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Linear & Rotary Actuators

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Overview of Linear & Rotary Actuators ····· F-2

Electric Linear Slides ····· F-11

EZS Series α_{STEP} AZ Equipped ····· F-12

Electric Cylinders ····· F-21

EAC Series α_{STEP} AZ Equipped ····· F-24

DRS2 Series α_{STEP} AZ Equipped ····· F-32

Hollow Rotary Actuators ····· F-41

DGII Series α_{STEP} AZ Equipped ····· F-42

Overview of Linear & Rotary Actuators

Motors offer excellent controllability and are therefore used as the drive source of various automated equipment. In many cases, a motor is combined with various mechanical components, such as a ball screw, belt-and-pulley, and rack-and-pinion, to convert the motor rotation to a different type of motion needed to drive the equipment. Oriental Motor has various linear & rotary actuators consisting of a motor assembled with the necessary mechanical components, to meet the various needs of automated devices.

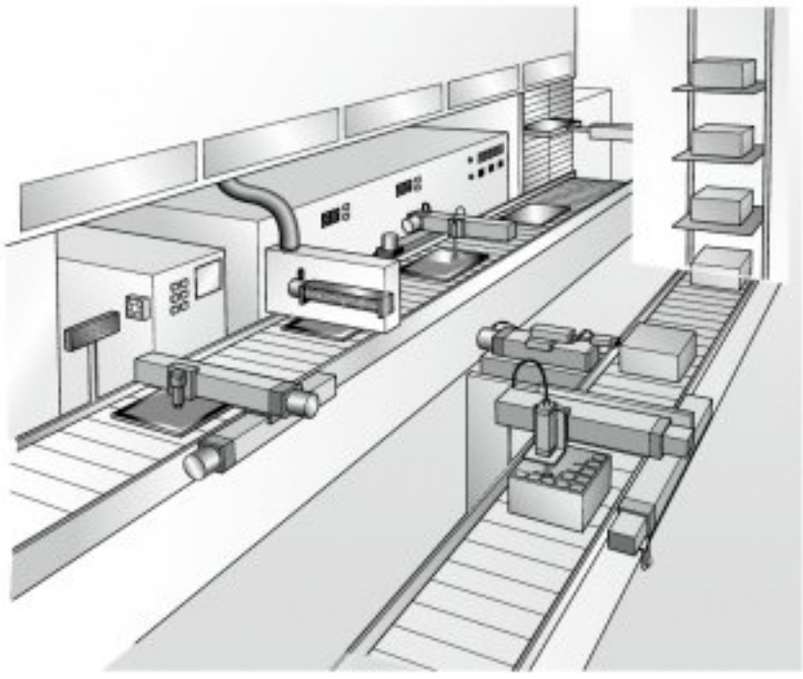
Features

Equipped with a motor that provides excellent controllability, the linear & rotary actuators offer the following advantages over hydraulic and pneumatic actuators.

- The actuator is very stable when operated, even at low speeds. It also offers smooth acceleration and deceleration operation.
- Operations can be programmed with multiple stopping points.
- With a linear & rotary actuator that uses a stepper motor and servo motor, position and speed regulation can be performed easily using data. Setup change is also simple, as all that needs to be done is changing the data.

Advantages of Using Linear & Rotary Actuators

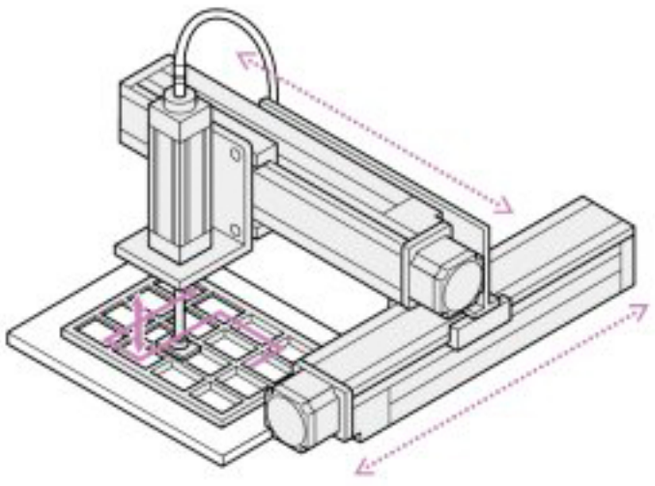
When automated equipment is designed, various factors must be taken into consideration including the production line layout, installation environment, ease of maintenance, configuration of electrical wiring and control system, and so on.
This means many man-hours are needed to select the motor and other mechanical components and to create a parts list, drawings, operating manuals, and so forth.
Oriental Motor offers various linear & rotary actuators to help improve the productivity of design work.
Use of linear & rotary actuators offers the benefits explained below.



