Electric Actuator

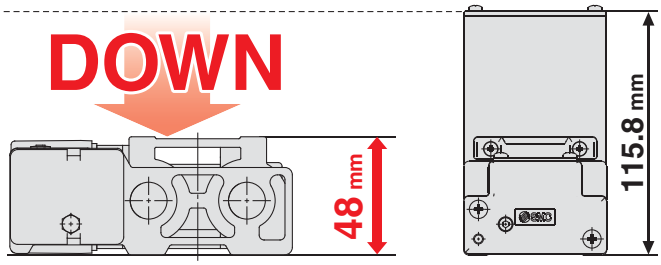
Guide Rod Slider | **Step Motor (Servo/24 VDC)**

New

CE RoHS

Low-profile/Flat Height 48 mm

Profile reduced by side mounting of motor

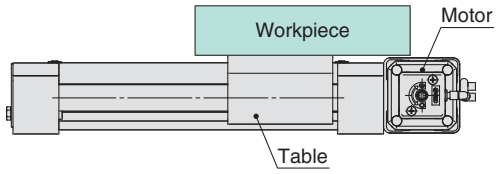


LEL25 LEFB25

Max. stroke: 1000 mm

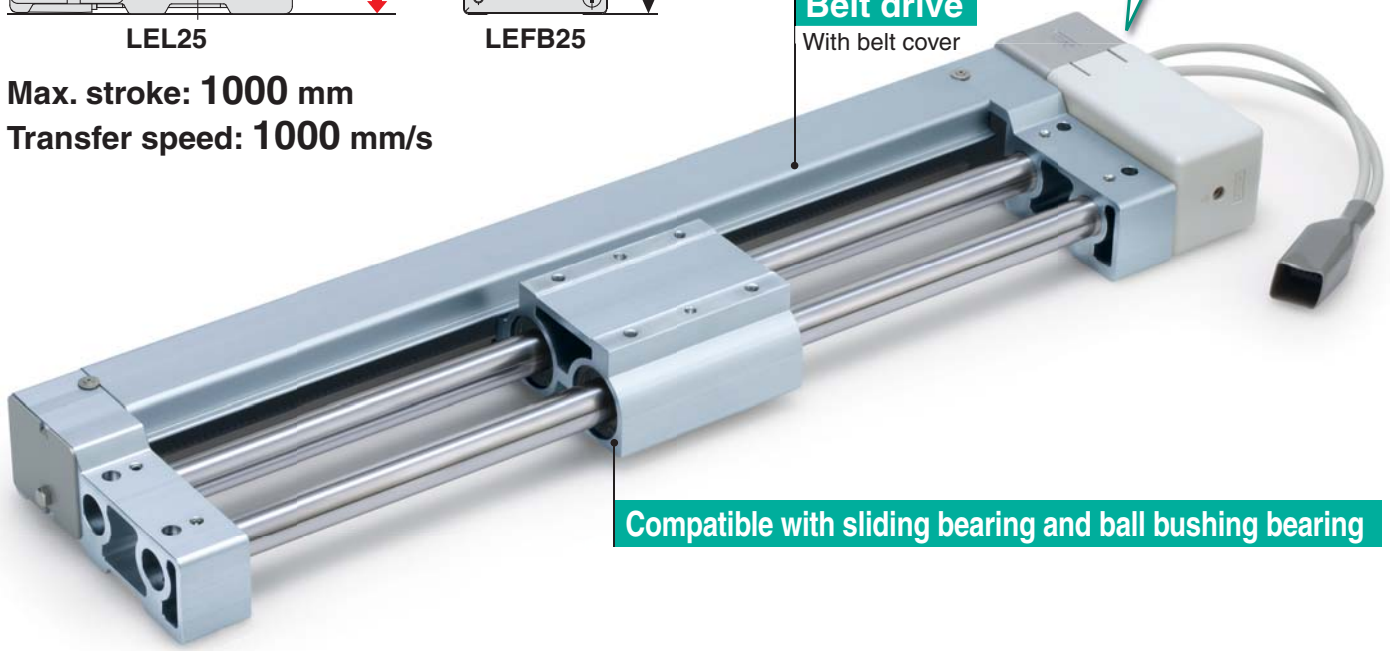
Transfer speed: 1000 mm/s

No interference with motor, even with large workpieces!



Belt drive

With belt cover



Compatible with sliding bearing and ball bushing bearing

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

Offering 2 types of controller



▶**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

Series LEL

SMC

CAT.EUS100-101A-UK

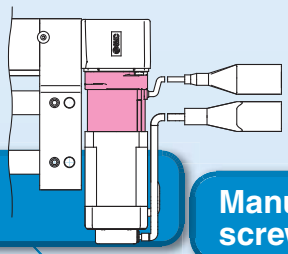
Step Motor (Servo/24 VDC) Type

Guide Rod Slider Size: 25

Simple construction.
Guide type can be selected.

Max. stroke: 1000 mm

Transfer speed: 1000 mm/s



Non-magnetizing lock (Option)

Holding a workpiece

Manual override screw

For manual table operation.
Adjustment operation possible when power OFF

Compatible motor
Step motor (Servo/24 VDC)

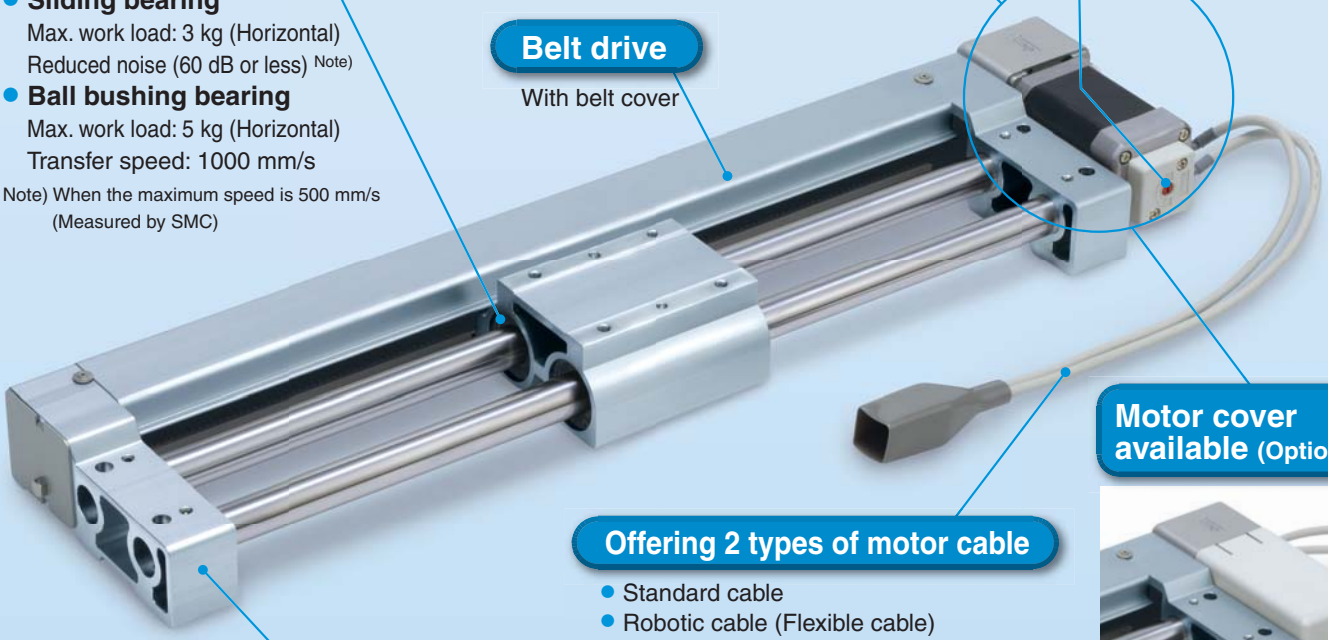
Guide type

- **Sliding bearing**
  Max. work load: 3 kg (Horizontal)
  Reduced noise (60 dB or less) Note)
- **Ball bushing bearing**
  Max. work load: 5 kg (Horizontal)
  Transfer speed: 1000 mm/s

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

Belt drive

With belt cover



Motor cover available (Option)

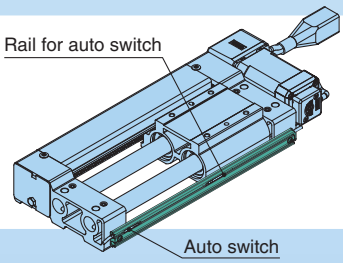
Offering 2 types of motor cable

- Standard cable
- Robotic cable (Flexible cable)

Auto switch mountable (Made to Order)

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

* The auto switches should be ordered separately. Refer to pages 8 and 9 for details.

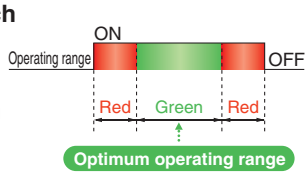


2-colour indication solid state auto switch

Appropriate setting of the mounting position can be performed without mistakes.

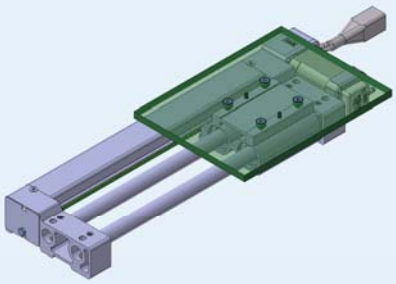
A green light lights up at the optimum operating range.



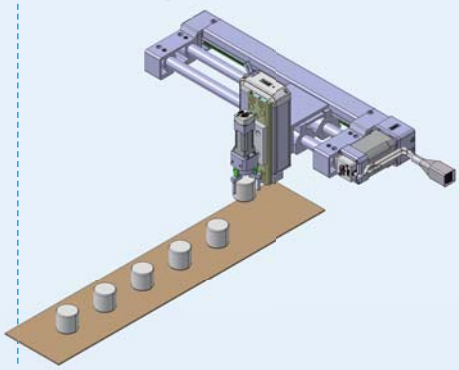


Application Examples

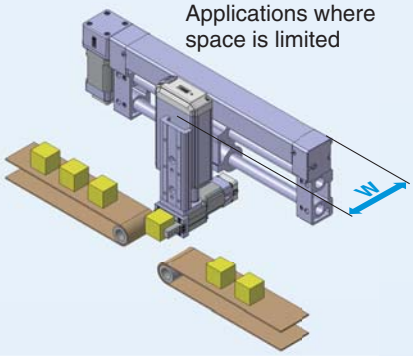
Load and unload transfer of workpieces



Pick and place



Applications where space is limited

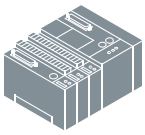


System Construction

Supplied by customer

PLC

Power supply for I/O signal 24 VDC



●I/O cable Pages 20, 30

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

●Controller



Step data input type
LECP6
Page 13



Programless type
LECP1
Page 24

Supplied by customer

Controller power supply 24 VDC



●Power supply connection Pages 16, 30

Controller type	Connection
LECP6 (Step data input type)	Power supply plug (accessory)
LECP1 (Programless type)	Power supply cable (1.5 m) (accessory)

●Controller setting kit (Option) Page 21

Controller setting kit
(Communication cable and USB cable are included.)
Part no.: LEC-W2



Communication cable●
(3 m)



●USB cable
(A-mini B type)

PC

●Actuator cable Pages 19, 29

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

Motor cable (Fixed)●

●Electric actuator

Electric actuator/ Page 4
Guide rod slider



Or

●Teaching box (Option) Page 22

Part no.: LEC-T1-3EG□



with 3 m cable

Offering 2 Types of Controller

Step data input type Series LECP6



Step Motor
(Servo/24 VDC)
LECP6

Simple Setting to Use Straight Away

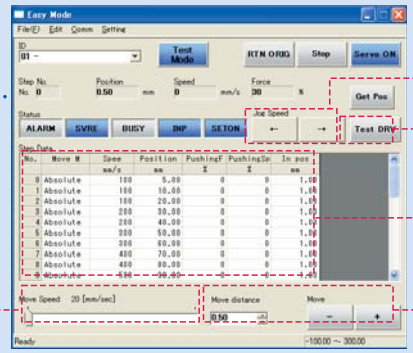
◎ Easy Mode for Simple Setting

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

<When using a PC>
Controller setting software

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



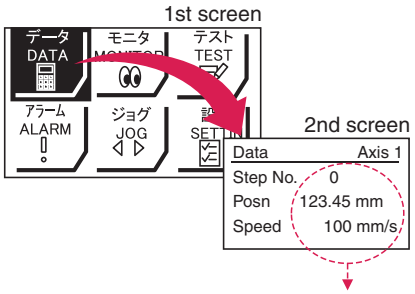


<When using a TB (teaching box)>

- 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.

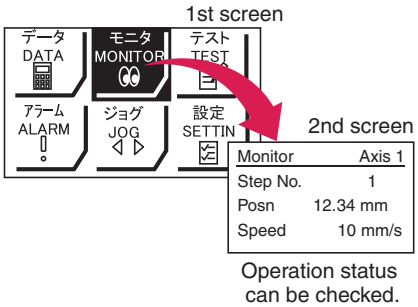


Example of setting the step data



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.)

