Electric Rotary Table

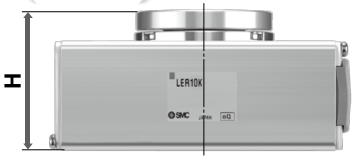
LER Series

Step Motor (Servo/24 VDC)

RoHS

- Rotation angle: 360°

Low profile



Basic type [mm]

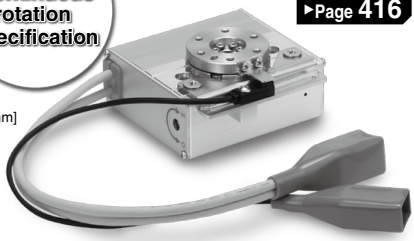
Model	H
LER10	42
LER30	53
LER50	68

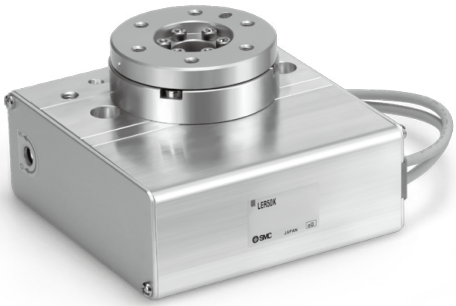
High precision type [mm]

Model	H
LERH10	49
LERH30	62
LERH50	78

Continuous rotation specification

▸Page 416





- **Shock-less/High speed actuation**
  Max. speed: 420°/sec (7.33 rad/sec)
  Max. acceleration/deceleration: 3000°/sec² (52.36 rad/sec²)
- **Positioning repeatability: ±0.03°** (High precision type)
  Repeatability at the end: ±0.01° (Pushing control/With external stopper)
- **Rotation angle**
  360°, 320° (310°), 180°, 90°
  The value indicated in brackets shows the value for the LER10.
- **Possible to set speed, acceleration/deceleration, and position. Max. 64 points**
- **Energy-saving product**
  Automatic 40% power reduction after the table has stopped.

Size	Rotating torque [N·m]		Max. speed [°/s]		Page
	Basic	High torque	Basic	High torque	
10	0.22	0.32	420	280	▸Page 404
30	0.8	1.2			
50	6.6	10			

∗ Value when an external stopper is mounted.

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

▸Page 547

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

▸CC-Link direct input type
LECPMJ Series*

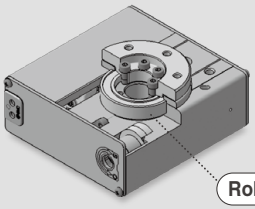
∗ Not applicable to CE.

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

▸Pulse input type
LECPA Series

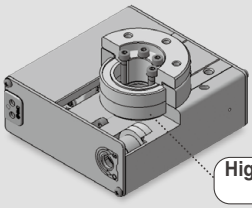
Basic and high precision types are available.

Basic type/LER



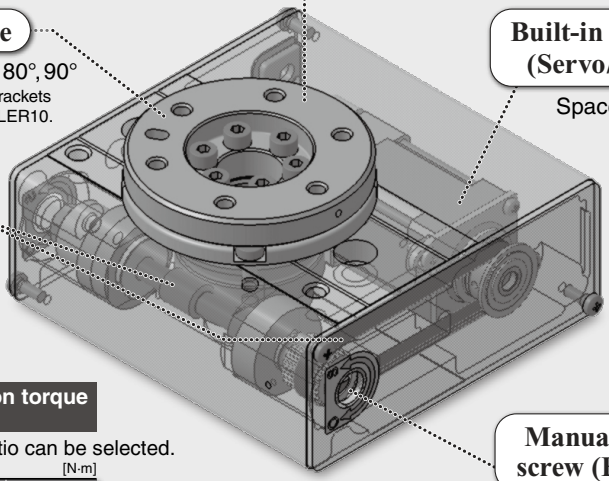
Rolling bearing

High precision type/LERH



High precision bearing

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



Rotation angle

360°, 320°(310°), 180°, 90°

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

Built-in step motor (Servo/24 VDC)

Space-saving

High torque

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

Maximum rotation torque can be selected.

Belt deceleration ratio can be selected.

[N·m]

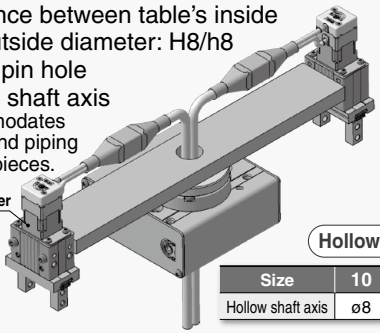
Model	Basic	High torque
LER10	0.22	0.32
LER30	0.8	1.2
LER50	6.6	10.0

Manual override screw (Both sides)

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

Easy Mounting of Workpieces

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

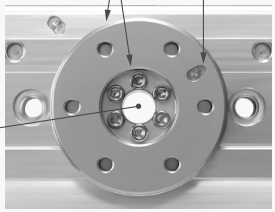


Electric gripper
LEH Series

For alignment of rotation center and workpiece

Dowel pin hole

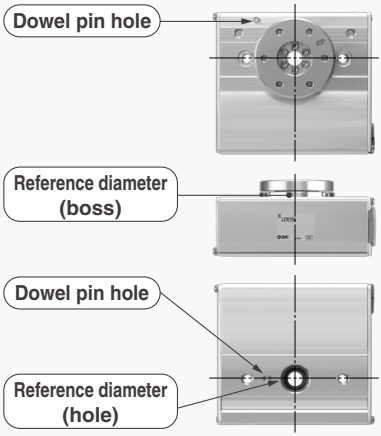
Positioning of rotating direction



Hollow shaft axis

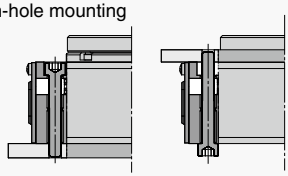
Size	10	30	50
Hollow shaft axis	ø8	ø17	ø20

Easy Mounting of the Main Body

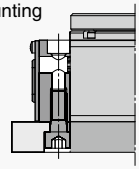


Mounting Variations

■ Through-hole mounting

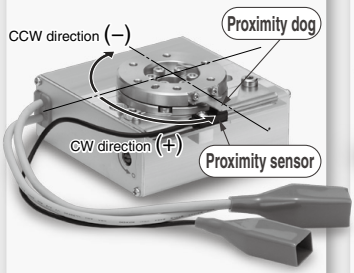


■ Body tapped mounting



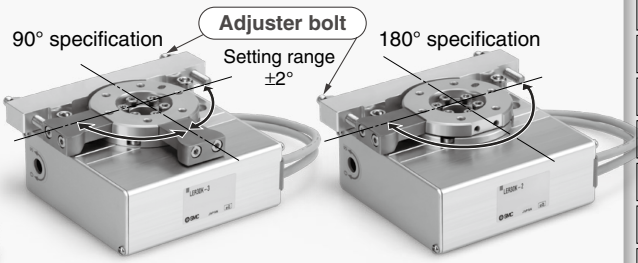
Continuous Rotation Specification

Rotation angle: 360°
Return to origin with proximity sensor

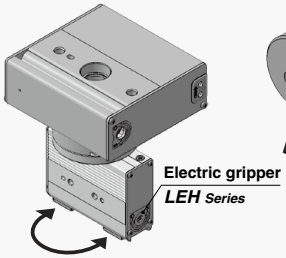


With External Stopper/Rotation Angle: 90°/180° Specification

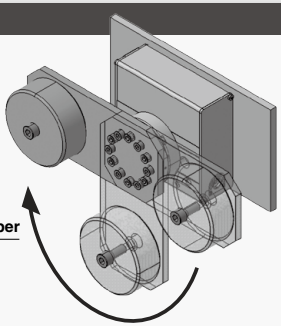
Repeatability at the end: ±0.01°



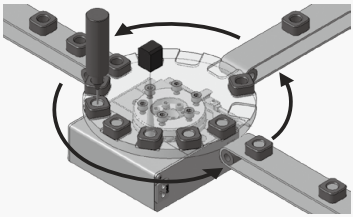
Application Examples



Rotation transfer after gripping in combination with a gripper



Vertical transfer: No change in speed due to load fluctuation



Continuous operation of multiple processes with 360° continuous rotation

Step Motor (Servo/24 VDC)

