New

Electric Rotary Table

Step Motor (Servo/24 VDC)

Low profile



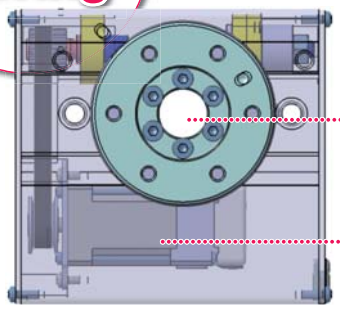
Basic type [mm]

Model	H
LER10	42
LER30	53
LER50	68

High precision type [mm]

Model	H
LERH10	49
LERH30	62
LERH50	78

Space-saving



Hollow shaft axis
Accommodates wiring and piping of workpieces.

Motor built-in
Space-saving



Shock-less/High speed actuation

Max. speed: 420°/sec (7.33 rad/sec)
Max. acceleration/deceleration: 3000°/sec² (52.36 rad/sec²)

Positioning repeatability: ±0.05°

Repeatability at the end: ±0.01° (Pushing control/With external stopper)

Rotation angle

360°, 320° (310°), 180°, 90°
The value indicated in brackets shows the value for the LER10.

Possible to set speed, acceleration/deceleration, and position. Max. 64 points

Energy-saving product

Automatic 40% power reduction after the table has stopped.

Size	Rotating torque [N·m]		Max. speed [°/s]		Positioning repeatability [°]	
	Basic	High torque	Basic	High torque	Basic	High torque
10	0.2 (0.22)	0.3 (0.32)	420	280	±0.05 (End: ±0.01)*	
30	0.8 (0.8)	1.2 (1.2)				
50	6.6 (6.6)	10 (10)				

* Value when an external stopper is mounted.
Note) Values in brackets for 360° rotation angle model.

* Not available for 360° rotation angle.

Step Motor (Servo/24 VDC)
Controller/Driver



Step data input type
Series **LECP6**
- 64 points positioning
- Input using controller setting kit or teaching box



Programless type
Series **LECP1***
- 14 points positioning
- Control panel setting



Pulse input type
Series **LECPA***

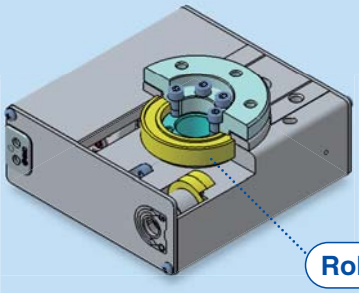
Series LER

SMC

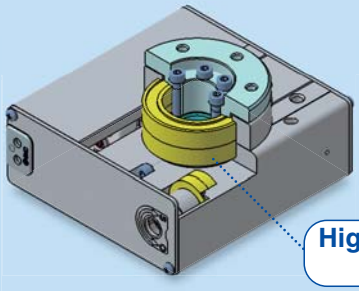
CAT.EUS100-94C-UK

Basic and high precision types are available.

Basic type/LER



High precision type/LERH



The movement in the table's radial thrust direction is reduced.

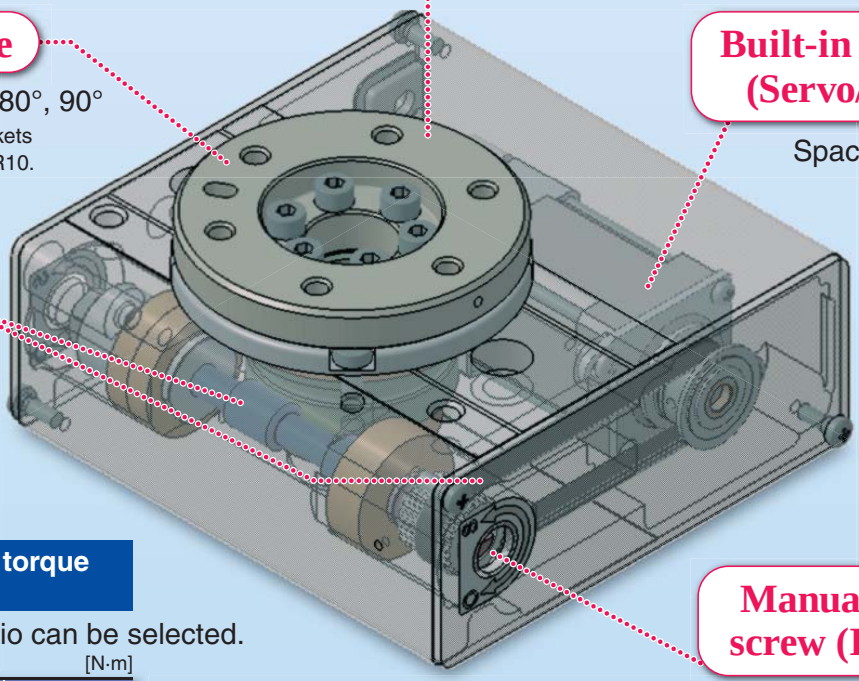
Rotation angle

360°, 320° (310°), 180°, 90°

The value indicated in brackets shows the value for the LER10.

Built-in step motor (Servo/24 VDC)

Space-saving



High torque

Output is 30 times with special worm gear. Special worm gear with reduced backlash is used.

Maximum rotation torque can be selected.

Belt deceleration ratio can be selected.

[N·m]

Model	Basic	High torque
LER10	0.2 (0.22)	0.3 (0.32)
LER30	0.8 (0.8)	1.2 (1.2)
LER50	6.6 (6.6)	10.0 (10.0)

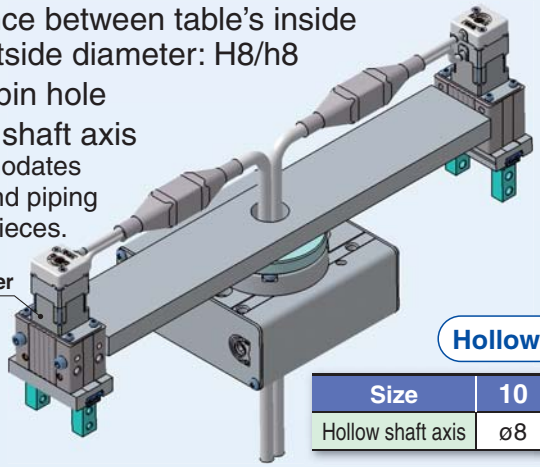
Note) Values in brackets for 360° rotation angle model.

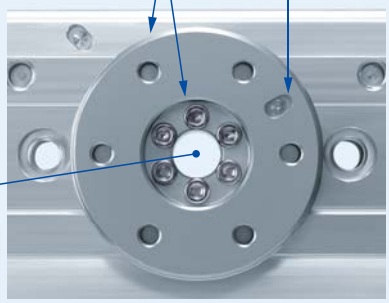
Manual override screw (Both sides)

Possible to rotate the table with power OFF by manual override.

Easy Mounting of Workpieces

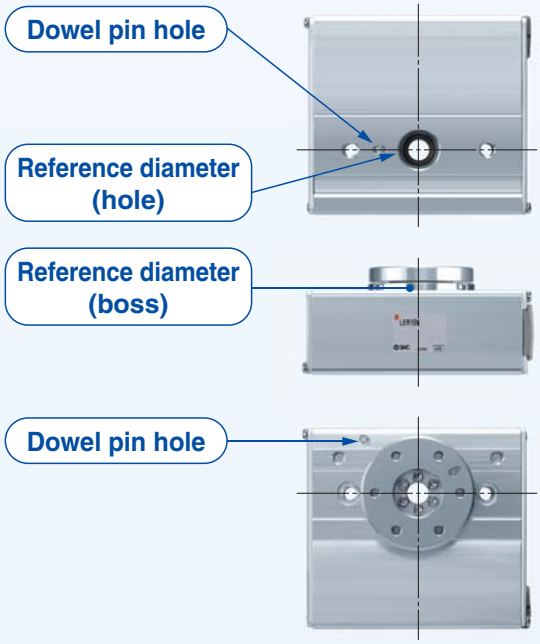
- Tolerance between table's inside and outside diameter: H8/h8
- Dowel pin hole
- Hollow shaft axis
  Accommodates wiring and piping of workpieces.





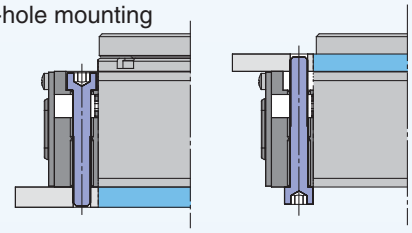
Size	10	30	50
Hollow shaft axis	ø8	ø17	ø20

Easy Mounting of the Main Body

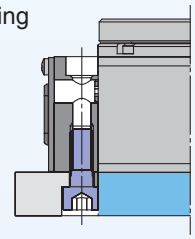


Mounting Variations

■ Through-hole mounting

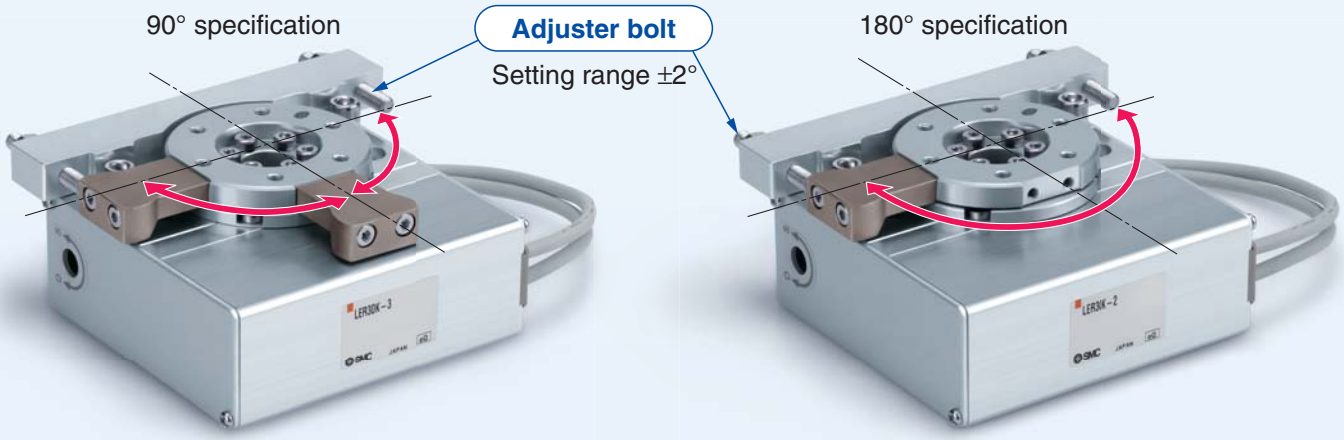


■ Body tapped mounting

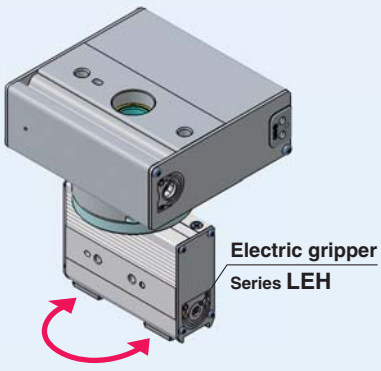


With External Stopper/Rotation Angle: 90°/180° Specification

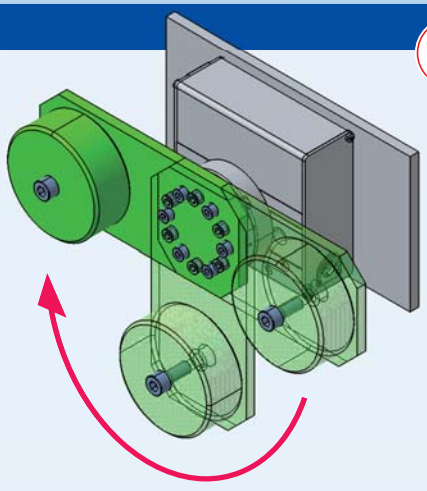
Repeatability at the end: ±0.01°



Application Examples



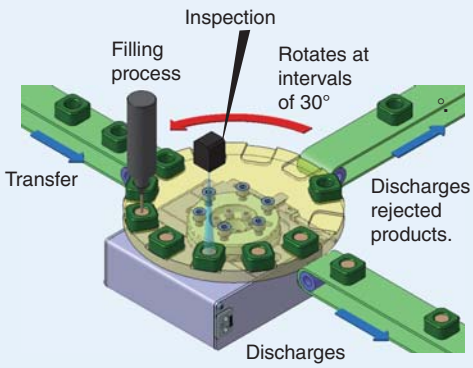
Rotation transfer after gripping in combination with a gripper



Vertical transfer: No change in speed due to load fluctuation

New

■ Rotation angle: 360°



Continuous rotation specification

Step Data Input Type Series LECP6

Simple Setting to Use Straight Away

◎Easy Mode for Simple Setting

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

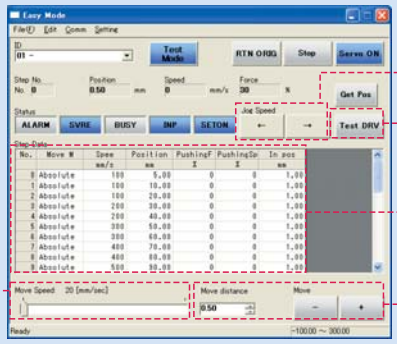


Step motor
(Servo/24 VDC)
LECP6

<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.



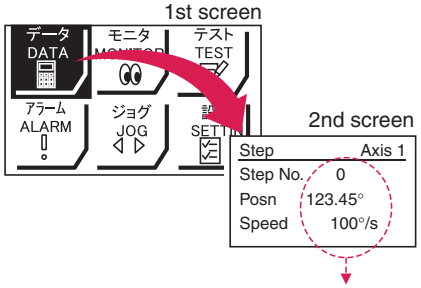


<When a TB (teaching box) is used>

- 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.

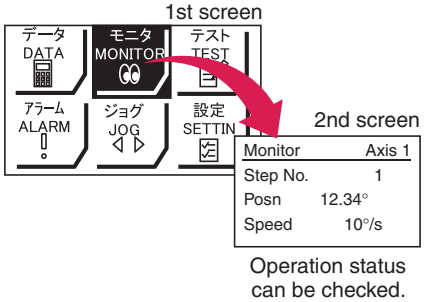


Example of setting the step data



It can be registered by "SET" after entering the values.

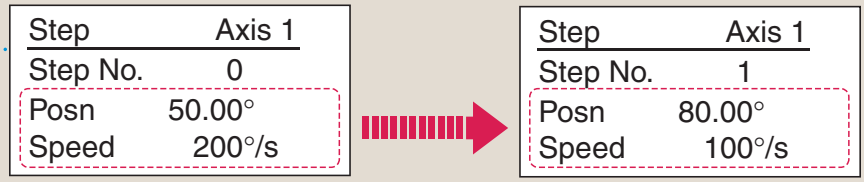
Example of checking the operation status



Operation status can be checked.

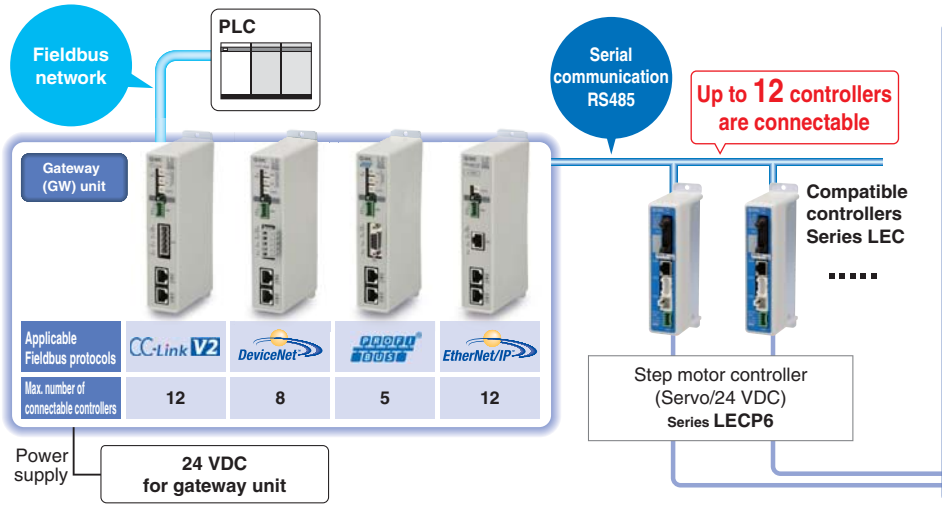
Teaching box screen

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

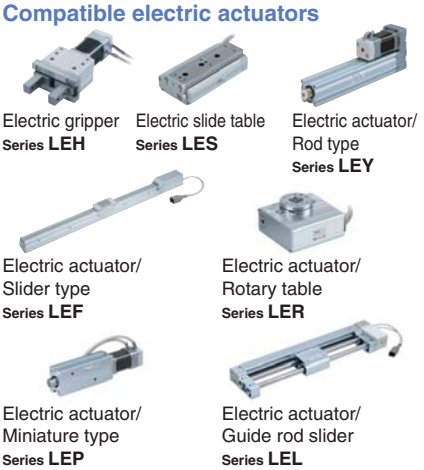


Gateway Unit Series LEC-G

- Unit linking the LECP6 series and Fieldbus network
- 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.



Compatible electric actuators



SMC

◎Normal Mode for Detailed Setting

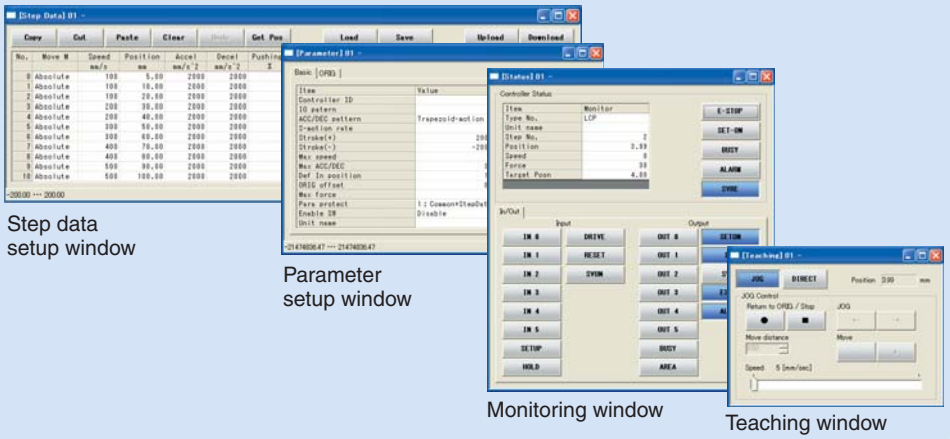
Select normal mode when detailed setting is required.

- 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.)

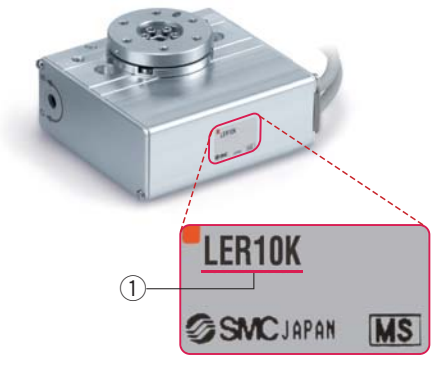
Confirm that the combination of the controller and the actuator is correct.

<Check the following before use.>

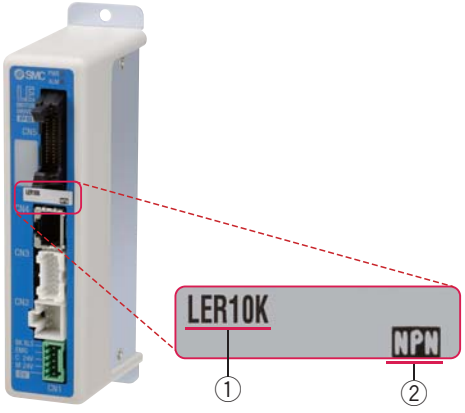
① Check the actuator labell for model number. This matches the controller.

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

Actuator



Controller



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

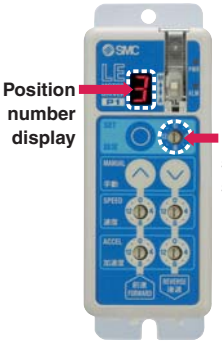
Setting a registered number for the stop position
Maximum 14 points

2 Setting a stop position

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

3 Registration

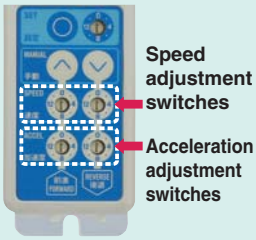
Registering the stop position using SET button







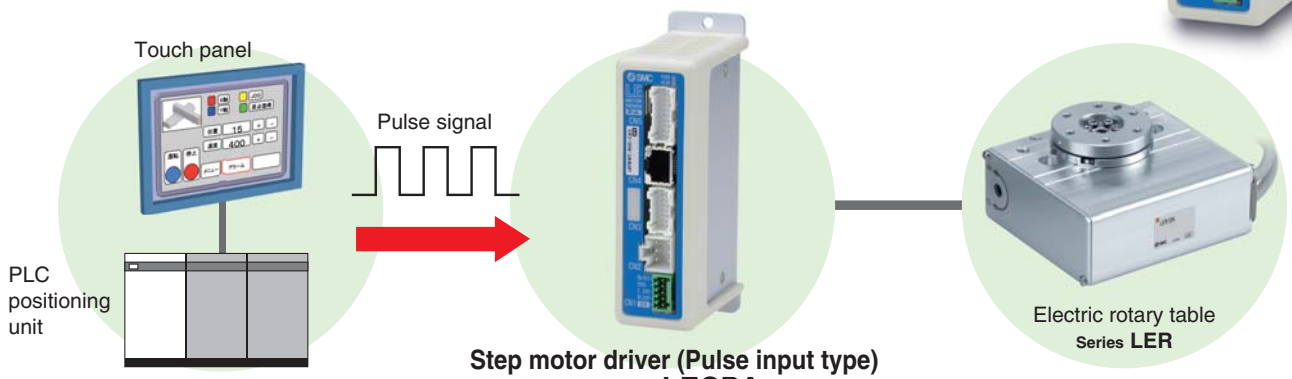
Speed/Acceleration 16-level adjustment



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.**



Step motor driver (Pulse input type)
Series LECPA

- **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°/s		Select from 16-level
	Position	[Position]: Target position [Pushing]: Pushing start position	●	●	●	Set in units of 0.01°		Direct teaching JOG teaching
	Acceleration/Deceleration	Acceleration/deceleration during movement	●	●	●	Set in units of 1°/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°/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°	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° or more (Units: 0.01°)	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°	Set in units of 0.01 mm	
	Stroke (–)	– side limit of position	×	×	●	Set in units of 0.01°	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 position	×	×	●	Set in units of 1°/s	Set in units of 1 mm/s	No setting required
	ORIG ACC	Acceleration during return to origin position	×	×	●	Set in units of 1°/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 rotary table



Provided by customer

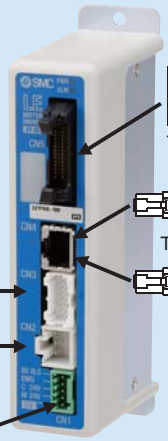
PLC

Power supply for I/O signal
24 VDC Note)

●I/O cable Pages 26, 39

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

●Controller* Page 18



To CN5

To CN4

To CN3

To CN2

To CN1



Programless type
LECP1
Page 34

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

Provided by customer

Power supply for controller
24 VDC Note)

Step data input type
LECP6
Page 19

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

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

●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.

