Rotary Table
LER Series

CE UKCA cULus
∗ For details, refer to page 1343 and onward.
RoHS

Size: **10, 30, 50**

Battery-less Absolute (Step Motor 24 VDC) **Incremental** (Step Motor 24 VDC)

Low profile

Basic type [mm]

Model	H
LER10	42
LER30	53
LER50	68

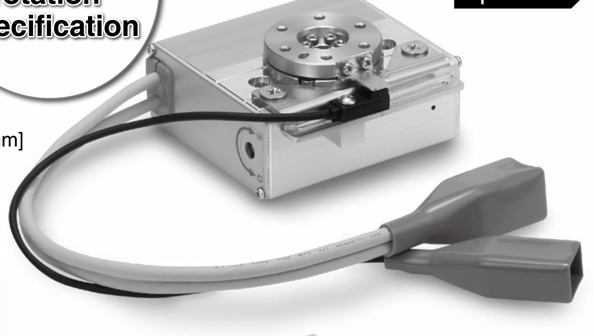
High-precision type [mm]

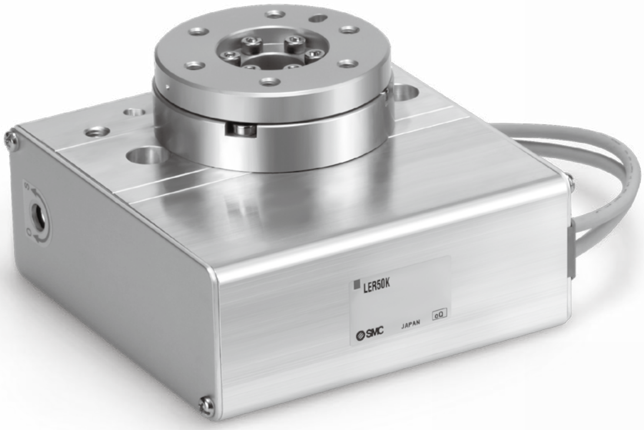
Model	H
LERH10	49
LERH30	62
LERH50	78

Continuous rotation specification

- **Rotation angle: 360°**

▸p. 793





- **Shock-less/High speed actuation**
  Max. speed: 420°/s (7.33 rad/s)
  Max. acceleration/deceleration: 3000°/s^2 (52.36 rad/s^2)
- **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.
- **Can 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	▸p. 774
30	0.8	1.2			
50	6.6	10			

Battery-less Absolute (Step Motor 24 VDC) **Incremental** (Step Motor 24 VDC) **Controllers/Drivers**

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▸Step data input type
JXC51/61 Series
- 64 positioning points
- Input using controller setting kit or teaching box

▸EtherCAT/EtherNet/IP™/PROFINET/DeviceNet®/IO-Link/CC-Link direct input type
JXCE□/91/P1/D1/L□/M1 Series

▸Programless type∗1
LECP1 Series
- 14 positioning points
- Control panel setting

▸Pulse input type∗1
LECPA Series
∗ Not applicable to the continuous rotation specification

∗1 Excludes the battery-less absolute

Battery-less Absolute (Step Motor 24 VDC)

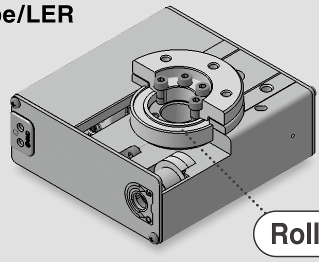
Restart from the last stop position is possible after recovery of the power supply.

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

Does not require the use of batteries. Reduced maintenance
Batteries are not used to store the position information.
Therefore, there is no need to store spare batteries or replace dead batteries.

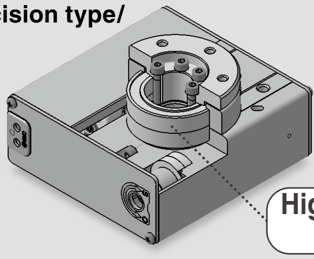
Basic and high-precision types are available.

Basic type/LER



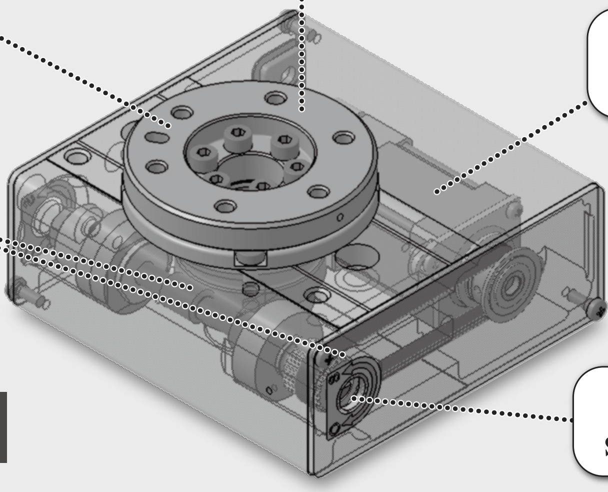
Rolling bearing

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.

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

Step motor (Servo/24 VDC)

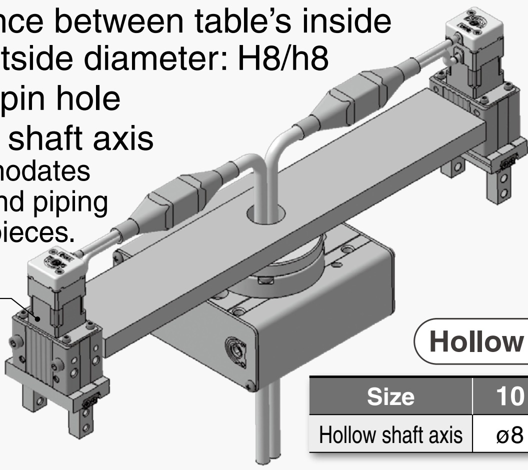
Space-saving

Manual override screw (Both sides)

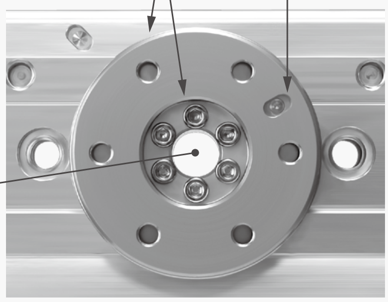
Possible to rotate the table with power OFF by manual override.

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.



Gripper
LEH Series



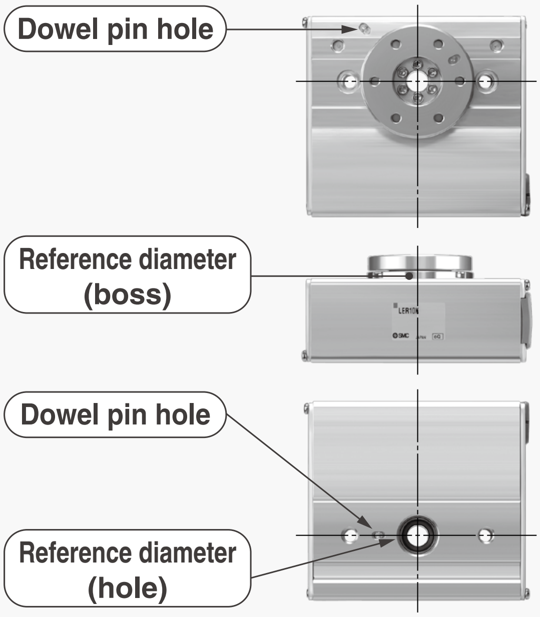
For alignment of rotation center and workpiece

Dowel pin hole
Positioning of rotating direction

Hollow shaft axis

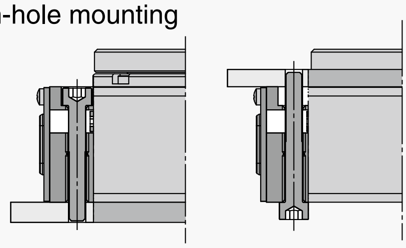
Size	10	30	50
Hollow shaft axis	ø8	ø17	ø20

Easy Mounting of the Main Body

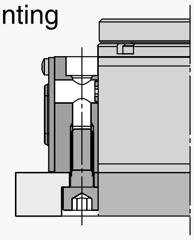


Mounting Variations

■ Through-hole mounting

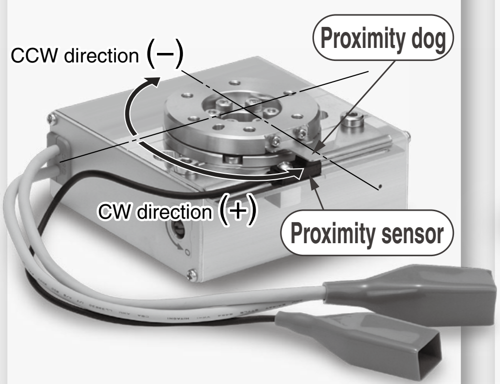


■ Body tapped mounting



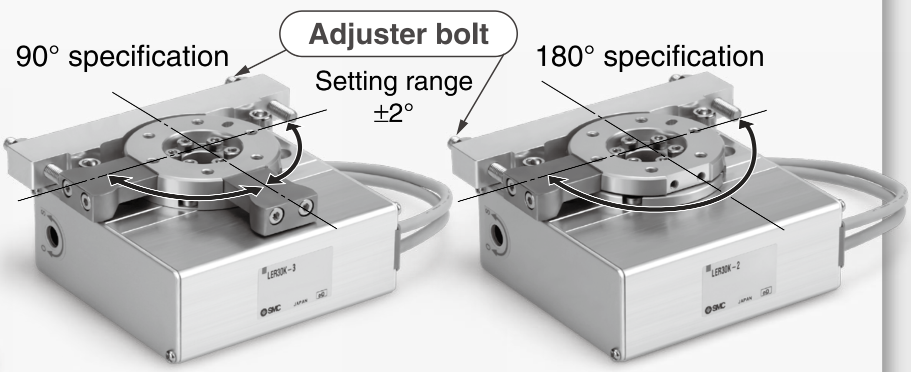
Continuous Rotation Specification

Rotation angle: 360°
Return to origin with proximity sensor

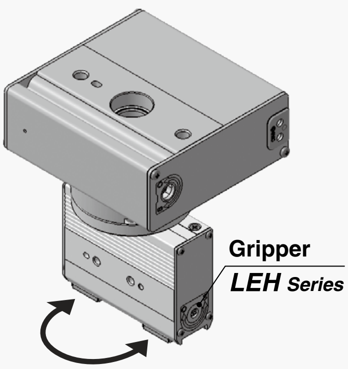


With External Stopper/Rotation Angle: 90°/180° Specification

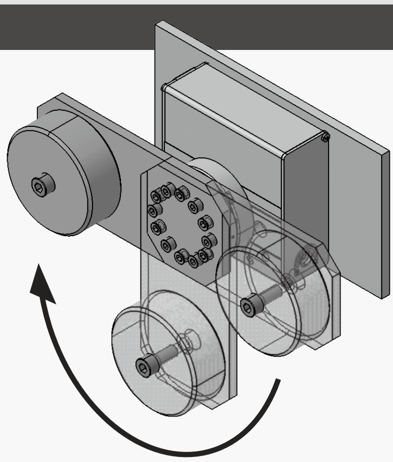
Repeatability at the end: ±0.01°



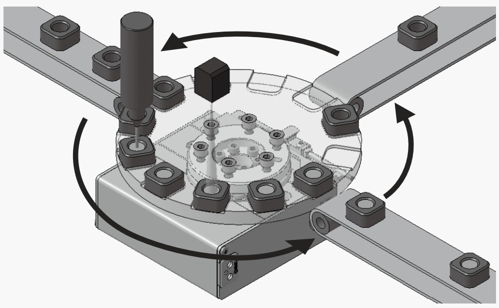
Application Examples



For rotation transfer after gripping in combination with a gripper



For vertical transfer: No change in speed due to load fluctuation



For continuous operation of multiple processes with 360° continuous rotation

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Continuous Rotation Specification Rotary Table *LER* *Series*

Incremental (Step Motor 24 VDC) Controllers

3-Axis Step Motor Controller

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

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Rotary Table
LER Series

Model Selection

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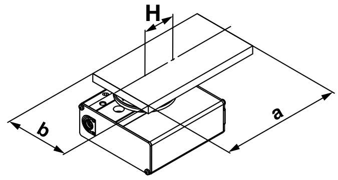
Selection Procedure

Operating conditions



Electric rotary table: LER50EJ
Mounting position: Horizontal
Load type: Inertial load Ta
Configuration of load: 150 mm x 80 mm (Rectangular plate)
Rotation angle θ: 180°

Angular acceleration/angular deceleration $\dot{\omega}$: 1000°/s^2
Angular speed ω: 420°/s
Load mass m: 6.0 kg
Distance between shaft and center of gravity H: 40 mm

Step 1 Moment of inertia—Angular acceleration/deceleration

① **Calculation of moment of inertia**

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

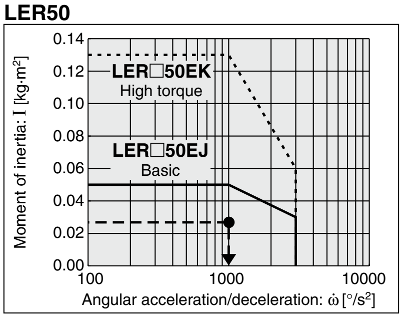
Formula

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

Selection example

$I = 6.0 \times (0.15^2 + 0.08^2)/12 + 6.0 \times 0.04^2$
$= 0.0241\ kg{\cdot}m^2$

LER50



Step 2 Necessary torque

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

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

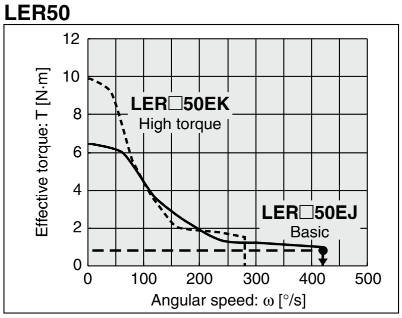
Formula

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

Selection example

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

LER50



Step 3 Allowable load

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

Formula

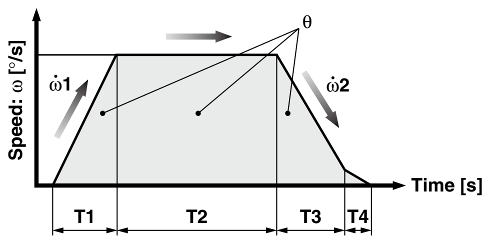
Allowable thrust load ≥ m x 9.8
Allowable moment ≥ m x 9.8 x H

Selection example

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

Step 4 Rotation time

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



θ: Rotation angle [°]
ω: Angular speed [°/s]
$\dot{\omega}$1: Angular acceleration [°/s^2]
$\dot{\omega}$2: Angular deceleration [°/s^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 the beginning of the constant speed operation to stop
T4: Settling time [s] ··· Time until positioning is completed

Formula

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

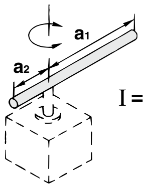
Selection example

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

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

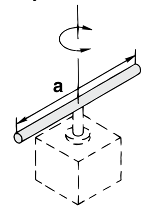
I: Moment of inertia [kg·m²] m: Load mass [kg]

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



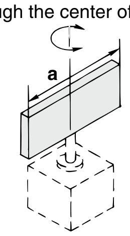
$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot \frac{a_2^2}{3}$$

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



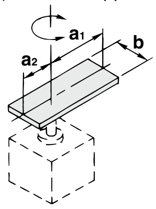
$$I = m \cdot \frac{a^2}{12}$$

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



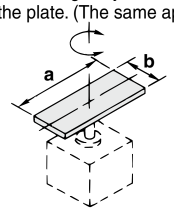
$$I = m \cdot \frac{a^2}{12}$$

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



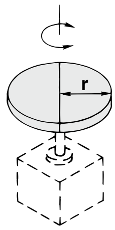
$$I = m_1 \cdot \frac{4a_1^2 + b^2}{12} + m_2 \cdot \frac{4a_2^2 + b^2}{12}$$

