

Step Motor Controller

Controller with STO Sub-Function

JXC□F Series



EtherCAT/EtherNet/IP™/PROFINET/IO-Link Direct Input Type

- Step Motor (Servo/24 VDC)
- Fieldbus direct input
- Numerical data/step data (64 points) defined operation

With STO Sub-Function



- Product certification obtained by a third party (EN61508-1/2 SIL3, EN62061 SIL CL3, EN ISO13849-1 Cat.3 PLe)
- Equipped with the EN61800-5-2 STO (Safe Torque Off) function

With STO Sub-Function

EtherCAT
Direct Input Type
JXCEF Series

Applicable network

EtherCAT



With STO Sub-Function

EtherNet/IP™
Direct Input Type
JXC9F Series

Applicable network

EtherNet/IP



With STO Sub-Function

PROFINET
Direct Input Type
JXCPF Series

Applicable network

PROFINET



With STO Sub-Function

IO-Link
Direct Input Type
JXCLF Series

Applicable network

IO-Link



◎ 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.

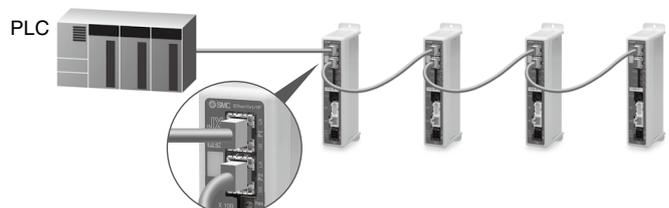
◎ Numerical monitoring available

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.

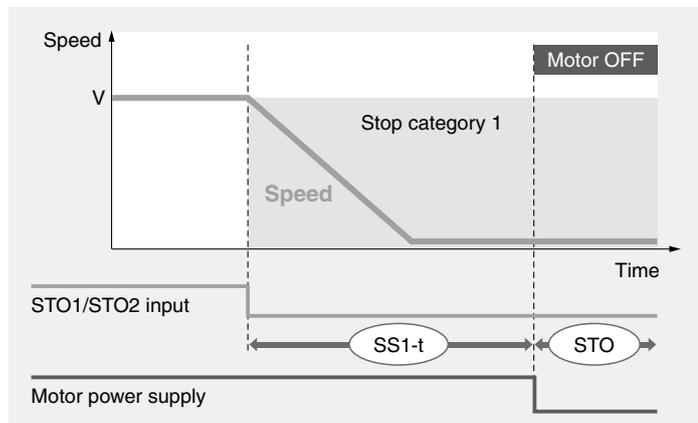
* 1 to 1 in the case of IO-Link



With STO Sub-Function

Safety function/STO, SS1-t (EN 61800-5-2)

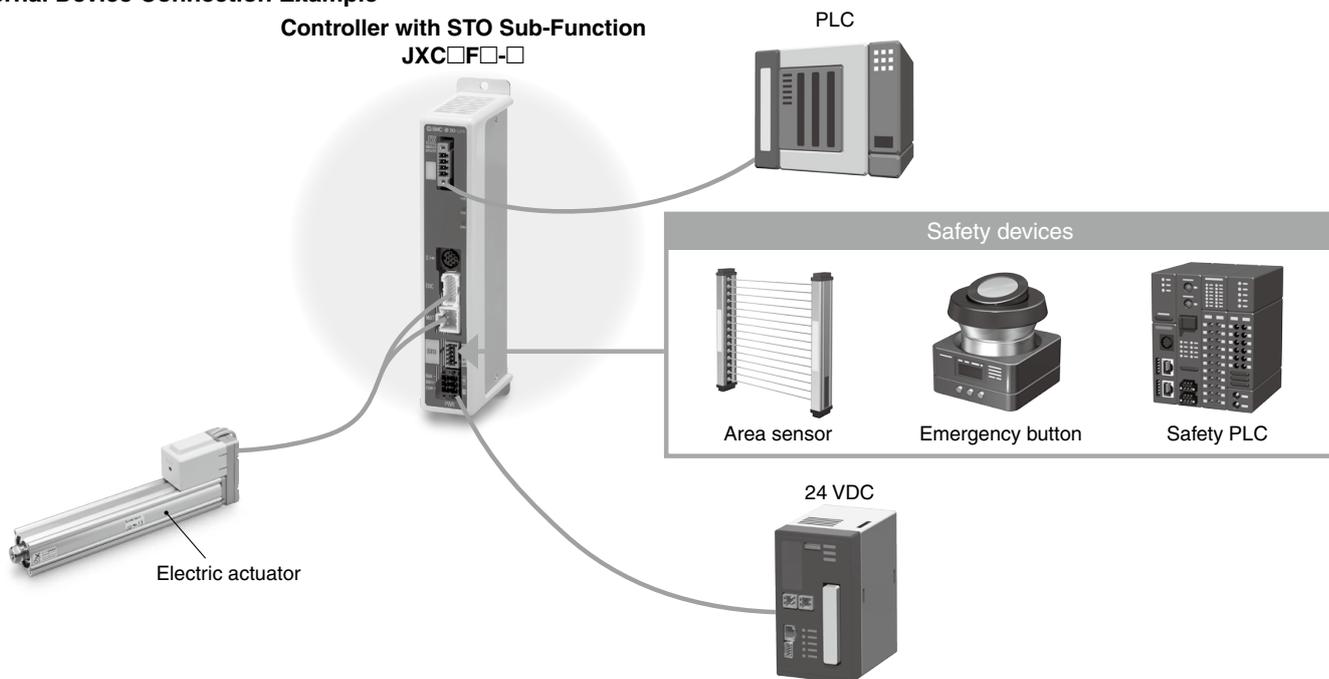
When the STO signal is input from the safety device, after the SS1-t operation is completed, the unit shifts to the STO operation and the power supply of the motor is turned OFF.



SS1-t operation: Safe Stop 1—After an application-specific delay time, a shift to the STO operation occurs.

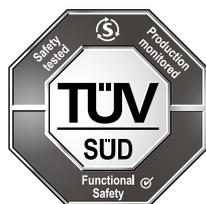
STO operation: Safe Torque Off—The power supply of the motor is turned OFF.

External Device Connection Example



Certified by a third-party organization

Facilitates the safety designing of equipment and facilities (compliant with ISO/IEC standards)



EN 61508-1/2 SIL 3*1
 EN 62061 SIL CL 3*1
 EN ISO 13849-1 Cat. 3 PL e
 EN 61800-5-2 STO, SS1-t

SIL (Safety Integrity Level)

A safety integrity level as defined by international standard IEC 61508/62061
 There are 4 levels of safety, with the lowest being SIL 1 and the highest being SIL 4.

PL (Performance Level)

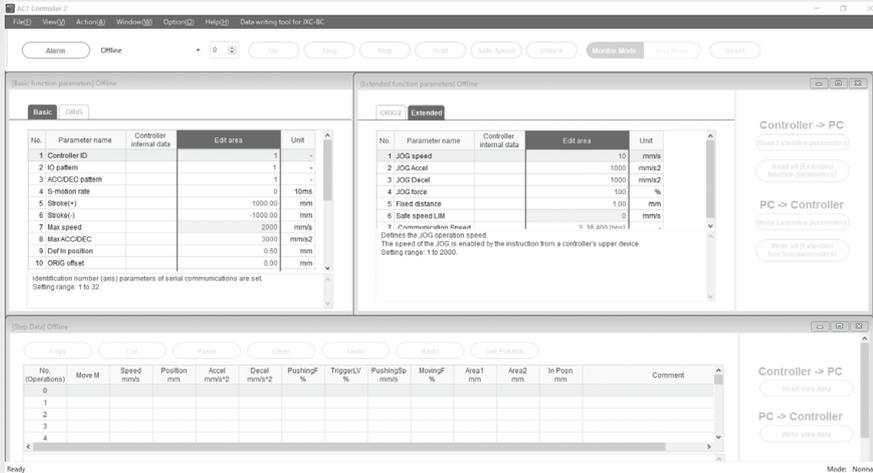
A scale used to define the capability of safety-related parts to perform a safety function as defined by international standard ISO 13849
 There are 5 levels of safety function, with the lowest being PL a and the highest being PL e.

