Electric Grippers

Step Motor (Servo/24 VDC)

With drop prevention function
(Self-lock mechanism is provided for all series.)
Gripping force of the workpieces is maintained when stopped or restarted. The workpieces can be removed with manual override.

Compact body sizes and long stroke variations
Gripping force equivalent to the widely used air grippers is available.

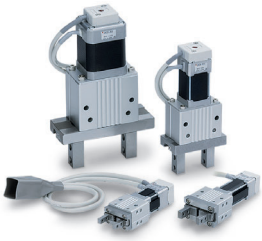
Possible to set position, speed and force. (64 points)

Energy-saving product
Power consumption reduced by self-lock mechanism.

With gripping check function
Identify workpieces with different dimensions/detect mounting and removal of the workpieces.

Z Type (2 fingers)

Compact and light, various gripping forces



Series **LEHZ**

Size	Stroke/ both sides [mm]	Gripping force [N]	
		Basic	Compact
10	4	6 to 14	2 to 6
16	6		3 to 8
20	10	16 to 40	11 to 28
25	14		
32	22	52 to 130	—
40	30	84 to 210	—

ZJ Type (2 fingers)

With dust cover (Equivalent to IP50)
3 types of cover material (Finger portion only)

Series **LEHZJ**

Size	Stroke/ both sides [mm]	Gripping force [N]	
		Basic	Compact
10	4	6 to 14	3 to 6
16	6		4 to 8
20	10	16 to 40	11 to 28
25	14		

F Type (2 fingers)

Can hold various types of workpieces with a long stroke.

Series **LEHF**

Size	Stroke/ both sides [mm]	Gripping force [N]
10	16 (32)	3 to 7
20	24 (48)	11 to 28
32	32 (64)	48 to 120
40	40 (80)	72 to 180

( ): Long stroke

S Type (3 fingers)

Can hold round workpieces.

Series **LEHS**

Size	Stroke/ diameter [mm]	Gripping force [N]	
		Basic	Compact
10	4	2.2 to 5.5	1.4 to 3.5
20	6	9 to 22	7 to 17
32	8	36 to 90	—
40	12	52 to 130	—

Step Motor (Servo/24 VDC)
Controller/Driver

- **Step data input type** Series **LECP6**
- **Step data input type** Series **JXC73/83**
- **Programless type** Series **LECP1**
- **Pulse input type** Series **LECPA**
- **Fieldbus compatible Network** Series **JXC□1** Series **JXC92/93**

Series LEH

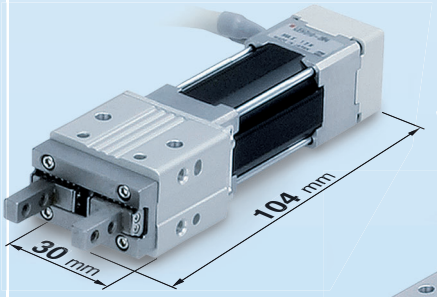
CAT.EUS100-77Ee-UK

Electric Gripper 2-Finger Type

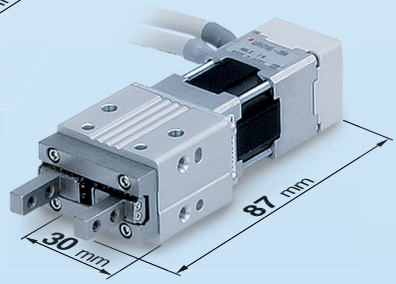
Series LEHZ/Size: 10, 16, 20, 25, 32, 40
Series LEHZJ/Size: 10, 16, 20, 25
Series LEHF/Size: 10, 20, 32, 40

●Compact and lightweight Various gripping forces

Weight: 165 g
(LEHZ10)



Compact
Weight: 135 g
(LEHZ10L)

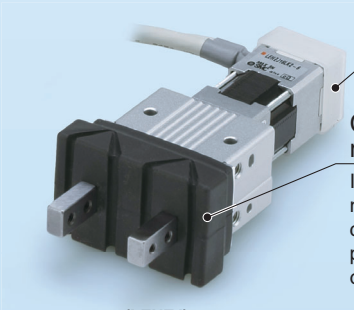


●Sealed-construction dust cover (Equivalent to IP50)

- Prevents machining chips, dust, etc., from getting inside
- Prevents spattering of grease, etc.

●3 types of cover material (Finger portion only)

- Chloroprene rubber (black): Standard
- Fluororubber (black): Option
- Silicone rubber (white): Option

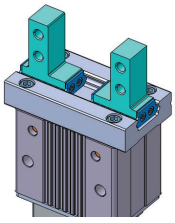


(LEHZJ)

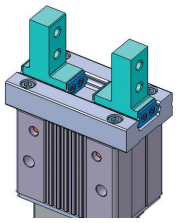
Encoder dust cover
Silicone rubber

Cover designed with no protrusions
Inward-folding design creates no protrusions when the cover is opened and closed, preventing interference with other devices' operations.

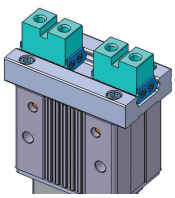
Finger options



Side tapped mounting

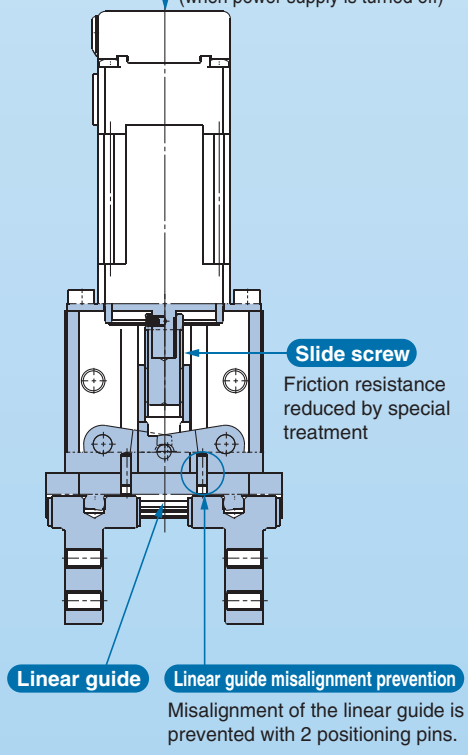


Through-hole in opening/ closing direction

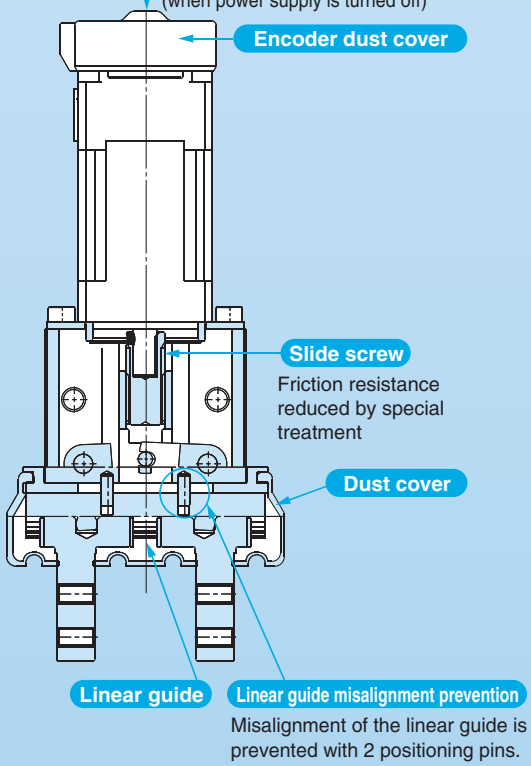


Flat fingers

Series LEHZ



Series LEHZJ



Electric Gripper 3-Finger Type

Series LEHS/Size: 10, 20, 32, 40

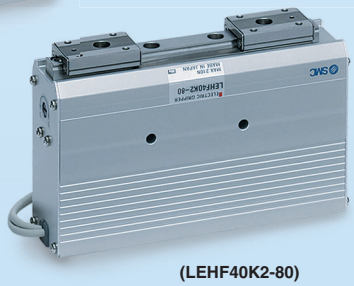
●Can hold various types of workpieces with a long stroke.

Stroke:
Max. **40** mm

(LEHF40K2-40)

Long stroke

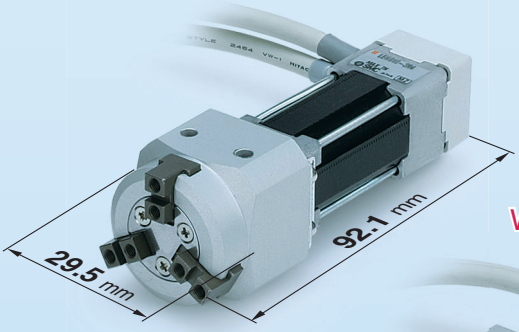
Stroke:
Max. **80** mm



(LEHF40K2-80)

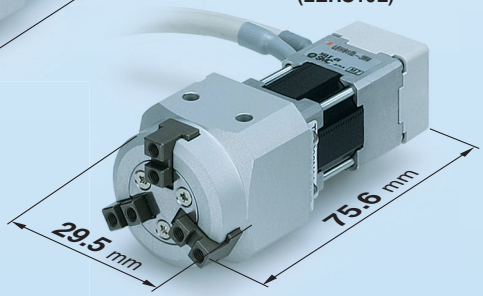
●Can hold round workpieces.

Weight: **185** g
(LEHS10)



Compact

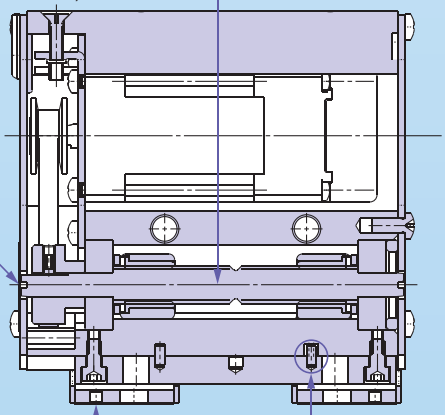
Weight: **150** g
(LEHS10L)



Series LEHF

Manual override screw/Both sides
For opening and closing the fingers (when power supply is turned off)

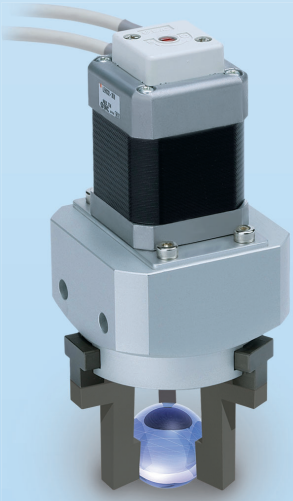
Slide screw
Friction resistance reduced by special treatment



Linear guide

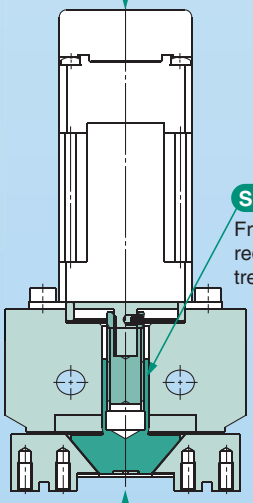
Linear guide misalignment prevention
Misalignment of the linear guide is prevented with 2 positioning pins.

Series LEHS



Manual override screw
For opening and closing the fingers (when power supply is turned off)

Slide screw
Friction resistance reduced by special treatment

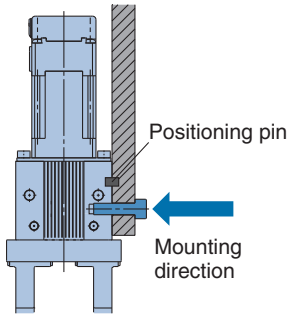


With wedge cam structure
Compact and large gripping force can be obtained through the wedge cam structure.

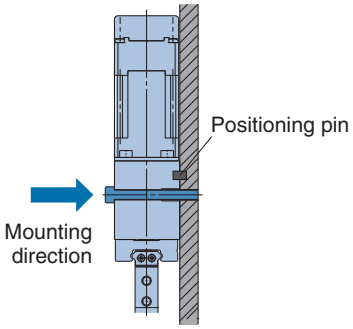
<Mounting Variations>

Series LEHZ/LEHZJ

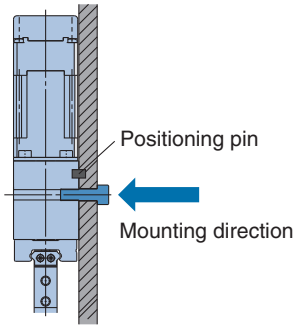
A When using the thread on the side of the body



B When using the thread on the mounting plate

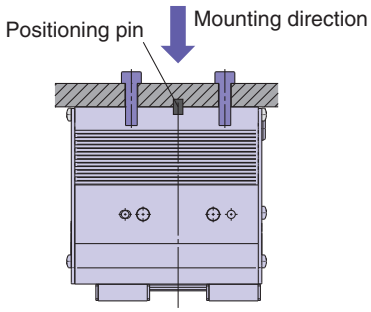


C When using the thread on the back of the body

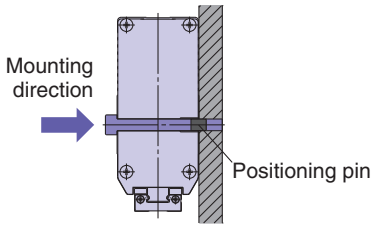


Series LEHF

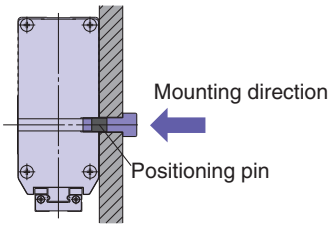
A When using the thread on the body



B When using the thread on the mounting plate

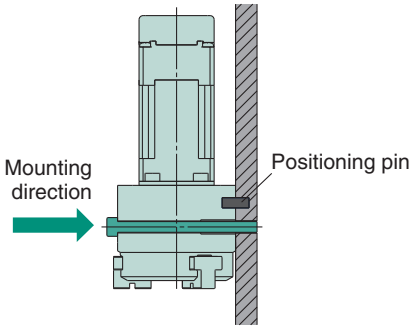


C When using the thread on the back of the body

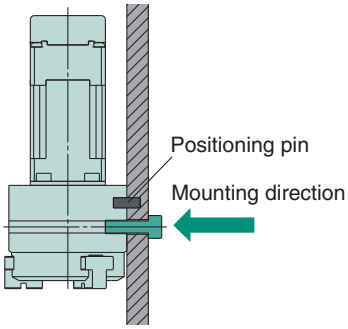


Series LEHS

A When using the thread on the mounting plate

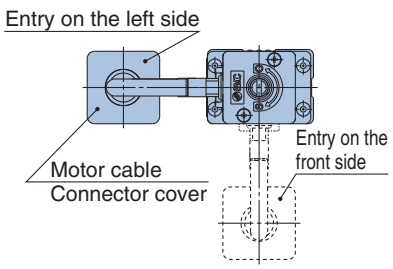


B When using the thread on the back of the body

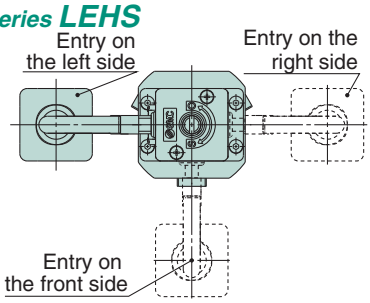


Motor cable mounting direction can be selected.

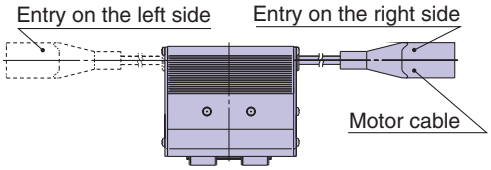
Series LEHZ/LEHZJ



Series LEHS

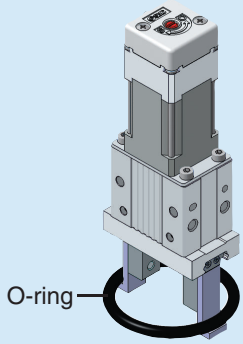


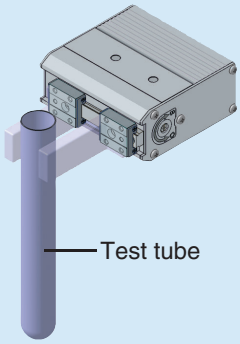
Series LEHF

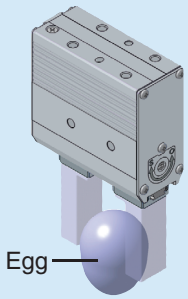


Application Examples

Gripping of components that are easily deformed or damaged

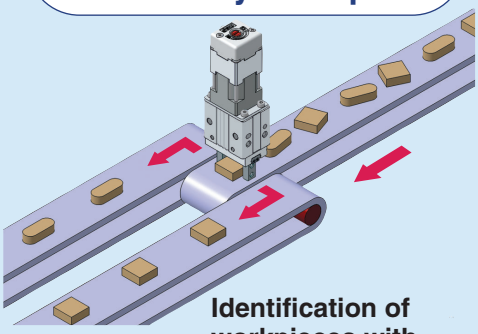






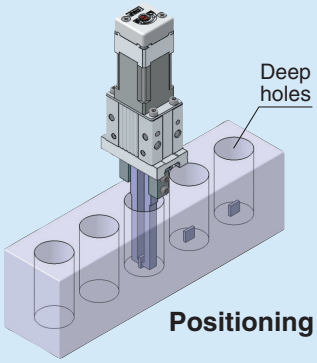
Speed and gripping force control and positioning

Alignment and selection of randomly lined parts



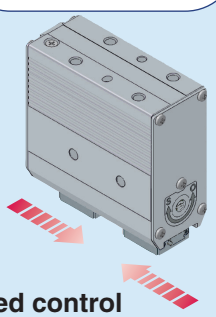
Identification of workpieces with different dimensions

Gripping in a narrow space



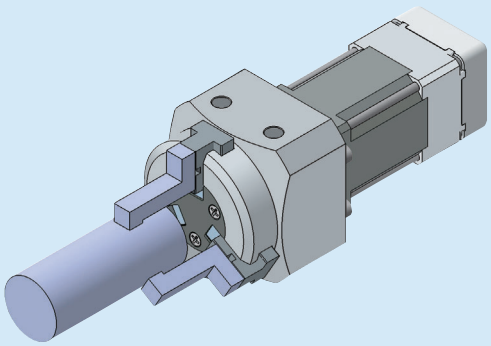
Positioning

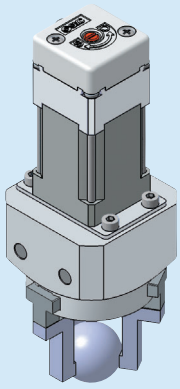
Soft touch/ High frequency

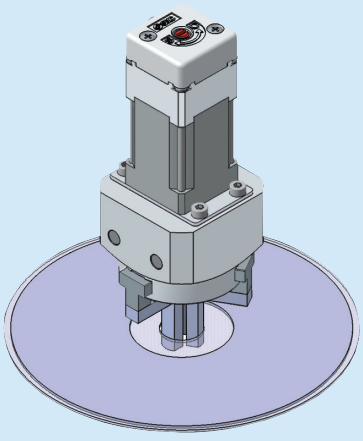


Speed control and positioning (Minimum stroke)

Gripping of cylindrical and spherical parts







Speed and gripping force control

Simple Setting to Use Straight Away

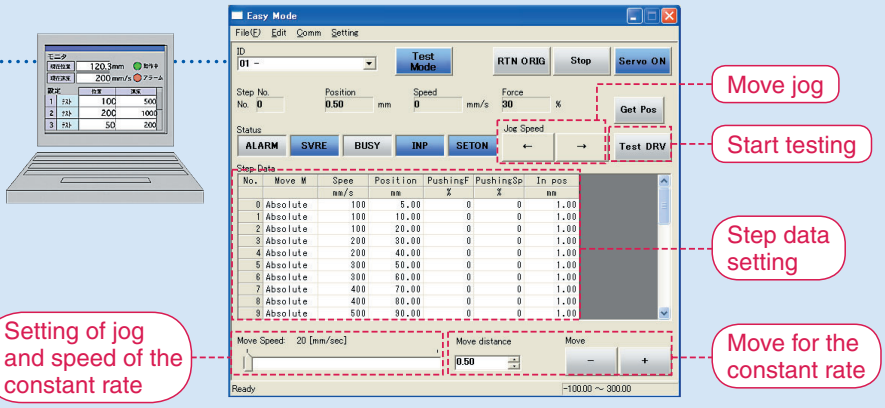
◎Easy Mode for Simple Setting

If you want to use it right away, select “Easy Mode.”

Step motor
(Servo/24 VDC)
LECP6

<When a PC is used>
Controller setting software

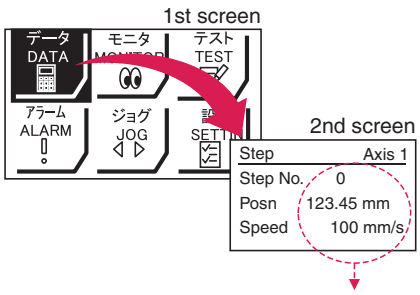
- Step data setting, test operation, move jog and move for the constant rate can be set and operated on one screen.



<When a TB (teaching box) is used>

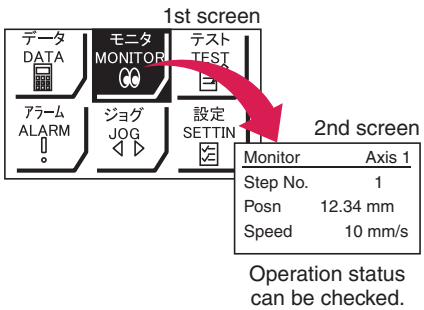
- Simple screen without scrolling promotes ease of setting and operating.
- Pick up an icon from the first screen to select a function.
- Set up the step data and check the monitor on the second screen.

Example of setting the step data



It can be registered by “SET” after entering the values.

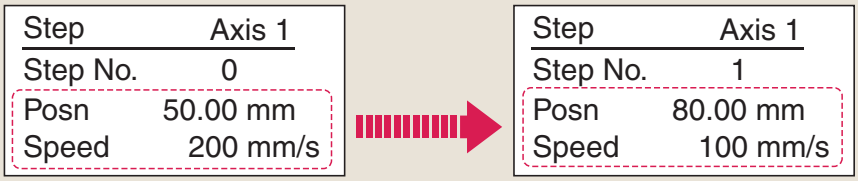
Example of checking the operation status



Operation status can be checked.

Teaching box screen

- **Data can be set with position and speed.** (Other conditions are already set.)



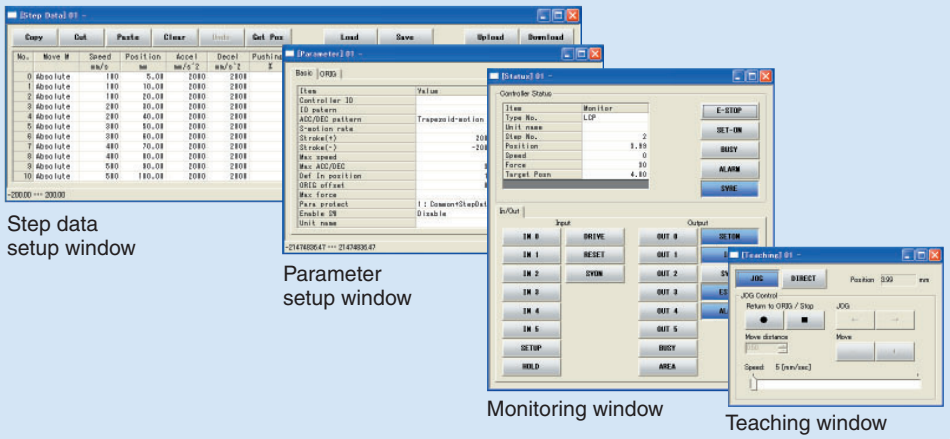
◎Normal Mode for Detailed Setting

Select normal mode when detailed setting is required.

- Step data can be set in detail.
- Parameters can be set.
- Signals and terminal status can be monitored.
- JOG and constant rate movement, return to origin, test operation and testing of forced output can be performed.

<When a PC is used> Controller setting software

- Step data setting, parameter setting, monitor, teaching, etc., are indicated in different windows.



Step data setup window

Parameter setup window

Monitoring window

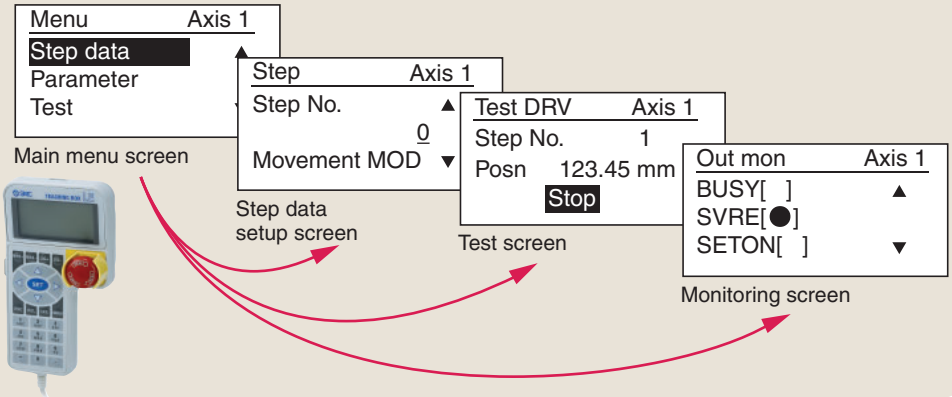
Teaching window

<When a TB (teaching box) is used>

- Multiple step data can be stored in the teaching box, and transferred to the controller.
- Continuous test operation by up to 5 step data.

Teaching box screen

- Each function (step data setting, test, monitor, etc.) can be selected from the main menu.



Main menu screen

Step data setup screen

Test screen

Monitoring screen

The actuator and controller are provided as a set. (They can be ordered separately.)

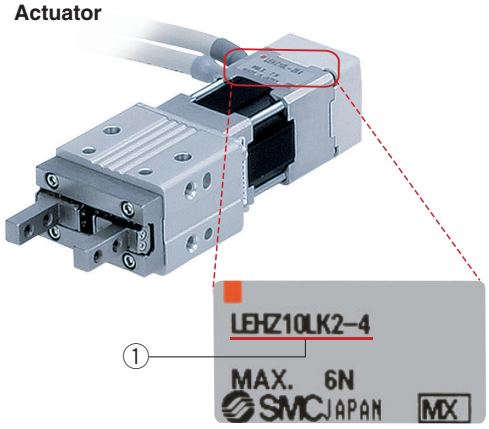
Confirm that the combination of the controller and the actuator is correct.

<Check the following before use.>

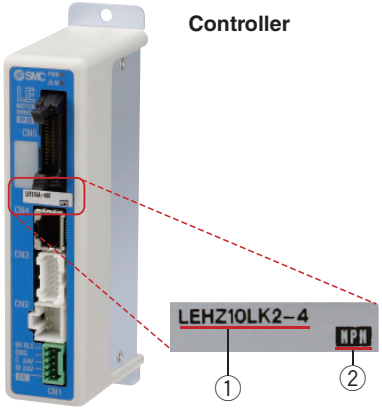
① Check the actuator labell for model number. This matches the controller.

② Check Parallel I/O configuration matches (NPN or PNP).

Actuator



Controller



Fieldbus-compatible Gateway (GW) Unit

Series LEC-G

◎ **Conversion unit for Fieldbus network and LEC serial communication**

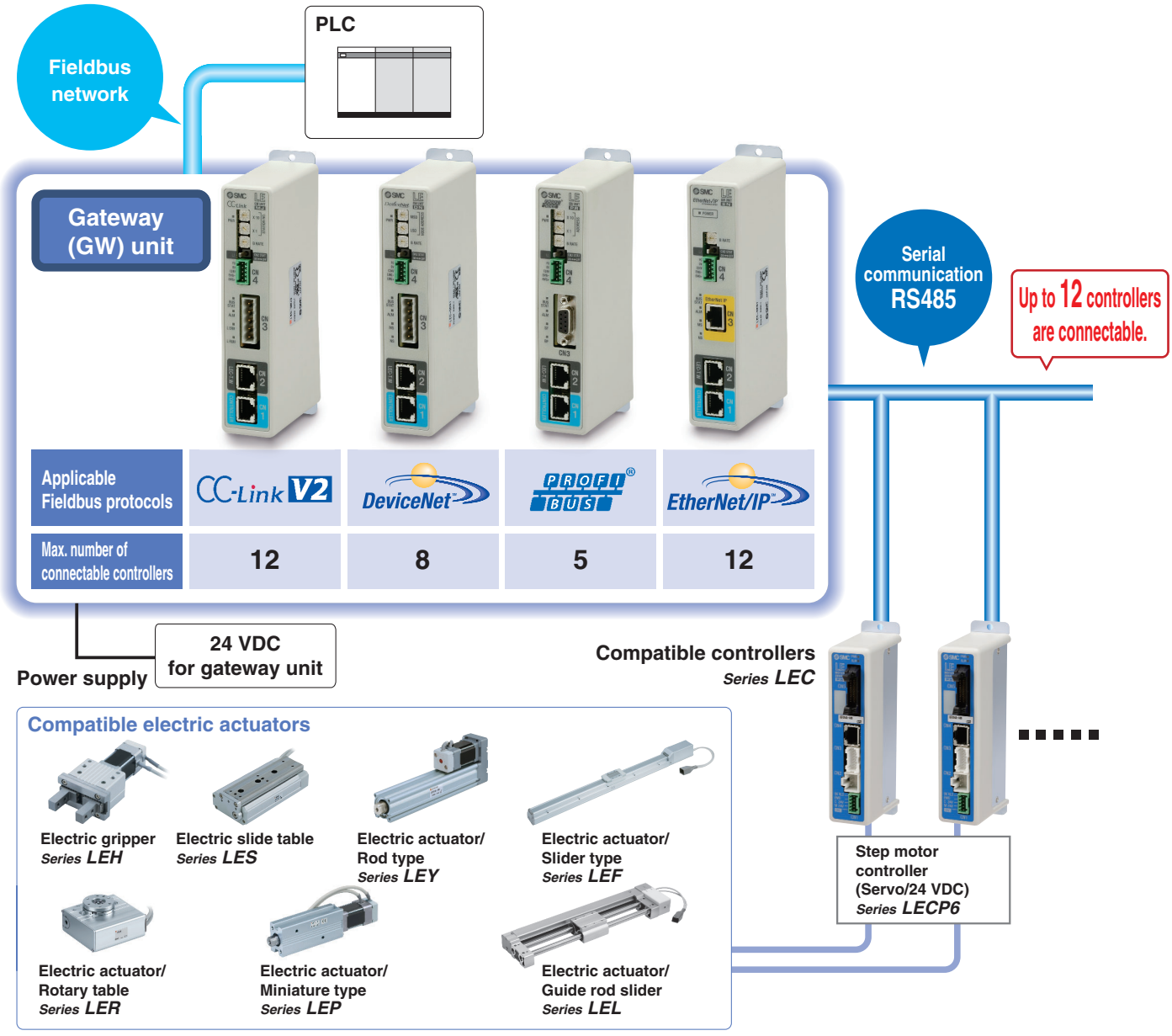
Applicable Fieldbus protocols: CC-Link V2, DeviceNet™, PROFIBUS®, EtherNet/IP™

◎ **Two methods of operation**

Step data input: Operate using preset step data in the controller.

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

◎ **Values such as position, speed can be checked on the PLC.**



Programless Type *Series LECP1*

Step motor
(Servo/24 VDC)
LECP1

No Programming

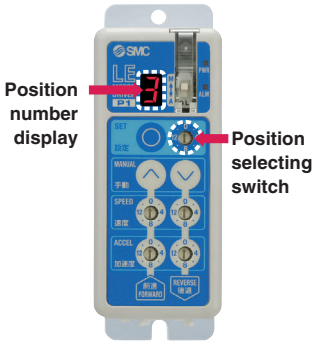
Capable of setting up an electric actuator operation without using a PC or teaching box

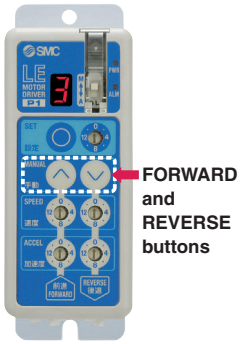
1 Setting position number → **2 Setting a stop position** → **3 Registration**

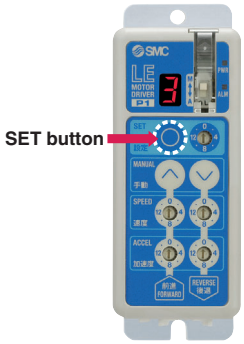
Setting a registered number for the stop position
Maximum 14 points

Moving the actuator to a stop position using FORWARD and REVERSE buttons

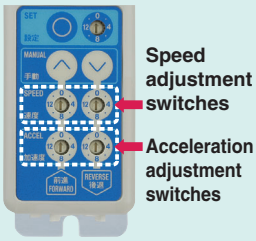
Registering the stop position using SET button



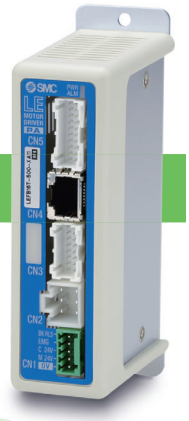




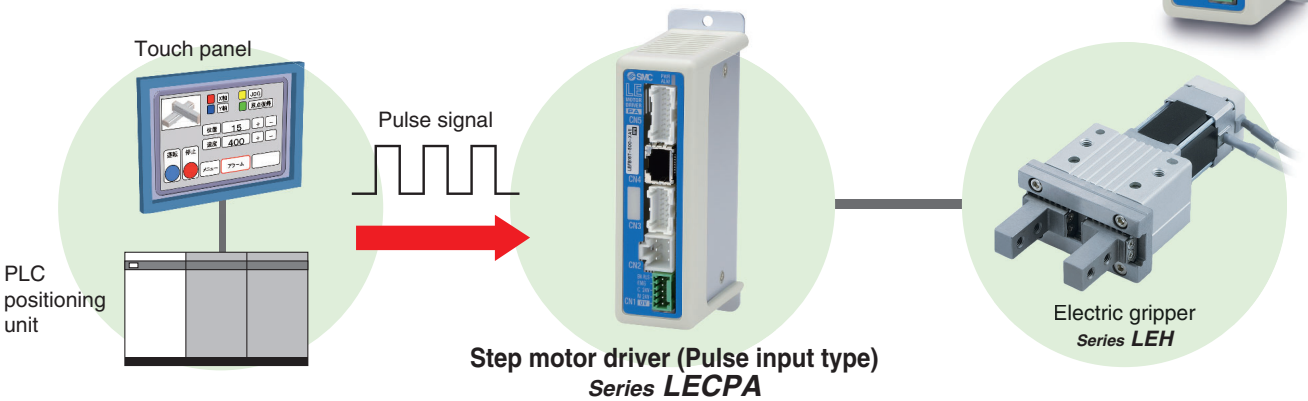
Speed/Acceleration 16-level adjustment



Pulse Input Type *Series LECPA*



- **A driver that uses pulse signals to allow positioning at any position. The actuator can be controlled from the customers' positioning unit.**



- **Return-to-origin command signal**
  Enables automatic return-to-origin action.

- **With force limit function (Pushing force/Gripping force operation available)**
  Pushing force/Positioning operation possible by switching signals.

Function

Item	Step data input type LECP6	Programless type LECP1	Pulse input type LECPA
Step data and parameter setting	• Input from controller setting software (PC) • Input from teaching box	• Select using controller operation buttons	• Input from controller setting software (PC) • Input from teaching box
Step data "position" setting	• Input the numerical value from controller setting software (PC) or teaching box • Input the numerical value • Direct teaching • JOG teaching	• Direct teaching • JOG teaching	• No "Position" setting required Position and speed set by pulse signal
Number of step data	64 points	14 points	—
Operation command (I/O signal)	Step No. [IN*] input ⇒ [DRIVE] input	Step No. [IN*] input only	Pulse signal
Completion signal	[INP] output	[OUT*] output	[INP] output

Setting Items

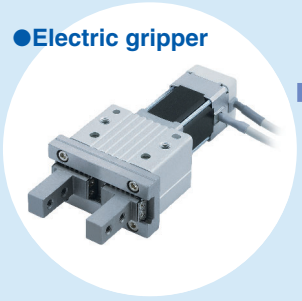
TB: Teaching box PC: Controller setting software

Item		Contents	Easy mode		Normal mode	Step data input type LECP6	Pulse input type LECPA	Programless type LECP1*
			TB	PC	TB·PC			
Step data setting (Excerpt)	Movement MOD	Selection of "absolute position" and "relative position"	△	●	●	Set at ABS/INC	No setting required	Fixed value (ABS)
	Speed	Transfer speed	●	●	●	Set in units of 1 mm/s		Select from 16-level
	Position	[Position]: Target position [Pushing]: Pushing start position	●	●	●	Set in units of 0.01 mm		Direct teaching JOG teaching
	Acceleration/Deceleration	Acceleration/deceleration during movement	●	●	●	Set in units of 1 mm/s²		Select from 16-level
	Pushing force	Rate of force during pushing operation	●	●	●	Set in units of 1 %	Set in units of 1 %	Select from 3-level (weak, medium, strong)
	Trigger LV	Target force during pushing operation	△	●	●	Set in units of 1 %	Set in units of 1 %	No setting required (same value as pushing force)
	Pushing speed	Speed during pushing operation	△	●	●	Set in units of 1 mm/s	Set in units of 1 mm/s	No setting required
	Moving force	Force during positioning operation	△	●	●	Set to 100 %	Set to (Different values for each actuator) %	
	Area output	Conditions for area output signal to turn ON	△	●	●	Set in units of 0.01 mm	Set in units of 0.01 mm	
	In position	[Position]: Width to the target position [Pushing]: How much it moves during pushing	△	●	●	Set to 0.5 mm or more (Units: 0.01 mm)	Set to (Different values for each actuator) or more (Units: 0.01 mm)	
Parameter setting (Excerpt)	Stroke (+)	+ side limit of position	×	×	●	Set in units of 0.01 mm	Set in units of 0.01 mm	
	Stroke (–)	– side limit of position	×	×	●	Set in units of 0.01 mm	Set in units of 0.01 mm	
	ORIG direction	Direction of the return to origin can be set.	×	×	●	Compatible	Compatible	Compatible
	ORIG speed	Speed during return to origin	×	×	●	Set in units of 1 mm/s	Set in units of 1 mm/s	No setting required
	ORIG ACC	Acceleration during return to origin	×	×	●	Set in units of 1 mm/s²	Set in units of 1 mm/s	
Test	JOG		●	●	●	Continuous operation at the set speed can be tested while the switch is being pressed.	Continuous operation at the set speed can be tested while the switch is being pressed.	Hold down MANUAL button (⏶⏷) for uniform sending (speed is specified value)
	MOVE		×	●	●	Operation at the set distance and speed from the current position can be tested.	Operation at the set distance and speed from the current position can be tested.	Press MANUAL button (⏶⏷) once for sizing operation (speed, sizing amount are specified values)
	Return to ORIG		●	●	●	Compatible	Compatible	Compatible
	Test drive	Operation of the specified step data	●	●	● (Continuous operation)	Compatible	Not compatible	Compatible
	Forced output	ON/OFF of the output terminal can be tested.	×	×	●	Compatible	Compatible	Not compatible
Monitor	DRV mon	Current position, speed, force and the specified step data can be monitored.	●	●	●	Compatible	Compatible	
	In/Out mon	Current ON/OFF status of the input and output terminal can be monitored.	×	×	●	Compatible	Compatible	
ALM	Status	Alarm currently being generated can be confirmed.	●	●	●	Compatible	Compatible	Compatible (display alarm group)
	ALM Log record	Alarm generated in the past can be confirmed.	×	×	●	Compatible	Compatible	Not compatible
File	Save/Load	Step data and parameter can be saved, forwarded and deleted.	×	×	●	Compatible	Compatible	
Other	Language	Can be changed to Japanese or English.	●	●	●	Compatible	Compatible	

△: Can be set from TB Ver. 2.** (The version information is displayed on the initial screen)
* Programless type LECP1 cannot be used with the teaching box and controller setting kit.

System Construction/General Purpose I/O

●Electric gripper



Provided by customer

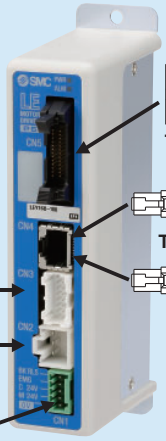
PLC

Power supply for I/O signal
24 VDC Note)

●I/O cable Pages 61, 74

Controller type	Part no.
LECP6	LEC-CN5-□
LECP1 (Programless)	LEC-CK4-□

●Controller* Page 54



To CN5

To CN4

To CN3

To CN2

To CN1

Programless type Page 68
LECP1

Note) The teaching box, controller setting kit and Touch Operator Interface cannot be connected.

Provided by customer

Power supply for controller
24 VDC Note)

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

Step data input type
LECP6
Page 55

●Power supply plug
(Accessory)
<Applicable cable size>
AWG20 (0.5 mm²)

●Actuator cable* Pages 61, 73

Controller type	Standard cable	Robotic cable
LECP6 (Step data input type)	LE-CP-□-S	LE-CP-□
LECP1 (Programless type)	LE-CP-□-S	LE-CP-□

●Touch Operator Interface (Provided by customer)
GP4501T/GP3500T
Manufactured by Digital Electronics Corp.

Pro-face
for the best interface

Cockpit parts can be downloaded free via the Pro-face website. Using cockpit parts makes adjustment from the Touch Operator Interface possible.

GOT2000 Series
Mitsubishi Electric Corporation

GOT2000
Graphic Operation Terminal

Sample screens for monitoring and changing the current value and the set value of the electric actuator can be downloaded free via the Mitsubishi Electric website.

The * mark: Can be included in the "How to Order" for the actuator.

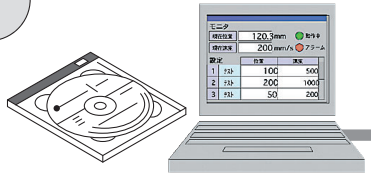
Options

●Teaching box Page 63
(With 3 m cable)
LEC-T1-3EG□

Or

●Controller setting kit Page 62
Controller setting kit
(Communication cable, conversion unit and USB cable are included.)
LEC-W2

Communication cable●
(3 m)



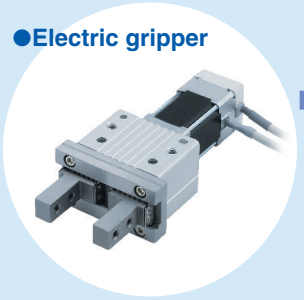
●USB cable
(A-mini B type)
(0.3 m)

PC

Note) Cannot be used with the programless type (LECP1).

System Construction/Pulse Signal

●Electric gripper



Page 81

●Current limit resistor

LEC-PA-R-□

＊The current limit resistor is used when the pulse signal output of the positioning unit is open collector output. For details, refer to page 102.

Provided by customer

PLC

Power supply for I/O signal 24 VDC Note)

Note) When conformity to UL is required, the electric actuator and driver should be used with a UL1310 Class 2 power supply.

●Driver＊ Page 54

●I/O cable Page 81

Driver type	Part no.
LECPA	LEC-CL5-□

To CN5

To CN4

To CN3

To CN2

To CN1

Provided by customer

Power supply for driver 24 VDC Note)

Note) When conformity to UL is required, the electric actuator and driver should be used with a UL 1 3 1 0 Class 2 power supply.

Pulse input type

LECPA Page 75

●Power supply plug (Accessory)

<Applicable cable size>

AWG20 (0.5 mm²)

●Actuator cable＊ Page 80

Driver type	Standard cable	Robotic cable
LECPA (Pulse input type)	LE-CP-□-S	LE-CP-□

The ＊ mark: Can be included in the "How to Order" for the actuator.

Options

●Teaching box Page 83

(With 3 m cable)

LEC-T1-3EG□

Or

●Controller setting software Page 82

Communication cable and USB cable are included.

LEC-W2

Communication cable

PC

●USB cable

(A-mini B type)

System Construction/Fieldbus Network

PLC
(Provided by customer)

Power supply for gateway unit 24 VDC Note 1)

Power supply

Fieldbus network

Gateway (GW) unit Page 65

Applicable Fieldbus protocols
CC-Link Ver. 2.0
DeviceNet™
PROFIBUS DP
EtherNet/IP™

●Power supply connector (Accessory) — To CN4

●Communication connector (Accessory)* — To CN3

* CC-Link Ver. 2.0
DeviceNet™

To CN2

To CN1

Page 65

●Communication cable
LEC-CG1-□

Page 65

●Cable between branches
LEC-CG2-□

●Branch connector Page 65
LEC-CGD

●Terminating resistor connector 120 Ω
LEC-CGR

●Communication cable Page 65
LEC-CG1-□

Options

●Controller setting software Page 62
(Communication cable and USB cable are included.)
LEC-W2

●Communication cable

USB cable●
(A-mini B type)

PC
(Provided by customer)

Or

●Teaching box Page 63
(With 3 m cable)
LEC-T1-3JG□

●Controller Page 54

To CN4

●Power supply connector (Accessory)

To CN1

Controller input power supply Note 1)

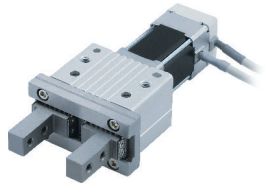
●Controller Page 54

●Power supply connector (Accessory)

To CN1

Controller input power supply Note 1)

●Electric gripper



Applicable Fieldbus protocols	Max. number of connectable controllers
CC-Link Ver. 2.0	12
DeviceNet™	8
PROFIBUS DP	5
EtherNet/IP™	12

Compatible Controller

Step motor controller (Servo/24 VDC)	*Series* ***LECP6***

Note 1) Connect the 0 V terminals for both the controller input power supply and gateway unit power supply.
When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

SMC Electric Actuators

Slider Type
Step Motor (Servo/24 VDC) | Servo Motor (24 VDC) | AC Servo Motor

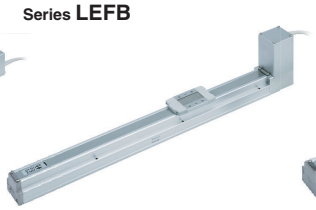
Ball screw drive
Series LEFS

Clean room compatible

Series LEFS

Size	Max. work load [Kg]	Stroke [mm]
16	10	Up to 400
25	20	Up to 600
32	45	Up to 800
40	60	Up to 1000

Belt drive
Series LEFB

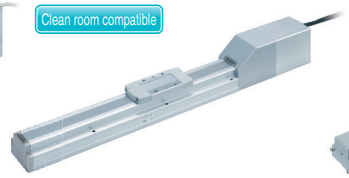


Series LEFB

Size	Max. work load [Kg]	Stroke [mm]
16	1	Up to 1000
25	5	Up to 2000
32	14	Up to 2000

Ball screw drive
Series LEFS

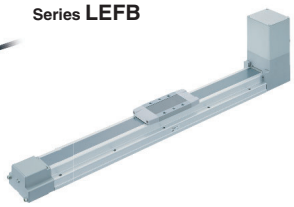
Clean room compatible



Series LEFS

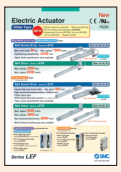
Size	Max. work load [Kg]	Stroke [mm]
25	20	Up to 600
32	45	Up to 800
40	60	Up to 1000

Belt drive
Series LEFB



Series LEFB

Size	Max. work load [Kg]	Stroke [mm]
25	5	Up to 2000
32	15	Up to 2500
40	25	Up to 3000

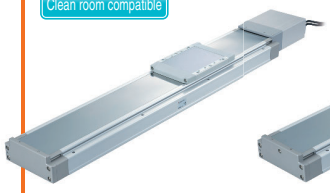


CAT.ES100-87

High Rigidity Slider Type
AC Servo Motor

Ball screw drive
Series LEJS

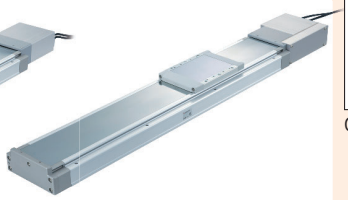
Clean room compatible



Series LEJS

Size	Max. work load [Kg]	Stroke [mm]
40	55	200 to 1200
63	85	300 to 1500

Belt drive
Series LEJB



Series LEJB

Size	Max. work load [Kg]	Stroke [mm]
40	20	200 to 2000
63	30	300 to 3000

CAT.ES100-104

Guide Rod Slider
Step Motor (Servo/24 VDC)

Belt drive
Series LEL

Series LEL25M
Sliding bearing

Size	Max. work load [Kg]	Stroke [mm]
25	3	Up to 1000

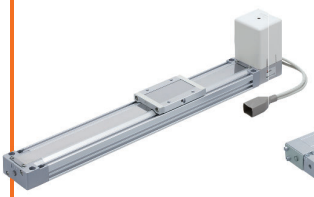
Series LEL25L
Ball bushing bearing

Size	Max. work load [Kg]	Stroke [mm]
25	5	Up to 1000

CAT.E102

Low Profile Slider Type
Step Motor (Servo/24 VDC)

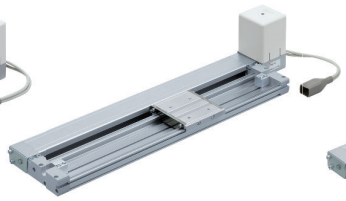
Basic type
Series LEMB



Series LEMB

Size	Max. work load [Kg]	Stroke [mm]
25	6	Up to 2000
32	11	Up to 2000

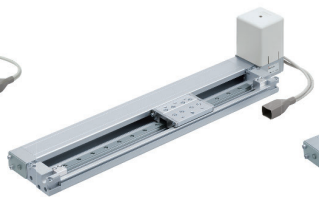
Cam follower guide type
Series LEMC



Series LEMC

Size	Max. work load [Kg]	Stroke [mm]
25	10	Up to 2000
32	20	Up to 2000

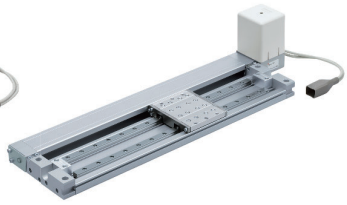
Linear guide single axis type
Series LEMH



Series LEMH

Size	Max. work load [Kg]	Stroke [mm]
25	10	Up to 1000
32	20	Up to 1500

Linear guide double axis type
Series LEMHT



Series LEMHT

Size	Max. work load [Kg]	Stroke [mm]
25	10	Up to 1000
32	20	Up to 1500

CAT.ES100-98

SMC Electric Actuators

Rod Type Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

Basic type
Series LEY

Dust/Drip proof compatible

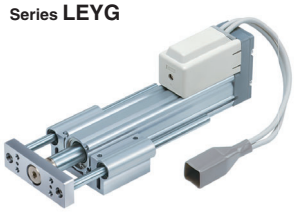
Series LEY

Size	Pushing force [N]	Stroke [mm]
16	141	Up to 300
25	452	Up to 400
32	707	Up to 500
40	1058	Up to 500

In-line motor type
Series LEY□D

Dust/Drip proof compatible

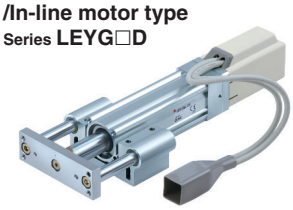
Guide rod type
Series LEYG



Series LEYG

Size	Pushing force [N]	Stroke [mm]
16	141	Up to 200
25	452	Up to 300
32	707	Up to 300
40	1058	Up to 300

Guide rod type /In-line motor type
Series LEYG□D

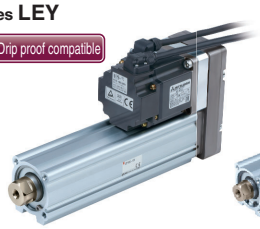


CAT.E102

AC Servo Motor

Basic type
Series LEY

Dust/Drip proof compatible



Series LEY

Size	Pushing force [N]	Stroke [mm]
25	485	Up to 400
32	588	Up to 500

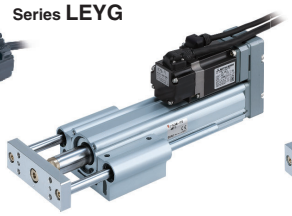
In-line motor type
Series LEY□D

Dust/Drip proof compatible

Series LEY

Size	Pushing force [N]	Stroke [mm]
25	485	Up to 400
32	736	Up to 500
63	1910	Up to 800

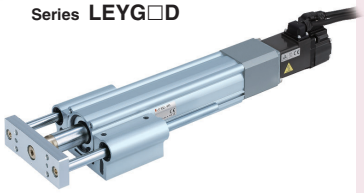
Guide rod type
Series LEYG



Series LEYG

Size	Pushing force [N]	Stroke [mm]
25	485	300
32	588	

Guide rod type /In-line motor type
Series LEYG□D



Series LEYG

Size	Pushing force [N]	Stroke [mm]
25	485	300
32	736	

Slide Table Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

Series LES

Basic type/R type
Series LES□R

Size	Max. work load [Kg]	Stroke [mm]
8	1	30, 50, 75
16	3	30, 50 75, 100
25	5	30, 50, 75 100, 125, 150

Symmetrical type/L type
Series LES□L

In-line motor type/D type
Series LES□D

Series LESH

Basic type/R type
Series LESH□R

Size	Max. work load [Kg]	Stroke [mm]
8	2	50, 75
16	6	50, 100
25	9	50, 100 150

Symmetrical type/L type
Series LESH□L

In-line motor type/D type
Series LESH□D

CAT.E102

Miniature Step Motor (Servo/24 VDC)

Rod type
Series LEPY

Series LEPY

Size	Max. work load [Kg]	Stroke [mm]
6	1	25, 50, 75
10	2	

Slide table type
Series LEPS

Series LEPS

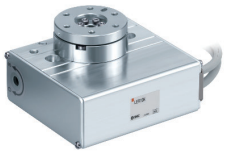
Size	Max. work load [Kg]	Stroke [mm]
6	1	25
10	2	50

CAT.E102

Rotary Table Step Motor (Servo/24 VDC)

Basic type
Series LER

High precision type
Series LERH



Series LER

Size	Rotating torque (N·m)		Max. speed (°/s)	
	Basic	High torque	Basic	High torque
10	0.22	0.32	420	280
30	0.8	1.2		
50	6.6	10		

CAT.E102

SMC Electric Actuators

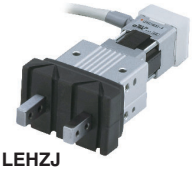
Gripper Step Motor (Servo/24 VDC)

2-finger type
Series **LEHZ**

Series **LEHZ**

Size	Max. gripping force [N]		Stroke/both sides [mm]
	Basic	Compact	
10	14	6	4
16		8	6
20	40	28	10
25			14
32	130	—	22
40	210	—	30

2-finger type
With dust cover
Series **LEHZJ**



Series **LEHZJ**

Size	Max. gripping force [N]		Stroke/both sides [mm]
	Basic	Compact	
10	14	6	4
16		8	6
20	40	28	10
25			14

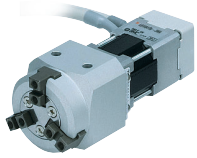
2-finger type
Long stroke
Series **LEHF**

Series **LEHF**

Size	Max. gripping force [N]	Stroke/both sides [mm]
10	7	16 (32)
20	28	24 (48)
32	120	32 (64)
40	180	40 (80)

Note) ( ): Long stroke

3-finger type
Series **LEHS**



Series **LEHS**

Size	Max. gripping force [N]		Stroke/ diameter [mm]
	Basic	Compact	
10	5.5	3.5	4
20	22	17	6
32	90	—	8
40	130	—	12

CAT.E102

Controllers/Driver

Step Motor (Servo/24 VDC)
Servo Motor (24 VDC)

Step Data Input Type
Series LECP6
Series LECA6

- 64 points positioning
- Input using controller setting kit or teaching box

Step Data Input Type
Series JXC73/83

Step Motor (Servo/24 VDC)

Programless Type
Series LECP1

- 14 points positioning
- Control panel setting (PC is not required.)

Programless Type (With Stroke Study)
Series LECP2

- End to end operation similar to an air cylinder
- 2 stroke end points + 12 intermediate points positioning

Specialized for Series LEM

Step Motor (Servo/24 VDC)

Pulse Input Type
Series LECPA

Fieldbus-compatible Network Controller/Gateway Unit

Series JXC□1

PROFIBUS
EtherCAT
DeviceNet
EtherNet/IP
IO-Link

Series JXC92

EtherNet/IP

Series JXC93

EtherNet/IP

Series LEC-G

PROFIBUS
CC-Link V2
DeviceNet
EtherNet/IP

AC Servo Motor

Pulse Input Type
Series LECSA
Series LECSB

- Absolute encoder (LECSB)
- Built-in positioning function (LECSA)

Series LECSA ***Series LECSB***

CC-Link Direct Input Type
Series LECSC

CC-Link

SSCNETⅢ Type
Series LECSS

SSCNETⅢ
SERVO SYSTEM CONTROLLER NETWORK

MECHATROLINKⅡ Type
Series LECYM

MECHATROLINK-Ⅱ

MECHATROLINKⅢ Type
Series LECYU

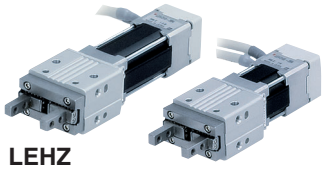
MECHATROLINK-Ⅲ

SSCNETⅢ/H Type
Series LECSS-T

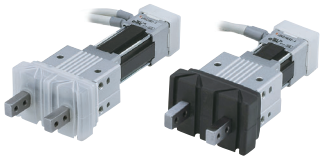
SSCNETⅢ/H
SERVO SYSTEM CONTROLLER NETWORK

Series Variations

Electric Gripper 2-Finger Type *Series* LEHZ/LEHZJ/LEHF



LEHZ



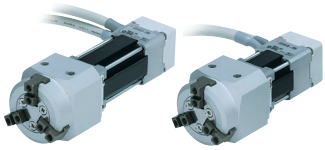
LEHZJ With dust cover

LEHF

Series	Size	Opening/closing stroke both sides [mm]	Gripping force [N]		Opening/closing speed (mm/s)	Controller /Driver series	Reference page
			Basic	Compact			
LEHZ	10	4	6 to 14	2 to 6	5 to 80	Series LECP6	Page 1
	16	6		3 to 8			
	20	10	16 to 40	11 to 28	5 to 100		
	25	14					
	32	22	52 to 130	—	5 to 120		
	40	30	84 to 210	—			
LEHZJ	10	4	6 to 14	3 to 6	5 to 80	Series LECP1 Series LECPA	Page 15
	16	6		4 to 8			
	20	10	16 to 40	11 to 28	5 to 100		
	25	14					
LEHF	10	16 (32) Note)	3 to 7		5 to 80		Page 27
	20	24 (48) Note)	11 to 28		5 to 100		
	32	32 (64) Note)	48 to 120				
	40	40 (80) Note)	72 to 180				

Note) ( ): Long stroke

Electric Gripper 3-Finger Type *Series* LEHS



Series	Size	Opening/closing stroke both sides [mm]	Gripping force [N]		Opening/closing speed (mm/s)	Controller /Driver series	Reference page
			Basic	Compact			
LEHS	10	4	2.2 to 5.5	1.4 to 3.5	5 to 70	Series LECP6 Series LECP1 Series LECPA	Page 40
	20	6	9 to 22	7 to 17	5 to 80		
	32	8	36 to 90	—	5 to 100		
	40	12	52 to 130	—	5 to 120		

Controller/Driver *LEC*

LECP6

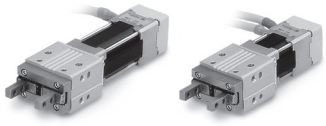
LECP1

LECPA

Type	Series	Compatible motor	Power supply voltage	Parallel I/O		Number of positioning pattern points	Reference page
				Input	Output		
Step data input type	LECP6	Step motor (Servo/24 VDC)	24 VDC ±10 %	11 inputs (Photo-coupler isolation)	13 outputs (Photo-coupler isolation)	64	Page 55
Programless type	LECP1	Step motor (Servo/24 VDC)	24 VDC ±10 %	6 inputs (Photo-coupler isolation)	6 outputs (Photo-coupler isolation)	14	Page 68
Pulse input type	LECPA	Step motor (Servo/24 VDC)	24 VDC ±10 %	5 inputs (Photo-coupler isolation)	9 outputs (Photo-coupler isolation)	—	Page 75

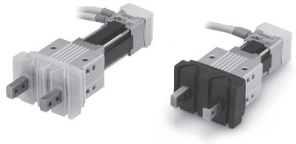
INDEX

Step Motor (Servo/24 VDC) Type



◎Electric Gripper 2-Finger Type Series LEHZ

Model Selection ..... Page 1
How to Order ..... Page 7
Specifications ..... Page 9
Construction ..... Page 10
Dimensions ..... Page 11
Finger Options ..... Page 14



◎Electric Gripper 2-Finger Type/With Dust Cover Series LEHZJ

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◎Electric Gripper 2-Finger Type Series LEHF

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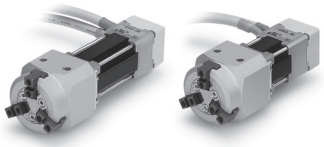

◎Electric Gripper 3-Finger Type Series LEHS

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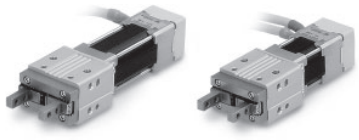
◎Step Motor (Servo/24 VDC) Controller/Driver

Step Data Input Type/Series **LECP6** ..... Page 55
Controller Setting Kit/**LEC-W2** ..... Page 62
Teaching Box/**LEC-T1** ..... Page 63
Gateway Unit/Series **LEC-G** ..... Page 65
Programless Controller/Series **LECP1** ..... Page 68
Step Motor Driver/Series **LECPA** ..... Page 75
Controller Setting Kit/**LEC-W2** ..... Page 82
Teaching Box/**LEC-T1** ..... Page 83
Direct Input Type Controller/Series **JXC□1** ..... Page 86
Multi-Axis Step Motor Controller/Series **JXC73/83/92/93** ..... Page 96

Electric Gripper 2-Finger Type Step Motor (Servo/24 VDC)

Series LEHZ

Model Selection



Selection Procedure

Step 1 Check the gripping force. → **Step 2** Check the gripping point and overhang. → **Step 3** Check the external force on fingers.

Step 1 Check the gripping force.

Check the conditions. → Calculate the required gripping force. → Select the model from gripping force graph. → Select the pushing speed.

Example

Workpiece mass: 0.1 kg

Guidelines for the selection of the gripper with respect to workpiece mass

- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times Note) the workpiece weight, or more.

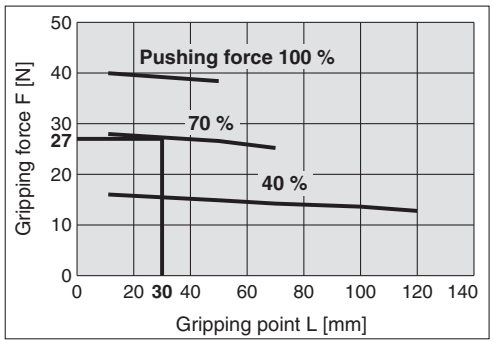
Note) For details, refer to the calculation of required gripping force.