Example of Production Line

◇Higher Design Efficiency

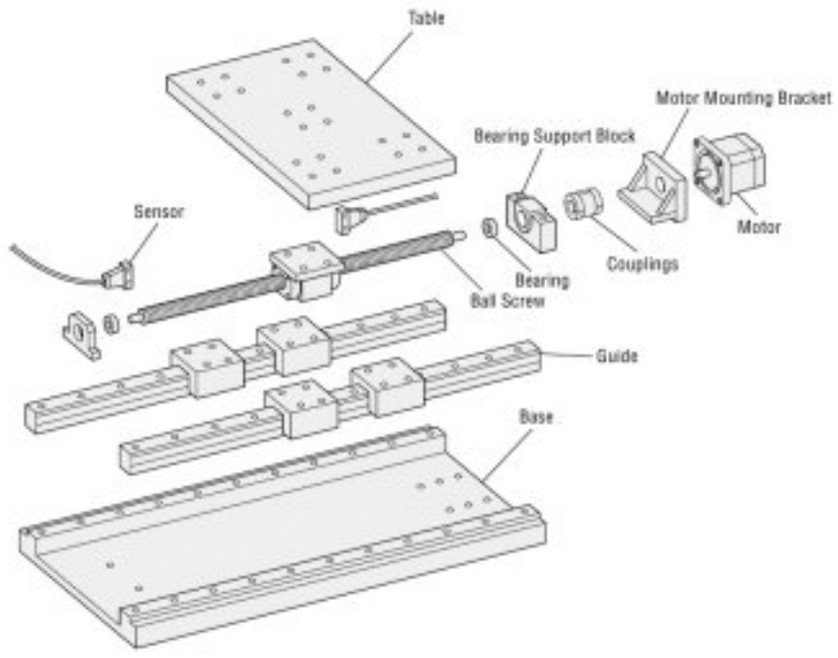
The primary feature of automated equipment is their ability to implement a series of basic operations such as "transfer", "push" and "rotate". In other words, automated equipment can be designed by selecting and combining linear & rotary actuators capable of performing these basic operations. The time and effort involved in designing automated equipment can be reduced.



Mechanism Example of Automated Equipment

◇Shorter Production Time and Higher Quality

When building equipment in-house by assembling a motor and mechanical components, the quality of assembly affects the traveling resistance and position accuracy. Therefore, adjustments will be needed. In comparison, Oriental Motor linear & rotary actuators are guaranteed to provide the specified operating performance. Using them reduces adjustment work and ensures uniform quality.



Example of Building Equipment In-House

Types of Linear & Rotary Actuators

Electric Linear Slides

The motor is combined with a linear motion mechanism. This is an ideal actuator for transferring loads.

Electric Cylinders

The motor is combined with a linear motion mechanism. This is an ideal actuator for pushing and pulling loads.

Compact Linear Actuators

This product features a stepper motor integrated with a ball screw. This is an ideal actuator for pushing and pulling small loads or fine-tuning applications.

Hollow Rotary Actuators

The motor is combined with a rotating table mechanism. This is an ideal actuator for index drive applications.

Types and Applications of Linear & Rotary Actuators

As components of automated equipment, linear & rotary actuators are used in many different ways. From the viewpoint of "motion," these uses are classified as follows.
A broad selection of linear & rotary actuators designed for different "motions" is available. Select the actuator that best suits the required specifications (transportable speed, transportable mass, resolution, accuracy), functions, system configurations and other applicable conditions.