Electric Rotary Table *LER Series*

Step Motor (Servo/24 VDC)

Continuous Rotation Specification Electric Rotary Table *LER Series*

Step Motor (Servo/24 VDC) Controller

Rotary Table

LER Series

Step Motor (Servo/24 VDC)

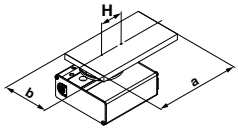
Continuous Rotation Specification

Model Selection

LER Series ▶ Page 410 | Continuous Rotation Specification LER-1 Series ▶ Page 416

Selection Procedure

Operating conditions



Electric rotary table: LER30J
Mounting position: Horizontal
Load type: Inertial load Ta
Configuration of load: 150 mm x 80 mm (Rectangular plate)
Rotation angle θ: 180°
Angular acceleration/angular deceleration $\dot{\omega}$: 1000°/sec²
Angular speed ω: 420°/sec
Load mass [m]: 2.0 kg
Distance between shaft and center of gravity H: 40 mm

Step1 Moment of inertia—Angular acceleration/deceleration

① **Calculation of moment of inertia**

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

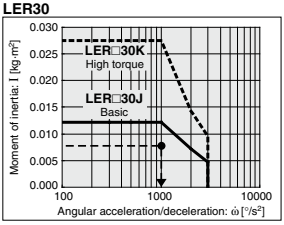
Formula

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

Selection example

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

LER30



Step2 Necessary torque

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

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

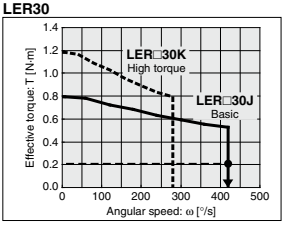
Formula

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

Selection example

Inertial load: Ta
$Ta \times 1.5 = I \times \dot{\omega} \times 2\pi/360 \times 1.5$
$= 0.00802 \times 1000 \times 0.0175 \times 1.5$
$= 0.21\ N \cdot m$

LER30



Step3 Allowable load

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

Formula

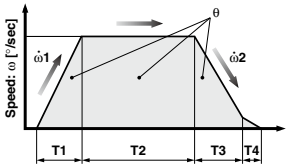
Allowable thrust load ≥ m x 9.8
Allowable moment ≥ m x 9.8 x H

Selection example

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

Step4 Rotation time

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



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

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

Formula

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

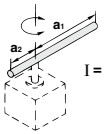
Selection example

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

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

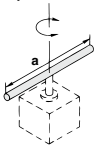
I: Moment of inertia [kg·m²] m: Load mass [kg]

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



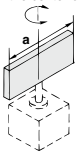
$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot \frac{a_2^2}{3}$$

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



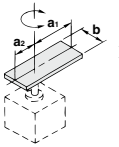
$$I = m \cdot \frac{a^2}{12}$$

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



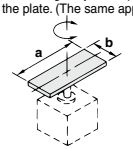
$$I = m \cdot \frac{a^2}{12}$$

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



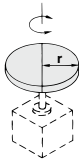
$$I = m_1 \cdot \frac{4a_1^2 + b^2}{12} + m_2 \cdot \frac{4a_2^2 + b^2}{12}$$

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



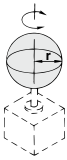
$$I = m \cdot \frac{a^2 + b^2}{12}$$

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



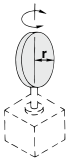
$$I = m \cdot \frac{r^2}{2}$$

7. Sphere
Position of rotation shaft: Diameter



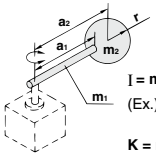
$$I = m \cdot \frac{2r^2}{5}$$

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



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

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

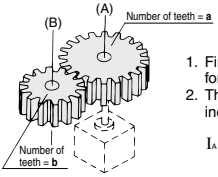


$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$$

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

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

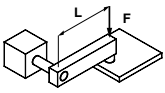
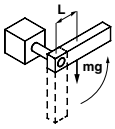
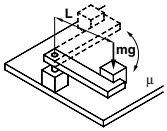
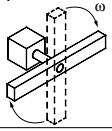
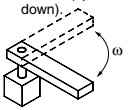
10. Gear transmission



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

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

Load Type

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

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

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

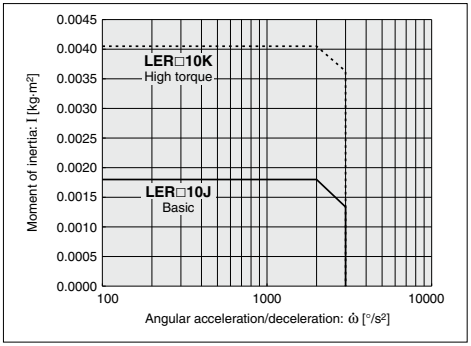
Note 1) To adjust the speed, margin is necessary for **Tf** and **Ta**.

For the LECPA, refer to page 407.

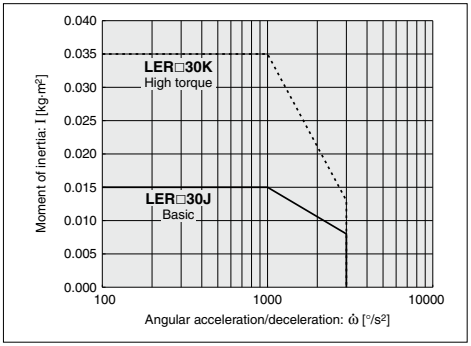
For Step Motor (Servo/24 VDC) LECP6, LECP1, LECPMJ