●Actuator cable* Pages 25, 39

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

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

Option

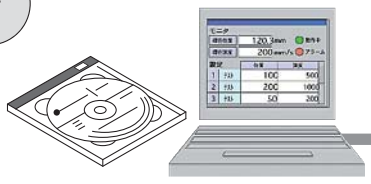
●Teaching box Page 28
(With 3 m cable)
Part no.: LEC-T1-3EG□



Or

●Controller setting kit Page 27
Controller setting kit
(Communication cable, conversion unit and USB cable are included.)
Part no.: LEC-W2

●Communication cable
(3 m)



●USB cable
(A-miniB type)
(0.3 m)

PC

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

System Construction/Pulse Signal

●Electric rotary table



Provided by customer

PLC

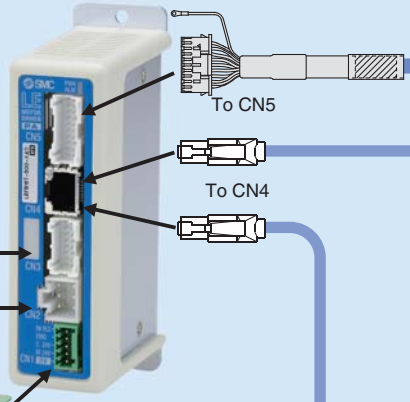
Power supply for I/O signal
24 VDC Note)

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

●Driver* Page 40

●I/O cable Page 46

Driver type	Part no.
LECPA	LEC-CL5-□



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 UL1310 Class 2 power supply.

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

●Actuator cable* Page 45

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.

Option

●Teaching box Page 48
(With 3 m cable)
Part no.: LEC-T1-3EG□



Or

●Controller setting software Page 47
Communication cable (With conversion unit) and USB cable are included.
Part no.: LEC-W2



Communication cable●



PC

●USB cable
(A-miniB 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 31

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™ only

To CN2

To CN1

Page 31
●Communication cable
LEC-CG1-□

Page 31
●Cable between branches
LEC-CG2-□

●Branch connector Page 31
LEC-CGD

●Terminating resistor connector 120Ω
LEC-CGR

Page 31
●Communication cable
LEC-CG1-□

●Controller Page 19

To CN4

●Power supply connector (Accessory) → To CN1

Controller input power supply Note 1)

●Controller Page 19

●Power supply connector (Accessory) → To CN1

Controller input power supply Note 1)

●Electric rotary table



Series LER

Option

●Controller setting software Page 27
(Communication cable and USB cable are included.)
Part no.: LEC-W2



●Communication cable



●USB cable
(A-miniB type)

PC
(Provided by customer)

Or

●Teaching box Page 28
(With 3 m cable)
Part no.: LEC-T1-3EG□



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

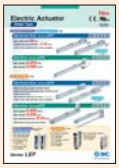
Compatible controller

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


CAT.ES100-87

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

High Rigidity Slider Type
AC Servo Motor


CAT.ES100-104

Ball screw drive
Series LEJS



Series LEJS

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

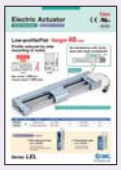
Belt drive
Series LEJB



Series LEJB

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

Guide Rod Slider
Step Motor (Servo/24 VDC)


CAT.ES100-101

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

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


CAT.ES100-83

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



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

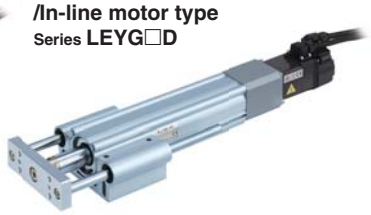
Guide rod type
Series LEYG



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	

SMC Electric Actuators

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


CAT.ES100-78

Compact type 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



High rigidity type 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



Miniature
Step Motor (Servo/24 VDC)


CAT.ES100-92

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

Rotary Table
Step Motor (Servo/24 VDC)


CAT.ES100-94

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	0.2 (0.22)	0.3 (0.32)	420	280
30	0.8 (0.8)	1.2 (1.2)		
50	6.6 (6.6)	10 (10)		

Note) Values in brackets for 360° rotation angle model.

Gripper
Step Motor (Servo/24 VDC)


CAT.ES100-77

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/both sides [mm]
	Basic	Compact	
10	5.5	3.5	4
20	22	17	6
32	90	—	8
40	130	—	12

Controller/Driver

Controller

Step data input type
For step motor
Series LECP6



Control motor
Step motor (Servo/24 VDC)

Step data input type
For servo motor
Series LECA6



Control motor
Servo motor (24 VDC)

Programless type
Series LECP1



Control motor
Step motor (Servo/24 VDC)

Driver

Pulse input type
Series LECPA



Control motor
Step motor (Servo/24 VDC)

Gateway Unit

Fieldbus-compatible gateway (GW) unit
Series LEC-G






Applicable Fieldbus protocols	CC-Link V2	DeviceNet	PROFIBUS	EtherNet/IP
Max. number of connectable controllers	12	8	5	12

Driver

AC Servo Motor Driver

Pulse input type/ Positioning type
Series LECSA
(Incremental type)



Control motor
AC servo motor (100/200/400 W)

Pulse input type
Series LECSB
(Absolute type)



Control motor
AC servo motor (100/200/400 W)

CC-Link direct input type
Series LECSC
(Absolute type)



Control motor
AC servo motor (100/200/400 W)

SSCNET III type
Series LECSS
(Absolute type)



Control motor
AC servo motor (100/200/400 W)

Series Variations

Electric Rotary Table *Series* LER



Type	Rotating torque [N·m]		Max. speed [°/s]		Positioning repeatability [°]		Controller /Driver series	Reference page
	Basic	High torque	Basic	High torque	Basic	High torque		
LER10	0.2 (0.22)	0.3 (0.32)	420	280	±0.05 (End: ±0.01)*		Series LECP6 Series LECP1 Series LECPA	Page 1
LER30	0.8 (0.8)	1.2 (1.2)						
LER50	6.6 (6.6)	10 (10)						

* Value when an external stopper is mounted.
Note) Values in brackets for 360° rotation angle model.

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 19
Programless type	LECP1	Step motor (Servo/24 VDC)	24 VDC ±10%	6 inputs (Photo-coupler isolation)	6 outputs (Photo-coupler isolation)	14	Page 34
Pulse input type	LECPA	Step motor (Servo/24 VDC)	24 VDC ±10%	5 inputs (Photo-coupler isolation)	9 outputs (Photo-coupler isolation)	—	Page 40

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Step Motor (Servo/24 VDC) Type

◎Electric Rotary Table Series LER



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



Step Data Input Type/Series **LECP6** ..... Page 19

Controller Setting Kit/**LEC-W2** ..... Page 27

Teaching Box/**LEC-T1** ..... Page 28

Gateway Unit/Series **LEC-G** ..... Page 31

Programless Controller/Series **LECP1** ..... Page 34

Step Motor Driver/Series **LECPA** ..... Page 40

Controller Setting Kit/**LEC-W2** ..... Page 47

Teaching Box/**LEC-T1** ..... Page 48

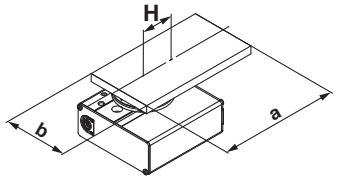
Electric Rotary Table Step Motor (Servo/24 VDC)

Series LER
Model Selection



Selection Precedure

Operating conditions



Electric rotary table: LER30J
Mounting position: Horizontal
Load type: Inertial load Ta
Configuration of load: 150 mm x 80 mm (Rectangular plate)
Rotation angle θ: 180°

Angular acceleration/ angular deceleration $\dot{\omega}$: 1,000°/sec²
Angular speed ω: 420°/sec
Load weight (m): 2.0 kg
Distance between shaft and centre of gravity H: 40 mm

Step1 Moment of inertia—Angular acceleration/deceleration

① **Calculation of moment of inertia**

② **Moment of inertia—Check the angular acceleration/deceleration**
Select the target model based on the moment of inertia and angular acceleration and deceleration with reference to the (Moment of Inertia —Angular Acceleration/Deceleration graph).

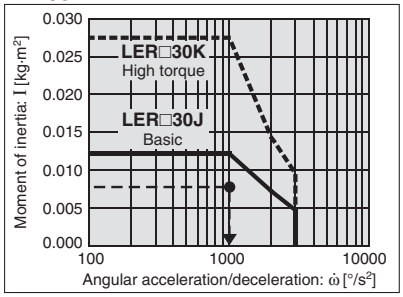
Formula

$I = m \times (a^2 + b^2)/12 + m \times H^2$

Selection example

$I = 2.0 \times (0.15^2 + 0.08^2)/12 + 2.0 \times 0.04^2$
$= 0.00802\ kg \cdot m^2$

LER30



Step2 Necessary torque

① **Load type**
- **Static load: Ts**
- **Resistance load: Tf**
- **Inertial load: Ta**

② **Check the effective torque**
Confirm whether it is possible to control the speed based on the effective torque corresponding with the angular speed with reference to the (Effective Torque—Angular Speed graph).

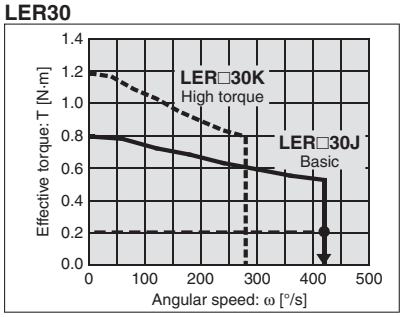
Formula

Effective torque ≥ Ts
Effective torque ≥ Tf x 1.5
Effective torque ≥ Ta x 1.5

Selection example

Inertial load: Ta
$Ta \times 1.5 = I \times \dot{\omega} \times 2\pi/360 \times 1.5$
$= 0.00802 \times 1{,}000 \times 0.0175 \times 1.5$
$= 0.21\ N \cdot m$

LER30



Step3 Allowable load

① **Check the allowable load**
- **Radial load**
- **Thrust load**
- **Moment**

Formula

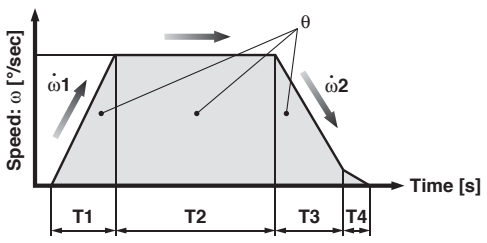
Allowable thrust load ≥ m x 9.8
Allowable moment ≥ m x 9.8 x H

Selection example

- **Thrust load**
  2.0 x 9.8 = 19.6 N < Allowable load OK
- **Allowable moment**
  2.0 x 9.8 x 0.04
  = 0.784 N·m < Allowable moment OK

Step4 Rotation time

① **Calculation of cycle time (rotation time)**



θ: **Rotation angle [°]**
ω: **Angular speed [°/sec]**
$\dot{\omega}1$: **Angular acceleration [°/sec²]**
$\dot{\omega}2$: **Angular deceleration [°/sec²]**

T1: Acceleration time [s] ··· Time until reaching the set speed
T2: Constant speed time [s] ··· Time while the actuator is operating at a constant speed
T3: Deceleration time [s] ··· Time from constant speed operation to stop
T4: Settling time [s] ··· Time until in position is completed

Formula

Angular acceleration time $T1 = \omega/\dot{\omega}1$
Angular deceleration time $T3 = \omega/\dot{\omega}2$
Constant speed time $T2 = \{\theta - 0.5 \times \omega \times (T1 + T3)\}/\omega$
Settling time $T4 = 0.2$ (sec)
Cycle time $T = T1 + T2 + T3 + T4$

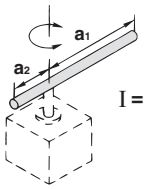
Selection example

- **Angular acceleration time** $T1 = 420/1{,}000 = 0.42$ sec
- **Angular deceleration time** $T3 = 420/1{,}000 = 0.42$ sec
- **Constant speed time**
  $T2 = \{180 - 0.5 \times 420 \times (0.42 + 0.42)\}/420$
  $= 0.009$ sec
- **Cycle time** $T = T1 + T2 + T3 + T4$
  $= 0.42 + 0.009 + 0.42 + 0.2$
  $= 1.049$ (sec)

Formulas for Moment of Inertia (Calculation of moment of inertia I)

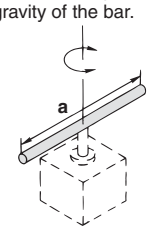
I: Moment of inertia [kg·m²] m: Load weight [kg]

1. Thin bar
Position of rotation shaft: Perpendicular to a bar through one end



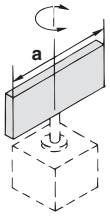
$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot \frac{a_2^2}{3}$$

2. Thin bar
Position of rotation shaft: Passes through the centre of gravity of the bar.



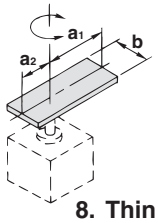
$$I = m \cdot \frac{a^2}{12}$$

3. Thin rectangular plate (cuboid)
Position of rotation shaft: Passes through the centre of gravity of a plate.



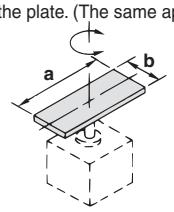
$$I = m \cdot \frac{a^2}{12}$$

4. Thin rectangular plate (cuboid)
Position of rotation shaft: Perpendicular to the plate and passes through one end. (The same applies to thicker cuboids.)



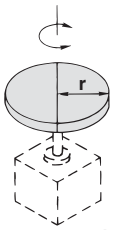
$$I = m_1 \cdot \frac{4a_1^2 + b^2}{12} + m_2 \cdot \frac{4a_2^2 + b^2}{12}$$

5. Thin rectangular plate (cuboid)
Position of the rotation shaft: Passes through the centre of gravity of the plate and perpendicular to the plate. (The same applies to thicker cuboids.)



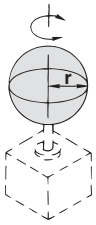
$$I = m \cdot \frac{a^2 + b^2}{12}$$

6. Cylindrical shape (including a thin disk)
Position of rotation shaft: Centre axis



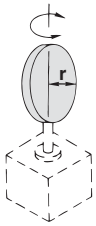
$$I = m \cdot \frac{r^2}{2}$$

7. Sphere
Position of rotation shaft: Diameter



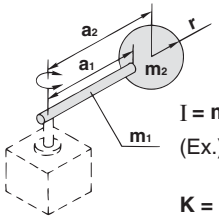
$$I = m \cdot \frac{2r^2}{5}$$

8. Thin disk (mounted vertically)
Position of rotation shaft: Diameter



$$I = m \cdot \frac{r^2}{4}$$

9. When a load is mounted on the end of the lever

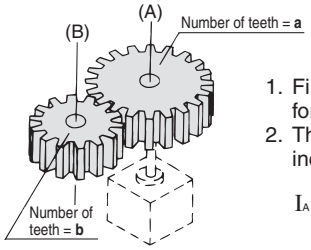


$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$$

(Ex.) Refer to **7** when the shape of m_2 is spherical.

$$K = m_2 \cdot \frac{2r^2}{5}$$

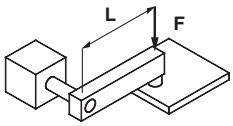
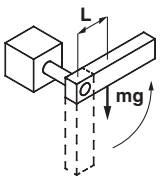
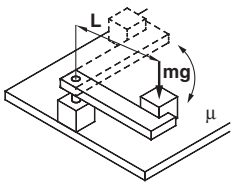
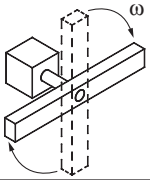
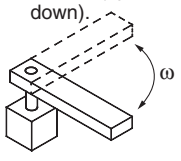
10. Gear transmission



1. Find the moment of inertia I_B for the rotation of shaft (B).
2. Then, replace the moment of inertia I_B around the shaft (A) by I_A,

$$I_A = \left(\frac{a}{b}\right)^2 \cdot I_B$$

Load Type

Load type		
Static load: Ts	**Resistance load: Tf**	**Inertial load: Ta**
Only pressing force is necessary. (e.g. for clamping)	Gravity or friction force is applied to rotating direction.	Rotate the load with inertia.
	Gravity is applied.  Friction force is applied. 	Centre of rotation and centre of gravity of the load are concentric.  Rotation shaft is vertical (up and down). 
Ts = F·L **Ts:** Static load (N·m) **F :** Clamping force (N) **L :** Distance from the rotation centre to the clamping position (m)	Gravity is applied to rotating direction. **Tf = m·g·L** Friction force is applied to rotating direction. **Tf = μ·m·g·L** **Tf:** Resistance load (N·m) **m:** Load weight (kg) **g :** Gravitational acceleration 9.8 (m/s²) **L :** Distance from the rotation centre to the point of application of the gravity or friction force (m) **μ :** Friction coefficient	**Ta = I·ω̇·2π/360** **(Ta = I·ω̇·0.0175)** **Ta:** Inertial load (N·m) **I :** Moment of inertia (kg·m²) **ω̇ :** Angular acceleration/deceleration (°/sec²) **ω :** Angular speed (°/sec)
Necessary torque: **T = Ts**	Necessary torque: **T = Tf x 1.5** Note 1)	Necessary torque: **T = Ta x 1.5** Note 1)

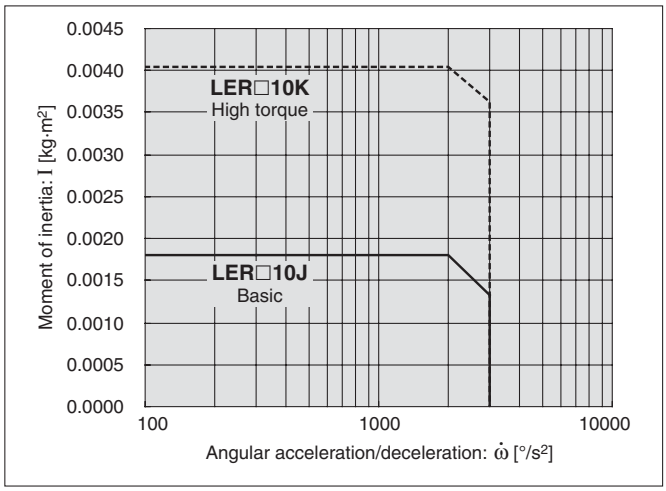
• Resistance load: Gravity or friction force is applied to rotating direction.
Ex. 1) Rotation shaft is horizontal (lateral), and the rotation centre and the centre of gravity of the load are not concentric.
Ex. 2) Load moves by sliding on the floor.
∗ The total of resistance load and inertial load is the necessary torque. **T = (Tf + Ta) x 1.5**

• Not resistance load: Neither gravity or friction force is applied to rotating direction.
Ex. 1) Rotation shaft is vertical (up and down).
Ex. 2) Rotation shaft is horizontal (lateral), and rotation centre and the centre of gravity of the load are concentric.
∗ Necessary torque is inertial load only. **T = Ta x 1.5**

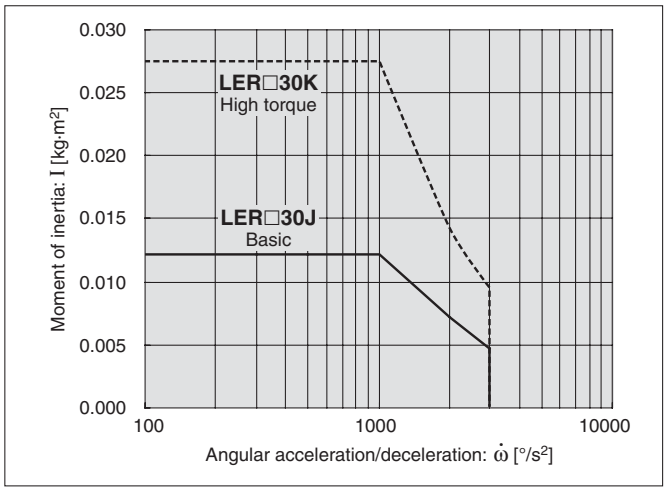
Note 1) To adjust the speed, margin is necessary for **Tf** and **Ta**.

Moment of Inertia—Angular Acceleration/Deceleration

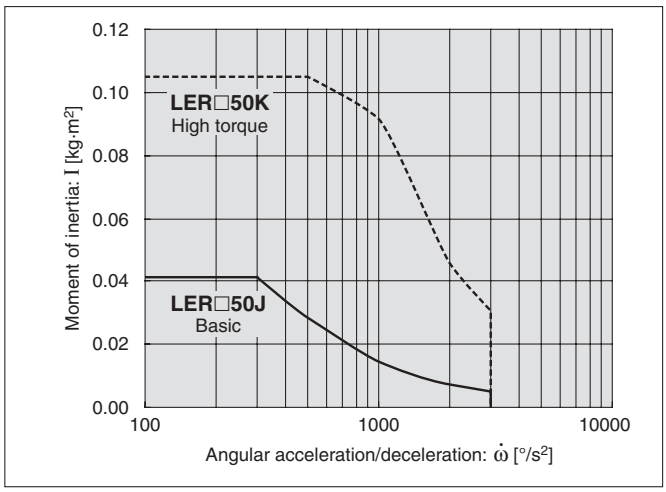
LER10



LER30

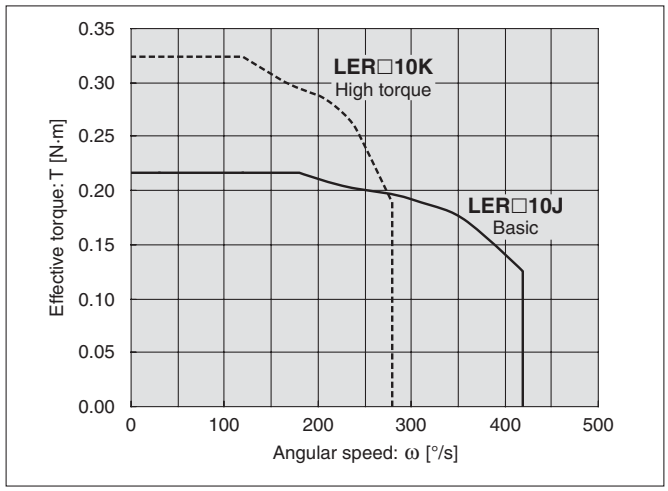


LER50

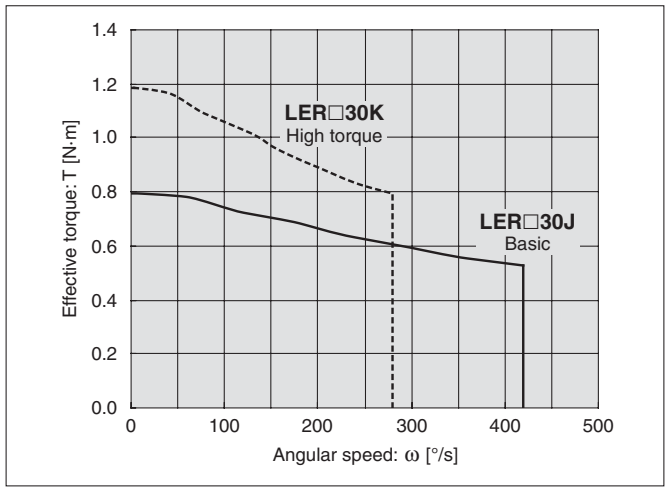


Effective Torque—Angular Speed

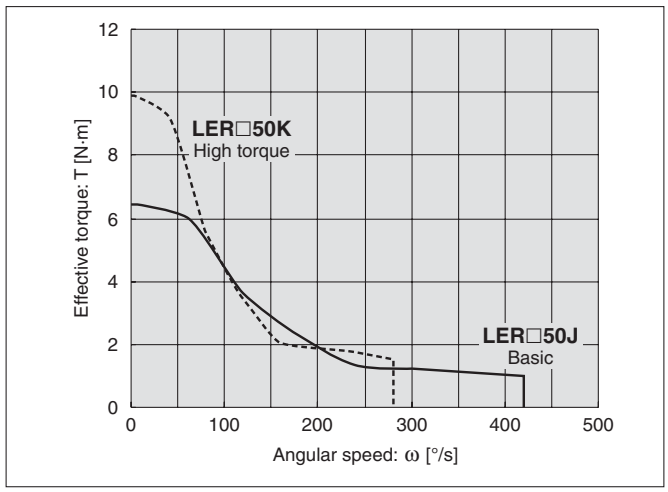
LER10



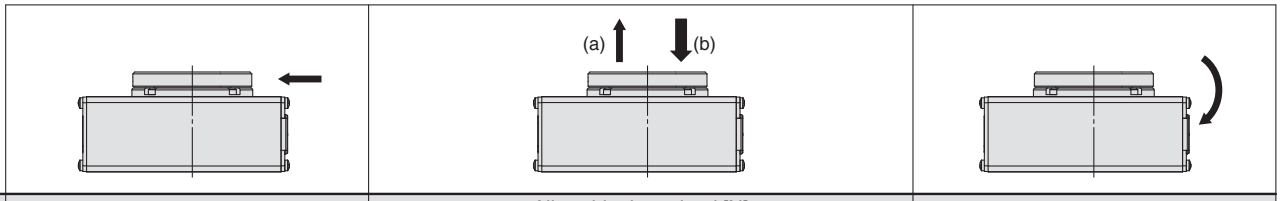
LER30



LER50



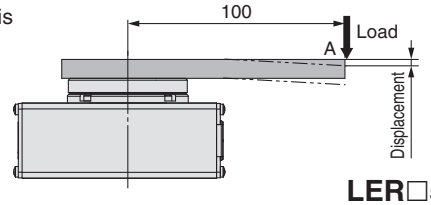
Allowable Load



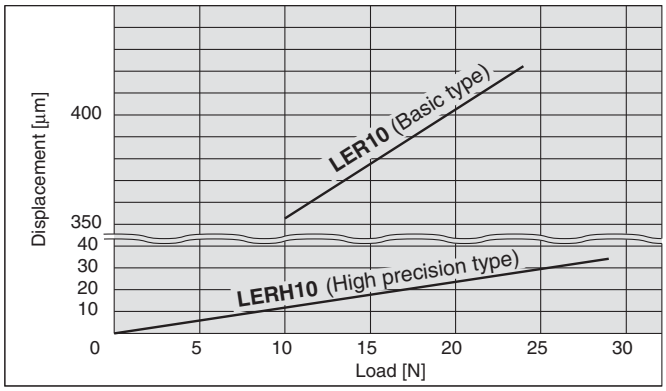
Size	Allowable radial load [N]		Allowable thrust load [N]				Allowable moment [N·m]	
			(a)		(b)			
	Basic type	High precision type	Basic type	High precision type	Basic type	High precision type	Basic type	High precision type
10	78	86	74		78	107	2.4	2.9
30	196	233	197		363	398	5.3	6.4
50	314	378	296		398	517	9.7	12.0

Table Displacement (Reference Value)

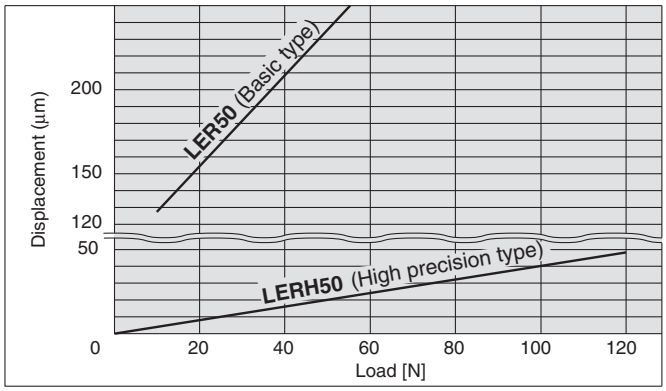
- Displacement at point A when a load is applied to point A 100 mm away from the rotation centre.



