

Linear and Rotary Actuators

## Compact Linear Actuators

DRL Series

Introduction
Motorized Linear Slides EZlimo EZSII
EZlimo SPV
Motorized Cylinders EZlimo EZCII
EZlimo EZA
EZlimo PMAII
Motorized Linear Slides/Cylinders Common Controller
Accessories
Compact Linear Actuators DRL
Hollow Rotary Actuators DG
Accessories

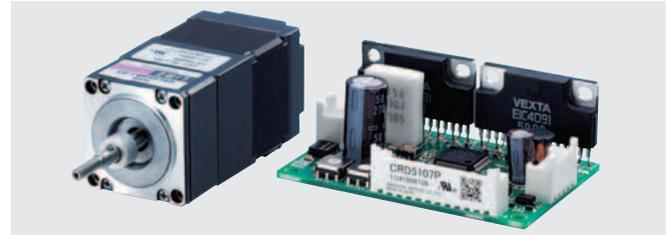
# Compact Linear Actuators DRL Series

For details on this product please refer to our website, contact technical support or your nearest Oriental Motor sales office.  
www.orientalmotor.com

The drive mechanism adopts a 5-phase stepping motor with ball screw. The **DRL Series** achieves high positioning accuracy in a space-saving design.



For detailed product safety standard information including standards, file number and certification body, please visit [www.orientalmotor.com](http://www.orientalmotor.com).

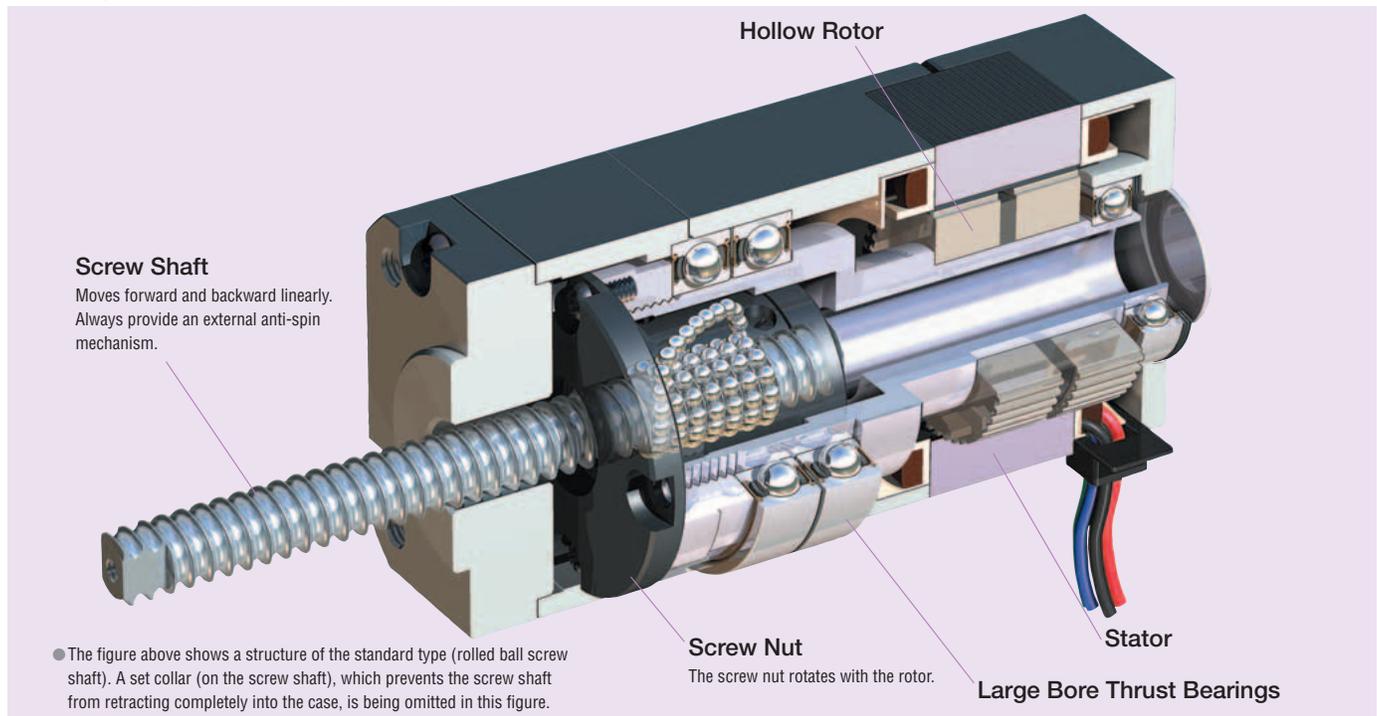


## Features

### Compact Design and High Positioning Accuracy

The actuator size was reduced using Oriental Motor's original technology. The compact and lightweight body houses the linear motion mechanism as well as the rotating components of the stepping motor. The **DRL Series** helps to achieve a significant reduction in the size of your equipment and system.

To meet the user's requirements for higher positioning accuracy, all models can be ordered with a ground ball screw specification [repetitive positioning accuracy:  $\pm 0.005$  mm ( $\pm 0.0002$  in.)].



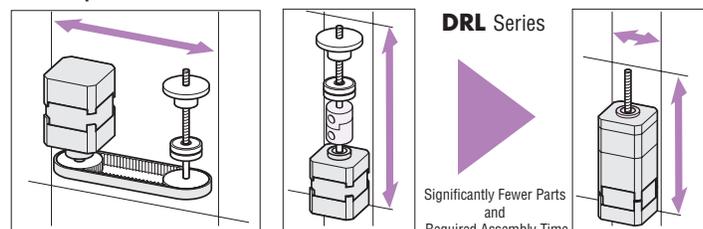
### Significantly Fewer Parts and Required Assembly Time

The compact body houses the entire linear-motion mechanism, with some of the conventional parts eliminated for a more streamlined structure. This substantially reduces the man-hours required for design and assembly of your equipment, so you will enjoy higher production efficiency.

### Reliable Design and Structure

The hollow rotor shaft incorporates large bore thrust bearings for the direct handling of thrust loads. Minimizing the number of parts involved in linear conversion results in higher reliability.