*1 The above safety integrity level is the max. value. The achievable level varies depending on the configuration and inspection method of the component. Be sure to refer to "Safety Manual for more information.

Easy-to-use setting software ACT Controller 2 (For PC)

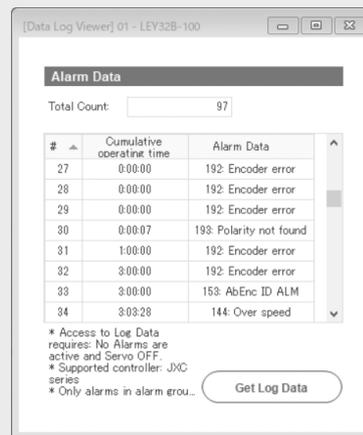
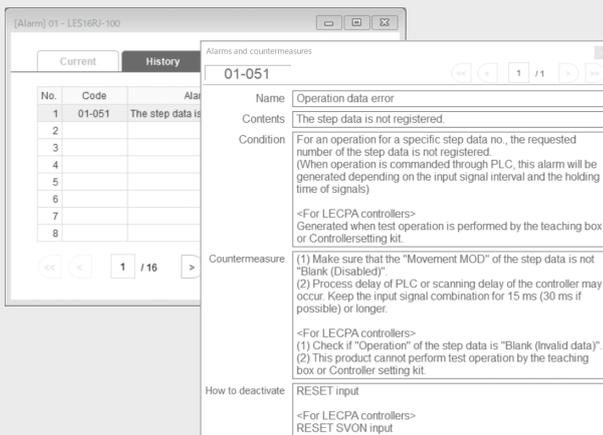
Various functions available in normal mode (Compared with the existing ACT Controller)

● Parameter and step data setting



* Customers operating computers with specifications other than Windows 10/64 bit and Windows 11 should use the existing ACT Controller.

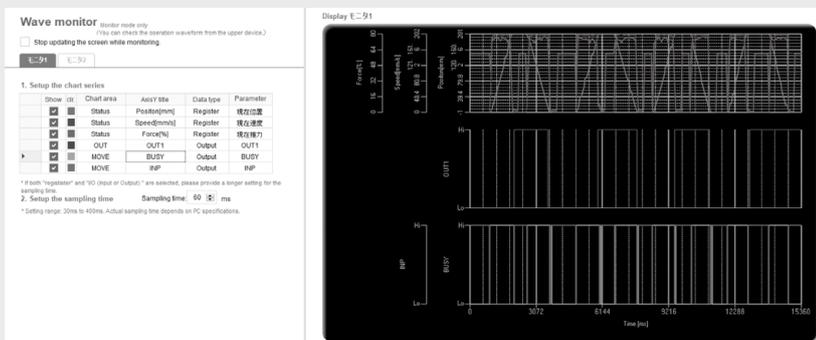
● Alarm confirmation



When an alarm is generated, the alarm details and countermeasures can be confirmed.

When an alarm is generated, the cumulative startup time of the controller can be confirmed.

● Waveform monitoring



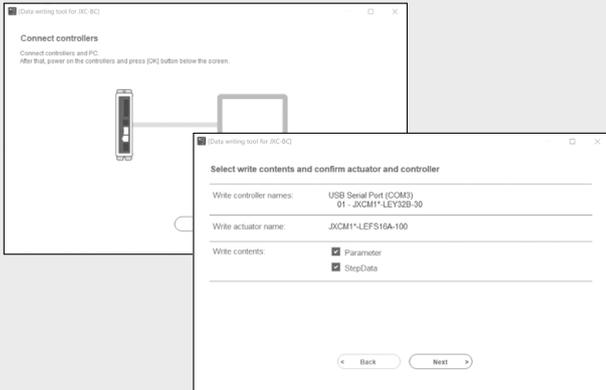
The position, speed, force, and input/output signals' waveform data during operation can be measured.

* When using the ACT Controller 2 test operation function, waveform monitoring is not available.

ACT 2

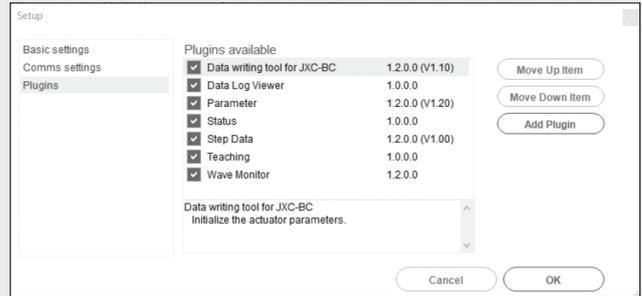
Controller Setting Software ACT Controller 2

• The JXC-BC writing tool



The writing tool can be used to write the connected actuator's parameters and step data to a JXC series blank controller.

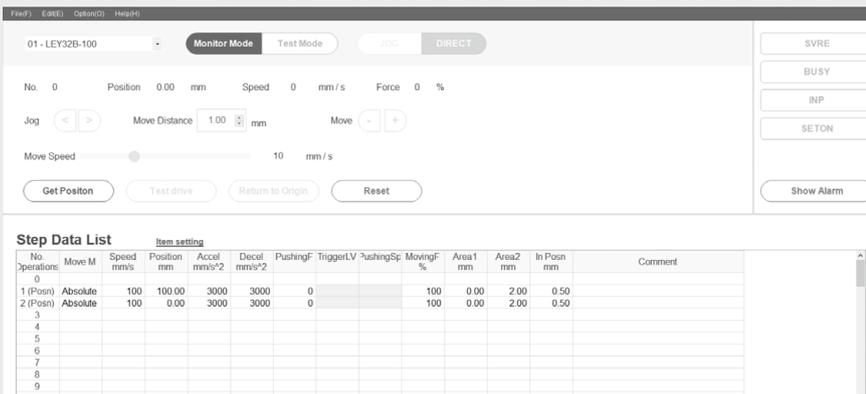
• Customizable plug-in functions



Which plug-in functions are displayed as well as the display order are customizable. Customers can add the functions they require.

In normal mode, various other test operation methods (program operation, jogging, moving of the constant rate, etc.), signal status monitoring, one-touch switching between Japanese and English, and other functions are available.

For immediate use, operate in easy mode.



Step data setting, various test operations, and status confirmation can be done on a single screen.

How to download the setting software

Operation Manuals

Product Search: Enter product name, series, model.

Series Search: A | C | D | E | F | G | H | I | J | K | L | M | N | O | P | R | S | T | V | W | X | Z. Please select a series.