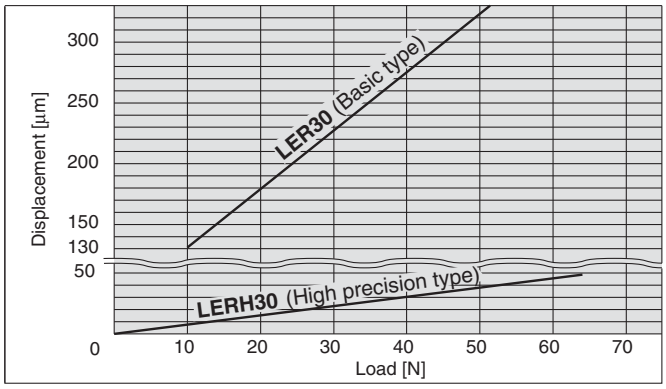
LER□10



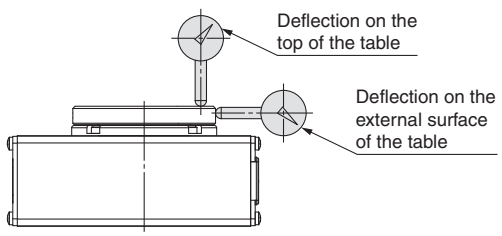
LER□50



LER□30



Deflection Accuracy: Displacement at 180° Rotation (Guide)



[mm]

Measured part	**LER** (Basic type)	**LERH** (High precision type)
Deflection on the top of the table	0.1	0.03
Deflection on the external surface of the table	0.1	0.03

Electric Rotary Table

Step Motor (Servo/24 VDC)

Series LER

LER10, 30, 50

How to Order

LER ❑ 10 K – ❑ ❑ – S 1 6P 1 ❑

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Table accuracy

—	Basic type
H	High precision type

❷ Size

10
30
50

❸ Max. rotating torque [N·m]

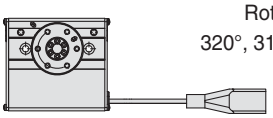
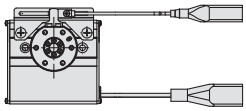
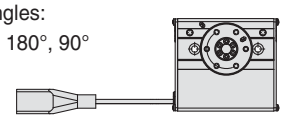
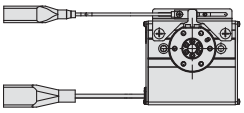
Symbol	Type	LER10	LER30	LER50
K	High torque	0.3 (0.32)	1.2	10
J	Basic	0.2 (0.22)	0.8	6.6

∗ Values in brackets for 360° rotation angle model.

❹ Rotation angle [°]

Symbol	LER10	LER30	LER50
—	310	320	
1	360° Continuos rotation specification		
2	External stopper: 180		
3	External stopper: 90		

❺ Motor cable entry

—	Basic type (entry on the right side)	
	Rotation angles: 320°, 310°, 180°, 90° 	Rotation angle: 360° 
L	Entry on the left side	
	Rotation angles: 320°, 310°, 180°, 90° 	Rotation angle: 360° 

❻ Actuator cable type∗

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

∗ The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.

⚠Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LER 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.

❽ Controller/Driver type∗1

—	Without controller/driver	
6N	**LECP6** (Step data input type)	NPN
6P		PNP
1N	**LECP1**∗2 (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 Not available for 360° rotation angle model.

❼ Actuator cable length [m]

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

∗ Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 6.

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 26 (For LECP6), page 39 (For LECP1) or page 46 (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 20.)

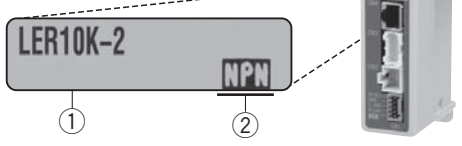
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

① Check the actuator labell 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.smcworld.com

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 19	Page 34	Page 40



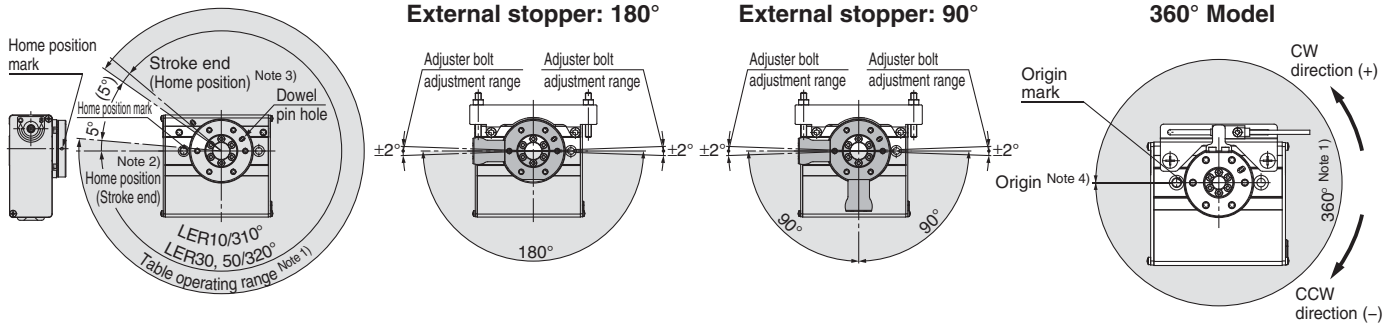
Specifications

Step Motor (Servo/24 VDC)

Model			LER□10K	LER□10J	LER□30K	LER□30J	LER□50K	LER□50J
Actuator specifications (Basic type)	Rotation angle [°]		310		320			
	Max. rotating torque [N·m] Note 8)		0.3 (0.32)	0.2 (0.22)	1.2	0.8	10	6.6
	Max. pushing torque [N·m] Note 1) 3) 8)		0.15 (0.16)	0.1 (0.11)	0.6	0.4	5	3.3
	Max. moment of inertia [kg·m²] Note 2) 3)		0.0040	0.0018	0.027	0.012	0.10	0.04
	Angular speed [°/sec] Note 2) 3)		20 to 280	30 to 420	20 to 280	30 to 420	20 to 280	30 to 420
	Pushing speed [°/sec]		20	30	20	30	20	30
	Max. angular acceleration/deceleration [°/sec²] Note 2)		3000					
	Backlash [°]		±0.3					
	Positioning repeatability [°]		±0.05					
	Impact/Vibration resistance [m/s²] Note 4)		150/30					
	Actuation type		Special worm gear + Belt drive					
	Max. operating frequency [c.p.m]		60					
	Operating temp. range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
	Weight [kg]	Basic type	0.49		1.1		2.2	
		High precision type	0.52		1.2		2.4	
360° type	Rotation angle [°]		360					
	Angle setting range [°] Note 9)		±20000000					
	Weight [kg]	Basic type	0.51		1.2		2.3	
		High precision type	0.55		1.3		2.5	
External stopper type	Rotation angle [°]	-2/ arm (1 pc.)	180					
		-3/ arm (2 pcs.)	90					
	Repeatability at the end [°]/ with external stopper		±0.01					
	External stopper setting range [°]		±2					
	Weight [kg] -2/external arm (1 pc.)	Basic type	0.55		1.2		2.5	
		High precision type	0.61		1.4		2.7	
	Weight [kg] -3/external arm (1 pc.)	Basic type	0.57		1.2		2.6	
		High precision type	0.63		1.4		2.8	
Electric specifications	Motor size		□20		□28		□42	
	Motor type		Step motor (Servo/24 VDC)					
	Encoder		Incremental A/B phase (800 pulse/rotation)					
	Proximity sensor (for return to origin)/Input circuit Note 10)		2-wire					
	Proximity sensor (for return to origin)/Input point Note 10)		1 input					
	Power supply [V]		24 VDC ±10%					
	Power consumption [W] Note 5)		11		22		34	
	Standby power consumption when operating [W] Note 6)		7		12		13	
	Max. instantaneous power consumption [W] Note 7)		14		42		57	

Note 1) Pushing force accuracy is LER10: ±30% (F.S.), LER30: ±25% (F.S.), LER50: ±20% (F.S.).
Note 2) The angular acceleration, angular deceleration and angular speed may fluctuate due to variations in the inertia moment.
Refer to page 3 "Moment of Inertia—Angular Acceleration/ Deceleration, Effective Torque—Angular Speed" graphs for confirmation.
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) Impact resistance: No malfunction occurred when the slide table was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the actuator 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 actuator in the initial state.)
Note 5) The power consumption (including the controller) is for when the actuator is operating.
Note 6) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during operation.
Note 7) The maximum instantaneous power consumption (including the controller) is for when the actuator is operating. This value can be used for the selection of the power supply.
Note 8) Values in brackets only for 360° rotation angle model.
Note 9) The angle displayed on the monitor is automatically reset to 0° every 360°.
To set an angle (position), use the INC (relative) operation method. If an angle of 360° or more is set using the ABS (absolute) operation method, the correct operation cannot be performed.
Note 10) For 360° rotation angle model.

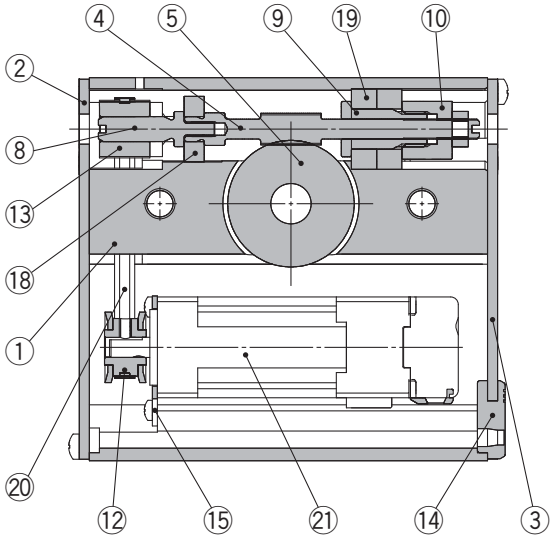
Table Rotation Angle Range



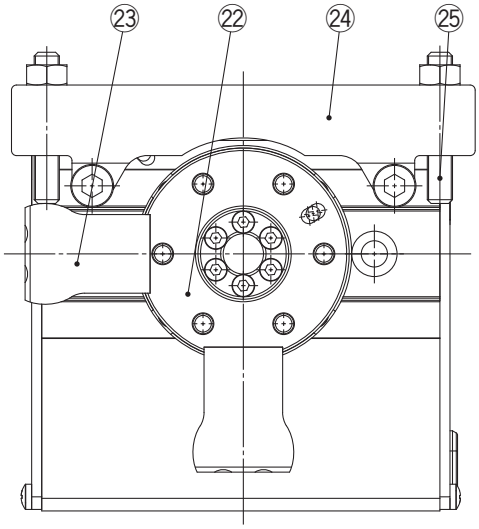
∗ The figures show the origin position for each actuator.

Note 1) Range within which the table can move when it returns to origin.
Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) The number in brackets indicates when the direction of return to origin has changed.
Note 4) The sensor detection range is recognized as origin. When detecting the sensor, the table rotates in the reverse direction within the sensor detection range.

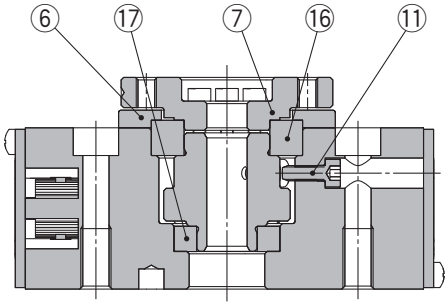
Construction



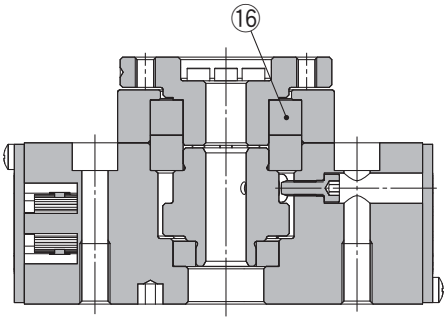
External stopper type



Basic type



High precision type



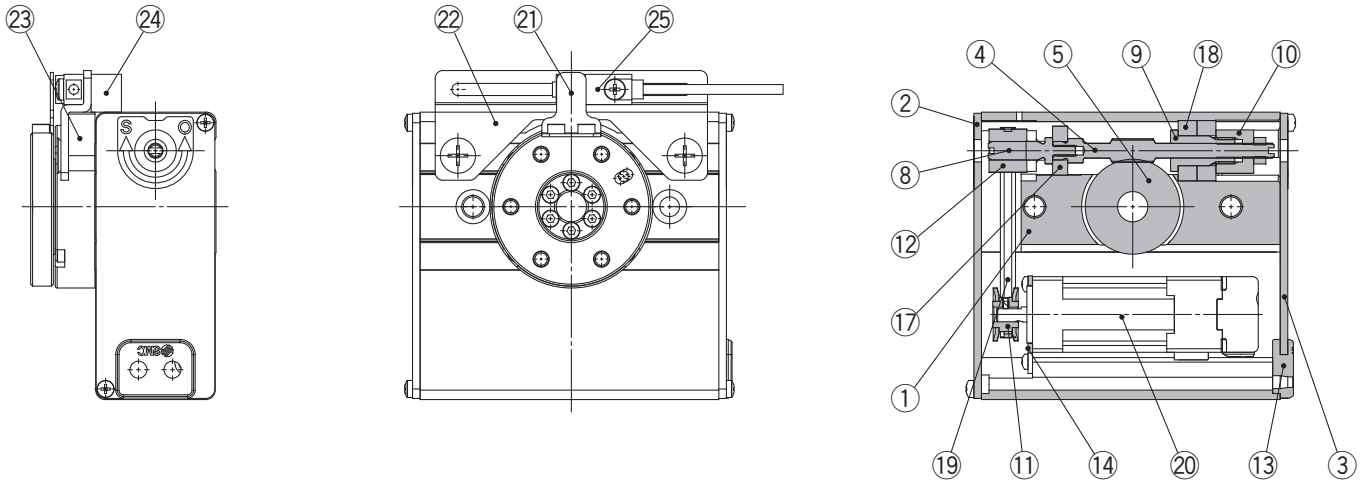
Component Parts

No.	Description		Material	Note
1	**Body**		Aluminium alloy	Anodised
2	**Side plate A**		Aluminium alloy	Anodised
3	**Side plate B**		Aluminium alloy	Anodised
4	**Worm screw**		Stainless steel	Heat treated, specially treated
5	**Worm wheel**		Stainless steel	Heat treated, specially treated
6	**Bearing cover**		Aluminium alloy	Anodised
7	**Table**		Aluminium alloy	
8	**Joint**		Stainless steel	
9	**Bearing holder**		Aluminium alloy	
10	**Bearing retainer**		Aluminium alloy	
11	**Home position bolt**		Carbon steel	
12	**Pulley A**		Aluminium alloy	
13	**Pulley B**		Aluminium alloy	
14	**Grommet**		NBR	
15	**Motor plate**		Carbon steel	
16	**Basic type**	Deep groove ball bearing	—	
	High precision type	Special ball bearing		
17	**Deep groove ball bearing**		—	
18	**Deep groove ball bearing**		—	
19	**Deep groove ball bearing**		—	
20	**Belt**		—	
21	**Step motor (Servo/24 VDC)**		—	

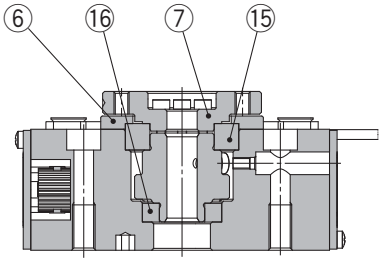
Component Parts

No.	Description	Material	Note
22	**Table**	Aluminium alloy	Anodised
23	**Arm**	Carbon steel	Heat treated, electroless nickel treated
24	**Holder**	Aluminium alloy	Anodised
25	**Adjuster bolt**	Carbon steel	Heat treated, chromate treated

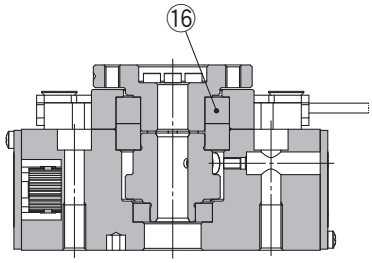
Dimensions: Continuous rotation specification (360°)



Basic type



High precision type



Component Parts

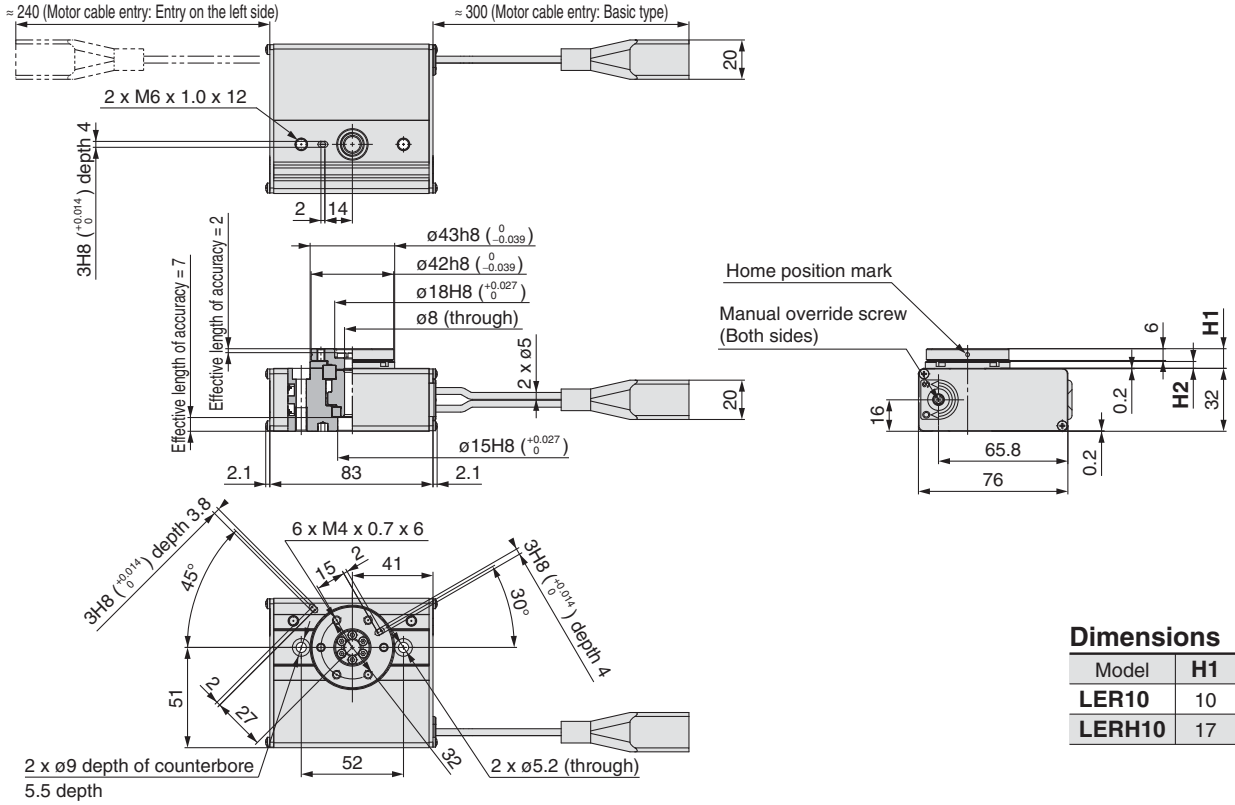
No.	Description		Material	Note
1	**Body**		Aluminium alloy	Anodised
2	**Side plate A**		Aluminium alloy	Anodised
3	**Side plate B**		Aluminium alloy	Anodised
4	**Worm screw**		Stainless steel	Heat treated + Specially treated
5	**Worm wheel**		Stainless steel	Heat treated + Specially treated
6	**Bearing cover**		Aluminium alloy	Anodised
7	**Table**		Aluminium alloy	
8	**Joint**		Stainless steel	
9	**Bearing holder**		Aluminium alloy	
10	**Bearing retainer**		Aluminium alloy	
11	**Pulley A**		Aluminium alloy	
12	**Pulley B**		Aluminium alloy	
13	**Grommet**		NBR	
14	**Motor plate**		Carbon steel	
15	**Basic type**	Deep groove ball bearing	—	
	High precision type	Special ball bearing		
16	**Deep groove ball bearing**		—	
17	**Deep groove ball bearing**		—	
18	**Deep groove ball bearing**		—	
19	**Belt**		—	

Component Parts (360° type)

No.	Description	Material	Note
21	**Proximity dog**	Stainless steel	
22	**Sensor holder**	Carbon steel	Chromate treated
23	**Sensor holder spacer**	Aluminium alloy	Anodised (High precision type can be used only)
24	**Square nut**	Aluminium alloy	
25	**Proximity sensor assembly**	—	Type