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



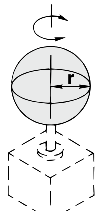
$$I = m \cdot \frac{a^2 + b^2}{12}$$

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



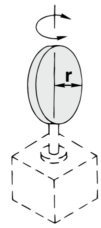
$$I = m \cdot \frac{r^2}{2}$$

7. Sphere
Position of rotation shaft: Diameter



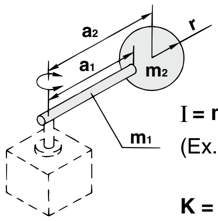
$$I = m \cdot \frac{2r^2}{5}$$

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



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

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

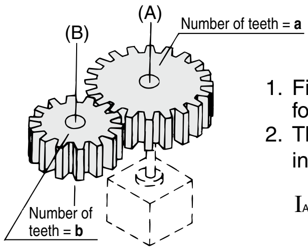


$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$$

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

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

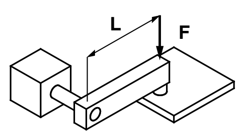
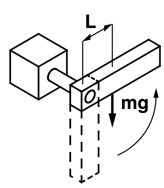
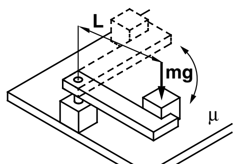
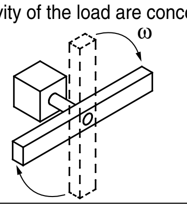
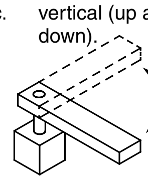
10. Gear transmission



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

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

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·ώ·2 π/360** **(Ta = I·ώ·0.0175)** **Ta:** Inertial load [N·m] **I :** Moment of inertia [kg·m²] **ώ :** Angular acceleration/deceleration [°/s²] **ω :** Angular speed [°/s]
Necessary torque: **T = Ts**	Necessary torque: **T = Tf x 1.5**∗1	Necessary torque: **T = Ta x 1.5**∗1

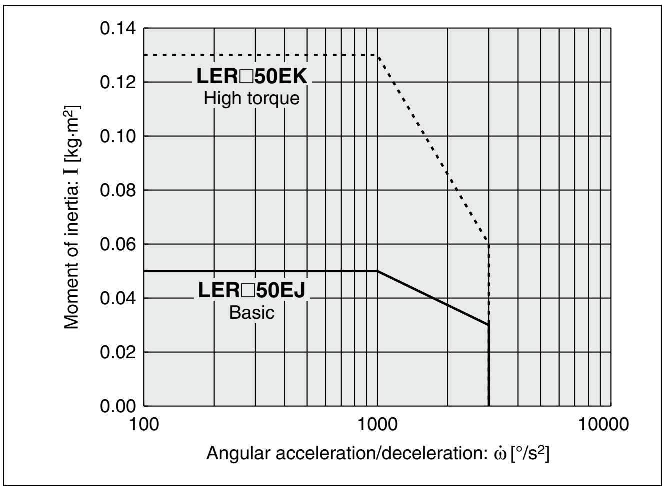
- **Resistance load: Gravity or friction force is applied to rotating direction.**
  Ex. 1) Rotation shaft is horizontal (lateral), and the rotation center and the center of gravity of the load are not concentric.
  Ex. 2) Load moves by sliding on the floor.
  ∗ The total of resistance load and inertial load is the necessary torque. **T = (Tf + Ta) x 1.5**
- **Not resistance load: Neither gravity or friction force is applied to rotating direction.**
  Ex. 1) Rotation shaft is vertical (up and down).
  Ex. 2) Rotation shaft is horizontal (lateral), and rotation center and the center of gravity of the load are concentric.
  ∗ Necessary torque is inertial load only. **T = Ta x 1.5**

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

Battery-less Absolute (Step Motor 24 VDC)

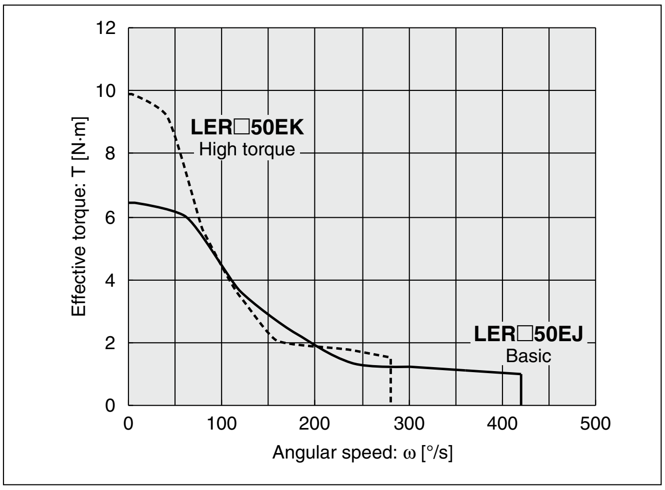
Moment of Inertia—Angular Acceleration/Deceleration

LER50

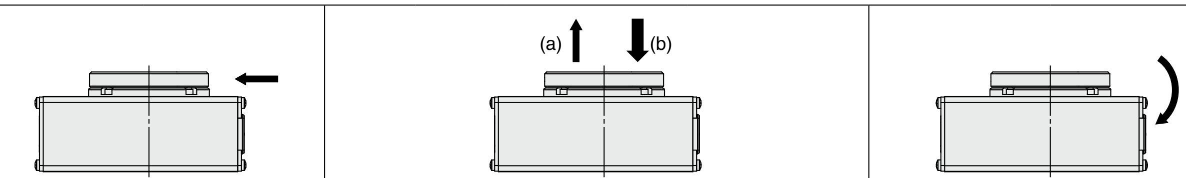


Effective Torque—Angular Speed

LER50



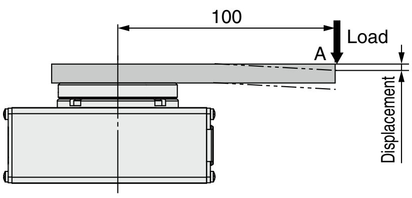
Allowable Load



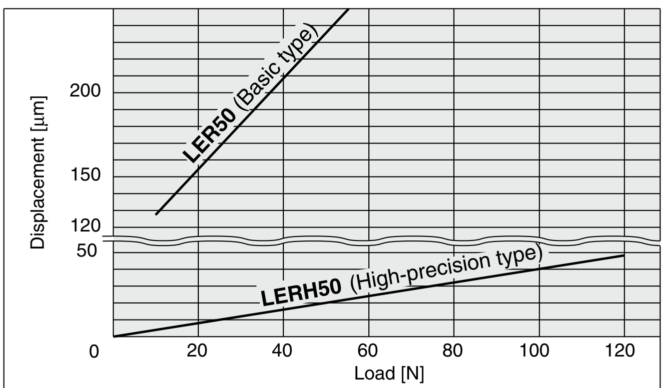
Size	Allowable radial load [N]		Allowable thrust load [N]				Allowable moment [N·m]	
			(a)		(b)			
	Basic type	High-precision type	Basic type	High-precision type	Basic type	High-precision type	Basic type	High-precision type
50	314	378	296		398	517	9.7	12.0

Table Displacement (Reference Value)

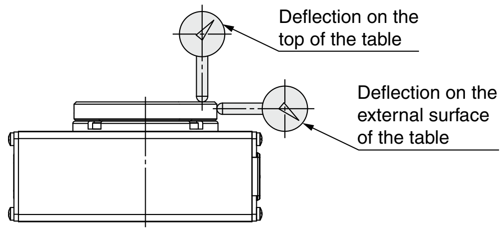
- Displacement at point A when a load is applied to point A 100 mm away from the rotation center.



LER□50



Deflection Accuracy: Displacement at 180° Rotation (Guide)



[mm]

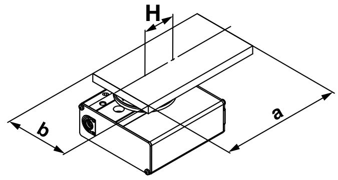
Measured part	**LER** (Basic type)	**LERH** (High-precision type)
Deflection on the top of the table	0.1	0.03
Deflection on the external surface of the table	0.1	0.03

Incremental (Step Motor 24 VDC)
Rotary Table
LER Series
Model Selection

LER Series ▶p. 785 Continuous Rotation Specification LER-1 Series ▶p. 793

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°/s²
- Angular speed ω: 420°/s
- Load mass [m]: 2.0 kg
- Distance between shaft and center of gravity H: 40 mm

Step 1 Moment of inertia—Angular acceleration/deceleration

① **Calculation of moment of inertia**

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

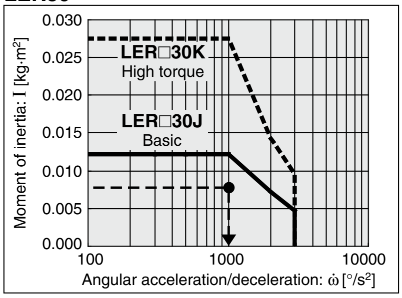
Formula

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

Selection example

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

LER30



Step 2 Necessary torque

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

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

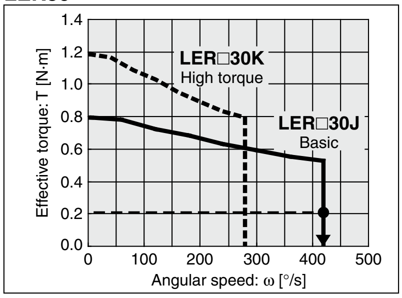
Formula

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

Selection example

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

LER30



Step 3 Allowable load

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

Formula

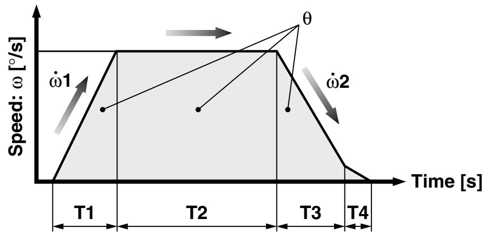
Allowable thrust load ≥ m x 9.8
Allowable moment ≥ m x 9.8 x H

Selection example

- Thrust load
  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

Step 4 Rotation time

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



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

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

Formula

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

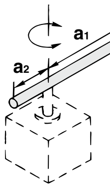
Selection example

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

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

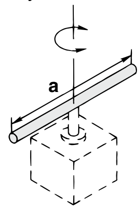
I: Moment of inertia [kg·m²] m: Load mass [kg]

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



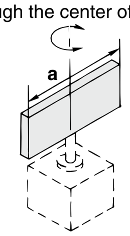
$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot \frac{a_2^2}{3}$$

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



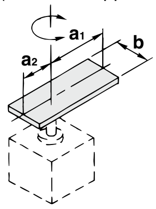
$$I = m \cdot \frac{a^2}{12}$$

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



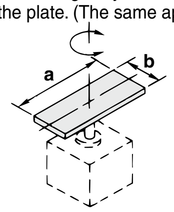
$$I = m \cdot \frac{a^2}{12}$$

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



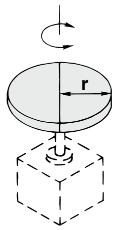
$$I = m_1 \cdot \frac{4a_1^2 + b^2}{12} + m_2 \cdot \frac{4a_2^2 + b^2}{12}$$

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



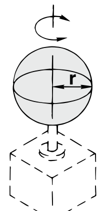
$$I = m \cdot \frac{a^2 + b^2}{12}$$

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



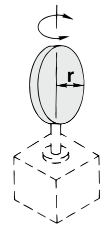
$$I = m \cdot \frac{r^2}{2}$$

7. Sphere
Position of rotation shaft: Diameter



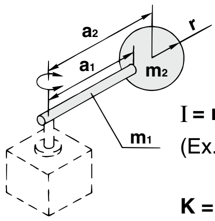
$$I = m \cdot \frac{2r^2}{5}$$

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



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

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

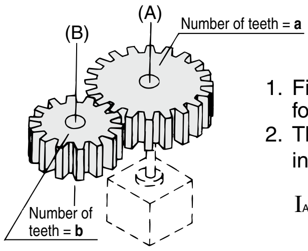


$$I = m_1 \cdot \frac{a_1^2}{3} + m_2 \cdot a_2^2 + K$$

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

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

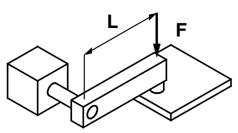
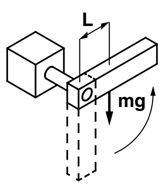
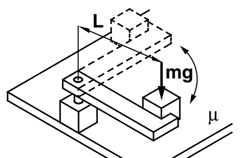
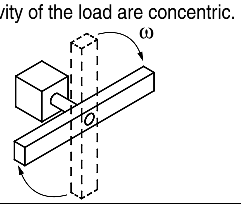
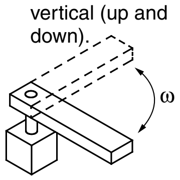
10. Gear transmission



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

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

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 = $I\cdot\dot{\omega}\cdot 2\pi/360$** **(Ta = $I\cdot\dot{\omega}\cdot 0.0175$)** **Ta:** Inertial load [N·m] I **:** Moment of inertia [kg·m²] $\dot{\omega}$ **:** Angular acceleration/deceleration [°/s²] ω **:** Angular speed [°/s]
Necessary torque: **T = Ts**	Necessary torque: **T = Tf x 1.5***1	Necessary torque: **T = Ta x 1.5***1

- **Resistance load: Gravity or friction force is applied to rotating direction.**
  Ex. 1) Rotation shaft is horizontal (lateral), and the rotation center and the center of gravity of the load are not concentric.
  Ex. 2) Load moves by sliding on the floor.
  * The total of resistance load and inertial load is the necessary torque. **T = (Tf + Ta) x 1.5**
- **Not resistance load: Neither gravity or friction force is applied to rotating direction.**
  Ex. 1) Rotation shaft is vertical (up and down).
  Ex. 2) Rotation shaft is horizontal (lateral), and rotation center and the center of gravity of the load are concentric.
  * Necessary torque is inertial load only. **T = Ta x 1.5**

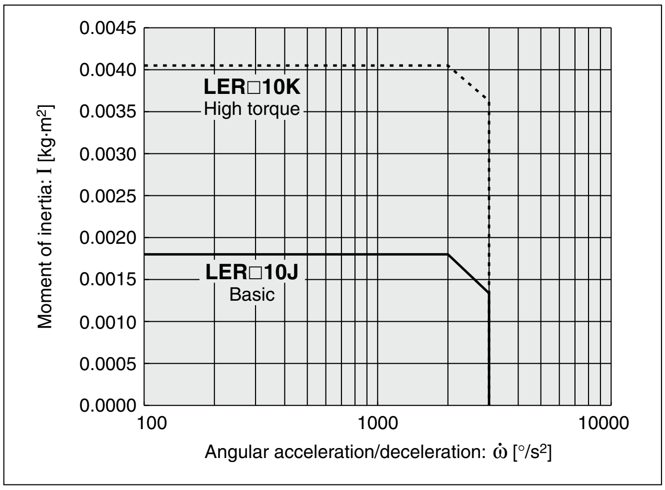
*1 To adjust the speed, margin is necessary for **Tf** and **Ta**.

For the LECPA/JXC□3, refer to page 777.

