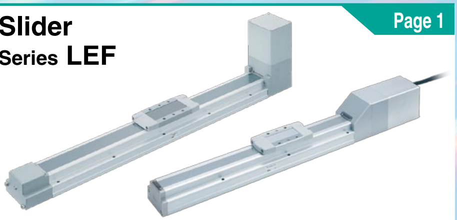
Electric Actuators

CE cULus* RoHS

Slider
Series **LEF**

Page 1



High Rigidity Slider
Series **LEJ**

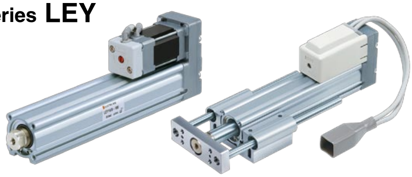
Page 87

Guide Rod Slider
Series **LEL**

Page 113

Rod/Guide Rod
Series **LEY**

Page 127



Slide Table
Series **LES**

Page 221

Miniature
Series **LEPY/LEPS**

Page 277

Rotary Table
Series **LER**

Page 303

Gripper
Series **LEH**

Page 319

Card Motor
Series **LAT3**

Page 439

* Except the AC servo motor and Card Motor.

SMC®

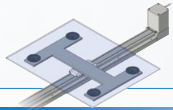
CAT.E102B

A Wide Range of Variations

Series LE□

Transfer

Load and unload transfer of workpieces



Slider Type

Step Motor (Servo/24 VDC) | Servo Motor (24 VDC) | AC Servo Motor (100/200/400 W)

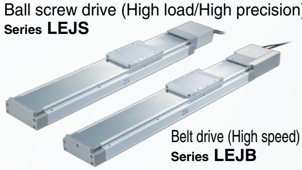
Series LEF

Ball screw drive Clean room compatible
Series **LEFS**

Belt drive
Series **LEFB**

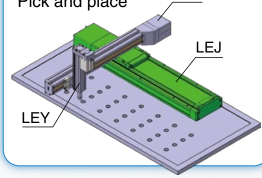
Series LEJ

Ball screw drive (High load/High precision)
Series **LEJS**

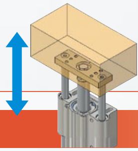


Belt drive (High speed)
Series **LEJB**

Application Example
Pick and place



Lift Up/Push



Rod Type

Series LEY Dust/Drip proof compatible

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

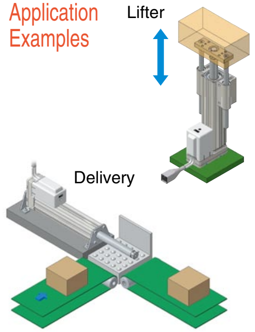
Basic type
Series **LEY**

In-line motor type
Series **LEY□D**

AC Servo Motor (100/200/400 W)

Series **LEY**

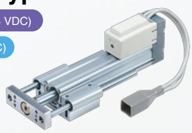
Application Examples



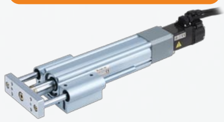
Guide Rod Type Series LEYG

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

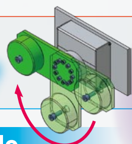
- Lateral end load: 5 times more



AC Servo Motor (100/200/400 W)



Rotate



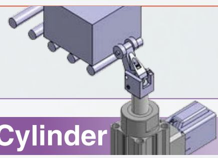
Rotary Table

Series LER

Step Motor (Servo/24 VDC)

[Basic type] [High precision type]

Stop

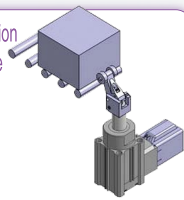


Electric Stopper Cylinder

Series LEBQ Made to Order

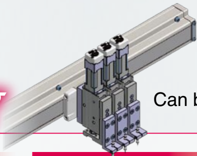
Suitable for conveyor lines without an air supply

Application Example



SMC

Space Saving



Can be mounted with short pitch. (LEP)

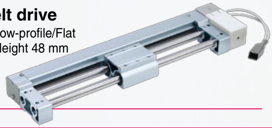
Guide Rod Slider

Series LEL

Step Motor (Servo/24 VDC)

Belt drive

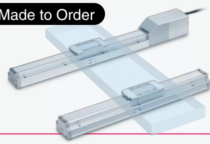
- Low-profile/Flat Height 48 mm



Support Guide Page 79

Series LEFS-X139

Made to Order



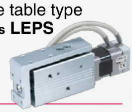
Miniature Compact and Lightweight

Series LEP

Step Motor (Servo/24 VDC)

Rod type
Series LEPY

Slide table type
Series LEPS



Slide Table

Compact type Series LES

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

Basic type	Symmetrical type	In-line motor type
Series LES□R	Series LES□L	Series LES□D

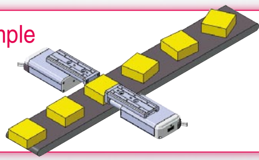
High rigidity type Series LESH

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

Basic type	Symmetrical type	In-line motor type
Series LESH□R	Series LESH□L	Series LESH□D

Application Example

Positioning of pallets on a conveyer

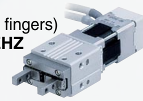


Grip

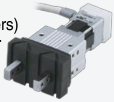
Gripper

Series LEH Step Motor (Servo/24 VDC)

Z type (2 fingers)
Series LEHZ

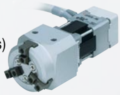


ZJ type (2 fingers)
With dust cover
Series LEHZJ



Long stroke
F type (2 fingers)
Series LEHF

Can hold round workpieces.
S type (3 fingers)
Series LEHS



Controller/Driver

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

Step data input type

Series LECP6
Series LECA6

- 64 points positioning
- Teaching box, controller setting kit input

Servo Motor (24 VDC)

Programless type

Series LECP1

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

AC Servo Motor

AC servo motor driver

Series LECSA
Series LECSB

- Pulse input type
- Absolute encoder (LECSB)
- Built-in positioning function (LECSA)

Series LECSA Series LECSB

Step Motor (Servo/24 VDC)

Pulse input type

Series LECPA

Fieldbus-compatible network gateway unit

Series LEC-G

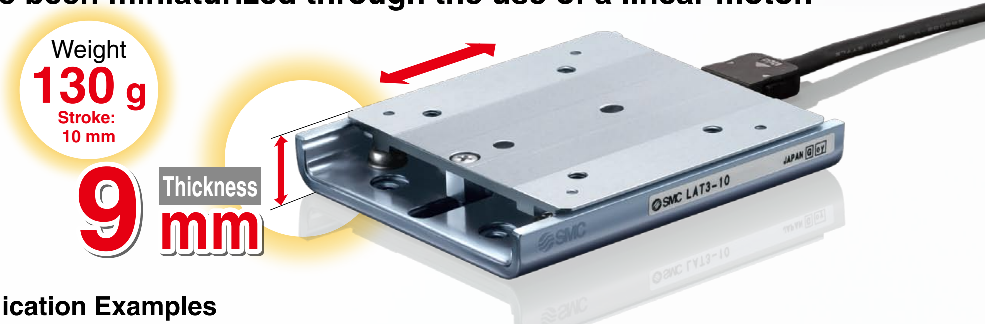
CC-Link V2 PROFIBUS DeviceNet EtherNet/IP

CC-Link direct input type
Series LECSC

SSCNET Ⅲ type
Series LECSS

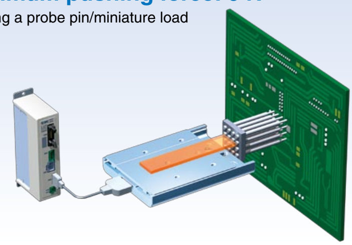
Card Motor
Series LAT3

The transportation, pushing and length measurement systems have been miniaturized through the use of a linear motor.

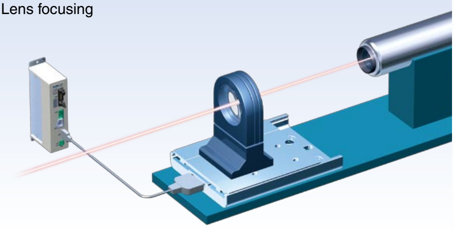


Application Examples

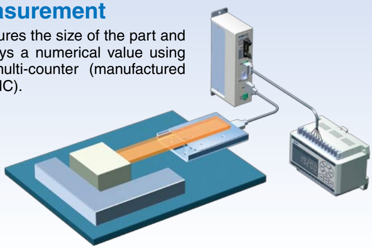
Maximum pushing force: 6 N
Pushing a probe pin/miniature load



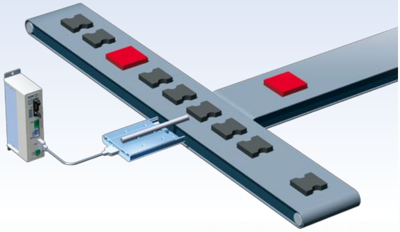
Positioning repeatability: ±5 µm
Lens focusing



Measurement
Measures the size of the part and displays a numerical value using the multi-counter (manufactured by SMC).



Maximum operating frequency: 500 cpm
Rejection of non-conforming products, etc.

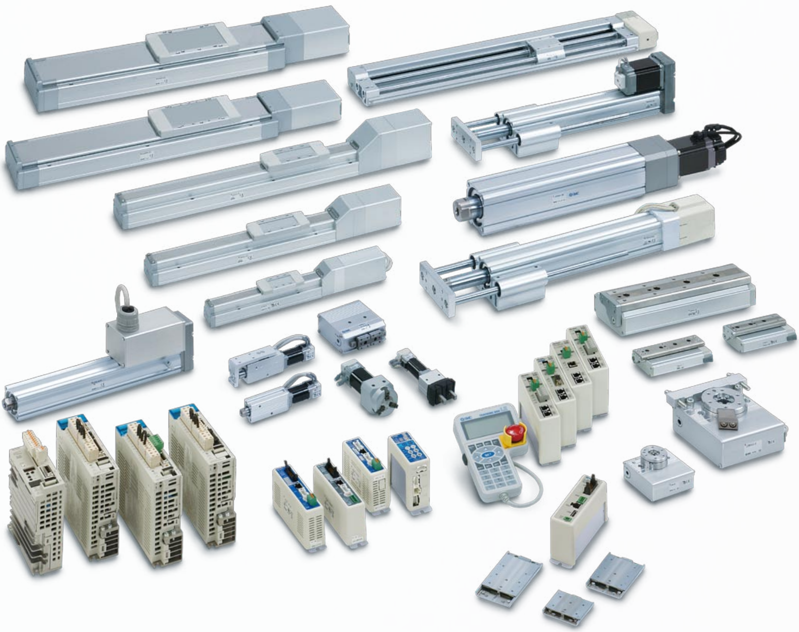


Controller

Step data input type
Series LATC4

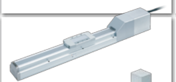
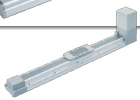
Just input 3 parameters: Positioning time, Target position, Load mass.

- 15 points positioning
- Built-in position display output
- Built-in function for measuring and check of workpieces
- Easy programming (Cycle time input)



Series Variations Series LE□

Slider Type

Series				Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LEFS	Linear guide Clean room compatible	Ball screw		Step motor (Servo/24 VDC)				●		●	●	●			Page 1
				Servo motor (24 VDC)				●		●					
LEFB	Linear guide	Belt		Step motor (Servo/24 VDC)				●		●	●				
				Servo motor (24 VDC)				●		●					
LEFS	Linear guide Clean room compatible	Ball screw		AC servo motor						●	●	●			
LEFB	Linear guide	Belt		AC servo motor						●	●	●			

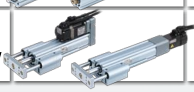
High Rigidity Slider Type

Series				Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LEJS	Linear guide	Ball screw		AC servo motor								●		●	Page 87
LEJB	Linear guide	Belt		AC servo motor								●		●	

Guide Rod Slider

Series				Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LEL	Sliding bearing Ball bushing bearing	Belt		Step motor (Servo/24 VDC)						●					Page 113

Rod Type

Series				Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LEY	Rod Dust/Drip proof compatible	Ball screw		Step motor (Servo/24 VDC)				●		●	●	●			Page 127
				Servo motor (24 VDC)				●		●					
LEYG	Guide rod	Ball screw		Step motor (Servo/24 VDC)				●		●	●	●			
				Servo motor (24 VDC)				●		●					
LEY	Rod Dust/Drip proof compatible	Ball screw		AC servo motor						●	●			●	
LEYG	Guide rod	Ball screw		AC servo motor						●	●				

Compact Type

Series				Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LES	Linear guide	Slide screw		Step motor (Servo/24 VDC)		●		●		●					Page 221
				Servo motor (24 VDC)		●		●		●					

High Rigidity Type

Series				Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LESH	Linear guide	Ball screw		Step motor (Servo/24 VDC)		●		●		●					Page 221
				Servo motor (24 VDC)		●		●		●					

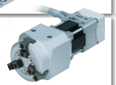
Miniature Type

Series				Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LEPY	Rod	Slide screw		Step motor (Servo/24 VDC)	●		●								Page 277
LEPS	Linear guide	Slide screw		Step motor (Servo/24 VDC)	●		●								

Electric Rotary Table

Series			Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LER	Rotating type		Step motor (Servo/24 VDC)		●					● Note)		●		Page 303

Electric Grippers

Series				Compatible motor	6	8	10	16	20	25	32	40	50	63	Page
LEHZ	2 fingers	Slide screw		Step motor (Servo/24 VDC)			●	●	●	●	●	●			Page 319
LEHZJ	2 fingers With dust cover	Slide screw		Step motor (Servo/24 VDC)			●	●	●	●					
LEHF	2 fingers Long stroke	Slide screw		Step motor (Servo/24 VDC)			●		●		●	●			
LEHS	3 fingers	Slide screw		Step motor (Servo/24 VDC)			●		●		●	●			

Note) Size 30

Controller & Driver *Series LEC□*

Controller/Driver series	Compatible motor: Step 24 VDC	Compatible motor: Servo 24 VDC	Compatible motor: AC servo	Control method: Positioning	Control method: Pulse	Application/Function: Synchronous	Application/Function: Absolute	Application/Function: Network direct input	Compatible option: Teaching box	Compatible option: Network gateway unit
 Controller (24 VDC) **Series LECP6**	●	●		● 64 points					●	●
 Controller (24 VDC) **Series LECA6**	●	●		● 64 points					●	●
 Programless controller (24 VDC) **Series LECP1**	●			● 14 points					● Special order	● Special order
 Pulse input type Step motor driver (24 VDC) **Series LECPA**	●				●					
 Positioning/Pulse input type AC servo motor driver (100/200 VAC) **Series LECSA**			●	● 7 points	●					
 Pulse input type AC servo motor driver (100/200 VAC) **Series LECSB**			●		●		●			
 CC-Link direct input **Series LECSC** / SSCNET Ⅲ **Series LECSS**			●	●		● LECSS only Note)	●	● CC-Link Ver. 1.10 / SSCNET Ⅲ		

Note) Available when the Mitsubishi motion controller is used for the master equipment.

Teaching box
Series LEC-T1

Gateway unit **Series LEC-G**

CC-Link V2 DeviceNet PROFIBUS EtherNet/IP

Compatible actuators

Slider type
Series LEF


Guide rod slider type
Series LEL


Rod type
Series LEY


Guide rod type
Series LEYG


Compact type
Series LES


High rigidity type
Series LESH


Miniature type
Series LEPY/LEPS


Electric rotary table
Series LER


Electric gripper
Series LEH


Slider type
Series LEF


Rod type
Series LEY


Guide rod type
Series LEYG


Compact type
Series LES


High rigidity type
Series LESH


Slider type
Series LEF


Guide rod slider type
Series LEL


Rod type
Series LEY


Guide rod type
Series LEYG


Compact type
Series LES


High rigidity type
Series LESH


Miniature type
Series LEPY/LEPS

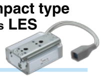

Electric rotary table
Series LER


Electric gripper
Series LEH


Slider type
Series LEF


Rod type
Series LEY


Guide rod type
Series LEYG

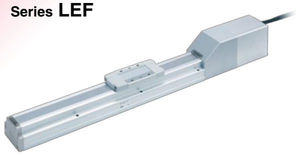

Compact type
Series LES


High rigidity type
Series LESH

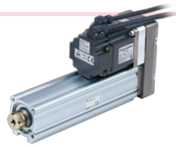

Miniature type
Series LEPY/LEPS

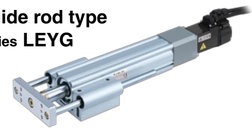

Electric rotary table
Series LER


Electric gripper
Series LEH


Slider type
Series LEF


Slider type/High rigidity type
Series LEJ


Rod type
Series LEY


Guide rod type
Series LEYG


Series Variations Series LAT3

Series			Compatible motor	Resolution	Stroke			Page
					10	20	30	
LAT3□	Linear guide with circulating balls		Moving magnetic type linear motor	1.25 µm	●	●	●	Page 439
				30 µm	●	●	●	

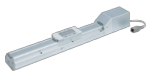
Controller series		Compatible motor	Control method	Compatible actuator	Page
Controller (24 VDC) LATC4		Moving magnetic type linear motor	Positioning 15 points	Card Motor Series LAT3 	Page 448

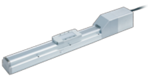
Slider Type Series LEF

Positioning repeatability: ±0.02 mm

Slider type

Series LEFS
Ball screw drive
Clean room compatible





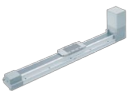
Motor	Model	Size	Screw lead (mm)	Stroke	Page
Step motor	LEFS16	16	10	Up to 400	Page 1
			5		
	LEFS25	25	12	Up to 600	
			6		
	LEFS32	32	16	Up to 800	
			8		
	LEFS40	40	20	Up to 1000	
			10		
Servo motor	LEFS16	16	10	Up to 400	
			5		
	LEFS25	25	12	Up to 600	
			6		
AC servo motor	LEFS25	25	12	Up to 600	
			6		
	LEFS32	32	16	Up to 800	
			8		
	LEFS40	40	20	Up to 1000	
			10		

Work load (Horizontal)(kg): 10 20 30 40 50 60
Speed (mm/s): 200 400 600 800 1000 1200

Positioning repeatability: ±0.1 mm (Step/Servo motor)
±0.08 mm (AC servo motor)

Slider type

Series LEFB
Belt drive



Motor	Model	Size	Screw lead (mm)	Stroke	Page
Step motor	LEFB16	16	48	Up to 1000	Page 1
	LEFB25	25	48	Up to 2000	
	LEFB32	32	48	Up to 2000	
Servo motor	LEFB16	16	48	Up to 1000	
	LEFB25	25	48	Up to 2000	
AC servo motor	LEFB25	25	54	Up to 2000	
	LEFB32	32	54	Up to 2500	
	LEFB40	40	54	Up to 3000	

Work load (Horizontal)(kg): 5 10 15 20 25 30
Speed (mm/s): 400 800 1200 1600 2000 2400

High Rigidity Slider Type Series LEJ

Positioning repeatability: ±0.02 mm

High rigidity slider type	Model			Size	Screw lead (mm)	Stroke	Orientation	Work load (kg) 20 40 60 80	Speed (mm/s) 200 400 600 800 1000 1200	Page
	Series LEJS Ball screw drive 	AC servo motor	LEJS40	40	16	Up to 1200	Horizontal transfer			Page 87
					8					
			LEJS63	63	20	Up to 1500				
					10					
			LEJS40	40	16	Up to 1200	Vertical transfer			
					8					
			LEJS63	63	20	Up to 1500				
					10					

Positioning repeatability: ±0.04 mm

High rigidity slider type	Model			Size	Screw lead (mm)	Stroke	Orientation	Work load (kg) 10 20 30 40	Speed (mm/s) 500 1000 1500 2000 2500 3000	Page
	Series LEJB Belt drive 	AC servo motor	LEJB40	40	Equivalent to 27	Up to 2000	Horizontal transfer			Page 87
			LEJB63	63	Equivalent to 42	Up to 3000				

Guide Rod Slider Series LEL

Positioning repeatability: ±0.1 mm

Guide rod slider	Model			Size	Screw lead (mm)	Stroke	Orientation	Work load (kg) 1 2 3 4 5 6	Speed (mm/s) 200 400 600 800 1000 1200	Page
	Series LEL 	Step motor	LEL25M (Sliding bearing)	25	48	Up to 1000	Horizontal/Bottom mounting			Page 113
			LEL25L (Ball bushing)							
			LEL25M (Sliding bearing)				Horizontal/Wall mounting			
			LEL25M (Ball bushing)							

Rod Type Series LEY

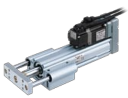
Positioning repeatability: ±0.02 mm

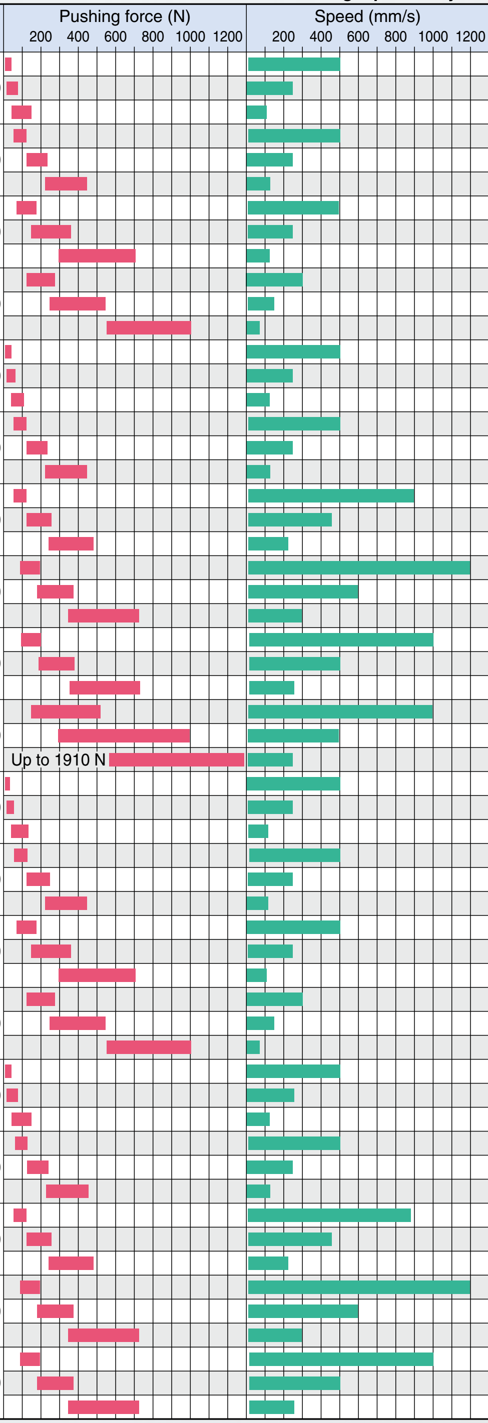
	Model	Motor	Model	Size	Screw lead (mm)	Stroke	Page
Rod type	Rod type Series LEY (Dust/Drip proof compatible)	Step motor	LEY16	16	10	Up to 300	Page 127
					5		
					2.5		
			LEY25	25	12	Up to 400	
					6		
					3		
			LEY32	32	16	Up to 500	
					8		
					4		
			LEY40	40	20	Up to 500	
					10		
					5		
		Servo motor	LEY16	16	10	Up to 300	
					5		
					2.5		
			LEY25	25	12	Up to 400	
					6		
					3		
		AC servo motor	LEY25	25	12	Up to 400	
					6		
					3		
			LEY32 Motor top/parallel type	32	20	Up to 500	
					10		
					5		
			LEY32 In-line motor type		16	Up to 500	
					8		
					4		
			LEY63 In-line motor type	63	20	Up to 800	
					10		
					5		
	Guide rod type Series LEYG	Step motor	LEYG16	16	10	Up to 200	
					5		
					2.5		
			LEYG25	25	12	Up to 300	
					6		
					3		
			LEYG32	32	16	Up to 300	
					8		
					4		
			LEYG40	40	16	Up to 300	
					8		
					4		
		Servo motor	LEYG16	16	10	Up to 200	
					5		
					2.5		
			LEYG25	25	12	Up to 300	
					6		
					3		
		AC servo motor	LEYG25	25	12	Up to 300	
					6		
					3		
			LEYG32 Motor top mounting type	32	20	Up to 300	
					10		
					5		
			LEYG32 In-line motor type		16	Up to 300	
					8		
					4		









Electric Slide Table Series LES

Positioning repeatability: ±0.05 mm

Slide table

Compact type
Series **LES**



High rigidity type
Series **LESH**



Type	Motor	Model	Size	Screw lead (mm)	Stroke	Orientation	Page
Compact type Series LES	Step motor	LES8	8	4	Up to 75	Horizontal transfer	Page 221
				8			
		LES16	16	5	Up to 100		
				10			
		LES25	25	8	Up to 150		
				16			
		LES8	8	4	Up to 75	Vertical transfer	
				8			
		LES16	16	5	Up to 100		
				10			
		LES25	25	8	Up to 150		
				16			
	Servo motor	LES8	8	4	Up to 75	Horizontal transfer	
				8			
		LES16	16	5	Up to 100		
				10			
		LES25	25	8	Up to 150		
				16			
		LES8	8	4	Up to 75	Vertical transfer	
				8			
		LES16	16	5	Up to 100		
				10			
		LES25	25	8	Up to 150		
				16			
High rigidity type Series LESH	Step motor	LESH8	8	4	Up to 75	Horizontal transfer	
				8			
		LESH16	16	5	Up to 100		
				10			
		LESH25	25	8	Up to 150		
				16			
		LESH8	8	4	Up to 75	Vertical transfer	
				8			
		LESH16	16	5	Up to 100		
				10			
		LESH25	25	8	Up to 150		
				16			
	Servo motor	LESH8	8	4	Up to 75	Horizontal transfer	
				8			
		LESH16	16	5	Up to 100		
				10			
		LESH25	25	8	Up to 150		
				16			
		LESH8	8	4	Up to 75	Vertical transfer	
				8			
		LESH16	16	5	Up to 100		
				10			
		LESH25	25	8	Up to 150		
				16			

Work load (kg): 2 4 6 8 10
Speed (mm/s): 100 200 300 400 500

SMC

Miniature Type Series LEP

Positioning repeatability: ±0.05 mm

Miniature rod

Model		Size	Screw lead (mm)	Motor size	Stroke (mm)	Pushing force (N) 5 10 15 20 25 30 35 40 45	Speed (mm/s) 10 50 100 150 200 250 300	Page
Rod type Series LEPY 	Step motor LEPY6	6	4	Basic	Up to 75			Page 277
			8					
	LEPY10	10	5	Basic	Up to 75			
				Compact				
			10	Basic	Up to 75			
				Compact				

Positioning repeatability: ±0.05 mm

Miniature slide table

Model		Size	Screw lead (mm)	Motor size	Stroke (mm)	Orientation	Work load (kg) 0.1 0.5 1 1.5 2	Speed (mm/s) 10 50 100 150 200 250 300	Page
Slide table type Series LEPS 	Step motor LEPS6	6	4	Basic	Up to 50	Horizontal transfer			Page 277
			8						
	LEPS10	10	5	Basic	Up to 50				
				Compact					
			10	Basic	Up to 50				
				Compact					
	LEPS6	6	4	Basic	Up to 50	Vertical transfer			
			8						
	LEPS10	10	5	Basic	Up to 50				
				Compact					
			10	Basic	Up to 50				
				Compact					

Electric Rotary Table Series LER

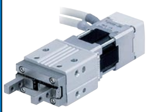
Positioning repeatability: ±0.05°

Electric rotary table

Model		Size	Rotating torque (N·m)	Rotating angle (°)	Rotating torque (N·m) 0.05 0.1 1 2 3 4 5 6 7 8 9 10	Angular speed (°/s) 100 200 300 400	Page
Series LER 	Step motor LER10	10	Basic	Up to 310			Page 303
			High torque				
	LER30	30	Basic	Up to 320			
			High torque				
	LER50	50	Basic	Up to 320			
			High torque				

Electric Gripper Series LEH

Positioning repeatability: ±0.05 mm

	Model			Size	Motor size	Stroke (mm)	Gripping force (N) 25 50 75 100 125 150 175 200	Opening and closing speed (mm/s) 5 10 20 30 40 50 60 70 80 90 100 110	Page
Electric gripper	2-finger type Compact and lightweight Series LEHZ 	Step motor	LEHZ10	10	Basic	4			Page 319
					Compact				
			LEHZ16	16	Basic	6			
					Compact				
			LEHZ20	20	Basic	10			
					Compact				
			LEHZ25	25	Basic	14			
					Compact				
			LEHZ32	32	Basic	22			
			LEHZ40	40	Basic	30			
	2-finger type Long stroke Series LEHF 		LEHF10	10	—	16, 32			
			LEHF20	20	—	24, 48			
			LEHF32	32	—	32, 64			
			LEHF40	40	—	40, 80			
	3-finger type Series LEHS 		LEHS10	10	Basic	4			
					Compact				
			LEHS20	20	Basic	6			
					Compact				
			LEHS32	32	Basic	8			
			LEHS40	40	Basic	12			

Card Motor Series LAT3

Positioning repeatability: ±0.09 mm, Measurement accuracy: ±0.1 mm

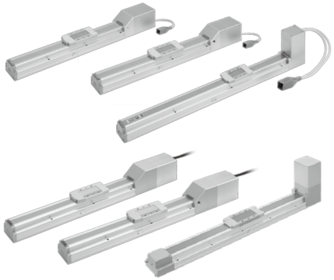
	Model		Resolution	Stroke	Pushing force (N) 1 2 3 4 5 6	Speed (mm/s) 50 100 200 300 400	Max. load mass (g) Horizontal	Max. load mass (g) Vertical	Page
Standard type	Series LAT3 	Moving magnetic type linear motor	30 µm	10			500	100	Page 439
				20					
				30				50	

Positioning repeatability: ±0.005 mm, Measurement accuracy: ±0.01 mm

	Model		Resolution	Stroke	Pushing force (N) 1 2 3 4 5 6	Speed (mm/s) 50 100 200 300 400	Max. load mass (g) Horizontal	Max. load mass (g) Vertical	Page
High resolution type	Series LAT3F 	Moving magnetic type linear motor	1.25 µm	10			500	100	Page 439
				20					
				30				50	

SMC

Electric Actuators



Electric Actuator
Series LEF

CE cULus RoHS

Slider Type

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

Ball Screw Drive *Series LEFS*

Size: 16, 25, 32, 40 ▸Page 8

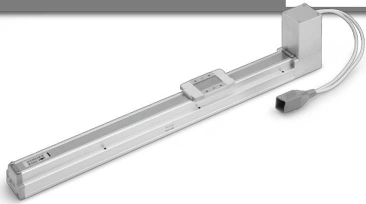
Max. work load: 60 kg
Positioning repeatability: ±0.02 mm
Clean room specification also available

Clean Room Specification ▸Page 13
11-LEFS

Belt Drive *Series LEFB*

Size: 16, 25, 32 ▸Page 8

Max. stroke: 2,000 mm
Max. speed: 2,000 mm/s



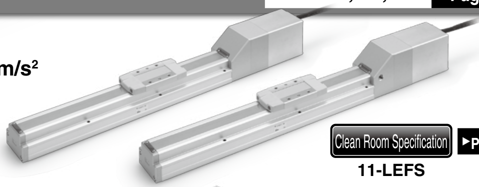
AC Servo Motor Type

∗ Not applicable to UL.

Ball Screw Drive *Series LEFS*

Size: 25, 32, 40 ▸Page 42

Improved high speed transfer ability
High acceleration/deceleration: 20,000 mm/s²
Pulse input type
With internal absolute encoder (For LECSB/C/S)
Clean room specification also available

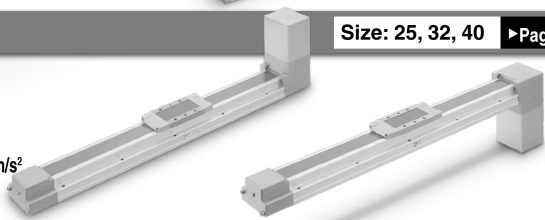


Clean Room Specification ▸Page 48
11-LEFS

Belt Drive *Series LEFB*

Size: 25, 32, 40 ▸Page 52

Max. speed: 2,000 mm/s
Max. stroke: 3,000 mm
Max. acceleration/deceleration: 20,000 mm/s²
Motor bottom mounting type also available



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

▸Page 377

- ▸**Step data input type**
  Series **LECP6/LECA6**
  64 points positioning
- ▸**Programless type**
  Series **LECP1**
  14 points positioning
- ▸**Pulse input type**
  Series **LECPA**

AC Servo Motor Driver

▸Page 419

∗ Not applicable to UL.

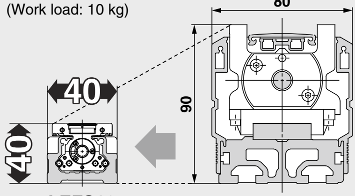
▸**For absolute encoder**
- **Pulse input type**
  Series **LECSB**
- **CC-Link direct input type**
  Series **LECSC**
- **SSCNET Ⅲ type**
  Series **LECSS**

▸**For incremental encoder**
- **Pulse input type/ Positioning type**
  Series **LECSA**

●Compact

Height/width dimensions reduced by approx. 50%

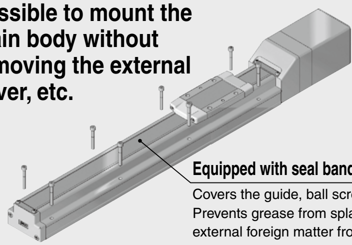
∗ Compared with SMC LJ1 series
(Work load: 10 kg)



LEFS16 LJ1H10

●Easy mounting of the body/Reduction of the installation labor

Possible to mount the main body without removing the external cover, etc.



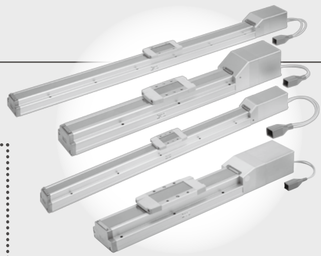
Equipped with seal bands as standard

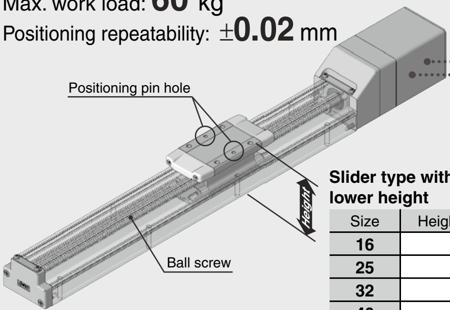
Covers the guide, ball screw and belt. Prevents grease from splashing and external foreign matter from entering.

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

Ball Screw Drive/*Series* LEFS Size: 16, 25, 32, 40

Max. work load: **60** kg
Positioning repeatability: ±**0.02** mm





Slider type with lower height

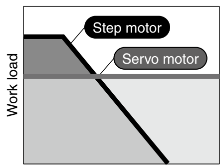
Size	Height (mm)
16	40
25	48
32	60
40	68

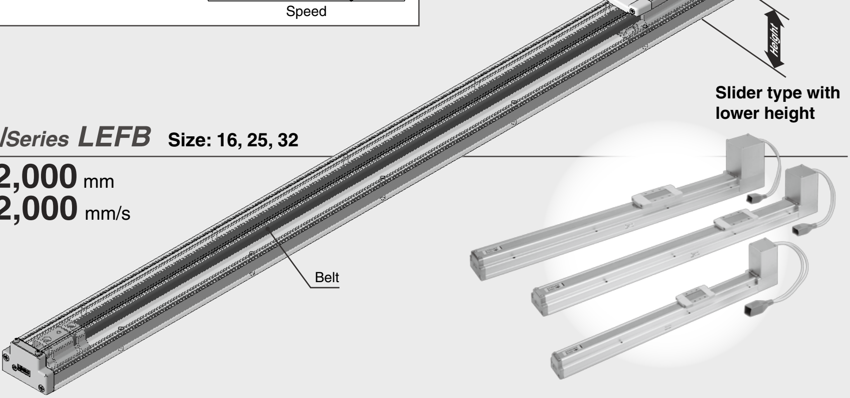
Non-magnetizing lock mechanism
(Option)

Drop prevention in case of power failure (Maintained)∗
∗ The belt drive actuator LEFB cannot be used vertically for applications.

Compatible motors

- ●Step motor (Servo/24 VDC)
  Ideal for transfer of high load at a low speed
- ●Servo motor (24 VDC)
  Stable at a high speed and silent operation





Slider type with lower height

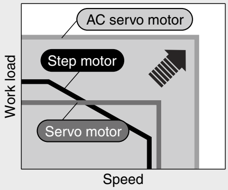
Belt Drive/*Series* LEFB Size: 16, 25, 32

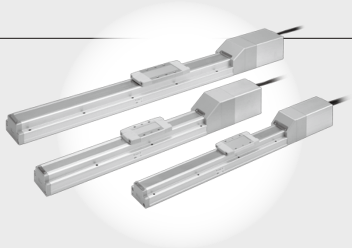
Max. stroke: **2,000** mm
Max. speed: **2,000** mm/s

AC Servo Motor

Ball Screw Drive/*Series* *LEFS* Size: 25, 32, 40

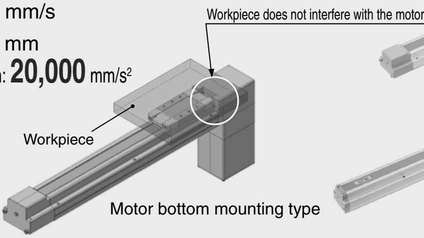
High output motor (100/200/400 W)
Improved high speed transfer ability
High acceleration/deceleration compatible: 20,000 mm/s^2
Pulse input type
With internal absolute encoder
(For LECSB/C/S)



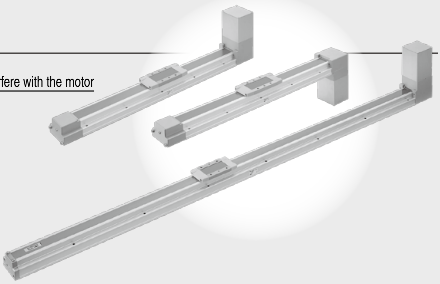


Belt Drive/*Series* *LEFB* Size: 25, 32, 40

Max. speed: **2,000** mm/s
Max. stroke: **3,000** mm
Max. acceleration/deceleration: **20,000** mm/s^2



Motor bottom mounting type



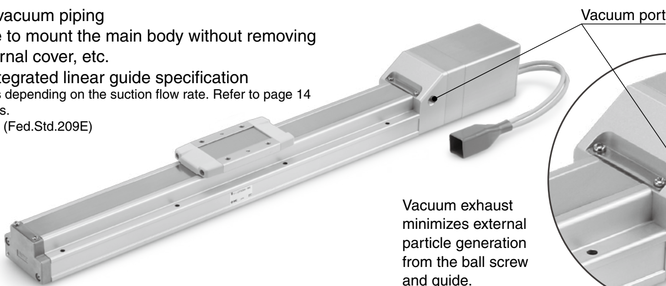
Clean Room Specification

Ball Screw Drive/*Series* *11-LEFS*

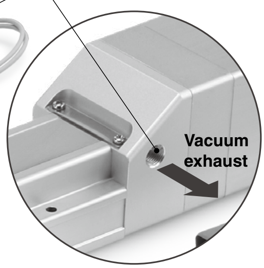
ISO Class 4*1, *2 (ISO14644-1)!

- Built-in vacuum piping
- Possible to mount the main body without removing the external cover, etc.
- Body-integrated linear guide specification

*1 Changes depending on the suction flow rate. Refer to page 14 for details.
*2 Class 10 (Fed.Std.209E)



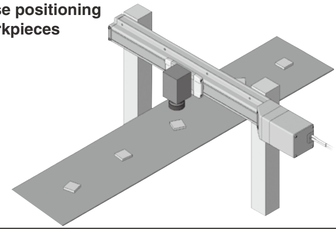
Vacuum exhaust minimizes external particle generation from the ball screw and guide.



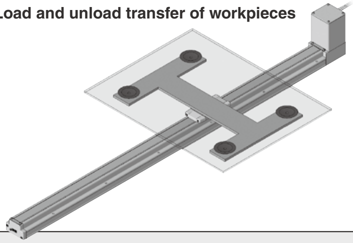
LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Application Examples

Precise positioning of workpieces



Load and unload transfer of workpieces



Series Variations

Ball Screw Drive/Series LEFS

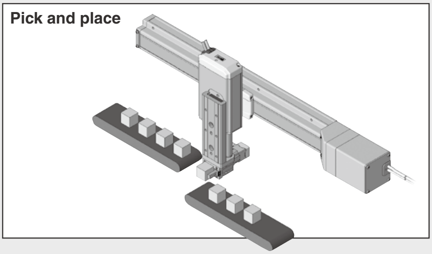
Type	Size*1	Lead (mm)	Stroke (mm)*2
Step motor (Servo/24 VDC) Clean room compatible*3	16	5	100, 200, 300, 400
		10	
	25	6	100, 200, 300, 400, 500, 600
		12	
	32	8	100, 200, 300, 400, 500, 600, 700, 800
		16	
	40	10	200, 300, 400, 500, 600, 700, 800, 900, 1000
		20	
Servo motor (24 VDC) Clean room compatible*3	16	5	100, 200, 300, 400
		10	
	25	6	100, 200, 300, 400, 500, 600
		12	
AC servo motor Clean room compatible*3	25	6	100, 200, 300, 400, 500, 600
		12	
	32	8	100, 200, 300, 400, 500, 600, 700, 800
		16	
	40	10	200, 300, 400, 500, 600, 700, 800, 900, 1000
		20	

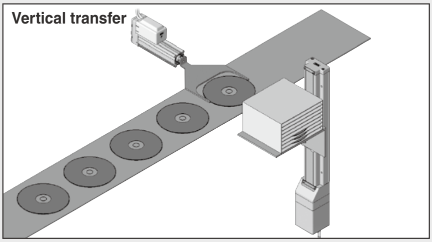
*1 The size corresponds to the bore of the air cylinder with an equivalent force. (For the ball screw drive)
*2 Consult with SMC for non-standard strokes as they are produced as special orders.
*3 For clean room specification, refer to pages 26 and 64.

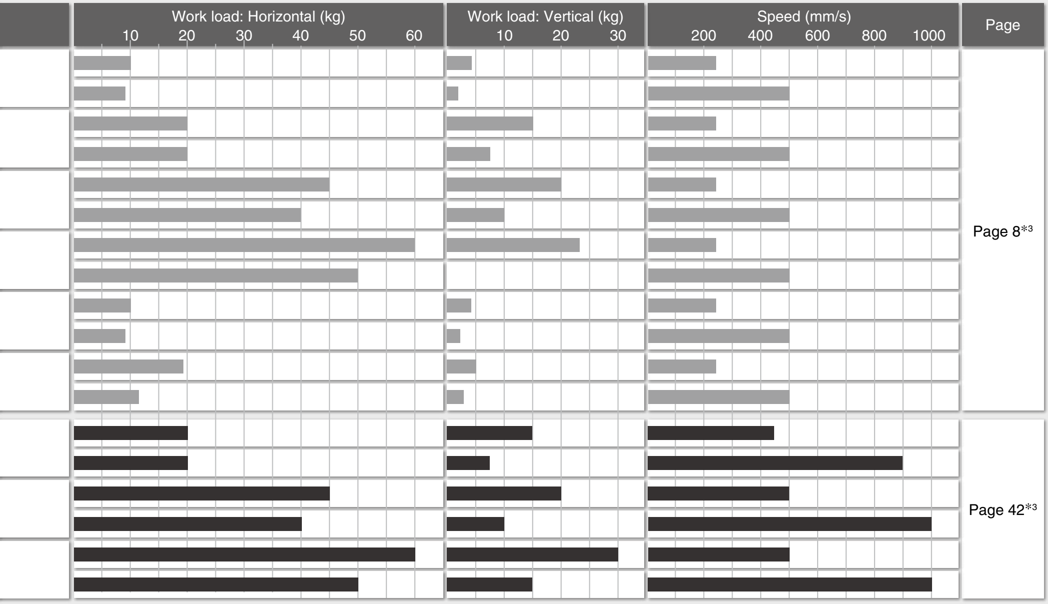
Belt Drive/Series LEFB

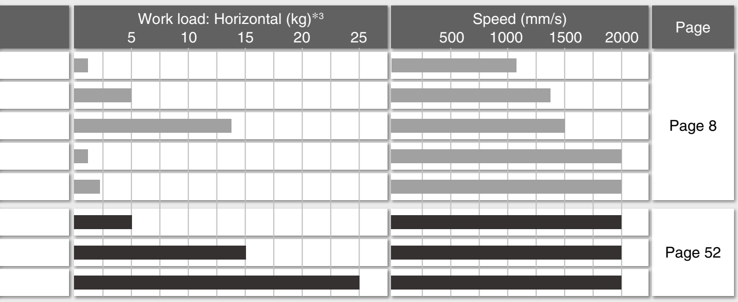
Type	Size*1	Equivalent lead (mm)	Stroke (mm)*2
Step motor (Servo/24 VDC)	16	48	300, 500, 600, 700, 800, 900, 1000
	25	48	300, 500, 600, 700, 800, 900, 1000, 1200, 1500, 1800, 2000
	32	48	300, 500, 600, 700, 800, 900, 1000, 1200, 1500, 1800, 2000
Servo motor (24 VDC)	16	48	300 ,500 ,600, 700, 800, 900, 1000
	25	48	300, 500 ,600, 700, 800, 900, 1000, 1200, 1500, 1800, 2000
AC servo motor	25	54	300, 400, 500, 600, 700, 800, 900, 1000, (1100), 1200, (1300), (1400), 1500, (1600), (1700), (1800), (1900), 2000
	32	54	300, 400, 500, 600, 700, 800, 900, 1000, (1100), 1200, (1300), (1400), 1500, (1600), (1700), (1800), (1900), 2000, 2500
	40	54	300, 400, 500, 600, 700, 800, 900, 1000, (1100), 1200, (1300), (1400), 1500, (1600), (1700), (1800), (1900), 2000, 2500, 3000

*1 The nominal size based on force (equivalent to the air cylinder) during operation with ball screws.
*2 Consult with SMC for non-standard strokes as they are produced as special orders.
*3 The belt drive actuator cannot be used vertically for applications.


Pick and place


Vertical transfer



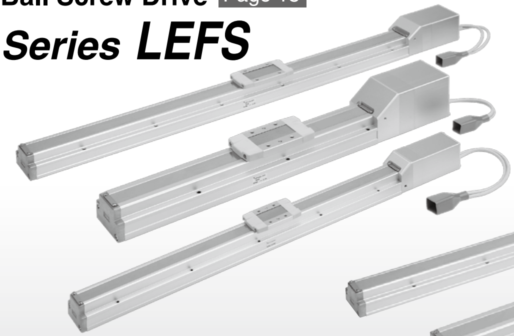


LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

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

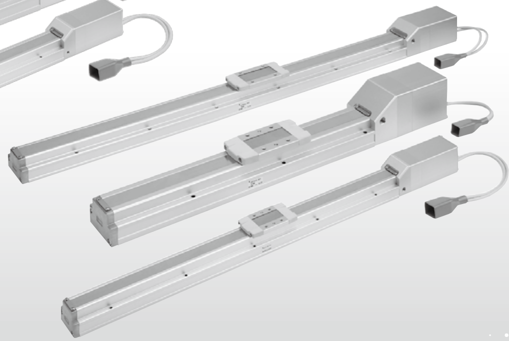
Ball Screw Drive Page 18

Series LEFS



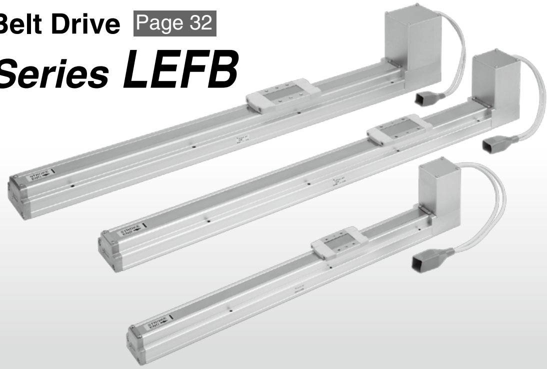
Clean Room Specification Page 26

Series 11-LEFS



Belt Drive Page 32

Series LEFB



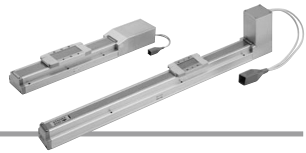
Step Motor/Servo Motor Controller Page 377
Step Motor Driver

Series LECP6/LECA6
Series LEC-G
Series LECP1
Series LECPA

Electric Actuator/Slider Type Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

Ball Screw Drive/*Series* ***LEFS*** Belt Drive/*Series* ***LEFB***

Model Selection



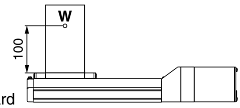
Selection Procedure

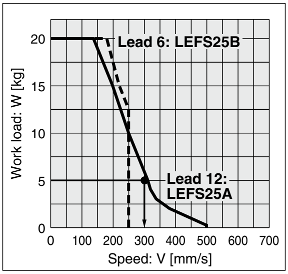
Step 1 Check the work load–speed. → **Step 2** Check the cycle time. → **Step 3** Check the allowable moment.

Selection Example

Operating conditions

- Workpiece mass: 5 [kg]
- Speed: 300 [mm/s]
- Acceleration/Deceleration: 3,000 [mm/s^2]
- Stroke: 200 [mm]
- Mounting orientation: Horizontal upward
- Workpiece mounting condition:





<Speed–Work load graph>
(LEFS25/Step motor)

Step 1 Check the work load–speed. <Speed–Work load graph> (Pages 9 and 10)

Select the target model based on the workpiece mass and speed with reference to the <Speed–Work load graph>.

Selection example) The **LEFS25A-200** is temporarily selected based on the graph shown on the right side.

Step 2 Check the cycle time.

Calculate the cycle time using the following calculation method.

Cycle time:

T can be found from the following equation.

$\boxed{T = T1 + T2 + T3 + T4 \text{ [s]}}$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

$\boxed{T1 = V/a1 \text{ [s]}}$ $\boxed{T3 = V/a2 \text{ [s]}}$

- T2: Constant speed time can be found from the following equation.

$$\boxed{T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} \text{ [s]}}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$\boxed{T4 = 0.2 \text{ [s]}}$

Calculation example)
T1 to T4 can be calculated as follows.

$T1 = V/a1 = 300/3000 = 0.1$ [s],

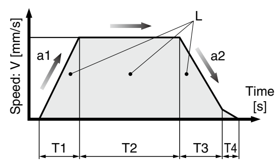
$T3 = V/a2 = 300/3000 = 0.1$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}$$
$$= \frac{200 - 0.5 \cdot 300 \cdot (0.1 + 0.1)}{300}$$
$$= 0.57 \text{ [s]}$$

$T4 = 0.2$ [s]

Therefore, the cycle time can be obtained as follows.

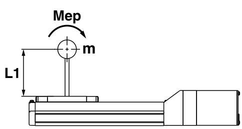
$T = T1 + T2 + T3 + T4$
$= 0.1 + 0.57 + 0.1 + 0.2$
$=$ **0.97 [s]**

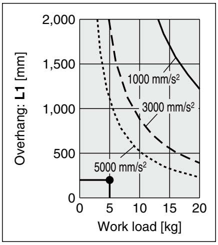


L : Stroke [mm]
··· (Operating condition)
V : Speed [mm/s]
··· (Operating condition)
a1: Acceleration [mm/s^2]
··· (Operating condition)
a2: Deceleration [mm/s^2]
··· (Operating condition)

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 the beginning of the constant speed operation to stop
T4: Settling time [s]
Time until in position is completed

Step 3 Check the guide moment.





Based on the above calculation result, the LEFS25A-200 is selected.

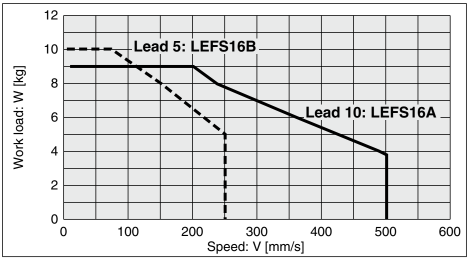
∗ If the step motor and servo motors do not meet your specifications, please also consider the AC servo specifications (Page 41).

Speed–Work Load Graph (Guide)
Step Motor (Servo/24 VDC)

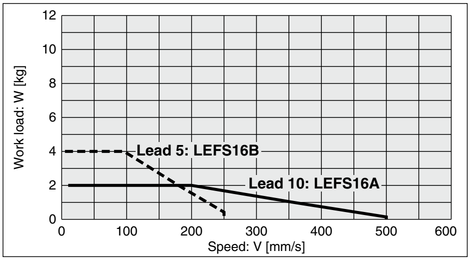
∗ The following graph shows the values when moving force is 100%.

LEFS16/Ball Screw Drive

Horizontal

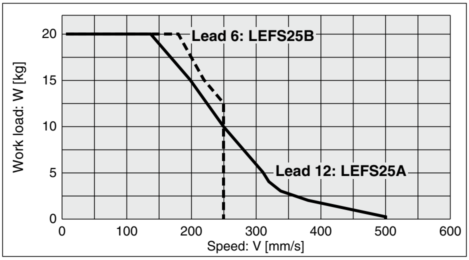


Vertical

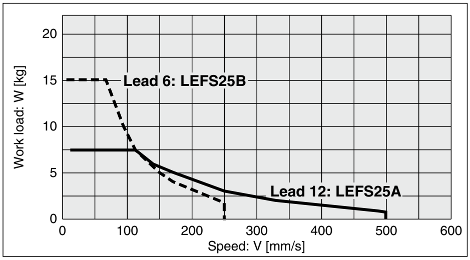


LEFS25/Ball Screw Drive

Horizontal

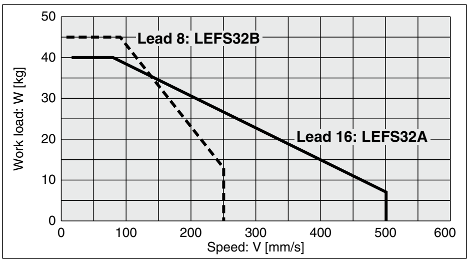


Vertical

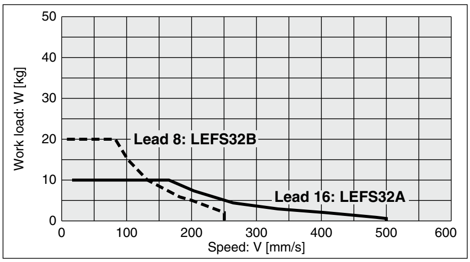


LEFS32/Ball Screw Drive

Horizontal

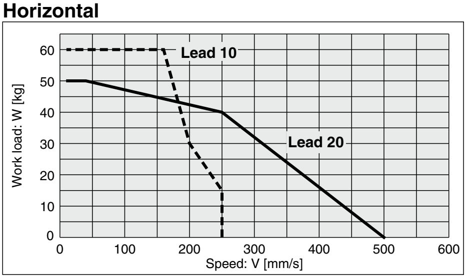


Vertical

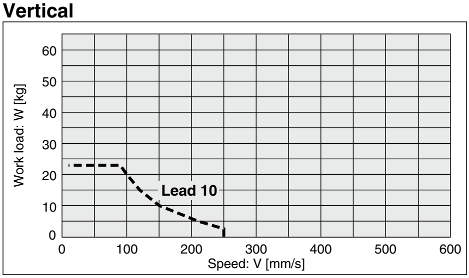


LEFS40/Ball Screw Drive

Horizontal



Vertical

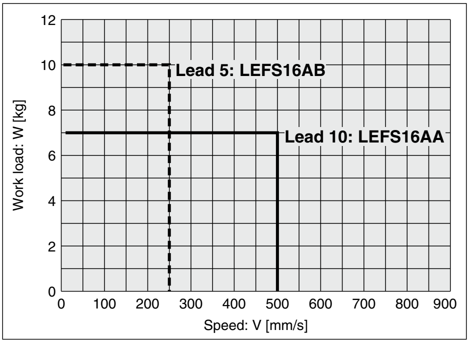


Speed–Work Load Graph (Guide)
Servo Motor (24 VDC)

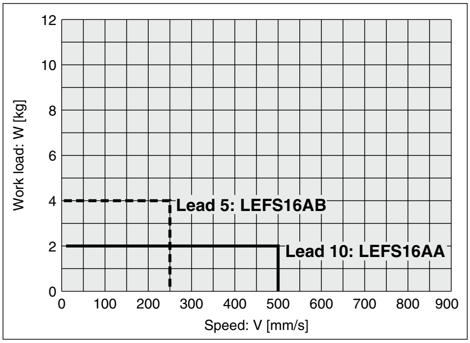
∗ The following graph shows the values when moving force is 250%.

LEFS16A/Ball Screw Drive

Horizontal

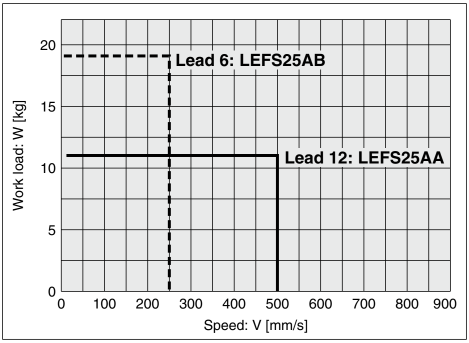


Vertical

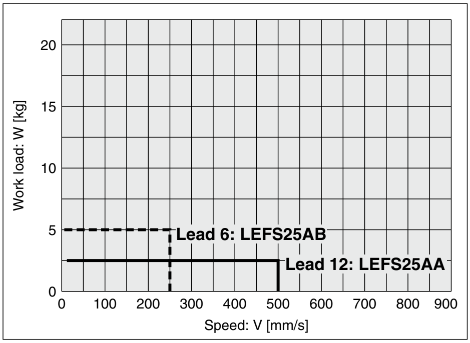


LEFS25A/Ball Screw Drive

Horizontal



Vertical

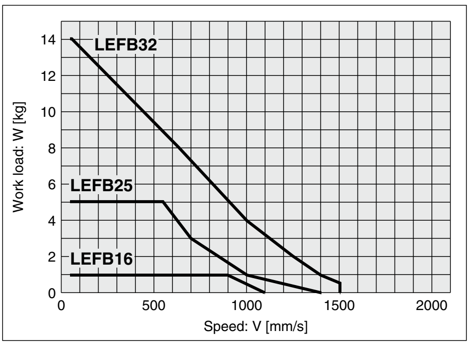


Step Motor (Servo/24 VDC)

LEFB/Belt Drive

∗ When moving force is 100%

Horizontal

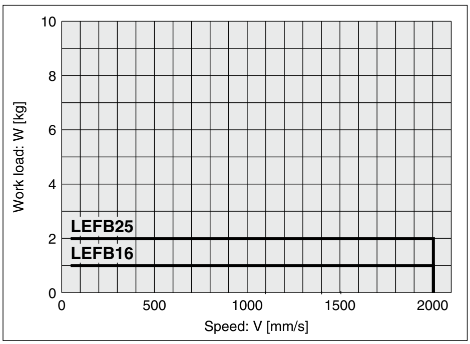


Servo Motor (24 VDC)

LEFB/Belt Drive

∗ When moving force is 250%

Horizontal



Dynamic Allowable Moment

∗ This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

Acceleration/Deceleration —— 1,000 mm/s² – – – 3,000 mm/s² ········ 5,000 mm/s²

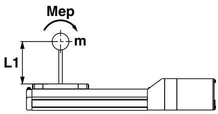
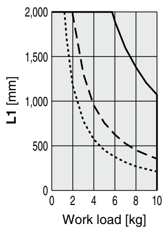
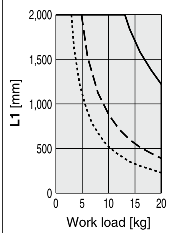
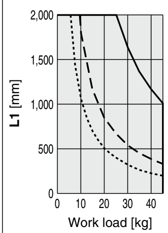
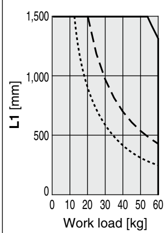
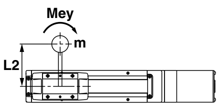
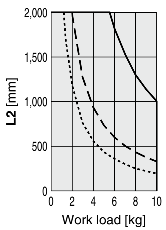
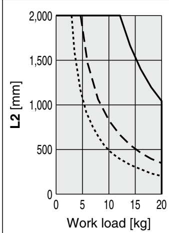
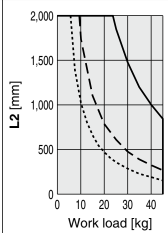
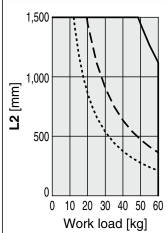
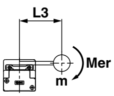
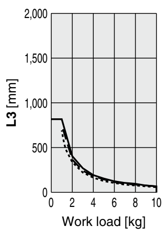
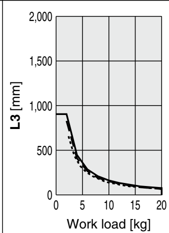
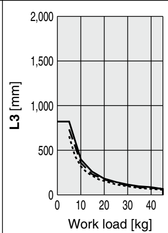
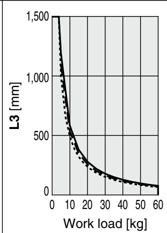
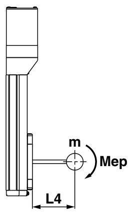
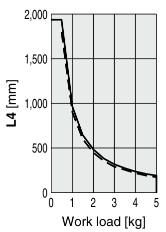
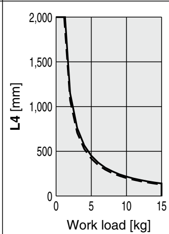
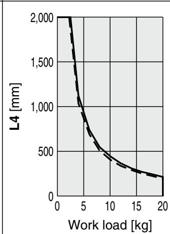
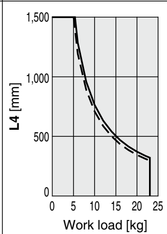
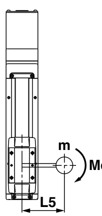
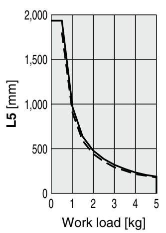
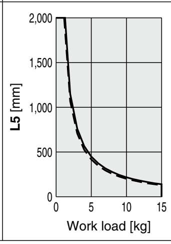
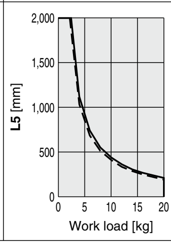
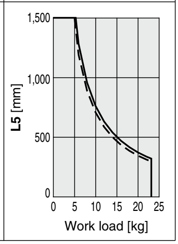
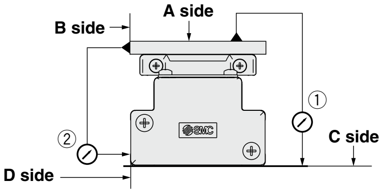
Orientation	Load overhanging direction m : Work load [kg] Me: Dynamic allowable moment [N·m] L : Overhang to the work load center of gravity [mm]		Model			
			LEF16	LEF25	LEF32	LEFS40
Horizontal		Pitching				
		Yawing				
		Rolling				
Vertical		Pitching				
		Yawing				

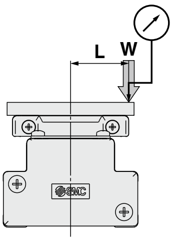
Table Accuracy

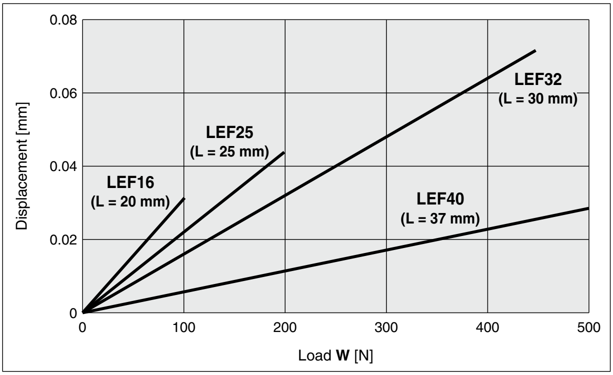


Model	Traveling parallelism [mm] (Every 300 mm)	
	① C side traveling parallelism to A side	② D side traveling parallelism to B side
LEF16	0.05	0.03
LEF25	0.05	0.03
LEF32	0.05	0.03
LEF40	0.05	0.03

Note) Traveling parallelism does not include the mounting surface accuracy.

Table Displacement (Reference Value)





Note 1) This displacement is measured when a 15 mm aluminum plate is mounted and fixed on the table.
Note 2) Please confirm the clearance and play of the guide separately.

Particle Generation Characteristics

Particle Generation Measuring Method

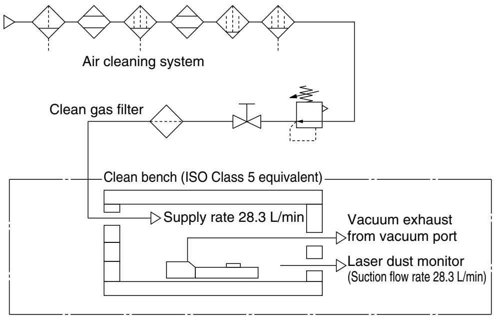
The particle generation data for SMC Clean Series are measured in the following test method.

■Test Method (Example)

Place the specimen in the acrylic resin chamber and operate it while supplying the same flow rate of clean air as the suction flow rate of the measuring instrument (28.3 L/min). Measure the changes of the particle concentration over time until the number of cycles reaches the specified point.
The chamber is placed in an ISO Class 5 equivalent clean bench.

■Measuring Conditions

Chamber	Internal volume	28.3 L
	Supply air quality	Same quality as the supply air for driving
Measuring instrument	Description	Laser dust monitor (Automatic particle counter by lightscattering method)
	Minimum measurable particle diameter	0.1 µm
	Suction flow rate	28.3 L/min
Setting conditions	Sampling time	5 min
	Interval time	55 min
	Sampling air flow	141.5 L



Particle generation measuring circuit

■Evaluation Method

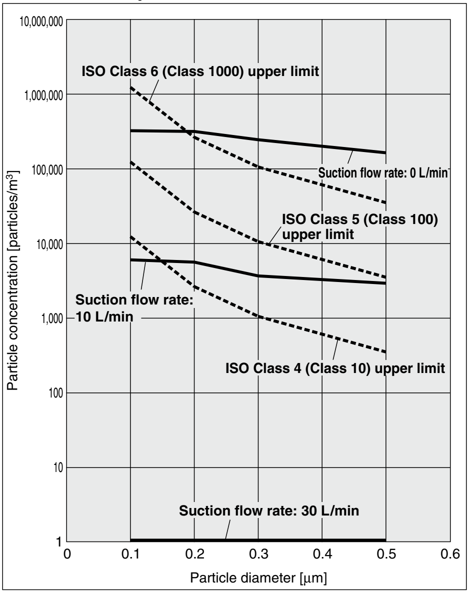
To obtain the measured values of particle concentration, the accumulated value Note 1) of particles captured every 5 minutes, by the laser dust monitor, is converted into the particle concentration in every 1 m^3.
When determining particle generation grades, the 95% upper confidence limit of the average particle concentration (average value), when each specimen is operated at a specified number of cycles Note 2) is considered.
The plots in the graphs indicate the 95% upper confidence limit of the average particle concentration of particles with a diameter within the horizontal axis range.

Note 1) Sampling air flow rate: Number of particles contained in 141.5 L of air
Note 2) Actuator: 1 million cycles

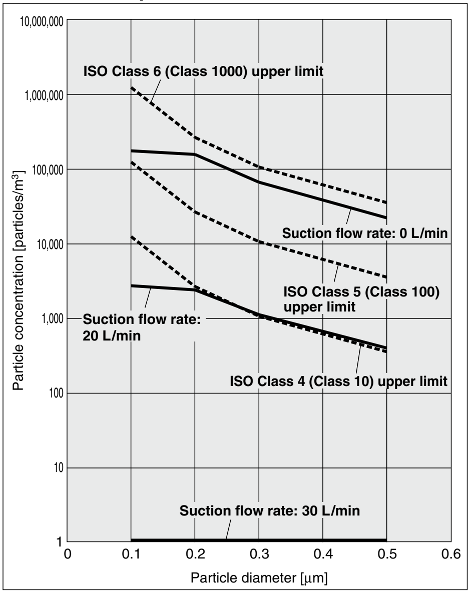
LEF LEJ LEL LEY LEYG LES LESH LEPY LEPS LER LEH LECA6 LECP6 LEC-G LECP1 LECPA LECS□ LAT3

Particle Generation Characteristics
Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

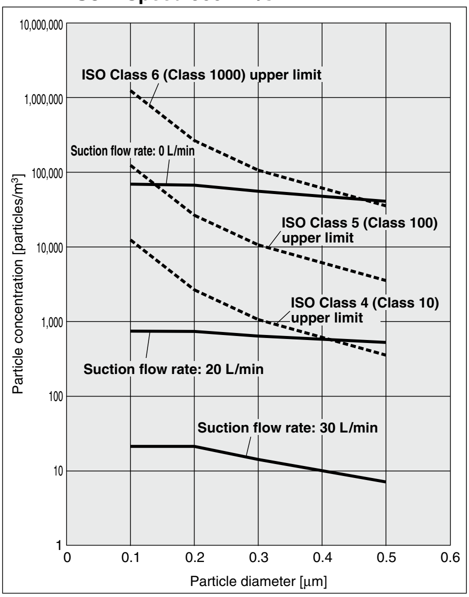
11-LEFS16 Speed 500mm/s



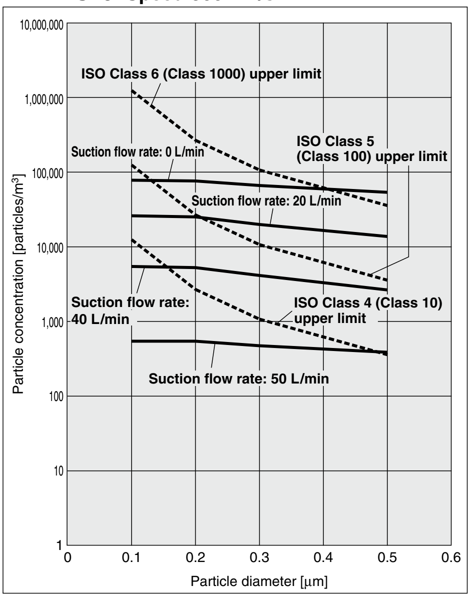
11-LEFS25 Speed 500mm/s



11-LEFS32 Speed 500mm/s



11-LEFS40 Speed 500mm/s



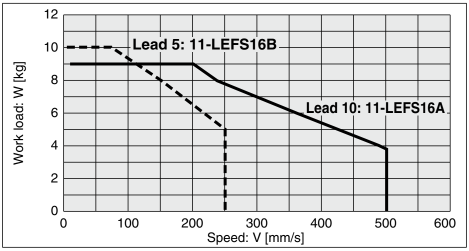
Model Selection

Speed–Work Load Graph (Guide)
Step Motor (Servo/24 VDC)

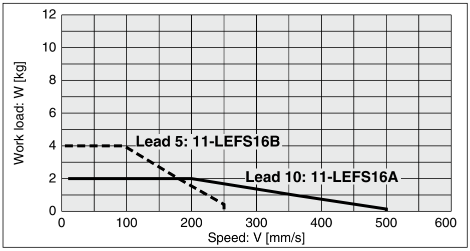
∗ The following graph shows the values when moving force is 100%.

11-LEFS16/Ball Screw Drive

Horizontal

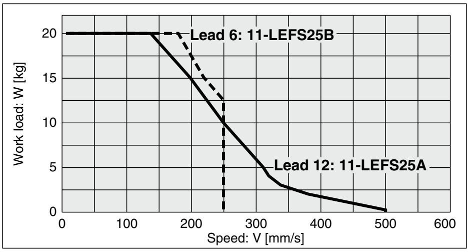


Vertical

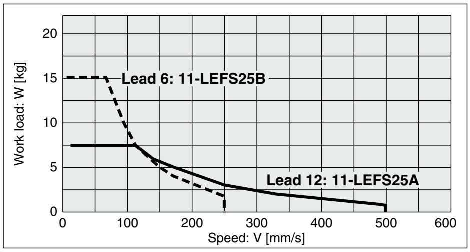


11-LEFS25/Ball Screw Drive

Horizontal

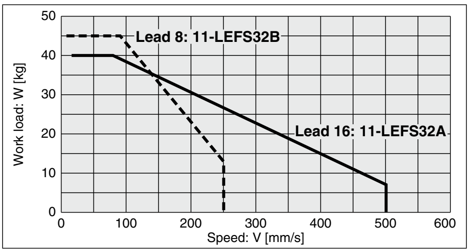


Vertical

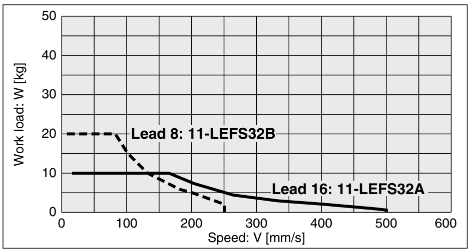


11-LEFS32/Ball Screw Drive

Horizontal

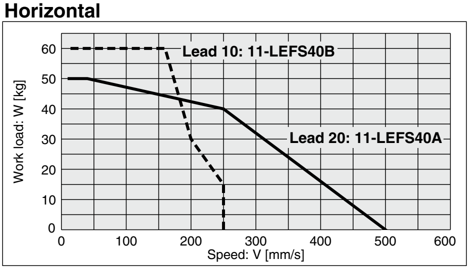


Vertical

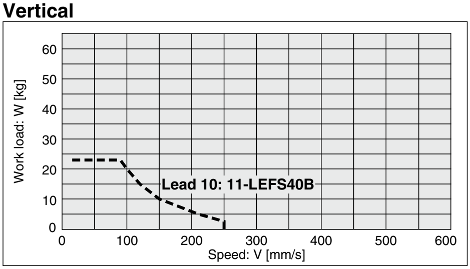


11-LEFS40/Ball Screw Drive

Horizontal



Vertical

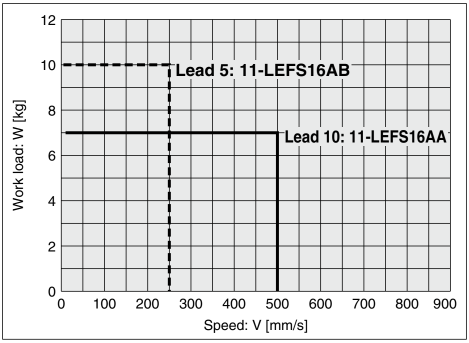


Speed–Work Load Graph (Guide)
Servo Motor (24 VDC)

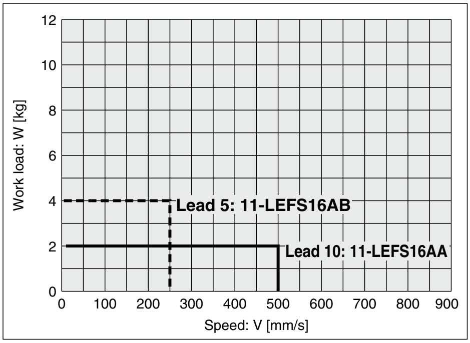
∗ The following graph shows the values when moving force is 250%.

11-LEFS16A/Ball Screw Drive

Horizontal

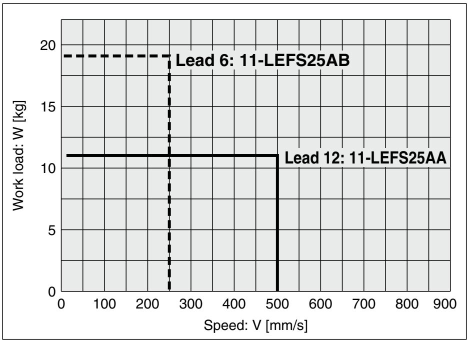


Vertical

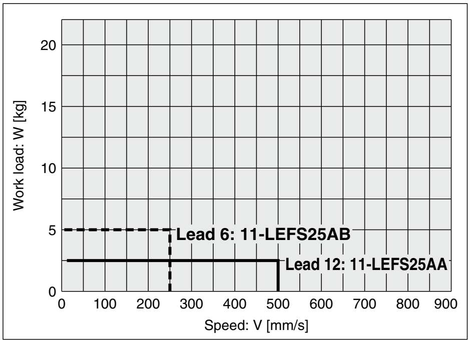


11-LEFS25A/Ball Screw Drive

Horizontal



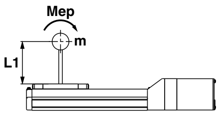
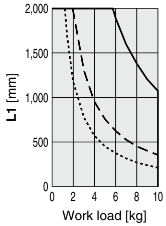
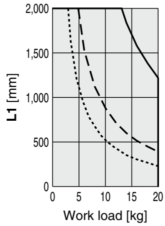
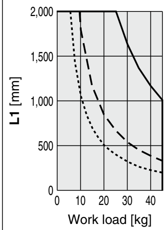
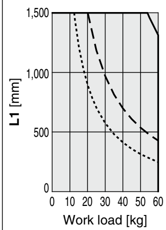
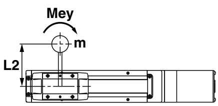
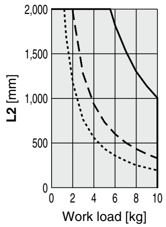
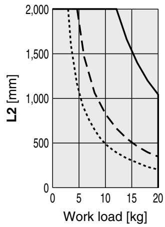
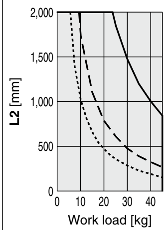
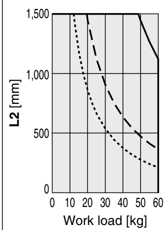
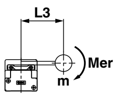
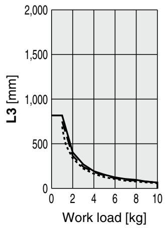
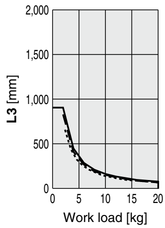
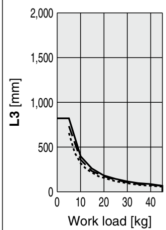
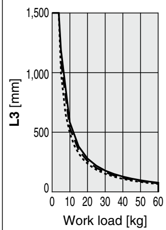
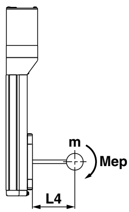
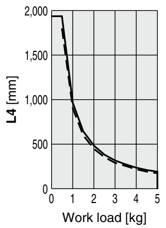
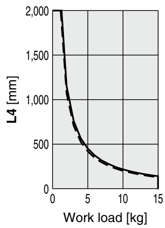
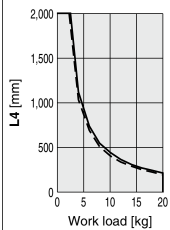
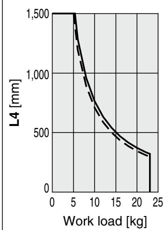
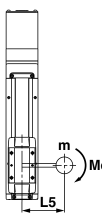
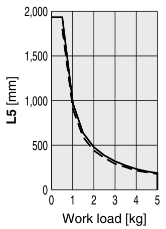
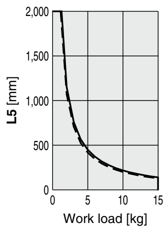
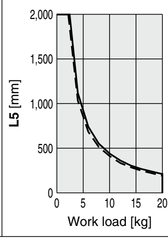
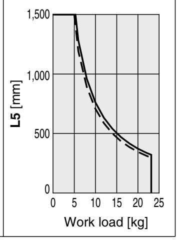
Vertical



Dynamic Allowable Moment

∗ This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

Acceleration/Deceleration ——— 1,000 mm/s² – – – 3,000 mm/s² ········ 5,000 mm/s²

Orientation	Load overhanging direction **m** : Work load [kg] **Me**: Dynamic allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model			
			11-LEFS16	**11-LEFS25**	**11-LEFS32**	**11-LEFS40**
Horizontal		**Pitching**				
		**Yawing**				
		**Rolling**				
Vertical		**Pitching**				
		**Yawing**				

Electric Actuator/Slider Type
Ball Screw Drive
Step Motor (Servo/24 VDC)
Servo Motor (24 VDC)

Series LEFS
LEFS16, 25, 32, 40

RoHS

How to Order

LEFS 16 [ ] B – 100 [ ] – S 1 6N 1 [ ]

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Size

16
25
32
40

❷ Motor type

Symbol	Type	Applicable size				Compatible controllers/driver
		LEFS16	LEFS25	LEFS32	LEFS40	
Nil	Step motor (Servo/24 VDC)	●	●	●	●	LECP6 LECP1 LECPA
A	Servo motor (24 VDC)	●	●	—	—	LECA6

❸ Lead [mm]

Symbol	LEFS16	LEFS25	LEFS32	LEFS40
A	10	12	16	20
B	5	6	8	10

❹ Stroke [mm]

100	100
to	to
1000	1000

∗ Refer to the applicable stroke table.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEF series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② For the servo motor (24 VDC) specification, EMC compliance was tested by installing a noise filter set (LEC-NFA). Refer to page 394 for the noise filter set. Refer to the LECA Operation Manual for installation.

[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.

Applicable stroke table

●Standard

Model \ Stroke	100	200	300	400	500	600	700	800	900	1000	Manufacturable stroke range [mm]
LEFS16	●	●	●	●	—	—	—	—	—	—	100 to 400
LEFS25	●	●	●	●	●	●	—	—	—	—	100 to 600
LEFS32	●	●	●	●	●	●	●	●	—	—	100 to 800
LEFS40	—	●	●	●	●	●	●	●	●	●	200 to 1000

∗ Consult with SMC for non-standard strokes as they are produced as special orders.

Made to Order

Made to Order Specifications
(For details, refer to page 79.)

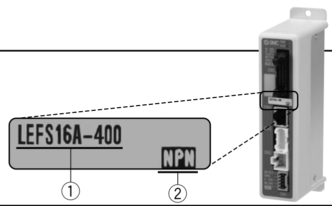
Symbol	Specifications
X139	Support guide

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

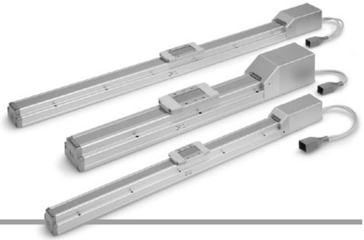
Confirm that the combination of the controller/driver and the actuator is correct.

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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



❺ Motor option

Nil	Without option
B	With lock

❻ Actuator cable type*1

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

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Only available for the motor type “Step motor.”

❼ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 2) on pages 20 and 21.

❽ Controller/Driver type*1

Nil	Without controller/driver	
6N	**LECP6/LECA6** (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 Only available for the motor type “Step motor.”

❾ I/O cable length [m]*1

Nil	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 394 (For LECP6/LECA6), page 407 (For LECP1) or page 414 (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

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

Compatible Controllers/Driver

Type	Step data input type 	Step data input type 	Programless type 	Pulse input type 
Series	LECP6	LECA6	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)	Servo motor (24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 386	Page 386	Page 401	Page 408

Specifications

Step Motor (Servo/24 VDC)

	Model		LEFS16		LEFS25		LEFS32		LEFS40	
Actuator specifications	**Stroke [mm]** Note 1)		100, 200, 300, 400		100, 200, 300 400, 500, 600		100, 200, 300, 400 500, 600, 700, 800		200, 300, 400, 500, 600 700, 800, 900, 1000	
	Work load [kg] Note 2)	**Horizontal**	9	10	20	20	40	45	50	60
		Vertical	2	4	7.5	15	10	20	—	23
	Speed [mm/s] Note 2)		10 to 500	5 to 250	12 to 500	6 to 250	16 to 500	8 to 250	20 to 500	10 to 250
	Max. acceleration/deceleration [mm/s^2]		3,000							
	Positioning repeatability [mm]		±0.02							
	Lead [mm]		10	5	12	6	16	8	20	10
	Impact/Vibration resistance [m/s^2] Note 3)		50/20							
	Actuation type		Ball screw							
	Guide type		Linear guide							
	Operating temperature range [°C]		5 to 40							
	Operating humidity range [%RH]		90 or less (No condensation)							
Electric specifications	**Motor size**		□28		□42		□56.4			
	Motor type		Step motor (Servo/24 VDC)							
	Encoder		Incremental A/B phase (800 pulse/rotation)							
	Rated voltage [V]		24 VDC ±10%							
	Power consumption [W] Note 4)		22		38		50		100	
	Standby power consumption when operating [W] Note 5)		18		16		44		43	
	Max. instantaneous power consumption [W] Note 6)		51		57		123		141	
Lock unit specifications	**Type** Note 7)		Non-magnetizing lock							
	Holding force [N]		20	39	78	157	108	216	113	225
	Power consumption [W] Note 8)		2.9		5		5		5	
	Rated voltage [V]		24 VDC ±10%							

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Speed changes according to the work load. Check "Speed–Work Load Graph (Guide)" on page 9.
Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m.
Note 3) Impact resistance: No malfunction occurred when the actuator 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 4) The power consumption (including the controller) is for when the actuator is operating.
Note 5) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation.
Note 6) 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 7) With lock only
Note 8) For an actuator with lock, add the power consumption for the lock.

Specifications

Servo Motor (24 VDC)

	Model		LEFS16A		LEFS25A	
Actuator specifications	Stroke [mm] Note 1)		100, 200, 300, 400		100, 200, 300 400, 500, 600	
	Work load [kg] Note 2)	Horizontal	7	10	11	18
		Vertical	2	4	2.5	5
	Speed [mm/s] Note 2)		10 to 500	5 to 250	12 to 500	6 to 250
	Max. acceleration/deceleration [mm/s^2]		3,000			
	Positioning repeatability [mm]		±0.02			
	Lead [mm]		10	5	12	6
	Impact/Vibration resistance [m/s^2] Note 3)		50/20			
	Actuation type		Ball screw			
	Guide type		Linear guide			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
Electric specifications	Motor size		□28		□42	
	Motor output [W]		30		36	
	Motor type		Servo motor (24 VDC)			
	Encoder		Incremental A/B (800 pulse/rotation)/Z phase			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption [W] Note 4)		63		102	
	Standby power consumption when operating [W] Note 5)		Horizontal 4/Vertical 9		Horizontal 4/Vertical 9	
	Max. instantaneous power consumption [W] Note 6)		70		113	
Lock unit specifications	Type Note 7)		Non-magnetizing lock			
	Holding force [N]		20	39	78	157
	Power consumption [W] Note 8)		2.9		5	
	Rated voltage [V]		24 VDC ±10%			

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Check "Speed–Work Load Graph (Guide)" on page 10 for details.
Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m.
Note 3) Impact resistance: No malfunction occurred when the actuator 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 4) The power consumption (including the controller) is for when the actuator is operating.
Note 5) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation.
Note 6) 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 7) With lock only
Note 8) For an actuator with lock, add the power consumption for the lock.

Weight

Series	LEFS16			
Stroke [mm]	100	200	300	400
Product weight [kg]	0.90	1.05	1.20	1.35
Additional weight with lock [kg]	0.12			

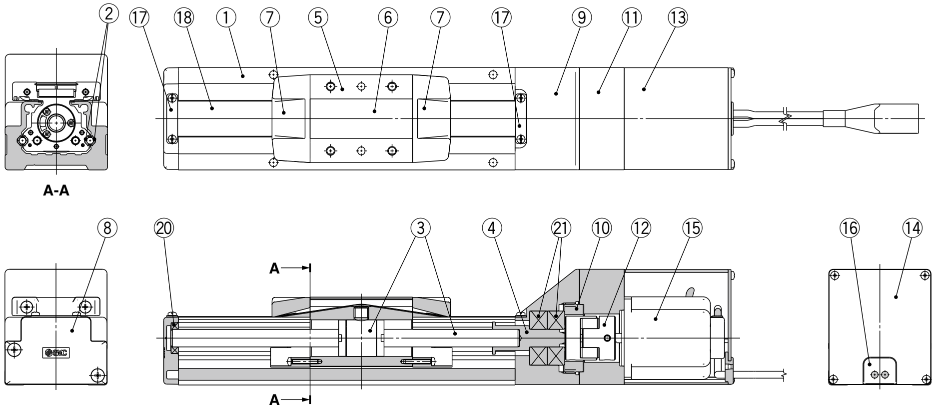
Series	LEFS25					
Stroke [mm]	100	200	300	400	500	600
Product weight [kg]	1.84	2.12	2.40	2.68	2.96	3.24
Additional weight with lock [kg]	0.26					

Series	LEFS32							
Stroke [mm]	100	200	300	400	500	600	700	800
Product weight [kg]	3.35	3.75	4.15	4.55	4.95	5.35	5.75	6.15
Additional weight with lock [kg]	0.53							

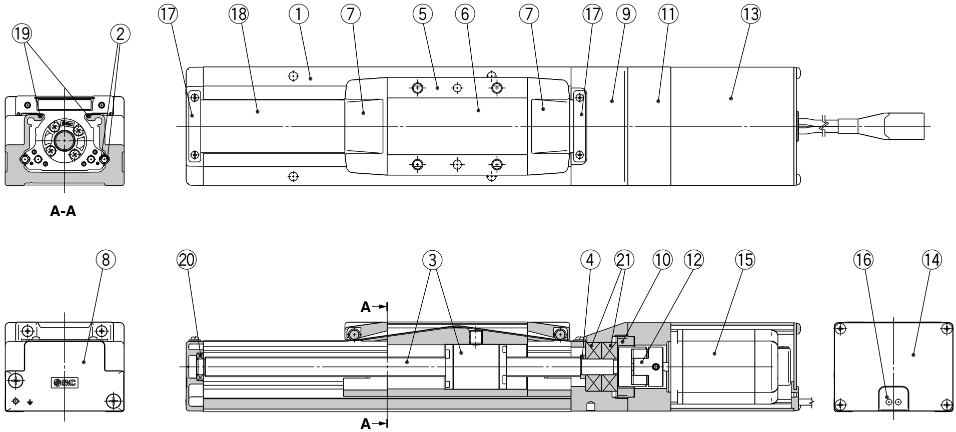
Series	LEFS40								
Stroke [mm]	200	300	400	500	600	700	800	900	1000
Product weight [kg]	5.65	6.21	6.77	7.33	7.89	8.45	9.01	9.57	10.13
Additional weight with lock [kg]	0.53								

Construction

LEFS16, 25, 32



LEFS40

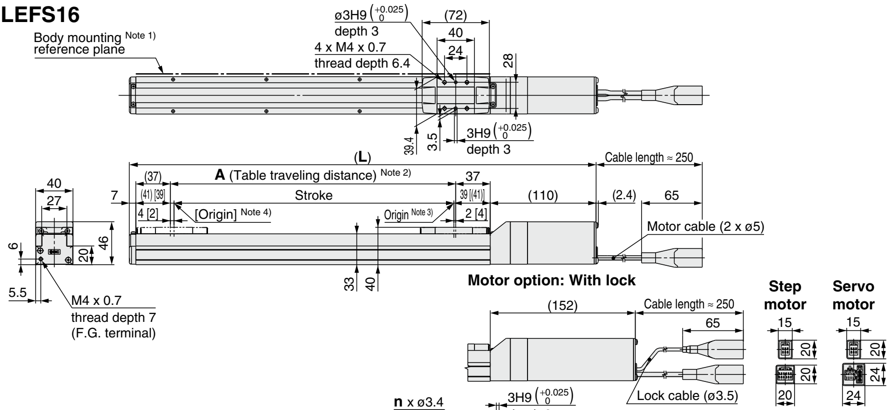


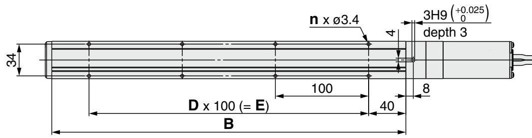
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Rail guide**	—	
3	**Ball screw assembly**	—	
4	**Connected shaft** — **LEFS16, 25, 32** **Spacer** — **LEFS40**	—	
5	**Table**	Aluminum alloy	Anodized
6	**Blanking plate**	Aluminum alloy	Anodized
7	**Seal band stopper**	Synthetic resin	
8	**Housing A**	Aluminum die-casted	Coating
9	**Housing B**	Aluminum die-casted	Coating
10	**Bearing stopper**	Aluminum alloy	

No.	Description	Material	Note
11	**Motor mount**	Aluminum alloy	Coating
12	**Coupling**	—	
13	**Motor cover**	Aluminum alloy	Anodized
14	**End cover**	Aluminum alloy	Anodized
15	**Motor**	—	
16	**Rubber bushing**	NBR	
17	**Band stopper**	Stainless steel	
18	**Dust seal band**	Stainless steel	
19	**Seal magnet**	—	
20	**Bearing**	—	
21	**Bearing**	—	

Dimensions: Ball Screw Drive

LEFS16



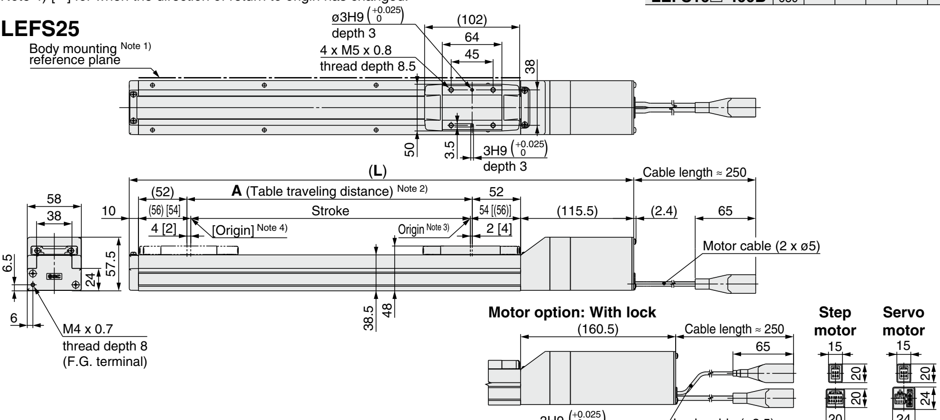


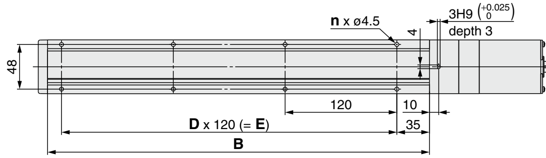
[mm]

Model	L	A	B	n	D	E
LEFS16□-100	297	106	180	4	—	—
LEFS16□-100B	339					
LEFS16□-200	397	206	280	6	2	200
LEFS16□-200B	439					
LEFS16□-300	497	306	380	8	3	300
LEFS16□-300B	539					
LEFS16□-400	597	406	480	10	4	400
LEFS16□-400B	639					

Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 2 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

LEFS25





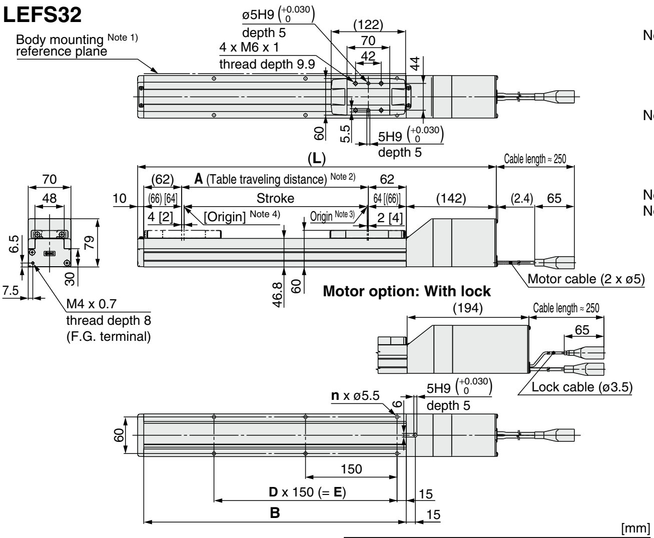
[mm]

Model	L	A	B	n	D	E
LEFS25□-100	335.5	106	210	4	—	—
LEFS25□-100B	380.5					
LEFS25□-200	435.5	206	310	6	2	240
LEFS25□-200B	480.5					
LEFS25□-300	535.5	306	410	8	3	360
LEFS25□-300B	580.5					
LEFS25□-400	635.5	406	510	8	3	360
LEFS25□-400B	680.5					
LEFS25□-500	735.5	506	610	10	4	480
LEFS25□-500B	780.5					
LEFS25□-600	835.5	606	710	12	5	600
LEFS25□-600B	880.5					

Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

Dimensions: Ball Screw Drive

LEFS32

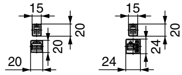


Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)

Note 2) Distance 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 3) Position after return to origin.

Note 4) [ ] for when the direction of return to origin has changed.



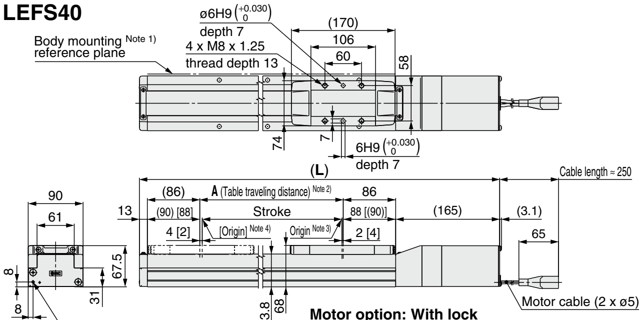
[mm]

Model	L	A	B	n	D	E
LEFS32□-100	387.5	106	230	4	—	—
LEFS32□-100B	439.5					
LEFS32□-200	487.5	206	330	6	2	300
LEFS32□-200B	539.5					

[mm]

Model	L	A	B	n	D	E
LEFS32□-300	582	306	430	6	2	300
LEFS32□-300B	634					
LEFS32□-400	682	406	530	8	3	450
LEFS32□-400B	734					
LEFS32□-500	782	506	630	10	4	600
LEFS32□-500B	834					
LEFS32□-600	882	606	730	10	4	600
LEFS32□-600B	934					
LEFS32□-700	982	706	830	12	5	750
LEFS32□-700B	1034					
LEFS32□-800	1082	806	930	14	6	900
LEFS32□-800B	1134					

LEFS40

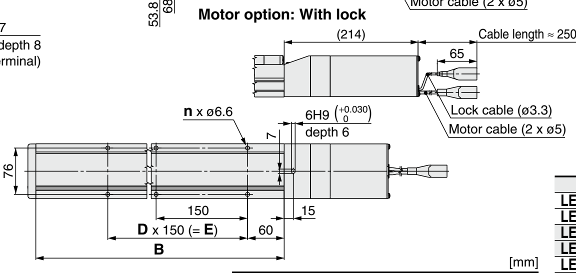


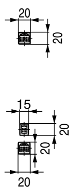
Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)

Note 2) Distance 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 3) Position after return to origin.

Note 4) [ ] for when the direction of return to origin has changed.





[mm]

Model	L	A	B	n	D	E
LEFS40□-200	556	206	378	6	2	300
LEFS40□-200B	605					
LEFS40□-300	656	306	478	6	2	300
LEFS40□-300B	705					
LEFS40□-400	756	406	578	8	3	450
LEFS40□-400B	805					

[mm]

Model	L	A	B	n	D	E
LEFS40□-500	856	506	678	10	4	600
LEFS40□-500B	905					
LEFS40□-600	956	606	778	10	4	600
LEFS40□-600B	1005					
LEFS40□-700	1056	706	878	12	5	750
LEFS40□-700B	1105					
LEFS40□-800	1156	806	978	14	6	900
LEFS40□-800B	1205					
LEFS40□-900	1256	906	1078	14	6	900
LEFS40□-900B	1305					
LEFS40□-1000	1356	1006	1178	16	7	1050
LEFS40□-1000B	1405					

Electric Actuator/Slider Type
Ball Screw Drive Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

Clean Room Specification

Series 11-LEFS

LEFS16, 25, 32, 40

RoHS

How to Order

11 – LEFS 16 □ B – 100 □ □ – S 1 6N 1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

Clean series

11	Vacuum type

❶ Size

16
25
32
40

❷ Motor type

Symbol	Type	Applicable size				Compatible controllers/driver
		11-LEFS16	11-LEFS25	11-LEFS32	11-LEFS40	
Nil	Step motor (Servo/24 VDC)	●	●	●	●	LECP6 LECP1 LECPA
A	Servo motor (24 VDC)	●	●	—	—	LECA6

❸ Lead [mm]

Symbol	11-LEFS16	11-LEFS25	11-LEFS32	11-LEFS40
A	10	12	16	20
B	5	6	8	10

❹ Stroke [mm]

100	100
to	to
1000	1000

∗ Refer to the applicable stroke table.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEF series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② For the servo motor (24 VDC) specification, EMC compliance was tested by installing a noise filter set (LEC-NFA). Refer to page 394 for the noise filter set. Refer to the LECA Operation Manual for installation.

[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.

Applicable stroke table ●Standard

Model \ Stroke	100	200	300	400	500	600	700	800	900	1000	Manufacturable stroke range [mm]
11-LEFS16	●	●	●	●	—	—	—	—	—	—	100 to 400
11-LEFS25	●	●	●	●	●	●	—	—	—	—	100 to 600
11-LEFS32	●	●	●	●	●	●	●	●	—	—	100 to 800
11-LEFS40	—	●	●	●	●	●	●	●	●	●	200 to 1000

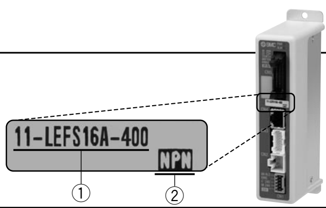
∗ Consult with SMC for non-standard strokes as they are produced as special orders.

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

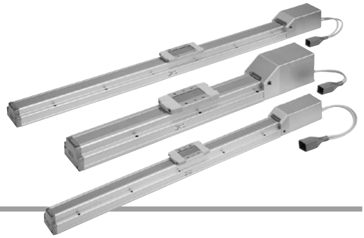
Confirm that the combination of the controller/driver and the actuator is correct.

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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



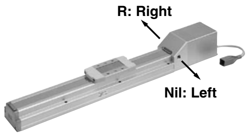
LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

5 Motor option

Nil	Without option
B	With lock

6 Vacuum port

Nil	Left
R	Right



7 Actuator cable type*1

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

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Only available for the motor type "Step motor."

8 Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 2) on pages 28 and 29.

9 Controller/Driver type*1

Nil	Without controller/driver	
6N	**LECP6/LECA6** (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 Only available for the motor type "Step motor."

10 I/O cable length [m]*1

Nil	Without cable
1	1.5 m
3	3 m*2
5	5 m*2

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 394 (For LECP6/LECA6), page 407 (For LECP1) or page 414 (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.

11 Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

Compatible Controllers/Driver

Type	**Step data input type** 	**Step data input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECA6**	**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)	Servo motor (24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 386	Page 386	Page 401	Page 408

Specifications

Step Motor (Servo/24 VDC)

	Model		11-LEFS16		11-LEFS25		11-LEFS32		11-LEFS40	
Actuator specifications	**Stroke [mm]** Note 1)		100, 200, 300, 400		100, 200, 300 400, 500, 600		100, 200, 300, 400 500, 600, 700, 800		200, 300, 400, 500, 600 700, 800, 900, 1000	
	Work load [kg] Note 2)	**Horizontal**	9	10	20	20	40	45	50	60
		Vertical	2	4	7.5	15	10	20	—	23
	Speed [mm/s] Note 2)		10 to 500	5 to 250	12 to 500	6 to 250	16 to 500	8 to 250	20 to 500	10 to 250
	Max. acceleration/deceleration [mm/s^2]		3,000							
	Positioning repeatability [mm]		±0.02							
	Lead [mm]		10	5	12	6	16	8	20	10
	Impact/Vibration resistance [m/s^2] Note 3)		50/20							
	Actuation type		Ball screw							
	Guide type		Linear guide							
	Operating temperature range [°C]		5 to 40							
	Operating humidity range [%RH]		90 or less (No condensation)							
	Cleanliness class Note 4)		ISO Class 4 (ISO 14644-1) Class 10 (Fed.Std.209E)							
	Grease	**Ball screw /Linear guide portion**	Low particle generation grease							
Electric specifications	**Motor size**		□28		□42		□56.4			
	Motor type		Step motor (Servo/24 VDC)							
	Encoder		Incremental A/B phase (800 pulse/rotation)							
	Rated voltage [V]		24 VDC ±10%							
	Power consumption [W] Note 5)		22		38		50		100	
	Standby power consumption when operating [W] Note 6)		18		16		44		43	
	Max. instantaneous power consumption [W] Note 7)		51		57		123		141	
Lock unit specifications	**Type** Note 8)		Non-magnetizing lock							
	Holding force [N]		20	39	78	157	108	216	113	225
	Power consumption [W] Note 9)		2.9		5		5		5	
	Rated voltage [V]		24 VDC ±10%							

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Speed changes according to the work load. Check "Speed–Work Load Graph (Guide)" on page 15.
Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m.
Note 3) Impact resistance: No malfunction occurred when the actuator 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 4) The amount of particle generation changes according to the operating conditions and suction flow rate. Refer to the particle generation characteristics for details.
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 the 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) With lock only
Note 9) For an actuator with lock, add the power consumption for the lock.

Specifications

Servo Motor (24 VDC)

Model			11-LEFS16A		11-LEFS25A	
Actuator specifications	Stroke [mm] Note 1)		100, 200, 300, 400		100, 200, 300 400, 500, 600	
	Work load [kg] Note 2)	Horizontal	7	10	11	18
		Vertical	2	4	2.5	5
	Speed [mm/s] Note 2)		10 to 500	5 to 250	12 to 500	6 to 250
	Max. acceleration/deceleration [mm/s²]		3,000			
	Positioning repeatability [mm]		±0.02			
	Lead [mm]		10	5	12	6
	Impact/Vibration resistance [m/s²] Note 3)		50/20			
	Actuation type		Ball screw			
	Guide type		Linear guide			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
	Cleanliness class Note 4)		ISO Class 4 (ISO 14644-1) Class 10 (Fed.Std.209E)			
	Grease	Ball screw /Linear guide portion	Low particle generation grease			
Electric specifications	Motor size		□28		□42	
	Motor output [W]		30		36	
	Motor type		Servo motor (24 VDC)			
	Encoder		Incremental A/B (800 pulse/rotation)/Z phase			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption [W] Note 5)		63		102	
	Standby power consumption when operating [W] Note 6)		Horizontal 4/Vertical 9		Horizontal 4/Vertical 9	
	Max. instantaneous power consumption [W] Note 7)		70		113	
Lock unit specifications	Type Note 8)		Non-magnetizing lock			
	Holding force [N]		20	39	78	157
	Power consumption [W] Note 9)		2.9		5	
	Rated voltage [V]		24 VDC ±10%			

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Check "Speed–Work Load Graph (Guide)" on page 16 for details. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m.
Note 3) Impact resistance: No malfunction occurred when the actuator 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 4) The amount of particle generation changes according to the operating conditions and suction flow rate. Refer to the particle generation characteristics for details.
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) With lock only
Note 9) For an actuator with lock, add the power consumption for the lock.

Weight

Model	11-LEFS16			
Stroke [mm]	100	200	300	400
Product weight [kg]	0.90	1.05	1.20	1.35
Additional weight with lock [kg]	0.12			

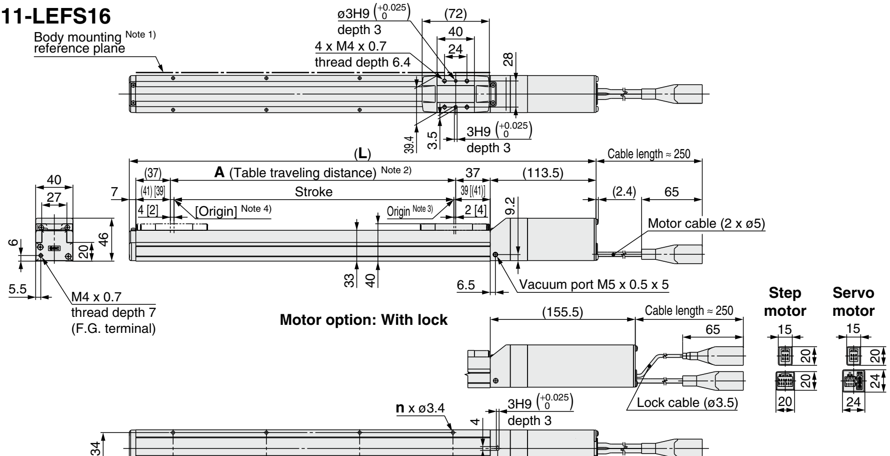
Model	11-LEFS25					
Stroke [mm]	100	200	300	400	500	600
Product weight [kg]	1.84	2.12	2.40	2.68	2.96	3.24
Additional weight with lock [kg]	0.26					

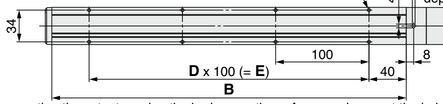
Model	11-LEFS32							
Stroke [mm]	100	200	300	400	500	600	700	800
Product weight [kg]	3.35	3.75	4.15	4.55	4.95	5.35	5.75	6.15
Additional weight with lock [kg]	0.53							

Model	11-LEFS40								
Stroke [mm]	200	300	400	500	600	700	800	900	1000
Product weight [kg]	5.65	6.21	6.77	7.33	7.89	8.45	9.01	9.57	10.13
Additional weight with lock [kg]	0.53								

Dimensions: Ball Screw Drive

11-LEFS16



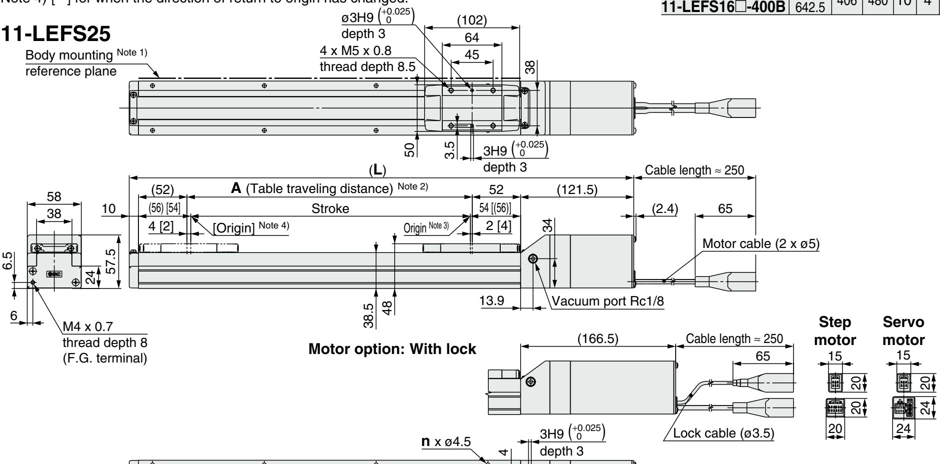


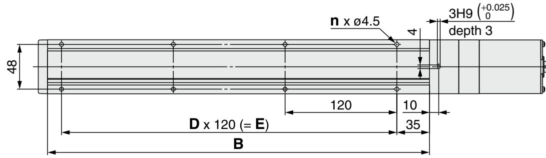
[mm]

Model	L	A	B	n	D	E
11-LEFS16□-100	300.5	106	180	4	—	—
11-LEFS16□-100B	342.5					
11-LEFS16□-200	400.5	206	280	6	2	200
11-LEFS16□-200B	442.5					
11-LEFS16□-300	500.5	306	380	8	3	300
11-LEFS16□-300B	542.5					
11-LEFS16□-400	600.5	406	480	10	4	400
11-LEFS16□-400B	642.5					

Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 2 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

11-LEFS25





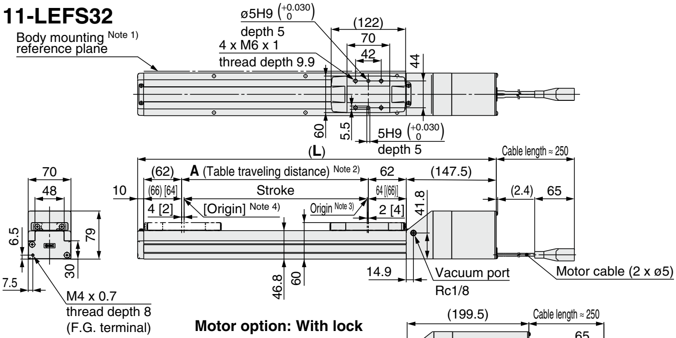
[mm]

Model	L	A	B	n	D	E
11-LEFS25□-100	341.5	106	210	4	—	—
11-LEFS25□-100B	386.5					
11-LEFS25□-200	441.5	206	310	6	2	240
11-LEFS25□-200B	486.5					
11-LEFS25□-300	541.5	306	410	8	3	360
11-LEFS25□-300B	586.5					
11-LEFS25□-400	641.5	406	510	8	3	360
11-LEFS25□-400B	686.5					
11-LEFS25□-500	741.5	506	610	10	4	480
11-LEFS25□-500B	786.5					
11-LEFS25□-600	841.5	606	710	12	5	600
11-LEFS25□-600B	886.5					

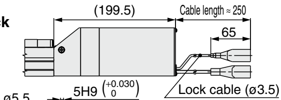
Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

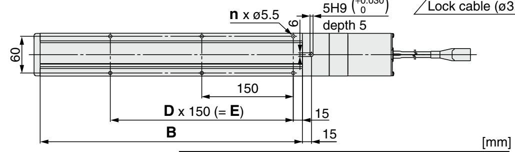
Dimensions: Ball Screw Drive

11-LEFS32

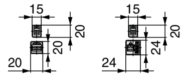


Motor option: With lock





Step motor **Servo motor**

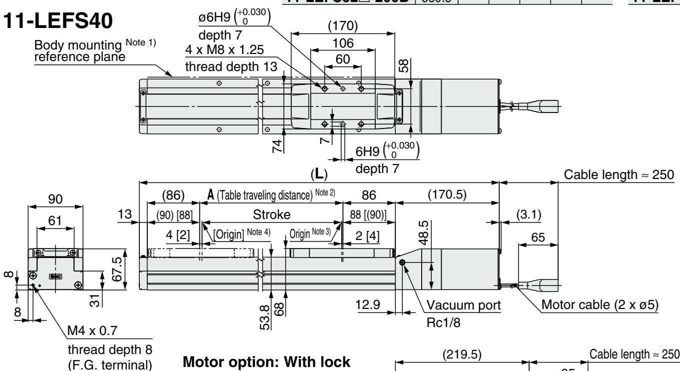


Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

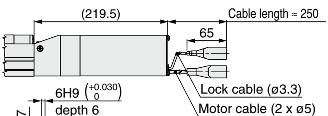
[mm]

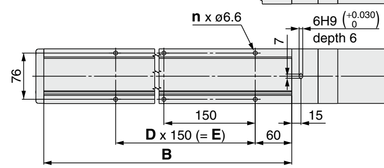
Model	L	A	B	n	D	E
11-LEFS32□-100	387.5	106	230	4	—	—
11-LEFS32□-100B	439.5					
11-LEFS32□-200	487.5	206	330	6	2	300
11-LEFS32□-200B	539.5					
11-LEFS32□-300	587.5	306	430	6	2	300
11-LEFS32□-300B	639.5					
11-LEFS32□-400	687.5	406	530	8	3	450
11-LEFS32□-400B	739.5					
11-LEFS32□-500	787.5	506	630	10	4	600
11-LEFS32□-500B	839.5					
11-LEFS32□-600	887.5	606	730	10	4	600
11-LEFS32□-600B	939.5					
11-LEFS32□-700	987.5	706	830	12	5	750
11-LEFS32□-700B	1039.5					
11-LEFS32□-800	1087.5	806	930	14	6	900
11-LEFS32□-800B	1139.5					

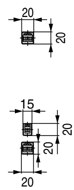
11-LEFS40



Motor option: With lock







Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

[mm]

Model	L	A	B	n	D	E
11-LEFS40□-200	561.5	206	378	6	2	300
11-LEFS40□-200B	610.5					
11-LEFS40□-300	661.5	306	478	6	2	300
11-LEFS40□-300B	710.5					
11-LEFS40□-400	761.5	406	578	8	3	450
11-LEFS40□-400B	810.5					
11-LEFS40□-500	861.5	506	678	10	4	600
11-LEFS40□-500B	910.5					
11-LEFS40□-600	961.5	606	778	10	4	600
11-LEFS40□-600B	1010.5					
11-LEFS40□-700	1061.5	706	878	12	5	750
11-LEFS40□-700B	1110.5					
11-LEFS40□-800	1161.5	806	978	14	6	900
11-LEFS40□-800B	1210.5					
11-LEFS40□-900	1261.5	906	1078	14	6	900
11-LEFS40□-900B	1310.5					
11-LEFS40□-1000	1361.5	1006	1178	16	7	1050
11-LEFS40□-1000B	1410.5					

Electric Actuator/Slider Type
Belt Drive

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

Series LEFB
LEFB16, 25, 32

RoHS

The belt drive actuator cannot be used vertically for applications.

How to Order

LEFB 16 ☐ T – 500 ☐ – R 1 6N 1 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Size

16
25
32

❷ Motor type

Symbol	Type	Applicable size			Compatible controllers/driver
		LEFB16	LEFB25	LEFB32	
Nil	Step motor (Servo/24 VDC)	●	●	●	LECP6 LECP1 LECPA
A	Servo motor (24 VDC)	●	●	—	LECA6

❸ Equivalent lead [mm]

T	48

❹ Stroke [mm]

300	300
to	to
2000	2000

∗ Refer to the applicable stroke table.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEF series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② For the servo motor (24 VDC) specification, EMC compliance was tested by installing a noise filter set (LEC-NFA). Refer to page 394 for the noise filter set. Refer to the LECA Operation Manual for installation.

[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.

Applicable stroke table

●Standard

Model \ Stroke	300	500	600	700	800	900	1000	1200	1500	1800	2000
LEFB16	●	●	●	●	●	●	●	—	—	—	—
LEFB25	●	●	●	●	●	●	●	●	●	●	●
LEFB32	●	●	●	●	●	●	●	●	●	●	●

∗ Consult with SMC for non-standard strokes as they are produced as special orders.

Made to Order

Made to Order Specifications
(For details, refer to page 79.)

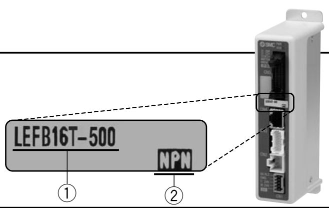
Symbol	Specifications
X139	Support guide

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

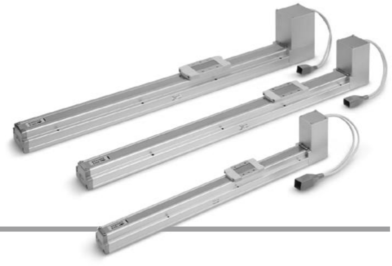
Confirm that the combination of the controller/driver and the actuator is correct.

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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



❺ Motor option

Nil	Without option
B	With lock

❻ Actuator cable type*1

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

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Only available for the motor type "Step motor."

❼ Actuator cable length [m]

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

*Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 2) on pages 34 and 35.

❽ Controller/Driver type*1

Nil	Without controller/driver	
6N	**LECP6/LECA6** (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 Only available for the motor type "Step motor."

❾ I/O cable length [m]*1

Nil	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 394 (For LECP6/LECA6), page 407 (For LECP1) or page 414 (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

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

Compatible Controllers/Driver

Type	**Step data input type** 	**Step data input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECA6**	**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)	Servo motor (24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 386	Page 386	Page 401	Page 408

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Specifications

Step Motor (Servo/24 VDC)

	Model		LEFB16	LEFB25	LEFB32
Actuator specifications	Stroke [mm] Note 1)		300, 500, 600, 700 800, 900, 1000	300, 500, 600, 700, 800, 900 1000, 1200, 1500, 1800, 2000	300, 500, 600, 700, 800, 900 1000, 1200, 1500, 1800, 2000
	Work load [kg] Note 2)	Horizontal	1	5	14
	Speed [mm/s] Note 2)		48 to 1100	48 to 1400	48 to 1500
	Max. acceleration/deceleration [mm/s²]		3,000		
	Positioning repeatability [mm]		±0.1		
	Equivalent lead [mm]		48	48	48
	Impact/Vibration resistance [m/s²] Note 3)		50/20		
	Actuation type		Belt		
	Guide type		Linear guide		
	Operating temperature range [°C]		5 to 40		
	Operating humidity range [%RH]		90 or less (No condensation)		
Electric specifications	Motor size		□28	□42	□56.4
	Motor type		Step motor (Servo/24 VDC)		
	Encoder		Incremental A/B phase (800 pulse/rotation)		
	Rated voltage [V]		24 VDC ±10%		
	Power consumption [W] Note 4)		24	32	52
	Standby power consumption when operating [W] Note 5)		18	16	44
	Max. instantaneous power consumption [W] Note 6)		51	60	127
Lock unit specifications	Type Note 7)		Non-magnetizing lock		
	Holding force [N]		4	19	36
	Power consumption [W] Note 8)		2.9	5	5
	Rated voltage [V]		24 VDC ±10%		

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Speed changes according to the work load. Check "Speed–Work Load Graph (Guide)" on page 10.
Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m.
Note 3) Impact resistance: No malfunction occurred when the actuator 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 4) The power consumption (including the controller) is for when the actuator is operating.
Note 5) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation.
Note 6) 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 7) With lock only
Note 8) For an actuator with lock, add the power consumption for the lock.

Specifications

Servo Motor (24 VDC)

	Model		LEFB16A	LEFB25A
Actuator specifications	Stroke [mm] Note 1)		300, 500, 600, 700 800, 900, 1000	300, 500, 600, 700, 800, 900 1000, 1200, 1500, 1800, 2000
	Work load [kg] Note 2)	Horizontal	1	2
	Speed [mm/s] Note 2)		48 to 2000	48 to 2000
	Max. acceleration/deceleration [mm/s²]		3,000	
	Positioning repeatability [mm]		±0.1	
	Equivalent lead [mm]		48	48
	Impact/Vibration resistance [m/s²] Note 3)		50/20	
	Actuation type		Belt	
	Guide type		Linear guide	
	Operating temperature range [°C]		5 to 40	
	Operating humidity range [%RH]		90 or less (No condensation)	
Electric specifications	Motor size		□28	□42
	Motor output [W]		30	36
	Motor type		Servo motor (24 VDC)	
	Encoder		Incremental A/B (800 pulse/rotation)/Z phase	
	Rated voltage [V]		24 VDC ±10%	
	Power consumption [W] Note 4)		78	69
	Standby power consumption when operating [W] Note 5)		Horizontal 4	Horizontal 5
	Max. instantaneous power consumption [W] Note 6)		87	120
Lock unit specifications	Type Note 7)		Non-magnetizing lock	
	Holding force [N]		4	19
	Power consumption [W] Note 8)		2.9	5
	Rated voltage [V]		24 VDC ±10%	

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Check "Speed–Work Load Graph (Guide)" on page 10 for details. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m.
Note 3) Impact resistance: No malfunction occurred when the actuator 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 4) The power consumption (including the controller) is for when the actuator is operating.
Note 5) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation.
Note 6) 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 7) With lock only
Note 8) For an actuator with lock, add the power consumption for the lock.

Weight

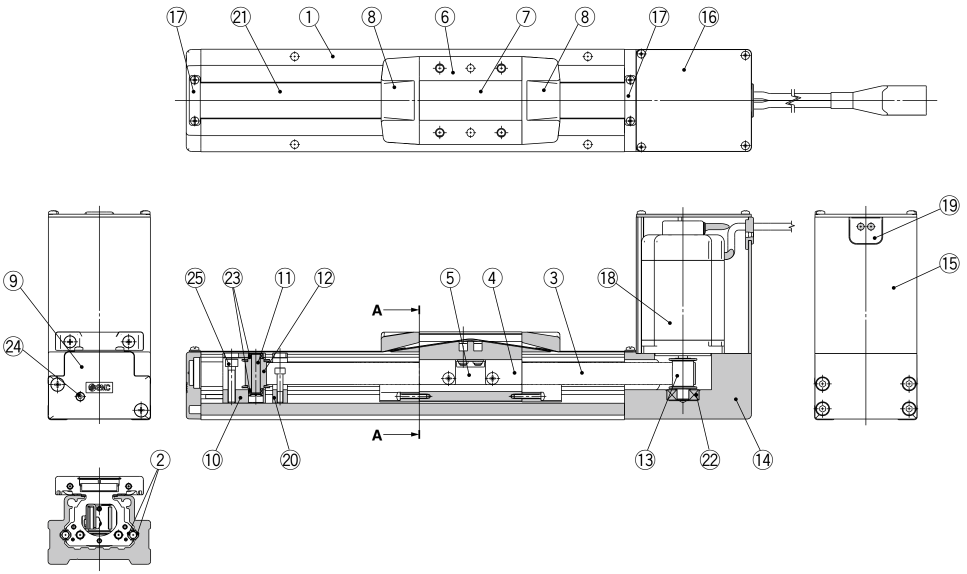
Series	LEFB16						
Stroke [mm]	300	500	600	700	800	900	1000
Product weight [kg]	1.19	1.45	1.58	1.71	1.84	1.97	2.10
Additional weight with lock [kg]	0.12						

Series	LEFB25										
Stroke [mm]	300	500	600	700	800	900	1000	1200	1500	1800	2000
Product weight [kg]	2.39	2.85	3.08	3.31	3.54	3.77	4.00	4.46	5.15	5.84	6.30
Additional weight with lock [kg]	0.26										

Series	LEFB32										
Stroke [mm]	300	500	600	700	800	900	1000	1200	1500	1800	2000
Product weight [kg]	4.12	4.80	5.14	5.48	5.82	6.16	6.50	7.18	8.20	9.22	9.90
Additional weight with lock [kg]	0.53										

Construction

Series LEFB

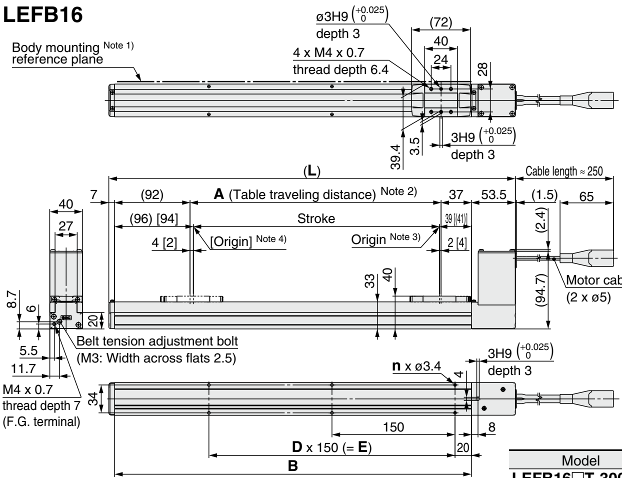


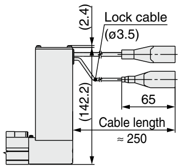
A-A

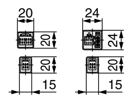
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Rail guide**	—	
3	**Belt**	—	
4	**Belt holder**	Carbon steel	Chromate treated
5	**Belt stopper**	Aluminum alloy	Anodized
6	**Table**	Aluminum alloy	Anodized
7	**Blanking plate**	Aluminum alloy	Anodized
8	**Seal band stopper**	Synthetic resin	
9	**Housing A**	Aluminum die-cast	Coating
10	**Pulley holder**	Aluminum alloy	
11	**Pulley shaft**	Stainless steel	
12	**End pulley**	Aluminum alloy	Anodized
13	**Motor pulley**	Aluminum alloy	Anodized
14	**Motor mount**	Aluminum alloy	Anodized
15	**Motor cover**	Aluminum alloy	Anodized
16	**End cover**	Aluminum alloy	Anodized
17	**Band stopper**	Stainless steel	
18	**Motor**	—	
19	**Rubber bushing**	NBR	
20	**Stopper**	Aluminum alloy	
21	**Dust seal band**	Stainless steel	
22	**Bearing**	—	
23	**Bearing**	—	
24	**Tension adjustment bolt**	Chromium molybdenum steel	Chromate treated
25	**Pulley fixing bolt**	Chromium molybdenum steel	Chromate treated

Dimensions: Belt Drive

LEFB16





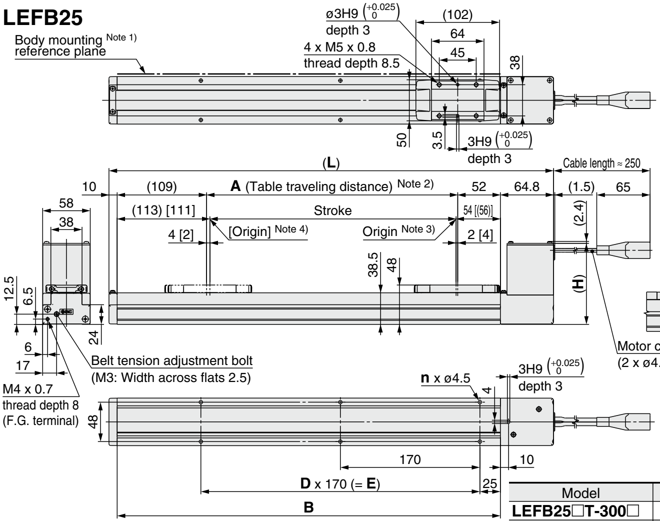


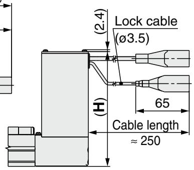
[mm]

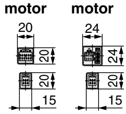
Model	L	A	B	n	D	E
LEFB16□T-300□	495.5	306	435	6	2	300
LEFB16□T-500□	695.5	506	635	10	4	600
LEFB16□T-600□	795.5	606	735	10	4	600
LEFB16□T-700□	895.5	706	835	12	5	750
LEFB16□T-800□	995.5	806	935	14	6	900
LEFB16□T-900□	1095.5	906	1035	14	6	900
LEFB16□T-1000□	1195.5	1006	1135	16	7	1050

Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 2 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

LEFB25







[mm]

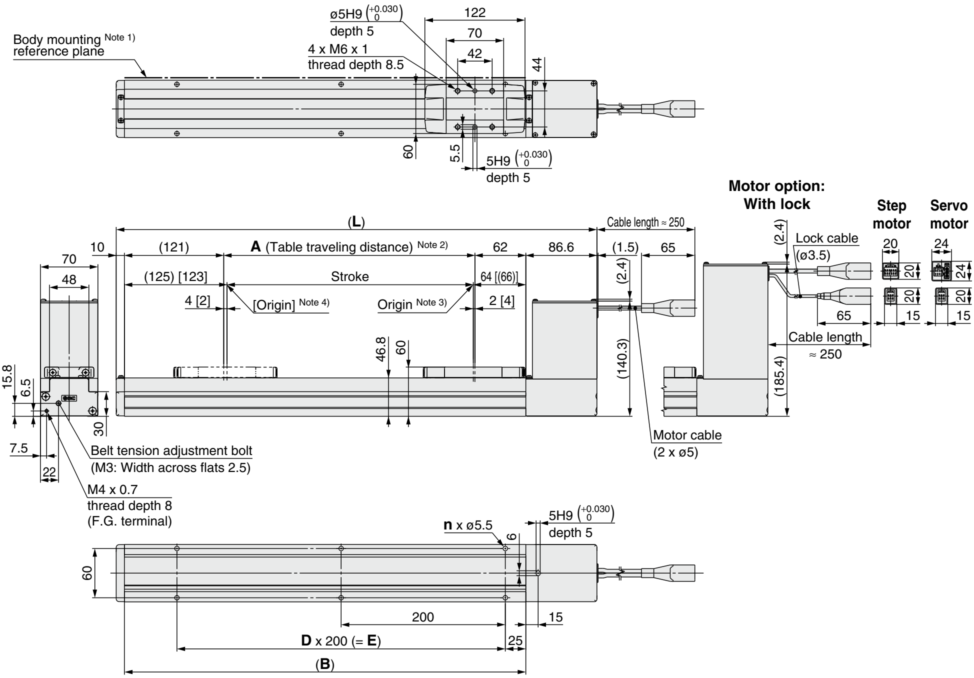
Model	H
LEFB25T-ST	115.8
LEFB25T-STB	158.8
LEFB25AT-ST	98.8
LEFB25AT-STB	139.8

Model	L	A	B	n	D	E
LEFB25□T-300□	541.8	306	467	6	2	340
LEFB25□T-500□	741.8	506	667	8	3	510
LEFB25□T-600□	841.8	606	767	10	4	680
LEFB25□T-700□	941.8	706	867	10	4	680
LEFB25□T-800□	1041.8	806	967	12	5	850
LEFB25□T-900□	1141.8	906	1067	14	6	1020
LEFB25□T-1000□	1241.8	1006	1167	14	6	1020
LEFB25□T-1200□	1441.8	1206	1367	16	7	1190
LEFB25□T-1500□	1741.8	1506	1667	20	9	1530
LEFB25□T-1800□	2041.8	1806	1967	24	11	1870
LEFB25□T-2000□	2241.8	2006	2167	26	12	2040

Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

Dimensions: Belt Drive

LEFB32



Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) Position after return to origin.
Note 4) [ ] for when the direction of return to origin has changed.

[mm]

Model	L	A	B	n	D	E
LEFB32□T-300□	585.6	306	489	6	2	400
LEFB32□T-500□	785.6	506	689	8	3	600
LEFB32□T-600□	885.6	606	789	8	3	600
LEFB32□T-700□	985.6	706	889	10	4	800
LEFB32□T-800□	1085.6	806	989	10	4	800
LEFB32□T-900□	1185.6	906	1089	12	5	1000
LEFB32□T-1000□	1285.6	1006	1189	12	5	1000
LEFB32□T-1200□	1485.6	1206	1389	14	6	1200
LEFB32□T-1500□	1785.6	1506	1689	18	8	1600
LEFB32□T-1800□	2085.6	1806	1989	20	9	1800
LEFB32□T-2000□	2285.6	2006	2189	22	10	2000

Series *LEF*
Electric Actuator/ Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Design

⚠Caution

1. Do not apply a load in excess of the operating limit.

Select a suitable actuator by work load and allowable moment. If the product is used outside of the operating limit, the eccentric load applied to the guide will be excessive and have adverse effects such as creating play on the guide, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force or impact force is applied to it.

This can cause failure.

Handling

⚠Caution

1. Set the position determination width in the step data to at least 0.5 (at least 1 for the belt type).

Otherwise, completion signal of in position may not be output.

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.

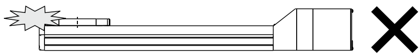
Handling

⚠Caution

3. Never hit at the stroke end except during return to origin.

When incorrect instructions are inputted, such as using the product outside of the operating limit or operation outside of actual stroke through changes in the controller/driver setting and or origin position, the table may collide against the stroke end of the actuator. Please check these points before use.

If the table collides against the stroke end of the actuator, the guide, belt or internal stopper can be broken. This may lead to abnormal operation.



Handle the actuator with care when it is used in the vertical direction as the workpiece will fall freely from its own weight.

4. The moving force should be the initial value.

If the moving force is set below the initial value, it may cause an alarm.

5. The actual speed of this actuator is affected by the work load.

Check the model selection section of the catalog.

6. Do not apply a load, impact or resistance in addition to the transferred load during return to origin.

Additional force will cause the displacement of the origin position since it is based on detected motor torque.

7. Do not dent, scratch or cause other damage to the body and table mounting surfaces.

This may cause unevenness in the mounting surface, play in the guide or an increase in the sliding resistance.

8. Do not apply strong impact or an excessive moment while mounting a workpiece.

If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.

9. Keep the flatness of mounting surface 0.1 mm or less.

Unevenness of a workpiece or base mounted on the body of the product may cause play in the guide and an increase in the sliding resistance.

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

11. Do not hit the table with the workpiece in the positioning operation and positioning range.

Series LEF
Electric Actuator/ Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

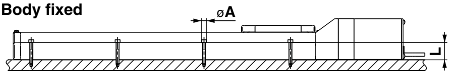
Handling

⚠Caution

12. When mounting the product, use screws with adequate length and tighten them with adequate torque.

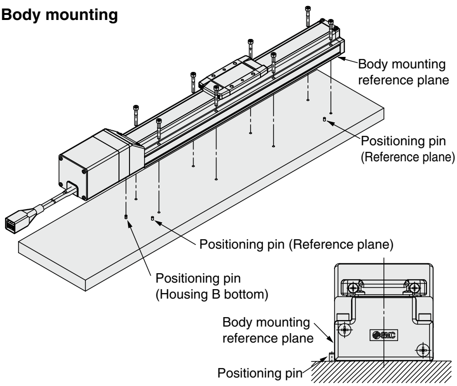
Tightening the screws with a higher torque than recommended may cause a malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Body fixed



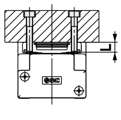
Model	Bolt	øA (mm)	L (mm)
LEF□16	M3	3.5	20
LEF□25	M4	4.5	24
LEF□32	M5	5.5	30
LEFS40	M6	6.6	31

Body mounting



The traveling parallelism is the reference plane for the body mounting reference plane.
If the traveling parallelism for a table is required, set the reference plane against parallel pins, etc.

Workpiece fixed



Model	Bolt	Max. tightening torque (N·m)	L (Max. screw-in depth) (mm)
LEF□16	M4 x 0.7	1.5	6
LEF□25	M5 x 0.8	3.0	8
LEF□32	M6 x 1	5.2	9
LEFS40	M8 x 1.25	12.5	13

To prevent the workpiece fixing bolts from touching the body, use bolts that are 0.5 mm or shorter than the maximum screw-in depth. If long bolts are used, they can touch the body and cause a malfunction, etc.

13. Do not operate by fixing the table and moving the actuator body.

14. The belt drive actuator cannot be used vertically for applications.

15. Check the specifications for the minimum speed of each actuator.

Otherwise, unexpected malfunctions, such as knocking, may occur.

16. In the case of the belt drive actuator, vibration may occur during operation at speeds within the actuator specifications, this could be caused by the operating conditions. Change the speed setting to a speed that does not cause vibration.

Maintenance

⚠Warning

Maintenance frequency

Perform maintenance according to the table below.

Frequency	Appearance check	Internal check	Belt check
Inspection before daily operation	○	—	—
Inspection every 6 months/1000 km/ 5 million cycles*	○	○	○

* Select whichever comes sooner.

- **Items for visual appearance check**
  1. Loose set screws, Abnormal dirt
  2. Check of flaw and cable joint
  3. Vibration, Noise

- **Items for internal check**
  1. Lubricant condition on moving parts.
  2. Loose or mechanical play in fixed parts or fixing screws.

- **Items for belt check**

  Stop operation immediately and replace the belt when belt appear to be below. Further, ensure your operating environment and conditions satisfy the requirements specified for the product.

  a. Tooth shape canvas is worn out.
  Canvas fiber becomes fuzzy. Rubber is removed and the fiber becomes whitish. Lines of fibers become unclear.

  b. Peeling off or wearing of the side of the belt
  Belt corner becomes round and frayed thread sticks out.

  c. Belt partially cut
  Belt is partially cut. Foreign matter caught in teeth other than cut part causes flaw.

  d. Vertical line of belt teeth
  Flaw which is made when the belt runs on the flange.

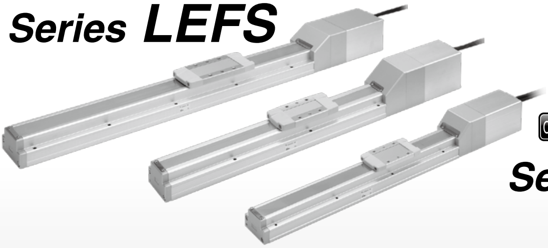
  e. Rubber back of the belt is softened and sticky.

  f . Crack on the back of the belt

AC Servo Motor

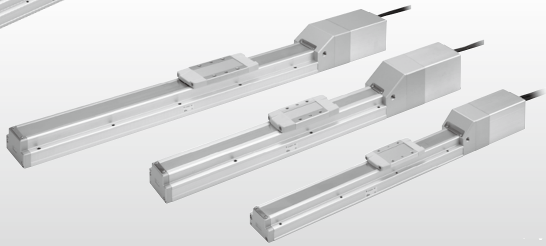
Ball Screw Drive Page 56

Series LEFS



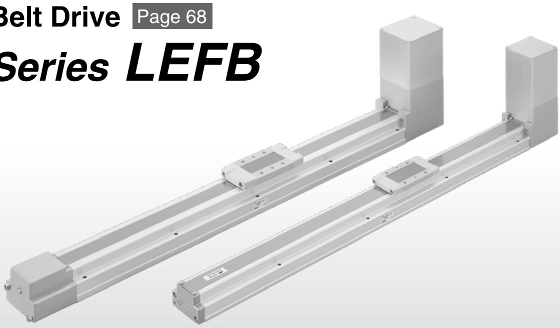
Clean Room Specification Page 64

Series 11-LEFS



Belt Drive Page 68

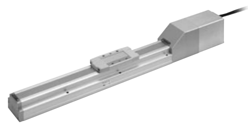
Series LEFB



AC Servo Motor Driver Page 419

Series LECS□

Model Selection



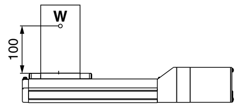
Selection Procedure

Step 1 Check the work load–speed. → **Step 2** Check the cycle time. → **Step 3** Check the allowable moment.

Selection Example

Operating conditions

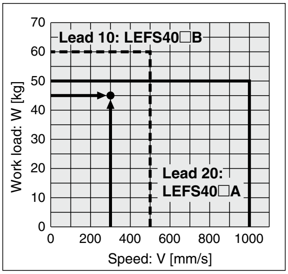
- Workpiece mass: 45 [kg]
- Speed: 300 [mm/s]
- Acceleration/Deceleration: 3,000 [mm/s²]
- Stroke: 200 [mm]
- Mounting position: Horizontal upward
- Workpiece mounting condition:



Step 1 Check the work load–speed. <Speed–Work load graph> (Page 43)

Select the target model based on the workpiece mass and speed with reference to the <Speed–Work load graph>.

Selection example) The **LEFS40S4B-200** is temporarily selected based on the graph shown on the right side.



<Speed–Work load graph>
(LEFS40)

Step 2 Check the cycle time.

Calculate the cycle time using the following calculation method.

Cycle time:

T can be found from the following equation.

$$\boxed{T = T1 + T2 + T3 + T4\ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

$$\boxed{T1 = V/a1\ [s]} \quad \boxed{T3 = V/a2\ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$\boxed{T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}\ [s]}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$$\boxed{T4 = 0.05\ [s]}$$

Calculation example)
T1 to T4 can be calculated as follows.

$T1 = V/a1 = 300/3000 = 0.1$ [s],

$T3 = V/a2 = 300/3000 = 0.1$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}$$

$$= \frac{200 - 0.5 \cdot 300 \cdot (0.1 + 0.1)}{300}$$

$= 0.57$ [s]

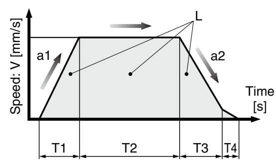
$T4 = 0.05$ [s]

Therefore, the cycle time can be obtained as follows.

$T = T1 + T2 + T3 + T4$

$= 0.1 + 0.57 + 0.1 + 0.05$

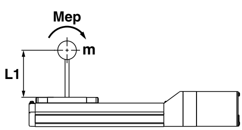
$=$ **0.82 [s]**

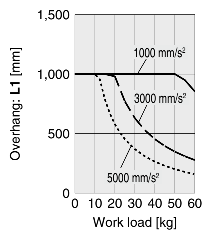


L : Stroke [mm]
··· (Operating condition)
V : Speed [mm/s]
··· (Operating condition)
a1: Acceleration [mm/s²]
··· (Operating condition)
a2: Deceleration [mm/s²]
··· (Operating condition)

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 the beginning of the constant speed operation to stop
T4: Settling time [s]
Time until in position is completed

Step 3 Check the guide moment.





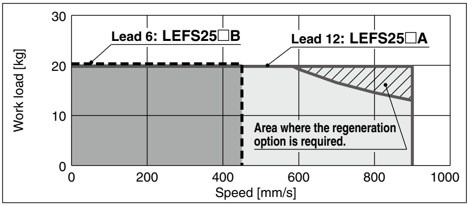
Based on the above calculation result, the LEFS40S4B-200 is selected.

Speed–Work Load Graph (Guide)

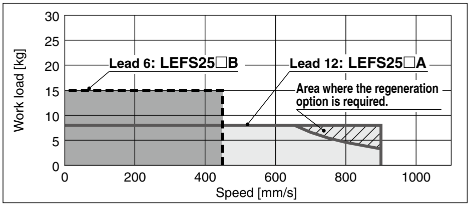
∗ The allowable speed is restricted depending on the stroke.
Select it by referring to "Allowable Stroke Speed" below.

LEFS25/Ball Screw Drive

Horizontal

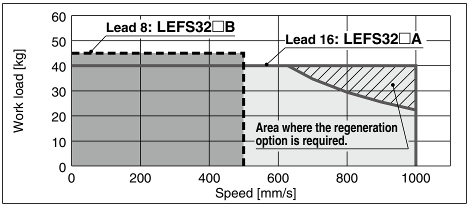


Vertical

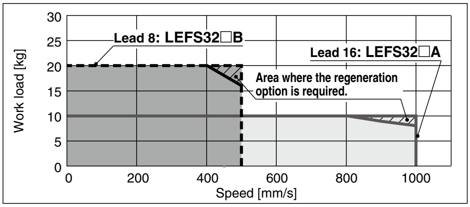


LEFS32/Ball Screw Drive

Horizontal

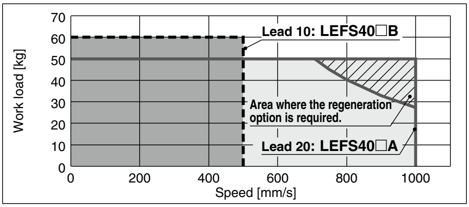


Vertical

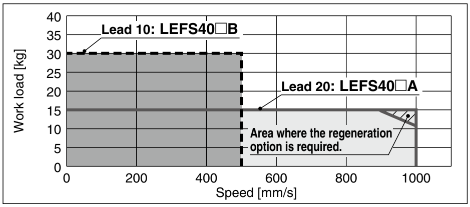


LEFS40/Ball Screw Drive

Horizontal



Vertical



Required conditions for "Regeneration option"

∗ Regeneration option required when using product above "Regeneration" line in graph. (Order separately)

[How to read the graph]
Required conditions change depending on the operating conditions.
Regeneration (50%) : Duty ratio 50% or more
Regeneration (100%): Duty ratio 100%

"Regeneration Option" Models

Size	Model
LEFS25□	LEC-MR-RB-032
LEFS32□	LEC-MR-RB-032
LEFS40□	LEC-MR-RB-032

Allowable Stroke Speed

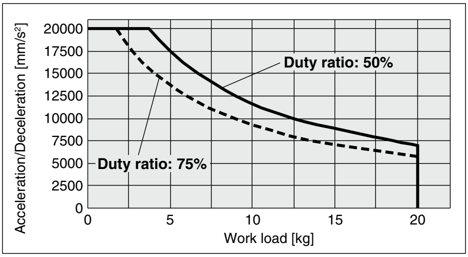
[mm/s]

Model	AC servo motor	Lead		Stroke [mm]									
		Symbol	[mm]	Up to 100	Up to 200	Up to 300	Up to 400	Up to 500	Up to 600	Up to 700	Up to 800	Up to 900	Up to 1000
LEFS25	100 W /□40	A	12	900				720	540	—	—	—	—
		B	6	450				360	270	—	—	—	—
		(Motor rotation speed)		(4500 rpm)				(3650 rpm)	(2700 rpm)	—	—	—	—
LEFS32	200 W /□60	A	16	1000	1000	1000	1000	1000	800	620	500	—	—
		B	8	500	500	500	500	500	400	310	250	—	—
		(Motor rotation speed)		(3750 rpm)					(3000 rpm)	(2325 rpm)	(1875 rpm)	—	—
LEFS40	400 W /□60	A	20	—	1000					940	760	620	520
		B	10	—	500					470	380	310	260
		(Motor rotation speed)		—	(3000 rpm)					(2820 rpm)	(2280 rpm)	(1860 rpm)	(1560 rpm)

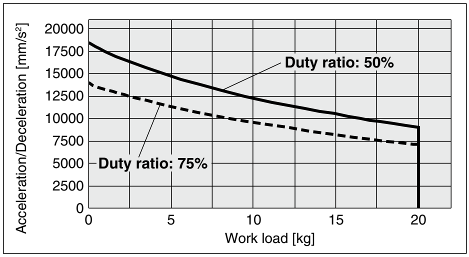
Work Load–Acceleration/Deceleration Graph (Guide)

LEFS25/Ball Screw Drive: Horizontal

LEFS25S□A

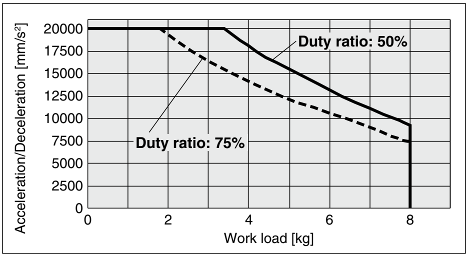


LEFS25S□B

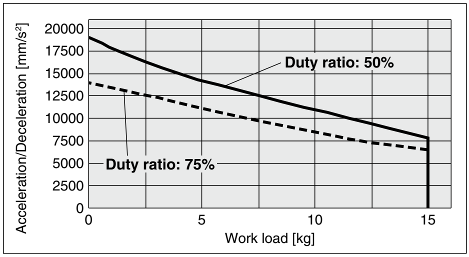


LEFS25/Ball Screw Drive: Vertical

LEFS25S□A

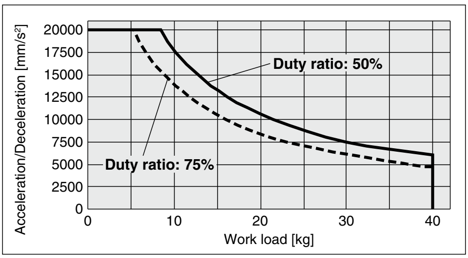


LEFS25S□B

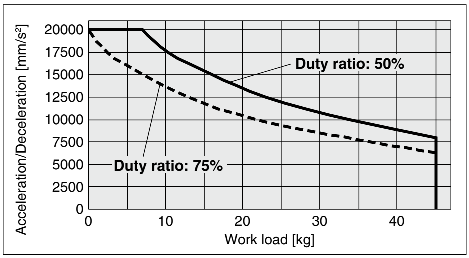


LEFS32/Ball Screw Drive: Horizontal

LEFS32S□A

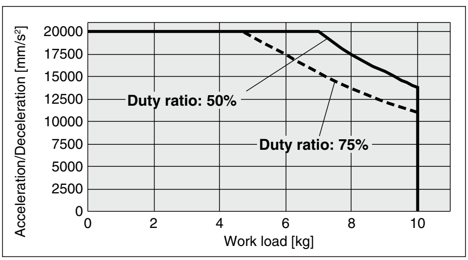


LEFS32S□B

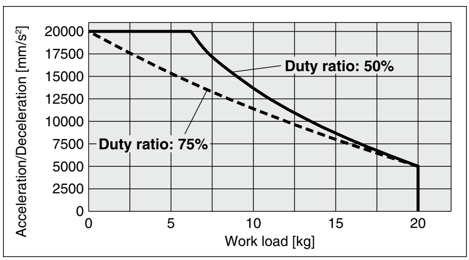


LEFS32/Ball Screw Drive: Vertical

LEFS32S□A



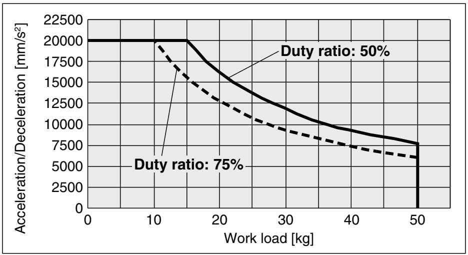
LEFS32S□B



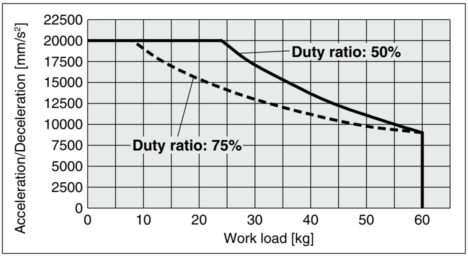
Work Load–Acceleration/Deceleration Graph (Guide)

LEFS40/Ball Screw Drive: Horizontal

LEFS40S□A

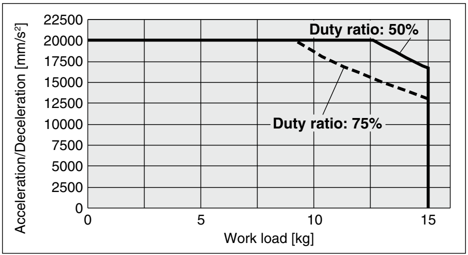


LEFS40S□B

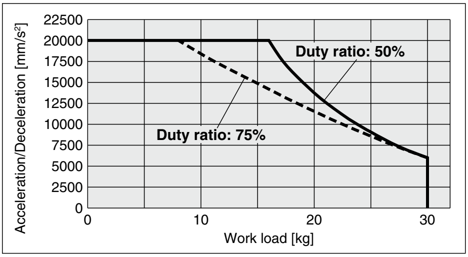


LEFS40/Ball Screw Drive: Vertical

LEFS40S□A



LEFS40S□B



Dynamic Allowable Moment

∗ This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

Acceleration/Deceleration ——— 1,000 mm/s² — — — 3,000 mm/s² ········ 5,000 mm/s² —·—·— 10,000 mm/s² - - - - 20,000 mm/s²

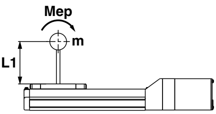
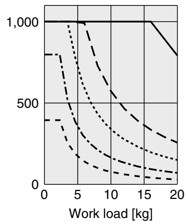
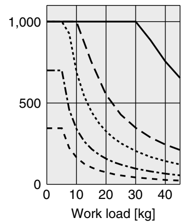
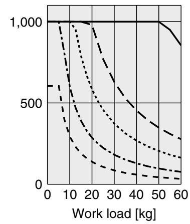
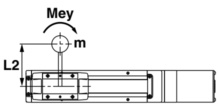
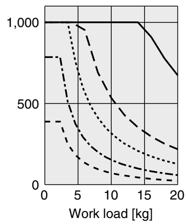
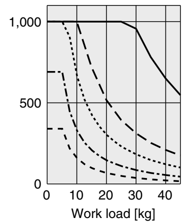
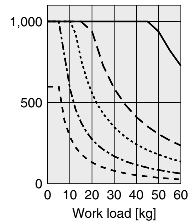
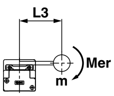
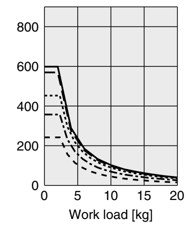
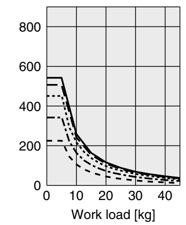
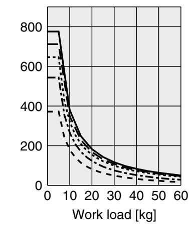
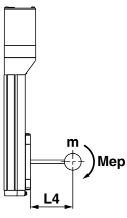
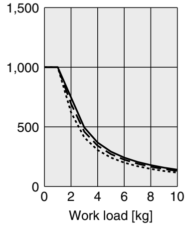
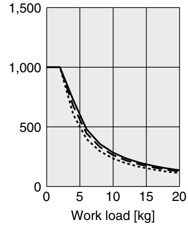
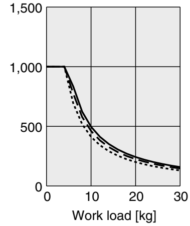
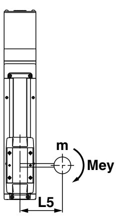
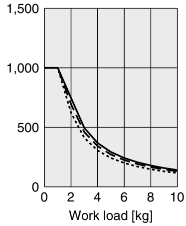
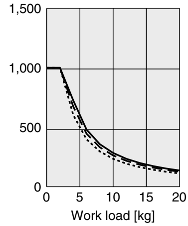
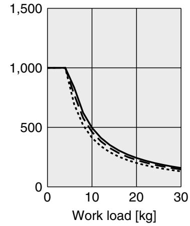
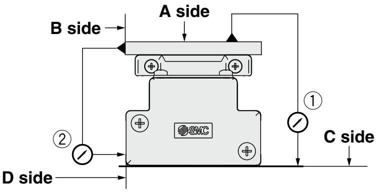
Orientation	Load overhanging direction		Model		
	m : Work load [kg] **Me**: Dynamic allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		**LEFS25S□**	**LEFS32S□**	**LEFS40S□**
Horizontal		**Pitching**			
Horizontal		**Yawing**			
Horizontal		**Rolling**			
Vertical		**Pitching**			
Vertical		**Yawing**			

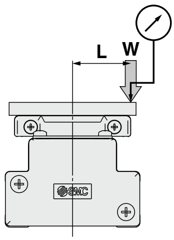
Table Accuracy

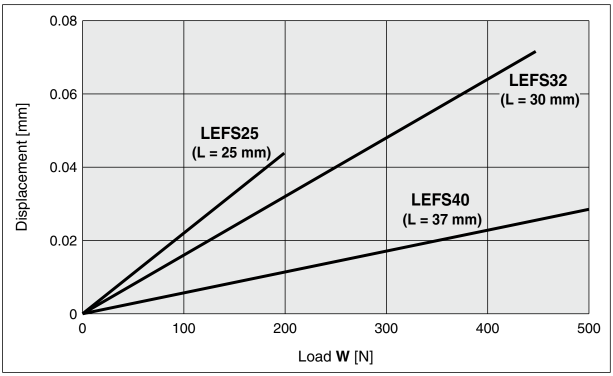


Model	Traveling parallelism [mm] (Every 300 mm)	
	① C side traveling parallelism to A side	② D side traveling parallelism to B side
LEFS25	0.05	0.03
LEFS32	0.05	0.03
LEFS40	0.05	0.03

Note) Traveling parallelism does not include the mounting surface accuracy.

Table Displacement (Reference Value)





Note 1) This displacement is measured when a 15 mm aluminum plate is mounted and fixed on the table.
Note 2) Please confirm the clearance and play of the guide separately.

Particle Generation Characteristics

Particle Generation Measuring Method

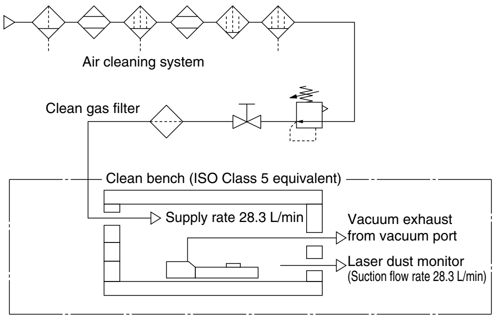
The particle generation data for SMC Clean Series are measured in the following test method.

■Test Method (Example)

Place the specimen in the acrylic resin chamber and operate it while supplying the same flow rate of clean air as the suction flow rate of the measuring instrument (28.3 L/min). Measure the changes of the particle concentration over time until the number of cycles reaches the specified point.
The chamber is placed in an ISO Class 5 equivalent clean bench.

■Measuring Conditions

Chamber	Internal volume	28.3 L
	Supply air quality	Same quality as the supply air for driving
Measuring instrument	Description	Laser dust monitor (Automatic particle counter by lightscattering method)
	Minimum measurable particle diameter	0.1 µm
	Suction flow rate	28.3 L/min
Setting conditions	Sampling time	5 min
	Interval time	55 min
	Sampling air flow	141.5 L



Particle generation measuring circuit

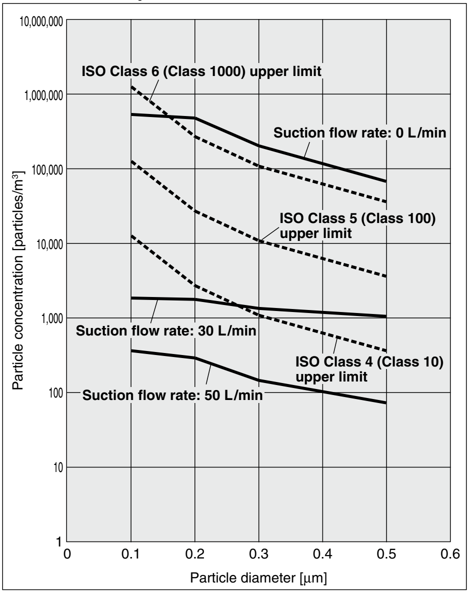
■Evaluation Method

To obtain the measured values of particle concentration, the accumulated value Note 1) of particles captured every 5 minutes, by the laser dust monitor, is converted into the particle concentration in every 1 m^3.
When determining particle generation grades, the 95% upper confidence limit of the average particle concentration (average value), when each specimen is operated at a specified number of cycles Note 2) is considered.
The plots in the graphs indicate the 95% upper confidence limit of the average particle concentration of particles with a diameter within the horizontal axis range.

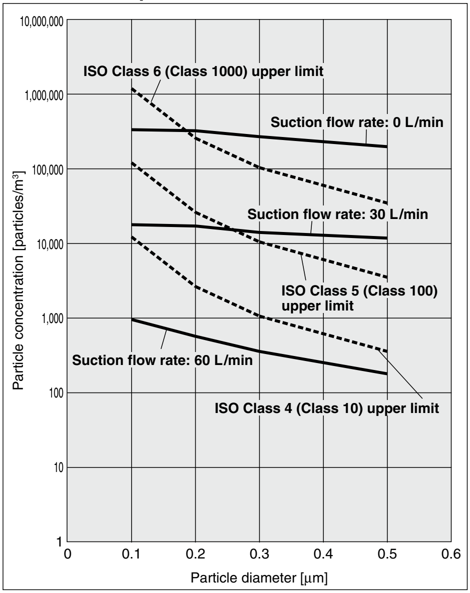
Note 1) Sampling air flow rate: Number of particles contained in 141.5 L of air
Note 2) Actuator: 1 million cycles

Particle Generation Characteristics
AC Servo Motor (100/200/400 W)

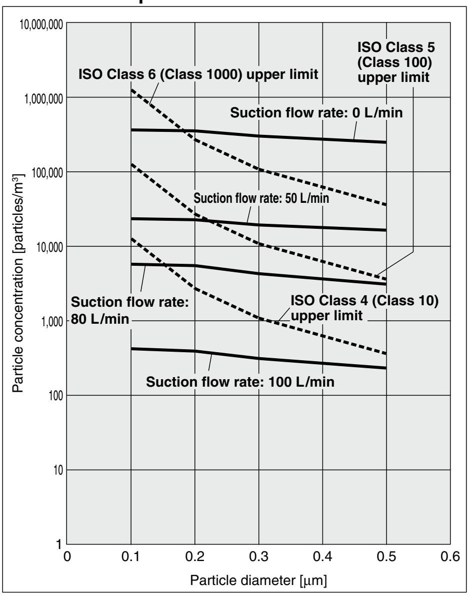
11-LEFS25 Speed 900 mm/s



11-LEFS32 Speed 1000 mm/s



11-LEFS40 Speed 1000 mm/s



LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

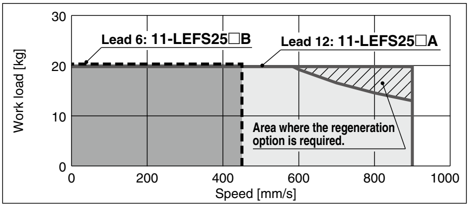
Model Selection

Speed–Work Load Graph (Guide)
AC Servo Motor

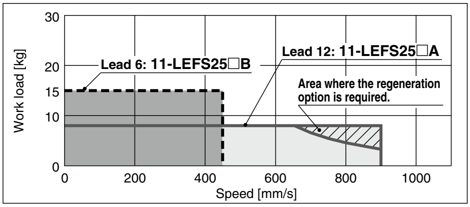
∗ The allowable speed is restricted depending on the stroke. Select it by referring to "Allowable Stroke Speed" below.

