

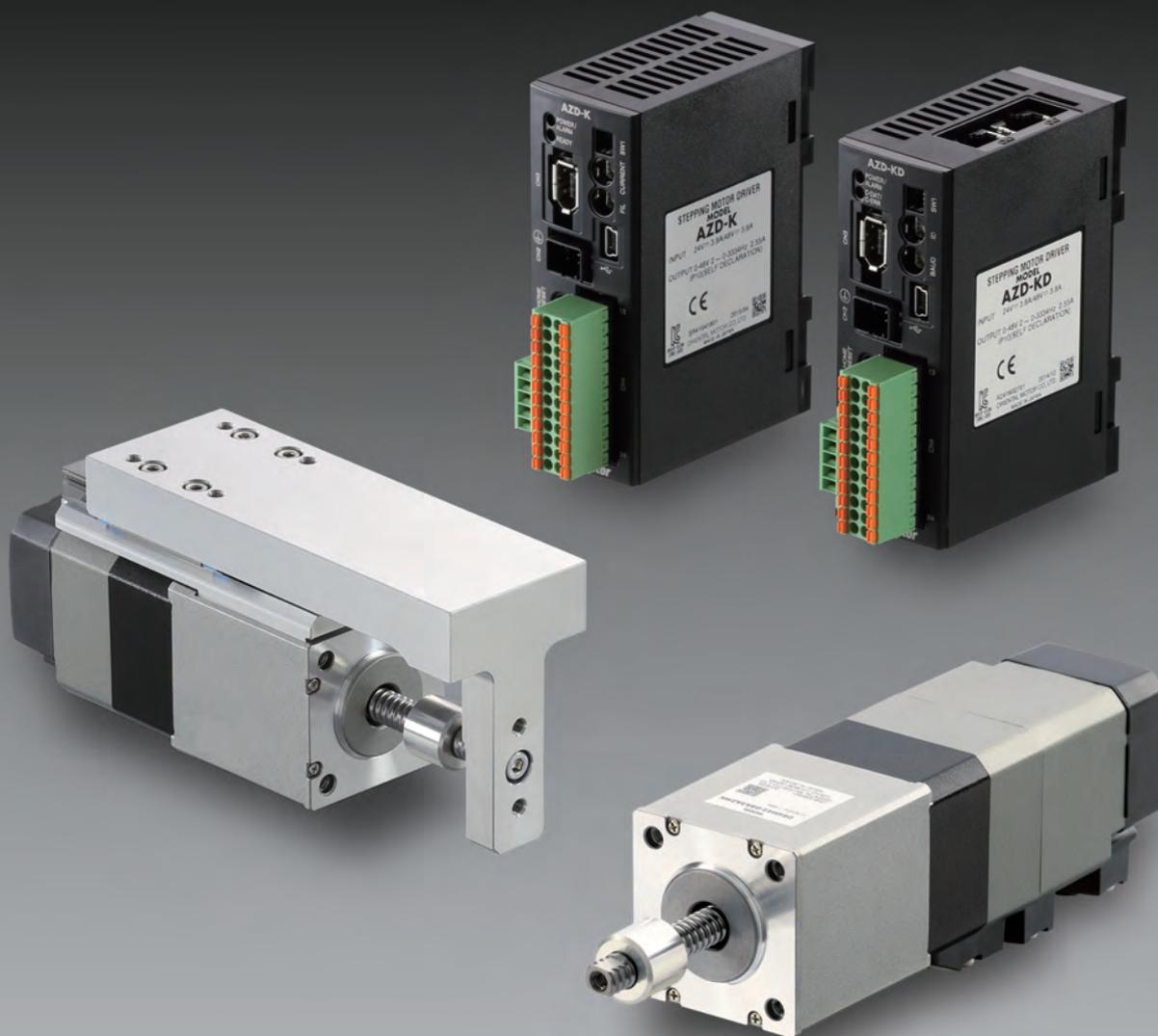
Orientalmotor

Hybrid Control System α STEP Equipped

Compact Linear Actuator

DRS2 Series

Battery-less Absolute Sensor Equipped.
Delivers Advanced High Precision Positioning More Compactly.