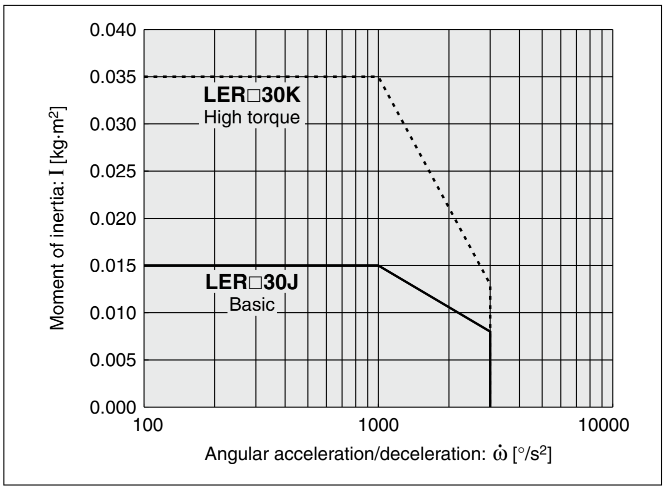
For Step Motor (Servo/24 VDC) JXC□1, LECP1

Moment of Inertia—Angular Acceleration/Deceleration

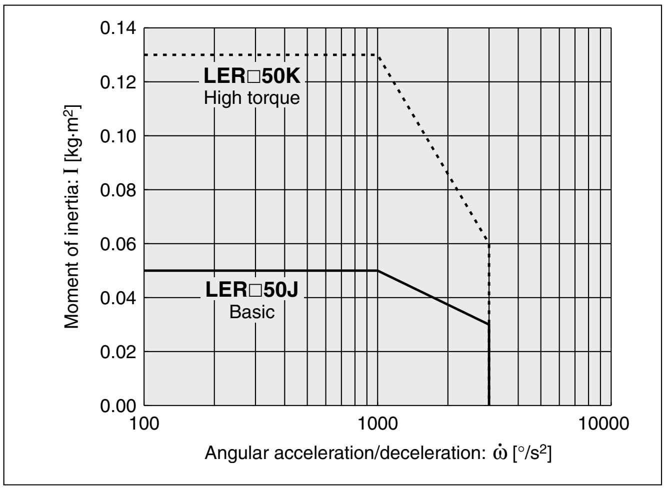
LER10



LER30

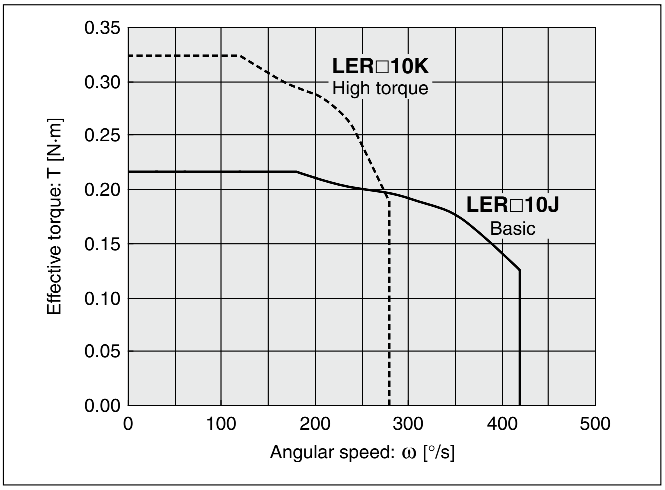


LER50

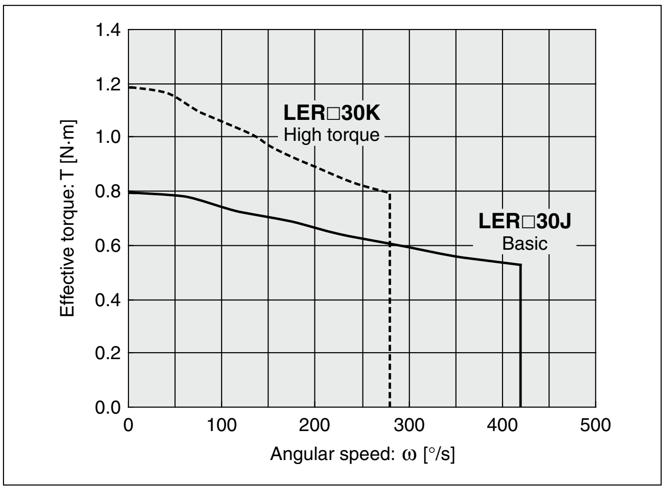


Effective Torque—Angular Speed

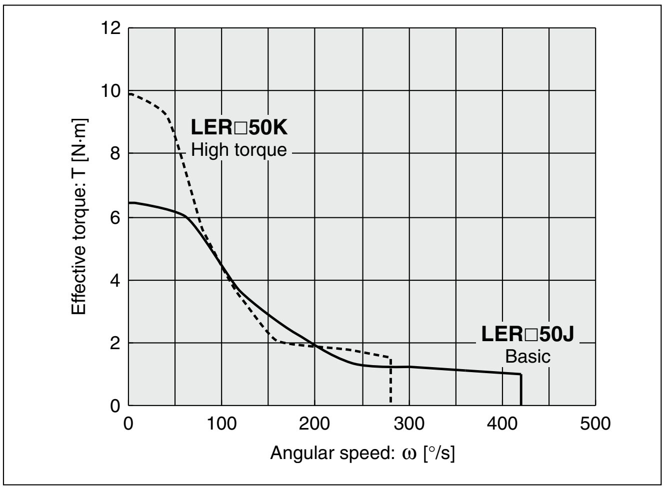
LER10



LER30



LER50

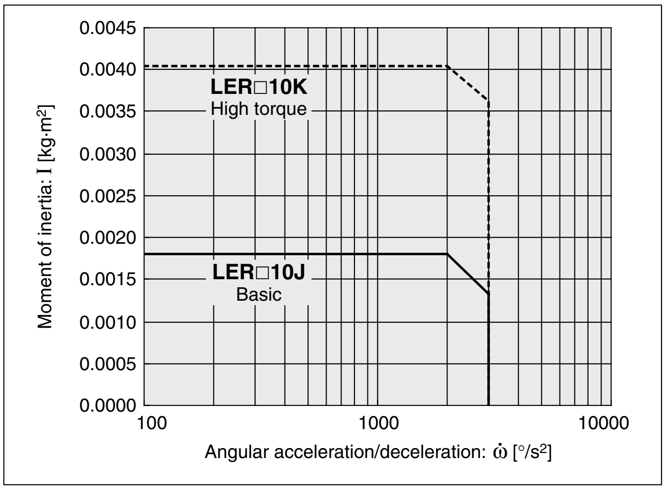


For the JXC□1/LECP1, refer to page 776.

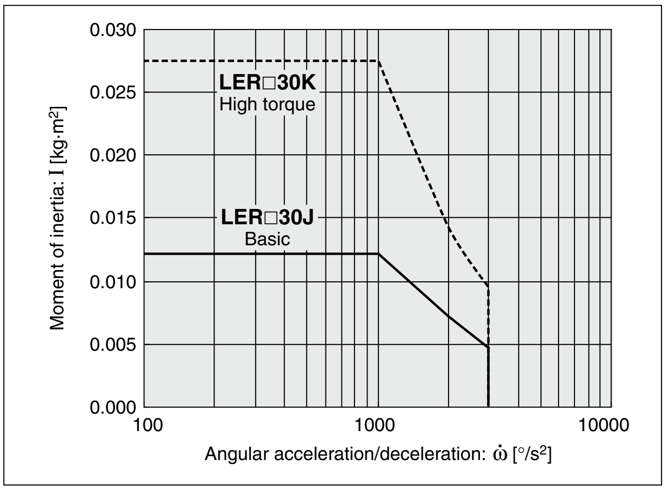
For Step Motor (Servo/24 VDC) LECPA, JXC□$^{2}_{3}$

Moment of Inertia—Angular Acceleration/Deceleration

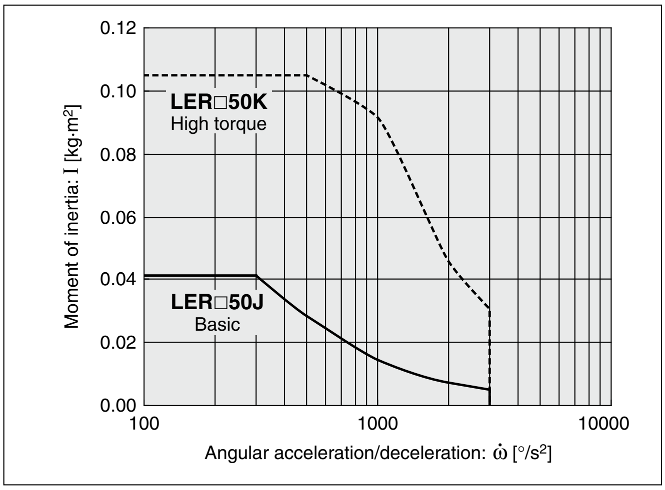
LER10



LER30

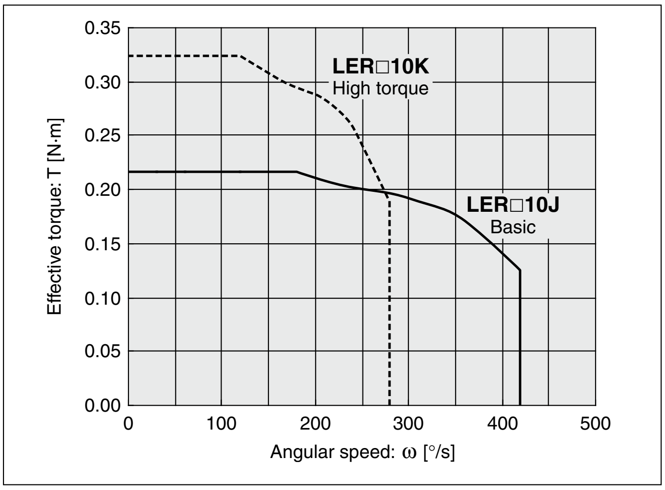


LER50

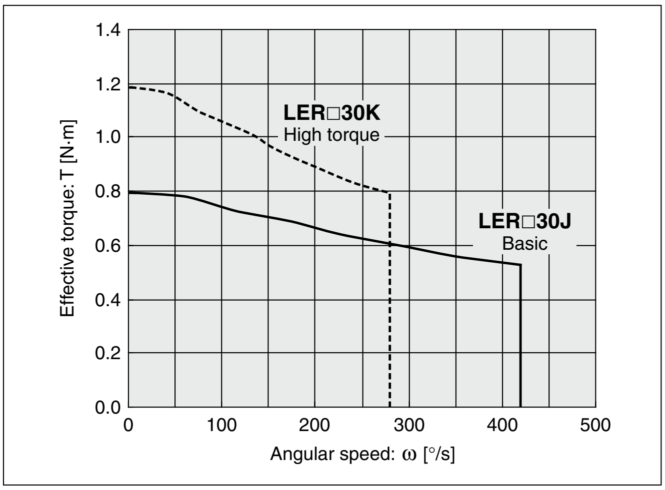


Effective Torque—Angular Speed

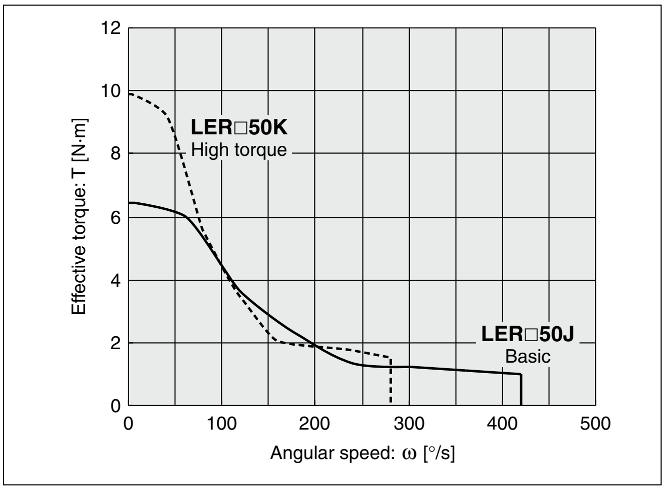
LER10



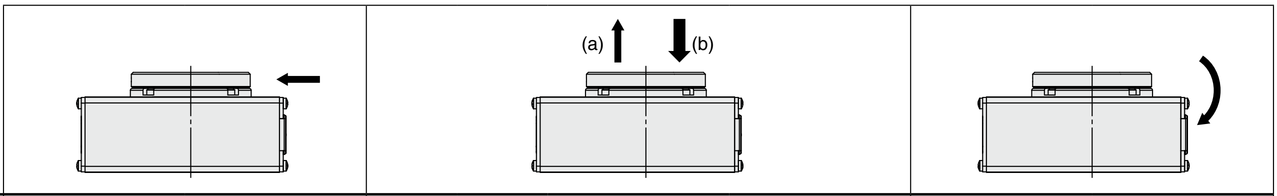
LER30



LER50



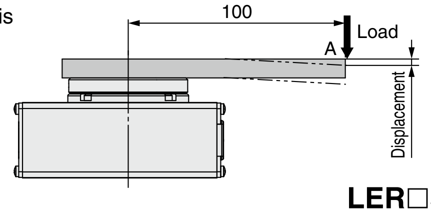
Allowable Load



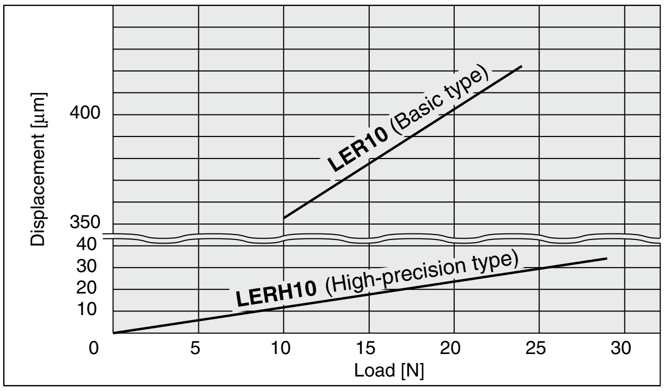
Size	Allowable radial load [N]		Allowable thrust load [N]				Allowable moment [N·m]	
			(a)		(b)			
	Basic type	High-precision type	Basic type	High-precision type	Basic type	High-precision type	Basic type	High-precision type
10	78	86	74		78	107	2.4	2.9
30	196	233	197		363	398	5.3	6.4
50	314	378	296	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

Table Displacement (Reference Value)

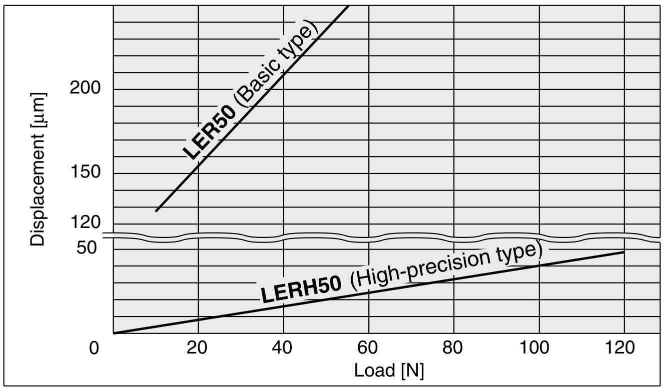
- Displacement at point A when a load is applied to point A 100 mm away from the rotation center.



