monitored on the PLC.

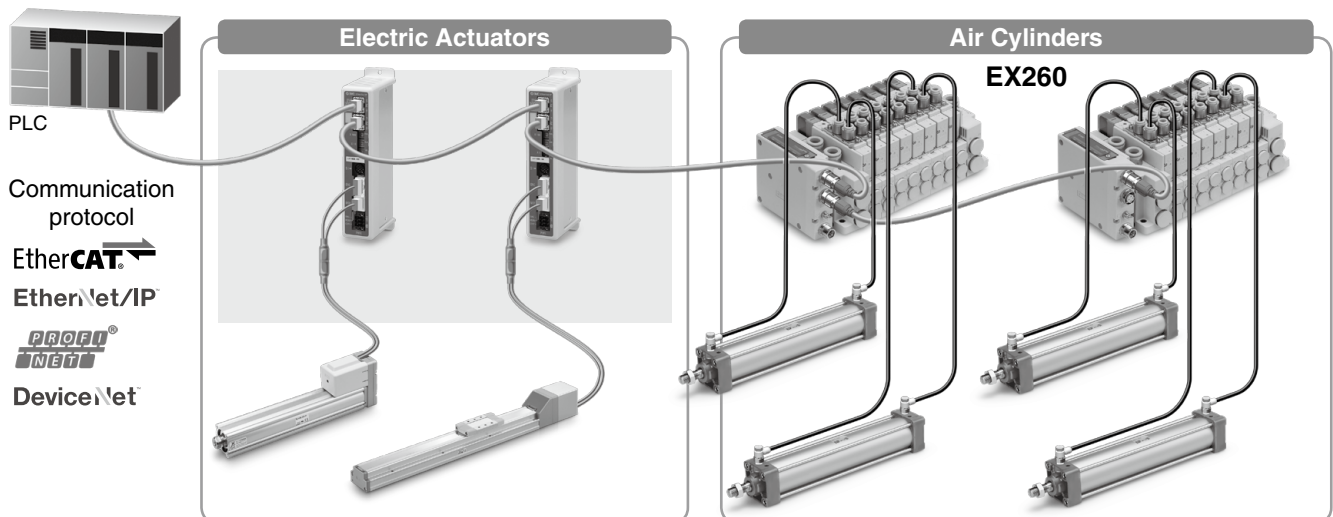## ◎Transition wiring of communication cables

Two communication ports are provided.

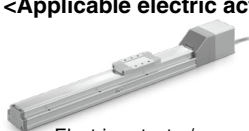∗ For the DeviceNet™ type, transition wiring is possible using a branch connector.
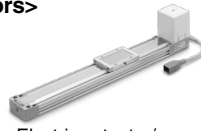
PLC



## Application Examples    Both air and electric systems can be established under the same protocol.



Electric Actuators

Air Cylinders
EX260

PLC

Communication protocol
EtherCAT®
EtherNet/IP™
PROFINET®
DeviceNet™

### <Applicable electric actuators>



Electric actuator/
Slider type
LEF Series

Electric actuator/
Low profile slider type
LEM Series

Electric actuator/
Guide rod slider
LEL Series

Electric actuator/
Rod type
LEY/LEYG Series

Electric slide table
LES/LESH Series

Electric actuator/
Miniature type
LEPY/LEPS Series

Electric gripper
LEH Series

Electric actuator/
Rotary table
LER Series

# JXCE1/91/P1/D1 Series

🅢SMC

15-E667

# JXCE1/91/P1/D1 *Series*

## System Construction

● **Electric actuators**

LEY/LEYG Series
LEF Series
LES/LESH Series
LER Series
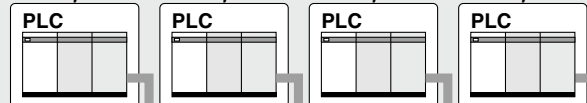LEL Series
LEPY/LEPS Series
LEH Series
LEM Series

| Provided by customer | Provided by customer | Provided by customer | Provided by customer |
|---|---|---|---|
| PLC | PLC | PLC | PLC |