Dimensions

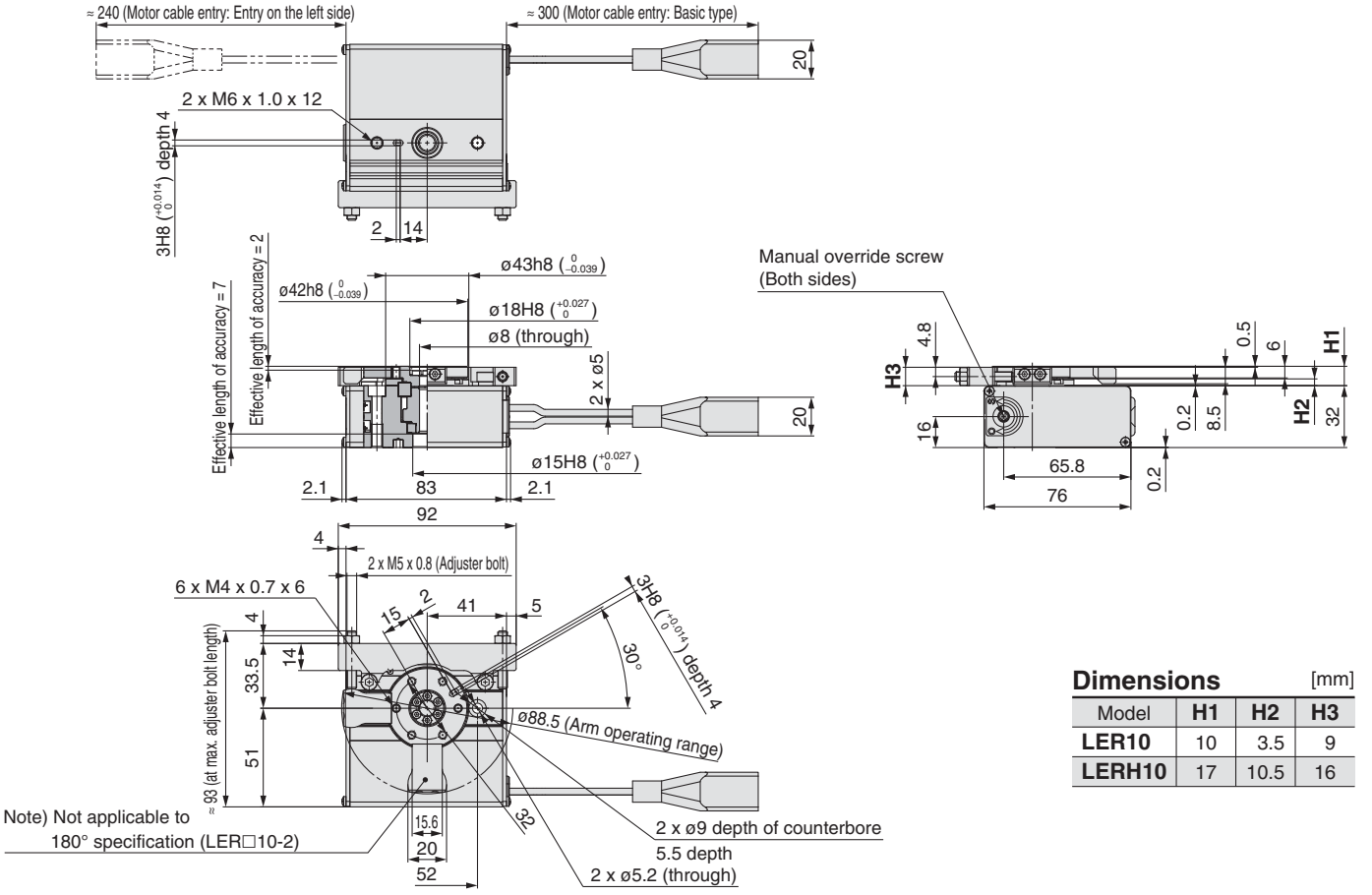
LER□10□ (Rotation angle: 310°)



Dimensions [mm]

Model	H1	H2
LER10	10	3.5
LERH10	17	10.5

LER□10-2 (Rotation angle: 180°)
LER□10-3 (Rotation angle: 90°)

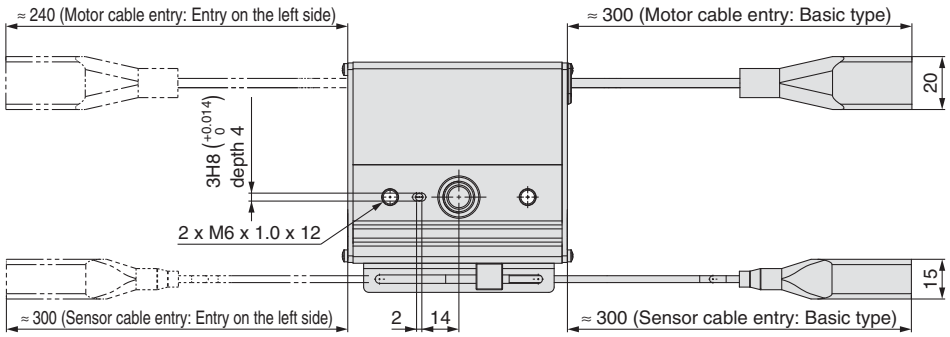


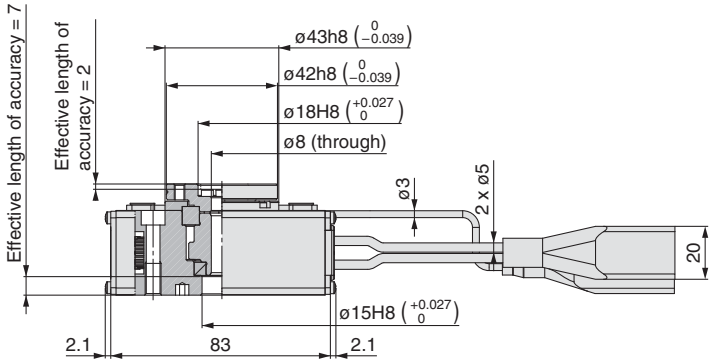
Dimensions [mm]

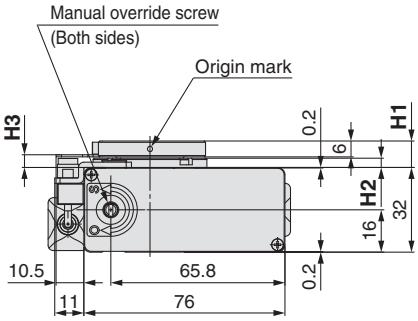
Model	H1	H2	H3
LER10	10	3.5	9
LERH10	17	10.5	16

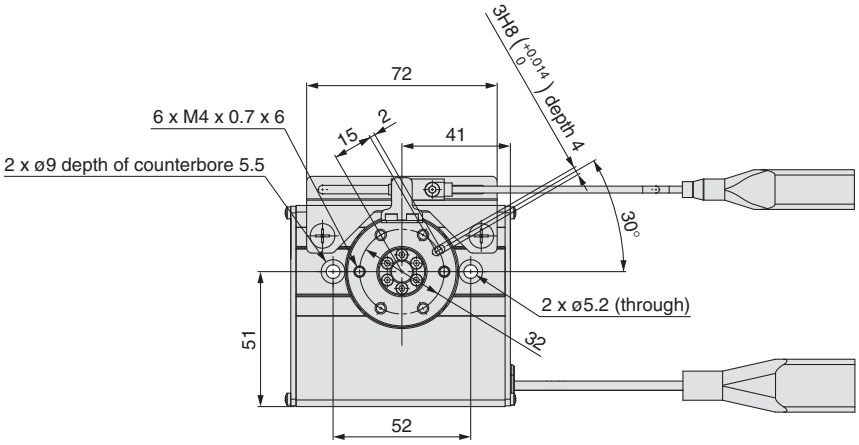
Dimensions: Continuous rotation specification (360°)

LER□10□







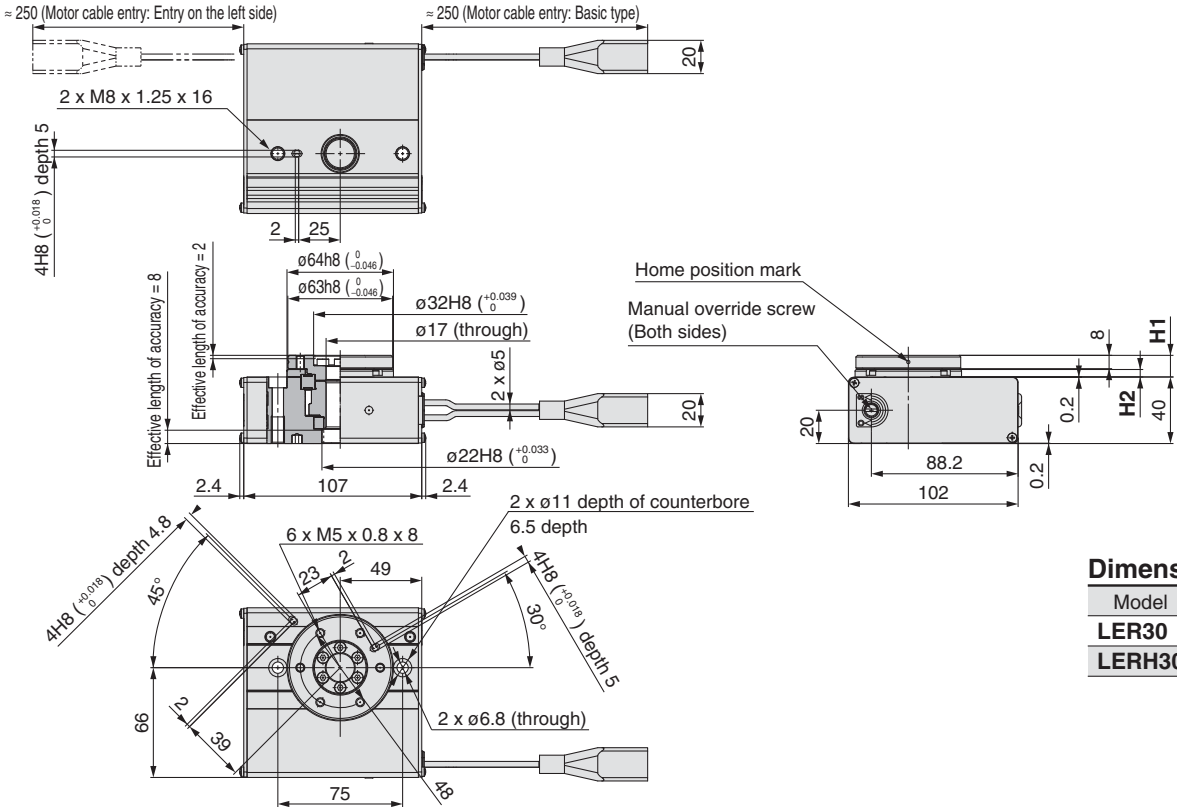


Dimensions [mm]

Model	H1	H2	H3
LER10	10	3.5	4.8
LERH10	17	10.5	11.8

Dimensions

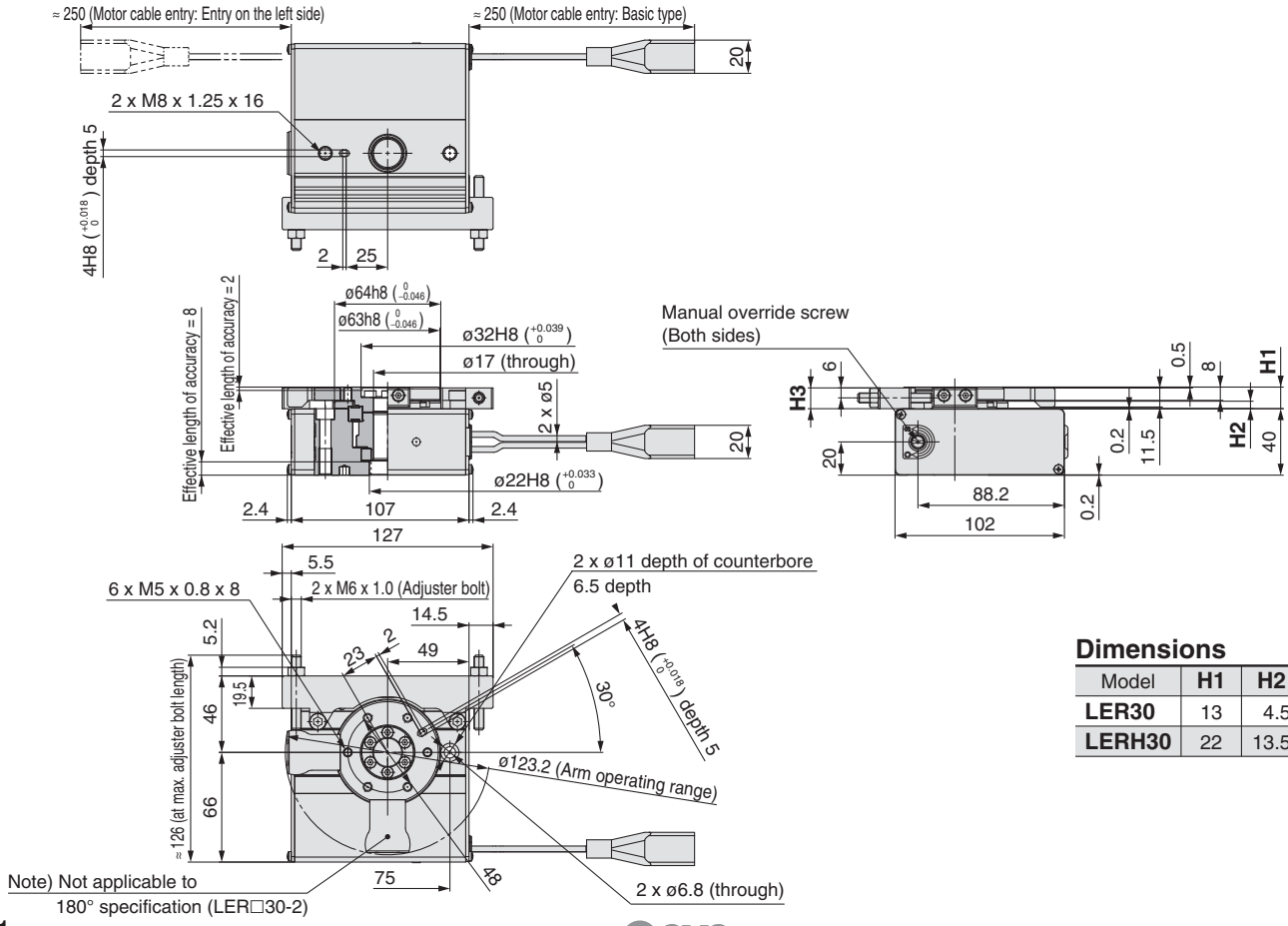
LER□30□ (Rotation angle: 320°)



Dimensions [mm]

Model	H1	H2
LER30	13	4.5
LERH30	22	13.5

LER□30-2 (Rotation angle: 180°)
LER□30-3 (Rotation angle: 90°)

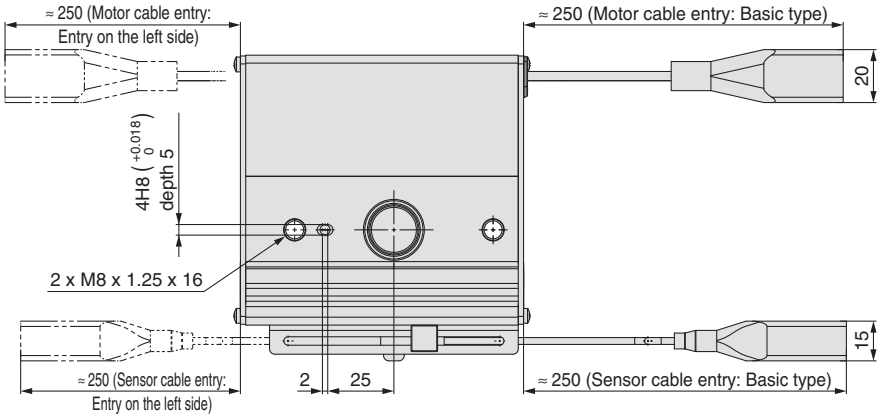


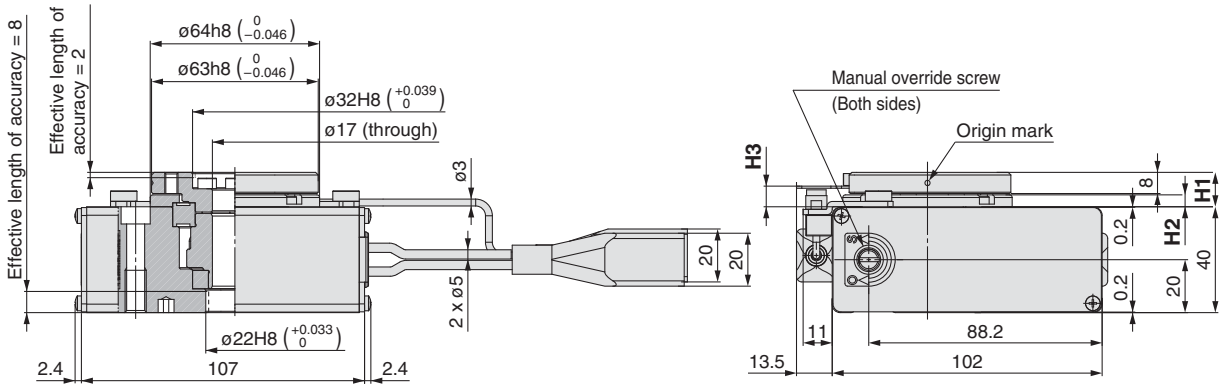
Dimensions [mm]

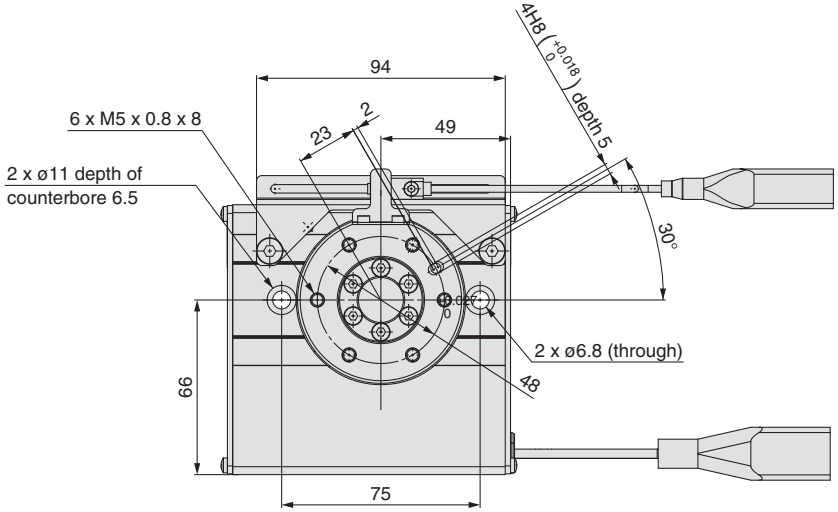
Model	H1	H2	H3
LER30	13	4.5	12.5
LERH30	22	13.5	21.5

Dimensions: Continuous rotation specification (360°)

LER□30





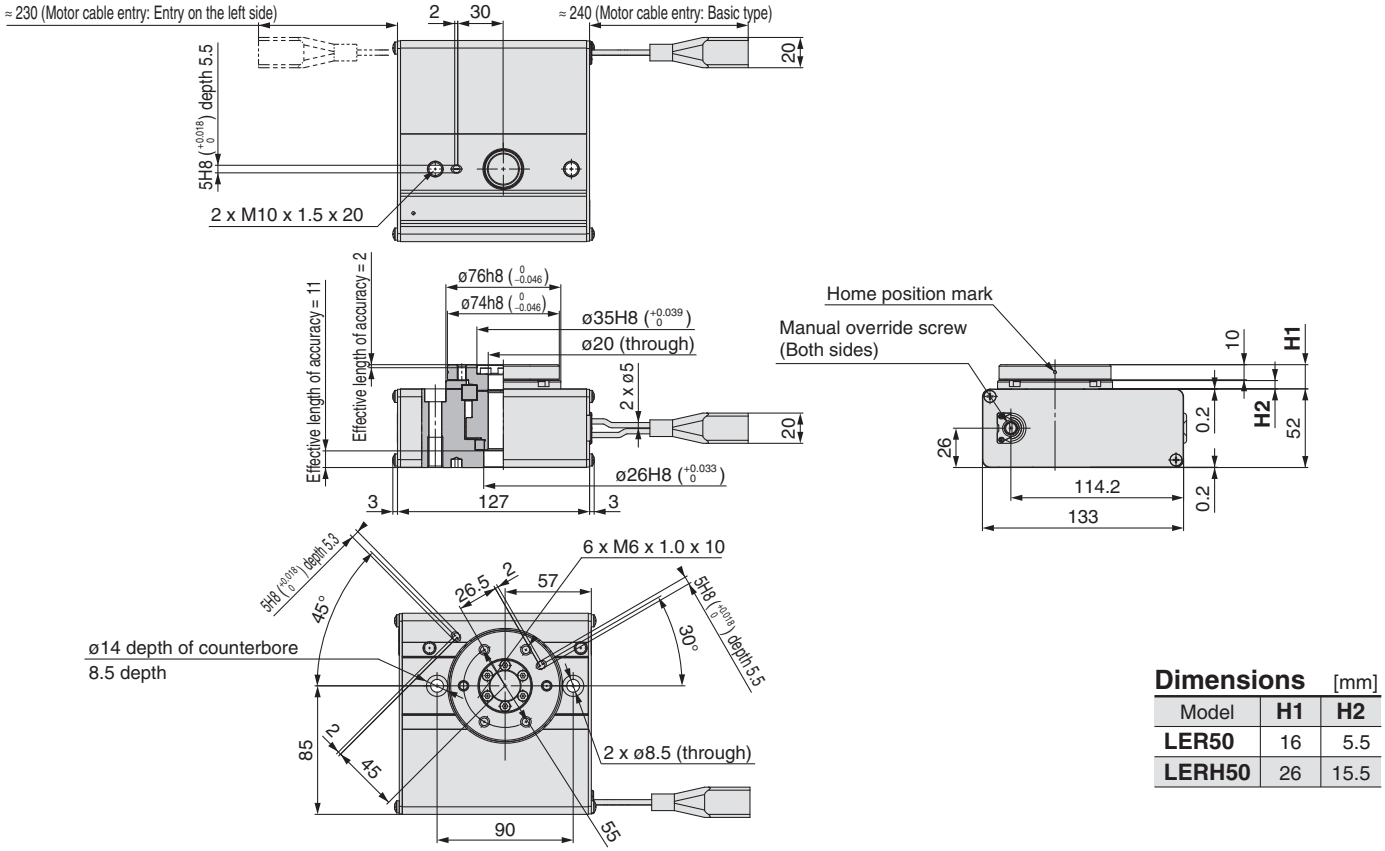


Dimensions [mm]

Model	H1	H2	H3
LER30	13	4.5	7.8
LERH30	22	13.5	16.8

Dimensions

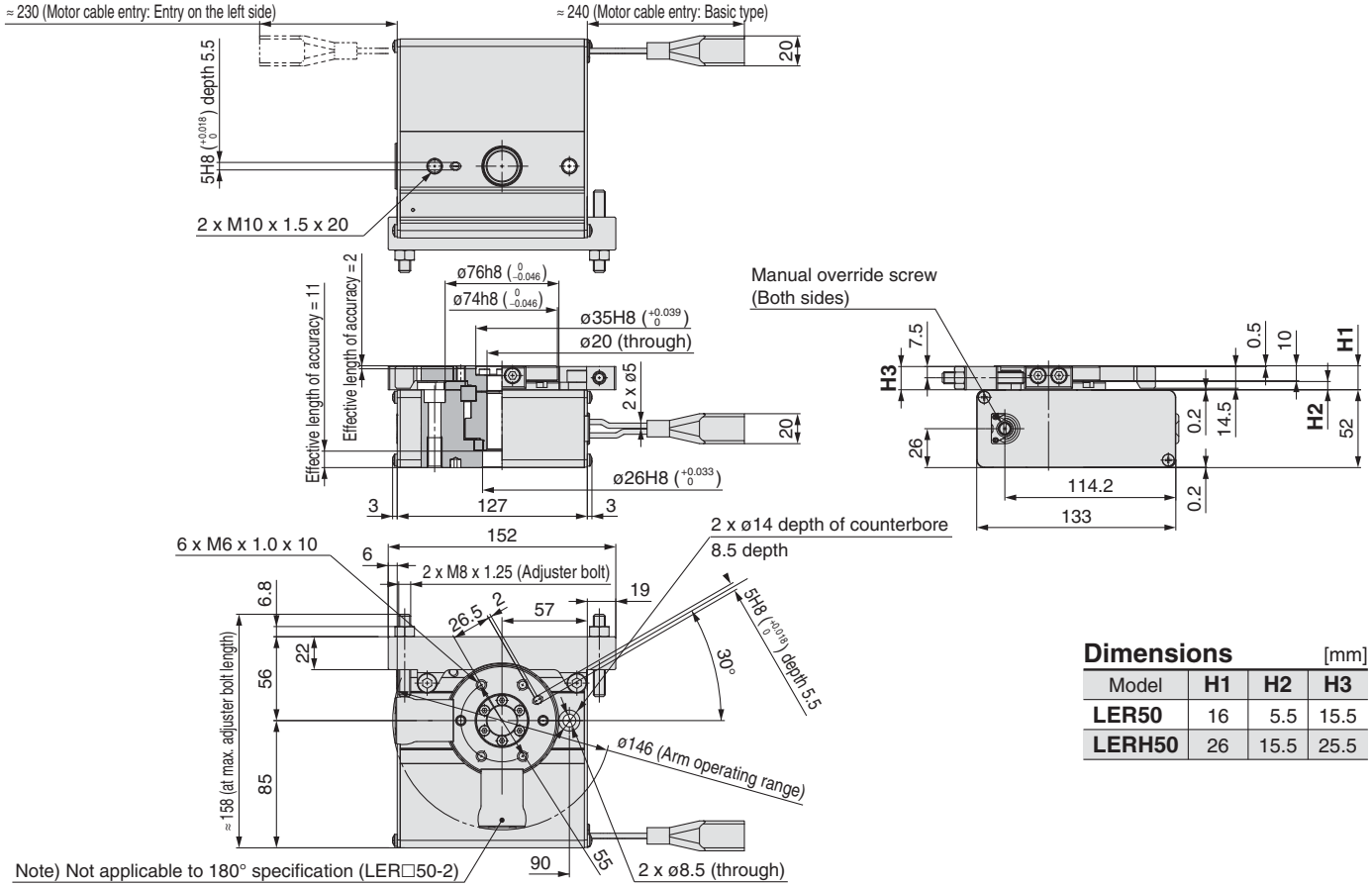
LER□50□ (Rotation angle: 320°)