α STEP

Hybrid Control System α STEP

Delivers Advanced Highly-Accurate Positioning More Compactly.

Integration of the stepping motor and the ball screw enables linear motion. Delivers high precision positioning in a compact body and space-/wire-saving.

The **DRS2** Series is equipped with the hybrid control system **αSTEP** Series. The linear motion mechanism delivers motion unique to the **AZ** Series equipped with the hybrid control system **αSTEP** and the battery-less absolute sensor.

Best for Inching Feed and High Precision Positioning

Integral Structure of the Stepping Motor and the Ball Screw

The hollow rotor and the ball screw nut are integrated. Lack of connected parts reduces backlash caused by parts combination including coupling rigidity and delivers high precision positioning.

Two Types of Driving Screws available – Ground and Rolled Ball Screws

[Minimum traveling amount]

0.001 mm

[Repetitive positioning accuracy]

Ground ball screw: ± 0.003 mm Rolled ball screw: ± 0.01 mm

Delivers Large Transportable Mass and High Speed

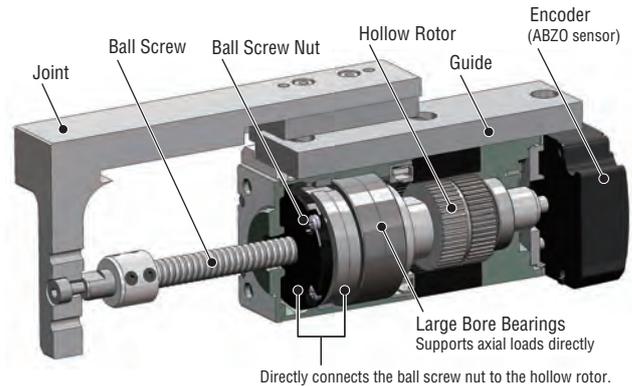
Guided type

[Transportable mass]

- Horizontal direction: **10** kg (2 mm lead), **5** kg (8 mm lead),
- Vertical direction: **10** kg (2 mm lead), **5** kg (8 mm lead),

[Maximum speed]

50 mm/sec (2 mm lead), **200** mm/sec (8 mm lead)



What is the ABZO Sensor?

It is a battery-less, mechanical driven, multi-rotation absolute sensor. It delivers benefits such as not only providing a compact, low-cost absolute system but also contributing to space-/wire-saving of equipment by not needing a home sensor.

Reduced Startup Time

Linear Motion Mechanism Equipped in a Compact Body

- Removing custom parts reduces time to design equipment and select parts.
- Reducing time for assembling and adjustments for installation accuracy increases production efficiency.

Parameters Set for Operation

[Minimum traveling amount]

Built-in controller type : 0.001 mm

Pulse input type : 0.001 mm

Specifiable by mm

You can specify the traveling amount in millimeters.