● **Communication plug connector for DeviceNet™** P.6

| Straight type | JXC-CD-S |
|---|---|
| T-branch type | JXC-CD-T |

EtherCAT    EtherNet/IP    PROFINET    DeviceNet

**Actuator cable** ●

| Standard cable | Robotic cable |
|---|---|
| LE-CP-□-S | LE-CP-□ |

**To ENC**

**To SI**

**To SI**

Provided by customer

**Power supply for controller 24 VDC**

**To PWR**

**To MOT**

● **Power supply plug** P.6
(Accessory)

**Communication cable** ●
(3 m)

### Options

● **Teaching box**
(With 3 m cable)
LEC-T1-3□G□

or

● **Controller setting kit** P.6

Controller setting kit
(Communication cable, USB cable, and controller setting software (CD-ROM) are included.)
JXC-W2

**PC**

● **USB cable**
(A-mini B type)
(0.8 m)

● **Conversion cable**[*1] P.6
P5062-5
(0.3 m)

The conversion cable can be used for connecting this controller to the optional teaching box [LEC-T1] offered with the LEC series.

● **Conversion cable**
P.6

*1  A conversion cable is also required for connecting the controller to the LEC-W2. (A conversion cable is not required for the JXC-W2.)

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# Step Motor Controller
## *JXCE1/91/P1/D1 Series* CE cULus RoHS

## How to Order

### Actuator + Controller

**LEFS16B-100** – **R1** **CD17T**

#### Actuator type
Refer to "How to Order" in the actuator catalog.
For compatible actuators, refer to the table below. Example: LEFS16B-100B-R1C917

| Compatible actuators | |
|---|---|
| **Electric Actuator/Rod  LEY** Series | |
| **Electric Actuator/Guide Rod  LEYG** Series | |
| **Electric Actuator/Slider  LEF** Series | |
| **Electric Slide Table  LES/LESH** Series | Refer to the **Web Catalog**. |
| **Electric Rotary Table  LER** Series | |
| **Electric Actuator/Guide Rod Slider  LEL** Series | |
| **Electric Actuator/Miniature  LEPY/LEPS** Series | |
| **Electric Gripper  LEH** Series | |
| **Electric Actuator/Low Profile Slider  LEM** Series | |

∗ Only the step motor type is applicable.

#### ⚠ Caution
**[CE-compliant products]**
EMC compliance was tested by combining the electric actuator LE series and the JXCE1/91/P1/D1 series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, compliance with the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify compliance with the EMC directive for the machinery and equipment as a whole.

#### Actuator cable type/length

| Nil | Without cable |
|---|---|
| **S1** | Standard cable 1.5 m |
| **S3** | Standard cable 3 m |
| **S5** | Standard cable 5 m |
| **R1** | Robotic cable 1.5 m |
| **R3** | Robotic cable 3 m |
| **R5** | Robotic cable 5 m |
| **R8** | Robotic cable 8 m∗1 |
| **RA** | Robotic cable 10 m∗1 |
| **RB** | Robotic cable 15 m∗1 |
| **RC** | Robotic cable 20 m∗1 |

∗1 Produced upon receipt of order (Robotic cable only)
∗ The standard cable should only be used on fixed parts. For use on moving parts, select the robotic cable.

#### Controller

| Nil | Without controller |
|---|---|
| **C□1□□** | With controller |

**C D 1 7 T**

#### Communication protocol

| **E** | EtherCAT® |
|---|---|
| **9** | EtherNet/IP™ |
| **P** | PROFINET |
| **D** | DeviceNet™ |

**For single axis**

#### Mounting

| **7** | Screw mounting |
|---|---|
| **8**∗1 | DIN rail |

∗1 DIN rail is not included. It must be ordered separately. (Page 6)

#### Communication plug connector for DeviceNet™

| Nil | Without plug connector |
|---|---|
| **S** | Straight type |
| **T** | T-branch type |

∗ Select "Nil" for anything other than DeviceNet™.

When selecting an electric actuator, refer to the model selection chart of each actuator. Also, for the "Speed–Work Load" graph of the actuator, refer to the LECPMJ section on the model selection page of the electric actuators **Web Catalog**.