### Comparison with "Screw Mechanism and Motor"



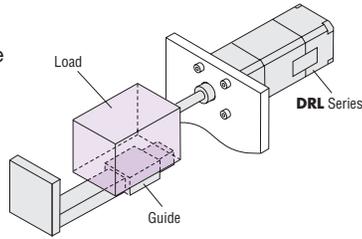
Large Bore Thrust Bearing  
+  
Hollow Rotor



## ● Actuator Types

### ◇ Standard Type

Install a load transfer guide externally to the actuator.



### ◇ Guide Type

An actuator comes with a guide provided as an anti-spin mechanism.



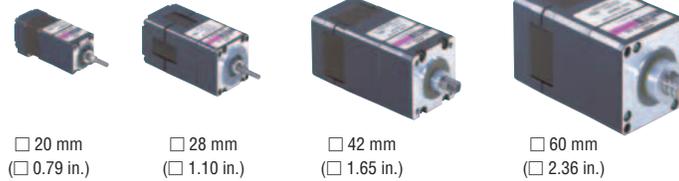
## ● Lead Screw Types

### ◇ Ground Ball Screw

Ideal for applications where high positioning accuracy and low vibration are required, such as optical devices and semiconductor systems that use fine-feed pitches. The **DRL** ground ball screw type achieves high reliability by maximizing the performance advantages of a 5-phase stepping motor.

### ◇ Rolled Ball Screw

Ideal for general positioning applications where reliability and ease of use are given priority.



## ● Improved Positioning Accuracy Achieved with the High-Resolution Motor

The high-resolution motors achieve high accuracy and reliability based on Oriental Motor's latest precision machining technology. The motor resolution is increased to double the level of a standard model to reduce the displacement angle against load torque, thereby achieving high positioning accuracy. Frame sizes of 28 mm (1.10 in.), 42 mm (1.65 in.) and 60 mm (2.36 in.) are available.

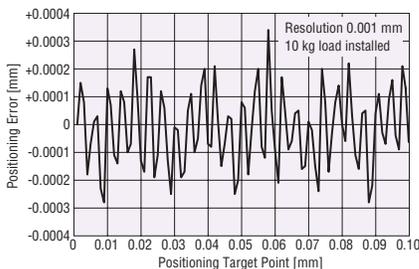
### ◇ Ideal for Applications Requiring Fine-Feed and Fine Adjustment

Under normal microstepping operation, the actuator will not operate until the initial motor torque exceeds the friction load. The high-resolution motor, with its high output torque, allows the torque to pick up quickly and thereby ensures smooth operation even with fine-feed.



## ● Comparison of Positioning Error (Comparison in the **DRL42** type)

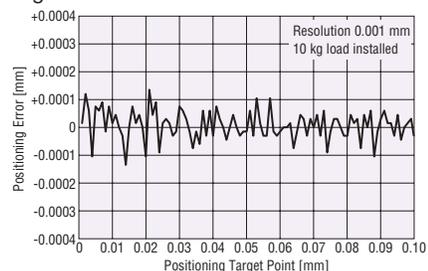
### Standard Motor



Positioning error is reduced by nearly half!

● Comparison with the standard motor

### High-Resolution Motor



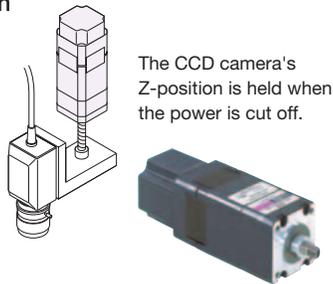
● Additional Functions

The standard type and guide type are available with an electromagnetic brake or adjusting knob as additional functions.

◇ With Electromagnetic Brake

The load position can be held when the power is cut off. Since the work will not fall in case of power failure or disconnection, you can safely use equipment in which the work moves vertically.

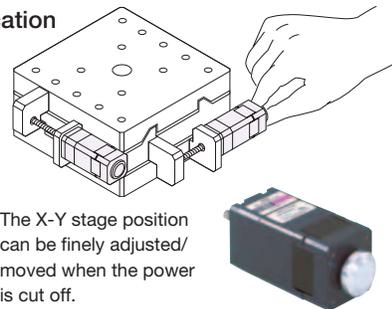
Application



◇ With Adjusting Knob

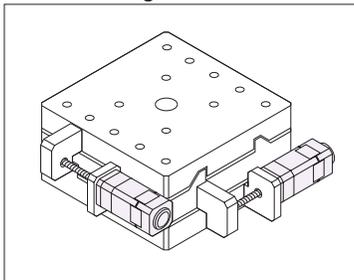
The load position can be adjusted manually when the power is cut off. This function is useful during servicing of the equipment.

Application

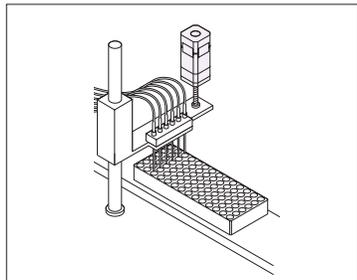


● Applications

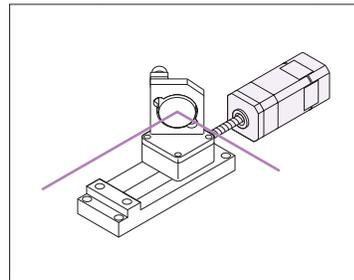
Drive mechanism for a micrometer head X-Y stage



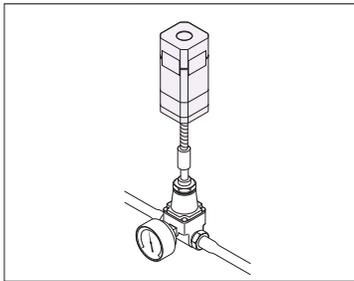
Automatic micro-plate dispensing



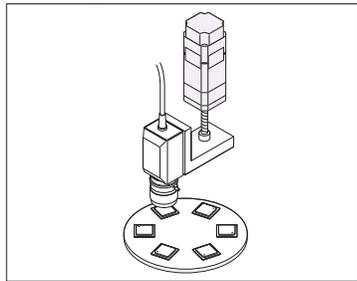
Adjusting a mirror positioning device



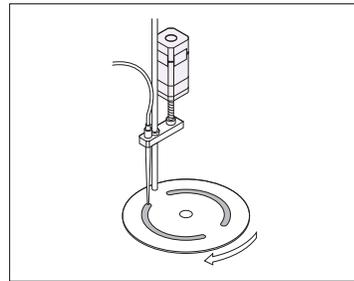
Fine-tuning of flow-rate regulator valve setting