Transport

Electric Linear Slides

EZS Series
Straight Type

EZS Series
Reversed Motor Type

Push

Electric Cylinders

EAC Series
Straight Type

EAC Series
Reversed Motor Type

EAC Series
Reversed Motor Type
with Shaft Guide Cover

Compact Linear Actuators

DRS2 Series
Type with a Guide

DRS2 Series
Type without a Guide

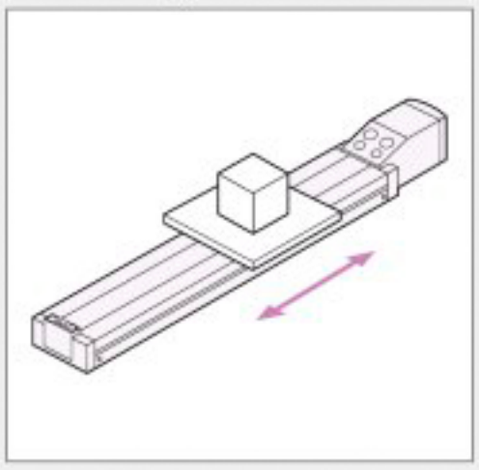
Rotate

Hollow Rotary Actuators

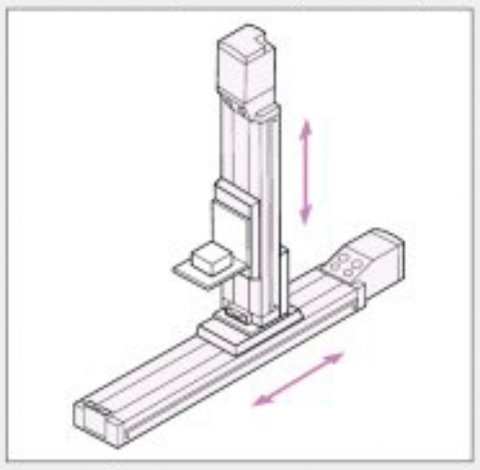
DGII Series
Single Shaft

DGII Series
with Electromagnetic Brake

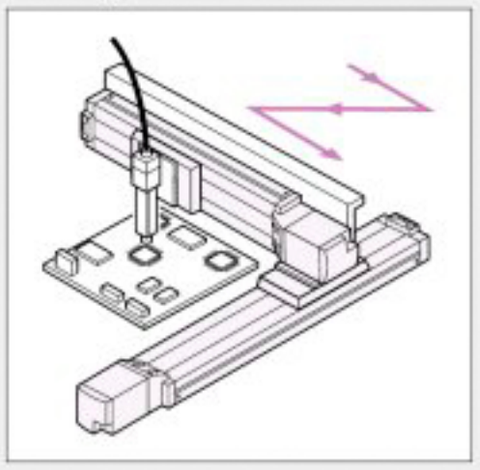
Transferring loads



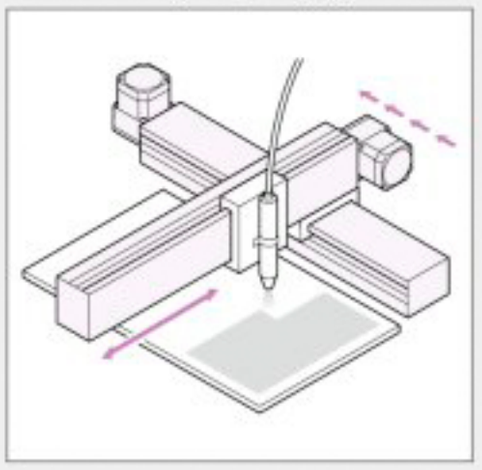
Transferring loads (vertical)