Data	Axis 1
Step No.	0
Posn	50.00 mm
Speed	200 mm/s



Data	Axis 1
Step No.	1
Posn	80.00 mm
Speed	100 mm/s

Programless type Series LECP1

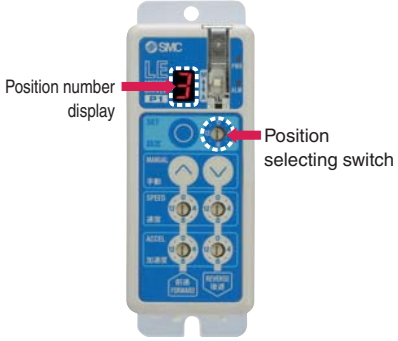


No Programming

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

Step Motor
(Servo/24 VDC)
LECP1

① Setting position number
Setting a registered number for the stop position
Maximum 14 points



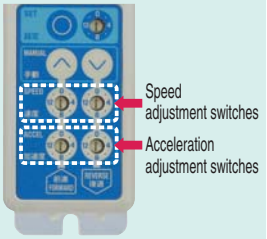
② Setting a stop position
Moving the actuator to a stop position using FORWARD and REVERSE buttons



③ Registration
Registering the stop position using SET button



Speed/Acceleration
16-level adjustment



◎Normal Mode for Detailed Setting

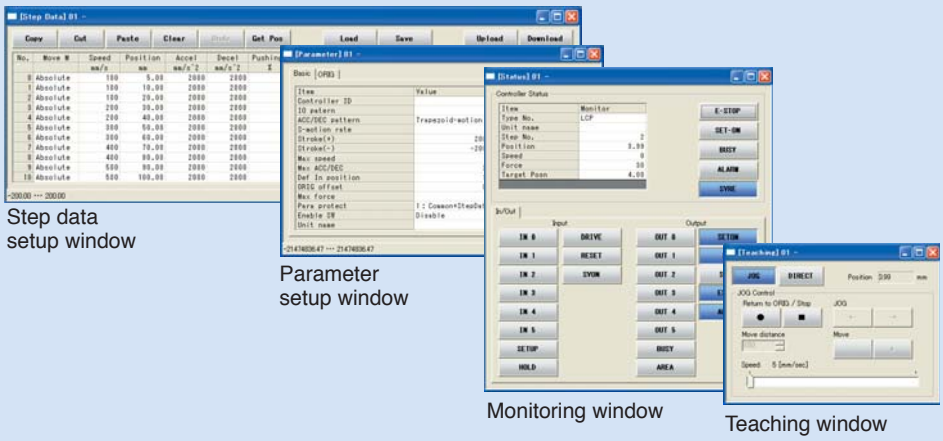
Select normal mode when detailed setting is required.

- 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 using a PC> 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 using a TB (teaching box)>

- 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.



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

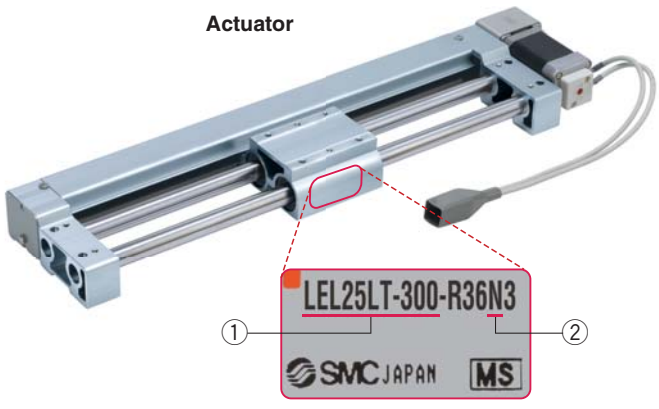
Confirm that the combination of the controller and the actuator is correct.

<Check the following before use.>

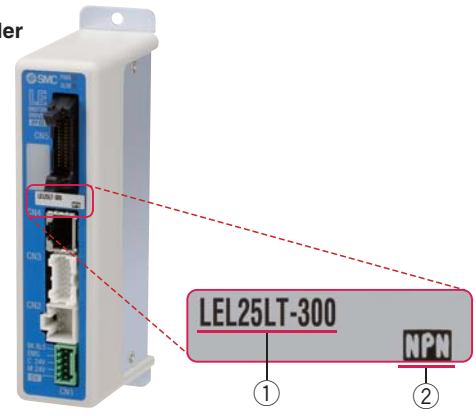
① Check the actuator label for model number matches the controller label.

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

Actuator



Controller



Function

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

Setting Items

TB: Teaching box PC: Controller setting software

Item		Details	Step data input type LECP6	Easy mode		Normal mode	Programless type LECP1
				TB	PC	TB, PC	
Step data setting (Excerpt)	Movement method	Selection of "absolute position" and "relative position"	Set at ABS/INC	×	●	●	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%	●	●	●	Select from 3-level (weak, medium, strong)
	Trigger LV	Target force during pushing operation	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	×	●	●	Fixed value
	Positioning force	Force during positioning operation	Set to 100%	×	●	●	Fixed value
	Area output	Conditions for area output signal to turn ON	Set in units of 0.01 mm	×	●	●	—
	In position	[Position]: Width to the target position [Pushing]: How much it moves during pushing	Set to 1 mm or more (Units: 0.01 mm)	×	●	●	Fixed value
Parameter setting (Excerpt)	Stroke (+)	+ side limit of position	Set in units of 0.01 mm	×	×	●	Fixed value
	Stroke (–)	– side limit of position	Set in units of 0.01 mm	×	×	●	Fixed value
	ORIG direction	Direction of the return to the original position can be set.	Compatible	×	×	●	Compatible
	ORIG speed	Speed when returning to the original position	Set in units of 1 mm/s	×	×	●	Fixed value
	ORIG ACC	Acceleration when returning to the original position	Set in units of 1 mm/s²	×	×	●	Fixed value
Test	JOG	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.		×	●	●	Press MANUAL button (⏶⏷) once for sizing operation (speed, sizing amount are specified values)
	Return to ORIG		Compatible	●	●	●	Compatible
	Test drive	Operation of the specified step data	Compatible	●	●	● (Continuous operation)	Compatible
	Forced output	ON/OFF of the output terminal can be tested.	Compatible	×	×	●	—
Monitor	DRV mon	Current position, speed, force and the specified step data can be monitored.	Compatible	●	●	●	—
	In/Out mon	Current ON/OFF status of the input and output terminal can be monitored.	Compatible	×	×	●	—
ALM	Status	Alarm currently being generated can be confirmed.	Compatible	●	●	●	Compatible (display alarm group)
	ALM Log record	Alarm generated in the past can be confirmed.	Compatible	×	×	●	—
File	Save/Load	Step data and parameter can be saved, forwarded and deleted.	Compatible	×	×	●	—
Other	Language	Can be changed to Japanese or English.	Compatible	●	●	●	—

Series Variations

Electric Actuator/Guide Rod Slider *Series LEL*



Model	Bearing	Stroke [mm]	Work load [kg]	Speed [mm/s]	Positioning repeatability [mm]	Controller series	Reference page
LEL25M	Sliding bearing	Up to 1000	3	Up to 500	±0.1	Series LECP6 Series LECP1	Page 1
LEL25L	Ball bushing bearing	Up to 1000	5	Up to 1000	±0.1		

Controller *LEC*



LECP6



Teaching Box



LECP1

Type	Series	Compatible motor	Power supply voltage	Parallel input/output		Number of positioning pattern points	Reference page
				Input	Output		
Step data input type	**LECP6**	Step motor (Servo/24 VDC)	24 VDC ±10%	11 inputs (Photo-coupler isolation)	13 outputs (Photo-coupler isolation)	64	Page 13
Programless type	**LECP1**	Step motor (Servo/24 VDC)	24 VDC ±10%	6 inputs (Photo-coupler isolation)	6 outputs (Photo-coupler isolation)	14	Page 24

Rod Type

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



CAT.ES100-83

Basic type
Series LEY

Size	Stroke
16	30 to 300
25	30 to 400
32	30 to 500



In-line motor type
Series LEY□D

Size	Stroke
16	30 to 300
25	30 to 400
32	30 to 500



Guide rod type
Series LEYG

Size	Stroke
16	30 to 200
25	30 to 300
32	30 to 300



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

Size	Stroke
16	30 to 200
25	30 to 300
32	30 to 300



Rod Type

AC Servo Motor (100/200 W)



CAT.ES100-83

Basic type
Series LEY

Size	Stroke
25	30 to 400
32	30 to 500



In-line motor type
Series LEY□D

Size	Stroke
25	30 to 400
32	30 to 500



Slider Type

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



CAT.ES100-87

Ball screw drive
Series LEFS

Size	Stroke
16	100 to 400
25	100 to 600
32	100 to 800
40	200 to 1000



Belt drive
Series LEFB

Size	Stroke
16	300 to 1000
25	300 to 2000
32	300 to 2000



Ball screw drive
Series LEFS

Size	Stroke
25	100 to 600
32	100 to 800
40	200 to 1000



Guide Rod Slider

Step Motor (Servo/24 VDC)



CAT.ES100-101

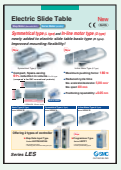
Belt drive
Series LEL

Size	Stroke
25	100 to 1000



Slide Table

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



CAT.ES100-78

Basic type (R type)
Series LESH□R

Size	Stroke
8	50, 75
16	50, 100
25	50, 100, 150



Symmetrical type (L type)
Series LESH□L

Size	Stroke
8	50, 75
16	50, 100
25	50, 100, 150



In-line motor type (D type)
Series LESH□D

Size	Stroke
8	50, 75
16	50, 100
25	50, 100, 150



Electric Actuators

Miniature Step Motor (Servo/24 VDC)



CAT.ES100-92

Rod type
Series LEPY

Size	Stroke
6	25, 50, 75
10	



Slide table type
Series LEPS

Size	Stroke
6	25, 50
10	



Rotary Table Step Motor (Servo/24 VDC)



CAT.ES100-94

Basic type
Series LER

Size	Rotation angle[°]
10	310, 180, 90
30	320, 180, 90
50	



High precision type
Series LERH

Size	Rotation angle[°]
10	310, 180, 90
30	320, 180, 90
50	



Gripper Step Motor (Servo/24 VDC)



CAT.ES100-77

Z type (2 fingers)
Series LEHZ

Size	Opening/closing stroke
10	4
16	6
20	10
25	14
32	22
40	30



With dust cover
Series LEHZJ

Size	Opening/closing stroke
10	4
16	6
20	10
25	14



F type (2 fingers)
Series LEHF

Size	Opening/closing stroke
10	16 (32)
20	24 (48)
32	32 (64)
40	40 (80)



S type (3 fingers)
Series LEHS

Size	Opening/closing stroke
10	4
20	6
32	8
40	12



Controller

Step data input type for step motor
Series LECP6

Control motor
Step motor (Servo/24 VDC)



Step data input type for servo motor
Series LECA6

Control motor
Servo motor (24 VDC)



Programless type
Series LECP1

Control motor
Step motor (Servo/24 VDC)



Driver

AC Servo Motor Driver Incremental type
Series LECSA

Control motor
AC servo motor (100/200 VAC)



AC Servo Motor Driver Absolute type
Series LECSB

Control motor
AC servo motor (100/200 VAC)



INDEX

Step Motor (Servo/24 VDC) Type

◎Electric Actuator/Guide Rod Slider Series LEL



Model Selection ..... Page 1
How to Order ..... Page 4
Specifications ..... Page 5
Construction ..... Page 6
Dimensions ..... Page 7
Auto Switch ..... Page 8
Specific Product Precautions ..... Page 10

◎Step Motor (Servo/24 VDC) Controller



Step Data Input Type/Series **LECP6** ..... Page 13
Controller Setting Kit/**LEC-W1** ..... Page 21
Teaching Box/**LEC-T1** ..... Page 22
Programless Controller/Series **LECP1** ..... Page 24

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

Series LEL

Model Selection



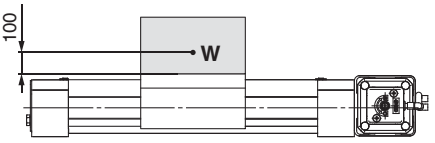
Selection Procedure

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

Selection Example

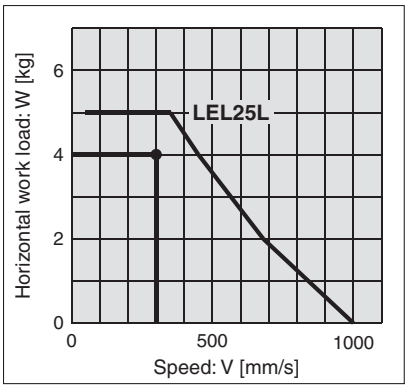
Operating conditions

- Workpiece mass: 4 [kg]
- Speed: 300 [mm/s]
- Acceleration/Deceleration: 3000 [mm/s²]
- Stroke: 500 [mm]
- Mounting orientation: Horizontal upward
- Workpiece mounting condition:



Step 1 **Check the work load–speed. <Speed–Work load graph>** (Pages 2 and 3)

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.



<Speed–Work load graph>
(LEL25L/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.

$T = T1 + T2 + T3 + T4$ [s]

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

  $T1 = V/a1$ [s] $T3 = V/a2$ [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.

  $T4 = 0.3$ [s]

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

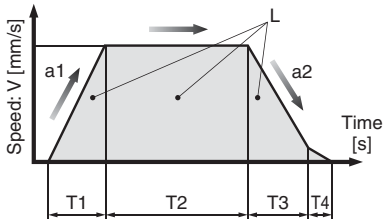
$T1 = V/a1 = 300/3000 = 0.1$ [s],
$T3 = V/a2 = 300/3000 = 0.1$ [s]

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

$T4 = 0.3$ [s]

Therefore, the cycle time can be obtained as follows.