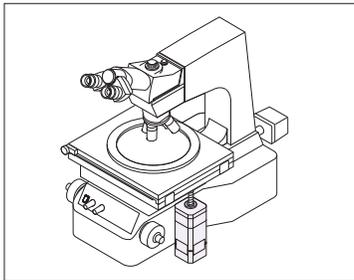
Focusing of a CCD camera



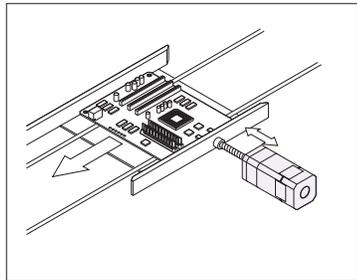
Fine-tuning of nozzle position



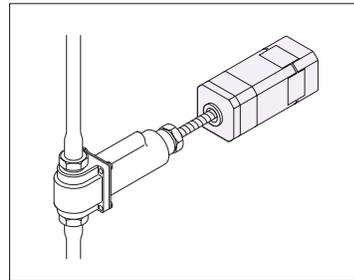
Vertical fine-tuning of table position



Centering of a board



Driving a pump actuator device



## ● Compact DC Input Board Driver Meeting the Space-Saving Needs

The compact, lightweight driver implements microstep drive. The new IC provides a wide range of functions, including the following:

- Smooth Drive Function
- 1-pulse/2-pulse input mode switching
- 25 microstep drive resolutions
- Power LED
- Photocoupler input
- Connector with lock (by MOLEX)
- Conforming to major safety standards

## ◇ Compact Microstep Driver

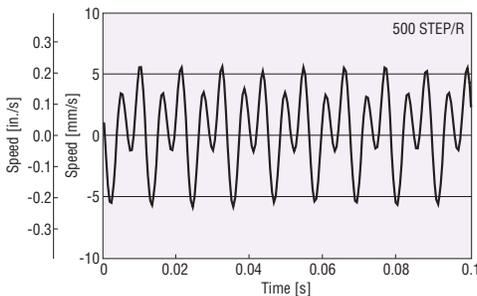
The microstep drive system allows you to set high resolutions up to one-250th of the basic resolution of the actuator. This function is effective in meeting your low-vibration/low-noise operation needs at low speeds. The high-performance driver is also compact and lightweight, achieving a reduction of approximately 47% in size compared with a conventional microstep driver.

## Smooth Drive Function Embodies Quieter Operation

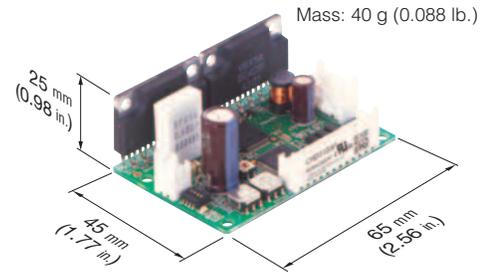
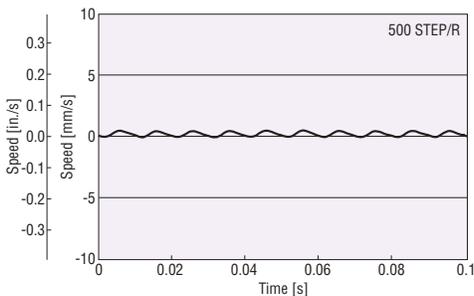
The Smooth Drive Function automatically controls the motor's microstep drive operation at the same travel and speed as in the full-step mode, without the operator having to change the pulse input settings. This function is especially useful when used in the full-step or half-step mode.

## ● Comparison of Speed Fluctuation

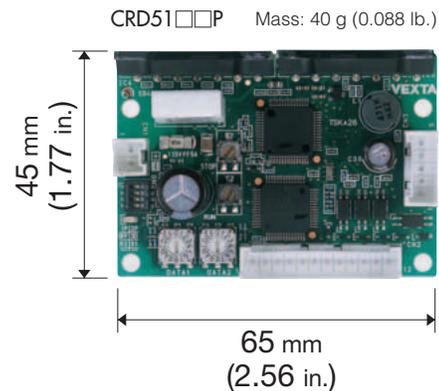
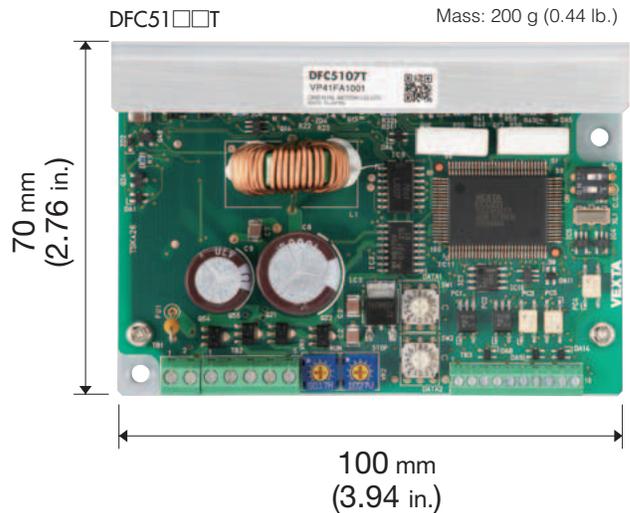
Smooth Drive Function: OFF