11-LEFS25/Ball Screw Drive

Horizontal

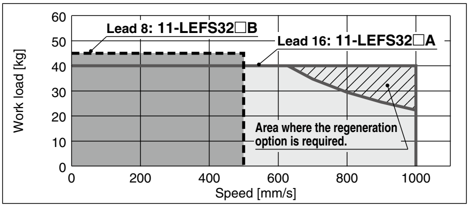


Vertical

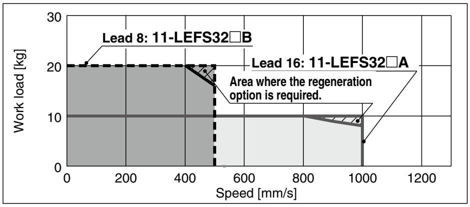


11-LEFS32/Ball Screw Drive

Horizontal

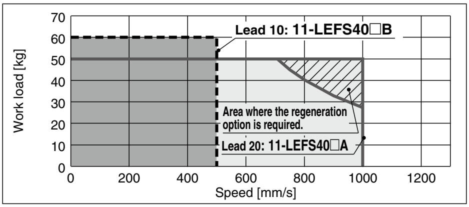


Vertical

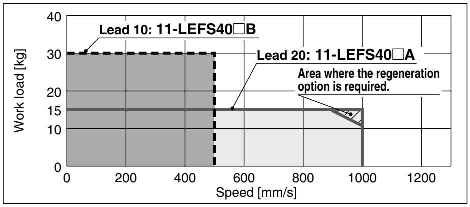


11-LEFS40/Ball Screw Drive

Horizontal



Vertical



Required conditions for "Regeneration option"

∗ Regeneration option required when using product above "Regeneration" line in graph. (Order separately)
[How to read the graph]
Required conditions change depending on the operating conditions.
Regeneration (50%) : Duty ratio 50% or more
Regeneration (100%): Duty ratio 100%

"Regeneration Option" Models

Size	Model
11-LEFS25□	LEC-MR-RB-032
11-LEFS32□	LEC-MR-RB-032
11-LEFS40□	LEC-MR-RB-032

Allowable Stroke Speed

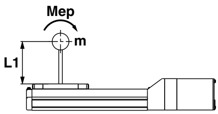
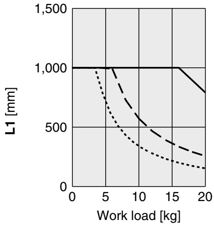
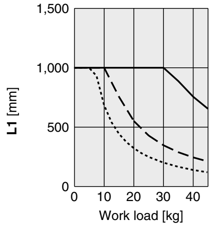
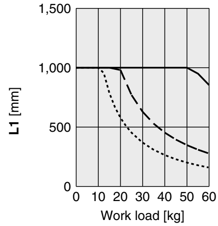
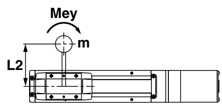
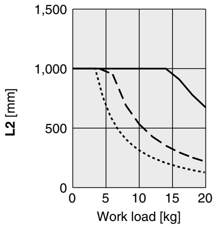
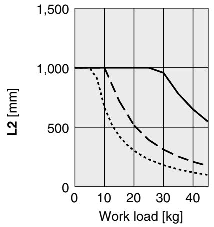
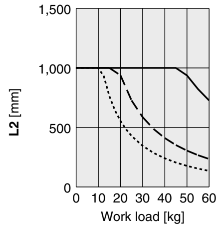
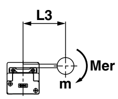
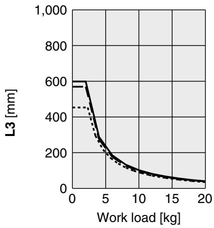
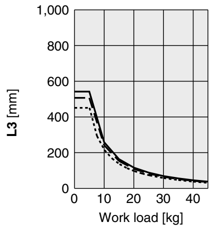
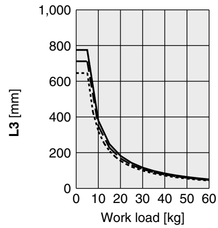
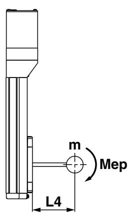
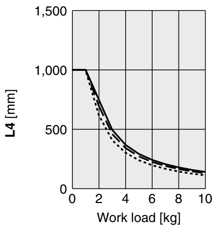
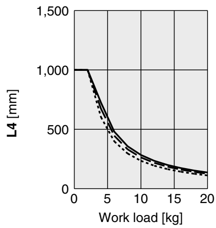
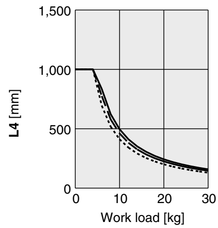
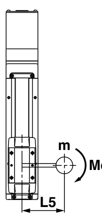
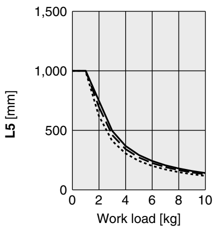
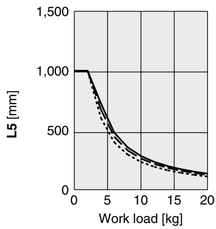
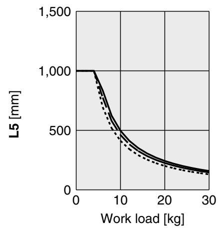
[mm/s]

Model	AC servo motor	Lead		Stroke [mm]									
		Symbol	[mm]	Up to 100	Up to 200	Up to 300	Up to 400	Up to 500	Up to 600	Up to 700	Up to 800	Up to 900	Up to 1000
11-LEFS25	100 W /□40	A	12	900				720	540	—	—	—	—
		B	6	450				360	270	—	—	—	—
		(Motor rotation speed)		(4500 rpm)				(3650 rpm)	(2700 rpm)	—	—	—	—
11-LEFS32	200 W /□60	A	16	1000	1000	1000	1000	1000	800	620	500	—	—
		B	8	500	500	500	500	500	400	310	250	—	—
		(Motor rotation speed)		(3750 rpm)					(3000 rpm)	(2325 rpm)	(1875 rpm)	—	—
11-LEFS40	400 W /□60	A	20	—	1000					940	760	620	520
		B	10	—	500					470	380	310	260
		(Motor rotation speed)		—	(3000 rpm)					(2820 rpm)	(2280 rpm)	(1860 rpm)	(1560 rpm)

Dynamic Allowable Moment
AC Servo Motor

* This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

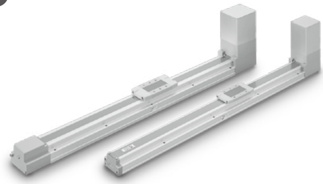
Acceleration/Deceleration ——— 1,000 mm/s² – – – 3,000 mm/s² ······· 5,000 mm/s²

Orientation	**Load overhanging direction** **m** : Work load [kg] **Me**: Dynamic allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model		
			11-LEFS25S□	**11-LEFS32S□**	**11-LEFS40S□**
Horizontal		**Pitching**			
		**Yawing**			
		**Rolling**			
Vertical		**Pitching**			
		**Yawing**			

Electric Actuator/Slider Type AC Servo Motor

Belt Drive/*Series LEFB*

Model Selection



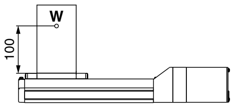
Selection Procedure

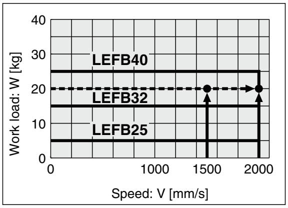
Step 1 Check the work load–speed. → **Step 2** Check the cycle time. → **Step 3** Check the allowable moment.

Selection Example

Operating conditions

- Workpiece mass: 20 [kg]
- Speed: 1,500 [mm/s]
- Acceleration/Deceleration: 3,000 [mm/s²]
- Stroke: 2,000 [mm]
- Mounting position: Horizontal upward
- Workpiece mounting condition:





<Speed–Work load graph> (LEFB40)

Step 1 **Check the work load–speed. <Speed–Work load graph>** (Page 53)

Select the target model based on the workpiece mass and speed with reference to the <Speed–Work load graph>.

Selection example) The **LEFB40S4S-2000** is temporarily selected based on the graph shown on the right side.

Step 2 **Check the cycle time.**

Calculate the cycle time using the following calculation method.

Cycle time:

T can be found from the following equation.

$$\boxed{T = T1 + T2 + T3 + T4\ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

$$\boxed{T1 = V/a1\ [s]} \quad \boxed{T3 = V/a2\ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$\boxed{T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}\ [s]}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$$\boxed{T4 = 0.05\ [s]}$$

Calculation example)
T1 to T4 can be calculated as follows.

T1 = V/a1 = 1500/3000 = 0.5 [s],

T3 = V/a2 = 1500/3000 = 0.5 [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}$$

$$= \frac{2000 - 0.5 \cdot 1500 \cdot (0.5 + 0.5)}{1500}$$

= 0.83 [s]

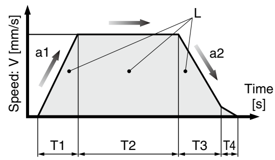
T4 = 0.05 [s]

Therefore, the cycle time can be obtained as follows.

T = T1 + T2 + T3 + T4

= 0.5 + 0.83 + 0.5 + 0.05

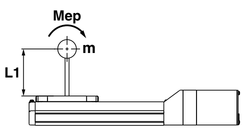
= **1.88 [s]**

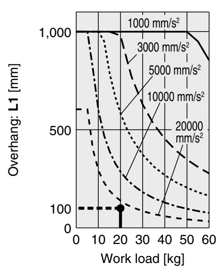


L : Stroke [mm]
··· (Operating condition)
V : Speed [mm/s]
··· (Operating condition)
a1: Acceleration [mm/s²]
··· (Operating condition)
a2: Deceleration [mm/s²]
··· (Operating condition)

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 the beginning of the constant speed operation to stop
T4: Settling time [s]
Time until in position is completed

Step 3 **Check the guide moment.**

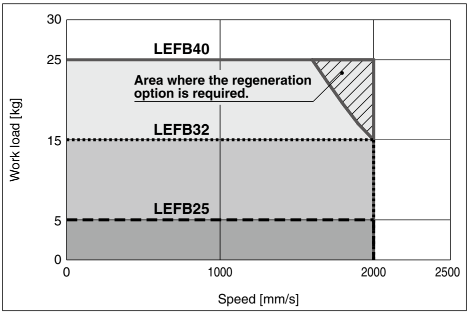




Based on the above calculation result, the LEFB40S4S-2000 is selected.

Speed–Work Load Graph (Guide)

LEFB□/Belt Drive

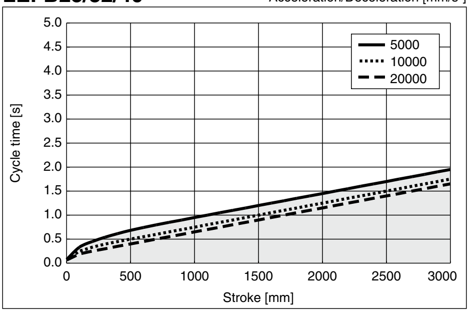


∗ The shaded area in the graph requires the regeneration option (LEC-MR-RB-032).

Cycle Time Graph (Guide)

LEFB□/Belt Drive

LEFB25/32/40

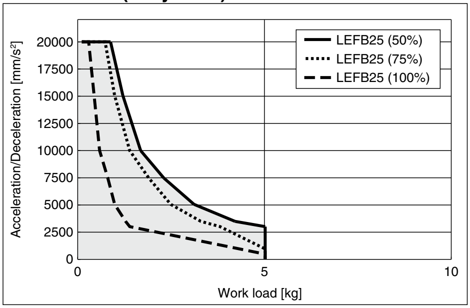


∗ Cycle time is for when maximum speed.
∗ Maximum stroke: LEFB25: 2000 mm
LEFB32: 2500 mm
LEFB40: 3000 mm

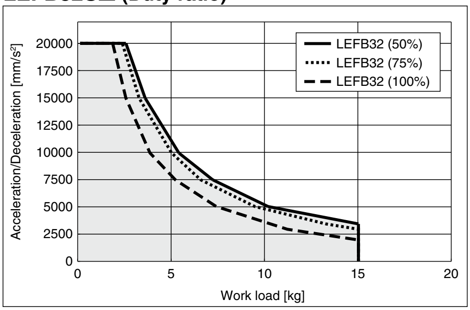
Work Load–Acceleration/Deceleration Graph (Guide)

LEFB□/Belt Drive

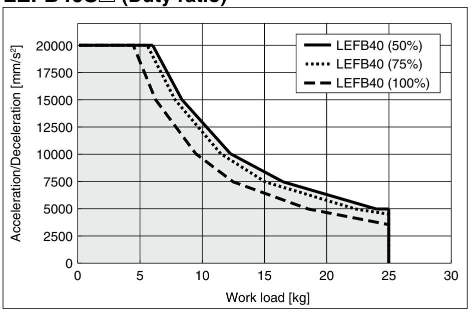
LEFB25S□ (Duty ratio)



LEFB32S□ (Duty ratio)



LEFB40S□ (Duty ratio)



Dynamic Allowable Moment

＊ This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

Acceleration/Deceleration ——— 1,000 mm/s² – – – 3,000 mm/s² ········ 5,000 mm/s² –·–·– 10,000 mm/s² - - - - 20,000 mm/s²

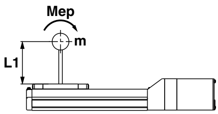
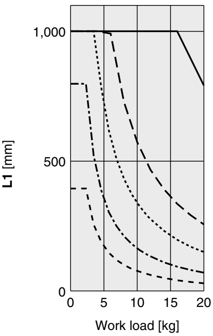
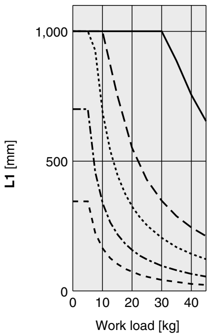
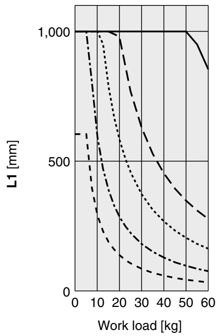
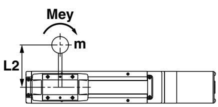
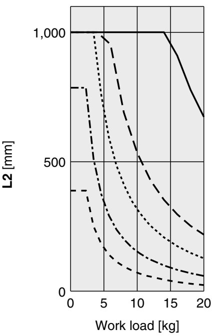
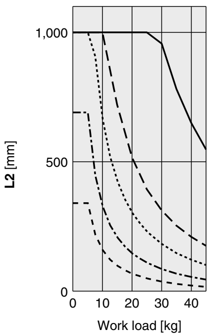
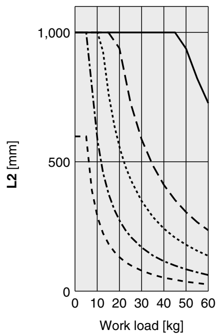
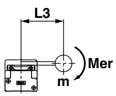
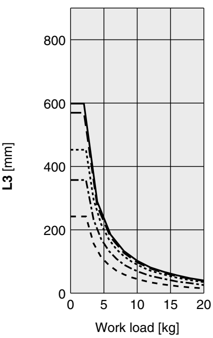
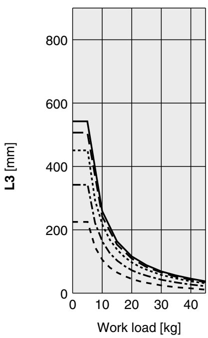
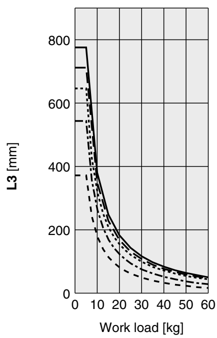
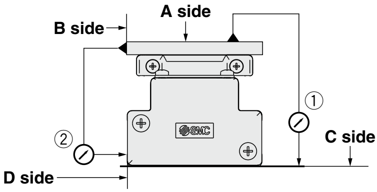
Orientation	Load overhanging direction m : Work load [kg] Me: Dynamic allowable moment [N·m] L : Overhang to the work load center of gravity [mm]		Model		
			LEFB25S□	LEFB32S□	LEFB40S□
Horizontal		Pitching			
		Yawing			
		Rolling			

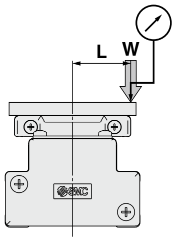
Table Accuracy

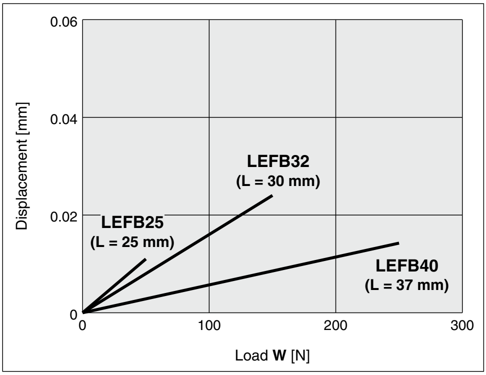


Model	Traveling parallelism [mm] (Every 300 mm)	
	① C side traveling parallelism to A side	② D side traveling parallelism to B side
LEFB25	0.05	0.03
LEFB32	0.05	0.03
LEFB40	0.05	0.03

Note) Traveling parallelism does not include the mounting surface accuracy.

Table Displacement (Reference Value)

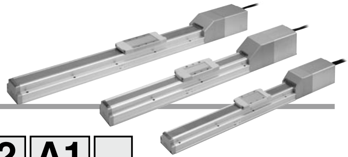




Note 1) This displacement is measured when a 15 mm aluminum plate is mounted and fixed on the table.
Note 2) Please confirm the clearance and play of the guide separately.

Electric Actuator/Slider Type
Ball Screw Drive AC Servo Motor
Series LEFS
LEFS25, 32, 40

RoHS



How to Order

LEFS 25 S2 B – 100 □ – S 2 A1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Size

25
32
40

❷ Motor type

Symbol	Type	Output (W)	Actuator size	Compatible drivers
S2*	AC servo motor (Incremental encoder)	100	25	LECSA□-S1
S3		200	32	LECSA□-S3
S4		400	40	LECSA2-S4
S6*	AC servo motor (Absolute encoder)	100	25	LECSB□-S5 LECSC□-S5 LECSS□-S5
S7		200	32	LECSB□-S7 LECSC□-S7 LECSS□-S7
S8		400	40	LECSB2-S8 LECSC2-S8 LECSS2-S8

* For motor type S2 and S6, the compatible driver part number suffixes are S1 and S5 respectively.

❸ Lead [mm]

Symbol	LEFS25	LEFS32	LEFS40
A	12	16	20
B	6	8	10

❹ Stroke [mm]

100
to
1000

* Refer to the table below for details.

❺ Motor option

Nil	Without option
B	With lock

❻ Cable type Note 1) Note 2)

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

Note 1) Motor cable and encoder cable are included. (Lock cable is also included if motor option "With lock" is selected.)
Note 2) Standard cable entry direction is "(B) Counter axis side". (Refer to page 435 for details.)

❼ Cable length Note 3) [m]

Nil	Without cable
2	2
5	5
A	10

Note 3) The length of the encoder, motor and lock cables are the same.

❽ Driver type

	Compatible drivers	Power supply voltage (V)	Size 25	Size 32	Size 40
Nil	Without driver	—	●	●	●
A1	LECSA1-S□	100 to 120	●	●	—
A2	LECSA2-S□	200 to 230	●	●	●
B1	LECSB1-S□	100 to 120	●	●	—
B2	LECSB2-S□	200 to 230	●	●	●
C1	LECSC1-S□	100 to 120	●	●	—
C2	LECSC2-S□	200 to 230	●	●	●
S1	LECSS1-S□	100 to 120	●	●	—
S2	LECSS2-S□	200 to 230	●	●	●

* When the driver type is selected, the cable is included. Select cable type and cable length.
Example)
S2S2: Standard cable (2 m) + Driver (LECSS2)
S2 : Standard cable (2 m)
Nil : Without cable and driver

❾ I/O connector

Nil	Without connector
H	With connector

Made to Order **Made to Order Specifications**
(For details, refer to page 79.)

Symbol	Specifications
X139	Support guide

* Applicable stroke table ●Standard

Model \ Stroke (mm)	100	200	300	400	500	600	700	800	900	1000
LEFS25	●	●	●	●	●	●	—	—	—	—
LEFS32	●	●	●	●	●	●	●	●	—	—
LEFS40	—	●	●	●	●	●	●	●	●	●

* Consult with SMC for non-standard strokes as they are produced as special orders.

Compatible Drivers

Driver type	Pulse input type /Positioning type 	Pulse input type 	CC-Link direct input type 	SSCNET Ⅲ type 
Series	LECSA	LECSB	LECSC	LECSS
Number of point tables	Up to 7	—	Up to 255 (2 stations occupied)	—
Pulse input	○	○	—	—
Applicable network	—	—	CC-Link	SSCNET Ⅲ
Control encoder	Incremental 17-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder
Communication function	USB communication	USB communication, RS422 communication	USB communication, RS422 communication	USB communication
Power supply voltage (V)	100 to 120 VAC (50/60 Hz), 200 to 230 VAC (50/60 Hz)			
Reference page	Page 419			

Specifications

LEFS25, 32, 40 AC Servo Motor

Model				LEFS25S$^{2}_{6}$		LEFS32S$^{3}_{7}$		LEFS40S$^{4}_{8}$	
Actuator specifications	**Stroke [mm]** Note 1)			100, 200, 300, 400 500, 600		100, 200, 300, 400 500, 600, 700, 800		200, 300, 400, 500 600, 700, 800, 900 1000	
	Work load [kg] Note 2)		**Horizontal**	20	20	40	45	50	60
			Vertical	8	15	10	20	15	30
	Max. speed [mm/s] Note 3)	**Stroke range**	**Up to 400**	900	450	1000	500	1000	500
			401 to 500	720	360	1000	500	1000	500
			501 to 600	540	270	800	400	1000	500
			601 to 700	—	—	620	310	940	470
			701 to 800	—	—	500	250	760	380
			801 to 900	—	—	—	—	620	310
			901 to 1000	—	—	—	—	520	260
	Max. acceleration/deceleration [mm/s²]			20,000 (Refer to page 43 for limit according to work load and duty ratio.)					
	Positioning repeatability [mm]			±0.02					
	Lead [mm]			12	6	16	8	20	10
	Impact/Vibration resistance [m/s²] Note 4)			50/20					
	Actuation type			Ball screw					
	Guide type			Linear guide					
	Operating temperature range [°C]			5 to 40					
	Operating humidity range [%RH]			90 or less (No condensation)					
Electric specifications	**Motor output/Size**			100 W/□40		200 W/□60		400 W/□60	
	Motor type			AC servo motor (100/200 VAC)					
	Encoder			Motor type S2, S3, S4: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S6, S7, S8: Absolute 18-bit encoder (Resolution: 262144 p/rev)					
	Power consumption [W] Note 5)		**Horizontal**	45		65		210	
			Vertical	145		175		230	
	Standby power consumption when operating [W] Note 6)		**Horizontal**	2		2		2	
			Vertical	8		8		18	
	Max. instantaneous power consumption [W] Note 7)			445		725		1275	
Lock unit specifications	**Type** Note 8)			Non-magnetizing lock					
	Holding force [N]			131	255	197	385	330	660
	Power consumption at 20°C [W] Note 9)			6.3		7.9		7.9	
	Rated voltage [V]			24 VDC$^{0}_{-10\%}$					

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) For details, refer to "Speed–Work Load Graph (Guide)" on page 43.
Note 3) The allowable speed changes according to the stroke.
Note 4) Impact resistance: No malfunction occurred when the actuator 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 driver) is for when the actuator is operating.
Note 6) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during the operation.
Note 7) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 8) Only when motor option "With lock" is selected.
Note 9) For an actuator with lock, add the power consumption for the lock.

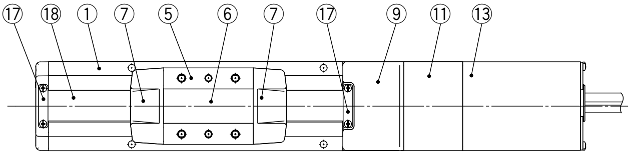
Weight

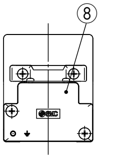
Series	LEFS25					
Stroke [mm]	100	200	300	400	500	600
Product weight [kg]	2.20	2.50	2.75	3.05	3.30	3.60
Additional weight with lock [kg]	0.35					

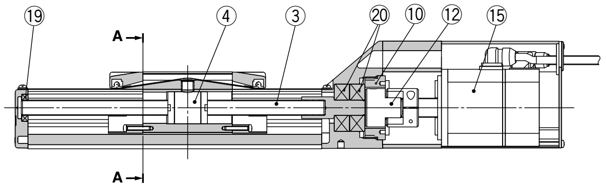
Series	LEFS32							
Stroke [mm]	100	200	300	400	500	600	700	800
Product weight [kg]	3.60	4.00	4.40	4.80	5.20	5.60	6.00	6.40
Additional weight with lock [kg]	0.70							

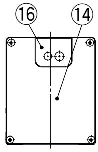
Series	LEFS40								
Stroke [mm]	200	300	400	500	600	700	800	900	1000
Product weight [kg]	6.20	6.75	7.35	7.90	8.35	9.00	9.55	10.15	10.70
Additional weight with lock [kg]	0.70								

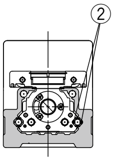
Construction











A-A

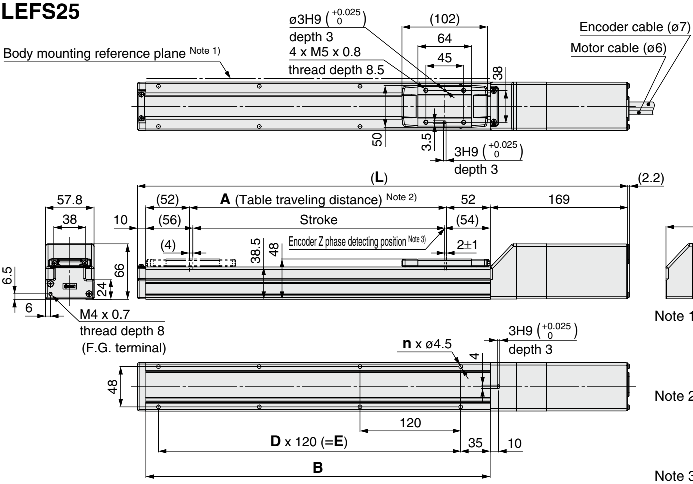
Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Rail guide**	—	
3	**Ball screw shaft**	—	
4	**Ball screw nut**	—	
5	**Table**	Aluminum alloy	Anodized
6	**Blanking plate**	Aluminum alloy	Anodized
7	**Seal band stopper**	Synthetic resin	
8	**Housing A**	Aluminum die-cast	Coating
9	**Housing B**	Aluminum die-cast	Coating
10	**Bearing stopper**	Aluminum alloy	

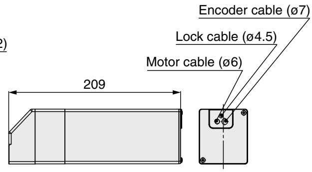
No.	Description	Material	Note
11	**Motor mount**	Aluminum alloy	Coating
12	**Coupling**	—	
13	**Motor cover**	Aluminum alloy	Anodized
14	**Motor end cover**	Aluminum alloy	Anodized
15	**Motor**	—	
16	**Grommet**	NBR	
17	**Band stopper**	Stainless steel	
18	**Dust seal band**	Stainless steel	
19	**Bearing**	—	
20	**Bearing**	—	

Dimensions: Ball Screw Drive

LEFS25



Motor option: With lock



Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) The Z phase first detecting position from the stroke end of the motor side.

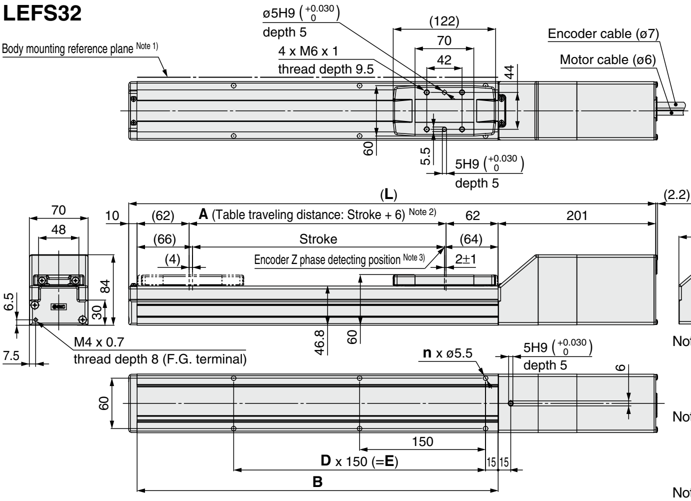
[mm]

Model	L	A	B	n	D	E
LEFS25□□-100-□□□□	389	106	210	4	—	—
LEFS25□□-100B-□□□□	429					
LEFS25□□-200-□□□□	489	206	310	6	2	240
LEFS25□□-200B-□□□□	529					
LEFS25□□-300-□□□□	589	306	410	8	3	360
LEFS25□□-300B-□□□□	629					

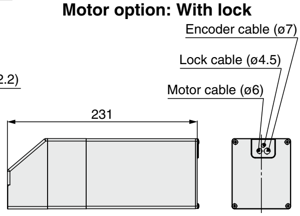
[mm]

Model	L	A	B	n	D	E
LEFS25□□-400-□□□□	689	406	510	8	3	360
LEFS25□□-400B-□□□□	729					
LEFS25□□-500-□□□□	789	506	610	10	4	480
LEFS25□□-500B-□□□□	829					
LEFS25□□-600-□□□□	889	606	710	12	5	600
LEFS25□□-600B-□□□□	929					

LEFS32



Motor option: With lock



Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) The Z phase first detecting position from the stroke end of the motor side.

[mm]

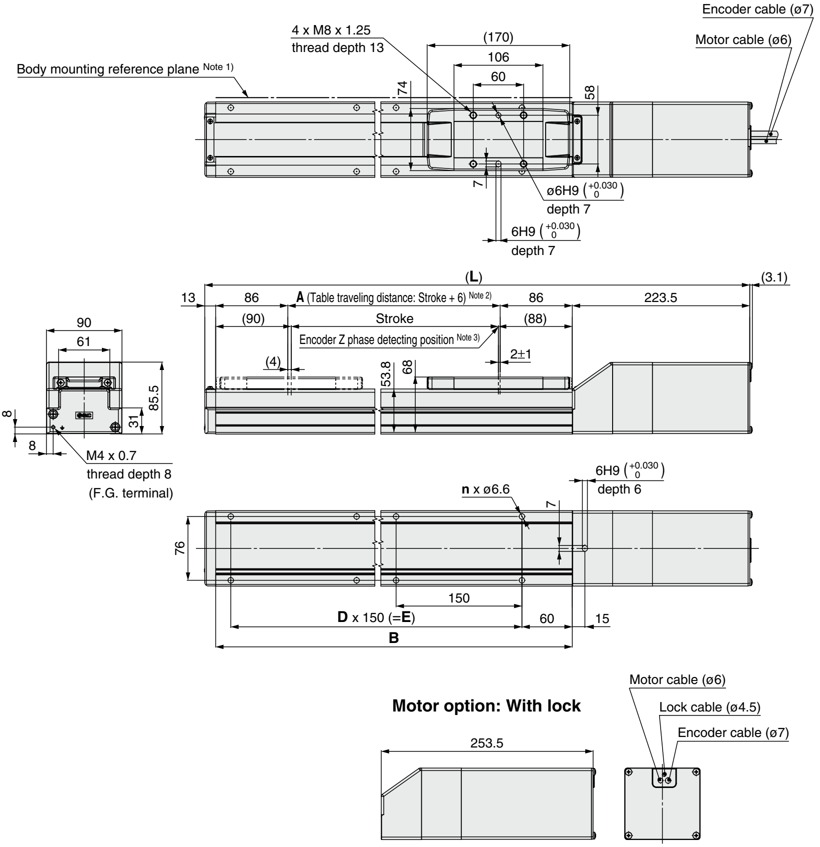
Model	L	A	B	n	D	E
LEFS32□□-100-□□□□	441	106	230	4	—	—
LEFS32□□-100B-□□□□	471					
LEFS32□□-200-□□□□	541	206	330	6	2	300
LEFS32□□-200B-□□□□	571					
LEFS32□□-300-□□□□	641	306	430	6	2	300
LEFS32□□-300B-□□□□	671					
LEFS32□□-400-□□□□	741	406	530	8	3	450
LEFS32□□-400B-□□□□	771					

[mm]

Model	L	A	B	n	D	E
LEFS32□□-500-□□□□	841	506	630	10	4	600
LEFS32□□-500B-□□□□	871					
LEFS32□□-600-□□□□	941	606	730	10	4	600
LEFS32□□-600B-□□□□	971					
LEFS32□□-700-□□□□	1041	706	830	12	5	750
LEFS32□□-700B-□□□□	1071					
LEFS32□□-800-□□□□	1141	806	930	14	6	900
LEFS32□□-800B-□□□□	1171					

Dimensions: Ball Screw Drive

LEFS40



Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) The Z phase first detecting position from the stroke end of the motor side.

[mm]

Model	L	A	B	n	D	E
LEFS40□□-200-□□□□	614.5	206	378	6	2	300
LEFS40□□-200B-□□□□	644.5					
LEFS40□□-300-□□□□	714.5	306	478	6	2	300
LEFS40□□-300B-□□□□	744.5					
LEFS40□□-400-□□□□	814.5	406	578	8	3	450
LEFS40□□-400B-□□□□	844.5					
LEFS40□□-500-□□□□	914.5	506	678	10	4	600
LEFS40□□-500B-□□□□	944.5					
LEFS40□□-600-□□□□	1014.5	606	778	10	4	600
LEFS40□□-600B-□□□□	1044.5					
LEFS40□□-700-□□□□	1114.5	706	878	12	5	750
LEFS40□□-700B-□□□□	1144.5					
LEFS40□□-800-□□□□	1214.5	806	978	14	6	900
LEFS40□□-800B-□□□□	1244.5					
LEFS40□□-900-□□□□	1314.5	906	1078	14	6	900
LEFS40□□-900B-□□□□	1344.5					
LEFS40□□-1000-□□□□	1414.5	1006	1178	16	7	1050
LEFS40□□-1000B-□□□□	1444.5					

Series *LEFS* Electric Actuator/ Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Design

⚠Caution

1. Do not apply a load in excess of the operating limit.
Select a suitable actuator by work load and allowable moment. If the product is used outside of the operating limit, the eccentric load applied to the guide will be excessive and have adverse effects such as creating play on the guide, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force or impact force is applied to it.
This can cause failure.

Selection

⚠Warning

1. Do not increase the speed in excess of the operating limit.
Select a suitable actuator by the relationship of the allowable work load and speed, and the allowable speed of each stroke. If the product is used outside of the operating limit, it will have adverse effects such as creating noise, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force or impact force is applied to it.
This can cause failure.

3. When the product repeatedly cycles with partial strokes (see the table below), operate it at a full stroke at least once every 10 strokes.
Otherwise, lubrication can run out.

Model	Partial stroke
LEFS25	65 mm or less
LEFS32	70 mm or less
LEFS40	105 mm or less

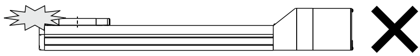
4. When external force is applied to the table, it is necessary to add external force to the work load as the total carried load for the sizing.
When a cable duct or flexible moving tube is attached to the actuator, the sliding resistance of the table increases and may lead to operational failure of the product.

5. The forward/reverse torque limit is set to 100% (3 times the motor rated torque) as default.
This value is the maximum torque (the limit value) in the “Position control mode”, “Speed control mode” or “Positioning mode”. When the product is operated with a smaller value than the default, acceleration when driving can decrease. Set the value after confirming the actual device to be used.

Handling

⚠Caution

1. Do not allow the table to hit the end of stroke.
When incorrect instructions are inputted, such as using the product outside of the operating limit or operation outside of actual stroke through changes in the controller/driver setting and or origin position, the table may collide against the stroke end of the actuator. Please check these points before use.
If the table collides against the stroke end of the actuator, the guide, belt or internal stopper can be broken. This may lead to abnormal operation.



Handle the actuator with care when it is used in the vertical direction as the workpiece will fall freely from its own weight.

2. The actual speed of this actuator is affected by the work load and stroke.
Check specifications with reference to the model selection section of the catalog.

3. Do not apply a load, impact or resistance in addition to the transferred load during return to origin.

4. Do not dent, scratch or cause other damage to the body and table mounting surfaces.
This may cause unevenness in the mounting surface, play in the guide or an increase in the sliding resistance.

5. Do not apply strong impact or an excessive moment while mounting a workpiece.
If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.

6. Keep the flatness of mounting surface 0.1 mm or less.
Unevenness of a workpiece or base mounted on the body of the product may cause play in the guide and an increase in the sliding resistance.

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

8. Do not hit the table with the workpiece in the positioning operation and positioning range.

Series LEFS
Electric Actuator/ Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

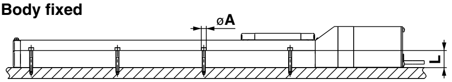
Handling

⚠Caution

9. When mounting the product, use screws with adequate length and tighten them with adequate torque.

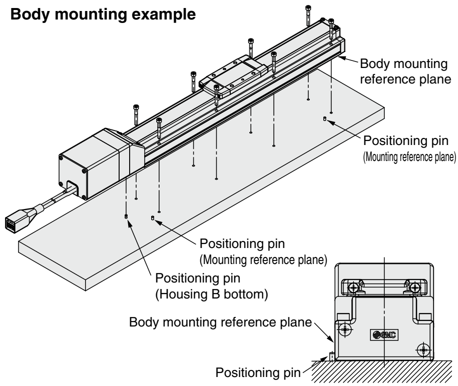
Tightening the screws with a higher torque than recommended may cause a malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Body fixed



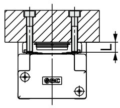
Model	Bolt	øA (mm)	L (mm)
LEFS25	M4	4.5	24
LEFS32	M5	5.5	30
LEFS40	M6	6.6	31

Body mounting example



The traveling parallelism is the reference plane for the body mounting reference plane. If the traveling parallelism for a table is required, set the reference plane against parallel pins, etc.

Workpiece fixed



Model	Bolt	Max. tightening torque (N·m)	L (Max. screw-in depth) (mm)
LEFS25	M5 x 0.8	3.0	8
LEFS32	M6 x 1	5.2	9
LEFS40	M8 x 1.25	12.5	13

To prevent the workpiece fixing bolts from touching the body, use bolts that are 0.5 mm or shorter than the maximum screw-in depth. If long bolts are used, they can touch the body and cause a malfunction, etc.

10. Do not operate by fixing the table and moving the actuator body.

11. Check the specifications for the minimum speed of each actuator.

Otherwise, unexpected malfunctions, such as knocking, may occur.

Maintenance

⚠Warning

Maintenance frequency

Perform maintenance according to the table below.

Frequency	Appearance check	Internal check
Inspection before daily operation	○	—
Inspection every 6 months/1000 km/ 5 million cycles*	○	○

* Select whichever comes sooner.

• Items for visual appearance check

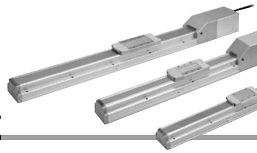
1. Loose set screws, Abnormal dirt
2. Check of flaw and cable joint
3. Vibration, Noise

• Items for internal check

1. Lubricant condition on moving parts.
2. Loose or mechanical play in fixed parts or fixing screws.

Electric Actuator/Slider Type
Ball Screw Drive AC Servo Motor Clean Room Specification
Series 11-LEFS
LEFS25, 32, 40

RoHS



How to Order

11 – LEFS 25 S2 B – 100 [ ] [ ] – S 2 A1 [ ]

Clean series

11	Vacuum type

❶ Size

25
32
40

❷ Motor type

Symbol	Type	Output (W)	Actuator size	Compatible drivers
S2*	AC servo motor (Incremental encoder)	100	25	LECSA□-S1
S3		200	32	LECSA□-S3
S4		400	40	LECSA2-S4
S6*	AC servo motor (Absolute encoder)	100	25	LECSB□-S5 LECSC□-S5 LECSS□-S5
S7		200	32	LECSB□-S7 LECSC□-S7 LECSS□-S7
S8		400	40	LECSB2-S8 LECSC2-S8 LECSS2-S8

* For motor type S2 and S6, the compatible driver part number suffixes are S1 and S5 respectively.

❸ Lead [mm]

Symbol	11-LEFS25	11-LEFS32	11-LEFS40
A	12	16	20
B	6	8	10

❹ Stroke [mm]

100	100
to	to
1000	1000

* Refer to the applicable stroke table.

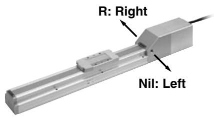
❺ Motor option

Nil	Without option
B	With lock

❻ Vacuum port*

Nil	Left
R	Right
D	Both left and right

* Select "D" for the vacuum port for suction of 50 L/min (ANR) or more.



❼ Cable type Note 1) Note 2)

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

Note 1) The motor and encoder cables are included. (The lock cable is also included when the motor with lock option is selected.)
Note 2) Standard cable entry direction is "(B) Counter axis side". (Refer to page 435 for details.)

❽ Cable length Note 3)

Nil	Without cable
2	2 m
5	5 m
A	10 m

Note 3) The length of the encoder, motor and lock cables are the same.

❿ I/O connector

Nil	Without connector
H	With connector

❾ Driver type

	Compatible drivers	Power supply voltage (V)	Size 25	Size 32	Size 40
Nil	Without driver	—	●	●	●
A1	LECSA1-S□	100 to 120	●	●	—
A2	LECSA2-S□	200 to 230	●	●	●
B1	LECSB1-S□	100 to 120	●	●	—
B2	LECSB2-S□	200 to 230	●	●	●
C1	LECSC1-S□	100 to 120	●	●	—
C2	LECSC2-S□	200 to 230	●	●	●
S1	LECSS1-S□	100 to 120	●	●	—
S2	LECSS2-S□	200 to 230	●	●	●

* When the driver type is selected, the cable is included. Select cable type and cable length.
Example)
S2S2: Standard cable (2 m) + Driver (LECSS2)
S2 : Standard cable (2 m)
Nil : Without cable and driver

* Applicable stroke table ●Standard

Model \ Stroke (mm)	100	200	300	400	500	600	700	800	900	1000
11-LEFS25	●	●	●	●	●	●	—	—	—	—
11-LEFS32	●	●	●	●	●	●	●	●	—	—
11-LEFS40	—	●	●	●	●	●	●	●	●	●

* Consult with SMC for non-standard strokes as they are produced as special orders.

Compatible Drivers

Driver type	Pulse input type /Positioning type 	Pulse input type 	CC-Link direct input type 	SSCNET Ⅲ type 
Series	LECSA	LECSB	LECSC	LECSS
Number of point tables	Up to 7	—	Up to 255 (2 stations occupied)	—
Pulse input	○	○	—	—
Applicable network	—	—	CC-Link	SSCNET Ⅲ
Control encoder	Incremental 17-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder
Communication function	USB communication	USB communication, RS422 communication	USB communication, RS422 communication	USB communication
Power supply voltage (V)	100 to 120 VAC (50/60 Hz), 200 to 230 VAC (50/60 Hz)			
Reference page	Page 419			

Specifications

11-LEFS25, 32, 40 AC Servo Motor

Model			11-LEFS25S^{2}_{6}		11-LEFS32S^{3}_{7}		11-LEFS40S^{4}_{8}	
Actuator specifications	Stroke [mm] Note 1)		100, 200, 300, 400 500, 600		100, 200, 300, 400 500, 600, 700, 800		200, 300, 400, 500, 600 700, 800, 900, 1000	
	Work load [kg] Note 2)	Horizontal	20	20	40	45	50	60
		Vertical	8	15	10	20	15	30
	Max. speed Note 3) [mm/s] Stroke range	Up to 400	900	450	1000	500	1000	500
		401 to 500	720	360	1000	500	1000	500
		501 to 600	540	270	800	400	1000	500
		601 to 700	—	—	620	310	940	470
		701 to 800	—	—	500	250	760	380
		801 to 900	—	—	—	—	620	310
		901 to 1000	—	—	—	—	520	260
	Max. acceleration/deceleration [mm/s²]		5,000 (Refer to page 50 for limit according to work load and duty ratio.)					
	Positioning repeatability [mm]		±0.02					
	Lead [mm]		12	6	16	8	20	10
	Impact/Vibration resistance [m/s²] Note 4)		50/20					
	Actuation type		Ball screw					
	Guide type		Linear guide					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
	Cleanliness class Note 5)		ISO Class 4 (ISO 14644-1) Class 10 (Fed.Std.209E)					
	Grease	Ball screw /Linear guide portion	Low particle generation grease					
Electric specifications	Motor output/Size		100 W/□40		200 W/□60		400 W/□60	
	Motor type		AC servo motor (100/200 VAC)					
	Encoder		Motor type S2, S3, S4: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S6, S7, S8: Absolute 18-bit encoder (Resolution: 262144 p/rev)					
	Power consumption [W] Note 6)	Horizontal	45		65		210	
		Vertical	145		175		230	
	Standby power consumption when operating [W] Note 7)	Horizontal	2		2		2	
		Vertical	8		8		18	
	Max. instantaneous power consumption [W] Note 8)		445		725		1275	
Lock unit specifications	Type Note 9)		Non-magnetizing lock					
	Holding force [N]		131	255	197	385	330	660
	Power consumption at 20°C [W] Note 10)		6.3		7.9		7.9	
	Rated voltage [V]		24 VDC $^{0}_{-10\%}$					

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) For details, refer to "Speed–Work Load Graph (Guide)" on page 50.
Note 3) The allowable speed changes according to the stroke.
Note 4) Impact resistance: No malfunction occurred when the actuator 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 amount of particle generation changes according to the operating conditions and suction flow rate. Refer to the particle generation characteristics for details.
Note 6) The power consumption (including the driver) is for when the actuator is operating.
Note 7) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during the operation.
Note 8) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 9) Only when motor option "With lock" is selected.
Note 10) For an actuator with lock, add the power consumption for the lock.

Weight

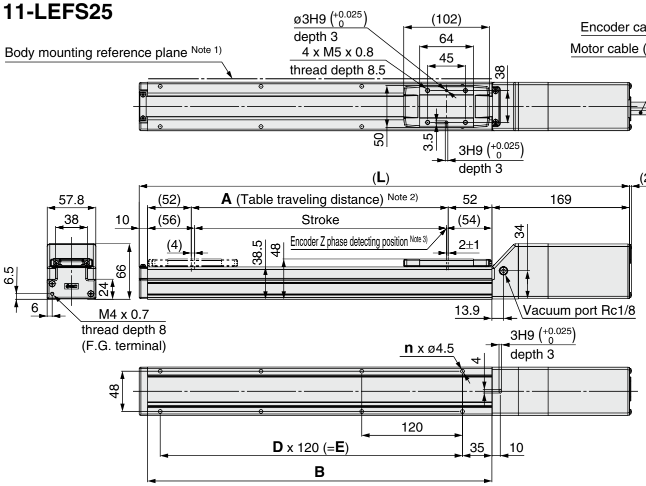
Series	11-LEFS25					
Stroke [mm]	100	200	300	400	500	600
Product weight [kg]	2.20	2.50	2.75	3.05	3.30	3.60
Additional weight with lock [kg]	0.35					

Series	11-LEFS32							
Stroke [mm]	100	200	300	400	500	600	700	800
Product weight [kg]	3.60	4.00	4.40	4.80	5.20	5.60	6.00	6.40
Additional weight with lock [kg]	0.70							

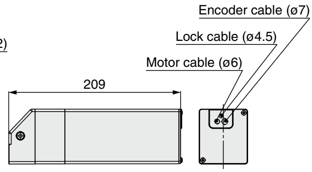
Series	11-LEFS40								
Stroke [mm]	200	300	400	500	600	700	800	900	1000
Product weight [kg]	6.20	6.75	7.35	7.90	8.35	9.00	9.55	10.15	10.70
Additional weight with lock [kg]	0.70								

Dimensions: Ball Screw Drive

11-LEFS25



Motor option: With lock



Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) The Z phase first detecting position from the stroke end of the motor side.

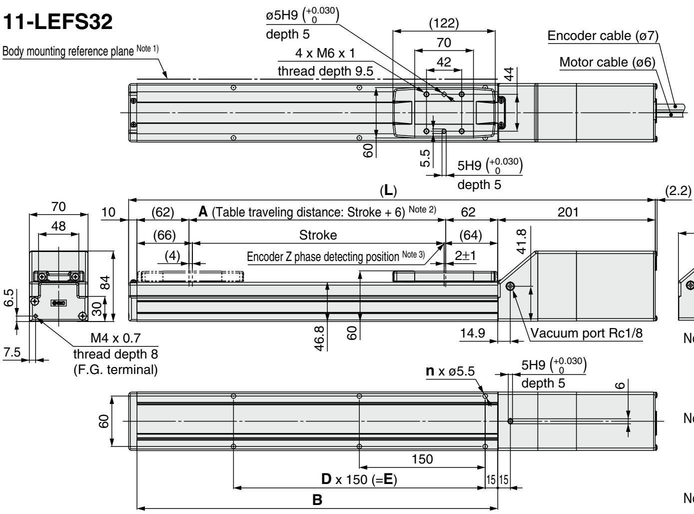
[mm]

Model	L	A	B	n	D	E
11-LEFS25□□-100-□□□□	389	106	210	4	—	—
11-LEFS25□□-100B-□□□□	429					
11-LEFS25□□-200-□□□□	489	206	310	6	2	240
11-LEFS25□□-200B-□□□□	529					
11-LEFS25□□-300-□□□□	589	306	410	8	3	360
11-LEFS25□□-300B-□□□□	629					

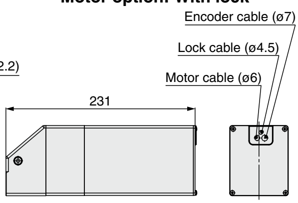
[mm]

Model	L	A	B	n	D	E
11-LEFS25□□-400-□□□□	689	406	510	8	3	360
11-LEFS25□□-400B-□□□□	729					
11-LEFS25□□-500-□□□□	789	506	610	10	4	480
11-LEFS25□□-500B-□□□□	829					
11-LEFS25□□-600-□□□□	889	606	710	12	5	600
11-LEFS25□□-600B-□□□□	929					

11-LEFS32



Motor option: With lock



Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) The Z phase first detecting position from the stroke end of the motor side.

[mm]

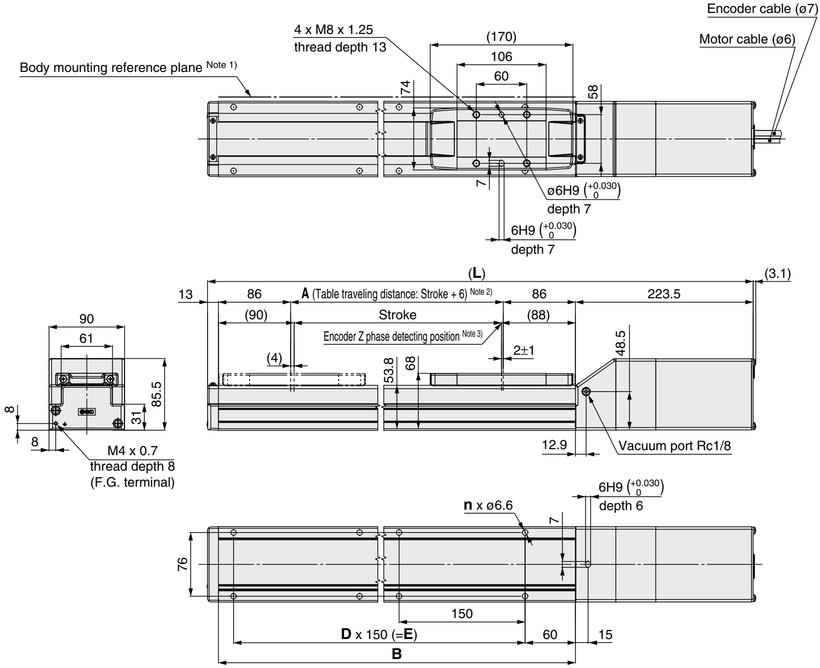
Model	L	A	B	n	D	E
11-LEFS32□□-100-□□□□	441	106	230	4	—	—
11-LEFS32□□-100B-□□□□	471					
11-LEFS32□□-200-□□□□	541	206	330	6	2	300
11-LEFS32□□-200B-□□□□	571					
11-LEFS32□□-300-□□□□	641	306	430	6	2	300
11-LEFS32□□-300B-□□□□	671					
11-LEFS32□□-400-□□□□	741	406	530	8	3	450
11-LEFS32□□-400B-□□□□	771					

[mm]

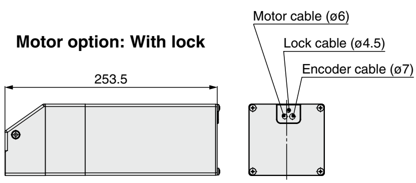
Model	L	A	B	n	D	E
11-LEFS32□□-500-□□□□	841	506	630	10	4	600
11-LEFS32□□-500B-□□□□	871					
11-LEFS32□□-600-□□□□	941	606	730	10	4	600
11-LEFS32□□-600B-□□□□	971					
11-LEFS32□□-700-□□□□	1041	706	830	12	5	750
11-LEFS32□□-700B-□□□□	1071					
11-LEFS32□□-800-□□□□	1141	806	930	14	6	900
11-LEFS32□□-800B-□□□□	1171					

Dimensions: Ball Screw Drive

11-LEFS40



Motor option: With lock



Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) The Z phase first detecting position from the stroke end of the motor side.

[mm]

Model	L	A	B	n	D	E
11-LEFS40□□-200-□□□□	614.5	206	378	6	2	300
11-LEFS40□□-200B-□□□□	644.5					
11-LEFS40□□-300-□□□□	714.5	306	478	6	2	300
11-LEFS40□□-300B-□□□□	744.5					
11-LEFS40□□-400-□□□□	814.5	406	578	8	3	450
11-LEFS40□□-400B-□□□□	844.5					
11-LEFS40□□-500-□□□□	914.5	506	678	10	4	600
11-LEFS40□□-500B-□□□□	944.5					
11-LEFS40□□-600-□□□□	1014.5	606	778	10	4	600
11-LEFS40□□-600B-□□□□	1044.5					
11-LEFS40□□-700-□□□□	1114.5	706	878	12	5	750
11-LEFS40□□-700B-□□□□	1144.5					
11-LEFS40□□-800-□□□□	1214.5	806	978	14	6	900
11-LEFS40□□-800B-□□□□	1244.5					
11-LEFS40□□-900-□□□□	1314.5	906	1078	14	6	900
11-LEFS40□□-900B-□□□□	1344.5					
11-LEFS40□□-1000-□□□□	1414.5	1006	1178	16	7	1050
11-LEFS40□□-1000B-□□□□	1444.5					

Electric Actuator/Slider Type
Belt Drive AC Servo Motor
Series LEFB
LEFB25, 32, 40

How to Order

LEFB 40 [ ] S4 S – 300 [ ] – S 2 A1 [ ]

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Size

25
32
40

❷ Motor mounting position

Nil	Top mounting
U	Bottom mounting

❸ Motor type

Symbol	Type	Output (W)	Actuator size	Compatible drivers
S2*	AC servo motor (Incremental encoder)	100	25	LECSA□-S1
S3		200	32	LECSA□-S3
S4		400	40	LECSA2-S4
S6*	AC servo motor (Absolute encoder)	100	25	LECSB□-S5 LECSC□-S5 LECSS□-S5
S7		200	32	LECSB□-S7 LECSC□-S7 LECSS□-S7
S8		400	40	LECSB2-S8 LECSC2-S8 LECSS2-S8

* For motor type S2 and S6, the compatible driver part number suffixes are S1 and S5 respectively.

❹ Equivalent lead

S	54 mm

❺ Stroke

300	300 mm
to	to
3000	3000 mm

* Refer to the applicable stroke table.

❻ Motor option

Nil	Without option
B	With lock

❼ Cable type Note 1) Note 2)

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

Note 1) The motor and encoder cables are included. (The lock cable is also included when the motor with lock option is selected.)

Note 2) Standard cable entry direction is "(A) Axis side". (Refer to page 435 for details.)

❽ Cable length

Nil	Without cable
2	2 m
5	5 m
A	10 m

* The length of the encoder, motor and lock cables are the same.

❾ Driver type

	Compatible drivers	Power supply voltage	Size 25	Size 32	Size 40
Nil	Without driver	—	●	●	●
A1	LECSA1-S□	100 to 120	●	●	—
A2	LECSA2-S□	200 to 230	●	●	●
B1	LECSB1-S□	100 to 120	●	●	—
B2	LECSB2-S□	200 to 230	●	●	●
C1	LECSC1-S□	100 to 120	●	●	—
C2	LECSC2-S□	200 to 230	●	●	●
S1	LECSS1-S□	100 to 120	●	●	—
S2	LECSS2-S□	200 to 230	●	●	●

❿ I/O connector

Nil	Without connector
H	With connector

* When the driver type is selected, the cable is included. Select cable type and cable length.
Example)
S2S2: Standard cable (2 m) + Driver (LECSS2)
S2 : Standard cable (2 m)
Nil : Without cable and driver

Made to Order Specifications
(For details, refer to page 79.)

Symbol	Specifications
X139	Support guide

* Applicable stroke table

●Standard/○Produced upon receipt of order

	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2500	3000
LEFB25	●	●	●	●	●	●	●	●	○	●	○	○	●	○	○	○	○	●	—	—
LEFB32	●	●	●	●	●	●	●	●	○	●	○	○	●	○	○	○	○	●	●	—
LEFB40	●	●	●	●	●	●	●	●	○	●	○	○	●	○	○	○	○	●	●	●

* Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.

Compatible Drivers

Driver type	Pulse input type /Positioning type 	Pulse input type 	CC-Link direct input type 	SSCNET Ⅲ type 
Series	LECSA	LECSB	LECSC	LECSS
Number of point tables	Up to 7	—	Up to 255 (2 stations occupied)	—
Pulse input	○	○	—	—
Applicable network	—	—	CC-Link	SSCNET Ⅲ
Control encoder	Incremental 17-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder
Communication function	USB communication	USB communication, RS422 communication	USB communication, RS422 communication	USB communication
Power supply voltage (V)	100 to 120 VAC (50/60 Hz), 200 to 230 VAC (50/60 Hz)			
Reference page	Page 419			

Specifications

LEFB25, 32, 40 AC Servo Motor

Model			LEFB25S$^{2}_{6}$	LEFB32S$^{3}_{7}$	LEFB40S$^{4}_{8}$
Actuator specifications	Stroke [mm] Note 1)		300, 400, 500 600, 700, 800 900, 1000, (1100) 1200, (1300, 1400) 1500, (1600, 1700) (1800, 1900), 2000	300, 400, 500 600, 700, 800 900, 1000, (1100) 1200, (1300, 1400) 1500, (1600, 1700) (1800, 1900), 2000 2500	300, 400, 500 600, 700, 800 900, 1000, (1100) 1200, (1300, 1400) 1500, (1600, 1700) (1800, 1900), 2000 2500, 3000
	Work load [kg] Note 2)	Horizontal	5	15	25
	Max. speed [mm/s]		2,000	2,000	2,000
	Max. acceleration/deceleration [mm/s²]		20,000 (Refer to page 53 for limit according to work load and duty ratio.) Note 3)		
	Positioning repeatability [mm]		±0.08		
	Equivalent lead [mm]		54		
	Impact/Vibration resistance [m/s²] Note 4)		50/20		
	Actuation type		Belt		
	Guide type		Linear guide		
	Operating temperature range [°C]		5 to 40		
	Operating humidity range [%RH]		90 or less (No condensation)		
Electric specifications	Motor output/Size		100 W/□40	200 W/□60	400 W/□60
	Motor type		AC servo motor (100/200 VAC)		
	Encoder		Motor type S2, S3, S4: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S6, S7, S8: Absolute 18-bit encoder (Resolution: 262144 p/rev)		
	Power consumption [W] Note 5)	Horizontal	29	41	72
		Vertical	—	—	—
	Standby power consumption when operating [W] Note 6)	Horizontal	2	2	2
		Vertical	—	—	—
	Max. instantaneous power consumption [W] Note 7)		445	725	1275
Lock unit specifications	Type Note 8)		Non-magnetizing lock		
	Holding force [N]		27	54	110
	Power consumption at 20°C [W] Note 9)		6.3	7.9	7.9
	Rated voltage [V]		24 VDC $^{0}_{-10\%}$		

Note 1) Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.
Note 2) For details, refer to "Speed–Work Load Graph (Guide)" on page 53.
Note 3) Maximum acceleration/deceleration changes according to the work load. Check "Work Load–Acceleration/Deceleration Graph" of the catalog.
Note 4) Impact resistance: No malfunction occurred when the actuator 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 driver) is for when the actuator is operating.
Note 6) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during the operation.
Note 7) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 8) Only when motor option "With lock" is selected.
Note 9) For an actuator with lock, add the power consumption for the lock.

Weight

Series	LEFB25S□S																	
Stroke [mm]	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Product weight [kg]	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25
Additional weight with lock [kg]	0.35																	

Series	LEFB32S□S																		
Stroke [mm]	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2500
Product weight [kg]	4.90	5.25	5.60	5.95	6.30	6.65	7.00	7.35	7.70	8.05	8.40	8.75	9.10	9.45	9.80	10.15	10.50	10.85	12.60
Additional weight with lock [kg]	0.75																		

Series	LEFB40S□S																			
Stroke [mm]	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2500	3000
Product weight [kg]	7.10	7.55	8.00	8.45	8.90	9.35	9.80	10.25	10.70	11.15	11.60	12.05	12.50	12.95	13.40	13.85	14.30	14.75	17.00	19.25
Additional weight with lock [kg]	0.7																			

Handling

⚠Caution

1. The belt drive actuator cannot be used vertically for applications.

2. In the case of the belt drive actuator, vibration may occur during operation at speeds within the actuator specifications, this could be caused by the operating conditions. Change the speed setting to a speed that does not cause vibration.

Maintenance

⚠Warning

Maintenance frequency

Perform maintenance according to the table below.

Frequency	Appearance check	Internal check	Belt check
Inspection before daily operation	○	—	—
Inspection every 6 months/1000 km/ 5 million cycles*	○	○	○

* Select whichever comes sooner.

• Items for visual appearance check

1. Loose set screws, Abnormal dirt
2. Check of flaw and cable joint
3. Vibration, Noise

Maintenance

⚠Warning

• Items for internal check

1. Lubricant condition on moving parts.
2. Loose or mechanical play in fixed parts or fixing screws.

• Items for belt check

Stop operation immediately and replace the belt when belt appear to be below. Further, ensure your operating environment and conditions satisfy the requirements specified for the product.

a. Tooth shape canvas is worn out.
Canvas fiber becomes fuzzy. Rubber is removed and the fiber becomes whitish. Lines of fibers become unclear.

b. Peeling off or wearing of the side of the belt
Belt corner becomes round and frayed thread sticks out.

c. Belt partially cut
Belt is partially cut. Foreign matter caught in teeth other than cut part causes flaw.

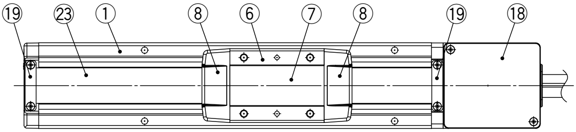
d. Vertical line of belt teeth
Flaw which is made when the belt runs on the flange.

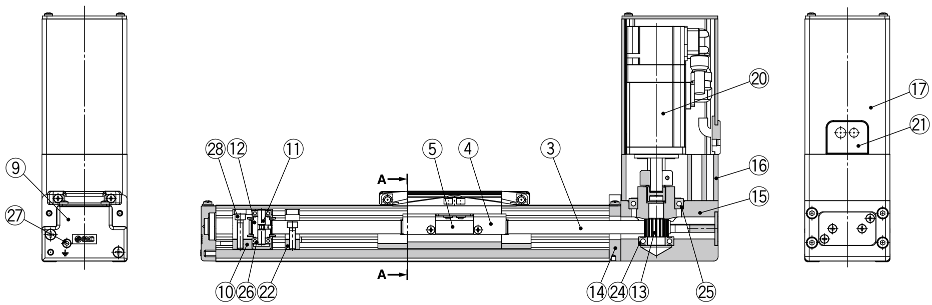
e. Rubber back of the belt is softened and sticky.

f . Crack on the back of the belt

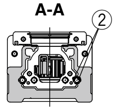
Construction

LEFB25S□S





A-A



∗ Motor bottom mounting type is the same.

Component Parts

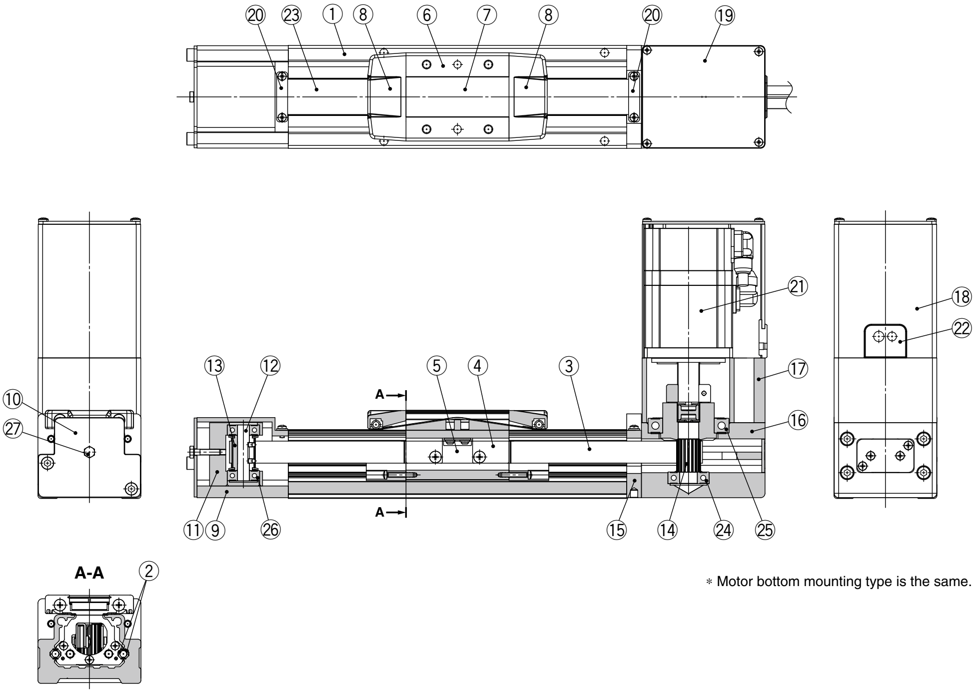
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Rail guide**		
3	**Belt**		
4	**Belt holder**	Carbon steel	Chromate treated
5	**Belt stopper**	Aluminum alloy	Anodized
6	**Table**	Aluminum alloy	Anodized
7	**Blanking plate**	Aluminum alloy	Anodized
8	**Seal band stopper**	Synthetic resin	
9	**Housing A**	Aluminum die-cast	Coating
10	**Pulley holder**	Aluminum alloy	
11	**Pulley shaft**	Stainless steel	
12	**End pulley**	Aluminum alloy	Anodized
13	**Motor pulley**	Aluminum alloy	Anodized
14	**Return flange**	Aluminum alloy	Coating

Component Parts

No.	Description	Material	Note
15	**Housing**	Aluminum alloy	Coating
16	**Motor mount**	Aluminum alloy	Coating
17	**Motor cover**	Aluminum alloy	Anodized
18	**Motor end cover**	Aluminum alloy	Anodized
19	**Band stopper**	Stainless steel	
20	**Motor**		
21	**Rubber bushing**	NBR	
22	**Stopper**	Aluminum alloy	
23	**Dust seal band**	Stainless steel	
24	**Bearing**		
25	**Bearing**		
26	**Spacer**	Stainless steel	
27	**Tension adjustment bolt**	Chromium molybdenum steel	Chromate treated
28	**Pulley fixing bolt**	Chromium molybdenum steel	Chromate treated

Construction

LEFB32/40S□S



∗ Motor bottom mounting type is the same.

Component Parts

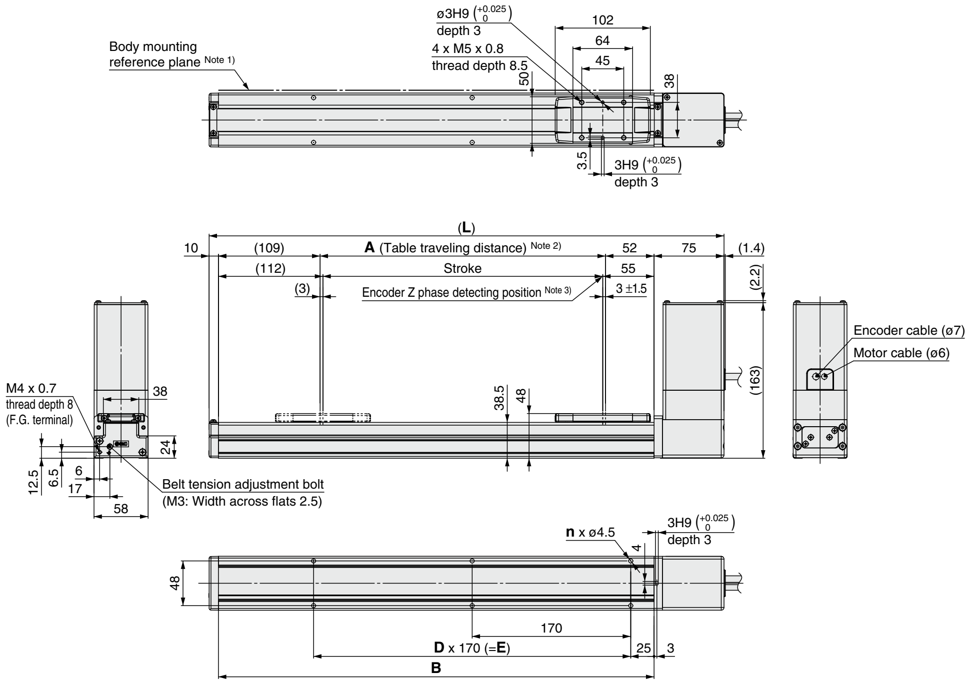
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Rail guide**		
3	**Belt**		
4	**Belt holder**	Carbon steel	Chromate treated
5	**Belt stopper**	Aluminum alloy	Anodized
6	**Table**	Aluminum alloy	Anodized
7	**Blanking plate**	Aluminum alloy	Anodized
8	**Seal band stopper**	Synthetic resin	
9	**End block**	Aluminum alloy	Coating
10	**End block cover**		
11	**Pulley holder**	Aluminum alloy	
12	**Pulley shaft**	Stainless steel	
13	**End pulley**	Aluminum alloy	Anodized
14	**Motor pulley**	Aluminum alloy	Anodized

Component Parts

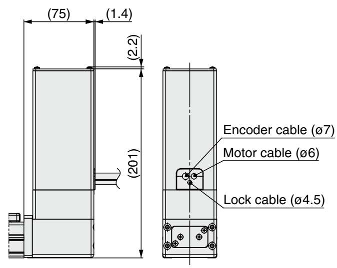
No.	Description	Material	Note
15	**Return flange**	Aluminum alloy	Coating
16	**Housing**	Aluminum alloy	Coating
17	**Motor mount**	Aluminum alloy	Coating
18	**Motor cover**	Aluminum alloy	Anodized
19	**Motor end cover**	Aluminum alloy	Anodized
20	**Band stopper**	Stainless steel	
21	**Motor**		
22	**Rubber bushing**	NBR	
23	**Dust seal band**	Stainless steel	
24	**Bearing**		
25	**Bearing**		
26	**Bearing**		
27	**Tension adjustment bolt**	Chromium molybdenum steel	Chromate treated

Dimensions: Belt Drive

LEFB25/Motor top mounting type



Motor option: With lock



Dimensions

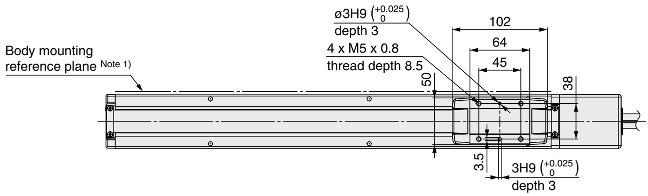
[mm]

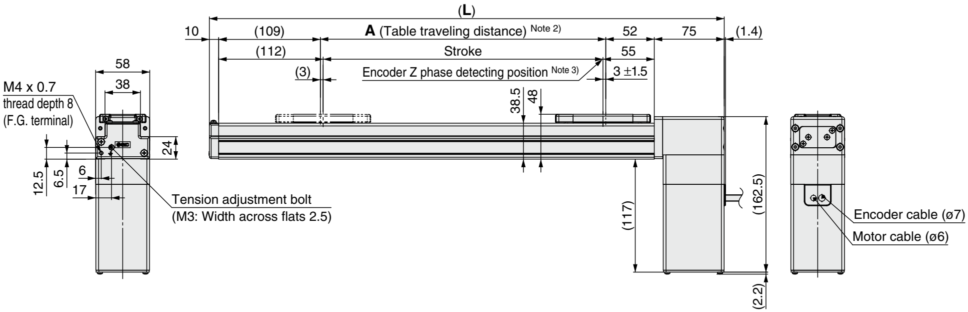
Stroke	L	A	B	n	D	E
300	552	306	467	6	2	340
400	652	406	567	8	3	510
500	752	506	667	8	3	510
600	852	606	767	10	4	680
700	952	706	867	10	4	680
800	1052	806	967	12	5	850
900	1152	906	1067	14	6	1020
1000	1252	1006	1167	14	6	1020
1100	1352	1106	1267	16	7	1190
1200	1452	1206	1367	16	7	1190
1300	1552	1306	1467	18	8	1360
1400	1652	1406	1567	20	9	1530
1500	1752	1506	1667	20	9	1530
1600	1852	1606	1767	22	10	1700
1700	1952	1706	1867	22	10	1700
1800	2052	1806	1967	24	11	1870
1900	2152	1906	2067	24	11	1870
2000	2252	2006	2167	26	12	2040

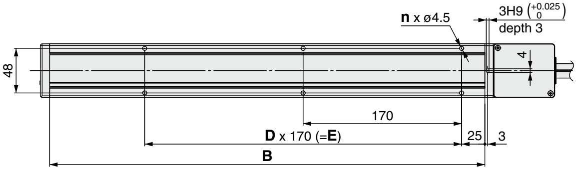
Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 3) The Z phase first detecting position from the stroke end of the motor side.

Dimensions: Belt Drive

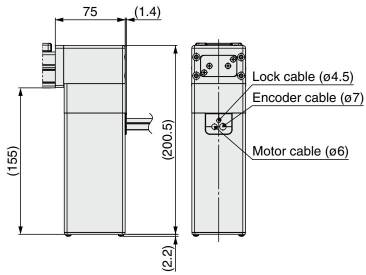
LEFB25U/Motor bottom mounting type







Motor option: With lock



Dimensions

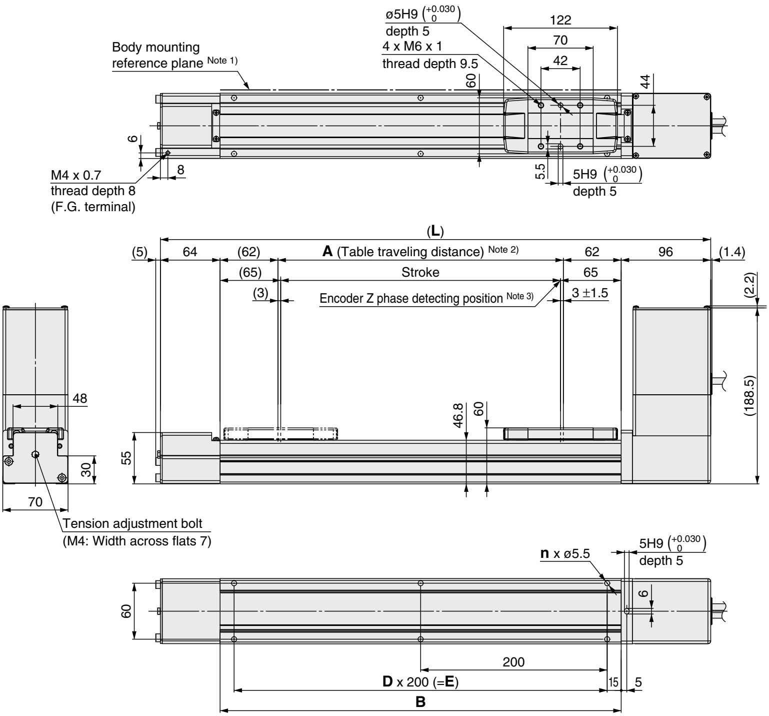
[mm]

Stroke	L	A	B	n	D	E
300	552	306	467	6	2	340
400	652	406	567	8	3	510
500	752	506	667	8	3	510
600	852	606	767	10	4	680
700	952	706	867	10	4	680
800	1052	806	967	12	5	850
900	1152	906	1067	14	6	1020
1000	1252	1006	1167	14	6	1020
1100	1352	1106	1267	16	7	1190
1200	1452	1206	1367	16	7	1190
1300	1552	1306	1467	18	8	1360
1400	1652	1406	1567	20	9	1530
1500	1752	1506	1667	20	9	1530
1600	1852	1606	1767	22	10	1700
1700	1952	1706	1867	22	10	1700
1800	2052	1806	1967	24	11	1870
1900	2152	1906	2067	24	11	1870
2000	2252	2006	2167	26	12	2040

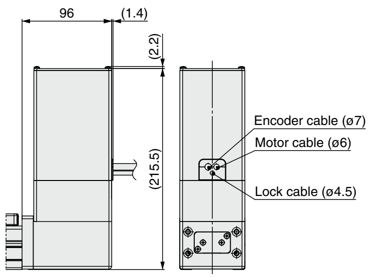
Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 3) The Z phase first detecting position from the stroke end of the motor side.

Dimensions: Belt Drive

LEFB32/Motor top mounting type



Motor option: With lock



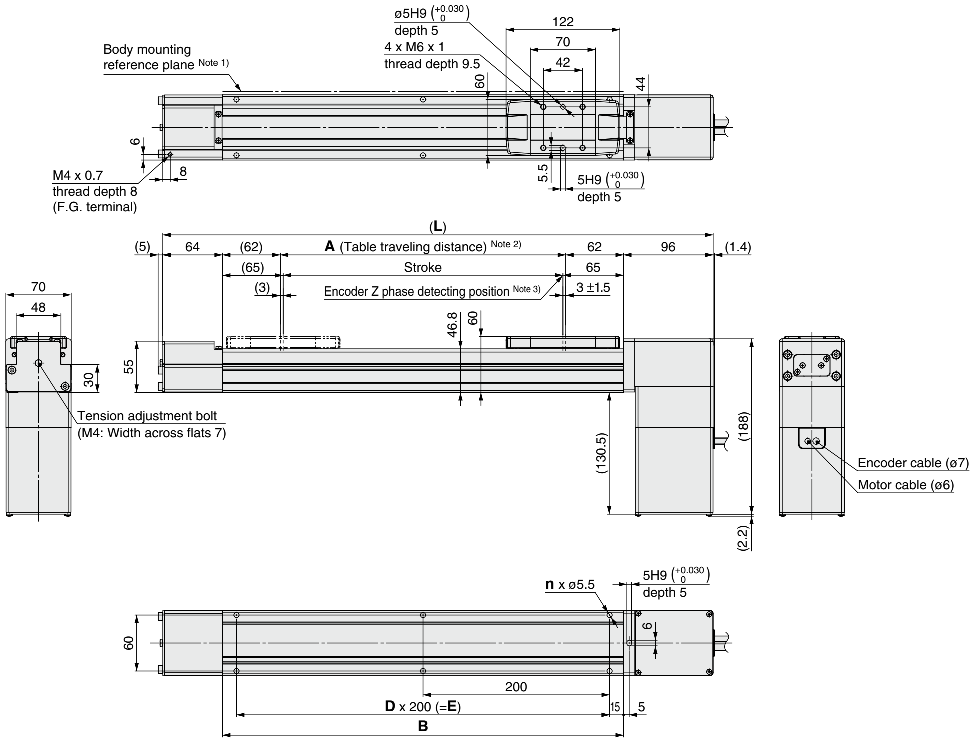
Dimensions [mm]

Stroke	L	A	B	n	D	E
300	590	306	430	6	2	400
400	690	406	530	6	2	400
500	790	506	630	8	3	600
600	890	606	730	8	3	600
700	990	706	830	10	4	800
800	1090	806	930	10	4	800
900	1190	906	1030	12	5	1000
1000	1290	1006	1130	12	5	1000
1100	1390	1106	1230	14	6	1200
1200	1490	1206	1330	14	6	1200
1300	1590	1306	1430	16	7	1400
1400	1690	1406	1530	16	7	1400
1500	1790	1506	1630	18	8	1600
1600	1890	1606	1730	18	8	1600
1700	1990	1706	1830	20	9	1800
1800	2090	1806	1930	20	9	1800
1900	2190	1906	2030	22	10	2000
2000	2290	2006	2130	22	10	2000
2500	2790	2506	2630	28	13	2600

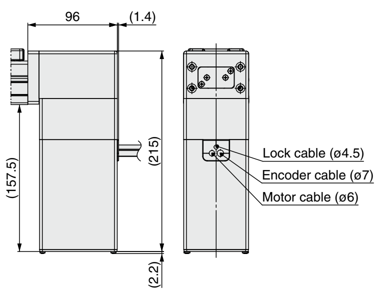
Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 3) The Z phase first detecting position from the stroke end of the motor side.

Dimensions: Belt Drive

LEFB32U/Motor bottom mounting type



Motor option: With lock



Dimensions

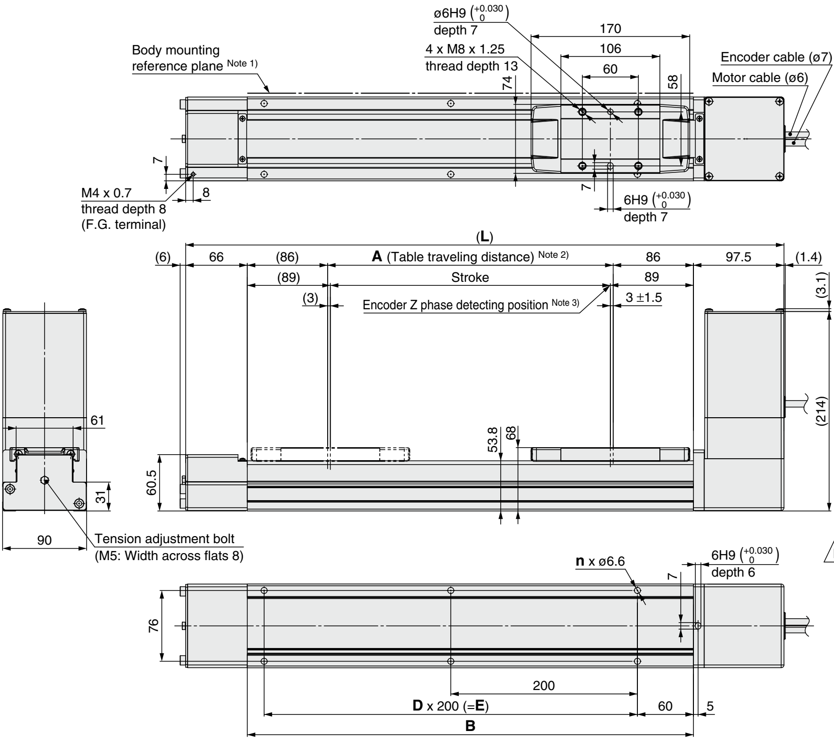
[mm]

Stroke	L	A	B	n	D	E
300	590	306	430	6	2	400
400	690	406	530	6	2	400
500	790	506	630	8	3	600
600	890	606	730	8	3	600
700	990	706	830	10	4	800
800	1090	806	930	10	4	800
900	1190	906	1030	12	5	1000
1000	1290	1006	1130	12	5	1000
1100	1390	1106	1230	14	6	1200
1200	1490	1206	1330	14	6	1200
1300	1590	1306	1430	16	7	1400
1400	1690	1406	1530	16	7	1400
1500	1790	1506	1630	18	8	1600
1600	1890	1606	1730	18	8	1600
1700	1990	1706	1830	20	9	1800
1800	2090	1806	1930	20	9	1800
1900	2190	1906	2030	22	10	2000
2000	2290	2006	2130	22	10	2000
2500	2790	2506	2630	28	13	2600

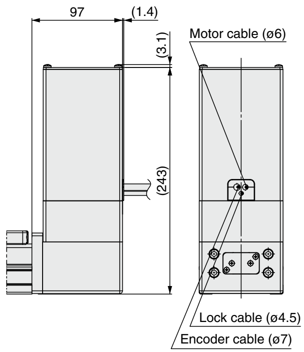
Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 3) The Z phase first detecting position from the stroke end of the motor side.

Dimensions: Belt Drive

LEFB40/Motor top mounting type



Motor option: With lock



Dimensions

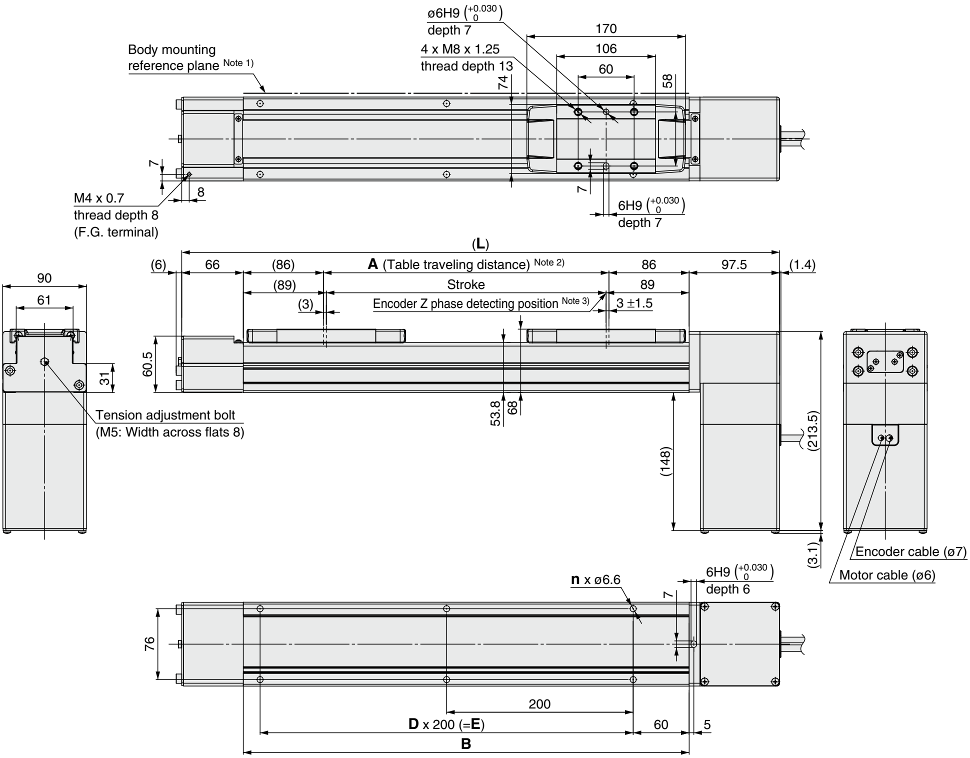
[mm]

Stroke	L	A	B	n	D	E
300	641.5	306	478	6	2	400
400	741.5	406	578	6	2	400
500	841.5	506	678	8	3	600
600	941.5	606	778	8	3	600
700	1041.5	706	878	10	4	800
800	1141.5	806	978	10	4	800
900	1241.5	906	1078	12	5	1000
1000	1341.5	1006	1178	12	5	1000
1100	1441.5	1106	1278	14	6	1200
1200	1541.5	1206	1378	14	6	1200
1300	1641.5	1306	1478	16	7	1400
1400	1741.5	1406	1578	16	7	1400
1500	1841.5	1506	1678	18	8	1600
1600	1941.5	1606	1778	18	8	1600
1700	2041.5	1706	1878	20	9	1800
1800	2141.5	1806	1978	20	9	1800
1900	2241.5	1906	2078	22	10	2000
2000	2341.5	2006	2178	22	10	2000
2500	2841.5	2506	2678	28	13	2600
3000	3341.5	3006	3178	32	15	3000

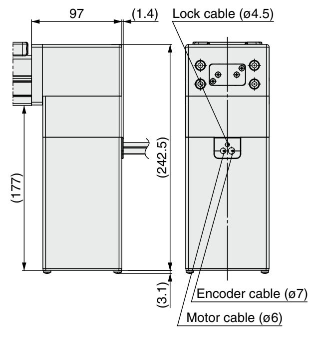
Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 3) The Z phase first detecting position from the stroke end of the motor side.

Dimensions: Belt Drive

LEFB40U/Motor bottom mounting type



Motor option: With lock



Dimensions

[mm]

Stroke	L	A	B	n	D	E
300	641.5	306	478	6	2	400
400	741.5	406	578	6	2	400
500	841.5	506	678	8	3	600
600	941.5	606	778	8	3	600
700	1041.5	706	878	10	4	800
800	1141.5	806	978	10	4	800
900	1241.5	906	1078	12	5	1000
1000	1341.5	1006	1178	12	5	1000
1100	1441.5	1106	1278	14	6	1200
1200	1541.5	1206	1378	14	6	1200
1300	1641.5	1306	1478	16	7	1400
1400	1741.5	1406	1578	16	7	1400
1500	1841.5	1506	1678	18	8	1600
1600	1941.5	1606	1778	18	8	1600
1700	2041.5	1706	1878	20	9	1800
1800	2141.5	1806	1978	20	9	1800
1900	2241.5	1906	2078	22	10	2000
2000	2341.5	2006	2178	22	10	2000
2500	2841.5	2506	2678	28	13	2600
3000	3341.5	3006	3178	32	15	3000

Note 1) When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of R chamfering. (Recommended height 5 mm)
Note 2) Distance 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 3) The Z phase first detecting position from the stroke end of the motor side.

Made to Order Specifications

Please contact SMC for detailed dimensions, specifications and lead times.

Made to Order

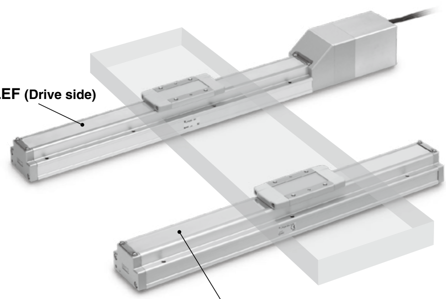
Symbol
-X139

1 Support Guide

A support guide is designed to support workpieces with significant overhang.

· As the dimensions are the same as the LEF series body, installation is simple and contributes to a reduction in installation and assembly labor.
· The standard equipped seal bands prevent grease from splashing and external foreign matter from entering.
· The dimensions of the product mounting hole and pitch are the same as those of the LEFB (belt type).

Application example



· After installing the actuator on the drive side, perform the alignment of the support guide. However, when the mounting flatness exceeds 0.1, install a floating mechanism separately on the workpiece installation surface (table).

How to Order

LEFS □ – □ – X139

Size

16
25
32
40

Stroke
Refer to the table below for applicable strokes.

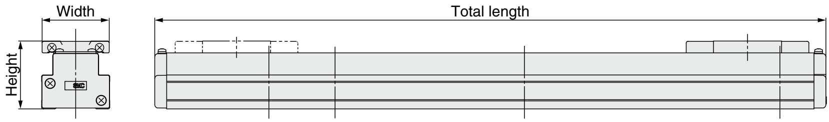
Applicable stroke table

Model	Applicable strokes													
	100	200	300	400	500	600	700	800	900	1000	1200	1500	1800	2000
LEFS16-[Stroke]-X139	●	●	●	●	●	●	●	●	●	●	—	—	—	—
LEFS25-[Stroke]-X139	●	●	●	●	●	●	●	●	●	●	●	●	●	●
LEFS32-[Stroke]-X139	●	●	●	●	●	●	●	●	●	●	●	●	●	●
LEFS40-[Stroke]-X139	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● : Available — : Not available

Dimensions

LEFS16, 25, 32, 40



Dimensions (mm)

Model	External dimensions		
	Height	Width	Total length
LEFS16-[Stroke]-X139	40	40	49 + [Stroke]
LEFS25-[Stroke]-X139	48	58	130 + [Stroke]
LEFS32-[Stroke]-X139	60	70	150 + [Stroke]
LEFS40-[Stroke]-X139	68	90	204 + [Stroke]

Weight

(kg)

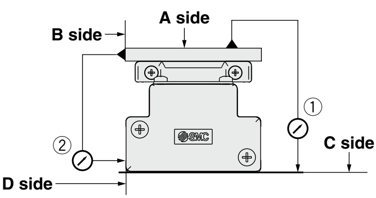
Model	Stroke													
	100	200	300	400	500	600	700	800	900	1000	1200	1500	1800	2000
LEFS16-[Stroke]-X139	0.31	0.43	0.55	0.67	0.79	0.91	1.03	1.15	1.27	1.39	—	—	—	—
LEFS25-[Stroke]-X139	0.67	0.89	1.11	1.33	1.55	1.77	1.99	2.21	2.43	2.65	3.09	3.75	4.41	4.85
LEFS32-[Stroke]-X139	1.08	1.40	1.72	2.04	2.36	2.68	3.00	3.32	3.64	3.96	4.60	5.56	6.52	7.16
LEFS40-[Stroke]-X139	1.86	2.29	2.72	3.15	3.58	4.01	4.44	4.87	5.30	5.73	6.59	7.88	9.17	10.03

Rated Load

Unit: N

Rated load	**LEFS16**	**LEFS25**	**LEFS32**	**LEFS40**
Basic dynamic rated load	6250	8950	16500	22700
Basic static rated load	8350	13900	22000	34500

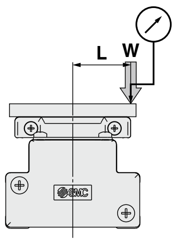
Table Accuracy

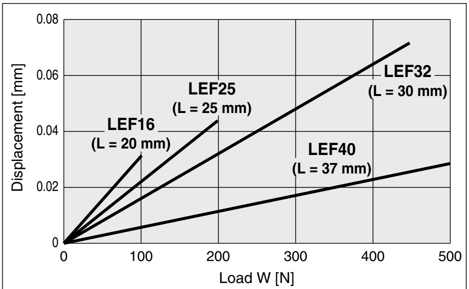


Model	Traveling parallelism [mm] (Every 300 mm)	
	① C side traveling parallelism to A side	② D side traveling parallelism to B side
LEF16	0.05	0.03
LEF25	0.05	0.03
LEF32	0.05	0.03
LEF40	0.05	0.03

Note) Traveling parallelism does not include the mounting surface accuracy.

Table Displacement (Reference Value)



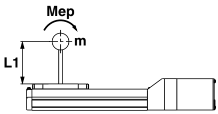
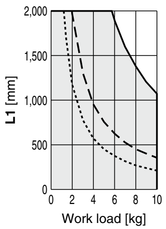
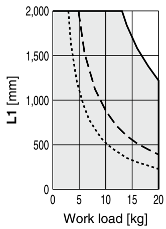
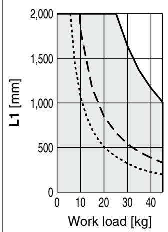
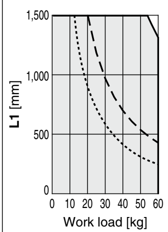
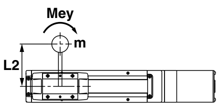
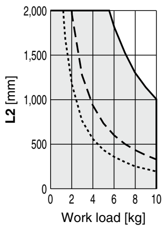
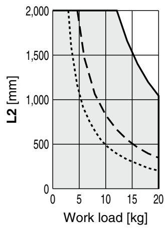
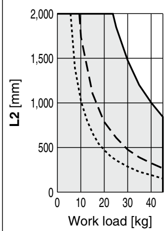
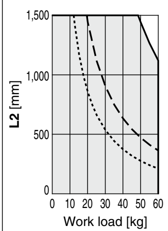
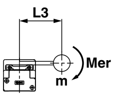
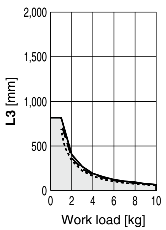
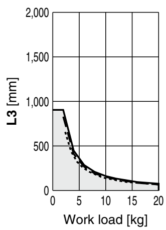
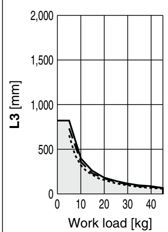
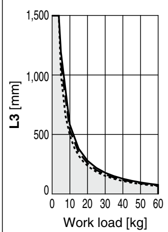
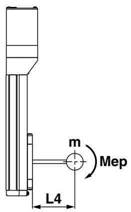
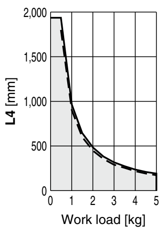
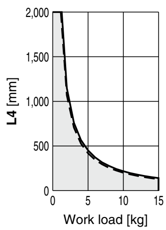
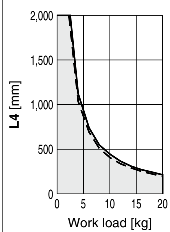
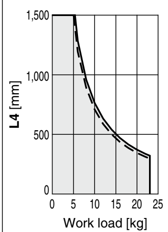
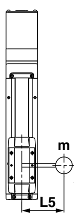
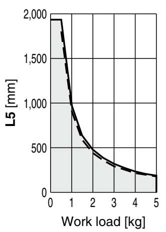
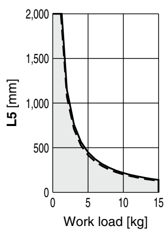
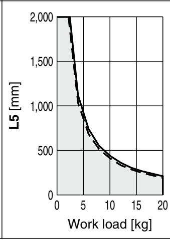
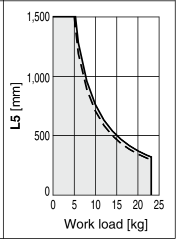


Note 1) This displacement is measured when a 15 mm aluminum plate is mounted and fixed on the table.
Note 2) Please confirm the clearance and play of the guide separately.

Dynamic Allowable Moment

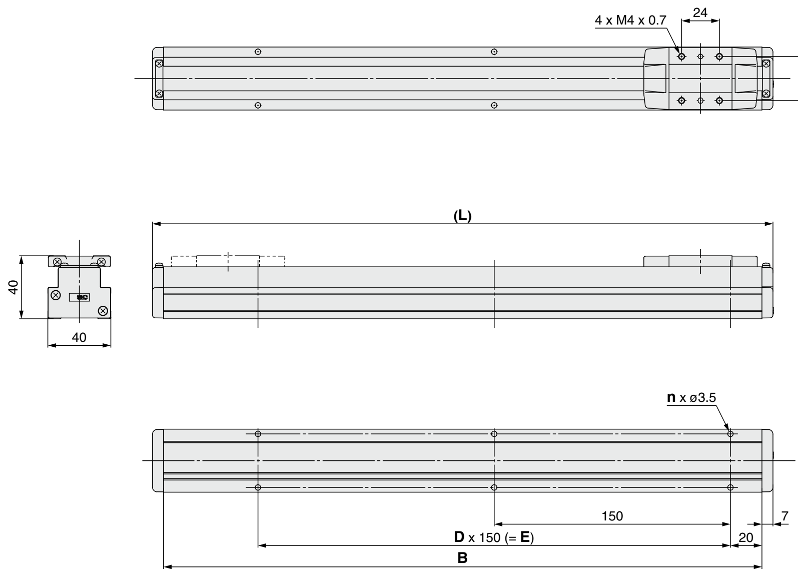
* This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

Acceleration/Deceleration —— 1,000 mm/s² – – – 3,000 mm/s² ········ 5,000 mm/s²

Orientation	Load overhanging direction **m**: Work load [kg] **Me**: Dynamic allowable moment [N·m] **L**: Overhang to the work load center of gravity [mm]		Model LEF16	LEF25	LEF32	LEFS40
Horizontal		Pitching				
		Yawing				
		Rolling				
Vertical		Pitching				
		Yawing				

Dimensions

LEFS16

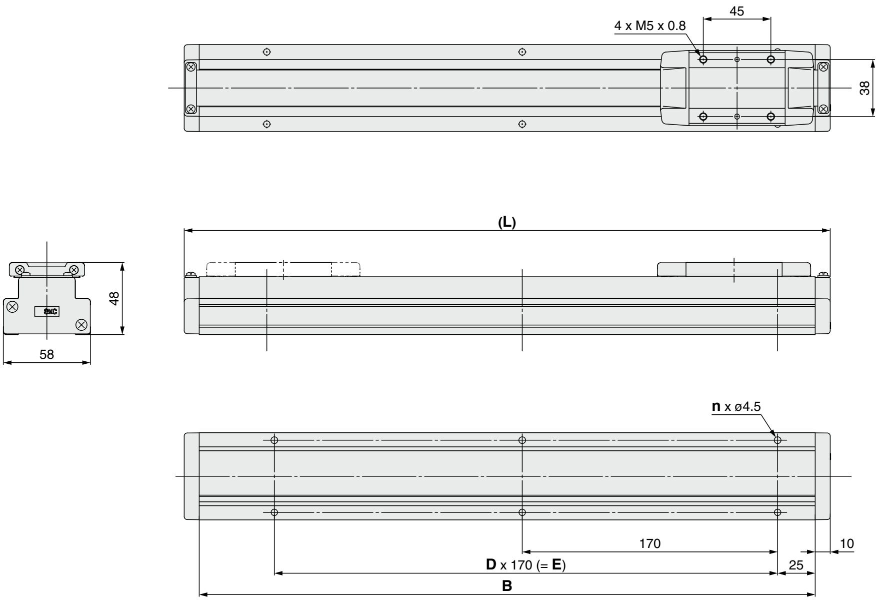


Dimensions (mm)

Part no.	L	B	n	D	E
LEFS16-100-X139	194	180	4	1	150
LEFS16-200-X139	294	280	4	1	150
LEFS16-300-X139	394	380	6	2	300
LEFS16-400-X139	494	480	8	3	450
LEFS16-500-X139	594	580	8	3	450
LEFS16-600-X139	694	680	10	4	600
LEFS16-700-X139	794	780	12	5	750
LEFS16-800-X139	894	880	12	5	750
LEFS16-900-X139	994	980	14	6	900
LEFS16-1000-X139	1094	1080	16	7	1050

Dimensions

LEFS25



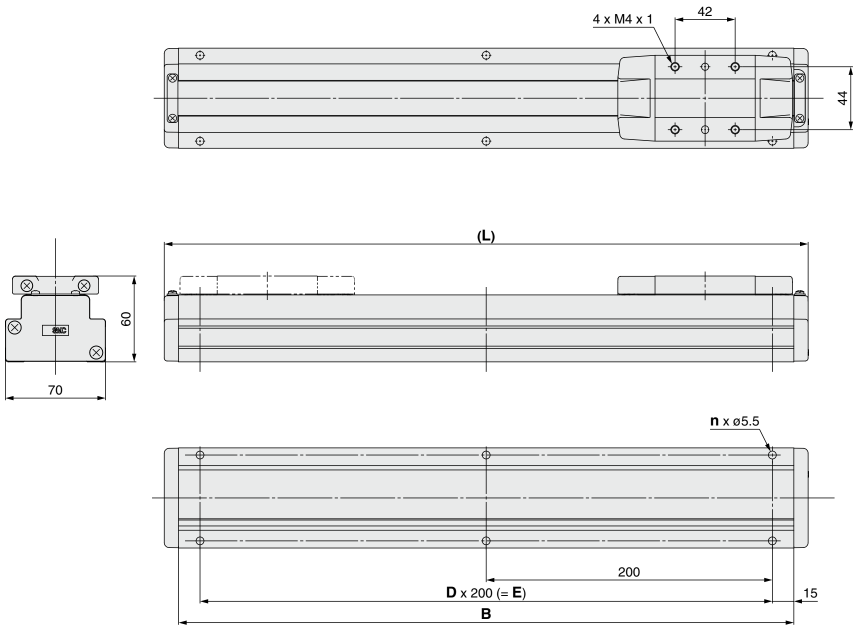
Dimensions

(mm)

Part no.	L	B	n	D	E
LEFS25-100-X139	230	210	4	1	170
LEFS25-200-X139	330	310	4	1	170
LEFS25-300-X139	430	410	6	2	340
LEFS25-400-X139	530	510	6	2	340
LEFS25-500-X139	630	610	8	3	510
LEFS25-600-X139	730	710	8	3	510
LEFS25-700-X139	830	810	10	4	680
LEFS25-800-X139	930	910	12	5	850
LEFS25-900-X139	1030	1010	12	5	850
LEFS25-1000-X139	1130	1110	14	6	1020
LEFS25-1200-X139	1330	1310	16	7	1190
LEFS25-1500-X139	1630	1610	20	9	1530
LEFS25-1800-X139	1930	1910	24	11	1870
LEFS25-2000-X139	2130	2110	26	12	2040

Dimensions

LEFS32

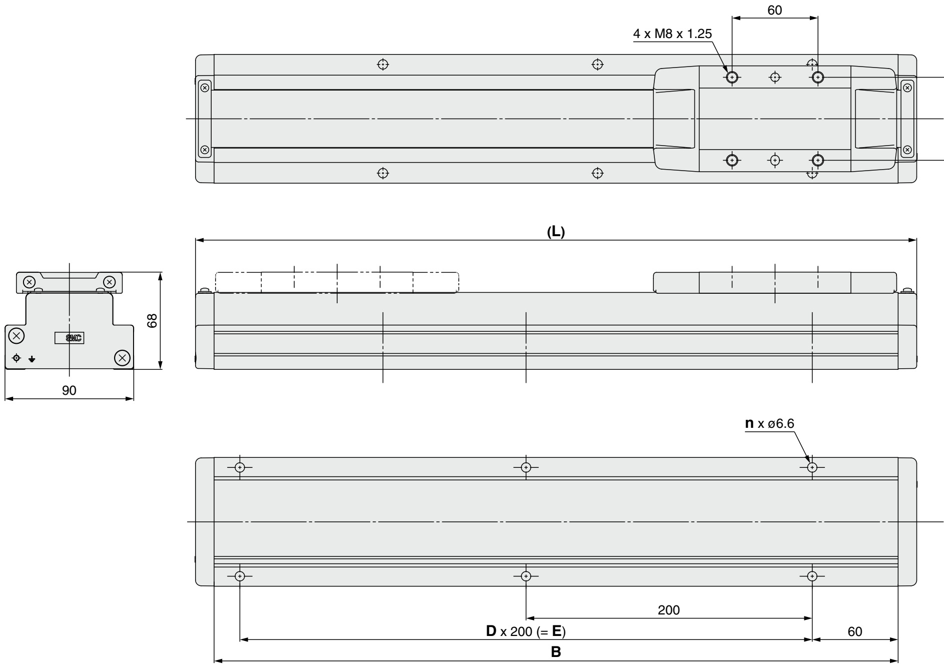


Dimensions (mm)

Part no.	L	B	n	D	E
LEFS32-100-X139	250	230	4	1	200
LEFS32-200-X139	350	330	4	1	200
LEFS32-300-X139	450	430	6	2	400
LEFS32-400-X139	550	530	6	2	400
LEFS32-500-X139	650	630	8	3	600
LEFS32-600-X139	750	730	8	3	600
LEFS32-700-X139	850	830	10	4	800
LEFS32-800-X139	950	930	10	4	800
LEFS32-900-X139	1050	1030	12	5	1000
LEFS32-1000-X139	1150	1130	12	5	1000
LEFS32-1200-X139	1350	1330	14	6	1200
LEFS32-1500-X139	1650	1630	18	8	1600
LEFS32-1800-X139	1950	1930	20	9	1800
LEFS32-2000-X139	2150	2130	22	10	2000

Dimensions

LEFS40



Dimensions (mm)

Part no.	L	B	n	D	E
LEFS40-200-X139	404	378	4	1	200
LEFS40-300-X139	504	478	6	2	400
LEFS40-400-X139	604	578	6	2	400
LEFS40-500-X139	704	678	8	3	600
LEFS40-600-X139	804	778	8	3	600
LEFS40-700-X139	904	878	10	4	800
LEFS40-800-X139	1004	978	10	4	800
LEFS40-900-X139	1104	1078	12	5	1000
LEFS40-1000-X139	1204	1178	12	5	1000
LEFS40-1200-X139	1404	1378	14	6	1200
LEFS40-1500-X139	1704	1678	16	8	1600
LEFS40-1800-X139	2004	1978	20	9	1800
LEFS40-2000-X139	2204	2178	22	10	2000

Electric Actuator
Series LEJ

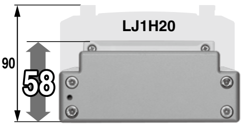
CE RoHS

High Rigidity Slider Type

Low-profile/Low center of gravity

Height dimension reduced by approx. **36**% (Reduced by **32** mm)

Series	Work load (kg)	Speed (mm/s)	Motor output (W)
New **LEJS40**	55	600	100
(Existing model) **LJ1H20**	30	500	100



LEJS40

AC Servo Motor Type

Ball Screw Drive *Series LEJS*

Size: 40, 63 ▸Page 90

Work load: 85 kg

Positioning repeatability: ±0.02 mm

Max. acceleration/deceleration: 20,000 mm/s^2

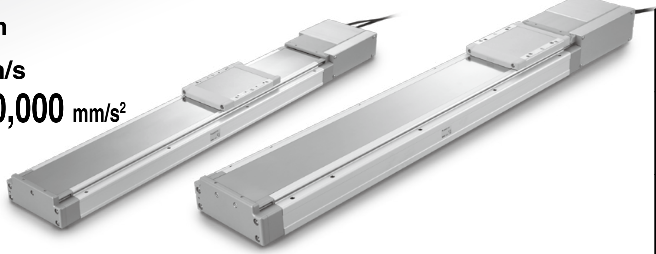
Belt Drive *Series LEJB*

Size: 40, 63 ▸Page 90

Max. stroke: 3,000 mm

Max. speed: 3,000 mm/s

Max. acceleration/deceleration: 20,000 mm/s^2



AC Servo Motor Driver ▸Page 419

Incremental Type

Pulse input type/
Positioning type
Series LECSA

Absolute Type

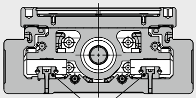
Pulse input type
Series LECSB

CC-Link
direct input type
Series LECSC

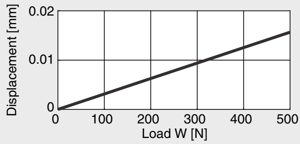
SSCNET Ⅲ type
Series LECSS

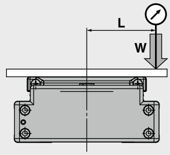
●High precision/High rigidity

Double axis linear guide reduces deflection



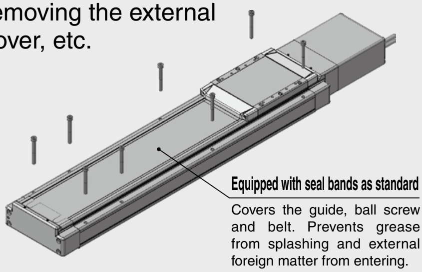
Linear guide (Double axis)





●Reduction of the installation labor

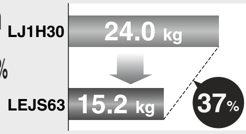
Possible to mount the main body without removing the external cover, etc.



●Weight reduction

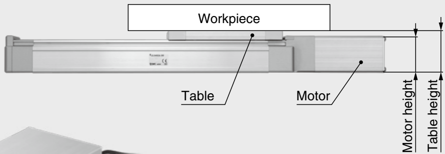
Weight reduced by approx. 37%

∗ Stroke: 600 mm



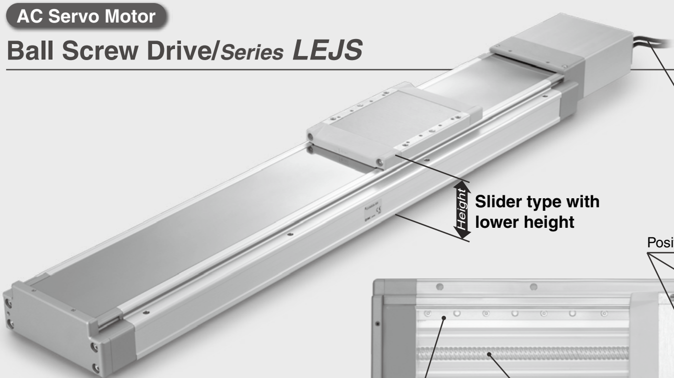
●Workpiece does not interfere with the motor

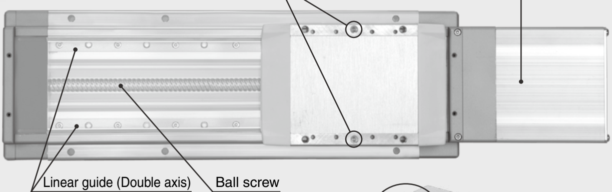
Table height > Motor height



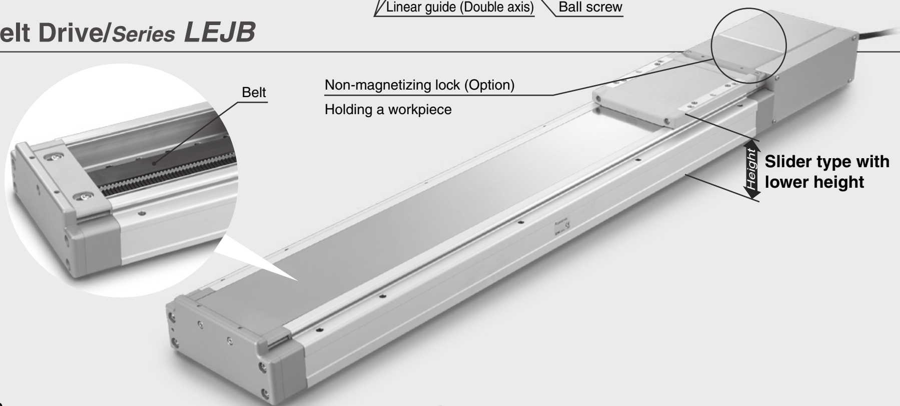
AC Servo Motor

Ball Screw Drive/*Series* LEJS



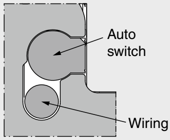


Belt Drive/*Series* LEJB



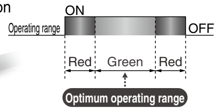
●Solid state auto switch can be mounted (For checking the limit and intermediate signal)

- Switch wiring can be placed in the body
- D-M9□W (2-color indication), D-M9□



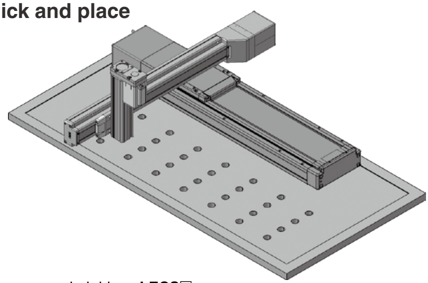
2-color indication solid state auto switch
Appropriate setting of the mounting position can be performed without mistakes.

A green light lights up at the optimum operating range.



Application Examples

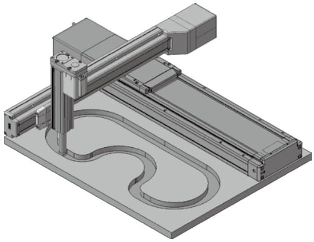
Pick and place



Recommended driver: **LECS□**

LECSA **LECSB** **LECSC** **LECSS**

Glue dispensing/High speed trajectory is available



Recommended driver: **LECSS**
(SSCNET Ⅲ)

Series Variations

Ball Screw Drive/Series LEJS

Size	Lead (mm)	Stroke (mm)*	Work load: Horizontal (kg) 10 20 30 40 50 60 70 80 90	Work load: Vertical (kg) 10 20 30	Speed (mm/s) 200 400 600 800 1000 1200	Page
40	8	200, 300, (400) 500, 600, (700) 800, (900) (1000), (1200)				Page 98
	16					
63	10	300, (400), 500 600, (700), 800 (900), 1000 (1200), (1500)				
	20					

* Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.

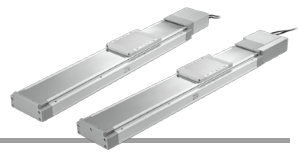
Belt Drive/Series LEJB

Size	Equivalent lead (mm)	Stroke (mm)*1	Work load: Horizontal (kg)*2 5 10 15 20 25 30	Speed (mm/s) 500 1000 1500 2000 2500 3000	Page
40	27	(200), 300, (400), 500, (600), (700), 800 (900), 1000, (1200), (1500), (2000)			Page 103
63	42	(300), (400), 500, (600), (700), 800 (900), 1000, 1200, (1500), (2000), (3000)			

*1 Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.
*2 The belt drive actuator cannot be used vertically for applications.

LEF LEJ LEL LEY LEYG LES LESH LEPY LEPS LER LEH LECA6 LECP6 LEC-G LECP1 LECPA LECS□ LAT3

Model Selection



Selection Procedure

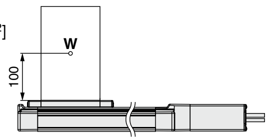
Step 1 Check the speed–work load. → **Step 2** Check the cycle time. → **Step 3** Check the allowable moment.

Selection Example

Operating conditions

- Work load: 60 [kg]
- Speed: 300 [mm/s]
- Acceleration/Deceleration: 3000 [mm/s²]
- Stroke: 300 [mm]
- Mounting orientation: Horizontal
- Motor type: Incremental encoder
- External force: 10 [N]

• Workpiece mounting condition:

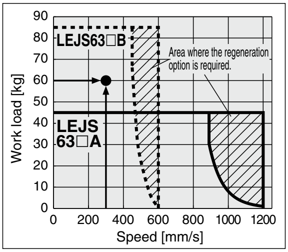


Step 1 Check the speed–work load.

Select the product by referring to "Speed–Work Load Graph" (Page 91).

Selection example) The **LEJS63S3B-300** is temporarily selected based on the graph shown on the right side.

The regeneration option (LEC-MR-RB-032) may be necessary. See the shaded area in the graph.



<Speed–Work load graph> (LEJS63)

Step 2 Check the cycle time.

Refer to method 1 for a rough estimate, and method 2 for a more precise value.

Method 1: Check the cycle time graph (Page 92)

The graph is based on the maximum speed of each size.

Method 2: Calculation

Cycle time T can be found from the following equation.

$\boxed{T = T1 + T2 + T3 + T4 \text{ [s]}}$

- T1 and T3 can be obtained by the following equation.

$\boxed{T1 = V/a1 \text{ [s]}}$ $\boxed{T3 = V/a2 \text{ [s]}}$

The acceleration and deceleration values have upper limits depending on the workpiece mass and the duty ratio. Check that they do not exceed the upper limit, by referring to "Work load–Acceleration/Deceleration Graph (Guide)" (Pages 93 and 94).
For the ball screw type, there is an upper limit of the speed depending on the stroke. Check that if it does not exceed the upper limit, by referring to the specifications (Page 99).

- T2 can be found from the following equation.

$$\boxed{T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} \text{ [s]}}$$

- T4 varies depending on the motor type and load. The value below is recommended.

$\boxed{T4 = 0.05 \text{ [s]}}$

Calculation example)
T1 to T4 can be calculated as follows.

$T1 = V/a1 = 300/3000 = 0.1$ [s],

$T3 = V/a2 = 300/3000 = 0.1$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}$$

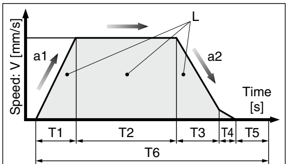
$$= \frac{300 - 0.5 \cdot 300 \cdot (0.1 + 0.1)}{300}$$

$= 0.90$ [s]

$T4 = 0.05$ [s]

Therefore, the cycle time can be obtained as follows.

$T = T1 + T2 + T3 + T4$
$= 0.1 + 0.90 + 0.1 + 0.05$
$=$ **1.15 [s]**



L : Stroke [mm]
V : Speed [mm/s]
a1: Acceleration [mm/s²]
a2: Deceleration [mm/s²]

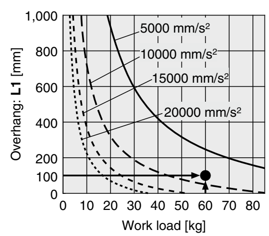
T1: Acceleration time [s]
Time until reaching the set speed
T2: Constant speed time [s]
Time while the actuator is operating at a constant speed
T3: Deceleration time [s]
Time from the beginning of the constant speed operation to stop
T4: Settling time [s]
Time until in position is completed
T5: Resting time [s]
Time the product is not running
T6: Total time [s]
Total time from T1 to T5

Duty ratio: Ratio of T to T6
T ÷ T6 x 100

Step 3 Check the allowable moment.

Refer to "Dynamic Allowable Moment" graphs (Pages 95 and 96).

Selection example) Select the **LEJS63S3B-300** from the graph on the right side.
Confirm that the external force is 20 [N] or less (Refer to the allowable external force on page 99.).
(The external force is the resistance due to cable duct, flexible trunking or air tubing.)

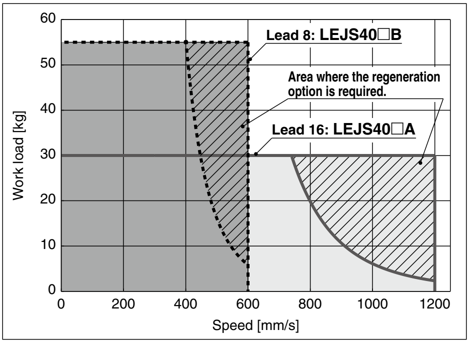


<Dynamic allowable moment> (LEJS63)

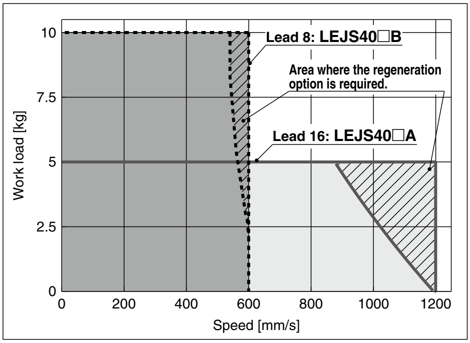
Speed–Work Load Graph (Guide)

LEJS40/Ball Screw Drive

Horizontal

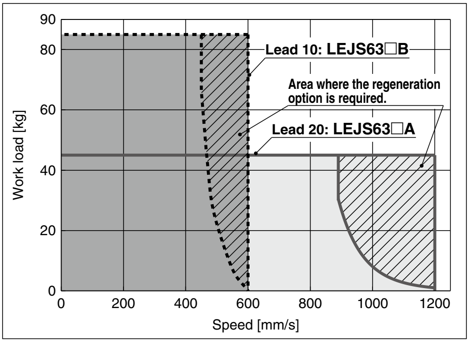


Vertical

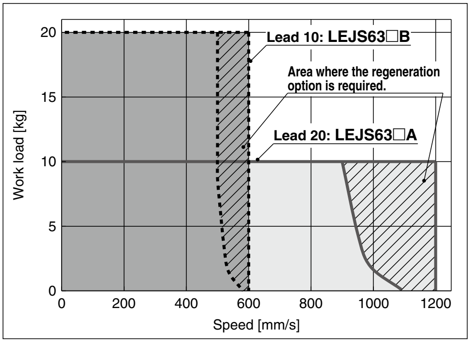


LEJS63/Ball Screw Drive

Horizontal

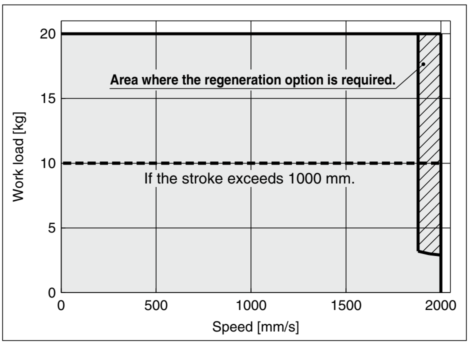


Vertical



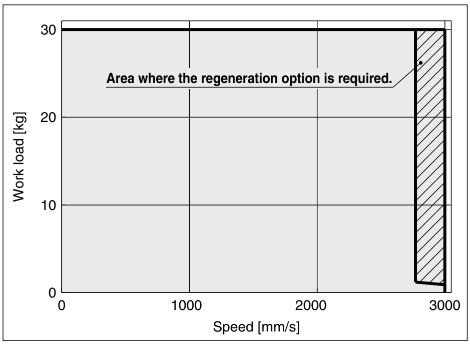
LEJB40/Belt Drive

Horizontal



LEJB63/Belt Drive

Horizontal

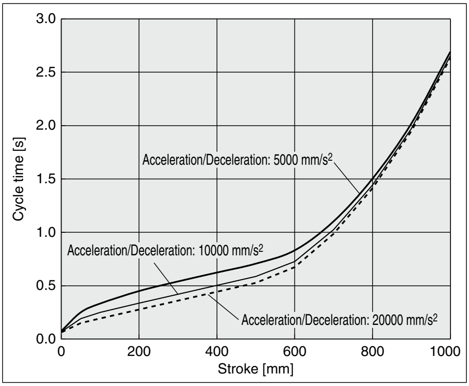


* When the stroke of the LEJB40 series exceeds 1000 mm, the work load is 10 kg.
* The shaded area in the graph requires the regeneration option (LEC-MR-RB-032).
* The belt drive actuator cannot be used vertically for applications.

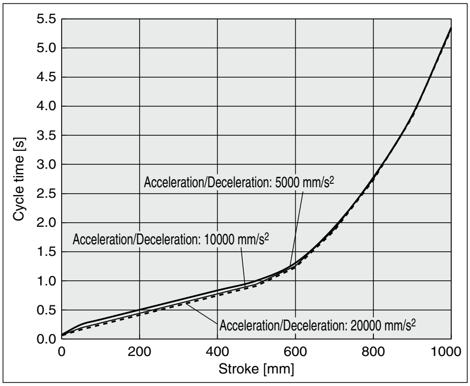
Cycle Time Graph (Guide)

LEJS40/Ball Screw Drive

LEJS40□A

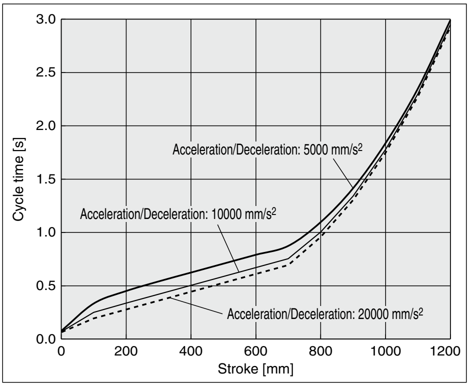


LEJS40□B

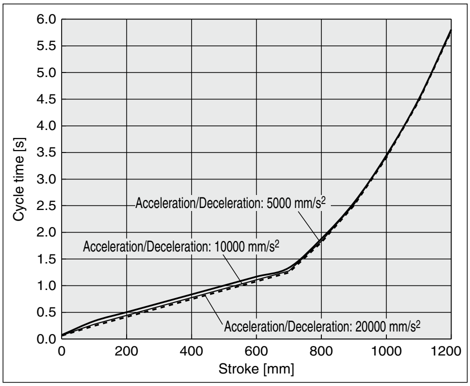


LEJS63/Ball Screw Drive

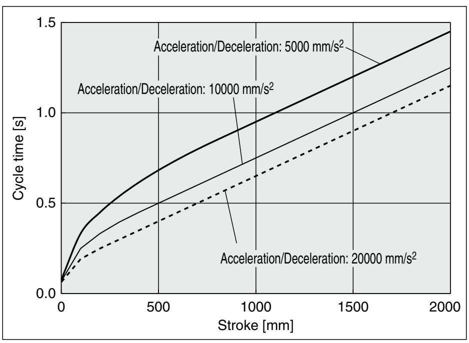
LEJS63□A



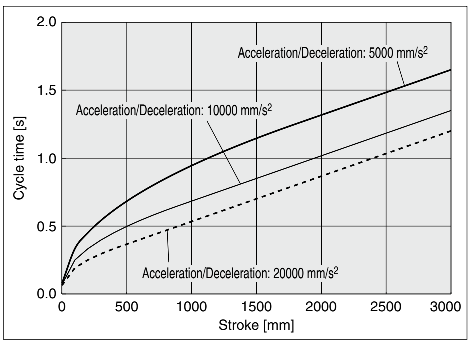
LEJS63□B



LEJB40/Belt Drive



LEJB63/Belt Drive

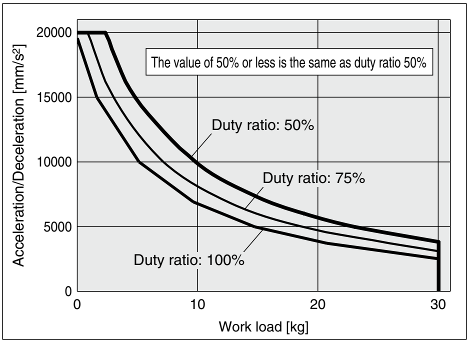


∗ Work load/acceleration/deceleration graph
∗ Maximum speed/acceleration/deceleration values graph for each stroke

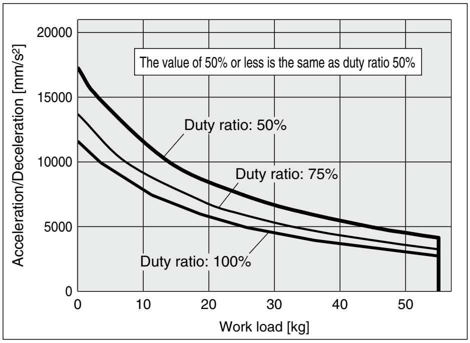
Work Load–Acceleration/Deceleration Graph (Guide)

LEJS40/Ball Screw Drive: Horizontal

LEJS40□A

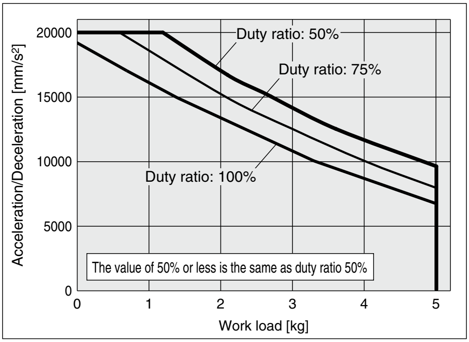


LEJS40□B

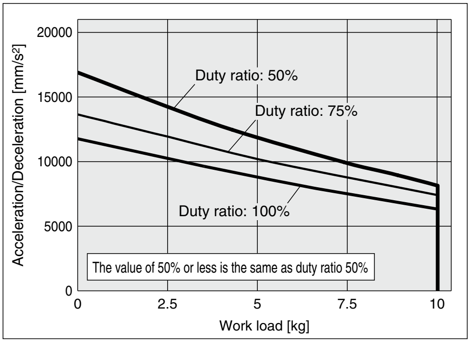


LEJS40/Ball Screw Drive: Vertical

LEJS40□A



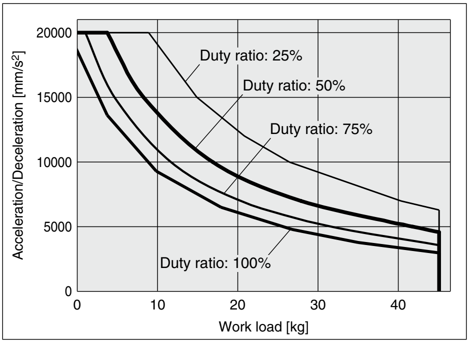
LEJS40□B



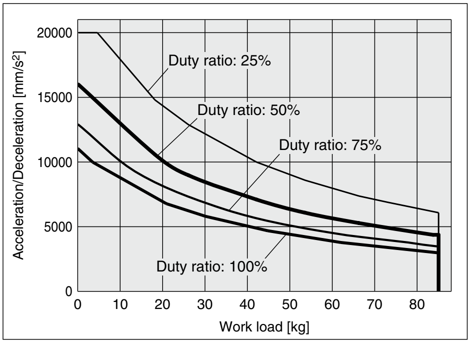
Work Load–Acceleration/Deceleration Graph (Guide)

LEJS63/Ball Screw Drive: Horizontal

LEJS63□A

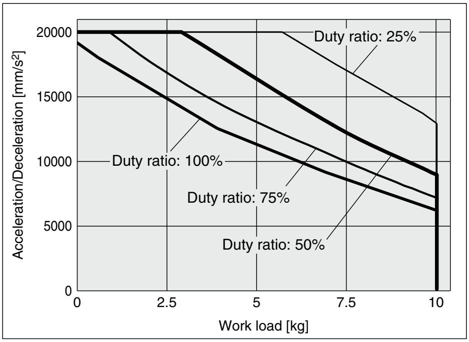


LEJS63□B

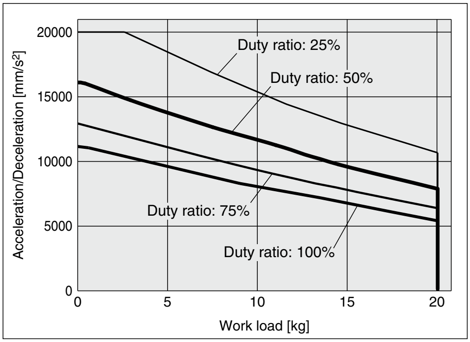


LEJS63/Ball Screw Drive: Vertical

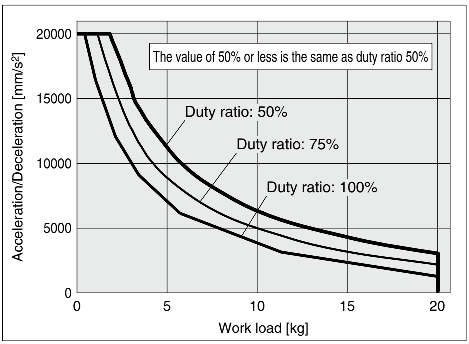
LEJS63□A



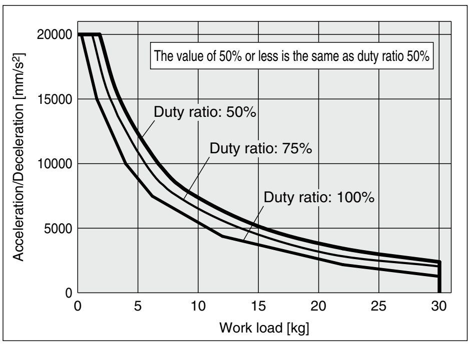
LEJS63□B



LEJB40/Belt Drive: Horizontal



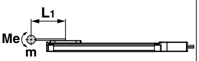
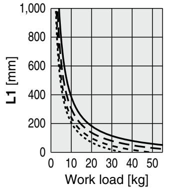
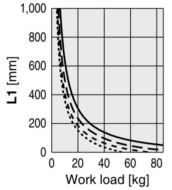
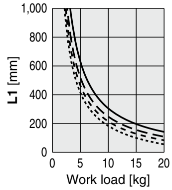
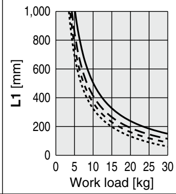
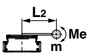
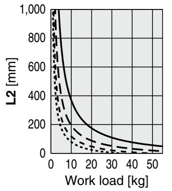
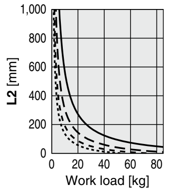
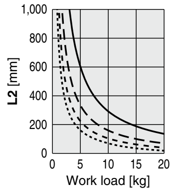
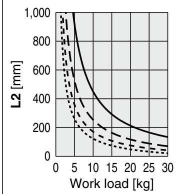
LEJB63/Belt Drive: Horizontal



Dynamic Allowable Moment

∗ This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

Acceleration/Deceleration —— 5,000 mm/s² — — — 10,000 mm/s² - - - - 15,000 mm/s² ········ 20,000 mm/s²

<table>
<tr><th rowspan="2">Orientation</th><th colspan="2" rowspan="2">Load overhanging direction
m : Work load [kg]
Me: Dynamic allowable moment [N·m]
L : Overhang to the work load center of gravity [mm]</th><th colspan="4">Model</th></tr>
<tr><th>LEJS40</th><th>LEJS63</th><th>LEJB40</th><th>LEJB63</th></tr>
<tr><td rowspan="3">Horizontal/Bottom</td><td></td><td>X</td>
<td></td>
<td></td>
<td></td>
<td></td></tr>
<tr><td></td><td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td></tr>
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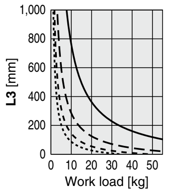
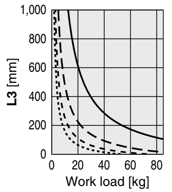
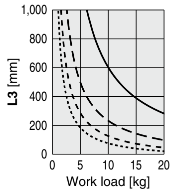
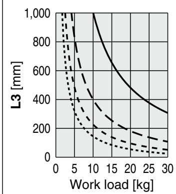
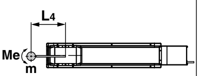
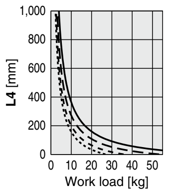
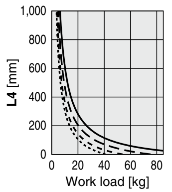
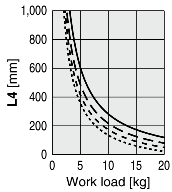
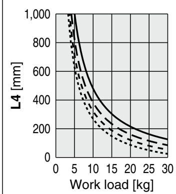
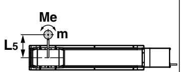
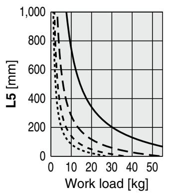
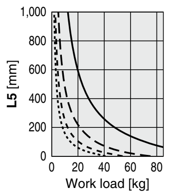
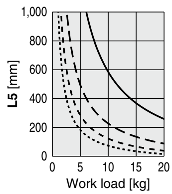
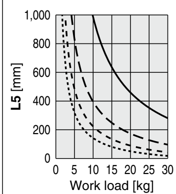
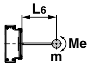
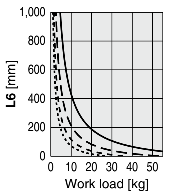
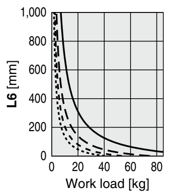
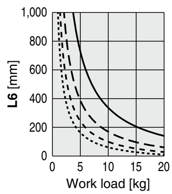
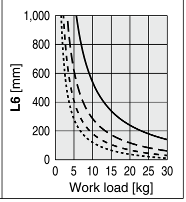
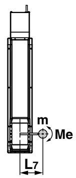
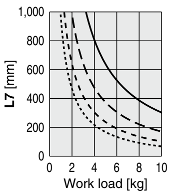
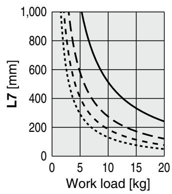
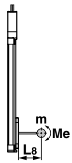
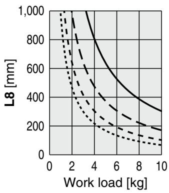
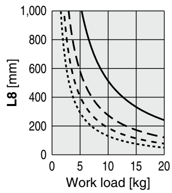
<td></td>
<td></td>
<td></td>
<td></td></tr>
<tr><td rowspan="3">Wall</td><td></td><td>X</td>
<td></td>
<td></td>
<td></td>
<td></td></tr>
<tr><td></td><td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td></tr>
<tr><td></td><td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td></tr>
</table>

Dynamic Allowable Moment

* This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

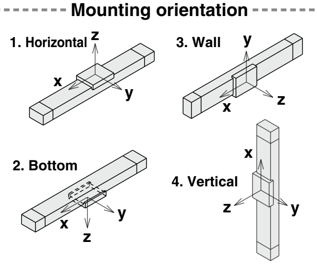
Acceleration/Deceleration —— 5,000 mm/s² — — — 10,000 mm/s² - - - - 15,000 mm/s² ········ 20,000 mm/s²

Orientation	Load overhanging direction **m** : Work load [kg] **Me**: Dynamic allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model LEJS40	Model LEJS63
Vertical		**Y**		
		**Z**		

Calculation of Guide Load Factor

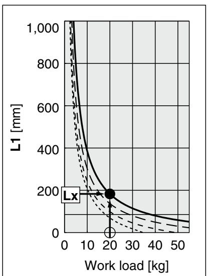
1. Decide operating conditions.
   Model: LEJS/LEJB
   Size: 40/63
   Mounting orientation: Horizontal/Bottom/Wall/Vertical
   Acceleration [mm/s²]: **a**
   Work load [kg]: **m**
   Work load center position [mm]: **Xc/Yc/Zc**
2. Select the target graph with reference to the model, size and mounting orientation.
3. Based on the acceleration and work load, obtain the overhang [mm]: **Lx/Ly/Lz** from the graph.
4. Calculate the load factor for each direction.
   $\alpha x = Xc/Lx$, $\alpha y = Yc/Ly$, $\alpha z = Zc/Lz$
5. Confirm the total of αx, αy and αz is 1 or less.
   $\alpha x + \alpha y + \alpha z \leq 1$
   When 1 is exceeded, please consider a reduction of acceleration and work load, or a change of the work load center position and series.

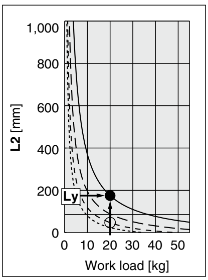
Mounting orientation



Example

1. Operating conditions
   Model: LEJS
   Size: 40
   Mounting orientation: Horizontal
   Acceleration [mm/s²]: 5000
   Work load [kg]: 20
   Work load center position [mm]: **Xc = 0**, **Yc = 50**, **Zc = 200**
2. Select the graph on page 95, top and left side first row.
3. **Lx = 180 mm**, **Ly = 170 mm**, **Lz = 360 mm**
4. The load factor for each direction can be obtained as follows.
   $\alpha x = 0/180 = 0$
   $\alpha y = 50/170 = 0.29$
   $\alpha z = 200/360 = 0.56$
5. $\alpha x + \alpha y + \alpha z = 0.85 \leq 1$





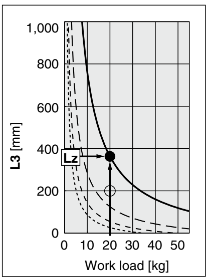
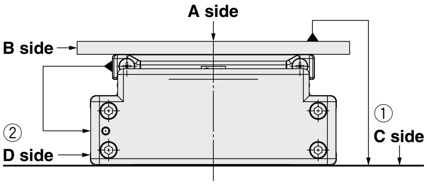


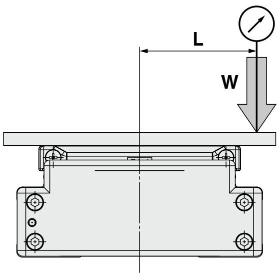
Table Accuracy (Reference Value)

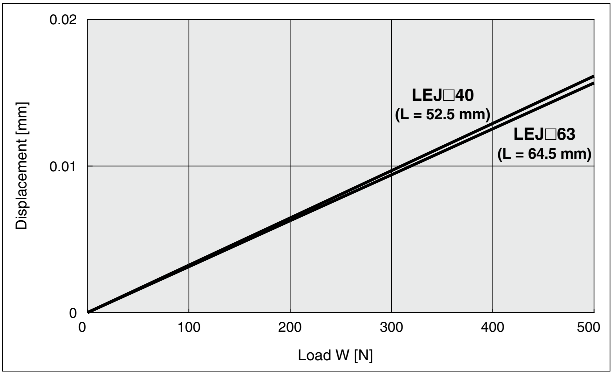


Model	Traveling parallelism [mm] (Every 300 mm)	
	① C side traveling parallelism to A side	② D side traveling parallelism to B side
LEJ□40	0.05	0.03
LEJ□63	0.05	0.03

Note) Traveling parallelism does not include the mounting surface accuracy.

Table Displacement (Reference Value)

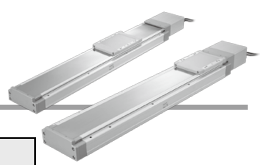




Note) This displacement is measured when a 15 mm aluminum plate is mounted and fixed on the table. (Table clearance is included.)

Electric Actuator/High Rigidity Slider Type
Ball Screw Drive AC Servo Motor
Series LEJS

CE RoHS



How to Order

LEJS 40 S2 A – 500 ☐ – ☐ ☐ ☐ ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Size

40
63

❷ Motor type*1

Symbol	Type	Output [W]	Actuator size	Compatible drivers*2
S2	AC servo motor (Incremental encoder)	100	40	LECSA☐-S1
S3	AC servo motor (Incremental encoder)	200	63	LECSA☐-S3
S6	AC servo motor (Absolute encoder)	100	40	LECSB☐-S5 LECSC☐-S5 LECSS☐-S5
S7	AC servo motor (Absolute encoder)	200	63	LECSB☐-S7 LECSC☐-S7 LECSS☐-S7

*1: For motor type S2 and S6, the compatible driver part number suffixes are S1 and S5 respectively.
*2: For details of the driver, refer to page 419.

❸ Lead [mm]

Symbol	LEJS40	LEJS63
A	16	20
B	8	10

❹ Stroke [mm]*3

200
to
1500

*3: Refer to the table below for details.

❺ Motor option

Nil	Without option
B	With lock

❻ Cable type*5, *6, *7

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

*6: The motor and encoder cables are included. (The lock cable is included when the motor with lock option is selected.)
*7: Standard cable entry direction is "(A) Axis side". (Refer to page 435 for details.)

❼ Cable length [m]*5, *8

Nil	Without cable
2	2 m
5	5 m
A	10 m

*8: The length of the motor, encoder and lock cables are the same.

❽ Driver type*5

	Compatible drivers	Power supply voltage (V)
Nil	Without driver	—
A1	LECSA1-S☐	100 to 120
A2	LECSA2-S☐	200 to 230
B1	LECSB1-S☐	100 to 120
B2	LECSB2-S☐	200 to 230
C1	LECSC1-S☐	100 to 120
C2	LECSC2-S☐	200 to 230
S1	LECSS1-S☐	100 to 120
S2	LECSS2-S☐	200 to 230

*5: When the driver type is selected, the cable is included. Select cable type and cable length.
Example)
S2S2: Standard cable (2 m) + Driver (LECSS2)
S2 : Standard cable (2 m)
Nil : Without cable and driver

❾ I/O connector

Nil	Without connector
H	With connector

Applicable Stroke Table*4

●Standard ○Produced upon receipt of order

Model \ Stroke (mm)	200	300	400	500	600	700	800	900	1000	1200	1500
LEJS40	●	●	○	●	●	○	●	○	○	○	—
LEJS63	—	●	○	●	●	○	●	○	●	○	○

*4: Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.

For auto switches, refer to pages 108 and 109.

Compatible Drivers

Driver type	Pulse input type /Positioning type 	Pulse input type 	CC-Link direct input type 	SSCNET Ⅲ type 
Series	LECSA	LECSB	LECSC	LECSS
Number of point tables	Up to 7	—	Up to 255	—
Pulse input	○	○	—	—
Applicable network	—	—	CC-Link	SSCNET Ⅲ
Control encoder	Incremental 17-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder
Communication	USB communication	USB communication, RS422 communication	USB communication, RS422 communication	USB communication
Power supply voltage (V)	100 to 120 VAC (50/60 Hz) 200 to 230 VAC (50/60 Hz)			
Reference page	Page 419			

Specifications

LEJS40/63 AC Servo Motor

Model				LEJS40S$^{2}_{6}$		LEJS63S$^{3}_{7}$	
Actuator specifications	Stroke [mm] Note 1)			200, 300, (400), 500, 600, (700), 800 (900), (1000), (1200)		300, (400), 500, 600, (700), 800, (900) 1000, (1200), (1500)	
	Work load [kg] Note 2)		Horizontal	30	55	45	85
			Vertical	5	10	10	20
	Speed Note 3) [mm/s]	Stroke range	Up to 500	1200	600	1200	600
			501 to 600	1050	520	1200	600
			601 to 700	780	390	1200	600
			701 to 800	600	300	930	460
			801 to 900	480	240	740	370
			901 to 1000	390	190	600	300
			1001 to 1100	320	160	500	250
			1101 to 1200	270	130	420	210
			1201 to 1300	—	—	360	180
			1301 to 1400	—	—	310	150
			1401 to 1500	—	—	270	130
	Max. acceleration/deceleration [mm/s^2]			20000 (Refer to page 93 for limit according to work load and duty ratio.)			
	Positioning repeatability [mm] Note 4)			±0.02			
	Lead [mm]			16	8	20	10
	Impact/Vibration resistance [m/s^2] Note 5)			50/20			
	Actuation type			Ball screw			
	Guide type			Linear guide			
	Allowable external force [N]			20			
	Operating temperature range [°C]			5 to 40			
	Operating humidity range [%RH]			90 or less (No condensation)			
	Regeneration option			May be required depending on speed and work load. (Refer to page 435.)			
Electric specifications	Motor output [W]/Size [mm]			100/□40		200/□60	
	Motor type			AC servo motor (100/200 VAC)			
	Encoder			Motor type S2, S3: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S6, S7: Absolute 18-bit encoder (Resolution: 262144 p/rev)			
	Power consumption [W] Note 6)		Horizontal	65		80	
			Vertical	165		235	
	Standby power consumption when operating [W] Note 7)		Horizontal	2		2	
			Vertical	10		12	
	Max. instantaneous power consumption [W] Note 8)			445		725	
Lock unit specifications	Type Note 9)			Non-magnetizing lock			
	Holding force [N]			101	203	330	660
	Power consumption at 20°C [W] Note 10)			6.3		7.9	
	Rated voltage [V]			24 VDC $^{0}_{-10\%}$			

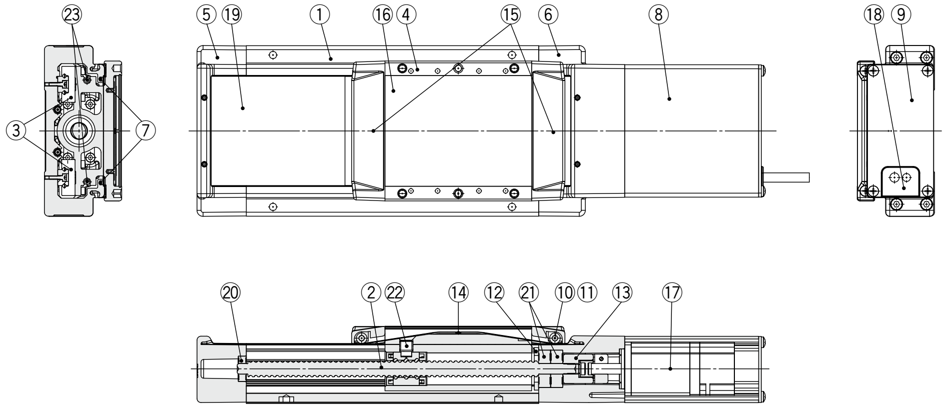
Note 1) Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.
Note 2) Check "Speed–Work Load Graph (Guide)" on page 91.
Note 3) The allowable speed changes according to the stroke.
Note 4) Conforming to JIS B 6191-1999
Note 5) Impact resistance: No malfunction occurred when the actuator 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 6) The power consumption (including the driver) is for when the actuator is operating.
Note 7) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during the operation.
Note 8) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 9) Only when motor option "With lock" is selected.
Note 10) For an actuator with lock, add the power consumption for the lock.

Weight

Model	LEJS40									
Stroke [mm]	200	300	(400)	500	600	(700)	800	(900)	(1000)	(1200)
Product weight [kg]	5.6	6.4	7.1	7.9	8.7	9.4	10.2	11.0	11.7	13.3
Additional weight with lock [kg]	0.2 (Incremental encoder)/0.3 (Absolute encoder)									

Model	LEJS63									
Stroke [mm]	300	(400)	500	600	(700)	800	(900)	1000	(1200)	(1500)
Product weight [kg]	11.4	12.7	13.9	15.2	16.4	17.7	18.9	20.1	22.6	26.4
Additional weight with lock [kg]	0.4 (Incremental encoder)/0.7 (Absolute encoder)									

Construction



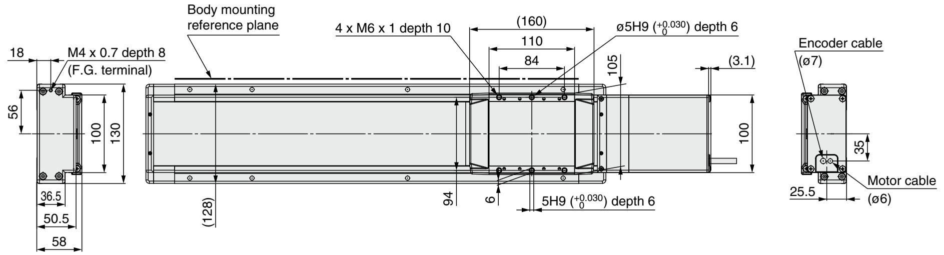
Component Parts

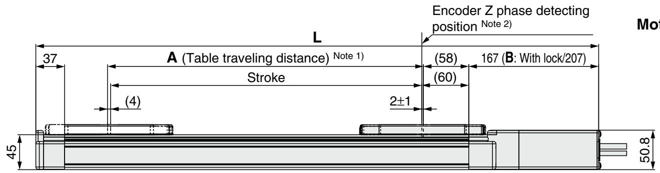
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw assembly**	—	
3	**Linear guide assembly**	—	
4	**Table**	Aluminum alloy	Anodized
5	**Housing A**	Aluminum alloy	Coating
6	**Housing B**	Aluminum alloy	Coating
7	**Seal magnet**	—	
8	**Motor cover**	Aluminum alloy	Anodized
9	**End cover A**	Aluminum alloy	Anodized
10	**Roller shaft**	Stainless steel	
11	**Roller**	Synthetic resin	
12	**Bearing stopper**	Carbon steel	

No.	Description	Material	Note
13	**Coupling**	—	
14	**Table cap**	Synthetic resin	
15	**Seal band stopper**	Synthetic resin	
16	**Blanking plate**	Aluminum alloy	Anodized
17	**Motor**	—	
18	**Grommet**	NBR	
19	**Dust seal band**	Stainless steel	
20	**Bearing**	—	
21	**Bearing**	—	
22	**Nut fixing pin**	Carbon steel	
23	**Magnet**	—	

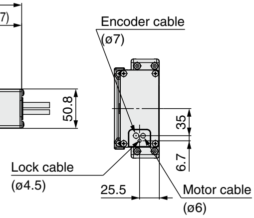
Dimensions: Ball Screw Drive

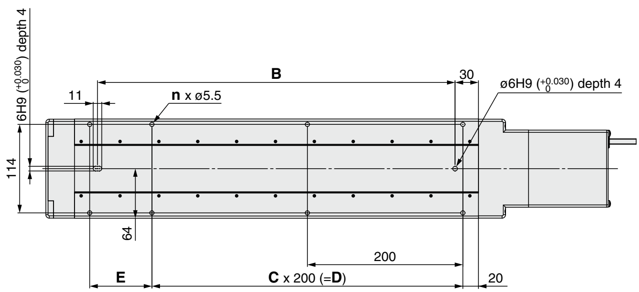
LEJS40





Motor option: B/With lock





Note 1) Distance 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) The Z phase first detecting position from the stroke end of the motor side.
Note 3) Auto switch magnet is located in the table center.

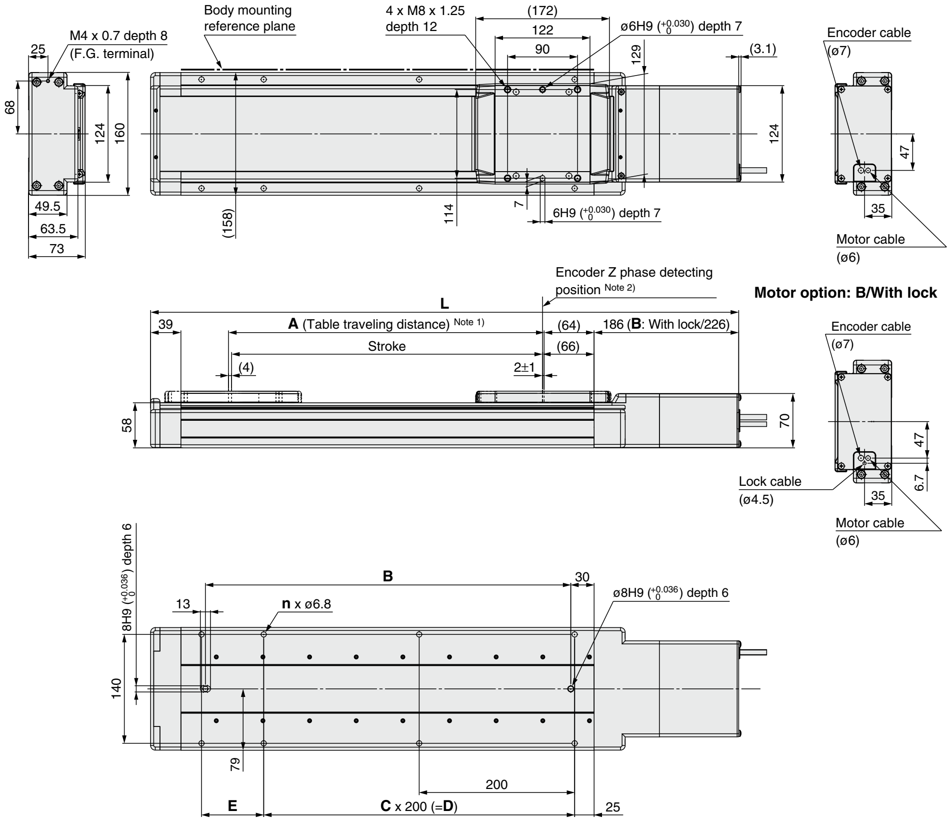
[mm]

Model	L		A	B	n	C	D	E
	Without lock	With lock						
LEJS40S□□-200□-□□□□	523.5	563.5	206	260	6	1	200	80
LEJS40S□□-300□-□□□□	623.5	663.5	306	360	6	1	200	180
LEJS40S□□-400□-□□□□	723.5	763.5	406	460	8	2	400	80
LEJS40S□□-500□-□□□□	823.5	863.5	506	560	8	2	400	180
LEJS40S□□-600□-□□□□	923.5	963.5	606	660	10	3	600	80
LEJS40S□□-700□-□□□□	1023.5	1063.5	706	760	10	3	600	180
LEJS40S□□-800□-□□□□	1123.5	1163.5	806	860	12	4	800	80
LEJS40S□□-900□-□□□□	1223.5	1263.5	906	960	12	4	800	180
LEJS40S□□-1000□-□□□□	1323.5	1363.5	1006	1060	14	5	1000	80
LEJS40S□□-1200□-□□□□	1523.5	1563.5	1206	1260	16	6	1200	80

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Dimensions: Ball Screw Drive

LEJS63



Note 1) Distance 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) The Z phase first detecting position from the stroke end of the motor side.
Note 3) Auto switch magnet is located in the table center.

[mm]

Model	L		A	B	n	C	D	E
	Without lock	With lock						
LEJS63S□□-300□-□□□□	656.5	696.5	306	370	6	1	200	180
LEJS63S□□-400□-□□□□	756.5	796.5	406	470	8	2	400	80
LEJS63S□□-500□-□□□□	856.5	896.5	506	570	8	2	400	180
LEJS63S□□-600□-□□□□	956.5	996.5	606	670	10	3	600	80
LEJS63S□□-700□-□□□□	1056.5	1096.5	706	770	10	3	600	180
LEJS63S□□-800□-□□□□	1156.5	1196.5	806	870	12	4	800	80
LEJS63S□□-900□-□□□□	1256.5	1296.5	906	970	12	4	800	180
LEJS63S□□-1000□-□□□□	1356.5	1396.5	1006	1070	14	5	1000	80
LEJS63S□□-1200□-□□□□	1556.5	1596.5	1206	1270	16	6	1200	80
LEJS63S□□-1500□-□□□□	1856.5	1896.5	1506	1570	18	7	1400	180

Electric Actuator/High Rigidity Slider Type Belt Drive AC Servo Motor

Series LEJB

CE RoHS

How to Order

LEJB 40 S2 T – 500 ☐ – ☐ ☐ ☐ ☐
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Size

40
63

❷ Motor type*1

Symbol	Type	Output [W]	Actuator size	Compatible drivers
S2	AC servo motor (Incremental encoder)	100	40	LECSA☐-S1
S3	AC servo motor (Incremental encoder)	200	63	LECSA☐-S3
S6	AC servo motor (Absolute encoder)	100	40	LECSB☐-S5 LECSC☐-S5 LECSS☐-S5
S7	AC servo motor (Absolute encoder)	200	63	LECSB☐-S7 LECSC☐-S7 LECSS☐-S7

*1: For motor type S2 and S6, the compatible driver part number suffixes are S1 and S5 respectively.

❸ Lead [mm]

Symbol	LEJB40	LEJB63
T	27	42

❹ Stroke [mm]*2

200
to
3000

*2: Refer to the table below for details.

❺ Motor option

Nil	Without option
B	With lock

❻ Cable type*4, *5, *6

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

*5: The motor and encoder cables are included. (The lock cable is included when the motor with lock option is selected.)
*6: Standard cable entry direction is "(A) Axis side". (Refer to page 435 for details.)

❼ Cable length [m]*4, *7

Nil	Without cable
2	2 m
5	5 m
A	10 m

*7: The length of the motor, encoder and lock cables are the same.

❽ Driver type*4

	Compatible drivers	Power supply voltage (V)
Nil	Without driver	—
A1	LECSA1	100 to 120
A2	LECSA2	200 to 230
B1	LECSB1	100 to 120
B2	LECSB2	200 to 230
C1	LECSC1	100 to 120
C2	LECSC2	200 to 230
S1	LECSS1	100 to 120
S2	LECSS2	200 to 230

❾ I/O connector

Nil	Without connector
H	With connector

Applicable Stroke Table*3

●Standard ○Produced upon receipt of order

Model \ Stroke (mm)	200	300	400	500	600	700	800	900	1000	1200	1500	2000	3000
LEJB40	○	●	○	●	○	○	●	○	●	○	○	○	—
LEJB63	—	○	○	●	○	○	●	○	●	●	○	○	○

*3: Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.

*4: When the driver type is selected, the cable is included. Select cable type and cable length.
Example)
S2S2: Standard cable (2 m) + Driver (LECSS2)
S2 : Standard cable (2 m)
Nil : Without cable and driver

For auto switches, refer to pages 108 and 109.

Compatible Drivers

Driver type	Pulse input type /Positioning type 	Pulse input type 	CC-Link direct input type 	SSCNET Ⅲ type 
Series	LECSA	LECSB	LECSC	LECSS
Number of point tables	Up to 7	—	Up to 255	—
Pulse input	○	○	—	—
Applicable network	—	—	CC-Link	SSCNET Ⅲ
Control encoder	Incremental 17-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder
Communication	USB communication	USB communication, RS422 communication	USB communication, RS422 communication	USB communication
Power supply voltage (V)	100 to 120 VAC (50/60 Hz) 200 to 230 VAC (50/60 Hz)			
Reference page	Page 419			

Specifications

LEJB40/63 AC Servo Motor

Model			LEJB40S$^{2}_{6}$	LEJB63S$^{3}_{7}$
Actuator specifications	Stroke [mm] Note 1)		(200), 300, (400), 500, (600), (700), 800 (900), 1000, (1200), (1500), (2000)	(300), (400), 500, (600), (700), 800 (900), 1000, 1200, (1500), (2000), (3000)
	Work load [kg]	Horizontal	20 (If the stroke exceeds 1000 mm: 10)	30
	Speed [mm/s] Note 2)		2000	3000
	Max. acceleration/deceleration [mm/s^2]		20000 (Refer to page 94 for limit according to work load and duty ratio.)	
	Positioning repeatability [mm] Note 3)		±0.04	
	Lead [mm]		27	42
	Impact/Vibration resistance [m/s^2] Note 4)		50/20	
	Actuation type		Belt	
	Guide type		Linear guide	
	Allowable external force [N]		20	
	Operating temperature range [°C]		5 to 40	
	Operating humidity range [%RH]		90 or less (No condensation)	
	Regeneration option		May be required depending on speed and work load. (Refer to page 435.)	
Electric specifications	Motor output [W]/Size [mm]		100/□40	200/□60
	Motor type		AC servo motor (100/200 VAC)	
	Encoder		Motor type S2, S3: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S6, S7: Absolute 18-bit encoder (Resolution: 262144 p/rev)	
	Power consumption [W] Note 5)	Horizontal	65	190
		Vertical	—	—
	Standby power consumption when operating [W] Note 6)	Horizontal	2	2
		Vertical	—	—
	Max. instantaneous power consumption [W] Note 7)		445	725
Lock unit specifications	Type Note 8)		Non-magnetizing lock	
	Holding force [N]		60	189
	Power consumption at 20°C [W] Note 9)		6.3	7.9
	Rated voltage [V]		24 VDC $^{0}_{-10\%}$	

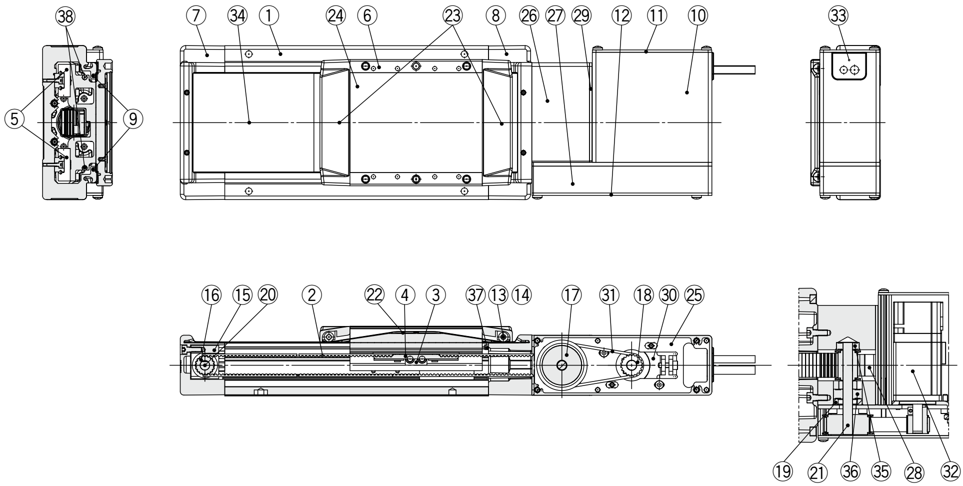
Note 1) Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.
Note 2) Check "Speed–Work Load Graph (Guide)" on page 91.
Note 3) Conforming to JIS B 6191-1999
Note 4) Impact resistance: No malfunction occurred when the actuator was tested with a drop tester 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 driver) is for when the actuator is operating.
Note 6) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during the operation.
Note 7) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 8) Only when motor option "With lock" is selected.
Note 9) For an actuator with lock, add the power consumption for the lock.