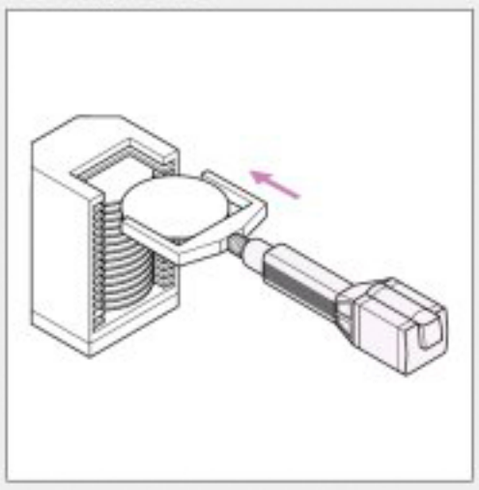
Moving a CCD camera



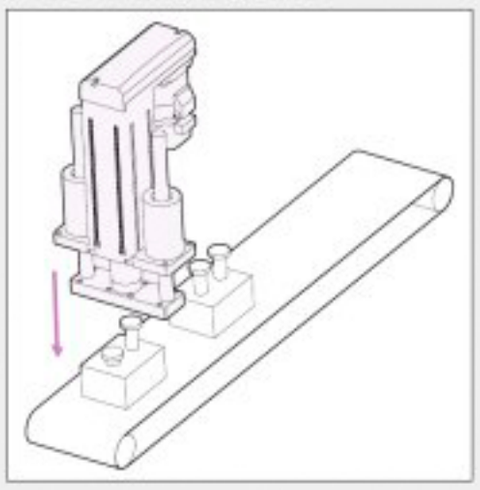
Transferring a spray gun



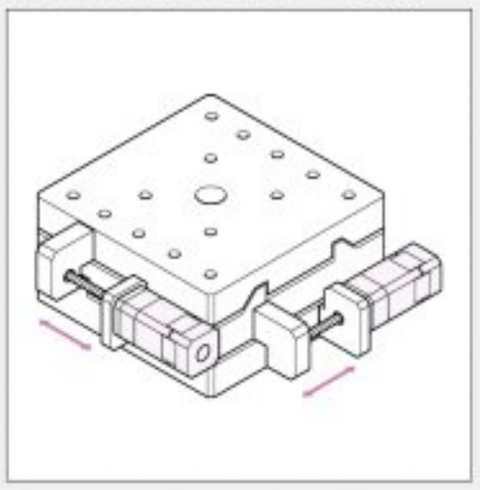
Storing loads



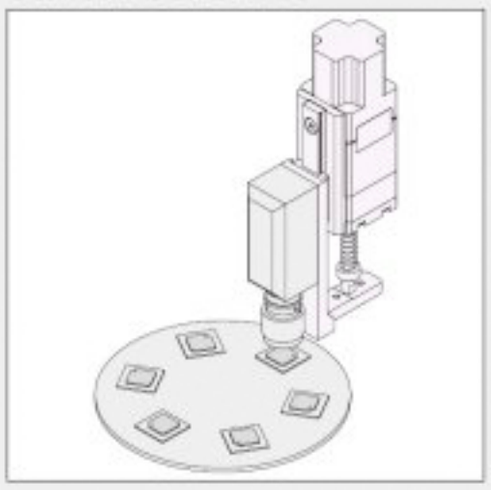
Press fitting of parts



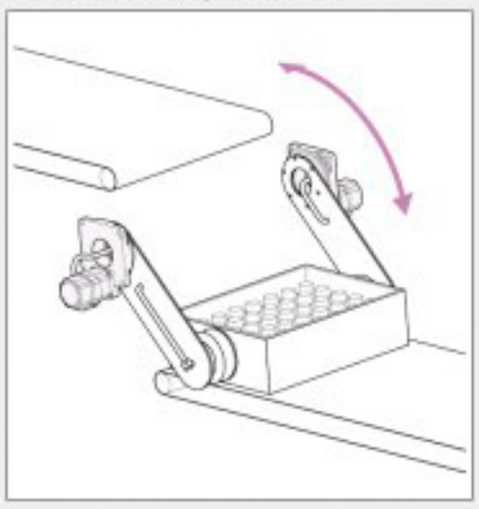
Driving mechanism for micrometer head X-Y stage