Smooth Drive Function: ON



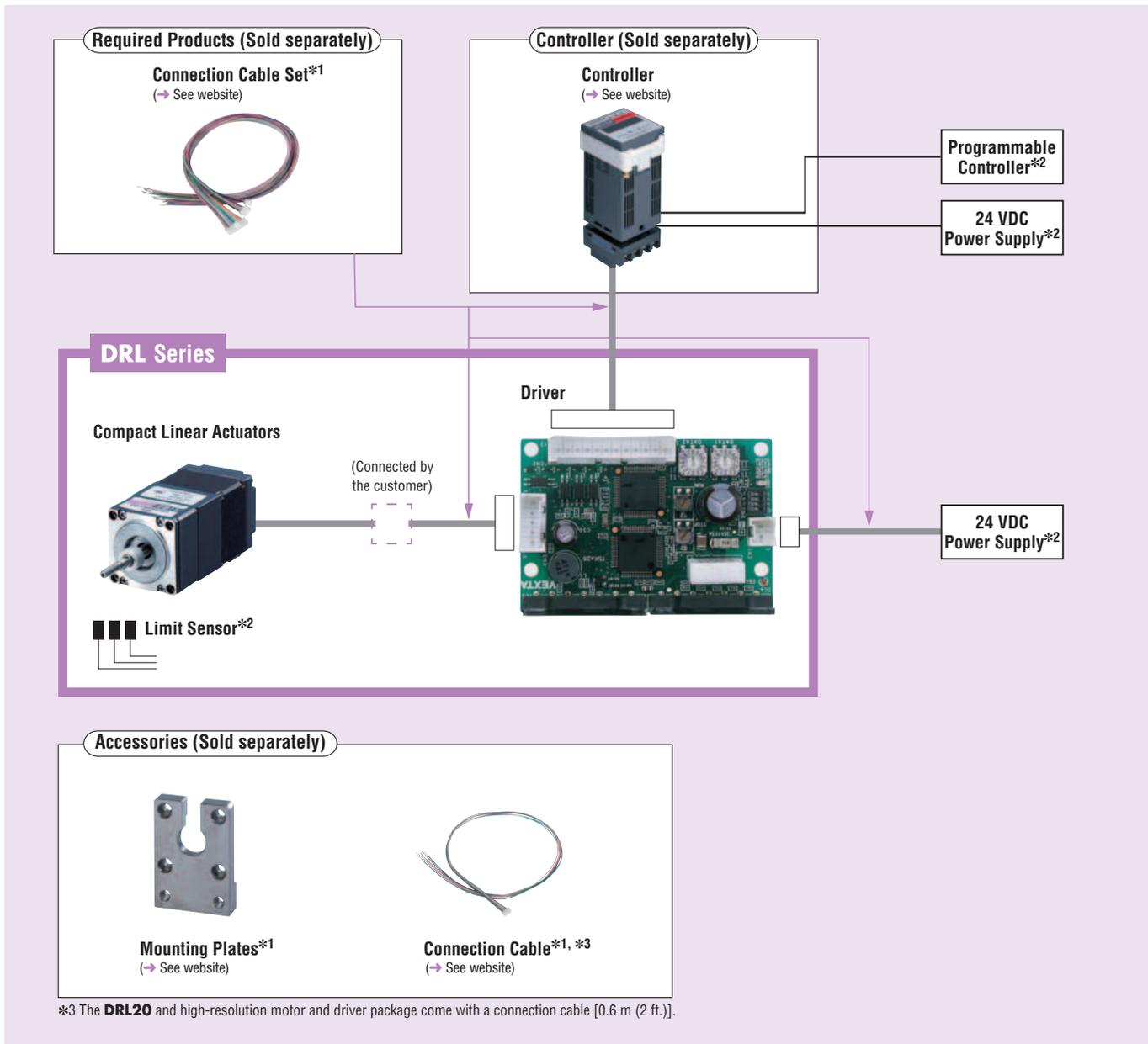
## ● Comparison of Driver Size and Mass



Introduction
Motorized Linear Slides
EZlimo EZSIT
EZlimo SPV
Motorized Cylinders
EZlimo EZCIT
EZlimo EZA
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Motorized Linear Slides/Cylinders
Common Controller
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Compact Linear Actuators
DRL
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DG
Accessories

## System Configuration

An example of system configuration with the **SG8030J** controller.



### Example of System Configuration

DRL Series	Sold Separately		
	Controller	Connection Cable Set [0.6 m (2 ft.)]	Mounting Plate
<b>DRL28PB1-03G</b>	<b>SG8030J-U</b>	<b>LCS04SD5</b>	<b>PADRL-28</b>

● The system configuration shown above is an example. Other combinations are available.

\*1 For accessory details on these products please either refer to our website, contact technical support or your nearest Oriental Motor sales office.  
[www.orientalmotor.com](http://www.orientalmotor.com)

\*2 Not supplied

## Product Number Code

# DRL 28 P B 1 G - 03 N G

①      ②      ③      ④      ⑤      ⑥      ⑦      ⑧      ⑨

①	Series	<b>DRL: DRL Series</b>
②	Frame Size	<b>20:</b> □20 mm (□0.79 in.) <b>28:</b> □28 mm (□1.10 in.) <b>42:</b> □42 mm (□1.65 in.) <b>60:</b> □60 mm (□2.36 in.)
③	Motor Type	<b>M:</b> High-Resolution Motor <b>P:</b> Standard Motor
④	Lead Screw Type	<b>A:</b> Rolled Ball Screw Type <b>B:</b> Ground Ball Screw Type
⑤	Lead	<b>1:</b> 1 mm (0.039 in.) [□20 mm, 28 mm (□0.79 in., 1.10 in.)] <b>2:</b> 2 mm (0.079 in.) [□42 mm (□1.65 in.)] <b>4:</b> 4 mm (0.157 in.) [□60 mm (□2.36 in.)]
⑥	Actuator Type	None: Standard Type (Without guide) <b>G:</b> Guide Type
⑦	Stroke	<b>02:</b> 25 mm (0.98 in.) [□20 mm (□0.79 in.)] <b>03:</b> 30 mm (1.18 in.) [□28 mm (□1.10 in.)] <b>04:</b> 40 mm (1.57 in.) [□42 mm (□1.65 in.)] <b>05:</b> 50 mm (1.97 in.) [□60 mm (□2.36 in.)] <b>06:</b> 60 mm (2.36 in.) [□28 mm (□1.10 in.)] <b>10:</b> 100 mm (3.94 in.) [□42 mm, 60 mm (□1.65 in., 2.36 in.)]
⑧	Additional Functions	Blank: Without Additional Functions <b>M:</b> With Electromagnetic Brake <b>N:</b> With Adjusting Knob
⑨	Driver Type	<b>G:</b> CRD51 □□P