Weight

Model	LEJB40											
Stroke [mm]	(200)	300	(400)	500	(600)	(700)	800	(900)	1000	(1200)	(1500)	(2000)
Product weight [kg]	5.7	6.4	7.1	7.7	8.4	9.1	9.8	10.5	11.2	12.6	14.7	18.1
Additional weight with lock [kg]	0.2 (Incremental encoder)/0.3 (Absolute encoder)											

Model	LEJB63											
Stroke [mm]	(300)	(400)	500	(600)	(700)	800	(900)	1000	1200	(1500)	(2000)	(3000)
Product weight [kg]	11.5	12.7	13.8	15.0	16.2	17.4	18.6	19.7	22.1	25.7	31.6	43.4
Additional weight with lock [kg]	0.4 (Incremental encoder)/0.7 (Absolute encoder)											

Construction



Motor details

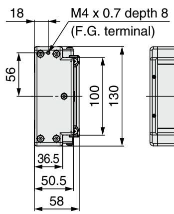
Component Parts

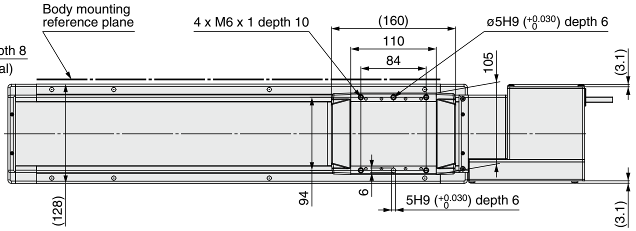
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Belt**	—	
3	**Belt holder**	Carbon steel	
4	**Belt stopper**	Aluminum alloy	
5	**Linear guide assembly**	—	
6	**Table**	Aluminum alloy	Anodized
7	**Housing A**	Aluminum alloy	Coating
8	**Housing B**	Aluminum alloy	Coating
9	**Seal magnet**	—	
10	**Motor cover**	Aluminum alloy	Anodized
11	**End cover A**	Aluminum alloy	Anodized
12	**End cover B**	Aluminum alloy	Anodized
13	**Roller shaft**	Stainless steel	
14	**Roller**	Synthetic resin	
15	**Pulley holder**	Aluminum alloy	
16	**Drive pulley**	Aluminum alloy	
17	**Speed reduction pulley**	Aluminum alloy	
18	**Motor pulley**	Aluminum alloy	
19	**Spacer**	Aluminum alloy	

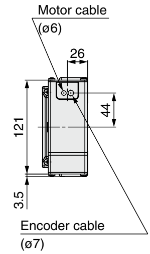
No.	Description	Material	Note
20	**Pulley shaft A**	Stainless steel	
21	**Pulley shaft B**	Stainless steel	
22	**Table cap**	Synthetic resin	
23	**Seal band stopper**	Synthetic resin	
24	**Blanking plate**	Aluminum alloy	Anodized
25	**Motor mount plate**	Carbon steel	
26	**Pulley block**	Aluminum alloy	Anodized
27	**Pulley cover**	Aluminum alloy	Anodized
28	**Belt stopper**	Aluminum alloy	
29	**Side plate**	Aluminum alloy	Anodized
30	**Motor plate**	Carbon steel	
31	**Belt**	—	
32	**Motor**	—	
33	**Grommet**	NBR	
34	**Dust seal band**	Stainless steel	
35	**Bearing**	—	
36	**Bearing**	—	
37	**Stopper pin**	Stainless steel	
38	**Magnet**	—	

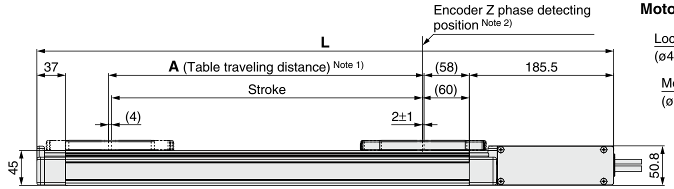
Dimensions: Belt Drive

LEJB40

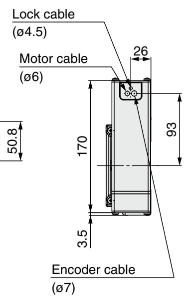


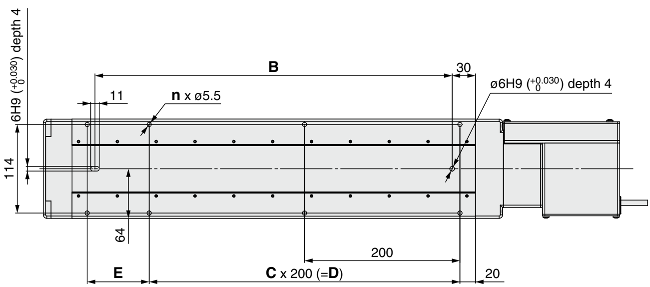






Motor option: B/With lock





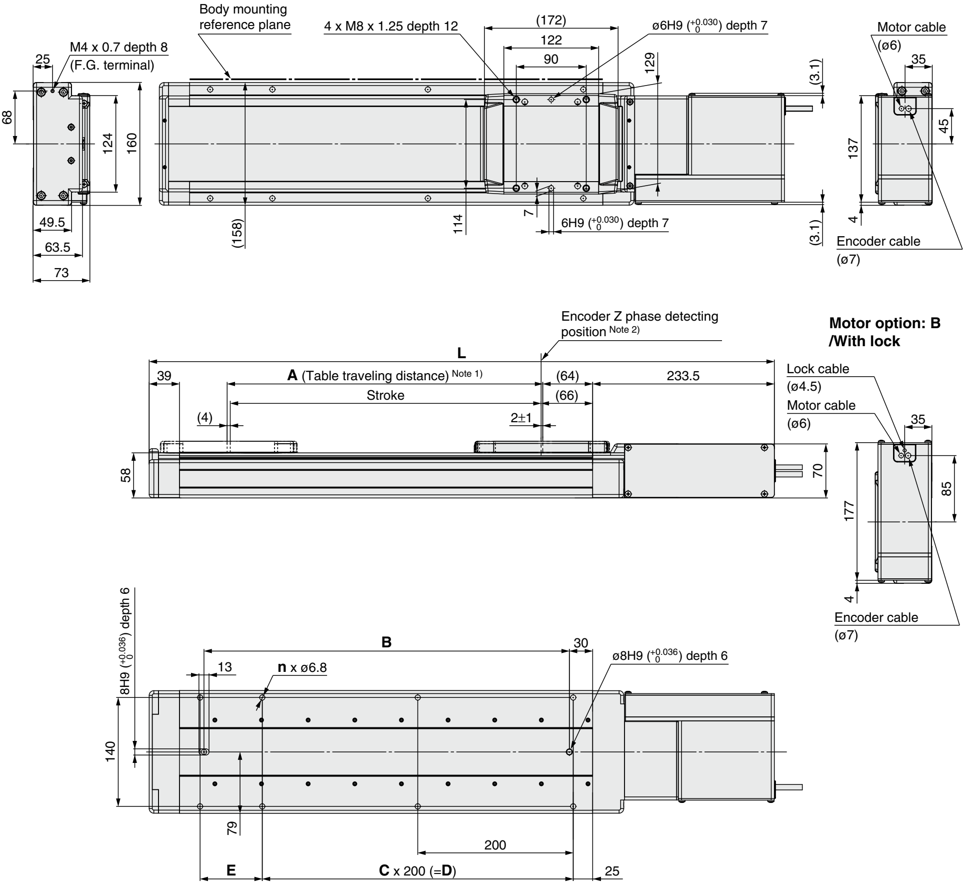
Note 1) Distance within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) The Z phase first detecting position from the stroke end of the motor side.
Note 3) Auto switch magnet is located in the table center.

[mm]

Model	L	A	B	n	C	D	E
LEJB40S□□-200□-□□□□	542	206	260	6	1	200	80
LEJB40S□□-300□-□□□□	642	306	360	6	1	200	180
LEJB40S□□-400□-□□□□	742	406	460	8	2	400	80
LEJB40S□□-500□-□□□□	842	506	560	8	2	400	180
LEJB40S□□-600□-□□□□	942	606	660	10	3	600	80
LEJB40S□□-700□-□□□□	1042	706	760	10	3	600	180
LEJB40S□□-800□-□□□□	1142	806	860	12	4	800	80
LEJB40S□□-900□-□□□□	1242	906	960	12	4	800	180
LEJB40S□□-1000□-□□□□	1342	1006	1060	14	5	1000	80
LEJB40S□□-1200□-□□□□	1542	1206	1260	16	6	1200	80
LEJB40S□□-1500□-□□□□	1842	1506	1560	18	7	1400	180
LEJB40S□□-2000□-□□□□	2342	2006	2060	24	10	2000	80

Dimensions: Belt Drive

LEJB63



Note 1) Distance 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) The Z phase first detecting position from the stroke end of the motor side.
Note 3) Auto switch magnet is located in the table center.

[mm]

Model	L	A	B	n	C	D	E
LEJB63S□□-300□-□□□□	704	306	370	6	1	200	180
LEJB63S□□-400□-□□□□	804	406	470	8	2	400	80
LEJB63S□□-500□-□□□□	904	506	570	8	2	400	180
LEJB63S□□-600□-□□□□	1004	606	670	10	3	600	80
LEJB63S□□-700□-□□□□	1104	706	770	10	3	600	180
LEJB63S□□-800□-□□□□	1204	806	870	12	4	800	80
LEJB63S□□-900□-□□□□	1304	906	970	12	4	800	180
LEJB63S□□-1000□-□□□□	1404	1006	1070	14	5	1000	80
LEJB63S□□-1200□-□□□□	1604	1206	1270	16	6	1200	80
LEJB63S□□-1500□-□□□□	1904	1506	1570	18	7	1400	180
LEJB63S□□-2000□-□□□□	2404	2006	2070	24	10	2000	80
LEJB63S□□-3000□-□□□□	3404	3006	3070	34	15	3000	80

Solid State Auto Switch
Direct Mounting Style
D-M9N(V)/D-M9P(V)/D-M9B(V)

CE RoHS

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard.

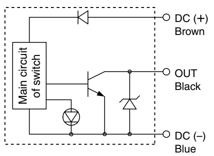
⚠Caution

Precautions

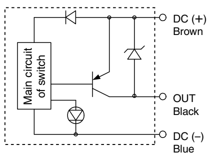
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

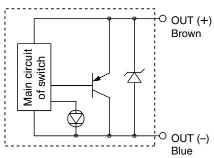
D-M9N/M9NV



D-M9P/M9PV



D-M9B/M9BV



Auto Switch Specifications

Refer to SMC website for details about products conforming to the international standards.

PLC: Programmable Logic Controller

D-M9□, D-M9□V (With indicator light)

Auto switch model	D-M9N	D-M9NV	D-M9P	D-M9PV	D-M9B	D-M9BV
Electrical entry	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 µA or less at 24 VDC				0.8 mA or less	
Indicator light	Red LED lights up when turned ON.					
Standards	CE marking, RoHS					

- Lead wires — Oilproof flexible heavy-duty vinyl cord: ø2.7 x 3.2 ellipse, 0.15 mm^2, 2 cores (D-M9B(V)), 3 cores (D-M9N(V)/D-M9P(V))

Note) Refer to Best Pneumatics No. 2 for solid state auto switch common specifications.

Weight

[g]

Auto switch model		D-M9N(V)	D-M9P(V)	D-M9B(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

How to Order

D-M9 N □ □

Series

Wiring/Output type

N	3-wire NPN
P	3-wire PNP
B	2-wire

Electrical entry

Nil	In-line
V	Perpendicular

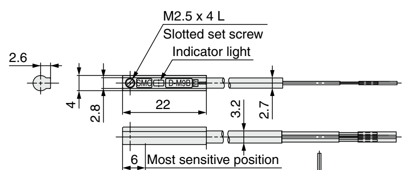
Lead wire length

Nil	0.5 m
M	1 m
L	3 m
Z	5 m

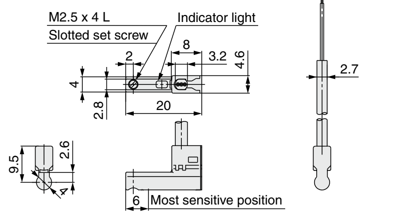
Dimensions

[mm]

D-M9□



D-M9□V



2-Color Indication Solid State Auto Switch Direct Mounting Style
D-M9NW(V)/D-M9PW(V)/D-M9BW(V)

CE RoHS

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard.
- The optimum operating range can be determined by the color of the light. (Red → Green ← Red)

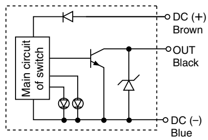
⚠Caution

Precautions

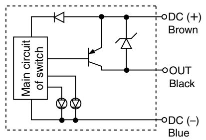
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

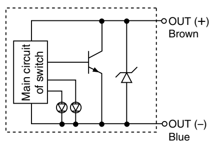
D-M9NW/M9NWV



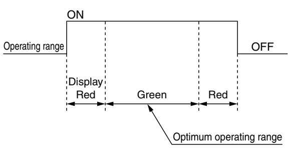
D-M9PW/M9PWV



D-M9BW/M9BWV



Indicator light/Indication method



Auto Switch Specifications

Refer to SMC website for details about products conforming to the international standards.

PLC: Programmable Logic Controller

D-M9□W, D-M9□WV (With indicator light)						
Auto switch model	D-M9NW	D-M9NWV	D-M9PW	D-M9PWV	D-M9BW	D-M9BWV
Electrical entry	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 µA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating range ·········· Red LED lights up. Optimum operating range ·········· Green LED lights up.					
Standards	CE marking, RoHS					

- Lead wires — Oilproof flexible heavy-duty vinyl cord: ø2.7 x 3.2 ellipse, 0.15 mm², 2 cores (D-M9BW(V)), 3 cores (D-M9NW(V), D-M9PW(V))

Note) Refer to Best Pneumatics No. 2 for solid state auto switch common specifications.

Weight

[g]

Auto switch model		D-M9NW(V)	D-M9PW(V)	D-M9BW(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

How to Order

D-M9 N W V L

Series

Wiring/Output type

N	3-wire NPN
P	3-wire PNP
B	2-wire

Electrical entry

Nil	In-line
V	Perpendicular

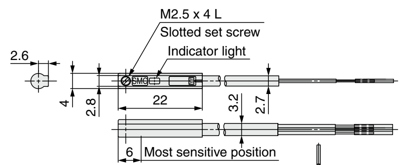
Lead wire length

Nil	0.5 m
M	1 m
L	3 m
Z	5 m

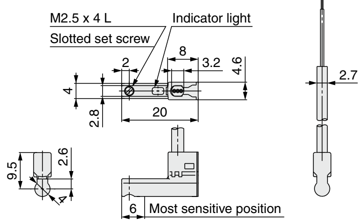
Dimensions

[mm]

D-M9□W



D-M9□WV



Series LEJ
Electric Actuator/ Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Design

⚠Caution

1. Do not apply a load in excess of the operating limit.

Select a suitable actuator by work load and allowable moment. If the product is used outside of the operating limit, the eccentric load applied to the guide will be excessive and have adverse effects such as creating play on the guide, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force or impact force is applied to it.

The product can be damaged.
The components including the motor are manufactured to precise tolerances. So that even a slight deformation may cause a malfunction or seizure.

Selection

⚠Warning

1. Do not increase the speed in excess of the operating limit.

Select a suitable actuator by the relationship of the allowable work load and speed, and the allowable speed of each stroke. If the product is used outside of the operating limit, it will have adverse effects such as creating noise, degrading accuracy and shortening the life of the product.

2. When the product repeatedly cycles with partial strokes (100 mm or less), lubrication can run out. Operate it at a full stroke at least once a day or every 1000 strokes.

3. When external force is applied to the table, it is necessary to add external force to the work load as the total carried load for the sizing.

When a cable duct or flexible moving tube is attached to the actuator, the sliding resistance of the table increases and may lead to operational failure of the product.

Handling

⚠Caution

1. Do not allow the table to hit the end of stroke.

When incorrect instructions are inputted, such as using the product outside of the operating limit or operation outside of actual stroke through changes in the controller/driver setting and or origin position, the table may collide against the stroke end of the actuator. Please check these points before use.

If the table collides against the stroke end of the actuator, the guide, belt or internal stopper can be broken. This may lead to abnormal operation.

Handle the actuator with care when it is used in the vertical direction as the workpiece will fall freely from its own weight.

2. The actual speed of this actuator is affected by the work load and stroke.

Check specifications with reference to the model selection section of the catalog.

3. Do not apply a load, impact or resistance in addition to the transferred load during return to origin.

4. Do not dent, scratch or cause other damage to the body and table mounting surfaces.

This may cause unevenness in the mounting surface, play in the guide or an increase in the sliding resistance.

5. Do not apply strong impact or an excessive moment while mounting the product or a workpiece.

If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.

6. Keep the flatness of mounting surface 0.1 mm or less.

Unevenness of a workpiece or base mounted on the body of the product may cause play in the guide and an increase in the sliding resistance.

7. When mounting the actuator, use all mounting holes.

If all mounting holes are not used, it influences the specifications, e.g., the amount of displacement of the table increases.

8. Do not hit the table with the workpiece in the positioning operation and positioning range.

9. Do not apply external force to the dust seal band.

Particularly during the transportation.

Series LEJ
Electric Actuator/ Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

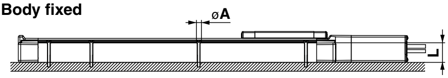
Handling

⚠Caution

10. When mounting the product, use screws with adequate length and tighten them with adequate torque.

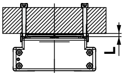
Tightening the screws with a higher torque than recommended may cause a malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Body fixed



Model	Bolt	øA (mm)	L (mm)
LEJ□40	M5	5.5	36.5
LEJ□63	M6	6.8	49.5

Workpiece fixed



Model	Bolt	Max. tightening torque (N·m)	L (Max. screw-in depth) (mm)
LEJ□40	M6 x 1	5.2	10
LEJ□63	M8 x 1.25	12.5	12

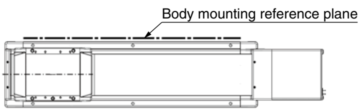
To prevent the workpiece fixing bolts from touching the body, use bolts that are 0.5 mm or shorter than the maximum screw-in depth. If long bolts are used, they can touch the body and cause a malfunction, etc.

11. Do not operate by fixing the table and moving the actuator body.

12. The belt drive actuator cannot be used vertically for applications.

13. Vibration may occur during operation, this could be caused by the operating conditions.
If it occurs, adjust response value of auto tuning of driver to be lower.
During the first auto tuning noise may occur, the noise will stop when the tuning is complete.

14. When mounting the actuator using the body mounting reference plane, use a pin. Set the height of the pin to be 5 mm or more because of chamfering. (Recommended height 6 mm)



Maintenance

⚠Warning

Maintenance frequency

Perform maintenance according to the table below.

Frequency	Appearance check	Internal check	Belt check
Inspection before daily operation	○	—	—
Inspection every 6 months/1000 km/ 5 million cycles*	○	○	○

* Select whichever comes sooner.

- **Items for visual appearance check**
  1. Loose set screws, Abnormal dirt
  2. Check of flaw and cable joint
  3. Vibration, Noise

- **Items for internal check**
  1. Lubricant condition on moving parts.
     * For lubrication, use lithium grease No. 2.
  2. Loose or mechanical play in fixed parts or fixing screws.

- **Items for belt check**

  Stop operation immediately and replace the belt when belt appear to be below. Further, ensure your operating environment and conditions satisfy the requirements specified for the product.

  a. Tooth shape canvas is worn out.
  Canvas fiber becomes fuzzy. Rubber is removed and the fiber becomes whitish. Lines of fibers become unclear.

  b. Peeling off or wearing of the side of the belt
  Belt corner becomes round and frayed thread sticks out.

  c. Belt partially cut
  Belt is partially cut. Foreign matter caught in teeth other than cut part causes flaw.

  d. Vertical line of belt teeth
  Flaw which is made when the belt runs on the flange.

  e. Rubber back of the belt is softened and sticky.

  f . Crack on the back of the belt

Electric Actuator
Series LEL

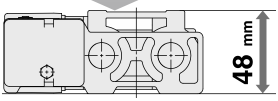
Guide Rod Slider

Step Motor (Servo/24 VDC)

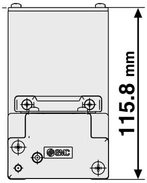
Low-profile/Flat Height 48 mm

Profile reduced by side mounting of motor

DOWN



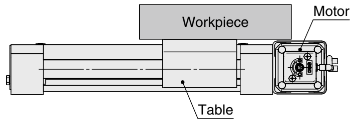
LEL25

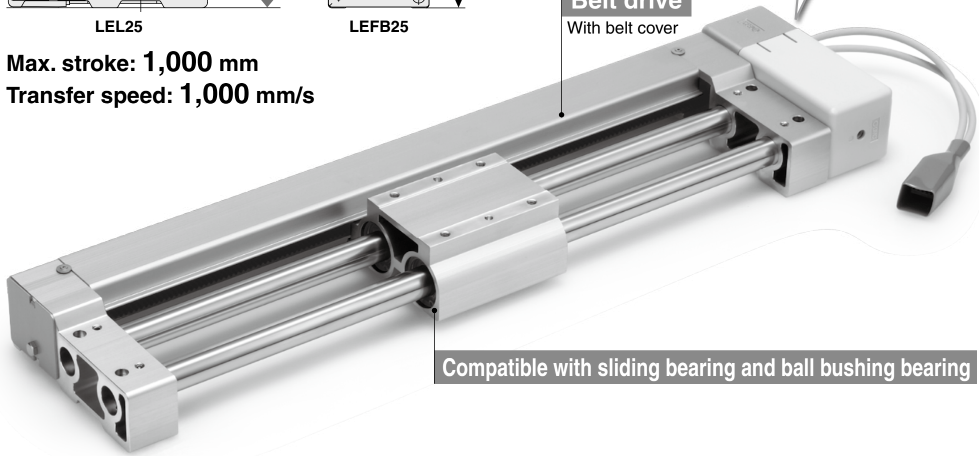


LEFB25

Max. stroke: 1,000 mm
Transfer speed: 1,000 mm/s

No interference with motor, even with large workpieces!





Model	Size	Bearing	Stroke [mm]	Work load (Horizontal) [kg]	Speed [mm/s]	Positioning repeatability [mm]	Page
LEL25M	25	Sliding bearing	Up to 1000	3	Up to 500	±0.1	▸Page 116
LEL25L		Ball bushing bearing	Up to 1000	5	Up to 1000	±0.1	

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

▸Page 377

▶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

Step Motor (Servo/24 VDC) Type
Guide Rod Slider Size: 25

Simple construction.
Guide type can be selected.

Max. stroke: 1,000 mm
Transfer speed: 1,000 mm/s

Guide type

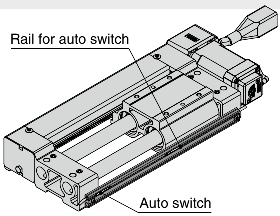
- **Sliding bearing**
  Work load: 3 kg (Horizontal)
  Reduced noise (60 dB or less) Note)
- **Ball bushing bearing**
  Work load: 5 kg (Horizontal)
  Transfer speed: 1,000 mm/s

Note) When the maximum speed is 500 mm/s (Measured by SMC)

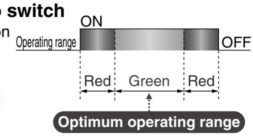
Auto switch mountable (Made to Order)

For checking the limit and intermediate signal
Applicable to the D-M9□ and D-M9□W (2-color indication)

∗ The auto switches should be ordered separately. Refer to pages 123 and 124 for details.



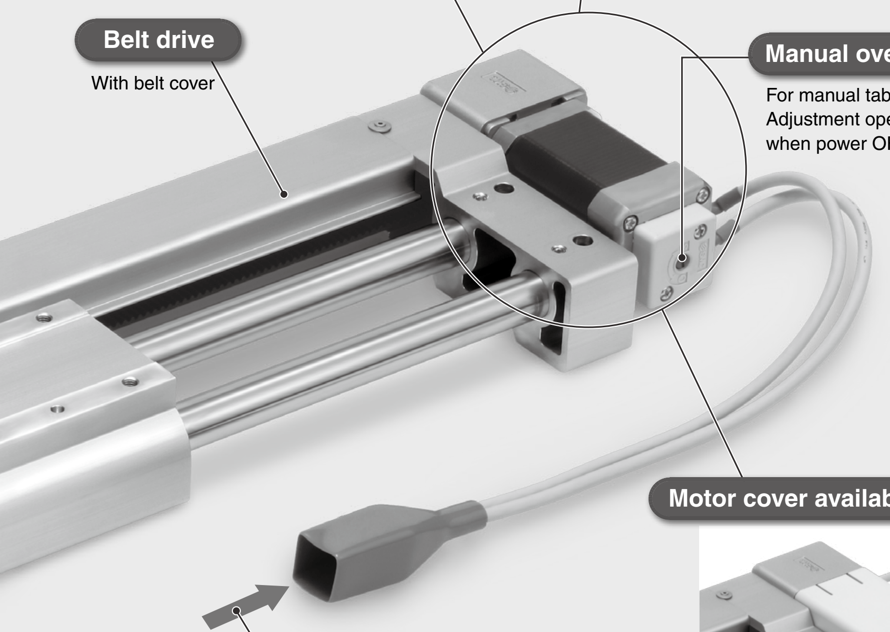
2-color indication solid state auto switch
Appropriate setting of the mounting position can be performed without mistakes.

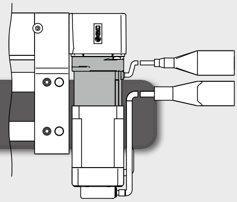


A green light lights up at the optimum operating range.

Compatible motor
Step motor (Servo/24 VDC)

Non-magnetizing lock (Option)
Holding a workpiece





Belt drive
With belt cover

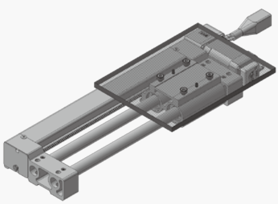
Manual override screw
For manual table operation.
Adjustment operation possible when power OFF

Motor cover available (Option)

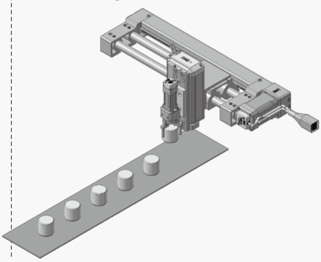
Offering 2 types of actuator cables
- Standard cable
- Robotic cable (Flexible cable)

Application Examples

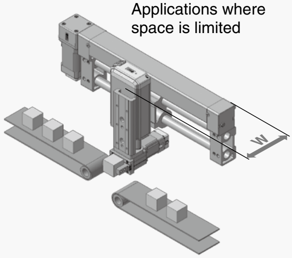
Load and unload transfer of workpieces



Pick and place



Applications where space is limited



Electric Actuator/Guide Rod Slider Step Motor (Servo/24 VDC)

Series LEL

Model Selection

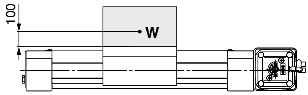
Selection Procedure

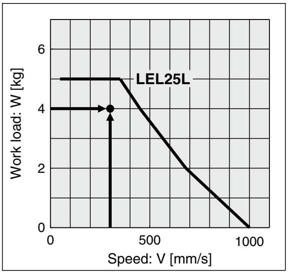
Step 1 Check the work load–speed. → **Step 2** Check the cycle time. → **Step 3** Check the allowable moment.

Selection Example

Operating conditions

- Workpiece mass: 4 [kg]
- Speed: 300 [mm/s]
- Acceleration/Deceleration: 3,000 [mm/s^2]
- Stroke: 500 [mm]
- Mounting position: Horizontal upward
- Workpiece mounting condition:





<Speed–Work load graph>
(LEL25L/Step motor)

Step 1 Check the work load–speed. <Speed–Work load graph> (Page 118)

Select the target model based on the workpiece mass and speed with reference to the <Speed–Work load graph>.

Selection example) The **LEL25LT-500** is temporarily selected based on the graph shown on the right side.

Step 2 Check the cycle time.

Calculate the cycle time using the following calculation method.

Cycle time:

T can be found from the following equation.

$\boxed{T = T1 + T2 + T3 + T4 \text{ [s]}}$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

$\boxed{T1 = V/a1 \text{ [s]}}$ $\boxed{T1 = V/a2 \text{ [s]}}$

- T2: Constant speed time can be found from the following equation.

$$\boxed{T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} \text{ [s]}}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$\boxed{T4 = 0.3 \text{ [s]}}$

Calculation example)
T1 to T4 can be calculated as follows.

T1 = V/a1 = 300/3000 = 0.1 [s],

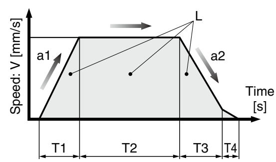
T3 = V/a2 = 300/3000 = 0.1 [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{500 - 0.5 \cdot 300 \cdot (0.1 + 0.1)}{300} = 1.57 \text{ [s]}$$

T4 = 0.3 [s]

Therefore, the cycle time can be obtained as follows.

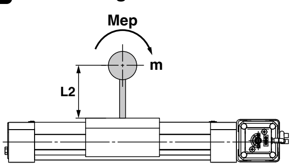
T = T1 + T2 + T3 + T4
= 0.1 + 1.57 + 0.1 + 0.3
= **2.07 [s]**

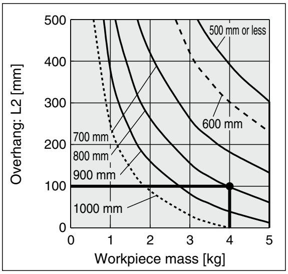


L : Stroke [mm]
···(Operating condition)
V : Speed [mm/s]
···(Operating condition)
a1: Acceleration [mm/s^2]
···(Operating condition)
a2: Deceleration [mm/s^2]
···(Operating condition)

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 the beginning of the constant speed operation to stop
T4: Settling time [s]
Time until in position is completed

Step 3 Check the guide moment.





Based on the above calculation result, the LEL25LT-500 is selected.

SMC

Dynamic Allowable Moment

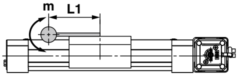
∗ This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

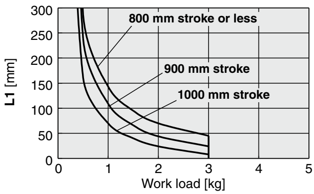
Acceleration/Deceleration ——— 3,000 mm/s²

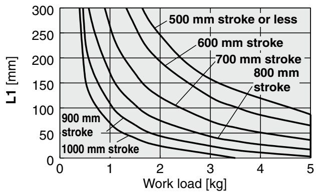
Mounting orientation | **Load overhanging direction**
m: Work load [kg]
L : Overhang to the work load center of gravity [mm]

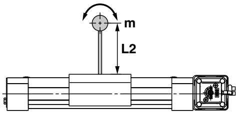
Model: **LEL25M**, **LEL25L**

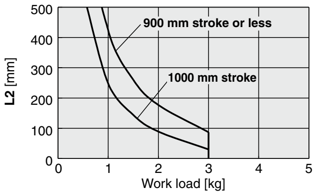
Horizontal mounting

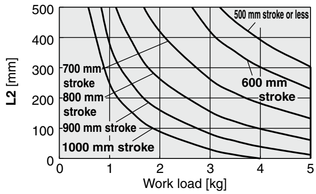


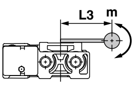


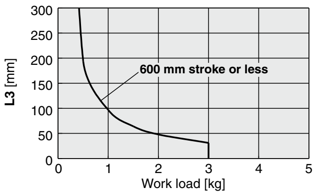


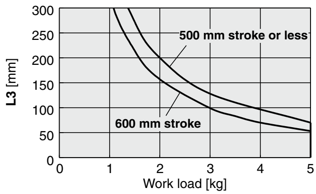




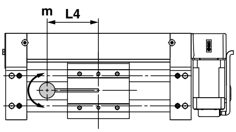


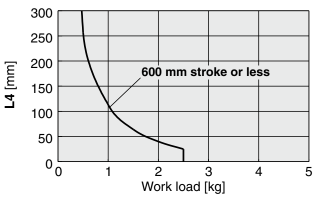


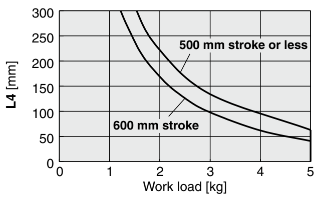


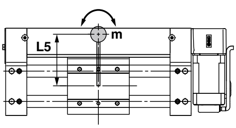


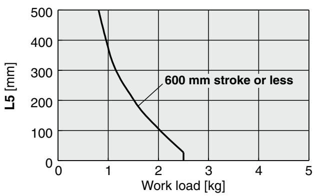
Wall mounting

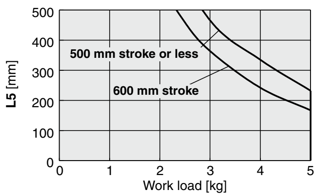


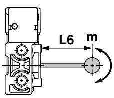


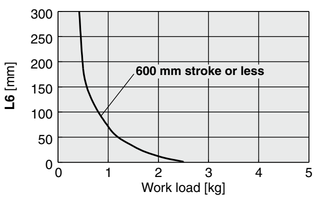


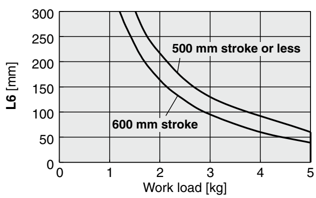






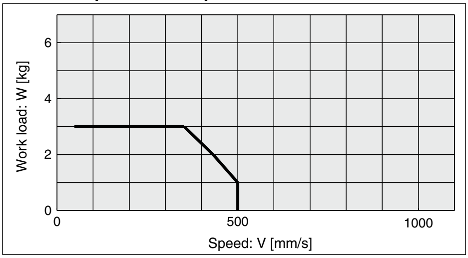






Speed–Work Load Graph (Guide)

LEL25M (Horizontal)



LEL25L (Horizontal)

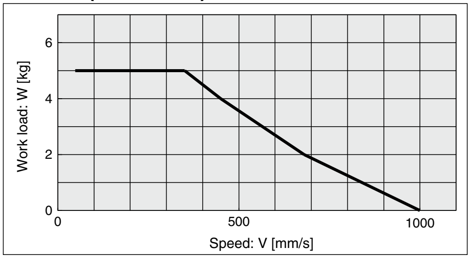
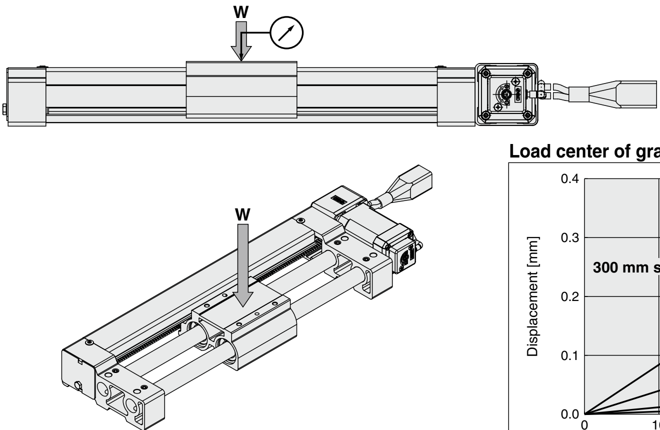


Table Displacement (Reference Value)

* Amount of displacement of the table when the load center of gravity is located at the table center in the middle of the stroke.



Load center of gravity located at the center of the table

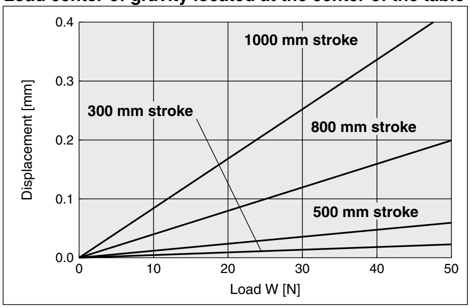
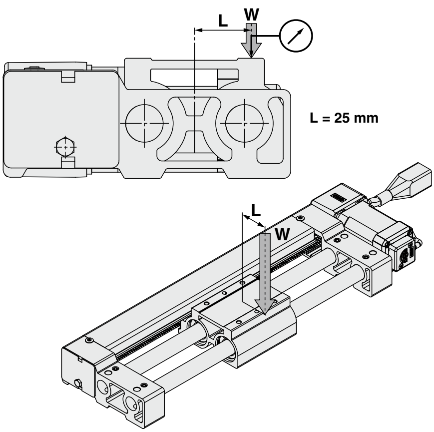
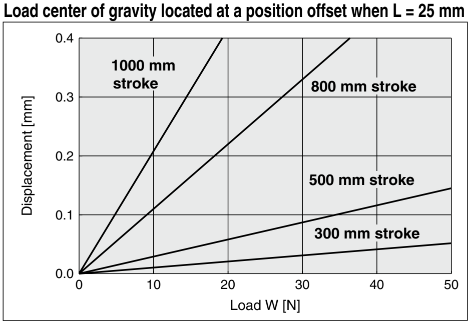


Table Displacement (Reference Value)

* Amount of displacement when the load is offset by “L” from the center of the table.

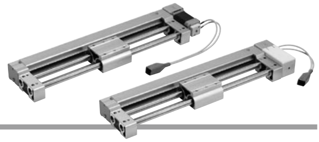


Load center of gravity located at a position offset when L = 25 mm



Electric Actuator/Guide Rod Slider
Belt Drive Step Motor (Servo/24 VDC)

Series LEL
LEL25



How to Order

LEL 25 M T – 100 □ – □ 1 6N 1 □ – □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

❶ Size

25

❷ Bearing type

M	Sliding bearing
L	Ball bushing bearing

❸ Equivalent lead

T	48 mm

❹ Stroke

100	100 mm
to	to
1000	1000 mm

* Refer to the applicable stroke table.

❺ Motor option

Nil	Without option
B	With lock
C	With motor cover*

* When [With lock] is selected, [With motor cover] cannot be selected.

❻ Actuator cable type*

Nil	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.

❼ Actuator cable length [m]

Nil	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 2) on page 120.

❽ Controller type*

Nil	Without controller	
6N	**LECP6** (Step data input type)	NPN
6P		PNP
1N	**LECP1** (Programless type)	NPN
1P		PNP

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

❾ I/O cable length [m]

Nil	Without cable
1	1.5*
3	3*
5	5*

* When "Without controller" is selected for controller types, I/O cable length cannot be selected.

❿ Controller mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

⓫ Made to Order

Nil	Standard product
X5	With magnet/switch rail

⚠Caution

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

Applicable Stroke Table

●Standard/○Produced upon receipt of order

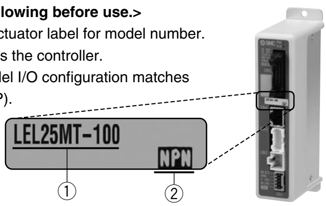
Model \ Stroke	100	200	300	400	500	600	700	800	900	1000
LEL25	○	○	●	●	●	●	○	○	○	○

* Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.

The actuator and controller are provided as a set.

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

<Check the following before use.>
① Check the actuator label for model number.
This matches the controller.
② Check Parallel I/O configuration matches (NPN or PNP).



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

Compatible Controllers

	Step data input type	Programless type
Type		
Series	LECP6	LECP1
Features	Value (Step data) input Standard controller	Capable of setting up operation (step data) without using a PC or teaching box
Compatible motor	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points	14 points
Power supply voltage	24 VDC	
Reference page	Page 386	Page 401

Specifications

Step Motor (Servo/24 VDC)

	Model		LEL25M	LEL25L
Actuator specifications	Stroke [mm] Note1)		(100), (200), 300, 400, 500, 600 (700), (800), (900), (1000)	
	Work load [kg] Note 2)	Horizontal (Wall mounting)	3 (2.5)	5 (5)
	Speed [mm/s] Note 2)		48 to 500	48 to 1000
	Max. acceleration/deceleration [mm/s²]		3000	
	Positioning repeatability [mm]		±0.1	
	Equivalent lead [mm]		48	
	Impact/Vibration resistance [m/s²] Note 3)		50/20	
	Actuation type		Belt	
	Guide type		Sliding bearing	Ball bushing bearing
	Allowable external force [N] Note 4)		5	
	Operating temperature range [°C]		5 to 40	
	Operating humidity range [%RH]		90 or less (No condensation)	
Electric specifications	Motor size		□42	
	Motor type		Step motor (Servo/24 VDC)	
	Encoder		Incremental A/B phase (800 pulse/rotation)	
	Rated voltage [V]		24 VDC ±10%	
	Power consumption [W] Note 5)		32	
	Standby power consumption when operating [W] Note 6)		16	
	Max. instantaneous power consumption [W] Note 7)		60	
Lock unit specifications	Type Note 8)		Non-magnetizing lock	
	Holding force [N]		19	
	Power consumption [W] Note 9)		5	
	Rated voltage [V]		24 VDC ±10%	

Note 1) Strokes shown in ( ) are produced upon receipt of order. Consult with SMC as all non-standard and non-made-to-order strokes are produced as special orders.

Note 2) Speed changes according to the work load. Check "Speed–Work Load Graph (Guide)" on page 118. The work load changes according to the stroke and work load mounting condition.
Check "Dynamic Allowable Moment" graph on page 117. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m.

Note 3) Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both the stroke direction and a perpendicular direction to the stroke. (The test was performed with the actuator in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz, when the actuator was tested in both stroke direction and a perpendicular direction to the stroke. (The test was performed with the actuator in the initial state.)

Note 4) Allowable external resistance is the allowable resistance when flexible moving tube or similar is used.

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.

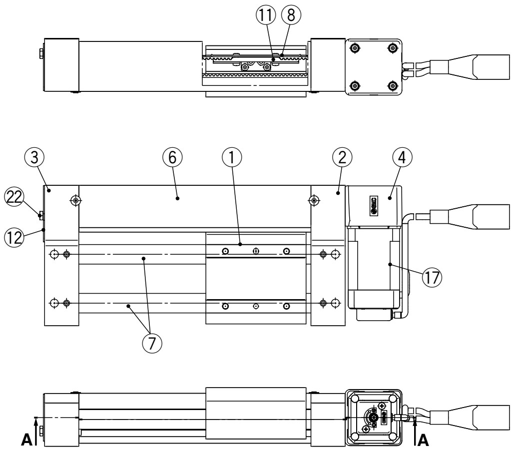
Note 8) With lock only

Note 9) For an actuator with lock, add the power consumption for the lock.

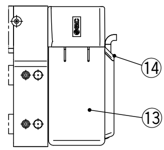
Actuator Product Weight

Stroke [mm]		(100)	(200)	300	400	500	600	(700)	(800)	(900)	(1000)
Product weight [kg]	LEL25M	2.13	2.47	2.82	3.17	3.52	3.87	4.21	4.56	4.91	5.26
	LEL25L	2.38	2.72	3.07	3.42	3.77	4.12	4.47	4.82	5.17	5.52
Additional weight with lock [kg]		0.26									
Additional weight with cover [kg]		0.04									

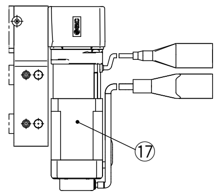
Construction

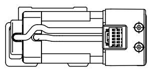


Motor option:
With motor cover

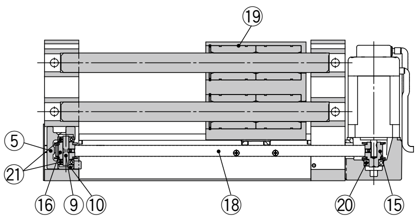


Motor option:
With lock

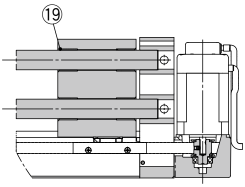




A-A (LEL25LT-□)



A-A (LEL25MT-□)

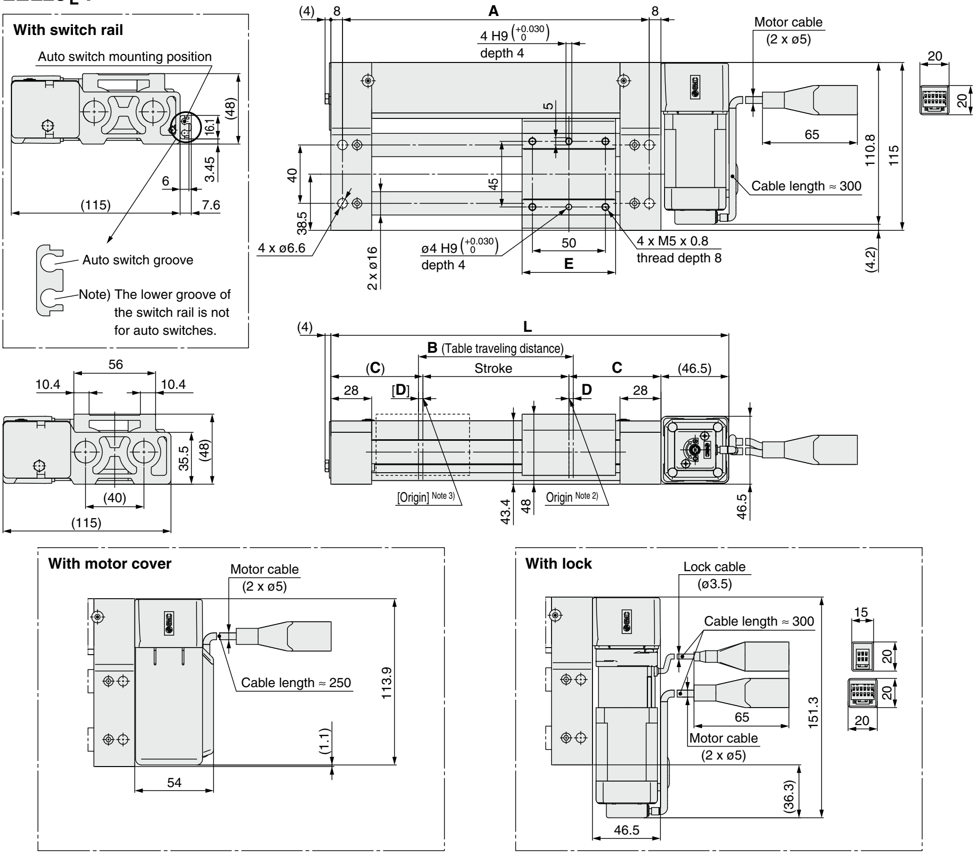


Component Parts

No.	Description	Material	Note
1	**Table**	Aluminum alloy	Anodized
2	**Motor end plate**	Aluminum alloy	Anodized
3	**End plate**	Aluminum alloy	Anodized
4	**Motor mount**	Aluminum die-cast	Painting
5	**Pulley holder**	Aluminum alloy	
6	**Belt cover**	Aluminum alloy	Anodized
7	**Guide rod**	Carbon steel	Hard chrome plated
8	**Belt holder**	Carbon steel	Chromating
9	**Pulley shaft**	Stainless steel	
10	**Spacer**	Aluminum alloy	
11	**Belt stopper**	Aluminum alloy	
12	**Tension plate**	Aluminum alloy	Anodized
13	**Motor cover**	Synthetic resin	“With motor cover” only
14	**Grommet**	Synthetic resin	“With motor cover” only
15	**Motor pulley**	Aluminum alloy	Anodized
16	**End pulley**	Aluminum alloy	Anodized
17	**Motor**	—	
18	**Belt**	—	
19	**Bushing**	—	
	Ball bushing bearing	—	
20	**Bearing**	—	
21	**Bearing**	—	
22	**Hexagon bolt**	Carbon steel	Chromating

Dimensions

LEL25$^{M}_{L}$T



Note 1) Distance 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) [ ] for when the direction of return to origin has changed.

[mm]

Model	L	L*	A	B	C	D	E
LEL25MT-100□-□□□□□	272.5	280	210	106	63	3	64
LEL25MT-200□-□□□□□	372.5	380	310	206			
LEL25MT-300□-□□□□□	472.5	480	410	306			
LEL25MT-400□-□□□□□	572.5	580	510	406			
LEL25MT-500□-□□□□□	672.5	680	610	506			
LEL25MT-600□-□□□□□	772.5	780	710	606			
LEL25MT-700□-□□□□□	872.5	880	810	706			
LEL25MT-800□-□□□□□	972.5	980	910	806			
LEL25MT-900□-□□□□□	1072.5	1080	1010	906			
LEL25MT-1000□-□□□□□	1172.5	1180	1110	1006			
LEL25LT-100□-□□□□□	292.5	300	230	108	73	4	82
LEL25LT-200□-□□□□□	392.5	400	330	208			
LEL25LT-300□-□□□□□	492.5	500	430	308			
LEL25LT-400□-□□□□□	592.5	600	530	408			
LEL25LT-500□-□□□□□	692.5	700	630	508			
LEL25LT-600□-□□□□□	792.5	800	730	608			
LEL25LT-700□-□□□□□	892.5	900	830	708			
LEL25LT-800□-□□□□□	992.5	1000	930	808			
LEL25LT-900□-□□□□□	1092.5	1100	1030	908			
LEL25LT-1000□-□□□□□	1192.5	1200	1130	1008			

* With motor cover

Solid State Auto Switch Direct Mounting Style
D-M9N(V)/D-M9P(V)/D-M9B(V)

RoHS

Refer to SMC website for details about products conforming to the international standards.

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard.

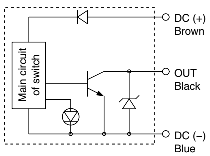
⚠Caution

Precautions

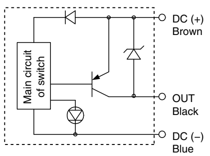
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

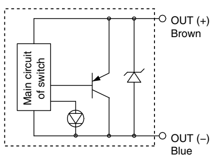
D-M9N/M9NV



D-M9P/M9PV



D-M9B/M9BV



Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□, D-M9□V (With indicator light)						
Auto switch model	D-M9N	D-M9NV	D-M9P	D-M9PV	D-M9B	D-M9BV
Electrical entry	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 µA or less at 24 VDC				0.8 mA or less	
Indicator light	Red LED lights up when turned ON.					
Standards	CE marking, RoHS					

- Lead wires — Oilproof flexible heavy-duty vinyl cord: ø2.7 x 3.2 ellipse, 0.15 mm², 2 cores (D-M9B(V)), 3 cores (D-M9N(V)/D-M9P(V))

Note) Refer to Best Pneumatics No. 2 for solid state auto switch common specifications.

Weight

[g]

Auto switch model		D-M9N(V)	D-M9P(V)	D-M9B(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

How to Order

D-M9 N □ □

Series

Wiring/Output type

N	3-wire NPN
P	3-wire PNP
B	2-wire

Electrical entry

Nil	In-line
V	Perpendicular

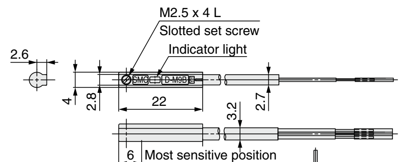
Lead wire length

Nil	0.5 m
M	1 m
L	3 m
Z	5 m

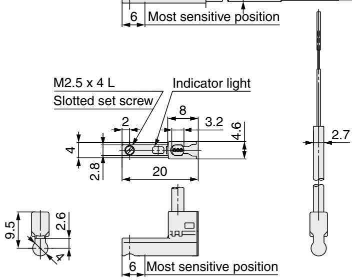
Dimensions

[mm]

D-M9□



D-M9□V



2-Color Indication Solid State Auto Switch Direct Mounting Style
D-M9NW(V)/D-M9PW(V)/D-M9BW(V)

CE RoHS

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard.
- The optimum operating range can be determined by the color of the light. (Red → Green ← Red)

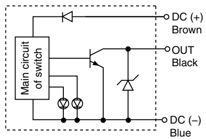
⚠Caution

Precautions

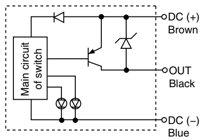
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

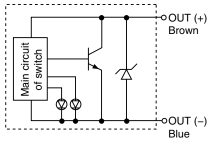
D-M9NW/M9NWV



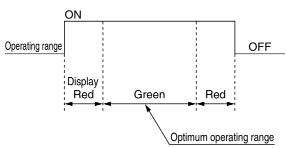
D-M9PW/M9PWV



D-M9BW/M9BWV



Indicator light/Indication method



Auto Switch Specifications

Refer to SMC website for details about products conforming to the international standards.

PLC: Programmable Logic Controller

D-M9□W, D-M9□WV (With indicator light)						
Auto switch model	D-M9NW	D-M9NWV	D-M9PW	D-M9PWV	D-M9BW	D-M9BWV
Electrical entry	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 µA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating range ·········· Red LED lights up. Optimum operating range ·········· Green LED lights up.					
Standards	CE marking, RoHS					

- Lead wires — Oilproof flexible heavy-duty vinyl cord: ø2.7 x 3.2 ellipse, 0.15 mm², 2 cores (D-M9BW(V)), 3 cores (D-M9NW(V), D-M9PW(V))

Note) Refer to Best Pneumatics No. 2 for solid state auto switch common specifications.

Weight

[g]

Auto switch model		D-M9NW(V)	D-M9PW(V)	D-M9BW(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

How to Order

D-M9 N W V L

Series

Wiring/Output type

N	3-wire NPN
P	3-wire PNP
B	2-wire

Electrical entry

Nil	In-line
V	Perpendicular

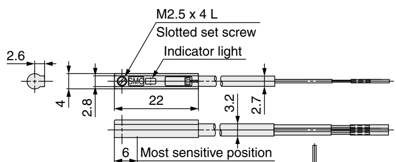
Lead wire length

Nil	0.5 m
M	1 m
L	3 m
Z	5 m

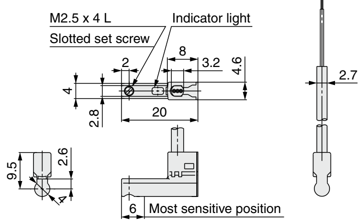
Dimensions

[mm]

D-M9□W



D-M9□WV



Electric Actuator/Guide Rod Slider Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Design

⚠Caution

1. Do not apply a load in excess of the operating limit.
Select a suitable actuator by work load and allowable moment. If the product is used outside of the operating limit, the eccentric load applied to the guide will be excessive and have adverse effects such as creating play on the guide, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force or impact force is applied to it.
This can cause failure.

3. Because of the guide mechanism type, vibration that comes from an external source may be introduced into the workpiece during operation. Do not use this product in a location where vibration is not allowed.

Handling

⚠Caution

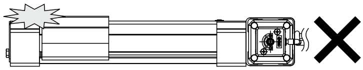
1. Set the position determination width in the step data to at least 1.
Otherwise, completion signal of in position may not be output.

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 [1] or higher.

Handling

⚠Caution

3. Never hit at the stroke end except during return to origin.
When incorrect instructions are inputted, such as using the product outside of the operating limit or operation outside of actual stroke through changes in the controller/driver setting and or origin position, the table may collide against the stroke end of the actuator. Please check these points before use.
If the table collides against the stroke end of the actuator, the guide, belt or internal stopper can be broken. This may lead to abnormal operation.



4. The moving force should be the initial value (100%).
If the moving force is set below the initial value, it may cause an alarm.

5. The actual speed of this actuator is affected by the work load.
When selecting a product, check the catalog for the instructions regarding selection.

6. Do not apply a load, impact or resistance in addition to the transferred load during return to origin.
Additional force will cause the displacement of the origin position since it is based on detected motor torque.

7. Do not dent, scratch or cause other damage to the body and table mounting surfaces.
This may cause unevenness in the mounting surface, play in the guide or an increase in the sliding resistance.

8. Do not apply strong impact or an excessive moment while mounting a workpiece.
If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.

9. Keep the flatness of the mounting surface 0.2 mm or less.
Unevenness of a workpiece or base mounted on the body of the product may cause play in the guide and an increase in the sliding resistance.

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

11. Do not hit the table with the workpiece in the positioning operation and positioning range.

12. Hold by the end plates when moving the body. Do not hold the belt cover.

Series LEL

Electric Actuator/Guide Rod Slider Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

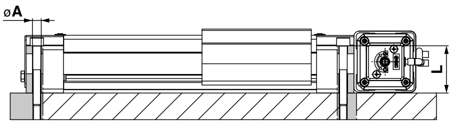
Handling

⚠Caution

13. When mounting the product, use screws with adequate length and tighten them with adequate torque.

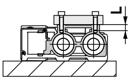
Tightening the screws with a higher torque than recommended may cause a malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Body fixed



Model	Bolt	øA [mm]	L [mm]
LEL25	M6	6.6	35.5

Workpiece fixed



Model	Bolt	Max. tightening torque [N·m]	L (Max. screw-in depth) [mm]
LEL25	M5 x 0.8	3	8

To prevent the workpiece fixing bolts from touching the body, use bolts that are 0.5 mm or shorter than the maximum screw-in depth. If long bolts are used, they can touch the body and cause a malfunction, etc.

14. Do not operate by fixing the table and moving the actuator body.

15. The belt drive actuator cannot be used vertically for applications.

16. Check the specifications for the minimum speed of each actuator.

Otherwise, unexpected malfunctions, such as knocking, may occur.

17. In the case of the belt drive actuator, vibration may occur during operation at speeds within the actuator specifications, this could be caused by the operating conditions. Change the speed setting to a speed that does not cause vibration.

Maintenance

⚠Warning

Maintenance frequency

Perform maintenance according to the table below.

Frequency	Appearance check	Internal check	Belt check
Inspection before daily operation	○	—	—
Inspection every 6 months/1000 km/ 5 million cycles*	○	○	○

* Select whichever comes sooner.

- **Items for visual appearance check**
  1. Loose set screws, Abnormal dirt
  2. Check of flaw and cable joint
  3. Vibration, Noise

- **Items for internal check**
  1. Lubricant condition on moving parts.
  2. Loose or mechanical play in fixed parts or fixing screws.

- **Items for belt check**

  Stop operation immediately and replace the belt when belt appear to be below. Further, ensure your operating environment and conditions satisfy the requirements specified for the product.

  a. Tooth shape canvas is worn out.
  Canvas fiber becomes fuzzy. Rubber is removed and the fiber becomes whitish. Lines of fibers become unclear.

  b. Peeling off or wearing of the side of the belt
  Belt corner becomes round and frayed thread sticks out.

  c. Belt partially cut
  Belt is partially cut. Foreign matter caught in teeth other than cut part causes flaw.

  d. Vertical line of belt teeth
  Flaw which is made when the belt runs on the flange.

  e. Rubber back of the belt is softened and sticky.

  f . Crack on the back of the belt

Electric Actuators
Series LEY

Rod Type/Guide Rod Type

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

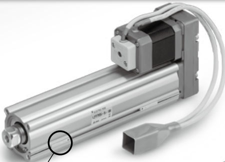
Rod Type Series LEY
Size: 16, 25, 32, 40 ▸Page 134

Dust/Drip Proof (IP65) Specification: -X5 ▸Page 138

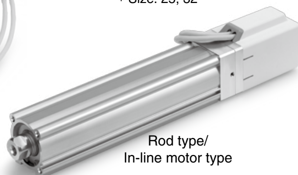
∗ Size: 25, 32

Long stroke:
Max. 500 mm (LEY32, 40)

Mounting variations
- Direct mounting: 3 directions, Bracket mounting: 3 types
- Either positioning or pushing control can be selected.
  Possible to hold the actuator with the rod pushing to a workpiece, etc.



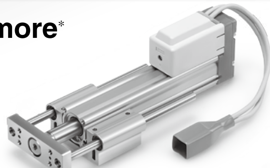
Rod type

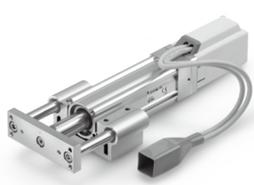

Rod type/
In-line motor type

Guide Rod Type Series LEYG
Size: 16, 25, 32, 40 ▸Page 162

Lateral end load: 5 times more∗
∗ Compared with rod type, size 25 and 100 stroke

Compatible with sliding bearing and ball bushing bearing.
Compatible with moment load and stopper (sliding bearing).
- Either positioning or pushing control can be selected.
  Possible to hold the actuator with the rod pushing to a workpiece, etc.


Guide rod type


Guide rod type/
In-line motor type

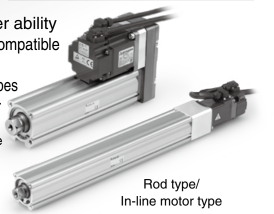
AC Servo Motor Type
∗ Not applicable to UL.

▸Page 184

Rod Type Series LEY
Size: 25, 32, 63 Note)

Dust/Drip Proof (IP65) Specification: -X5

- High output motor
  (100/200/400 W)
- Improved high speed transfer ability
- High acceleration/deceleration compatible
  (5,000 mm/s²)
- Pulse input/CC-Link/SSCNET Ⅲ types
- With internal absolute encoder
  (For LECSB/C/S)

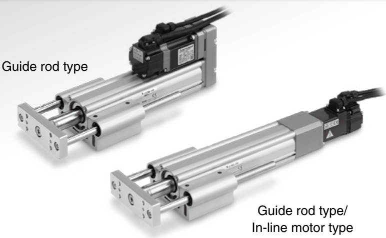

Rod type

Rod type/
In-line motor type

Note) LEY63 is applicable only to the in-line motor type

▸Page 208

Guide Rod Type Series LEYG
Size: 25, 32


Guide rod type

Guide rod type/
In-line motor type

Step Motor (Servo/24 VDC) **Servo Motor** (24 VDC) **Controller/Driver** ▸Page 377

▸**Step data input type**
Series **LECP6/LECA6**
64 points positioning

▸**Programless type**
Series **LECP1**
14 points positioning

▸**Pulse input type**
Series **LECPA**

AC Servo Motor Driver ▸Page 419
∗ Not applicable to UL.

▸**For absolute encoder**
- **Pulse input type**
  Series **LECSB**
- **CC-Link direct input type**
  Series **LECSC**
- **SSCNET Ⅲ type**
  Series **LECSS**

▸**For incremental encoder**
- **Pulse input type/ Positioning type**
  Series **LECSA**

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

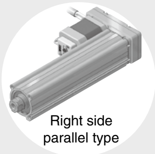
Step Motor (Servo/24 VDC) **Servo Motor** (24 VDC) **Type**

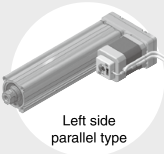
Rod Type *Series LEY* **/Size: 16, 25, 32, 40**

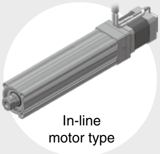
Control of intermediate positioning and pushing is possible.
High precision with ball screws (Positioning repeatability: ±0.02 mm)

Motor mounting position selectable

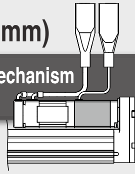
Top mounting type is the standard product.


Right side parallel type

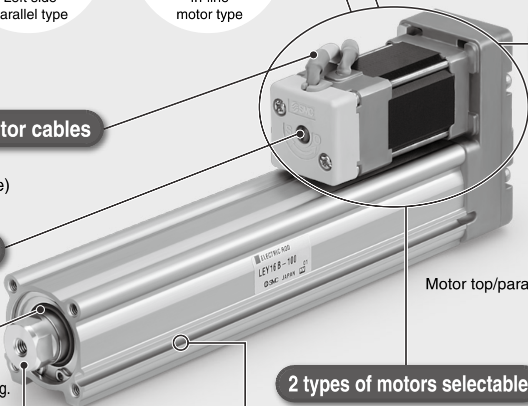

Left side parallel type


In-line motor type

Non-magnetizing lock mechanism (Option)



Prevents a workpiece from dropping. (Holding)



Motor cover available (Option)

Motor top/parallel type

Offering 2 types of actuator cables

- Standard cable
- Robotic cable (Flexible cable)

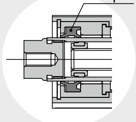
Manual override screw

For manual piston rod operation
Adjustment operation possible when power OFF

Scraper

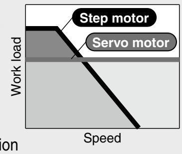
Prevents foreign matter from entering.

Scraper



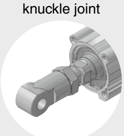
2 types of motors selectable

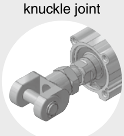
- **Step motor (Servo/24 VDC)**
  Ideal for transfer of high load at a low speed and pushing operation
- **Servo motor (24 VDC)**
  Stable at high speed and silent operation

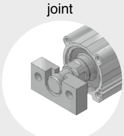


Pages 152, 153

Rod end brackets


Single knuckle joint

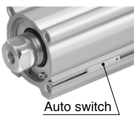

Double knuckle joint


Simple joint

Groove for auto switch

For checking the limit and intermediate signal
Applicable to the D-M9□ and D-M9□W (2-color indication)

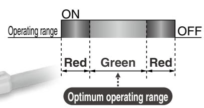
∗ The auto switches should be ordered separately. Refer to pages 154 and 155 for details.



2-color indication solid state auto switch

Appropriate setting of the mounting position can be performed without mistakes.

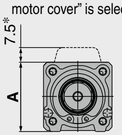
A green light lights up at the optimum operating range.



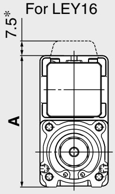
In-line motor type Height dimension shortened by up to 49%

For LEY16D

∗ When "Motor option/With motor cover" is selected.



For LEY16



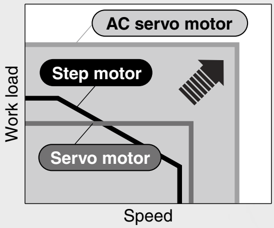
A Dimension (mm)

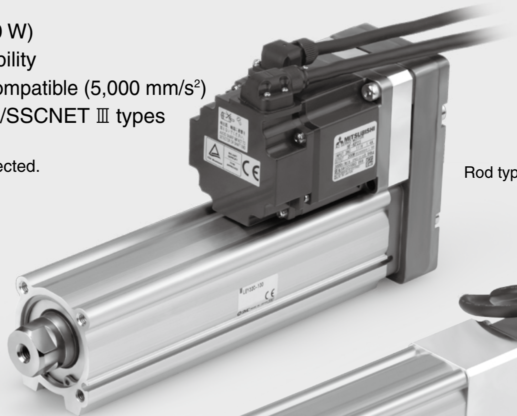
Size	In-line motor	Motor top mounting
16	**35.5**	67.5
25	**46.5**	92
32, 40	**61**	118

AC Servo Motor **Type**

Rod Type *Series* ***LEY*** /Size: 25, 32, 63

- High output motor (100/200/400 W)
- Improved high speed transfer ability
- High acceleration/deceleration compatible (5,000 mm/s^2)
- Pulse input/CC-Link direct input/SSCNET Ⅲ types
- With internal absolute encoder
  ∗ Incremental encoder can also be selected.

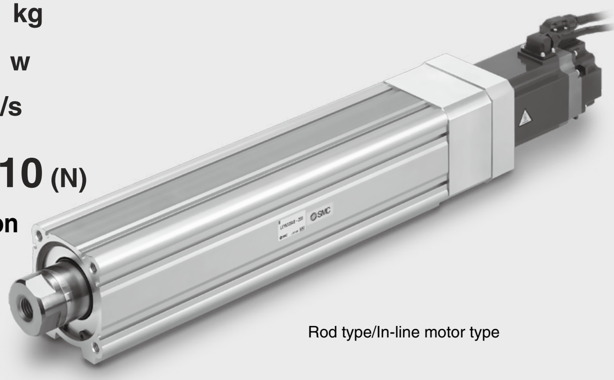



Rod type


Rod type/In-line motor type

Added large bore size 63!

- **Work load** **Horizontal** **80 kg**
  Vertical **72 kg**
- **High output motor: 400 W**
- **Max. speed: 1,000 mm/s**
  ∗ 500 stroke
- **Max. pushing force: 1,910 (N)**
- **Dust/Drip proof specification (IP65)**


Rod type/In-line motor type

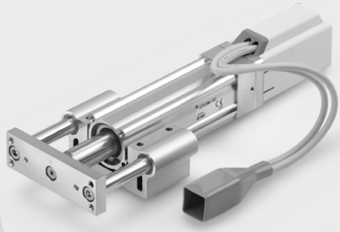
LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

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

Guide Rod Type *Series* LEYG /Size: 16, 25, 32, 40

Compact integrated guide rods

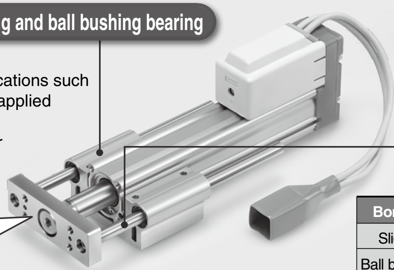
Lateral load resistance and high non-rotating accuracy



In-line motor type

Compatible with sliding bearing and ball bushing bearing

- **Sliding bearing**
  Suitable for lateral load applications such as a stopper where shock is applied
- **Ball bushing bearing**
  Smooth operation suitable for pusher and lifter



Motor top mounting type

Improved rigidity

Lateral end load: 5 times more*

* Compared with rod type, size 25 and 100 stroke

Non-rotating accuracy improved by using two guide rods

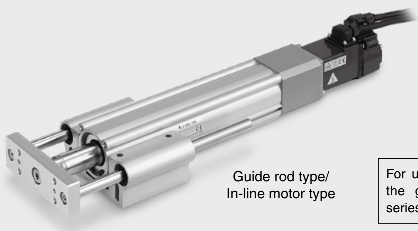
Bore size (mm)	16	25	32	40
Sliding bearing	±0.06°	±0.05°		
Ball bushing bearing	±0.07°	±0.06°		

When the cylinder is retracted (initial value), the non-rotating accuracy without a load or deflection of the guide rods will be below the values shown in the table.

AC Servo Motor Type

Guide Rod Type *Series* LEYG /Size: 25, 32

Guide rod type



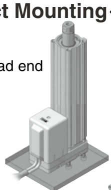
Guide rod type/
In-line motor type

For use of auto switches for the guide rod type LEYG series, refer to page 219.

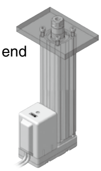
Mounting Variations

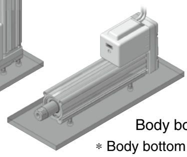
Direct Mounting

Head end



Rod end



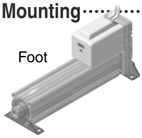


Body bottom

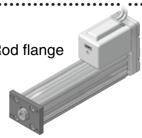
* Body bottom tapped: When "**U**" is selected

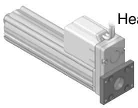
Bracket Mounting

Foot



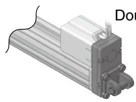
Rod flange



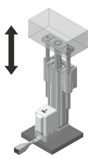


Head flange

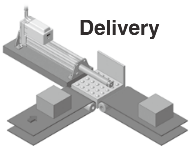
Double clevis



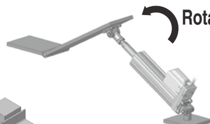
Application Examples



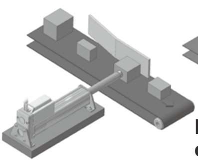
Lifter



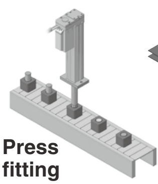
Delivery



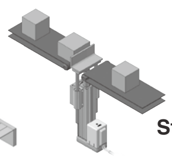
Rotation



Pushing operation



Press fitting



Stopper

Dust/Drip Proof (IP65) Specification

●Enclosure: IP65
●Max. stroke: 500 mm*

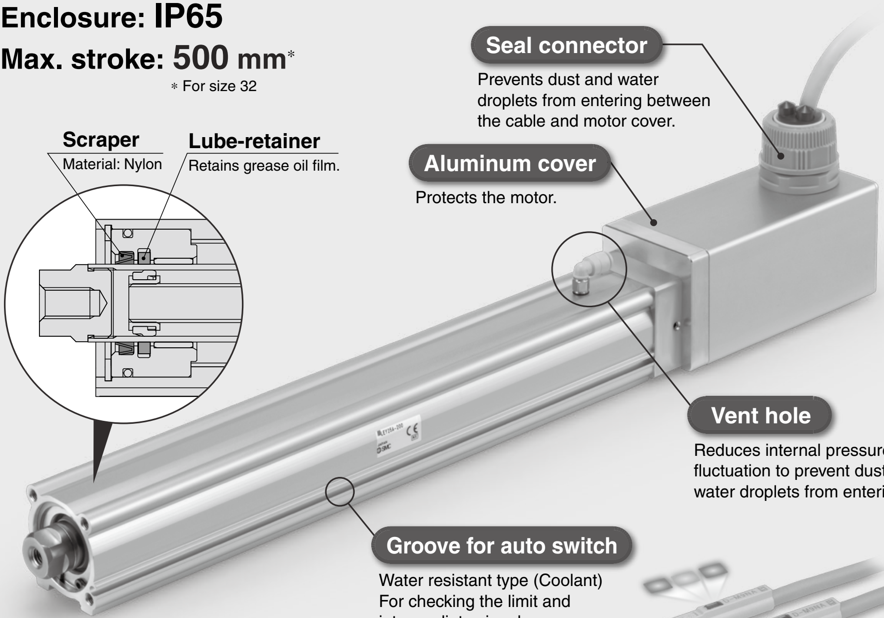
* For size 32

Scraper
Material: Nylon

Lube-retainer
Retains grease oil film.

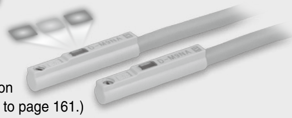
Seal connector
Prevents dust and water droplets from entering between the cable and motor cover.

Aluminum cover
Protects the motor.



Vent hole
Reduces internal pressure fluctuation to prevent dust and water droplets from entering.

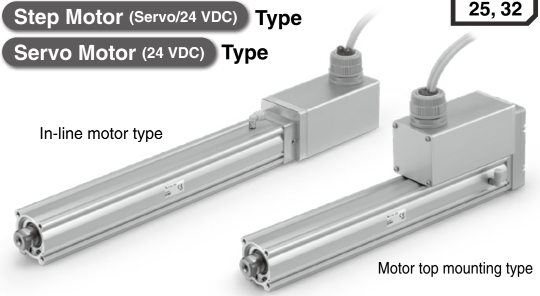
Groove for auto switch
Water resistant type (Coolant)
For checking the limit and intermediate signal
* Order the water resistant 2-color indication solid state auto switch separately. (Refer to page 161.)



LEY-X5 (Refer to page 156.)

Size
25, 32

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

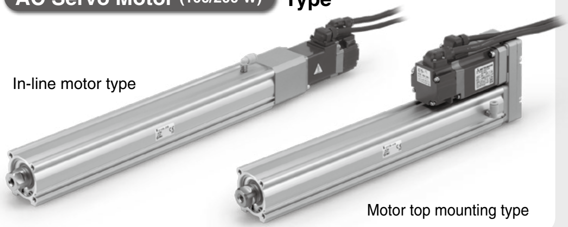


In-line motor type

Motor top mounting type

LEY-X5 (Refer to page 203.)

AC Servo Motor (100/200 W) Type



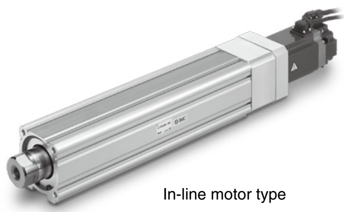
In-line motor type

Motor top mounting type

LEY63D□□-□P
(Refer to page 198./Option)

Size
63

AC Servo Motor (400 W) Type

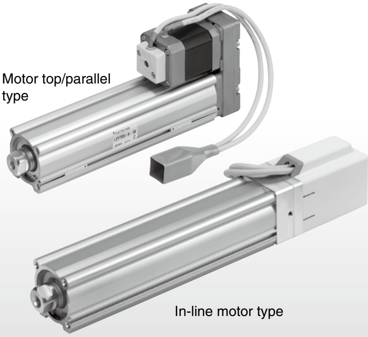


In-line motor type

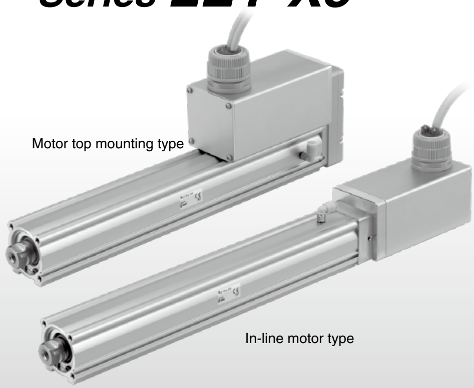
LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

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

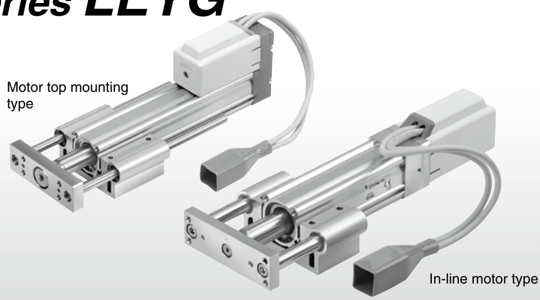
Rod Type Page 140
Series LEY



Dust/Drip Proof (IP65) Specification Page 156
Series LEY-X5



Guide Rod Type Page 168
Series LEYG



Step Motor/Servo Motor Controller Page 377
Step Motor Driver
Series LECP6/LECA6
Series LEC-G
Series LECP1
Series LECPA

Series ***LEY***

Model Selection

Selection Procedure

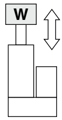
Positioning Control Selection Procedure

Step 1 **Check the work load–speed. (Vertical transfer)** → **Step 2** **Check the cycle time.**

Selection Example

Operating conditions

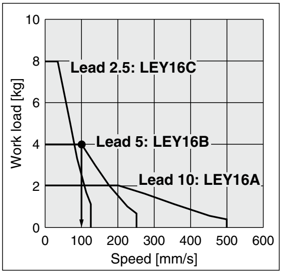
- Workpiece mass: 4 [kg]
- Speed: 100 [mm/s]
- Acceleration/Deceleration: 3,000 [mm/s^2]
- Stroke: 200 [mm]
- Workpiece mounting condition: Vertical upward downward transfer



Step 1 **Check the work load–speed. <Speed–Vertical work load graph>**

Select the target model based on the workpiece mass and speed with reference to the <Speed–Vertical work load graph>.

Selection example) The **LEY16B** is temporarily selected based on the graph shown on the right side.



<Speed–Vertical work load graph>
(LEY16/Step motor)

* It is necessary to mount a guide outside the actuator when used for horizontal transfer. When selecting the target model, refer to page 142 for the horizontal work load in the specifications, and page 179 for the precautions.

Step 2 **Check the cycle time.**

Calculate the cycle time using the following calculation method.

- Cycle time T can be found from the following equation.

$$\boxed{T = T1 + T2 + T3 + T4\ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

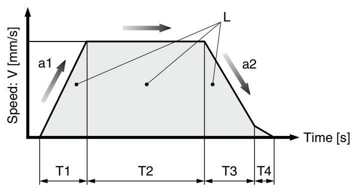
$$\boxed{T1 = V/a1\ [s]} \quad \boxed{T3 = V/a2\ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$\boxed{T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}\ [s]}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$$\boxed{T4 = 0.2\ [s]}$$



L : Stroke [mm] ··· (Operating condition)
V : Speed [mm/s] ··· (Operating condition)
a1: Acceleration [mm/s^2] ··· (Operating condition)
a2: Deceleration [mm/s^2] ··· (Operating condition)

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 the beginning of the constant speed operation to stop
T4: Settling time [s] ··· Time until in position is completed

Calculation example)
T1 to T4 can be calculated as follows.

T1 = V/a1 = 100/3000 = 0.033 [s], T3 = V/a2 = 100/3000 = 0.033 [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{200 - 0.5 \cdot 100 \cdot (0.033 + 0.033)}{100} = 1.97\ [s]$$

T4 = 0.2 [s]

Therefore, the cycle time can be obtained as follows.
T = T1 + T2 + T3 + T4 = 0.033 + 1.967 + 0.033 + 0.2 = **2.233 [s]**

Based on the above calculation result, the LEY16B-200 is selected.

Pushing Control Selection Procedure

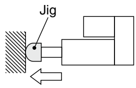
Step 1 Check the duty ratio. → **Step 2** Check the pushing force. → **Step 3** Check the lateral load on the rod end.

∗ The duty ratio is a ratio at the time that can keep being pushed.

Selection Example

Operating conditions

- Mounting condition: Horizontal (pushing)
- Jig weight: 0.2 [kg]
- Pushing force: 60 [N]
- Duty ratio: 20 [%]
- Speed: 100 [mm/s]
- Stroke: 200 [mm]

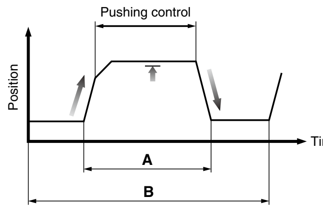


Step 1 Check the duty ratio. <Conversion table of pushing force–duty ratio>

Select the [Pushing force] from the duty ratio with reference to the <Conversion table of pushing force–duty ratio>.

Selection example)
Based on the table below,
- Duty ratio: 20 [%]

Therefore, the set value of pushing force will be 70 [%].



Duty ratio = A/B x 100 [%]

<Conversion table of pushing force–duty ratio>
(LEY16/Step motor)

Set value of pushing force [%]	Duty ratio (%)	Continuous pushing time (minute)
40 or less	100	—
50	70	12
70	20	1.3
85	15	0.8

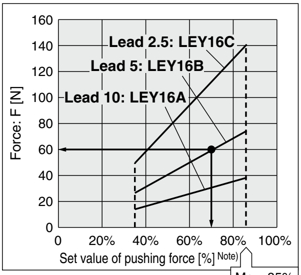
∗ [Set value of pushing force] is one of the step data input to the controller.
∗ [Continuous pushing time] is the time that the actuator can continuously keep pushing.

Step 2 Check the pushing force. <Force conversion graph>

Select the target model based on the set value of pushing force and force with reference to the <Force conversion graph>.

Selection example)
Based on the graph shown on the right side,
- Set value of pushing force: 70 [%]
- Pushing force: 60 [N]

Therefore, the **LEY16B** is temporarily selected.



<Force conversion graph>
(LEY16/Step motor)

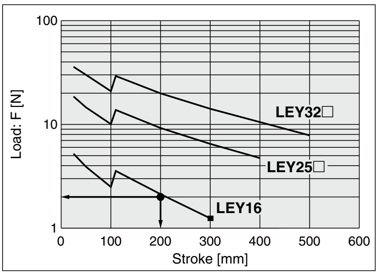
Note) Set values for the controller.

Step 3 Check the lateral load on the rod end. <Graph of allowable lateral load on the rod end>

Confirm the allowable lateral load on the rod end of the actuator: LEY16□, which has been selected temporarily with reference to the <Graph of allowable lateral load on the rod end>.

Selection example)
Based on the graph shown on the right side,
- Jig weight: 0.2 [kg] ≈ 2 [N]
- Product stroke: 200 [mm]

Therefore, the lateral load on the rod end is in the allowable range.



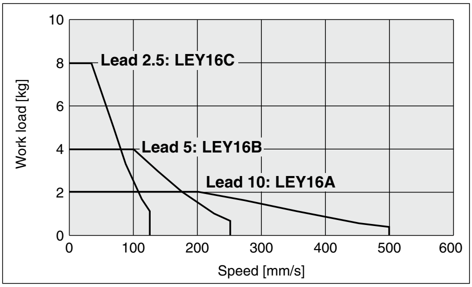
<Graph of allowable lateral load on the rod end>

Based on the above calculation result, the LEY16B-200 is selected.

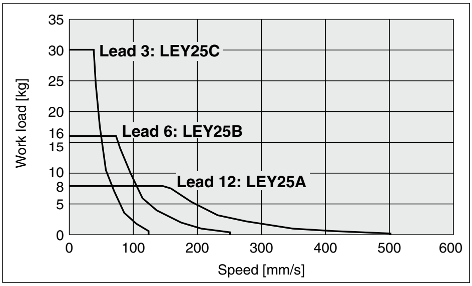
Speed–Vertical Work Load Graph (Guide)

Step Motor (Servo/24 VDC)

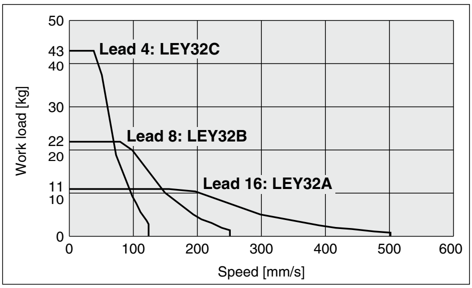
LEY16



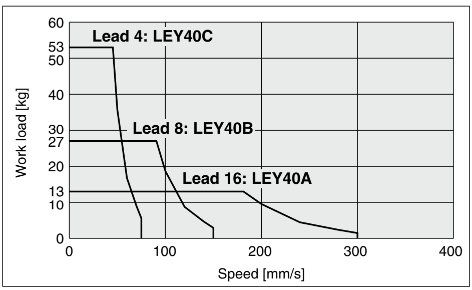
LEY25



LEY32

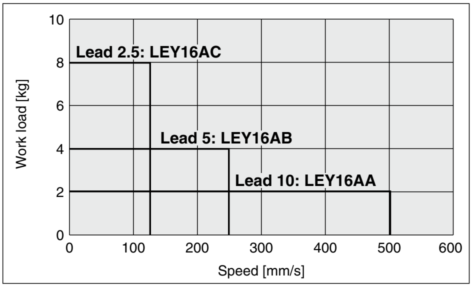


LEY40

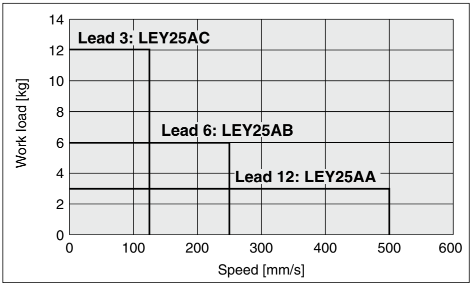


Servo Motor (24 VDC)

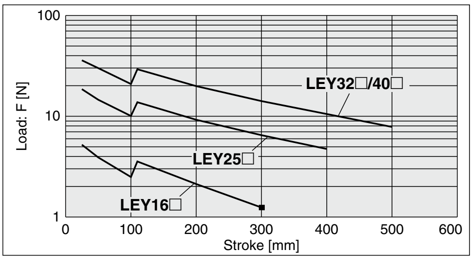
LEY16



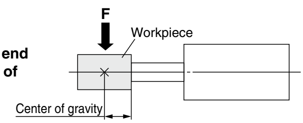
LEY25



Graph of Allowable Lateral Load on the Rod End (Guide)



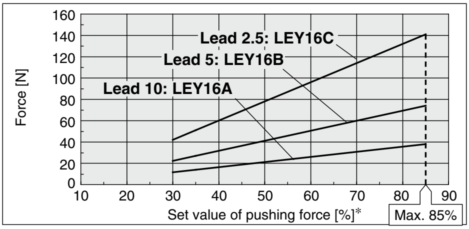
[Stroke]
= [Product stroke] +
[Distance from the rod end to the center of gravity of the workpiece]



Force Conversion Graph (Guide)

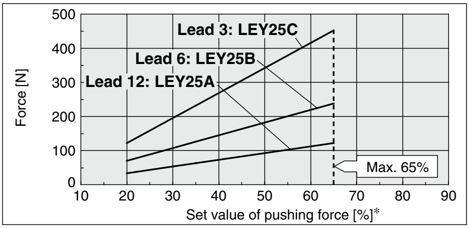
Step Motor (Servo/24 VDC)

LEY16



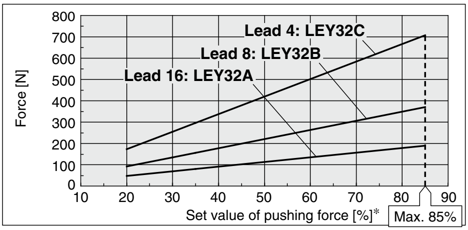
Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
25°C or less	85 or less	100	—
40°C	40 or less	100	—
	50	70	12
	70	20	1.3
	85	15	0.8

LEY25



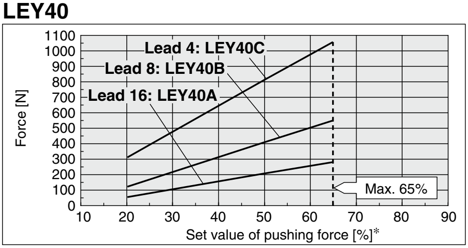
Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	65 or less	100	—

LEY32



Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
25°C or less	85 or less	100	—
40°C	65 or less	100	—
	85	50	15

LEY40

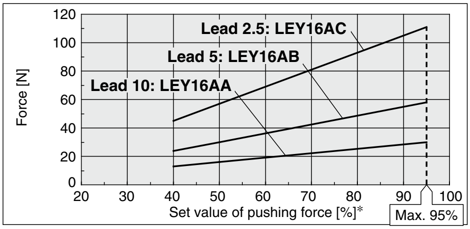


Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	65 or less	100	—

* Set values for the controller.

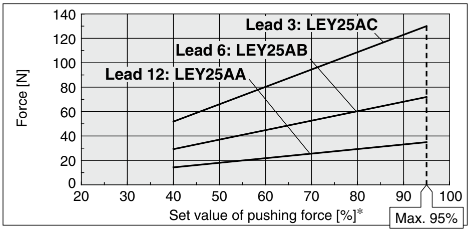
Servo Motor (24 VDC)

LEY16



Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	95 or less	100	—

LEY25



Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	95 or less	100	—

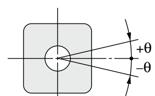
<Pushing Force and Trigger Level Range> Without Load

Model	Pushing speed [mm/s]	Pushing force (Setting input value)	Model	Pushing speed [mm/s]	Pushing force (Setting input value)
LEY16□	1 to 4	30% to 85%	**LEY16□A**	1 to 4	40% to 95%
	5 to 20	35% to 85%		5 to 20	60% to 95%
	21 to 50	60% to 85%		21 to 50	80% to 95%
LEY25□	1 to 4	20% to 65%	**LEY25□A**	1 to 4	40% to 95%
	5 to 20	35% to 65%		5 to 20	60% to 95%
	21 to 35	50% to 65%		21 to 35	80% to 95%
LEY32□	1 to 4	20% to 85%			
	5 to 20	35% to 85%			
	21 to 30	60% to 85%			
LEY40□	1 to 4	20% to 65%			
	5 to 20	35% to 65%			
	21 to 30	50% to 65%			

Note) For vertical loads (upward), set the pushing force to the maximum value shown below, and operate at the work load or less.

Model	LEY16□			LEY25□			LEY32□			LEY40□			LEY16□A			LEY25□A		
Lead	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Work load [kg]	1	1.5	3	2.5	5	10	4.5	9	18	7	14	28	1	1.5	3	1.2	2.5	5
Pushing force	85%			65%			85%			65%			95%			95%		

Non-rotating Accuracy of Rod

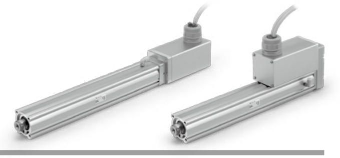


Size	Non-rotating accuracy θ
16	±1.1°
25	±0.8°
32	±0.7°
40	

* Avoid using the electric actuator in such a way that rotational torque would be applied to the piston rod.
This may cause deformation of the non-rotating guide, abnormal responses of the auto switch, play in the internal guide or an increase in the sliding resistance.

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

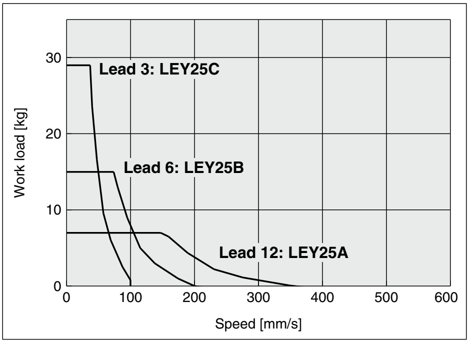
Model Selection



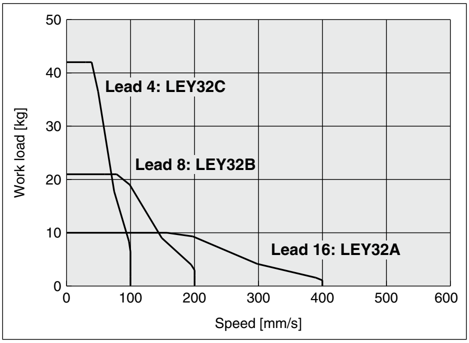
Speed–Vertical Work Load Graph

Step Motor (Servo/24 VDC)

LEY25□

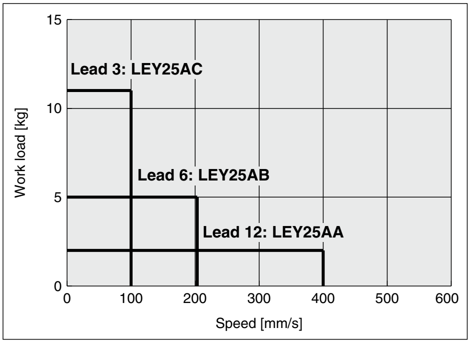


LEY32□

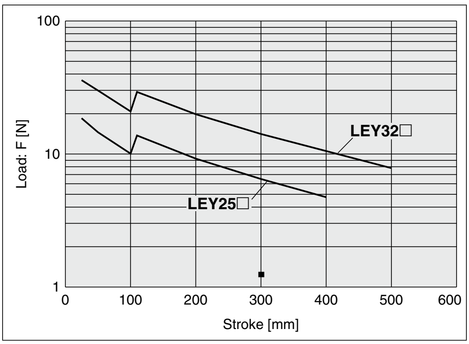


Servo Motor (24 VDC)

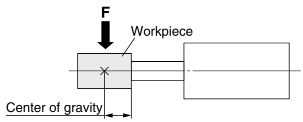
LEY25A□



Graph of Allowable Lateral Load on the Rod End (Guide)



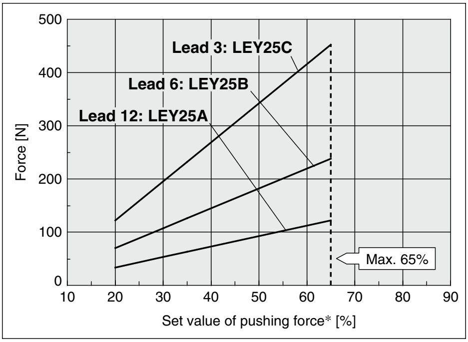
[Stroke] = [Product stroke] + [Distance from the rod end to the center of gravity of the workpiece]



Force Conversion Graph

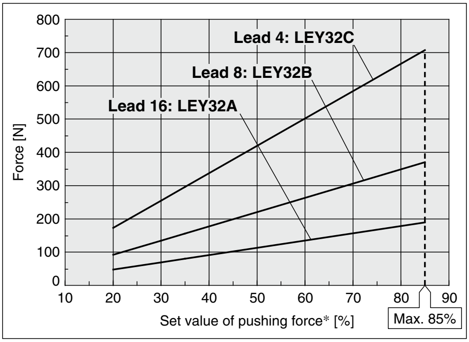
Step Motor (Servo/24 VDC)

LEY25



Ambient temperature	Set value of pushing force* [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	65 or less	100	—

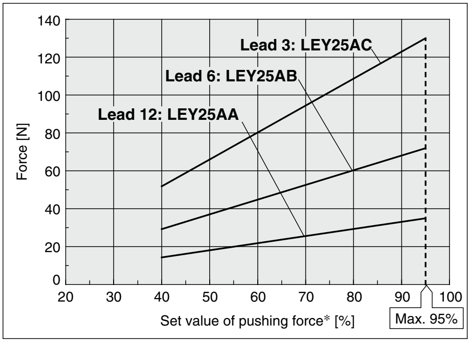
LEY32



Ambient temperature	Set value of pushing force* [%]	Duty ratio [%]	Continuous pushing time [minute]
25°C or less	85 or less	100	—
40°C	65 or less	100	—
	85	50	15

Servo Motor (24 VDC)

LEY25



Ambient temperature	Set value of pushing force* [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	95 or less	100	—

<Pushing Force and Trigger Level Range> Without Load

Model	Pushing speed [mm/s]	Pushing force (Setting input value)
LEY25□	1 to 4	20% to 65%
	5 to 20	35% to 65%
	21 to 35	50% to 65%
LEY32□	1 to 4	20% to 85%
	5 to 20	35% to 85%
	21 to 30	60% to 85%

Model	Pushing speed [mm/s]	Pushing force (Setting input value)
LEY25□A	1 to 4	40% to 95%
	5 to 20	60% to 95%
	21 to 35	80% to 95%

Note) For vertical loads (upward), set the pushing force to the maximum value shown below, and operate at the work load or less.

Model	**LEY25□**			**LEY32□**			**LEY25□A**		
Lead	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
Work load [kg]	2.5	5	10	4.5	9	18	1.2	2.5	5
Pushing force	65%			85%			95%		

∗ Set values for the controller.

Electric Actuator/Rod Type

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

Series LEY

LEY16, 25, 32, 40

RoHS

How to Order

LEY [16] [ ] [ ] [B] – [30] [ ] [ ] [ ] – [S] [1] [6N] [1] [ ]

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭

❶ Size

16
25
32
40

❷ Motor mounting position

Nil	Top mounting
R	Right side parallel
L	Left side parallel
D	In-line

❸ Motor type

Symbol	Type	Size LEY16	Size LEY25	Size LEY32/40	Compatible controllers/driver
Nil	Step motor (Servo/24 VDC)	●	●	●	LECP6 LECP1 LECPA
A	Servo motor (24 VDC)	●	●	—	LECA6

❹ Lead [mm]

Symbol	LEY16	LEY25	LEY32/40
A	10	12	16
B	5	6	8
C	2.5	3	4

❺ Stroke [mm]

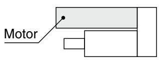
30	30
to	to
500	500

∗ Refer to the applicable stroke table.

❻ Motor option∗

Nil	Without option
C	With motor cover
B	With lock
W	With lock/motor cover

∗ When “With lock” or “With lock/motor cover” are selected for the top mounting and right/left side parallel types, the motor body will stick out of the end of the body for size 16 with strokes 30 or less. Check for interference with workpieces before selecting a model.



❼ Rod end thread

Nil	Rod end female thread
M	Rod end male thread (1 rod end nut is included.)

∗ Applicable stroke table ●Standard

Model \ Stroke [mm]	30	50	100	150	200	250	300	350	400	450	500	Manufacturable stroke range [mm]
LEY16	●	●	●	●	●	●	●	—	—	—	—	10 to 300
LEY25	●	●	●	●	●	●	●	●	●	—	—	15 to 400
LEY32/40	●	●	●	●	●	●	●	●	●	●	●	20 to 500

∗ Consult with SMC for non-standard strokes as they are produced as special orders.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEY 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.

② For the servo motor (24 VDC) specification, EMC compliance was tested by installing a noise filter set (LEC-NFA). Refer to page 394 for the noise filter set.
Refer to the LECA Operation Manual for installation.

[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.

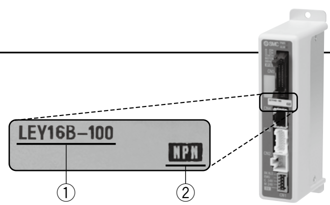
For auto switches, refer to pages 154 and 155.

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

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP)



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

Motor mounting position: Top/Parallel

Motor mounting position: In-line

❽ Mounting*1

Symbol	Type	Motor mounting position	
		Top/Parallel	In-line
Nil	Ends tapped (Standard)*2	●	●
U	Body bottom tapped	●	●
L	Foot	●	—
F	Rod flange*2	●	●
G	Head flange*2	●*4	—
D	Double clevis*3	●	—

*1 Mounting bracket is shipped together, (but not assembled).
*2 For horizontal cantilever mounting with the rod flange, head flange and ends tapped, use the actuator within the following stroke range.
・LEY25: 200 or less
・LEY32/40: 100 or less
*3 For mounting with the double clevis, use the actuator within the following stroke range.
・LEY16: 100 or less
・LEY25: 200 or less
・LEY32/40: 200 or less
*4 Head flange is not available for the LEY32/40.

❾ Actuator cable type*1

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

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Only available for the motor type "Step motor."

❿ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 5) on page 142.

⓫ Controller/Driver type*1

Nil	Without controller/driver	
6N	**LECP6/LECA6** (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 Only available for the motor type "Step motor."

⓬ I/O cable length [m]*1

Nil	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 394 (For LECP6/LECA6), page 407 (For LECP1) or page 414 (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.

⓭ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*1

*1 DIN rail is not included. Order it separately.

Compatible Controllers/Driver

Type	**Step data input type** 	**Step data input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECA6**	**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)	Servo motor (24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 386	Page 386	Page 401	Page 408

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Specifications

Step Motor (Servo/24 VDC)

	Model	LEY16			LEY25			LEY32			LEY40		
Actuator specifications	**Stroke [mm]** Note 1)	30, 50, 100, 150 200, 250, 300			30, 50, 100, 150, 200 250, 300, 350, 400			30, 50, 100, 150, 200, 250 300, 350, 400, 450, 500			30, 50, 100, 150, 200, 250 300, 350, 400, 450, 500		
	Work load [kg] Note 2) Horizontal **(3000 [mm/s^2])**	4	11	20	12	30	30	20	40	40	30	60	60
	Work load [kg] Note 2) Horizontal **(2000 [mm/s^2])**	6	17	30	18	50	50	30	60	60	—	—	—
	Work load [kg] Note 2) Vertical **(3000 [mm/s^2])**	2	4	8	8	16	30	11	22	43	13	27	53
	Pushing force [N] Note 3) 4) 5)	14 to 38	27 to 74	51 to 141	63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707	132 to 283	266 to 553	562 to 1058
	Speed [mm/s] Note 5)	15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125	24 to 500	12 to 250	6 to 125	24 to 300	12 to 150	6 to 75
	Max. acceleration/deceleration [mm/s^2]	3000											
	Pushing speed [mm/s] Note 6)	50 or less			35 or less			30 or less			30 or less		
	Positioning repeatability [mm]	±0.02											
	Screw lead [mm]	10	5	2.5	12	6	3	16	8	4	16	8	4
	Impact/Vibration resistance [m/s^2] Note 7)	50/20											
	Actuation type	Ball screw + Belt (LEY□)/Ball screw (LEY□D)											
	Guide type	Sliding bushing (Piston rod)											
	Operating temperature range [°C]	5 to 40											
	Operating humidity range [%RH]	90 or less (No condensation)											
Electric specifications	**Motor size**	□28			□42			□56.4			□56.4		
	Motor type	Step motor (Servo/24 VDC)											
	Encoder	Incremental A/B phase (800 pulse/rotation)											
	Rated voltage [V]	24 VDC ±10%											
	Power consumption [W] Note 8)	23			40			50			50		
	Standby power consumption when operating [W] Note 9)	16			15			48			48		
	Max. instantaneous power consumption [W] Note 10)	43			48			104			106		
Lock unit specifications	**Type** Note 11)	Non-magnetizing lock											
	Holding force [N]	20	39	78	78	157	294	108	216	421	127	265	519
	Power consumption [W] Note 12)	2.9			5			5			5		
	Rated voltage [V]	24 VDC ±10%											

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Horizontal: The maximum value of the work load. An external guide is necessary to support the load. The actual work load and transfer speed change according to the condition of the external guide.
Vertical: Speed changes according to the work load. Check "Model Selection" on page 134.
The values shown in ( ) are the acceleration/deceleration.
Set these values to be 3000 [mm/s^2] or less.
Note 3) Pushing force accuracy is ±20% (F.S.).
Note 4) The pushing force values for LEY16□ is 35% to 85%, for LEY25□ is 35% to 65%, for LEY32□ is 35% to 85% and for LEY40□ is 35% to 65%.
The pushing force values change according to the duty ratio and pushing speed. Check "Model Selection" on page 135.
Note 5) 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 6) The allowable speed for pushing operation. When push conveying a workpiece, operate at the vertical work load or less.
Note 7) Impact resistance: No malfunction occurred when the actuator 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 8) The power consumption (including the controller) is for when the actuator is operating.
Note 9) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation.
Note 10) 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 11) With lock only
Note 12) For an actuator with lock, add the power consumption for the lock.

Specifications

Servo Motor (24 VDC)

	Model	LEY16A			LEY25A		
Actuator specifications	Stroke [mm] Note 1)	30, 50, 100, 150 200, 250, 300			30, 50, 100, 150, 200 250, 300, 350, 400		
	Work load [kg] Note 2) Horizontal (3000 [mm/s²])	3	6	12	7	15	30
	Work load [kg] Note 2) Vertical (3000 [mm/s²])	2	4	8	3	6	12
	Pushing force [N] Note 3) 4)	16 to 30	30 to 58	57 to 111	18 to 35	37 to 72	66 to 130
	Speed [mm/s]	15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125
	Max. acceleration/deceleration [mm/s²]	3000					
	Pushing speed [mm/s] Note 5)	50 or less			35 or less		
	Positioning repeatability [mm]	±0.02					
	Screw lead [mm]	10	5	2.5	12	6	3
	Impact/Vibration resistance [m/s²] Note 6)	50/20					
	Actuation type	Ball screw + Belt (LEY□)/Ball screw (LEY□D)					
	Guide type	Sliding bushing (Piston rod)					
	Operating temperature range [°C]	5 to 40					
	Operating humidity range [%RH]	90 or less (No condensation)					
Electric specifications	Motor size	□28			□42		
	Motor output [W]	30			36		
	Motor type	Servo motor (24 VDC)					
	Encoder	Incremental A/B phase (800 pulse/rotation)/Z phase					
	Rated voltage [V]	24 VDC ±10%					
	Power consumption [W] Note 7)	40			86		
	Standby power consumption when operating [W] Note 8)	4 (Horizontal)/6 (Vertical)			4 (Horizontal)/12 (Vertical)		
	Max. instantaneous power consumption [W] Note 9)	59			96		
Lock unit specifications	Type Note 10)	Non-magnetizing lock					
	Holding force [N]	20	39	78	78	157	294
	Power consumption [W] Note 11)	2.9			5		
	Rated voltage [V]	24 VDC ±10%					

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Horizontal: The maximum value of the work load. An external guide is necessary to support the load. The actual work load and transfer speed change according to the condition of the external guide.
Vertical: Check "Model Selection" on page 134 for details.
The values shown in ( ) are the acceleration/deceleration.
Set these values to be 3000 [mm/s²] or less.
Note 3) Pushing force accuracy is ±20% (F.S.).
Note 4) The pushing force values for LEY16A□ is 50% to 95% and for LEY25A□ is 50% to 95%. The pushing force values change according to the duty ratio and pushing speed. Check "Model Selection" on page 135.
Note 5) The allowable speed for pushing operation. When push conveying a workpiece, operate at the vertical work load or less.
Note 6) Impact resistance: No malfunction occurred when the actuator 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 7) The power consumption (including the controller) is for when the actuator is operating.
Note 8) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation.
Note 9) 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 10) With lock only
Note 11) For an actuator with lock, add the power consumption for the lock.

Weight

Weight: Motor Top/Parallel Type

Series		LEY16						
Stroke [mm]		30	50	100	150	200	250	300
Product weight [kg]	Step motor	0.58	0.62	0.73	0.87	0.98	1.09	1.20
	Servo motor	0.58	0.62	0.73	0.87	0.98	1.09	1.20

Series		LEY25								
Stroke [mm]		30	50	100	150	200	250	300	350	400
Product weight [kg]	Step motor	1.18	1.25	1.42	1.68	1.86	2.03	2.21	2.38	2.56
	Servo motor	1.14	1.21	1.38	1.64	1.82	1.99	2.17	2.34	2.52

Series		LEY32										
Stroke [mm]		30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	Step motor	2.09	2.20	2.49	2.77	3.17	3.46	3.74	4.03	4.32	4.60	4.89
	Servo motor	—	—	—	—	—	—	—	—	—	—	—

Series		LEY40										
Stroke [mm]		30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	Step motor	2.39	2.50	2.79	3.07	3.47	3.76	4.04	4.33	4.62	4.90	5.19
	Servo motor	—	—	—	—	—	—	—	—	—	—	—

Weight: In-line Motor Type

Series		LEY16D						
Stroke [mm]		30	50	100	150	200	250	300
Product weight [kg]	Step motor	0.58	0.62	0.73	0.87	0.98	1.09	1.20
	Servo motor	0.58	0.62	0.73	0.87	0.98	1.09	1.20

Series		LEY25D								
Stroke [mm]		30	50	100	150	200	250	300	350	400
Product weight [kg]	Step motor	1.17	1.24	1.41	1.67	1.85	2.02	2.20	2.37	2.55
	Servo motor	1.13	1.20	1.37	1.63	1.81	1.98	2.16	2.33	2.51

Series		LEY32D										
Stroke [mm]		30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	Step motor	2.08	2.19	2.48	2.76	3.16	3.45	3.73	4.02	4.31	4.59	4.88
	Servo motor	—	—	—	—	—	—	—	—	—	—	—

Series		LEY40D										
Stroke [mm]		30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	Step motor	2.38	2.49	2.78	3.06	3.46	3.75	4.03	4.32	4.61	4.89	5.18
	Servo motor	—	—	—	—	—	—	—	—	—	—	—

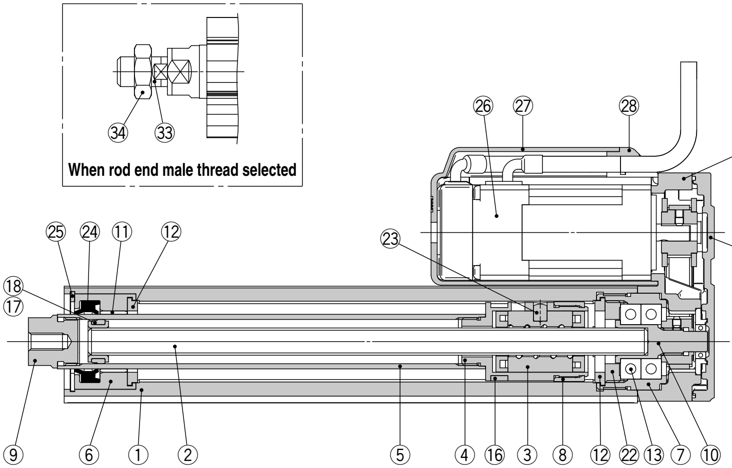
Additional Weight

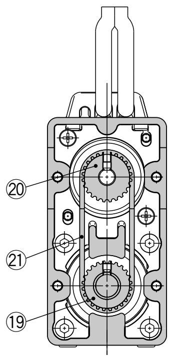
[kg]

Size		16	25	32	40
Lock		0.12	0.26	0.53	0.53
Motor cover		0.02	0.03	0.04	0.05
Lock/Motor cover		0.16	0.32	0.61	0.62
Rod end male thread	Male thread	0.01	0.03	0.03	0.03
	Nut	0.01	0.02	0.02	0.02
Foot (2 sets including mounting bolt)		0.06	0.08	0.14	0.14
Rod flange (including mounting bolt)		0.13	0.17	0.20	0.20
Head flange (including mounting bolt)					
Double clevis (including pin, retaining ring and mounting bolt)		0.08	0.16	0.22	0.22

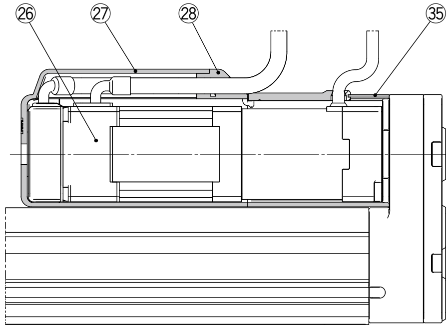
Construction

Motor top mounting type: LEY 16, 25, 32, 40



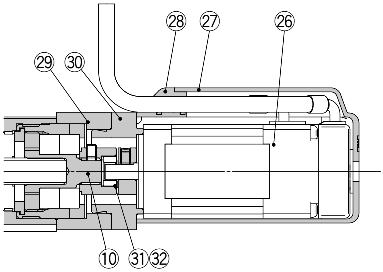


Motor top/parallel type
With lock/motor cover

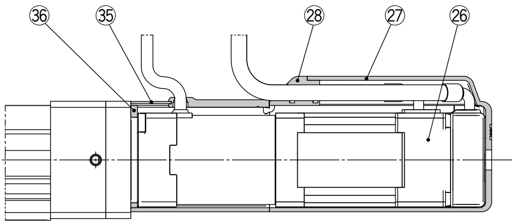


Construction

In-line motor type: LEY 16/25/32/40 D



In-line motor type: With lock/motor cover



Component Parts

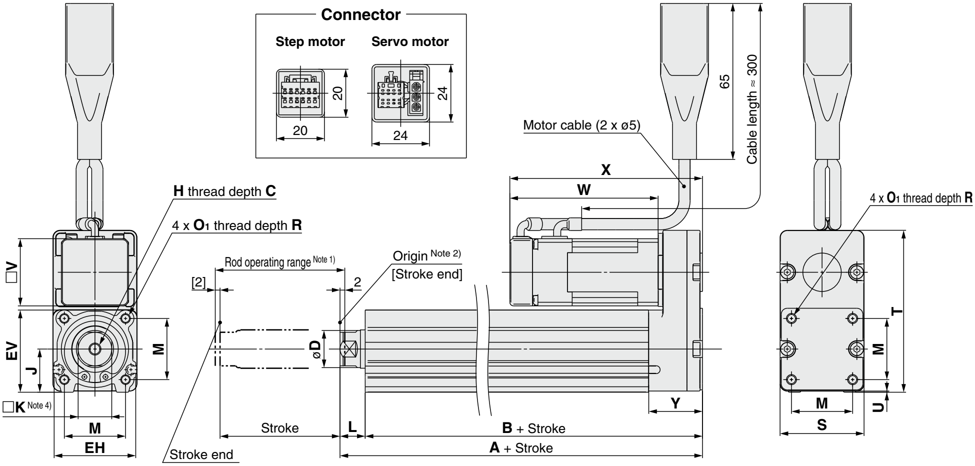
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw (shaft)**	Alloy steel	
3	**Ball screw nut**	Resin/Alloy steel	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plated
6	**Rod cover**	Aluminum alloy	
7	**Housing**	Aluminum alloy	
8	**Rotation stopper**	POM	
9	**Socket**	Free cutting carbon steel	Nickel plated
10	**Connected shaft**	Free cutting carbon steel	Nickel plated
11	**Bushing**	Lead bronze cast	
12	**Bumper**	Urethane	
13	**Bearing**	—	
14	**Return box**	Aluminum die-cast	Trivalent chromated
15	**Return plate**	Aluminum die-cast	Trivalent chromated
16	**Magnet**	—	
17	**Wear ring holder**	Stainless steel	Stroke 101 mm or more
18	**Wear ring**	POM	Stroke 101 mm or more
19	**Screw shaft pulley**	Aluminum alloy	
20	**Motor pulley**	Aluminum alloy	
21	**Belt**	—	

No.	Description	Material	Note
22	**Bearing stopper**	Aluminum alloy	
23	**Parallel pin**	Stainless steel	
24	**Seal**	NBR	
25	**Retaining ring**	Steel for spring	Phosphate coated
26	**Motor**	—	
27	**Motor cover**	Synthetic resin	Only “With motor cover”
28	**Grommet**	Synthetic resin	Only “With motor cover”
29	**Motor block**	Aluminum alloy	Anodized
30	**Motor adapter**	Aluminum alloy	Anodized/LEY16, 25 only
31	**Hub**	Aluminum alloy	
32	**Spider**	NBR	
33	**Socket (Male thread)**	Free cutting carbon steel	Nickel plated
34	**Nut**	Alloy steel	
35	**Motor cover with lock**	Aluminum alloy	Only “With lock/motor cover”
36	**Cover support**	Aluminum alloy	Only “With lock/motor cover”

Replacement Parts (Top/Parallel only)/Belt

No.	Size	Order no.
21	**16**	LE-D-2-1
	25	LE-D-2-2
	32, 40	LE-D-2-3

Dimensions: Motor Top/Parallel

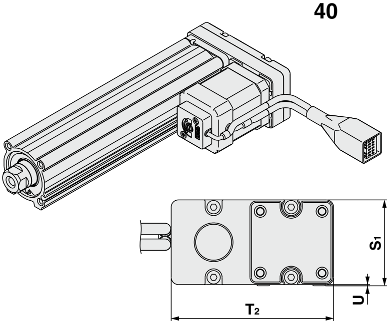


Note 1) Range within which the rod can move when it returns to origin. Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) The direction of rod end width across flats (□K) differs depending on the products.

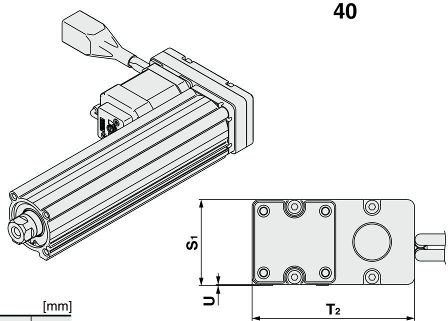
[mm]

Size	Stroke range (mm)	A	B	C	D	EH	EV	H	J	K	L	M	O1	R	S	T	U	V	Step motor W	Step motor X	Servo motor W	Servo motor X	Y
16	10 to 100	101	90.5	10	16	34	34.3	M5 x 0.8	18	14	10.5	25.5	M4 x 0.7	7	35	67.5	0.5	28	61.8	80.3	62.5	81	22.5
	101 to 300	121	110.5																				
25	15 to 100	130.5	116	13	20	44	45.5	M8 x 1.25	24	17	14.5	34	M5 x 0.8	8	46	92	1	42	63.4	85.4	59.6	81.6	26.5
	101 to 400	155.5	141																				
32	20 to 100	148.5	130	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1.0	10	60	118	1	56.4	68.4	95.4	—	—	34
	101 to 500	178.5	160																				
40	20 to 100	148.5	130	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1.0	10	60	118	1	56.4	90.4	117.4	—	—	34
	101 to 500	178.5	160																				

Motor left side parallel type: LEY 16/25/32/40 L



Motor right side parallel type: LEY 16/25/32/40 R

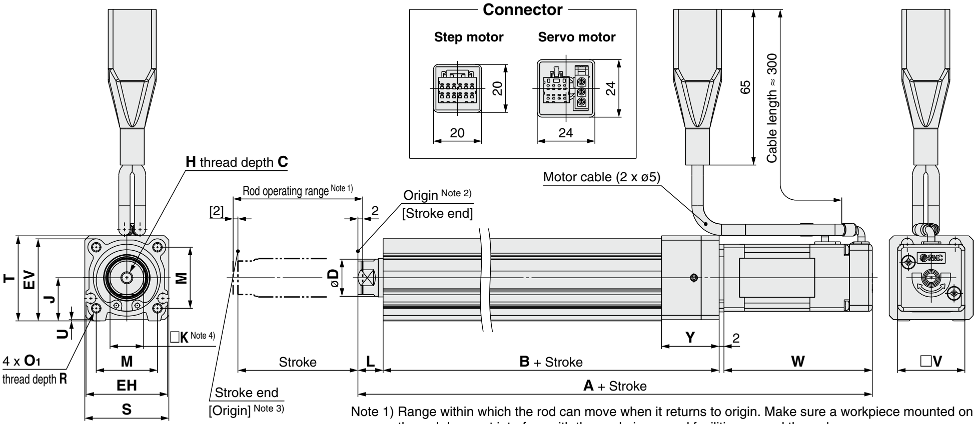


[mm]

Size	S1	T2	U
16	35.5	67	0.5
25	47	91	1
32, 40	61	117	1

Note) When the motor is mounted on the left or right side in parallel, the groove for auto switch on the side to which the motor is mounted is hidden.

Dimensions: In-line Motor



Note 1) Range within which the rod can move when it returns to origin. Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) The direction of rod end width across flats (□K) differs depending on the products.

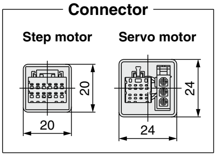
[mm]

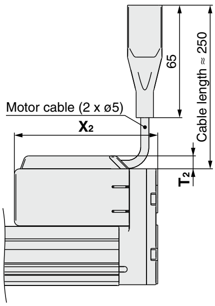
Size	Stroke range (mm)	A: Step motor	A: Servo motor	B	C	D	EH	EV	H	J	K	L	M	O1	R	S	T	U
16	10 to 100	166.3	167	92	10	16	34	34.3	M5 x 0.8	18	14	10.5	25.5	M4 x 0.7	7	35	35.5	0.5
	101 to 300	186.3	187	112														
25	15 to 100	195.4	191.6	115.5	13	20	44	45.5	M8 x 1.25	24	17	14.5	34	M5 x 0.8	8	45	46.5	1.5
	101 to 400	220.4	216.6	140.5														
32	20 to 100	216.9	—	128	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1	10	60	61	1
	101 to 500	246.9	—	158														
40	20 to 100	238.9	—	128	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1	10	60	61	1
	101 to 500	268.9	—	158														

Size	Stroke range (mm)	V	W: Step motor	W: Servo motor	Y
16	10 to 100	28	61.8	62.5	24
	101 to 300				
25	15 to 100	42	63.4	59.6	26
	101 to 400				
32	20 to 100	56.4	68.4	—	32
	101 to 500				
40	20 to 100	56.4	90.4	—	32
	101 to 500				

Dimensions

Motor top/parallel type / With motor cover: LEY 16/25/32/40 □□ A/B/C -□C



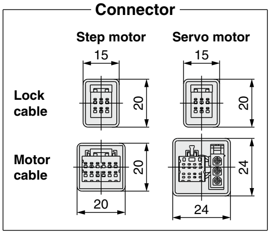


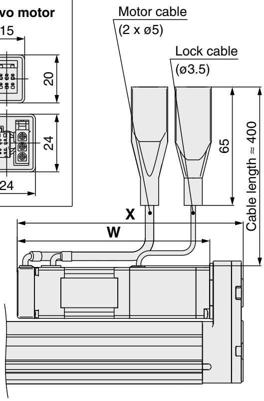
[mm]

Size	T_2	X_2
16	7.5	83
25	7.5	88.5
32	7.5	98.5
40	7.5	120.5

Motor cover material: Synthetic resin

With lock: LEY 16/25/32/40 □□ A/B/C -□B

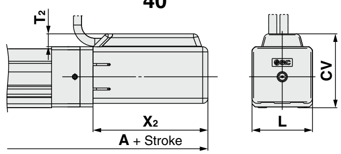




[mm]

Size	Step motor		Servo motor	
	W	X	W	X
16	103.3	121.8	104.0	122.5
25	103.9	125.9	100.1	122.1
32	111.4	138.4	—	—
40	133.4	160.4	—	—

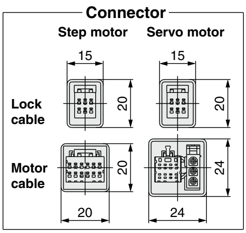
In-line motor type / With motor cover: LEY 16/25/32/40 D□ A/B/C -□C

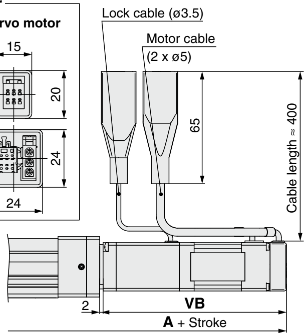


[mm]

Size	Stroke range	A	T_2	X_2	L	CV
16	100st or less	169	7.5	66.5	35	43
	101st or more, 200st or less	189				
25	100st or less	198.5	7.5	68.5	46	54.5
	101st or more, 400st or less	223.5				
32	100st or less	220	7.5	73.5	60	68.5
	101st or more, 500st or less	250				
40	100st or less	242	7.5	95.5	60	68.5
	101st or more, 500st or less	272				

With lock: LEY 16/25/32/40 D□ A/B/C -□B

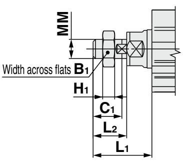




[mm]

Size	Stroke range	A		VB	
		Step motor	Servo motor	Step motor	Servo motor
16	100st or less	207.8	208.5	103.3	104
	101st or more, 200st or less	227.8	228.5		
25	100st or less	235.9	232.1	103.9	100.1
	101st or more, 400st or less	260.9	257.1		
32	100st or less	259.9	—	111.4	—
	101st or more, 500st or less	289.9	—		
40	100st or less	281.9	—	133.4	—
	101st or more, 500st or less	311.9	—		

End male thread: LEY 16/25/32/40 □□ A/B/C -□□M



* Refer to page 152 for details about the rod end nut and mounting bracket.

Note) Refer to the "Handling" precautions on pages 180 and 181 when mounting end brackets such as knuckle joint or workpieces.

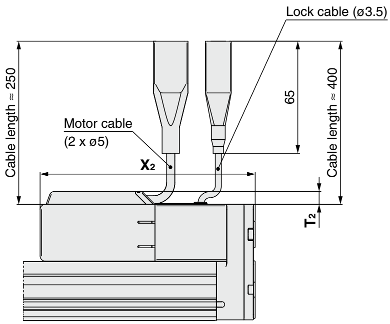
[mm]

Size	B_1	C_1	H_1	L_1	L_2	MM
16	13	12	5	24.5	14	M8 x 1.25
25	22	20.5	8	38	23.5	M14 x 1.5
32, 40	22	20.5	8	42.0	23.5	M14 x 1.5

* The L_1 measurement is when the unit is in the original position. At this position, 2 mm at the end.

Dimensions

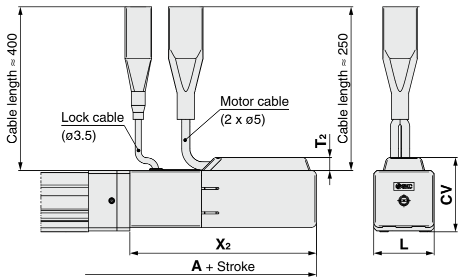
Motor top/parallel type
With lock/motor cover: LEY 16/25/32/40 □□ A/B/C -□W



[mm]

Size	T_2	X_2
16	7.5	124.5
25	7.5	129
32	7.5	141.5
40	7.5	163.5

In-line motor type
With lock/motor cover: LEY 16/25/32/40 D□ A/B/C -□W

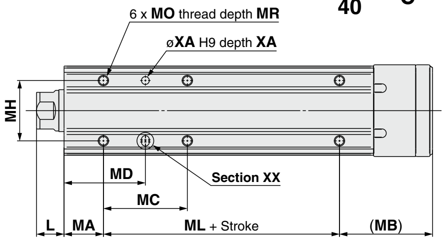


[mm]

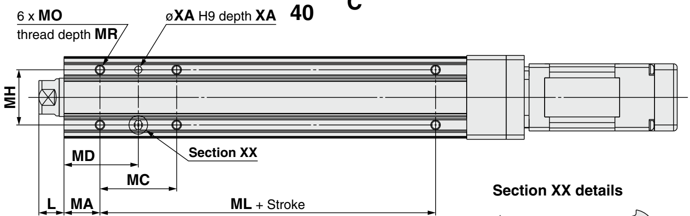
Size	Stroke range	A	T_2	X_2	L	CV
16	100st or less	210.5	7.5	108	35	43
	101st or more, 300st or less	230.5				
25	100st or less	239	7.5	109	46	54.4
	101st or more, 400st or less	264				
32	100st or less	263	7.5	116.5	60	68.5
	101st or more, 500st or less	293				
40	100st or less	285	7.5	138.5	60	68.5
	101st or more, 500st or less	315				

Dimensions

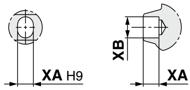
Body bottom tapped
Motor top/parallel: LEY16/25/32/40□□A/B/C-□□□U



Body bottom tapped
In-line motor: LEY16/25/32/40D□A/B/C-□□□U



Section XX details



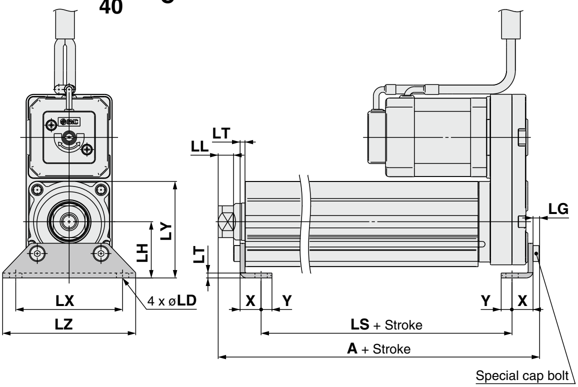
Body Bottom Tapped

[mm]

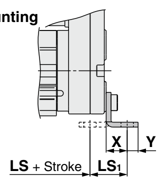
Size	Stroke range (mm)	L	MA	MB	MC	MD	MH	ML
16	10 to 39	10.5	15	35.5	17	23.5	23	40
	40 to 100				32	31		
	101 to 300				62	46		60
25	15 to 39	14.5	20	46	24	32	29	50
	40 to 100				42	41		
	101 to 124							75
	125 to 200				59	49.5		
	201 to 400				76	58		
32 40	20 to 39	18.5	25	55	22	36	30	50
	40 to 100				36	43		
	101 to 124							80
	125 to 200				53	51.5		
	201 to 500				70	60		

Size	Stroke range (mm)	MO	MR	XA	XB
16	10 to 39	M4 x 0.7	5.5	3	4
	40 to 100				
	101 to 300				
25	15 to 39	M5 x 0.8	6.5	4	5
	40 to 100				
	101 to 124				
	125 to 200				
	201 to 400				
32 40	20 to 39	M6 x 1	8.5	5	6
	40 to 100				
	101 to 124				
	125 to 200				
	201 to 500				

Foot: LEY16/25/32/40□□A/B/C-□□□L



Outward mounting



Included parts
- Foot
- Body mounting bolt

Foot

[mm]

Size	Stroke range (mm)	A	LS	LS_1	LL	LD	LG
16	10 to 100	106.1	76.7	16.1	5.4	6.6	2.8
	101 to 300	126.1	96.7				
25	15 to 100	136.6	98.8	19.8	8.4	6.6	3.5
	101 to 400	161.6	123.8				
32 40	20 to 100	155.7	114	19.2	11.3	6.6	4
	101 to 500	185.7	144				

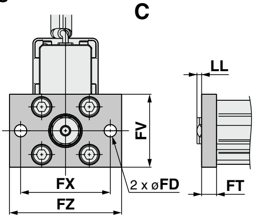
Size	Stroke range (mm)	LH	LT	LX	LY	LZ	X	Y
16	10 to 100	24	2.3	48	40.3	62	9.2	5.8
	101 to 300							
25	15 to 100	30	2.6	57	51.5	71	11.2	5.8
	101 to 400							
32 40	20 to 100	36	3.2	76	61.5	90	11.2	7
	101 to 500							

Material: Carbon steel (Chromate treated)

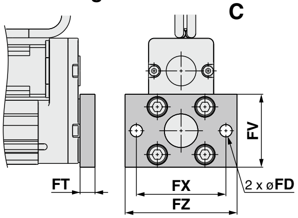
∗ The A measurement is when the unit is in the original position. At this position, 2 mm at the end.

Note) When the motor mounting is the right or left side parallel type, the head side foot should be mounted outwards.

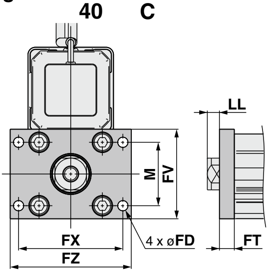
Rod flange: LEY16□□A/B/C-□□□F



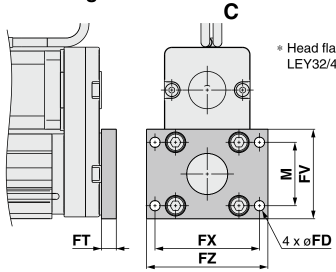
Head flange: LEY16□□A/B/C-□□□G



Rod flange: LEY25/32/40□□A/B/C-□□□F



Head flange: LEY25□□A/B/C-□□□G



∗ Head flange is not available for the LEY32/40.

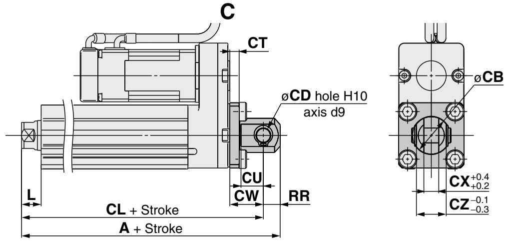
Included parts
- Flange
- Body mounting bolt

Rod/Head Flange [mm]

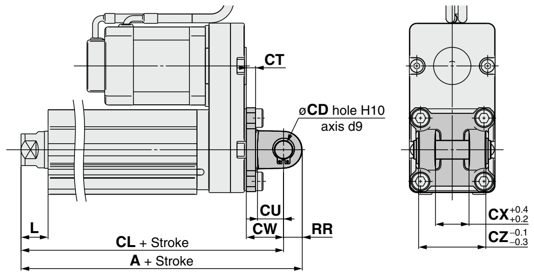
Size	FD	FT	FV	FX	FZ	LL	M
16	6.6	8	39	48	60	2.5	—
25	5.5	8	48	56	65	6.5	34
32, 40	5.5	8	54	62	72	10.5	40

Material: Carbon steel (Nickel plated)

Double clevis: LEY16□□A/B/C-□□□D



Double clevis: LEY25/32/40□□A/B/C-□□□D



Included parts
- Double clevis
- Body mounting bolt
- Clevis pin
- Retaining ring

∗ Refer to page 152 for details about the rod end nut and mounting bracket.

Double Clevis [mm]

Size	Stroke range (mm)	A	CL	CB	CD	CT
16	10 to 100	128	119	20	8	5
25	15 to 100	160.5	150.5	—	10	5
	101 to 200	185.5	175.5			
32, 40	20 to 100	180.5	170.5	—	10	6
	101 to 200	210.5	200.5			

Size	Stroke range (mm)	CU	CW	CX	CZ	L	RR
16	10 to 100	12	18	8	16	10.5	9
25	15 to 100	14	20	18	36	14.5	10
	101 to 200						
32, 40	20 to 100	14	22	18	36	18.5	10
	101 to 200						

Material: Cast iron (Coating)
∗ The A and CL measurements are when the unit is in the original position. At this position, 2 mm at the end.

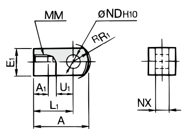
Accessory Mounting Brackets

Accessory Brackets/Support Brackets

Single Knuckle Joint

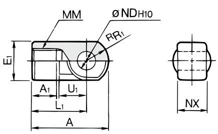
∗ If a knuckle joint is used, select the body option [end male thread].

I-G02



Material: Carbon steel
Surface treatment: Nickel plated

I-G04

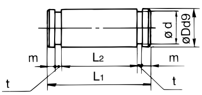


Material: Cast iron
Surface treatment: Nickel plated

[mm]

Part no.	Applicable size	A	A_1	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX
I-G02	**16**	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{-0.2}_{-0.4}$
I-G04	**25, 32, 40**	42	14	ø22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{-0.3}_{-0.5}$
I-G05	**63**	56	18	ø28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{-0.3}_{-0.5}$

Knuckle Pin (Common with double clevis pin)



Material: Carbon steel

[mm]

Part no.	Applicable size	Dd9	L_1	L_2	d	m	t	Retaining ring
IY-G02	**16**	$8^{-0.040}_{-0.076}$	21	16.2	7.6	1.5	0.9	Type C retaining ring 8
IY-G04	**25, 32, 40**	$10^{-0.040}_{-0.076}$	41.6	36.2	9.6	1.55	1.15	Type C retaining ring 10
IY-G05	**63**	$14^{-0.050}_{-0.093}$	50.6	44.2	13.4	2.05	1.15	Type C retaining ring 14

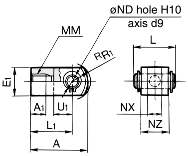
Mounting Brackets/Part No.

Applicable size	Foot	Flange	Double clevis
16	LEY-L016	LEY-F016	LEY-D016
25	LEY-L025	LEY-F025	LEY-D025
32, 40	LEY-L032	LEY-F032	LEY-D032
63	—	LEY-F063	—

∗ When ordering foot brackets, order 2 pieces per actuator.
∗ Parts belonging to each bracket are as follows.
Foot: Body mounting bolt
Flange: Body mounting bolt
Double clevis: Clevis pin, Type C retaining ring for axis, Body mounting bolt

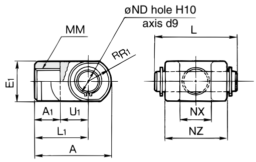
Double Knuckle Joint

Y-G02



Material: Carbon steel
Surface treatment: Nickel plated

Y-G04



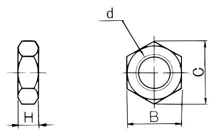
Material: Cast iron
Surface treatment: Nickel plated

∗ Knuckle pin and retaining ring are included. [mm]

Part no.	Applicable size	A	A_1	E_1	L_1	MM	R_1
Y-G02	**16**	34	8.5	□16	25	M8 x 1.25	10.3
Y-G04	**25, 32, 40**	42	16	ø22	30	M14 x 1.5	12
Y-G05	**63**	56	20	ø28	40	M18 x 1.5	16

Part no.	Applicable size	U_1	ND_{H10}	NX	NZ	L	Applicable pin part no.
Y-G02	**16**	11.5	$8^{+0.058}_{0}$	$8^{+0.4}_{+0.2}$	16	21	**IY-G02**
Y-G04	**25, 32, 40**	14	$10^{+0.058}_{0}$	$18^{+0.5}_{+0.3}$	36	41.6	**IY-G04**
Y-G05	**63**	20	$14^{+0.070}_{0}$	$22^{+0.5}_{+0.3}$	44	50.6	**IY-G05**

Rod End Nut



Material: Carbon steel (Nickel plated)

[mm]

Part no.	Applicable size	d	H	B	C
NT-02	**16**	M8 x 1.25	5	13	15.0
NT-04	**25, 32, 40**	M14 x 1.5	8	22	25.4
NT-05	**63**	M18 x 1.5	11	27	31.2

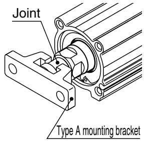
Simple Joint Brackets
∗ The joint is not included in type A and type B mounting brackets. Therefore, it must be ordered separately.

Joint and Mounting Bracket (Type A/B)/Part No.

Joint **LEY−U025**

Applicable size

025	25, 32, 40



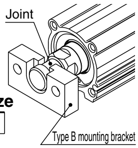
Mounting bracket **YA−03**

Mounting bracket

YA	Type A mounting bracket
YB	Type B mounting bracket

Applicable size

03	25, 32, 40



Allowable Eccentricity [mm]

Applicable size	25	32	40
Eccentricity tolerance	±1		
Backlash	0.5		

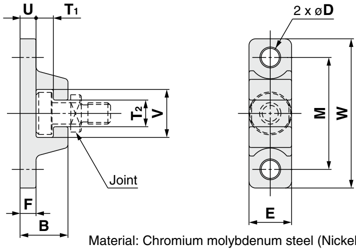
<How to Order>
- The joint is not included in type A and type B mounting brackets. Therefore, it must be ordered separately.

Example) Order no.
- Joint LEY-U025
- Type A mounting bracket YA-03

Joint and Mounting Bracket (Type A/B)/Part No.

Applicable size	Joint part no.	Applicable mounting bracket part no.	
		Type A mounting bracket	Type B mounting bracket
25, 32, 40	LEY-U025	YA-03	YB-03

Type A Mounting Bracket



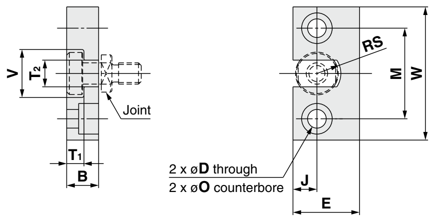
Material: Chromium molybdenum steel (Nickel plated)

[mm]

Part no.	Applicable size	B	D	E	F	M	T_1	T_2	U
YA-03	25, 32, 40	18	6.8	16	6	42	6.5	10	6

Part no.	Applicable size	V	W	Weight (g)
YA-03	25, 32, 40	18	56	55

Type B Mounting Bracket



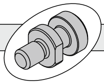
Material: Stainless steel

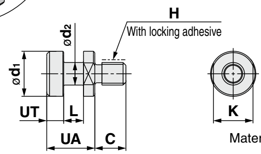
[mm]

Part no.	Applicable size	B	D	E	J	M	øO
YB-03	25, 32, 40	12	7	25	9	34	11.5 depth 7.5

Part no.	Applicable size	T_1	T_2	V	W	RS	Weight (g)
YB-03	25, 32, 40	6.5	10	18	50	9	80

Joint





Material: Stainless steel

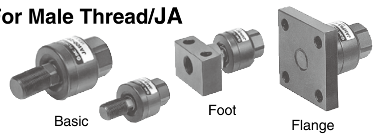
[mm]

Part no.	Applicable size	UA	C	d_1	d_2	H	K	L	UT	Weight (g)
LEY-U025	25, 32, 40	17	11	16	8	M8 x 1.25	14	7	6	22

Floating Joints
(Refer to Best Pneumatics No. 2 for details.)

●For Male Thread/JC (Light weight type)
- With the aluminum case

●For Male Thread/JA



●For Male Thread/JS (Stainless steel)
- Stainless steel 304 (Appearance)
- Dust cover

Fluororubber/Silicone rubber

Applicable size	Thread size
16	M8 x 1.25
25, 32, 40	M14 x 1.5

●For Female Thread/JB

Applicable size	Thread size
16	M5 x 0.8
25, 32, 40	M8 x 1.25

Solid State Auto Switch
Direct Mounting Style
D-M9N(V)/D-M9P(V)/D-M9B(V)

CE RoHS

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard.

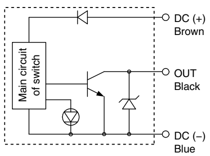
⚠Caution

Precautions

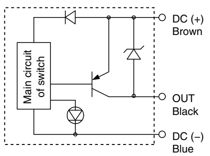
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

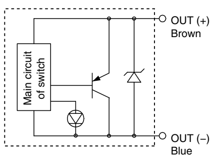
D-M9N/M9NV



D-M9P/M9PV



D-M9B/M9BV



Auto Switch Specifications

Refer to SMC website for details about products conforming to the international standards.

PLC: Programmable Logic Controller

D-M9□, D-M9□V (With indicator light)						
Auto switch model	D-M9N	D-M9NV	D-M9P	D-M9PV	D-M9B	D-M9BV
Electrical entry	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 µA or less at 24 VDC				0.8 mA or less	
Indicator light	Red LED lights up when turned ON.					
Standards	CE marking, RoHS					

- Lead wires — Oilproof flexible heavy-duty vinyl cord: ø2.7 x 3.2 ellipse, 0.15 mm^2, 2 cores (D-M9B(V)), 3 cores (D-M9N(V)/D-M9P(V))

Note) Refer to Best Pneumatics No. 2 for solid state auto switch common specifications.

Weight

[g]

Auto switch model		D-M9N(V)	D-M9P(V)	D-M9B(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

How to Order

D-M9 N □ □

Series

Wiring/Output type

N	3-wire NPN
P	3-wire PNP
B	2-wire

Electrical entry

Nil	In-line
V	Perpendicular

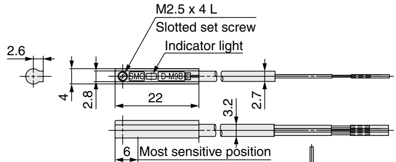
Lead wire length

Nil	0.5 m
M	1 m
L	3 m
Z	5 m

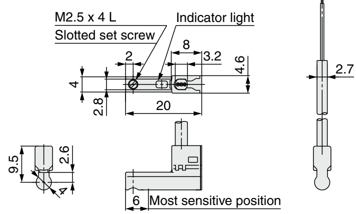
Dimensions

[mm]

D-M9□



D-M9□V



SMC

2-Color Indication Solid State Auto Switch Direct Mounting Style
D-M9NW(V)/D-M9PW(V)/D-M9BW(V)

CE RoHS

Refer to SMC website for details about products conforming to the international standards.

Grommet

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard.
- The optimum operating range can be determined by the color of the light. (Red → Green ← Red)

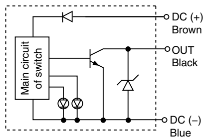
⚠Caution

Precautions

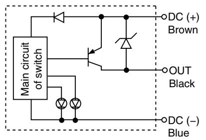
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

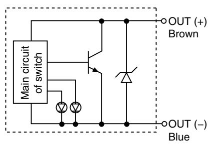
D-M9NW/M9NWV



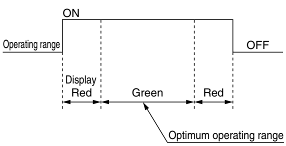
D-M9PW/M9PWV



D-M9BW/M9BWV



Indicator light/Indication method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□W, D-M9□WV (With indicator light)						
Auto switch model	D-M9NW	D-M9NWV	D-M9PW	D-M9PWV	D-M9BW	D-M9BWV
Electrical entry	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 µA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating range ············ Red LED lights up. Optimum operating range ········ Green LED lights up.					
Standards	CE marking, RoHS					

• Lead wires — Oilproof flexible heavy-duty vinyl cord: ø2.7 x 3.2 ellipse, 0.15 mm², 2 cores (D-M9BW(V)), 3 cores (D-M9NW(V), D-M9PW(V))

Note) Refer to Best Pneumatics No. 2 for solid state auto switch common specifications.

Weight

[g]

Auto switch model		D-M9NW(V)	D-M9PW(V)	D-M9BW(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

How to Order

D-M9 N W V L

Series

Wiring/Output type

N	3-wire NPN
P	3-wire PNP
B	2-wire

Electrical entry

Nil	In-line
V	Perpendicular

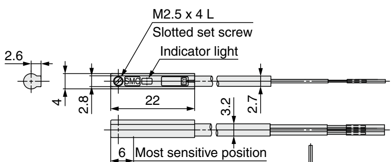
Lead wire length

Nil	0.5 m
M	1 m
L	3 m
Z	5 m

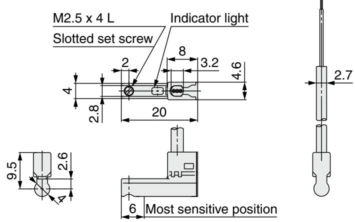
Dimensions

[mm]

D-M9□W



D-M9□WV

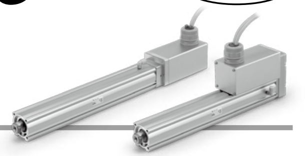


Electric Actuator/Rod Type

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

Series LEY-X5

Size: 25, 32 Dust/Drip Proof (IP65) Specification



How to Order

LEY 25 D ☐ B – 50 ☐ ☐ ☐ – R 1 6N 1 ☐ – X5

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭ ● Dust/Drip proof specification

❶ Size

25
32

❷ Motor mounting position

Nil	Top mounting
D	In-line

❸ Motor type

Symbol	Type	Size		Compatible controllers/driver
		25	32	
Nil	Step motor (Servo/24 VDC)	●	●	LECP6 LECP1 LECPA
A	Servo motor (24 VDC)	●	—	LECA6

❹ Lead [mm]

Symbol	LEY25	LEY32
A	12	16
B	6	8
C	3	4

❺ Stroke [mm]

30	30
to	to
500	500

* Refer to the applicable stroke table.

❻ Motor option

Nil	Without option
B	With lock

❼ Rod end thread

Nil	Rod end female thread
M	Rod end male thread (1 rod end nut is included.)

❽ Mounting*1

Symbol	Type	Motor mounting position	
		Top mounting	In-line
Nil	Ends tapped (Standard)*2	●	●
U	Body bottom tapped	●	●
L	Foot	●	—
F	Rod flange*2	●	●
G	Head flange*2	●*3	—

*1 Mounting bracket is shipped together, (but not assembled).
*2 For horizontal cantilever mounting with the rod flange, head flange and ends tapped, use the actuator within the following stroke range.
・LEY25: 200 or less ・LEY32: 100 or less
*3 Head flange is not available for the LEY32.

❾ Actuator cable type

R	Robotic cable (Flexible cable)

* Cable is shipped assembled.

❿ Actuator cable length [m]

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

⓫ Controller/Driver type

Nil	Without controller/driver	
6N	LECP6/LECA6 (Step data input type)	NPN
6P		PNP
1N*	LECP1 (Programless type)	NPN
1P*		PNP
AN*	LECPA (Pulse input type)	NPN
AP*		PNP

* Only available for the motor type "Step motor".

⓬ I/O cable length [m]*1

Nil	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 394 (For LECP6/LECA6), page 407 (For LECP1) or page 414 (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.

⓭ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEY 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.

② For the servo motor (24 VDC) specification, EMC compliance was tested by installing a noise filter set (LEC-NFA). Refer to page 394 for the noise filter set. Refer to the LECA Operation Manual for installation.

[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.

Applicable stroke table

●Standard

Model \ Stroke	30	50	100	150	200	250	300	350	400	450	500	Manufacturable stroke range [mm]
LEY25	●	●	●	●	●	●	●	●	●	—	—	15 to 400
LEY32	●	●	●	●	●	●	●	●	●	●	●	20 to 500

* Consult with SMC for non-standard strokes as they are produced as special orders.

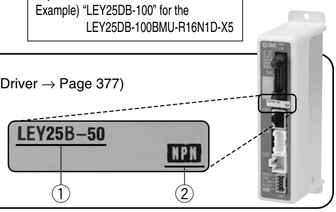
* For auto switches, refer to page 161.
* "-X5" is not added to an actuator model with a controller/driver part number suffix.
Example) "LEY25DB-100" for the LEY25DB-100BMU-R16N1D-X5

The actuator and controller/driver are sold as a package. (Controller/Driver → Page 377)

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

Specifications

Step Motor (Servo/24 VDC)

Model				LEY25			LEY32		
Actuator specifications	**Stroke [mm]** Note 1)			30, 50, 100, 150, 200 250, 300, 350, 400			30, 50, 100, 150, 200 250, 300, 350, 400, 450, 500		
	Work load [kg] Note 2)	**Horizontal**	**(3000 [mm/s²])**	12	30	30	20	40	40
			(2000 [mm/s²])	18	50	50	30	60	60
		Vertical	**(3000 [mm/s²])**	7	15	29	10	21	42
	Pushing force [N] Note 3) Note 4) Note 5)			63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707
	Speed [mm/s] Note 5)			18 to 400	9 to 200	5 to 100	24 to 400	12 to 200	6 to 100
	Max. acceleration/deceleration [mm/s²]			3,000					
	Pushing speed [mm/s] Note 6)			35 or less			30 or less		
	Positioning repeatability [mm]			±0.02					
	Screw lead [mm]			12	6	3	16	8	4
	Impact/Vibration resistance [m/s²] Note 7)			50/20					
	Actuation type			Ball screw + Belt (LEY□) Ball screw (LEY□D)					
	Guide type			Sliding bushing (Piston rod)					
	Enclosure			IP65					
	Operating temperature range [°C]			5 to 40					
	Operating humidity range [%RH]			90 or less (No condensation)					
Electric specifications	**Motor size**			□42			□56.4		
	Motor type			Step motor (Servo/24 VDC)					
	Encoder			Incremental A/B phase (800 pulse/rotation)					
	Rated voltage [V]			24 VDC ±10%					
	Power consumption [W] Note 8)			40			50		
	Standby power consumption when operating [W] Note 9)			15			48		
	Max. instantaneous power consumption [W] Note 10)			48			104		
Lock unit specifications	**Type** Note 11)			Non-magnetizing lock					
	Holding force [N]			78	157	294	108	216	421
	Power consumption [W] Note 12)			5			5		
	Rated voltage [V]			24 VDC ±10%					

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Horizontal: The maximum value of the work load. An external guide is necessary to support the load. The actual work load and transfer speed change according to the condition of the external guide.
Vertical: Speed changes according to the work load. Check "Model Selection" on page 138.
The values shown in ( ) are the acceleration/deceleration. Set these values to be 3000 [mm/s²] or less.
Note 3) Pushing force accuracy is ±20% (F.S.).
Note 4) The pushing force values for LEY25□ is 35% to 65% and for LEY32□ is 35% to 85%. The pushing force values change according to the duty ratio and pushing speed. Check "Model Selection" on page 139.
Note 5) 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 6) The allowable speed for pushing operation. When push conveying a workpiece, operate at the vertical work load or less.
Note 7) Impact resistance: No malfunction occurred when the actuator 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 8) The power consumption (including the controller) is for when the actuator is operating.
Note 9) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation.
Note 10) 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 11) With lock only
Note 12) For an actuator with lock, add the power consumption for the lock.

Specifications

Servo Motor (24 VDC)

	Model			LEY25A		
Actuator specifications	Stroke [mm] Note 1)			30, 50, 100, 150, 200 250, 300, 350, 400		
	Work load [kg] Note 2)	Horizontal	(3000 [mm/s²])	7	15	30
		Vertical	(3000 [mm/s²])	2	5	11
	Pushing force [N] Note 3) Note 4)			18 to 35	37 to 72	66 to 130
	Speed [mm/s]			18 to 400	9 to 200	5 to 100
	Max. acceleration/deceleration [mm/s²]			3,000		
	Pushing speed [mm/s] Note 5)			35 or less		
	Positioning repeatability [mm]			±0.02		
	Screw lead [mm]			12	6	3
	Impact/Vibration resistance [m/s²] Note 6)			50/20		
	Actuation type			Ball screw + Belt (LEY□) Ball screw (LEY□D)		
	Guide type			Sliding bushing (Piston rod)		
	Enclosure			IP65		
	Operating temperature range [°C]			5 to 40		
	Operating humidity range [%RH]			90 or less (No condensation)		
Electric specifications	Motor size			□42		
	Motor type			Servo motor (24 VDC)		
	Encoder			Incremental A/B phase (800 pulse/rotation)/Z phase		
	Rated voltage [V]			24 VDC ±10%		
	Power consumption [W] Note 7)			86		
	Standby power consumption when operating [W] Note 8)			4 (Horizontal)/12 (Vertical)		
	Max. instantaneous power consumption [W] Note 9)			96		
Lock unit specifications	Type Note 10)			Non-magnetizing lock		
	Holding force [N]			78	157	294
	Power consumption [W] Note 11)			5		
	Rated voltage [V]			24 VDC ±10%		

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Horizontal: The maximum value of the work load. An external guide is necessary to support the load. The actual work load and transfer speed change according to the condition of the external guide.
Vertical: Speed changes according to the work load. Check "Model Selection" on page 138. The values shown in ( ) are the acceleration/deceleration.
Set these values to be 3000 [mm/s²] or less.
Note 3) Pushing force accuracy is ±20% (F.S.).
Note 4) The pushing force values for LEY25A□ is 50% to 95%. The pushing force values change according to the duty ratio and pushing speed. Check "Model Selection" on page 139.
Note 5) The allowable speed for pushing operation. When push conveying a workpiece, operate at the vertical work load or less.
Note 6) Impact resistance: No malfunction occurred when the actuator 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 7) The power consumption (including the controller) is for when the actuator is operating.
Note 8) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation with the maximum work load. Except during the pushing operation.
Note 9) 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 10) With lock only
Note 11) For an actuator with lock, add the power consumption for the lock.

Weight

Weight: Motor Top Mounting Type

Model		LEY25									LEY32										
Stroke [mm]		30	50	100	150	200	250	300	350	400	30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	Step motor	1.45	1.52	1.69	1.95	2.13	2.30	2.48	2.65	2.83	2.48	2.59	2.88	3.35	3.64	3.91	4.21	4.49	4.76	5.04	5.32
	Servo motor	1.41	1.48	1.65	1.91	2.09	2.26	2.44	2.61	2.79	—	—	—	—	—	—	—	—	—	—	—

Weight: In-line Motor Type

Model		LEY25D									LEY32D										
Stroke [mm]		30	50	100	150	200	250	300	350	400	30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	Step motor	1.46	1.53	1.70	1.96	2.14	2.31	2.49	2.66	2.84	2.49	2.60	2.89	3.36	3.65	3.92	4.22	4.50	4.77	5.05	5.33
	Servo motor	1.42	1.49	1.66	1.92	2.10	2.27	2.45	2.62	2.80	—	—	—	—	—	—	—	—	—	—	—

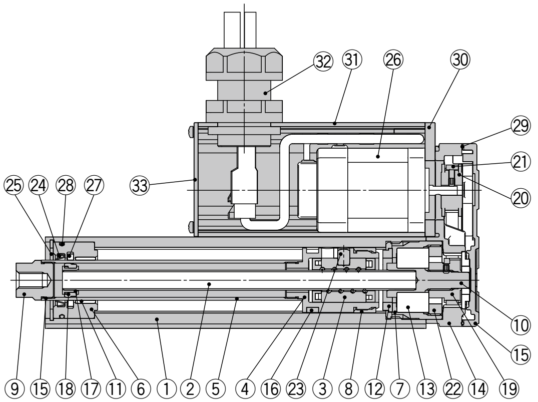
Additional Weight

[kg]

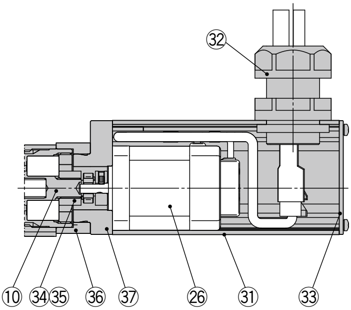
Size		25	32
Lock		0.33	0.63
Rod end male thread	Male thread	0.03	0.03
	Nut	0.02	0.02
Foot (2 sets including mounting bolt)		0.08	0.14
Rod flange (including mounting bolt)		0.17	0.20
Head flange (including mounting bolt)			

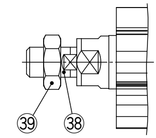
Construction

Motor top mounting type: LEY$^{25}_{32}$



In-line motor type: LEY$^{25}_{32}$D





When rod end male thread selected

Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw (shaft)**	Alloy steel	
3	**Ball screw nut**	Resin/Alloy steel	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plated
6	**Rod cover**	Aluminum alloy	
7	**Housing**	Aluminum alloy	
8	**Rotation stopper**	POM	
9	**Socket**	Free cutting carbon steel	Nickel plated
10	**Connected shaft**	Free cutting carbon steel	Nickel plated
11	**Bushing**	Lead bronze cast	
12	**Bumper**	Urethane	
13	**Bearing**	—	
14	**Return box**	Aluminum die-cast	Trivalent chromated
15	**Return plate**	Aluminum die-cast	Trivalent chromated
16	**Magnet**	—	
17	**Wear ring holder**	Stainless steel	Stroke 101 mm or more
18	**Wear ring**	POM	Stroke 101 mm or more
19	**Screw shaft pulley**	Aluminum alloy	
20	**Motor pulley**	Aluminum alloy	

No.	Description	Material	Note
21	**Belt**	—	
22	**Bearing stopper**	Aluminum alloy	
23	**Parallel pin**	Stainless steel	
24	**Scraper**	Nylon	
25	**Retaining ring**	Steel for spring	Nickel plated
26	**Motor**	—	
27	**Lube-retainer**	Felt	
28	**O-ring**	NBR	
29	**Gasket**	NBR	
30	**Motor adapter**	Aluminum alloy	Anodized
31	**Motor cover**	Aluminum alloy	Anodized
32	**Seal connector**	—	
33	**End cover**	Aluminum alloy	Anodized
34	**Hub**	Aluminum alloy	
35	**Spider**	NBR	
36	**Motor block**	Aluminum alloy	Anodized
37	**Motor adapter**	Aluminum alloy	LEY25 only
38	**Socket (Male thread)**	Free cutting carbon steel	Nickel plated
39	**Nut**	Alloy steel	

Replacement Parts (Top mounting only)/Belt

No.	Size	Order no.
21	**25**	LE-D-2-2
	32	LE-D-2-3

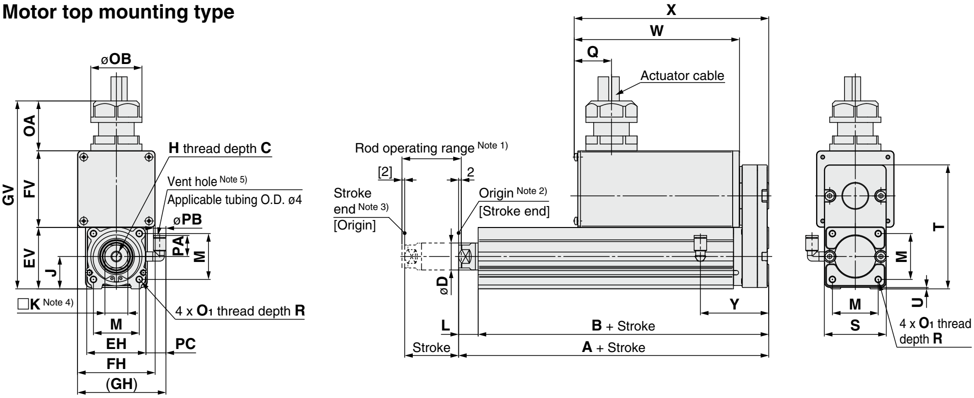
Replacement Parts/Grease Pack

Applied portion	Order no.
Piston rod	GR-S-010 (10 g) GR-S-020 (20 g)

∗ Apply grease on the piston rod periodically.
Grease should be applied at 1 million cycles or 200 km, whichever comes sooner.

Dimensions

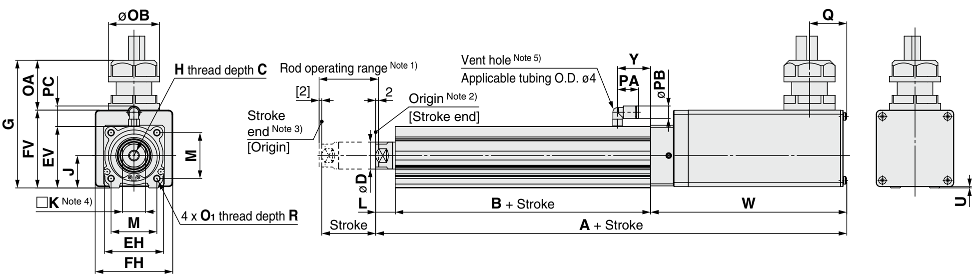
Motor top mounting type



Size	Stroke range (mm)	A	B	C	D	EH	EV	FH	FV	GH	GV	H	J	K	L	M	O_1
25	15 to 100	130.5	116	13	20	44	45.5	57.6	56.8	65.6	139.5	M8 x 1.25	24	17	14.5	34	M5 x 0.8
	101 to 400	155.5	141														
32	20 to 100	148.5	130	13	25	51	56.5	69.6	78.6	75.6	173.5	M8 x 1.25	31	22	18.5	40	M6 x 1.0
	101 to 500	178.5	160														

Size	Stroke range (mm)	R	OA	OB	PA	PB	Q	S	T	U	PC	W		X		Y
												Without lock	With lock	Without lock	With lock	
25	15 to 100	8	37	38	15.6	9.3	28	46	92	1	14.8	123	173	145	195	51
	101 to 400															
32	20 to 100	10	37	38	15.6	9.3	28	60	118	1	15.3	123	173	150	200	61
	101 to 500															

In-line motor type



Size	Stroke range (mm)	A		B	C	D	EH	EV	FH	FV	G	H	J	K	L
		Without lock	With lock												
25	15 to 100	250	300	89.5	13	20	44	45.5	57.6	57.7	94.7	M8 x 1.25	24	17	14.5
	101 to 400	275	325	124.5											
32	20 to 100	265.5	315.5	96	13	25	51	56.5	69.6	79.6	116.6	M8 x 1.25	31	22	18.5
	101 to 500	295.5	345.5	126											

Size	Stroke range (mm)	M	O_1	R	OA	OB	PA	PB	Q	U	PC	W		Y
												Without lock	With lock	
25	15 to 100	34	M5 x 0.8	8	37	38	15.6	9.3	28	0.9	15.3	146	196	24.5
	101 to 400													
32	20 to 100	40	M6 x 1.0	10	37	38	15.6	9.3	28	1	15.3	151	201	26
	101 to 500													

Note 1) Range within which the rod can move when it returns to origin. Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) The direction of rod end width across flats (□K) differs depending on the products.
Note 5) The vent hole is the port for releasing to atmosphere. Do not apply pressure to this hole.
Attach tubing to the vent hole and place the end of the tubing so it is not exposed to dust or water.