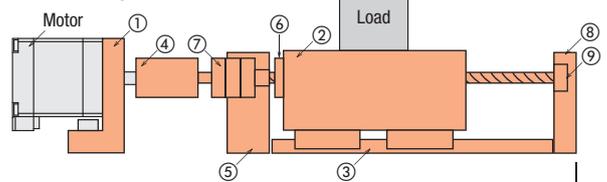


Comparison of Number of Components

Examples of configurations for load travel with the same stroke

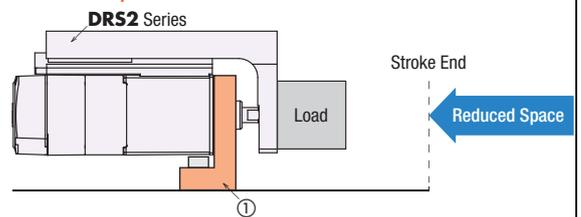
◇ Custom

Number of components: 9



◇ DRS2 Series with a Guide

Number of components: 1

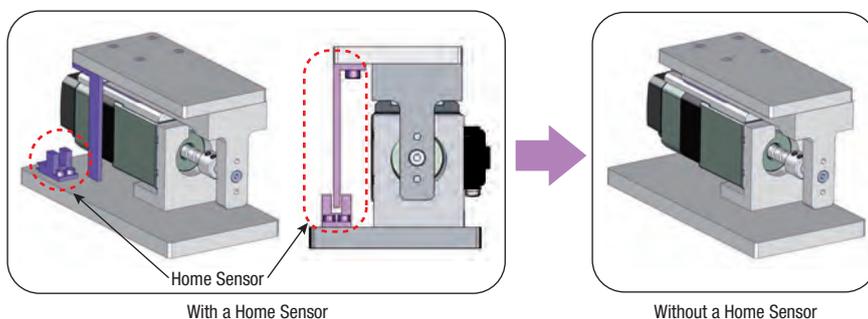


[Parts used] ①Mounting plate ②Transportation table ③Linear guide ④Coupling ⑤Fixed side block ⑥Ball screw ⑦Fixed side bearing ⑧Supported side block ⑨Supported side bearing

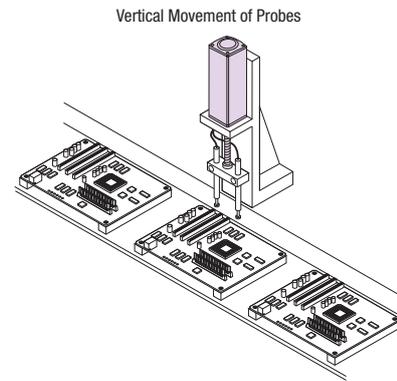
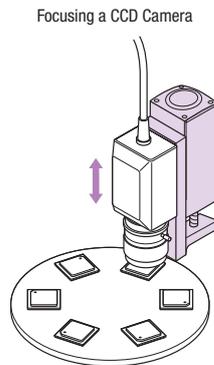
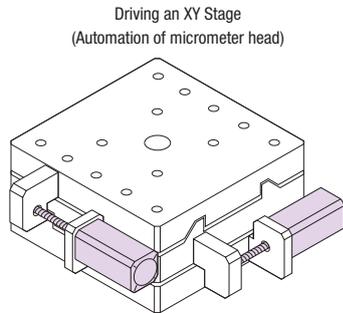
Space-/Wire-Saving Achieved with the ABZO Sensor

The compact body allows downsized lightweight equipment. The equipment will also not require a home sensor with the equipped ABZO sensor. It contributes to saving further space and reducing wiring of the equipment, and avoids regular maintenance and issues that arise when using a home sensor.

Application Example



Typical Applications



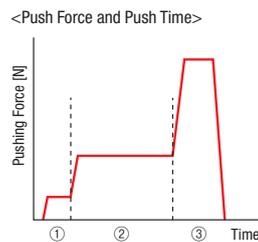
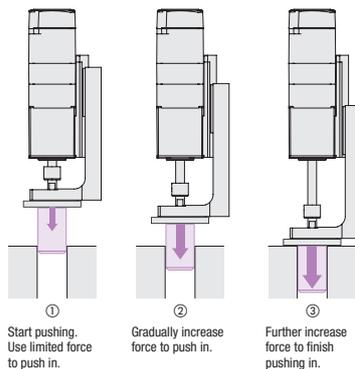
Enhanced Pushing Features

You can easily change the Push Force and Time.

The **DRS2** Series simply switches to pushing after completing positioning. In addition, you can easily change the push force and time.

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- You can set the push force and time for each operation data No., allowing you to select data No. to change them easily.
- You can set a slow push-in stage for accurate positioning using a reduced force and a quick push-in stage using increased force.



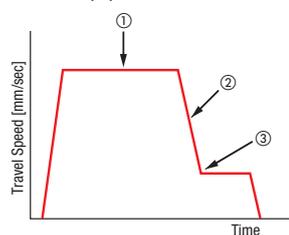
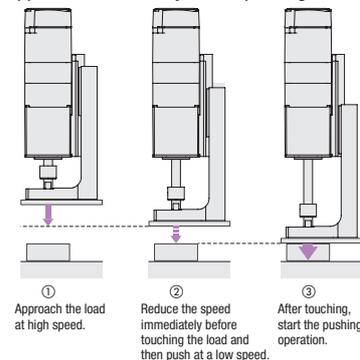
- Start pushing. Use limited force to push in.
- Gradually increase force to push in.
- Further increase force to finish pushing in.

