Electric Actuators
Battery-less Absolute Encoder Type

CE RoHS

* For details, refer to page 182 and onwards.

Restart from the last stop position is possible after recovery of the power supply.

Easy operation restart after recovery of the power supply

The position information is held by the encoder even when the power supply is turned off. A return to origin operation is not necessary when the power supply is recovered.

Does not require the use of batteries.

Reduced maintenance

Batteries are not used to store the position information. Therefore, there is no need to store spare batteries or replace dead batteries.

Compatible Actuators

Slider Type LEF Series
Rod Type/Guide Rod Type LEY/LEYG Series
Slide Table/High Precision Type LESYH Series
Slide Table LES Series
Gripper LEHF Series
Rotary Table LER Series

Step Motor Controller JXC□ Series p. 164
Battery-less Absolute Type
(Step Motor 24 VDC)

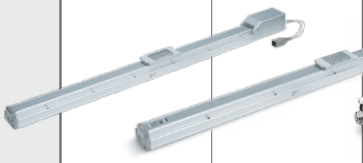
New
- **Size 16 has been added to the LEFS, LEFB, LEY, and LEYG series.**
- **The high precision type slide table LESYH series has been added.**

LE□ Series

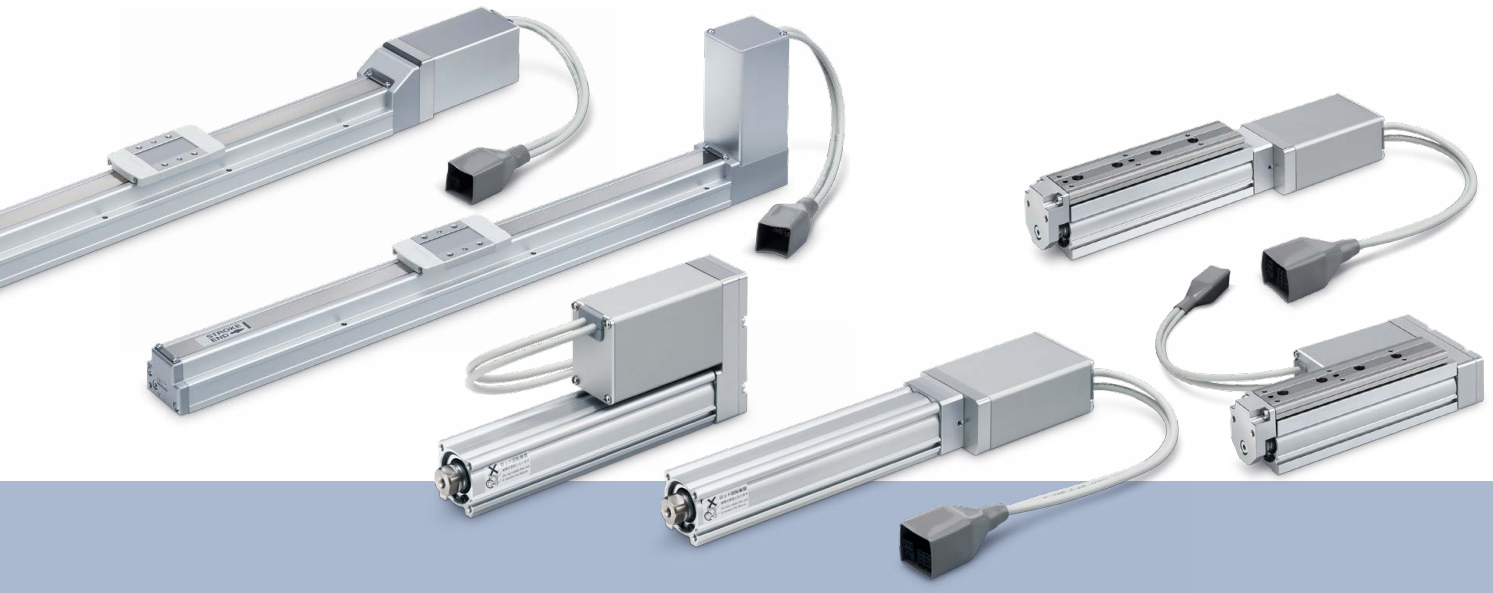
SMC

CAT.ES100-136B

Compatible Actuators

Type			Slider		Rod		Slide Table		
Series			**LEFS**  p. 13	**LEFB** p. 13	**LEY**  p. 55	**LEYG** p. 73	**High precision type LESYH**  p. 91	**Compact type LES**  p. 107	**High rigidity type LESH**  p. 125
Drive method			Ball screw	Belt	Ball screw + Belt (In-line: Ball screw)	Ball screw + Belt (In-line: Ball screw)	Ball screw	—	—
Max. speed*1 [mm/s]			1200	1500	500	500	400	400	400
Positioning repeatability [mm]			±0.015	±0.08	±0.02	±0.02	±0.01	±0.05	±0.05
Drive motor	Step motor		●	●	●	●	●	●	●
Size		**8**					●		
		16	●	●	●	●	●		
		25	●	●	●	●	●	●	●
		32	●	●	●	●			
		40	●		●	●			
Max. work load [kg] The values in parentheses are for when mounted vertically.	Size	**8**					2 (6)		
		16	15 (4)	1	35 (8)	35 (7.5)	8 (12)		
		25	30 (15)	10	70 (30)	70 (29)	12 (20)	5 (5)	12 (4)
		32	50 (20)	19	80 (43)	80 (41)			
		40	65 (23)		90 (53)	90 (51)			
Max. pushing force [N]	Size	**8**					138		
		16			141	141	348		
		25			452	452	420	180	180
		32			707	707			
		40			1058	1058			
Max. stroke [mm]			1200	2000	500	300	150	150	150
Motor mounting position			In-line, Parallel (Right/Left)	Top	In-line, Parallel (Top)	In-line, Parallel (Top)	In-line, Parallel (Right/Left)	In-line, Parallel (Right/Left)	In-line, Parallel (Right/Left)
Auto switch mounting			●	●	●	●	●		

*1 The numerical values vary depending on the controller/driver type, work load, speed, and specifications.
For details, refer to the “Speed-work load graph (Guide),” “Allowable moment,” and “Specifications” of each actuator.



Type			Rotary Table	Gripper
Series			LER  p. 155	LEHF  p. 143
Max. speed*1			420 [°/s]	100 [mm/s]
Positioning repeatability			±0.05 [°] (±0.03 [°])*3	±0.1 (One side) [mm]
Drive motor	Step motor		●	●
Size		32		●
		40		●
		50	●	
Max. moment of inertia [kg·m^2]	Size	50	0.13	
Max. rotating torque [N·m]	Size	50	10	
Rotation angle [°]			320	
Max. gripping force [N]	Size	32		120
		40		180
Max. gripping stroke [mm]	Size	32		32 (64)*2
		40		40 (80)*2

*1 The numerical values vary depending on the controller/driver type, work load, speed, and specifications.
For details, refer to the “Speed-work load graph (Guide),” “Allowable moment,” and “Specifications” of each actuator.
*2 The values in parentheses are for the long stroke type.
*3 The values in parentheses are for the table accuracy of the high-precision type.

Compatible Controllers

Battery-less Absolute Type (Step Motor 24 VDC)

Step Motor Controller JXC□ Series p. 164

Step Data Input Type

JXC51
JXC61

Direct Input Type

EtherCAT

JXCE1

EtherNet/IP

JXC91

PROFINET

JXCP1

DeviceNet

JXCD1

IO-Link

JXCL1

CC-Link

JXCM1

Step Data Input Type *JXC51/61 Series* p. 165

JXC51/61

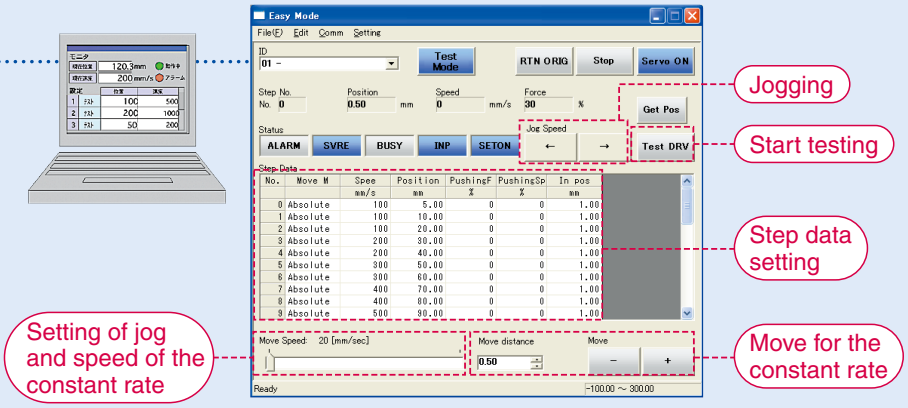
Simple setting allows for immediate use!

◎ "Easy Mode" for simple setting

For immediate use, select "Easy Mode."

<When a PC is used> Controller setting software

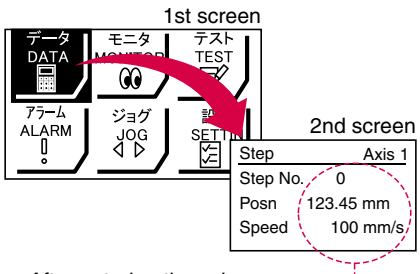
- Step data setting, test drive, jogging, and move for the constant rate can be set and operated on one screen.



<When a TB (teaching box) is used>

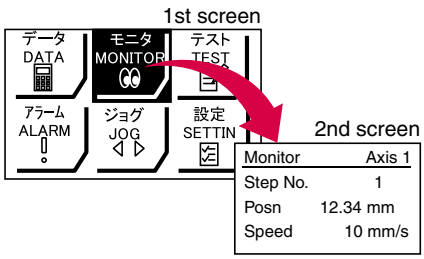
- The simple screen without scrolling promotes ease of setting and operation.
- Choose an icon from the first screen to select a function.
- Set the step data and check the monitor on the second screen.

Example of setting the step data



After entering the values, they can be registered by pressing "SET."

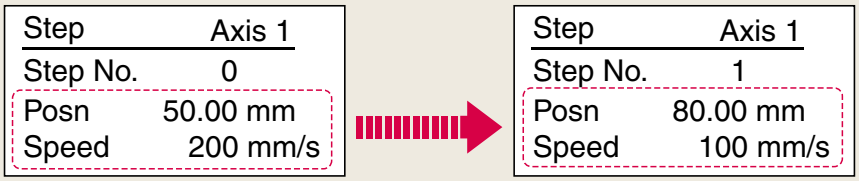
Example of checking the operation status



The operation status can be checked.

Teaching box screen

- **Data can be set by inputting only the position and speed.** (Other conditions are preset.)



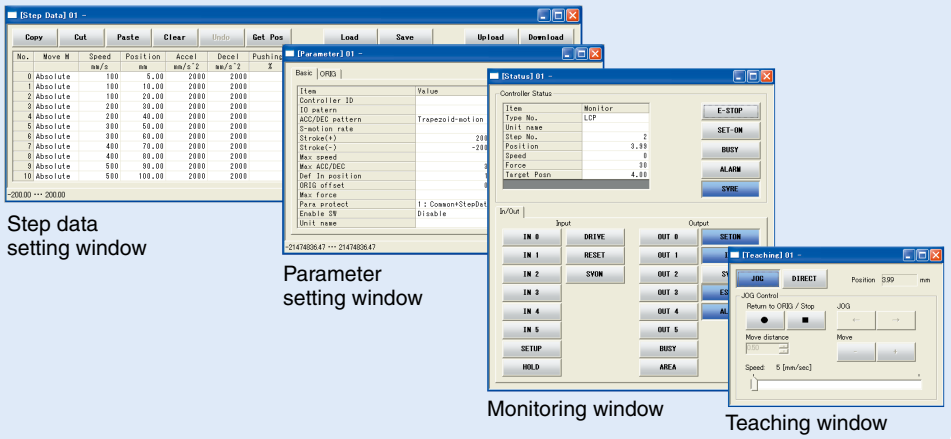
◎"Normal Mode" for detailed setting

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 drive, and testing of forced output can be performed.

<When a PC is used> Controller setting software

- Step data setting, parameter setting, monitoring, teaching, etc., are displayed in different windows.



Step data setting window

Parameter setting window

Monitoring window

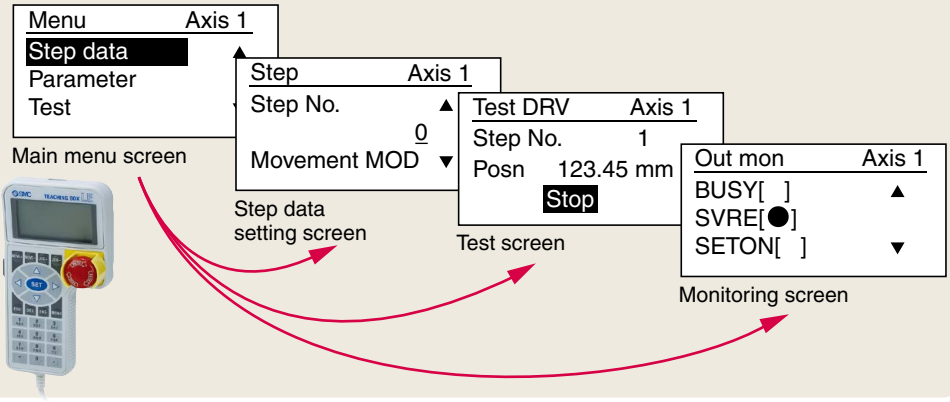
Teaching window

<When a TB (teaching box) is used>

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

Teaching box screen

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



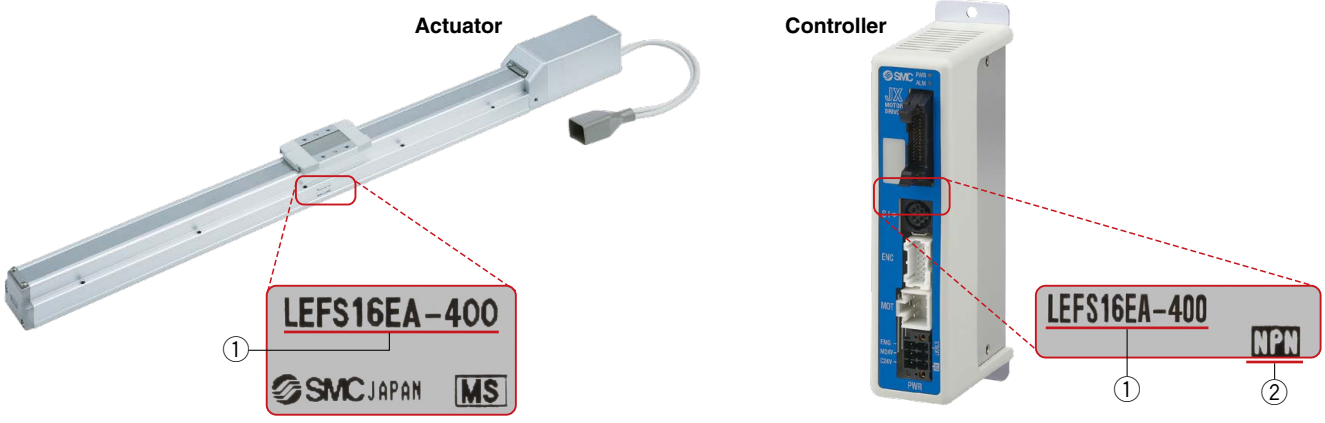
The actuator and controller are provided as a set. (They can be ordered separately as well.)

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

<Check the following before use.>

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

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



Function

Item	Step data input type JXC51/61
Step data and parameter setting	• Input from controller setting software (PC) • Input from teaching box
Step data "position" setting	• Numerical value input from controller setting software (PC) or teaching box • Input numerical value • Direct teaching • JOG teaching
Number of step data	64 points
Operation command (I/O signal)	Step No. [IN*] input ⇒ [DRIVE] input
Completion signal	[INP] output

Setting Items

TB: Teaching box PC: Controller setting software

Item		Contents	Easy Mode		Normal Mode	Step data input type JXC51/61
			TB	PC	TB/PC	
Step data setting (Excerpt)	Movement MOD	Selection of "absolute position" and "relative position"	△	●	●	Set at ABS/INC
	Speed	Transfer speed	●	●	●	Set in units of 1 mm/s
	Position	[Position]: Target position [Pushing]: Pushing start position	●	●	●	Set in units of 0.01 mm
	Acceleration/Deceleration	Acceleration/deceleration during movement	●	●	●	Set in units of 1 mm/s^2
	Pushing force	Rate of force during pushing operation	●	●	●	Set in units of 1%
	Trigger LV	Target force during pushing operation	△	●	●	Set in units of 1%
	Pushing speed	Speed during pushing operation	△	●	●	Set in units of 1 mm/s
	Moving force	Force during positioning operation	△	●	●	Set to 100%
	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 0.5 mm or more (Units: 0.01 mm)
Parameter setting (Excerpt)	Stroke (+)	+ side position limit	×	×	●	Set in units of 0.01 mm
	Stroke (–)	– side position limit	×	×	●	Set in units of 0.01 mm
	ORIG direction	Direction of the return to origin can be set.	×	×	●	Compatible
	ORIG speed	Speed during return to origin	×	×	●	Set in units of 1 mm/s
	ORIG ACC	Acceleration during return to origin	×	×	●	Set in units of 1 mm/s^2
Test	JOG		●	●	●	Continuous operation at the set speed can be tested while the switch is being pressed.
	MOVE		×	●	●	Operation at the set distance and speed from the current position can be tested.
	Return to ORIG		●	●	●	Compatible
	Test drive	Operation of the specified step data	●	●	● (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
	ALM Log record	Alarms generated in the past can be confirmed.	×	×	●	Compatible
File	Save/Load	Step data and parameters can be saved, forwarded, and deleted.	×	×	●	Compatible
Other	Language	Can be changed to Japanese or English	●	●	●	Compatible

△: Can be set from TB Ver. 2.** (The version information is displayed on the initial screen.)

Fieldbus Network

EtherCAT®/EtherNet/IP™/PROFINET/ DeviceNet™/IO-Link/CC-Link Direct Input Type Step Motor Controller/JXC□ Series p. 172

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

JXCE1 JXC91 JXCP1 JXCD1 JXCL1 JXCM1

◎Two types of operation command

Step no. defined operation: Operate using the preset step data in the controller.
Numerical data defined operation: The actuator operates using values such as position and speed from the PLC.

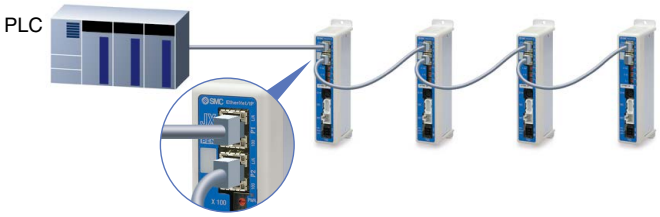
◎Numerical monitoring available

Numerical information, such as the current speed, current position, and alarm codes, can be monitored on the PLC.

◎Transition wiring of communication cables

Two communication ports are provided.

* For DeviceNet™ and CC-Link, transition wiring is possible using a branch connector.
* 1 to 1 in the case of IO-Link



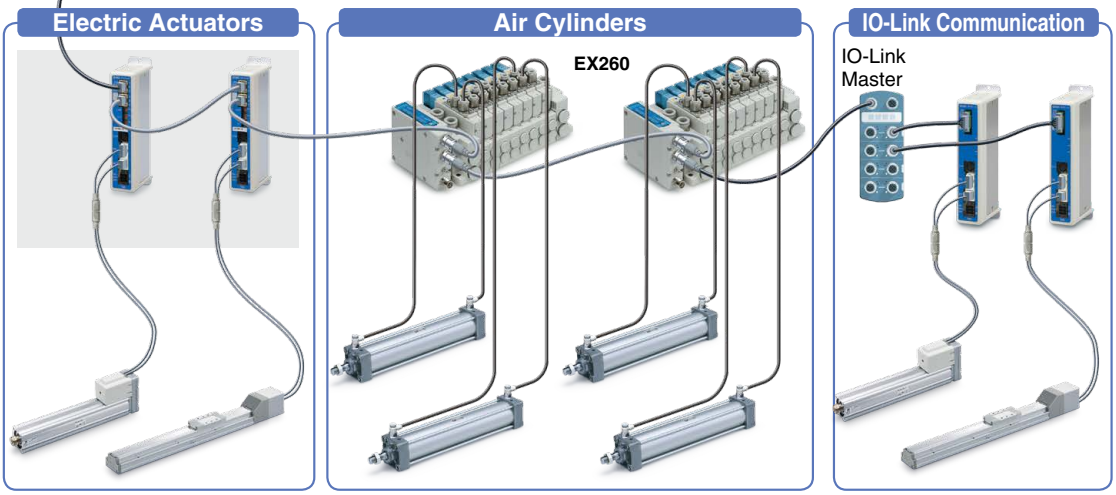
Application

Communication protocols

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

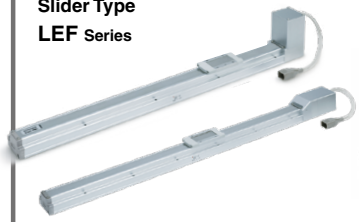
Both air and electric systems can be established under the same protocol.

Can be additionally installed in an existing network



<Applicable Electric Actuators>

Slider Type
LEF Series



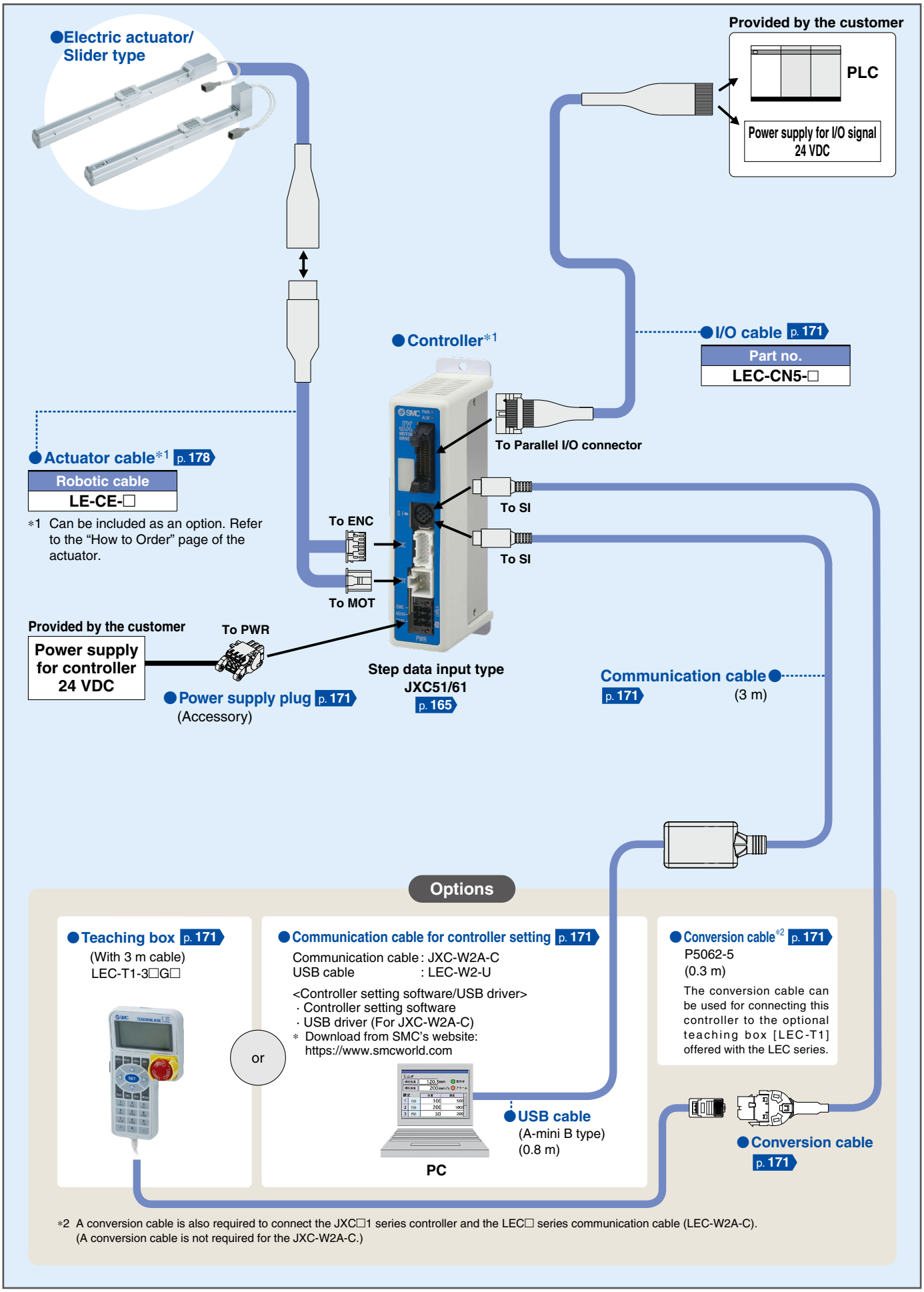
Rod Type/Guide Rod Type
LEY/LEYG Series

Slide Table
LESYH/LES/LESH Series

Gripper
LEHF Series

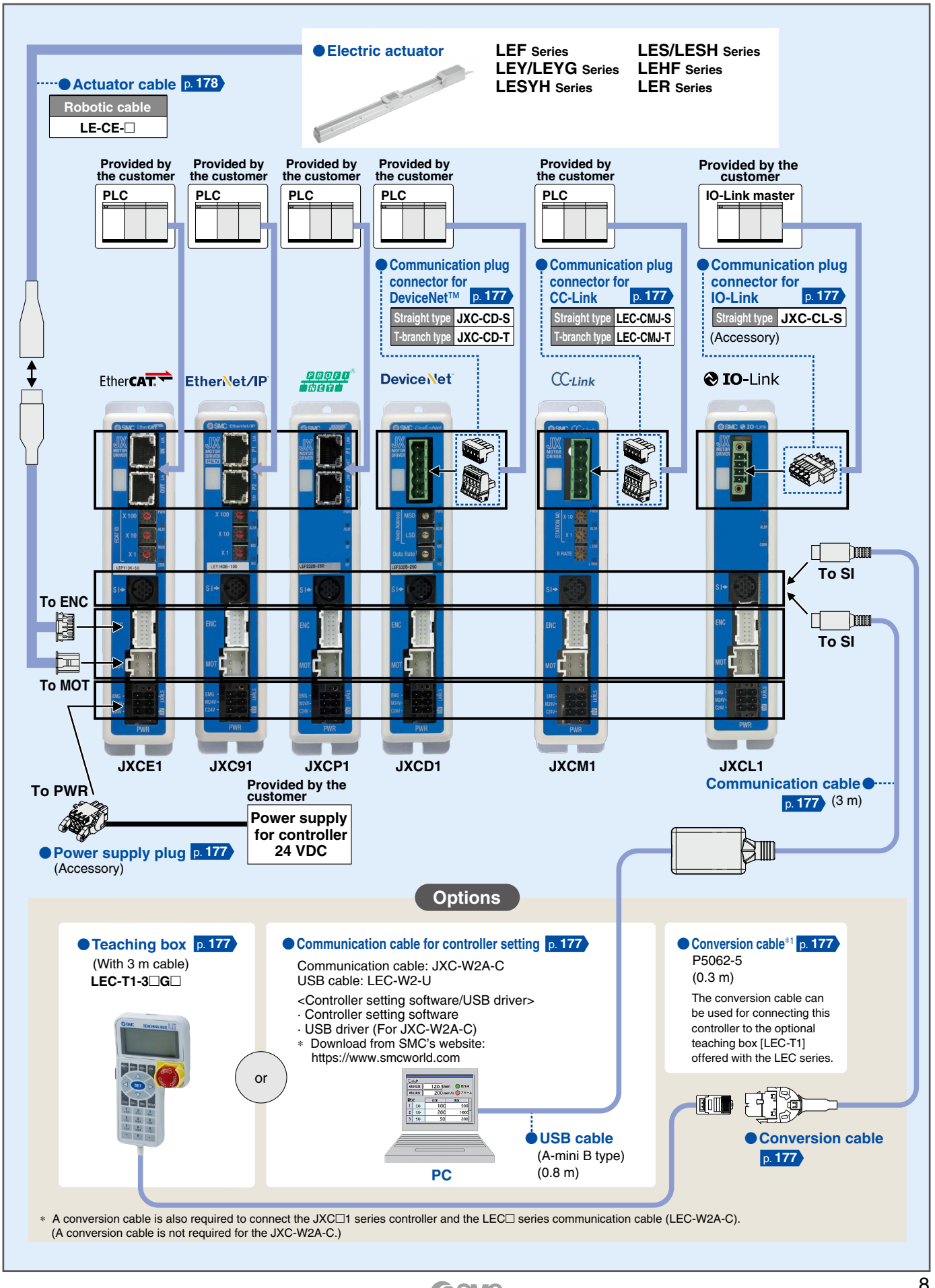
Rotary Table
LER Series

System Construction/General Purpose I/O



*2 A conversion cable is also required to connect the JXC□1 series controller and the LEC□ series communication cable (LEC-W2A-C).
(A conversion cable is not required for the JXC-W2A-C.)

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



* A conversion cable is also required to connect the JXC□1 series controller and the LEC□ series communication cable (LEC-W2A-C).
(A conversion cable is not required for the JXC-W2A-C.)

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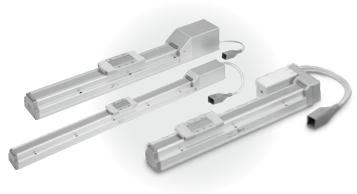
Electric Actuators

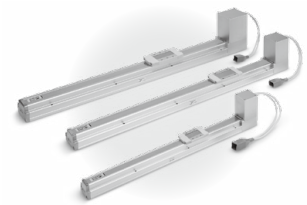
Battery-less Absolute Encoder Type *LE□ Series*

Battery-less Absolute (Step Motor 24 VDC)

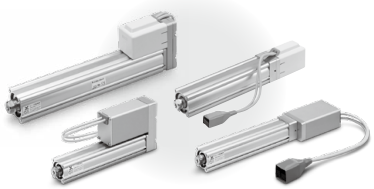
Slider Type/Ball Screw Drive *LEFS Series* Battery-less Absolute (Step Motor 24 VDC) p. 12



Slider Type/Belt Drive *LEFB Series* Battery-less Absolute (Step Motor 24 VDC) p. 12



Rod Type *LEY Series* Battery-less Absolute (Step Motor 24 VDC) p. 54



Guide Rod Type *LEYG Series* Battery-less Absolute (Step Motor 24 VDC) p. 54

Slide Table/High Precision Type *LESYH Series* Battery-less Absolute (Step Motor 24 VDC) p. 90

Slide Table/Compact Type *LES Series* Battery-less Absolute (Step Motor 24 VDC) p. 90

Slide Table/High Rigidity Type *LESH* Series Battery-less Absolute (Step Motor 24 VDC) p. 90

Gripper *LEHF* Series Battery-less Absolute (Step Motor 24 VDC) p. 142

Rotary Table *LER* Series Battery-less Absolute (Step Motor 24 VDC) p. 154

Controllers *JXC□* Series p. 164

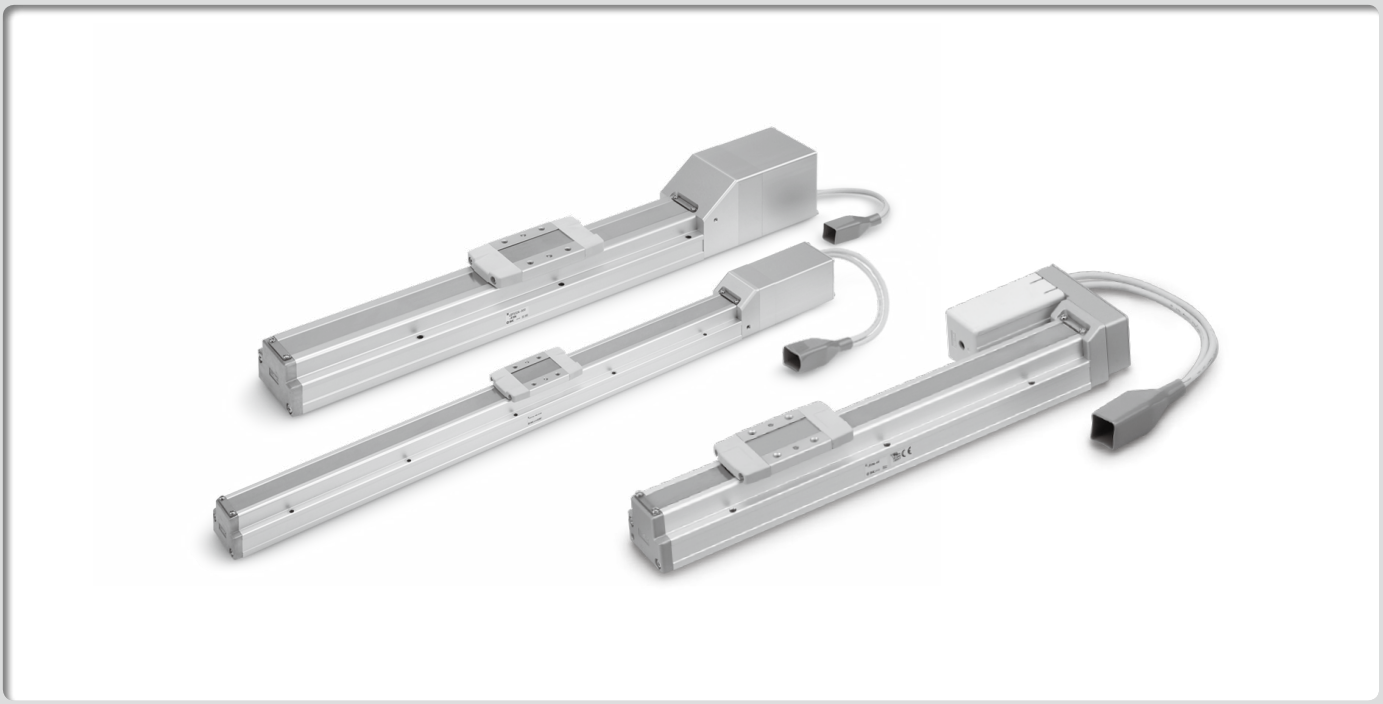
Controller (Step Data Input Type) *JXC51/61* Series Battery-less Absolute (Step Motor 24 VDC)

Step Motor Controller *JXCE1/91/P1/D1/L1/M1* Series Battery-less Absolute (Step Motor 24 VDC)

Slider Type

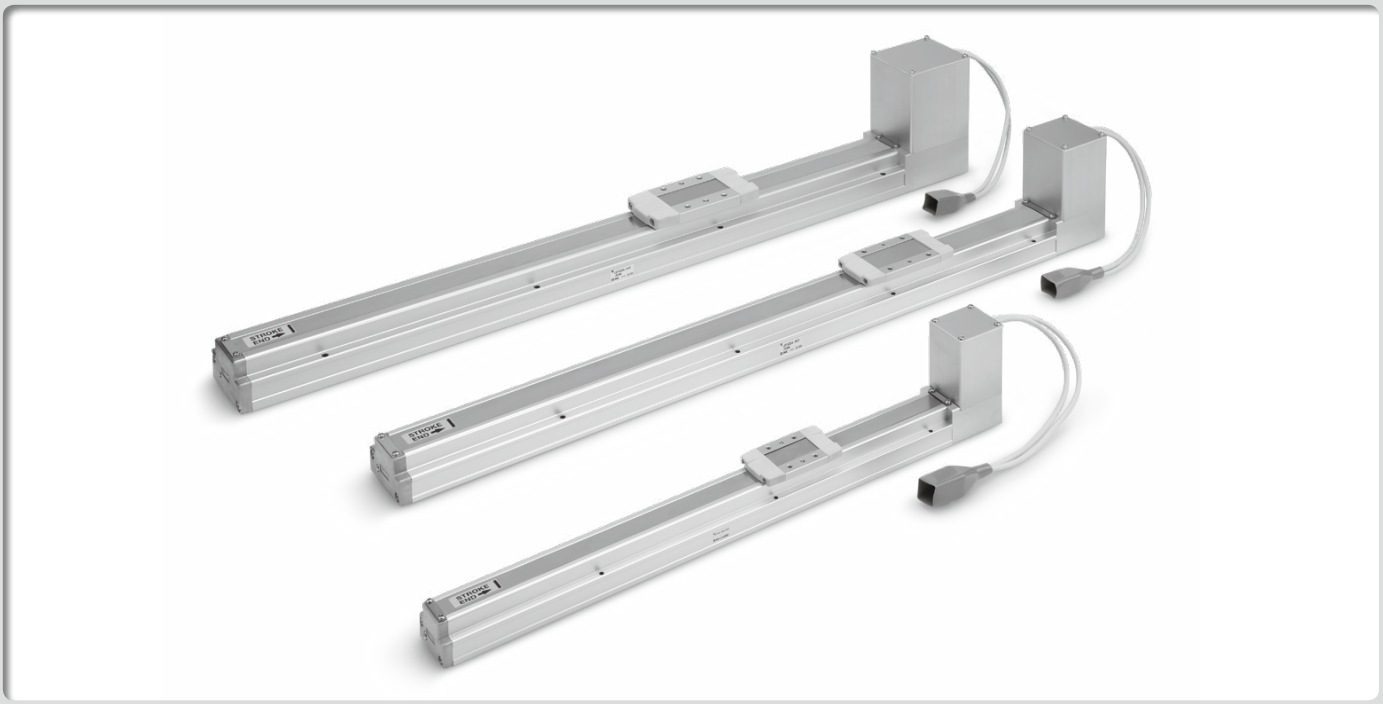
Ball Screw Drive LEFS Series

p. 13



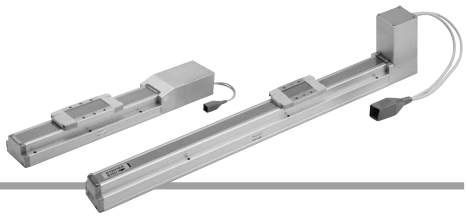
Belt Drive LEFB Series

p. 13



Controllers p. 164

Model Selection



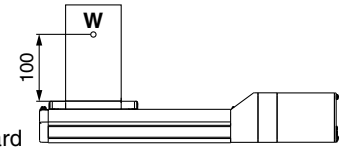
Selection Procedure

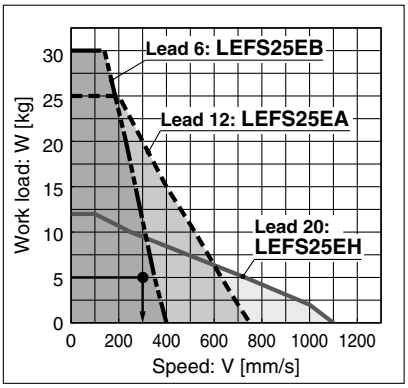
Step 1 Check the work load–speed. → **Step 2** Check the cycle time. → **Step 3** Check the allowable moment.

Selection Example

Operating conditions

- Workpiece mass: 5 [kg]
- Speed: 300 [mm/s]
- Acceleration/Deceleration: 3000 [mm/s^2]
- Stroke: 200 [mm]
- Mounting orientation: Horizontal upward
- Workpiece mounting condition:





<Speed–Work load graph> (LEFS25/Battery-less absolute)

Step 1 Check the work load–speed. <Speed–Work load graph> (pages 14 to 16)

Select a model based on the workpiece mass and speed while referencing the speed–work load graph.

Selection example) The **LEFS25EA-200** can be temporarily selected as a possible candidate based on the graph shown on the right side.

Step 2 Check the cycle time.

Calculate **the cycle time** using the following calculation method.

Cycle time:

T can be found from the following equation.

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

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

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

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

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

- T4: Settling time varies depending on the conditions such as motor types, load and in position of the step data. Therefore, calculate the settling time while referencing the following value.

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

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

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

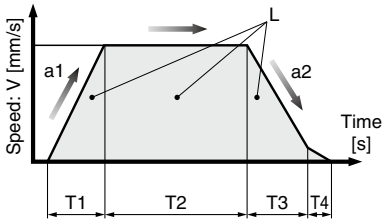
$T3 = V/a2 = 300/3000 = 0.1$ [s]

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

$T4 = 0.2$ [s]

The cycle time can be found as follows.

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

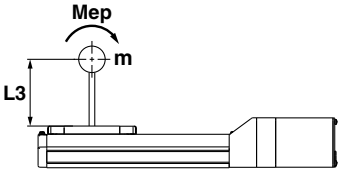


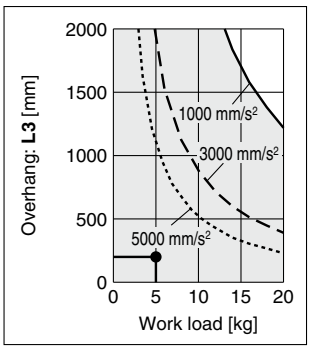
L : Stroke [mm] ··· (Operating condition)
V : Speed [mm/s] ··· (Operating condition)
a1: Acceleration [mm/s^2] ··· (Operating condition)
a2: Deceleration [mm/s^2] ··· (Operating condition)

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

Step 3 Check the allowable moment. <Static allowable moment> (page 16) <Dynamic allowable moment> (page 17)

Confirm the moment that applies to the actuator is within the allowable range for both static and dynamic conditions.





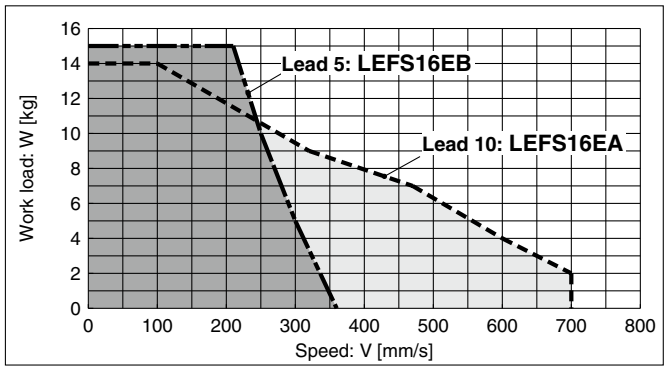
Based on the above calculation result, the LEFS25EA-200 should be selected.

Speed–Work Load Graph (Guide)
For Battery-less Absolute (Step Motor 24 VDC), In-line Motor Type

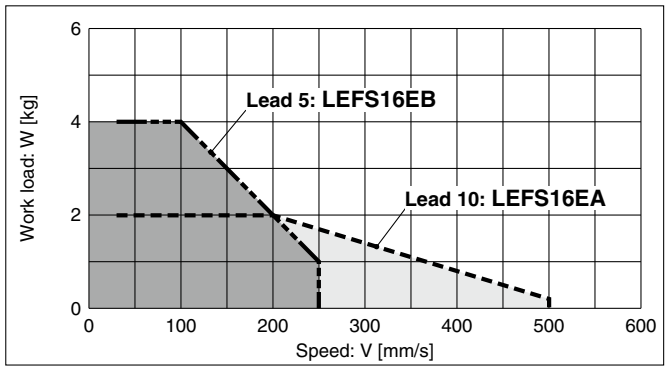
* The following graphs show the values when the moving force is 100%.

LEFS16/Ball Screw Drive

Horizontal

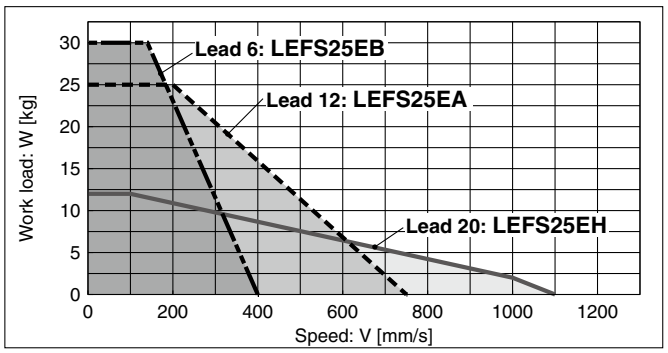


Vertical

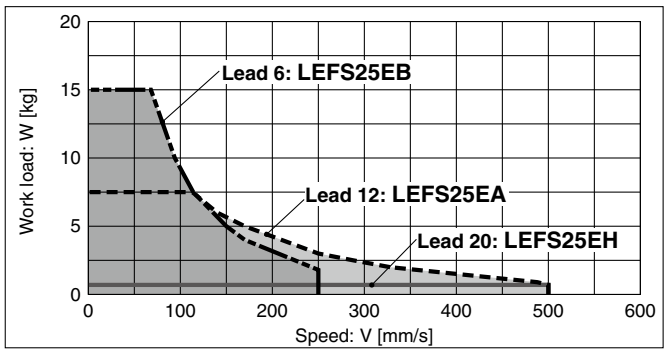


LEFS25/Ball Screw Drive

Horizontal

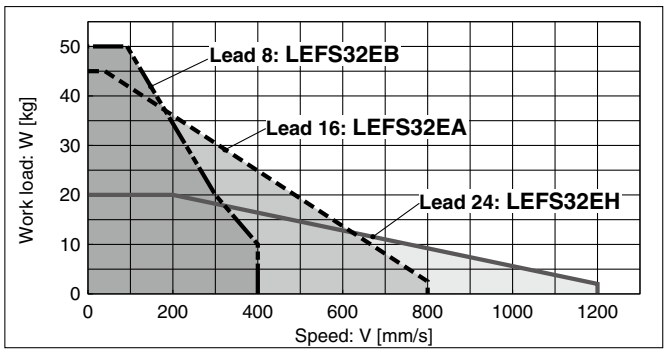


Vertical

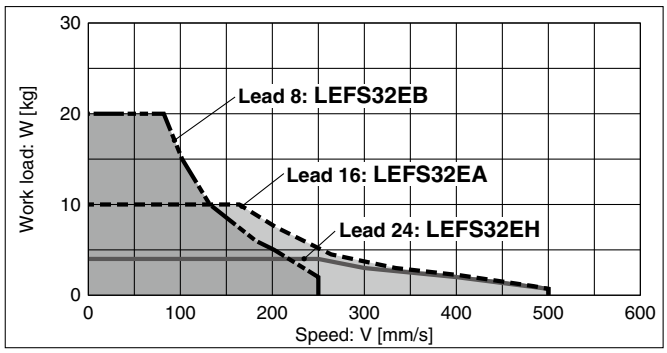


LEFS32/Ball Screw Drive

Horizontal

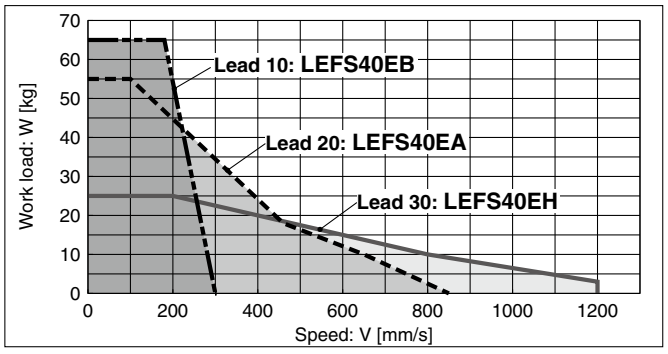


Vertical

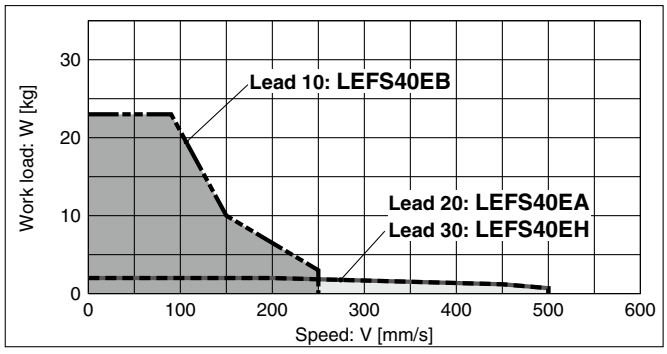


LEFS40/Ball Screw Drive

Horizontal



Vertical

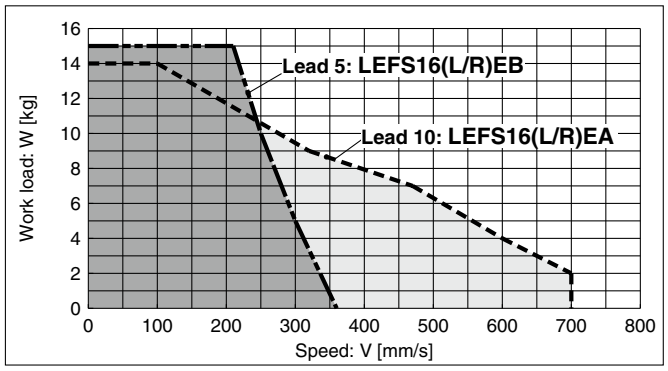


Speed–Work Load Graph (Guide)
For Battery-less Absolute (Step Motor 24 VDC), Motor Parallel Type

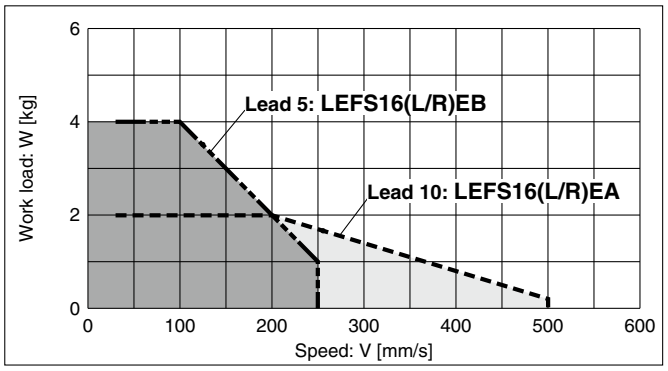
* The following graphs show the values when the moving force is 100%.

LEFS16(L/R)/Ball Screw Drive

Horizontal

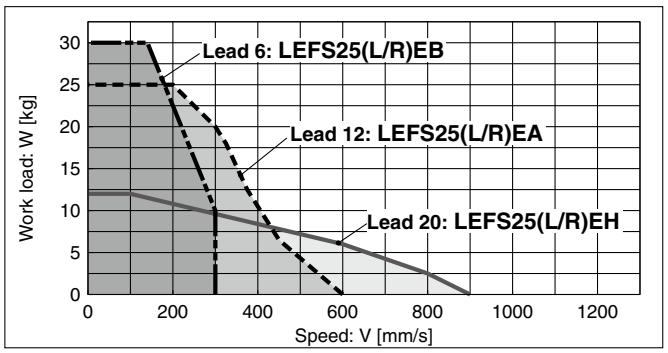


Vertical

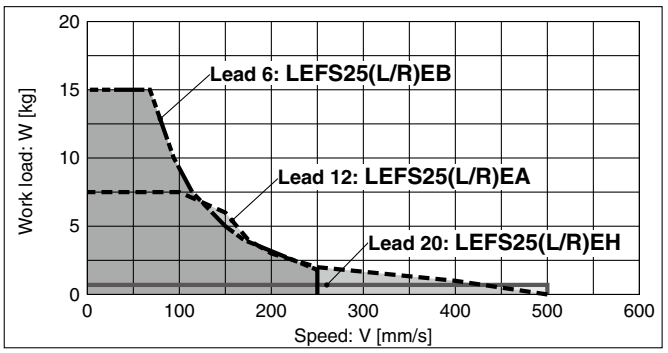


LEFS25(L/R)/Ball Screw Drive

Horizontal

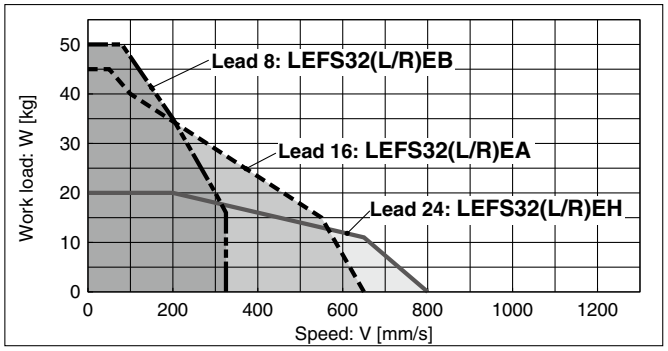


Vertical

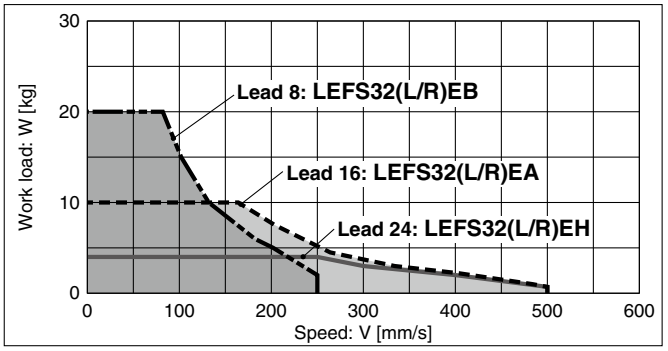


LEFS32(L/R)/Ball Screw Drive

Horizontal

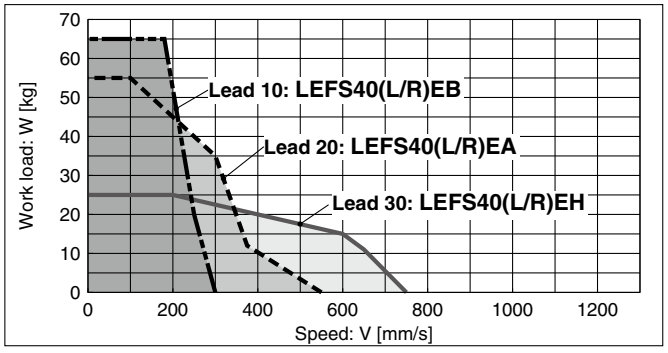


Vertical

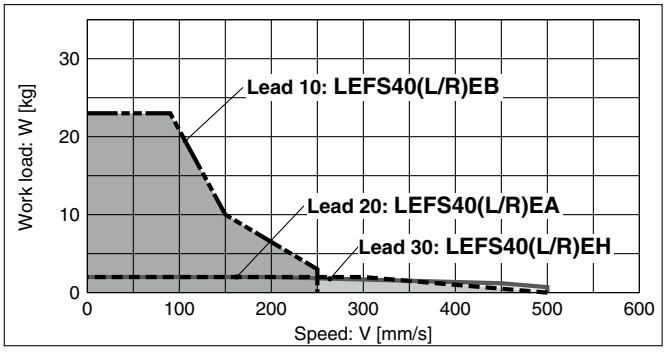


LEFS40(L/R)/Ball Screw Drive

Horizontal



Vertical

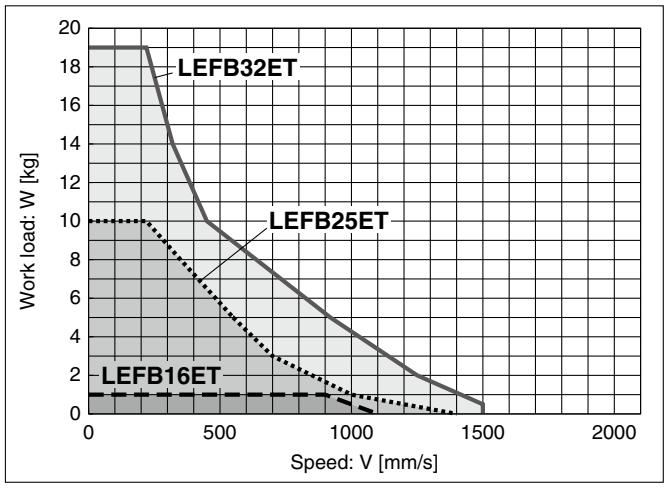


Speed–Work Load Graph (Guide) For Battery-less Absolute (Step Motor 24 VDC)

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

LEFB/Belt Drive

Horizontal



Static Allowable Moment∗1

[N·m]

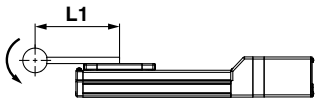
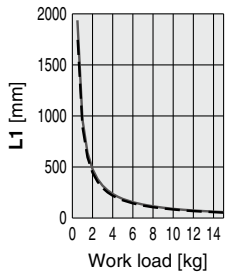
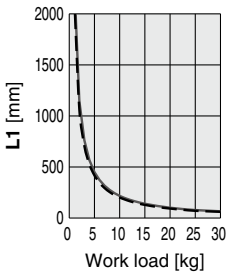
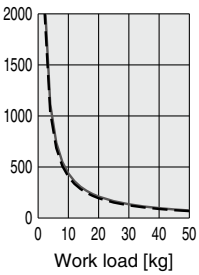
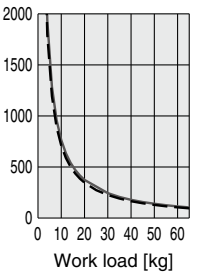
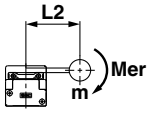
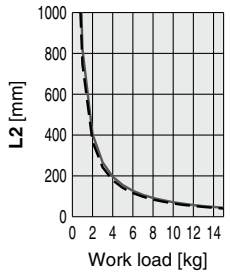
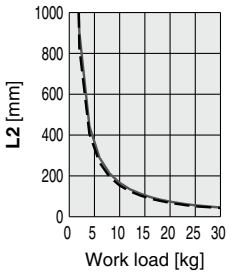
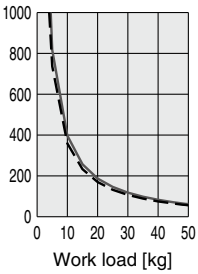
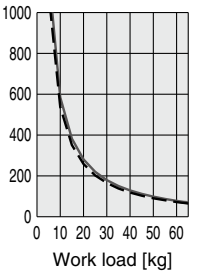
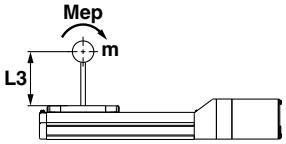
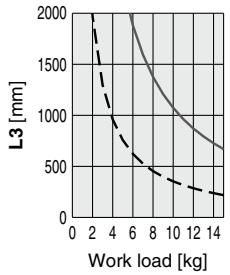
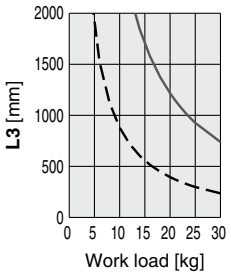
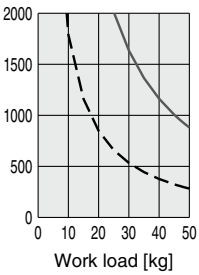
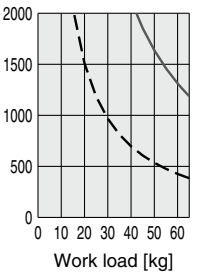
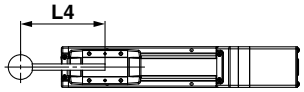
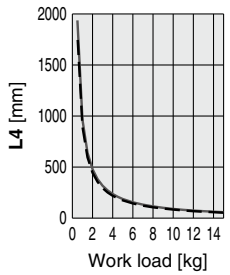
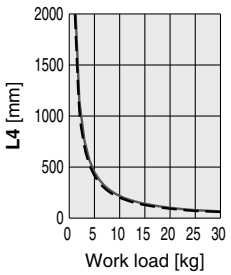
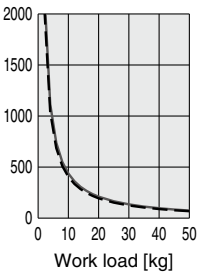
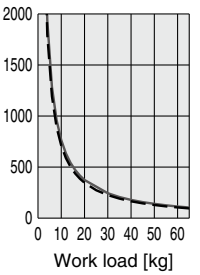
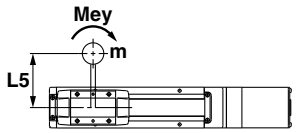
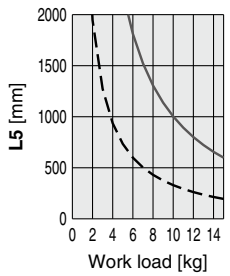
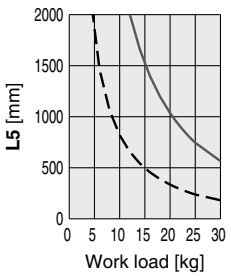
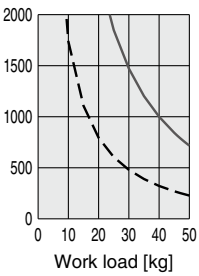
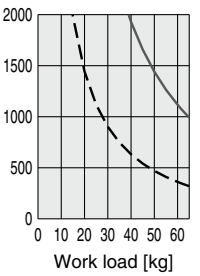
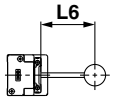
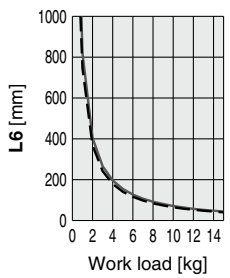
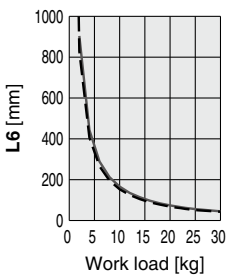
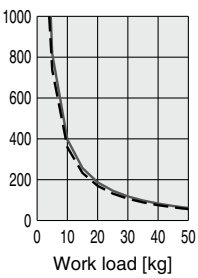
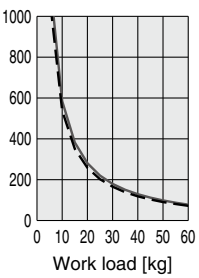
Model	Size	Pitching	Yawing	Rolling
LEF□	**16**	10.0	10.0	20.0
	25	27.0	27.0	52.0
	32	46.0	46.0	101.0
	40	110.0	110.0	207.0

∗1 The static allowable moment is the amount of static moment which can be applied to the actuator when it is stopped.
If the product is exposed to impact or repeated load, be sure to take adequate safety measures when using the product.

Dynamic Allowable Moment

∗ These graphs show the amount of allowable overhang (guide unit) when the center of gravity of the workpiece overhangs in one direction. When selecting the overhang, refer to the "Calculation of Guide Load Factor" or the Electric Actuator Model Selection Software for confirmation: https://www.smcworld.com

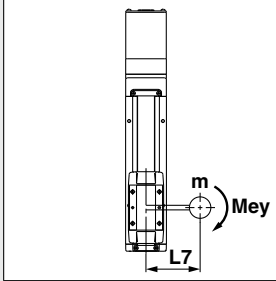
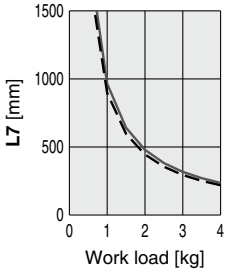
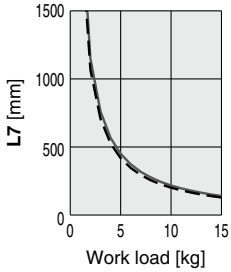
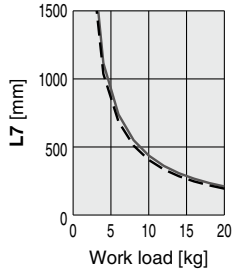
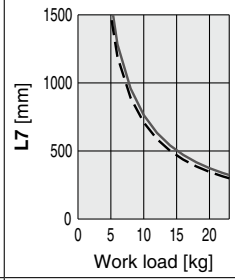
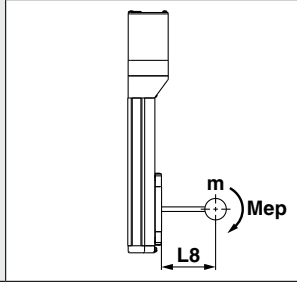
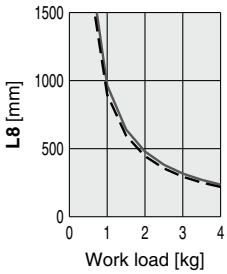
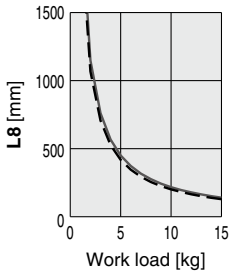
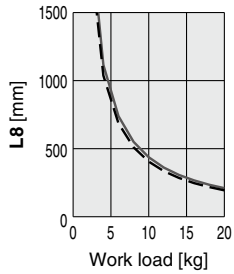
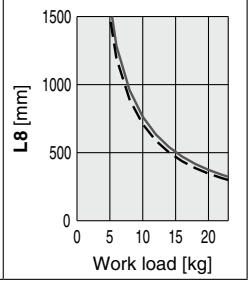
Acceleration/Deceleration ——1000 mm/s² – – –3000 mm/s²

Orientation	Load overhanging direction **m** : Work load [kg] **Me**: Allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model LEF16	LEF25	LEF32	LEF40
Horizontal/Bottom		X				
		Y				
		Z				
Wall		X				
		Y				
		Z				

Dynamic Allowable Moment

* These graphs show the amount of allowable overhang (guide unit) when the center of gravity of the workpiece overhangs in one direction. When selecting the overhang, refer to the "Calculation of Guide Load Factor" or the Electric Actuator Model Selection Software for confirmation: https://www.smcworld.com

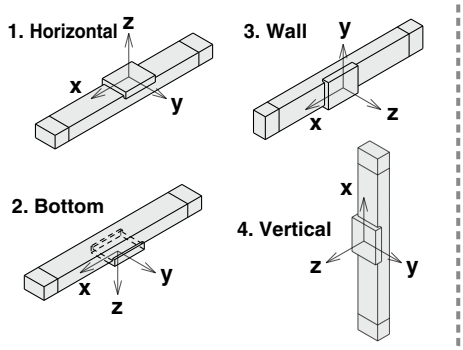
Acceleration/Deceleration ——1000 mm/s² – – –3000 mm/s²

Orientation	Load overhanging direction **m** : Work load [kg] **Me**: Allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model			
			LEF16	**LEF25**	**LEF32**	**LEF40**
Vertical		Y				
		Z				

Calculation of Guide Load Factor

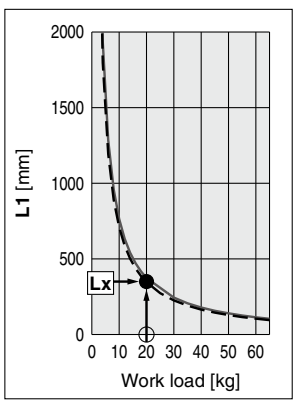
1. Decide operating conditions.
   Model: LEFS/LEFB
   Size: 16/25/32/40
   Mounting orientation: Horizontal/Bottom/Wall/Vertical
   Acceleration [mm/s²]: **a**
   Work load [kg]: **m**
   Work load center position [mm]: **Xc/Yc/Zc**
2. Select the target graph while referencing the model, size, and mounting orientation.
3. Based on the acceleration and work load, find the overhang [mm]: **Lx/Ly/Lz** from the graph.
4. Calculate the load factor for each direction.
   α**x = Xc/Lx**, α**y = Yc/Ly**, α**z = Zc/Lz**
5. Confirm the total of α**x**, α**y**, and α**z** is 1 or less.
   α**x + αy + αz ≤ 1**
   When 1 is exceeded, please consider a reduction of acceleration and work load, or a change of the work load center position and series.

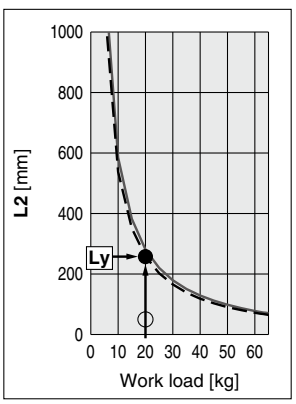
Mounting orientation



Example

1. Operating conditions
   Model: LEFS40
   Size: 40
   Mounting orientation: Horizontal
   Acceleration [mm/s²]: 3000
   Work load [kg]: 20
   Work load center position [mm]: **Xc = 0**, **Yc = 50**, **Zc = 200**
2. Select the graphs for horizontal of the LEF40 on page 17.
3. **Lx = 400 mm**, **Ly = 250 mm**, **Lz = 1500 mm**
4. The load factor for each direction can be found as follows.
   α**x = 0/400 = 0**
   α**y = 50/250 = 0.2**
   α**z = 200/1500 = 0.13**
5. α**x + αy + αz = 0.33 ≤ 1**





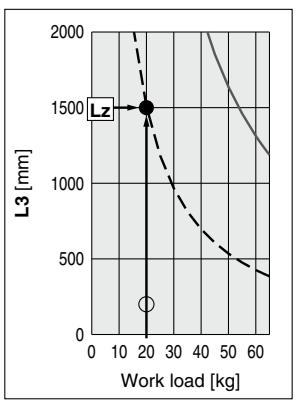
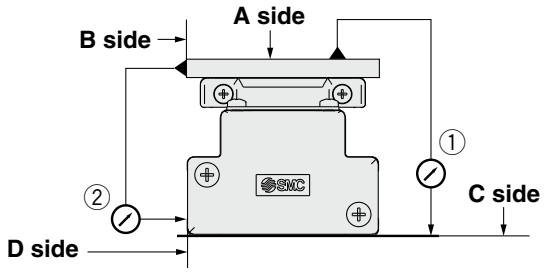


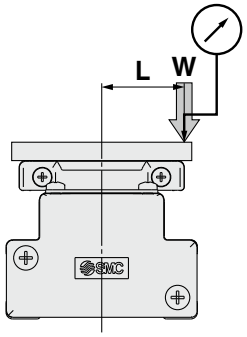
Table Accuracy (Reference Value)

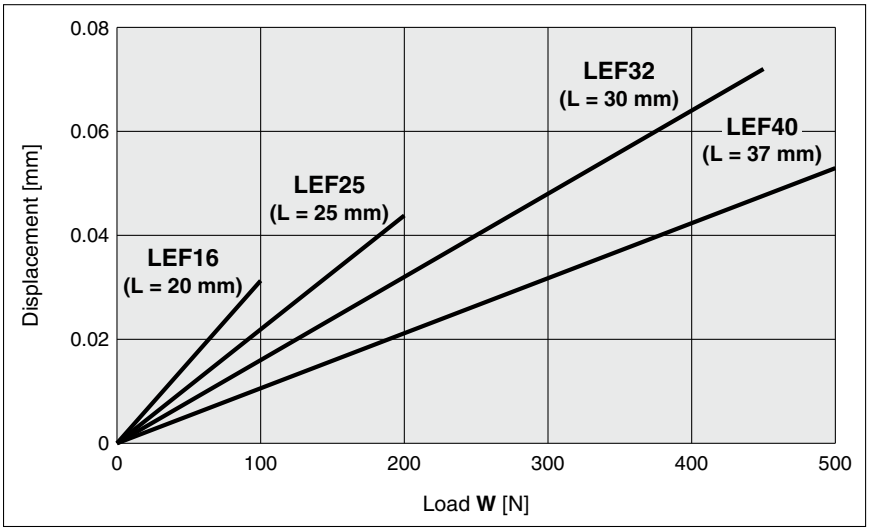


Model	Traveling parallelism [mm] (Every 300 mm)	
	① C side traveling parallelism to A side	② D side traveling parallelism to B side
LEF16	0.05	0.03
LEF25	0.05	0.03
LEF32	0.05	0.03
LEF40	0.05	0.03

∗ Traveling parallelism does not include the mounting surface accuracy. (Excludes when the stroke exceeds 2000 mm)

Table Displacement (Reference Value)

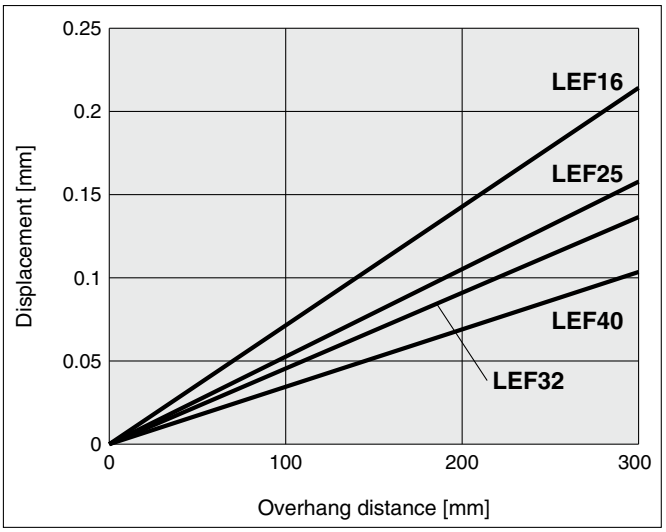




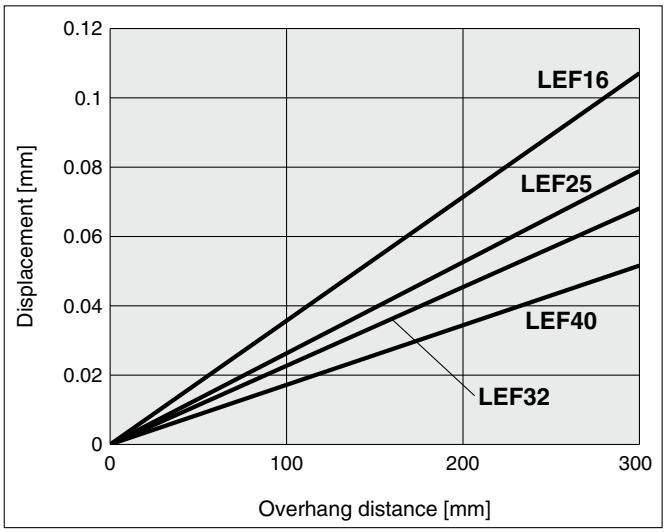
∗ This displacement is measured when a 15 mm aluminum plate is mounted and fixed on the table.
∗ Check the clearance and play of the guide separately.

Overhang Displacement Due to Table Clearance (Initial Reference Value)

Basic type



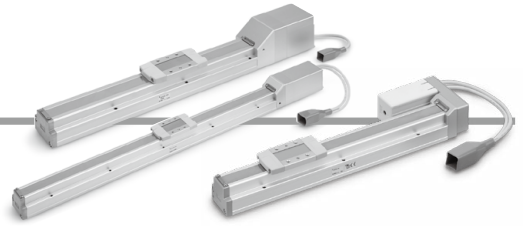
High-precision type



Battery-less Absolute Encoder Type
Slider Type/Ball Screw Drive
LEFS Series LEFS16, 25, 32, 40

CE RoHS

* For details, refer to page 182 and onwards.



How to Order

LEFS H 25 R E B – 200 ❻ ❼ C N K – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬

For details on controllers, refer to the next page.

❶ Accuracy

Nil	Basic type
H	High-precision type

❷ Size

16
25
32
40

❸ Motor mounting position

Nil	In-line
R	Right side parallel
L	Left side parallel

❹ Motor type

E	Battery-less absolute (Step motor 24 VDC)

❺ Lead [mm]

Symbol	LEFS16	LEFS25	LEFS32	LEFS40
H	—	20	24	30
A	10	12	16	20
B	5	6	8	10

❻ Stroke*1 [mm]

Stroke	Note	
	Size	Applicable stroke
50 to 500	**16**	50, 100, 150, 200, 250, 300, 350, 400, 450, 500
50 to 800	**25**	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800
50 to 1000	**32**	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000
150 to 1200	**40**	150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1100, 1200

❼ Motor option

Nil	Without option
B	With lock

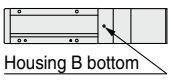
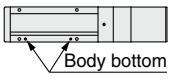
❽ Auto switch compatibility (In-line only)*2 *3 *4 *5

Nil	None
C	With (Includes 1 mounting bracket)

❾ Grease application (Seal band part)

Nil	With
N	Without (Roller specification)

❿ Positioning pin hole

Nil	Housing B bottom*6	 Housing B bottom
K	Body bottom 2 locations	 Body bottom

⓫ Actuator cable type/length

Robotic cable [m]

Nil	None	**R8**	8*7
R1	1.5	**RA**	10*7
R3	3	**RB**	15*7
R5	5	**RC**	20*7

For details on auto switches, refer to the **Web Catalog**.

⑫ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗8	DIN rail

Communication plug connector, I/O cable∗9

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 Please contact SMC for non-standard strokes as they are produced as special orders.
∗2 Excludes the LEF16
∗3 If 2 or more are required, please order them separately. (Part no.: LEF-D-2-1 For details, refer to the **Web Catalog**.)
∗4 Order auto switches separately. (For details, refer to the **Web Catalog**.)
∗5 When "Nil" is selected, the product will not come with a built-in magnet for an auto switch, and so a mounting bracket cannot be secured. Be sure to select an appropriate model initially as the product cannot be changed to have auto switch compatibility after purchase.
∗6 For details on the mounting method, refer to the **Web Catalog**.
∗7 Produced upon receipt of order
∗8 The DIN rail is not included. It must be ordered separately.
∗9 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet™ or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

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

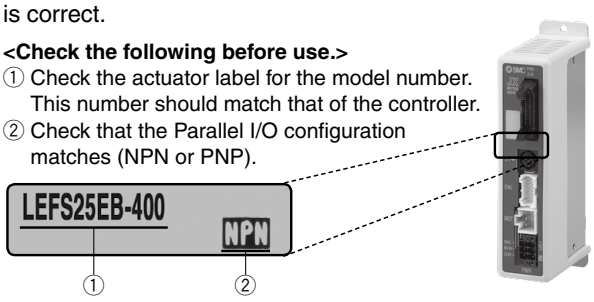
[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.