For the rod end male thread, refer to page 148.
For the mounting bracket dimensions, refer to page 152.

Water Resistant 2-Color Indication Solid State Auto Switch: Direct Mounting Style
D-M9NA(V)/D-M9PA(V)/D-M9BA(V) CE RoHS

Grommet

- Water (coolant) resistant type
- 2-wire load current is reduced (2.5 to 40 mA).
- The optimum operating range can be determined by the color of the light. (Red → Green ← Red)
- Using flexible cable as standard.

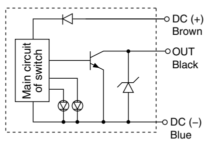
⚠Caution

Precautions

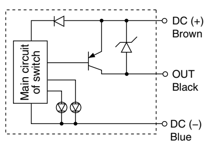
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

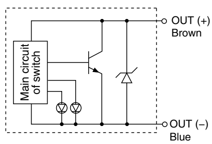
D-M9NA/M9NAV



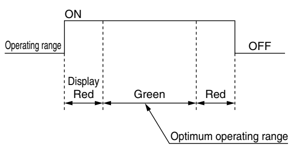
D-M9PA/M9PAV



D-M9BA/M9BAV



Indicator light/Indication method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□A, D-M9□AV (With indicator light)						
Auto switch model	D-M9NA	D-M9NAV	D-M9PA	D-M9PAV	D-M9BA	D-M9BAV
Electrical entry	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				24 VDC relay, PLC	
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)				—	
Current consumption	10 mA or less				—	
Load voltage	28 VDC or less		—		24 VDC (10 to 28 VDC)	
Load current	40 mA or less				2.5 to 40 mA	
Internal voltage drop	0.8 V or less at 10 mA (2 V or less at 40 mA)				4 V or less	
Leakage current	100 µA or less at 24 VDC				0.8 mA or less	
Indicator light	Operating range .... Red LED lights up. Optimum operating range ...... Green LED lights up.					
Standards	CE marking, RoHS					

- Lead wires — Oilproof flexible heavy-duty vinyl cord: ø2.7 x 3.2 ellipse, 0.15 mm², 2 cores (D-M9BA(V)), 3 cores (D-M9NA(V), D-M9PA(V))

Note 1) Refer to Best Pneumatics No. 2 for solid state auto switch common specifications.
Note 2) Refer to Best Pneumatics No. 2 for lead wire length.

Weight

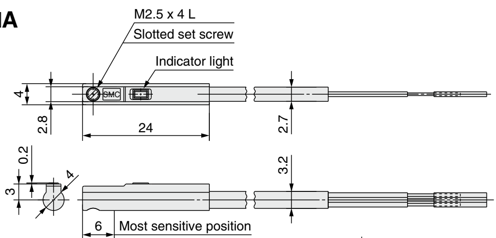
[g]

Auto switch model		D-M9NA(V)	D-M9PA(V)	D-M9BA(V)
Lead wire length (m)	0.5	8	8	7
	1	14	14	13
	3	41	41	38
	5	68	68	63

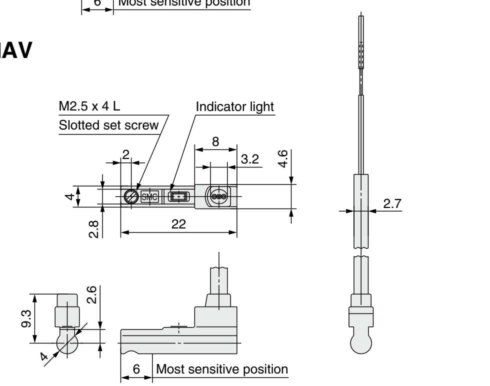
Dimensions

[mm]

D-M9□A



D-M9□AV



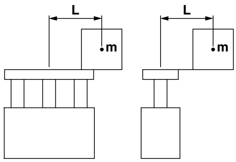
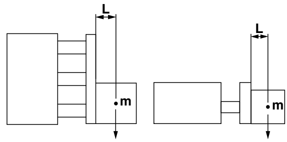
Electric Actuator/Guide Rod Type Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

Series LEYG

Model Selection

Moment Load Graph

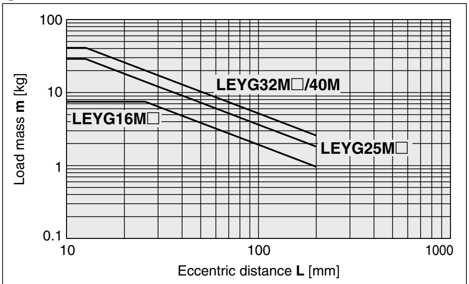
Selection conditions

	Vertical	Horizontal	
Mounting position			
Max. speed [mm/s]	“Speed–Vertical Work Load Graph”	200 or less	Over 200
Graph (Sliding bearing type)	①, ②	⑤, ⑥*	—
Graph (Ball bushing bearing type)	③, ④	⑦, ⑧	⑨, ⑩

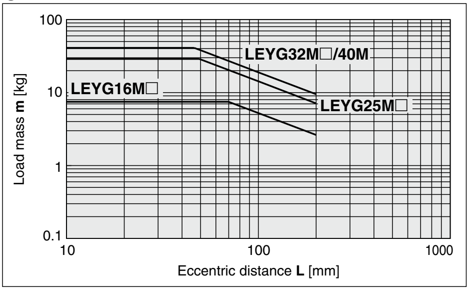
* For the sliding bearing type, the speed is restricted with a horizontal/moment load.

Vertical Mounting, Sliding Bearing

① **70 stroke or less**



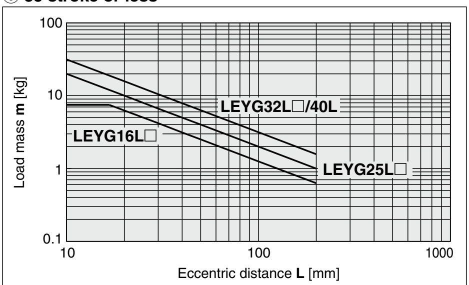
② **Over 75 stroke**



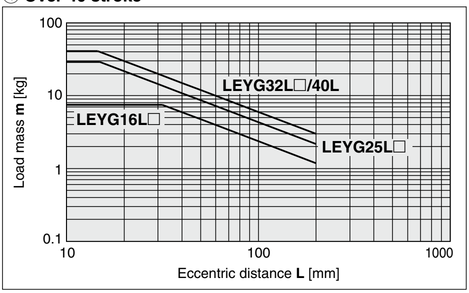
* The limit of vertical load mass varies depending on “lead” and “speed”.
Check “Speed–Vertical Work Load Graph” on page 164.

Vertical Mounting, Ball Bushing Bearing

③ **35 stroke or less**



④ **Over 40 stroke**

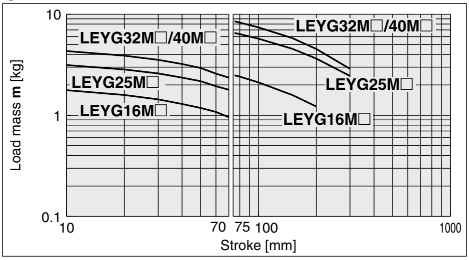


* The limit of vertical load mass varies depending on “lead” and “speed”.
Check “Speed–Vertical Work Load Graph” on page 164.

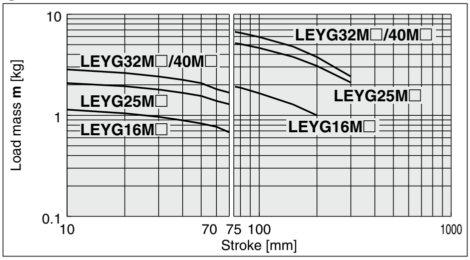
Moment Load Graph

Horizontal Mounting, Sliding Bearing

⑤ L = 50 mm



⑥ L = 100 mm



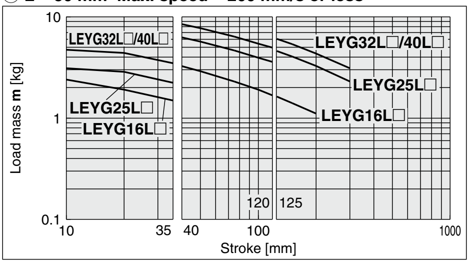
∗ Set the speed to less than or equal to the values shown below.

Motor type	LEYG□M□A	LEYG□M□B	LEYG□M□C
Step motor (Servo/24 VDC)	200 mm/s	125 mm/s	75 mm/s
Servo motor (24 VDC)	200 mm/s	200 mm/s	125 mm/s

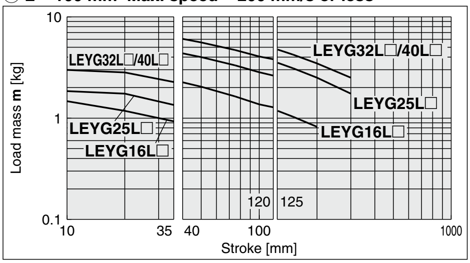
∗ For the specifications below, operate the system at the "load mass" shown in the graph x 80%.
- LEYG25MAA/Servo motor (24 VDC), Lead 12

Horizontal Mounting, Ball Bushing Bearing

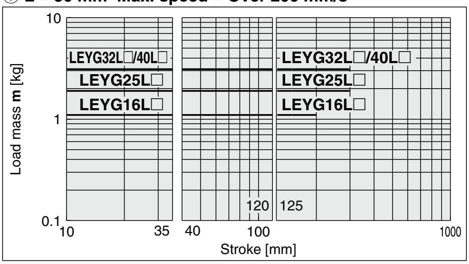
⑦ L = 50 mm Max. speed = 200 mm/s or less



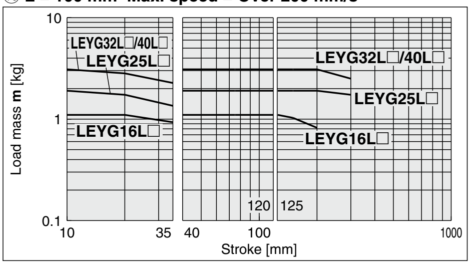
⑧ L = 100 mm Max. speed = 200 mm/s or less



⑨ L = 50 mm Max. speed = Over 200 mm/s

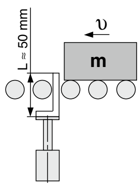


⑩ L = 100 mm Max. speed = Over 200 mm/s



Operating Range when Used as Stopper

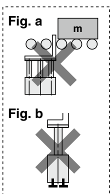
LEYG□M (Sliding bearing)

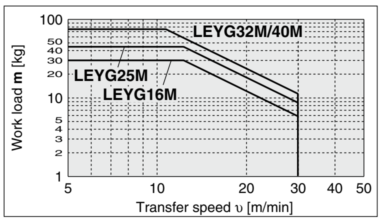


⚠Caution

Handling Precautions

Note 1) When used as a stopper, select a model with 30 stroke or less.
Note 2) LEYG□L (ball bushing bearing) cannot be used as a stopper.
Note 3) Workpiece collision in series with guide rod cannot be permitted (**Fig. a**).
Note 4) The body should not be mounted on the end. It must be mounted on the top or bottom (**Fig. b**).

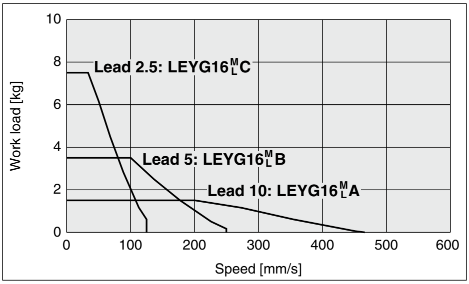




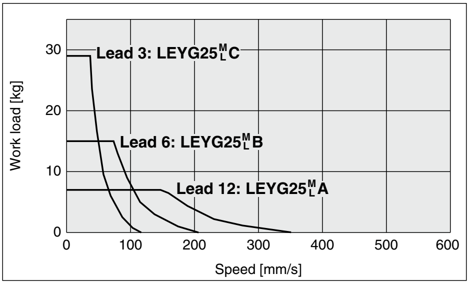
Speed–Vertical Work Load Graph (Guide)

Step Motor (Servo/24 VDC)

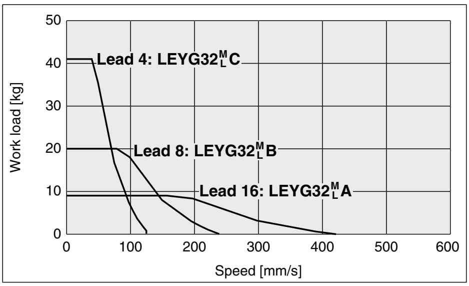
LEYG16$^{M}_{L}$□



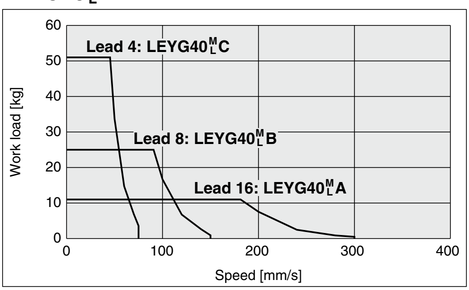
LEYG25$^{M}_{L}$□



LEYG32$^{M}_{L}$□

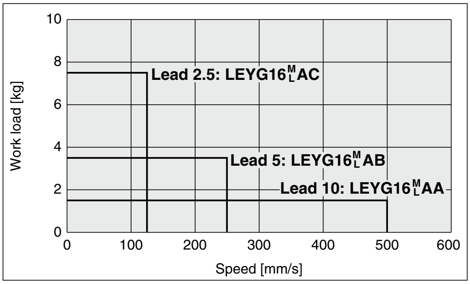


LEYG40$^{M}_{L}$□

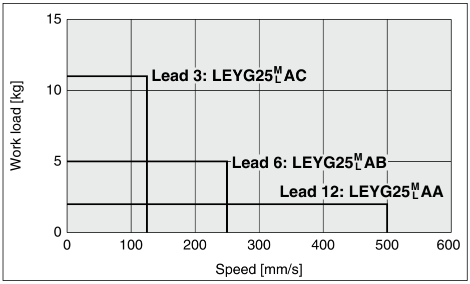


Servo Motor (24 VDC)

LEYG16$^{M}_{L}$A□



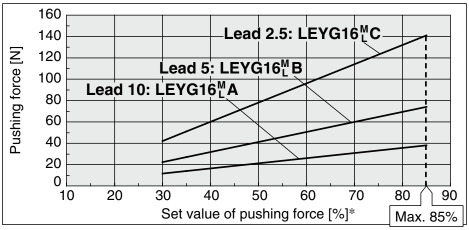
LEYG25$^{M}_{L}$A□



Force Conversion Graph (Guide)

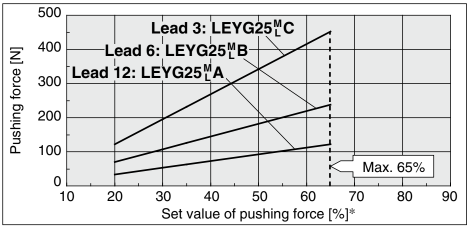
Step Motor (Servo/24 VDC)

LEYG16$^{M}_{L}$□



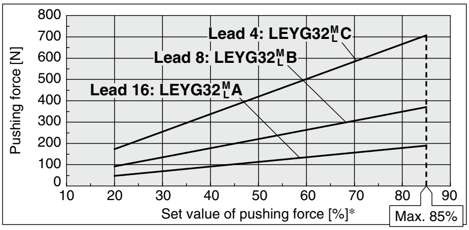
Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
25°C or less	85 or less	100	—
40°C	40 or less	100	—
	50	70	12
	70	20	1.3
	85	15	0.8

LEYG25$^{M}_{L}$□



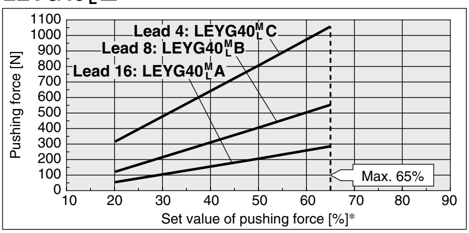
Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	65 or less	100	—

LEYG32$^{M}_{L}$□



Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
25°C or less	85 or less	100	—
40°C	65 or less	100	—
	85	50	15

LEYG40$^{M}_{L}$□

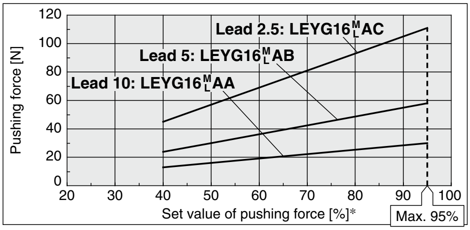


Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	65 or less	100	—

∗ Set values for the controller.

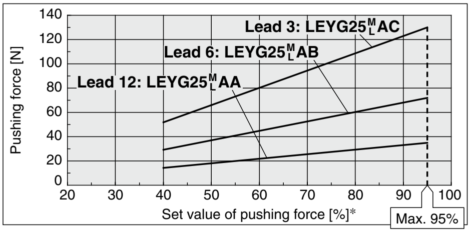
Servo Motor (24 VDC)

LEYG16$^{M}_{L}$A□



Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	95 or less	100	—

LEYG25$^{M}_{L}$A□



Ambient temperature	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
40°C or less	95 or less	100	—

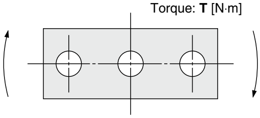
<Pushing Force and Trigger Level Range> Without Load

Model	Pushing speed [mm/s]	Pushing force (Setting input value)	Model	Pushing speed [mm/s]	Pushing force (Setting input value)
LEYG16$^{M}_{L}$□	1 to 4	30% to 85%	LEYG16$^{M}_{L}$□A	1 to 4	40% to 95%
	5 to 20	35% to 85%		5 to 20	60% to 95%
	21 to 50	60% to 85%		21 to 50	80% to 95%
LEYG25$^{M}_{L}$□	1 to 4	20% to 65%	LEYG25$^{M}_{L}$□A	1 to 4	40% to 95%
	5 to 20	35% to 65%		5 to 20	60% to 95%
	21 to 35	50% to 65%		21 to 35	80% to 95%
LEYG32$^{M}_{L}$□	1 to 4	20% to 85%			
	5 to 20	35% to 85%			
	21 to 30	60% to 85%			
LEYG40$^{M}_{L}$□	1 to 4	20% to 65%			
	5 to 20	35% to 65%			
	21 to 30	50% to 65%			

Note) For vertical loads (upward), set the pushing force to the maximum value shown below, and operate at the work load or less.

Model	LEYG16$^{M}_{L}$□			LEYG25$^{M}_{L}$□			LEYG32$^{M}_{L}$□			LEYG40$^{M}_{L}$□			LEYG16$^{M}_{L}$□A			LEYG25$^{M}_{L}$□A		
Lead	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Work load [kg]	0.5	1	2.5	1.5	4	9	2.5	7	16	5	12	26	0.5	1	2.5	0.5	1.5	4
Pushing force	85%			65%			85%			65%			95%			95%		

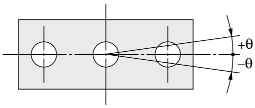
Allowable Rotational Torque of Plate



T [N·m]

Model	Stroke [mm]				
	30	50	100	200	300
LEYG16M	0.70	0.57	1.05	0.56	—
LEYG16L	0.82	1.48	0.97	0.57	—
LEYG25M	1.56	1.29	3.50	2.18	1.36
LEYG25L	1.52	3.57	2.47	2.05	1.44
LEYG32M	2.55	2.09	5.39	3.26	1.88
LEYG32L	2.80	5.76	4.05	3.23	2.32
LEYG40M	2.55	2.09	5.39	3.26	1.88
LEYG40L	2.80	5.76	4.05	3.23	2.32

Non-rotating Accuracy of Plate



Size	Non-rotating accuracy θ	
	LEYG□M	**LEYG□L**
16	0.06°	0.07°
25	0.05°	0.06°
32		
40		

Electric Actuator/Guide Rod Type

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

Series LEYG

LEYG16, 25, 32, 40

RoHS

How to Order

LEYG 16 M ☐ ☐ B – 50 ☐ ☐ – S 1 6N 1 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭

❶ Size

16
25
32
40

❷ Bearing type

M	Sliding bearing
L	Ball bushing bearing

∗ When [M: Sliding bearing] is selected, the maximum speed of lead [A] is 400 mm/s (at no-load, horizontal mounting). The speed is also restricted with a horizontal/moment load. Refer to "Model Selection" on page 162.

❹ Motor type

Symbol	Type	Size			Compatible controllers/driver
		LEYG16	LEYG25	LEYG32/40	
Nil	Step motor (Servo/24 VDC)	●	●	●	LECP6 LECP1 LECPA
A	Servo motor (24 VDC)	●	●	—	LECA6

❸ Motor mounting position

Nil	Top mounting
D	In-line

❺ Lead [mm]

Symbol	LEYG16	LEYG25	LEYG32/40
A	10	12	16
B	5	6	8
C	2.5	3	4

❻ Stroke [mm]

30	30
to	to
300	300

∗ Refer to the applicable stroke table.

❼ Motor option∗

Nil	Without option
C	With motor cover
B	With lock
W	With lock/motor cover

∗ When "With lock" or "With lock/motor cover" are selected for the top mounting and right/left side parallel types, the motor body will stick out of the end of the body for size 16 with strokes 30 or less.
Check for interference with workpieces before selecting a model.

❽ Guide option

Nil	Without option
F	With grease retaining function

∗ Only available for size 25 and 32 sliding bearings. (Refer to "Construction" on page 173.)

∗ Applicable stroke table ●Standard

Model \ Stroke [mm]	30	50	100	150	200	250	300	Manufacturable stroke range [mm]
LEYG16	●	●	●	●	●	—	—	10 to 200
LEYG25	●	●	●	●	●	●	●	15 to 300
LEYG32/40	●	●	●	●	●	●	●	20 to 300

∗ Consult with SMC for non-standard strokes as they are produced as special orders.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEYG 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.

② For the servo motor (24 VDC) specification, EMC compliance was tested by installing a noise filter set (LEC-NFA). Refer to page 394 for the noise filter set. Refer to the LECA Operation Manual for installation.

[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.

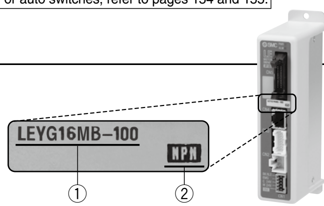
For auto switches, refer to pages 154 and 155.

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

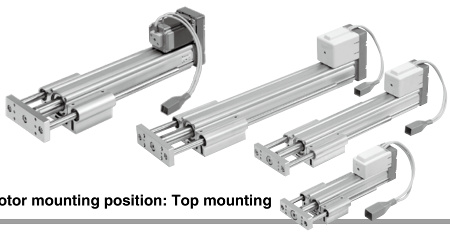
Confirm that the combination of the controller/driver and the actuator is correct.

<Check the following before use.>

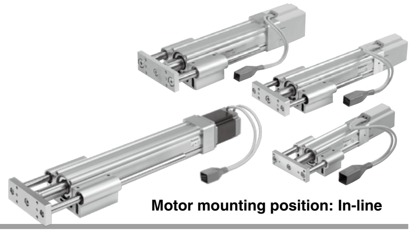
① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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



Motor mounting position: Top mounting



Motor mounting position: In-line

⑨ Actuator cable type*1

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

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Only available for the motor type "Step motor".

⑩ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 5) on page 170.

⑪ Controller/Driver type*1

Nil	Without controller/driver	
6N	**LECP6/LECA6** (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 Only available for the motor type "Step motor".

⑫ I/O cable length [m]*1

Nil	Without cable
1	1.5
3	3*2
5	5*2

*1 If "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 394 (For LECP6/LECA6), page 407 (For LECP1) or page 414 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

⑬ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

Use of auto switches for the guide rod type LEYG series
· Insert the auto switch from the front side with rod (plate) sticking out.
· For the parts hidden behind the guide attachment (Rod stick out side), the auto switch cannot be fixed.
· Consult with SMC when using auto switch on the rod stick out side.

Compatible Controllers/Driver

Type	**Step data input type** 	**Step data input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECA6**	**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)	Servo motor (24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 386	Page 386	Page 401	Page 408

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Specifications

Step Motor (Servo/24 VDC)

	Model			LEYG16$^{M}_{L}$			LEYG25$^{M}_{L}$			LEYG32$^{M}_{L}$			LEYG40$^{M}_{L}$		
Actuator specifications	**Stroke [mm]** Note 1)			30, 50, 100, 150, 200			30, 50, 100, 150, 200, 250, 300			30, 50, 100, 150, 200, 250, 300			30, 50, 100, 150, 200, 250, 300		
	Work load [kg] Note 2)	Horizontal	Acceleration/Deceleration at 3000 [mm/s^2]	4	11	20	12	30	30	20	40	40	30	60	60
			Acceleration/Deceleration at 2000 [mm/s^2]	6	17	30	18	50	50	30	60	60	—	—	—
		Vertical	Acceleration/Deceleration at 3000 [mm/s^2]	1.5	3.5	7.5	7	15	29	9	20	41	11	25	51
	Pushing force [N] Note 3) 4) 5)			14 to 38	27 to 74	51 to 141	63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707	132 to 283	266 to 553	562 to 1058
	Speed [mm/s] Note 5)			15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125	24 to 500	12 to 250	6 to 125	24 to 300	12 to 150	6 to 75
	Max. acceleration/deceleration [mm/s^2]			3000											
	Pushing speed [mm/s] Note 6)			50 or less			35 or less			30 or less			30 or less		
	Positioning repeatability [mm]			±0.02											
	Screw lead [mm]			10	5	2.5	12	6	3	16	8	4	16	8	4
	Impact/Vibration resistance [m/s^2] Note 7)			50/20											
	Actuation type			Ball screw + Belt (LEYG□□), Ball screw (LEYG□□D)											
	Guide type			Sliding bearing (LEYG□M), Ball bushing bearing (LEYG□L)											
	Operating temp. range [°C]			5 to 40											
	Operating humidity range [%RH]			90 or less (No condensation)											
Electric specifications	**Motor size**			□28			□42			□56.4			□56.4		
	Motor type			Step motor (Servo/24 VDC)											
	Encoder			Incremental A/B phase (800 pulse/rotation)											
	Rated voltage [V]			24 VDC ±10%											
	Power consumption [W] Note 8)			23			40			50			50		
	Standby power consumption when operating [W] Note 9)			16			15			48			48		
	Max. instantaneous power consumption [W] Note 10)			43			48			104			106		
Lock unit specifications	**Type** Note 11)			Non-magnetizing lock											
	Holding force [N]			20	39	78	78	157	294	108	216	421	127	265	519
	Power consumption [W] Note 12)			2.9			5			5			5		
	Rated voltage [V]			24 VDC ±10%											

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Horizontal: The maximum value of the work load for the positioning operation. The work load is the same as the vertical work load during pushing operation. An external guide is necessary to support the load. The actual work load and transfer speed change according to the condition of the external guide.
Vertical: Speed changes according to the work load. Check “Model Selection” on page 164.
Set the acceleration/deceleration values to be 3000 [mm/s^2] or less.
Note 3) Pushing force accuracy is ±20% (F.S.).
Note 4) The pushing force values for LEYG16□□ is 35% to 85%, for LEYG25□□ is 35% to 65%, for LEYG32□□ is 35% to 85% and for LEYG40□□ is 35% to 65%. The pushing force values change according to the duty ratio and pushing speed. Check “Model Selection” on page 165.
Note 5) 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%)
When [M: Sliding bearing] is selected, the maximum speed of lead [A] is 400 mm/s (at no-load, horizontal mounting).
The speed is also restricted with a horizontal/moment load. Refer to “Model Selection” on page 162.
Note 6) The allowable speed for the pushing operation.
Note 7) Impact resistance: No malfunction occurred when it 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 8) The power consumption (including the controller) is for when the actuator is operating.
Note 9) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation.
Note 10) 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 11) With lock only
Note 12) For an actuator with lock, add the power consumption for the lock.

Specifications

Servo Motor (24 VDC)

	Model			LEYG16$^{M}_{L}$A			LEYG25$^{M}_{L}$A		
Actuator specifications	Stroke [mm] Note 1)			30, 50, 100, 150, 200			30, 50, 100, 150, 200, 250, 300		
	Work load [kg] Note 2)	Horizontal	Acceleration/Deceleration at 3000 [mm/s²]	3	6	12	7	15	30
		Vertical	Acceleration/Deceleration at 3000 [mm/s²]	1.5	3.5	7.5	2	5	11
	Pushing force [N] Note 3) 4)			16 to 30	30 to 58	57 to 111	18 to 35	37 to 72	66 to 130
	Speed [mm/s]			15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125
	Max. acceleration/deceleration [mm/s²]			3000					
	Pushing speed [mm/s] Note 5)			50 or less			35 or less		
	Positioning repeatability [mm]			±0.02					
	Screw lead [mm]			10	5	2.5	12	6	3
	Impact/Vibration resistance [m/s²] Note 6)			50/20					
	Actuation type			Ball screw + Belt (LEYG□□), Ball screw (LEYG□□D)					
	Guide type			Sliding bearing (LEYG□M), Ball bushing bearing (LEYG□L)					
	Operating temp. range [°C]			5 to 40					
	Operating humidity range [%RH]			90 or less (No condensation)					
Electric specifications	Motor size			□28			□42		
	Motor output [W]			30			36		
	Motor type			Servo motor (24 VDC)					
	Encoder			Incremental A/B (800 pulse/rotation)/Z phase					
	Rated voltage [V]			24 VDC ±10%					
	Power consumption [W] Note 7)			40			86		
	Standby power consumption when operating [W] Note 8)			4 (Horizontal)/6 (Vertical)			4 (Horizontal)/12 (Vertical)		
	Max. instantaneous power consumption [W] Note 9)			59			96		
Lock unit specifications	Type Note 10)			Non-magnetizing lock					
	Holding force [N]			20	39	78	78	157	294
	Power consumption [W] Note 11)			2.9			5		
	Rated voltage [V]			24 VDC ±10%					

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) Horizontal: The maximum value of the work load for the positioning operation. The work load is the same as the vertical work load during pushing operation. An external guide is necessary to support the load. The actual work load and transfer speed change according to the condition of the external guide.
Vertical: Check "Model Selection" on page 164 for details.
Set the acceleration/deceleration values to be 3000 [mm/s²] or less.
Note 3) Pushing force accuracy is ±20% (F.S.).
Note 4) The pushing force values for LEYG16□A□ is 50% to 95% and for LEYG25□A□ is 50% to 95%. The pushing force values change according to the duty ratio and pushing speed. Check "Model Selection" on page 165.
Note 5) The allowable speed for the pushing operation.
Note 6) Impact resistance: No malfunction occurred when it 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 7) The power consumption (including the controller) is for when the actuator is operating.
Note 8) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation.
Note 9) 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 10) With lock only
Note 11) For an actuator with lock, add the power consumption for the lock.

Weight

Weight: Motor Top Mounting Type

Model		LEYG16M					LEYG25M							LEYG32M						
Stroke [mm]		30	50	100	150	200	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	Step motor	0.83	0.97	1.20	1.49	1.66	1.67	1.86	2.18	2.60	2.94	3.28	3.54	2.91	3.17	3.72	4.28	4.95	5.44	5.88
	Servo motor	0.83	0.97	1.20	1.49	1.66	1.63	1.82	2.14	2.56	2.90	3.24	3.50	—	—	—	—	—	—	—

Model		LEYG16L					LEYG25L							LEYG32L						
Stroke [mm]		30	50	100	150	200	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	Step motor	0.84	0.97	1.14	1.43	1.58	1.68	1.89	2.13	2.56	2.82	3.14	3.38	2.91	3.18	3.57	4.12	4.66	5.17	5.56
	Servo motor	0.84	0.97	1.14	1.43	1.58	1.64	1.85	2.09	2.52	2.78	3.10	3.34	—	—	—	—	—	—	—

Model		LEYG40M							LEYG40L						
Stroke [mm]		30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	Step motor	3.21	3.47	4.02	4.58	5.25	5.74	6.18	3.21	3.48	3.87	4.42	4.96	5.47	5.86
	Servo motor	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Weight: In-line Motor Type

Model		LEYG16M					LEYG25M							LEYG32M						
Stroke [mm]		30	50	100	150	200	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	Step motor	0.83	0.97	1.20	1.49	1.66	1.66	1.85	2.17	2.59	2.93	3.27	3.53	2.90	3.16	3.71	4.27	4.94	5.43	5.87
	Servo motor	0.83	0.97	1.20	1.49	1.66	1.62	1.81	2.13	2.55	2.89	3.23	3.49	—	—	—	—	—	—	—

Model		LEYG16L					LEYG25L							LEYG32L						
Stroke [mm]		30	50	100	150	200	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	Step motor	0.84	0.97	1.14	1.43	1.58	1.67	1.88	2.12	2.55	2.81	3.13	3.37	2.90	3.17	3.56	4.11	4.65	5.16	5.55
	Servo motor	0.84	0.97	1.14	1.43	1.58	1.63	1.84	2.08	2.51	2.77	3.09	3.33	—	—	—	—	—	—	—

Model		LEYG40M							LEYG40L						
Stroke [mm]		30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	Step motor	3.20	3.46	4.01	4.57	5.24	5.73	6.17	3.20	3.47	3.86	4.41	4.95	5.46	5.85
	Servo motor	—	—	—	—	—	—	—	—	—	—	—	—	—	—

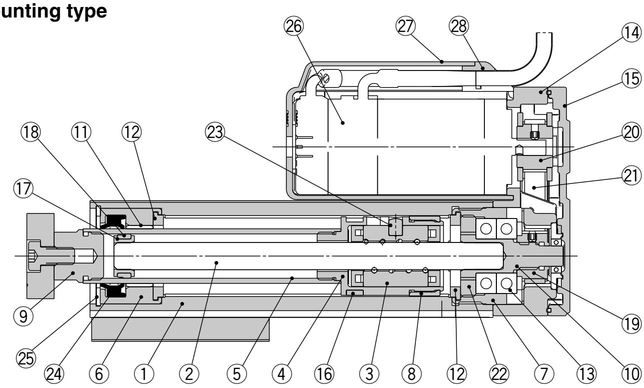
Additional Weight

[kg]

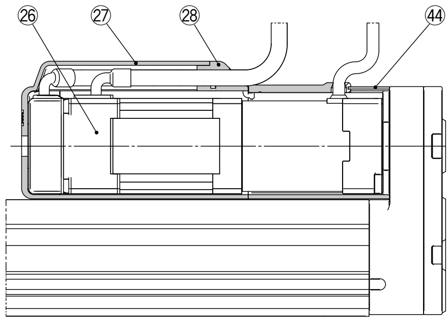
Size	16	25	32	40
Lock	0.12	0.26	0.53	0.53
Motor cover	0.02	0.03	0.04	0.05
Lock/Motor cover	0.16	0.32	0.61	0.62

Construction

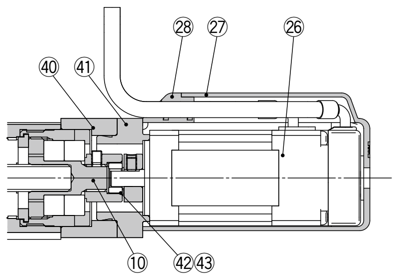
Motor top mounting type



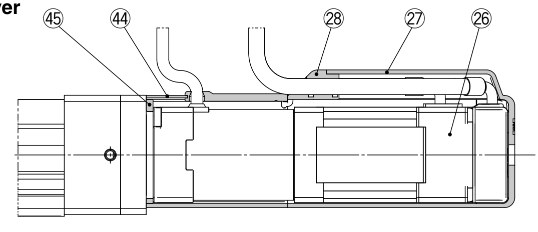
Motor top/parallel type With lock/motor cover



In-line motor type

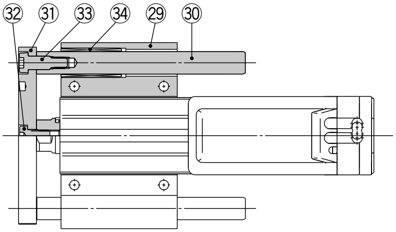


In-line motor type With lock/motor cover

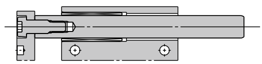


Construction

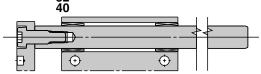
LEYG□M



LEYG16/25/32/40M: 50st or less

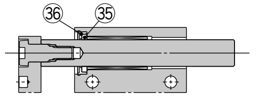


LEYG16/25/32/40M: Over 50st

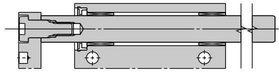


When grease retaining function selected

LEYG25/32/40M□□A/B/C-□□F: 50st or less

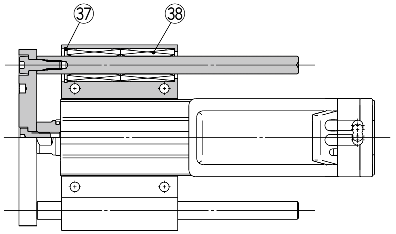


LEYG25/32/40M□□A/B/C-□□F: Over 50st

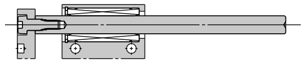


Note) Felt material is inserted to retain grease at the sliding part of the sliding bearing. This lengthens the life of the sliding part, but does not guarantee it permanently.

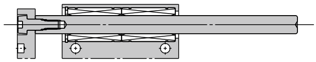
LEYG□L



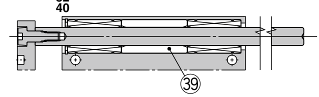
LEYG16L: 30st or less
LEYG25/32/40L: 100st or less



LEYG16L: Over 30st, 100st or less



LEYG16/25/32/40L: Over 100st



Replacement Parts/Belt

No.	Size	Order no.
21	16	LE-D-2-1
	25	LE-D-2-2
	32, 40	LE-D-2-3

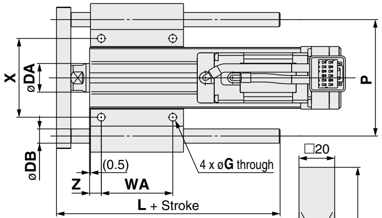
Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw (shaft)**	Alloy steel	
3	**Ball screw nut**	Resin/Alloy steel	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plated
6	**Rod cover**	Aluminum alloy	
7	**Housing**	Aluminum alloy	
8	**Rotation stopper**	POM	
9	**Socket**	Free cutting carbon steel	Nickel plated
10	**Connected shaft**	Free cutting carbon steel	Nickel plated
11	**Bushing**	Lead bronze cast	
12	**Bumper**	Urethane	
13	**Bearing**	—	
14	**Return box**	Aluminum die-cast	Trivalent chromated
15	**Return plate**	Aluminum die-cast	Trivalent chromated
16	**Magnet**	—	
17	**Wear ring holder**	Stainless steel	Stroke 101 mm or more
18	**Wear ring**	POM	Stroke 101 mm or more
19	**Screw shaft pulley**	Aluminum alloy	
20	**Motor pulley**	Aluminum alloy	
21	**Belt**	—	
22	**Bearing stopper**	Aluminum alloy	
23	**Parallel pin**	Stainless steel	

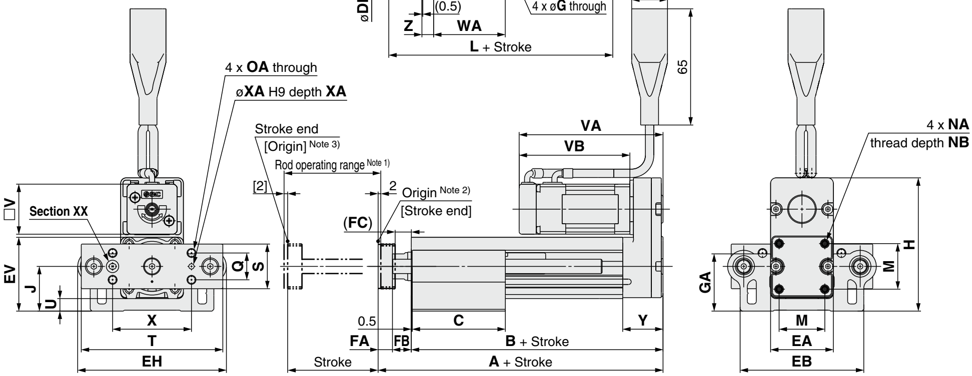
No.	Description	Material	Note
24	**Seal**	NBR	
25	**Retaining ring**	Steel for spring	Phosphate coated
26	**Motor**	—	
27	**Motor cover**	Synthetic resin	Only “With motor cover”
28	**Grommet**	Synthetic resin	Only “With motor cover”
29	**Guide attachment**	Aluminum alloy	Anodized
30	**Guide rod**	Carbon steel	
31	**Plate**	Aluminum alloy	Anodized
32	**Plate mounting bolt**	Carbon steel	Nickel plated
33	**Guide bolt**	Carbon steel	Nickel plated
34	**Sliding bearing**	—	
35	**Lube-retainer**	Felt	
36	**Holder**	Resin	
37	**Retaining ring**	Steel for spring	Phosphate coated
38	**Ball bushing**	—	
39	**Spacer**	Aluminum alloy	Chromated
40	**Motor block**	Aluminum alloy	Anodized
41	**Motor adapter**	Aluminum alloy	Anodized/LEY16, 25 only
42	**Hub**	Aluminum alloy	
43	**Spider**	NBR	
44	**Motor cover with lock**	Aluminum alloy	Only “With lock/motor cover”
45	**Cover support**	Aluminum alloy	Only “With lock/motor cover”

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Dimensions: Motor Top Mounting



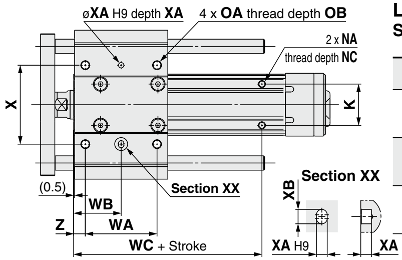
Note 1) Range within which the rod can move when it returns to origin.
Make sure a workpiece mounted on the rod does not interfere with the work pieces and facilities around the rod.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.



LEYG□L (Ball bushing bearing)
Standard stroke: 50, 100, 200

[mm]

Size	Stroke range	L	DB
16	90st or less	75	8
	91st or more, 200st or less	105	
25	114st or less	91	10
	115st or more, 190st or less	115	
	191st or more, 300st or less	133	
32 40	114st or less	97.5	13
	115st or more, 190st or less	116.5	
	191st or more, 300st or less	134	



LEYG□M (Sliding bearing)
Standard stroke: 30, 50, 100

[mm]

Size	Stroke range	L	DB
16	64st or less	51.5	10
	65st or more, 90st or less	74.5	
	91st or more, 200st or less	105	
25	59st or less	67.5	12
	60st or more, 185st or less	100.5	
	186st or more, 300st or less	138	
32 40	54st or less	74	16
	55st or more, 180st or less	107	
	181st or more, 300st or less	144	

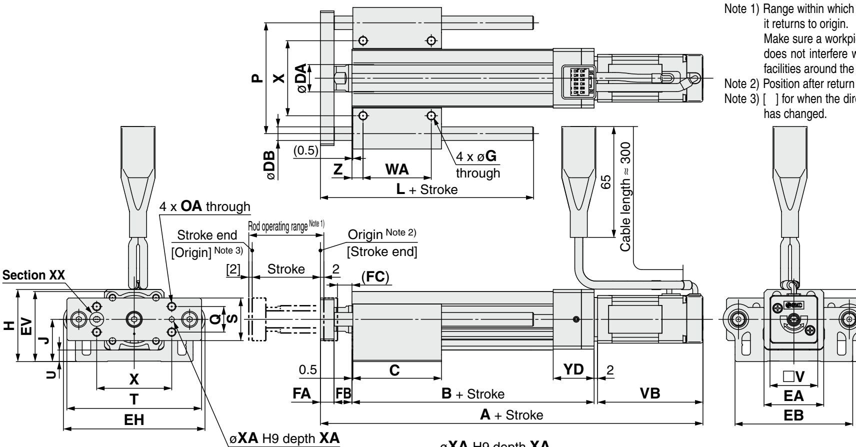
LEYG□M, LEYG□L Common

[mm]

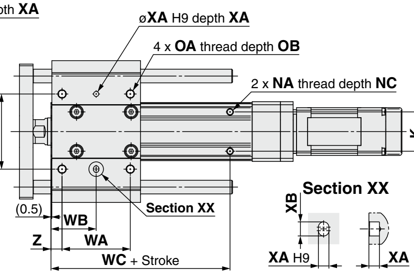
Size	Stroke range	A	B	C	DA	EA	EB	EH	EV	FA	FB	FC	G	GA	H	J	K	M	NA	NB	NC
16	39st or less	109	90.5	37	16	35	69	83	41.3	8	10.5	8.5	4.3	31.8	74.5	24.8	23	25.5	M4 x 0.7	7	5.5
	40st or more, 100st or less			52																	
	101st or more, 200st or less	129	110.5	82																	
25	39st or less	141.5	116	50	20	46	85	103	52.5	11	14.5	12.5	5.4	40.3	99	30.8	29	34	M5 x 0.8	8	6.5
	40st or more, 100st or less			67.5																	
	101st or more, 124st or less	166.5	141																		
	125st or more, 200st or less			84.5																	
	201st or more, 300st or less			102																	
32 40	39st or less	160.5	130	55	25	60	101	123	64	12	18.5	16.5	5.4	50.3	125.5	38.3	30	40	M6 x 1.0	10	8.5
	40st or more, 100st or less			68																	
	101st or more, 124st or less	190.5	160																		
	125st or more, 200st or less			85																	
	201st or more, 300st or less			102																	

Size	Stroke range	OA	OB	P	Q	S	T	U	V	Step motor VA	Step motor VB	Servo motor VA	Servo motor VB	WA	WB	WC	X	XA	XB	Y	Z
16	39st or less	M5 x 0.8	10	65	15	25	79	6.8	28	80.3	61.8	81	62.5	25	19	55	44	3	4	22.5	6.5
	40st or more, 100st or less													40	26.5						
	101st or more, 200st or less													70	41.5	75					
25	39st or less	M6 x 1.0	12	80	18	30	95	6.8	42	85.4	63.4	81.6	59.6	35	26	70	54	4	5	26.5	8.5
	40st or more, 100st or less													50	33.5						
	101st or more, 124st or less															95					
	125st or more, 200st or less													70	43.5						
	201st or more, 300st or less													85	51						
32	39st or less	M6 x 1.0	12	95	28	40	117	7.3	56.4	95.4	68.4	—	—	40	28.5	75	64	5	6	34	8.5
	40st or more, 100st or less													50	33.5						
	101st or more, 124st or less															105					
	125st or more, 200st or less													70	43.5						
	201st or more, 300st or less													85	51						
40	39st or less	M6 x 1.0	12	95	28	40	117	7.3	56.4	117.4	90.4	—	—	40	28.5	75	64	5	6	34	8.5
	40st or more, 100st or less													50	33.5						
	101st or more, 124st or less															105					
	125st or more, 200st or less													70	43.5						
	201st or more, 300st or less													85	51						

Dimensions: In-line Motor



Note 1) Range within which the rod can move when it returns to origin.
Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.



LEYG□L (Ball bushing bearing)
Standard stroke: 50, 100, 200

[mm]

Size	Stroke range	L	DB
16	90st or less	75	8
	91st or more, 200st or less	105	
25	114st or less	91	10
	115st or more, 190st or less	115	
	191st or more, 300st or less	133	
32 40	114st or less	97.5	13
	115st or more, 190st or less	116.5	
	191st or more, 300st or less	134	

LEYG□M (Sliding bearing)
Standard stroke: 30, 50, 100

[mm]

Size	Stroke range	L	DB
16	64st or less	51.5	10
	65st or more, 90st or less	74.5	
	91st or more, 200st or less	105	
25	59st or less	67.5	12
	60st or more, 185st or less	100.5	
	186st or more, 300st or less	138	
32 40	54st or less	74	16
	55st or more, 180st or less	107	
	181st or more, 300st or less	144	

LEYG□M, LEYG□L Common

[mm]

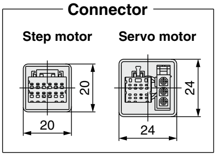
Size	Stroke range	A Step motor	A Servo motor	B	C	DA	EA	EB	EH	EV	FA	FB	FC	G	GA	H	J	K	NA	NC
16	39st or less	174.3	175	92	37	16	35	69	83	41.3	8	10.5	8.5	4.3	31.8	42.5	24.8	23	M4 x 0.7	5.5
	40st or more, 100st or less				52															
	101st or more, 200st or less	194.3	195	112	82															
25	39st or less	206.4	202.6	115.5	50	20	45	85	103	52.5	11	14.5	12.5	5.4	40.3	53.5	30.8	29	M5 x 0.8	6.5
	40st or more, 100st or less				67.5															
	101st or more, 124st or less	231.4	227.6	140.5																
	125st or more, 200st or less				84.5															
	201st or more, 300st or less				102															
32	39st or less	228.9	—	128	55	25	60	101	123	64	12	18.5	16.5	5.4	50.3	68.5	38.3	30	M6 x 1.0	8.5
	40st or more, 100st or less				68															
	101st or more, 124st or less	258.9	—	158																
	125st or more, 200st or less				85															
	201st or more, 300st or less				102															
40	39st or less	250.9	—	128	55	25	60	101	123	64	12	18.5	16.5	5.4	50.3	68.5	38.3	30	M6 x 1.0	8.5
	40st or more, 100st or less				68															
	101st or more, 124st or less	280.9	—	158																
	125st or more, 200st or less				85															
	201st or more, 300st or less				102															

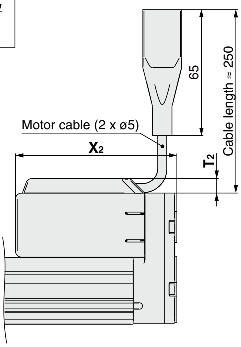
Size	Stroke range	OA	OB	P	Q	S	T	U	V	VB Step motor	VB Servo motor	WA	WB	WC	X	XA	XB	YD	Z
16	39st or less	M5 x 0.8	10	65	15	25	79	6.8	28	61.8	62.5	25	19	55	44	3	4	24	6.5
	40st or more, 100st or less											40	26.5						
	101st or more, 200st or less											70	41.5	75					
25	39st or less	M6 x 1.0	12	80	18	30	95	6.8	42	63.4	59.6	35	26	70	54	4	5	26	8.5
	40st or more, 100st or less											50	33.5						
	101st or more, 124st or less													95					
	125st or more, 200st or less											70	43.5						
	201st or more, 300st or less											85	51						
32	39st or less	M6 x 1.0	12	95	28	40	117	7.3	56.4	68.4	—	40	28.5	75	64	5	6	32	8.5
	40st or more, 100st or less											50	33.5						
	101st or more, 124st or less													105					
	125st or more, 200st or less											70	43.5						
	201st or more, 300st or less											85	51						
40	39st or less	M6 x 1.0	12	95	28	40	117	7.3	56.4	90.4	—	40	28.5	75	64	5	6	32	8.5
	40st or more, 100st or less											50	33.5						
	101st or more, 124st or less													105					
	125st or more, 200st or less											70	43.5						
	201st or more, 300st or less											85	51						

Dimensions

Motor top mounting type

With motor cover: LEYG$\begin{smallmatrix}16\\25\\32\\40\end{smallmatrix}$**□□**$\begin{smallmatrix}A\\B\\C\end{smallmatrix}$**-□C**



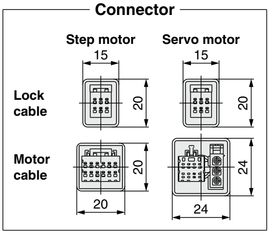


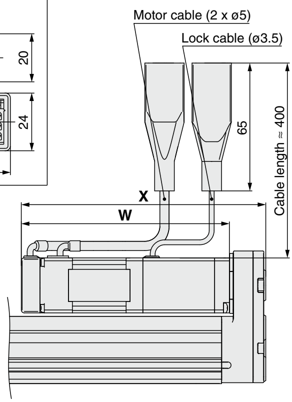
[mm]

Size	T_2	X_2
16	7.5	83
25	7.5	88.5
32	7.5	98.5
40	7.5	120.5

Motor cover material:
Synthetic resin

With lock: LEYG$\begin{smallmatrix}16\\25\\32\\40\end{smallmatrix}$**□□**$\begin{smallmatrix}A\\B\\C\end{smallmatrix}$**-□B**



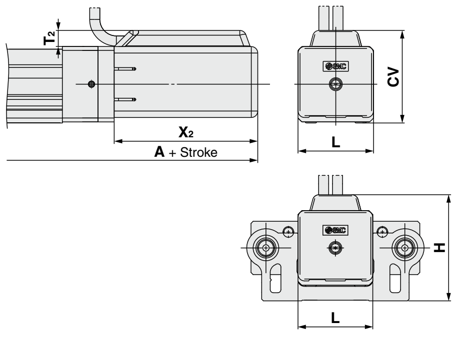


[mm]

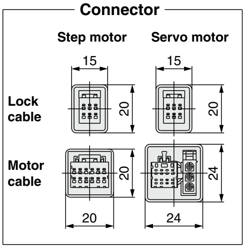
Size	Step motor		Servo motor	
	W	X	W	X
16	103.3	121.8	104.0	122.5
25	103.9	125.9	100.1	122.1
32	111.4	138.4	—	—
40	133.4	160.4	—	—

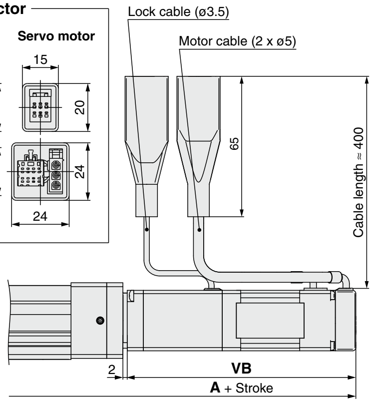
In-line motor type

With motor cover: LEYG$\begin{smallmatrix}16\\25\\32\\40\end{smallmatrix}$**□D□**$\begin{smallmatrix}A\\B\\C\end{smallmatrix}$**-□C**



With lock: LEYG$\begin{smallmatrix}16\\25\\32\\40\end{smallmatrix}$**□D□**$\begin{smallmatrix}A\\B\\C\end{smallmatrix}$**-□B**





[mm]

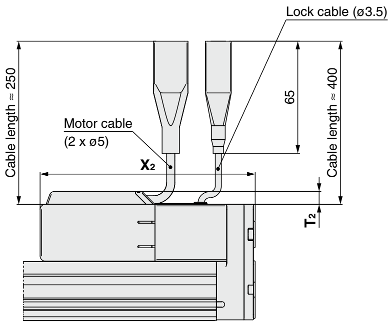
Size	Stroke range	A	T_2	X_2	L	H	CV
16	100st or less	177	7.5	66.5	35	49.8	43
	101st or more, 200st or less	197					
25	100st or less	209.5	7.5	68.5	46	61.3	54.5
	101st or more, 300st or less	234.5					
32	100st or less	232	7.5	73.5	60	75.8	68.5
	101st or more, 300st or less	262					
40	100st or less	254	7.5	95.5	60	75.8	68.5
	101st or more, 300st or less	284					

[mm]

Size	Stroke range	Step motor	Servo motor	Step motor	Servo motor
		A		VB	
16	100st or less	215.8	216.5	103.3	104
	101st or more, 200st or less	235.8	236.5		
25	100st or less	246.9	243.1	103.9	100.1
	101st or more, 300st or less	271.9	268.1		
32	100st or less	271.9	—	111.4	—
	101st or more, 300st or less	301.9	—		
40	100st or less	293.9	—	133.4	—
	101st or more, 300st or less	323.9	—		

Dimensions

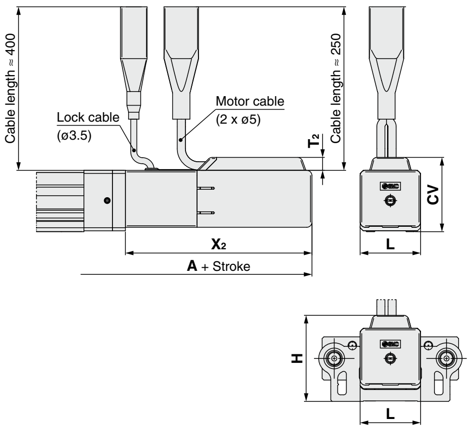
Motor top/parallel type
With lock/motor cover: LEYG 16/25/32/40 □□ A/B/C -□W



[mm]

Size	T_2	X_2
16	7.5	124.5
25	7.5	129
32	7.5	141.5
40	7.5	163.5

In-line motor type
With lock/motor cover: LEYG 16/25/32/40 D□ A/B/C -□W



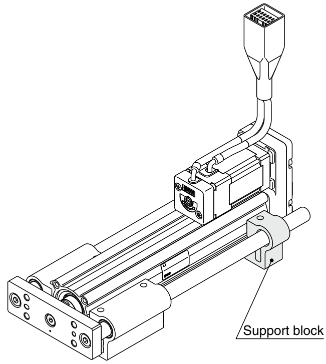
[mm]

Size	Stroke range	A	T_2	X_2	L	H	CV
16	100st or less	218.5	7.5	108	35	49.8	43
	101st or more, 300st or less	238.5					
25	100st or less	250	7.5	109	46	61.3	54.4
	101st or more, 300st or less	275					
32	100st or less	275	7.5	116.5	60	75.8	68.5
	101st or more, 300st or less	305					
40	100st or less	297	7.5	138.5	60	75.8	68.5
	101st or more, 300st or less	327					

Support Block

●Guide for support block application

When the stroke exceeds 100 mm and the lateral load is applied, the body will be bent based on the load. Mounting the support block is recommended. (Please order it separately from the models shown below.)

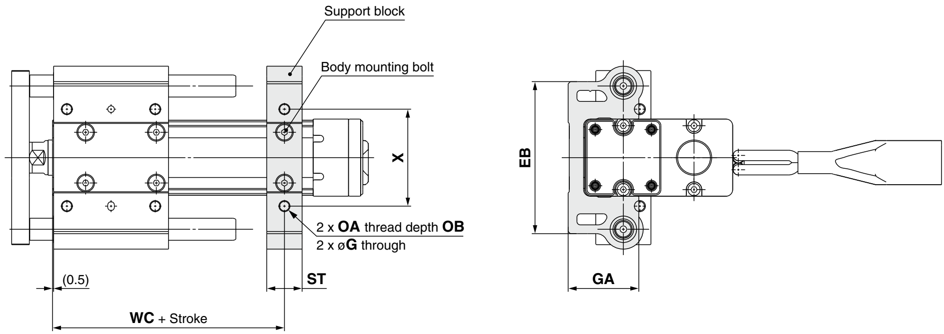


Support Block Model

LEYG-S 016

●Size

016	For size 16
025	For size 25
032	For size 32, 40



⚠Caution

Do not install the body using only a support block.
The support block should be used only for support.

[mm]

Size	Model	Stroke range	EB	G	GA	OA	OB	ST	WC	X
16	**LEYG-S016**	100st or less	69	4.3	31.8	M5 x 0.8	10	16	55	44
		101st or more, 200st or less							75	
25	**LEYG-S025**	100st or less	85	5.4	40.3	M6 x 1.0	12	20	70	54
		101st or more, 300st or less							95	
32 **40**	**LEYG-S032**	100st or less	101	5.4	50.3	M6 x 1.0	12	22	75	64
		101st or more, 300st or less							105	

∗ Two body mounting bolts are included with the support block.

Series LEY/LEYG
Electric Actuators/ Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 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. Do not apply a load in excess of the operating limit.

Select a suitable actuator by work load and allowable lateral load on the rod end. If the product is used outside of the operating limit, the eccentric load applied to the piston rod will be excessive and have adverse effects such as creating play on the sliding parts of the piston rod, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force or impact force is applied to it.

This can cause failure.

3. When used as a stopper, select the LEYG series "Sliding bearing".

4. When used as a stopper, fix the main body with a guide attachment ("Top mounting" or "Bottom mounting").

If the end of the actuator is used to fix the main body (end mounting), the excessive load acts on the actuator, which adversely affects the operation and life of the product.

Handling

⚠Caution

1. INP output signal

1) Positioning operation
When the product comes within the set range by step data [In position], the INP output signal will turn on.
Initial value: Set to [0.50] or higher.

2) Pushing operation
When the effective force exceeds step data [Trigger LV], the INP output signal will turn on.
Use the product within the specified range of [Pushing force] and [Trigger LV].

a) To ensure that the actuator pushes the workpiece with the set [Pushing force], it is recommended that the [Trigger LV] be set to the same value as the [Pushing force].

b) When the [Pushing force] and [Trigger LV] are set less than the specified range, the INP output signal will turn on from the pushing start position.

Handling

⚠Caution

<Pushing Force and Trigger Level Range> Without load/With lateral load on rod end

Model	Pushing speed [mm/s]	Pushing force (Setting input value)
LEY□16□	1 to 4	30% to 85%
	5 to 20	35% to 85%
	21 to 50	60% to 85%
LEY□25□	1 to 4	20% to 65%
	5 to 20	35% to 65%
	21 to 35	50% to 65%
LEY□32□	1 to 4	20% to 85%
	5 to 20	35% to 85%
	21 to 30	60% to 85%
LEY□40□	1 to 4	20% to 65%
	5 to 20	35% to 65%
	21 to 30	50% to 65%

Model	Pushing speed [mm/s]	Pushing force (Setting input value)
LEY□16□A	1 to 4	40% to 95%
	5 to 20	60% to 95%
	21 to 50	80% to 95%
LEY□25□A	1 to 4	40% to 95%
	5 to 20	60% to 95%
	21 to 35	80% to 95%

∗ For vertical loads (upward), set the pushing force to the maximum value shown below, and operate at the work load or less.

Model	LEY16□			LEY25□			LEY32□			LEY40□		
Lead	A	B	C	A	B	C	A	B	C	A	B	C
Work load [kg]	1	1.5	3	2.5	5	10	4.5	9	18	7	14	28
Pushing force	85%			65%			85%			65%		

Model	LEY16□A			LEY25□A		
Lead	A	B	C	A	B	C
Work load [kg]	1	1.5	3	1.2	2.5	5
Pushing force	95%			95%		

Model	LEYG16$^{M}_{L}$□			LEYG25$^{M}_{L}$□			LEYG32$^{M}_{L}$□			LEYG40$^{M}_{L}$□		
Lead	A	B	C	A	B	C	A	B	C	A	B	C
Work load [kg]	0.5	1	2.5	1.5	4	9	2.5	7	16	5	12	26
Pushing force	85%			65%			85%			65%		

Model	LEYG16$^{M}_{L}$□A			LEYG25$^{M}_{L}$□A		
Lead	A	B	C	A	B	C
Work load [kg]	0.5	1	2.5	0.5	1.5	4
Pushing force	95%			95%		

2. When the pushing operation is used, be sure to set to [Pushing operation].

Also, do not hit the workpiece in positioning operation or in the range of positioning operation. It may malfunction.

3. Use the product within the specified pushing speed range for the pushing operation.

It may lead to damage and malfunction.

4. The moving force should be the initial value (LEY16□/25□/32□/40□: 100%, LEY16A□: 150%, LEY25A□: 200%).

If the moving force is set below the initial value, it may cause an alarm.

5. The actual speed of this actuator is affected by the load.

Check the model selection section of the catalog.

6. Do not apply a load, impact or resistance in addition to the transferred load during return to origin.

Additional force will cause the displacement of the origin position since it is based on detected motor torque.

Series LEY/LEYG
Electric Actuators/ Specific Product Precautions 2

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Handling

⚠Caution

7. In pushing operation, set the product to a position of at least 2 mm away from a workpiece. (This position is referred to as a pushing start position.)

The following alarms may be generated and operation may become unstable.

a. “Posn failed” alarm is generated.

The product cannot reach a pushing start position due to variation in the target position.

b. “Pushing ALM” alarm is generated.

The product is pushed back from a pushing start position after starting to push.

8. Do not scratch or dent the sliding parts of the piston rod, by striking or attaching objects.

The piston rod and guide rod are manufactured to precise tolerances, even a slight deformation may cause malfunction.

9. When an external guide is used, connect it in such a way that no impact or load is applied to it.

Use a freely moving connector (such as a floating joint).

10. Do not operate by fixing the piston rod and moving the actuator body.

Excessive load will be applied to the piston rod, leading to damage to the actuator and reduced the life of the product.

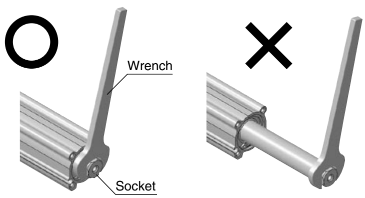
11. Avoid using the electric actuator in such a way that rotational torque would be applied to the piston rod.

This may cause deformation of the non-rotating guide, abnormal responses of the auto switch, play in the internal guide or an increase in the sliding resistance.

Refer to the table below for the approximate values of the allowable range of rotational torque.

Allowable rotational torque (N·m) or less	LEY16□□	LEY25□□	LEY32/40□□
	0.8	1.1	1.4

When screwing in a bracket or nut to the end of the piston rod, hold the flats of the rod end with a wrench (the piston rod should be fully retracted). Do not apply tightening torque to the non-rotating mechanism.



12. When rotational torque is applied to the end of the plate, use it within the allowable range. [Series LEYG]

This may cause deformation of the guide rod and bushing, play in the guide or an increase in the sliding resistance.

13. For the pushing operation, use the product within the duty ratio range below.

The duty ratio is a ratio at the time that can keep being pushed.

• Step motor (Servo/24 VDC)

LEY16□

Pushing force [%]	Ambient temperature: 25°C or less		Ambient temperature: 40°C	
	Duty ratio [%]	Continuous pushing time [minute]	Duty ratio [%]	Continuous pushing time [minute]
40 or less	100	—	100	—
50			70	12
70			20	1.3
85			15	0.8

LEY25□

Pushing force [%]	Ambient temperature: 25°C or less		Ambient temperature: 40°C	
	Duty ratio [%]	Continuous pushing time [minute]	Duty ratio [%]	Continuous pushing time [minute]
65 or less	100	—	100	—

LEY32□/40□

Pushing force [%]	Ambient temperature: 25°C or less		Ambient temperature: 40°C	
	Duty ratio [%]	Continuous pushing time [minute]	Duty ratio [%]	Continuous pushing time [minute]
65 or less	100	—	100	—
85			50	15

• Servo motor (24 VDC)

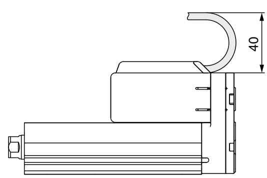
LEY16A□

Pushing force [%]	Ambient temperature: 25°C or less		Ambient temperature: 40°C	
	Duty ratio [%]	Continuous pushing time [minute]	Duty ratio [%]	Continuous pushing time [minute]
95 or less	100	—	100	—

LEY25A□

Pushing force [%]	Ambient temperature: 25°C or less		Ambient temperature: 40°C	
	Duty ratio [%]	Continuous pushing time [minute]	Duty ratio [%]	Continuous pushing time [minute]
95 or less	100	—	100	—

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



15. When mounting a bolt, workpiece or jig, hold the flats of the piston rod end with a wrench so that the piston rod does not rotate. The bolt should be tightened within the specified torque range.

This may cause abnormal responses of the auto switch, play in the internal guide or an increase in the sliding resistance.

Series LEY/LEYG Electric Actuators/ Specific Product Precautions 3

**Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
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Handling

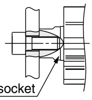
⚠Caution

16. When mounting the product and/or a workpiece, tighten the mounting screws within the specified torque range.

Tightening the screws with a higher torque than recommended may cause a 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.

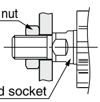
<Series LEY>

Workpiece fixed/Rod end female thread

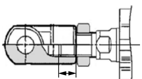

End socket

Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)	End socket width across flats (mm)
LEY16	M5 x 0.8	3.0	10	14
LEY25	M8 x 1.25	12.5	13	17
LEY32/40	M8 x 1.25	12.5	13	22

Workpiece fixed/Rod end male thread (When "Rod end male thread" is selected.)


Rod end nut
End socket

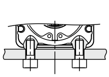
Model	Thread size	Max. tightening torque (N·m)	Effective thread length (mm)	End socket width across flats (mm)
LEY16	M8 x 1.25	12.5	12	14
LEY25	M14 x 1.5	65.0	20.5	17
LEY32/40	M14 x 1.5	65.0	20.5	22


End bracket screw-in depth

Model	Rod end nut		End bracket screw-in depth (mm)
	Width across flats (mm)	Length (mm)	
LEY16	13	5	5 or more
LEY25	22	8	8 or more
LEY32/40	22	8	8 or more

∗ Rod end nut is an accessary.

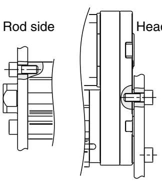
Body fixed/Body bottom tapped style (When "Body bottom tapped" is selected.)



Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)
LEY16	M4 x 0.7	1.5	5.5
LEY25	M5 x 0.8	3.0	6.5
LEY32/40	M6 x 1.0	5.2	8.8

Body fixed/Rod side/Head side tapped style

Rod side Head side∗

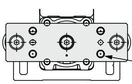


Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)
LEY16	M4 x 0.7	1.5	7
LEY25	M5 x 0.8	3.0	8
LEY32/40	M6 x 1.0	5.2	10

∗ Except the LEY□D.

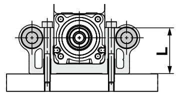
<Series LEYG>

Workpiece fixed/Plate tapped style


Tap (4 locations)

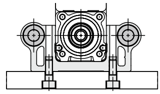
Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)
LEYG16$^{M}_{L}$	M5 x 0.8	3.0	8
LEYG25$^{M}_{L}$	M6 x 1.0	5.2	11
LEYG$^{32M}_{40L}$	M6 x 1.0	5.2	12

Body fixed/Top mounting



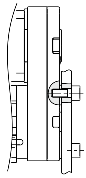
Model	Bolt	Max. tightening torque (N·m)	Length: L (mm)
LEYG16$^{M}_{L}$	M4 x 0.7	1.5	32
LEYG25$^{M}_{L}$	M5 x 0.8	3.0	40.5
LEYG$^{32M}_{40L}$	M5 x 0.8	3.0	50.5

Body fixed/Bottom mounting



Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)
LEYG16$^{M}_{L}$	M5 x 0.8	3.0	10
LEYG25$^{M}_{L}$	M6 x 1.0	5.2	12
LEYG$^{32M}_{40L}$	M6 x 1.0	5.2	12

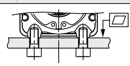
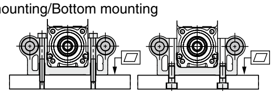
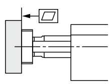
Body fixed/Head side tapped style



Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)
LEYG16$^{M}_{L}$	M4 x 0.7	1.5	7
LEYG25$^{M}_{L}$	M5 x 0.8	3.0	8
LEYG$^{32M}_{40L}$	M6 x 1.0	5.2	10

17. Keep the flatness of the mounting surface within the following ranges when mounting the actuator body and workpiece.

Unevenness of a workpiece or base mounted on the body of the product may cause an increase in the sliding resistance.

Model	Mounting position	Flatness
LEY□	Body/Body bottom 	0.1 mm or less
LEYG□	Top mounting/Bottom mounting 	0.05 mm or less
	Workpiece/Plate mounting 	0.05 mm or less

18. When using auto switch with the guide rod type LEYG series, the following limits will be in effect. Please select the product while paying attention to this.

- Insert the auto switch from the front side with rod (plate) sticking out.
- The auto switches with perpendicular electrical entry cannot be used.
- For the parts hidden behind the guide attachment (Rod stick out side), the auto switch cannot be fixed.
- Consult with SMC when using auto switch on the rod stick out side.

Electric Actuators/ Specific Product Precautions 4

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions. Please download it via our website, http://www.smcworld.com

Enclosure

IP – □□

First characteristic numeral • • Second characteristic numeral

• **First Characteristics:**
Degrees of protection against solid foreign objects

0	Non-protected
1	Protected against solid foreign objects of 50 mmø and greater
2	Protected against solid foreign objects of 12 mmø and greater
3	Protected against solid foreign objects of 2.5 mmø and greater
4	Protected against solid foreign objects of 1.0 mmø and greater
5	Dust-protected
6	Dust-tight

• **Second Characteristics:**
Degrees of protection against water

0	Non-protected	—
1	Protected against vertically falling water drops	Dripproof type 1
2	Protected against vertically falling water drops when enclosure tilted up to 15°	Dripproof type 2
3	Protected against rainfall when enclosure tilted up to 60°	Rainproof type
4	Protected against splashing water	Splashproof type
5	Protected against water jets	Water-jet-proof type
6	Protected against powerful water jets	Powerful water-jet-proof type
7	Protected against the effects of temporary immersion in water	Immersible type
8	Protected against the effects of continuous immersion in water	Submersible type

Example) IP65: Dusttight, Low jetproof type
"Low jetproof type" means that no water intrudes inside an equipment that could hinder from operating normally by means of applying water for 3 minutes in the prescribed manner. Take appropriate protection measures, since a device is not usable in an environment where a droplet of water is splashed constantly.

Maintenance

⚠Warning

1. Ensure that the power supply is stopped and the workpiece is removed before starting maintenance work or replacement of the product.

• **Maintenance frequency**
Perform maintenance according to the table below.

Frequency	Appearance check	Belt check
Inspection before daily operation	○	—
Inspection every 6 months/ 250 km/5 million cycles*	○	○

* Select whichever comes sooner.

• **Items for visual appearance check**
1. Loose set screws, Abnormal dirt
2. Check of flaw and cable joint
3. Vibration, Noise

• **Belt replacement (Guide)**
It is recommended that the belt be replaced after being in service for 2 years, or before reaching the following distance.

Model	Distance	Model	Distance	Model	Distance
LEY16□A	2,000 km	**LEY25□A**	2,500 km	**LEY32A**	4,000 km
LEY16□B	1,000 km	**LEY25□B**	1,200 km	**LEY32B**	2,000 km
LEY16□C	500 km	**LEY25□C**	600 km	**LEY32C**	1,000 km

Model	Distance
LEY40A	4,000 km
LEY40B	2,000 km
LEY40C	1,000 km

• **Items for belt check**
Stop operation immediately and replace the belt when belt appear to be below. Further, ensure your operating environment and conditions satisfy the requirements specified for the product.

a. Tooth shape canvas is worn out
Canvas fiber becomes fuzzy. Rubber is removed and the fiber becomes whitish. Lines of fibers become unclear.

b. Peeling off or wearing of the side of the belt
Belt corner becomes round and frayed thread sticks out.

c. Belt partially cut
Belt is partially cut. Foreign matter caught in teeth other than cut part causes flaw.

d. Vertical line of belt teeth
Flaw which is made when the belt runs on the flange.

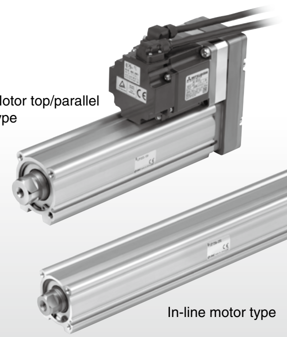
e. Rubber back of the belt is softened and sticky

f. Crack on the back of the belt

AC Servo Motor

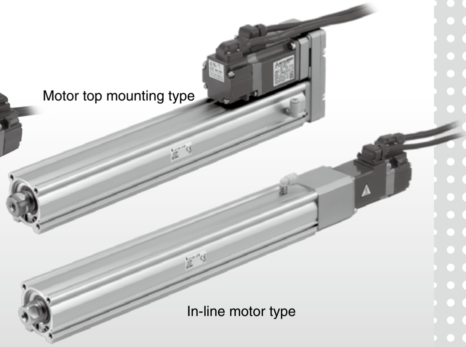
Rod Type Page 190

Series LEY



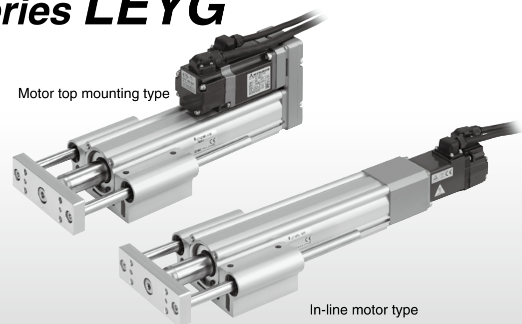
Dust/Drip Proof (IP65) Specification Page 203

Series LEY-X5



Guide Rod Type Page 212

Series LEYG



AC Servo Motor Driver Page 419

Series LECS□

Model Selection

Selection Procedure

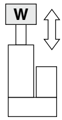
Positioning Control Selection Procedure

Step 1 Check the work load–speed. (Vertical transfer) → **Step 2** Check the cycle time.

Selection Example

Operating conditions

- Workpiece mass: 16 [kg]
- Speed: 300 [mm/s]
- Acceleration/Deceleration: 5,000 [mm/s²]
- Stroke: 300 [mm]
- Workpiece mounting condition: Vertical upward downward transfer



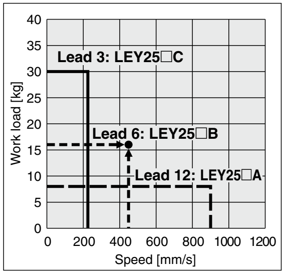
Step 1 **Check the work load–speed. <Speed–Vertical work load graph>**

Select the target model based on the workpiece mass and speed with reference to the <Speed–Vertical work load graph>.

Selection example) The **LEY25□B** is temporarily selected based on the graph shown on the right side.

∗ It is necessary to mount a guide outside the actuator when used for horizontal transfer. When selecting the target model, refer to pages 192, 199 and 204 for the horizontal work load in the specifications, and page 219 for the precautions.

The regeneration option may be necessary. Refer to pages 186, 187 and 189 for "Required Conditions for Regeneration Option".



<Speed–Vertical work load graph> (LEY25□)

Step 2 **Check the cycle time.**

Calculate the cycle time using the following calculation method.

- Cycle time T can be found from the following equation.

$$T = T1 + T2 + T3 + T4 \text{ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

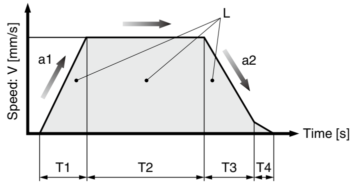
$$T1 = V/a1 \text{ [s]} \qquad T3 = V/a2 \text{ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} \text{ [s]}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$$T4 = 0.05 \text{ [s]}$$



L : Stroke [mm] ··· (Operating condition)
V : Speed [mm/s] ··· (Operating condition)
a1: Acceleration [mm/s²] ··· (Operating condition)
a2: Deceleration [mm/s²] ··· (Operating condition)

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 the beginning of the constant speed operation to stop
T4: Settling time [s] ··· Time until in position is completed

Calculation example)
T1 to T4 can be calculated as follows.

$$T1 = V/a1 = 300/5000 = 0.06 \text{ [s]}, \quad T3 = V/a2 = 300/5000 = 0.06 \text{ [s]}$$

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{300 - 0.5 \cdot 300 \cdot (0.06 + 0.06)}{300} = 0.94 \text{ [s]}$$

$$T4 = 0.05 \text{ [s]}$$

Therefore, the cycle time can be obtained as follows.
T = T1 + T2 + T3 + T4 = 0.06 + 0.94 + 0.06 + 0.05 = **1.11 [s]**

Based on the above calculation result, the LEY25□B-300 is selected.

Selection Procedure

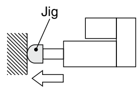
Pushing Control Selection Procedure

Step 1 Check the pushing force. → **Step 2** Check the lateral load on the rod end.

Selection Example

Operating conditions

- Mounting condition: Horizontal (pushing)
- Jig weight: 0.5 [kg]
- Pushing force: 200 [N]
- Speed: 100 [mm/s]
- Stroke: 300 [mm]



Step 1 **Check the pushing force. <Force conversion graph>**

Select the target model based on the torque limit/command value and pushing force with reference to the <Force conversion graph>.

Selection example)
Based on the graph shown on the right side,
- Torque limit/Command value: 24 [%]
- Pushing force: 200 [N]

Therefore, the **LEY25B** is temporarily selected.

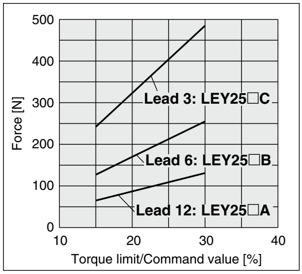
Step 2 **Check the lateral load on the rod end.**
<Graph of allowable lateral load on the rod end>

Confirm the allowable lateral load on the rod end of the actuator: LEY25B, which has been selected temporarily with reference to the <Graph of allowable lateral load on the rod end>.

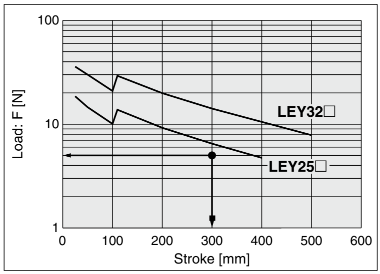
Selection example)
Based on the graph shown on the right side,
- Jig weight: 0.2 [kg] ≈ 2 [N]
- Product stroke: 200 [mm]

Therefore, the lateral load on the rod end is in the allowable range.

Based on the above calculation result, the LEY25B-300 is selected.



<Force conversion graph>
(LEY25□)

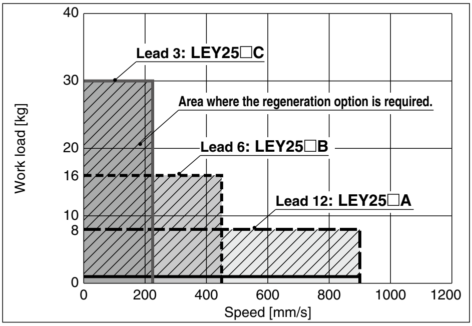


<Graph of allowable lateral load on the rod end>

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Speed–Vertical Work Load Graph/Required Conditions for “Regeneration Option”

LEY25□ (Motor mounting position: Top/Parallel, In-line)



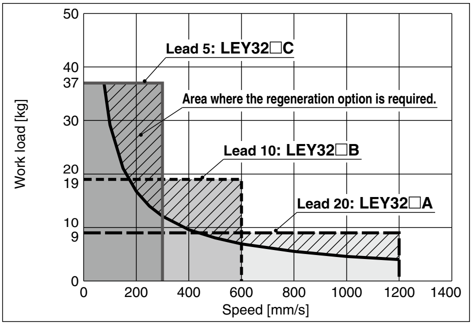
Required conditions for “Regeneration option”

* Regeneration option required when using product above “Regeneration” line in graph. (Order separately)

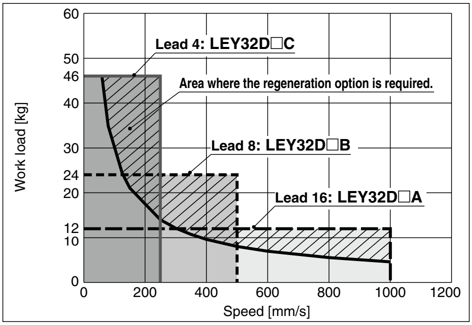
“Regeneration Option” Models

Size	Model
LEY25□	LEC-MR-RB-032
LEY32□	LEC-MR-RB-032

LEY32□ (Motor mounting position: Top/Parallel)

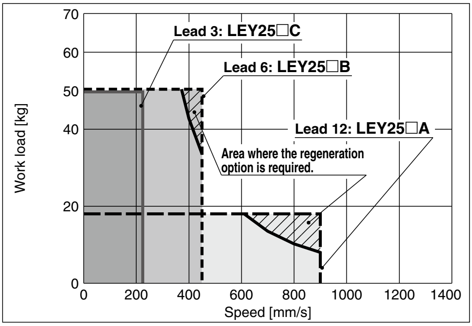


LEY32D (Motor mounting position: In-line)



Speed–Horizontal Work Load Graph/Required Conditions for “Regeneration Option”

LEY25□ (Motor mounting position: Top/Parallel, In-line)



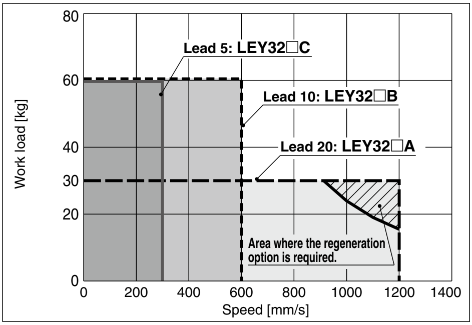
Required conditions for “Regeneration option”

* Regeneration option required when using product above “Regeneration” line in graph. (Order separately)

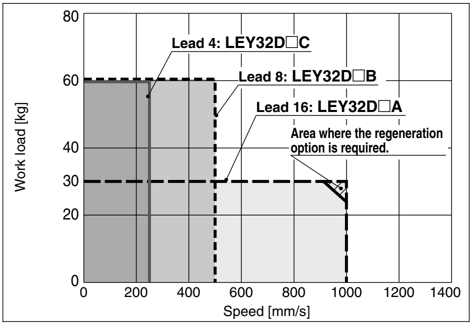
“Regeneration Option” Models

Size	Model
LEY25□	LEC-MR-RB-032
LEY32□	LEC-MR-RB-032

LEY32□ (Motor mounting position: Top/Parallel)



LEY32D (Motor mounting position: In-line)



Allowable Stroke Speed

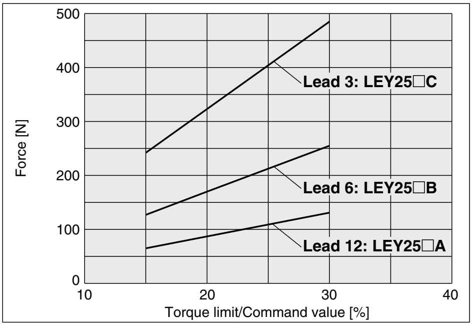
[mm/s]

Model	AC servo motor	Lead		Stroke [mm]										
		Symbol	[mm]	30	50	100	150	200	250	300	350	400	450	500
LEY25□ (Motor mounting position: Top/Parallel, In-line)	100 W /□40	**A**	12	900							600		—	—
		B	6	450							300		—	—
		C	3	225							150		—	—
		(Motor rotation speed)		(4500 rpm)							(3000 rpm)		—	—
LEY32□ (Motor mounting position: Top/Parallel)	200 W /□60	**A**	20	1200									800	
		B	10	600									400	
		C	5	300									200	
		(Motor rotation speed)		(3600 rpm)									(2400 rpm)	
LEY32D (Motor mounting position: In-line)	200 W /□60	**A**	16	1000									640	
		B	8	500									320	
		C	4	250									160	
		(Motor rotation speed)		(3750 rpm)									(2400 rpm)	

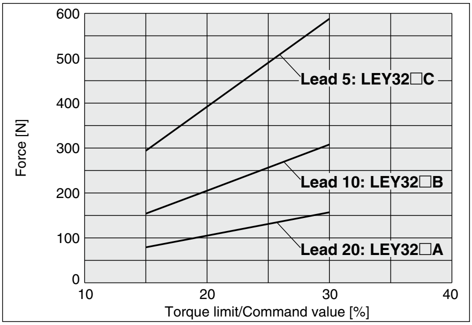
LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Force Conversion Graph (Guide)

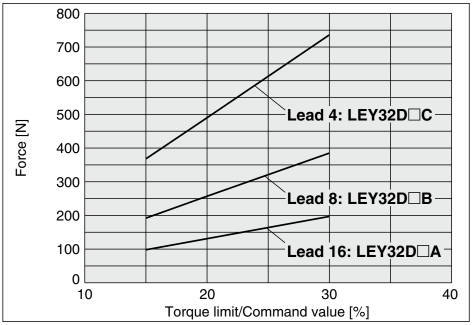
LEY25□ (Motor mounting position: Top/Parallel, In-line)



LEY32□ (Motor mounting position: Top/Parallel)

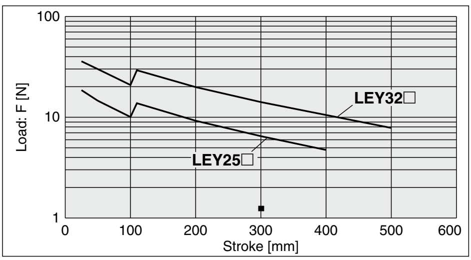


LEY32D□ (Motor mounting position: In-line)

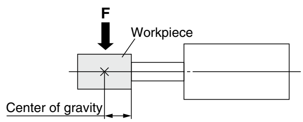


∗1 When limiting torque with incremental encoder, parameter No. PC12/the value of the internal torque command should be set 30% or less.
∗2 When limiting torque with absolute encoder, parameter No. PC13/the value of the maximum output command for analog torque should be set 30% or less.

Graph of Allowable Lateral Load on the Rod End (Guide)



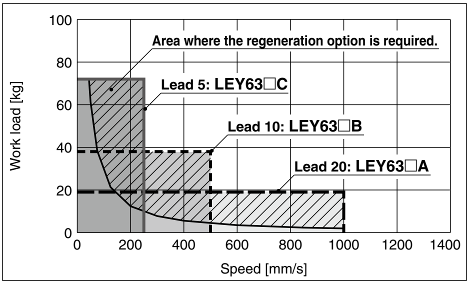
[Stroke] = [Product stroke] + [Distance from the rod end to the center of gravity of the workpiece]



Speed–Work Load Graph/Required Conditions for “Regeneration Option”

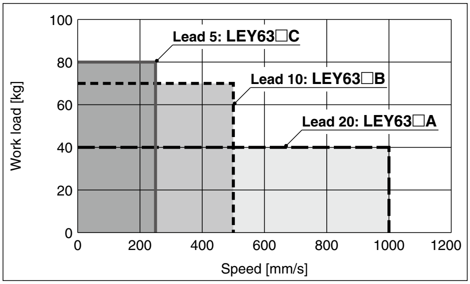
Vertical transfer

LEY63□



Horizontal transfer

LEY63□



Required conditions for “Regeneration option”

∗ Regeneration option required when using product above “Regeneration” line in graph. (Order separately)

“Regeneration Option” Models

Size	Model
LEY63□	LEC-MR-RB-12

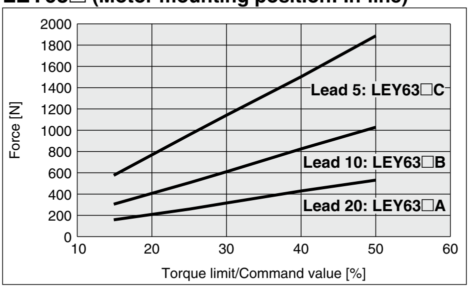
Allowable Stroke Speed

[mm/s]

Model	AC servo motor	Lead Symbol	Lead [mm]	Stroke [mm] 100	200	300	400	500	600	700	800
LEY63□	400 W/□60	A	20	1000					800	600	500
		B	10	500					400	300	250
		C	5	250					200	150	125
		(Motor rotation speed)		(3000 rpm)					(2400 rpm)	(1800 rpm)	(1500 rpm)

Force Conversion Graph

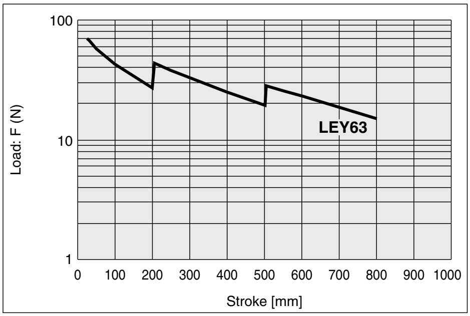
LEY63□ (Motor mounting position: In-line)



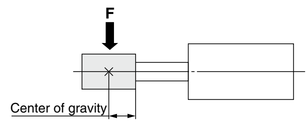
Torque limit/Command value [%]	Duty ratio [%]	Continuous pushing time [minute]
25 or less	100	—
30	100 (60)	— (1.5)
40	50 (30)	1.5 (0.5)
50	30 (20)	0.5 (0.16)

∗1 The values in ( ) are for a closely-mounted driver.
∗2 When limiting torque with incremental encoder, parameter No. PC12/the value of the internal torque command should be set 50% or less.
∗3 When limiting torque with absolute encoder, parameter No. PC13/the value of the maximum output command for analog torque should be set 50% or less.

Graph of Allowable Lateral Load on the Rod End



[Stroke] = [Product stroke] + [Distance from the rod end to the center of gravity of the workpiece]



Electric Actuator/Rod Type

AC Servo Motor

Series LEY

LEY25, 32

Size 25, 32

How to Order

LEY 25 ☐ S2 B − 100 ☐ ☐ ☐ − S 2 A1 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬

❶ Size

25
32

❷ Motor mounting position

Nil	Top mounting
R	Right side parallel
L	Left side parallel
D	In-line

❸ Motor type*1

Symbol	Type	Output [W]	Actuator size	Compatible drivers*2
S2	AC servo motor (Incremental encoder)	100	25	LECSA☐-S1
S3	AC servo motor (Incremental encoder)	200	32	LECSA☐-S3
S6	AC servo motor (Absolute encoder)	100	25	LECSB☐-S5 LECSC☐-S5 LECSS☐-S5
S7	AC servo motor (Absolute encoder)	200	32	LECSB☐-S7 LECSC☐-S7 LECSS☐-S7

*1: For motor type S2 and S6, the compatible driver part number suffixes are S1 and S5 respectively.
*2: For details about the driver, refer to page 419.

❹ Lead [mm]

Symbol	LEY25	LEY32*
A	12	16 (20)
B	6	8 (10)
C	3	4 (5)

* The values shown in ( ) are the lead for size 32 top mounting, right/left side parallel types. (Equivalent lead which includes the pulley ratio [1.25:1])

❺ Stroke [mm]

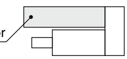
30	30
to	to
500	500

* Refer to the table below for details.

❻ Motor option

Nil	Without option
B	With lock*

* When "With lock" is selected for the top mounting and right/left side parallel types, the motor body will stick out of the end of the body for size 25 with strokes 30 or less. Check for interference with workpieces before selecting a model.



❼ Rod end thread

Nil	Rod end female thread
M	Rod end male thread (1 rod end nut is included.)

❽ Mounting*1

Symbol	Type	Motor mounting position: Top/Parallel	Motor mounting position: In-line
Nil	Ends tapped (Standard)*2	●	●
U	Body bottom tapped	●	●
L	Foot	●	—
F	Rod flange*2	●	●
G	Head flange*2	●*4	—
D	Double clevis*3	●	—

*1 Mounting bracket is shipped together, (but not assembled).
*2 For horizontal cantilever mounting with the rod flange, head flange and ends tapped, use the actuator within the following stroke range.
・LEY25: 200 or less ・LEY32: 100 or less
*3 For mounting with the double clevis, use the actuator within the following stroke range.
・LEY25: 200 or less ・LEY32: 200 or less
*4 Head flange is not available for the LEY32.

* Applicable stroke table ●Standard

Model \ Stroke (mm)	30	50	100	150	200	250	300	350	400	450	500	Manufacturable stroke range
LEY25	●	●	●	●	●	●	●	●	●	—	—	15 to 400
LEY32	●	●	●	●	●	●	●	●	●	●	●	20 to 500

Note) Consult with SMC for non-standard strokes as they are produced as special orders.

For auto switches, refer to pages 154 and 155.

Motor mounting position: Top/Parallel

Motor mounting position: In-line

❾ Cable type*

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

* The motor and encoder cables are included. (The lock cable is also included when the motor with lock option is selected.)
* Standard cable entry direction is
  - Top/Parallel: (A) Axis side
  - In-line: (B) Counter axis side

  (Refer to page 435 for details.)

⓬ I/O connector

Nil	Without connector
H	With connector

❿ Cable length* [m]

Nil	Without cable
2	2
5	5
A	10

* The length of the encoder, motor and lock cables are the same.

⓫ Driver type*

	Compatible drivers	Power supply voltage (V)
Nil	Without driver	—
A1	LECSA1-S□	100 to 120
A2	LECSA2-S□	200 to 230
B1	LECSB1-S□	100 to 120
B2	LECSB2-S□	200 to 230
C1	LECSC1-S□	100 to 120
C2	LECSC2-S□	200 to 230
S1	LECSS1-S□	100 to 120
S2	LECSS2-S□	200 to 230

* When the driver type is selected, the cable is included. Select cable type and cable length.
  Example)
  S2S2: Standard cable (2 m) + Driver (LECSS2)
  S2 : Standard cable (2 m)
  Nil : Without cable and driver

Compatible Drivers

Driver type	**Pulse input type /Positioning type** 	**Pulse input type** 	**CC-Link direct input type** 	**SSCNET Ⅲ type** 
Series	**LECSA**	**LECSB**	**LECSC**	**LECSS**
Number of point tables	Up to 7	—	Up to 255 (2 stations occupied)	—
Pulse input	○	○	—	—
Applicable network	—	—	CC-Link	SSCNET Ⅲ
Control encoder	Incremental 17-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder
Communication function	USB communication	USB communication, RS422 communication	USB communication, RS422 communication	USB communication
Power supply voltage (V)	100 to 120 VAC (50/60 Hz) 200 to 230 VAC (50/60 Hz)			
Reference page	Page 419			

Specifications

	Model		LEY25S$^{2}_{6}$ (Top/Parallel)/LEY25DS$^{2}_{6}$ (In-line)			LEY32S$^{3}_{7}$ (Top/Parallel)			LEY32DS$^{3}_{7}$ (In-line)		
Actuator specifications	**Stroke [mm]** Note 1)		30, 50, 100, 150, 200, 250, 300, 350, 400			30, 50, 100, 150, 200, 250, 300, 350, 400, 450, 500			30, 50, 100, 150, 200, 250, 300, 350, 400, 450, 500		
	Work load [kg]	**Horizontal** Note 2)	18	50	50	30	60	60	30	60	60
		Vertical	8	16	30	9	19	37	12	24	46
	Pushing force [N] Note 3) **(Set value: 15 to 30%)**		65 to 131	127 to 255	242 to 485	79 to 157	154 to 308	294 to 588	98 to 197	192 to 385	368 to 736
	Max. speed [mm/s] Note 4) **Stroke range**	**Up to 300**	900	450	225	1200	600	300	1000	500	250
		305 to 400	600	300	150						
		405 to 500	—	—	—	800	400	200	640	320	160
	Pushing speed [mm/s²] Note 5)		35 or less			30 or less			30 or less		
	Max. acceleration/deceleration [mm/s²]		5,000			5,000					
	Positioning repeatability [mm]		±0.02			±0.02					
	Lead [mm] (including pulley ratio)		12	6	3	20	10	5	16	8	4
	Impact/Vibration resistance [m/s²] Note 6)		50/20			50/20					
	Actuation type		Ball screw + Belt (LEY□)/Ball screw (LEY□D)			Ball screw + Belt [1.25:1]			Ball screw		
	Guide type		Sliding bushing (Piston rod)			Sliding bushing (Piston rod)					
	Operating temperature range [°C]		5 to 40			5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)			90 or less (No condensation)					
	Required conditions for Note 7) **"Regeneration option" [kg]**	**Horizontal**	8 or more	31 or more	Not required	15 or more	Not required	Not required	23 or more	Not required	Not required
		Vertical	3 or more	2 or more	2 or more	6 or more	7 or more	11 or more	6 or more	7 or more	12 or more
Electric specifications	**Motor output/Size**		100 W/□40			200 W/□60					
	Motor type		AC servo motor (100/200 VAC)			AC servo motor (100/200 VAC)					
	Encoder		Motor type S2, S3: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S6, S7: Absolute 18-bit encoder (Resolution: 262144 p/rev)								
	Power consumption [W] Note 8)	**Horizontal**	45			65			65		
		Vertical	145			175			175		
	Standby power consumption when operating [W] Note 9)	**Horizontal**	2			2			2		
		Vertical	8			8			8		
	Max. instantaneous power consumption [W] Note 10)		445			724			724		
Lock unit specifications	**Type** Note 11)		Non-magnetizing lock								
	Holding force [N]		131	255	485	157	308	588	197	385	736
	Power consumption [W] at 20°C Note 12)		6.3			7.9			7.9		
	Rated voltage [V]		24 VDC $^{0}_{-10\%}$								

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) The maximum value of the horizontal work load. An external guide is necessary to support the load. The actual work load changes according to the condition of the external guide. Please confirm using actual device.
Note 3) The force setting range (set values for the driver) for the pushing operation with the torque control mode, etc. Set it with reference to "Force Conversion Graph" on page 188.
Note 4) The allowable speed changes according to the stroke.
Note 5) The allowable collision speed for the pushing operation with the torque control mode, etc.
Note 6) Impact resistance: No malfunction occurred when the actuator 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 7) The work load conditions which require "Regeneration option" when operating at the maximum speed (Duty ratio: 100%). Order the regeneration option separately. For details and order numbers, refer to "Required Conditions for Regeneration Option" on pages 186 and 187.
Note 8) The power consumption (including the driver) is for when the actuator is operating.
Note 9) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during the operation.
Note 10) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 11) Only when motor option "With lock" is selected.
Note 12) For an actuator with lock, add the power consumption for the lock.

Weight

Product Weight

[kg]

	Series	LEY25S□ (Motor mounting position: Top/Parallel)									LEY32S□ (Motor mounting position: Top/Parallel)										
	Stroke [mm]	30	50	100	150	200	250	300	350	400	30	50	100	150	200	250	300	350	400	450	500
Motor type	**Incremental encoder**	1.31	1.38	1.55	1.81	1.99	2.16	2.34	2.51	2.69	2.42	2.53	2.82	3.29	3.57	3.85	4.14	4.42	4.70	4.98	5.26
	Absolute encoder	1.37	1.44	1.61	1.87	2.05	2.22	2.40	2.57	2.75	2.36	2.47	2.76	3.23	3.51	3.79	4.08	4.36	4.64	4.92	5.20

	Series	LEY25DS□ (Motor mounting position: In-line)									LEY32DS□ (Motor mounting position: In-line)										
	Stroke [mm]	30	50	100	150	200	250	300	350	400	30	50	100	150	200	250	300	350	400	450	500
Motor type	**Incremental encoder**	1.34	1.41	1.58	1.84	2.02	2.19	2.37	2.54	2.72	2.44	2.55	2.84	3.31	3.59	3.87	4.16	4.44	4.72	5.00	5.28
	Absolute encoder	1.40	1.47	1.64	1.90	2.08	2.25	2.43	2.60	2.78	2.38	2.49	2.78	3.25	3.53	3.81	4.10	4.38	4.66	4.94	5.22

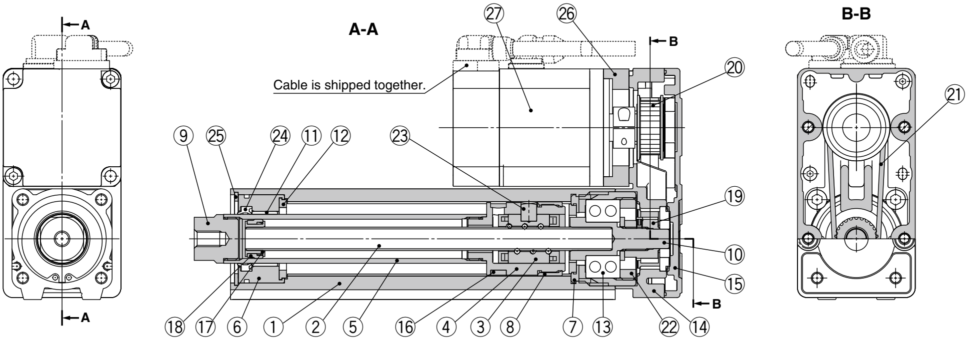
Additional Weight

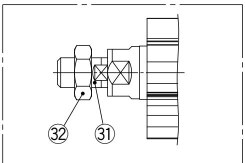
[kg]

Size		25	32
Lock	**Incremental encoder**	0.20	0.40
	Absolute encoder	0.30	0.66
Rod end male thread	**Male thread**	0.03	0.03
	Nut	0.02	0.02
Foot (2 sets including mounting bolt)		0.08	0.14
Rod flange (including mounting bolt)		0.17	0.20
Head flange (including mounting bolt)			
Double clevis (including pin, retaining ring and mounting bolt)		0.16	0.22

Construction

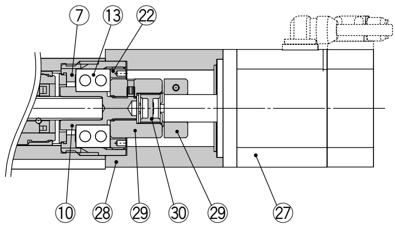
Motor top mounting type: LEY$^{25}_{32}$





When rod end male thread selected

In-line motor type: LEY$^{25}_{32}$D



Component Parts

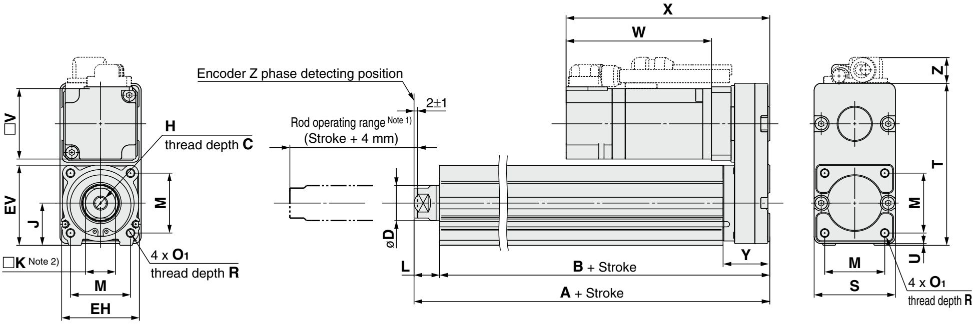
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw shaft**	Alloy steel	
3	**Ball screw nut**	Resin/Alloy steel	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plated
6	**Rod cover**	Aluminum alloy	
7	**Housing**	Aluminum alloy	
8	**Rotation stopper**	POM	
9	**Socket**	Free cutting carbon steel	Nickel plated
10	**Connected shaft**	Free cutting carbon steel	Nickel plated
11	**Bushing**	Lead bronze cast	
12	**Bumper**	Urethane	
13	**Bearing**	—	
14	**Return box**	Aluminum die-cast	Coating
15	**Return plate**	Aluminum die-cast	Coating
16	**Magnet**	—	
17	**Wear ring holder**	Stainless steel	Stroke 101 mm or more
18	**Wear ring**	POM	Stroke 101 mm or more
19	**Screw shaft pulley**	Aluminum alloy	

No.	Description	Material	Note
20	**Motor pulley**	Aluminum alloy	
21	**Belt**	—	
22	**Bearing stopper**	Aluminum alloy	
23	**Parallel pin**	Stainless steel	
24	**Seal**	NBR	
25	**Retaining ring**	Steel for spring	Phosphate coated
26	**Motor adapter**	Aluminum alloy	Coating
27	**Motor**	—	
28	**Motor block**	Aluminum alloy	Coating
29	**Hub**	Aluminum alloy	
30	**Spider**	Urethane	
31	**Socket (Male thread)**	Free cutting carbon steel	Nickel plated
32	**Nut**	Alloy steel	Zinc chromated

Replacement Parts (Top/Parallel only)/Belt

No.	Size	Order no.
21	**25**	LE-D-2-2
	32	LE-D-2-4

Dimensions: Motor Top/Parallel



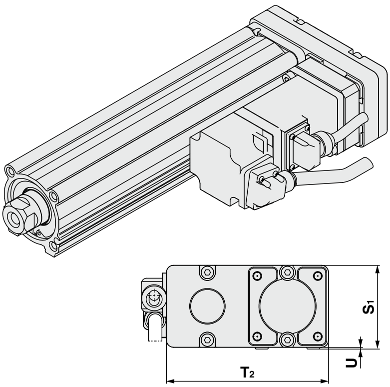
Note 1) Range within which the rod can move. Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) The direction of rod end width across flats (□K) differs depending on the products.

[mm]

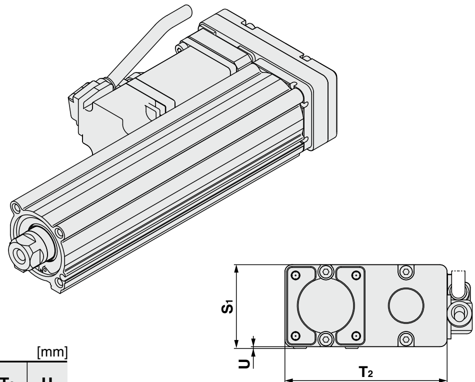
Size	Stroke range (mm)	A	B	C	D	EH	EV	H	J	K	L	M	O_1	R	S
25	15 to 100	130.5	116	13	20	44	45.5	M8 x 1.25	24	17	14.5	34	M5 x 0.8	8	46
	105 to 400	155.5	141												
32	20 to 100	148.5	130	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1.0	10	60
	105 to 500	178.5	160												

Size	Stroke range (mm)	T	U	Y	V	Incremental encoder						Absolute encoder					
						Without lock			With lock			Without lock			With lock		
						W	X	Z	W	X	Z	W	X	Z	W	X	Z
25	15 to 100	92	1	26.5	40	87	120	14.1	123.9	156.9	15.8	82.4	115.4	14.1	123.5	156.5	15.8
	105 to 400																
32	20 to 100	118	1	34	60	88.2	128.2	17.1	116.8	156.8	17.1	76.6	116.6	17.1	116.1	156.1	17.1
	105 to 500																

Motor left side parallel type: LEY$^{25}_{32}$L



Motor right side parallel type: LEY$^{25}_{32}$R

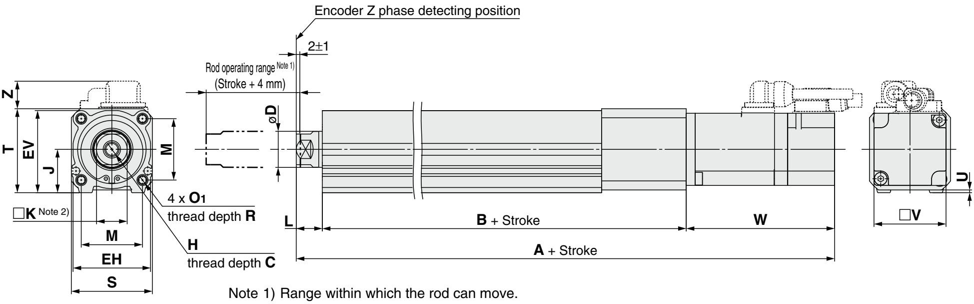


[mm]

Size	S_1	T_2	U
25	47	91	1
32	61	117	1

Note) When the motor is mounted on the left or right side in parallel, the groove for auto switch on the side to which the motor is mounted is hidden.

Dimensions: In-line Motor



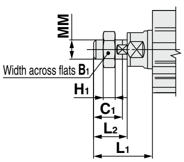
Note 1) Range within which the rod can move.
Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) The direction of rod end width across flats (□K) differs depending on the products.

[mm]

Size	Stroke range (mm)	C	D	EH	EV	H	J	K	L	M	O_1	R	S	T	U
25	15 to 100	13	20	44	45.5	M8 x 1.25	24	17	14.5	34	M5 x 0.8	8	45	46.5	1.5
	105 to 400														
32	20 to 100	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1.0	10	60	61	1
	105 to 500														

Size	Stroke range (mm)	B	V	Incremental encoder						Absolute encoder					
				Without lock			With lock			Without lock			With lock		
				A	W	Z	A	W	Z	A	W	Z	A	W	Z
25	15 to 100	136.5	40	238	87	14.6	274.9	123.9	16.3	233.4	82.4	14.6	274.5	123.5	16.3
	105 to 400	161.5		263			299.9			258.4			299.5		
32	20 to 100	156	60	262.7	88.2	17.1	291.3	116.8	17.1	251.1	76.6	17.1	290.6	116.1	17.1
	105 to 500	186		292.7			321.3			281.1			320.6		

End male thread: LEY 25/32 □□ A/B/C -□□M



∗ Refer to page 152 for details about the rod end nut and mounting bracket.
Note) Refer to the “Handling” precautions on page 220 when mounting end brackets such as knuckle joint or work pieces.

[mm]

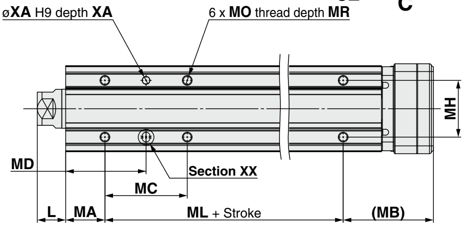
Size	B_1	C_1	H_1	L_1	L_2	MM
25	22	20.5	8	38	23.5	M14 x 1.5
32	22	20.5	8	42.0	23.5	M14 x 1.5

∗ The L_1 measurement is when the unit is in the original position. At this position, 2 mm at the end.

Dimensions

Body bottom tapped

Motor top/parallel: LEY$^{25}_{32}$□□$\overset{A}{\underset{C}{B}}$-□□□U



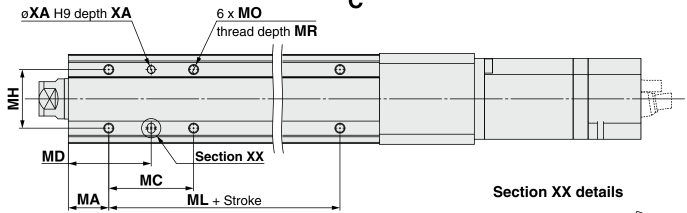
Body Bottom Tapped

[mm]

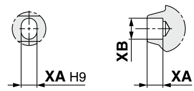
Size	Stroke range (mm)	L	MA	MB	MC	MD	MH	ML
25	15 to 39	14.5	20	46	24	32	29	50
	40 to 100				42	41		
	101 to 124							75
	125 to 200				59	49.5		
	201 to 400				76	58		
32	20 to 39	18.5	25	55	22	36	30	50
	40 to 100				36	43		
	101 to 124							80
	125 to 200				53	51.5		
	201 to 500				70	60		

Body bottom tapped

In-line motor: LEY$^{25}_{32}$D□$\overset{A}{\underset{C}{B}}$-□□□U



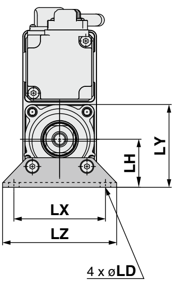
Section XX details

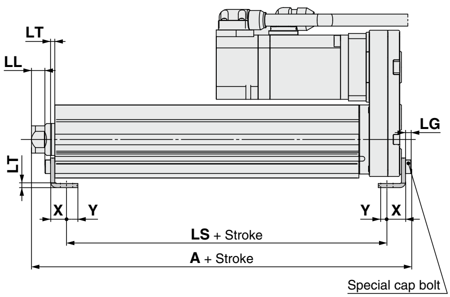


Size	Stroke range (mm)	MO	MR	XA	XB
25	15 to 39	M5 x 0.8	6.5	4	5
	40 to 100				
	101 to 124				
	125 to 200				
	201 to 400				
32	20 to 39	M6 x 1	8.5	5	6
	40 to 100				
	101 to 124				
	125 to 200				
	201 to 500				

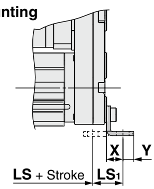
Foot: LEY$^{25}_{32}$□□$\overset{A}{\underset{C}{B}}$-□□□L

Included parts
- Foot
- Body mounting bolt





Outward mounting



Foot

[mm]

Size	Stroke range (mm)	A	LS	LS_1	LL	LD	LG	LH	LT	LX	LY	LZ	X	Y
25	15 to 100	136.6	99	19.8	8.4	6.6	3.5	30	2.6	57	51.5	71	11.2	5.8
	101 to 400	161.6	124											
32	20 to 100	155.7	114	19.2	11.3	6.6	4	36	3.2	76	61.5	90	11.2	7
	101 to 500	185.7	144											

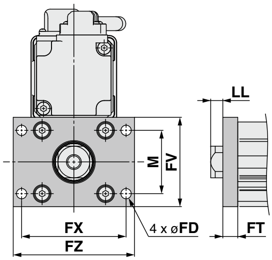
Material: Carbon steel (Chromate treated)

∗ The A measurement is when the unit is in the Z phase first detecting position. At this position, 2 mm at the end.

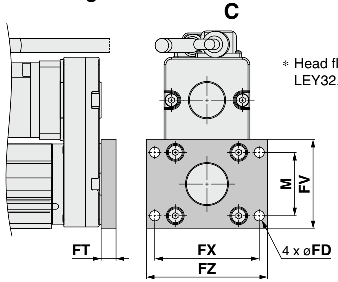
Note) When the motor mounting is the right or left side parallel type, the head side foot should be mounted outwards.

Dimensions

Rod flange: LEY25/32□□A/B/C-□□□F



Head flange: LEY25□□A/B/C-□□□G



∗ Head flange is not available for the LEY32.

Included parts
- Flange
- Body mounting bolt

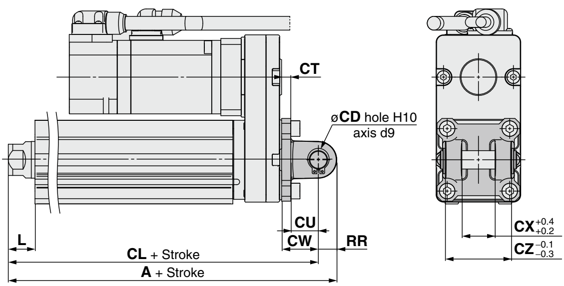
Rod/Head Flange

[mm]

Size	FD	FT	FV	FX	FZ	LL	M
25	5.5	8	48	56	65	6.5	34
32	5.5	8	54	62	72	10.5	40

Material: Carbon steel (Nickel plated)

Double clevis: LEY25/32□□A/B/C-□□□D



Included parts
- Double clevis
- Body mounting bolt
- Clevis pin
- Retaining ring

∗ Refer to page 152 for details about the rod end nut and mounting bracket.

Double Clevis

[mm]

Size	Stroke range (mm)	A	CL	CD	CT
25	15 to 100	160.5	150.5	10	5
	101 to 200	185.5	175.5		
32	20 to 100	180.5	170.5	10	6
	101 to 200	210.5	200.5		

Size	Stroke range (mm)	CU	CW	CX	CZ	L	RR
25	15 to 100	14	20	18	36	14.5	10
	101 to 200						
32	20 to 100	14	22	18	36	18.5	10
	101 to 200						

Material: Cast iron (Coating)

∗ The A and CL measurements are when the unit is in the Z phase first detecting position. At this position, 2 mm at the end.

Electric Actuator/Rod Type

AC Servo Motor

Series LEY

LEY63

Size 63 Dust/Drip Proof (IP65) Specification (Select options)

CE RoHS

How to Order

LEY 63 D S4 B - 200 ☐ ☐ ☐ ☐ - S 2 A2 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭

❶ Size

63

❷ Motor mounting position

D	In-line

❸ Motor type

Symbol	Type	Output [W]	Actuator size	Compatible drivers
S4	AC servo motor (Incremental encoder)	400	63	LECSA2-S4
S8	AC servo motor (Absolute encoder)	400	63	LECSB2-S8 LECSC2-S8 LECSS2-S8

❹ Lead [mm]

Symbol	LEY63
A	20
B	10
C	5

❺ Stroke [mm]

100	100
to	to
800	800

❻ Dust/Drip proof

Nil	IP5x (Dust proof specification)
P	IP65 (Dust/Drip proof specification)/With vent hole tap

* When using the dust/drip proof (IP65), correctly mount the fitting and tubing to the vent hole tap, and then place the end of the tubing in an area not exposed to dust or water.
* The fitting and tubing should be provided separately by the customer. Select [Applicable tubing O.D.: ø4 or more, Connection thread: Rc1/8].

❼ Motor option

Nil	Without option
B	With lock

❽ Rod end thread

Nil	Rod end female thread
M	Rod end male thread (1 rod end nut is included.)

❾ Mounting*1

Symbol	Type	Motor mounting position
		In-line
Nil	Ends tapped (Standard)*2	●
U	Body bottom tapped	●
F	Rod flange*2	●

*1 Mounting bracket is shipped together, (but not assembled).
*2 For horizontal cantilever mounting with the rod flange and ends tapped, use the actuator within the following stroke range.
• LEY63: 100 or less

❿ Cable type*

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

* The motor and encoder cables are included. (The lock cable is also included when the motor with lock option is selected.)
* Standard cable entry direction is "(B) Counter axis side". (Refer to page 435 for details.)

⓫ Cable length* [m]

Nil	Without cable
2	2
5	5
A	10

* The length of the encoder, motor and lock cables are the same.

⓬ Driver type*

	Compatible drivers	Power supply voltage
Nil	Without driver	
A2	LECSA2/Pulse input (Incremental encoder)	200 V to 230 V
B2	LECSB2/Pulse input (Absolute encoder)	200 V to 230 V
C2	LECSC2/CC-Link (Absolute encoder)	200 V to 230 V
S2	LECSS2/SSCNET Ⅲ (Absolute encoder)	200 V to 230 V

* When the driver type is selected, the cable is included. Select cable type and cable length.
Example)
S2S2: Standard cable (2 m) + Driver (LECSS2)
S2 : Standard cable (2 m)
Nil : Without cable and driver

⓭ I/O connector

Nil	Without connector
H	With connector

* Applicable stroke table

●Standard

Model \ Stroke (mm)	100	200	300	400	500	600	700	800	Manufacturable stroke range
LEY63	●	●	●	●	●	●	●	●	50 to 800

Note) Consult with SMC for non-standard strokes as they are produced as special orders.

Specifications

	Model			LEY63DS$^{4}_{8}$□		
Actuator specifications	Stroke [mm] Note 1)			100, 200, 300, 400, 500, 600, 700, 800		
	Work load [kg]		Horizontal Note 2)	40	70	80
			Vertical	19	38	72
	Pushing force [N]/Set value Note 3): 15 to 50% Note 4)			156 to 521	304 to 1,012	573 to 1,910
	Max. speed [mm/s] Note 5)	Stroke range	Up to 500	1000	500	250
			505 to 600	800	400	200
			605 to 700	600	300	150
			705 to 800	500	250	125
	Pushing speed [mm/s] Note 6)			30 or less		
	Max. acceleration/deceleration [mm/s²]			5,000		
	Positioning repeatability [mm]			±0.02		
	Screw lead [mm] (including pulley ratio)			20	10	5
	Impact/Vibration resistance [m/s²] Note 7)			50/20		
	Actuation type			Ball screw		
	Guide type			Sliding bushing (Piston rod)		
	Operating temperature range [°C]			5 to 40		
	Operating humidity range [%RH]			90 or less (No condensation)		
	Required conditions for “Regeneration option” [kg] Note 8)		Horizontal	Not required	Not required	Not required
			Vertical	2 or more	5 or more	12 or more
Electric specifications	Motor output/Size			400 W/□60		
	Motor type			AC servo motor (200 VAC)		
	Encoder			Motor type S4: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S8: Absolute 18-bit encoder (Resolution: 262144 p/rev)		
	Power consumption [W] Note 9)		Horizontal	210		
			Vertical	230		
	Standby power consumption when operating [W] Note 10)		Horizontal	2		
			Vertical	18		
	Max. instantaneous power consumption [W] Note 11)			1275		
Lock unit specifications	Type Note 12)			Non-magnetizing lock		
	Holding force [N]			313	607	1,146
	Power consumption [W] at 20°C Note 13)			7.9		
	Rated voltage [V]			24 VDC $^{0}_{-10\%}$		

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) The maximum value of the horizontal work load. An external guide is necessary to support the load. The actual work load changes according to the condition of the external guide. Please confirm using actual device.
Note 3) Set values for the driver.
Note 4) The force setting range (set values for the driver) for the pushing operation with the torque control mode, etc. The pushing force and duty ratio change according to the set value. Set it with reference to “Force Conversion Graph” on page 189.
Note 5) The allowable speed changes according to the stroke.
Note 6) The allowable collision speed for the pushing operation with the torque control mode, etc.
Note 7) Impact resistance: No malfunction occurred when the actuator 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 8) The work load conditions which require “Regeneration option” when operating at the maximum speed (Duty ratio: 100%).
Note 9) The power consumption (including the driver) is for when the actuator is operating.
Note 10) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during the operation.
Note 11) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 12) Only when motor option “With lock” is selected.
Note 13) For an actuator with lock, add the power consumption for the lock.

Weight

Product Weight

[kg]

Series		LEY63DS□□							
Stroke [mm]		100	200	300	400	500	600	700	800
Motor type	Incremental encoder	5.6	6.7	8.4	9.6	10.7	12.4	13.5	14.7
	Absolute encoder	5.7	6.8	8.5	9.7	10.8	12.5	13.6	14.8

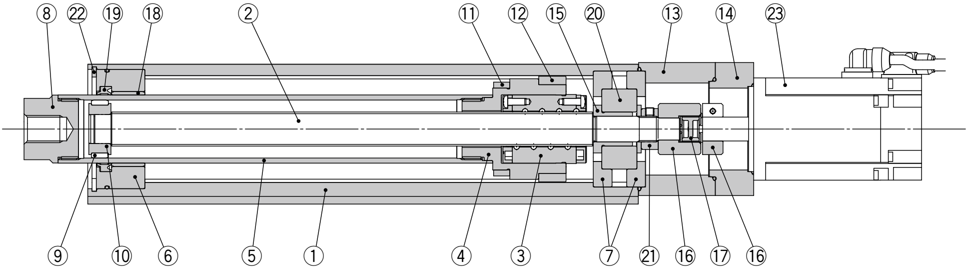
Additional Weight

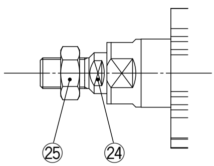
[kg]

Size		63
Lock	Incremental encoder	0.4
	Absolute encoder	0.6
Rod end male thread	Male thread	0.12
	Nut	0.04
Rod flange (including mounting bolt)		0.51

Construction

In-line motor type: LEY63





When rod end male thread selected

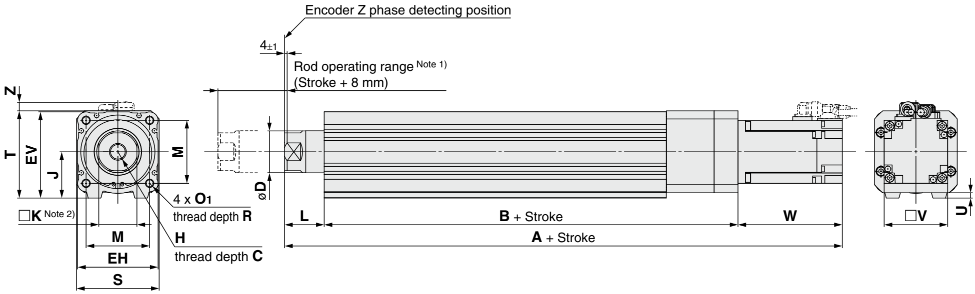
Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw shaft**	Alloy steel	
3	**Ball screw nut**	Resin/Alloy steel	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plated
6	**Rod cover**	Aluminum alloy	
7	**Bearing holder**	Aluminum alloy	
8	**Socket**	Free cutting carbon steel	Nickel plated
9	**Wear ring**	Resin	
10	**Wear ring holder**	Stainless steel	
11	**Magnet**	—	
12	**Rotation stopper**	Resin	
13	**Motor block**	Aluminum alloy	Coating

No.	Description	Material	Note
14	**Motor adapter**	Aluminum alloy	Coating
15	**Spacer A**	Stainless steel	
16	**Hub**	Aluminum alloy	
17	**Spider**	Urethane	
18	**Bushing**	Lead bronze cast	
19	**Seal**	NBR	
20	**Bearing**	—	
21	**Lock nut**	Alloy steel	Hard chrome plated
22	**Retaining ring**	Steel for spring	Phosphate coated
23	**Motor**	—	
24	**Socket (Male thread)**	Free cutting carbon steel	Nickel plated
25	**Nut**	Alloy steel	Trivalent chromated

Dimensions: In-line Motor

LEY63D□



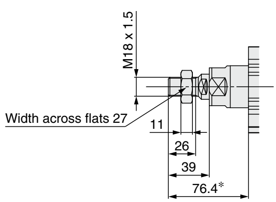
Note 1) Range within which the rod can move. Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) The direction of rod end width across flats (□K) differs depending on the products.

[mm]

Size	Stroke range [mm]	C	D	EH	EV	H	J	K	L	M	O1	R	S	T	U
63	Up to 200	21	40	76	82	M16 x 2	44	36	37.4	60	M8 x 1.25	16	78	83	5
	205 to 500														
	505 to 800														

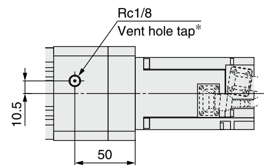
Size	Stroke range [mm]	B	V	Incremental encoder						Absolute encoder					
				Without lock			With lock			Without lock			With lock		
				A	W	Z	A	W	Z	A	W	Z	A	W	Z
63	Up to 200	190.7	60	338.3	110.2	8.1	366.9	138.8	8.1	326.6	98.5	8.1	366.1	138	8.1
	205 to 500	225.7		373.3			401.9			361.6			401.1		
	505 to 800	260.7		408.3			436.9			396.6			436.1		

End male thread: LEY63□□□-□□M



* The measurement 76.4 is when the unit is in the encoder Z phase detecting position. At this position, 4 mm at the end.

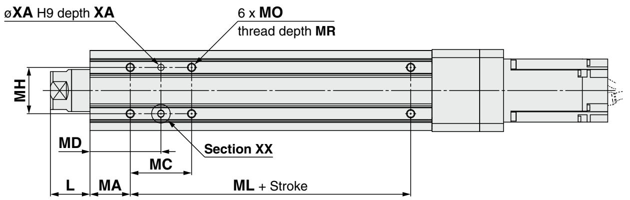
IP65 (Dust/Drip proof specification): LEY63D□□-□P



* When using the dust/drip proof (IP65), correctly mount the fitting and tubing to the vent hole tap, and then place the end of the tubing in an area not exposed to dust or water. The fitting and tubing should be provided separately by the customer.
Select [Applicable tubing O.D.: ø4 or more, Connection thread: Rc1/8].

Dimensions: In-line Motor

Body bottom tapped: LEY63□□□-□□U

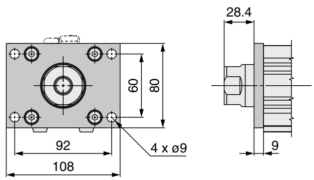


Section XX details

[mm]

Size	Stroke range [mm]	L	MA	MC	MD	MH	ML	MO	MR	XA	XB
63	50 to 74	37.4	38	24	50	44	65	M8 x 1.25	10	6	7
	75 to 124			45	60.5						
	125 to 200			58	67						
	201 to 500			86	81		100				
	501 to 800						135				

Rod flange: LEY63□□□-□□F



Included parts
- Flange
- Body mounting bolt

Material: Carbon steel (Nickel plated)

Electric Actuator/Rod Type

AC Servo Motor

Series LEY-X5

LEY25, 32 Dust/Drip Proof (IP65) Specification

How to Order

LEY 25 □ S2 B – 100 □ □ □ – S 2 A1 □ – X5

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ • Dust/Drip proof specification

❶ Size

25
32

❷ Motor mounting position

Nil	Top mounting
D	In-line

❸ Motor type*

Symbol	Type	Output [W]	Actuator size	Compatible drivers
S2	AC servo motor (Incremental encoder)	100	25	LECSA□-S1
S3	AC servo motor (Incremental encoder)	200	32	LECSA□-S3
S6	AC servo motor (Absolute encoder)	100	25	LECSB□-S5 LECSC□-S5 LECSS□-S5
S7	AC servo motor (Absolute encoder)	200	32	LECSB□-S7 LECSC□-S7 LECSS□-S7

* For motor type S2 and S6, the compatible driver part number suffixes are S1 and S5 respectively.

❹ Lead [mm]

Symbol	LEY25□	LEY32□*
A	12	16 (20)
B	6	8 (10)
C	3	4 (5)

* The values shown in ( ) are the equivalent lead which includes the pulley ratio for size 32 top mounting type.

❺ Stroke [mm]

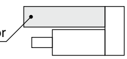
30	30
to	to
500	500

* Refer to the applicable stroke table.

❻ Motor option

Nil	Without option
B	With lock*

* When "With lock" is selected for the top mounting type, the motor body will stick out of the end of the body for size 25 with strokes 30 or less. Check for interference with workpieces before selecting a model.



❼ Rod end thread

Nil	Rod end female thread
M	Rod end male thread (1 rod end nut is included.)

❽ Mounting*1

Symbol	Type	Motor mounting position: Top mounting	Motor mounting position: In-line
Nil	Ends tapped (Standard)*2	●	●
U	Body bottom tapped	●	●
L	Foot	●	—
F	Rod flange*2	●	●
G	Head flange*2	●*3	—

*1 Mounting bracket is shipped together, (but not assembled).

*2 For horizontal cantilever mounting with the rod flange, head flange and ends tapped, use the actuator within the following stroke range.
- LEY25: 200 or less
- LEY32: 100 or less

*3 Head flange is not available for the LEY32.

❾ Cable type*

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

* The motor and encoder cables are included. (The lock cable is also included when the motor with lock option is selected.)

* Standard cable entry direction is
- Top mounting: (A) Axis side
- In-line: (B) Counter axis side

(Refer to page 435 for details.)

❿ Cable length [m]*

Nil	Without cable
2	2
5	5
A	10

* The length of the encoder, motor and lock cables are the same.

⓫ Driver type*

	Compatible drivers	Power supply voltage [V]
Nil	Without driver	—
A1	LECSA1	100 to 120
A2	LECSA2	200 to 230
B1	LECSB1	100 to 120
B2	LECSB2	200 to 230
C1	LECSC1	100 to 120
C2	LECSC2	200 to 230
S1	LECSS1	100 to 120
S2	LECSS2	200 to 230

* When the driver type is selected, the cable is included. Select cable type and cable length.

Example)
S2S2: Standard cable (2 m) + Driver (LECSS2)
S2 : Standard cable (2 m)
Nil : Without cable and driver

⓬ I/O connector

Nil	Without connector
H	With connector

* Applicable stroke table

●Standard

Model \ Stroke	30	50	100	150	200	250	300	350	400	450	500	Manufacturable stroke range [mm]
LEY25	●	●	●	●	●	●	●	●	●	—	—	15 to 400
LEY32	●	●	●	●	●	●	●	●	●	●	●	20 to 500

* Consult with SMC for non-standard strokes as they are produced as special orders.

* For auto switches, refer to page 161.

Specifications

Model				LEY25S$_6^2$/LEY25DS$_6^2$			LEY32S$_7^3$ (Top mounting)			LEY32DS$_7^3$ (In-line)		
Actuator specifications	Stroke [mm] Note 1)			30, 50, 100, 150, 200 250, 300, 350, 400			30, 50, 100, 150, 200, 250 300, 350, 400, 450, 500			30, 50, 100, 150, 200, 250 300, 350, 400, 450, 500		
	Work load [kg]	Horizontal Note 2)		18	50	50	30	60	60	30	60	60
		Vertical		8	16	30	9	19	37	12	24	46
	Pushing force [N] Note 3) (Set value: 15 to 30%)			65 to 131	127 to 255	242 to 485	79 to 157	154 to 308	294 to 588	98 to 197	192 to 385	368 to 736
	Max. speed [mm/s] Note 4)	Stroke range	Up to 300	900	450	225	1200	600	300	1000	500	250
			305 to 400	600	300	150						
			405 to 500	—	—	—	800	400	200	640	320	160
	Pushing speed [mm/s] Note 5)			35 or less			30 or less			30 or less		
	Max. acceleration/deceleration [mm/s²]			5,000			5,000					
	Positioning repeatability [mm]			±0.02			±0.02					
	Lead [mm]			12	6	3	20 Note 6)	10 Note 6)	5 Note 6)	16	8	4
	Impact/Vibration resistance [m/s²] Note 7)			50/20			50/20					
	Actuation type			Ball screw + Belt/Ball screw			Ball screw + Belt			Ball screw		
	Guide type			Sliding bushing (Piston rod)			Sliding bushing (Piston rod)					
	Enclosure			IP65								
	Operating temperature range [°C]			5 to 40			5 to 40					
	Operating humidity range [%RH]			90 or less (No condensation)			90 or less (No condensation)					
	Required conditions for Note 8) "Regeneration option" [kg]	Horizontal		8 or more	31 or more	Not required	15 or more	Not required	Not required	23 or more	Not required	Not required
		Vertical		3 or more	2 or more	2 or more	6 or more	7 or more	11 or more	6 or more	7 or more	12 or more
Electric specifications	Motor output/Size			100 W/□40			200 W/□60					
	Motor type			AC servo motor (100/200 VAC)			AC servo motor (100/200 VAC)					
	Encoder			Motor type S2, S3: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S6, S7: Absolute/incremental dual 18-bit encoder (Resolution: 262144 p/rev)								
	Power consumption [W] Note 9)	Horizontal		45			65			65		
		Vertical		145			175			175		
	Standby power consumption when operating [W] Note 10)	Horizontal		2			2			2		
		Vertical		8			8			8		
	Max. instantaneous power consumption [W] Note 11)			445			724			724		
Lock unit specifications	Type Note 12)			Non-magnetizing lock								
	Holding force [N]			131	255	485	157	308	588	197	385	736
	Power consumption [W] at 20°C Note 13)			6.3			7.9			7.9		
	Rated voltage [V]			24 VDC $^{0}_{-10\%}$								

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) The maximum value of the horizontal work load. An external guide is necessary to support the load. The actual work load changes according to the condition of the external guide. Please confirm using actual device.
Note 3) The force setting range (set values for the driver) for the pushing operation with the torque control mode, etc. Set it with reference to "Force Conversion Graph" on page 188.
Note 4) The allowable speed changes according to the stroke.
Note 5) The allowable collision speed for the pushing operation with the torque control mode, etc.
Note 6) Equivalent lead which includes the pulley ratio [1.25:1]
Note 7) Impact resistance: No malfunction occurred when the actuator 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 8) The work load conditions which require "Regeneration option" when operating at the maximum speed (Duty ratio: 100%). Order the regeneration option separately. For details and order numbers, refer to "Required Conditions for Regeneration Option" on pages 186 and 187.
Note 9) The power consumption (including the driver) is for when the actuator is operating.
Note 10) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during the operation.
Note 11) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 12) Only when motor option "With lock" is selected.
Note 13) For an actuator with lock, add the power consumption for the lock.

Weight

Product Weight

[kg]

Series		LEY25S□ (Motor mounting position: Top mounting)									LEY32S□ (Motor mounting position: Top mounting)										
Stroke [mm]		30	50	100	150	200	250	300	350	400	30	50	100	150	200	250	300	350	400	450	500
Motor type	Incremental encoder	1.31	1.38	1.55	1.81	1.99	2.16	2.34	2.51	2.69	2.42	2.53	2.82	3.29	3.57	3.85	4.14	4.42	4.70	4.98	5.26
	Absolute encoder	1.37	1.44	1.61	1.87	2.05	2.22	2.40	2.57	2.75	2.36	2.47	2.76	3.23	3.51	3.79	4.08	4.36	4.64	4.92	5.20

Series		LEY25DS□ (Motor mounting position: In-line)									LEY32DS□ (Motor mounting position: In-line)										
Stroke [mm]		30	50	100	150	200	250	300	350	400	30	50	100	150	200	250	300	350	400	450	500
Motor type	Incremental encoder	1.34	1.41	1.58	1.84	2.02	2.19	2.37	2.54	2.72	2.44	2.55	2.84	3.31	3.59	3.87	4.16	4.44	4.72	5.00	5.28
	Absolute encoder	1.40	1.47	1.64	1.90	2.08	2.25	2.43	2.60	2.78	2.38	2.49	2.78	3.25	3.53	3.81	4.10	4.38	4.66	4.94	5.22

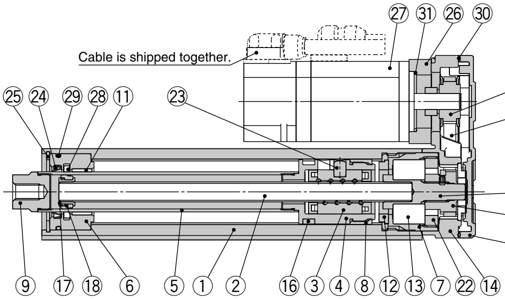
Additional Weight

[kg]

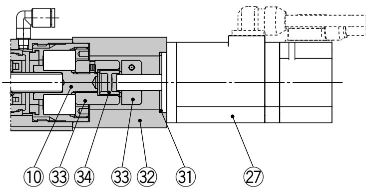
Size		25	32
Lock	Incremental encoder	0.20	0.40
	Absolute encoder	0.30	0.66
Rod end male thread	Male thread	0.03	0.03
	Nut	0.02	0.02
Foot (2 sets including mounting bolt)		0.08	0.14
Rod flange (including mounting bolt)		0.17	0.20
Head flange (including mounting bolt)			

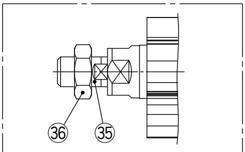
Construction

Motor top mounting type: LEY$_{32}^{25}$



In-line motor type: LEY$_{32}^{25}$D





When rod end male thread selected

Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw (shaft)**	Alloy steel	
3	**Ball screw nut**	Resin/Alloy steel	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plated
6	**Rod cover**	Aluminum alloy	
7	**Housing**	Aluminum alloy	
8	**Rotation stopper**	POM	
9	**Socket**	Free cutting carbon steel	Nickel plated
10	**Connected shaft**	Free cutting carbon steel	Nickel plated
11	**Bushing**	Lead bronze cast	
12	**Bumper**	Urethane	
13	**Bearing**	—	
14	**Return box**	Aluminum die-cast	Coating
15	**Return plate**	Aluminum die-cast	Coating
16	**Magnet**	—	
17	**Wear ring holder**	Stainless steel	Stroke 101 mm or more
18	**Wear ring**	POM	Stroke 101 mm or more

No.	Description	Material	Note
19	**Screw shaft pulley**	Aluminum alloy	
20	**Motor pulley**	Aluminum alloy	
21	**Belt**	—	
22	**Bearing stopper**	Aluminum alloy	
23	**Parallel pin**	Stainless steel	
24	**Scraper**	Nylon	
25	**Retaining ring**	Steel for spring	Nickel plated
26	**Motor adapter**	Aluminum alloy	Coating
27	**Motor**	—	
28	**Lube-retainer**	Felt	
29	**O-ring**	NBR	
30	**Gasket**	NBR	
31	**O-ring**	NBR	
32	**Motor block**	Aluminum alloy	Coating
33	**Hub**	Aluminum alloy	
34	**Spider**	Urethane	
35	**Socket (Male thread)**	Free cutting carbon steel	Nickel plated
36	**Nut**	Alloy steel	Zinc chromated

Replacement Parts (Top mounting only)/Belt

No.	Size	Order no.
21	**25**	LE-D-2-2
	32	LE-D-2-4

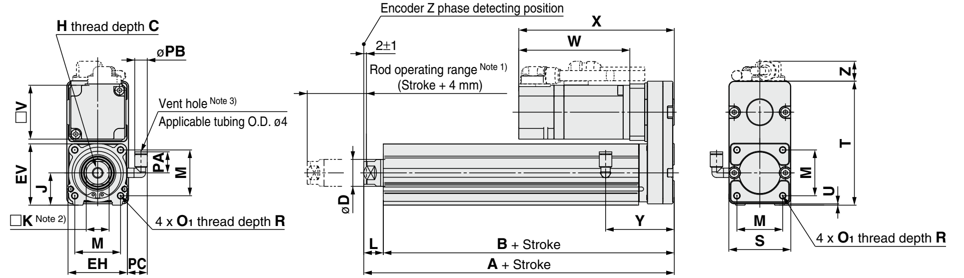
Replacement Parts/Grease Pack

Applied portion	Order no.
Piston rod	GR-S-010 (10 g) GR-S-020 (20 g)

∗ Apply grease on the piston rod periodically.
Grease should be applied at 1 million cycles or 200 km, whichever comes sooner.

Dimensions

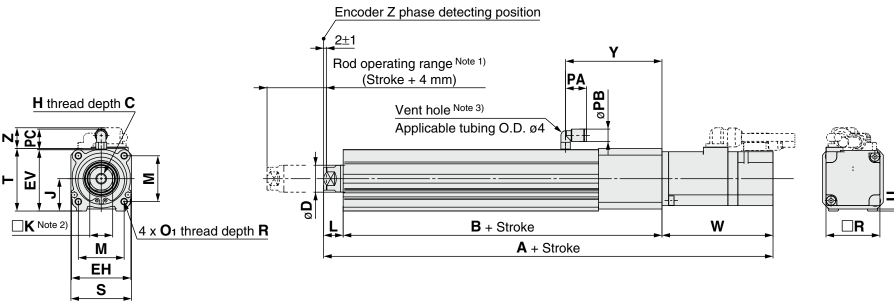
Motor top mounting type: LEY$^{25}_{32}$



Size	Stroke range (mm)	A	B	C	D	EH	EV	H	J	K	L	M	O_1	R	PA	PB	V
25	15 to 100	130.5	116	13	20	44	45.5	M8 x 1.25	24	17	14.5	34	M5 x 0.8	8	15.6	9.3	40
	101 to 400	155.5	141														
32	20 to 100	148.5	130	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1.0	10	15.6	9.3	60
	101 to 500	178.5	160														

Size	Stroke range (mm)	S	T	U	PC	Incremental encoder						Absolute encoder						Y
						Without lock			With lock			Without lock			With lock			
						W	X	Z	W	X	Z	W	X	Z	W	X	Z	
25	15 to 100 101 to 400	46	92	1	14.8	87	120	14.1	123.9	156.9	15.8	82.4	115.4	14.1	123.5	156.5	15.8	51
32	20 to 100 101 to 500	60	118	1	15.3	88.2	128.2	17.1	116.8	156.8	17.1	76.6	116.6	17.1	116.1	156.1	17.1	61

In-line motor type: LEY$^{25}_{32}$D



Size	Stroke range (mm)	Incremental encoder						Absolute encoder						B	C	D	EH	EV
		Without lock			With lock			Without lock			With lock							
		A	W	Z	A	W	Z	A	W	Z	A	W	Z					
25	15 to 100	238	87	14.6	274.9	123.9	16.3	233.4	82.4	14.6	274.5	123.5	16.3	136.5	13	20	44	45.5
	101 to 400	263			299.9			258.4			299.5			161.5				
32	20 to 100	262.7	88.2	17.1	291.3	116.8	17.1	251.1	76.6	17.1	290.6	116.1	17.1	156	13	25	51	56.5
	101 to 500	292.7			321.3			281.1			320.6			186				

Size	Stroke range (mm)	H	J	K	L	M	O_1	R	PA	PB	V	S	T	U	PC	Y
25	15 to 100 101 to 400	M8 x 1.25	24	17	14.5	34	M5 x 0.8	8	15.6	9.3	40	45	46.5	1.5	15.3	71.5
32	20 to 100 101 to 500	M8 x 1.25	31	22	18.5	40	M6 x 1.0	10	15.6	9.3	60	60	61	1	15.3	87

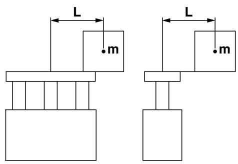
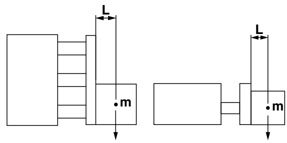
Note 1) Range within which the rod can move. Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) The direction of rod end width across flats (□K) differs depending on the products.
Note 3) The vent hole is the port for releasing to atmosphere. Do not apply pressure to this hole.
Attach tubing to the vent hole and place the end of the tubing so it is not exposed to dust or water.

For the rod end male thread, refer to page 195.
For the mounting bracket dimensions, refer to page 152.

Electric Actuator/Guide Rod Type AC Servo Motor
Series LEYG
Model Selection

Moment Load Graph

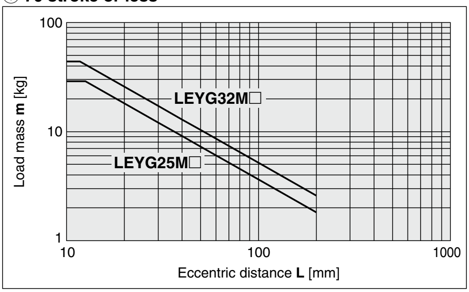
Selection conditions

	Vertical	Horizontal	
Mounting position			
Max. speed [mm/s]	"Speed–Vertical Work Load Graph"	200 or less	Over 200
Graph (Sliding bearing type)	①, ②	⑤, ⑥*	⑦, ⑧
Graph (Ball bushing bearing type)	③, ④	⑨, ⑩	⑪, ⑫

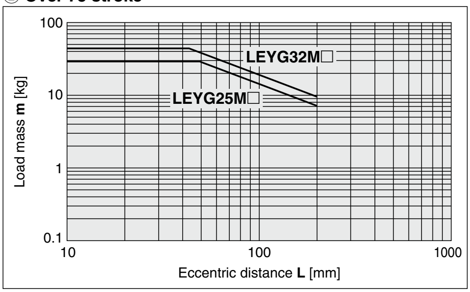
∗ For the sliding bearing type, the speed is restricted with a horizontal/moment load.

Vertical Mounting, Sliding Bearing

① **70 stroke or less**



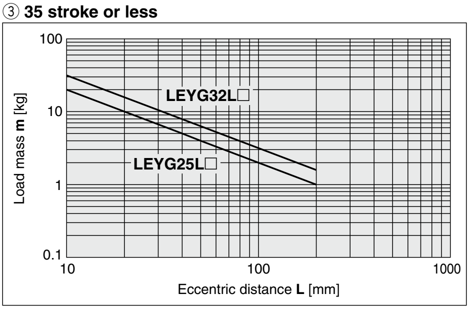
② **Over 75 stroke**



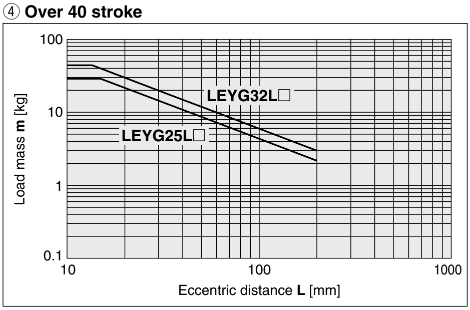
∗ The limit of vertical load mass varies depending on "lead" and "speed".
Check "Speed–Vertical Work Load Graph" on page 210.

Vertical Mounting, Ball Bushing Bearing

③ **35 stroke or less**



④ **Over 40 stroke**

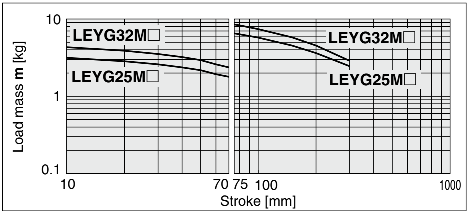


∗ The limit of vertical load mass varies depending on "lead" and "speed".
Check "Speed–Vertical Work Load Graph" on page 210.

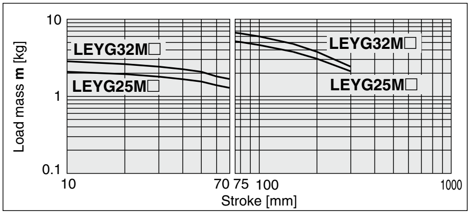
Moment Load Graph

Horizontal Mounting, Sliding Bearing

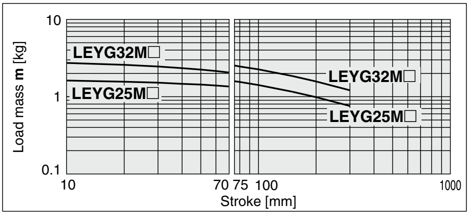
⑤ **L = 50 mm Max. speed = 200 mm/s or less**



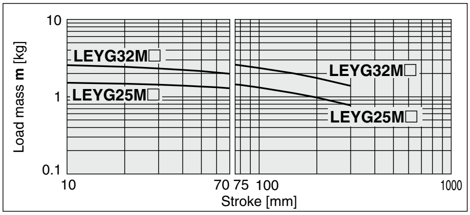
⑥ **L = 100 mm Max. speed = 200 mm/s or less**



⑦ **L = 50 mm Max. speed = Over 200 mm/s**

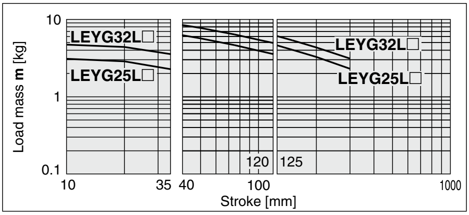


⑧ **L = 100 mm Max. speed = Over 200 mm/s**

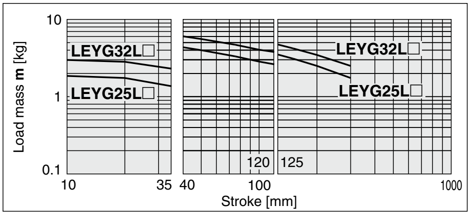


Horizontal Mounting, Ball Bushing Bearing

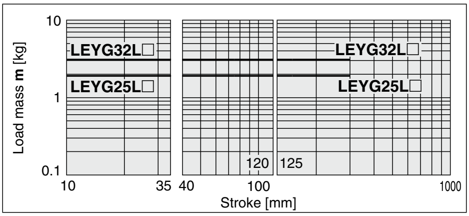
⑨ **L = 50 mm Max. speed = 200 mm/s or less**



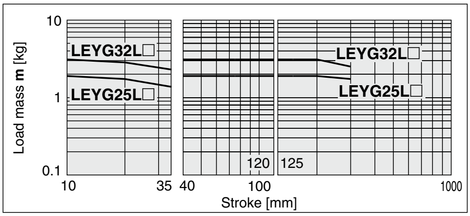
⑩ **L = 100 mm Max. speed = 200 mm/s or less**



⑪ **L = 50 mm Max. speed = Over 200 mm/s**

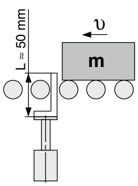


⑫ **L = 100 mm Max. speed = Over 200 mm/s**



Operating Range when Used as Stopper

LEYG□M (Sliding bearing)



⚠Caution

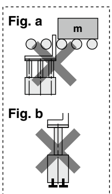
Handling Precautions

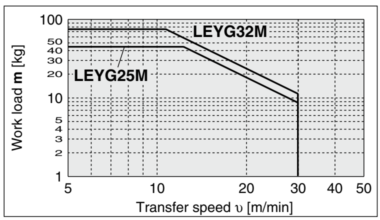
Note 1) When used as a stopper, select a model with 30 stroke or less.

Note 2) LEYG□L (ball bushing bearing) cannot be used as a stopper.

Note 3) Workpiece collision in series with guide rod cannot be permitted (**Fig. a**).

Note 4) The body should not be mounted on the end. It must be mounted on the top or bottom (**Fig. b**).

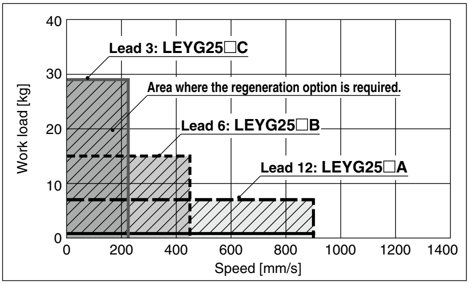




LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Speed–Vertical Work Load Graph/Required Conditions for “Regeneration Option”

LEYG25□ (Motor mounting position: Top mounting/In-line)



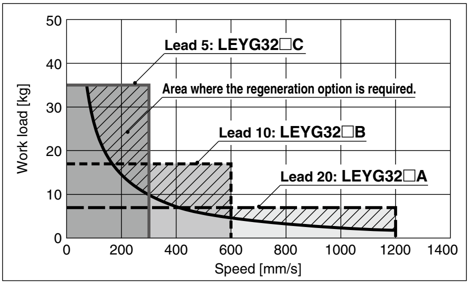
Required conditions for “Regeneration option”

∗ Regeneration option required when using product above “Regeneration” line in graph. (Order separately)

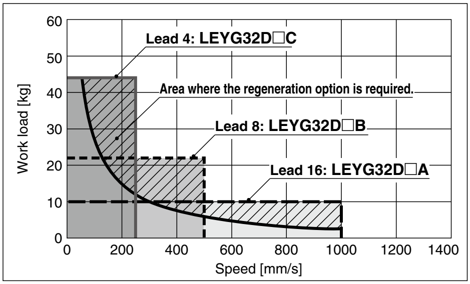
“Regeneration Option” Models

Size	Model
LEYG25□	LEC-MR-RB-032
LEYG32□	LEC-MR-RB-032

LEYG32□ (Motor mounting position: Top mounting)

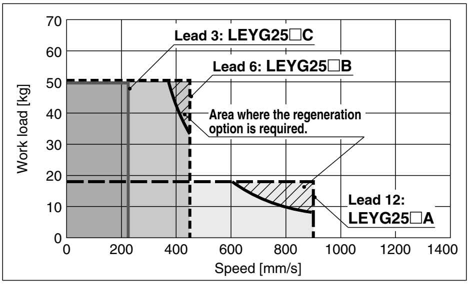


LEYG32D (Motor mounting position: In-line)



Speed–Horizontal Work Load Graph/Required Conditions for “Regeneration Option”

LEYG25□ (Motor mounting position: Top mounting/In-line)



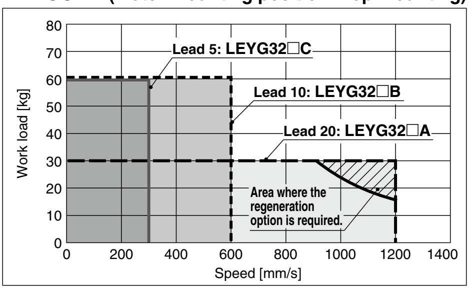
Required conditions for “Regeneration option”

∗ Regeneration option required when using product above “Regeneration” line in graph. (Order separately)

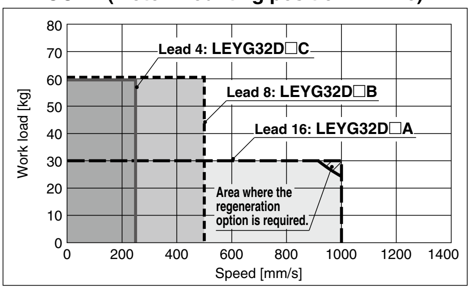
“Regeneration Option” Models

Size	Model
LEYG25□	LEC-MR-RB-032
LEYG32□	LEC-MR-RB-032

LEYG32□ (Motor mounting position: Top mounting)

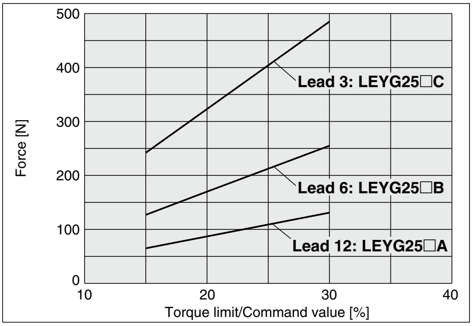


LEYG32D (Motor mounting position: In-line)

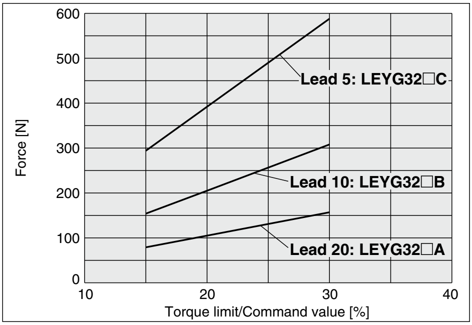


Force Conversion Graph

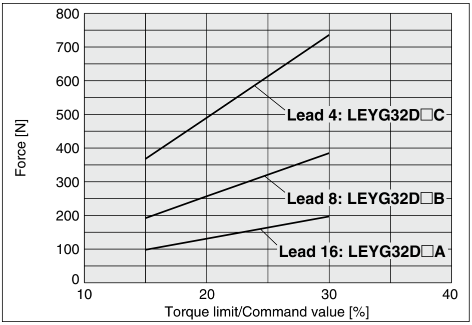
LEYG25□ (Motor mounting position: Top mounting/In-line)



LEYG32□ (Motor mounting position: Top mounting)



LEYG32D (Motor mounting position: In-line)



∗1 When limiting torque with incremental encoder, parameter No. PC12/the value of the internal torque command should be set 30% or less.
∗2 When limiting torque with absolute encoder, parameter No. PC13/the value of the maximum output command for analog torque should be set 30% or less.

Electric Actuator/Guide Rod Type

AC Servo Motor

Series LEYG

LEYG25, 32

CE

RoHS

How to Order

LEYG 25 M □ S2 B – 100 □ □ – S 2 A1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬

❶ Size

25
32

❷ Bearing type

M	Sliding bearing
L	Ball bushing bearing

❸ Motor mounting position

Nil	Top mounting
D	In-line

❹ Motor type*1

Symbol	Type	Output [W]	Actuator size	Compatible drivers*2
S2	AC servo motor (Incremental encoder)	100	25	LECSA□-S1
S3	AC servo motor (Incremental encoder)	200	32	LECSA□-S3
S6	AC servo motor (Absolute encoder)	100	25	LECSB□-S5 LECSC□-S5 LECSS□-S5
S7	AC servo motor (Absolute encoder)	200	32	LECSB□-S7 LECSC□-S7 LECSS□-S7

*1: For motor type S2 and S6, the compatible driver part number suffixes are S1 and S5 respectively.

*2: For details about the driver, refer to page 419.

❺ Lead [mm]

Symbol	LEYG25	LEYG32*
A	12	16 (20)
B	6	8 (10)
C	3	4 (5)

* The values shown in ( ) are the lead for size 32 top mounting types. (Equivalent lead which includes the pulley ratio [1.25:1])

❻ Stroke [mm]

30	30
to	to
300	300

* Refer to the table below for details.

❼ Motor option

Nil	Without option
B	With lock

❽ Guide option

Nil	Without option
F	With grease retaining function

* Only available for size 25 and 32 sliding bearings. (Refer to "Construction" on page 215.)

❾ Cable type*

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

* The motor and encoder cables are included. (The lock cable is also included when the motor with lock option is selected.)

* Standard cable entry direction is
- Top mounting: (A) Axis side
- In-line: (B) Counter axis side

(Refer to page 435 for details.)

❿ Cable length* [m]

Nil	Without cable
2	2
5	5
A	10

* The length of the encoder, motor and lock cables are the same.

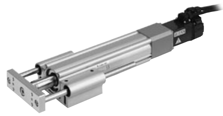
* Applicable stroke table ●Standard

Model \ Stroke (mm)	30	50	100	150	200	250	300	Manufacturable stroke range
LEYG25	●	●	●	●	●	●	●	15 to 300
LEYG32	●	●	●	●	●	●	●	20 to 300

Note) Consult with SMC for non-standard strokes as they are produced as special orders.

For auto switches, refer to pages 154 and 155.

Motor mounting position: Top mounting



Motor mounting position: In-line

⑪ Driver type*

	Compatible drivers	Power supply voltage (V)
Nil	Without driver	—
A1	LECSA1-S□	100 to 120
A2	LECSA2-S□	200 to 230
B1	LECSB1-S□	100 to 120
B2	LECSB2-S□	200 to 230
C1	LECSC1-S□	100 to 120
C2	LECSC2-S□	200 to 230
S1	LECSS1-S□	100 to 120
S2	LECSS2-S□	200 to 230

* When the driver type is selected, the cable is included.
Select cable type and cable length.
Example)
S2S2: Standard cable (2 m) + Driver (LECSS2)
S2 : Standard cable (2 m)
Nil : Without cable and driver

⑫ I/O connector

Nil	Without connector
H	With connector

Use of auto switches for the guide rod type LEYG series
· Insert the auto switch from the front side with rod (plate) sticking out.
· For the parts hidden behind the guide attachment (Rod stick out side), the auto switch cannot be fixed.
· Consult with SMC when using auto switch on the rod stick out side.

