

Electric Rotary Table

LER Series

Step Motor (Servo/24 VDC)

**Low
profile**



Basic type [mm]

Model	H
LER10	42
LER30	53
LER50	68

High precision type [mm]

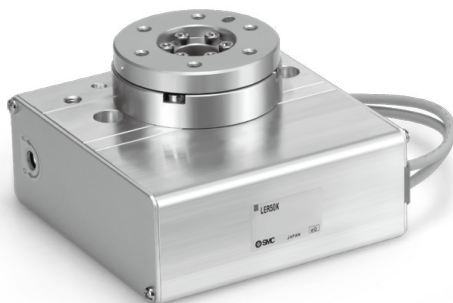
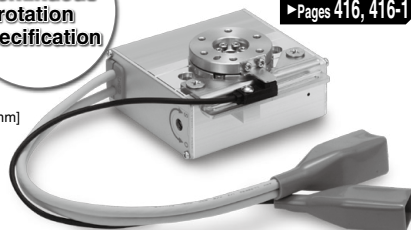
Model	H
LEHR10	49
LEHR30	62
LEHR50	78

**Continuous
rotation
specification**



● Rotation angle: 360°

►Pages 416, 416-1



● 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			►Page 404
30	0.8	1.2	420	280	
50	6.6	10			

* Value when an external stopper is mounted.

Step Motor (Servo/24 VDC)

Controller/Driver

►Step data input type

LECP6 Series

- 64 points positioning
- Input using controller setting kit or teaching box



►CC-Link direct input type

LECPMJ Series*

- EtherCAT®/EtherNet/IP™/PROFINET/DeviceNet™/IO-Link direct input type
- JXCE1/91/P1/D1/L1 Series

* Not applicable to CE.



►Programless type

LECP1 Series

- 14 points positioning
- Control panel setting



►Pulse input type

LECPA Series

- * Not applicable to the continuous rotation specification



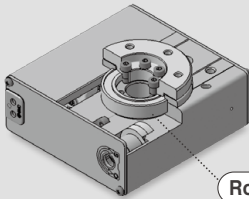
►Page 547



Electric Rotary Table

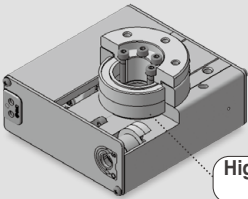
Basic and high precision types are available.

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.

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

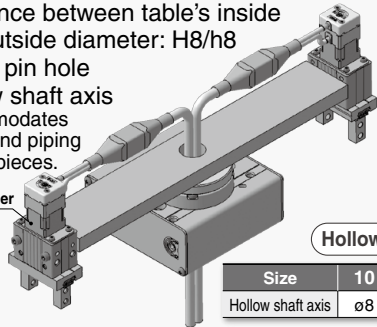
Manual override screw (Both sides)

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



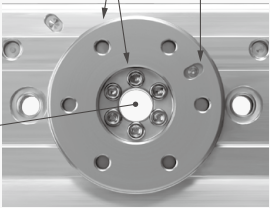
For alignment of rotation center and workpiece

Dowel pin hole

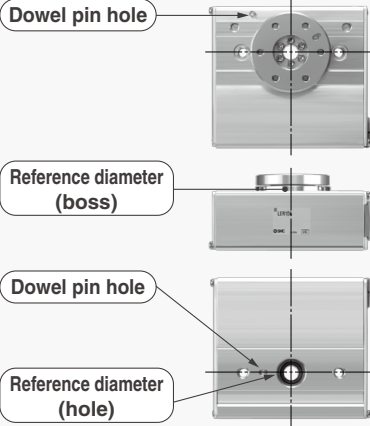
Positioning of rotating direction

Hollow shaft axis

Size	10	30	50
Hollow shaft axis	ø8	ø17	ø20

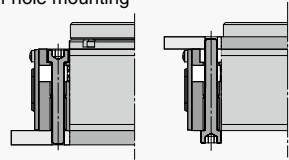


Easy Mounting of the Main Body

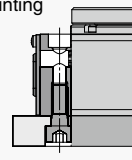


Mounting Variations

Through-hole mounting



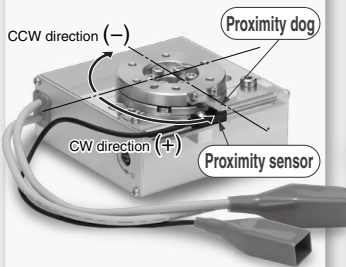
Body tapped mounting



Continuous Rotation Specification

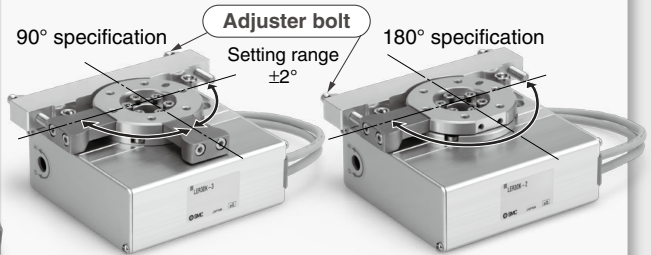
Rotation angle: 360°

Return to origin with proximity sensor

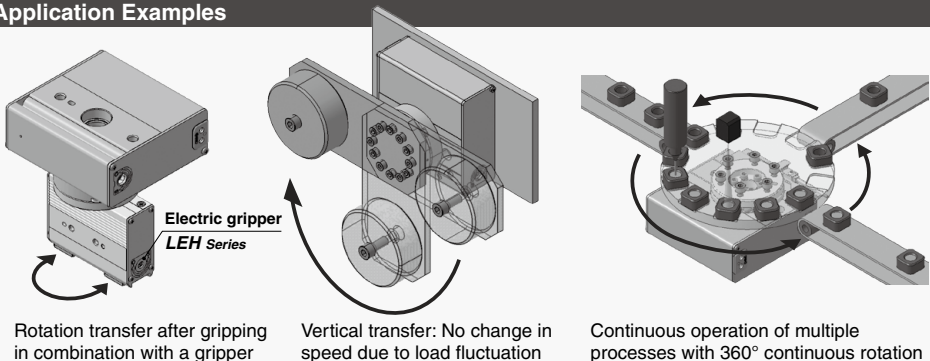


With External Stopper/Rotation Angle: 90°/180° Specification

Repeatability at the end: $\pm 0.01^\circ$



Application Examples



Model Selection	Page 404
-----------------------	----------

Step Motor (Servo/24 VDC)

Electric Rotary Table *LER Series*



How to Order	Pages 410, 410-1
Specifications	Page 411
Construction	Page 412
Dimensions	Page 413