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

<Check the following before use.>
① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

Specifications

Battery-less Absolute (Step Motor 24 VDC)

Model					LEFS16□E		LEFS25□E			LEFS32□E			LEFS40□E		
Actuator specifications	Stroke [mm]*1				50 to 500		50 to 800			50 to 1000			150 to 1200		
	Work load [kg]*2	Horizontal			14	15	12	25	30	20	45	50	25	55	65
		Vertical			2	4	0.5	7.5	15	4	10	20	2	2	23
	Speed*2 [mm/s]	In-line	Stroke range	Up to 450	10 to 700	5 to 360	20 to 1100	12 to 750	6 to 400	24 to 1200	16 to 800	8 to 400	30 to 1200	20 to 850	10 to 300
				451 to 500	10 to 600	5 to 300	20 to 1100	12 to 750	6 to 400	24 to 1200	16 to 800	8 to 400	30 to 1200	20 to 850	10 to 300
				501 to 600	—	—	20 to 900	12 to 540	6 to 270	24 to 1200	16 to 800	8 to 400	30 to 1200	20 to 850	10 to 300
				601 to 700	—	—	20 to 630	12 to 420	6 to 230	24 to 930	16 to 620	8 to 310	30 to 1200	20 to 850	10 to 300
				701 to 800	—	—	20 to 550	12 to 330	6 to 180	24 to 750	16 to 500	8 to 250	30 to 1140	20 to 760	10 to 300
				801 to 900	—	—	—	—	—	24 to 610	16 to 410	8 to 200	30 to 930	20 to 620	10 to 300
				901 to 1000	—	—	—	—	—	24 to 500	16 to 340	8 to 170	30 to 780	20 to 520	10 to 250
				1001 to 1100	—	—	—	—	—	—	—	—	30 to 660	20 to 440	10 to 220
				1101 to 1200	—	—	—	—	—	—	—	—	30 to 570	20 to 380	10 to 190
		Parallel	Stroke range	Up to 450	10 to 700	5 to 360	—	—	—	—	—	—	—	—	—
				451 to 500	10 to 600	5 to 300	20 to 900	12 to 600	6 to 300	24 to 800	16 to 650	8 to 325	30 to 750	20 to 550	10 to 300
				501 to 600	—	—	20 to 900	12 to 540	6 to 270	24 to 800	16 to 650	8 to 325	30 to 750	20 to 550	10 to 300
				601 to 700	—	—	20 to 630	12 to 420	6 to 230	24 to 800	16 to 620	8 to 310	30 to 750	20 to 550	10 to 300
				701 to 800	—	—	20 to 550	12 to 330	6 to 180	24 to 750	16 to 500	8 to 250	30 to 750	20 to 550	10 to 300
				801 to 900	—	—	—	—	—	24 to 610	16 to 410	8 to 200	30 to 750	20 to 550	10 to 300
				901 to 1000	—	—	—	—	—	24 to 500	16 to 340	8 to 170	30 to 750	20 to 520	10 to 250
				1001 to 1100	—	—	—	—	—	—	—	—	30 to 660	20 to 440	10 to 220
				1101 to 1200	—	—	—	—	—	—	—	—	30 to 570	20 to 380	10 to 190
	Max. acceleration/deceleration [mm/s²]				3000										
	Positioning repeatability [mm]			Basic type	±0.02										
				High-precision type	±0.015 (Lead H: ±0.02)										
	Lost motion [mm]*3			Basic type	0.1 or less										
				High-precision type	0.05 or less										
	Lead [mm]				10	5	20	12	6	24	16	8	30	20	10
	Impact/Vibration resistance [m/s²]*4				50/20										
	Actuation type				Ball screw (LEFS□), Ball screw + Belt (LEFS□$^{R}_{L}$)										
	Guide type				Linear guide										
	Operating temperature range [°C]				5 to 40										
	Operating humidity range [%RH]				90 or less (No condensation)										
Electric specifications	Motor size				□28		□42			□56.4					
	Motor type				Battery-less absolute (Step motor 24 VDC)										
	Encoder				Battery-less absolute										
	Power supply voltage [V]				24 VDC ±10%										
	Power [W]*5 *7				Max. power 51		Max. power 57			Max. power 123			Max. power 141		
Lock unit specifications	Type*6				Non-magnetizing lock										
	Holding force [N]				20	39	47	78	157	72	108	216	75	113	225
	Power [W]*7				2.9		5			5			5		
	Rated voltage [V]				24 VDC ±10%										

∗1 Please contact SMC for non-standard strokes as they are produced as special orders.
∗2 Speed changes according to the work load. Check the “Speed–Work Load Graph (Guide)” on pages 14 and 15.
Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m.
∗3 A reference value for correcting errors in reciprocal operation
∗4 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (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. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
∗5 Indicates the max. power during operation (including the controller). This value can be used for the selection of the power supply.
∗6 With lock only
∗7 For an actuator with lock, add the power for the lock.

Weight

Series	LEFS16□E									
Stroke [mm]	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	0.83	0.90	0.98	1.05	1.13	1.20	1.28	1.35	1.43	1.50
Additional weight with lock [kg]	0.12									

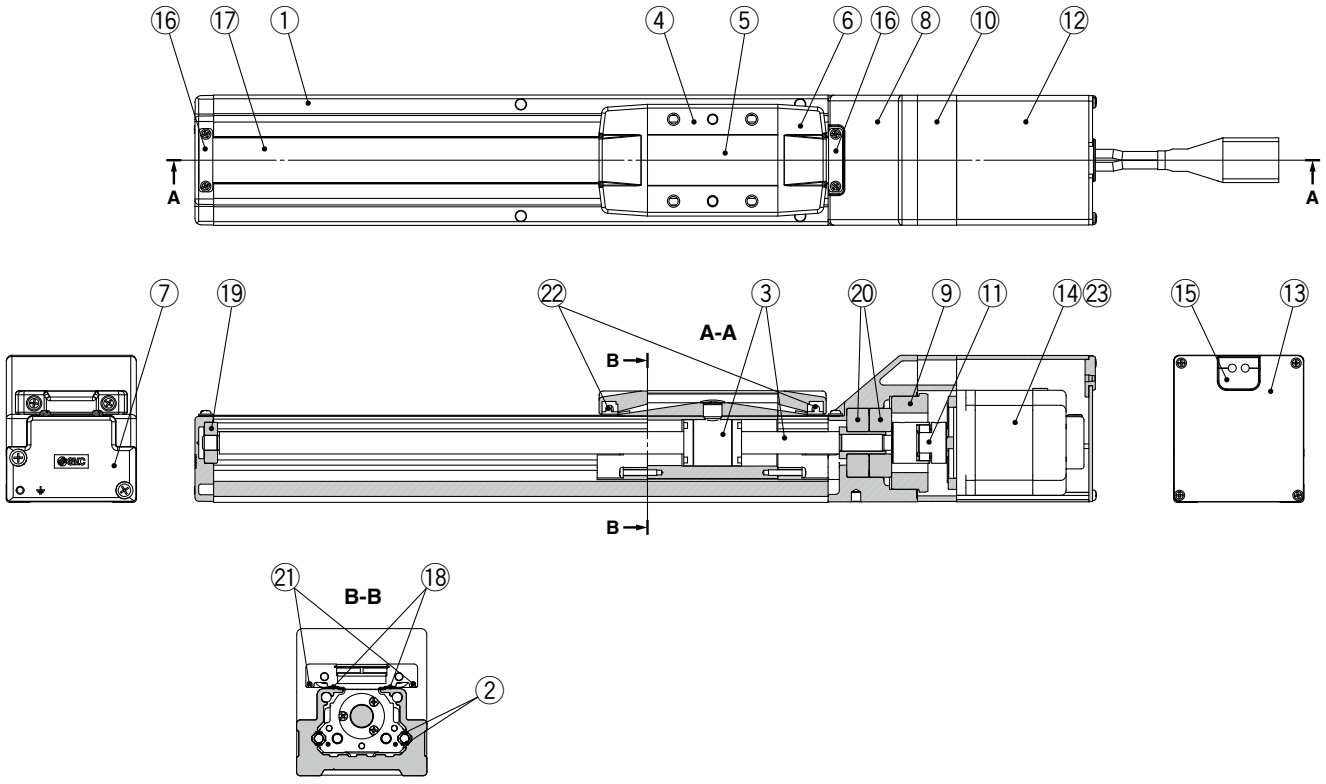
Series	LEFS25□E															
Stroke [mm]	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
Product weight [kg]	1.70	1.84	1.98	2.12	2.26	2.40	2.54	2.68	2.82	2.96	3.10	3.24	3.38	3.52	3.66	3.80
Additional weight with lock [kg]	0.26															

Series	LEFS32□E																			
Stroke [mm]	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
Product weight [kg]	3.15	3.35	3.55	3.75	3.95	4.15	4.35	4.55	4.75	4.95	5.15	5.35	5.55	5.75	5.95	6.15	6.35	6.55	6.75	6.95
Additional weight with lock [kg]	0.53																			

Series	LEFS40□E																			
Stroke [mm]	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1100	1200
Product weight [kg]	5.37	5.65	5.93	6.21	6.49	6.77	7.15	7.33	7.61	7.89	8.17	8.45	8.73	9.01	9.29	9.57	9.85	10.13	10.69	11.25
Additional weight with lock [kg]	0.53																			

Construction: In-line Motor

LEFS16, 25, 32, 40

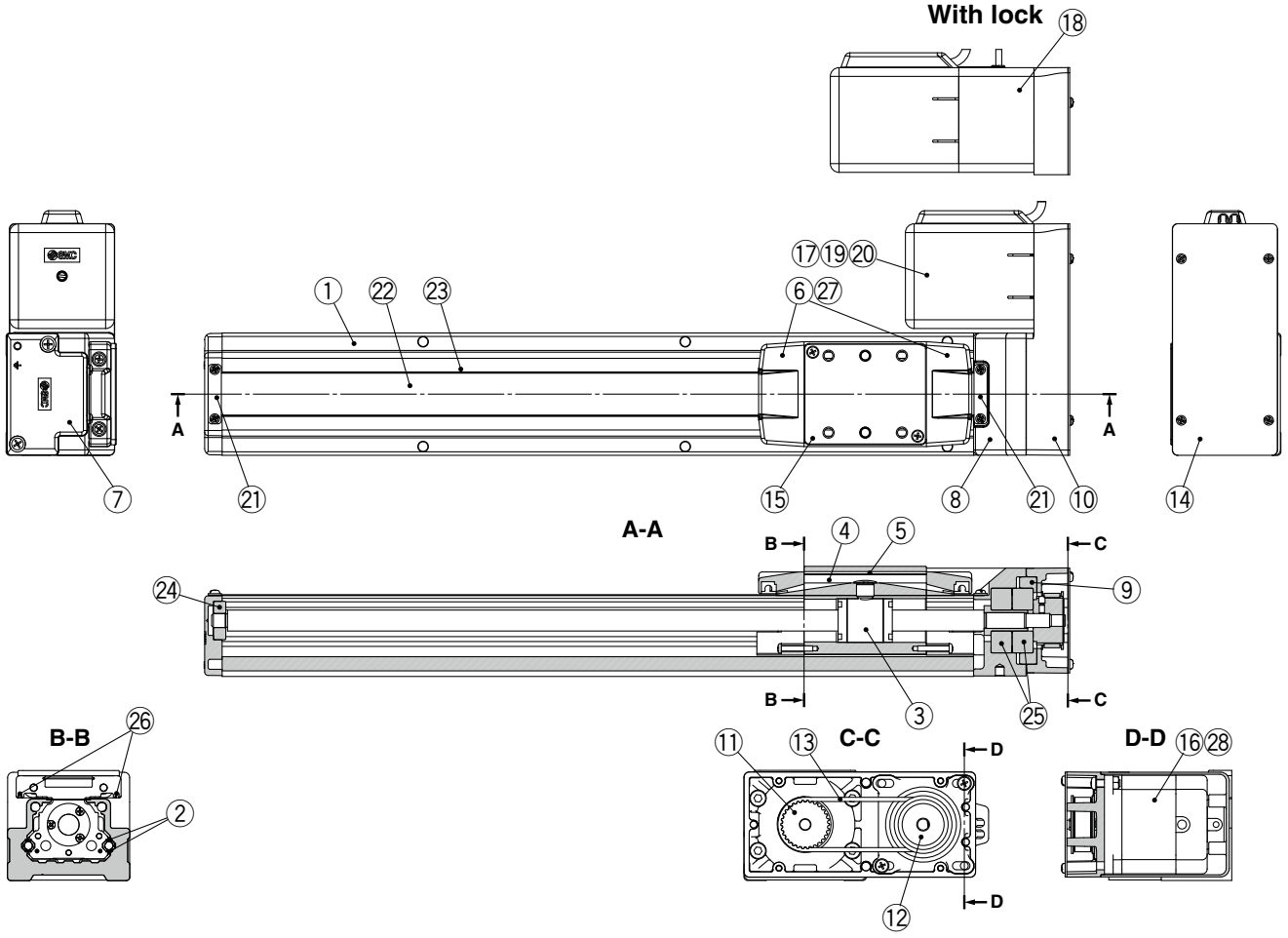


Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Rail guide**	—	
3	**Ball screw assembly**	—	
4	**Table**	Aluminum alloy	Anodized
5	**Blanking plate**	Aluminum alloy	Anodized
6	**Seal band holder**	Synthetic resin	
7	**Housing A**	Aluminum die-casted	Coating
8	**Housing B**	Aluminum die-casted	Coating
9	**Bearing stopper**	Aluminum alloy	
10	**Motor mount**	Aluminum alloy	Coating/Anodized
11	**Coupling**	—	
12	**Motor cover**	Aluminum alloy	Anodized

No.	Description	Material	Note
13	**End cover**	Aluminum alloy	Anodized
14	**Motor**	—	
15	**Rubber bushing**	NBR	
16	**Band stopper**	Stainless steel	
17	**Dust seal band**	Stainless steel	
18	**Seal magnet** **LEFS40**	—	
19	**Bearing**	—	Stroke 250 mm or more
20	**Bearing**	—	
21	**Magnet**	—	With auto switch compatibility
22	**Roller assembly**	—	Without grease application
23	Heat dissipation sheet **LEFS16**	—	

Construction: Motor Parallel



Component Parts

No.	Description		Material	Note
1	**Body**		Aluminum alloy	Anodized
2	**Rail guide**		—	
3	**Ball screw assembly**		—	
4	**Table**		Aluminum alloy	Anodized
5	**Blanking plate**		Aluminum alloy	Anodized
6	**Seal band holder**		Synthetic resin	
7	**Housing A**		Aluminum die-casted	Coating
8	**Housing B**		Aluminum die-casted	Coating
9	**Bearing stopper**		Aluminum alloy	
10	**Return plate**		Aluminum alloy	Coating/Anodized
11	**Pulley**		Aluminum alloy	
12	**Pulley**		Aluminum alloy	
14	**Cover plate**		Aluminum alloy	Anodized
15	**Table spacer**	**LEFS32**	Aluminum alloy	Anodized (LEFS32 only)
16	**Motor**		—	
17	**Motor cover**	**LEFS16**	Aluminum alloy	Anodized
		LEFS25/32/40	Synthetic resin	
18	**Motor cover with lock**	**LEFS25/32/40**	Aluminum alloy	Anodized

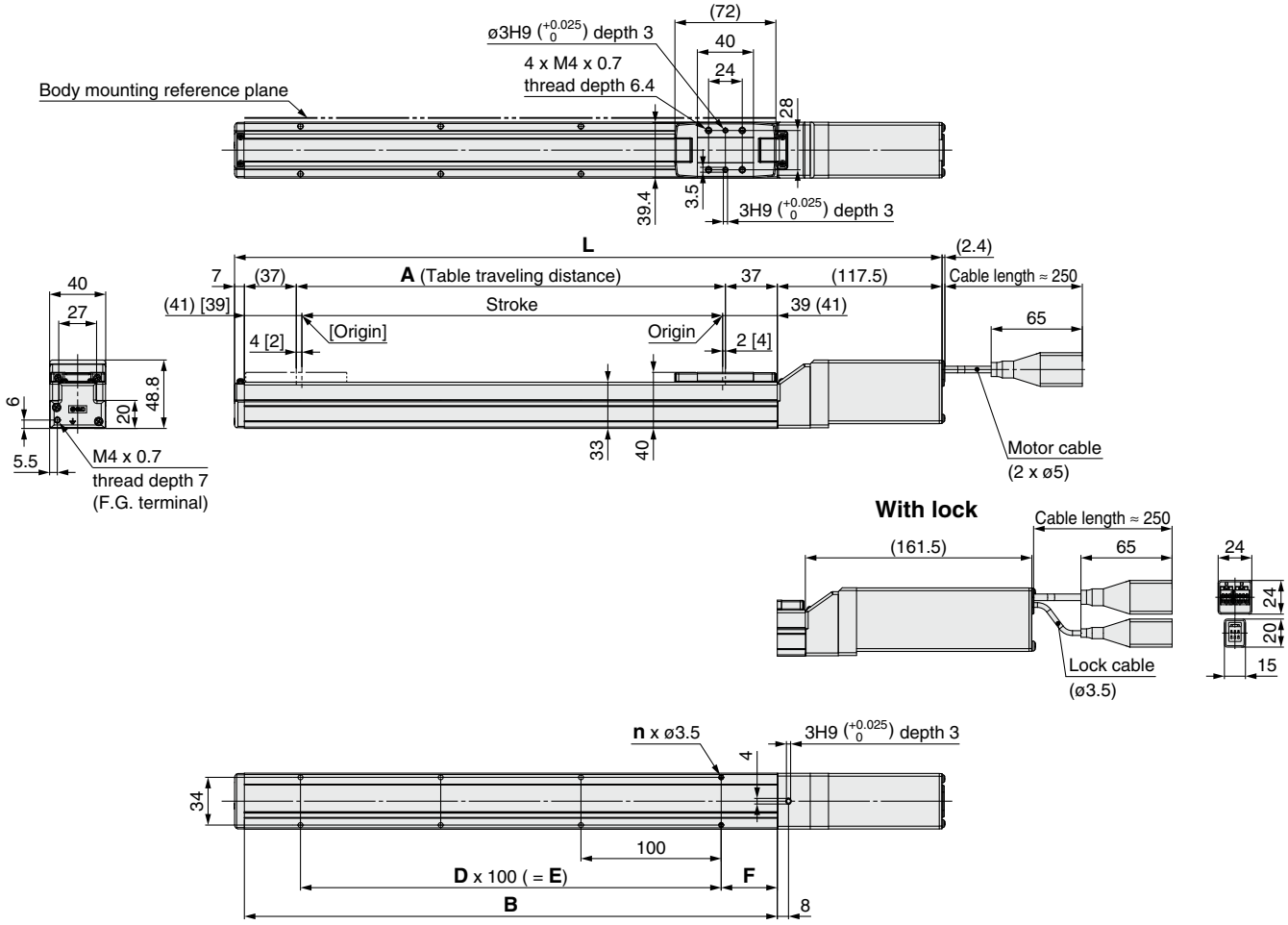
No.	Description		Material	Note
19	**End cover**	**LEFS16**	Aluminum alloy	Anodized
20	**Rubber bushing**	**LEFS16**	NBR	
21	**Band stopper**		Stainless steel	
22	**Dust seal band**		Stainless steel	
23	**Seal magnet**	**LEFS40**	—	
24	**Bearing**		—	Stroke 250 mm or more
25	**Bearing**		—	
26	**Magnet**		—	With auto switch compatibility
27	**Roller assembly**		—	Without grease application
28	**Heat dissipation sheet**	**LEFS16**	—	

Replacement Parts/Belt

No.	Size	Order no.
13	16	LE-D-6-5
	25	LE-D-6-2
	32	LE-D-6-3
	40	LE-D-6-4

Dimensions: In-line Motor

LEFS16E



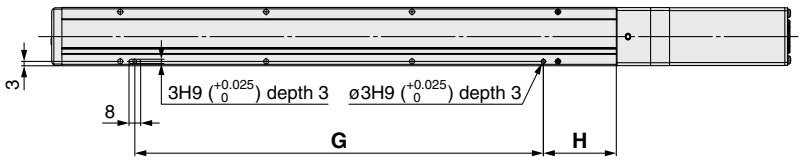
Dimensions [mm]

Model	L		A	B	n	D	E	F
	Without lock	With lock						
LEFS16E□-50□	254.5	298.5	56	130	4	—	—	15
LEFS16E□-100□	304.5	348.5	106	180				40
LEFS16E□-150□	354.5	398.5	156	230				
LEFS16E□-200□	404.5	448.5	206	280	6	2	200	
LEFS16E□-250□	454.5	498.5	256	330				
LEFS16E□-300□	504.5	548.5	306	380	8	3	300	
LEFS16E□-350□	554.5	598.5	356	430				
LEFS16E□-400□	604.5	648.5	406	480	10	4	400	
LEFS16E□-450□	654.5	698.5	456	530				
LEFS16E□-500□	704.5	748.5	506	580	12	5	500	

Dimensions: In-line Motor

LEFS16E

Positioning pin hole (Option): Body bottom

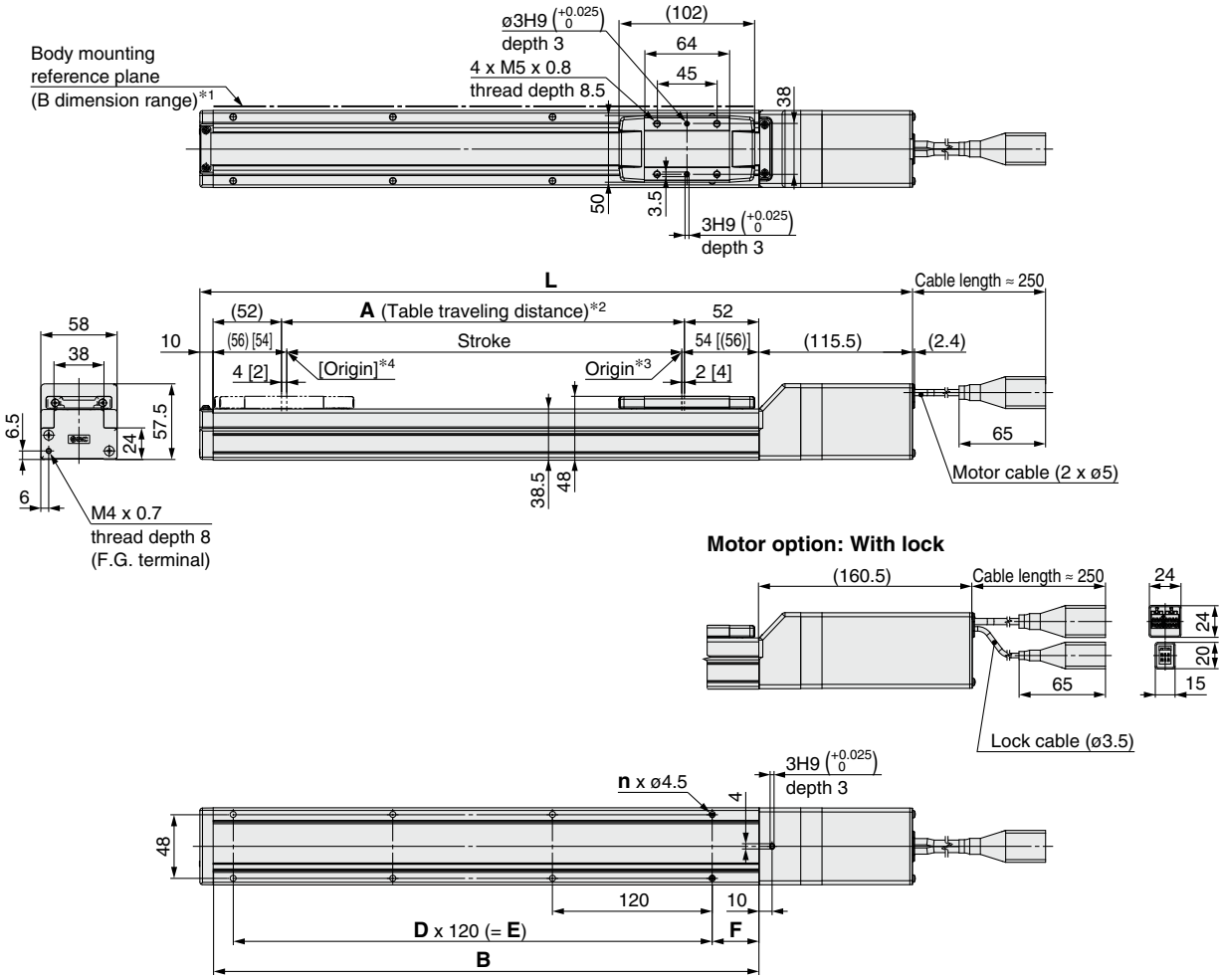


Dimensions [mm]

Model	Positioning pin hole: K	
	G	H
LEFS16E□-50□	80	25
LEFS16E□-100□		50
LEFS16E□-150□		
LEFS16E□-200□	180	
LEFS16E□-250□		
LEFS16E□-300□	280	
LEFS16E□-350□		
LEFS16E□-400□	380	
LEFS16E□-450□		
LEFS16E□-500□	480	

Dimensions: In-line Motor

LEFS25E



*1 When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of round chamfering. (Recommended height: 5 mm)
In addition, be aware that surfaces other than the body mounting reference plane (B dimension range) may slightly protrude from the body mounting reference plane. Be sure to provide a clearance of 1 mm or more to avoid interference with workpieces, facilities, etc.
*2 This is the distance within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*3 Position after returning to origin
*4 [ ] for when the direction of return to origin has changed

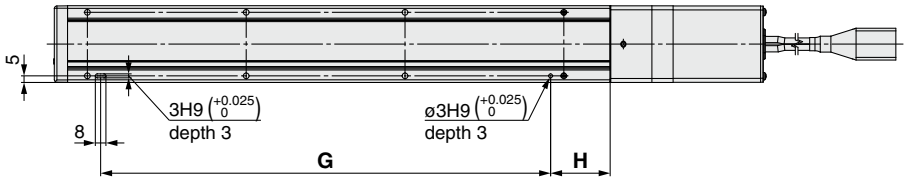
Dimensions [mm]

Model	L		A	B	n	D	E	F
	Without lock	With lock						
LEFS25E□-50□	285.5	330.5	56	160	4	—	—	20
LEFS25E□-100□	335.5	380.5	106	210	4	—	—	
LEFS25E□-150□	385.5	430.5	156	260	4	—	—	
LEFS25E□-200□	435.5	480.5	206	310	6	2	240	
LEFS25E□-250□	485.5	530.5	256	360	6	2	240	
LEFS25E□-300□	535.5	580.5	306	410	8	3	360	
LEFS25E□-350□	585.5	630.5	356	460	8	3	360	
LEFS25E□-400□	635.5	680.5	406	510	8	3	360	
LEFS25E□-450□	685.5	730.5	456	560	10	4	480	35
LEFS25E□-500□	735.5	780.5	506	610	10	4	480	
LEFS25E□-550□	785.5	830.5	556	660	12	5	600	
LEFS25E□-600□	835.5	880.5	606	710	12	5	600	
LEFS25E□-650□	885.5	930.5	656	760	12	5	600	
LEFS25E□-700□	935.5	980.5	706	810	14	6	720	
LEFS25E□-750□	985.5	1030.5	756	860	14	6	720	
LEFS25E□-800□	1035.5	1080.5	806	910	16	7	840	

Dimensions: In-line Motor

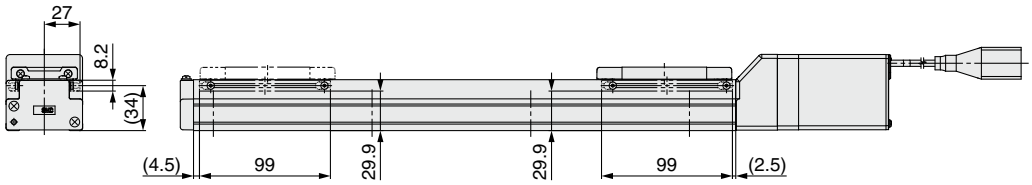
LEFS25E

Positioning pin hole*1 (Option): Body bottom



*1 When using the body bottom positioning pin holes, do not simultaneously use the housing B bottom pin hole.

With auto switch (Option)



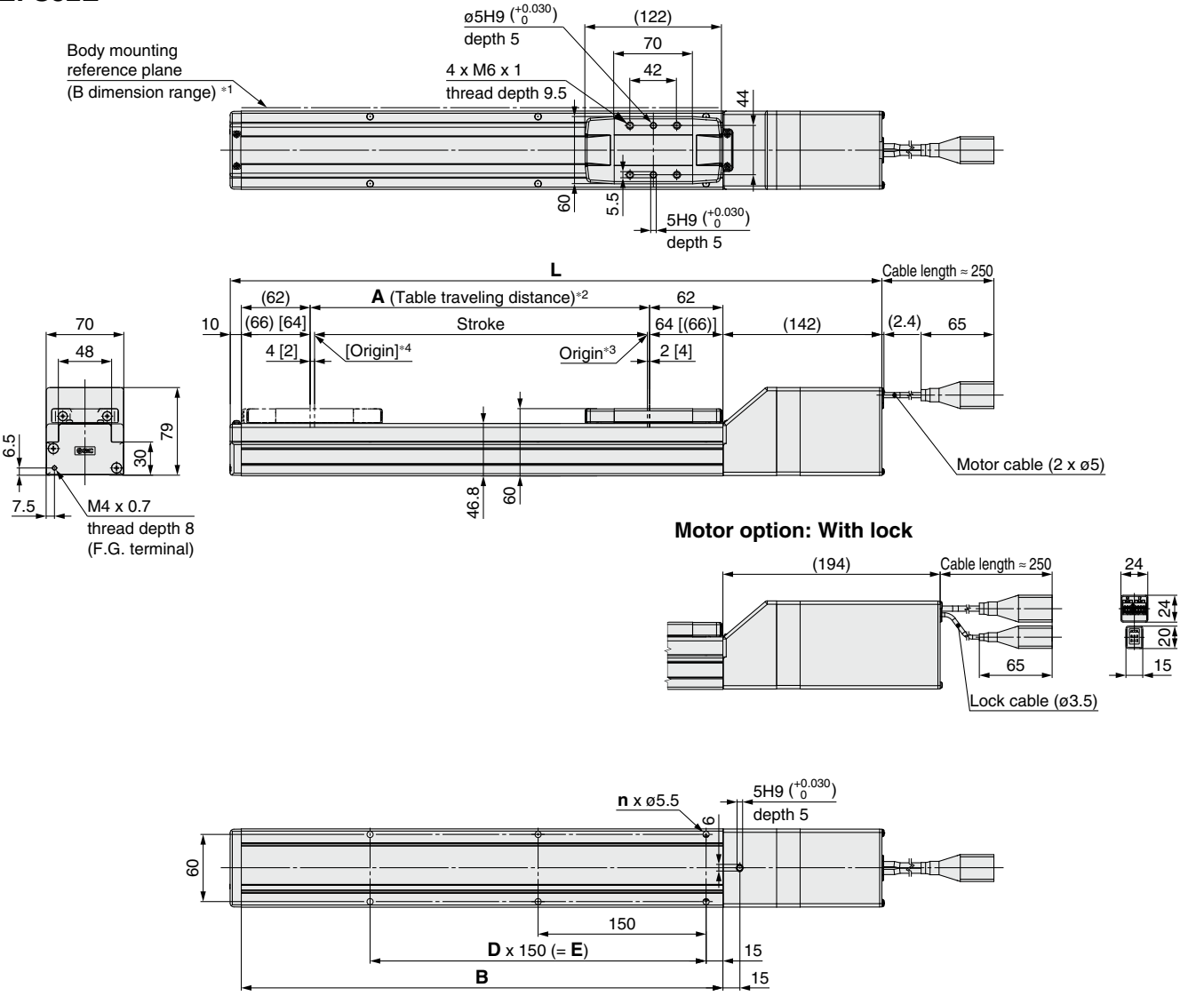
* For strokes of 99 mm or less, only 2 auto switch mounting brackets can be installed on the motor side.

Dimensions [mm]

Model	G	H
LEFS25E□-50□	100	30
LEFS25E□-100□	100	45
LEFS25E□-150□	100	45
LEFS25E□-200□	220	45
LEFS25E□-250□	220	45
LEFS25E□-300□	340	45
LEFS25E□-350□	340	45
LEFS25E□-400□	340	45
LEFS25E□-450□	460	45
LEFS25E□-500□	460	45
LEFS25E□-550□	580	45
LEFS25E□-600□	580	45
LEFS25E□-650□	580	45
LEFS25E□-700□	700	45
LEFS25E□-750□	700	45
LEFS25E□-800□	820	45

Dimensions: In-line Motor

LEFS32E



*1 When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of round chamfering. (Recommended height: 5 mm)
In addition, be aware that surfaces other than the body mounting reference plane (B dimension range) may slightly protrude from the body mounting reference plane. Be sure to provide a clearance of 1 mm or more to avoid interference with workpieces, facilities, etc.
*2 This is the distance within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*3 Position after returning to origin
*4 [ ] for when the direction of return to origin has changed

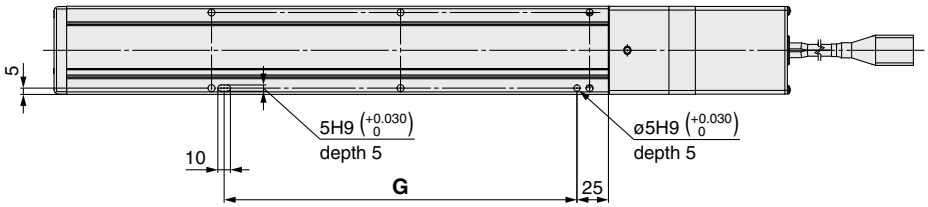
Dimensions [mm]

Model	L		A	B	n	D	E
	Without lock	With lock					
LEFS32E□-50□	332	384	56	180	4	—	—
LEFS32E□-100□	382	434	106	230	4	—	—
LEFS32E□-150□	432	484	156	280	4	—	—
LEFS32E□-200□	482	534	206	330	6	2	300
LEFS32E□-250□	532	584	256	380	6	2	300
LEFS32E□-300□	582	634	306	430	6	2	300
LEFS32E□-350□	632	684	356	480	8	3	450
LEFS32E□-400□	682	734	406	530	8	3	450
LEFS32E□-450□	732	784	456	580	8	3	450
LEFS32E□-500□	782	834	506	630	10	4	600
LEFS32E□-550□	832	884	556	680	10	4	600
LEFS32E□-600□	882	934	606	730	10	4	600
LEFS32E□-650□	932	984	656	780	12	5	750
LEFS32E□-700□	982	1034	706	830	12	5	750
LEFS32E□-750□	1032	1084	756	880	12	5	750
LEFS32E□-800□	1082	1134	806	930	14	6	900
LEFS32E□-850□	1132	1184	856	980	14	6	900
LEFS32E□-900□	1182	1234	906	1030	14	6	900
LEFS32E□-950□	1232	1284	956	1080	16	7	1050
LEFS32E□-1000□	1282	1334	1006	1130	16	7	1050

Dimensions: In-line Motor

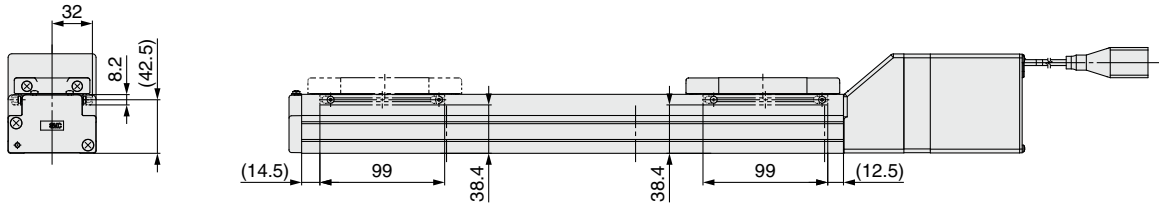
LEFS32E

Positioning pin hole*1 (Option): Body bottom



*1 When using the body bottom positioning pin holes, do not simultaneously use the housing B bottom pin hole.

With auto switch (Option)



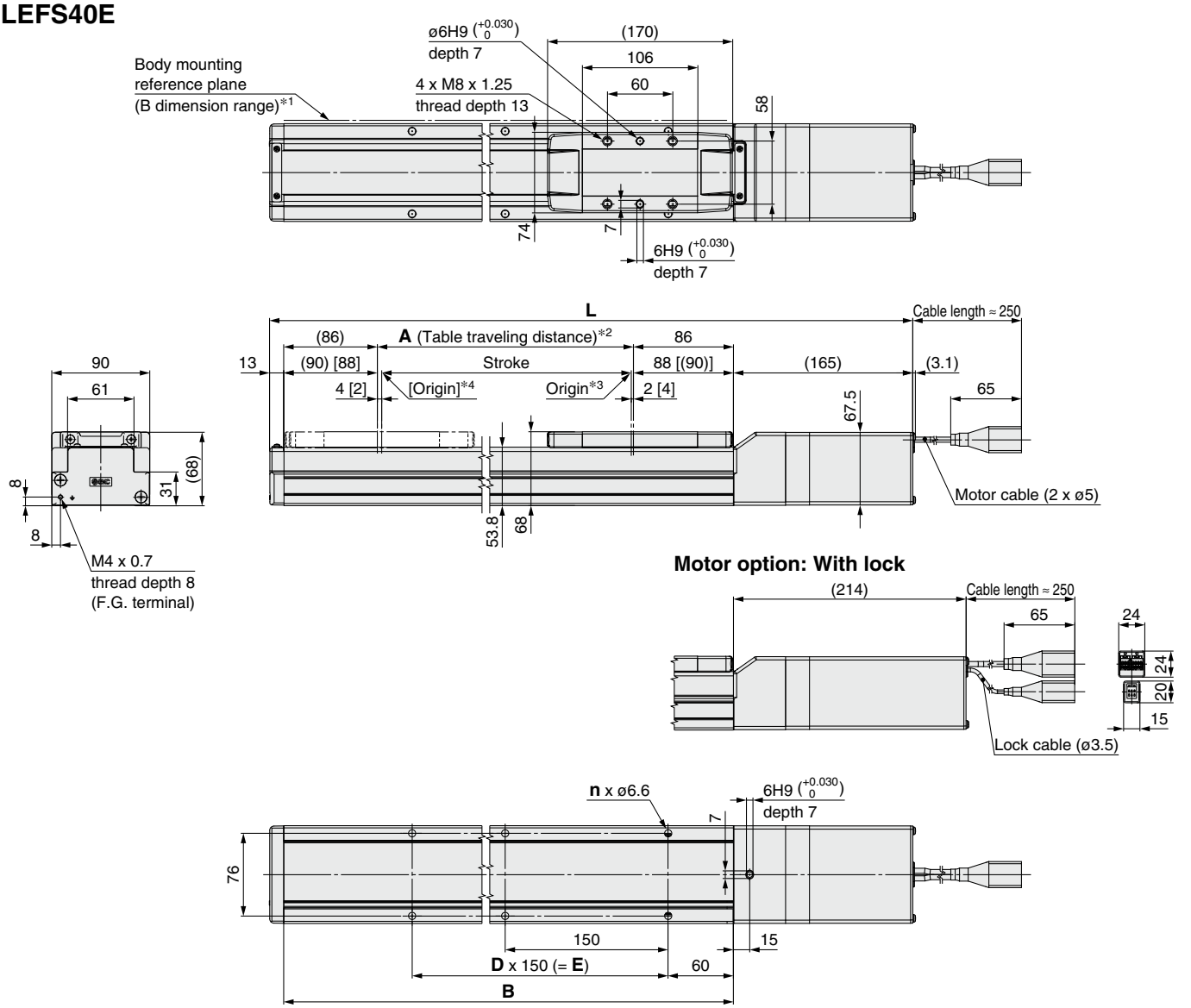
* For strokes of 99 mm or less, only 2 auto switch mounting brackets can be installed on the motor side.

Dimensions [mm]

Model	G
LEFS32E□-50□	130
LEFS32E□-100□	130
LEFS32E□-150□	130
LEFS32E□-200□	280
LEFS32E□-250□	280
LEFS32E□-300□	280
LEFS32E□-350□	430
LEFS32E□-400□	430
LEFS32E□-450□	430
LEFS32E□-500□	580
LEFS32E□-550□	580
LEFS32E□-600□	580
LEFS32E□-650□	730
LEFS32E□-700□	730
LEFS32E□-750□	730
LEFS32E□-800□	880
LEFS32E□-850□	880
LEFS32E□-900□	880
LEFS32E□-950□	1030
LEFS32E□-1000□	1030

Dimensions: In-line Motor

LEFS40E



*1 When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of round chamfering. (Recommended height: 5 mm)
In addition, be aware that surfaces other than the body mounting reference plane (B dimension range) may slightly protrude from the body mounting reference plane. Be sure to provide a clearance of 1 mm or more to avoid interference with workpieces, facilities, etc.

*2 This is the distance within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.

*3 Position after returning to origin

*4 [ ] for when the direction of return to origin has changed

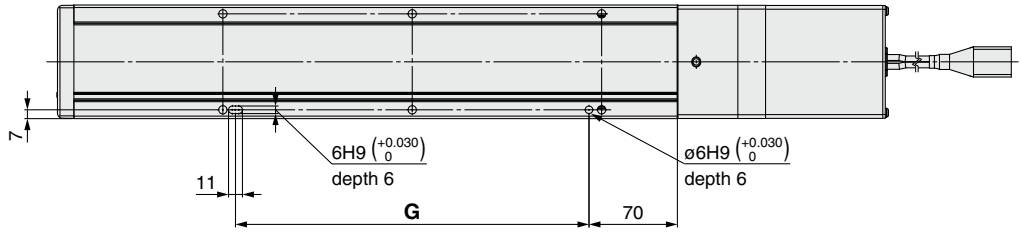
Dimensions [mm]

Model	L		A	B	n	D	E
	Without lock	With lock					
LEFS40E□-150□	506	555	156	328	4	—	150
LEFS40E□-200□	556	605	206	378	6	2	300
LEFS40E□-250□	606	655	256	428	6	2	300
LEFS40E□-300□	656	705	306	478	6	2	300
LEFS40E□-350□	706	755	356	528	8	3	450
LEFS40E□-400□	756	805	406	578	8	3	450
LEFS40E□-450□	806	855	456	628	8	3	450
LEFS40E□-500□	856	905	506	678	10	4	600
LEFS40E□-550□	906	955	556	728	10	4	600
LEFS40E□-600□	956	1005	606	778	10	4	600
LEFS40E□-650□	1006	1055	656	828	12	5	750
LEFS40E□-700□	1056	1105	706	878	12	5	750
LEFS40E□-750□	1106	1155	756	928	12	5	750
LEFS40E□-800□	1156	1205	806	978	14	6	900
LEFS40E□-850□	1206	1255	856	1028	14	6	900
LEFS40E□-900□	1256	1305	906	1078	14	6	900
LEFS40E□-950□	1306	1355	956	1128	16	7	1050
LEFS40E□-1000□	1356	1405	1006	1178	16	7	1050
LEFS40E□-1100□	1456	1505	1106	1278	18	8	1200
LEFS40E□-1200□	1556	1605	1206	1378	18	8	1200

Dimensions: In-line Motor

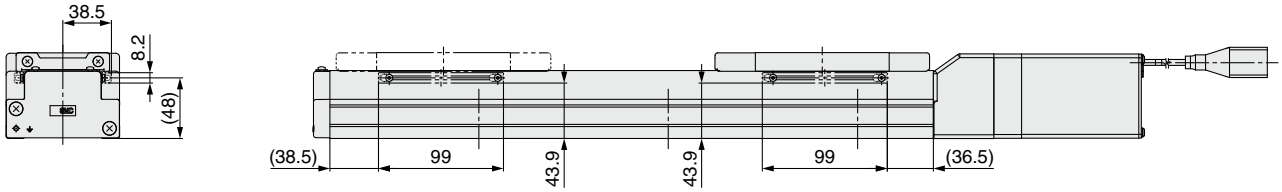
LEFS40E

Positioning pin hole*1 (Option): Body bottom



*1 When using the body bottom positioning pin holes, do not simultaneously use the housing B bottom pin hole.

With auto switch (Option)

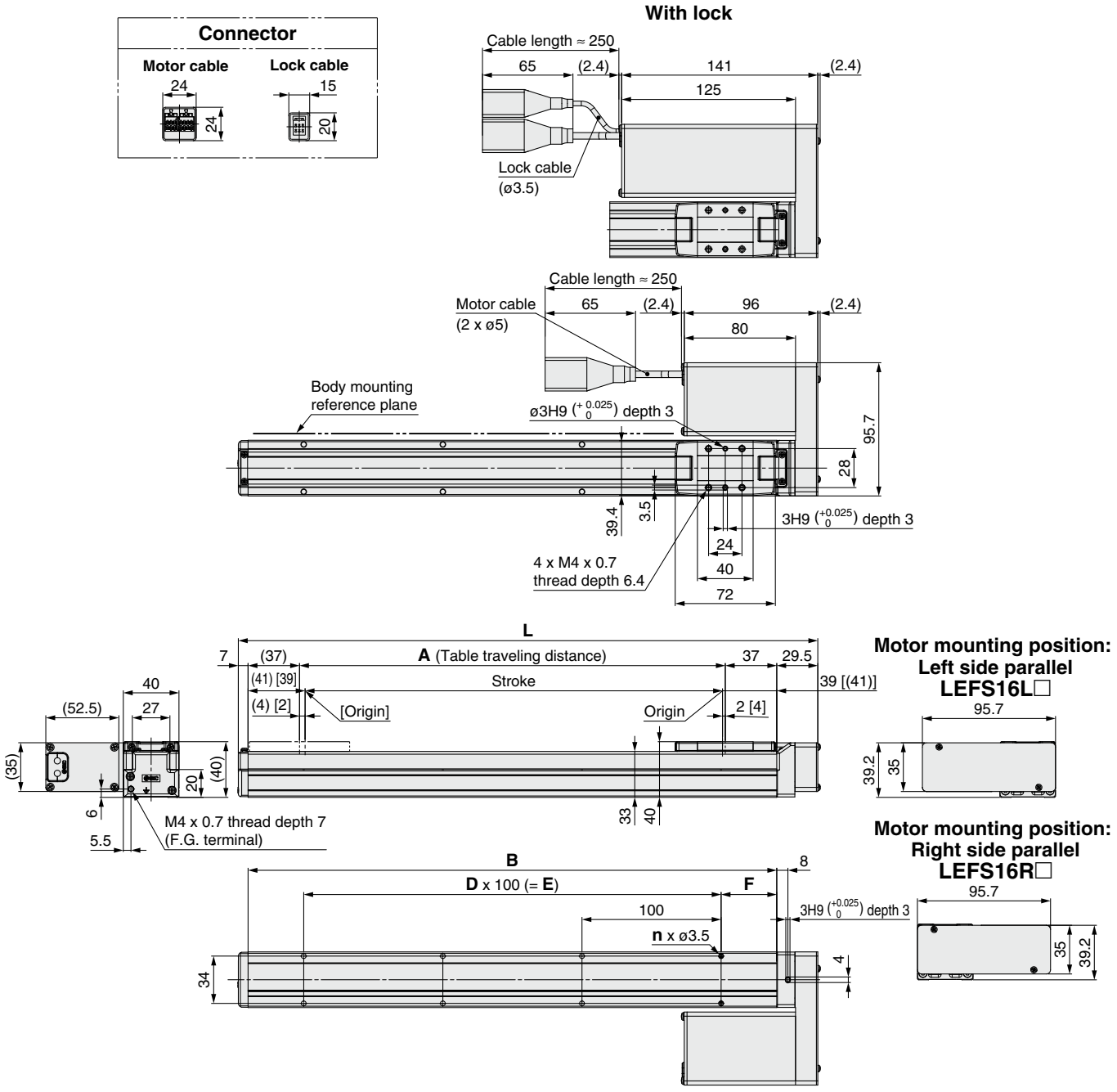


Dimensions [mm]

Model	G
LEFS40E□-150□	130
LEFS40E□-200□	280
LEFS40E□-250□	280
LEFS40E□-300□	280
LEFS40E□-350□	430
LEFS40E□-400□	430
LEFS40E□-450□	430
LEFS40E□-500□	580
LEFS40E□-550□	580
LEFS40E□-600□	580
LEFS40E□-650□	730
LEFS40E□-700□	730
LEFS40E□-750□	730
LEFS40E□-800□	880
LEFS40E□-850□	880
LEFS40E□-900□	880
LEFS40E□-950□	1030
LEFS40E□-1000□	1030
LEFS40E□-1100□	1180
LEFS40E□-1200□	1180

Dimensions: Motor Parallel

LEFS16RE



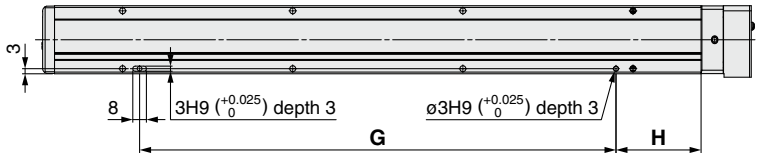
Dimensions [mm]

Model	L	A	B	n	D	E	F
LEFS16□E□-50□	166.5	56	130	4	—	—	15
LEFS16□E□-100□	216.5	106	180				40
LEFS16□E□-150□	266.5	156	230				
LEFS16□E□-200□	316.5	206	280	6	2	200	
LEFS16□E□-250□	366.5	256	330				
LEFS16□E□-300□	416.5	306	380	8	3	300	
LEFS16□E□-350□	466.5	356	430				
LEFS16□E□-400□	516.5	406	480	10	4	400	
LEFS16□E□-450□	566.5	456	530				
LEFS16□E□-500□	616.5	506	580	12	5	500	

Dimensions: Motor Parallel

LEFS16R

Positioning pin hole (Option): Body bottom

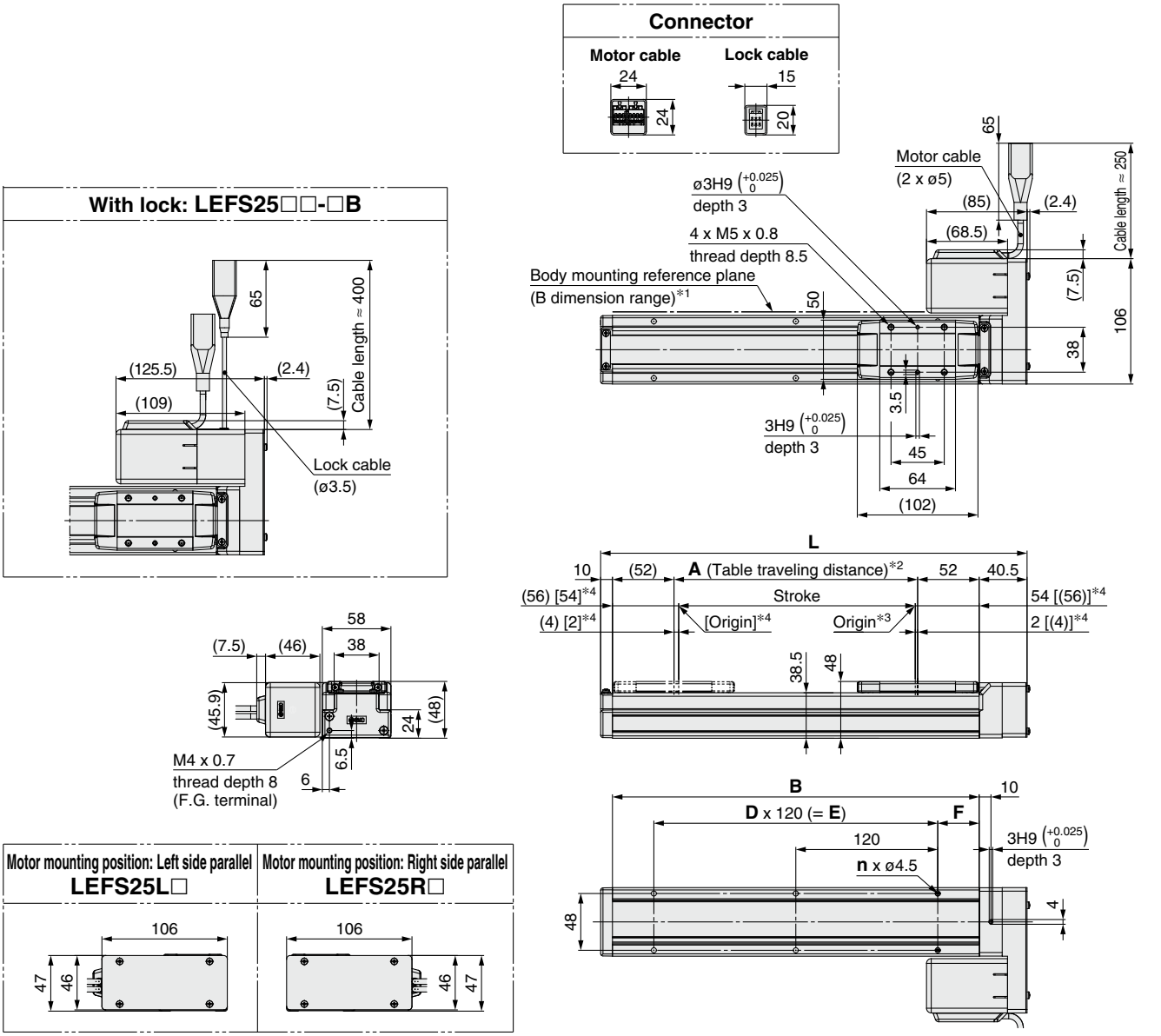


Dimensions [mm]

Model	Positioning pin hole: K	
	G	H
LEFS16□E□-50□	80	25
LEFS16□E□-100□		50
LEFS16□E□-150□		
LEFS16□E□-200□	180	
LEFS16□E□-250□		
LEFS16□E□-300□	280	
LEFS16□E□-350□		
LEFS16□E□-400□	380	
LEFS16□E□-450□		
LEFS16□E□-500□	480	

Dimensions: Motor Parallel

LEFS25R



*1 When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more. (Recommended height: 5 mm) In addition, be aware that surfaces other than the body mounting reference plane (B dimension range) may slightly protrude from the body mounting reference plane. Be sure to provide a clearance of 1 mm or more to avoid interference with workpieces, facilities, etc.

*2 This is the distance within which the table can move when it returns to origin. Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.

*3 Position after returning to origin

*4 [ ] for when the direction of return to origin has changed

Dimensions [mm]

Model	L	A	B	n	D	E	F
LEFS25□E□-50□	210.5	56	160	4	—	—	20
LEFS25□E□-100□	260.5	106	210	4	—	—	35
LEFS25□E□-150□	310.5	156	260	4	—	—	
LEFS25□E□-200□	360.5	206	310	6	2	240	
LEFS25□E□-250□	410.5	256	360	6	2	240	
LEFS25□E□-300□	460.5	306	410	8	3	360	
LEFS25□E□-350□	510.5	356	460	8	3	360	
LEFS25□E□-400□	560.5	406	510	8	3	360	

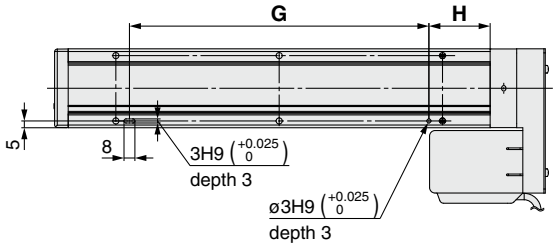
Dimensions [mm]

Model	L	A	B	n	D	E	F
LEFS25□E□-450□	610.5	456	560	10	4	480	35
LEFS25□E□-500□	660.5	506	610	10	4	480	
LEFS25□E□-550□	710.5	556	660	12	5	600	
LEFS25□E□-600□	760.5	606	710	12	5	600	
LEFS25□E□-650□	810.5	656	760	12	5	600	
LEFS25□E□-700□	860.5	706	810	14	6	720	
LEFS25□E□-750□	910.5	756	860	14	6	720	
LEFS25□E□-800□	960.5	806	910	16	7	840	

Dimensions: Motor Parallel

LEFS25R

Positioning pin hole*1 (Option): Body bottom



*1 When using the body bottom positioning pin holes, do not simultaneously use the housing B bottom pin hole.

Dimensions [mm]

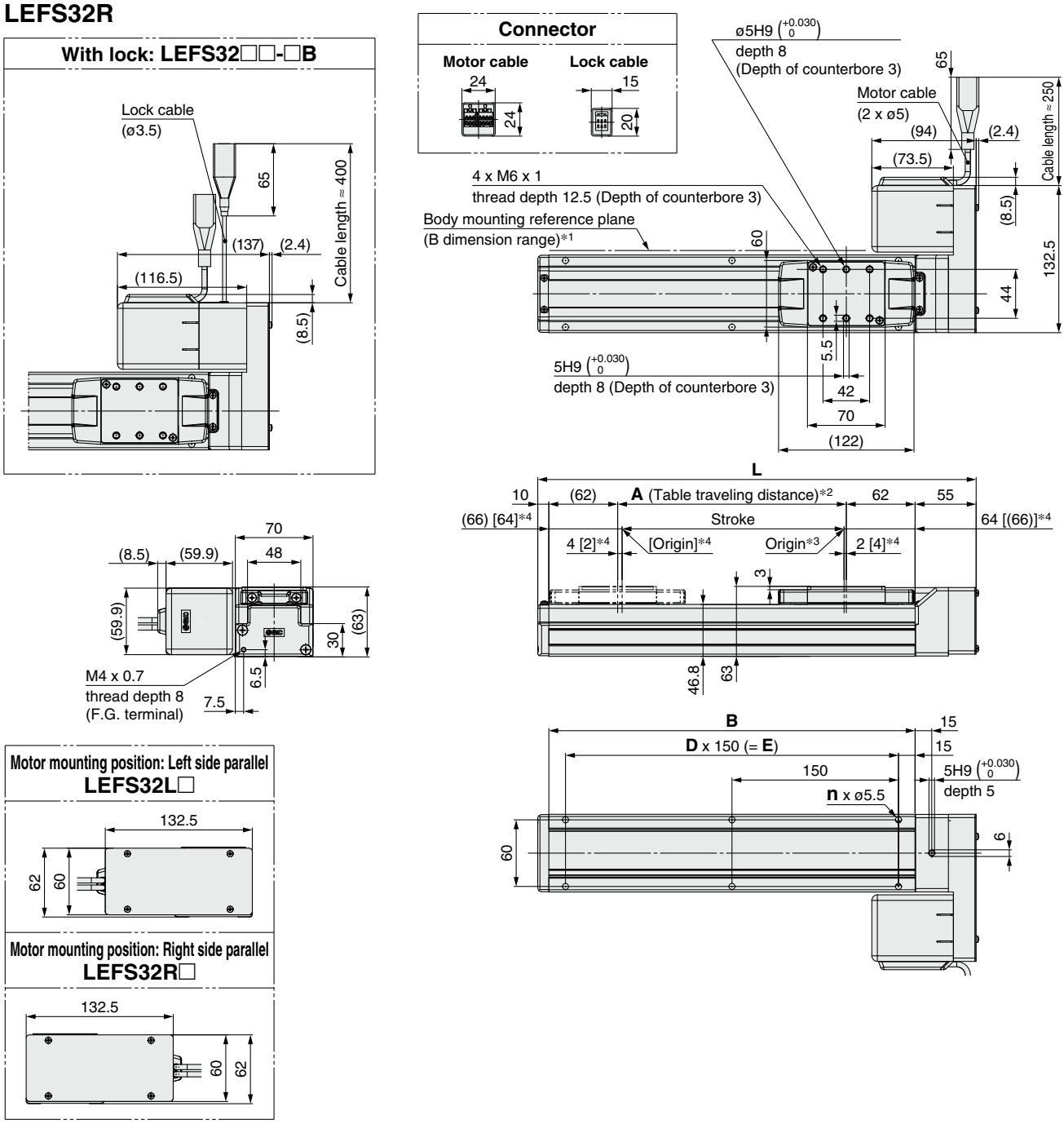
Model	G	H
LEFS25□E□-50□	100	30
LEFS25□E□-100□	100	45
LEFS25□E□-150□	100	45
LEFS25□E□-200□	220	45
LEFS25□E□-250□	220	45
LEFS25□E□-300□	340	45
LEFS25□E□-350□	340	45
LEFS25□E□-400□	340	45

Dimensions [mm]

Model	G	H
LEFS25□E□-450□	460	45
LEFS25□E□-500□	460	45
LEFS25□E□-550□	580	45
LEFS25□E□-600□	580	45
LEFS25□E□-650□	580	45
LEFS25□E□-700□	700	45
LEFS25□E□-750□	700	45
LEFS25□E□-800□	820	45

Dimensions: Motor Parallel

LEFS32R



*1 When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more. (Recommended height: 5 mm) In addition, be aware that surfaces other than the body mounting reference plane (B dimension range) may slightly protrude from the body mounting reference plane. Be sure to provide a clearance of 1 mm or more to avoid interference with workpieces, facilities, etc.

*2 This is the distance within which the table can move when it returns to origin. Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.

*3 Position after returning to origin

*4 [ ] for when the direction of return to origin has changed

Dimensions [mm]

Model	L	A	B	n	D	E
LEFS32□E□-50□	245	56	180	4	—	—
LEFS32□E□-100□	295	106	230	4	—	—
LEFS32□E□-150□	345	156	280	4	—	—
LEFS32□E□-200□	395	206	330	6	2	300
LEFS32□E□-250□	445	256	380	6	2	300
LEFS32□E□-300□	495	306	430	6	2	300
LEFS32□E□-350□	545	356	480	8	3	450
LEFS32□E□-400□	595	406	530	8	3	450
LEFS32□E□-450□	645	456	580	8	3	450
LEFS32□E□-500□	695	506	630	10	4	600

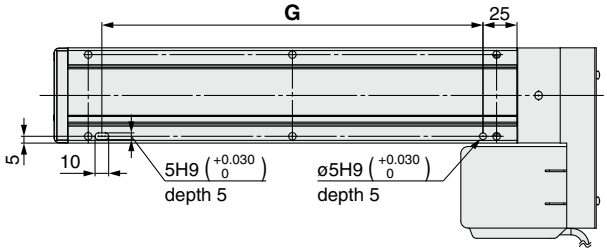
Dimensions [mm]

Model	L	A	B	n	D	E
LEFS32□E□-550□	745	556	680	10	4	600
LEFS32□E□-600□	795	606	730	10	4	600
LEFS32□E□-650□	845	656	780	12	5	750
LEFS32□E□-700□	895	706	830	12	5	750
LEFS32□E□-750□	945	756	880	12	5	750
LEFS32□E□-800□	995	806	930	14	6	900
LEFS32□E□-850□	1045	856	980	14	6	900
LEFS32□E□-900□	1095	906	1030	14	6	900
LEFS32□E□-950□	1145	956	1080	16	7	1050
LEFS32□E□-1000□	1195	1006	1130	16	7	1050

Dimensions: Motor Parallel

LEFS32R

Positioning pin hole*1 (Option): Body bottom



*1 When using the body bottom positioning pin holes, do not simultaneously use the housing B bottom pin hole.

Dimensions [mm]

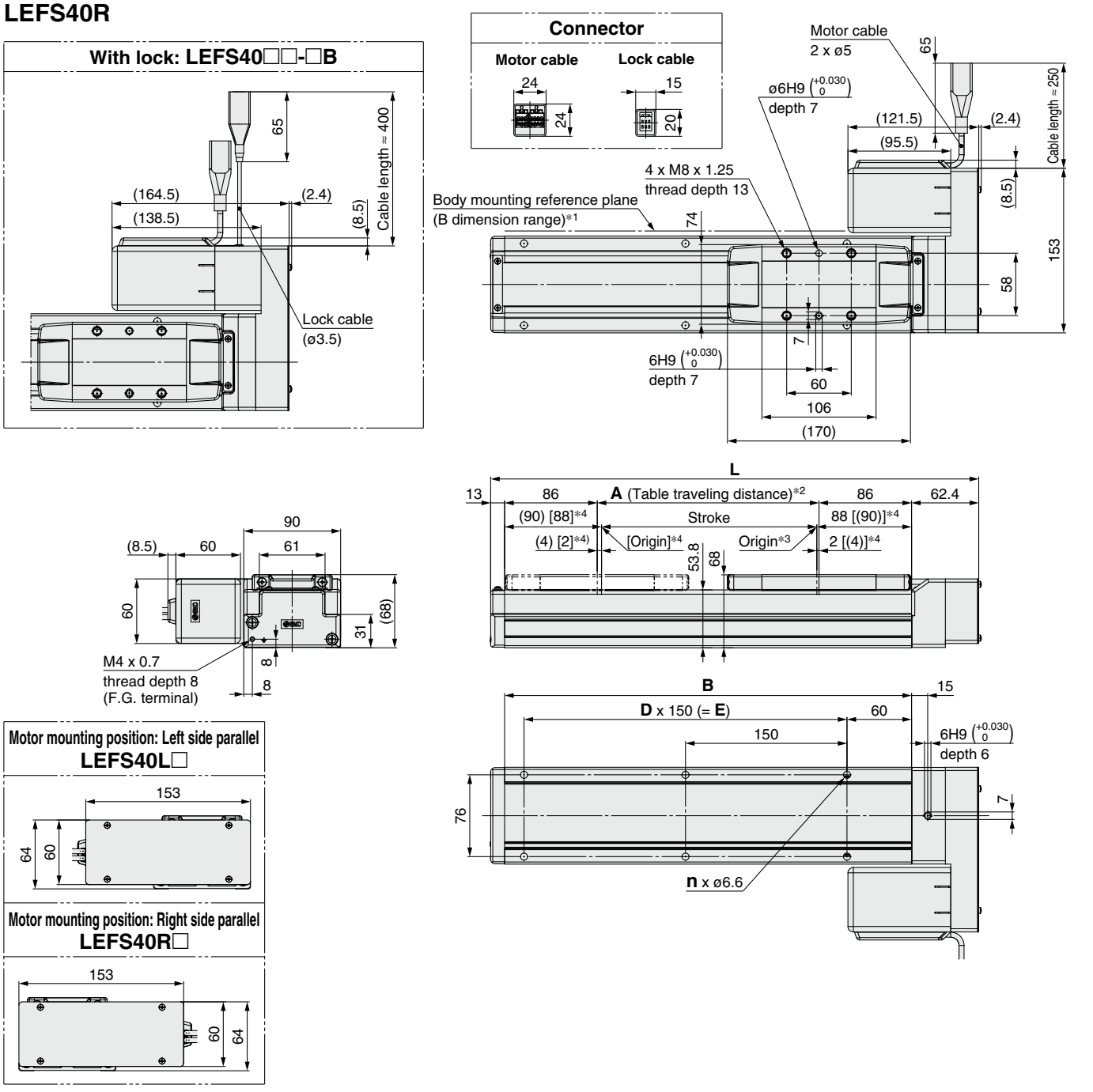
Model	G
LEFS32□E□-50□	130
LEFS32□E□-100□	130
LEFS32□E□-150□	130
LEFS32□E□-200□	280
LEFS32□E□-250□	280
LEFS32□E□-300□	280
LEFS32□E□-350□	430
LEFS32□E□-400□	430
LEFS32□E□-450□	430
LEFS32□E□-500□	580

Dimensions [mm]

Model	G
LEFS32□E□-550□	580
LEFS32□E□-600□	580
LEFS32□E□-650□	730
LEFS32□E□-700□	730
LEFS32□E□-750□	730
LEFS32□E□-800□	880
LEFS32□E□-850□	880
LEFS32□E□-900□	880
LEFS32□E□-950□	1030
LEFS32□E□-1000□	1030

Dimensions: Motor Parallel

LEFS40R



*1 When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more. (Recommended height: 5 mm)
In addition, be aware that surfaces other than the body mounting reference plane (B dimension range) may slightly protrude from the body mounting reference plane.
Be sure to provide a clearance of 1 mm or more to avoid interference with workpieces, facilities, etc.
*2 This is the distance within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*3 Position after returning to origin
*4 [ ] for when the direction of return to origin has changed

Dimensions [mm]

Model	L	A	B	n	D	E
LEFS40□E□-150□	403.4	156	328	4	—	150
LEFS40□E□-200□	453.4	206	378	6	2	300
LEFS40□E□-250□	503.4	256	428	6	2	300
LEFS40□E□-300□	553.4	306	478	6	2	300
LEFS40□E□-350□	603.4	356	528	8	3	450
LEFS40□E□-400□	653.4	406	578	8	3	450
LEFS40□E□-450□	703.4	456	628	8	3	450
LEFS40□E□-500□	753.4	506	678	10	4	600
LEFS40□E□-550□	803.4	556	728	10	4	600
LEFS40□E□-600□	853.4	606	778	10	4	600

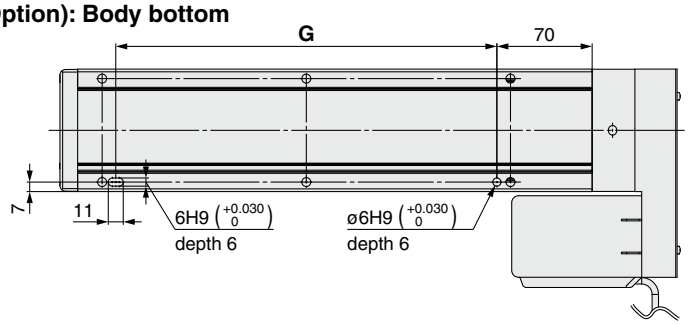
Dimensions [mm]

Model	L	A	B	n	D	E
LEFS40□E□-650□	903.4	656	828	12	5	750
LEFS40□E□-700□	953.4	706	878	12	5	750
LEFS40□E□-750□	1003.4	756	928	12	5	750
LEFS40□E□-800□	1053.4	806	978	14	6	900
LEFS40□E□-850□	1103.4	856	1028	14	6	900
LEFS40□E□-900□	1153.4	906	1078	14	6	900
LEFS40□E□-950□	1203.4	956	1128	16	7	1050
LEFS40□E□-1000□	1253.4	1006	1178	16	7	1050
LEFS40□E□-1100□	1353.4	1106	1278	18	8	1200
LEFS40□E□-1200□	1453.4	1206	1378	18	8	1200

Dimensions: Motor Parallel

LEFS40R

Positioning pin hole*1 (Option): Body bottom



*1 When using the body bottom positioning pin holes, do not simultaneously use the housing B bottom pin hole.

Dimensions [mm]

Model	G
LEFS40□E□-150□	130
LEFS40□E□-200□	280
LEFS40□E□-250□	280
LEFS40□E□-300□	280
LEFS40□E□-350□	430
LEFS40□E□-400□	430
LEFS40□E□-450□	430
LEFS40□E□-500□	580
LEFS40□E□-550□	580
LEFS40□E□-600□	580

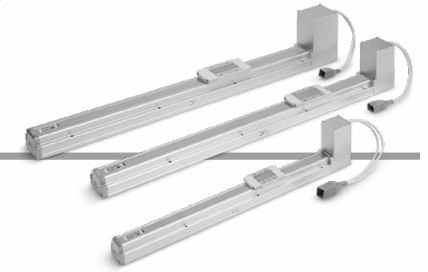
Dimensions [mm]

Model	G
LEFS40□E□-650□	730
LEFS40□E□-700□	730
LEFS40□E□-750□	730
LEFS40□E□-800□	880
LEFS40□E□-850□	880
LEFS40□E□-900□	880
LEFS40□E□-950□	1030
LEFS40□E□-1000□	1030
LEFS40□E□-1100□	1180
LEFS40□E□-1200□	1180

Battery-less Absolute Encoder Type
Slider Type/Belt Drive
LEFB Series LEFB16, 25, 32

CE RoHS

∗ For details, refer to page 182 and onwards.



How to Order

LEFB 25 E T – 500 [ ] C N K – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

For details on controllers, refer to the next page.

❶ Size

16
25
32

❷ Motor type

E	Battery-less absolute (Step motor 24 VDC)

❸ Equivalent lead [mm]

T	48

❹ Stroke∗1 [mm]

Stroke	Note	
	Size	Applicable stroke
300 to 1000	16	300, 500, 600, 700, 800, 900, 1000
300 to 2000	25	300, 500, 600, 700, 800, 900, 1000, 1200, 1500, 1800, 2000
300 to 2000	32	300, 500, 600, 700, 800, 900, 1000, 1200, 1500, 1800, 2000

❺ Motor option

Nil	Without option
B	With lock

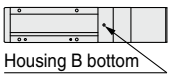
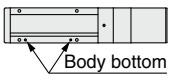
❻ Auto switch compatibility∗2 ∗3 ∗4 ∗5

Nil	None
C	With (Includes 1 mounting bracket)

❼ Grease application (Seal band part)

Nil	With
N	Without (Roller specification)

❽ Positioning pin hole

Nil	Housing B bottom∗6	
K	Body bottom 2 locations	

❾ Actuator cable type/length

Robotic cable [m]

Nil	None	R8	8∗7
R1	1.5	RA	10∗7
R3	3	RB	15∗7
R5	5	RC	20∗7

The belt drive actuator cannot be used for vertical applications.

For details on auto switches, refer to the **Web Catalog**.

⑩ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗8	DIN rail

Communication plug connector, I/O cable∗9

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 Please contact SMC for non-standard strokes as they are produced as special orders.
∗2 Excludes the LEF16
∗3 If 2 or more are required, please order them separately. (Part no.: LEF-D-2-1 For details, refer to the **Web Catalog**.)
∗4 Order auto switches separately. (For details, refer to the **Web Catalog**.)
∗5 When "Nil" is selected, the product will not come with a built-in magnet for an auto switch, and so a mounting bracket cannot be secured. Be sure to select an appropriate model initially as the product cannot be changed to have auto switch compatibility after purchase.
∗6 For details on the mounting method, refer to the **Web Catalog**.
∗7 Produced upon receipt of order
∗8 The DIN rail is not included. It must be ordered separately.
∗9 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet™ or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

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

[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

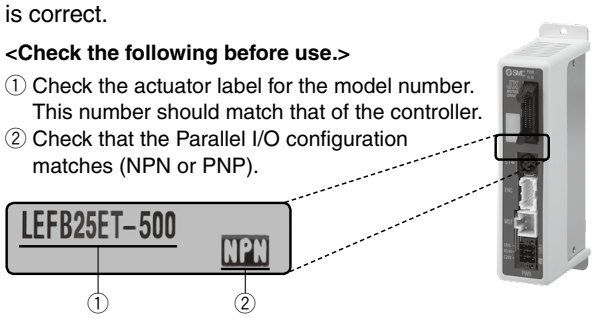
[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.

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

<Check the following before use.>

① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

Specifications

Battery-less Absolute (Step Motor 24 VDC)

Model			LEFB16E	LEFB25E	LEFB32E
Actuator specifications	Stroke [mm]*1		300, 500, 600, 700 800, 900, 1000	300, 500, 600, 700, 800, 900 1000, 1200, 1500, 1800, 2000	300, 500, 600, 700, 800, 900 1000, 1200, 1500, 1800, 2000
	Work load [kg]*2	Horizontal	1	10	19
	Speed [mm/s]*2		48 to 1100	48 to 1400	48 to 1500
	Max. acceleration/deceleration [mm/s²]		3000		
	Positioning repeatability [mm]		±0.08		
	Lost motion [mm]*3		0.1 or less		
	Equivalent lead [mm]		48	48	48
	Impact/Vibration resistance [m/s²]*4		50/20		
	Actuation type		Belt		
	Guide type		Linear guide		
	Operating temperature range [°C]		5 to 40		
	Operating humidity range [%RH]		90 or less (No condensation)		
Electric specifications	Motor size		□28	□42	□56.4
	Motor type		Battery-less absolute (Step motor 24 VDC)		
	Encoder		Battery-less absolute		
	Power supply voltage [V]		24 VDC ±10%		
	Power [W]*5 *7		Max. power 51	Max. power 60	Max. power 127
Lock unit specifications	Type*6		Non-magnetizing lock		
	Holding force [N]		4	19	36
	Power [W]*7		2.9	5	5
	Rated voltage [V]		24 VDC ±10%		

*1 Please contact SMC for non-standard strokes as they are produced as special orders.
*2 Speed changes according to the controller/driver type and work load. Check the "Speed–Work Load Graph (Guide)" on page 16.
Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. Cannot be used for vertical applications
*3 A reference value for correcting errors in reciprocal operation
*4 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (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. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
*5 Indicates the max. power during operation (including the controller). This value can be used for the selection of the power supply.
*6 With lock only
*7 For an actuator with lock, add the power for the lock.