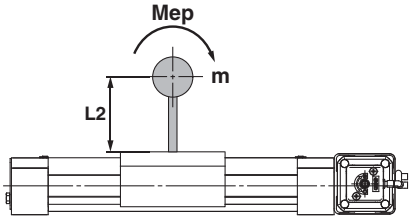
$T = T1 + T2 + T3 + T4$
$= 0.1 + 1.57 + 0.1 + 0.3$
$=$ **2.07 [s]**

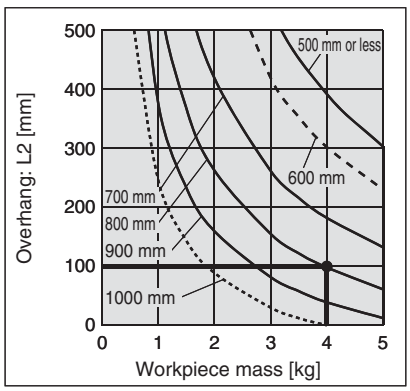


L : Stroke [mm]
··· (Operating condition)
V : Speed [mm/s]
··· (Operating condition)
a1 : Acceleration [mm/s²]
··· (Operating condition)
a2 : Deceleration [mm/s²]
··· (Operating condition)

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.**

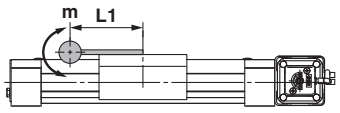
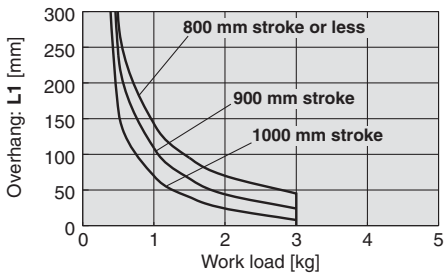
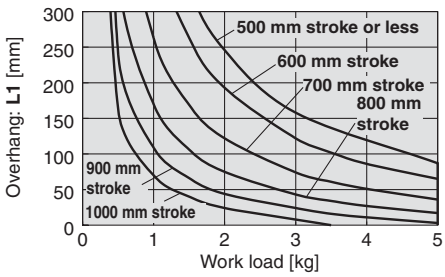
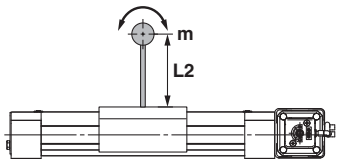
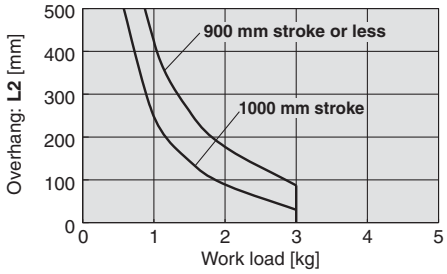
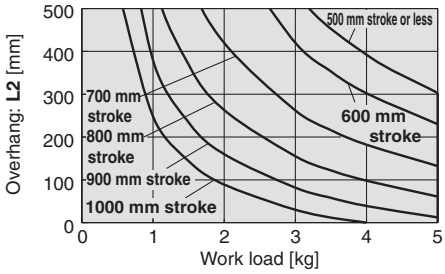
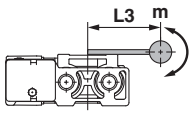
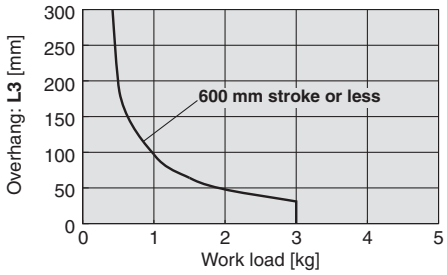
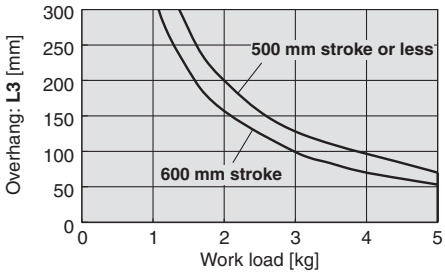
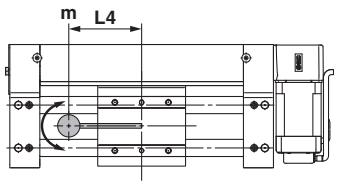
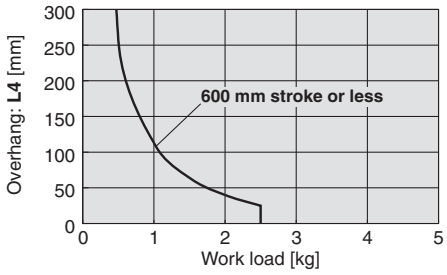
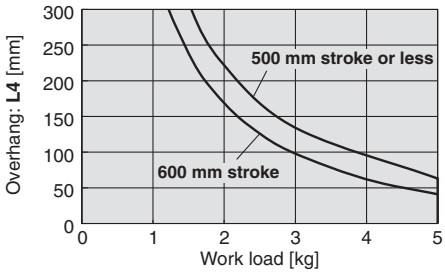
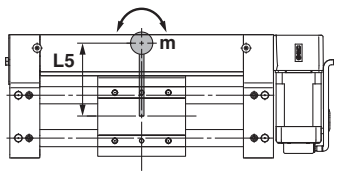
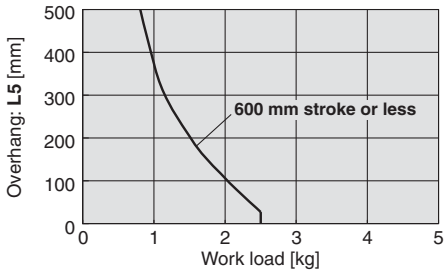
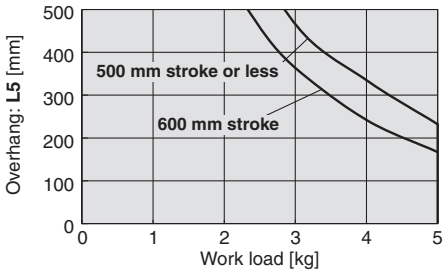
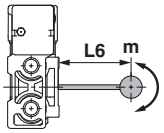
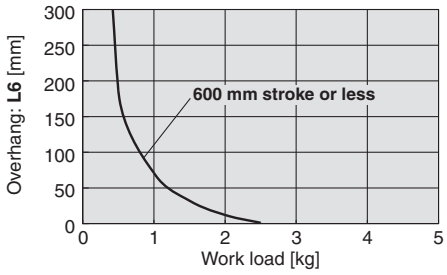
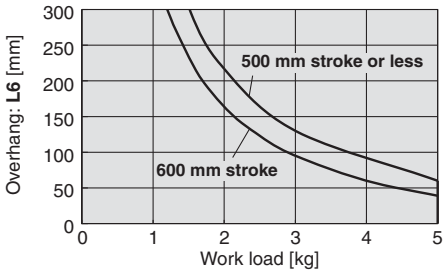




Based on the above calculation result, the LEL25LT-500 is selected.

SMC

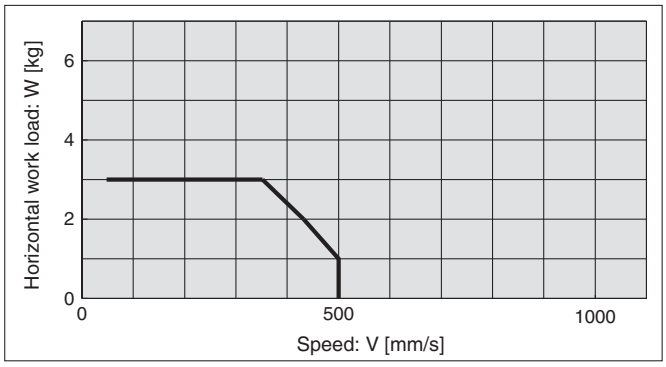
Dynamic Allowable Moment

Mounting orientation	Load overhanging direction **m:** Work load [kg] **L :** Overhang to the work load centre of gravity [mm]	Model LEL25M	Model LEL25L
Horizontal mounting			
			
			
Wall mounting			
			
			

Speed–Work Load Graph (Guide)

∗ These graphs show the allowable value for the actuator alone.
For applications where an exterior guide is mounted, please contact SMC.

LEL25M



LEL25L

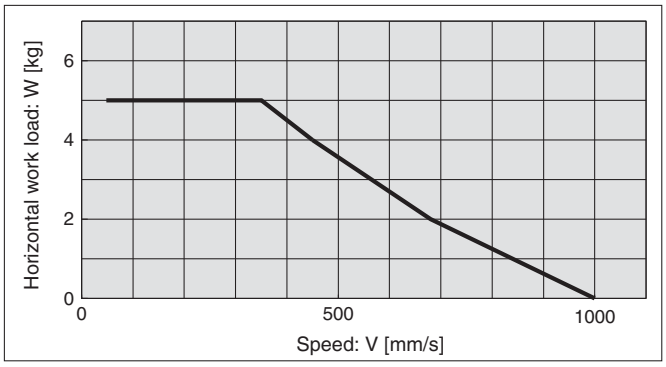
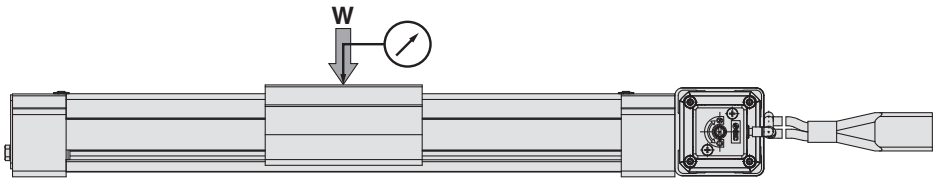
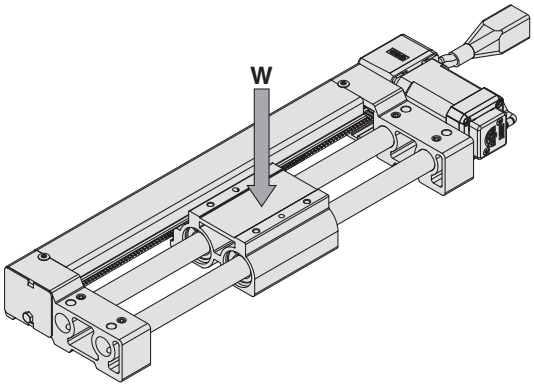


Table Displacement (Reference Value)

∗ Amount of displacement of the table when the load centre of gravity is located at the table centre in the middle of the stroke.





Load centre of gravity located at the centre of the table

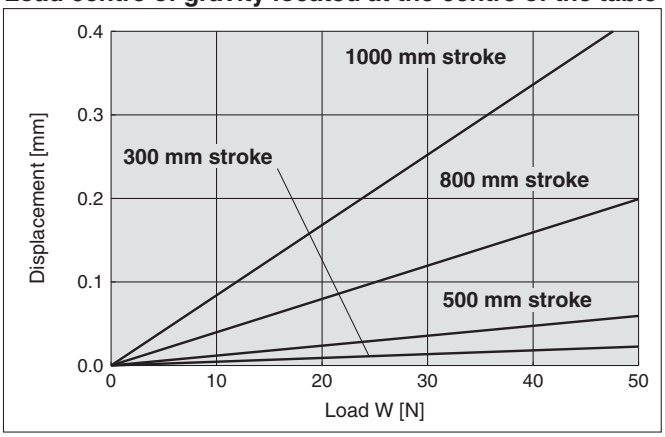
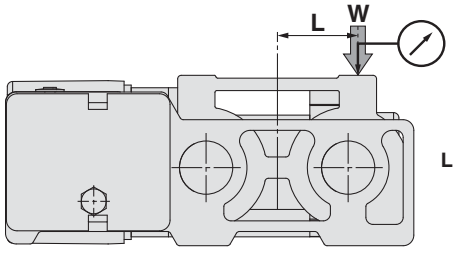
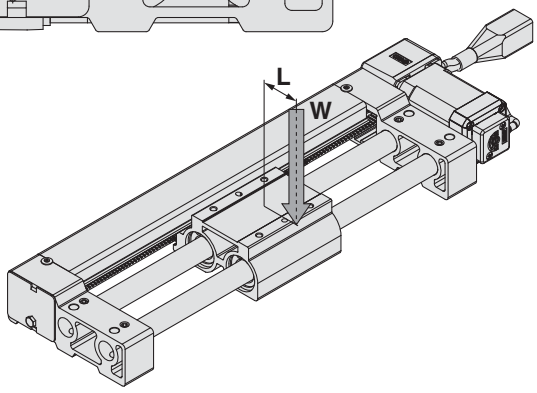


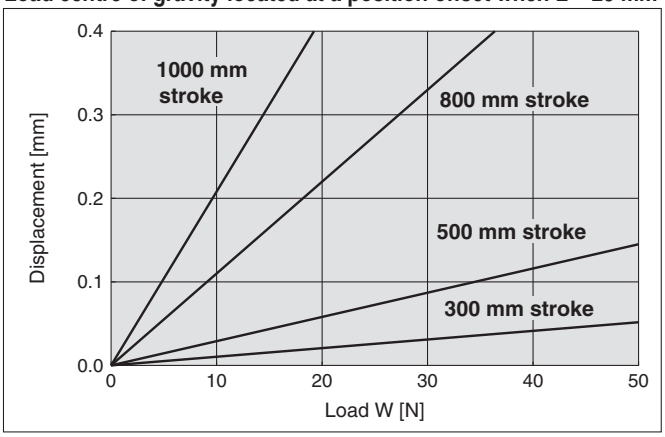
Table Displacement (Reference Value)

∗ Amount of displacement when the load is offset by "L" from the centre of the table.



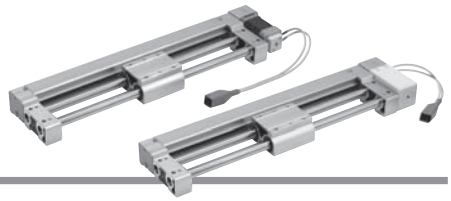


Load centre of gravity located at a position offset when L = 25 mm



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

Series LEL
LEL25



How to Order

LEL 25 M T – 100 ☐ – ☐ 1 6P 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

—	Without option
B	With lock
C	With motor cover∗

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

❻ Actuator cable type∗

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

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

❼ Actuator cable length [m]

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

∗ Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 2) on page 5.

❽ Controller type∗

—	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]

—	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

—	Screw mounting
D	DIN rail mounting∗1

∗ 1 Only available for the controller types "6N" and "6P"
∗ 2 DIN rail is not included. Order it separately.