Step Motor (Servo/24 VDC)

Continuous Rotation Specification Electric Rotary Table *LER Series*



How to Order	Pages 416, 416-1
Specifications	Page 417
Construction	Page 418
Dimensions	Page 419
Specific Product Precautions	Page 422

Step Motor (Servo/24 VDC) Controller



Step Data Input Type/ <i>LECP6 Series</i>	Page 560
Controller Setting Kit/ <i>LEC-W2</i>	Page 569
Teaching Box/ <i>LEC-T1</i>	Page 570
CC-Link Direct Input Type/ <i>LECPMJ Series</i>	Page 600
Controller Setting Kit/ <i>LEC-W2</i>	Page 603-2
Teaching Box/ <i>LEC-T1</i>	Page 603-2
EtherCAT®/EtherNet/IP™/PROFINET/DeviceNet™/IO-Link	
Direct Input Type/ <i>JXCE1/91/P1/D1/L1 Series</i>	Page 603-5
Controller Setting Kit/ <i>LEC-W2</i>	Page 603-10
Teaching Box/ <i>LEC-T1</i>	Page 605
Gateway Unit/ <i>LEC-G Series</i>	Page 572
Programless Controller/ <i>LECP1 Series</i>	Page 576
Step Motor Driver/ <i>LECPA Series</i>	Page 590
Controller Setting Kit/ <i>LEC-W2</i>	Page 597
Teaching Box/ <i>LEC-T1</i>	Page 598

4-Axis Step Motor Controller (Servo/24 VDC)



Parallel I/O/ <i>JXC73/83 Series</i>	Page 606-1
EtherNet/IP™ Type/ <i>JXC93 Series</i>	Page 606-1

Electric Actuators

Rotary Table

LER Series

Step Motor (Servo/24 VDC)



Continuous Rotation Specification



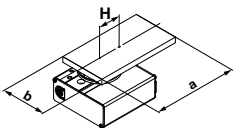
Model Selection

LER Series ▶ Pages 410, 410-1 Continuous Rotation Specification LER-1 Series ▶ Pages 416, 416-1



Selection Procedure

Operating conditions



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

Angular acceleration/
angular deceleration $\dot{\omega}$: $1000^\circ/\text{sec}^2$
Angular speed ω : $420^\circ/\text{sec}$
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

Formula

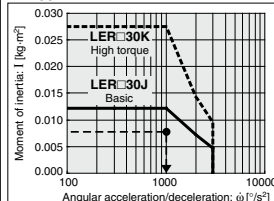
$$I = m \times (a^2 + b^2)/12 + m \times H^2$$

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).

Selection example

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

LER30



Step2 Necessary torque

① Load type

- Static load: T_s
- Resistance load: T_f
- Inertial load: T_a

Formula

Effective torque $\geq T_s$
Effective torque $\geq T_f \times 1.5$
Effective torque $\geq T_a \times 1.5$

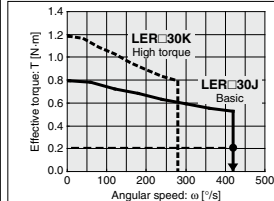
② Check the effective torque

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).

Selection example

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

LER30



Step3 Allowable load

① Check the allowable load

- Radial load
- Thrust load
- Moment

Formula

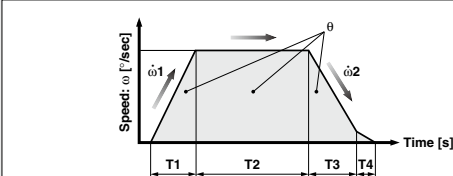
Allowable thrust load $\geq m \times 9.8$
Allowable moment $\geq m \times 9.8 \times H$

Selection example

- Thrust load
 $2.0 \times 9.8 = 19.6 \text{ N} < \text{Allowable load OK}$
- Allowable moment
 $2.0 \times 9.8 \times 0.04 \\ = 0.784 \text{ N} \cdot \text{m} < \text{Allowable moment OK}$

Step4 Rotation time

① Calculation of cycle time (rotation time)



θ : Rotation angle $^\circ$

ω : Angular speed $^\circ/\text{sec}$

$\dot{\omega}1$: Angular acceleration $^\circ/\text{sec}^2$

$\dot{\omega}2$: Angular deceleration $^\circ/\text{sec}^2$

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 $T4 = 0.2 \text{ (sec)}$

Cycle time $T = T1 + T2 + T3 + T4$

Selection example

• Angular acceleration time $T1 = 420/1000 = 0.42 \text{ sec}$

• Angular deceleration time $T3 = 420/1000 = 0.42 \text{ sec}$

• Constant speed time

$$T2 = \{180 - 0.5 \times 420 \times (0.42 + 0.42)\} / 420 \\ = 0.009 \text{ sec}$$

• Cycle time

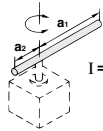
$$T = T1 + T2 + T3 + T4 \\ = 0.42 + 0.009 + 0.42 + 0.2 \\ = 1.049 \text{ (sec)}$$

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

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

1. Thin bar

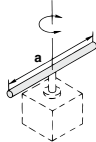
Position of rotation shaft:
Perpendicular to a bar
through one end



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

2. Thin bar

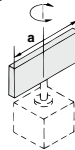
Position of rotation shaft:
Passes through the center of
gravity of the bar.



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

3. Thin rectangular plate (cuboid)

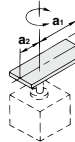
Position of rotation shaft: Passes
through the center of gravity of a plate.



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

4. Thin rectangular plate (cuboid)

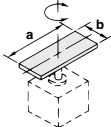
Position of rotation shaft: Perpendicular
to the plate and passes through one end.
(The same applies to thicker cuboids.)



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

5. Thin rectangular plate (cuboid)

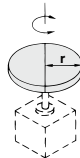
Position of the rotation shaft: Passes through the
center of gravity of the plate and perpendicular to
the plate. (The same applies to thicker cuboids.)



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

6. Cylindrical shape (including a thin disk)

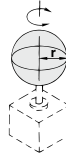
Position of rotation shaft:
Center axis



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

7. Sphere

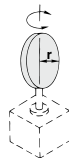
Position of rotation shaft:
Diameter



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

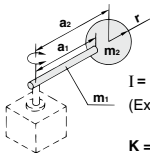
8. Thin disk (mounted vertically)

Position of rotation shaft:
Diameter



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

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

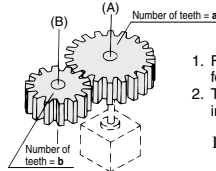


$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$$

(Ex.) Refer to 7 when the shape of
m₂ is spherical.