Weight

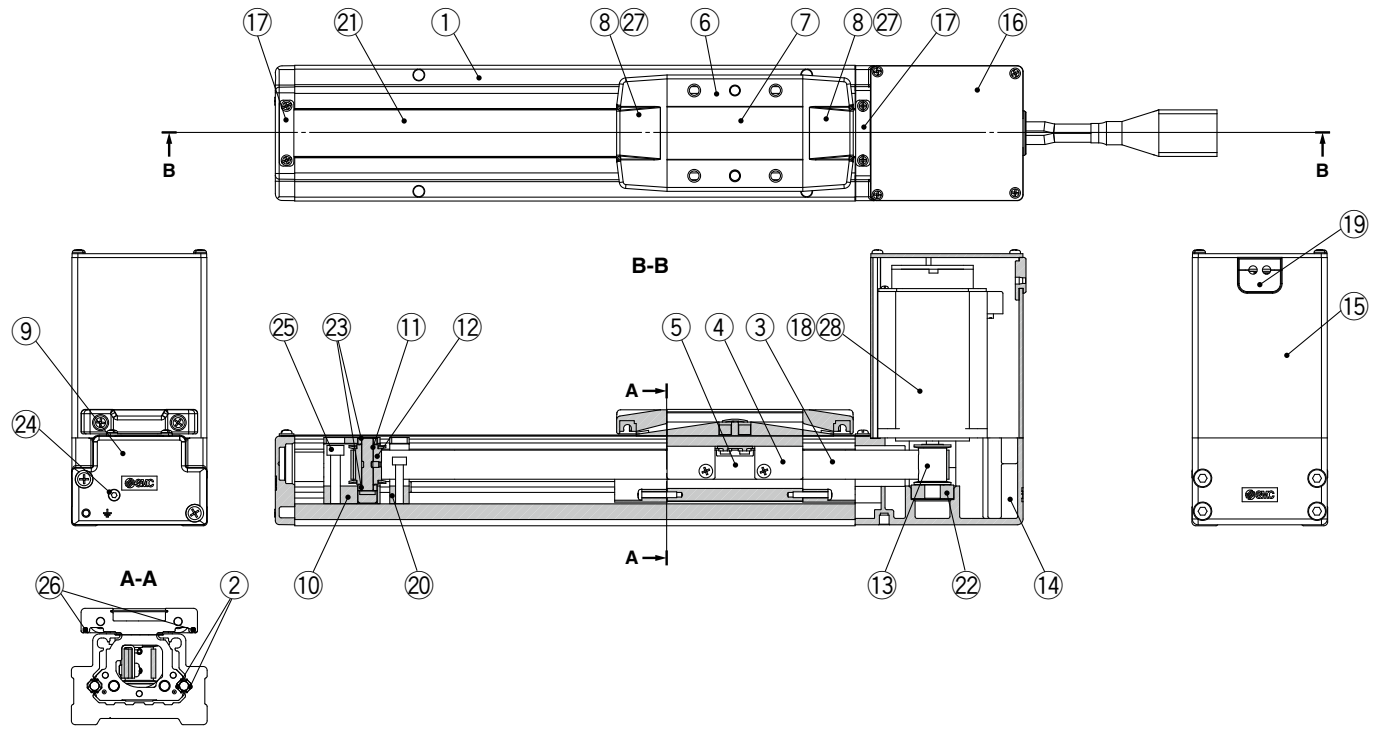
Series	LEFB16E						
Stroke [mm]	300	500	600	700	800	900	1000
Product weight [kg]	1.19	1.45	1.58	1.71	1.84	1.97	2.10
Additional weight with lock [kg]	0.12						

Series	LEFB25E										
Stroke [mm]	300	500	600	700	800	900	1000	1200	1500	1800	2000
Product weight [kg]	2.39	2.85	3.08	3.31	3.54	3.77	4.00	4.46	5.15	5.84	6.30
Additional weight with lock [kg]	0.26										

Series	LEFB32E										
Stroke [mm]	300	500	600	700	800	900	1000	1200	1500	1800	2000
Product weight [kg]	4.12	4.80	5.14	5.48	5.82	6.16	6.50	7.18	8.20	9.22	9.90
Additional weight with lock [kg]	0.53										

Construction

LEFB Series

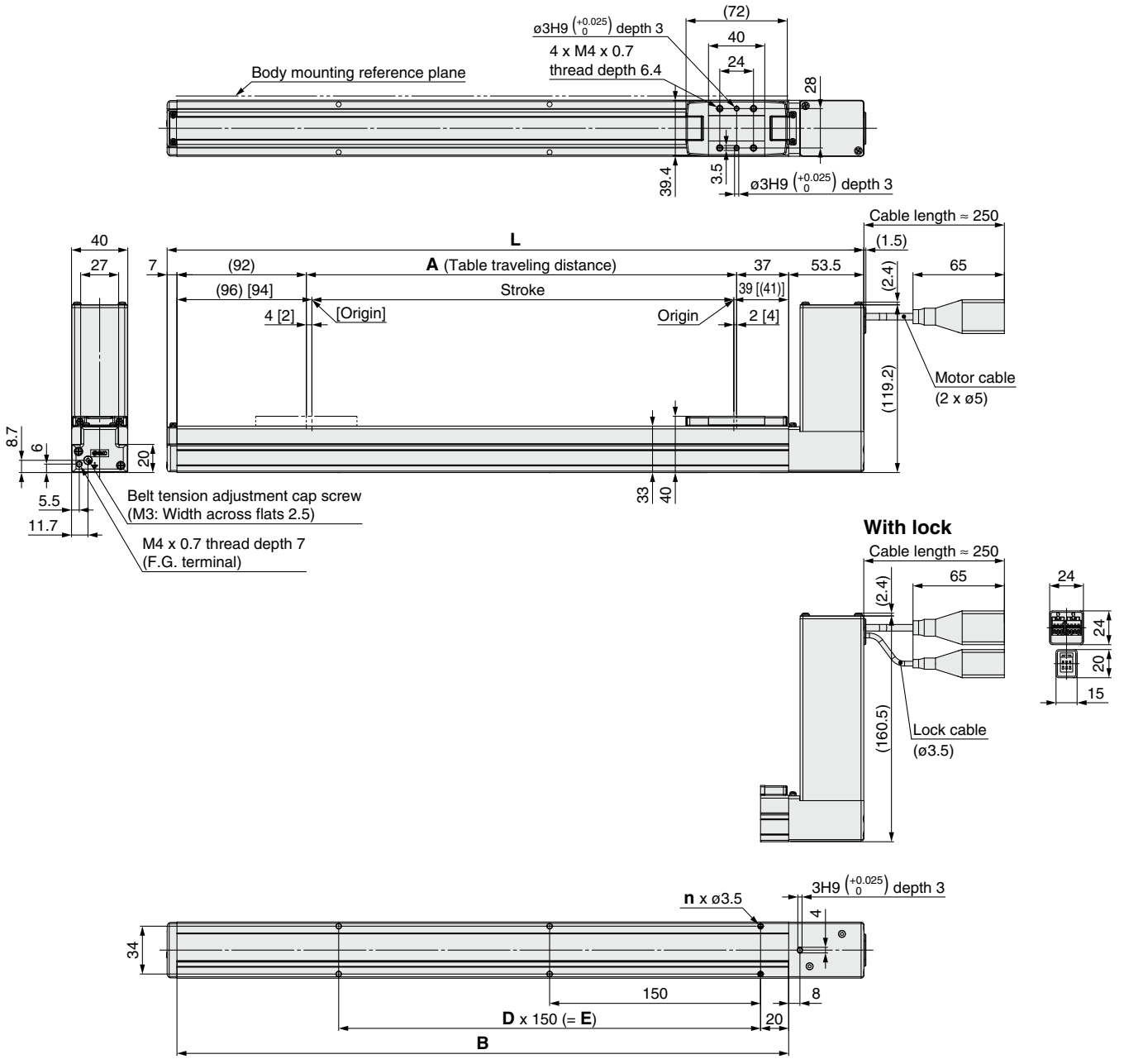


Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Rail guide**	—	
3	**Belt**	—	
4	**Belt holder**	Carbon steel	Chromating
5	**Belt stopper**	Aluminum alloy	Anodized
6	**Table**	Aluminum alloy	Anodized
7	**Blanking plate**	Aluminum alloy	Anodized
8	**Seal band holder**	Synthetic resin	
9	**Housing A**	Aluminum die-cast	Coating
10	**Pulley holder**	Aluminum alloy	
11	**Pulley shaft**	Stainless steel	
12	**End pulley**	Aluminum alloy	Anodized
13	**Motor pulley**	Aluminum alloy	Anodized
14	**Motor mount**	Aluminum alloy	Coating/Anodized
15	**Motor cover**	Aluminum alloy	Anodized
16	**End cover**	Aluminum alloy	Anodized
17	**Band stopper**	Stainless steel	
18	**Motor**	—	
19	**Rubber bushing**	NBR	
20	**Stopper**	Aluminum alloy	
21	**Dust seal band**	Stainless steel	
22	**Bearing**	—	
23	**Bearing**	—	
24	**Tension adjustment cap screw**	Chromium molybdenum steel	Chromating
25	**Pulley retaining screw**	Chromium molybdenum steel	Chromating
26	**Magnet**	—	With auto switch compatibility
27	**Roller assembly**	—	Without grease application
28	**Heat dissipation sheet** **LEFB16**	—	

Dimensions: Belt Drive

LEFB16E



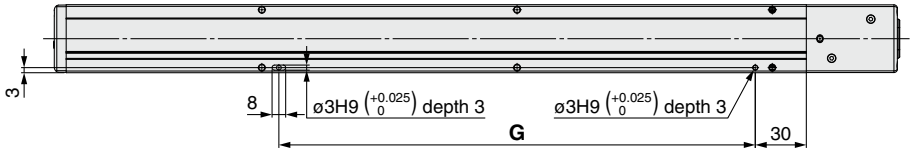
Dimensions [mm]

Model	L	A	B	n	D	E
LEFB16ET-300□	495	306	435	6	2	300
LEFB16ET-500□	695	506	635	10	4	600
LEFB16ET-600□	795	606	735			
LEFB16ET-700□	895	706	835	12	5	750
LEFB16ET-800□	995	806	935	14	6	900
LEFB16ET-900□	1095	906	1035			
LEFB16ET-1000□	1195	1006	1135	16	7	1050

Dimensions: Belt Drive

LEFB16E

Positioning pin hole (Option): Body bottom

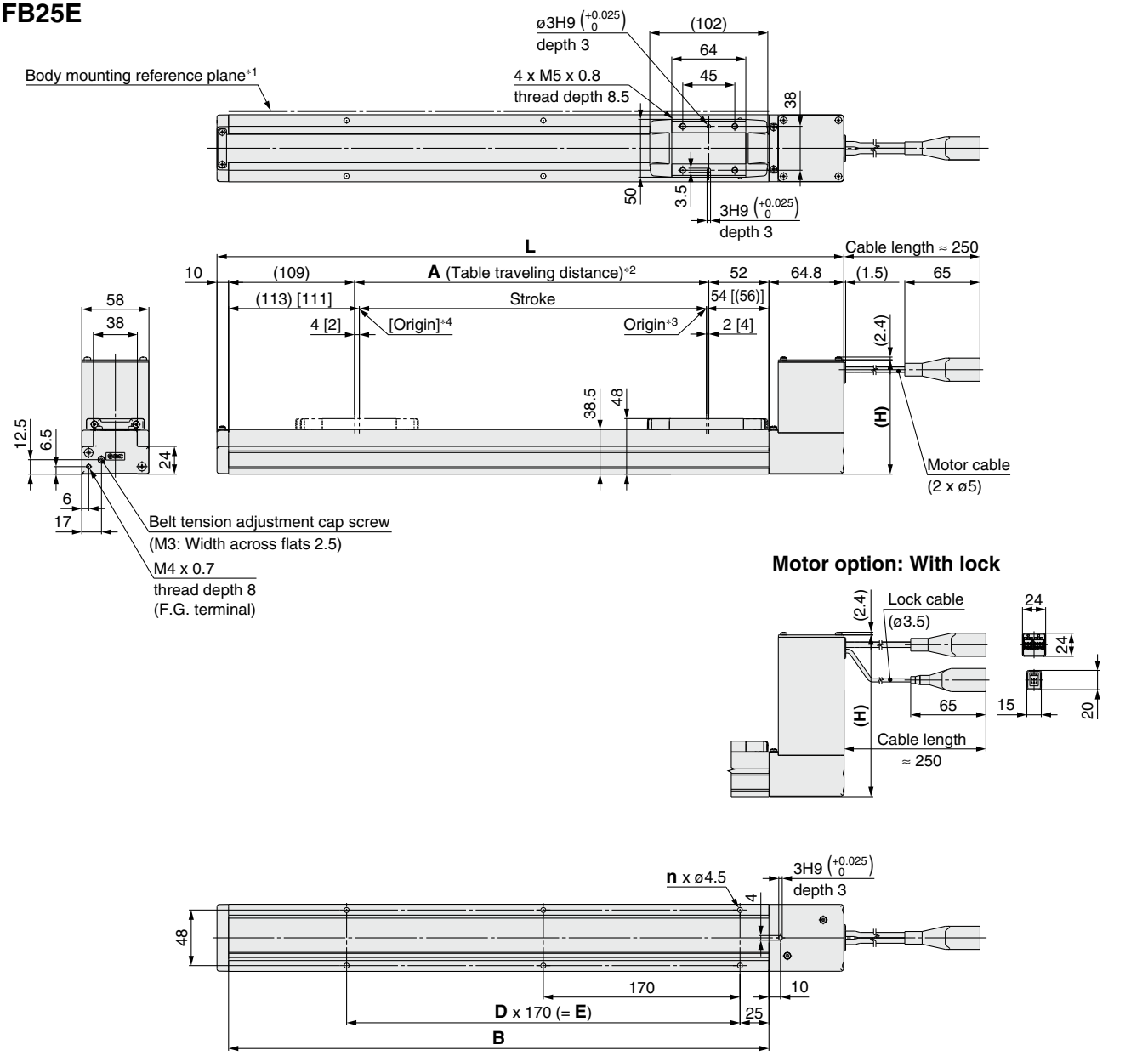


Dimensions [mm]

Model	Positioning pin hole: **K**
	G
LEFB16ET-300□	280
LEFB16ET-500□	580
LEFB16ET-600□	
LEFB16ET-700□	730
LEFB16ET-800□	880
LEFB16ET-900□	
LEFB16ET-1000□	1030

Dimensions: Belt Drive

LEFB25E



Motor option: With lock

*1 When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of round chamfering. (Recommended height: 5 mm)
*2 This is the distance within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*3 Position after returning to origin
*4 [ ] for when the direction of return to origin has changed

[mm]

Model	H
LEFB25ET-ST	115.8
LEFB25ET-STB	158.8

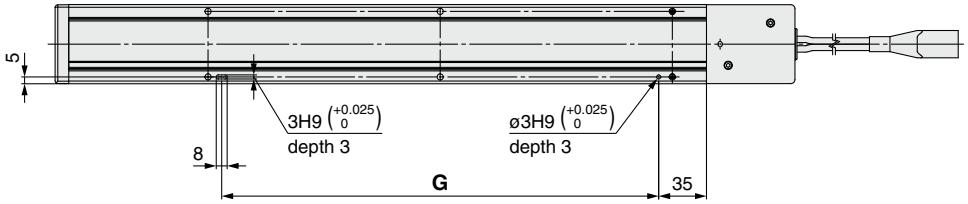
Dimensions

Model	L	A	B	n	D	E
LEFB25ET-300□	541.8	306	467	6	2	340
LEFB25ET-500□	741.8	506	667	8	3	510
LEFB25ET-600□	841.8	606	767	10	4	680
LEFB25ET-700□	941.8	706	867	10	4	680
LEFB25ET-800□	1041.8	806	967	12	5	850
LEFB25ET-900□	1141.8	906	1067	14	6	1020
LEFB25ET-1000□	1241.8	1006	1167	14	6	1020
LEFB25ET-1200□	1441.8	1206	1367	16	7	1190
LEFB25ET-1500□	1741.8	1506	1667	20	9	1530
LEFB25ET-1800□	2041.8	1806	1967	24	11	1870
LEFB25ET-2000□	2241.8	2006	2167	26	12	2040

Dimensions: Belt Drive

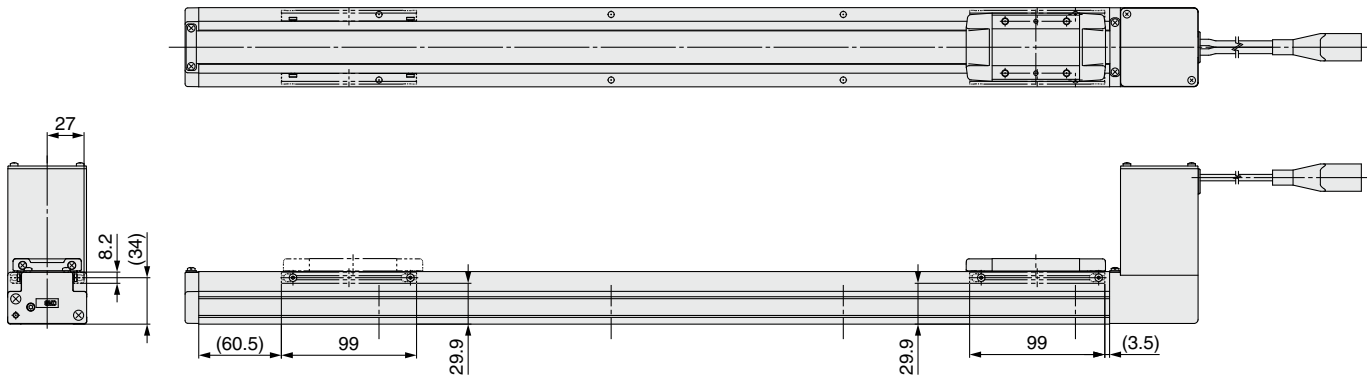
LEFB25E

Positioning pin hole*1 (Option): Body bottom



*1 When using the body bottom positioning pin holes, do not simultaneously use the housing B bottom pin hole.

With auto switch (Option)

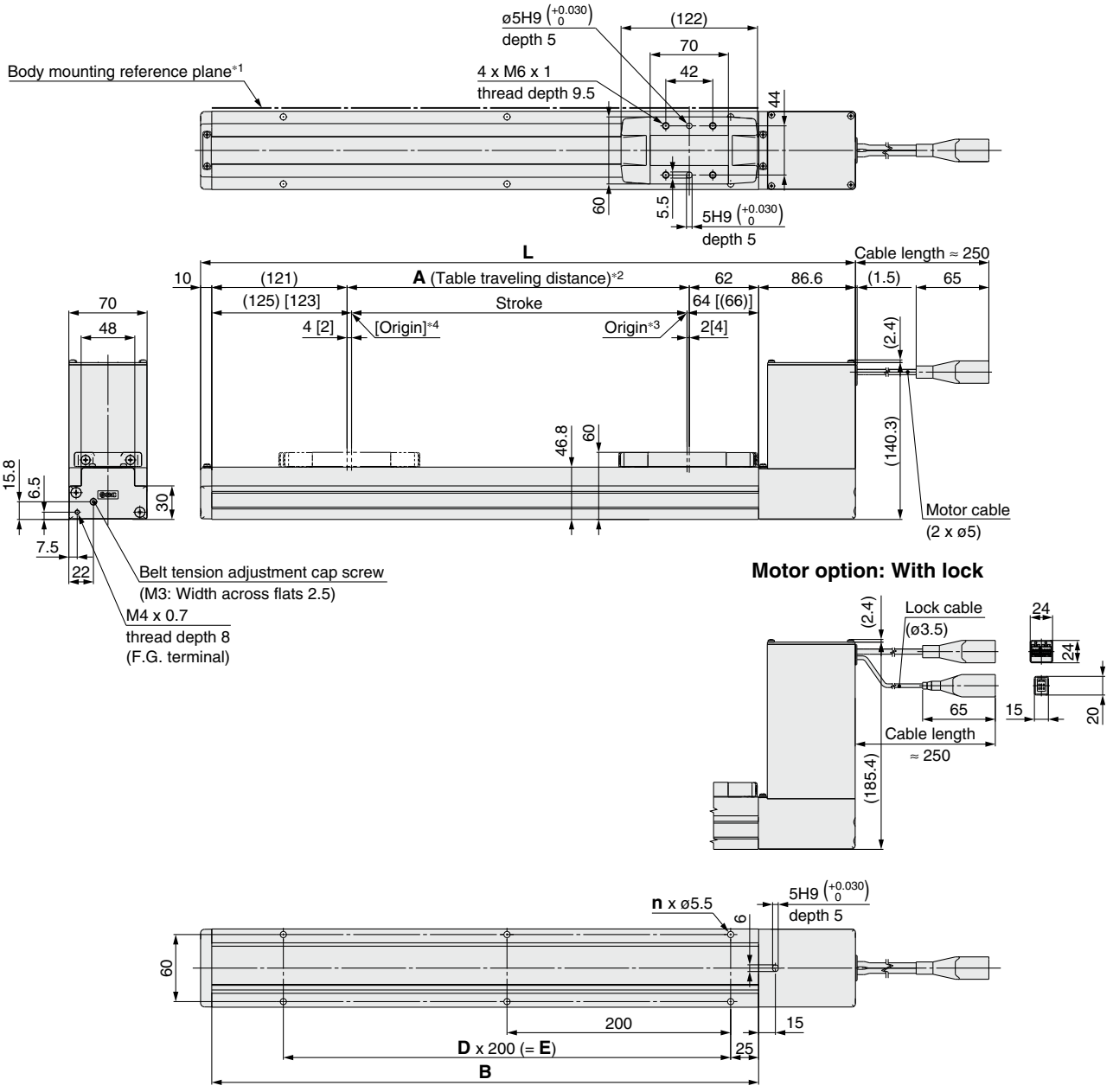


Dimensions [mm]

Model	G
LEFB25ET-300□	320
LEFB25ET-500□	490
LEFB25ET-600□	660
LEFB25ET-700□	660
LEFB25ET-800□	830
LEFB25ET-900□	1000
LEFB25ET-1000□	1000
LEFB25ET-1200□	1170
LEFB25ET-1500□	1510
LEFB25ET-1800□	1850
LEFB25ET-2000□	2020

Dimensions: Belt Drive

LEFB32E



*1 When mounting the actuator using the body mounting reference plane, set the height of the opposite surface or pin to be 3 mm or more because of round chamfering. (Recommended height: 5 mm)
*2 This is the distance within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*3 Position after returning to origin
*4 [ ] for when the direction of return to origin has changed

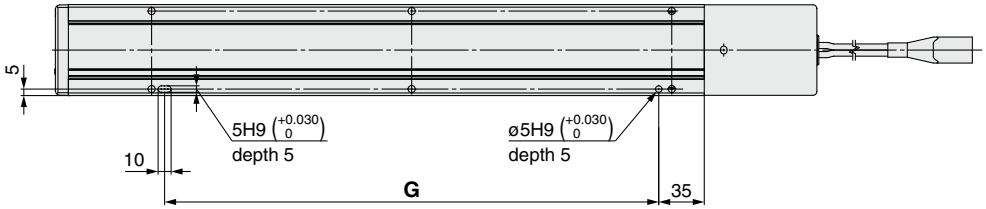
Dimensions [mm]

Model	L	A	B	n	D	E
LEFB32ET-300□	585.6	306	489	6	2	400
LEFB32ET-500□	785.6	506	689	8	3	600
LEFB32ET-600□	885.6	606	789	8	3	600
LEFB32ET-700□	985.6	706	889	10	4	800
LEFB32ET-800□	1085.6	806	989	10	4	800
LEFB32ET-900□	1185.6	906	1089	12	5	1000
LEFB32ET-1000□	1285.6	1006	1189	12	5	1000
LEFB32ET-1200□	1485.6	1206	1389	14	6	1200
LEFB32ET-1500□	1785.6	1506	1689	18	8	1600
LEFB32ET-1800□	2085.6	1806	1989	20	9	1800
LEFB32ET-2000□	2285.6	2006	2189	22	10	2000

Dimensions: Belt Drive

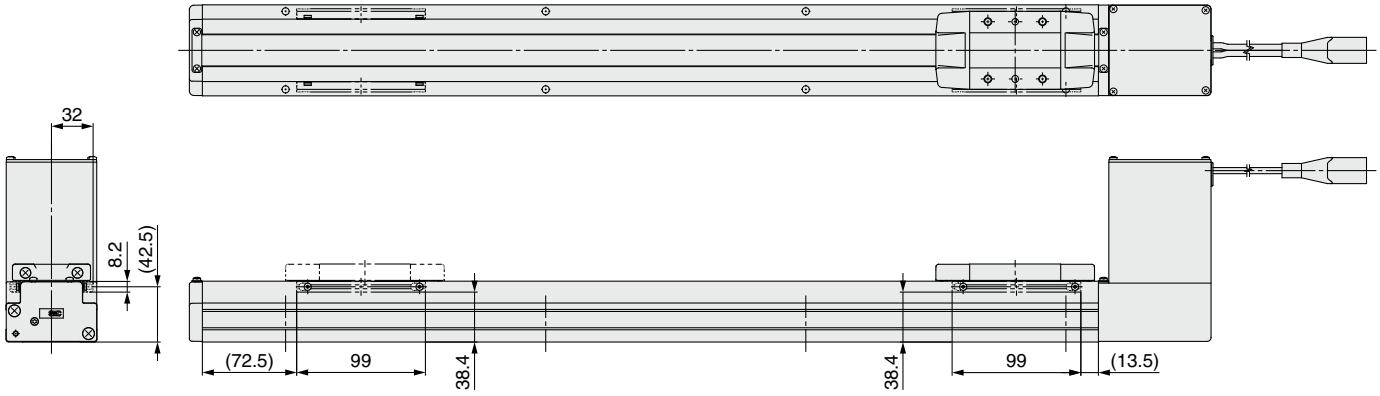
LEFB32E

Positioning pin hole*1 (Option): Body bottom



*1 When using the body bottom positioning pin holes, do not simultaneously use the housing B bottom pin hole.

With auto switch (Option)

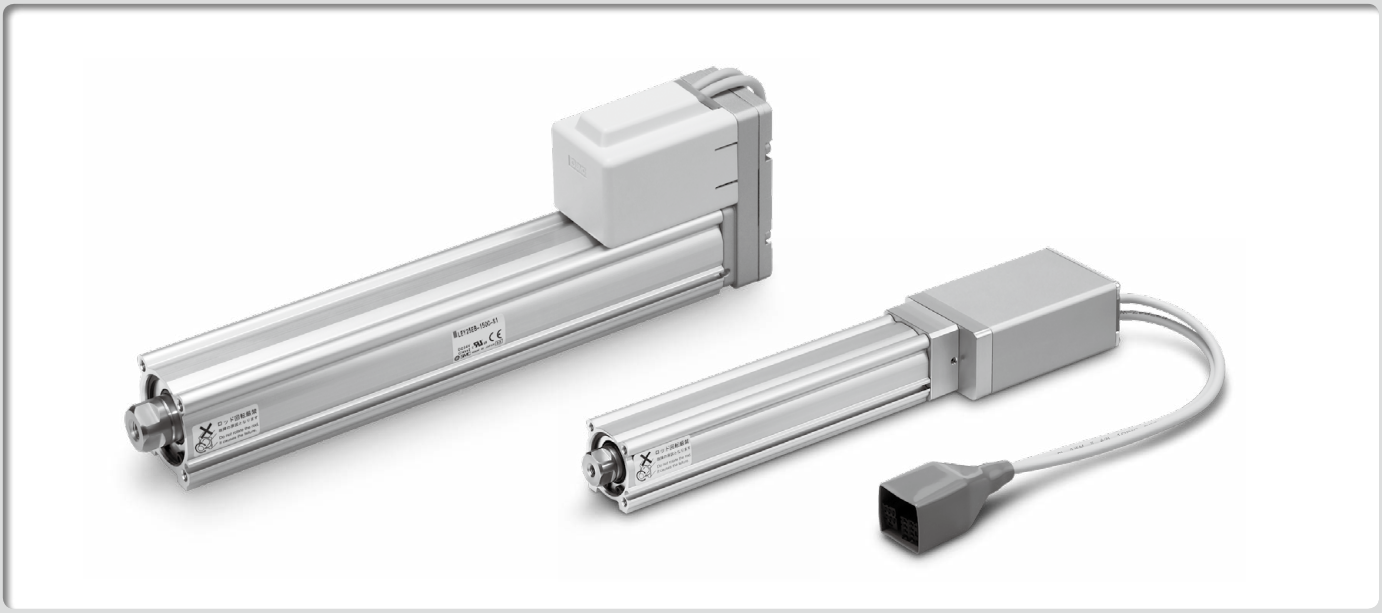


Dimensions [mm]

Model	G
LEFB32ET-300□	380
LEFB32ET-500□	580
LEFB32ET-600□	580
LEFB32ET-700□	780
LEFB32ET-800□	780
LEFB32ET-900□	980
LEFB32ET-1000□	980
LEFB32ET-1200□	1180
LEFB32ET-1500□	1580
LEFB32ET-1800□	1780
LEFB32ET-2000□	1980

Rod Type/Guide Rod Type

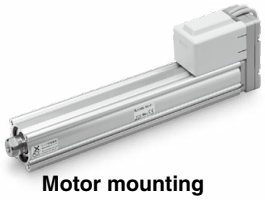
Rod Type LEY Series p. 55



Guide Rod Type LEYG Series p. 73

Controllers p. 164

Model Selection



Motor mounting position: Parallel

Motor mounting position: In-line

Selection Procedure

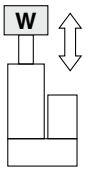
Positioning Control Selection Procedure

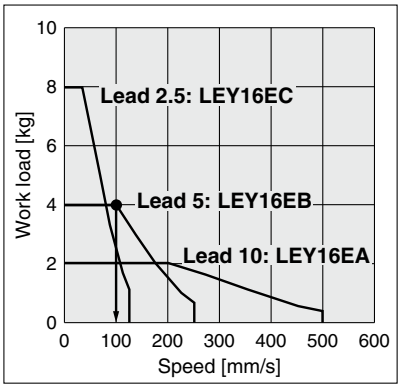
Step 1 Check the work load–speed. (Vertical transfer) → **Step 2** Check the cycle time.

Selection Example

Operating conditions

- Workpiece mass: 4 [kg]
- Speed: 100 [mm/s]
- Acceleration/Deceleration: 3000 [mm/s^2]
- Stroke: 200 [mm]
- Workpiece mounting condition: Vertical upward downward transfer





<Speed–Vertical work load graph> (LEY16/Battery-less absolute)

Step 1 **Check the work load–speed. <Speed–Vertical work load graph>**

Select a model based on the workpiece mass and speed while referencing the speed–vertical work load graph.

Selection example) The **LEY16EB** can be temporarily selected as a possible candidate based on the graph shown on the right side.

* It is necessary to mount a guide outside the actuator when used for horizontal transfer. When selecting the target model, refer to the horizontal work load in the specifications on page 63 and the precautions.

Step 2 **Check the cycle time.**

Calculate **the cycle time** using the following calculation method.

Cycle time:

T can be found from the following equation.

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

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

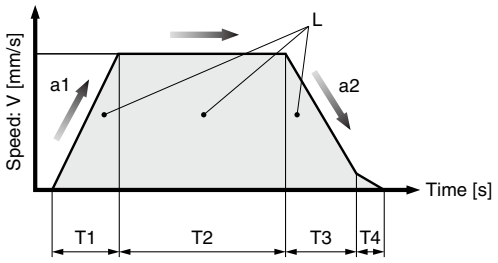
$$T1 = V/a1 \text{ [s]} \qquad T3 = V/a2 \text{ [s]}$$

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

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

- T4: Settling time varies depending on the conditions such as motor types, load and in position of the step data. Therefore, calculate the settling time while referencing the following value.

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



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

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

Calculation example)

T1 to T4 can be calculated as follows.

$$T1 = V/a1 = 100/3000 = 0.033 \text{ [s]}, \quad T3 = V/a2 = 100/3000 = 0.033 \text{ [s]}$$

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{200 - 0.5 \cdot 100 \cdot (0.033 + 0.033)}{100} = 1.97 \text{ [s]}$$

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

The cycle time can be found as follows.

$T = T1 + T2 + T3 + T4 = 0.033 + 1.967 + 0.033 + 0.2 =$ **2.233 [s]**

Based on the above calculation result, the LEY16EB-200 should be selected.

Selection Procedure

Pushing Control Selection Procedure

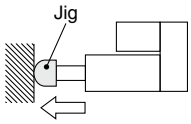
Step 1 Check the duty ratio. → **Step 2** Check the pushing force. → **Step 3** Check the lateral load on the rod end.

∗ The duty ratio is a ratio of the operation time in one cycle.

Selection Example

Operating conditions

- Mounting condition: Horizontal (pushing)
- Jig weight: 0.2 [kg]
- Pushing force: 68 [N]
- Duty ratio: 18 [%]
- Speed: 100 [mm/s]
- Stroke: 200 [mm]



Step 1 **Check the duty ratio.**
<Conversion table of pushing force–duty ratio>

Select the [Pushing force] from the duty ratio while referencing the conversion table of pushing force–duty ratio.

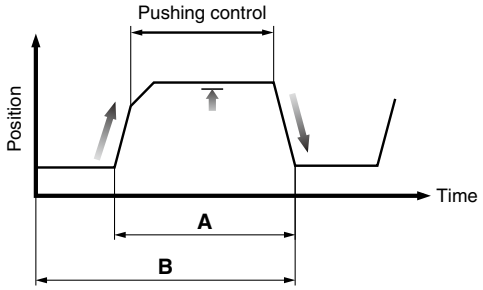
Selection example)
Based on the table below,
- Duty ratio: 18 [%]

The pushing force set value will be 60 [%].

<Conversion table of pushing force–duty ratio>
(LEY16/Battery-less absolute)

Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
40 or less	100	—
50	30	45 or less
60	18	15 or less
65	15	10 or less

∗ [Pushing force set value] is one of the step data input to the controller.
∗ [Continuous pushing time] is the time that the actuator can continuously keep pushing.



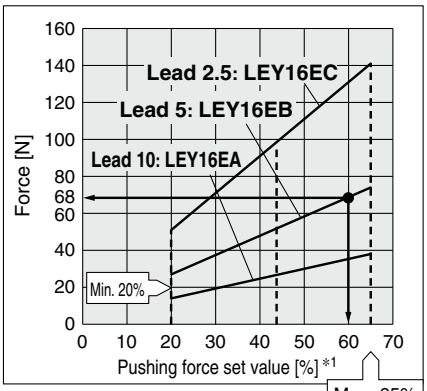
Duty ratio = A/B x 100 [%]

Step 2 **Check the pushing force.**
<Force conversion graph>

Select a model based on the pushing force set value and force while referencing the force conversion graph.

Selection example)
Based on the graph shown on the right side,
- Pushing force set value: 60 [%]
- Pushing force: 68 [N]

The **LEY16EB** can be temporarily selected as a possible candidate.



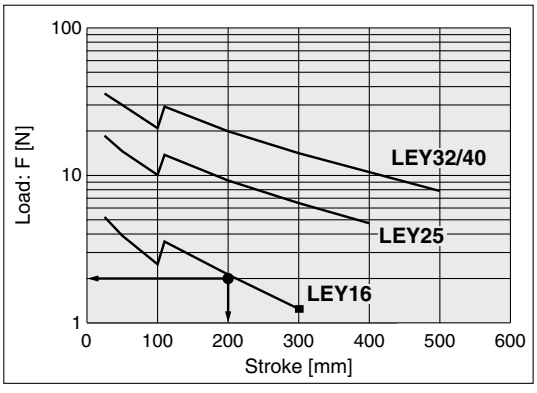
<Force conversion graph>
(LEY16/Battery-less absolute)
∗1 Set values for the controller

Step 3 **Check the lateral load on the rod end.**
<Graph of allowable lateral load on the rod end>

Confirm the allowable lateral load on the rod end of the actuator: LEY16□, which has been selected temporarily while referencing the graph of allowable lateral load on the rod end.

Selection example)
Based on the graph shown on the right side,
- Jig weight: 0.2 [kg] ≈ 2 [N]
- Product stroke: 200 [mm]

The lateral load on the rod end is in the allowable range.



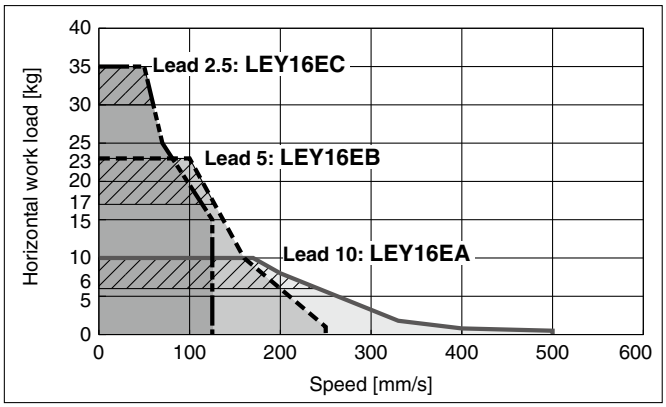
<Graph of allowable lateral load on the rod end>

Based on the above calculation result, the LEY16EB-200 should be selected.

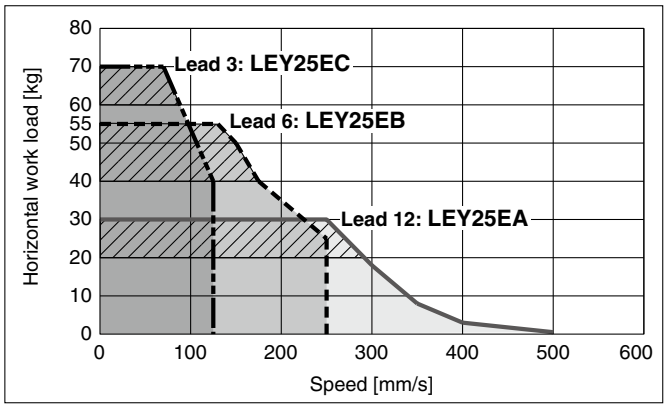
Speed–Work Load Graph (Guide)
For Battery-less Absolute (Step Motor 24 VDC)

Horizontal

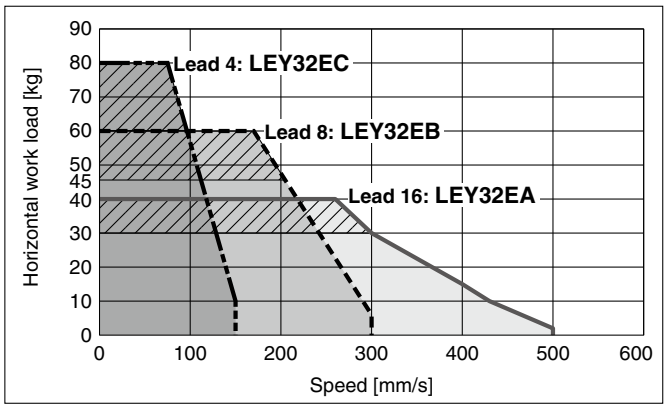
LEY16□E



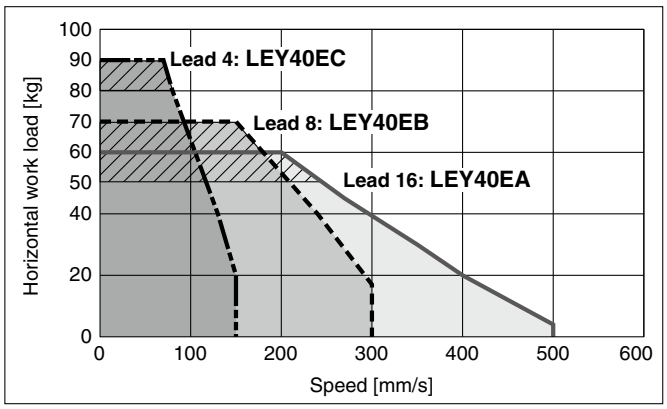
LEY25□E



LEY32□E

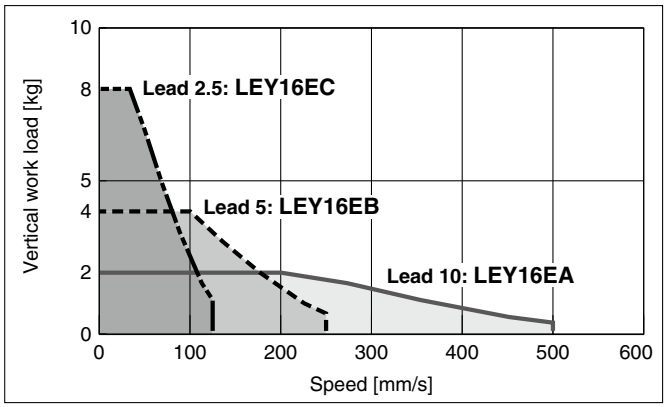


LEY40□E

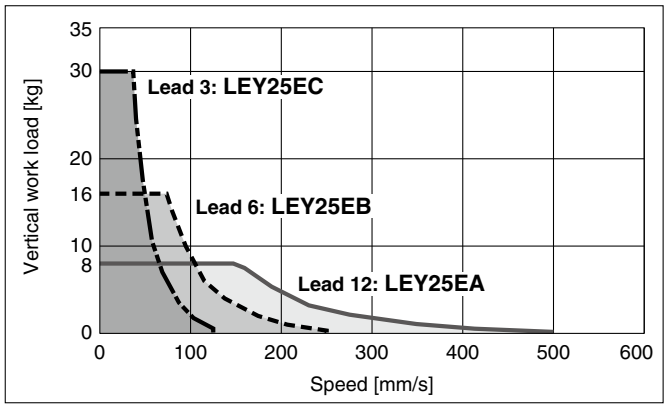


Vertical

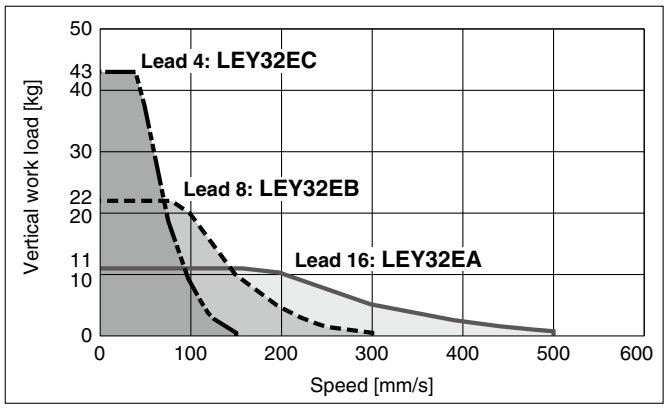
LEY16□E



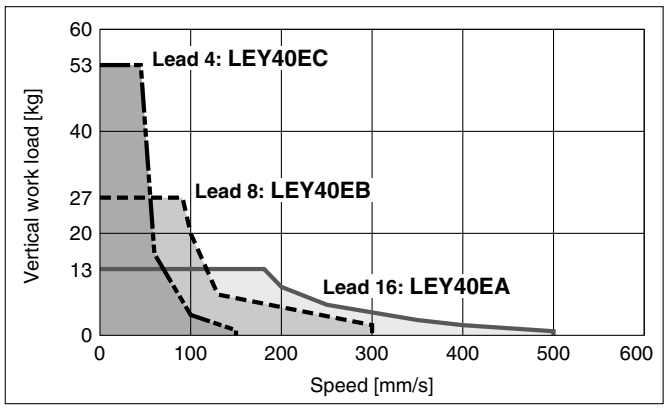
LEY25□E



LEY32□E



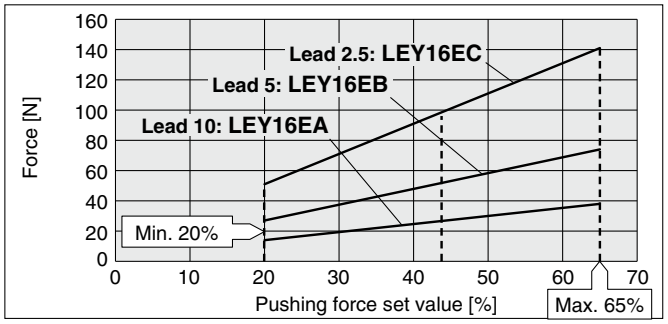
LEY40□E



Force Conversion Graph (Guide)

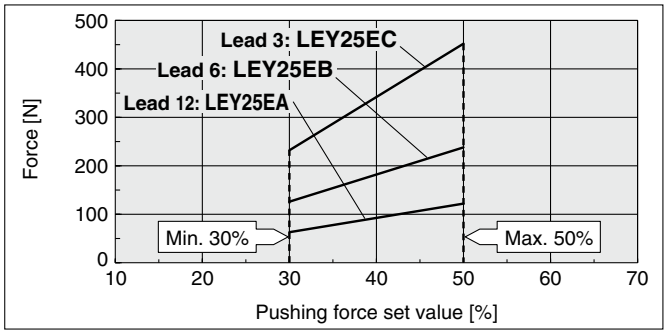
Battery-less Absolute (Step Motor 24 VDC)

LEY16□E



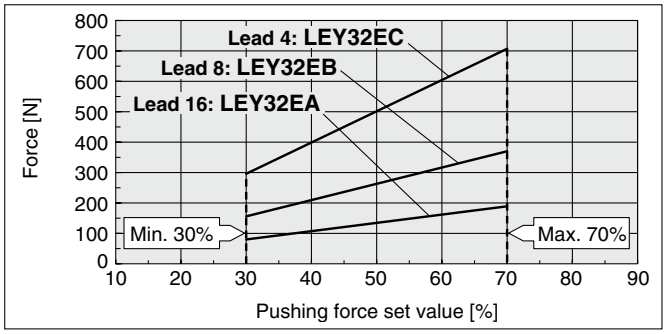
Ambient temperature	Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
30°C or less	65 or less	100	—
40°C	40 or less	100	—
	50	30	45 or less
	60	18	15 or less
	65	15	10 or less

LEY25□E



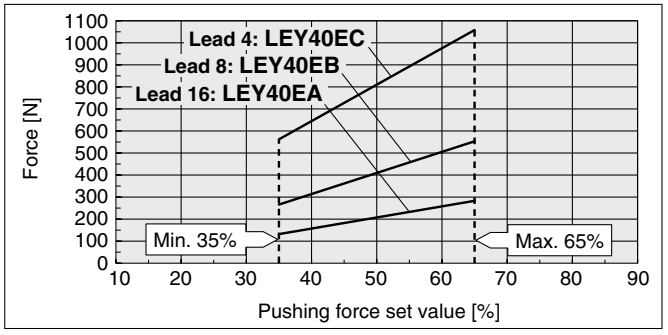
Ambient temperature	Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
40°C or less	50 or less	100	No restriction

LEY32□E



Ambient temperature	Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
40°C or less	70 or less	100	No restriction

LEY40□E



Ambient temperature	Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
40°C or less	65 or less	100	No restriction

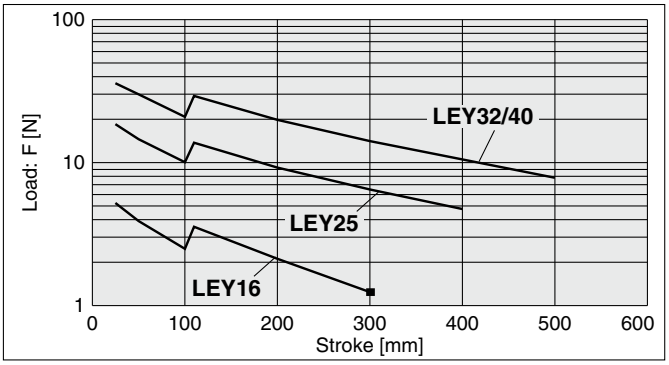
<Limit Values for Pushing Force and Trigger Level in Relation to Pushing Speed>

Model	Lead	Pushing speed [mm/s]	Pushing force (Setting input value)
LEY16□E	A/B/C	21 to 50	45 to 65%
LEY25□E	A/B/C	21 to 35	40 to 50%
LEY32□E	A	24 to 30	50 to 70%
	B/C	21 to 30	
LEY40□E	A	24 to 30	50 to 65%
	B/C	21 to 30	

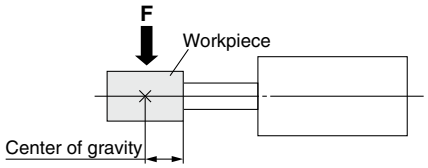
<Set Values for Vertical Upward Transfer Pushing Operations>

Model	LEY16□E			LEY25□E			LEY32□E			LEY40□E		
Lead	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
Work load [kg]	1	1.5	3	2.5	5	10	4.5	9	18	7	14	28
Pushing force	65%			50%			70%			65%		

Graph of Allowable Lateral Load on the Rod End (Guide)

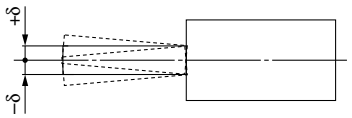


[Stroke] = [Product stroke] + [Distance from the rod end to the center of gravity of the workpiece]



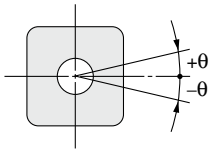
Rod Displacement: δ [mm]

Size \ Stroke	30	50	100	150	200	250	300	350	400	450	500
16	±0.4	±0.5	±0.9	±0.8	±1.1	±1.3	±1.5	—	—	—	—
25	±0.3	±0.4	±0.7	±0.7	±0.9	±1.1	±1.3	±1.5	±1.7	—	—
32, 40	±0.3	±0.4	±0.7	±0.6	±0.8	±1.0	±1.1	±1.3	±1.5	±1.7	±1.8



∗ The values without a load are shown.

Non-rotating Accuracy of Rod



Size	Non-rotating accuracy θ
16	±1.1°
25	±0.8°
32	±0.7°
40	

∗ Avoid using the electric actuator in such a way that rotational torque would be applied to the piston rod.
Failure to do so may result in the deformation of the non-rotating guide, abnormal auto switch responses, play in the internal guide, or an increase in the sliding resistance.

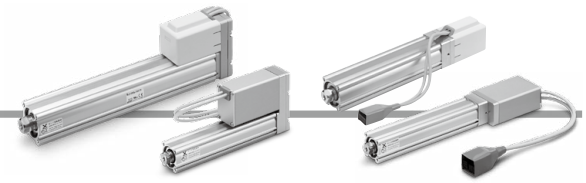
Battery-less Absolute (Step Motor 24 VDC)

Battery-less Absolute Encoder Type
Rod Type
LEY Series LEY16, 25, 32, 40

CE RoHS

* For details, refer to page 182 and onwards.

How to Order



Motor mounting position: Parallel

Motor mounting position: In-line

LEY 25 ❶ E ❷ B ❸ – 30 ❹ C ❺ ❻ ❼ – R1 ❽ CD17T ❾ ❿

For details on controllers, refer to the next page.

❶ Size

16
25
32
40

❷ Motor mounting position/Motor cover direction

Symbol	Motor mounting position	Motor cover direction
Nil	Top side parallel	—
D	In-line	—*1
D1		Left*2
D2		Right*2
D3		Top*2
D4		Bottom*2

❸ Motor type

E	Battery-less absolute (Step motor 24 VDC)

❹ Lead [mm]

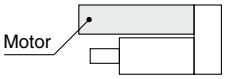
Symbol	LEY16	LEY25	LEY32/40
A	10	12	16
B	5	6	8
C	2.5	3	4

❺ Stroke*3 [mm]

Stroke	Note	
	Size	Applicable stroke
30 to 300	16	30, 50, 100, 150, 200, 250, 300
30 to 400	25	30, 50, 100, 150, 200, 250, 300, 350, 400
30 to 500	32/40	30, 50, 100, 150, 200, 250, 300, 350, 400, 450, 500

❻ Motor option*4

C	With motor cover
W	With lock/motor cover



❼ Rod end thread

Nil	Rod end female thread
M	Rod end male thread (1 rod end nut is included.)

❽ Mounting*5

Symbol	Type	Motor mounting position	
		Parallel	In-line
Nil	Ends tapped/ Body bottom tapped*6	●	●
L	Foot	●	—
F	Rod flange*6	●*8	●
G	Head flange*6	●*9	—
D	Double clevis*7	●	—

❾ Actuator cable type/length

Robotic cable [m]

Nil	None	R8	8*10
R1	1.5	RA	10*10
R3	3	RB	15*10
R5	5	RC	20*10

⑩ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗11	DIN rail

Communication plug connector, I/O cable∗12

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 Sizes 25, 32, and 40 only
∗2 Size 16 only
∗3 Please contact SMC for non-standard strokes as they are produced as special orders.
∗4 When "With lock/motor cover" is selected for the top side parallel motor type, the motor body will stick out from the end of the body for size 16 with strokes of 50 mm or less and size 40 with strokes of 30 mm or less. Check for interference with workpieces before selecting a model.
∗5 The mounting bracket is shipped together with the product but does not come assembled.
∗6 For the horizontal cantilever mounting of the rod flange, head flange, or ends tapped types, use the actuator within the following stroke range.
· LEY25: 200 or less · LEY32/40: 100 or less
∗7 For the mounting of the double clevis type, use the actuator within the following stroke range.
· LEY16: 100 or less · LEY25: 200 or less · LEY32/40: 200 or less
∗8 The rod flange type is not available for the LEY16 with strokes of 50 mm or less and LEY40 with strokes of 30 mm or less, and motor option "With lock/motor cover."
∗9 The head flange type is not available for the LEY32/40.
∗10 Produced upon receipt of order
∗11 The DIN rail is not included. It must be ordered separately.
∗12 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet™ or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

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

[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

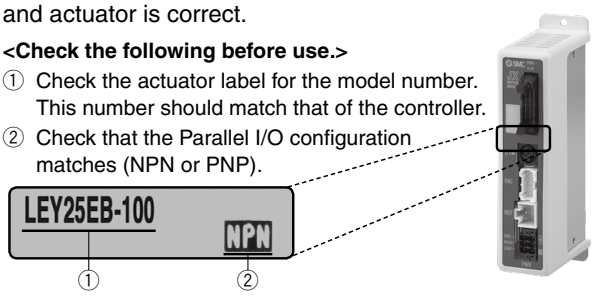
[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.

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

<Check the following before use.>

① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

Specifications

Battery-less Absolute (Step Motor 24 VDC)

Model				LEY16□E			LEY25□E			LEY32□E			LEY40□E		
Actuator specifications	Work load [kg]*1	Horizontal	(3000 [mm/s²])	6	17	30	20	40	60	30	45	60	50	60	80
			(2000 [mm/s²])	10	23	35	30	55	70	40	60	80	60	70	90
		Vertical	(3000 [mm/s²])	2	4	8	8	16	30	11	22	43	13	27	53
	Pushing force [N]*2 *3 *4			14 to 38	27 to 74	51 to 141	63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707	132 to 283	266 to 553	562 to 1058
	Speed [mm/s]*4			15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125	24 to 500	12 to 300	6 to 150	24 to 500	12 to 300	6 to 150
	Max. acceleration/deceleration [mm/s²]			3000											
	Pushing speed [mm/s]*5			50 or less			35 or less			30 or less			30 or less		
	Positioning repeatability [mm]			±0.02											
	Lost motion [mm]*6			0.1 or less											
	Screw lead [mm]			10	5	2.5	12	6	3	16	8	4	16	8	4
	Impact/Vibration resistance [m/s²]*7			50/20											
	Actuation type			Ball screw + Belt (LEY□)/Ball screw (LEY□D)											
	Guide type			Sliding bushing (Piston rod)											
	Operating temperature range [°C]			5 to 40											
	Operating humidity range [%RH]			90 or less (No condensation)											
Electric specifications	Motor size			□28			□42			□56.4			□56.4		
	Motor type			Battery-less absolute (Step motor 24 VDC)											
	Encoder			Battery-less absolute											
	Power supply voltage [V]			24 VDC ±10%											
	Power [W]*8 *10			Max. power 43			Max. power 48			Max. power 104			Max. power 106		
Lock unit specifications	Type*9			Non-magnetizing lock											
	Holding force [N]			20	39	78	78	157	294	108	216	421	127	265	519
	Power [W]*10			2.9			5			5			5		
	Rated voltage [V]			24 VDC ±10%											

*1 Horizontal: The maximum value of the work load. An external guide is necessary to support the load (Friction coefficient of guide: 0.1 or less). The actual work load and transfer speed change according to the condition of the external guide. Also, speed changes according to the work load. Check the "Model Selection" on pages 56 and 57.
Vertical: Speed changes according to the work load. Check the "Model Selection" on pages 55 and 57.
The values shown in ( ) are the acceleration/deceleration.
Set these values to be 3000 [mm/s²] or less.

*2 Pushing force accuracy is ±20% (F.S.).

*3 The pushing force values for LEY16□E are 20% to 65%, for LEY25□E are 30% to 50%, for LEY32□E are 30% to 70%, and for LEY40□E are 35% to 65%. The pushing force values change according to the duty ratio and pushing speed. Check the "Model Selection" on page 58.

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

*5 The allowable speed for pushing operation. When push conveying a workpiece, operate at the vertical work load or less.

*6 A reference value for correcting errors in reciprocal operation

*7 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (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. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)

*8 Indicates the max. power during operation (including the controller). This value can be used for the selection of the power supply.

*9 With lock only

*10 For an actuator with lock, add the power for the lock.

Weight

Weight: Top Side Parallel Motor Type

Series	LEY16E							LEY25E									LEY32E										
Stroke [mm]	30	50	100	150	200	250	300	30	50	100	150	200	250	300	350	400	30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	0.75	0.79	0.9	1.04	1.15	1.26	1.37	1.21	1.28	1.45	1.71	1.89	2.06	2.24	2.41	2.59	2.13	2.24	2.53	2.81	3.21	3.5	3.78	4.07	4.36	4.64	4.93

Series	LEY40E										
Stroke [mm]	30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	2.44	2.55	2.84	3.12	3.52	3.81	4.09	4.38	4.67	4.95	5.24

Weight: In-line Motor Type

Series	LEY16DE							LEY25DE									LEY32DE										
Stroke [mm]	30	50	100	150	200	250	300	30	50	100	150	200	250	300	350	400	30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	0.72	0.76	0.87	1.01	1.12	1.23	1.34	1.2	1.27	1.44	1.7	1.88	2.05	2.23	2.4	2.58	2.12	2.23	2.52	2.8	3.2	3.49	3.77	4.06	4.35	4.63	4.92

Series	LEY40DE										
Stroke [mm]	30	50	100	150	200	250	300	350	400	450	500
Product weight [kg]	2.43	2.54	2.83	3.11	3.51	3.8	4.08	4.37	4.66	4.94	5.24

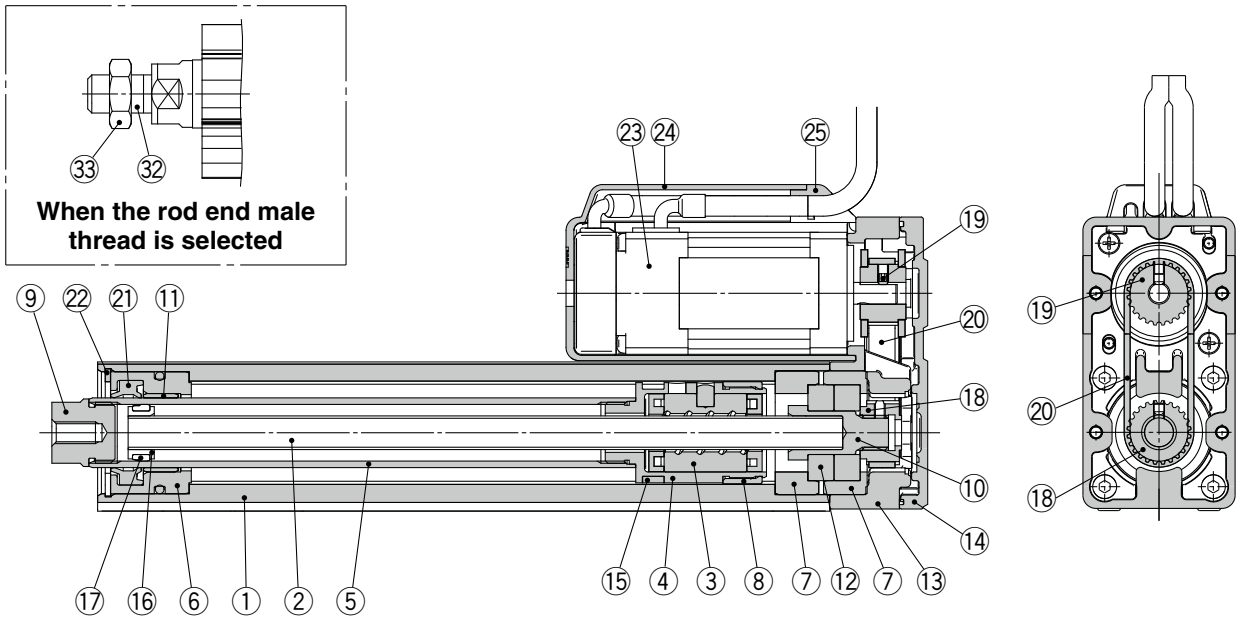
Additional Weight

[kg]

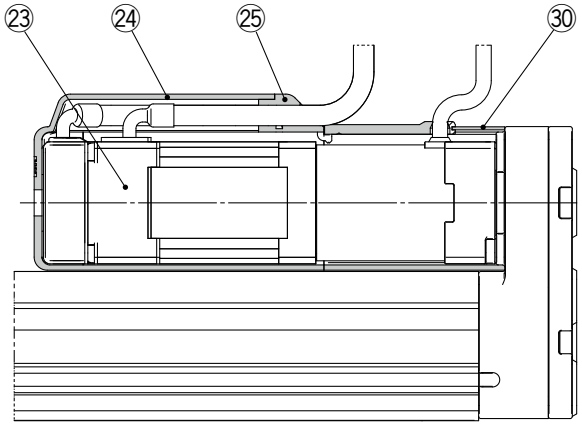
Size		16	25	32	40
Lock/Motor cover		0.16	0.29	0.57	0.57
Rod end male thread	**Male thread**	0.01	0.03	0.03	0.03
	Nut	0.01	0.02	0.02	0.02
Foot bracket (2 sets including mounting bolt)		0.06	0.08	0.14	0.14
Rod flange (including mounting bolt)		0.13	0.17	0.20	0.20
Head flange (including mounting bolt)					
Double clevis (including pin, retaining ring, and mounting bolt)		0.08	0.16	0.22	0.22

Construction

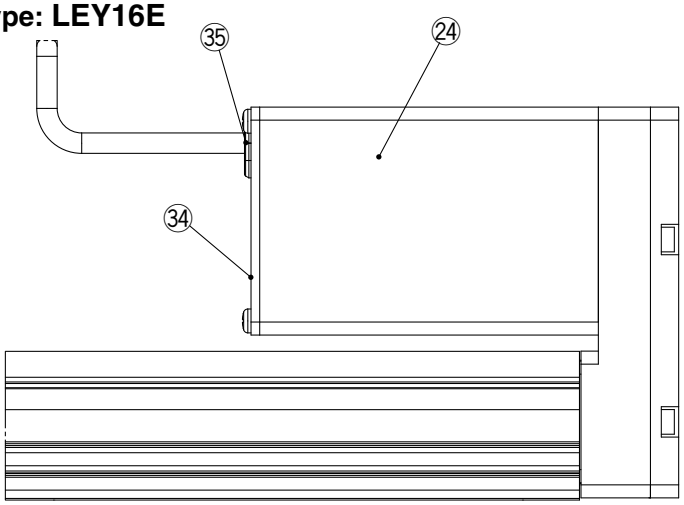
Top side parallel motor type: LEY 25 / 32 / 40 E



Top side parallel motor type, With lock/motor cover

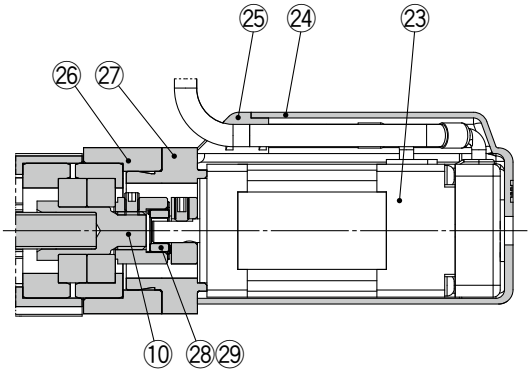


Top side parallel motor type: LEY16E

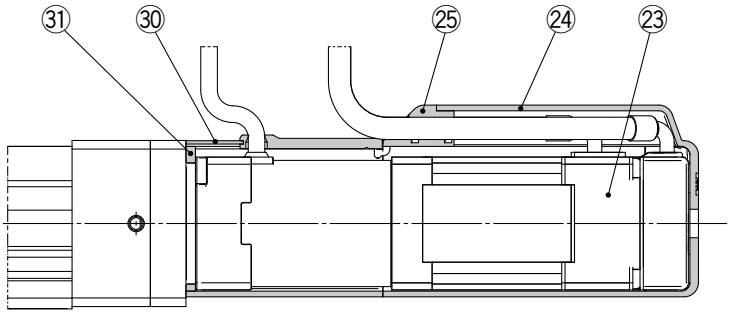


Construction

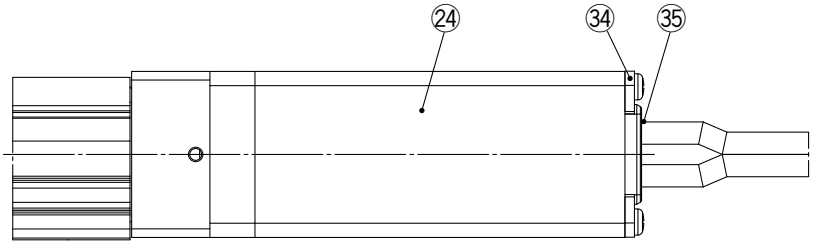
In-line motor type: LEY25, LEY32DE, LEY40



In-line motor type, With lock/motor cover



In-line motor type: LEY16DE



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw shaft**	Alloy steel	
3	**Ball screw nut**	Synthetic resin/Alloy steel	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plating
6	**Rod cover**	Aluminum alloy	
7	**Bearing holder**	Aluminum alloy	
8	**Rotation stopper**	Synthetic resin	
9	**Socket**	Free cutting carbon steel	Nickel plating
10	**Connected shaft**	Free cutting carbon steel	Nickel plating
11	**Bushing**	Bearing alloy	
12	**Bearing**	—	
13	**Return box**	Aluminum die-cast	Coating
14	**Return plate**	Aluminum die-cast	Coating
15	**Magnet**	—	
16	**Wear ring holder**	Stainless steel	Stroke 101 mm or more
17	**Wear ring**	Synthetic resin	Stroke 101 mm or more
18	**Screw shaft pulley**	Aluminum alloy	
19	**Motor pulley**	Aluminum alloy	
20	**Belt**	—	
21	**Seal**	NBR	
22	**Retaining ring**	Steel for spring	Phosphate coating
23	**Motor**	—	
24	**Motor cover**	Aluminum alloy	Anodized/LEY16 only
		Synthetic resin	
25	**Grommet**	Synthetic resin	Only “With motor cover”
26	**Motor block**	Aluminum alloy	Anodized
27	**Motor adapter**	Aluminum alloy	Anodized/LEY16, 25 only
28	**Hub**	Aluminum alloy	
29	**Spider**	NBR	
30	**Motor cover with lock**	Aluminum alloy	Only “With lock/motor cover”/LEY25, 32, 40
31	**Cover support**	Aluminum alloy	Only “With lock/motor cover”/LEY25, 32, 40
32	**Socket (Male thread)**	Free cutting carbon steel	Nickel plating
33	**Nut**	Alloy steel	Zinc chromating
34	**End cover**	Aluminum alloy	Anodized/LEY16 only
35	**Rubber bushing**	NBR	LEY16 only

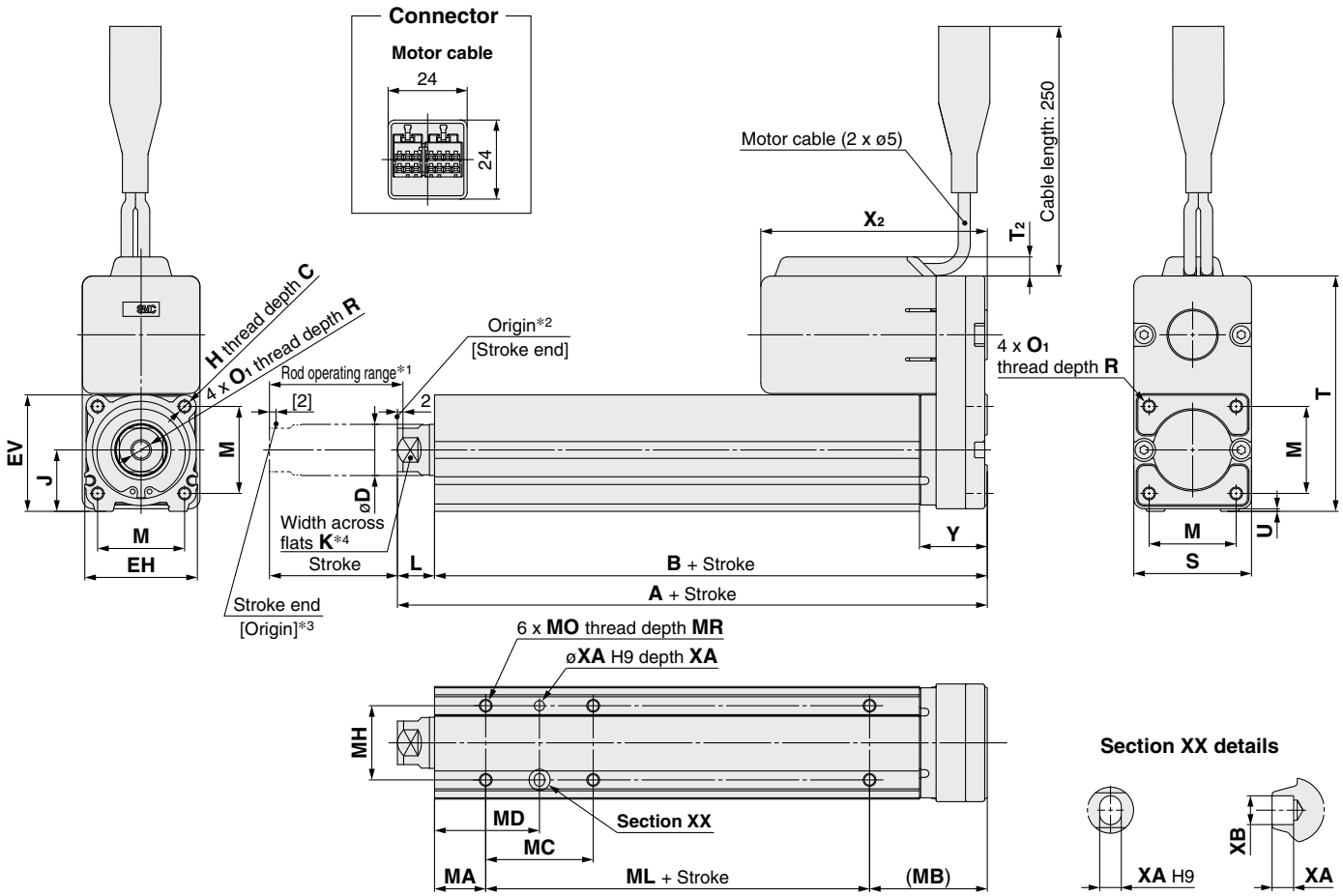
Replacement Parts (Top side parallel only)/Belt

No.	Size	Order no.
20	**16**	LE-D-2-7
	25	LE-D-2-2
	32, 40	LE-D-2-3

Replacement Parts/Grease Pack

Applied portion	Order no.
Piston rod	GR-S-010 (10 g) GR-S-020 (20 g)

Dimensions: Top Side Parallel Motor



*1 This is the range within which the rod can move when it returns to origin. Make sure workpieces mounted on the rod do not interfere with other workpieces or the facilities around the rod.
*2 Position after returning to origin
*3 [ ] for when the direction of return to origin has changed
*4 The direction of rod end width across flats (□K) differs depending on the products.

[mm]

Size	Stroke range [mm]	A	B	C	D	EH	EV	H	J	K	L	M	O1	R	S	T	T2	U	V	X2 Without lock	X2 With lock	Y
16	10 to 100	101	90.5	10	16	34	34.3	M5 x 0.8	18	14	10.5	25.5	M4 x 0.7	7	35	90.5	—	0.5	28	100.5	145.5	22.5
	101 to 300	121	110.5																			
25	15 to 100	130.5	116	13	20	44	45.5	M8 x 1.25	24	17	14.5	34	M5 x 0.8	8	46	92	7.5	1	42	88.5	129	26.5
	101 to 400	155.5	141																			
32	20 to 100	148.5	130	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1.0	10	60	118	8.5	1	56.4	98.5	141.5	34
	101 to 500	178.5	160																			
40	20 to 100	148.5	130	13	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1.0	10	60	118	8.5	1	56.4	120.5	163.5	34
	101 to 500	178.5	160																			

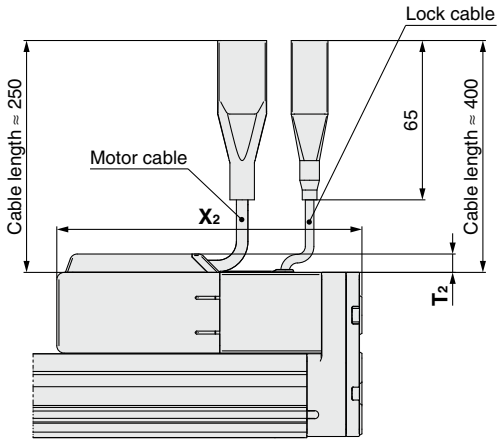
Body Bottom Tapped

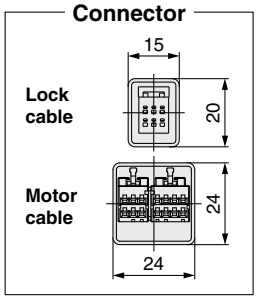
[mm]

Size	Stroke range [mm]	MA	MB	MC	MD	MH	ML	MO	MR	XA	XB
16	10 to 35	15	35.5	17	23.5	23	40	M4 x 0.7	5.5	3	4
	40 to 100			32	31						
	105 to 300			62	46		60				
25	15 to 35	20	46	24	32	29	50	M5 x 0.8	6.5	4	5
	40 to 100			42	41						
	105 to 120						75				
	125 to 200			59	49.5						
	205 to 400			76	58						
32 40	20 to 35	25	55	22	36	30	50	M6 x 1	8.5	5	6
	40 to 100			36	43						
	105 to 120						80				
	125 to 200			53	51.5						
	205 to 500			70	60						

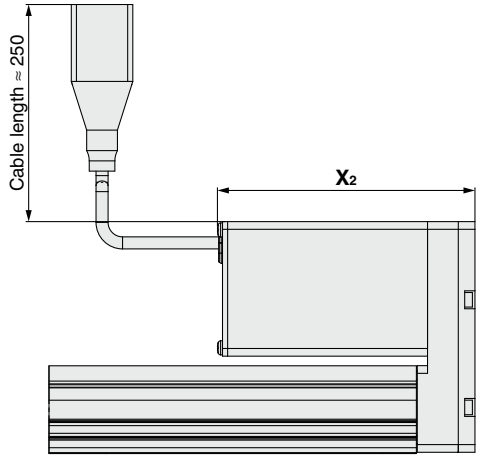
Dimensions: Top Side Parallel Motor

With lock/motor cover: LEY$^{25}_{32}$$^{A}_{C}$EB-□W

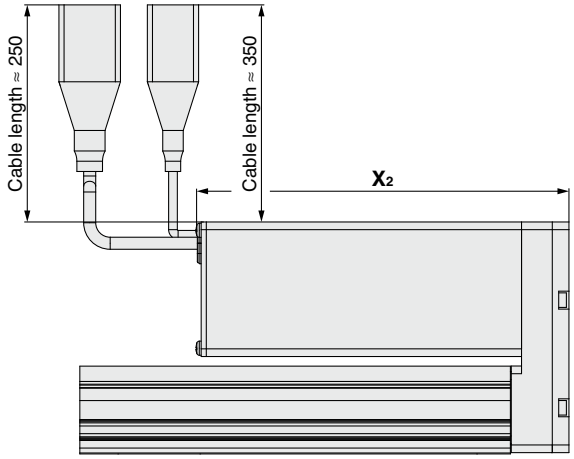




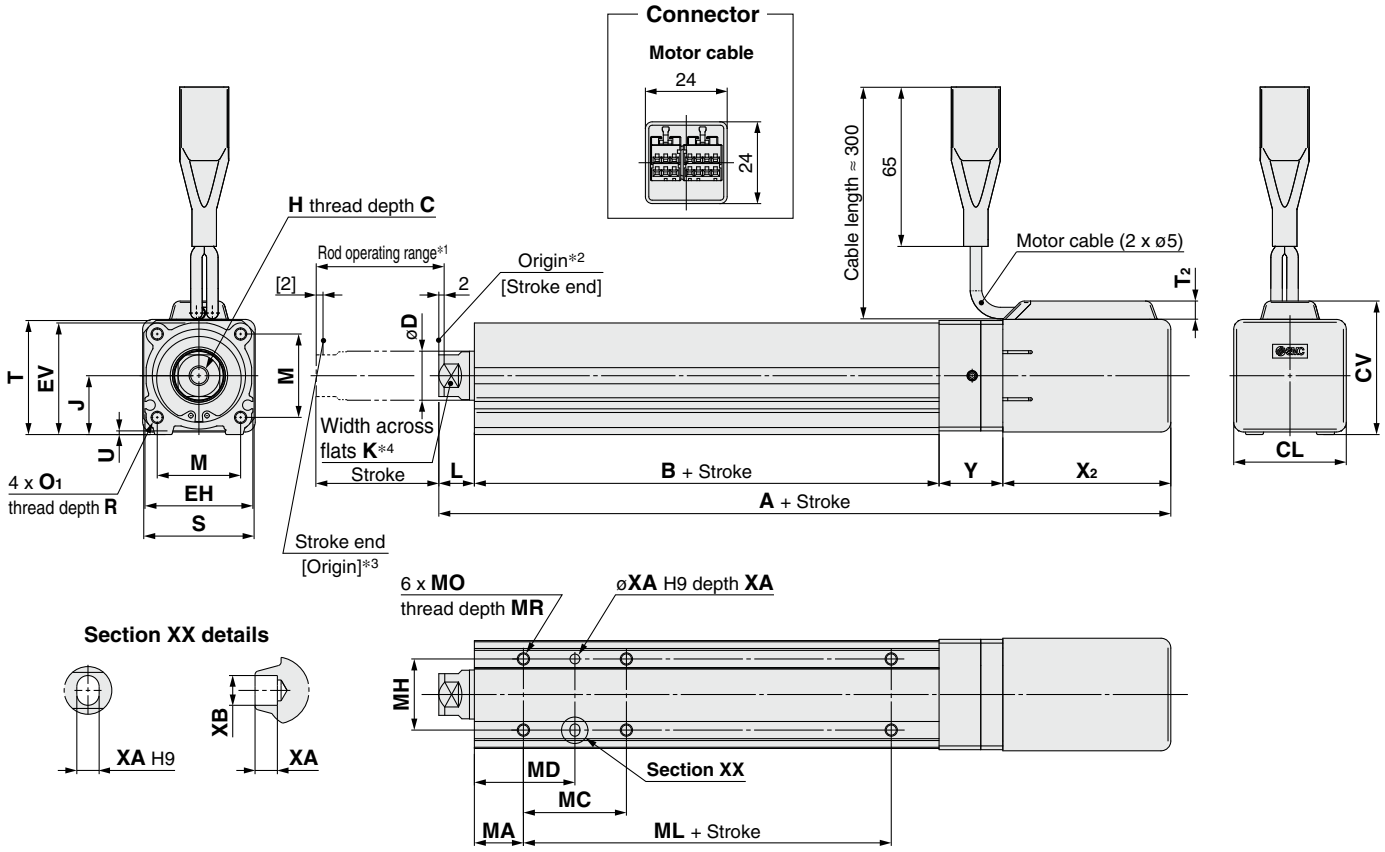
With motor cover: LEY16E$^{A}_{C}$B-□C



With lock/motor cover: LEY16E$^{A}_{C}$B-□W



Dimensions: In-line Motor



*1 This is the range within which the rod can move when it returns to origin. Make sure workpieces mounted on the rod do not interfere with other workpieces or the facilities around the rod.
*2 Position after returning to origin
*3 [ ] for when the direction of return to origin has changed
*4 The direction of rod end width across flats (□K) differs depending on the products.
*5 Refer to page 70 for motor cover dimensions of the LEY16.

[mm]

Size	Stroke range [mm]	A		B	C	CL	CV	D	EH	EV	H	J	K	L	M	O1	R	S	T	T2	U	X2		Y
		Without lock	With lock																			Without lock	With lock	
16	30 to 100	186.5	231.5	94	10	—	—*6	16	34	34.3	M5 x 0.8	18	14	10.5	25.5	M4 x 0.7	7	35*5	35.5	—	0.5	82	127	26
	105 to 300	206.5	251.5	114																				
25	15 to 100	198.5	239	115.5	13	46	54.5	20	44	45.5	M8 x 1.25	24	17	14.5	34	M5 x 0.8	8	45	46.5	7.5	1.5	68.5	109	26
	101 to 400	223.5	264	140.5																				
32	20 to 100	220	263	128	13	60	69.5	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1	10	60	61	8.5	1	73.5	116.5	32
	101 to 500	250	293	158																				
40	20 to 100	242	285	128	13	60	69.5	25	51	56.5	M8 x 1.25	31	22	18.5	40	M6 x 1	10	60	61	8.5	1	95.5	138.5	32
	101 to 500	272	315	158																				

*6 Refer to page 70.

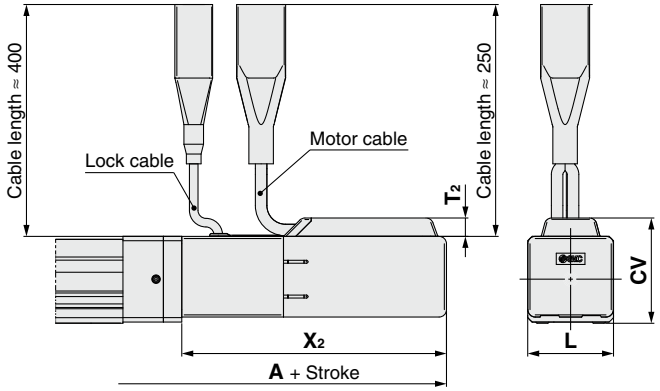
Body Bottom Tapped

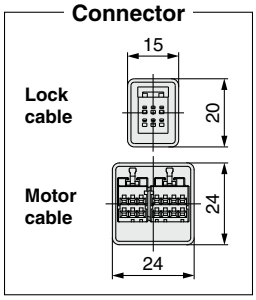
[mm]

Size	Stroke range [mm]	MA	MC	MD	MH	ML	MO	MR	XA	XB
16	10 to 35	15	17	23.5	23	40	M4 x 0.7	5.5	3	4
	40 to 100		32	31						
	105 to 300		62	46		60				
25	15 to 35	20	24	32	29	50	M5 x 0.8	6.5	4	5
	40 to 100		42	41						
	105 to 120					75				
	125 to 200		59	49.5						
	205 to 400		76	58						
32 40	20 to 35	25	22	36	30	50	M6 x 1	8.5	5	6
	40 to 100		36	43						
	105 to 120					80				
	125 to 200		53	51.5						
	205 to 500		70	60						

Dimensions: In-line Motor

With lock/motor cover: LEY 25/32/40 D E B/C -□W A



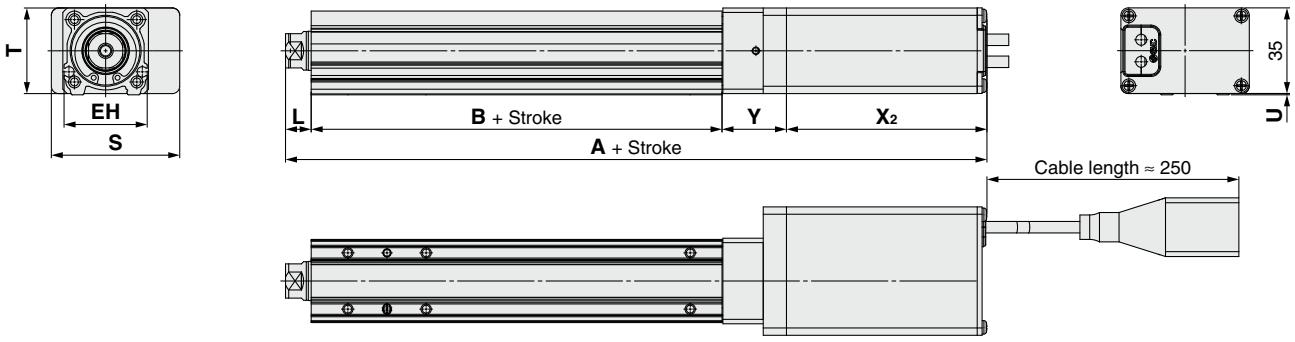


[mm]

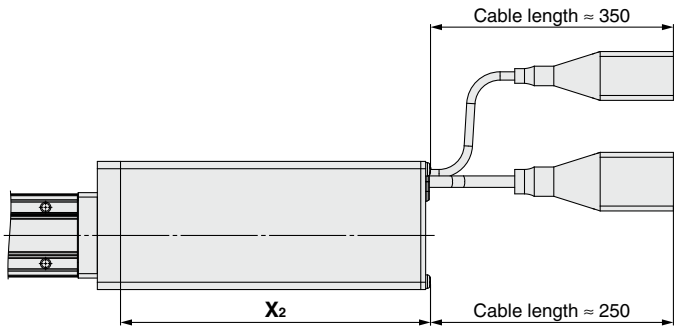
Size	Stroke range	T2	X2	L	CV
16	100st or less	7.5	108	35	—*1
	101st or more, 300st or less				
25	100st or less	7.5	109	46	54.4
	101st or more, 400st or less				
32	100st or less	7.5	116.5	60	68.5
	101st or more, 500st or less				
40	100st or less	7.5	138.5	60	68.5
	101st or more, 500st or less				

*1 Refer to the table below.