⓫ Made to Order

—	Standard product
X5	With magnet/switch rail

Applicable Stroke Table ◐Standard/○ Produced upon receipt of order

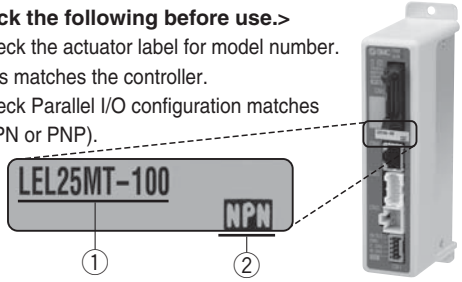
Model \ Stroke	100	200	300	400	500	600	700	800	900	1000
LEL25	○	○	◐	◐	◐	◐	○	○	○	○

The actuator and controller are sold as a package.
(Controller → Page 13)

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

Type	Step data input type	Programless type
		
Series	LECP6	LECP1
Features	Value input Standard controller	Capable of setting up operation without using a PC or teaching box
Compatible motor	Step motor (Servo/24 VDC)	
Max. number of step data	64 points	14 points
Power supply voltage	24 VDC	
Reference page	Page 13	Page 24

Specifications

Step Motor (Servo/24 VDC)

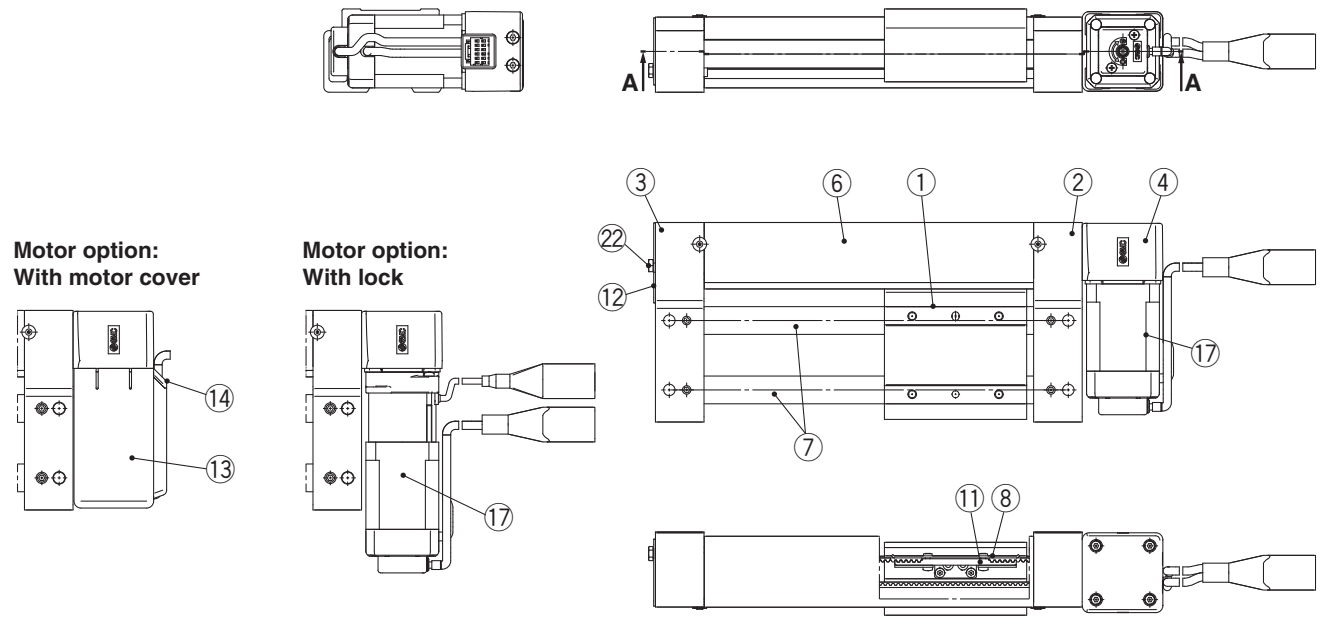
Model			LEL25M	LEL25L
Actuator specifications	Stroke [mm] Note1)		(100), (200), 300, 400, 500, 600 (700), (800), (900), (1000)	
	Work load [kg] Note 2)	Horizontal (Wall mounting)	3 (2.5)	5 (5)
	Speed [mm/s] Note 2)		48 to 500	48 to 1000
	Max. acceleration/deceleration [mm/s^2]		3000	
	Positioning repeatability [mm]		±0.1	
	Equivalent lead [mm]		48	
	Impact/Vibration resistance [m/s^2] 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	
	Momentary max. power consumption [W] Note 7)		60	
	Controller weight [kg]		LECP6: 0.15 (Screw mounting), 0.17 (DIN rail mounting), LECP1: 0.13	
Lock 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.
Note 2) Speed is changed by the work load. Check “Speed–Work Load Graph (Guide)” on page 3. The work load is changed by the stroke and work load mounting condition.
Check “Dynamic Allowable Moment” graph on page 2. 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) Power consumption (including the controller) is for when the actuator is operating.
Note 6) Standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during operation.
Note 7) Momentary max. 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.

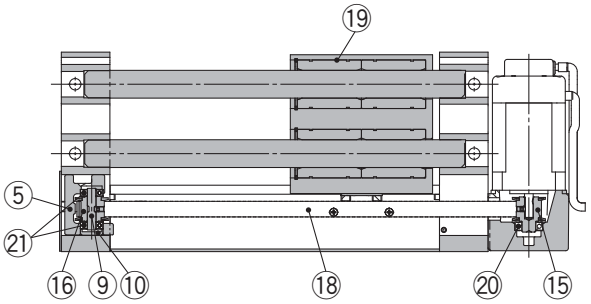
Actuator Product Weight

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									

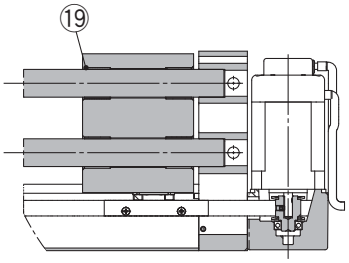
Construction



A-A (LEL25LT-□)



A-A (LEL25MT-□)

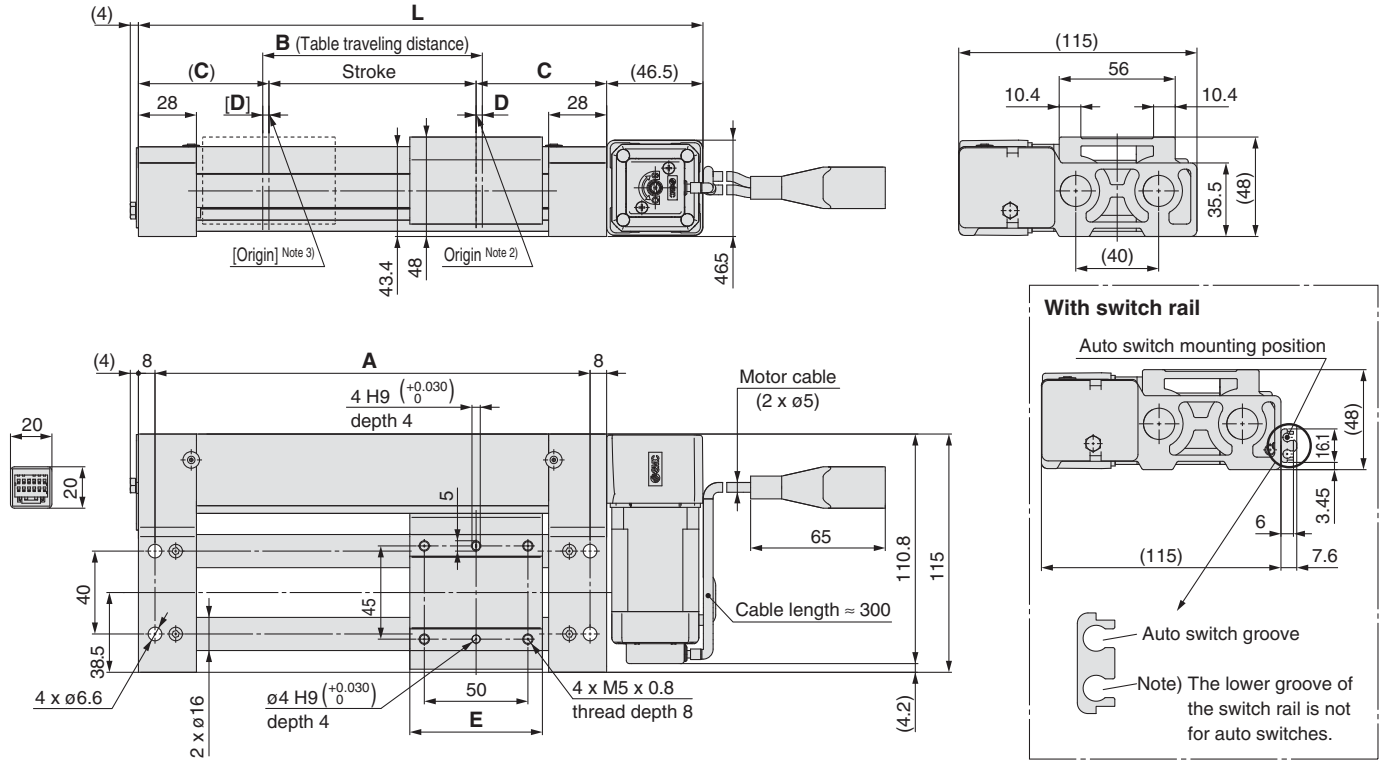


Component Parts

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

Dimensions

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



[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

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) The number in brackets indicates when the direction of return to origin has changed.

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

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.**



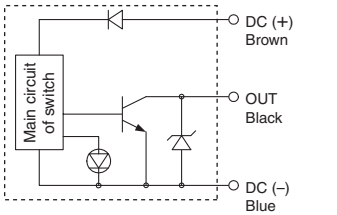
⚠Caution

Precautions

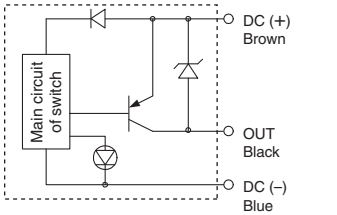
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

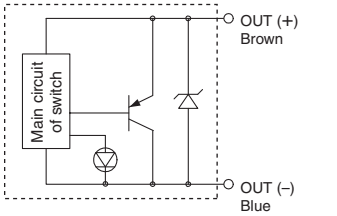
D-M9N(V)



D-M9P(V)



D-M9B(V)



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					

● 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

—	In-line
V	Perpendicular

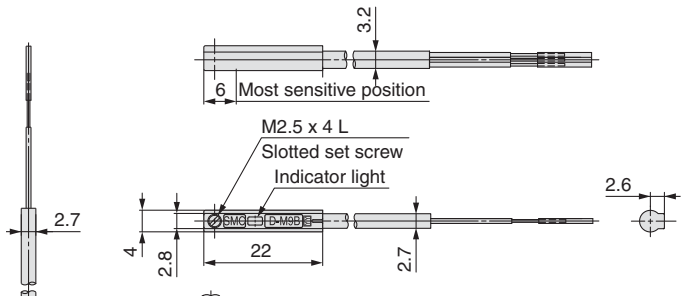
- Lead wire length

—	0.5 m
M	1 m
L	3 m
Z	5 m

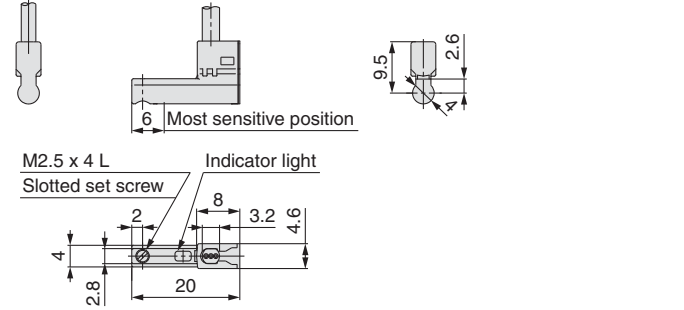
Dimensions

[mm]

D-M9□



D-M9□V



2-Colour 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 colour of the light. (Red → Green ← Red)**



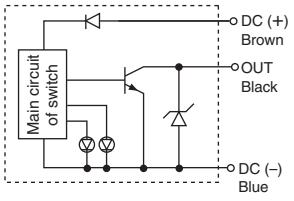
⚠Caution

Precautions

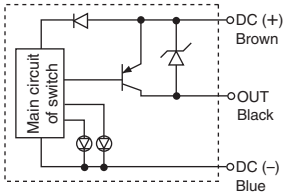
Fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

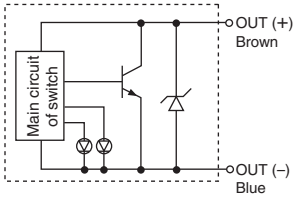
D-M9NW(V)



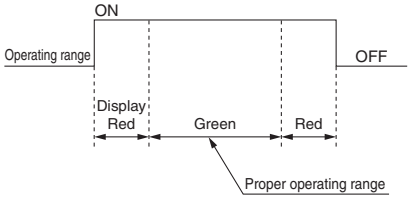
D-M9PW(V)



D-M9BW(V)



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					

● 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

—	In-line
V	Perpendicular

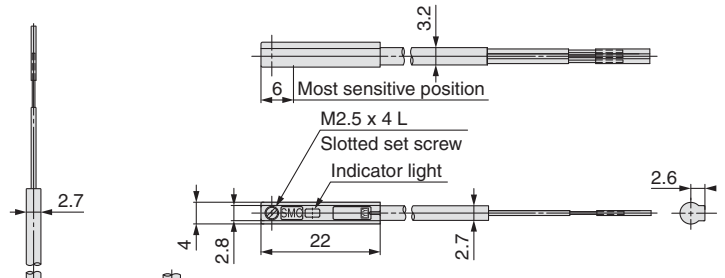
Lead wire length

—	0.5 m
M	1 m
L	3 m
Z	5 m

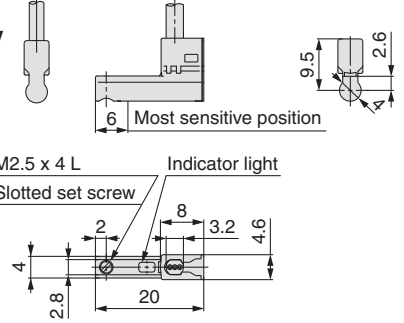
Dimensions

[mm]

D-M9□W



D-M9□WV



SMC

Electric Actuator/Guide Rod Slider Specific Product Precautions 1

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

Design

⚠Caution

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

A product should be selected based on the maximum load and allowable moment. If the product is used outside of the operating limit, eccentric load applied to the guide will become excessive and have adverse effects such as creating play at the guide, degraded accuracy and shortened product life.

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

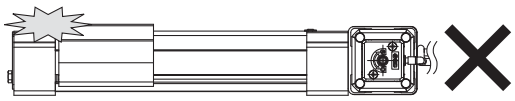
1) Positioning operation
When the product comes within the set range by step data [In position], the INP output signal will be turned on.
Initial value: Set to [1] or higher.

Handling

⚠Caution

3. Never hit at the stroke end other than returning to the original position.

The internal stopper can be broken.



4. The positioning force should be the initial value.

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

5. Actual speed of the product can be changed by load.

When selecting a product, check the catalogue for the instructions regarding selection.

6. Do not apply a load, impact or resistance in addition to a transferred load during returning to the original position.

Otherwise, the original position can be displaced since it is based on detected motor torque.

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

It may cause a loss of parallelism in the mounting surfaces, looseness in the guide unit, an increase in sliding resistance or other problems.