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

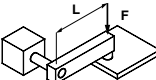
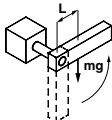
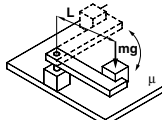
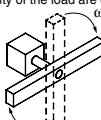
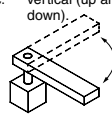
10. Gear transmission



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

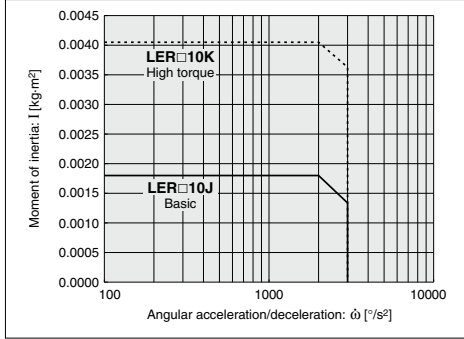
Load type		
Static load: Ts	Resistance load: Tf	Inertial load: Ta
Only pressing force is necessary. (e.g. for clamping)	Gravity or friction force is applied to rotating direction.	Rotate the load with inertia.
	Gravity is applied.  Friction force is applied. 	Center of rotation and center of gravity 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 Tf: Resistance load [N·m] m: Load mass [kg] g: Gravitational acceleration 9.8 [m/s ²] 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·m ²] ω̇: Angular acceleration/deceleration [°/sec ²] ω: Angular speed [°/sec]
Necessary torque: T = Ts	Necessary torque: T = Tf x 1.5 <small>Note 1)</small>	Necessary torque: T = Ta x 1.5 <small>Note 1)</small>
<ul style="list-style-type: none"> • 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 Step Motor (Servo/24 VDC) LECP6, LECP1, LECPMJ, JXC□1

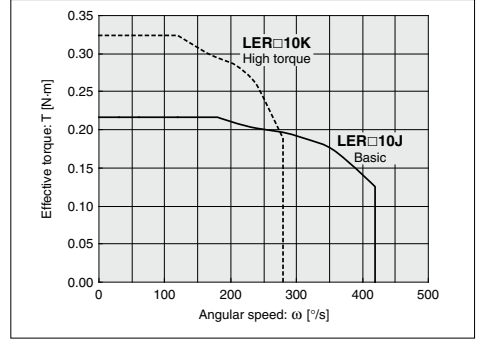
Moment of Inertia—Angular Acceleration/Deceleration

LER10

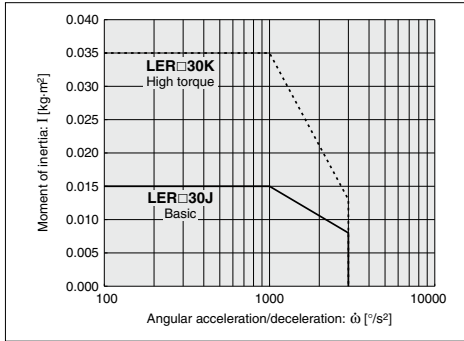


Effective Torque—Angular Speed

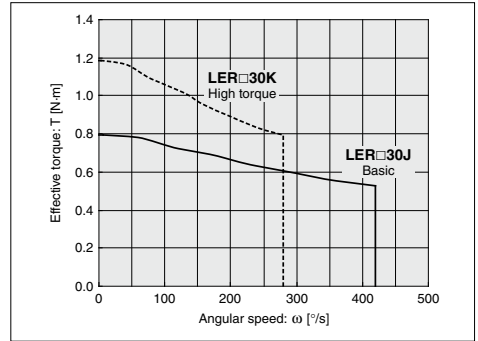
LER10



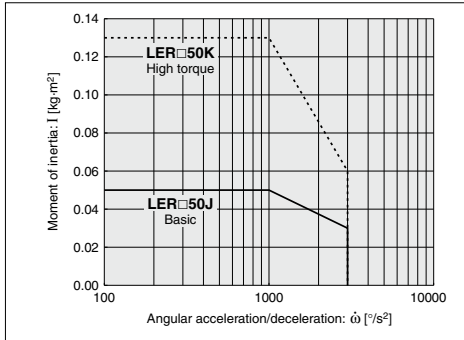
LER30



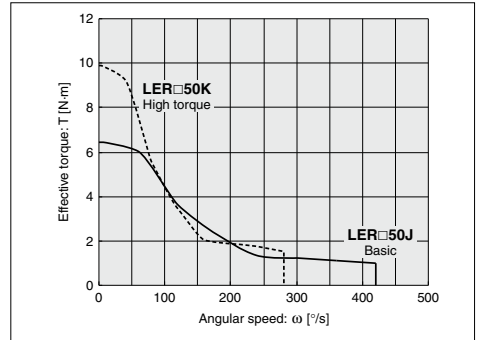
LER30



LER50



LER50

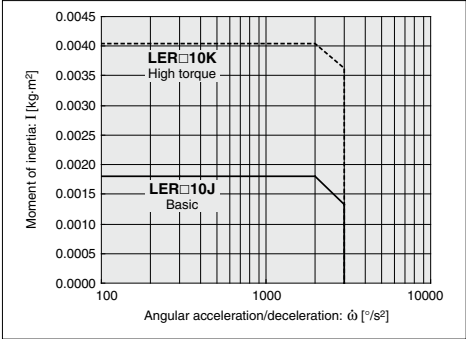


For the LEC6/LECP1/LECPMJ/JXC□1, refer to page 406.

For Step Motor (Servo/24 VDC) LECPA, JXC□3

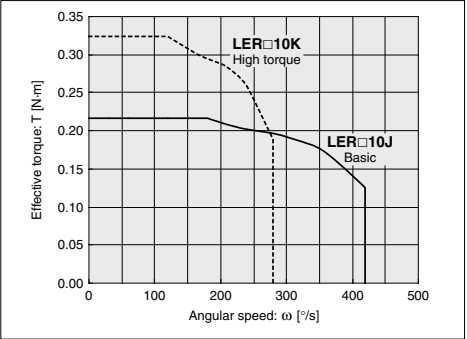
Moment of Inertia—Angular Acceleration/Deceleration