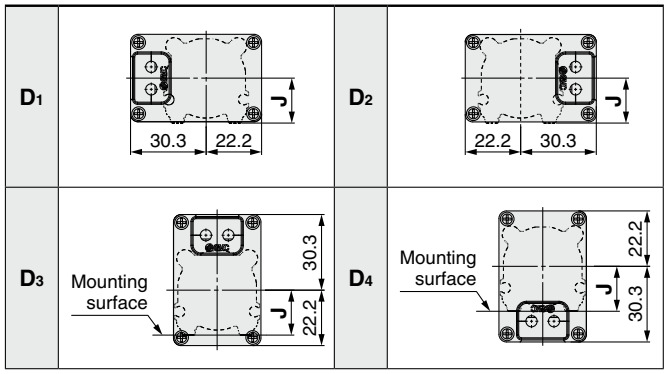
With motor cover: LEY16D□E B/C -□C A



With lock/motor cover: LEY16D□E B/C -□W A



Motor Cover Direction

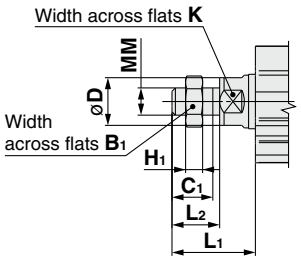


CV Dimensions (Size 16)

Motor cover direction	CV
D1	35.5
D2	35.5
D3	48.3
D4	40.2

Dimensions

End male thread: LEY16/25/32/40□EA/EBC-□□M



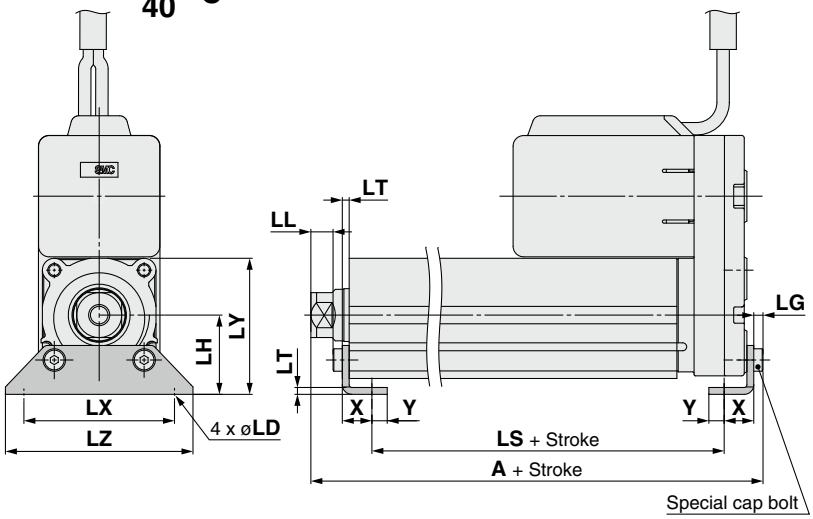
[mm]

Size	B1	C1	øD	H1	K	L1	L2	MM
16	13	12	16	5	14	24.5	14	M8 x 1.25
25	22	20.5	20	8	17	38	23.5	M14 x 1.5
32, 40	22	20.5	25	8	22	42.0	23.5	M14 x 1.5

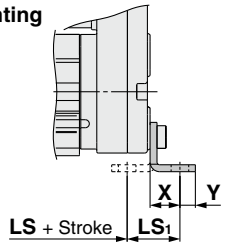
∗ The L1 measurement is when the unit is in the original position. At this position, 2 mm at the end.

∗ Refer to the **Web Catalog** for details on the rod end nut and mounting bracket.
∗ Refer to the specific product precautions ("Handling") in the **Web Catalog** when mounting end brackets such as knuckle joint or workpieces.

Foot: LEY16/25/32/40EA/EBC-□□□L



Outward mounting



Included parts
· Foot bracket
· Body mounting bolt

Foot

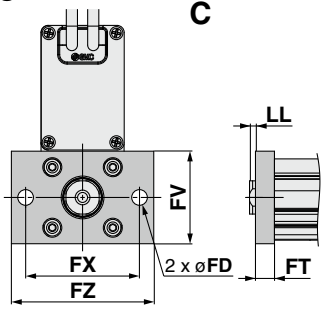
[mm]

Size	Stroke range [mm]	A	LS	LS1	LL	LD	LG	LH	LT	LX	LY	LZ	X	Y
16	10 to 100	106.1	76.7	16.1	5.4	6.6	2.8	24	2.3	48	40.3	62	9.2	5.8
	101 to 300	126.1	96.7											
25	15 to 100	136.6	98.8	19.8	8.4	6.6	3.5	30	2.6	57	51.5	71	11.2	5.8
	101 to 400	161.6	123.8											
32	20 to 100	155.7	114	19.2	11.3	6.6	4	36	3.2	76	61.5	90	11.2	7
40	101 to 500	185.7	144											

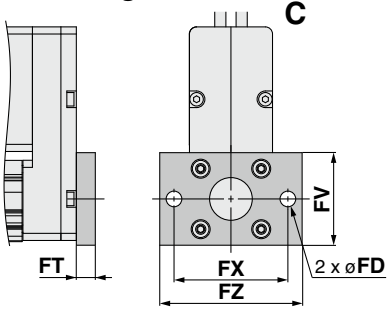
Material: Carbon steel (Chromating)
∗ The A measurement is when the unit is in the original position. At this position, 2 mm at the end.

Dimensions

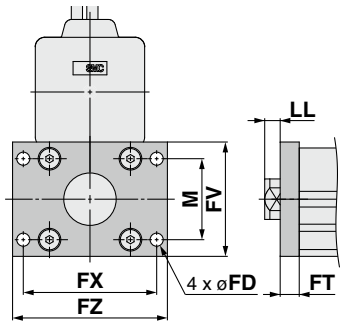
Rod flange: LEY16□EB$^{A}_{C}$-□□□F



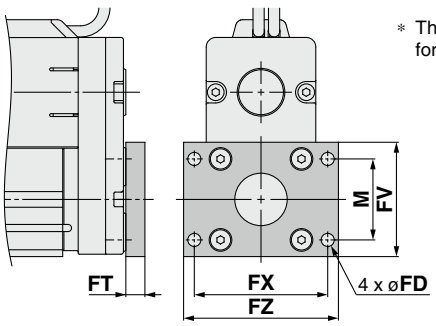
Head flange: LEY16EB$^{A}_{C}$-□□□G



Rod flange: LEY$^{25}_{32}$^{40}□EB$^{A}_{C}$-□□□F



Head flange: LEY25EB$^{A}_{C}$-□□□G



∗ The head flange type is not available for the LEY32/40.

Included parts
· Flange
· Body mounting bolt

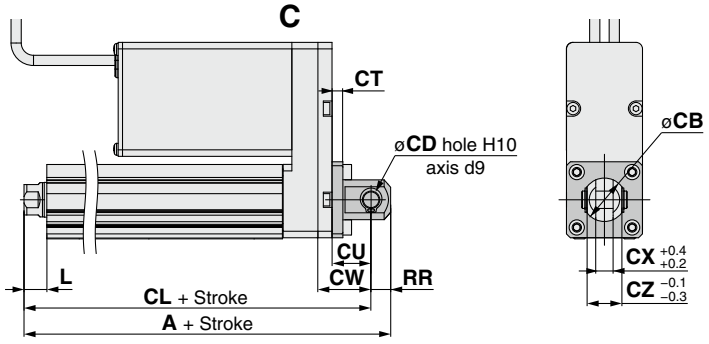
Rod/Head Flange

[mm]

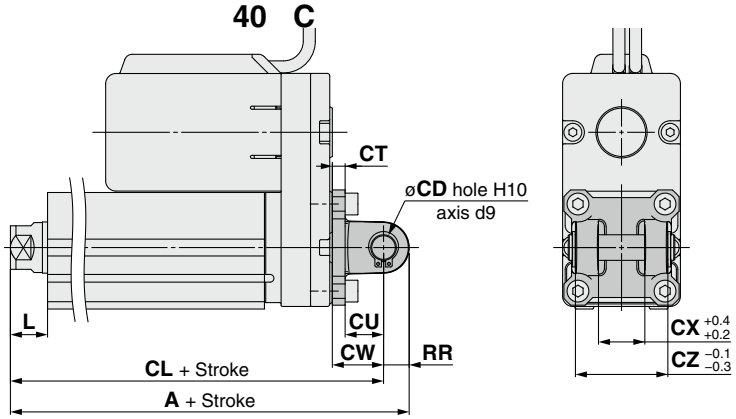
Size	FD	FT	FV	FX	FZ	LL	M
16	6.6	8	39	48	60	2.5	—
25	5.5	8	48	56	65	6.5	34
32, 40	5.5	8	54	62	72	10.5	40

Material: Carbon steel (Nickel plating)

Double clevis: LEY16EB$^{A}_{C}$-□□□D



Double clevis: LEY$^{25}_{32}$^{40}EB$^{A}_{C}$-□□□D



Included parts
· Double clevis
· Body mounting bolt
· Clevis pin
· Retaining ring

∗ Refer to the **Web Catalog** for details on the rod end nut and mounting bracket.

Double Clevis

[mm]

Size	Stroke range [mm]	A	CL	CB	CD	CT
16	10 to 100	128	119	20	8	5
25	15 to 100	160.5	150.5	—	10	5
	101 to 200	185.5	175.5			
32	20 to 100	180.5	170.5	—	10	6
40	101 to 200	210.5	200.5			

Size	Stroke range [mm]	CU	CW	CX	CZ	L	RR
16	10 to 100	12	18	8	16	10.5	9
25	15 to 100	14	20	18	36	14.5	10
	101 to 200						
32	20 to 100	14	22	18	36	18.5	10
40	101 to 200						

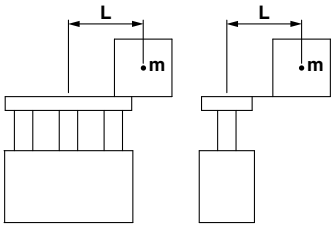
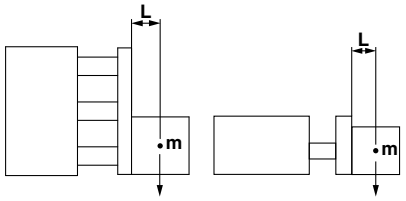
Material: Cast iron (Coating)

∗ The A and CL measurements are when the unit is in the original position. At this position, 2 mm at the end.

Model Selection

Moment Load Graph

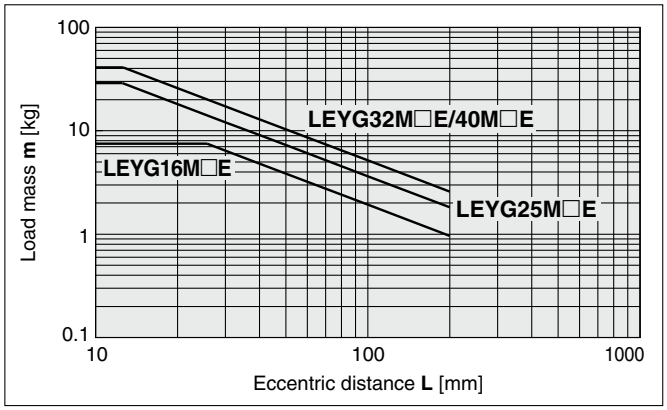
Selection conditions

		Vertical	Horizontal	
Mounting position				
Max. speed [mm/s]		"Speed–Work Load Graph"	200 or less	Over 200
Bearing	Sliding bearing	Graphs ①, ②	Graphs ⑤, ⑥*1	—
	Ball bushing bearing	Graphs ③, ④	Graphs ⑦, ⑧	Graphs ⑨, ⑩

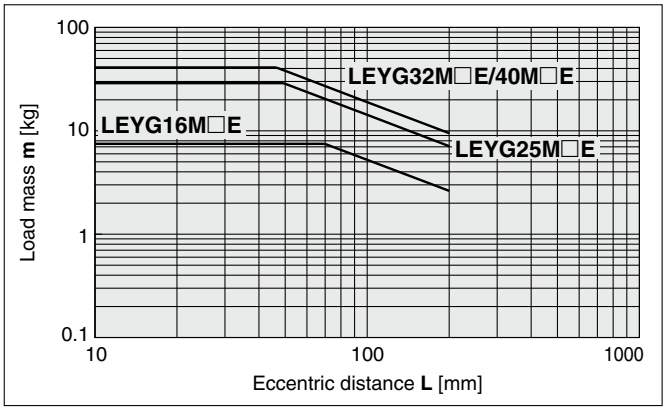
*1 For the sliding bearing type, the speed is restricted with a horizontal/moment load.

Vertical Mounting, Sliding Bearing

① **70 mm stroke or less**



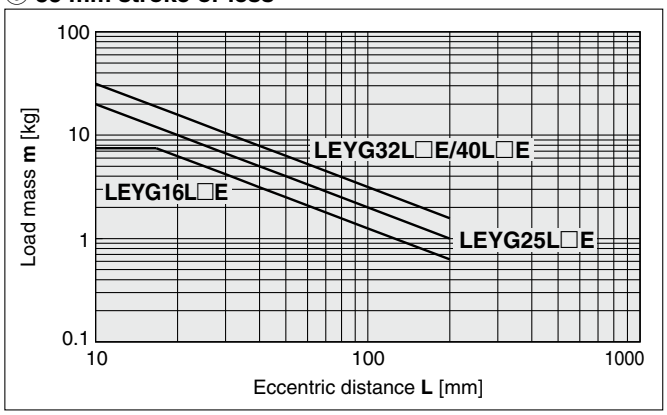
② **Over 75 mm stroke**



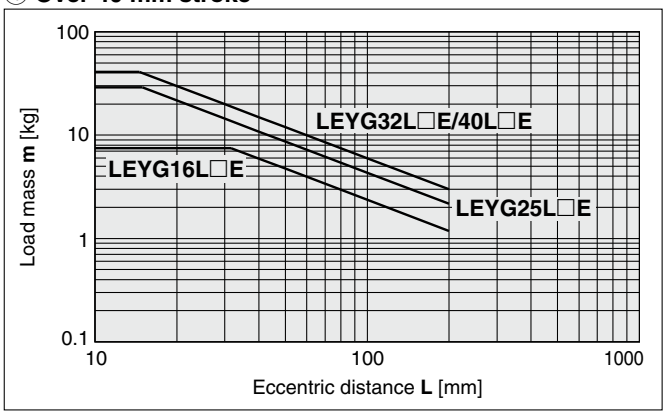
∗ The limit of vertical load mass varies depending on "lead" and "speed." Check the "Speed–Work Load Graph" on page 75.

Vertical Mounting, Ball Bushing Bearing

③ **35 mm stroke or less**



④ **Over 40 mm stroke**

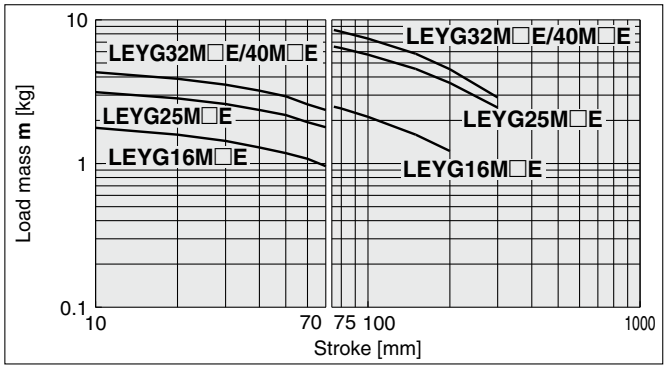


∗ The limit of vertical load mass varies depending on "lead" and "speed." Check the "Speed–Work Load Graph" on page 75.

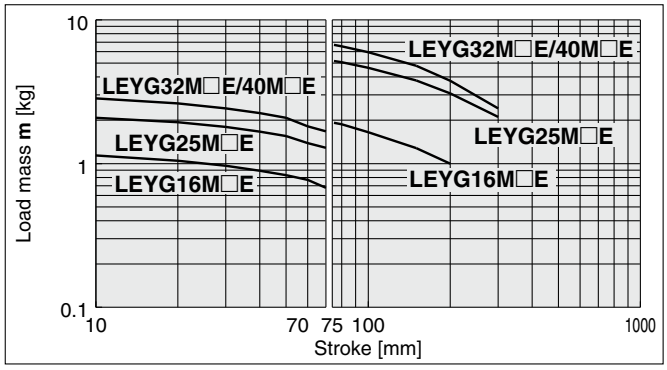
Moment Load Graph

Horizontal Mounting, Sliding Bearing

⑤ **L = 50 mm**



⑥ **L = 100 mm**

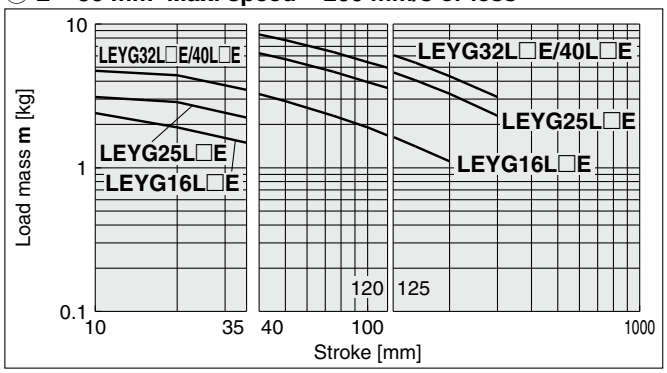


∗ Set the speed to less than or equal to the values shown below.

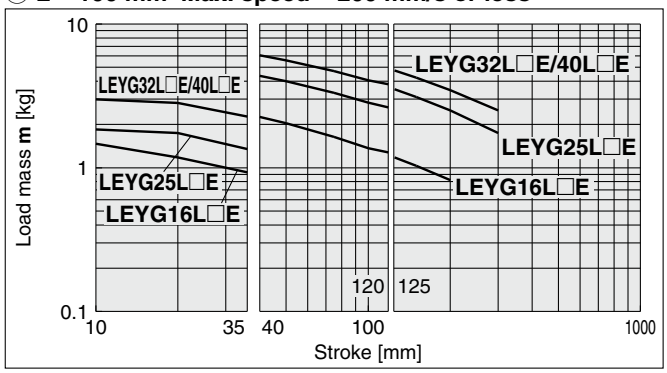
Motor type	LEYG□M□A	LEYG□M□B	LEYG□M□C
Battery-less absolute (Step motor 24 VDC)	200 mm/s	125 mm/s	75 mm/s

Horizontal Mounting, Ball Bushing Bearing

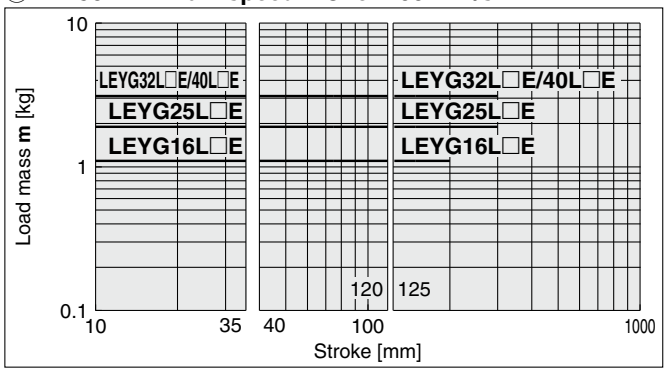
⑦ **L = 50 mm Max. speed = 200 mm/s or less**



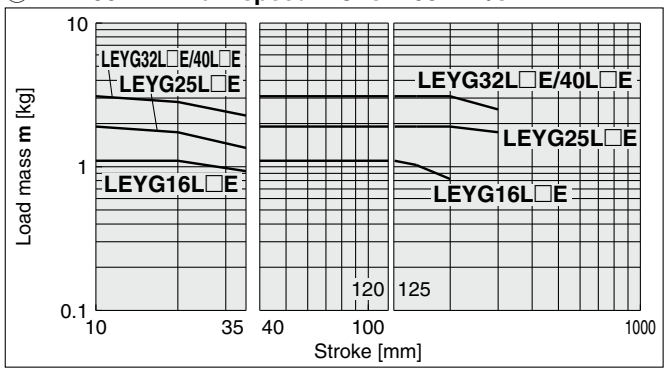
⑧ **L = 100 mm Max. speed = 200 mm/s or less**



⑨ **L = 50 mm Max. speed = Over 200 mm/s**

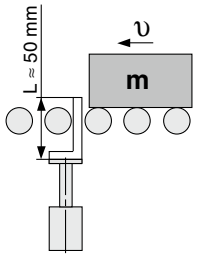


⑩ **L = 100 mm Max. speed = Over 200 mm/s**



Operating Range when Used as a Stopper

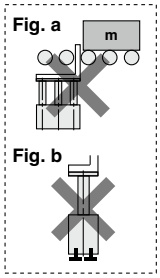
LEYG□M (Sliding bearing)

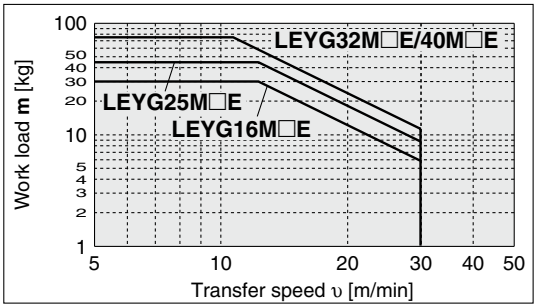


⚠Caution

Handling Precautions

- ∗ When used as a stopper, select a model with a stroke of 30 mm or less.
- ∗ LEYG□L□E (ball bushing bearing) cannot be used as a stopper.
- ∗ Workpiece collision in series with guide rod cannot be permitted (**Fig. a**).
- ∗ The body should not be mounted on the end. It must be mounted on the top or bottom (**Fig. b**).

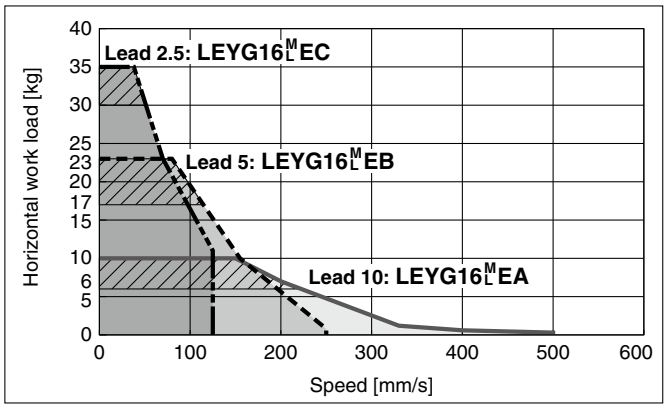




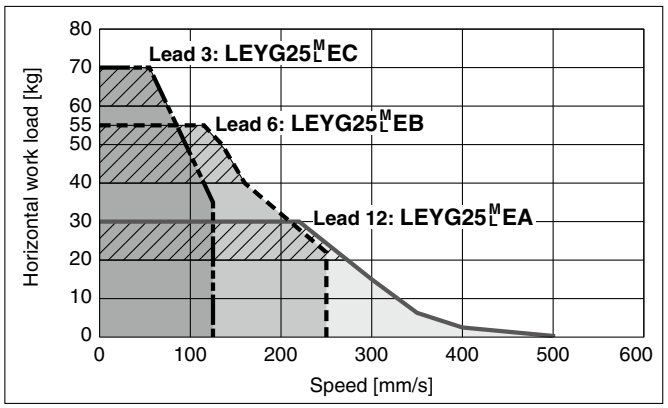
Speed–Work Load Graph (Guide)
For Battery-less Absolute (Step Motor 24 VDC)

Horizontal

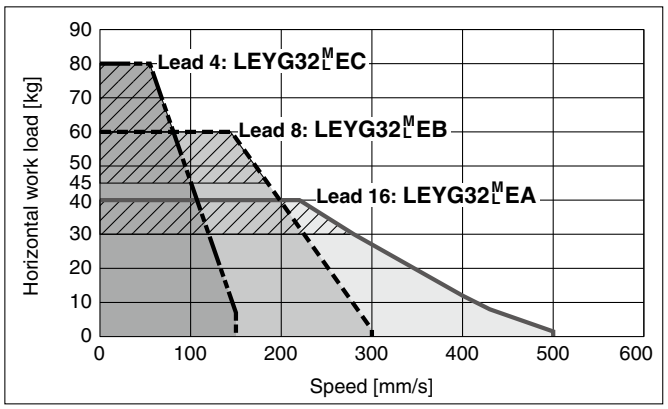
LEYG16$^{M}_{L}$□E



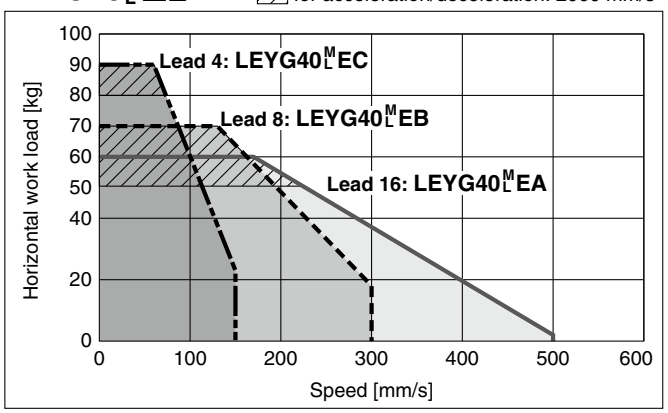
LEYG25$^{M}_{L}$□E



LEYG32$^{M}_{L}$□E

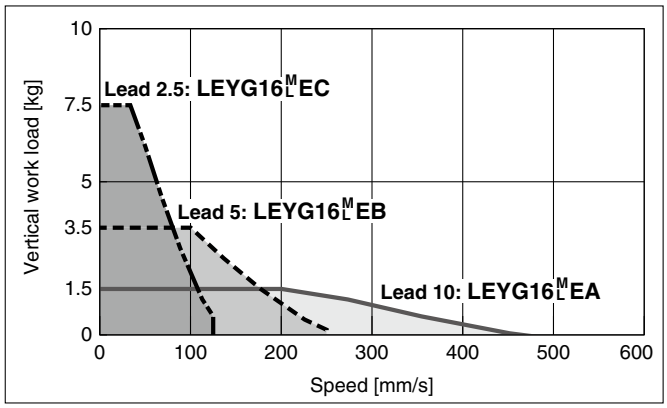


LEYG40$^{M}_{L}$□E

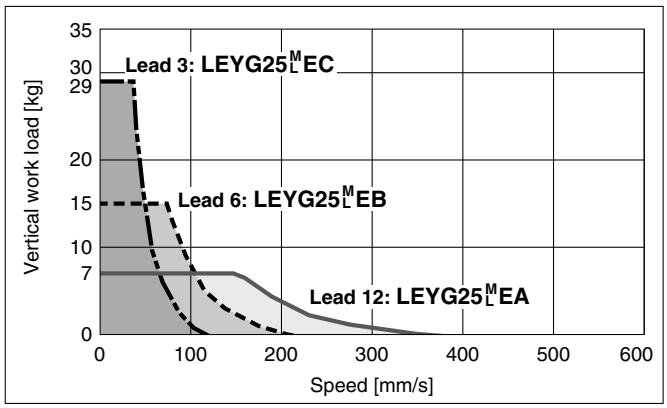


Vertical

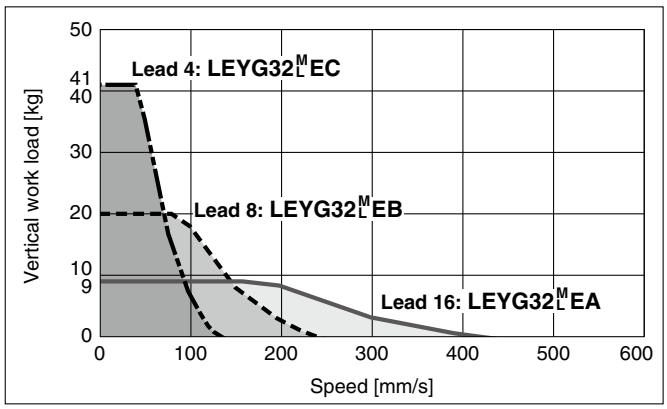
LEYG16$^{M}_{L}$□E



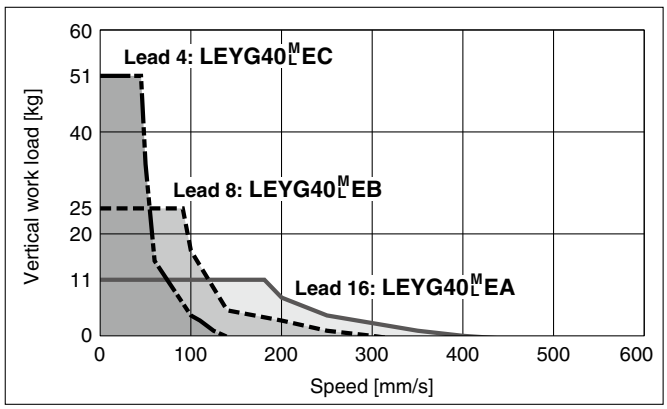
LEYG25$^{M}_{L}$□E



LEYG32$^{M}_{L}$□E



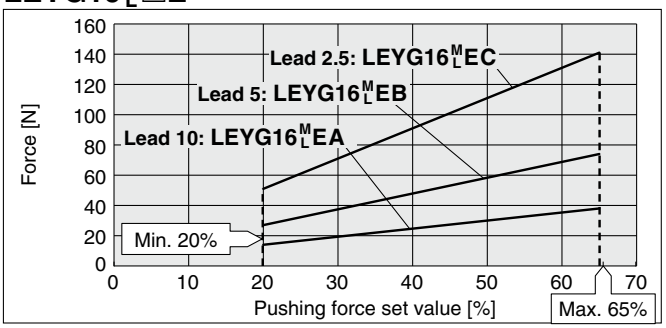
LEYG40$^{M}_{L}$□E



Force Conversion Graph (Guide)

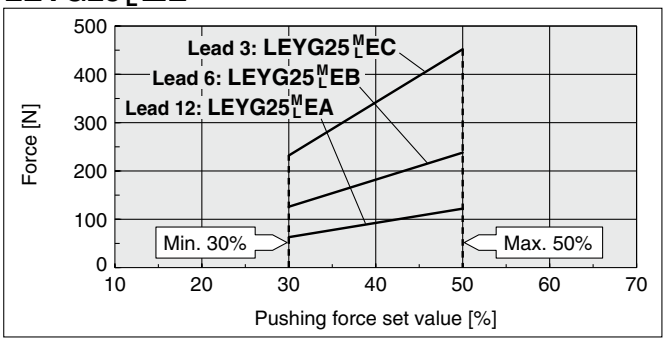
Battery-less Absolute (Step Motor 24 VDC)

LEYG16$^{M}_{L}$□E



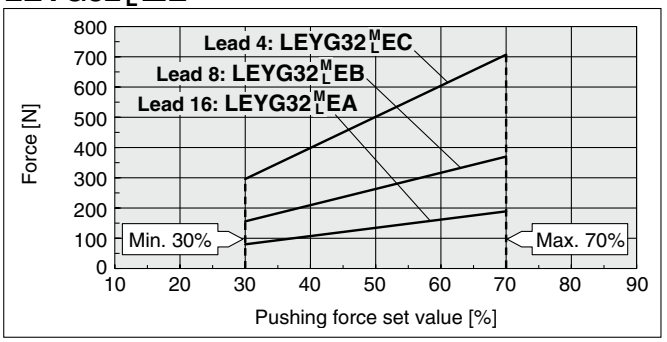
Ambient temperature	Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
30°C or less	65 or less	100	—
40°C	40 or less	100	—
	50	30	45 or less
	60	18	15 or less
	65	15	10 or less

LEYG25$^{M}_{L}$□E



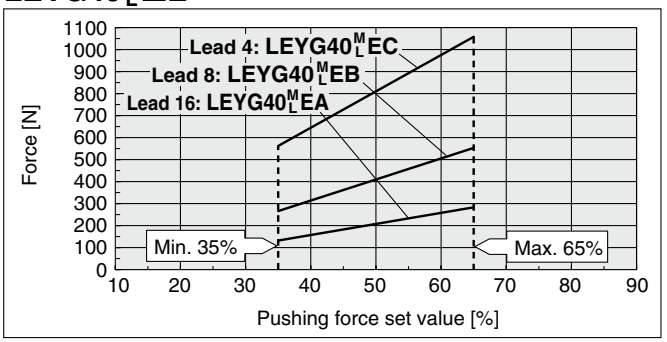
Ambient temperature	Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
40°C or less	50 or less	100	No restriction

LEYG32$^{M}_{L}$□E



Ambient temperature	Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
40°C or less	70 or less	100	No restriction

LEYG40$^{M}_{L}$□E



Ambient temperature	Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
40°C or less	65 or less	100	No restriction

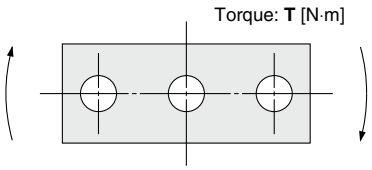
<Limit Values for Pushing Force and Trigger Level in Relation to Pushing Speed>

Model	Lead	Pushing speed [mm/s]	Pushing force (Setting input value)
LEYG16$^{M}_{L}$□E	A/B/C	21 to 50	45 to 65%
LEYG25$^{M}_{L}$□E	A/B/C	21 to 35	40 to 50%
LEYG32$^{M}_{L}$□E	A	24 to 30	50 to 70%
	B/C	21 to 30	
LEYG40$^{M}_{L}$□E	A	24 to 30	50 to 65%
	B/C	21 to 30	

<Set Values for Vertical Upward Transfer Pushing Operations>

Model	LEYG16$^{M}_{L}$□E			LEYG25$^{M}_{L}$□E			LEYG32$^{M}_{L}$□E			LEYG40$^{M}_{L}$□E		
Lead	A	B	C	A	B	C	A	B	C	A	B	C
Work load [kg]	0.5	1	2.5	1.5	4	9	2.5	7	16	5	12	26
Pushing force	65%			50%			70%			65%		

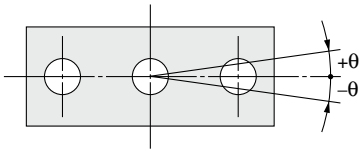
Allowable Rotational Torque of Plate: T



T [N·m]

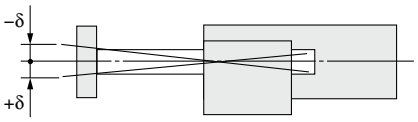
Model	Stroke [mm]				
	30	50	100	200	300
LEYG16M	0.70	0.57	1.05	0.56	—
LEYG16L	0.82	1.48	0.97	0.57	—
LEYG25M	1.56	1.29	3.50	2.18	1.36
LEYG25L	1.52	3.57	2.47	2.05	1.44
LEYG32M	2.55	2.09	5.39	3.26	1.88
LEYG32L	2.80	5.76	4.05	3.23	2.32
LEYG40M	2.55	2.09	5.39	3.26	1.88
LEYG40L	2.80	5.76	4.05	3.23	2.32

Non-rotating Accuracy of Plate: θ



Size	Non-rotating accuracy θ	
	LEYG□M□E	**LEYG□L□E**
16	0.06°	0.05°
25		0.04°
32	0.05°	
40		

Plate Displacement: δ



[mm]

Model	Stroke [mm]				
	30	**50**	**100**	**200**	**300**
LEYG16M	±0.20	±0.25	±0.24	±0.27	—
LEYG16L	±0.13	±0.12	±0.17	±0.19	—
LEYG25M	±0.26	±0.31	±0.25	±0.38	±0.36
LEYG25L	±0.13	±0.13	±0.17	±0.20	±0.23
LEYG32M	±0.23	±0.29	±0.23	±0.36	±0.34
LEYG32L	±0.11	±0.11	±0.15	±0.19	±0.22
LEYG40M	±0.23	±0.29	±0.23	±0.36	±0.34
LEYG40L	±0.11	±0.11	±0.15	±0.19	±0.22

∗ The values without a load are shown.

Battery-less Absolute (Step Motor 24 VDC)

Battery-less Absolute Encoder Type
Guide Rod Type
LEYG Series LEYG16, 25, 32, 40

CE RoHS

* For details, refer to page 182 and onwards.

How to Order

LEYG 25 M ☐ E B – 50 C ☐ – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

For details on controllers, refer to the next page.

❶ Size

16
25
32
40

❷ Bearing type*1

M	Sliding bearing
L	Ball bushing bearing

❸ Motor mounting position/Motor cover direction

Symbol	Motor mounting position	Motor cover direction
Nil	Top side parallel	—
D	In-line	—*2
D1		Left*3
D2		Right*3
D3		Top*3
D4		Bottom*3

❹ Motor type

E	Battery-less absolute (Step motor 24 VDC)

❺ Lead [mm]

Symbol	LEYG16	LEYG25	LEYG32/40
A	10	12	16
B	5	6	8
C	2.5	3	4

❻ Stroke*4 *5 [mm]

Stroke	Note	
	Size	Applicable stroke
30 to 200	16	30, 50, 100, 150, 200
30 to 300	25/32/40	30, 50, 100, 150, 200, 250, 300

❼ Motor option*6

C	With motor cover
W	With lock/motor cover

❽ Guide option*7

Nil	Without option
F	With grease retaining function

❾ Actuator cable type/length

Robotic cable [m]

Nil	None	**R8**	8*8
R1	1.5	**RA**	10*8
R3	3	**RB**	15*8
R5	5	**RC**	20*8

For details on auto switches, refer to the Web Catalog.

Use of auto switches for the guide rod type LEYG series
- Auto switches must be inserted from the front side with the rod (plate) sticking out.
- Auto switches cannot be fixed with the parts hidden behind the guide attachment (the side of the rod that sticks out).
- Please consult with SMC when using auto switches on the side of the rod that sticks out, as it is produced as a special order.

⑩ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗9	DIN rail

Communication plug connector, I/O cable∗10

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 When [M: Sliding bearing] is selected, the maximum speed of lead [A] is 400 mm/s (at no-load, horizontal mounting). The speed is also restricted with a horizontal/moment load. Refer to the "Model Selection" on page 73.
∗2 Sizes 25, 32, and 40 only
∗3 Size 16 only
∗4 Please contact SMC for non-standard strokes as they are produced as special orders.
∗5 There is a limit for mounting size 16/32/40 top side parallel motor types and strokes of 50 mm or less. Refer to the dimensions.
∗6 When "With lock/motor cover" is selected for the top side parallel motor type, the motor body will stick out from the end of the body for size 16 with strokes of 50 mm or less and size 40 with strokes of 30 mm or less. Check for interference with workpieces before selecting a model.
∗7 Only available for size 25, 32, and 40 sliding bearings (Refer to the "Construction" on page 84.)
∗8 Produced upon receipt of order
∗9 The DIN rail is not included. It must be ordered separately.
∗10 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet™ or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

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

[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

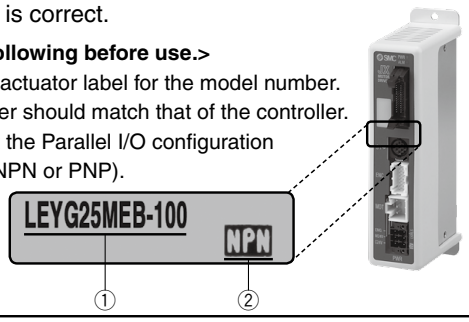
[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.

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

<Check the following before use.>

① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

Specifications

Battery-less Absolute (Step Motor 24 VDC)

Model				LEYG16$^{M}_{L}$□E			LEYG25$^{M}_{L}$□E			LEYG32$^{M}_{L}$□E			LEYG40$^{M}_{L}$□E		
Actuator specifications	Work load [kg]*1	Horizontal	Acceleration/Deceleration at 3000 [mm/s²]	6	17	30	20	40	60	30	45	60	50	60	80
			Acceleration/Deceleration at 2000 [mm/s²]	10	23	35	30	55	70	40	60	80	60	70	90
		Vertical	Acceleration/Deceleration at 3000 [mm/s²]	1.5	3.5	7.5	7	15	29	9	20	41	11	25	51
	Pushing force [N]*2 *3 *4			14 to 38	27 to 74	51 to 141	63 to 122	126 to 238	232 to 452	80 to 189	156 to 370	296 to 707	132 to 283	266 to 553	562 to 1058
	Speed [mm/s]*4			15 to 500	8 to 250	4 to 125	18 to 500	9 to 250	5 to 125	24 to 500	12 to 300	6 to 150	24 to 500	12 to 300	6 to 150
	Max. acceleration/deceleration [mm/s²]			3000											
	Pushing speed [mm/s]*5			50 or less			35 or less			30 or less			30 or less		
	Positioning repeatability [mm]			±0.02											
	Lost motion [mm]*6			0.1 or less											
	Screw lead [mm]			10	5	2.5	12	6	3	16	8	4	16	8	4
	Impact/Vibration resistance [m/s²]*7			50/20											
	Actuation type			Ball screw + Belt (LEYG□□), Ball screw (LEYG□□D)											
	Guide type			Sliding bearing (LEYG□M), Ball bushing bearing (LEYG□L)											
	Operating temp. range [°C]			5 to 40											
	Operating humidity range [%RH]			90 or less (No condensation)											
Electric specifications	Motor size			□28			□42			□56.4			□56.4		
	Motor type			Battery-less absolute (Step motor 24 VDC)											
	Encoder			Battery-less absolute											
	Power supply voltage [V]			24 VDC ±10%											
	Power [W]*8 *10			Max. power 43			Max. power 48			Max. power 104			Max. power 106		
Lock unit specifications	Type*9			Non-magnetizing lock											
	Holding force [N]			20	39	78	78	157	294	108	216	421	127	265	519
	Power [W]*10			2.9			5			5			5		
	Rated voltage [V]			24 VDC ±10%											

*1 Horizontal: An external guide is necessary to support the load (Friction coefficient of guide: 0.1 or less). The actual work load and transfer speed change according to the condition of the external guide. Also, speed changes according to the work load. Check the “Model Selection” on pages 73 to 75.
Vertical: Speed changes according to the work load. Check the “Model Selection” on pages 73 to 75.
Set the acceleration/deceleration values to be 3000 [mm/s²] or less.

*2 Pushing force accuracy is ±20% (F.S.).

*3 The pushing force values for LEYG16□□E are 20% to 65%, for LEYG25□□E are 30% to 50%, for LEYG32□□E are 30% to 70%, and for LEYG40□□E are 35% to 65%.
The pushing force values change according to the duty ratio and pushing speed. Check the “Model Selection” on page 76.

*4 The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
When [M: Sliding bearing] is selected, the maximum speed of lead [A] is 400 mm/s (at no-load, horizontal mounting).
The speed is also restricted with a horizontal/moment load. For details, refer to the “Model Selection” on page 74.

*5 The allowable speed for the pushing operation

*6 A reference value for correcting errors in reciprocal operation

*7 Impact resistance: No malfunction occurred when it was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (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. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)

*8 Indicates the max. power during operation (including the controller). This value can be used for the selection of the power supply.

*9 With lock only

*10 For an actuator with lock, add the power for the lock.

Weight

Weight: Top Side Parallel Motor Type

Series	LEYG16M□E					LEYG25M□E							LEYG32M□E						
Stroke [mm]	30	50	100	150	200	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	1	1.14	1.37	1.66	1.83	1.7	1.89	2.21	2.63	2.97	3.31	3.57	2.95	3.21	3.76	4.32	4.99	5.48	5.92

Series	LEYG16L□E					LEYG25L□E							LEYG32L□E						
Stroke [mm]	30	50	100	150	200	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	1.01	1.14	1.31	1.6	1.75	1.71	1.92	2.16	2.59	2.85	3.17	3.41	2.95	3.22	3.61	4.16	4.7	5.21	5.6

Series	LEYG40M□E							LEYG40L□E						
Stroke [mm]	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	3.26	3.52	4.07	4.63	5.3	5.79	6.23	3.26	3.53	3.92	4.47	5.01	5.52	5.91

Weight: In-line Motor Type

Series	LEYG16M□E					LEYG25M□E							LEYG32M□E						
Stroke [mm]	30	50	100	150	200	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	0.97	1.11	1.34	1.68	1.8	1.09	1.88	2.20	2.62	2.96	3.30	3.56	2.96	3.20	3.75	4.81	4.98	5.47	5.91

Series	LEYG16L□E					LEYG25L□E							LEYG32L□E						
Stroke [mm]	30	50	100	150	200	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	0.98	1.11	1.28	1.57	1.72	1.70	1.91	2.15	2.58	2.84	3.16	3.40	2.54	3.21	3.60	4.15	4.69	5.20	5.59

Series	LEYG40M□E							LEYG40L□E						
Stroke [mm]	30	50	100	150	200	250	300	30	50	100	150	200	250	300
Product weight [kg]	3.25	3.51	4.06	4.62	5.25	5.78	6.22	3.25	3.52	3.91	4.46	5.00	5.51	5.90

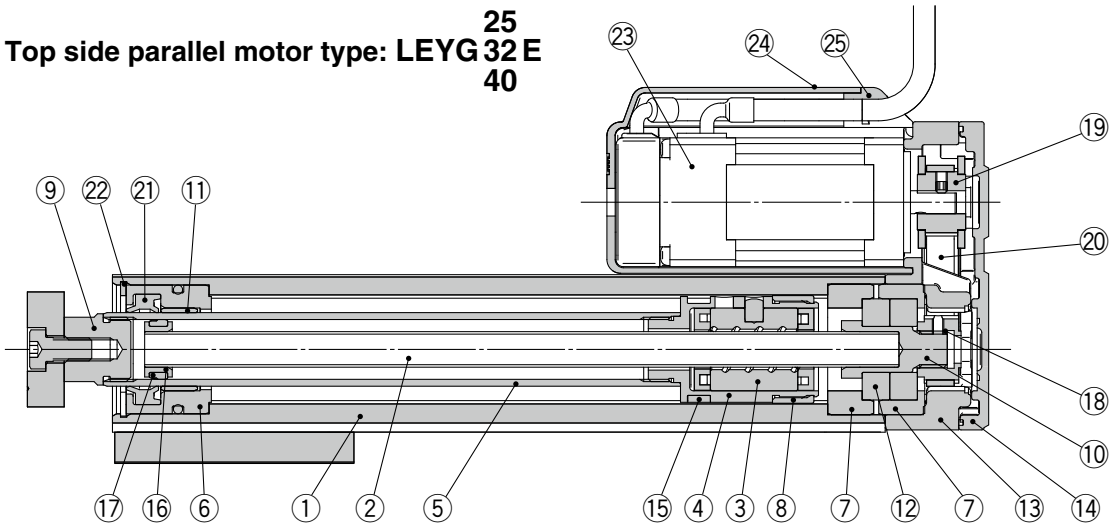
Additional Weight

(kg)

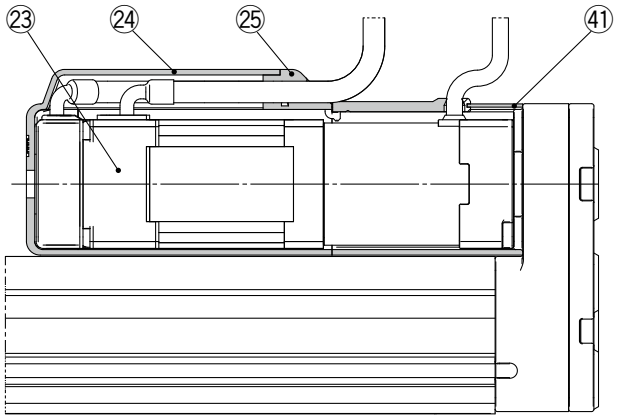
Size	16	25	32	40
Lock/Motor cover	0.16	0.29	0.57	0.57

Construction

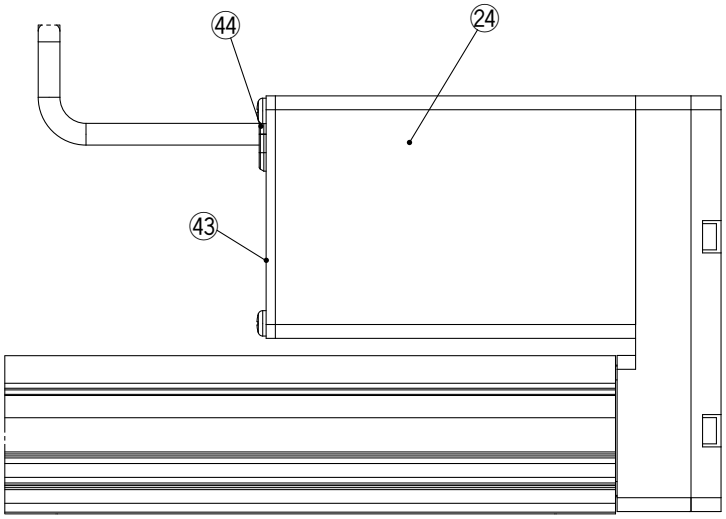
Top side parallel motor type: LEYG 25 32 40 E



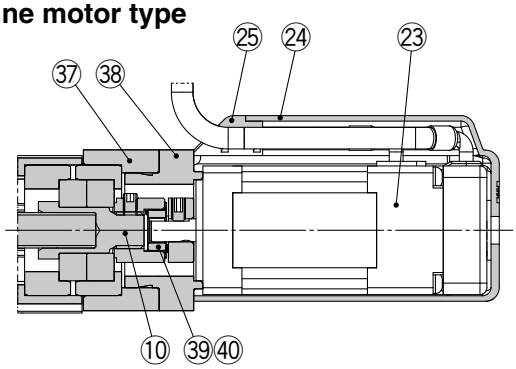
Top side parallel motor type, With lock/motor cover



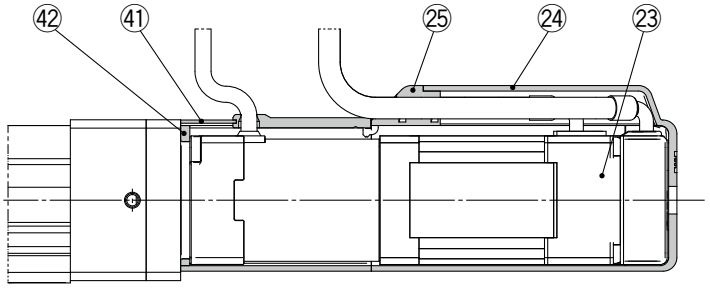
Top side parallel motor type: LEYG16E



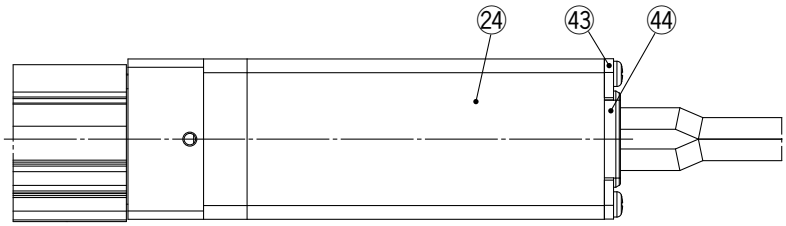
In-line motor type



In-line motor type, With lock/motor cover

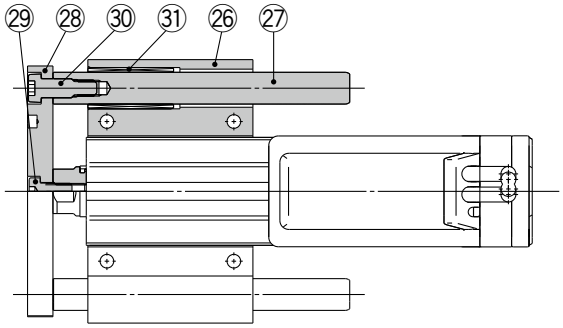


In-line motor type: LEYG16E

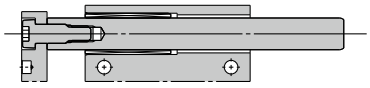


Construction

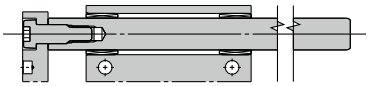
LEYG□M



LEYG$^{16}_{25}_{32}_{40}$M: 50st or less

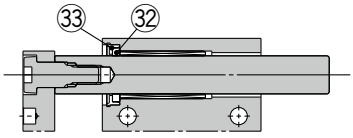


LEYG$^{16}_{25}_{32}_{40}$M: Over 50st

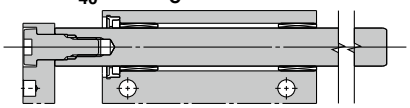


When grease retaining function selected

LEYG$^{25}_{32}_{40}$M□□$^{A}_{B}_{C}$-□□F: 50st or less

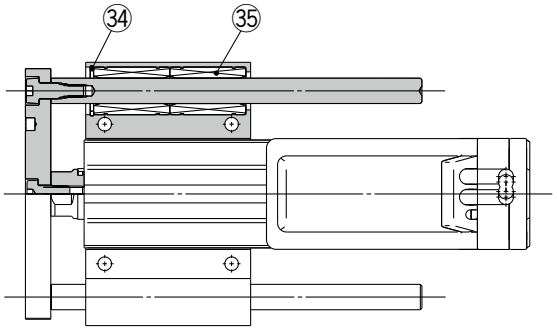


LEYG$^{25}_{32}_{40}$M□□$^{A}_{B}_{C}$-□□F: Over 50st

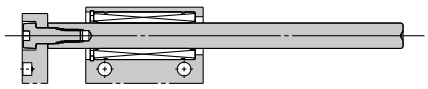


∗ Felt material is inserted to retain grease at the sliding part of the sliding bearing. This lengthens the life of the sliding part, but does not guarantee it permanently.

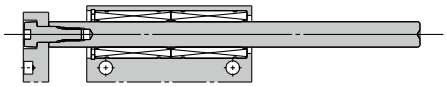
LEYG□L



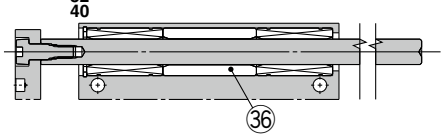
LEYG16L: 30st or less
LEYG$^{25}_{32}_{40}$L: 100st or less



LEYG16L: Over 30st, 100st or less



LEYG$^{16}_{25}_{32}_{40}$L: Over 100st



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Ball screw shaft**	Alloy steel	
3	**Ball screw nut**	Synthetic resin/Alloy steel	
4	**Piston**	Aluminum alloy	
5	**Piston rod**	Stainless steel	Hard chrome plating
6	**Rod cover**	Aluminum alloy	
7	**Bearing holder**	Aluminum alloy	
8	**Rotation stopper**	Synthetic resin	
9	**Socket**	Free cutting carbon steel	Nickel plating
10	**Connected shaft**	Free cutting carbon steel	Nickel plating
11	**Bushing**	Bearing alloy	
12	**Bearing**	—	
13	**Return box**	Aluminum die-cast	Coating
14	**Return plate**	Aluminum die-cast	Coating
15	**Magnet**	—	
16	**Wear ring holder**	Stainless steel	Stroke 101 mm or more
17	**Wear ring**	Synthetic resin	Stroke 101 mm or more
18	**Screw shaft pulley**	Aluminum alloy	
19	**Motor pulley**	Aluminum alloy	
20	**Belt**	—	
21	**Seal**	NBR	
22	**Retaining ring**	Steel for spring	Phosphate coating
23	**Motor**	—	
24	**Motor cover**	Aluminum alloy	Anodized/LEY16 only
		Synthetic resin	
25	**Grommet**	Synthetic resin	Only “With motor cover”
26	**Guide attachment**	Aluminum alloy	Anodized
27	**Guide rod**	Carbon steel	

No.	Description	Material	Note
28	**Plate**	Aluminum alloy	Anodized
29	**Plate mounting cap screw**	Carbon steel	Nickel plating
30	**Guide cap screw**	Carbon steel	Nickel plating
31	**Sliding bearing**	Bearing alloy	
32	**Lube-retainer**	Felt	
33	**Holder**	Synthetic resin	
34	**Retaining ring**	Steel for spring	Phosphate coating
35	**Ball bushing**	—	
36	**Spacer**	Aluminum alloy	Chromating
37	**Motor block**	Aluminum alloy	Anodized
38	**Motor adapter**	Aluminum alloy	Anodized/LEY16, 25 only
39	**Hub**	Aluminum alloy	
40	**Spider**	NBR	
41	**Motor cover with lock**	Aluminum alloy	Only “With lock/motor cover”/LEY25, 32, 40
42	**Cover support**	Aluminum alloy	Only “With lock/motor cover”/LEY25, 32, 40
43	**End cover**	Aluminum alloy	Anodized/LEY16 only
44	**Rubber bushing**	NBR	LEY16 only

Replacement Parts/Belt

No.	Size	Order no.
20	**16**	LE-D-2-7
	25	LE-D-2-2
	32, 40	LE-D-2-3

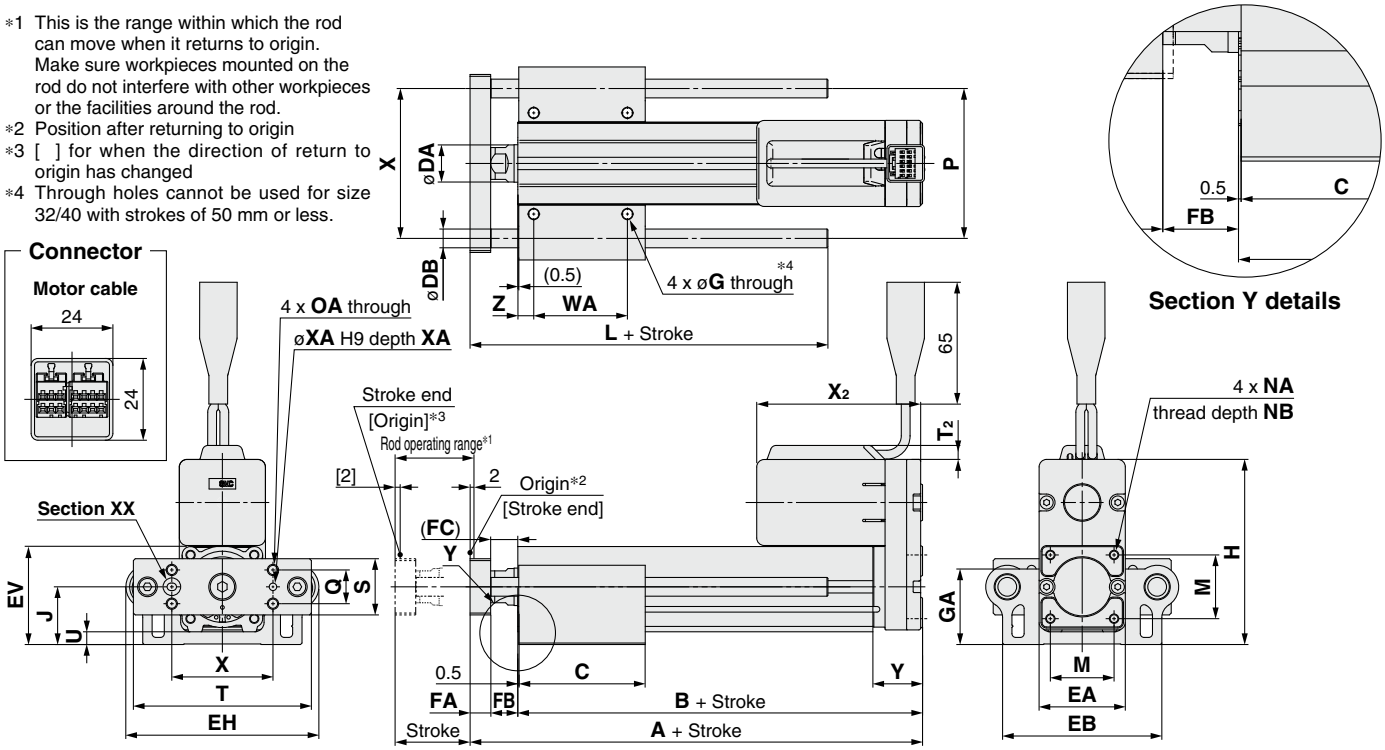
Replacement Parts/Grease Pack

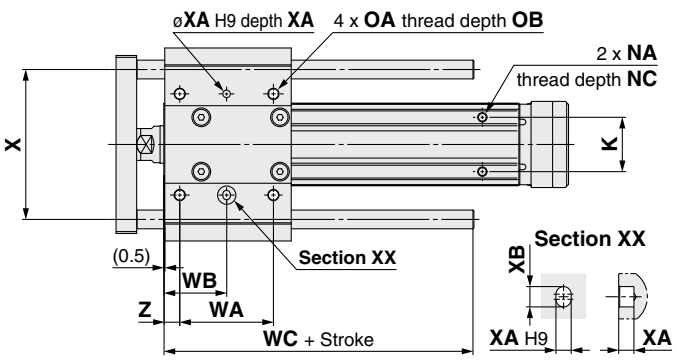
Applied portion	Order no.
Piston rod	GR-S-010 (10 g)
Guide rod	GR-S-020 (20 g)

∗ Apply grease to the piston rod periodically. Grease should be applied when 1 million cycles or 200 km have been reached, whichever comes first.

Dimensions: Top Side Parallel Motor

∗1 This is the range within which the rod can move when it returns to origin. Make sure workpieces mounted on the rod do not interfere with other workpieces or the facilities around the rod.
∗2 Position after returning to origin
∗3 [ ] for when the direction of return to origin has changed
∗4 Through holes cannot be used for size 32/40 with strokes of 50 mm or less.





LEYG□L (Ball bushing bearing) [mm]

Size	Stroke range	L	DB
16	90st or less	75	8
	91st or more, 100st or less	95	
	101st or more, 200st or less	105	
25	114st or less	91	10
	115st or more, 190st or less	115	
	191st or more, 300st or less	133	
32 40	114st or less	97.5	13
	115st or more, 190st or less	116.5	
	191st or more, 300st or less	134	

LEYG□M (Sliding bearing) [mm]

Size	Stroke range	L	DB
16	64st or less	51.5	10
	65st or more, 90st or less	74.5	
	91st or more, 100st or less	95	
	101st or more, 200st or less	105	
25	59st or less	67.5	12
	60st or more, 185st or less	100.5	
	186st or more, 300st or less	138	
32 40	54st or less	74	16
	55st or more, 180st or less	107	
	181st or more, 300st or less	144	

LEYG□M, LEYG□L Common

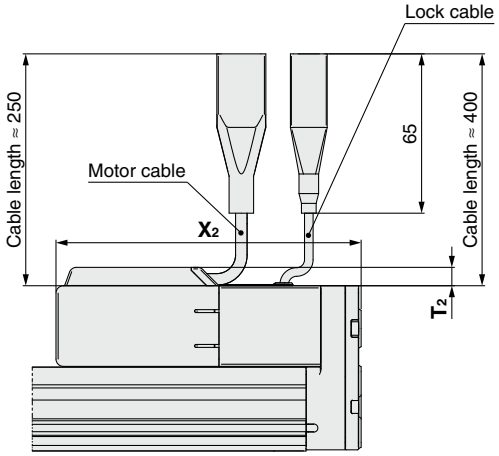
[mm]

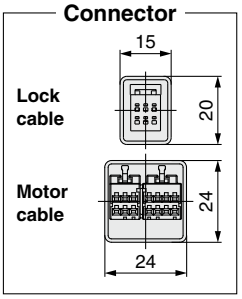
Size	Stroke range	A	B	C	DA	EA	EB	EH	EV	FA	FB	FC	G	GA	H	J	K	M	NA	NB	NC
16	39st or less	109	90.5	37	16	35	69	83	41.1	8	10.5	8.5	4.3	31.8	97.3	24.8	23	25.5	M4 x 0.7	7	5.5
	40st or more, 100st or less			52																	
	101st or more, 200st or less	129	110.5	82																	
25	39st or less	141.5	116	50	20	46	85	103	52.3	11	14.5	12.5	5.4	40.3	98.8	30.8	29	34	M5 x 0.8	8	6.5
	40st or more, 100st or less			67.5																	
	101st or more, 124st or less																				
	125st or more, 200st or less	166.5	141	84.5																	
	201st or more, 300st or less			102																	
32 40	39st or less	160.5	130	55	25	60	101	123	63.8	12	18.5	16.5	5.4	50.3	125.3	38.3	30	40	M6 x 1.0	10	8.5
	40st or more, 100st or less			68																	
	101st or more, 124st or less																				
	125st or more, 200st or less	190.5	160	85																	
	201st or more, 300st or less			102																	

Size	Stroke range	OA	OB	P	Q	S	T	T2	U	WA	WB	WC	X2 With motor cover	X2 With lock/motor cover	X	XA	XB	Y	Z
16	39st or less	M5 x 0.8	10	65	15	25	79	—	6.8	25	19	55	100.5	145.5	44	3	4	22.5	6.5
	40st or more, 100st or less									40	26.5								
	101st or more, 200st or less									70	41.5	75							
25	39st or less	M6 x 1.0	12	80	18	30	95	7.5	6.8	35	26	70	88.5	129	54	4	5	26.5	8.5
	40st or more, 100st or less									50	33.5								
	101st or more, 124st or less											95							
	125st or more, 200st or less									70	43.5								
	201st or more, 300st or less									85	51								
32	39st or less	M6 x 1.0	12	95	28	40	117	8.5	7.3	40	28.5	75	98.5	141.5	64	5	6	34	8.5
	40st or more, 100st or less									50	33.5								
	101st or more, 124st or less											105							
	125st or more, 200st or less									70	43.5								
	201st or more, 300st or less									85	51								
40	39st or less	M6 x 1.0	12	95	28	40	117	8.5	7.3	40	28.5	75	120.5	163.5	64	5	6	34	8.5
	40st or more, 100st or less									50	33.5								
	101st or more, 124st or less											105							
	125st or more, 200st or less									70	43.5								
	201st or more, 300st or less									85	51								

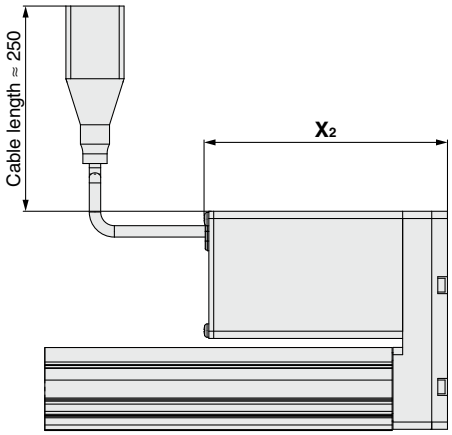
Dimensions: Top Side Parallel Motor

With lock/motor cover: LEYG$^{25}_{40}$32E$^{A}_{B,C}$-□W

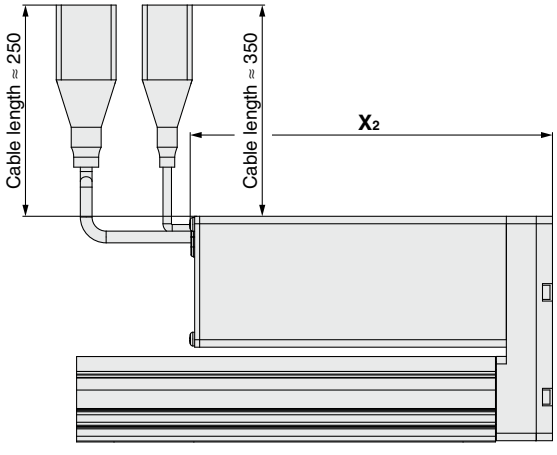




With motor cover: LEYG16E$^{A}_{B,C}$-□C

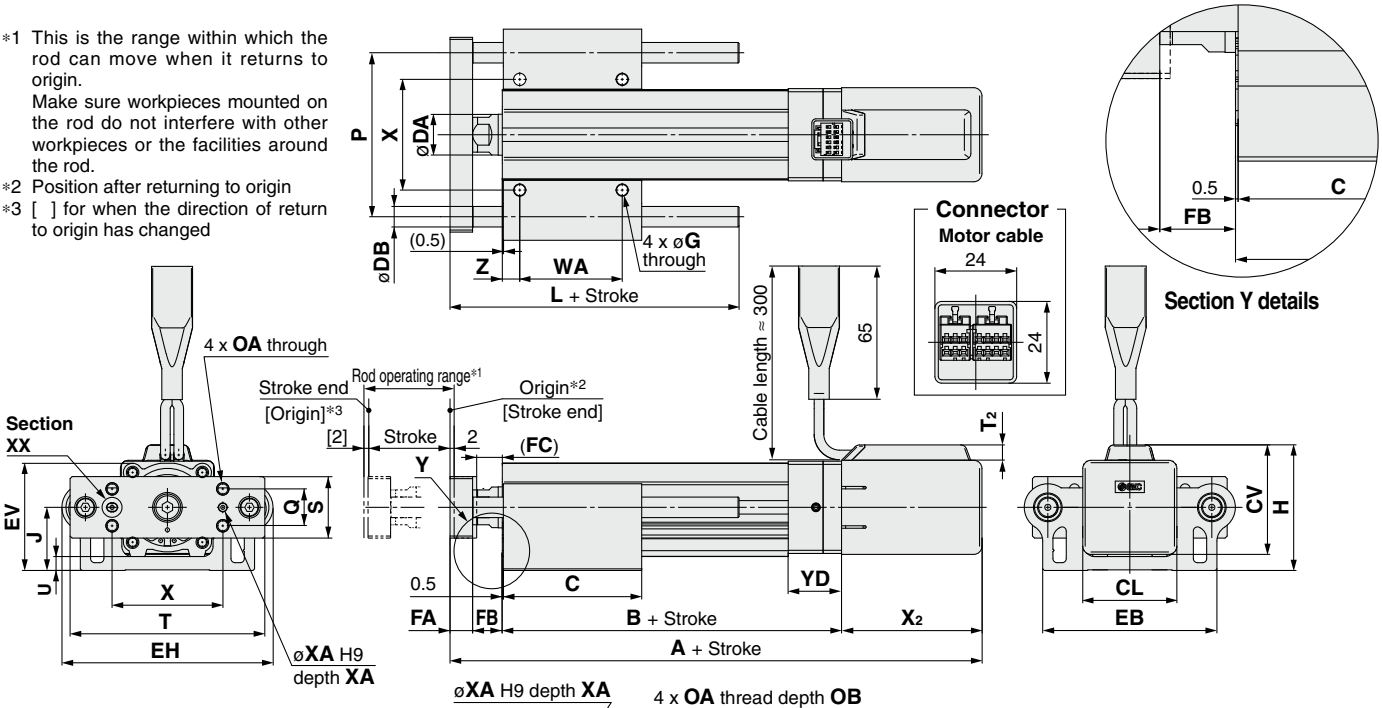


With lock/motor cover: LEYG16E$^{A}_{B,C}$-□W



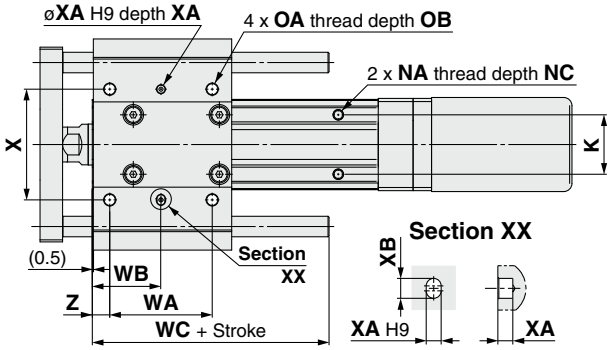
Dimensions: In-line Motor

∗1 This is the range within which the rod can move when it returns to origin.
Make sure workpieces mounted on the rod do not interfere with other workpieces or the facilities around the rod.
∗2 Position after returning to origin
∗3 [ ] for when the direction of return to origin has changed



LEYG□L (Ball bushing bearing) [mm]

Size	Stroke range	L	DB
16	90st or less	75	8
	91st or more, 100st or less	95	
	101st or more, 200st or less	105	
25	114st or less	91	10
	115st or more, 190st or less	115	
	191st or more, 300st or less	133	
32 40	114st or less	97.5	13
	115st or more, 190st or less	116.5	
	191st or more, 300st or less	134	



LEYG□M (Sliding bearing) [mm]

Size	Stroke range	L	DB
16	64st or less	51.5	10
	65st or more, 90st or less	74.5	
	91st or more, 100st or less	95	
	101st or more, 200st or less	105	
25	59st or less	67.5	12
	60st or more, 185st or less	100.5	
	186st or more, 300st or less	138	
32 40	54st or less	74	16
	55st or more, 180st or less	107	
	181st or more, 300st or less	144	

LEYG□M, LEYG□L Common

[mm]

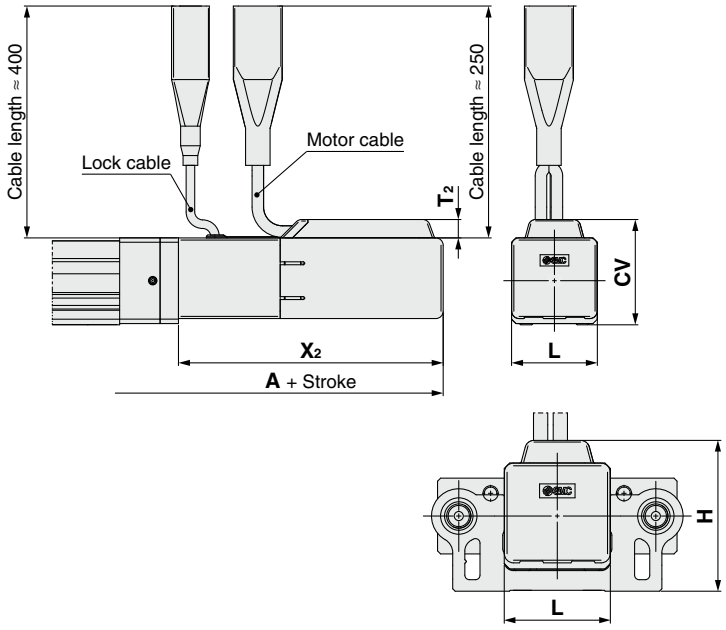
Size	Stroke range	A Without lock	A With lock	B	C	CL	CV	DA	EB	EH	EV	FA	FB	FC	G	GA	H	J	K	NA	NC
16	39st or less	194.5	239.5	94	37	—	—	16	69	83	41.1	8	10.5	8.5	4.3	31.8	∗1 42.3	24.8	23	M4 x 0.7	5.5
	40st or more, 100st or less				52																
	101st or more, 200st or less	214.5	259.5	114	82																
25	39st or less	209.5	250	115.5	50	46	54.5	20	85	103	52.3	11	14.5	12.5	5.4	40.3	61.3	30.8	29	M5 x 0.8	6.5
	40st or more, 100st or less				67.5																
	101st or more, 124st or less	234.5	275	140.5																	
	125st or more, 200st or less				84.5																
	201st or more, 300st or less				102																
32	39st or less	232	275	128	55	60	68.5	25	101	123	63.8	12	18.5	16.5	5.4	50.3	75.8	38.3	30	M6 x 1.0	8.5
	40st or more, 100st or less				68																
	101st or more, 124st or less	262	305	158																	
	125st or more, 200st or less				85																
	201st or more, 300st or less				102																
40	39st or less	254	297	128	55	60	68.5	25	101	123	63.8	12	18.5	16.5	5.4	50.3	75.8	38.3	30	M6 x 1.0	8.5
	40st or more, 100st or less				68																
	101st or more, 124st or less	284	327	158																	
	125st or more, 200st or less				85																
	201st or more, 300st or less				102																

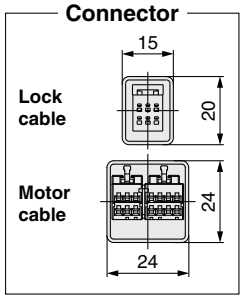
Size	Stroke range	OA	OB	P	Q	S	T	T2	U	WA	WB	WC	X	X2 With motor cover	X2 With lock/motor cover	XA	XB	YD	Z
16	39st or less	M5 x 0.8	10	65	15	25	79	—	6.8	25	19	55	44	82	127	3	4	24	6.5
	40st or more, 100st or less									40	26.5								
	101st or more, 200st or less									70	41.5	75							
25	39st or less	M6 x 1.0	12	80	18	30	95	7.5	6.8	35	26	70	54	68.5	109	4	5	26	8.5
	40st or more, 100st or less									50	33.5								
	101st or more, 124st or less											95							
	125st or more, 200st or less									70	43.5								
	201st or more, 300st or less									85	51								
32	39st or less	M6 x 1.0	12	95	28	40	117	8.5	7.3	40	28.5	75	64	73.5	116.5	5	6	32	8.5
	40st or more, 100st or less									50	33.5								
	101st or more, 124st or less											105							
	125st or more, 200st or less									70	43.5								
	201st or more, 300st or less									85	51								
40	39st or less	M6 x 1.0	12	95	28	40	117	8.5	7.3	40	28.5	75	64	95.5	138.5	5	6	32	8.5
	40st or more, 100st or less									50	33.5								
	101st or more, 124st or less											105							
	125st or more, 200st or less									70	43.5								
	201st or more, 300st or less									85	51								

∗1 Refer to page 88.

Dimensions: In-line Motor

With lock/motor cover: LEYG32DE$^{25}_{40}$B$^{A}_{C}$-□W



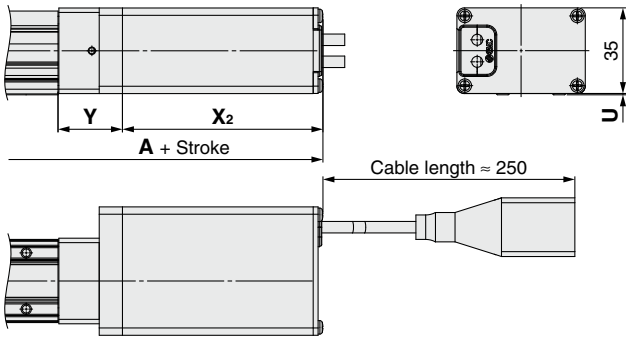


[mm]

Size	Stroke range	T2	X2	L	H	CV
16	100st or less	7.5	108	35	42.3 *1	—
	101st or more, 300st or less					
25	100st or less	7.5	109	46	61.3	54.4
	101st or more, 300st or less					
32	100st or less	7.5	116.5	60	75.8	68.5
	101st or more, 300st or less					
40	100st or less	7.5	138.5	60	75.8	68.5
	101st or more, 300st or less					

*1 Refer to the table below.