- If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

Example) When it is desired to set the gripping force at 20 times or more above the workpiece weight.

Required gripping force
= 0.1 kg x 20 x 9.8 m/s² ≈ 19.6 N or more

LEHZ20



Pushing force: 70 %

Pushing force is one of the values of step data that is input into the controller.

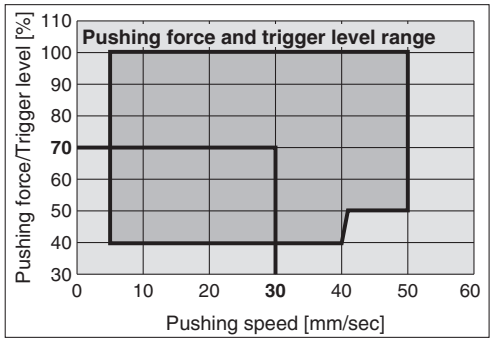
Gripping point distance: 30 mm

When the LEHZ20 is selected.

- A gripping force of 27 N is obtained from the intersection point of gripping point distance L = 30 mm and pushing force of 70 %.
- Gripping force is 27.6 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

Pushing speed: 30 mm/sec

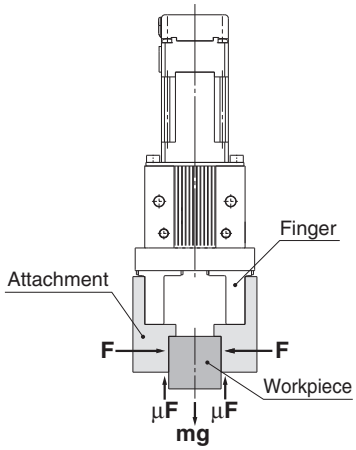
LEHZ20



- Pushing speed is satisfied at the point where 70 % of the pushing force and 30 mm/sec of the pushing speed cross.

Note) Confirm the pushing speed range from the determined pushing force [%].

Calculation of required gripping force



When gripping a workpiece as in the figure to the left, and with the following definitions,

F: Gripping force [N]
μ: Coefficient of friction between the attachments and the workpiece
m: Workpiece mass [kg]
g: Gravitational acceleration (= 9.8 m/s²)
mg: Workpiece weight [N]

the conditions under which the workpiece will not drop are

$$\underset{\text{Number of fingers}}{2} \times \mu F > mg$$

and therefore, $F > \dfrac{mg}{2 \times \mu}$

With "a" representing the margin, "F" is determined by the following formula:

$$F = \frac{mg}{2 \times \mu} \times a$$

"Gripping force at least 10 to 20 times the workpiece weight"

- The "10 to 20 times or more of the workpiece weight" recommended by SMC is calculated with a margin of "a" = 4, which allows for impacts that occur during normal transportation, etc.

When μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \dfrac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
↑ 10 x Workpiece weight	↑ 20 x Workpiece weight

<Reference> Coefficient of friction μ (depends on the operating environment, contact pressure, etc.)

Coefficient of friction μ	Attachment – Material of workpieces (guideline)
0.1	Metal (surface roughness Rz3.2 or less)
0.2	Metal
0.2 or more	Rubber, Resin, etc.

Note) • Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration or impact forces are encountered during motion, a further margin should be considered.

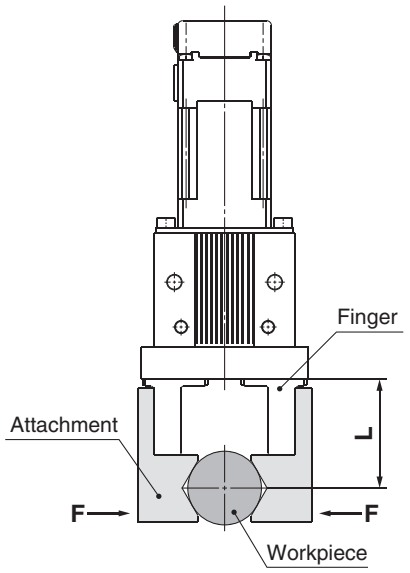
SMC

Selection Procedure

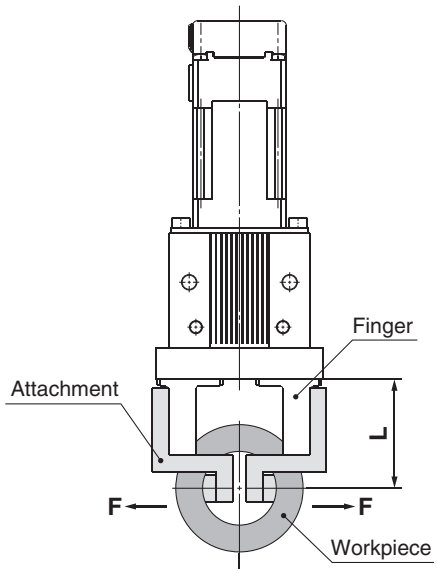
Step 1 Check the gripping force: Series LEHZ

● **Indication of gripping force**
The gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

External Gripping State



Internal Gripping State

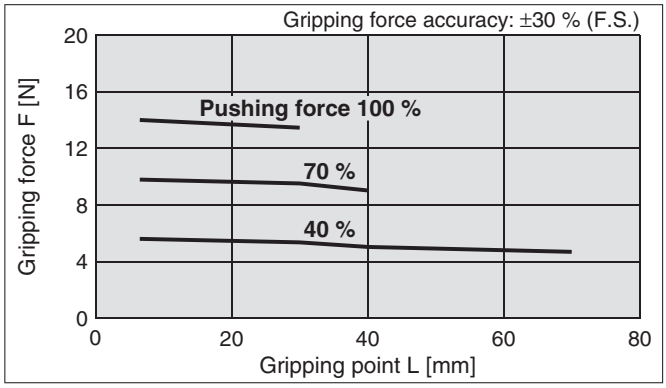


● Set the workpiece gripping point "L" so that it is within the range shown in the figure below.

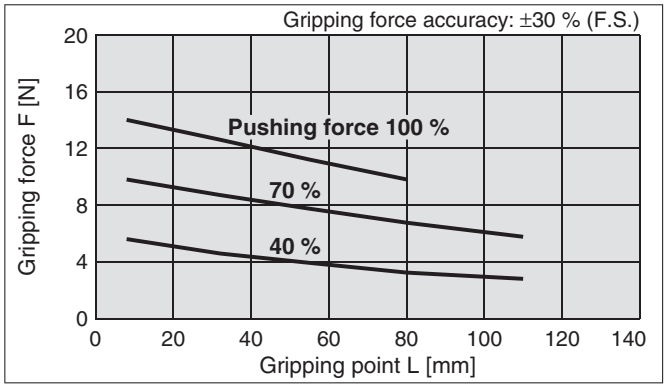
Basic

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZ10



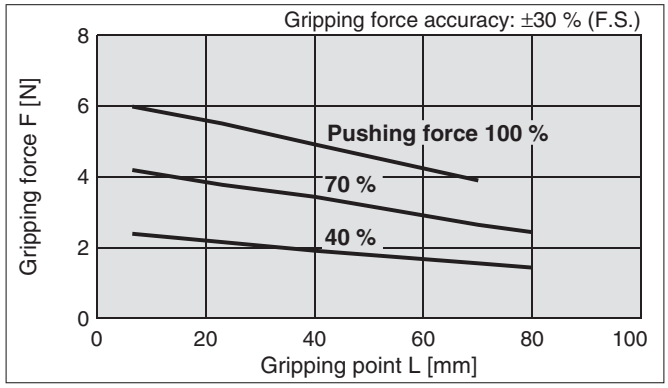
LEHZ16



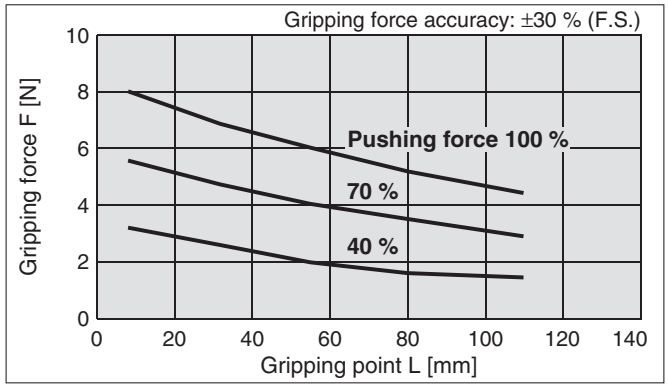
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZ10L



LEHZ16L



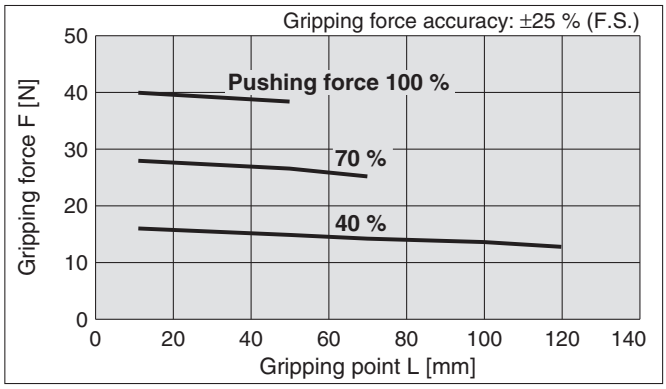
Selection Procedure

Step 1 **Check the gripping force: Series LEHZ**

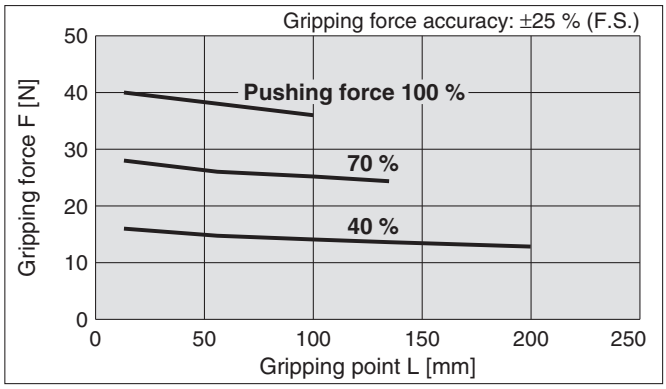
Basic

∗ Pushing force is one of the values of step data that is input into the controller.

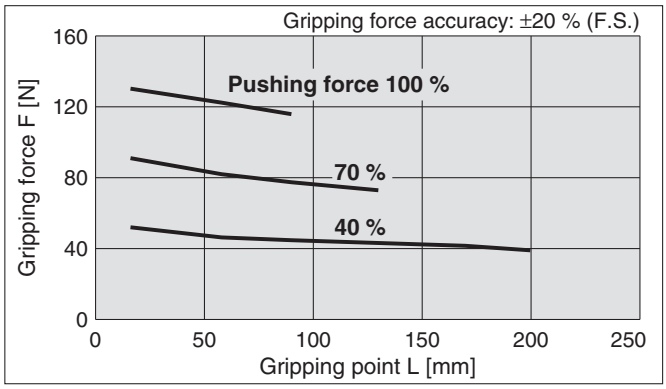
LEHZ20



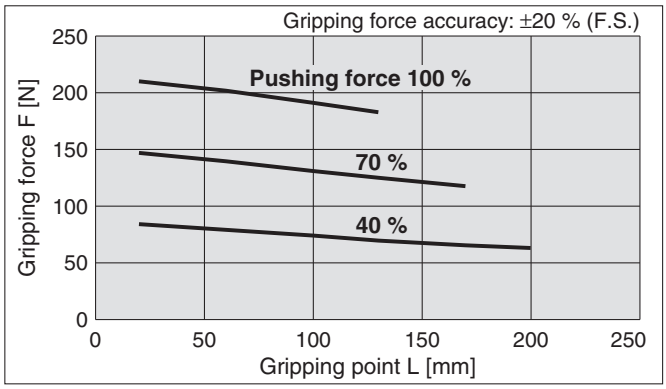
LEHZ25



LEHZ32



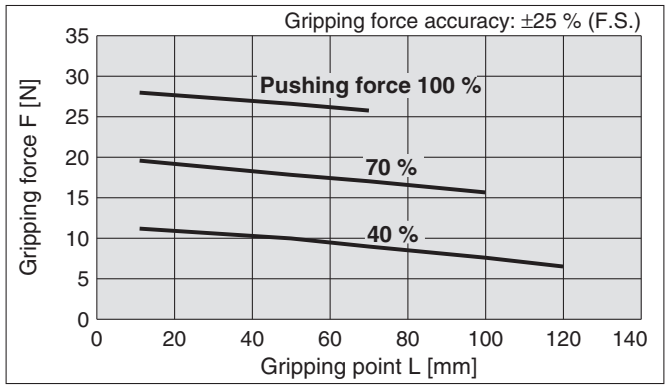
LEHZ40



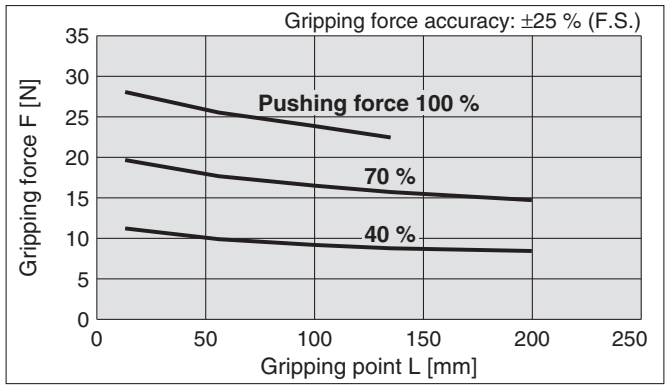
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZ20L



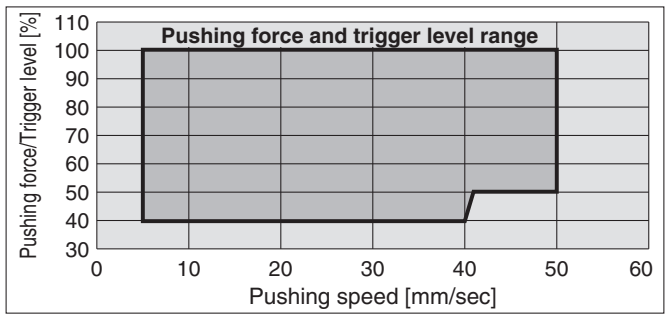
LEHZ25L



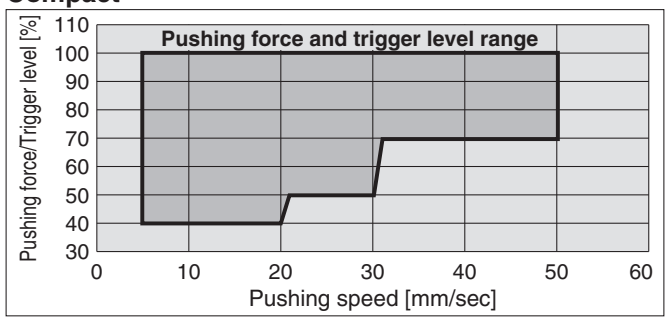
Selection of Pushing Speed

● Set the [Pushing force] and the [Trigger LV] within the range shown in the figure below.

Basic



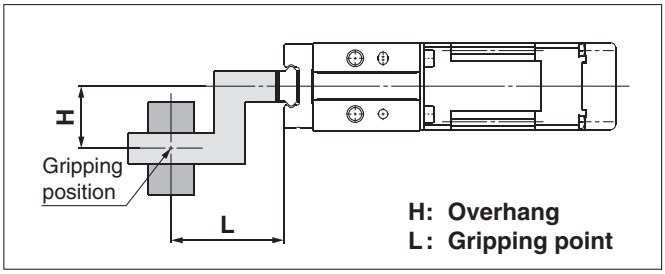
Compact



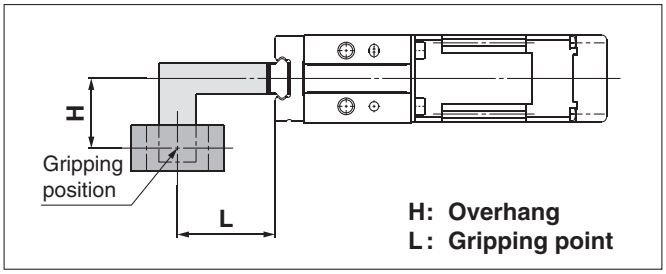
Step 2 Check the gripping point and overhang: Series LEHZ

- Decide the gripping position of the workpiece so that the amount of overhang "H" stays within the range shown in the figure below.
- If the gripping position is out of the limit, it may shorten the life of the electric gripper.

External Gripping State



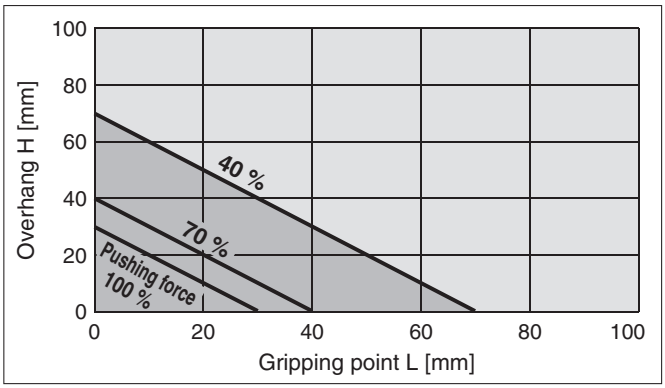
Internal Gripping State



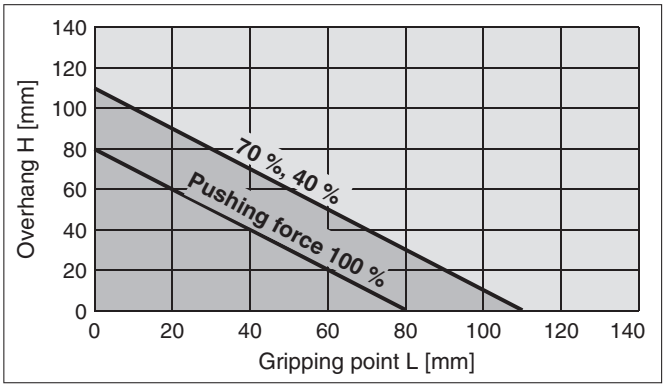
Basic

∗ Pushing force is one of the values of step data that is input into the controller.

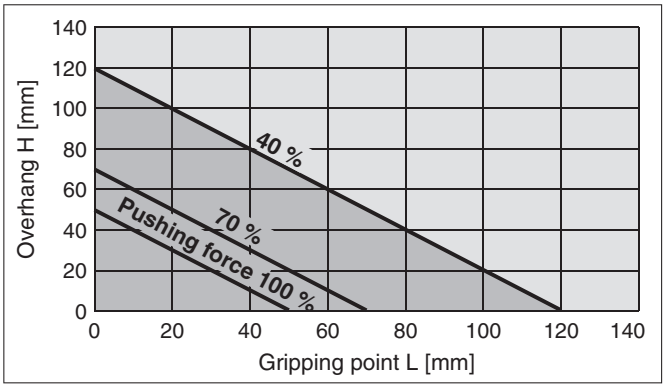
LEHZ10



LEHZ16



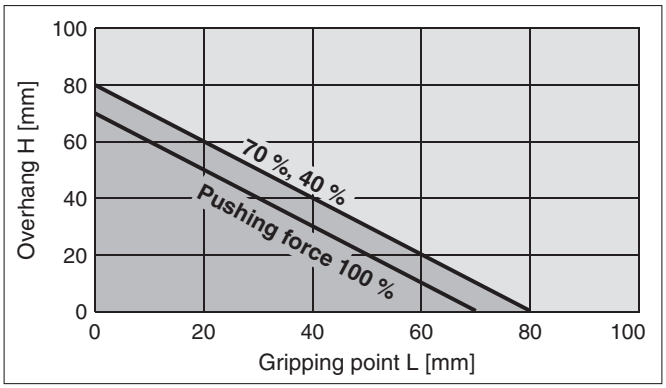
LEHZ20



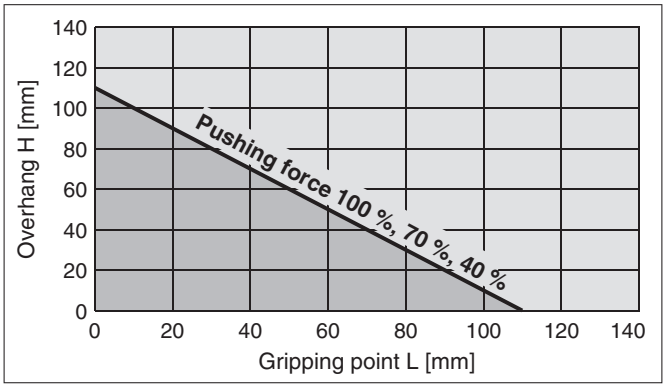
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

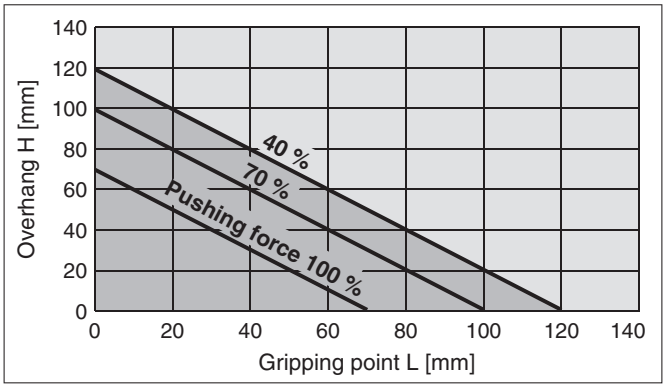
LEHZ10L



LEHZ16L



LEHZ20L



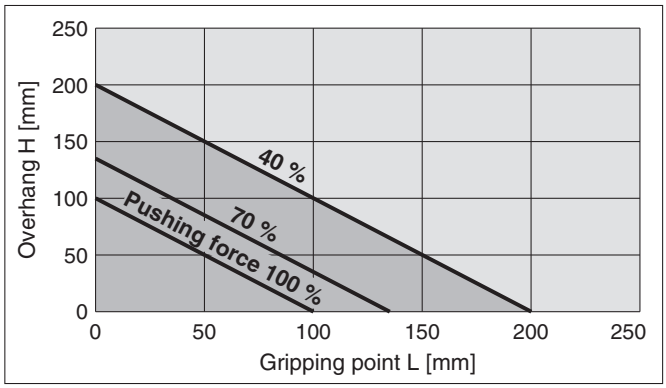
Selection Procedure

Step 2 **Check the gripping point and overhang: Series LEHZ**

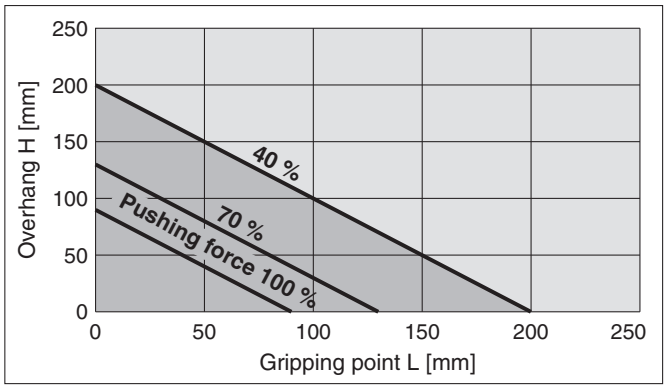
Basic

∗ Pushing force is one of the values of step data that is input into the controller.

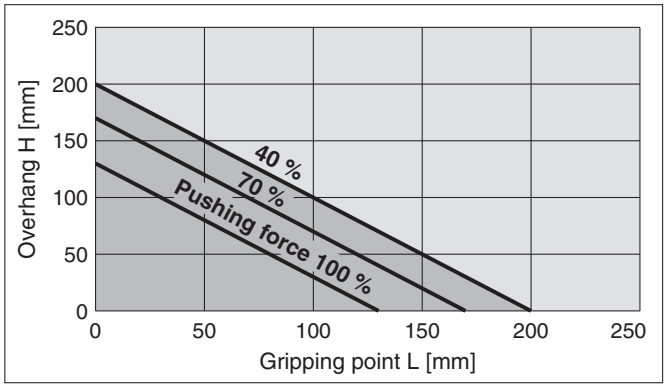
LEHZ25



LEHZ32



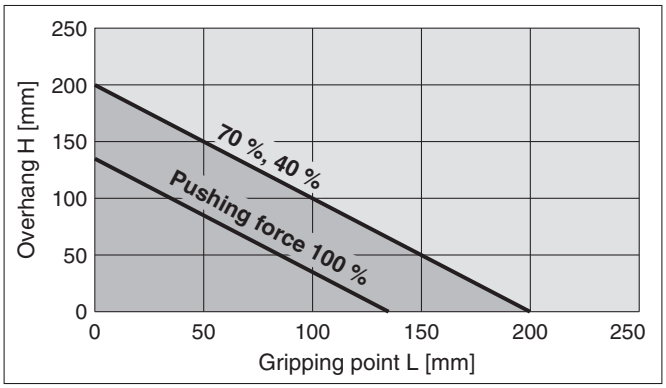
LEHZ40



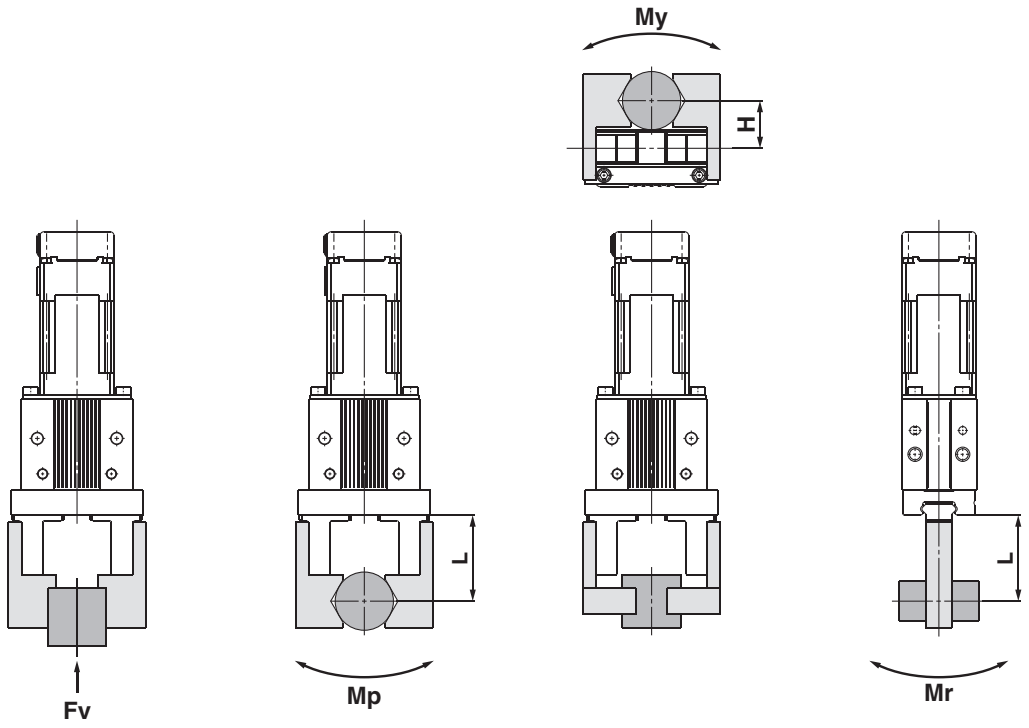
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZ25L



Step 3 Check the external force on fingers: Series LEHZ



Fv: Allowable vertical load **Mp: Pitch moment** **My: Yaw moment** **Mr: Roll moment**

H, L: Distance to the point at which the load is applied [mm]

Model	Allowable vertical load Fv [N]	Static allowable moment		
		Pitch moment: Mp [N·m]	Yaw moment: My [N·m]	Roll moment: Mr [N·m]
LEHZ10(L)K2-4	58	0.26	0.26	0.53
LEHZ16(L)K2-6	98	0.68	0.68	1.36
LEHZ20(L)K2-10	147	1.32	1.32	2.65
LEHZ25(L)K2-14	255	1.94	1.94	3.88
LEHZ32(L)K2-22	343	3	3	6
LEHZ40(L)K2-30	490	4.5	4.5	9

Note) Values for load in the table indicate static values.

Calculation of allowable external force (when moment load is applied)	Calculation example
Allowable load F (N) = $\frac{\text{M (Static allowable moment) [N·m]}}{\text{L} \times 10^{-3}}$ * (* Constant for unit conversion)	When a static load of f = 10 N is operating, which applies pitch moment to point L = 30 mm from the LEHZ16K2-6 guide. Therefore, it can be used. **Allowable load F = $\frac{0.68}{30 \times 10^{-3}}$ = 22.7 (N)** **Load f = 10 (N) < 22.7 (N)**

Electric Gripper 2-Finger Type

Step Motor (Servo/24 VDC)

Series LEHZ

LEHZ10, 16, 20, 25, 32, 40

EtherNet/IP™ DeviceNet™ PROFINET EtherCAT® IO-Link Compatible ▶Page 86

Multi-Axis Step Motor Controller Compatible ▶Page 96

How to Order

LEHZ 10 ❑ K 2 – 4 ❑ ❑ – S 1 6P 1 ❑

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬

❶ Size

10
16
20
25
32
40

❷ Motor size

—	Basic
L Note)	Compact

Note) Size: 10, 16, 20, 25 only

❸ Lead

K	Basic

❹ 2-finger type

❺ Stroke [mm]

Stroke/both sides	Size
4	10
6	16
10	20
14	25
22	32
30	40

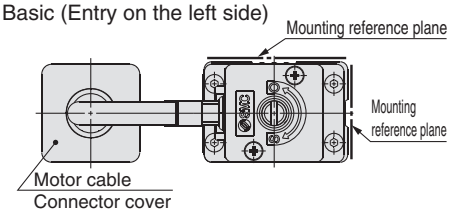
❻ Finger options

—	Basic (Tapped in opening/closing direction)
A	Side tapped mounting
B	Through-hole in opening/closing direction
C	Flat fingers

❼ Motor cable entry

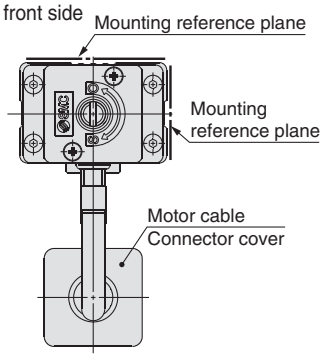
—

Basic (Entry on the left side)



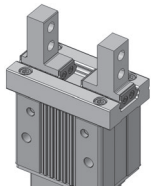
F

Entry on the front side

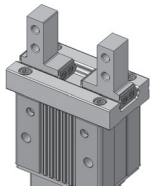


Finger options

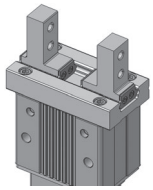
—: Basic (Tapped in opening/closing direction)



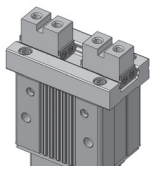
A: Side tapped mounting



B: Through-hole in opening/closing direction



C: Flat fingers



⚠Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.

The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to 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 conformity to the EMC directive for the machinery and equipment as a whole.

[UL-compliant products]

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

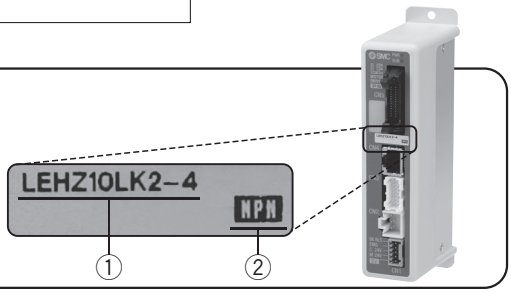
The actuator and controller/driver are sold as a package.

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

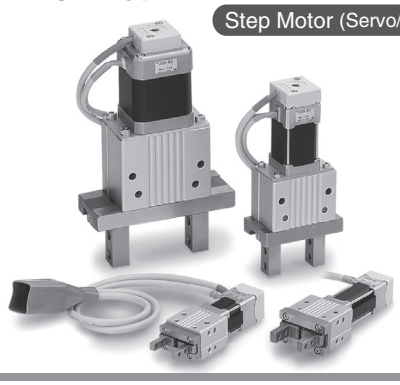
<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.

② Check Parallel I/O configuration matches (NPN or PNP).



∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smc.eu



❽ Actuator cable type*1

—	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)*2

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

❾ Actuator cable length [m]

—	Without cable
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 9.

❿ Controller/Driver type*

—	Without controller/driver	
6N	**LECP6** (Step data input type)	NPN
6P		PNP
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA** (Pulse input type)	NPN
AP		PNP

* For details about controllers/driver and compatible motors, refer to the compatible controllers/driver below.

⓫ I/O cable length [m]*1

—	Without cable
1	1.5
3	3*2
5	5*2

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 61 (For LECP6), page 74 (For LECP1) or page 81 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

⓬ Controller/Driver mounting

—	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 56.)

Compatible Controllers/Driver

Type	Step data input type	Programless type	Pulse input type
Series	**LECP6**	**LECP1**	**LECPA**
Features	Value (Step data) input Standard controller	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points	14 points	—
Power supply voltage	24 VDC		
Reference page	Page 55	Page 68	Page 75

Specifications

Model			LEHZ10	LEHZ16	LEHZ20	LEHZ25	LEHZ32	LEHZ40
Actuator specifications	Opening/closing stroke (Both sides)		4	6	10	14	22	30
	Gripping force [N] Note 1) Note 3)	Basic	6 to 14		16 to 40		52 to 130	84 to 210
		Compact	2 to 6	3 to 8	11 to 28		—	—
	Opening and closing speed/ Pushing speed [mm/s] Note 2) Note 3)		5 to 80/5 to 50		5 to 100/5 to 50		5 to 120/5 to 50	
	Drive method		Slide screw + Slide cam					
	Finger guide type		Linear guide (No circulation)					
	Repeated length measurement accuracy [mm] Note 4)		±0.05					
	Finger backlash/ both sides [mm] Note 5)		0.25 or less				0.5 or less	
	Repeatability [mm] Note 6)		±0.02					
	Positioning repeatability/one side [mm]		±0.05					
	Lost motion/one side [mm] Note 7)		0.25 or less				0.3 or less	
	Impact/Vibration resistance [m/s²] Note 8)		150/30					
	Max. operating frequency [C.P.M]		60					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
	Weight [g]	Basic	165	220	430	585	1120	1760
		Compact	135	190	365	520	—	—
Electric specifications	Motor size		□20		□28		□42	
	Motor type		Step motor (Servo/24 VDC)					
	Encoder		Incremental A/B phase (800 pulse/rotation)					
	Rated voltage [V]		24 VDC ±10 %					
	Power consumption/ Standby power consumption when operating [W] Note 9)	Basic	11/7		28/15		34/13	36/13
		Compact	8/7		22/12		—	—
	Max. instantaneous power consumption [W] Note 10)	Basic	19		51		57	61
		Compact	14		42		—	—

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Positioning force should be 150 % when releasing the workpiece. Gripping force accuracy should be ±30 % (F.S.) for LEHZ10/16, ±25 % (F.S.) for LEHZ20/25 and ±20 % (F.S.) for LEHZ32/40. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing speed and pushing speed are for both fingers. The speed for one finger is half this value.

Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10 % for each 5 m. (At 15 m: Reduced by up to 20 %)

Note 4) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 5) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

Note 6) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.

Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

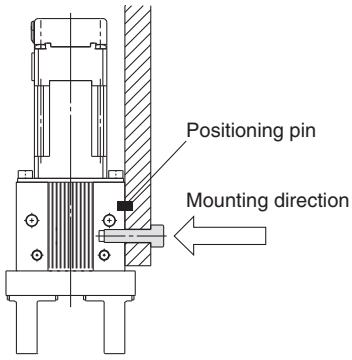
Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

Note 9) The power consumption (including the controller) is for when the gripper is operating.
The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.

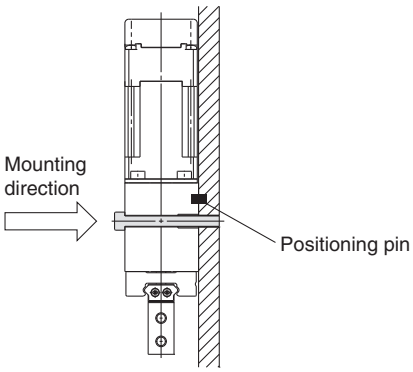
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

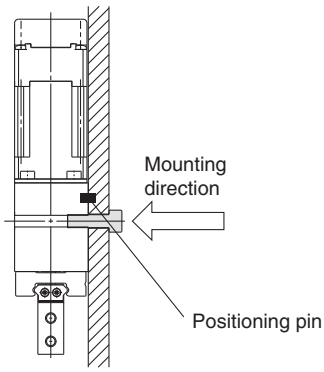
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

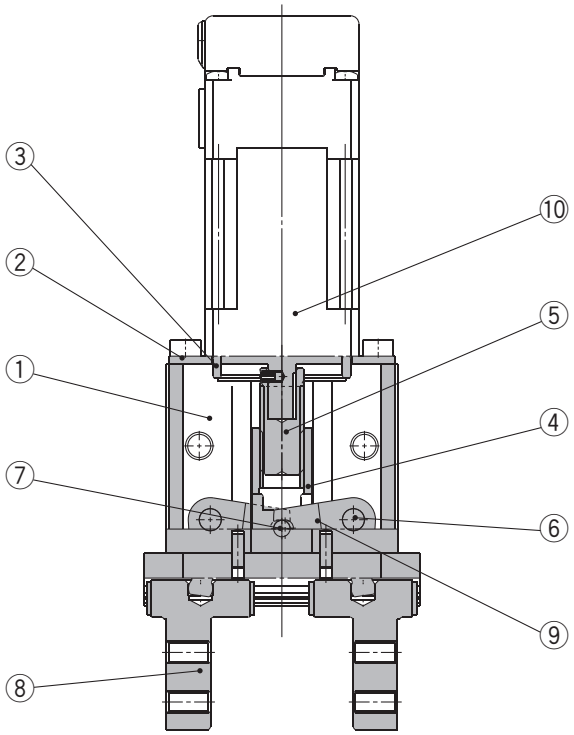


c) When using the thread on the back of the body



Construction

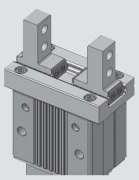
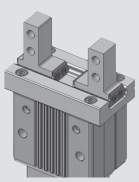
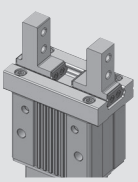
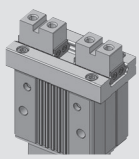
Series LEHZ



Component Parts

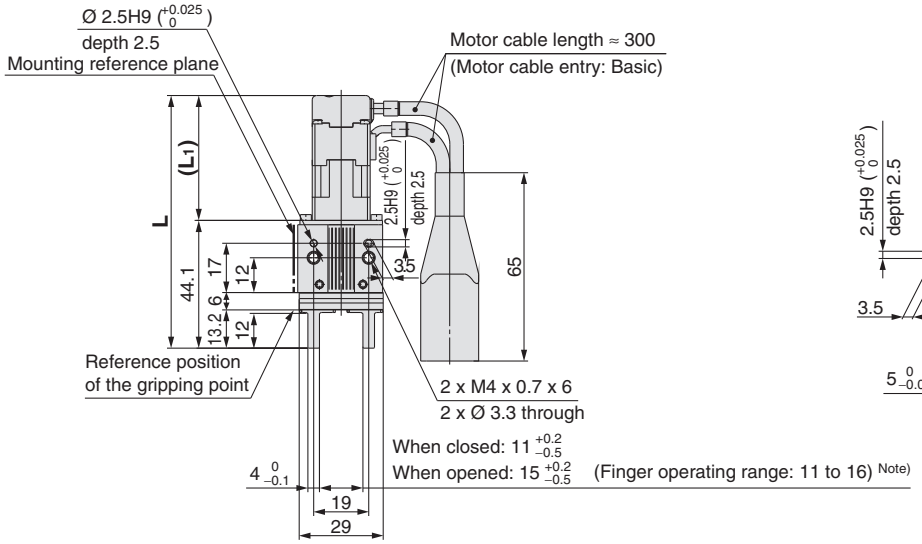
No.	Description	Material	Note
1	**Body**	Aluminium alloy	Anodised
2	**Motor plate**	Aluminium alloy	Anodised
3	**Guide ring**	Aluminium alloy	
4	**Slide nut**	Stainless steel	Heat treatment + Special treatment
5	**Slide bolt**	Stainless steel	Heat treatment + Special treatment
6	**Needle roller**	High carbon chromium bearing steel	
7	**Needle roller**	High carbon chromium bearing steel	
8	**Finger assembly**	—	
9	**Lever**	Special stainless steel	
10	**Step motor (Servo/24 VDC)**	—	

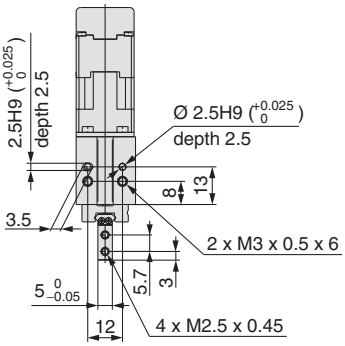
Replacement Parts ⑧ Finger Assembly

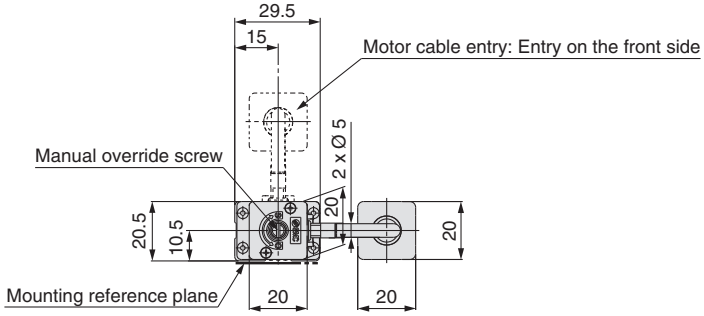
Size	Basic (—)	Side tapped mounting (**A**)	Through-hole in opening/ closing direction (**B**)	Flat fingers (**C**)
				
10	MHZ-A1002	MHZ-A1002-1	MHZ-A1002-2	MHZ-A1002-3
16	MHZ-A1602	MHZ-A1602-1	MHZ-A1602-2	MHZ-A1602-3
20	MHZ-A2002	MHZ-A2002-1	MHZ-A2002-2	MHZ-A2002-3
25	MHZ-A2502	MHZ-A2502-1	MHZ-A2502-2	MHZ-A2502-3
32	MHZ-A3202	MHZ-A3202-1	MHZ-A3202-2	MHZ-A3202-3
40	MHZ-A4002	MHZ-A4002-1	MHZ-A4002-2	MHZ-A4002-3

Dimensions

LEHZ10(L)K2-4





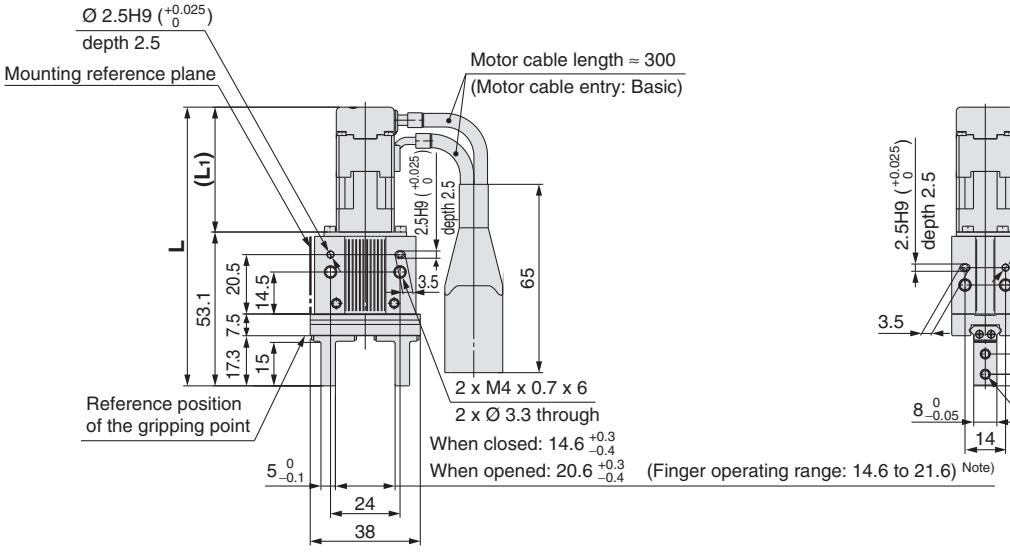


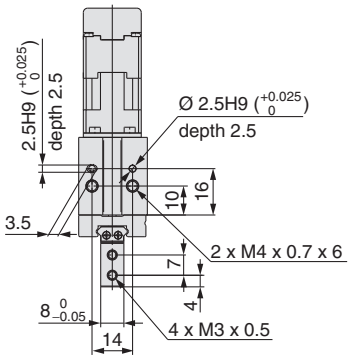
[mm]

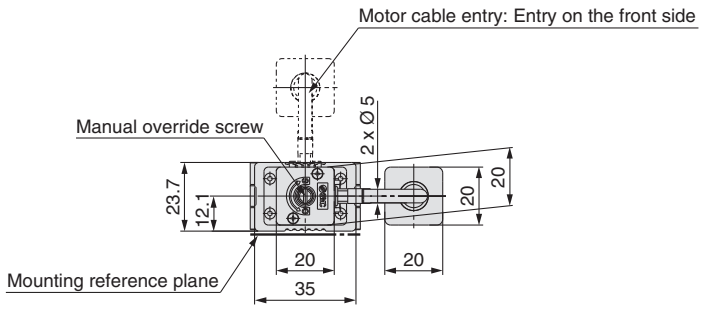
Model	L	(L1)
LEHZ10K2-4□	103.8	(59.7)
LEHZ10LK2-4□	87.2	(43.1)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZ16(L)K2-6







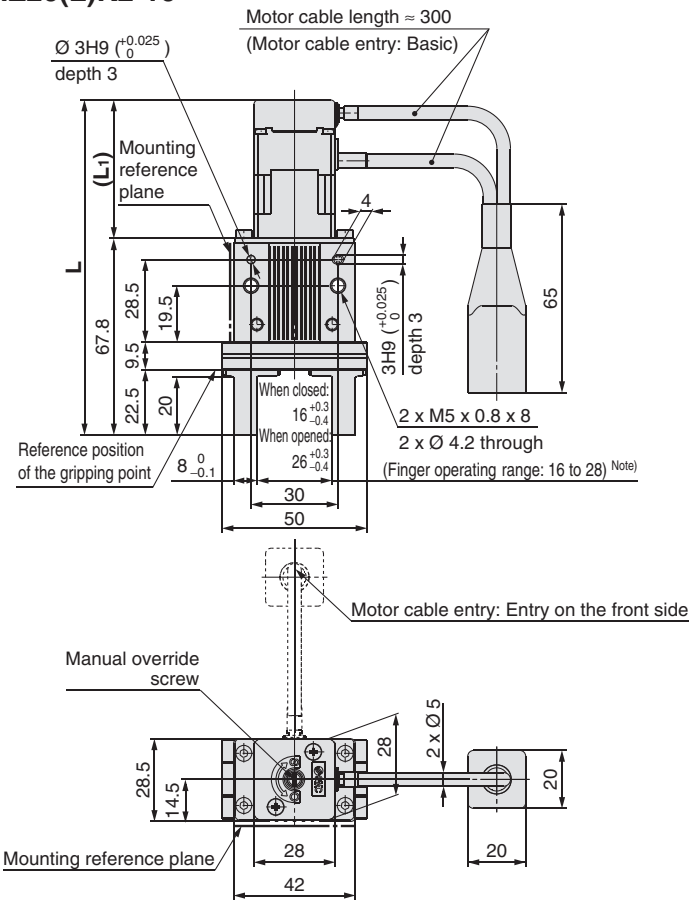
[mm]

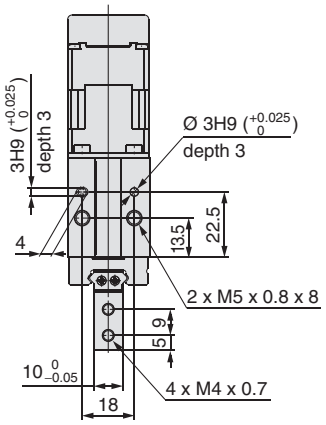
Model	L	(L1)
LEHZ16K2-6□	112.8	(59.7)
LEHZ16LK2-6□	96.2	(43.1)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

LEHZ20(L)K2-10



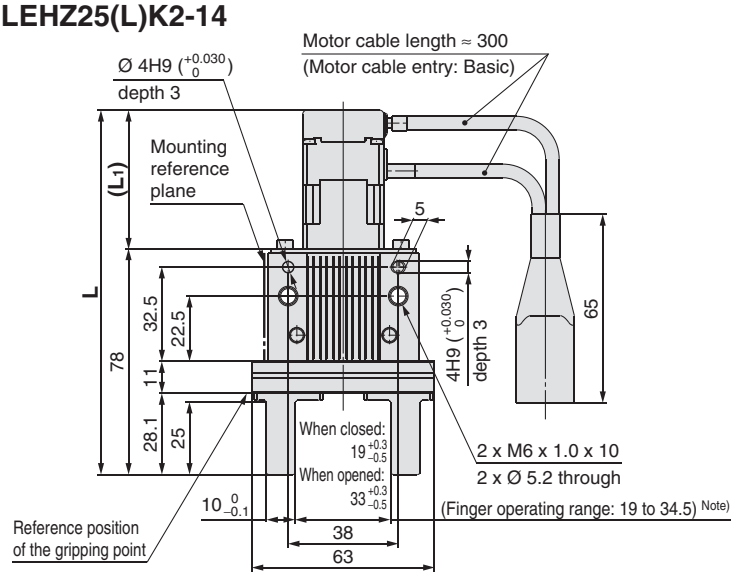


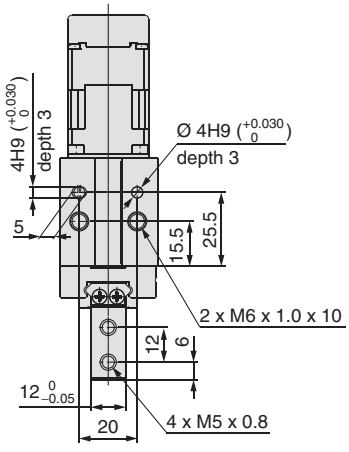
[mm]

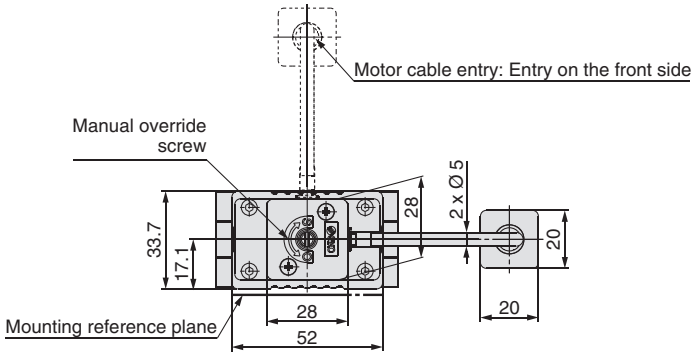
Model	L	(L1)
LEHZ20K2-10□	129.6	(61.8)
LEHZ20LK2-10□	115.6	(47.8)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZ25(L)K2-14







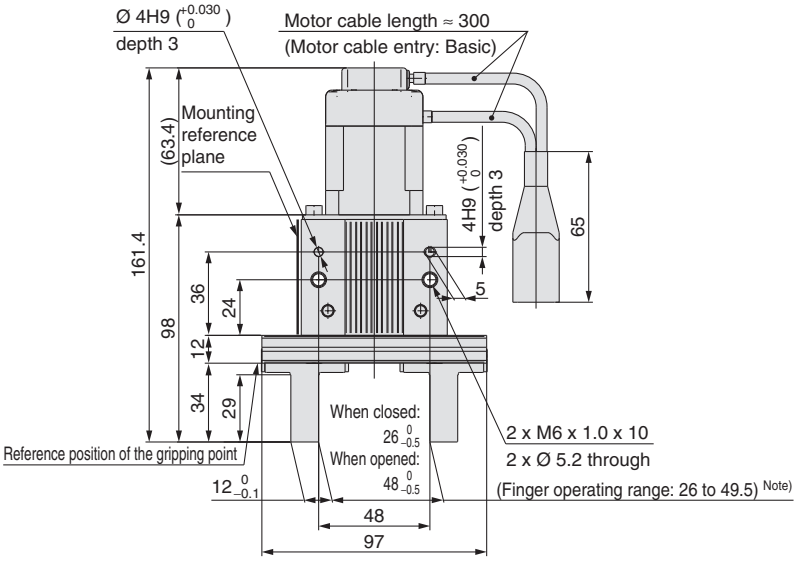
[mm]

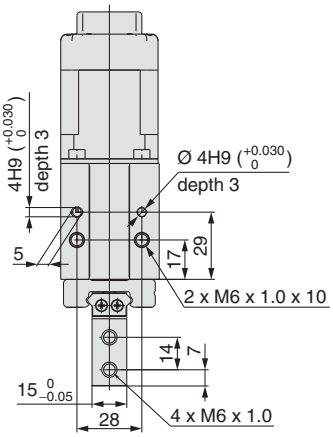
Model	L	(L1)
LEHZ25K2-14□	139.8	(61.8)
LEHZ25LK2-14□	125.8	(47.8)

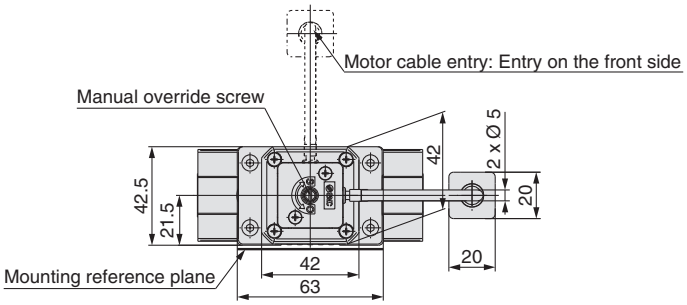
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

LEHZ32K2-22

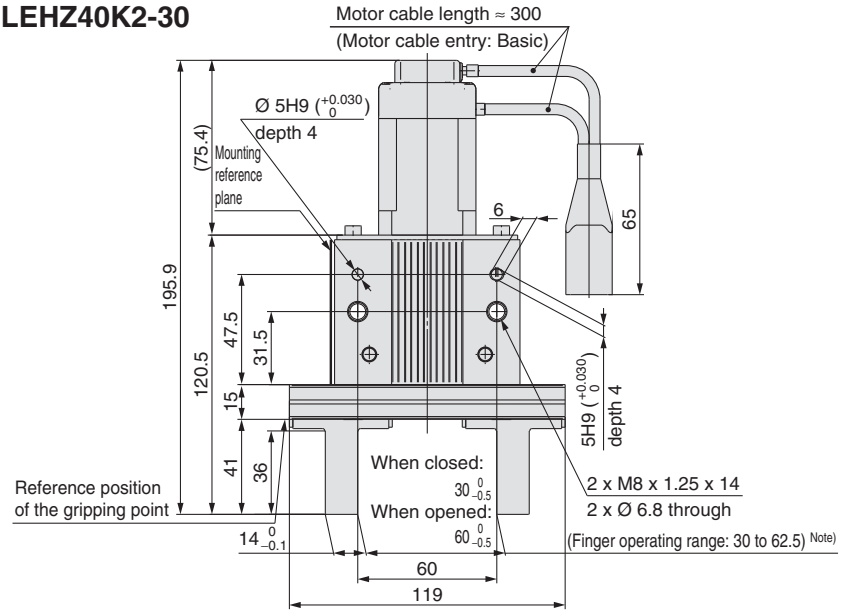


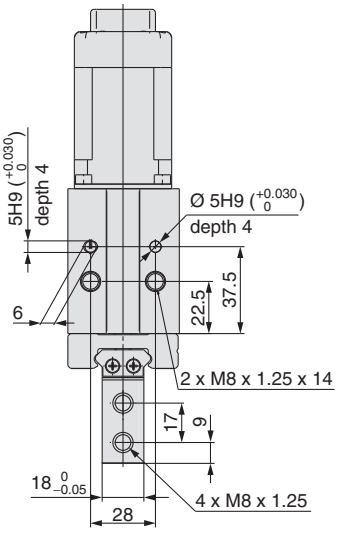


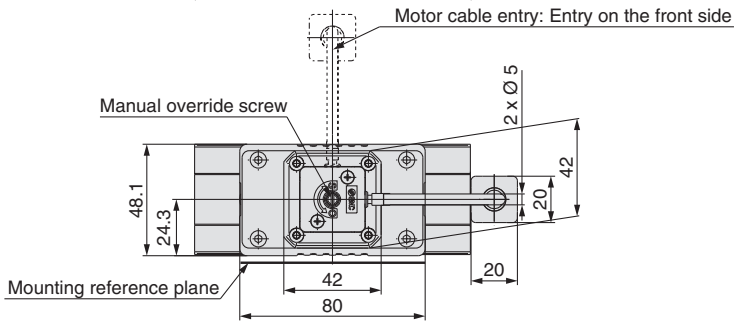


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZ40K2-30



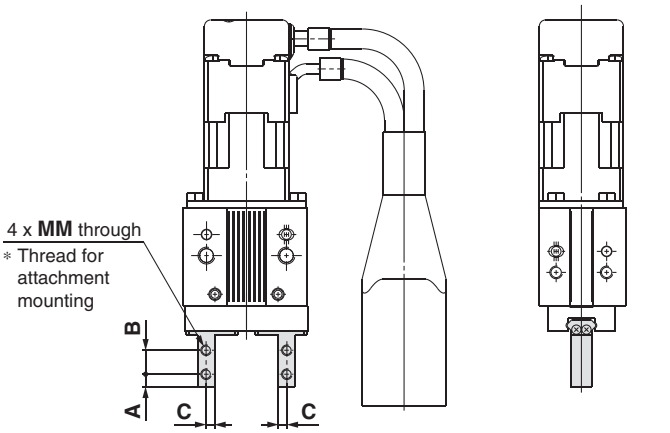




Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Finger Options

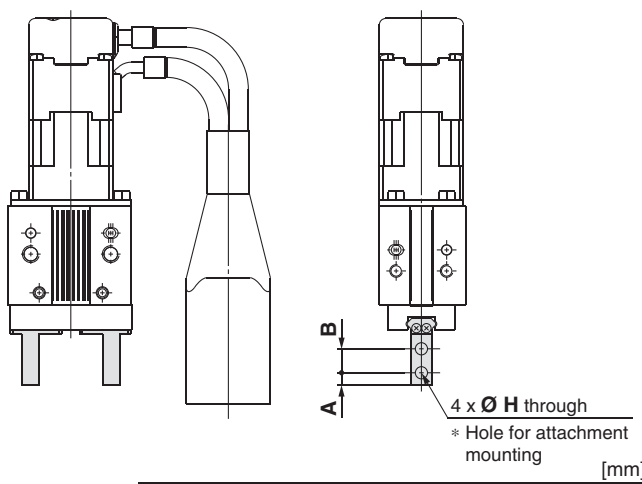
Side Tapped Mounting (A)



[mm]

Model	A	B	C	MM
LEHZ10(L)K2-4A□	3	5.7	2	M2.5 x 0.45
LEHZ16(L)K2-6A□	4	7	2.5	M3 x 0.5
LEHZ20(L)K2-10A□	5	9	4	M4 x 0.7
LEHZ25(L)K2-14A□	6	12	5	M5 x 0.8
LEHZ32K2-22A□	7	14	6	M6 x 1
LEHZ40K2-30A□	9	17	7	M8 x 1.25

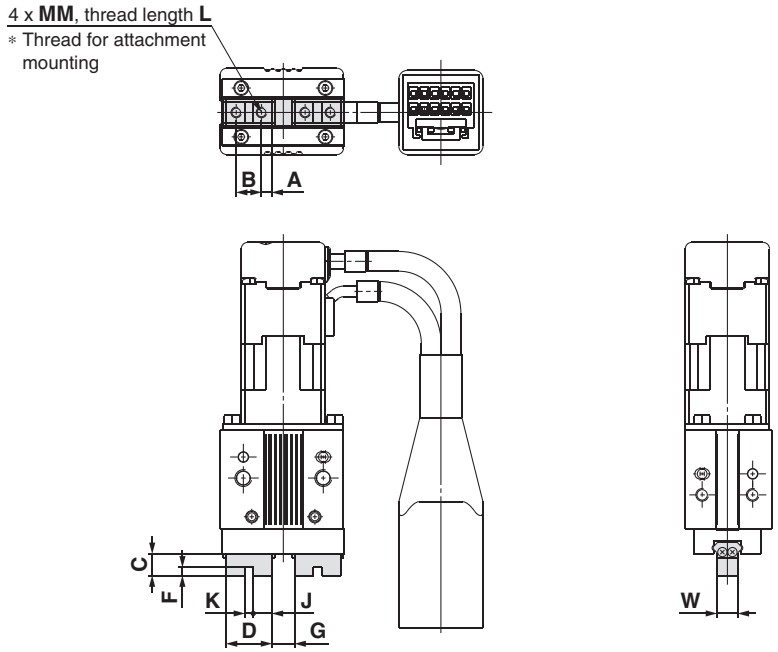
Through-hole in Opening/Closing Direction (B)



[mm]

Model	A	B	H
LEHZ10(L)K2-4B□	3	5.7	2.9
LEHZ16(L)K2-6B□	4	7	3.4
LEHZ20(L)K2-10B□	5	9	4.5
LEHZ25(L)K2-14B□	6	12	5.5
LEHZ32K2-22B□	7	14	6.6
LEHZ40K2-30B□	9	17	9

Flat Fingers (C)



[mm]

Model	A	B	C	D	F	G		J	K	MM	L	W	Weight (g)
						When opened	When closed						
LEHZ10K2-4C□	2.45	6	5.2	10.9	2	$5.4^{0}_{-0.2}$	$1.4^{0}_{-0.2}$	4.45	$2H9^{+0.025}_{0}$	M2.5 x 0.45	5	$5^{0}_{-0.05}$	165
LEHZ10LK2-4C□													135
LEHZ16K2-6C□	3.05	8	8.3	14.1	2.5	$7.4^{0}_{-0.2}$	$1.4^{0}_{-0.2}$	5.8	$2.5H9^{+0.025}_{0}$	M3 x 0.5	6	$8^{0}_{-0.05}$	220
LEHZ16LK2-6C□													190
LEHZ20K2-10C□	3.95	10	10.5	17.9	3	$11.6^{0}_{-0.2}$	$1.6^{0}_{-0.2}$	7.45	$3H9^{+0.025}_{0}$	M4 x 0.7	8	$10^{0}_{-0.05}$	430
LEHZ20LK2-10C□													365
LEHZ25K2-14C□	4.9	12	13.1	21.8	4	$16^{0}_{-0.2}$	$2^{0}_{-0.2}$	8.9	$4H9^{+0.030}_{0}$	M5 x 0.8	10	$12^{0}_{-0.05}$	575
LEHZ25LK2-14C□													510
LEHZ32K2-22C□	7.3	20	18	34.6	5	$25^{0}_{-0.2}$	$3^{0}_{-0.2}$	14.8	$5H9^{+0.030}_{0}$	M6 x 1	12	$15^{0}_{-0.05}$	1145
LEHZ40K2-30C□	8.7	24	22	41.4	6	$33^{0}_{-0.2}$	$3^{0}_{-0.2}$	17.7	$6H9^{+0.030}_{0}$	M8 x 1.25	16	$18^{0}_{-0.05}$	1820

Model Selection

Selection Procedure

Step 1 Check the gripping force. → **Step 2** Check the gripping point and overhang. → **Step 3** Check the external force on fingers.