Compatible Drivers

Driver type	Pulse input type /Positioning type 	Pulse input type 	CC-Link direct input type 	SSCNET Ⅲ type 
Series	**LECSA**	**LECSB**	**LECSC**	**LECSS**
Number of point tables	Up to 7	—	Up to 255 (2 stations occupied)	—
Pulse input	○	○	—	—
Applicable network	—	—	CC-Link	SSCNET Ⅲ type
Control encoder	Incremental 17-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder	Absolute 18-bit encoder
Communication function	USB communication	USB communication, RS422 communication	USB communication, RS422 communication	USB communication
Power supply voltage (V)	100 to 120 VAC (50/60 Hz) 200 to 230 VAC (50/60 Hz)			
Reference page	Page 419			

Specifications

	Model		LEYG25□S$^{2}_{6}$ (Top mounting) LEYG25□DS$^{2}_{6}$ (In-line)			LEYG32□S$^{3}_{7}$ (Top mounting)			LEYG32□DS$^{3}_{7}$ (In-line)		
Actuator specifications	Stroke [mm] Note 1)		30, 50, 100, 150, 200, 250, 300			30, 50, 100, 200, 250, 300			30, 50, 100, 200, 250, 300		
	Work load [kg]	Horizontal Note 2)	18	50	50	30	60	60	30	60	60
		Vertical	7	15	29	7	17	35	10	22	44
	Pushing force [N] Note 3) (Set value: 15 to 30%)		65 to 131	127 to 255	242 to 485	79 to 157	154 to 308	294 to 588	98 to 197	192 to 385	368 to 736
	Max. speed [mm/s]		900	450	225	1200	600	300	1000	500	250
	Pushing speed [mm/s²] Note 4)		35 or less			30 or less			30 or less		
	Max. acceleration/deceleration [mm/s²]		5,000			5,000					
	Positioning repeatability [mm]		±0.02			±0.02					
	Lead [mm] (including pulley ratio)		12	6	3	20	10	5	16	8	4
	Impact/Vibration resistance [m/s²] Note 5)		50/20			50/20					
	Actuation type		Ball screw + Belt [1:1]/Ball screw			Ball screw + Belt [1:1.25]			Ball screw		
	Guide type		Sliding bearing (LEYG□M), Ball bushing bearing (LEYG□L)								
	Operating temperature range [°C]		5 to 40			5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)			90 or less (No condensation)					
	Required conditions for Note 6) "Regeneration option" [kg]	Horizontal	8 or more	31 or more	Not required	15 or more	Not required	Not required	23 or more	Not required	Not required
		Vertical	2 or more	1 or more	1 or more	4 or more	5 or more	9 or more	4 or more	5 or more	9 or more
Electric specifications	Motor output/Size		100 W/□40			200 W/□60					
	Motor type		AC servo motor (100/200 VAC)			AC servo motor (100/200 VAC)					
	Encoder		Motor type S2, S3: Incremental 17-bit encoder (Resolution: 131072 p/rev) Motor type S6, S7: Absolute 18-bit encoder (Resolution: 262144 p/rev)								
	Power consumption [W] Note 7)	Horizontal	45			65			65		
		Vertical	145			175			175		
	Standby power consumption when operating [W] Note 8)	Horizontal	2			2			2		
		Vertical	8			8			8		
	Max. instantaneous power consumption [W] Note 9)		445			724			724		
Lock unit specifications	Type Note 10)		Non-magnetizing lock			Non-magnetizing lock					
	Holding force [N]		131	255	485	157	308	588	197	385	736
	Power consumption at 20°C [W] Note 11)		6.3			7.9			7.9		
	Rated voltage [V]		24 VDC $^{0}_{-10\%}$								

Note 1) Consult with SMC for non-standard strokes as they are produced as special orders.
Note 2) The maximum value of the horizontal work load. An external guide is necessary to support the load. The actual work load changes according to the condition of the external guide. Please confirm using actual device.
Note 3) The force setting range (set values for the driver) for the pushing operation with the torque control mode, etc. Set it with reference to "Force Conversion Graph" on page 211.
Note 4) The allowable collision speed for the pushing operation with the torque control mode, etc.
Note 5) Impact resistance: No malfunction occurred when the actuator 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 6) The work load conditions which require "Regeneration option" when operating at the maximum speed (Duty ratio: 100%). Order the regeneration option separately. For details and order numbers, refer to "Required Conditions for Regeneration Option" on page 210.
Note 7) The power consumption (including the driver) is for when the actuator is operating.
Note 8) The standby power consumption when operating (including the driver) is for when the actuator is stopped in the set position during operation.
Note 9) The maximum instantaneous power consumption (including the driver) is for when the actuator is operating.
Note 10) Only when motor option "With lock" is selected.
Note 11) For an actuator with lock, add the power consumption for the lock.

Weight

Weight: Top Mounting Type

[kg]

	Series	LEYG25M							LEYG32M						
	Stroke [mm]	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Motor type	Incremental encoder	1.80	1.99	2.31	2.73	3.07	3.41	3.67	3.24	3.50	4.05	4.80	5.35	5.83	6.28
	Absolute encoder	1.86	2.05	2.37	2.79	3.13	3.47	3.73	3.18	3.44	3.99	4.74	5.29	5.77	6.22

	Series	LEYG25L							LEYG32L						
	Stroke [mm]	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Motor type	Incremental encoder	1.81	2.02	2.26	2.69	2.95	3.27	3.51	3.24	3.51	3.9	4.64	5.06	5.56	5.96
	Absolute encoder	1.87	2.08	2.32	2.75	3.01	3.33	3.57	3.18	3.45	3.84	4.58	5.00	5.50	5.90

Weight: In-line Motor Type

[kg]

	Series	LEYG25MD							LEYG32MD						
	Stroke [mm]	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Motor type	Incremental encoder	1.83	2.02	2.34	2.76	3.10	3.44	3.70	3.26	3.52	4.07	4.82	5.37	5.85	6.30
	Absolute encoder	1.89	2.08	2.40	2.82	3.16	3.50	3.76	3.20	3.46	4.01	4.76	5.31	5.79	6.24

	Series	LEYG25LD							LEYG32LD						
	Stroke [mm]	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Motor type	Incremental encoder	1.84	2.05	2.29	2.72	2.98	3.30	3.54	3.26	3.53	3.92	4.66	5.08	5.58	5.98
	Absolute encoder	1.90	2.11	2.35	2.78	3.04	3.36	3.60	3.20	3.47	3.86	4.60	5.02	5.52	5.92

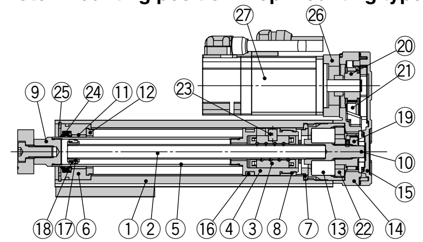
Additional Weight

[kg]

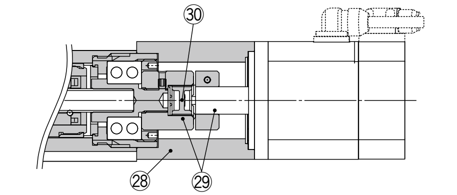
Size		25	32
Lock	Incremental encoder	0.20	0.40
	Absolute encoder	0.30	0.66

Construction

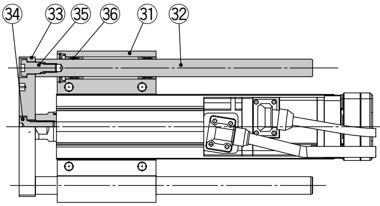
Motor mounting position: Top mounting type



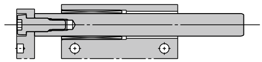
Motor mounting position: In-line type



LEYG□M



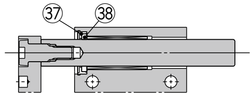
LEYG25/32M: 50st or less



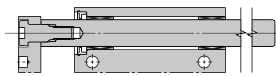
LEYG25/32M: Over 50st

When grease retaining function selected

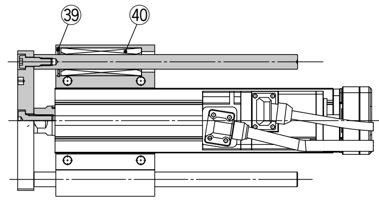
LEYG25/32M: 50st or less



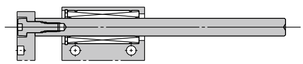
LEYG25/32M: Over 50st



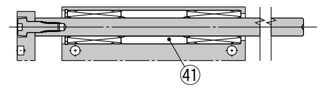
LEYG□L



LEYG25/32L: 100st or less



LEYG25/32L: Over 100st



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw shaft**	Alloy steel	
3	**Ball screw nut**	—	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plated
6	**Rod cover**	Aluminum alloy	
7	**Housing**	Aluminum alloy	
8	**Rotation stopper**	POM	
9	**Socket**	Free cutting carbon steel	Nickel plated
10	**Connected shaft**	Free cutting carbon steel	Nickel plated
11	**Bushing**	Lead bronze cast	
12	**Bumper**	Urethane	
13	**Bearing**	—	
14	**Return box**	Aluminum die-cast	Trivalent chromated
15	**Return plate**	Aluminum die-cast	Trivalent chromated
16	**Magnet**	—	
17	**Wear ring holder**	Stainless steel	Stroke 101 mm or more
18	**Wear ring**	POM	Stroke 101 mm or more
19	**Screw shaft pulley**	Aluminum alloy	
20	**Motor pulley**	Aluminum alloy	
21	**Belt**	—	

No.	Description	Material	Note
22	**Bearing stopper**	Aluminum alloy	
23	**Parallel pin**	Stainless steel	
24	**Seal**	NBR	
25	**Retaining ring**	Steel for spring	Phosphate coated
26	**Motor adapter**	Aluminum alloy	Anodized
27	**Motor**	—	
28	**Motor block**	Aluminum alloy	Anodized
29	**Hub**	Aluminum alloy	
30	**Spider**	Urethane	Spider
31	**Guide attachment**	Aluminum alloy	Anodized
32	**Guide rod**	Carbon steel	
33	**Plate**	Aluminum alloy	Anodized
34	**Plate mounting bolt**	Carbon steel	Nickel plated
35	**Guide bolt**	Carbon steel	Nickel plated
36	**Sliding bearing**	—	
37	**Felt**	Felt	
38	**Holder**	Resin	
39	**Retaining ring**	Steel for spring	Phosphate coated
40	**Ball bushing**	—	
41	**Spacer**	Aluminum alloy	Chromated

Support Block

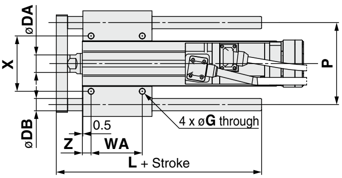
Size	Order no.
25	LEYG-S025
32	LEYG-S032

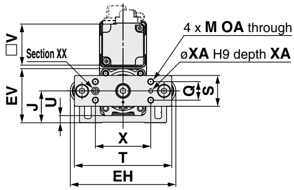
∗ Two body mounting bolts are included with the support block.

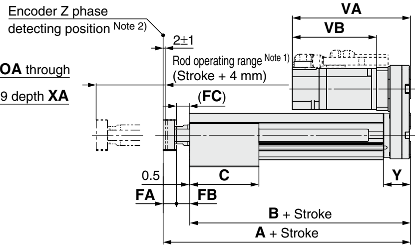
Replacement Parts /Belt

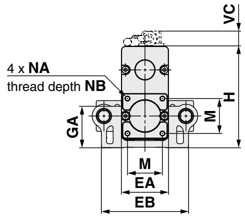
Size	Order no.
25	LE-D-2-2
32	LE-D-2-4

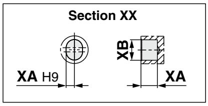
Dimensions: Top Mounting



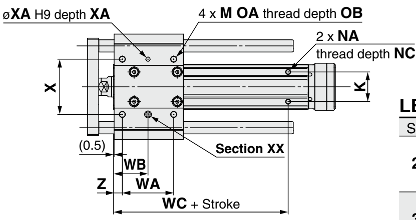








Note 1) Range within which the rod can move. Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) The Z phase first detecting position from the stroke end of the motor side.



LEYG□L (Ball bushing bearing) [mm]

Size	Stroke range (mm)	L	DB
25	Up to 114	91	10
	115 to 190	115	
	191 to 300	133	
32	Up to 114	97.5	13
	115 to 190	116.5	
	191 to 300	134	

LEYG□M (Sliding bearing) [mm]

Size	Stroke range (mm)	L	DB
25	Up to 59	67.5	12
	60 to 185	100.5	
	186 to 300	138	
32	Up to 59	74	16
	60 to 185	107	
	186 to 300	144	

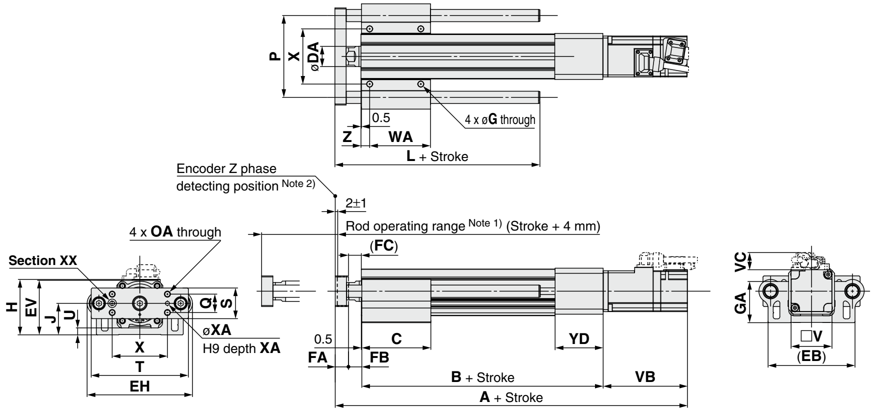
LEYG□M, LEYG□L Common [mm]

Size	Stroke range (mm)	A	B	C	DA	EA	EB	EH	EV	FA	FB	FC	G	GA	H	J	K	M	NA	NB	NC
25	Up to 39	141.5	116	50	20	46	85	103	52.5	11	14.5	12.5	5.4	40.3	99	30.8	29	34	M5 x 0.8	8	6.5
	40 to 100			67.5																	
	101 to 124	166.5	141																		
	125 to 200			84.5																	
	201 to 300			102																	
32	Up to 39	160.5	130	55	25	60	101	123	64	12	18.5	16.5	5.4	50.3	126	38.3	30	40	M6 x 1.0	10	8.5
	40 to 100			68																	
	101 to 124	190.5	160																		
	125 to 200			85																	
	201 to 300			102																	

Size	Stroke range (mm)	OA	OB	P	Q	S	T	U	V	WA	WB	WC	X	XA	XB	Y	Z
25	Up to 39	M6 x 1.0	12	80	18	30	95	6.8	40	35	26	70	54	4	5	26.5	8.5
	40 to 100									50	33.5						
	101 to 124											95					
	125 to 200									70	43.5						
	201 to 300									85	51						
32	Up to 39	M6 x 1.0	12	95	28	40	117	7.3	60	40	28.5	75	64	5	6	34	8.5
	40 to 100									50	33.5						
	101 to 124											105					
	125 to 200									70	43.5						
	201 to 300									85	51						

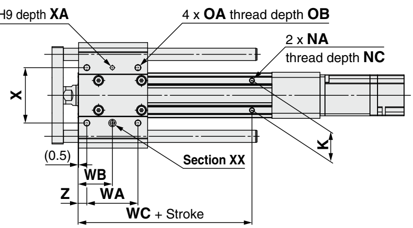
Size	Incremental encoder						Absolute encoder					
	Without lock			With lock			Without lock			With lock		
	VA	VB	VC	VA	VB	VC	VA	VB	VC	VA	VB	VC
25	120	87	14.1	156.9	123.9	15.8	115.4	82.4	14.1	156.5	123.5	15.8
32	128.2	88.2	17.1	156.8	116.8	17.1	116.6	76.6	17.1	156.1	116.1	17.1

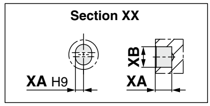
Dimensions: In-line Motor



Note 1) Range within which the rod can move. Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.

Note 2) The Z phase first detecting position from the stroke end of the motor side.





LEYG□L (Ball bushing bearing) [mm]

Size	Stroke range (mm)	L	DB
25	Up to 114	91	10
	115 to 190	115	
	191 to 300	133	
32	Up to 114	97.5	13
	115 to 190	116.5	
	191 to 300	134	

LEYG□M (Sliding bearing) [mm]

Size	Stroke range (mm)	L	DB
25	Up to 59	67.5	12
	60 to 185	100.5	
	186 to 300	138	
32	Up to 59	74	16
	60 to 185	107	
	186 to 300	144	

LEYG□M, LEYG□L Common [mm]

Size	Stroke range (mm)	B	C	DA	EB	EH	EV	FA	FB	FC	G	GA	H	J	K	NA	NC
25	Up to 39	115.5	50	20	85	103	52.5	11	14.5	12.5	5.4	40.3	53.5	30.8	29	M5 x 0.8	6.5
	40 to 100		67.5														
	101 to 124	140.5															
	125 to 200		84.5														
	201 to 300		102														
32	Up to 39	128	55	25	101	123	64	12	18.5	16.5	5.4	50.3	68.5	38.3	30	M6 x 1.0	8.5
	40 to 100		68														
	101 to 124	158															
	125 to 200		85														
	201 to 300		102														

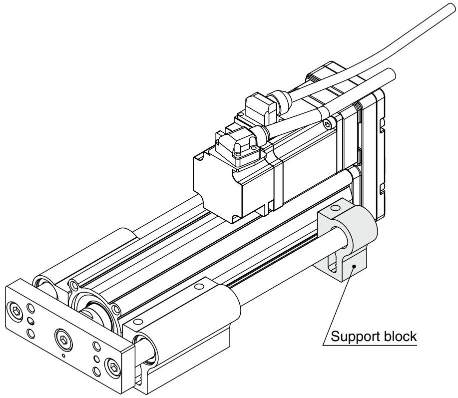
Size	Stroke range (mm)	OA	OB	P	Q	S	T	U	V	WA	WB	WC	X	XA	XB	YD	Z
25	Up to 39	M6 x 1.0	12	80	18	30	95	6.8	40	35	26	70	54	4	5	47	8.5
	40 to 100									50	33.5						
	101 to 124											95					
	125 to 200									70	43.5						
	201 to 300									85	51						
32	Up to 39	M6 x 1.0	12	95	28	40	117	7.3	60	40	28.5	75	64	5	6	60	8.5
	40 to 100									50	33.5						
	101 to 124											105					
	125 to 200									70	43.5						
	201 to 300									85	51						

Size	Stroke range (mm)	Incremental encoder						Absolute encoder					
		Without lock			With lock			Without lock			With lock		
		A	VB	VC	A	VB	VC	A	VB	VC	A	VB	VC
25	15 to 100	249	87	14.6	285.9	123.9	16.3	244.4	82.4	14.6	285.5	123.5	16.3
	105 to 300	274			310.9			269.4			315.5		
32	15 to 100	274.7	88.2	17.1	303.3	116.8	17.1	263.1	76.6	17.1	302.6	116.1	17.1
	105 to 300	304.7			333.3			293.1			332.6		

Support Block

●Guide for support block application

When the stroke exceeds 100 mm and the lateral load is applied, the body will be bent based on the load. Mounting the support block is recommended. (Please order it separately from the models shown below.)

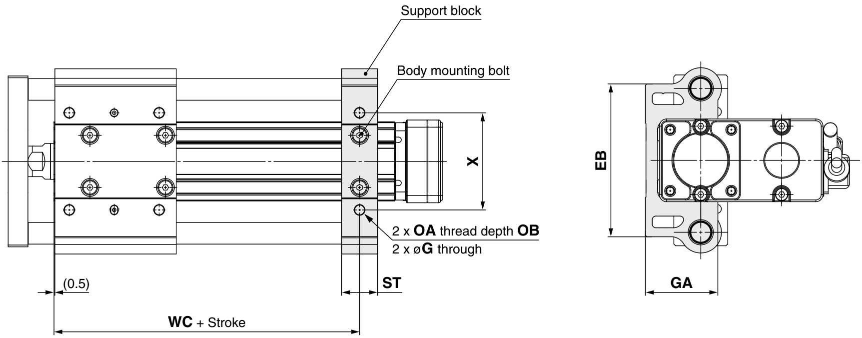


Support Block Model

LEYG–S 025

●Size

025	For size 25
032	For size 32



⚠Caution

Do not install the body using only a support block.
The support block should be used only for support.

[mm]

Size	Model	Stroke range	EB	G	GA	OA	OB	ST	WC	X
25	**LEYG-S025**	100st or less	85	5.4	40.3	M6 x 1.0	12	20	70	54
		101st or more, 300st or less							95	
32	**LEYG-S032**	100st or less	101	5.4	50.3	M6 x 1.0	12	22	75	64
		101st or more, 300st or less							105	

∗ Two body mounting bolts are included with the support block.

Series LEY/LEYG Electric Actuators/ Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 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. Do not apply a load in excess of the operating limit.
Select a suitable actuator by work load and allowable lateral load on the rod end. If the product is used outside of the operating limit, the eccentric load applied to the piston rod will be excessive and have adverse effects such as creating play on the sliding parts of the piston rod, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force or impact force is applied to it.
This can cause failure.

3. Do not use as a stopper.

Handling

⚠ Caution

1. When the pushing operation is used, be sure to set to "Torque control mode", and use within the specified pushing speed range for each series.
Do not allow the piston rod to hit the workpiece and end of the stroke in the "Position control mode", "Speed control mode" or "Positioning mode". The lead screw, bearing and internal stopper may be damaged and lead to malfunction.

2. When operating with "Torque control mode", the value of the internal torque command (LECSA) or the maximum output command for analog torque (LECSB) should be set 30% or less.
It may lead to damage and malfunction.

3. The forward/reverse torque limit is set to 100% (3 times the motor rated torque) as default.
This value is the maximum torque (the limit value) in the "Position control mode", "Speed control mode" or "Positioning mode". When the product is operated with a smaller value than the default, acceleration when driving can decrease. Set the value after confirming the actual device to be used.

4. The maximum speed of this actuator is affected by the product stroke.
Check the model selection section of the catalog.

5. Do not apply a load, impact or resistance in addition to the transferred load during return to origin.
Additional force will cause the displacement of the origin position.

6. Do not scratch or dent the sliding parts of the piston rod, by striking or attaching objects.
The piston rod and guide rod are manufactured to precise tolerances, even a slight deformation may cause malfunction.

7. When an external guide is used, connect it in such a way that no impact or load is applied to it.
Use a freely moving connector (such as a floating joint).

8. Do not operate by fixing the piston rod and moving the actuator body.
Excessive load will be applied to the piston rod, leading to damage to the actuator and reduced the life of the product.

Handling

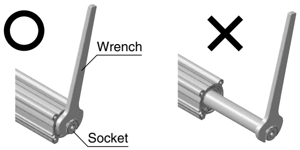
⚠ Caution

9. When an actuator is operated with one end fixed and the other free (ends tapped (standard), flange type), a bending moment may act on the actuator due to vibration generated at the stroke end, which can damage the actuator. In such a case, install a mounting bracket to suppress the vibration of the actuator body or reduce the speed so that the actuator does not vibrate.
Also, use a mounting bracket when moving the actuator body or when a long stroke actuator is mounted horizontally and fixed at one end.

10. Avoid using the electric actuator in such a way that rotational torque would be applied to the piston rod.
This may cause deformation of the non-rotating guide, abnormal responses of the auto switch, play in the internal guide or an increase in the sliding resistance.
Refer to the table below for the approximate values of the allowable range of rotational torque.

	LEY25□	LEY32
Allowable rotational torque [N·m] or less	1.1	1.4

When screwing in a bracket or nut to the end of the piston rod, hold the flats of the rod end with a wrench (the piston rod should be fully retracted). Do not apply tightening torque to the non-rotating mechanism.



11. When using auto switch with the guide rod type LEYG series, the following limits will be in effect. Please select the product while paying attention to this.
- Insert the auto switch from the front side with rod (plate) sticking out.
- The auto switches with perpendicular electrical entry cannot be used.
- For the parts hidden behind the guide attachment (Rod stick out side), the auto switch cannot be fixed.
- Consult with SMC when using auto switch on the rod stick out side.

Enclosure

IP –□□

First characteristic numeral • **Second characteristic numeral**

- **First Characteristics:**
  Degrees of protection against solid foreign objects

0	Non-protected
1	Protected against solid foreign objects of 50 mmø and greater
2	Protected against solid foreign objects of 12 mmø and greater
3	Protected against solid foreign objects of 2.5 mmø and greater
4	Protected against solid foreign objects of 1.0 mmø and greater
5	Dust-protected
6	Dust-tight

Series LEY/LEYG
Electric Actuators/ Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Enclosure

- **Second Characteristics:**
  Degrees of protection against water

0	Non-protected	—
1	Protected against vertically falling water drops	Dripproof type 1
2	Protected against vertically falling water drops when enclosure tilted up to 15°	Dripproof type 2
3	Protected against rainfall when enclosure tilted up to 60°	Rainproof type
4	Protected against splashing water	Splashproof type
5	Protected against water jets	Water-jet-proof type
6	Protected against powerful water jets	Powerful water-jet-proof type
7	Protected against the effects of temporary immersion in water	Immersible type
8	Protected against the effects of continuous immersion in water	Submersible type

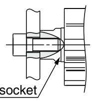
Example) IP65: Dusttight, Low jetproof type
"Low jetproof type" means that no water intrudes inside an equipment that could hinder from operating normally by means of applying water for 3 minutes in the prescribed manner. Take appropriate protection measures, since a device is not usable in an environment where a droplet of water is splashed constantly.

Mounting

⚠Caution

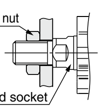
1. **When mounting workpieces or jigs to the piston rod end, hold the flats of the piston rod end with a wrench so that the piston rod does not rotate. The bolt should be tightened within the specified torque range.**
   This may cause abnormal responses of the auto switch, play in the internal guide or an increase in the sliding resistance.
2. **When mounting the product and/or a workpiece, tighten the mounting screws within the specified torque range.**
   Tightening the screws with a higher torque than recommended may cause a 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.

Workpiece fixed/Rod end female thread

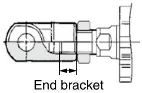


Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)	End socket width across flats (mm)
LEY25	M8 x 1.25	12.5	13	17
LEY32	M8 x 1.25	12.5	13	22

Workpiece fixed/Rod end male thread (When "Rod end male thread" is selected.)



Model	Thread size	Max. tightening torque (N·m)	Effective thread length (mm)	End socket width across flats (mm)
LEY25	M14 x 1.5	65.0	20.5	17
LEY32	M14 x 1.5	65.0	20.5	22



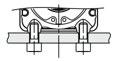
Model	Rod end nut		End bracket screw-in depth (mm)
	Width across flats (mm)	Length (mm)	
LEY25	22	8	8 or more
LEY32	22	8	8 or more

∗ Rod end nut is an accessory.

Mounting

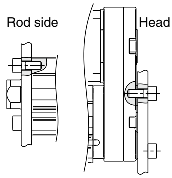
⚠Caution

Body fixed/Body bottom tapped style (When "Body bottom tapped" is selected.)



Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)
LEY25	M5 x 0.8	3.0	6.5
LEY32	M6 x 1.0	5.2	8.8

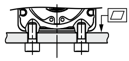
Body fixed/Rod side/Head side tapped style



Model	Bolt	Max. tightening torque (N·m)	Max. screw-in depth (mm)
LEY25	M5 x 0.8	3.0	8
LEY32	M6 x 1.0	5.2	10

∗ Except the LEY□D.

3. **Keep the flatness of the mounting surface within the following ranges when mounting the actuator body and workpiece.**
   Unevenness of a workpiece or base mounted on the body of the product may cause an increase in the sliding resistance.

Model	Mounting position	Flatness
LEY□	Body/Body bottom 	0.1 mm or less

Maintenance

⚠Warning

1. **Ensure that the power supply is stopped and the workpiece is removed before starting maintenance work or replacement of the product.**

- **Maintenance frequency**
  Perform maintenance according to the table below.

Frequency	Appearance check	Belt check
Inspection before daily operation	○	—
Inspection every 6 months/250 km/5 million cycles∗	○	○

∗ Select whichever comes sooner.

- **Items for visual appearance check**
  1. Loose set screws, Abnormal dirt
  2. Check of flaw and cable joint
  3. Vibration, Noise
- **Items for belt check**
  Stop operation immediately and replace the belt when belt appear to be below. Further, ensure your operating environment and conditions satisfy the requirements specified for the product.
  - **a. Tooth shape canvas is worn out**
    Canvas fiber becomes fuzzy. Rubber is removed and the fiber becomes whitish. Lines of fibers become unclear.
  - **b. Peeling off or wearing of the side of the belt**
    Belt corner becomes round and frayed thread sticks out.
  - **c. Belt partially cut**
    Belt is partially cut. Foreign matter caught in teeth other than cut part causes flaw.
  - **d. Vertical line of belt teeth**
    Flaw which is made when the belt runs on the flange.
  - **e. Rubber back of the belt is softened and sticky**
  - **f. Crack on the back of the belt**

Electric Slide Tables
Series LES/LESH

CE cULus RoHS

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

- **Reduced cycle time**
- **Positioning repeatability: ±0.05 mm**
- **Max. pushing force: 180 N**
  Max. acceleration/deceleration: 5,000 mm/s^2
  Max. speed: 400 mm/s

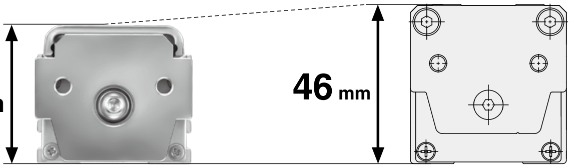
Compact Type *Series LES*

Size: 8, 16, 25 ▶Page 226

Compact

Compared with the LESH, **Workpiece mounting surface height: Reduced by up to 12%**

40.3 mm



46 mm

New Compact type LES16D

LESH16D

Basic type/R type	Symmetrical type/L type	In-line motor type/D type
		

High Rigidity Type *Series LESH*

Size: 8, 16, 25 ▶Page 250

High rigidity

Deflection: 0.016 mm*

* LESH16-50 Load: 25 N

Basic type/R type	Symmetrical type/L type	In-line motor type/D type
Series LESH□R	Series LESH□L	Series LESH□D
		

Step Motor (Servo/24 VDC) Servo Motor (24 VDC) **Controller/Driver** ▶Page 377

▶**Step data input type**
Series LECP6/LECA6
- 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

LEF LEJ LEL LEY LEYG LES LESH LEPY LEPS LER LEH LECA6 LECP6 LEC-G LECP1 LECPA LECS□ LAT3

Compact Type *Series LES*

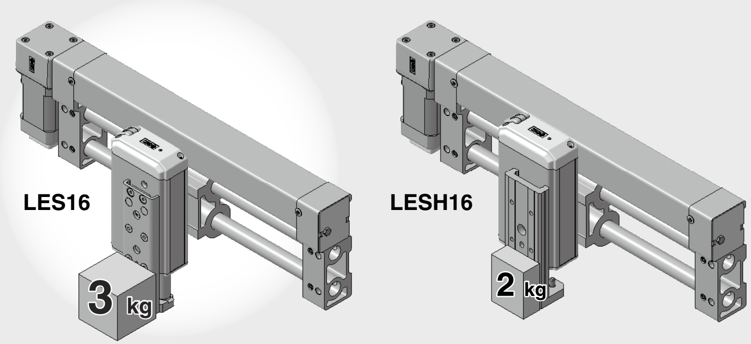
Vertical work load

Increased by up to 50%*

∗ By reducing weight of the moving parts
∗ Compared with the LESH16

Model	Vertical work load (kg)
LES16	3.0
LESH16	2.0

Applications



Light weight

Reduced by up to 29%

Model	Weight (kg)	Reduction amount
LES16D-100	1.20	Reduced by 0.50 kg
LESH16D-100	1.70	

- **Max. pushing force: 180 N**
- **Positioning repeatability: ±0.05 mm**
- **Possible to reduce cycle time**
  Max. acceleration/deceleration: 5,000 mm/s²
  Max. speed: 400 mm/s
- **2 types of motors selectable/Step motor (Servo/24 VDC), Servo motor (24 VDC)**

Basic type/R type
Series LES□R

Symmetrical type/L type
Series LES□L

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

High Rigidity Type *Series LESH*

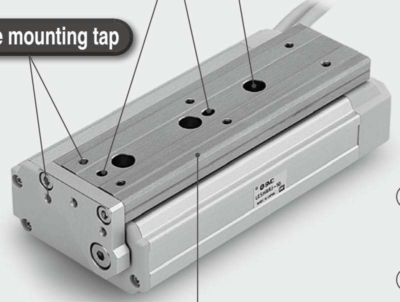
High rigidity **Deflection: 0.016 mm*** ∗ LESH16-50 Load: 25 N

Integration of the guide rail and the table
Uses a circulating linear guide.

Positioning pin hole
Improved workpiece mounting reproducibility

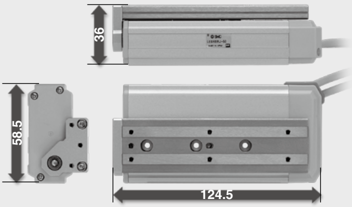
Body mounting through-hole
Can be mounted from the top.

Workpiece mounting tap

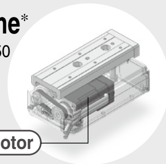


Integration of the guide rail and the table

◎Compact, Space-saving
For LESH8 R/L, 50 mm stroke



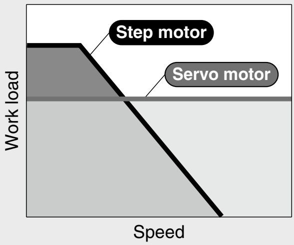
◎Reduced by 61% in volume*
∗ Compared with the LESH16-50/LXSH-50
∗ For R/L type

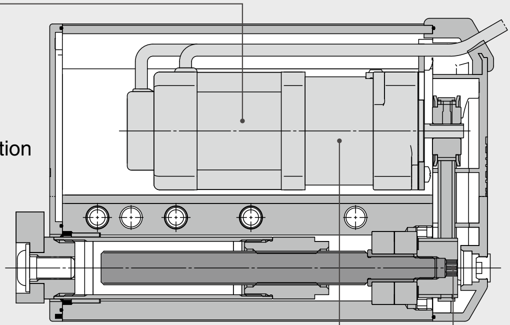


◎Motor integrated into the body
Built-in motor

2 types of motors selectable

- **Step motor (Servo/24 VDC)**
  Ideal for transfer of high load at a low speed and pushing operation
- **Servo motor (24 VDC)**
  Stable at high speed and silent operation



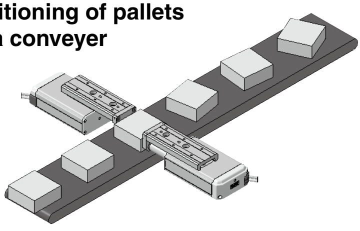


Non-magnetizing lock mechanism (Option)
Prevents workpieces from dropping (holding)

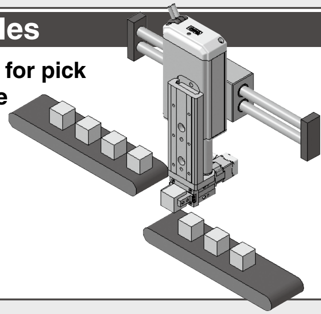
Manual override screw
Adjustment operation possible when power OFF

Application Examples

Positioning of pallets on a conveyer



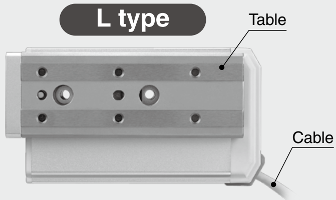
Z motion for pick and place



LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

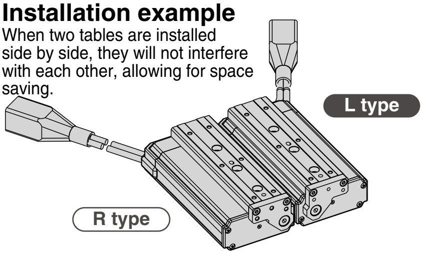
Symmetrical Type/L Type

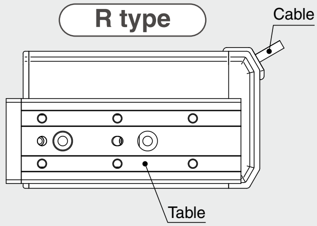
The locations of the table and cable are opposite those of the basic type (R type), expanding design applications.



Installation example

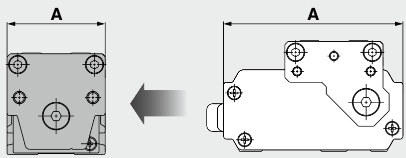
When two tables are installed side by side, they will not interfere with each other, allowing for space saving.





In-line Motor Type/D Type

Width dimension shortened by up to 45%

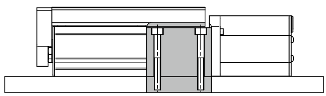


A Dimension (mm)

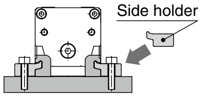
Size	D type	R/L type
8	32	58.5
16	45	72.5
25	61	106

How to Mount

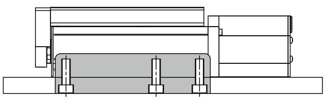
Through-hole mounting (R/L/D type)



Side holder mounting (D type)



Body tapped mounting (R/L/D type)



Series LES
Model Selection 1

Selection Procedure

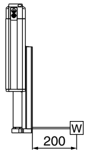
For the high rigidity type LESH series, refer to page 250.

Step 1 Check the work load–speed. → **Step 2** Check the cycle time. → **Step 3** Check the allowable moment.

Selection Example

Operating conditions

- Workpiece mass: 1 [kg]
- Speed: 220 [mm/s]
- Mounting orientation: Vertical
- Stroke: 50 [mm]
- Acceleration/Deceleration: 5,000 [mm/s²]
- Cycle time: 0.5 seconds
- Workpiece mounting condition:

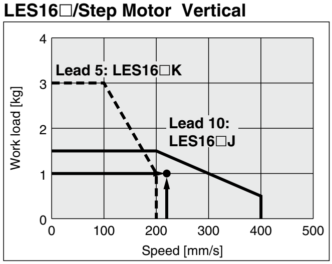


Step 1 Check the work load–speed. <Speed–Work load graph> (Page 227)

Select the target model based on the workpiece mass and speed with reference to the <Speed–Work load graph>.

Selection example) The **LES16□J-50** is temporarily selected based on the graph shown on the right side.

LES16□/Step Motor Vertical



<Speed–Work load graph>

Step 2 Check the cycle time.

It is possible to obtain an approximate cycle time by using method 1, but if a more detailed cycle time is required, use method 2.

Method 1: Check the cycle time graph. (Page 228)

Method 2: Calculation <Speed–Work load graph> (Page 227)

Calculate the cycle time using the following calculation method.

Cycle time:

T can be found from the following equation.

$$\boxed{T = T1 + T2 + T3 + T4\ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

$$\boxed{T1 = V/a1\ [s]} \quad \boxed{T3 = V/a2\ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$\boxed{T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}\ [s]}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$$\boxed{T4 = 0.15\ [s]}$$

Calculation example)
T1 to T4 can be calculated as follows.

T1 = V/a1 = 220/5000 = 0.04 [s],

T3 = V/a2 = 220/5000 = 0.04 [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}$$

$$= \frac{50 - 0.5 \cdot 220 \cdot (0.04 + 0.04)}{220}$$

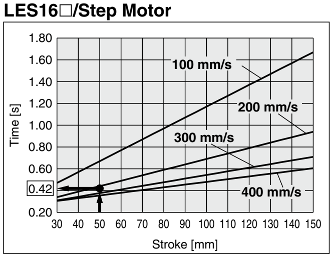
$$= 0.19\ [s]$$

T4 = 0.15 [s]

Therefore, the cycle time can be obtained as follows.

T = T1 + T2 + T3 + T4
= 0.04 + 0.19 + 0.04 + 0.15
= **0.42 [s]**

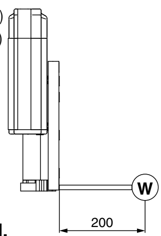
LES16□/Step Motor



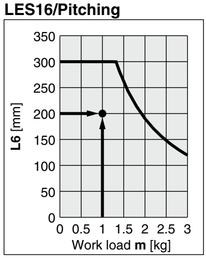
<Cycle time>

Step 3 Check the allowable moment. <Static allowable moment> (Page 228) <Dynamic allowable moment> (Page 229)

Confirm the moment that applies to the actuator is within the allowable range for both static and dynamic conditions.



LES16/Pitching



<Dynamic allowable moment>

Based on the above calculation result, the LES16□J-50 is selected.

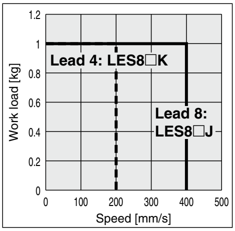
Speed–Work Load Graph (Guide)

Step Motor (Servo/24 VDC)

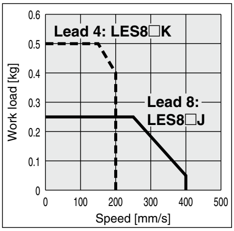
∗ The following graph shows the values when moving force is 100%.

LES8□

Horizontal

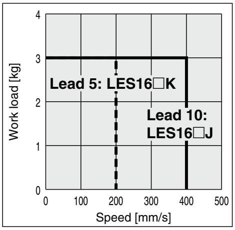


Vertical

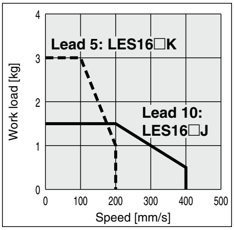


LES16□

Horizontal

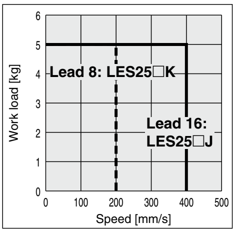


Vertical

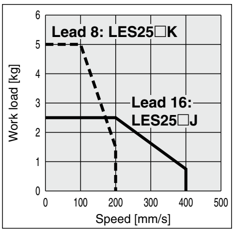


LES25□

Horizontal



Vertical

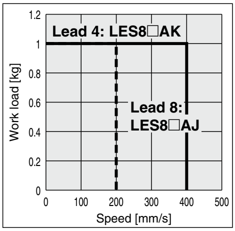


Servo Motor (24 VDC)

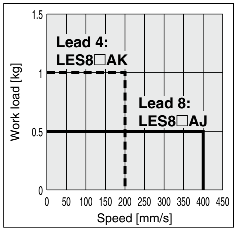
∗ The following graph shows the values when moving force is 250%.

LES8□A

Horizontal

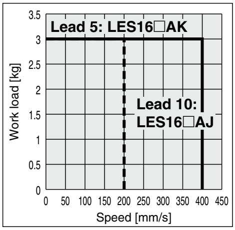


Vertical

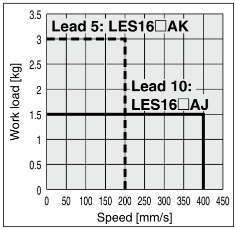


LES16□A

Horizontal

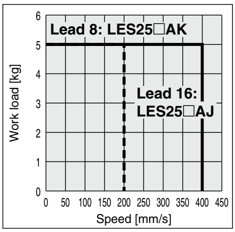


Vertical

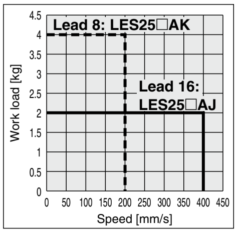


LES25$^{R}_{L}$A

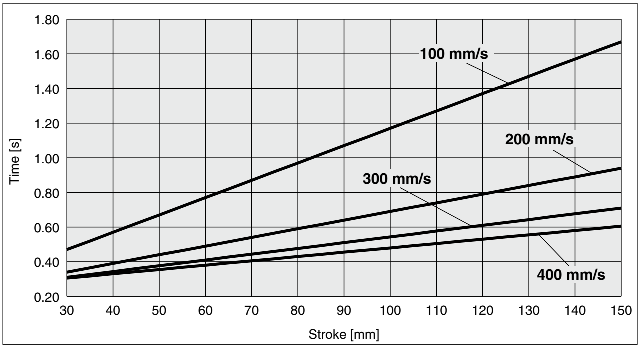
Horizontal



Vertical



Cycle Time (Guide)



Operating Conditions

Acceleration/Deceleration: 5,000 mm/s^2
In position: 0.5

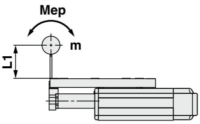
Static Allowable Moment

Model		LES8	LES16	LES25
Pitching	[N·m]	2	4.8	14.1
Yawing	[N·m]	2	4.8	14.1
Rolling	[N·m]	0.8	1.8	4.8

Dynamic Allowable Moment

Note 1) This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation.
Note 2) For static moment as well, use a product below the range in the graph. http://www.smcworld.com

Acceleration/Deceleration ——— 5,000 mm/s²

<table>
<tr><th rowspan="2">Orientation</th><th rowspan="2" colspan="2">Load overhanging direction
m : Work load [kg]
Me: Dynamic allowable moment [N·m]
L : Overhang to the work load center of gravity [mm]</th><th colspan="3">Model</th></tr>
<tr><th>LES8</th><th>LES16</th><th>LES25</th></tr>
<tr><td rowspan="5">Horizontal</td><td>
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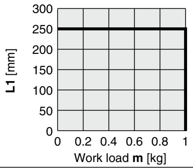
<td>
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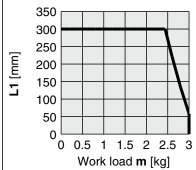
<td>
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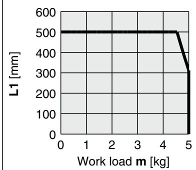
<td>
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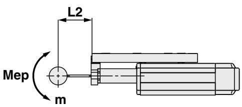
<tr><td>
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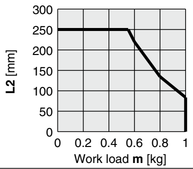
<td>
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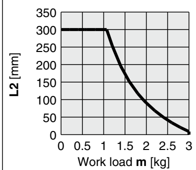
<td>
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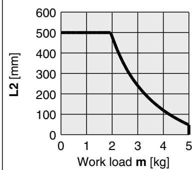
<td>
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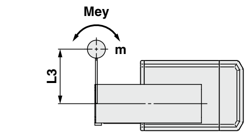
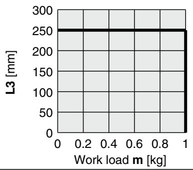
<tr><td>
</td><td rowspan="2">Yawing</td>
<td>
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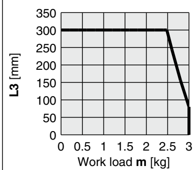
<td>
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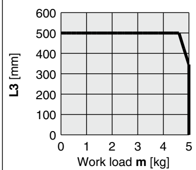
<td>
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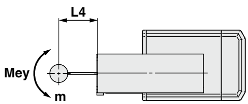
<tr><td>
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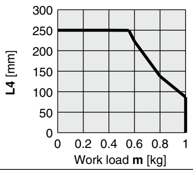
<td>
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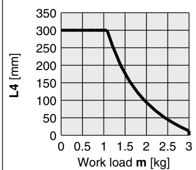
<td>
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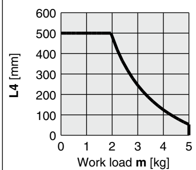
<td>
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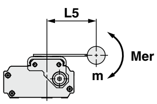
<tr><td>
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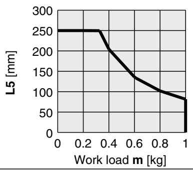
<td>
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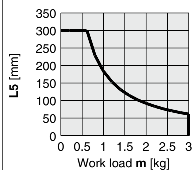
<td>
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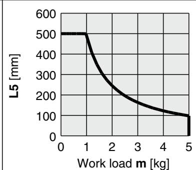
<td>
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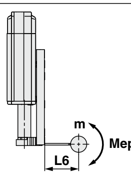
<tr><td rowspan="2">Vertical</td><td>
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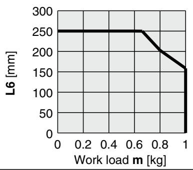
<td>
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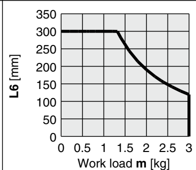
<td>
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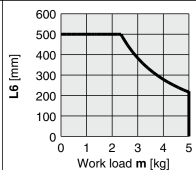
<td>
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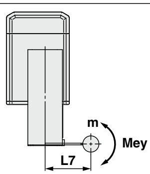
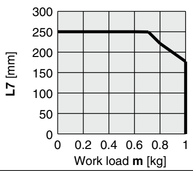
<tr><td>
</td><td>Yawing</td>
<td>
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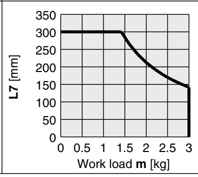
<td>
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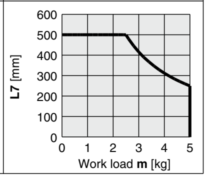
<td>
</td></tr>
</table>

Electric Slide Table/Compact Type Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

Series ***LES***

Model Selection 2

Selection Procedure

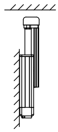
For the high rigidity type LESH series, refer to page 254.

Step 1 Check the required force. → **Step 2** Check the set value of pushing force. → **Step 3** Check the duty ratio.

Selection Example

Operating conditions

- Pushing force: 90 [N]
- Workpiece mass: 1 [kg]
- Speed: 100 [mm/s]
- Stroke: 100 [mm]
- Mounting orientation: Vertical upward
- Pushing time + Operation (A): 1.5 seconds
- All cycle time (B): 6 seconds



Step 1 Check the required force.

Calculate the approximate required force for pushing operation.

Selection example) • Pushing force: 90 [N]
• Workpiece mass: 1 [kg]
Therefore, the approximate required force can be obtained as 90 + 10 = 100 [N].

Select the target model based on the approximate required force with reference to the specifications (Pages 236 and 237).

Selection example) Based on the specifications,
• Approximate required force: 100 [N]
• Speed: 100 [mm/s]
Therefore, the **LES25□** is temporarily selected.

Then, calculate the required force for pushing operation.
If the mounting position is vertical upward, add the actuator table weight.

Selection example) Based on the <Table weight>,
• **LES25□** table weight: 0.5 [kg]
Therefore, the required force can be obtained as 100 + 5 = 105 [N].

Step 2 Check the set value of pushing force.

<Set value of pushing force–Force graph> (Page 231)

Select the target model based on the required force with reference to the <Set value of pushing force–Force graph>, and confirm the set value of pushing force.

Selection example) Based on the graph shown on the right side,
• Required force: 105 [N]
Therefore, the **LES25□K** is temporarily selected.
This set value of pushing force is 40 [%].

Step 3 Check the duty ratio.

Confirm the allowable duty ratio based on the set value of pushing force with reference to the <Allowable duty ratio>.

Selection example) Based on the <Allowable duty ratio>,
• Set value of pushing force: 40 [%]
Therefore, the allowable duty ratio can be obtained as 30 [%].

Calculate the duty ratio for operating conditions, and confirm it does not exceed the allowable duty ratio.

Selection example) • Pushing time + Operation (A): 1.5 seconds
• All cycle time (B): 6 seconds
Therefore, the duty ratio can be obtained as 1.5/6 x 100 = 25 [%], and this is the allowable range.

Based on the above calculation result, the LES25□K-100 is selected.

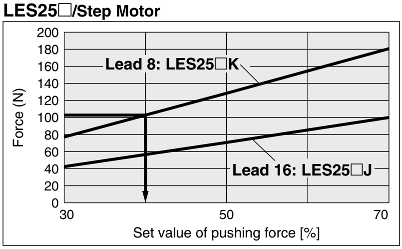
For allowable moment, the selection procedure is the same as the positioning control.

Table Weight [kg]

Model	Stroke [mm] 30	50	75	100	125	150
LES8	0.06	0.08	0.10	—	—	—
LES16	0.10	0.13	0.18	0.20	—	—
LES25	0.25	0.30	0.36	0.50	0.55	0.59

∗ If the mounting position is vertical upward, add the table weight.

LES25□/Step Motor



<Set value of pushing force–Force graph>

Allowable Duty Ratio

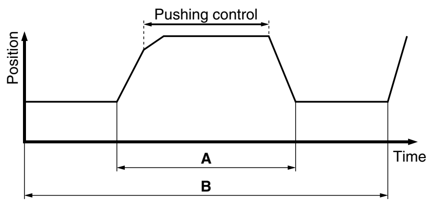
Step Motor (Servo/24 VDC)

Set value of pushing force (%)	Duty ratio (%)	Continuous pushing time (minute)
30	—	—
50 or less	30 or less	5 or less
70 or less	20 or less	3 or less

Servo Motor (24 VDC)

Set value of pushing force (%)	Duty ratio (%)	Continuous pushing time (minute)
50	—	—
75 or less	30 or less	5 or less
100 or less	20 or less	3 or less

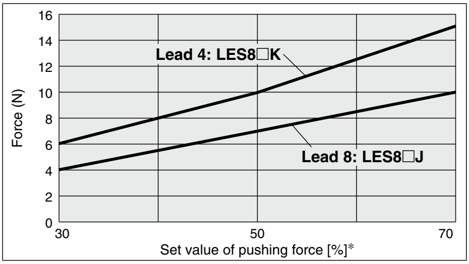
∗ The pushing force of the LES8□A is up to 75%.



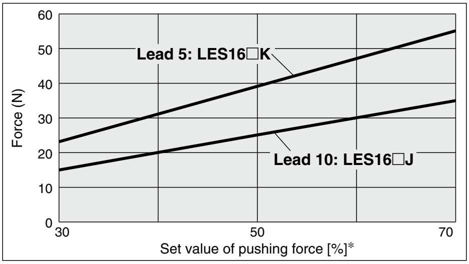
Set Value of Pushing Force–Force Gragh

Step Motor (Servo/24 VDC)

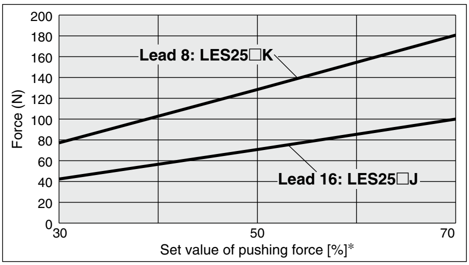
LES8□



LES16□

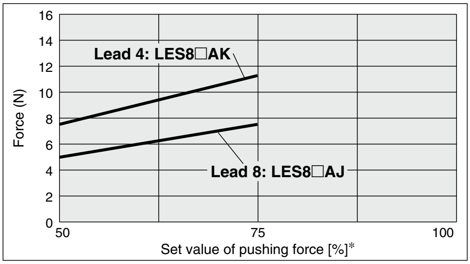


LES25□

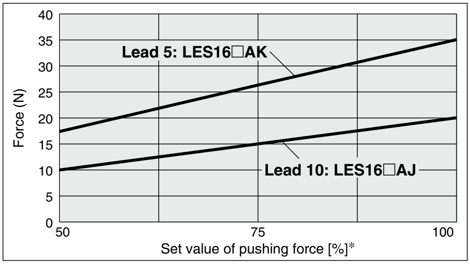


Servo Motor (24 VDC)

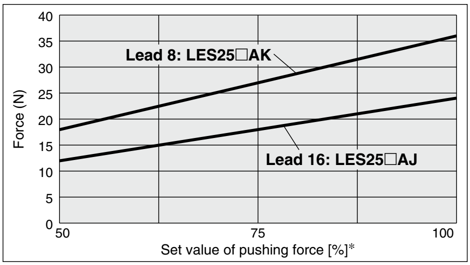
LES8□A



LES16□A



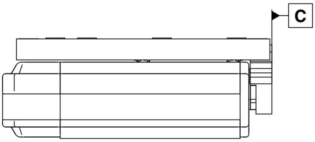
LES25$^{R}_{L}$A

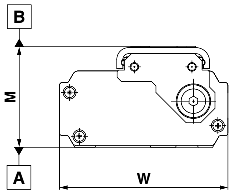


∗ Set values for the controller.

Table Accuracy

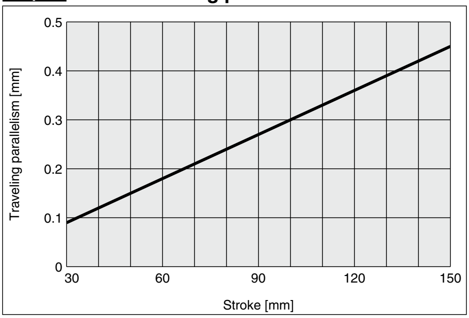
∗ These values are initial guideline values.

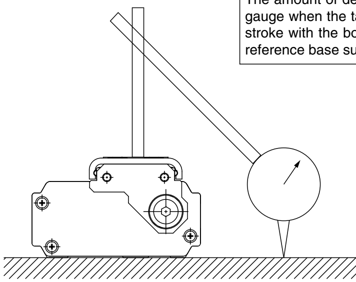




Model	LES8	LES16	LES25
B side parallelism to A side	0.4 mm		
B side traveling parallelism to A side	Refer to Graph 1.		
C side perpendicularity to A side	0.2 mm		
M dimension tolerance	±0.3 mm		
W dimension tolerance	±0.2 mm		

Graph 1 **B side traveling parallelism to A side**





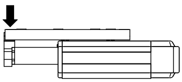
Traveling parallelism:
The amount of deflection on a dial gauge when the table travels a full stroke with the body secured on a reference base surface

Table Deflection (Reference Value)

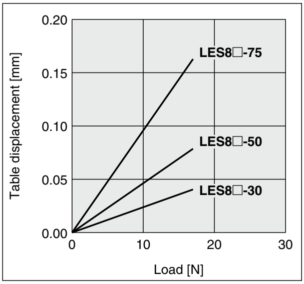
∗ These values are initial guideline values.

Pitching moment

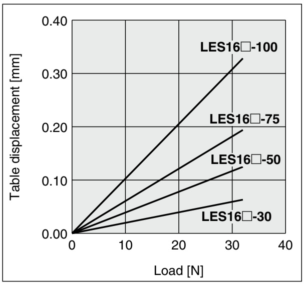
Table displacement due to pitch moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.



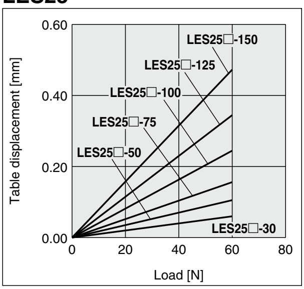
LES8



LES16

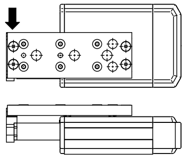


LES25

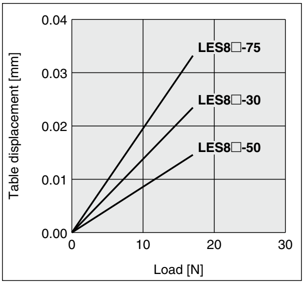


Yawing moment

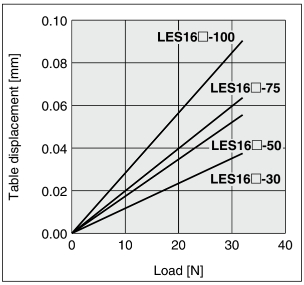
Table displacement due to yaw moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.



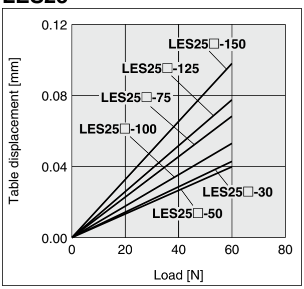
LES8



LES16

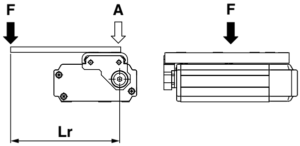


LES25



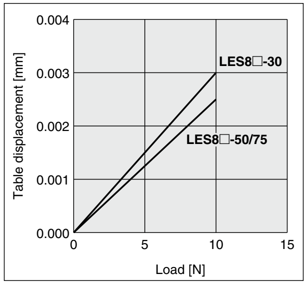
Rolling moment

Table displacement due to roll moment load
Table displacement of section A when loads are applied to the section F with the slide table retracted.



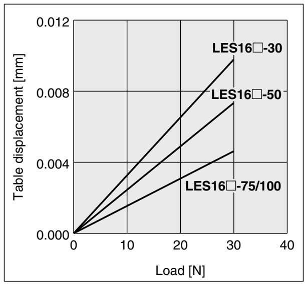
LES8

Lr = 80 mm



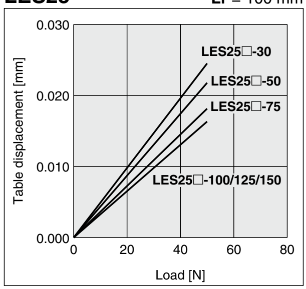
LES16

Lr = 60 mm



LES25

Lr = 100 mm



LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Electric Slide Table/Compact Type

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

Series LES

LES8, 16, 25

RoHS

How to Order

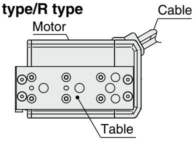
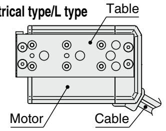
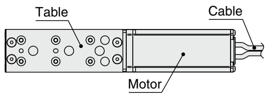
LES 8 R □ J – 30 □ □ □ – S 1 6N 1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭

❶ Size

8
16
25

❷ Motor mounting position

R	**Basic type/R type** 
L	**Symmetrical type/L type** 
D	**In-line motor type/D type** 

❸ Motor type

Symbol	Type	Compatible controllers/ driver
Nil	Step motor (Servo/24 VDC)	LECP6 LECP1 LECPA
A	Servo motor* (24 VDC)	LECA6

* LES25DA is not available.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LES 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.

② For the servo motor (24 VDC) specification, EMC compliance was tested by installing a noise filter set (LEC-NFA).
Refer to page 394 for the noise filter set. Refer to the LECA Operation Manual for installation.

[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.

❹ Lead [mm]

Symbol	LES8	LES16	LES25
J	8	10	16
K	4	5	8

❺ Stroke [mm]

Model \ Stroke	30	50	75	100	125	150
LES8	●*	●*	●	—	—	—
LES16	●*	●*	●	●	—	—
LES25	●*	●	●	●	●	●

* R/L type with lock is not available.

❻ Motor option

Nil	Without option
B	With lock

❼ Body option

Nil	Without option
S	Dustproof specification*

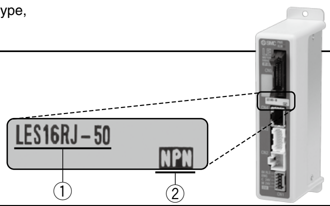
* For R/L type (IP5X equivalent), a scraper is mounted on the rod cover, and gaskets are mounted on both the end covers. For D type, a scraper is mounted on the rod cover.

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

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

SMC

Basic type (R type)

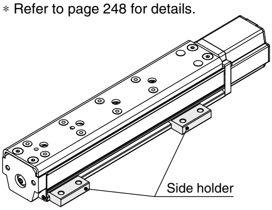
Symmetrical type (L type)

In-line motor type (D type)

❽ Mounting*

Symbol	Mounting	R type L type	D type
Nil	Without side holder	●	●
H	With side holder (4 pcs.)	—	●

* Refer to page 248 for details.



❾ Actuator cable type*1

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

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Only available for the motor type "Step motor."

❿ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 236.

⓫ Controller/Driver type*1

Nil	Without controller/driver	
6N	**LECP6/LECA6** (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 Refer to page 377 for the detailed specifications of the controller/driver.
*2 Only available for the motor type "Step motor."

⓬ I/O cable length [m]*1

Nil	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 394 (For LECP6/LECA6), page 407 (For LECP1) or page 414 (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.

⓭ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. Refer to page 387 for details.

Compatible Controllers/Driver

Type	**Step data input type** 	**Step data input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECA6**	**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)	Servo motor (24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 386		Page 401	Page 408

Specifications

Step Motor (Servo/24 VDC)

	Model		LES8□		LES16□		LES25□	
Actuator specifications	Stroke [mm]		30, 50, 75		30, 50, 75, 100		30, 50, 75, 100, 125, 150	
	Work load [kg] Note 1)	Horizontal	1		3		5	
		Vertical	0.5	0.25	3	1.5	5	2.5
	Pushing force 30 to 70 % [N] Note 2) 3)		6 to 15	4 to 10	23.5 to 55	15 to 35	77 to 180	43 to 100
	Speed [mm/s] Note 1) 3)		10 to 200	20 to 400	10 to 200	20 to 400	10 to 200	20 to 400
	Pushing speed [mm/s]		10 to 20	20	10 to 20	20	10 to 20	20
	Max. acceleration/deceleration [mm/s²]		5,000					
	Positioning repeatability [mm]		±0.05					
	Screw lead [mm]		4	8	5	10	8	16
	Impact/Vibration resistance [m/s²] Note 4)		50/20					
	Actuation type		Slide screw + Belt (R/L type), Slide screw (D type)					
	Guide type		Linear guide (Circulating type)					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
Electric specifications	Motor size		□20		□28		□42	
	Motor type		Step motor (Servo/24 VDC)					
	Encoder		Incremental A/B phase (800 pulse/rotation)					
	Rated voltage [V]		24 VDC ±10%					
	Power consumption [W] Note 5)		18		69		45	
	Standby power consumption when operating [W] Note 6)		7		15		13	
	Max. instantaneous power consumption [W] Note 7)		35		69		67	
Lock unit specifications	Type	Note 8)	Non-magnetizing lock					
	Holding force [N]		24	2.5	300	48	500	77
	Power consumption [W] Note 9)		4		3.6		5	
	Rated voltage [V]		24 VDC ±10%					

Note 1) Speed changes according to the work load. Check "Speed–Work Load Graph (Guide)" on page 227.
Note 2) Pushing force accuracy is ±20% (F.S.).
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) 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.)
Impact resistance: No malfunction occurred when the actuator 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.)
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 the operation. Except during the pushing 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) With lock only
Note 9) For an actuator with lock, add the power consumption for the lock.

Specifications

Servo Motor (24 VDC)

	Model		LES8□A		LES16□A		LES25$^{R}_{L}$A Note 1)	
Actuator specifications	Stroke [mm]		30, 50, 75		30, 50, 75, 100		30, 50, 75, 100, 125, 150	
	Work load [kg]	Horizontal	1		3		5	
		Vertical	1	0.5	3	1.5	4	2
	Pushing force 50 to 100% [N] Note 2)		7.5 to 11	5 to 7.5	17.5 to 35	10 to 20	18 to 36	12 to 24
	Speed [mm/s]		10 to 200	20 to 400	10 to 200	20 to 400	10 to 200	20 to 400
	Pushing speed [mm/s]		10 to 20	20	10 to 20	20	10 to 20	20
	Max. acceleration/deceleration [mm/s²]		5,000					
	Positioning repeatability [mm]		±0.05					
	Screw lead [mm]		4	8	5	10	8	16
	Impact/Vibration resistance [m/s²] Note 3)		50/20					
	Actuation type		Slide screw + Belt (R/L type), Slide screw (D type)					
	Guide type		Linear guide (Circulating type)					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
Electric specifications	Motor size		□20		□28		□42	
	Motor output [W]		10		30		36	
	Motor type		Servo motor (24 VDC)					
	Encoder (Angular displacement sensor)		Incremental A/B/Z phase (800 pulse/rotation)					
	Rated voltage [V]		24 VDC ±10%					
	Power consumption [W] Note 4)		42		68		97	
	Standby power consumption when operating [W] Note 5)		8 (Horizontal)/19 (Vertical)		9 (Horizontal)/23 (Vertical)		16 (Horizontal)/32 (Vertical)	
	Max. instantaneous power consumption [W] Note 6)		71		102		111	
Lock unit specifications	Type	Note 7)	Non-magnetizing lock					
	Holding force [N]		24	2.5	300	48	500	77
	Power consumption [W] Note 8)		4		3.6		5	
	Rated voltage [V]		24 VDC ±10%					

Note 1) LES25DA is not available.
Note 2) The pushing force values for LES8□A is 50 to 75%. Pushing force accuracy is ±20% (F.S.).
Note 3) 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.)
Impact resistance: No malfunction occurred when the actuator 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.)
Note 4) The power consumption (including the controller) is for when the actuator is operating.
Note 5) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation.
Note 6) 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 7) With lock only
Note 8) For an actuator with lock, add the power consumption for the lock.

Weight

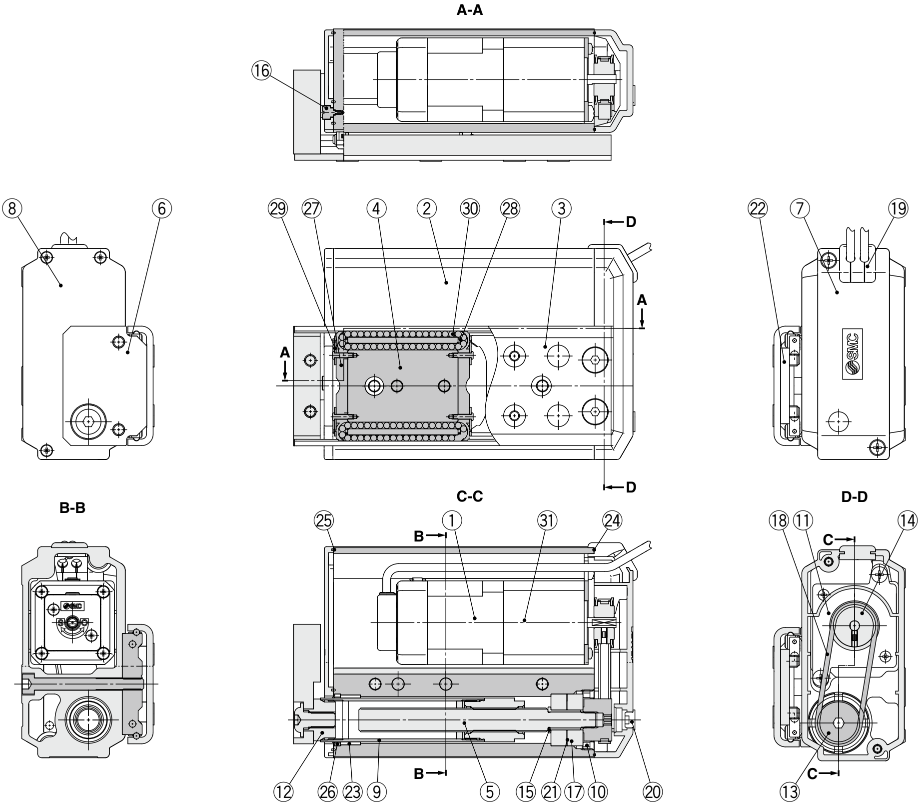
Step Motor (Servo/24 VDC), Servo Motor (24 VDC) Common

[kg]

		Without lock						With lock					
Stroke [mm]		30	50	75	100	125	150	30	50	75	100	125	150
Model	LES8$^{R}_{L}$(A)	0.45	0.54	0.59	—	—	—	—	—	0.66	—	—	—
	LES16$^{R}_{L}$(A)	0.91	1.00	1.16	1.24	—	—	—	—	1.29	1.37	—	—
	LES25$^{R}_{L}$(A)	1.81	2.07	2.41	3.21	3.44	3.68	—	2.34	2.68	3.48	3.71	3.95
	LES8D(A)	0.40	0.52	0.58	—	—	—	0.47	0.59	0.65	—	—	—
	LES16D(A)	0.77	0.90	1.11	1.20	—	—	0.90	1.03	1.25	1.33	—	—
	LES25D	1.82	2.05	2.35	3.07	3.27	3.47	2.08	2.31	2.61	3.33	3.53	3.74

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Construction: Basic Type/R Type, Symmetrical Type/L Type



Component Parts

No.	Description	Material	Note
1	**Motor**	—	—
2	**Body**	Aluminum alloy	Anodized
3	**Table**	Stainless steel	Heat treatment + Electroless nickel plated
4	**Guide block**	Stainless steel	Heat treatment
5	**Lead screw**	Stainless steel	Heat treatment + Specially treated
6	**End plate**	Aluminum alloy	Anodized
7	**Pulley cover**	Synthetic resin	—
8	**End cover**	Synthetic resin	—
9	**Rod**	Stainless steel	—
10	**Bearing stopper**	Structural steel	Electroless nickel plated
		Brass	Electroless nickel plated (LES25R/L□ only)
11	**Motor plate**	Structural steel	—
12	**Socket**	Structural steel	Electroless nickel plated
13	**Lead screw pulley**	Aluminum alloy	—
14	**Motor pulley**	Aluminum alloy	—
15	**Spacer**	Stainless steel	LES25R/L□ only
16	**Origin stopper**	Structural steel	Electroless nickel plated
17	**Bearing**	—	—
18	**Belt**	—	—
19	**Grommet**	Synthetic resin	—
20	**Cap**	SI	—
21	**Sim ring**	Structural steel	—
22	**Stopper**	Structural steel	—
23	**Bushing**	—	Dustproof specification only
24	**Pulley gasket**	NBR	Dustproof specification only
25	**End gasket**	NBR	Dustproof specification only
26	**Scraper**	NBR	Dustproof specification only
27	**Cover**	Synthetic resin	—
28	**Return guide**	Synthetic resin	—
29	**Cover support**	Stainless steel	—
30	**Steel ball**	Special steel	—
31	**Lock**	—	With lock only

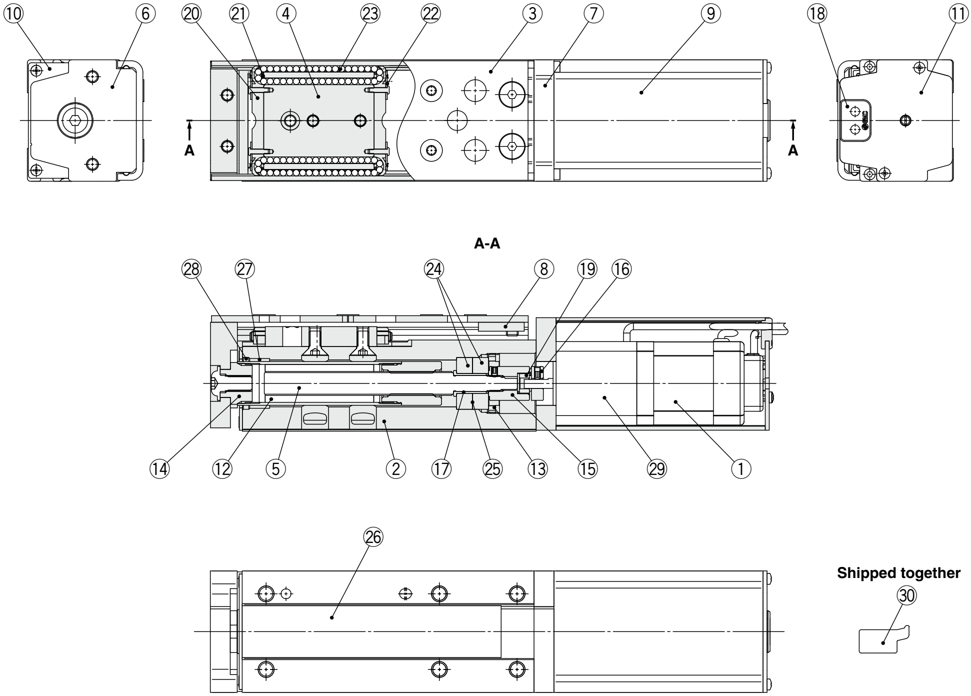
Replacement Parts/Belt

Size	Order no.	Note
LES8□	LE-D-1-1	Without manual override screw
LES16□	LE-D-1-2	—
LES25□	LE-D-1-3	—
LES25□A	LE-D-1-4	—
LES8□	LE-D-1-5	With manual override screw

Replacement Parts/Grease Pack

Applied portion	Order no.
Guide unit	GR-S-010 (10 g) GR-S-020 (20 g)

Construction: In-line Motor Type/D Type



Component Parts

No.	Description	Material	Note
1	**Motor**	—	—
2	**Body**	Aluminum alloy	Anodized
3	**Table**	Stainless steel	Heat treatment + Electroless nickel plated
4	**Guide block**	Stainless steel	Heat treatment
5	**Lead screw**	Stainless steel	Heat treatment + Specially treated
6	**End plate**	Aluminum alloy	Anodized
7	**Motor flange**	Aluminum alloy	Anodized
8	**Stopper**	Structural steel	—
9	**Motor cover**	Aluminum alloy	Anodized
10	**End cover**	Aluminum alloy	Anodized
11	**Motor end cover**	Aluminum alloy	Anodized
12	**Rod**	Stainless steel	—
13	**Bearing stopper**	Structural steel	Electroless nickel plated
		Brass	Electroless nickel plated (LES25D□ only)
14	**Socket**	Structural steel	Electroless nickel plated
15	**Hub (Lead screw side)**	Aluminum alloy	—
16	**Hub (Motor side)**	Aluminum alloy	—
17	**Spacer**	Stainless steel	LES25D□ only
18	**Grommet**	NBR	—
19	**Spider**	NBR	—
20	**Cover**	Synthetic resin	—

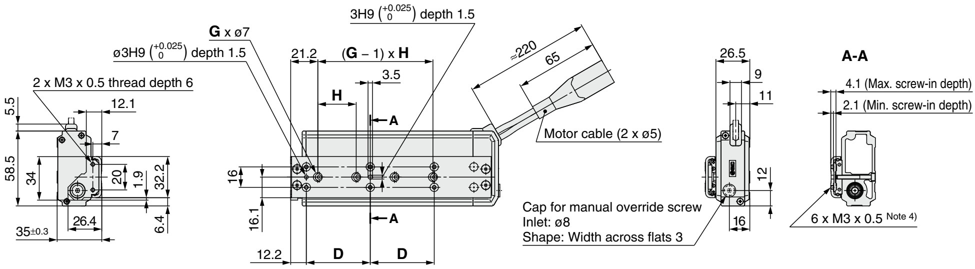
No.	Description	Material	Note
21	**Return guide**	Synthetic resin	—
22	**Cover support**	Stainless steel	—
23	**Steel ball**	Special steel	—
24	**Bearing**	—	—
25	**Sim ring**	Structural steel	—
26	**Masking tape**	—	—
27	**Bushing**	—	Dustproof specification only
28	**Scraper**	NBR	Dustproof specification only
29	**Lock**	—	With lock only
30	**Side holder**	Aluminum alloy	Anodized

Optional Parts/Side Holder

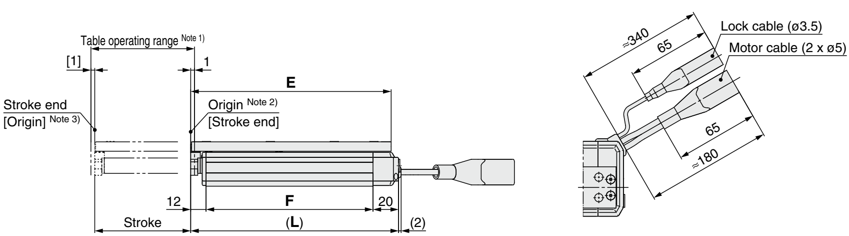
Model	Order no.
LES8D	LE-D-3-1
LES16D	LE-D-3-2
LES25D	LE-D-3-3

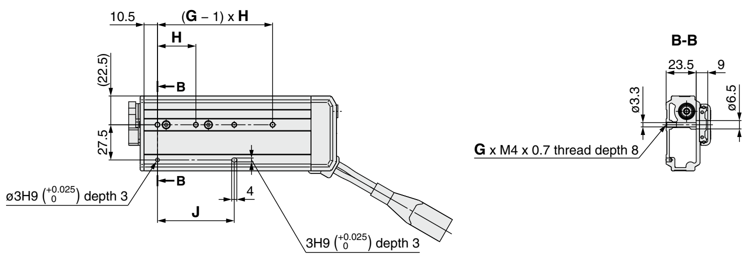
Dimensions: Basic Type/R Type

LES8R



With lock





Connector	Step motor	Servo motor
Motor cable	20 x 20	24 x 24
Lock cable	15 x 20	15 x 20

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) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc.
Use bolts that are between the maximum and minimum screw-in depths in length.

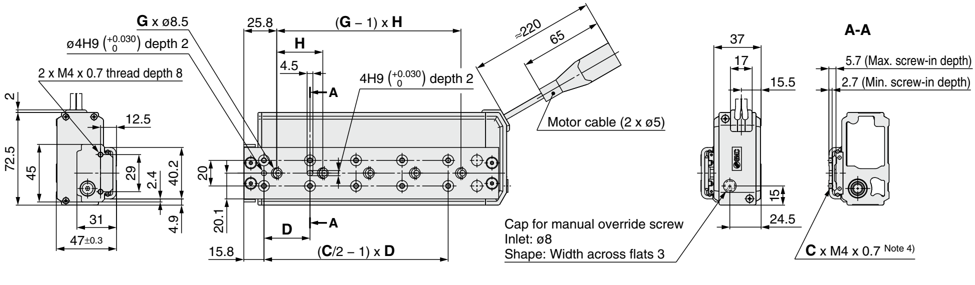
Dimensions

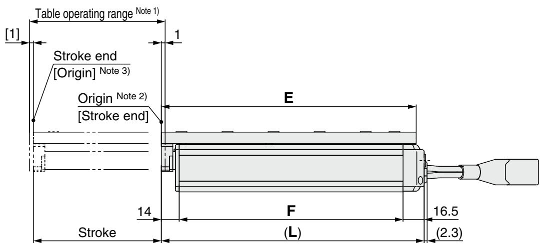
(mm)

Model	L	D	E	F	G	H	J
LES8R□□-30□-□□□□□	94.5	26	88.7	62.5	2	27	27
LES8R□□-50□-□□□□□	137.5	46	131.7	105.5	3	29	58
LES8R□□-75□□-□□□□□	162.5	50	156.7	130.5	4	30	60

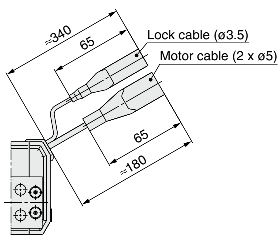
Dimensions: Basic Type/R Type

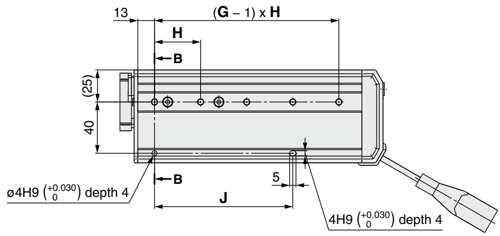
LES16R

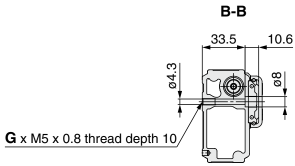




With lock







Connector	Step motor	Servo motor
Motor cable	20 x 20	24 x 24
Lock cable	15 x 20	15 x 20

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) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

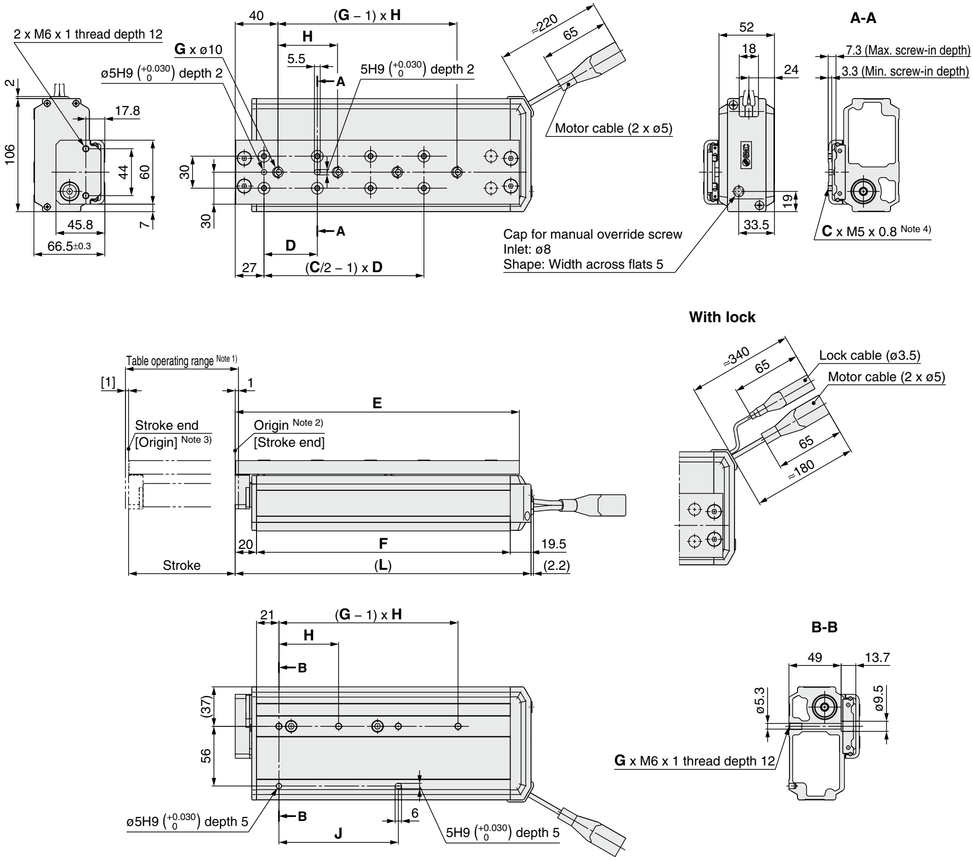
Dimensions

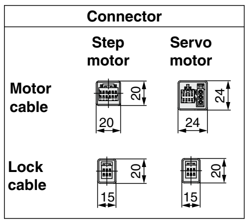
(mm)

Model	L	C	D	E	F	G	H	J
LES16R□□-30□-□□□□□	108.5	4	38	102.3	78	2	40	40
LES16R□□-50□-□□□□□	136.5	6	34	130.3	106	2	78	78
LES16R□□-75□□-□□□□□	180.5	8	36	174.3	150	4	36	72
LES16R□□-100□□-□□□□□	205.5	10	36	199.3	175	5	36	108

Dimensions: Basic Type/R Type

LES25R





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) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc.
Use bolts that are between the maximum and minimum screw-in depths in length.

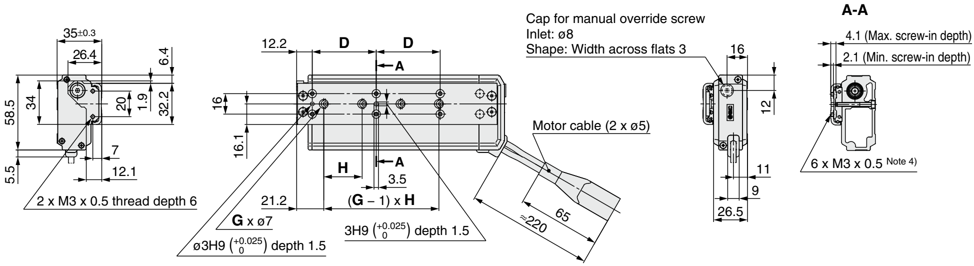
Dimensions

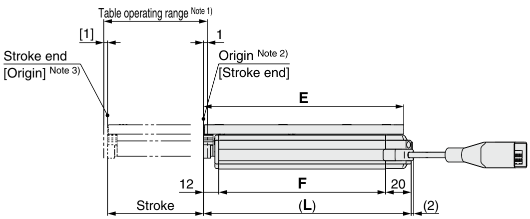
(mm)

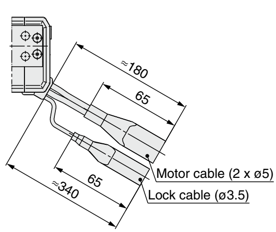
Model	L	C	D	E	F	G	H	J
LES25R□□-30□-□□□□□	144.5	4	48	133.5	105	2	46	46
LES25R□□-50□□-□□□□□	170.5	6	42	159.5	131	2	84	84
LES25R□□-75□□-□□□□□	204.5	6	55	193.5	165	2	112	112
LES25R□□-100□□-□□□□□	277.5	8	50	266.5	238	4	56	112
LES25R□□-125□□-□□□□□	302.5	8	55	291.5	263	4	59	118
LES25R□□-150□□-□□□□□	327.5	8	62	316.5	288	4	62	124

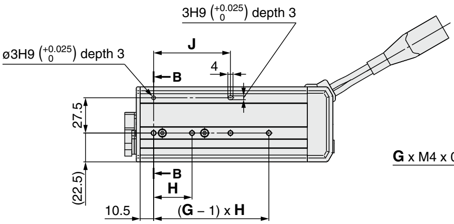
Dimensions: Symmetrical Type/L Type

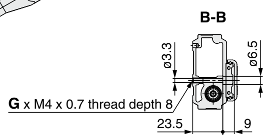
LES8L

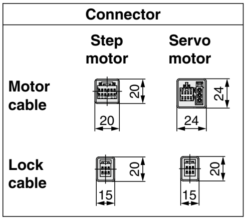












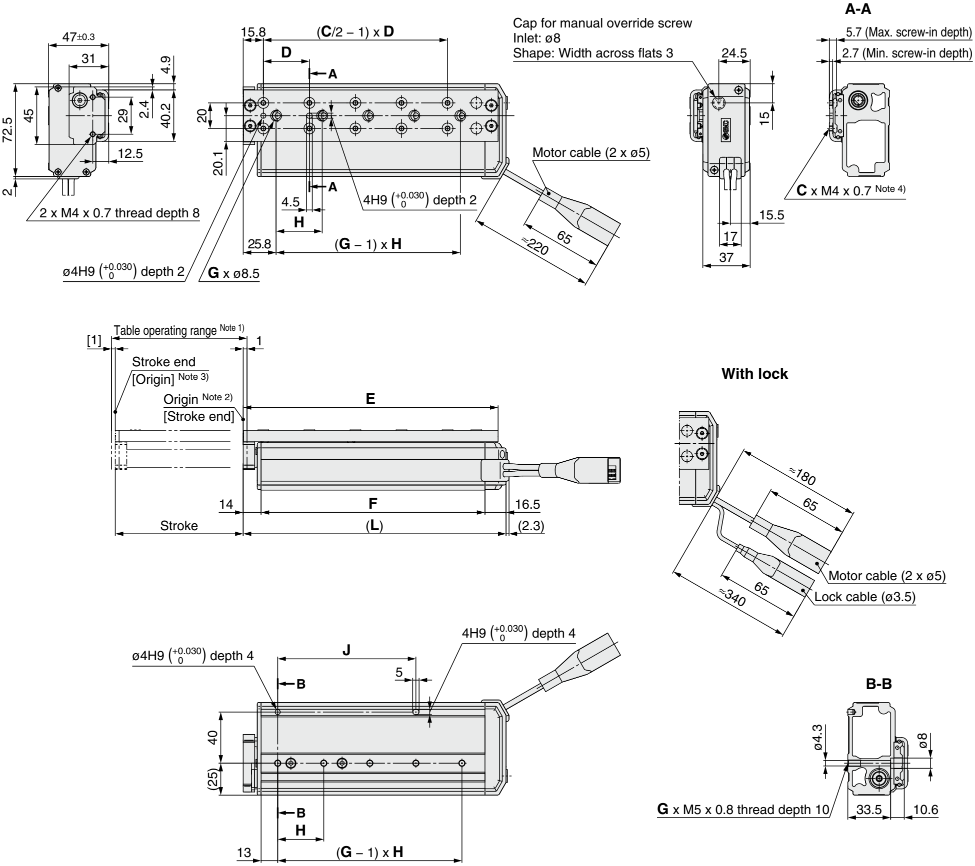
Note 1) Range within which the table can move when it returns to origin.
Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc.
Use bolts that are between the maximum and minimum screw-in depths in length.

Dimensions (mm)

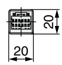
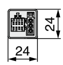
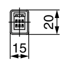
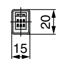
Model	L	D	E	F	G	H	J
LES8L□□-30□-□□□□□	94.5	26	88.7	62.5	2	27	27
LES8L□□-50□-□□□□□	137.5	46	131.7	105.5	3	29	58
LES8L□□-75□□-□□□□□	162.5	50	156.7	130.5	4	30	60

Dimensions: Symmetrical Type/L Type

LES16L



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) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc.
Use bolts that are between the maximum and minimum screw-in depths in length.

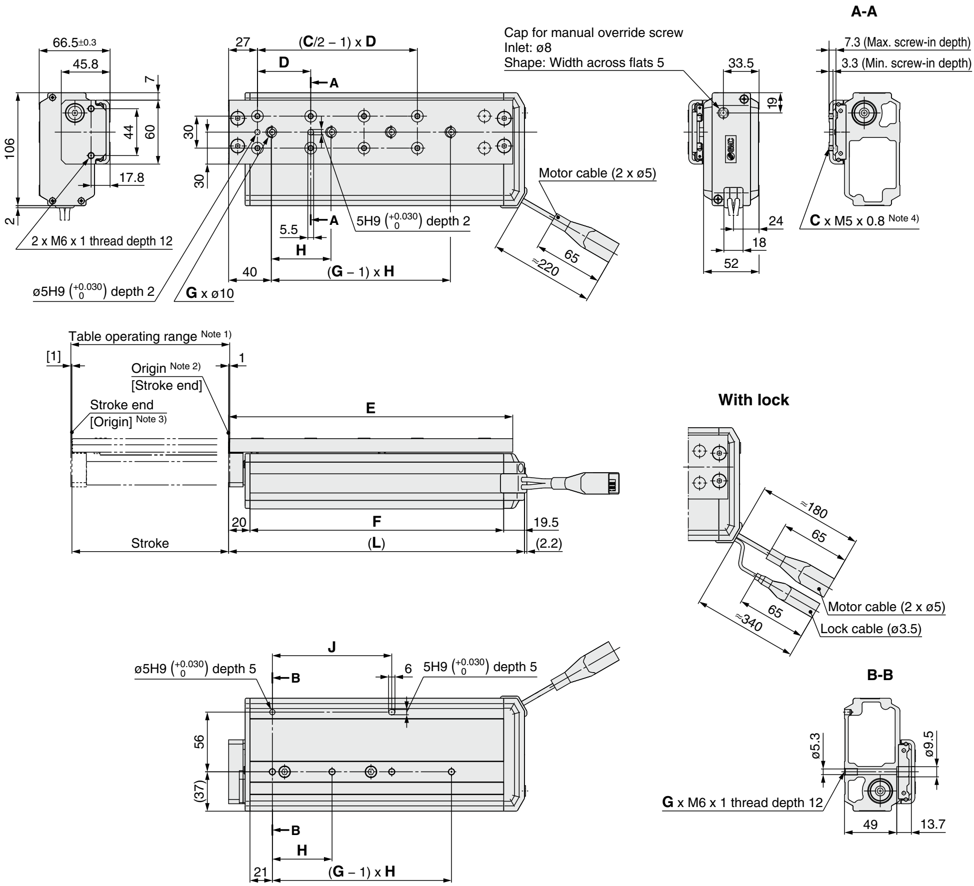
Connector		
	Step motor	**Servo motor**
Motor cable		
Lock cable		

Dimensions (mm)

Model	L	C	D	E	F	G	H	J
LES16L□□-30□-□□□□□	108.5	4	38	102.3	78	2	40	40
LES16L□□-50□-□□□□□	136.5	6	34	130.3	106	2	78	78
LES16L□□-75□□-□□□□□	180.5	8	36	174.3	150	4	36	72
LES16L□□-100□□-□□□□□	205.5	10	36	199.3	175	5	36	108

Dimensions: Symmetrical Type/L Type

LES25L



Connector		
	Step motor	Servo motor
Motor cable	20 x 20	24 x 24
Lock cable	15 x 20	15 x 20

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) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc.
Use bolts that are between the maximum and minimum screw-in depths in length.

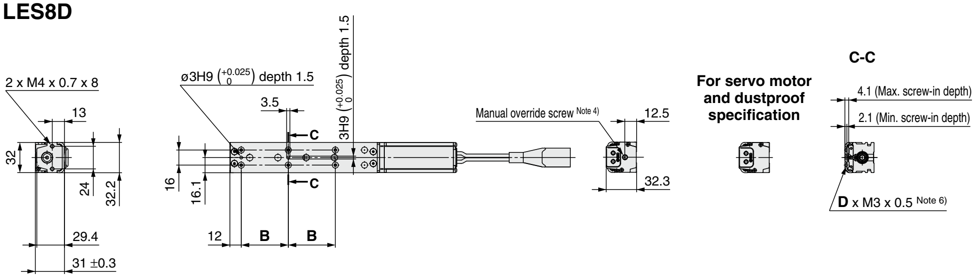
Dimensions

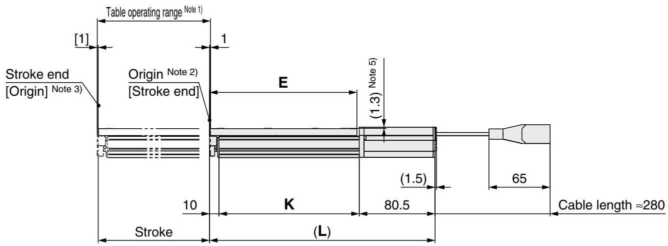
(mm)

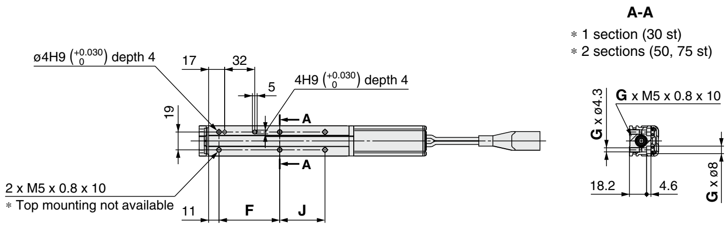
Model	L	C	D	E	F	G	H	J
LES25L□□-30□-□□□□□	144.5	4	48	133.5	105	2	46	46
LES25L□□-50□□-□□□□□	170.5	6	42	159.5	131	2	84	84
LES25L□□-75□□-□□□□□	204.5	6	55	193.5	165	2	112	112
LES25L□□-100□□-□□□□□	277.5	8	50	266.5	238	4	56	112
LES25L□□-125□□-□□□□□	302.5	8	55	291.5	263	4	59	118
LES25L□□-150□□-□□□□□	327.5	8	62	316.5	288	4	62	124

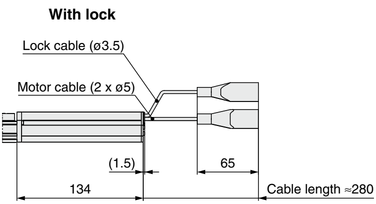
Dimensions: In-line Motor Type/D Type

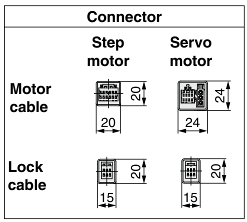
LES8D











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) [ ] for when the direction of return to origin has changed.
Note 4) The distance between the motor end cover and the manual override screw is up to 16 mm. The motor end cover hole size is ø5.5.
Note 5) The table is lower than the motor cover. Make sure it does not interfere with the workpiece.
Note 6) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc.
Use bolts that are between the maximum and minimum screw-in depths in length.

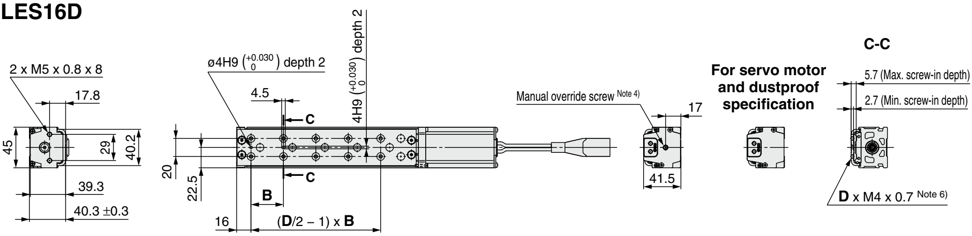
Dimensions

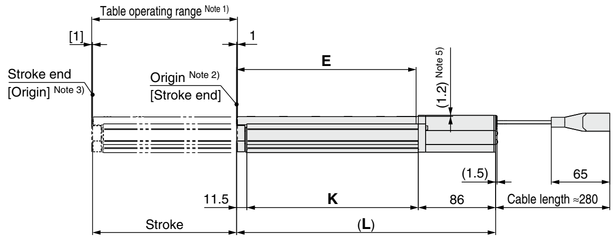
(mm)

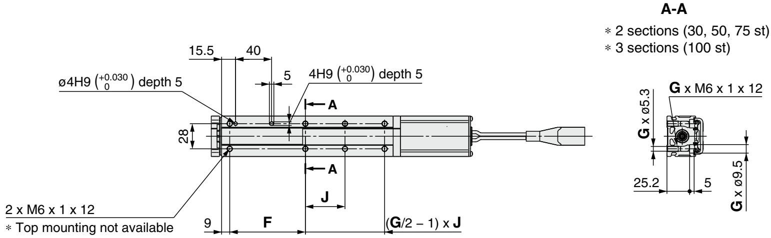
Model	(L)	B	D	E	F	G	J	K
LES8D□□-30□□-□□□□□	171.5	26	6	88.5	44.5	2	—	81
LES8D□□-30B□□-□□□□□	225							
LES8D□□-50□□-□□□□□	214.5	46	6	131.5	64.5	4	23	124
LES8D□□-50B□□-□□□□□□□	268							
LES8D□□-75□□-□□□□□	239.5	50	6	156.5	64.5	4	48	149
LES8D□□-75B□□-□□□□□	293							

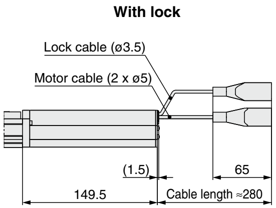
Dimensions: In-line Motor Type/D Type

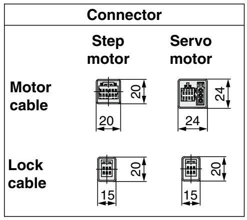
LES16D











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) [ ] for when the direction of return to origin has changed.
Note 4) The distance between the motor end cover and the manual override screw is up to 17 mm. The motor end cover hole size is ø5.5.
Note 5) The table is lower than the motor cover. Make sure it does not interfere with the workpiece.
Note 6) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc.
Use bolts that are between the maximum and minimum screw-in depths in length.

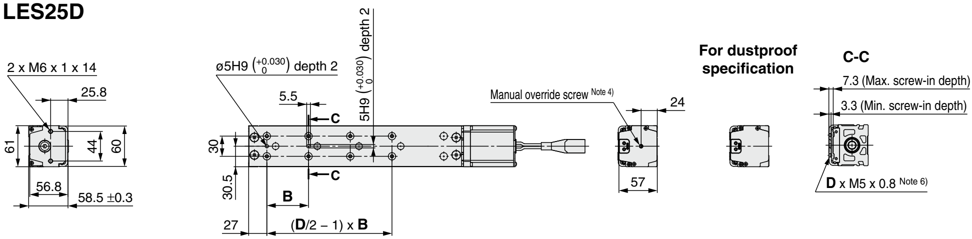
Dimensions

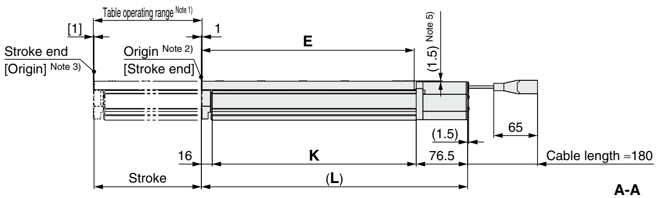
(mm)

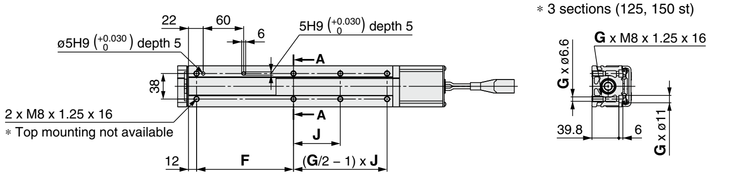
Model	(L)	B	D	E	F	G	J	K
LES16D□□-30□□-□□□□□	193	38	4	102.5	56.5	4	18.5	95.5
LES16D□□-30B□□-□□□□□	256.5							
LES16D□□-50□□-□□□□□	221	34	6	130.5	65	4	38	123.5
LES16D□□-50B□□-□□□□□	284.5							
LES16D□□-75□□-□□□□□	265	36	8	174.5	84	4	63	167.5
LES16D□□-75B□□-□□□□□	328.5							
LES16D□□-100□□-□□□□□	290	36	10	199.5	84	6	44	192.5
LES16D□□-100B□□-□□□□□	353.5							

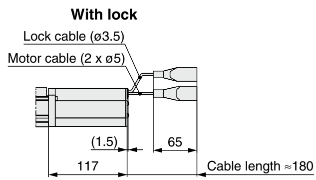
Dimensions: In-line Motor Type/D Type

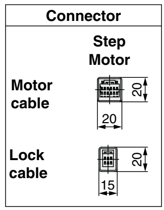
LES25D











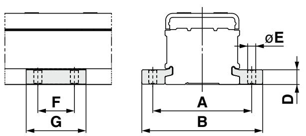
Note 1) Range within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) The distance between the motor end cover and the manual override screw is up to 4 mm. The motor end cover hole size is ø5.5.
Note 5) The table is lower than the motor cover.
Note 6) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

Dimensions

(mm)

Model	(L)	B	D	E	F	G	J	K
LES25D□-30□□-□□□□□	214	48	4	133.5	81	4	19	121.5
LES25D□-30B□□-□□□□□	254.5							
LES25D□-50□□-□□□□□	240	42	6	159.5	87	4	39	147.5
LES25D□-50B□□-□□□□□	280.5							
LES25D□-75□□-□□□□□	274	55	6	193.5	96	4	64	181.5
LES25D□-75B□□-□□□□□	314.5							
LES25D□-100□□-□□□□□	347	50	8	266.5	144	4	89	254.5
LES25D□-100B□□-□□□□□	387.5							
LES25D□-125□□-□□□□□	372	55	8	291.5	144	6	57	279.5
LES25D□-125B□□-□□□□□	412.5							
LES25D□-150□□-□□□□□	397	62	8	316.5	144	6	69.5	304.5
LES25D□-150B□□-□□□□□	437.5							

Side Holder



(mm)

Part no. Note)	A	B	D	E	F	G	Applicable model
LE-D-3-1	45	57.6	6.7	4.5	20	33	LES8D
LE-D-3-2	60	74	8.3	5.5	25	40	LES16D
LE-D-3-3	81	99	12	6.6	30	49	LES25D

Note) Model numbers for 1 side holder.

Series ***LESH***

Model Selection 1

Selection Procedure

For the compact type LES series, refer to page 226.

Step 1 Check the work load–speed. → **Step 2** Check the cycle time. → **Step 3** Check the allowable moment.

Selection Example

Step 1 Check the work load–speed. <Speed–Work load graph> (Page 251)

Select the target model based on the workpiece mass and speed with reference to the <Speed–Work load graph>.

Selection example) The **LESH16□J-50** is temporarily selected based on the graph shown on the right side.

Step 2 Check the cycle time.

It is possible to obtain an approximate cycle time by using method 1, but if a more detailed cycle time is required, use method 2.

∗ Although it is possible to make a suitable selection by using method 1, this calculation is based on a maximum load condition. Therefore, if a more detailed selection for each load is required, use method 2.

Method 1: Check the cycle time graph. (Page 252)

Method 2: Calculation <Speed–Work load graph> (Page 251)

Calculate the cycle time using the following calculation method.

Cycle time:

T can be found from the following equation.

$$T = T1 + T2 + T3 + T4 \text{ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

$$T1 = V/a1 \text{ [s]} \qquad T3 = V/a2 \text{ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} \text{ [s]}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$$T4 = 0.15 \text{ [s]}$$

Calculation example)

T1 to T4 can be calculated as follows.

$T1 = V/a1 = 220/5000 = 0.04$ [s],

$T3 = V/a2 = 220/5000 = 0.04$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}$$

$$= \frac{50 - 0.5 \cdot 220 \cdot (0.04 + 0.04)}{220}$$

$$= 0.19 \text{ [s]}$$

$T4 = 0.15$ [s]

Therefore, the cycle time can be obtained as follows.

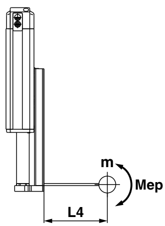
$T = T1 + T2 + T3 + T4$

$= 0.04 + 0.19 + 0.04 + 0.15$

$= \mathbf{0.42}$ **[s]**

Step 3 Check the allowable moment. <Static allowable moment> (Page 252) <Dynamic allowable moment> (Page 253)

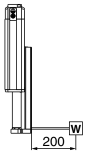
Confirm the moment that applies to the actuator is within the allowable range for both static and dynamic conditions.



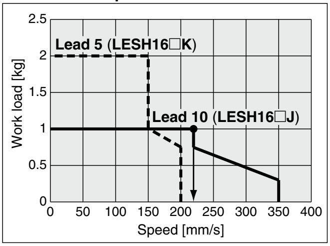
Based on the above calculation result, the LESH16□J-50 is selected.

Operating conditions

- Workpiece mass: 1 [kg]
- Speed: 220 [mm/s]
- Mounting orientation: Vertical
- Stroke: 50 [mm]
- Acceleration/Deceleration: 5,000 [mm/s²]
- Cycle time: 0.5 seconds
- Workpiece mounting condition:

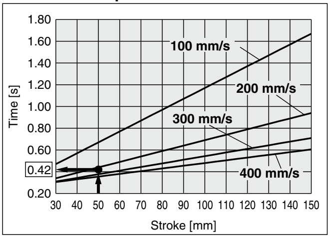


LESH16□/Step Motor Vertical



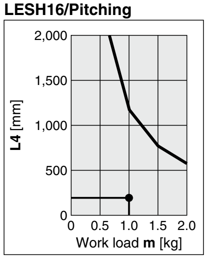
<Speed–Work load graph>

LESH16□/Step Motor



<Cycle time>

LESH16/Pitching



<Dynamic allowable moment>

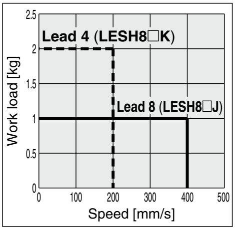
Speed–Work Load Graph (Guide)

Step Motor (Servo/24 VDC)

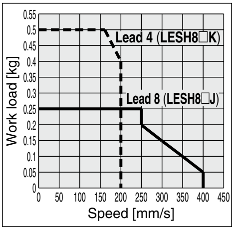
∗ The following graph shows the values when moving force is 100%.

LESH8□

Horizontal

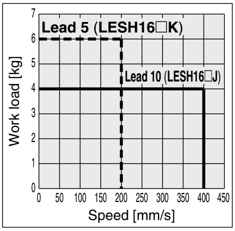


Vertical

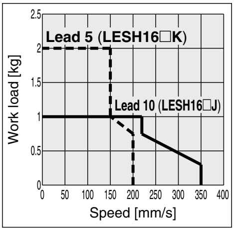


LESH16□

Horizontal

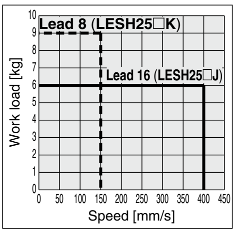


Vertical

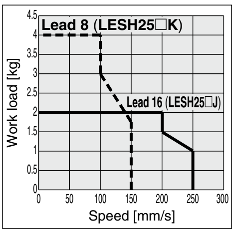


LESH25□

Horizontal



Vertical

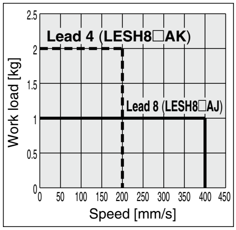


Servo Motor (24 VDC)

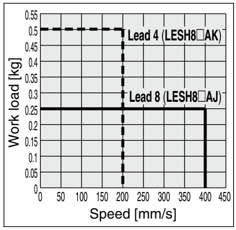
∗ The following graph shows the values when moving force is 250%.

LESH8□A

Horizontal

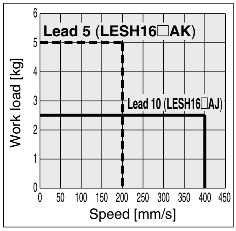


Vertical

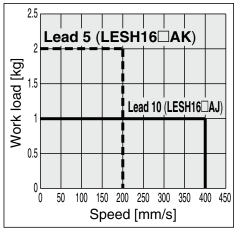


LESH16□A

Horizontal

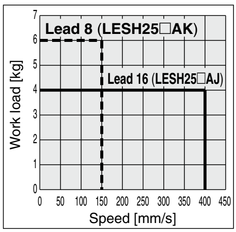


Vertical

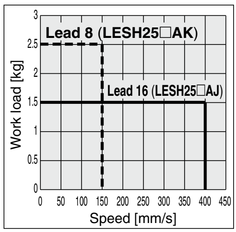


LESH25$^{R}_{L}$A

Horizontal

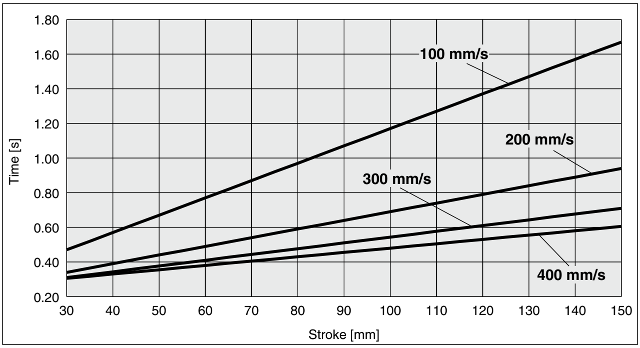


Vertical



LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Cycle Time (Guide)



Operating Conditions
Acceleration/Deceleration: 5,000 mm/s^2
In position: 0.5

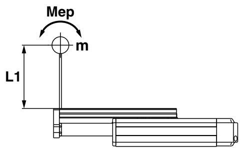
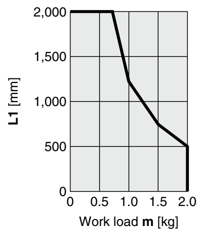
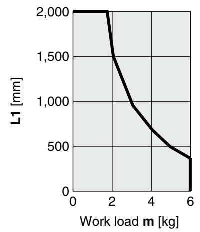
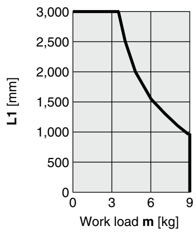
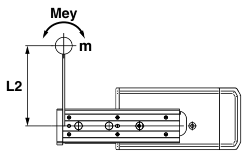
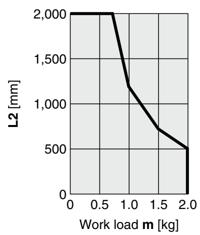
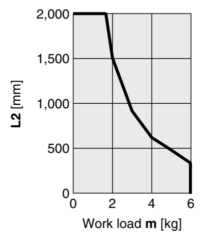
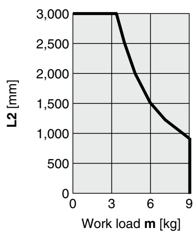
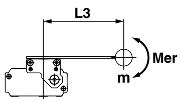
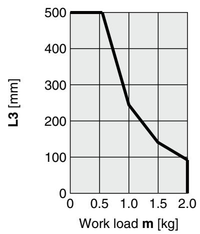
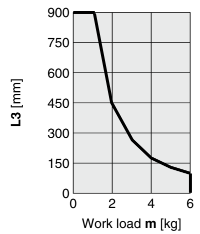
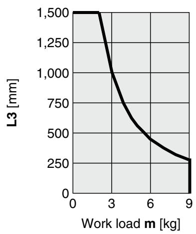
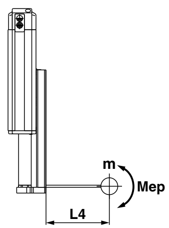
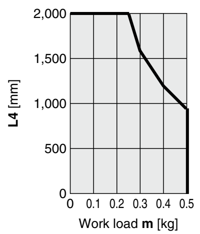
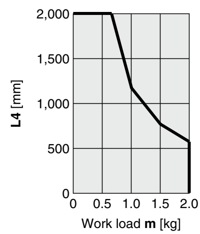
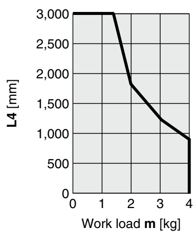
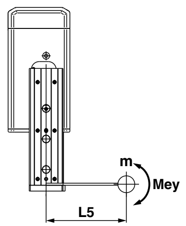
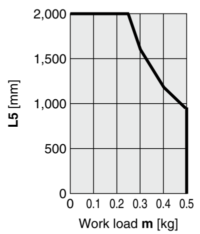
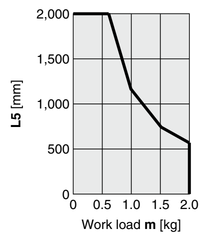
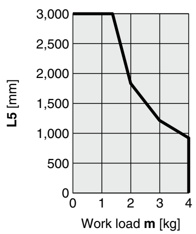
Static Allowable Moment

Model		LESH8		LESH16		LESH25		
Stroke	[mm]	**50**	**75**	**50**	**100**	**50**	**100**	**150**
Pitching	[N·m]	11		26	43	77	112	155
Yawing	[N·m]	11						
Rolling	[N·m]	12		48		146	177	152

Dynamic Allowable Moment

∗ This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

Acceleration/Deceleration —— 5,000 mm/s²

Orientation	Load overhanging direction m : Work load [kg] Me: Dynamic allowable moment [N·m] L : Overhang to the work load center of gravity [mm]		Model: LESH8	LESH16	LESH25
Horizontal		Pitching Mep			
		Yawing Mey			
		Rolling Mer			
Vertical		Pitching Mep			
		Yawing Mey			

Model Selection 2

Selection Procedure

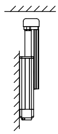
For the compact type LES series, refer to page 230.

Step 1 Check the required force. → **Step 2** Check the set value of pushing force. → **Step 3** Check the duty ratio.

Selection Example

Operating conditions

- Pushing force: 90 [N]
- Workpiece mass: 1 [kg]
- Speed: 100 [mm/s]
- Stroke: 100 [mm]
- Mounting orientation: Vertical upward
- Pushing time + Operation (A): 1.5 seconds
- All cycle time (B): 6 seconds



Step 1 Check the required force.

Calculate the approximate required force for pushing operation.
Selection example) • Pushing force: 90 [N]
• Workpiece mass: 1 [kg]
Therefore, the approximate required force can be obtained as 90 + 10 = 100 [N].
Select the target model based on the approximate required force with reference to the specifications (Pages 260 and 261).
Selection example) Based on the specifications,
• Approximate required force: 100 [N]
• Speed: 100 [mm/s]
Therefore, the **LESH25□** is temporarily selected.
Then, calculate the required force for pushing operation.
If the mounting position is vertical upward, add the actuator table weight.
Selection example) Based on the <Table weight>,
• **LESH25□** table weight: 1.3 [kg]
Therefore, the required force can be obtained as 100 + 13 = 113 [N].

Step 2 Check the set value of pushing force.

<Set value of pushing force–Force graph> (Page 255)

Select the target model based on the required force with reference to the <Set value of pushing force–Force graph>, and confirm the set value of pushing force.
Selection example) Based on the graph shown on the right side,
• Required force: 113 [N]
Therefore, the **LESH25□K** is temporarily selected.
This set value of pushing force is 40 [%].

Step 3 Check the duty ratio.

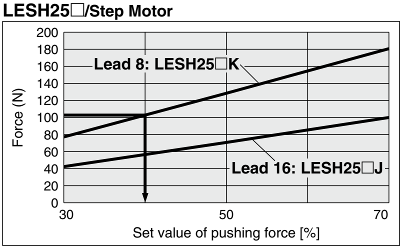
Confirm the allowable duty ratio based on the set value of pushing force with reference to the <Allowable duty ratio>.
Selection example) Based on the <Allowable duty ratio>,
• Set value of pushing force: 40 [%]
Therefore, the allowable duty ratio can be obtained as 30 [%].
Calculate the duty ratio for operating conditions, and confirm it does not exceed the allowable duty ratio.
Selection example) • Pushing time + Operation (A): 1.5 seconds
• All cycle time (B): 6 seconds
Therefore, the duty ratio can be obtained as 1.5/6 x 100 = 25 [%], and this is the allowable range.

Table Weight [kg]

Model	Stroke [mm]			
	50	75	100	150
LESH8	0.2	0.3	—	—
LESH16	0.4	—	0.7	—
LESH25	0.9	—	1.3	1.7

∗ If the mounting position is vertical upward, add the table weight.

LESH25□/Step Motor



<Set value of pushing force–Force graph>

Allowable Duty Ratio

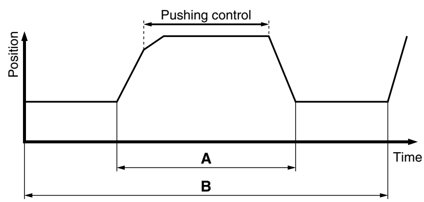
Step Motor (Servo/24 VDC)

Set value of pushing force (%)	Duty ratio (%)	Continuous pushing time (minute)
30	—	—
50 or less	30 or less	5 or less
70 or less	20 or less	3 or less

Servo Motor (24 VDC)

Set value of pushing force (%)	Duty ratio (%)	Continuous pushing time (minute)
50	—	—
75 or less	30 or less	5 or less
100 or less	20 or less	3 or less

∗ The pushing force of the LESH8□A is up to 75%.

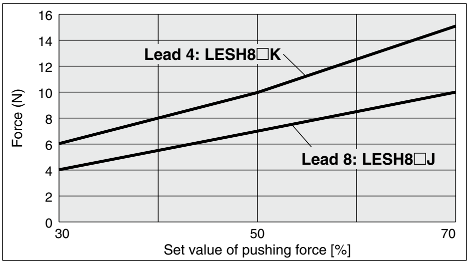


Based on the above calculation result, the LESH25□K-100 is selected.
For allowable moment, the selection procedure is the same as the positioning control.

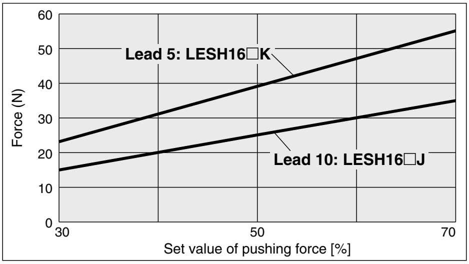
Set Value of Pushing Force–Force Graph

Step Motor (Servo/24 VDC)

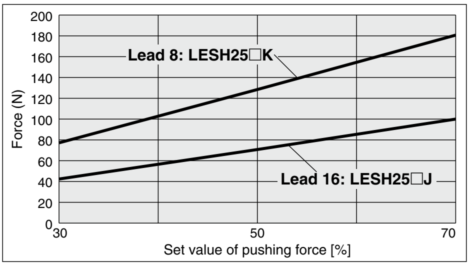
LESH8□



LESH16□

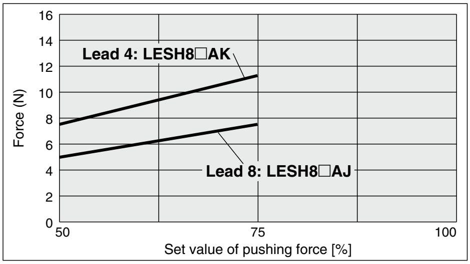


LESH25□

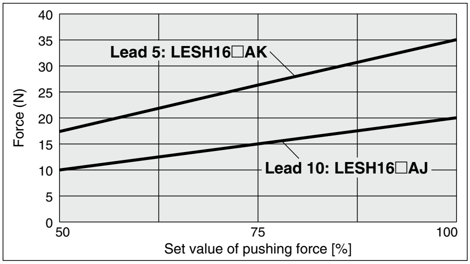


Servo Motor (24 VDC)

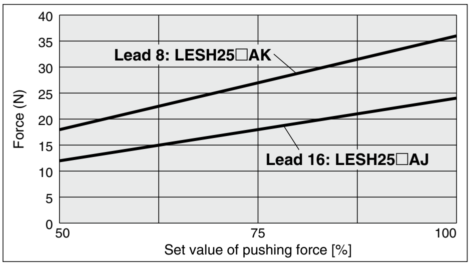
LESH8□A



LESH16□A



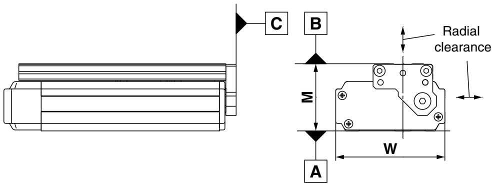
LESH25$\genfrac{}{}{0pt}{}{R}{L}$A



LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Table Accuracy

* These values are initial guideline values.

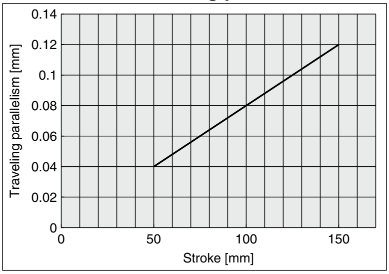


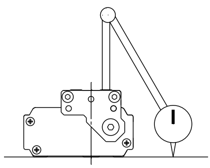
Model	LESH8	LESH16	LESH25
B side parallelism to A side [mm]	Refer to Table 1.		
B side traveling parallelism to A side [mm]	Refer to Graph 1.		
C side perpendicularity to A side [mm]	0.05	0.05	0.05
M dimension tolerance [mm]	±0.3		
W dimension tolerance [mm]	±0.2		
Radial clearance [μm]	–4 to 0	–10 to 0	–14 to 0

Table 1 B side parallelism to A side

Model	Stroke [mm]			
	50	75	100	150
LESH8	0.055	0.065	—	—
LESH16	0.05	—	0.08	—
LESH25	0.06	—	0.08	0.125

Graph 1 B side traveling parallelism to A side





Traveling parallelism:
The amount of deflection on a dial gauge when the table travels a full stroke with the body secured on a reference base surface

Table Deflection (Reference Value)

∗ These values are initial guideline values.

Table displacement due to pitch moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.

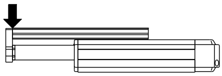


Table displacement due to yaw moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.

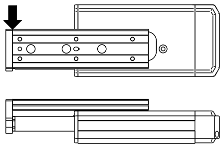
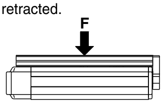
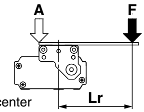


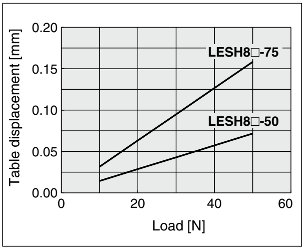
Table displacement due to roll moment load
Table displacement of section A when loads are applied to the section F with the slide table retracted.



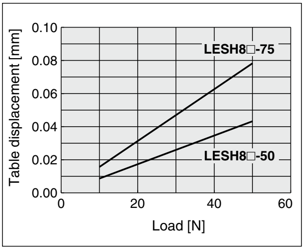


Lr: Distance between the center of the table and the work load center of gravity

LESH8

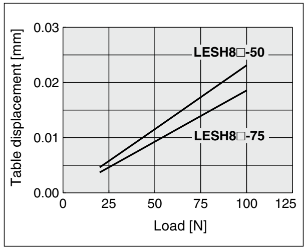


LESH8

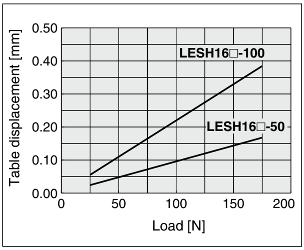


LESH8

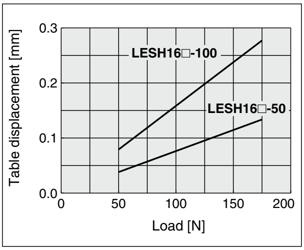
Lr = 70 mm



LESH16

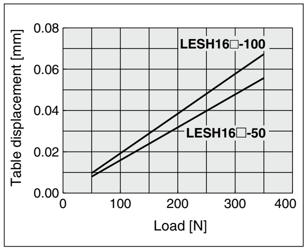


LESH16

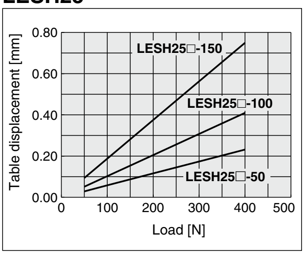


LESH16

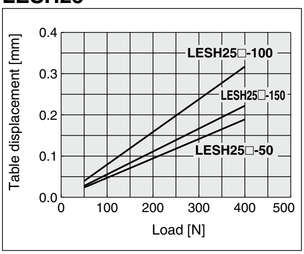
Lr = 120 mm



LESH25

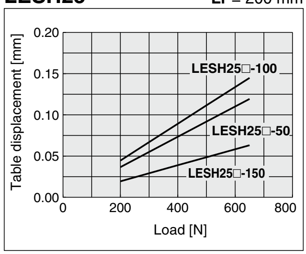


LESH25



LESH25

Lr = 200 mm



Electric Slide Table/High Rigidity Type

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

Series LESH

LESH8, 16, 25

RoHS

How to Order

LESH [8] [R] [ ] [J] – [50] [ ] [ ] [ ] – [S] [1] [6N] [1] [ ]

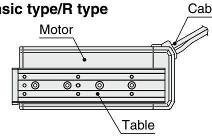
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭

❶ Size

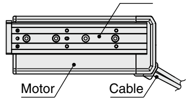
8
16
25

❷ Motor mounting position

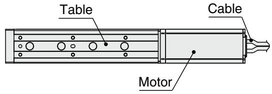
R — **Basic type/R type**



L — **Symmetrical type/L type**



D — **In-line motor type/D type**



❸ Motor type

Symbol	Type	Compatible controllers/ driver
Nil	Step motor (Servo/24 VDC)	LECP6 LECP1 LECPA
A	Servo motor* (24 VDC)	LECA6

∗ LESH25DA is not available.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LES 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.

② For the servo motor (24 VDC) specification, EMC compliance was tested by installing a noise filter set (LEC-NFA).
Refer to page 394 for the noise filter set.
Refer to the LECA Operation Manual for installation.

[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.

❹ Lead [mm]

Symbol	LESH8	LESH16	LESH25
J	8	10	16
K	4	5	8

❺ Stroke [mm]

Model \ Stroke	50	75	100	150
LESH8	●*	●	—	—
LESH16	●*	—	●	—
LESH25	●	—	●	●

∗ R/L type with lock is not available.

❻ Motor option

Nil	Without option
B	With lock

❼ Body option

Nil	Without option
S	Dustproof specification*

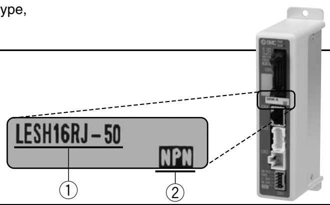
∗ For R/L type (IP5X equivalent), a scraper is mounted on the rod cover, and gaskets are mounted on both the end covers. For D type, a scraper is mounted on the rod cover.

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

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

Basic type (R type)

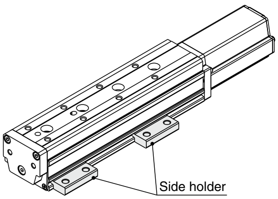
Symmetrical type (L type)

In-line motor type (D type)

❽ Mounting*

Symbol	Mounting	R type L type	D type
Nil	Without side holder	●	●
H	With side holder (4 pcs.)	—	●

* Refer to page 273 for details.



❾ Actuator cable type*1

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

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.
*2 Only available for the motor type “Step motor.”

❿ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 260.

⓫ Controller/Driver type*1

Nil	Without controller/driver	
6N	**LECP6/LECA6** (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 Refer to page 377 for the detailed specifications of the controller/driver.
*2 Only available for the motor type “Step motor.”

⓬ I/O cable length [m]*1

Nil	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 394 (For LECP6/LECA6), page 407 (For LECP1) or page 414 (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.

⓭ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. Refer to page 387 for details.

Compatible Controllers/Driver

Type	**Step data input type** 	**Step data input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECA6**	**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)	Servo motor (24 VDC)	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 386		Page 401	Page 408

Specifications

Step Motor (Servo/24 VDC)

Model			LESH8□		LESH16□		LESH25□	
Actuator specifications	Stroke [mm]		50, 75		50, 100		50, 100, 150	
	Work load [kg] Note 1) 3)	Horizontal	2	1	6	4	9	6
		Vertical	0.5	0.25	2	1	4	2
	Pushing force [N] 30% to 70% Note 2) 3)		6 to 15	4 to 10	23.5 to 55	15 to 35	77 to 180	43 to 100
	Speed [mm/s] Note 1) 3)		10 to 200	20 to 400	10 to 200	20 to 400	10 to 150	20 to 400
	Pushing speed [mm/s]		10 to 20	20	10 to 20	20	10 to 20	20
	Max. acceleration/deceleration [mm/s²]		5,000					
	Positioning repeatability [mm]		±0.05					
	Screw lead [mm]		4	8	5	10	8	16
	Impact/Vibration resistance [m/s²] Note 4)		50/20					
	Actuation type		Slide screw + Belt (R/L type), Slide screw (D type)					
	Guide type		Linear guide (Circulating type)					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
Electric specifications	Motor size		□20		□28		□42	
	Motor type		Step motor (Servo/24 VDC)					
	Encoder		Incremental A/B phase (800 pulse/rotation)					
	Rated voltage [V]		24 VDC ±10%					
	Power consumption [W] Note 5)		20		43		67	
	Standby power consumption when operating [W] Note 6)		7		15		13	
	Max. instantaneous power consumption [W] Note 7)		35		60		74	
Lock unit specifications	Type	Note 8)	Non-magnetizing lock					
	Holding force [N]		24	2.5	300	48	500	77
	Power consumption [W] Note 9)		4		3.6		5	
	Rated voltage [V]		24 VDC ±10%					

Note 1) Speed changes according to the work load. Check "Speed–Work Load Graph (Guide)" on page 251.
Note 2) Pushing force accuracy is ±20% (F.S.).
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) 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.)
Impact resistance: No malfunction occurred when the actuator 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.)
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 the operation. Except during the pushing 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) With lock only
Note 9) For an actuator with lock, add the power consumption for the lock.

Specifications

Servo Motor (24 VDC)

Model			LESH8□A		LESH16□A		LESH25$^{R}_{L}$A Note 1)	
Actuator specifications	Stroke [mm]		50, 75		50, 100		50, 100, 150	
	Work load [kg]	Horizontal	2	1	5	2.5	6	4
		Vertical	0.5	0.25	2	1	2.5	1.5
	Pushing force 50 to 100% [N] Note 2)		7.5 to 11	5 to 7.5	17.5 to 35	10 to 20	18 to 36	12 to 24
	Speed [mm/s]		10 to 200	20 to 400	10 to 200	20 to 400	10 to 150	20 to 400
	Pushing speed [mm/s] Note 2)		10 to 20	20	10 to 20	20	10 to 20	20
	Max. acceleration/deceleration [mm/s^2]		5,000					
	Positioning repeatability [mm]		±0.05					
	Screw lead [mm]		4	8	5	10	8	16
	Impact/Vibration resistance [m/s^2] Note 3)		50/20					
	Actuation type		Slide screw + Belt (R/L type), Slide screw (D type)					
	Guide type		Linear guide (Circulating type)					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
Electric specifications	Motor size		□20		□28		□42	
	Motor output [W]		10		30		36	
	Motor type		Servo motor (24 VDC)					
	Encoder		Incremental A/B/Z phase (800 pulse/rotation)					
	Rated voltage [V]		24 VDC ±10%					
	Power consumption [W] Note 4)		58		84		144	
	Standby power consumption when operating [W] Note 5)		4 (Horizontal)/7 (Vertical)		2 (Horizontal)/15 (Vertical)		4 (Horizontal)/43 (Vertical)	
	Max. instantaneous power consumption [W] Note 6)		84		124		158	
Lock unit specifications	Type	Note 7)	Non-magnetizing lock					
	Holding force [N]		24	2.5	300	48	500	77
	Power consumption [W] Note 8)		3.5		2.9		5	
	Rated voltage [V]		24 VDC ±10%					

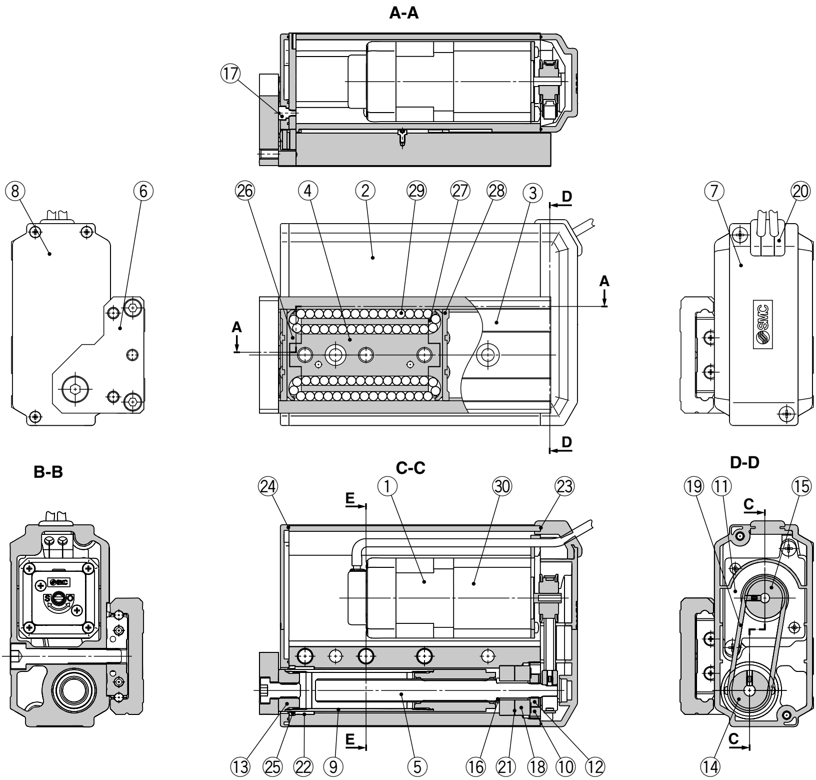
Note 1) LESH25DA is not available.
Note 2) The pushing force values for LESH8□A is 50% to 75%. Pushing force accuracy is ±20% (F.S.).
Note 3) Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the actuator in the initial state.)
Impact resistance: No malfunction occurred when the actuator 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.)
Note 4) The power consumption (including the controller) is for when the actuator is operating.
Note 5) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during the operation. Except during the pushing operation.
Note 6) 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 7) With lock only
Note 8) For an actuator with lock, add the power consumption for the lock.

Weight

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

Model		Basic type/R type, Symmetrical type/L type							In-line motor type/D type						
		LESH8$^{R}_{L}$(A)		LESH16$^{R}_{L}$(A)		LESH25$^{R}_{L}$(A)			LESH8D(A)		LESH16D(A)		LESH25D		
Stroke [mm]		50	75	50	100	50	100	150	50	75	50	100	50	100	150
Product weight [kg]	Without lock	0.55	0.70	1.15	1.60	2.50	3.30	4.26	0.57	0.70	1.25	1.70	2.52	3.27	3.60
	With lock	—	0.76	—	1.71	2.84	3.64	4.60	0.63	0.76	1.36	1.81	2.86	3.61	3.94

Construction: Basic Type/R Type, Symmetrical Type/L Type



Component Parts

No.	Description	Material	Note
1	**Motor**	—	—
2	**Body**	Aluminum alloy	Anodized
3	**Table**	Stainless steel	Heat treatment + Electroless nickel plated
4	**Guide block**	Stainless steel	Heat treatment
5	**Lead screw**	Stainless steel	Heat treatment + Specially treated
6	**End plate**	Aluminum alloy	Anodized
7	**Pulley cover**	Synthetic resin	—
8	**End cover**	Synthetic resin	—
9	**Rod**	Stainless steel	—
10	**Bearing stopper**	Structural steel	Electroless nickel plated
		Brass	Electroless nickel plated (LESH25R/L□ only)
11	**Motor plate**	Structural steel	
12	**Lock nut**	Structural steel	Chromate treated
13	**Socket**	Structural steel	Electroless nickel plated
14	**Lead screw pulley**	Aluminum alloy	—
15	**Motor pulley**	Aluminum alloy	—
16	**Spacer**	Stainless steel	LESH25R/L□ only
17	**Origin stopper**	Structural steel	Electroless nickel plated
18	**Bearing**	—	—
19	**Belt**	—	—
20	**Grommet**	Synthetic resin	—
21	**Sim ring**	Structural steel	—
22	**Bushing**	—	Dustproof specification only
23	**Pulley gasket**	NBR	Dustproof specification only
24	**End gasket**	NBR	Dustproof specification only
25	**Scraper**	NBR	Dustproof specification only/Rod
26	**Cover**	Synthetic resin	—
27	**Return guide**	Synthetic resin	—
28	**Scraper**	Stainless steel + NBR	Linear guide
29	**Steel ball**	Special steel	—
30	**Lock**	—	With lock only

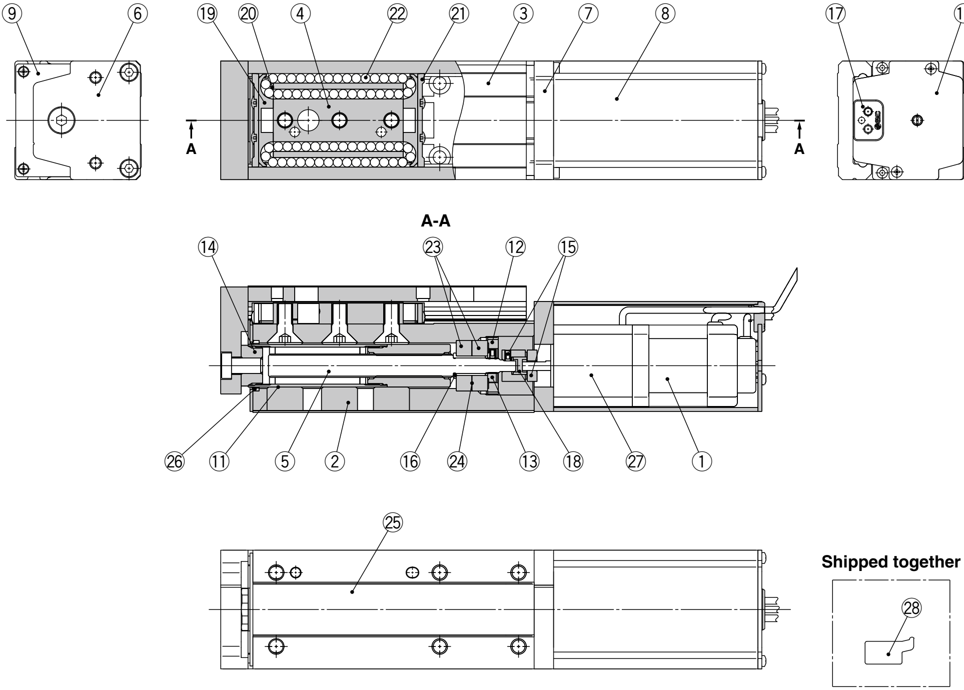
Replacement Parts/Belt

Model	Order no.
LESH8□	LE-D-1-1
LESH16□	LE-D-1-2
LESH25□	LE-D-1-3
LESH25□A	LE-D-1-4

Replacement Parts/Grease Pack

Applied portion	Order no.
Guide unit	GR-S-010 (10 g) GR-S-020 (20 g)

Construction: In-line Motor Type/D Type



Component Parts

No.	Description	Material	Note
1	**Motor**	—	—
2	**Body**	Aluminum alloy	Anodized
3	**Table**	Stainless steel	Heat treatment + Electroless nickel plated
4	**Guide block**	Stainless steel	Heat treatment
5	**Lead screw**	Stainless steel	Heat treatment + Specially treated
6	**End plate**	Aluminum alloy	Anodized
7	**Motor flange**	Aluminum alloy	Anodized
8	**Motor cover**	Aluminum alloy	Anodized
9	**End cover**	Aluminum alloy	Anodized
10	**Motor end cover**	Aluminum alloy	Anodized
11	**Rod**	Stainless steel	—
12	**Bearing stopper**	Structural steel	Electroless nickel plated
		Brass	Electroless nickel plated (LESH25D☐ only)
13	**Socket**	Structural steel	Electroless nickel plated
14	**Hub (Lead screw side)**	Aluminum alloy	—
15	**Hub (Motor side)**	Aluminum alloy	—
16	**Spacer**	Stainless steel	LESH25D☐ only
17	**Grommet**	NBR	—
18	**Spider**	NBR	—
19	**Cover**	Synthetic resin	—
20	**Return guide**	Synthetic resin	—
21	**Scraper**	Stainless steel + NBR	Linear guide
22	**Steel ball**	Special steel	—
23	**Bearing**	—	—
24	**Sim ring**	Structural steel	—
25	**Masking tape**	—	—
26	**Scraper**	NBR	Dustproof specification only/Rod
27	**Lock**	—	With lock only
28	**Side holder**	Aluminum alloy	Anodized

Optional Parts/Side Holder

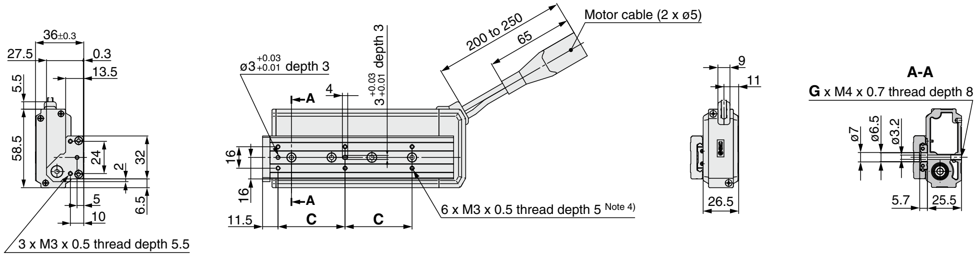
Model	Order no.
LESH8D	LE-D-3-1
LESH16D	LE-D-3-2
LESH25D	LE-D-3-3

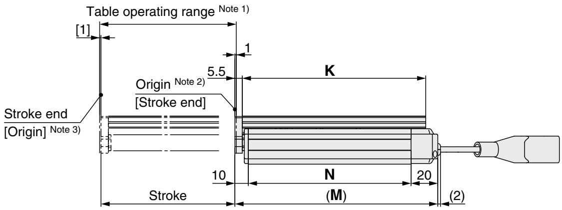
Replacement Parts/Grease Pack

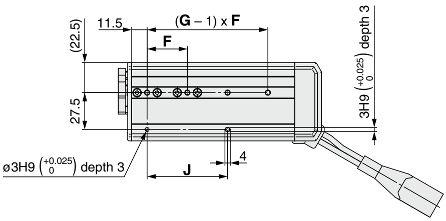
Applied portion	Order no.
Guide unit	GR-S-010 (10 g) GR-S-020 (20 g)

Dimensions: Basic Type/R Type

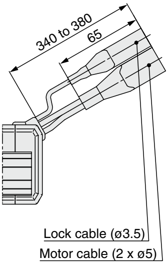
LESH8R



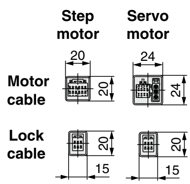




With lock



Connector



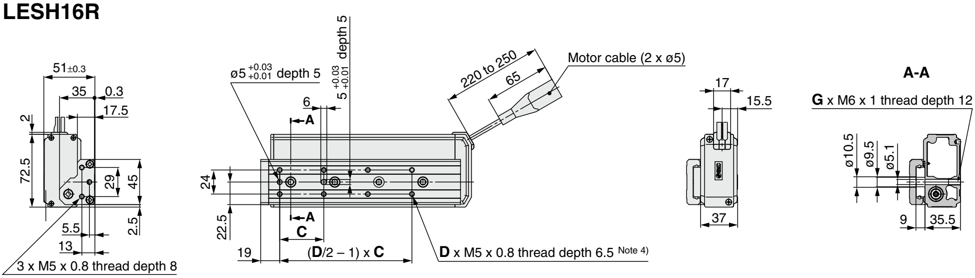
[mm]

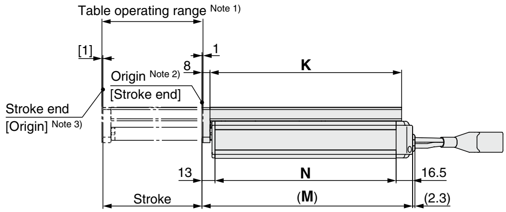
Model	C	F	G	J	K	M	N
LESH8R□□-50□□-□□□□□	46	29	3	58	111	125.5	95.5
LESH8R□□-75□□-□□□□□	50	30	4	60	137	151.5	121.5

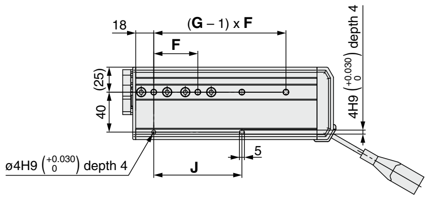
Note 1) Range within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

Dimensions: Basic Type/R Type

LESH16R







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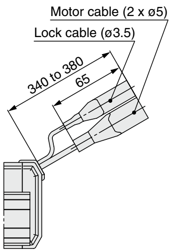

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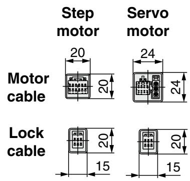


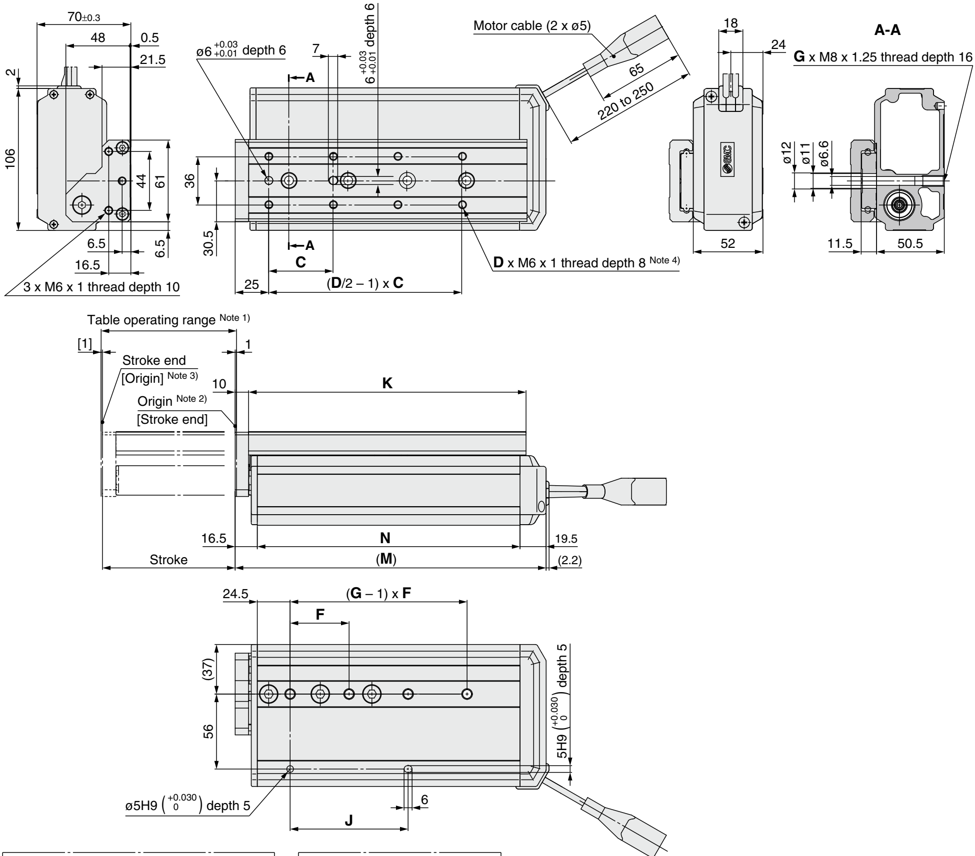
[mm]

Model	C	D	F	G	J	K	M	N
LESH16R□□-50□□-□□□□□	40	6	45	2	45	116.5	135.5	106
LESH16R□□-100□□-□□□□□	44	8	44	4	88	191.5	210.5	181

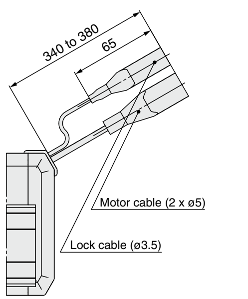
Note 1) Range within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

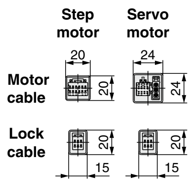
Dimensions: Basic Type/R Type

LESH25R



With lock	Connector





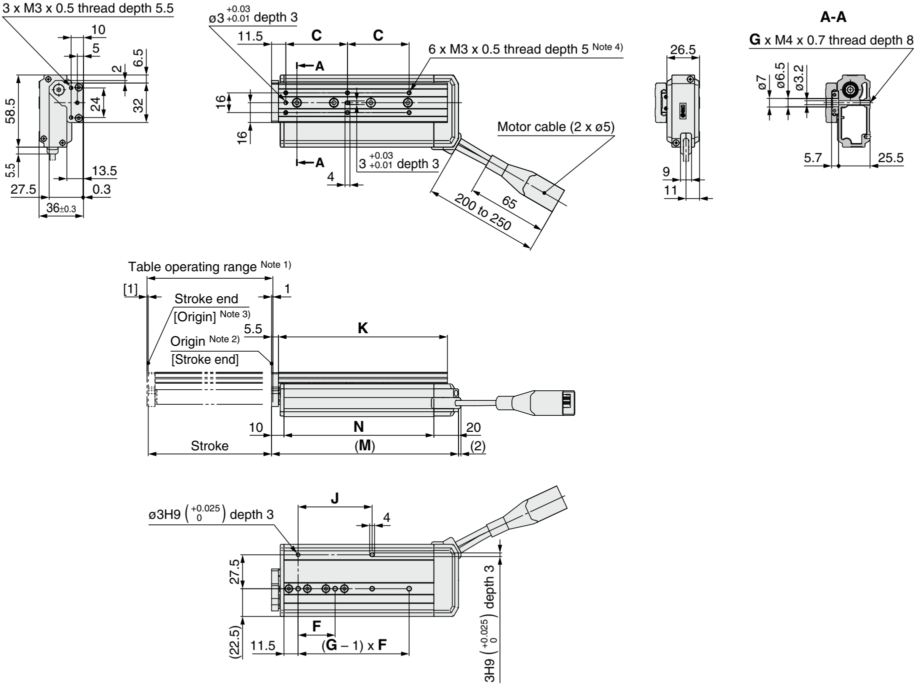
[mm]

Model	C	D	F	G	J	K	M	N
LESH25R□□-50□□-□□□□□	75	4	80	2	80	143	168	132
LESH25R□□-100□□-□□□□□	48	8	44	4	88	207	232	196
LESH25R□□-150□□-□□□□□	65	8	66	4	132	285	310	274

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) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

Dimensions: Symmetrical Type/L Type

LESH8L



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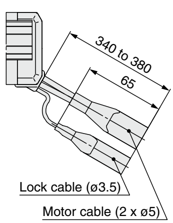

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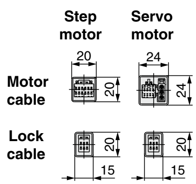


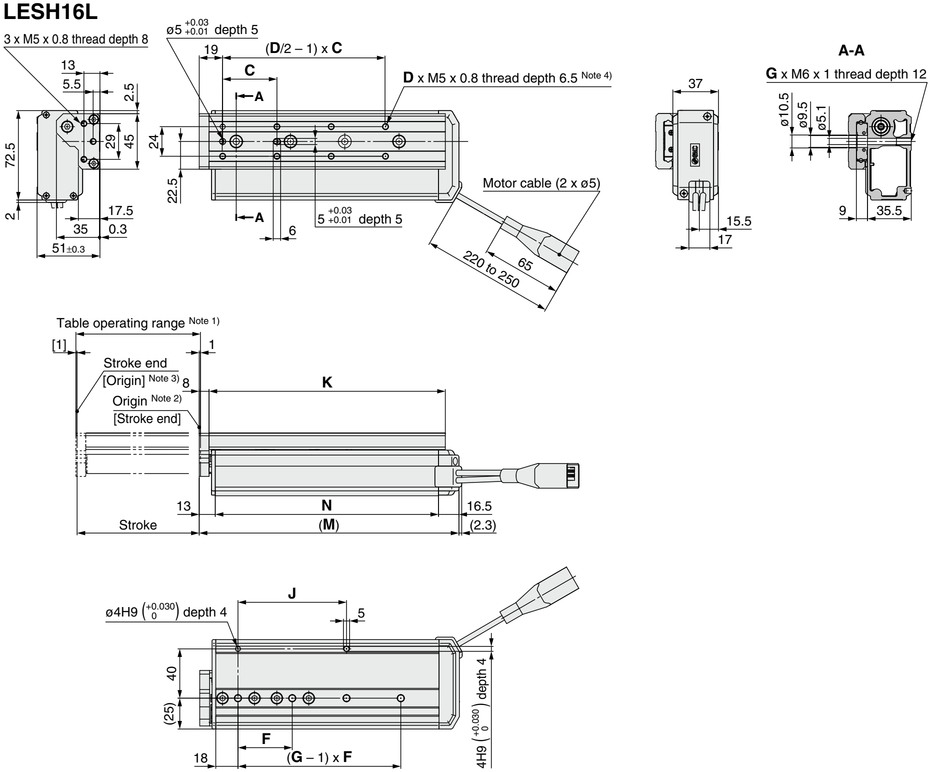
[mm]

Model	C	F	G	J	K	M	N
LESH8L□□-50□□-□□□□□	46	29	3	58	111	125.5	95.5
LESH8L□□-75□□-□□□□□	50	30	4	60	137	151.5	121.5

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) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

Dimensions: Symmetrical Type/L Type

LESH16L



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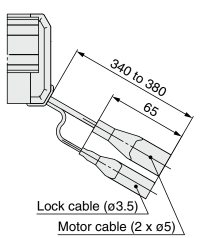

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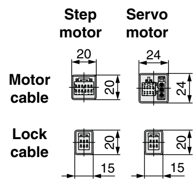


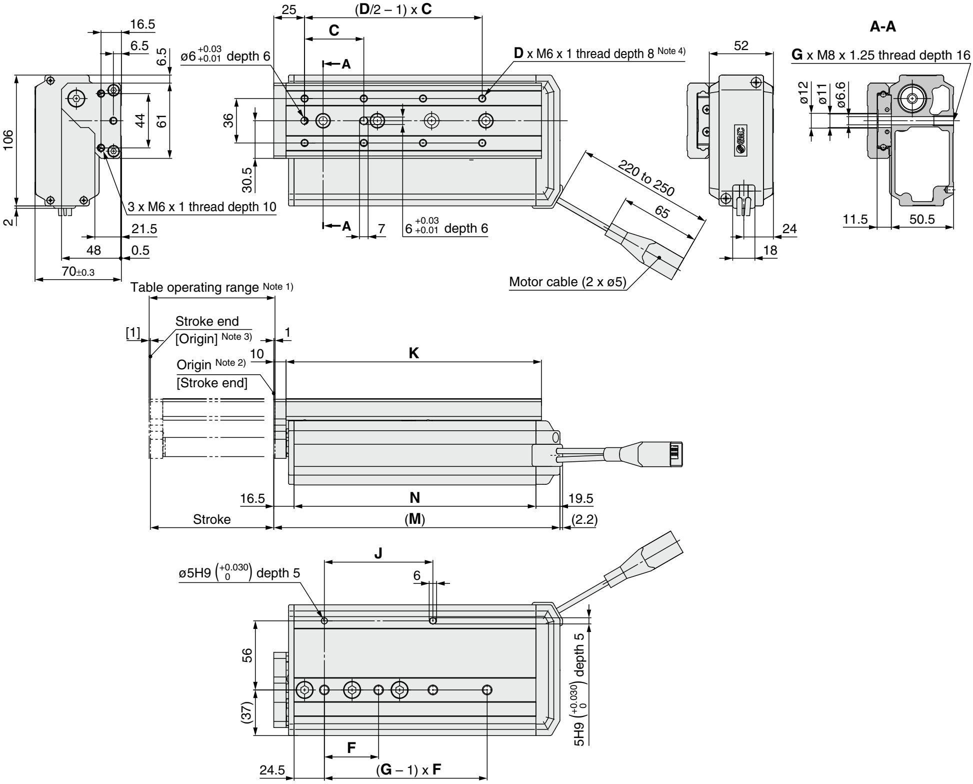
[mm]

Model	C	D	F	G	J	K	M	N
LESH16L□□-50□□-□□□□□	40	6	45	2	45	116.5	135.5	106
LESH16L□□-100□□-□□□□□	44	8	44	4	88	191.5	210.5	181

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) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

Dimensions: Symmetrical Type/L Type

LESH25L



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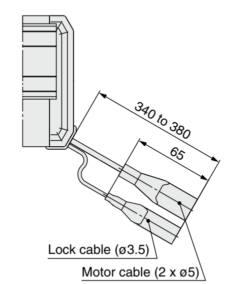

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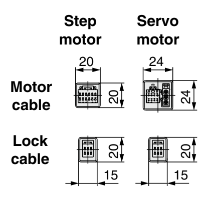


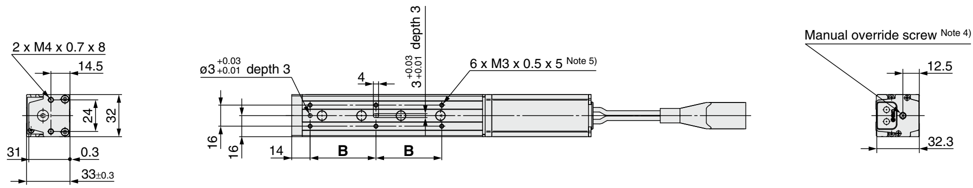
[mm]

Model	C	D	F	G	J	K	M	N
LESH25L□□-50□□-□□□□□	75	4	80	2	80	143	168	132
LESH25L□□-100□□-□□□□□	48	8	44	4	88	207	232	196
LESH25L□□-150□□-□□□□□	65	8	66	4	132	285	310	274

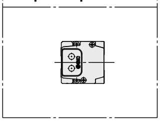
Note 1) Range within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

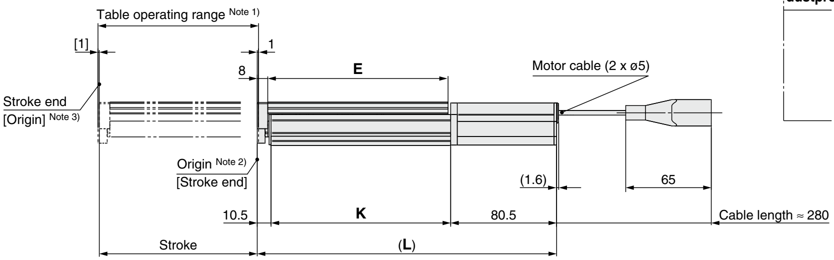
Dimensions: In-line Motor Type/D Type

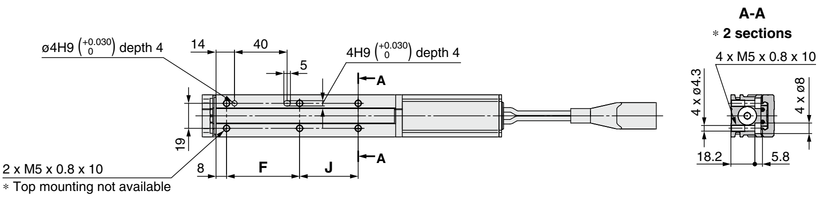
LESH8D



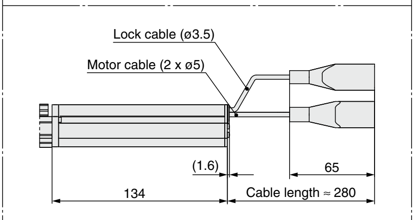
For servo motor and dustproof specification



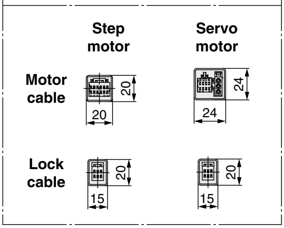




With lock



Connector



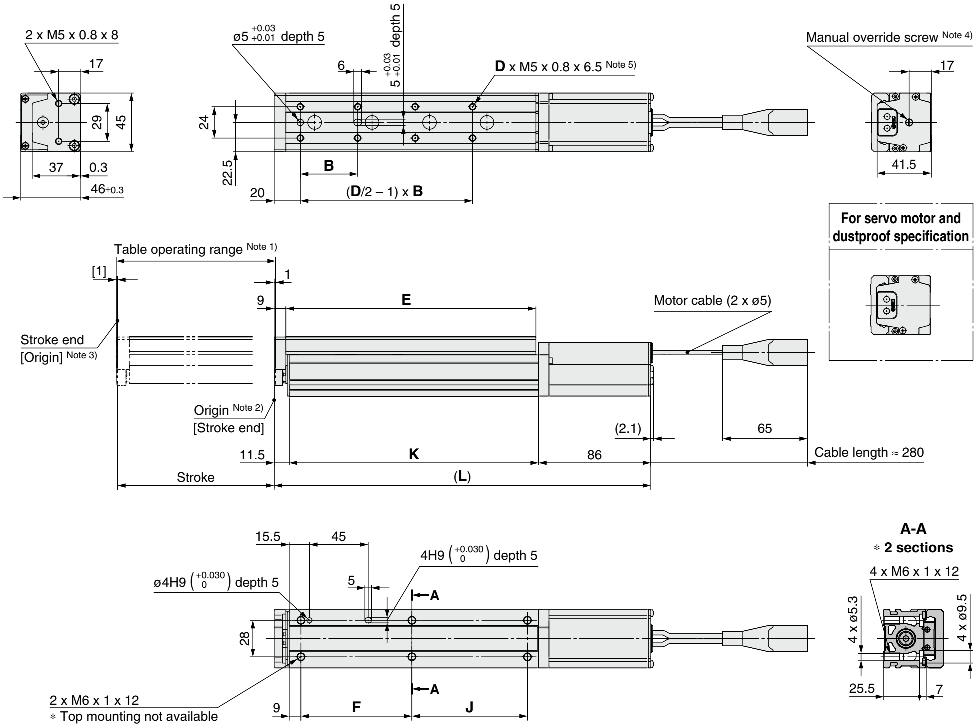
[mm]

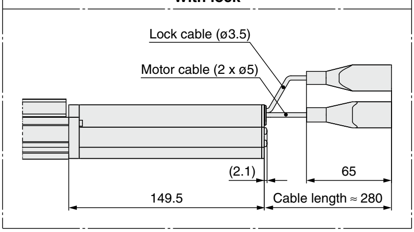
Model	L	B	E	F	J	K
LESH8D□□-50□□-□□□□□	201.5	46	111	54.5	19.5	110.5
LESH8D□□-50B□□-□□□□□	255					
LESH8D□□-75□□-□□□□□	227.5	50	137	55.5	44.5	136.5
LESH8D□□-75B□□-□□□□□	281					

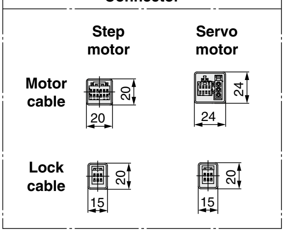
Note 1) Range within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) The distance between the motor end cover and the manual override screw is up to 16 mm. The motor end cover hole size is ø5.5.
Note 5) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

Dimensions: In-line Motor Type/D Type

LESH16D







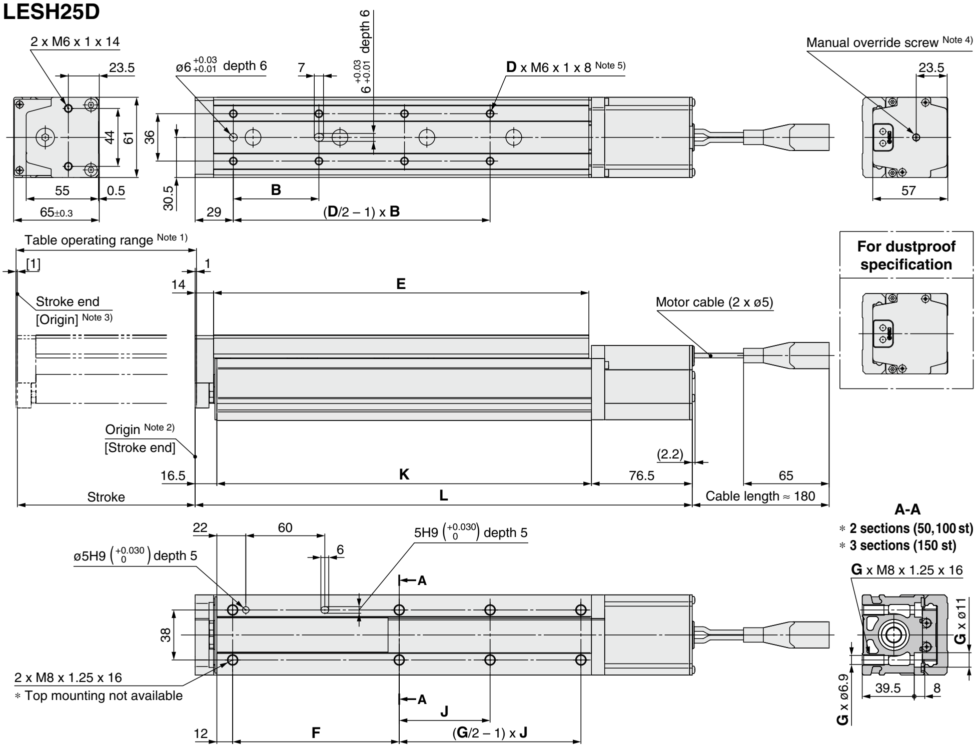
[mm]

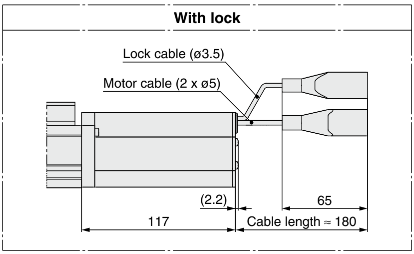
Model	L	B	D	E	F	J	K
LESH16D□□-50□□-□□□□□	219.5	40	6	116.5	65	39.5	122
LESH16D□□-50B□□-□□□□□	283						
LESH16D□□-100□□-□□□□□	288.5	44	8	191.5	85	88.5	191
LESH16D□□-100B□□-□□□□□	352						

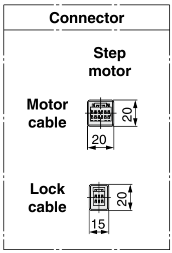
Note 1) Range within which the table can move when it returns to origin. Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) The distance between the motor end cover and the manual override screw is up to 17 mm. The motor end cover hole size is ø5.5.
Note 5) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc. Use bolts that are between the maximum and minimum screw-in depths in length.