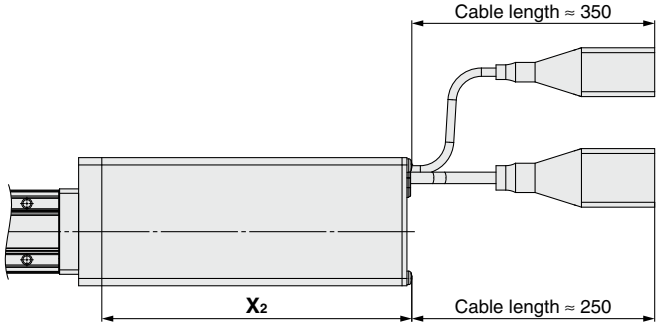
With motor cover: LEYG16D□E$^{A}_{C}$B-□C



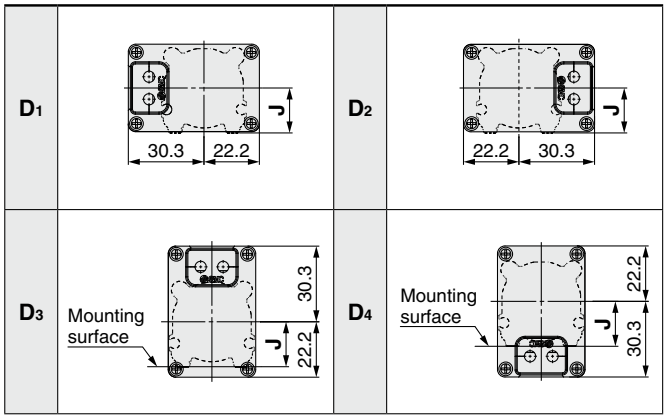
H Dimensions (Size 16)

Motor cover direction	H
D1	42.3
D2	42.3
D3	55.1
D4	47

With lock/motor cover: LEYG16D□E$^{A}_{C}$B-□W



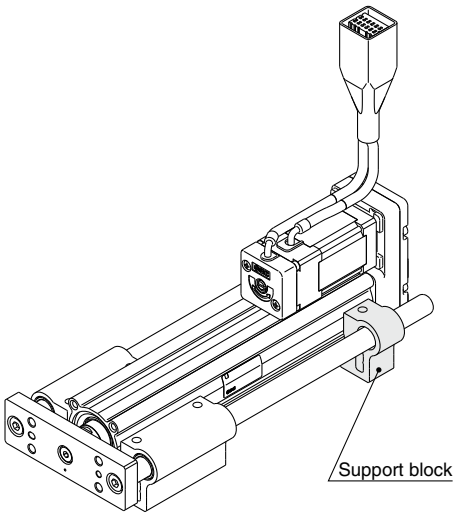
Motor Cover Direction



Support Block

●Guide for support block application

When the stroke exceeds 100 mm and the mounting orientation is horizontal, the body will be bent. Mounting the support block is recommended. (Please order it separately from the models shown below.)

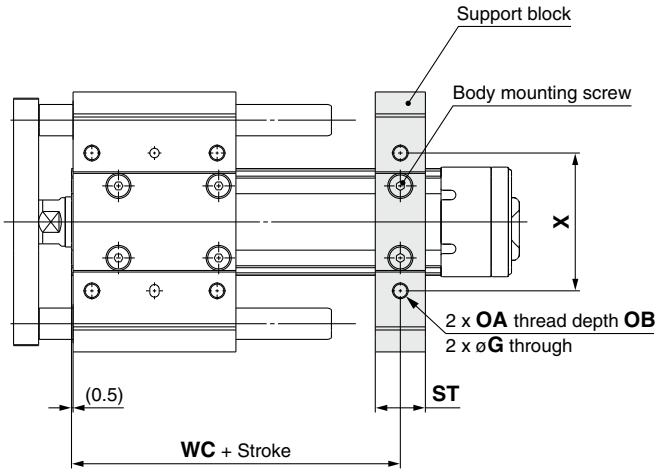


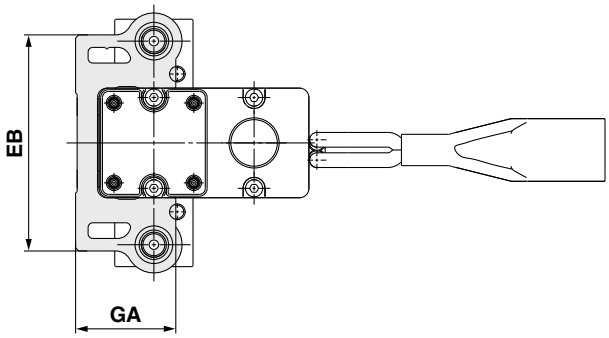
Support Block Model

LEYG-S016

●**Size**

016	For size 16
025	For size 25
032	For sizes 32, 40





⚠Caution

Do not install the body using only a support block.
The support block should be used only for support.

[mm]

Size	Model	Stroke range	EB	G	GA	OA	OB	ST	WC	X
16	**LEYG-S016**	100st or less	69	4.3	31.8	M5 x 0.8	10	16	55	44
		101st or more, 200st or less							75	
25	**LEYG-S025**	100st or less	85	5.4	40.3	M6 x 1.0	12	20	70	54
		101st or more, 300st or less							95	
32 40	**LEYG-S032**	100st or less	101	(5.4)	(50.3)	M6 x 1.0	12	22	75	64
		101st or more, 300st or less							105	

∗ Two body mounting screws are included with the support block.
∗ The through holes of the LEYG-S032 cannot be used for the top side parallel motor type. Use taps on the bottom.

Slide Tables

High Precision Type LESYH Series p. 91

Compact Type LES Series p. 107

High Rigidity Type LESH Series p. 125

Controllers p. 164

Model Selection

Selection Procedure

Positioning Control Selection Procedure

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

Selection Example

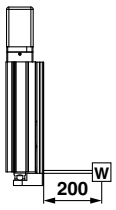
Step 1 **Check the work load–speed. <Speed–Work load graph>** (page 93)

Select a model based on the workpiece mass and speed while referencing the speed–work load graph.

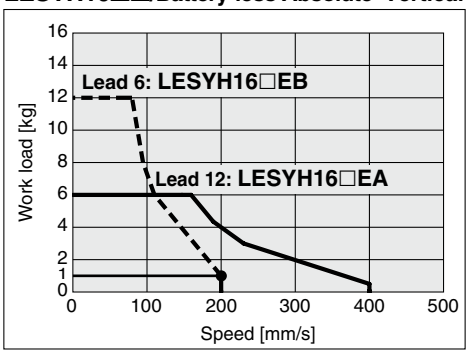
Selection example) The **LESYH16□EB-50** can be temporarily selected as a possible candidate based on the graph shown on the right side.

Operating conditions

- Workpiece mass: 1 [kg]
- Speed: 200 [mm/s]
- Mounting orientation: Vertical
- Stroke: 50 [mm]
- Acceleration/Deceleration: 3000 [mm/s²]
- Cycle time: 0.5 s
- Workpiece mounting condition:



LESYH16□□/Battery-less Absolute Vertical



<Speed–Work load graph>

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 found 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 position of the step data. Therefore, calculate the settling time while referencing the following value.

  $T4 = 0.15$ [s]

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

$T1 = V/a1 = 200/3000 = 0.07$ [s],

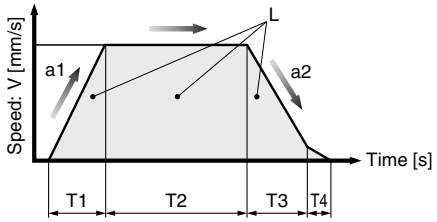
$T3 = V/a2 = 200/3000 = 0.07$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{50 - 0.5 \cdot 200 \cdot (0.07 + 0.07)}{200} = 0.18 \text{ [s]}$$

$T4 = 0.15$ [s]

The cycle time can be found as follows.

$T = T1 + T2 + T3 + T4$
$= 0.07 + 0.18 + 0.07 + 0.15$
$=$ **0.47 [s]**

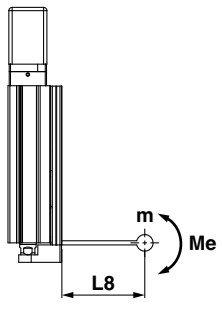


L : Stroke [mm] ····· (Operating condition)
V : Speed [mm/s] ····· (Operating condition)
a1: Acceleration [mm/s²] ··· (Operating condition)
a2: Deceleration [mm/s²] ··· (Operating condition)

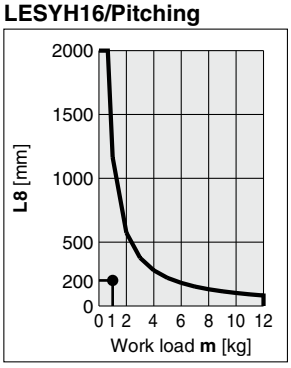
T1: Acceleration time [s] ··· Time until reaching the set speed
T2: Constant speed time [s] ··· Time while the actuator is operating at a constant speed
T3: Deceleration time [s] ··· Time from the beginning of the constant speed operation to stop
T4: Settling time [s] ··· Time until positioning is completed

Step 3 **Check the allowable moment.**
<Static allowable moment> (page 93)
<Dynamic allowable moment> (pages 95, 96)

Confirm the moment that applies to the actuator is within the allowable range for both static and dynamic conditions.



LESYH16/Pitching



<Dynamic allowable moment>

Based on the above calculation result, the LESYH16□EB-50 should be selected.

Selection Procedure

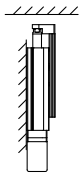
Pushing Control Selection Procedure

Step 1 Check the required force. → **Step 2** Check the pushing force. → **Step 3** Check the duty ratio. → **Step 4** Check the allowable moment.

Selection Example

Operating conditions

- Pushing force: 150 N
- Workpiece mass: 1 kg
- Speed: 100 mm/s
- Stroke: 100 mm
- Mounting position: Vertical upward
- Pushing time + Operation (A): 1.5 s
- Full cycle time (B): 10 s



Step 1 **Check the required force.**

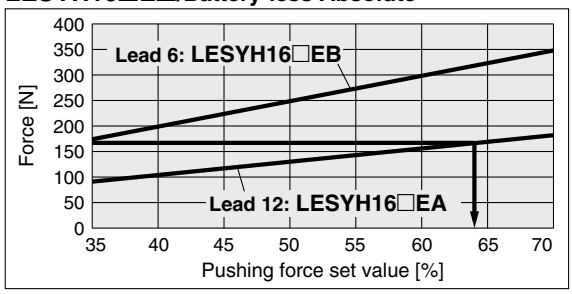
Calculate the approximate required force for a pushing operation.
Selection example) ● Pushing force: 150 [N]
● Workpiece mass: 1 [kg]
The approximate required force can be found to be 150 + 10 = 160 [N].
Select a model based on the approximate required force while referencing the specifications (page 101).
Selection example based on the specifications)
● Approximate required force: 160 [N]
● Speed: 100 [mm/s]
The **LESYH16□EA** can be temporarily selected as a possible candidate.
Then, calculate the required force for a pushing operation. If the mounting position is vertical upward, add the actuator table weight.
Selection example based on the table weight)
● **LESYH16□EA** table weight: 0.7 [kg]
The required force can be found to be 160 + 7 = 167 [N].

Table Weight Unit [kg]

Model	Stroke [mm]			
	50	75	100	150
LESYH8	0.2	0.3	—	—
LESYH16	0.4	—	0.7	—
LESYH25	0.9	—	1.3	1.7

∗ If the mounting position is vertical upward, add the table weight.

LESYH16□E□/Battery-less Absolute



<Pushing force set value–Force graph>

Step 2 **Check the pushing force.**

<Pushing force set value–Force graph> (page 94)

Select a model based on the required force while referencing the pushing force set value–force graph, and confirm the pushing force set value.
Selection example based on the graph shown on the right side)
● Required force: 167 [N]
The **LESYH16□EA** can be temporarily selected as a possible candidate.
The pushing force set value is 64 [%].

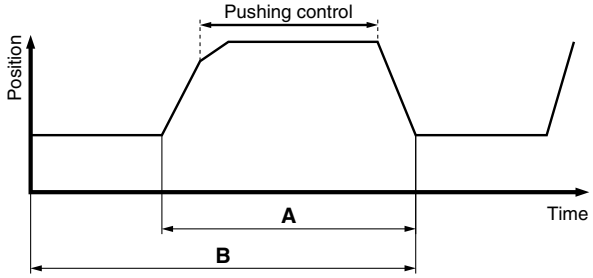
Step 3 **Check the duty ratio.**

Confirm the allowable duty ratio based on the pushing force set value while referencing the allowable duty ratio.
Selection example based on the allowable duty ratio)
● Pushing force set value: 64 [%]
The allowable duty ratio can be found to be 20 [%].
Calculate the duty ratio for the operating conditions, and confirm it does not exceed the allowable duty ratio.
Selection example) ● Pushing time + Operation (A): 1.5 s
● Full cycle time (B): 10 s
The duty ratio can be found to be 1.5/10 x 100 = 15 [%], and this is within the allowable range.

Allowable Duty Ratio

Battery-less Absolute

Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
35	—	—
50 or less	30 or less	5 or less
70 or less	20 or less	3 or less

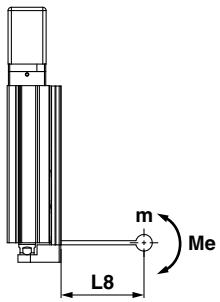


Step 4 **Check the allowable moment.**

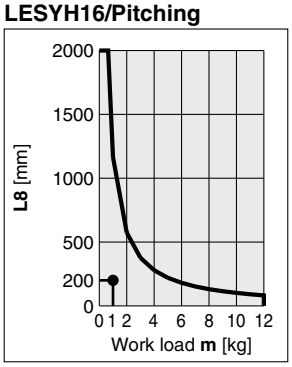
<Static allowable moment> (page 93)

<Dynamic allowable moment> (pages 95, 96)

Confirm the moment that applies to the actuator is within the allowable range for both static and dynamic conditions.



LESYH16/Pitching



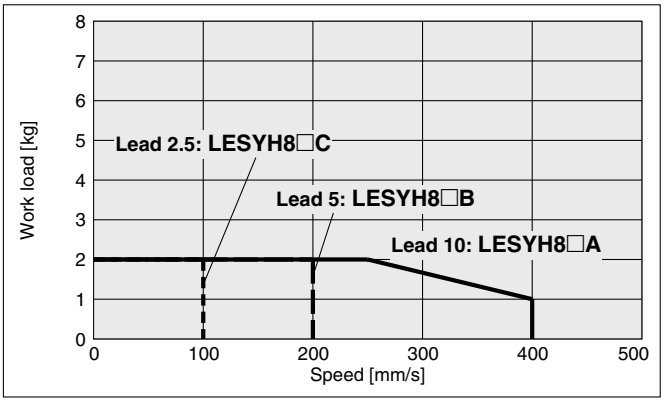
<Dynamic allowable moment>

Based on the above calculation result, the LESYH16□EA-100 should be selected.

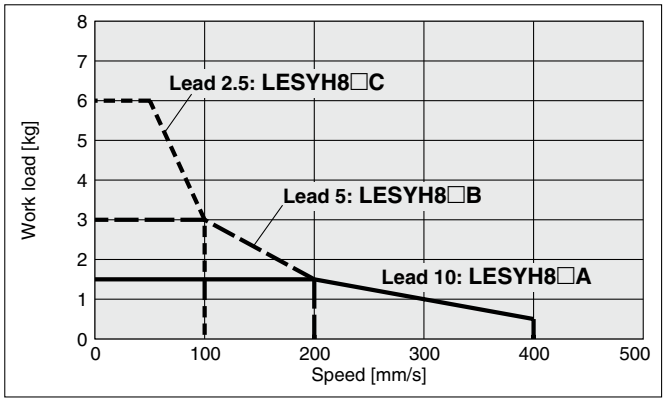
Speed–Work Load Graph (Guide)

LESYH8□E

Horizontal

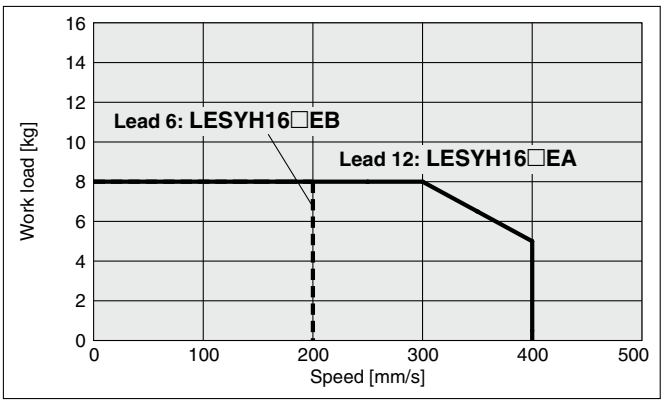


Vertical

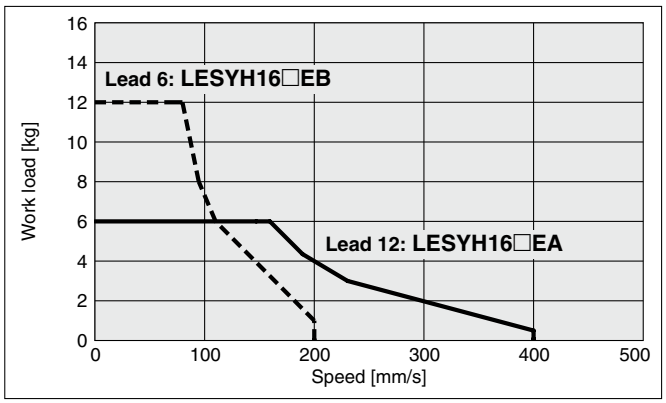


LESYH16□E

Horizontal

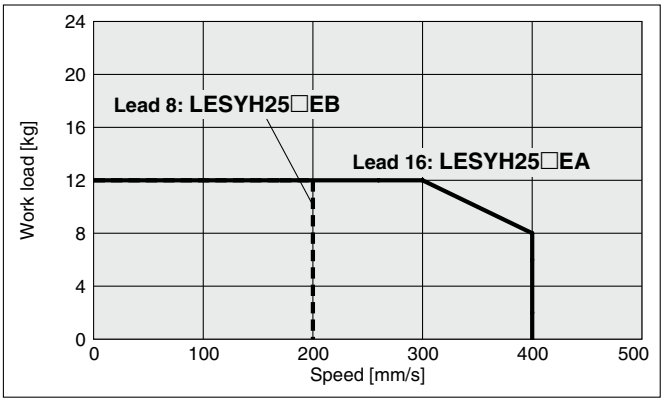


Vertical

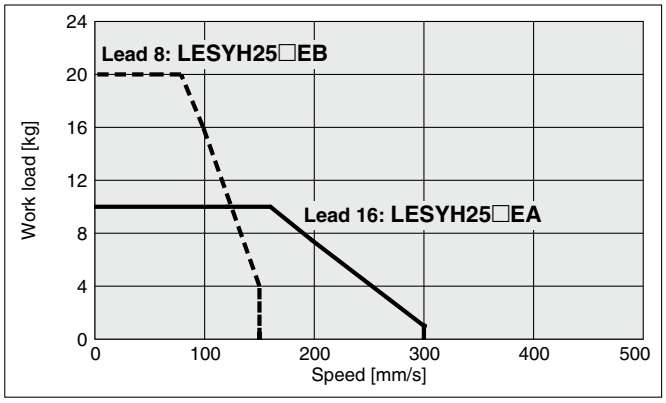


LESYH25□E

Horizontal



Vertical

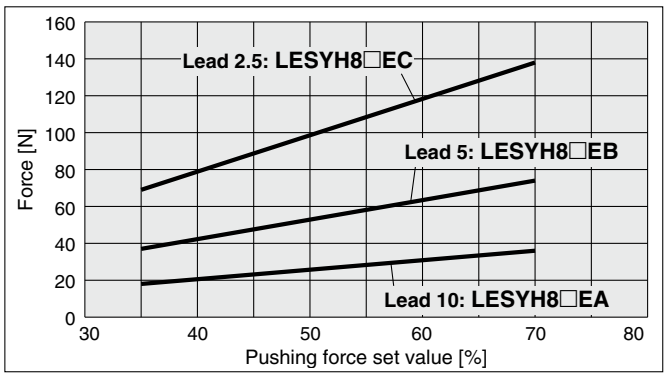


Static Allowable Moment

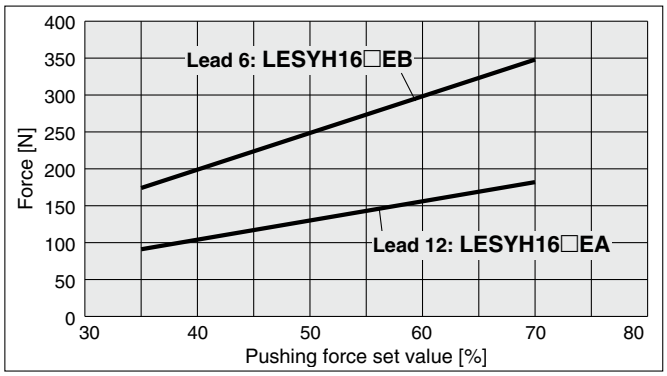
Model	LESYH8		LESYH16		LESYH25		
Stroke [mm]	50	75	50	100	50	100	150
Pitching [N·m]	11		26	43	77	112	155
Yawing [N·m]							
Rolling [N·m]	12		48		146	177	152

Pushing Force Set Value–Force Graph

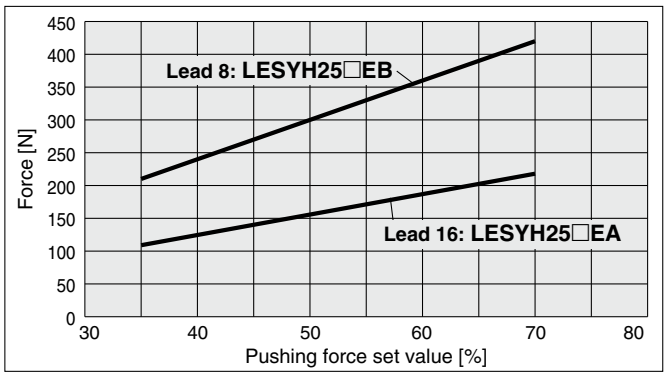
LESYH8□E□



LESYH16□E□



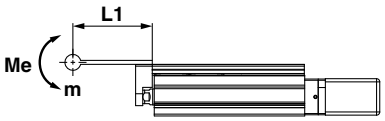
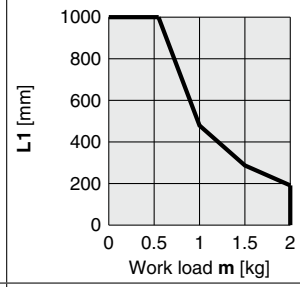
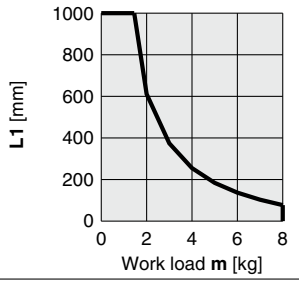
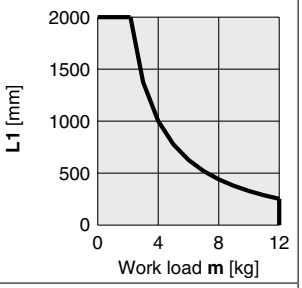
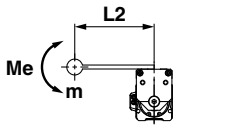
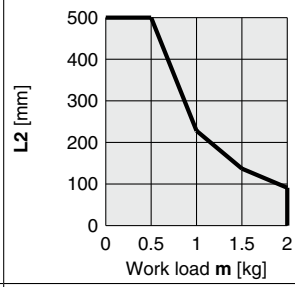
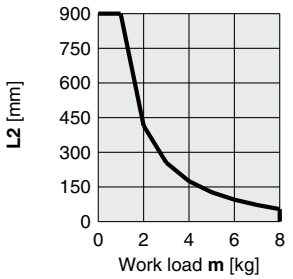
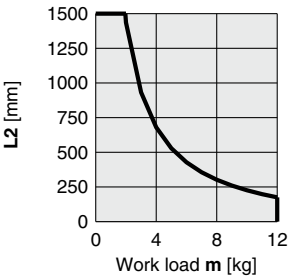
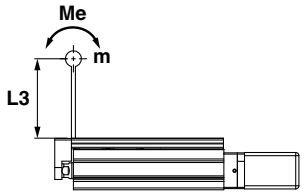
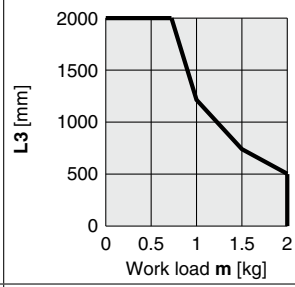
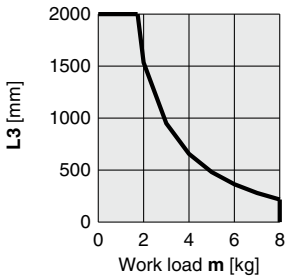
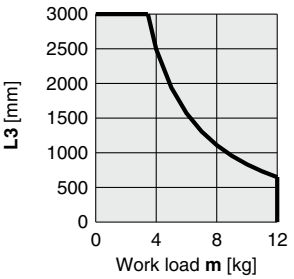
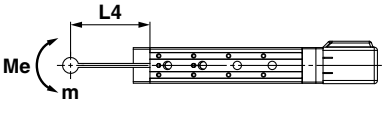
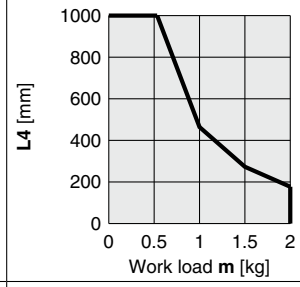
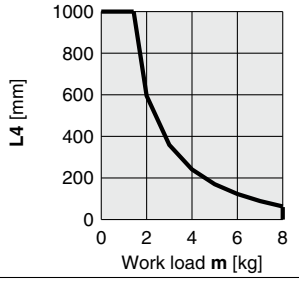
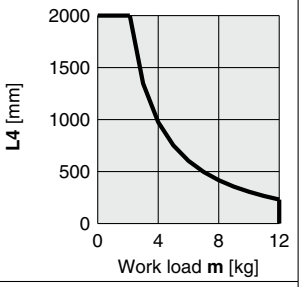
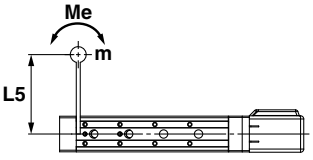
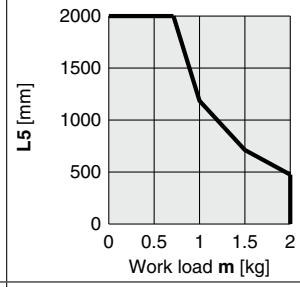
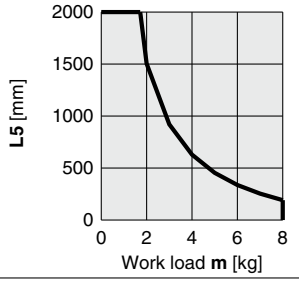
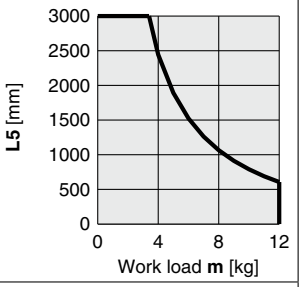
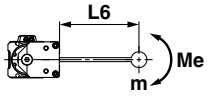
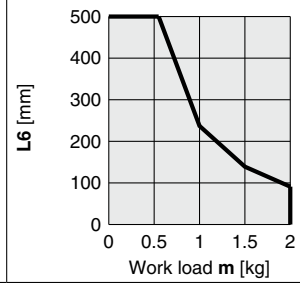
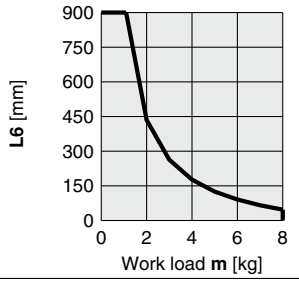
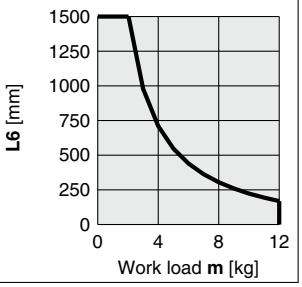
LESYH25□E□



Dynamic Allowable Moment

* These graphs show the amount of allowable overhang (guide unit) when the center of gravity of the workpiece overhangs in one direction. When selecting the overhang, refer to the "Calculation of Guide Load Factor" or the Electric Actuator Model Selection Software for confirmation: https://www.smcworld.com

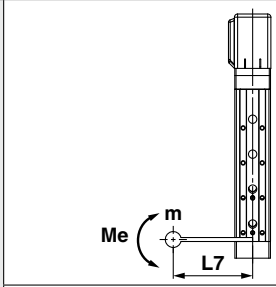
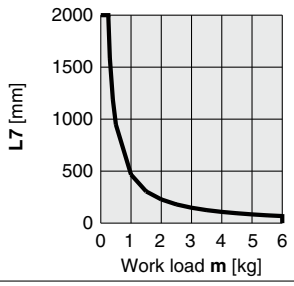
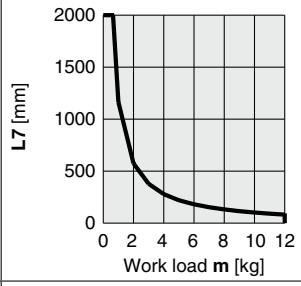
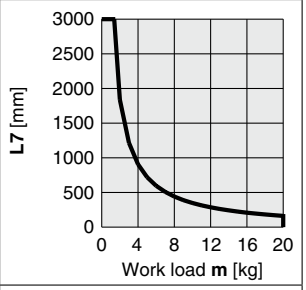
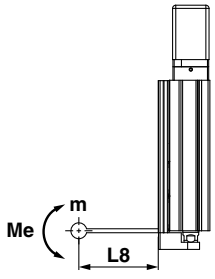
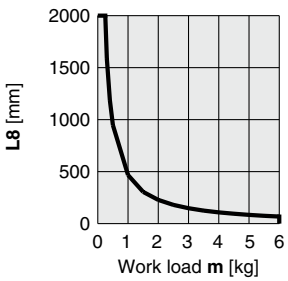
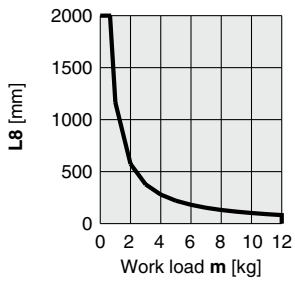
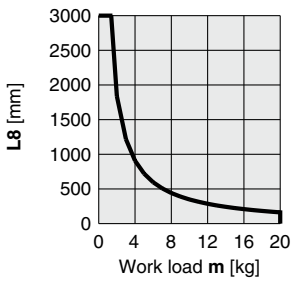
Acceleration/Deceleration —— 5000 mm/s²

Orientation	Load overhanging direction **m**: Work load [kg] **Me**: Allowable moment [N·m] **L**: Overhang to the work load center of gravity [mm]		Model: LESYH8	Model: LESYH16	Model: LESYH25
Horizontal/Bottom		X			
		Y			
		Z			
Horizontal (Wall)		X			
		Y			
		Z			

Dynamic Allowable Moment

* These graphs show the amount of allowable overhang (guide unit) when the center of gravity of the workpiece overhangs in one direction. When selecting the overhang, refer to the "Calculation of Guide Load Factor" or the Electric Actuator Model Selection Software for confirmation: https://www.smcworld.com

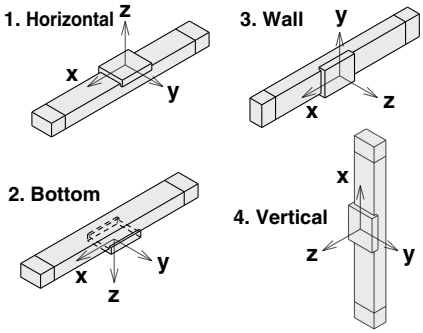
Acceleration/Deceleration —— 5000 mm/s²

Orientation	Load overhanging direction **m**: Work load [kg] **Me**: Allowable moment [N·m] **L**: Overhang to the work load center of gravity [mm]		Model: LESYH8	Model: LESYH16	Model: LESYH25
Vertical		Y			
		Z			

Calculation of Guide Load Factor

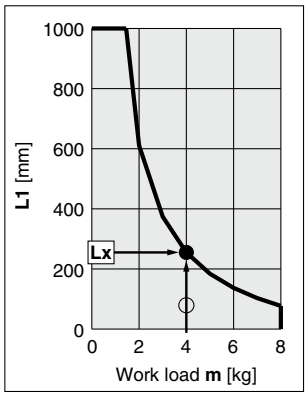
1. Decide operating conditions.
   Model: LESYH
   Size: 16
   Mounting orientation: Horizontal/Bottom/Wall/Vertical
   Acceleration [mm/s²]: **a**
   Work load [kg]: **m**
   Work load center position [mm]: **Xc/Yc/Zc**
2. Select the target graph while referencing the model, size, and mounting orientation.
3. Based on the acceleration and work load, find the overhang [mm]: **Lx/Ly/Lz** from the graph.
4. Calculate the load factor for each direction.
   α**x = Xc/Lx**, α**y = Yc/Ly**, α**z = Zc/Lz**
5. Confirm the total of α**x**, α**y**, and α**z** is 1 or less.
   α**x + αy + αz ≤ 1**
   When 1 is exceeded, consider a reduction of acceleration and work load, or a change of the work load center position and series.

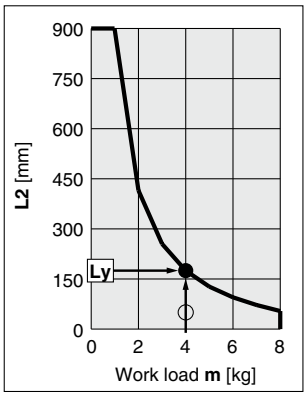
Mounting orientation



Example

1. Operating conditions
   Model: LESYH
   Size: 16
   Mounting orientation: Horizontal
   Acceleration [mm/s²]: 5000
   Work load [kg]: 4.0
   Work load center position [mm]: **Xc = 80**, **Yc = 50**, **Zc = 60**
2. Select three graphs from the top of the second row on page 95.
3. **Lx = 250 mm**, **Ly = 160 mm**, **Lz = 700 mm**
4. The load factor for each direction can be found as follows.
   α**x = 80/250 = 0.32**
   α**y = 50/160 = 0.32**
   α**z = 60/700 = 0.09**
5. α**x + αy + αz = 0.73 ≤ 1**





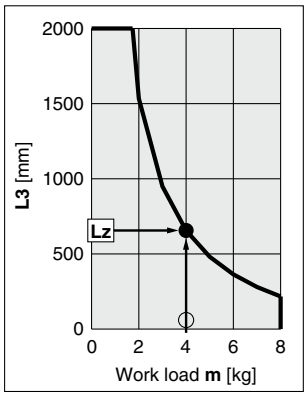
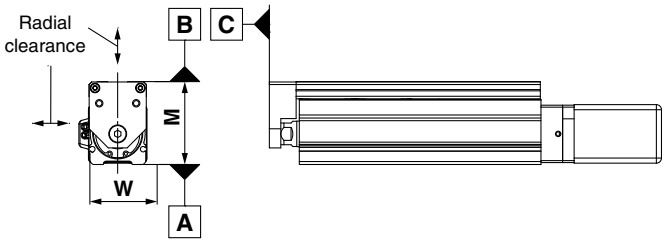


Table Accuracy

* These values are initial guideline values.

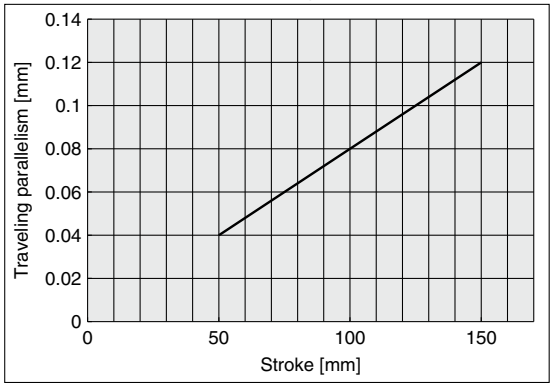


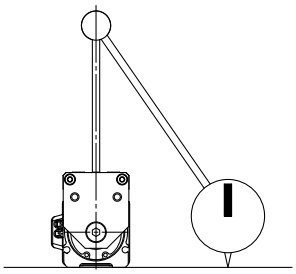
Model	LESYH8	LESYH16	LESYH25
B side parallelism to A side [mm]	Refer to Table 1.		
B side traveling parallelism to A side [mm]	Refer to Graph 1.		
C side perpendicularity to A side [mm]	0.05	0.05	0.05
M dimension tolerance [mm]	±0.3		
W dimension tolerance [mm]	±0.2		
Radial clearance [μm]	−4 to 0	−10 to 0	−14 to 0

Table 1 B side parallelism to A side

Model	Stroke [mm]			
	50	75	100	150
LESYH8	0.055	0.065	—	—
LESYH16	0.05	—	0.08	—
LESYH25	0.06	—	0.08	0.125

Graph 1 B side traveling parallelism to A side





Traveling parallelism:
The amount of deflection on a dial gauge when the table travels a full stroke with the body secured on a reference base surface

Table Deflection (Reference Value)

＊ These values are initial guideline values.

Table displacement due to pitch moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.

Table displacement due to yaw moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.

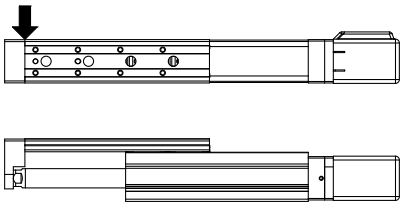
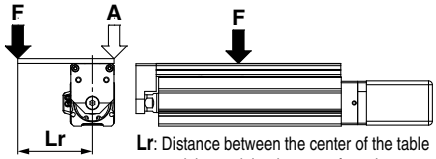
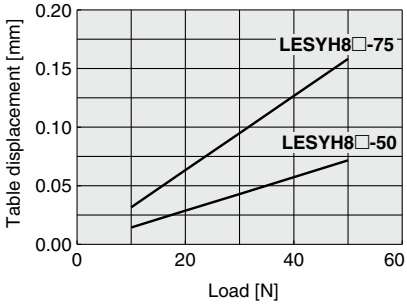


Table displacement due to roll moment load
Table displacement of section A when loads are applied to the section F with the slide table retracted.

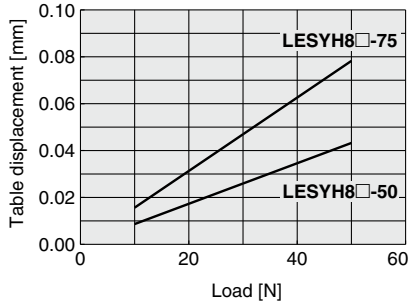


Lr: Distance between the center of the table and the work load center of gravity

LESYH8

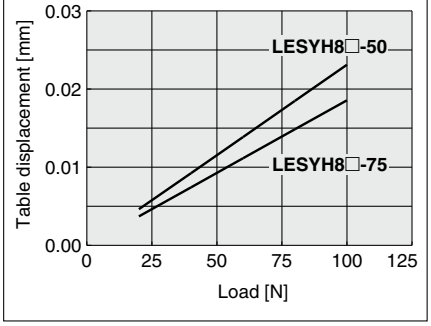


LESYH8

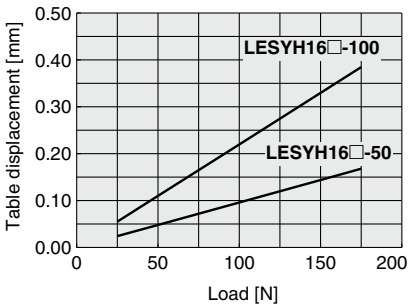


LESYH8

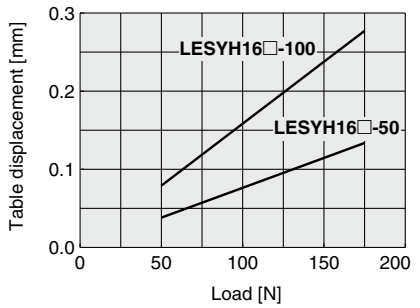
Lr = 70 mm



LESYH16

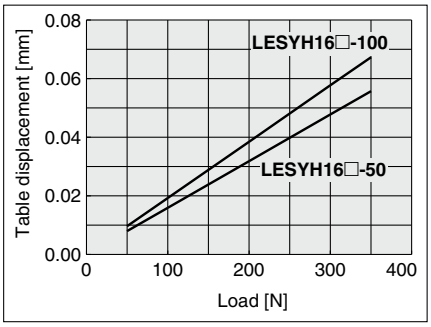


LESYH16

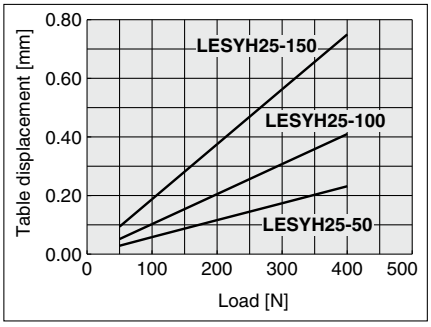


LESYH16

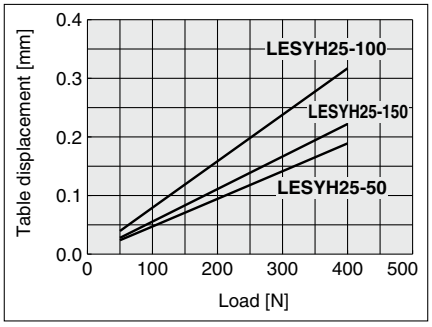
Lr = 120 mm



LESYH25

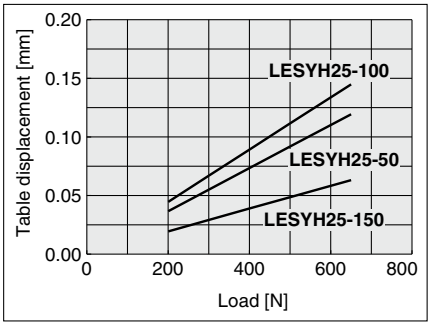


LESYH25



LESYH25

Lr = 200 mm



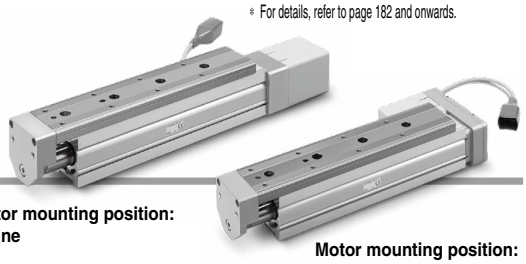
Battery-less Absolute Encoder Type

Slide Table/High Precision Type

LESYH Series

CE RoHS

* For details, refer to page 182 and onwards.



Motor mounting position: In-line

Motor mounting position: Right side parallel

How to Order

LESYH 16 D1 E A – 50 C – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

For details on controllers, refer to the next page.

❶ Size

8
16
25

❷ Motor mounting position/Motor cover direction (For size 8)

Symbol	Motor mounting position	Motor cover direction
D1	In-line	Left side
D2		Right side
D3		Top side
D4		Bottom side
R	Right side parallel	—
L	Left side parallel	—

Motor mounting position (For sizes 16 and 25)

Symbol	Motor mounting position
D	In-line
R	Right side parallel
L	Left side parallel

❸ Motor type

Symbol	Motor type
E	Battery-less absolute (Step motor 24 VDC)

❹ Lead [mm]

	Size		
	8	16	25
A	10	12	16
B	5	6	8
C	2.5	—	—

❺ Stroke [mm]

	Size		
	8	16	25
50	●	●	●
75	●	—	—
100	—	●	●
150	—	—	●

❻ Motor option

C	Without lock
W	With lock

❼ Actuator cable type/length

Robotic cable [m]

Nil	Without cable	R8	8*1
R1	1.5	RA	10*1
R3	3	RB	15*1
R5	5	RC	20*1

For details on auto switches, refer to the **Web Catalog**.

⑧ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗2	DIN rail

Communication plug connector, I/O cable∗3

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 Produced upon receipt of order
∗2 The DIN rail is not included. It must be ordered separately.
∗3 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet™ or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

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

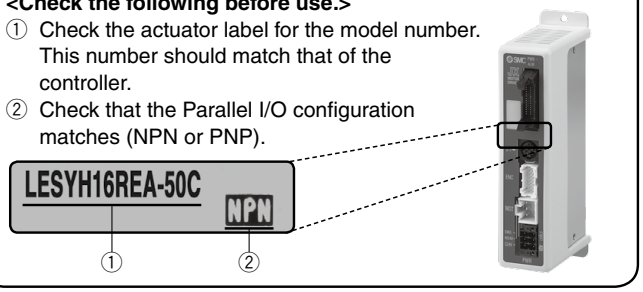
[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.

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

<Check the following before use.>
① Check the actuator label for the model number. This number should match that of 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:
https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

Specifications

Battery-less Absolute (Step Motor 24 VDC)

Model			LESYH8□EA	LESYH8□EB	LESYH8□EC	LESYH16□EA	LESYH16□EB	LESYH25□EA	LESYH25□EB
Actuator specifications	Stroke [mm]		50, 75			50, 100		50, 100, 150	
	Max. work load [kg]*1 *3	Horizontal	2			8		12	
		Vertical	1.5	3	6	6	12	10	20
	Pushing force 35% to 70% [N]*2 *3		18 to 36	37 to 74	69 to 138	91 to 182	174 to 348	109 to 218	210 to 420
	Max. speed [mm/s]*1 *3		400	200	100	400	200	400	200
	Pushing speed [mm/s]		20 to 30	10 to 30	5 to 30	20 to 30	10 to 30	20 to 30	10 to 30
	Max. acceleration/deceleration [mm/s²]		5000						
	Positioning repeatability [mm]		±0.01						
	Lost motion [mm]*4		0.1 or less						
	Screw lead [mm]		10	5	2.5	12	6	16	8
	Impact/Vibration resistance [m/s²]*5		50/20						
	Actuation type		Ball screw: LESYH□D Ball screw + Belt: LESYH□(R, L)						
	Guide type		Linear guide (Circulating type)						
	Operating temperature range [°C]		5 to 40						
	Operating humidity range [%RH]		90 or less (No condensation)						
Electric specifications	Motor size		□28			□42		□56	
	Motor type		Battery-less absolute (Step motor 24 VDC)						
	Encoder (Angular displacement sensor)		Battery-less absolute						
	Power supply voltage [V]		24 VDC ±10%						
	Power [W]*6 *8		Max. power 43			Max. power 48		Max. power 104	
Lock unit specifications	Type	*7	Non-magnetizing lock						
	Holding force [N]		20	39	78	78	157	108	216
	Power [W]*8		2.9			5			
	Rated voltage [V]		24 VDC ±10%						

*1 Speed changes according to the work load. Check the “Speed–Work Load Graph (Guide)” on page 93.
*2 Pushing force accuracy is ±20% (F.S.).
*3 The speed and force may change depending on the cable length, load, and mounting conditions.
Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
*4 A reference value for correcting errors in reciprocal operation
*5 Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
*6 Indicates the max. power during operation (including the controller). This value can be used for the selection of the power supply.
*7 With lock only
*8 For an actuator with lock, add the power for the lock.

Weight

Product Weight

[kg]

Model	Stroke			
	50	75	100	150
LESYH8□E	1.06	1.23	—	—
LESYH16□E	1.87	—	2.26	—
LESYH25□E	3.50	—	4.10	4.90

Additional Weight

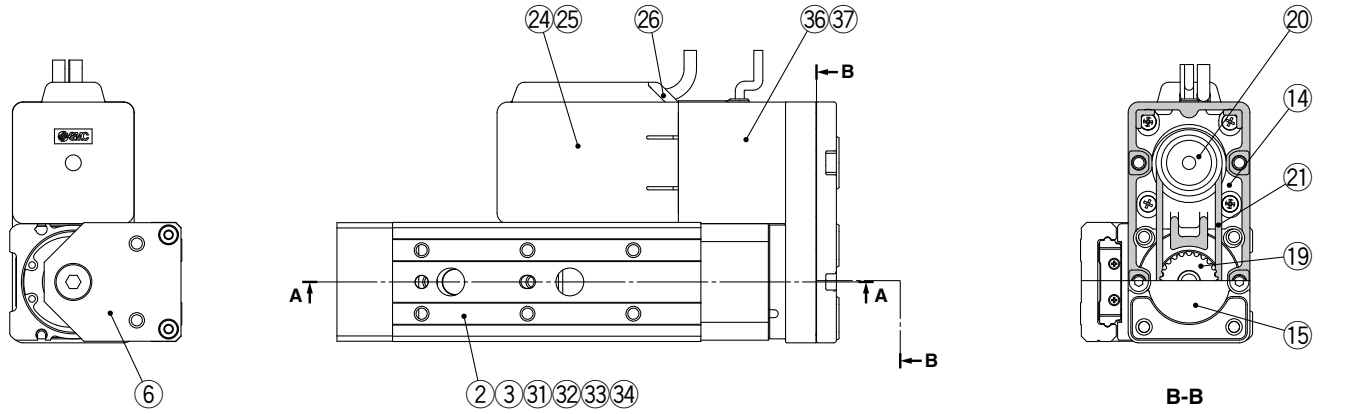
[kg]

Size	8	16	25
With lock	0.16	0.32	0.61

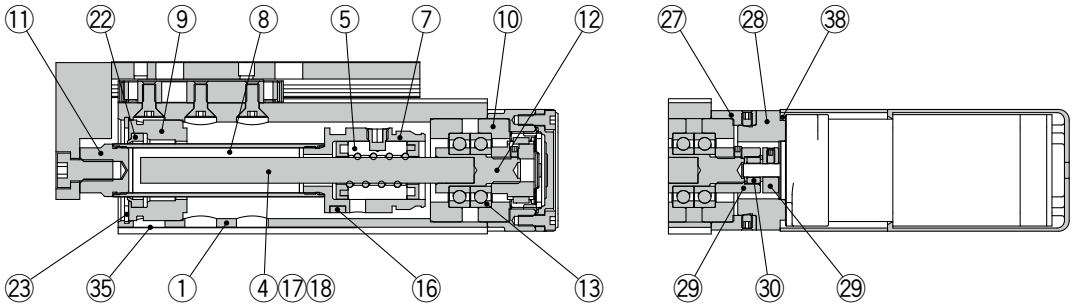
Construction

Right side parallel/R type, Left side parallel/L type

＊ The figures show the R type.



In-line/D type



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Table**	Stainless steel	—
3	**Guide block**	Stainless steel	—
4	**Ball screw shaft**	Alloy steel	—
5	**Ball screw nut**	Resin/Alloy steel	—
6	**End plate**	Aluminum alloy	Anodized
7	**Piston**	Aluminum alloy	—
8	**Piston rod**	Stainless steel	Hard chrome plating
9	**Rod cover**	Aluminum alloy	—
10	**Bearing holder**	Aluminum alloy	—
11	**Socket**	Free cutting steel	Electroless nickel plating
12	**Connected shaft**	Free cutting steel	Electroless nickel plating
13	**Bearing**	—	—
14	**Return box**	Aluminum die-cast	Coating
15	**Return plate**	Aluminum die-cast	Coating
16	**Magnet**	—	
17	**Wear ring holder**	Stainless steel	Size 25, 150st only
18	**Wear ring**	Resin	Size 25, 150st only
19	**Screw shaft pulley**	Aluminum alloy	—
20	**Motor pulley**	Aluminum alloy	—
21	**Belt**	—	—
22	**Scraper**	NBR	—
23	**Type C retaining ring for hole**	Steel for spring	Phosphate coating
24	**Motor**	—	—
25	**Motor cover**	Resin	—
		Aluminum alloy	Size 8 only

No.	Description	Material	Note
26	**Grommet**	Resin	—
27	**Motor block**	Aluminum alloy	Anodized
28	**Motor adapter**	Aluminum alloy	Anodized
29	**Hub**	Aluminum alloy	—
30	**Spider**	NBR	—
31	**Cover**	Resin	—
32	**Return guide**	Resin	—
33	**Scraper**	NBR	—
34	**Steel ball**	Special steel	—
35	**Masking tape**	—	—
36	**Lock**	—	With lock only
37	**Motor cover with lock**	Aluminum alloy	With lock only
38	**Cover support**	Aluminum alloy	With lock only

Replacement Parts (Motor mounting position: Parallel type only)/Belt

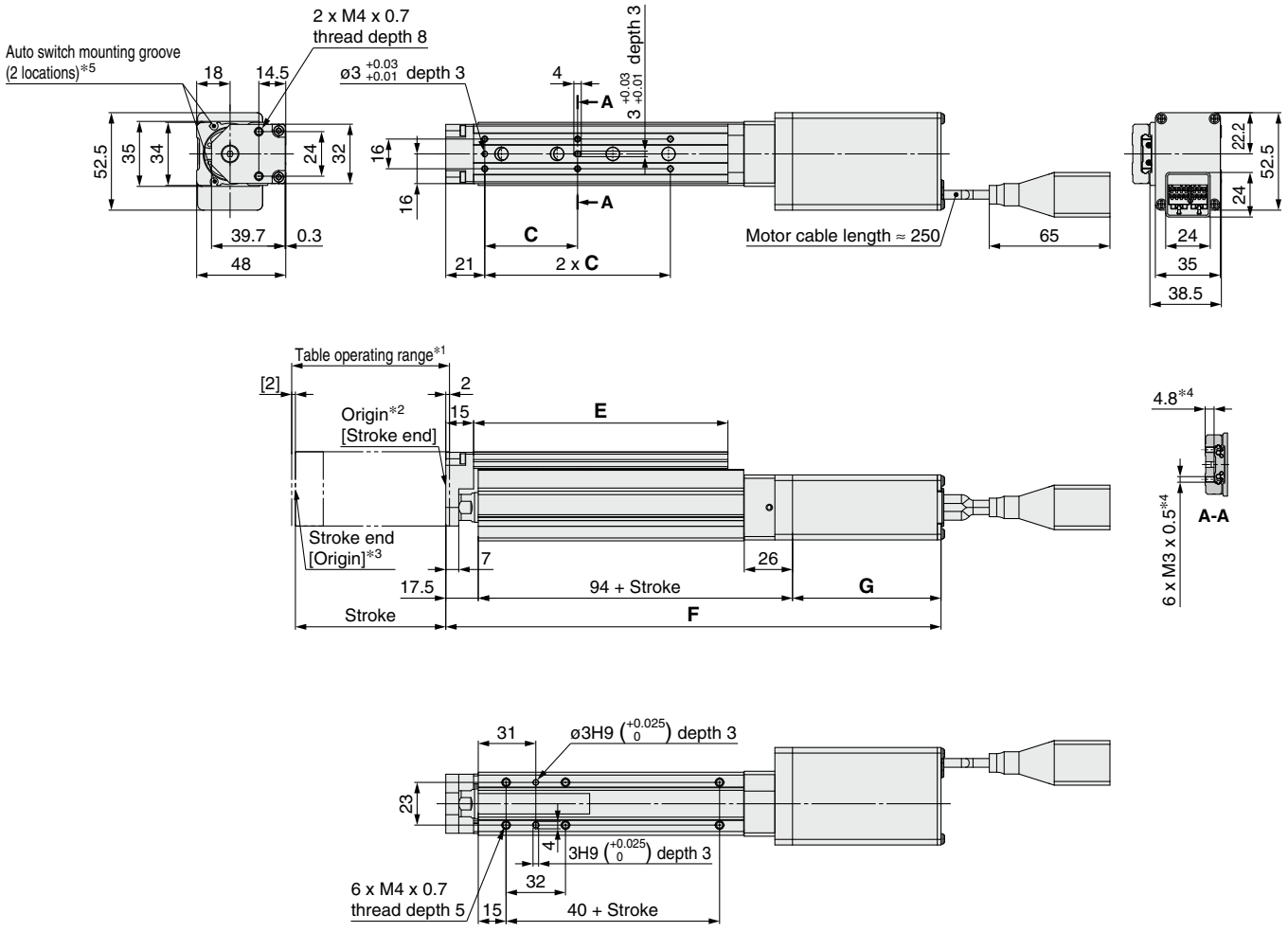
No.	Size	Order no.
21	**8**	LE-D-2-1
	16	LE-D-2-2
	25	LE-D-2-3

Replacement Parts/Grease Pack

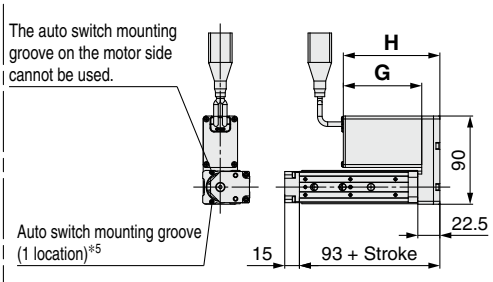
Applied portion	Order no.
Piston rod Guide unit	GR-S-010 (10 g) GR-S-020 (20 g)

Dimensions

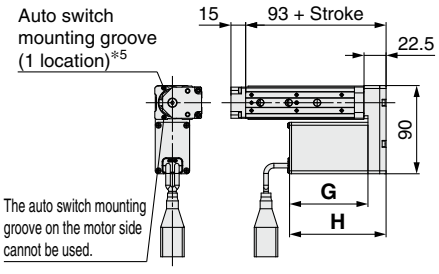
LESYH8D□E□-□



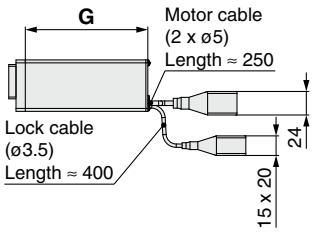
Motor mounting position: Right side parallel
LESYH8RE□-□-□



Motor mounting position: Left side parallel
LESYH8LE□-□-□



Motor option: With lock
LESYH8□E□-□W-□



*1 This is the range within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*2 Position after returning to origin
*3 [ ] for when the direction of return to origin has changed
*4 If the workpiece retaining screws are too long, they may come in contact with the guide block, resulting in a malfunction.
Use screws of a length equal to or shorter than the thread length.
*5 For checking the limit and the intermediate signal. Applicable to the D-M9□, D-M9□E, and D-M9□W (2-color indicator)
The auto switches should be ordered separately. Refer to the **Web Catalog** for details.

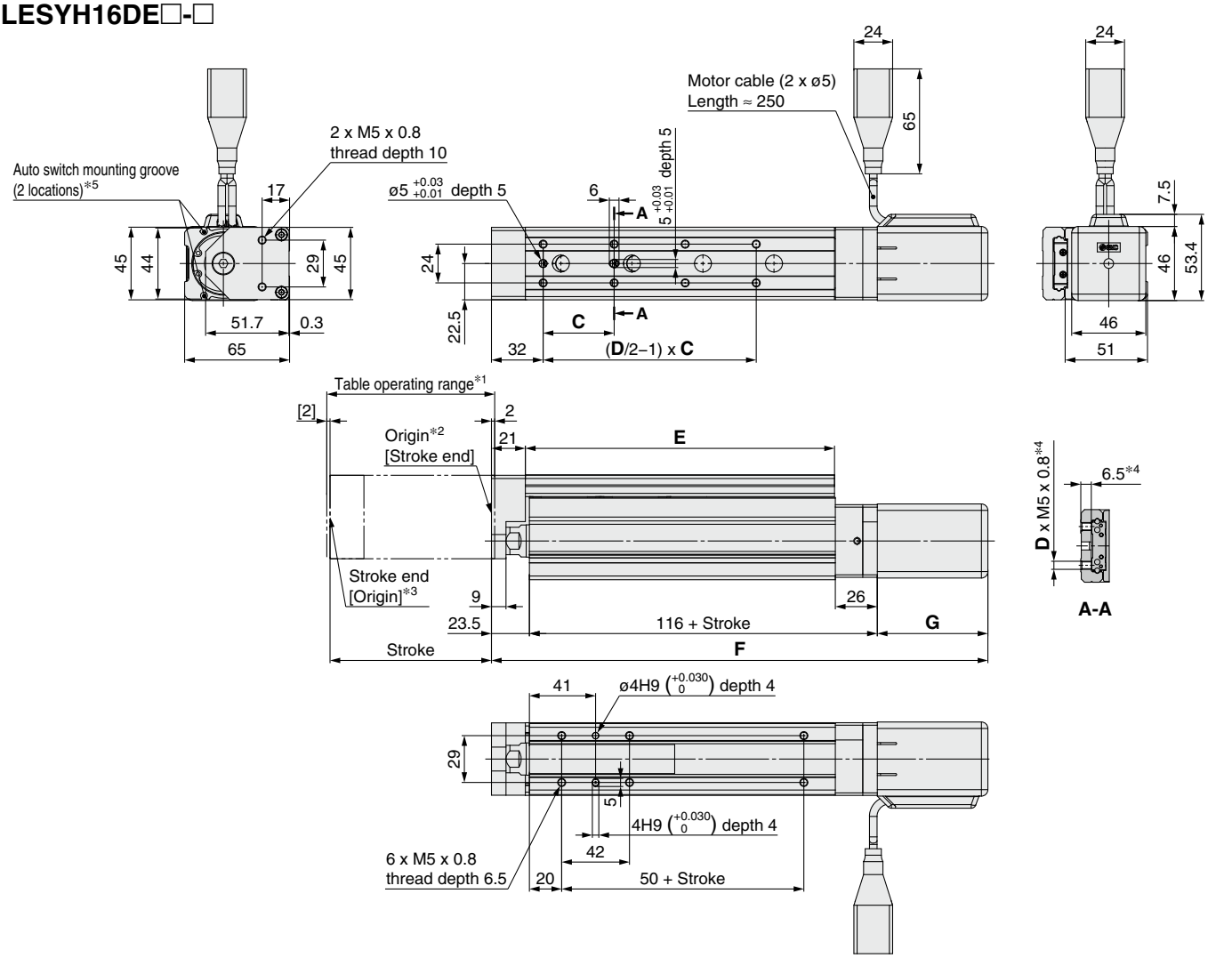
Dimensions

[mm]

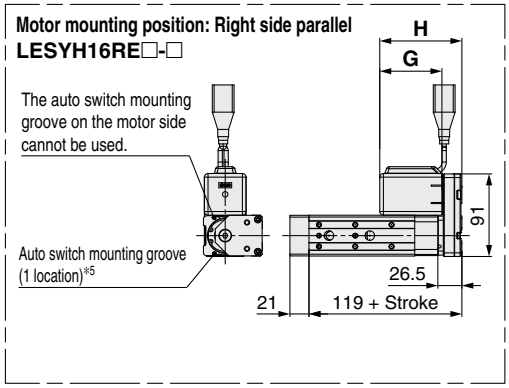
Model	Stroke	C	E	Without lock			With lock		
				F	G	H	F	G	H
LESYH8□E□	50	46	111	241.5	80	98.5	286.5	125	143.5
	75	50	137	266.5			311.5		

Dimensions

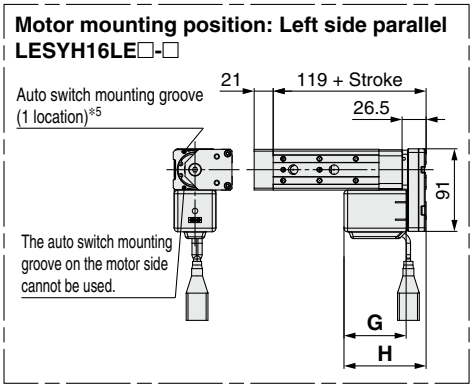
LESYH16DE□-□



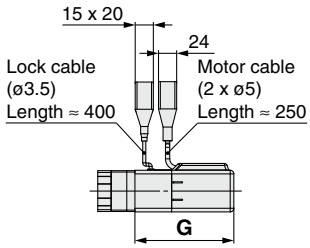
Motor mounting position: Right side parallel
LESYH16RE□-□



Motor mounting position: Left side parallel
LESYH16LE□-□



Motor option: With lock
LESYH16□E□-□B



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Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*2 Position after returning to origin
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Use screws of a length equal to or shorter than the thread length.
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The auto switches should be ordered separately. Refer to the **Web Catalog** for details.

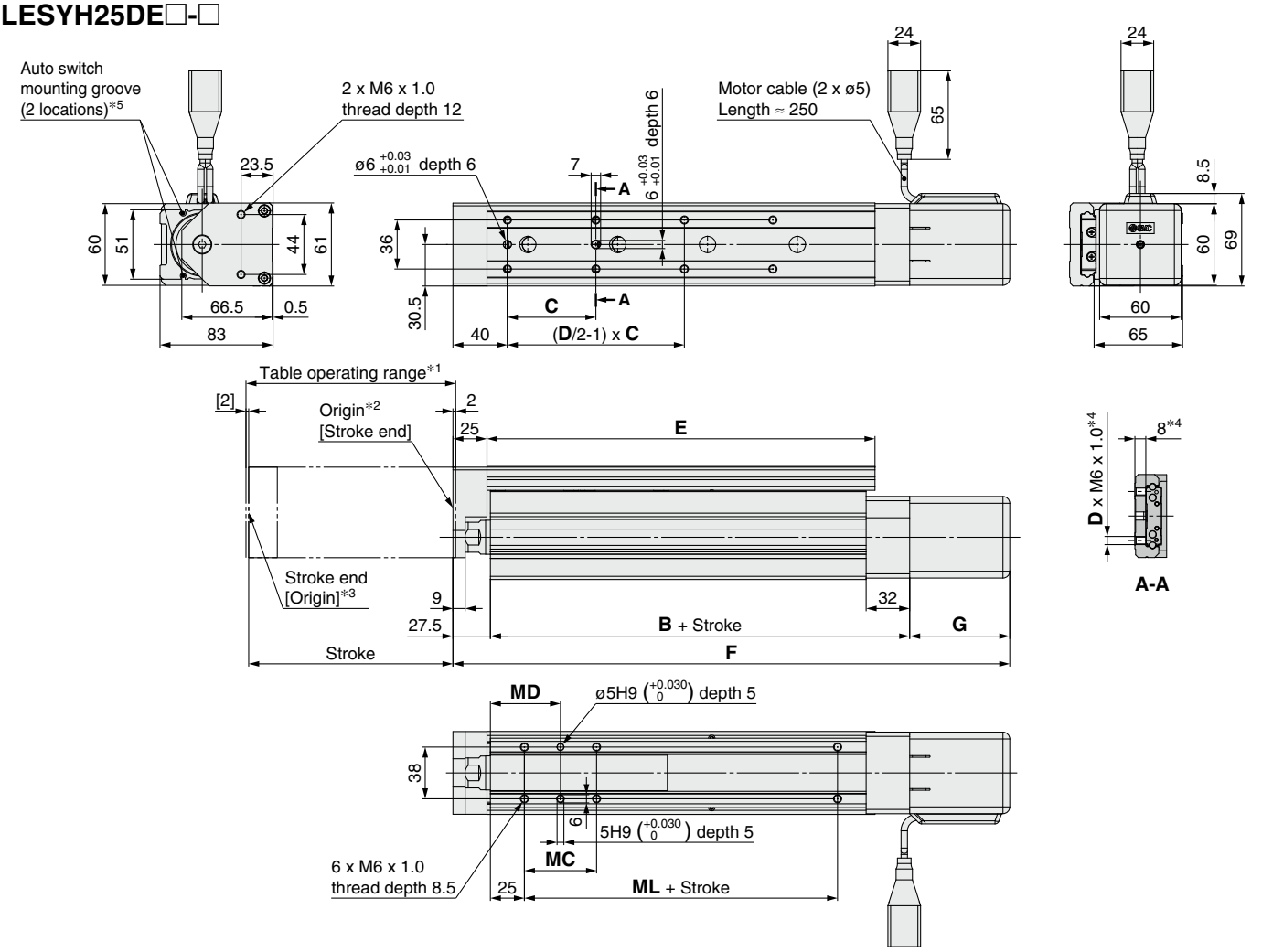
Dimensions

[mm]

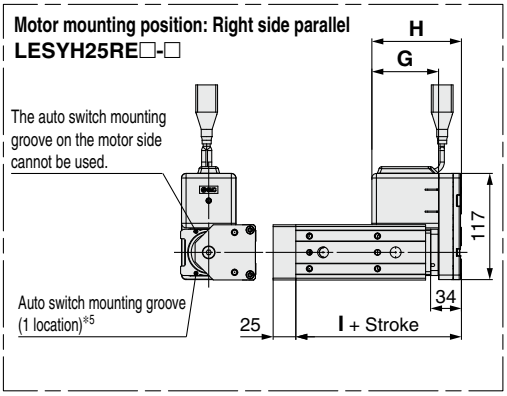
Model	Stroke	C	D	E	Without lock			With lock		
					F	G	H	F	G	H
LESYH16□E□	50	40	6	116.5	258	68.5	88.5	298.5	109	129
	100	44	8	191.5	308			348.5		

Dimensions

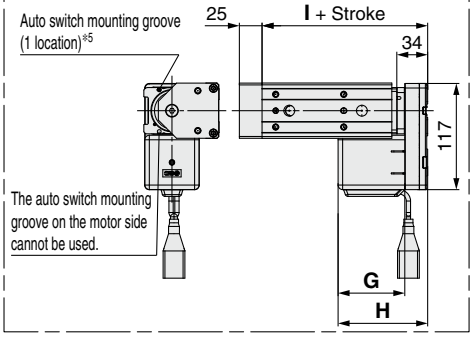
LESYH25DE□-□



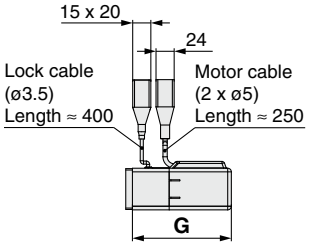
Motor mounting position: Right side parallel
LESYH25RE□-□



Motor mounting position: Left side parallel
LESYH25LE□-□



Motor option: With lock
LESYH25□E□-□B



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Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*2 Position after returning to origin
*3 [ ] for when the direction of return to origin has changed
*4 If the workpiece retaining screws are too long, they may come in contact with the guide block, resulting in a malfunction.
Use screws of a length equal to or shorter than the thread length.
*5 For checking the limit and the intermediate signal. Applicable to the D-M9□, D-M9□E, and D-M9□W (2-color indicator)
The auto switches should be ordered separately. Refer to the **Web Catalog** for details.

Dimensions

[mm]

Model	Stroke	B	C	D	E	Without lock			With lock			I	MC	MD	ML
						F	G	H	F	G	H				
LESYH25□E□	50	128.5	75	4	143	279.5	73.5	98.5	322.5	116.5	141.5	133	36	43	50
	100		48	8	207	329.5			372.5						
	150	158.5	65		285	409.5			452.5			163	53	51.5	80

Model Selection 1

Selection Procedure

For the high rigidity type LESH series, refer to page 125

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

Selection Example

Step 1 **Check the work load–speed. <Speed–Work load graph>** (page 108)

Select a model based on the workpiece mass and speed while referencing the speed–work load graph.

Selection example) The **LES25□EJ-50** can be temporarily selected as a possible candidate based on the graph shown on the right side.

Step 2 **Check the cycle time.**

It is possible to find an approximate cycle time by using method 1, but if a more detailed cycle time is required, use method 2.

Method 1: Check the cycle time graph. (page 108)

Method 2: Calculation <Speed–Work load graph> (page 108)

Calculate **the cycle time** using the following calculation method.

Cycle time:

T can be found from the following equation.

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

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

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

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

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

- T4: Settling time varies depending on the conditions such as motor types, load, and in position of the step data. Therefore, calculate the settling time while referencing the following value.

$$T4 = 0.15 \text{ [s]}$$

Calculation example)

T1 to T4 can be calculated as follows.

$T1 = V/a1 = 200/5000 = 0.04$ [s],

$T3 = V/a2 = 200/5000 = 0.04$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{50 - 0.5 \cdot 220 \cdot (0.04 + 0.04)}{200} = 0.21 \text{ [s]}$$

$T4 = 0.15$ [s]

The cycle time can be found as follows.

$T = T1 + T2 + T3 + T4$

$= 0.04 + 0.21 + 0.04 + 0.15$

$=$ **0.44 [s]**

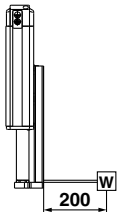
Step 3 **Check the allowable moment. <Static allowable moment>** (page 108) **<Dynamic allowable moment>** (page 109)

Confirm the moment that applies to the actuator is within the allowable range for both static and dynamic conditions.

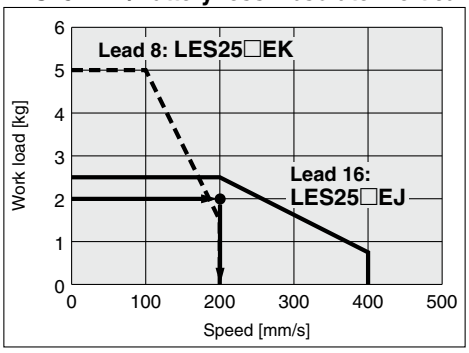
Based on the above calculation result, the LES25□EJ-50 should be selected.

Operating conditions

- Workpiece mass: 2 [kg]
- Speed: 200 [mm/s]
- Mounting orientation: Vertical
- Stroke: 50 [mm]
- Acceleration/Deceleration: 5000 [mm/s²]
- Cycle time: 0.5 s
- Workpiece mounting condition:

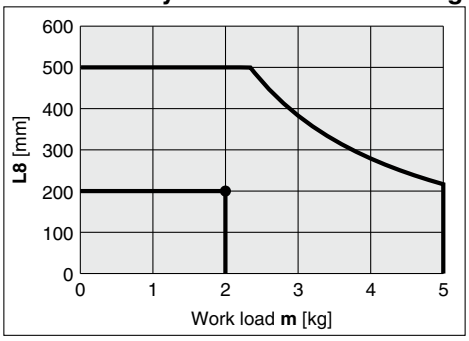


LES25□E□/Battery-less Absolute Vertical

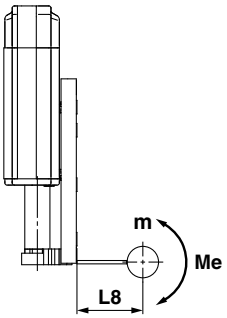


<Speed–Work load graph>

LES25/Battery-less Absolute Pitching



<Dynamic allowable moment>



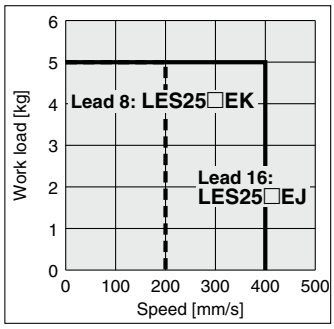
Speed–Work Load Graph (Guide)

Battery-less Absolute (Step Motor 24 VDC)

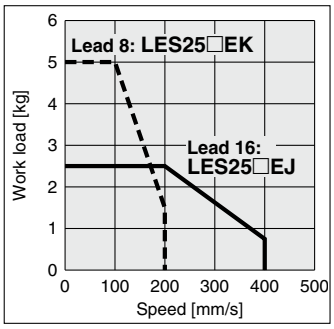
∗ The following graphs show the values when the moving force is 100%.

LES25□E□

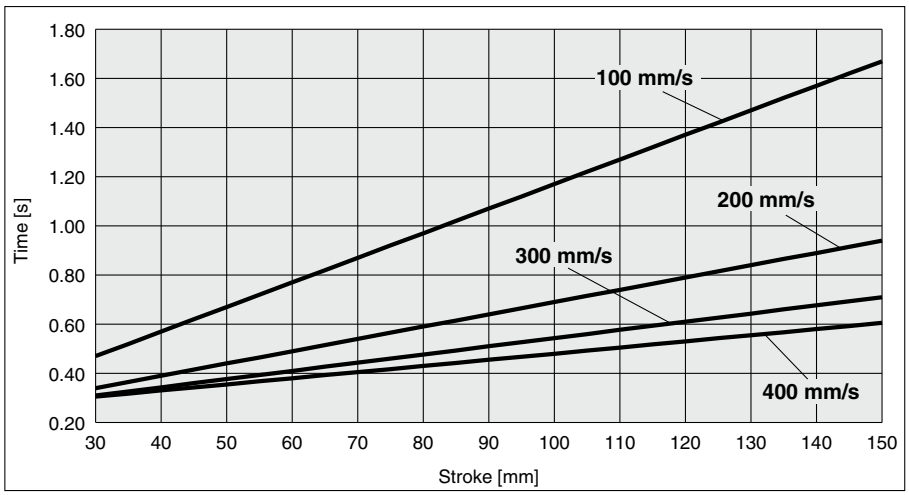
Horizontal



Vertical



Cycle Time Graph (Guide)



Operating Conditions

Acceleration/Deceleration: 5000 mm/s^2
In position: 0.5 mm

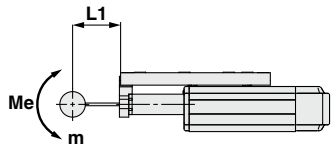
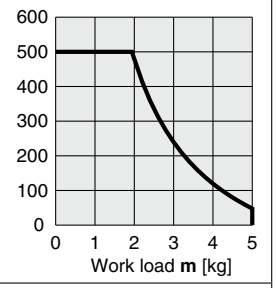
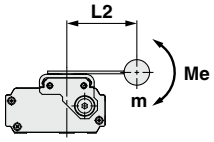
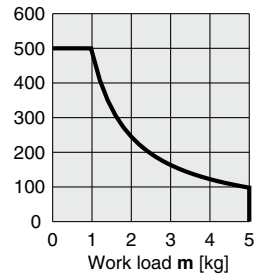
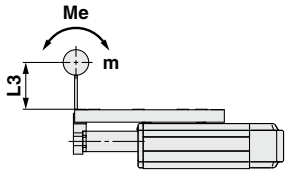
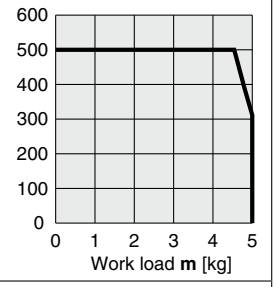
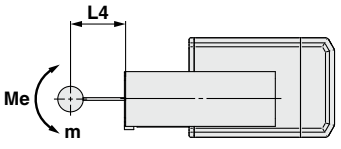
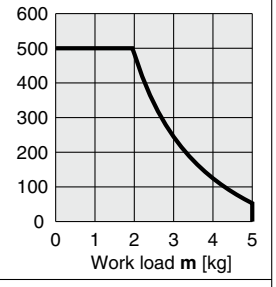
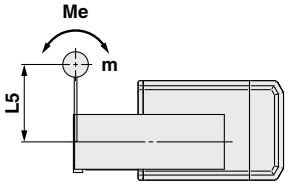
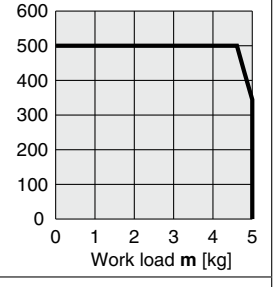
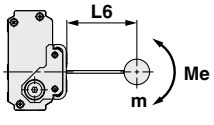
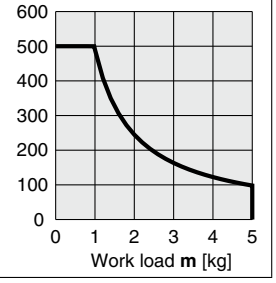
Static Allowable Moment

Model		LES25
Pitching	[N·m]	14.1
Yawing	[N·m]	14.1
Rolling	[N·m]	4.8

Dynamic Allowable Moment

* These graphs show the amount of allowable overhang (guide unit) when the center of gravity of the workpiece overhangs in one direction. When selecting the overhang, refer to the "Calculation of Guide Load Factor" or the Electric Actuator Model Selection Software for confirmation: https://www.smcworld.com

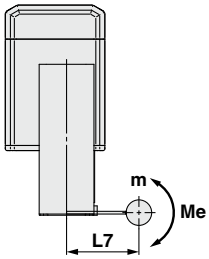
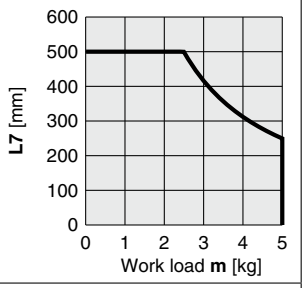
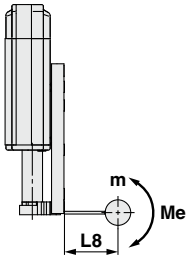
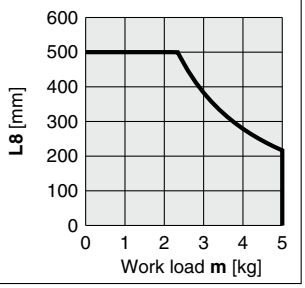
Acceleration/Deceleration —— 5000 mm/s²

Orientation	Load overhanging direction **m** : Work load [kg] **Me**: Allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model **LES25**
Horizontal/Bottom		X	
		Y	
		Z	
Wall		X	
		Y	
		Z	

Dynamic Allowable Moment

* These graphs show the amount of allowable overhang (guide unit) when the center of gravity of the workpiece overhangs in one direction. When selecting the overhang, refer to the "Calculation of Guide Load Factor" or the Electric Actuator Model Selection Software for confirmation: https://www.smcworld.com

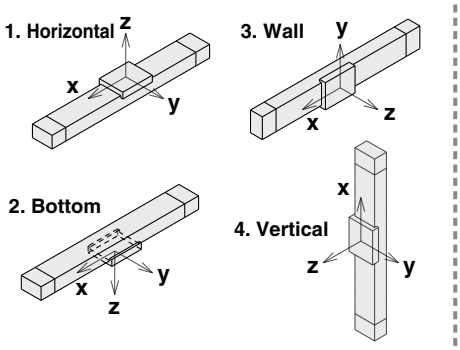
Acceleration/Deceleration —— 5000 mm/s²

Orientation	Load overhanging direction **m** : Work load [kg] **Me**: Allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model **LES25**
Vertical		**Y**	
		**Z**	

Calculation of Guide Load Factor

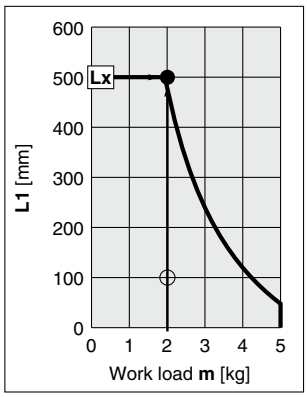
1. Decide operating conditions.
   Model: LES
   Size: 25
   Mounting orientation: Horizontal/Bottom/Wall/Vertical
   Acceleration [mm/s²]: **a**
   Work load [kg]: **m**
   Work load center position [mm]: **Xc/Yc/Zc**
2. Select the target graph while referencing the model, size, and mounting orientation.
3. Based on the acceleration and work load, find the overhang [mm]: **Lx/Ly/Lz** from the graph.
4. Calculate the load factor for each direction.
   α**x = Xc/Lx**, α**y = Yc/Ly**, α**z = Zc/Lz**
5. Confirm the total of α**x**, α**y**, and α**z** is 1 or less.
   α**x** + α**y** + α**z** ≤ **1**
   When 1 is exceeded, please consider a reduction of acceleration and work load, or a change of the work load center position and series.