Step 1 Check the of gripping force.

Check the conditions. → Calculate the required gripping force. → Select the model from gripping force graph. → Select the pushing speed.

Example

Workpiece mass: 0.1 kg

Guidelines for the selection of the gripper with respect to workpiece mass

- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times Note) the workpiece weight, or more.

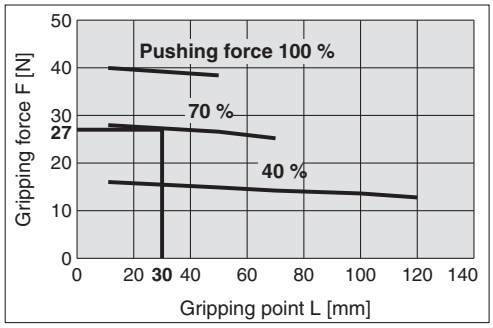
Note) For details, refer to the calculation of required gripping force.

- If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

Example) When it is desired to set the gripping force at 20 times or more above the workpiece weight.

Required gripping force
= 0.1 kg x 20 x 9.8 m/s^2 ≈ 19.6 N or more

LEHZJ20



When the LEHZJ20 is selected.

- A gripping force of 27 N is obtained from the intersection point of gripping point distance L = 30 mm and pushing force of 70 %.
- Gripping force is 27.6 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

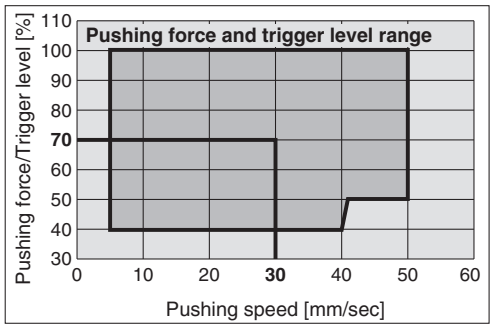
Pushing force: 70 %

Pushing force is one of the values of step data that is input into the controller.

Gripping point distance: 30 mm

Pushing speed: 30 mm/sec

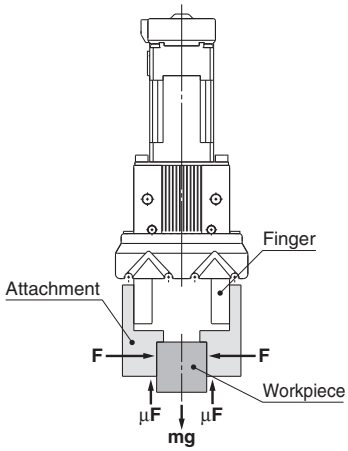
LEHZJ20



- Pushing speed is satisfied at the point where 70 % of the pushing force and 30 mm/sec of the pushing speed cross.

Note) Confirm the pushing speed range from the determined pushing force [%].

Calculation of required gripping force



When gripping a workpiece as in the figure to the left, and with the following definitions,

F: Gripping force (N)
μ: Coefficient of friction between the attachments and the workpiece
m: Workpiece mass (kg)
g: Gravitational acceleration (= 9.8 m/s^2)
mg: Workpiece weight (N)

the conditions under which the workpiece will not drop are

$$\underline{2} \times \mu F > mg$$

(2: Number of fingers)

and therefore, $F > \dfrac{mg}{2 \times \mu}$

With "a" representing the margin, "F" is determined by the following formula:

$$F = \frac{mg}{2 \times \mu} \times a$$

"Gripping force at least 10 to 20 times the workpiece weight"

- The "10 to 20 times or more of the workpiece weight" recommended by SMC is calculated with a margin of "a" = 4, which allows for impacts that occur during normal transportation, etc.

When μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \dfrac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
10 x Workpiece weight	20 x Workpiece weight

<Reference> Coefficient of friction μ (depends on the operating environment, contact pressure, etc.)

Coefficient of friction μ	Attachment – Material of workpieces (guideline)
0.1	Metal (surface roughness Rz3.2 or less)
0.2	Metal
0.2 or more	Rubber, Resin, etc.

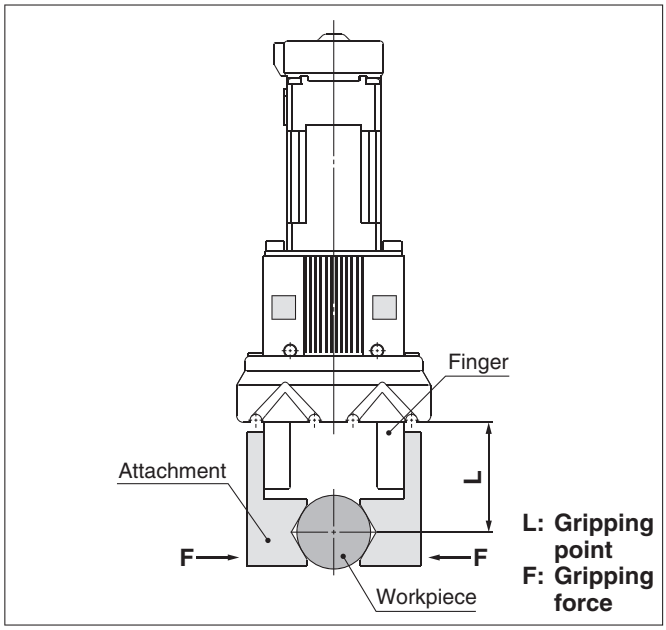
Note)
- Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
- If high acceleration or impact forces are encountered during motion, a further margin should be considered.

Selection Procedure

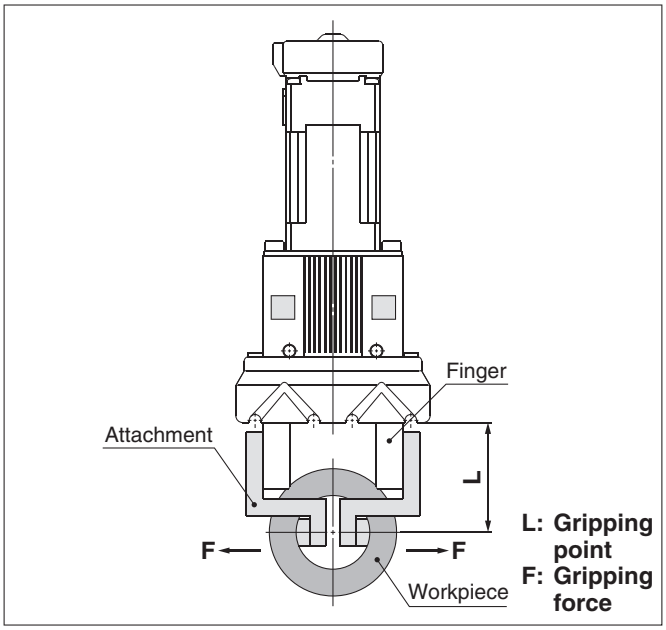
Step 1 Check the gripping force: Series LEHZJ

● **Indication of gripping force**
The gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

External Gripping State



Internal Gripping State

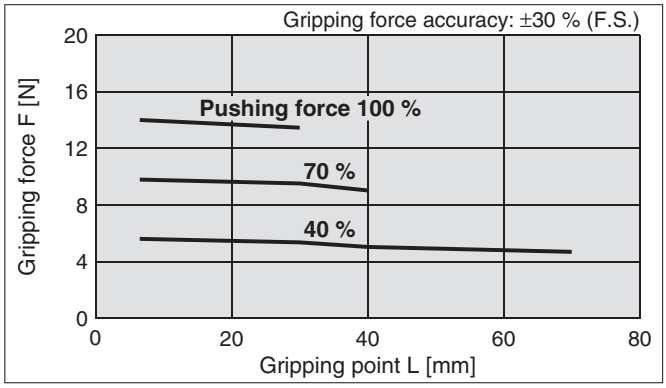


● Set the workpiece gripping point "L" so that it is within the range shown in the figure below.

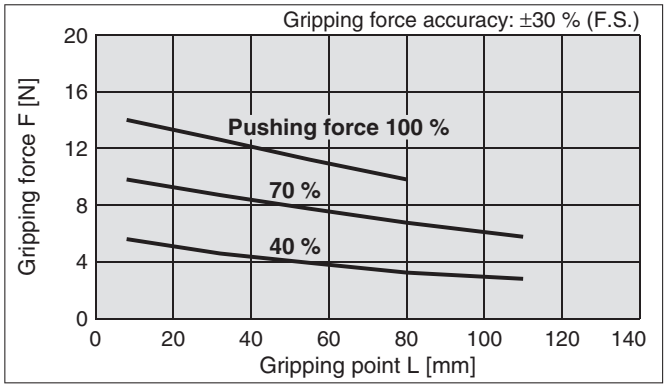
Basic

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZJ10



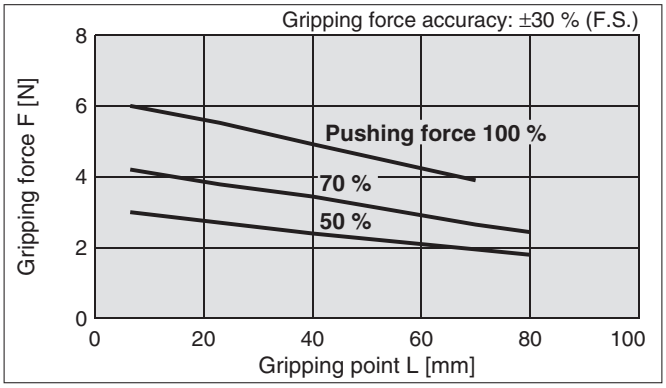
LEHZJ16



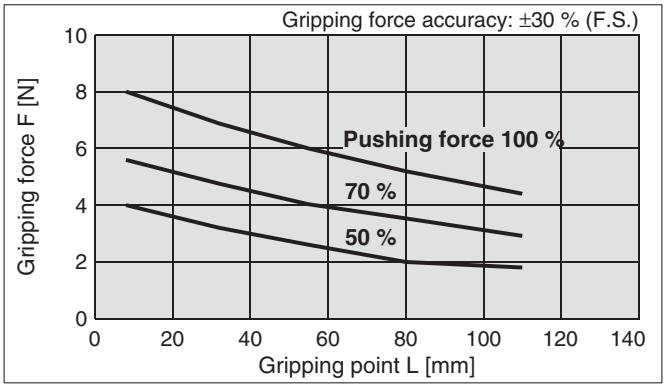
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZJ10L



LEHZJ16L



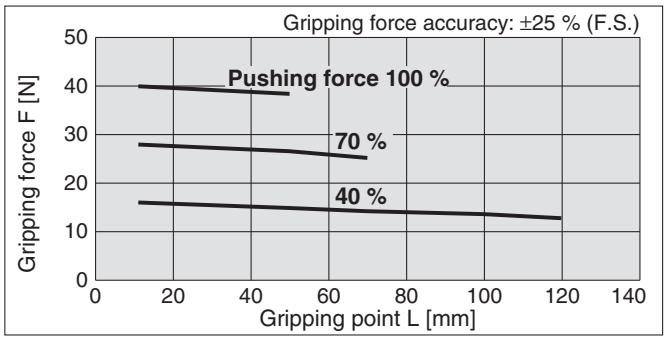
Selection Procedure

Step 1 Check the gripping force: Series LEHZJ

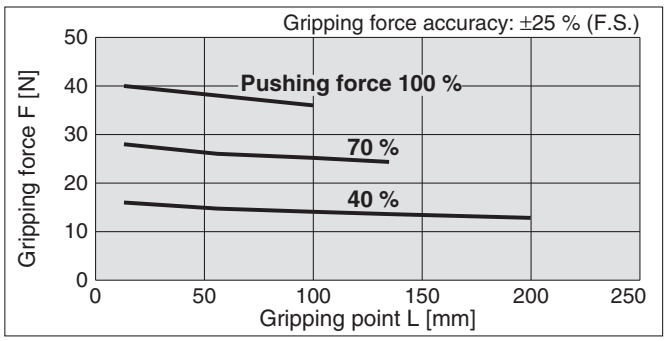
Basic

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZJ20



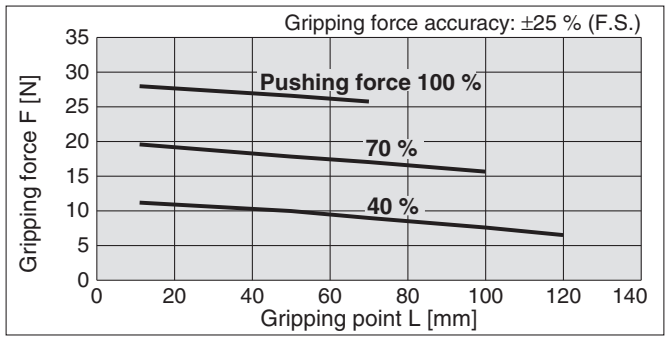
LEHZJ25



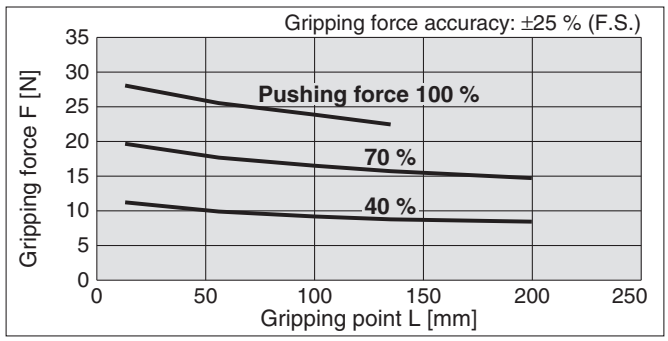
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZJ20L



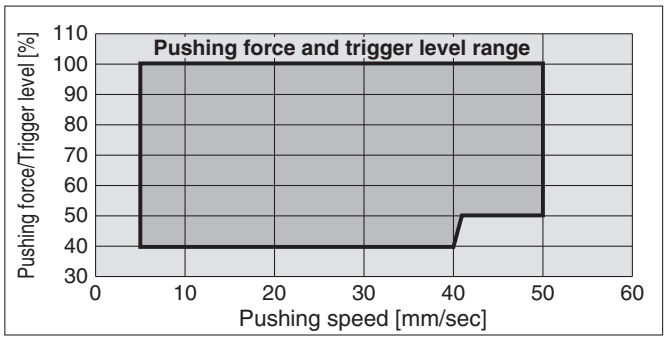
LEHZJ25L



Selection of Pushing Speed

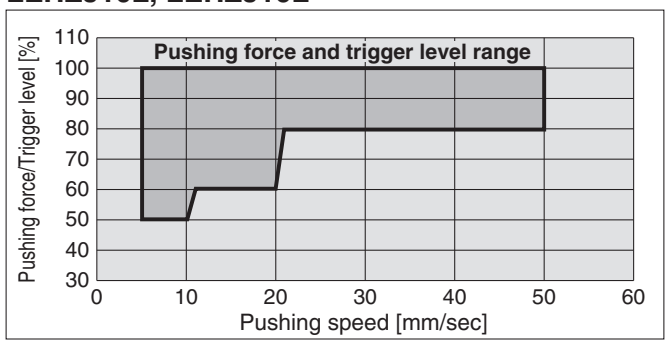
● Set the [Pushing force] and [Trigger level] within the range shown in the figure below.

Basic

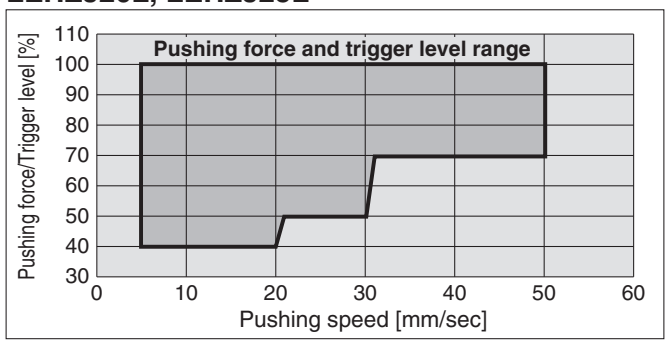


Compact

LEHZJ10L, LEHZJ16L



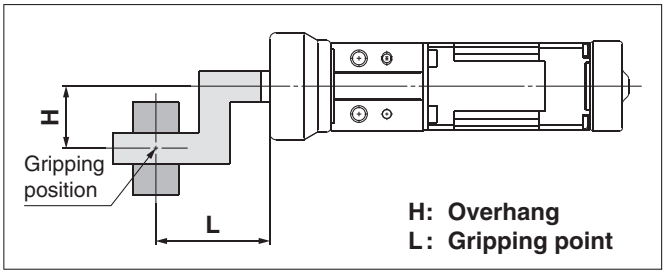
LEHZJ20L, LEHZJ25L



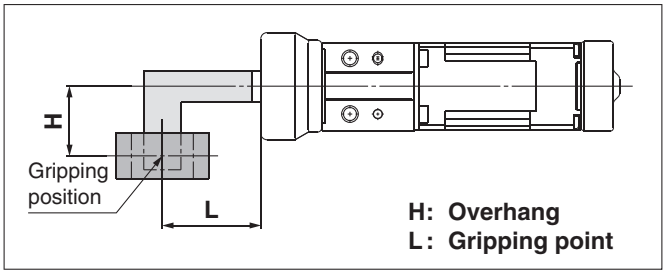
Step 2 Check the gripping point and overhang: Series LEHZJ

- Decide the gripping position of the workpiece so that the amount of overhang "H" stays within the range shown in the figure below.
- If the gripping position is out of the limit, it may shorten the life of the electric gripper.

External Gripping State



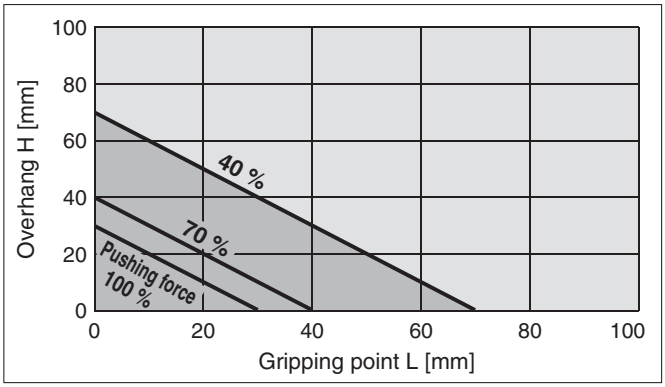
Internal Gripping State



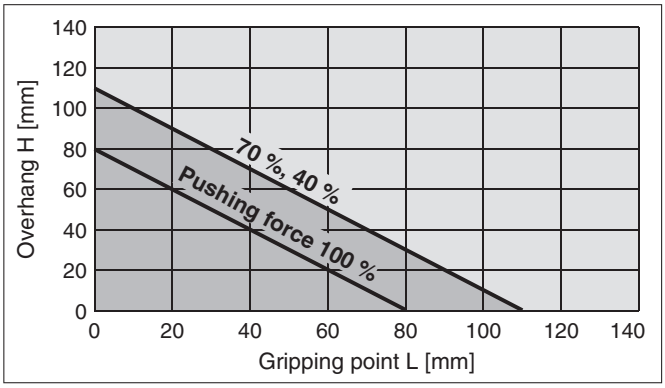
Basic

∗ Pushing force is one of the values of step data that is input into the controller.

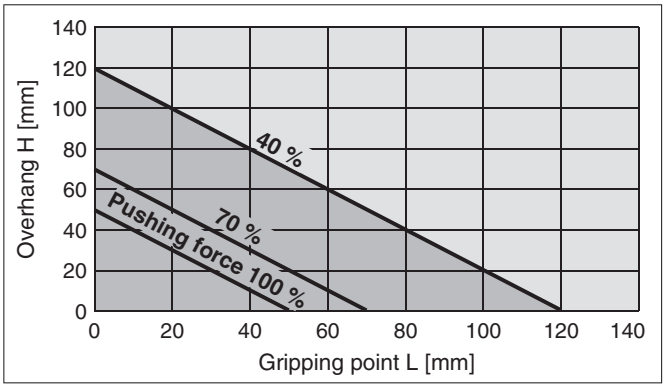
LEHZJ10



LEHZJ16



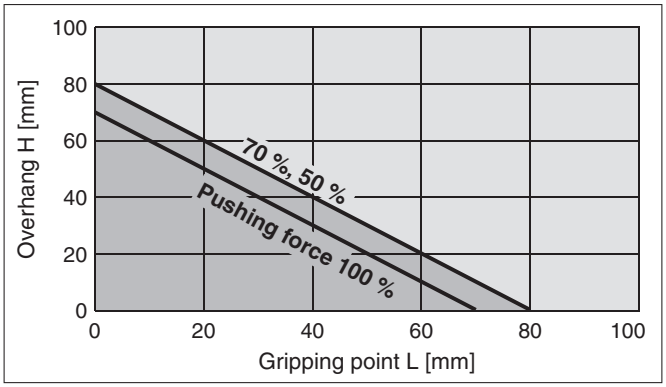
LEHZJ20



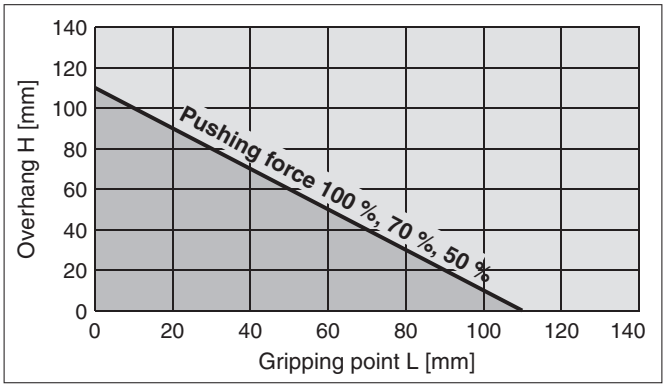
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

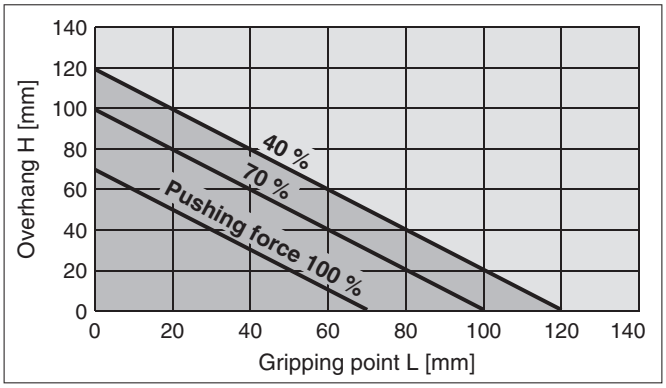
LEHZJ10L



LEHZJ16L



LEHZJ20L



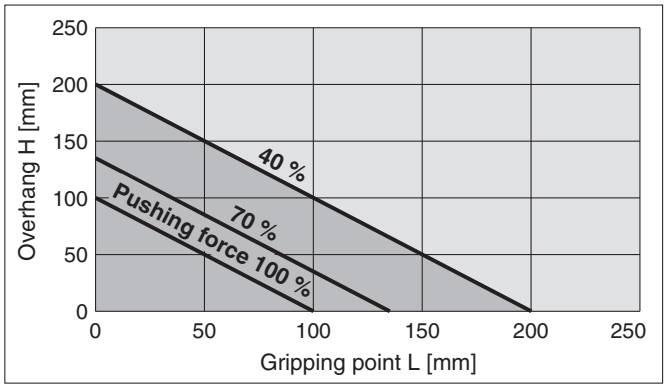
Selection Procedure

Step 2 **Check the gripping point and overhang: Series LEHZJ**

Basic

∗ Pushing force is one of the values of step data that is input into the controller.

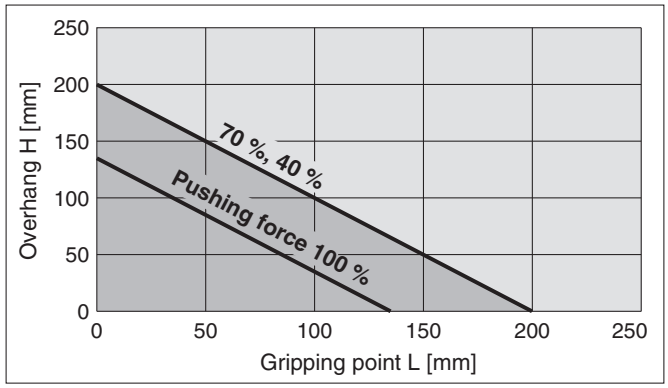
LEHZJ25



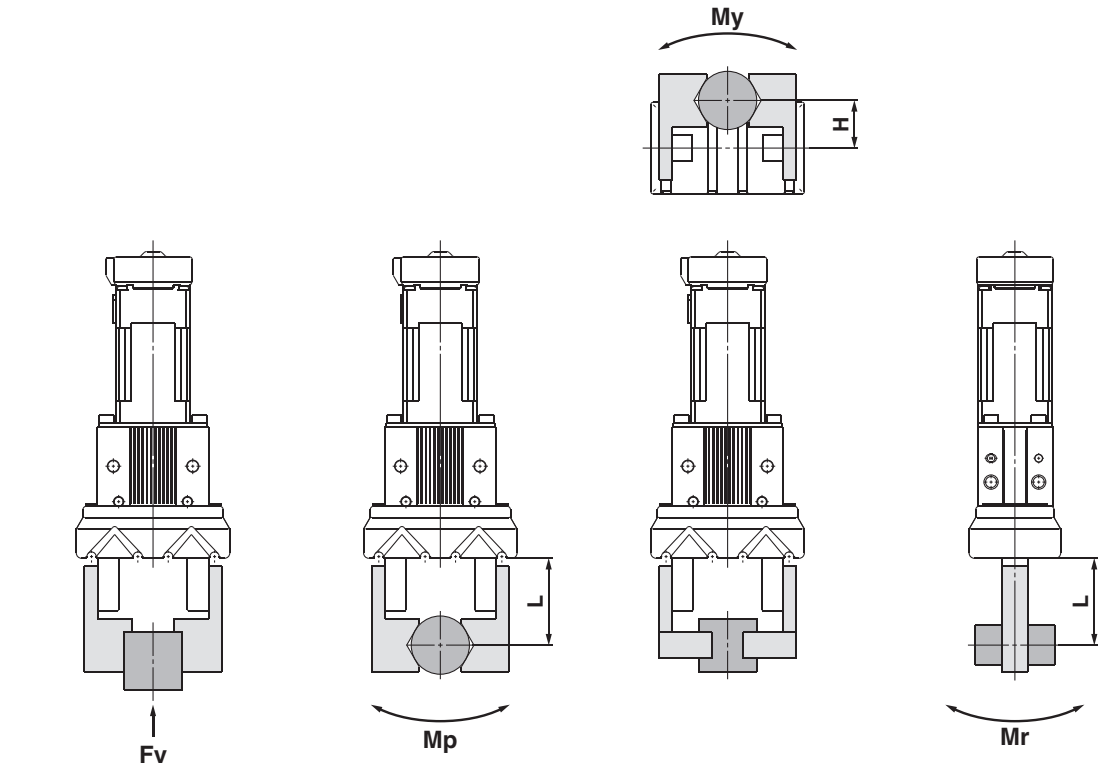
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

LEHZJ25L



Step 3 Check the external force on fingers: Series LEHZJ



Fv: Allowable vertical load **Mp: Pitch moment** **My: Yaw moment** **Mr: Roll moment**

H, L: Distance to the point at which the load is applied [mm]

Model	Allowable vertical load Fv [N]	Static allowable moment		
		Pitch moment: Mp [N·m]	Yaw moment: My [N·m]	Roll moment: Mr [N·m]
LEHZJ10(L)K2-4	58	0.26	0.26	0.53
LEHZJ16(L)K2-6	98	0.68	0.68	1.36
LEHZJ20(L)K2-10	147	1.32	1.32	2.65
LEHZJ25(L)K2-14	255	1.94	1.94	3.88

Note) Values for load in the table indicate static values.

Calculation of allowable external force (when moment load is applied)	Calculation example
Allowable load F (N) = $\frac{\text{M (Static allowable moment) (N·m)}}{\text{L x } 10^{-3} *}$ (∗ Constant for unit conversion)	When a static load of f = 10 N is operating, which applies pitch moment to point L = 30 mm from the LEHZJ16K2-6 guide. Therefore, it can be used. **Allowable load F = $\frac{0.68}{30 \times 10^{-3}}$** **= 22.7 (N)** **Load f = 10 (N) < 22.7 (N)**

Electric Gripper 2-Finger Type/With Dust Cover

Step Motor (Servo/24 VDC)

Series LEHZJ

LEHZJ10, 16, 20, 25

EtherNet/IP™ DeviceNet™ IO-Link PROFINET EtherCAT® Compatible ▶Page 86

Multi-Axis Step Motor Controller Compatible ▶Page 96

How to Order

LEHZ J 10 ❑ K 2 – 4 ❑ ❑ – S 1 6N 1 ❑

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭

❶ Dust cover

J	With dust cover

❷ Size

10
16
20
25

❸ Motor size

—	Basic
L	Compact

❹ Lead

K	Basic

❺ 2-finger type

❻ Stroke [mm]

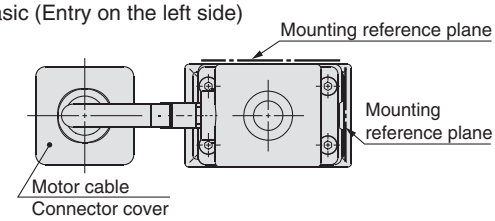
Stroke/both sides	Size
4	10
6	16
10	20
14	25

❼ Dust cover type

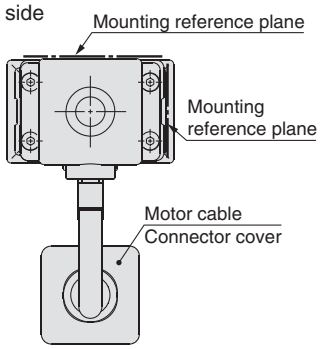
—	Chloroprene rubber (CR)
K	Fluororubber (FKM)
S	Silicone rubber (Si)

❽ Motor cable entry

— Basic (Entry on the left side)



F Entry on the front side



⚠Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.

The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to 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 conformity to the EMC directive for the machinery and equipment as a whole.

[UL-compliant products]

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

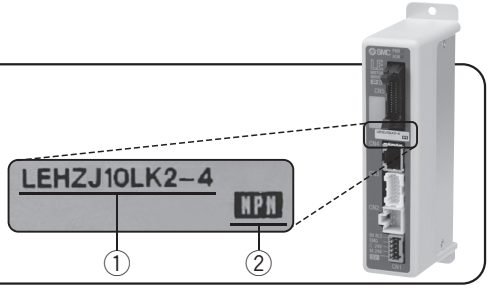
The actuator and controller/driver are sold as a package.

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

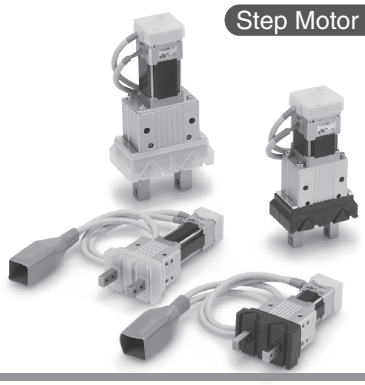
<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.

② Check Parallel I/O configuration matches (NPN or PNP).



∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smc.eu



⑨ Actuator cable type*1

—	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)*2

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

⑩ Actuator cable length [m]

—	Without cable
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 23.

⑪ Controller/Driver type*

—	Without controller/driver	
6N	**LECP6** (Step data input type)	NPN
6P		PNP
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA** (Pulse input type)	NPN
AP		PNP

* For details about controllers/driver and compatible motors, refer to the compatible controllers/driver below.

⑫ I/O cable length [m]*1

—	Without cable
1	1.5
3	3*2
5	5*2

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 61 (For LECP6), page 74 (For LECP1) or page 81 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

⑬ Controller/Driver mounting

—	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 56.)

Compatible Controllers/Driver

Type	Step data input type	Programless type	Pulse input type
Series	**LECP6**	**LECP1**	**LECPA**
Features	Value (Step data) input Standard controller	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points	14 points	—
Power supply voltage	24 VDC		
Reference page	Page 55	Page 68	Page 75

Specifications

Model			LEHZJ10	LEHZJ16	LEHZJ20	LEHZJ25
Actuator specifications	Opening/closing stroke (Both sides)		4	6	10	14
	Gripping force [N] Note 1) Note 3)	Basic	6 to 14		16 to 40	
		Compact	3 to 6	4 to 8	11 to 28	
	Opening and closing speed/Pushing speed [mm/s] Note 2) Note 3)		5 to 80/5 to 50		5 to 100/5 to 50	
	Drive method		Slide screw + Slide cam			
	Finger guide type		Linear guide (No circulation)			
	Repeatability [mm] Note 4)		±0.02			
	Repeated length measurement accuracy [mm] Note 5)		±0.05			
	Finger backlash/ both sides [mm] Note 6)		0.25 or less			
	Impact/Vibration resistance [m/s²] Note 7)		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
	Weight [g]	Basic	170	230	440	610
		Compact	140	200	375	545
Electric specifications	Motor size		□20		□28	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10 %			
	Power consumption/ Standby power consumption when operating [W] Note 8)	Basic	11/7		28/15	
		Compact	8/7		22/12	
	Max. instantaneous power consumption [W] Note 9)	Basic	19		51	
		Compact	14		42	

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Positioning force should be 150 % when releasing the workpiece. Gripping force accuracy should be ±30 % (F.S.) for LEHZ10/16, ±25 % (F.S.) for LEHZ20/25 and ±20 % (F.S.) for LEHZ32/40. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing speed and pushing speed are for both fingers. The speed for one finger is half this value.

Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10 % for each 5 m. (At 15 m: Reduced by up to 20 %)

Note 4) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.

Note 5) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 6) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

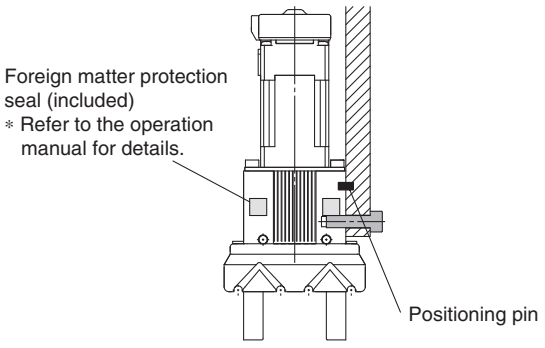
Note 7) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

Note 8) The power consumption (including the controller) is for when the gripper is operating.
The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.

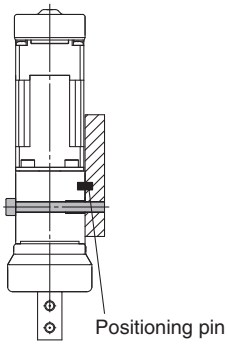
Note 9) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

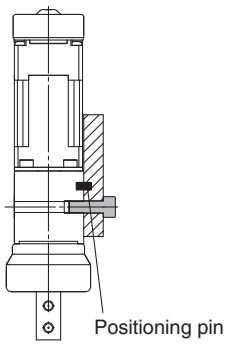
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

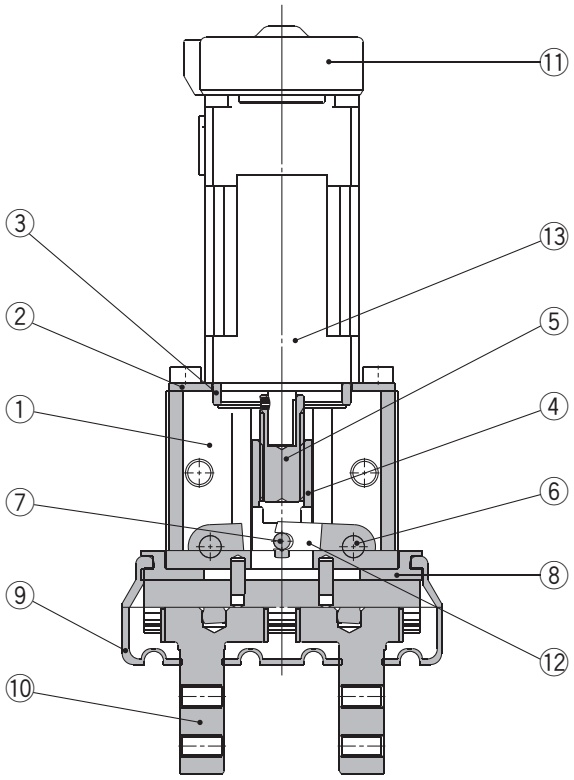


c) When using the thread on the back of the body



Construction

Series LEHZJ



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminium alloy	Anodised
2	**Motor plate**	Aluminium alloy	Anodised
3	**Guide ring**	Aluminium alloy	
4	**Slide nut**	Stainless steel	Heat treatment + Special treatment
5	**Slide bolt**	Stainless steel	Heat treatment + Special treatment
6	**Needle roller**	High carbon chromium bearing steel	
7	**Needle roller**	High carbon chromium bearing steel	
8	**Body plate**	Aluminium alloy	Anodised
9	**Dust cover**	CR	Chloroprene rubber
		FKM	Fluororubber
		Si	Silicone rubber
10	**Finger assembly**	—	
11	**Encoder dust cover**	Si	Silicone rubber
12	**Lever**	Special stainless steel	
13	**Step motor (Servo/24 VDC)**	—	

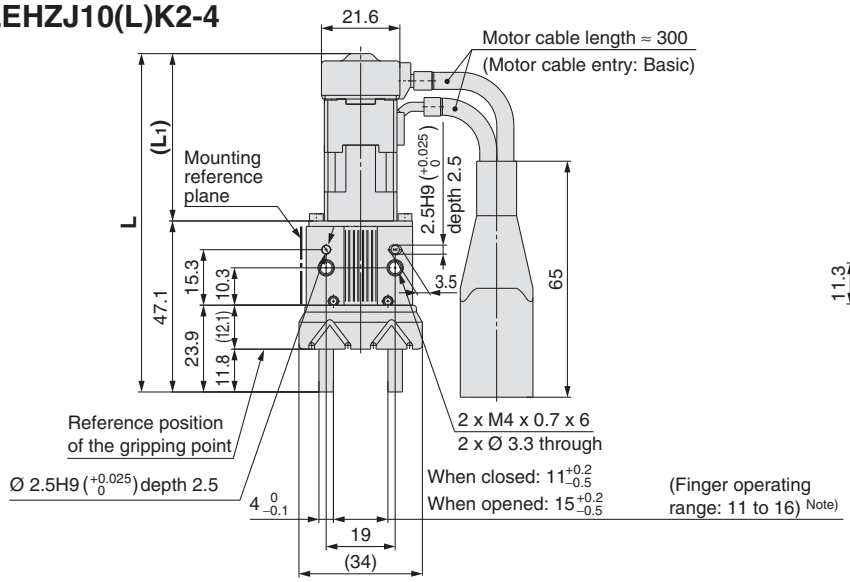
Replacement Parts

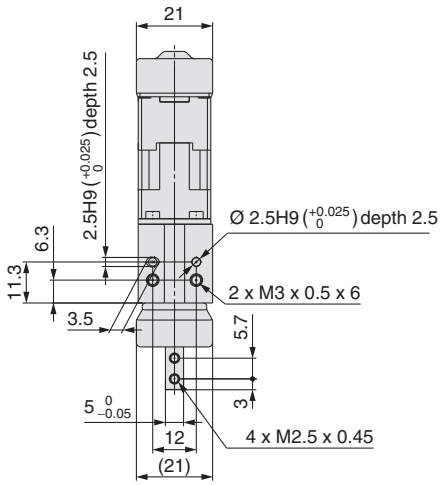
No.	Description			LEHZJ10	LEHZJ16	LEHZJ20	LEHZJ25
9	**Dust cover**	Material	CR	MHZJ2-J10	MHZJ2-J16	MHZJ2-J20	MHZJ2-J25
			FKM	MHZJ2-J10F	MHZJ2-J16F	MHZJ2-J20F	MHZJ2-J25F
			Si	MHZJ2-J10S	MHZJ2-J16S	MHZJ2-J20S	MHZJ2-J25S
10	**Finger assembly**			MHZJ-A1002	MHZJ-A1602	MHZJ-A2002	MHZJ-A2502

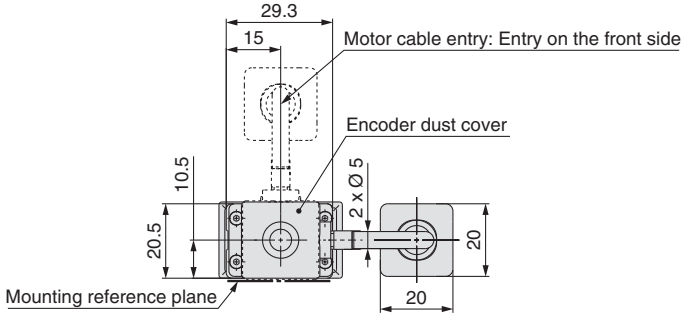
∗ The dust cover is a consumable part. Please replace as necessary.

Dimensions

LEHZJ10(L)K2-4





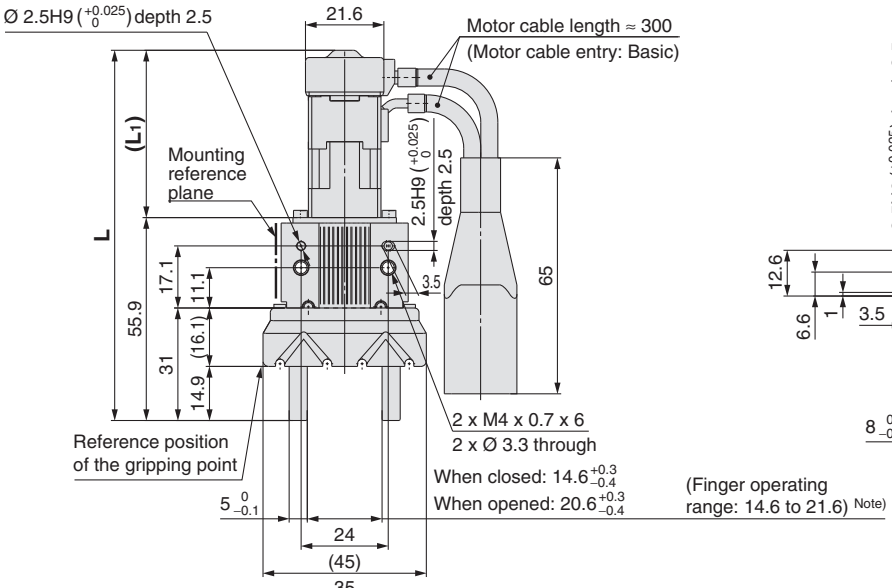


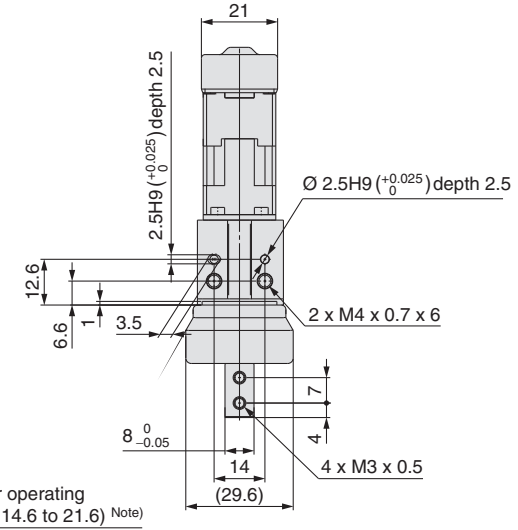
[mm]

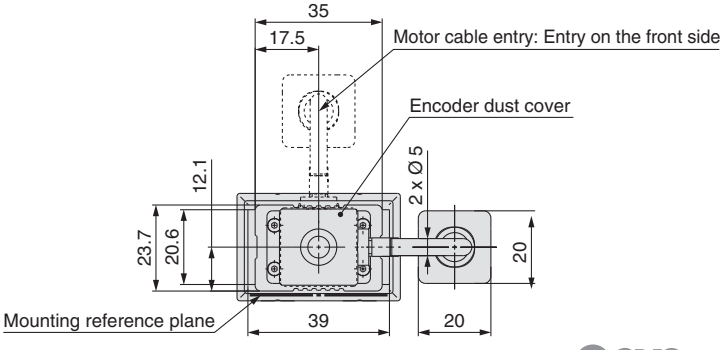
Model	L	(L1)
LEHZJ10K2-4□	109.8	(62.7)
LEHZJ10LK2-4□	93.2	(46.1)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZJ16(L)K2-6







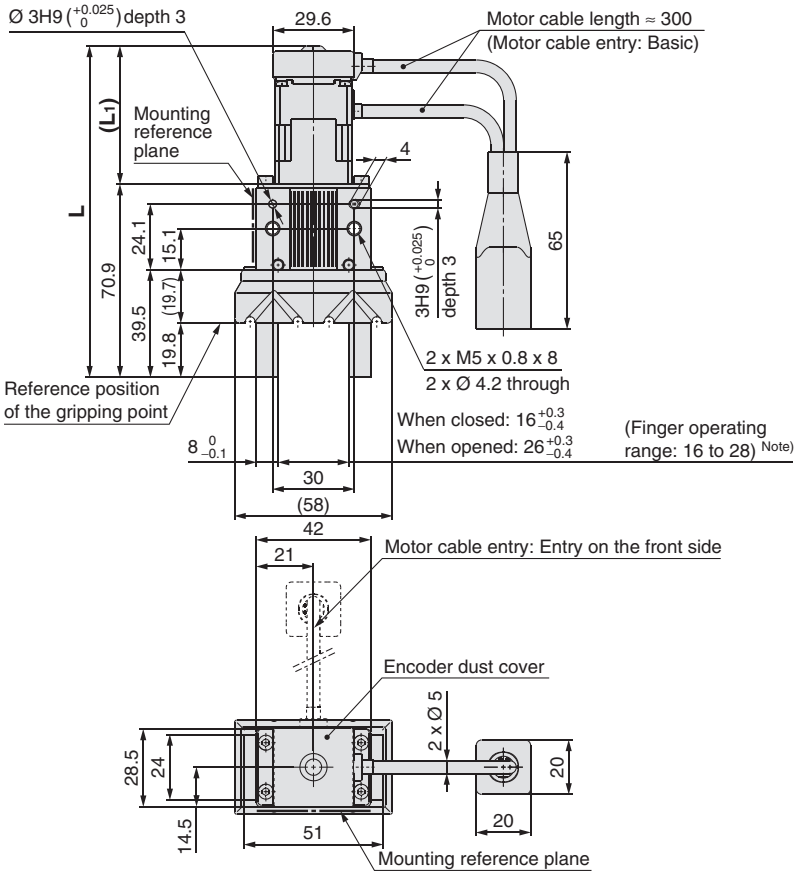
[mm]

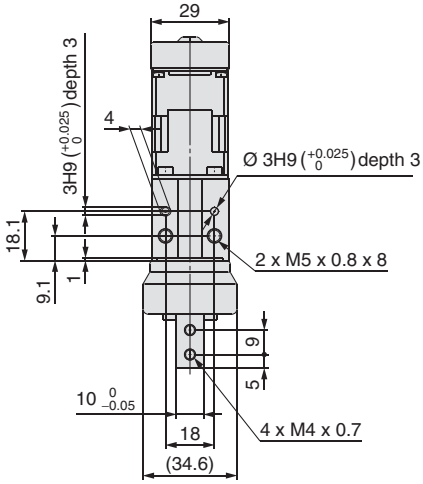
Model	L	(L1)
LEHZJ16K2-6□	118.6	(62.7)
LEHZJ16LK2-6□	102	(46.1)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

LEHZJ20(L)K2-10



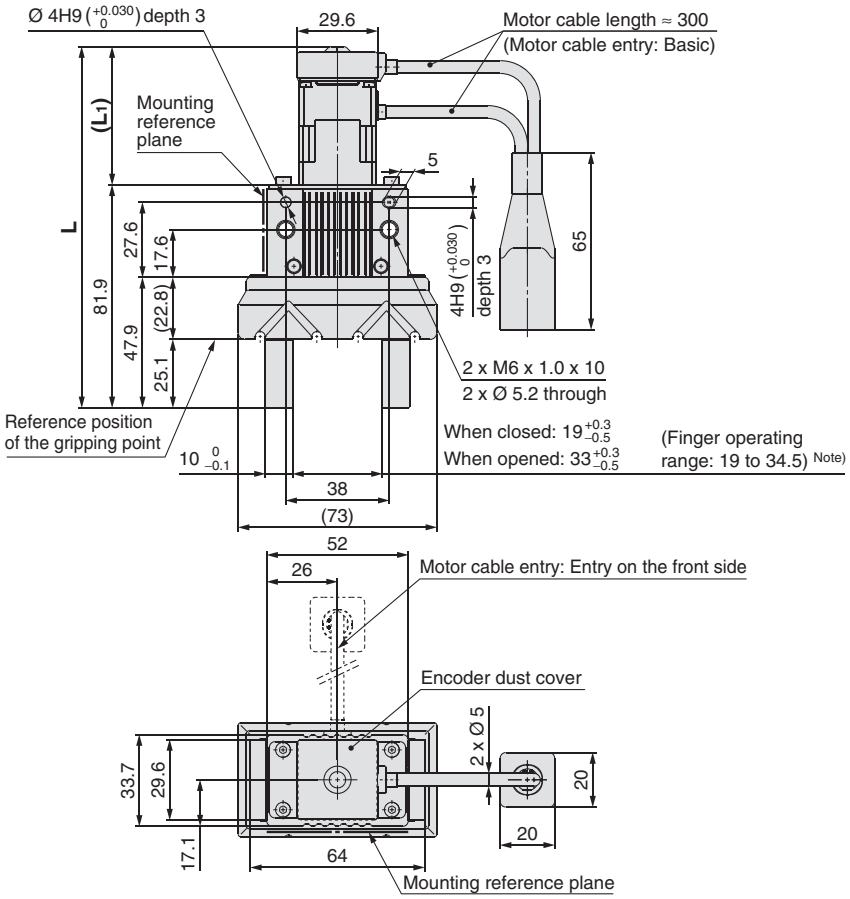


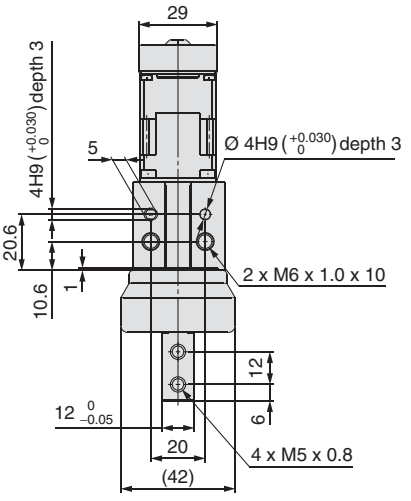
[mm]

Model	L	(L1)
LEHZJ20K2-10□	135.7	(64.8)
LEHZJ20LK2-10□	121.7	(50.8)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZJ25(L)K2-14





[mm]

Model	L	(L1)
LEHZJ25K2-14□	146.7	(64.8)
LEHZJ25LK2-14□	132.7	(50.8)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Model Selection

Selection Procedure

Step 1 Check the gripping force. → **Step 2** Check the gripping point and overhang. → **Step 3** Check the external force on fingers.

Step 1 Check the gripping force.

Check the conditions. → Calculate the required gripping force. → Select the model from gripping force graph. → Select the pushing speed.

Example

Workpiece mass: 0.1 kg

Guidelines for the selection of the gripper with respect to workpiece mass

- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times Note) the workpiece weight, or more.

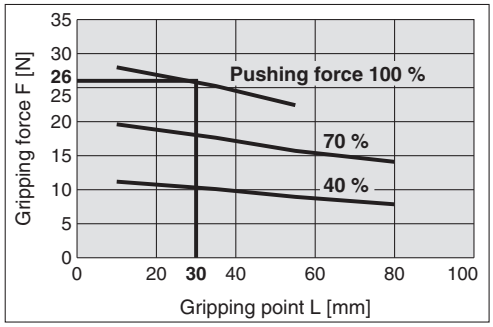
Note) For details, refer to the model selection illustration.

- If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

Example) When it is desired to set the gripping force at 20 times or more above the workpiece weight.

Required gripping force
= 0.1 kg x 20 x 9.8 m/s^2 ≈ 19.6 N or more

LEHF20



Pushing force: 100 %

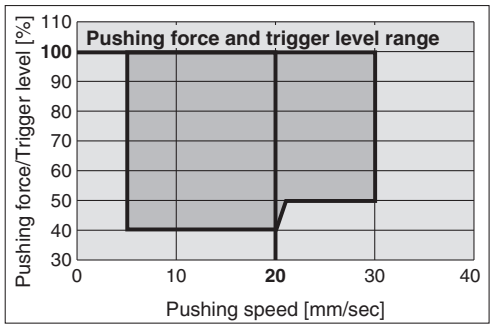
Gripping point distance: 30 mm

When the LEHF20 is selected.

- A gripping force of 26 N is obtained from the intersection point of gripping point distance L = 30 mm and pushing force of 100 %.
- Gripping force is 26.5 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

Pushing speed: 20 mm/sec

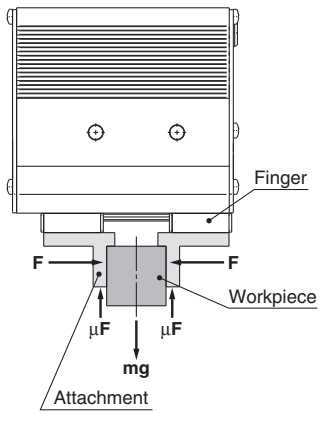
LEHF20



- Pushing speed is satisfied at the point where 100 % of the pushing force and 20 mm/sec of the pushing speed cross.

Note) Confirm the pushing speed range from the determined pushing force [%].

Calculation of required gripping force



When gripping a workpiece as in the figure to the left, and with the following definitions,

F: Gripping force [N]
μ: Coefficient of friction between the attachments and the workpiece
m: Workpiece mass [kg]
g: Gravitational acceleration (= 9.8 m/s^2)
mg: Workpiece weight [N]

the conditions under which the workpiece will not drop are

$$\underline{2} \times \mu F > mg$$

(2: Number of fingers)

and therefore, $F > \dfrac{mg}{2 \times \mu}$

With "a" representing the margin, "F" is determined by the following formula:

$$F = \frac{mg}{2 \times \mu} \times a$$

"Gripping force at least 10 to 20 times the workpiece weight"

- The "10 to 20 times or more of the workpiece weight" recommended by SMC is calculated with a margin of "a" = 4, which allows for impacts that occur during normal transportation, etc.

When μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \dfrac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
10 x Workpiece weight	20 x Workpiece weight

<Reference> Coefficient of friction μ (depends on the operating environment, contact pressure, etc.)

Coefficient of friction μ	Attachment – Material of workpieces (guideline)
0.1	Metal (surface roughness Rz3.2 or less)
0.2	Metal
0.2 or more	Rubber, Resin, etc.

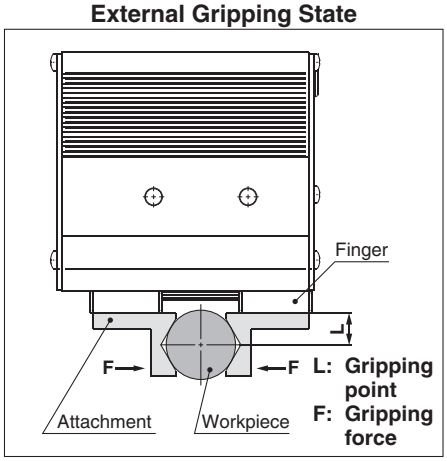
Note) • Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration or impact forces are encountered during motion, a further margin should be considered.

Selection Procedure

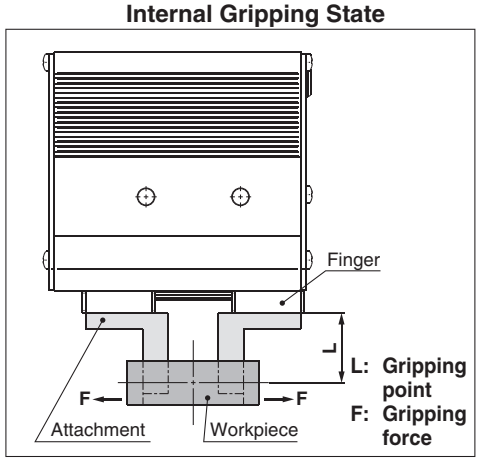
Step 1 Check the gripping force: Series LEHF

- **Indication of gripping force**
  Gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.
- Set the workpiece gripping point "L" so that it is within the range shown in the figure below.

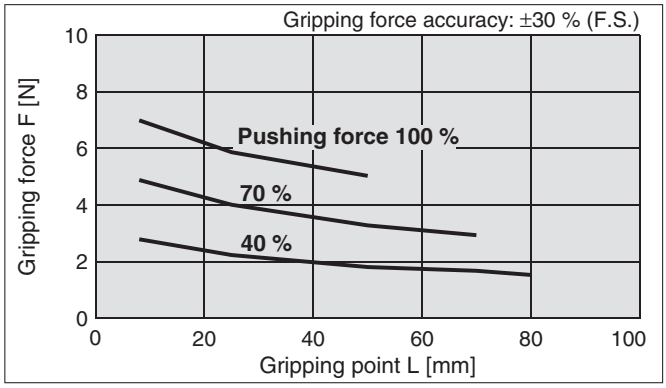
External Gripping State



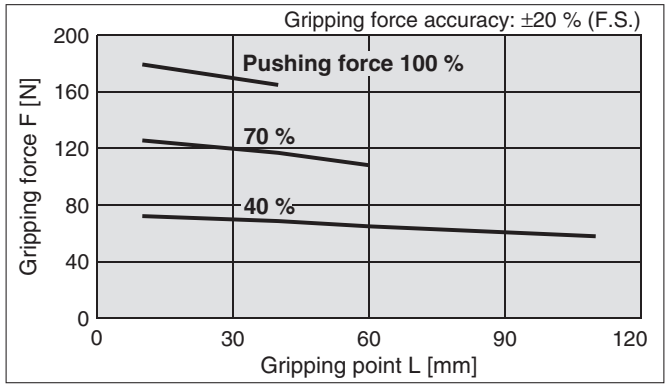
Internal Gripping State



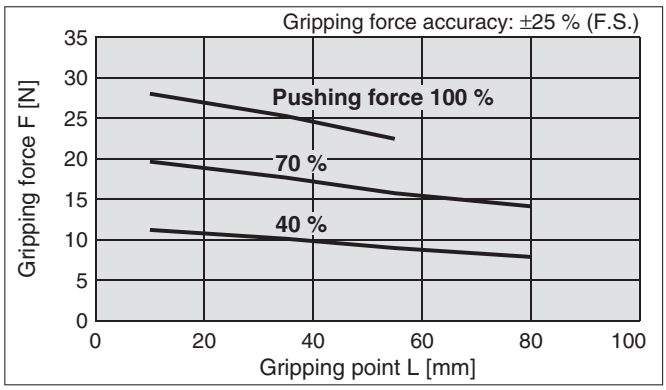
LEHF10



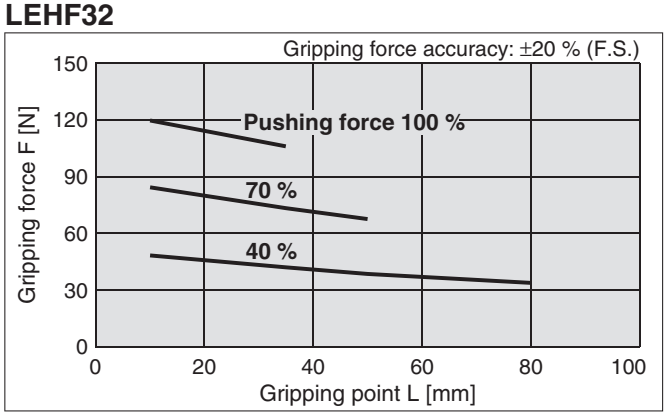
LEHF40



LEHF20

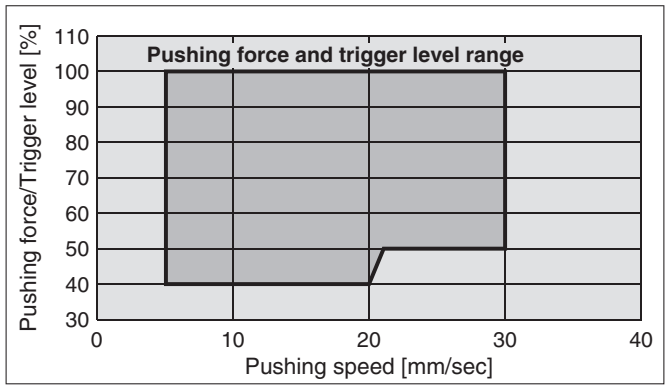


LEHF32



Selection of Pushing Speed

- Set the [Pushing force] and the [Trigger LV] within the range shown in the figure below.



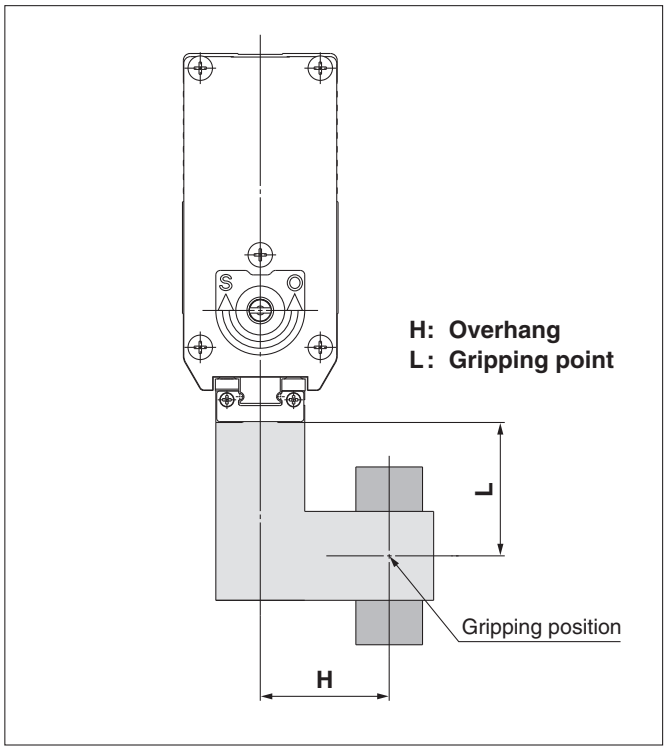
∗ Pushing force is one of the values of step data that is input into the controller.