Dimensions [mm]

Model	H1	H2
LER50	16	5.5
LERH50	26	15.5

LER□50-2 (Rotation angle: 180°)
LER□50-3 (Rotation angle: 90°)



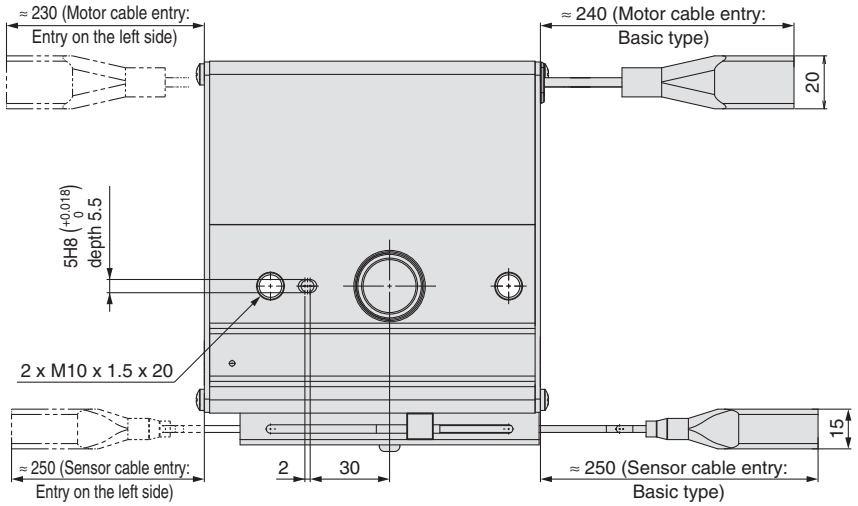
Note) Not applicable to 180° specification (LER□50-2)

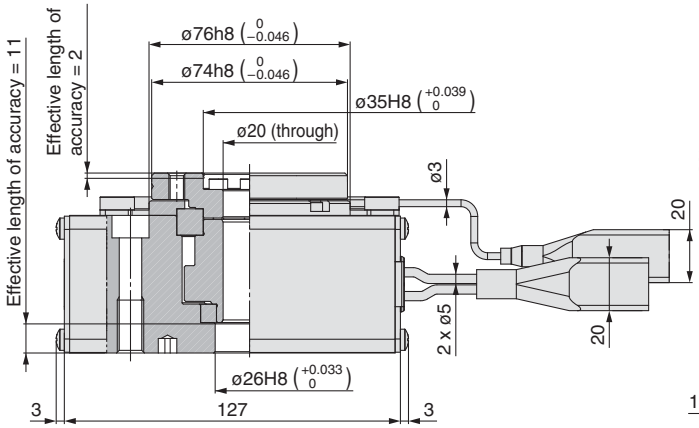
Dimensions [mm]

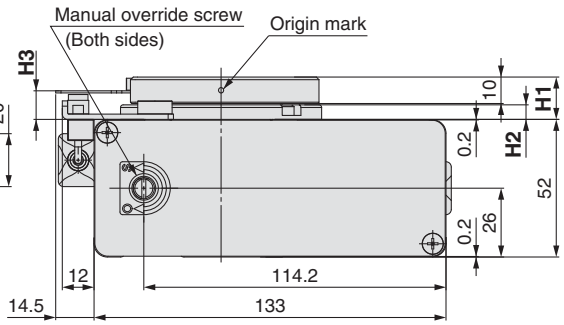
Model	H1	H2	H3
LER50	16	5.5	15.5
LERH50	26	15.5	25.5

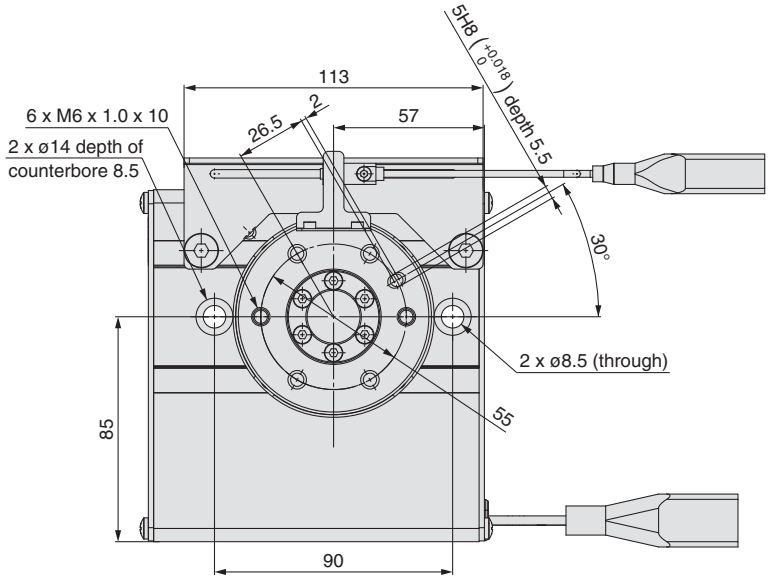
Dimensions: Continuous rotation specification (360°)

LER□50









Dimensions [mm]

Model	H1	H2	H3
LER50	16	5.5	10.8
LERH50	26	15.5	20.8

Series LER
Electric Rotary Table/ Specific Product Precautions 1

Be sure to read before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Design/Selection

⚠Warning

1. If the operating conditions involve load fluctuations, ascending/descending movements, or changes in the frictional resistance, ensure that safety measures are in place to prevent injury to the operator or damage to the equipment.
Failure to provide such measures could accelerate the operation speed, which may be hazardous to humans, machinery, and other equipment.

2. Power failure may result in a decrease in the pushing force; ensure that safety measures are in place to prevent injury to the operator or damage to the equipment.
When the product is used for clamping, the clamping force could be decreased due to power failure, potentially creating a hazardous situation in which the workpiece is released.

⚠Caution

1. If the operating speed is set too fast and the moment of inertia is too large, the product could be damaged.
Set appropriate product operating conditions in accordance with the model selection procedure.

2. If more precise repeatability of the rotation angle is required, use the product with an external stopper, with repeatability of ±0.01° (180° and 90° with adjustment of ±2°) or by directly stopping the workpiece using an external object utilizing the pushing operation.
When using angle adjustment, the initially set rotation angle may change.

3. When using the electric rotary table with an external stopper, or by directly stopping the load externally, ensure that the [Pushing operation] is utilized.
Also, ensure that the workpiece is not impacted externally during the positioning operation or in the range of positioning operation.

Mounting

⚠Warning

1. Do not drop or hit the electric rotary table to avoid scratching and denting the mounting surfaces.
Even slight deformation can cause the deterioration of accuracy and operation failure.

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

Mounting the workpiece to the electric rotary table

The load should be mounted with the torque specified in the following table by screwing the bolt into the mounting female thread. If long threads are used, they can interfere with the body and cause a malfuction, etc.

Model	Bolt	Thread length	Max. tightening torque [N·m]
LER□10	M4 x 0.7	6	1.4
LER□30	M5 x 0.8	8	3.0
LER□50	M6 x 1	10	5.0

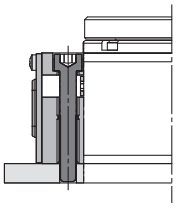
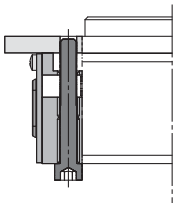
3. When mounting the electric rotary table, use screws with adequate length and tighten them with adequate torque within the specified torque range.
Tightening the screws with a higher torque than recommended may cause malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Mounting

⚠Warning

Through-hole mounting

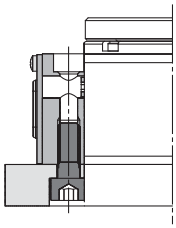
Body mounting/bottom **Body mounting/top**

Model	Bolt	Max. tightening torque [N·m]
LER□10	M5 x 0.8	3.0
LER□30	M6 x 1	5.0
LER□50	M8 x 1.25	12.0

Body tapped mounting

Body mounting/bottom

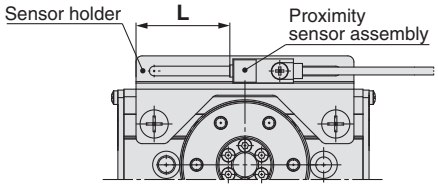


Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth [mm]
LER□10	M6 x 1	5.0	12
LER□30	M8 x 1.25	12.0	16
LER□50	M10 x 1.5	25.0	20

4. The mounting face has holes and slots for positioning. Use them for accurate positioning of the electric rotary table if required.

5. If it is necessary to operate the electric rotary table when it is not energised, use the manual override screws.
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.

6. The 360° type proximity sensor for return to origin can be changed ±30°. When changing the position of the proximity sensor for return to origin, tighten the screws with a tightening torque of 0.6±0.1 [N·m].



Model	**L** [mm] (Initial setting) Cable entry: Basic type/Entry on the left side (Between the sensor holder end face and proximity sensor end
LER□10-1	31/31
LER□30-1	42/42
LER□50-1	51.5/51.5

Series LER
Electric Rotary Table/ Specific Product Precautions 2

Be sure to read before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Handling

⚠Caution

1. When an external guide is used, connect it in such a way that no impact or load is applied to it.
Use a free moving connector (such as a coupling).

2. 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 the [Trigger LV] value (including thrust during operation), the INP output signal will turn on.
The [Trigger LV] should be set between 40% and [Pushing force].
a) To ensure that the clamping and external stop is achieved by [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.

3. When the workpiece is to be stopped by the electric rotary actuator with an external stopper or directly by an external object, utilize the "pushing operation". Do not stop the table with an external stopper or external object by using in the range of the "positioning operation mode".
If the product is used in the positioning operation mode, there may be galling or other problems when the product/workpiece comes into contact with the external stopper or external object.

4. When the table is stopped by the pushing operation mode (stopping/clamping), set the product to a position of at least 1° away from the workpiece. (This position is referred to as the pushing start position.)
If the pushing operations start position (stopping or clamping) is set to the same position as the external stop position, the following alarms may be generated and operation may become unstable.
a. "Posn failed" alarm is generated.
It is not possible to reach the pushing operation start position within the target time.
b. "Pushing ALM" alarm is generated.
The product is pushed back from a pushing start position after starting to push.
c. "Deviation over flow" alarm is generated.
Displacement exceeding the specified value is generated at the pushing start position.

5. There is no backlash effect when the product is stopped externally by pushing operation.
For the return to origin, the origin position is set by the pushing operation.

6. For the specification with an external stopper, an angle adjustment bolt is provided as standard.
The rotation angle adjustment range is ±2° from the angle rotation end.
If the angle adjustment range is exceeded, the rotation angle may change due to insufficient strength of the external stopper.
One revolution of the adjustment bolt is approximately equal to 1° of rotation.

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

Maintenance

⚠Danger

1. The high precision type bearing is assembled by pressing into position. It is not possible to disassemble it.

Controller/Driver

Step Data Input Type ····· **Page 19**



Step Motor (Servo/24 VDC)
Series LECP6

Gateway Unit ····· **Page 31**



Series LEC-G

Programless Type ····· **Page 34**



Step Motor (Servo/24 VDC)
Series LECP1

Pulse Input Type ····· **Page 40**



Step Motor (Servo/24 VDC)
Series LECPA

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



How to Order

⚠Caution

[CE-compliant products]
EMC compliance was tested by combining the electric actuator LER 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

(Except cable specifications and actuator options)
Example: Enter "LER10K-2" for the LER10K-2L-R16N1.

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.

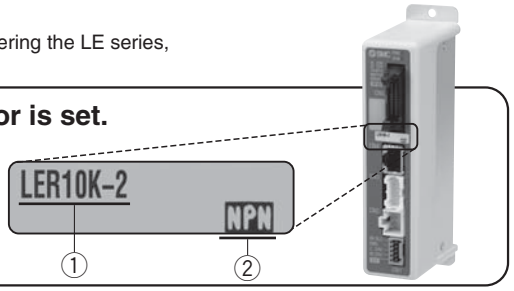
The controller is sold as single unit after the compatible actuator is set.

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

<Check the following before use.>

① Check that actuator labell 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.smcworld.com

Specifications

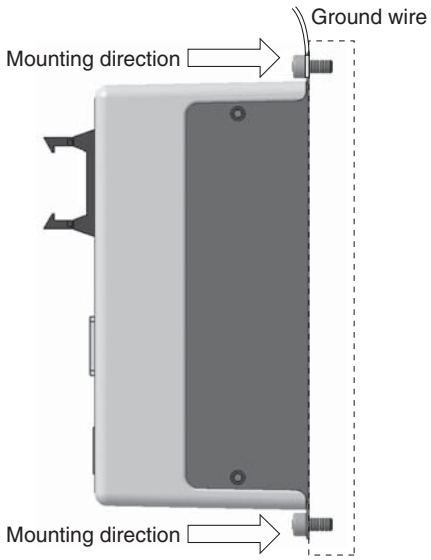
Basic Specifications

Item	Specifications
Compatible motor	Step motor (Servo/24 VDC)
Power supply Note 1)	Power voltage: 24 VDC±10% Current consumption: 3 A (Peak 5 A) 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)

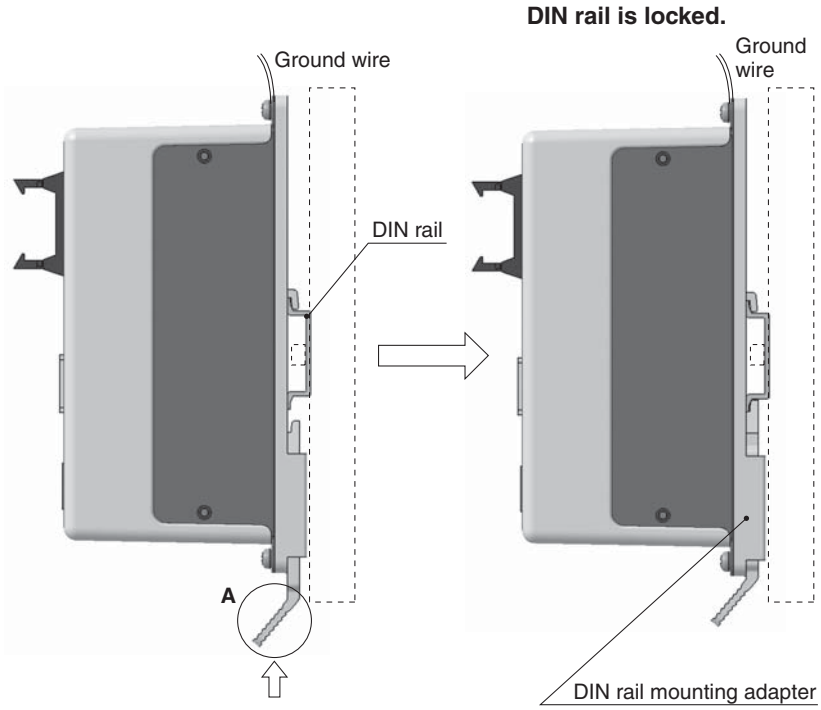
Note 1) Do not use the power supply of "inrush current prevention type" for the controller power supply. When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.
Note 2) The power consumption changes depending on the actuator model. Refer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

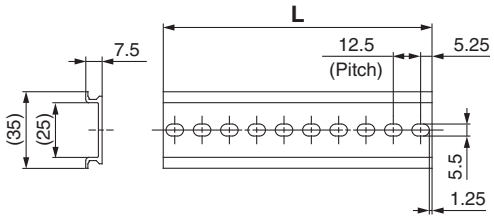


Hook the controller on the DIN rail and press the lever of section **A** in the arrow direction to lock it.

Note) When sizes 30 or 50 of the LER 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 21 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

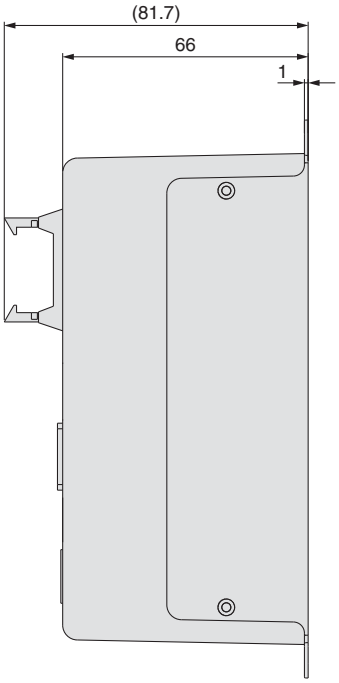
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5	498	510.5

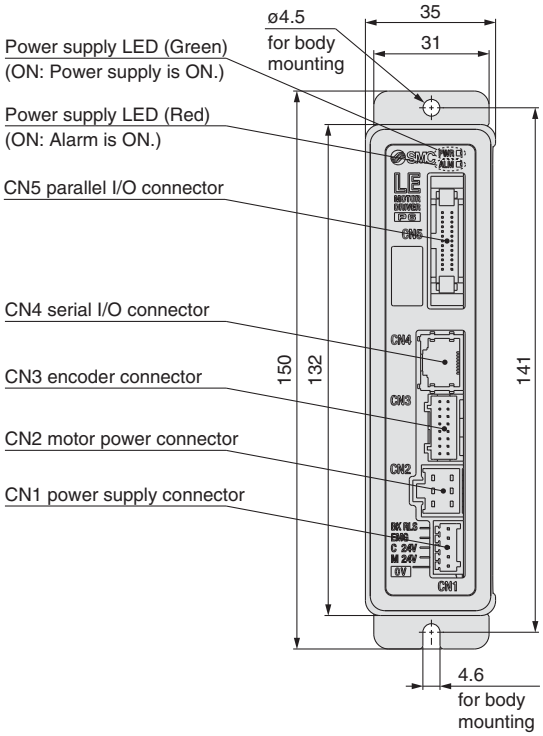
DIN rail mounting adapter
LEC-D0 (with 2 mounting screws)

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

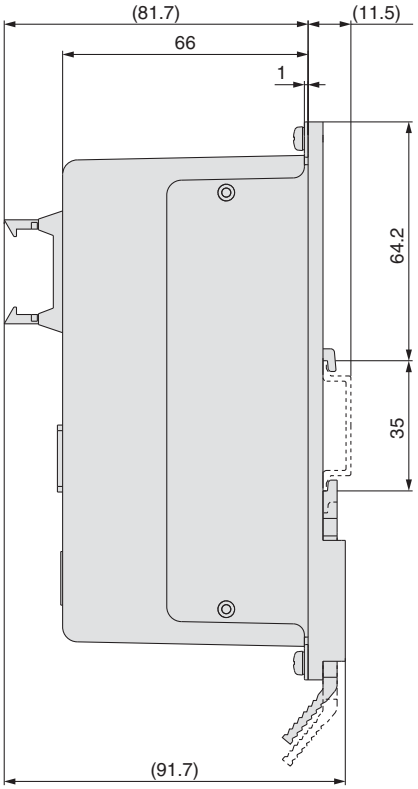
Dimensions

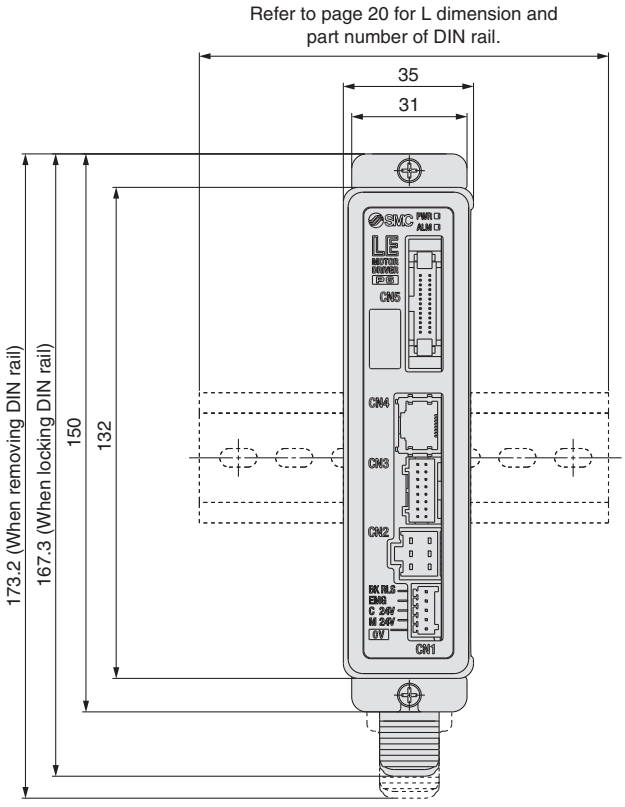
a) Screw mounting (LECP6□□-□)





b) DIN rail mounting (LECP6□□D-□)



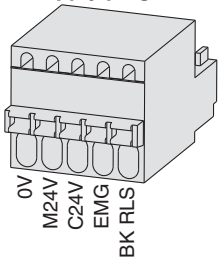


Wiring Example 1

Power Supply Connector: CN1

∗ Power supply plug is an accessory.

Power supply plug for LECP6



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

Terminal name	Function	Details
0V	Common supply (–)	M24V terminal/C24V terminal/EMG terminal/BK RLS terminal are common (–).
M24V	Motor power supply (+)	Motor power supply (+) supplied to the controller
C24V	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

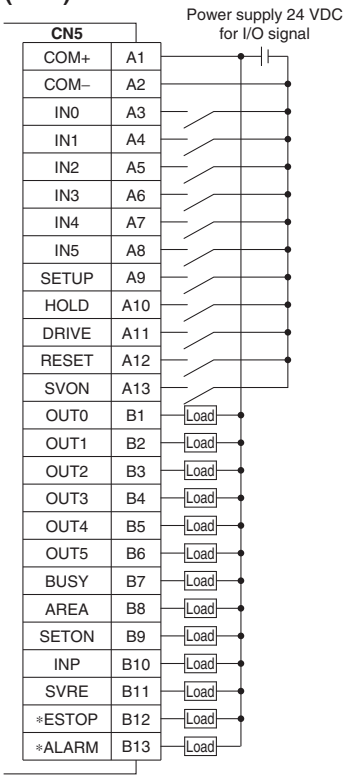
Wiring Example 2

Parallel I/O Connector: CN5

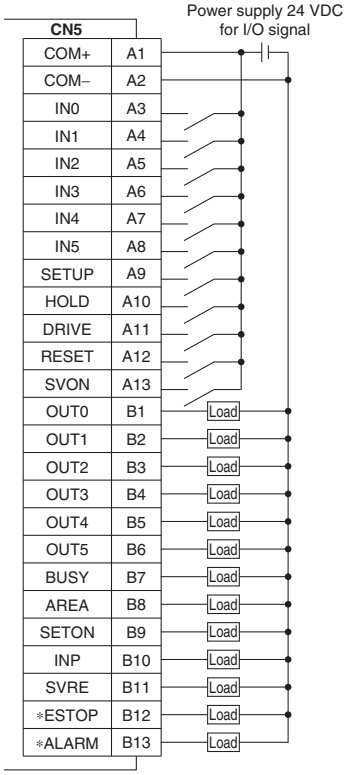
∗ When you connect a PLC, etc., to the CN5 parallel I/O connector, please use the I/O cable (LEC-CN5-□).
∗ The wiring should be changed depending on the type of the parallel I/O (NPN or PNP).