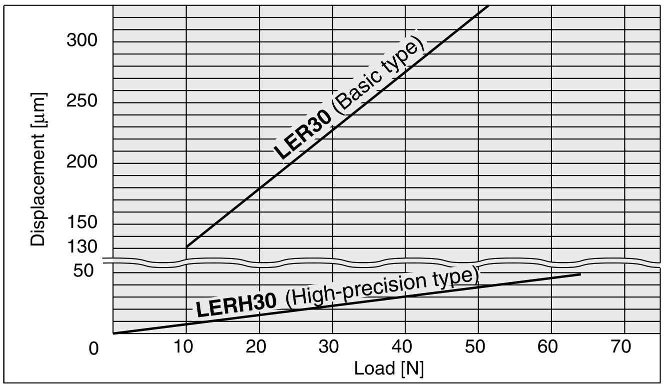
LER□10



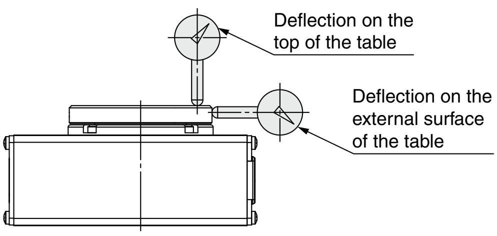
LER□50



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

Battery-less Absolute (Step Motor 24 VDC)

Rotary Table

LER Series LER50

CE UKCA RoHS

＊ For details, refer to page 1343 and onward.

How to Order

LER ☐ 50 E K – ☐ ☐ – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

For details on controllers, refer to the next page.

❶ Table accuracy

Nil	Basic type
H	High-precision type

❷ Size

50

❸ Motor type

Symbol	Type	Compatible controllers/drivers		
E	Battery-less absolute (Step motor 24 VDC)	JXC51	JXCP1	JXCEF
		JXC61	JXCD1	JXC9F
		JXCE1	JXCL1	JXCPF
		JXC91	JXCM1	JXCLF

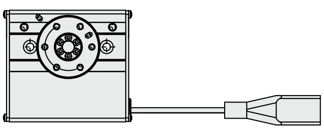
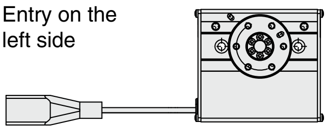
❹ Max. rotating torque [N·m]

K	High torque	10
J	Basic	6.6

❺ Rotation angle [°]

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

❻ Motor cable entry

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

❼ Actuator cable type/length

Robotic cable [m]

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

❽ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Communication protocol/Input/Output)

Symbol	Type	Number of axes, Special specification: Standard	Number of axes, Special specification: With STO sub-function
5	Parallel input (NPN)	●	
6	Parallel input (PNP)	●	
E	EtherCAT	●	●
9	EtherNet/IP™	●	●
P	PROFINET	●	●
D	DeviceNet®	●	
L	IO-Link	●	●
M	CC-Link	●	

Mounting

7	Screw mounting
8∗2	DIN rail

Number of axes, Special specification

Symbol	Number of axes	Specification
1	Single axis	Standard
F	Single axis	With STO sub-function

Communication plug connector, I/O cable∗3

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

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

⚠Caution

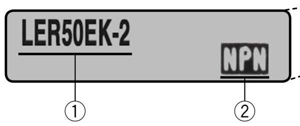
[CE/UKCA-compliant products]
EMC compliance was tested by combining the electric actuator LER series and the controller JXC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, compliance with the EMC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

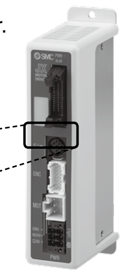
[Precautions relating to differences in controller versions]
When the JXC series is to be used in combination with the battery-less absolute encoder, use a controller that is version V3.4 or S3.4 or higher. For details, refer to pages 1077 and 1078.

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

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

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





∗ Refer to the Operation Manual for using the products.
Please download it via our website: https://www.smcworld.com

Type	Step data input type	EtherCAT direct input type	EtherCAT direct input type with STO sub-function	EtherNet/IP™ direct input type	EtherNet/IP™ direct input type with STO sub-function	PROFINET direct input type	PROFINET direct input type with STO sub-function	DeviceNet® direct input type	IO-Link direct input type	IO-Link direct input type with STO sub-function	CC-Link direct input type
											
Series	JXC51 JXC61	JXCE1	JXCEF	JXC91	JXC9F	JXCP1	JXCPF	JXCD1	JXCL1	JXCLF	JXCM1
Features	Parallel I/O	EtherCAT direct input	EtherCAT direct input with STO sub-function	EtherNet/IP™ direct input	EtherNet/IP™ direct input with STO sub-function	PROFINET direct input	PROFINET direct input with STO sub-function	DeviceNet® direct input	IO-Link direct input	IO-Link direct input with STO sub-function	CC-Link direct input
Compatible motor	Battery-less absolute (Step motor 24 VDC)										
Max. number of step data	64 points										
Power supply voltage	24 VDC										
Reference page	1017	1063									

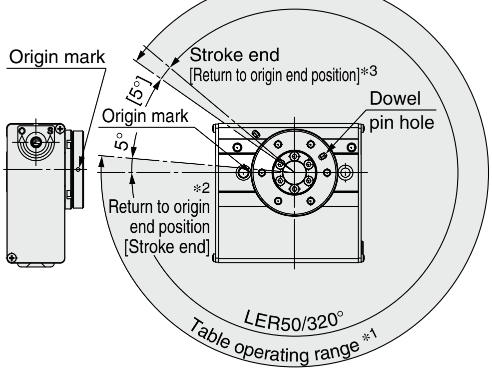
Specifications

Battery-less Absolute (Step Motor 24 VDC)

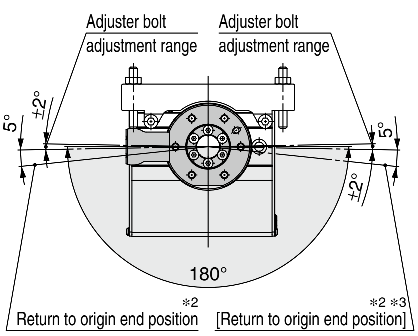
	Model		LER□50EK	LER□50EJ
Actuator specifications Basic type	Rotation angle [°]		320	
	Lead [°]		7.5	12
	Max. rotating torque [N·m]		10	6.6
	Max. pushing torque 40 to 50% [N·m]*1 *3		4.0 to 5.0	2.6 to 3.3
	Max. moment of inertia [kg·m²]*2 *3		0.13	0.05
	Angular speed [°/s]*2 *3		20 to 280	30 to 420
	Pushing speed [°/s]		20	30
	Max. angular acceleration/deceleration [°/s²]*2		3000	
	Backlash [°]	Basic type	±0.2	
		High-precision type	±0.1	
	Positioning repeatability [°]	Basic type	±0.05	
		High-precision type	±0.03	
	Lost motion [°]*4	Basic type	0.3 or less	
		High-precision type	0.2 or less	
	Impact/Vibration resistance [m/s²]*5		150/30	
	Actuation type		Special worm gear + Belt drive	
	Max. operating frequency [c.p.m]		60	
	Operating temp. range [°C]		5 to 40	
	Operating humidity range [%RH]		90 or less (No condensation)	
	Enclosure		IP20	
	Weight [kg]	Basic type	2.2	
		High-precision type	2.4	
External stopper type	Rotation angle [°]	-2/ arm (1 pc.)	180	
		-3/ arm (2 pcs.)	90	
	Repeatability at the end [°]/ with external stopper		±0.01	
	External stopper setting range [°]		±2	
	Weight [kg] -2/external arm (1 pc.)	Basic type	2.5	
		High-precision type	2.7	
	Weight [kg] -3/external arm (1 pc.)	Basic type	2.6	
		High-precision type	2.8	
Electric specifications	Motor size		□42	
	Motor type		Battery-less absolute (Step motor 24 VDC)	
	Encoder		Battery-less absolute	
	Power supply voltage [V]		24 VDC ±10%	
	Power [W]*6		Max. power 57	

*1 Pushing force accuracy is LER50: ±20% (F.S.).
*2 The angular acceleration, angular deceleration, and angular speed may fluctuate due to variations in the moment of inertia.
Refer to the "Moment of Inertia—Angular Acceleration/ Deceleration, Effective Torque—Angular Speed" graphs on page 773 for confirmation.
*3 The speed and force may change depending on the cable length, load, and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
*4 A reference value for correcting errors in reciprocal operation
*5 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
*6 Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply.

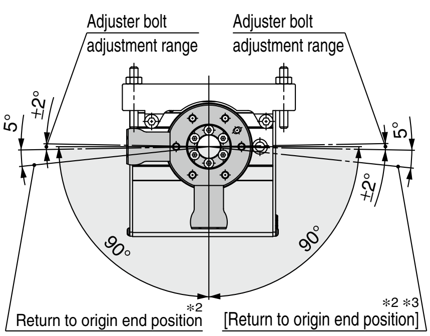
Table Rotation Angle Range



External stopper: 180°



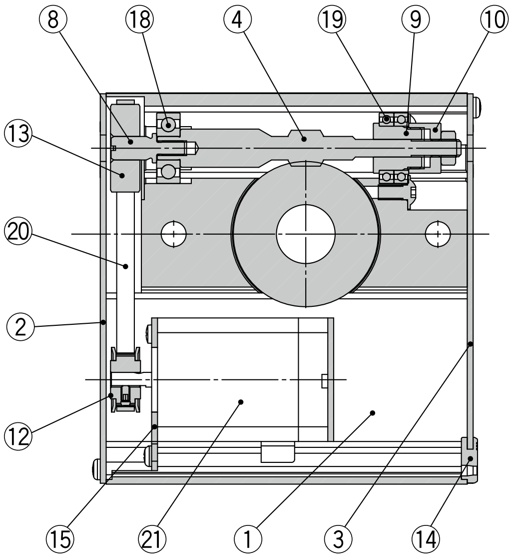
External stopper: 90°



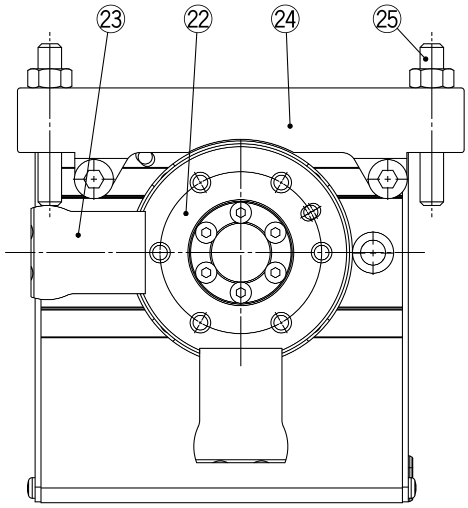
* The figures show the origin position for each actuator.

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

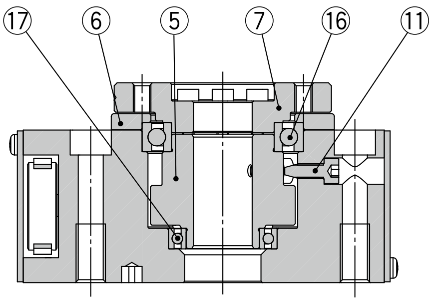
Construction



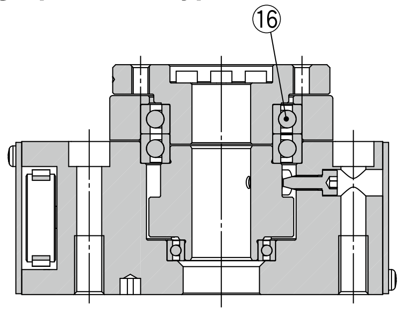
External stopper type



Basic type



High-precision type



Component Parts

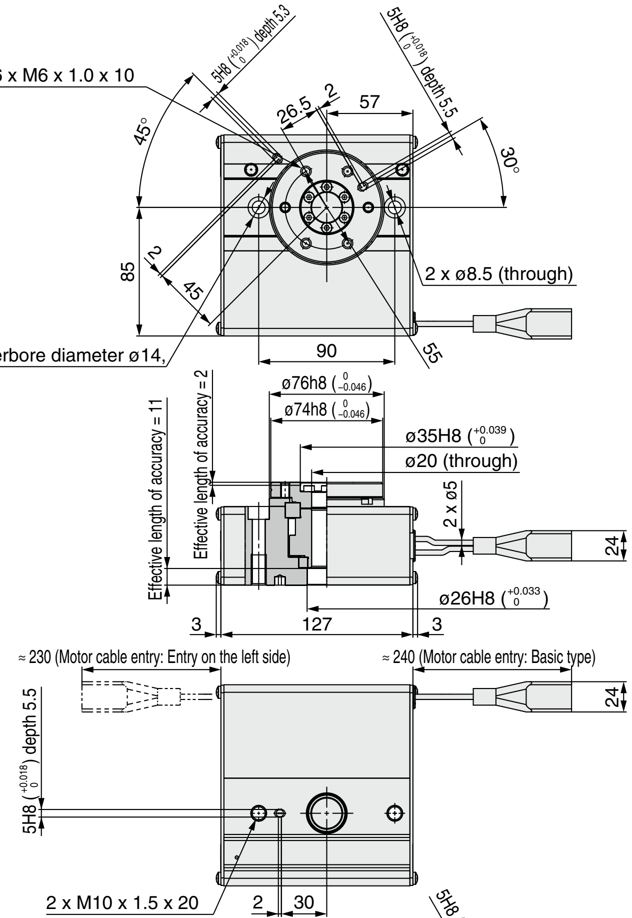
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Side plate A**	Aluminum alloy	Anodized
3	**Side plate B**	Aluminum alloy	Anodized
4	**Worm screw**	Stainless steel	Heat treatment + Special treatment
5	**Worm wheel**	Stainless steel	Heat treatment + Special treatment
6	**Bearing cover**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

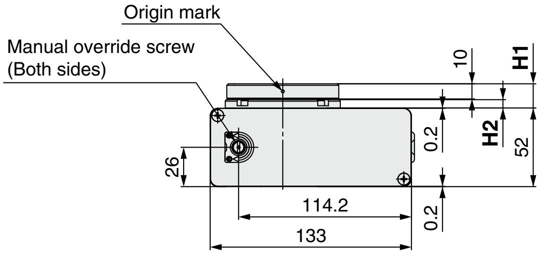
Component Parts

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

Dimensions

LER□50E□ (Rotation angle: 320°)

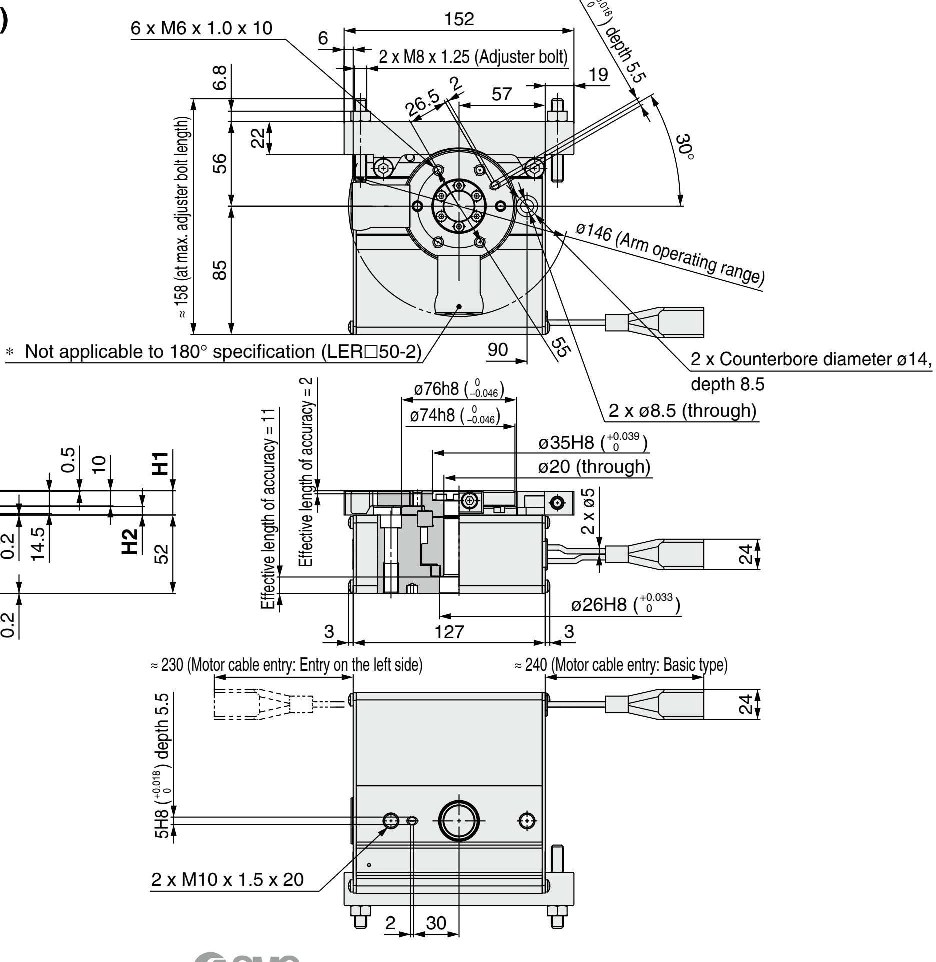


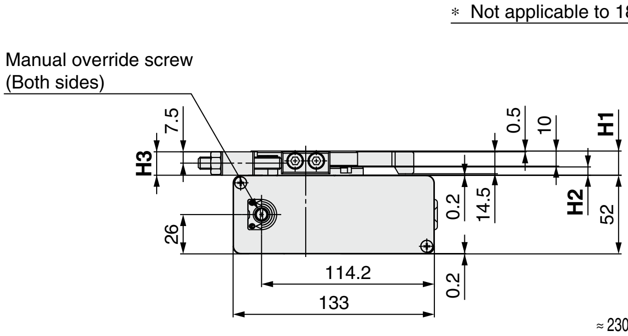


Dimensions [mm]

Model	H1	H2
LER50	16	5.5
LERH50	26	15.5

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





Dimensions [mm]

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

Incremental (Step Motor 24 VDC)

Rotary Table

LER Series LER10, 30, 50

∗ For details, refer to page 1343 and onward.