Moment of Inertia—Angular Acceleration/Deceleration

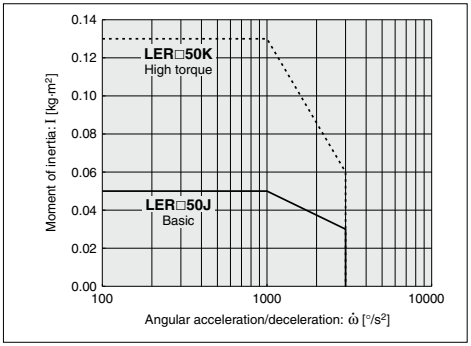
LER10



LER30

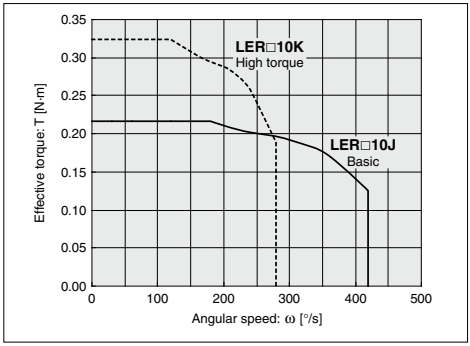


LER50

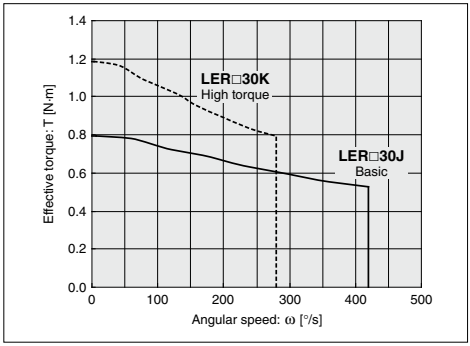


Effective Torque—Angular Speed

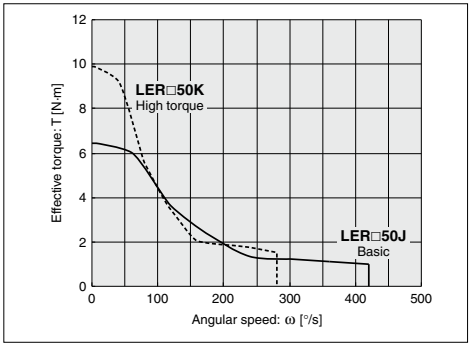
LER10



LER30



LER50

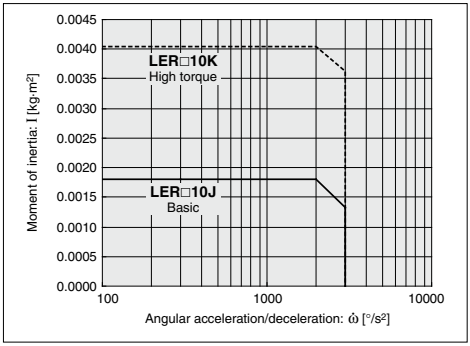


For the LECP6/LECP1/LECPMJ, refer to page 406.

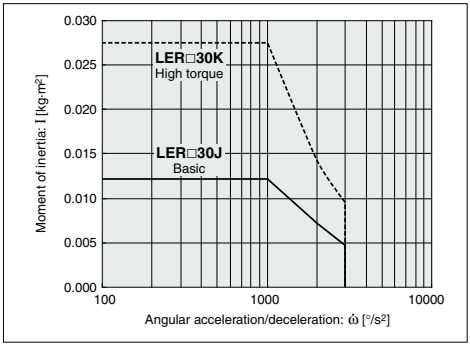
For Step Motor (Servo/24 VDC) LECPA

Moment of Inertia—Angular Acceleration/Deceleration

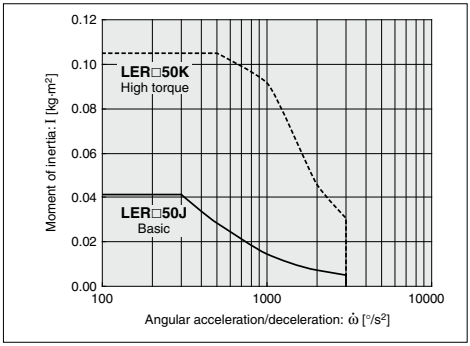
LER10



LER30

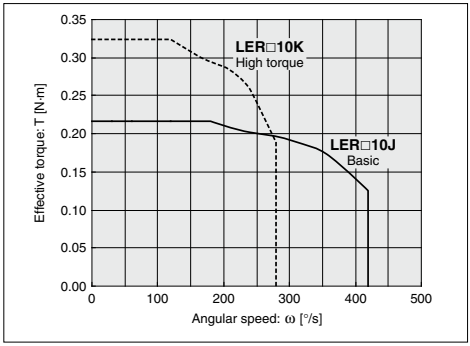


LER50

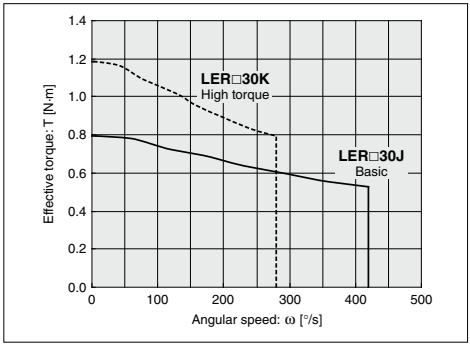


Effective Torque—Angular Speed

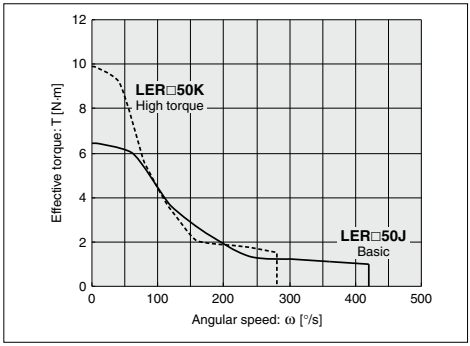
LER10



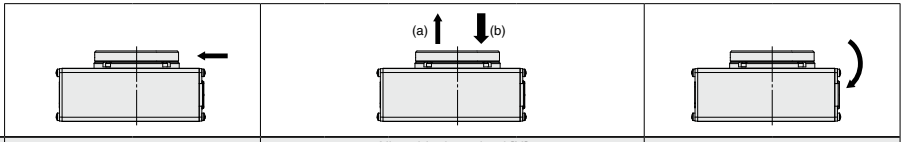
LER30



LER50



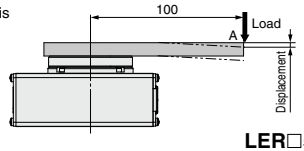
Allowable Load



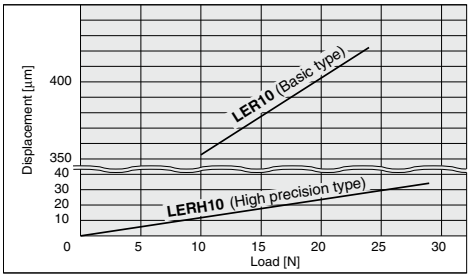
Size	Allowable radial load [N]		Allowable thrust load [N]			Allowable moment [N·m]	
			(a)		(b)		
	Basic type	High precision type	Basic type / High precision type		Basic type	High precision type	Basic type	High precision type
10	78	86	74		78	107	2.4	2.9
30	196	233	197		363	398	5.3	6.4
50	314	378	296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

Table Displacement (Reference Value)

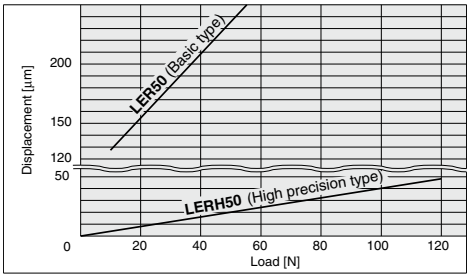
- Displacement at point A when a load is applied to point A 100 mm away from the rotation center.



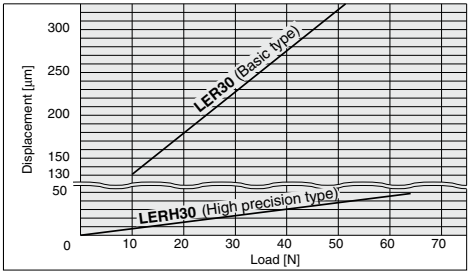
LER□10



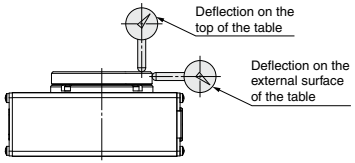
LER□50



LER□30



Deflection Accuracy: Displacement at 180° Rotation (Guide)



[mm]

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

Step Motor (Servo/24 VDC)

Electric Rotary Table

LER Series LER10, 30, 50

RoHS

How to Order

LER ☐ 10 K – ☐ ☐ – S 1 6N 1 ☐

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Table accuracy

Nil	Basic type
H	High precision type

❷ Size

10
30
50

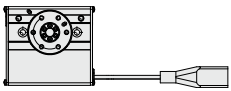
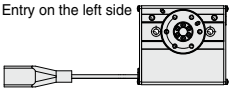
❸ Max. rotating torque [N·m]

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

❹ Rotation angle [°]

Symbol	LER10	LER30	LER50
Nil	310	320	
2	External stopper: 180		
3	External stopper: 90		

❺ Motor cable entry

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

❻ Actuator cable type∗1

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

∗1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.

∗2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

❼ Actuator cable length [m]

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

∗ Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 411.