Setting tool (Setting Software)

Product name	Series/Model	Download	Replacement Procedure	Notes
Controller setting software (For 3-axis Step Motor Controller) Installation Manual	JXC-NM1	Controller Setting Software	English	
Controller setting software (For 3-axis Step Motor Controller) Installation Manual	JXC-NM1	Installation Manual	English	
Controller Setting Software (For 4-axis Step Motor Controller)	JXC-8B1	Initial Manual	English - Chinese	
Controller Setting Software (For 4-axis Step Motor Controller)	JXC-8B1	Initial Manual	English	
Controller setting software (ACT Controller 2) Controller setting software	ACT Controller 2	Controller setting software	English	Software download
Controller setting software (ACT Controller) Controller setting software	ACT Controller	Controller setting software	English	
Communication cable for controller setting kit (ACT-CD) (ACT-CD)	JXC-CD	USB Driver Manual	English	
Controller setting software (LESPNLEHALLPPLPPLP)	ACT-CD	Control software	English	

Setting software ACT Controller 2

From the SMC website

Documents/Download

↓

Operation Manuals

↓

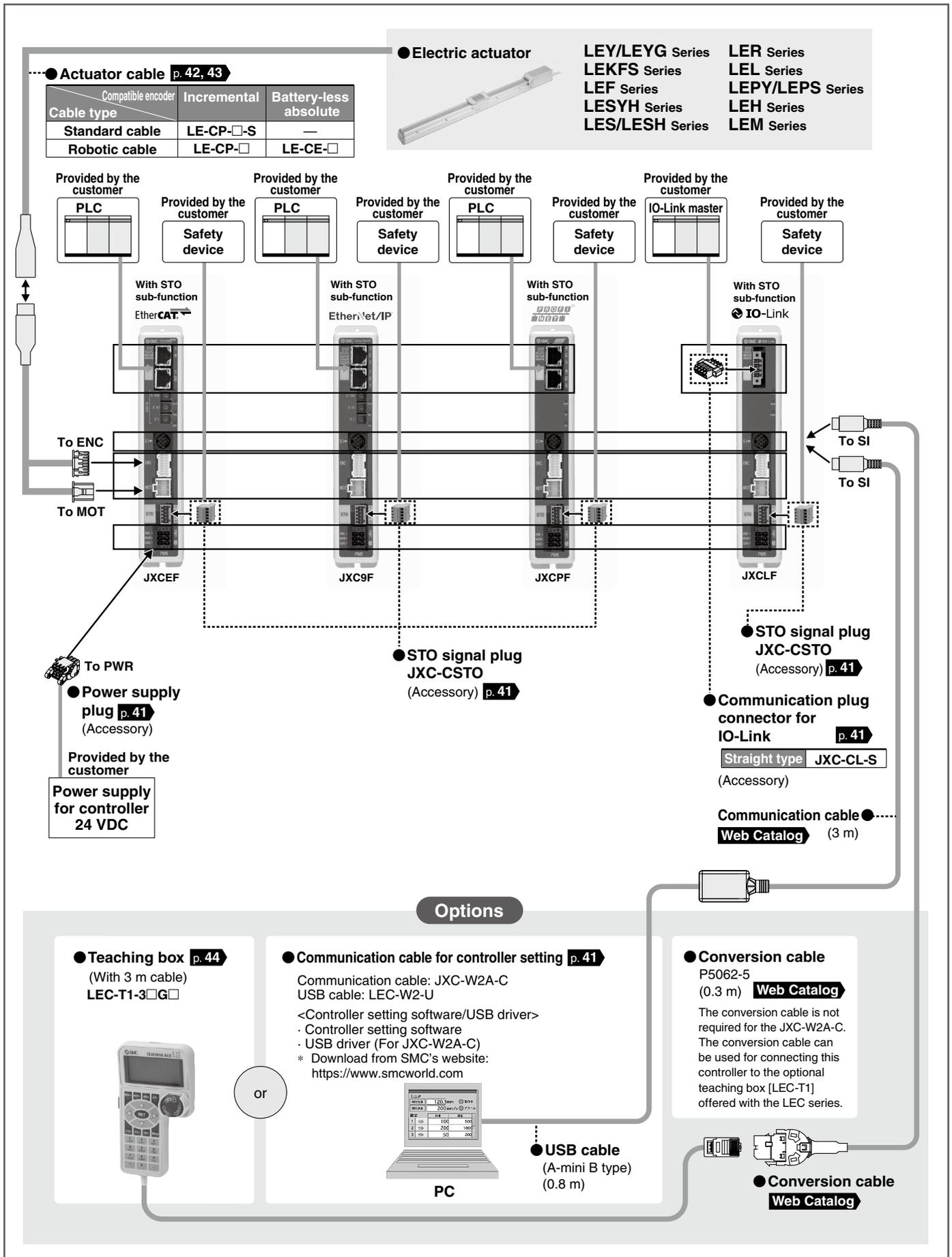
Electric Actuators

↓

Setting tool (Setting Software)

Setting software ACT Controller 2

System Construction/Fieldbus Network (EtherCAT/EtherNet/IP™/PROFINET/IO-Link Direct Input Type)



Compatible actuators

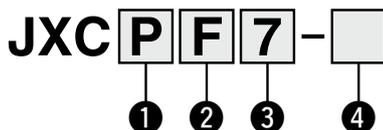
- LEKFS LEP LER
- LEF LEM LEY/G LESYH
- LES/H LEP LER
- LEH

Step Motor Controller

JXCEF/9F/PF/LF Series



How to Order



1 Communication protocol

E	EtherCAT
9	EtherNet/IP™
P	PROFINET
L	IO-Link

2 Number of axes, Special specification

F	1 axis, With STO sub-function
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3 Mounting

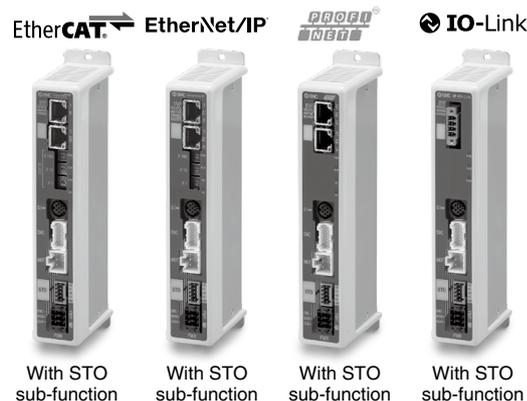
7	Screw mounting
8 *1	DIN rail

*1 The DIN rail is not included. It must be ordered separately. (Refer to page 39.)

4 Actuator part number

Without cable specifications and actuator options	
Example: Enter "LEFS16B-100" for the LEFS16B-100B-S1□□.	
BC	Blank controller*1

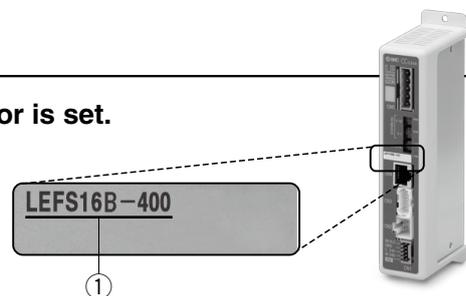
*1 Requires dedicated software (JXC-BCW or ACT Controller 2)



The controller is sold as single unit after the compatible actuator is set.

Confirm that the combination of the controller and actuator is correct.

- ① Check the actuator label for the model number. This number should match that of the controller.



* Refer to the operation manual for using the products. Please download it via our website: <https://www.smcworld.com>

Precautions for blank controllers (JXC□□□□-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. For data writing, use the controller setting software ACT Controller 2 or the dedicated software JXC-BCW.

- Both ACT Controller 2 and JXC-BCW can be downloaded from the SMC website.
- To use this software, order the communication cable for controller setting (JXC-W2A-C) and the USB cable (LEC-W2-U) separately.

Hardware Requirements

OS	Windows®10 (64 bit)	Windows®11	Windows®7	Windows®8	Windows®10
Software	ACT Controller 2 (With JXC-BCW function)		JXC-BCW		

* Windows®7, Windows®8, Windows®10, and Windows®11 are registered trademarks of Microsoft Corporation in the United States.