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### Controller

**JXC** **D** **1** **7** **T** – **LEFS16B-100**

#### Precautions for blank controllers (JXC□1□□-BC)
A blank controller is a controller to which the customer can write the data of the actuator it is to be combined and used with. Use the dedicated software (JXC-BCW) for data writing.
• Please download the dedicated software (JXC-BCW) via our website.
• Order the controller setting kit (LEC-W2) separately to use this software.

**SMC website**
**http://www.smcworld.com**

#### Communication protocol

| **E** | EtherCAT® |
|---|---|
| **9** | EtherNet/IP™ |
| **P** | PROFINET |
| **D** | DeviceNet™ |

**For single axis**

#### Mounting

| **7** | Screw mounting |
|---|---|
| **8**∗1 | DIN rail |

∗1 DIN rail is not included. It must be ordered separately. (Page 6)

#### Communication plug connector for DeviceNet™

| Nil | Without plug connector |
|---|---|
| **S** | Straight type |
| **T** | T-branch type |

∗ Select "Nil" for anything other than DeviceNet™.

#### Actuator part number
Without cable specifications and actuator options
Example: Enter "LEFS16B-100" for the LEFS16B-100B-S1□□.

| **BC** | Blank controller∗1 |
|---|---|

∗1 Requires dedicated software (JXC-BCW).

When selecting an electric actuator, refer to the model selection chart of each actuator. Also, for the "Speed–Work Load" graph of the actuator, refer to the LECPMJ section on the model selection page of the electric actuators **Web Catalog**.

# JXCE1/91/P1/D1 *Series*

## Specifications

| Model | JXCE1 | JXC91 | JXCP1 | JXCD1 |
|---|---|---|---|---|
| **Network** | EtherCAT® | EtherNet/IP™ | PROFINET | DeviceNet™ |
| **Compatible motor** | | Step motor (Servo/24 VDC) | | |
| **Power supply** | | Power voltage: 24 VDC ±10% | | |
| **Current consumption (Controller)** | 200 mA or less | 130 mA or less | 200 mA or less | 100 mA or less |
| **Compatible encoder** | | Incremental A/B phase (800 pulse/rotation) | | |
| **Communication specifications** — Applicable system — **Protocol** | EtherCAT®*2 | EtherNet/IP™*2 | PROFINET*2 | DeviceNet™ |
| **Communication specifications** — Applicable system — **Version***1 | Conformance Test Record V.1.2.6 | Volume 1 (Edition 3.14) Volume 2 (Edition 1.15) | Specification Version 2.32 | Volume 1 (Edition 3.14) Volume 3 (Edition 1.13) |
| **Communication specifications** — **Communication speed** | 100 Mbps*2 | 10/100 Mbps*2 (Automatic negotiation) | 100 Mbps*2 | 125/250/500 kbps |
| **Communication specifications** — **Configuration file***3 | ESI file | EDS file | GSDML file | EDS file |
| **Communication specifications** — **I/O occupation area** | Input 20 bytes Output 36 bytes | Input 36 bytes Output 36 bytes | Input 36 bytes Output 36 bytes | Input 4, 10, 20 bytes Output 4, 12, 20, 36 bytes |
| **Communication specifications** — **Terminating resistor** | | Not included | | |
| **Memory** | | EEPROM | | |
| **LED indicator** | PWR, RUN, ALM, ERR | PWR, ALM, MS, NS | PWR, ALM, SF, BF | PWR, ALM, MS, NS |
| **Cable length [m]** | | Actuator cable: 20 m or less | | |
| **Cooling system** | | Natural air cooling | | |
| **Operating temperature range [°C]** | | 0 to 40 (No freezing) | | |
| **Operating humidity range [%RH]** | | 90 or less (No condensation) | | |
| **Insulation resistance [MΩ]** | | Between all external terminals and the case 50 (500 VDC) | | |
| **Weight [g]** | 220 (Screw mounting) 240 (DIN rail mounting) | 210 (Screw mounting) 230 (DIN rail mounting) | 220 (Screw mounting) 240 (DIN rail mounting) | 210 (Screw mounting) 230 (DIN rail mounting) |

∗1 Please note that versions are subject to change.
∗2 Use a shielded communication cable with CAT5 or higher for the PROFINET, EtherNet/IP™, and EtherCAT®.
∗3 The files can be downloaded from the SMC website: http://www.smcworld.com

**■Trademark**
EtherNet/IP™ is a trademark of ODVA.
DeviceNet™ is a trademark of ODVA.
EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

## Example of Operation Command

In addition to the step data input of 64 points maximum in each communication protocol, the changing of each parameter can be performed in real time in the numerical data defined operation.