Selection Procedure

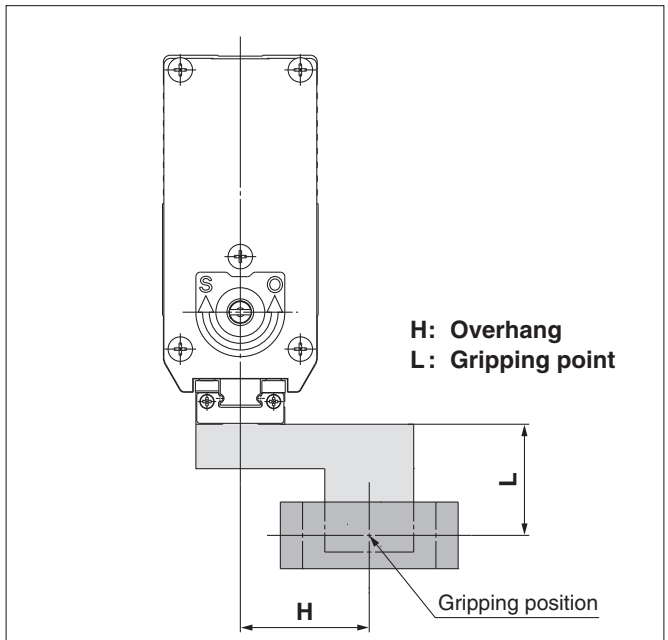
Step 2 Check the gripping point and overhang: Series LEHF

- Decide the gripping position of the workpiece so that the amount of overhang "H" stays within the range shown in the figure below.
- If the gripping position is out of the limit, it may shorten the life of the electric gripper.

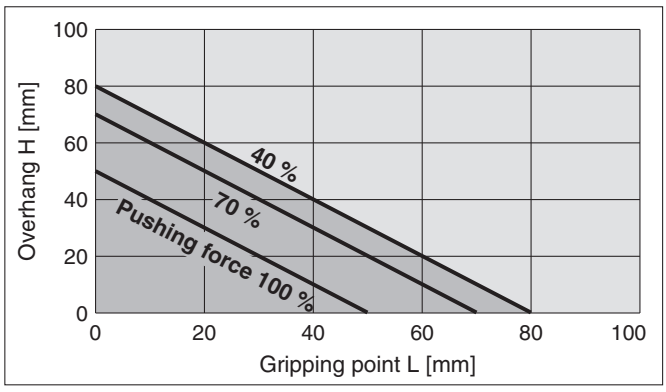
External Gripping State



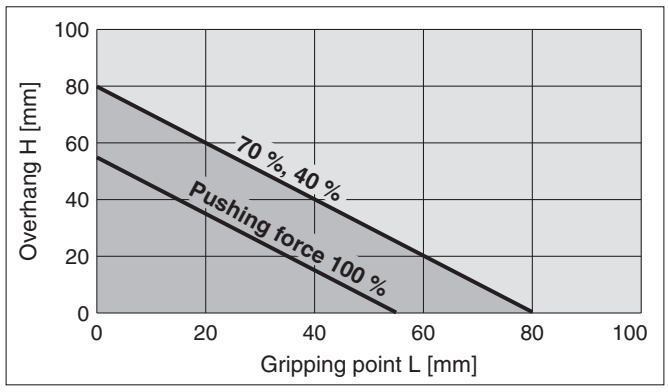
Internal Gripping State



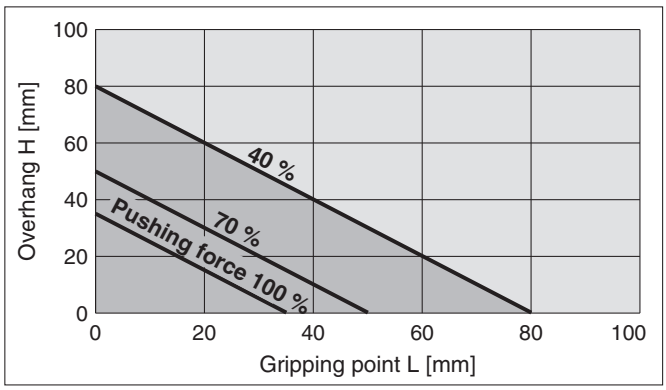
LEHF10



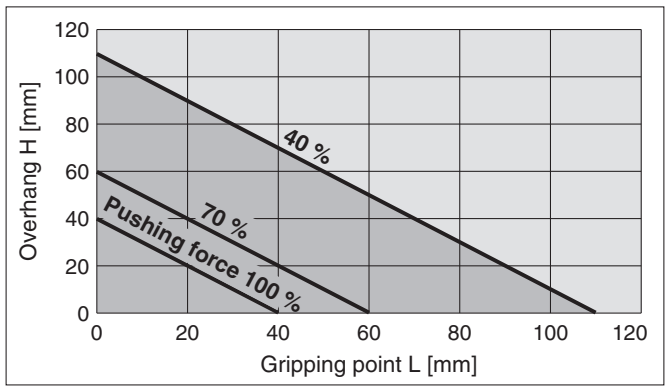
LEHF20



LEHF32

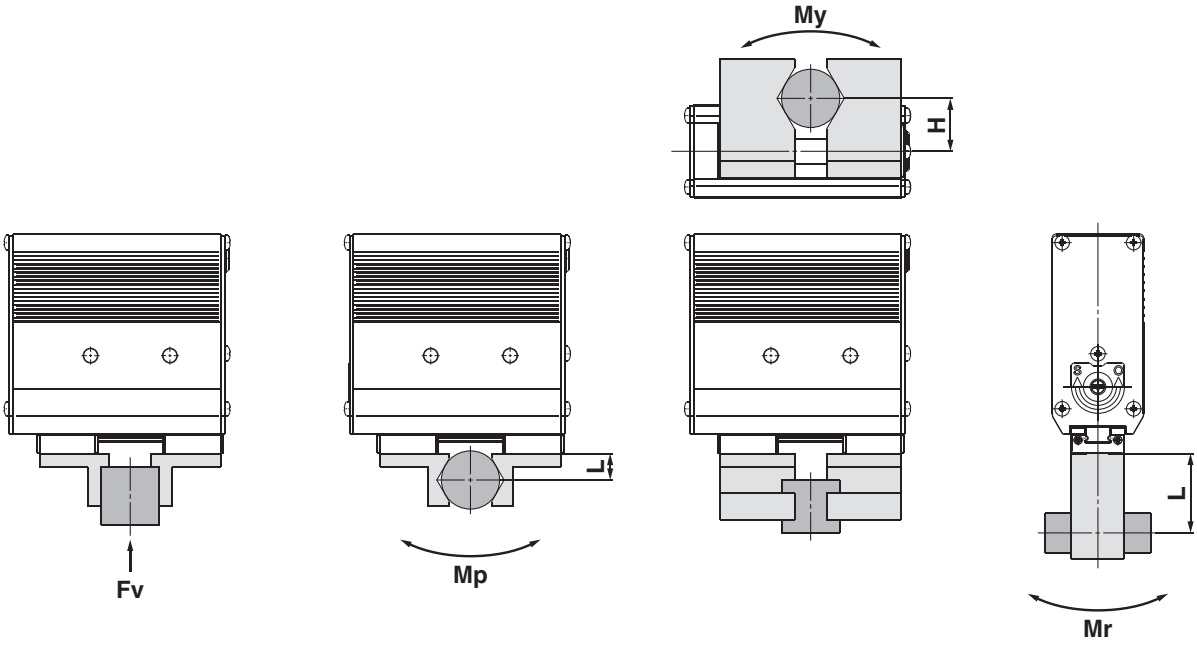


LEHF40



∗ Pushing force is one of the values of step data that is input into the controller.

Step 3 Check the external force on fingers: Series LEHF



Fv: Allowable vertical load **Mp: Pitch moment** **My: Yaw moment** **Mr: Roll moment**

H, L: Distance to the point at which the load is applied [mm]

Model	Allowable vertical load Fv [N]	Static allowable moment		
		Pitch moment: Mp [N·m]	Yaw moment: My [N·m]	Roll moment: Mr [N·m]
LEHF10K2-□	58	0.26	0.26	0.53
LEHF20K2-□	98	0.68	0.68	1.4
LEHF32K2-□	176	1.4	1.4	2.8
LEHF40K2-□	294	2	2	4

Note) Values for load in the table indicate static values.

Calculation of allowable external force (when moment load is applied)	Calculation example
Allowable load F (N) = $\dfrac{\text{M (Static allowable moment) (N·m)}}{\text{L x } 10^{-3}\ *}$ (* Constant for unit conversion)	When a static load of f = 10 N is operating, which applies pitch moment to point L = 30 mm from the LEHF20K2-□ guide. Therefore, it can be used. **Allowable load F =** $\dfrac{0.68}{30 \times 10^{-3}}$ **= 22.7 (N)** **Load f = 10 (N) < 22.7 (N)**

Electric Gripper 2-Finger Type

Step Motor (Servo/24 VDC)

Series LEHF

LEHF10, 20, 32, 40

EtherNet/IP™ DeviceNet™ PROFINET IO-Link EtherCAT® Compatible ▶Page 86

Multi-Axis Step Motor Controller Compatible ▶Page 96

How to Order

LEHF 10 K 2 – 16 □ – S 1 6P 1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Size

10
20
32
40

❷ Lead

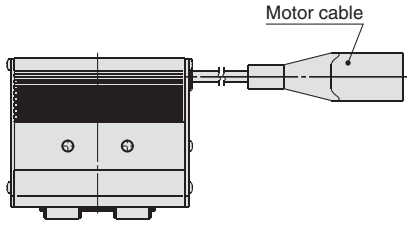
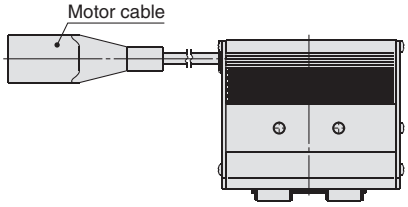
K	Basic

❸ 2-finger type

❹ Stroke [mm]

Stroke/both sides		Size
Basic	Long stroke	
16	32	10
24	48	20
32	64	32
40	80	40

❺ Motor cable entry

—	Basic (Entry on the right side) 
L	Entry on the left side 

⚠Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.

The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to 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 conformity to the EMC directive for the machinery and equipment as a whole.

[UL-compliant products]

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

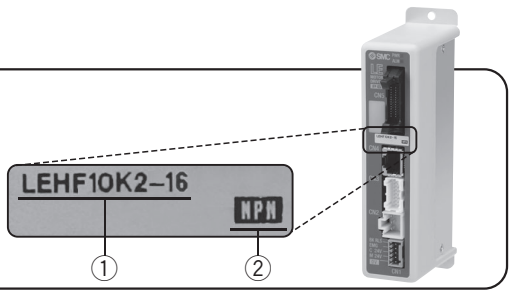
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.

② Check Parallel I/O configuration matches (NPN or PNP).



∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smc.eu

❻ Actuator cable type*1

—	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)*2

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

❼ Actuator cable length [m]

—	Without cable
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 23.

❽ Controller/Driver type*1

—	Without controller/driver	
6N	**LECP6** (Step data input type)	NPN
6P		PNP
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA***2 (Pulse input type)	NPN
AP		PNP

*1 For details about controllers/driver and compatible motors, refer to the compatible controllers/driver below.
*2 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 81 separately.

❾ I/O cable length [m]*1

—	Without cable
1	1.5
3	3*2
5	5*2

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 61 (For LECP6), page 74 (For LECP1) or page 81 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

❿ Controller/Driver mounting

—	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 56.)

Compatible Controllers/Driver

Type	Step data input type	Programless type	Pulse input type
Series	**LECP6**	**LECP1**	**LECPA**
Features	Value (Step data) input Standard controller	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points	14 points	—
Power supply voltage	24 VDC		
Reference page	Page 55	Page 68	Page 75

Specifications

Model			LEHF10	LEHF20	LEHF32	LEHF40
Actuator specifications	Opening/closing stroke (Both sides)	Basic	16	24	32	40
		Long stroke	32	48	64	80
	Gripping force [N] Note 1) Note 3)		3 to 7	11 to 28	48 to 120	72 to 180
	Opening and closing speed/Pushing speed [mm/s] Note 2) Note 3)		5 to 80/5 to 20	5 to 100/5 to 30		
	Drive method		Slide screw + Belt			
	Finger guide type		Linear guide (No circulation)			
	Repeated length measurement accuracy [mm] Note 4)		±0.05			
	Finger backlash/both sides [mm] Note 5)		0.5 or less			
	Repeatability [mm] Note 6)		±0.05			
	Positioning repeatability/one side [mm]		±0.1			
	Lost motion/one side [mm] Note 7)		0.3 or less			
	Impact/Vibration resistance [m/s²] Note 8)		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
	Weight [g]	Basic	340	610	1625	1980
		Long stroke	370	750	1970	2500
Electric specifications	Motor size		□20	□28	□42	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10 %			
	Power consumption/Standby power consumption when operating [W] Note 9)		11/7	28/15	34/13	36/13
	Max. instantaneous power consumption [W] Note 10)		19	51	57	61

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Positioning force should be 150 % when releasing the workpiece. Gripping force accuracy should be ±30 % (F.S.) for LEHZ10/16, ±25 % (F.S.) for LEHZ20/25 and ±20 % (F.S.) for LEHZ32/40. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing speed and pushing speed are for both fingers. The speed for one finger is half this value.

Note 3) The speed and force may change depending on the cable length, load and mounting conditions.
Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10 % for each 5 m. (At 15 m: Reduced by up to 20 %)

Note 4) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 5) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

Note 6) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.

Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

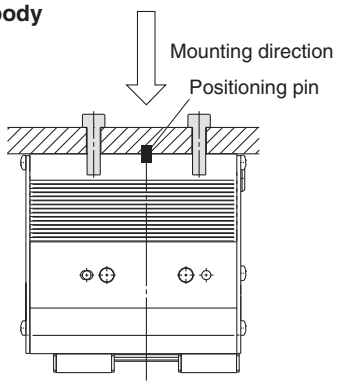
Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

Note 9) The power consumption (including the controller) is for when the gripper is operating.
The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.

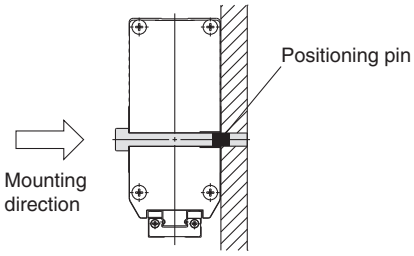
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

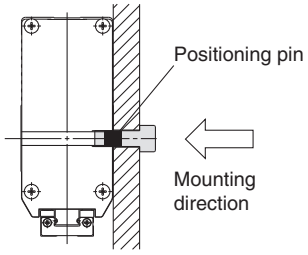
a) When using the thread on the body



b) When using the thread on the mounting plate

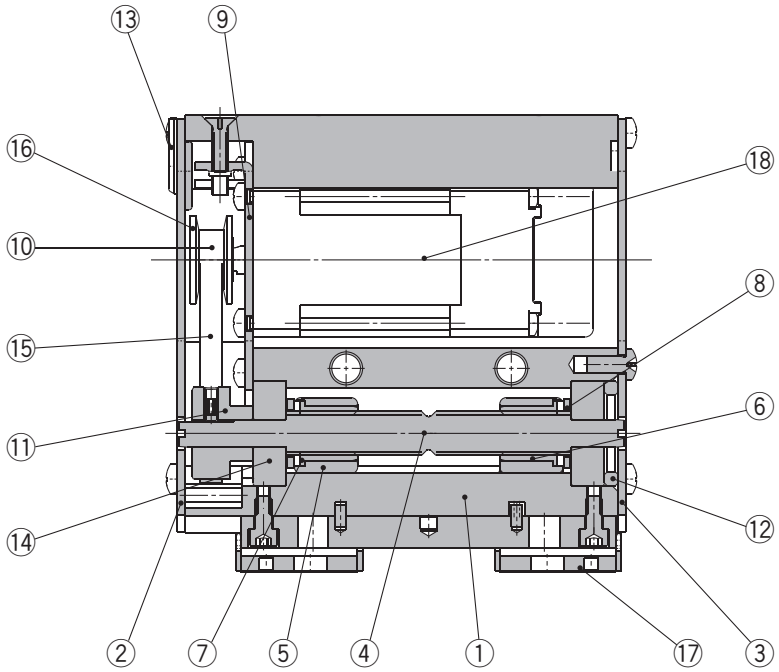


c) When using the thread on the back of the body



Construction

Series LEHF

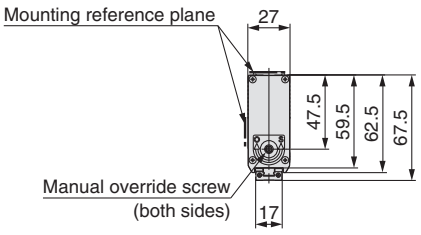


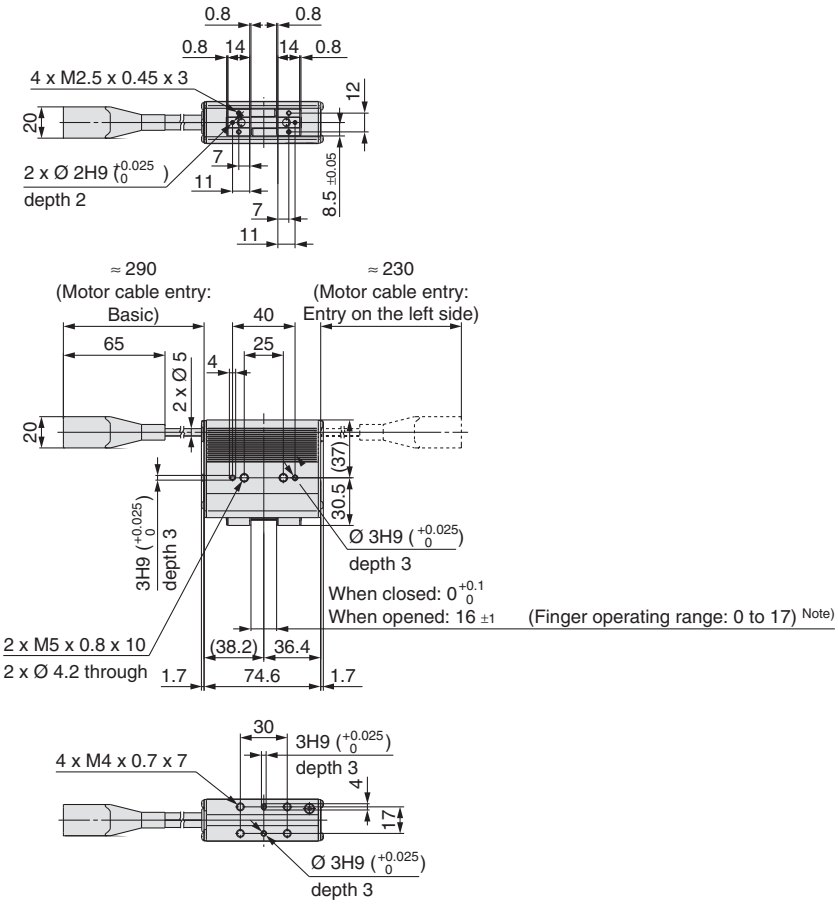
Component Parts

No.	Description	Material	Note
1	**Body**	Aluminium alloy	Anodised
2	**Side plate A**	Aluminium alloy	Anodised
3	**Side plate B**	Aluminium alloy	Anodised
4	**Slide shaft**	Stainless steel	Heat treatment + Special treatment
5	**Slide bushing**	Stainless steel	
6	**Slide nut**	Stainless steel	Heat treatment + Special treatment
7	**Slide nut**	Stainless steel	Heat treatment + Special treatment
8	**Fixed plate**	Stainless steel	
9	**Motor plate**	Carbon steel	
10	**Pulley A**	Aluminium alloy	
11	**Pulley B**	Aluminium alloy	
12	**Bearing stopper**	Aluminium alloy	
13	**Rubber bushing**	NBR	
14	**Bearing**	—	
15	**Belt**	—	
16	**Flange**	—	
17	**Finger assembly**	—	
18	**Step motor (Servo/24 VDC)**	—	

Dimensions

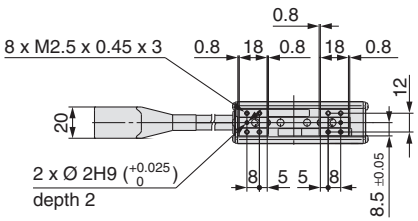
LEHF10K2-16: Basic

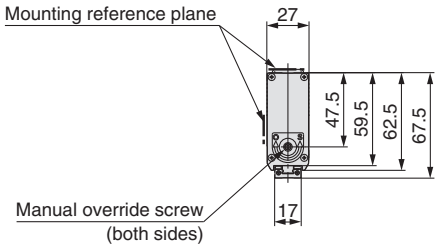


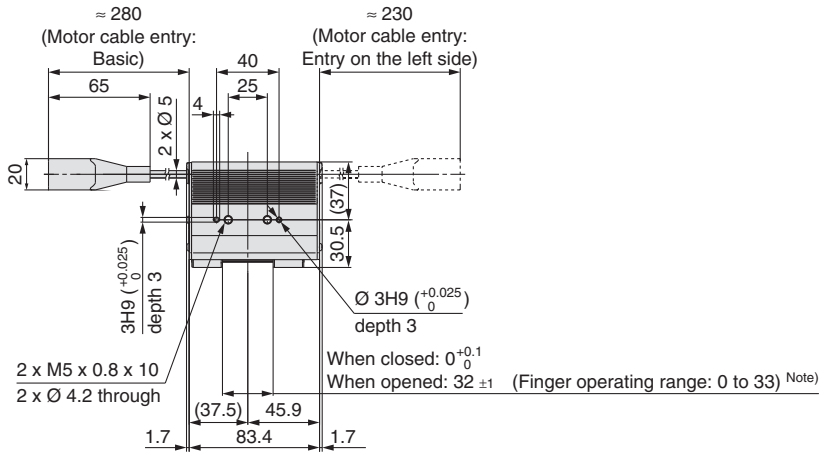


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

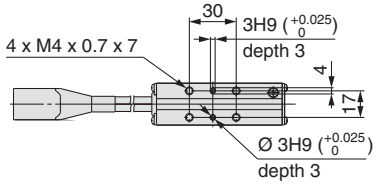
LEHF10K2-32: Long Stroke





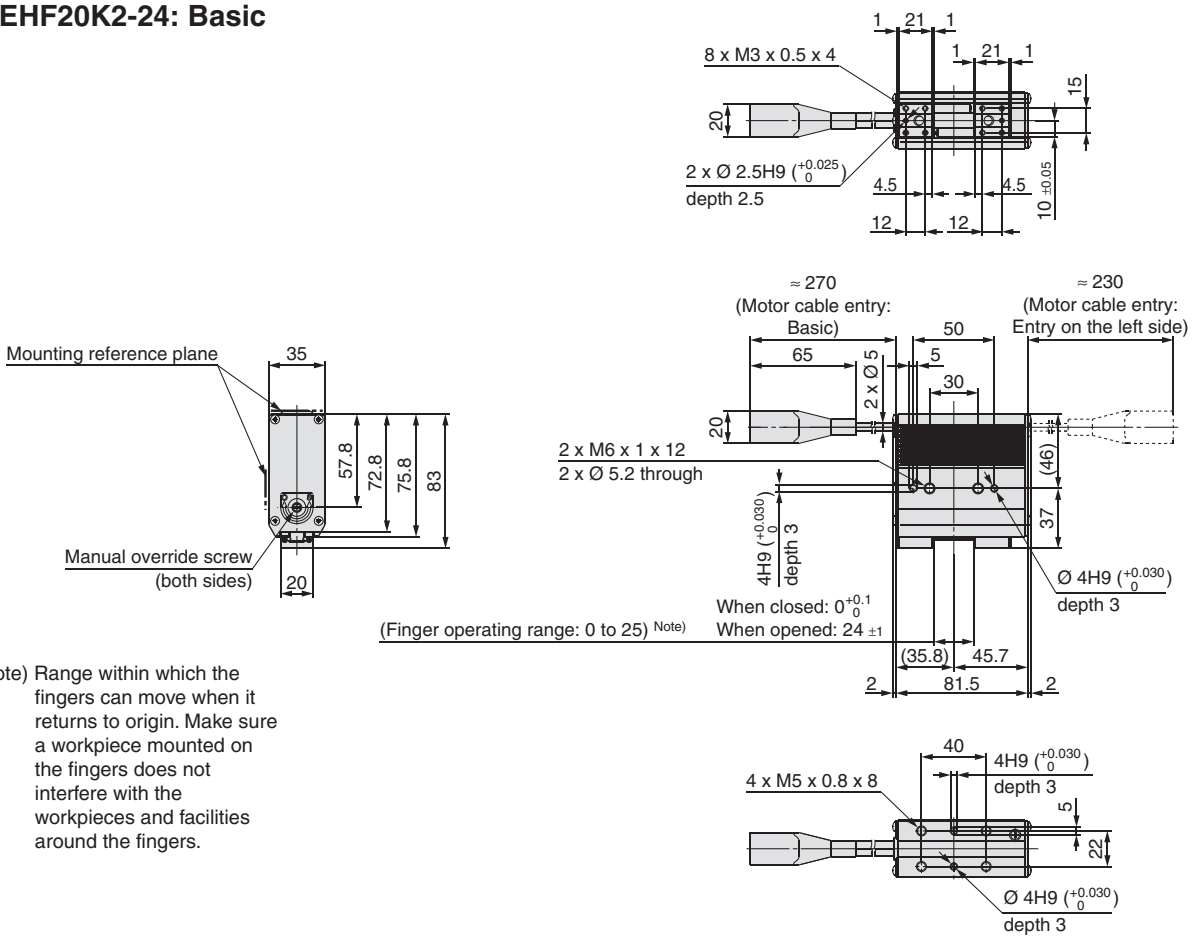


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.



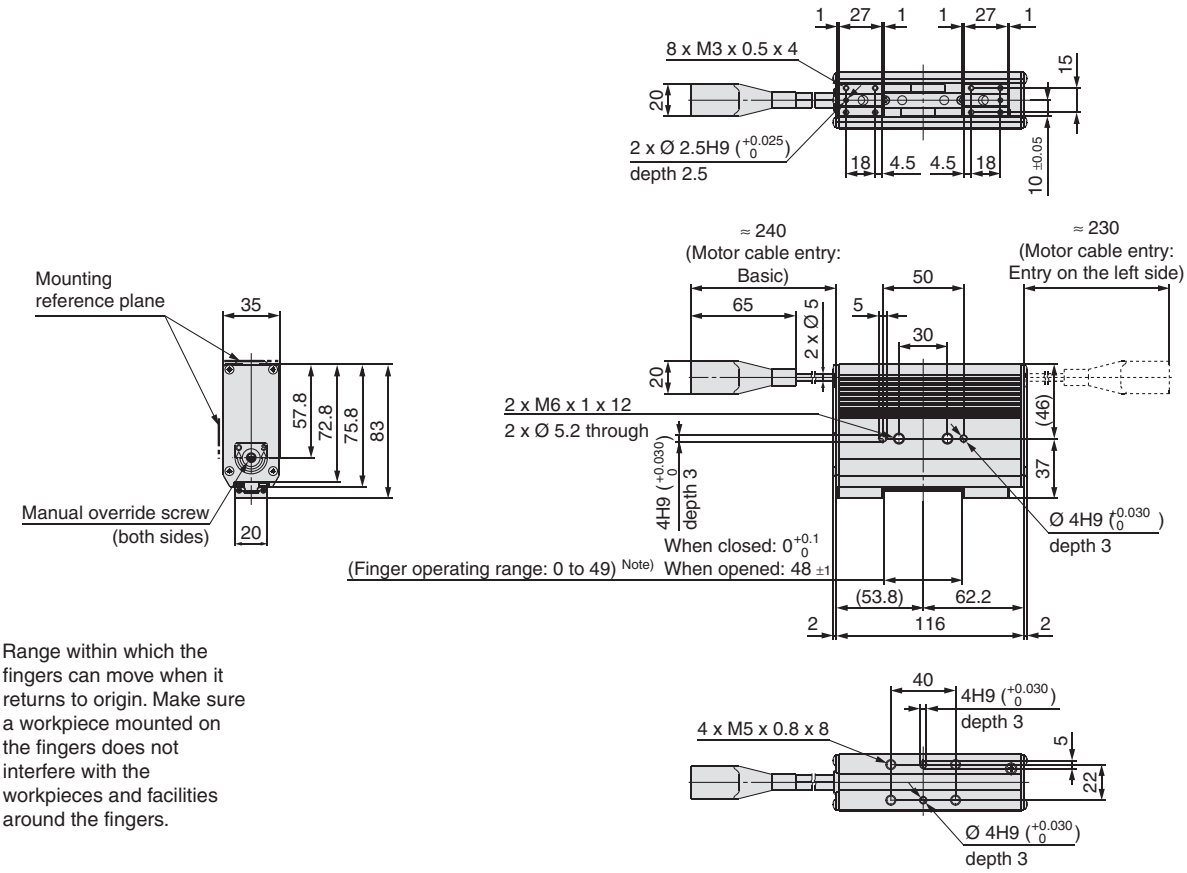
Dimensions

LEHF20K2-24: Basic



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

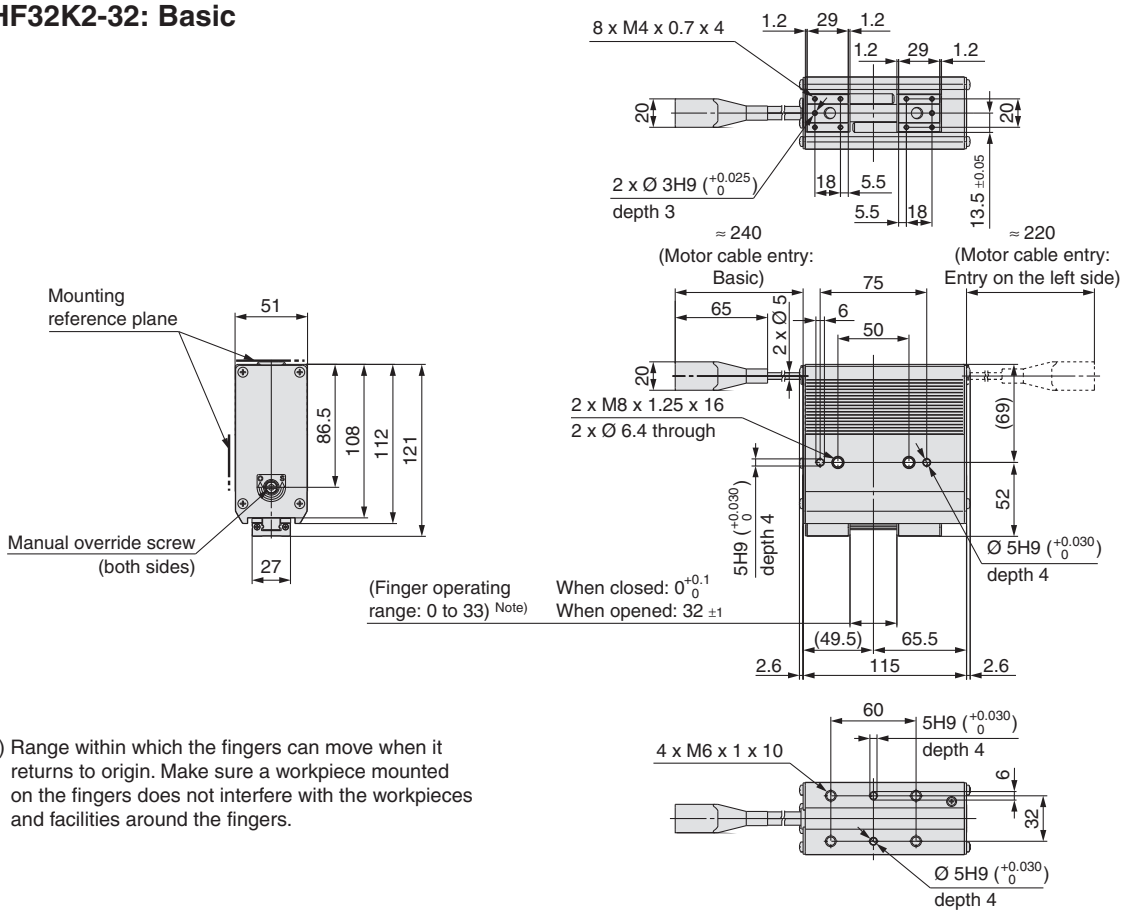
LEHF20K2-48: Long Stroke



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

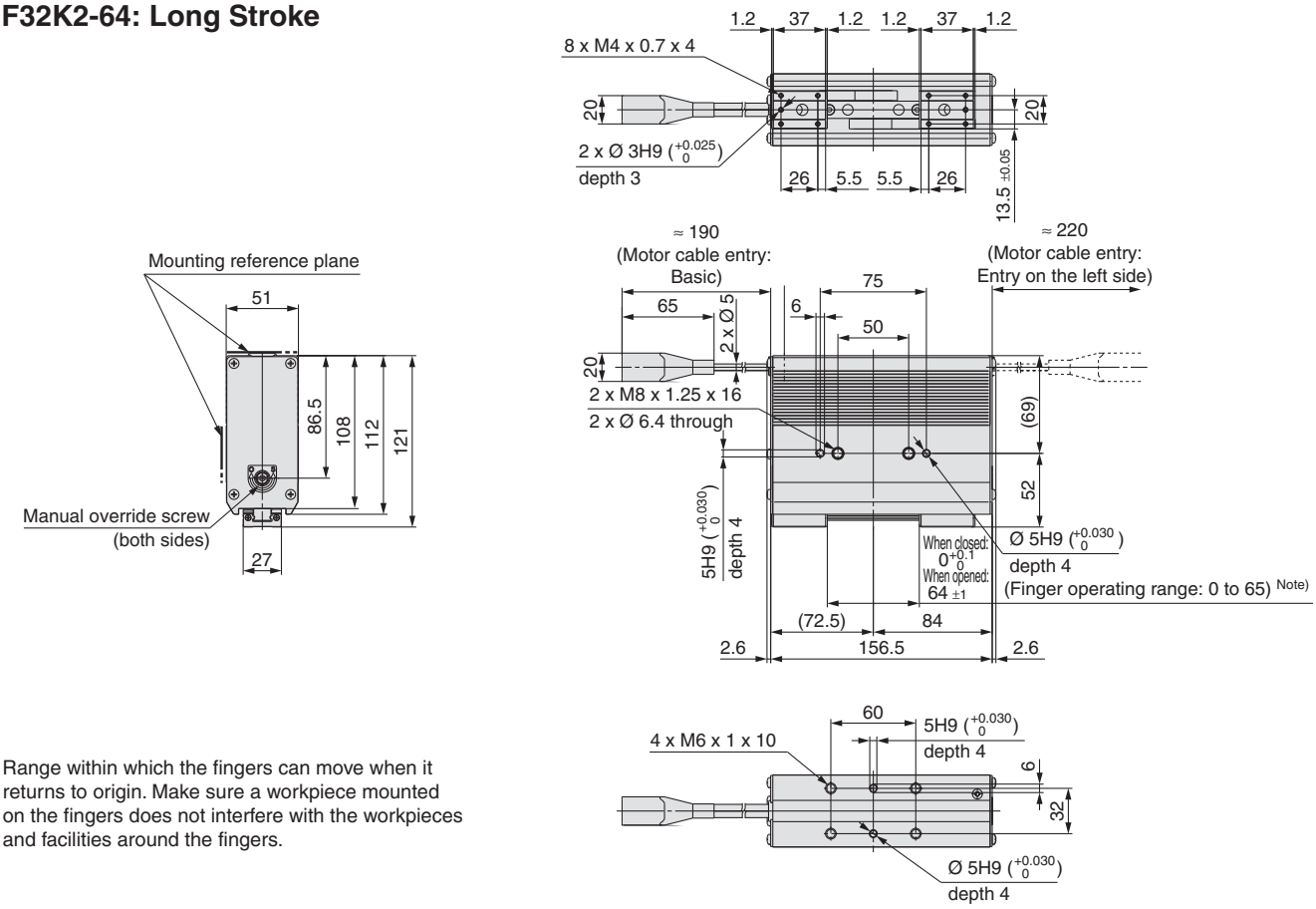
Dimensions

LEHF32K2-32: Basic



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

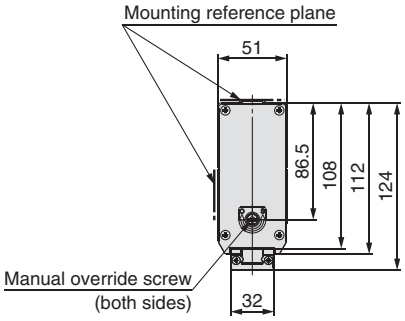
LEHF32K2-64: Long Stroke

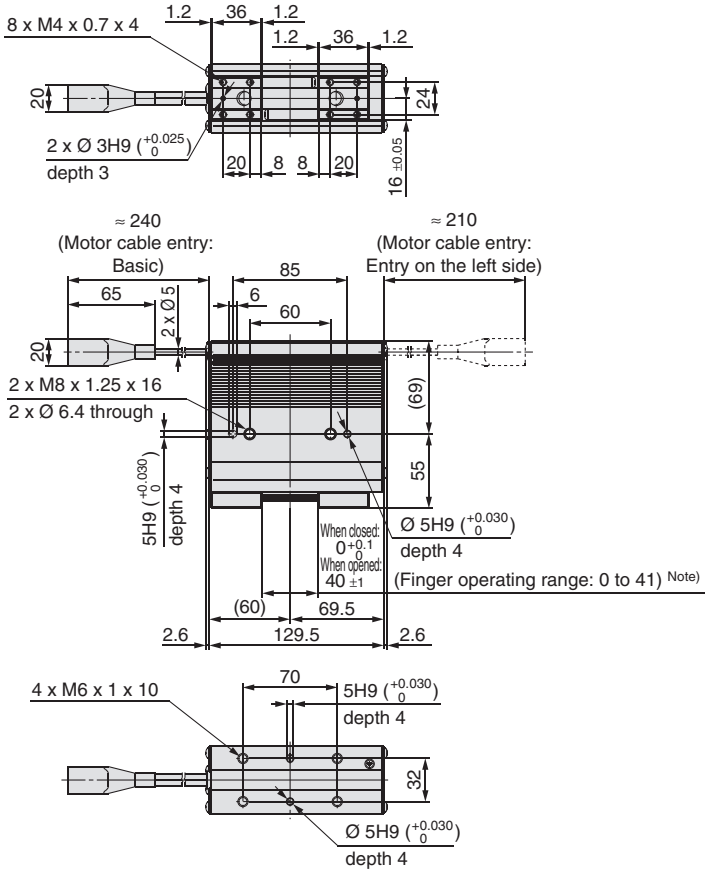


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

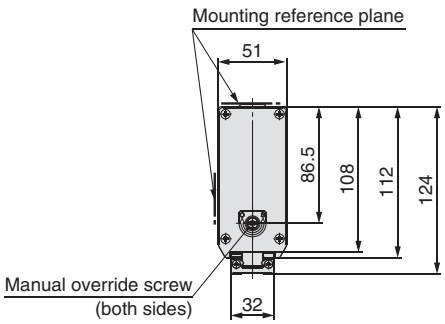
LEHF40K2-40: Basic

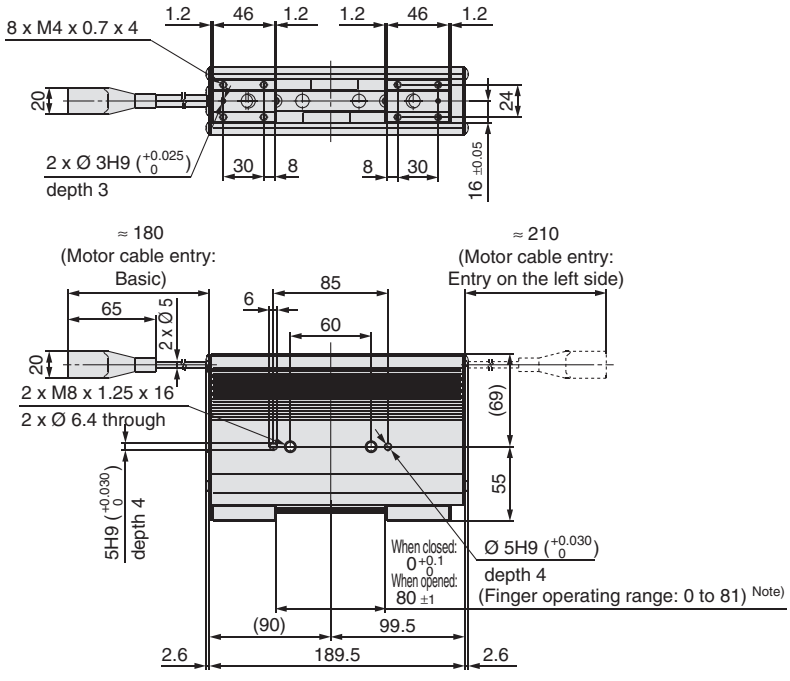


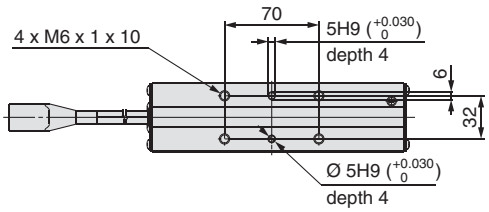


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHF40K2-80: Long Stroke

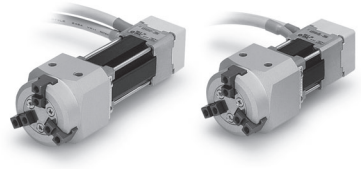






Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Model Selection



Selection Procedure

Step **Check the gripping force.**

Check the conditions. → Calculate the required gripping force. → Select the model from gripping force graph. → Select the pushing speed.

Example

Workpiece mass: 0.1 kg

Guidelines for the selection of the gripper with respect to workpiece mass

- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 7 to 13 times Note) the workpiece weight, or more.

Note) For details, refer to the calculation of required gripping force.

- If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

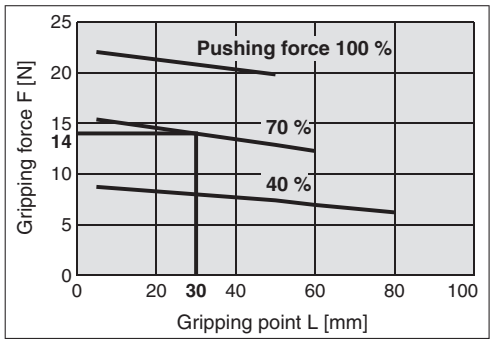
Example) When it is desired to set the gripping force at 13 times or more above the workpiece weight.

Required gripping force
= 0.1 kg x 13 x 9.8 m/s^2 ≈ 12.7 N or more

Pushing force: 70 %

Gripping point distance: 30 mm

LEHS20

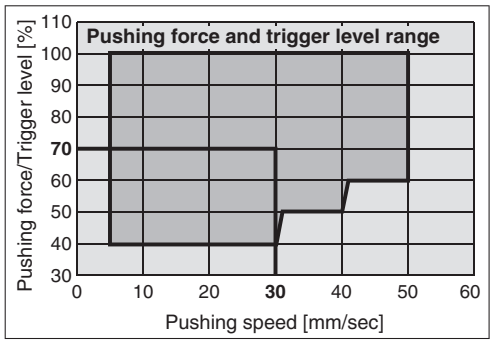


When the LEHS20 is selected.

- A gripping force of 14 N is obtained from the intersection point of gripping point distance L = 30 mm and pushing force of 70 %.
- Gripping force is 14 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 13 times or more.

Pushing speed: 30 mm/sec

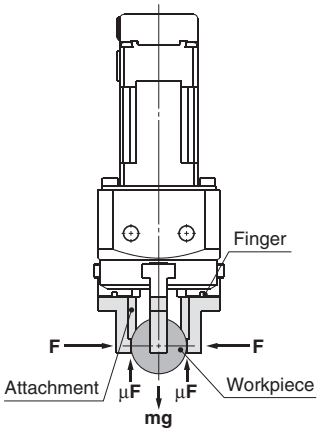
LEHS20



- Pushing speed is satisfied at the point where 70 % of the pushing force and 30 mm/sec of the pushing speed cross.

Note) Confirm the pushing speed range from the determined pushing force [%].

Calculation of required gripping force



When gripping a workpiece as in the figure to the left, and with the following definitions,

F: Gripping force [N]
μ: Coefficient of friction between the attachments and the workpiece
m: Workpiece mass [kg]
g: Gravitational acceleration (= 9.8 m/s^2)
mg: Workpiece weight [N]

the conditions under which the workpiece will not drop are

$$\underbrace{3}_{\text{Number of fingers}} \times \mu F > mg$$

and therefore, $F > \dfrac{mg}{3 \times \mu}$

With "a" representing the margin, "F" is determined by the following formula:

$$F = \frac{mg}{3 \times \mu} \times a$$

"Gripping force at least 7 to 13 times the workpiece weight"

- The "7 to 13 times or more of the workpiece weight" recommended by SMC is calculated with a margin of "a" = 4, which allows for impacts that occur during normal transportation, etc.

When μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{3 \times 0.2} \times 4 = 6.7 \times mg$	$F = \dfrac{mg}{3 \times 0.1} \times 4 = 13.3 \times mg$
7 x Workpiece weight	13 x Workpiece weight

<Reference> Coefficient of friction μ (depends on the operating environment, contact pressure, etc.)

Coefficient of friction μ	Attachment – Material of workpieces (guideline)
0.1	Metal (surface roughness Rz3.2 or less)
0.2	Metal
0.2 or more	Rubber, Resin, etc.

Note) • Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 7 to 13 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration or impact forces are encountered during motion, a further margin should be considered.

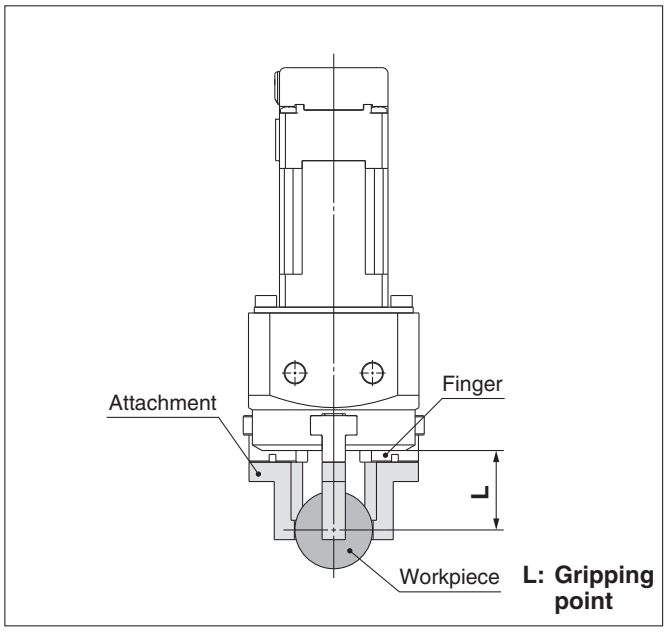
Selection Procedure

Step Check the gripping force: Series LEHS

● **Indication of gripping force**
The gripping force shown in the graphs on page 42 is expressed as “F”, which is the gripping force of one finger, when three fingers and attachments are in full contact with the workpiece as shown in the figure below.

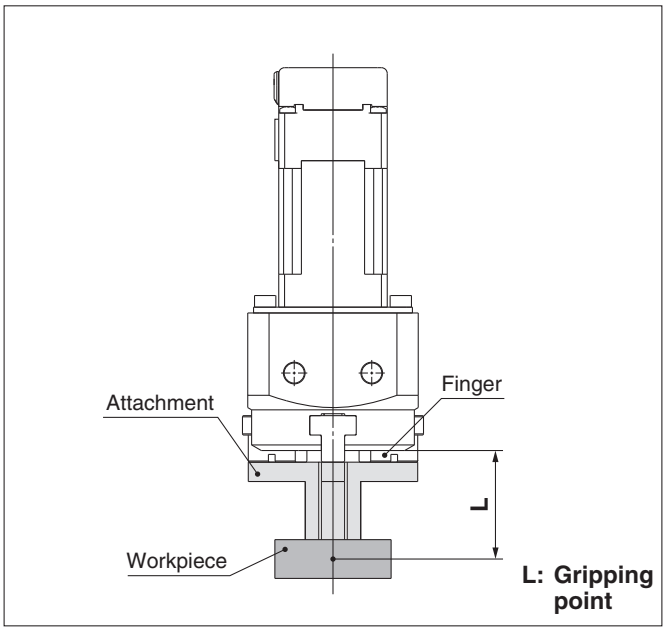
● Set the workpiece gripping point “L” so that it is within the range shown in the figure below.

External Gripping State

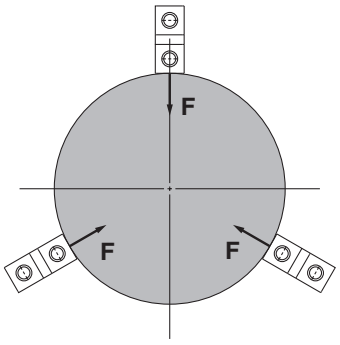


L: Gripping point

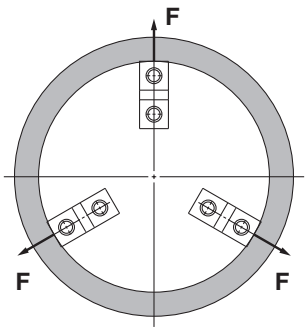
Internal Gripping State



L: Gripping point



F: Gripping force



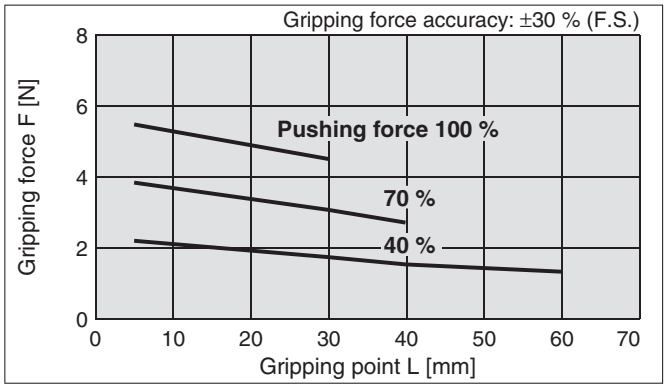
F: Gripping force

Step Check the gripping force: Series LEHS

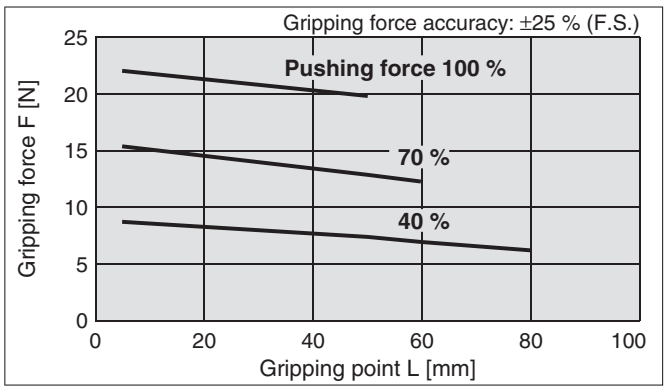
Basic

∗ Pushing force is one of the values of step data that is input into the controller.

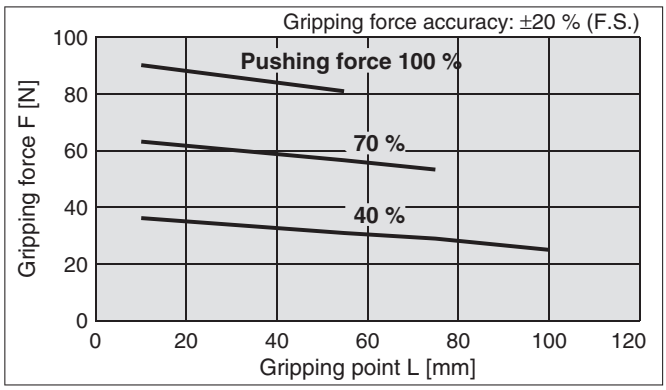
LEHS10



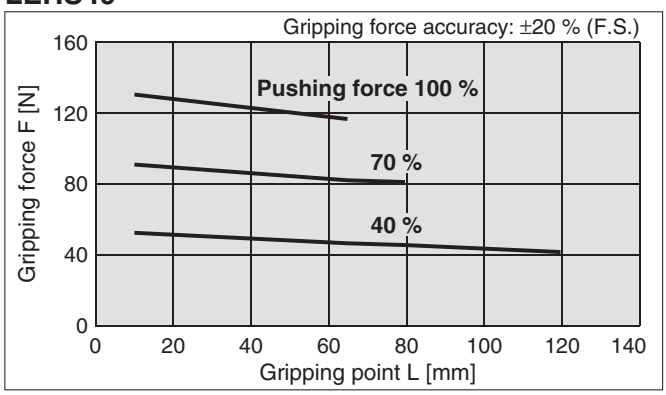
LEHS20



LEHS32



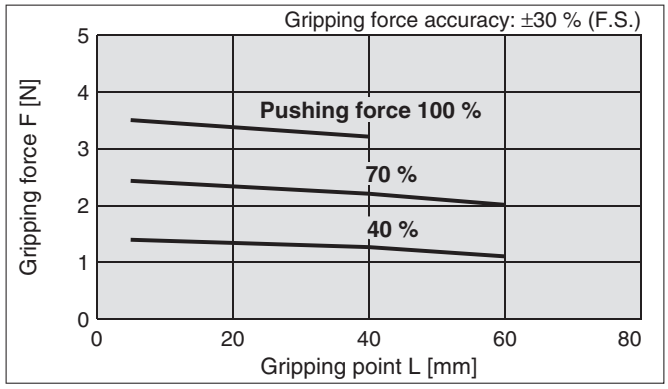
LEHS40



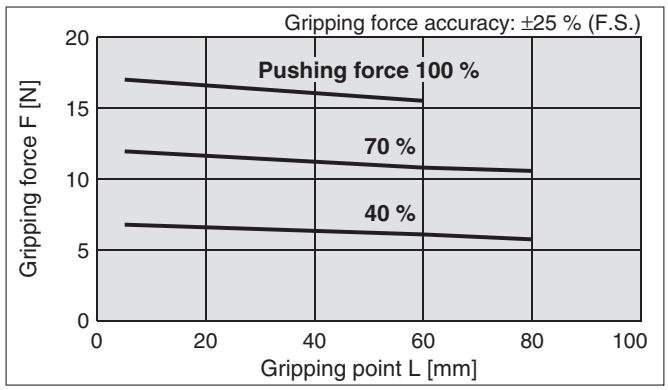
Compact

∗ Pushing force is one of the values of step data that is input into the controller.

LEHS10L



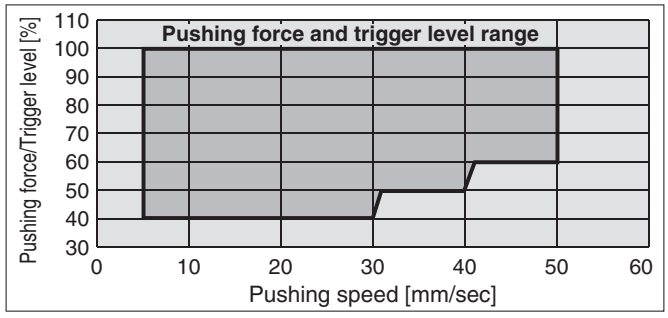
LEHS20L



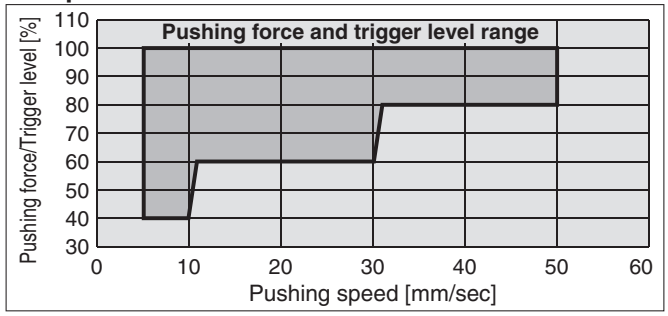
Selection of Pushing Speed

● Set the [Pushing force] and the [Trigger LV] within the range shown in the figure below.

Basic



Compact



Electric Gripper 3-Finger Type

Step Motor (Servo/24 VDC)

Series LEHS

LEHS10, 20, 32, 40

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

Compatible ▶ Page 86

Multi-Axis Step Motor Controller Compatible ▶ Page 96

How to Order

LEHS 10 □ K 3 – 4 □ – S 1 6P 1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

❶ Size

10
20
32
40

❷ Motor size

—	Basic
L Note)	Compact

Note) Size: 10, 20 only

❸ Lead

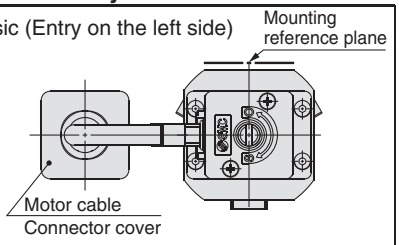
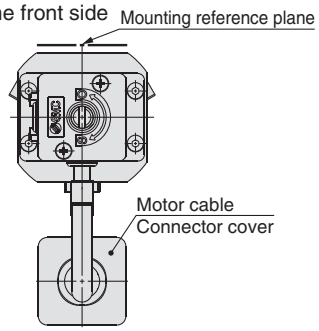
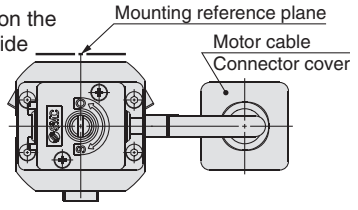
K	Basic

❹ 3-finger type

❺ Stroke [mm]

Stroke/diameter	Size
4	10
6	20
8	32
12	40

❻ Motor cable entry

—	Basic (Entry on the left side) 
F	Entry on the front side 
R	Entry on the right side 

⚠ Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.

The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to 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 conformity to the EMC directive for the machinery and equipment as a whole.

[UL-compliant products]

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

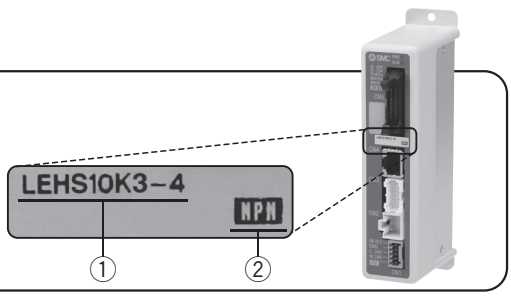
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.

② Check Parallel I/O configuration matches (NPN or PNP).



∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smc.eu

SMC

❼ Actuator cable type*1

—	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)*2

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

❽ Actuator cable length [m]

—	Without cable
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 45.

❾ Controller/Driver type*1

—	Without controller/driver	
6N	**LECP6** (Step data input type)	NPN
6P		PNP
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA***2 (Pulse input type)	NPN
AP		PNP

*1 For details about controllers/driver and compatible motors, refer to the compatible controllers/driver below.
*2 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 81 separately.

❿ I/O cable length [m]*1

—	Without cable
1	1.5
3	3*2
5	5*2

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 61 (For LECP6), page 74 (For LECP1) or page 81 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

⓫ Controller/Driver mounting

—	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 56.)

Compatible Controllers/Driver

Type	Step data input type	Programless type	Pulse input type
Series	**LECP6**	**LECP1**	**LECPA**
Features	Value (Step data) input Standard controller	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points	14 points	—
Power supply voltage	24 VDC		
Reference page	Page 55	Page 68	Page 75

Specifications

Model			LEHS10	LEHS20	LEHS32	LEHS40
Actuator specifications	Opening/closing stroke (diameter)		4	6	8	12
	Gripping force [N] Note 1) Note 3)	Basic	2.2 to 5.5	9 to 22	36 to 90	52 to 130
		Compact	1.4 to 3.5	7 to 17	—	—
	Opening and closing speed/ Pushing speed [mm/s] Note 2) Note 3)		5 to 70/ 5 to 50	5 to 80/ 5 to 50	5 to 100/ 5 to 50	5 to 120/ 5 to 50
	Drive method		Slide screw + Wedge cam			
	Repeated length measurement accuracy [mm] Note 4)		±0.05			
	Finger backlash/both sides [mm] Note 5)		0.25 or less			
	Repeatability [mm] Note 6)		±0.02			
	Positioning repeatability/one side [mm]		±0.05			
	Lost motion/one side [mm] Note 7)		0.25 or less			
	Impact/Vibration resistance [m/s^2] Note 8)		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
	Weight [g]	Basic	185	410	975	1265
		Compact	150	345	—	—
Electric specifications	Motor size		□20	□28	□42	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10 %			
	Power consumption/ Standby power consumption when operating [W] Note 9)	Basic	11/7	28/15	34/13	36/13
		Compact	8/7	22/12	—	—
	Max. instantaneous power consumption [W] Note 10)	Basic	19	51	57	61
		Compact	14	42	—	—

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Positioning force should be 150 % when releasing the workpiece. Gripping force accuracy should be ±30 % (F.S.) for LEHZ10/16, ±25 % (F.S.) for LEHZ20/25 and ±20 % (F.S.) for LEHZ32/40. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing speed and pushing speed are for both fingers. The speed for one finger is half this value.

Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10 % for each 5 m. (At 15 m: Reduced by up to 20 %)

Note 4) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 5) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

Note 6) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.

Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

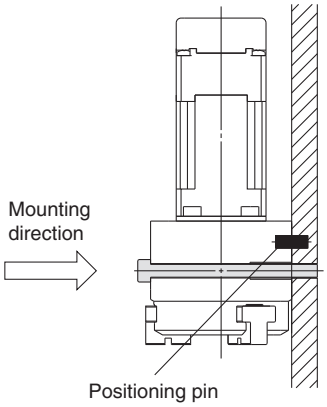
Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

Note 9) The power consumption (including the controller) is for when the gripper is operating.
The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.