LER10

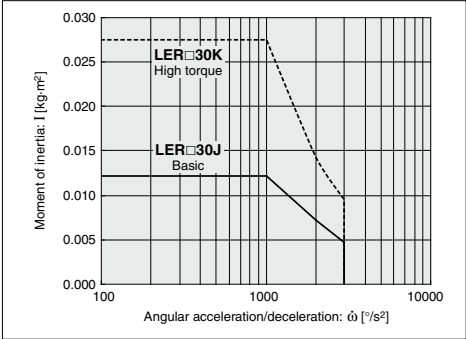


Effective Torque—Angular Speed

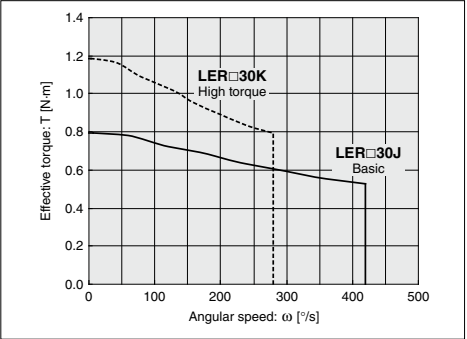
LER10



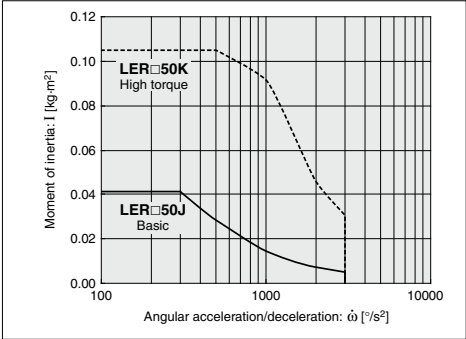
LER30



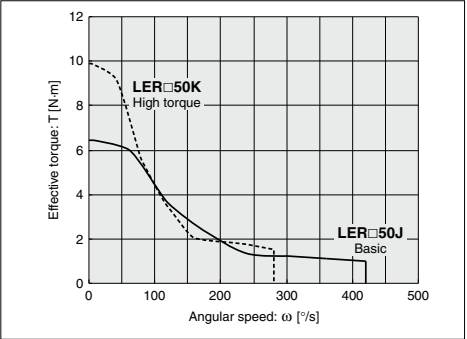
LER30



LER50



LER50

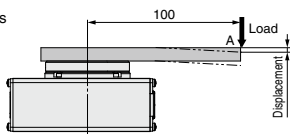


Allowable Load

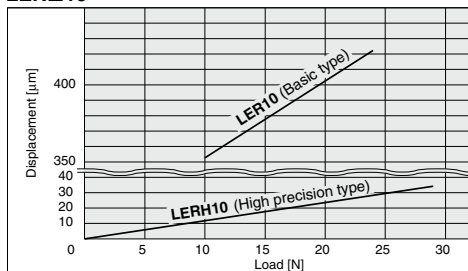
Size	Allowable radial load [N]		Allowable thrust load [N]				Allowable moment [N·m]	
	Basic type	High precision type	(a)		(b)		Basic type	High precision type
			Basic type	High precision type	Basic type	High precision type		
10	78	86	74	78	107	107	2.4	2.9
30	196	233	197	363	398	398	5.3	6.4
50	314	378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

Table Displacement (Reference Value)

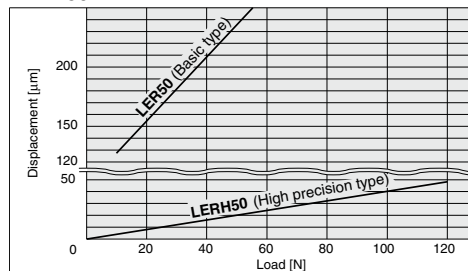
- Displacement at point A when a load is applied to point A 100 mm away from the rotation center.



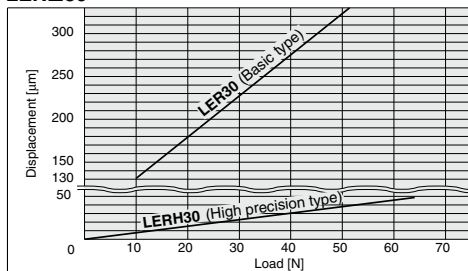
LER□10



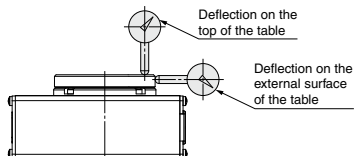
LER□50



LER□30



Deflection Accuracy: Displacement at 180° Rotation (Guide)



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

Applicable to the
LEC□ series

Electric Rotary Table

LER Series LER10, 30, 50



How to Order

Refer to page 410-1 for the communication protocols EtherCAT®, EtherNet/IP™, PROFINET, DeviceNet™, and IO-Link.

LER 10 K - - R1 6N 1

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Table accuracy

Nil	Basic type
H	High precision type

② Size

10
30
50

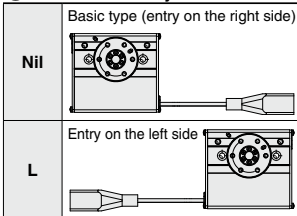
③ Max. rotating torque [N·m]

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

④ Rotation angle [°]

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

⑤ Motor cable entry



⑥ Actuator cable type/length

Nil	Without cable	R5	Robotic cable 5 m
S1	Standard cable 1.5 m	R8	Robotic cable 8 m*1
S3	Standard cable 3 m	RA	Robotic cable 10 m*1
S5	Standard cable 5 m	RB	Robotic cable 15 m*1
R1	Robotic cable 1.5 m	RC	Robotic cable 20 m*1
R3	Robotic cable 3 m		

*1 Produced upon receipt of order (Robotic cable only)

*2 The standard cable should only be used on fixed parts.
For use on moving parts, select the robotic cable.

⑨ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

⑦ Controller/Driver type*1

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

⑧ 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.

⚠ 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.

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

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.>

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

LER10K-2

NPN

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

Applicable to the
JXC□ series

Electric Rotary Table

LER Series LER10, 30, 50

How to Order

Refer to page 410 for the communication protocol CC-Link.

LER 10 K - - R1 CD17T

1
2
3
4
5
6
7

① Table accuracy

Nil	Basic type
H	High precision type

② Size

10
30
50

③ 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

⑦ Controller

Nil	Without controller
C□□□	With controller

④ Rotation angle [°]

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

⑥ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m ^{*1}
RA	Robotic cable 10 m ^{*1}
RB	Robotic cable 15 m ^{*1}
RC	Robotic cable 20 m ^{*1}

* 1 Produced upon receipt of order (Robotic cable only)

* 2 The standard cable should only be used on fixed parts.

For use on moving parts, select the robotic cable.

⑤ Motor cable entry

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

⚠ Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LE series and the JXCE1/91/P1/D1/L1 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.