### <Application example> Movement between 2 points

| No. | Movement mode | Speed | Position | Acceleration | Deceleration | Pushing force | Trigger LV | Pushing speed | Moving force | Area 1 | Area 2 | In position |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1: Absolute | 100 | 10 | 3000 | 3000 | 0 | 0 | 0 | 100 | 0 | 0 | 0.50 |
| 1 | 1: Absolute | 100 | 100 | 3000 | 3000 | 0 | 0 | 0 | 100 | 0 | 0 | 0.50 |

### <Step No. defined operation>
Sequence 1: Servo ON instruction
Sequence 2: Instruction to return to origin
Sequence 3: Specify step data No. 0 to input the DRIVE signal.
Sequence 4: Specify step data No. 1 after the DRIVE signal has been temporarily turned OFF to input the DRIVE signal.
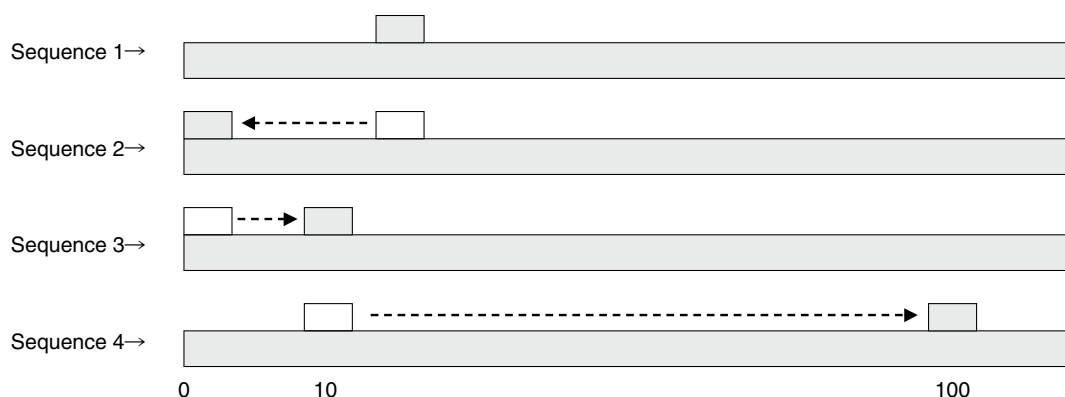
### <Numerical data defined operation>
Sequence 1: Servo ON instruction
Sequence 2: Instruction to return to origin
Sequence 3: Specify step data No. 0 and turn ON the input instructions flag (position). Input 10 in the target position. Subsequently the start flag turns ON.
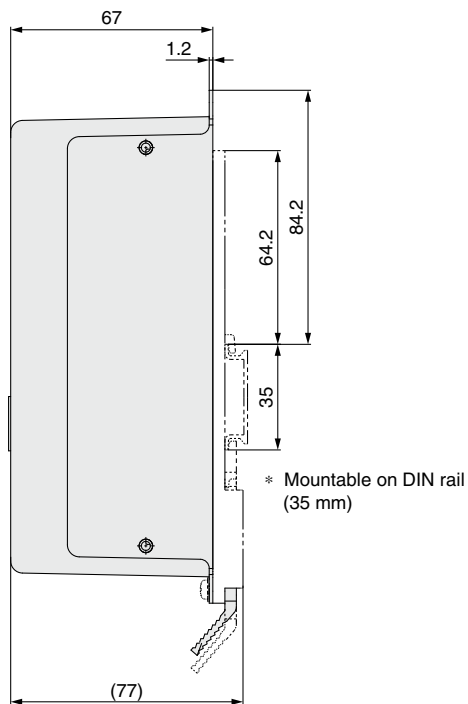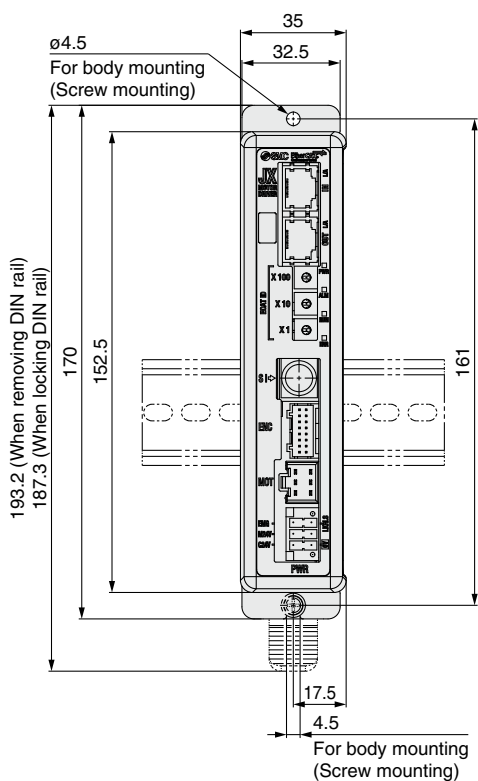Sequence 4: Turn ON step data No. 0 and the input instructions flag (position) to change the target position to 100 while the start flag is ON.