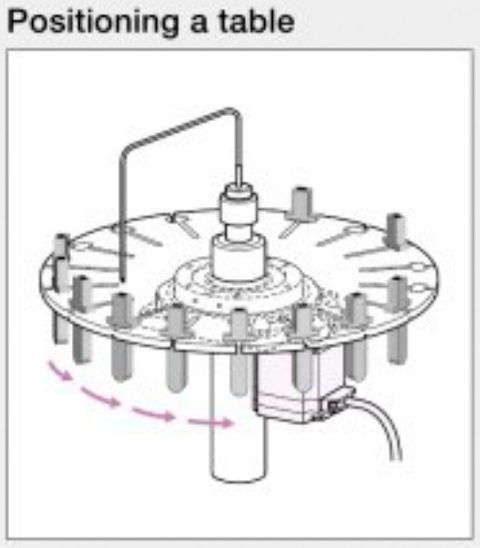
Camera focus drive



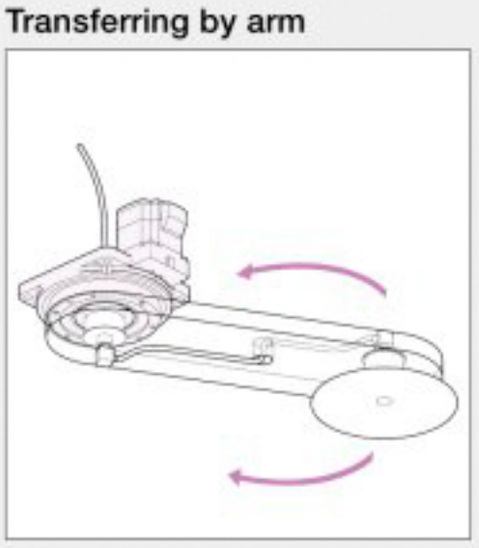
Packet transportation



Positioning a table

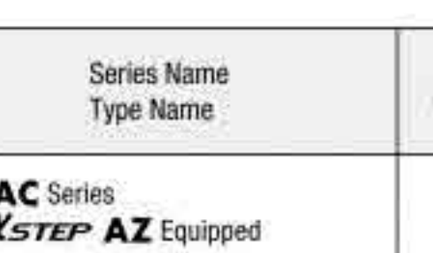


Transferring by arm



Adjusting an optical axis

Selection of Electric Linear Slides

Series Name Type Name	Product Width × Height	Power Supply Voltage	Lead Screw Pitch [mm]	Stroke [mm] 100 200 300 400 500 600 700 800 900	Maximum Speed [mm/s] 200 400 600 800
EZS Series **α_{STEP} AZ** Equipped Straight Type  Reversed Motor Type 	**EZS3** 54 × 50 mm	AC Input	12	50~700	800
			6	50~700	400
		DC Input	12	50~700	600
			6	50~700	300
	EZS4 74 × 50 mm	AC Input	12	50~700	800
			6	50~700	400
		DC Input	12	50~700	600
			6	50~700	300
	EZS6 74 × 66.5 mm	AC Input	12	50~850	800
			6	50~850	400
		DC Input	12	50~850	600
			6	50~850	300

Selection of Electric Cylinders

Series Name Type Name	Product Width × Height	Power Supply Voltage	Lead Screw Pitch [mm]	Stroke [mm] 100 200 300 400	Maximum Speed [mm/s] 100 200 300 400 500 600 700 800	Thrust Force [N]
EAC Series **α_{STEP} AZ** Equipped Straight Type  Reversed Motor Type 	**EAC4** 42 × 42 mm	AC Input	12	50~300	600	~70
			6	50~300	300	~140 (125) *
		DC Input	12	50~300	600	~70
			6	50~300	300	~140 (125) *
	EAC6 60 × 60 mm	AC Input	12	50~300	600	~200
			6	50~300	300	~400 (360) *
		DC Input	12	50~300	600	~200
			6	50~300	300	~400 (360) *
EAC Series **α_{STEP} AZ** Equipped Straight Type with Shaft Guide Cover  Reversed Motor Type with Shaft Guide Cover 	**EAC4W** 42 × 114 mm	AC Input	12	50~300	600	~70
			6	50~300	300	~140 (125) *
		DC Input	12	50~300	600	~70
			6	50~300	300	~140 (125) *
	EAC6W 60 × 156 mm	AC Input	12	50~300	600	~200
			6	50~300	300	~400 (360) *
		DC Input	12	50~300	600	~200
			6	50~300	300	~400 (360) *

*The parentheses ( ) indicate the value of the reversed motor type.