❽ Controller/Driver type∗1

Nil	Without controller/driver	
6N	**LECP6** (Step data input type)	NPN
6P		PNP
1N	**LECP1** (Programless type)	NPN
1P		PNP
MJ	**LECPMJ**∗2 (CC-Link direct input type)	—
AN	**LECPA**∗3 (Pulse input type)	NPN
AP		PNP

∗1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.

∗2 Not applicable to CE.

∗3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-☐) on page 596 separately.

❾ I/O cable length [m]∗1**, Communication plug**

Nil	Without cable (Without communication plug connector)∗3
1	1.5
3	3∗2
5	5∗2
S	Straight type communication plug connector∗3
T	T-branch type communication plug connector∗3

∗1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 568 (For LECP6), page 582 (For LECP1) or page 596 (For LECPA) if I/O cable is required.

∗2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

∗3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

❿ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting∗

∗ DIN rail is not included. Order it separately.

⚠Caution

[CE-compliant products]

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

② CC-Link direct input type (LECPMJ) is not CE-compliant.

[UL-compliant products]

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

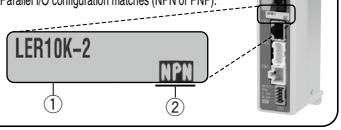
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

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

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



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

Compatible Controller/Driver

Type	Step data input type 	CC-Link direct input type 	Programless type 	Pulse input type 
Series	LECP6	LECPMJ	LECP1	LECPA
Features	Value (Step data) input/Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 560	Page 600	Page 576	Page 590

SMC

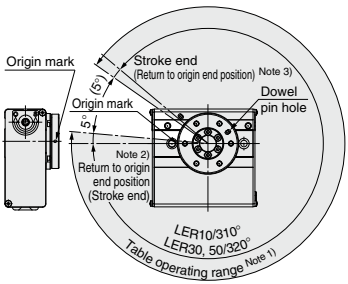
Specifications

Step Motor (Servo/24 VDC)

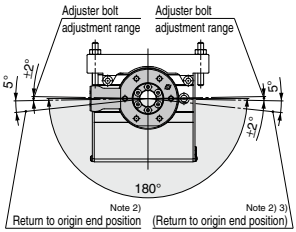
Model				LER□10K	LER□10J	LER□30K	LER□30J	LER□50K	LER□50J
Actuator specifications	Basic type	Rotation angle [°]		310		320			
		Lead [°]		8	12	8	12	7.5	12
		Max. rotating torque [N·m]		0.32	0.22	1.2	0.8	10	6.6
		Max. pushing torque 40 to 50 % [N·m] Note 1) 3)		0.13 to 0.16	0.09 to 0.11	0.48 to 0.60	0.32 to 0.40	4.0 to 5.0	2.6 to 3.3
		Max. moment of inertia [kg·m²] Note 2) 3)	LECP6/LECP1/LECPMJ	0.0040	0.0018	0.035	0.015	0.13	0.05
			LECPA			0.027	0.012	0.10	0.04
		Angular speed [°/sec] Note 2) 3)		20 to 280	30 to 420	20 to 280	30 to 420	20 to 280	30 to 420
		Pushing speed [°/sec]		20	30	20	30	20	30
		Max. angular acceleration/deceleration [°/sec²] Note 2)		3000					
		Backlash [°]	Basic type	±0.3		±0.2			
			High precision type			±0.1			
		Positioning repeatability [°]	Basic type	±0.05		±0.05			
			High precision type			±0.03			
		Lost motion [°] Note 4)	Basic type	0.3 or less		0.3 or less			
			High precision type			0.2 or less			
		Impact/Vibration resistance [m/s²] Note 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	0.49		1.1		2.2	
			High precision type	0.52		1.2		2.4	
	External stopper type	Rotation angle [°]	-2/ arm (1 pc.)	180					
			-3/ arm (2 pcs.)	90					
		Repeatability at the end [°]/ with external stopper		±0.01					
		External stopper setting range [°]		±2					
		Weight [kg] -2/external arm (1 pc.)	Basic type	0.55		1.2		2.5	
			High precision type	0.61		1.4		2.7	
		Weight [kg] -3/external arm (1 pc.)	Basic type	0.57		1.2		2.6	
			High precision type	0.63		1.4		2.8	
Electric specifications		Motor size		□20		□28		□42	
		Motor type		Step motor (Servo/24 VDC)					
		Encoder		Incremental A/B phase (800 pulse/rotation)					
		Power supply [V]		24 VDC ±10%					
		Power consumption [W] Note 6)		11		22		34	
		Standby power consumption when operating [W] Note 7)		7		12		13	
		Max. instantaneous power consumption [W] Note 8)		14		42		57	

Note 1) Pushing force accuracy is LER10: ±30% (F.S.), LER30: ±25% (F.S.), LER50: ±20% (F.S.).
Note 2) The angular acceleration, angular deceleration and angular speed may fluctuate due to variations in the moment of inertia.
Refer to "Moment of Inertia—Angular Acceleration/ Deceleration, Effective Torque—Angular Speed" graphs on pages 406 and 407 for confirmation.
Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
Note 4) A reference value for correcting an error in reciprocal operation.
Note 5) Impact resistance: No malfunction occurred when the slide table was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the actuator in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the actuator in the initial state.)
Note 6) The power consumption (including the controller) is for when the actuator is operating.
Note 7) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during operation.
Note 8) The maximum instantaneous power consumption (including the controller) is for when the actuator is operating. This value can be used for the selection of the power supply.

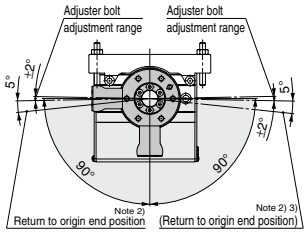
Table Rotation Angle Range



External stopper: 180°



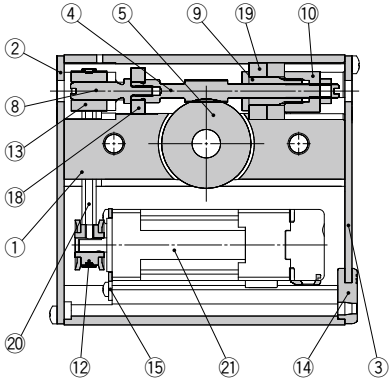
External stopper: 90°



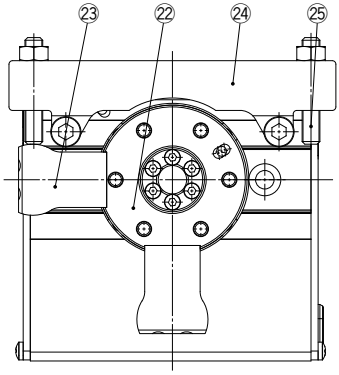
∗ The figures show the origin position for each actuator.

Note 1) Range within which the table can move when it returns to origin.
Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) Position after return to origin. The position varies depending on whether there is an external stopper.
Note 3) [ ] for when the direction of return to origin has changed.