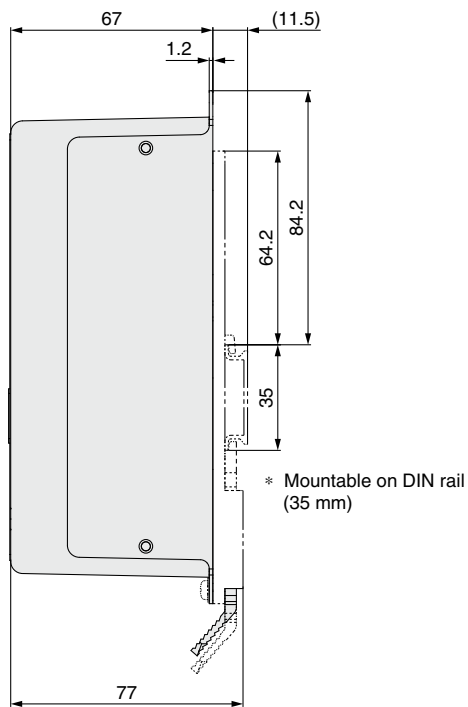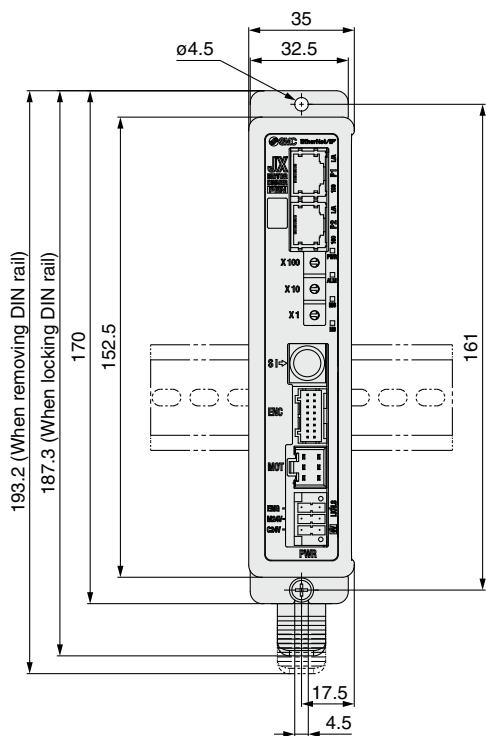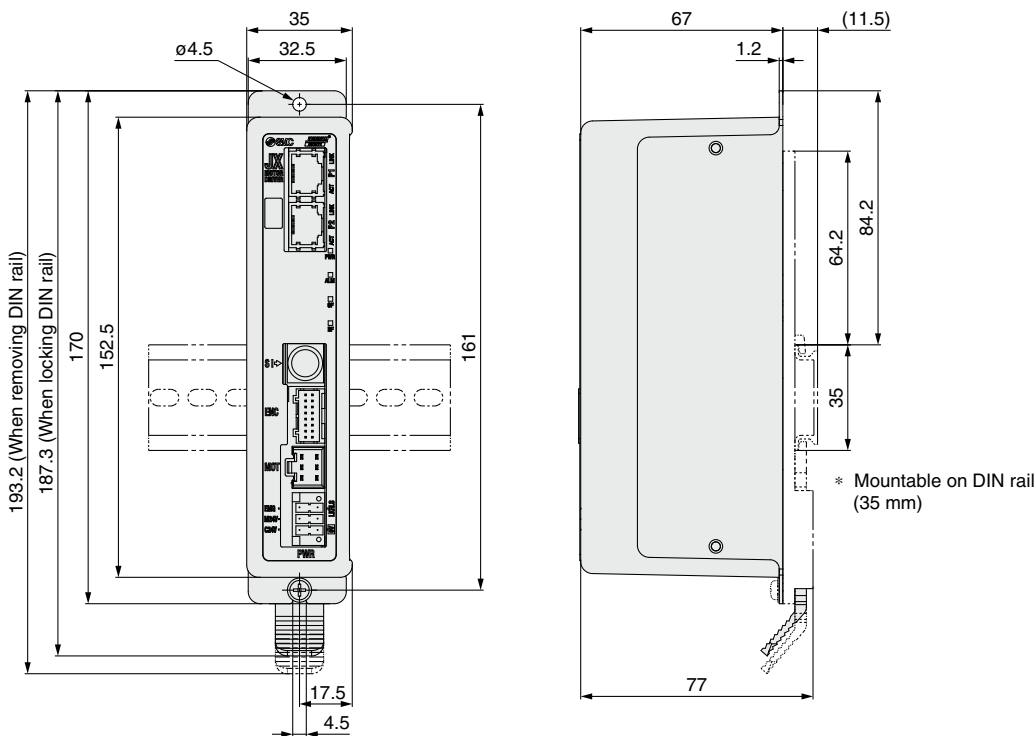The same operation can be performed with any operation command.