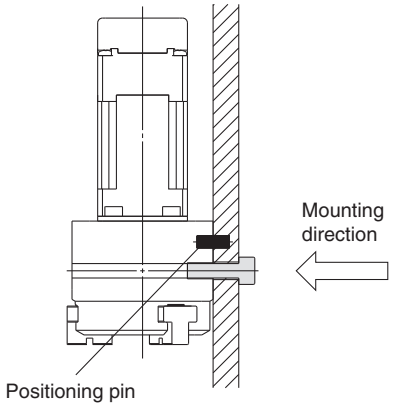
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

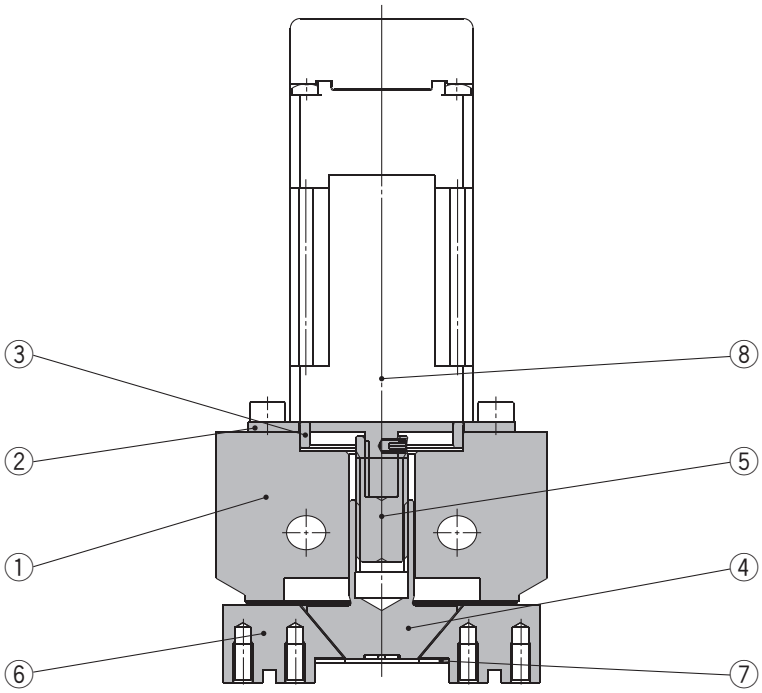
a) Mounting A type
(when using the thread on the mounting plate)



b) Mounting B type
(when using the thread on the back of the body)



Construction

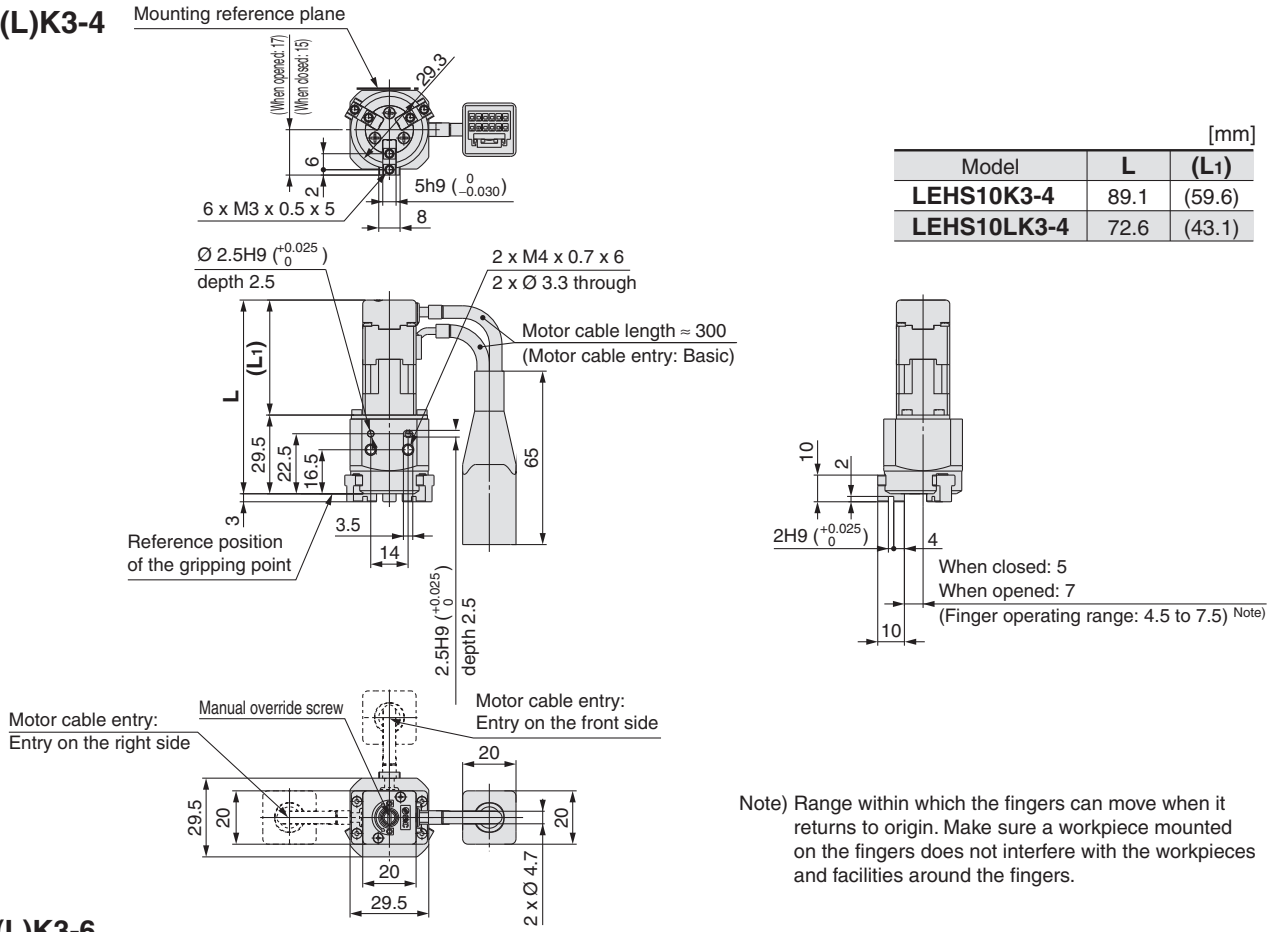


Component Parts

No.	Description	Material	Note
1	**Body**	Aluminium alloy	Anodised
2	**Motor plate**	Aluminium alloy	Anodised
3	**Guide ring**	Aluminium alloy	
4	**Slide cam**	Stainless steel	Heat treatment + Special treatement
5	**Slide bolt**	Stainless steel	Heat treatment + Special treatement
6	**Finger**	Carbon steel	Heat treatment + Special treatement
7	**End plate**	Stainless steel	
8	**Step motor (Servo/24 VDC)**		

Dimensions

LEHS10(L)K3-4

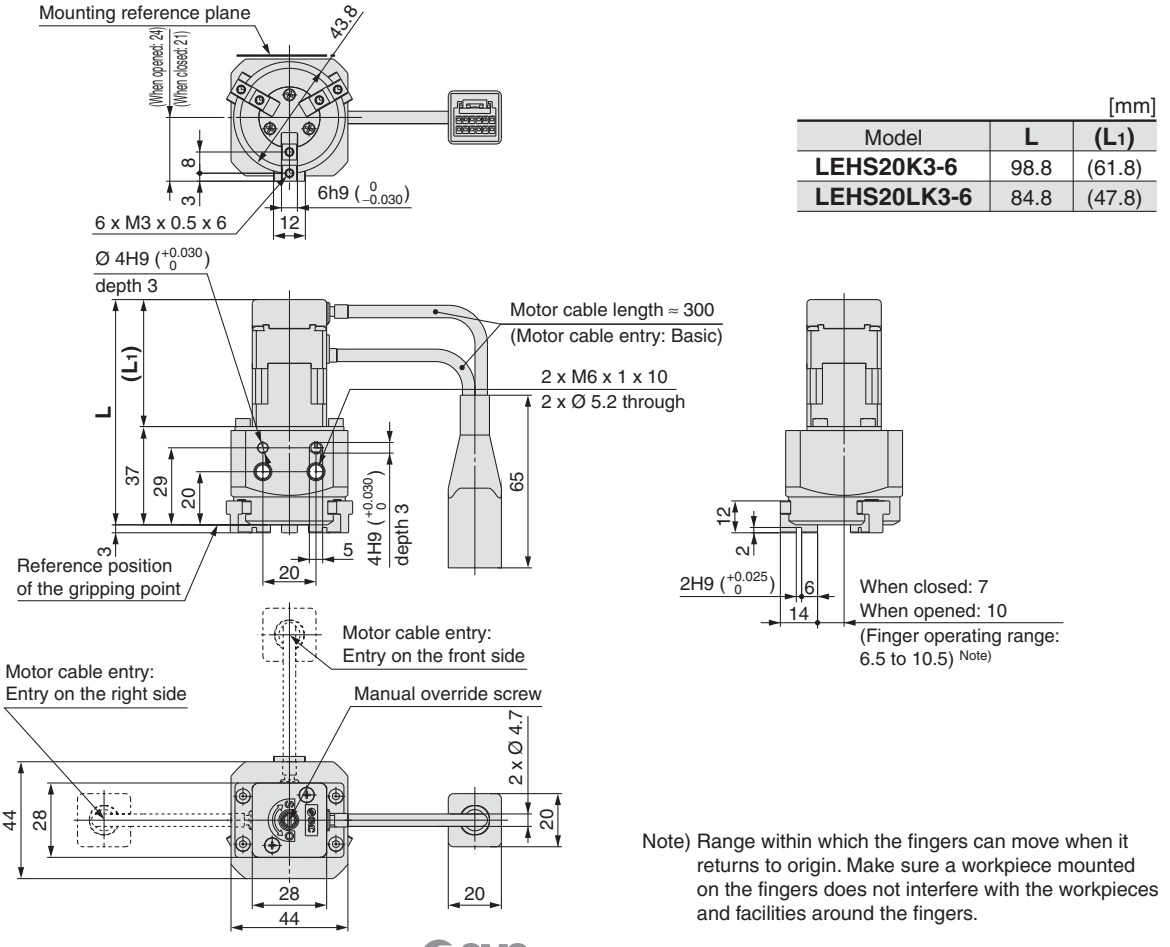


[mm]

Model	L	(L1)
LEHS10K3-4	89.1	(59.6)
LEHS10LK3-4	72.6	(43.1)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHS20(L)K3-6



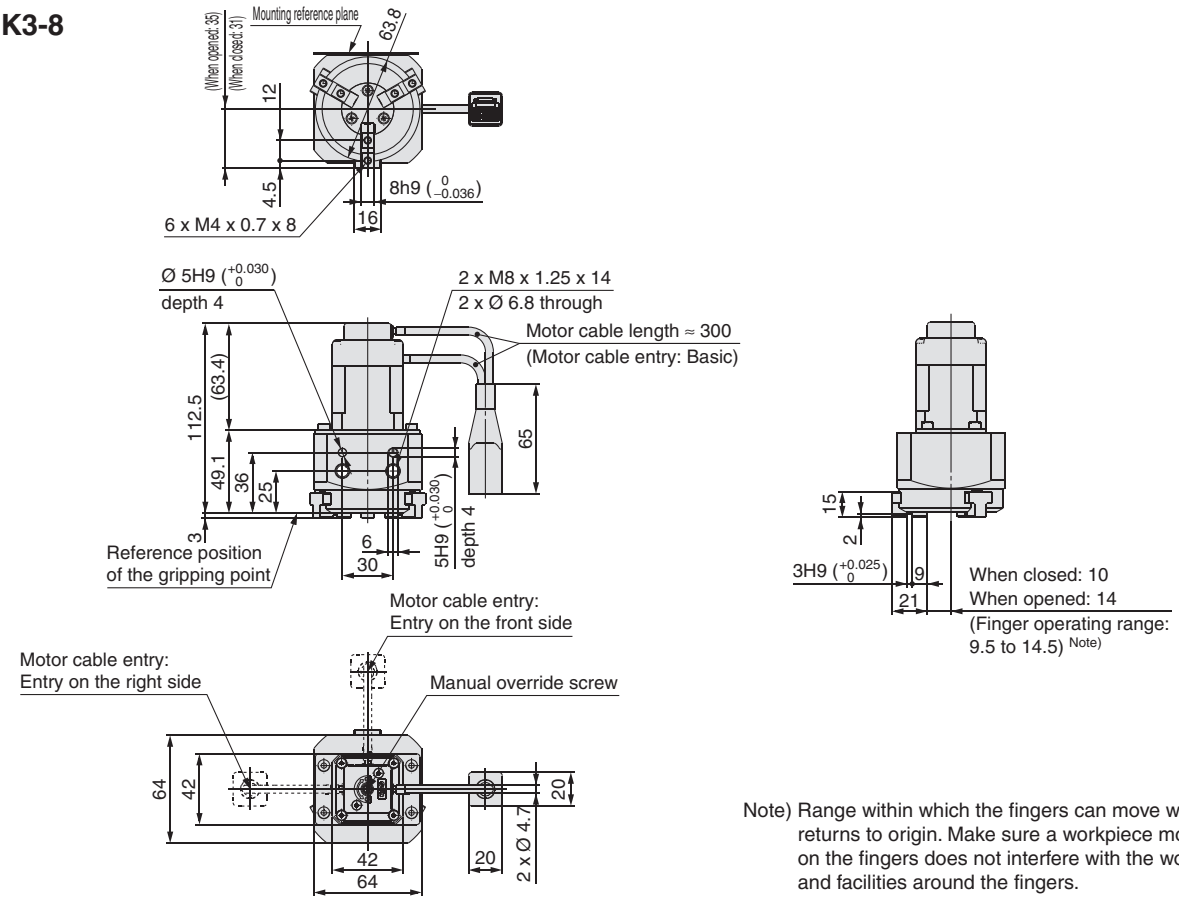
[mm]

Model	L	(L1)
LEHS20K3-6	98.8	(61.8)
LEHS20LK3-6	84.8	(47.8)

Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

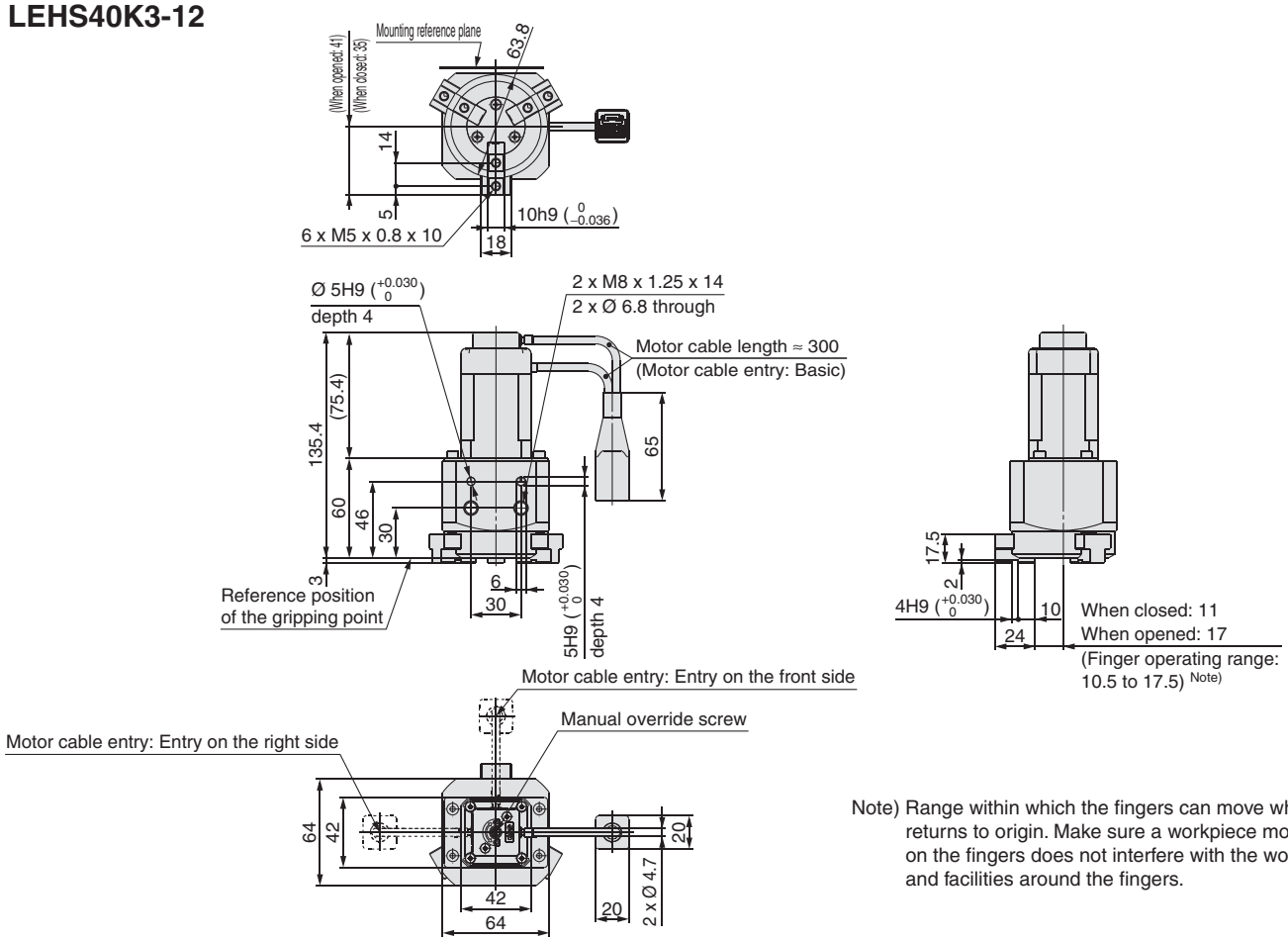
Dimensions

LEHS32K3-8



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHS40K3-12



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Series LEH
Electric Grippers/ Specific Product Precautions 1

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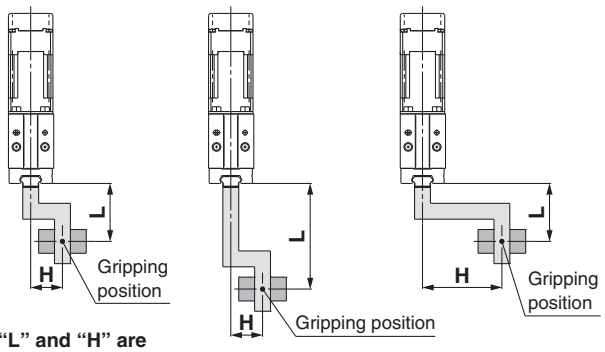
Design/Selection

⚠Warning

1. Keep the specified gripping point.

If the specified gripping range is exceeded, excessive moment is applied to the sliding part of the finger, which may have an adverse affect on the life of the product.

L: Gripping point
H: Overhang



○ **"L" and "H" are appropriate.**
× **"L" is too long.**
× **"H" is too long.**

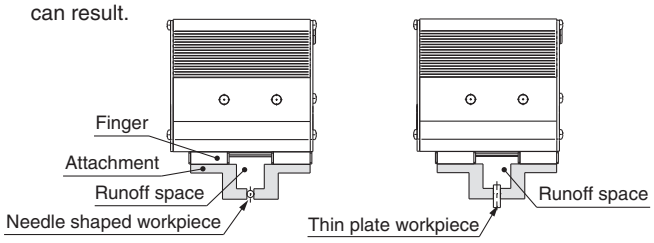
2. Design the attachment to be lightweight and short.

A long and heavy attachment will increase inertia force when the product is opened or closed, which causes play on the finger. Even if the gripping point of the attachment is within a specified range, design it to be short and lightweight as possible.

For a long or large workpiece, select a model of a larger size or use two or more grippers together.

3. Provide a runoff space for attachment when a workpiece is extremely thin or small.

Without a runoff space, the product cannot perform stable gripping, and the displacement of a workpiece or gripping failure can result.



4. Select the model that allows for gripping force in relation to the workpiece weight, as appropriate.

The selection of inappropriate model can cause dropping of a workpiece. Gripping force should be from 10 to 20 times (LEHZ, LEHF) or 7 to 13 times (LEHS) of the workpiece weight.

Gripping Force Accuracy

LEHZ(J)10(L)	LEHZ(J)16(L)	LEHZ(J)20(L)	LEHZ(J)25(L)	LEHZ32	LEHZ40
±30 % (F.S.)		±25 % (F.S.)		±20 % (F.S.)	
LEHF10		**LEHF20**		**LEHF32**	**LEHF40**
±30 % (F.S.)		±25 % (F.S.)		±20 % (F.S.)	
LEHS10(L)		**LEHS20(L)**		**LEHS32**	**LEHS40**
±30 % (F.S.)		±25 % (F.S.)		±20 % (F.S.)	

5. Do not use the product in applications where excessive external force (including vibration) or impact force is applied to it.

It may lead to breakage or galling, which causes operation failure. Do not apply impact and vibration outside of the specifications.

6. Select the model that allows for opening and closing width relative to a workpiece.

The selection of an inappropriate model will cause gripping at unexpected positions due to variable opening and closing width of the product and the diameter of a workpiece the product can handle. It is also necessary to make a larger stroke to overcome backlash created when the product will open after gripping.

Mounting

⚠Warning

1. Do not drop or hit the gripper to avoid scratching and denting the mounting surfaces.

Even slight deformation can cause the deterioration of accuracy and operation failure.

2. When mounting the attachment, use screws with adequate length and tighten them with adequate torque within the specified torque range.

Tightening the screws with a higher torque than recommended may cause malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Mounting of Attachment to Finger

The attachment should be mounted at the torque specified in the following table by screwing the bolt into the finger mounting female thread and hole.

<Series LEHZ>

Model	Bolt	Max. tightening torque [N·m]
LEHZ(J)10(L)	M2.5 x 0.45	0.3
LEHZ(J)16(L)	M3 x 0.5	0.9
LEHZ(J)20(L)	M4 x 0.7	1.4
LEHZ(J)25(L)	M5 x 0.8	3.0
LEHZ32	M6 x 1	5.0
LEHZ40	M8 x 1.25	12.0

<Series LEHF>

Model	Bolt	Max. tightening torque [N·m]
LEHF10	M2.5 x 0.45	0.3
LEHF20	M3 x 0.5	0.9
LEHF32	M4 x 0.7	1.4
LEHF40	M4 x 0.7	1.4

<Series LEHS>

Model	Bolt	Max. tightening torque [N·m]
LEHS10(L)	M3 x 0.5	0.9
LEHS20(L)	M3 x 0.5	0.9
LEHS32	M4 x 0.7	1.4
LEHS40	M5 x 0.8	3.0

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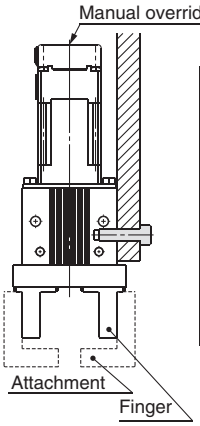
Mounting

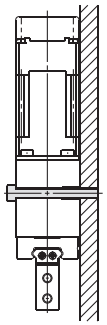
Mounting of Electric Gripper, Series LEHZ/LEHZJ

When using the thread on the side of the body



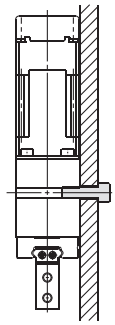
Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHZ(J)10(L)	M3 x 0.5	0.9	6
LEHZ(J)16(L)	M4 x 0.7	1.4	6
LEHZ(J)20(L)	M5 x 0.8	3.0	8
LEHZ(J)25(L)	M6 x 1	5.0	10
LEHZ32	M6 x 1	5.0	10
LEHZ40	M8 x 1.25	12.0	14

When using the thread on the mounting plate



Model	Bolt	Max. tightening torque [N·m]
LEHZ(J)10(L)	M3 x 0.5	0.9
LEHZ(J)16(L)	M3 x 0.5	0.9
LEHZ(J)20(L)	M4 x 0.7	1.4
LEHZ(J)25(L)	M5 x 0.8	3.0
LEHZ32	M5 x 0.8	3.0
LEHZ40	M6 x 1	5.0

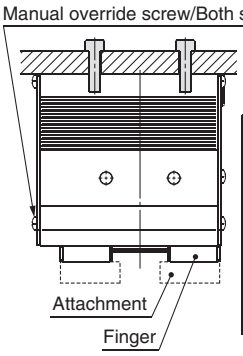
When using the thread on the back of the body



Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHZ(J)10(L)	M4 x 0.7	1.4	6
LEHZ(J)16(L)	M4 x 0.7	1.4	6
LEHZ(J)20(L)	M5 x 0.8	3.0	8
LEHZ(J)25(L)	M6 x 1	5.0	10
LEHZ32	M6 x 1	5.0	10
LEHZ40	M8 x 1.25	12.0	14

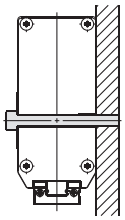
Mounting of Electric Gripper, Series LEHF

When using the thread on the body



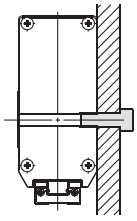
Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHF10	M4 x 0.7	1.4	7
LEHF20	M5 x 0.8	3.0	8
LEHF32	M6 x 1	5.0	10
LEHF40	M6 x 1	5.0	10

When using the thread on the mounting plate



Model	Bolt	Max. tightening torque [N·m]
LEHF10	M4 x 0.7	1.4
LEHF20	M5 x 0.8	3.0
LEHF32	M6 x 1	5.0
LEHF40	M6 x 1	5.0

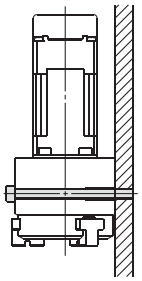
When using the thread on the back of the body



Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHF10	M5 x 0.8	3.0	10
LEHF20	M6 x 1	5.0	12
LEHF32	M8 x 1.25	12.0	16
LEHF40	M8 x 1.25	12.0	16

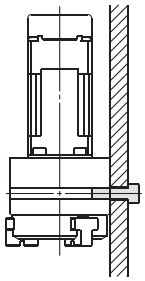
Mounting of Electric Gripper, Series LEHS

When using the thread on the mounting plate



Model	Bolt	Max. tightening torque [N·m]
LEHS10(L)	M3 x 0.5	0.9
LEHS20(L)	M5 x 0.8	3.0
LEHS32	M6 x 1	5.0
LEHS40	M6 x 1	5.0

When using the thread on the back of the body



Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHS10(L)	M4 x 0.7	1.4	6
LEHS20(L)	M6 x 1	5.0	10
LEHS32	M8 x 1.25	12.0	14
LEHS40	M8 x 1.25	12.0	14

Series LEH
Electric Grippers/ Specific Product Precautions 3

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Mounting

⚠Warning

3. Tighten the electric gripper mounting screws to the specified torque.
Tightening to a torque greater than the specified range may cause malfunction, and insufficient tightening may cause displacement.

4. When fixing the attachment to the finger, avoid applying excessive torque to the finger.
Play or deteriorated accuracy can result.

5. The mounting face has holes and slots for positioning. Use them for accurate positioning of the electric gripper if required.

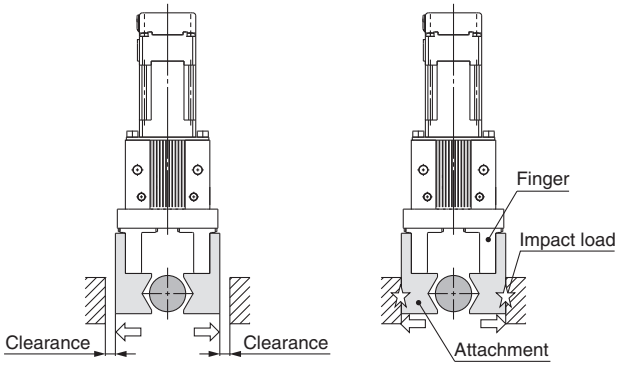
6. When a workpiece is to be removed when it is not energized, open or close the finger manually or remove the attachment beforehand.
When the product is operated with the manual override screws, check the position of the manual override screws of the product, and leave necessary space. Do not apply excessive torque to the manual override screws that could lead to damage and malfunction of the product.

7. When gripping a workpiece, keep a gap in the horizontal direction to prevent the load from concentrating on one finger, to allow for workpiece misalignment.
For the same purpose, when moving a workpiece for alignment by the product, minimize the friction resistance created by the movement of the workpiece. The finger can be displaced, play or breakage.

8. Perform adjustment and confirmation to ensure there is no external force applied to the finger.
If the finger is subject to repetitive lateral load or impact load, it can cause play or breakage and the lead screw can get stuck, which results in operation failure. Allow a clearance to prevent the workpiece or the attachment from hitting gripper product at the end of the stroke.

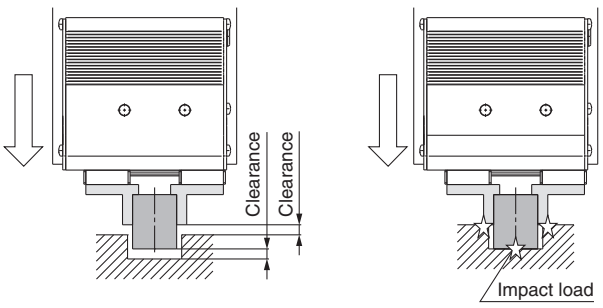
1) Stroke end when fingers are open

○ **With clearance** × **Without clearance**

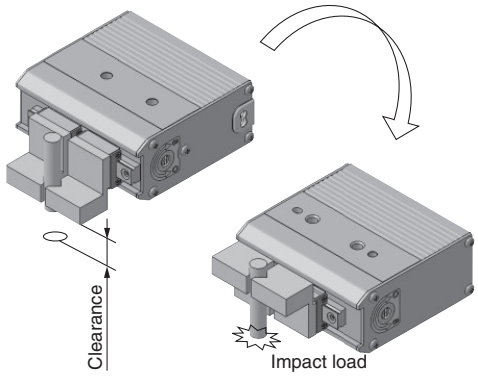


2) Stroke end when gripper is moving

○ **With clearance** × **Without clearance**

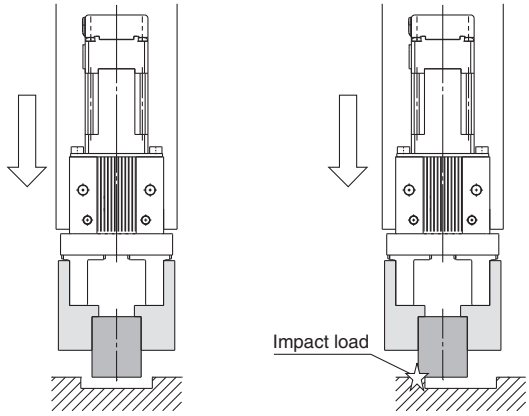


3) When turning over



9. Adjust the gripping point so that an excessive force will not be applied to the fingers when inserting a workpiece.
In particular, during a trial run, operate the product manually or at a low speed and check that the safety is assured without impact.

○ **Aligned** × **Not aligned**



Handling

⚠Caution

1. The parameters of the stroke and the opening/closing speed are for both fingers.
The stroke and the opening/closing speed for one finger is half a set parameter.

2. When gripping a workpiece by the product, be sure to set to the pushing operation.
Also, do not hit the workpiece to the finger and attachment in positioning operation or in the range of positioning operation.
Otherwise, the lead screw can get caught and cause operation failure.
However, if the workpiece cannot be gripped in pushing operation (such as a plastically deformed workpiece, rubber component, etc.), you can grip it in positioning operation with consideration to the elastic force of the workpiece. In this case, keep the driving speed for impact specified in item 3 on page 52.
When the operation is interrupted by a stop or temporary stop, and a pushing operation instruction is output just after operation is restarted, the operating direction will vary depending on the start position.

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Handling

⚠Caution

3. Keep the following driving speed range for pushing operation.
• LEHZ/LEHZJ: 5 to 50 mm/s • LEHF10: 5 to 20 mm/s
• LEHF20/32/40: 5 to 30 mm/s • LEHS: 5 to 50 mm/s
Operation at the speed outside of the range can get the lead screw caught and cause operation failure.

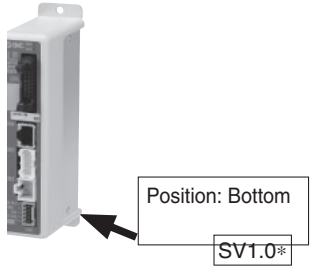
4. There is no backlash effect in pushing operation.
The return to origin is done by pushing operation.
The finger position can be displaced by the effect of the backlash during the positioning operation.
Take the backlash into consideration when setting the position.

5. Do not change the setting of energy saving mode.
When pushing (gripping) operation is continued, the heat generated by the motor can cause operation failure.
This is due to the self-lock mechanism in the lead screw, which makes the product keep the gripping force. To save the energy in this situation where the product is to be standby or continue to grip for extended periods of time, the product will be controlled to reduce current consumption (to 40 % automatically after it has gripped a workpiece once).
If there is the reduction of gripping force seen in the product after a workpiece has been gripped and deformed over certain amount of time, contact SMC separately.

6. INP output signal
1) Positioning operation
When the product comes within the set range by step data [In position], the INP output signal will turn on.
Initial value: Set to [0.50] or higher.
2) Pushing operation
When the effective force exceeds step data [Trigger LV], the INP output signal will turn on.
Use the product within the specified range of [Pushing force] and [Trigger LV].
a) To ensure that the gripper holds the workpiece with the set [Pushing force], it is recommended that the [Trigger LV] be set to the same value as the [Pushing force].
b) When the [Pushing force] and [Trigger LV] are set less than the specified range, the INP output signal will turn on from the pushing start position.
c) The INP output signal is turned on when pushing in the stroke end of an electric gripper even if workpiece is not held.

<INP output signal in the controller version>
● SV1.0∗ or more
Although the product automatically switches to the energy saving mode (reduced current) after pushing operation is completed, the INP output signal remains ON.
● SV0.6∗ or less
a. When [Trigger LV] is set to 40 % (when the value is the same as the energy saving mode)
Although the product automatically switches to the energy saving mode (reduced current) after pushing operation is completed, the INP output signal remains ON.
b. When [Trigger LV] is set higher than 40 %
The product is turned on after pushing operation is completed, but INP output signal will turn off when current consumption is reduced automatically in energy saving mode.

Label position for controller version



<Pushing force and trigger level range>

Series LEHZ

Motor size	Pushing speed [mm/sec]	Pushing force (Setting input value)
Basic	41 to 50	50 % to 100 %
	5 to 40	40 % to 100 %
Compact	31 to 50	70 % to 100 %
	21 to 30	50 % to 100 %
	5 to 20	40 % to 100 %

Series LEHZJ

Motor size	Body size	Pushing speed [mm/sec]	Pushing force (Setting input value)
Basic	10, 16	41 to 50	50 % to 100 %
	20, 25	5 to 40	40 % to 100 %
Compact	10 L, 16 L	21 to 50	80 % to 100 %
		11 to 20	60 % to 100 %
		5 to 10	50 % to 100 %
	20 L, 25 L	31 to 50	70 % to 100 %
		21 to 30	50 % to 100 %
		5 to 20	40 % to 100 %

Series LEHF

Pushing speed [mm/sec]	Pushing force (Setting input value)
21 to 30	50 % to 100 %
5 to 20	40 % to 100 %

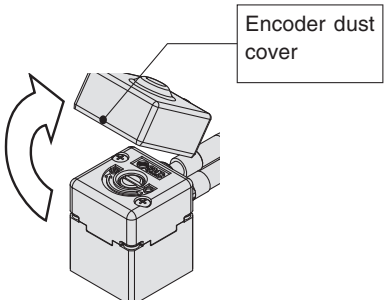
Series LEHS

Motor size	Pushing speed [mm/sec]	Pushing force (Setting input value)
Basic	41 to 50	50 % to 100 %
	5 to 40	40 % to 100 %
Compact	31 to 50	80 % to 100 %
	11 to 30	60 % to 100 %
	5 to 10	40 % to 100 %

7. When releasing a workpiece, set the moving force to 150 %.
If the torque is too small when a workpiece is gripped in pushing operation, the product can have galling and become unable to release the workpiece.

8. If the finger has galling due to operational setting error, etc., open and close the finger manually.
When it is necessary to operate the product by the manual override screws, check the position of the manual override screws of the product, and leave necessary space. Do not apply excessive torque to the manual override screws. This may lead to damage and malfunction.

<series LEHZJ >
In the case of a gripper with dust covers, remove the encoder dust cover before operating the manual override.
Refit the encoder dust cover after using the manual override.



Series LEH
Electric Grippers/ Specific Product Precautions 5

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Handling

⚠Caution

9. Self-lock mechanism

The product keeps a gripping force due to the self-lock mechanism in the lead screw. Also, it will not operate in opposite direction even when external force is applied during gripping a workpiece.

<Type of Stops, Cautions>

1) All the power supplies to the controller are shut off.

When the power supply is turned on to restart operation, the controller will be initialized, and the product can drop a workpiece due to a motor magnetic pole detective operation. (It means that there is finger motions of partial strokes by the phase detection of motor after power supply is turned on.) Remove the workpiece before restarting operation.

2) "EMG (stop)" of the CN1 of the controller is shut off.

When using the stop switch on the teaching box;

a) In case both of [SVRE] and [SETON] are ON before stop, [SVRE]: OFF / [SETON]: ON

b) How to restart operation

In this situation, since [SVRE] is on before stop, [SVRE] will be turned on automatically when stop is released, and operation can be restarted after that. It is not necessary to remove a workpiece beforehand because a motor magnetic pole detective operation will not occur.

c) Cautions

An alarm can take place when operation is restarted from stop. Check that [SVRE] is turned on after the release of stop and restart operation.

3) "M24V (motor driving power supply)" of the CN1 of the controller is shut off.

a) There will be no change in output conditions due to stop.

b) How to restart operation

In this situation, operation can be restarted after stop is released. It is not necessary to remove a workpiece beforehand because a motor magnetic pole detective operation will not occur.

c) Cautions

An alarm can take place when stop is activated during operation or operation is restarted from stop.

10. Return to origin

1) It is recommended to set the directions of return to origin and workpiece gripping to the same direction.
If they are set opposite, there can be backlash, which worsens the measurement accuracy significantly.

2) If the direction of return to origin is set to CW (Internal gripping);
If the return to origin is performed with the product only, there can be significant deviation between different actuators. Use a workpiece to set return to origin.

3) If the return to origin is performed by using a workpiece;
The stroke (operation range) will be shortened. Recheck the value of step data.

4) If basic parameters (Origin offset) are used;
When the return to origin is set with [Origin offset], it is necessary to change the current position of the product. Recheck the value of step data.

Handling

⚠Caution

11. In pushing (gripping) operation, set the product to a position of at least 0.5 mm away from a workpiece. (This position is referred to as a pushing start position.)

If the product is set to the same position as a workpiece, the following alarms may be generated and operation may become unstable.

a. "Posn failed" alarm is generated.
The product cannot reach a pushing start position due to variation in the width of workpieces.

b. "Pushing ALM" alarm is generated.
The product is pushed back from a pushing start position after starting to push.

c. "Err overflow" alarm
The displacement at the pushing start position exceeds the specified range.

12. When mounting the product, keep a 40 mm or longer diameter for bends in the motor cable.

13. Finite orbit type guide is used in the actuator finger part. By using this, when there are inertial force which cause by movements or rotation to the actuator, steel ball will move to one side and this will cause a large resistance and degrade the accuracy. When there are inertial force which cause by movements or rotation to the actuator, operate the finger to full stroke.

Especially in long stroke type, the accuracy of finger may degrade.

Maintenance

⚠Danger

1. When the product is to be removed, check it has not been gripping a workpiece.

There is a risk of dropping the workpiece.

⚠Caution

1. The dust cover on the gripper finger (series LEHZJ only) is a consumable item, replace the dust cover as and when it is necessary.

Otherwise, machining chips and fine particles may get into the product from the outside, leading to operation failure.

The dust cover on the gripper finger can be damaged if the finger attachment or the workpiece comes into contact with the dust cover during operation.

Controller/Driver

Step Data Input Type ····· **Page 55**

Step Motor (Servo/24 VDC)
Series LECP6

Gateway Unit ····· **Page 65**

Series LEC-G

Programless Type ····· **Page 68**

Step Motor (Servo/24 VDC)
Series LECP1

Pulse Input Type ····· **Page 75**

Step Motor (Servo/24 VDC)
Series LECPA

Step Data Input Type
Step Motor (Servo/24 VDC)
Series LECP6

Series LECP6

How to Order

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LE series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to 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 conformity to the EMC directive for the machinery and equipment as a whole.

[UL-compliant products]

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

LE C P 6 P □ □ – □

Controller

Compatible motor

P	Step motor (Servo/24 VDC)

Number of step data (Points)

6	64

Parallel I/O type

N	NPN
P	PNP

I/O cable length [m]

—	Without cable
1	1.5
3	3
5	5

Actuator part number

Part number except cable specifications and actuator options
Example: Enter "**LEHZ10LK2-4**" for the LEHZ10LK2-4AF-R16N1.

BC	Blank controller Note)

Note) The dedicated software (LEC-BCW) is required.

Option

—	Screw mounting
D Note)	DIN rail mounting

Note) DIN rail is not included. Order it separately.

∗ When controller equipped type is selected when ordering the LE series, you do not need to order this controller.

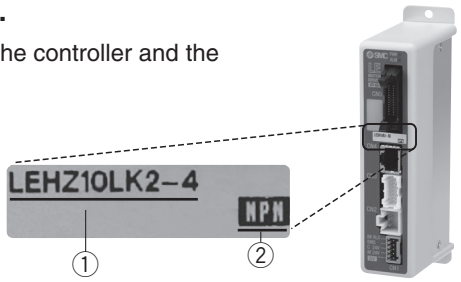
The controller is sold as single unit after the compatible actuator is set.

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller.

② Check Parallel I/O configuration matches (NPN or PNP).



∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smc.eu

Precautions on blank controller (LECP6□□-BC)

Blank controller is a controller to which the customer can write the data of the actuator to be combined and used. Use the dedicated software (LEC-BCW) for data writing.

- Please download the dedicated software (LEC-BCW) via our website.
- Order the controller setting kit (LEC-W2) separately to use this software.

SMC website
http://www.smc.eu

Specifications

Basic Specifications

Item	LECP6
Compatible motor	Step motor (Servo/24 VDC)
Power supply Note 1)	Power voltage: 24 VDC ±10 % Note 2) [Including motor drive power, control power, stop, lock release]
Parallel input	11 inputs (Photo-coupler isolation)
Parallel output	13 outputs (Photo-coupler isolation)
Compatible encoder	Incremental A/B phase (800 pulse/rotation)
Serial communication	RS485 (Modbus protocol compliant)
Memory	EEPROM
LED indicator	LED (Green/Red) one of each
Lock control	Forced-lock release terminal Note 3)
Cable length [m]	I/O cable: 5 or less, Actuator cable: 20 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)
Storage temperature range [°C]	–10 to 60 (No freezing)
Storage humidity range [%RH]	90 or less (No condensation)
Insulation resistance [MΩ]	Between the housing and SG terminal: 50 (500 VDC)
Weight [g]	150 (Screw mounting), 170 (DIN rail mounting)

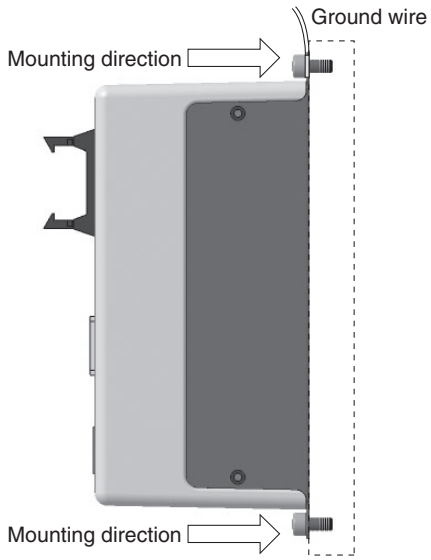
Note 1) Do not use the power supply of "inrush current prevention type" for the controller power supply. When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

Note 2) The power consumption changes depending on the actuator model. Refer to the specifications of actuator for more details.

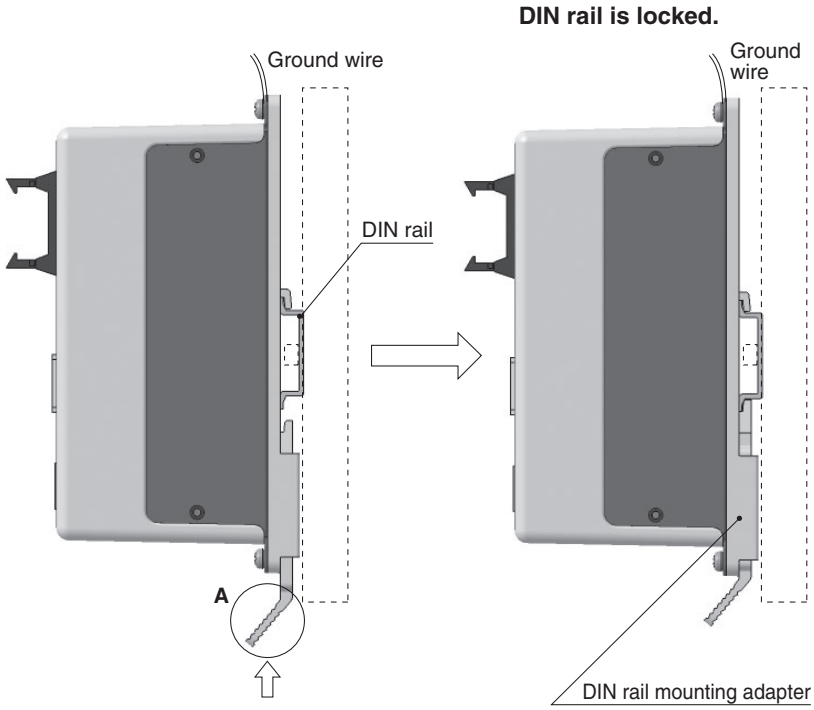
Note 3) Applicable to non-magnetizing lock.

How to Mount

a) Screw mounting (LECP6□□-□)
(Installation with two M4 screws)



b) DIN rail mounting (LECP6□□D-□)
(Installation with the DIN rail)

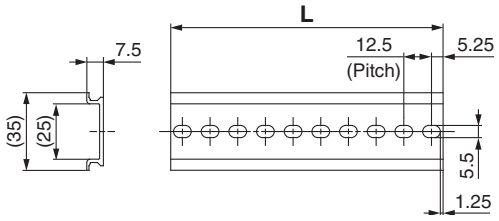


Hook the controller on the DIN rail and press the lever of section **A** in the arrow direction to lock it.

Note) 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 dimensions on page 57 for the mounting dimensions.



L Dimension [mm]

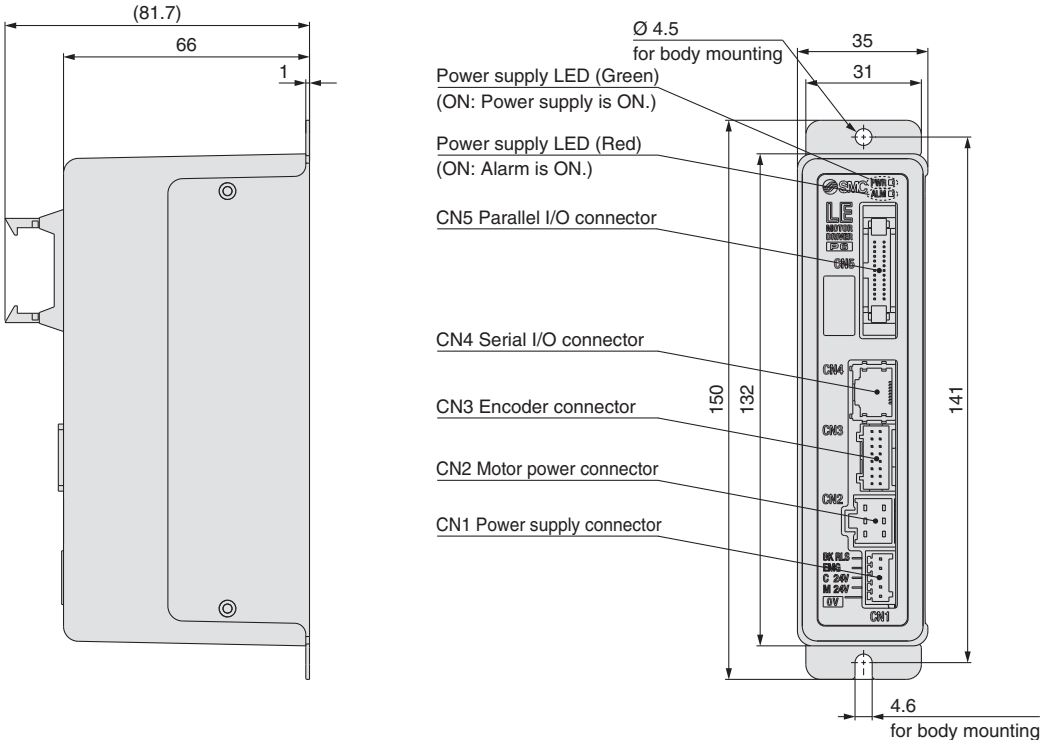
No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L	23	35.5	48	60.5	73	85.5	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5	223	235.5	248	260.5
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5	498	510.5

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

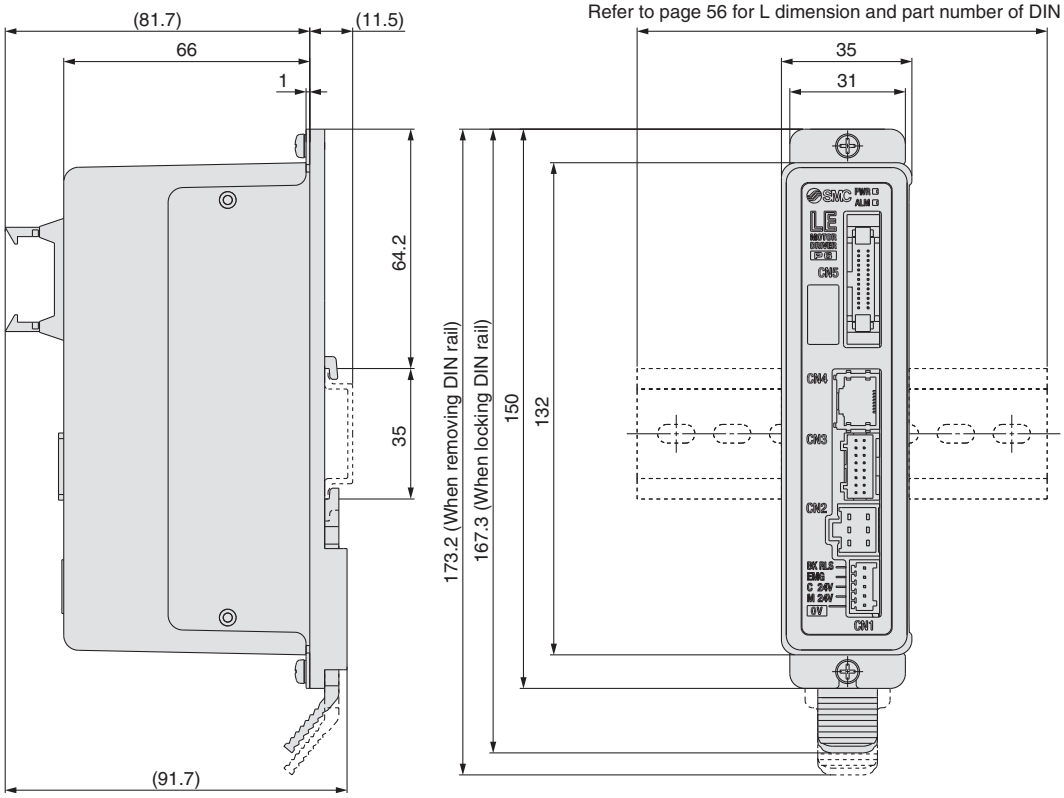
This should be used when the DIN rail mounting adapter is mounted onto the screw mounting type controller afterward.

Dimensions

a) Screw mounting (LECP6□□-□)



b) DIN rail mounting (LECP6□□D-□)



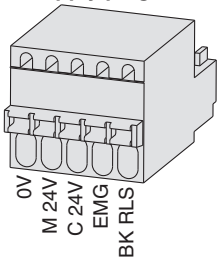
Wiring Example 1

Power Supply Connector: CN1 ∗ Power supply plug is an accessory.

CN1 Power Supply Connector Terminal for LECP6 (PHOENIX CONTACT FK-MC0.5/5-ST-2.5)

Terminal name	Function	Details
0V	Common supply (–)	M 24V terminal/C 24V terminal/EMG terminal/BK RLS terminal are common (–).
M 24V	Motor power supply (+)	Motor power supply (+) supplied to the controller
C 24V	Control power supply (+)	Control power supply (+) supplied to the controller
EMG	Stop (+)	Input (+) for releasing the stop
BK RLS	Lock release (+)	Input (+) for releasing the lock

Power supply plug for LECP6



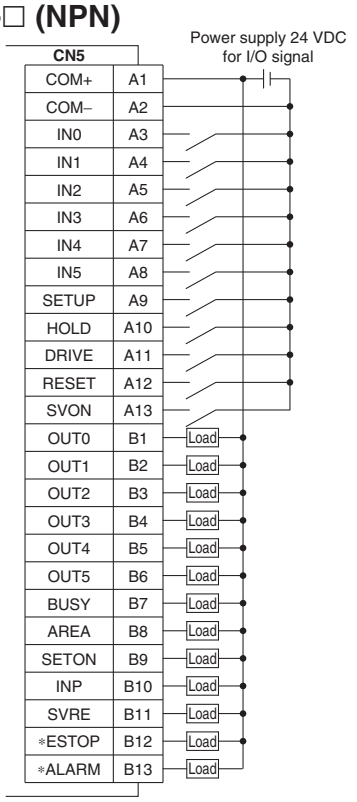
Wiring Example 2

Parallel I/O Connector: CN5

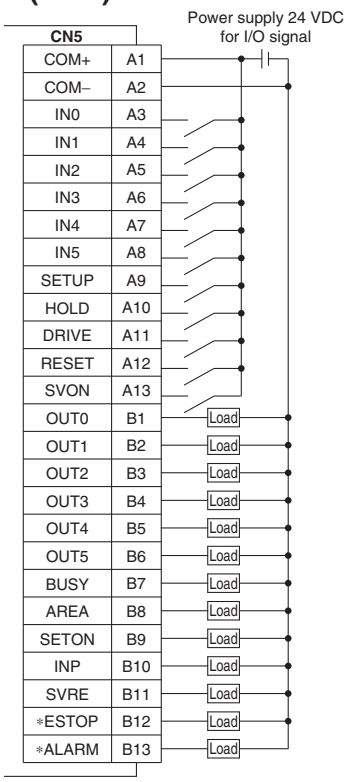
∗ When you connect a PLC etc., to the CN5 parallel I/O connector, use the I/O cable (LEC-CN5-□).
∗ The wiring should be changed depending on the type of the parallel I/O (NPN or PNP).

Wiring diagram

LECP6N□□-□ (NPN)



LECP6P□□-□ (PNP)



Input Signal

Name	Details
COM+	Connects the power supply 24 V for input/output signal
COM–	Connects the power supply 0 V for input/output signal
IN0 to IN5	Step data specified Bit No. (Input is instructed in the combination of IN0 to 5.)
SETUP	Instruction to return to origin
HOLD	Operation is temporarily stopped
DRIVE	Instruction to drive
RESET	Alarm reset and operation interruption
SVON	Servo ON instruction

Output Signal

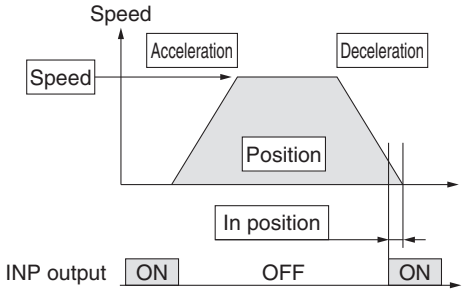
Name	Details
OUT0 to OUT5	Outputs the step data no. during operation
BUSY	Outputs when the actuator is moving
AREA	Outputs within the step data area output setting range
SETON	Outputs when returning to origin
INP	Outputs when target position or target force is reached (Turns on when the positioning or pushing is completed.)
SVRE	Outputs when servo is on
∗ESTOP Note)	Not output when EMG stop is instructed
∗ALARM Note)	Not output when alarm is generated

Note) Signal of negative-logic circuit (N.C.)

Step Data Setting

1. Step data setting for positioning

In this setting, the actuator moves toward and stops at the target position.
The following diagram shows the setting items and operation.
The setting items and set values for this operation are stated below.



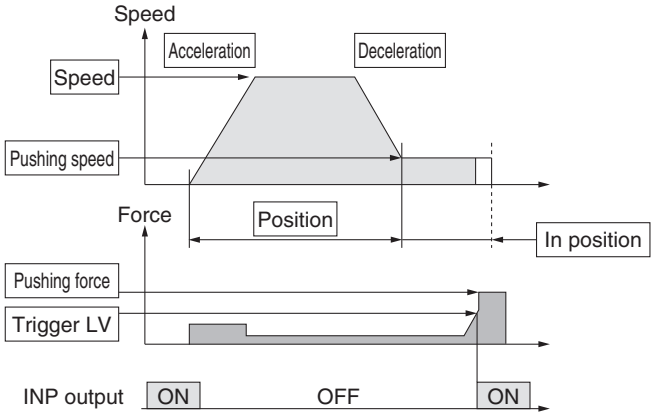
◎: Need to be set.
○: Need to be adjusted as required.
—: Setting is not required.

Step Data (Positioning)

Necessity	Item	Details
◎	Movement MOD	When the absolute position is required, set Absolute. When the relative position is required, set Relative.
◎	Speed	Transfer speed to the target position
◎	Position	Target position
○	Acceleration	Parameter which defines how rapidly the actuator reaches the speed set. The higher the set value, the faster it reaches the speed set.
○	Deceleration	Parameter which defines how rapidly the actuator comes to stop. The higher the set value, the quicker it stops.
◎	Pushing force	Set 0. (If values 1 to 100 are set, the operation will be changed to the pushing operation.)
—	Trigger LV	Setting is not required.
—	Pushing speed	Setting is not required.
○	Moving force	Max. torque during the positioning operation (No specific change is required.)
○	Area 1, Area 2	Condition that turns on the AREA output signal.
○	In position	Condition that turns on the INP output signal. When the actuator enters the range of [in position], the INP output signal turns on. (It is unnecessary to change this from the initial value.) When it is necessary to output the arrival signal before the operation is completed, make the value larger.

2. Step data setting for pushing

The actuator moves toward the pushing start position, and when it reaches that position, it starts pushing with the set force or less.
The following diagram shows the setting items and operation.
The setting items and set values for this operation are stated below.



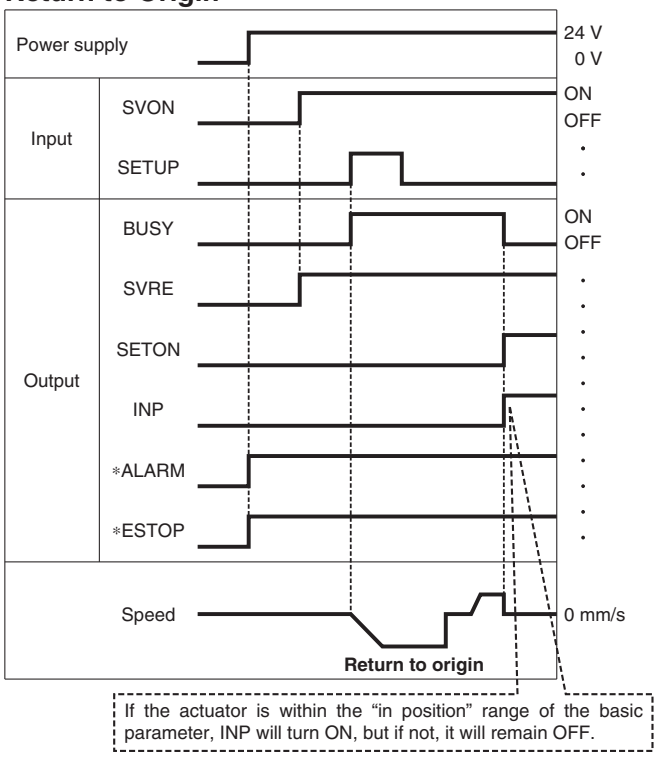
◎: Need to be set.
○: Need to be adjusted as required.

Step Data (Pushing)

Necessity	Item	Details
◎	Movement MOD	When the absolute position is required, set Absolute. When the relative position is required, set Relative.
◎	Speed	Transfer speed to the pushing start position
◎	Position	Pushing start position
○	Acceleration	Parameter which defines how rapidly the actuator reaches the speed set. The higher the set value, the faster it reaches the speed set.
○	Deceleration	Parameter which defines how rapidly the actuator comes to stop. The higher the set value, the quicker it stops.
◎	Pushing force	Pushing force ratio is defined. The setting range differs depending on the electric actuator type. Refer to the Operation Manual for the electric actuator.
◎	Trigger LV	Condition that turns on the INP output signal. The INP output signal turns on when the generated force exceeds the value. Trigger level should be the pushing force or less.
○	Pushing speed	Pushing speed during pushing. When the speed is set fast, the electric actuator and work pieces might be damaged due to the impact when they hit the end, so this set value should be smaller. Refer to the Operation Manual for the electric actuator.
○	Moving force	Max. torque during the positioning operation (No specific change is required.)
○	Area 1, Area 2	Condition that turns on the AREA output signal.
◎	In position	Transfer distance during pushing. If the transferred distance exceeds the setting, it stops even if it is not pushing. If the transfer distance is exceeded, the INP output signal will not turn on.

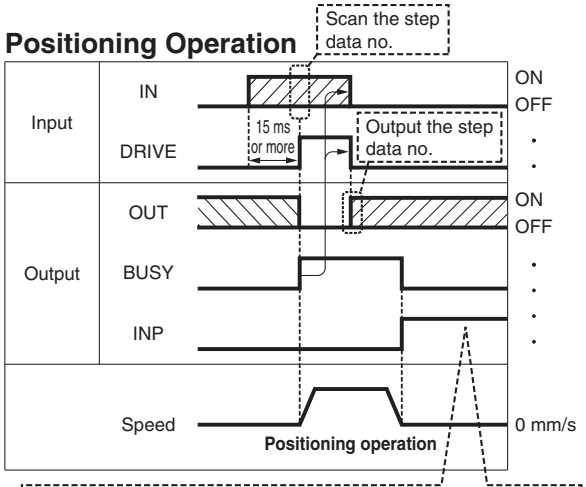
Signal Timing

Return to Origin



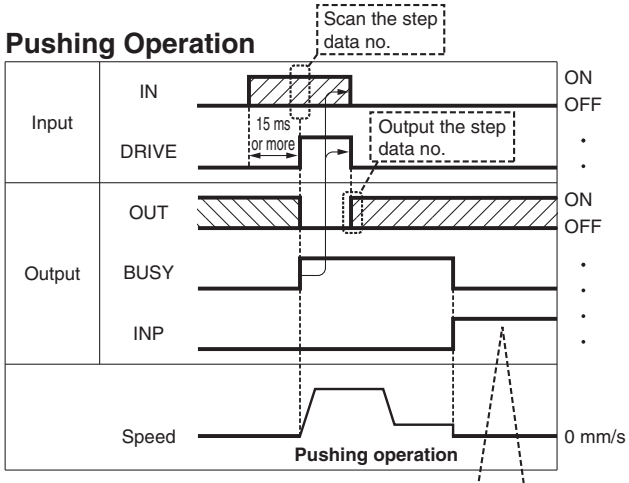
∗ "∗ALARM" and "∗ESTOP" are expressed as negative-logic circuit.