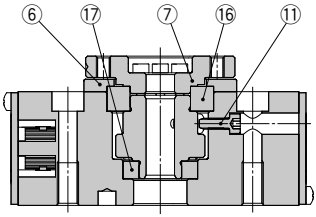
Construction



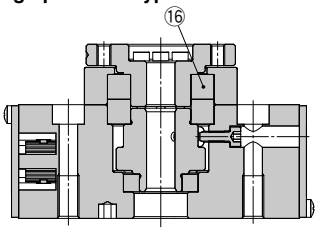
External stopper type



Basic type



High precision type



Component Parts

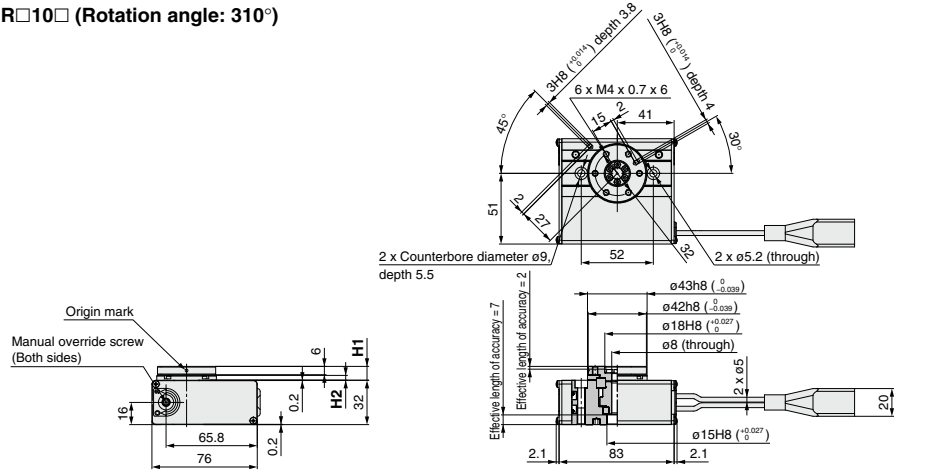
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Side plate A**	Aluminum alloy	Anodized
3	**Side plate B**	Aluminum alloy	Anodized
4	**Worm screw**	Stainless steel	Heat treated + Specially treated
5	**Worm wheel**	Stainless steel	Heat treated + Specially treated
6	**Bearing cover**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

Component Parts

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

Dimensions

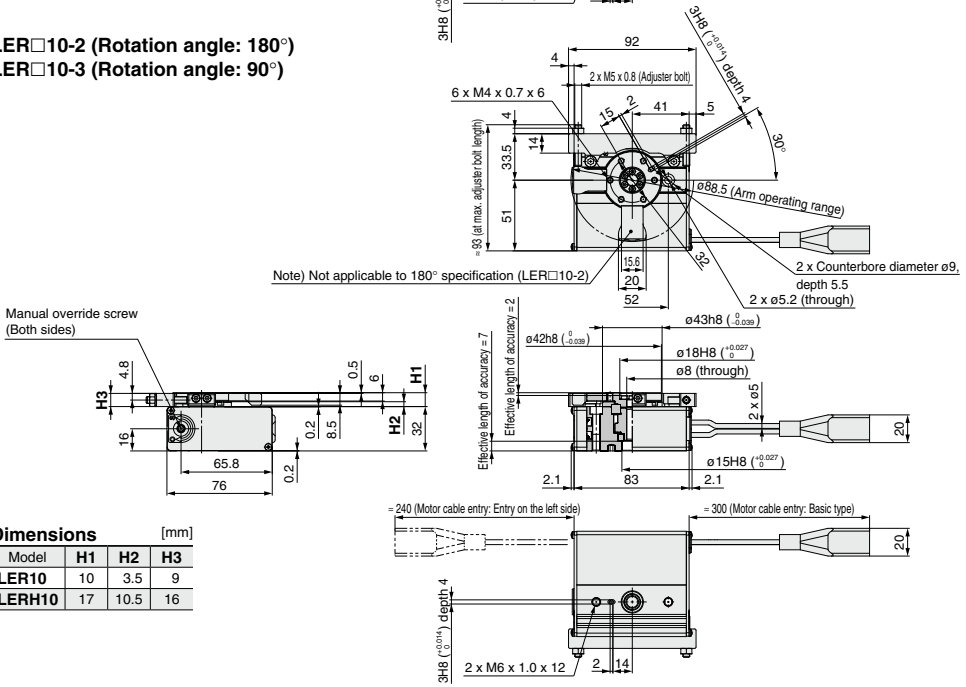
LER□10□ (Rotation angle: 310°)



Dimensions [mm]

Model	H1	H2
LER10	10	3.5
LERH10	17	10.5

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

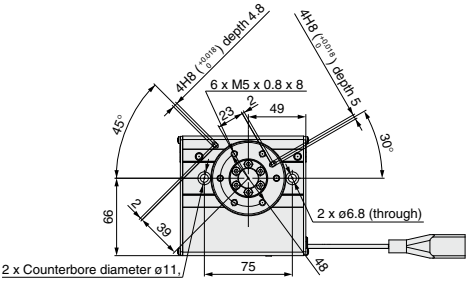


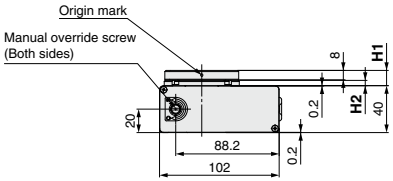
Dimensions [mm]

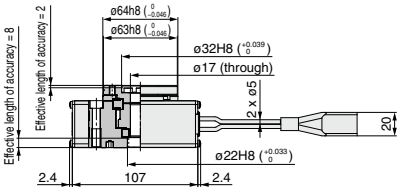
Model	H1	H2	H3
LER10	10	3.5	9
LERH10	17	10.5	16

Dimensions

LER□30□ (Rotation angle: 320°)

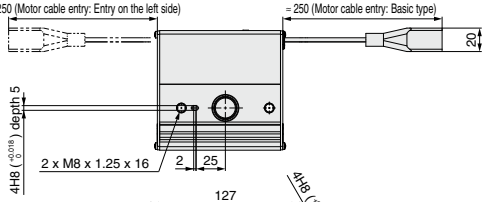




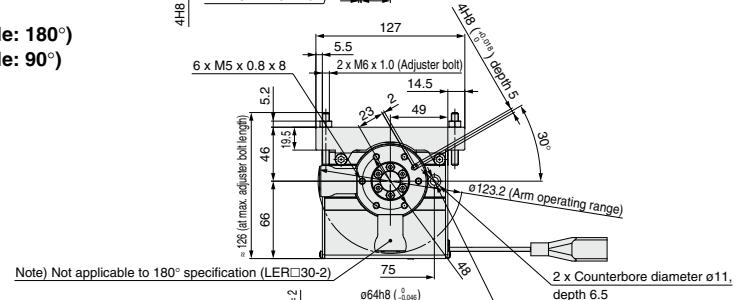


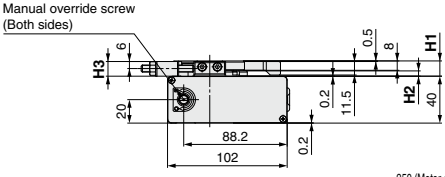
Dimensions [mm]

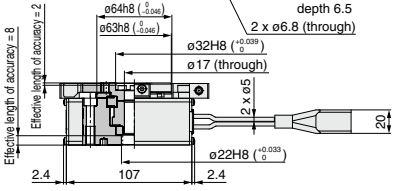
Model	H1	H2
LER30	13	4.5
LERH30	22	13.5



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

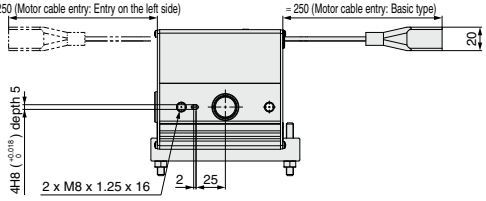






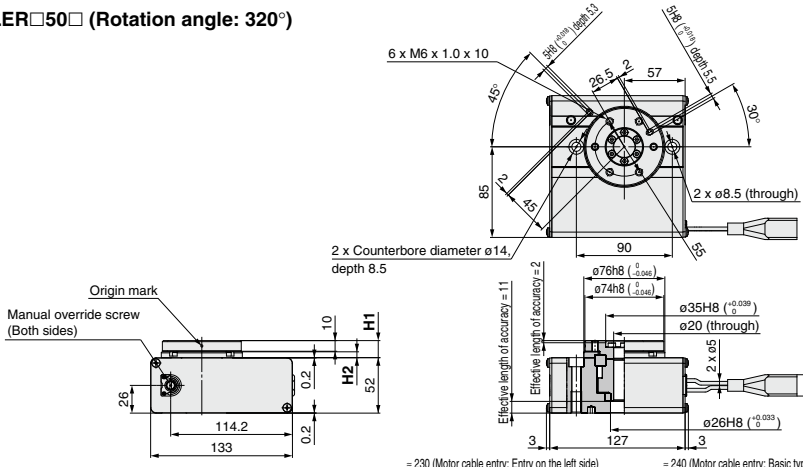
Dimensions [mm]