Low Speed Pushing Possible

You can set to approach the load at high speed and then reduce the speed immediately before touching it and push at a lower speed.

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- Since almost no impact occurs when pushing, no cushioning mechanism is required to absorb the impact.
- High-speed approach immediately before pushing reduces the tact time of the equipment.



- Approach the load at high speed.
- Reduce the speed immediately before touching the load and then push at a low speed.
- After touching, start the pushing operation.

Pushing also Possible with Pulse Input Type

Setting the T-MODE input allows pushing even with pulse input type without overload alarms.

This is very useful for pulse train controls requiring pushing.

Drivers and cables that are used with actuators are common to the **AZ** Series.

For details, see the catalogs of the **AZ** Series or our website.

- Driver Specifications
- RS-485 Communication Specifications
- Dimensions (Drivers, Connection Cables)
- Cautions for Using Connection Cables
- Connection and Operation
- Accessories (Extension Cables)



Equipped with the ABZO Sensor.

The absolute system is achieved with battery-less.

Uses Newly Developed ABZO Sensor

Oriental Motor has developed a compact, low-cost, battery-less mechanical driven type absolute sensor <ABZO sensor> (Patented), improving productivity and reducing costs.

● Mechanical Driven Sensor

A mechanical driven sensor consisting of multiple gears recognizes the angle of each gear to detect positional information.

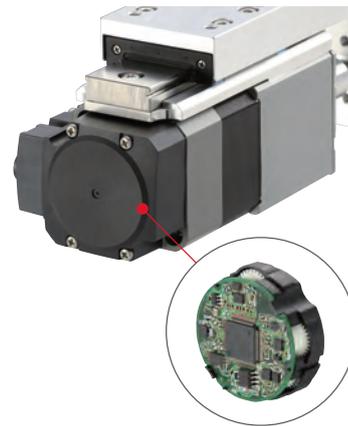
● Multi-rotation Absolute Sensor

From the reference point of the origin, absolute position for ± 900 rotations (for 1800 rotations) of the motor shaft can be detected.

● How to Set a Home Position

A home position can be easily set by pressing the switch on the driver, and the ABZO sensor saves it.

You can also use the support software (**MEXE02**) or external input signals to set a home position.



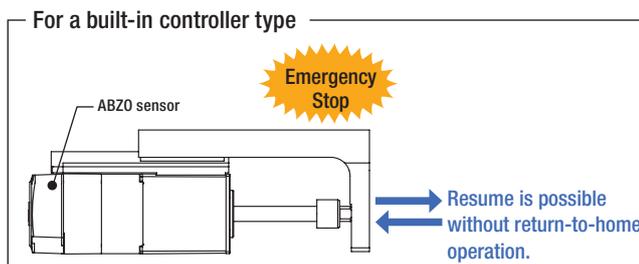
Battery-less Absolute Sensor (Equipped with ABZO sensor)

Battery-less

With a mechanical sensor, no battery is required. The positional information is mechanically managed by the ABZO sensor.

● Keeping Positional Information

Positional information is kept even if power is shut down during positioning operation or the cable between the motor and the driver is removed. When a built-in controller type recovers from an emergency stop of the production line or from a power failure, it can resume positioning operation without returning to the home position.



● Less Maintenance Work

Do not require of battery replacement, able to reduce the maintenance work and costs.

● Desired Installation of the Driver

There is no need of space for battery replacement, thus the driver can be installed in any location, and more flexible in layout design for the control panel or other devices.

● Overseas Transportation Trouble-free

Care must be taken regarding battery discharge when transported over a long period of time for international or long-distance shipment. The ABZO sensor does not require a battery, and there is no time limit for retaining the positioning information. In addition, there is no need to consider the regulations applied to battery export.

No External Sensor Required

This series can configure the absolute system, which does not require external sensors such as a home sensor and a limit sensor.

● High-speed Return-To-Home

The return to home without using an external sensor is possible, enabling the return-to-home position at a high speed regardless of the sensor sensitivity. This leads to reduction in the machine cycle time.