RoHS

How to Order

LER [ ] 10 K – [ ] [ ] – R1

❶ ❷ ❸ ❹ ❺ ❻

JXC□ *Series*: CD17T

LEC□ *Series*: AN 1 [ ]

❼ ❽ ❾

For details on controllers, refer to page 786.

❶ Table accuracy

Nil	Basic type
H	High-precision type

❷ Size

10
30
50

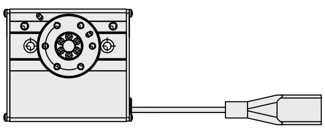
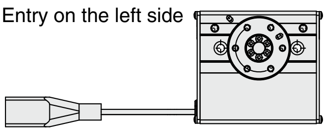
❸ Max. rotating torque [N·m]

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/length∗2

Standard cable [m]

Nil	None
S1	1.5
S3	3
S5	5

Robotic cable [m]

R1	1.5	**RA**	10∗1
R3	3	**RB**	15∗1
R5	5	**RC**	20∗1
R8	8∗1		

SMC

JXC□ Series (For details, refer to page 787.)

❼ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Communication protocol/Input/Output)

Symbol	Type	Number of axes, Special specification	
		Standard	With STO sub-function
5	Parallel input (NPN)	●	
6	Parallel input (PNP)	●	
E	EtherCAT	●	●
9	EtherNet/IP™	●	●
P	PROFINET	●	●
D	DeviceNet®	●	
L	IO-Link	●	●
M	CC-Link	●	

Mounting

7	Screw mounting
8*7	DIN rail

Number of axes, Special specification

Symbol	Number of axes	Specification
1	Single axis	Standard
F	Single axis	With STO sub-function

Communication plug connector, I/O cable*8

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

LEC□ Series (For details, refer to page 787.)

AN 1 □
❼ ❽ ❾

❼ Controller/Driver type*3

Nil	Without controller/driver	
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA***4 (Pulse input type)	NPN
AP		PNP

❽ I/O cable length*5

Nil	Without cable (Without communication plug connector)
1	1.5 m
3	3 m*6
5	5 m*6

❾ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail*7

*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.
Refer to page 1092 if only the actuator cable is required.
*3 For details on controllers/drivers and compatible motors, refer to the compatible controllers/drivers on the next page.
*4 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 1062 separately.
*5 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 1047 (For LECP1) or page 1062 (For LECPA) if an I/O cable is required.
*6 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
*7 The DIN rail is not included. It must be ordered separately.
*8 Select "Nil" for anything other than DeviceNet®, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet® or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

[CE/UKCA-compliant products]

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

[UL-compliant products (For the LEC series)]

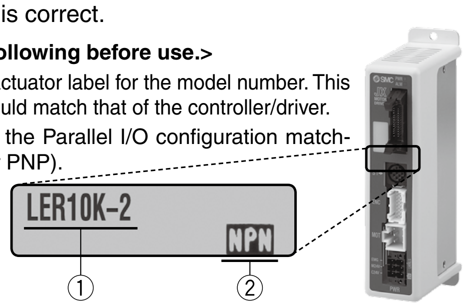
When compliance with UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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 the model number. This number should match that of the controller/driver.
② Check that the Parallel I/O configuration matches (NPN or PNP).



* Refer to the Operation Manual for using the products. Please download it via our website: https://www.smcworld.com

Compatible Controllers/Drivers

	Step data input type	Programless type	Pulse input type
Type			
Series	JXC51 JXC61	LECP1	LECPA
Features	Parallel I/O	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)		
Max. number of step data	64 points	14 points	—
Power supply voltage	24 VDC		
Reference page	1017	1042	1057

	EtherCAT direct input type	EtherCAT direct input type with STO sub-function	EtherNet/IP™ direct input type	EtherNet/IP™ direct input type with STO sub-function	PROFINET direct input type	PROFINET direct input type with STO sub-function	DeviceNet® direct input type	IO-Link direct input type	IO-Link direct input type with STO sub-function	CC-Link direct input type
Type										
Series	JXCE1	JXCEF	JXC91	JXC9F	JXCP1	JXCPF	JXCD1	JXCL1	JXCLF	JXCM1
Features	EtherCAT direct input	EtherCAT direct input with STO sub-function	EtherNet/IP™ direct input	EtherNet/IP™ direct input with STO sub-function	PROFINET direct input	PROFINET direct input with STO sub-function	DeviceNet® direct input	IO-Link direct input	IO-Link direct input with STO sub-function	CC-Link direct input
Compatible motor	Step motor (Servo/24 VDC)									
Max. number of step data	64 points									
Power supply voltage	24 VDC									
Reference page	1063									

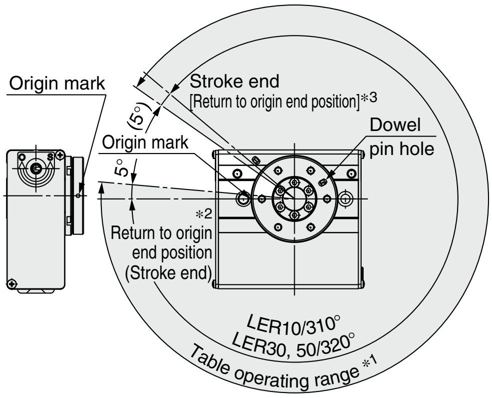
Specifications

Step Motor (Servo/24 VDC)

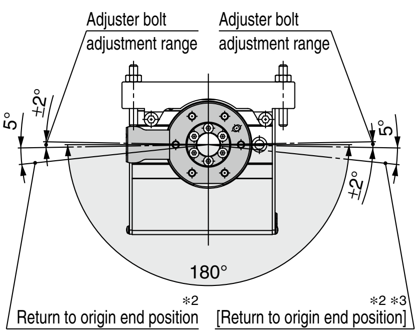
	Model		LER□10K	LER□10J	LER□30K	LER□30J	LER□50K	LER□50J
Actuator specifications – Basic type	Rotation angle [°]		310		320			
	Lead [°]		8	12	8	12	7.5	12
	Max. rotating torque [N·m]		0.32	0.22	1.2	0.8	10	6.6
	Max. pushing torque 40 to 50 % [N·m]*1 *3		0.13 to 0.16	0.09 to 0.11	0.48 to 0.60	0.32 to 0.40	4.0 to 5.0	2.6 to 3.3
	Max. moment of inertia [kg·m²]*2 *3	JXC□1/ JXC□F LECP1	0.0040	0.0018	0.035	0.015	0.13	0.05
		LECPA JXC□$^2_3$			0.027	0.012	0.10	0.04
	Angular speed [°/s]*2 *3		20 to 280	30 to 420	20 to 280	30 to 420	20 to 280	30 to 420
	Pushing speed [°/s]		20	30	20	30	20	30
	Max. angular acceleration/deceleration [°/s²]*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 [°]*4	Basic type	0.3 or less		0.3 or less			
		High-precision type			0.2 or less			
	Impact/Vibration resistance [m/s²]*5		150/30					
	Actuation type		Special worm gear + Belt drive					
	Max. operating frequency [c.p.m]		60					
	Operating temp. range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
	Enclosure		IP20					
	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					
	Power supply voltage [V]		24 VDC ±10%					
	Power [W]*6		Max. power 14		Max. power 42		Max. power 57	

*1 Pushing force accuracy is LER10: ±30% (F.S.), LER30: ±25% (F.S.), LER50: ±20% (F.S.).
*2 The angular acceleration, angular deceleration and angular speed may fluctuate due to variations in the moment of inertia.
Refer to the "Moment of Inertia—Angular Acceleration/ Deceleration, Effective Torque—Angular Speed" graphs on pages 776 and 777 for confirmation.
*3 The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
*4 A reference value for correcting errors in reciprocal operation
*5 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
*6 Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply.

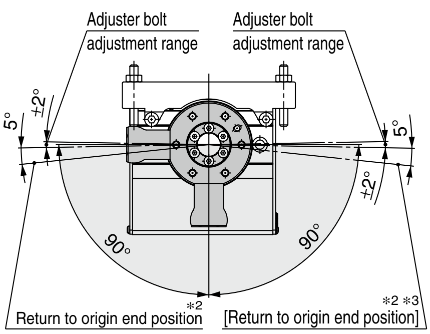
Table Rotation Angle Range



External stopper: 180°



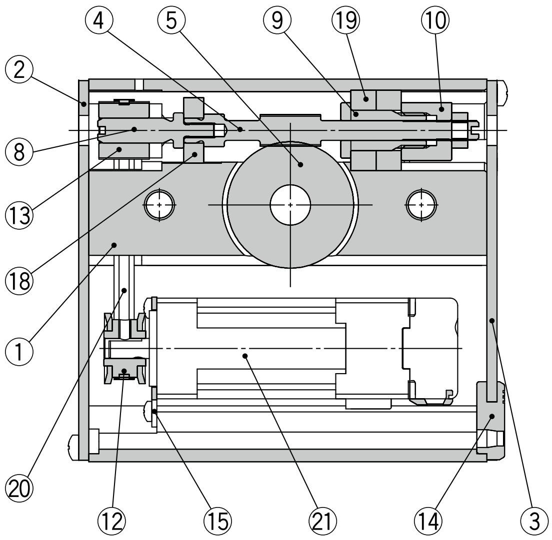
External stopper: 90°



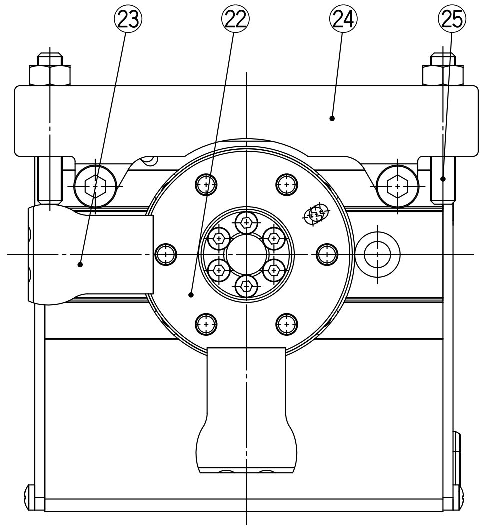
* The figures show the origin position for each actuator.

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

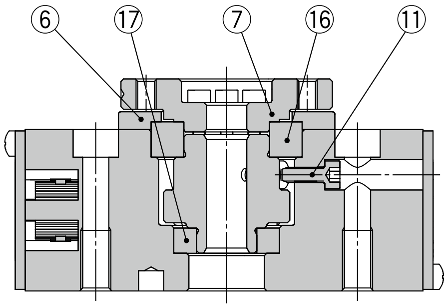
Construction



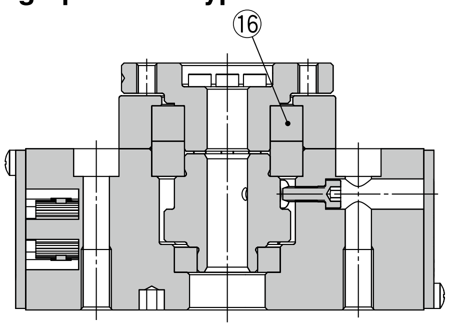
External stopper type



Basic type



High-precision type



Component Parts

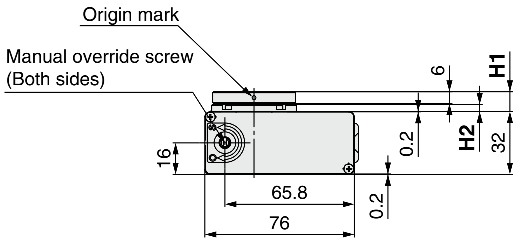
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Side plate A**	Aluminum alloy	Anodized
3	**Side plate B**	Aluminum alloy	Anodized
4	**Worm screw**	Stainless steel	Heat treatment + Special treatment
5	**Worm wheel**	Stainless steel	Heat treatment + Special treatment
6	**Bearing cover**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

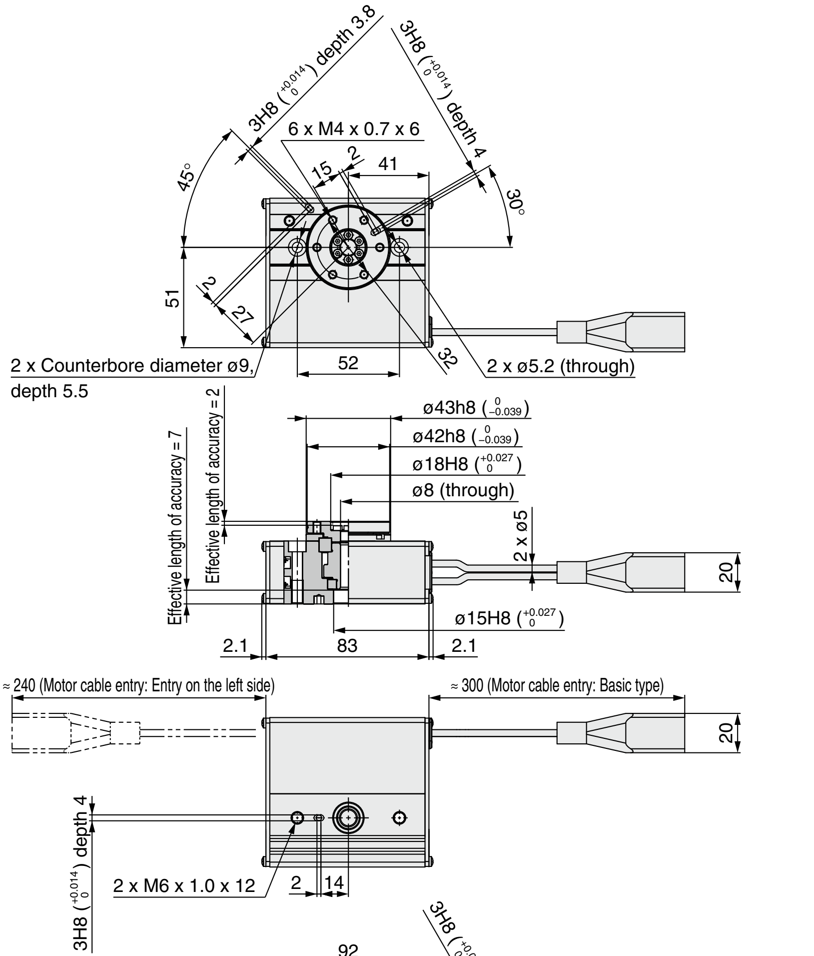
Component Parts

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

Dimensions

LER□10□ (Rotation angle: 310°)