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

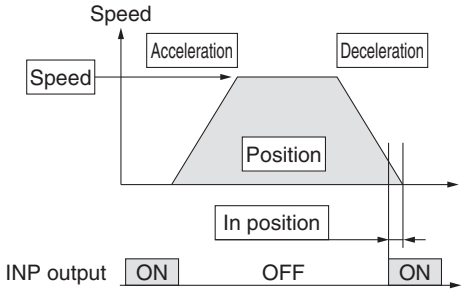
Name	Details
OUT0 to OUT5	Outputs the step data no. during operation
BUSY	Outputs when the actuator is moving
AREA	Outputs within the step data area output setting range
SETON	Outputs when returning to origin
INP	Outputs when target position or target force is reached (Turns on when the positioning or 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 ON (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.



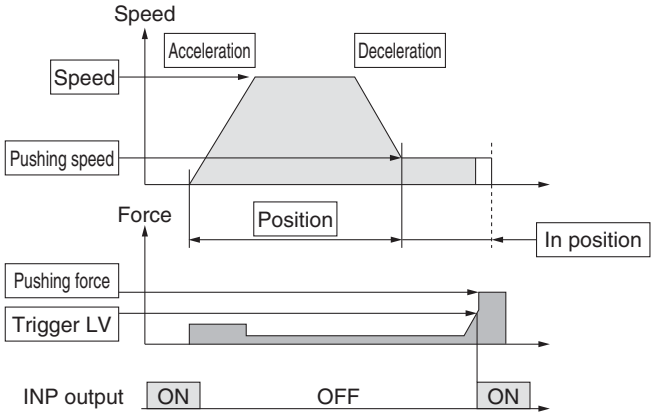
◎: Need to be set.
○: Need to be adjusted as required.
—: Setting is not required.

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.



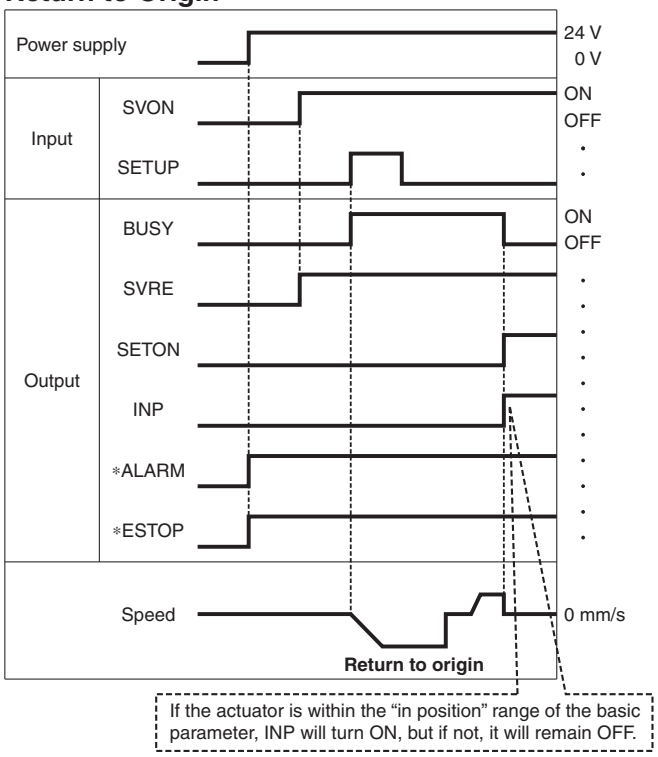
◎: Need to be set.
○: Need to be adjusted as required.

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 workpieces 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.

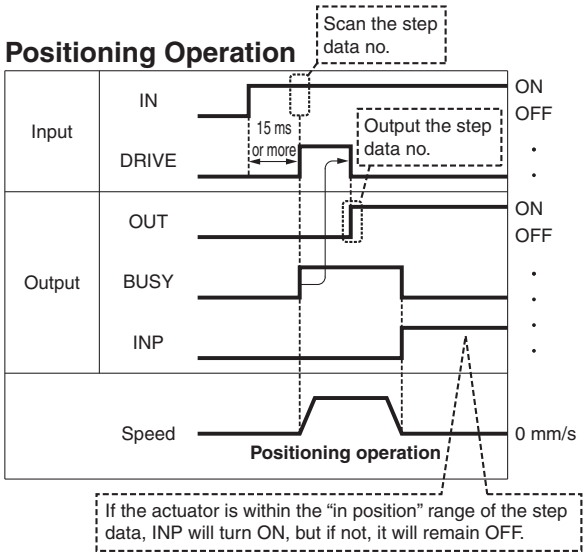
Signal Timing

Return to Origin



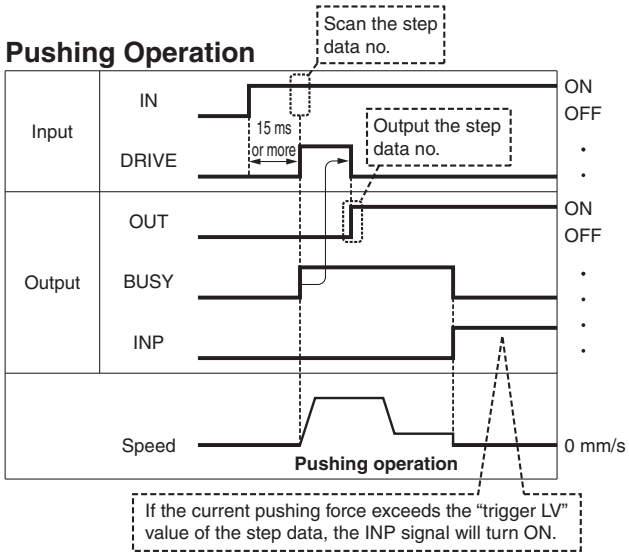
∗ "∗ALARM" and "∗ESTOP" are expressed as negative-logic circuit.

Positioning Operation

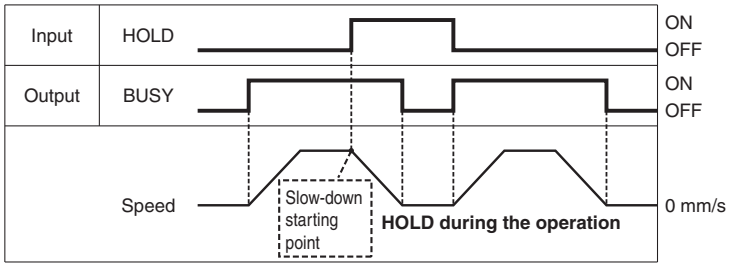


∗ "OUT" is output when "DRIVE" is changed from ON to OFF.
(When power supply is applied, "DRIVE" or "RESET" is turned ON or "∗ESTOP" is turned OFF, all of the "OUT" outputs are OFF.)

Pushing Operation

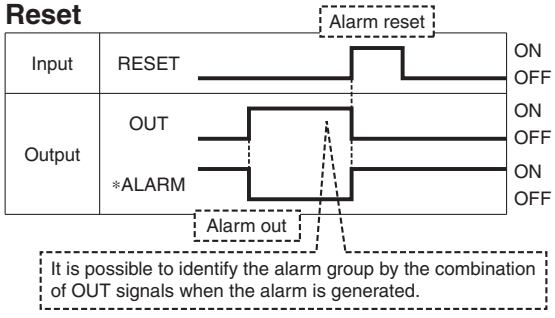


HOLD



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

LE – CP – 1 – ☐

Cable length (L)[m]

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

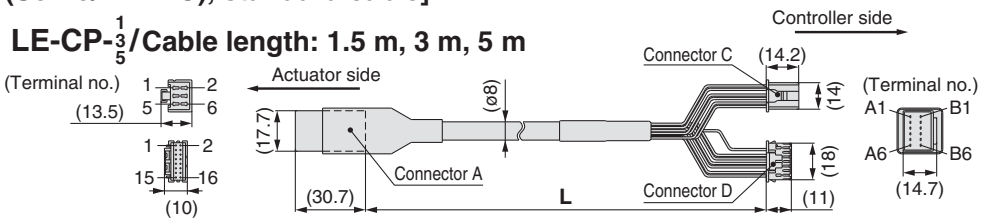
* Produced upon receipt of order (Robotic cable only)

Cable type

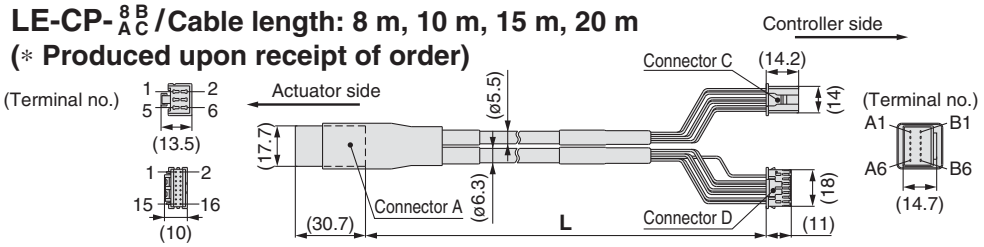
—	Robotic cable (Flexible cable)
S	Standard cable

* For continuous rotation specification, use actuator cable with lock and sensor.

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



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



Circuit	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

Circuit	Connector A terminal no.	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

[Robotic cable with lock and sensor for step motor (Servo/24 VDC), standard cable]

LE – CP – 1 – B – ☐

Cable length (L)[m]

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

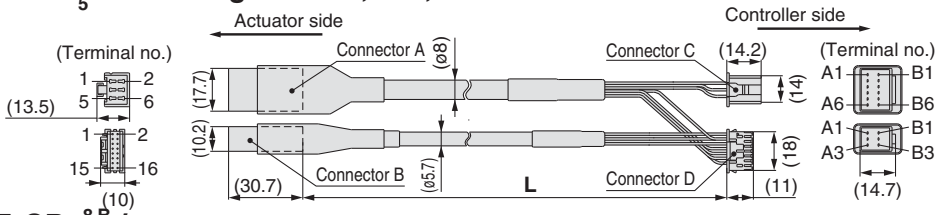
* Produced upon receipt of order (Robotic cable only)

With lock and sensor

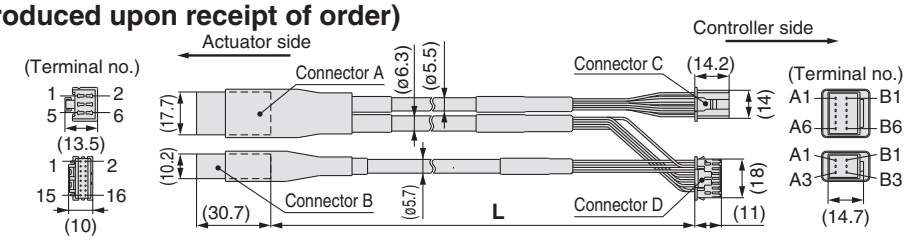
Cable type

—	Robotic cable (Flexible cable)
S	Standard cable

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



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



Circuit	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

Circuit	Connector A terminal no.	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

Circuit	Connector B terminal no.		
Lock (+)	B-1	Red	4
Lock (–)	A-1	Black	5
Sensor (+) Note)	B-3	Brown	1
Sensor (–) Note)	A-3	Blue	2

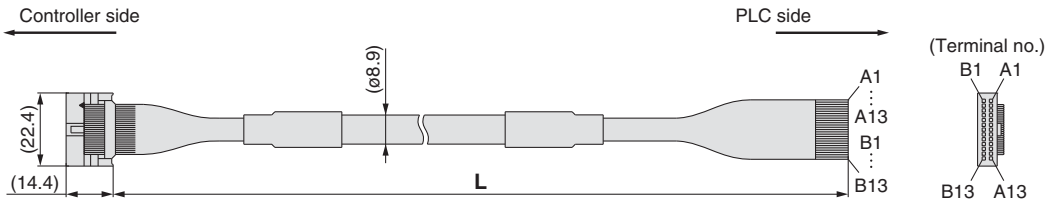
Note) Not used for the LE series.

Options: I/O Cable

LEC − CN5 − 1

Cable length (L) [m]

1	1.5
3	3
5	5



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

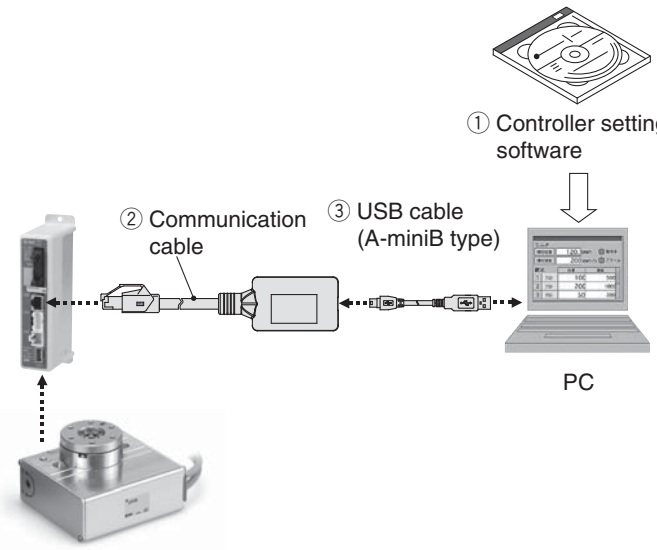
Connector pin no.	Insulation colour	Dot mark	Dot colour
B1	Yellow	■ ■	Red
B2	Light green	■ ■	Black
B3	Light green	■ ■	Red
B4	Grey	■ ■	Black
B5	Grey	■ ■	Red
B6	White	■ ■	Black
B7	White	■ ■	Red
B8	Light brown	■ ■ ■	Black
B9	Light brown	■ ■ ■	Red
B10	Yellow	■ ■ ■	Black
B11	Yellow	■ ■ ■	Red
B12	Light green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

∗ Conductor size: AWG28

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

① **Controller setting software (CD-ROM)**
② **Communication cable (With conversion unit)**
③ **USB cable**
(Cable between the PC and the conversion unit)

Compatible Controller/Driver

Step motor controller (Servo/24 VDC) **Series LECP6**
Step motor driver (Pulse input type) **Series LECPA**

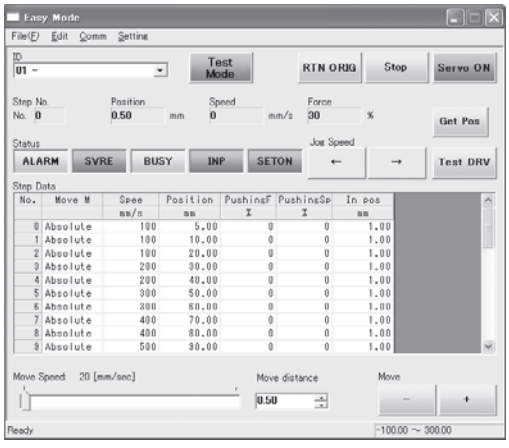
Hardware Requirements

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

∗ Windows® and Windows®7 are registered trademarks of Microsoft Corporation in the United States.
∗ Refer to SMC website for version update information, http://www.smcworld.com

Screen Example

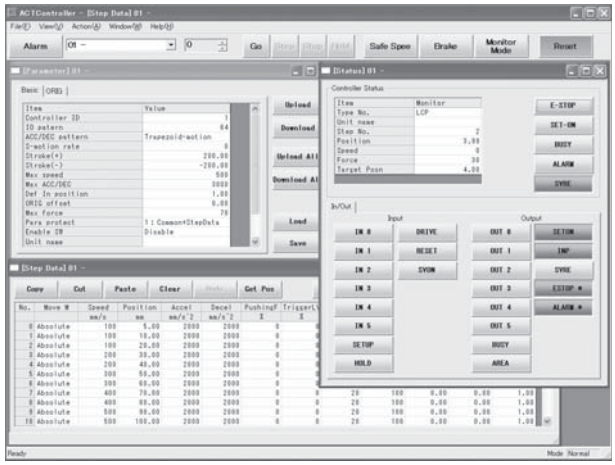
Easy mode screen example



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



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

Option
- **Enable switch is provided.**

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

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 • 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
(Position, Speed, Force, Acceleration, Deceleration)

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
Easy/Normal
Set item

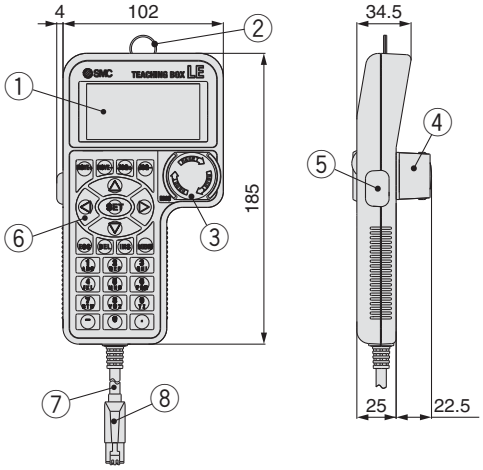
Normal Mode

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.
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
- **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 LER 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

Branch connector LEC-CGD

Branch connector



Cable between branches

Terminating resistor LEC-CGR

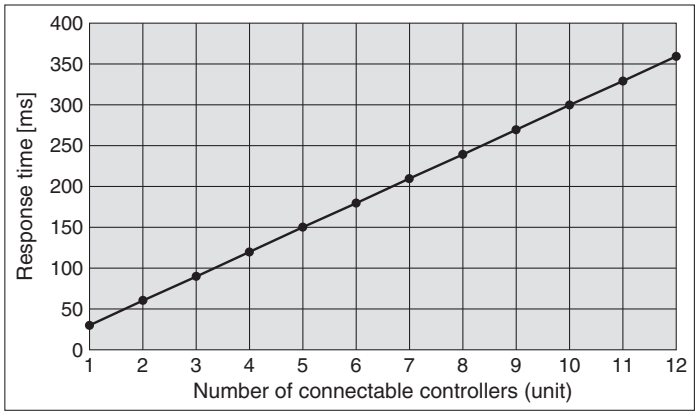
Specifications

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 1A				
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.smcworld.com
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.

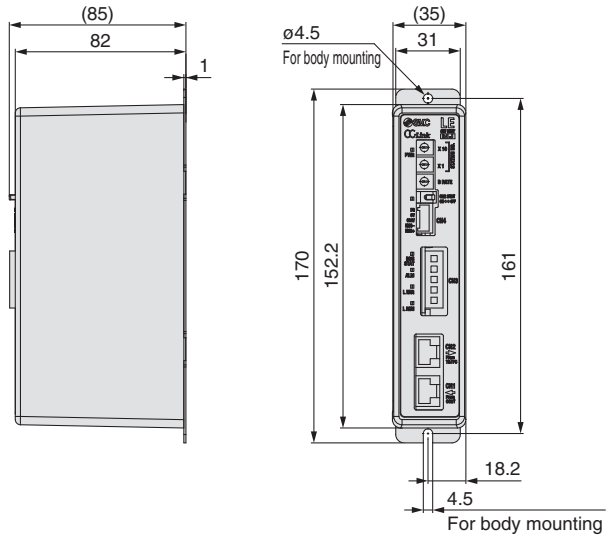


∗ This graph shows delay times between gateway unit and controllers. Fieldbus network delay time is not included.

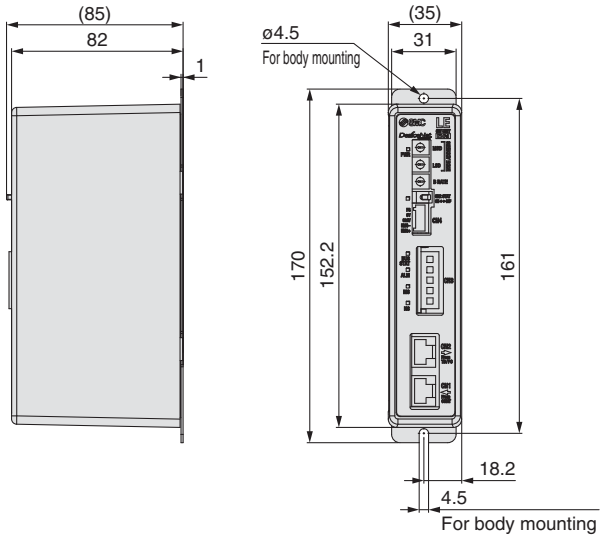
Dimensions

Screw mounting (LEC-G□□□)

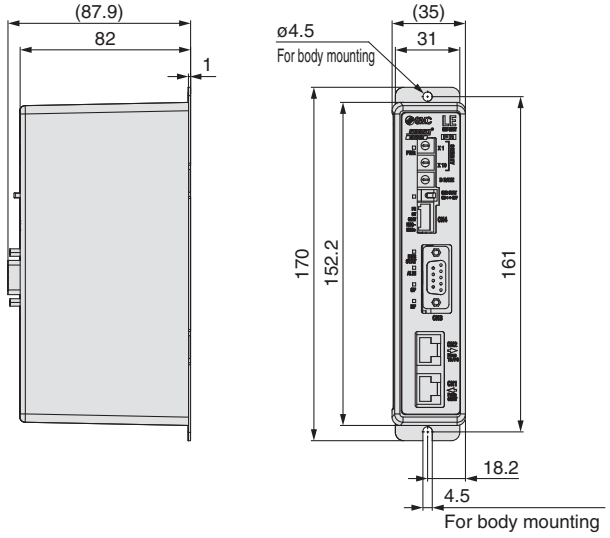
Applicable Fieldbus protocol: CC-Link Ver. 2.0



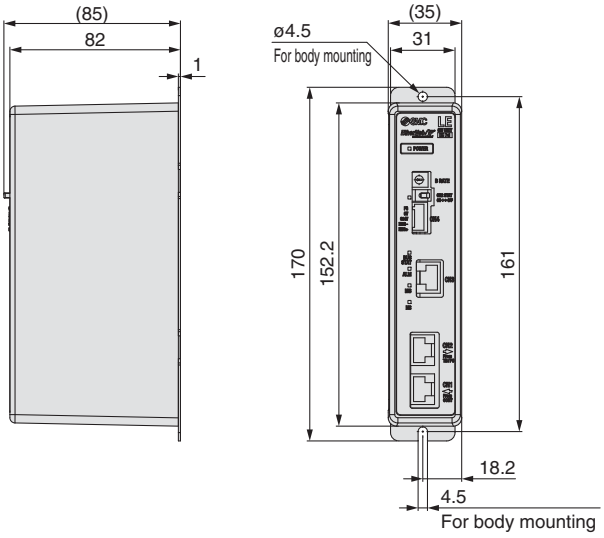
Applicable Fieldbus protocol: DeviceNet™



Applicable Fieldbus protocol: PROFIBUS DP



Applicable Fieldbus protocol: EtherNet/IP™

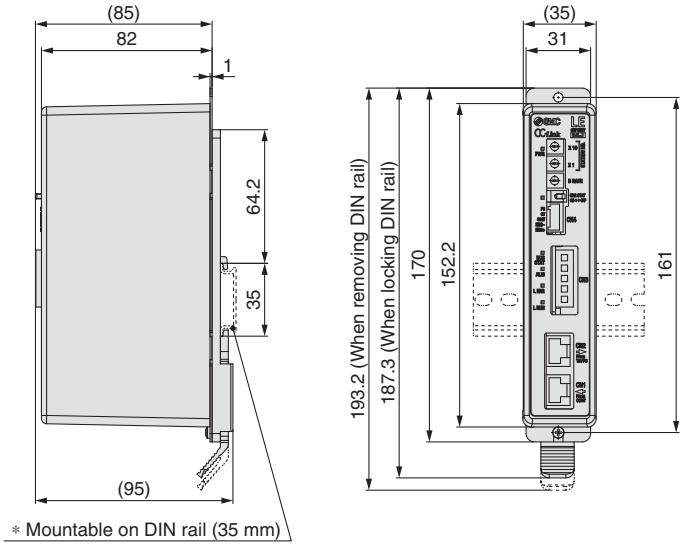


■**Trademark** DeviceNet™ is a trademark of ODVA. EtherNet/IP™ is a trademark of ODVA.