Positioning Operation

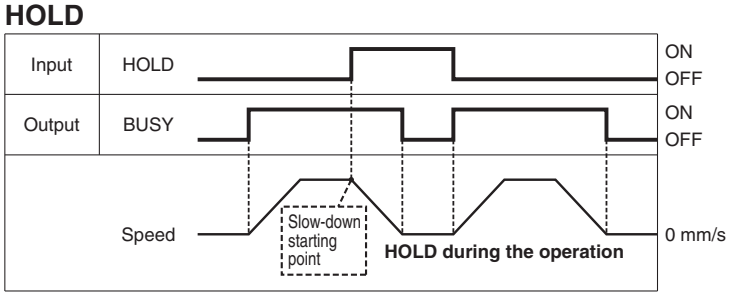


∗ "OUT" is output when "DRIVE" is changed from ON to OFF.
(When power supply is applied, "DRIVE" or "RESET" is turned ON or "∗ESTOP" is turned OFF, all of the "OUT" outputs are OFF.)

Pushing Operation

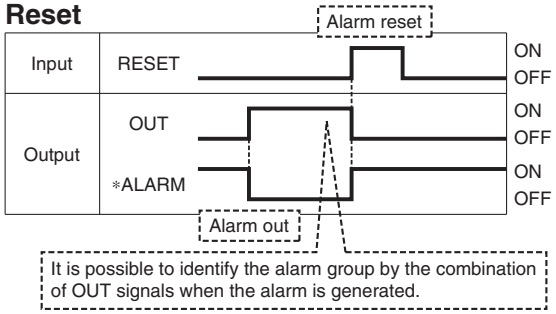


HOLD



∗ When the actuator is in the positioning range in the pushing operation, it does not stop even if HOLD signal is input.

Reset



∗ "∗ALARM" is expressed as negative-logic circuit.

Options: Actuator Cable

[Robotic cable, standard cable for step motor (Servo/24 VDC)]

LE − CP − 1 − ☐

Cable length (L) [m]

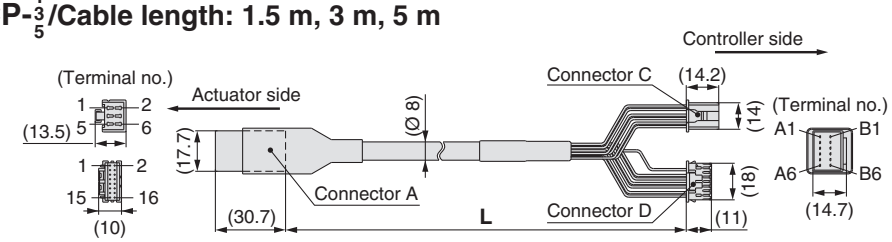
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

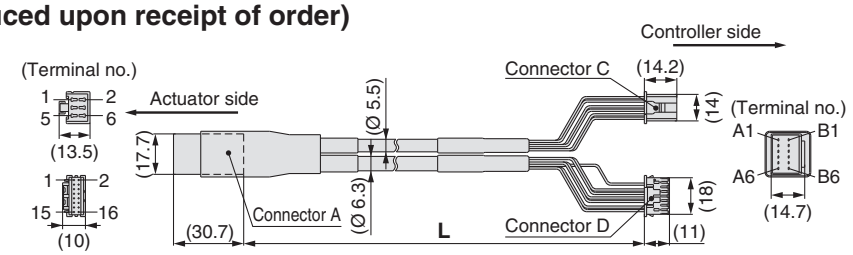
Cable type

—	Robotic cable (Flexible cable)
S	Standard cable

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



LE-CP-8/A B/C/Cable length: 8 m, 10 m, 15 m, 20 m
(* Produced upon receipt of order)



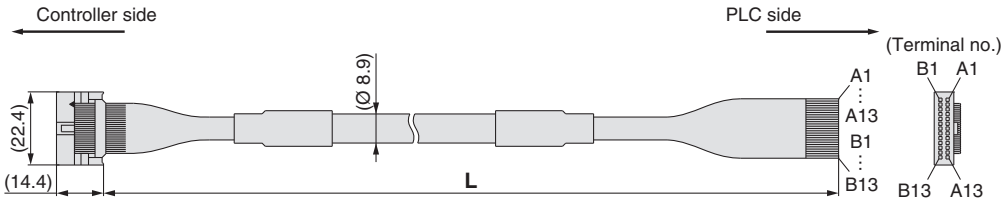
Signal	Connector A terminal no.	Cable colour	Connector C terminal no.
A	B-1	Brown	2
$\overline{A}$	A-1	Red	1
B	B-2	Orange	6
$\overline{B}$	A-2	Yellow	5
COM-A/COM	B-3	Green	3
COM-B/—	A-3	Blue	4
		Shield	
		Cable colour	Connector D terminal no.
Vcc	B-4	Brown	12
GND	A-4	Black	13
$\overline{A}$	B-5	Red	7
A	A-5	Black	6
$\overline{B}$	B-6	Orange	9
B	A-6	Black	8
		—	3

Option: I/O Cable

LEC − CN5 − 1

Cable length (L) [m]

1	1.5
3	3
5	5



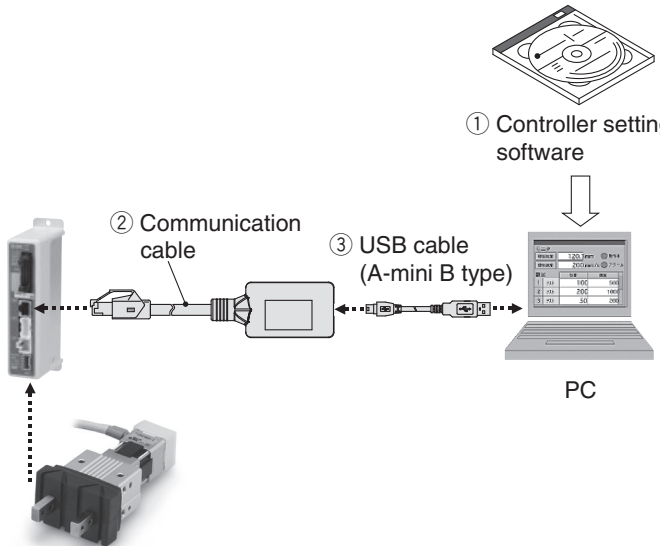
* Conductor size: AWG28

Connector pin no.	Insulation colour	Dot mark	Dot colour
A1	Light brown	■	Black
A2	Light brown	■	Red
A3	Yellow	■	Black
A4	Yellow	■	Red
A5	Light green	■	Black
A6	Light green	■	Red
A7	Grey	■	Black
A8	Grey	■	Red
A9	White	■	Black
A10	White	■	Red
A11	Light brown	■ ■	Black
A12	Light brown	■ ■	Red
A13	Yellow	■ ■	Black

Connector pin no.	Insulation colour	Dot mark	Dot colour
B1	Yellow	■ ■	Red
B2	Light green	■ ■	Black
B3	Light green	■ ■	Red
B4	Grey	■ ■	Black
B5	Grey	■ ■	Red
B6	White	■ ■	Black
B7	White	■ ■	Red
B8	Light brown	■ ■ ■	Black
B9	Light brown	■ ■ ■	Red
B10	Yellow	■ ■ ■	Black
B11	Yellow	■ ■ ■	Red
B12	Light green	■ ■ ■	Black
B13	Light green	■ ■ ■	Red
—	Shield		

Series LEC Controller Setting Kit/LEC-W2

Windows®XP, Windows®7 compatible



How to Order

LEC-W2

Controller setting kit
(Japanese and English are available.)

Contents

	Description	Model*
①	Controller setting software (CD-ROM)	LEC-W2-S
②	Communication cable	LEC-W2-C
③	USB cable (between the PC and the communication cable)	LEC-W2-U

* Can be ordered separately.

Compatible Controller/Driver

Step data input type — ***Series LECP6***
Pulse input type — ***Series LECPA***

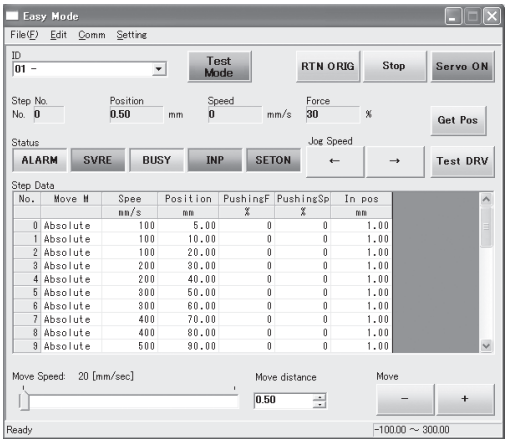
Hardware Requirements

OS	IBM PC/AT compatible machine running Windows®XP (32-bit), Windows®7 (32-bit and 64-bit), Windows®8.1 (32-bit and 64-bit).
Communication interface	USB 1.1 or USB 2.0 ports
Display	XGA (1024 x 768) or more

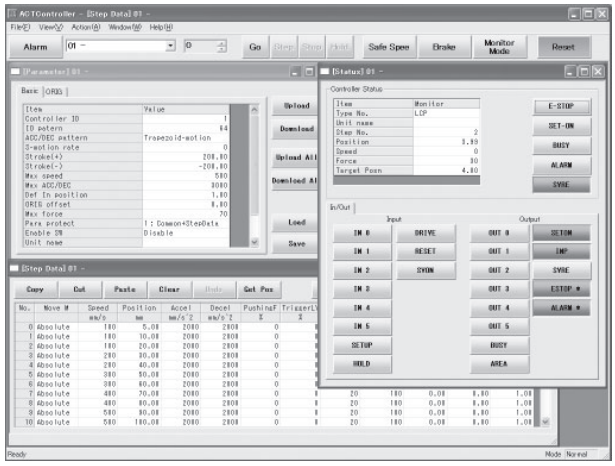
* Windows®XP, Windows®7 and Windows®8.1 are registered trademarks of Microsoft Corporation in the United States.
* Refer to SMC website for version upgrade information, http://www.smc.eu

Screen Example

Easy mode screen example



Normal mode screen example



Easy operation and simple setting

- Allowing to set and display actuator step data such as position, speed, force, etc.
- Setting of step data and testing of the drive can be performed on the same page.
- Can be used to jog and move at a constant rate.

Detailed setting

- Step data can be set in detail.
- Signals and terminal status can be monitored.
- Parameters can be set.
- JOG and constant rate movement, return to origin, test operation and testing of forced output can be performed.

Series LEC
Teaching Box/LEC-T1

How to Order

LEC-T1-3EG□

Teaching box

Cable length [m]

3	3

Initial language

J	Japanese
E	English

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

Stop switch

G	Equipped with stop switch

Enable switch

—	None
S	Equipped with enable switch

∗ Interlock switch for jog and test function

Standard functions
- **Chinese character display**
- **Stop switch is provided.**

Option
- **Enable switch is provided.**

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)

[CE-compliant products]
The EMC compliance of the teaching box was tested with the LECP6 series step motor controller (servo/24 VDC) and an applicable actuator.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

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

Menu
- Data
- Monitor
- Jog
- Test
- ALM
- TB setting

Data
Step data no.
Setting of two items selected below
Ver. 1.∗∗:
Position, Speed, Force, Acceleration, Deceleration
Ver. 2.∗∗:
Position, Speed, Pushing force, Acceleration, Deceleration, Movement MOD, Trigger LV, Pushing speed, Moving force, Area 1, Area 2, In position

Monitor
Display of step no.
Display of two items selected below
(Position, Speed, Force)

Jog
Return to origin
Jog operation

Test
1 step operation

ALM
Active alarm display
Alarm reset

TB setting
Reconnect (Ver. 1.∗∗)
Japanese/English (Ver. 2.∗∗)
Easy/Normal
Set item

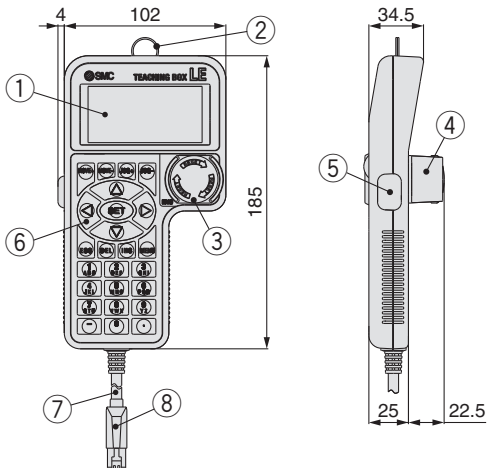
Normal Mode

Function	Details
Step data	• Step data setting
Parameter	• Parameters setting
Test	• 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	• Drive monitor • Output signal monitor • Input signal monitor • Output terminal monitor • Input terminal monitor
ALM	• Active alarm display (Alarm reset) • Alarm log record display
File	• 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	• 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	• Reconnection of axis

Menu Operations Flowchart

- **Menu**
  - Step data
  - Parameter
  - Monitor
  - Test
  - ALM
  - File
  - TB setting
  - Reconnect
- **Step data**
  - Step data no.
  - Movement MOD
  - Speed
  - Position
  - Acceleration
  - Deceleration
  - Pushing force
  - Trigger LV
  - Pushing speed
  - Moving force
  - Area 1, 2
  - In position
- **Parameter**
  - Basic
  - ORIG
  - **Basic setting**
  - **ORIG setting**
- **Monitor**
  - Drive
  - Output signal
  - Input signal
  - Output terminal
  - Input terminal
  - **DRV monitor**
    - Position, Speed, Torque
    - Step no.
    - Last step no.
  - **Output signal monitor**
  - **Input signal monitor**
  - **Output terminal monitor**
  - **Input terminal monitor**
- **Test**
  - JOG/MOVE
  - Return to ORIG
  - Test drive
  - Forced output
- **ALM**
  - Status
  - ALM Log record
  - **Status**
    - Active alarm display
    - Alarm reset
  - **ALM Log record display**
    - Log entry display
- **File**
  - Data saving
  - Load to controller
  - File deletion
  - File protection (Ver. 2.**)
- **TB setting**
  - Easy/Normal
  - Language
  - Backlight
  - LCD contrast
  - Beep
  - Max. connection axis
  - Password
  - Distance unit
- **Reconnect**

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

Gateway Unit
Series LEC-G

How to Order

⚠Caution

[CE-compliant products]
EMC compliance was tested by combining the electric actuator LE series and the controller LEC series. The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to 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 conformity to the EMC directive for the machinery and equipment as a whole.

[UL-compliant products]
When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

Gateway unit **LEC-G MJ2 □**

Applicable Fieldbus protocols

MJ2	CC-Link Ver. 2.0
DN1	DeviceNet™
PR1	PROFIBUS DP
EN1	EtherNet/IP™

Mounting

—	Screw mounting
D Note)	DIN rail mounting

Note) DIN rail is not included. Order it separately.

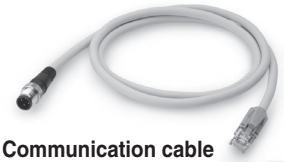
Cable **LEC-CG 1-L**

Cable type

1	Communication cable
2	Cable between branches

Cable length

K	0.3 m
L	0.5 m
1	1 m



Communication cable

Cable between branches

Branch connector **LEC-CGD**

Branch connector

Terminating resistor **LEC-CGR**

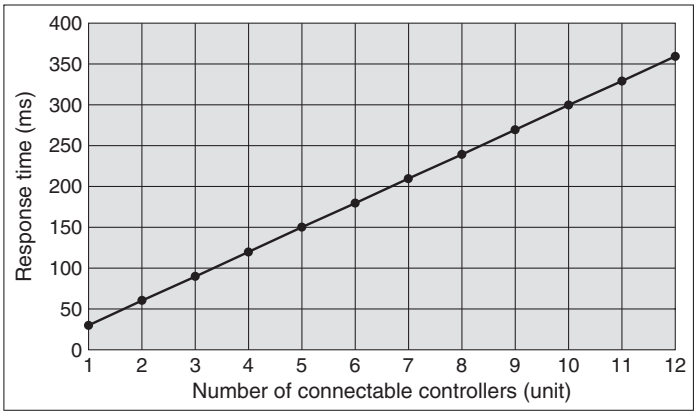
Specifications

Model			LEC-GMJ2□	LEC-GDN1□	LEC-GPR1□	LEC-GEN1□
Communication specifications	Applicable system	Fieldbus	CC-Link	DeviceNet™	PROFIBUS DP	EtherNet/IP™
		Version Note 1)	Ver. 2.0	Release 2.0	V1	Release 1.0
	Communication speed [bps]		156 k/625 k/2.5 M /5 M/10 M	125 k/250 k/500 k	9.6 k/19.2 k/45.45 k/ 93.75 k/187.5 k/500 k/ 1.5 M/3 M/6 M/12 M	10 M/100 M
	Configuration file Note 2)		—	EDS file	GSD file	EDS file
	I/O occupation area		4 stations occupied (8 times setting) Input 896 points 108 words Output 896 points 108 words	Input 200 bytes Output 200 bytes	Input 57 words Output 57 words	Input 256 bytes Output 256 bytes
	Power supply for communication	Power supply voltage [V] Note 6)	—	11 to 25 VDC	—	—
		Internal current consumption [mA]	—	100	—	—
	Communication connector specifications		Connector (Accessory)	Connector (Accessory)	D-sub	RJ45
	Terminating resistor		Not included	Not included	Not included	Not included
Power supply voltage [V] Note 6)			24 VDC ±10 %			
Current consumption [mA]	Not connected to teaching box		200			
	Connected to teaching box		300			
EMG output terminal			30 VDC 1 A			
Controller specifications	Applicable controllers		Series LECP6, Series LECA6			
	Communication speed [bps] Note 3)		115.2 k/230.4 k			
	Max. number of connectable controllers Note 4)		12	8 Note 5)	5	12
Accessories			Power supply connector, communication connector		Power supply connector	
Operating temperature range [°C]			0 to 40 (No freezing)			
Operating humidity range [%RH]			90 or less (No condensation)			
Storage temperature range [°C]			−10 to 60 (No freezing)			
Storage humidity range [%RH]			90 or less (No condensation)			
Weight [g]			200 (Screw mounting), 220 (DIN rail mounting)			

Note 1) Please note that the version is subject to change.
Note 2) Each file can be downloaded from the SMC website, http://www.smc.eu
Note 3) When using a teaching box (LEC-T1-□), set the communication speed to 115.2 kbps.
Note 4) A communication response time for 1 controller is approximately 30 ms.
Refer to "Communication Response Time Guideline" for response times when several controllers are connected.
Note 5) For step data input, up to 12 controllers connectable.
Note 6) When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

Communication Response Time Guideline

Response time between gateway unit and controllers depends on the number of controllers connected to the gateway unit. For response time, refer to the graph below.

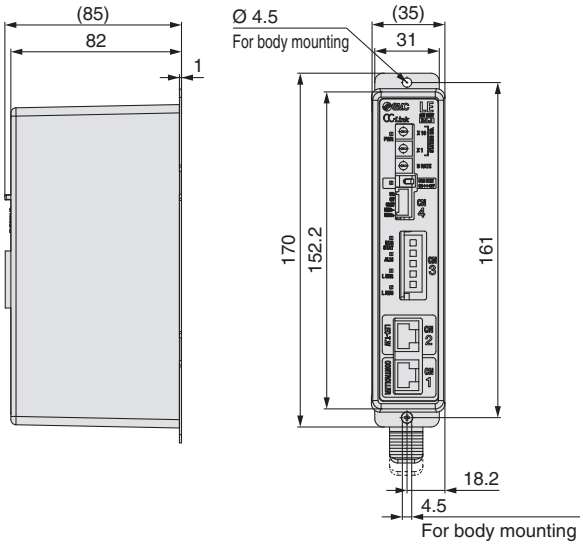


* This graph shows delay times between gateway unit and controllers. Fieldbus network delay time is not included.

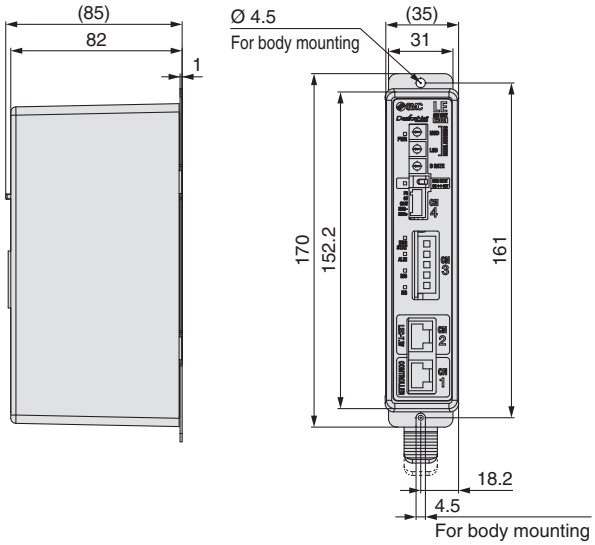
Dimensions

Screw mounting (LEC-G□□□)

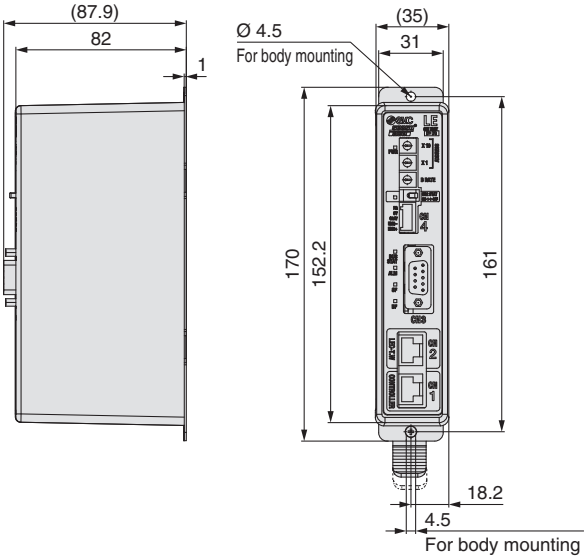
Applicable Fieldbus protocol: CC-Link Ver. 2.0



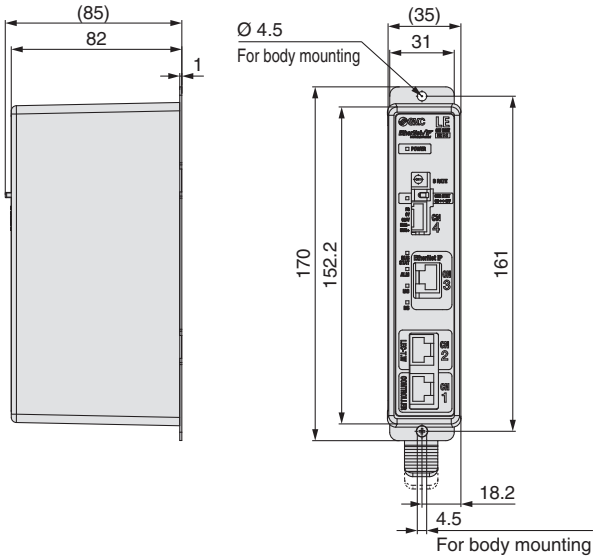
Applicable Fieldbus protocol: DeviceNet™



Applicable Fieldbus protocol: PROFIBUS DP



Applicable Fieldbus protocol: EtherNet/IP™

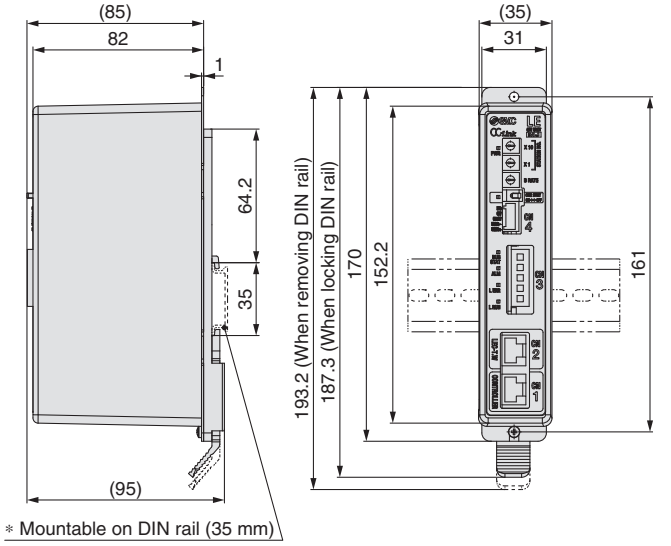


■ **Trademark** DeviceNet™ is a trademark of ODVA. EtherNet/IP™ is a trademark of ODVA.

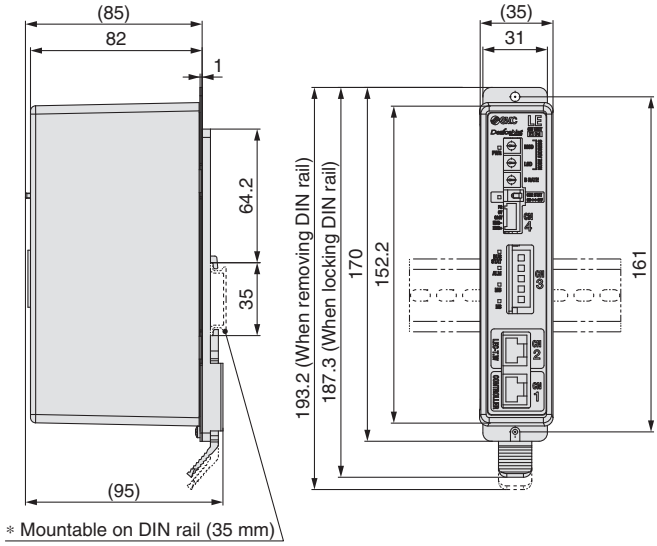
Dimensions

DIN rail mounting (LEC-G□□□D)

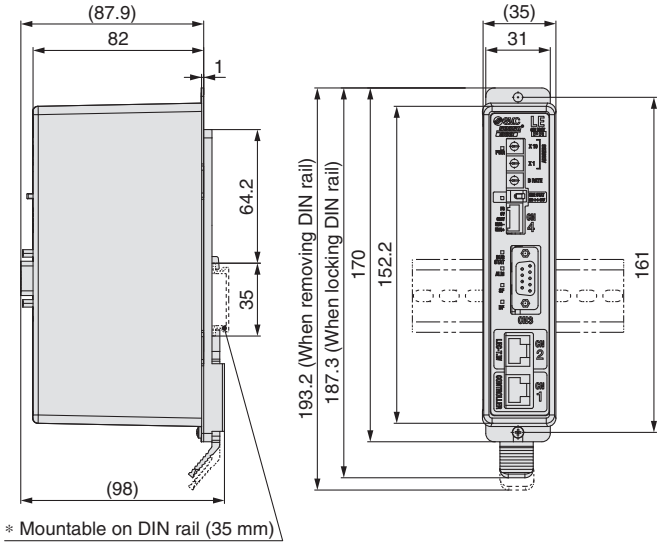
Applicable Fieldbus protocol: CC-Link Ver. 2.0



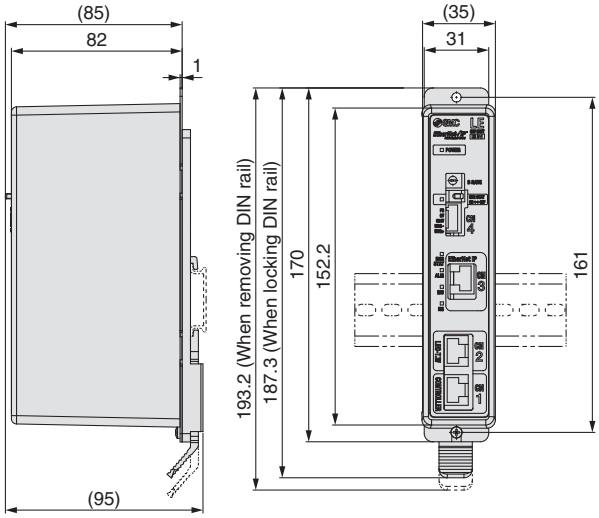
Applicable Fieldbus protocol: DeviceNet™



Applicable Fieldbus protocol: PROFIBUS DP

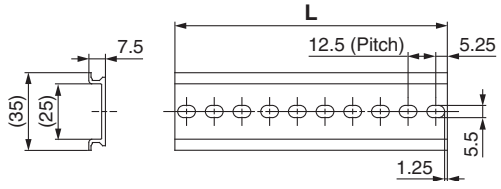


Applicable Fieldbus protocol: EtherNet/IP™



DIN rail
AXT100-DR-□

∗ For □, enter a number from the "No." line in the table below.
Refer to the dimensions above for the mounting dimensions.



L Dimension [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

■ **Trademark** DeviceNet™ is a trademark of ODVA. EtherNet/IP™ is a trademark of ODVA.

Programless Controller
Series LECP1

How to Order

LE C P 1 P 1 [ ] – LEHZ10LK2-4

Controller

Compatible motor

P	Step motor (Servo/24 VDC)

Number of step data (Points)

1	14 (Programless)

Parallel I/O type

N	NPN
P	PNP

I/O cable length [m]

—	Without cable
1	1.5
3	3
5	5

Option

—	Screw mounting
D Note)	DIN rail mounting

Note) DIN rail is not included. Order it separately.

Actuator part number

(Except cable specification and actuator options)
Example: Enter "**LEHZ10LK2-4**" for the LEHZ10LK2-4AF-R16N1.

∗ **When controller equipped type (-□1N□/-□1P□) is selected when ordering the LE series, you do not need to order this controller.**

⚠ Caution

[CE-compliant products]
EMC compliance was tested by combining the electric actuator LEF series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to 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 conformity to the EMC directive for the machinery and equipment as a whole.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

The controller is sold as single unit after the compatible actuator is set.
Confirm that the combination of the controller and the actuator is correct.

∗ Refer to the Operation Manual for using the products. Please download it via our website, http://www.smc.eu

Specifications

Basic Specifications

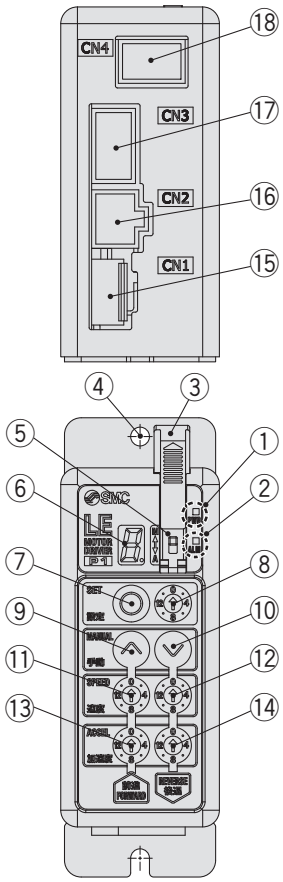
Item	LECP1
Compatible motor	Step motor (Servo/24 VDC)
Power supply Note 1)	Power supply voltage: 24 VDC ±10 %, Max. current consumption: 3A (Peak 5A) Note 2) [Including the motor drive power, control power supply, stop, lock release]
Parallel input	6 inputs (Photo-coupler isolation)
Parallel output	6 outputs (Photo-coupler isolation)
Stop points	14 points (Position number 1 to 14(E))
Compatible encoder	Incremental A/B phase (800 pulse/rotation)
Memory	EEPROM
LED indicator	LED (Green/Red) one of each
7-segment LED display Note 3)	1 digit, 7-segment display (Red) Figures are expressed in hexadecimal ("10" to "15" in decimal number are expressed as "A" to "F")
Lock control	Forced-lock release terminal Note 4)
Cable length [m]	I/O cable: 5 or less, Actuator cable: 20 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)
Storage temperature range [°C]	–10 to 60 (No freezing)
Storage humidity range [%RH]	90 or less (No condensation)
Insulation resistance [MΩ]	Between the housing and SG terminal: 50 (500 VDC)
Weight [g]	130 (Screw mounting), 150 (DIN rail mounting)

Note 1) Do not use the power supply of "inrush current prevention type" for the controller input power supply. When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the each actuator's operation manual etc. for details.
Note 3) "10" to "15" in decimal number are displayed as follows in the 7-segment LED.

Decimal display	10	11	12	13	14	15
Hexadecimal display	A	b	c	d	E	F

Note 4) Applicable to non-magnetizing lock.

Controller Details



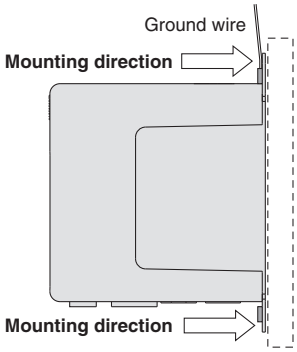
No.	Display	Description	Details
①	**PWR**	Power supply LED	Power supply ON/Servo ON : Green turns on Power supply ON/Servo OFF: Green flashes
②	**ALM**	Alarm LED	With alarm : Red turns on Parameter setting : Red flashes
③	—	Cover	Change and protection of the mode switch (Close the cover after changing switch)
④	—	FG	Frame ground (Tighten the bolt with the nut when mounting the controller. Connect the ground wire.)
⑤	—	Mode switch	Switch the mode between manual and auto.
⑥	—	7-segment LED	Stop position, the value set by ⑧ and alarm information are displayed.
⑦	**SET**	Set button	Decide the settings or drive operation in Manual mode.
⑧	—	Position selecting switch	Assign the position to drive (1 to 14), and the origin position (15).
⑨	**MANUAL**	Manual forward button	Perform forward jog and inching.
⑩		Manual reverse button	Perform reverse jog and inching.
⑪	**SPEED**	Forward speed switch	16 forward speeds are available.
⑫		Reverse speed switch	16 reverse speeds are available.
⑬	**ACCEL**	Forward acceleration switch	16 forward acceleration steps are available.
⑭		Reverse acceleration switch	16 reverse acceleration steps are available.
⑮	**CN1**	Power supply connector	Connect the power supply cable.
⑯	**CN2**	Motor connector	Connect the motor connector.
⑰	**CN3**	Encoder connector	Connect the encoder connector.
⑱	**CN4**	I/O connector	Connect I/O cable.

How to Mount

Controller mounting shown below.

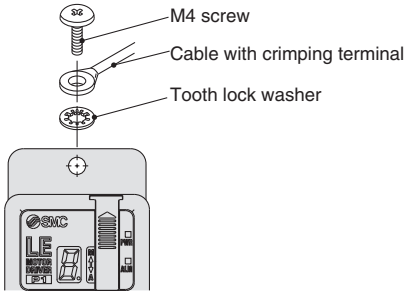
1. Mounting screw (LECP1□□-□)

(Installation with two M4 screws)



2. Grounding

Tighten the bolt with the nut when mounting the ground wire as shown below.



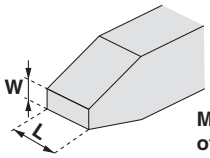
Controller

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

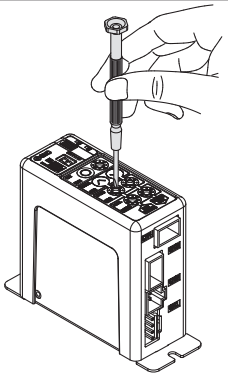
⚠Caution

- M4 screws, cable with crimping terminal and tooth lock washer are not included. Be sure to carry out grounding earth in order to ensure the noise tolerance.
- Use a watchmaker's screwdriver of the size shown below when changing position switch ⑧ and the set value of the speed/acceleration switch ⑪ to ⑭.

Size
End width **L**: 2.0 to 2.4 [mm]
End thickness **W**: 0.5 to 0.6 [mm]

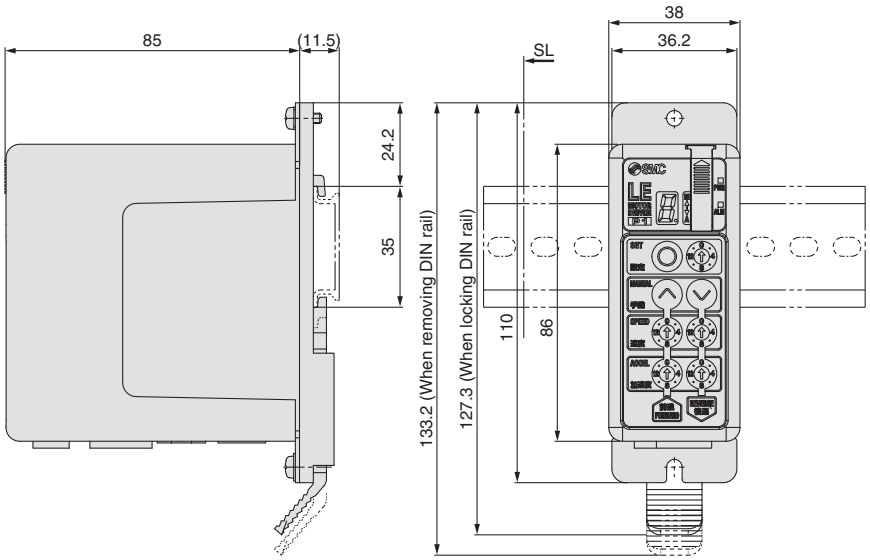


Magnified view of the end of the screwdriver



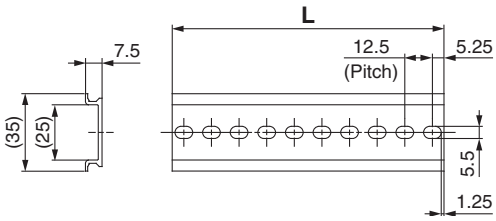
Dimensions

DIN rail mounting (LEC□1□□D-□)



DIN rail
AXT100-DR-□

∗ For □, enter a number from the "No." line in the table below.
Refer to the dimensions above for the mounting dimensions.



L Dimension [mm]

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
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	273

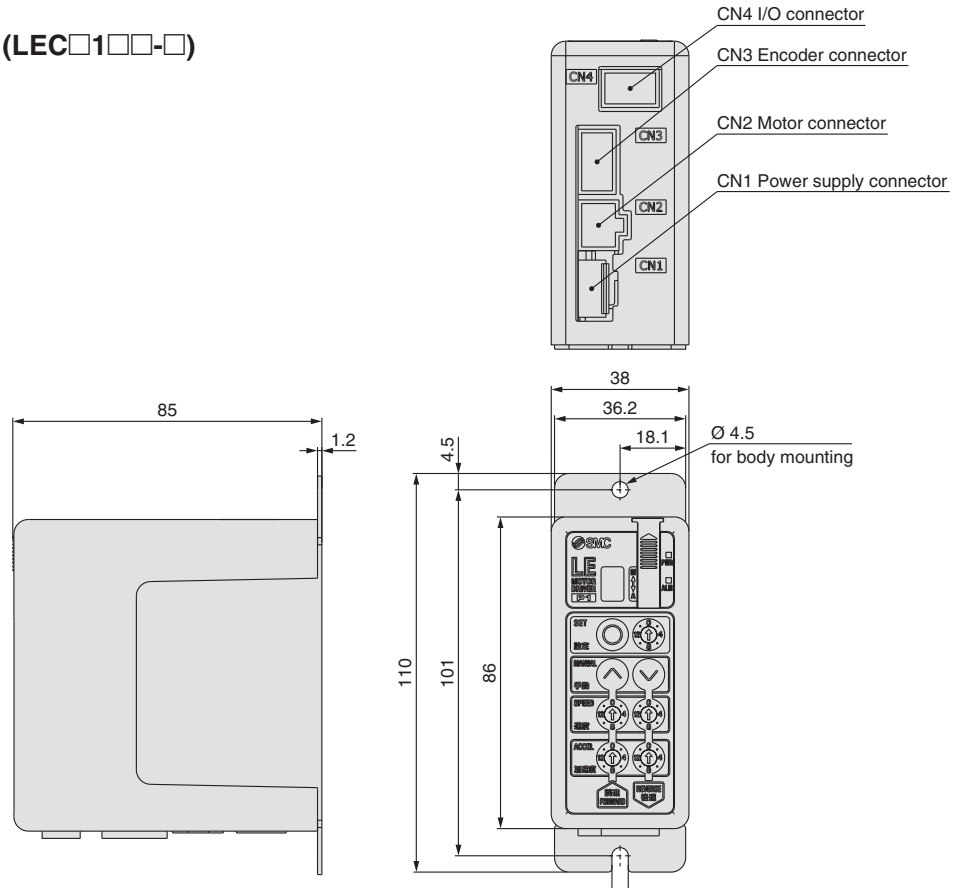
No.	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5	498	510.5

DIN rail mounting adapter

LEC-1-D0 (with 2 mounting screws)

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

Screw mounting (LEC□1□□-□)



Wiring Example 1

Power Supply Connector: CN1

* When you connect a CN1 power supply connector, use the power supply cable (LEC-CK1-1).
* Power supply cable (LEC-CK1-1) is an accessory.

CN1 Power Supply Connector Terminal for LECP1

Terminal name	Cable colour	Function	Details
0V	Blue	Common supply (–)	M 24V terminal/C 24V terminal/BK RLS terminal are common (–).
M 24V	White	Motor power supply (+)	Motor power supply (+) supplied to the controller
C 24V	Brown	Control power supply (+)	Control power supply (+) supplied to the controller
BK RLS	Black	Lock release (+)	Input (+) for releasing the lock

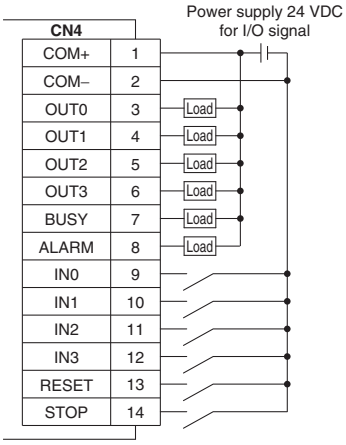
Power supply cable for LECP1 (LEC-CK1-1)

Wiring Example 2

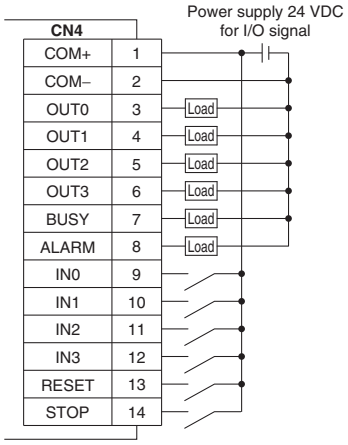
Parallel I/O Connector: CN4

* When you connect a PLC etc., to the CN4 parallel I/O connector, use the I/O cable (LEC-CK4-□).
* The wiring should be changed depending on the type of the parallel I/O (NPN or PNP).

■NPN



■PNP



Input Signal

Name	Details
COM+	Connects the power supply 24 V for input/output signal
COM–	Connects the power supply 0 V for input/output signal
IN0 to IN3	• Instruction to drive (input as a combination of IN0 to IN3) • Instruction to return to origin (IN0 to IN3 all ON simultaneously) Example - (instruction to drive for position no. 5) IN3: OFF, IN2: ON, IN1: OFF, IN0: ON
RESET	Alarm reset and operation interruption During operation: deceleration stop from position at which signal is input (servo ON maintained) While alarm is active: alarm reset
STOP	Instruction to stop (after maximum deceleration stop, servo OFF)

Output Signal

Name	Details
OUT0 to OUT3	Turns on when the positioning or pushing is completed. (Output is instructed in the combination of OUT0 to 3.) Example - (operation complete for position no. 3) OUT3: OFF, OUT2: OFF, OUT1: ON, OUT0: ON
BUSY	Outputs when the actuator is moving
*ALARM Note)	Not output when alarm is active or servo OFF

Note) Signal of negative-logic circuit (N.C.)

Input Signal [IN0 - IN3] Position Number Chart ○: OFF ●: ON

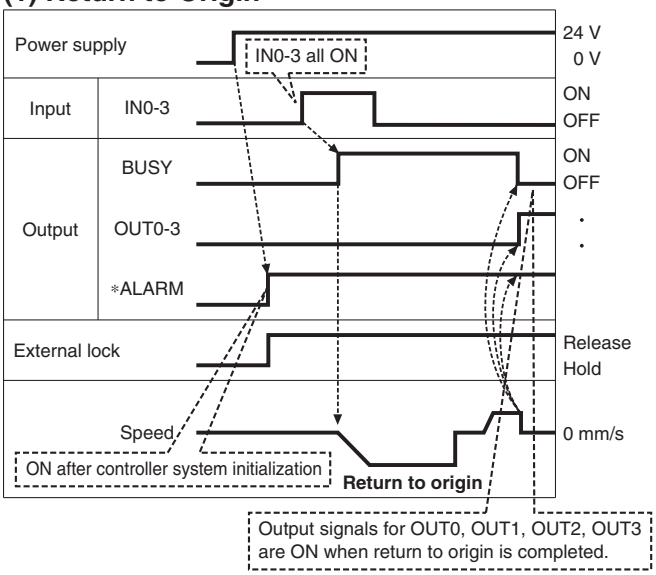
Position number	IN3	IN2	IN1	IN0
1	○	○	○	●
2	○	○	●	○
3	○	○	●	●
4	○	●	○	○
5	○	●	○	●
6	○	●	●	○
7	○	●	●	●
8	●	○	○	○
9	●	○	○	●
10 (A)	●	○	●	○
11 (B)	●	○	●	●
12 (C)	●	●	○	○
13 (D)	●	●	○	●
14 (E)	●	●	●	○
Return to origin	●	●	●	●

Output Signal [OUT0 - OUT3] Position Number Chart ○: OFF ●: ON

Position number	OUT3	OUT2	OUT1	OUT0
1	○	○	○	●
2	○	○	●	○
3	○	○	●	●
4	○	●	○	○
5	○	●	○	●
6	○	●	●	○
7	○	●	●	●
8	●	○	○	○
9	●	○	○	●
10 (A)	●	○	●	○
11 (B)	●	○	●	●
12 (C)	●	●	○	○
13 (D)	●	●	○	●
14 (E)	●	●	●	○
Return to origin	●	●	●	●

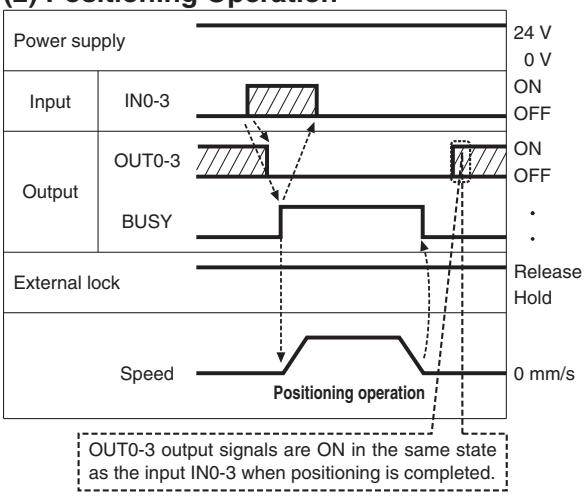
Signal Timing

(1) Return to Origin

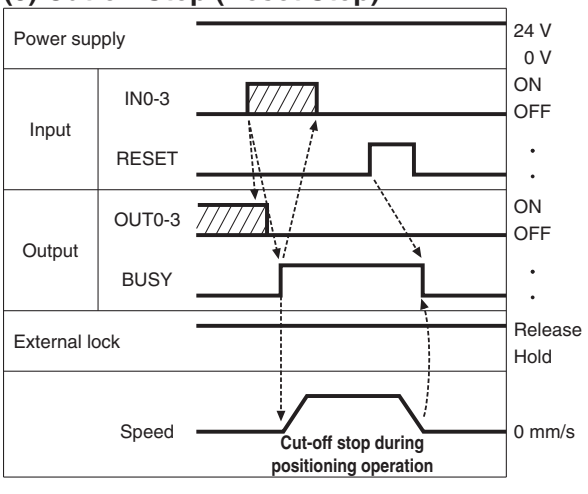


∗ "∗ALARM" is expressed as negative-logic circuit.

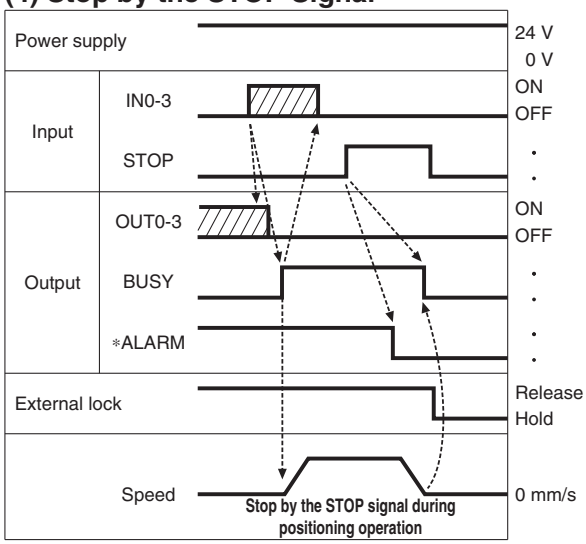
(2) Positioning Operation



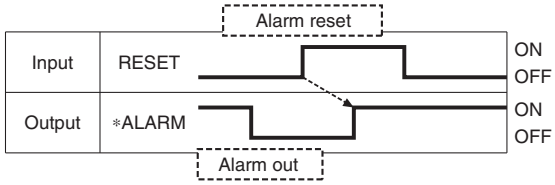
(3) Cut-off Stop (Reset Stop)



(4) Stop by the STOP Signal



(5) Alarm Reset



∗ "∗ALARM" is expressed as negative-logic circuit.

Options: Actuator Cable

[Robotic cable, standard cable for step motor (Servo/24 VDC)]

LE − CP − 1 − ☐

Cable length (L) [m]

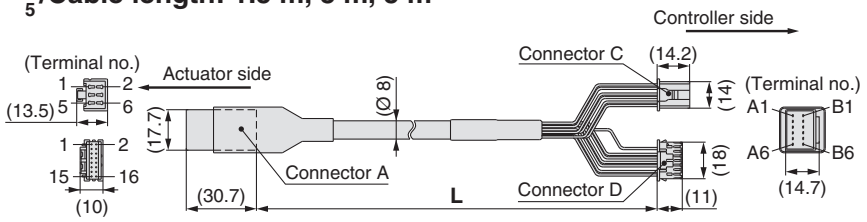
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

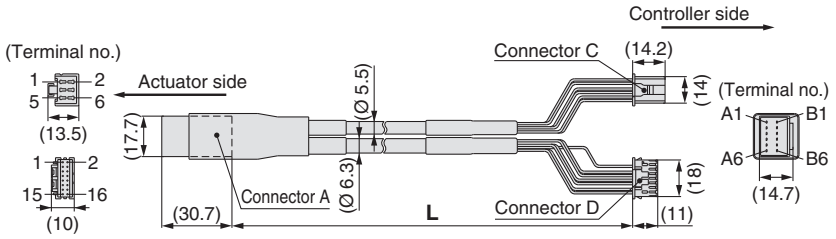
Cable type

—	Robotic cable (Flexible cable)
S	Standard cable

LE-CP-$^{1}_{3}_{5}$/Cable length: 1.5 m, 3 m, 5 m



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

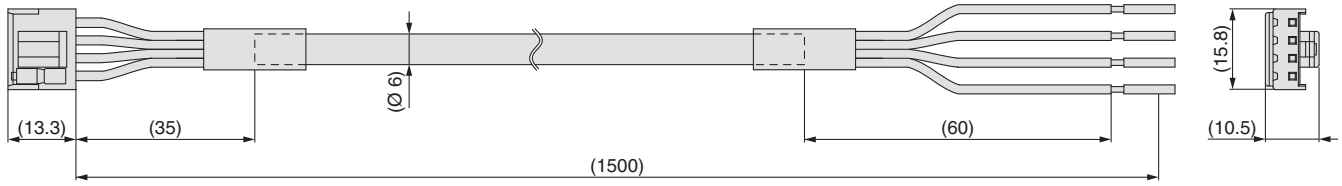


Signal	Connector A terminal no.	Cable colour	Connector C terminal no.
A	B-1	Brown	2
$\overline{A}$	A-1	Red	1
B	B-2	Orange	6
$\overline{B}$	A-2	Yellow	5
COM-A/COM	B-3	Green	3
COM-B/—	A-3	Blue	4
		Shield	
		Cable colour	Connector D terminal no.
Vcc	B-4	Brown	12
GND	A-4	Black	13
A	B-5	Red	7
A	A-5	Black	6
B	B-6	Orange	9
B	A-6	Black	8
		—	3

Options

[Power supply cable]

LEC−CK1−1



Terminal name	Covered colour	Function
0V	Blue	Common supply (−)
M 24V	White	Motor power supply (+)
C 24V	Brown	Control power supply (+)
BK RLS	Black	Lock release (+)

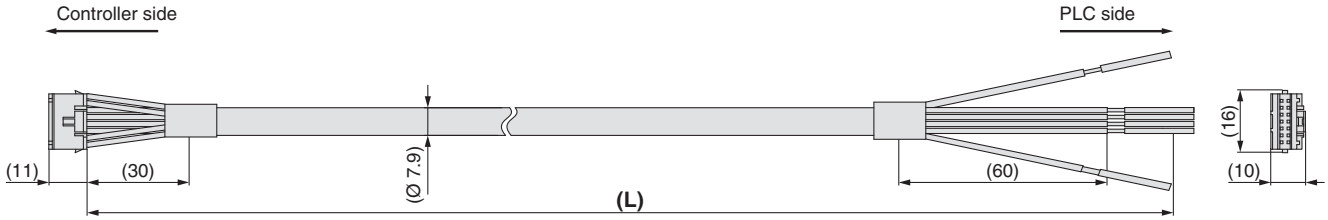
∗ Conductor size: AWG20

[I/O cable]

LEC−CK4−□

Cable length (L) [m]

1	1.5
3	3
5	5



Terminal no.	Insulation colour	Dot mark	Dot colour	Function
1	Light brown	■	Black	COM+
2	Light brown	■	Red	COM−
3	Yellow	■	Black	OUT0
4	Yellow	■	Red	OUT1
5	Light green	■	Black	OUT2
6	Light green	■	Red	OUT3
7	Grey	■	Black	BUSY
8	Grey	■	Red	ALARM
9	White	■	Black	IN0
10	White	■	Red	IN1
11	Light brown	■ ■	Black	IN2
12	Light brown	■ ■	Red	IN3
13	Yellow	■ ■	Black	RESET
14	Yellow	■ ■	Red	STOP

∗ Conductor size: AWG26

∗ Parallel I/O signal is valid in auto mode. While the test function operates at manual mode, only the output is valid.

Pulse Input Type
Series LECPA

How to Order

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LE series and the LECPA series. The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to 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 conformity to the EMC directive for the machinery and equipment as a whole.

② For the LECPA series (step motor driver), EMC compliance was tested by installing a noise filter set (LEC-NFA).
Refer to page 81 for the noise filter set. Refer to the LECPA Operation Manual for installation.

[UL-compliant products]

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

LECP AP 1 – LEHZ10LK2-4

Driver type

AN	Pulse input type (NPN)
AP	Pulse input type (PNP)

I/O cable length [m]

—	None
1	1.5
3	3*
5	5*

* Pulse input usable only with differential. Only 1.5 m cables usable with open collector.

Driver mounting

—	Screw mounting
D Note)	DIN rail mounting

Note) DIN rail is not included. Order it separately.

Actuator part number

Part number except cable specifications and actuator options
Example: Enter "**LEHZ10LK2-4**" for the LEHZ10LK2-4AF-R16N1.

BC	Blank controller Note)

Note) The dedicated software (LEC-BCW) is required.

* When controller equipped type is selected when ordering the LE series, you do not need to order this driver.
* When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) separately.

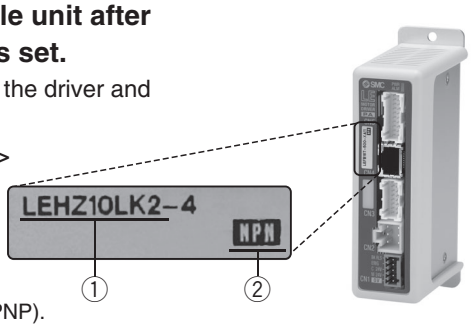
The driver is sold as single unit after the compatible actuator is set.

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

<Check the following before use.>

① Check the actuator label for model number. This matches the driver.

② Check Parallel I/O configuration matches (NPN or PNP).



* Refer to the operation manual for using the products. Please download it via our website, http://www.smc.eu

Precautions on blank controller (LECPA□□-BC)

Blank controller is a controller to which the customer can write the data of the actuator to be combined and used. Use the dedicated software (LEC-BCW) for data writing.

- Please download the dedicated software (LEC-BCW) via our website.
- Order the controller setting kit (LEC-W2) separately to use this software.

SMC website
http://www.smc.eu

Specifications

Item	LECPA
Compatible motor	Step motor (Servo/24 VDC)
Power supply Note 1)	Power voltage: 24 VDC ±10 % Note 2) [Including motor drive power, control power, stop, lock release]
Parallel input	5 inputs (Except photo-coupler isolation, pulse input terminal, COM terminal)
Parallel output	9 outputs (Photo-coupler isolation)
Pulse signal input	Maximum frequency: 60 kpps (Open collector), 200 kpps (Differential) Input method: 1 pulse mode (Pulse input in direction), 2 pulse mode (Pulse input in differing directions)
Compatible encoder	Incremental A/B phase (Encoder resolution: 800 pulse/rotation)
Serial communication	RS485 (Modbus protocol compliant)
Memory	EEPROM
LED indicator	LED (Green/Red) one of each
Lock control	Forced-lock release terminal Note 3)
Cable length [m]	I/O cable: 1.5 or less (Open collector), 5 or less (Differential), Actuator cable: 20 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)
Storage temperature range [°C]	−10 to 60 (No freezing)
Storage humidity range [%RH]	90 or less (No condensation)
Insulation resistance [MΩ]	Between the housing and SG terminal: 50 (500 VDC)
Weight [g]	120 (Screw mounting), 140 (DIN rail mounting)

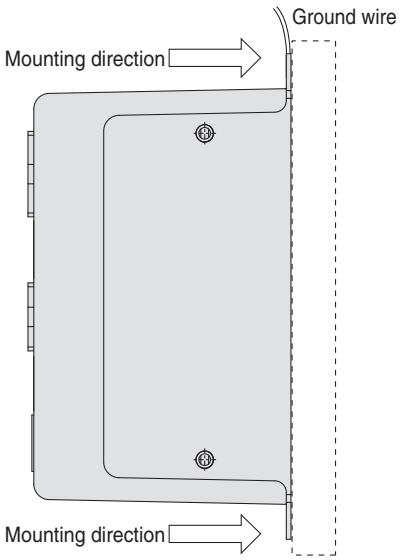
Note 1) Do not use the power supply of "inrush current prevention type" for the driver power supply. When conformity to UL is required, the electric actuator and driver should be used with a UL1310 Class 2 power supply.

Note 2) The power consumption changes depending on the actuator model. Refer to the specifications of actuator for more details.

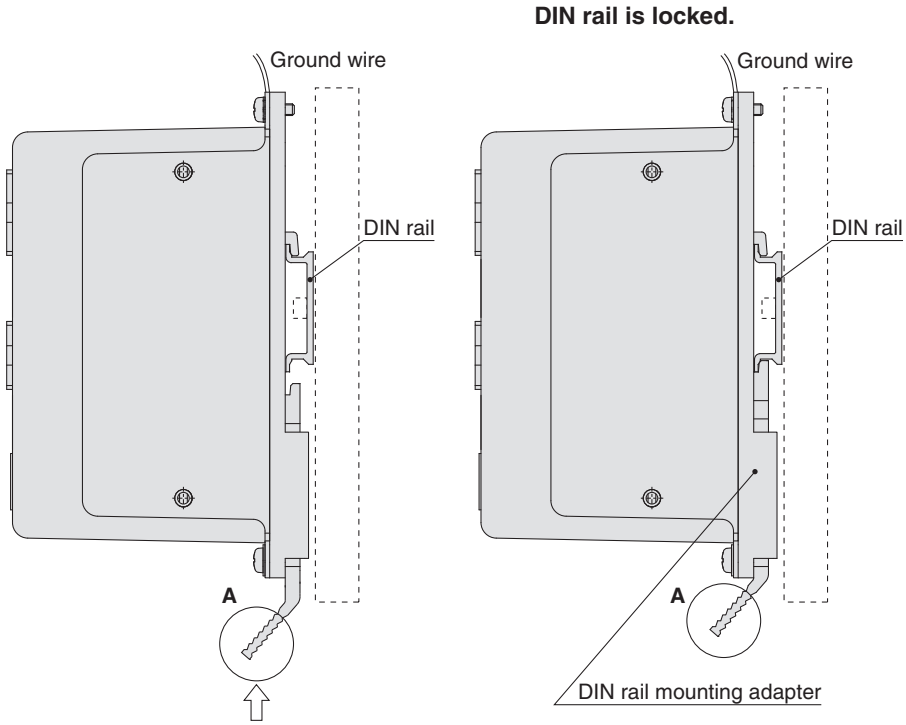
Note 3) Applicable to non-magnetizing lock.

How to Mount

a) Screw mounting (LECPA□□-□)
(Installation with two M4 screws)



b) DIN rail mounting (LECPA□□D-□)
(Installation with the DIN rail)

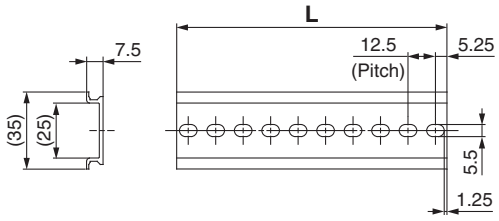


Hook the driver on the DIN rail and press the lever of section **A** in the arrow direction to lock it.

Note) The space between the drivers 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 dimensions on page 77 for the mounting dimensions.