8. When attaching a workpiece, do not apply strong impact or large moment.

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

9. Keep the flatness of mounting surface 0.2 mm or less.

Insufficient flatness of a workpiece or base mounted on the body of the product can cause play at the guide and increased sliding resistance.

10. When mounting the product, keep the 40 mm or more for bending 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 back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smcworld.com

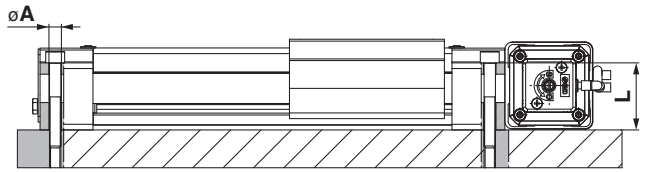
Handling

⚠Caution

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

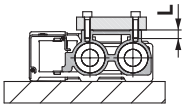
Tightening the screws with a higher torque than recommended may malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

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. Belt drive actuator cannot be used for vertically mounted 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 driven actuator, vibration may occur during operation at speeds within the actuator specification, 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

Controller

Step data input type ····· **Page 13**



Step Motor
(Servo/24 VDC)

Series LECP6

Programless type ····· **Page 24**



Step Motor
(Servo/24 VDC)

Series LECP1

Controller (Step data input type)
Step Motor (Servo/24 VDC)
Series LECP6



How to Order

LE C P 6 P □ □ – □

Controller

Compatible motor

P	Step motor (Servo/24 VDC)

Number of step data (Points)

6	64

Parallel I/O type

N	NPN
P	PNP

I/O cable length [m]

—	Without cable
1	1.5
3	3
5	5

Option

—	Screw mounting
D Note)	DIN rail mounting

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

Actuator part number

(Except cable specifications and actuator options)
Example: Enter "LEL25MT-100" for the LEL25MT-100B-R36N3.

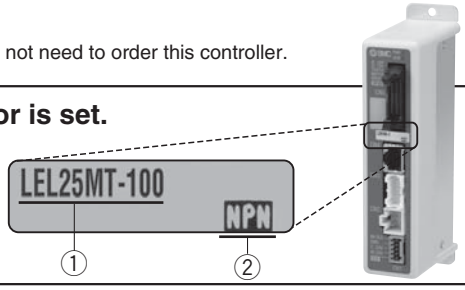
∗ When controller equipped type (-□6N□/-□6P□) is selected when ordering the LE series, you do not need to order this controller.

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

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

<Check the following before use.>

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



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

Specifications

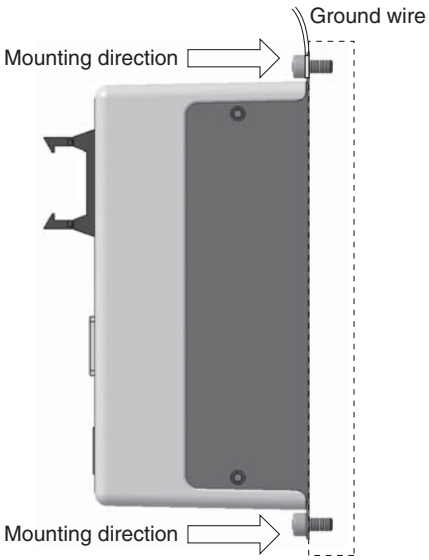
Basic Specifications

Item	Specifications
Compatible motor	Step motor (Servo/24 VDC)
Power supply Note 1)	Power voltage: 24 VDC ±10% Current consumption: 3 A (Peak 5 A) Note 2) [Including motor drive power, control power, stop, lock release]
Parallel input	11 inputs (Photo-coupler isolation)
Parallel output	13 outputs (Photo-coupler isolation)
Compatible encoder	Incremental A/B phase (800 pulse/rotation)
Serial communication	RS485 (Modbus protocol compliant)
Memory	EEPROM
LED indicator	LED (Green/Red) one of each
Lock control	Forced-lock release terminal Note 3)
Cable length [m]	I/O cable: 5 or less Actuator cable: 20 or less
Cooling system	Natural air cooling
Operating temperature range [°C]	0 to 40 (No freezing)
Operating humidity range [%RH]	90 or less (No condensation)
Storage temperature range [°C]	–10 to 60 (No freezing)
Storage humidity range [%RH]	90 or less (No condensation)
Insulation resistance [MΩ]	Between the housing (radiation fin) and SG terminal 50 (500 VDC)
Weight [g]	150 (Screw mounting) 170 (DIN rail mounting)

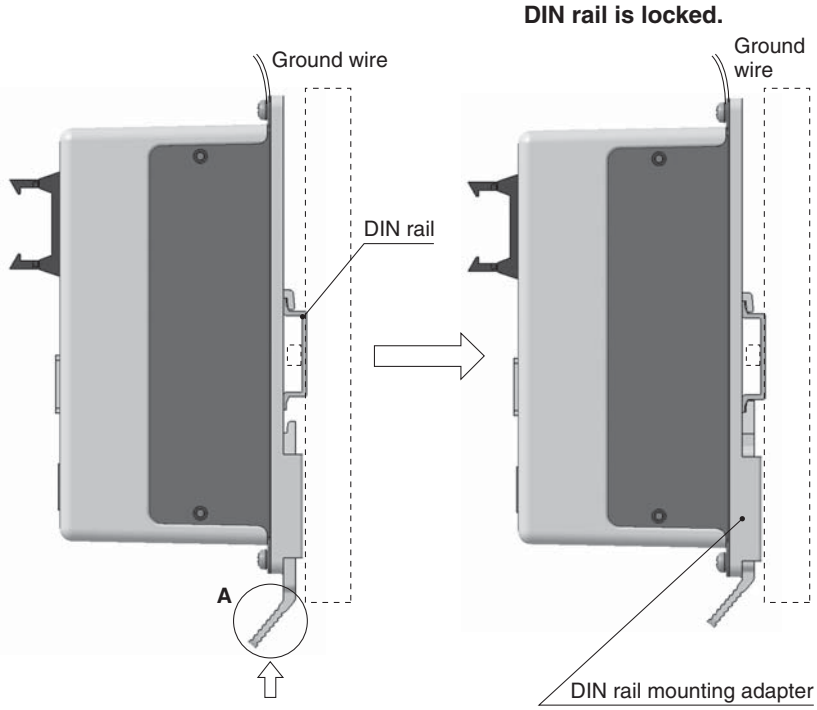
Note 1) Do not use the power supply of "inrush current prevention type" for the controller power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the specifications of actuator for more details.
Note 3) Applicable to non-magnetizing lock.

How to Mount

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



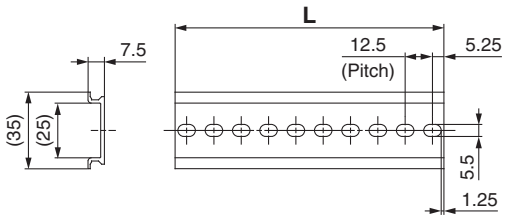
b) DIN rail mounting (LECP6□□D-□)
(Installation with the DIN rail)



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

DIN rail
AXT100-DR-□

∗ For □, enter a number from the "No." line in the table below.
Refer to the dimensions on page 15 for the mounting dimensions.



L Dimension [mm]

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L	23	35.5	48	60.5	73	85.5	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5	223	235.5	248	260.5

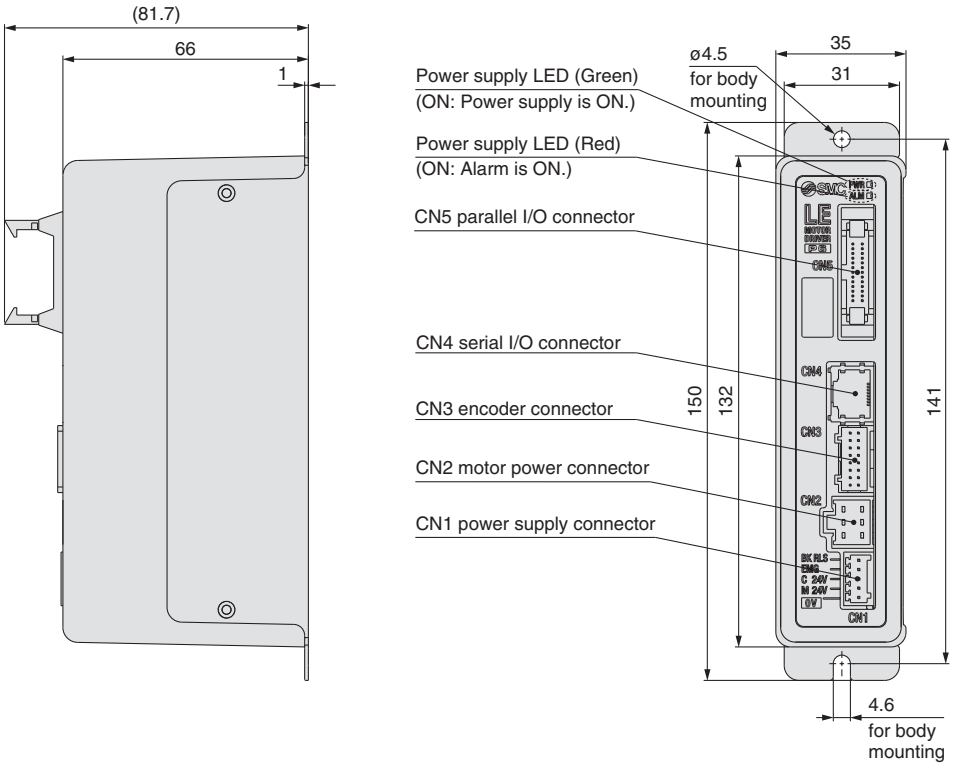
No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
L	273	285.5	298	310.5	323	335.5	348	360.5	373	385.5	398	410.5	423	435.5	448	460.5	473	485.5	498	510.5

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

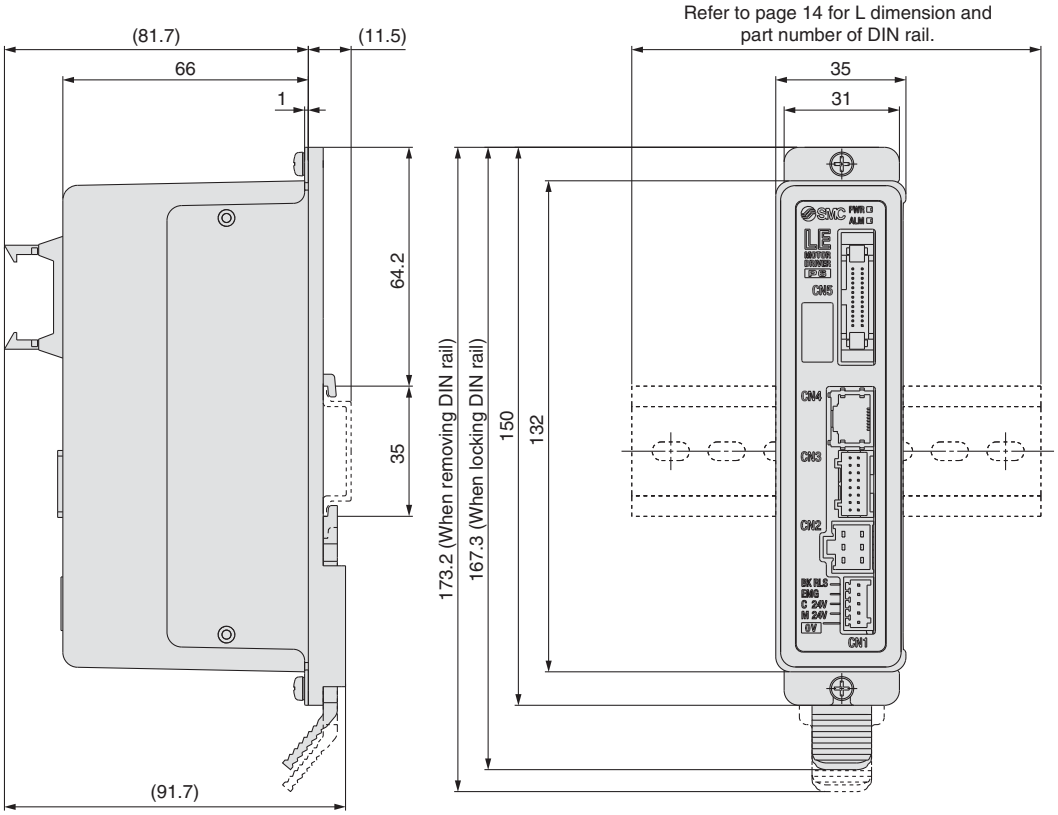
This should be used when the DIN rail mounting adapter is mounted onto the screw mounting type controller afterwards.

Dimensions

a) Screw mounting (LECP6□□-□)



b) DIN rail mounting (LECP6□□D-□)

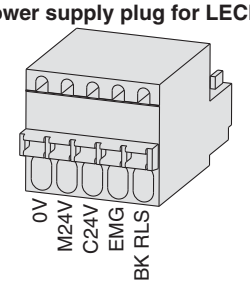


Wiring Example 1

Power Supply Connector: CN1

∗ Power supply plug is an accessory.