C D 1 7 T

Communication protocol

E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link

For single axis

Mounting

7	Screw mounting
8*	DIN rail






* DIN rail is not included. It must be ordered separately. (Page 603-8)

Communication plug connector for DeviceNet™

Nil	Without plug connector
S	Straight type
T	T-branch type

* Select "Nil" for anything other than DeviceNet™.

Compatible Controller

Type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type
					
Series	JXCE1	JXC91	JXCP1	JXCD1	JXCL1
Features	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-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 603-5				

Specifications

Step Motor (Servo/24 VDC)

Model			LER□10K	LER□10J	LER□30K	LER□30J	LER□50K	LER□50J
Actuator specifications	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·m ²] ^{Note 2) 3)}	LECP6/LECP1/LECPM/JXC□1	0.0040	0.0018	0.035	0.015	0.13	0.05
		LECPA JXC□3			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 [°/sec ²] ^{Note 3)}		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/s ²] ^{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	
	-3/external arm (1 pc.)	Basic type	0.57		1.2		2.6	
		High precision type	0.63		1.4		2.8	
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.

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.)

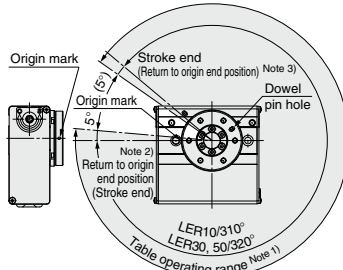
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the actuator in the initial state.)

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

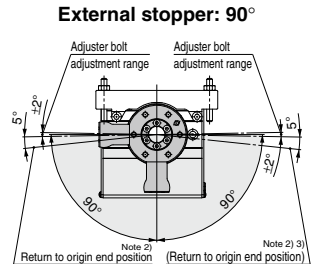
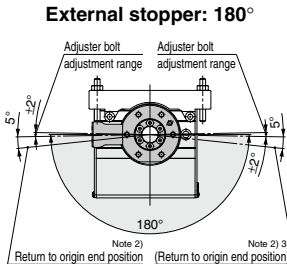


Note 1) Range within which the table can move when it returns to origin.

Make sure a workpiece mounted on the table does not interfere with the workpieces and facilities around the table.

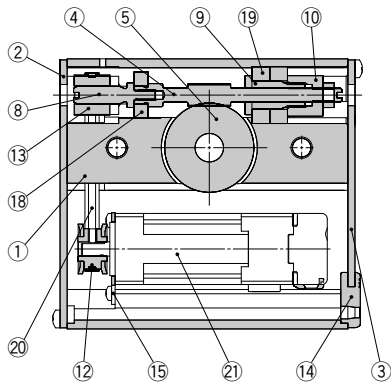
Note 2) Position after return to origin. The position varies depending on whether there is an external stopper.

Note 3) [] for when the direction of return to origin has changed.

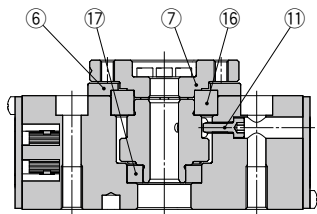


* The figures show the origin position for each actuator.

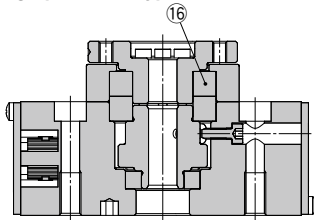
Construction



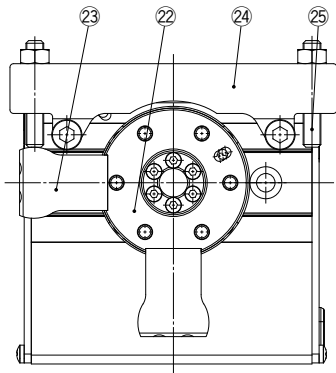
Basic type



High precision type



External stopper type



Component Parts

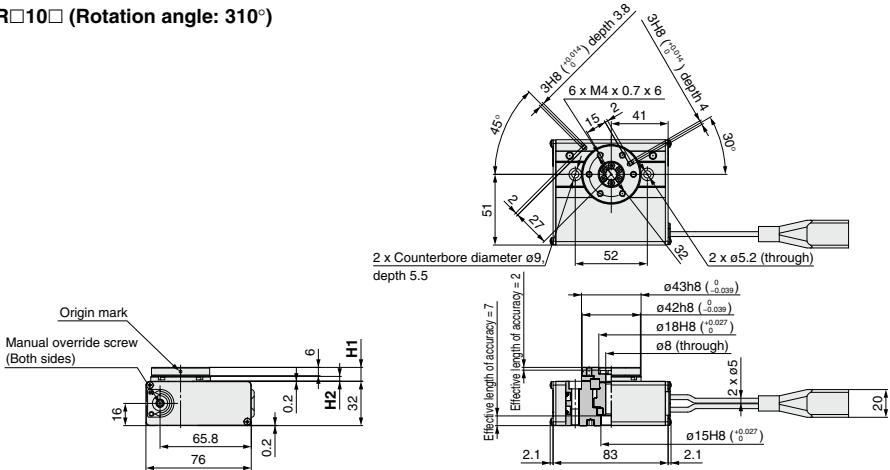
No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Side plate A	Aluminum alloy	Anodized
3	Side plate B	Aluminum alloy	Anodized
4	Worm screw	Stainless steel	Heat treated + Specially treated
5	Worm wheel	Stainless steel	Heat treated + Specially treated
6	Bearing cover	Aluminum alloy	Anodized
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 High precision type	Deep groove ball bearing 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°)

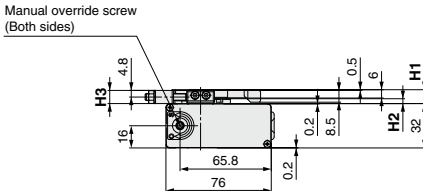
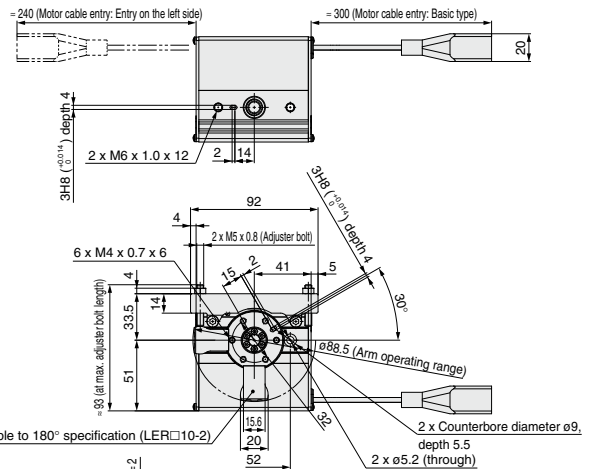