SMC website: <https://www.smcworld.com>

JXCEF/9F/PF/LF Series

Specifications

Model		JXCEF	JXC9F	JXCPF	JXCLF	
Network		EtherCAT	EtherNet/IP™	PROFINET	IO-Link	
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/Battery-less absolute				
Communication specifications	Applicable system	Protocol	EtherCAT*2	EtherNet/IP™*2	PROFINET*2	IO-Link
		Version*1	Conformance Test Record V.1.2.6	Volume 1 (Edition 3.14) Volume 2 (Edition 1.15)	Specification Version 2.32	Version 1.1 Port Class A
	Communication speed	100 Mbps*2	10/100 Mbps*2 (Automatic negotiation)	100 Mbps*2	230.4 kbps (COM3)	
	Configuration file*3	ESI file	EDS file	GSDML file	IODD file	
	I/O occupation area	Input 20 bytes Output 36 bytes	Input 36 bytes Output 36 bytes	Input 36 bytes Output 36 bytes	Input 14 bytes Output 22 bytes	
Terminating resistor		Not included				
Memory		EEPROM				
LED indicator		PWR, ALM, RUN, ERR	PWR, ALM, MS, NS	PWR, ALM, SF, BF	PWR, ALM, COM	
Cable length [m]		Actuator cable: 20 or less				
Cooling system		Natural air cooling				
Operating temperature range [°C]		0 to 55 (No freezing)*5				
Operating humidity range [%RH]		90 or less (No condensation)				
Enclosure		IP30 (Excludes the connector)				
Insulation resistance [MΩ]		Between all external terminals and the case: 50 (500 VDC)				
Safety function		STO,SS1-t	STO,SS1-t	STO,SS1-t	STO, SS1-t	
Safety standards		EN61508 SIL3*4 EN62061 SIL CL3*4 EN ISO13849-1 Cat.3 PLe*4	EN61508 SIL3*4 EN62061 SIL CL3*4 EN ISO13849-1 Cat.3 PLe*4	EN61508 SIL3*4 EN62061 SIL CL3*4 EN ISO13849-1 Cat.3 PLe*4	EN 61508 SIL 3*4 EN 62061 SIL CL 3*4 EN ISO 13849-1 Cat. 3 PL e*4	
Weight [g]	Screw mounting	250	240	250	220	
	DIN rail mounting	270	260	270	240	

*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.

*4 The above safety integrity level is the max. value. The achievable level varies depending on the configuration and inspection method of the component. Be sure to refer to "Safety Manual for more information.

*5 If the vertical work load for the LEY40□E or LEYG40□E series product is equal to or greater than the weight below, use the controller at an ambient temperature at 40°C or less.

Series	Weight [kg]	Series	Weight [kg]
LEY40□EA	9	LEYG40□EA	7
LEY40□EB	19	LEYG40□EB	17
LEY40□EC	38	LEYG40□EC	36

■Trademark

EtherNet/IP® is a registered trademark of ODVA, Inc.

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.

* Numerical values other than "Moving force," "Area 1," and "Area 2" can be used to perform operation under numerical instructions from JXCL□.

<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>

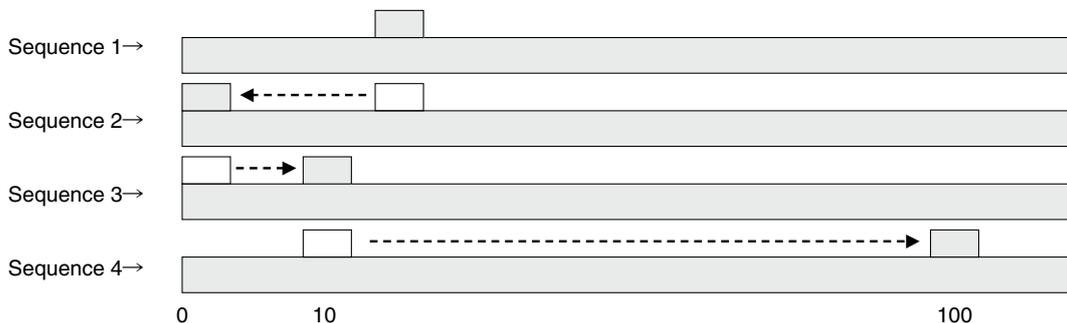
Sequence 1: Servo ON instruction

Sequence 2: Instruction to return to origin

Sequence 3: Specify step data No. 0 and turn ON the input instruction flag (position). Input 10 in the target position. Subsequently the start flag turns ON.

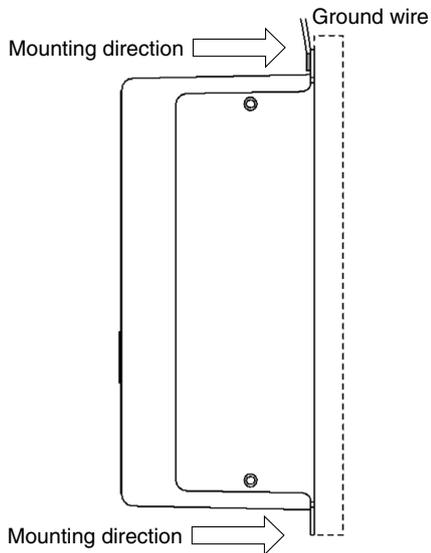
Sequence 4: Turn ON step data No. 0 and the input instruction flag (position) to change the target position to 100 while the start flag is ON.

The same operation can be performed with any operation command.



How to Mount

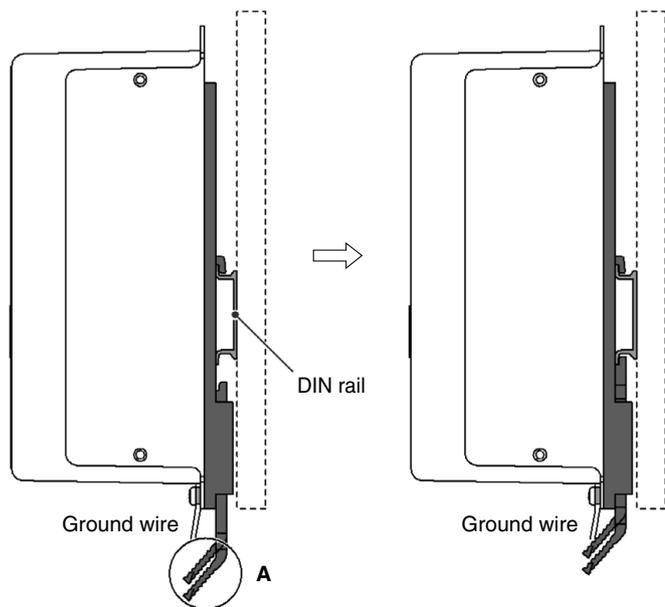
a) Screw mounting (JXC□17-□, JXC□F7-□)
(Installation with two M4 screws)



b) DIN rail mounting (JXC□18-□, JXC□F8-□)
(Installation with the DIN rail)

Before locked onto DIN rail

DIN rail is locked.

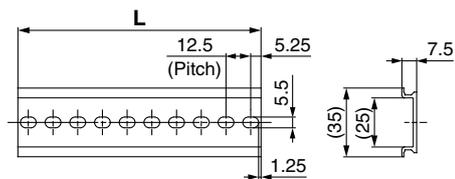


Hook the controller on the DIN rail and press the lever of section A in the arrow direction to lock it.

* When size 25 or more of the LE series are used, the space between the controllers should be 10 mm or more.

DIN rail AXT100-DR-□

* For □, enter a number from the No. line in the table below.
Refer to the dimension drawings on page 40 for the mounting dimensions.