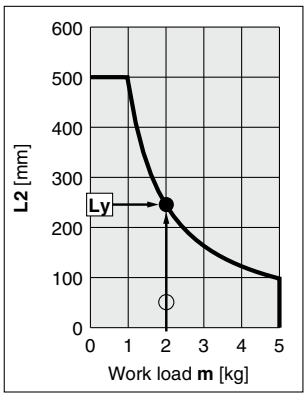
Mounting orientation

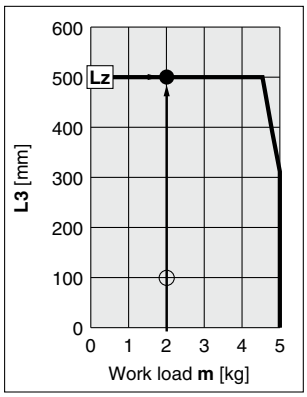


Example

1. Operating conditions
   Model: LES
   Size: 25
   Mounting orientation: Horizontal
   Acceleration [mm/s²]: 5000
   Work load [kg]: 2.0
   Work load center position [mm]: **Xc = 100**, **Yc = 50**, **Zc = 100**
2. Select three graphs from the top on page 109.
3. **Lx = 500 mm**, **Ly = 240 mm**, **Lz = 500 mm**
4. The load factor for each direction can be found as follows.
   α**x = 100/500 = 0.20**
   α**y = 50/240 = 0.21**
   α**z = 100/500 = 0.20**
5. α**x** + α**y** + α**z = 0.61** ≤ **1**







Model Selection 2

Selection Procedure

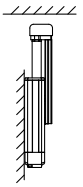
For the high rigidity type LESH series, refer to page 129

Step 1 Check the required force. → **Step 2** Check the pushing force set value. → **Step 3** Check the duty ratio.

Selection Example

Operating conditions

- Pushing force: 90 [N]
- Mounting orientation: Vertical upward
- Workpiece mass: 1 [kg]
- Pushing time + Operation (A): 1.5 s
- Speed: 100 [mm/s]
- Full cycle time (B): 6 s
- Stroke: 100 [mm]



Step 1 Check the required force.

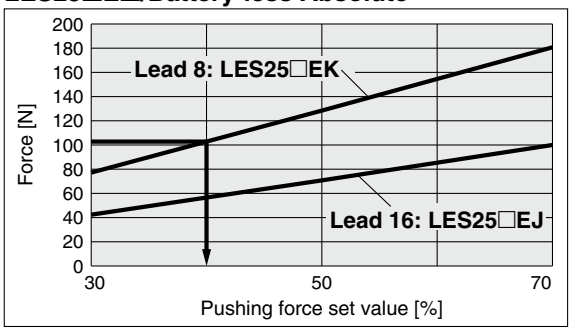
Calculate the approximate required force for a pushing operation.
Selection example) •Pushing force: 90 [N]
•Workpiece mass: 1 [kg]
The approximate required force can be found to be 90 + 10 = 100 [N].
Select a model based on the approximate required force while referencing the specifications (page 117).
Selection example) Based on the specifications,
•Approximate required force: 100 [N]
•Speed: 100 [mm/s]
The **LES25□E** can be temporarily selected as a possible candidate.
Then, calculate the required force for a pushing operation.
If the mounting position is vertical upward, add the actuator table weight.
Selection example) Based on the table weight,
•**LES25□E** table weight: 0.5 [kg]
The required force can be found to be 100 + 5 = 105 [N].

Table Weight [kg]

Model	Stroke [mm]					
	30	50	75	100	125	150
LES25	0.25	0.30	0.36	0.50	0.55	0.59

∗ If the mounting position is vertical upward, add the table weight.

LES25□E□/Battery-less Absolute



<Pushing force set value–Force graph>

Step 2 Check the pushing force set value.

<Pushing force set value–Force graph> (page 112)
Select a model based on the required force while referencing the pushing force set value–force graph, and confirm the pushing force set value.
Selection example) Based on the graph shown on the right side,
•Required force: 105 [N]
The **LES25□EK** can be temporarily selected as a possible candidate.
This pushing force set value is 40 [%].

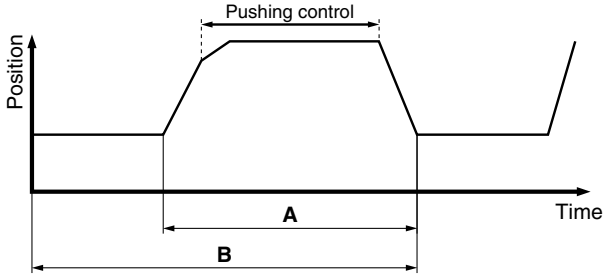
Step 3 Check the duty ratio.

Confirm the allowable duty ratio based on the pushing force set value while referencing the allowable duty ratio.
Selection example) Based on the allowable duty ratio,
•Pushing force set value: 40 [%]
The allowable duty ratio can be found to be 30 [%].
Calculate the duty ratio for the operating conditions, and confirm it does not exceed the allowable duty ratio.
Selection example) •Pushing time + Operation (A): 1.5 s
•Full cycle time (B): 6 s
The duty ratio can be found to be 1.5/6 x 100 = 25 [%], and this is within the allowable range.

Allowable Duty Ratio

Battery-less Absolute

Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
30	—	—
50 or less	30 or less	5 or less
70 or less	20 or less	3 or less



Based on the above calculation result, the LES25□EK-100 should be selected.
For allowable moment, the selection procedure is the same as that for the positioning control.

Pushing Force Set Value–Force Graph

Battery-less Absolute (Step Motor 24 VDC)

LES25□E□

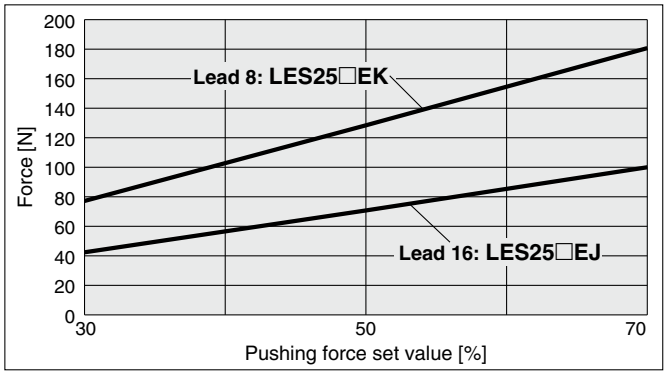
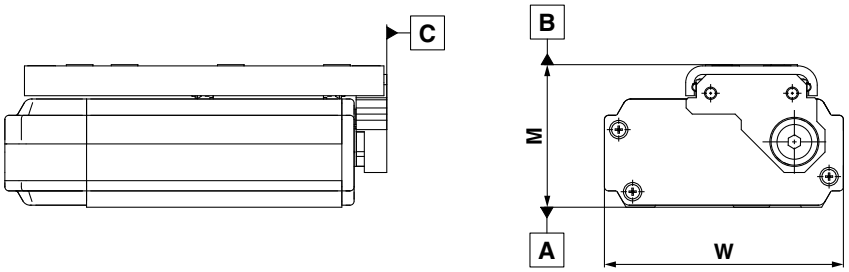


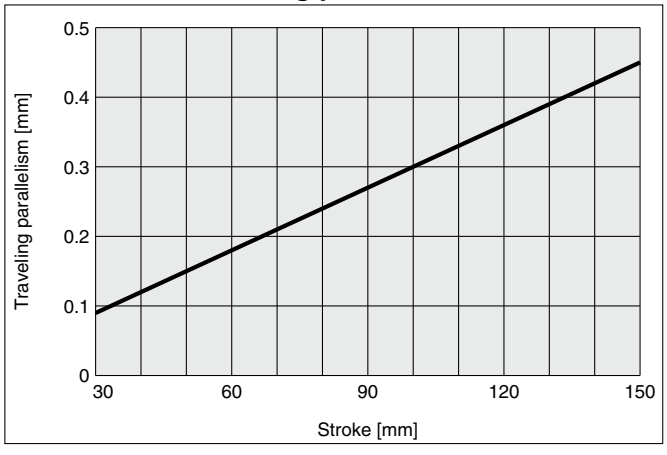
Table Accuracy

* These values are initial guideline values.



Model	LES25
B side parallelism to A side	0.4 mm
B side traveling parallelism to A side	Refer to Graph 1.
C side perpendicularity to A side	0.2 mm
M dimension tolerance	±0.3 mm
W dimension tolerance	±0.2 mm

Graph 1 **B side traveling parallelism to A side**



Traveling parallelism:
The amount of deflection on a dial gauge when the table travels a full stroke with the body secured on a reference base surface

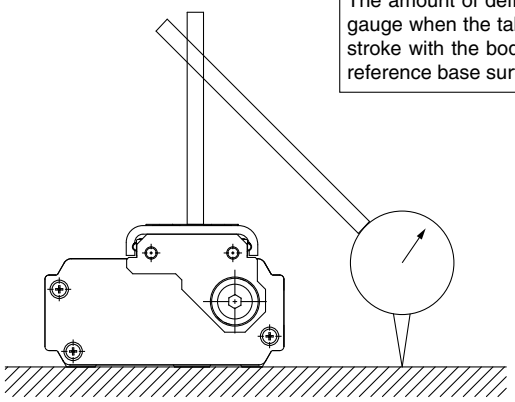
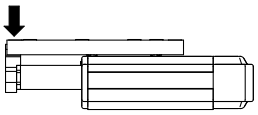


Table Deflection (Reference Value)

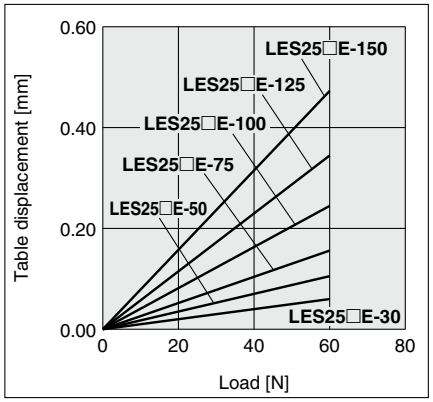
* These values are initial guideline values.

Pitching moment

Table displacement due to pitch moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.

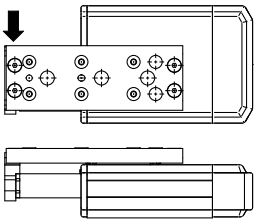


LES25

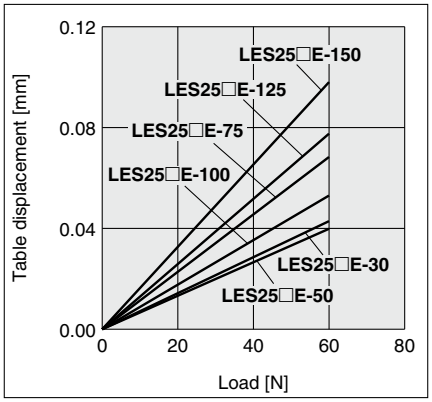


Yawing moment

Table displacement due to yaw moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.

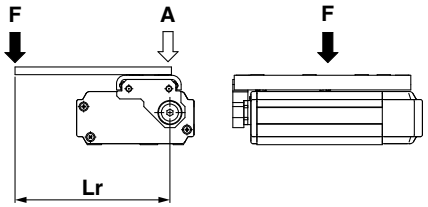


LES25

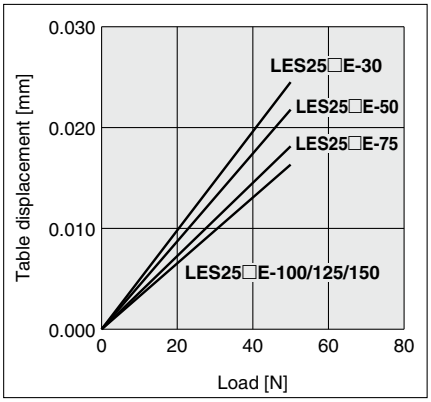


Rolling moment

Table displacement due to roll moment load
Table displacement of section A when loads are applied to the section F with the slide table retracted.



LES25 **Lr** = 100 mm



LEFS
LEFB
LEY
LEYG
LESYH
LES
LESH
LEHF
LER
JXC51/61
JXC□1

Battery-less Absolute Encoder Type
Slide Table/Compact Type
LES Series LES25

CE RoHS

* For details, refer to page 182 and onwards.

How to Order

Compact type

LES 25 R E J – 30 ❑ ❑ ❑ – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

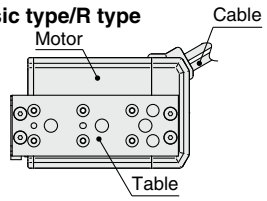
For details on controllers, refer to the next page.

❶ Size

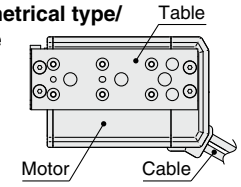
25

❷ Motor mounting position

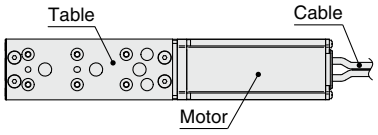
R — **Basic type/R type**



L — **Symmetrical type/ L type**



D — **In-line motor type/D type**



❸ Motor type

E	Battery-less absolute (Step motor 24 VDC)

❹ Lead [mm]

J	16
K	8

❺ Stroke [mm]

Stroke	Applicable stroke
30 to 150	30*1, 50, 75, 100, 125, 150

❻ Motor option

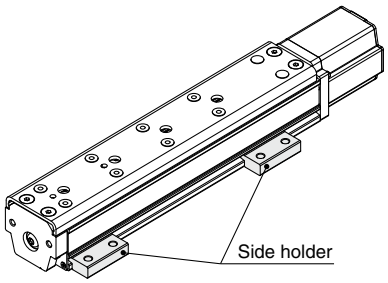
Nil	Without option
B	With lock

❼ Body option

Nil	Without option
S	Dust-protected*2

❽ Mounting*3

Symbol	Mounting	R type L type	D type
Nil	Without side holder	●	●
H	With side holder (4 pcs.)	—	●



❾ Actuator cable type/length

Robotic cable [m]

Nil	None	**R8**	8*4
R1	1.5	**RA**	10*4
R3	3	**RB**	15*4
R5	5	**RC**	20*4

⑩ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗5	DIN rail

Communication plug connector, I/O cable∗6

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 Not applicable to the R/L type with lock
∗2 For R/L type (IP5X equivalent), a scraper is mounted on the rod cover, and gaskets are mounted on both the end covers. For D type, a scraper is mounted on the rod cover.
∗3 For details, refer to page 123.
∗4 Produced upon receipt of order
∗5 The DIN rail is not included. It must be ordered separately.
∗6 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input. Select "Nil," "S," or "T" for DeviceNet™ or CC-Link. Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

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

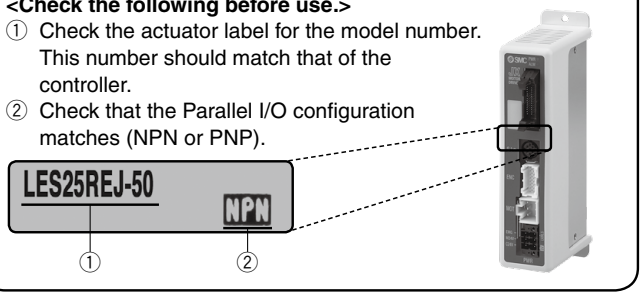
[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.

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

<Check the following before use.>
① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

Specifications

Battery-less Absolute (Step Motor 24 VDC)

Model			LES25□E	
Actuator specifications	Stroke [mm]		30, 50, 75, 100, 125, 150	
	Work load [kg]*1	Horizontal	5	
		Vertical	5	2.5
	Pushing force 30 to 70% [N]*2 *3		77 to 180	43 to 100
	Speed [mm/s]*1 *3		10 to 200	20 to 400
	Pushing speed [mm/s]		10 to 20	20
	Max. acceleration/deceleration [mm/s²]		5000	
	Positioning repeatability [mm]		±0.05	
	Lost motion [mm]*4		0.3 or less	
	Screw lead [mm]		8	16
	Impact/Vibration resistance [m/s²]*5		50/20	
	Actuation type		Slide screw + Belt (R/L type), Slide screw (D type)	
	Guide type		Linear guide (Circulating type)	
	Operating temperature range [°C]		5 to 40	
	Operating humidity range [%RH]		90 or less (No condensation)	
Electric specifications	Motor size		□42	
	Motor type		Battery-less absolute (Step motor 24 VDC)	
	Encoder		Battery-less absolute	
	Power supply voltage [V]		24 VDC ±10%	
	Power [W]*6 *8		Max. power 67	
Lock unit specifications	Type	*7	Non-magnetizing lock	
	Holding force [N]		500	77
	Power [W]*8		5	
	Rated voltage [V]		24 VDC ±10%	

*1 Speed changes according to the work load. Check the "Speed–Work Load Graph (Guide)" on page 108.
*2 Pushing force accuracy is ±20% (F.S.).
*3 The speed and force may change depending on the cable length, load, and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
*4 A reference value for correcting errors in reciprocal operation
*5 Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
*6 Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply.
*7 With lock only
*8 For an actuator with lock, add the power for the lock.

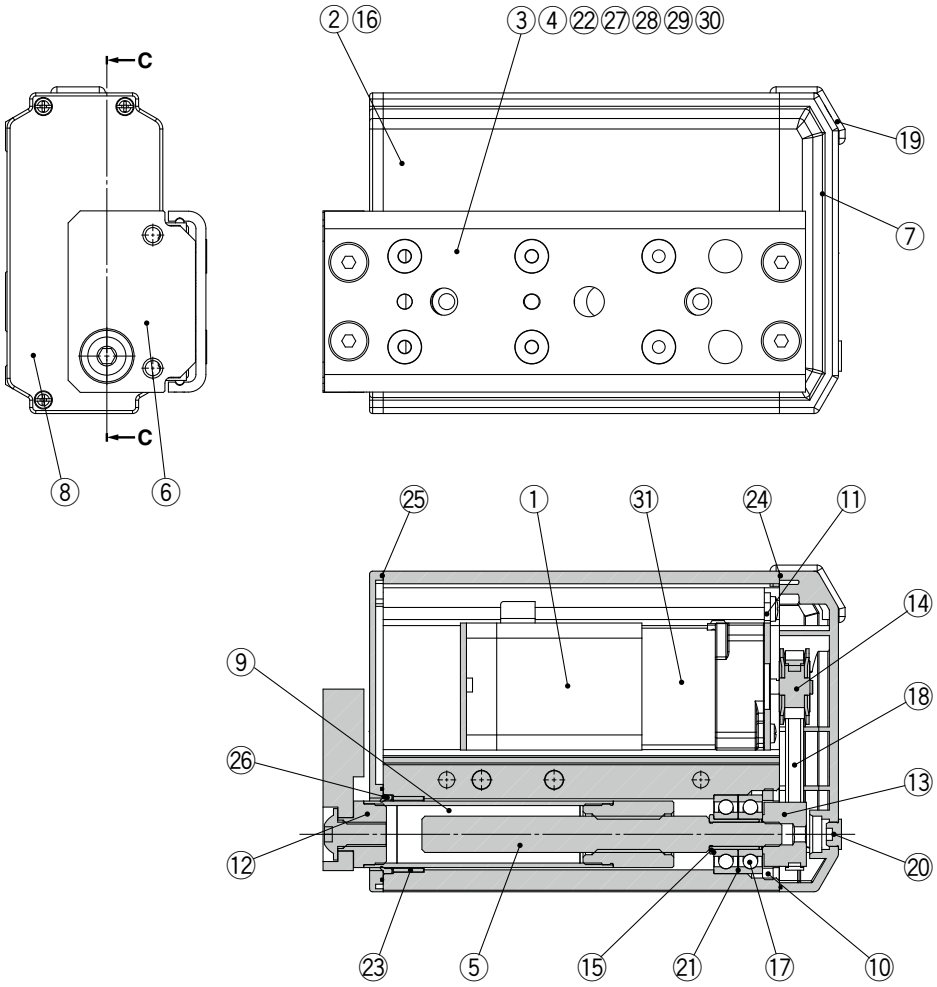
Weight

Battery-less Absolute (Step Motor 24 VDC)

[kg]

		Without lock						With lock					
Stroke [mm]		30	50	75	100	125	150	30	50	75	100	125	150
Model	LES25$^{R}_{L}$	1.81	2.07	2.41	3.21	3.44	3.68	—	2.34	2.68	3.48	3.71	3.95
	LES25D	1.82	2.05	2.35	3.07	3.27	3.47	2.08	2.31	2.61	3.33	3.53	3.74

Construction: Basic Type/R Type, Symmetrical Type/L Type



Component Parts

No.	Description	Material	Note
1	**Motor**	—	—
2	**Body**	Aluminum alloy	Anodized
3	**Table**	Stainless steel	Heat treatment + Electroless nickel plating
4	**Guide block**	Stainless steel	Heat treatment
5	**Lead screw**	Stainless steel	Heat treatment + Special treatment
6	**End plate**	Aluminum alloy	Anodized
7	**Pulley cover**	Synthetic resin	—
8	**End cover**	Synthetic resin	—
9	**Rod**	Stainless steel	—
10	**Bearing stopper**	Structural steel	Electroless nickel plating
		Brass	Electroless nickel plating (LES25R/L□ only)
11	**Motor plate**	Structural steel	—
12	**Socket**	Structural steel	Electroless nickel plating
13	**Lead screw pulley**	Aluminum alloy	—
14	**Motor pulley**	Aluminum alloy	—
15	**Spacer**	Stainless steel	LES25R/L□ only
16	**Origin stopper**	Structural steel	Electroless nickel plating
17	**Bearing**	—	—
18	**Belt**	—	—
19	**Grommet**	Synthetic resin	—
20	**Cap**	Silicone rubber	—
21	**Sim ring**	Structural steel	—

No.	Description	Material	Note
22	**Stopper**	Structural steel	—
23	**Bushing**	—	Dust-protected option only
24	**Pulley gasket**	NBR	Dust-protected option only
25	**End gasket**	NBR	Dust-protected option only
26	**Scraper**	NBR	Dust-protected option only
27	**Cover**	Synthetic resin	—
28	**Return guide**	Synthetic resin	—
29	**Cover support**	Stainless steel	—
30	**Steel ball**	Special steel	—
31	**Lock**	—	With lock only

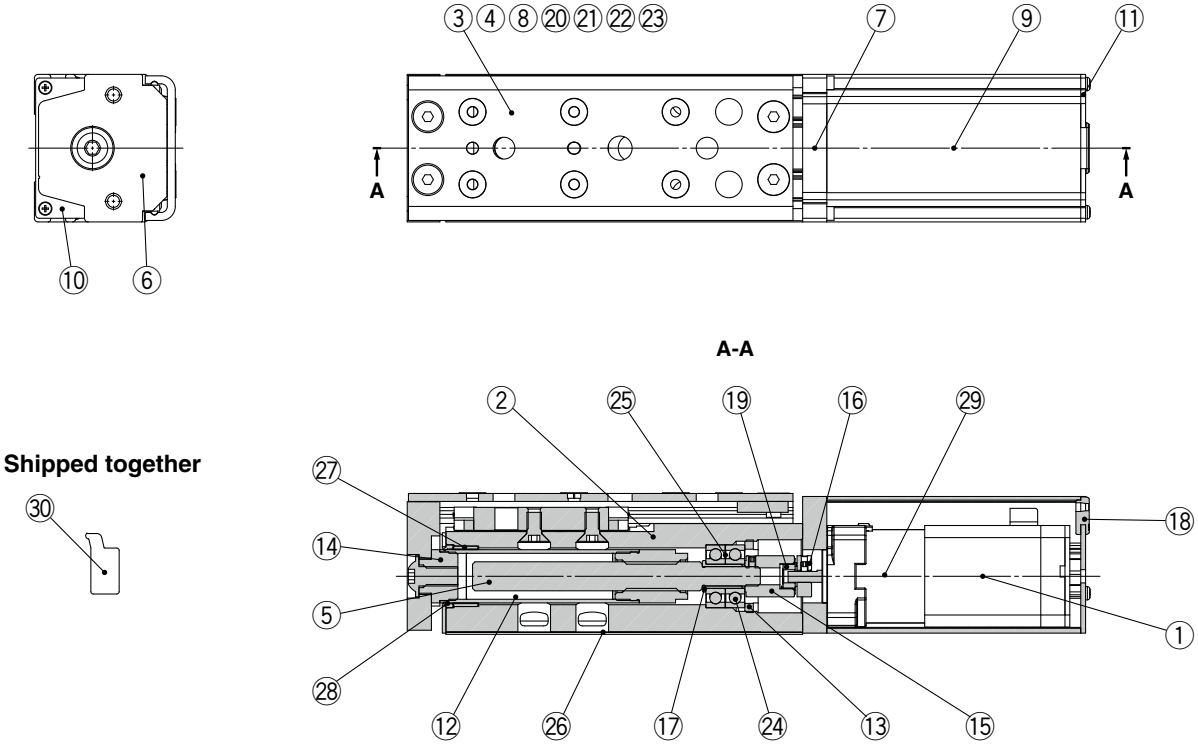
Replacement Parts/Belt

Size	Order no.	Note
LES25□	LE-D-1-3	—

Replacement Parts/Grease Pack

Applied portion	Order no.
Guide unit	GR-S-010 (10 g) GR-S-020 (20 g)

Construction: In-line Motor Type/D Type



Component Parts

No.	Description	Material	Note
1	**Motor**	—	—
2	**Body**	Aluminum alloy	Anodized
3	**Table**	Stainless steel	Heat treatment + Electroless nickel plating
4	**Guide block**	Stainless steel	Heat treatment
5	**Lead screw**	Stainless steel	Heat treatment + Special treatment
6	**End plate**	Aluminum alloy	Anodized
7	**Motor flange**	Aluminum alloy	Anodized
8	**Stopper**	Structural steel	—
9	**Motor cover**	Aluminum alloy	Anodized
10	**End cover**	Aluminum alloy	Anodized
11	**Motor end cover**	Aluminum alloy	Anodized
12	**Rod**	Stainless steel	—
13	**Bearing stopper**	Structural steel	Electroless nickel plating
		Brass	Electroless nickel plating (LES25D□ only)
14	**Socket**	Structural steel	Electroless nickel plating
15	**Hub (Lead screw side)**	Aluminum alloy	—
16	**Hub (Motor side)**	Aluminum alloy	—
17	**Spacer**	Stainless steel	LES25D□ only
18	**Grommet**	NBR	—
19	**Spider**	NBR	—
20	**Cover**	Synthetic resin	—

No.	Description	Material	Note
21	**Return guide**	Synthetic resin	—
22	**Cover support**	Stainless steel	—
23	**Steel ball**	Special steel	—
24	**Bearing**	—	—
25	**Sim ring**	Structural steel	—
26	**Masking tape**	—	—
27	**Bushing**	—	Dust-protected option only
28	**Scraper**	NBR	Dust-protected option only
29	**Lock**	—	With lock only
30	**Side holder**	Aluminum alloy	Anodized

Optional Parts/Side Holder

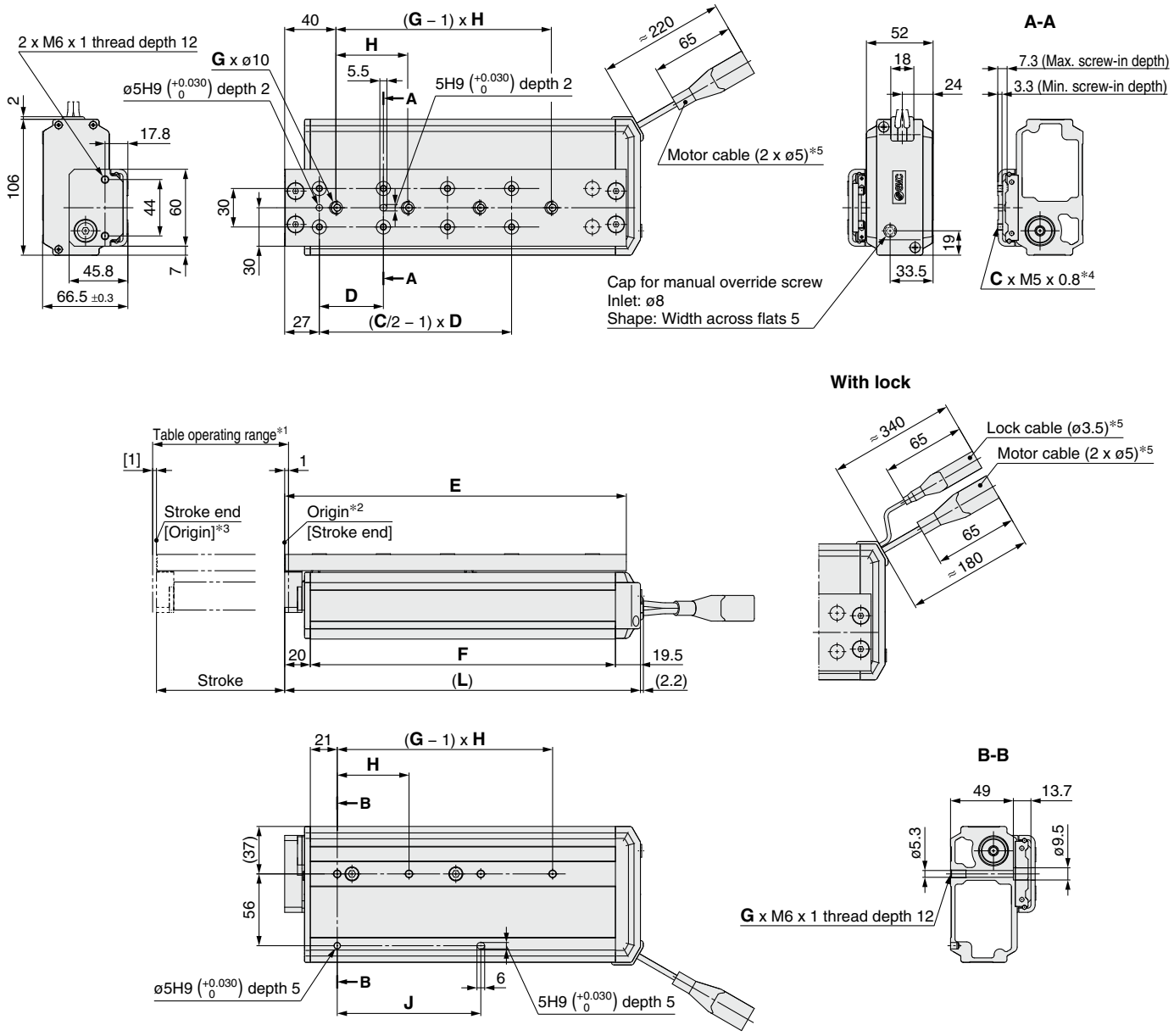
Model	Order no.
LES25D	LE-D-3-3

Replacement Parts/Grease Pack

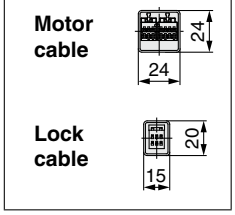
Applied portion	Order no.
Guide unit	GR-S-010 (10 g) GR-S-020 (20 g)

Dimensions: Basic Type/R Type

LES25RE



Connector



∗1 This is the range within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
∗2 Position after returning to origin
∗3 [ ] for when the direction of return to origin has changed
∗4 If workpiece retaining screws are too long, they can touch the guide block and cause a malfunction.
Use screws that are between the maximum and minimum screw-in depths in length.
∗5 Secure the motor cable and lock cable so that the cables are not repeatedly bent.

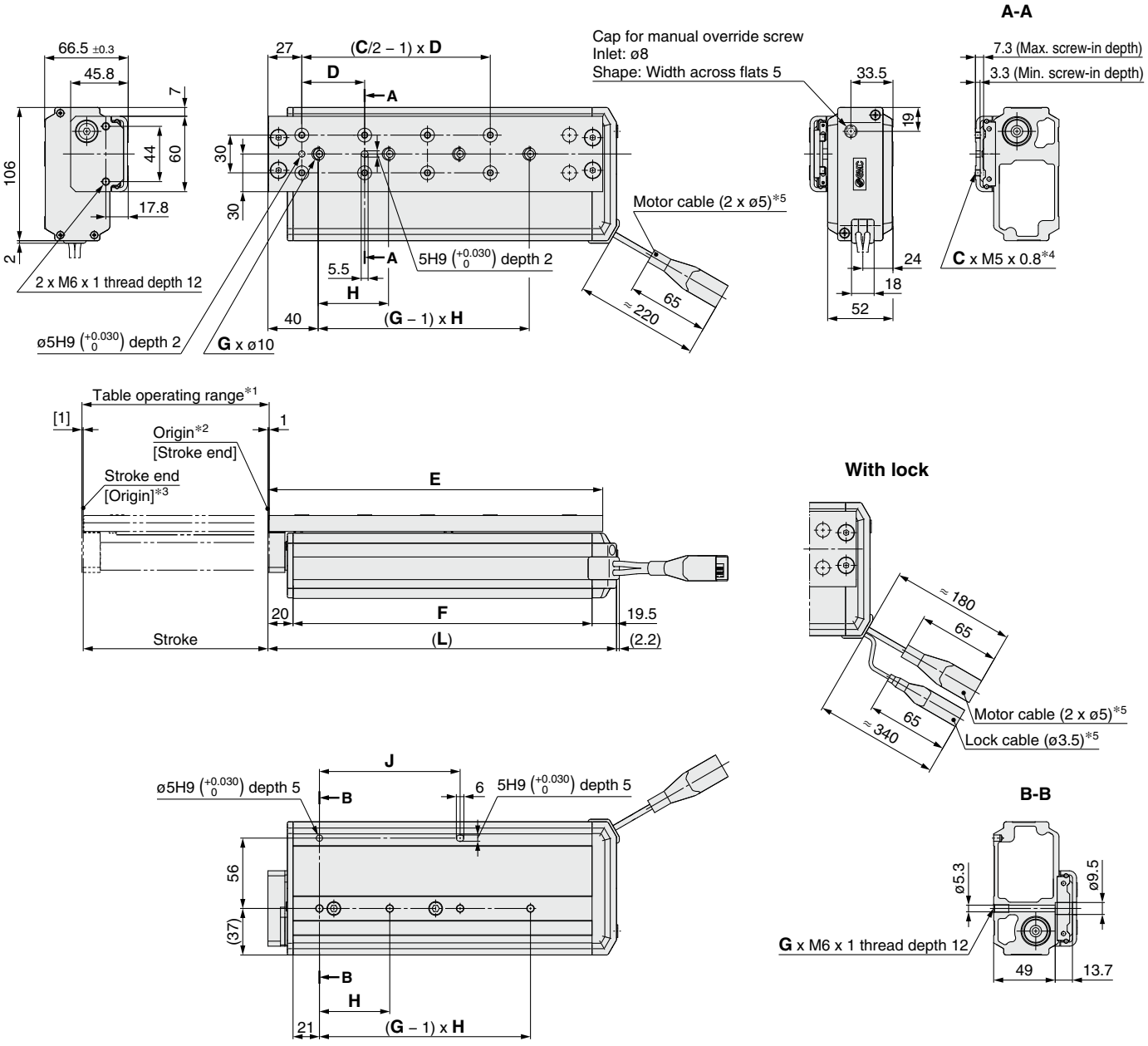
Dimensions

[mm]

Model	L	C	D	E	F	G	H	J
LES25RE□-30□-□□□□□	144.5	4	48	133.5	105	2	46	46
LES25RE□-50□□-□□□□□	170.5	6	42	159.5	131	2	84	84
LES25RE□-75□□-□□□□□	204.5	6	55	193.5	165	2	112	112
LES25RE□-100□□-□□□□□	277.5	8	50	266.5	238	4	56	112
LES25RE□-125□□-□□□□□	302.5	8	55	291.5	263	4	59	118
LES25RE□-150□□-□□□□□	327.5	8	62	316.5	288	4	62	124

Dimensions: Symmetrical Type/L Type

LES25LE



Connector	
Motor cable	24 / 24
Lock cable	20 / 15

*1 This is the range within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*2 Position after returning to origin
*3 [ ] for when the direction of return to origin has changed
*4 If workpiece retaining screws are too long, they can touch the guide block and cause a malfunction.
Use screws that are between the maximum and minimum screw-in depths in length.
*5 Secure the motor cable and lock cable so that the cables are not repeatedly bent.

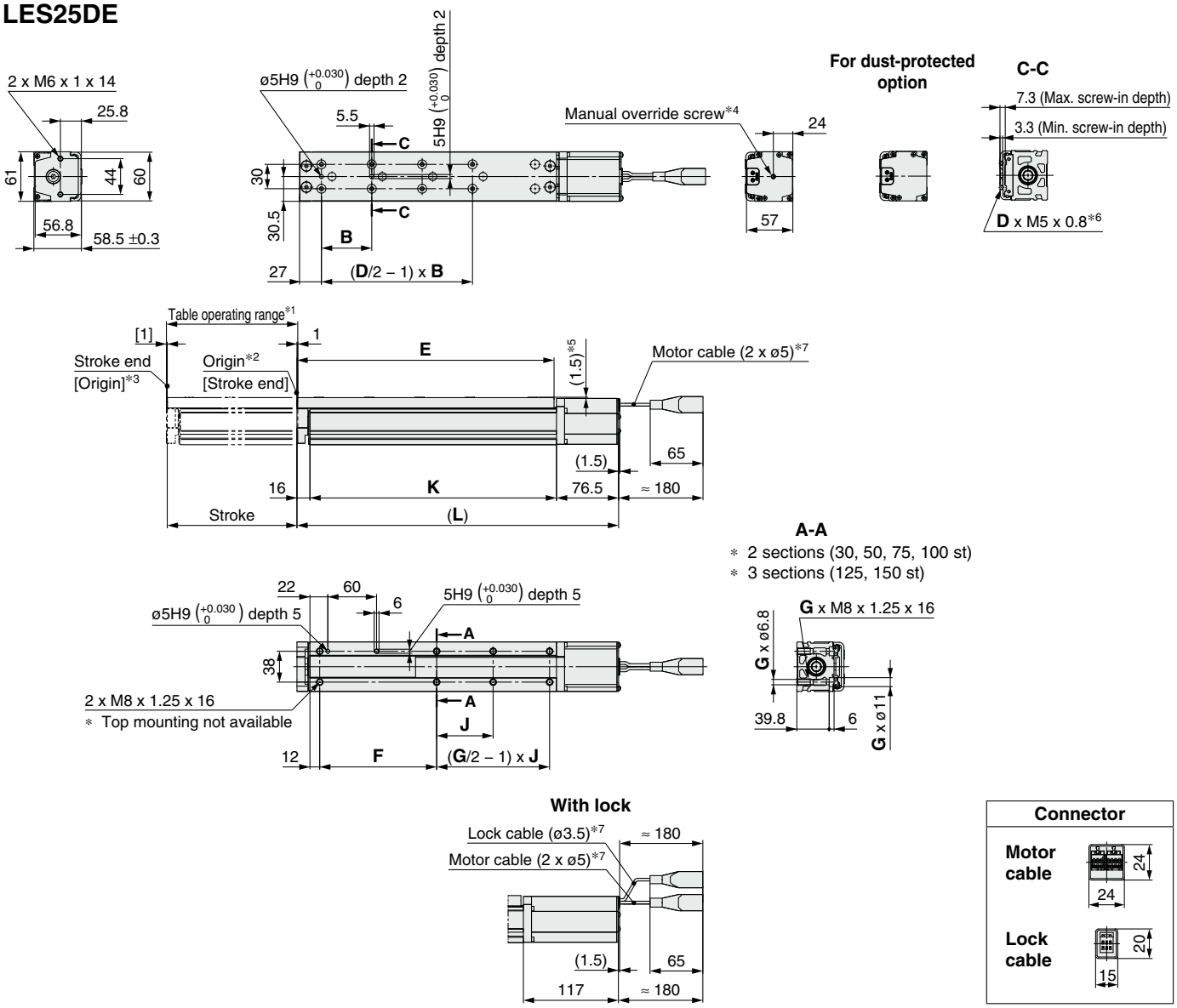
Dimensions

[mm]

Model	L	C	D	E	F	G	H	J
LES25LE□-30□-□□□□□	144.5	4	48	133.5	105	2	46	46
LES25LE□-50□□-□□□□□	170.5	6	42	159.5	131	2	84	84
LES25LE□-75□□-□□□□□	204.5	6	55	193.5	165	2	112	112
LES25LE□-100□□-□□□□□	277.5	8	50	266.5	238	4	56	112
LES25LE□-125□□-□□□□□	302.5	8	55	291.5	263	4	59	118
LES25LE□-150□□-□□□□□	327.5	8	62	316.5	288	4	62	124

Dimensions: In-line Motor Type/D Type

LES25DE



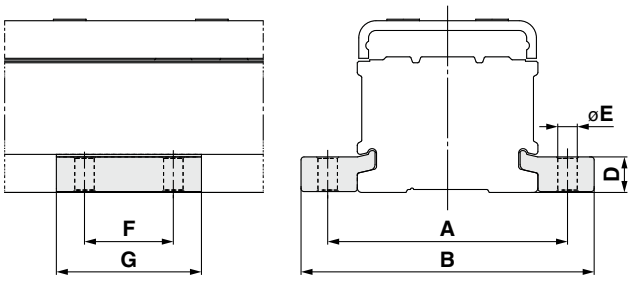
*1 This is the range within which the table can move when it returns to origin. Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*2 Position after returning to origin
*3 [ ] for when the direction of return to origin has changed
*4 The distance between the motor end cover and the manual override screw is up to 4 mm. The motor end cover hole size is ø5.5.
*5 The table is lower than the motor cover.
*6 If workpiece retaining screws are too long, they can touch the guide block and cause a malfunction. Use screws that are between the maximum and minimum screw-in depths in length.
*7 Secure the motor cable and lock cable so that the cables are not repeatedly bent.

Dimensions

[mm]

Model	(L)	B	D	E	F	G	J	K
LES25DE□-30□□-□□□□□	214	48	4	133.5	81	4	19	121.5
LES25DE□-30B□□-□□□□□	254.5							
LES25DE□-50□□-□□□□□	240	42	6	159.5	87	4	39	147.5
LES25DE□-50B□□-□□□□□	280.5							
LES25DE□-75□□-□□□□□	274	55	6	193.5	96	4	64	181.5
LES25DE□-75B□□-□□□□□	314.5							
LES25DE□-100□□-□□□□□	347	50	8	266.5	144	4	89	254.5
LES25DE□-100B□□-□□□□□	387.5							
LES25DE□-125□□-□□□□□	372	55	8	291.5	144	6	57	279.5
LES25DE□-125B□□-□□□□□	412.5							
LES25DE□-150□□-□□□□□	397	62	8	316.5	144	6	69.5	304.5
LES25DE□-150B□□-□□□□□	437.5							

Side Holder (In-line Motor Type/D Type)



[mm]

Part no.*1	A	B	D	E	F	G	Applicable model
LE-D-3-3	81	99	12	6.6	30	49	**LES25DE**

*1 Part number for 1 side holder

Model Selection 1

Selection Procedure

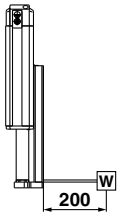
For the compact type LES series, refer to page 107.

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: 2 [kg]
- Speed: 200 [mm/s]
- Mounting orientation: Vertical
- Stroke: 50 [mm]
- Acceleration/Deceleration: 5000 [mm/s²]
- Cycle time: 0.5 s
- Workpiece mounting condition:

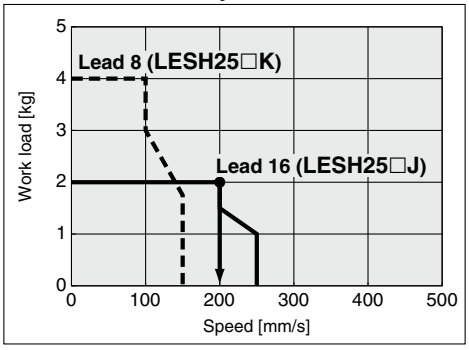


Step 1 **Check the work load–speed. <Speed–Work load graph>** (page 126)

Select a model based on the workpiece mass and speed while referencing the speed–work load graph.

Selection example) The **LESH25□EJ-50** can be temporarily selected as a possible candidate based on the graph shown on the right side.

LESH25□E□/Battery-less Absolute Vertical



<Speed–Work load graph>

Step 2 **Check the cycle time.**

It is possible to find an approximate cycle time by using method 1, but if a more detailed cycle time is required, use method 2.

∗ Although it is possible to make a suitable selection by using method 1, this calculation is based on a maximum load condition. Therefore, if a more detailed selection for each load is required, use method 2.

Method 1: Check the cycle time graph. (page 126)

Method 2: Calculation <Speed–Work load graph> (page 126)

Calculate **the cycle time** using the following calculation method.

Cycle time:

T can be found from the following equation.

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

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

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

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

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

- T4: Settling time varies depending on the conditions such as motor types, load, and in position of the step data. Therefore, calculate the settling time while referencing the following value.

$$T4 = 0.15 \text{ [s]}$$

Calculation example)

T1 to T4 can be calculated as follows.

$T1 = V/a1 = 200/5000 = 0.04$ [s],

$T3 = V/a2 = 200/5000 = 0.04$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{50 - 0.5 \cdot 220 \cdot (0.04 + 0.04)}{200} = 0.21 \text{ [s]}$$

$T4 = 0.15$ [s]

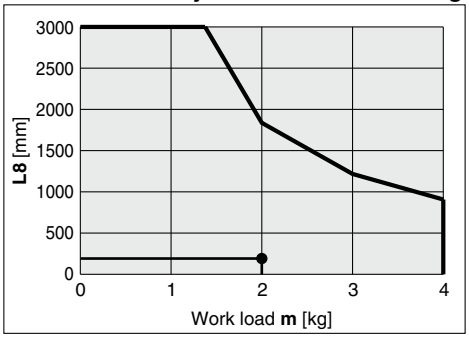
The cycle time can be found as follows.

$T = T1 + T2 + T3 + T4$

$= 0.04 + 0.21 + 0.04 + 0.15$

$=$ **0.44 [s]**

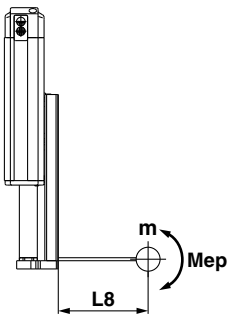
LESH25□/Battery-less Absolute Pitching



<Dynamic allowable moment>

Step 3 **Check the allowable moment. <Static allowable moment>** (page 126) **<Dynamic allowable moment>** (page 127)

Confirm the moment that applies to the actuator is within the allowable range for both static and dynamic conditions.



Based on the above calculation result, the LESH25□EJ-50 should be selected.

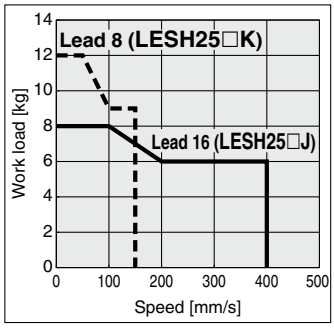
Speed–Work Load Graph (Guide)

Battery-less Absolute (Step Motor 24 VDC)

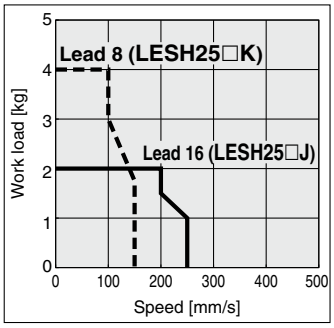
∗ The following graphs show the values when the moving force is 100%.

LESH25□E□

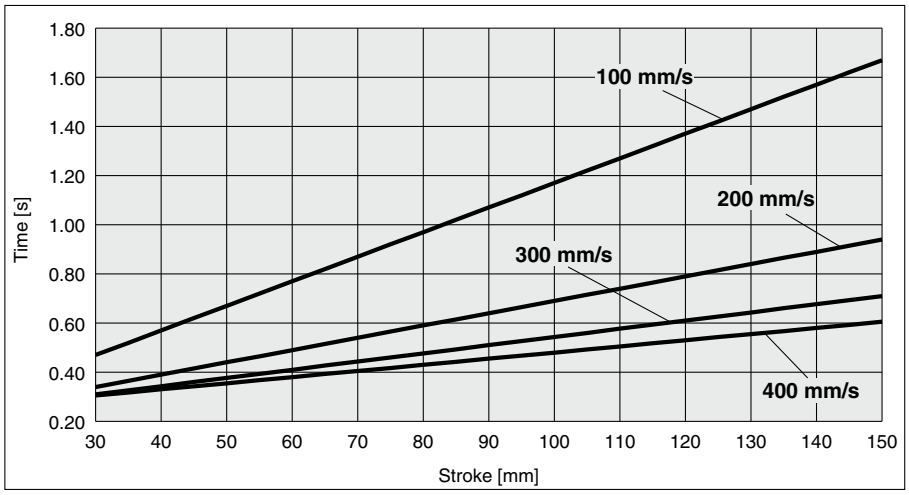
Horizontal



Vertical



Cycle Time Graph (Guide)



Operating Conditions

Acceleration/Deceleration: 5000 mm/s²
In position: 0.5 mm

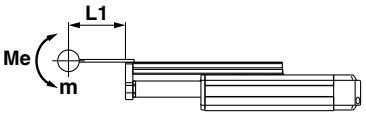
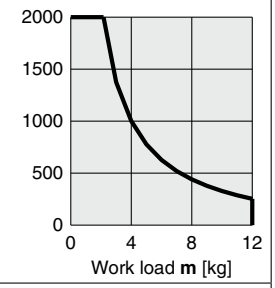
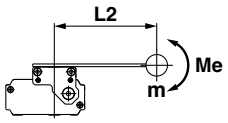
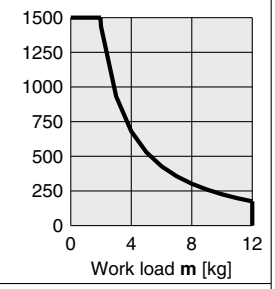
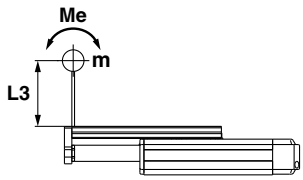
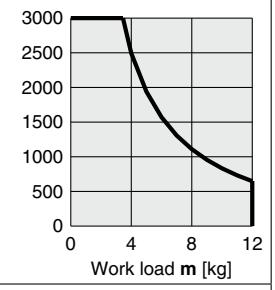
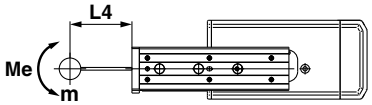
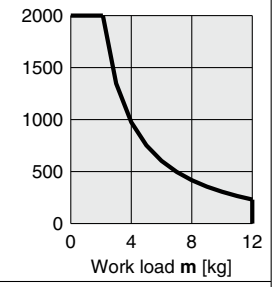
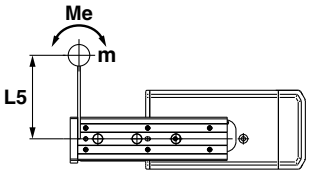
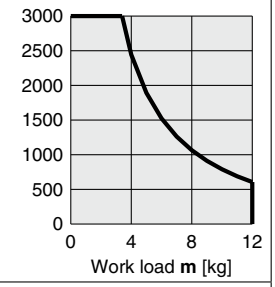
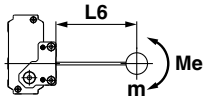
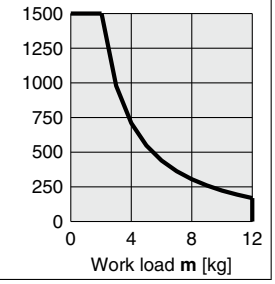
Static Allowable Moment

Model		LESH25		
Stroke	[mm]	**50**	**100**	**150**
Pitching	[N·m]	77	112	155
Yawing	[N·m]			
Rolling	[N·m]	146	177	152

Dynamic Allowable Moment

* These graphs show the amount of allowable overhang (guide unit) when the center of gravity of the workpiece overhangs in one direction. When selecting the overhang, refer to the "Calculation of Guide Load Factor" or the Electric Actuator Model Selection Software for confirmation: https://www.smcworld.com

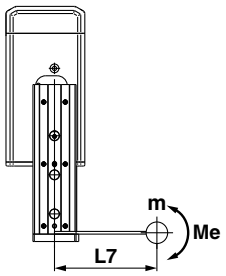
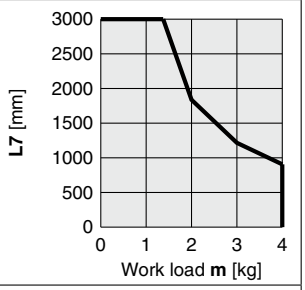
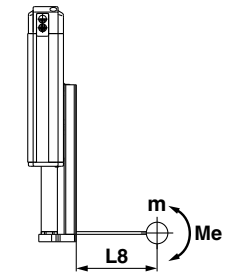
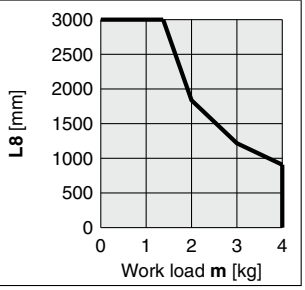
Acceleration/Deceleration —— 5000 mm/s²

Orientation	Load overhanging direction **m** : Work load [kg] **Me**: Allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model **LESH25**
Horizontal/Bottom		X	
		Y	
		Z	
Horizontal (Wall)		X	
		Y	
		Z	

Dynamic Allowable Moment

* These graphs show the amount of allowable overhang (guide unit) when the center of gravity of the workpiece overhangs in one direction. When selecting the overhang, refer to the "Calculation of Guide Load Factor" or the Electric Actuator Model Selection Software for confirmation: https://www.smcworld.com

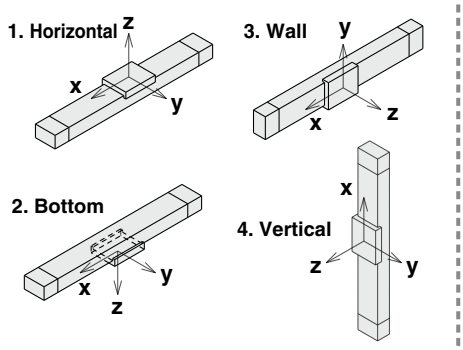
Acceleration/Deceleration —— 5000 mm/s²

Orientation	Load overhanging direction **m** : Work load [kg] **Me**: Allowable moment [N·m] **L** : Overhang to the work load center of gravity [mm]		Model **LESH25**
Vertical		Y	
		Z	

Calculation of Guide Load Factor

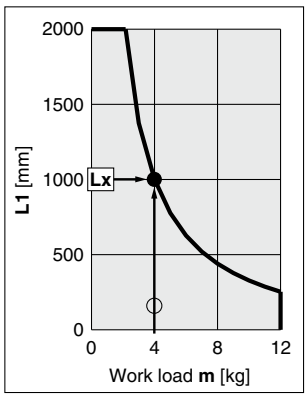
1. Decide operating conditions.
   Model: LESH
   Size: 25
   Mounting orientation: Horizontal/Bottom/Wall/Vertical
   Acceleration [mm/s²]: **a**
   Work load [kg]: **m**
   Work load center position [mm]: **Xc/Yc/Zc**
2. Select the target graph while referencing the model, size, and mounting orientation.
3. Based on the acceleration and work load, find the overhang [mm]: **Lx/Ly/Lz** from the graph.
4. Calculate the load factor for each direction.
   α**x = Xc/Lx**, α**y = Yc/Ly**, α**z = Zc/Lz**
5. Confirm the total of α**x**, α**y**, and α**z** is 1 or less.
   α**x + αy + αz ≤ 1**
   When 1 is exceeded, please consider a reduction of acceleration and work load, or a change of the work load center position and series.

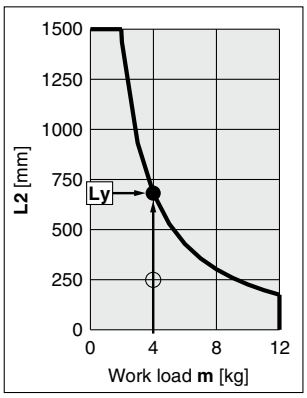
Mounting orientation

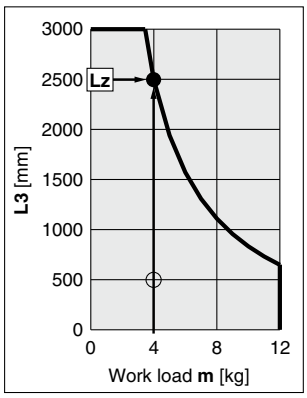


Example

1. Operating conditions
   Model: LESH
   Size: 25
   Mounting orientation: Horizontal
   Acceleration [mm/s²]: 5000
   Work load [kg]: 4.0
   Work load center position [mm]: **Xc = 250**, **Yc = 250**, **Zc = 500**
2. Select three graphs from the top on page 127.
3. **Lx = 1000 mm**, **Ly = 650 mm**, **Lz = 2500 mm**
4. The load factor for each direction can be found as follows.
   α**x = 250/1000 = 0.25**
   α**y = 250/650 = 0.38**
   α**z = 500/2500 = 0.20**
5. α**x + αy + αz = 0.83 ≤ 1**







Model Selection 2

Selection Procedure

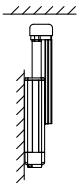
For the compact type LES series, refer to page 111.

Step 1 Check the required force. → **Step 2** Check the pushing force set value. → **Step 3** Check the duty ratio.

Selection Example

Operating conditions

- Pushing force: 90 [N]
- Workpiece mass: 1 [kg]
- Speed: 100 [mm/s]
- Stroke: 100 [mm]
- Mounting orientation: Vertical upward
- Pushing time + Operation (A): 1.5 s
- Full cycle time (B): 6 s



Step 1 Check the required force.

Calculate the approximate required force for a pushing operation.
Selection example) •Pushing force: 90 [N]
•Workpiece mass: 1 [kg]
The approximate required force can be found to be 90 + 10 = 100 [N].
Select a model based on the approximate required force while referencing the specifications (page 135).
Selection example) Based on the specifications,
•Approximate required force: 100 [N]
•Speed: 100 [mm/s]
The **LESH25□E** can be temporarily selected as a possible candidate.
Then, calculate the required force for a pushing operation.
If the mounting position is vertical upward, add the actuator table weight.
Selection example) Based on the table weight,
•**LESH25□E** table weight: 1.3 [kg]
The required force can be found to be 100 + 13 = 113 [N].

Step 2 Check the pushing force set value.

<Pushing force set value–Force graph> (page 130)

Select a model based on the required force while referencing the pushing force set value–force graph, and confirm the pushing force set value.
Selection example) Based on the graph shown on the right side,
•Required force: 113 [N]
The **LESH25□EK** can be temporarily selected as a possible candidate.
This pushing force set value is 40 [%].

Step 3 Check the duty ratio.

Confirm the allowable duty ratio based on the pushing force set value while referencing the allowable duty ratio,
Selection example) Based on the allowable duty ratio,
•Pushing force set value: 40 [%]
The allowable duty ratio can be found to be 30 [%].
Calculate the duty ratio for the operating conditions, and confirm it does not exceed the allowable duty ratio.
Selection example) •Pushing time + Operation (A): 1.5 s
•Full cycle time (B): 6 s
The duty ratio can be found to be 1.5/6 x 100 = 25 [%], and this is within the allowable range.

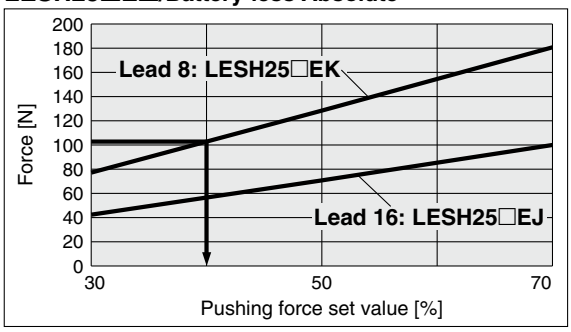
Based on the above calculation result, the LESH25□EK-100 should be selected.
For allowable moment, the selection procedure is the same as that for the positioning control.

Table Weight [kg]

Model	Stroke [mm]			
	50	75	100	150
LESH25	0.9	—	1.3	1.7

∗ If the mounting position is vertical upward, add the table weight.

LESH25□E□/Battery-less Absolute

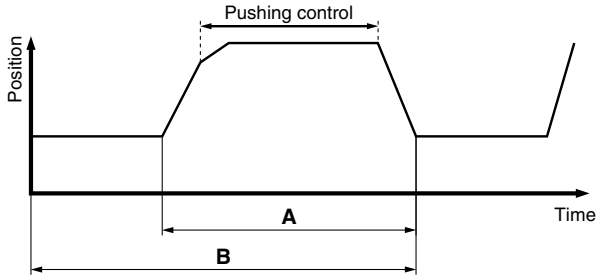


<Pushing force set value–Force graph>

Allowable Duty Ratio

Battery-less Absolute

Pushing force set value [%]	Duty ratio [%]	Continuous pushing time [min]
30	—	—
50 or less	30 or less	5 or less
70 or less	20 or less	3 or less



Pushing Force Set Value–Force Graph

Battery-less Absolute (Step Motor 24 VDC)

LESH25□E□

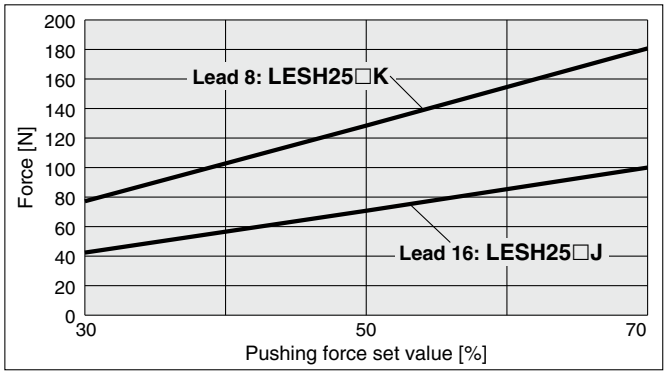
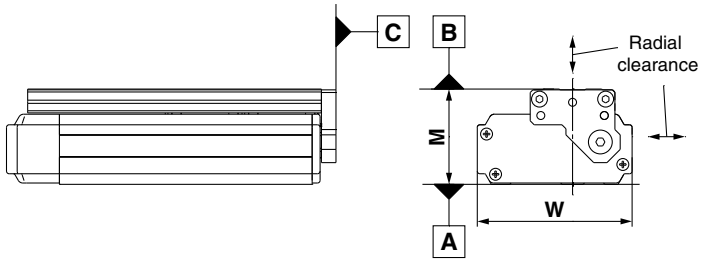


Table Accuracy

* These values are initial guideline values.

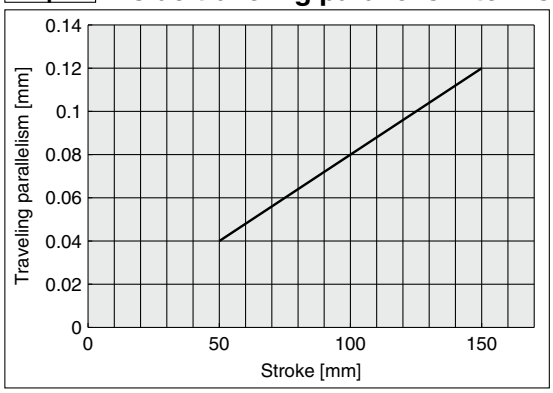


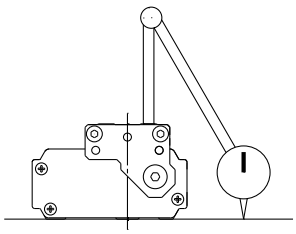
Model	LESH25
B side parallelism to A side [mm]	Refer to Table 1.
B side traveling parallelism to A side [mm]	Refer to Graph 1.
C side perpendicularity to A side [mm]	0.05
M dimension tolerance [mm]	±0.3
W dimension tolerance [mm]	±0.2
Radial clearance [μm]	−14 to 0

Table 1 B side parallelism to A side

Model	Stroke [mm]			
	50	75	100	150
LESH25	0.06	—	0.08	0.125

Graph 1 B side traveling parallelism to A side





Traveling parallelism:
The amount of deflection on a dial gauge when the table travels a full stroke with the body secured on a reference base surface

Table Deflection (Reference Value)

* These values are initial guideline values.

Table displacement due to pitch moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.

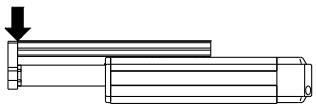


Table displacement due to yaw moment load
Table displacement when loads are applied to the section marked with the arrow with the slide table stuck out.

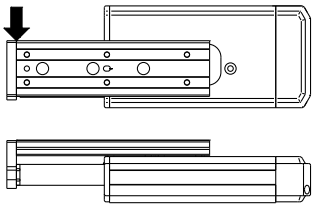
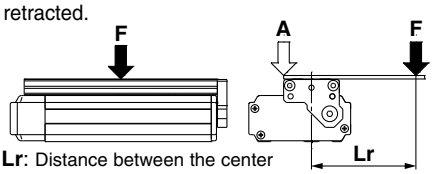
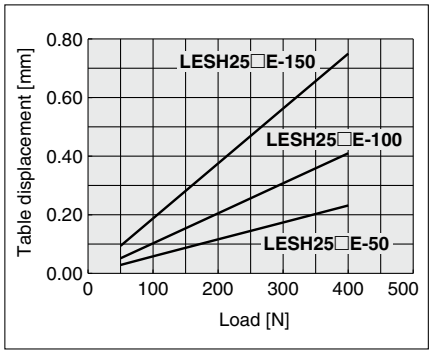


Table displacement due to roll moment load
Table displacement of section A when loads are applied to the section F with the slide table retracted.

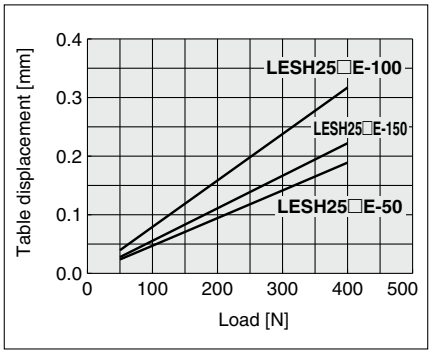


Lr: Distance between the center of the table and the work load center of gravity

LESH25

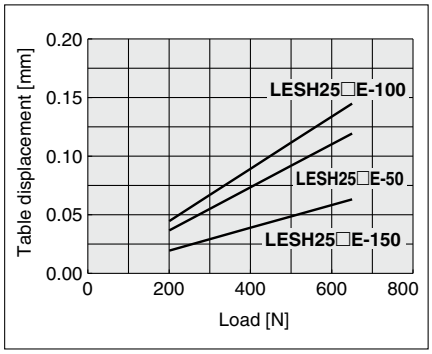


LESH25



LESH25

Lr = 200 mm



Battery-less Absolute Encoder Type
Slide Table/High Rigidity Type
LESH Series LESH25

CE RoHS

* For details, refer to page 182 and onwards.

High rigidity type

How to Order

LESH 25 R E J – 50 □ □ □ – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

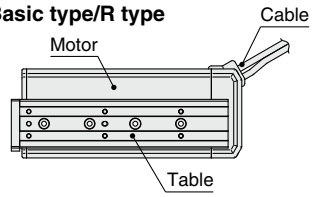
For details on controllers, refer to the next page.

❶ Size

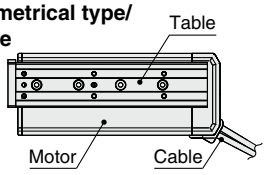
25

❷ Motor mounting position

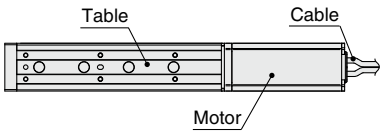
R: Basic type/R type



L: Symmetrical type/ L type



D: In-line motor type/D type



❸ Motor type

E	Battery-less absolute (Step motor 24 VDC)

❹ Lead [mm]

J	16
K	8

❺ Stroke [mm]

Stroke	Applicable stroke
50 to 150	50, 100, 150

❻ Motor option

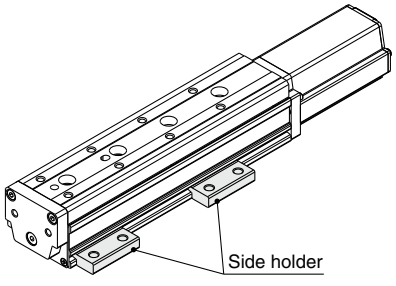
Nil	Without option
B	With lock

❼ Body option

Nil	Without option
S	Dust-protected*1

❽ Mounting*2

Symbol	Mounting	R type L type	D type
Nil	Without side holder	●	●
H	With side holder (4 pcs.)	—	●



❾ Actuator cable type/length

Robotic cable [m]

Nil	None	**R8**	8*3
R1	1.5	**RA**	10*3
R3	3	**RB**	15*3
R5	5	**RC**	20*3

⑩ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗4	DIN rail

Communication plug connector, I/O cable∗5

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 For R/L type (IP5X equivalent), a scraper is mounted on the rod cover, and gaskets are mounted on both the end covers. For D type, a scraper is mounted on the rod cover.
∗2 For details, refer to page 141.
∗3 Produced upon receipt of order
∗4 The DIN rail is not included. It must be ordered separately.
∗5 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet™ or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

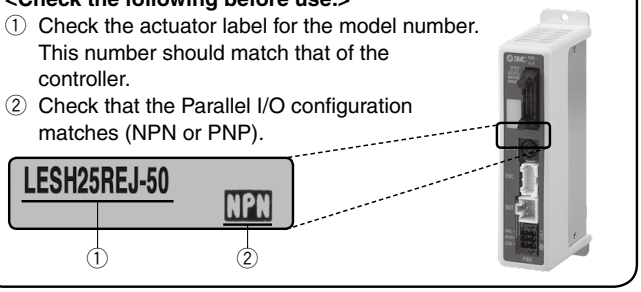
[CE-compliant products]
EMC compliance was tested by combining the electric actuator LES series and the controller JXC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, compliance with the EMC directive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

[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.
Confirm that the combination of the controller and actuator is correct.

<Check the following before use.>
① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

Specifications

Battery-less Absolute (Step Motor 24 VDC)

Model			LESH25□E	
Actuator specifications	Stroke [mm]		50, 100, 150	
	Work load [kg]*1 *3	Horizontal	12	8
		Vertical	4	2
	Pushing force [N] 30% to 70%*2 *3		77 to 180	43 to 100
	Speed [mm/s]*1 *3		10 to 150	20 to 400
	Pushing speed [mm/s]		10 to 20	20
	Max. acceleration/deceleration [mm/s²]		5000	
	Positioning repeatability [mm]		±0.05	
	Lost motion [mm]*4		0.15 or less	
	Screw lead [mm]		8	16
	Impact/Vibration resistance [m/s²]*5		50/20	
	Actuation type		Slide screw + Belt (R/L type), Slide screw (D type)	
	Guide type		Linear guide (Circulating type)	
	Operating temperature range [°C]		5 to 40	
	Operating humidity range [%RH]		90 or less (No condensation)	
Electric specifications	Motor size		□42	
	Motor type		Battery-less absolute (Step motor 24 VDC)	
	Encoder		Battery-less absolute	
	Power supply voltage [V]		24 VDC ±10%	
	Power [W]*6 *8		Max. power 74	
Lock unit specifications	Type	*7	Non-magnetizing lock	
	Holding force [N]		500	77
	Power [W]*8		5	
	Rated voltage [V]		24 VDC ±10%	

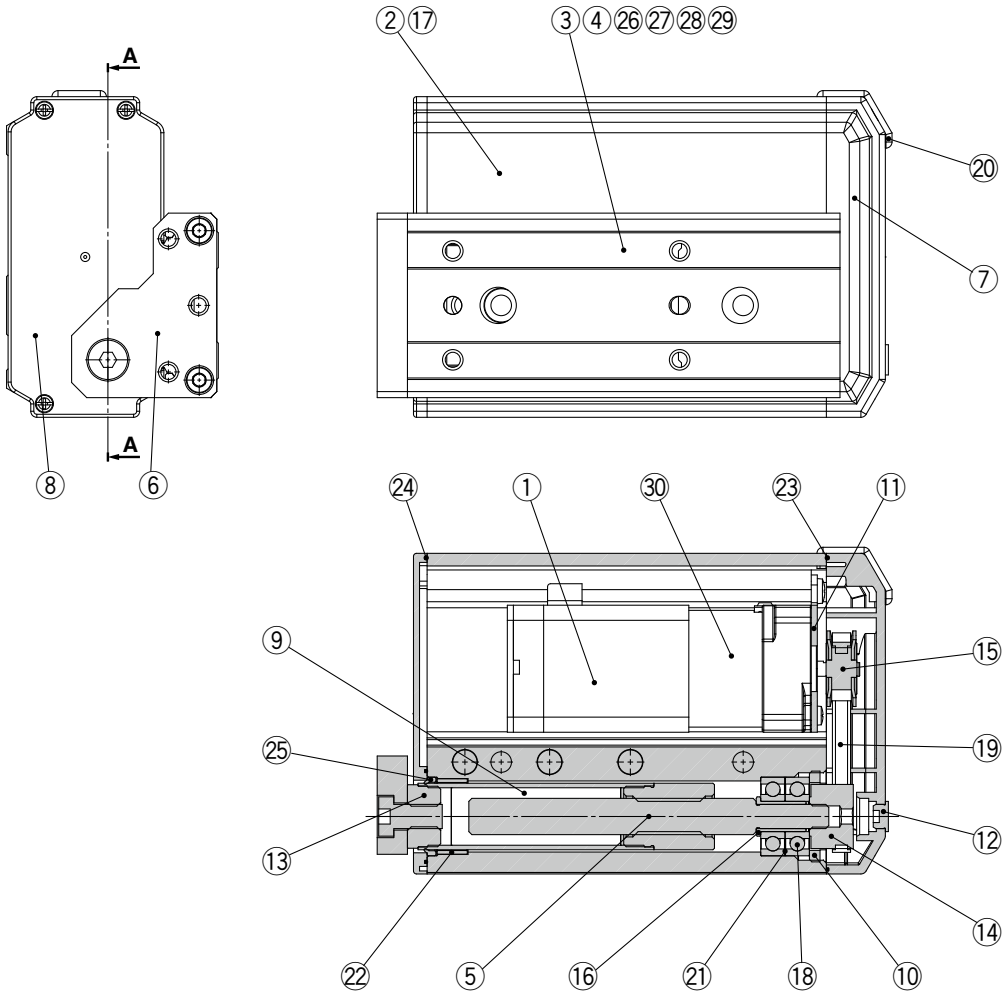
*1 Speed changes according to the work load. Check the "Speed–Work Load Graph (Guide)" on page 126.
*2 Pushing force accuracy is ±20% (F.S.).
*3 The speed and force may change depending on the cable length, load, and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
*4 A reference value for correcting errors in reciprocal operation
*5 Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
*6 Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply.
*7 With lock only
*8 For an actuator with lock, add the power for the lock.

