Step Motor Controller

5 types of communication protocols

- IO-Link
- EtherCAT
- PROFINET
- DeviceNet
- EtherNet/IP

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

Can be additionally installed in an existing network

Application

Electric Actuators

- Low-profile slider type LEM Series
- Guide rod slider LEL Series
- Rod type LEY/LEYG Series

Air Cylinders

- EX260

IO-Link Communication

- IO-Link Master

<Applicable electric actuators>

- Slider type LEF Series
- Slide table LES/LESH Series
- Low-profile slider type LEPY/LEPS Series
- Miniature type LEH Series
- Rotary table LER Series

JXCE1/91/P1/D1/L1 Series
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.

IO-Link communication can be performed.

The data storage function eliminates the need for troublesome resetting of step data and parameters when changing over the controller.

- 4-wire unshielded cables can be used.

**Application**

- Step data and parameters can be set from the master side.
  - Step data and parameters can be set or changed by means of IO-Link communication.

- Data storage function
  - When the controller is changed, the parameters and step data for the actuator are automatically set.**1

- 4-wire unshielded cables can be used.

**Transition wiring of communication cables**

Two communication ports are provided.
- For the DeviceNet™ type, transition wiring is possible using a branch connector.
- 1 to 1 in the case of IO-Link

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**IO-Link**

IO-Link is an open communication interface technology between the sensor/actuator and the I/O terminal that is an international standard, IEC61131-9.

**Application**

- The “basic parameter” and the “return to origin parameter” are automatically set as the actuator parameters, and the 3 items of data consisting of No. 0 to 2 are automatically set as the step data.
System Construction

**Actuator cable**
- Standard cable: LE-CP-□-S
- Robotic cable: LE-CP-□

**Electric actuators**
- LEY/LEYG Series
- LEL Series
- LEF Series
- LEPYE/LEPS Series
- LES/LESH Series
- LER Series
- LEH Series
- LEM Series

**JXC-CD-T** (Straight type)
- JXC-CD-S (T-branch type)

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

**Communication plug connector for IO-Link**
- Straight type: JXC-CL-S

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

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

**Power supply plug**
- (Accessory)
- For controller
- 24 VDC

**Communication cable**
- (3 m)

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

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

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

**Converter cable**
- P5062-5
- (0.3 m)

"*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.)"
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.

### 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

<table>
<thead>
<tr>
<th>Actuator Type</th>
<th>Compatible Actuators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Actuator/Rod</td>
<td>LEY Series</td>
</tr>
<tr>
<td>Electric Actuator/Slider</td>
<td>LEYG Series</td>
</tr>
<tr>
<td>Electric Slide Table</td>
<td>LES/LESH Series</td>
</tr>
<tr>
<td>Electric Rotary Table</td>
<td>LER Series</td>
</tr>
<tr>
<td>Electric Actuator/Miniature</td>
<td>LEPY/LEPS Series</td>
</tr>
<tr>
<td>Electric Actuator/Low-Profile Slider</td>
<td>LEM Series</td>
</tr>
</tbody>
</table>

* Only the step motor type is applicable.

### 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
- **RA** Robotic cable 10 m
- **RB** Robotic cable 15 m
- **RC** Robotic cable 20 m

*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

**JXC D17 T** - **LEFS16B-100**

- **Communication protocol**
  - E EtherCAT®
  - 9 EtherNet/IP™
  - P PROFINET
  - D DeviceNet™
  - L IO-Link

### Precautions for blank controllers (JXC-BCW-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 the dedicated software (JXC-BCW) for data writing.
- Please download the dedicated software (JXC-BCW) via our website.
- Order the controller setting kit (ILEC-W2) separately to use this software.

- **Caution**
  - [CE-compliant products]
  - EMC compliance was tested by combining the electric actuator LE series and the JXCE1/91/P1/D1/L1 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.

### How to Order

**Actuator + Controller**

- **Controller**
  - Nil Without controller
  - C1 With controller

**Mounting**

- 7 Screw mounting
- 8*1 DIN rail

*1 The DIN rail is not included. It must be ordered separately. (Refer to page 7.)