Sequence 1→

Sequence 2→
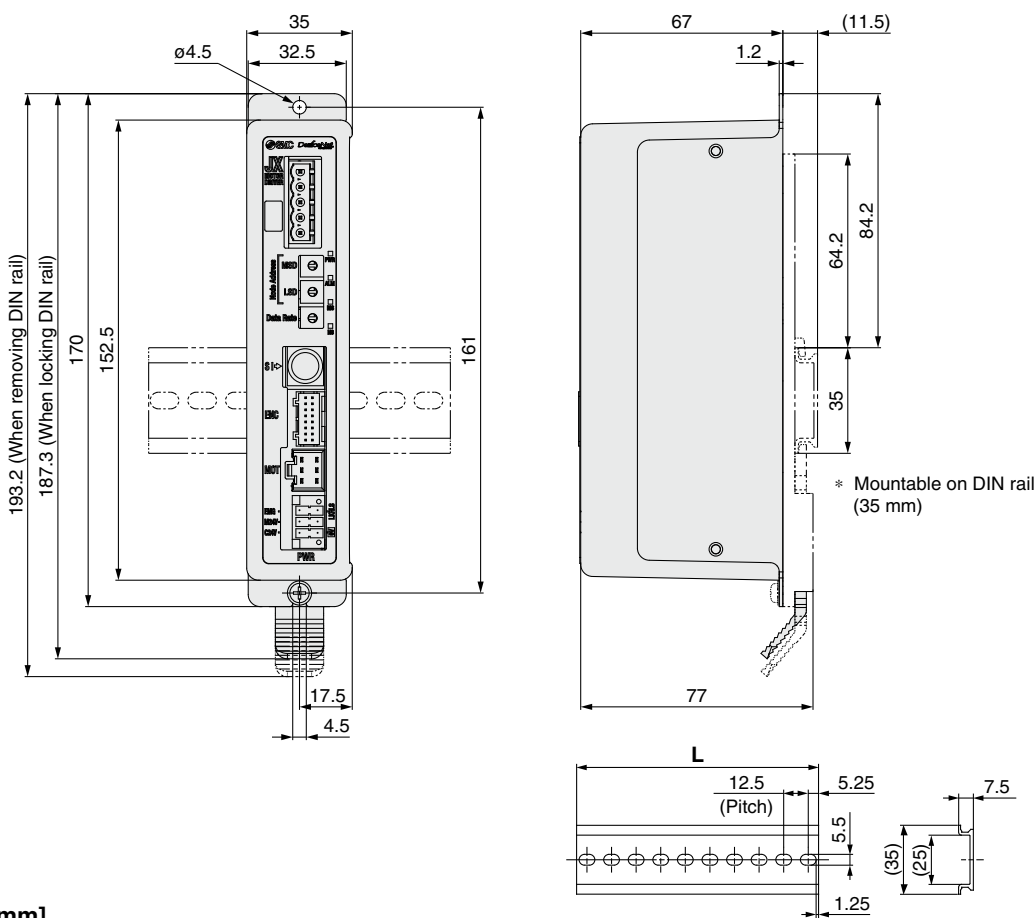
Sequence 3→

Sequence 4→

0    10                                                                                100

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## Dimensions

### JXCE1



ø4.5
For body mounting
(Screw mounting)

35
32.5

67
1.2

84.2
64.2
35

193.2 (When removing DIN rail)
187.3 (When locking DIN rail)
170
152.5
161

X100
X10
X1

17.5
4.5

For body mounting
(Screw mounting)

(77)

∗ Mountable on DIN rail
(35 mm)

### JXC91



ø4.5

35
32.5

67
(11.5)
1.2

84.2
64.2
35

193.2 (When removing DIN rail)
187.3 (When locking DIN rail)
170
152.5
161

X100
X10
X1

17.5
4.5

77

∗ Mountable on DIN rail
(35 mm)

## Dimensions

### JXCP1

* Mountable on DIN rail (35 mm)

### JXCD1

* Mountable on DIN rail (35 mm)

**L Dimensions [mm]**

| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|-----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| **L** | 23 | 35.5 | 48 | 60.5 | 73 | 85.5 | 98 | 110.5 | 123 | 135.5 | 148 | 160.5 | 173 | 185.5 | 198 | 210.5 | 223 | 235.5 | 248 | 260.5 |

| No. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| **L** | 273 | 285.5 | 298 | 310.5 | 323 | 335.5 | 348 | 360.5 | 373 | 385.5 | 398 | 410.5 | 423 | 435.5 | 448 | 460.5 | 473 | 485.5 | 498 | 510.5 |