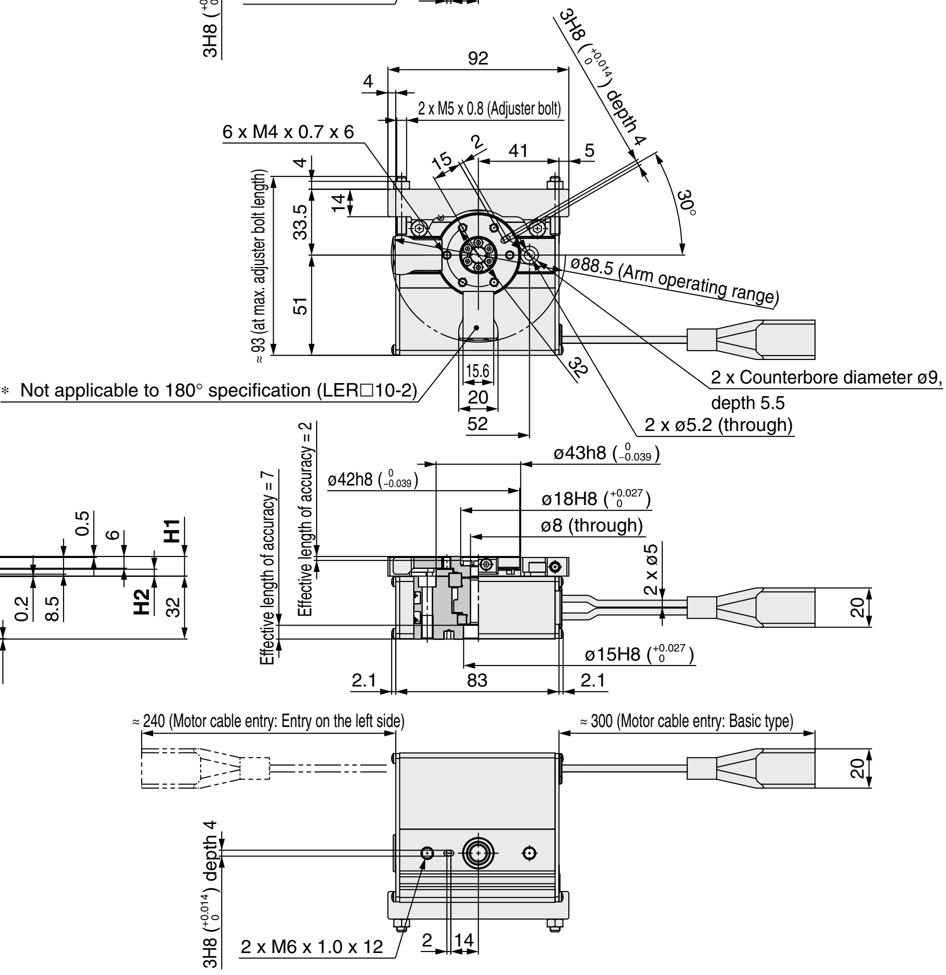


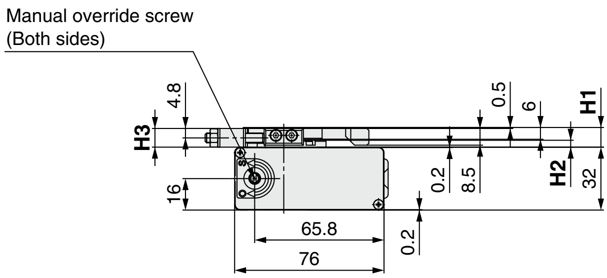


Dimensions [mm]

Model	H1	H2
LER10	10	3.5
LERH10	17	10.5

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



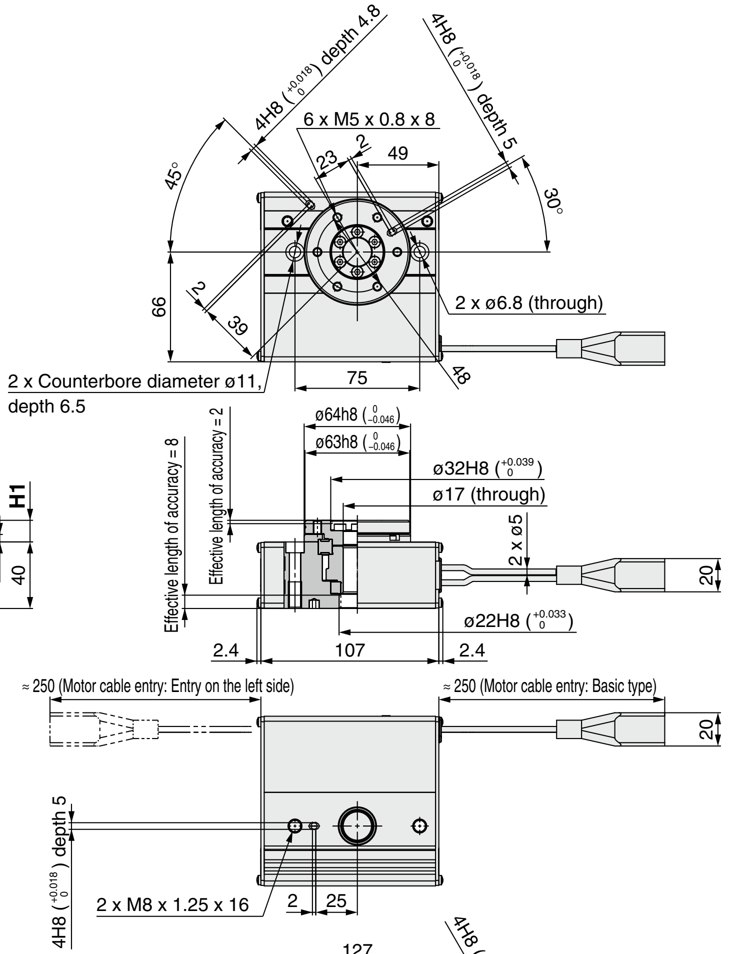


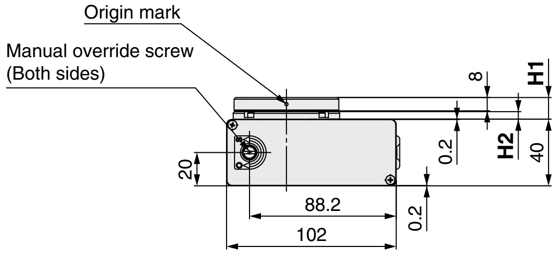
Dimensions [mm]

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

Dimensions

LER□30□ (Rotation angle: 320°)

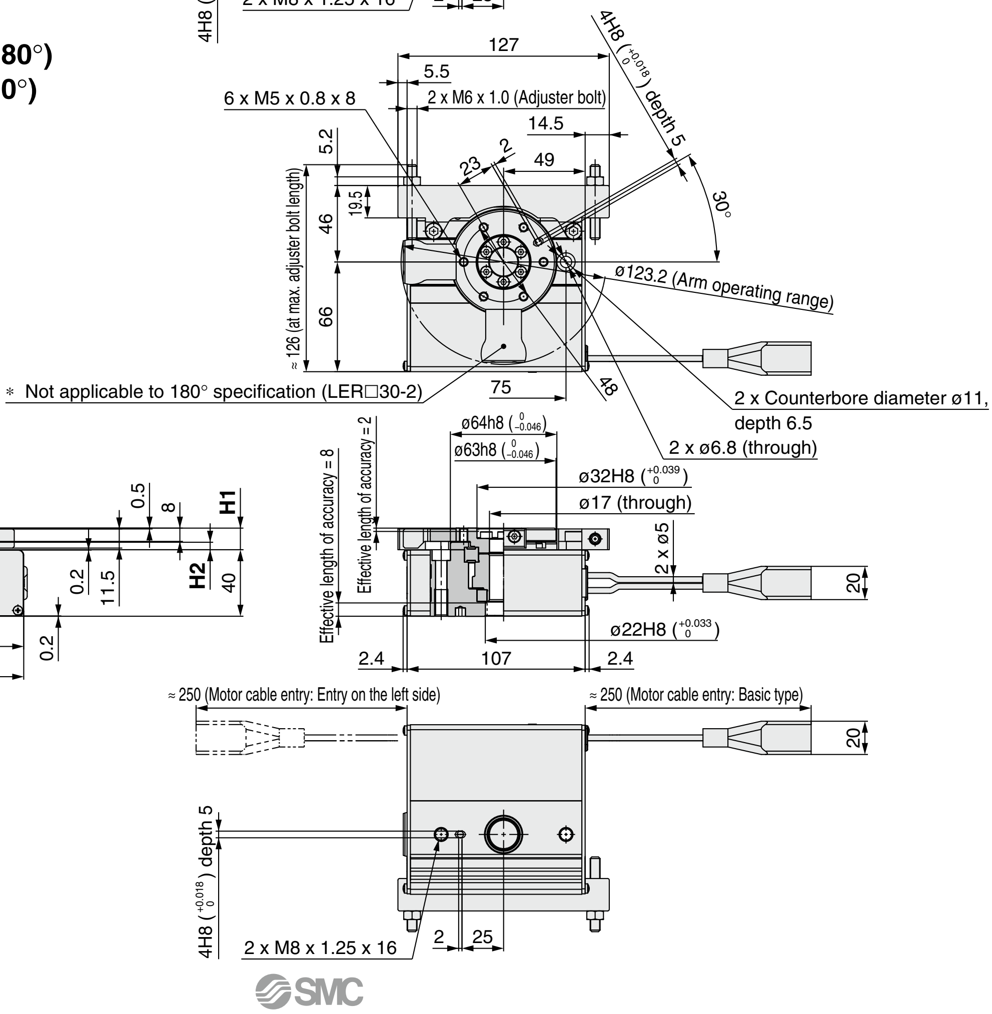


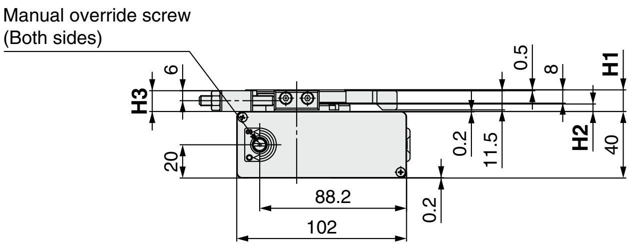


Dimensions [mm]

Model	H1	H2
LER30	13	4.5
LERH30	22	13.5

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



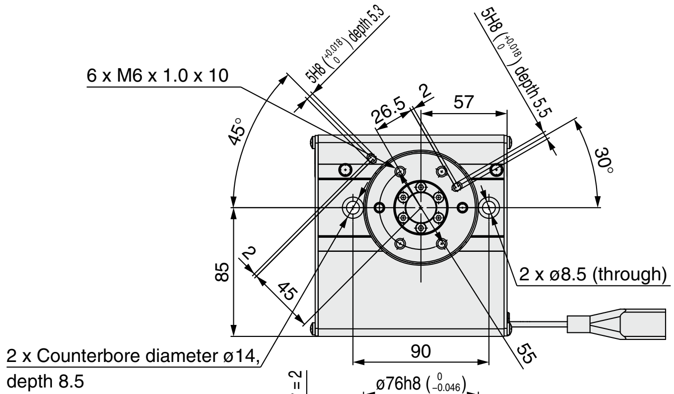


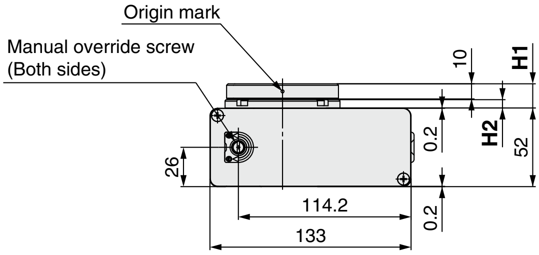
Dimensions [mm]

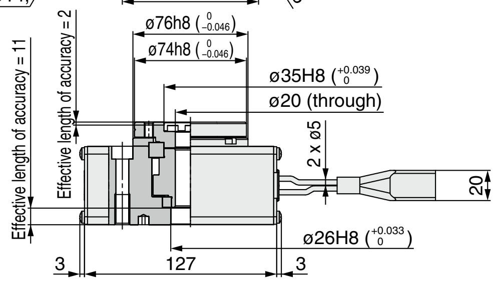
Model	H1	H2	H3
LER30	13	4.5	12.5
LERH30	22	13.5	21.5

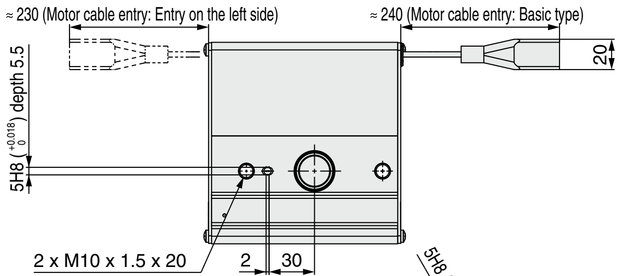
Dimensions

LER□50□ (Rotation angle: 320°)





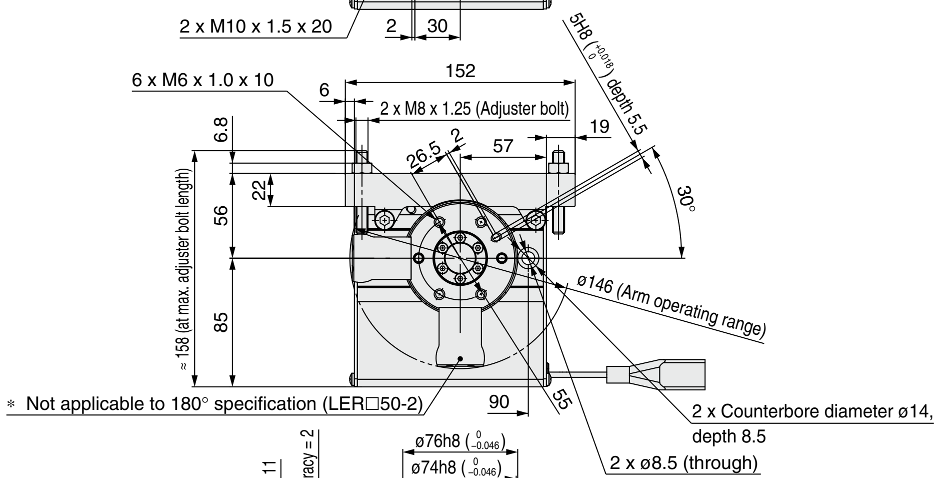


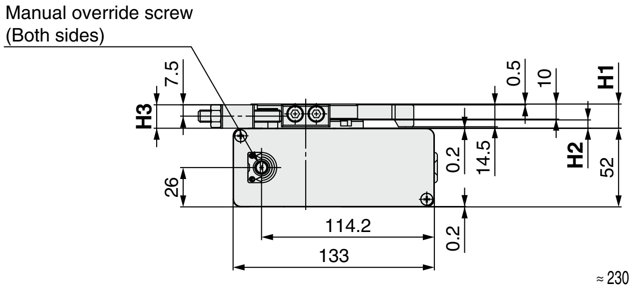


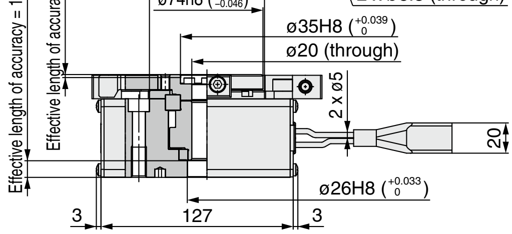
Dimensions [mm]

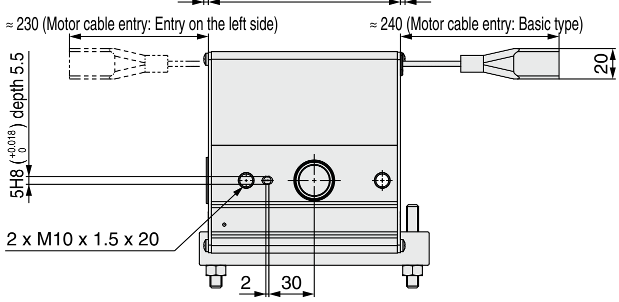
Model	H1	H2
LER50	16	5.5
LERH50	26	15.5

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

Continuous Rotation Specification

Rotary Table

LER Series LER10, 30, 50

∗ For details, refer to page 1343 and onward.