Dimensions: In-line Motor Type/D Type

LESH25D





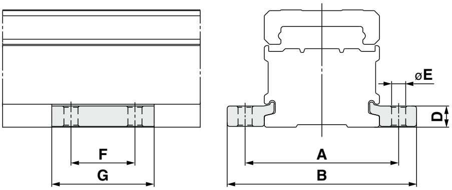


[mm]

Model	L	B	D	E	F	G	J	K
LESH25D□-50□□-□□□□□	237.5	75	4	143	84	4	40.5	144.5
LESH25D□-50B□□-□□□□□	278							
LESH25D□-100□□-□□□□□	299.5	48	8	207	98.5		88	206.5
LESH25D□-100B□□-□□□□□	340							
LESH25D□-150□□-□□□□□	377.5	65		285	126.5	6	69	284.5
LESH25D□-150B□□-□□□□□	418							

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) [ ] for when the direction of return to origin has changed.
Note 4) The distance between the motor end cover and the manual override screw is up to 4 mm.
The motor end cover hole size is ø5.5.
Note 5) If workpiece fixing bolts are too long, they can touch the guide block and cause a malfunction, etc.
Use bolts that are between the maximum and minimum screw-in depths in length.

Side Holder (In-line Motor Type/D Type)



[mm]

Part no. Note)	A	B	D	E	F	G	Applicable model
LE-D-3-1	45	57.6	6.7	4.5	20	33	**LESH8D**
LE-D-3-2	60	74	8.3	5.5	25	40	**LESH16D**
LE-D-3-3	81	99	12	6.6	30	49	**LESH25D**

Note) Model numbers for 1 side holder.

Series LES/LESH
Electric Slide Tables/ Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions. Please download it via our website, http://www.smcworld.com

Design

⚠Caution

1. Do not apply a load in excess of the operating limit.

Select a suitable actuator by work load and allowable moment. If the product is used outside of the operating limit, the eccentric load applied to the guide will be excessive and have adverse effects such as creating play on the guide, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force or impact force is applied to it.

This can cause failure.

Handling

⚠Caution

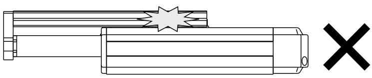
1. INP output signal

1) Positioning operation
When the product comes within the set range by step data [In position], the INP output signal will turn on.
Initial value: Set to [0.50] or higher.

2) Pushing operation
When the effective force exceeds step data [Trigger LV], the INP output signal will turn on. Use the product within the specified range of [Pushing force] and [Trigger LV].
To ensure that the actuator pushes the workpiece with the set [Pushing force], it is recommended that the [Trigger LV] be set to the same value as the [Pushing force].

2. When the pushing operation is used, be sure to set to [Pushing operation]. Never hit at the stroke end except during return to origin.

When incorrect instructions are inputted, such as using the product outside of the operating limit or operation outside of actual stroke through changes in the controller/driver setting and or origin position, the table may collide against the stroke end of the actuator. Please check these points before use.
If the table collides against the stroke end of the actuator, the guide, belt or internal stopper can be broken. This may lead to abnormal operation.



Handle the actuator with care when it is used in the vertical direction as the workpiece will fall freely from its own weight.

3. Use the product with the following moving force.

- Step motor (Servo/24 VDC): 100%
- Servo motor (24 VDC) : 250%

If the moving force is set below the above values, it may cause an alarm.

Handling

⚠Caution

4. The actual speed of this actuator is affected by the load.

Check the model selection section of the catalog.

5. Do not apply a load, impact or resistance in addition to the transferred load during return to origin.

Additional force will cause the displacement of the origin position since it is based on detected motor torque.

6. The table and guide block are made of special stainless steel, but can rust in an environment where droplets of water adhere to it.

7. Do not dent, scratch or cause other damage to the body, table and end plate mounting surfaces.

This may cause unevenness in the mounting surface, play in the guide or an increase in the sliding resistance.

8. Do not dent, scratch or cause other damage to the surface over which the rail and guide will move.

This may cause play or an increase in the sliding resistance.

9. Do not apply strong impact or an excessive moment while mounting a workpiece.

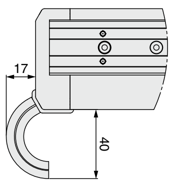
If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.

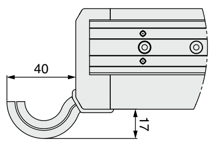
10. Keep the flatness of mounting surface 0.02 mm or less.

Unevenness of a workpiece or base mounted on the body of the product may cause play on the guide and increased sliding resistance. Do not deform the mounting surface by mounting with workpieces tucked in.

11. Do not drive the main body with the table fixed.

12. When mounting the product, for R/L type fixed cable, keep the following dimension or more for bends in the cable. For D type, keep a 40 mm or longer diameter for bends in the cable.





Series LES/LESH Electric Slide Tables/ Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

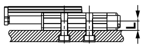
Handling

⚠Caution

13. When mounting the product, use screws with adequate length and tighten them to the maximum torque or less.

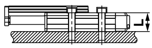
Tightening the screws with a higher torque than recommended may cause a malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Body fixed/ Side mounting (Body tapped)



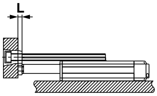
Model	Bolt	Max. tightening torque (N·m)	L (Max. screw-in depth mm)
LES□8R/L	M4 x 0.7	1.5	8
LES□8D	M5 x 0.8	3	10
LES16R/L			
LES16D	M6 x 1	5.2	12
LESH16□			
LES25R/L			
LES25D	M8 x 1.25	10	16
LESH25□			

Body fixed/ Side mounting (Through-hole)



Model	Bolt	Max. tightening torque (N·m)	L (mm)
LES8R/L	M3 x 0.5	0.63	23.5
LESH8R/L			25.5
LES□8D	M4 x 0.7	1.5	18.2
LES16R/L			33.5
LES16D	M5 x 0.8	3	25.2
LESH16R/L			35.5
LESH16D			25.5
LES25R/L			49
LES25D	M6 x 1	5.2	39.8
LESH25R/L			50.5
LESH25D			39.5

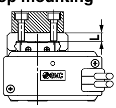
Workpiece fixed/ Front mounting



Model	Bolt	Max. tightening torque (N·m)	L (mm)
LES8R/L	M3 x 0.5	0.63	6
LESH8R/L			5.5
LES□8D	M4 x 0.7	1.5	8
LES16R/L			
LES16D	M5 x 0.8	3	
LESH16□			
LES25R/L	M6 x 1	5.2	12
LESH25R/L			10
LES□25D			14

To prevent the workpiece fixing bolts from penetrating the end plate, use bolts that are 0.5 mm or shorter than the maximum screw-in depth. If long bolts are used, they can touch the end plate and cause a malfunction, etc.

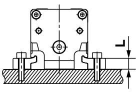
Workpiece fixed/ Top mounting



Model	Bolt	Max. tightening torque (N·m)	L (Min. to Max. screw-in depth mm)
LES8□	M3 x 0.5	0.63	2.1 to 4.1
LESH8□			5 (Max.)
LES16□	M4 x 0.7	1.5	2.7 to 5.7
LESH16□	M5 x 0.8	3	6.5 (Max.)
LES25□			3.3 to 7.3
LESH25□	M6 x 1	5.2	8 (Max.)

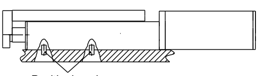
To prevent the workpiece fixing bolts from touching the guide block, use bolts that are the maximum screw-in depth or less. If long bolts are used, they can touch the guide block and cause a malfunction, etc.

Body fixed/Side mounting (Side holder)



Model	Bolt	Max. tightening torque (N·m)	L (mm)
LESH8D	M4 x 0.7	1.5	6.7
LESH16D	M5 x 0.8	3	8.3
LESH25D	M6 x 1	5.2	12

When using the side holders to install the actuator, be sure to use the positioning pin. It can be displaced when vibration or excessive external force is applied.



Positioning pin

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

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

a. "Posn failed" alarm is generated.

The product cannot reach a pushing start position due to variation in the width of workpieces.

b. "Pushing ALM" alarm is generated.

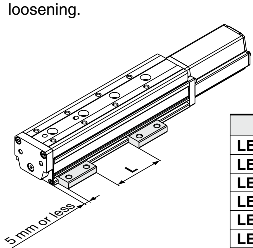
The product is pushed back from a pushing start position after starting to push.

15. When external force is applied to the table, it is necessary to reduce the work load for the sizing.

When a cable duct or flexible moving tube is attached to the actuator, the sliding resistance of the table increases and may lead to operational failure of the product.

16. When using the side holders to install the actuator, use within the following dimension range.

Otherwise, installation balance will deteriorate and cause loosening.

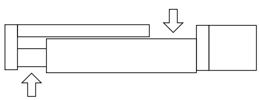


Model	L (mm)
LES□8D□-30	5 to 10
LES□8D□-50	20 to 30
LES□8D□-75	50 to 60
LES□16D□-30	5 to 10
LES□16D□-50	20 to 30
LES□16D□-75	60 to 75
LES□16D□-100	85 to 100
LES□25D□-30	5 to 15
LES□25D□-50	25 to 35
LES□25D□-75	60 to 75
LES□25D□-100	70 to 100
LES□25D□-125	155 to 170
LES□25D□-150	160 to 180

17. For the LES□□D, do not grasp or peel off a masking tape on the bottom of the body.

The masking tape may peel off and foreign matter may get inside the actuator.

18. For the LES□□D, a gap will form between the motor flange and table when the table moves (marked with the arrow below). Be careful not to put hands or fingers in a gap.



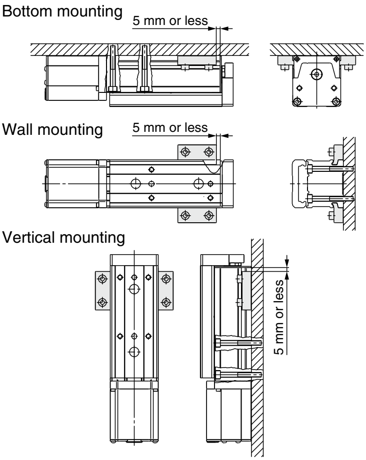
Electric Slide Tables/ Specific Product Precautions 3

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

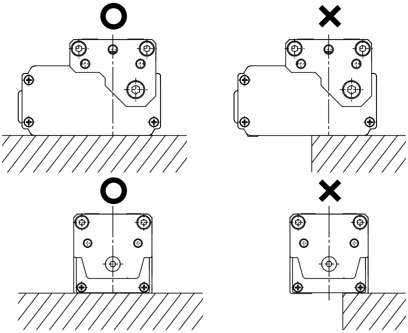
Handling

⚠Caution

19. When mounting the body with through-holes in the following mounting orientations, make sure to use two side holders as shown in the figures.
Otherwise, installation balance will deteriorate and cause loosening.



20. Install the body as shown below with the ○.
Since the product support becomes unstable, it may cause a malfunction, noise or an increase in the deflection.

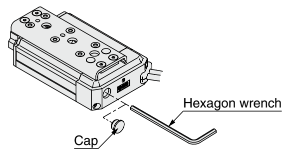


21. Even with the same product number, the table of some products can be moved by hand and the table of some products cannot be moved by hand. However, there is no abnormality with these products. (Without lock)
This difference is caused because there is a little variation with the positive efficiency (when the table is moved by the motor) and there is a large variation with the reverse-efficiency (when the table is moved manually) due to the product characteristics. There is hardly any difference among products when they are operated by the motor.

Handling

⚠Caution

22. For LES□□$^{R}_{L}$, remove the cap and operate the manual override screw with a hexagon wrench.



Maintenance

⚠Warning

1. Ensure that the power supply is stopped before starting maintenance work or replacement of the product.
2. For lubrication, wear protective glasses.
3. Perform maintenance according to the following requirements.

• **Maintenance frequency**

Perform maintenance according to the table below.

Frequency	Appearance check	Belt check
Inspection before daily operation	○	—
Inspection every 6 months*	—	○
Inspection every 250 km*	—	○
Inspection every 5 million cycles*	—	○

* Select whichever comes sooner.

• **Items for visual appearance check**

1. Loose set screws, Abnormal dirt
2. Check of flaw and cable joint
3. Vibration, Noise

• **Items for belt check (R/L type only)**

Stop operation immediately and replace the belt when belt appear to be below.

a. Tooth shape canvas is worn out.
Canvas fiber becomes fuzzy. Rubber is removed and the fiber becomes whitish. Lines of fibers become unclear.

b. Peeling off or wearing of the side of the belt
Belt corner becomes round and frayed thread sticks out.

c. Belt partially cut
Belt is partially cut. Foreign matter caught in teeth other than cut part causes flaw.

d. Vertical line of belt teeth
Flaw which is made when the belt runs on the flange.

e. Rubber back of the belt is softened and sticky.

f . Crack on the back of the belt

It is recommended that the belt be replaced after being in service for 2 years, or before reaching the following distance.

Electric Actuators
Series *LEPY/LEPS*

Miniature Rod Type/Miniature Slide Table Type

Step Motor (Servo/24 VDC)

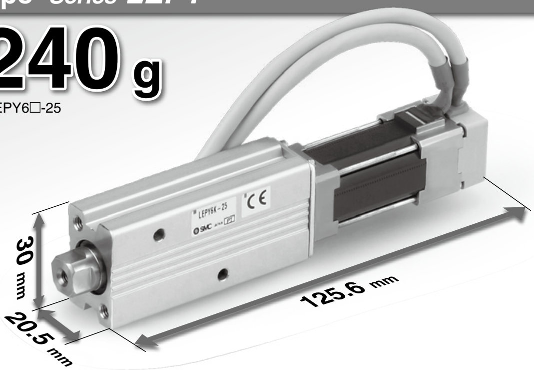
Compact and lightweight

- **Maximum pushing force: 50 N**
- **Positioning repeatability: ±0.05 mm**
- **Possible to set position, speed and force. (64 points)**

Rod Type *Series LEPY*

Size: 6, 10 ▸Page 280

Weight **240 g**
∗ LEPY6□-25



Slide Table Type *Series LEPS*

Size: 6, 10 ▸Page 289

Weight **290 g**
∗ LEPS6□-25

Linear guide integrated

Step Motor (Servo/24 VDC) **Controller/Driver** ▸Page 377

▸ **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**

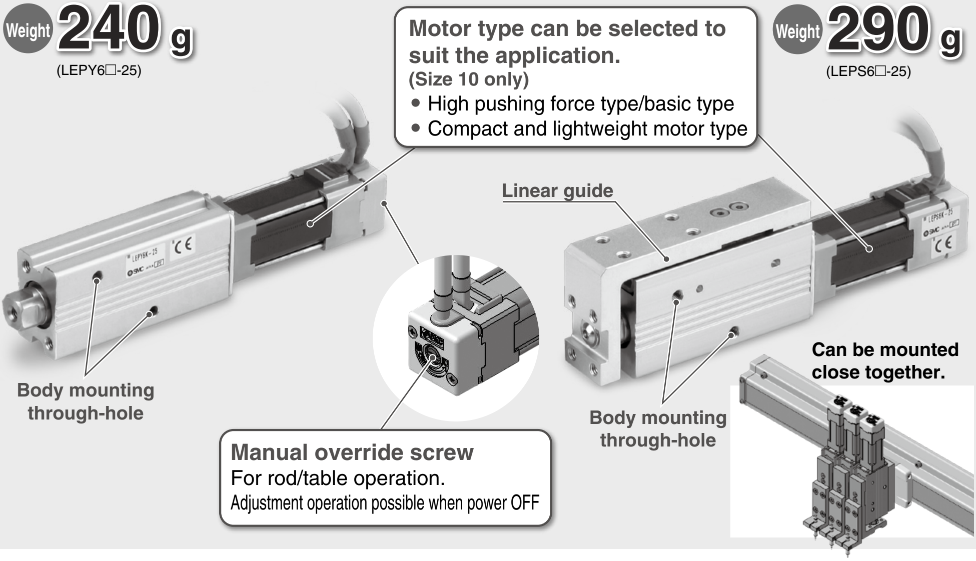
Compact and lightweight

Rod Type *Series* ***LEPY***

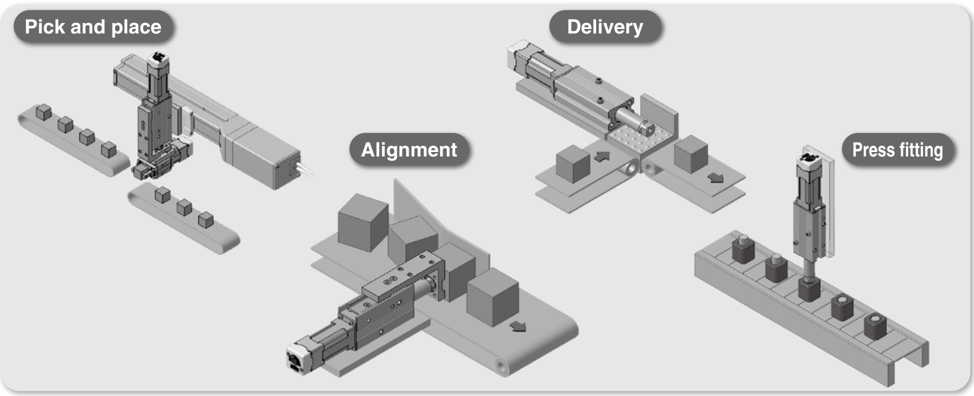
Weight **240** g
(LEPY6□-25)

Slide Table Type *Series* ***LEPS***

Weight **290** g
(LEPS6□-25)



Application Examples



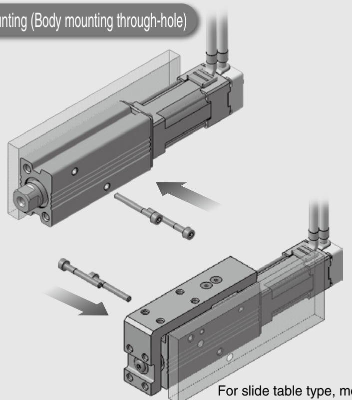
Variations

Type	Size	Screw lead	Pushing force [N]		Max. work load [kg] (Horizontal)		Max. work load [kg] (Vertical)		Max. speed [mm/s] (Horizontal)		Stroke [mm]
			Basic	Compact	Basic	Compact	Basic	Compact	Basic	Compact	
Rod type Series LEPY	6	4	14 to 20	—	1.0	—	0.5	—	150	—	25 50 75
		8	7 to 10	—	0.75	—	0.25	—	300	—	
	10	5	25 to 50	24 to 40	2.0	2.0	1.5	1.5	200	200	
		10	12.5 to 25	12 to 20	1.5	1.5	1.0	1.0	350	350	
Slide table type Series LEPS	6	4	14 to 20	—	1.0	—	0.5	—	150	—	25 50
		8	7 to 10	—	0.75	—	0.25	—	300	—	
	10	5	25 to 50	24 to 40	2.0	2.0	1.5	1.5	200	200	
		10	12.5 to 25	12 to 20	1.5	1.5	1.0	1.0	350	350	

Mounting Variations

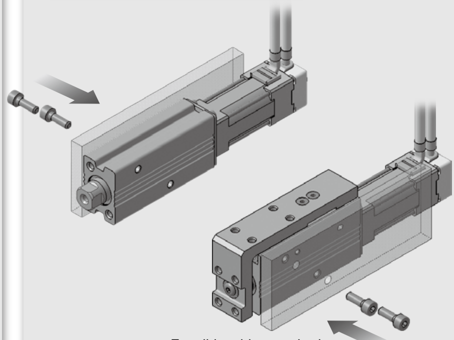
Mounting from various directions

Side mounting (Body mounting through-hole)



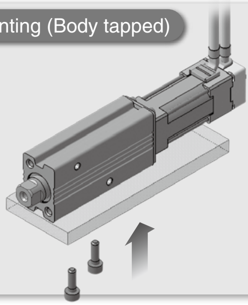
For slide table type, mounting from both sides is possible.

Side mounting (Body tapped)

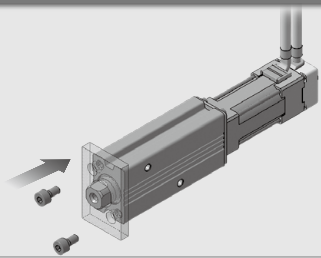


For slide table type, body tapped from both sides.

Bottom mounting (Body tapped)



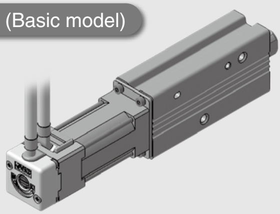
Axial mounting ∗ Rod type only (Body tapped)



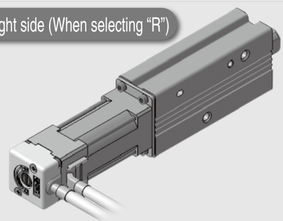
Motor Cable Entry Direction

Can be selected from 4 directions.

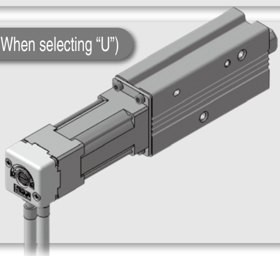
Top entry (Basic model)



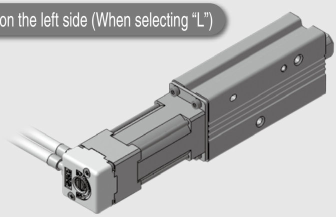
Entry on the right side (When selecting “R”)



Bottom entry (When selecting “U”)



Entry on the left side (When selecting “L”)



Series LEPY
Model Selection

Selection Procedure

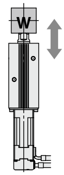
Positioning Control Selection Procedure

Step 1 **Check the work load–speed. (Vertical transfer)** → **Step 2** **Check the cycle time.**

Selection Example

Operating conditions

- Workpiece mass: 0.2 [kg]
- Speed: 200 [mm/s]
- Acceleration/Deceleration: 3,000 [mm/s²]
- Stroke: 40 [mm]
- Workpiece mounting condition: Vertical upward downward transfer

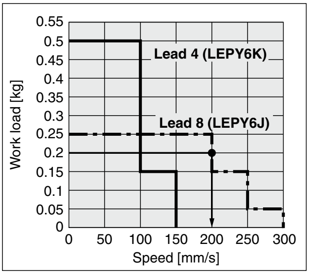


Step 1 **Check the work load–speed. <Speed–Work load graph>**

Select the target model based on the workpiece mass and speed with reference to the <Speed–Work load graph>.

Selection example) The **LEPY6J** is temporarily selected based on the graph shown on the right side.

* It is necessary to mount a guide outside the actuator when used for horizontal transfer. When selecting the target model, refer to page 286 for the horizontal work load in the specifications, and page 299 for the precautions.



<Speed–Work load graph>
(LEPY6/Step motor)

Step 2 **Check the cycle time.**

Calculate the cycle time using the following calculation method.

- Cycle time T can be found from the following equation.

$$\boxed{T = T1 + T2 + T3 + T4\ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

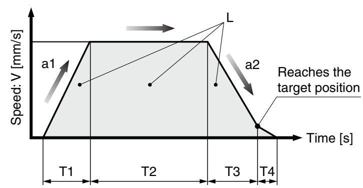
$$\boxed{T1 = V/a1\ [s]} \quad \boxed{T3 = V/a2\ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$\boxed{T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}\ [s]}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$$\boxed{T4 = 0.2\ [s]}$$



L : Stroke [mm] ··· (Operating condition)
V : Speed [mm/s] ··· (Operating condition)
a1: Acceleration [mm/s²] ··· (Operating condition)
a2: Deceleration [mm/s²] ··· (Operating condition)

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 the beginning of the constant speed operation to stop
T4: Settling time [s] ··· Time until in position is completed

Calculation example)
T1 to T4 can be calculated as follows.

T1 = V/a1 = 200/3000 = 0.067 [s], T3 = V/a2 = 200/3000 = 0.067 [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{40 - 0.5 \cdot 200 \cdot (0.067 + 0.067)}{200} = 0.133\ [s]$$

T4 = 0.2 [s]

Therefore, the cycle time can be obtained as follows.
T = T1 + T2 + T3 + T4 = 0.067 + 0.133 + 0.067 + 0.2 = **0.467 [s]**

Based on the above calculation result, the LEPY6J-50 is selected.

Selection Procedure

Pushing Control Selection Procedure

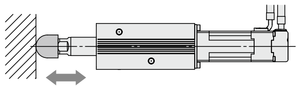
Step 1 Check the duty ratio. → **Step 2** Check the pushing force. → **Step 3** Check the lateral load on the rod end.

* The duty ratio is a ratio at the time that can keep being pushed.

Selection Example

Operating conditions

- Mounting condition: Horizontal (pushing)
- Jig weight: 0.05 [kg]
- Pushing force: 30 [N]
- Duty ratio: 70 [%]
- Speed: 150 [mm/s]
- Stroke: 40 [mm]

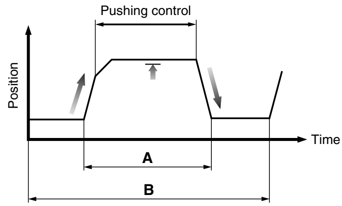


Step 1 **Check the duty ratio.**
<Conversion table of pushing force–duty ratio>

Select the [Pushing force] from the duty ratio with reference to the <Conversion table of pushing force–duty ratio>.

Selection example)
Based on the table below,
- Duty ratio: 70 [%]

Therefore, the set value of pushing force will be 80 [%].



Duty ratio = A/B x 100 [%]

<Conversion table of pushing force–duty ratio>
(LEPY10L)

Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
70 or less	100	—
80	70	10
100	50	5

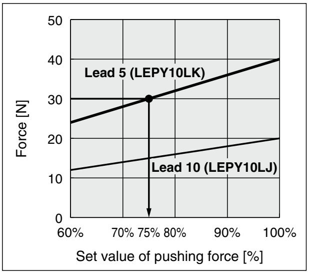
* [Set value of pushing force] is one of the step data input to the controller.
* [Continuous pushing time] is the time that the actuator can continuously keep pushing.

Step 2 **Check the pushing force. <Set value of pushing force–Force graph>**

Select the target model based on the set value of pushing force and force with reference to the <Set value of pushing force–Force graph>.

Selection example)
Based on the graph shown on the right side,
- Set value of pushing force: 75 [%]
- Pushing force: 30 [N]

Therefore, the **LEPY10LK** is temporarily selected.



<Set value of pushing force–Force graph>
(LEPY10L)

Step 3 **Check the lateral load on the rod end.**
<Allowable lateral load on the rod end>

Confirm the allowable lateral load on the rod end of the actuator: LEPY10L, which has been selected temporarily with reference to the <Allowable lateral load on the rod end>.

Selection example)
Based on the table below,
- Jig weight: 0.05 [kg] ≈ 0.5 [N]

Therefore, the lateral load on the rod end is in the allowable range.

<Allowable lateral load on the rod end>

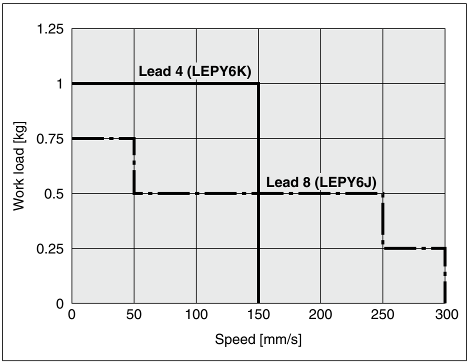
Model	Allowable lateral load on the rod end [N]
LEPY6 (Basic)	0.50
LEPY10 (Basic)	1.0
LEPY10L (Compact)	1.0

Based on the above calculation result, the LEPY10LK-50 is selected.

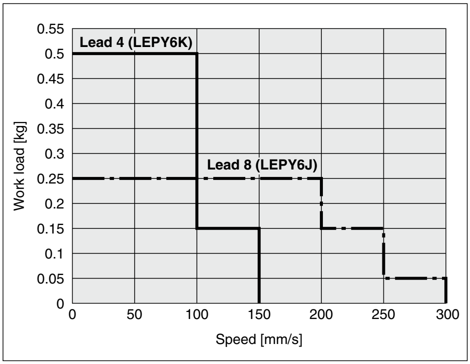
Speed–Work Load Graph (Guide)

LEPY6 (Basic)

Horizontal

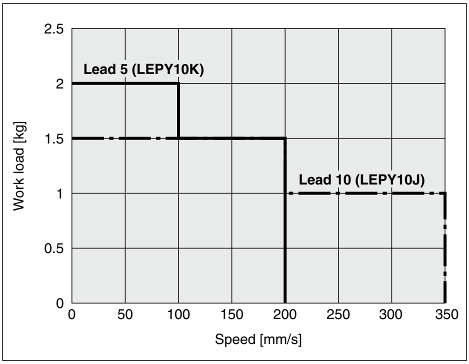


Vertical

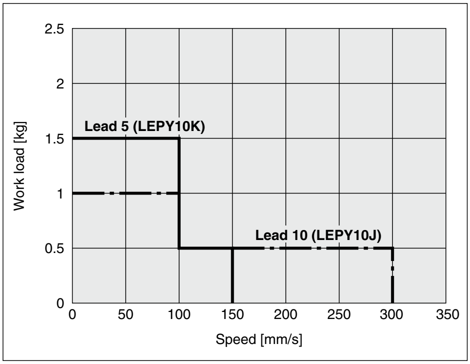


LEPY10(L) (Basic/Compact)

Horizontal

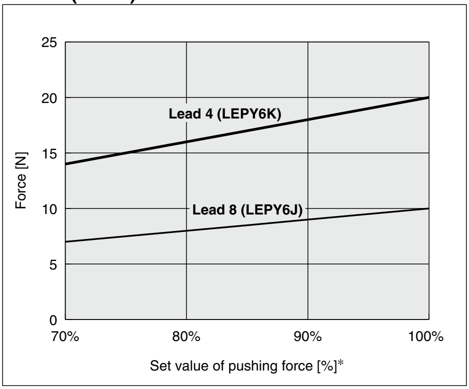


Vertical



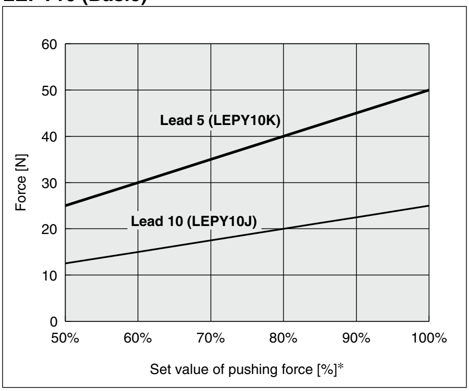
Set Value of Pushing Force–Force Graph (Guide)

LEPY6 (Basic)



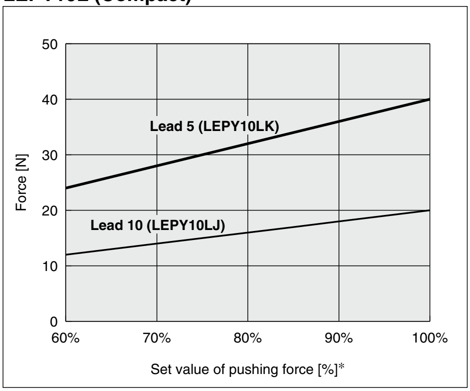
Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
70	100	—
80	70	10
100	50	5

LEPY10 (Basic)



Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
60 or less	100	—
70	30	3
100	15	1

LEPY10L (Compact)

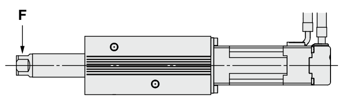


Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
70 or less	100	—
80	70	10
100	50	5

∗ Set values for the controller.

Allowable Lateral Load on the Rod End

Model	Allowable lateral load on the rod end [N]
LEPY6 (Basic)	0.50
LEPY10 (Basic)	1.0
LEPY10L (Compact)	1.0



Electric Actuator
Miniature Rod Type Step Motor (Servo/24 VDC)
Series LEPY
LEPY6, 10

RoHS

How to Order

LEPY 10 [ ] K – 50 [ ] – R 1 6N 1 [ ]
❶ (10) ❷ ( ) ❸ (K) ❹ (50) ❺ ( ) ❻ (R) ❼ (1) ❽ (6N) ❾ (1) ❿ ( )

❶ Size

6
10

❷ Motor size

Symbol	Motor size	Applicable size
Nil	Basic	6, 10
L	Compact	10

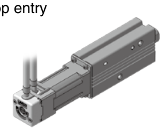
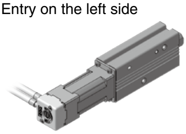
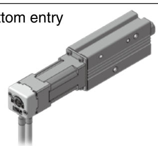
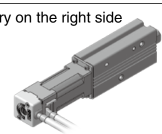
❸ Lead screw type [mm]

Symbol	Screw lead	
	LEPY6	**LEPY10**
K	4	5
J	8	10

❹ Stroke [mm]

Symbol	Stroke
25	25
50	50
75	75

❺ Motor cable mounting direction

Nil	Top entry 	**L**	Entry on the left side 
U	Bottom entry 	**R**	Entry on the right side 

❻ Actuator cable type*

Nil	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.

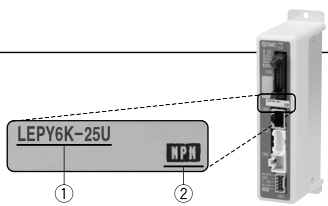
⚠Caution

[CE-compliant products]
EMC compliance was tested by combining the electric actuator LEP series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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

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

<Check the following before use.>
① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

❼ Actuator cable length [m]

Nil	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 6) on page 286.

❽ Controller/Driver type*

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

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

❾ I/O cable length [m]*1

Nil	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 394 (For LECP6), page 407 (For LECP1) or page 414 (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

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 387.)

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 386	Page 401	Page 408

Specifications

	Model			LEPY6		LEPY10	
Actuator specifications	Stroke [mm]			25, 50, 75			
	Screw lead [mm]			4	8	5	10
	Pushing force [N] Note 1)		Basic	14 to 20	7 to 10	25 to 50	12.5 to 25
			Compact	—	—	24 to 40	12 to 20
	Work load [kg] Note 2) Note 3)	Horizontal	Basic	1.0	0.75	2.0	1.5
			Compact	—	—	2.0	1.5
		Vertical	Basic	0.5	0.25	1.5	1.0
			Compact	—	—	1.5	1.0
	Speed [mm/s] Note 3) Note 6)	Horizontal	Basic	10 to 150	20 to 300 Note 4)	10 to 200	20 to 350 Note 4)
			Compact	—	—	10 to 200	20 to 350 Note 4)
		Vertical	Basic	10 to 150	20 to 300 Note 4)	10 to 150	20 to 300 Note 4)
			Compact	—	—	10 to 150	20 to 300 Note 4)
	Pushing speed [mm/s] Note 5)			10	20	10	20
	Acceleration/Deceleration [mm/s²]			3,000			
	Positioning repeatability [mm]			±0.05			
	Backlash [mm]			±0.1			
	Impact/Vibration resistance [m/s²] Note 7)			50/20			
	Actuation type			Slide screw			
	Guide type			Sliding bushing			
	Max. operating frequency [c.p.m]			60			
	Operating temperature range [°C]			5 to 40			
	Operating humidity range [%RH]			90 or less (No condensation)			
Electric specifications	Motor size			□20		□28	
	Motor type			Step motor (Servo/24 VDC)			
	Encoder			Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]			24 VDC ±10%			
	Power consumption [W] Note 8)		Basic	12		28	
			Compact	—		22	
	Standby power consumption when operating [W] Note 9)		Basic	11		22	
			Compact	—		16	
	Max. instantaneous power consumption [W] Note 10)		Basic	22		55	
			Compact	—		45	

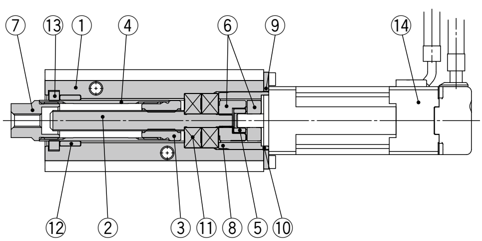
Note 1) Pushing force accuracy is LEPY6: ±30% (F.S.), LEPY10: ±25% (F.S.).
Refer to page 301 for the detailed setting range and precautions.
The pushing force and the duty ratio change according to the set value. Check "Set Value of Pushing Force–Force Graph (Guide)" on page 283 and [14] on page 301.
Note 2) The maximum value of the work load for the positioning operation. An external guide is necessary to support the load. The actual work load and transfer speed change according to the condition of the external guide.
Note 3) Speed changes according to the work load. Check "Speed–Work Load Graph (Guide)" on page 282.
Note 4) When the stroke is 25 mm, the maximum speed will be 250 mm/sec.
Note 5) Set to the pushing force when pushing.
Note 6) 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 7) Impact resistance: No malfunction occurred when the actuator 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 8) The power consumption (including the controller) is for when the actuator is operating.
Note 9) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during operation. Except during the pushing operation.
Note 10) 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.

Weight

Model		LEPY6		
Stroke [mm]		25	50	75
Product weight [kg]	Basic	0.24	0.29	0.34

Model		LEPY10		
Stroke [mm]		25	50	75
Product weight [kg]	Basic	0.47	0.55	0.65
	Compact	0.41	0.49	0.59

Construction

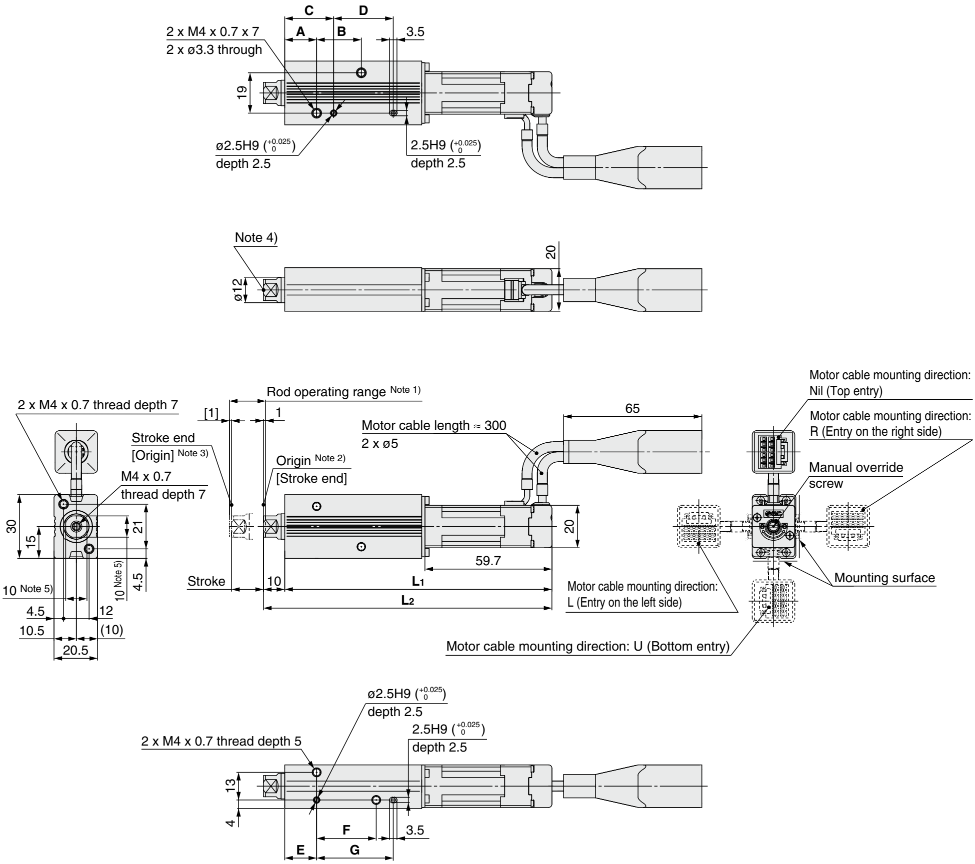


Component Parts

No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Screw shaft	Stainless steel	Heat treatment + Specially treated
3	Screw nut	Stainless steel	Heat treatment + Specially treated
4	Rod	Stainless steel	
5	Spider	NBR	
6	Hub	Aluminum alloy	
7	Socket	Free cutting carbon steel	Nickel plated
8	Bearing stopper	Size 6: Aluminum alloy Size 10: Carbon steel	
9	Motor plate	Aluminum alloy	Anodized
10	Guide ring	Aluminum alloy	Size 10 only
11	Bearing	—	
12	Bushing	Oil impregnated sintered copper alloy	
13	Soft wiper	—	
14	Step motor (Servo/24 VDC)	—	

Dimensions

LEPY6



Note 1) Range within which the rod can move when it returns to origin.
Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) Do not apply rotational torque to the rod end.
Note 5) The direction of rod end width across flats (□10) differs depending on the products.

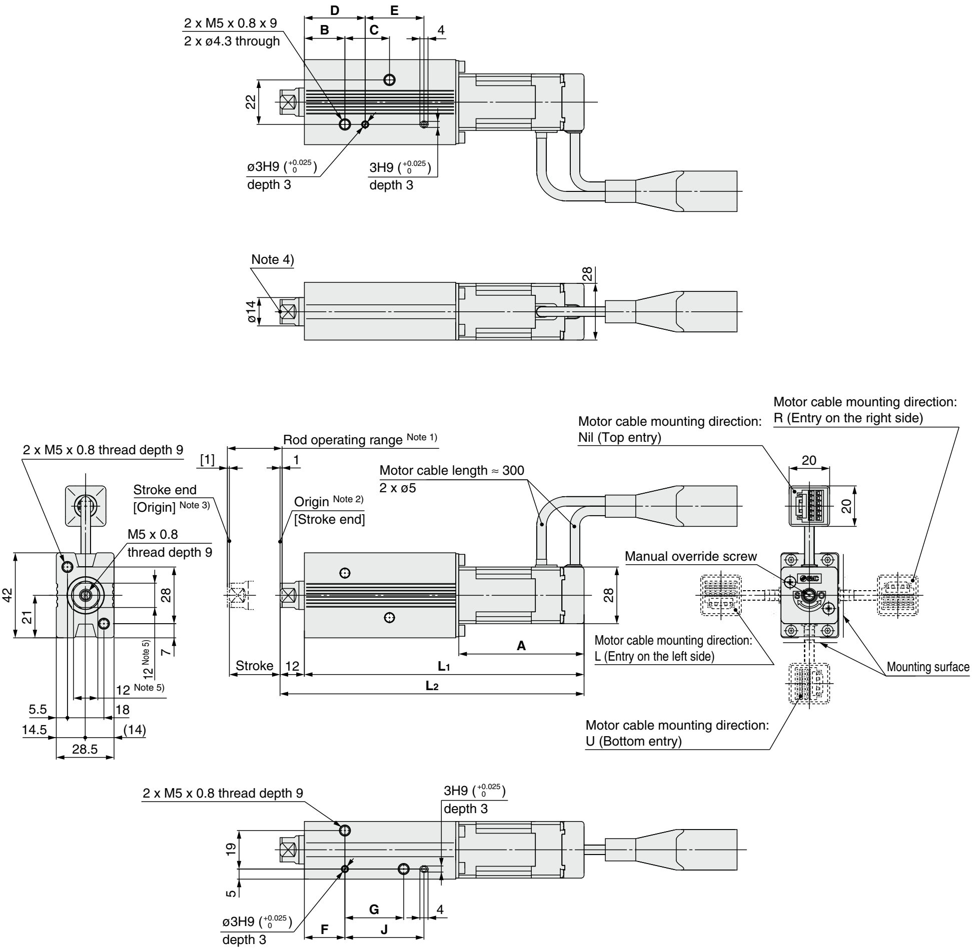
Dimensions

[mm]

Model	L_1	L_2	A	B	C	D	E	F	G
LEPY6□-25□	125.6	135.6	15	21	23	28	15	28	36
LEPY6□-50□	156.6	166.6	22	45	30	52	22	52	60
LEPY6□-75□	188.6	198.6	29	70	37	77	29	77	85

Dimensions

LEPY10



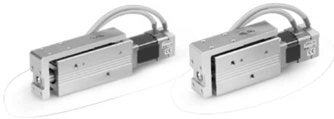
Note 1) Range within which the rod can move when it returns to origin.
Make sure a workpiece mounted on the rod does not interfere with the workpieces and facilities around the rod.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.
Note 4) Do not apply rotational torque to the rod end.
Note 5) The direction of rod end width across flats (□12) differs depending on the products.

Dimensions

[mm]

Model	L_1	L_2	A	B	C	D	E	F	G	J
LEPY10□-25□	138	150	61.8	20	22	30	29	20	29	39
LEPY10□-50□	163	175		24	43	34	50	24	50	60
LEPY10□-75□	198	210		30	72	40	79	30	79	89
LEPY10L□-25□	124	136	47.8	20	22	30	29	20	29	39
LEPY10L□-50□	149	161		24	43	34	50	24	50	60
LEPY10L□-75□	184	196		30	72	40	79	30	79	89

Series LEPS
Model Selection



Selection Procedure

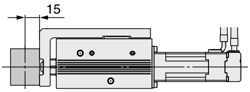
Positioning Control Selection Procedure

Step 1 Check the work load–speed. (Horizontal transfer) → **Step 2** Check the cycle time. → **Step 3** Check the guide allowable moment.

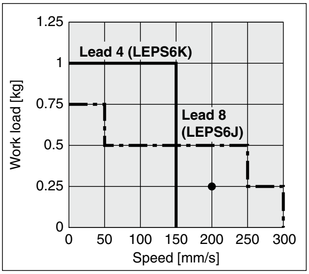
Selection Example

Operating conditions

- Workpiece mass: 0.25 [kg]
- Speed: 200 [mm/s]
- Acceleration/Deceleration: 3,000 [mm/s^2]
- Stroke: 20 [mm]
- Workpiece mounting condition: Horizontal transfer



LEPS6 (Basic)



<Speed–Work load graph>
(LEPS6/Step motor)

Step 1 Check the work load–speed. <Speed–Work load graph>

Select the target model based on the workpiece mass and speed with reference to the <Speed–Work load graph>.

Selection example) The **LEPS6J** is temporarily selected based on the graph shown on the right side.

Step 2 Check the cycle time.

Calculate the cycle time using the following calculation method.

- Cycle time T can be found from the following equation.

$$T = T1 + T2 + T3 + T4 \text{ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be obtained by the following equation.

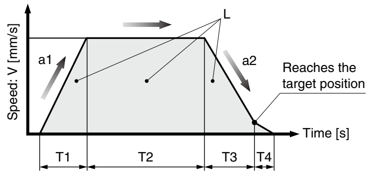
$$T1 = V/a1 \text{ [s]} \qquad T3 = V/a2 \text{ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} \text{ [s]}$$

- T4: Settling time varies depending on the conditions such as motor types, load and in positioning of the step data. Therefore, please calculate the settling time with reference to the following value.

$$T4 = 0.2 \text{ [s]}$$



L : Stroke [mm] ··· (Operating condition)
V : Speed [mm/s] ··· (Operating condition)
a1: Acceleration [mm/s^2] ··· (Operating condition)
a2: Deceleration [mm/s^2] ··· (Operating condition)

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 the beginning of the constant speed operation to stop
T4: Settling time [s] ··· Time until in position is completed

Calculation example)
T1 to T4 can be calculated as follows.

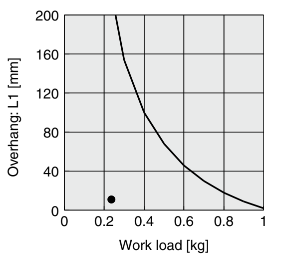
$T1 = V/a1 = 200/3000 = 0.067$ [s], $T3 = V/a2 = 200/3000 = 0.067$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{20 - 0.5 \cdot 200 \cdot (0.067 + 0.067)}{200} = 0.033 \text{ [s]}$$

$T4 = 0.2$ [s]

Therefore, the cycle time can be obtained as follows.
$T = T1 + T2 + T3 + T4 = 0.067 + 0.033 + 0.067 + 0.2 = \mathbf{0.367}$ **[s]**

Step 3 Check the guide allowable moment.



Guide allowable moment

Based on the above calculation result, the LEPS6J-25 is selected.

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Selection Procedure

Pushing Control Selection Procedure

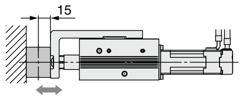
Step 1 Check the duty ratio. → **Step 2** Check the pushing force. → **Step 3** Check the guide allowable moment.

∗ The duty ratio is a ratio at the time that can keep being pushed.

Selection Example

Operating conditions

- Mounting condition: Horizontal (pushing)
- Jig weight: 0.4 [kg]
- Pushing force: 30 [N]
- Duty ratio: 70 [%]
- Speed: 150 [mm/s]
- Stroke: 40 [mm]



Step 1 **Check the duty ratio.**
<Conversion table of pushing force–duty ratio>

Select the [Pushing force] from the duty ratio with reference to the <Conversion table of pushing force–duty ratio>.

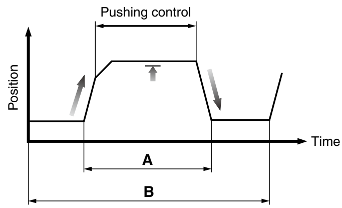
Selection example)
Based on the table below,
- Duty ratio: 70 [%]

Therefore, the set value of pushing force will be 80 [%].

<Conversion table of pushing force–duty ratio>
(LEPS10L)

Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
70 or less	100	—
80	70	10
100	50	5

∗ [Set value of pushing force] is one of the step data input to the controller.
∗ [Continuous pushing time] is the time that the actuator can continuously keep pushing.



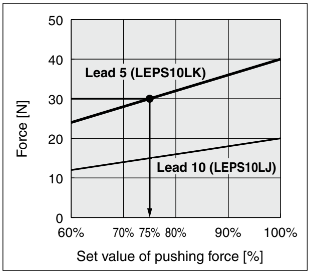
Duty ratio = A/B x 100 [%]

Step 2 **Check the pushing force. <Set value of pushing force–Force graph>**

Select the target model based on the set value of pushing force and force with reference to the <Set value of pushing force–Force graph>.

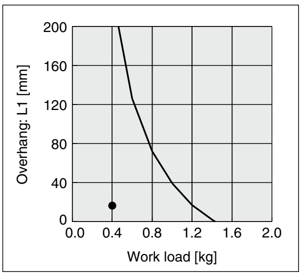
Selection example)
Based on the graph shown on the right side,
- Set value of pushing force: 75 [%]
- Pushing force: 30 [N]

Therefore, the **LEPS10LK** is temporarily selected.



<Set value of pushing force–Force graph>
(LEPS10L)

Step 3 **Check the guide allowable moment.**

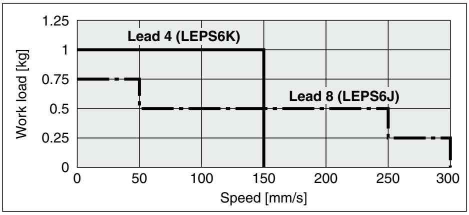


Based on the above calculation result, the LEPS10LK-50 is selected.

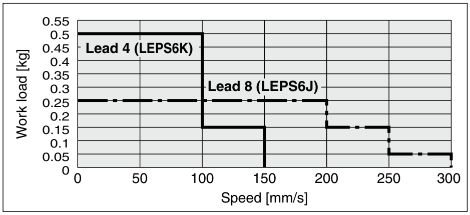
Speed–Work Load Graph (Guide)

LEPS6 (Basic)

Horizontal

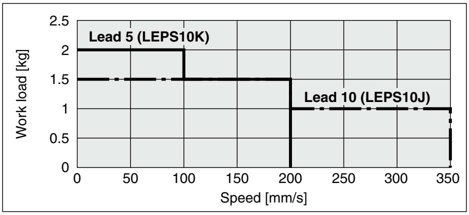


Vertical

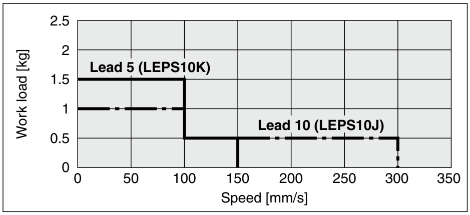


LEPS10(L) (Basic/Compact)

Horizontal

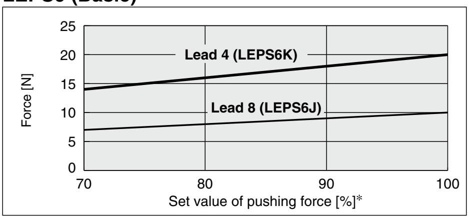


Vertical



Set Value of Pushing Force–Force Graph (Guide)

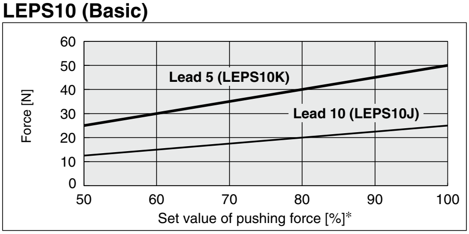
LEPS6 (Basic)



Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
70	100	—
80	70	10
100	50	5

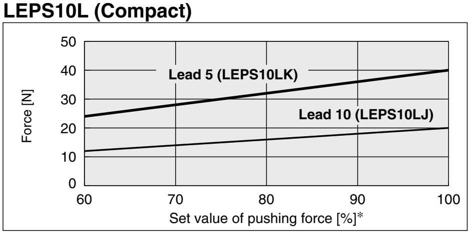
* Set values for the controller.

LEPS10 (Basic)



Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
60 or less	100	—
70	30	3
100	15	1

LEPS10L (Compact)

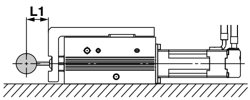
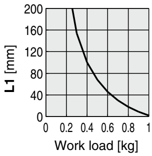
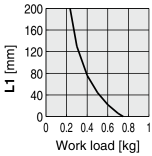
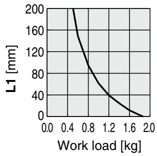
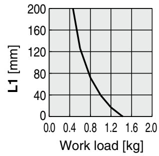
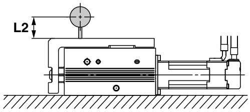
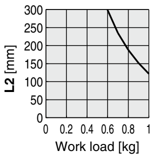
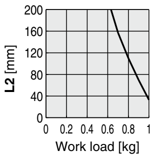
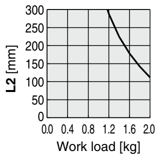
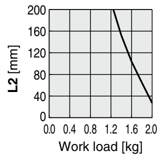
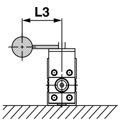
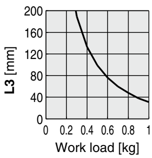
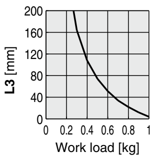
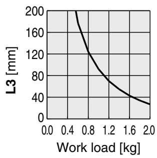
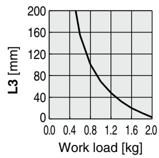
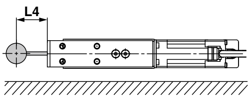
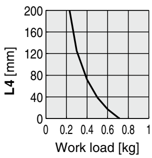
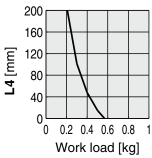
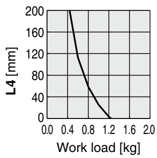
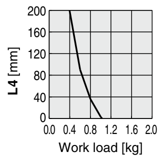
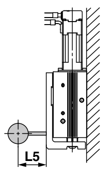
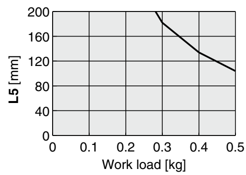
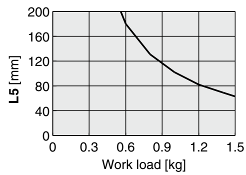
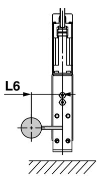
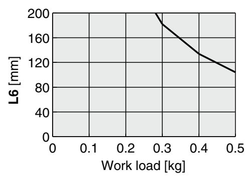
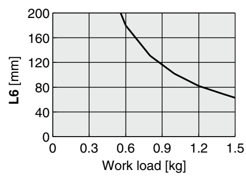


Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
70 or less	100	—
80	70	10
100	50	5

Dynamic Allowable Moment

∗ This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction. When the center of gravity of the workpiece overhangs in two directions, refer to the Electric Actuator Selection Software for confirmation. http://www.smcworld.com

Acceleration/Deceleration —— 3,000 mm/s²

Mounting orientation	**Load overhanging direction** **m**: Work load **L**: Overhang to the work load center of gravity [mm]	Model			
		LEPS6		**LEPS10**	
		LEPS6□-25	**LEPS6□-50**	**LEPS10□-25**	**LEPS10□-50**
Horizontal mounting					
					
					
					
Wall mounting					
					

Note) This graph shows the amount of allowable overhang when the center of gravity of the workpiece overhangs in one direction.

Static Allowable Moment

Model	Allowable moment (N·m)		
	Pitch moment	Yaw moment	Roll moment
	Mp	**My**	**Mr**
LEPS6	1.07	1.07	2.51
LEPS10	2.55	2.55	5.47

Traveling Parallelism

Traveling parallelism	Stroke (mm)	
	25	50
	0.05 mm or less	0.1 mm or less

Table Deflection (Reference Value)

∗ These values are initial guideline values.

Table displacement due to pitch moment load (marked with the arrow)

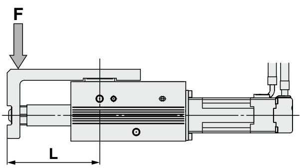


Table displacement due to yaw moment load (marked with the arrow)

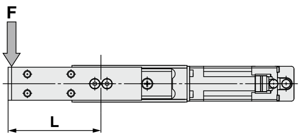
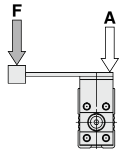


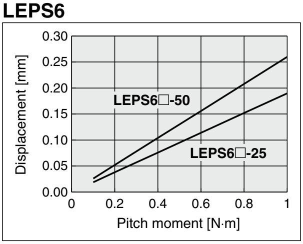
Table displacement due to roll moment load (marked with A)



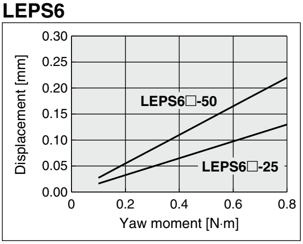
Distance L [mm]

Model	LEPS6		LEPS10	
Stroke [mm]	25	50	25	50
Distance L [mm]	53.0	77.0	59.5	82.0

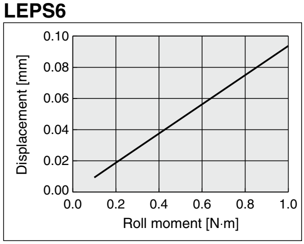
LEPS6



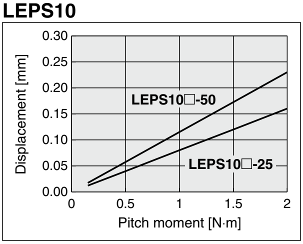
LEPS6



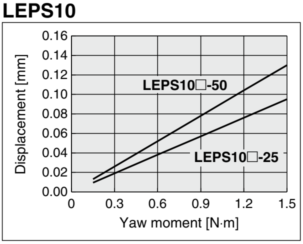
LEPS6



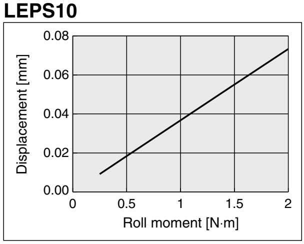
LEPS10



LEPS10



LEPS10



Electric Actuator
Miniature Slide Table Type

Step Motor (Servo/24 VDC)

Series LEPS
LEPS6, 10

RoHS

How to Order

LEPS 10 ☐ K − 50 ☐ − R 1 6N 1 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ **Size**

6
10

❷ **Motor size**

Symbol	Motor size	Applicable size
Nil	Basic	6, 10
L	Compact	10

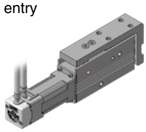
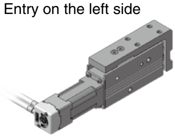
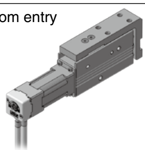
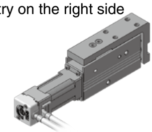
❸ **Lead screw type [mm]**

Symbol	Screw lead	
	LEPS6	**LEPS10**
K	4	5
J	8	10

❹ **Stroke [mm]**

Symbol	Stroke
25	25
50	50

❺ **Motor cable mounting direction**

Nil	Top entry 	**L**	Entry on the left side 
U	Bottom entry 	**R**	Entry on the right side 

❻ **Actuator cable type***

Nil	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.

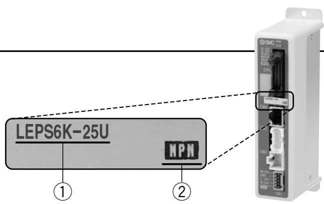
⚠Caution

[CE-compliant products]
EMC compliance was tested by combining the electric actuator LEP series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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

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

<Check the following before use.>
① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

❼ Actuator cable length [m]

Nil	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 6) on page 296.

❾ I/O cable length [m]*1

Nil	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 394 (For LECP6), page 407 (For LECP1) or page 414 (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.

❽ Controller/Driver type*

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

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

❿ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 387.)

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 386	Page 401	Page 408

Specifications

Model				LEPS6		LEPS10	
Actuator specifications	Stroke [mm]			25, 50			
	Screw lead [mm]			4	8	5	10
	Pushing force [N] Note 1)		Basic	14 to 20	7 to 10	25 to 50	12.5 to 25
			Compact	—	—	24 to 40	12 to 20
	Work load [kg] Note 2) Note 3)	Horizontal	Basic	1.0	0.75	2.0	1.5
			Compact	—	—	2.0	1.5
		Vertical	Basic	0.5	0.25	1.5	1.0
			Compact	—	—	1.5	1.0
	Speed [mm/s] Note 3) Note 6)	Horizontal	Basic	10 to 150	20 to 300 Note 4)	10 to 200	20 to 350 Note 4)
			Compact	—	—	10 to 200	20 to 350 Note 4)
		Vertical	Basic	10 to 150	20 to 300 Note 4)	10 to 150	20 to 300 Note 4)
			Compact	—	—	10 to 150	20 to 300 Note 4)
	Pushing speed [mm/s] Note 5) Note 6)			10	20	10	20
	Acceleration/Deceleration [mm/s²]			3,000			
	Positioning repeatability [mm]			±0.05			
	Backlash [mm]			±0.1			
	Impact/Vibration resistance [m/s²] Note 7)			50/20			
	Actuation type			Slide screw			
	Guide type			Linear guide			
	Max. operating frequency [c.p.m]			60			
	Operating temperature range [°C]			5 to 40			
	Operating humidity range [%RH]			90 or less (No condensation)			
Electric specifications	Motor size			□20		□28	
	Motor type			Step motor (Servo/24 VDC)			
	Encoder (Angular displacement sensor)			Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]			24 VDC ±10%			
	Power consumption [W] Note 8)		Basic	12		28	
			Compact	—		22	
	Standby power consumption when operating [W] Note 9)		Basic	11		22	
			Compact	—		16	
	Max. instantaneous power consumption [W] Note 10)		Basic	22		55	
			Compact	—		45	

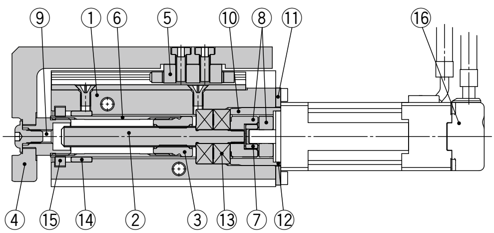
Note 1) Pushing force accuracy is LEPS6: ±30% (F.S.), LEPS10: ±25%(F.S.).
Refer to page 301 for the detailed setting range and precautions. The pushing force and the duty ratio change according to the set value. Check "Set Value of Pushing Force–Force Graph (Guide)" on page 291 and [14] on page 301.
Note 2) The maximum value of the work load for the positioning operation. Check "Dynamic Allowable Moment" graph for the allowable moment of the guide on page 292.
Note 3) Speed changes according to the work load. Check "Speed–Work Load Graph (Guide)" on page 291.
Note 4) When the stroke is 25 mm, the maximum speed will be 250 mm/sec.
Note 5) Set to the pushing force when pushing.
Note 6) 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 7) Impact resistance: No malfunction occurred when the actuator 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 8) The power consumption (including the controller) is for when the actuator is operating.
Note 9) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during operation. Except during the pushing operation.
Note 10) 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.

Weight

Model		LEPS6	
Stroke [mm]		25	50
Product weight [kg]	Basic	0.29	0.35

Model		LEPS10	
Stroke [mm]		25	50
Product weight [kg]	Basic	0.56	0.65
	Compact	0.50	0.59

Construction

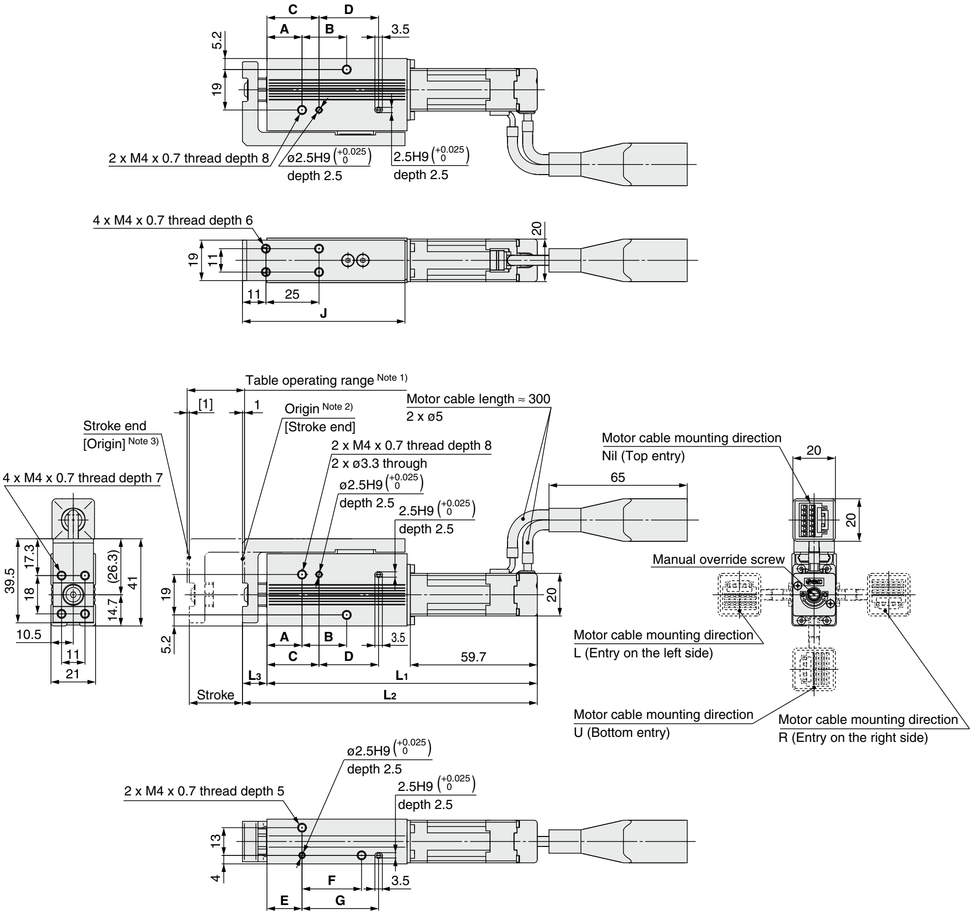


Component Parts

No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Screw shaft	Stainless steel	Heat treatment + Specially treated
3	Screw nut	Stainless steel	Heat treatment + Specially treated
4	Table	Aluminum alloy	Anodized
5	Linear guide	—	
6	Rod	Stainless steel	
7	Spider	NBR	
8	Hub	Aluminum alloy	
9	Socket	Free cutting carbon steel	Nickel plated
10	Bearing stopper	Size 6: Aluminum alloy Size 10: Carbon steel	
11	Motor plate	Aluminum alloy	Anodized
12	Guide ring	Aluminum alloy	Size 10 only
13	Bearing	—	
14	Bushing	Oil impregnated sintered copper alloy	
15	Soft wiper	—	
16	Step motor (Servo/24 VDC)	—	

Dimensions

LEPS6



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) [ ] for when the direction of return to origin has changed.

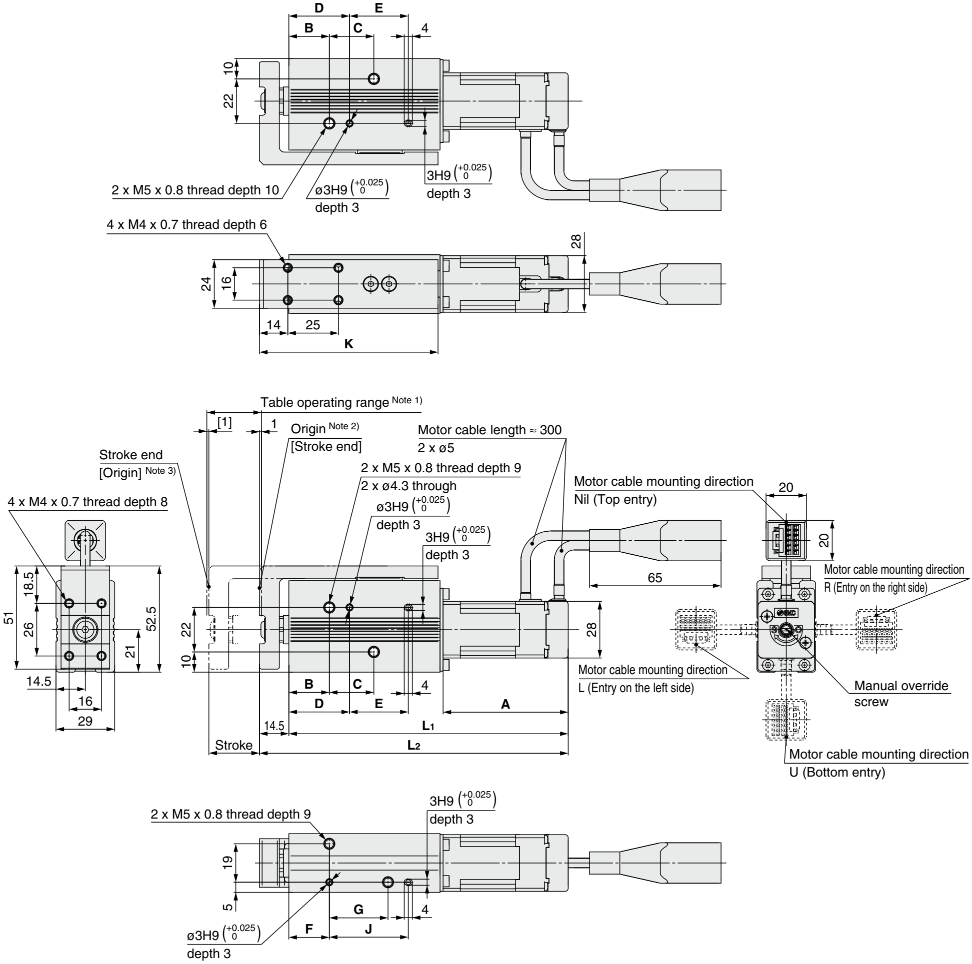
Dimensions

[mm]

Model	L_1	L_2	L_3	A	B	C	D	E	F	G	J
LEPS6□-25□	127.1	138.6	11.5	16.5	21	24.5	28	16.5	28	36	76.4
LEPS6□-50□	156.6	169.6	13	22	45	30	52	22	52	60	107.4

Dimensions

LEPS10



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) [ ] for when the direction of return to origin has changed.

Dimensions

[mm]

Model	L_1	L_2	A	B	C	D	E	F	G	J	K
LEPS10□-25□	138	152.5	61.8	20	22	30	29	20	29	39	88.2
LEPS10□-50□	163	177.5		24	43	34	50	24	50	60	113.2
LEPS10L□-25□	124	138.5	47.8	20	22	30	29	20	29	39	88.2
LEPS10L□-50□	149	163.5		24	43	34	50	24	50	60	113.2

Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 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. Do not apply a load in excess of the operating limit.
Select a suitable actuator by work load and allowable lateral load on the rod end. If the product is used outside of the operating limit, the eccentric load applied to the rod will be excessive and have adverse effects such as creating play on the sliding parts of the rod, degrading accuracy and shortening the life of the product.

2. Do not use the product in applications where excessive external force (including vibration) or impact force is applied to it.
Do not apply impact and vibration outside of the specifications; it may lead to a malfunction.

3. If gravity acts on the workpiece due to vertical mounting, it may drop due to its own weight depending on the conditions when the product is not energized (SVON signal is OFF) or stopped (EMG is not energized).

4. 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.

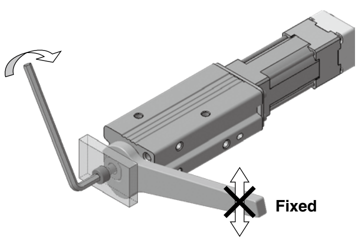
5. This product cannot be used as a stopper.
Excessive load acts on the actuator, which adversely affects the operation and the life of the product.

Mounting

⚠Warning

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

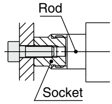
2. When mounting workpieces or jigs to the rod end, hold the flats of the rod end with a wrench so that the rod does not rotate (Rod type only).
When attaching a bolt or workpiece to the end of the rod, hold the flats of the rod end with a wrench (the rod should be fully retracted). Do not apply tightening torque to the rod non-rotating mechanism. The rod is manufactured to precise tolerances, so even a slight deformation may cause a malfunction and damage.



Mounting

⚠Warning

3. When mounting a bolt, workpiece or jig to the rod end, the bolt should be tightened with a torque within the specified range (Rod type only).
Tightening to a torque higher than the specified value may cause a malfunction due to deformation of the component, whilst under-tightening can cause displacement of the mounting position or in extreme conditions detaching of the workpiece. If the bolt is screwed in more than the maximum depth, the lead screw will be damaged, leading to operation failure.

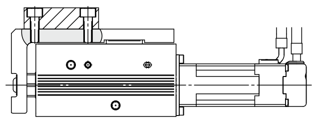


Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth [mm]	Rod end width across flats [mm]
LEPY6	M4 x 0.7	1.4	7	10
LEPY10	M5 x 0.8	3.0	9	12

4. The angular position of the rod end flats cannot be changed because the rod has a non-rotating mechanism inside (Rod type only).
The angular position of the rod end flats is not specified; it depends on the actuator type.
The rod rotates slightly due to the clearance of the non-rotating mechanism: Install the bolt or workpiece with consideration to the rotation.

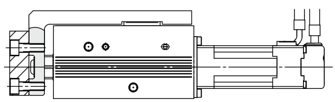
5. When attaching the workpiece to the table, hold the table and tighten the bolts with a torque within the specified range (Slide table type only).
The table is supported by a linear guide, do not apply impact or moment when mounting the work load.
If the bolts are screwed to more than the maximum screw-in depth, it may lead to a malfunction due to damage of the linear guide or body.

Top mounting



Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth [mm]
LEPS6	M4 x 0.7	1.4	6
LEPS10	M4 x 0.7	1.4	6

Front mounting



Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth [mm]
LEPS6	M4 x 0.7	1.4	7
LEPS10	M4 x 0.7	1.4	8

Specific Product Precautions 2

**Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com**

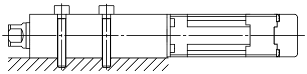
Mounting

⚠Warning

6. When mounting the product, tighten the mounting screws within the specified torque range.

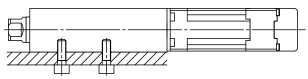
Tightening the screws with a higher torque than recommended may cause a malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Side mounting (Body mounting through-hole)



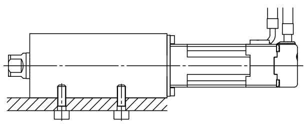
Model	Bolt	Max. tightening torque [N·m]
LEPY6 / **LEPS6**	M3 x 0.5	0.9
LEPY10 / **LEPS10**	M4 x 0.7	1.4

Side mounting (Body tapped)



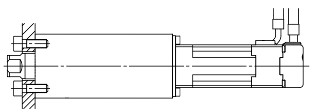
Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth [mm]
LEPY6 / **LEPS6**	M4 x 0.7	1.4	7
LEPY10 / **LEPS10**	M5 x 0.8	3.0	9

Bottom mounting (Body tapped)



Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth [mm]
LEPY6 / **LEPS6**	M4 x 0.7	1.4	5
LEPY10 / **LEPS10**	M5 x 0.8	3.0	9

Rod side mounting (Rod type only)



Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth [mm]
LEPY6	M4 x 0.7	1.4	7
LEPY10	M5 x 0.8	3.0	9

7. When it is necessary to operate the product by the manual override screw, check the position of the manual override and leave necessary space.

Do not apply excessive torque to the manual override screw. This may lead to damage and malfunction.

8. When an external guide is used, connect it in such a way that no impact or load is applied to it.

This may cause a malfunction due to an increase in sliding resistance, or use a freely moving connector (such as a floating joint).

Handling

⚠Caution

1. When the pushing operation is used, be sure to set to [Pushing operation].
Also, do not hit the workpiece in positioning operation or in the range of positioning operation.

It may damage and malfunction. If the operation is interrupted or stopped during the cycle: When the pushing operation command is output immediately after restarting the operation, the direction of movement depends on the position of restart.

2. Use the product within the specified pushing speed range for the pushing operation.

It may lead to damage and malfunction.

Model	Lead	Pushing speed [mm/sec]
LEPY6	4	10
LEPS6	8	20
LEPY10	5	10
LEPS10	10	20

3. For the pushing operation, ensure that the force is applied in the direction of the rod axis.

4. The moving force should be the initial value.

If the moving force is set below the initial value, it may cause an alarm.

Model	Motor size	Moving force [%]
LEPY6	Basic	150
LEPY10	Basic / Compact	150

5. The actual speed of this actuator is affected by the load.

Check the model selection section of the catalog.

6. Do not scratch or dent the sliding parts of the rod, by striking or attaching objects.

The rod is manufactured to precise tolerances, even a slight deformation may cause malfunction.

7. Avoid using the electric actuator in such a way that rotational torque would be applied to the rod.

It may cause deformation of the non-rotating sliding part, leading to clearance in the internal guide or an increase in the sliding resistance. Refer to the table below for the approximate values of the allowable range of rotational torque.

	LEPY6□	**LEPY10□**
Allowable rotational torque [N·m] or less	0.04	0.08

Series LEPY/LEPS
Specific Product Precautions 3

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Handling

⚠Caution

8. Do not operate by fixing the rod and moving the actuator body.
Excessive load will be applied to the rod, leading to damage to the actuator and reduced the life of the product.

9. Return to origin
1) Do not apply a load, impact or resistance in addition to the transferred load during return to origin.
Additional force will cause the displacement of the origin position since it is based on detected motor torque.
2) When the return to origin is set with <Basic parameter> [Origin offset], it is necessary to change the current position of the product. Recheck the value of step data.
3) It is recommended to set the directions of return to origin and pushing in the same direction in order to enhance the measurement accuracy during pushing operation.

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

<Backlash>

Model	Backlash [mm]
LEPY6	±0.1
LEPS6	±0.1
LEPY10	±0.1
LEPS10	±0.1

11. Do not hit at the stroke end except during return to origin.
This may damage the inner parts.

12. 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 pushing force exceeds the step data [Trigger LV], the INP output signal will turn on.
When [Pushing force] setting and [Trigger LV] are set less than [Pushing force], use the product within the specified range of [Pushing force] and [Trigger LV].
a) To ensure that the actuator pushes the workpiece with the set [Pushing force], it is recommended that the [Trigger LV] be set to the same value as the [Pushing force].
b) If the [Trigger LV] is set lower than the [operation pushing force (current pushing force) for the pushing operation], the pushing force will exceed the trigger LV from the pushing start position and the INP output signal will turn on before pushing the workpiece. Increase the pushing force, or change the work load so that the current pushing force becomes smaller than the trigger LV.

<Pushing force and trigger LV range>

Model	Motor size	Set value of pushing force [%]
LEPY6 LEPS6	Basic	70 to 100
LEPY10 LEPS10	Basic	50 to 100
	Compact	60 to 100

13. In pushing operation, set the product to a position of at least 0.5 mm away from a workpiece. (This position is referred to as a pushing start position.)
The following alarms may be generated and operation may become unstable.
a. "Posn failed" alarm is generated.
The product cannot reach a pushing start position due to variation in the width of workpieces.
b. "Pushing ALM" alarm is generated.
The product is pushed back from a pushing start position after starting to push.
c. "Deviation over flow" alarm is generated.
Displacement exceeding the specified value is generated at the pushing start position.

14. For the pushing operation, use the product within the duty ratio range below.
The duty ratio is a ratio at the time that can keep being pushed.

Model	Motor size	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
LEPY6 LEPS6	Basic	70	100	—
		80	70	10
		100	50	5

Model	Motor size	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
LEPY10 LEPS10	Basic	60 or less	100	—
		70	30	3
		100	15	1

Model	Motor size	Set value of pushing force [%]	Duty ratio [%]	Continuous pushing time [minute]
LEPY10 LEPS10	Compact	70 or less	100	—
		80	70	10
		100	50	5

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

Maintenance

⚠Warning

1. Ensure that the power supply is stopped and the workpiece is removed before starting maintenance work or replacement of the product.

Electric Rotary Table

Series LER

CE cULus RoHS

Step Motor (Servo/24 VDC)

Low profile

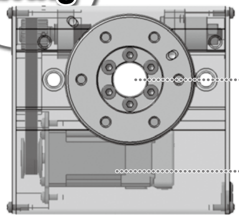
Basic type [mm]

Model	H
LER10	42
LER30	53
LER50	68

High precision type [mm]

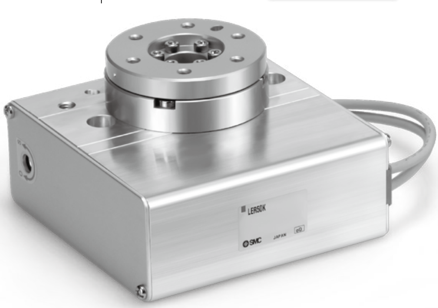
Model	H
LERH10	49
LERH30	62
LERH50	78

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: 3,000°/sec^2 (52.36 rad/sec^2)
- **Positioning repeatability: ±0.05°**
  Repeatability at the end: ±0.01° (Pushing control/With external stopper)
- **Rotation angle**
  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 [°]		Page
	Basic	High torque	Basic	High torque	Basic	High torque	
10	0.22	0.32	420	280	±0.05 (End: ±0.01)*		▸Page 306
30	0.8	1.2					
50	6.6	10					

* Value when an external stopper is mounted.

Step Motor (Servo/24 VDC) **Controller/Driver** ▸Page 377

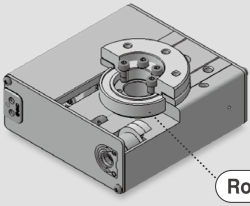
▸Step data input type
Series **LECP6**
- 64 points positioning
- Input using controller setting kit or teaching box

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

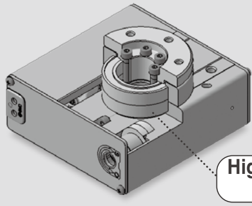
▸Pulse input type
Series **LECPA**

Basic and high precision types are available.

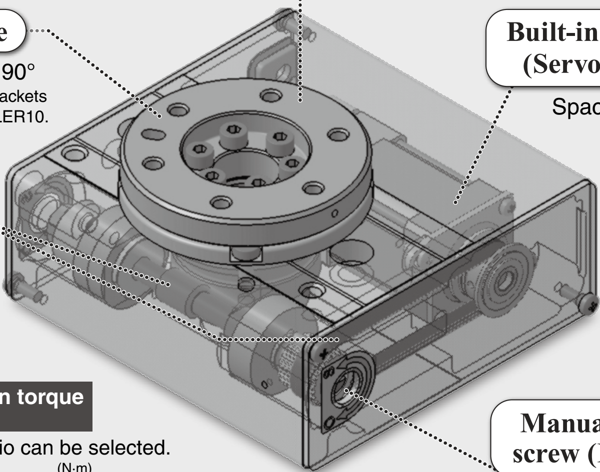
Basic type/LER



High precision type/LERH



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



Rotation angle

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)

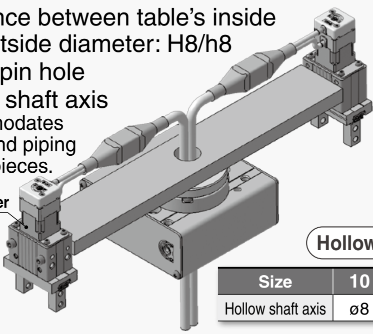
Model	Basic	High torque
LER10	0.22	0.32
LER30	0.8	1.2
LER50	6.6	10.0

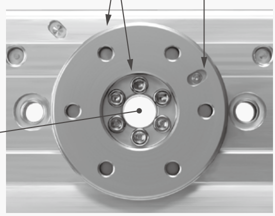
Manual override screw (Both sides)

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

Easy Mounting of Workpieces

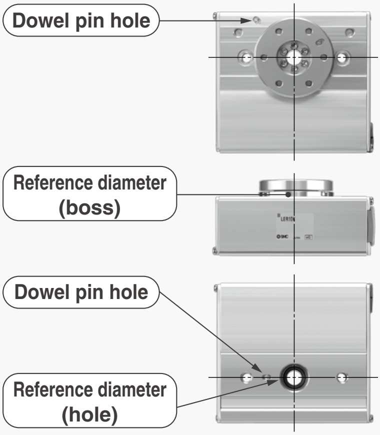
- Tolerance between table's inside and outside diameter: H8/h8
- Dowel pin hole
- Hollow shaft axis
  Accommodates wiring and piping of workpieces.





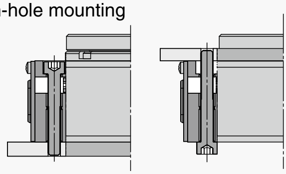
Size	10	30	50
Hollow shaft axis	ø8	ø17	ø20

Easy Mounting of the Main Body

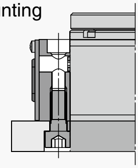


Mounting Variations

■ Through-hole mounting

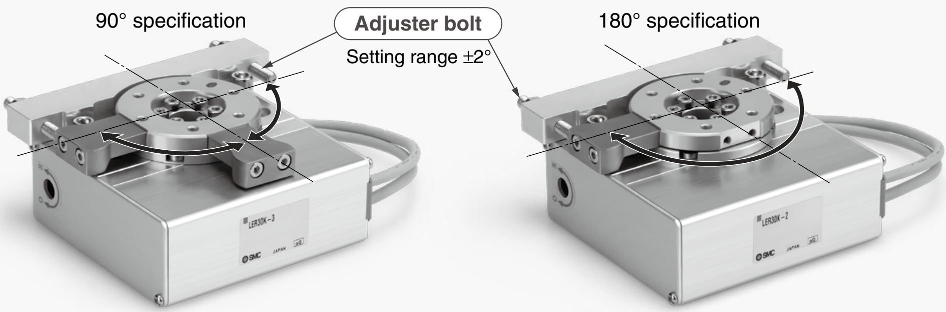


■ Body tapped mounting

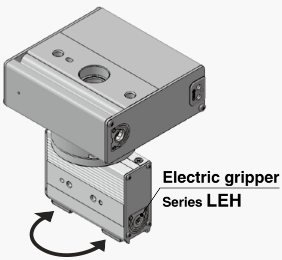


With External Stopper/Rotation Angle: 90°/180° Specification

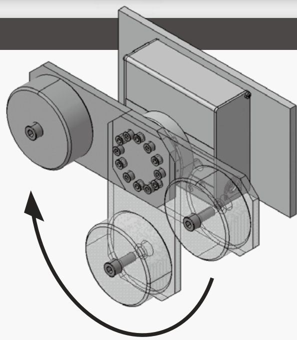
Repeatability at the end: ±0.01°



Application Examples



Rotation transfer after gripping in combination with a gripper



Vertical transfer: No change in speed due to load fluctuation

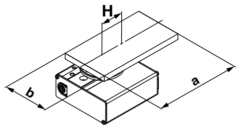
Electric Rotary Table **Step Motor** (Servo/24 VDC)

Series ***LER***

Model Selection

Selection Procedure

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°/sec^2
Angular speed ω: 420°/sec
Load mass (m): 2.0 kg
Distance between shaft and center 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).

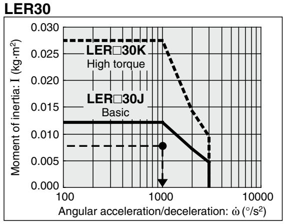
Formula

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

Selection example

$I = 2.0 \times (0.15^2 + 0.08^2)/12 + 2.0 \times 0.04^2$
$= 0.00802 \text{ kg·m}^2$

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).

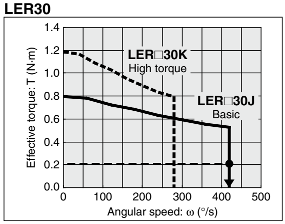
Formula

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

Selection example

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

LER30



Step3 Allowable load

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

Formula

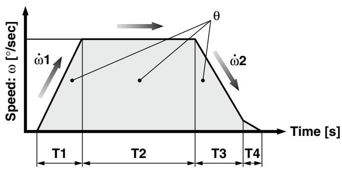
Allowable thrust load ≥ m x 9.8
Allowable moment ≥ m x 9.8 x H

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 [°]	T1: Acceleration time [s]	··· Time until reaching the set speed
ω: Angular speed [°/sec]	T2: Constant speed time [s]	··· Time while the actuator is operating at a constant speed
$\dot{\omega}1$: Angular acceleration [°/sec^2]	T3: Deceleration time [s]	··· Time from constant speed operation to stop
$\dot{\omega}2$: Angular deceleration [°/sec^2]	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 $T = T1 + T2 + T3 + T4$

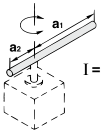
Selection example

- 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)

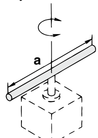
I: Moment of inertia (kg·m²)   m: Load mass (kg)

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



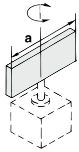
$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot \frac{a_2^2}{3}$$

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



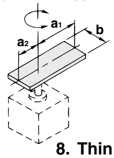
$$I = m \cdot \frac{a^2}{12}$$

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



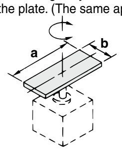
$$I = m \cdot \frac{a^2}{12}$$

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



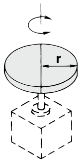
$$I = m_1 \cdot \frac{4a_1^2 + b^2}{12} + m_2 \cdot \frac{4a_2^2 + b^2}{12}$$

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



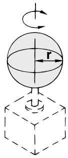
$$I = m \cdot \frac{a^2 + b^2}{12}$$

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



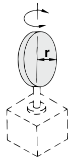
$$I = m \cdot \frac{r^2}{2}$$

7. Sphere
Position of rotation shaft: Diameter



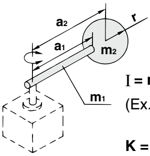
$$I = m \cdot \frac{2r^2}{5}$$

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

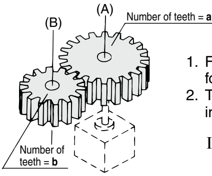


$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$$

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

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

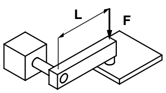
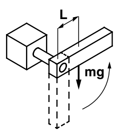
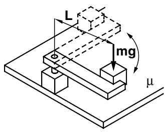
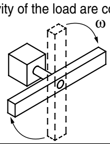
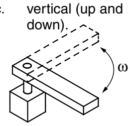
10. Gear transmission



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

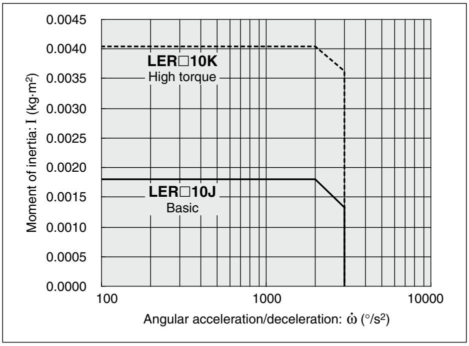
Load type		
Static load: Ts	**Resistance load: Tf**	**Inertial load: Ta**
Only pressing force is necessary. (e.g. for clamping)	Gravity or friction force is applied to rotating direction.	Rotate the load with inertia.
	Gravity is applied.  Friction force is applied. 	Center of rotation and center of 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 center 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 mass (kg) **g :** Gravitational acceleration 9.8 (m/s²) **L :** Distance from the rotation center to the point of application of the gravity or friction force (m) μ **:** Friction coefficient	**Ta = I·ω̇·2 π/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 center and the center 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 center and the center of gravity of the load are concentric.
  ∗ Necessary torque is inertial load only. **T = Ta x 1.5**

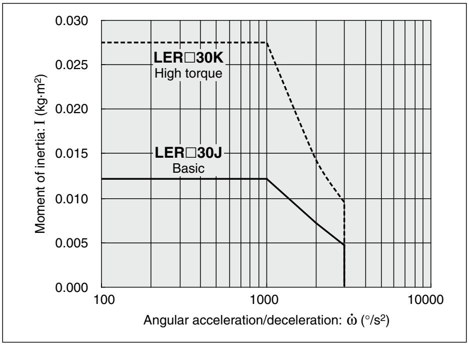
Note 1) To adjust the speed, margin is necessary for **Tf** and **Ta**.

Moment of Inertia—Angular Acceleration/Deceleration

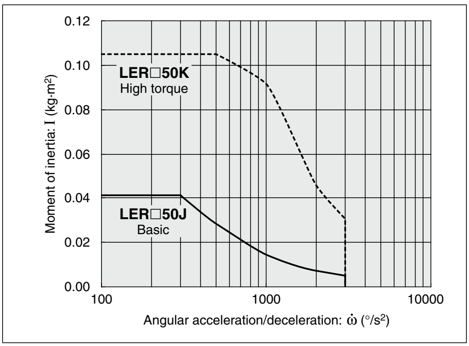
LER10



LER30

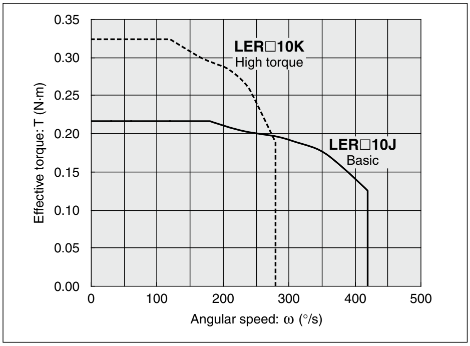


LER50

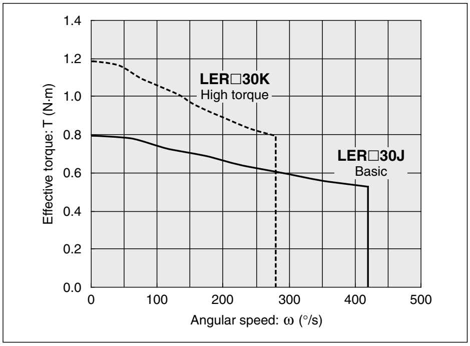


Effective Torque—Angular Speed

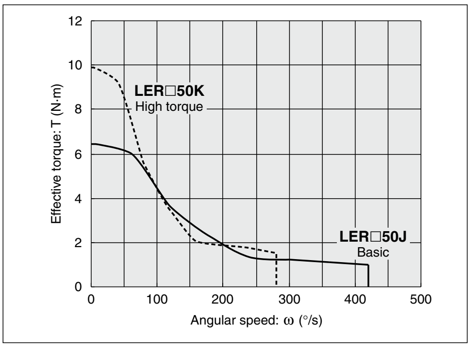
LER10



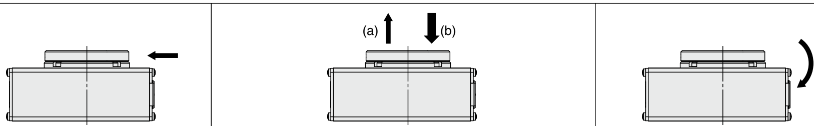
LER30



LER50



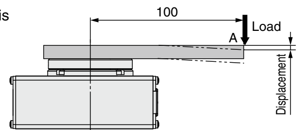
Allowable Load



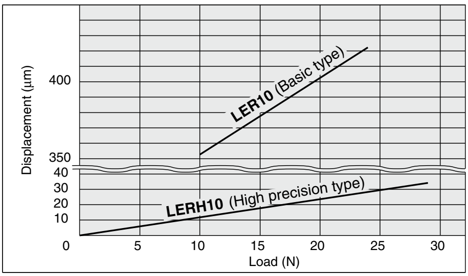
Size	Allowable radial load (N)		Allowable thrust load (N)				Allowable moment (N·m)	
			(a)		(b)			
	Basic type	High precision type	Basic type	High precision type	Basic type	High precision type	Basic type	High precision type
10	78	86	74		78	107	2.4	2.9
30	196	233	197		363	398	5.3	6.4
50	314	378	296	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

Table Displacement (Reference Value)

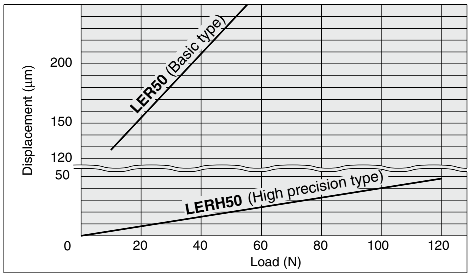
- Displacement at point A when a load is applied to point A 100 mm away from the rotation center.



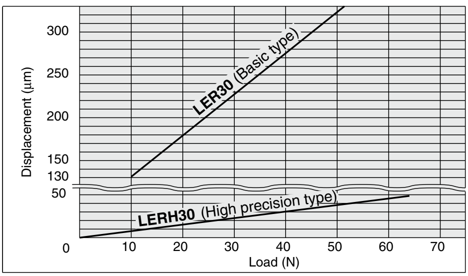
LER□10



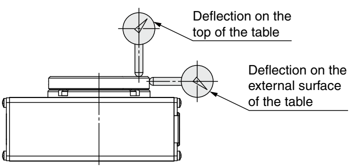
LER□50



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

CE c UL US RoHS

How to Order

LER [ ] [10] [K] – [ ] [ ] – [S] [1] [6N] [1] [ ]

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Table accuracy

Nil	Basic type
H	High precision type

❷ Size

10
30
50

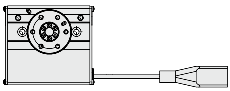
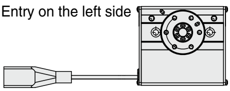
❸ Max. rotating torque [N·m]

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

❹ Rotation angle [°]

Symbol	LER10	LER30	LER50
Nil	310	320	
2	External stopper: 180		
3	External stopper: 90		

❺ Motor cable entry

Nil	Basic type (entry on the right side) 
L	Entry on the left side 

❻ Actuator cable type*

Nil	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.

❼ Actuator cable length [m]

Nil	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 311.

❽ Controller/Driver type*1

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

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

❾ I/O cable length [m]*1

Nil	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 394 (For LECP6), page 407 (For LECP1) or page 414 (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

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 387.)

⚠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.

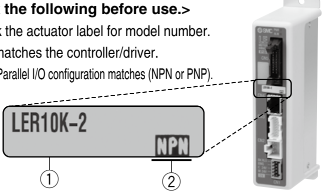
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

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

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



* Refer to the operation manual for using the products. Please download it via our website, http://www.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 386	Page 401	Page 408

SMC

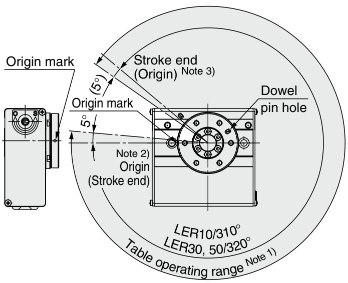
Specifications

Step Motor (Servo/24 VDC)

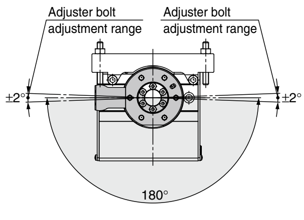
	Model		LER□10K	LER□10J	LER□30K	LER□30J	LER□50K	LER□50J
Actuator specifications — Basic type	Rotation angle [°]		310		320			
	Gear ratio [°]		8	12	8	12	7.5	12
	Max. rotating torque [N·m]		0.32	0.22	1.2	0.8	10	6.6
	Max. pushing torque [N·m] Note 1) 3)		0.16	0.11	0.6	0.4	5	3.3
	Max. moment of inertia [kg·m²] Note 2)		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)		3,000					
	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	
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)					
	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 308 “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.

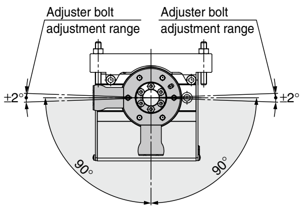
Table Rotation Angle Range



External stopper: 180°



External stopper: 90°

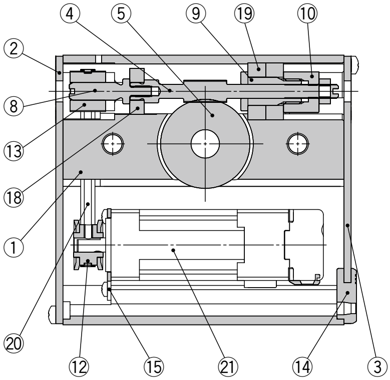


∗ The figures show the origin position for each actuator.

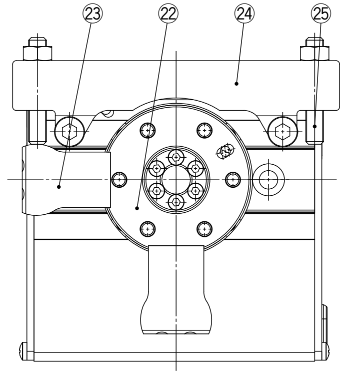
Note 1) Range within which the table can move when it returns to origin.
Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin.
Note 3) [ ] for when the direction of return to origin has changed.

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

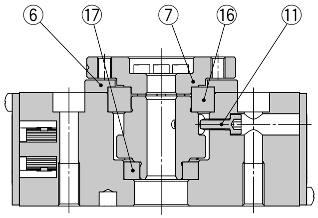
Construction



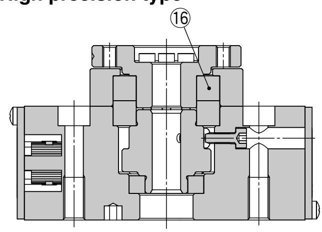
External stopper type



Basic type



High precision type



Component Parts

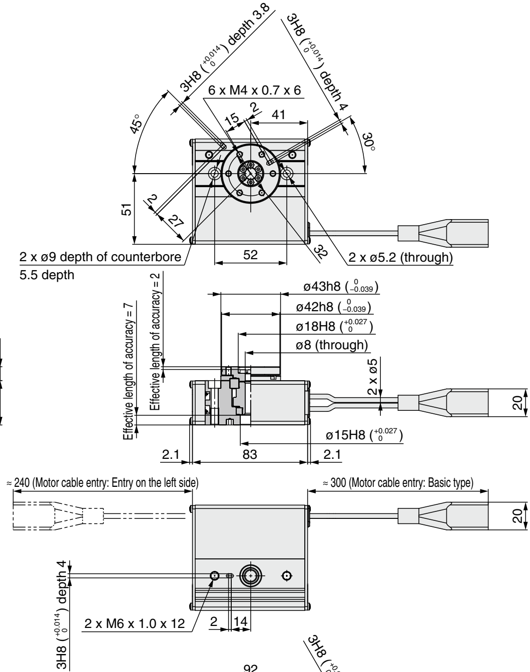
No.	Description		Material	Note
1	**Body**		Aluminum alloy	Anodized
2	**Side plate A**		Aluminum alloy	Anodized
3	**Side plate B**		Aluminum alloy	Anodized
4	**Worm screw**		Stainless steel	Heat treated + Specially treated
5	**Worm wheel**		Stainless steel	Heat treated + Specially treated
6	**Bearing cover**		Aluminum alloy	Anodized
7	**Table**		Aluminum alloy	
8	**Joint**		Stainless steel	
9	**Bearing holder**		Aluminum alloy	
10	**Bearing stopper**		Aluminum alloy	
11	**Origin bolt**		Carbon steel	
12	**Pulley A**		Aluminum alloy	
13	**Pulley B**		Aluminum 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)**		—	

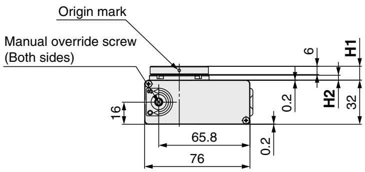
Component Parts

No.	Description	Material	Note
22	**Table**	Aluminum alloy	Anodized
23	**Arm**	Carbon steel	Heat treated + Electroless nickel treated
24	**Holder**	Aluminum alloy	Anodized
25	**Adjuster bolt**	Carbon steel	Heat treated + Chromate treated

Dimensions

LER□10□ (Rotation angle: 310°)

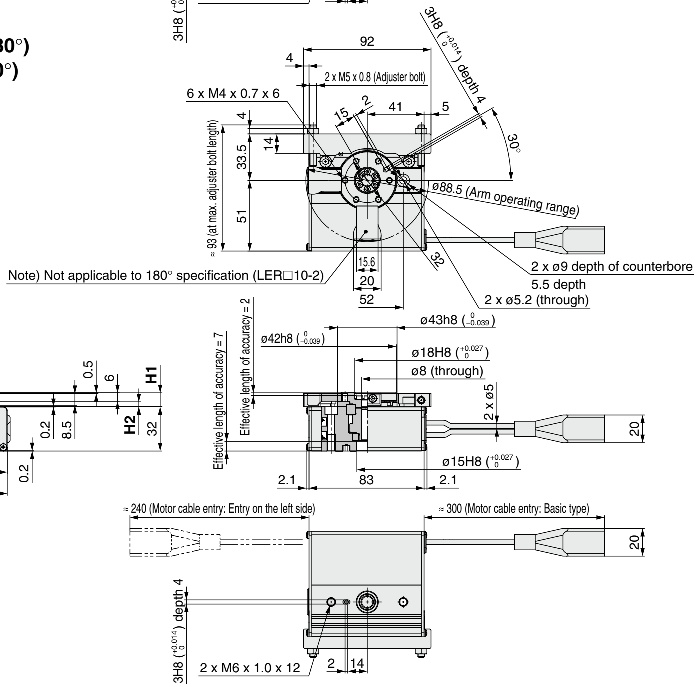


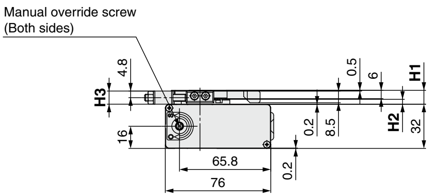


Dimensions [mm]

Model	H1	H2
LER10	10	3.5
LERH10	17	10.5

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



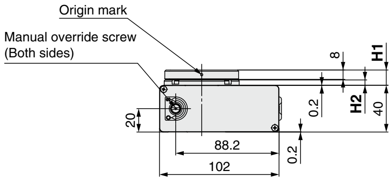


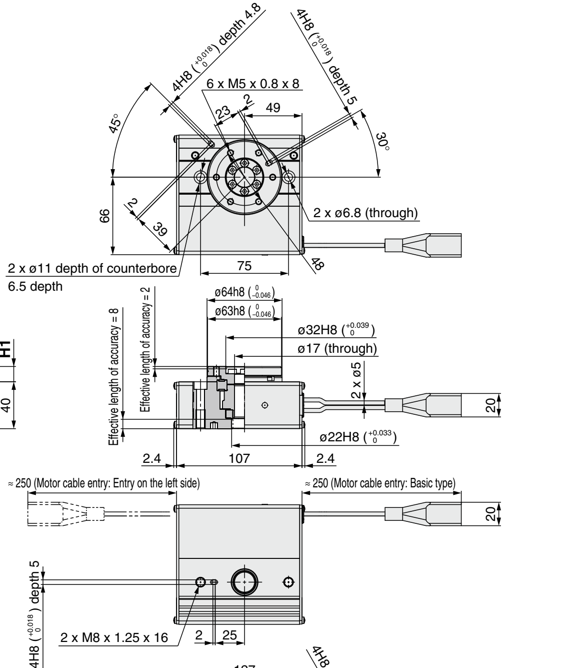
Dimensions [mm]

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

Dimensions

LER□30□ (Rotation angle: 320°)

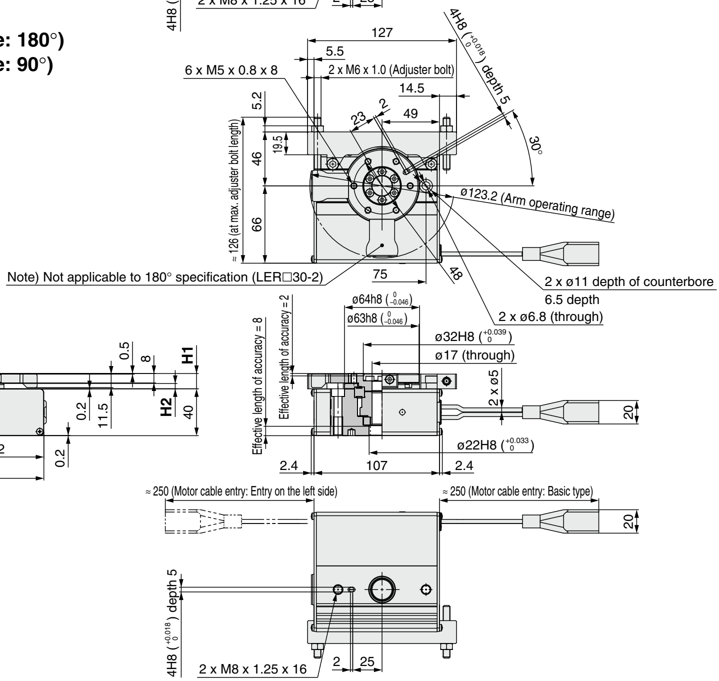


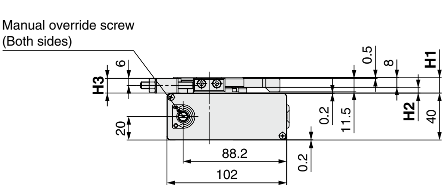


Dimensions [mm]

Model	H1	H2
LER30	13	4.5
LERH30	22	13.5

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



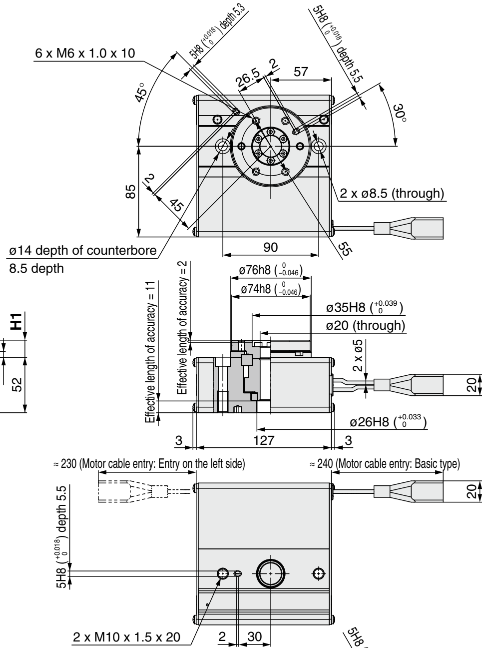


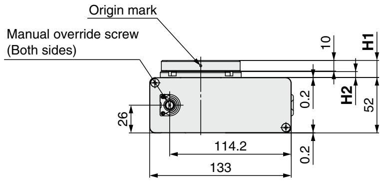
Dimensions [mm]

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

Dimensions

LER□50□ (Rotation angle: 320°)

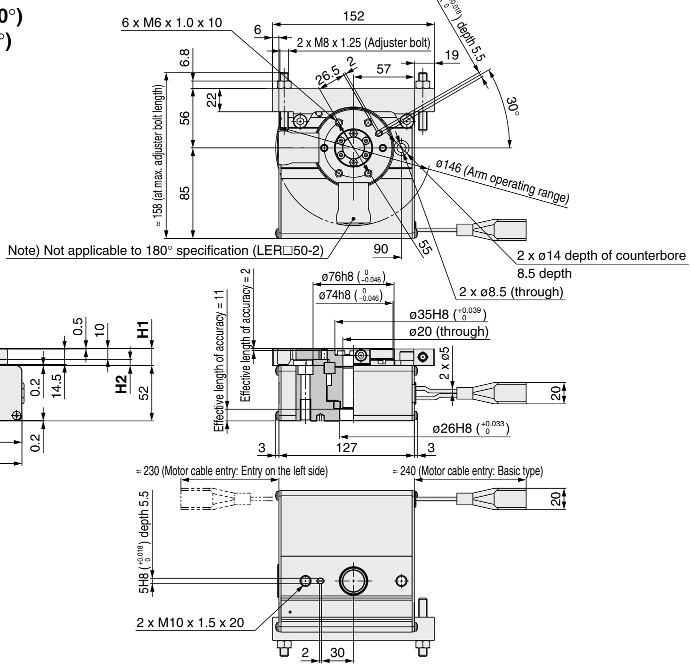


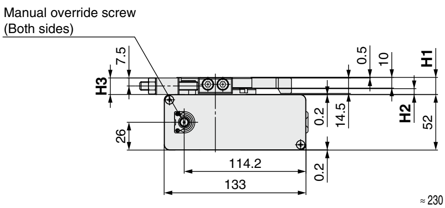


Dimensions [mm]

Model	H1	H2
LER50	16	5.5
LERH50	26	15.5

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





Dimensions [mm]

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

Electric Rotary Table/ Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 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.**
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. **When mounting the load, tighten the mounting screws 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.

Mounting the workpiece to the electric rotary table

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

Model	Bolt	Thread length [mm]	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

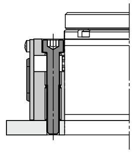
Mounting

⚠Warning

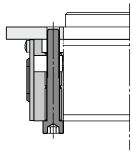
3. **When mounting the electric rotary table, tighten the mounting screws within the specified torque range.**
   Tightening the screws with a higher torque than recommended may cause malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position.

Through-hole mounting

Body mounting/Bottom



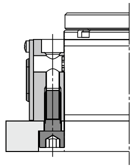
Body mounting/Top



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 energized, use the manual override screws.**
   When it is necessary to operate the product by the manual override screws, check the position of the manual override screws of the product, and leave necessary space. Do not apply excessive torque to the manual override screws. This may lead to damage and malfunction.

Series LER Electric Rotary Table/ Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 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 motor cable.

Maintenance

⚠Danger

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

Electric Grippers
Series LEH

CE c UL US
RoHS

Step Motor (Servo/24 VDC)

- **With drop prevention function**
  (Self-lock mechanism is provided for all series.)
  Gripping force of the workpieces is maintained when stopped or restarted. The workpieces can be removed with manual override.
- **Compact body sizes and long stroke variations**
  Gripping force equivalent to the widely used air grippers is available.
- **Possible to set position, speed and force.** (64 points)
- **Energy-saving product**
  Power consumption reduced by self-lock mechanism.
- **With gripping check function**
  Identify workpieces with different dimensions/detect mounting and removal of the workpieces.

Z Type (2 fingers)
▸Page 324

Compact and light, various gripping forces

Series ***LEHZ***

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

ZJ Type (2 fingers)
▸Page 338

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

Series ***LEHZJ***

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

F Type (2 fingers)
▸Page 350

Can hold various types of workpieces with a long stroke.

Series ***LEHF***

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

( ): Long stroke

S Type (3 fingers)
▸Page 363

Can hold round workpieces.

Series ***LEHS***

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

Step Motor (Servo/24 VDC) **Controller/Driver**
▸Page 377

▸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

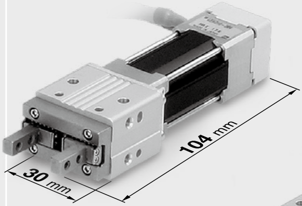
▸Pulse input type
Series LECPA

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

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

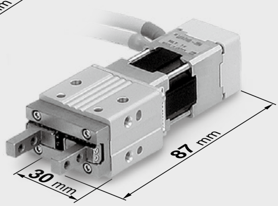
●Compact and lightweight Various gripping forces

Weight: **165** g (LEHZ10)



Compact

Weight: **135** g (LEHZ10L)

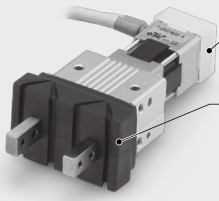


●Sealed-construction dust cover (Equivalent to IP50)

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

●3 types of cover material (Finger portion only)

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

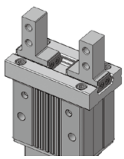


Encoder dust cover
Silicone rubber

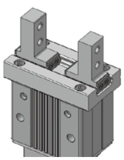
Cover designed with no protrusions

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

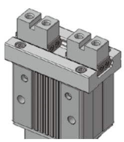
Finger options



Side tapped mounting

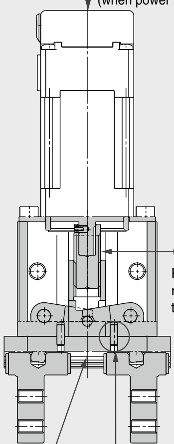


Through-hole in opening/closing direction

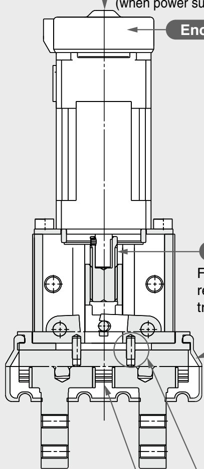


Flat fingers

Series LEHZ



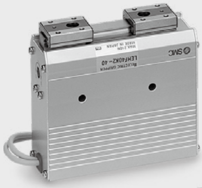
Series LEHZJ



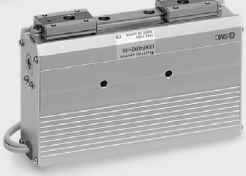
Series LEHS/Size: 10, 20, 32, 40

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

Stroke:
Max. **40** mm

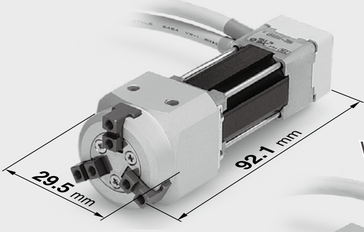


Long stroke
Stroke:
Max. **80** mm

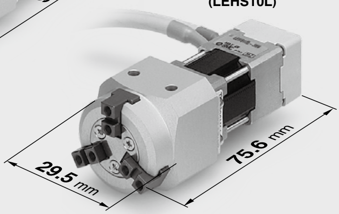


●Can hold round workpieces.

Weight: **185** g
(LEHS10)



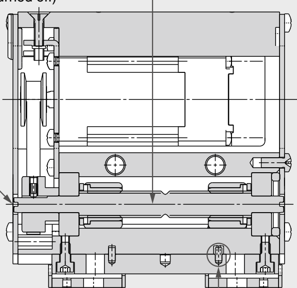
Compact
Weight: **150** g
(LEHS10L)



Series LEHF

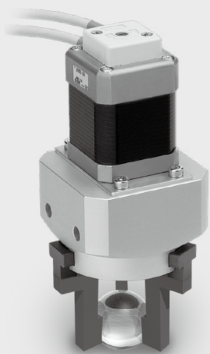
Manual override screw/Both sides
For opening and closing the fingers (when power supply is turned off)

Slide screw
Friction resistance reduced by special treatment



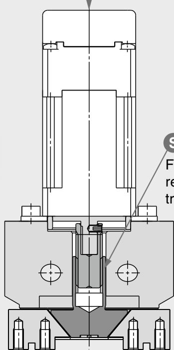
Linear guide

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



Series LEHS

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



Slide screw
Friction resistance reduced by special treatment

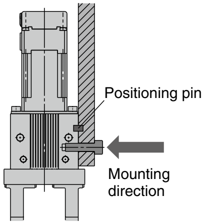
With wedge cam structure
Compact and large gripping force can be obtained through the wedge cam structure.

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

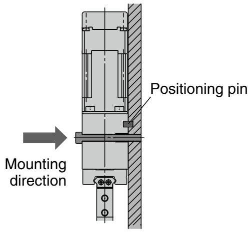
<Mounting Variations>

Series LEHZ/LEHZJ

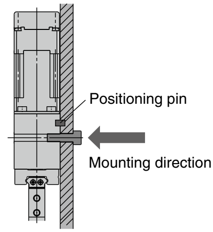
A When using the thread on the side of the body



B When using the thread on the mounting plate

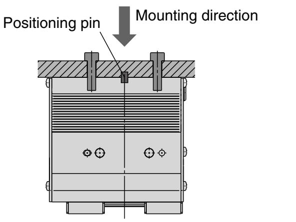


C When using the thread on the back of the body

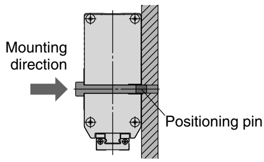


Series LEHF

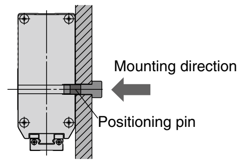
A When using the thread on the body



B When using the thread on the mounting plate

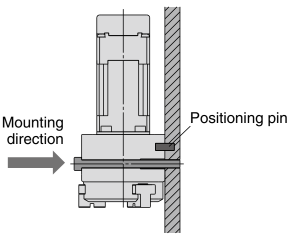


C When using the thread on the back of the body

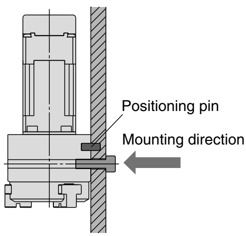


Series LEHS

A When using the thread on the mounting plate

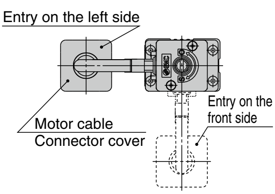


B When using the thread on the back of the body

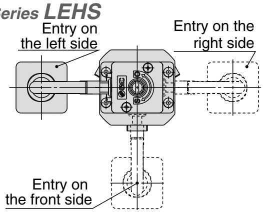


Motor cable mounting direction can be selected.

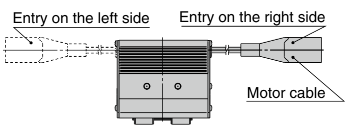
Series **LEHZ/LEHZJ**



Series **LEHS**

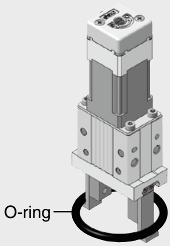


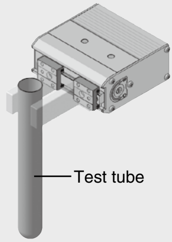
Series **LEHF**

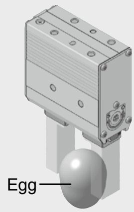


Application Examples

Gripping of components that are easily deformed or damaged

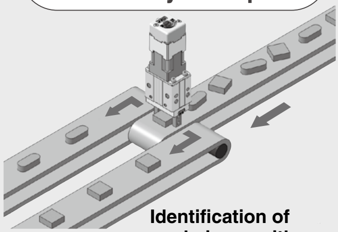






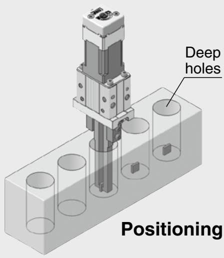
Speed and gripping force control and positioning

Alignment and selection of randomly lined parts



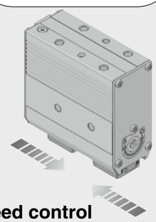
Identification of workpieces with different dimensions

Gripping in a narrow space



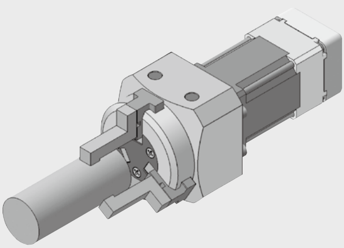
Positioning

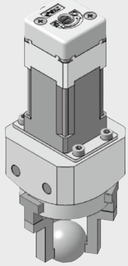
Soft touch/ High frequency

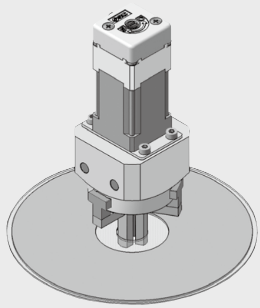


Speed control and positioning (Minimum stroke)

Gripping of cylindrical and spherical parts







Speed and gripping force control

Model Selection

Selection Procedure

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

Step 1 Check the gripping force.

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

Example

Workpiece mass: 0.1 kg

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

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

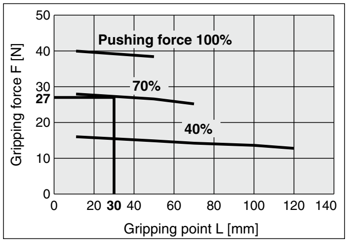
Note) For details, refer to the calculation of required gripping force.

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

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

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

LEHZ20



Pushing force: 70%

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

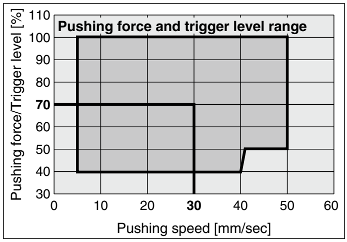
Gripping point distance: 30 mm

When the LEHZ20 is selected.

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

Pushing speed: 30 mm/sec

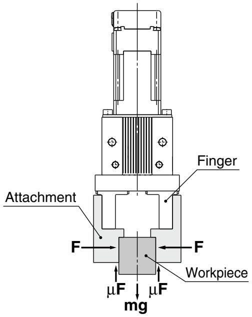
LEHZ20



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

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

Calculation of required gripping force



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

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

the conditions under which the workpiece will not drop are

$2 \times \mu F > mg$

2 — Number of fingers

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

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

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

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

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

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

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

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

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

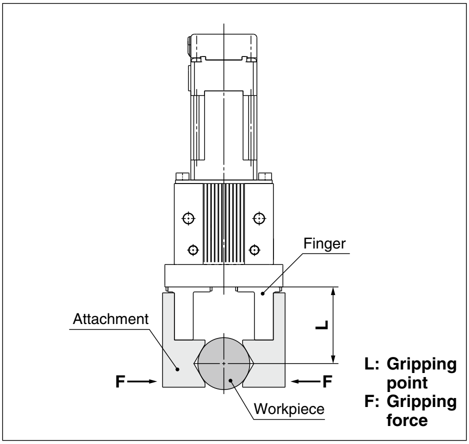
Selection Procedure

Step 1 Check the gripping force: Series LEHZ

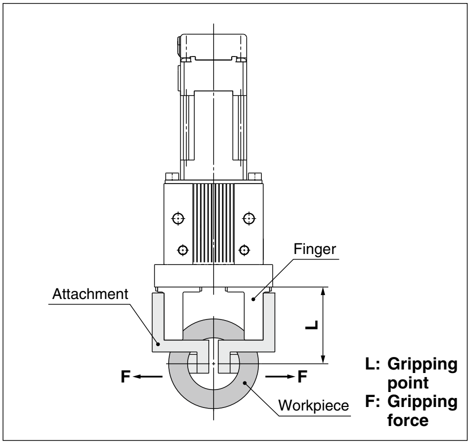
- **Indication of gripping force**
  The gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

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

External Gripping State



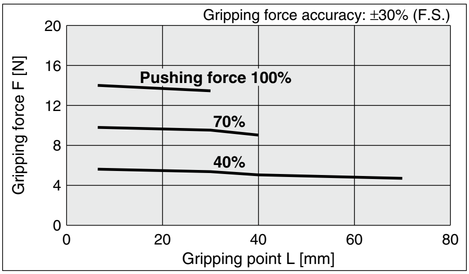
Internal Gripping State



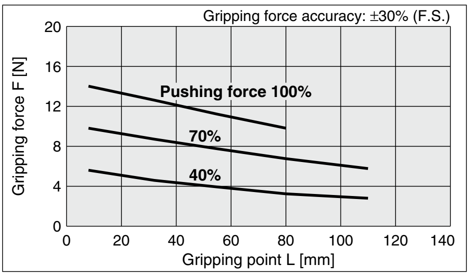
Basic

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

LEHZ10



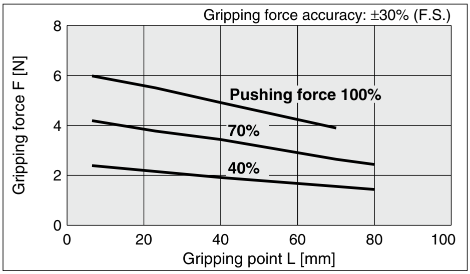
LEHZ16



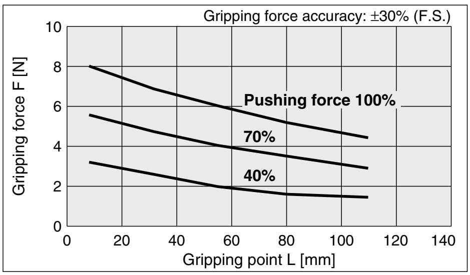
Compact

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

LEHZ10L



LEHZ16L



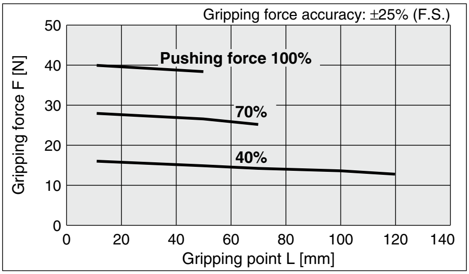
Selection Procedure

Step 1 Check the gripping force: Series LEHZ

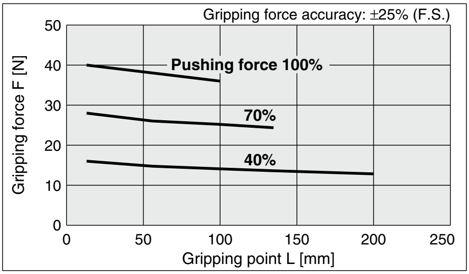
Basic

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

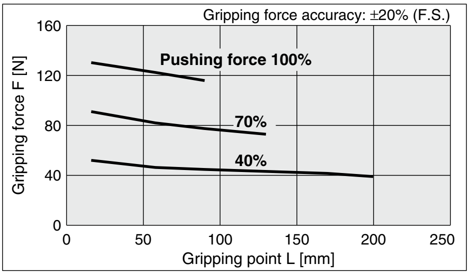
LEHZ20



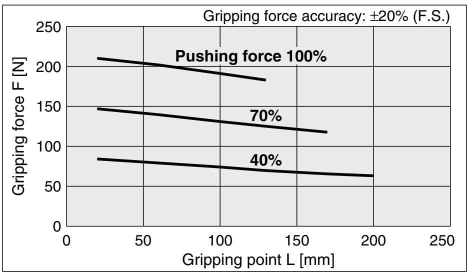
LEHZ25



LEHZ32



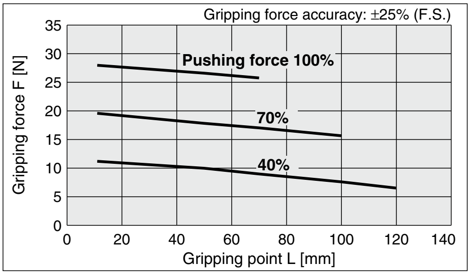
LEHZ40



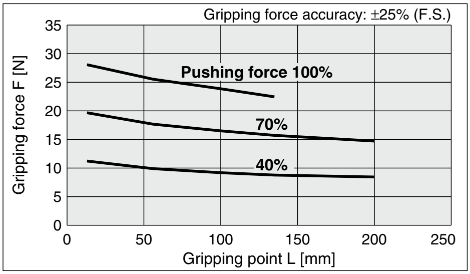
Compact

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

LEHZ20L



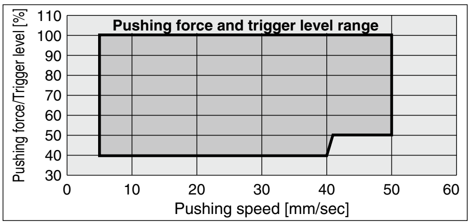
LEHZ25L



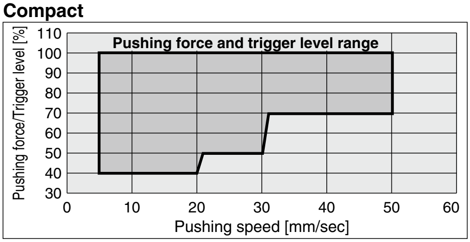
Selection of Pushing Speed

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

Basic



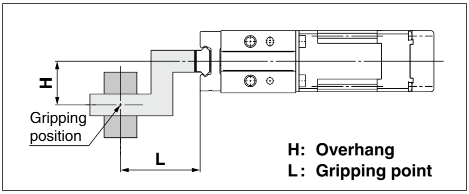
Compact



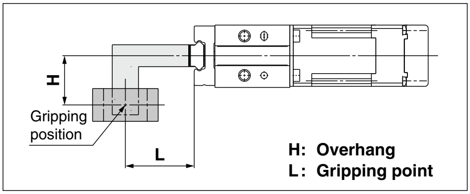
Step 2 Check the gripping point and overhang: Series LEHZ

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

External Gripping State



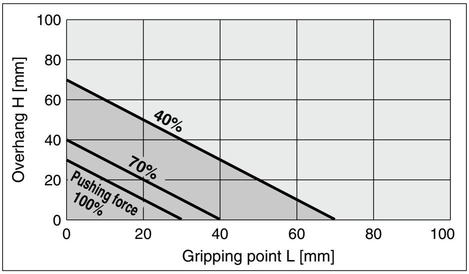
Internal Gripping State



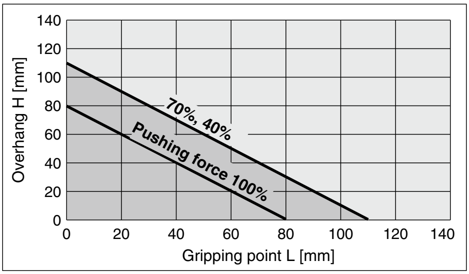
Basic

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

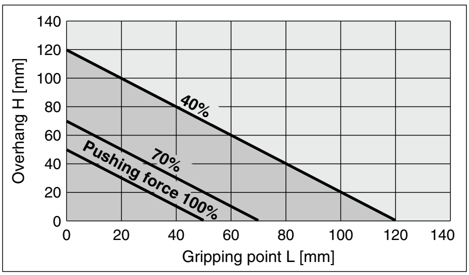
LEHZ10



LEHZ16



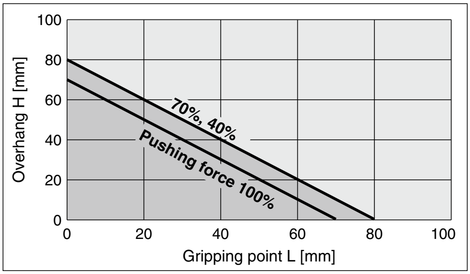
LEHZ20



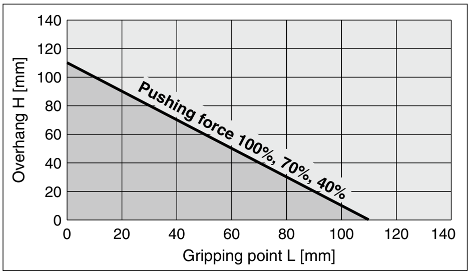
Compact

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

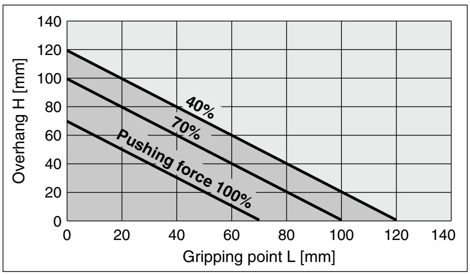
LEHZ10L



LEHZ16L



LEHZ20L



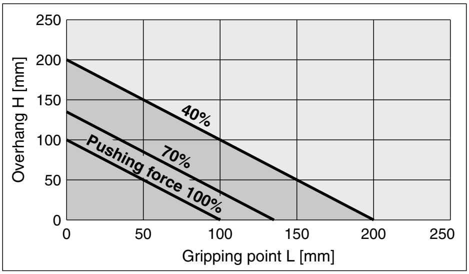
Selection Procedure

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

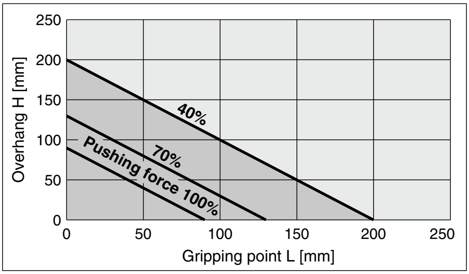
Basic

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

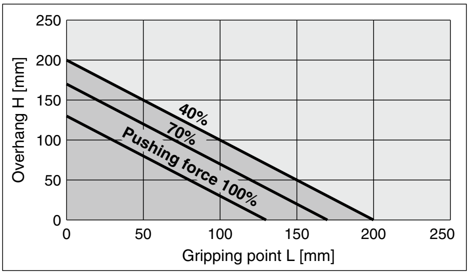
LEHZ25



LEHZ32



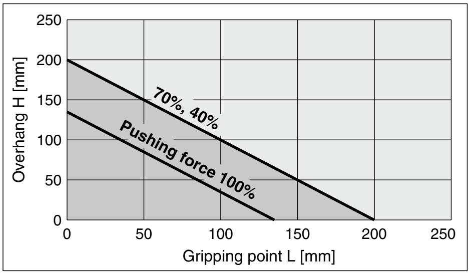
LEHZ40



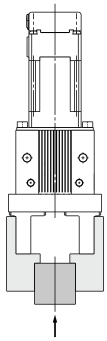
Compact

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

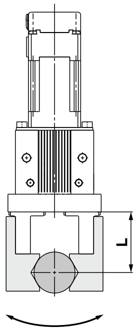
LEHZ25L



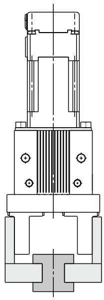
Step 3 Check the external force on fingers: Series LEHZ



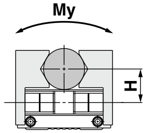
Fv: Allowable vertical load

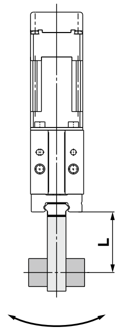


Mp: Pitch moment



My: Yaw moment





Mr: Roll moment

H, L: Distance to the point at which the load is applied (mm)

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

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

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

Electric Gripper 2-Finger Type

Step Motor (Servo/24 VDC)

Series LEHZ

LEHZ10, 16, 20, 25, 32, 40

RoHS

How to Order

LEHZ 10 ☐ K 2 – 4 ☐ ☐ – S 1 6N 1 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬

❶ Size

10
16
20
25
32
40

❷ Motor size

Nil	Basic
L Note)	Compact

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

❸ Lead

K	Basic

❹ 2-finger type

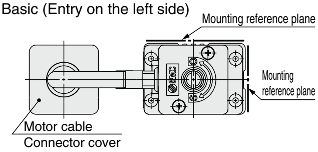
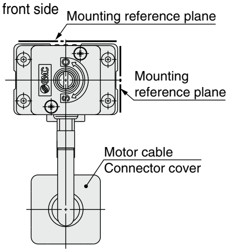
❺ Stroke [mm]

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

❻ Finger options

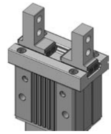
Nil	Basic (Tapped in opening/closing direction)
A	Side tapped mounting
B	Through-hole in opening/closing direction
C	Flat fingers

❼ Motor cable entry

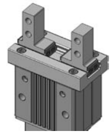
Nil	Basic (Entry on the left side) 
F	Entry on the front side 

Finger options

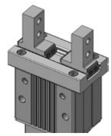
Nil: Basic (Tapped in opening/closing direction)



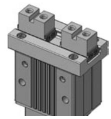
A: Side tapped mounting



B: Through-hole in opening/closing direction



C: Flat fingers



⚠Caution

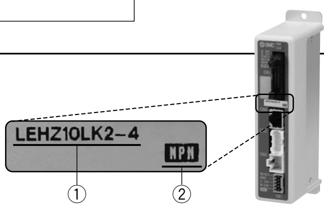
[CE-compliant products]
EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

❽ Actuator cable type*

Nil	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.

❾ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 3) on page 332.

❿ Controller/Driver type*

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

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

⓫ I/O cable length [m]*1

Nil	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 394 (For LECP6), page 407 (For LECP1) or page 414 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

⓬ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 387.)

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 386	Page 401	Page 408

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

SMC

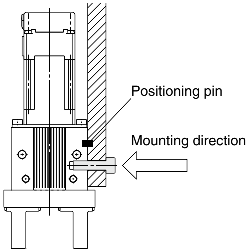
Specifications

	Model		LEHZ10	LEHZ16	LEHZ20	LEHZ25	LEHZ32	LEHZ40
Actuator specifications	Opening/closing stroke (Both sides)		4	6	10	14	22	30
	Gripping force [N] Note 1) Note 3)	Basic	6 to 14		16 to 40		52 to 130	84 to 210
		Compact	2 to 6	3 to 8	11 to 28		—	—
	Opening and closing speed/ Pushing speed [mm/s] Note 2) Note 3)		5 to 80/5 to 50		5 to 100/5 to 50		5 to 120/5 to 50	
	Drive method		Slide screw + Slide cam					
	Finger guide type		Linear guide (No circulation)					
	Repeatability [mm] Note 4)		±0.02					
	Repeated length measurement accuracy [mm] Note 5)		±0.05					
	Finger backlash/ both sides [mm] Note 6)		0.5 or less				1.0 or less	
	Impact/Vibration resistance [m/s²] Note 7)		150/30					
	Max. operating frequency [C.P.M]		60					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
	Weight [g]	Basic	165	220	430	585	1120	1760
		Compact	135	190	365	520	—	—
Electric specifications	Motor size		□20		□28		□42	
	Motor type		Step motor (Servo/24 VDC)					
	Encoder		Incremental A/B phase (800 pulse/rotation)					
	Rated voltage [V]		24 VDC ±10%					
	Power consumption/ Standby power consumption when operating [W] Note 8)	Basic	11/7		28/15		34/13	36/13
		Compact	8/7		22/12		—	—
	Max. instantaneous power consumption [W] Note 9)	Basic	19		51		57	61
		Compact	14		42		—	—

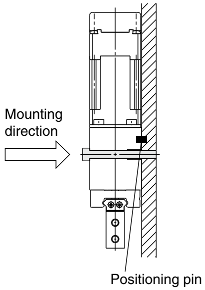
Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHZ10/16, ±25% (F.S.) for LEHZ20/25 and ±20% (F.S.) for LEHZ32/40.
Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing speed and pushing speed are for both fingers. The speed for one finger is half this value.
Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
Note 4) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.
Note 5) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.
Note 6) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.
Note 7) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Note 8) The power consumption (including the controller) is for when the gripper is operating.
The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.
Note 9) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

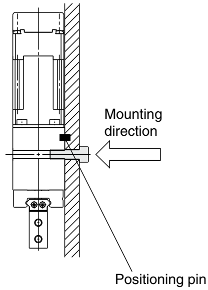
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

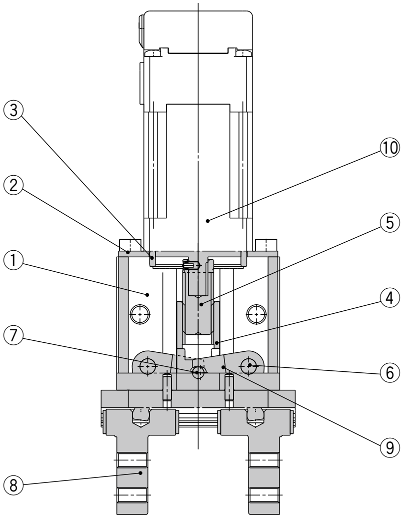


c) When using the thread on the back of the body



Construction

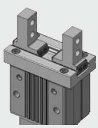
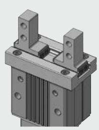
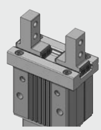
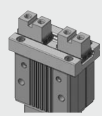
Series LEHZ



Component Parts

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

Replacement Parts ⑧ Finger Assembly

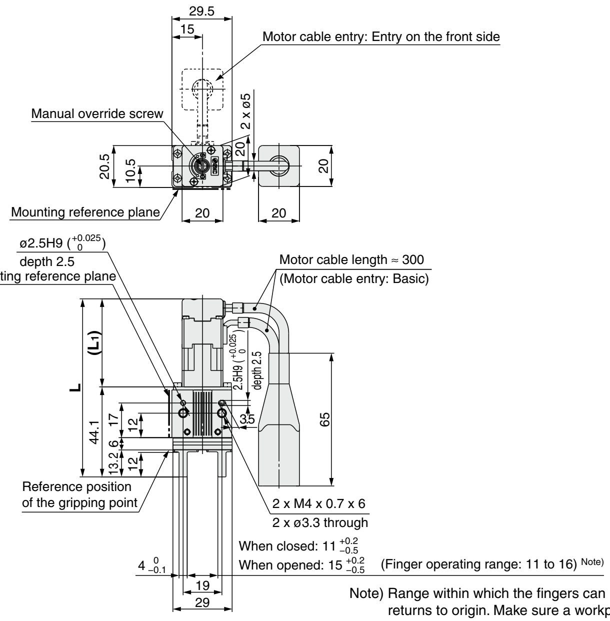
Size	Basic (**Nil**)	Side tapped mounting (**A**)	Through-hole in opening/ closing direction (**B**)	Flat fingers (**C**)
				
10	MHZ-A1002	MHZ-A1002-1	MHZ-A1002-2	MHZ-A1002-3
16	MHZ-A1602	MHZ-A1602-1	MHZ-A1602-2	MHZ-A1602-3
20	MHZ-A2002	MHZ-A2002-1	MHZ-A2002-2	MHZ-A2002-3
25	MHZ-A2502	MHZ-A2502-1	MHZ-A2502-2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

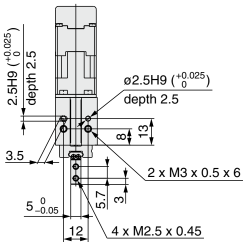
Dimensions

LEHZ10(L)K2-4

[mm]

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



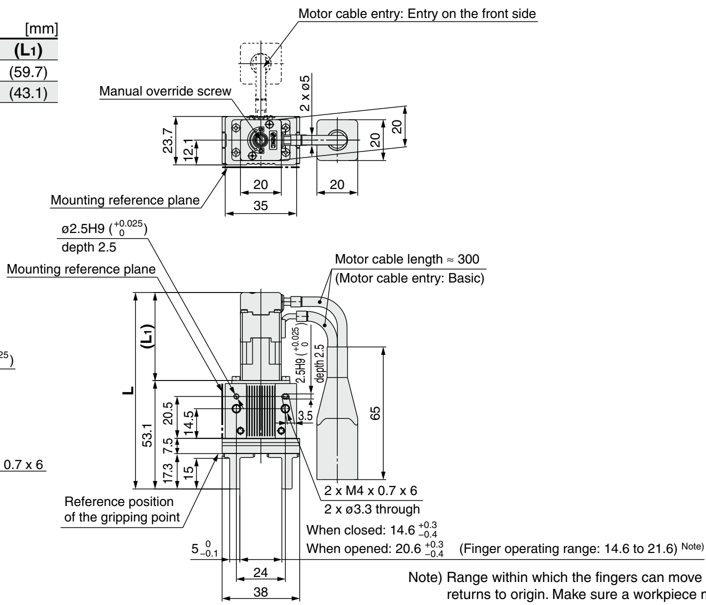


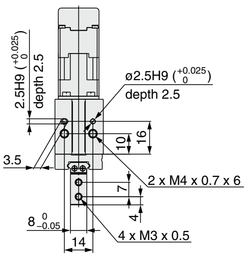
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZ16(L)K2-6

[mm]

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





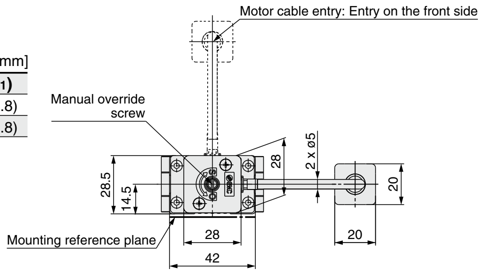
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

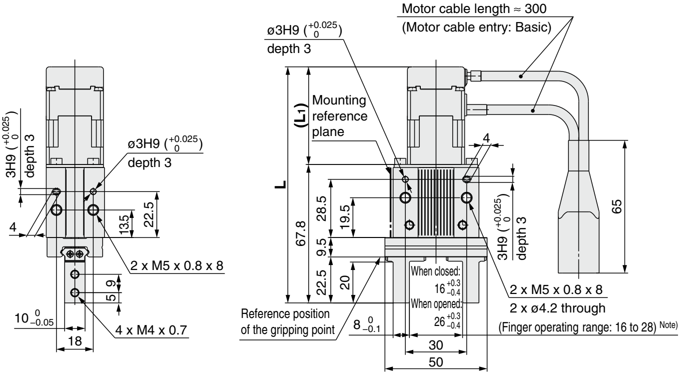
Dimensions

LEHZ20(L)K2-10

[mm]

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



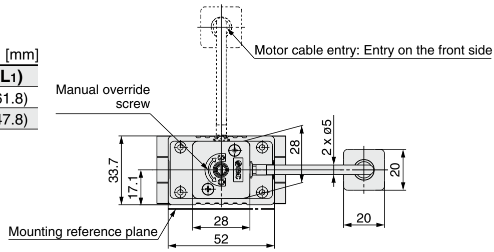


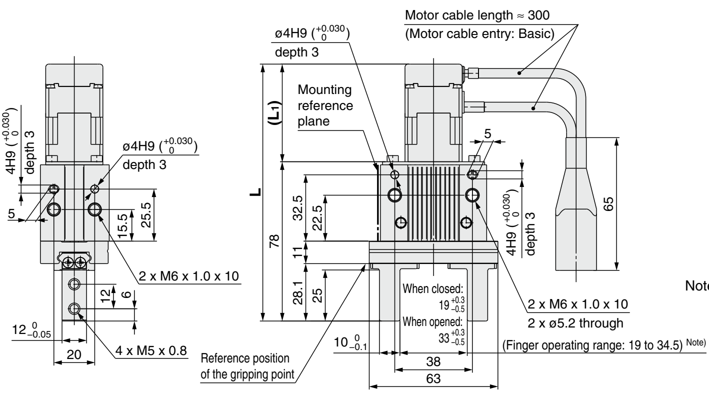
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZ25(L)K2-14

[mm]

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

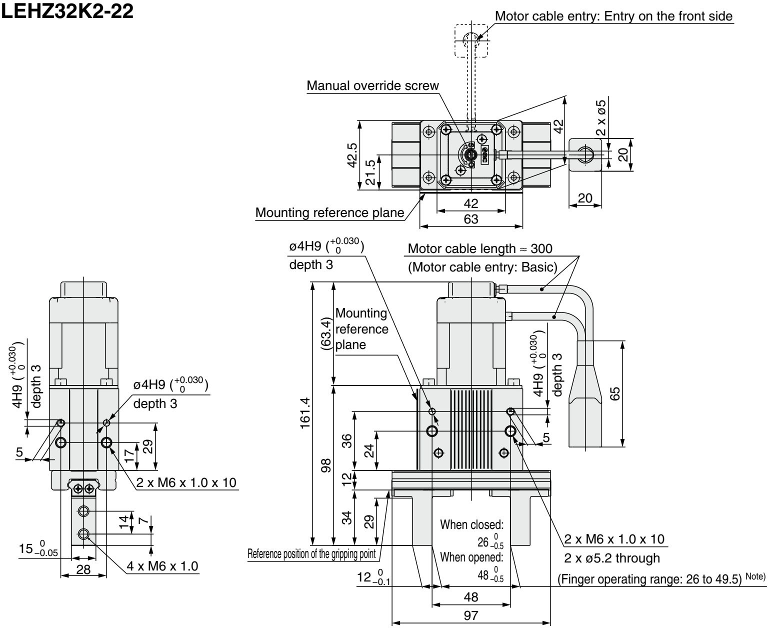




Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

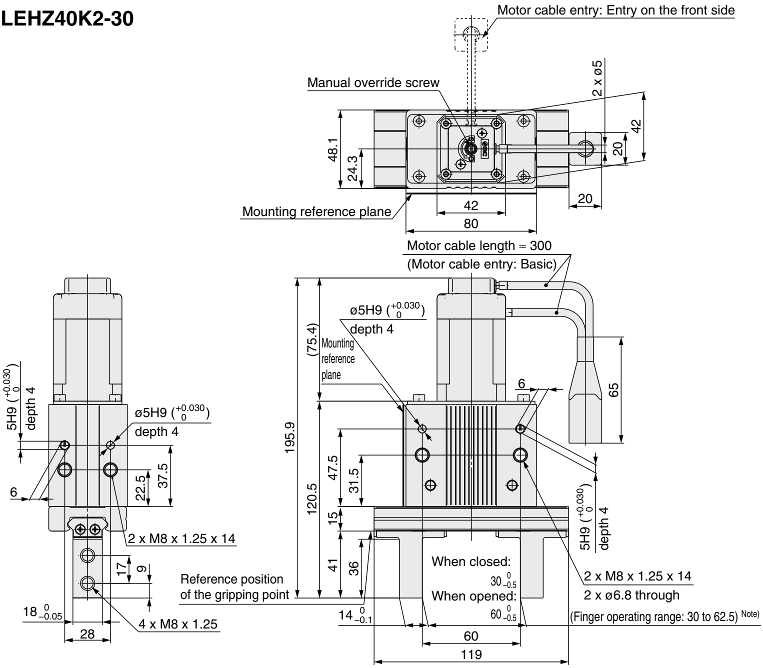
Dimensions

LEHZ32K2-22



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

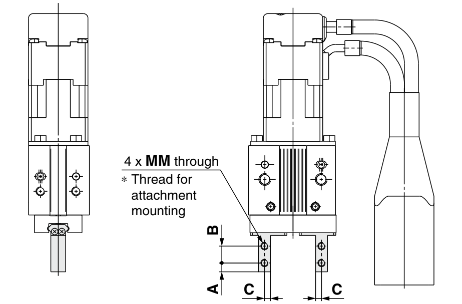
LEHZ40K2-30



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

Finger Options

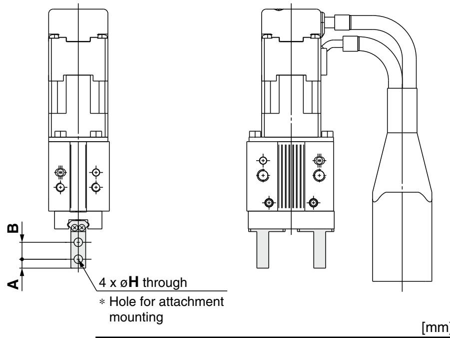
Side Tapped Mounting (A)



[mm]

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

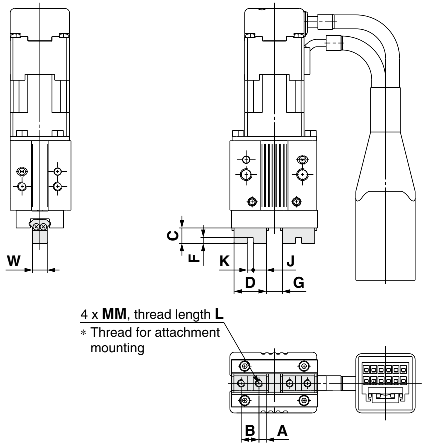
Through-hole in Opening/Closing Direction (B)



[mm]

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

Flat Fingers (C)



[mm]

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

Model Selection

Selection Procedure

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

Step 1 Check the of gripping force.

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

Example

Workpiece mass: 0.1 kg

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

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

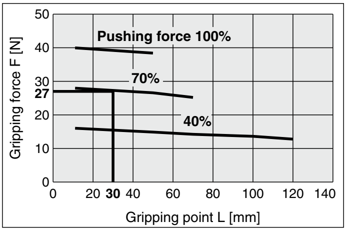
Note) For details, refer to the calculation of required gripping force.

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

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

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

LEHZJ20



Pushing force: 70%

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

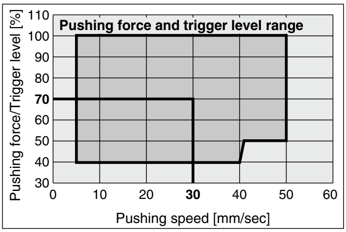
Gripping point distance: 30 mm

When the LEHZJ20 is selected.