Weight

Battery-less Absolute (Step Motor 24 VDC)

Model		Basic type/R type, Symmetrical type/L type			In-line motor type/ D type		
		$LESH25^{R}_{L}$			LESH25D		
Stroke [mm]		50	100	150	50	100	150
Product weight [kg]	Without lock	2.50	3.30	4.26	2.52	3.27	3.60
	With lock	2.84	3.64	4.60	2.86	3.61	3.94

Construction: Basic Type/R Type, Symmetrical Type/L Type



Component Parts

No.	Description	Material	Note
1	**Motor**	—	—
2	**Body**	Aluminum alloy	Anodized
3	**Table**	Stainless steel	Heat treatment + Electroless nickel plating
4	**Guide block**	Stainless steel	Heat treatment
5	**Lead screw**	Stainless steel	Heat treatment + Special treatment
6	**End plate**	Aluminum alloy	Anodized
7	**Pulley cover**	Synthetic resin	—
8	**End cover**	Synthetic resin	—
9	**Rod**	Stainless steel	—
10	**Bearing stopper**	Structural steel	Electroless nickel plating
		Brass	Electroless nickel plating (LESH25R/L□ only)
11	**Motor plate**	Structural steel	
12	**Cap**	Silicone rubber	—
13	**Socket**	Structural steel	Electroless nickel plating
14	**Lead screw pulley**	Aluminum alloy	—
15	**Motor pulley**	Aluminum alloy	—
16	**Spacer**	Stainless steel	LESH25R/L□ only
17	**Origin stopper**	Structural steel	Electroless nickel plating
18	**Bearing**	—	—
19	**Belt**	—	—
20	**Grommet**	Synthetic resin	—
21	**Sim ring**	Structural steel	—

No.	Description	Material	Note
22	**Bushing**	—	Dust-protected option only
23	**Pulley gasket**	NBR	Dust-protected option only
24	**End gasket**	NBR	Dust-protected option only
25	**Scraper**	NBR	Dust-protected option only/Rod
26	**Cover**	Synthetic resin	—
27	**Return guide**	Synthetic resin	—
28	**Scraper**	Stainless steel + NBR	Linear guide
29	**Steel ball**	Special steel	—
30	**Lock**	—	With lock only

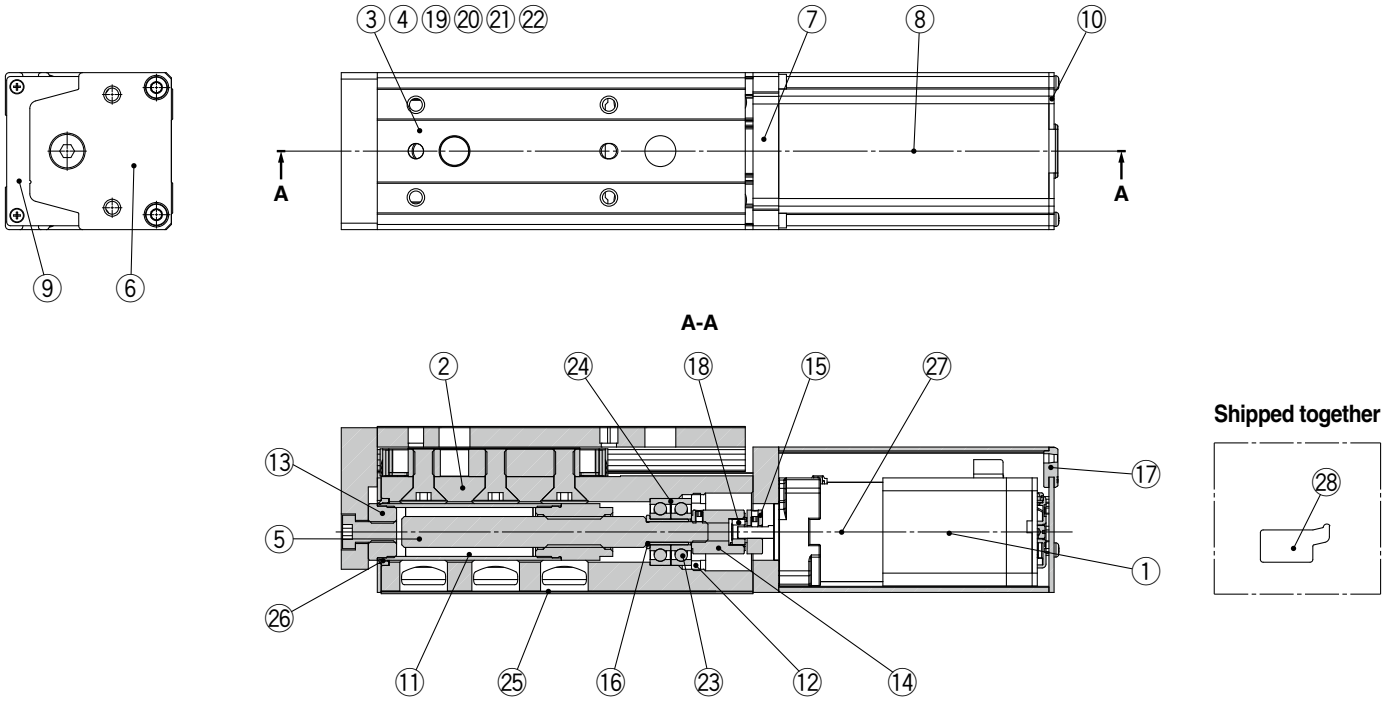
Replacement Parts/Belt

Model	Order no.
LESH25□	LE-D-1-3

Replacement Parts/Grease Pack

Applied portion	Order no.
Guide unit	GR-S-010 (10 g) GR-S-020 (20 g)

Construction: In-line Motor Type/D Type



Component Parts

No.	Description	Material	Note
1	**Motor**	—	—
2	**Body**	Aluminum alloy	Anodized
3	**Table**	Stainless steel	Heat treatment + Electroless nickel plating
4	**Guide block**	Stainless steel	Heat treatment
5	**Lead screw**	Stainless steel	Heat treatment + Special treatment
6	**End plate**	Aluminum alloy	Anodized
7	**Motor flange**	Aluminum alloy	Anodized
8	**Motor cover**	Aluminum alloy	Anodized
9	**End cover**	Aluminum alloy	Anodized
10	**Motor end cover**	Aluminum alloy	Anodized
11	**Rod**	Stainless steel	—
12	**Bearing stopper**	Structural steel	Electroless nickel plating
		Brass	Electroless nickel plating (LESH25D□ only)
13	**Socket**	Structural steel	Electroless nickel plating
14	**Hub (Lead screw side)**	Aluminum alloy	—
15	**Hub (Motor side)**	Aluminum alloy	—
16	**Spacer**	Stainless steel	LESH25D□ only
17	**Grommet**	NBR	—
18	**Spider**	NBR	—
19	**Cover**	Synthetic resin	—
20	**Return guide**	Synthetic resin	—
21	**Scraper**	Stainless steel + NBR	Linear guide

No.	Description	Material	Note
22	**Steel ball**	Special steel	—
23	**Bearing**	—	—
24	**Sim ring**	Structural steel	—
25	**Masking tape**	—	—
26	**Scraper**	NBR	Dust-protected option only/ Rod
27	**Lock**	—	With lock only
28	**Side holder**	Aluminum alloy	Anodized

Optional Parts/Side Holder

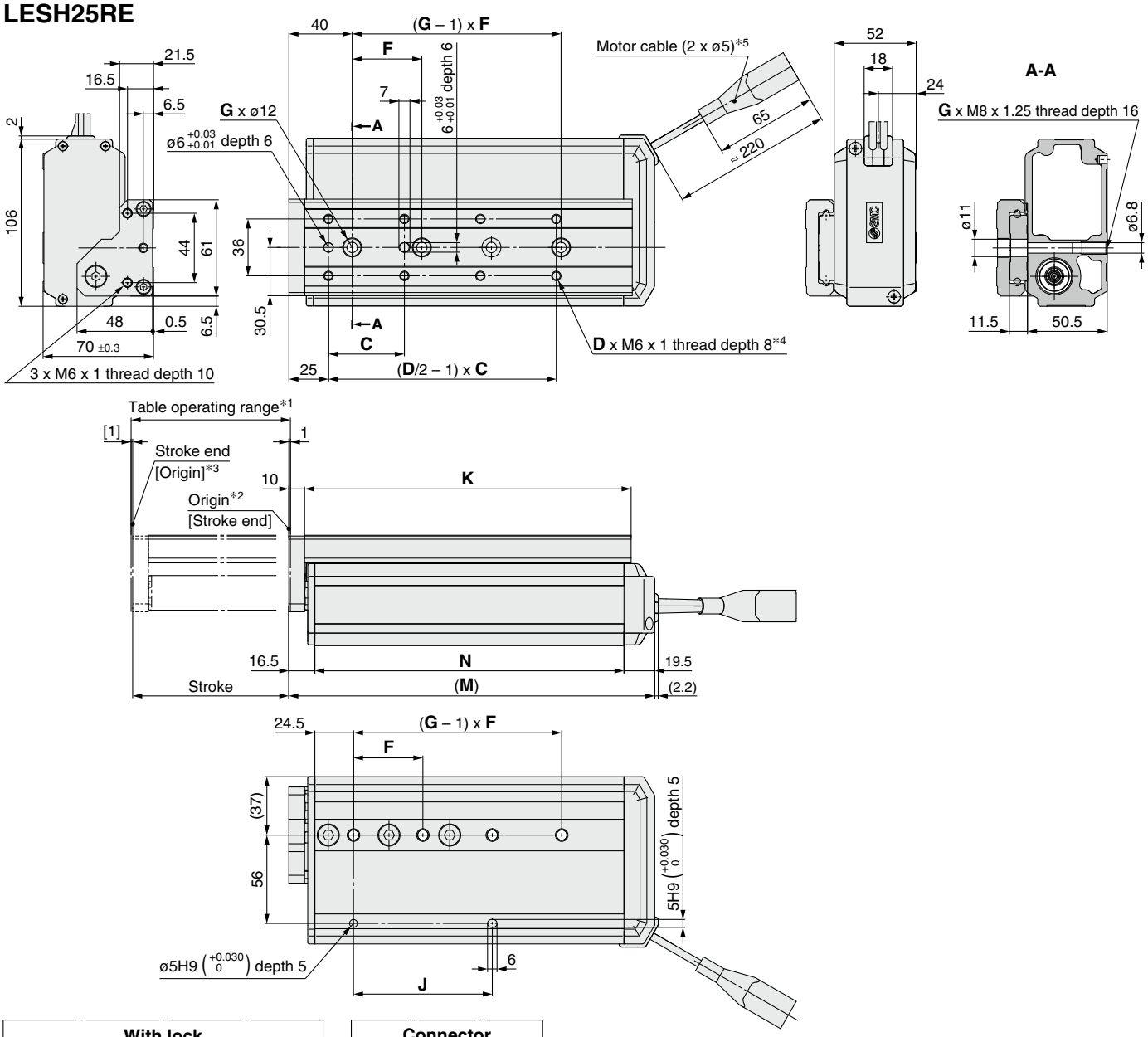
Model	Order no.
LESH25D	LE-D-3-3

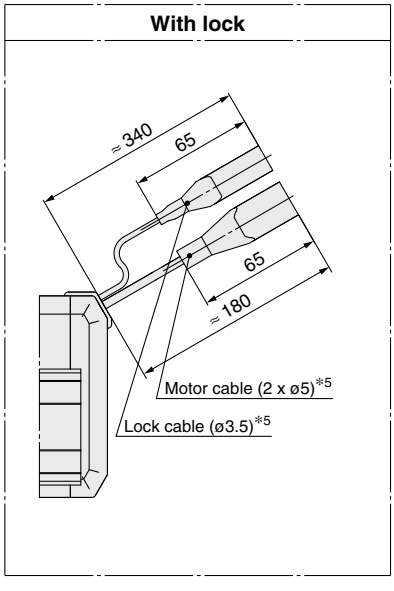
Replacement Parts/Grease Pack

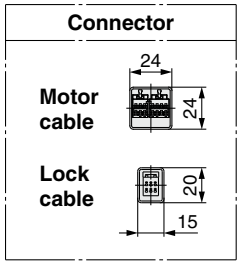
Applied portion	Order no.
Guide unit	GR-S-010 (10 g) GR-S-020 (20 g)

Dimensions: Basic Type/R Type

LESH25RE







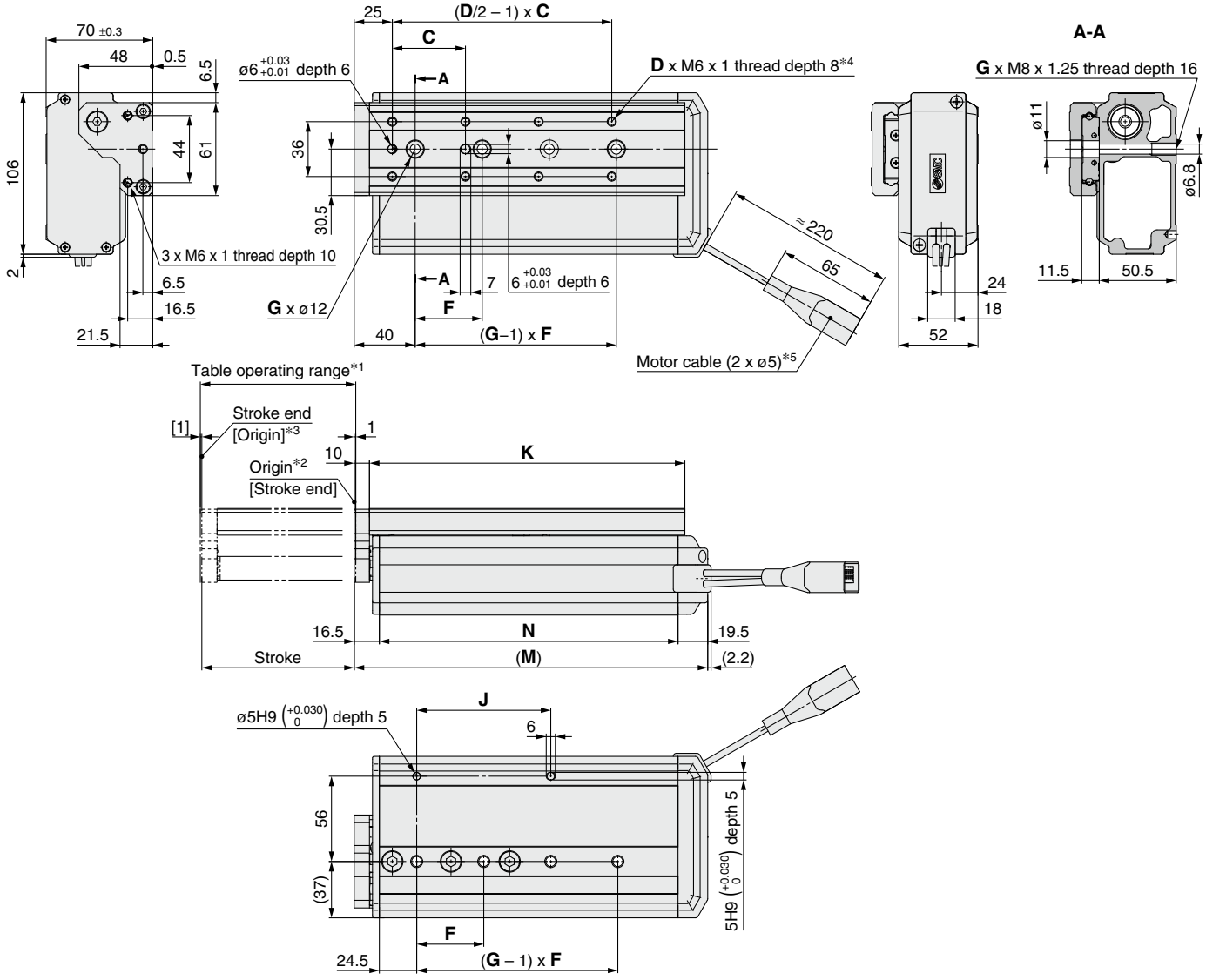
[mm]

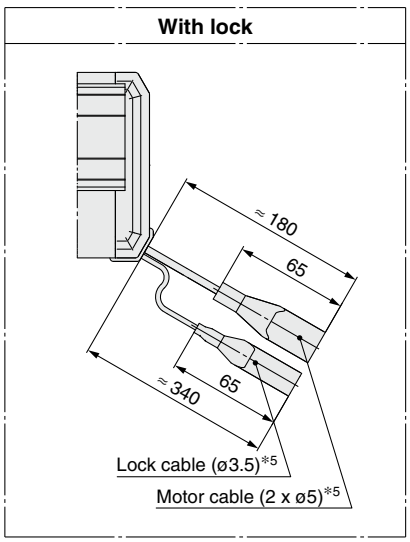
Model	C	D	F	G	J	K	M	N
LESH25RE□-50□□-□□□□□	75	4	80	2	80	143	168	132
LESH25RE□-100□□-□□□□□	48	8	44	4	88	207	232	196
LESH25RE□-150□□-□□□□□	65	8	66	4	132	285	310	274

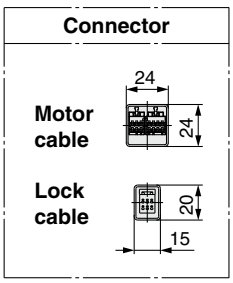
*1 This is the range within which the table can move when it returns to origin. Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*2 Position after returning to origin
*3 [ ] for when the direction of return to origin has changed
*4 If workpiece retaining screws are too long, they can touch the guide block and cause a malfunction. Use screws that are between the maximum and minimum screw-in depths in length.
*5 Secure the motor cable and lock cable so that the cables are not repeatedly bent.

Dimensions: Symmetrical Type/L Type

LESH25LE







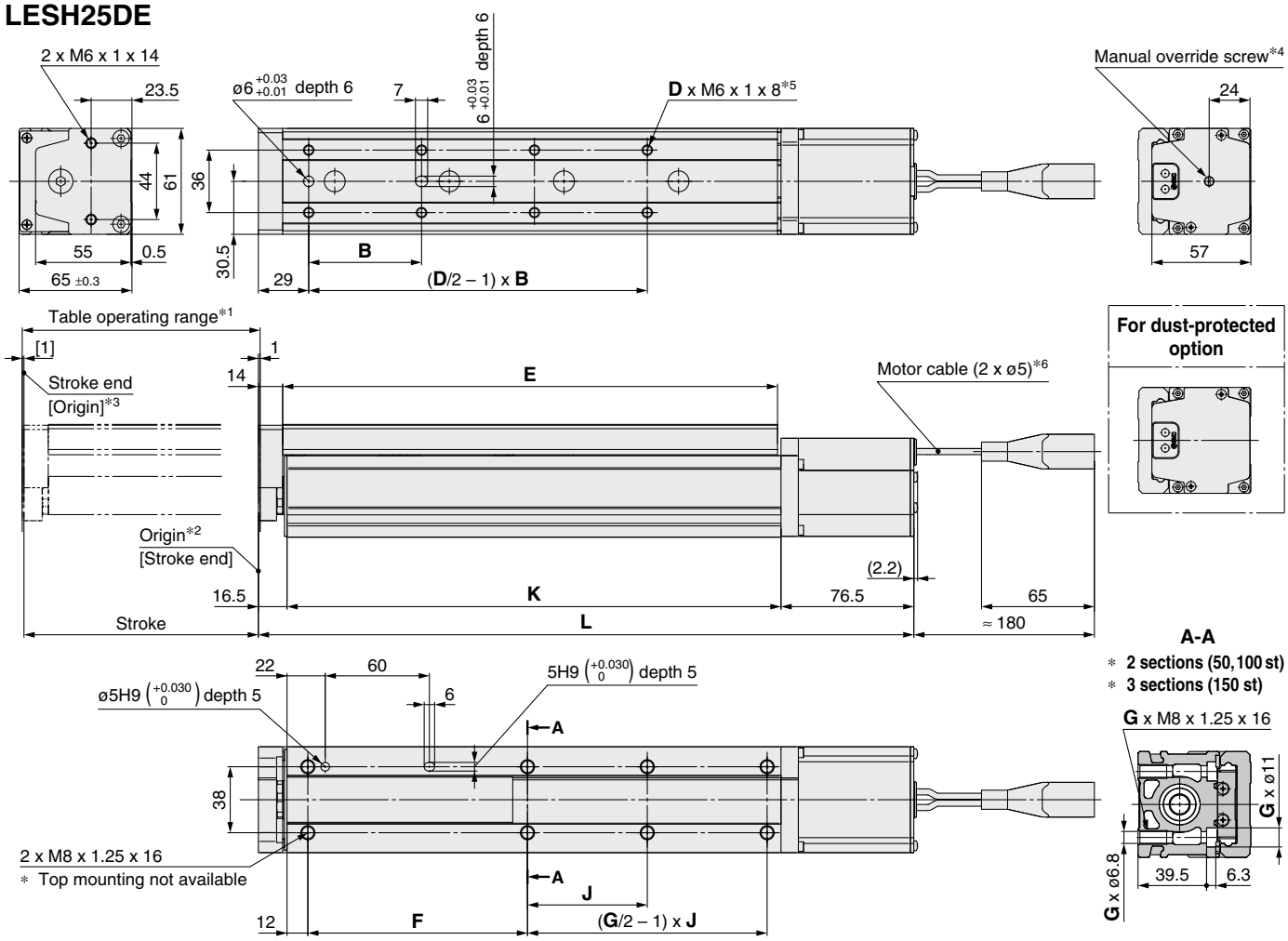
[mm]

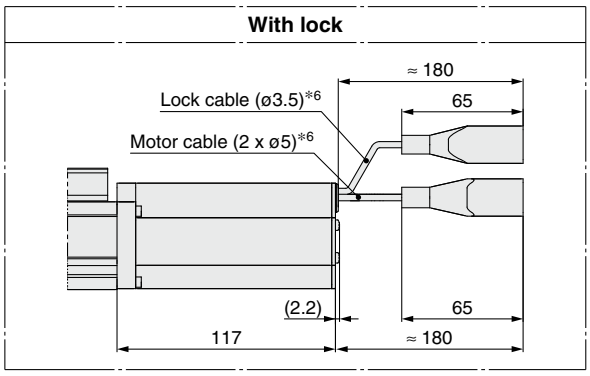
Model	C	D	F	G	J	K	M	N
LESH25LE□-50□□-□□□□□	75	4	80	2	80	143	168	132
LESH25LE□-100□□-□□□□□	48	8	44	4	88	207	232	196
LESH25LE□-150□□-□□□□□	65	8	66	4	132	285	310	274

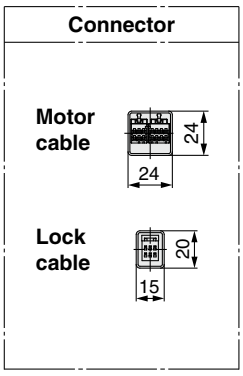
*1 This is the range within which the table can move when it returns to origin. Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
*2 Position after returning to origin
*3 [ ] for when the direction of return to origin has changed
*4 If workpiece retaining screws are too long, they can touch the guide block and cause a malfunction. Use screws that are between the maximum and minimum screw-in depths in length.
*5 Secure the motor cable and lock cable so that the cables are not repeatedly bent.

Dimensions: In-line Motor Type/D Type

LESH25DE





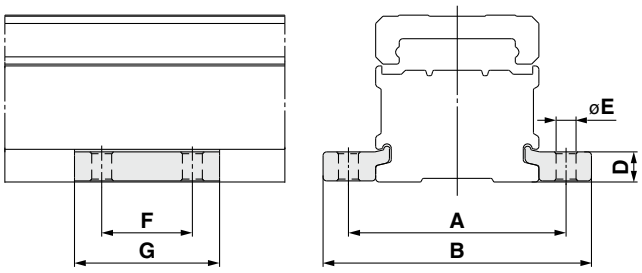


[mm]

Model	L	B	D	E	F	G	J	K
LESH25DE□-50□□-□□□□□	237.5	75	4	143	84	4	40.5	144.5
LESH25DE□-50B□□-□□□□□	278							
LESH25DE□-100□□-□□□□□	299.5	48	8	207	98.5		88	206.5
LESH25DE□-100B□□-□□□□□	340							
LESH25DE□-150□□-□□□□□	377.5	65		285	126.5	6	69	284.5
LESH25DE□-150B□□-□□□□□	418							

∗1 This is the range within which the table can move when it returns to origin. Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
∗2 Position after returning to origin
∗3 [ ] for when the direction of return to origin has changed
∗4 The distance between the motor end cover and the manual override screw is up to 4 mm. The motor end cover hole size is ø5.5.
∗5 If workpiece retaining screws are too long, they can touch the guide block and cause a malfunction. Use screws that are between the maximum and minimum screw-in depths in length.
∗6 Secure the motor cable and lock cable so that the cables are not repeatedly bent.

Side Holder (In-line Motor Type/D Type)



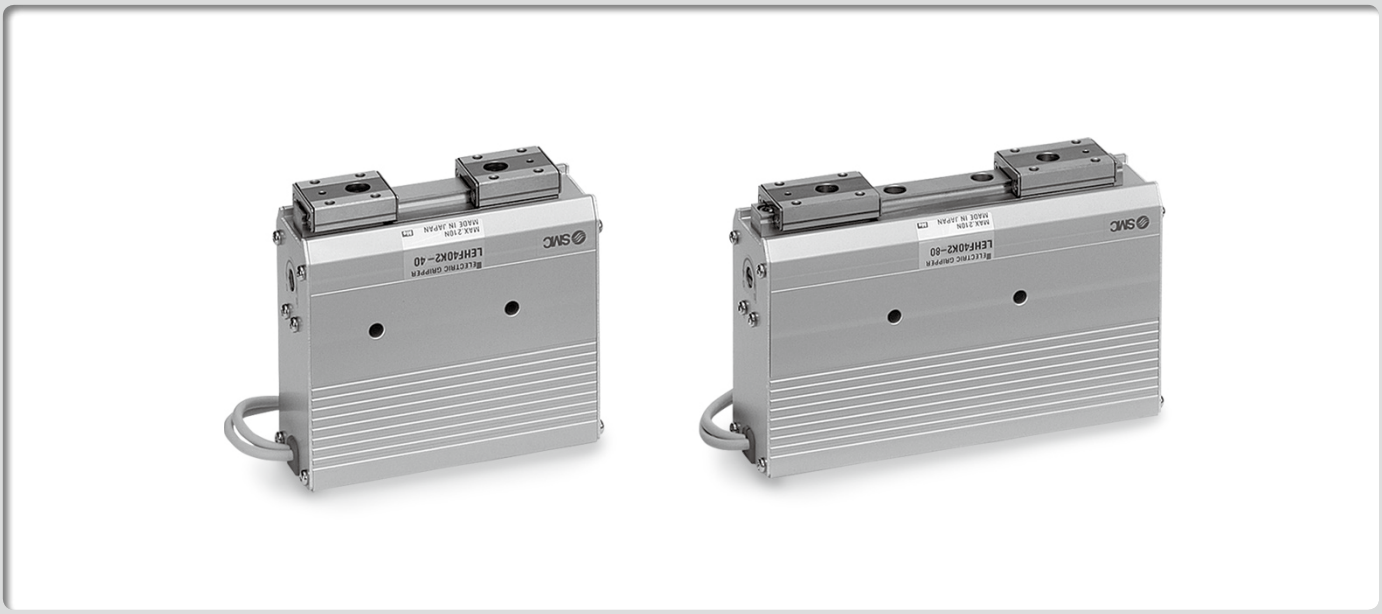
[mm]

Part no.*1	A	B	D	E	F	G	Applicable model
LE-D-3-3	81	99	12	6.6	30	49	**LESH25DE**

*1 Part number for 1 side holder

Gripper

2-Finger Type LEHF Series p. 143



Controllers p. 164

Model Selection

Selection Procedure

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

Step 1 Check the gripping force.

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

Example

Workpiece mass: 0.5 kg

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

- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times*1 the workpiece weight, or more.

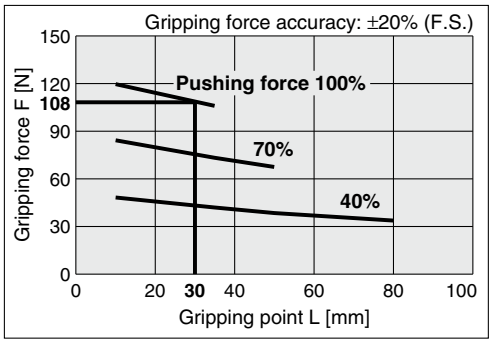
*1 For details, refer to the model selection illustration.

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

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

Required gripping force
= 0.5 kg x 20 x 9.8 m/s² ≈ 98 N or more

LEHF32



When the LEHF32 is selected.

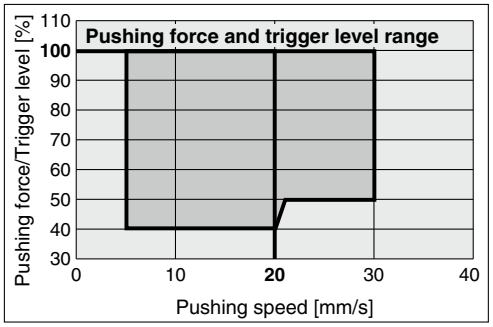
- Gripping force can be found to be 108 N from the intersection point of gripping point distance L = 30 mm and pushing force of 100%.
- Gripping force is 22 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

Pushing force: 100%

Gripping point distance: 30 mm

Pushing speed: 20 mm/s

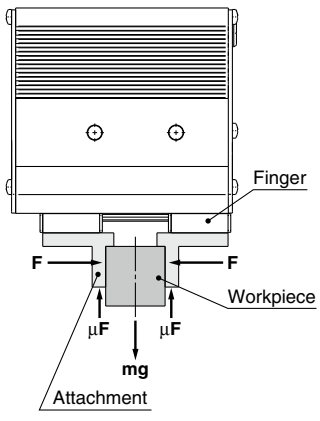
LEHF32



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

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

Calculation of required gripping force



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

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

the conditions under which the workpiece will not drop are

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

(2: Number of fingers)

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

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

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

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

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

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

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

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

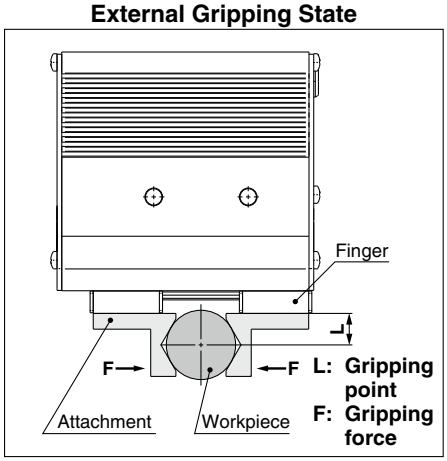
* • Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration or impact forces are encountered during motion, a further margin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

Selection Procedure

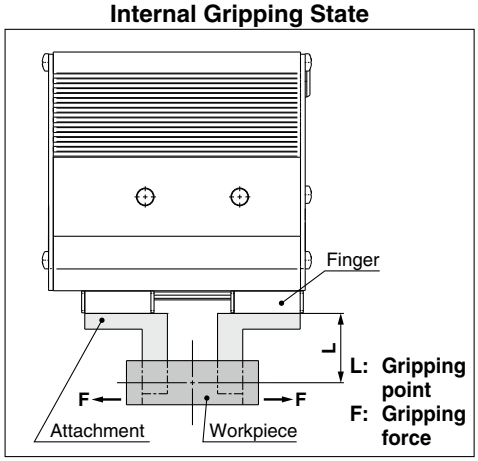
Step 1 Check the gripping force: LEHF Series

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

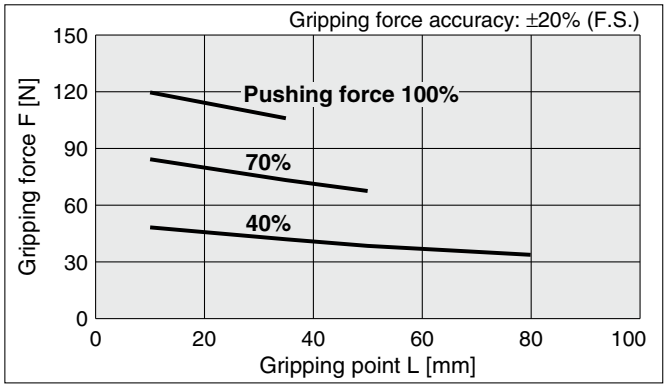
External Gripping State



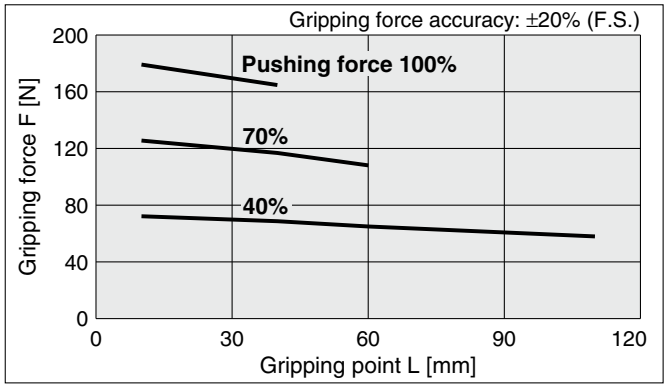
Internal Gripping State



LEHF32



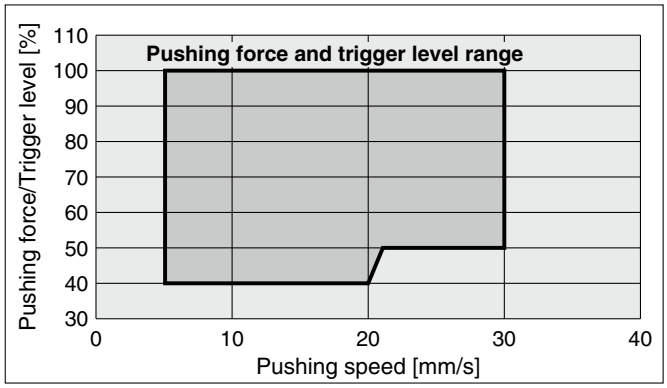
LEHF40



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

Selection of Pushing Speed

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

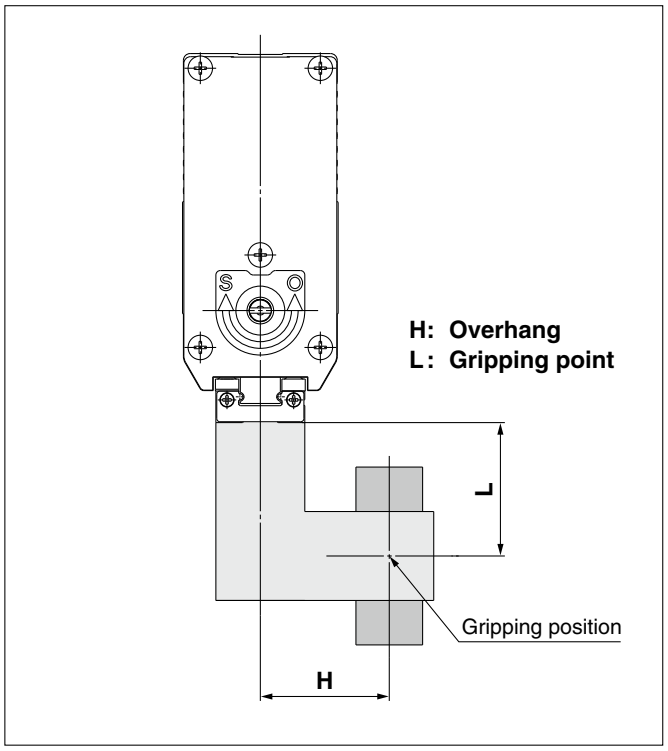


Selection Procedure

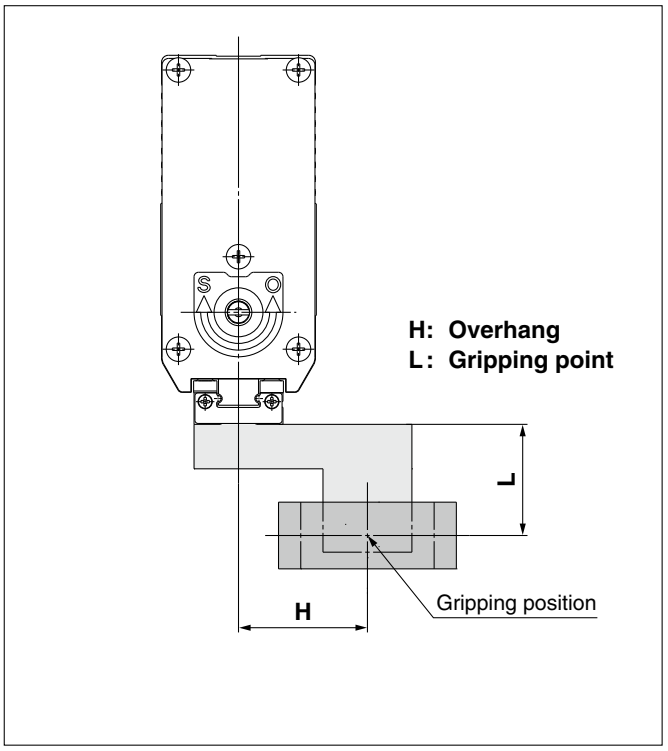
Step 2 Check the gripping point and overhang: LEHF Series

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

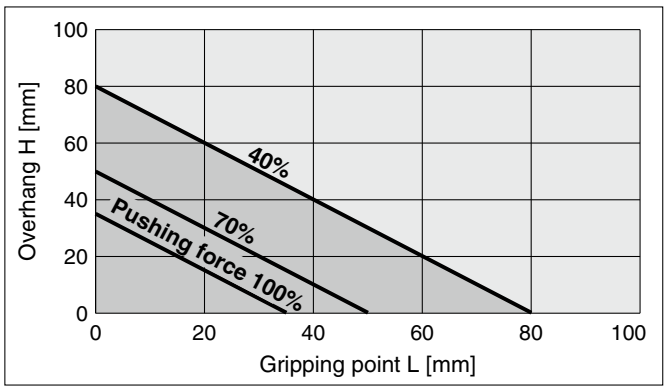
External Gripping State



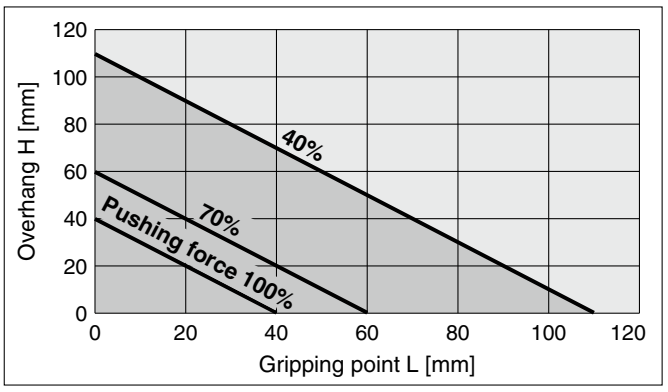
Internal Gripping State



LEHF32



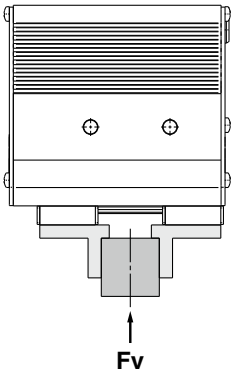
LEHF40



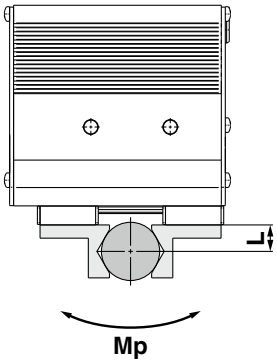
∗ Pushing force is one of the values of step data that is input into the controller.

Selection Procedure

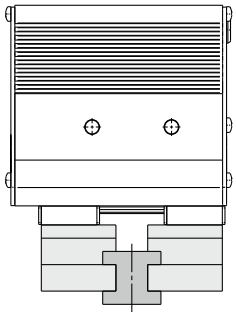
Step 3 Check the external force on fingers: LEHF Series



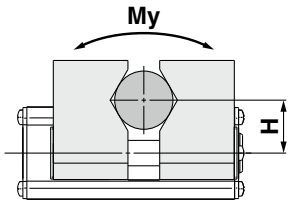
Fv: Allowable vertical load

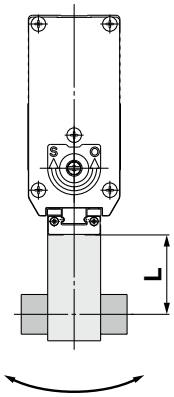


Mp: Pitch moment



My: Yaw moment





Mr: Roll moment

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

Model	Allowable vertical load Fv [N]	Static allowable moment		
		Pitch moment: Mp [N·m]	Yaw moment: My [N·m]	Roll moment: Mr [N·m]
LEHF32EK2-□	176	1.4	1.4	2.8
LEHF40EK2-□	294	2	2	4

∗ Values for load in the table indicate static values.

Calculation of allowable external force (when moment load is applied)	Calculation example
Allowable load F [N] = $\dfrac{\text{M (Static allowable moment) [N·m]}}{\text{L x } 10^{-3} \text{ ∗1}}$ (∗1 Constant for unit conversion)	When a static load of f = 10 N is operating, which applies pitch moment to point L = 30 mm from the LEHF20K2-□ guide. Therefore, it can be used. **Allowable load F =** $\dfrac{0.68}{30 \text{ x } 10^{-3}}$ **= 22.7 [N]** **Load f = 10 [N] < 22.7 [N]**

Battery-less Absolute Encoder Type
Gripper
LEHF Series LEHF32, 40

CE RoHS

* For details, refer to page 182 and onwards.

How to Order

LEHF 32 E K 2 – 64 □ – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

For details on controllers, refer to the next page.

❶ Size

32
40

❷ Motor type

E	Battery-less absolute (Step motor 24 VDC)

❸ Lead

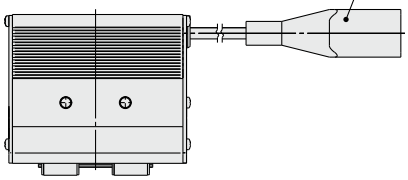
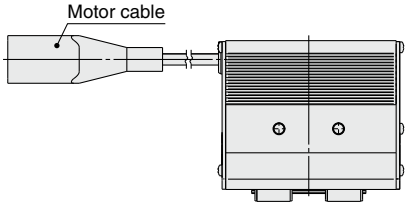
K	Basic

❹ 2-finger type

❺ Stroke [mm]

Stroke/both sides		Size
Basic	Long stroke	
32	**64**	32
40	**80**	40

❻ Motor cable entry

Nil	Basic (Entry on the right side) Motor cable 
L	Entry on the left side Motor cable 

❼ Actuator cable type/length

Robotic cable [m]

Nil	None	**R8**	8*1
R1	1.5	**RA**	10*1
R3	3	**RB**	15*1
R5	5	**RC**	20*1

⑧ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗2	DIN rail

Communication plug connector, I/O cable∗3

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 Produced upon receipt of order
∗2 The DIN rail is not included. It must be ordered separately.
∗3 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet™ or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

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

[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

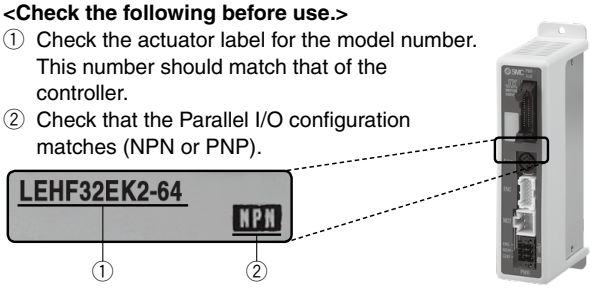
[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.

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

<Check the following before use.>

① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

Specifications

Battery-less Absolute (Step Motor 24 VDC)

Model			LEHF32E	LEHF40E
Actuator specifications	Open and close stroke/both sides [mm]	Basic	32	40
		Long stroke	64	80
	Lead [mm]		70/16 (4.375)	70/16 (4.375)
	Gripping force [N]*1 *3		48 to 120	72 to 180
	Open and close speed/Pushing speed [mm/s]*2 *3		5 to 100/5 to 30	
	Drive method		Slide screw + Belt	
	Finger guide type		Linear guide (No circulation)	
	Repeated length measurement accuracy [mm]*4		±0.05	
	Finger backlash/one side [mm]*5		0.5 or less	
	Repeatability [mm]*6		±0.05	
	Positioning repeatability/one side [mm]		±0.1	
	Lost motion/one side [mm]*7		0.3 or less	
	Impact/Vibration resistance [m/s²]*8		150/30	
	Max. operating frequency [C.P.M]		60	
	Operating temperature range [°C]		5 to 40	
	Operating humidity range [%RH]		90 or less (No condensation)	
	Weight [g]	Basic	1625	1980
		Long stroke	1970	2500
Electric specifications	Motor size		□42	
	Motor type		Battery-less absolute (Step motor 24 VDC)	
	Encoder		Battery-less absolute	
	Power supply voltage [V]		24 VDC ±10%	
	Power [W]*9		Max. power 57	Max. power 61

*1 Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±20% (F.S.) for LEHF32/40. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

*2 Pushing speed should be set within the range during pushing (gripping) operations. Otherwise, it may cause a malfunction. The open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

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

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

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

*6 Repeatability means the variation of the gripping position (workpiece position) when gripping operations are repeatedly performed by the same sequence for the same workpiece.

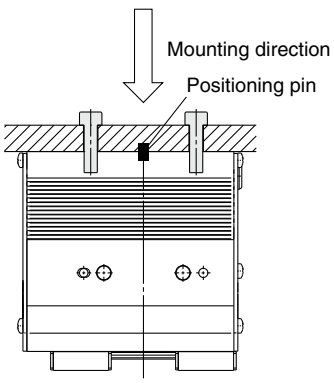
*7 A reference value for correcting errors in reciprocal operation which occur during positioning operations

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

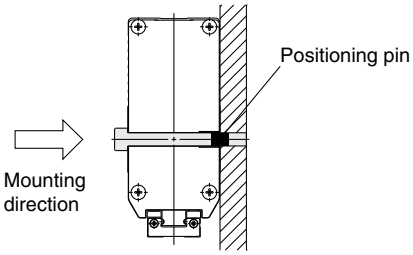
*9 Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply.

How to Mount

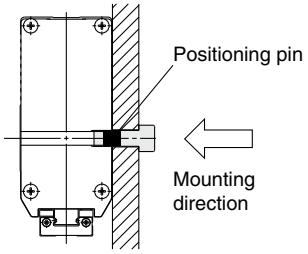
a) When using the thread on the body



b) When using the thread on the mounting plate

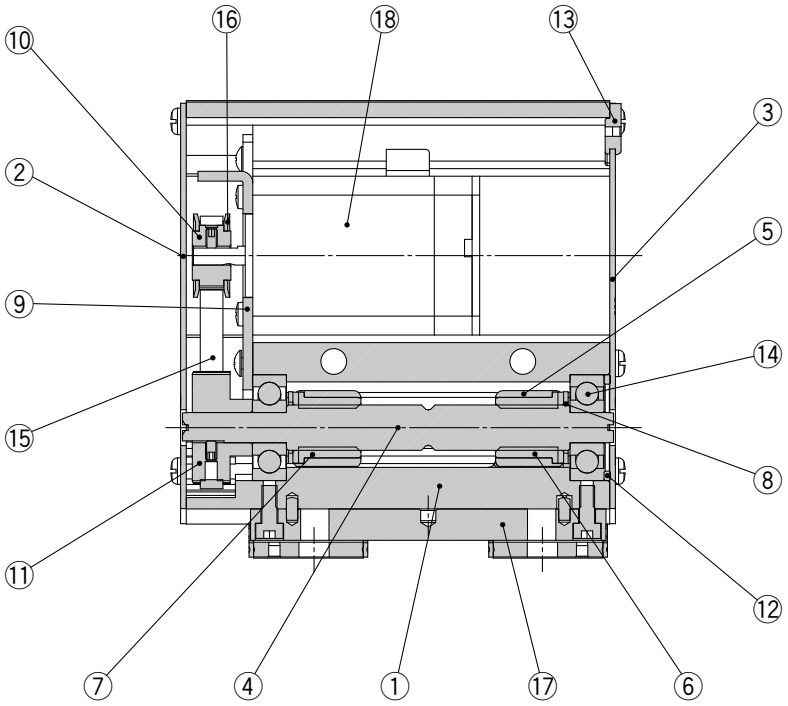


c) When using the thread on the back of the body



Construction

LEHF Series

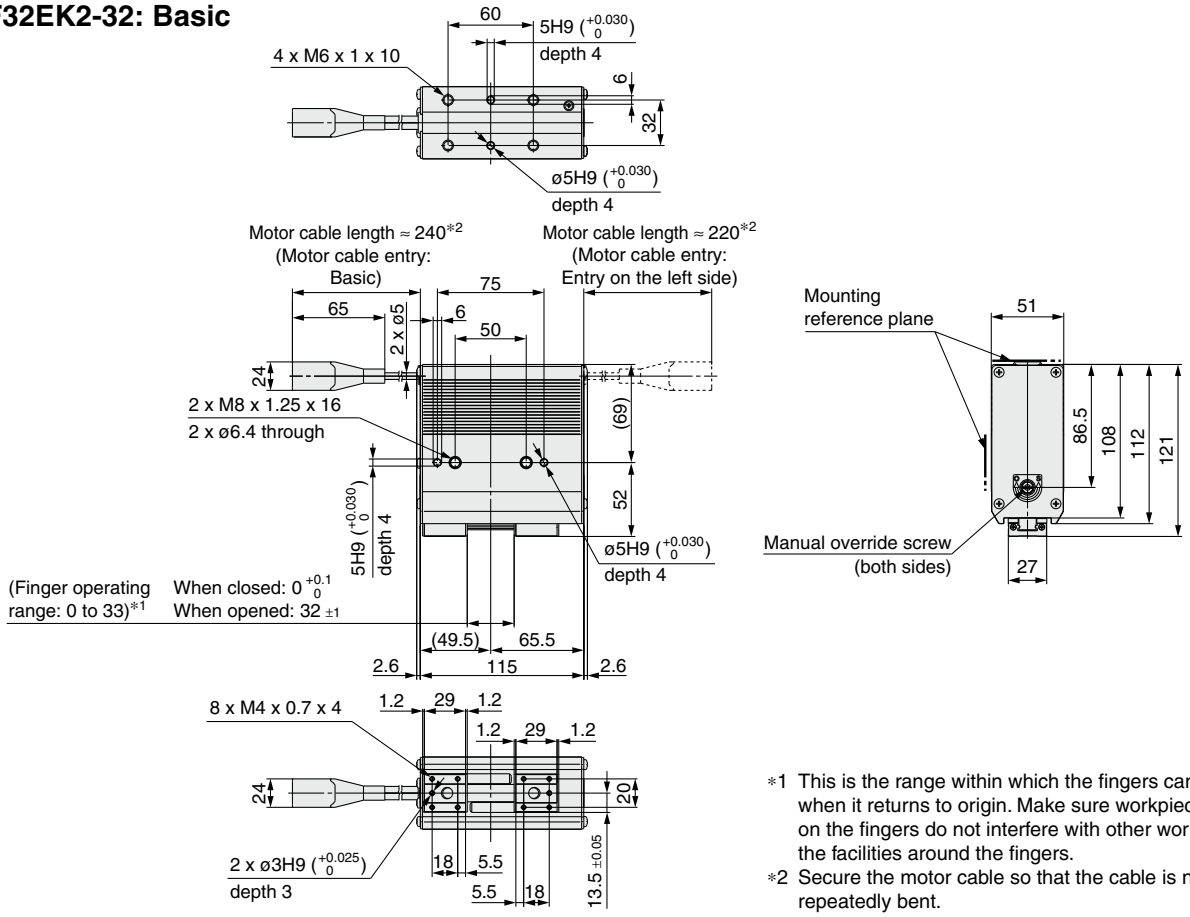


Component Parts

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

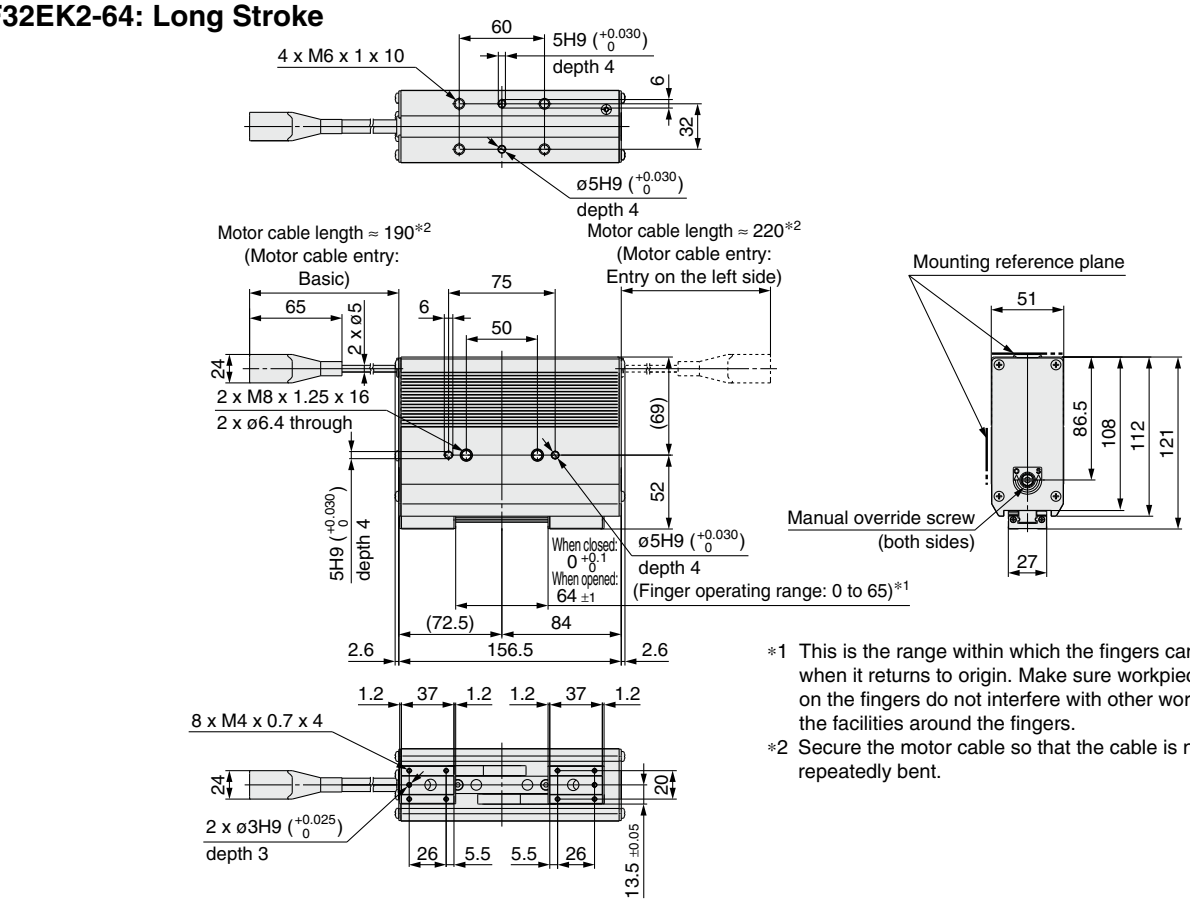
Dimensions

LEHF32EK2-32: Basic



*1 This is the range within which the fingers can move when it returns to origin. Make sure workpieces mounted on the fingers do not interfere with other workpieces or the facilities around the fingers.
*2 Secure the motor cable so that the cable is not repeatedly bent.

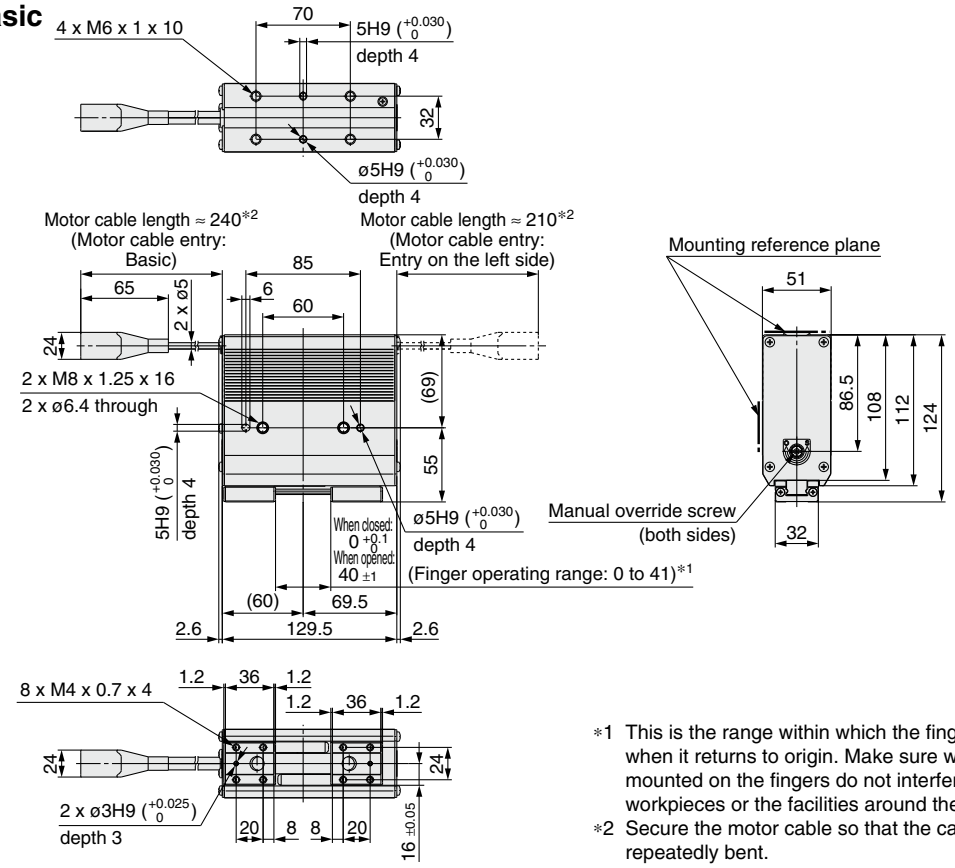
LEHF32EK2-64: Long Stroke



*1 This is the range within which the fingers can move when it returns to origin. Make sure workpieces mounted on the fingers do not interfere with other workpieces or the facilities around the fingers.
*2 Secure the motor cable so that the cable is not repeatedly bent.

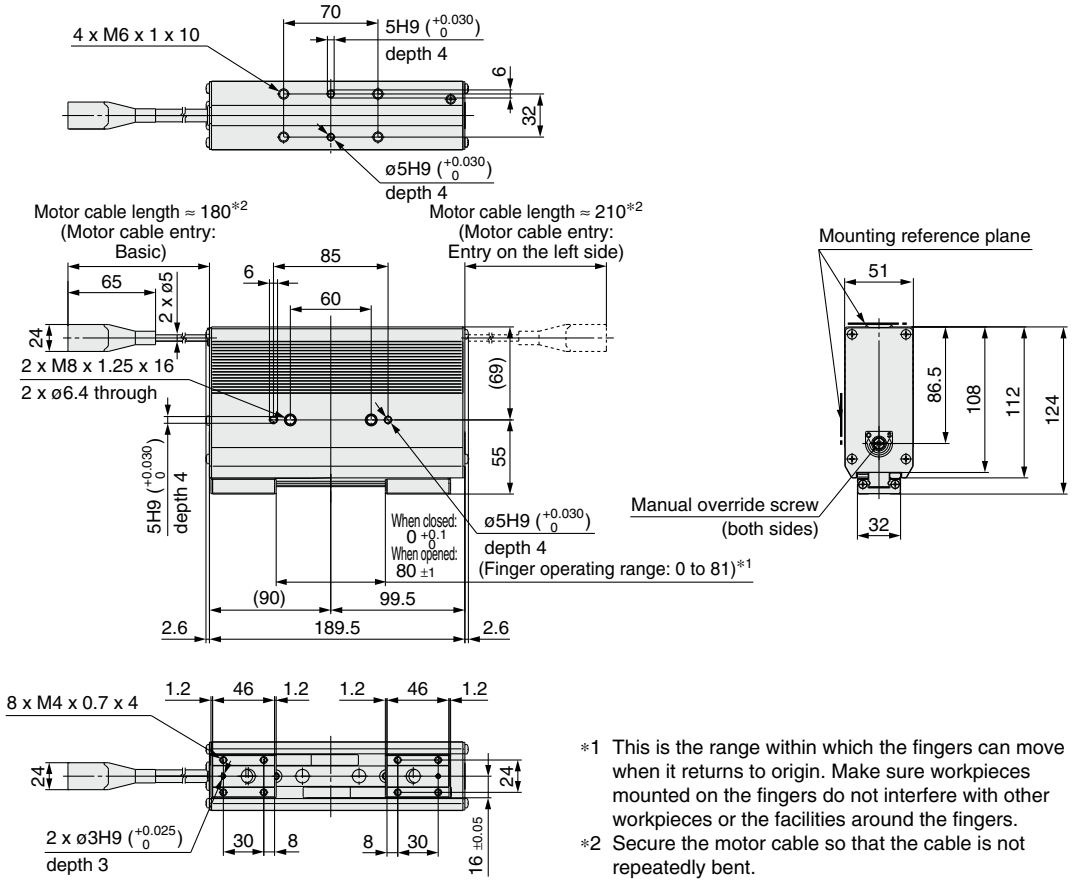
Dimensions

LEHF40EK2-40: Basic



*1 This is the range within which the fingers can move when it returns to origin. Make sure workpieces mounted on the fingers do not interfere with other workpieces or the facilities around the fingers.
*2 Secure the motor cable so that the cable is not repeatedly bent.

LEHF40EK2-80: Long Stroke



*1 This is the range within which the fingers can move when it returns to origin. Make sure workpieces mounted on the fingers do not interfere with other workpieces or the facilities around the fingers.
*2 Secure the motor cable so that the cable is not repeatedly bent.

Rotary Table

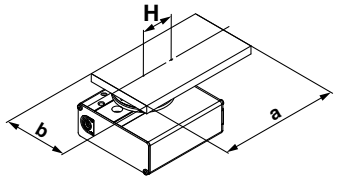
Rotary Table LER Series p. 155

Controllers p. 164

Model Selection

Selection Procedure

Operating conditions



Electric rotary table: LER50EJ
Mounting position: Horizontal
Load type: Inertial load Ta
Configuration of load: 150 mm x 80 mm (Rectangular plate)
Rotation angle θ: 180°
Angular acceleration/angular deceleration $\dot{\omega}$: 1000°/s²
Angular speed ω: 420°/s
Load mass m: 6.0 kg
Distance between shaft and center of gravity H: 40 mm

Step 1 Moment of inertia—Angular acceleration/deceleration

① **Calculation of moment of inertia**

② **Moment of inertia—Check the angular acceleration/deceleration**
Select a model based on the moment of inertia and angular acceleration and deceleration while referencing the (Moment of Inertia—Angular Acceleration/Deceleration graph).

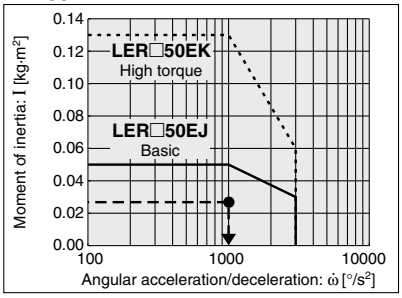
Formula

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

Selection example

$I = 6.0 \times (0.15^2 + 0.08^2)/12 + 6.0 \times 0.04^2$
$= 0.0241$ kg·m²

LER50



Step 2 Necessary torque

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

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

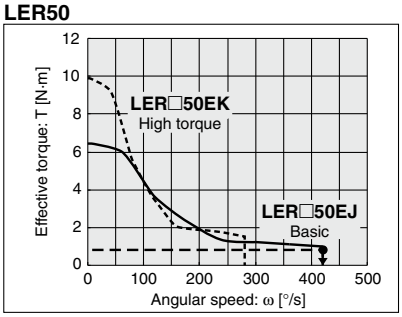
Formula

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

Selection example

Inertial load: Ta
$Ta \times 1.5 = I \times \dot{\omega} \times 2\pi/360 \times 1.5$
$= 0.0241 \times 1000 \times 0.0175 \times 1.5$
$= 0.63$ N·m

LER50



Step 3 Allowable load

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

Formula

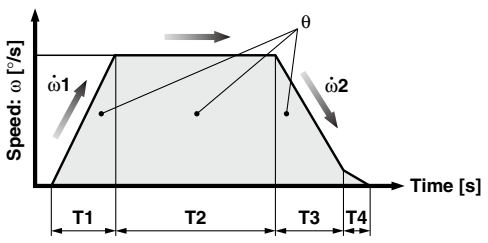
Allowable thrust load ≥ m x 9.8
Allowable moment ≥ m x 9.8 x H

Selection example

- **Thrust load**
  6.0 x 9.8 = 58.8 N < Allowable load OK
- **Allowable moment**
  6.0 x 9.8 x 0.04
  = 2.352 N·m < Allowable moment OK

Step 4 Rotation time

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



θ: **Rotation angle [°]**
ω: **Angular speed [°/s]**
$\dot{\omega}1$: **Angular acceleration [°/s²]**
$\dot{\omega}2$: **Angular deceleration [°/s²]**

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

Formula

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

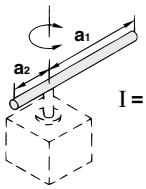
Selection example

- **Angular acceleration time** $T1 = 420/1000 = 0.42$ s
- **Angular deceleration time** $T3 = 420/1000 = 0.42$ s
- **Constant speed time**
  $T2 = \{180 - 0.5 \times 420 \times (0.42 + 0.42)\}/420$
  $= 0.009$ s
- **Cycle time** $T = T1 + T2 + T3 + T4$
  $= 0.42 + 0.009 + 0.42 + 0.2$
  $= 1.049$ [s]

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

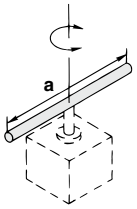
I: Moment of inertia [kg·m²] m: Load mass [kg]

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



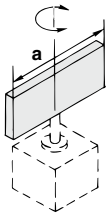
$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot \frac{a_2^2}{3}$$

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



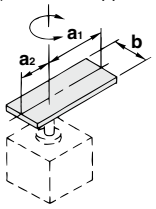
$$I = m \cdot \frac{a^2}{12}$$

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



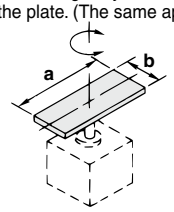
$$I = m \cdot \frac{a^2}{12}$$

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



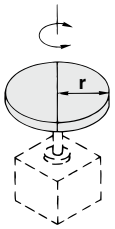
$$I = m_1 \cdot \frac{4a_1^2 + b^2}{12} + m_2 \cdot \frac{4a_2^2 + b^2}{12}$$

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



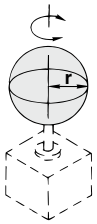
$$I = m \cdot \frac{a^2 + b^2}{12}$$

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



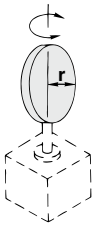
$$I = m \cdot \frac{r^2}{2}$$

7. Sphere
Position of rotation shaft: Diameter



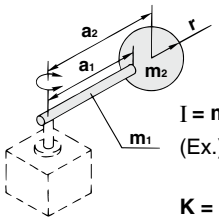
$$I = m \cdot \frac{2r^2}{5}$$

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



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

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

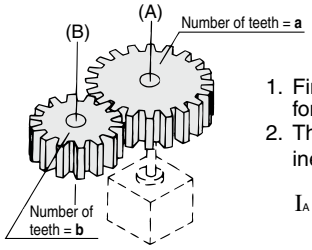


$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$$

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

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

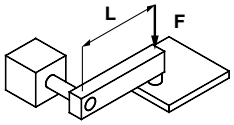
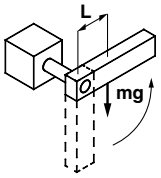
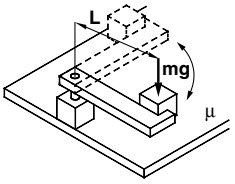
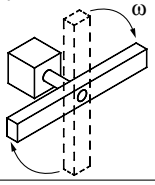
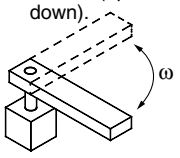
10. Gear transmission



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

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

Load Type

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

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

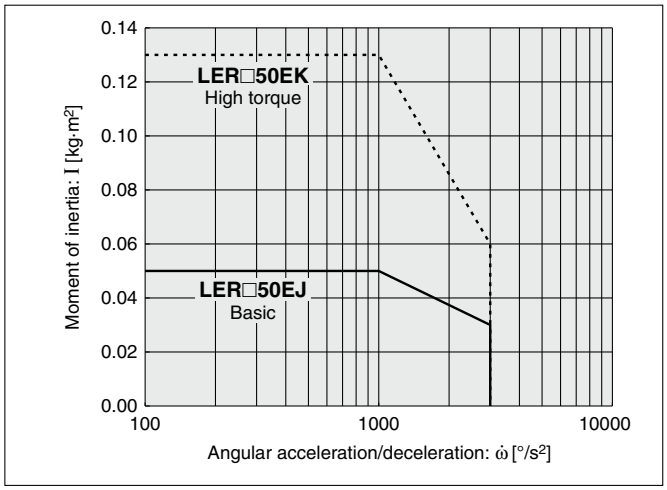
• Not resistance load: Neither gravity or friction force is applied to rotating direction.
Ex. 1) Rotation shaft is vertical (up and down).
Ex. 2) Rotation shaft is horizontal (lateral), and rotation center and the center of gravity of the load are concentric.
* Necessary torque is inertial load only.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

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

Battery-less Absolute (Step Motor 24 VDC)

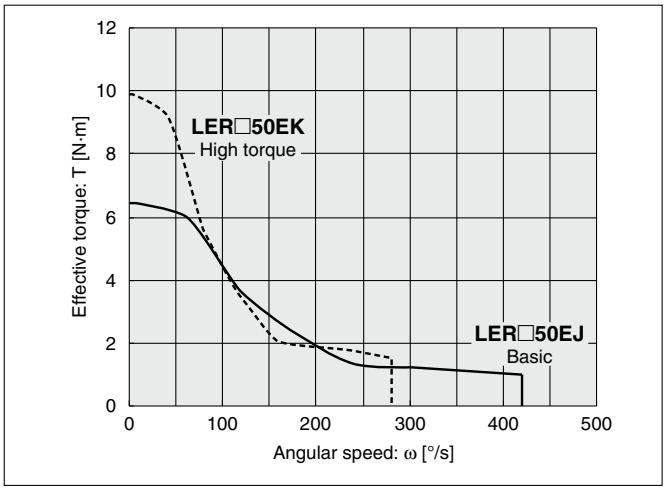
Moment of Inertia—Angular Acceleration/Deceleration

LER50

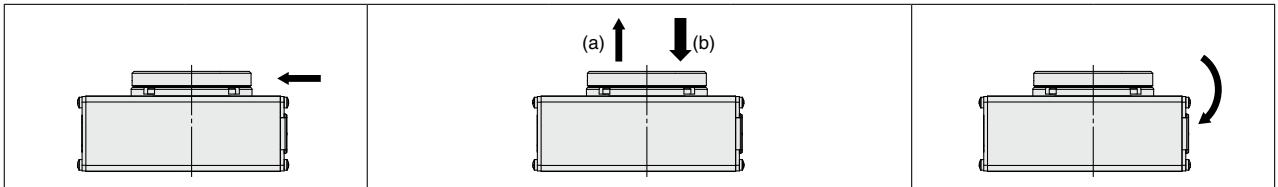


Effective Torque—Angular Speed

LER50



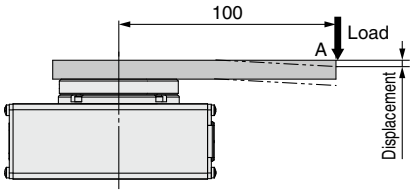
Allowable Load



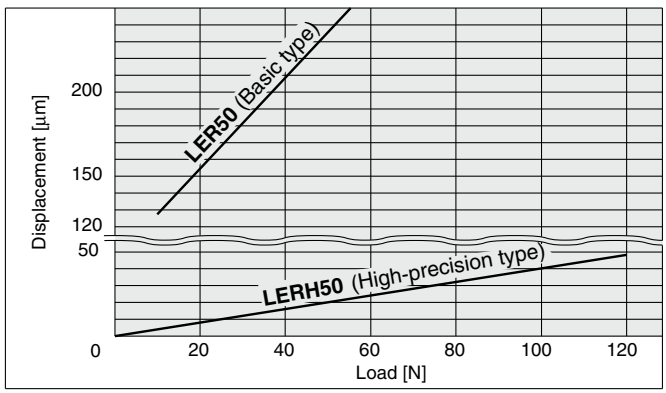
Size	Allowable radial load [N]		Allowable thrust load [N]				Allowable moment [N·m]	
			(a)		(b)			
	Basic type	High-precision type	Basic type	High-precision type	Basic type	High-precision type	Basic type	High-precision type
50	314	378	296		398	517	9.7	12.0

Table Displacement (Reference Value)

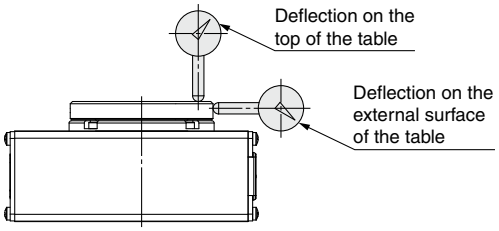
- Displacement at point A when a load is applied to point A 100 mm away from the rotation center.



LER□50



Deflection Accuracy: Displacement at 180° Rotation (Guide)



[mm]

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

Battery-less Absolute (Step Motor 24 VDC)

Battery-less Absolute Encoder Type
Rotary Table
LER Series LER50

CE RoHS

* For details, refer to page 182 and onwards.

How to Order

LER ❶ 50 ❷ E ❸ K ❹ – ❺ ❻ – R1 ❼ CD17T ❽

For details on controllers, refer to the next page.

❶ Table accuracy

Nil	Basic type
H	High-precision type

❷ Size

50

❸ Motor type

E	Battery-less absolute (Step motor 24 VDC)

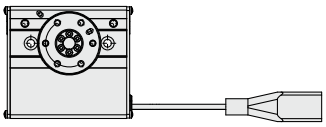
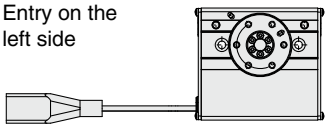
❹ Max. rotating torque [N·m]

K	High torque	10
J	Basic	6.6

❺ Rotation angle [°]

Nil	320
2	External stopper: 180
3	External stopper: 90

❻ Motor cable entry

Nil	Basic type (entry on the right side) 
L	Entry on the left side 

❼ Actuator cable type/length

Robotic cable [m]

Nil	None	**R8**	8*1
R1	1.5	**RA**	10*1
R3	3	**RB**	15*1
R5	5	**RC**	20*1

⑧ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Input/Output/ Communication protocol)

5	Parallel input (NPN)
6	Parallel input (PNP)
E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link
M	CC-Link Ver. 1.10

For single axis

Mounting

7	Screw mounting
8∗2	DIN rail

Communication plug connector, I/O cable∗3

Symbol	Type	Applicable interface
Nil	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver. 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

∗1 Produced upon receipt of order
∗2 The DIN rail is not included. It must be ordered separately.
∗3 Select "Nil" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet™ or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

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

[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 179 and 180.

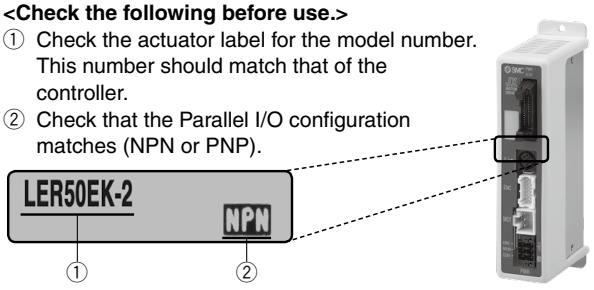
[UL certification]
The JXC series controllers used in combination with electric actuators are UL certified.

The actuator and controller are sold as a package.

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

<Check the following before use.>

① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Type	Step data input type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type	CC-Link direct input type
							
Series	**JXC51 JXC61**	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**	**JXCM1**
Features	Parallel I/O	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)						
Max. number of step data	64 points						
Power supply voltage	24 VDC						
Reference page	165	172					

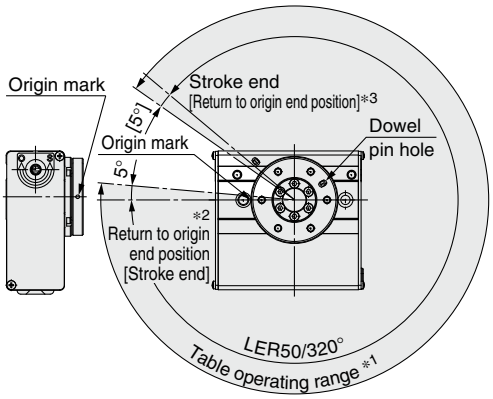
Specifications

Battery-less Absolute (Step Motor 24 VDC)

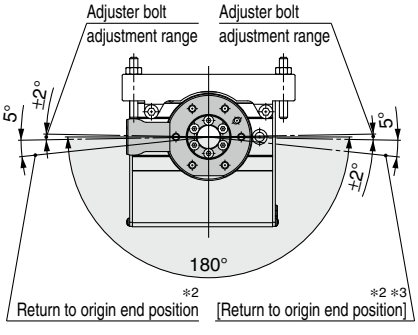
Model				LER□50EK	LER□50EJ
Actuator specifications (Basic type)	Rotation angle [°]			320	
	Lead [°]			7.5	12
	Max. rotating torque [N·m]			10	6.6
	Max. pushing torque 40 to 50% [N·m]∗1 ∗3			4.0 to 5.0	2.6 to 3.3
	Max. moment of inertia [kg·m²]∗2 ∗3	LECP6/LECP1/ LECPMJ/JXC□1		0.13	0.05
		LECPA JXC□3		0.10	0.04
	Angular speed [°/s]∗2 ∗3			20 to 280	30 to 420
	Pushing speed [°/s]			20	30
	Max. angular acceleration/deceleration [°/s²]∗2			3000	
	Backlash [°]		Basic type	±0.2	
			High-precision type	±0.1	
	Positioning repeatability [°]		Basic type	±0.05	
			High-precision type	±0.03	
	Lost motion [°]∗4		Basic type	0.3 or less	
			High-precision type	0.2 or less	
	Impact/Vibration resistance [m/s²]∗5			150/30	
	Actuation type			Special worm gear + Belt drive	
	Max. operating frequency [c.p.m]			60	
	Operating temp. range [°C]			5 to 40	
	Operating humidity range [%RH]			90 or less (No condensation)	
	Weight [kg]		Basic type	2.2	
			High-precision type	2.4	
External stopper type	Rotation angle [°]	-2/ arm (1 pc.)		180	
		-3/ arm (2 pcs.)		90	
	Repeatability at the end [°]/ with external stopper			±0.01	
	External stopper setting range [°]			±2	
	Weight [kg]	-2/external arm (1 pc.)	Basic type	2.5	
			High-precision type	2.7	
		-3/external arm (1 pc.)	Basic type	2.6	
			High-precision type	2.8	
Electric specifications	Motor size			□42	
	Motor type			Battery-less absolute (Step motor 24 VDC)	
	Encoder			Battery-less absolute	
	Power supply voltage [V]			24 VDC ±10%	
	Power [W]∗6			Max. power 57	

∗1 Pushing force accuracy is LER50: ±20% (F.S.).
∗2 The angular acceleration, angular deceleration, and angular speed may fluctuate due to variations in the moment of inertia.
Refer to the "Moment of Inertia—Angular Acceleration/ Deceleration, Effective Torque—Angular Speed" graphs on page 157 for confirmation.
∗3 The speed and force may change depending on the cable length, load, and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
∗4 A reference value for correcting errors in reciprocal operation
∗5 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (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. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
∗6 Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply.