RoHS

How to Order

LER ☐ 10 K – 1 ☐ – R1 CD17T

❶ ❷ ❸ – 1 (Rotation angle) ❹ – ❺ ❻ (*JXC☐ Series*)

For details on controllers, refer to page 794.

Rotation angle [°]

1	360

❶ Table accuracy

Nil	Basic type
H	High-precision type

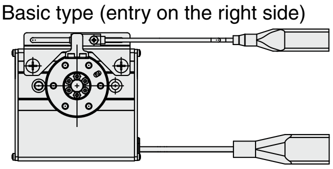
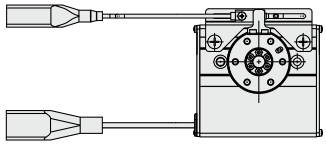
❷ Size

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 Motor cable entry

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

❺ Actuator cable type/length∗1 ∗3

Standard cable [m]

Nil	None
S1	1.5
S3	3
S5	5

Robotic cable [m]

R1	1.5	**RA**	10∗2
R3	3	**RB**	15∗2
R5	5	**RC**	20∗2
R8	8∗2		

JXC□ Series (For details, refer to page 795.)

❻ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Communication protocol/Input/Output)

Symbol	Type	Number of axes, Special specification	
		Standard	With STO sub-function
5	Parallel input (NPN)	●	
6	Parallel input (PNP)	●	
E	EtherCAT	●	●
9	EtherNet/IP™	●	●
P	PROFINET	●	●
D	DeviceNet®	●	
L	IO-Link	●	●
M	CC-Link	●	

Mounting

7	Screw mounting
8*4	DIN rail

Number of axes, Special specification

Symbol	Number of axes	Specification
1	Single axis	Standard
F	Single axis	With STO sub-function

Communication plug connector, I/O cable*5

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

*1 The actuator cable is equipped with a lock and sensor.
*2 Produced upon receipt of order (Robotic cable only)
*3 The standard cable should only be used on fixed parts.
For use on moving parts, select the robotic cable.
Refer to page 1092 if only the actuator cable is required.
*4 The DIN rail is not included. It must be ordered separately.
*5 Select "Nil" for anything other than DeviceNet®, CC-Link, or parallel input.
Select "Nil," "S," or "T" for DeviceNet® or CC-Link.
Select "Nil," "1," "3," or "5" for parallel input.

⚠Caution

[CE/UKCA-compliant products]

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

[UL-compliant products (For the LEC series)]

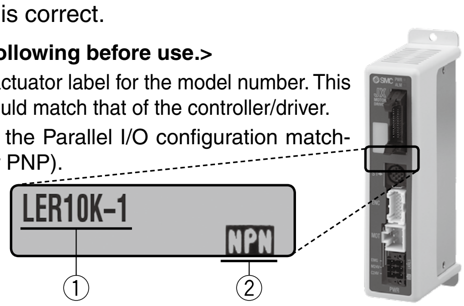
When compliance with UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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 the model number. This number should match that of the controller/driver.
② Check that the Parallel I/O configuration matches (NPN or PNP).



* Refer to the Operation Manual for using the products. Please download it via our website: https://www.smcworld.com

Compatible Controllers

Type	**Step data input type** 
Series	**JXC51** **JXC61**
Features	Parallel I/O
Compatible motor	Step motor (Servo/24 VDC)
Max. number of step data	64 points
Power supply voltage	24 VDC
Reference page	1017

Type	**EtherCAT direct input type** 	**EtherCAT direct input type with STO sub-function** 	**EtherNet/IP™ direct input type** 	**EtherNet/IP™ direct input type with STO sub-function** 	**PROFINET direct input type** 	**PROFINET direct input type with STO sub-function** 	**DeviceNet® direct input type** 	**IO-Link direct input type** 	**IO-Link direct input type with STO sub-function** 	**CC-Link direct input type** 
Series	**JXCE1**	**JXCEF**	**JXC91**	**JXC9F**	**JXCP1**	**JXCPF**	**JXCD1**	**JXCL1**	**JXCLF**	**JXCM1**
Features	EtherCAT direct input	EtherCAT direct input with STO sub-function	EtherNet/IP™ direct input	EtherNet/IP™ direct input with STO sub-function	PROFINET direct input	PROFINET direct input with STO sub-function	DeviceNet® direct input	IO-Link direct input	IO-Link direct input with STO sub-function	CC-Link direct input
Compatible motor	Step motor (Servo/24 VDC)									
Max. number of step data	64 points									
Power supply voltage	24 VDC									
Reference page	1063									

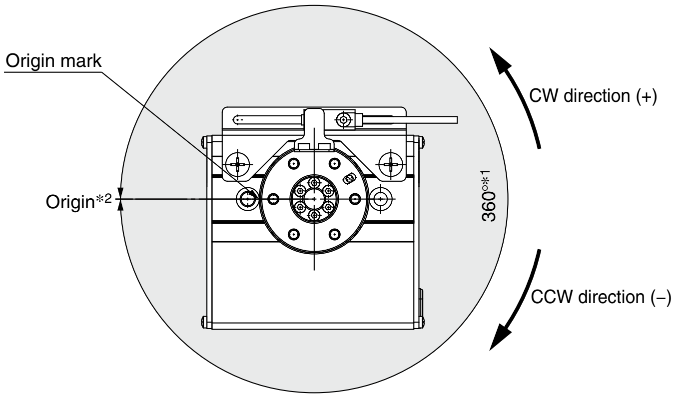
Specifications

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 [°]*7		±20 000 000					
	Max. rotating torque [N·m]		0.32	0.22	1.2	0.8	10	6.6
	Max. pushing torque 40 to 50 % [N·m]*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]*2 *3		0.0040	0.0018	0.035	0.015	0.13	0.05
	Angular speed [°/s]*2 *3		20 to 280	30 to 420	20 to 280	30 to 420	20 to 280	30 to 420
	Pushing speed [°/s]		20	30	20	30	20	30
	Max. angular acceleration/deceleration [°/s²] *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 [°]*4	Basic type	0.3 or less		0.3 or less			
		High-precision type			0.2 or less			
	Impact/Vibration resistance [m/s²]*5		150/30					
	Actuation type		Special worm gear + Belt drive					
	Max. operating frequency [c.p.m]		60					
	Operating temperature range [°C]		5 to 40					
	Operating humidity range [%RH]		90 or less (No condensation)					
	Enclosure		IP20					
	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					
	Proximity sensor (for return to origin)/Input circuit		2-wire					
	Proximity sensor (for return to origin)/Input point		1 input					
	Power supply voltage [V]		24 VDC ±10%					
	Power*6		Max. power 14		Max. power 42		Max. power 57	

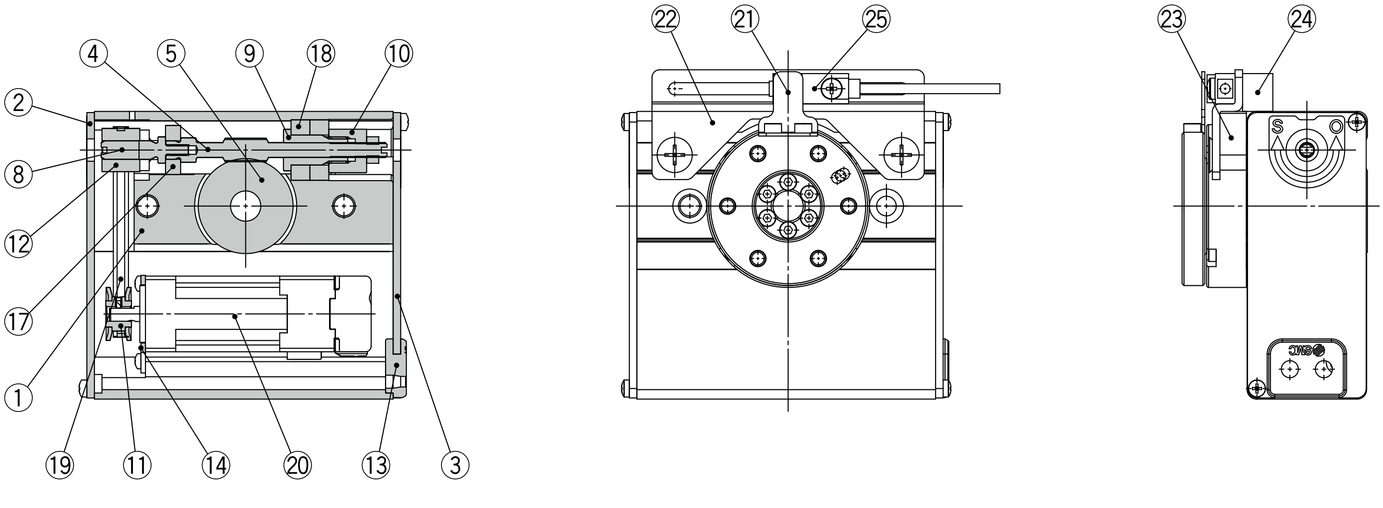
*1 Pushing force accuracy is LER10: ±30% (F.S.), LER30: ±25% (F.S.), LER50: ±20% (F.S.).
*2 The angular acceleration, angular deceleration and angular speed may fluctuate due to variations in the moment of inertia. Refer to the "Moment of Inertia—Angular Acceleration/Deceleration, Effective Torque—Angular Speed" graphs on pages 776 and 777 for confirmation.
*3 The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)
*4 A reference value for correcting errors in reciprocal operation
*5 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
*6 Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply.
*7 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.

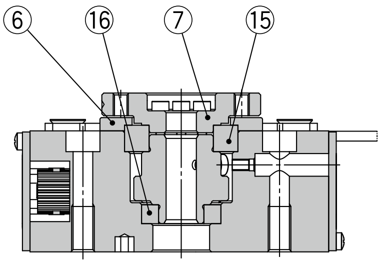
Table Rotation Angle Range



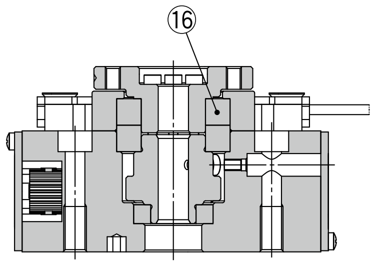
*1 This is the range within which the table can move.
Make sure that workpieces mounted on the table do not interfere with other workpieces on the facilities around the table.
*2 The sensor detection range is recognized as origin. When detecting the sensor, the table rotates in the reverse direction within the sensor detection range.

Construction





Basic type



High-precision type

Component Parts

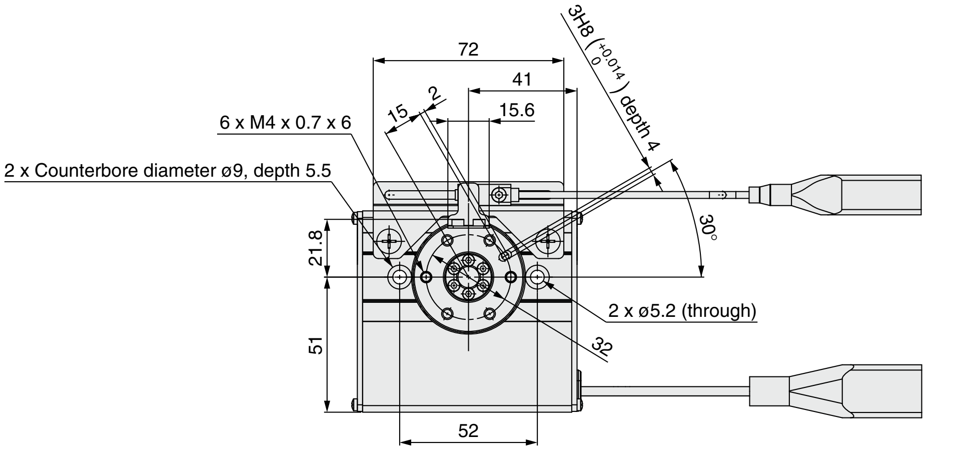
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Side plate A**	Aluminum alloy	Anodized
3	**Side plate B**	Aluminum alloy	Anodized
4	**Worm screw**	Stainless steel	Heat treatment + Special treatment
5	**Worm wheel**	Stainless steel	Heat treatment + Special treatment
6	**Bearing cover**	Aluminum alloy	Anodized
7	**Table**	Aluminum alloy	
8	**Joint**	Stainless steel	
9	**Bearing holder**	Alloy steel	
10	**Bearing stopper**	Alloy steel	
11	**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)**	—	

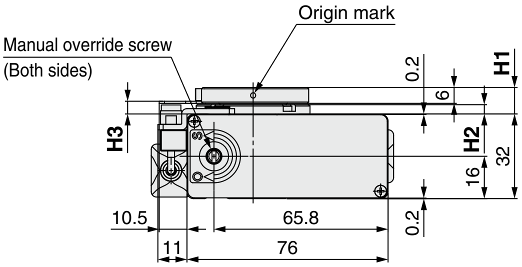
Component Parts (360° type)

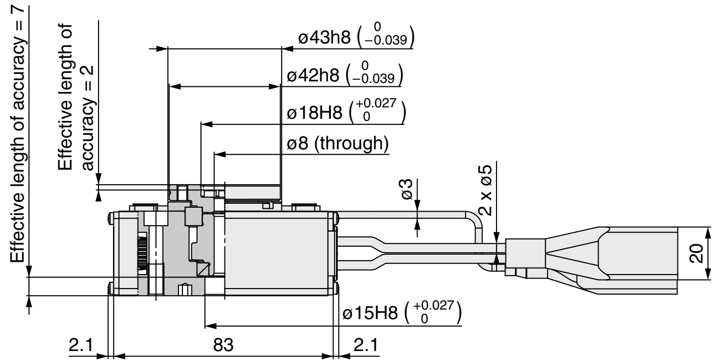
No.	Description	Material	Note
21	**Proximity dog**	Stainless steel	
22	**Sensor holder**	Carbon steel	Chromating
23	**Sensor holder spacer**	Aluminum alloy	Anodized (High-precision type can be used only)
24	**Square nut**	Aluminum alloy	
25	**Proximity sensor assembly**	—	