Dimensions

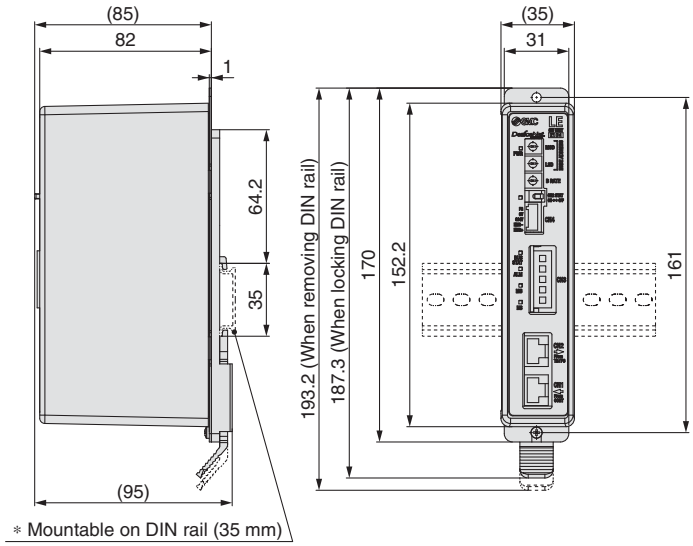
DIN rail mounting (LEC-G□□□D)

Applicable Fieldbus protocol: CC-Link Ver. 2.0



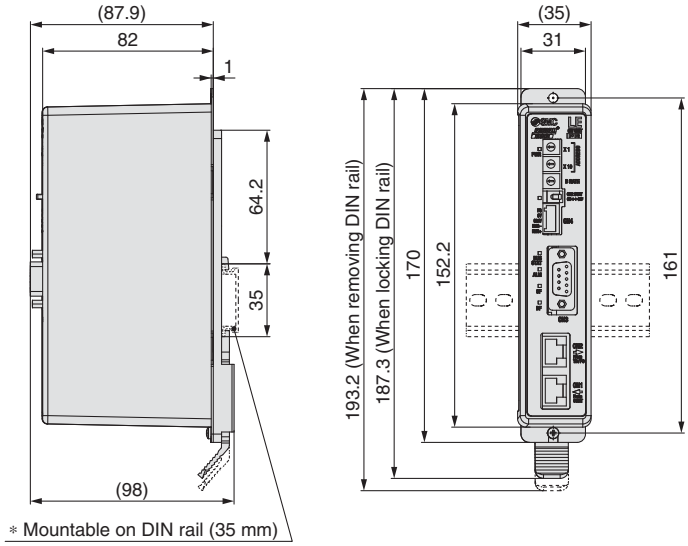
∗ Mountable on DIN rail (35 mm)

Applicable Fieldbus protocol: DeviceNet™



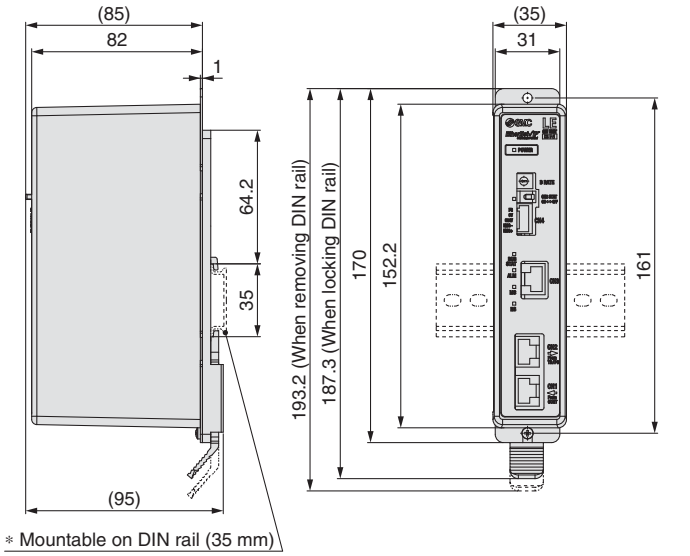
∗ Mountable on DIN rail (35 mm)

Applicable Fieldbus protocol: PROFIBUS DP



∗ Mountable on DIN rail (35 mm)

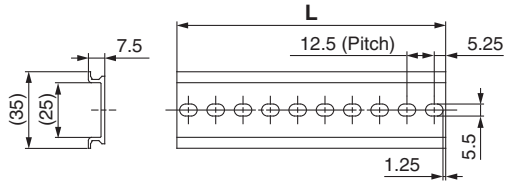
Applicable Fieldbus protocol: EtherNet/IP™



∗ Mountable on DIN rail (35 mm)

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 [ ] – LER10K-2

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 specifications and actuator options)
Example: Enter "LER10K-2" for the LER10K-2L-R11N1.

∗ **When controller equipped type 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 LER 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.

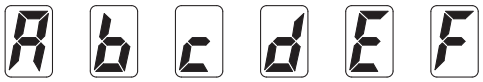
∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smcworld.com

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)
Serial communication	RS485 (Modbus protocol compliant)
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)

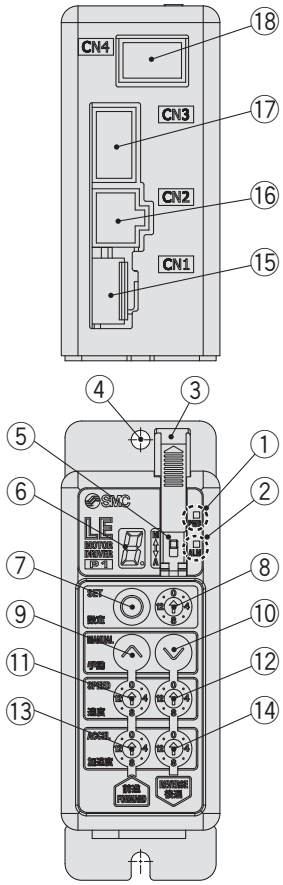
Note 1) Do not use the power supply of "inrush current prevention type" for the controller input power supply. When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.
Note 2) The power consumption changes depending on the actuator model.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



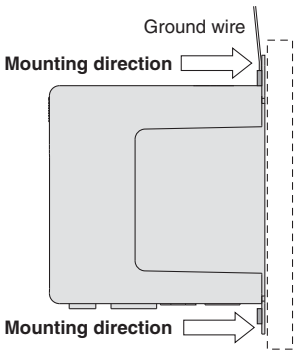
No.	Display	Description	Details
①	**PWR**	Power supply LED	Power supply ON/Servo ON : Green turns on Power supply ON/Servo OFF: Green flashes
②	**ALM**	Alarm LED	With alarm : Red turns on Parameter setting : Red flashes
③	—	Cover	Change and protection of the mode switch (Close the cover after changing 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.

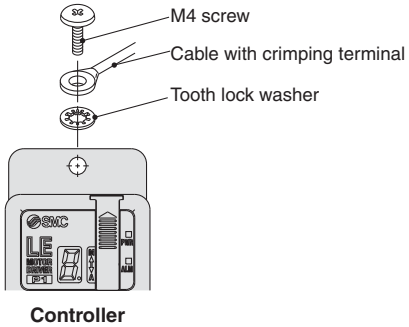
1. Mounting screw (LECP1□□-□)

(Installation with two M4 screws)



2. Grounding

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



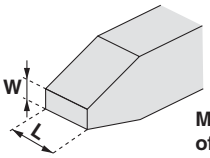
Controller

Note) When sizes 30 or 50 of the LER series are used, the space between the controllers should be 10 mm or more.

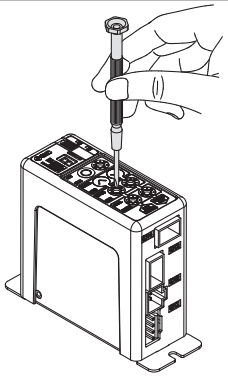
⚠Caution

- 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]

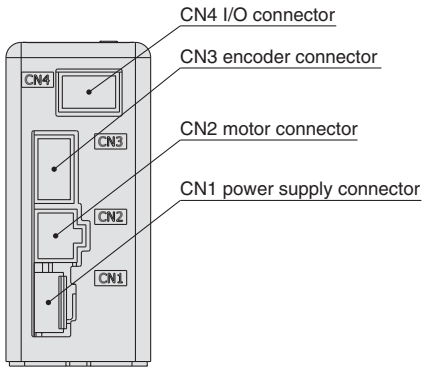


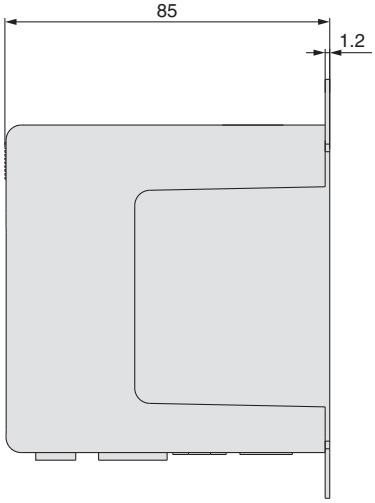
Magnified view of the end of the screwdriver

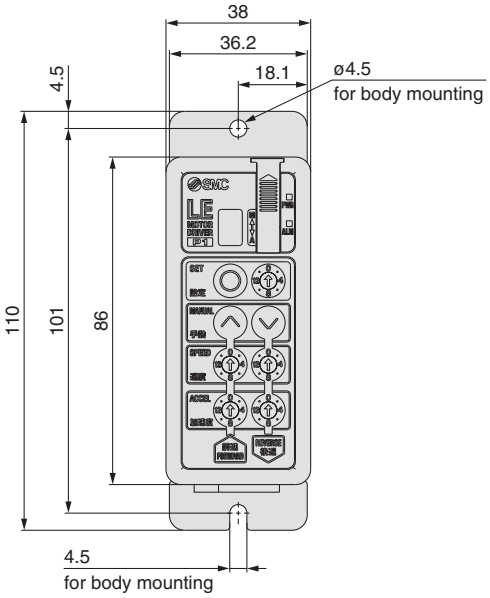


Dimensions

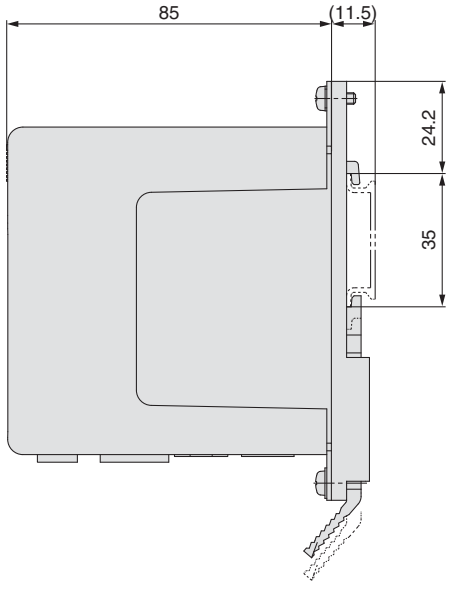
Screw mounting (LEC□1□□-□)

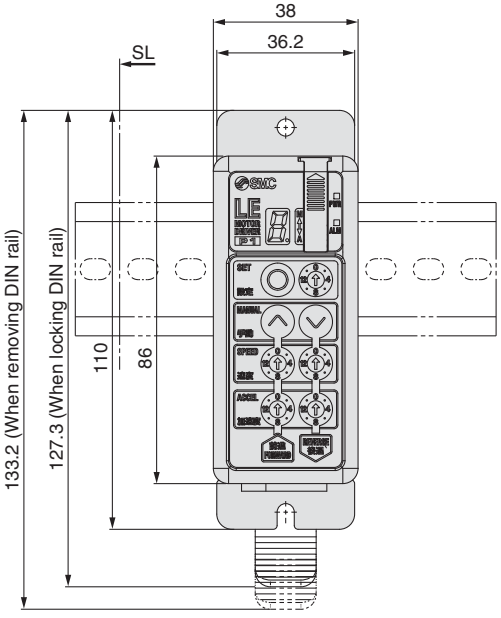






DIN rail mounting (LEC□1□□D-□)





Wiring Example 1

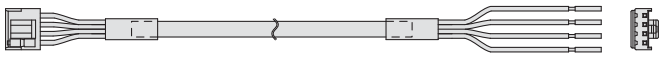
Power Supply Connector: CN1

* When you connect a CN1 power supply connector, please 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 (–)	M24V terminal/C24V terminal/BK RLS terminal are common (–).
M24V	White	Motor power supply (+)	Motor power supply (+) supplied to the controller
C24V	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)

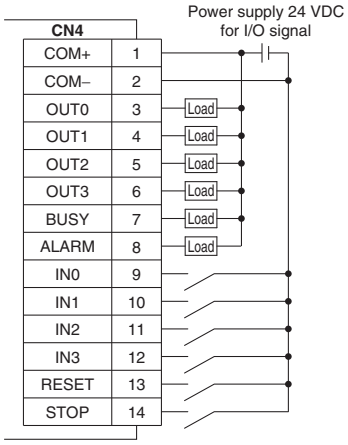


Wiring Example 2

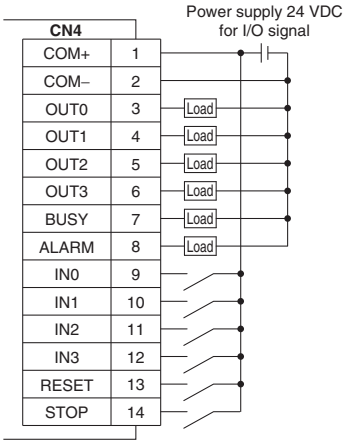
Parallel I/O Connector: CN4

* When you connect a PLC, etc., to the CN4 parallel I/O connector, please 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

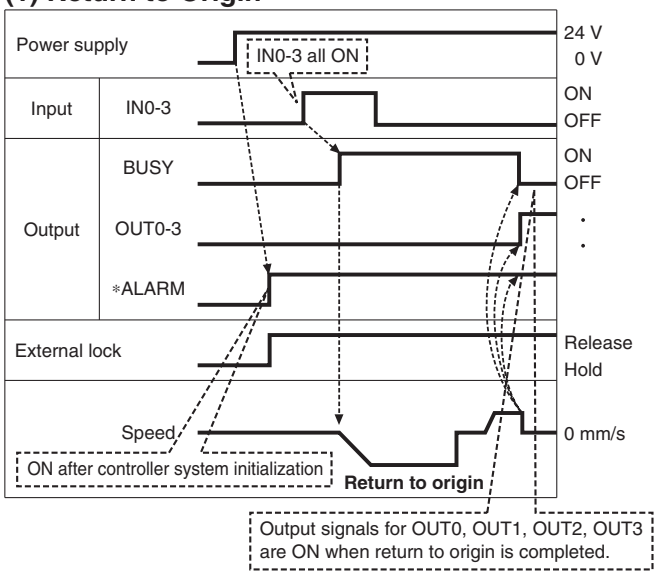
Position number	IN3	IN2	IN1	IN0
1	○	○	○	●
2	○	○	●	○
3	○	○	●	●
4	○	●	○	○
5	○	●	○	●
6	○	●	●	○
7	○	●	●	●
8	●	○	○	○
9	●	○	○	●
10 (A)	●	○	●	○
11 (B)	●	○	●	●
12 (C)	●	●	○	○
13 (D)	●	●	○	●
14 (E)	●	●	●	○
Retun to origin	●	●	●	●

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)	●	●	●	○
Retun to origin	●	●	●	●

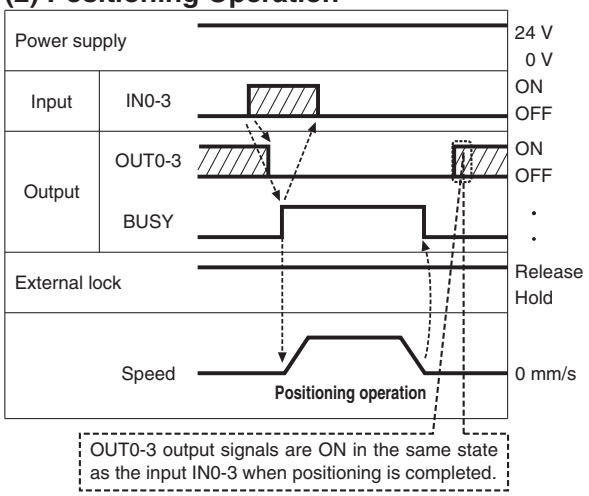
Signal Timing

(1) Return to Origin

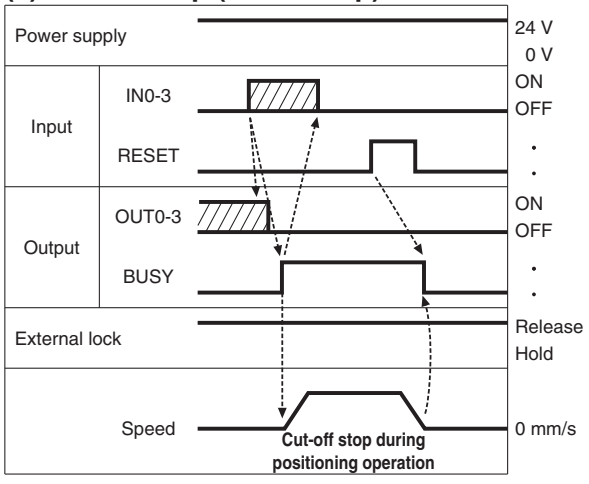


∗ "∗ALARM" is expressed as negative-logic circuit.

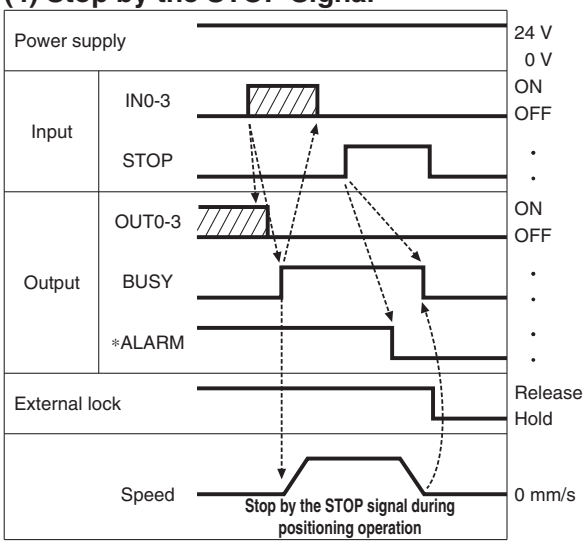
(2) Positioning Operation



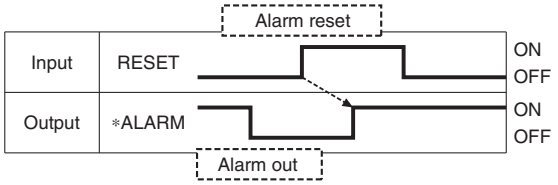
(3) Cut-off Stop (Reset Stop)



(4) Stop by the STOP Signal



(5) Alarm Reset



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

Options: Actuator Cable

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

LE − CP − 1 − □

Cable length (L)[m]

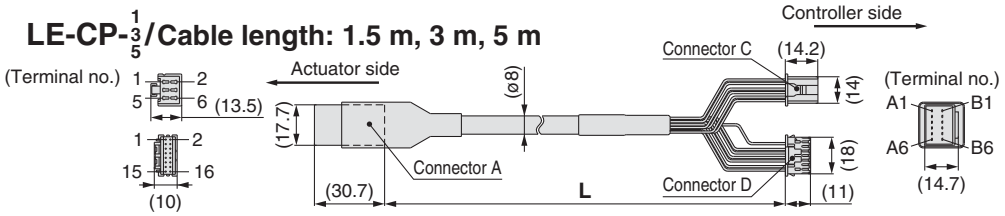
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

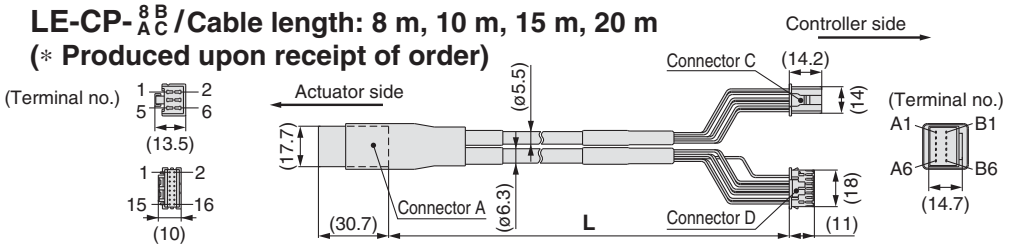
Cable type

—	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)



Circuit	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

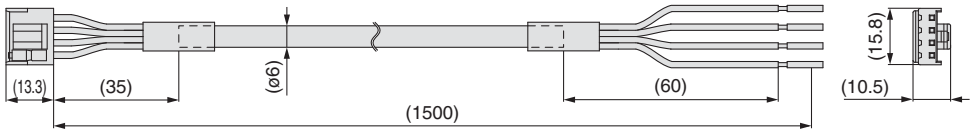
Cable colour	Connector D terminal no.
Brown	12
Black	13
Red	7
Black	6
Orange	9
Black	8
—	3

Options

[Power supply cable]

LEC − CK1 − 1

Terminal name	Covered colour	Function
0V	Blue	Common supply (–)
M24V	White	Motor power supply (+)
C24V	Brown	Control power supply (+)
BK RLS	Black	Lock release (+)



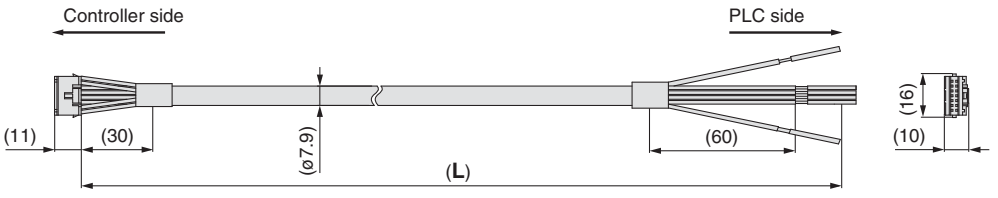
* Conductor size: AWG20

[I/O cable]

LEC − CK4 − □

Cable length (L) [m]

1	1.5
3	3
5	5



* Conductor size: AWG26

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

Terminal no.	Insulation colour	Dot mark	Dot colour	Function
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

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

Step Motor Driver
Series LECPA

How to Order

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LER 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 46 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 AN 1 ☐ – LER10K-2

Driver type

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

Driver mounting

—	Screw mounting
D Note)	DIN rail mounting

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

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.

Actuator part number

(Except cable specifications and actuator options)
Example: Enter "LER10K-2" for the LER10K-2L-R1AN1.

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

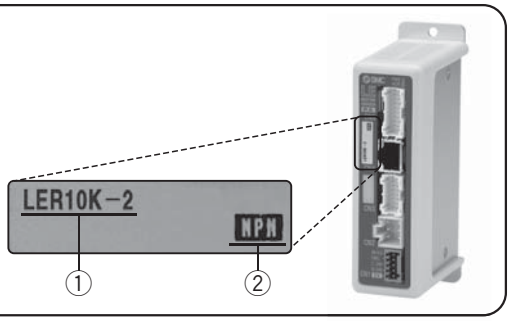
The driver is sold as single unit after the compatible actuator is set.