Dimensions [mm]

Model	H1	H2
LER10	10	3.5
LERH10	17	10.5

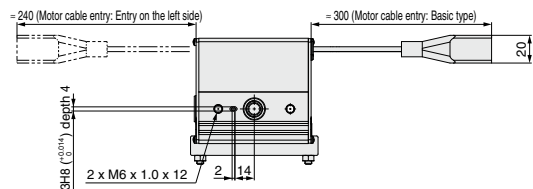
LER□10-2 (Rotation angle: 180°)

LER□10-3 (Rotation angle: 90°)



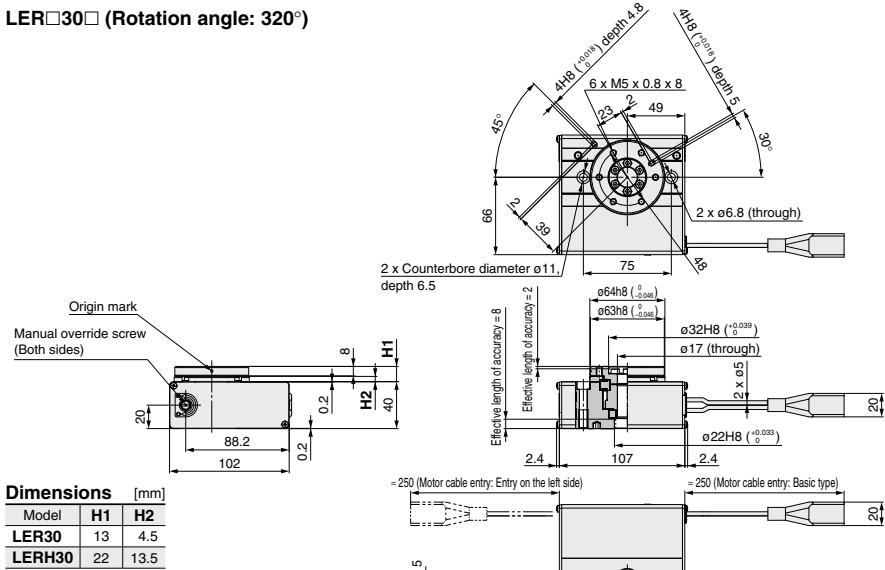
Dimensions [mm]

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



Dimensions

LER□30□ (Rotation angle: 320°)

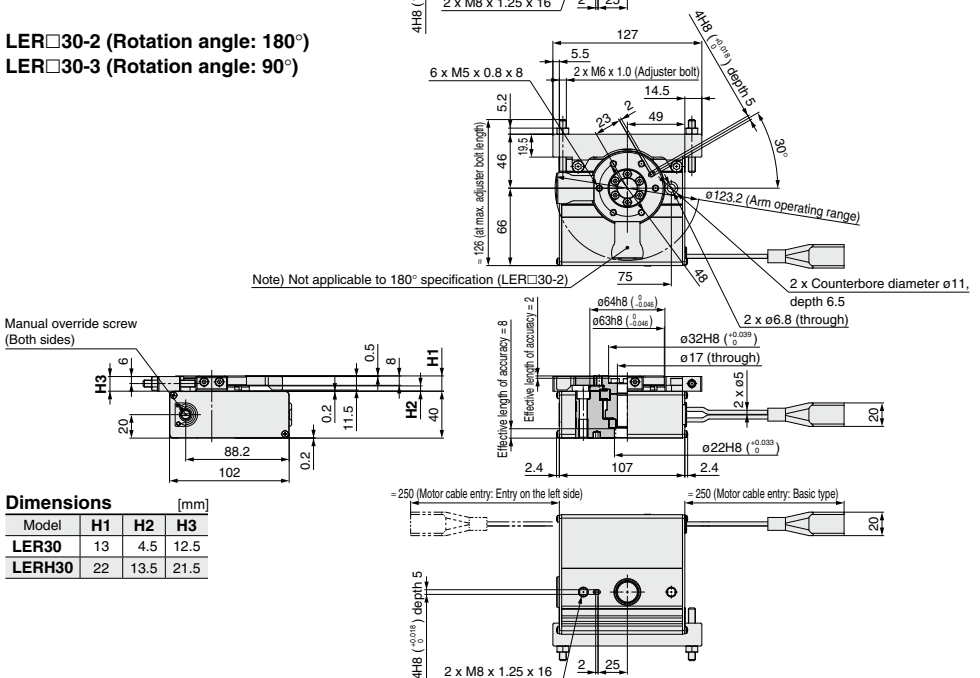


Dimensions [mm]

Model	H1	H2
LER30	13	4.5
LERH30	22	13.5

LER□30-2 (Rotation angle: 180°)

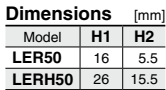
LER□30-3 (Rotation angle: 90°)



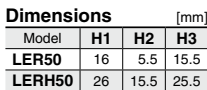
Dimensions [mm]

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

LER□50□ (Rotation angle: 320°)



LER□50-3 (Rotation angle: 90°)



Continuous Rotation Specification

Electric Rotary Table

LER Series LER10, 30, 50

Applicable to the
LEC□ series

Refer to page 416-1 for the communication protocols EtherCAT®, EtherNet/IP™, PROFINET, DeviceNet™, and IO-Link.

How to Order

LER 10 K - 1 - R1 6N 1

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Table accuracy

NII	Basic type
H	High precision type

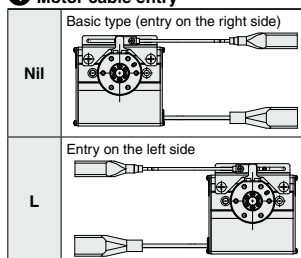
② Size

10
30
50

• Rotation angle [°]

1	360
---	-----

④ Motor cable entry

⑦ I/O cable length [m]^{*1}, Communication plug

NII	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 LEC6 is required.

^{*2} For the LECPMJ, only "NII", "S" and "T" are selectable since I/O cable is not included.

⑤ Actuator cable type/length

NII	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m ^{*1}
RA	Robotic cable 10 m ^{*1}
RB	Robotic cable 15 m ^{*1}
RC	Robotic cable 20 m ^{*1}

^{*1} Produced upon receipt of order (Robotic cable only)

^{*2} The standard cable should only be used on fixed parts.
For use on moving parts, select the robotic cable.

⑧ Controller mounting

NII	Screw mounting
D	DIN rail mounting [*]

^{*} DIN rail is not included. Order it separately.