● Cost Reduction

The sensor cost and the wiring cost can be reduced, lowering the total cost of the system.

● Wire-saving

Wire saving allows the equipment to be designed more flexibly.

● The Equipment is not affected by a malfunction of an External Sensor

There is no need to worry about the malfunction of the sensor, the failure of the sensor, or sensor wire disconnection.

● Accuracy Improvement in Return-To-Home

Returning to the home position is possible regardless of variation in the sensing of the home sensor, improving the accuracy of the home position.

● If there is no limit sensor attached, you can use the software limit of the driver to prevent the threshold from being exceeded.

Product Variation with Unified Control Method

Mechanical products equipped with the α STEP AZ Series are available. With the same motor and the driver equipped in each of them, common wirings, controls, and maintenance parts can be used, reducing startup time and effort.



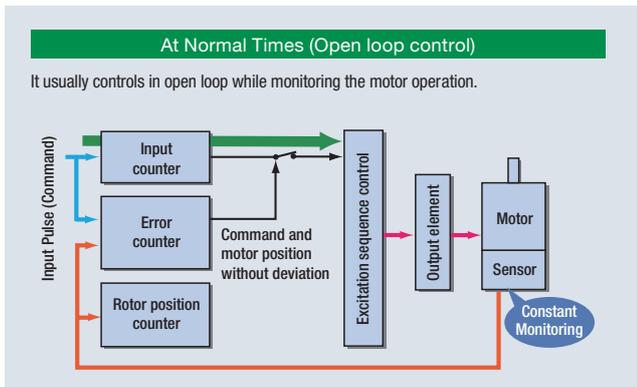
Advantages of Common Unit Use

- Integration of Wiring**
 The same pin assignment is used for I/O, saving effort for electrical design and wiring.
- Integration of Controls**
 With the same control method, units can be operated in the same manner. Additionally, remote I/Os and command codes are the same for network controls, reducing effort for program coding.
- Integration of Maintenance Parts**
 Using common motors, drivers, cables, and other parts reduces maintenance parts to the minimum. This leads to reduction in management cost (parts cost, management space).

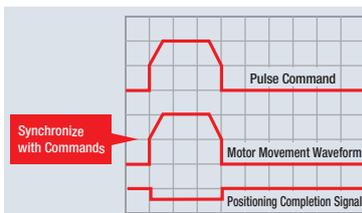
Features of the Hybrid Control System α STEP

The α STEP is a motor based on a stepping motor providing unique controls using advantages of both the "Open loop control" and the "Closed loop control". According to the situation, it automatically switches between the two controls while always monitoring the motor position.

It usually uses Open Loop Control with usability like a Stepping Motor



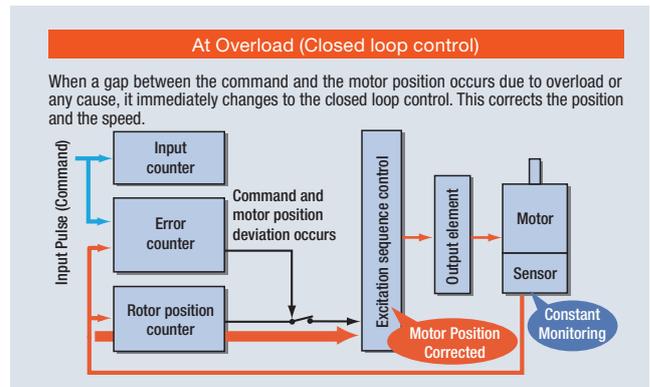
◇ **High Response**
 Utilizing the high response of the stepping motor, the unit can move the device in a short distance for a short time. The unit can move the device by following the command and without delay.



◇ **The Stop Position is Retained without Hunting**
 During positioning, stoppage is done by the retaining force of the motor, without hunting. Therefore, the unit is most suitable for the applications in which a low-rigidity positioning mechanism is used and for which vibration should not occur during stoppage.

◇ **No Tuning is Required**
 Under normal conditions, this unit operates by open loop control. This enables positioning without gain adjustment even when there is a change in the load in the belt mechanism, cum or chain drive, or other mechanical drives.