**Option**

- S With straight type DeviceNet™ communication plug for JXCD1
- T With T-branch type DeviceNet™ communication plug for JXCD1

* Select “Nil” for anything other than JXCD1.

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.
Numerical values other than “Moving force,” “Area 1,” and “Area 2” can be used to perform operation under numerical instructions from JXCL1.

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>JXCE1</th>
<th>JX91</th>
<th>JXCP1</th>
<th>JXCD1</th>
<th>JXCL1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network</td>
<td>EtherCAT®</td>
<td>EtherNet/IP™</td>
<td>PROFINET</td>
<td>DeviceNet™</td>
<td>IO-Link</td>
</tr>
<tr>
<td>Compatible motor</td>
<td>Step motor (Servo/24 VDC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>Power voltage: 24 VDC ±10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption (Controller)</td>
<td>200 mA or less</td>
<td>130 mA or less</td>
<td>200 mA or less</td>
<td>100 mA or less</td>
<td>100 mA or less</td>
</tr>
<tr>
<td>Compatible encoder</td>
<td>Incremental A/B phase (800 pulse/rotation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Communication specifications

<table>
<thead>
<tr>
<th>Applicable system</th>
<th>Protocol</th>
<th>Version ¹</th>
<th>Version ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record V.1.2.6</td>
<td>EtherNet/IP™</td>
<td>Volume 2 (Edition 1.15)</td>
<td>Volume 1 (Edition 3.14)</td>
</tr>
<tr>
<td>PROFINET®</td>
<td>DeviceNet™</td>
<td>Volume 3 (Edition 1.13)</td>
<td>Version 1.1</td>
</tr>
<tr>
<td>IO-Link</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication speed</th>
<th>100 Mbps ²²</th>
<th>10/100 Mbps ²² (Automatic negotiation)</th>
<th>100 Mbps ²²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>125/250/500 kbps</td>
<td>230.4 kbps (COM3)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Configuration file ³³</th>
<th>ESI file</th>
<th>EDS file</th>
<th>GSDML file</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IODD file</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I/O occupation area</th>
<th>Input 20 bytes</th>
<th>Input 36 bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output 36 bytes</td>
<td>Output 36 bytes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminating resistor</th>
<th>Not included</th>
</tr>
</thead>
</table>

#### Memory

<table>
<thead>
<tr>
<th>LED indicator</th>
<th>PWR, RUN, ALM, ERR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable length [m]</td>
<td>PWR, ALM, MS, NS</td>
</tr>
<tr>
<td>Cooling system</td>
<td>PWR, ALM, SF, BF</td>
</tr>
<tr>
<td>Operating temperature range [°C]</td>
<td>PWR, ALM, MS, NS</td>
</tr>
<tr>
<td>Operating humidity range [%RH]</td>
<td>PWR, ALM, COM</td>
</tr>
</tbody>
</table>

#### Insulation resistance [MΩ]

<table>
<thead>
<tr>
<th>Between all external terminals and the case 50 (500 VDC)</th>
</tr>
</thead>
</table>

#### Weight [g]

<table>
<thead>
<tr>
<th>220 (Screw mounting)</th>
<th>210 (Screw mounting)</th>
<th>220 (Screw mounting)</th>
</tr>
</thead>
<tbody>
<tr>
<td>240 (DIN rail mounting)</td>
<td>230 (DIN rail mounting)</td>
<td>210 (DIN rail mounting)</td>
</tr>
<tr>
<td>240 (DIN rail mounting)</td>
<td>230 (DIN rail mounting)</td>
<td>190 (Screw mounting)</td>
</tr>
</tbody>
</table>