③ 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

⑥ Controller type^{*1}

NII	Without controller	
6N	LECP6	NPN
6P	(Step data input type)	PNP
MJ	LECPMJ ^{*2}	—
	(CC-Link direct input type)	

^{*1} For details about controller and compatible motor, refer to the compatible controller below. The LEC61 and LEC6A cannot be selected.

^{*2} Not applicable to CE.

⚠ 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

Continuous Rotation Specification

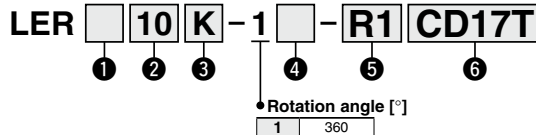
Electric Rotary Table

LER Series LER10, 30, 50

Applicable to the
JXC□ series

How to Order

Refer to page 416 for the communication protocol CC-Link.



1 Table accuracy

Nil	Basic type
H	High precision type

2 Size

10
30
50

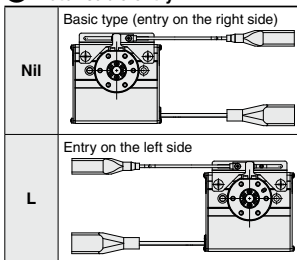
3 Max. rotating torque [N·m]

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

6 Controller

Nil	Without controller
C□1□□	With controller

4 Motor cable entry



5 Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m ^{*1}
RA	Robotic cable 10 m ^{*1}
RB	Robotic cable 15 m ^{*1}
RC	Robotic cable 20 m ^{*1}

*1 Produced upon receipt of order (Robotic cable only)

*2 The standard cable should only be used on fixed parts.

For use on moving parts, select the robotic cable.



Communication protocol

E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link

For single axis

Mounting

7	Screw mounting
8*	DIN rail

* DIN rail is not included. It must be ordered separately. (Page 603-8)

Communication plug connector for DeviceNet™

Nil	Without plug connector
S	Straight type
T	T-branch type

* Select "Nil" for anything other than DeviceNet™.

⚠ Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LE series and the JXC1/91/P1/D1/L1 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.

Compatible Controller

Type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type
Series	JXC1	JXC91	JXCP1	JXCD1	JXCL1
Features	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-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 603-5				

Specifications

Step Motor (Servo/24 VDC)

Model		LER□10K	LER□10J	LER□30K	LER□30J	LER□50K	LER□50J		
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·m ²] (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 [°/sec ²] (Note 2)		3000							
Actuator specifications	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/s ²] (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)						
Electric specifications	Weight [kg]	Basic type	0.51	1.2	2.3				
		High precision type	0.55	1.3	2.5				
	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.

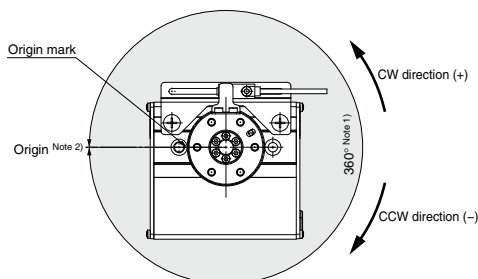
Note 8) The maximum instantaneous power consumption (including the controller) is for when the actuator is operating. This value can be used for the selection of the power supply.

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.

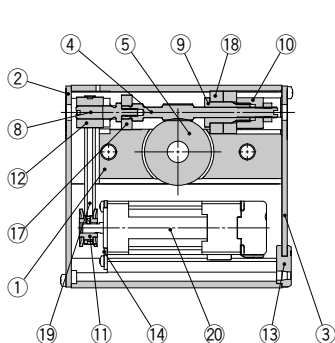
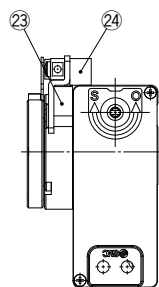
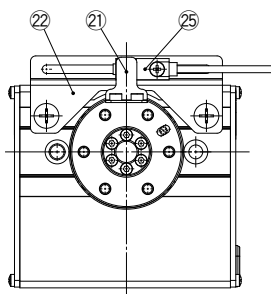
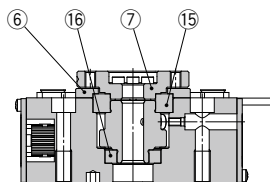
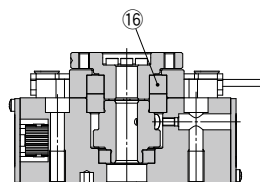
Table Rotation Angle Range



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**

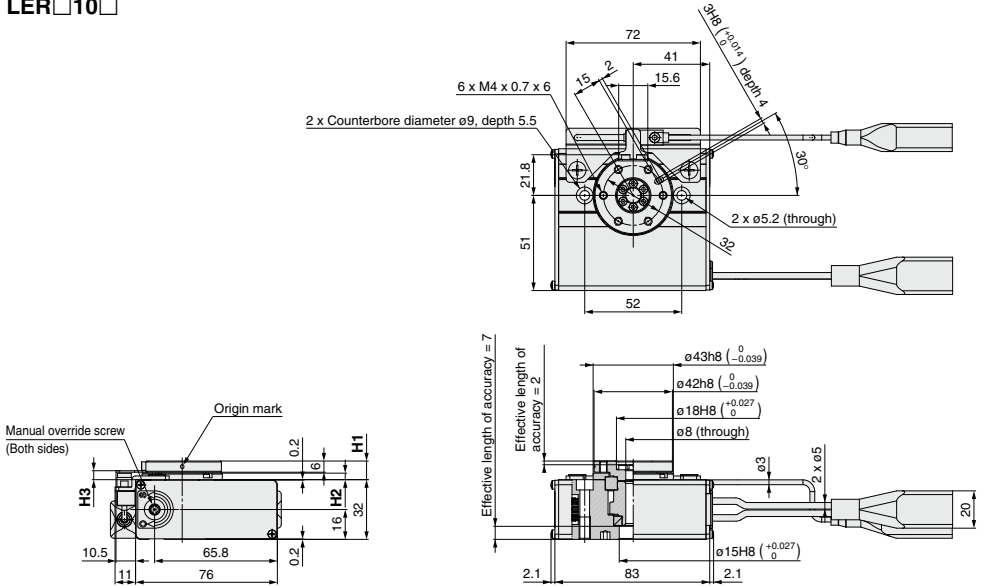
No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Side plate A	Aluminum alloy	Anodized
3	Side plate B	Aluminum alloy	Anodized
4	Worm screw	Stainless steel	Heat treated + Specially treated
5	Worm wheel	Stainless steel	Heat treated + Specially treated
6	Bearing cover	Aluminum alloy	Anodized
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)