More Secure Operation by Closed Loop Control at Overload



◇ **Operation Continues Even at Sudden Load Change or Sudden Acceleration**
 At normal times, this compact unit synchronizes with commands and operates with open loop control. When overloaded, the current control immediately changes to the closed loop control and corrects the position.

◇ **Alarm Signal Output in Case of Abnormality**
 If continuously overloaded, an alarm signal is output. An END signal is output when positioning is finished. With these features, it provides reliability equal to that of a servo motor.

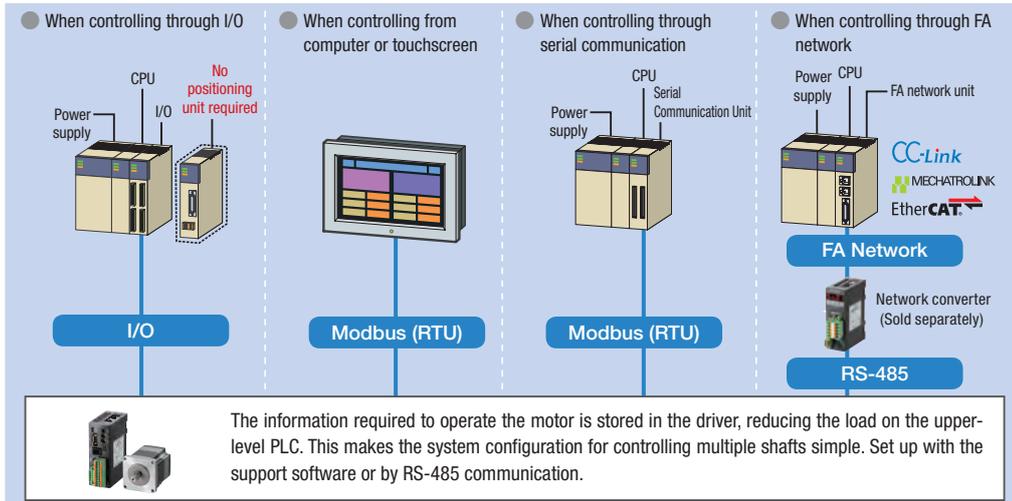
● **Smooth Movement Even at a Low Speed**
 The micro-step drive and smooth driving functions* that are equipped with as standard functions suppress vibration at a low speed and allow smooth movement.
 *These functions do not require any change of the pulse input setting but allow the micro-step drive the travel distance and speed of which are the same as those of full-step drive.

Drivers Selectable According to the Host System

A compatible driver can be selected for the **DRS2** Series according to your host system.

Built-in Controller Type **FLEX**

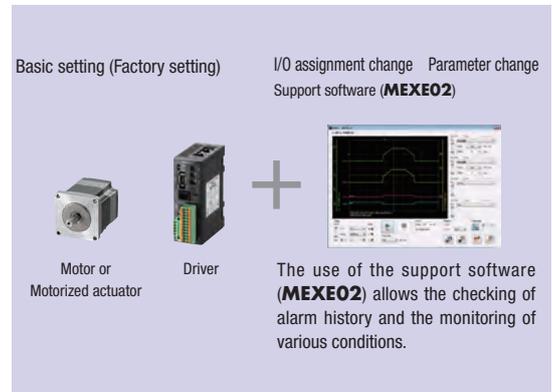
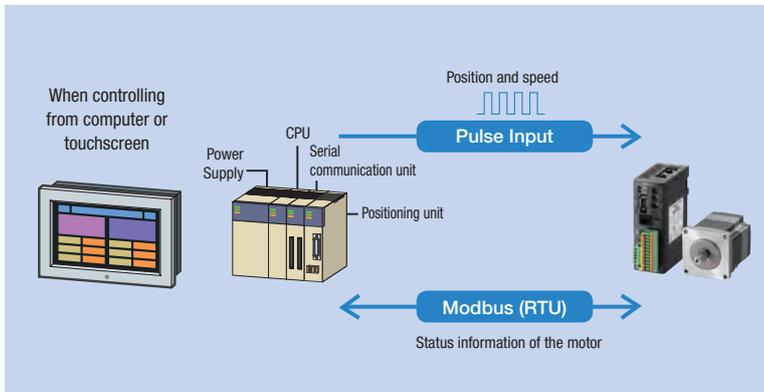
Set the operating data in the driver, and the operating data is selected and executed from the host system. Host system connection and control is performed through I/O, Modbus (RTU), RS-485 communication, or FA network. The use of a network converter (sold separately) allows control via CC-Link communication, MECHATROLINK communication, or EtherCAT communication.