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

<Check the following before use.>

① Check the actuator labell 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.smcworld.com

Specifications

Item	LECPA
Compatible motor	Step motor (Servo/24 VDC)
Power supply Note 1)	Power voltage: 24 VDC ±10% Maximum current consumption: 3 A (Peak 5 A) 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)

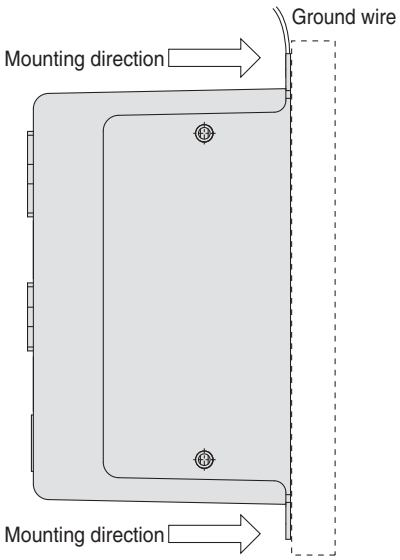
Note 1) Do not use the power supply of "inrush current prevention type" for the driver power supply. When conformity to UL is required, the electric actuator and driver should be used with a UL1310 Class 2 power supply.

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

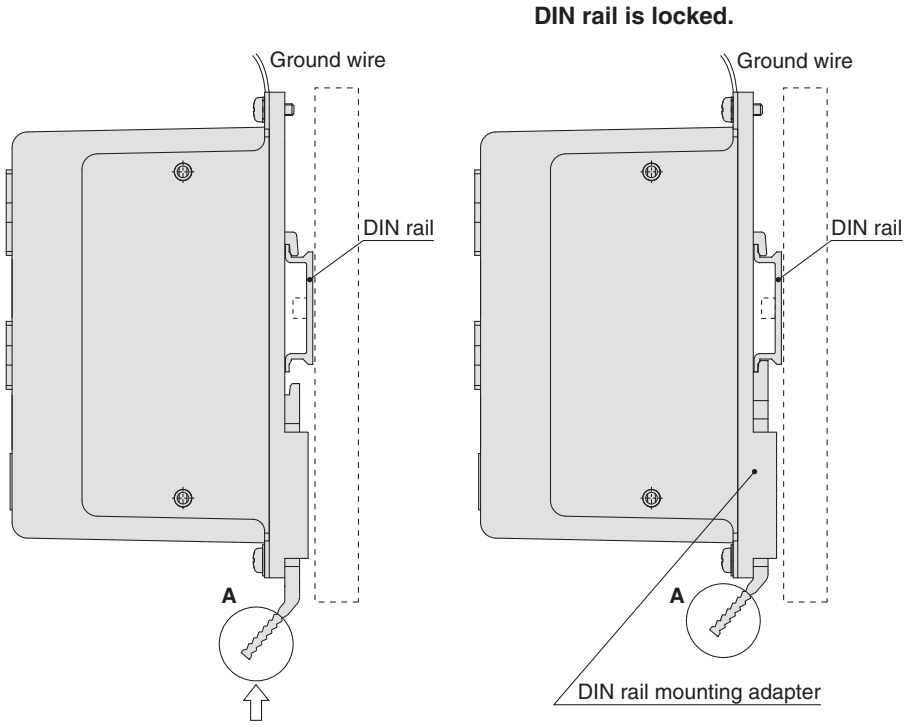
Note 3) Applicable to non-magnetizing lock.

How to Mount

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



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

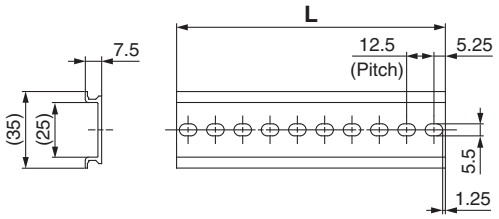


Hook the driver on the DIN rail and press the lever of section **A** in the arrow direction to lock it.

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 42 for the mounting dimensions.



L Dimension [mm]

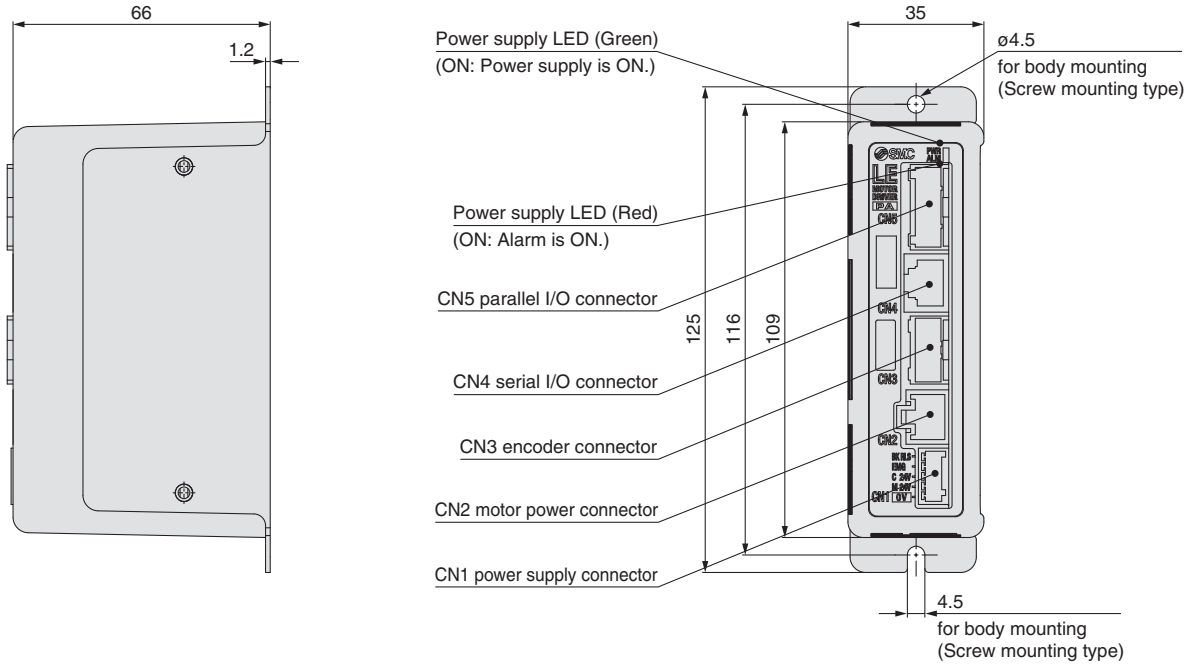
No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L	23	35.5	48	60.5	73	85.5	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5	223	235.5	248	260.5
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5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

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

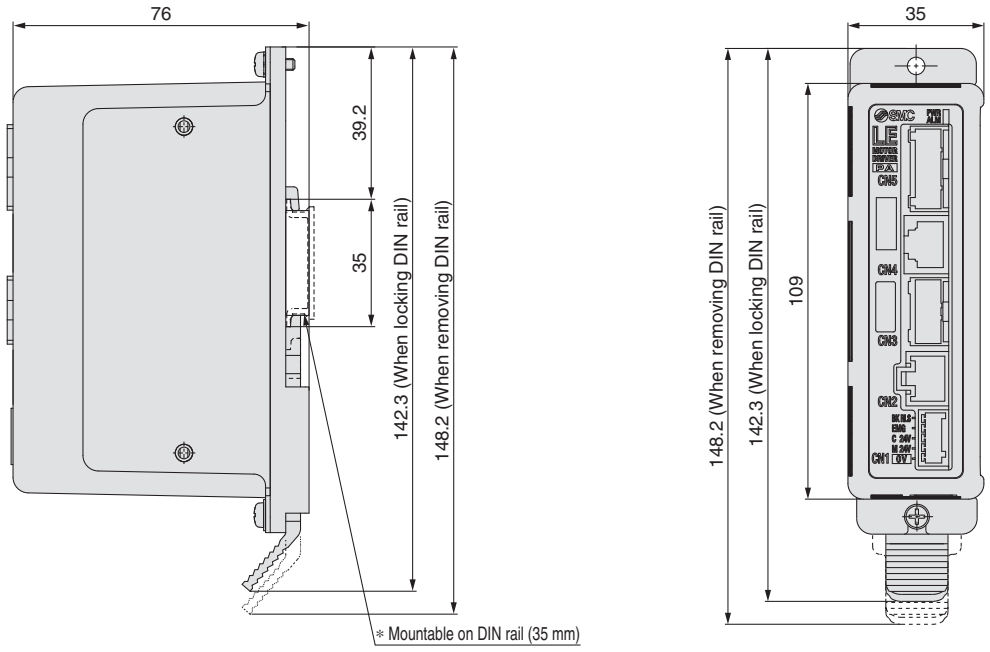
This should be used when the DIN rail mounting adapter is mounted onto the screw mounting type driver afterwards.

Dimensions

a) Screw mounting (LECPA□□-□)



b) DIN rail mounting (LECPA□□D-□)



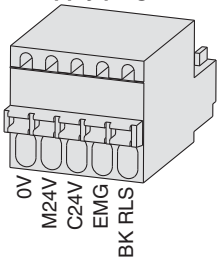
Wiring Example 1

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 (–)	M24V terminal/C24V terminal/EMG terminal/BK RLS terminal are common (–).
M24V	Motor power supply (+)	Motor power supply (+) supplied to the driver
C24V	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



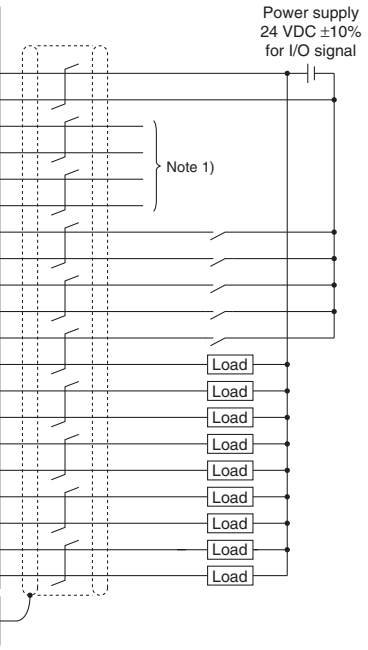
Wiring Example 2

Parallel I/O Connector: CN5

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

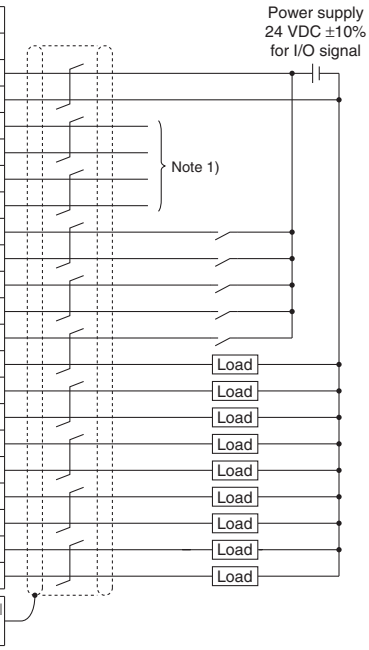
LECPAN□□-□ (NPN)

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

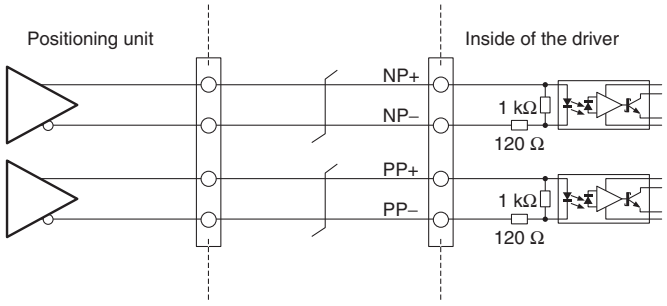
Output Signal

Name	Details
BUSY	Outputs when the actuator is operating
SETON	Outputs when returning to origin
INP	Outputs when target position is reached
*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

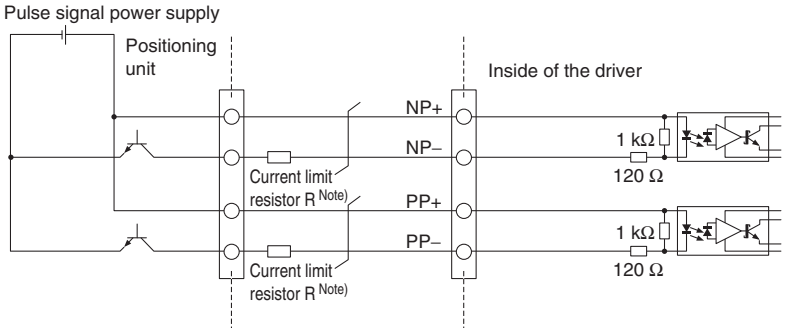
Note 3) Signal of negative-logic circuit ON (N.C.)

Pulse Signal Wiring Details

•Pulse signal output of positioning unit is differential output



•Pulse signal output of positioning unit is open collector output

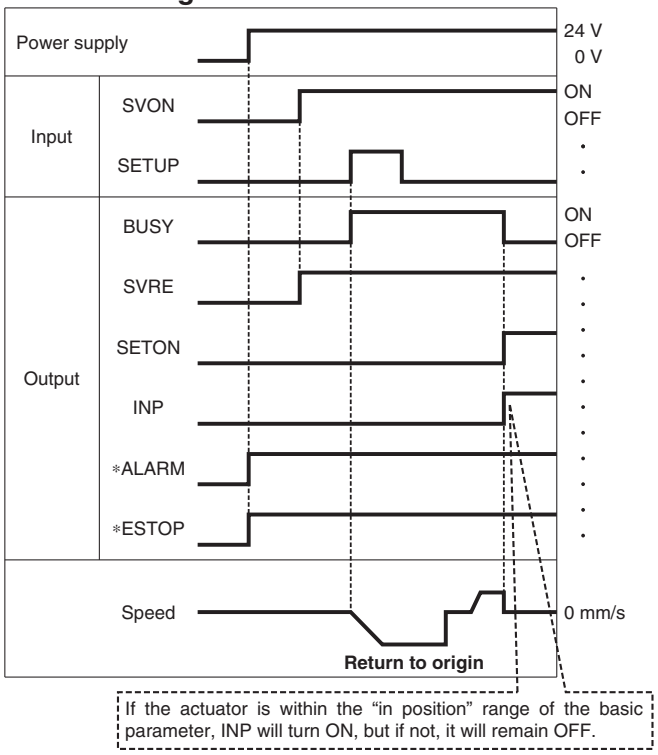


Note) Connect the current limit resistor R in series to correspond to the pulse signal voltage.

Pulse signal power supply voltage	Current limit resistor R specifications
24 VDC ±10%	3.3 kΩ ±5% (0.5 W or more)
5 VDC ±5%	390 Ω ±5% (0.1 W or more)

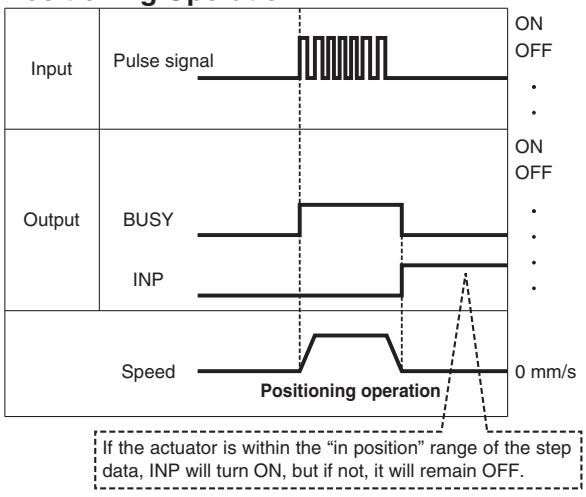
Signal Timing

Return to Origin

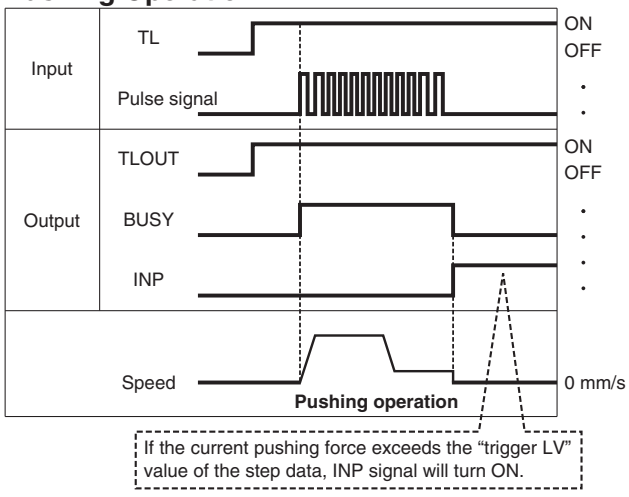


∗ "∗ALARM" and "∗ESTOP" are expressed as negative-logic circuit.

Positioning Operation

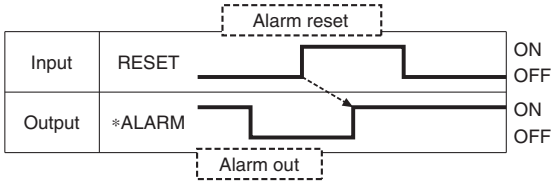


Pushing Operation



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]

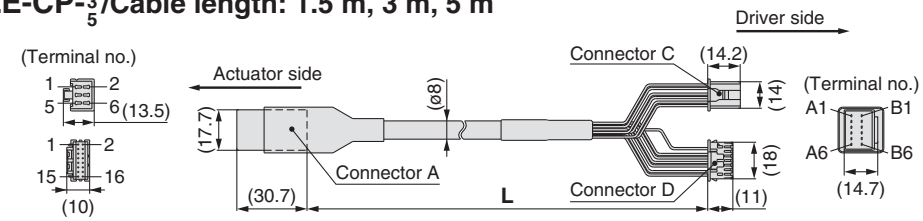
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

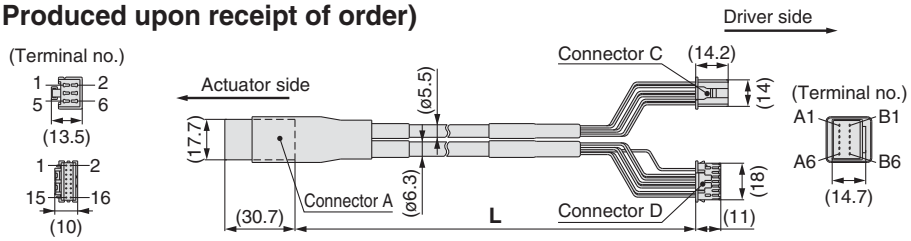
Cable type

—	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	
		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

Options

[I/O cable]

LEC-C L5-1

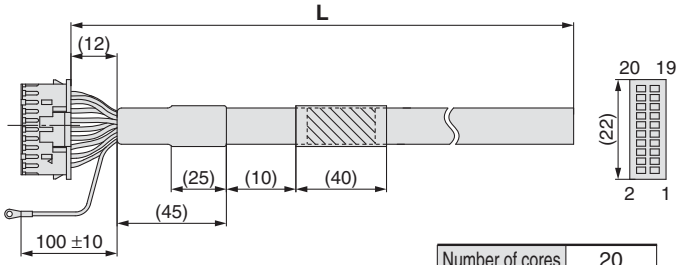
I/O cable type

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

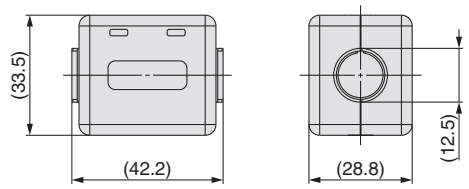
Pin no.	Insulation colour	Dot mark	Dot colour
12	Light brown	■■	Red
13	Yellow	■■	Black
14	Yellow	■■	Red
15	Light green	■■	Black
16	Light green	■■	Red
17	Grey	■■	Black
18	Grey	■■	Red
19	White	■■	Black
20	White	■■	Red

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)

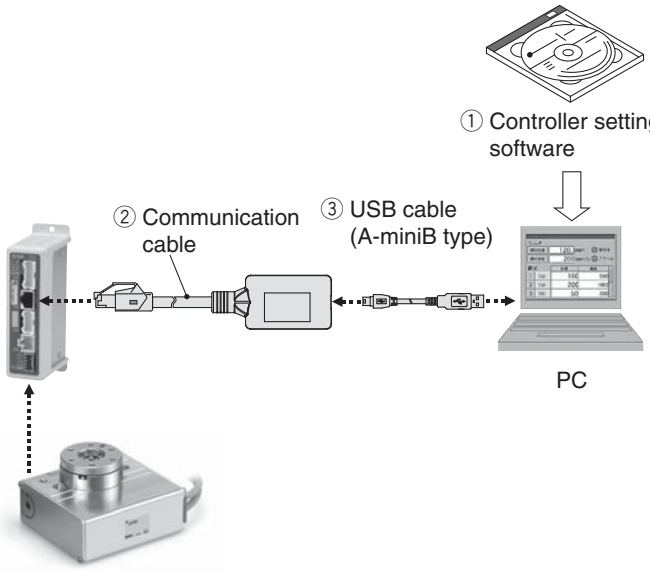


* Refer to the LECPA series Operation Manual for installation.

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

① Controller setting software (CD-ROM)
② Communication cable
③ USB cable
(Cable between the PC and the conversion unit)

Compatible Controllers/Driver

Step motor controller (Servo/24 VDC) **Series LECP6**
Step motor driver (Pulse input type) **Series LECPA**

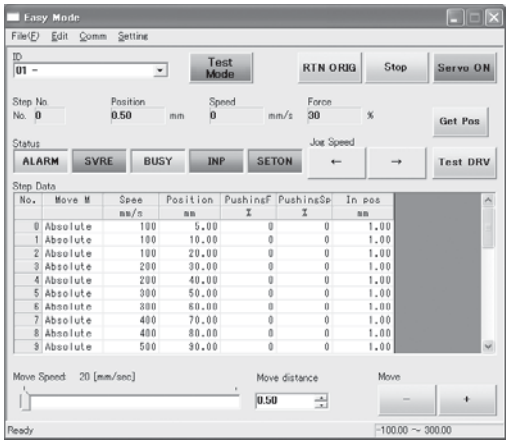
Hardware Requirements

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

∗ Windows® and Windows®7 are registered trademarks of Microsoft Corporation in the United States.
∗ Refer to SMC website for version update information, http://www.smcworld.com

Screen Example

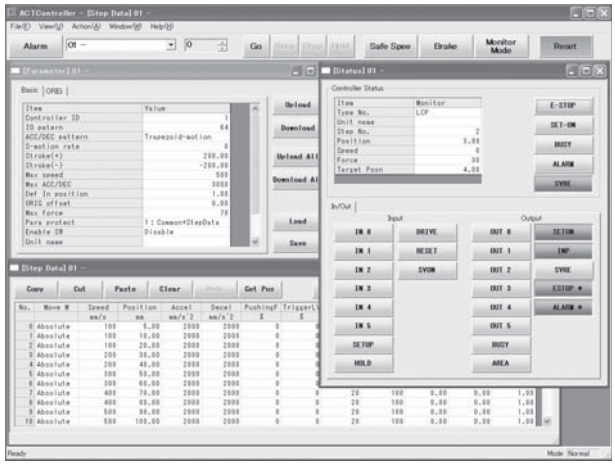
Easy mode screen example



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

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.

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

Option
- **Enable switch is provided.**

Easy Mode

Function	Details
Step data	• Setting of step data
Jog	• Jog operation • Return to origin
Test	• 1 step operation 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
Reconnection of axis (Ver. 1.∗∗)
Japanese/English (Ver. 2.∗∗)
Easy/Normal
Set item

Note 1) Not compatible with the LECPA.

Normal Mode

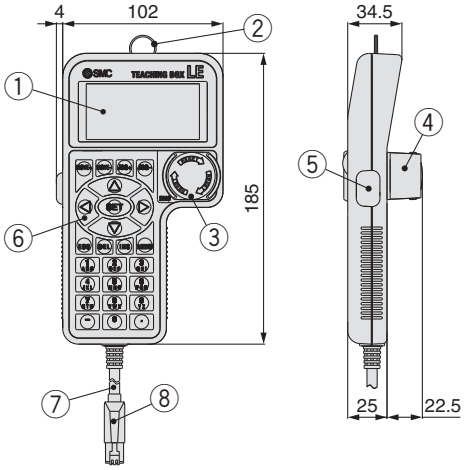
Function	Details
Step data	• Step data setting
Parameter	• Parameters setting
Test	• Jog operation/Constant rate movement • Return to origin • Test drive Note 1) (Specify a maximum of 5 step data and operate.) • Forced output (Forced signal output, Forced terminal output) Note 2)
Monitor	• Drive monitor • 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 not compatible with the LECPA.
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

⚠ 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.*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.

⚠ Safety Instructions | Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.

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1st printing SO printing SO 00 Printed in Spain

Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.