	Upper Level: Dynamic Permissible Moment [N·m] Lower Level: Static Permissible Moment [N·m]			Horizontal Transportable Mass [kg]	Vertical Transportable Mass [kg]	Repetitive Positioning Accuracy [mm]	Reference Page
	M_P	M_Y	M_R	10 20 30 40 50 60 70 80	10 20 30		
	4.2 26.4	4.2 26.4	10.5 52.0	7.5 15	3.5 7	±0.02	F-12
	4.2 26.4	4.2 26.4	10.5 52.0	7.5 15	3.5 7		
	8 51.2	8 42.5	27.8 176	15 30	7 14(12.5)*		
	8 51.2	8 42.5	27.8 176	15 30	7 14(12.5)*		
	45.7 290	37.5 187	55.6 340	30 60	15 30		
	45.7 290	37.5 187	55.6 340	30 60	15 30		

	Push Force [N]	Horizontal Transportable Mass [kg]	Vertical Transportable Mass [kg]	Repetitive Positioning Accuracy [mm]	Reference Page
		10 20 30 40 50 60 ≒ 200 400	10 20 30		
	100	15	7	±0.02	F-24
	200	30	14(12.5)*		
	100	15	7		
	200	30	14(12.5)*		
	400	30	15		
	500	60	30		
	400	30	15		
	500	60	30		
	100	15	6		
	200	30	13(11.5)*		
	100	15	6		
	200	30	13(11.5)*		
	400	30	13		
	500	60	28		
	400	30	13		
	500	60	28		

Selection of Compact Linear Actuators

DRS2 Series α_{STEP} AZ Equipped

●Type with a Guide

DRSM42

Product	Frame Size [mm]	Ball Screw Type	Accuracy		Lead Screw Pitch [mm]	Stroke [mm]	Speed [mm/s]	Thrust Force [N]	Transportable Mass [kg]		Dynamic Permissible Moment [N·m]			Reference Page
			Repetitive Positioning Accuracy [mm]	Lost Motion [mm]			10 20 30 40 50	50 100 150 200	Horizontal	Vertical	M_P	M_Y	M_R	
DRSM42	42	Rolled	0.01[0.02]*	0.05	2	40	50	200	10	10	1.3	1	2.5	F-32
					8		200	50	5	5				
		Ground	0.003[0.005]*	0.02	2		50	200	10	10				

*Specifications will vary according to conditions. For details, check the specifications for each product.

●Type without a Guide

DRSM42

DRSM60

Product	Frame Size [mm]	Ball Screw Type	Accuracy		Lead Screw Pitch [mm]	Stroke [mm]	Speed [mm/s]	Thrust Force [N]	Transportable Mass [kg]		Reference Page
			Repetitive Positioning Accuracy [mm]	Lost Motion [mm]			10 20 30 40 50	50 100 150 200	Horizontal	Vertical	
DRSM42	42	Rolled	0.01	0.05	2	40	50	200	40	20	F-32
			0.01		8		200	50	10	5	
		Ground	0.003	0.02	2		50	200	40	20	
DRSM60	60	Rolled	0.01	0.05	4	50	50	500	50	50	

Selection of Hollow Rotary Actuators

DGII Series α_{STEP} AZ Equipped

Reference Page ▶ F-42

Product Frame Size	Power Supply Voltage	Electro-magnetic Brake	Diameter of Hollow Section [mm (in.)]	Permissible Torque [N·m (lb-in)]	Permissible Moment [N·m (lb-in)] 20 40 60 80	Permissible Axial Load [N (lb.)] 500 1000 2000 4000	Lost Motion [arcmin]	Backlash [arcmin]	Angular Transmission Accuracy [arcmin]	Repetitive Positioning Accuracy [arcsec]
DGM85R 85 mm (3.35 in.) 	AC Input DC Input	Not equipped	ϕ33 (ϕ1.3)	4.5 (39)	10 (88)	500 (112)	2 (0.033°)		4 (0.067°)	±15 (±0.004°)
		Equipped								
DGM130R 130 mm (5.12 in.) 	AC Input DC Input	Not equipped	ϕ62 (ϕ2.44)	12 (106)	50 (440)	2000 (450)	2 (0.033°)	Non-Backlash	3 (0.05°)	±15 (±0.004°)
		Equipped								
DGM200R 200 mm (7.87 in.) 	AC Input	Not equipped	ϕ100 (ϕ3.94)	50 (440)	100 (880)	4000 (900)	2 (0.033°)		2 (0.033°)	±15 (±0.004°)
		Equipped								