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



Dimensions

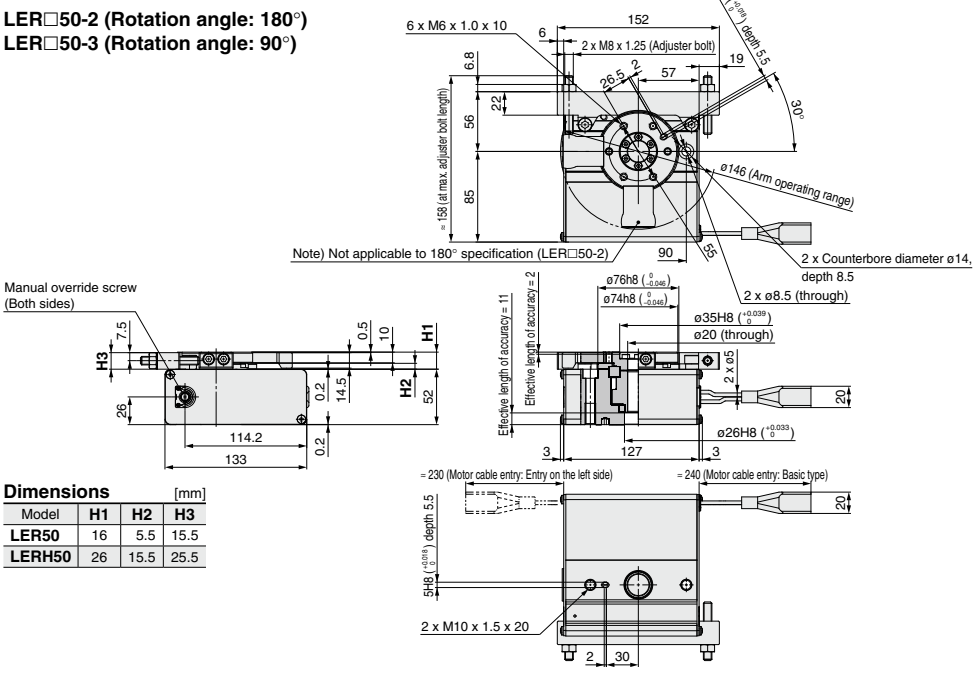
LER□50□ (Rotation angle: 320°)



Dimensions [mm]

Model	H1	H2
LER50	16	5.5
LERH50	26	15.5

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



Dimensions [mm]

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

Step Motor (Servo/24 VDC)

Continuous Rotation Specification

Electric Rotary Table

LER Series LER10, 30, 50

How to Order

LER ❶ 10 ❷ K ❸ – 1 ❹ – S ❺ 1 ❻ 6N ❼ 1 ❽ ❾

❶ Table accuracy

Nil	Basic type
H	High precision type

❷ Size

10
30
50

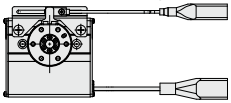
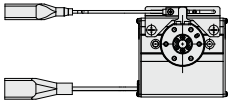
Rotation angle [°]

1	360

❸ Max. rotating torque [N·m]

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

❹ Motor cable entry

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

❺ Actuator cable type[*1] [*2]

Nil	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)[*3]

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

❻ Actuator cable length [m]

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

* Produced upon receipt of order (Robotic cable only) Refer to the specifications Note 3) on page 417.

❼ Controller type[*1]

Nil	Without controller	
6N	**LECP6** (Step data input type)	NPN
6P		PNP
MJ	**LECPMJ**[*2] (CC-Link direct input type)	—

*1 For details about controller and compatible motor, refer to the compatible controller below. The LECP1 and LECPA cannot be selected.
*2 Not applicable to CE.

❽ I/O cable length [m][*1]**, Communication plug**

Nil	Without cable (Without communication plug connector)[*2]
1	1.5
3	3
5	5
S	Straight type communication plug connector[*2]
T	T-branch type communication plug connector[*2]

*1 When "Without controller" is selected for controller types, I/O cable cannot be selected. Refer to page 568 if I/O cable for LECP6 is required.
*2 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

❾ Controller mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

⚠Caution

[CE-compliant products]
① EMC compliance was tested by combining the electric actuator LER series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.
② CC-Link direct input type (LECPMJ) is not CE-compliant.

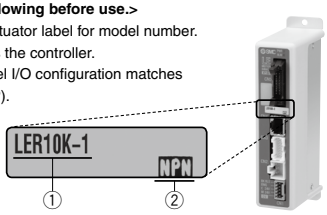
[UL-compliant products]
When conformity to UL is required, the electric actuator and controller should be used with a UL1310 Class 2 power supply.

The actuator and controller are sold as a package.

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

<Check the following before use.>

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



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

Compatible Controller

Type	Step data input type 	CC-Link direct input type 
Series	LECP6	LECPMJ
Features	Value (Step data) input Standard controller	CC-Link direct input
Compatible motor	Step motor (Servo/24 VDC)	
Maximum number of step data	64 points	
Power supply voltage	24 VDC	
Reference page	Page 560	Page 600

SMC

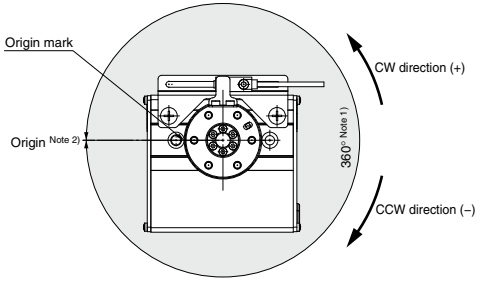
Specifications

Step Motor (Servo/24 VDC)

	Model		LER□10K	LER□10J	LER□30K	LER□30J	LER□50K	LER□50J
Actuator specifications	Rotation angle [°]		360					
	Angle setting range [°] Note 9)		±20000000					
	Max. rotating torque [N·m]		0.32	0.22	1.2	0.8	10	6.6
	Max. pushing torque 40 to 50 % [N·m] Note 1) Note 3)		0.13 to 0.16	0.09 to 0.11	0.48 to 0.60	0.32 to 0.40	4.0 to 5.0	2.6 to 3.3
	Max. moment of inertia [kg·m²] Note 2) Note 3)		0.0040	0.0018	0.035	0.015	0.13	0.05
	Angular speed [°/sec] Note 2) Note 3)		20 to 280	30 to 420	20 to 280	30 to 420	20 to 280	30 to 420
	Pushing speed [°/sec]		20	30	20	30	20	30
	Max. angular acceleration/deceleration [°/sec²] Note 2)		3000					
	Backlash [°]	Basic type	±0.3		±0.2			
		High precision type			±0.1			
	Positioning repeatability [°]	Basic type	±0.05		±0.05			
		High precision type			±0.03			
	Lost motion [°] Note 4)	Basic type	0.3 or less		0.3 or less			
		High precision type			0.2 or less			
	Impact/Vibration resistance [m/s²] Note 5)		150/30					
	Actuation type		Special worm gear + Belt drive					
	Max. operating frequency [c.p.m]		60					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
	Weight [kg]	Basic type	0.51		1.2		2.3	
		High precision type	0.55		1.3		2.5	
Electric specifications	Motor size		□20		□28		□42	
	Motor type		Step motor (Servo/24 VDC)					
	Encoder		Incremental A/B phase (800 pulse/rotation)					
	Proximity sensor (for return to origin)/Input circuit		2-wire					
	Proximity sensor (for return to origin)/Input point		1 input					
	Power supply [V]		24 VDC ±10%					
	Power consumption [W] Note 6)		11		22		34	
	Standby power consumption when operating [W] Note 7)		7		12		13	
	Max. instantaneous power consumption Note 8)		14		42		57	