### 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 via numerical data defined operation.

**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 via numerical data defined operation.

#### Application example> Movement between 2 points

<table>
<thead>
<tr>
<th>No.</th>
<th>Movement mode</th>
<th>Speed</th>
<th>Position</th>
<th>Acceleration</th>
<th>Deceleration</th>
<th>Pushing force</th>
<th>Trigger LV</th>
<th>Pushing speed</th>
<th>Moving force</th>
<th>Area 1</th>
<th>Area 2</th>
<th>In position</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1: Absolute</td>
<td>100</td>
<td>10</td>
<td>3000</td>
<td>3000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0.50</td>
</tr>
<tr>
<td>1</td>
<td>1: Absolute</td>
<td>100</td>
<td>100</td>
<td>3000</td>
<td>3000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**<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 instruction 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 instruction 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.
JXCE1/91/P1/D1/L1 Series

Dimensions

- JXCE1
  - 152.5 (When locking DIN rail)
  - 170 (When removing DIN rail)
  - ø4.5
  - 35
  - 32.5
- JXC91
  - 161
- JXCE1/JXC91
  - 17.5
  - 77
  - 84.2
  - 64.2
- JXCP1
  - 187.3 (When locking DIN rail)
  - 193.2 (When removing DIN rail)
  - ø4.5
  - 35
  - 32.5
- JXCD1
  - 187.3 (When locking DIN rail)
  - 193.2 (When removing DIN rail)
  - ø4.5
  - 35
  - 32.5
- JXCP1/JXCD1
  - Mountable on DIN rail (35 mm)
  - 11.5
  - 67
  - 84.2
  - 64.2

For body mounting (Screw mounting)
Step Motor Controller  **JXCE1/91/P1/D1/L1 Series**

**Dimensions**

| 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|

**L Dimensions [mm]**

- **Pitch:** 12.5
- **JXCL1**
- **Mountable on DIN rail (35 mm)**

- **For body mounting (Screw mounting)**

- **Dimensions:**
  - Width: 12.5
  - Height: 5.25
  - Depth: 7.5
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.

- Power supply plug JXC-CPW
  * The power supply plug is an accessory.

<table>
<thead>
<tr>
<th>Terminal name</th>
<th>Function Details</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>0V</td>
<td>Common supply (–)</td>
<td>M24V terminal/C24V terminal/EMG terminal/LK RLS terminal are common (–).</td>
</tr>
<tr>
<td>M24V</td>
<td>Motor power supply (+)</td>
<td>Motor power supply (+) of the controller</td>
</tr>
<tr>
<td>C24V</td>
<td>Control power supply (+)</td>
<td>Control power supply (+) of the controller</td>
</tr>
<tr>
<td>EMG</td>
<td>Stop (+)</td>
<td>Connection terminal of the external stop circuit</td>
</tr>
<tr>
<td>LK RLS</td>
<td>Lock release (+)</td>
<td>Connection terminal of the lock release switch</td>
</tr>
</tbody>
</table>

- Communication plug connector

  - For DeviceNet™
    - Straight type JXC-CD-S
    - T-branch type JXC-CD-T

- Communication plug connector for DeviceNet™

<table>
<thead>
<tr>
<th>Terminal name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>V+</td>
<td>Power supply (+) for DeviceNet™</td>
</tr>
<tr>
<td>CAN_H</td>
<td>Communication wire (High)</td>
</tr>
<tr>
<td>Drain</td>
<td>Grounding wire/Shielded wire</td>
</tr>
<tr>
<td>CAN_L</td>
<td>Communication wire (Low)</td>
</tr>
<tr>
<td>V–</td>
<td>Power supply (–) for DeviceNet™</td>
</tr>
</tbody>
</table>

- For IO-Link
  - Straight type JXC-CL-S

- Communication plug connector for IO-Link

<table>
<thead>
<tr>
<th>Terminal no.</th>
<th>Terminal name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L+</td>
<td>+24 V</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>L–</td>
<td>0 V</td>
</tr>
<tr>
<td>4</td>
<td>C/Q</td>
<td>IO-Link signal</td>
</tr>
</tbody>
</table>

- Conversion cable P5062-5 (Cable length: 300 mm)
  * 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 JX-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
Safety Instructions: Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.