Power supply plug for LECP6



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

Terminal name	Function	Details
0V	Common supply (–)	M24V terminal/C24V terminal/EMG terminal/BK RLS terminal are common (–).
M24V	Motor power supply (+)	Motor power supply (+) supplied to the controller
C24V	Control power supply (+)	Control power supply (+) supplied to the controller
EMG	Stop (+)	Input (+) for releasing the stop
BK RLS	Lock release (+)	Input (+) for releasing the lock

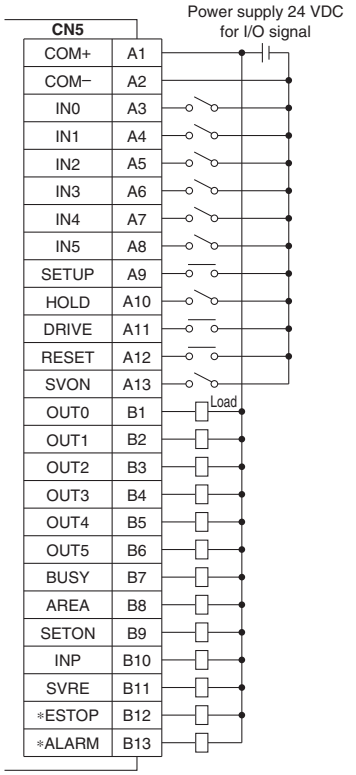
Wiring Example 2

Parallel I/O Connector: CN5

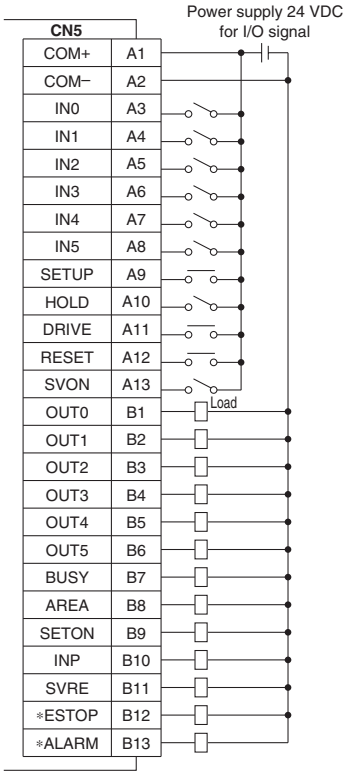
∗ When you connect a PLC, etc., to the CN5 parallel I/O connector, please use the I/O cable (LEC-CN5-□).
∗ The wiring should be changed depending on the type of the parallel I/O (NPN or PNP).

Wiring diagram

LECP6N□□-□ (NPN)



LECP6P□□-□ (PNP)



Input Signal

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

Output Signal

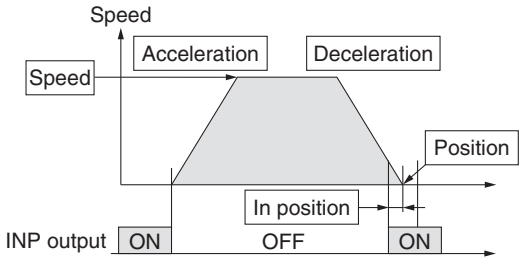
Name	Details
OUT0 to OUT5	Outputs the step data no. during operation
BUSY	Outputs when the actuator is moving
AREA	Outputs within the step data area output setting range
SETON	Outputs when returning to the original position
INP	Outputs when target position or target force is reached (Turns on when the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

Step data setting for positioning

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



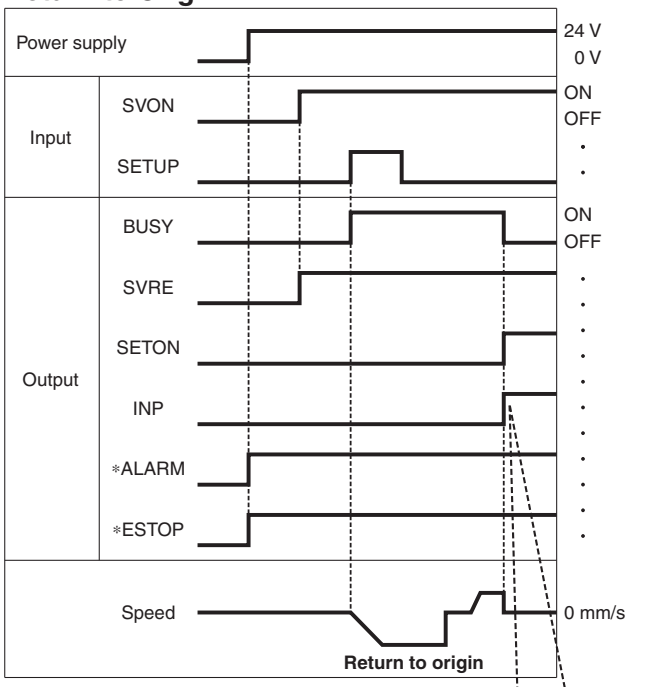
◎: Need to be set.
○: Need to be adjusted as required.
—: Setting is not required.

Step Data (Positioning)

Necessity	Item	Details
◎	Movement method	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.
○	Positioning 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.

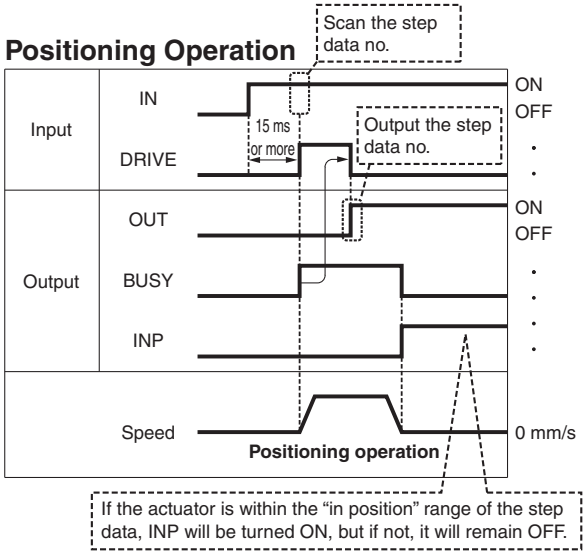
Signal Timing

Return to Origin



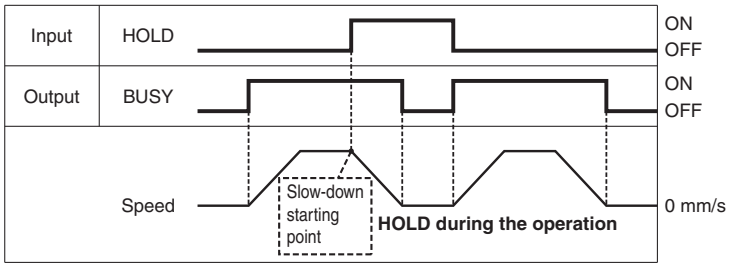
"∗ALARM" and "∗ESTOP" are expressed as negative-logic circuit.

Positioning Operation



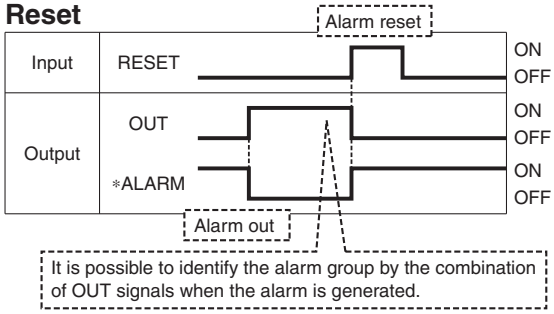
∗ "OUT" is output when "DRIVE" is changed from ON to OFF.
(When power supply is applied, "DRIVE" or "RESET" is turned ON or "∗ESTOP" is turned OFF, all of the "OUT" outputs are turned OFF.)

HOLD



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

Reset



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

Options: Actuator Cable

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

LE – CP – 1 – ☐

Cable length (L)[m]

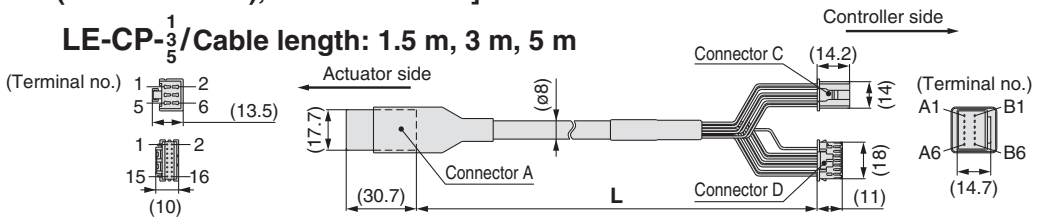
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

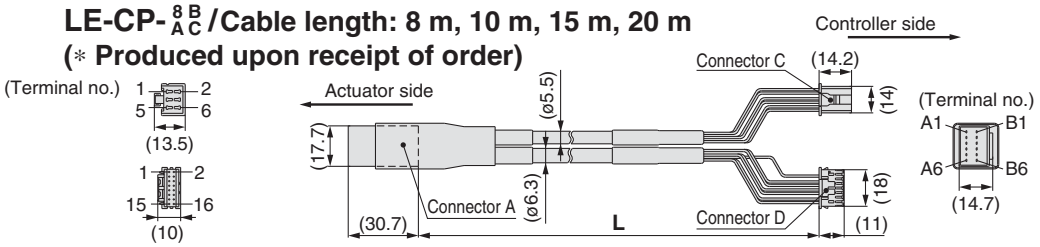
Cable type

—	Robotic cable (Flexible cable)
S	Standard cable

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



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



Circuit	Connector A terminal no.
A	B-1
$\overline{A}$	A-1
B	B-2
$\overline{B}$	A-2
COM-A/COM	B-3
COM-B/–	A-3
Vcc	B-4
GND	A-4
$\overline{A}$	B-5
A	A-5
$\overline{B}$	B-6
B	A-6

Shield

Cable colour	Connector C terminal no.
Brown	2
Red	1
Orange	6
Yellow	5
Green	3
Blue	4

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

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

LE – CP – 1 – B – ☐

Cable length (L)[m]

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

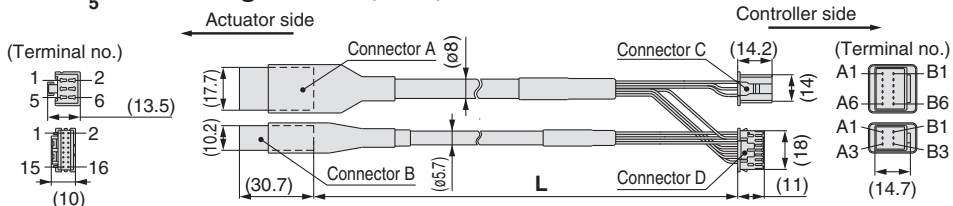
* Produced upon receipt of order (Robotic cable only)

With lock and sensor

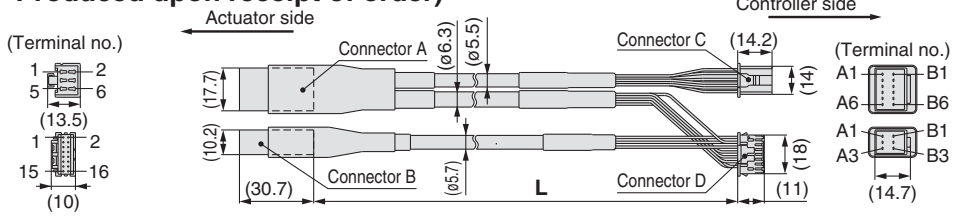
Cable type

—	Robotic cable (Flexible cable)
S	Standard cable

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



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



Circuit	Connector A terminal no.
A	B-1
$\overline{A}$	A-1
B	B-2
$\overline{B}$	A-2
COM-A/COM	B-3
COM-B/–	A-3
Vcc	B-4
GND	A-4
$\overline{A}$	B-5
A	A-5
$\overline{B}$	B-6
B	A-6

Shield

Cable colour	Connector C terminal no.
Brown	2
Red	1
Orange	6
Yellow	5
Green	3
Blue	4

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

Circuit	Connector B terminal no.
Lock (+)	B-1
Lock (–)	A-1
Sensor (+) Note)	B-3
Sensor (–) Note)	A-3

Red	4
Black	5
Brown	1
Blue	2

Note) This is not used for the LEL series.

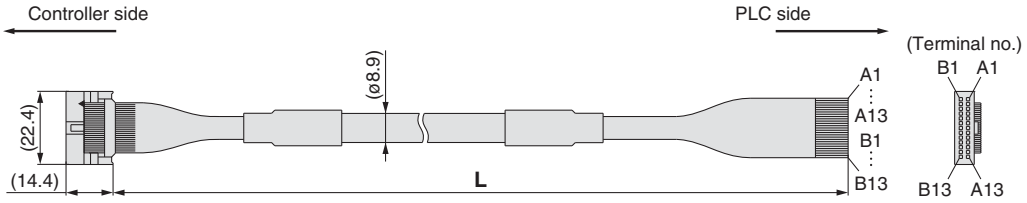
Options: I/O Cable

I/O cable

LEC − CN5 − 1

Cable length(L) [m]

1	1.5
3	3
5	5



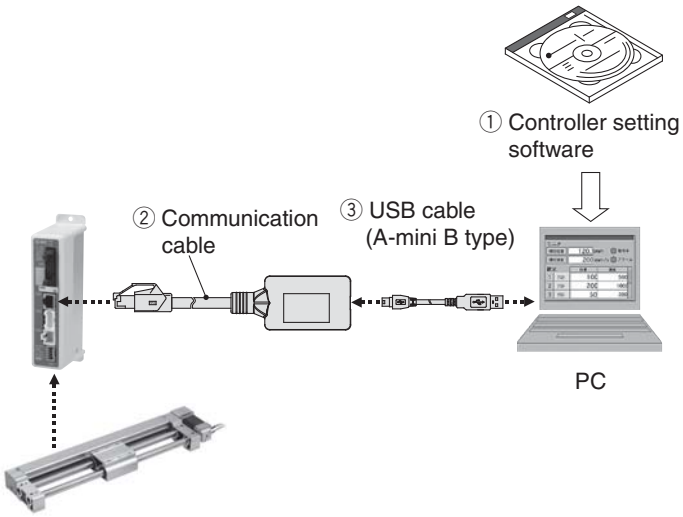
∗ Conductor size: AWG28

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

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

Series LEC

Controller Setting Kit/LEC-W2



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)

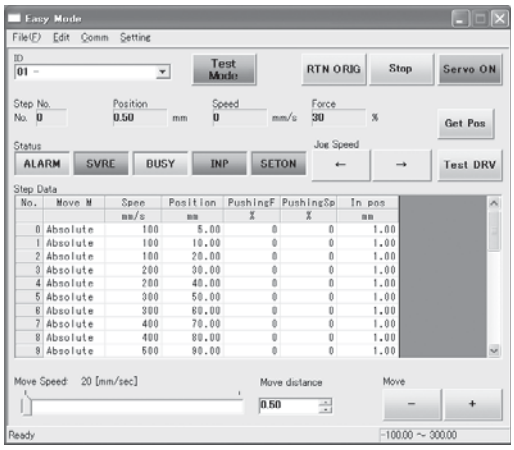
Hardware Requirements

PC/AT compatible machine installed with Windows XP and equipped with USB1.1 or USB2.0 ports.