FLEX FLEX is a general term of the products that support I/O control, Modbus (RTU) control, and FA network control via a network converter.

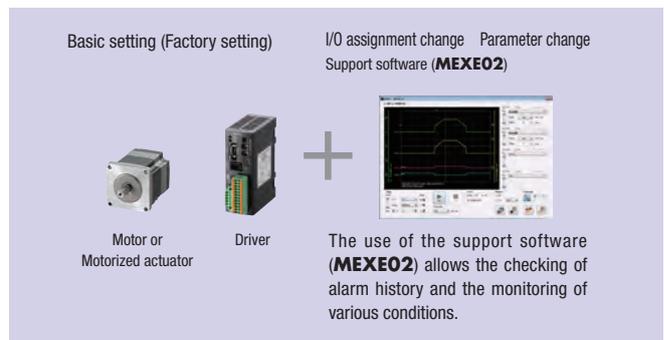
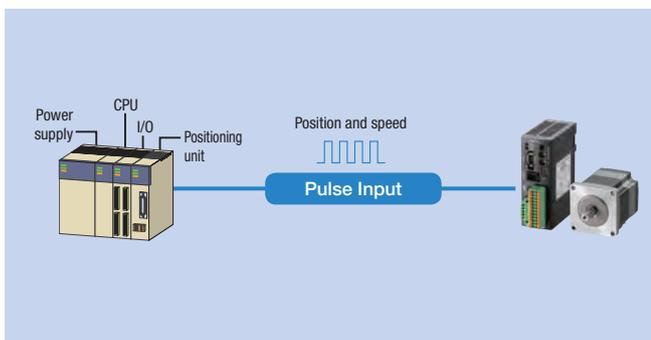
Pulse Input Type with RS-485 Communication

This type executes operation by inputting pulses to the driver. The motor is controlled from the positioning unit (pulse oscillator) provided by the customer. The use of RS-485 communication allows the monitoring of status information (position, speed, torque, alarms, temperature, etc.) of the motor.



Pulse Input Type

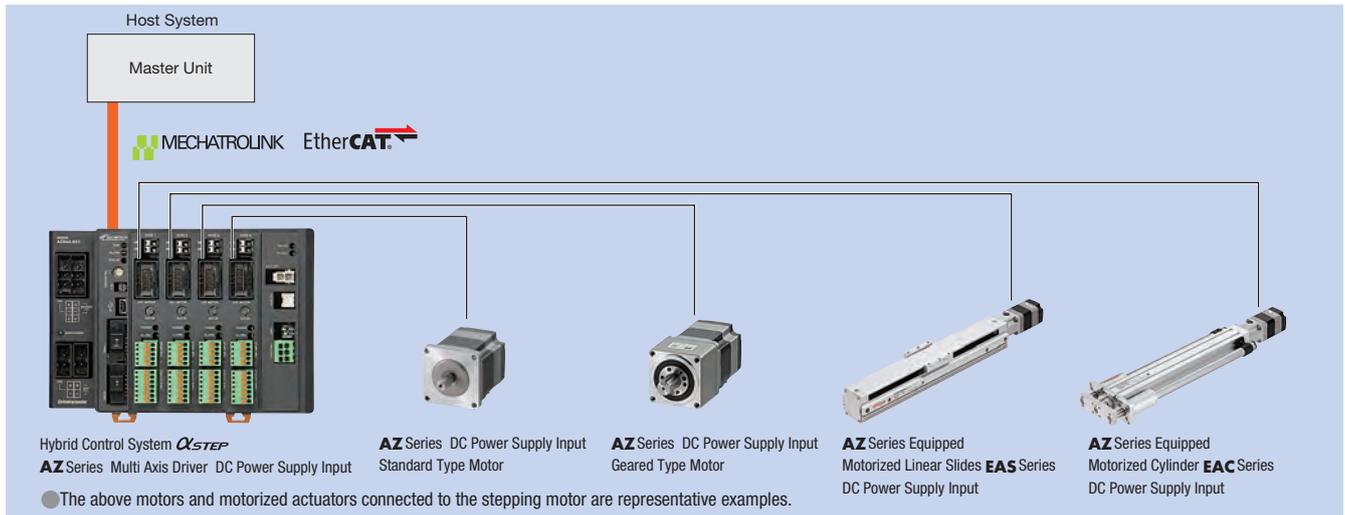
This type executes operation by inputting pulses to the driver. The motor is controlled from the positioning unit (pulse oscillator) provided by the customer. The use of the support software (**MEXE02**) allows the checking of alarm history and the monitoring of various conditions.