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

Pushing speed: 30 mm/sec

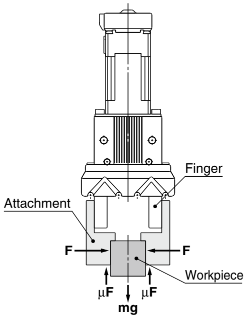
LEHZJ20



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

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

Calculation of required gripping force



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

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

the conditions under which the workpiece will not drop are

$2 \times \mu F > mg$

2 — **Number of fingers**

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

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

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

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

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

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

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

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

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

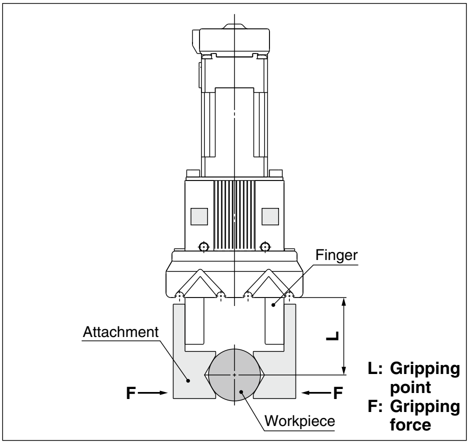
Selection Procedure

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

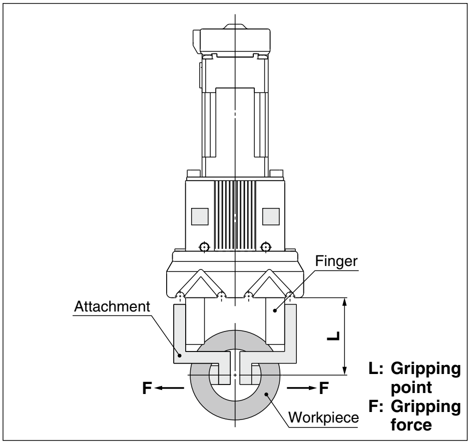
● **Indication of gripping force**
The gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

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

External Gripping State



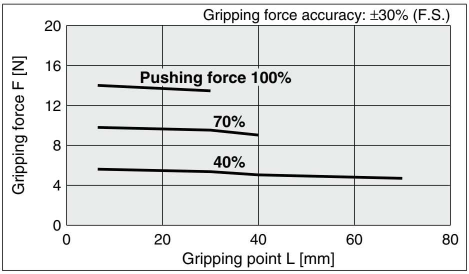
Internal Gripping State



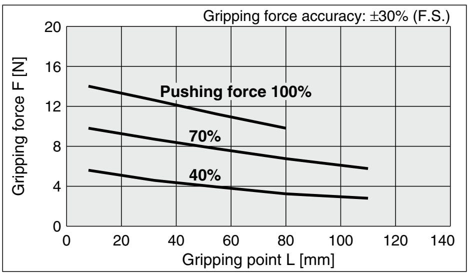
Basic

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

LEHZJ10



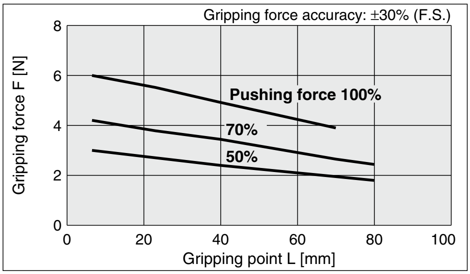
LEHZJ16



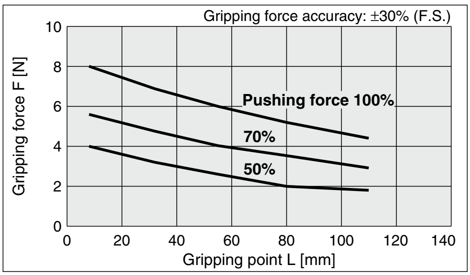
Compact

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

LEHZJ10L



LEHZJ16L



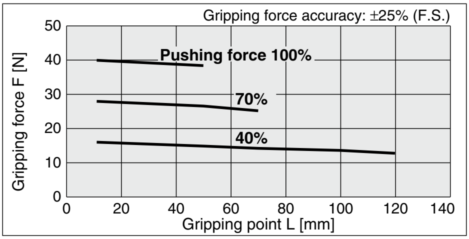
Selection Procedure

Step 1 Check the gripping force: Series LEHZJ

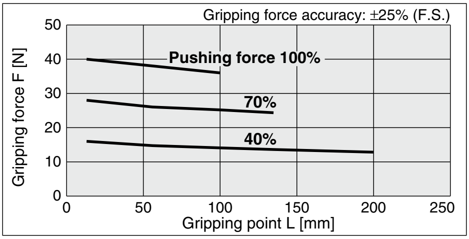
Basic

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

LEHZJ20



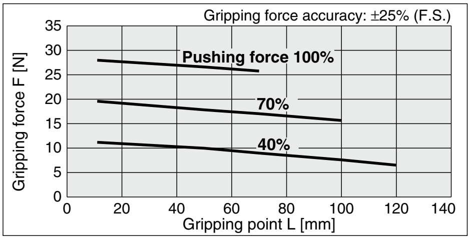
LEHZJ25



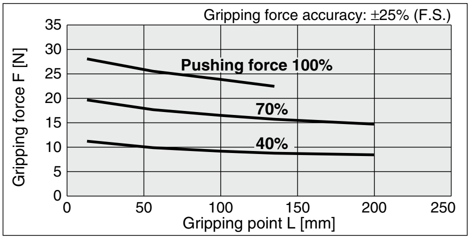
Compact

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

LEHZJ20L



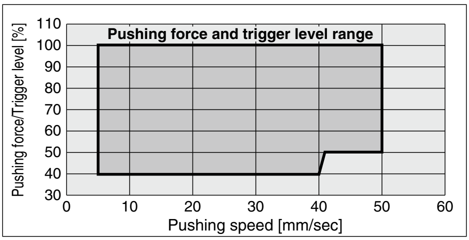
LEHZJ25L



Selection of Pushing Speed

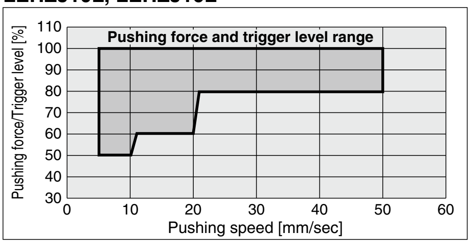
● Set the [Pushing force] and [Trigger level] within the range shown in the figure below.

Basic

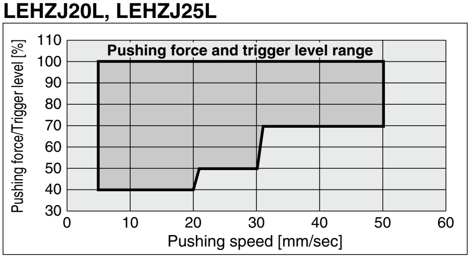


Compact

LEHZJ10L, LEHZJ16L



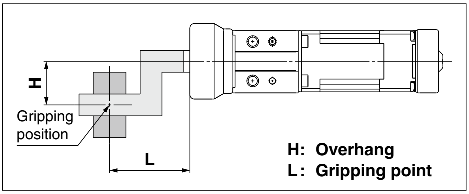
LEHZJ20L, LEHZJ25L



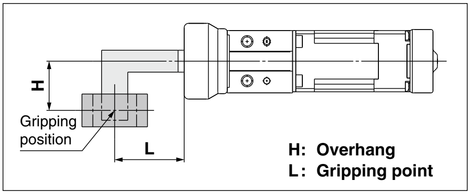
Step 2 Check the gripping point and overhang: Series LEHZJ

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

External Gripping State



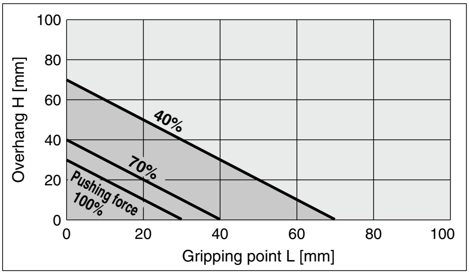
Internal Gripping State



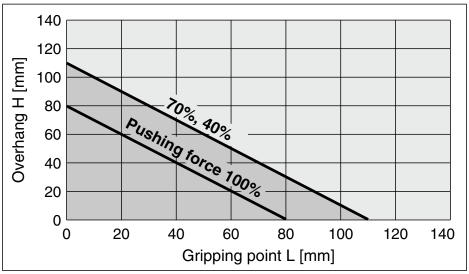
Basic

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

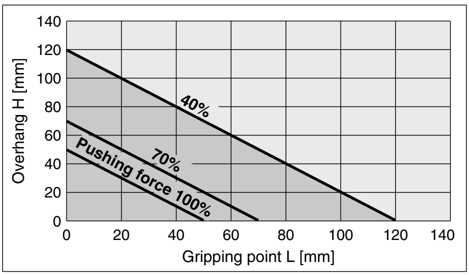
LEHZJ10



LEHZJ16



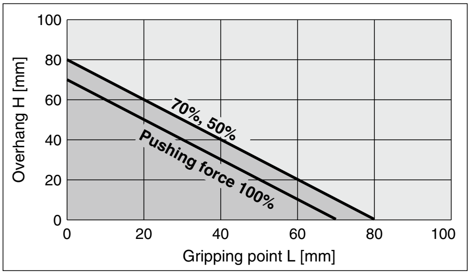
LEHZJ20



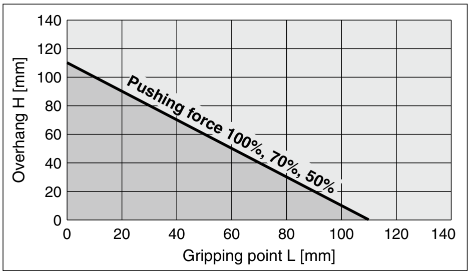
Compact

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

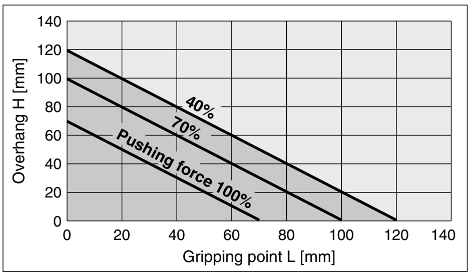
LEHZJ10L



LEHZJ16L



LEHZJ20L



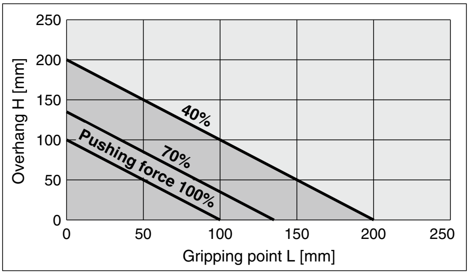
Selection Procedure

Step 2 Check the gripping point and overhang: Series LEHZJ

Basic

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

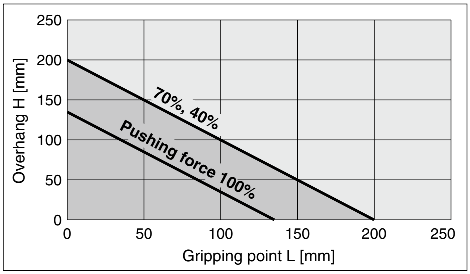
LEHZJ25



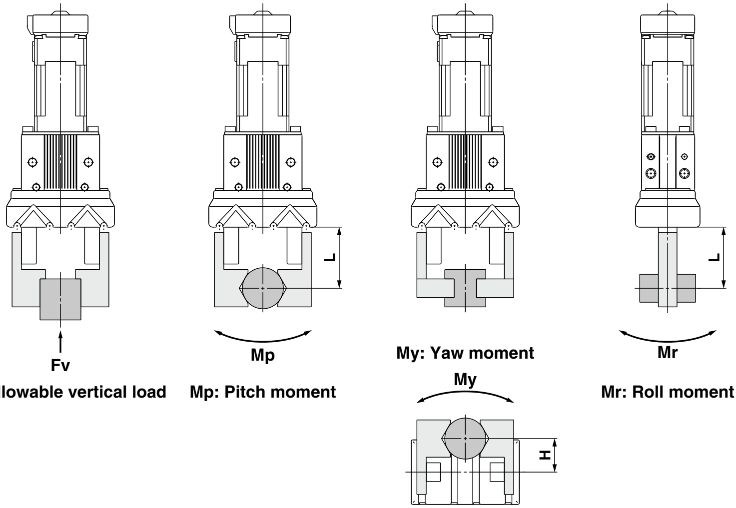
Compact

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

LEHZJ25L



Step 3 **Check the external force on fingers: Series LEHZJ**



Fv: Allowable vertical load   Mp: Pitch moment   Mr: Roll moment

H, L: Distance to the point at which the load is applied (mm)

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

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

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

Electric Gripper 2-Finger Type/With Dust Cover

Step Motor (Servo/24 VDC)

Series LEHZJ

LEHZJ10, 16, 20, 25

RoHS

How to Order

LEHZ J 10 □ K 2 – 4 □ □ – S 1 6N 1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬ ⓭

❶ Dust cover

J	With dust cover

❷ Size

10
16
20
25

❸ Motor size

Nil	Basic
L	Compact

❹ Lead

K	Basic

❺ 2-finger type

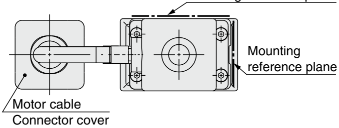
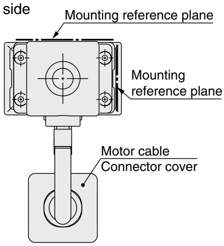
❻ Stroke [mm]

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

❼ Dust cover type

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

❽ Motor cable entry

Nil	Basic (Entry on the left side) 
F	Entry on the front side 

⚠Caution

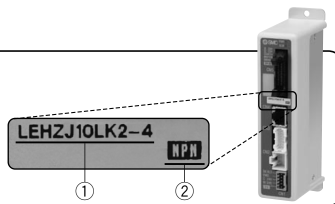
[CE-compliant products]
EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

⑨ Actuator cable type*

Nil	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.

⑩ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 346.

⑪ Controller/Driver type*

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

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

⑫ I/O cable length [m]*1

Nil	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 394 (For LECP6), page 407 (For LECP1) or page 414 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

⑬ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 387.)

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 386	Page 401	Page 408

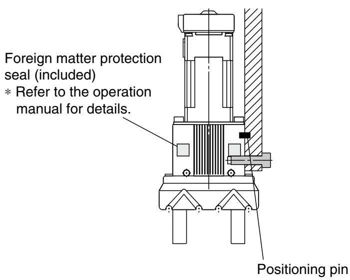
Specifications

Model			LEHZJ10	LEHZJ16	LEHZJ20	LEHZJ25
Actuator specifications	Opening/closing stroke (Both sides)		4	6	10	14
	Gripping force [N] Note 1) Note 3)	Basic	6 to 14		16 to 40	
		Compact	3 to 6	4 to 8	11 to 28	
	Opening and closing speed/Pushing speed [mm/s] Note 2) Note 3)		5 to 80/5 to 50		5 to 100/5 to 50	
	Drive method		Slide screw + Slide cam			
	Finger guide type		Linear guide (No circulation)			
	Repeatability [mm] Note 4)		±0.02			
	Repeated length measurement accuracy [mm] Note 5)		±0.05			
	Finger backlash/ both sides [mm] Note 6)		0.5 or less			
	Impact/Vibration resistance [m/s²] Note 7)		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
	Weight [g]	Basic	170	230	440	610
		Compact	140	200	375	545
Electric specifications	Motor size		□20		□28	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/ Standby power consumption when operating [W] Note 8)	Basic	11/7		28/15	
		Compact	8/7		22/12	
	Max. instantaneous power consumption [W] Note 9)	Basic	19		51	
		Compact	14		42	

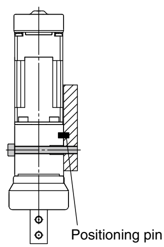
Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHZJ10/16 and ±25% (F.S.) for LEHZJ20/25.
Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing speed and pushing speed are for both fingers. The speed for one finger is half this value.
Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
Note 4) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.
Note 5) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.
Note 6) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.
Note 7) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Note 8) The power consumption (including the controller) is for when the gripper is operating.
The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.
Note 9) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

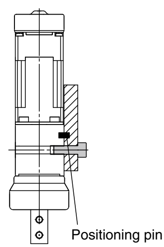
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

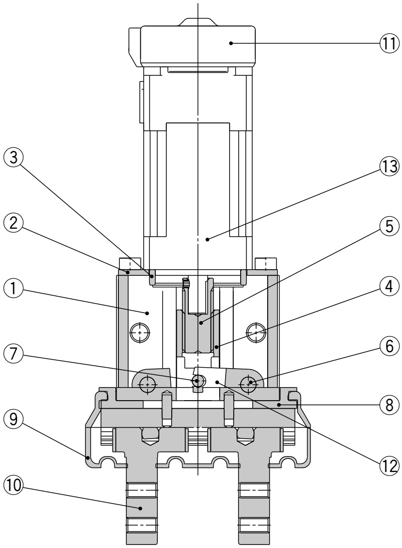


c) When using the thread on the back of the body



Construction

Series LEHZJ



Component Parts

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

Replacement Parts

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

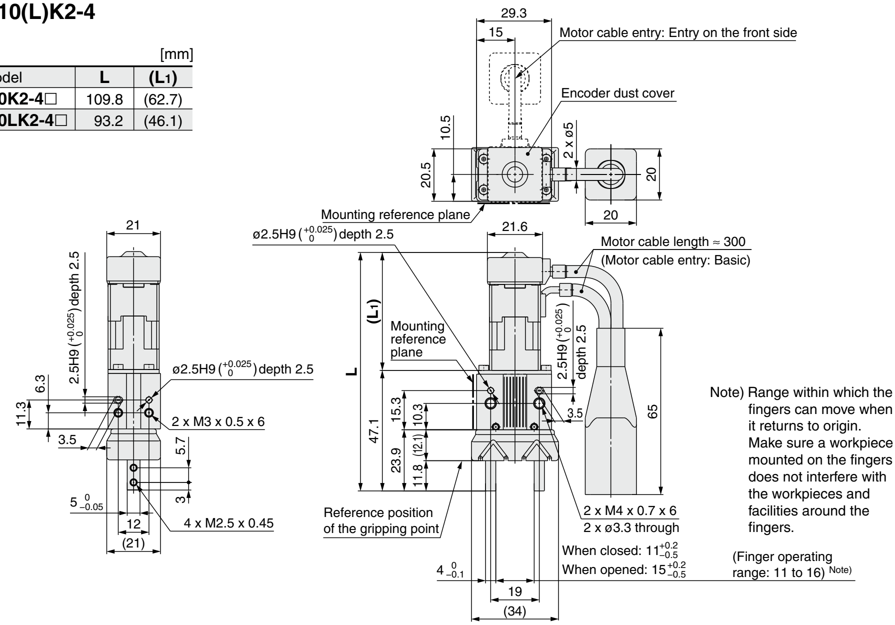
∗ The dust cover is a consumable part. Please replace as necessary.

Dimensions

LEHZJ10(L)K2-4

[mm]

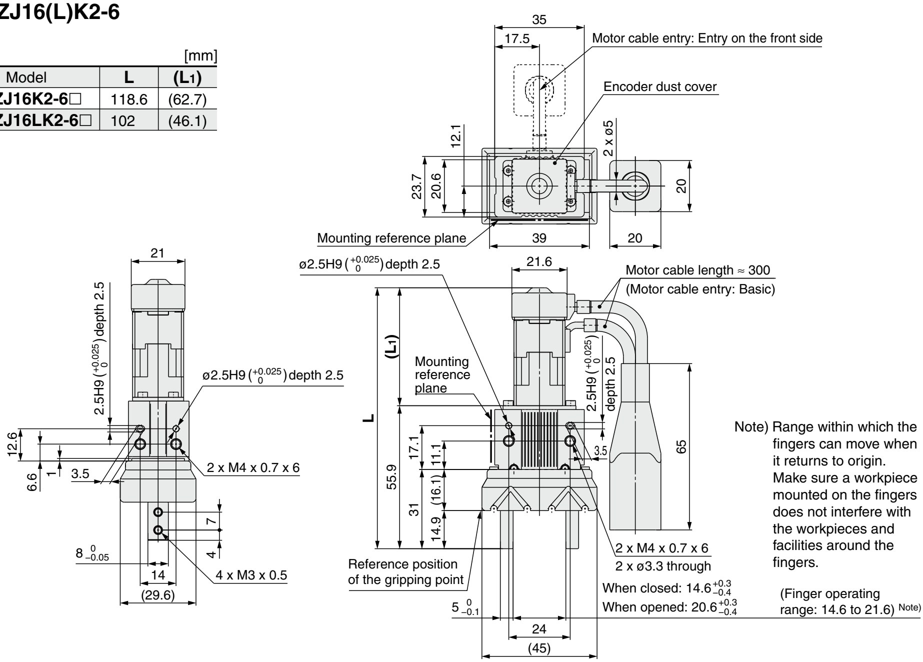
Model	L	(L1)
LEHZJ10K2-4□	109.8	(62.7)
LEHZJ10LK2-4□	93.2	(46.1)



LEHZJ16(L)K2-6

[mm]

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

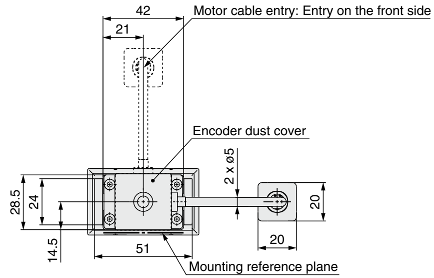


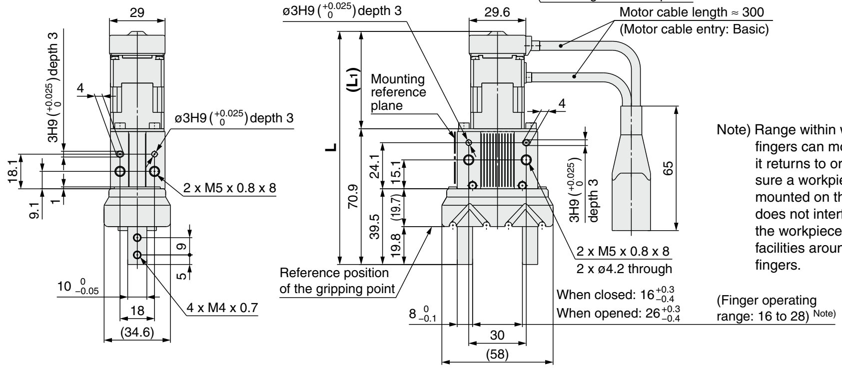
Dimensions

LEHZJ20(L)K2-10

[mm]

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



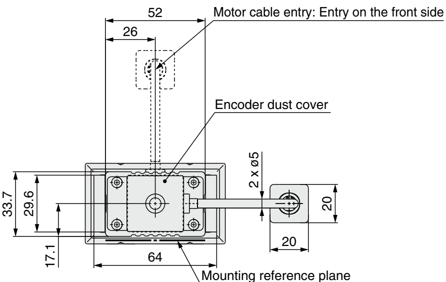


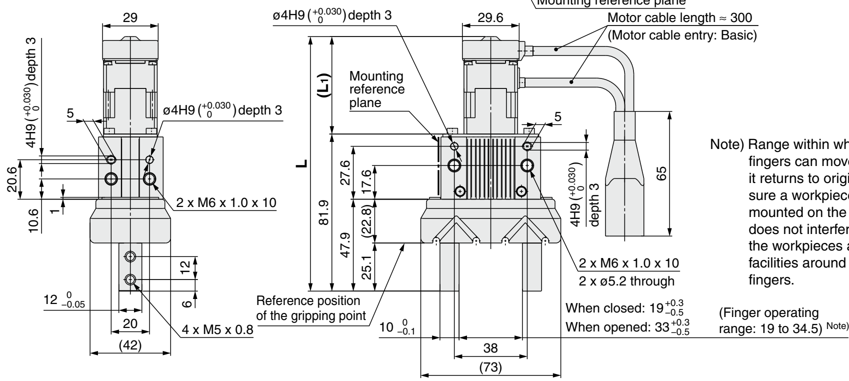
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZJ25(L)K2-14

[mm]

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





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

Model Selection

Selection Procedure

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

Step 1 Check the gripping force.

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

Example

Workpiece mass: 0.1 kg

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

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

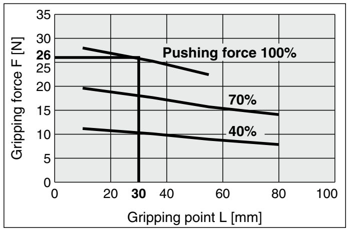
Note) For details, refer to the model selection illustration.

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

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

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

LEHF20



When the LEHF20 is selected.

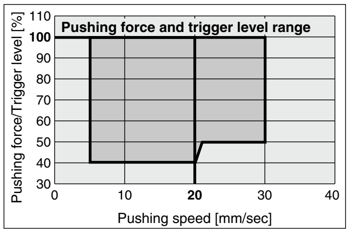
- A gripping force of 26 N is obtained from the intersection point of gripping point distance L = 30 mm and pushing force of 100%.
- Gripping force is 26.5 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

Pushing force: 100%

Gripping point distance: 30 mm

Pushing speed: 20 mm/sec

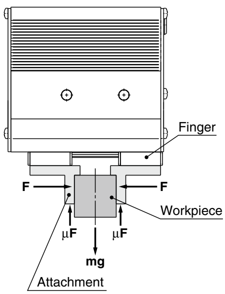
LEHF20



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

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

Calculation of required gripping force



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

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

the conditions under which the workpiece will not drop are

$2 \times \mu F > mg$

(2 = Number of fingers)

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

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

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

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

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

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

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

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

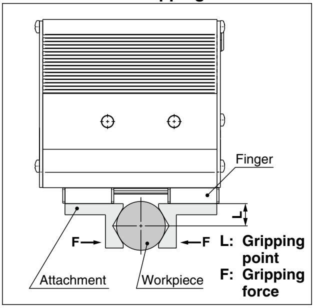
Note) • Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration or impact forces are encountered during motion, a further margin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

Selection Procedure

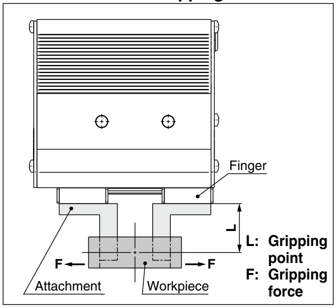
Step 1 Check the gripping force: Series LEHF

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

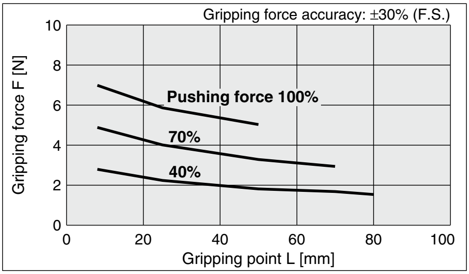
External Gripping State



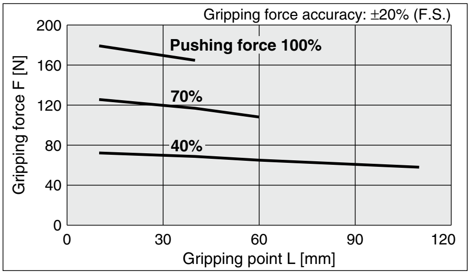
Internal Gripping State



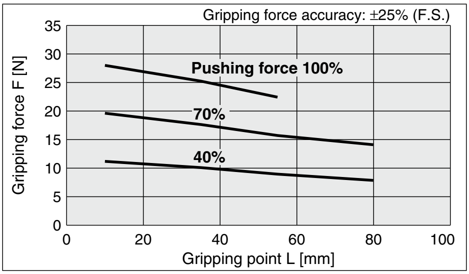
LEHF10



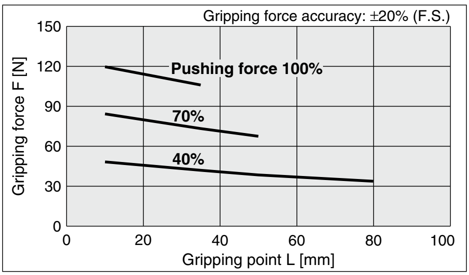
LEHF40



LEHF20

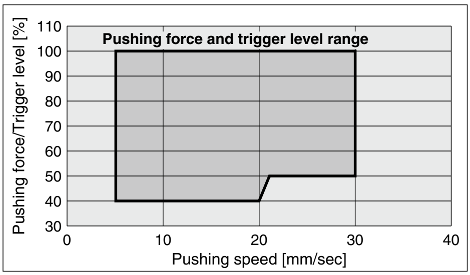


LEHF32



Selection of Pushing Speed

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



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

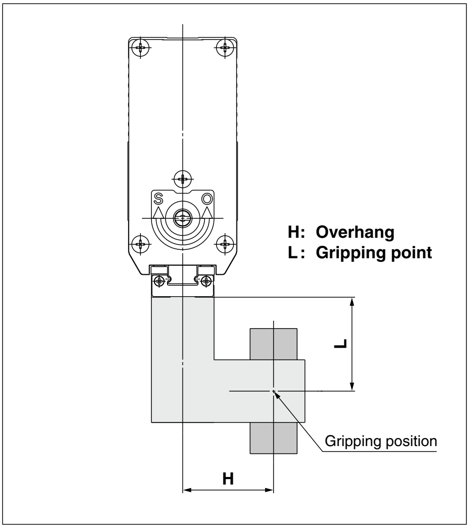
LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Selection Procedure

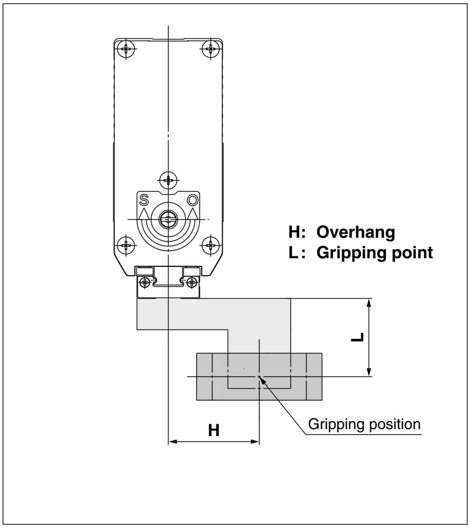
Step 2 Check the gripping point and overhang: Series LEHF

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

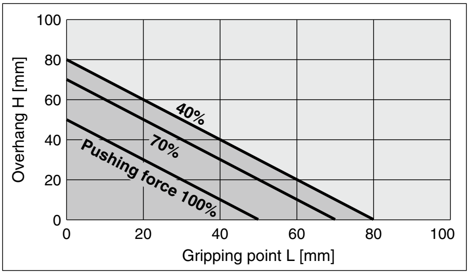
External Gripping State



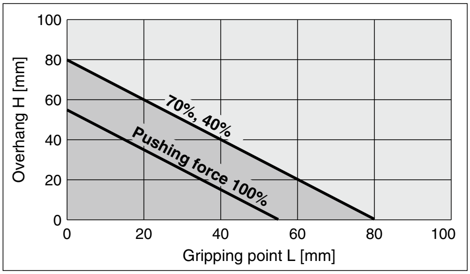
Internal Gripping State



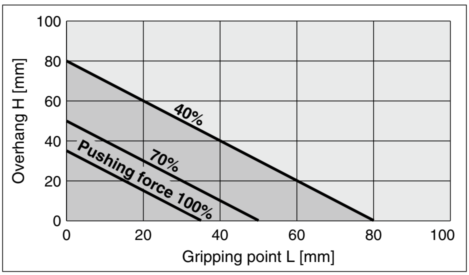
LEHF10



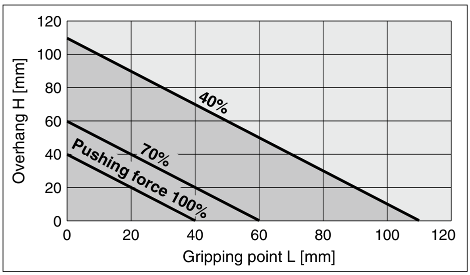
LEHF20



LEHF32

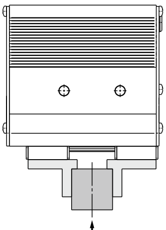


LEHF40



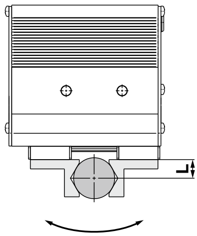
∗ Pushing force is one of the values of step data that is input into the controller.

Step 3 Check the external force on fingers: Series LEHF



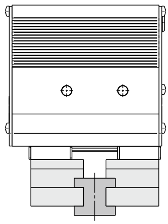
Fv

Fv: Allowable vertical load



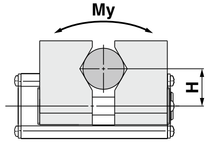
Mp

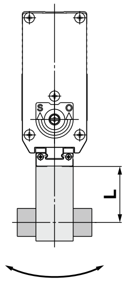
Mp: Pitch moment



My: Yaw moment

My





Mr

Mr: Roll moment

H, L: Distance to the point at which the load is applied (mm)

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

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

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

Electric Gripper 2-Finger Type

Step Motor (Servo/24 VDC)

Series LEHF

LEHF10, 20, 32, 40

CE c UL US RoHS

How to Order

LEHF 10 K 2 – 16 ☐ – S 1 6N 1 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Size

10
20
32
40

❷ Lead

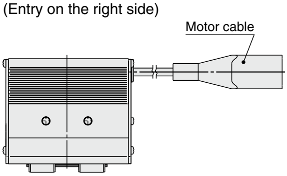
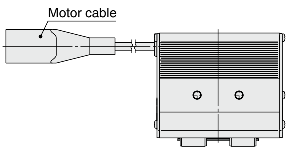
K	Basic

❸ 2-finger type

❹ Stroke [mm]

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

❺ Motor cable entry

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

⚠Caution

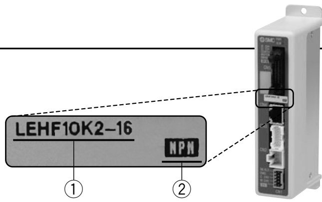
[CE-compliant products]
EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

❻ Actuator cable type*

Nil	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.

❼ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 3) on page 356.

❽ Controller/Driver type*

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

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

❾ I/O cable length [m]*1

Nil	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 394 (For LECP6), page 407 (For LECP1) or page 414 (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

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 387.)

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 386	Page 401	Page 408

Specifications

Model			LEHF10	LEHF20	LEHF32	LEHF40
Actuator specifications	Opening/closing stroke (Both sides)	Basic	16	24	32	40
		Long stroke	32	48	64	80
	Gripping force [N] Note 1) Note 3)		3 to 7	11 to 28	48 to 120	72 to 180
	Opening and closing speed/Pushing speed [mm/s] Note 2) Note 3)		5 to 80/5 to 20	5 to 100/5 to 30		
	Drive method		Slide screw + Belt			
	Finger guide type		Linear guide (No circulation)			
	Repeatability [mm] Note 4)		±0.05			
	Repeated length measurement accuracy [mm] Note 5)		±0.05			
	Finger backlash/both sides [mm] Note 6)		1.0 or less			
	Impact/Vibration resistance [m/s²] Note 7)		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
	Weight [g]	Basic	340	610	1625	1980
		Long stroke	370	750	1970	2500
Electric specifications	Motor size		□20	□28	□42	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/Standby power consumption when operating [W] Note 8)		11/7	28/15	34/13	36/13
	Max. instantaneous power consumption [W] Note 9)		19	51	57	61

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHF10, ±25% (F.S.) for LEHF20 and ±20% (F.S.) for LEHF32/40.

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

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

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

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

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

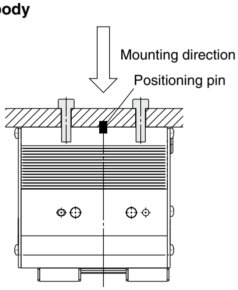
Note 7) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between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

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

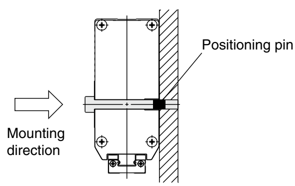
Note 9) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

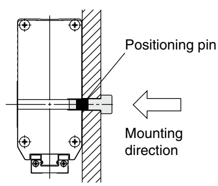
a) When using the thread on the body



b) When using the thread on the mounting plate

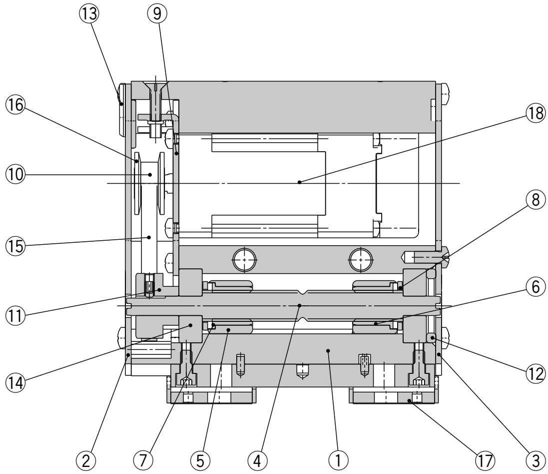


c) When using the thread on the back of the body



Construction

Series LEHF

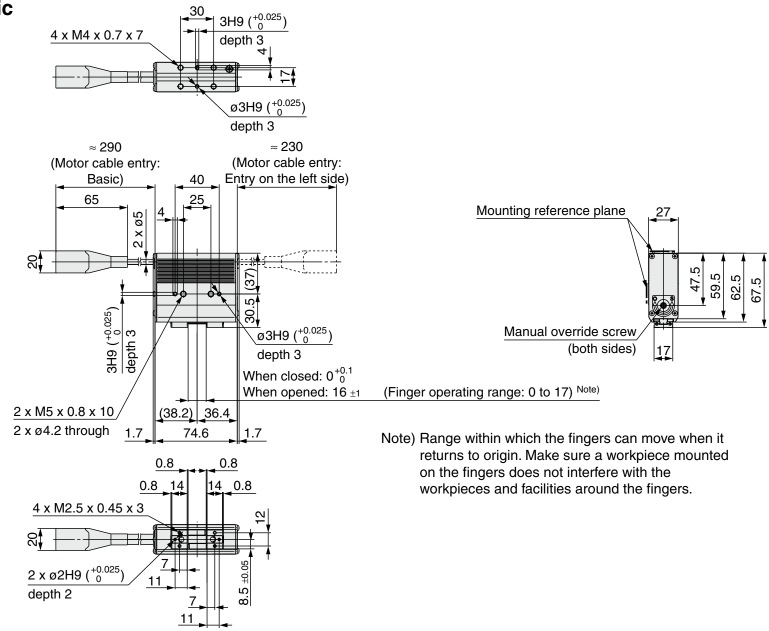


Component Parts

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

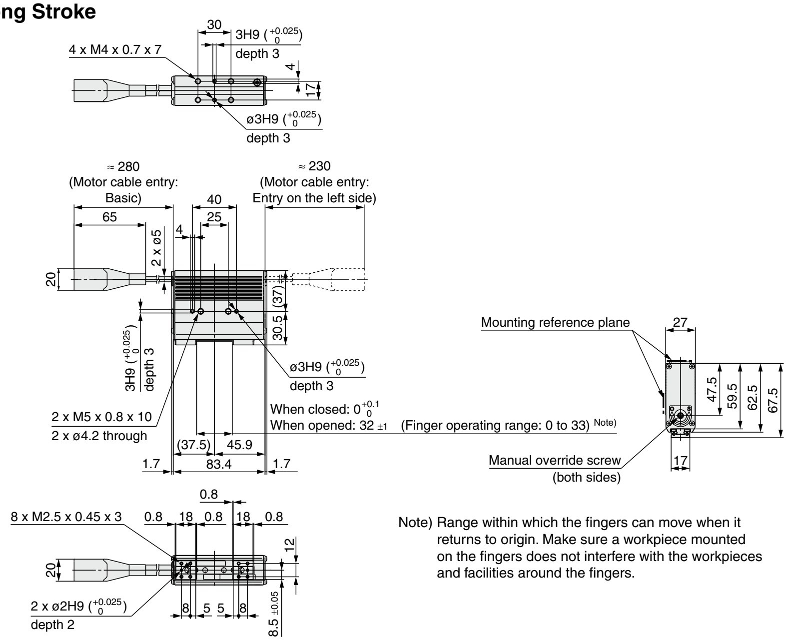
Dimensions

LEHF10K2-16: Basic



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

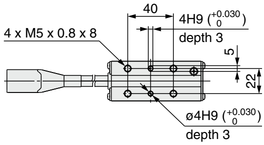
LEHF10K2-32: Long Stroke

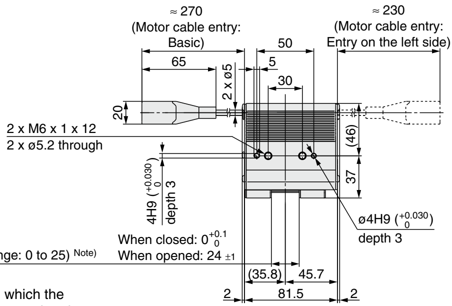


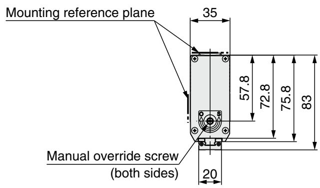
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

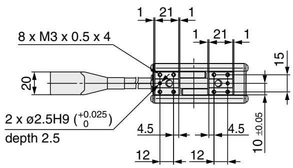
LEHF20K2-24: Basic



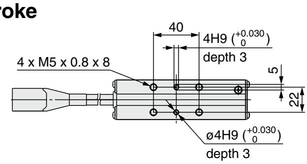


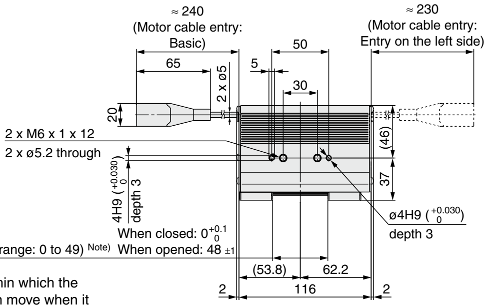


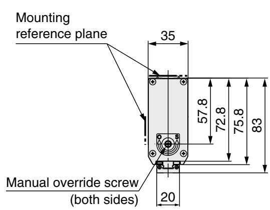
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.



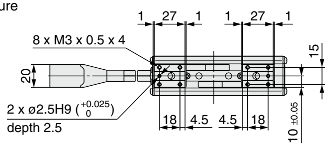
LEHF20K2-48: Long Stroke





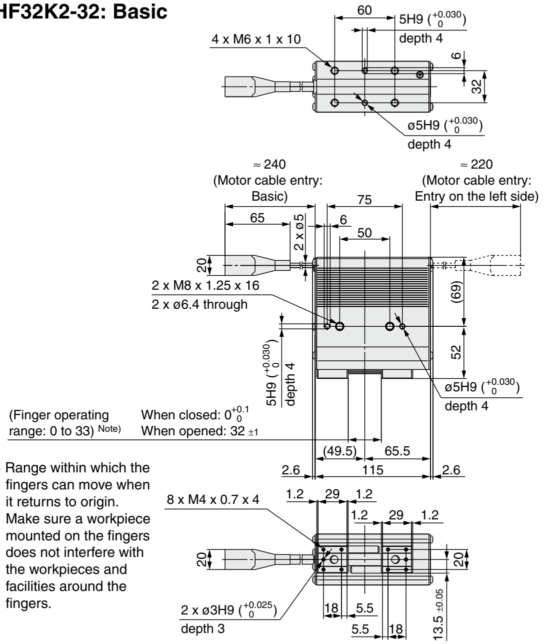


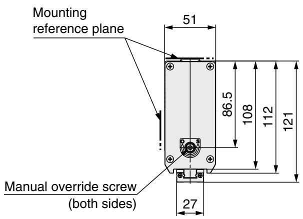
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.



Dimensions

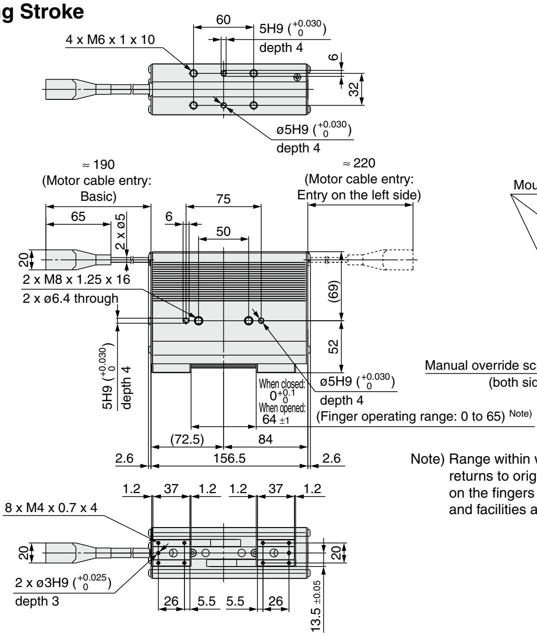
LEHF32K2-32: Basic

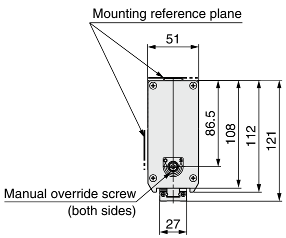




Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHF32K2-64: Long Stroke

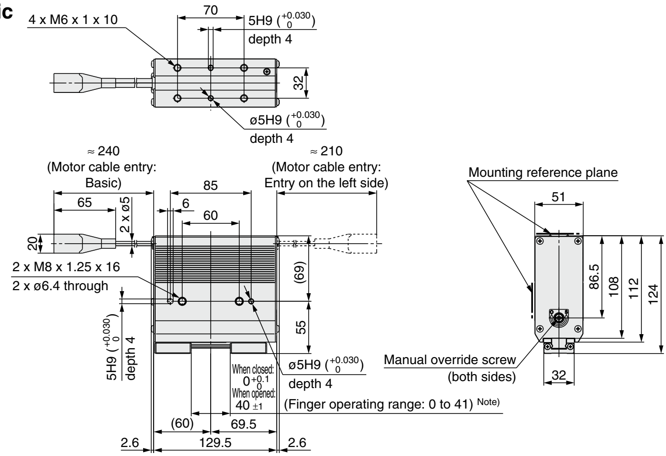


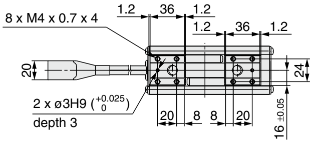


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

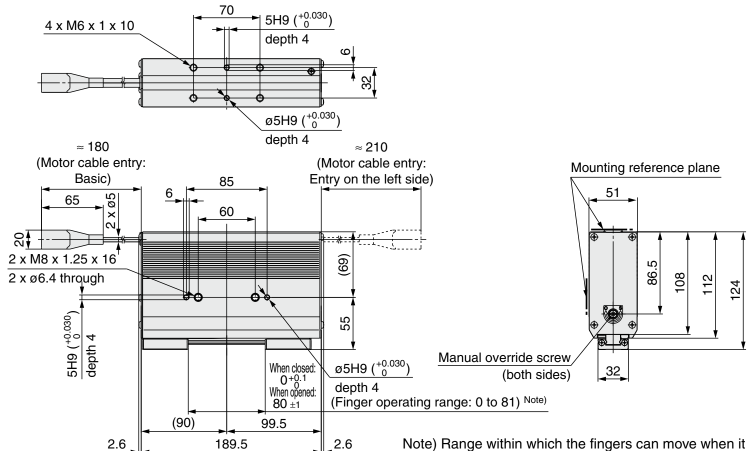
LEHF40K2-40: Basic

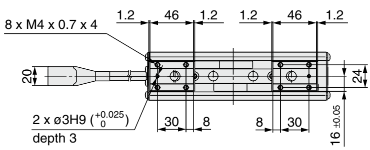




Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

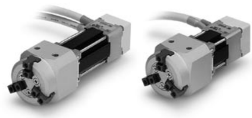
LEHF40K2-80: Long Stroke





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

Series LEHS
Model Selection



Selection Procedure

Step **Check the gripping force.**

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

Example

Workpiece mass: 0.1 kg

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

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

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

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

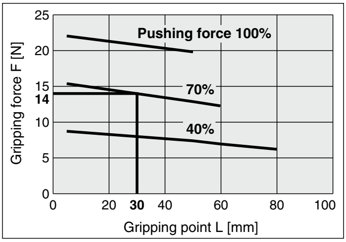
Example) When it is desired to set the gripping force at 13 times or more above the workpiece weight.

Required gripping force
= 0.1 kg x 13 x 9.8 m/s² ≈ 12.7 N or more

Pushing force: 70%

Gripping point distance: 30 mm

LEHS20

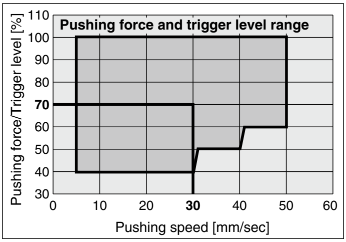


When the LEHS20 is selected.

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

Pushing speed: 30 mm/sec

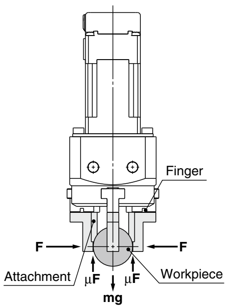
LEHS20



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

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

Calculation of required gripping force



When gripping a workpiece as in the figure to the left, and with the following definitions,
F: Gripping force (N)
μ: Coefficient of friction between the attachments and the workpiece
m: Workpiece mass (kg)
g: Gravitational acceleration (= 9.8 m/s²)
mg: Workpiece weight (N)
the conditions under which the workpiece will not drop are

$\underline{3} \times \mu F > mg$

3 — Number of fingers

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

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

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

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

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

When μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{3 \times 0.2} \times 4 = 6.7 \times mg$	$F = \dfrac{mg}{3 \times 0.1} \times 4 = 13.3 \times mg$

↑ 7 x Workpiece weight ↑ 13 x Workpiece weight

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

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

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

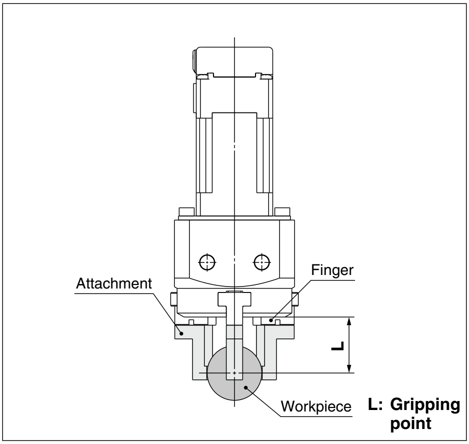
Selection Procedure

Step Check the gripping force: Series LEHS

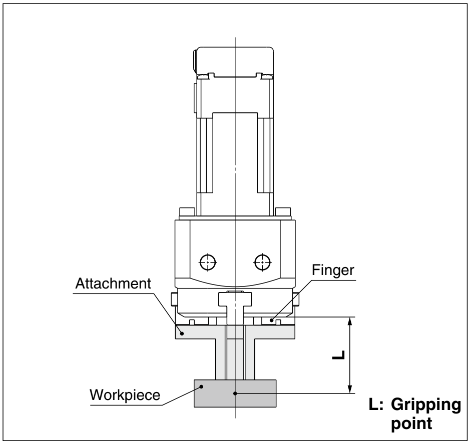
- **Indication of gripping force**
  The gripping force shown in the graphs on page 365 is expressed as “F”, which is the gripping force of one finger, when three fingers and attachments are in full contact with the workpiece as shown in the figure below.

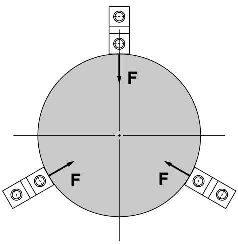
- Set the workpiece gripping point “L” so that it is within the range shown in the figure below.

External Gripping State

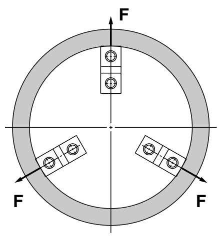


Internal Gripping State





F: Gripping force



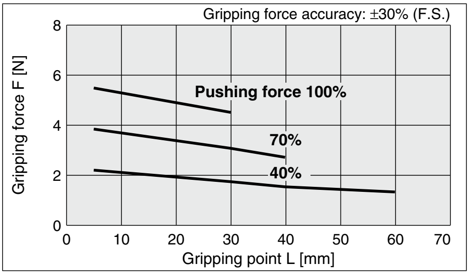
F: Gripping force

Step Check the gripping force: Series LEHS

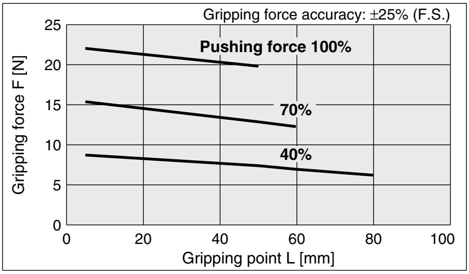
Basic

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

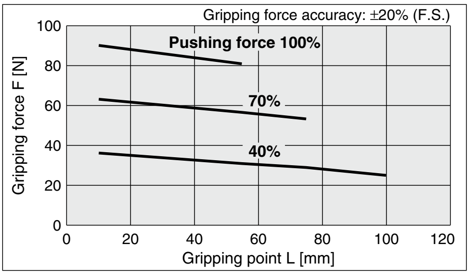
LEHS10



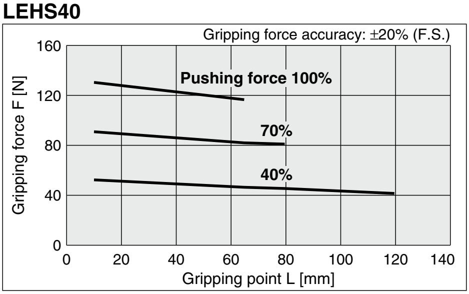
LEHS20



LEHS32



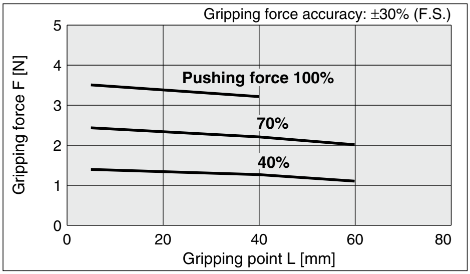
LEHS40



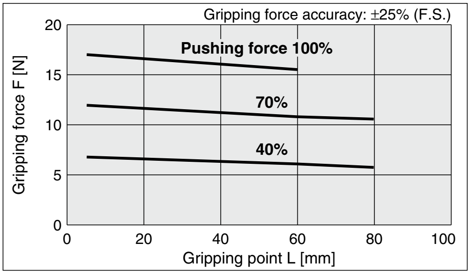
Compact

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

LEHS10L



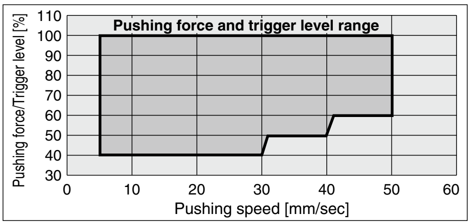
LEHS20L



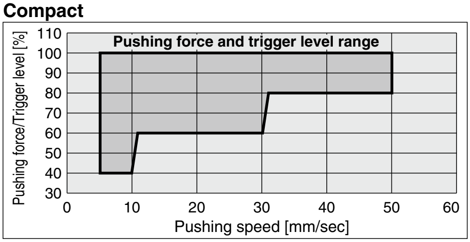
Selection of Pushing Speed

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

Basic



Compact



Electric Gripper 3-Finger Type

Step Motor (Servo/24 VDC)

Series LEHS

LEHS10, 20, 32, 40

CE c UL US RoHS

How to Order

LEHS 10 ☐ K 3 – 4 ☐ – S 1 6N 1 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

❶ Size

10
20
32
40

❷ Motor size

Nil	Basic
L Note)	Compact

Note) Size: 10, 20 only

❸ Lead

K	Basic

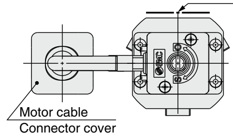
❹ 3-finger type

❺ Stroke [mm]

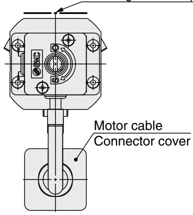
Stroke/diameter	Size
4	10
6	20
8	32
12	40

❻ Motor cable entry

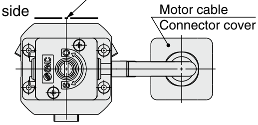
Nil: Basic (Entry on the left side)



F: Entry on the front side



R: Entry on the right side



⚠Caution

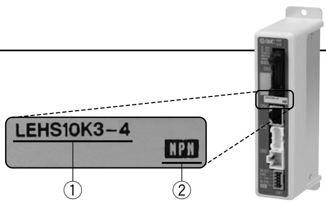
[CE-compliant products]
EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.
② Check Parallel I/O configuration matches (NPN or PNP).



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

❼ Actuator cable type*

Nil	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.

❽ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 3) on page 368.

❾ Controller/Driver type*

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

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

❿ I/O cable length [m]*1

Nil	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 394 (For LECP6), page 407 (For LECP1) or page 414 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

⓫ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately. (Refer to page 387.)

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 386	Page 401	Page 408

Specifications

	Model		LEHS10	LEHS20	LEHS32	LEHS40
Actuator specifications	Opening/closing stroke (diameter)		4	6	8	12
	Gripping force [N] Note 1) Note 3)	Basic	2.2 to 5.5	9 to 22	36 to 90	52 to 130
		Compact	1.4 to 3.5	7 to 17	—	—
	Opening and closing speed/ Pushing speed [mm/s] Note 2) Note 3)		5 to 70/ 5 to 50	5 to 80/ 5 to 50	5 to 100/ 5 to 50	5 to 120/ 5 to 50
	Drive method		Slide screw + Wedge cam			
	Repeatability [mm] Note 4)		±0.02			
	Repeated length measurement accuracy [mm] Note 5)		±0.05			
	Finger backlash/dia. [mm] Note 6)		0.5 or less			
	Impact/Vibration resistance [m/s²] Note 7)		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
	Weight [g]	Basic	185	410	975	1265
		Compact	150	345	—	—
Electric specifications	Motor size		□20	□28	□42	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/ Standby power consumption when operating [W] Note 8)	Basic	11/7	28/15	34/13	36/13
		Compact	8/7	22/12	—	—
	Max. instantaneous power consumption [W] Note 9)	Basic	19	51	57	61
		Compact	14	42	—	—

Note 1) Gripping force should be from 7 to 13 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHS10, ±25% (F.S.) for LEHS20 and ±20% (F.S.) for LEHS32/40.

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

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

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

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

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

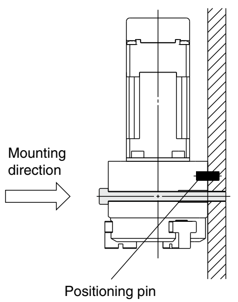
Note 7) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between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

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

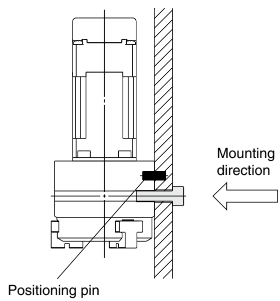
Note 9) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

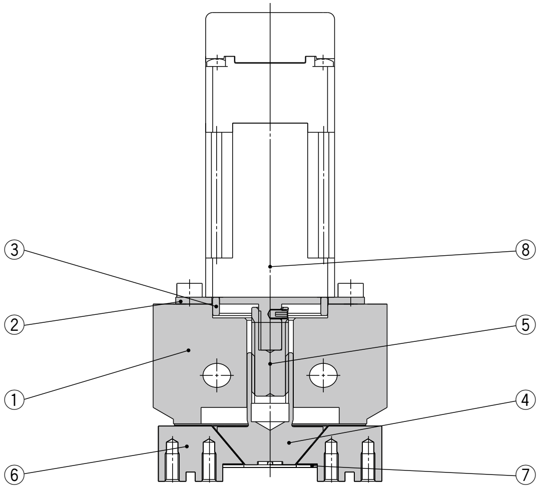
a) Mounting A type (when using the thread on the mounting plate)



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



Construction



Component Parts

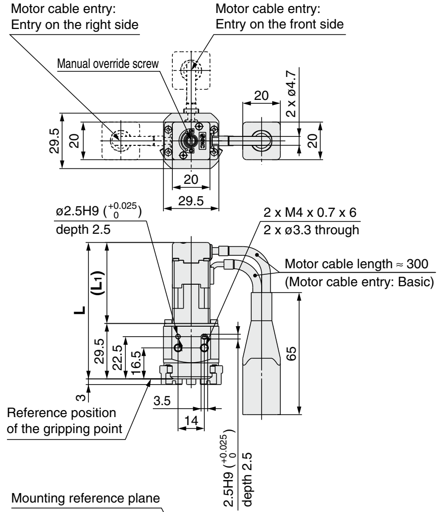
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Motor plate**	Aluminum alloy	Anodized
3	**Guide ring**	Aluminum alloy	
4	**Slide cam**	Stainless steel	Heat treatment + Special treatment
5	**Slide bolt**	Stainless steel	Heat treatment + Special treatment
6	**Finger**	Carbon steel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

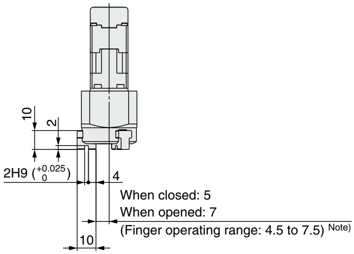
Dimensions

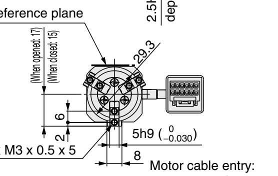
LEHS10(L)K3-4

[mm]

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





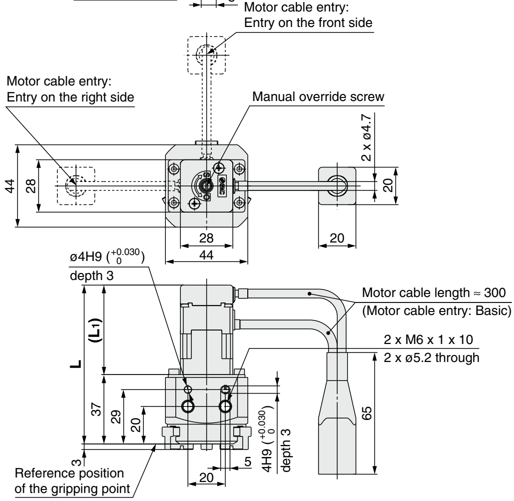


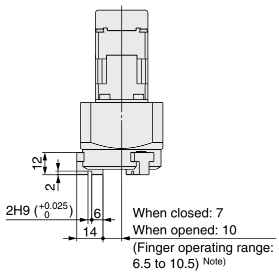
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

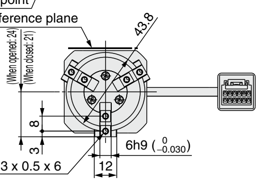
LEHS20(L)K3-6

[mm]

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



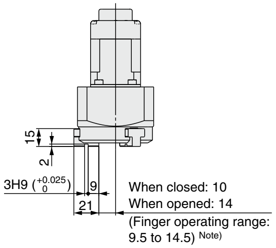


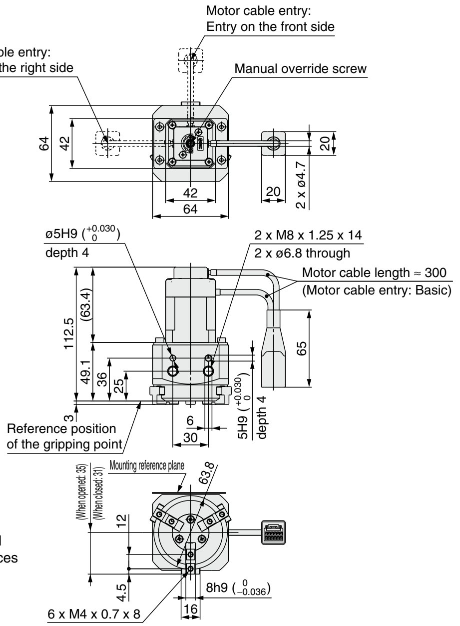


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

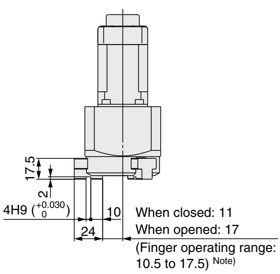
LEHS32K3-8

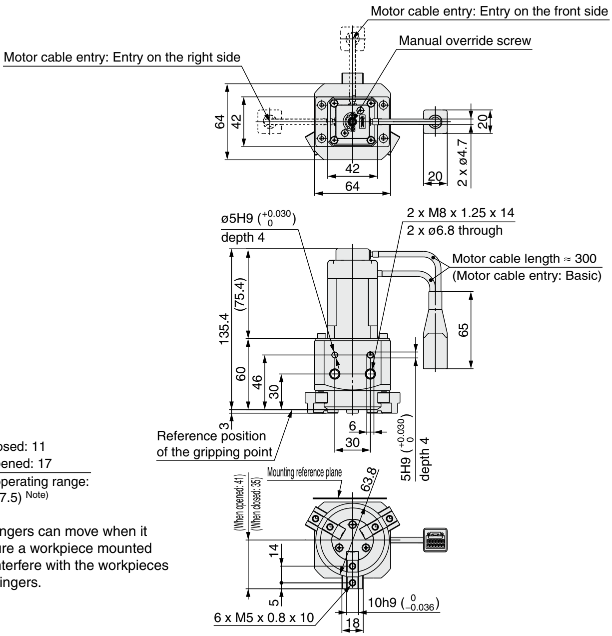




Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHS40K3-12





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

Series LEH Electric Grippers/ Specific Product Precautions 1

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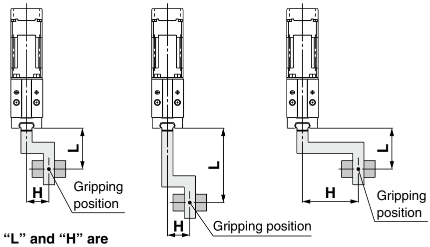
Design/Selection

⚠Warning

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

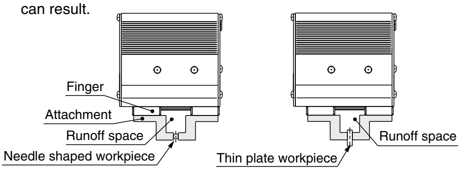
L: Gripping point
H: Overhang



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

2. Design the attachment to be lightweight and short.
A long and heavy attachment will increase inertia force when the product is opened or closed, which causes play on the finger. Even if the gripping point of the attachment is within a specified range, design it to be short and lightweight as possible.
For a long or large workpiece, select a model of a larger size or use two or more grippers together.

3. Provide a runoff space for attachment when a workpiece is extremely thin or small.
Without a runoff space, the product cannot perform stable gripping, and the displacement of a workpiece or gripping failure can result.



4. Select the model that allows for gripping force in relation to the workpiece weight, as appropriate.
The selection of inappropriate model can cause dropping of a workpiece. Gripping force should be from 10 to 20 times (LEHZ, LEHF) or 7 to 13 times (LEHS) of the workpiece weight.

Gripping Force Accuracy

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

5. Do not use the product in applications where excessive external force (including vibration) or impact force is applied to it.
It may lead to breakage or galling, which causes operation failure.
Do not apply impact and vibration outside of the specifications.

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

Mounting

⚠Warning

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

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

Mounting of Attachment to Finger

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

<Series LEHZ>

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

<Series LEHF>

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

<Series LEHS>

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

Series LEH
Electric Grippers/ Specific Product Precautions 2

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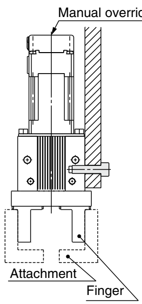
Mounting

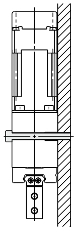
Mounting of Electric Gripper, Series LEHZ/LEHZJ

When using the thread on the side of the body



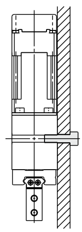
Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHZ(J)10(L)	M3 x 0.5	0.9	6
LEHZ(J)16(L)	M4 x 0.7	1.4	6
LEHZ(J)20(L)	M5 x 0.8	3.0	8
LEHZ(J)25(L)	M6 x 1	5.0	10
LEHZ32	M6 x 1	5.0	10
LEHZ40	M8 x 1.25	12.0	14

When using the thread on the mounting plate



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

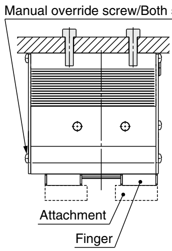
When using the thread on the back of the body



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

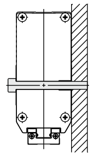
Mounting of Electric Gripper, Series LEHF

When using the thread on the body



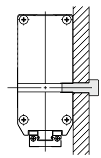
Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHF10	M4 x 0.7	1.4	7
LEHF20	M5 x 0.8	3.0	8
LEHF32	M6 x 1	5.0	10
LEHF40	M6 x 1	5.0	10

When using the thread on the mounting plate



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

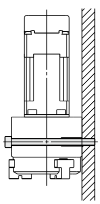
When using the thread on the back of the body



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

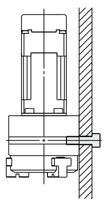
Mounting of Electric Gripper, Series LEHS

When using the thread on the mounting plate



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

When using the thread on the back of the body



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

Series LEH Electric Grippers/ Specific Product Precautions 3

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Mounting

⚠Warning

3. When mounting the electric gripper, tighten the mounting screws 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.

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

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

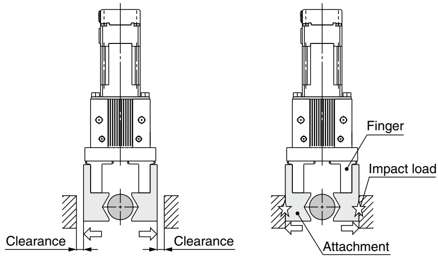
6. When a workpiece is to be removed when it is not energized, open or close the finger manually or remove the attachment beforehand.
When it is necessary to operate the product by the manual override screws, check the position of the manual override screws of the product, and leave necessary space.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

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

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

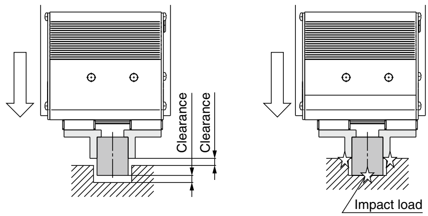
1) Stroke end when fingers are open

○ With clearance　　× Without clearance

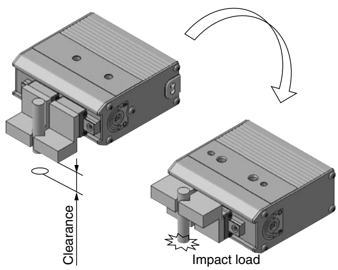


2) Stroke end when gripper is moving

○ With clearance　　× Without clearance

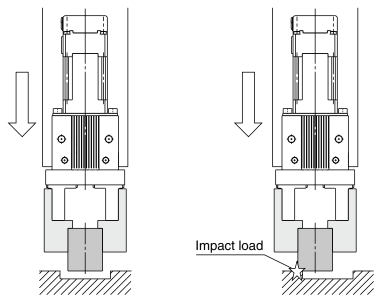


3) When turning over



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

○ Aligned　　× Not aligned



Handling

⚠Caution

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

2. When gripping a workpiece by the product, be sure to set to the pushing operation.
Also, do not hit the workpiece to the finger and attachment in positioning operation or in the range of positioning operation.
Otherwise, the lead screw can get caught and cause operation failure. However, if the workpiece cannot be gripped in pushing operation (such as a plastically deformed workpiece, rubber component, etc.), you can grip it in positioning operation with consideration to the elastic force of the workpiece. In this case, keep the driving speed for impact specified in item 3 on page 375.
When the operation is interrupted by a stop or temporary stop, and a pushing operation instruction is output just after operation is restarted, the operating direction will vary depending on the start position.

Electric Grippers/ Specific Product Precautions 4

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Handling

⚠Caution

3. Keep the following driving speed range for pushing operation.
- **LEHZ/LEHZJ: 5 to 50 mm/s**
- **LEHF10: 5 to 20 mm/s**
- **LEHF20/32/40: 5 to 30 mm/s**
- **LEHS: 5 to 50 mm/s**

Operation at the speed outside of the range can get the lead screw caught and cause operation failure.

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

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

6. INP output signal
1) Positioning operation
When the product comes within the set range by step data [In position], the INP output signal will turn on.
Initial value: Set to [0.50] or higher.
2) Pushing operation
When the effective force exceeds step data [Trigger LV], the INP output signal will turn on.
Use the product within the specified range of [Pushing force] and [Trigger LV].
a) To ensure that the gripper holds the workpiece with the set [Pushing force], it is recommended that the [Trigger LV] be set to the same value as the [Pushing force].
b) When the [Pushing force] and [Trigger LV] are set less than the specified range, the INP output signal will turn on from the pushing start position.

<INP output signal in the controller version>
● SV0.8 or more
Although the product automatically switches to the energy saving mode (reduced current) after pushing operation is completed, the INP output signal remains ON.
● SV0.7 or less
a. When [Trigger LV] is set to 40% (when the value is the same as the energy saving mode)
Although the product automatically switches to the energy saving mode (reduced current) after pushing operation is completed, the INP output signal remains ON.
b. When [Trigger LV] is set higher than 40%
The product is turned on after pushing operation is completed, but INP output signal will turn off when current consumption is reduced automatically in energy saving mode.

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

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

9. Self-lock mechanism
The product keeps a gripping force due to the self-lock mechanism in the lead screw. Also, it will not operate in opposite direction even when external force is applied during gripping a workpiece.
<Type of Stops, Cautions>
1) All the power supplies to the controller are shut off.
When the power supply is turned on to restart operation, the controller will be initialized, and the product can drop a workpiece due to a motor magnetic pole detective operation. (It means that there is finger motions of partial strokes by the phase detection of motor after power supply is turned on.) Remove the workpiece before restarting operation.
2) "EMG (stop)" of the CN1 of the controller is shut off.
When using the stop switch on the teaching box;
It is not necessary to remove a workpiece beforehand because a motor magnetic pole detective operation will not occur when the power supply is turned on to restart operation. An alarm can take place when operation is restarted from stop.
3) "M24V (motor driving power supply)" of the CN1 of the controller is shut off.
It is not necessary to remove a workpiece beforehand because a motor magnetic pole detective operation will not occur when the power supply is turned on to restart operation.
An alarm can take place when stop is activated during operation or operation is restarted from stop.

10. Return to origin
1) It is recommended to set the directions of return to origin and workpiece gripping to the same direction.
If they are set opposite, there can be backlash, which worsens the measurement accuracy significantly.
2) If the direction of return to origin is set to CW (Internal gripping);
If the return to origin is performed with the product only, there can be significant deviation between different actuators. Use a workpiece to set return to origin.
3) If the return to origin is performed by using a workpiece;
The stroke (operation range) will be shortened. Recheck the value of step data.
4) If basic parameters (Origin offset) are used;
When the return to origin is set with [Origin offset], it is necessary to change the current position of the product. Recheck the value of step data.

11. In pushing (gripping) operation, set the product to a position of at least 0.5 mm away from a workpiece. (This position is referred to as a pushing start position.)
If the product is set to the same position as a workpiece, the following alarms may be generated and operation may become unstable.
a. "Posn failed" alarm is generated.
The product cannot reach a pushing start position due to variation in the width of workpieces.
b. "Pushing ALM" alarm is generated.
The product is pushed back from a pushing start position after starting to push.

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

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

Electric Grippers/ Specific Product Precautions 5

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Maintenance

⚠Warning

1. **When the product is to be removed, check it has not been gripping a workpiece.**
   There is a risk of dropping the workpiece.

Controller/Driver

Step Data Input Type ······ Page 386

Step Motor (Servo/24 VDC)
Series LECP6

Servo Motor (24 VDC)
Series LECA6

Gateway Unit ······ Page 398

Series LEC-G

Programless Type ······ Page 401

Step Motor (Servo/24 VDC)
Series LECP1

Pulse Input Type ······ Page 408

Step Motor (Servo/24 VDC)
Series LECPA

Step Data Input Type Series LECP6/LECA6

Simple Setting to Use Straight Away

◎Easy Mode for Simple Setting

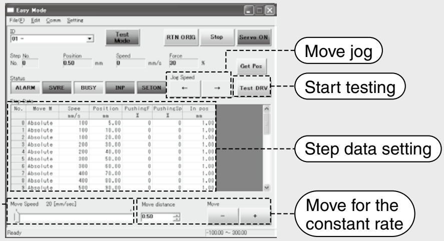
If you want to use it right away, select “Easy Mode.”

Step motor
(Servo/24 VDC)
LECP6

Servo motor
(24 VDC)
LECA6

<When a PC is used>
Controller setting software

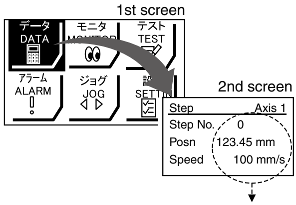
●Step data setting, test operation, move jog and move for the constant rate can be set and operated on one screen.



<When a TB (teaching box) is used>

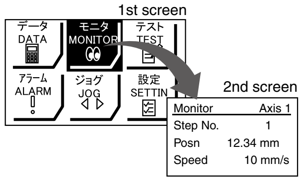
●Simple screen without scrolling promotes ease of setting and operating.
●Pick up an icon from the first screen to select a function.
●Set up the step data and check the monitor on the second screen.

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.)

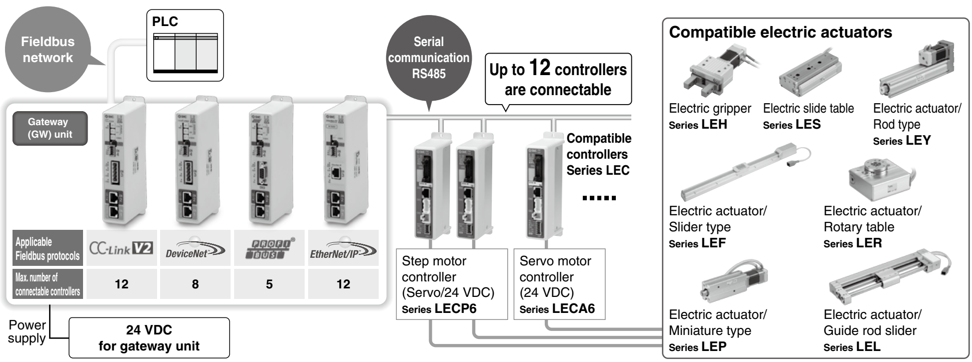
Step	Axis 1
Step No.	0
Posn	50.00 mm
Speed	200 mm/s

→

Step	Axis 1
Step No.	1
Posn	80.00 mm
Speed	100 mm/s

Gateway Unit Series LEC-G

●Unit linking the LECP6/LECA6 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.



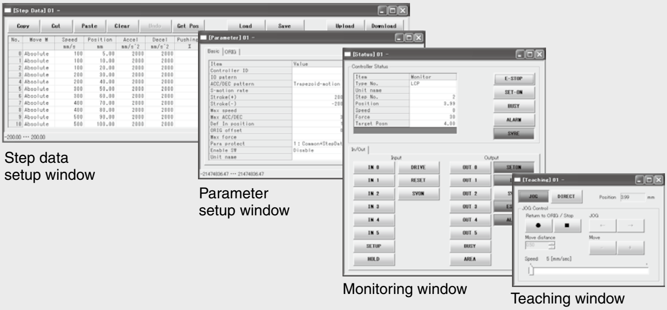
◎Normal Mode for Detailed Setting

Select normal mode when detailed setting is required.

●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.

<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

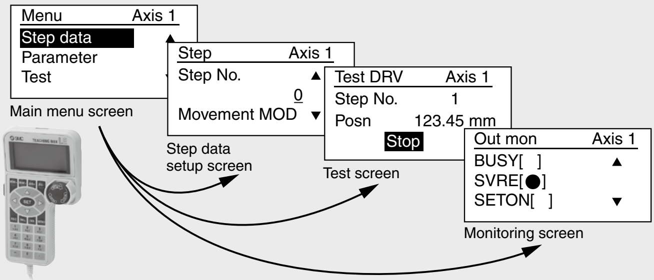
Teaching window

<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

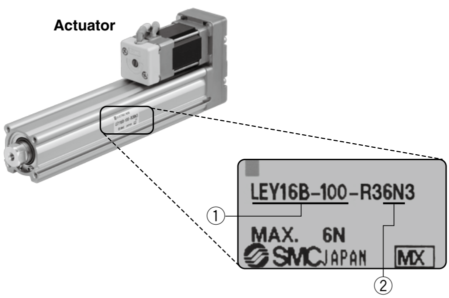
The actuator and controller are provided as a set. (They can be ordered separately.)

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

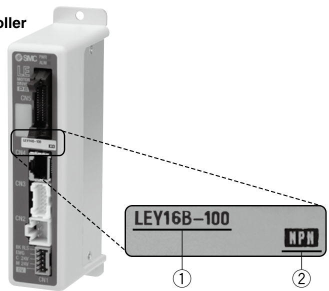
<Check the following before use.>

① Check the actuator label for model number. This matches the controller.
② Check Parallel I/O configuration matches (NPN or PNP).

Actuator



Controller



Step motor
(Servo/24 VDC)
LECP1

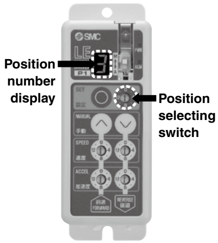
Programless Type Series LECP1

No programming

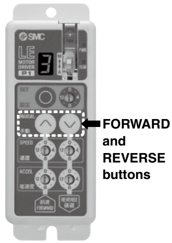
Capable of setting up an electric actuator operation without using a PC or teaching box

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

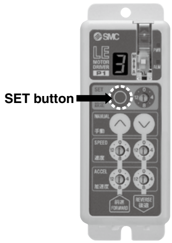
① Setting position number
Setting a registered number for the stop position
Maximum 14 points



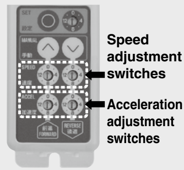
② Setting a stop position
Moving the actuator to a stop position using FORWARD and REVERSE buttons



③ Registration
Registering the stop position using SET button

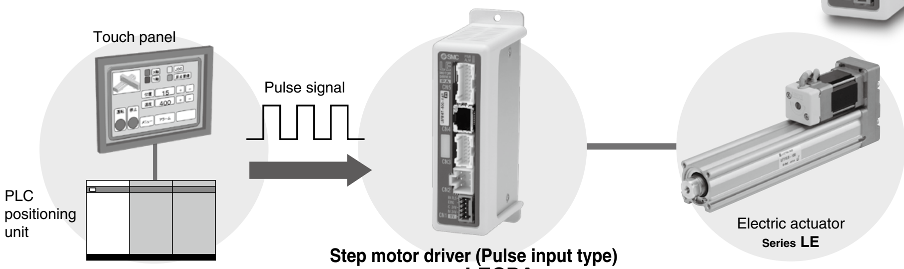


Speed/Acceleration 16-level adjustment



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/LECA6	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

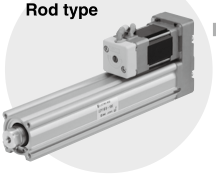
Item		Contents	Easy mode TB	Easy mode PC	Normal mode TB/PC	Step data input type LECP6/LECA6	Pulse input type LECPA	Programless type LECP1*
Step data setting (Excerpt)	Movement MOD	Selection of "absolute position" and "relative position"	△	●	●	Set at ABS/INC	No setting required	Fixed value (ABS)
	Speed	Transfer speed	●	●	●	Set in units of 1 mm/s		Select from 16-level
	Position	[Position]: Target position [Pushing]: Pushing start position	●	●	●	Set in units of 0.01 mm		Direct teaching JOG teaching
	Acceleration/Deceleration	Acceleration/deceleration during movement	●	●	●	Set in units of 1 mm/s²		Select from 16-level
	Pushing force	Rate of force during pushing operation	●	●	●	Set in units of 1%	Set in units of 1%	Select from 3-level (weak, medium, strong)
	Trigger LV	Target force during pushing operation	△	●	●	Set in units of 1%	Set in units of 1%	No setting required (same value as pushing force)
	Pushing speed	Speed during pushing operation	△	●	●	Set in units of 1 mm/s	Set in units of 1 mm/s	No setting required
	Moving force	Force during positioning operation	△	●	●	Set to 100%	Set to (Different values for each actuator)%	
	Area output	Conditions for area output signal to turn ON	△	●	●	Set in units of 0.01 mm	Set in units of 0.01 mm	
	In position	[Position]: Width to the target position [Pushing]: How much it moves during pushing	△	●	●	Set to 0.5 mm or more (Units: 0.01 mm)	Set to (Different values for each actuator) or more (Units: 0.01 mm)	
Parameter setting (Excerpt)	Stroke (+)	+ side limit of position	×	×	●	Set in units of 0.01 mm	Set in units of 0.01 mm	
	Stroke (–)	– side limit of position	×	×	●	Set in units of 0.01 mm	Set in units of 0.01 mm	
	ORIG direction	Direction of the return to origin can be set.	×	×	●	Compatible	Compatible	Compatible
	ORIG speed	Speed during return to origin	×	×	●	Set in units of 1 mm/s	Set in units of 1 mm/s	No setting required
	ORIG ACC	Acceleration during return to origin	×	×	●	Set in units of 1 mm/s²	Set in units of 1 mm/s	
Test	JOG		●	●	●	Continuous operation at the set speed can be tested while the switch is being pressed.	Continuous operation at the set speed can be tested while the switch is being pressed.	Hold down MANUAL button (∧∨) for uniform sending (speed is specified value)
	MOVE		×	●	●	Operation at the set distance and speed from the current position can be tested.	Operation at the set distance and speed from the current position can be tested.	Press MANUAL button (∧∨) once for sizing operation (speed, sizing amount are specified values)
	Return to ORIG		●	●	●	Compatible	Compatible	Compatible
	Test drive	Operation of the specified step data	●	●	● (Continuous operation)	Compatible	Not compatible	Compatible
	Forced output	ON/OFF of the output terminal can be tested.	×	×	●	Compatible	Compatible	Not compatible
Monitor	DRV mon	Current position, speed, force and the specified step data can be monitored.	●	●	●	Compatible	Compatible	
	In/Out mon	Current ON/OFF status of the input and output terminal can be monitored.	×	×	●	Compatible	Compatible	
ALM	Status	Alarm currently being generated can be confirmed.	●	●	●	Compatible	Compatible	Compatible (display alarm group)
	ALM Log record	Alarm generated in the past can be confirmed.	×	×	●	Compatible	Compatible	Not compatible
File	Save/Load	Step data and parameter can be saved, forwarded and deleted.	×	×	●	Compatible	Compatible	
Other	Language	Can be changed to Japanese or English.	●	●	●	Compatible	Compatible	

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

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

System Construction/General Purpose I/O

●Electric actuator/
Rod type



Provided by customer

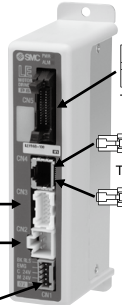
PLC

Power supply for I/O signal
24 VDC Note)

●I/O cable Pages 394, 407

Controller type	Part no.
LECP6/LECA6	LEC-CN5-□
LECP1 (Programless)	LEC-CK4-□

●Controller* Page 377



To CN5

To CN4

To CN3

To CN2

To CN1

Step data input type
LECP6/LECA6

Programless type
LECP1
Page 401

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

Provided by customer

Power supply for controller
24 VDC Note)

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

●Power supply plug Page 386
(Accessory)
<Applicable cable size>
AWG20 (0.5 mm²)

●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 392, 406

Controller type	Standard cable	Robotic cable
LECP6 (Step data input type)	LE-CP-□-S	LE-CP-□
LECA6 (Step data input type)	—	LE-CA-□
LECP1 (Programless type)	LE-CP-□-S	LE-CP-□

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

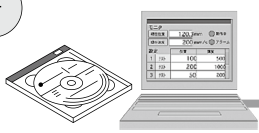
Option

●Teaching box Page 396
(With 3 m cable)
Part no.: LEC-T1-3JG□

Or

●Controller setting kit Page 395
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)

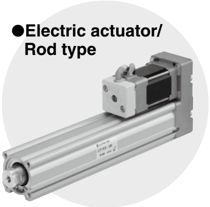
PC

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

SMC

System Construction/Pulse Signal

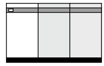
●**Electric actuator/ Rod type**



●**Current limit resistor** Page 414
LEC-PA-R-□

∗ The current limit resistor is used when the pulse signal output of the positioning unit is open collector output. For details, refer to page 414.

Provided by customer

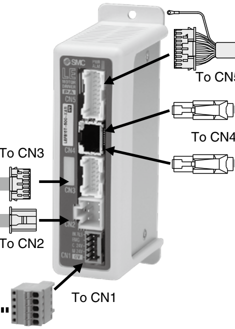


PLC

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 408



●**I/O cable** Page 414

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 mm^2)

●**Actuator cable**∗ Page 413

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 416
(With 3 m cable)
Part no.: LEC-T1-3JG□

Or

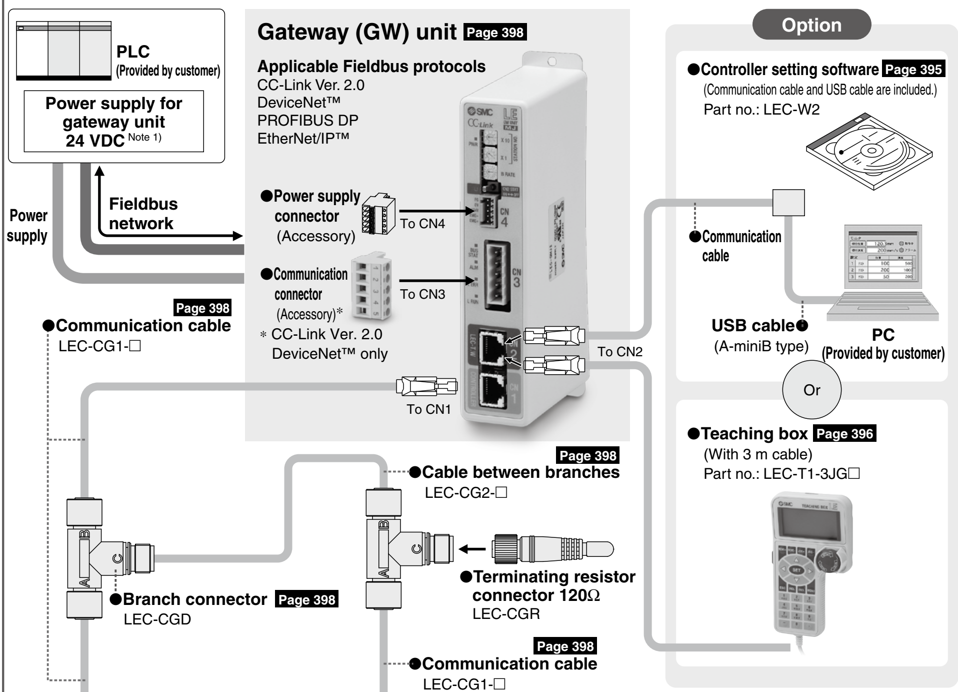
●**Controller setting software** Page 415
Communication cable (With conversion unit) and USB cable are included.
Part no.: LEC-W2

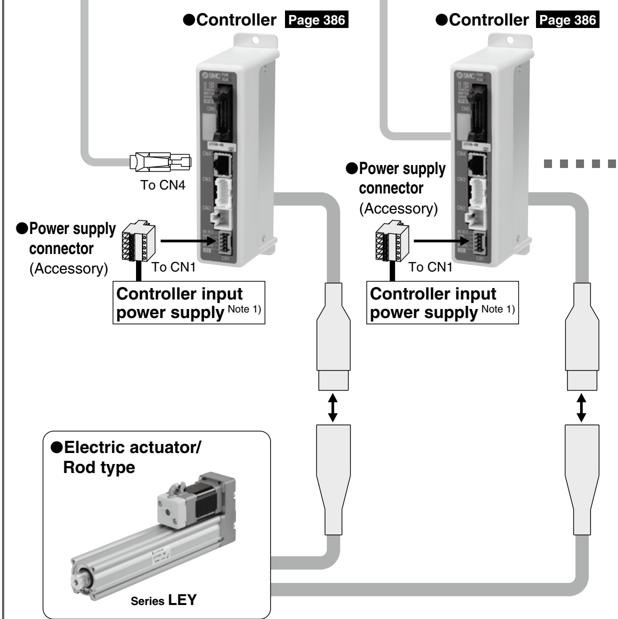
Communication cable●

●**USB cable**
(A-miniB type)

PC

System Construction/Fieldbus Network





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

Compatible controllers

Step motor controller (Servo/24 VDC)	Series LECP6
Servo motor controller (24 VDC)	Series LECA6

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.

Compatible actuators

LEF LEL* LEY

LES LEP* LER*

LEH*

* Not compatible with the LECA6.

Controller (Step Data Input Type)

Step Motor (Servo/24 VDC)

Series LECP6

Servo Motor (24 VDC)

Series LECA6

CE cULus RoHS

Series **LECP6** *Series* **LECA6**

How to Order

LE C P 6 N ▢ ▢ – ▢

Controller

Compatible motor

P	Step motor (Servo/24 VDC)
A	Servo motor (24 VDC)

Number of step data (Points)

6	64

Parallel I/O type

N	NPN
P	PNP

I/O cable length [m]

Nil	Without cable
1	1.5
3	3
5	5

Option

Nil	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 "LEY16B-100" for the LEY16B-100B-R16N1.

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

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LE series and the controller LEC series. The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② For the LECA6 series (servo motor controller), EMC compliance was tested by installing a noise filter set (LEC-NFA). Refer to page 394 for the noise filter set. Refer to the LECA Operation Manual for installation.

[UL-compliant products]

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

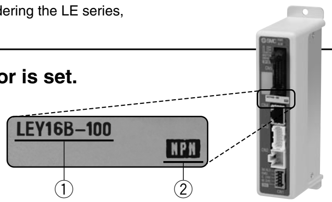
The controller is sold as single unit after the compatible actuator is set.

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

<Check the following before use.>

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

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



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

Specifications

Basic Specifications

Item	LECP6	LECA6
Compatible motor	Step motor (Servo/24 VDC)	Servo motor (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]	Power voltage: 24 VDC ±10% Current consumption: 3 A (Peak 10 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)	Incremental A/B/Z 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)	

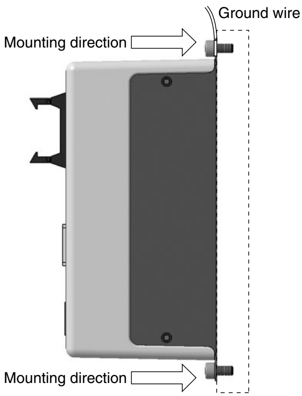
Note 1) Do not use the power supply of "inrush current prevention type" for the controller power supply. When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

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

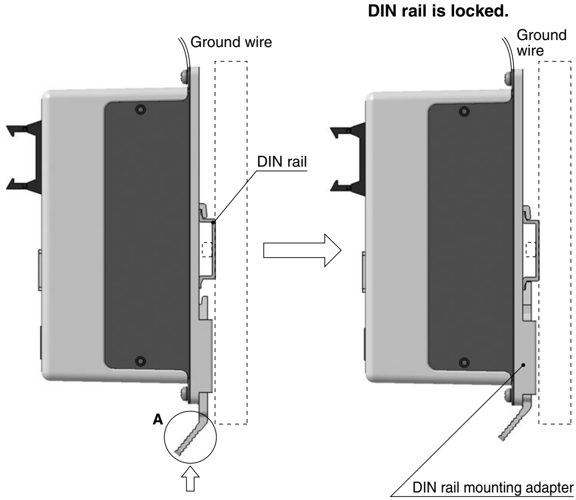
Note 3) Applicable to non-magnetizing lock.

How to Mount

a) Screw mounting (LEC□6□□-□)
(Installation with two M4 screws)



b) DIN rail mounting (LEC□6□□D-□)
(Installation with the DIN rail)

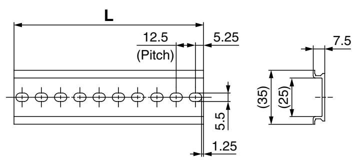


Hook the controller on the DIN rail and press the lever of section **A** in the arrow direction to lock it.

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

DIN rail
AXT100-DR-□

∗ For □, enter a number from the “No.” line in the table below.
Refer to the dimensions on page 388 for the mounting dimensions.



L Dimension [mm]

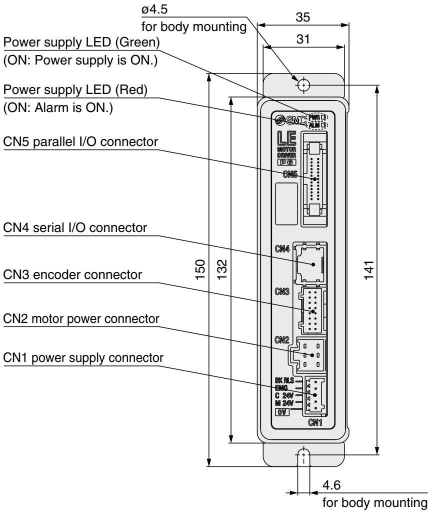
No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L	23	35.5	48	60.5	73	85.5	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5	223	235.5	248	260.5
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5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

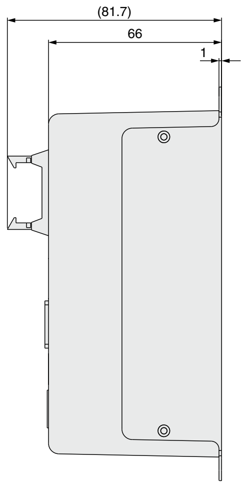
DIN rail mounting adapter
LEC-D0 (with 2 mounting screws)

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

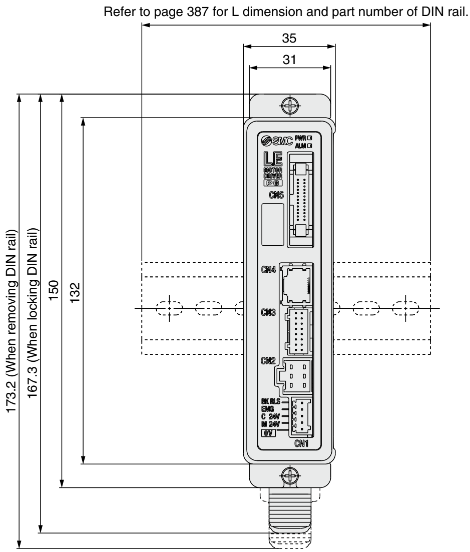
Dimensions

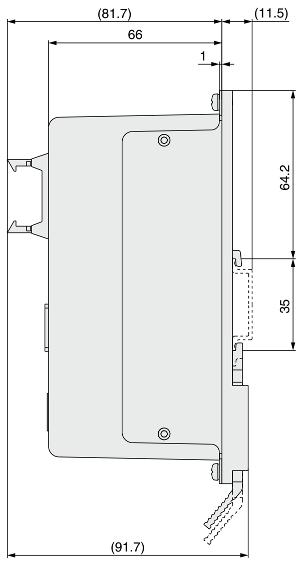
a) Screw mounting (LEC□6□□-□)





b) DIN rail mounting (LEC□6□□D-□)





Wiring Example 1

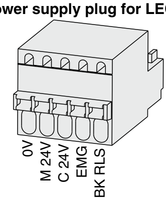
Power Supply Connector: CN1

∗ Power supply plug is an accessory.

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

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

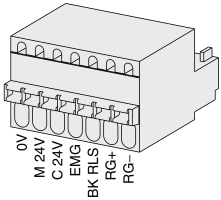
Power supply plug for LECP6



CN1 Power Supply Connector Terminal for LECA6 (PHOENIX CONTACT FK-MC0.5/7-ST-2.5)

Terminal name	Function	Details
0V	Common supply (–)	M 24V terminal/C 24V terminal/EMG terminal/BK RLS terminal are common (–).
M 24V	Motor power supply (+)	Motor power supply (+) supplied to the controller
C 24V	Control power supply (+)	Control power supply (+) supplied to the controller
EMG	Stop (+)	Input (+) for releasing the stop
BK RLS	Lock release (+)	Input (+) for releasing the lock
RG+	Regenerative output 1	Regenerative output terminals for external connection
RG–	Regenerative output 2	(Not necessary to connect them in the combination with the LE series standard specifications.)

Power supply plug for LECA6



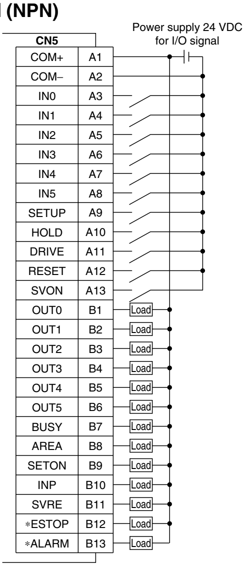
Wiring Example 2

Parallel I/O Connector: CN5

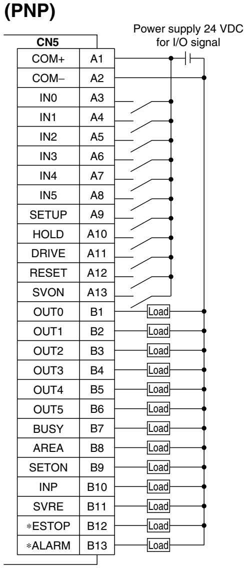
∗ When you connect a PLC, etc., to the CN5 parallel I/O connector, please use the I/O cable (LEC-CN5-□).
∗ The wiring should be changed depending on the type of the parallel I/O (NPN or PNP).

Wiring diagram

LEC□6N□□-□ (NPN)



LEC□6P□□-□ (PNP)



Input Signal

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

Output Signal

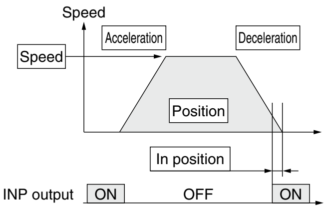
Name	Details
OUT0 to OUT5	Outputs the step data no. during operation
BUSY	Outputs when the actuator is moving
AREA	Outputs within the step data area output setting range
SETON	Outputs when returning to origin
INP	Outputs when target position or target force is reached (Turns on when the positioning or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

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

Step Data Setting

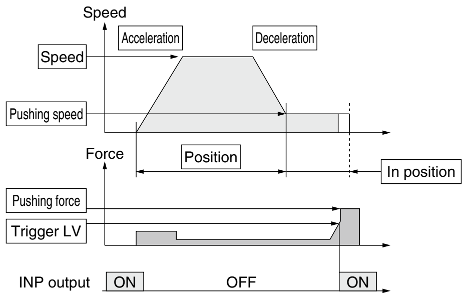
1. Step data setting for positioning

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



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.



Step Data (Positioning)

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

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.

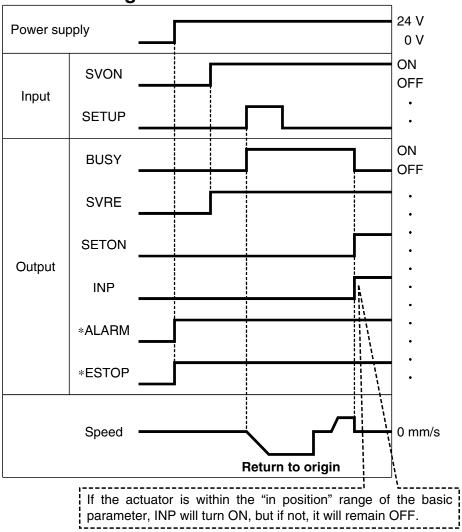
Step Data (Pushing)

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

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.

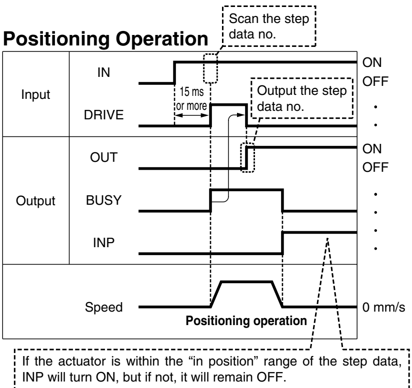
Signal Timing

Return to Origin



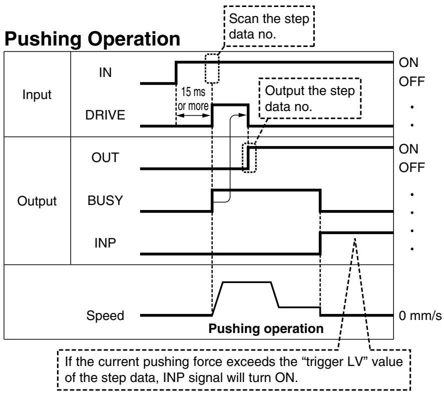
∗ “∗ALARM” and “∗ESTOP” are expressed as negative-logic circuit.

Positioning Operation

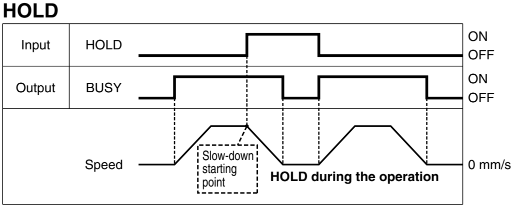


∗ “OUT” is output when “DRIVE” is changed from ON to OFF.
(When power supply is applied, “DRIVE” or “RESET” is turned ON or “∗ESTOP” is turned OFF, all of the “OUT” outputs are OFF.)

Pushing Operation

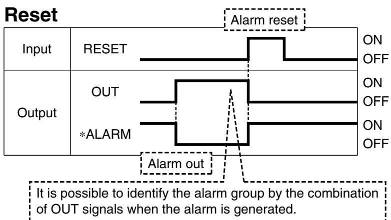


HOLD



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

LE – CP – 1 – □

Cable length (L) [m]

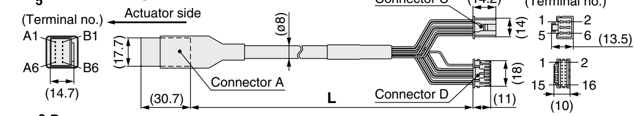
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

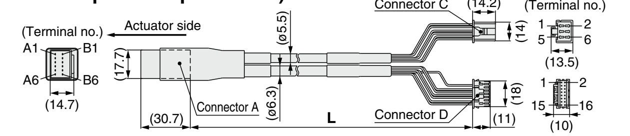
Cable type

Nil	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 color	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

Signal	Connector A terminal no.	Cable color	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, standard cable with lock and sensor for step motor (Servo/24 VDC)]

LE – CP – 1 – B – □

Cable length (L) [m]

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

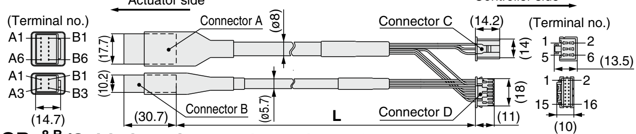
* Produced upon receipt of order (Robotic cable only)

With lock and sensor

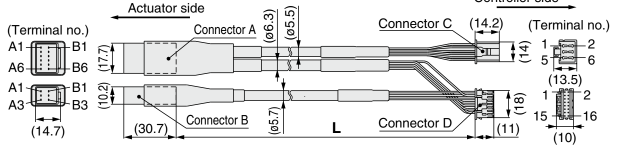
Cable type

Nil	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 color	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

Signal	Connector A terminal no.	Cable color	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

Signal	Connector B terminal no.	Cable color	Connector D 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.

[Robotic cable for servo motor (24 VDC)]

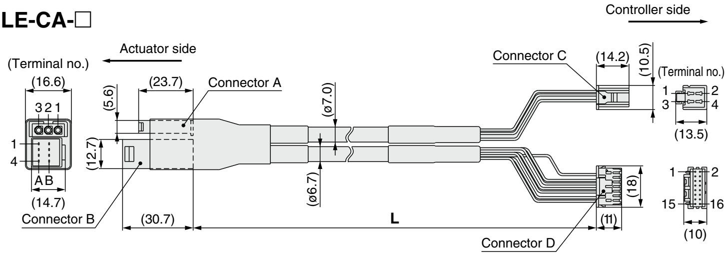
LE–CA–1

Cable length (L) [m]

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

* Produced upon receipt of order

LE-CA-□



Signal	Connector A terminal no.	Cable color	Connector C terminal no.
U	1	Red	1
V	2	White	2
W	3	Black	3

Shield

Signal	Connector B terminal no.	Cable color	Connector D terminal no.
Vcc	B-1	Brown	12
GND	A-1	Black	13
$\overline{A}$	B-2	Red	7
A	A-2	Black	6
$\overline{B}$	B-3	Orange	9
B	A-3	Black	8
$\overline{Z}$	B-4	Yellow	11
Z	A-4	Black	10
		—	3

Connection of shield material

[Robotic cable with lock and sensor for servo motor (24 VDC)]

LE–CA–1–B

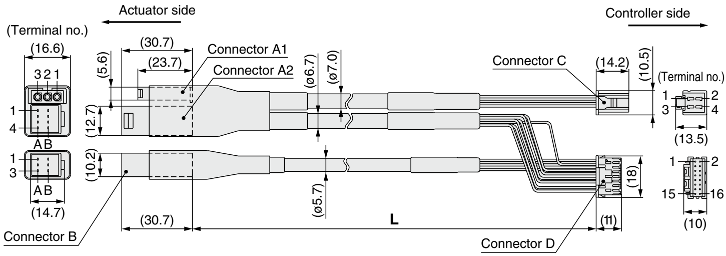
Cable length (L) [m]

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

* Produced upon receipt of order

With lock and sensor

LE-CA-□-B



Signal	Connector A1 terminal no.	Cable color	Connector C terminal no.
U	1	Red	1
V	2	White	2
W	3	Black	3

Shield

Signal	Connector A2 terminal no.	Cable color	Connector D terminal no.
Vcc	B-1	Brown	12
GND	A-1	Black	13
$\overline{A}$	B-2	Red	7
A	A-2	Black	6
$\overline{B}$	B-3	Orange	9
B	A-3	Black	8
$\overline{Z}$	B-4	Yellow	11
Z	A-4	Black	10
		—	3

Connection of shield material

Signal	Connector B terminal no.	Cable color	Connector D terminal no.
Lock (+)	B-1	Red	4
Lock (–)	A-1	Black	5
Sensor (+) Note)	B-3	Brown	1
Sensor (–) Note)	A-3	Black	2

Note) Not used for the LE series.

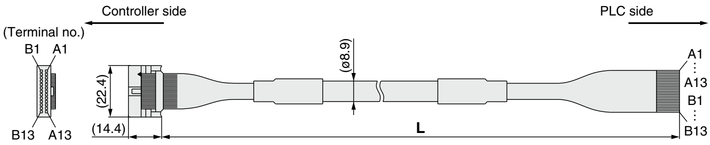
Option: I/O Cable

LEC − CN5 − 1

Cable length (L) [m]

1	1.5
3	3
5	5

∗ Conductor size: AWG28



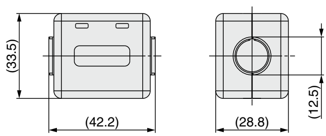
Connector pin no.	Insulation color	Dot mark	Dot color
A1	Light brown	■	Black
A2	Light brown	■	Red
A3	Yellow	■	Black
A4	Yellow	■	Red
A5	Light green	■	Black
A6	Light green	■	Red
A7	Gray	■	Black
A8	Gray	■	Red
A9	White	■	Black
A10	White	■	Red
A11	Light brown	■ ■	Black
A12	Light brown	■ ■	Red
A13	Yellow	■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

Connector pin no.	Insulation color	Dot mark	Dot color
B1	Yellow	■ ■	Red
B2	Light green	■ ■	Black
B3	Light green	■ ■	Red
B4	Gray	■ ■	Black
B5	Gray	■ ■	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		

Option: Noise Filter Set for Servo Motor (24 VDC)

LEC − NFA

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

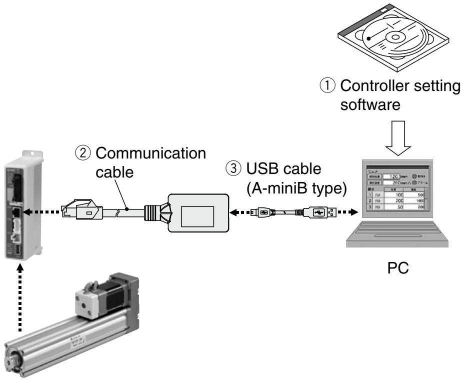


∗ Refer to the LECA6 series Operation Manual for installation.

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**
Servo motor controller (24 VDC)	Series **LECA6**
Step motor driver (Pulse input type)	Series **LECPA**

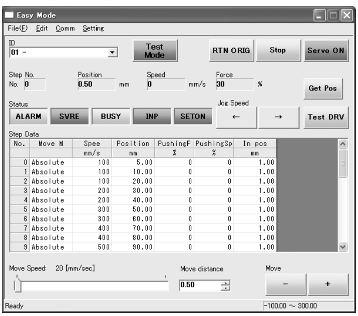
Hardware Requirements

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

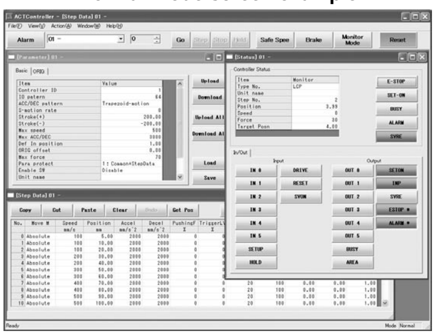
Easy mode screen example



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-T1-3 J G □

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

Nil	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.

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

Option
- **Enable switch is provided.**

Easy Mode

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

Menu Operations Flowchart

Menu
Data
Monitor
Jog
Test
ALM
TB setting

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

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

Jog
Return to origin
Jog operation

Test
1 step operation

ALM
Active alarm display
Alarm reset

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

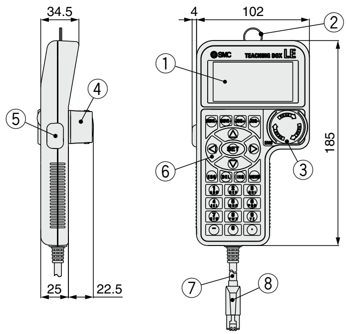
Normal Mode

Function	Details
Step data	• Step data setting
Parameter	• Parameters setting
Test	• Jog operation/Constant rate movement • Return to origin • Test drive (Specify a maximum of 5 step data and operate.) • Forced output (Forced signal output, Forced terminal output)
Monitor	• Drive monitor • Output signal monitor • Input signal monitor • Output terminal monitor • Input terminal monitor
ALM	• Active alarm display (Alarm reset) • Alarm log record display
File	• Data saving Save the step data and parameters of the controller which is being used for communication (it is possible to save four files, with one set of step data and parameters defined as one file). • Load to controller Loads the data which is saved in the teaching box to the controller which is being used for communication. • Delete the saved data. • File protection (Ver. 2.∗∗)
TB setting	• Display setting (Easy/Normal mode) • Language setting (Japanese/English) • Backlight setting • LCD contrast setting • Beep sound setting • Max. connection axis • Distance unit (mm/inch)
Reconnect	• Reconnection of axis

Menu Operations Flowchart

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

Dimensions



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

Gateway Unit
Series LEC-G

RoHS

How to Order

> **⚠Caution**
> **[CE-compliant products]**
> EMC compliance was tested by combining the electric actuator LE series and the controller LEC series. The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
> **[UL-compliant products]**
> When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

Gateway unit

LEC − G MJ2 ☐

Applicable Fieldbus protocols

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

Mounting

Nil	Screw mounting
D Note)	DIN rail mounting

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

Cable

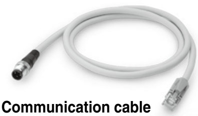
LEC − CG 1 − L

Cable type

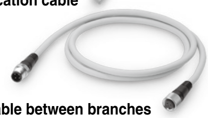
1	Communication cable
2	Cable between branches

Cable length

K	0.3 m
L	0.5 m
1	1 m



Communication cable



Cable between branches

Branch connector

LEC − CGD

Branch connector

Terminating resistor

LEC − CGR

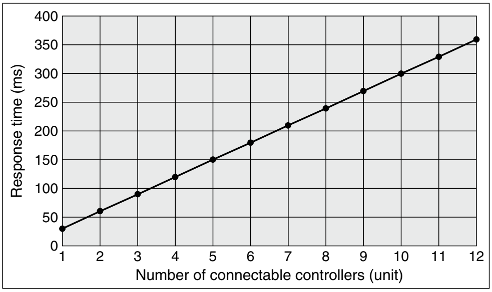
Specifications

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

Note 1) Please note that the version is subject to change.
Note 2) Each file can be downloaded from the SMC website, http://www.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.

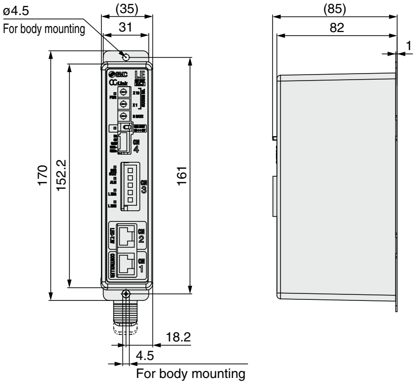


∗ This graph shows delay times between gateway unit and controllers. Fieldbus network delay time is not included.

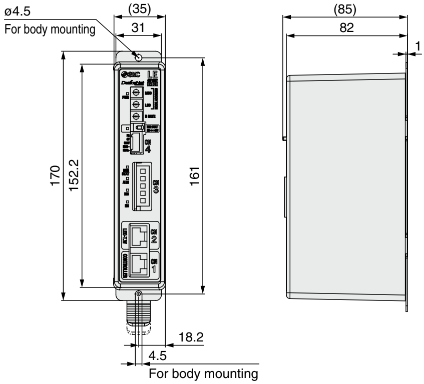
Dimensions

Screw mounting (LEC-G□□□)

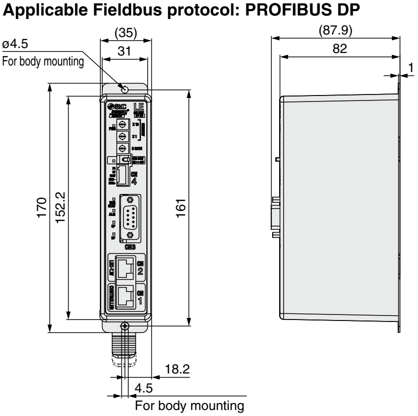
Applicable Fieldbus protocol: CC-Link Ver. 2.0



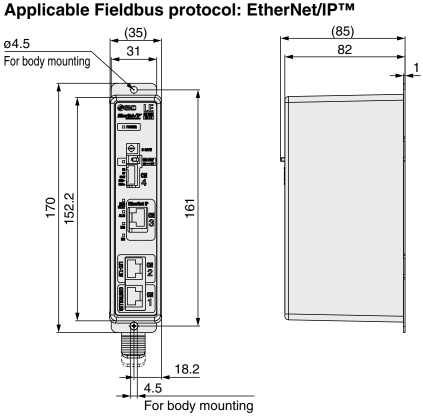
Applicable Fieldbus protocol: DeviceNet™



Applicable Fieldbus protocol: PROFIBUS DP



Applicable Fieldbus protocol: EtherNet/IP™

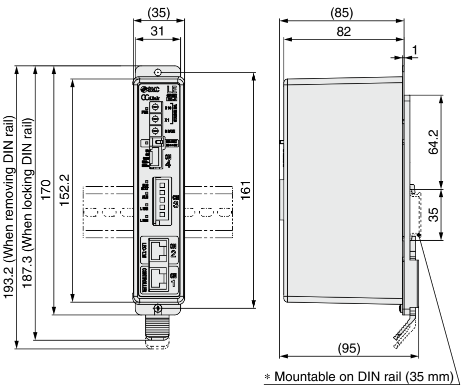


■**Trademark** DeviceNet™ is a trademark of ODVA. EtherNet/IP™ is a trademark of ODVA.

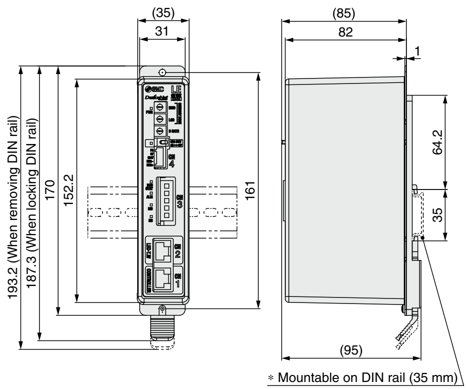
Dimensions

DIN rail mounting (LEC-G□□□D)

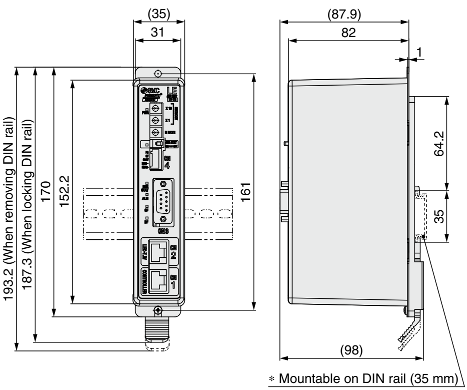
Applicable Fieldbus protocol: CC-Link Ver. 2.0



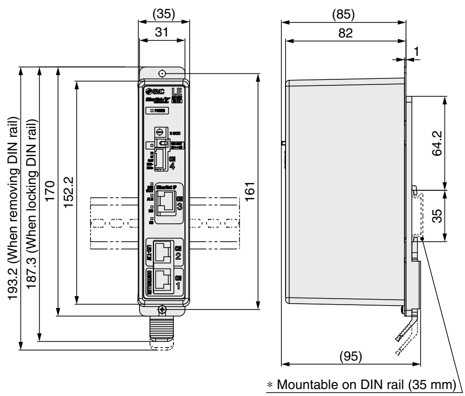
Applicable Fieldbus protocol: DeviceNet™



Applicable Fieldbus protocol: PROFIBUS DP

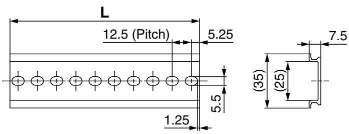


Applicable Fieldbus protocol: EtherNet/IP™



DIN rail
AXT100-DR-□

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



L Dimension [mm]

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

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

Programless Controller
Series LECP1

How to Order

LE C P 1 N 1 ☐ – LEY16B-100

Controller (C)

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]

Nil	Without cable
1	1.5
3	3
5	5

Option

Nil	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 "LEY16B-100" for the LEY16B-100B-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 LE series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

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.

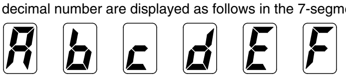
∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smcworld.com

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)
Memory	EEPROM
LED indicator	LED (Green/Red) one of each
7-segment LED display Note 3)	1 digit, 7-segment display (Red) Figures are expressed in hexadecimal ("10" to "15" in decimal number are expressed as "A" to "F")
Lock control	Forced-lock release terminal Note 4)
Cable length [m]	I/O cable: 5 or less, Actuator cable: 20 or less
Cooling system	Natural air cooling
Operating temperature range [°C]	0 to 40 (No freezing)
Operating humidity range [%RH]	90 or less (No condensation)
Storage temperature range [°C]	–10 to 60 (No freezing)
Storage humidity range [%RH]	90 or less (No condensation)
Insulation resistance [MΩ]	Between the housing and SG terminal: 50 (500 VDC)
Weight [g]	130 (Screw mounting), 150 (DIN rail mounting)

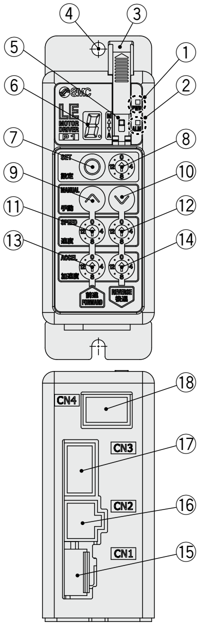
Note 1) Do not use the power supply of "inrush current prevention type" for the controller input power supply. When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.
Note 2) The power consumption changes depending on the actuator model.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



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

Note 4) Applicable to non-magnetizing lock.

Controller Details



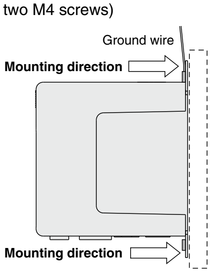
No.	Display	Description	Details
①	**PWR**	Power supply LED	Power supply ON/Servo ON : Green turns on Power supply ON/Servo OFF: Green flashes
②	**ALM**	Alarm LED	With alarm : Red turns on Parameter setting : Red flashes
③	—	Cover	Change and protection of the mode switch (Close the cover after changing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

How to Mount

Controller mounting shown below.

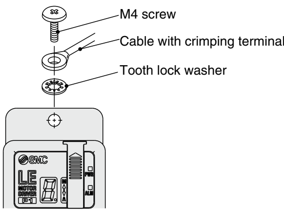
1. Mounting screw (LECP1□□-□)

(Installation with two M4 screws)



2. Grounding

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



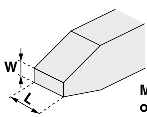
Controller

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

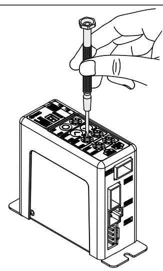
⚠Caution

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

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

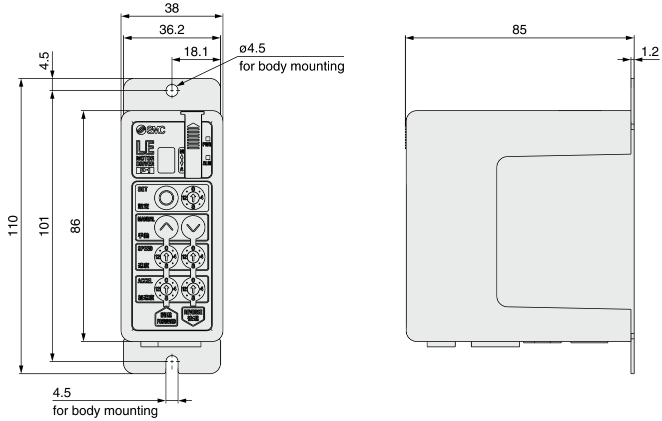


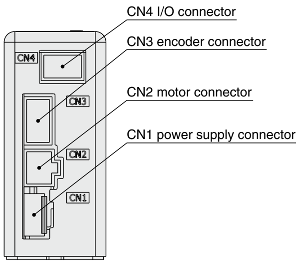
Magnified view of the end of the screwdriver



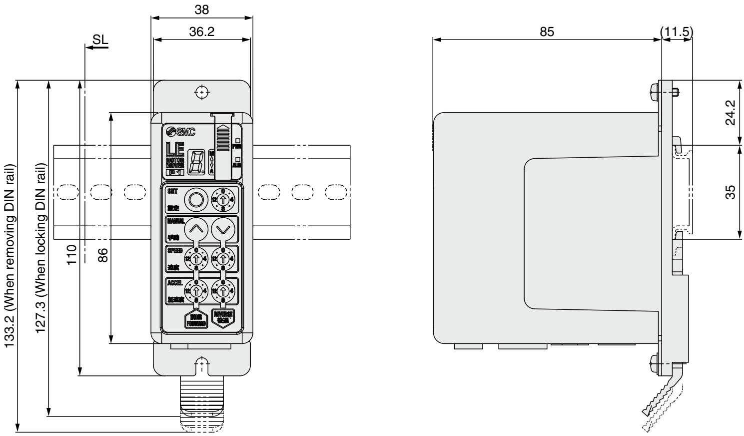
Dimensions

Screw mounting (LEC□1□□-□)





DIN rail mounting (LEC□1□□D-□)



Wiring Example 1

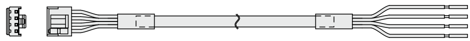
Power Supply Connector: CN1

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

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

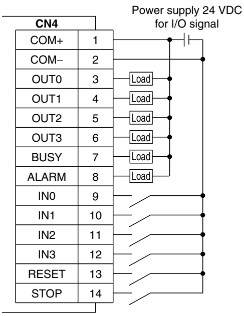


Wiring Example 2

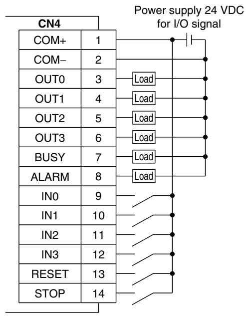
Parallel I/O Connector: CN4

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

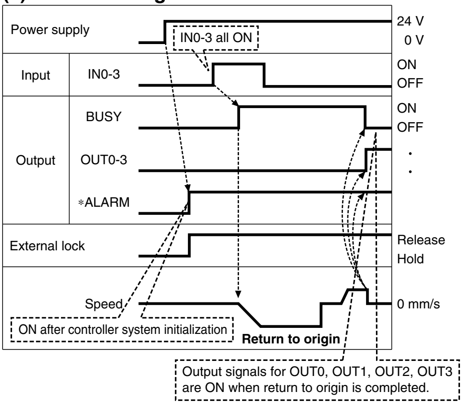
Position number	IN3	IN2	IN1	IN0
1	○	○	○	●
2	○	○	●	○
3	○	○	●	●
4	○	●	○	○
5	○	●	○	●
6	○	●	●	○
7	○	●	●	●
8	●	○	○	○
9	●	○	○	●
10 (A)	●	○	●	○
11 (B)	●	○	●	●
12 (C)	●	●	○	○
13 (D)	●	●	○	●
14 (E)	●	●	●	○
Return to origin	●	●	●	●

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

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

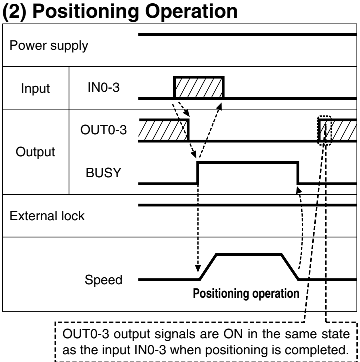
Signal Timing

(1) Return to Origin

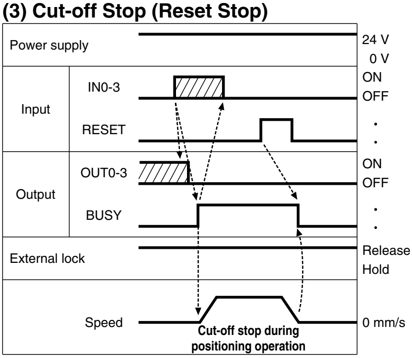


* “*ALARM” is expressed as negative-logic circuit.

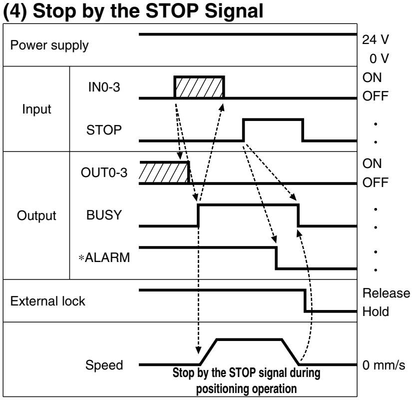
(2) Positioning Operation



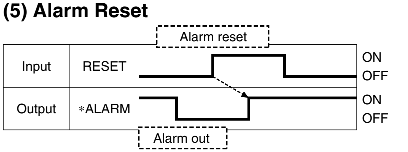
(3) Cut-off Stop (Reset Stop)



(4) Stop by the STOP Signal



(5) Alarm Reset



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

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Options: Actuator Cable

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

LE – CP – [1] – [ ]

Cable length (L) [m]

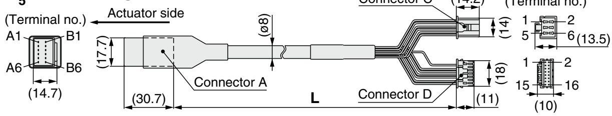
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

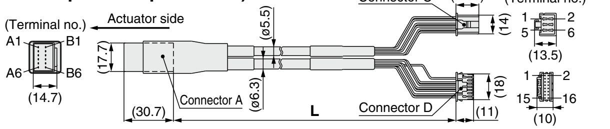
Cable type

Nil	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 color	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

Signal	Connector A terminal no.	Cable color	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, standard cable with lock and sensor for step motor (Servo/24 VDC)]

LE – CP – [1] – B – [ ]

Cable length (L) [m]

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

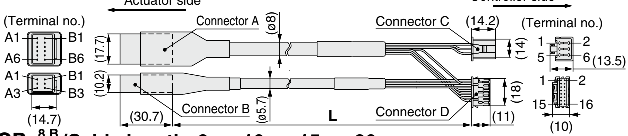
* Produced upon receipt of order (Robotic cable only)

With lock and sensor

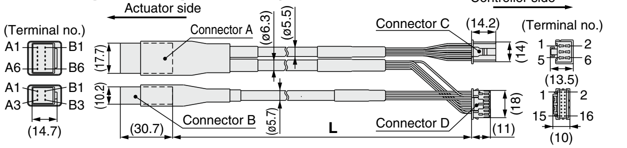
Cable type

Nil	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 color	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

Signal	Connector A terminal no.	Cable color	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

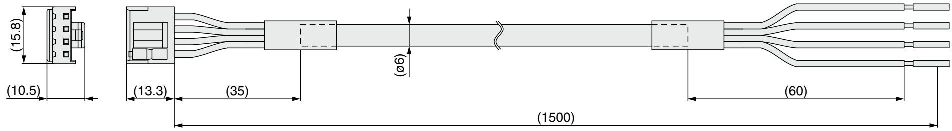
Signal	Connector B terminal no.	Cable color	Connector D terminal no.
Lock (+)	B-1	Red	4
Lock (–)	A-1	Black	5
Sensor (+) Note)	B-3	Brown	1
Sensor (–) Note)	A-3	Blue	2

Note) Not used for the LE series.

Options

[Power supply cable]

LEC – CK1 – 1



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

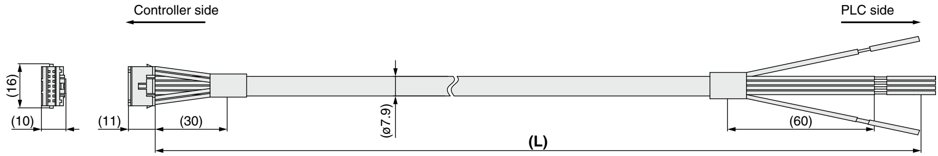
∗ Conductor size: AWG20

[I/O cable]

LEC – CK4 – □

Cable length (L) [m]

1	1.5
3	3
5	5



∗ Conductor size: AWG26

Terminal no.	Insulation color	Dot mark	Dot color	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	Gray	■	Black	BUSY
8	Gray	■	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.

Compatible actuators

LEF LEY LES

LEP LER LEH

Step Motor Driver
Series LECPA

RoHS

How to Order

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LE series and the LECPA series. The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② For the LECPA series (step motor driver), EMC compliance was tested by installing a noise filter set (LEC-NFA).
Refer to page 414 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 [ ] – LEY16B-100

Driver type

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

I/O cable length [m]

Nil	None
1	1.5
3	3*
5	5*

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

Driver mounting

Nil	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 "LEY16B-100" for the LEY16B-100B-R1AN1D.

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

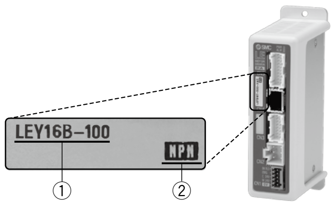
The driver is sold as single unit after the compatible actuator is set.

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

<Check the following before use.>

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

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



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

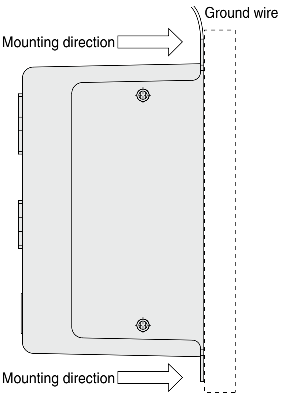
Specifications

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)

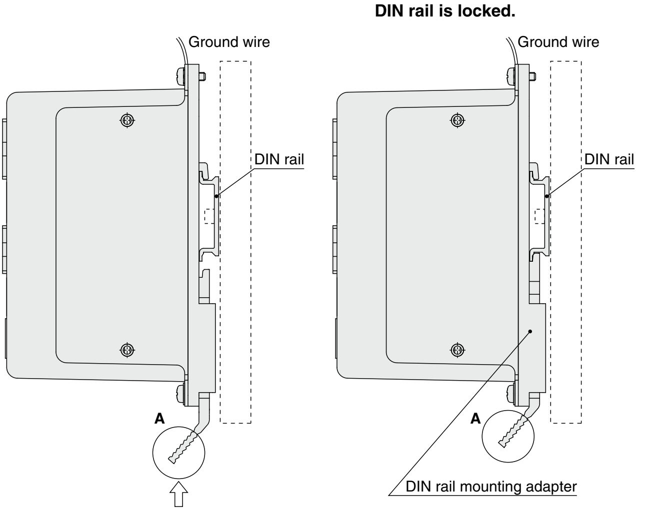
Note 1) Do not use the power supply of "inrush current prevention type" for the driver power supply. When conformity to UL is required, the electric actuator and driver should be used with a UL1310 Class 2 power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the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

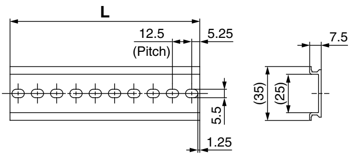


Hook the driver on the DIN rail and press the lever of section **A** in the arrow direction to lock it.

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 410 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

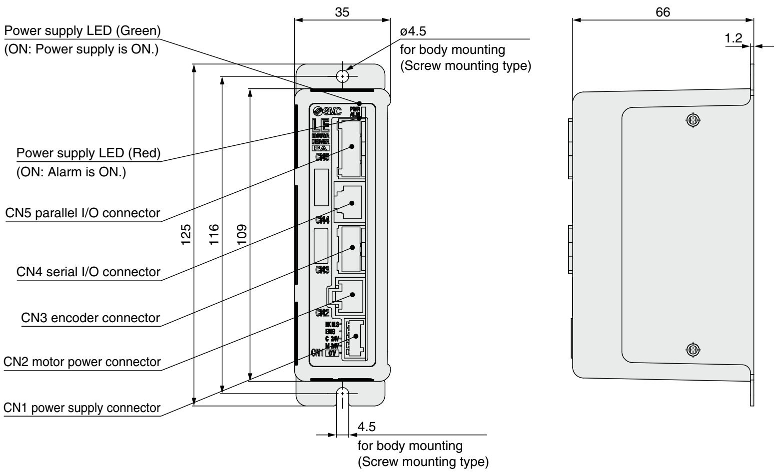
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5	498	510.5

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

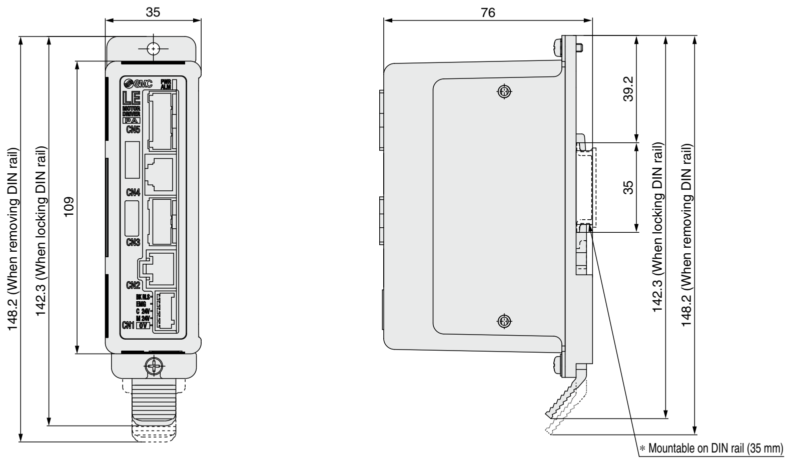
This should be used when the DIN rail mounting adapter is mounted onto the screw mounting type driver afterwards.

Dimensions

a) Screw mounting (LECPA□□-□)



b) DIN rail mounting (LECPA□□D-□)



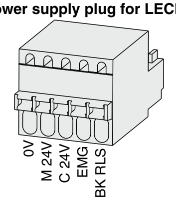
Wiring Example 1

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

Power supply plug for LECPA



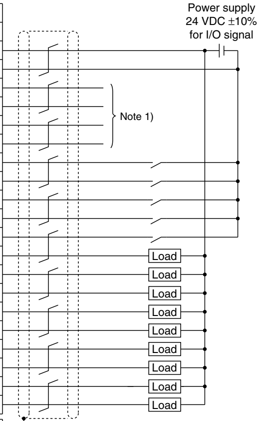
Wiring Example 2

Parallel I/O Connector: CN5

∗ When you connect a PLC, etc., to the CN5 parallel I/O connector, 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).

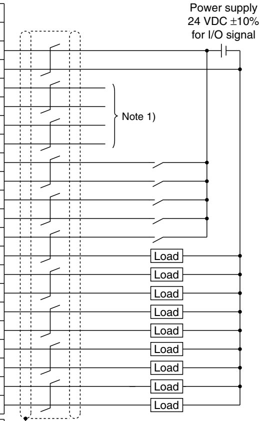
LECPAN□□-□ (NPN)

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

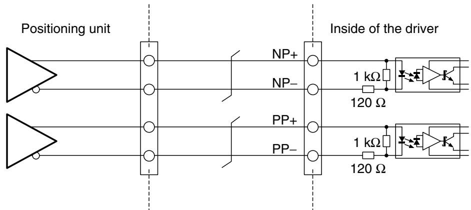
Output Signal

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

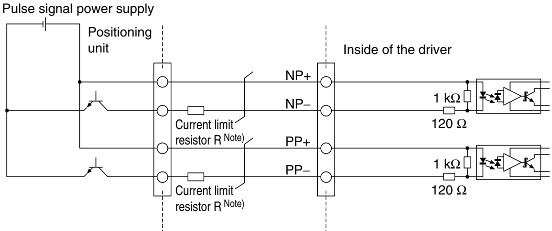
Note 3) Signal of negative-logic circuit ON (N.C.)

Pulse Signal Wiring Details

• Pulse signal output of positioning unit is differential output



• Pulse signal output of positioning unit is open collector output



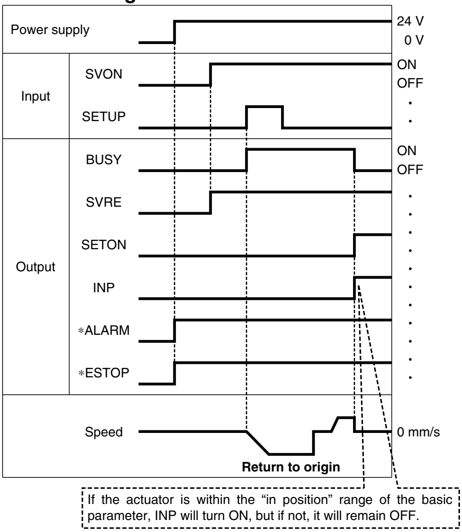
Note) Connect the current limit resistor R in series to correspond to the pulse signal voltage.

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

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

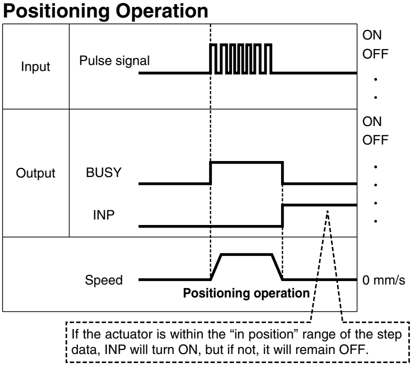
Signal Timing

Return to Origin

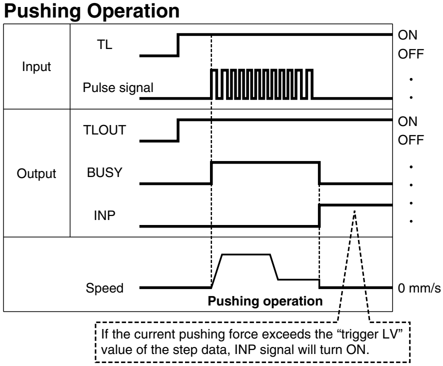


* "*ALARM" and "*ESTOP" are expressed as negative-logic circuit.

Positioning Operation

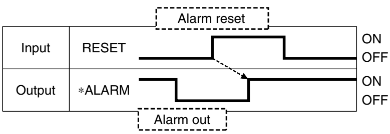


Pushing Operation



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]

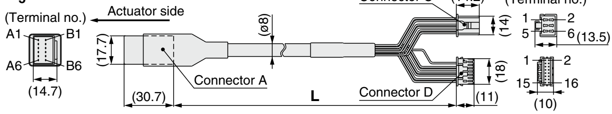
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

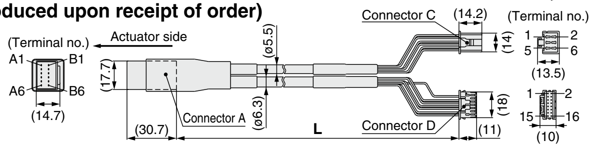
Cable type

Nil	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 color	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

Signal	Connector A terminal no.	Cable color	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, standard cable with lock and sensor for step motor (Servo/24 VDC)]

LE – CP – 1 – B – □

Cable length (L) [m]

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

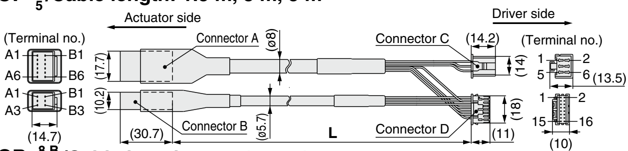
* Produced upon receipt of order (Robotic cable only)

With lock and sensor

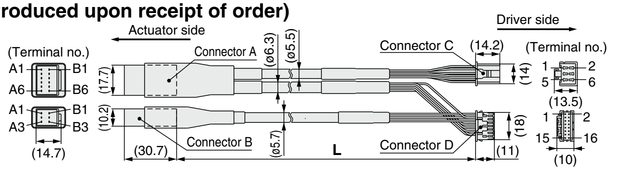
Cable type

Nil	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 color	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

Signal	Connector A terminal no.	Cable color	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

Signal	Connector B terminal no.	Cable color	Connector D 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-C L5-1

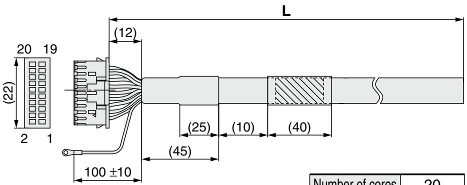
I/O cable type

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

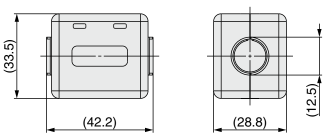
Pin no.	Insulation color	Dot mark	Dot color
1	Light brown	■	Black
2	Light brown	■	Red
3	Yellow	■	Black
4	Yellow	■	Red
5	Light green	■	Black
6	Light green	■	Red
7	Gray	■	Black
8	Gray	■	Red
9	White	■	Black
10	White	■	Red
11	Light brown	■ ■	Black

Pin no.	Insulation color	Dot mark	Dot color
12	Light brown	■ ■	Red
13	Yellow	■ ■	Black
14	Yellow	■ ■	Red
15	Light green	■ ■	Black
16	Light green	■ ■	Red
17	Gray	■ ■	Black
18	Gray	■ ■	Red
19	White	■ ■	Black
20	White	■ ■	Red
Round terminal 0.5-5	Green		

[Noise filter set]
Step Motor Driver (Pulse Input Type)

LEC-NFA

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



* Refer to the LECPA series Operation Manual for installation.

[Current limit resistor]

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

LEC-PA-R-□

Current limit resistor

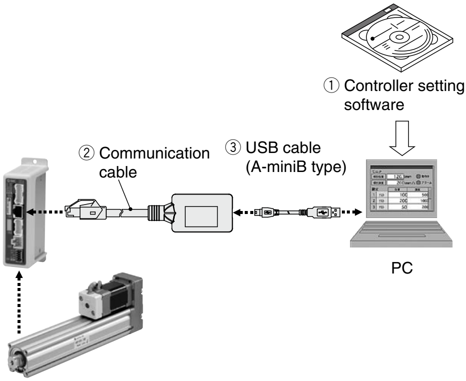
Symbol	Resistance	Pulse signal power supply voltage
332	3.3 kΩ ±5%	24 VDC ±10%
391	390 Ω ±5%	5 VDC ±5%

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

Series LEC

Windows®XP, Windows®7 compatible

Controller Setting Kit/LEC-W2



How to Order

LEC – W2

Controller setting kit
(Japanese and English are available.)

Contents

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**
Servo motor controller (24 VDC)	Series **LECA6**
Step motor driver (Pulse input type)	Series **LECPA**

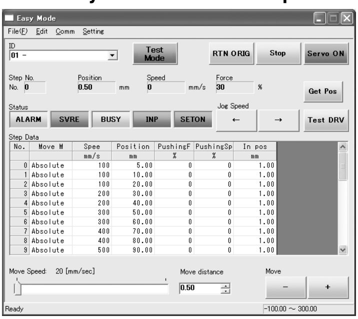
Hardware Requirements

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

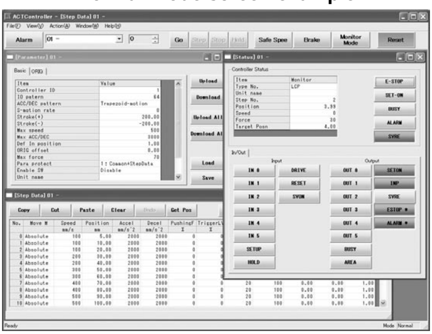
Easy mode screen example



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

RoHS

How to Order

LEC – T1 – 3 J G □

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

Nil	None
S	Equipped with enable switch

∗ Interlock switch for jog and test function

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

Option
- **Enable switch is provided.**

Specifications

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

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

Easy Mode

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

Menu Operations Flowchart

Menu
Data
Monitor
Jog
Test
ALM
TB setting

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

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

Jog
Return to origin
Jog operation

Test Note 1)
1 step operation

ALM
Active alarm display
Alarm reset

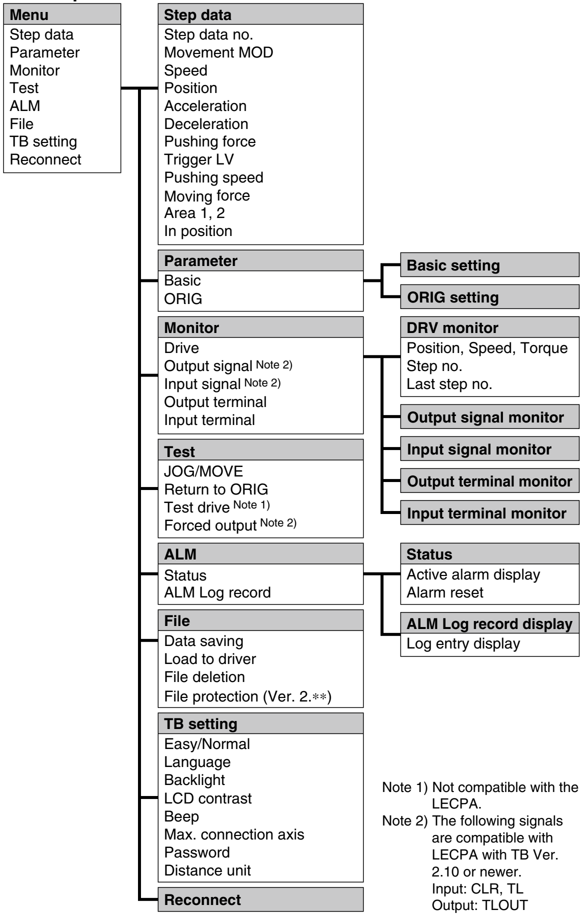
TB setting
Reconnect (Ver. 1.∗∗)
Japanese/English (Ver. 2.∗∗)
Easy/Normal
Set item

Note 1) Not compatible with the LECPA.

Normal Mode

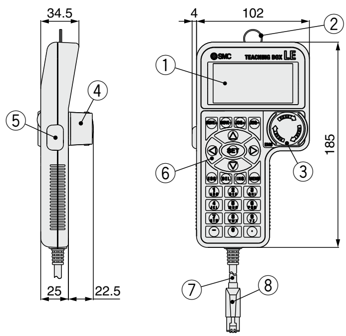
Function	Details
Step data	• Step data setting
Parameter	• Parameters setting
Test	• Jog operation/Constant rate movement • Return to origin • Test drive Note 1) (Specify a maximum of 5 step data and operate.) • Forced output (Forced signal output, Forced terminal output) Note 2)
Monitor	• Drive monitor • Output signal monitor Note 2) • Input signal monitor Note 2) • Output terminal monitor • Input terminal monitor
ALM	• Active alarm display (Alarm reset) • Alarm log record display
File	• Data saving Save the step data and parameters of the driver which is being used for communication (it is possible to save four files, with one set of step data and parameters defined as one file). • Load to driver Loads the data which is saved in the teaching box to the driver which is being used for communication. • Delete the saved data. • File protection (Ver. 2.**)
TB setting	• Display setting (Easy/Normal mode) • Language setting (Japanese/English) • Backlight setting • LCD contrast setting • Beep sound setting • Max. connection axis • Distance unit (mm/inch)
Reconnect	• Reconnection of axis

Menu Operations Flowchart



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

Dimensions



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

AC Servo Motor Driver

Series LECS□

Pulse Input Type/ Positioning Type

Incremental Type
Series LECSA

Pulse Input Type

Absolute Type
Series LECSB

CC-Link Direct Input Type

Absolute Type
Series LECSC

SSCNET Ⅲ Type

Absolute Type
Series LECSS

AC Servo Motor Driver

Series LECS□ list

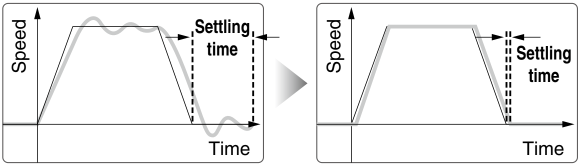
Type	Series	Compatible motor (100/200 VAC)			Control method			Application/ Function	Compatible option
		100 W	200 W	400 W	Positioning Note 1)	Pulse	Network direct input	Synchronous Note 2)	Setup software LEC-MR-SETUP221
Incremental Type	 **LECSA** (Pulse input type/ Positioning type)	●	●	●	Up to 7 points ●	●			●
Absolute Type	 **LECSB** (Pulse input type)	●	●	●		●			●
Absolute Type	 **LECSC** (CC-Link direct input type)	●	●	●	Up to 255 points ●		CC-Link Ver. 1.10 ●		●
Absolute Type	 **LECSS** (SSCNET Ⅲ type) Compatible with Mitsubishi Electric's servo system controller network	●	●	●			SSCNET Ⅲ ●	●	●

Note 1) For positioning type, setting needs to be changed to use with maximum set values.
Setup software (MR Configurator) LEC-MR-SETUP221 is required.
Note 2) Available when the Mitsubishi motion controller is used for the master equipment.

Servo adjustment using auto gain tuning

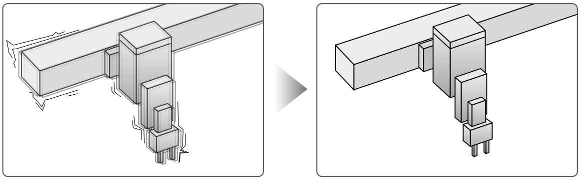
Auto resonant filter function

- Control the difference between command value and actual action



Auto damping control function

- Automatically suppress low frequency machine vibrations (up to 100 Hz)



With display setting function

One-touch adjustment button

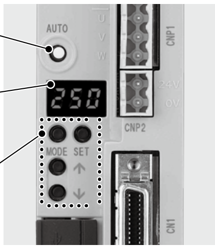
One-touch servo adjustment

Display

Display the monitor, parameter and alarm.

Settings

Set parameters and monitor display, etc. with push buttons.



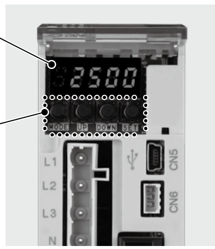
LECSA

Display

Display the monitor, parameter and alarm.

Settings

Set parameters and monitor display, etc. with push buttons.



(With the front cover opened)

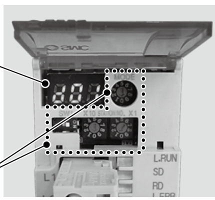
LECSB

Display

Display the communication status with the driver, the alarm and the point table No.

Settings

Control Baud rate, station number and the occupied station count.



(With the front cover opened)

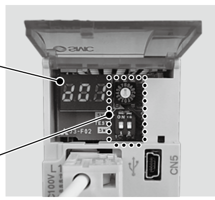
LECSC

Display

Display the communication status with the driver and the alarm.

Settings

Switches for selecting axis and switching to the test operation



(With the front cover opened)

LECSS

System Construction

Incremental encoder compatible *Series LECSA*

(Pulse input type/Positioning type)

Provided by customer

Power supply

Single phase 100 to 120 VAC (50/60 Hz)
200 to 230 VAC (50/60 Hz)

◎Option Page 435
Regeneration option
Part no.: **LEC-MR-RB-□**

●**Main circuit power supply connector** Page 429
(Accessory)

Driver

●**Motor cable** Page 435

Standard cable	Robotic cable
LE-CSM-S□□	LE-CSM-R□□

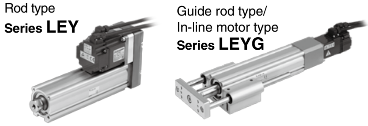
●**Lock cable** Page 435

Standard cable	Robotic cable
LE-CSB-S□□	LE-CSB-R□□

Electric actuator Page 183

Rod type
Series **LEY**

Guide rod type/
In-line motor type
Series **LEYG**



●**Encoder cable** Page 435

Standard cable	Robotic cable
LE-CSE-S□□	LE-CSE-R□□

Provided by customer

Control circuit power supply
24 VDC

●**Control circuit power supply connector** Page 429
(Accessory)

◎Option

Setup software Page 436
(MR Configurator™)
Part no.: **LEC-MR-SETUP221□**

PC

∗ Order USB cable (Part no.: LEC-MR-J3USB) separately to use this software.

●**USB cable** Page 436
Part no.: **LEC-MR-J3USB**

◎Option Page 435
●**I/O connector**
Part no.: **LE-CSNA**

Provided by customer

PLC (Positioning unit)

Power supply for I/O signal 24 VDC

Absolute encoder compatible *Series LECSB*

(Pulse input type)

Provided by customer

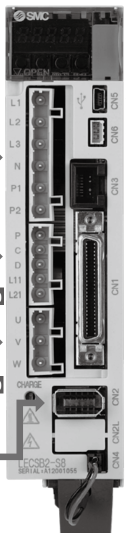
Power supply

Single phase 100 to 120 VAC (50/60 Hz)
200 to 230 VAC (50/60 Hz)
Three phase 200 to 230 VAC (50/60 Hz)

◎Option Page 435
Regeneration option
Part no.: **LEC-MR-RB-□**

●**Main circuit power supply connector** Page 430
(Accessory)

Driver



●**Control circuit power supply connector** Page 430
(Accessory)

●**Motor connector** Page 430
(Accessory)

●**Motor cable** Page 435

Standard cable	Robotic cable
LE-CSM-S□□	LE-CSM-R□□

●**Lock cable** Page 435

Standard cable	Robotic cable
LE-CSB-S□□	LE-CSB-R□□

Electric actuator Page 183

Rod type
Series **LEY**

Guide rod type/
In-line motor type
Series **LEYG**

●**Encoder cable** Page 435

Standard cable	Robotic cable
LE-CSE-S□□	LE-CSE-R□□

Page 436
Battery (Accessory)
Part no.: **(LEC-MR-J3BAT)**

◎Option

●**USB cable** Page 436
Part no.: **LEC-MR-J3USB**

Setup software Page 436
(MR Configurator™)
Part no.: **LEC-MR-SETUP221□**

PC

∗ Order USB cable (Part no.: LEC-MR-J3USB) separately to use this software.

●**Analog monitor output**

●**RS-422 communication**

◎Option Page 435
●**I/O connector**
Part no.: **LE-CSNB**

Provided by customer

PLC (Positioning unit)

Power supply for I/O signal 24 VDC

System Construction

Absolute encoder compatible *Series LECSC*
(CC-Link direct input type)

Provided by customer

Power supply
Single phase 100 to 120 VAC (50/60 Hz)
200 to 230 VAC (50/60 Hz)
Three phase 200 to 230 VAC (50/60 Hz)

◎Option Page 435
Regeneration option
Part no.: **LEC-MR-RB-□**

●**Motor cable** Page 435

Standard cable	Robotic cable
LE-CSM-S□□	LE-CSM-R□□

●**Lock cable** Page 435

Standard cable	Robotic cable
LE-CSB-S□□	LE-CSB-R□□

Electric actuator Page 183
Rod type
Series **LEY**
Guide rod type/
In-line motor type
Series **LEYG**

●**Encoder cable** Page 435

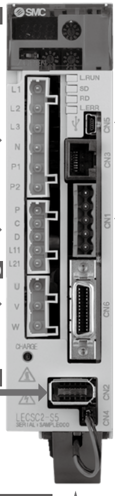
Standard cable	Robotic cable
LE-CSE-S□□	LE-CSE-R□□

●**Main circuit power supply connector** Page 430
(Accessory)

●Control circuit power supply connector Page 430
(Accessory)

●**Motor connector** Page 430
(Accessory)

Driver



Page 436
Battery (Accessory)
Part no.: **(LEC-MR-J3BAT)**

●**USB cable** Page 436 ◎Option
Part no.: **LEC-MR-J3USB**

Setup software Page 436
(MR Configurator™)
Part no.: **LEC-MR-SETUP221□**
PC

●**RS-422 communication**

CC-Link connector
(Accessory)

◎Option Page 435
●**I/O connector**
Part no.: **LE-CSNA**

Provided by customer

PLC (CC-Link master unit)
Power supply for I/O signal 24 VDC

Absolute encoder compatible *Series LECSS*
(SSCNET Ⅲ type)

Provided by customer

Power supply
Single phase 100 to 120 VAC (50/60 Hz)
200 to 230 VAC (50/60 Hz)
Three phase 200 to 230 VAC (50/60 Hz)

◎Option Page 435
Regeneration option
Part no.: **LEC-MR-RB-□**

●**Motor cable** Page 435

Standard cable	Robotic cable
LE-CSM-S□□	LE-CSM-R□□

●**Lock cable** Page 435

Standard cable	Robotic cable
LE-CSB-S□□	LE-CSB-R□□

Electric actuator Page 183
Rod type
Series **LEY**
Guide rod type/
In-line motor type
Series **LEYG**

●**Encoder cable** Page 435

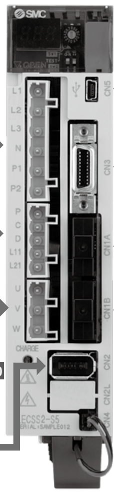
Standard cable	Robotic cable
LE-CSE-S□□	LE-CSE-R□□

●**Main circuit power supply connector** Page 430
(Accessory)

●Control circuit power supply connector Page 430
(Accessory)

●**Motor connector** Page 430
(Accessory)

Driver



Page 436
Battery (Accessory)
Part no.: **(LEC-MR-J3BAT)**

●**USB cable** Page 436 ◎Option
Part no.: **LEC-MR-J3USB**

Setup software Page 436
(MR Configurator™)
Part no.: **LEC-MR-SETUP221□**
PC

◎Option Page 435
●**I/O connector**
Part no.: **LE-CSNS**

CN1A
CN1B
CN1A

◎Option Page 435
●**SSCNET Ⅲ optical cable**
Part no.: **LE-CSS-□**

Provided by customer

PLC (Positioning unit/Motion controller)
Power supply for I/O signal 24 VDC

AC Servo Motor Driver
Series LECS□

Power supply voltage	100 to 120 VAC 200 to 230 VAC
Motor capacity	100/200/400 W

Incremental Type

Series LECSA (Pulse input type/Positioning type)

- **Up to 7 positioning points by point table**
- **Input type:** Pulse input
- **Control encoder:** Incremental 17-bit encoder (Resolution: 131072 pulse/rev)
- **Parallel input:** 6 inputs
  output: 4 outputs

Absolute Type

Series LECSB (Pulse input type)

- **Input type:** Pulse input
- **Control encoder:** Absolute 18-bit encoder (Resolution: 262144 pulse/rev)
- **Parallel input:** 10 inputs
  output: 6 outputs

Series LECSC (CC-Link direct input type)

- **Position data/speed data setting and operation start/stop**
- **Positioning by up to 255 point tables (when 2 stations occupied)**
- **Up to 32 drivers connectable (when 2 stations occupied) with CC-Link communication**
- **Applicable Fieldbus protocol:** CC-Link (Ver. 1.10, max. communication speed: 10 Mbps)
- **Control encoder:** Absolute 18-bit encoder (Resolution: 262144 pulse/rev)

Series LECSS (SSCNET Ⅲ type)

- **Compatible with Mitsubishi Electric's servo system controller network**
- **Reduced wiring and SSCNET Ⅲ optical cable for one-touch connection**
- **SSCNET Ⅲ optical cable provides enhanced noise resistance**
- **Up to 16 drivers connectable with SSCNET Ⅲ communication**
- **Applicable Fieldbus protocol:** SSCNET Ⅲ
  (High-speed optical communication, max. one-way communication speed: 100 Mbps)
- **Control encoder:** Absolute 18-bit encoder (Resolution: 262144 pulse/rev)

Compatible actuators

LEF LEJ LEY

AC Servo Motor Driver

Incremental Type

Series LECSA (Pulse Input Type/Positioning Type)

Absolute Type

Series LECSB/LECSC/LECSS

(Pulse Input Type) (CC-Link Direct Input Type) (SSCNET Ⅲ Type)

CE RoHS

How to Order

Driver

LECS A 1 – S1

Driver type

A	Pulse input type/Positioning type (For incremental encoder)
B	Pulse input type (For absolute encoder)
C	CC-Link direct input type (For absolute encoder)
S	SSCNET Ⅲ type (For absolute encoder)

Power supply voltage

1	100 to 120 VAC, 50/60 Hz
2	200 to 230 VAC, 50/60 Hz

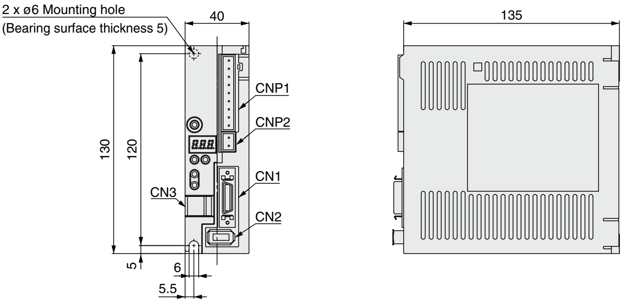
Compatible motor type

Symbol	Type	Capacity	Encoder
S1	AC servo motor (S2)	100 W	Incremental
S3	AC servo motor (S3)	200 W	
S4	AC servo motor (S4)*	400 W	
S5	AC servo motor (S6)	100 W	Absolute
S7	AC servo motor (S7)	200 W	
S8	AC servo motor (S8)*	400 W	

* Only available for power supply voltage "200 to 230 VAC".