∗ Windows® and Windows XP® are registered trademarks of Microsoft Corporation.

Screen Example

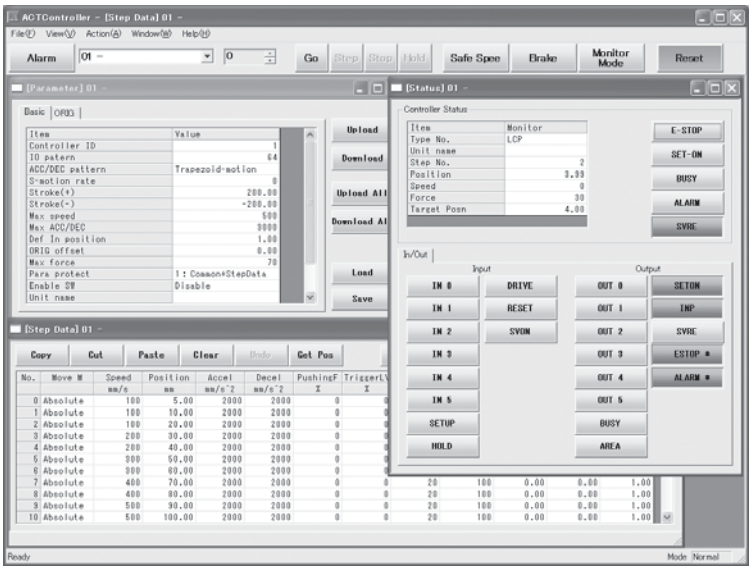
Easy mode screen example



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.

SMC

Series LEC

Teaching Box/LEC-T1



How to Order

LEC-T1-3EG□

Teaching box

Cable length [m]

3	3

Initial language

J	Japanese
E	English

Stop switch

G	Equipped with stop switch

Enable switch

—	None
S	Equipped with enable switch

∗ Interlock switch for jog and test function

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

Option
- **Enable switch is provided.**

Specifications

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

Note) CE-compliance
The EMC compliance of the teaching box was tested with the LECP6 series step motor controller (servo/24 VDC) and an applicable actuator.

Easy Mode

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

Menu Operations Flowchart

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

Data
Step data no.
Setting of two items selected below
(Position, Speed, Force, Acceleration, Deceleration)

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

Jog
Return to origin
Jog operation

Test
1 step operation

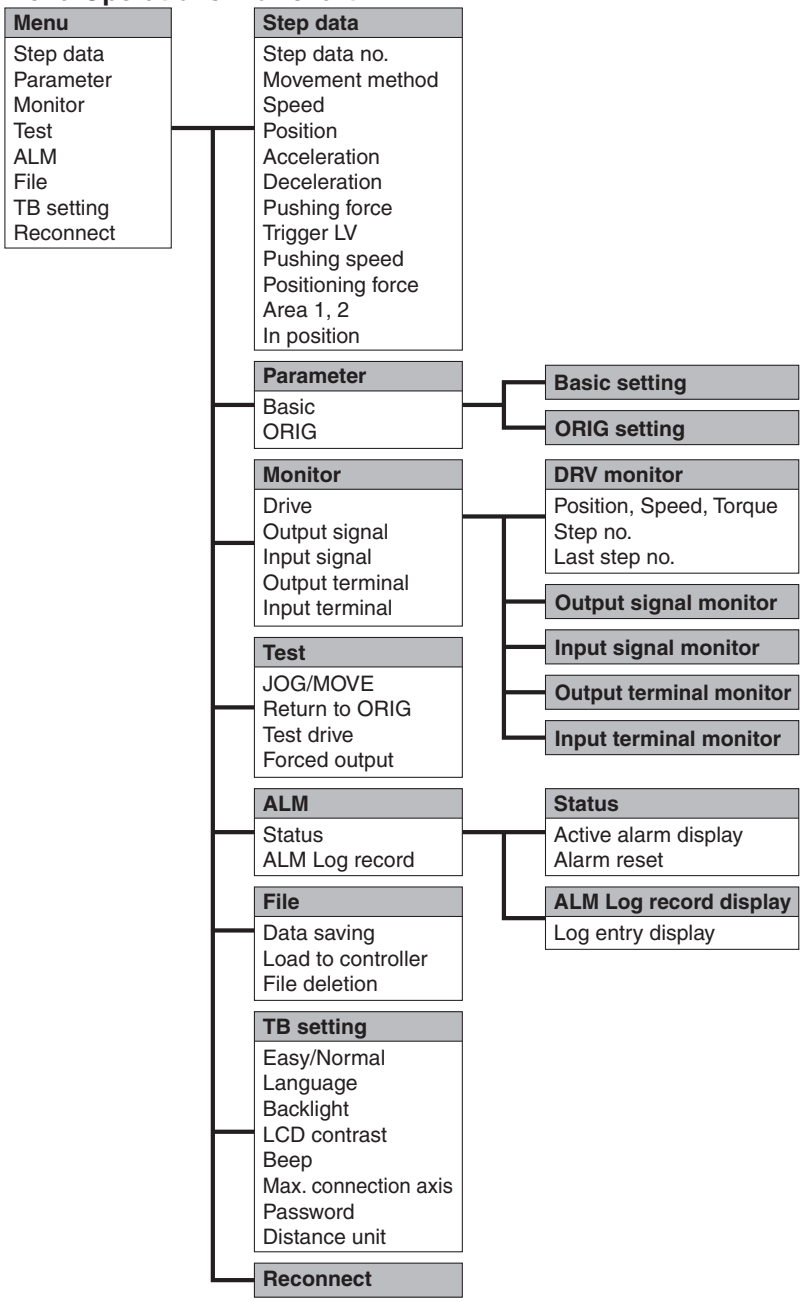
ALM
Active alarm display
Alarm reset

TB setting
Reconnect
Easy/Normal
Set item

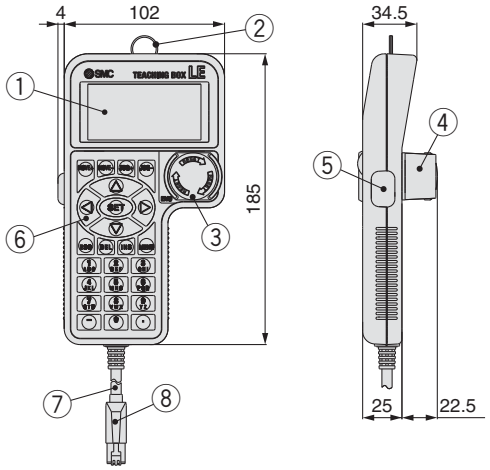
Normal Mode

Function	Details
Step data	• Step data setting
Parameter	• Parameters setting
Test	• Jog operation/Constant rate movement • Return to origin • Test drive (Specify a maximum of 5 step data and operate.) • Forced output (Forced signal output, Forced terminal output)
Monitor	• Drive monitor • Output signal monitor • Input signal monitor • Output terminal monitor • Input terminal monitor
ALM	• Active alarm display (Alarm reset) • Alarm log record display
File	• Data saving Save the step data and parameters of the controller which is being used for communication (it is possible to save four files, with one set of step data and parameters defined as one file). • Load to controller Loads the data which is saved in the teaching box to the controller which is being used for communication. • Delete the saved data.
TB setting	• Display setting (Easy/Normal mode) • Language setting (Japanese/English) • Backlight setting • LCD contrast setting • Beep sound setting • Max. connection axis • Distance unit (mm/inch)
Reconnect	• Reconnection of axis

Menu Operations Flowchart



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

Programless Controller
Series LECP1



How to Order

LE C P 1 P 1 – LEL25MT-100

Controller

Compatible motor

P	Step motor (Servo/24 VDC)

Number of step data (Points)

1	14 (Programless)

Parallel I/O type

N	NPN
P	PNP

I/O cable length [m]

—	Without cable
1	1.5
3	3
5	5

Actuator part number

(Except cable specifications and actuator options)
Example: Enter "LEL25MT-100" for the LEL25MT-100B-R36N3.

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

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

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

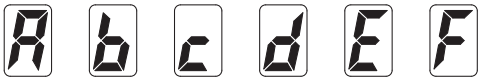
∗ Refer to the operation manual for using the products. Please download it via our website, http://www.smcworld.com

Specifications

Basic Specifications

Item	Specifications
Compatible motor	Step motor (Servo/24 VDC)
Power supply Note 1)	Power supply voltage: 24 VDC ±10% Max. current consumption: 3 A (Peak 5 A) Note 2) [Including the motor drive power, control power supply, stop, lock release]
Parallel input	6 inputs (Photo-coupler isolation)
Parallel output	6 outputs (Photo-coupler isolation)
Stop points	14 points (Position number 1 to 14(E))
Compatible encoder	Incremental A/B phase (800 pulse/rotation)
Serial communication	RS485 (Modbus protocol compliant)
Memory	EEPROM
LED indicator	LED (Green/Red) one of each
7-segment LED display Note 3)	1 digit, 7-segment display (red) Figures are expressed in hexadecimal ("10" to "15" in decimal number are expressed as "A" to "F")
Lock control	Forced-lock release terminal Note 4)
Cable length [m]	I/O cable: 5 or less Actuator cable: 20 or less
Cooling system	Natural air cooling
Operating temperature range [°C]	0 to 40 (No freezing)
Operating humidity range [%RH]	90 or less (No condensation)
Storage temperature range [°C]	–10 to 60 (No freezing)
Storage humidity range [%RH]	90 or less (No condensation)
Insulation resistance [MΩ]	Between the housing (radiation fin) and SG terminal 50 (500 VDC)
Weight [g]	130

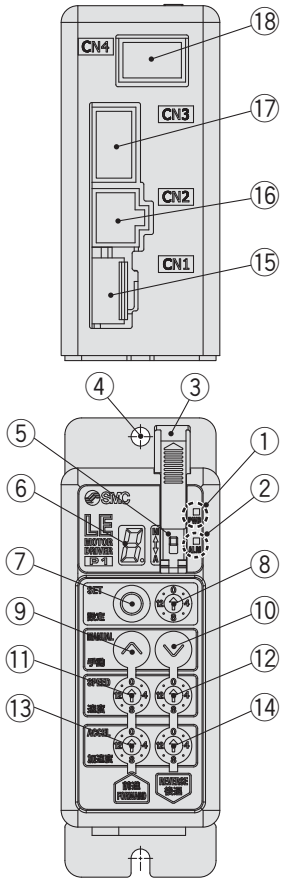
Note 1) Do not use the power supply of "inrush current prevention type" for the controller input power supply.
Note 2) The power consumption changes depending on the actuator model. Refer to the each actuator's operation manual etc. for details.
Note 3) "10" to "15" in decimal number are displayed as 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



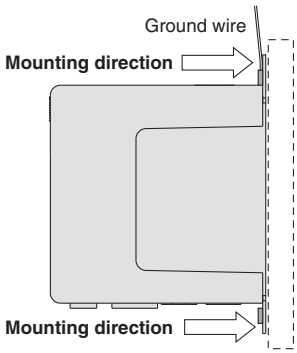
No.	Display	Description	Details
①	**PWR**	Power supply LED	Power supply ON/Servo ON : Green turns on Power supply ON/Servo OFF : Green flashes
②	**ALM**	Alarm LED	With alarm : Red turns on Parameter setting : Red flashes
③	—	Cover	Change and protection of the mode SW (Close the cover after changing SW)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

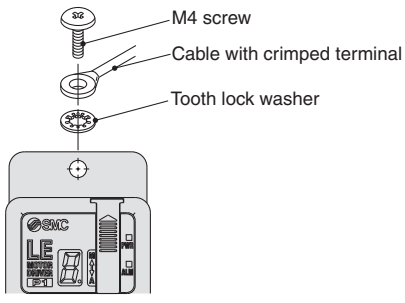
1. Mounting screw (LECP1□□-□)

(Installation with two M4 screws)



2. Grounding

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

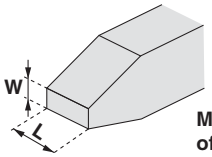


Controller

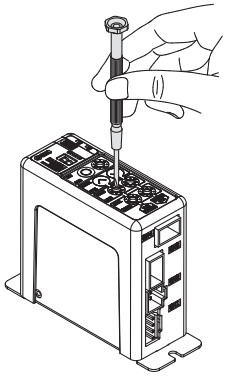
⚠Caution

- 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.