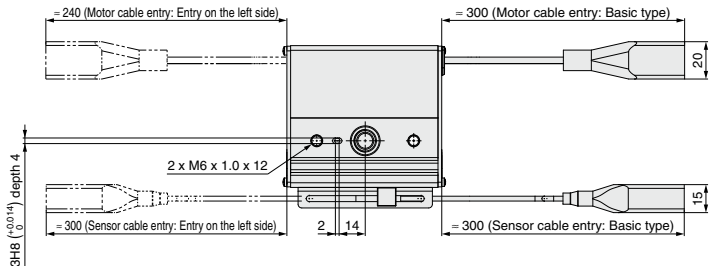
No.	Description	Material	Note
21	Proximity dog	Stainless steel	
22	Sensor holder	Carbon steel	Chromate treated
23	Sensor holder spacer	Aluminum alloy	Anodized (High precision type can be used only)
24	Square nut	Aluminum alloy	
25	Proximity sensor assembly	—	

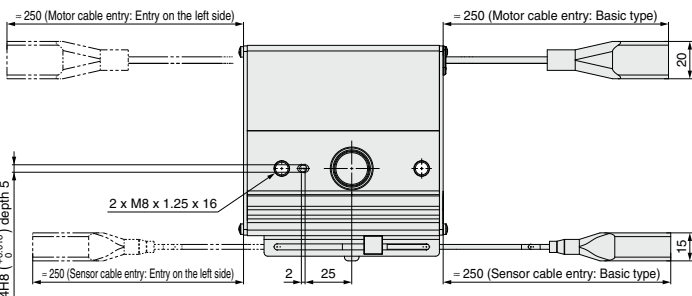
Dimensions

LER□10□

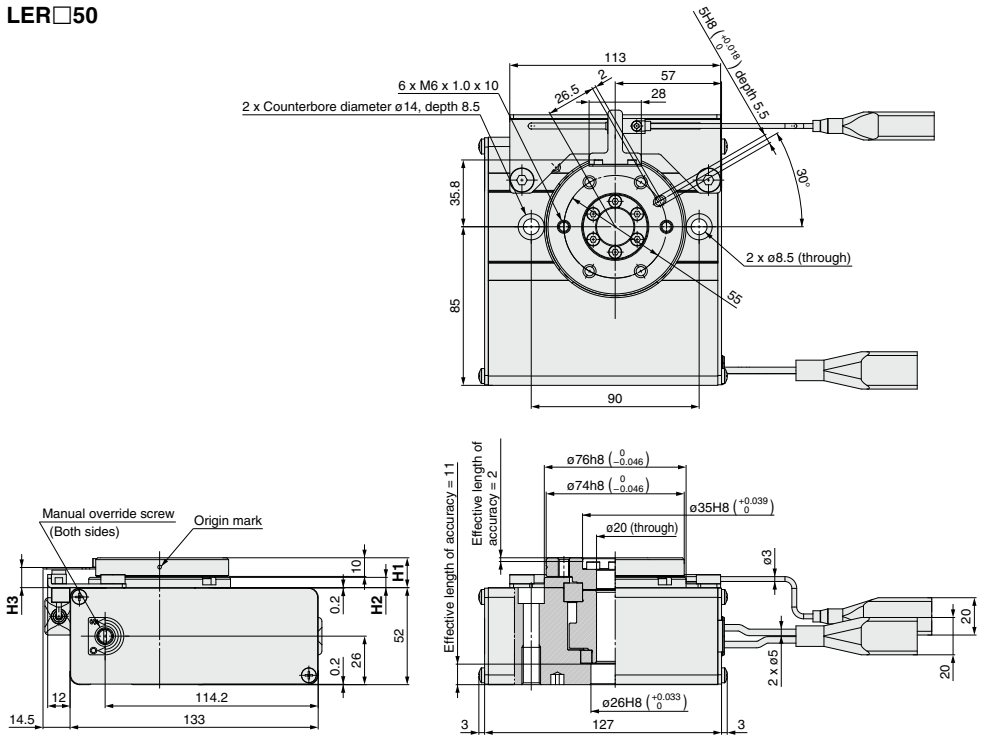
**Dimensions** [mm]

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



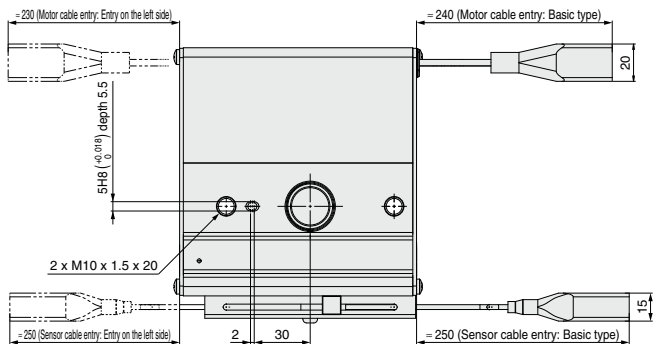
LER□30

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 $\pm 0.01^\circ$ (180° and 90° with adjustment of $\pm 2^\circ$) 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

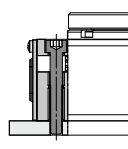
3. When mounting the electric rotary table, tighten the mounting screws within the specified torque range.
Tightening the screws with a higher torque than recommended may cause malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position.

Mounting

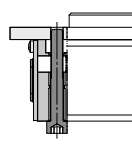
Warning

Through-hole mounting

Body mounting/Bottom



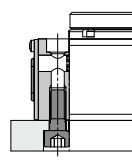
Body mounting/Top



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

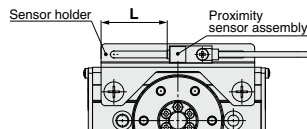
Body tapped mounting

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 $\pm 30^\circ$. 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

- 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).
- 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.
- INP output signal**
 - 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.
 - 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].
 - 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].
 - 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

- 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.
- 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.
 - “Posn failed” alarm is generated.**
It is not possible to reach the pushing start position within the target time.
 - “Pushing ALM” alarm is generated.**
The product is pushed back from a pushing start position after starting to push.
 - “Deviation over flow” alarm is generated.**
Displacement exceeding the specified value is generated at the pushing start position.
- 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

- For the specification with an external stopper, an angle adjustment bolt is provided as standard.**
The rotation angle adjustment range is $\pm 2^\circ$ 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.
- 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.**
- When mounting the product, keep a 40 mm or longer diameter for bends in the motor cable.**

Maintenance

Danger

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