L Dimension [mm]

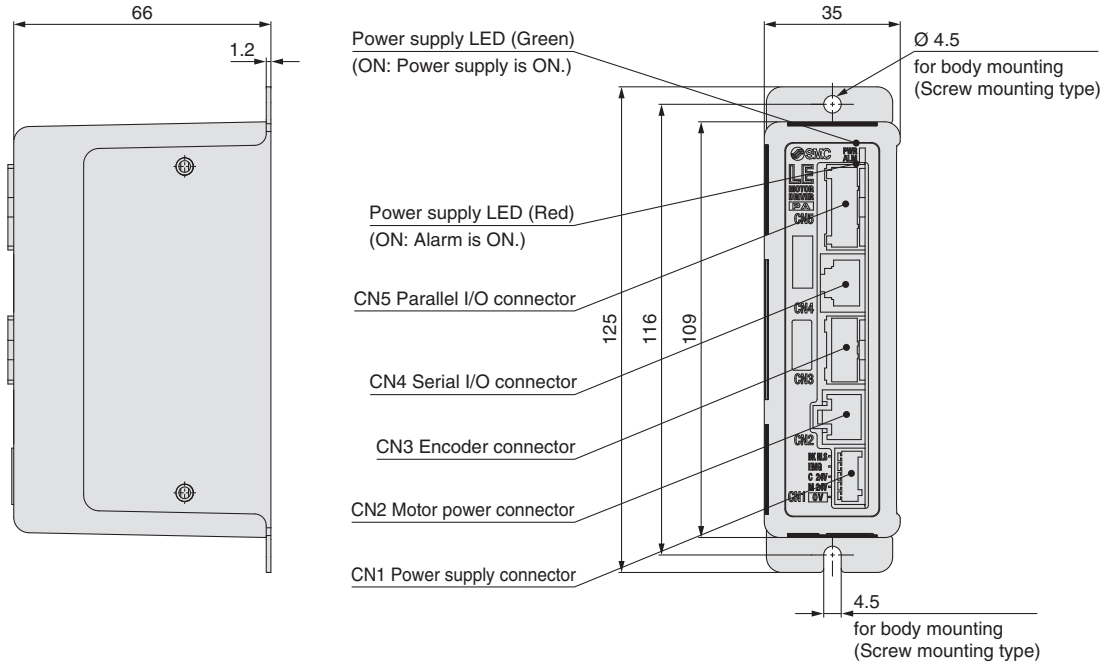
No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L	23	35.5	48	60.5	73	85.5	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5	223	235.5	248	260.5
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5	498	510.5

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

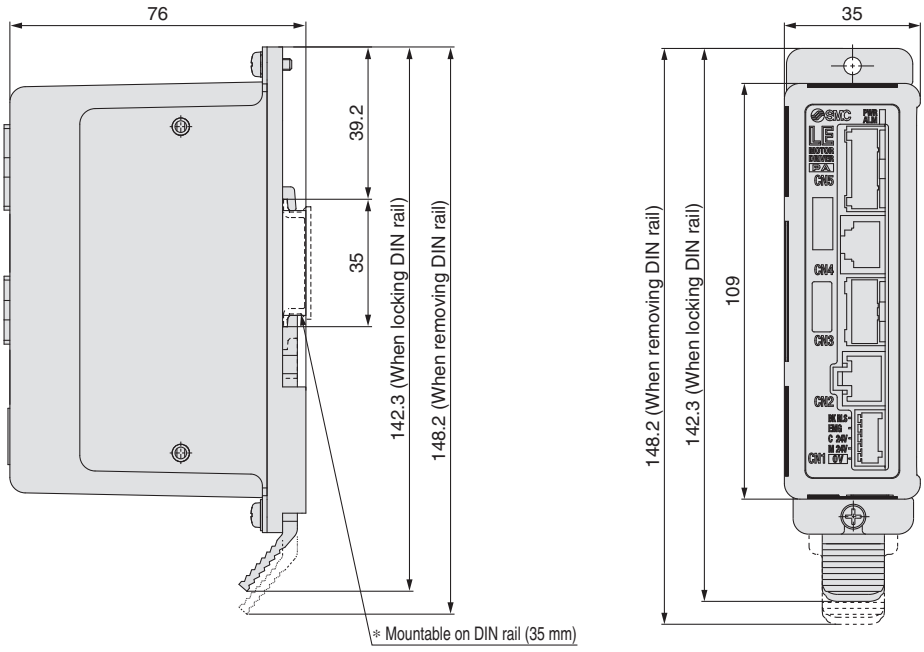
This should be used when the DIN rail mounting adapter is mounted onto the screw mounting type driver afterward.

Dimensions

a) Screw mounting (LECPA□□-□)



b) DIN rail mounting (LECPA□□D-□)



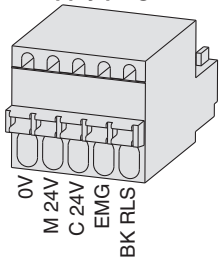
Wiring Example 1

Power Supply Connector: CN1 * Power supply plug is an accessory.

CN1 Power Supply Connector Terminal for LECPA (PHOENIX CONTACT FK-MC0.5/5-ST-2.5)

Terminal name	Function	Details
0V	Common supply (–)	M 24V terminal/C 24V terminal/EMG terminal/BK RLS terminal are common (–).
M 24V	Motor power supply (+)	Motor power supply (+) supplied to the driver
C 24V	Control power supply (+)	Control power supply (+) supplied to the driver
EMG	Stop (+)	Input (+) for releasing the stop
BK RLS	Lock release (+)	Input (+) for releasing the lock

Power supply plug for LECPA



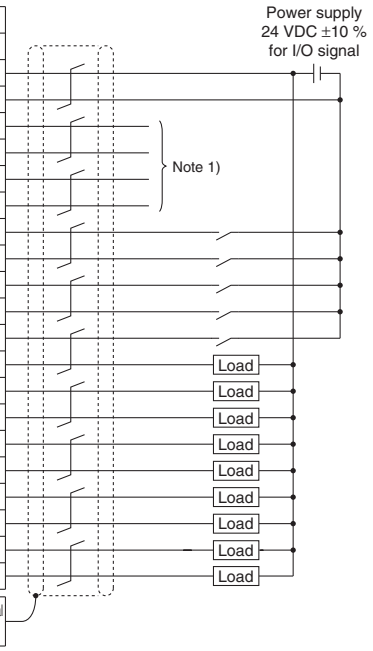
Wiring Example 2

Parallel I/O Connector: CN5

* When you connect a PLC etc., to the CN5 parallel I/O connector, use the I/O cable (LEC-CL5-□).
* The wiring should be changed depending on the type of the parallel I/O (NPN or PNP).

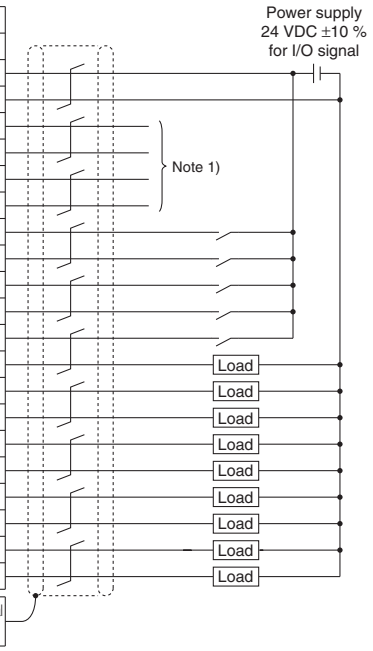
LECPAN□□-□ (NPN)

CN5		
Terminal name	Function	Pin no.
COM+	24 V	1
COM–	0 V	2
NP+	Pulse signal	3
NP–	Pulse signal	4
PP+	Pulse signal	5
PP–	Pulse signal	6
SETUP	Input	7
RESET	Input	8
SVON	Input	9
CLR	Input	10
TL	Input	11
TLOUT	Output	12
WAREA	Output	13
BUSY	Output	14
SETON	Output	15
INP	Output	16
SVRE	Output	17
*ESTOP Note 2)	Output	18
*ALARM Note 2)	Output	19
AREA	Output	20
FG	Round terminal	0.5-5



LECPAP□□-□ (PNP)

CN5		
Terminal name	Function	Pin no.
COM+	24 V	1
COM–	0 V	2
NP+	Pulse signal	3
NP–	Pulse signal	4
PP+	Pulse signal	5
PP–	Pulse signal	6
SETUP	Input	7
RESET	Input	8
SVON	Input	9
CLR	Input	10
TL	Input	11
TLOUT	Output	12
WAREA	Output	13
BUSY	Output	14
SETON	Output	15
INP	Output	16
SVRE	Output	17
*ESTOP Note 2)	Output	18
*ALARM Note 2)	Output	19
AREA	Output	20
FG	Round terminal	0.5-5



Note 1) For pulse signal wiring method, refer to "Pulse Signal Wiring Details".
Note 2) Output when the power supply of the driver is ON. (N.C.)

Input Signal

Name	Details
COM+	Connects the power supply 24 V for input/output signal
COM–	Connects the power supply 0 V for input/output signal
SETUP	Instruction to return to origin
RESET	Alarm reset
SVON	Servo ON instruction
CLR	Deviation reset
TL	Instruction to pushing operation

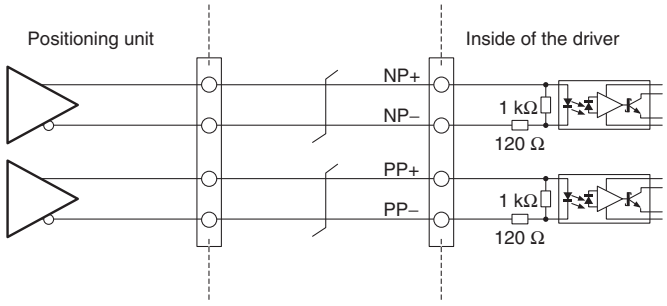
Output Signal

Name	Details
BUSY	Outputs when the actuator is operating
SETON	Outputs when returning to origin
INP	Outputs when target position is reached
SVRE	Outputs when servo is on
*ESTOP Note 3)	Not output when EMG stop is instructed
*ALARM Note 3)	Not output when alarm is generated
AREA	Outputs within the area output setting range
WAREA	Outputs within W-AREA output setting range
TLOUT	Outputs during pushing operation

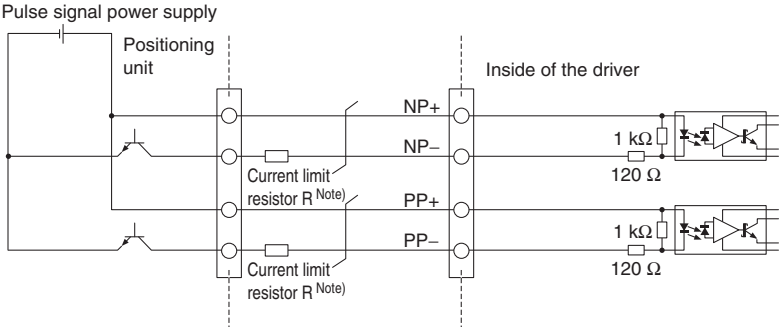
Note 3) Signal of negative-logic circuit ON (N.C.)

Pulse Signal Wiring Details

•Pulse signal output of positioning unit is differential output



•Pulse signal output of positioning unit is open collector output

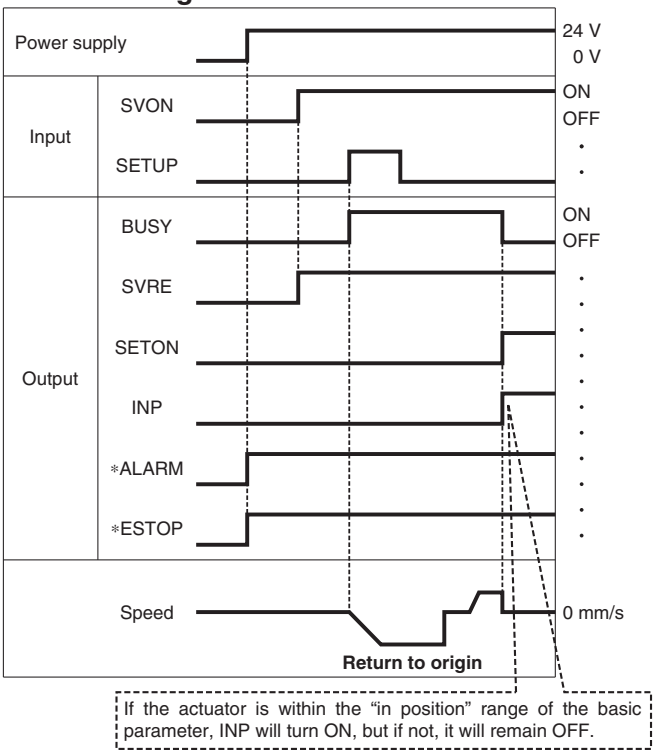


Note) Connect the current limit resistor R in series to correspond to the pulse signal voltage.

Pulse signal power supply voltage	Current limit resistor R specifications	Current limit resistor part no.
24 VDC ±10 %	3.3 kΩ ±5 % (0.5 W or more)	LEC-PA-R-332
5 VDC ±5 %	390 Ω ±5 % (0.1 W or more)	LEC-PA-R-391

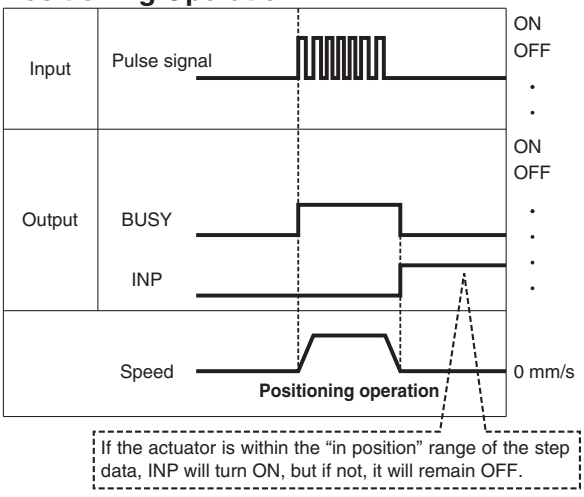
Signal Timing

Return to Origin

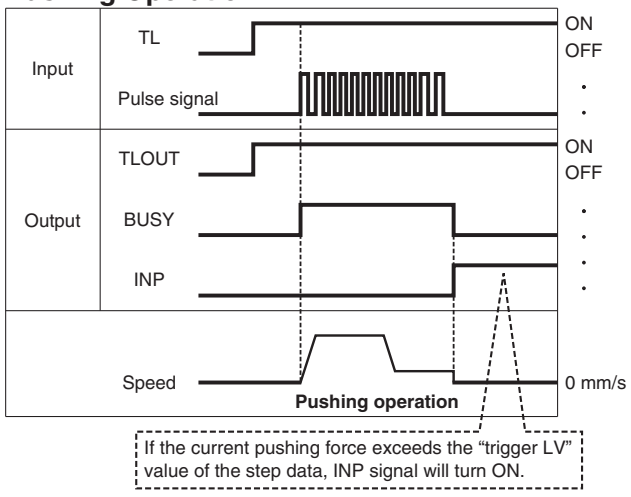


∗ “∗ALARM” and “∗ESTOP” are expressed as negative-logic circuit.

Positioning Operation

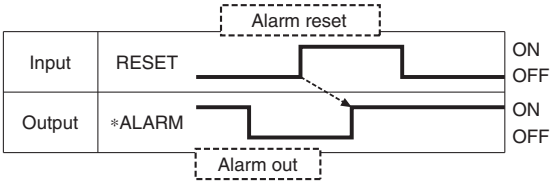


Pushing Operation



Note) If pushing operation is stopped when there is no pulse deviation, the moving part of the actuator may pulsate.

Alarm Reset



∗ “∗ALARM” is expressed as negative-logic circuit.

Options: Actuator Cable

[Robotic cable, standard cable for step motor (Servo/24 VDC)]

LE – CP – 1 – ☐

Cable length (L) [m]

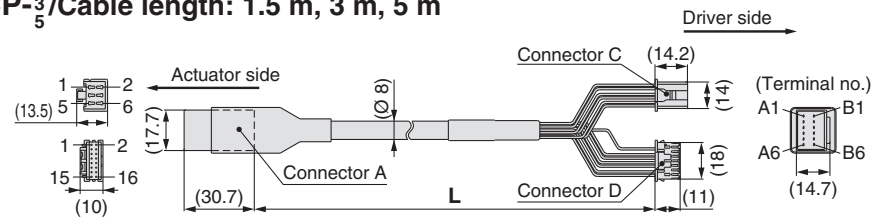
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

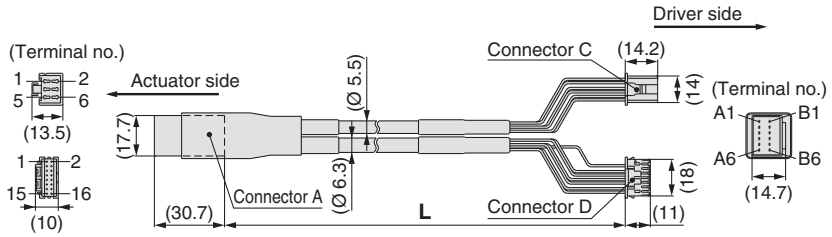
Cable type

—	Robotic cable (Flexible cable)
S	Standard cable

LE-CP-$^{1}_{3}$$_{5}$/Cable length: 1.5 m, 3 m, 5 m



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



Signal	Connector A terminal no.	Cable colour	Connector C terminal no.
A	B-1	Brown	2
$\overline{A}$	A-1	Red	1
B	B-2	Orange	6
$\overline{B}$	A-2	Yellow	5
COM-A/COM	B-3	Green	3
COM-B/—	A-3	Blue	4
		Shield	
Vcc	B-4	Cable colour	Connector D terminal no.
GND	A-4	Brown	12
$\overline{A}$	B-5	Black	13
A	A-5	Red	7
$\overline{B}$	B-6	Black	6
B	A-6	Orange	9
		Black	8
		—	3

Options

[I/O cable]

LEC-C L5-1

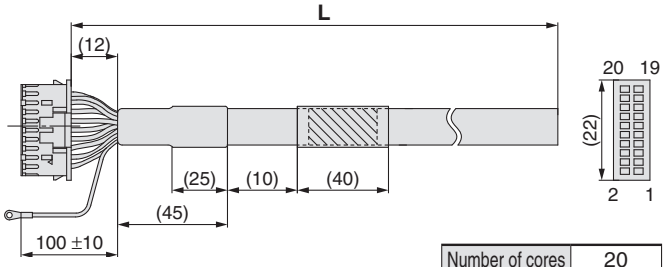
I/O cable type

L5	For LECPA

I/O cable length (L)

1	1.5 m
3	3 m*
5	5 m*

* Pulse input usable only with differential. Only 1.5 m cables usable with open collector.



Number of cores	20
AWG size	24

Pin no.	Insulation colour	Dot mark	Dot colour
1	Light brown	■	Black
2	Light brown	■	Red
3	Yellow	■	Black
4	Yellow	■	Red
5	Light green	■	Black
6	Light green	■	Red
7	Grey	■	Black
8	Grey	■	Red
9	White	■	Black
10	White	■	Red
11	Light brown	■■	Black

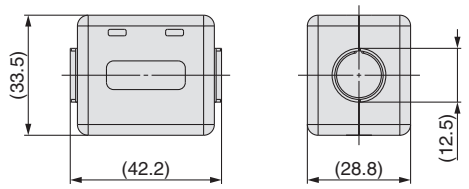
Pin no.	Insulation colour	Dot mark	Dot colour
12	Light brown	■■	Red
13	Yellow	■■	Black
14	Yellow	■■	Red
15	Light green	■■	Black
16	Light green	■■	Red
17	Grey	■■	Black
18	Grey	■■	Red
19	White	■■	Black
20	White	■■	Red

Round terminal 0.5-5	Green

[Noise filter set]
Step motor driver (Pulse input type)

LEC-NFA

Contents of the set: 2 noise filters
(Manufactured by WURTH ELEKTRONIK: 74271222)



* Refer to the LECPA series Operation Manual for installation.

[Current limit resistor]

This optional resistor (LEC-PA-R-□) is used when the pulse signal output of the positioning unit is open collector output.

LEC-PA-R-□

Current limit resistor

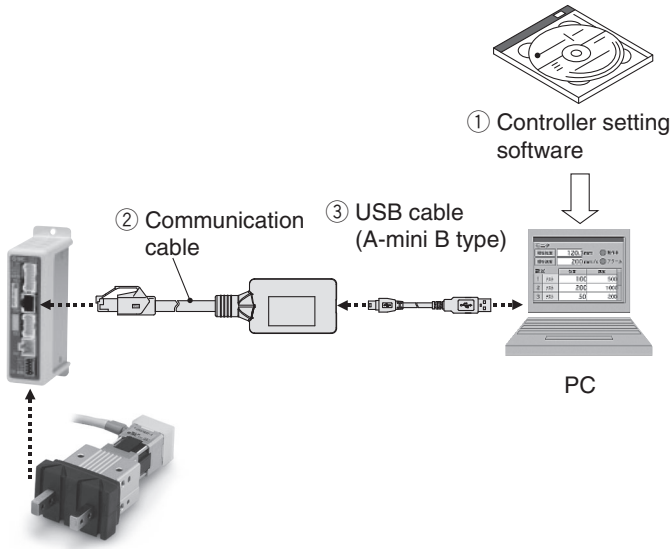
Symbol	Resistance	Pulse signal power supply voltage
332	3.3 kΩ ±5 %	24 VDC ±10 %
391	390 Ω ±5 %	5 VDC ±5 %

* Select a current limit resistor that corresponds to the pulse signal power supply voltage.
* For the LEC-PA-R-□, two pieces are shipped as a set.

Series LEC

Windows®XP, Windows®7 compatible

Controller Setting Kit/LEC-W2



How to Order

LEC-W2

Controller setting kit
(Japanese and English are available.)

Contents

	Description	Model*
①	Controller setting software (CD-ROM)	LEC-W2-S
②	Communication cable	LEC-W2-C
③	USB cable (between the PC and the communication cable)	LEC-W2-U

* Can be ordered separately.

Compatible Controller/Driver

Step data input type — ***Series LECP6***

Pulse input type — ***Series LECPA***

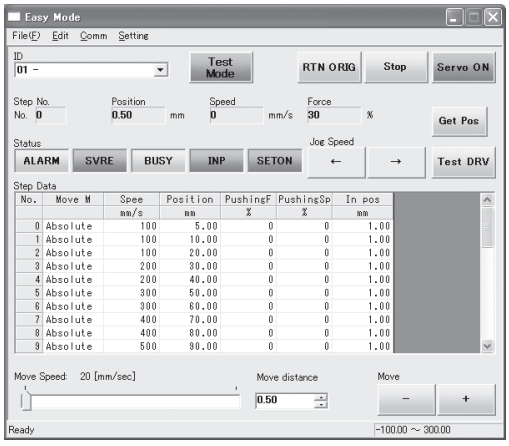
Hardware Requirements

OS	IBM PC/AT compatible machine running Windows®XP (32-bit), Windows®7 (32-bit and 64-bit), Windows®8.1 (32-bit and 64-bit).
Communication interface	USB 1.1 or USB 2.0 ports
Display	XGA (1024 x 768) or more

* Windows®XP, Windows®7 and Windows®8.1 are registered trademarks of Microsoft Corporation in the United States.
* Refer to SMC website for version upgrade information, http://www.smc.eu

Screen Example

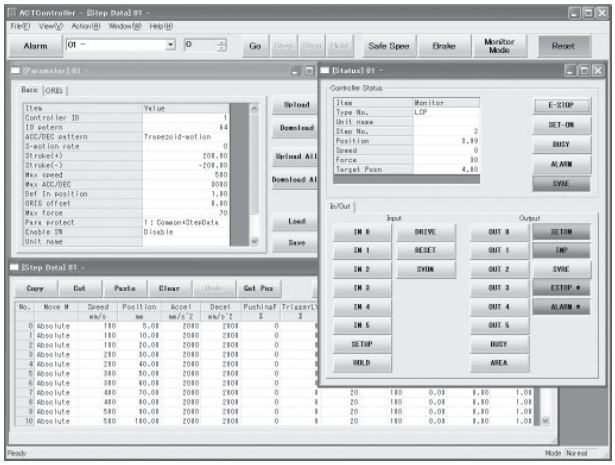
Easy mode screen example



Easy operation and simple setting

- Allowing to set and display actuator step data such as position, speed, force, etc.
- Setting of step data and testing of the drive can be performed on the same page.
- Can be used to jog and move at a constant rate.

Normal mode screen example



Detailed setting

- Step data can be set in detail.
- Signals and terminal status can be monitored.
- Parameters can be set.
- JOG and constant rate movement, return to origin, test operation and testing of forced output can be performed.

Series LEC

Teaching Box/LEC-T1

How to Order

LEC-T1-3EG□

Teaching box

Cable length [m]

3	3

Initial language

J	Japanese
E	English

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

Stop switch

G	Equipped with stop switch

Enable switch

—	None
S	Equipped with enable switch

∗ Interlock switch for jog and test function

Standard functions
- **Chinese character display**
- **Stop switch is provided.**

Option
- **Enable switch is provided.**

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)

[CE-compliant products]
The EMC compliance of the teaching box was tested with the LECP6 series step motor controller (servo/24 VDC) and an applicable actuator.
[UL-compliant products]
When conformity to UL is required, the electric actuator and driver should be used with a UL1310 Class 2 power supply.

Easy Mode

Function	Details
Step data	• Setting of step data
Jog	• Jog operation • Return to origin
Test	• 1 step operation Note 1) • 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

Menu
- Data
- Monitor
- Jog
- Test
- ALM
- TB setting

Data
Step data no.
Setting of two items selected below
Ver. 1.∗∗:
Position, Speed, Force, Acceleration, Deceleration
Ver. 2.∗∗:
Position, Speed, Pushing force, Acceleration, Deceleration, Movement MOD, Trigger LV, Pushing speed, Moving force, Area 1, Area 2, In position

Monitor
Display of step no.
Display of two items selected below
(Position, Speed, Force)

Jog
Return to origin
Jog operation

Test Note 1)
1 step operation

ALM
Active alarm display
Alarm reset

TB setting
Reconnect (Ver. 1.∗∗)
Japanese/English (Ver. 2.∗∗)
Easy/Normal
Set item

Note 1) Not compatible with the LECPA.

Normal Mode

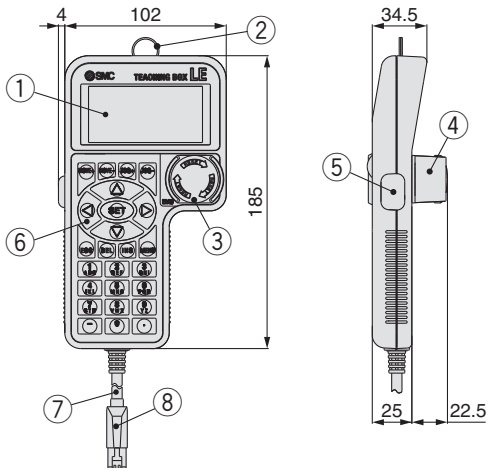
Function	Details
Step data	• Step data setting
Parameter	• Parameters setting
Test	• Jog operation/Constant rate movement • Return to origin • Test drive Note 1) (Specify a maximum of 5 step data and operate.) • Forced output (Forced signal output, Forced terminal output) Note 2)
Monitor	• Drive monitor • Output signal monitor Note 2) • Input signal monitor Note 2) • Output terminal monitor • Input terminal monitor
ALM	• Active alarm display (Alarm reset) • Alarm log record display
File	• Data saving Save the step data and parameters of the driver 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 driver Loads the data which is saved in the teaching box to the driver which is being used for communication. • Delete the saved data. • File protection (Ver. 2.**)
TB setting	• 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	• Reconnection of axis

Menu Operations Flowchart

- **Menu**: Step data / Parameter / Monitor / Test / ALM / File / TB setting / Reconnect
- **Step data**: Step data no. / Movement MOD / Speed / Position / Acceleration / Deceleration / Pushing force / Trigger LV / Pushing speed / Moving force / Area 1, 2 / In position
- **Parameter**: Basic / ORIG
  - **Basic setting**
  - **ORIG setting**
- **Monitor**: Drive / Output signal Note 2) / Input signal Note 2) / Output terminal / Input terminal
  - **DRV monitor**: Position, Speed, Torque / Step no. / Last step no.
  - **Output signal monitor**
  - **Input signal monitor**
  - **Output terminal monitor**
  - **Input terminal monitor**
- **Test**: JOG/MOVE / Return to ORIG / Test drive Note 1) / Forced output Note 2)
- **ALM**: Status / ALM Log record
  - **Status**: Active alarm display / Alarm reset
  - **ALM Log record display**: Log entry display
- **File**: Data saving / Load to driver / File deletion / File protection (Ver. 2.**)
- **TB setting**: Easy/Normal / Language / Backlight / LCD contrast / Beep / Max. connection axis / Password / Distance unit
- **Reconnect**

Note 1) Not compatible with the LECPA.
Note 2) The following signals are compatible with LECPA with TB Ver. 2.10 or newer.
Input: CLR, TL
Output: TLOUT

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 driver

Step Motor Controller

5 types of communication protocols

New IO-Link EtherCAT PROFINET DeviceNet EtherNet/IP

Application

Communication protocol

EtherCAT EtherNet/IP PROFINET DeviceNet IO-Link

PLC

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

Can be additionally installed in an existing network

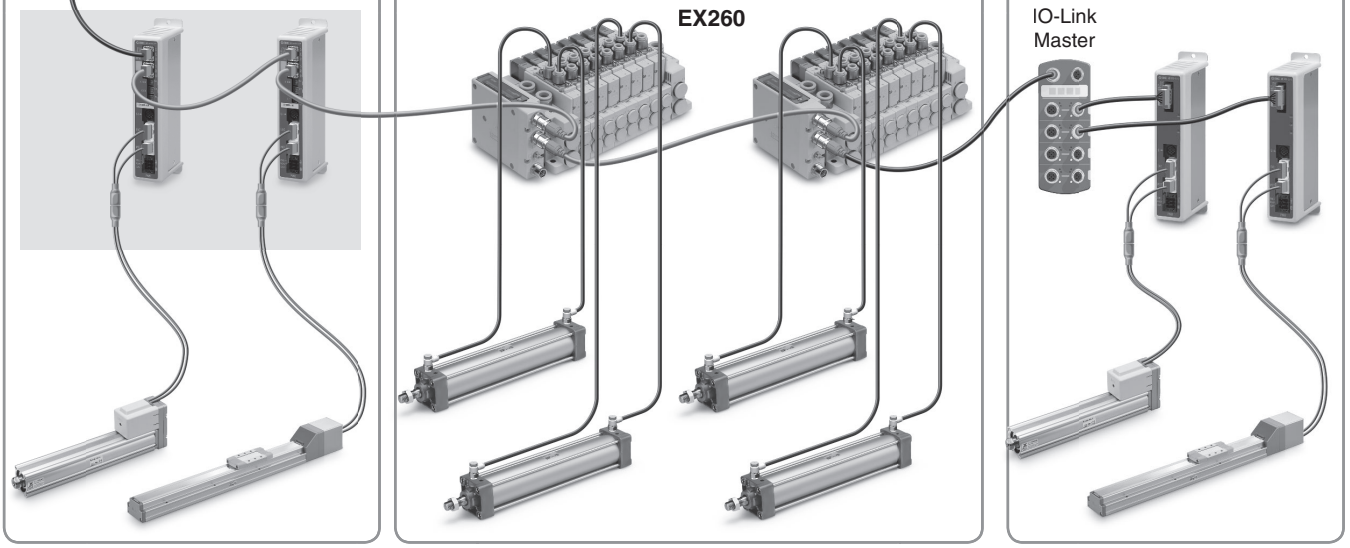
Electric Actuators

Air Cylinders

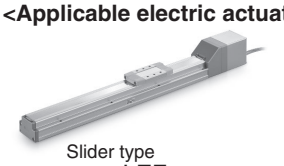
EX260

IO-Link Communication

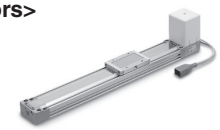
IO-Link Master



<Applicable electric actuators>



Slider type
Series LEF



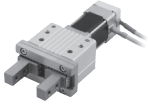
Low-profile slider type
Series LEM

Guide rod slider
Series LEL

Rod type
Series LEY/LEYG

Slide table
Series LES/LESH

Miniature type
Series LEPY/LEPS



Gripper
Series LEH

Rotary table
Series LER

Series JXCE1/91/P1/D1/L1

SMC

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.

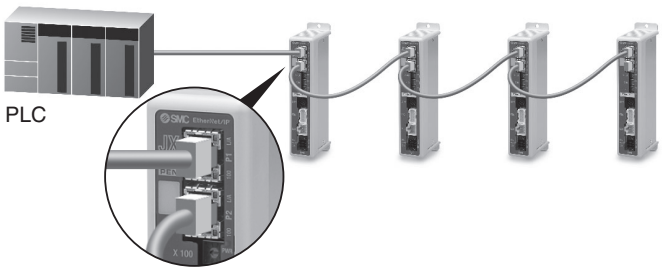
Numerical monitoring available

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.
* 1 to 1 in the case of IO-Link

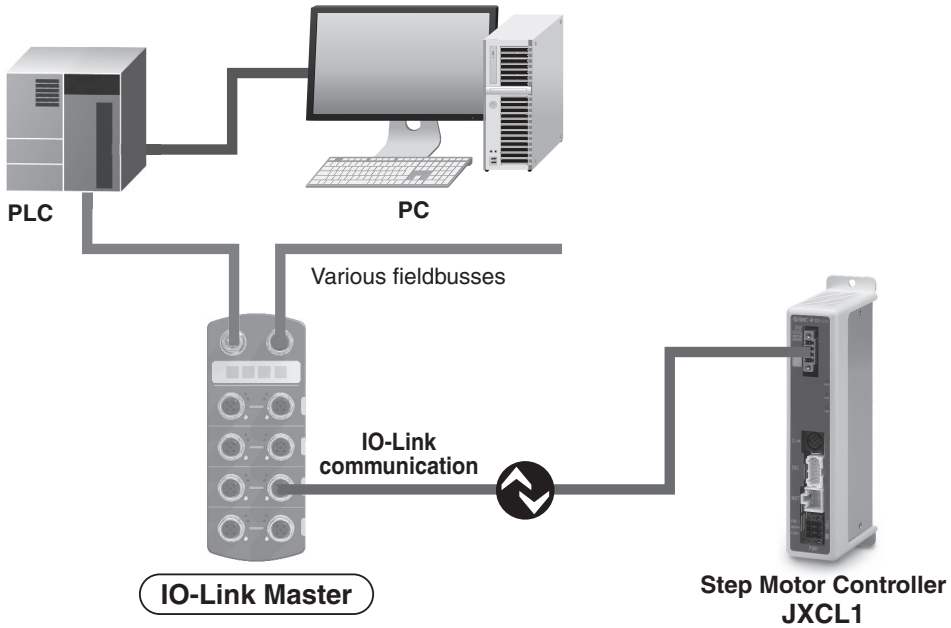


IO-Link communication can be performed.

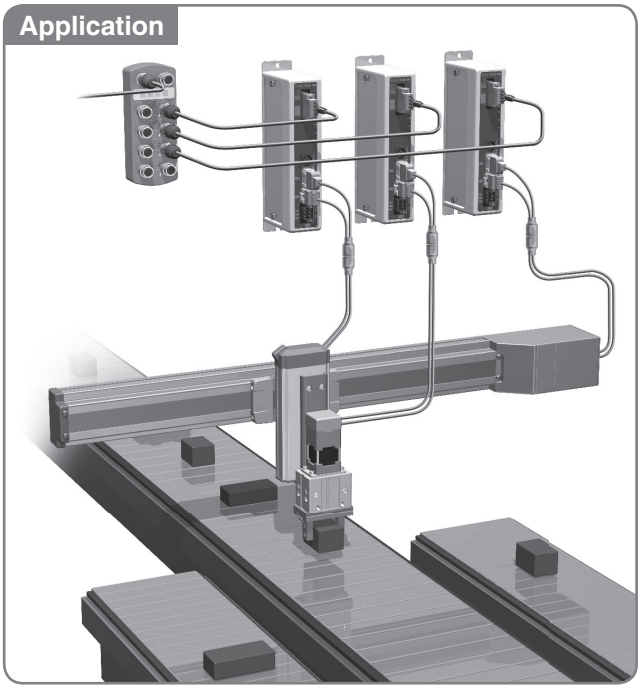
The data storage function eliminates the need for troublesome resetting of step data and parameters when changing over the controller.

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



● 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.

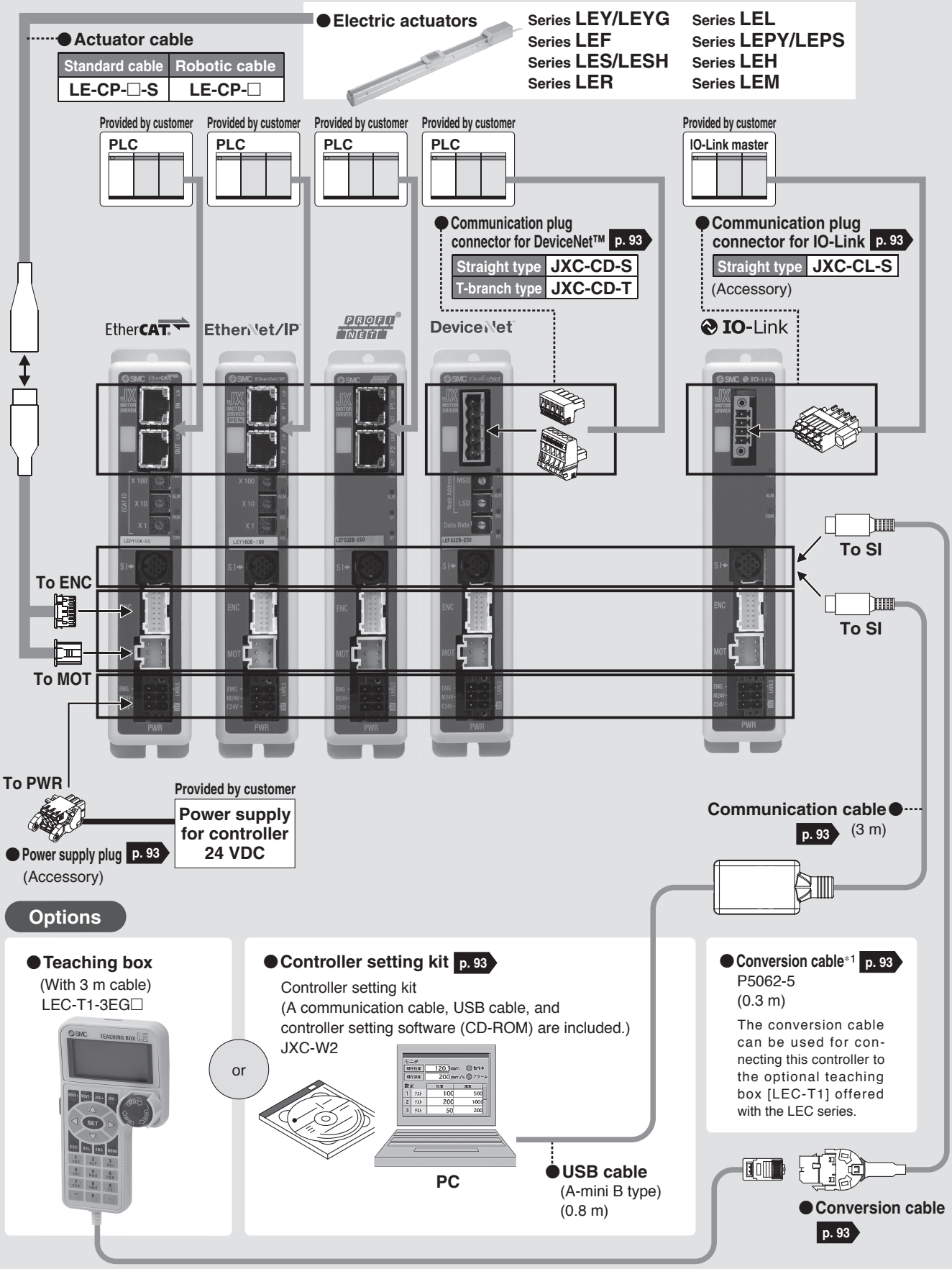
● Data storage function

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

● 4-wire unshielded cables can be used.

*1 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



Options

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

or

●Controller setting kit p. 93
Controller setting kit
(A 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. 93
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. 93

*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.)

Step Motor Controller

Series JXCE1/91/P1/D1/L1

How to Order

Actuator + Controller

LEH16B-100 – R1 CD17T

Actuator type

Refer to "How to Order" in the actuator catalogue available at www.smc.eu.
For compatible actuators, refer to the table below. Example: LEH16B-100B-R1C917

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

∗ Only the step motor type is applicable.

Controller

—	Without controller
C□1□□	With controller

C D 1 7 T

Communication protocol

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

For single axis

Mounting

7	Screw mounting
8∗1	DIN rail

∗1 The DIN rail is not included. It must be ordered separately. (Refer to page 93.)

Actuator cable type/length

—	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.

Option

—	Without 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.

⚠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.

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 LECP6 section on the model selection page of the electric actuators **Web Catalogue**.

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-W 2) separately to use this software.

SMC website
http://www.smc.eu

Communication protocol

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

For single axis

Mounting

7	Screw mounting
8∗1	DIN rail

∗1 The DIN rail is not included. It must be ordered separately. (Refer to page 93.)

Option

—	Without 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.

Actuator part number

Without cable specifications and actuator options
Example: Enter "**LEH16B-100**" for the LEH16B-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 LECP6 section on the model selection page of the electric actuators **Web Catalogue**.

Specifications

Model			JXCE1	JXC91	JXCP1	JXCD1	JXCL1
Network			EtherCAT®	EtherNet/IP™	PROFINET	DeviceNet™	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	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™	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	Volume 1 (Edition 3.14) Volume 3 (Edition 1.13)	Version 1.1 Port Class A
	Communication speed		100 Mbps*2	10/100 Mbps*2 (Automatic negotiation)	100 Mbps*2	125/250/500 kbps	230.4 kbps (COM3)
	Configuration file*3		ESI file	EDS file	GSDML file	EDS 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 4, 10, 20 bytes Output 4, 12, 20, 36 bytes	Input 14 bytes Output 22 bytes
	Terminating resistor		Not included				
Memory			EEPROM				
LED indicator			PWR, RUN, ALM, ERR	PWR, ALM, MS, NS	PWR, ALM, SF, BF	PWR, ALM, MS, NS	PWR, ALM, COM
Cable length [m]			Actuator cable: 20 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)	190 (Screw mounting) 210 (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.smc.eu

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

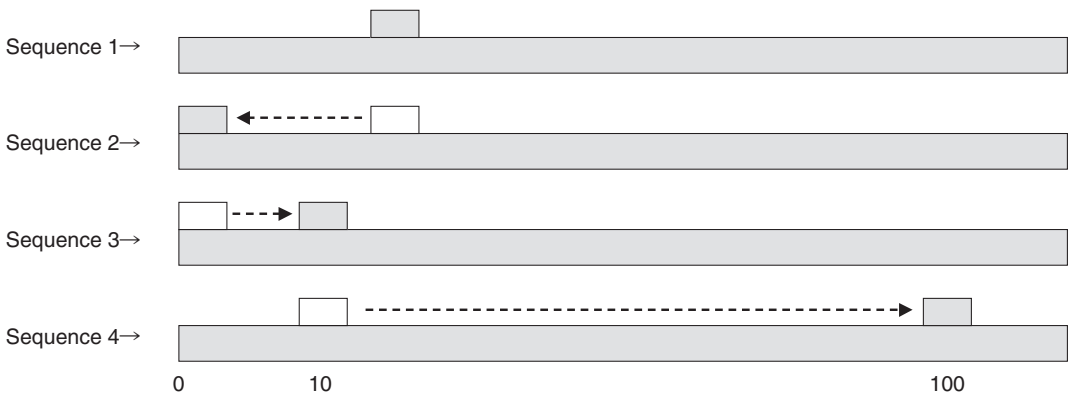
<Application example> Movement between 2 points

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.

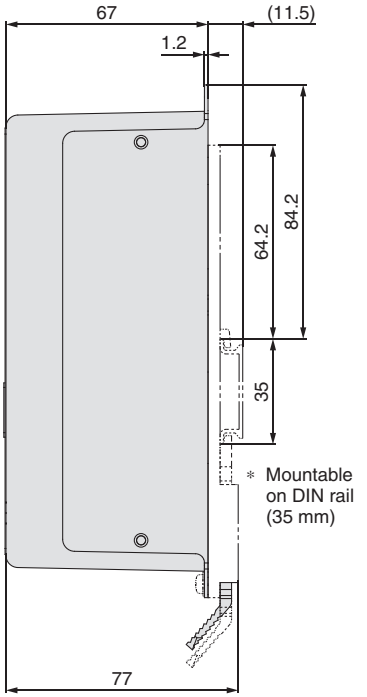
<Numerical data defined operation>
Sequence 1: Servo ON instruction
Sequence 2: Instruction to return to origin
Sequence 3: Specify step data No. 0 and turn ON the input instruction flag (position). Input 10 in the target position. Subsequently the start flag turns ON.
Sequence 4: Turn ON step data No. 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.

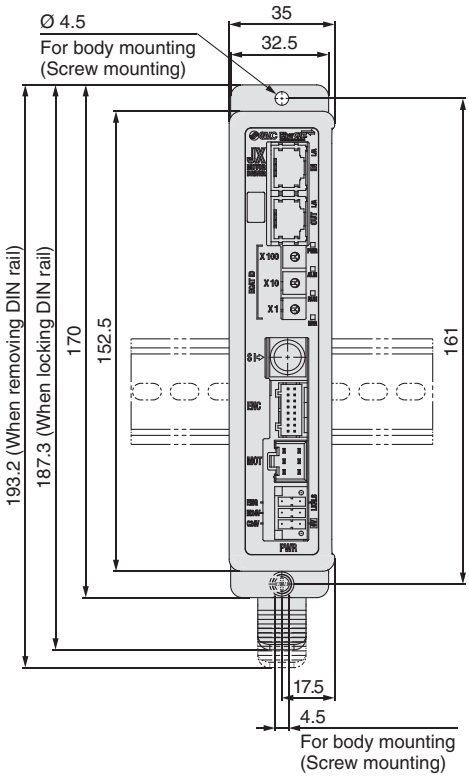


Dimensions

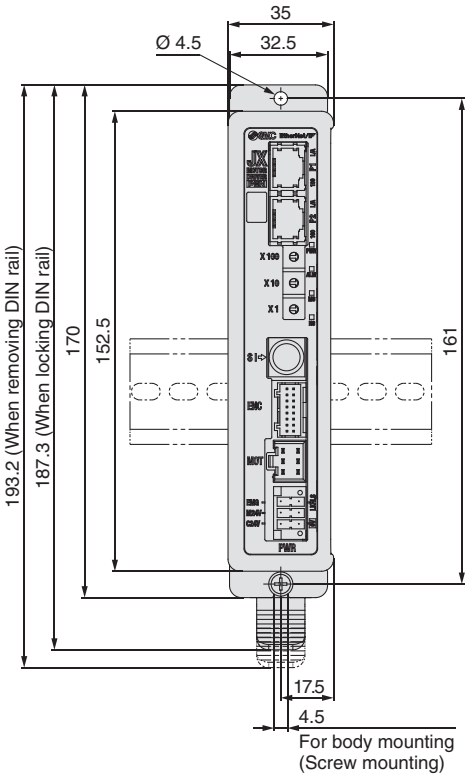
JXCE1/JXC91



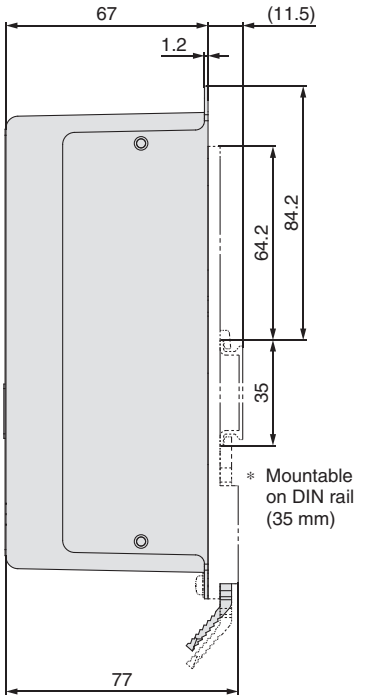
JXCE1



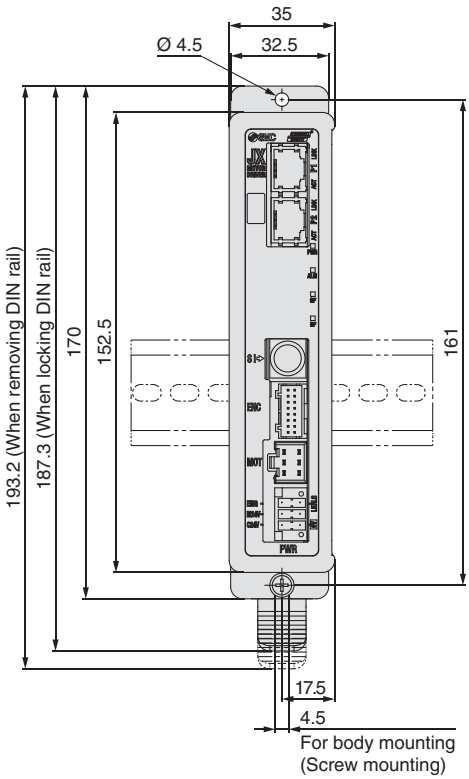
JXC91



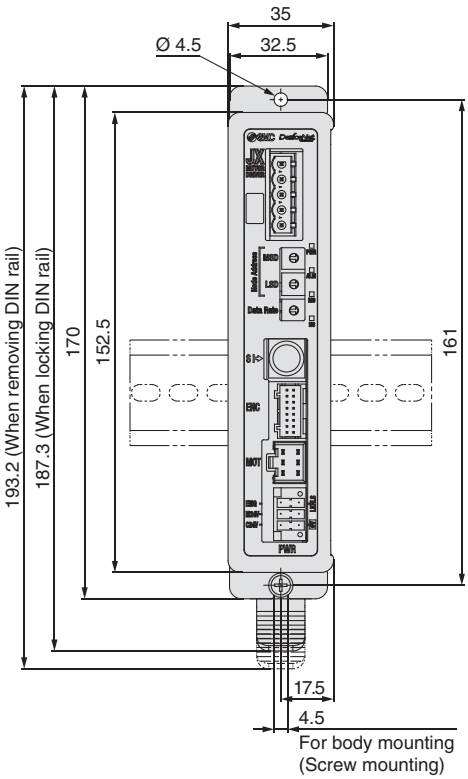
JXCP1/JXCD1



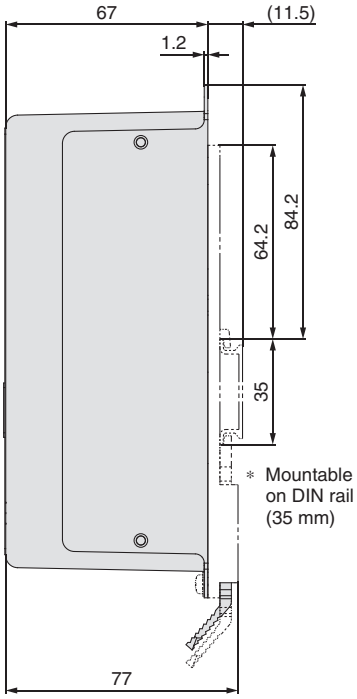
JXCP1



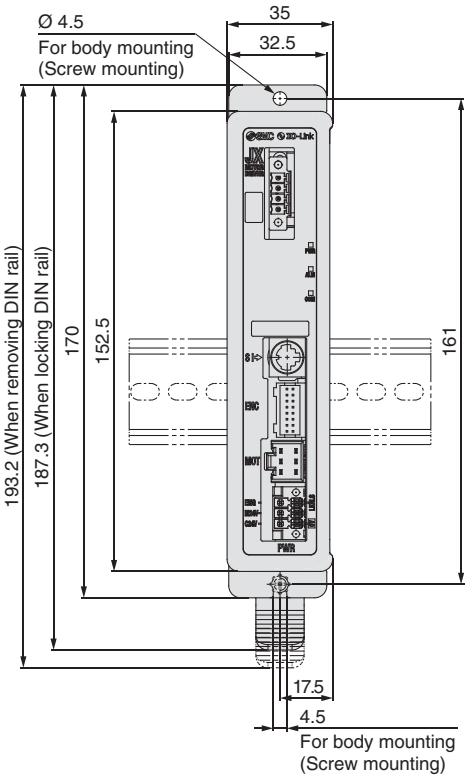
JXCD1



Dimensions

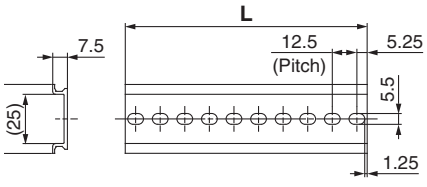


JXCL1



DIN rail
AXT100-DR-□

* For □, enter a number from the "No." line in the table below.



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

Options

■ Controller setting kit JXC-W2

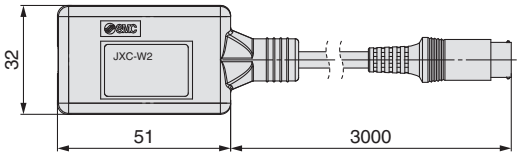
[Contents]
① Communication cable
② USB cable
③ Controller setting software
∗ A conversion cable (P5062-5) is not required.

JXC − W2 − □

Contents

—	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

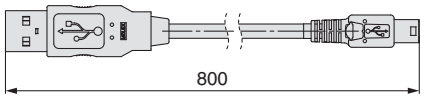


∗ It can be connected to the controller directly.

② USB cable JXC-W2-U

③ Controller setting software JXC-W2-S

∗ CD-ROM



■ DIN rail mounting adapter LEC-3-D0

∗ With 2 mounting screws

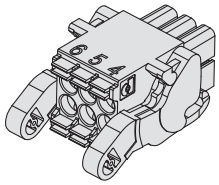
This should be used when a DIN rail mounting adapter is mounted onto a screw mounting type controller afterwards.

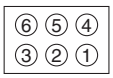
■ DIN rail AXT100-DR-□

∗ For □, enter a number from the No. line in the table on page 92. Refer to the dimension drawings on page 92 for the mounting dimensions.

■ Power supply plug JXC-CPW

∗ The power supply plug is an accessory.





① C24V ④ 0V
② M24V ⑤ N.C.
③ EMG ⑥ LK RLS

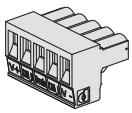
Power supply plug

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

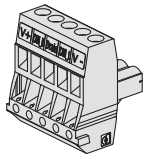
■ Communication plug connector

For DeviceNet™

Straight type
JXC-CD-S



T-branch type
JXC-CD-T

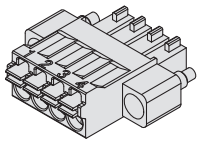


Communication plug connector for DeviceNet™

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™

For IO-Link

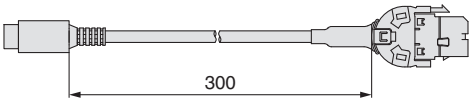
Straight type
JXC-CL-S



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

■ 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.

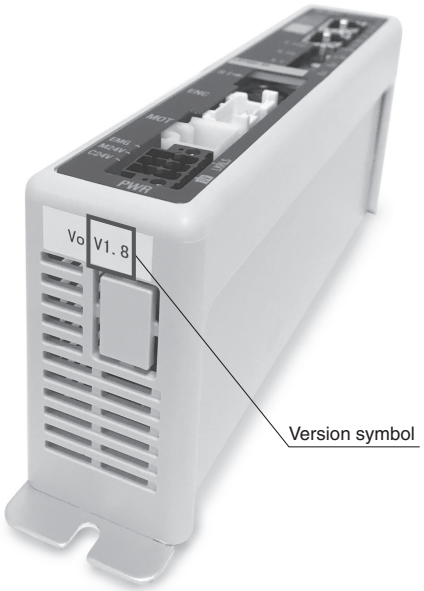
Series JXCE1/91/P1/D1
Precautions Related to Differences in Controller Versions

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

Series JXC91□

VZ S1.3T1.0

Applicable models

Series JXCD1□
Series JXCP1□
Series JXCE1□

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

Series JXC91□

VZ S2.0T1.0

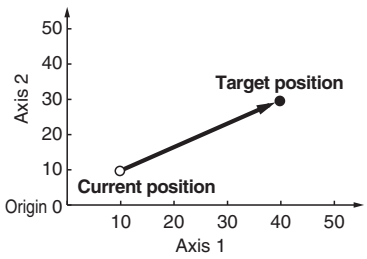
Applicable models

Series JXCD1□
Series JXCP1□
Series JXCE1□

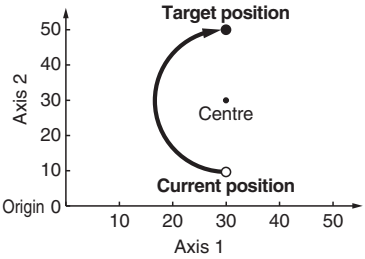
Multi-Axis Step Motor Controller

- **Speed tuning control** *1
  (3 Axes: JXC92 4 Axes: JXC73/83/93)
- **Linear/circular interpolation**

Linear interpolation



Circular interpolation



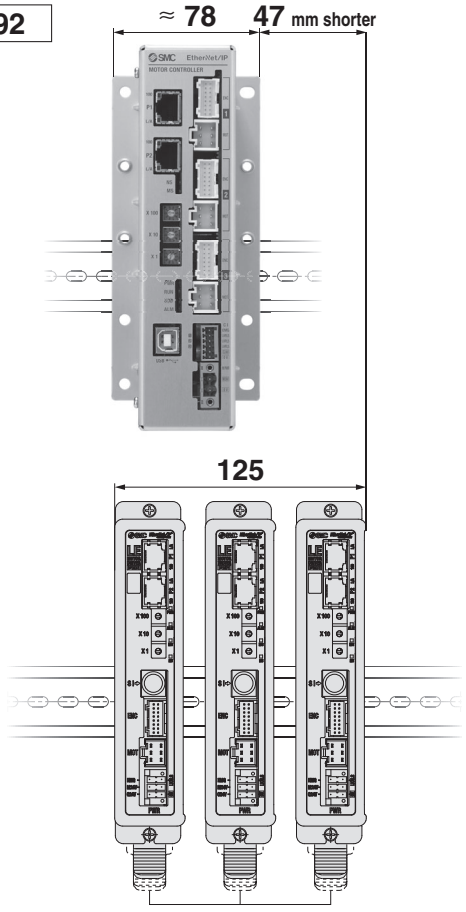
- **Positioning/pushing operation**
- **Step data input (Max. 2048 points)**
- **Space saving, reduced wiring**
- **Absolute/relative position coordinate instructions**

*1 This controls the speed of the slave axis when the speed of the main axis drops due to the effects of an external force and when a speed difference with the slave axis occurs. This control is not for synchronising the position of the main axis and slave axis.

For 3 Axes *Series JXC92*

- **EtherNet/IP™ Type**
- **Width: Approx. 38 % reduction**

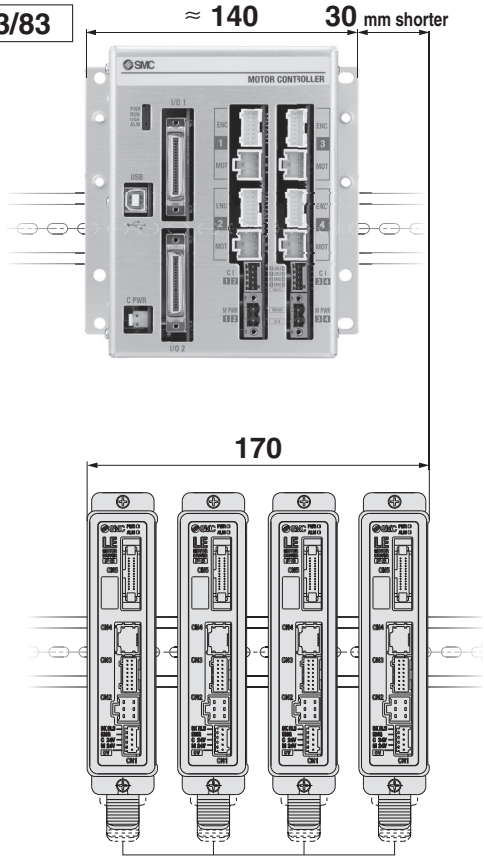
JXC92



For 4 Axes *Series JXC73/83/93*

- **Parallel I/O/ EtherNet/IP™ Type**
- **Width: Approx. 18 % reduction**

JXC73/83



* For LE□, size 25 or larger

Step Data Input: Max. 2048 points

For 3 Axes

3-axis operation can be set collectively in one step.

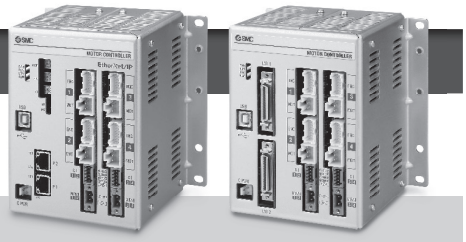
Step	Axis	Movement mode	Speed	Position	Acceleration	Deceleration	Pushing force	Trigger LV	Pushing speed	Moving force	Area 1	Area 2	In position	Comments
			mm/s	mm	mm/s²	mm/s²					mm	mm	mm	
0	Axis 1	ABS	500	100.00	3000	3000	0	85.0	50	100.0	10.0	30.0	0.5	
	Axis 2	ABS	500	100.00	3000	3000	0	85.0	50	100.0	10.0	30.0	0.5	
	Axis 3	ABS	500	100.00	3000	3000	0	85.0	50	100.0	10.0	30.0	0.5	
1	Axis 1	INC	500	200.00	3000	3000	0	85.0	50	100.0	0	0	0.5	
	Axis 2	INC	500	200.00	3000	3000	0	85.0	50	100.0	0	0	0.5	
	Axis 3	INC	500	200.00	3000	3000	0	85.0	50	100.0	0	0	0.5	
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
2046	Axis 1	SYN-I	500	100.00	3000	3000	0	0	0	100.0	0	0	0.5	
	Axis 2	SYN-I	0	0.00	0	0	0	0	0	100.0	0	0	0.5	
	Axis 3	SYN-I	0	0.00	0	0	0	0	0	100.0	0	0	0.5	
2047	Axis 1	CIR-R	500	0.00	3000	3000	0	0	0	100.0	0	0	0.5	
	Axis 2	CIR-R	0	50.00	0	0	0	0	0	100.0	0	0	0.5	
	Axis 3 ∗1		0	0.00	0	0	0	0	0	100.0	0	0	0.5	
	Axis 4 ∗1		0	25.00	0	0	0	0	0	100.0	0	0	0.5	

∗1 When circular interpolation (CIR-R, CIR-L, CIR-3) is selected in the movement mode, input the X and Y coordinates in the rotation centre position or input the X and Y coordinates in the passing position.

Movement mode	Pushing operation	Details
Blank	×	Invalid data (Invalid process)
ABS	○	Moves to the absolute coordinate position based on the origin of the actuator
INC	○	Moves to the relative coordinate position based on the current position
LIN-A	×	Moves to the absolute coordinate position based on the origin of the actuator by linear interpolation
LIN-I	×	Moves to the relative coordinate position based on the current position by linear interpolation
CIR-R∗2	×	With Axis 1 assigned to the X-axis and Axis 2 to the Y-axis, it moves in the clockwise direction by circular interpolation. The target position and rotation centre position are specified according to the relative coordinates from the current position. The position data is assigned as follows. Axis 1: Target position X Axis 2: Target position Y Axis 3 ∗1: Rotation centre position X Axis 4 ∗1: Rotation centre position Y
CIR-L∗2	×	With Axis 1 assigned to the X-axis and Axis 2 to the Y-axis, it moves in the counter-clockwise direction by circular interpolation. The target position and rotation centre position are specified according to the relative coordinates from the current position. The position data is assigned as follows. Axis 1: Target position X Axis 2: Target position Y Axis 3 ∗1: Rotation centre position X Axis 4 ∗1: Rotation centre position Y
SYN-I	×	Moves to the relative coordinate position based on the current position by speed tuning control ∗3
CIR-3∗2	×	With Axis 1 assigned to the X-axis and Axis 2 to the Y-axis, it moves based on the three specified points by circular interpolation. The target position and passing position are specified according to the relative coordinates from the current position. The position data is assigned as follows. Axis 1: Target position X Axis 2: Target position Y Axis 3 ∗1: Passing position X Axis 4 ∗1: Passing position Y

∗2 Performs a circular operation on a plane using Axis 1 and Axis 2

∗3 This controls the speed of the slave axis when the speed of the main axis drops due to the effects of an external force and when a speed difference with the slave axis occurs. This control is not for synchronising the position of the main axis and slave axis.