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

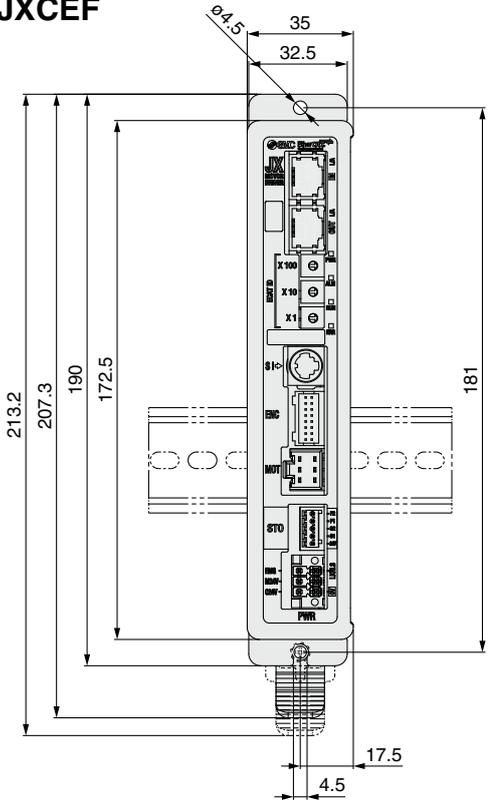
DIN rail mounting adapter LEC-3-D0 (with 2 mounting screws)

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

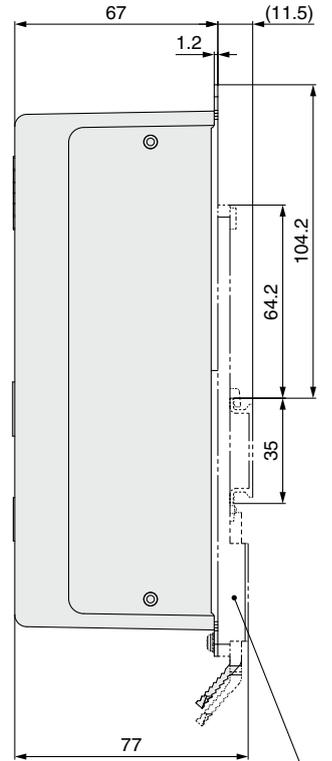
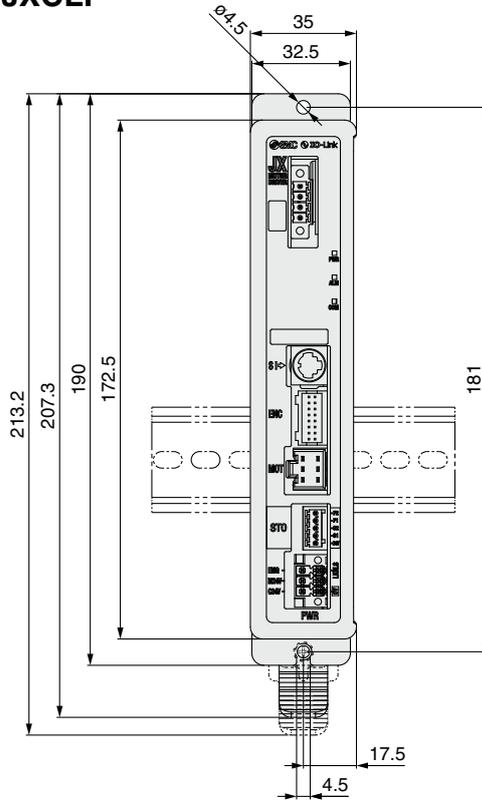
JXCEF/9F/PF/LF Series

Dimensions

JXCEF

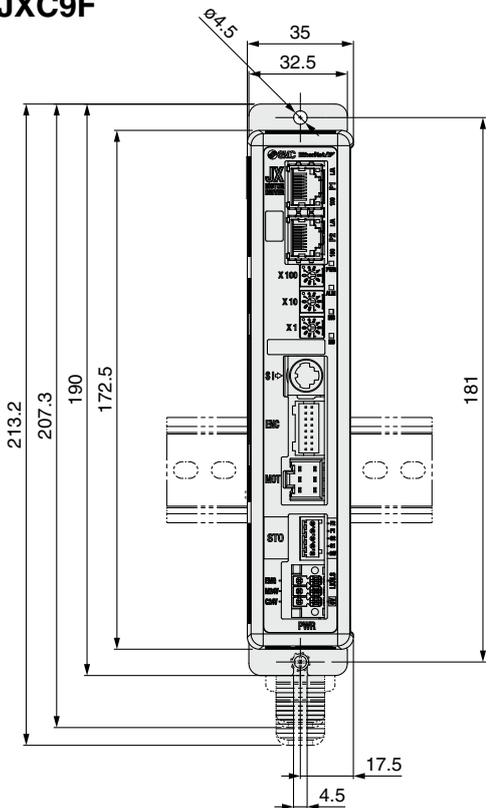


JXCLF

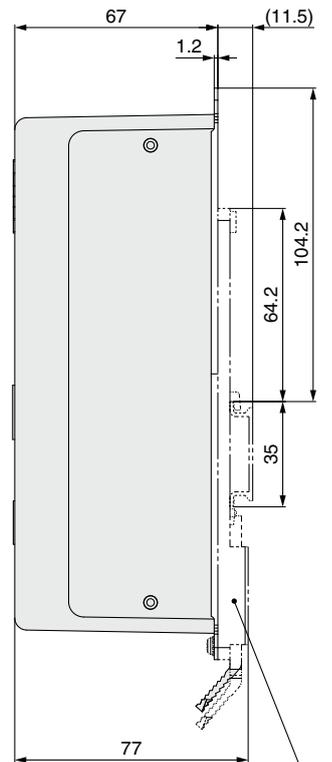
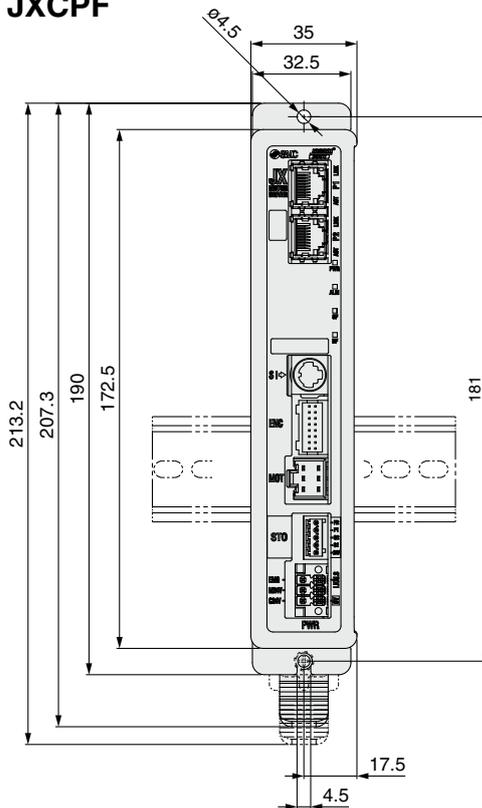


DIN rail mounting adapter

JXC9F



JXCPF

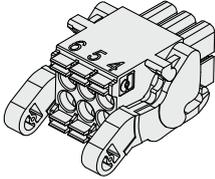


DIN rail mounting adapter

Options

■ 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

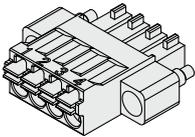
Terminal name	Function	Details
0V	Common supply (-)	The M24V terminal, C24V terminal, EMG terminal, and LK RLS terminal are common (-).
M24V	Motor power supply (+)	Motor power supply (+) of the controller
C24V	Control power supply (+)	Control power supply (+) of the controller
EMG	Stop (+)	Connection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

■ Communication plug connector

For IO-Link

Straight type JXC-CL-S

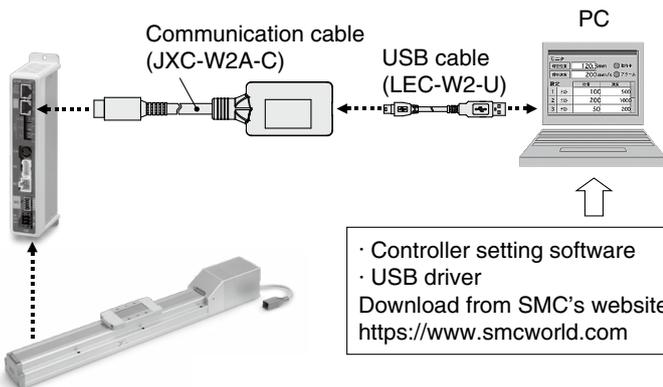
* The communication plug connector for IO-Link is an accessory.