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# Options

## · Controller setting kit JXC-W2

**[Contents]**
① Communication cable
② USB cable
③ Controller setting software
∗ A conversion cable (P5062-5) is not required.
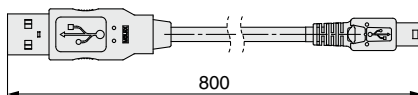
**JXC‑W2‑☐**

● **Contents**

| | |
|---|---|
| **Nil** | A kit includes: Communication cable, USB cable, Controller setting software |
| **C** | Communication cable |
| **U** | USB cable |
| **S** | Controller setting software (CD-ROM) |

### ① Communication cable JXC-W2-C
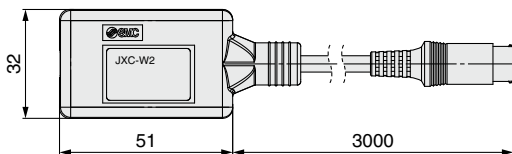
∗ It can be connected to the controller directly.

### ② USB cable JXC-W2-U

### ③ Controller setting software (CD-ROM) JXC-W2-S
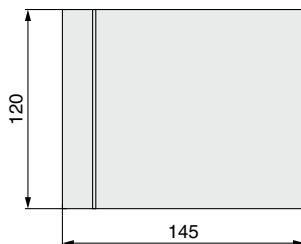
## · DIN rail mounting adapter LEC-3-D0 (with 2 mounting screws)

This should be used when a DIN rail mounting adapter is mounted onto a screw mounting type controller afterwards.

## · DIN rail AXT100-DR-☐

∗ For ☐, enter a number from the No. line in the table. (Page 5) Refer to the dimension drawings (Page 5) for the mounting dimensions.