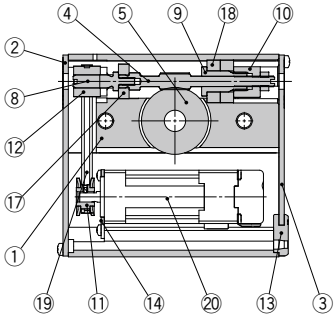
Note 1) Pushing force accuracy is LER10: ±30% (F.S.), LER30: ±25% (F.S.), LER50: ±20% (F.S.).
Note 2) The angular acceleration, angular deceleration and angular speed may fluctuate due to variations in the moment of inertia. Refer to "Moment of Inertia—Angular Acceleration/Deceleration, Effective Torque—Angular Speed" graphs on pages 406 and 407 for confirmation.
Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
Note 4) A reference value for correcting an error in reciprocal operation.
Note 5) Impact resistance: No malfunction occurred when the slide table was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the actuator in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the actuator in the initial state.)
Note 6) The power consumption (including the controller) is for when the actuator is operating.
Note 7) The standby power consumption when operating (including the controller) is for when the actuator is stopped in the set position during operation.
Note 8) The maximum instantaneous power consumption (including the controller) is for when the actuator is operating. This value can be used for the selection of the power supply.
Note 9) The angle displayed on the monitor is automatically reset to 0° every 360°.
To set an angle (position), use the "Relative" movement mode.
If an angle of 360° or more is set using the "Absolute" movement mode, the correct operation cannot be performed.

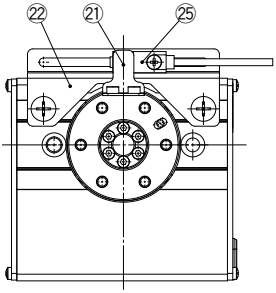
Table Rotation Angle Range

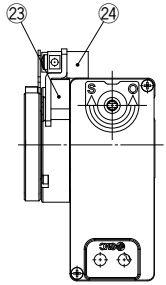


Note 1) Range within which the table can move.
Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.
Note 2) The sensor detection range is recognized as origin. When detecting the sensor, the table rotates in the reverse direction within the sensor detection range.

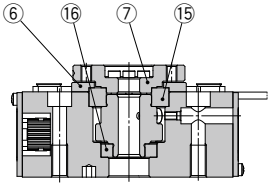
Construction



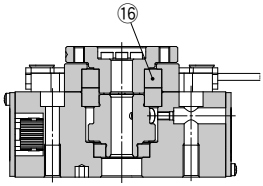




Basic type



High precision type



Component Parts

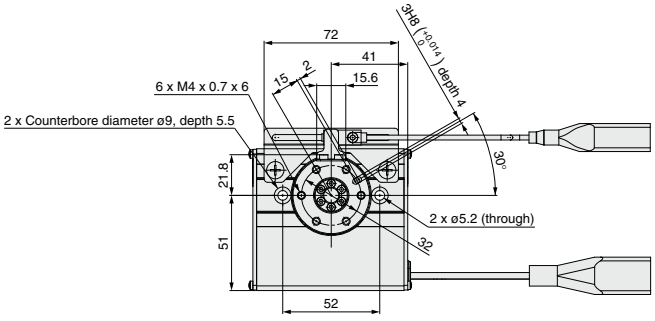
No.	Description		Material	Note
1	**Body**		Aluminum alloy	Anodized
2	**Side plate A**		Aluminum alloy	Anodized
3	**Side plate B**		Aluminum alloy	Anodized
4	**Worm screw**		Stainless steel	Heat treated + Specially treated
5	**Worm wheel**		Stainless steel	Heat treated + Specially treated
6	**Bearing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

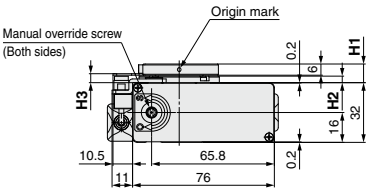
Component Parts (360° type)

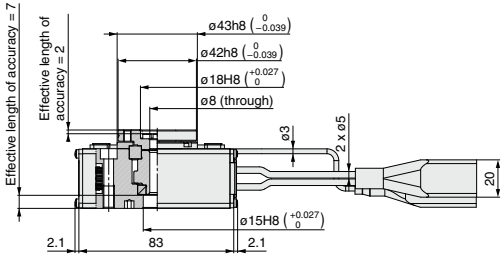
No.	Description	Material	Note
21	**Proximity dog**	Stainless steel	
22	**Sensor holder**	Carbon steel	Chromate treated
23	**Sensor holder spacer**	Aluminum alloy	Anodized (High precision type can be used only)
24	**Square nut**	Aluminum alloy	
25	**Proximity sensor assembly**	—	

Dimensions

LER□10□

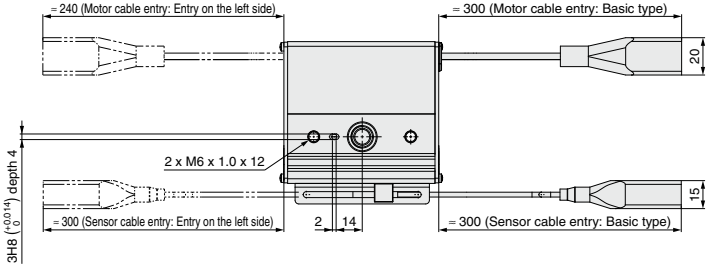






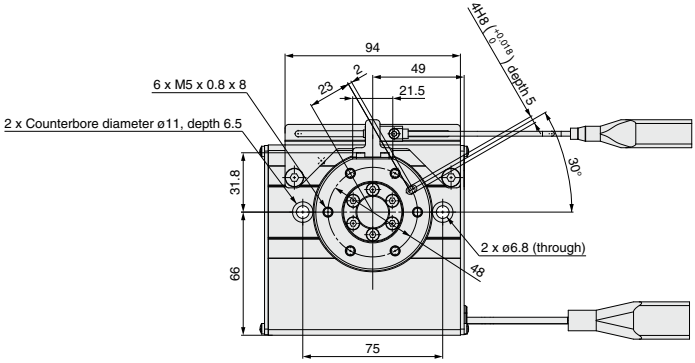
Dimensions [mm]

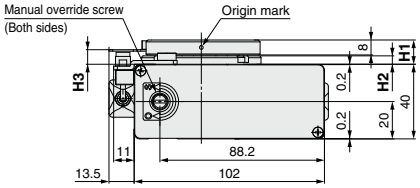
Model	H1	H2	H3
LER10	10	3.5	4.8
LERH10	17	10.5	11.8