Dimensions

LER□10□



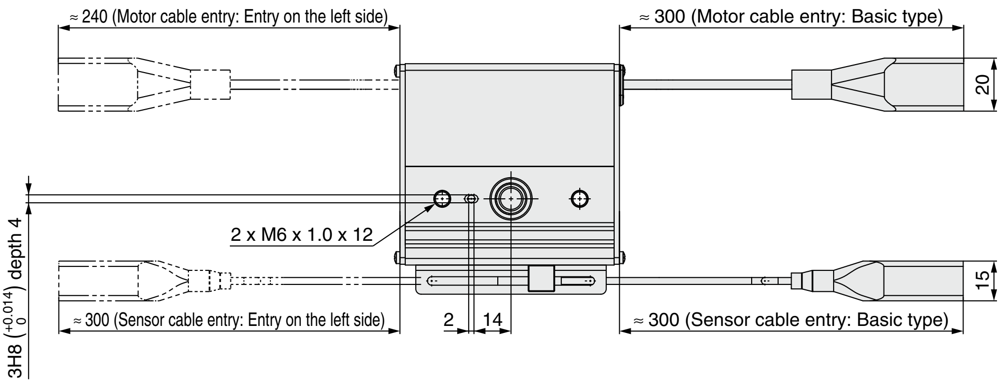




Dimensions

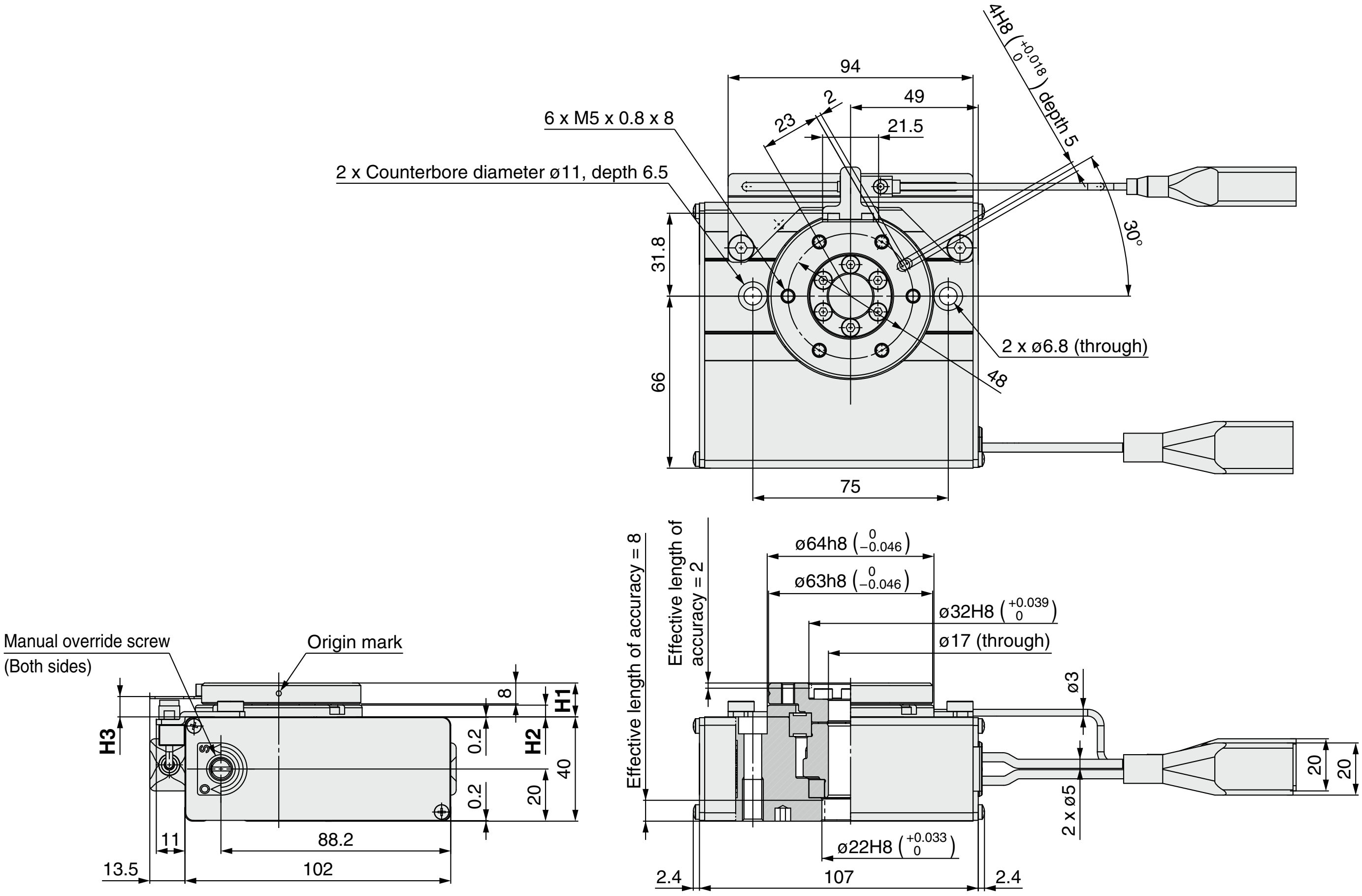
[mm]

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



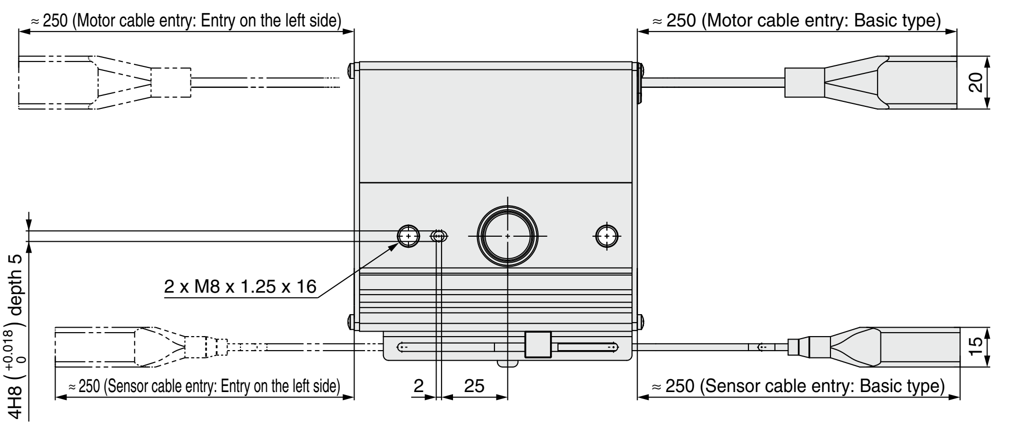
Dimensions

LER□30



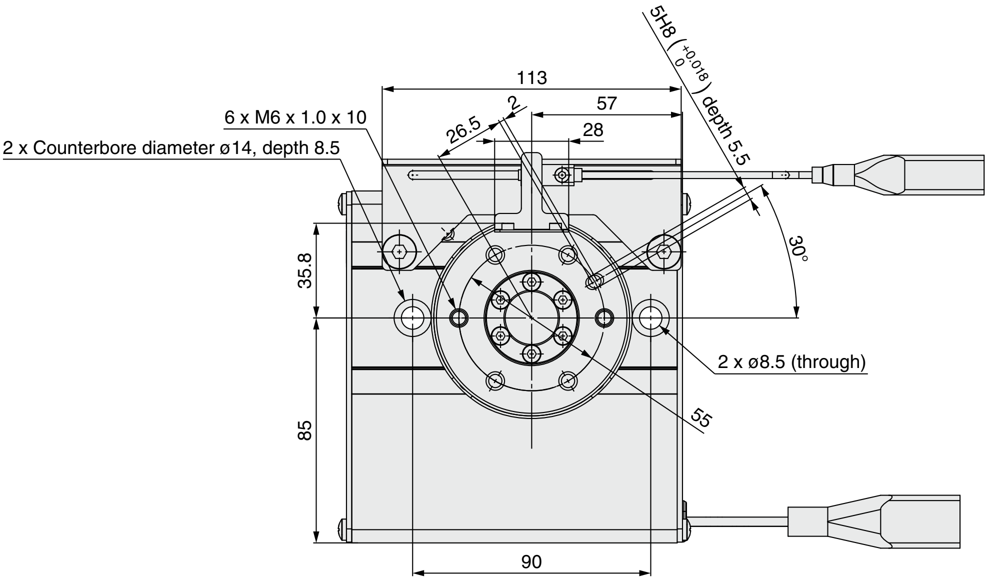
Dimensions [mm]

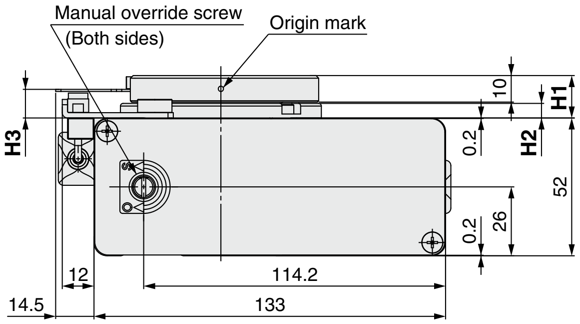
Model	H1	H2	H3
LER30	13	4.5	7.8
LERH30	22	13.5	16.8

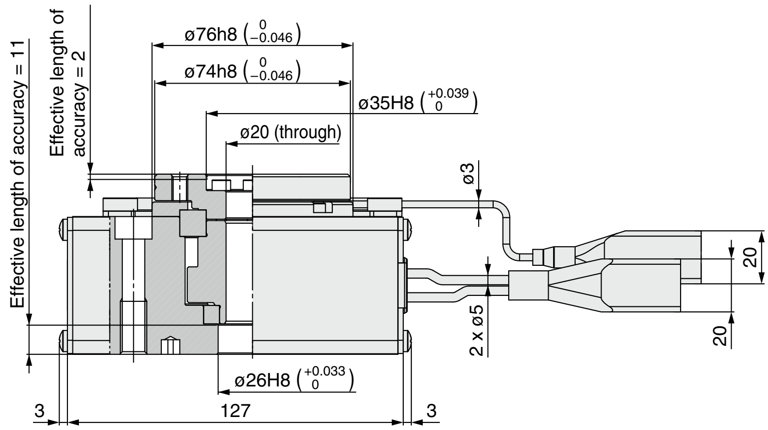


Dimensions

LER□50



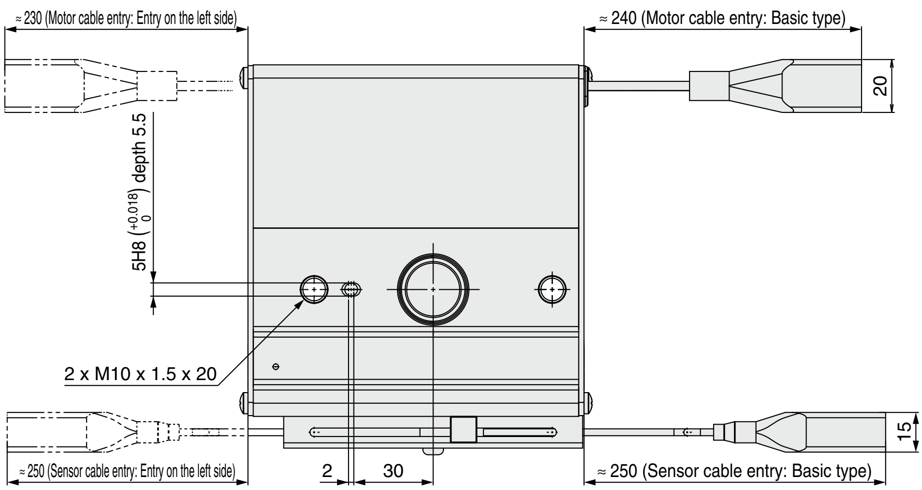




Dimensions

[mm]

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



Specific Product Precautions 1

Be sure to read this before handling the products. Refer to page 1351 for safety instructions and pages 1352 to 1357 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 a 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 result in a malfunction, while tightening with a lower torque can result in 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.

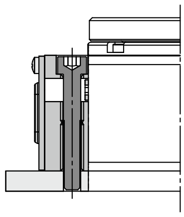
Tightening the screws with a higher torque than recommended may result in a malfunction, while tightening with a lower torque can result in the displacement of the mounting position.

Mounting

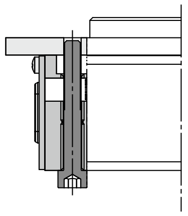
⚠Warning

Through-hole mounting

Body mounting/Bottom



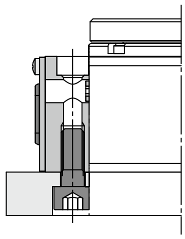
Body mounting/Top



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



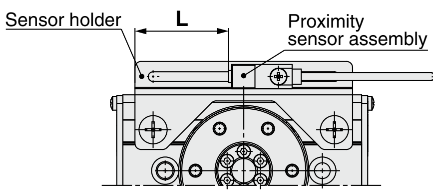
Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth [mm]
LER□10	M6 x 1	5.0	12
LER□30	M8 x 1.25	12.0	16
LER□50	M10 x 1.5	25.0	20

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 Specific Product Precautions 2

Be sure to read this before handling the products. Refer to page 1351 for safety instructions and pages 1352 to 1357 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 of the 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 the [Pushing force] are set below the specified range, there is the possibility that the INP output signal will turn ON from the pushing start position.

<Pushing force and trigger LV range>

Model	Pushing force set value [%]	Trigger LV set value [%]
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"
The product cannot reach the pushing start position within the target time.

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

c. "Deviation over flow"
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 adjuster 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 adjuster 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, secure a bending diameter of 40 mm or longer for the motor cable.

10. The 360° type proximity sensor for return to origin responds when it approaches anything made of metal. For this reason, be sure to keep metal objects other than the proximity dog away from the sensor during return to origin.
Recommended distance: 5 mm or more

Maintenance

⚠Danger

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

LER Series
Battery-less Absolute Encoder Type Specific Product Precautions

Be sure to read this before handling the products. Refer to page 1351 for safety instructions and pages 1352 to 1357 for electric actuator precautions.

Handling

⚠Caution

1. Absolute encoder ID mismatch error at the first connection

In the following cases, an “ID mismatch error” alarm occurs after the power is turned ON. Perform a return to origin operation after resetting the alarm before use.

· When an electric actuator is connected and the power is turned ON for the first time after purchase*1
· When the actuator or motor is replaced
· When the controller is replaced

*1 If you have purchased an electric actuator and controller with the set part number, the pairing may have already been completed and the alarm may not be generated.

“ID mismatch error”

Operation is enabled by matching the encoder ID on the electric actuator side with the ID registered in the controller. This alarm occurs when the encoder ID is different from the registered contents of the controller. By resetting this alarm, the encoder ID is registered (paired) to the controller again.

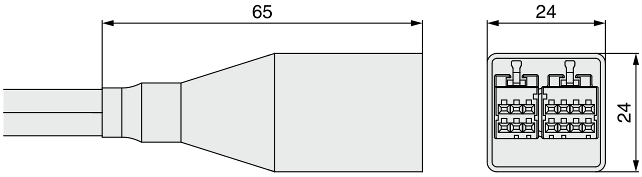
When a controller is changed after pairing is completed				
	Encoder ID no. (* Numbers below are examples.)			
Actuator	17623	17623	17623	17623
Controller	17623	17699	17699	17623
ID mismatch error occurred?	No	Yes	Error reset ⇒ No	

2. In environments where strong magnetic fields are present, use may be limited.

A magnetic sensor is used in the encoder. Therefore, if the actuator motor is used in an environment where strong magnetic fields are present, malfunction or failure may occur. Do not expose the actuator motor to magnetic fields with a magnetic flux density of 1 mT or more.
When installing an electric actuator and an air cylinder with an auto switch (ex. CDQ2 series) or multiple electric actuators side by side, maintain a space of 40 mm or more around the motor. Refer to the construction drawing of the actuator motor.

3. The connector size of the motor cable is different from that of the electric actuator with an incremental encoder.

The motor cable connector of an electric actuator with a battery-less absolute encoder is different from that of an electric actuator with an incremental encoder. As the connector cover dimensions are different, take the dimensions below into consideration during the design process.



Battery-less absolute encoder connector cover dimensions