## · Power supply plug JXC-CPW

∗ The power supply plug is an accessory.
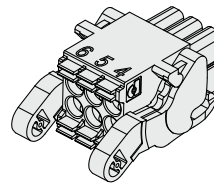
| ⑥ ⑤ ④ | ① C24V | ④ 0V |
| ③ ② ① | ② M24V | ⑤ N.C. |
| | ③ EMG | ⑥ LK RLS |

**Power supply plug**

| Terminal name | Function | Details |
|---|---|---|
| 0V | Common supply (−) | M24V terminal/C24V terminal/EMG terminal/ LK RLS terminal are common (−). |
| M24V | Motor power supply (+) | Motor power supply (+) of the controller |
| C24V | Control power supply (+) | Control power supply (+) of the controller |
| EMG | Stop (+) | Connection terminal of the external stop circuit |
| LK RLS | Lock release (+) | Connection terminal of the lock release switch |

## · Communication plug connector for DeviceNet™

**Straight type** **T-branch type**
**JXC-CD-S** **JXC-CD-T**
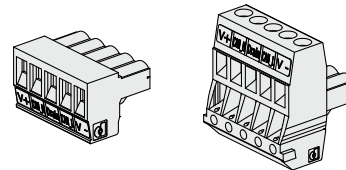
**Communication plug connector for DeviceNet™**

| Terminal name | Details |
|---|---|
| V+ | Power supply (+) for DeviceNet™ |
| CAN_H | Communication wire (High) |
| Drain | Grounding wire/Shielded wire |
| CAN_L | Communication wire (Low) |
| V− | Power supply (−) for DeviceNet™ |

## · Conversion cable P5062-5 (Cable length: 0.3 m)
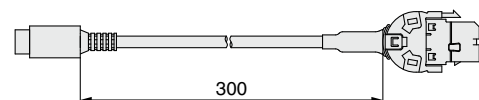
∗ To connect the teaching box (LEC-T1-3☐G☐) or controller setting kit (LEC-W2) to the controller, a conversion cable is required.

# ⚠️ JXCE1/91/P1/D1 *Series*
# Precautions Related to Differences in Controller Versions

**As the controller version of the JXC series differs, the internal parameters are not compatible.**

■ Do not use a version V2.0 or S2.0 or higher controller with parameters lower than version V2.0 or S2.0.
  Do not use a version V2.0 or S2.0 or lower controller with parameters higher than version V2.0 or S2.0.
■ Please use the latest version of the JXC-BCW (parameter writing tool).
  ∗ The latest version is Ver. 2.0 (as of December 2017).

## Identifying Version Symbols
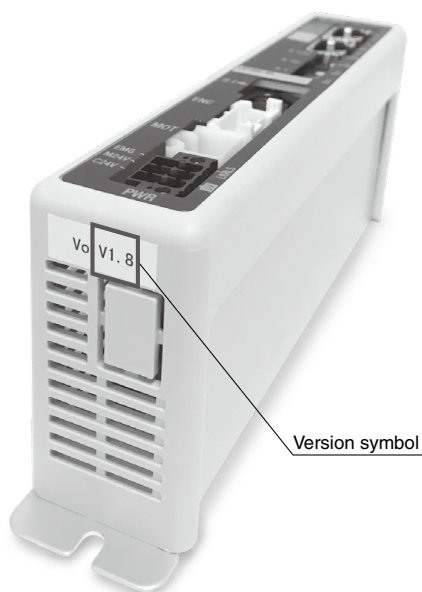
**For versions lower than V2.0 and S2.0:**

Do not use with controller parameters higher than V2.0 or S2.0.

VZ V1. 8

**Applicable models**

JXC91□ Series

VZ S1. 3 T1. 0

**Applicable models**

JXCD1□ Series
JXCP1□ Series
JXCE1□ Series

**For versions higher than V2.0 and S2.0:**

Do not use with controller parameters lower than V2.0 or S2.0.

VZ V2. 0

**Applicable models**

JXC91□ Series

VZ S2. 0 T1. 0

**Applicable models**

JXCD1□ Series
JXCP1□ Series
JXCE1□ Series

Vo V1. 8 ─ Version symbol

Ⓢ SMC