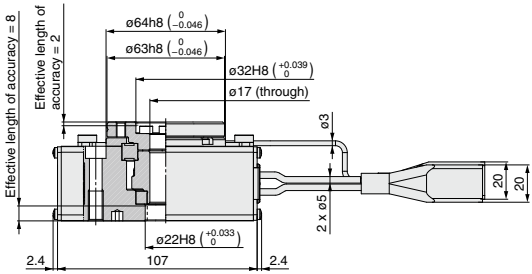


Dimensions

LER□30

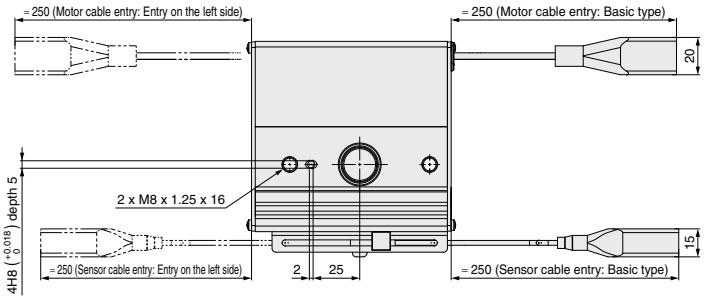






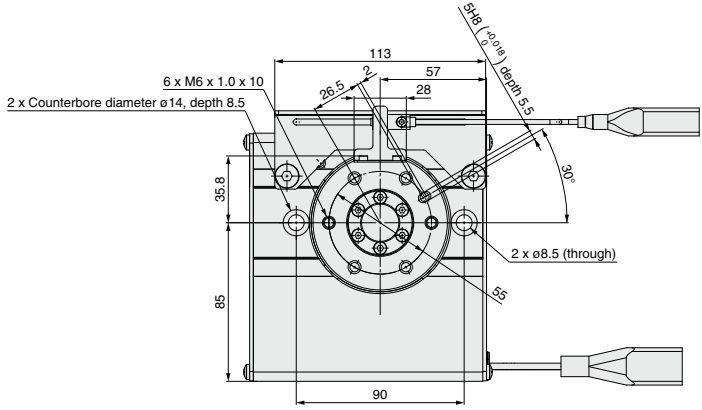
Dimensions [mm]

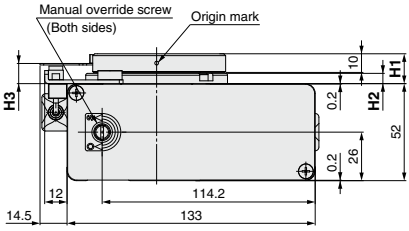
Model	H1	H2	H3
LER30	13	4.5	7.8
LERH30	22	13.5	16.8

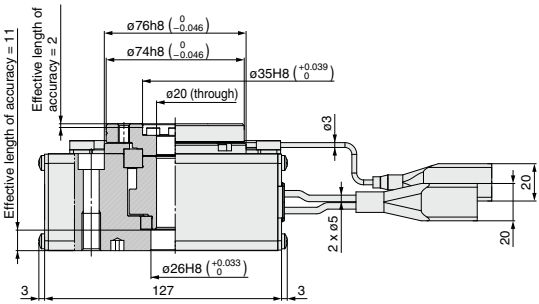


Dimensions

LER□50

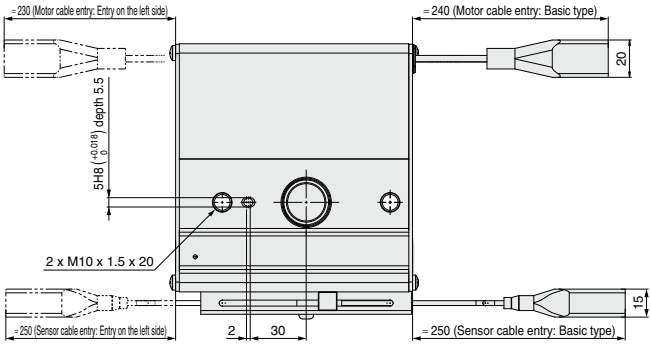






Dimensions [mm]

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



LER Series
Electric Rotary Table/ Specific Product Precautions 1

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 8 for Electric Actuator Precautions.

Design/Selection

⚠Warning

1. If the operating conditions involve load fluctuations, ascending/descending movements, or changes in the frictional resistance, ensure that safety measures are in place to prevent injury to the operator or damage to the equipment.

Failure to provide such measures could accelerate the operation speed, which may be hazardous to humans, machinery, and other equipment.

2. Power failure may result in a decrease in the pushing force; ensure that safety measures are in place to prevent injury to the operator or damage to the equipment.

When the product is used for clamping, the clamping force could be decreased due to power failure, potentially creating a hazardous situation in which the workpiece is released.

⚠Caution

1. If the operating speed is set too fast and the moment of inertia is too large, the product could be damaged.

Set appropriate product operating conditions in accordance with the model selection procedure.

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

3. When using the electric rotary table with an external stopper, or by directly stopping the load externally, be sure to set to [Pushing operation].

Also, ensure that the workpiece is not impacted externally during the positioning operation or in the range of positioning operation.

Mounting

⚠Warning

1. Do not drop or hit the electric rotary table to avoid scratching and denting the mounting surfaces.

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

2. When mounting the load, tighten the mounting screws within the specified torque range.

Tightening the screws with a higher torque than recommended may cause malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position.

Mounting the workpiece to the electric rotary table

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

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

3. When mounting the electric rotary table, tighten the mounting screws within the specified torque range.

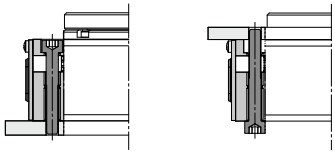
Tightening the screws with a higher torque than recommended may cause malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position.

Mounting

⚠Warning

Through-hole mounting

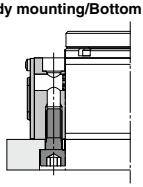
Body mounting/Bottom **Body mounting/Top**



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

Body tapped mounting

Body mounting/Bottom



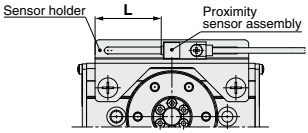
Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth [mm]
LER□10	M6 x 1	5.0	12
LER□30	M8 x 1.25	12.0	16
LER□50	M10 x 1.5	25.0	20

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

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

When it is necessary to operate the product by the manual override screws, check the position of the manual override screws of the product, and leave necessary space. Do not apply excessive torque to the manual override screws. This may lead to damage and malfunction.

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



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

LER Series
Electric Rotary Table/ Specific Product Precautions 2

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 8 for Electric Actuator Precautions.

Handling

⚠Caution

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

2. The moving force should be the initial value (100%).
If the moving force is set below the initial value, there may be variation in the cycle time, or an alarm may be generated.

3. INP output signal

1) Positioning operation
When the product comes within the set range by step data [In position], the INP output signal will turn on.
Initial value: Set to [0.50] or higher.

2) Pushing operation
When the effective force exceeds the [Trigger LV] value (including force during operation), the INP output signal will turn on.
The [Trigger LV] should be set between 40% and [Pushing force].

a) To ensure that the clamping and external stop is achieved by [Pushing force], it is recommended that the [Trigger LV] be set to the same value as the [Pushing force].

b) When the [Trigger LV] and [Pushing force] are set to be less than the lower limit of the specified range, there is the possibility that the INP output signal will be switched on from the pushing operation start position.

< Pushing force and trigger LV range >

Model	Set value of pushing force [%]	Set value of Trigger LV [%]
LER□	40 to 50	40 to 50

4. When using the electric rotary table with an external stopper, or by directly stopping the load externally, be sure to set to [Pushing operation].
Also, ensure that the workpiece is not impacted externally during the positioning operation or in the range of positioning operation.
If the product is used in the positioning operation mode, there may be galling or other problems when the product/workpiece comes into contact with the external stopper or external object.

5. When the table is stopped by the pushing operation mode (stopping/clamping), set the product to a position of at least 1° away from the workpiece. (This position is referred to as the pushing start position.)
If the pushing start position (stopping or clamping) is set to the same position as the external stop position, the following alarms may be generated and operation may become unstable.

a. "Posn failed" alarm is generated.
It is not possible to reach the pushing start position within the target time.

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

c. "Deviation over flow" alarm is generated.
Displacement exceeding the specified value is generated at the pushing start position.

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

Handling

⚠Caution

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

8. In case that gravity is added to the workpiece along the rotation direction when product is mounted vertically, the workpiece may fall down when "SVON" signal is OFF or EMG is not energizing.

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

Maintenance

⚠Danger

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