For 4 Axes

4-axis operation can be set collectively in one step.

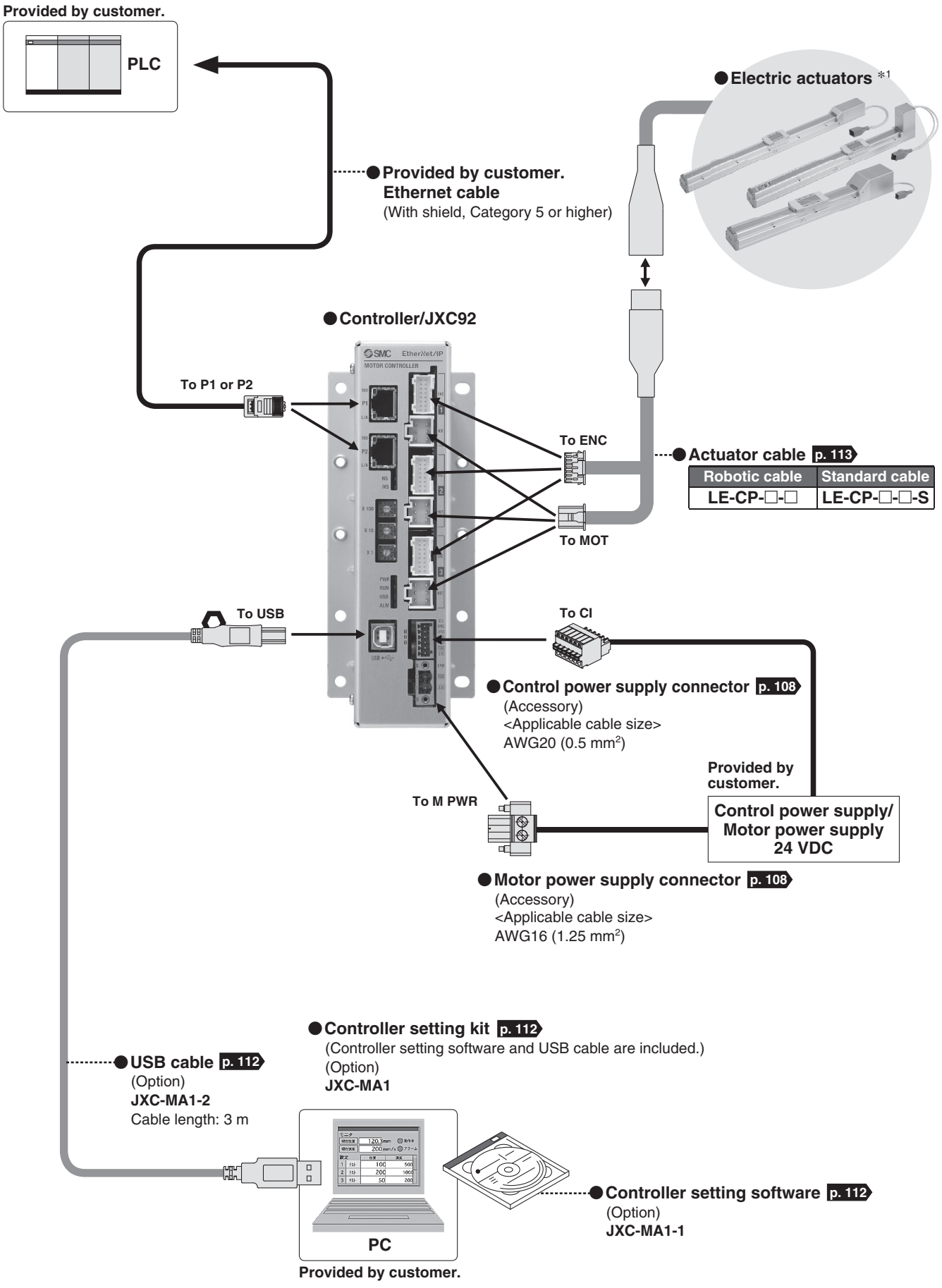
Step	Axis	Movement mode	Speed	Position	Acceleration	Deceleration	Positioning/ Pushing	Area 1	Area 2	In position	Comments
			mm/s	mm	mm/s²	mm/s²		mm	mm	mm	
0	Axis 1	ABS	100	200.00	1000	1000	0	6.0	12.0	0.5	
	Axis 2	ABS	50	100.00	1000	1000	0	6.0	12.0	0.5	
	Axis 3	ABS	50	100.00	1000	1000	0	6.0	12.0	0.5	
	Axis 4	ABS	50	100.00	1000	1000	0	6.0	12.0	0.5	
1	Axis 1	INC	500	250.00	1000	1000	1	0	0	20.0	
	Axis 2	INC	500	250.00	1000	1000	1	0	0	20.0	
	Axis 3	INC	500	250.00	1000	1000	1	0	0	20.0	
	Axis 4	INC	500	250.00	1000	1000	1	0	0	20.0	
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2046	Axis 4	ABS	200	700	500	500	0	0	0	0.5	
2047	Axis 1	ABS	500	0.00	3000	3000	0	0	0	0.5	
	Axis 2	ABS	500	0.00	3000	3000	0	0	0	0.5	
	Axis 3	ABS	500	0.00	3000	3000	0	0	0	0.5	
	Axis 4	ABS	500	0.00	3000	3000	0	0	0	0.5	

Movement mode	Pushing operation	Details
Blank	×	Invalid data (Invalid process)
ABS	○	Moves to the absolute coordinate position based on the origin of the actuator
INC	○	Moves to the relative coordinate position based on the current position
LIN-A	×	Moves to the absolute coordinate position based on the origin of the actuator by linear interpolation
LIN-I	×	Moves to the relative coordinate position based on the current position by linear interpolation
CIR-R*1	×	With Axis 1 assigned to the X-axis and Axis 2 to the Y-axis, it moves in the clockwise direction by circular interpolation. The target position and rotation centre position are specified according to the relative coordinates from the current position. The position data is assigned as follows. Axis 1: Target position X Axis 2: Target position Y Axis 3: Rotation centre position X Axis 4: Rotation centre position Y
CIR-L*1	×	With Axis 1 assigned to the X-axis and Axis 2 to the Y-axis, it moves in the counter-clockwise direction by circular interpolation. The target position and rotation centre position are specified according to the relative coordinates from the current position. The position data is assigned as follows. Axis 1: Target position X Axis 2: Target position Y Axis 3: Rotation centre position X Axis 4: Rotation centre position Y
SYN-I	×	Moves to the relative coordinate position based on the current position by speed tuning control *2

*1 Performs a circular operation on a plane using Axis 1 and Axis 2

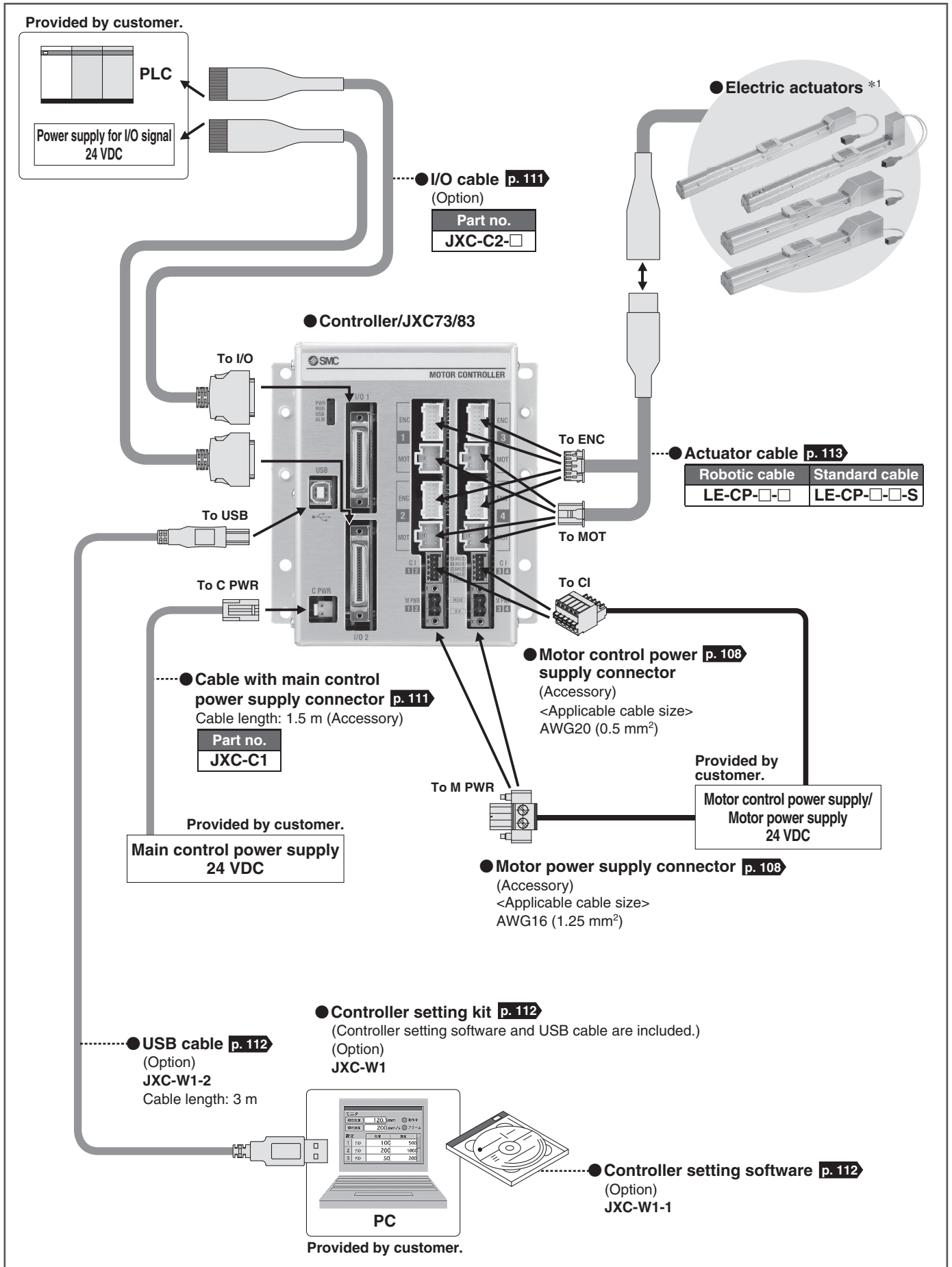
*2 This controls the speed of the slave axis when the speed of the main axis drops due to the effects of an external force and when a speed difference with the slave axis occurs. This control is not for synchronising the position of the main axis and slave axis.

For 3 Axes System Construction/EtherNet/IP™ Type (JXC92)



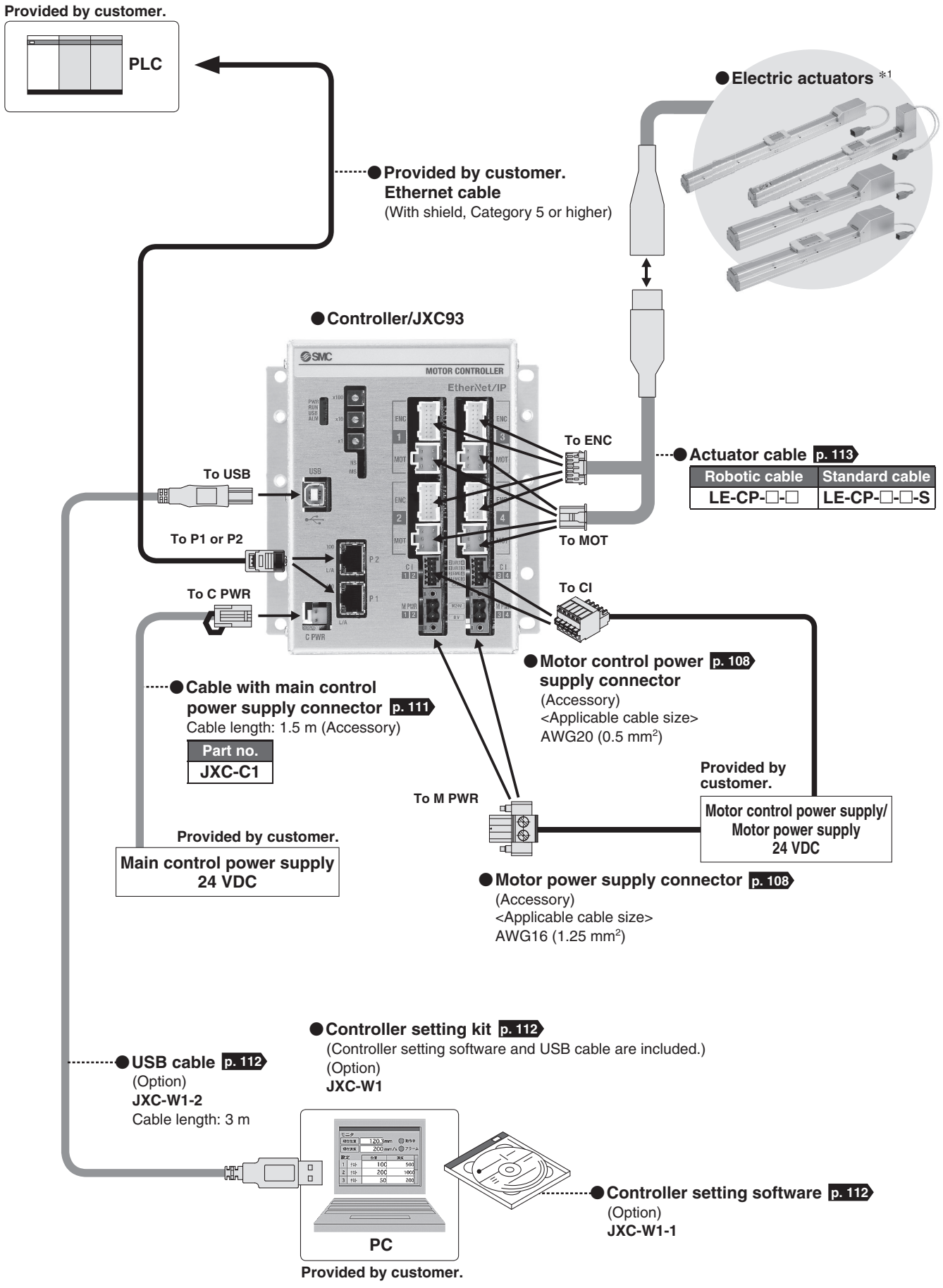
*1 The connected actuators should be ordered separately. (Refer to the applicable actuators on page 102.)

For 4 Axes System Construction/Parallel I/O (JXC73/83)



*1 The connected actuators should be ordered separately. (Refer to the applicable actuators on page 104.)

For 4 Axes System Construction/EtherNet/IP™ Type (JXC93)



*1 The connected actuators should be ordered separately. (Refer to the applicable actuators on page 104.)

3-Axis Step Motor Controller
(EtherNet/IP™ Type)
Series JXC92

CE RoHS

How to Order

■ EtherNet/IP™ Type (JXC92)

Controller

JXC 9 2 7

- EtherNet/IP™ type: 9
- 3-axis type: 2
- Mounting: 7

Symbol	Mounting
7	Screw mounting
8	DIN rail

Applicable Actuators

Applicable actuators	
Electric Actuator/Rod Series LEY	Refer to the **Web Catalogue**.
Electric Actuator/Guide Rod Series LEYG	
Electric Actuator/Slider Series LEF	
Electric Slide Table Series LES/LESH	
Electric Rotary Table Series LER	
Electric Actuator/Miniature Series LEPY/LEPS	
Electric Gripper (2-Finger Type, 3-Finger Type) Series LEH	

∗ Order the actuator separately, including the actuator cable. (Example: LEFS16B-100B-S1)

∗ For the "Speed–Work Load" graph of the actuator, refer to the LECPA section on the model selection page of the electric actuators **Web Catalogue**.

Specifications

For the setting of functions and operation methods, refer to the operation manual on the SMC website. (Documents/Download --> Instruction Manuals)

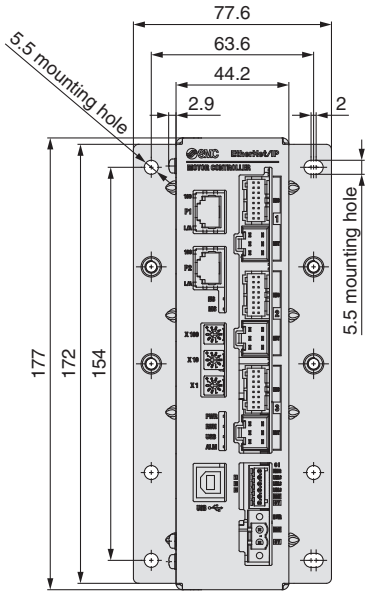
EtherNet/IP™ Type (JXC92)

Item		Specifications
Number of axes		Max. 3 axes
Compatible motor		Step motor (Servo/24 VDC)
Compatible encoder		Incremental A/B phase (Encoder resolution: 800 pulse/rotation)
Power supply ∗1		Control power supply Power voltage: 24 VDC ±10 % Max. current consumption: 500 mA Motor power supply Power voltage: 24 VDC ±10 % Max. current consumption: Based on the connected actuator ∗2
Communication	**Protocol**	EtherNet/IP™ ∗3
	Communication speed	10 Mbps/100 Mbps (automatic negotiation)
	Communication method	Full duplex/Half duplex (automatic negotiation)
	Configuration file	EDS file
	Occupied area	Input 16 bytes/Output 16 bytes
	IP address setting range	Manual setting by switches: From 192.168.1.1 to 254, Via DHCP server: Arbitrary address
	Vendor ID	7 h (SMC Corporation)
	Product type	2 Bh (Generic Device)
	Product code	DEh
Serial communication		USB2.0 (Full Speed 12 Mbps)
Memory		Flash-ROM
LED indicator		PWR, RUN, USB, ALM, NS, MS, L/A, 100
Lock control		Forced-lock release terminal ∗4
Cable length		Actuator cable: 20 m or less
Cooling system		Natural air cooling
Operating temperature range		0 °C to 40 °C (No freezing)
Operating humidity range		90 % RH or less (No condensation)
Storage temperature range		-10 °C to 60 °C (No freezing)
Storage humidity range		90 % RH or less (No condensation)
Insulation resistance		Between all external terminals and the case: 50 MΩ (500 VDC)
Weight		600 g (Screw mounting), 650 g (DIN rail mounting)

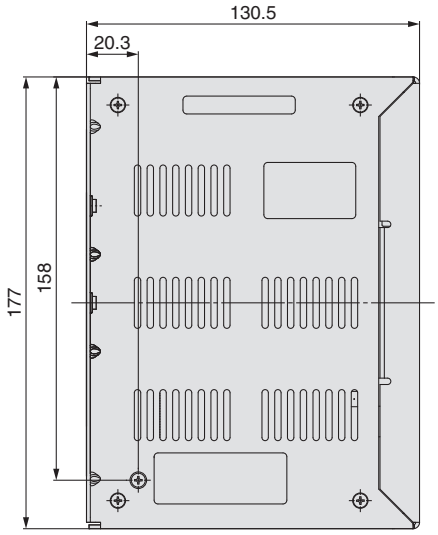
∗1 Do not use a power supply with inrush current protection for the motor drive power supply.
∗2 Power consumption depends on the actuator connected. Refer to the actuator specifications for further details.
∗3 EtherNet/IP™ is a trademark of ODVA.
∗4 Applicable to non-magnetising locks

Dimensions

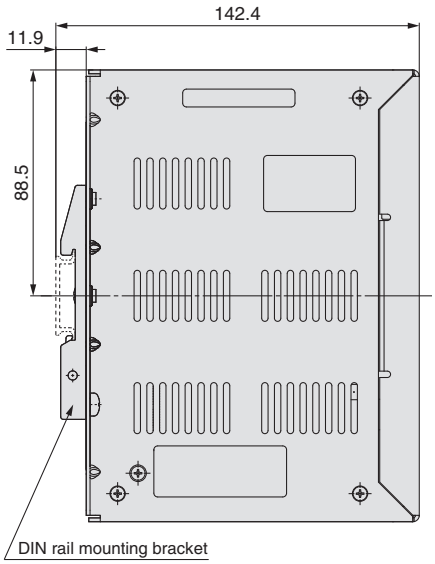
EtherNet/IP™ Type JXC92



Screw mounting

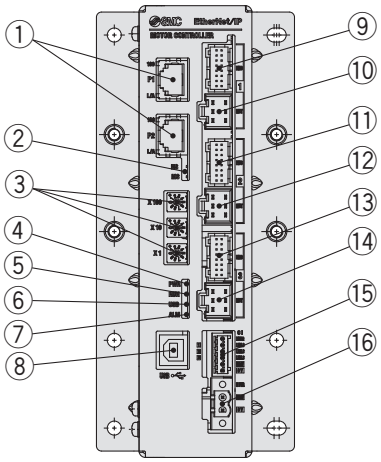


DIN rail mounting



Controller Details

EtherNet/IP™ Type JXC92



No.	Name	Description	Details
①	**P1, P2**	EtherNet/IP™ communication connector	Connect Ethernet cable.
②	**NS, MS**	Communication status LED	Displays the status of the EtherNet/IP™ communication
③	**X100** **X10** **X1**	IP address setting switches	Switch to set the 4th byte of the IP address by X1, X10 and X100.
④	**PWR**	Power supply LED (Green)	Power supply ON: Green turns on Power supply OFF: Green turns off
⑤	**RUN**	Operation LED (Green)	Running in EtherNet/IP™: Green turns on Running via USB communication: Green flashes Stopped: Green turns off
⑥	**USB**	USB connection LED (Green)	USB connected: Green turns on USB not connected: Green turns off
⑦	**ALM**	Alarm LED (Red)	With alarm: Red turns on Without alarm: Red turns off
⑧	**USB**	Serial communication connector	Connect to a PC via the USB cable.
⑨	**ENC** 1	Encoder connector (16 pins)	Axis 1: Connect the actuator cable.
⑩	**MOT** 1	Motor power connector (6 pins)	
⑪	**ENC** 2	Encoder connector (16 pins)	Axis 2: Connect the actuator cable.
⑫	**MOT** 2	Motor power connector (6 pins)	
⑬	**ENC** 3	Encoder connector (16 pins)	Axis 3: Connect the actuator cable.
⑭	**MOT** 3	Motor power connector (6 pins)	
⑮	**CI**	Control power supply connector ∗1	Control power supply (+), All axes stop (+), Axis 1 lock release (+), Axis 2 lock release (+), Axis 3 lock release (+), Common (–)
⑯	**M PWR**	Motor power supply connector ∗1	Motor power supply (+), Motor power supply (–)

∗1 Connectors are included. (Refer to page 108.)

4-Axis Step Motor Controller
(Parallel I/O/EtherNet/IP™ Type)
Series JXC73/83/93

CE RoHS

How to Order

■ **Parallel I/O (JXC73/83)**

Controller

JXC 8 3 2

I/O type

Symbol	I/O type
7	NPN
8	PNP

4-axis type

I/O cable, mounting

Symbol	I/O cable	Mounting
1	1.5 m	Screw mounting
2	1.5 m	DIN rail
3	3 m	Screw mounting
4	3 m	DIN rail
5	5 m	Screw mounting
6	5 m	DIN rail
7	None	Screw mounting
8	None	DIN rail

∗ Two I/O cables are included.

■ **EtherNet/IP™ Type (JXC93)**

Controller

JXC 9 3 8

EtherNet/IP™ type

4-axis type

Mounting

Symbol	Mounting
7	Screw mounting
8	DIN rail

Applicable Actuators

Applicable actuators	
Electric Actuator/Rod Series LEY	Refer to the **Web Catalogue**.
Electric Actuator/Guide Rod Series LEYG	
Electric Actuator/Slider Series LEF	
Electric Slide Table Series LES/LESH	
Electric Rotary Table Series LER ∗1	
Electric Actuator/Miniature Series LEPY/LEPS	
Electric Gripper (2-Finger Type, 3-Finger Type) Series LEH	

∗1 Except the continuous rotation (360°) specification.

∗ Order the actuator separately, including the actuator cable. (Example: LEFS16B-100B-S1)

∗ For the "Speed–Work Load" graph of the actuator, refer to the LECPA section on the model selection page of the electric actuators **Web Catalogue**.

Specifications

For the setting of functions and operation methods, refer to the operation manual on the SMC website. (Documents/Download --> Instruction Manuals)

Parallel I/O (JXC73/83)

Item	Specifications
Number of axes	Max. 4 axes
Compatible motor	Step motor (Servo/24 VDC)
Compatible encoder	Incremental A/B phase (Encoder resolution: 800 pulse/rotation)
Power supply ∗1	Main control power supply Power voltage: 24 VDC ±10 % Max. current consumption: 300 mA Motor power supply, Motor control power supply (Common) Power voltage: 24 VDC ±10 % Max. current consumption: Based on the connected actuator ∗2
Parallel input	16 inputs (Photo-coupler isolation)
Parallel output	32 outputs (Photo-coupler isolation)
Serial communication	USB2.0 (Full Speed 12 Mbps)
Memory	Flash-ROM/EEPROM
LED indicator	PWR, RUN, USB, ALM
Lock control	Forced-lock release terminal ∗3
Cable length	I/O cable: 5 m or less, Actuator cable: 20 m or less
Cooling system	Natural air cooling
Operating temperature range	0 °C to 40 °C (No freezing)
Operating humidity range	90 % RH or less (No condensation)
Storage temperature range	-10 °C to 60 °C (No freezing)
Storage humidity range	90 % RH or less (No condensation)
Insulation resistance	Between all external terminals and the case: 50 MΩ (500 VDC)
Weight	1050 g (Screw mounting), 1100 g (DIN rail mounting)

∗1 Do not use a power supply with inrush current protection for the motor drive power and motor control power supply.
∗2 Power consumption depends on the actuator connected. Refer to the actuator specifications for further details.
∗3 Applicable to non-magnetising locks

For the setting of functions and operation methods, refer to the operation manual on the SMC website. (Documents/Download --> Instruction Manuals)

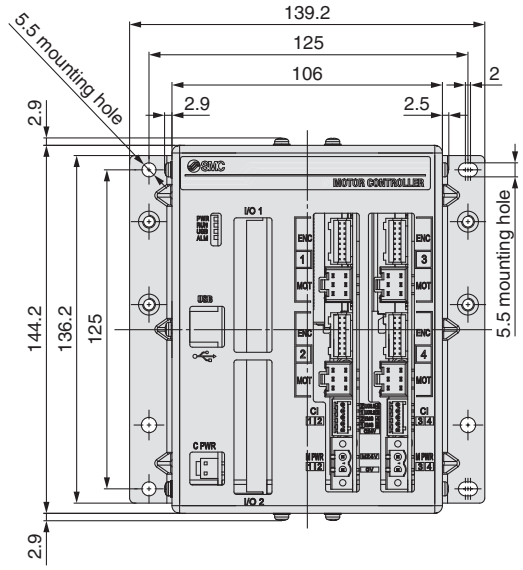
EtherNet/IP™ Type (JXC93)

Item		Specifications
Number of axes		Max. 4 axes
Compatible motor		Step motor (Servo/24 VDC)
Compatible encoder		Incremental A/B phase (Encoder resolution: 800 pulse/rotation)
Power supply ∗1		Main control power supply Power voltage: 24 VDC ±10 % Max. current consumption: 350 mA Motor power supply, Motor control power supply (Common) Power voltage: 24 VDC ±10 % Max. current consumption: Based on the connected actuator ∗2
Communication	**Protocol**	EtherNet/IP™ ∗4
	Communication speed	10 Mbps/100 Mbps (automatic negotiation)
	Communication method	Full duplex/Half duplex (automatic negotiation)
	Configuration file	EDS file
	Occupied area	Input 16 bytes/Output 16 bytes
	IP address setting range	Manual setting by switches: From 192.168.1.1 to 254, Via DHCP server: Arbitrary address
	Vendor ID	7 h (SMC Corporation)
	Product type	2 Bh (Generic Device)
	Product code	DCh
Serial communication		USB2.0 (Full Speed 12 Mbps)
Memory		Flash-ROM/EEPROM
LED indicator		PWR, RUN, USB, ALM, NS, MS, L/A, 100
Lock control		Forced-lock release terminal ∗3
Cable length		Actuator cable: 20 m or less
Cooling system		Natural air cooling
Operating temperature range		0° C to 40 °C (No freezing)
Operating humidity range		90 % RH or less (No condensation)
Storage temperature range		-10 °C to 60 °C (No freezing)
Storage humidity range		90 % RH or less (No condensation)
Insulation resistance		Between all external terminals and the case: 50 MΩ (500 VDC)
Weight		1050 g (Screw mounting), 1100 g (DIN rail mounting)

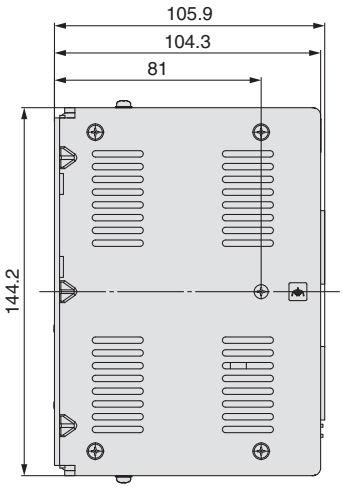
∗1 Do not use a power supply with inrush current protection for the motor drive power and motor control power supply.
∗2 Power consumption depends on the actuator connected. Refer to the actuator specifications for further details.
∗3 Applicable to non-magnetising locks
∗4 EtherNet/IP™ is a trademark of ODVA.

Dimensions

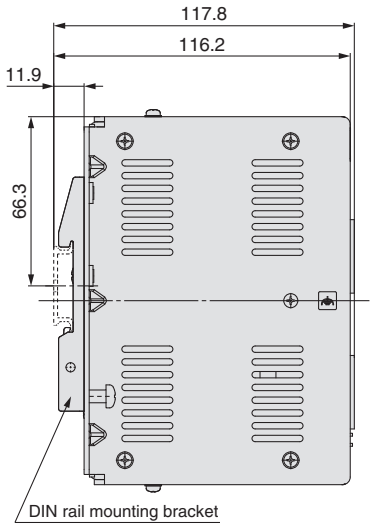
Parallel I/O JXC73/83



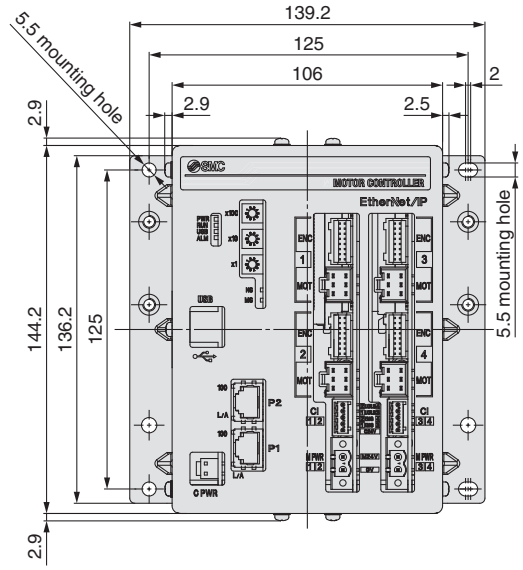
Screw mounting



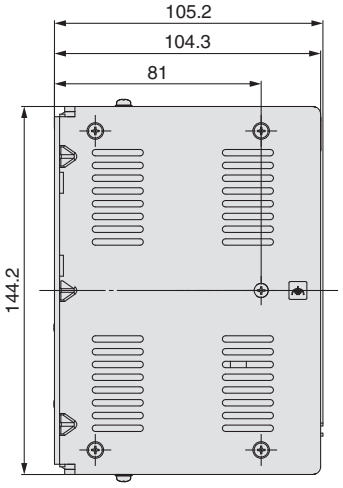
DIN rail mounting



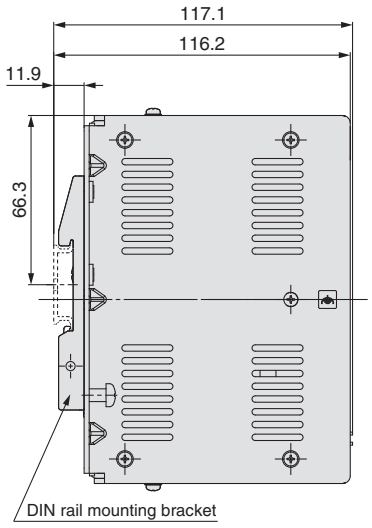
EtherNet/IP™ Type JXC93



Screw mounting

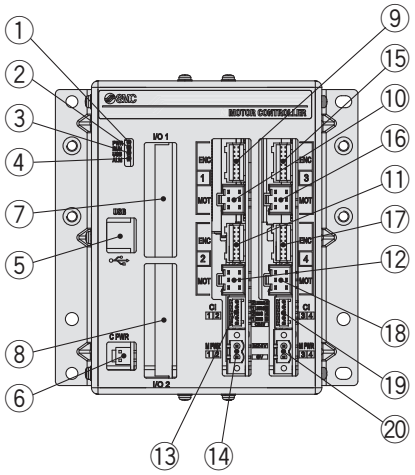


DIN rail mounting



Controller Details

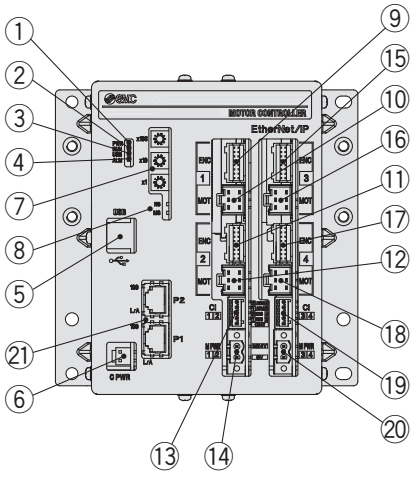
Parallel I/O JXC73/83



No.	Name	Description	Details
①	**PWR**	Power supply LED (Green)	Power supply ON: Green turns on Power supply OFF: Green turns off
②	**RUN**	Operation LED (Green)	Running in parallel I/O: Green turns on Running via USB communication: Green flashes Stopped: Green turns off
③	**USB**	USB connection LED (Green)	USB connected: Green turns on USB not connected: Green turns off
④	**ALM**	Alarm LED (Red)	With alarm: Red turns on Without alarm: Red turns off
⑤	**USB**	Serial communication	Connect to a PC via the USB cable.
⑥	**C PWR**	Main control power supply connector (2 pins) *1	Main control power supply (+) (–)
⑦	**I/O 1**	Parallel I/O connector (40 pins)	Connect to a PLC via the I/O cable.
⑧	**I/O 2**	Parallel I/O connector (40 pins)	Connect to a PLC via the I/O cable.
⑨	**ENC** 1	Encoder connector (16 pins)	Axis 1: Connect the actuator cable.
⑩	**MOT** 1	Motor power connector (6 pins)	
⑪	**ENC** 2	Encoder connector (16 pins)	Axis 2: Connect the actuator cable.
⑫	**MOT** 2	Motor power connector (6 pins)	
⑬	**CI** 1 2	Motor control power supply connector *1	Motor control power supply (+), Axis 1 stop (+), Axis 1 lock release (+), Axis 2 stop (+), Axis 2 lock release (+)
⑭	**M PWR** 1 2	Motor power supply connector *1	For Axis 1, 2. Motor power supply (+), Common (–)
⑮	**ENC** 3	Encoder connector (16 pins)	Axis 3: Connect the actuator cable.
⑯	**MOT** 3	Motor power connector (6 pins)	
⑰	**ENC** 4	Encoder connector (16 pins)	Axis 4: Connect the actuator cable.
⑱	**MOT** 4	Motor power connector (6 pins)	
⑲	**CI** 3 4	Motor control power supply connector *1	Motor control power supply (+), Axis 3 stop (+), Axis 3 lock release (+), Axis 4 stop (+), Axis 4 lock release (+)
⑳	**M PWR** 3 4	Motor power supply connector *1	For Axis 3, 4. Motor power supply (+), Common (–)

*1 Connectors are included. (Refer to page 108.)

EtherNet/IP™ Type JXC93



No.	Name	Description	Details
①	**PWR**	Power supply LED (Green)	Power supply ON: Green turns on Power supply OFF: Green turns off
②	**RUN**	Operation LED (Green)	Running in EtherNet/IP™: Green turns on Running via USB communication: Green flashes Stopped: Green turns off
③	**USB**	USB connection LED (Green)	USB connected: Green turns on USB not connected: Green turns off
④	**ALM**	Alarm LED (Red)	With alarm: Red turns on Without alarm: Red turns off
⑤	**USB**	Serial communication	Connect to a PC via the USB cable.
⑥	**C PWR**	Main control power supply connector (2 pins) *1	Main control power supply (+) (–)
⑦	**x100** **x10** **x1**	IP address setting switches	Switch to set the 4th byte of the IP address by X1, X10 and X100.
⑧	**MS, NS**	Communication status LED	Displays the status of the EtherNet/IP™ communication
⑨	**ENC** 1	Encoder connector (16 pins)	Axis 1: Connect the actuator cable.
⑩	**MOT** 1	Motor power connector (6 pins)	
⑪	**ENC** 2	Encoder connector (16 pins)	Axis 2: Connect the actuator cable.
⑫	**MOT** 2	Motor power connector (6 pins)	
⑬	**CI** 1 2	Motor control power supply connector *1	Motor control power supply (+), Axis 1 stop (+), Axis 1 lock release (+), Axis 2 stop (+), Axis 2 lock release (+)
⑭	**M PWR** 1 2	Motor power supply connector *1	For Axis 1, 2. Motor power supply (+), Common (–)
⑮	**ENC** 3	Encoder connector (16 pins)	Axis 3: Connect the actuator cable.
⑯	**MOT** 3	Motor power connector (6 pins)	
⑰	**ENC** 4	Encoder connector (16 pins)	Axis 4: Connect the actuator cable.
⑱	**MOT** 4	Motor power connector (6 pins)	
⑲	**CI** 3 4	Motor control power supply connector *1	Motor control power supply (+), Axis 3 stop (+), Axis 3 lock release (+), Axis 4 stop (+), Axis 4 lock release (+)
⑳	**M PWR** 3 4	Motor power supply connector *1	For Axis 3, 4. Motor power supply (+), Common (–)
㉑	**P1, P2**	EtherNet/IP™ communication connector	Connect Ethernet cable.

*1 Connectors are included. (Refer to page 108.)

Wiring Example 1

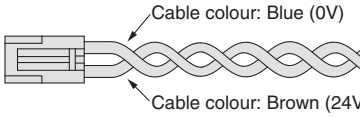
Cable with Main Control Power Supply Connector (For 4 Axes)*1: C PWR 1 pc.

For 4 Axes: JXC73/83/93

Terminal name	Function	Details
+24V	Main control power supply (+)	Power supply (+) supplied to the main control
24–0V	Main control power supply (–)	Power supply (–) supplied to the main control

*1 Part no.: JXC-C1 (Cable length: 1.5 m)

Cable with main control power supply connector



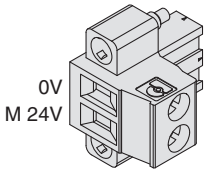
Motor Power Supply Connector (For 3/4 Axes)*2: M PWR 2 pcs.*3

For 3 Axes: JXC92; For 4 Axes: JXC73/83/93

Terminal name	Function	Details	Note
0V	Motor power supply (–)	Power supply (–) supplied to the motor power	For 3 axes JXC92
		The M 24V terminal, C 24V terminal, EMG terminal, and LKRLS terminal are common (–).	For 4 axes JXC73/83/93
M 24V	Motor power supply (+)	Power supply (+) supplied to the motor power	

*2 Manufactured by PHOENIX CONTACT (Part no.: MSTB2, 5/2-STF-5, 08)
*3 1 pc. for 3 axes (JXC92)

Motor power supply connector



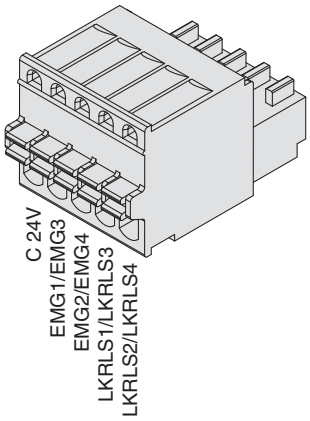
Motor Control Power Supply Connector (For 4 Axes)*4: CI 2 pcs.

For 4 Axes: JXC73/83/93

Terminal name	Function	Details
C 24V	Motor control power supply (+)	Power supply (+) supplied to the motor control
EMG1/EMG3	Stop (+)	Axis 1/Axis 3: Input (+) for releasing the stop
EMG2/EMG4	Stop (+)	Axis 2/Axis 4: Input (+) for releasing the stop
LKRLS1/LKRLS3	Lock release (+)	Axis 1/Axis 3: Input (+) for releasing the lock
LKRLS2/LKRLS4	Lock release (+)	Axis 2/Axis 4: Input (+) for releasing the lock

*4 Manufactured by PHOENIX CONTACT (Part no.: FK-MC0, 5/5-ST-2, 5)

Motor control power supply connector



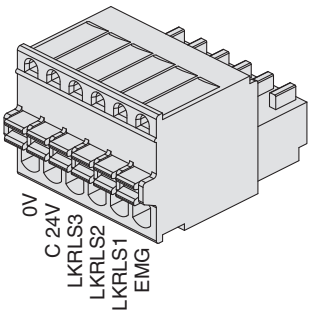
Control Power Supply Connector (For 3 Axes)*5: CI 1 pc.

For 3 Axes: JXC92

Terminal name	Function	Details
0V	Control power supply (–)	The C 24V terminal, LKRLS terminal, and EMG terminal are common (–).
C 24V	Control power supply (+)	Power supply (+) supplied to the control
LKRLS3	Lock release (+)	Axis 3: Input (+) for releasing the lock
LKRLS2	Lock release (+)	Axis 2: Input (+) for releasing the lock
LKRLS1	Lock release (+)	Axis 1: Input (+) for releasing the lock
EMG	Stop (+)	All axes: Input (+) for releasing the stop

*5 Manufactured by PHOENIX CONTACT (Part no.: FK-MC0, 5/6-ST-2, 5)

Control power supply connector



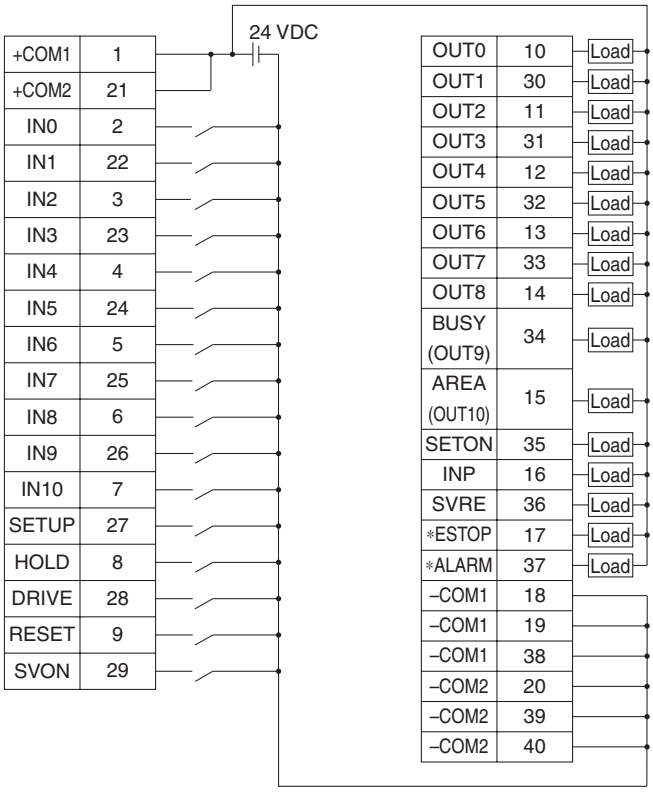
Wiring Example 2

Parallel I/O Connector

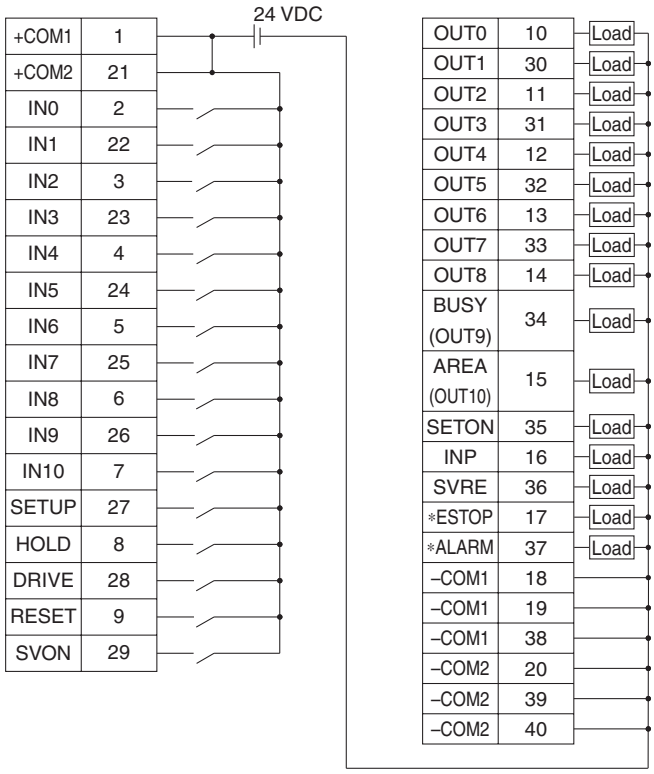
* When you connect a PLC to the I/O 1 or I/O 2 parallel I/O connector, use the I/O cable (JXC-C2-□).
* The wiring changes depending on the type of the parallel I/O (NPN or PNP).

I/O 1 Wiring example

NPN JXC73



PNP JXC83



I/O 1 Input Signal

Name	Details
+COM1 +COM2	Connects the power supply 24 V for input/output signal
IN0 to IN8	Step data specified Bit No. (Standard: When 512 points are used)
IN9 IN10	Step data specified extension Bit No. (Extension: When 2048 points are used)
SETUP	Instruction to return to origin
HOLD	Operation is temporarily stopped
DRIVE	Instruction to drive
RESET	Alarm reset and operation interruption
SVON	Servo ON instruction

I/O 1 Output Signal

Name	Details
OUT0 to OUT8	Outputs the step data no. during operation
BUSY (OUT9)	Outputs when the operation of the actuator is in progress
AREA (OUT10)	Outputs when all actuators are within the area output range
SETON	Outputs when the return to origin of all actuators is completed
INP	Outputs when the positioning or pushing of all actuators is completed
SVRE	Outputs when servo is ON
*ESTOP *1	Not output when EMG stop is instructed
*ALARM *1	Not output when alarm is generated
–COM1 –COM2	Connects the power supply 0 V for input/output signal

*1 Negative-logic circuit signal

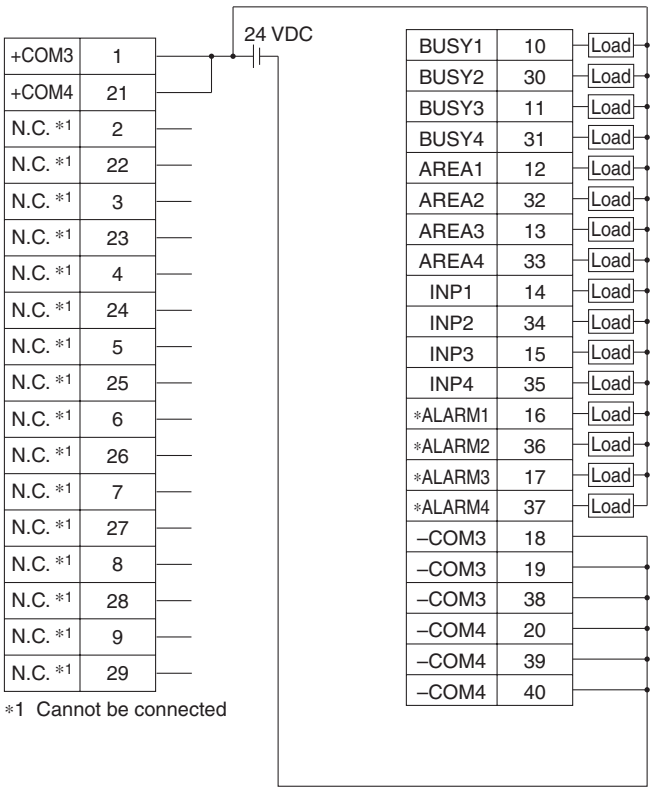
Wiring Example 2

Parallel I/O Connector

* When you connect a PLC to the I/O 1 or I/O 2 parallel I/O connector, use the I/O cable (JXC-C2-□).
* The wiring changes depending on the type of the parallel I/O (NPN or PNP).

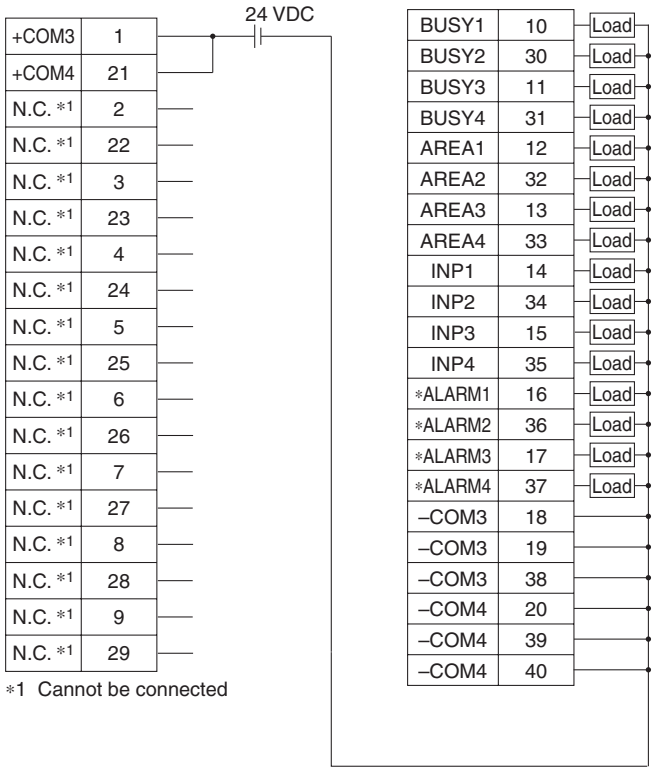
I/O 2 Wiring example

NPN JXC73



*1 Cannot be connected

PNP JXC83



*1 Cannot be connected

I/O 2 Input Signal

Name	Details
+COM3 +COM4	Connects the power supply 24 V for input/output signal
N.C.	Cannot be connected

I/O 2 Output Signal

Name	Details
BUSY1	Busy signal for axis 1
BUSY2	Busy signal for axis 2
BUSY3	Busy signal for axis 3
BUSY4	Busy signal for axis 4
AREA1	Area signal for axis 1
AREA2	Area signal for axis 2
AREA3	Area signal for axis 3
AREA4	Area signal for axis 4
INP1	Positioning or pushing completion signal for axis 1
INP2	Positioning or pushing completion signal for axis 2
INP3	Positioning or pushing completion signal for axis 3
INP4	Positioning or pushing completion signal for axis 4
*ALARM1 *2	Alarm signal for axis 1
*ALARM2 *2	Alarm signal for axis 2
*ALARM3 *2	Alarm signal for axis 3
*ALARM4 *2	Alarm signal for axis 4
–COM3 –COM4	Connects the power supply 0 V for input/output signal

*2 Negative-logic circuit signal

Options

Cable with main control power supply connector

For 4 Axes
JXC73/83/93

JXC − C1

Cable length: 1.5 m (Accessory)

Number of cores	2
AWG size	AWG20

I/O cable (1 pc.)

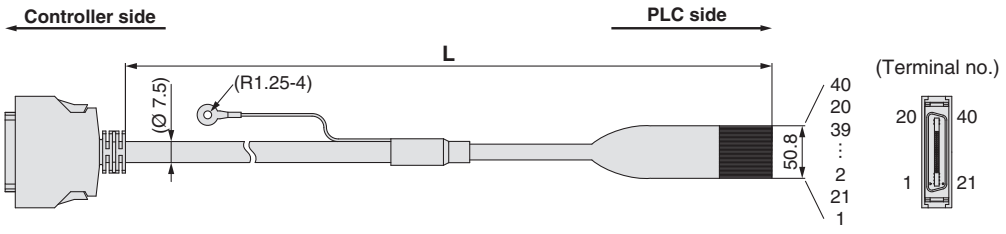
For 4 Axes
JXC73/83

JXC − C2 − □

Cable length (L) [m]

1	1.5
3	3
5	5

Number of cores	40
AWG size	AWG28



Pin no.	Wire colour	Pin no.	Wire colour	Pin no.	Wire colour	Pin no.	Wire colour
1	Orange (Black 1)	6	Orange (Black 2)	11	Orange (Black 3)	16	Orange (Black 4)
21	Orange (Red 1)	26	Orange (Red 2)	31	Orange (Red 3)	36	Orange (Red 4)
2	Grey (Black 1)	7	Grey (Black 2)	12	Grey (Black 3)	17	Grey (Black 4)
22	Grey (Red 1)	27	Grey (Red 2)	32	Grey (Red 3)	37	Grey (Red 4)
3	White (Black 1)	8	White (Black 2)	13	White (Black 3)	18	White (Black 4)
23	White (Red 1)	28	White (Red 2)	33	White (Red 3)	38	White (Red 4)
4	Yellow (Black 1)	9	Yellow (Black 2)	14	Yellow (Black 3)	19	Yellow (Black 4)
24	Yellow (Red 1)	29	Yellow (Red 2)	34	Yellow (Red 3)	39	Yellow (Red 4)
5	Pink (Black 1)	10	Pink (Black 2)	15	Pink (Black 3)	20	Pink (Black 4)
25	Pink (Red 1)	30	Pink (Red 2)	35	Pink (Red 3)	40	Pink (Red 4)

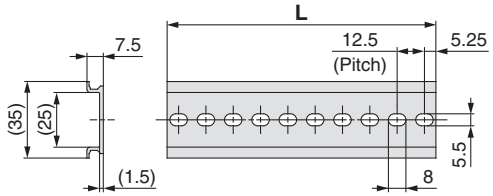
DIN rail

For 3 Axes
JXC92

For 4 Axes
JXC73/83/93

AXT100 − DR − □

∗ For □, enter a number from the No. line in the table below. Refer to the dimension drawings on pages 103 and 106 for the mounting dimensions.



L Dimension

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 bracket (with 6 mounting screws)

For 3 Axes
JXC92

For 4 Axes
JXC73/83/93

JXC − Z1

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

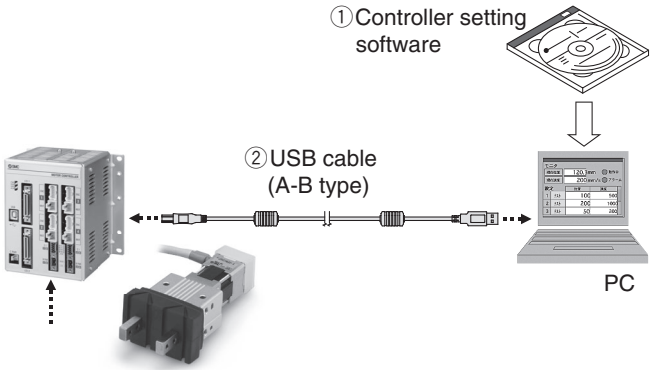
Options

Controller setting kit

For 4 Axes
JXC73/83/93

JXC – W1

Controller setting kit
(Japanese and English are available.)



Contents

①Controller setting software (CD-ROM)
②USB cable (Cable length: 3 m)

	Description	Model
①	Controller setting software	JXC-W1-1
②	USB cable	JXC-W1-2

∗ Can be ordered separately

Hardware Requirements

PC/AT compatible machine with Windows 7 or Windows 8.1 and USB1.1 or USB2.0 port

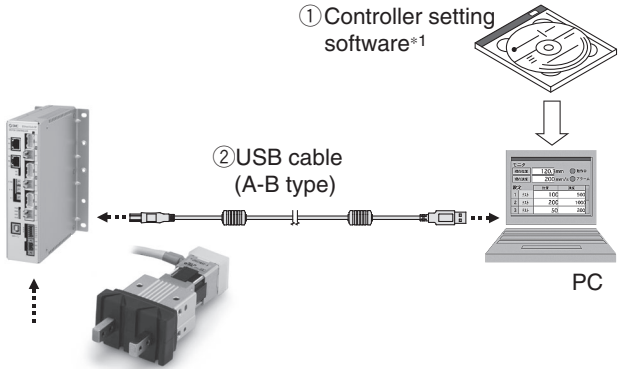
∗ Windows® is a registered trademark of Microsoft Corporation in the United States.

Controller setting kit

For 3 Axes
JXC92

JXC – MA1∗1

Controller setting kit
(Japanese and English are available.)



Contents

①Controller setting software (CD-ROM)∗1
②USB cable (Cable length: 3 m)

	Description	Model
①	Controller setting software	JXC-MA1-1
②	USB cable	JXC-MA1-2

∗ Can be ordered separately

Hardware Requirements

PC/AT compatible machine with Windows 7 or Windows 8.1 and USB1.1 or USB2.0 port

∗1 The controller setting software also includes software dedicated for 4 axes.
∗ Windows® is a registered trademark of Microsoft Corporation in the United States.

Options: Actuator Cable

[Robotic cable, standard cable for step motor (Servo/24 VDC)]

For 3 Axes	For 4 Axes
JXC92	JXC73/83/93

LE − CP − 1 − □

Cable length (L) [m]

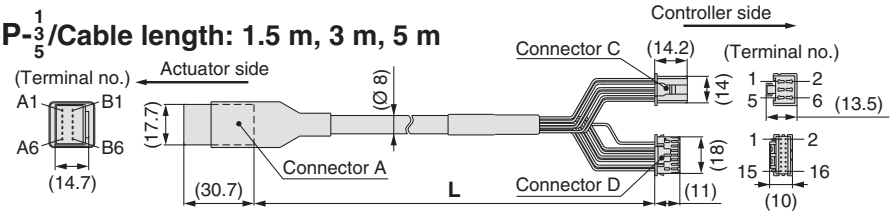
1	1.5
3	3
5	5
8	8*1
A	10*1
B	15*1
C	20*1

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

Cable type

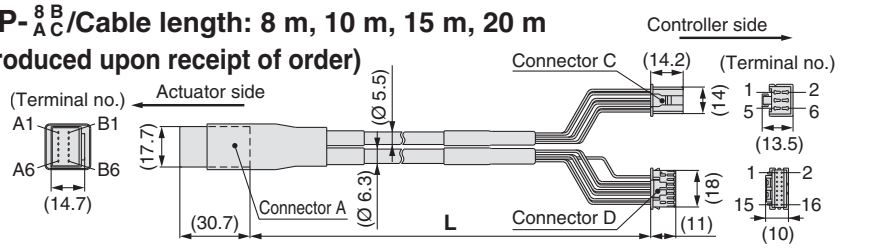
—	Robotic cable (Flexible cable)
S	Standard cable

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



LE-CP-8/A/B/C/Cable length: 8 m, 10 m, 15 m, 20 m

(*1 Produced upon receipt of order)



Signal	Connector A terminal no.	Cable colour	Connector C terminal no.
A	B-1	Brown	2
$\overline{A}$	A-1	Red	1
B	B-2	Orange	6
$\overline{B}$	A-2	Yellow	5
COM-A/COM	B-3	Green	3
COM-B/—	A-3	Blue	4
		Shield	
Vcc	B-4	Brown	12
GND	A-4	Black	13
$\overline{A}$	B-5	Red	7
A	A-5	Black	6
$\overline{B}$	B-6	Orange	9
B	A-6	Black	8
		—	3

Cable colour	Connector D terminal no.
Brown	12
Black	13
Red	7
Black	6
Orange	9
Black	8
—	3

[Robotic cable, standard cable with lock and sensor for step motor (Servo/24 VDC)]

For 3 Axes	For 4 Axes
JXC92	JXC73/83/93

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

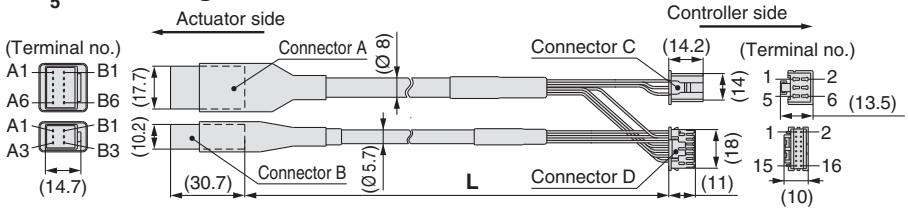
*1 Produced upon receipt of order (Robotic cable only)

With lock and sensor

Cable type

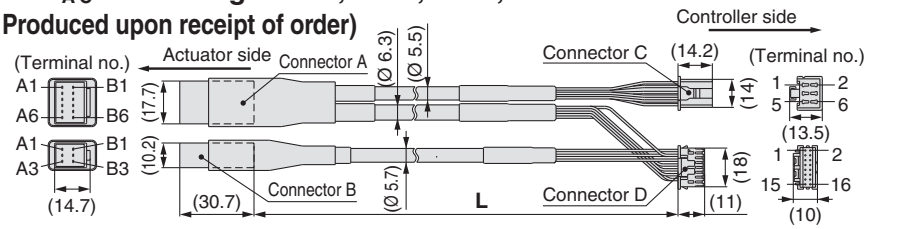
—	Robotic cable (Flexible cable)
S	Standard cable

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



LE-CP-8/A/B/C/Cable length: 8 m, 10 m, 15 m, 20 m

(*1 Produced upon receipt of order)



Signal	Connector A terminal no.	Cable colour	Connector C terminal no.
A	B-1	Brown	2
$\overline{A}$	A-1	Red	1
B	B-2	Orange	6
$\overline{B}$	A-2	Yellow	5
COM-A/COM	B-3	Green	3
COM-B/—	A-3	Blue	4
		Shield	
Vcc	B-4	Brown	12
GND	A-4	Black	13
$\overline{A}$	B-5	Red	7
A	A-5	Black	6
$\overline{B}$	B-6	Orange	9
B	A-6	Black	8
		—	3

Cable colour	Connector D terminal no.
Brown	12
Black	13
Red	7
Black	6
Orange	9
Black	8
—	3

Signal	Connector B terminal no.	Cable colour	
Lock (+)	B-1	Red	4
Lock (–)	A-1	Black	5
Sensor (+)	B-3	Brown	1
Sensor (–)	A-3	Blue	2

⚠ 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.

⚠ 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.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.

⚠ Warning

1. 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 catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove 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 safety measures as mentioned above 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.

4. 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 catalogue.
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

1. 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 exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, wichever is first.*2) Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

⚠ Safety Instructions Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.

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