Communication plug connector for IO-Link

Terminal no.	Terminal name	Details
1	L+	+24 V
2	NC	N/A
3	L-	0 V
4	C/Q	IO-Link signal

■ Communication cable for controller setting



■ STO signal plug JXC-CSTO

* Included with the JXC□F



⑤
④
③
②
①

STO signal plug

Pin no.	Signal name	Details
1	24V	+24 V output (Max. 100 mA)
2	STO1	STO input 1
3	STO2	STO input 2
4	Feedback 1	STO1 feedback signal
5	Feedback 2	STO2 feedback signal

■ DIN rail mounting adapter LEC-3-D0

* With 2 mounting screws

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

■ DIN rail AXT100-DR-□

* For □, enter a number from the No. line in the table on page 39. Refer to the dimension drawings on page 40 for the mounting dimensions.

How to Order

JXC Series **JXC-W2A-C**

* For JXC□ series

Communication cable

LEC-W2-U

USB cable

Controller setting kit JXC-W2A

A set which includes a communication cable (JXC-W2A-C) and a USB cable (LEC-W2-U)

Actuator Cable 1

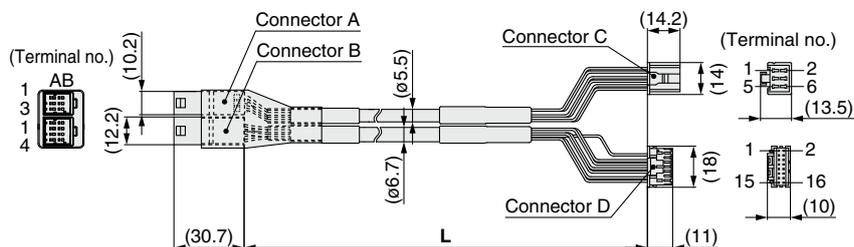
[Robotic cable for battery-less absolute (Step motor 24 VDC)]

LE-CE-1

Cable length (L) [m]

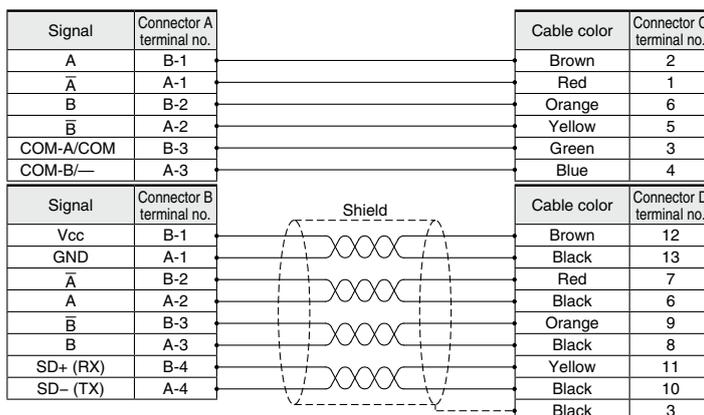
1	1.5
3	3
5	5
8	8*1
A	10*1
B	15*1
C	20*1

*1 Produced upon receipt of order



Weight

Product no.	Weight [g]	Note
LE-CE-1	190	Robotic cable
LE-CE-3	360	
LE-CE-5	570	
LE-CE-8	900	
LE-CE-A	1120	
LE-CE-B	1680	
LE-CE-C	2210	



[Robotic cable with lock for battery-less absolute (Step motor 24 VDC)]

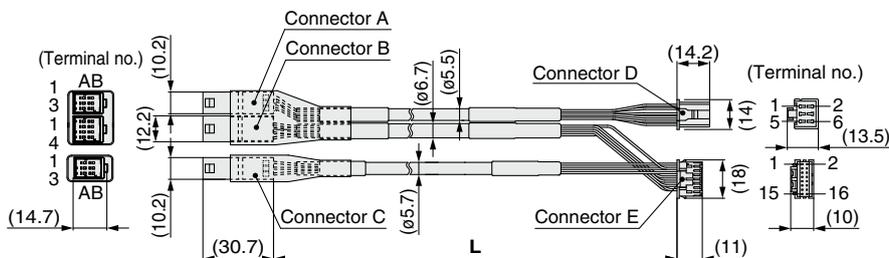
LE-CE-1-B

Cable length (L) [m]

1	1.5
3	3
5	5
8	8*1
A	10*1
B	15*1
C	20*1

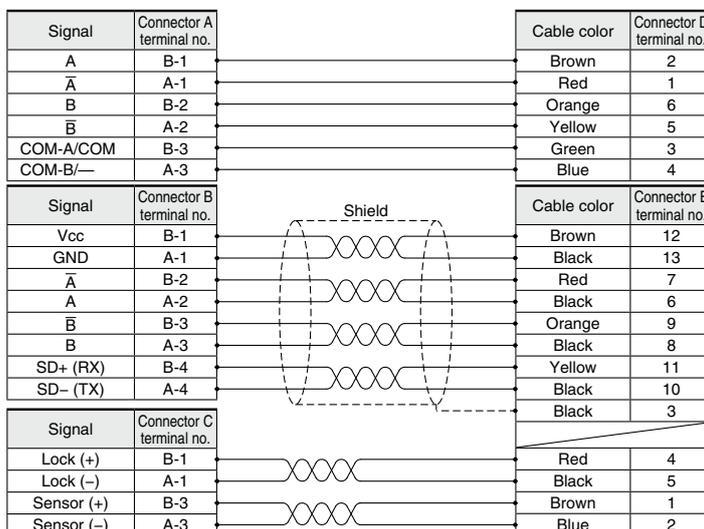
*1 Produced upon receipt of order

With lock and sensor



Weight

Product no.	Weight [g]	Note
LE-CE-1-B	240	Robotic cable
LE-CE-3-B	460	
LE-CE-5-B	740	
LE-CE-8-B	1170	
LE-CE-A-B	1460	
LE-CE-B-B	2120	
LE-CE-C-B	2890	



Compatible controllers

JXC□F

Actuator Cable 2

[Robotic cable, standard cable for incremental (Step motor 24 VDC)]

LE-CP-1-□

Cable length (L) [m]

1	1.5
3	3
5	5
8	8*1
A	10*1
B	15*1
C	20*1

*1 Produced upon receipt of order (Robotic cable only)