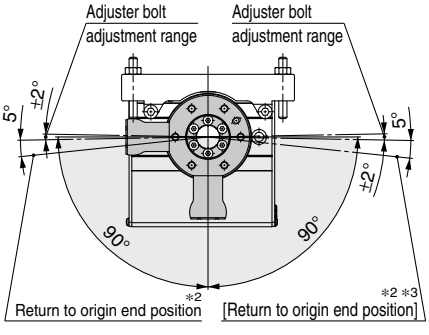
Table Rotation Angle Range



External stopper: 180°



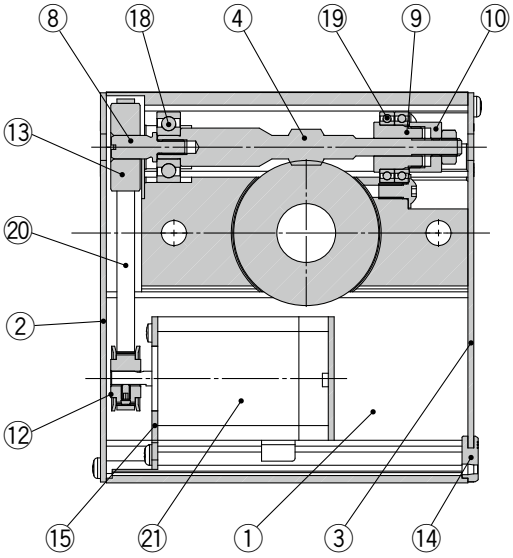
External stopper: 90°



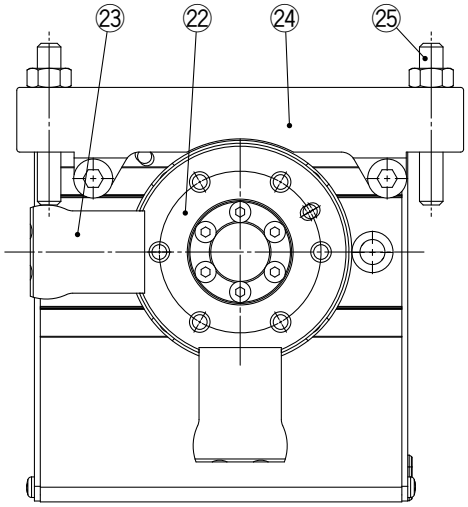
∗ The figures show the origin position for each actuator.

∗1 This is the range within which the table can move when it returns to origin.
Make sure workpieces mounted on the table do not interfere with other workpieces or the facilities around the table.
∗2 Position after returning to origin. The position varies depending on whether there is an external stopper.
∗3 [ ] for when the direction of return to origin has changed

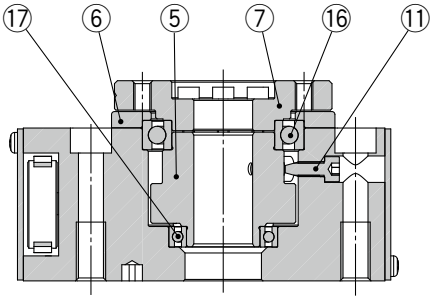
Construction



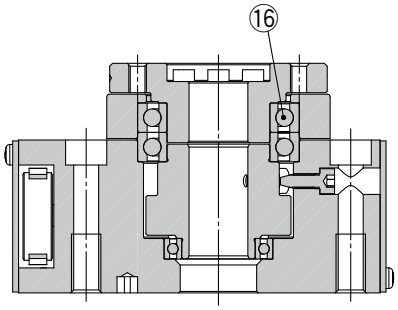
External stopper type



Basic type



High-precision type



Component Parts

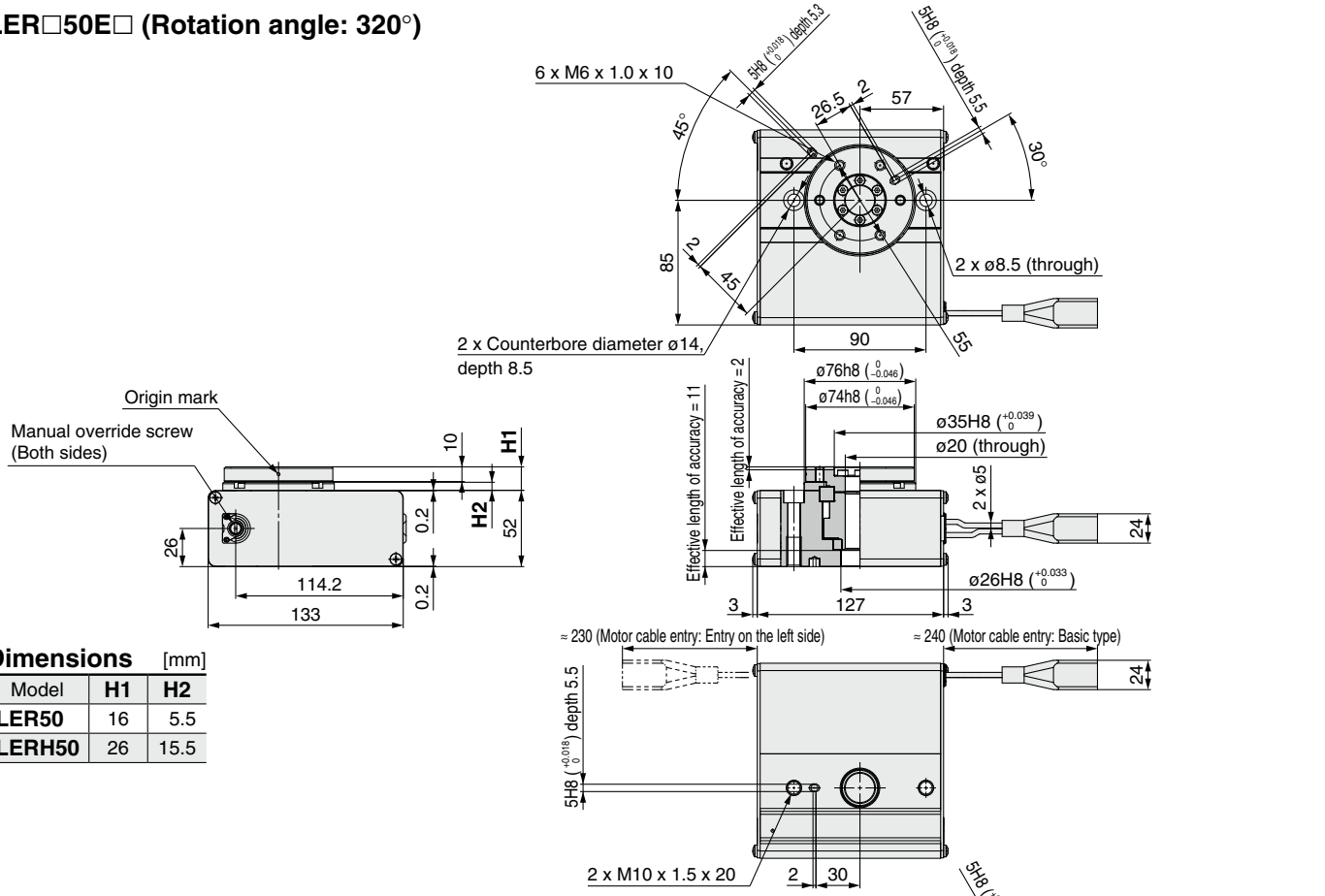
No.	Description		Material	Note
1	**Body**		Aluminum alloy	Anodized
2	**Side plate A**		Aluminum alloy	Anodized
3	**Side plate B**		Aluminum alloy	Anodized
4	**Worm screw**		Stainless steel	Heat treatment + Special treatment
5	**Worm wheel**		Stainless steel	Heat treatment + Special treatment
6	**Bearing cover**		Aluminum alloy	Anodized
7	**Table**		Aluminum alloy	
8	**Joint**		Stainless steel	
9	**Bearing holder**		Alloy steel	
10	**Bearing stopper**		Alloy steel	
11	**Origin bolt**		Carbon steel	
12	**Pulley A**		Aluminum alloy	
13	**Pulley B**		Aluminum alloy	
14	**Grommet**		NBR	
15	**Motor plate**		Carbon steel	
16	**Basic type**	Deep groove ball bearing	—	
	High-precision type	Special ball bearing		
17	**Deep groove ball bearing**		—	
18	**Deep groove ball bearing**		—	
19	**Deep groove ball bearing**		—	
20	**Belt**		—	
21	**Motor**		—	

Component Parts

No.	Description	Material	Note
22	**Table**	Aluminum alloy	Anodized
23	**Arm**	Carbon steel	Heat treatment + Electroless nickel treated
24	**Holder**	Aluminum alloy	Anodized
25	**Adjuster bolt**	Carbon steel	Heat treatment + Chromating

Dimensions

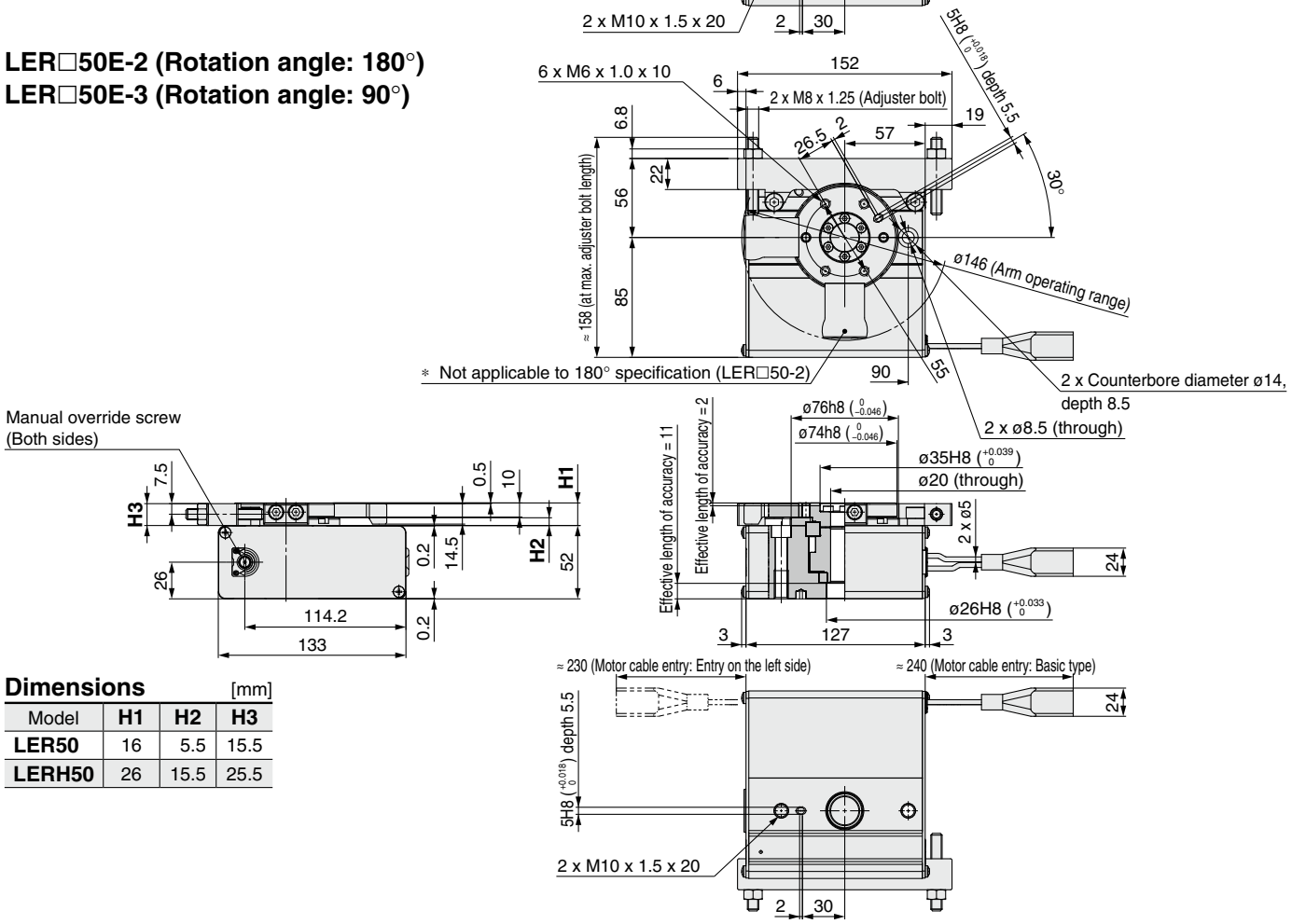
LER□50E□ (Rotation angle: 320°)



Dimensions [mm]

Model	H1	H2
LER50	16	5.5
LERH50	26	15.5

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



Dimensions [mm]

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

Controllers
JXC□ Series

* For details, refer to page 182 and onwards.

Step Data Input Type ..... p. 165

Battery-less Absolute (Step Motor 24 VDC)

JXC51/61 Series

EtherCAT®/EtherNet/IP™/PROFINET/DeviceNet™/IO-Link/CC-Link Direct Input Type ..... p. 172

Battery-less Absolute (Step Motor 24 VDC)

JXC□ Series

EtherCAT®

EtherNet/IP™

PROFINET®

DeviceNet™

IO-Link

CC-Link

Precautions Relating to Differences in Controller Versions p. 179, 180

Controller (Step Data Input Type)

JXC51/61 Series

∗ For details, refer to page 182 and onwards.

RoHS

Parallel I/O

How to Order

JXC 5 1 7 1 – □

❶ ❷ ❸ ❹

❶ Parallel I/O type

5	NPN
6	PNP

❷ Mounting

7	Screw mounting
8∗1	DIN rail

∗1 The DIN rail is not included. It must be ordered separately. (Refer to page 166.)

❸ I/O cable length [m]

Nil	None
1	1.5
3	3
5	5

❹ Actuator part number

Without cable specifications and actuator options Example: Enter "LEFS25EB-100" for the LEFS25EB-100B-R1□□.	
BC-E	Blank controller∗1

∗1 Requires dedicated software (JXC-BCW)

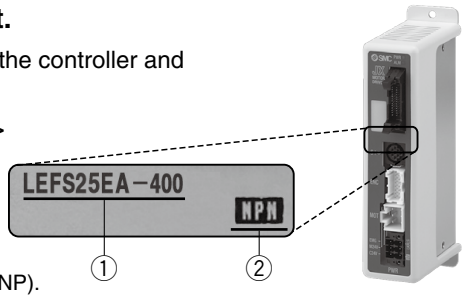
The controller is sold as single unit after the compatible actuator is set.

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

<Check the following before use.>

① Check the actuator label for the model number. This number should match that of 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: https://www.smcworld.com

Precautions for blank controllers (JXC□1□□-BC-E)

A blank controller is a controller to which the customer can write the data of the actuator it is to be combined and used with. Use the dedicated software (JXC-BCW) for data writing.

- The applicable electric actuator size range differs depending on the controller version. Refer to pages 179 and 180 for how to confirm the controller version and applicable actuator sizes.
- Please download the dedicated software (JXC-BCW) via our website.
- Order the communication cable for controller setting (JXC-W2A-C) and USB cable (LEC-W2-U) separately to use this software.

SMC website
https://www.smcworld.com

Specifications

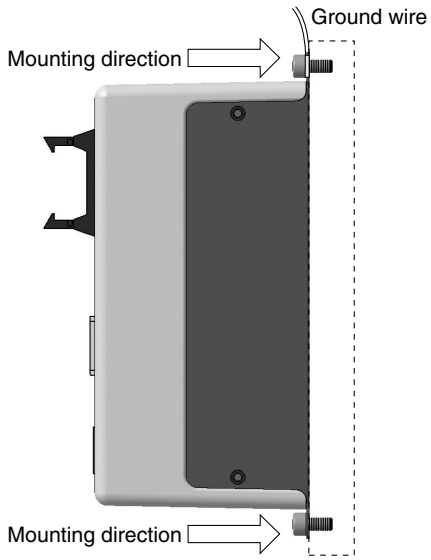
Model	JXC51 JXC61
Compatible motor	Step motor (Servo/24 VDC)
Power supply	Power voltage: 24 VDC ±10%
Current consumption (Controller)	100 mA or less
Compatible encoder	Battery-less absolute
Parallel input	11 inputs (Photo-coupler isolation)
Parallel output	13 outputs (Photo-coupler isolation)
Serial communication	RS485 (Only for the LEC-T1 and JXC-W2)
Memory	EEPROM
LED indicator	PWR, ALM
Cable length [m]	Actuator cable: 20 or less
Cooling system	Natural air cooling
Operating temperature range [°C]	0 to 55°C∗1
Operating humidity range [%RH]	90 or less (No condensation)
Insulation resistance [MΩ]	Between all external terminals and the case: 50 (500 VDC)
Weight [g]	150 (Screw mounting), 170 (DIN rail mounting)

∗1 For the LEY40 and LEYG40 series, if the vertical work load is greater than the weight listed below, use the controller at an ambient temperature of 40°C or less.

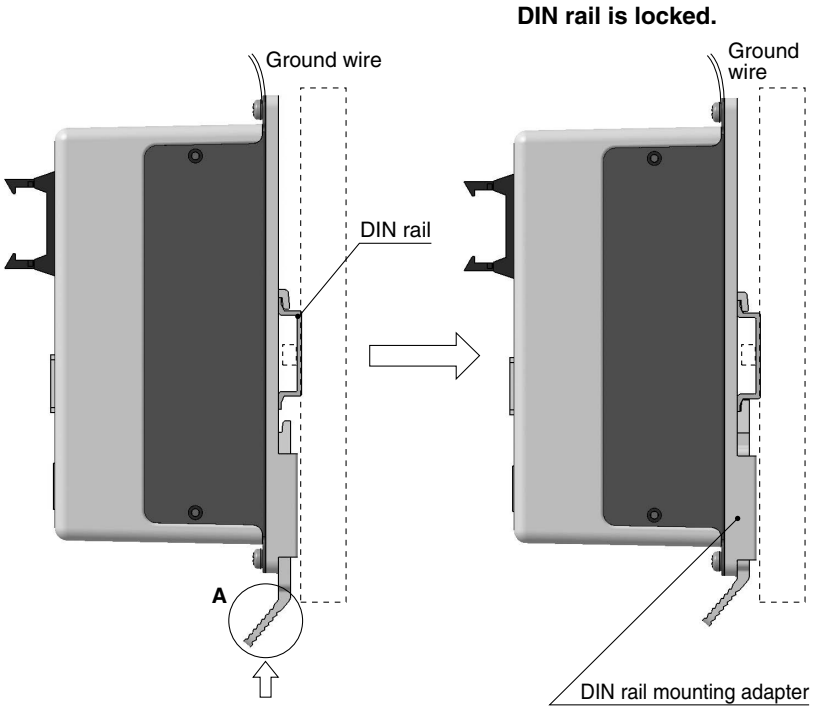
Series	Weight [kg]	Series	Weight [kg]
LEY40□EA	9	**LEYG40□EA**	7
LEY40□EB	19	**LEYG40□EB**	17
LEY40□EC	38	**LEYG40□EC**	36

How to Mount

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



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

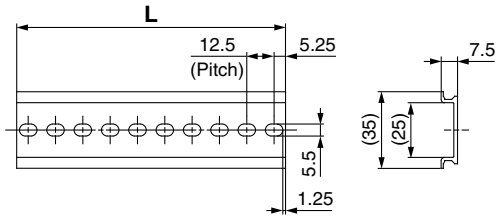


Hook the controller on the DIN rail and press the lever of section **A** in the arrow direction to lock it.

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

DIN rail
AXT100-DR-□

∗ For □, enter a number from the No. line in the table below.
Refer to the dimension drawings on page 167 for the mounting dimensions.



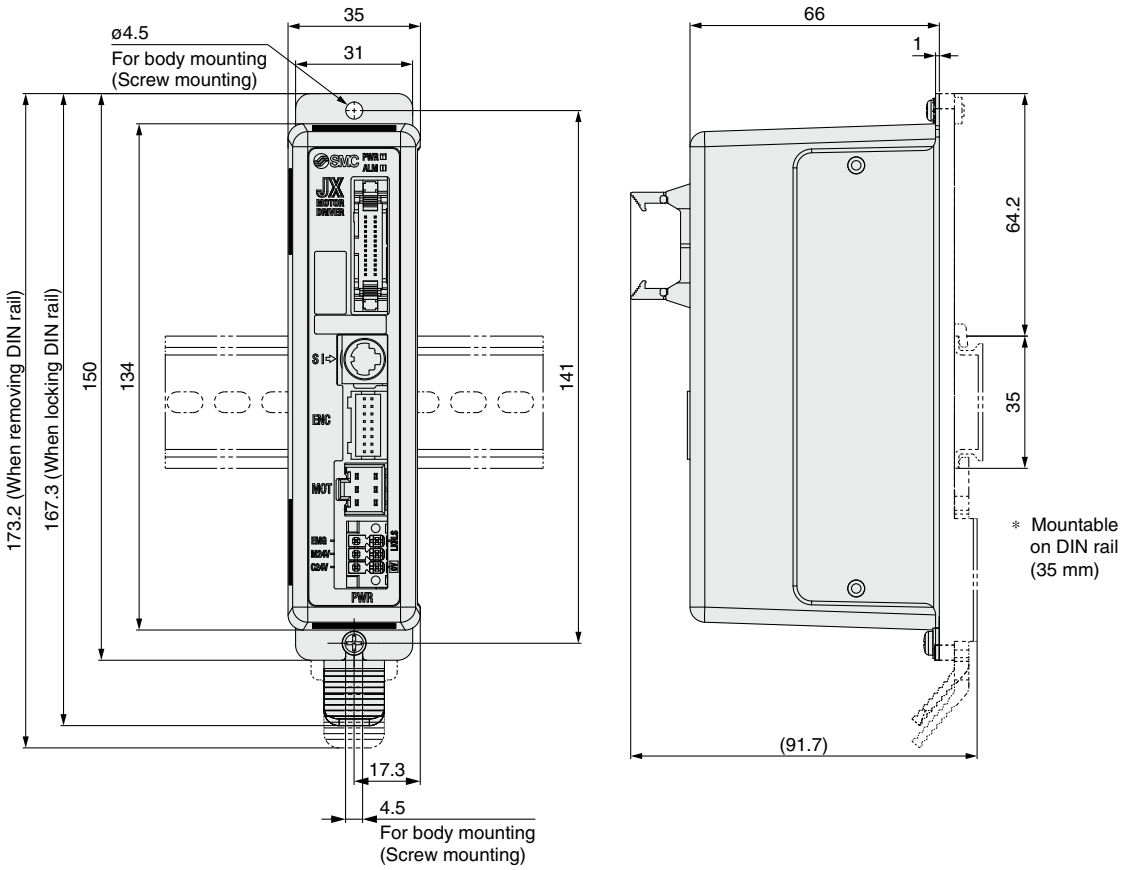
L Dimensions [mm]

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

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

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

Dimensions


35
ø4.5
For body mounting
(Screw mounting)
31
173.2 (When removing DIN rail)
167.3 (When locking DIN rail)
150
134
141
17.3
4.5
For body mounting
(Screw mounting)
66
1
64.2
35
* Mountable
on DIN rail
(35 mm)
(91.7)

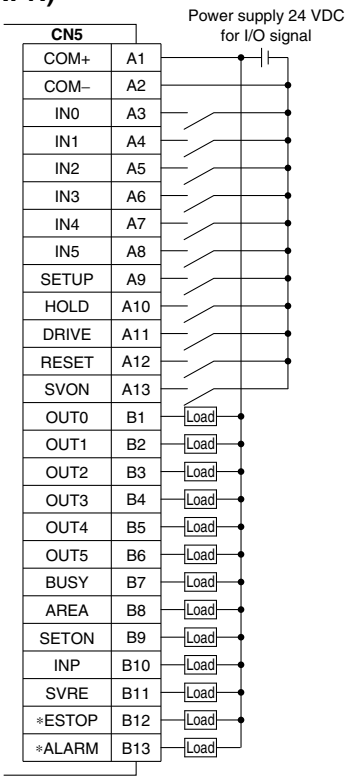
Wiring Example 1

Parallel I/O Connector

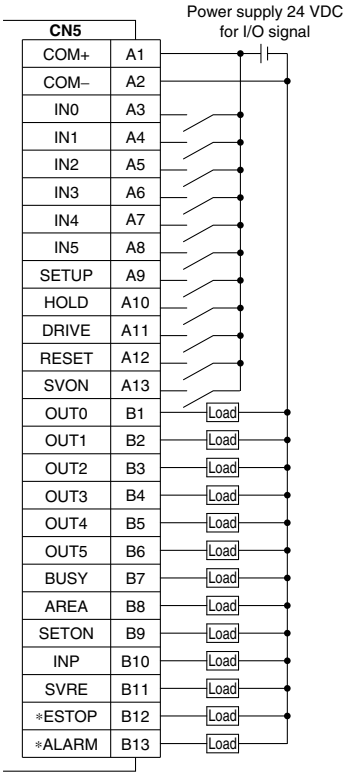
* When you connect a PLC to the parallel I/O connector, use the I/O cable (LEC-CN5-□).
* The wiring changes depending on the type of parallel I/O (NPN or PNP).

Wiring diagram

JXC51□□-□ (NPN)



JXC61□□-□ (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 by combining IN0 to 5.)
SETUP	Instruction to return to origin
HOLD	Temporarily stops operation
DRIVE	Instruction to drive
RESET	Resets alarm and interrupts operation
SVON	Servo ON instruction

Output Signal

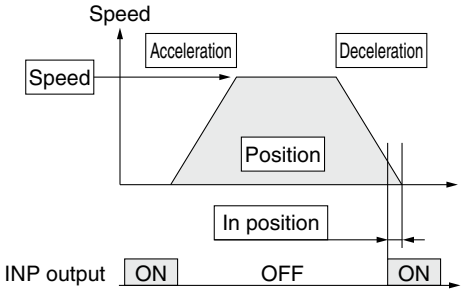
Name	Details
OUT0 to OUT5	Outputs the step data no. during operation
BUSY	Outputs when the actuator is moving
AREA	Outputs within the step data area output setting range
SETON	Outputs when returning to origin
INP	Outputs when target position or target force is reached (Turns on when the positioning or pushing is completed.)
SVRE	Outputs when servo is on
*ESTOP*1	OFF when EMG stop is instructed
*ALARM*1	OFF when alarm is generated

*1 Signal of negative-logic circuit (N.C.)

Step Data Setting

1. Step data setting for positioning

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



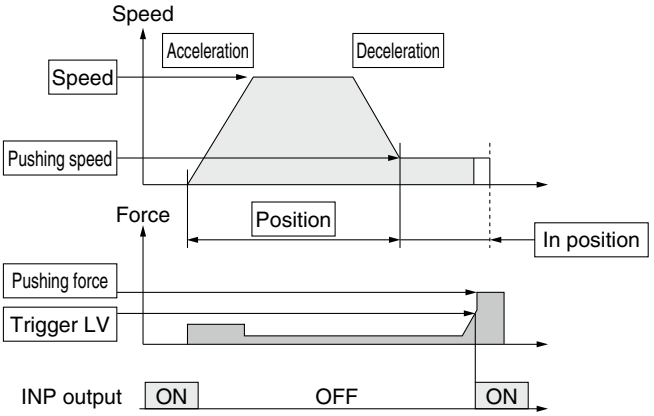
◎: Need to be set.
○: Need to be adjusted as required.
—: Setting is not required.

Step Data (Positioning)

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

2. Step data setting for pushing

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



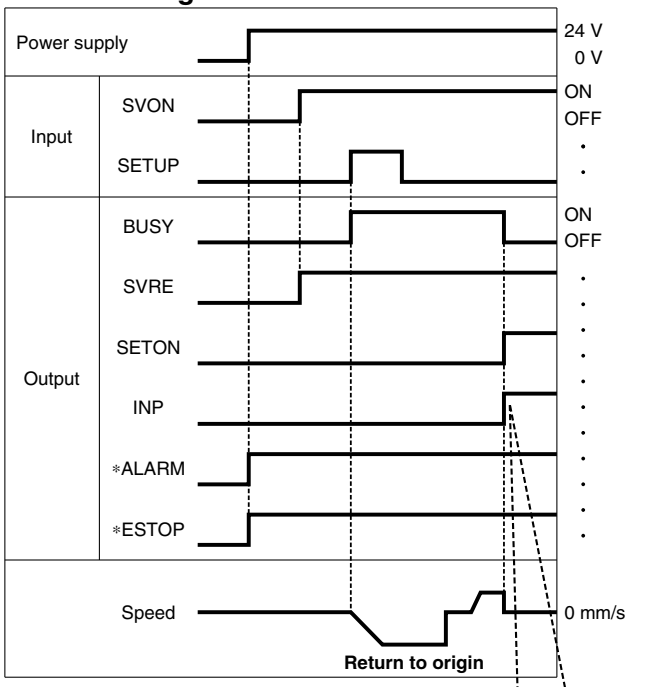
◎: Need to be set.
○: Need to be adjusted as required.

Step Data (Pushing)

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

Signal Timing

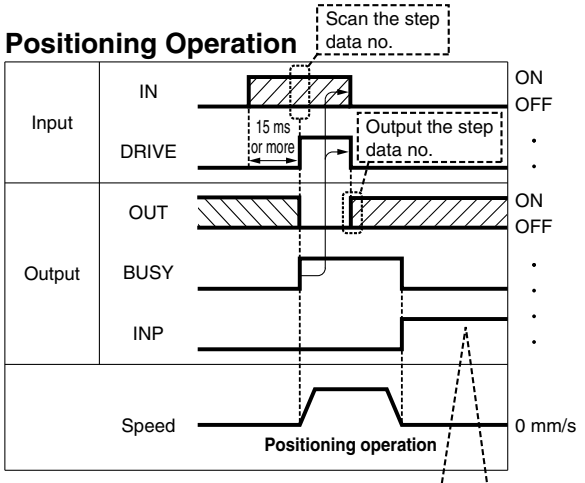
Return to Origin



If the actuator is within the "In position" range of the basic parameter, INP will turn ON, but if not, it will remain OFF.

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

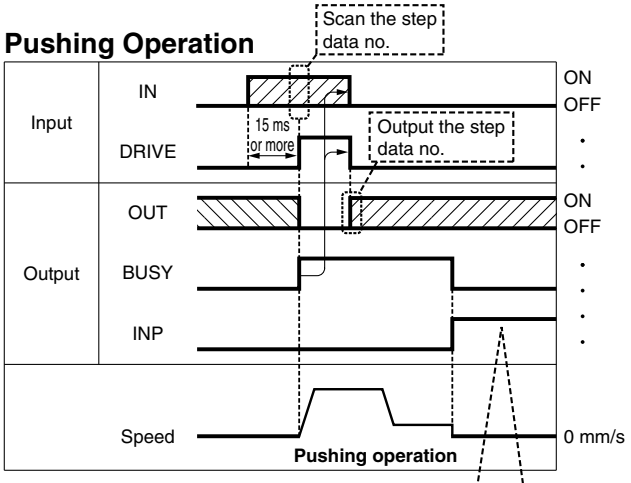
Positioning Operation



If the actuator is within the "In position" range of the step data, INP will turn ON, but if not, it will remain OFF.

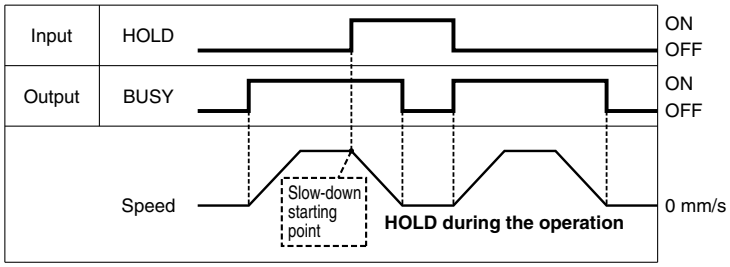
∗ "OUT" is output when "DRIVE" is changed from ON to OFF.
Refer to the operation manual for details on the controller for the LEM series.
(When power supply is applied, "DRIVE" or "RESET" is turned ON or "∗ESTOP" is turned OFF, all of the "OUT" outputs are OFF.)

Pushing Operation



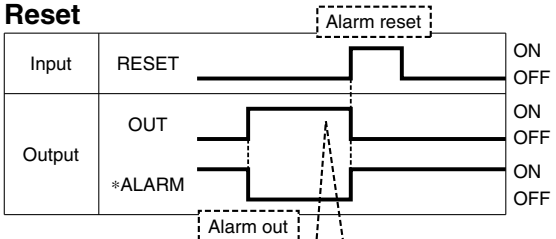
If the current pushing force exceeds the "Trigger LV" value of the step data, INP signal will turn ON.

HOLD



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

Reset



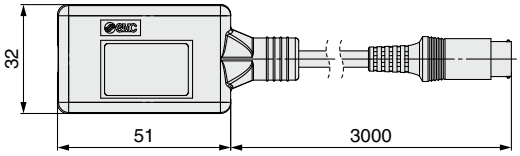
It is possible to identify the alarm group by the combination of OUT signals when the alarm is generated.

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

Options

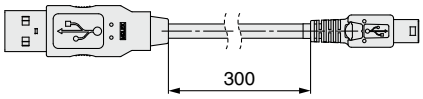
■ Communication cable for controller setting

① Communication cable JXC-W2A-C



∗ It can be connected to the controller directly.

② USB cable LEC-W2-U



③ Controller setting kit JXC-W2A

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

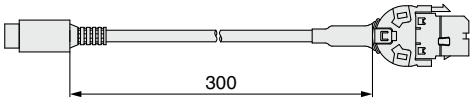
<Controller setting software/USB driver>
• Controller setting software
• USB driver (For JXC-W2A-C)
Download from SMC's website:
https://www.smcworld.com

Hardware Requirements

OS	Windows®7, Windows®8.1, Windows®10
Communication interface	USB 1.1 or USB 2.0 ports
Display	1024 x 768 or more

∗ Windows®7, Windows®8.1, and Windows®10 are registered trademarks of Microsoft Corporation in the United States.

■ Conversion cable P5062-5 (Cable length: 300 mm)



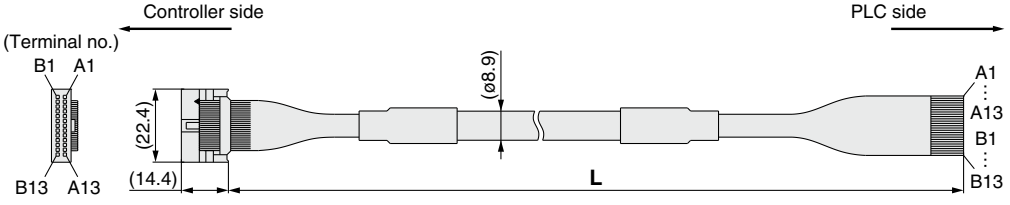
∗ To connect the teaching box (LEC-T1-3□G□) or controller setting kit (LEC-W2□) to the controller, a conversion cable is required.

■ I/O cable

LEC − CN5 − 1

Cable length (L) [m]

1	1.5
3	3
5	5



∗ Conductor size: AWG28

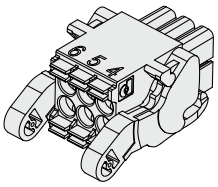
Connector pin no.	Insulation color	Dot mark	Dot color
A1	Light brown	■	Black
A2	Light brown	■	Red
A3	Yellow	■	Black
A4	Yellow	■	Red
A5	Light green	■	Black
A6	Light green	■	Red
A7	Gray	■	Black
A8	Gray	■	Red
A9	White	■	Black
A10	White	■	Red
A11	Light brown	■ ■	Black
A12	Light brown	■ ■	Red
A13	Yellow	■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

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

Weight

Product no.	Weight [g]
LEC-CN5-1	170
LEC-CN5-3	320
LEC-CN5-5	520

■ Power supply plug JXC-CPW



∗ The power supply plug is an accessory.
<Applicable cable size> AWG20 (0.5 mm²), cover diameter 2.0 mm or less

⑥ ⑤ ④
③ ② ①

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

Power supply plug

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

■ Teaching box

LEC − T1 − 3 J G □

Teaching box

Cable length [m]

3	3

Initial language

J	Japanese
E	English

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

Enable switch

Nil	None
S	Equipped with enable switch

∗ Interlock switch for jog and test function

Stop switch

G	Equipped with stop switch

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)

Step Motor Controller

JXCE1/91/P1/D1/L1/M1 Series

∗ For details, refer to page 182 and onwards.

RoHS

How to Order

JXC D 1 7 T – ☐

Communication protocol

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

For single axis

Mounting

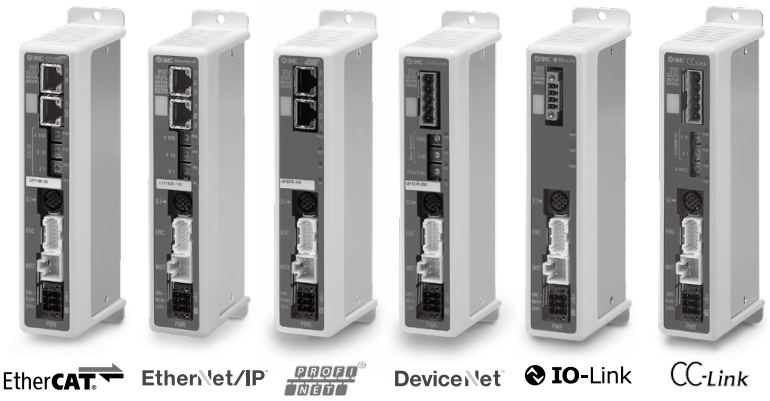
7	Screw mounting
8∗1	DIN rail

∗1 The DIN rail is not included. It must be ordered separately. (Refer to page 177.)

Option

Nil	Without option
S	With straight type communication plug
T	With T-branch type communication plug

∗ Select "Nil" for anything other than JXCD1 and JXCM1.



Actuator part number

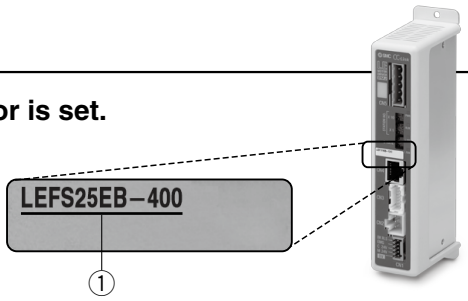
Without cable specifications and actuator options Example: Enter "**LEFS25EB-100**" for the LEFS25EB-100B-R1☐☐.	
BC-E	Blank controller∗1

∗1 Requires dedicated software (JXC-BCW)

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

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

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



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

Precautions for blank controllers (JXC□1□□-BC-E)

A blank controller is a controller to which the customer can write the data of the actuator it is to be combined and used with. Use the dedicated software (JXC-BCW) for data writing.

- The applicable electric actuator size range differs depending on the controller version. Refer to pages 179 and 180 for how to confirm the controller version and applicable actuator sizes.
- Please download the dedicated software (JXC-BCW) via our website.
- Order the controller setting kit (JXC-W2A-C) and USB cable (LEC-W2-U) separately to use this software.

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

Specifications

Model			JXCE1	JXC91	JXCP1	JXCD1	JXCL1	JXCM1
Network			EtherCAT®	EtherNet/IP™	PROFINET	DeviceNet™	IO-Link	CC-Link
Compatible motor			Step motor (Servo/24 VDC)					
Power supply			Power voltage: 24 VDC ±10%					
Current consumption (Controller)			200 mA or less	130 mA or less	200 mA or less	100 mA or less	100 mA or less	100 mA or less
Compatible encoder			Battery-less absolute					
Communication specifications	Applicable system	Protocol	EtherCAT®*2	EtherNet/IP™*2	PROFINET*2	DeviceNet™	IO-Link	CC-Link
		Version*1	Conformance Test Record V.1.2.6	Volume 1 (Edition 3.14) Volume 2 (Edition 1.15)	Specification Version 2.32	Volume 1 (Edition 3.14) Volume 3 (Edition 1.13)	Version 1.1 Port Class A	Ver. 1.10
	Communication speed		100 Mbps*2	10/100 Mbps*2 (Automatic negotiation)	100 Mbps*2	125/250/500 kbps	230.4 kbps (COM3)	156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps, 10 Mbps
	Configuration file*3		ESI file	EDS file	GSDML file	EDS file	IODD file	CSP+ file
	I/O occupation area		Input 20 bytes Output 36 bytes	Input 36 bytes Output 36 bytes	Input 36 bytes Output 36 bytes	Input 4, 10, 20 bytes Output 4, 12, 20, 36 bytes	Input 14 bytes Output 22 bytes	1 station, 2 stations, 4 stations
	Terminating resistor		Not included					
Memory			EEPROM					
LED indicator			PWR, RUN, ALM, ERR	PWR, ALM, MS, NS	PWR, ALM, SF, BF	PWR, ALM, MS, NS	PWR, ALM, COM	PWR, ALM, L ERR, L RUN
Cable length [m]			Actuator cable: 20 or less					
Cooling system			Natural air cooling					
Operating temperature range [°C]			0 to 55 (No freezing)*4					
Operating humidity range [%RH]			90 or less (No condensation)					
Insulation resistance [MΩ]			Between all external terminals and the case: 50 (500 VDC)					
Weight [g]			220 (Screw mounting) 240 (DIN rail mounting)	210 (Screw mounting) 230 (DIN rail mounting)	220 (Screw mounting) 240 (DIN rail mounting)	210 (Screw mounting) 230 (DIN rail mounting)	190 (Screw mounting) 210 (DIN rail mounting)	170 (Screw mounting) 190 (DIN rail mounting)

*1 Please note that versions are subject to change.
*2 Use a shielded communication cable with CAT5 or higher for the PROFINET, EtherNet/IP™, and EtherCAT®.
*3 The files can be downloaded from the SMC website.
*4 For the LEY40 and LEYG40 series, if the vertical work load is greater than the weight listed below, use the controller at an ambient temperature of 40°C or less.

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

■Trademark
EtherNet/IP™ is a trademark of ODVA.
DeviceNet™ is a trademark of ODVA.
EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Example of Operation Command

In addition to the step data input of 64 points maximum in each communication protocol, the changing of each parameter can be performed in real time via numerical data defined operation.

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

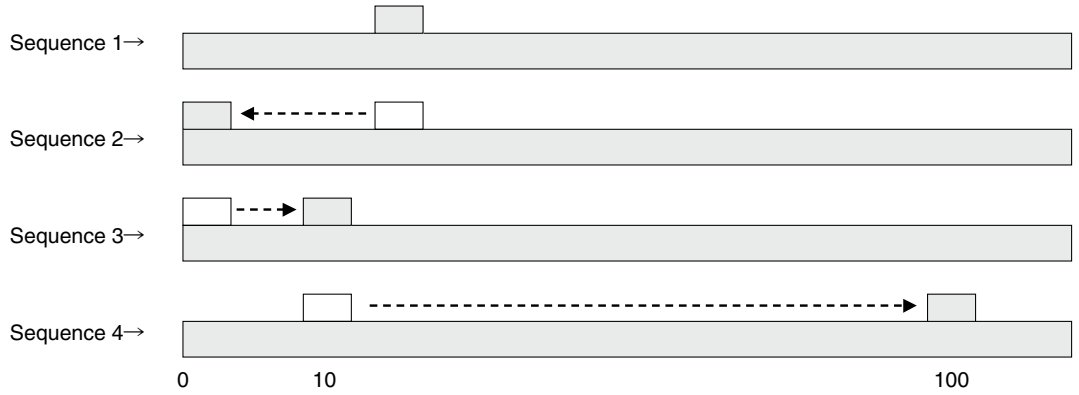
<Application example> Movement between 2 points

No.	Movement mode	Speed	Position	Acceleration	Deceleration	Pushing force	Trigger LV	Pushing speed	Moving force	Area 1	Area 2	In position
0	1: Absolute	100	10	3000	3000	0	0	0	100	0	0	0.50
1	1: Absolute	100	100	3000	3000	0	0	0	100	0	0	0.50

<Step no. defined operation>
Sequence 1: Servo ON instruction
Sequence 2: Instruction to return to origin
Sequence 3: Specify step data No. 0 to input the DRIVE signal.
Sequence 4: Specify step data No. 1 after the DRIVE signal has been temporarily turned OFF to input the DRIVE signal.

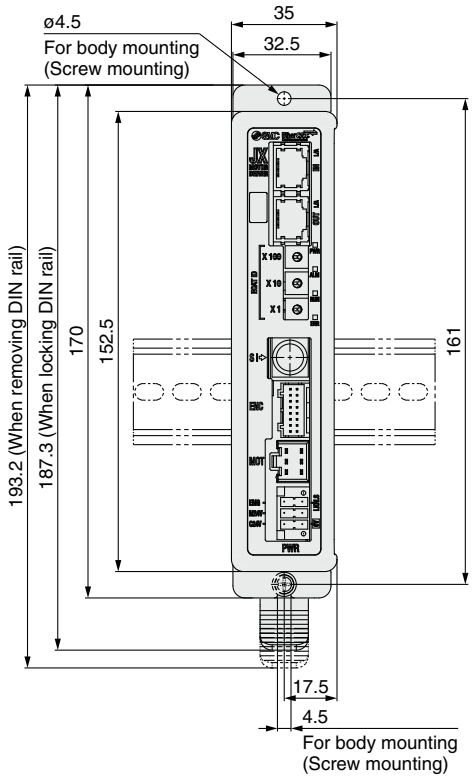
<Numerical data defined operation>
Sequence 1: Servo ON instruction
Sequence 2: Instruction to return to origin
Sequence 3: Specify step data No. 0 and turn ON the input instruction flag (position). Input 10 in the target position. Subsequently the start flag turns ON.
Sequence 4: Turn ON step data No. 0 and the input instruction flag (position) to change the target position to 100 while the start flag is ON.

The same operation can be performed with any operation command.

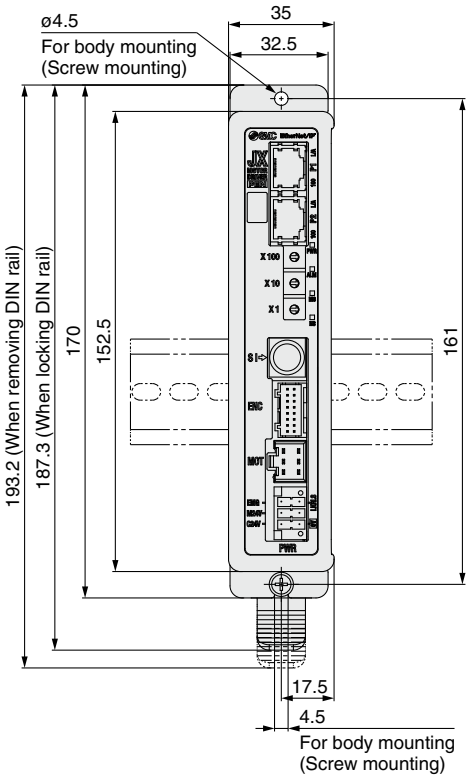


Dimensions

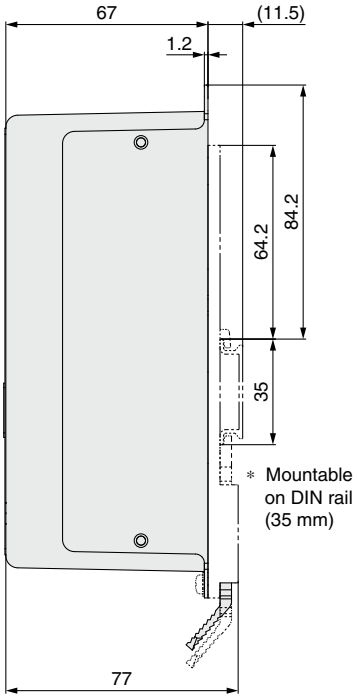
JXCE1



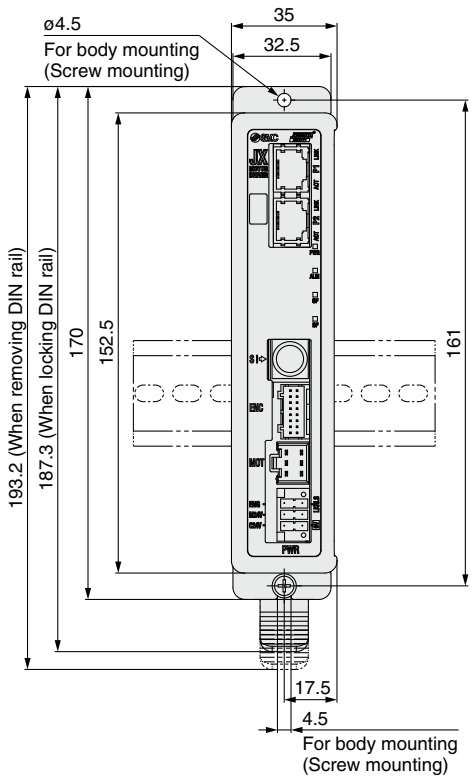
JXC91



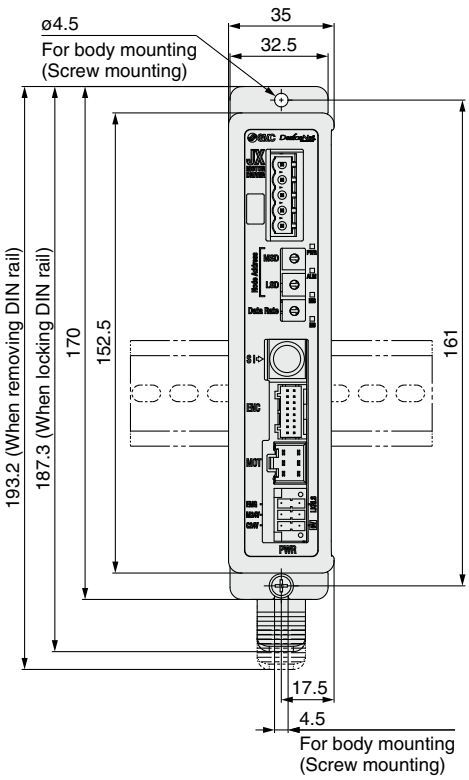
JXCE1/JXC91



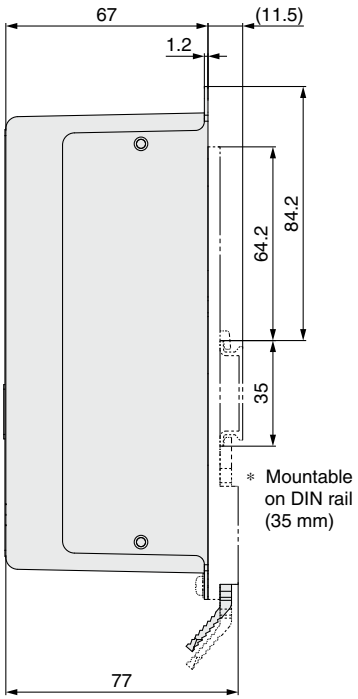
JXCP1



JXCD1

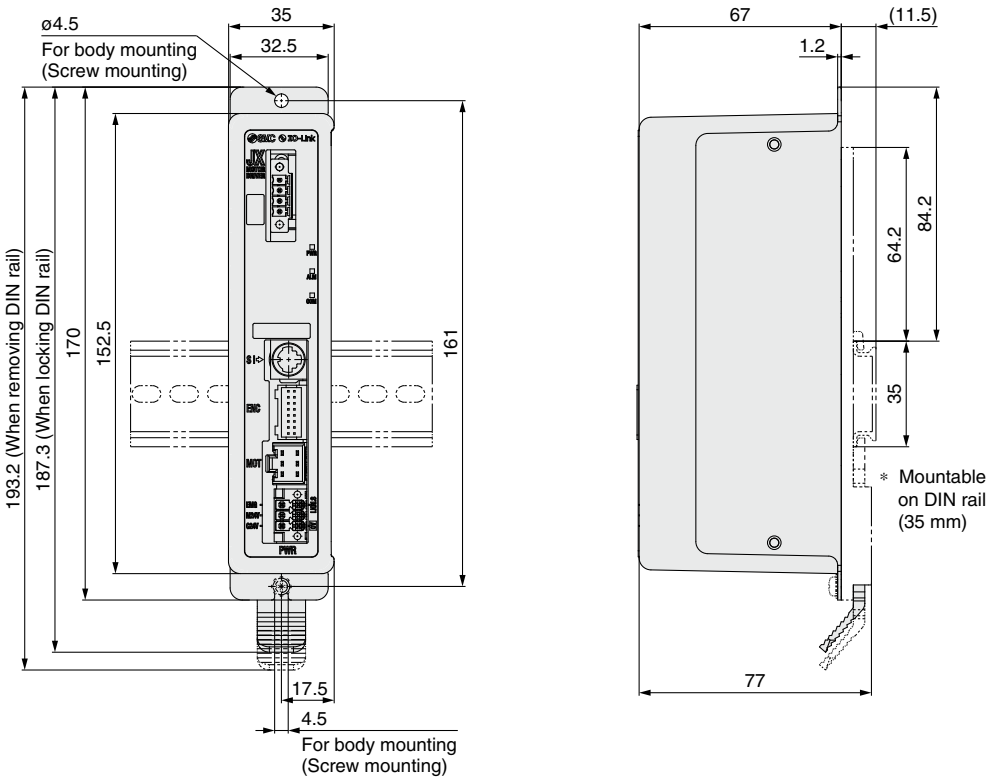


JXCP1/JXCD1

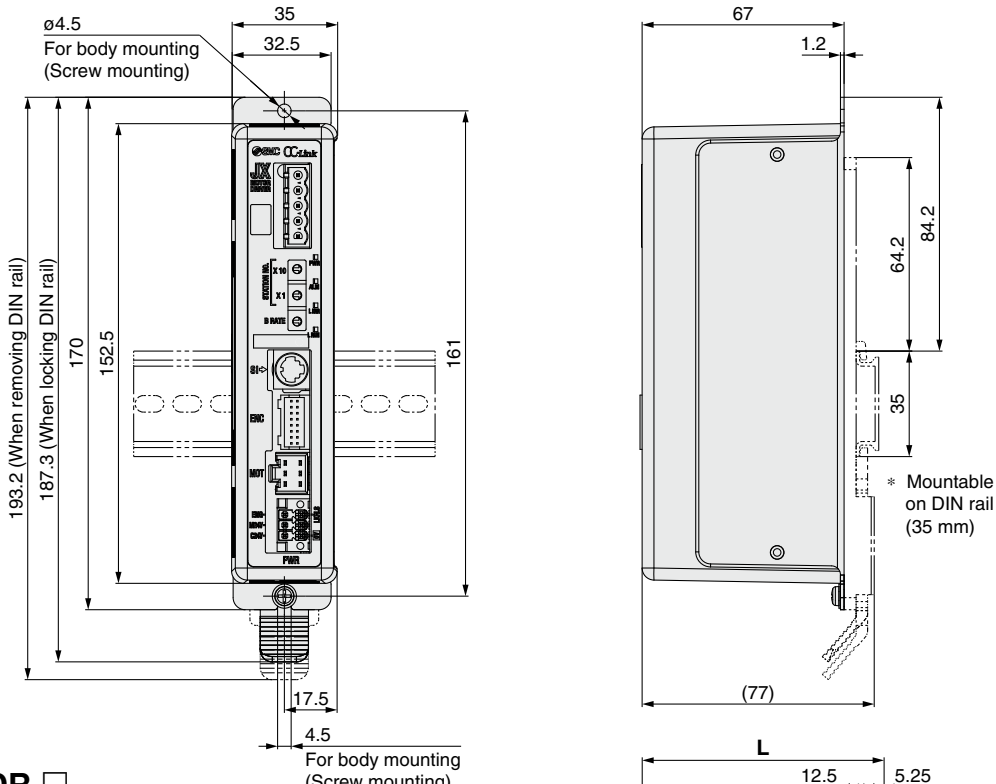


Dimensions

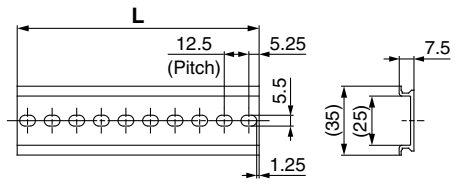
JXCL1



JXCM1



AXT100-DR-□



L Dimensions [mm]

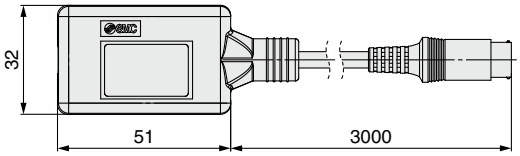
No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L	23	35.5	48	60.5	73	85.5	98	110.5	123	135.5	148	160.5	173	185.5	198	210.5	223	235.5	248	260.5

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

Options

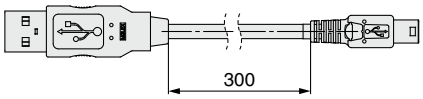
■ Communication cable for controller setting

① Communication cable JXC-W2A-C



∗ It can be connected to the controller directly.

② USB cable LEC-W2-U



③ Controller setting kit JXC-W2A

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

<Controller setting software/USB driver>
• Controller setting software
• USB driver (For JXC-W2A-C)
Download from SMC's website:
https://www.smcworld.com

Hardware Requirements

OS	Windows®7, Windows®8.1, Windows®10
Communication interface	USB 1.1 or USB 2.0 ports
Display	1024 x 768 or more

∗ Windows®7, Windows®8.1, and Windows®10 are registered trademarks of Microsoft Corporation in the United States.

■ DIN rail mounting adapter LEC-3-D0

∗ With 2 mounting screws

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

■ DIN rail AXT100-DR-□

∗ For □, enter a number from the No. line in the table on page 176. Refer to the dimension drawings on pages 175 and 176 for the mounting dimensions.

■ Teaching box

LEC − T1 − 3 J G □

Teaching box

Cable length [m]

3	3

Initial language

J	Japanese
E	English

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

Enable switch

Nil	None
S	Equipped with enable switch

∗ Interlock switch for jog and test function

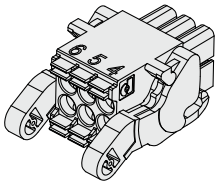
Stop switch

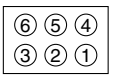
G	Equipped with stop switch

∗ For details, refer to page 171.

■ Power supply plug JXC-CPW

∗ The power supply plug is an accessory.





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

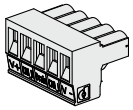
Power supply plug

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

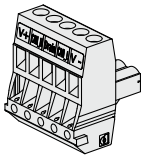
■ Communication plug connector

For DeviceNet™

Straight type JXC-CD-S



T-branch type JXC-CD-T



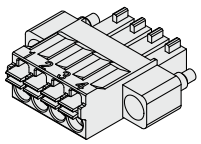
Communication plug connector for DeviceNet™

Terminal name	Details
V+	Power supply (+) for DeviceNet™
CAN_H	Communication wire (High)
Drain	Grounding wire/Shielded wire
CAN_L	Communication wire (Low)
V–	Power supply (–) for DeviceNet™

For IO-Link

Straight type JXC-CL-S

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



Communication plug connector for IO-Link

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

For CC-Link

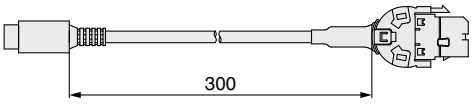
Straight type LEC-CMJ-S

T-branch type LEC-CMJ-T

Communication plug connector for CC-Link

Terminal name	Details
DA	CC-Link communication line A
DB	CC-Link communication line B
DG	CC-Link ground line
SLD	CC-Link shield
FG	Frame ground

■ Conversion cable P5062-5 (Cable length: 300 mm)



∗ To connect the teaching box (LEC-T1-3□G□) or controller setting kit (LEC-W2□) to the controller, a conversion cable is required.

JXC51/61 Series
JXCE1/91/P1/D1/L1/M1 Series
Actuator Cable (Option)

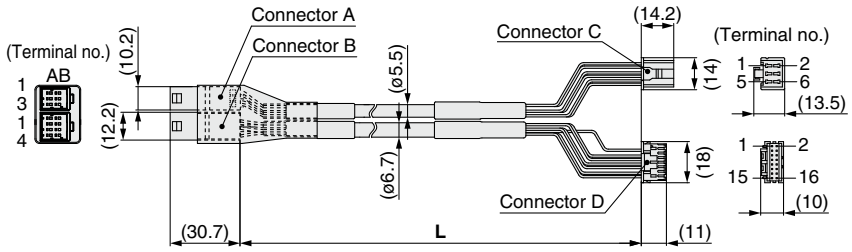
[Robotic cable for battery-less absolute (Step motor 24 VDC)]

LE − CE − 1

Cable length (L) [m]

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

*1 Produced upon receipt of order



Weight

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

Signal	Connector A terminal no.		Cable color	Connector C terminal no.
A	B-1		Brown	2
$\overline{A}$	A-1		Red	1
B	B-2		Orange	6
$\overline{B}$	A-2		Yellow	5
COM-A/COM	B-3		Green	3
COM-B/—	A-3		Blue	4
Signal	Connector B terminal no.	Shield	Cable color	Connector D terminal no.
Vcc	B-1		Brown	12
GND	A-1		Black	13
$\overline{A}$	B-2		Red	7
A	A-2		Black	6
$\overline{B}$	B-3		Orange	9
B	A-3		Black	8
SD+ (RX)	B-4		Yellow	11
SD− (TX)	A-4		Black	10
			Black	3

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

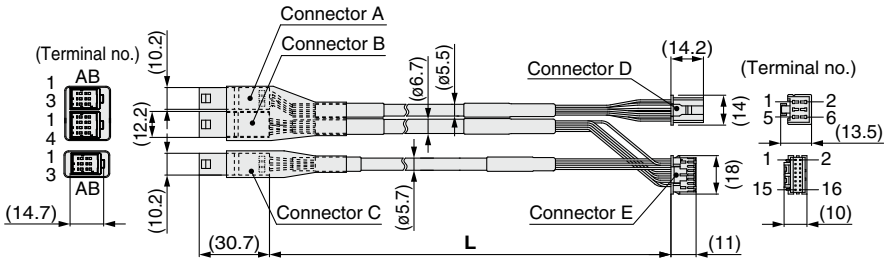
LE − CE − 1 − B

Cable length (L) [m]

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

*1 Produced upon receipt of order

With lock and sensor



Weight

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

Signal	Connector A terminal no.		Cable color	Connector D terminal no.
A	B-1		Brown	2
$\overline{A}$	A-1		Red	1
B	B-2		Orange	6
$\overline{B}$	A-2		Yellow	5
COM-A/COM	B-3		Green	3
COM-B/—	A-3		Blue	4
Signal	Connector B terminal no.	Shield	Cable color	Connector E terminal no.
Vcc	B-1		Brown	12
GND	A-1		Black	13
$\overline{A}$	B-2		Red	7
A	A-2		Black	6
$\overline{B}$	B-3		Orange	9
B	A-3		Black	8
SD+ (RX)	B-4		Yellow	11
SD− (TX)	A-4		Black	10
			Black	3
Signal	Connector C terminal no.			
Lock (+)	B-1		Red	4
Lock (–)	A-1		Black	5
Sensor (+)	B-3		Brown	1
Sensor (–)	A-3		Blue	2

JXC51/61/E1/91/P1/D1/L1/M1 Series
Precautions Relating to Differences in Controller Versions

As the controller version of the JXC series differs, the internal parameters are not compatible.

■ If using the JXC□1□-BC or JXC□1□-BC-E, please use the latest version of the JXC-BCW (parameter writing tool).

■ There are currently 3 versions available: version 1 products (V1.□ or S1.□), version 2 products (V2.□ or S2.□), and version 3 products (V3.□ or S3.□). Keep in mind that in order to write a backup file (.bkp) to another controller with the JXC-BCW, it needs to be the same version as the controller that created the file. (For example, a backup file created by a version 1 product can only be written to another version 1 product, and so on.) A backup file for the electric actuator with battery-less absolute encoder can only be written between version 3.4 or higher product (the backup file of version 2 or earlier products cannot be written).

Identifying Version Symbols

JXC□1 Series Version V3.□ or S3.□ Products

XR V3.0

Applicable models

JXC91□ Series

XR S3.0 T1.0

Applicable models

JXC51/61□ Series
JXCE1□ Series
JXCP1□ Series
JXCD1□ Series
JXCL1□ Series
JXCM1□ Series

JXC□1 Series Version V2.□ or S2.□ Products

WP V2.1

Applicable models

JXC91□ Series

WP S2.2 T1.1

Applicable models

JXCE1□ Series
JXCP1□ Series
JXCD1□ Series
JXCL1□ Series

JXC□1 Series Version V1.□ or S1.□ Products

XR V1.0

Applicable models

JXC91□ Series

XR S1.0 T1.0

Applicable models

JXCE1□ Series
JXCP1□ Series
JXCD1□ Series
JXCL1□ Series

Blank Controller Versions and Applicable Actuator Sizes

■ The applicable electric actuator size range differs depending on the controller version.
Be sure to confirm the controller version before using a blank controller.

Blank Controller Versions/Applicable Actuator Sizes

Blank controller		Applicable electric actuator size								
Series	Controller version	**LEFS□E**	**LEFB□E**	**LEY□E**	**LEYG□E**	**LES□E**	**LESH□E**	**LESY□E**	**LER□E**	**LEHF□E**
JXC91□ Series **JXCD1□ Series** **JXCE1□ Series** **JXCP1□ Series** **JXCL1□ Series**	Version 3.4 (V3.4, S3.4) Version 3.5 (V3.5, S3.5)	25, 32, 40	25, 32, 40	25, 32, 40	25, 32, 40	25	25	16, 25	50	32, 40
	Version 3.6 (V3.6, S3.6) or higher	16, 25, 32, 40	16, 25, 32, 40	16, 25, 32, 40	16, 25, 32, 40			8, 16, 25		
JXCM1□ Series **JXC51/61 Series**	Version 3.4 (V3.4, S3.4)	25, 32, 40	25, 32, 40	25, 32, 40	25, 32, 40			16, 25		
	Version 3.5 (V3.5, S3.5) or higher	16, 25, 32, 40	16, 25, 32, 40	16, 25, 32, 40	16, 25, 32, 40			8, 16, 25		

Battery-less Absolute Encoder Type Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For electric actuator precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com

Handling

⚠Caution

1. Absolute encoder ID mismatch error at the first connection

In the following cases, an "ID mismatch error" alarm occurs after the power is turned ON. Perform a return to origin operation after resetting the alarm before use.

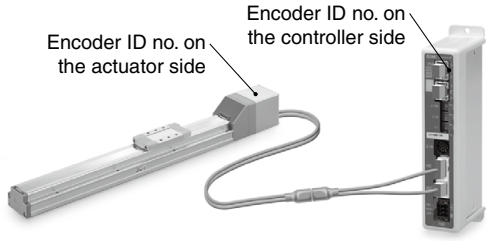
- When an electric actuator is connected and the power is turned ON for the first time after purchase*1
- When the actuator or motor is replaced
- When the controller is replaced

*1 If you have purchased an electric actuator and controller with the set part number, the pairing may have already been completed and the alarm may not be generated.

"ID mismatch error"

Operation is enabled by matching the encoder ID on the electric actuator side with the ID registered in the controller. This alarm occurs when the encoder ID is different from the registered contents of the controller. By resetting this alarm, the encoder ID is registered (paired) to the controller again.

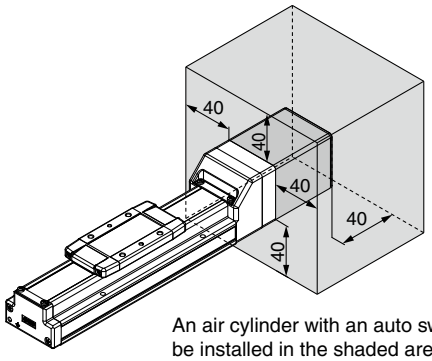
When a controller is changed after paring is completed				
	Encoder ID no. (* Numbers below are examples.)			
Actuator	17623	17623	17623	17623
Controller	17623	17699	17699	17623
ID mismatch error occurred?	No	Yes	Error reset ⇒ No	



The ID number is automatically checked when the control power supply is turned ON.
An error is output if the ID number does not match.

2. In environments where strong magnetic fields are present, use may be limited.

A magnetic sensor is used in the encoder. Therefore, if the actuator motor is used in an environment where strong magnetic fields are present, malfunction or failure may occur.
Do not expose the actuator motor to magnetic fields with a magnetic flux density of 1 mT or more.
When installing an electric actuator and an air cylinder with an auto switch (ex. CDQ2 series) or multiple electric actuators side by side, maintain a space of 40 mm or more around the motor. Refer to the construction drawing of the actuator motor.

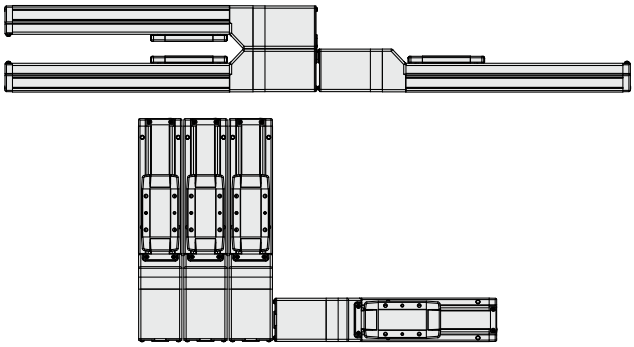


An air cylinder with an auto switch cannot be installed in the shaded area.

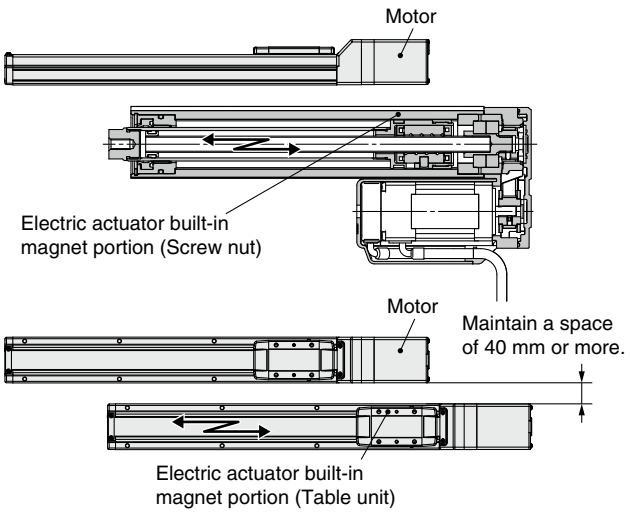
● When lining up actuators

SMC actuators can be used with their motors adjacent to each other. However, for actuators with a built-in auto switch magnet (the LEY and LEF series), maintain a space of 40 mm or more between the motors and the position where the magnet passes.
For the LEF series, the magnet is in the middle of the table, and for the LEY series, the magnet is in the piston portion. (Refer to the construction drawings in the catalog for details.)

○ Can be used with their motors adjacent to each other

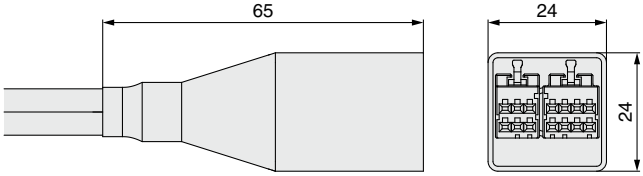


× Do not allow the motors to be in close proximity to the position where the magnet passes.



3. The connector size of the motor cable is different from that of the electric actuator with an incremental encoder.

The motor cable connector of an electric actuator with a battery-less absolute encoder is different from that of an electric actuator with an incremental encoder. As the connector cover dimensions are different, take the dimensions below into consideration during the design process.



Battery-less absolute encoder connector cover dimensions

CE/UL-compliance List

∗ For CE/UL-compliant products, refer to the tables below and the following pages.

■ Controller "○": Compliant "×": Not compliant

As of September 2021

Compatible motor	Series	CE	c UL us	
			Compliance	No.
Step motor (Incremental)	**JXCE1**	○	○	E480340
	JXC91	○	○	E480340
	JXCP1	○	○	E480340
	JXCD1	○	○	E480340
	JXCL1	○	○	E480340
	LECP1	○	○	E339743
	LECP2	○	○	E339743
	LECPA	○	○	E339743
Step motor (Battery-less absolute)	**JXC51/61**	○	○	E480340
	JXCE1	○	○	E480340
	JXC91	○	○	E480340
	JXCP1	○	○	E480340
	JXCD1	○	○	E480340
	JXCL1	○	○	E480340
	JXCM1	○	○	E480340
High performance step motor (24 VDC)	**JXC5H/6H**	○	○	E480340
	JXCEH	○	○	E480340
	JXC9H	○	○	E480340
	JXCPH	○	○	E480340
Servo motor (24 VDC)	**LECA6**	○	○	E339743
Multi-axis step motor controller	**JXC73**	○	×	—
	JXC83	○	×	—
	JXC93	○	×	—
	JXC92	○	×	—

Compatible motor	Series	CE	c UL us LISTED	
			Compliance	No.
AC servo motor	**LECSA**	○	○	E466261
	LECSB	○	×	—
	LECSC	○	×	—
	LECSS	○	×	—
	LECSB-T	○	○	E466261
	LECSC-T	○	○	E466261
	LECSN-T	○	○∗1	E466261
	LECSS-T	○	○	E466261
	LECYM	○	×	—
	LECYU	○	×	—

∗1 Only the "Without network card" option is UL compliant.

■ Actuator "○": Compliant "×": Not compliant

As of September 2021

Compatible motor	Series	CE	c UL us	
			Compliance	No.
Step motor (Incremental)	**LEFS**	○	×	—
	11-LEFS	○	×	—
	25A-LEFS	○	×	—
	LEFB	○	×	—
	LEL	○	×	—
	LEM	○	×	—
	LEY	○	×	—
	25A-LEY	○	×	—
	LEY-X5/X7	○	×	—
	LEYG	○	×	—
	LES	○	×	—
	LESH	○	×	—
	LEPY	○	×	—
	LEPS	○	×	—
	LER	○	×	—
	LEHZ	○	×	—
	LEHZJ	○	×	—
	LEHF	○	×	—
	LEHS	○	×	—
Step motor (Battery-less absolute)	**LEFS**	○	×	—
	LEFB	○	×	—
	LEKFS	○	×	—
	LEY	○	×	—
	LEY-X8	○	×	—
	LEYG	○	×	—
	LES	○	×	—
	LESH	○	×	—
	LESYH	○	×	—
	LER	○	×	—
	LEHF	○	×	—

Compatible motor	Series	CE	c UL us	
			Compliance	No.
High performance step motor (24 VDC)	**LEFS**	○	×	—
Servo motor (24 VDC)	**LEFS**	○	×	—
	11-LEFS	○	×	—
	25A-LEFS	○	×	—
	LEFB	○	×	—
	LEY	○	×	—
	LEY-X5/X7	○	×	—
	LEYG	○	×	—
	LES	○	×	—
	LESH	○	×	—
	LEPY	○	×	—
	LEPS	○	×	—
AC servo motor	**LEFS**	○	×	—
	11-LEFS	○	×	—
	25A-LEFS	○	×	—
	LEFB	○	×	—
	LEJS	○	×	—
	11-LEJS	○	×	—
	25A-LEJS	○	×	—
	LEJB	○	×	—
	LEY25/32/63	○	×	—
	LEY100	○	×	—
	LEYG	○	×	—
	LESYH	○	×	—

∗ Actuators ordered as single units are not UL compliant.

CE/UL-compliance List

■ Actuator (When ordered with a controller)

"○": Compliant "×": Not compliant "—": Not applicable

As of September 2021

Compatible motor	Series	JXC51/61			JXCE1			JXC91			JXCP1			JXCD1		
		CE	cULus		CE	cULus		CE	cULus		CE	cULus		CE	cULus	
			Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.
Step motor (Incremental)	**LEFS**	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	11-LEFS	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	25A-LEFS	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEFB	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEL	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEM	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEY	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	25A-LEY	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEY-X5/X7	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LEYG	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LES	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LESH	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEPY	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEPS	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LER	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEHZ	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEHZJ	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEHF	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEHS	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743

Compatible motor	Series	JXCL1			JXCM1			LECP1			LECP2			LECPA		
		CE	cULus		CE	cULus		CE	cULus		CE	cULus		CE	cULus	
			Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.
Step motor (Incremental)	**LEFS**	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	11-LEFS	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	25A-LEFS	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEFB	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEL	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEM	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEY	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	25A-LEY	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEY-X5/X7	○	×	—	○	×	—	○	×	—	×	×	—	○	×	—
	LEYG	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LES	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LESH	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEPY	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEPS	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LER	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEHZ	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEHZJ	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEHF	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743
	LEHS	○	○	E339743	○	○	E339743	○	○	E339743	×	×	—	○	○	E339743

Compatible motor	Series	JXC51/61			JXCE1			JXC91			JXCP1			JXCD1		
		CE	cULus		CE	cULus		CE	cULus		CE	cULus		CE	cULus	
			Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.
Step motor (Battery-less absolute)	**LEFS**	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LEFB	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LEKFS	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LEY	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LEY-X8	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LEYG	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LES	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LESH	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LESYH	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LER	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—
	LEHF	○	×	—	○	×	—	○	×	—	○	×	—	○	×	—

Compatible motor	Series	JXCL1			JXCM1		
		CE	cULus		CE	cULus	
			Compliance	No.		Compliance	No.
Step motor (Battery-less absolute)	**LEFS**	○	×	—	○	×	—
	LEFB	○	×	—	○	×	—
	LEKFS	○	×	—	○	×	—
	LEY	○	×	—	○	×	—
	LEY-X8	○	×	—	○	×	—
	LEYG	○	×	—	○	×	—
	LES	○	×	—	○	×	—
	LESH	○	×	—	○	×	—
	LESYH	○	×	—	○	×	—
	LER	○	×	—	○	×	—
	LEHF	○	×	—	○	×	—

■ Actuator (When ordered with a controller)

"○": Compliant "×": Not compliant "—": Not applicable As of September 2021

Compatible motor	Series	JXC5H/6H			JXCEH			JXC9H			JXCPH		
		CE	c UL us		CE	c UL us		CE	c UL us		CE	c UL us	
			Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.
High performance step motor (24 VDC)	**LEF**	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743

Compatible motor	Series	LECA6		
		CE	c UL us	
			Compliance	No.
Servo motor (24 VDC)	**LEFS**	○	○	E339743
	11-LEFS	○	○	E339743
	25A-LEFS	○	○	E339743
	LEFB	○	○	E339743
	LEY	○	○	E339743
	LEY-X7	○	×	—
	LEYG	○	○	E339743
	LES	○	○	E339743
	LESH	○	○	E339743

Compatible motor	Series	LECSA*1			LECSB			LECSC			LECSS			LECSB-T*1		
		CE	c UL us		CE	c UL us		CE	c UL us		CE	c UL us		CE	c UL us	
			Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.		Compliance	No.
AC servo motor	**LEFS**	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	11-LEFS	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	25A-LEFS	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	LEFB	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	LEJS	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	11-LEJS	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	25A-LEJS	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	LEJB	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	LEY25/32/63	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	LEY100	—	—	—	—	—	—	—	—	—	—	—	—	○	×	—
	LEYG	○	○	E339743	○	×	—	○	×	—	○	×	—	○	×	—
	LESYH	○	×	—	—	—	—	—	—	—	—	—	—	○	×	—

Compatible motor	Series	LECSC-T*1			LECSN-T*1			LECSS-T*1		
		CE	c UL us		CE	c UL us		CE	c UL us	
			Compliance	No.		Compliance	No.		Compliance	No.
AC servo motor	**LEFS**	○	×	—	○	×	—	○	○	E339743
	11-LEFS	○	×	—	○	×	—	○	○	E339743
	25A-LEFS	○	×	—	○	×	—	○	○	E339743
	LEFB	○	×	—	○	×	—	○	○	E339743
	LEJS	○	×	—	○	×	—	○	○	E339743
	11-LEJS	○	×	—	○	×	—	○	○	E339743
	25A-LEJS	○	×	—	○	×	—	○	○	E339743
	LEJB	○	×	—	○	×	—	○	○	E339743
	LEY25/32/63	○	×	—	○	×	—	○	○	E339743
	LEY100	○	×	—	○	×	—	○	×	—
	LEYG	○	×	—	○	×	—	○	○	E339743
	LESYH	○	×	—	○	×	—	○	×	—

*1 There is a "UL Listed" mark on the AC servo motor driver body.

⚠ Safety Instructions

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

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

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

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

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

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

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

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

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

⚠ Caution

1. The product is provided for use in manufacturing industries.

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

Limited warranty and Disclaimer/ Compliance Requirements

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

Limited warranty and Disclaimer

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

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

Compliance Requirements

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

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Revision History

Edition B
* Size 16 has been added to the LEFS, LEFB, LEY, and LEYG series.
* The high precision type slide table LESYH series has been added.
* Number of pages has been increased from 48 to 188. AO

⚠ Safety Instructions Be sure to read the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use.

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