## Product Line

### ● Rolled Ball Screw, Standard Motor

Frame Size mm (in.)	Actuator Type	Additional Functions		
		None Model	With Electromagnetic Brake Model	With Adjusting Knob Model
□28 (□1.10)	Standard Type	<b>DRL28PA1-03G</b>	–	<b>DRL28PA1-03NG</b>
	Guide Type	<b>DRL28PA1G-03G</b>	–	<b>DRL28PA1G-03NG</b>
□42 (□1.65)	Standard Type	<b>DRL42PA2-04G</b>	<b>DRL42PA2-04MG</b>	<b>DRL42PA2-04NG</b>
	Guide Type	<b>DRL42PA2G-04G</b>	<b>DRL42PA2G-04MG</b>	<b>DRL42PA2G-04NG</b>
□60 (□2.36)	Standard Type	<b>DRL60PA4-05G</b>	<b>DRL60PA4-05MG</b>	<b>DRL60PA4-05NG</b>
	Guide Type	<b>DRL60PA4G-05G</b>	<b>DRL60PA4G-05MG</b>	<b>DRL60PA4G-05NG</b>

### ● Ground Ball Screw, High-Resolution Motor

Frame Size mm (in.)	Actuator Type	Additional Functions		
		None Model	With Electromagnetic Brake Model	With Adjusting Knob Model
□28 (□1.10)	Standard Type	<b>DRL28MB1-03G</b>	–	<b>DRL28MB1-03NG</b>
	Guide Type	<b>DRL28MB1G-03G</b>	–	<b>DRL28MB1G-03NG</b>
□42 (□1.65)	Standard Type	<b>DRL42MB2-04G</b>	<b>DRL42MB2-04MG</b>	<b>DRL42MB2-04NG</b>
	Guide Type	<b>DRL42MB2G-04G</b>	<b>DRL42MB2G-04MG</b>	<b>DRL42MB2G-04NG</b>
□60 (□2.36)	Standard Type	<b>DRL60MB4-05G</b>	<b>DRL60MB4-05MG</b>	<b>DRL60MB4-05NG</b>
	Guide Type	<b>DRL60MB4G-05G</b>	<b>DRL60MB4G-05MG</b>	<b>DRL60MB4G-05NG</b>

### ● Ground Ball Screw, Standard Motor

Frame Size mm (in.)	Actuator Type	Additional Functions		
		None Model	With Electromagnetic Brake Model	With Adjusting Knob Model
□20 (□0.79)	Standard Type	<b>DRL20PB1-02G</b>	–	<b>DRL20PB1-02NG</b>
	Guide Type	<b>DRL20PB1G-02G</b>	–	<b>DRL20PB1G-02NG</b>
□28 (□1.10)	Standard Type	<b>DRL28PB1-03G</b>	–	<b>DRL28PB1-03NG</b>
	Guide Type	<b>DRL28PB1G-03G</b>	–	<b>DRL28PB1G-03NG</b>
□42 (□1.65)	Standard Type	<b>DRL42PB2-04G</b>	<b>DRL42PB2-04MG</b>	<b>DRL42PB2-04NG</b>
	Guide Type	<b>DRL42PB2G-04G</b>	<b>DRL42PB2G-04MG</b>	<b>DRL42PB2G-04NG</b>
□60 (□2.36)	Standard Type	<b>DRL60PB4-05G</b>	<b>DRL60PB4-05MG</b>	<b>DRL60PB4-05NG</b>
	Guide Type	<b>DRL60PB4G-05G</b>	<b>DRL60PB4G-05MG</b>	<b>DRL60PB4G-05NG</b>

The following items are included in each product.

Actuator, Driver, Driver Connector, Motor Lead Wire/Connector Assembly\*1, Operating Manual, Surge Suppressor\*2

\*1 Only for Actuator Frame Size 20 mm (0.79 in.) and High-Resolution Motor

\*2 Only for Electromagnetic Brake Type

Introduction  
EZlimo  
EZSIT  
EZlimo  
SPV  
EZlimo  
EZCIT  
EZlimo  
EZA  
EZlimo  
PMAIT  
EZlimo  
Common  
Controller  
Accessories  
Compact Linear  
Actuators  
DRL  
Hollow Rotary Actuators  
DG  
Accessories

## Specifications

### ● Actuator

#### ◇ Ground Ball Screw, High-Resolution Motor (RoHS)



Model	DRL28MB1-03G DRL28MB1-03NG	DRL42MB2-04G DRL42MB2-04NG	DRL42MB2-04MG	DRL60MB4-05G DRL60MB4-05NG	DRL60MB4-05MG	
Electromagnetic Brake	Not equipped	Not equipped	Equipped	Not equipped	Equipped	
Max. Vertical Transportable Mass*1	kg (lb.) 3 (6.6)		10 (22)		30 (66)	
Maximum Speed*2	mm/s (in./s) 24 (0.94)		15 (0.59)		22 (0.87)	
Maximum Acceleration	m/s <sup>2</sup> (ft./s <sup>2</sup> ) 0.2 (0.66)		0.2 (0.66)		0.26 (0.85)	
Maximum Thrust Force*3	N (lb.) 30 (6.7)		100 (22)		300 (67)	
Maximum Holding Force	At Excitation*4					
	N (lb.)	30 (6.7)		100 (22)	300 (67)	
	At Non-Excitation	0	0	0	0	
	N (lb.)	0	0	0	0	
	Electromagnetic Brake	–	–	100 (22)	–	300 (67)
Repetitive Positioning Accuracy	mm (in.)	±0.005 (0.0002)				
Lost Motion	mm (in.)	0.05 (0.002)				
Resolution*5	mm (in.)	0.001 (0.000039)	0.002 (0.000079)		0.004 (0.00016)	
Lead	mm (in.)	1 (0.039)	2 (0.079)		4 (0.157)	
Stroke	mm (in.)	30 (1.18)	40 (1.57)		50 (1.97)	
Mass [Mass with adjusting knob]	kg (lb.)	0.18 (0.39) [0.19 (0.41)]	0.6 (1.32) [0.6 (1.32)]	0.8 (1.76)	1.3 (2.8) [1.35 (2.9)]	1.7 (3.7)