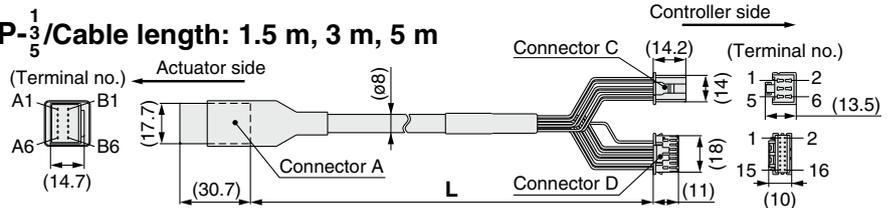
Cable type

Nil	Robotic cable (Flexible cable)
S	Standard cable

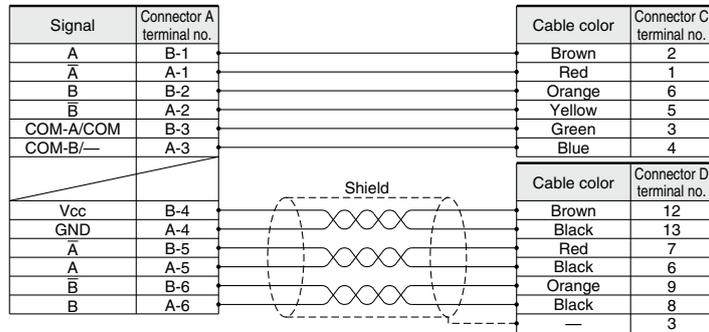
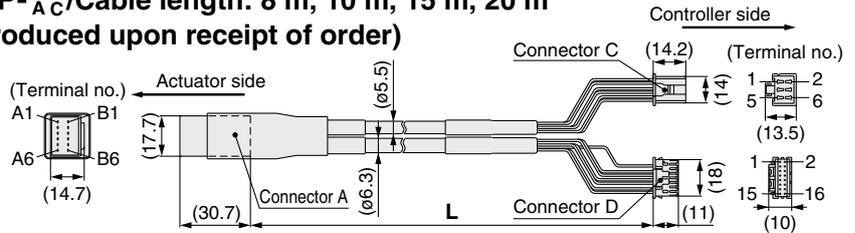
Weight

Product no.	Weight [g]	Note
LE-CP-1-S	190	Standard cable
LE-CP-3-S	280	
LE-CP-5-S	460	
LE-CP-1	140	Robotic cable
LE-CP-3	260	
LE-CP-5	420	
LE-CP-8	790	
LE-CP-A	980	
LE-CP-B	1460	
LE-CP-C	1940	

LE-CP-¹/₅/Cable length: 1.5 m, 3 m, 5 m



LE-CP-^{8 B}/_{AC}/Cable length: 8 m, 10 m, 15 m, 20 m
(*1 Produced upon receipt of order)



[Robotic cable, standard cable with lock and sensor for incremental (Step motor 24 VDC)]

LE-CP-1-B-□

Cable length (L) [m]

1	1.5
3	3
5	5
8	8*1
A	10*1
B	15*1
C	20*1

*1 Produced upon receipt of order (Robotic cable only)

With lock and sensor

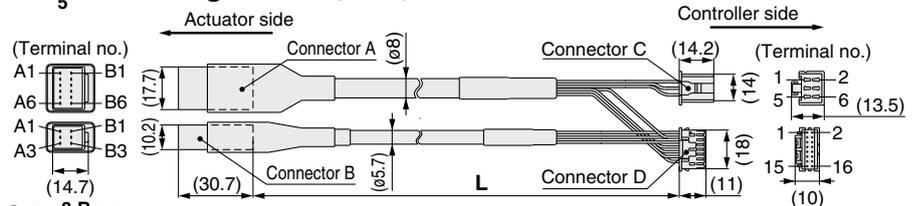
Cable type

Nil	Robotic cable (Flexible cable)
S	Standard cable

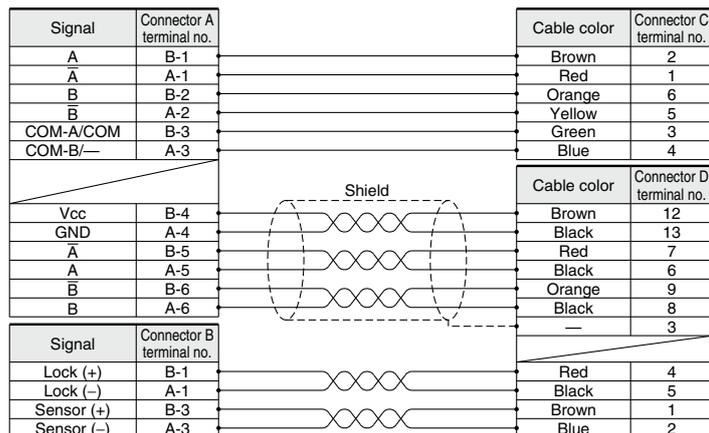
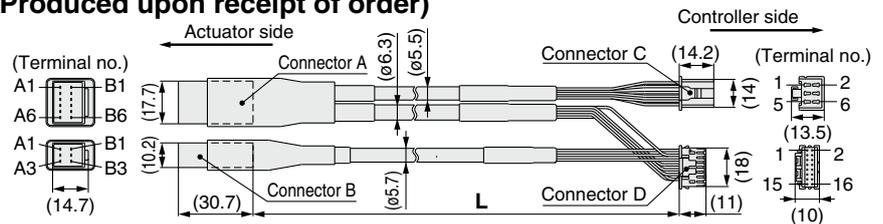
Weight

Product no.	Weight [g]	Note
LE-CP-1-B-S	240	Standard cable
LE-CP-3-B-S	380	
LE-CP-5-B-S	630	
LE-CP-1-B	190	Robotic cable
LE-CP-3-B	360	
LE-CP-5-B	590	
LE-CP-8-B	1060	
LE-CP-A-B	1320	
LE-CP-B-B	1920	
LE-CP-C-B	2620	

LE-CP-¹/₅/Cable length: 1.5 m, 3 m, 5 m



LE-CP-^{8 B}/_{AC}/Cable length: 8 m, 10 m, 15 m, 20 m
(*1 Produced upon receipt of order)



LEC-T1 Teaching Box

Compatible controllers

JXC□F



How to Order

LEC-T1-3 J G □

Teaching box

Cable length [m]

3 3

Initial language

J	Japanese
E	English

Enable switch

Nil	None
S	Equipped with enable switch

* Interlock switch for jog and test function

Stop switch

G	Equipped with stop switch
---	---------------------------

* The displayed language can be changed to English or Japanese.

Specifications

Item	Description
Switch	Stop switch, Enable switch (Option)
Cable length [m]	3
Enclosure	IP64 (Except connector)
Operating temperature range [°C]	5 to 50
Operating humidity range [%RH]	90 or less (No condensation)
Weight [g]	350 (Except cable)

[UL-compliant products]

When compliance with UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

Standard functions

- Chinese character display
- Stop switch is provided.