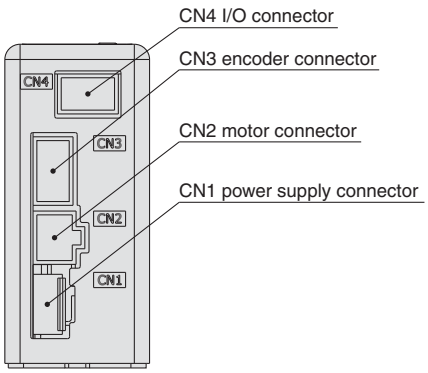
Size
End width **L**: 2.0 to 2.4 [mm]
End thickness **W**: 0.5 to 0.6 [mm]

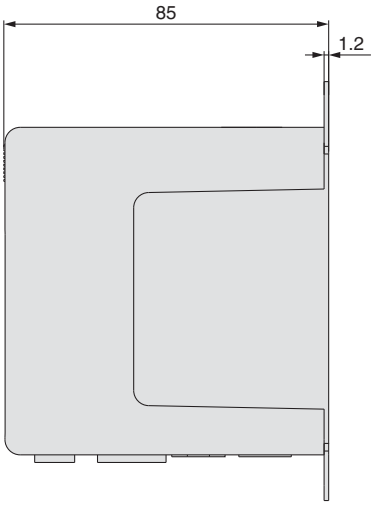


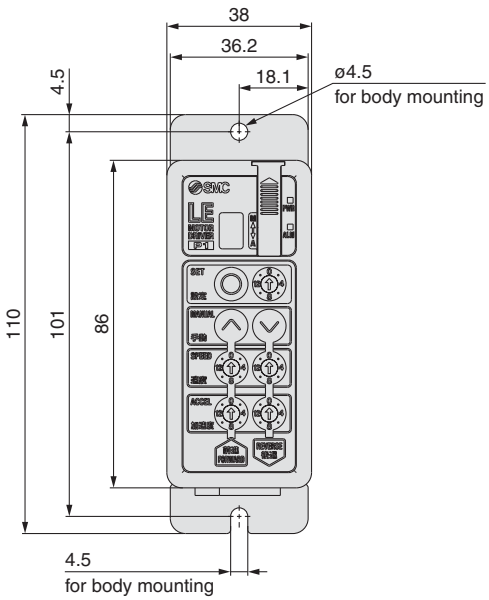
Magnified view of the end of the screwdriver



Dimensions


CN4 I/O connector
CN3 encoder connector
CN2 motor connector
CN1 power supply connector
CN4
CN3
CN2
CN1


85
1.2


38
36.2
18.1
ø4.5
for body mounting
4.5
110
101
86
4.5
for body mounting

Wiring Example 1

Power Supply Connector: CN1

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

CN1 Power Supply Connector Terminal for LECP1

Terminal name	Cable colour	Function	Details
0V	Blue	Common supply (–)	M24V terminal/C24V terminal/BK RLS terminal are common (–).
M24V	White	Motor power supply (+)	Motor power supply (+) supplied to the controller
C24V	Brown	Control power supply (+)	Control power supply (+) supplied to the controller
BK RLS	Black	Lock release (+)	Input (+) for releasing the lock

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

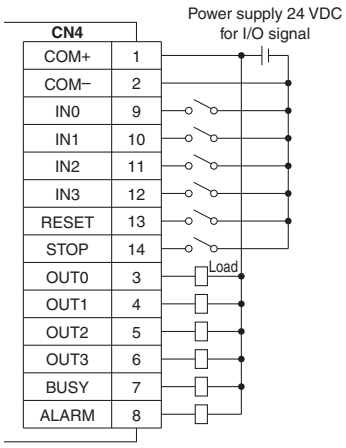


Wiring Example 2

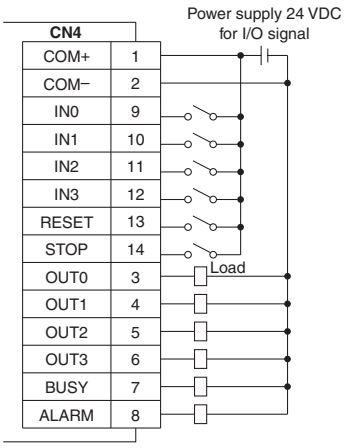
Parallel I/O Connector: CN4

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

■NPN



■PNP



Input Signal

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

Output Signal

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

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

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

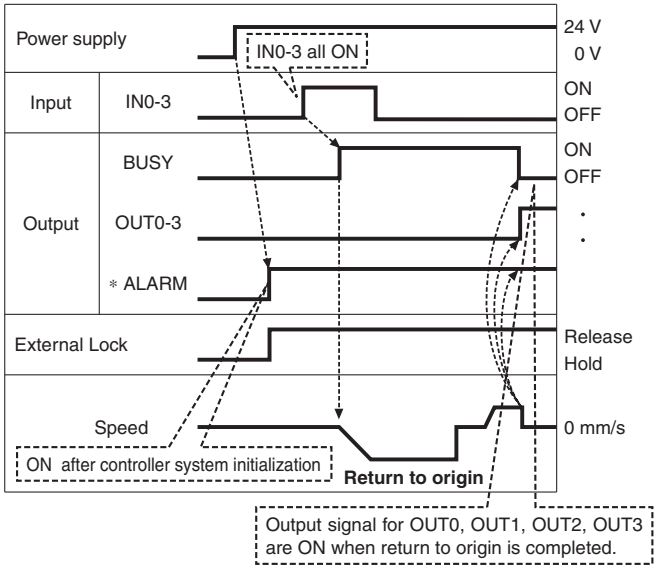
Position number	IN3	IN2	IN1	IN0
1	○	○	○	●
2	○	○	●	○
3	○	○	●	●
4	○	●	○	○
5	○	●	○	●
6	○	●	●	○
7	○	●	●	●
8	●	○	○	○
9	●	○	○	●
10 (A)	●	○	●	○
11 (B)	●	○	●	●
12 (C)	●	●	○	○
13 (D)	●	●	○	●
14 (E)	●	●	●	○
Retun to origin	●	●	●	●

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

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

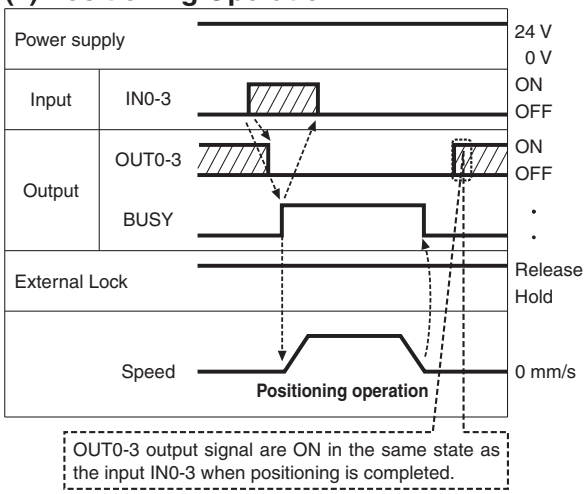
Signal Timing

(1) Return to Origin

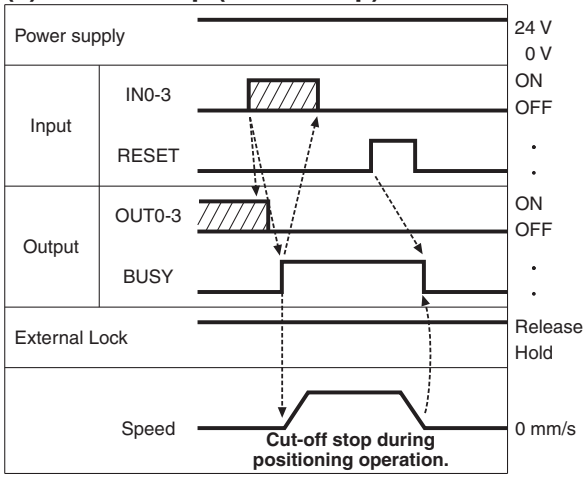


"∗ALARM" is expressed as negative-logic circuit.

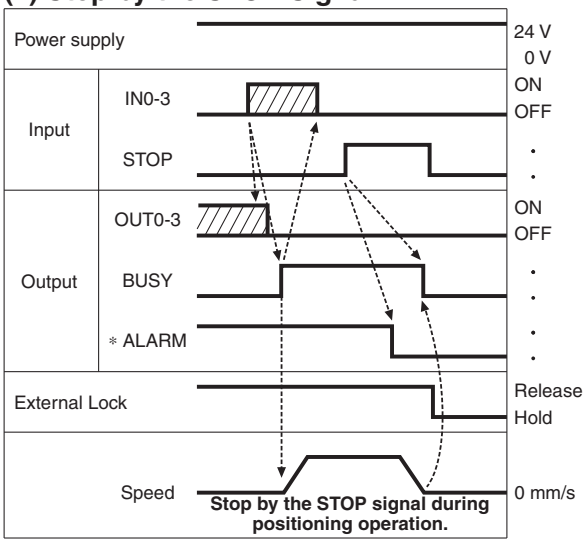
(2) Positioning Operation



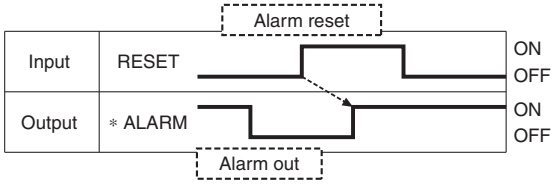
(3) Cut-off Stop (Reset Stop)



(4) Stop by the STOP Signal



(5) Alarm Reset



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

Options: Actuator Cable

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

LE – CP – 1 – ☐

Cable length (L)[m]

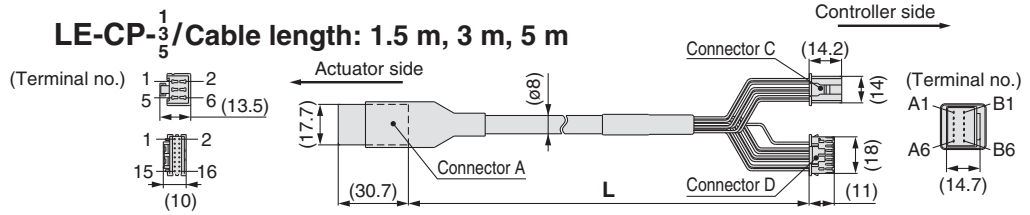
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)

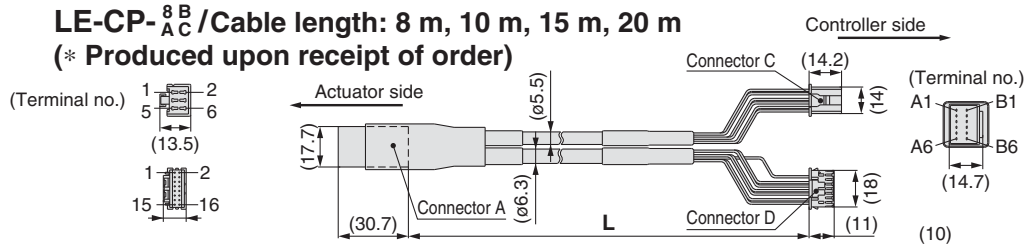
Cable type

—	Robotic cable (Flexible cable)
S	Standard cable

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



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



Circuit	Connector A terminal no.
A	B-1
$\overline{A}$	A-1
B	B-2
$\overline{B}$	A-2
COM-A/COM	B-3
COM-B/–	A-3
Vcc	B-4
GND	A-4
$\overline{A}$	B-5
A	A-5
$\overline{B}$	B-6
B	A-6

Shield

Cable colour	Connector C terminal no.
Brown	2
Red	1
Orange	6
Yellow	5
Green	3
Blue	4

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

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

LE – CP – 1 – B – ☐

Cable length (L)[m]

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

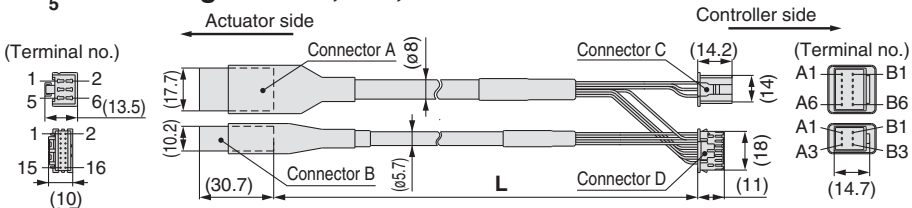
* Produced upon receipt of order (Robotic cable only)

With lock and sensor

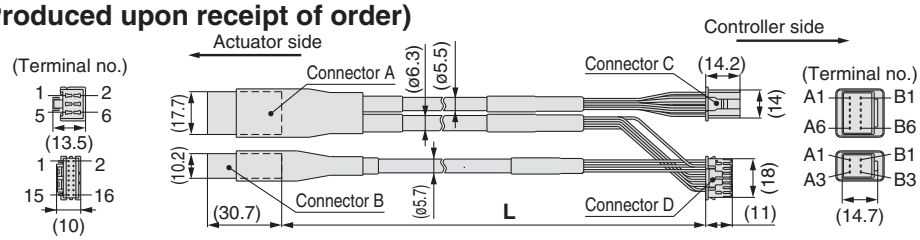
Cable type

—	Robotic cable (Flexible cable)
S	Standard cable

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



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



Circuit	Connector A terminal no.
A	B-1
$\overline{A}$	A-1
B	B-2
$\overline{B}$	A-2
COM-A/COM	B-3
COM-B/–	A-3
Vcc	B-4
GND	A-4
$\overline{A}$	B-5
A	A-5
$\overline{B}$	B-6
B	A-6

Shield

Cable colour	Connector C terminal no.
Brown	2
Red	1
Orange	6
Yellow	5
Green	3
Blue	4

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

Circuit	Connector B terminal no.
Lock (+)	B-1
Lock (–)	A-1
Sensor (+) Note)	B-3
Sensor (–) Note)	A-3

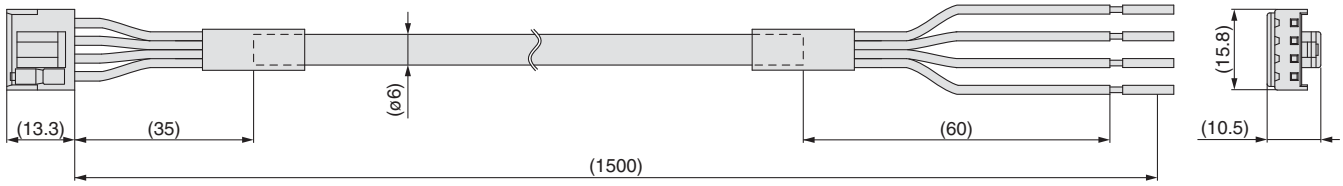
Red	4
Black	5
Brown	1
Blue	2

Note) This is not used for the LEL series.

Options

[Power supply cable]

LEC−CK1−1



Terminal name	Covered colour	Function
0 V	Blue	Common supply (–)
M24 V	White	Motor power supply (+)
C24 V	Brown	Control power supply (+)
BK RLS	Black	Lock release (+)

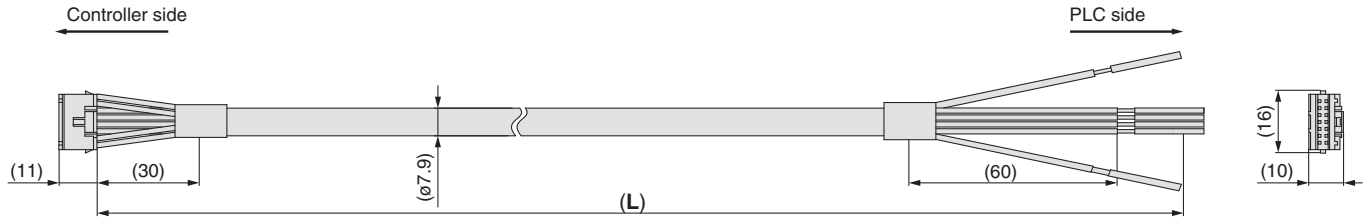
∗ Conductor size: AWG20

[I/O cable]

LEC−CK4−□

Cable length(L)[m]

1	1.5
3	3
5	5



∗ Conductor size: AWG26

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

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

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

1. The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

***2) Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

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

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1st printing QT printing QT 00 Printed in Spain

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