#### ◇ Ground Ball Screw, High-Resolution Motor, Guide Type (RoHS)



Model	DRL28MB1G-03G DRL28MB1G-03NG	DRL42MB2G-04G DRL42MB2G-04NG	DRL42MB2G-04MG	DRL60MB4G-05G DRL60MB4G-05NG	DRL60MB4G-05MG	
Electromagnetic Brake	Not equipped	Not equipped	Equipped	Not equipped	Equipped	
Max. Horizontal Transportable Mass (Fig. A)	kg (lb.) 1 (2.2)		2 (4.4)		3 (6.6)	
Max. Vertical Transportable Mass (Fig. B)*1	kg (lb.) 1.5 (3.3)		5 (11)		15 (33)	
Maximum Speed*2	mm/s (in./s) 24 (0.94)		15 (0.59)		22 (0.87)	
Maximum Acceleration	m/s <sup>2</sup> (ft./s <sup>2</sup> ) 0.2 (0.66)		0.2 (0.66)		0.26 (0.85)	
Maximum Thrust Force*3	N (lb.) 30 (6.7)		100 (22)		300 (67)	
Maximum Holding Force	At Excitation*4					
	N (lb.)	30 (6.7)		100 (22)	300 (67)	
	At Non-Excitation	0	0	0	0	
	N (lb.)	0	0	0	0	
	Electromagnetic Brake	–	–	100 (22)	–	300 (67)
Maximum Load Moment	N·m (oz-in)	M <sub>p</sub> : 0 M <sub>y</sub> : 0 M <sub>r</sub> : 0	M <sub>p</sub> : 0.5 (71) M <sub>y</sub> : 0.25 (35) M <sub>r</sub> : 0.8 (113)	M <sub>p</sub> : 0.6 (85) M <sub>y</sub> : 0.35 (49) M <sub>r</sub> : 2.2 (310)		
Repetitive Positioning Accuracy	mm (in.)	①±0.005 (0.0002) ②±0.02 (0.00079)		①±0.005 (0.0002) ②±0.01 (0.00039)		
Lost Motion	mm (in.)	0.05 (0.002)				
Resolution*5	mm (in.)	0.001 (0.000039)	0.002 (0.000079)		0.004 (0.00016)	
Lead	mm (in.)	1 (0.039)	2 (0.079)		4 (0.157)	
Stroke	mm (in.)	30 (1.18)	40 (1.57)		50 (1.97)	
Mass [Mass with adjusting knob]	kg (lb.)	0.25 (0.55) [0.26 (0.57)]	0.8 (1.76) [0.8 (1.76)]	1.0 (2.2)	1.8 (3.9) [1.85 (4.0)]	2.2 (4.8)

\*1 When the power is turned off, or output current is turned off (non-excitation state), the actuator loses its thrust force or holding force. As such, it can no longer keep the load in position or withstand an external force.

\*2 Use the actuator at or below the following maximum speed in a low-temperature environment [0~+10°C (+32~+50°F)]. **DRL28**: 12 mm/s (0.47 in./s)

\*3 The maximum thrust force is measured during constant-speed operation in horizontal operation with no load applied to the moving parts (screw shaft and joint). Thrust force varies with load mass and acceleration.

\*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (50% of the rated current).

\*5 25 resolutions can be set.

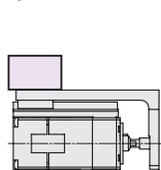
#### Note

● Use the actuator in conditions where its surface temperature will not exceed 90°C (194°F). The repetitive positioning accuracy is measured at a constant temperature under a constant load.

#### ● Maximum Transportable Mass

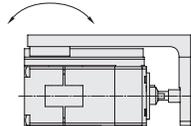
Figure A

Figure B

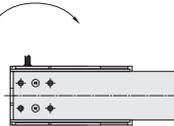


#### ● Load Moment

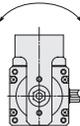
M<sub>p</sub>



M<sub>y</sub>

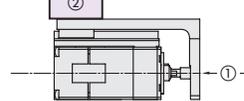


M<sub>r</sub>



#### ● Repetitive Positioning Accuracy

②



① Repetitive positioning accuracy is measured at the end of the guide.

② Repetitive positioning accuracy is measured on the linear-guide.

If footnote ① or ② is not indicated, then the accuracy values are identical.

For details (specifications, characteristics, dimensions and others) on these products please refer either to our website, contact technical support or your nearest Oriental Motor sales office.  
www.orientalmotor.com

## ◇ Ground Ball Screw, Standard Motor (RoHS)



Model	DRL20PB1-02G DRL20PB1-02NG	DRL28PB1-03G DRL28PB1-06G DRL28PB1-03NG	DRL42PB2-04G DRL42PB2-10G DRL42PB2-04NG	DRL42PB2-04MG	DRL60PB4-05G DRL60PB4-10G DRL60PB4-05NG	DRL60PB4-05MG	
Electromagnetic Brake	Not equipped	Not equipped	Not equipped	Equipped	Not equipped	Equipped	
Max. Vertical Transportable Mass* <sup>1</sup>	kg (lb.) 1.5 (3.3)	3 (6.6)	10 (22)		30 (66)		
Maximum Speed* <sup>2</sup>	mm/s (in./s) 20 (0.79)	24 (0.94)	30 (1.18)		32 (1.26)		
Maximum Acceleration	m/s <sup>2</sup> (ft./s <sup>2</sup> ) 0.2 (0.66)	0.2 (0.66)	0.4 (1.3)		0.26 (0.85)		
Maximum Thrust Force* <sup>3</sup>	N (lb.) 15 (3.3)	30 (6.7)	100 (22)		300 (67)		
Maximum Holding Force	At Excitation* <sup>4</sup>	N (lb.) 15 (3.3)	30 (6.7)	100 (22)	300 (67)		
	At Non-Excitation	N (lb.) 0	0	0	0	0	
	Electromagnetic Brake	N (lb.) -	-	-	100 (22)	-	300 (67)
Repetitive Positioning Accuracy	mm (in.)	±0.005 (0.0002)					
Lost Motion	mm (in.)	0.05 (0.002)					
Resolution* <sup>5</sup>	mm (in.)	0.002 (0.000079)	0.002 (0.000079)	0.004 (0.00016)	0.008 (0.00031)		
Lead	mm (in.)	1 (0.039)		2 (0.079)	4 (0.157)		
Stroke	mm (in.)	25 (0.98)	03: 30 (1.18) 06: 60 (2.36)	04: 40 (1.57) 10: 100 (3.94)	40 (1.57)	05: 50 (1.97) 10: 100 (3.94) 50 (1.97)	
Mass [Mass with adjusting knob]	kg (lb.)	0.08 (0.17) [0.08 (0.17)]	03: 0.18 (0.39) [0.19 (0.41)] 06: 0.18 (0.39)	04: 0.6 (1.32) [0.6 (1.32)] 10: 0.63 (1.38)	0.8 (1.76)	05: 1.3 (2.8) [1.35 (2.9)] 10: 1.38 (3.0)	1.7 (3.7)