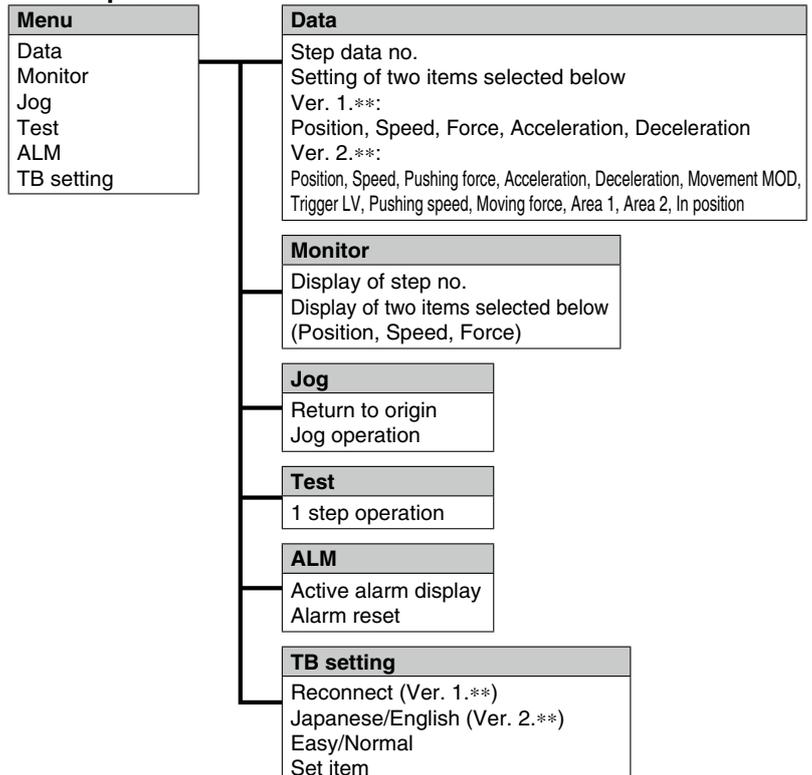
Option

- Enable switch is provided.

Easy Mode

Function	Details
Step data	• Setting of step data
Jog	• Jog operation • Return to origin
Test	• 1 step operation • Return to origin
Monitor	• Display of axis and step data no. • Display of two items selected from Position, Speed, Force.
ALM	• Active alarm display • Alarm reset
TB setting	• Reconnection of axis (Ver. 1.**) • Displayed language setting (Ver. 2.**) • Setting of easy/normal mode • Setting step data and selection of items from easy mode monitor

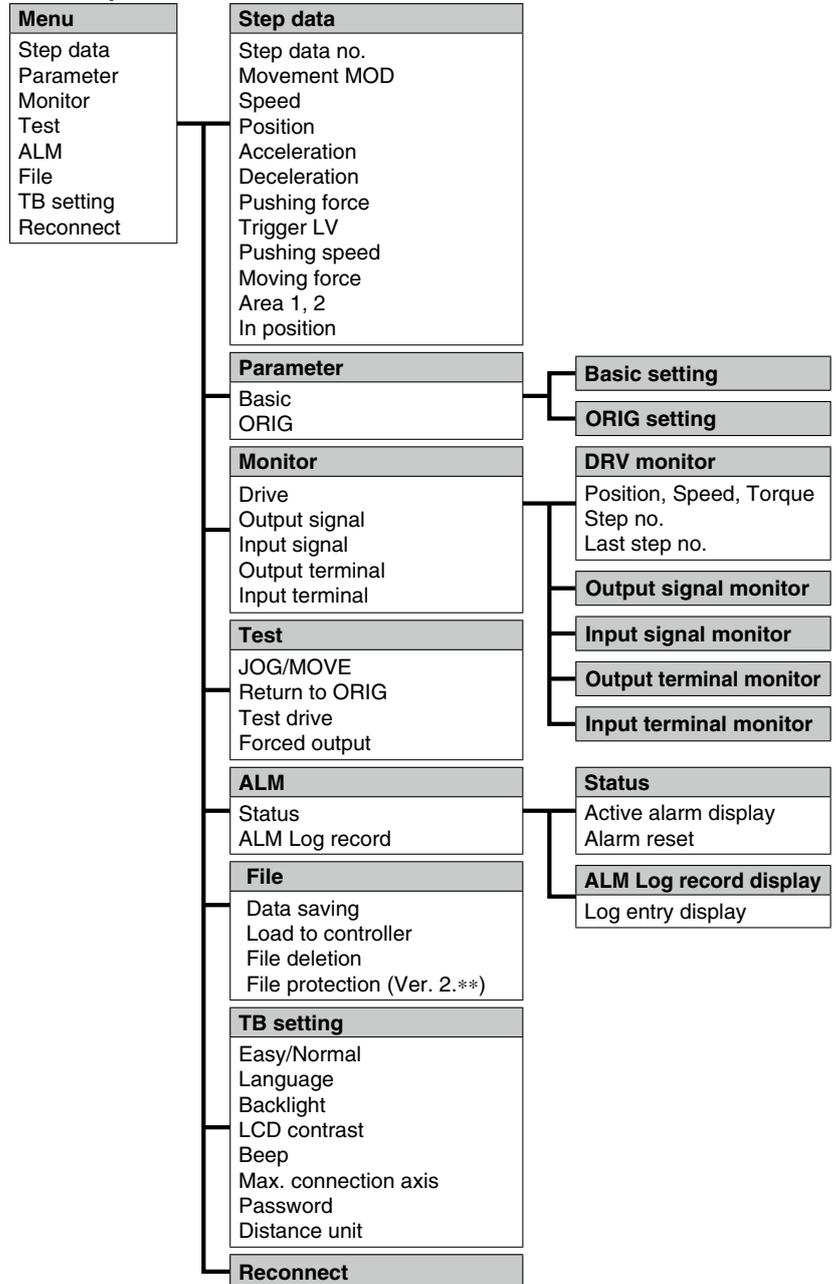
Menu Operations Flowchart



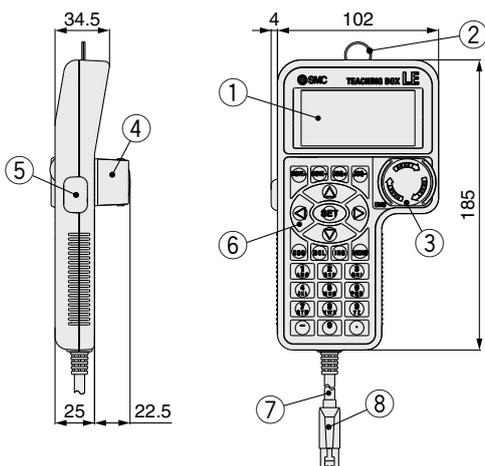
Normal Mode

Function	Details
Step data	<ul style="list-style-type: none"> Step data setting
Parameter	<ul style="list-style-type: none"> Parameters setting
Test	<ul style="list-style-type: none"> Jog operation/Constant rate movement Return to origin Test drive (Specify a maximum of 5 step data and operate.) Forced output (Forced signal output, Forced terminal output)
Monitor	<ul style="list-style-type: none"> Drive monitor Output signal monitor Input signal monitor Output terminal monitor Input terminal monitor
ALM	<ul style="list-style-type: none"> Active alarm display (Alarm reset) Alarm log record display
File	<ul style="list-style-type: none"> Data saving Save the step data and parameters of the controller which is being used for communication (it is possible to save four files, with one set of step data and parameters defined as one file). Load to controller Loads the data which is saved in the teaching box to the controller which is being used for communication. Delete the saved data. File protection (Ver. 2.**)
TB setting	<ul style="list-style-type: none"> Display setting (Easy/Normal mode) Language setting (Japanese/English) Backlight setting LCD contrast setting Beep sound setting Max. connection axis Distance unit (mm/inch)
Reconnect	<ul style="list-style-type: none"> Reconnection of axis

Menu Operations Flowchart



Dimensions



No.	Description	Function
1	LCD	A screen of liquid crystal display (with backlight)
2	Ring	A ring for hanging the teaching box
3	Stop switch	When switch is pushed in, the switch locks and stops. The lock is released when it is turned to the right.
4	Stop switch guard	A guard for the stop switch
5	Enable switch (Option)	Prevents unintentional operation (unexpected operation) of the jog test function. Other functions such as data change are not covered.
6	Key switch	Switch for each input
7	Cable	Length: 3 meters
8	Connector	A connector connected to CN4 of the controller