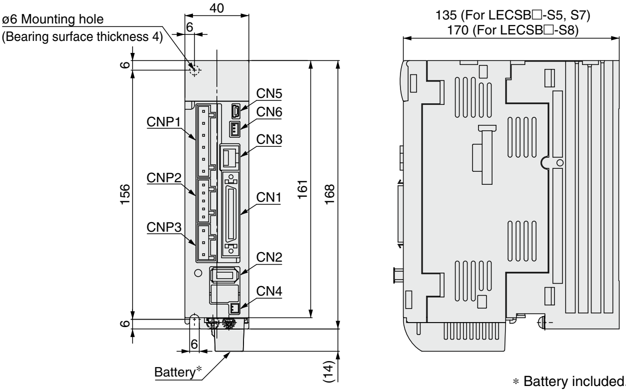
Dimensions

LECSA□



Connector name	Description
CN1	I/O signal connector
CN2	Encoder connector
CN3	USB communication connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector

LECSB□

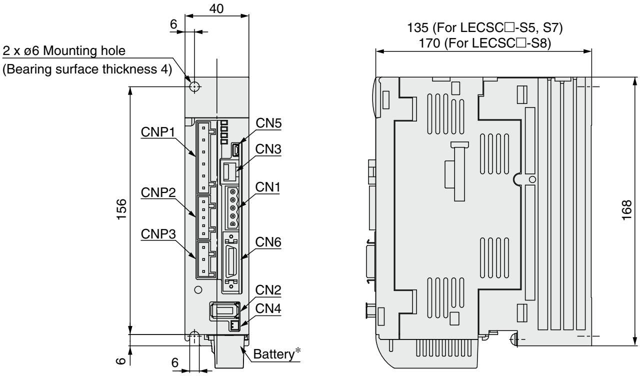


Connector name	Description
CN1	I/O signal connector
CN2	Encoder connector
CN3	RS-422 communication connector
CN4	Battery connector
CN5	USB communication connector
CN6	Analog monitor connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector
CNP3	Servo motor power connector

* Battery included.

Dimensions

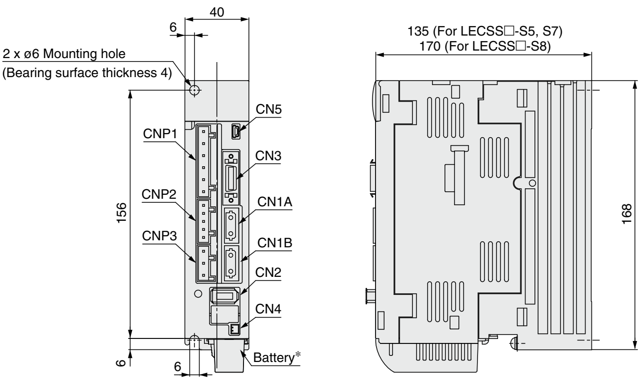
LECSC□



* Battery included.

Connector name	Description
CN1	CC-Link connector
CN2	Encoder connector
CN3	RS-422 communication connector
CN4	Battery connector
CN5	USB communication connector
CN6	I/O signal connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector
CNP3	Servo motor power connector

LECSS□



* Battery included.

Connector name	Description
CN1A	Front axis connector for SSCNET Ⅲ optical cable
CN1B	Rear axis connector for SSCNET Ⅲ optical cable
CN2	Encoder connector
CN3	I/O signal connector
CN4	Battery connector
CN5	USB communication connector
CNP1	Main circuit power supply connector
CNP2	Control circuit power supply connector
CNP3	Servo motor power connector

Specifications

Series LECSA

Model		LECSA1-S1	LECSA1-S3	LECSA2-S1	LECSA2-S3	LECSA2-S4
Compatible motor capacity [W]		100	200	100	200	400
Compatible encoder		Incremental 17-bit encoder (Resolution: 131072 p/rev)				
Main power supply	Power voltage [V]	Single phase 100 to 120 VAC (50/60 Hz)		Single phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation [V]	Single phase 85 to 132 VAC		Single phase 170 to 253 VAC		
	Rated current [A]	3.0	5.0	1.5	2.4	4.5
Control power supply	Control power supply voltage [V]	24 VDC				
	Allowable voltage fluctuation [V]	21.6 to 26.4 VDC				
	Rated current [A]	0.5				
Parallel input		6 inputs				
Parallel output		4 outputs				
Max. input pulse frequency [pps]		1 M (for differential receiver), 200 k (for open collector)				
Function	In-position range setting [pulse]	0 to ±65535 (Command pulse unit)				
	Error excessive	±3 rotations				
	Torque limit	Parameter setting				
	Communication	USB communication				
Operating temperature range [°C]		0 to 55 (No freezing)				
Operating humidity range [%RH]		90 or less (No condensation)				
Storage temperature range [°C]		–20 to 65 (No freezing)				
Storage humidity range [%RH]		90 or less (No condensation)				
Insulation resistance [MΩ]		Between the housing and SG: 10 (500 VDC)				
Weight [g]		600				700

Series LECSB

Model		LECSB1-S5	LECSB1-S7	LECSB2-S5	LECSB2-S7	LECSB2-S8
Compatible motor capacity [W]		100	200	100	200	400
Compatible encoder		Absolute 18-bit encoder (Resolution: 262144 p/rev)				
Main power supply	Power voltage [V]	Single phase 100 to 120 VAC (50/60 Hz)		Three phase 200 to 230 VAC (50/60 Hz) Single phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation [V]	Single phase 85 to 132 VAC		Three phase 170 to 253 VAC Single phase 170 to 253 VAC		
	Rated current [A]	3.0	5.0	0.9	1.5	2.6
Control power supply	Control power supply voltage [V]	Single phase 100 to 120 VAC (50/60 Hz)		Three phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation [V]	Single phase 85 to 132 VAC		Single phase 170 to 253 VAC		
	Rated current [A]	0.4		0.2		
Parallel input		10 inputs				
Parallel output		6 outputs				
Max. input pulse frequency [pps]		1 M (for differential receiver), 200 k (for open collector)				
Function	In-position range setting [pulse]	0 to ±10000 (Command pulse unit)				
	Error excessive	±3 rotations				
	Torque limit	Parameter setting or external analog input setting (0 to 10 VDC)				
	Communication	USB communication, RS422 communication*1				
Operating temperature range [°C]		0 to 55 (No freezing)				
Operating humidity range [%RH]		90 or less (No condensation)				
Storage temperature range [°C]		–20 to 65 (No freezing)				
Storage humidity range [%RH]		90 or less (No condensation)				
Insulation resistance [MΩ]		Between the housing and SG: 10 (500 VDC)				
Weight [g]		800				1000

*1 USB communication and RS422 communication cannot be performed at the same time.

Specifications

Series LECSC

Model			LECSC1-S5	LECSC1-S7	LECSC2-S5	LECSC2-S7	LECSC2-S8
Compatible motor capacity [W]			100	200	100	200	400
Compatible encoder			Absolute 18-bit encoder (Resolution: 262144 p/rev)				
Main power supply	Power voltage [V]		Single phase 100 to 120 VAC (50/60 Hz)		Three phase 200 to 230 VAC (50/60 Hz) Single phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation [V]		Single phase 85 to 132 VAC		Three phase 170 to 253 VAC, Single phase 170 to 253 VAC		
	Rated current [A]		3.0	5.0	0.9	1.5	2.6
Control power supply	Control power supply voltage [V]		Single phase 100 to 120 VAC (50/60 Hz)		Single phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation [V]		Single phase 85 to 132 VAC		Single phase 170 to 253 VAC		
	Rated current [A]		0.4		0.2		
Communication specifications	Applicable Fieldbus protocol (Version)		CC-Link communication (Ver. 1.10)				
	Connection cable		CC-Link Ver. 1.10 compliant cable (Shielded 3-core twisted pair cable)*1				
	Remote station number		1 to 64				
	Cable length	Communication speed [bps]	16 k	625 k	2.5 M	5 M	10 M
		Maximum overall cable length [m]	1200	900	400	160	100
		Cable length between stations [m]	0.2 or more				
	I/O occupation area (Inputs/Outputs)		1 station occupied (Remote I/O 32 points/32 points)/(Remote register 4 words/4 words) 2 stations occupied (Remote I/O 64 points/64 points)/(Remote register 8 words/8 words)				
	Number of connectable drivers		Up to 42 (when 1 station is occupied by 1 driver), Up to 32 (when 2 stations are occupied by 1 driver), when there are only remote device stations.				
Command method	Remote register input		Available with CC-Link communication (2 stations occupied)				
	Point table No. input		Available with CC-Link communication, RS-422 communication CC-Link communication (1 station occupied): 31 points CC-Link communication (2 stations occupied): 255 points RS-422 communication: 255 points				
	Indexer positioning input		Available with CC-Link communication CC-Link communication (1 station occupied): 31 points CC-Link communication (2 stations occupied): 255 points				
Communication function			USB communication, RS-422 communication*2				
Operating temperature range [°C]			0 to 55 (No freezing)				
Operating humidity range [%RH]			90 or less (No condensation)				
Storage temperature range [°C]			–20 to 65 (No freezing)				
Storage humidity range [%RH]			90 or less (No condensation)				
Insulation resistance [MΩ]			Between the housing and SG: 10 (500 VDC)				
Weight [g]			800				1000

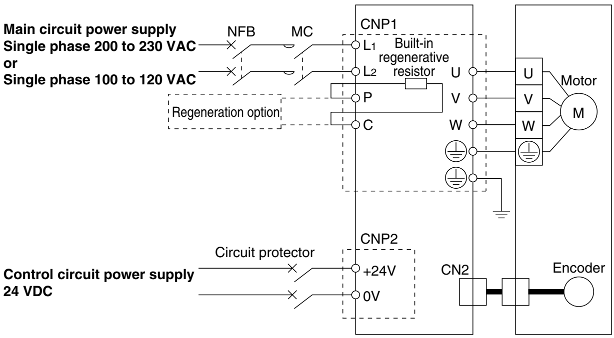
*1 If the system comprises of both CC-Link Ver. 1.00 and Ver. 1.10 compliant cables, Ver. 1.00 specifications are applied to the cable extensions and the cable length between stations.
*2 USB communication and RS422 communication cannot be performed at the same time.

Series LECSS

Model		LECSS1-S5	LECSS1-S7	LECSS2-S5	LECSS2-S7	LECSS2-S8
Compatible motor capacity [W]		100	200	100	200	400
Compatible encoder		Absolute 18-bit encoder (Resolution: 262144 p/rev)				
Main power supply	Power voltage [V]	Single phase 100 to 120 VAC (50/60 Hz)		Three phase 200 to 230 VAC (50/60 Hz) Single phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation [V]	Single phase 85 to 132 VAC		Three phase 170 to 253 VAC, Single phase 170 to 253 VAC		
	Rated current [A]	3.0	5.0	0.9	1.5	2.6
Control power supply	Control power supply voltage [V]	Single phase 100 to 120 VAC (50/60 Hz)		Single phase 200 to 230 VAC (50/60 Hz)		
	Allowable voltage fluctuation [V]	Single phase 85 to 132 VAC		Single phase 170 to 253 VAC		
	Rated current [A]	0.4		0.2		
Applicable Fieldbus protocol		SSCNET Ⅲ (High-speed optical communication)				
Communication function		USB communication				
Operating temperature range [°C]		0 to 55 (No freezing)				
Operating humidity range [%RH]		90 or less (No condensation)				
Storage temperature range [°C]		–20 to 65 (No freezing)				
Storage humidity range [%RH]		90 or less (No condensation)				
Insulation resistance [MΩ]		Between the housing and SG: 10 (500 VDC)				
Weight [g]		800				1000

Power Supply Wiring Example: LECSA

LECSA□-□



Main Circuit Power Supply Connector: CNP1

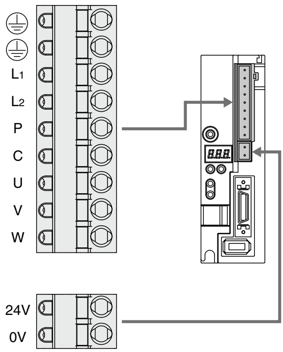
∗ Accessory

Terminal name	Function	Details
⏚	Protective earth (PE)	Should be grounded by connecting the servo motor's earth terminal and the control panel's protective earth (PE).
L_1	Main circuit power supply	Connect the main circuit power supply. LECSA1: Single phase 100 to 120 VAC, 50/60 Hz LECSA2: Single phase 200 to 230 VAC, 50/60 Hz
L_2		
P	Regeneration option	Terminal to connect regeneration option LECSA□-S1: Not connected at time of shipping. LECSA□-S3, S4: Connected at time of shipping. ∗ If regeneration option is required for "Model Selection", connect to this terminal.
C		
U	Servo motor power (U)	Connect to motor cable (U, V, W).
V	Servo motor power (V)	
W	Servo motor power (W)	

Control Circuit Power Supply Connector: CNP2

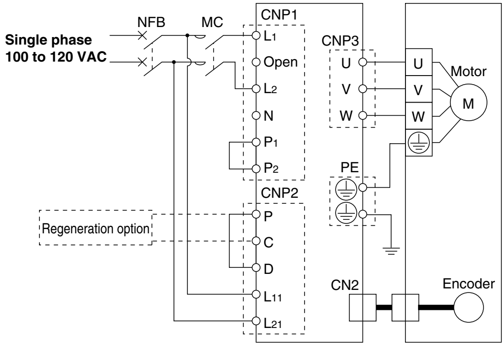
∗ Accessory

Terminal name	Function	Details
24V	Control circuit power supply (24 V)	24 V side of the control circuit power supply (24 VDC) supplied to the driver
0V	Control circuit power supply (0 V)	0 V side of the control circuit power supply (24 VDC) supplied to the driver



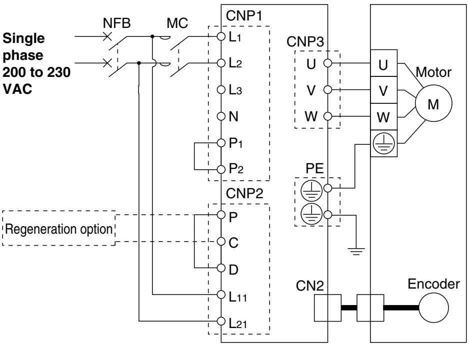
Power Supply Wiring Example: LECSB, LECSC, LECSS

LECSB1-□
LECSC1-□
LECSS1-□

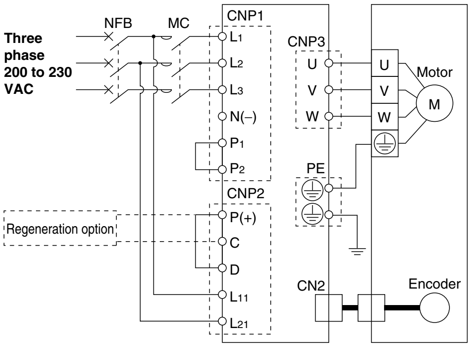


LECSB2-□
LECSC2-□
LECSS2-□

For single phase 200 VAC



For three phase 200 VAC



Note) For single phase 200 to 230 VAC, power supply should be connected to L_1 and L_2 terminals, with nothing connected to L_3.

Main Circuit Power Supply Connector: CNP1

∗ Accessory

Terminal name	Function	Details
L_1	Main circuit power supply	Connect the main circuit power supply. LECSB1/LECSC1/LECSS1: Single phase 100 to 120 VAC, 50/60 Hz Connection terminal: L_1,L_2 LECSB2/LECSC2/LECSS2: Single phase 200 to 230 VAC, 50/60 Hz Connection terminal: L_1,L_2 Three phase 200 to 230 VAC, 50/60 Hz Connection terminal: L_1,L_2,L_3
L_2		
L_3		
N	Do not connect.	
P_1	Connect between P_1 and P_2. (Connected at time of shipping.)	
P_2		

Control Circuit Power Supply Connector: CNP2

∗ Accessory

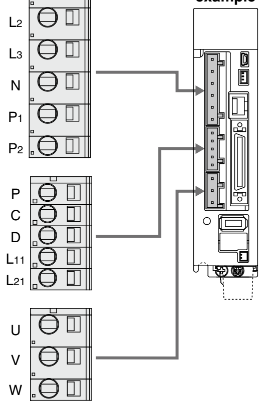
Terminal name	Function	Details
P	Regeneration option	Connect between P and D. (Connected at time of shipping.) ∗ If regeneration option is required for “Model Selection”, connect to this terminal.
C		
D		
L_{11}	Control circuit power supply	Connect the control circuit power supply. LECSB1/LECSC1/LECSS1: Single phase 100 to 120 VAC, 50/60 Hz Connection terminal: L_{11},L_{21} LECSB2/LECSC2/LECSS2: Single phase 200 to 230 VAC, 50/60 Hz Connection terminal: L_{11},L_{21} Three phase 200 to 230 VAC, 50/60 Hz Connection terminal: L_{11},L_{21}
L_{21}		

Motor Connector: CNP3

∗ Accessory

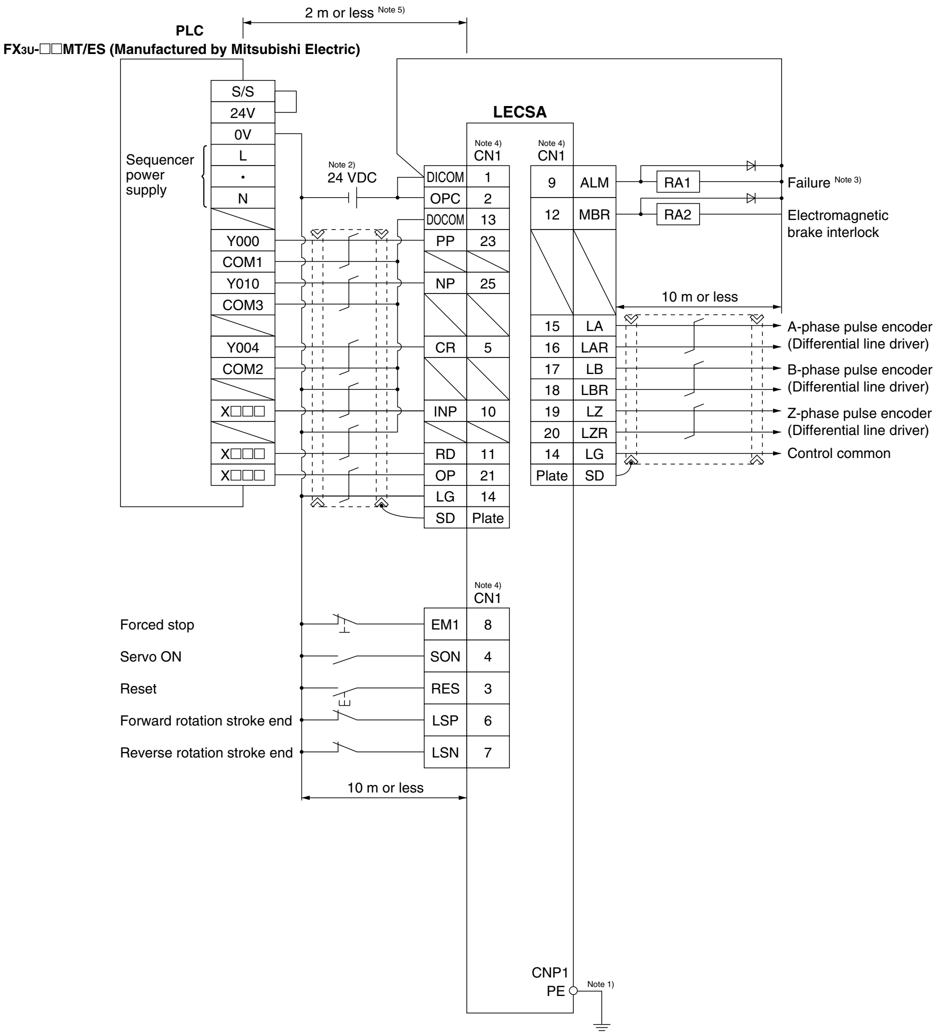
Terminal name	Function	Details
U	Servo motor power (U)	Connect to motor cable (U, V, W).
V	Servo motor power (V)	
W	Servo motor power (W)	

LECSB Front view example



Control Signal Wiring Example: LECSA

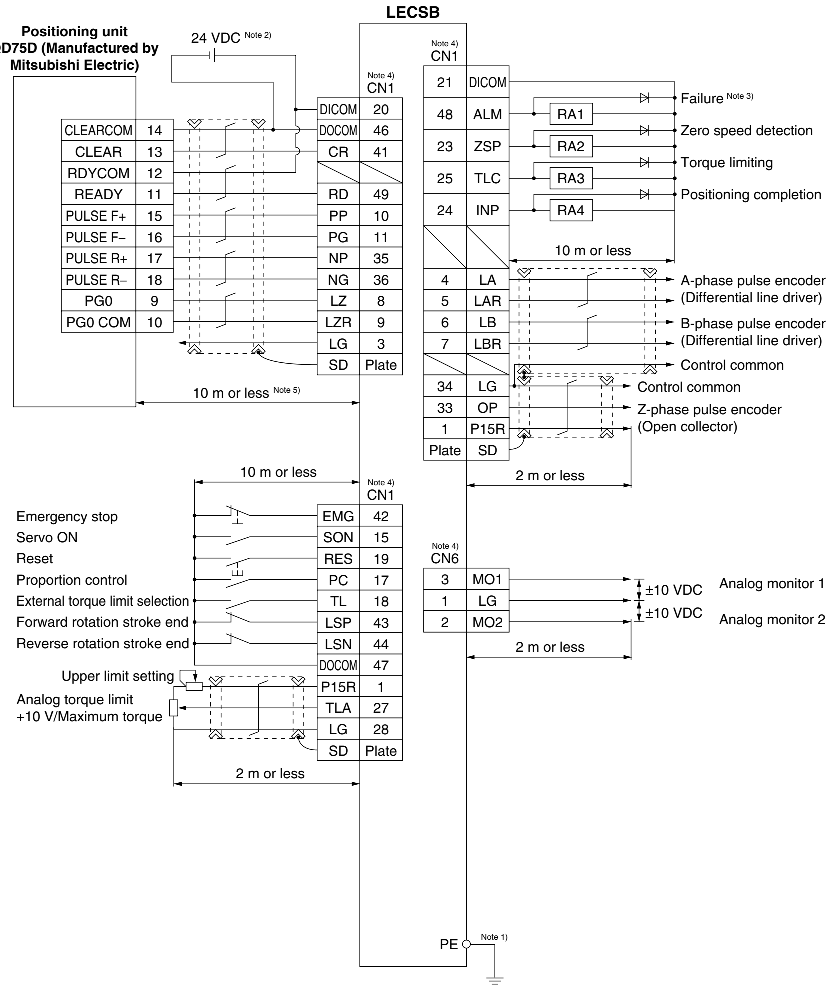
This wiring example shows connection with a PLC (FX3U-□□MT/ES) manufactured by Mitsubishi Electric as when used in position control mode. Refer to the LECSA operation manual and any technical literature or operation manuals for your PLC and positioning unit before connecting to another PLC or positioning unit.



Note 1) For preventing electric shock, be sure to connect the driver circuit power supply connector (CNP1)'s protective earth (PE) terminal (marked ⏚) to the control panel's protective earth (PE).
Note 2) For interface use, supply 24 VDC ±10% 200 mA using an external source. 200 mA is the value when all I/O command signals are used and reducing the number of inputs/outputs can decrease current capacity. Refer to "Operation Manual" for required current for interface.
Note 3) The failure (ALM) is ON during normal conditions. When it is OFF (alarm occurs), stop the sequencer signal using the sequence program.
Note 4) The same name signals are connected inside the driver.
Note 5) For command pulse input with an open collector method. When a positioning unit loaded with a differential line driver method is used, it is 10 m or less.

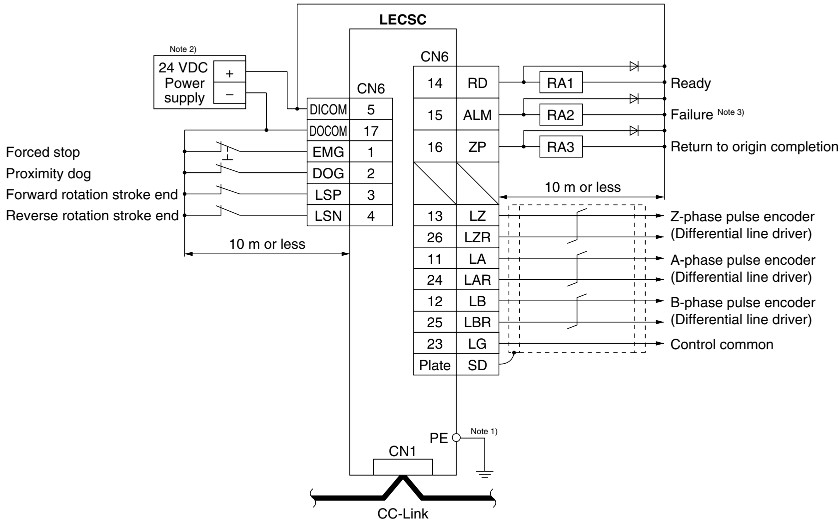
Control Signal Wiring Example: LECSB

This wiring example shows connection with a positioning unit (QD75D) manufactured by Mitsubishi Electric as when used in position control mode. Refer to the LECSB operation manual and any technical literature or operation manuals for your PLC and positioning unit before connecting to another PLC or positioning unit.



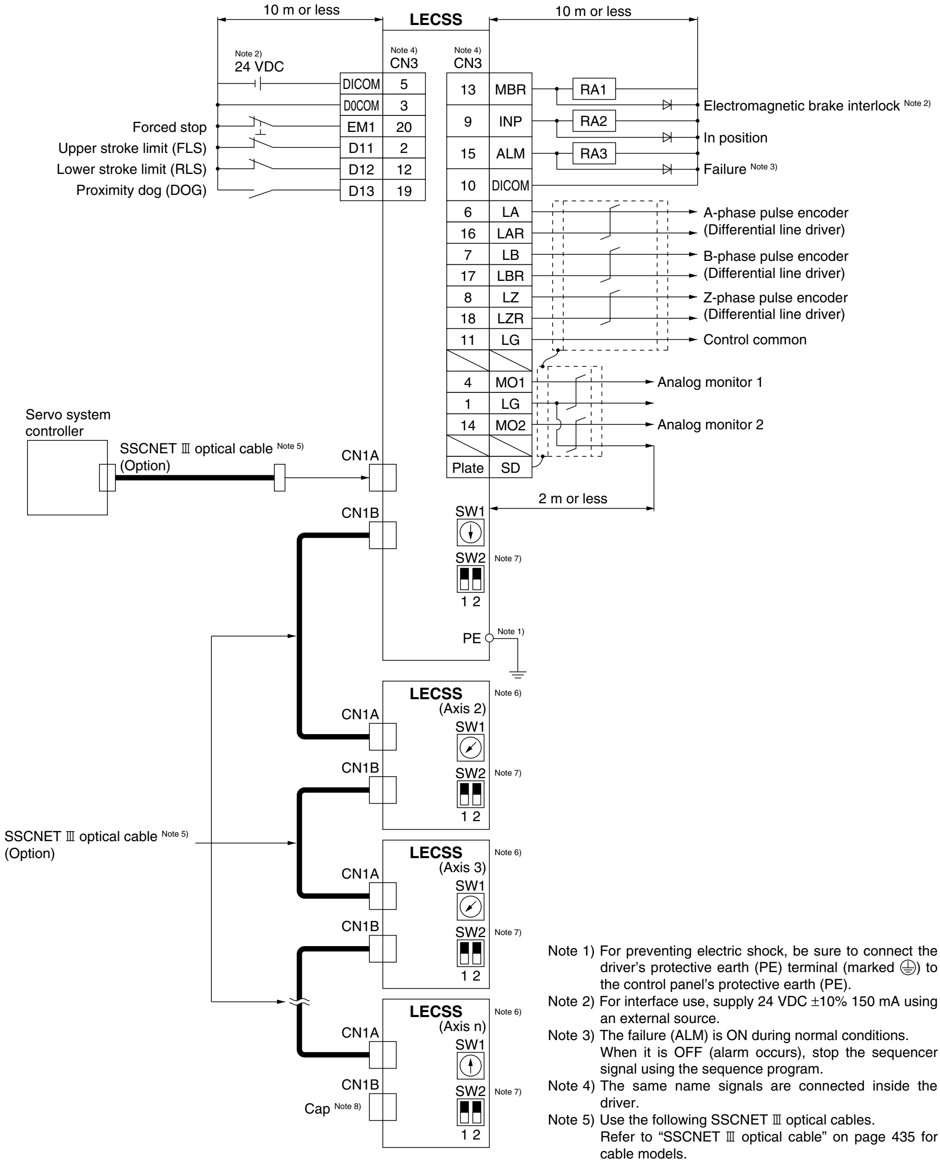
Note 1) For preventing electric shock, be sure to connect the driver's protective earth (PE) terminal (marked ⏚) to the control panel's protective earth (PE).
Note 2) For interface use, supply 24 VDC ±10% 300 mA using an external source.
Note 3) The failure (ALM) is ON during normal conditions. When it is OFF (alarm occurs), stop the sequencer signal using the sequence program.
Note 4) The same name signals are connected inside the driver.
Note 5) For command pulse input with a differential line driver method. For open collector method, it is 2 m or less.

Control Signal Wiring Example: LECSC



Note 1) For preventing electric shock, be sure to connect the driver's protective earth (PE) terminal (marked ⏚) to the control panel's protective earth (PE).
Note 2) For interface use, supply 24 VDC ±10% 150 mA using an external source.
Note 3) The failure (ALM) is ON during normal conditions. When it is OFF (alarm occurs), stop the sequencer signal using the sequence program.

Control Signal Wiring Example: LECSS



Note 1) For preventing electric shock, be sure to connect the driver's protective earth (PE) terminal (marked ⏚) to the control panel's protective earth (PE).

Note 2) For interface use, supply 24 VDC ±10% 150 mA using an external source.

Note 3) The failure (ALM) is ON during normal conditions. When it is OFF (alarm occurs), stop the sequencer signal using the sequence program.

Note 4) The same name signals are connected inside the driver.

Note 5) Use the following SSCNET Ⅲ optical cables. Refer to "SSCNET Ⅲ optical cable" on page 435 for cable models.

Cable	Cable model	Cable length
SSCNET Ⅲ optical cable	**LE-CSS-□**	0.15 m to 3 m

Note 6) Connections from Axis 2 onward are omitted.

Note 7) Up to 16 axes can be set.

Note 8) Be sure to place a cap on unused CN1A/CN1B.

Options

Motor cable, Lock cable, Encoder cable (LECS□ common)

LE − CS M − S 5 A

Motor type

S	AC servo motor

Cable description

M	Motor cable
B	Lock cable
E	Encoder cable

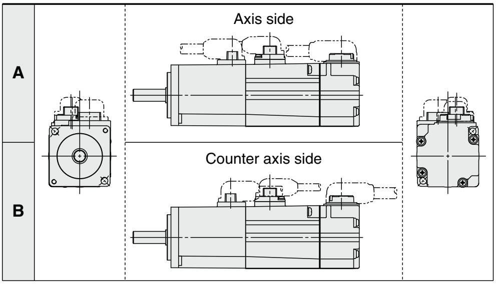
Cable type

S	Standard cable
R	Robotic cable

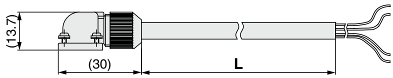
Cable length (L) [m]

2	2
5	5
A	10

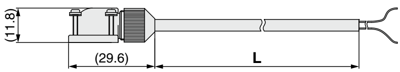
Direction of connector



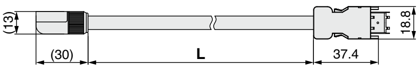
LE-CSM-□□: Motor cable



LE-CSB-□□: Lock cable



LE-CSE-□□: Encoder cable



∗ LE-CSM-S□□ is MR-PWS1CBL□M-A□-L manufactured by Mitsubishi Electric.
LE-CSB-S□□ is MR-BKS1CBL□M-A□-L manufactured by Mitsubishi Electric.
LE-CSE-S□□ is MR-J3ENCBL□M-A□-L manufactured by Mitsubishi Electric.
LE-CSM-R□□ is MR-PWS1CBL□M-A□-H manufactured by Mitsubishi Electric.
LE-CSB-R□□ is MR-BKS1CBL□M-A□-H manufactured by Mitsubishi Electric.
LE-CSE-R□□ is MR-J3ENCBL□M-A□-H manufactured by Mitsubishi Electric.

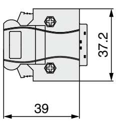
I/O connector

LE − CSN A

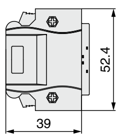
Driver type

A	LECSA□, LECSC□
B	LECSB□
S	LECSS□

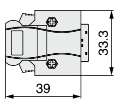
LE-CSNA



LE-CSNB



LE-CSNS



∗ LE-CSNA: 10126-3000PE (connector)/10326-52F0-008 (shell kit) manufactured by 3M or equivalent item.
LE-CSNB: 10150-3000PE (connector)/10350-52F0-008 (shell kit) manufactured by 3M or equivalent item.
LE-CSNS: 10120-3000PE (connector)/10320-52F0-008 (shell kit) manufactured by 3M or equivalent item.
∗ Conductor size: AWG24

SSCNET Ⅲ optical cable

LE − CSS − 1

Motor type

S	AC servo motor

Cable description

S	SSCNET Ⅲ optical cable

Cable length

L	0.15 m
K	0.3 m
J	0.5 m
1	1 m
3	3 m

∗ LE-CSS-□ is MR-J3BUS□M manufactured by Mitsubishi Electric.

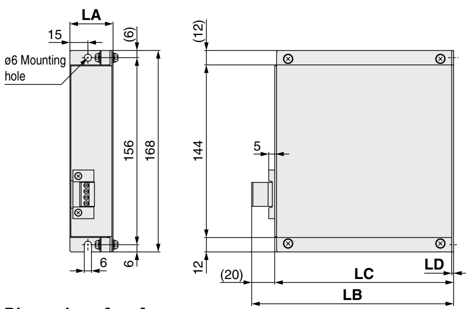
Regeneration option (LECS□ common)

LEC − MR − RB − □

Regeneration option type

032	Allowable regenerative power 30 W
12	Allowable regenerative power 100 W

∗ Confirm regeneration option to be used in “Model Selection”.

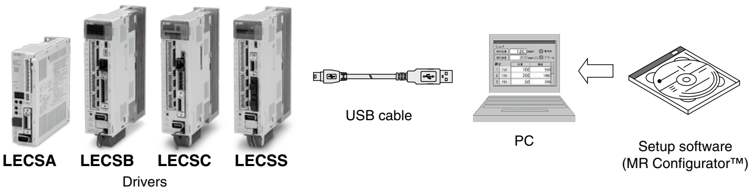


Dimensions [mm]

Model	LA	LB	LC	LD
LEC-MR-RB-032	30	119	99	1.6
LEC-MR-RB-12	40	169	149	2

∗ MR-RB□ manufactured by Mitsubishi Electric.

Options



Setup software (MR Configurator™) (LECSA, LECSB, LECSC, LECSS common)

LEC－MR－SETUP221□

Display language

Nil	Japanese version
E	English version

＊ MRZJW3-SETUP221 manufactured by Mitsubishi Electric.
Refer to Mitsubishi Electric’s website for operating environment and version update information.
MR Configurator™ is a registered trademark or trademark of Mitsubishi Electric.

Adjustment, waveform display, diagnostics, parameter read/write, and test operation can be performed upon a PC.

Compatible PC

When using setup software (MR Configurator™), use an IBM PC/AT compatible PC that meets the following operating conditions.

Hardware Requirements

Equipment		Setup software (MR Configurator™) **LEC-MR-SETUP221□**
PC Note 1) 2) 3) 4)	OS	Windows®98, Windows®Me, Windows®2000 Professional, Windows®XP Professional / Home Edition, Windows Vista® Home Basic / Home Premium / Business / Ultimate / Enterprise Windows®7 Starter / Home Premium / Professional / Ultimate / Enterprise
	Available HD space	130 MB or more
	Communication interface	Use USB port
Display		Resolution 1024 x 768 or more Must be capable of high color (16-bit) display. The connectable with the above PC
Keyboard		The connectable with the above PC
Mouse		The connectable with the above PC
Printer		The connectable with the above PC
USB cable		LEC-MR-J3USB Note 5)

Note 1) Before using a PC for setting LECSA point table method/program method or LECSC point table No. input, upgrade to version C5 (Japanese version) /version C4 (English version). Refer to Mitsubishi Electric’s website for version upgrade information.
Note 2) Windows, Windows Vista, Windows 7 are registered trademarks of Microsoft Corporation in the United States and/or other countries.
Note 3) This software may not run correctly depending on the PC that you are using.
Note 4) Not compatible with 64-bit Windows® XP, 64-bit Windows Vista® and 64-bit Windows® 7.
Note 5) Order USB cable separately.

USB cable (3 m)

LEC－MR－J3USB

＊ MR-J3USB manufactured by Mitsubishi Electric.

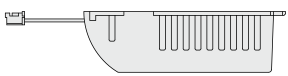
Cable for connecting PC and driver when using the setup software (MR Configurator™).
Do not use any cable other than this cable.

Battery (only for LECSB, LECSC or LECSS)

LEC－MR－J3BAT

＊ MR-J3BAT manufactured by Mitsubishi Electric.

Battery for replacement.
Absolute position data is maintained by installing the battery to the driver.



Series LECS□
Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 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. **Use the specified voltage.**
   If the applied voltage is higher than the specified voltage, malfunction and damage to the driver may result. If the applied voltage is lower than the specified voltage, there is a possibility that the load cannot be moved due to internal voltage drop. Check the operating voltage prior to start. Also, confirm that the operating voltage does not drop below the specified voltage during operation.
2. **Do not use the products outside the specifications.**
   Otherwise, fire, malfunction or damage to the driver/actuator can result. Check the specifications prior to use.
3. **Install an emergency stop circuit.**
   Install an emergency stop outside the enclosure in easy reach to the operator so that the operator can stop the system operation immediately and intercept the power supply.
4. **To prevent danger and damage due to a breakdown or malfunction of these products, which may occur at a certain probability, a backup system should be arranged in advance by using a multiple-layered structure or by making a fail-safe equipment design, etc.**
5. **If there is a risk of fire or personal injury due to abnormal heat generation, sparking, smoke generated by the product, etc., cut off the power supply from this product and the system immediately.**

Handling

⚠Warning

1. **Never touch the inside of the driver and its peripheral devices.**
   Otherwise, electric shock or failure can result.
2. **Do not operate or set up this equipment with wet hands.**
   Otherwise, electric shock can result.
3. **Do not use a product that is damaged or missing any components.**
   Electric shock, fire or injury can result.
4. **Use only the specified combination between the electric actuator and driver.**
   Otherwise, it may cause damage to the driver or to the other equipment.
5. **Be careful not to touch, get caught or hit by the workpiece while the actuator is moving.**
   An injury can result.
6. **Do not connect the power supply or power up the product until it is confirmed that the workpiece can be moved safely within the area that can be reached by the workpiece.**
   Otherwise, the movement of the workpiece may cause an accident.
7. **Do not touch the product when it is energized and for some time after the power has been disconnected, as it is very hot.**
   Otherwise, it may cause burns due to the high temperature.
8. **Check the voltage using a tester at least 5 minutes after power-off when performing installation, wiring and maintenance.**
   Otherwise, electric shock, fire or injury can result.

Handling

⚠Warning

9. **Static electricity may cause a malfunction or damage the driver. Do not touch the driver while power is supplied to it.**
   Take sufficient safety measures to eliminate static electricity when it is necessary to touch the driver for maintenance.
10. **Do not use the products in an area where they could be exposed to dust, metallic powder, machining chips or splashes of water, oil or chemicals.**
    Otherwise, a failure or malfunction can result.
11. **Do not use the products in a magnetic field.**
    Otherwise, a malfunction or failure can result.
12. **Do not use the products in an environment where flammable, explosive or corrosive gases, liquids or other substances are present.**
    Otherwise, fire, explosion or corrosion can result.
13. **Avoid heat radiation from strong heat sources, such as direct sunlight or a hot furnace.**
    Otherwise, it will cause a failure to the driver or its peripheral devices.
14. **Do not use the products in an environment with cyclic temperature changes.**
    Otherwise, it will cause a failure to the driver or its peripheral devices.
15. **Do not use the products in an environment where surges are generated.**
    Devices (solenoid type lifters, high frequency induction furnaces, motors, etc.) that generate a large amount of surge around the product may lead to deterioration or damage to the internal circuits of the products. Avoid supplies of surge generation and crossed lines.
16. **Do not install these products in a place subject to vibration and impact.**
    Otherwise, a malfunction or failure can result.
17. **When a surge generating load such as a relay or solenoid valve is directly driven, use a product that incorporates a surge absorption element.**

Mounting

⚠Warning

1. **Install the driver and its peripheral devices on fireproof material.**
   Direct installation on or near flammable material may cause fire.
2. **Do not install these products in a place subject to vibration and impact.**
   Otherwise, a malfunction or failure can result.
3. **The driver should be mounted on a vertical wall in a vertical direction.**
   Also, do not cover the driver's suction/exhaust ports.
4. **Install the driver and its peripheral devices on a flat surface.**
   If the mounting surface is not flat or uneven, excessive force may be applied to the housing and other parts resulting in a malfunction.

Series LECS□
Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

Power Supply

⚠Caution

1. **Use a power supply with low noise between lines and between power and ground.**
   In cases where noise is high, use an isolation transformer.
2. **Take appropriate measures to prevent surges from lightning. Ground the surge absorber for lightning separately from the grounding of the driver and its peripheral devices.**

Wiring

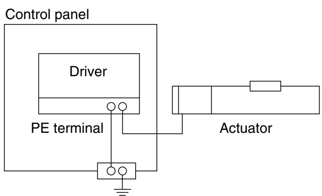
⚠Warning

1. **The driver will be damaged if a commercial power supply (100V/200V) is added to the driver's servo motor power (U, V, W). Be sure to check wiring such as wiring mistakes when the power supply is turned on.**
2. **Connect the ends of the U, V, W wires from the motor cable correctly to the phases (U, V, W) of the servo motor power. If these wires do not match up, it is unable to control the servo motor.**

Grounding

⚠Warning

1. **For grounding actuator, connect the copper wire of the actuator to the driver's protective earth (PE) terminal and connect the copper wire of the driver to the earth via the control panel's protective earth (PE) terminal.**
   Do not connect them directly to the control panel's protective earth (PE) terminal.



2. **In the unlikely event that malfunction is caused by the ground, it may be disconnected.**

Maintenance

⚠Warning

1. **Perform maintenance checks periodically.**
   Confirm wiring and screws are not loose.
   Loose screws or wires may cause unexpected malfunction.
2. **Conduct an appropriate functional inspection and test after completed maintenance.**
   In case of any abnormalities (if the actuator does not move or the equipment does not operate properly, etc.), stop the operation of the system.
   Otherwise, unexpected malfunction may occur and safety cannot be assured.
   Conduct a test of the emergency stop to confirm the safety of the equipment.
3. **Do not disassemble, modify or repair the driver or its peripheral devices.**
4. **Do not put anything conductive or flammable inside the driver.**
   Otherwise, fire can result.
5. **Do not conduct an insulation resistance test or insulation withstand voltage test.**
6. **Reserve sufficient space for maintenance.**
   Design the system so that it allows required space for maintenance.

Card Motor
Series LAT3

CE
RoHS

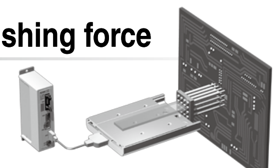
The transportation, pushing and length measurement systems have been miniaturized through the use of a linear motor.

Weight
130 g
Stroke: 10 mm

Thickness
9 mm

Maximum pushing force
6 N

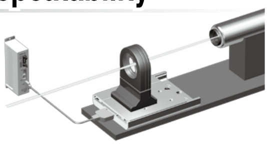
Pushing a miniature load



Example) Pushing a probe pin

Positioning repeatability
±5 µm

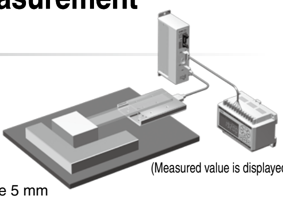
Positioning a workpiece



Example) Lens focusing

Pushing measurement accuracy
±10 µm

Parts measurement

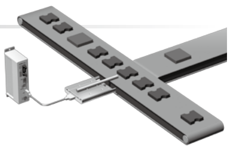


(Measured value is displayed)

Load mass 100 g, Stroke 5 mm

Maximum operating frequency
500 cpm

Rejection of non-conforming products, etc.



Linear guide

Linear motor

Displacement sensor

3 functions in 1 unit

- Easy programming (Cycle time entry)

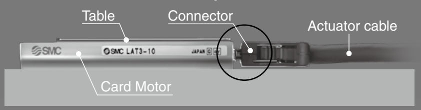
Just input 3 parameters: Positioning time, Target position, Load mass.

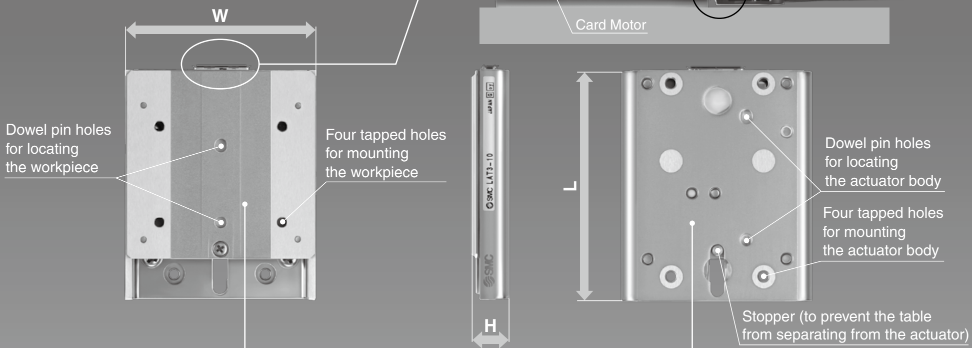
Compact and lightweight

Model	W (mm)	L (mm)	H (mm)	Weight (g)
LAT3□-10	50	60	9	130
LAT3□-20		90		190
LAT3□-30		120		250

Cable Mounting

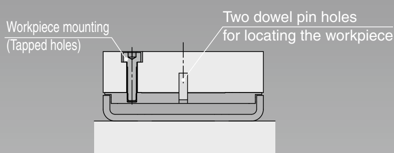
The cable connector does not protrude above the actuator.





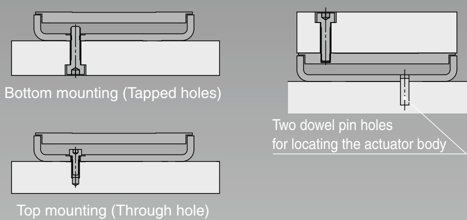
Workpiece Mounting

The table is provided with dowel pin holes for locating the workpiece as standard equipment.



Body Mounting

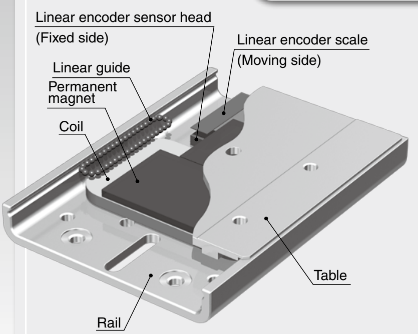
2 body mounting options



Series Variations

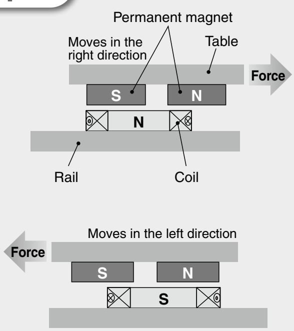
Model	Stroke	Sensor (Optical linear encoder)	Linear motor	Linear guide	Pushing	Positioning repeatability	Pushing measurement	Maximum load mass		Maximum speed
		Resolution	Type	Type	Maximum instantaneous thrust	Accuracy	Accuracy	Horizontal	Vertical	
LAT3F	10	1.25 µm	Moving magnetic type linear motor	Linear guide with circulating balls	5.2 N	±5 µm	±10 µm	500 g	100 g	400 mm/s
LAT3	20	30 µm			6 N	±90 µm	±100 µm			
	30				5.5 N				50 g	

Structure and Working Principle



The permanent magnet is mounted on the bottom side of the table, and the coil is mounted on the top surface of the rail. When current is supplied to the coil, a north pole (N) is generated in the middle of the top surface of the coil. This north pole attracts the south pole (S) of the permanent magnet on the left and repels the north pole on the right, and these attracting and repelling forces generate the thrust force. Therefore, thrust force is applied to the table in the right direction, and the table moves to the right.

When current is applied to the coil in the reverse direction, a south pole will be generated in the middle of the top surface of the coil. Similarly, a thrust force will be applied to the table in the left direction, and the table moves to the left.

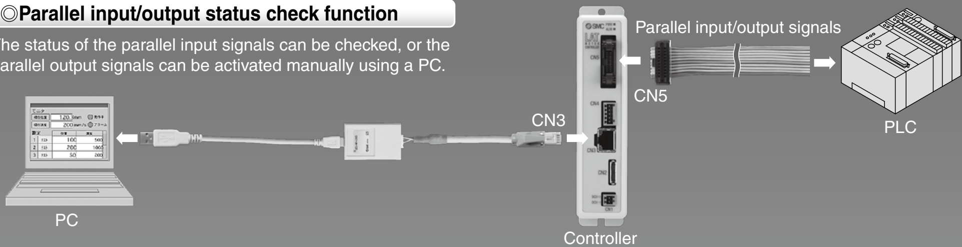


Start-up time is reduced greatly with a system that is ready-to-use and easy to set up.

The functions described below makes the start-up quick and easy.

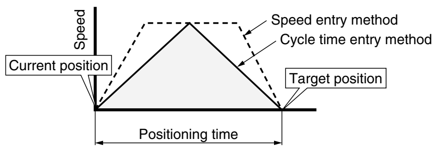
◎Parallel input/output status check function

The status of the parallel input signals can be checked, or the parallel output signals can be activated manually using a PC.



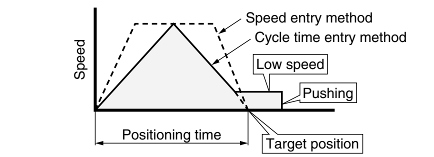
◎Built-in operation patterns

Positioning operation (Absolute • Relative)



Absolute: The table moves to the target position with reference to the origin position and stops there.
Relative: The table moves to the target position with reference to the current position and stops there.

Pushing operation (Absolute • Relative)



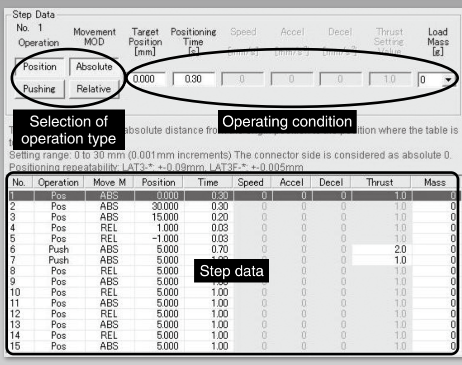
The table moves to a position close to the target position, decelerates to low speed and starts pushing after the table has come in contact with the workpiece.

◎Cycle time entry method

Only target position and positioning time need to be entered, so there is no need to enter the speed, acceleration and deceleration.
(Using the speed entry method allows you to enter the speed.)

◎Step data input

The Card Motor operation type and condition are preset in the step data. The Card Motor is operated according to the contents of the selected preset step data number.



No.	Operation	Move M	Position	Time	Speed	Accel	Decel	Thrust	Mass
1	Pos	ABS	0.000	0.30	0	0	0	1.0	0
2	Pos	ABS	30.000	0.30	0	0	0	1.0	0
3	Pos	ABS	15.000	0.20	0	0	0	1.0	0
4	Pos	REL	1.000	0.03	0	0	0	1.0	0
5	Pos	REL	−1.000	0.03	0	0	0	1.0	0
6	Push	ABS	5.000	0.70	0	0	0	2.0	0
7	Push	ABS	5.000	[illegible]	0	0	0	1.0	0
8	Pos	REL	5.000	[illegible]	[illegible]	0	0	1.0	0
9	Pos	ABS	5.000	[illegible]	0	0	0	1.0	0
10	Pos	REL	5.000	1.00	0	0	0	1.0	0
11	Pos	ABS	5.000	1.00	0	0	0	1.0	0
12	Pos	REL	5.000	1.00	0	0	0	1.0	0
13	Pos	ABS	5.000	1.00	0	0	0	1.0	0
14	Pos	REL	5.000	1.00	0	0	0	1.0	0
15	Pos	ABS	5.000	1.00	0	0	0	1.0	0

Function for measuring and differentiation of workpieces

The size of the workpiece can be measured based on the table stopping position by driving the table until it comes into contact with the workpiece.
The workpieces can be differentiated or checked for quality using parallel output signals that correspond to preset table position ranges.
Furthermore, using the multi-counter (optional accessory: refer to page 459) makes it possible to display the table position and output up to 31 preset points.

Series LAT3
Model Selection 1

Selection Procedure for Positioning Operation (Refer to pages 444 and 445 for Fig.1, 2, 3, 4, 5 and Table 1, 2, 3.)

Selection Procedure	Formula/Data	Selection Example

❶ Operating conditions

Selection Procedure

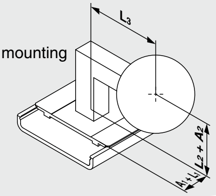
List the operating conditions with consideration to the mounting orientation and shape of the workpiece.

Formula/Data

- Stroke St [mm]
- Load mass W [g]
- Mounting orientation
- Mounting angle θ [°] Fig.2
- Amount of overhang Ln [mm] Fig.1
- Correction values for the distances to the moment center An [mm] Fig.1 Table 1
- Positioning time Tp [ms]
- Positioning repeatability [µm]

Selection Example

15 mm
200 g
Horizontal table mounting
θ = 0°
L_1 = –10 mm
L_2 = 30 mm
L_3 = 35 mm
Tp = 200 ms
100 µm



❷ Select an actuator temporarily.

Selection Procedure

Select a model temporarily based on the required positioning repeatability and stroke.

Formula/Data

Table 2

Selection Example

From Table 2, temporarily select the **LAT3-20**, which satisfies the positioning repeatability 100 µm and the minimum stroke that satisfies the stroke St = 15

Model	LAT3-10	LAT3F-10	LAT3-20	LAT3F-20	LAT3-30	LAT3F-30
Stroke [mm]	10		20		30	
Positioning repeatability [µm]	±90	±5	±90	±5	±90	±5

❸ Check the load mass and load factor.

Selection Procedure

Find the allowable load mass Wmax [g] from the graph.

∗Confirm that the applied load mass W [g] does not exceed the allowable load mass.

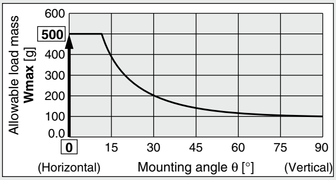
Formula/Data

Wmax Fig.2

W ≤ Wmax

Selection Example

From Fig. 2: θ = 0, find Wmax = 500
As W = 200 < Wmax = 500, the selected model can be used.



Selection Procedure

From Table 1, find the correction values for the distances to the moment center. Calculate the static moment M [N·m].
From Table 3, find the allowable moment Mmax [N·m]. Calculate the load factor αn for the static moments.

∗Confirm that the total sum of the guide load factors for the static moments does not exceed 1.

Formula/Data

An Table 1

M = W/1000 · 9.8 (Ln + An)/1000

Mmax Table 3

α = M/Mmax

$\Sigma\alpha p + \alpha y + \alpha r \leq 1$

Selection Example

From Table 1, A_1 = 32.5

Pitch moment

Mp = 200/1000 x 9.8 (–10 + 32.5)/1000
= 0.044
From Table 3, Mpmax = 0.3
αp = 0.044/0.3 = 0.15

Roll moment

Mr = 200/1000 x 9.8 x 35/1000
= 0.069
From Table 3, Mrmax = 0.2
αr = 0.069/0.2
= 0.35
$\Sigma\alpha$n = 0.15 + 0.35
= 0.5 ≤ 1, thus, the selected model can be used.

❹ Check the positioning time.

Selection Procedure

Find the shortest positioning time Tmin [ms] from the graph.

∗Confirm that the positioning time Tp [ms] is longer than the shortest positioning time.

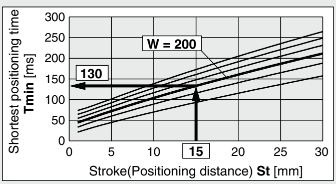
Formula/Data

Tmin Fig.3

Tp ≥ Tmin

Selection Example

From Fig. 3: St = 15 and W = 200, find Tmin = 130
As Tp = 200 ≥ Tmin = 130, the selected model can be used.



Selection Procedure for Pushing Operation

Selection Procedure	Formula/Data	Selection Example

❶ Operating conditions

Selection Procedure: List the operating conditions with consideration to the mounting orientation and shape of the workpiece.

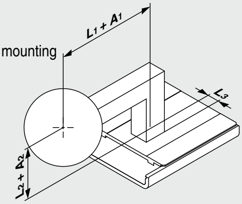
∗When operating the product in a vertical direction, consider the effect of the table weight on the Card Motor (See Table 2) and the weight of the workpiece to find out the pushing force of the Card Motor.

Formula/Data:

- Stroke St [mm]
- Load mass W [g]
- Mounting orientation
- Mounting angle θ [°]
- Amount of overhang (L1, L2, L3) [mm] **Fig.1**
- Correction values for the distances to the moment center An [mm] **Fig.1** **Table 1**
- Measuring accuracy [µm]
- Positioning time Tp [ms]
- Pushing force F [N]
- Pushing position [mm]
- Pushing direction
- Positioning time + Pushing time Ta [s]
- Cycle time Tb [s]

Selection Example:

8 mm
50 g
Horizontal table mounting
$\theta = 0°$
L1 = 30 mm
L2 = 10 mm
L3 = 0 mm
10 µm
Tp = 150 ms
4 N
4 mm
Pushing direction away from the connector
4 s
10 s



❷ Select an actuator temporarily.

Selection Procedure: Select a model temporarily based on the required measuring accuracy and stroke.

Formula/Data: **Table 2**

Model	LAT3-10	LAT3F-10	LAT3-20	LAT3F-20	LAT3-30	LAT3F-30
Stroke [mm]	10		20		30	
Measuring accuracy [µm]	30	1.25	30	1.25	30	1.25

Selection Example: From Table 2, temporarily select the **LAT3F-10**, which satisfies the measuring accuracy 10 µm and the minimum stroke that satisfies the stroke St = 8

❸ Check the load mass and moment.

Selection Procedure: Find the allowable load mass Wmax [g] from the graph.

∗Confirm that the applied load mass W [g] does not exceed the allowable load mass.

From Table 1, find the correction values for the distances to the moment center. Calculate the static moment M [N·m].

From Table 3, find the allowable moment Mmax [N·m]. Calculate the load factor αn for the static moments.

∗Confirm that the total sum of the guide load factors for the static moments does not exceed 1.

Formula/Data:

Wmax **Fig.2**

$W \leq Wmax$

An **Table 1**

$M = W/1000 \cdot 9.8\ (Ln + An)/1000$

Mmax **Table 3**

$\alpha = M/Mmax$

$\Sigma\alpha p + \alpha y + \alpha r \leq 1$

Selection Example:

From Fig. 2: $\theta = 0$, find Wmax = 500

As W = 50 < Wmax = 500, the selected model can be used.

From Table 1, $A_1 = 22.5$

Pitch moment

Mp = 50/1000 x 9.8 (30 + 22.5)/1000
= 0.026

From Table 3, Mpmax = 0.2

$\alpha p = 0.026/0.2$
= 0.13

$\Sigma\alpha n = 0.13 \leq 1$, thus, the selected model can be used.

❹ Check the positioning time.

Selection Procedure: Find the shortest positioning time Tmin [ms] from the graph.

∗Confirm that the positioning time Tp [ms] is longer than the minimum positioning time.

Formula/Data:

Tmin **Fig.3**

$Tp \geq Tmin$

Selection Example:

From Fig. 3: St = 8 and W = 50, find Tmin = 100

As Tp = 150 ≥ Tmin = 100, the selected model can be used.

❺ Check the pushing force.

Selection Procedure: Calculate the duty ratio [%].

Find the allowable thrust setting value from the graph.

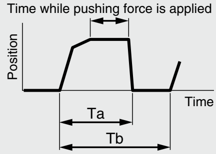
From Fig. 5, find the allowable pushing force Fmax [N] generated at the required pushing position and for the allowable thrust setting value.

Confirm that the pushing force F [N] does not exceed the allowable pushing force.

Formula/Data:

Duty ratio = Ta/Tb x 100 **Fig.4**

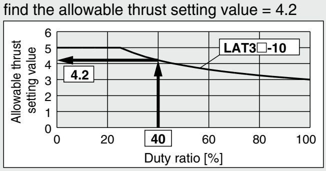
$F \leq Fmax$



Selection Example:

Duty ratio = 4/10 x 100 = 40%

From Fig. 4: **LAT3□-10** and 40% duty ratio, find the allowable thrust setting value = 4.2



From Fig. 5: **LAT3□-10**, pushing direction away from the connector at pushing position 4 mm, find Fmax = 4.5

As F = 4 ≤ Fmax = 4.5, the selected model can be used.

Model Selection 2

Selection

⚠Caution

1. **The temperature increase of the Card Motor varies depending on the duty ratio and the heat dissipation properties of the base it is mounted onto. If the temperature of the Card Motor becomes high, reduce the duty ratio by increasing the cycle time, or improve the heat transfer properties of the mounting base and the surroundings.**
2. **The pushing force generated by the Card Motor varies in relation to the thrust setting value depending on the pushing position and the pushing direction. Refer to Fig. 5 for details.**

Fig. 1 Amount of Overhang: Ln [mm], Correction Value for the Distances to the Moment Center: An [mm]

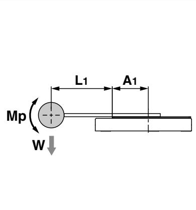
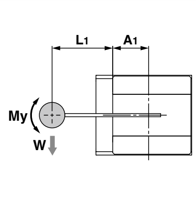
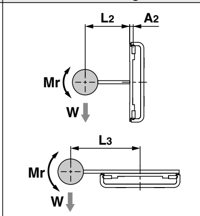
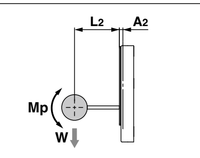
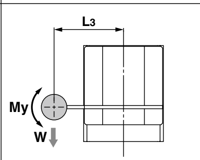
Mounting orientation	**Mp**: Pitching	**My**: Yawing	**Mr**: Rolling
Horizontal			
Vertical			—

Table 1 Correction Value for the Distances to the Moment Center: An [mm]

Model	A_1	A_2
LAT3□-10	22.5	2.2
LAT3□-20	32.5	2.2
LAT3□-30	42.5	2.2

Fig. 2 Allowable Load Mass: Wmax [g]

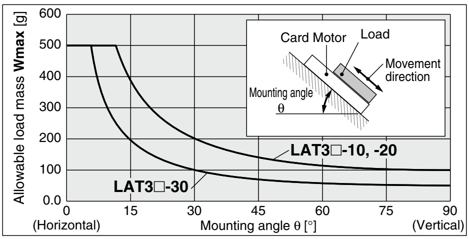
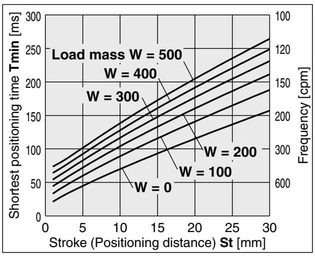


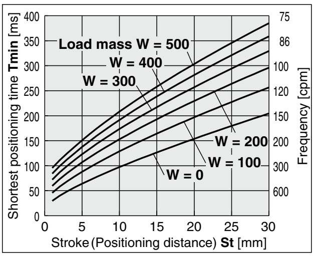
Fig. 3 Shortest Positioning Time: Tmin [ms] (These are only reference values.)

LAT3-□



Operating conditions
Model: **LAT3-□**
Mounting orientation: Horizontal/Vertical
Step data input version: Cycle time entry method (Triangular movement profile)

LAT3F-□



Operating conditions
Model: **LAT3F-□**
Mounting orientation: Horizontal/Vertical
Step data input version: Cycle time entry method (Triangular movement profile)

Fig. 4 Allowable Thrust Setting Value

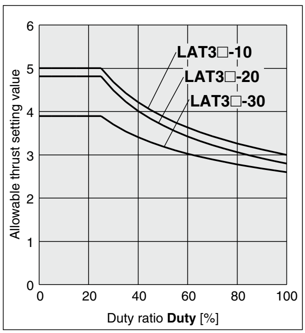
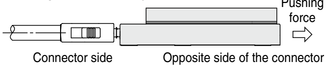


Fig.5 Pushing force: F [N] characteristics (Reference)

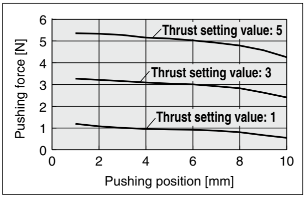
Pushing direction away from the connector



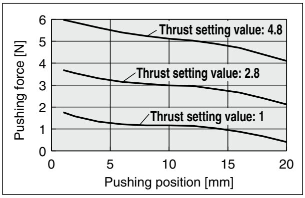
Operating conditions
Mounting orientation: Horizontal table mounting
Thrust setting value: Minimum, continuous, instantaneous maximum of each model.

Table start position: Retracted end (Connector side)
Pushing direction: Away from the connector
Pushing position: Positioning distance from the connector side, retracted end

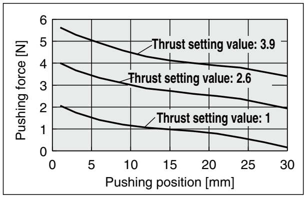
LAT3□-10



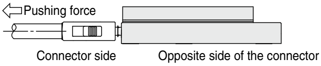
LAT3□-20



LAT3□-30



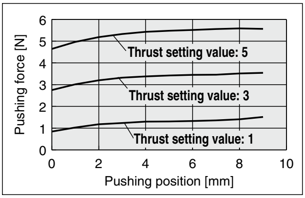
Pushing direction toward the connector



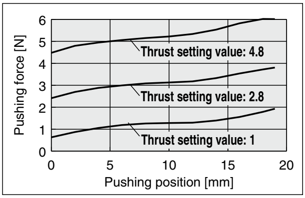
Operating conditions
Mounting orientation: Horizontal table mounting
Thrust setting value: Minimum, continuous, instantaneous maximum of each model.

Table start position: Extended end (Opposite side of the connector)
Pushing force direction: Toward the connector
Pushing position: Positioning distance from the connector side, retracted end

LAT3□-10



LAT3□-20



LAT3□-30

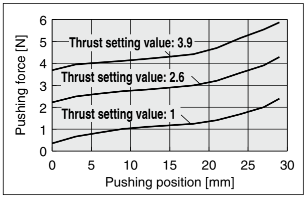


Table Displacement (Reference)

Displacement through the entire stroke when a load is applied to the point indicated by the arrow

Table displacement due to pitch moment load

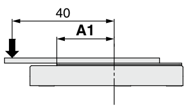


Table displacement due to yaw moment load

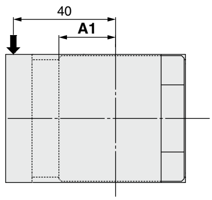
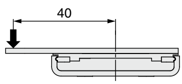
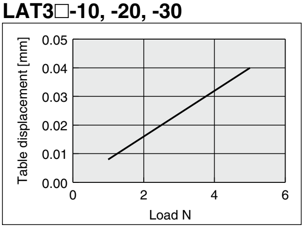


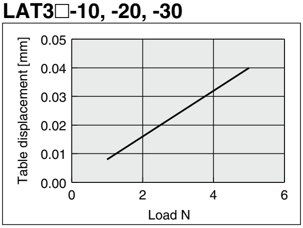
Table displacement due to roll moment load



LAT3□-10, -20, -30



LAT3□-10, -20, -30



LAT3□-10, -20, -30

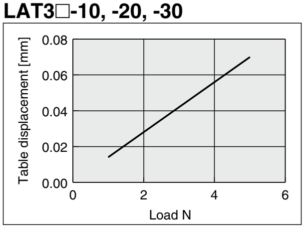


Table 2 Stroke: St [mm], Positioning Repeatability [μm], Measuring Accuracy [μm], Table Weight [g]

Model	LAT3-10	LAT3F-10	LAT3-20	LAT3F-20	LAT3-30	LAT3F-30
Stroke [mm]	10		20		30	
Positioning repeatability [μm]	±90	±5	±90	±5	±90	±5
Measuring accuracy [μm]	30	1.25	30	1.25	30	1.25
Table weight [g]	50		70		90	

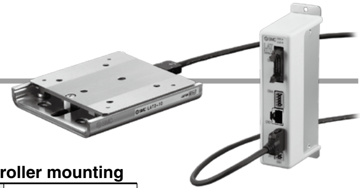
Table 3 Allowable Moment: Mmax [N·m]

Model	Pitch moment/Yaw moment **Mpmax, Mymax**	Roll moment **Mrmax**
LAT3□-10	0.2	0.2
LAT3□-20	0.3	0.2
LAT3□-30	0.4	0.2

Card Motor

Series LAT3

RoHS



How to Order

LAT3 [ ] - 10 - 1 N 1 D

Sensor resolution

Nil	30 µm
F	1.25 µm

Stroke

10	10 mm
20	20 mm
30	30 mm

Actuator cable length

Nil	Without cable
1	1 m
3	3 m
5	5 m

Controller Note 1)

Nil	Without controller
N	With controller (NPN)
P	With controller (PNP)

I/O cable length Note 2)

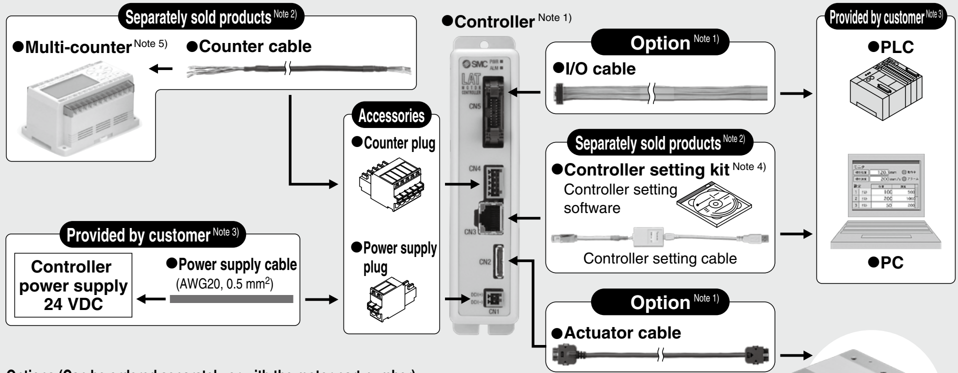
Nil	Without cable
1	1 m
3	3 m
5	5 m

Controller mounting

Nil	Screw mounting
D Note 3)	DIN rail mounting

Note 1) Refer to page 448 for detailed specifications of the controller.
Note 2) If "Without controller" has been selected, the I/O cable is also not included.
Therefore it is not possible to select the I/O cable for this option.
If the I/O cable is required, please order separately. (Refer to page 458, "[I/O cable]" for details.)
Note 3) The DIN rail is not included. If the DIN rail is required, please order separately. (Refer to page 449, "DIN rail" and "DIN rail mounting adapter" for details.)

System Construction




●Card Motor

Options (Can be ordered separately or with the motor part number)

No.	Description	Part no.	Remarks
1	Controller	LATC4-□□□	For details, refer to page 448.
2	Actuator cable	LATH1-□	For details, refer to page 458.
3	I/O cable	LATH2-□	For details, refer to page 458.

Accessories (Supplied with the controller attached to it)

No.	Description	Remarks
1	Power supply plug	For the controller power supply
2	Counter plug	For the multi-counter

Separately Sold Products

No.	Description	Part no.	Remarks
1	Multi-counter	CEU5□□-□	For details, refer to page 459.
2	Counter cable	LATH3-□	For details, refer to page 458.
3	Controller setting kit (Controller setting cable is included.)	LATC-W1	For details, refer to page 459.

Note 1) It is possible to include options such as controllers and cables in the "How to Order" for the Card Motor. Refer to "How to Order" on this page for details.
Note 2) It is not possible to include separately sold products in the "How to Order" for the Card Motor. Refer to pages 458 and 459, and order separately.
Note 3) Power supply, power supply cables, PLC and PCs should be prepared by the customer.
Note 4) These items are used to set the actuator parameters and the operating conditions to the controller and to perform test operations.
Note 5) These items are used to display the table position and to signal active pre-set positions to external devices via digital outputs when measuring the length.

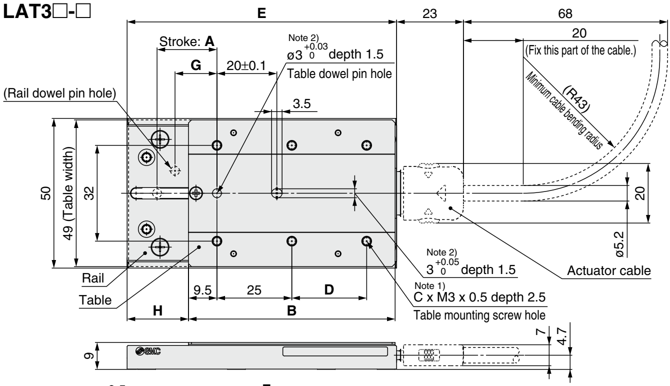
Specifications

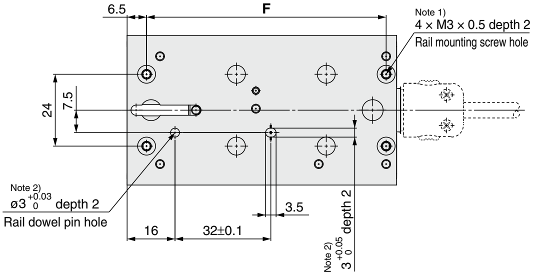
Model		LAT3-10	LAT3F-10	LAT3-20	LAT3F-20	LAT3-30	LAT3F-30
Stroke (mm)		10		20		30	
Motor	Type	Moving magnet type linear motor					
	Maximum instantaneous thrust (N) Note 1)2)3)	5.2		6		5.5	
	Continuous thrust (N) Note 1) 2) 3)	3		2.8		2.6	
Guide	Type	Linear guide with circulating balls					
	Maximum load mass (g)	Horizontal: 500, Vertical: 100				Horizontal: 500, Vertical: 50	
Sensor	Type	Optical linear encoder (incremental)					
	Resolution (μm)	30	1.25	30	1.25	30	1.25
	Origin position signal	None	Provided	None	Provided	None	Provided
Pushing operation	Pushing speed (mm/s)	6					
	Thrust setting value Note 1)2)3)	1 to 5		1 to 4.8		1 to 3.9	
Positioning operation	Positioning repeatability (μm) Note 4)5)	±90	±5	±90	±5	±90	±5
Measurement	Accuracy (μm) Note 4)5)	±100	±10	±100	±10	±100	±10
Maximum speed (mm/s) Note 6)		400					
Operating temperature range (°C)		5 to 40 (No condensation)					
Operating humidity range (%)		35 to 85 (No condensation)					
Weight (g) Note 7)		130		190		250	
Table weight (g)		50		70		90	

Note 1) Continuous thrust can be generated and maintained continuously. Maximum instantaneous thrust is the maximum peak thrust that can be generated. Refer to **Fig. 4** Allowable thrust setting value (Page 444) and to **Fig. 5** Pushing force characteristics (Page 445).
Note 2) When mounted on a base with good heat dissipating capacity at 20°C ambient temperature.
Note 3) The pushing force varies depending on the operating environment, pushing direction and table position. Refer to **Fig. 5** Pushing force characteristics (Page 445).
Note 4) When the temperature of the Card Motor is 20°C.
Note 5) The accuracy after mounting the Card Motor may vary depending on the mounting conditions, operating conditions and environment, so please calibrate it with the equipment used in your application.
Note 6) The maximum speed varies depending on the operating conditions (load mass, positioning distance).
Note 7) The weight of the Card Motor itself. Controllers and cables are not included.

Dimensions

LAT3□-□





Note 1) Refer to page 461 regarding Specific Product Precautions for the mounting screws.
Note 2) The length of the part of the dowel pin inserted into the positioning hole should be shorter than the specified depth.
Note 3) This drawing shows the origin position.
Note 4) The origin positions G and H are reference dimensions (guide). Refer to page 456 for details on the origin position.

(mm)

Model	Stroke	Table dimensions			Rail dimensions		Origin position Note 4)	
	A	B	C	D	E	F	G	H
LAT3□-10	10	49	4	—	60	50	4	10.5
LAT3□-20	20	69	6	25	90	80	14	20.5
LAT3□-30	30	89	6	25	120	110	24	30.5

Card Motor Controller

Series LATC4 CE RoHS

How to Order

LATC4 – N □ □

Controller for the Card Motor

Parallel I/O type

N	NPN
P	PNP

I/O cable length Note 1)

Nil	Without cable
1	1 m
3	3 m
5	5 m

Option

Nil	Screw mounting
D Note 2)	DIN rail mounting

Note 1) The actuator cable, the counter cable and the controller setting cable are not supplied with the controller. Refer to pages 458 and 459 for options.
Note 2) The DIN rail is not included. If the DIN rail is required, please order separately. (Refer to page 449.)

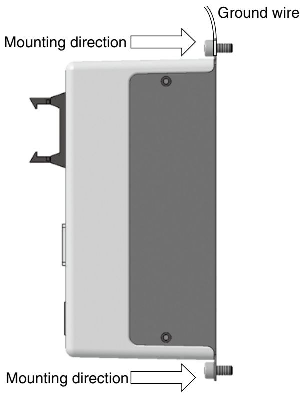
Specifications

Item	LATC4
Setting method	Step data input type
Compatible actuator	Card Motor series LAT3
Number of axis	1 axis
Power supply Note 1)	Power supply voltage: 24 VDC ±10%, Current consumption: Rated 2 A (Peak 3 A) Note 2), Power consumption: 48 W (Maximum 72 W) Note 2)
Control system	Closed loop
Movement modes	Positioning operation, Pushing operation
Number of step data	15 (Absolute or relative)
Parallel input	6 inputs (Optically isolated)
Parallel output	4 outputs (Optically isolated, open collector output)
Step data	15 points
Position display output Note 3)	A-phase and B-phase pulse signals, RESET signal (NPN open collector output)
LED indicator	2 LED's (Green and Red)
Cooling method	Natural air-cooling
Operating temperature range	5 to 40°C (No condensation)
Operating humidity range	35 to 85% (No condensation)
Insulation resistance	Between case and FG: 50 MΩ (500 VDC)
Weight Note 4)	Screw mounting: 130 g, DIN rail mounting: 150 g
Controller setting software for PC Note 5)	LATC-W1

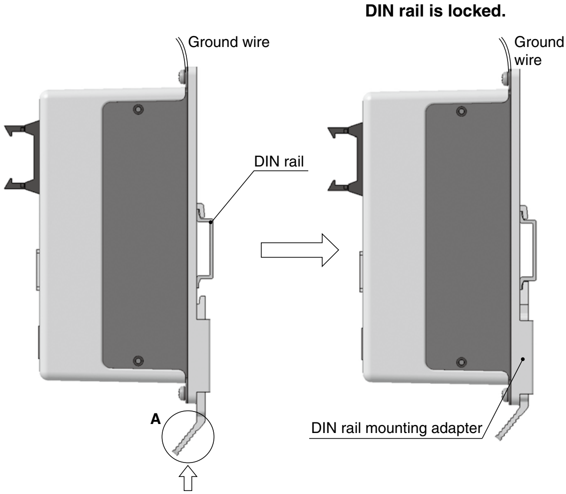
Note 1) Do not use a power supply of "inrush current limited" type for the controller.
Note 2) Rated current: Current consumption when continuous thrust is generated. Peak current: Current consumption when maximum instantaneous thrust is generated.
Note 3) Specification for the connection of the separately sold multi-counter (CEU5).
Note 4) Cables are not included.
Note 5) This setting software is not supplied with the controller. Order it separately (Refer to page 459 for details).

How to Mount

a) Screw mounting (LATC4-□□)
(Installation with two M4 screws)



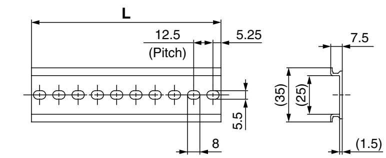
b) DIN rail mounting (LATC4-□□D)
(Installation with the DIN rail)



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

DIN rail
AXT100-DR-□

∗For □, enter a number from the "No." line in the table below.
Refer to the dimensions on page 450 for the mounting dimensions.



L Dimension

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

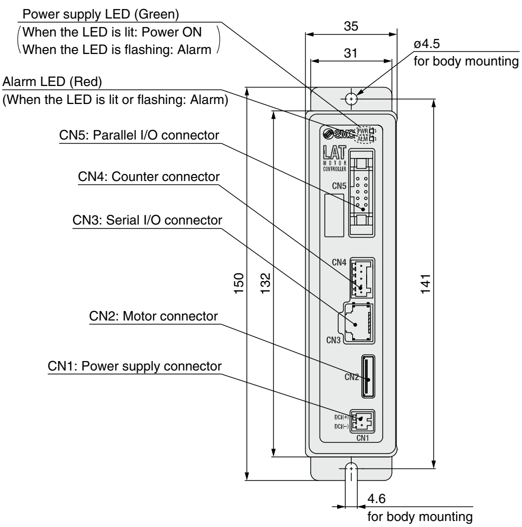
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5	498	510.5

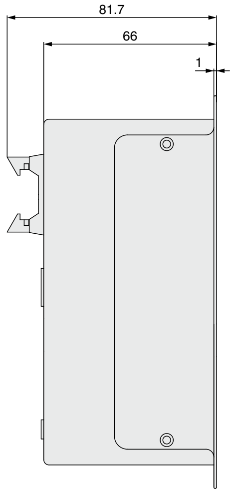
DIN rail mounting adapter
LEC-D0 (with 2 mounting screws)

The DIN rail mounting adapter can be retrofitted onto a screw mounting type controller.

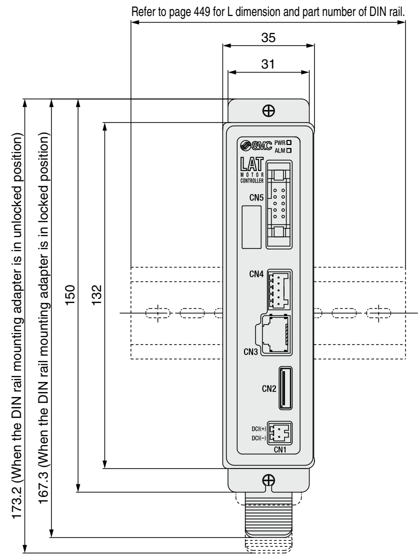
Dimensions

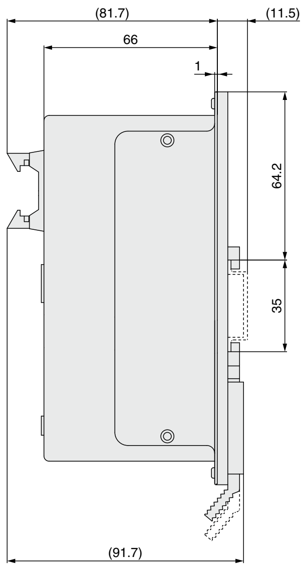
a) Screw mounting (LATC4-□□)





b) DIN rail mounting (LATC4-□□D)





Note) When two or more controllers are used, the space between the controllers should be 10 mm or more.

Wiring Example

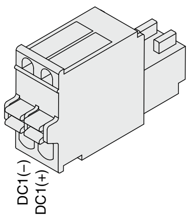
Power Supply Connector: CN1

∗The power supply plug is an accessory (supplied with the controller).
Use an AWG20 (0.5 mm²) cable for connecting the power supply plug to a 24 VDC power supply.

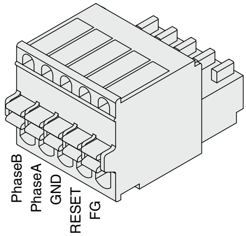
Power Supply Connector Terminal

Terminal name	Function	Details
DC1 (–)	Power supply (–)	The negative (–) power supply terminal to the controller. Power (–) is also supplied to the Card Motor via the internal circuit of the controller and actuator cable.
DC1 (+)	Power supply (+)	The positive (+) power supply terminal to the controller. Power (+) is also supplied to the Card Motor via the internal circuit of the controller and actuator cable.

Power supply plug



Counter plug



Counter Connector: CN4

∗The counter plug is an accessory (supplied with the controller).
∗Use the counter cable (LATH3-□) for connecting the counter to the counter plug.

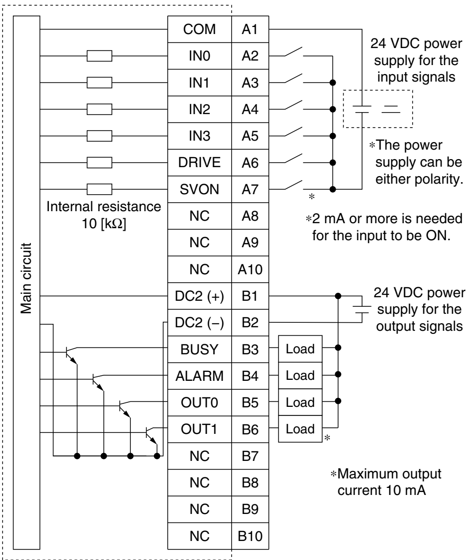
Counter Connector Terminal

Name	Details	Cable color
PhaseB	Connect to the phase B wire of the counter cable.	White
PhaseA	Connect to the phase A wire of the counter cable.	Red
GND	Connect to the GND wire of the counter cable.	Light gray
RESET	Connect to the Reset wire of the counter cable.	Yellow
FG	Connect to the FG wire of the counter cable.	Green

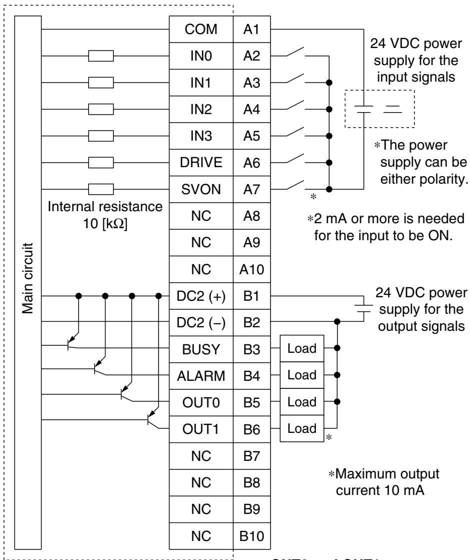
Parallel I/O Connector: CN5

∗Use the I/O cable (LATH2-□) to connect a PLC, etc., to the CN5 parallel I/O connector.
∗The wiring is specific to the type of parallel I/O (NPN or PNP). Please refer to the wiring diagrams below for correct wiring of NPN and PNP type controllers.

■NPN output circuit



■PNP output circuit



Input Signal

Name	Details
COM	Connect a 24 VDC power supply for the input signals. (Polarity is reversible)
IN0 to IN3	Selection of step data number specified by a Bit No. (combinations of IN0 to IN3)
DRIVE	Command to drive the motor
SVON	Command to turn the servo motor ON
NC	Not connected

Output Signal

Name	Details
DC2 (+)	Connect the 24 V power supply terminal for the output signals.
DC2 (–)	Connect the 0 V power supply terminal for the output signals.
BUSY	ON when the actuator is moving Note 1)
ALARM	OFF when an alarm has been generated Note 2)
OUT0 OUT1	Select an output function among BUSY, INP, INFP, INF, AREA A and AREA B. Note 3)
NC	Not connected

Note 1) Other output functions can also be assigned to the BUSY output.
Note 2) This output signal turns ON when power is supplied to the controller, but turns OFF in alarm condition (N.C.).
Note 3) INP is set as a default for OUT0, and INF for OUT1.

OUT0 and OUT1 optional output functions Note)

Name	Details
BUSY	ON when the actuator is moving Note 1)
INP	ON when the table is within the "INP" output range of the current "Target Position".
INFP	ON when the table is within the positioning repeatability range of the actuator for the current "Target Position".
INF	ON when the pushing force is within the "Threshold Force Value".
AREA A, AREA B	ON when the table is within the set "Area Ranges".

Note) One output function can be selected for each OUT0 and OUT1.

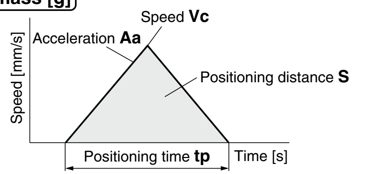
Step Data Setting Methods and Movement Profiles

There are two methods for setting the step data in the Card Motor controller as described below.

Cycle time entry method	To operate the table based on the target position and positioning time, or to operate it at high frequency. The speed, acceleration and deceleration are calculated automatically after the target position and positioning time have been set.
Speed entry method	To operate the table at a constant speed. The table moves to the set target position based on the set speed, acceleration and deceleration.

Cycle Time Entry Method (Positioning Operation)

Setting items: **Target position [mm]** **Positioning time [s]** **Load mass [g]**



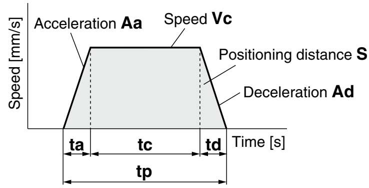
Calculate the positioning distance S [mm] between the start position and the target position. The table will move to the target position based on the set positioning time tp [s] according to a triangular movement profile as shown in the diagram on the right.

∗ It is not necessary to enter the speed, acceleration and deceleration since they are calculated automatically by the Card Motor Controller Setting Software.

The positioning time should be set longer than the shortest positioning time shown in **Fig. 3** on page 444 with consideration to the load mass during the operation. If there is overshoot or vibration, set the positioning time longer.

Speed Entry Method (Positioning Operation)

Setting items: **Target position [mm]** **Speed [mm/s]** **Acceleration [mm/s²]** **Deceleration [mm/s²]** **Load mass [g]**



Calculate the positioning distance S [mm] between the start position and the target position. The table will move to the target position based on the set speed Vc [mm/s], acceleration Aa [mm/s^2] and deceleration Ad [mm/s^2] according to a trapezoidal movement profile as shown in the diagram on the right.

Refer to the equations below for how to calculate the acceleration, constant velocity and deceleration times and distances.

Acceleration time: ta = Vc / Aa [s]

Deceleration time: td = Vc / Ad [s]

Acceleration distance: Sa = 0.5 x Aa x ta^2 [mm]

Deceleration distance: Sd = 0.5 x Ad x td^2 [mm]

Distance with constant velocity: Sc = S – Sa – Sd [mm]

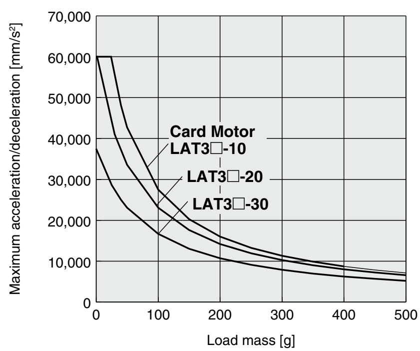
Time with constant velocity: tc = Sc / Vc [s]

Positioning time: tp = ta + tc + td [s]

(Add settling time to the positioning time to obtain the real cycle time.)

∗The settling time varies depending on the positioning distance and load mass. 0.15 seconds can be used as a reference value.

The acceleration and deceleration should be smaller than the maximum acceleration/deceleration with consideration to the load mass during the operation as specified in the diagram on the right.



> **⚠ Caution**
> If the acceleration/deceleration is low, the table may not reach the set speed due to a triangular movement profile.

Cycle Time Entry

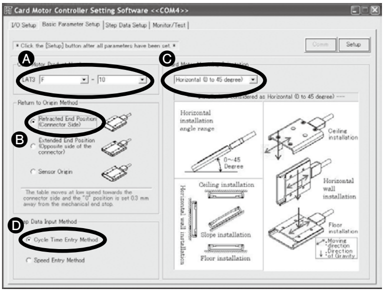
The controller automatically calculates the speed, acceleration and deceleration after the user has entered how many seconds it should take for the Card Motor table to move to the target position. Therefore, there is no need to enter the speed, acceleration and deceleration.

Cycle Time Entry Method

Step 1 Basic settings

Set each item described below and register it to the controller by clicking [Setup].

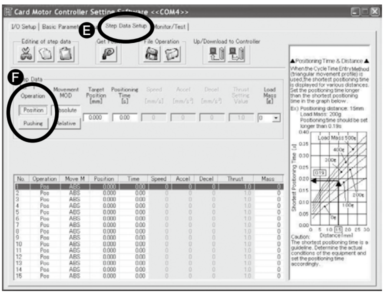
A **[Card Motor Product Number]**: Enter the product number of the connected Card Motor.
B **[Method to Return to Origin]**: Select origin method and position.
C **[Card Motor Mounting Orientation]**: Select horizontal or vertical.
D **[Step Data Input Version]**: Select cycle time entry method



Step 2 Setting of the operating conditions -Selection of operation type-

E **Select the [Step Data Setup] tab.**
F **Select "Operation" type.**

Position	For transporting a workpiece to a specific position
Pushing	For applying force to a workpiece or for measuring the size of a workpiece



Step 3 Setting of the operating conditions -Entering of the operating values-

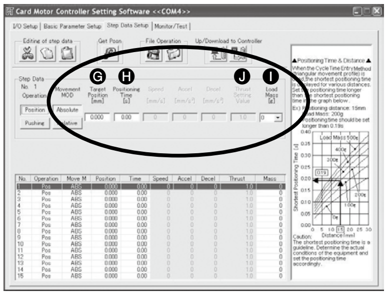
<Positioning operation>
Items to enter

G Target position [mm]	Distance from the origin position (or current position) to the target position
H Positioning time [s]	Time required to move to the target position
I Load mass [g]	Select the approximate weight of jigs or workpieces mounted on the Card Motor table.

<Pushing operation>
Items to enter

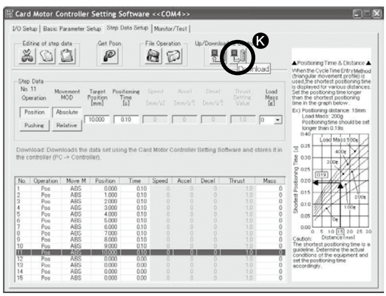
G Target position [mm]
H Positioning time [s]
I Load mass [g]

\+ J Thrust setting value
Force to be applied



Step 4 Download the completed settings

After the operating conditions have been set,
K **Click the [Download] button to complete the settings.**



∗ Refer to the operation manual for details.

LEF
LEJ
LEL
LEY LEYG
LES LESH
LEPY LEPS
LER
LEH
LECA6 LECP6
LEC-G
LECP1
LECPA
LECS□
LAT3

Operation Modes

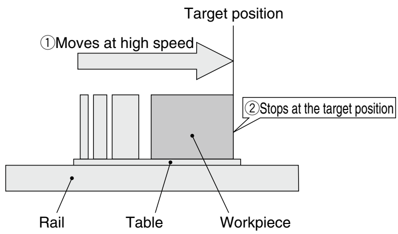
The Card Motor controller has two operation modes as described below.

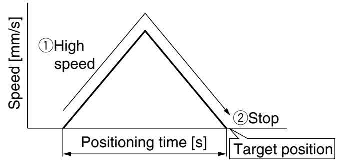
Position For transporting a workpiece to a specific position

Pushing For applying force to a workpiece or for measuring the size of a workpiece.

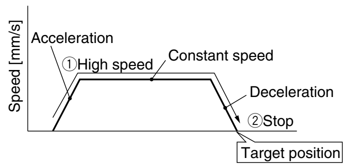
Positioning Operation

Cycle Time Entry Method: The acceleration and deceleration are automatically calculated based on the set positioning time, and the table moves according to a triangular movement profile ① and stops at the set target position ②.
Speed Entry Method: The table moves based on the set acceleration, speed and deceleration according to a trapezoidal movement profile ① and stops at the target position ②.





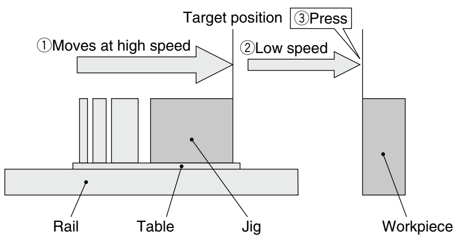
Movement profile for the Cycle Time Entry Method (Triangular)

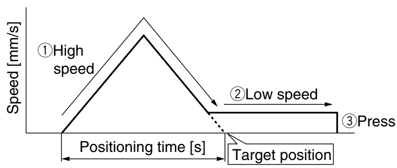


Movement profile for the Speed Entry Method (Trapezoidal)

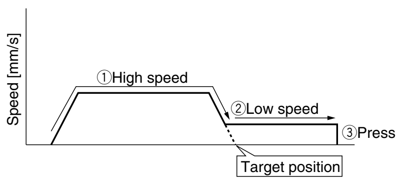
Pushing Operation

Cycle Time Entry Method: The acceleration and deceleration are automatically calculated based on the set positioning time, and the table moves according to a triangular movement profile close to the target position ①, and continues to move at low speed (6 mm/s) until it comes into contact with the workpiece ②. After the table has come into contact with the workpiece the Card Motor presses the workpiece ③.
Speed Entry Method: The table moves based on the set acceleration, speed and deceleration according to a trapezoidal movement profile close to the target position ①, and continues to move at low speed (6 mm/s) until it comes into contact with the workpiece ②. After the table has come into contact with the workpiece the Card Motor presses the workpiece ③.





Movement profile for the Cycle Time Entry Method (Triangular)



Movement profile for the Speed Entry Method (Trapezoidal)

⚠Caution

For pushing operations, set the target position at least 1 mm away from the position where the table or the pushing tool comes into contact with the workpiece. Otherwise, the table may hit the workpiece at a speed exceeding the specified 6 mm/s pushing speed, which could damage the workpiece and Card Motor.
The pushing force varies from the thrust setting value depending on the operating environment, pushing direction and table position. The thrust setting value is a nominal value. Please calibrate the thrust setting value according to the application requirements.

Length measurement, differentiation and quality judgement of workpieces is possible using the multi-counter (optional accessory: refer to page 459) and the AREA outputs of the controller.

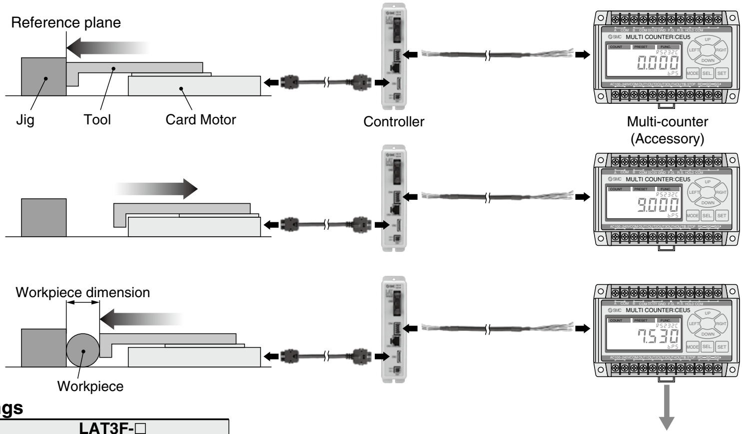
Length Measurement

The amount of table movement is detected by the sensor (encoder) built into the Card Motor for measuring the size of workpieces.

①Touch the reference plane with the tool and reset the counter.

②Return the tool.

③Touch the workpiece with the tool to measure the size of it.
(The counter displays and outputs the length.)



CEU5 multi-counter settings

Card Motor model	LAT3-□	LAT3F-□		
Encoder resolution [µm]	30	5	2.5	1.25 Note)
Connected model	MANUAL			
Multiplication factor	X4	X1	X2	X4
Value per 1 pulse	00.0300	00.0050	00.0025	0.00125
Decimal point position	**.****			*.*****
Input signal type	2PHASE			

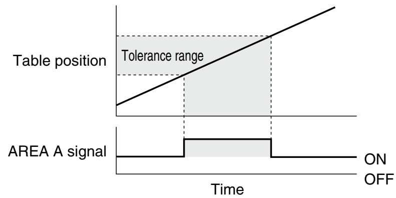
Note) The decimal numbers will not be displayed when the resolution is set to "0.00125", because the CEU5 multi-counter has a 6-digit display.

⚠Caution
The multi-counter may lose pulses when a long counter cable is used or the Card Motor is driven at high speed.

Workpiece Quality Judgement and Differentiation

The area output range preset in the controller is compared with the table position, and the AREA output signals are activated by the controller when the table is within the set range. These signals are used for quality judgement and differentiation of workpieces.

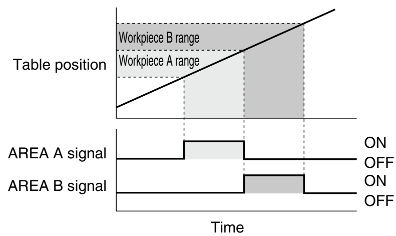
Workpiece quality judgement



Judgement results

		Judgement
AREA A signal at stop	ON	OK
	OFF	NG

Workpiece differentiation



Judgement results

		AREA B signal at stop: ON	AREA B signal at stop: OFF
AREA A signal at stop	ON	Workpiece A	—
	OFF	Workpiece B	—

It is possible to output up to 31 preset points using the multi-counter (optional accessory: refer to page 459).

Return to Origin

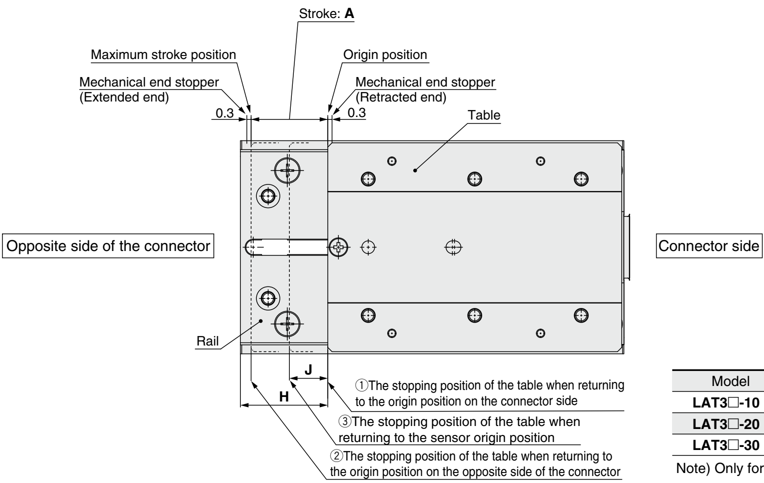
The Card Motor uses an incremental type sensor (linear encoder) to detect the position of the table. Therefore it is necessary to return the table to the origin position after the power has been turned on. There are three [Return to Origin] methods as stated below.
In any of the methods, the origin position (0) will be set at the connector side. When the table is moved away from the connector toward the opposite side, after the [Return to Origin] has been performed, the new position of the table is added in the controller (incremental positive direction).

①Retracted end position (Connector side)
The default origin position is set to the connector side [Retracted End Position].
The table is moved toward the connector side, returns 0.3 mm and the origin position (0) is set at 0.3 mm away from the mechanical end stop of the table at the connector side.
After [Return to Origin] is completed, the table stops at the origin position.

②Extended end position
An external jig is used to stop the table of the Card Motor when the [Return to Origin] is performed. The table is moved to the opposite side of the connector, returns 0.3 mm and the origin position is set at 0.3 mm away from the mechanical end stop of the table at the opposite side of the connector. After [Return to Origin] is completed, the table stops at the maximum stroke end (**A**).

③Sensor origin
This method is used to achieve high positioning repeatability accuracy of the origin position. Only the LAT3F-□, which is equipped with a origin position signal (Z-pulse) in the sensor, can be used with this method. The origin position is set based on the Z-pulse from the integrated sensor (linear encoder).
The table is moved to the Z-pulse of the integrated sensor, and the origin position of the table is set at a certain distance (**J**) away from the Z-pulse when the [Return to Origin] is performed.
After [Return to Origin] is completed, the table stops at the sensor origin signal position.

If the table is returned to the origin position by the mechanical end stopper installed in the Card Motor, the origin position will be set to the position shown below.



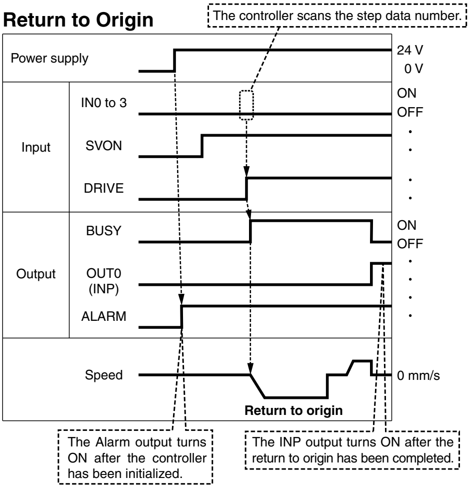
Model	A	H	J Note)
LAT3□-10	10	10.5	5
LAT3□-20	20	20.5	5
LAT3□-30	30	30.5	15

Note) Only for the LAT3F-□

⚠Caution
· The origin position varies depending on the return to origin position method. Please adjust according to the specific equipment used with this product.
· If the return to origin position is performed using an external jig or workpiece to stop the table, the origin position may be set outside of the travel range. Do not set the target position of the step data outside of the Card Motor movable range. It may damage the workpieces and the Card Motor.

Signal Timing

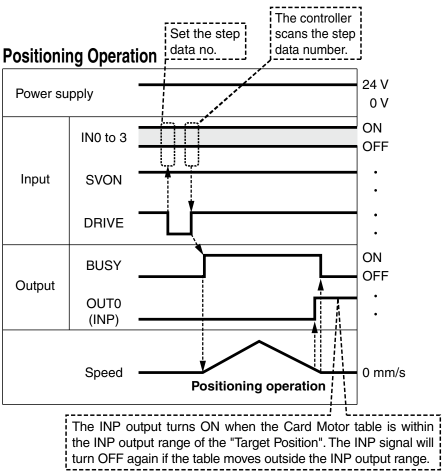
Return to Origin



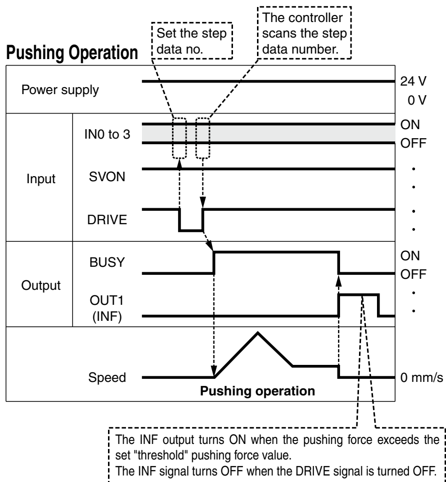
∗ "ALARM" is expressed as negative-logic circuit.

> **⚠Caution**
> - Use a 2 msec interval or more between input signals, and maintain the signal state for at least 2 msec.
> - Turn ON the SVON signal first after that the ALARM signal has turned ON after power has been supplied to the controller.
>   If the SVON signal is already ON, the operation will not start for safety reasons.
> - Keep the DRIVE signal turned ON until the next operation instruction is given except when stopped during operation.
> - When the DRIVE signal is turned OFF during pushing operation, the pushing operation is completed and this position is retained.

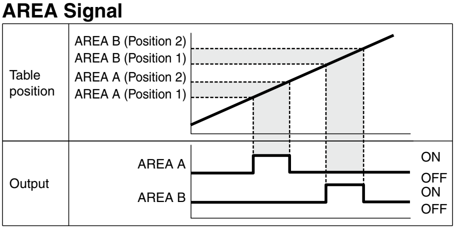
Positioning Operation



Pushing Operation

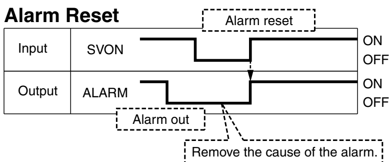


AREA Signal



∗ Select the AREA signal for the parallel output (OUT0 or OUT1).

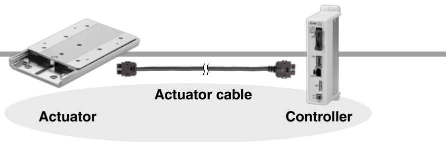
Alarm Reset



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

Options

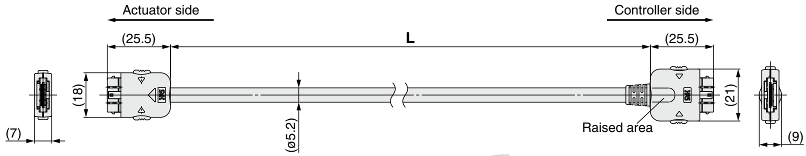
[Actuator cable]



LATH1 – 1

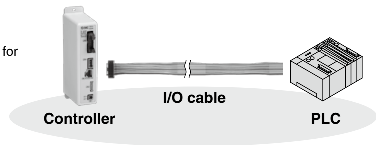
Cable length (L)

1	1 m
3	3 m
5	5 m



Note) The actuator cable is direction dependent.
Make sure to connect the Card Motor side of the cable to the Card Motor and vice versa. There is a small raised area on the connector for the controller.

[I/O cable]

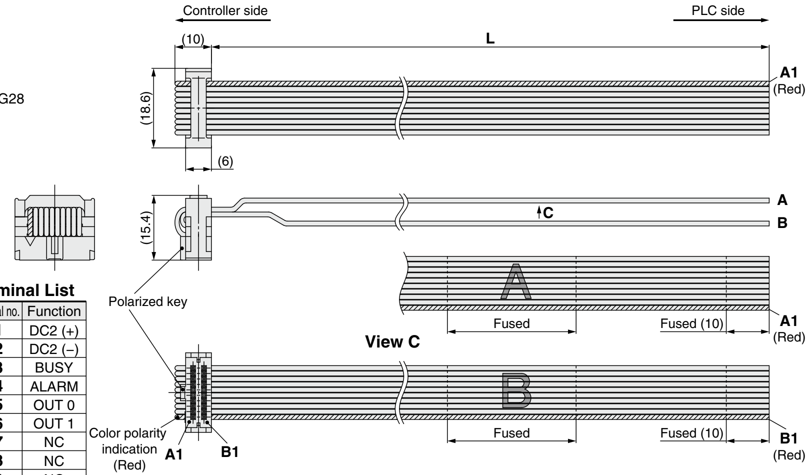


LATH2 – 1

Cable length (L)

1	1 m
3	3 m
5	5 m

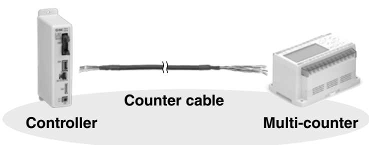
∗ Conductor size: AWG28



Parallel I/O Plug Terminal List

Terminal no.	Function	Terminal no.	Function
A1	COM	**B1**	DC2 (+)
A2	IN 0	**B2**	DC2 (–)
A3	IN 1	**B3**	BUSY
A4	IN 2	**B4**	ALARM
A5	IN 3	**B5**	OUT 0
A6	DRIVE	**B6**	OUT 1
A7	SVON	**B7**	NC
A8	NC	**B8**	NC
A9	NC	**B9**	NC
A10	NC	**B10**	NC

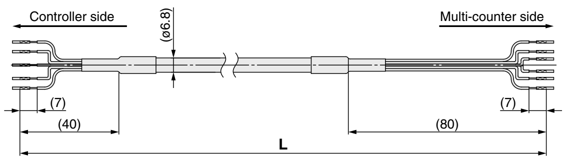
[Counter cable]



LATH3 – 1

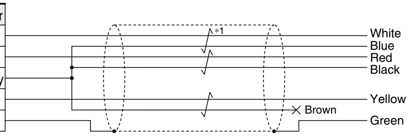
Cable length (L)

1	1 m
3	3 m
5	5 m



Wiring Diagram

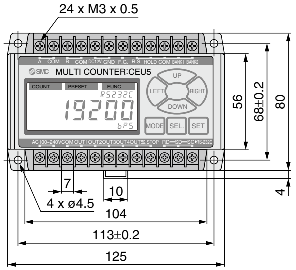
Terminal no.	Circuit	Cable color
1	PhaseB	White
2	PhaseA	Red
3	GND	Light gray
4	RESET	Yellow
5	FG	Green

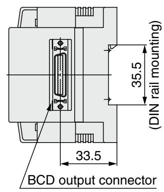


∗1: indicates a twisted pair cable.

[Multi-counter]

This counter displays the table position of the Card Motor and performs preset outputs according to the program (preset data and output form, etc.) when measuring. The RS-232C can be used to send the table position to a PLC or PC or to set the Multi-counter.





CEU5□□–□

Power voltage

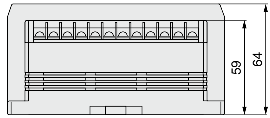
Nil	100 to 240 VAC
D	24 VDC

External output

Nil	RS-232C
B	RS-232C + BCD

Output transistor type

Nil	NPN open collector output
P	PNP open collector output



Specifications

Model	CEU5□□-□
Mounting method	Surface mounting (Fixed by DIN rail or screw)
Operation mode	Operating mode, Data setting mode, Function setting mode
Display type	LCD with backlight
Number of digits	6 digits
Counting speed	100 kHz
Insulation resistance	Between case and AC line: 500 VDC, 50 MΩ or more
Ambient temperature	0 to + 50°C (No freezing)
Ambient humidity	35 to 85%RH (No condensation)
Weight	350 g or less

∗For details, refer to the Multi-counter catalog and operation manual that can be downloaded from the SMC website, http://www.smcworld.com

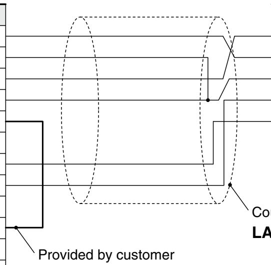
■Wiring Example

Multi-counter CEU5 Terminal Block

Name	Cable color
A	Red
COM	Black
B	White
COM	Blue
12 VDC	–
GND	–
F.G.	Green
RESET	Yellow
HOLD	–
COM	–
BANK1	–
BANK2	–

Controller LATC4 Counter Plug

Cable color	Name
White	PhaseB
Red	PhaseA
Light gray	GND
Yellow	RESET
Green	F.G.

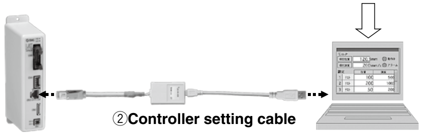


[Controller setting kit]

LATC-W1

Controller setting kit (Japanese and English are available.)

①Controller setting software



②Controller setting cable

Controller

PC

Contents

①**Controller setting software (CD-ROM)**
②**Controller setting cable (Communication cable, Conversion unit, USB cable)**

Hardware Requirements

PC with WindowsXP or Windows7 and USB1.1 or USB2.0 port.

∗Windows®, Windows®XP and Windows®7 are registered trademarks of Microsoft Corporation.

Function

- ○**Status display for parallel input signals and manual output of parallel output signals**
- ○**Entering of driven actuator**
- ○**Setting of the step data operating conditions**
- ○**Jog, constant speed and distance movements and test operation**
- ○**Monitoring of operation status (parallel input/output signals, position, speed and thrust)**

Series LAT3
Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 for Safety Instructions.
For Electric Actuator Precautions, refer to "Handling Precautions for SMC Products" (M-E03-3) and Operation Manual. Please download it via our website, http://www.smcworld.com

Design/Selection

⚠Warning

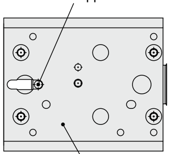
1. Consider possible movements of the actuator in the event of an emergency stop, alarm or power failure.
If power is not supplied to the product due to an emergency stop or if the SVON signal is turned OFF, in the event of an alarm (when temperature of the Card Motor exceeds 70°C) or at power failure, the table will not be held in place and may be moved by external forces. Design the Card Motor application so that people and equipment will not be injured or damaged by the table movement.

⚠Caution

1. Do not apply a load outside the specifications.
The Card Motor should be fitted for the application based on the maximum work load and allowable moments. If the product is used outside the specifications, the excess load applied to the guide will lead to play in the guide, decrease in accuracy and the life span of the product will be shortened.

2. Do not use the product in applications where excessive external force or impact is applied to it.
Otherwise, a failure or malfunction can result.

3. The Card Motor is equipped with a stopper to prevent the table from coming off and to be resistant to light impacts generated by returning to origin or during transportation.
Thus, excessive external force or impact may damage the product, so please install a separate external stopper if the operating conditions require.



4. Strong magnet
The Card Motor contains a strong rare earth magnet, whose magnetic field may affect the workpiece. Mount the workpiece away from the Card Motor far enough to prevent the magnetic field from affecting the workpiece.

5. In pushing operation, use thrust setting values within the allowable limits.
Otherwise, it may cause overheating of the workpiece or the mounting surface.

6. The flatness of the mounting surface of the table and rail must be 0.02 mm or less.
Unevenness of a workpiece the Card Motor is mounted to or of the base the Card Motor is mounted onto, can cause play in the guide and an increase in the sliding resistance.

7. SMC products are not intended for use as instruments for legal metrology.
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Handling

⚠Warning

1. Do not touch the product when it is energized or for a few minutes after it has been de-energized.
The surface temperature of the Card Motor can increase up to approximately 70°C depending on the operating conditions. Energizing alone may also cause the temperature to increase. Do not touch the Card Motor during operation or when energized to prevent burns or other injuries.

⚠Caution

1. Strong magnet
The Card Motor contains a strong rare earth magnet. If a magnetic card is brought close to the Card Motor, the card data may get distorted or lost. Do not bring items, which are sensitive to or affected by magnetism close to the product.

2. Do not operate the Card Motor continuously with an allowable set thrust or more at 100% of duty ratio.
The Card Motor may overheat due to the heat generated by the Card Motor itself, and a temperature error or malfunction may occur.

3. Do not hit the stroke ends during operation, except during return to origin and in pushing operation.
Otherwise, a failure can result.

4. For pushing operations, set the target position at least 1 mm away from the position where the pushing tool comes into contact with the workpiece.
Otherwise, the table may hit the workpiece at a speed exceeding the specified pushing speed.

5. The table and the guide rail are made of special stainless steel, but can rust in an environment where droplets of water adhere to it.

6. Do not dent, scratch or cause other damage to the steel ball rolling surface of the table and the rail.
Otherwise, it will result in play or increased sliding friction.

7. Positioning accuracy, thrust and measurement accuracy may vary after the Card Motor or the work load have been mounted, depending on the mounting conditions and environment.
Calibrate them according to the actual application.

8. Consider mounting a bumper on the pushing surface.
If impact to the Card Motor should be avoided during pushing operation, we recommend an elastic bumper is attached on the pushing surface.

Series LAT3
Specific Product Precautions 2

Be sure to read before handling. Refer to page 469 for Safety Instructions.
For Electric Actuator Precautions, refer to “Handling Precautions for SMC Products” (M-E03-3) and Operation Manual. Please download it via our website, http://www.smcworld.com

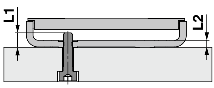
Installation

⚠Caution

1. **Strong magnet**
   The Card Motor contains a strong rare earth magnet. If magnetized workpieces, tools and metallic parts are brought in the vicinity of the Card Motor, they will be attracted, which could cause injury to operators and damage equipment. Take special care when handling and operating the product.
2. **Mount the Card Motor on a base with good cooling performance, for example a metal plate.**
   If the cooling performance is not good enough, the temperature of the Card Motor will increase and a failure can result.
3. **Do not apply strong impact or an excessive moment to the Card Motor while mounting a workpiece.**
   If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.
4. **Do not dent, scratch or cause other damage to the table and rail mounting surfaces.**
   This may cause unevenness in the mounting surface, play in the guide or an increase in the sliding resistance.
5. **When mounting the Card Motor, use stainless steel screws with appropriate length and tighten with recommended tightening torque.**
   If the maximum screw-in depth is exceeded, it may damage the internal components. Using a tightening torque higher than the specified torque may cause a malfunction, and using a lower tightening torque may displace the workpiece or cause it to drop off.

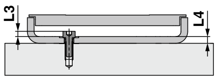
1) Body mounting/Body tapped

Bolt (Stainless steel)	M3 x 0.5
Max. recommended torque [N·m]	0.63
L1 (Max. screw-in depth) [mm]	4.6
L2 (Plate thickness) [mm]	2.1



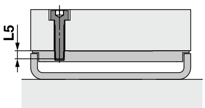
2) Body mounting/Through hole

Bolt (Stainless steel)	M2.5 x 0.45
Max. recommended torque [N·m]	0.36
L3 (Max. screw-in depth) [mm]	2.5
L4 (Plate thickness) [mm]	2.1



3) Workpiece mounting/Top mounting

Bolt (Stainless steel)	M3 x 0.5
Max. recommended torque [N·m]	0.63
L5 (Max. screw-in depth) [mm]	2.5



6. **When connecting the cables, avoid applying any stress to the connector from the cable side.**
   If an external force or vibration is applied to the connector, a failure can result. Do not bend the cable for approximately 20 mm from the connector and fix this part of the cable with a cable fixture.

Grounding

⚠Warning

1. **Always ground the Card Motor.**
2. **Use a dedicated grounding.**
   Use a D-class grounding. (Ground resistance 100 Ω or less)
3. **The grounding point should be as close as possible to the actuator, and the ground wires as short as possible.**

Operating Environment

⚠Caution

1. **Do not use the products in an area where they could be exposed to dust, metallic powder, machining chips or splashes of water, oil or chemicals.**
   Otherwise, a failure or malfunction can result.
2. **Do not use the products in a magnetic field.**
   Otherwise, the ambient magnetic field may affect the motor and a malfunction or failure can result.
3. **Do not expose the product to a strong light sources, such as direct sunlight.**
   The Card Motor uses an optical sensor to detect the position, so if it is exposed to a strong light source such as direct sunlight, a malfunction could result. In such a case, install a light shielding plate such as a cover to shield the sensor from light.
4. **Do not use the products in an environment where flammable, explosive or corrosive gases, liquids or other substances are present.**
   Otherwise, fire, explosion or corrosion can result.
5. **Avoid heat radiation from strong heat sources, such as direct sunlight or a hot furnace.**
   Otherwise, the product can overheat and a failure can result.
6. **Do not use the products in an environment with cyclic temperature changes.**
   Otherwise, a failure can result.
7. **Use the products within the operating temperature and humidity range.**

Maintenance

⚠Caution

1. **Perform regular maintenance and inspections.**
   Confirm that there is no twisting of wires, play in the table or large sliding friction. This may result in a malfunction.
2. **Conduct an appropriate functional inspection and test after completed maintenance.**
   In case of any abnormalities (if the actuator does not move or the equipment does not operate properly, etc.), stop the operation of the system. Otherwise, unexpected malfunction may occur and safety cannot be assured. Conduct a test of the emergency stop to confirm the safety of the equipment.
3. **Do not disassemble, modify or repair the product.**
4. **Maintenance space**
   Allow sufficient space for maintenance and inspection.

Series LAT3
Controller and Peripheral Devices/ Specific Product Precautions 1

Be sure to read before handling. Refer to page 469 for Safety Instructions.
For Electric Actuator Precautions, refer to pages 470 to 475 and Operation Manual.
Please download it via our website, http://www.smcworld.com

Design/Selection

⚠Warning

1. **Use the specified voltage.**
   If the applied voltage is higher than the specified voltage, malfunction and damage to the controller may result. If the applied voltage is lower than the specified voltage, there is a possibility that the load cannot be moved due to internal voltage drop. Check the operating voltage prior to start. Also, confirm that the operating voltage does not drop below the specified voltage during operation. If the current is too low, the Card Motor may not be able to generate the maximum force or cause a malfunction.
2. **Do not use the products outside the specifications.**
   Otherwise, fire, malfunction or damage to the product can result. Check the specifications prior to use.
3. **Install an emergency stop circuit.**
   Install an emergency stop outside the enclosure in easy reach to the operator so that the operator can stop the system operation immediately and intercept the power supply.
4. **To prevent danger and damage due to a breakdown or malfunction of these products, which may occur at a certain probability, a backup system should be arranged in advance by using a multiple-layered structure or by making a fail-safe equipment design, etc.**
5. **If there is a risk of fire or personal injury due to abnormal heat generation, sparking, smoke generated by the product, etc., cut off the power supply from this product and the system immediately.**

Handling

⚠Warning

1. **Never touch the inside of the controller and its peripheral devices.**
   Otherwise, electric shock or failure can result.
2. **Do not operate or set up this equipment with wet hands.**
   Otherwise, electric shock can result.
3. **Do not use a product that is damaged or missing any components.**
   Electric shock, fire or injury can result.
4. **Do not connect the controller to other devices than the Card Motor.**
   Otherwise, it may cause damage to the controller or to the other equipment.
5. **Be careful not to touch, get caught or hit by the workpiece while the Card Motor is moving.**
   An injury can result.
6. **Do not connect the power supply or power up the product until it is confirmed that the workpiece can be moved safely within the area that can be reached by the workpiece.**
   Otherwise, the movement of the workpiece may cause an accident.
7. **Do not touch the product when it is energized and for some time after the power has been disconnected, as it is very hot.**
   Otherwise, it may cause burns due to the high temperature.
8. **Check the voltage using a tester at least 5 minutes after power-off when performing installation, wiring and maintenance.**
   Otherwise, electric shock, fire or injury can result.
9. **Static electricity may cause a malfunction or damage the controller. Do not touch the controller while power is supplied to it.**
   Take sufficient safety measures to eliminate static electricity when it is necessary to touch the controller for maintenance.

Handling

⚠Caution

1. **When the Multi-counter is not used, attach the counter plug to the counter connector of the controller.**
   If foreign matter such as metal fragments enters the counter connector, short-circuit may occur.
2. **Be sure to perform return to origin prior to start.**
   If the origin position is not set, the product will not operate even if the step data is performed.
3. **The positioning time entered and set in the controller setting software is just a target value. It cannot be guaranteed.**
   The operation may not have been completed even if the set positioning time has passed. In such a case, the BUSY and INP digital output signals can be used to detect when the operation has been completed.
4. **Set the "Load Mass" value in the controller setting software according to the approximate weight of jigs or workpieces mounted on the Card Motor.**
   If the "Load Mass" value in the controller setting software and the weight of the work load are different, the product may vibrate or the positioning accuracy may be reduced.
5. **When the load mounted on the Card Motor is small (such as 100 g or less) and the Card Motor has stopped at a target position, depending on the operating conditions the Card Motor may continuously hunt for the target position (vibrate) within the positioning accuracy range.**
   Please contact an SMC sales representative for how to improve it.
6. **BUSY signal**
   The BUSY signal turns ON when the Card Motor begins to operate, and it turns OFF when the operating speed reaches 2 mm/s or less. However, when the Card Motor operates at a slower speed than 5 mm/s, the BUSY signal may not turn ON at all.
7. **INP output signal (OUT0)**
   Both in positioning operation and pushing operation, the INP signal will turn ON when the table has reached within the INP output range of the target position.
   In pushing operation, if the table exceeds the target position and moves outside the INP output range, the INP signal will turn OFF again.

Output range of the INP signal (OUT0)

Model	Output range (mm)
LAT3F-□	±0.05
LAT3-□	±0.3

Mounting

⚠Warning

1. **Install the controller and its peripheral devices on fireproof material.**
   Direct installation on or near flammable material may cause fire.
2. **Do not install these products in a place subject to vibration and impact.**
   Otherwise, a malfunction or failure can result.
3. **Do not mount the controller and its peripheral devices on the same base together with a large-sized electromagnetic contactor or no-fuse breaker that generate vibration. Mount them on different base plates, or keep the controller and its peripheral devices away from such vibration supplies.**
   Otherwise, a malfunction can result.
4. **Install the controller and its peripheral devices on a flat surface.**
   If the mounting surface is not flat or uneven, excessive force may be applied to the housing and other parts resulting in a malfunction.

Power Supply

⚠Warning

1. **Use a power supply with low noise between lines and between power and ground.**
   In cases where noise is high, use an isolation transformer.
2. **The power supplies should be separated between the controller power and the I/O signal power, and both power supplies must not be of "inrush current limited" type.**
   If the power supply is of "inrush current limited" type, a voltage drop may occur during the acceleration or deceleration of the actuator.

Series LAT3
Controller and Peripheral Devices/ Specific Product Precautions 2

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Power Supply

⚠Warning

3. **Take appropriate measures to prevent surges from lightning. Ground the surge absorber for lightning separately from the grounding of the controller and its peripheral devices.**
4. **Use the UL-certified products listed below as direct current power supplies.**
   (1) Limited voltage current circuit in accordance with UL 508.
   A circuit in which power is supplied by secondary coil of an insulated transformer that meets the following conditions
   · Maximum voltage (No load): 30 Vrms (42.4 V peak) or less
   · Maximum current : ① 8 A or less (including short circuit)
   ② Limited by a circuit protector (such as a fuse) with the following ratings

Voltage without load (V peak)	Maximum current rating
0 to 20 [V]	5.0
Over 20 [V] up to 30 [V]	$\frac{100}{\text{Peak voltage}}$

   (2) Circuit (of class 2) which is of maximum 30 Vrms (42.4 V peak) or less, with UL 1310 class 2 power supply unit or UL 1585 class 2 transformer.

Grounding

⚠Warning

1. **Make sure the product is grounded to ensure the noise tolerance of the controller.**
   Otherwise, it may cause a malfunction, damage, electric shock or fire. Do not share the earth with devices or equipment that generates a strong electromagnetic noise.
2. **Use a dedicated grounding.**
   Use a D-class grounding. (Ground resistance 100 Ω or less)
3. **The grounding point should be as close as possible to the controller, and the ground wires as short as possible.**
4. **In the unlikely event that malfunction is caused by the ground, it may be disconnected.**

Wiring

⚠Warning

1. **Preparation for wiring**
   Turn the power supply off before wiring or plugging and unplugging of connectors. Mount a protective cover on the terminal block after the wires have been connected.
2. **Do not route the digital I/O signal and power cables together.**
   Malfunctions stemming from noise may occur if the signal line and output lines are routed together.
3. **Confirm proper wiring before turning the power on.**
   Incorrect wiring will lead to malfunction or may damage the controller or its peripheral devices. Confirm that there is no mis-wiring before turning the power on.
4. **Reserve enough space for the routing of the cables**
   If the cables are forced into unreasonable positions, it may damage the cables and connectors, which may lead to misconnection and result in a malfunction. Avoid bending the cables in sharp angles close to the connectors or where they enter the product. Fix the cable as close as possible to the connectors so that mechanical stress cannot be applied to the connectors.

Operating Environment

⚠Caution

1. **Do not use the products in an area where they could be exposed to dust, metallic powder, machining chips or splashes of water, oil or chemicals.**
   Otherwise, a failure or malfunction can result.
2. **Do not use the products in a magnetic field.**
   Otherwise, a malfunction or failure can result.
3. **Do not use the products in an environment where flammable, explosive or corrosive gases, liquids or other substances are present.**
   Otherwise, fire, explosion or corrosion can result.
4. **Avoid heat radiation from strong heat sources, such as direct sunlight or a hot furnace.**
   Otherwise, it will cause a failure to the controller or its peripheral devices.
5. **Do not use the products in an environment with cyclic temperature changes.**
   Otherwise, it will cause a failure to the controller or its peripheral devices.
6. **Do not use the products in an environment where surges are generated.**
   Devices (solenoid type lifters, high frequency induction furnaces, motors, etc.) that generate a large amount of surge around the product may lead to deterioration or damage to the internal circuits of the products. Avoid supplies of surge generation and crossed lines.
7. **The Card Motor and the controller are not immune to lightning strikes.**
8. **Do not install these products in a place subject to vibration and impact.**
   Otherwise, a malfunction or failure can result.

Maintenance

⚠Warning

1. **Perform maintenance checks periodically.**
   Confirm wiring and screws are not loose. Loose screws or wires may cause unexpected malfunction.
2. **Conduct an appropriate functional inspection and test after completed maintenance.**
   In case of any abnormalities (if the actuator does not move or the equipment does not operate properly, etc.), stop the operation of the system. Otherwise, unexpected malfunction may occur and safety cannot be assured. Conduct a test of the emergency stop to confirm the safety of the equipment.
3. **Do not disassemble, modify or repair the controller or its peripheral devices.**
4. **Do not put anything conductive or flammable inside the controller.**
   Otherwise, fire can result.
5. **Do not conduct an insulation resistance test or insulation withstand voltage test.**

⚠Caution

1. **Reserve sufficient space for maintenance.**
   Design the system so that it allows required space for maintenance.

Glossary of Terms

A

■ Absolute Encoder
An encoder with a function to detect the absolute position so that it does not have to return to origin whenever it is powered on.

■ Absolute Position
A position against the reference point (origin). The antonym is “incremental position.”

■ Absolute Positioning Repeatability
Difference between the coordinate value and the actual value when positioning at any point indicated by the coordinate value.

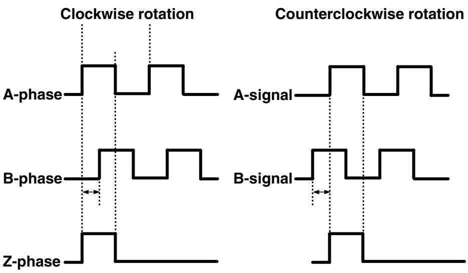
■ AC Servo Motor
A servo motor rotated by an alternating current in the fixed winding. It does not have a brush and a commutator which are weaknesses of DC servo motors.

■ Address
An absolute position given in an absolute coordinate system.

■ Addressing
A method of transferring indications to actuators. One is absolute addressing (absolute coordinate system), the other is incremental addressing (relative coordinate system, indicating the distance of transfer).

■ Alarm Signal
An signal sent when something wrong (trouble) has happened in the device.

■ A-phase (Signal) Output, B-phase (Signal) Output
Whether the axis rotation is clockwise or counterclockwise is judged with difference of A and B phases by outputting incremental figure as shown below. The A-phase precedes the B-phase in case of a clockwise rotation (CW).



∗ The A-signal precedes by 90°　∗ The B-signal precedes by 90°

Note) The 360° is an electrical angle, not a mechanical angle.

■ Automatic Operation
An operation activated by a start signal from an external device (PLC etc.)

B

■ Backlash
There is a gap between the screw axis and ball bearing or nut. Therefore, the nut does not move even after the screw axis begins to shift until the gap distance is traveled. This mechanical allowance along the direction of the slider movement is called “backlash”.

■ BCD (Binary Coded Decimal)
One of measures to deal with decimal numbers in computers. A one-digit decimal number (0 to 9) is represented by a four-digit binary number.

C

■ CCW (Counter Clock Wise)
Counterclockwise motor rotation from the view point of the axis.

■ Closed-loop Method
A control method in which the information of position and speed from the encoder is to be fed back to the controller.

■ Coupling
Shaft coupling. A mechanical component to connect shafts. In the case of electric actuators, coupling is used to connect the motor and the screw playing the role like a floating joint.

■ cpm
Cycle per minute.

■ Critical Speed
The speed of a slider (ball screw rotations) which causes resonance of a ball screw. The physical limit of available speed.

■ CW (Clock Wise)
Clockwise motor rotation from the viewpoint of the axis.

■ Cycle Time
Time required to complete one process.

D

■ Deviation
Difference from the reference value. In the servo mechanism, it means the difference between the targeted value and the current value.

■ Driver
The circuit device to make a motor rotate. A controller and PLC are required to operate it. There exist several drivers (names).

■ Duty
Duty means “operating rate” in the machine industry. The time in which the actuator is moving during one cycle time.

E

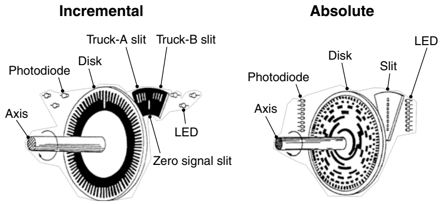
■ Earth (Ground)
To connect casings of devices and/or electronics’ reference potential wirings etc. to the reference potential point in order to eliminate noises and electric shocks, etc. Or it can mean the reference potential point itself.

■ EEPROM (Electrically Erasable PROM)
A kind of nonvolatile memories which can be written on or erased. Sustainable of data even after power is cut off.

■ Emergency Stop Circuit
A circuit which enables the device to stop ether manually or automatically in case the device is in a dangerous state.

■ Encoder

A device to detect the number and direction of rotations by shedding light on a rotating disk with slits and sensing on and off states of the light. (The device converts the rotations into pulses.) The controller detects the position and speed of the slider according to the signals from the encoder.



F

■ Feedback Control

The representative method of automatic control. A device is controlled by comparing the current state measured and the targeted value, then eliminating the difference.

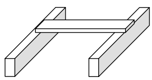
G

■ Gain

The ratio of an input and an output (gain). The value is used to adjust reactions (responses) or deviations when a controller controls a servo motor. In servo motors, the ratio works as a parameter to decide responses or stability of movement. There are speed loop gain and position loop gain etc. Generally, to make servo gain higher causes better response and less bias. But when it is too high, vibration (resonance phenomenon) occurs.

■ Gantry

A gantry with X-Y axes and a guide to support the Y axis so that the axis can carry a heavy load.



■ Ground

Refer to “Earth”.

H

■ Hunting

The state in which the movement becomes vibrative near the targeted value.

I

■ I/O

Input/Output. An interface to be used to exchange information (signals) with an outside device or devices.

■ In-position Signal (INP Signal)

A signal sent when positioning is completed. This signal is to be put out in a allowable range set up against a targeted position.

■ Incremental Encoder

An encoder capable of detecting the relative position. Implementation of the return to origin action is needed whenever it is powered on, as this type of encoder can detect only relative positions.

■ Incremental Position

A position from any point settled. The antonym is “absolute position.”

■ Inertia

A property of matter by which it continues in its existing state (against an inertial system) unless that state is changed by an external force.

■ IP∗∗ (International Protection)

Degrees of protection against the intrusion of external solid bodies or liquids, defined by IEC-60529. The first asterisk after “IP” is for numbers 1 to 6 representing degrees of protection against solid bodies such as fingers or dust. The second asterisk is for 1 to 8 against penetration of water.

J

■ Jog Operation

Action of making slight moves intermittently of a motor etc. for positioning of a device or other purposes.

L

■ Lead

Lead for the lead screw means the distance the screw travels when the motor makes one rotation (and the screw makes one rotation accordingly).

■ Linear Encoder

An encoder to detect the linear distance. It is used to detect the position of a linear motor etc. There are the optical type and the magnetic type among others.

■ Linear Motor

An motor which makes an linear movement.

■ Load Factor

The ratio of the load against the rated output of the motor.

M

■ Maximum Instantaneous Torque

The torque a servo motor can generate for a moment.

■ Mechanical End

The position where the slider of an actuator stops mechanically. Mechanical stopper (ex. urethane rubber).

■ Moment

The force that makes an object rotate.

■ Moment of Inertia

The degree of resistance in rotation.

N

■ Noise Filter

A device to prevent noise to leak or intrude into the power supply, signals, etc.

O

■ Open Collector Output

A method without load resistance in a voltage output circuit. Signals are sent by sinking the load current. This circuit can switch on/off the load current regardless of whether the load is connected to any V potential, and is widely used for switching external loads such as relays or lights, etc.

■ Open-loop Method (Control)
One of control methods in which only indications are made without feedbacks. The stepping motor is a representative example. The controller cannot correct the error when a step-out (signal error) occurs. Because the command value and the actual value are not compared.

■ Origin
The reference point for actuator movements. The actuator memorizes its own position as counts of pulses from the origin.

■ Origin Precision
Variability of the positions when the return to origin is implemented repeatedly. (If the origin position gets out of its place, every position gets out of its place accordingly.)

■ Overload
The state in which more than allowable load is applied in a mobile portion of a machine or an electric/electronic circuit.

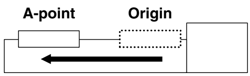
P

■ Parameter
Values to set movements etc. Setting values to specify driving methods to be memorized by controllers or to specify the specifications of actuators connected.

■ Photo Coupler
An electronic device to transfer electric signals converted into light. It is not easily affected by noise because the input and output are isolated electrically.

■ PLC
Programmable Logic Controller. Also called “sequencer.” A controller programmable to control production facilities/devices.

■ Positioning Repeatability
Variability of stopping position precision when positioning at the same point repeatedly.



■ PTP Control
Control for a movement from point to point. (Point To Point Control)

■ Pushing Return to Origin
A defining method of the origin position by pushing the stopper (end). The return to origin can be made without using the origin sensor.

R

■ Rated Force
The force of an actuator which can be generated continuously.

■ Rated Rotation
The rotation of an actuator which can be kept continuously.

■ Rated Torque
The torque of an actuator which can be generated continuously.

■ Regenerative Energy
The energy that a motor generates when it rotates. When the rotation speed is reduced the energy returns to the motor driver (controller). This energy is called regenerative energy.

■ Regenerative Resistor
A resistor to discharge regenerative current.

■ Resolution
The minimum unit of physical quantity that a measurement device (an encoder etc.) can deal with.

■ Return to Origin
The homing movement detecting the origin position.

■ Robotic Cable
Cables to be used for movable portions. Resistance is excellent against bending, rubbing, twisting, etc.

■ Rotary Encoder
An encoder to detect rotation angle. It is used to find the position of a servo motor etc. There are the optical type and the magnetic type among others.

■ RS-232C
One of standards for serial telecommunications defined by Electronic Industries Alliance (EIA).

■ RS-422
One of standards for serial telecommunications defined by Electronic Industries Alliance (EIA).

S

■ SCARA
Selective Compliance Assembly Robot Arm.
A robot arm that has compliance in the horizontal direction and high stiffness in the vertical direction.

■ Sequence Control
A control method in which every step of control is advanced one by one according to the already-indicated orders or procedures.

■ Servo Free (Servo Off)
The state in which the power supply for the motor is cut off. The slider can be moved freely.

■ Servo Lock (Servo On)
The state in which the power supply for the motor is switched on. The servo mechanism maintains its position even though an external force is applied as long as the position command remains unchanged.

■ Servo Motor
A general term to describe motors used in the servo mechanism. Usually the motor has high response characteristic with a position finder such as an encoder and follows a targeted value by using the feedback control. The position control, speed control and thrust control, etc. are possible.

■ Servo Off
The uncontrolled state in a servo mechanism.

■ Servo On
The controlled state in a servo mechanism.

■ Settling Time
Time elapsed after a speed command becomes zero until the actuator stops in positioning operation.

■ Shielded Wire
A cable with its core wire covered by electrostatic shield-aluminum tape, braided wire, etc. Not easily affected by noise.

■ Soft Limit
To limit the operating range to the software.

■ S-shaped Curve Driving Method
A method in which acceleration is reduced at the beginning and end of the accelerating range, and increased in the middle. Reducing the impact of acceleration and deceleration, this method is effective when smooth movement is required.

■ Step Motor

A motor which does angular positioning proportional to input pulse signals by using an open-loop control (or a motor activated by synchronization to the frequency of the current). Relatively easy to control movements.

T

■ Teaching

A way of making a program memorize movements and positions, etc.

■ Trapezoidal Control (Trapezoidal Driving Method)

A driving method in which acceleration and deceleration are fixed with a constant speed range in between. This method is called the trapezoidal driving method. Because the time and speed relationship of a movement becomes trapezoid in a graph. It is usually used in common positioning.

■ Types of Screws

There are several types of screws to convert motor rotation into linear movement.

		Features
Ball Screw	**Grinding**	Ground screws are superior in precision but expensive in cost.
	Rolling	Rolled screws are capable of being mass-produced.
Slide Screw		Less expensive, but low precision and short product life. Not suitable for high-speed operations.

W

■ Work Load

Mass of a workpiece which can be transferred by an actuator's table/rod.

Z

■ Z-phase

A phase (signal) to detect a reference point of incremental encoders. It is used to find the origin when the return to origin is being implemented. Detecting the Z-phase signal as a reference point during the return to origin action is called the "Z-phase search".

⚠ 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 catalog 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 catalog.
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, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog 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.

Electric Actuators Precautions 1

Be sure to read before handling.

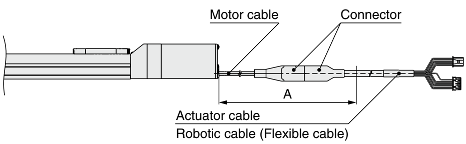
Wiring/Cables

⚠ Warning

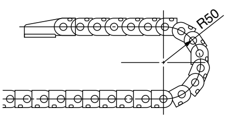
1. **Adjustment, installation, or wiring changes should be conducted after power supply to the product is turned off.**
   Electrical shock, malfunction and damaged can result.
2. **Never disassemble the cable. Use only specified cables.**
3. **Never connect or disconnect the cable or connector with power on.**

⚠ Caution

1. **Wiring should be done correctly.**
   For each terminal, voltages other than stipulated in the operation manual should not be applied.
2. **Connect the connector securely.**
   Check for correct connector wiring and polarity.
3. **Treat the noise securely.**
   If the noise is at the same wavelength as the signal lines, it will lead to malfunction. As a countermeasure, separate the high and low electrical lines and shorten the length of wiring, etc.
4. **Do not connect power or high voltage cables in the same wiring path as the unit.**
   The product can malfunction due to noise and surge voltage interference in the signal line from the power and high voltage cables.
   Separate the wiring of the controller and its peripheral device from that of power and high voltage cables.
5. **Be careful that cables are not caught by actuator movement.**
6. **Operate with cables such that they are not easily moved.**
   Avoid bending cables at sharp angles where they enter the product.
7. **Avoid twisting, folding, rotating or applying an external force to the cable.**
   Risk of electric shock, wire breakage, contact failure and loss of control for the product can occur.
8. **Do not move cables connected to the actuator.**
   The motor and lock cables are not robotic cables and can be broken when moved. Therefore, fix the cables and the connectors (part "A" in figure below) in place during set up.



9. **Select "Robotic cable (Flexible cable)" when repeated bending of the actuator cable is required. Also, do not put cables into a flexible moving tube with a radius smaller than the specified value (50 mm or longer).**
   Risk of electric shock, wire breakage, contact failure and loss of control for the product can occur if "Standard cables" are used for repeated bending.



⚠ Caution

10. **Verify wiring insulation.**
    Insulation failure (interference with other circuits, poor insulation between terminals, etc.) could introduce excessive voltage or current to the controller or its peripheral devices and damage them.
11. **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%)

[Transportation]

⚠ Caution

1. **Do not carry or swing the product by the cable.**

Design/Selection

⚠ Warning

1. **Be sure to read the operation manual (this manual and the one for the controller: LEC series).**
   Handling or usage/operation other than that specified in the operation manual may lead to breakage and operation failure of the product.
   Any damage attributed to the use beyond the specifications is not guaranteed.
2. **There is a possibility of dangerous sudden action by the product if sliding parts of machinery are twisted due to external forces etc.**
   In such cases, human injury may occur, such as by catching hands or feet in the machinery, or damage to the machinery itself may occur. Design the machinery should be designed to avoid such dangers.
3. **A protective cover is recommended to minimize the risk of personal injury.**
   If a driven object and moving parts of the product are in close proximity, personal injury may occur. Design the system to avoid contact with the human body.
4. **Securely tighten all stationary parts and connected parts so that they will not become loose.**
   When the product operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.
5. **Consider a possible loss of power source.**
   Take measures to prevent injury and equipment damage even in the case of a power source failure.
6. **Consider emergency stops.**
   Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions such as a power outage or a manual emergency stop.
7. **Consider the action whole system.**
   Design the system so that human injury or equipment damage will not occur upon restart of operation of whole system.
8. **Disassembly and modification is prohibited.**
   Do not modify or reconstruct (including additional machining) the product. An injury or failure can result.

Electric Actuators Precautions 2

Be sure to read before handling.

Design/Selection

⚠Warning

9. **Do not use the stop signal, "EMG" of the controller and stop switch on the teaching box as the emergency stop of system.**
   The stop signal, "EMG" of controller and the stop switch on the teaching box are for decelerating and stopping the actuator.
   Design the system with an emergency stop circuit which is applied relevant safety standard separately.
10. **When using it vertically for applications, it is necessary to build in a safety device.**
   The table may fall due to the weight of workpiece. The safety device should not interfere with normal operation of the machine.

⚠Caution

1. **Operate within the limits of the maximum usable stoke.**
   The product will be damaged if it is used with the stroke which is over the maximum stroke. Refer to the specifications of the product.
2. **When the product repeatedly cycles with partial strokes, operate it at a full stroke at least once a day or every 1000 strokes.**
   Otherwise, lubrication can run out.
3. **Do not use the product in applications where excessive external force or impact force is applied to it.**
   The product can be damaged. The components including the motor are manufactured to precise tolerances. So that even a slight deformation may cause a malfunction or seizure.
4. **During operation (positioning operation or pushing operation), it cannot be returned to the origin position.**
5. **Refer to Auto Switches Precautions (Best Pneumatics No. 2) when an auto switch is built in and used.**
6. **When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.**

Mounting

⚠Warning

1. **Keep the manual in a safe place future reference.**
   The product should be mounted and operated after thoroughly reading the operation manual and understanding its contents.
2. **Observe the tightening torque for screws.**
   Tighten the screws to the recommended torque for mounting the product.
3. **Do not make any alterations to the product.**
   Alterations made to the product may lead to a loss of durability and damage to the product, which can lead to human injury and damage to other equipment and machinery.
4. **Connect the rod axis and the load and the direction of the movement being sure to match it.**
   It causes to cause the complication in the lead screw, to be worn out, and to damage it when not matching.
5. **When an external guide is used, connect the moving parts of the actuator and the load in such a way that there is no interference at any point within the stroke.**
   Do not scratch or dent the sliding parts of the product tube or piston rod etc., by striking or grasping them with other objects. The components are manufactured to precise tolerances. So that even a slight deformation may cause a malfunction or seizure.

Mounting

⚠Warning

6. **Prevent the seizure of rotating parts (pins, etc.) by applying grease.**
7. **Do not use the product until you verify that the equipment can operate properly.**
   After mounting or repair, connect the power supply to the product and perform appropriate functional inspections to check it is mounted properly.
8. **When one side is fixed**
   When an actuator is operated at high speed with one end fixed and the other free (basic, flange or direct mount types), a bending moment may act on the actuator due to vibration generated at the stroke end, which can damage the actuator. In such a case, install a mounting bracket to suppress the vibration of the actuator body or reduce the speed so that the actuator does not vibrate. Also, use a mounting bracket when moving the actuator body or when a long stroke actuator is mounted horizontally and fixed at one end.
9. **Do not apply strong impact or an excessive moment while mounting the product or a workpiece.**
   If an external force over the allowable moment is applied, it may cause play in the guide or an increase in the sliding resistance.
10. **Maintenance space**
   Reserve sufficient space for maintenance.

Handling

⚠Warning

1. **Do not touch the motor in operation.**
   The surface temperature of the motor can increase to approx. 90°C to 100°C due to operating conditions. This temperature increase may also be caused by energizing alone. As it may cause burns, do not touch the motor when in operation.
2. **If abnormal heating, smoking or fire, etc., occurs in the product, immediately shut off the power supply.**
3. **Stop operation at once if there are abnormal noises or vibrations.**
   Abnormal noises or vibrations may mean that the product is not properly mounted, and if allowed to continue in this state, damage to the equipment may occur.
4. **Never touch the rotating part of the motor while in operation.**
5. **When installing, adjusting, inspecting or performing maintenance on the product, controller and related equipment, be sure to shut off the power supply to them. Then, lock it so that no one other than the person working can turn the power on, or implement measures such as a safety plug.**
6. **In the case of the actuator that has a servo motor (24 VDC), the motor phase detection step is done by inputting the servo on signal just after the controller power is turned on. The motor phase detection step moves the table/rod for the distance of the one screw-lead as the maximum.**
   (The motor rotates in the reverse direction if the table hits an obstacle such as the end stop damper.) Take the motor phase detection step into consideration for the installation and operation of this actuator.

⚠Caution

1. **Keep the controller and the actuator combined as delivered for use.**
   The actuator is set in parameters for shipment. If it is combined with a different parameter, failure can result.

Electric Actuators Precautions 3

Be sure to read before handling.

Handling

⚠Caution

2. Conduct the following inspection before operation.
a) Confirm that the power supply line or each signal line is not broken.
b) Confirm that the power supply line or each signal line is not loosened.
c) Confirm that the electric actuator/cylinder/controller/driver is not mounted loosely.
d) Confirm that the electric actuator/cylinder/controller/driver is operated correctly.
e) Confirm the function of the emergency stop of the total system.

3. In case several persons are doing the job, determine the procedure, signs, measures against abnormality and restarting measures in advance. Then, let the person who is not doing the job, supervise that job.

4. The product can operate at a different speed from the set speed depending on load and resistance.
When selecting a product, check the catalog for the instructions regarding selection and specifications.

5. Do not apply a load, impact or resistance in addition to the transferred load during return to origin.
The product is made return to origin by pushing force, which causes the displacement of origin position.

6. Do not remove the name plate.

7. Operation test should be done by low speed. Start operation by predefined speed after confirming there is no trouble.

[Grounding]

⚠Warning

1. Be certain to ground the actuator.

2. Dedicated grounding should be used.
Grounding should be to a D-class ground. (Ground resistance of 100 Ω or less.)

3. Grounding should be performed near the actuator to shorten the grounding distance.

[Unpackaging]

⚠Caution

1. Check the received product is as ordered.
If the different product is installed from the one ordered, injury or damage can result.

Operating Environment

⚠Warning

1. Avoid use in the following environments.
a. Areas with large amounts of dust or cutting chips that could enter the product.
b. Areas where the ambient temperature exceeds the specified range. (Refer to the specifications.)
c. Areas where the ambient humidity exceeds the specified range. (Refer to the specifications.)
d. Areas with corrosive gas, flammable gas, sea water, water and steam that could adhere to the product.
e. Areas where strong magnetic or electric fields are generated.
f. Areas where direct vibration or impact shock is applied to the product.
g. Areas where there is large amounts of dust or is exposed to water/oil droplets.
h. Areas that are exposed to direct sunlight (ultraviolet rays).

Operating Environment

⚠Warning

2. Do not use in an environment where the product is directly exposed to liquid, such as cutting oils.
If cutting oils, coolant or oil mist adheres to the product, failure or increased sliding resistance can result.

3. Install a protective cover when the product is used in an environment directly exposed to foreign matters such as dust, cutting chips and spatter.
Looseness or increased sliding resistance can result.

4. Shade the sunlight in the place where the product is applied with direct sunshine.

5. In locations near heat sources, block off them.
When there is a heat source surrounding the product, the radiated heat from the heat source can increase the temperature of the product beyond the operating temperature range. Protect it with a cover, etc.

6. Grease oil can be decreased due to external environment and operating conditions, and it deteriorates lubrication performance to shorten the life of the product.

[Storage]

⚠Warning

1. Do not store the product in a place in direct contact with rain or water drops or is exposed to harmful gas or liquid.

2. Store in an area that is shaded from direct sunlight and has a temperature and humidity within the specified range (–10°C to 60°C and 35 to 85% no condensation or freezing).

3. Do not apply vibration and impact to the product during storage.

Maintenance

⚠Warning

1. Do not disassemble or repair the product.
Fire or electric shock can result.

2. Before modifying or checking the wiring, the voltage should be checked with a tester 5 minutes after the power supply is turned off.
Electrical shock can result.

⚠Caution

1. Perform maintenance work according to the procedures indicated in the operation manual.
Improper handling can cause an injury, damage or malfunction of equipment and machinery.

2. Removal of equipment
When equipment is removed, first confirm that measures are in place to prevent dropping or runaway of driven objects, etc., and then proceed after cutting off the electric power. When starting up again, proceed with caution after confirming that conditions are safe.

[Lubrication]

⚠Caution

1. The product has been lubricated for life at manufacturer, and does not require any further lubrication.
When lubrication is applied, special grease must be used. Please read the maintenance manual of each actuator.

Electric Actuators Precautions 4

Be sure to read before handling.

Actuator with Lock

⚠Warning

1. **Do not use the lock as a safety brake or a control that requires a locking force.**
   The lock used for the product with lock is designed to prevent dropping of workpiece.
2. **For vertical mounting, use the product with lock.**
   If the product is not equipped with lock, the product will move and drop the workpiece when the power is removed. Please ensure that your safe equipment designs include measures against falling workpieces.
3. **"Drop prevention" means preventing a workpiece from dropping due to its weight when the product operation is stopped and the power supply is turned off.**
4. **Do not apply an impact load or strong vibration while the lock is activated.**
   If an external impact load or strong vibration is applied to the product, the lock will lose it's holding force and damage to the sliding part of the lock or shortening of lifespan can result. The same situations will happen when the lock slips due to a force over the holding force, as this accelerates the wear to the lock.
5. **Do not apply liquid or oil and grease to the lock or its surrounding.**
   When liquid or oil and grease is applied to the sliding part of the lock, its holding force will reduce significantly.
6. **Take measures against drops and check that safety is assured before mounting, adjustment and inspection of the product.**
   If the lock is released with the product mounted vertically, a work piece can drop due to its weight.
7. **When the actuator is operated manually (when SVRE output signal is off), supply 24 VDC to the [BK RLS] terminal of the power supply connector.**
   If the product is operated without releasing the lock, wearing of the lock sliding surface will be accelerated, causing reduction in the holding force and the life of the locking mechanism.
8. **Do not supply 24 VDC power supply constantly to the [BK RLS (Lock release)] terminal.**
   Stop supplying 24 VDC power supply to the [BK RLS (Lock release) terminal during normal operation. If power is supplied to the [BK RLS] terminal continuously, the lock will be released, and workpieces may be dropped at stop (EMG).

Electric Actuators Precautions 5

Be sure to read before handling.

Controller/Driver and Peripheral Devices

Design/Selection

⚠Warning

1. **Be sure to apply the specified voltage.**
   Otherwise, malfunction and breakage may be caused. If the applied voltage is lower than the specified, it is possible that the load cannot be moved due to an internal voltage drop of the controller. Please check the operating voltage before use.
2. **Do not operate the product beyond the specifications.**
   Otherwise, a fire, malfunction or actuator damage can result. Please check the specifications before use.
3. **Install an emergency stop circuit.**
   Please install an emergency stop outside of the enclosure so that it can stop the system operation immediately and intercept the power supply.
4. **In order to prevent damage due to the breakdown and the malfunction of the controller and its peripheral devices, a backup system should be established previously by giving a multiple-layered structure or a fail-safe design to the equipment, etc.**
5. **If a danger against the personnel is expected due to an abnormal heat generation, smoking, ignition, etc., of the controller and its peripheral devices, cut off the power supply for the product and the system immediately.**

Handling

⚠Warning

1. **Do not touch the inside of the controller and its peripheral devices.**
   It may cause an electric shock or damage to the controller.
2. **Do not perform the operation or setting of the product with wet hands.**
   It may cause an electric shock.
3. **Product with damage or the one lacking of any components should not be used.**
   It may cause an electric shock, fire, or injury.
4. **Use only the specified combination between the electric actuator and controller.**
   It may cause damage to the actuator or the controller.
5. **Be careful not to be caught or hit by the workpiece while the actuator is moving.**
   It may cause an injury.
6. **Do not connect the power supply or power on the product before confirming the area to which the workpiece moves is safe.**
   The movement of the workpiece may cause an accident.
7. **Do not touch the product when it is energized and for some time after power has been disconnected, as it is very hot.**
   It may lead to a burn due to the high temperature.
8. **Check the voltage using a tester for more than 5 minutes after power-off in case of installation, wiring and maintenance.**
   It may cause an electric shock, fire, or injury.

Handling

⚠Warning

9. **Static electricity may cause malfunction or break the controller. Do not touch the controller while power is supplied.**
   When touching the controller for maintenance, take sufficient measures to eliminate static electricity.
10. **Do not use the product in an area where dust, powder dust, water, chemicals or oil is in the air.**
    It will cause failure or malfunction.
11. **Do not use the product in an area where a magnetic field is generated.**
    It will cause failure or malfunction.
12. **Do not install the product in the environment of flammable gas, explosive gas and corrosive gas.**
    It could lead to fire, explosion and corrosion.
13. **Radiant heat from strong heat supplies such as a furnace, direct sunlight, etc., should not be applied to the product.**
    It will cause failure of the controller or its peripheral devices.
14. **Do not use the product in an environment subject to a temperature cycle.**
    It will cause failure of the controller or its peripheral devices.
15. **Do not use the product in a place where surges are generated.**
    When there are units that generate a large amount of surge around the product (e.g., solenoid type lifters, high frequency induction furnaces, motors, etc.), this may cause deterioration or damage to the product's internal circuit. Avoid supplies of surge generation and crossed lines.
16. **Do not install the product in an environment under the effect of vibrations and impacts.**
    It will cause failure or malfunction.
17. **When a surge generating load such as a relay or solenoid valve is directly driven, use a product that incorporates a surge absorption element.**
18. **The power supplies should be separated between the driver power and the I/O signal power and both power supplies must not be of "inrush-current limited" type.**
    If the power supply is of "inrush-current limited" type, a voltage drop may occur during the acceleration or deceleration of the actuator.

Electric Actuators Precautions 6

Be sure to read before handling.

Controller/Driver and Peripheral Devices

Installation

⚠Warning

1. **Install the controller and its peripheral devices on a fire-proof material.**
   A direct installation on or near a flammable material may cause fire.
2. **Do not install the product in a place subject to vibrations and impacts.**
   It will cause failure or malfunction.
3. **Do not mount the controller and its peripheral devices together with a large-sized electromagnetic contactor or no-fuse breaker, which generates vibration, on the same panel. Mount them on different panels, or keep the controller and its peripheral devices away from such a vibration supply.**
4. **Install the controller and its peripheral devices on a flat surface.**
   If the mounting surface is distorted or not flat, an unacceptable force may be added to the housing, etc., to cause troubles.
5. **Take measure so that the operating temperature of the driver and its peripheral devices are within the range of the specifications. Also, the driver should be installed with 50 mm or larger spaces between each side of it and the other structures or components.**
   It may cause a malfunction of the driver and its peripheral devices and a fire.

Power Supply

⚠Caution

1. **Use a power supply that has low noise between lines and between power and ground.**
   In cases where noise is high, an isolation transformer should be used.
2. **To prevent surges from lightning, an appropriate measure should be taken. Ground the surge absorber for lightning separately from the grounding of the controller and its peripheral devices.**

Grounding

⚠Warning

1. **Be sure to carry out grounding in order to ensure the noise tolerance.**
2. **Dedicated grounding should be used.**
   Grounding should be to a D-class ground. (Ground resistance of 100 Ω or less)
3. **Grounding should be performed near the controller and its peripheral devices to shorten the grounding distance.**
4. **In the unlikely event that malfunction is caused by the ground, it may be disconnected.**

Wiring

⚠Warning

1. **Do not apply any excessive force to cables by repeated bending, tensioning or placing a heavy object on the cables.**
   It may cause an electric shock, fire, or breaking of wire.
2. **Connect wires and cables correctly.**
   Incorrect wiring could break the driver or its peripheral devices depending on the seriousness.
3. **Do not connect wires while the power is supplied.**
   It can break the driver or its peripheral devices could be damaged to cause a malfunction.
4. **Do not carry the product by holding its cables.**
   It may cause an injury or damage to the product.
5. **Do not connect power or high voltage cables in the same wiring path as the unit.**
   The product can malfunction due to noise and surge voltage interference in the signal line from the power and high voltage cables.
   Separate the wiring of the driver and its peripheral device from that of power and high voltage cables.
6. **Verify wiring insulation.**
   Insulation failure (interference with other circuits, poor insulation between terminals, etc.) could introduce excessive voltage or current to the driver or its peripheral devices and damage them.

Maintenance

⚠Warning

1. **Perform a maintenance check periodically.**
   Confirm wiring and screws are not loose.
   Loose screws or wires may cause unintentional malfunction.
2. **Conduct an appropriate functional inspection after completing the maintenance.**
   At times where the equipment or machinery does not operate properly, conduct an emergency stop of the system. Otherwise, an unexpected malfunction may occur and it will become impossible to secure the safety. Conduct a test of the emergency stop in order to confirm the safety of the equipment.
3. **Do not disassemble, modify or repair the controller and its peripheral devices.**
4. **Do not put anything conductive or flammable inside of the controller.**
   It may cause a fire.
5. **Do not conduct an insulation resistance test and withstand voltage test on the product.**
6. **Ensure sufficient space for maintenance activities.**
   Design the system that allows required space for maintenance.

With 400 sales offices in 79 countries worldwide, our sales force of over 5,800 maintains close communication with customers.

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Revision history

Edition B
* Added a "Rated Load" table and "Dynamic Allowable Moment" graphs to the LEF series, Made to Order/Support guide (-X139).
* Added a motor option "With lock/motor cover" to the LEY/LEYG series.
* Added a manual override screw to the LES series.

SP

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