## ◇ Ground Ball Screw, Standard Motor, Guide Type (RoHS)



Model	DRL20PB1G-02G DRL20PB1G-02NG	DRL28PB1G-03G DRL28PB1G-03NG	DRL42PB2G-04G DRL42PB2G-04NG	DRL42PB2G-04MG	DRL60PB4G-05G DRL60PB4G-05NG	DRL60PB4G-05MG	
Electromagnetic Brake	Not equipped	Not equipped	Not equipped	Equipped	Not equipped	Equipped	
Max. Horizontal Transportable Mass (Fig. A)	kg (lb.) 0.5 (1.1)	1 (2.2)	2 (4.4)		3 (6.6)		
Max. Vertical Transportable Mass (Fig. B)* <sup>1</sup>	kg (lb.) 1 (2.2)	1.5 (3.3)	5 (11)		15 (33)		
Maximum Speed* <sup>2</sup>	mm/s (in./s) 20 (0.79)	24 (0.94)	30 (1.18)		32 (1.26)		
Maximum Acceleration	m/s <sup>2</sup> (ft./s <sup>2</sup> ) 0.2 (0.66)	0.2 (0.66)	0.4 (1.3)		0.26 (0.85)		
Maximum Thrust Force* <sup>3</sup>	N (lb.) 15 (3.3)	30 (6.7)	100 (22)		300 (67)		
Maximum Holding Force	At Excitation* <sup>4</sup>	N (lb.) 15 (3.3)	30 (6.7)	100 (22)	300 (67)		
	At Non-Excitation	N (lb.) 0	0	0	0	0	
	Electromagnetic Brake	N (lb.) -	-	-	100 (22)	-	300 (67)
Maximum Load Moment	N·m (oz-in)	M <sub>p</sub> : 0 M <sub>v</sub> : 0 M <sub>R</sub> : 0	M <sub>p</sub> : 0 M <sub>v</sub> : 0 M <sub>R</sub> : 0	M <sub>p</sub> : 0.5 (71) M <sub>v</sub> : 0.25 (35) M <sub>R</sub> : 0.8 (113)	M <sub>p</sub> : 0.6 (85) M <sub>v</sub> : 0.35 (49) M <sub>R</sub> : 2.2 (310)		
Repetitive Positioning Accuracy	mm (in.)	①±0.005 (0.0002) ②±0.01 (0.00039)		①±0.005 (0.0002) ②±0.01 (0.00039)			
Lost Motion	mm (in.)	0.05 (0.002)					
Resolution* <sup>5</sup>	mm (in.)	0.002 (0.000079)	0.002 (0.000079)	0.004 (0.00016)	0.008 (0.00031)		
Lead	mm (in.)	1 (0.039)		2 (0.079)	4 (0.157)		
Stroke	mm (in.)	25 (0.98)	30 (1.18)	40 (1.57)	50 (1.97)		
Mass [Mass with adjusting knob]	kg (lb.)	0.14 (0.3) [0.15 (0.33)]	0.25 (0.55) [0.26 (0.57)]	0.8 (1.76) [0.8 (1.76)]	1.0 (2.2)	1.8 (3.9) [1.85 (4.0)]	2.2 (4.8)

\*1 When the power is turned off, or output current is turned off (non-excitation state), the actuator loses its thrust force or holding force. As such, it can no longer keep the load in position or withstand an external force.

\*2 Use each actuator at or below the following maximum speed in a low-temperature environment [0~+10°C (+32~+50°F)].

**DRL20:** 13 mm/s (0.51 in./s), **DRL28:** 15 mm/s (0.59 in./s), **DRL42:** 20 mm/s (0.79 in./s), **DRL60:** 24 mm/s (0.94 in./s)

\*3 The maximum thrust force is measured during constant-speed operation in horizontal operation with no load applied to the moving parts (screw shaft and joint). Thrust force varies with load mass and acceleration.

\*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (50% of the rated current).

\*5 25 resolutions can be set.

### Note

● Use the actuator in conditions where its surface temperature will not exceed 90°C (194°F). The repetitive positioning accuracy is measured at a constant temperature under a constant load.

### ● Maximum Transportable Mass

Figure A

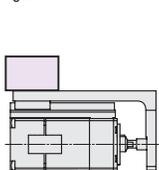
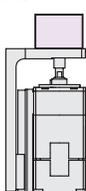
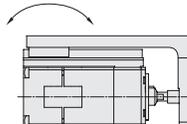


Figure B

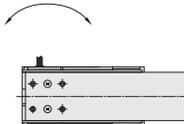


### ● Load Moment

M<sub>p</sub>



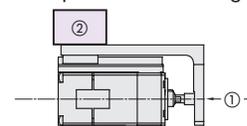
M<sub>v</sub>



M<sub>R</sub>



### ● Repetitive Positioning Accuracy



- ① Repetitive positioning accuracy is measured at the end of the guide.
- ② Repetitive positioning accuracy is measured on the linear-guide.

If footnote ① or ② is not indicated, then the accuracy values are identical.

For details (specifications, characteristics, dimensions and others) on these products please refer either to our website, contact technical support or your nearest Oriental Motor sales office.  
www.orientalmotor.com

◇ Rolled Ball Screw, Standard Motor (RoHS)



Model	DRL28PA1-03G DRL28PA1-06G DRL28PA1-03NG	DRL42PA2-04G DRL42PA2-10G DRL42PA2-04NG	DRL42PA2-04MG	DRL60PA4-05G DRL60PA4-10G DRL60PA4-05NG	DRL60PA4-05MG	
Electromagnetic Brake	Not equipped		Equipped	Not equipped		
Max. Vertical Transportable Mass* <sup>1</sup>	kg (lb.)	3 (6.6)	10 (22)	30 (66)		
Maximum Speed* <sup>2</sup>	mm/s (in./s)	24 (0.94)	30 (1.18)	32 (1.26)		
Maximum Acceleration	m/s <sup>2</sup> (ft./s <sup>2</sup> )	0.2 (0.66)	0.4 (1.3)	0.26 (0.85)		
Maximum Thrust Force* <sup>3</sup>	N (lb.)	30 (6.7)	100 (22)	300 (67)		
Maximum Holding Force	At Excitation* <sup>4</sup>	N (lb.)	30 (6.7)	100 (22)		
	At Non-Excitation	N (lb.)	0	0	0	
	Electromagnetic Brake	N (lb.)	—	100 (22)	—	300 (67)
Repetitive Positioning Accuracy	mm (in.)	±0.02 (0.00079)				
Lost Motion	mm (in.)	0.1 (0.0039)				
Resolution* <sup>5</sup>	mm (in.)	0.002 (0.000079)	0.004 (0.00016)	0.008 (0.00031)		
Lead	mm (in.)	1 (0.039)	2 (0.079)	4 (0.157)		
Stroke	mm (in.)	<b>03:</b> 30 (1.18) <b>06:</b> 60 (2.36)	<b>04:</b> 40 (1.57) <b>10:</b> 100 (3.94)	40 (1.57)	<b>05:</b> 50 (1.97) <b>10:</b> 100 (3.94)	50 (1.97)
	kg (lb.)	<b>03:</b> 0.18 (0.39) [0.19 (0.41)] <b>06:</b> 0.18 (0.39)	<b>04:</b> 0.6 (1.32) [0.6 (1.32)] <b>10:</b> 0.63 (1.38)	0.8 (1.76)	<b>05:</b> 1.3 (2.8) [1.35 (2.9)] <b>10:</b> 1.38 (3.0)	1.7 (3.7)

◇ Rolled Ball Screw, Standard Motor, Guide Type (RoHS)



Model	DRL28PA1G-03G DRL28PA1G-03NG	DRL42PA2G-04G DRL42PA2G-04NG	DRL42PA2G-04MG	DRL60PA4G-05G DRL60PA4G-05NG	DRL60PA4G-05MG	
Electromagnetic Brake	Not equipped		Equipped	Not equipped		
Max. Horizontal Transportable Mass (Fig. A)	kg (lb.)	1 (2.2)	2 (4.4)	3 (6.6)		
Max. Vertical Transportable Mass (Fig. B)* <sup>1</sup>	kg (lb.)	1.5 (3.3)	5 (11)	15 (33)		
Maximum Speed* <sup>2</sup>	mm/s (in./s)	24 (0.94)	30 (1.18)	32 (1.26)		
Maximum Acceleration	m/s <sup>2</sup> (ft./s <sup>2</sup> )	0.2 (0.66)	0.4 (1.3)	0.26 (0.85)		
Maximum Thrust Force* <sup>3</sup>	N (lb.)	30 (6.7)	100 (22)	300 (67)		
Maximum Holding Force	At Excitation* <sup>4</sup>	N (lb.)	30 (6.7)	100 (22)		
	At Non-Excitation	N (lb.)	0	0	0	
	Electromagnetic Brake	N (lb.)	—	100 (22)	—	300 (67)
Maximum Load Moment	N·m (oz·in)	M <sub>r</sub> : 0 M <sub>v</sub> : 0 M <sub>r</sub> : 0	M <sub>r</sub> : 0.5 (71) M <sub>v</sub> : 0.25 (35) M <sub>r</sub> : 0.8 (113)	M <sub>r</sub> : 0.6 (85) M <sub>v</sub> : 0.35 (49) M <sub>r</sub> : 2.2 (310)		
Repetitive Positioning Accuracy	mm (in.)	±0.02 (0.00079)				
Lost Motion	mm (in.)	0.1 (0.0039)				
Resolution* <sup>5</sup>	mm (in.)	0.002 (0.000079)	0.004 (0.00016)	0.008 (0.00031)		
Lead	mm (in.)	1 (0.039)	2 (0.079)	4 (0.157)		
Stroke	mm (in.)	30 (1.18)	40 (1.57)	50 (1.97)		
Mass [Mass with adjusting knob]	kg (lb.)	0.25 (0.55) [0.26 (0.57)]	0.8 (1.76) [0.8 (1.76)]	1.0 (2.2)	1.8 (3.9) [1.85 (4.0)]	2.2 (4.8)

\*1 When the power is turned off, or output current is turned off (non-excitation state), the actuator loses its thrust force or holding force. As such, it can no longer keep the load in position or withstand an external force.

\*2 Use each actuator at or below the following maximum speed in a low-temperature environment [0~+10°C (+32~+50°F)].

**DRL28:** 15 mm/s (0.59 in./s), **DRL42:** 20 mm/s (0.79 in./s), **DRL60:** 24 mm/s (0.94 in./s)

\*3 The maximum thrust force is measured during constant-speed operation in horizontal operation with no load applied to the moving parts (screw shaft and joint). Thrust force varies with load mass and acceleration.

\*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (50% of the rated current).

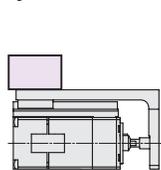
\*5 25 resolutions can be set.

**Note**

● Use the actuator in conditions where its surface temperature will not exceed 90°C (194°F). The repetitive positioning accuracy is measured at a constant temperature under a constant load.

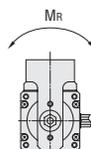
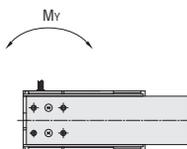
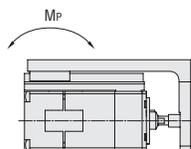
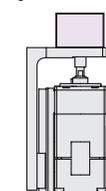
● Maximum Transportable Mass

Figure A

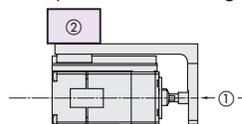


● Load Moment

Figure B



● Repetitive Positioning Accuracy



① Repetitive positioning accuracy is measured at the end of the guide.

② Repetitive positioning accuracy is measured on the linear-guide.

If footnote ① or ② is not indicated, then the accuracy values are identical.

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