- **CC-Link** and **MECHATROLINK** are the registered trademarks of the CC-Link Partner Association and the MECHATROLINK Members Association, respectively.
- **EtherCAT** is the registered trademark licensed by Beckhoff Automation in Germany.
- The support software (**MEXE02**) can be downloaded from the Oriental Motor website. The media is also available (for free).

● **Network-compatible Multi Axis Driver* (DC power supply input only)**

Multi axis driver that supports MECHATROLINK-III and EtherCAT Drive Prole. The driver can be connected to a DC power supply motor of the **AZ** Series and to an actuator equipped with motor. 2-axis, 3-axis, and 4-axis connectable drivers are available.



*For details of the products, see the Oriental Motor website.

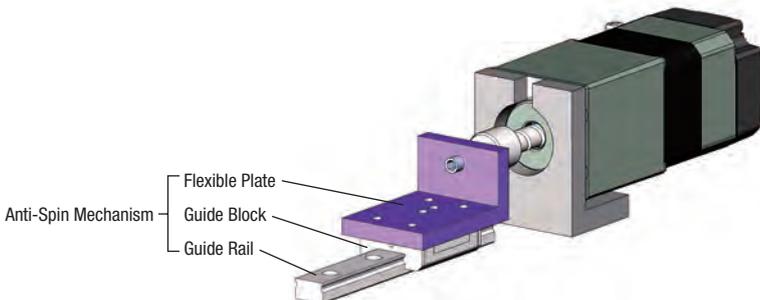
Lineup

Compact linear actuators, drivers and connection cables must be provided separately for the **DRS2** Series. They are provided in combination.

Compact Linear Actuator						Driver* (24 VDC/48 VDC)	Connection Cable Set			
Shape	Frame Size	Stroke	Ball Screw Type	Lead [mm]	Cable Orientation					
● Without Electromagnetic Brake ● With Electromagnetic Brake 	42 mm	40 mm	Rolled	2	Right/Left	● Built-in Controller Type 	● Without Electromagnetic Brake For Motor For Encoder			
				8						
● Without Electromagnetic Brake ● With Electromagnetic Brake 			60 mm	50 mm		Ground		2	● Pulse Input Type with RS-485 Communication 	● With Electromagnetic Brake For Motor For Encoder
								8		
● Without Electromagnetic Brake ● With Electromagnetic Brake 	60 mm	50 mm	Rolled	2	● Pulse Input Type 	For Electromagnetic Brake 				
				4						

*Multi-axis drivers which can control multi-axis drivers are available. For details, see page 28.

● Products without a guide require an anti-spin mechanism for the screw mechanism.



Drive Easily with Support Software MEXE02

By using the support software, data settings, actual operation, and checks by the various monitor functions are also easily performed on the computer.

Support Software MEXE02

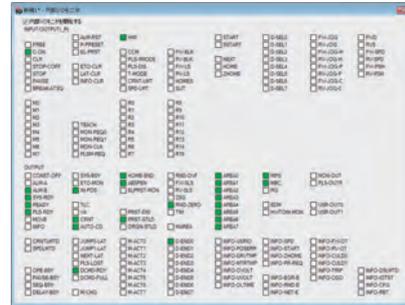
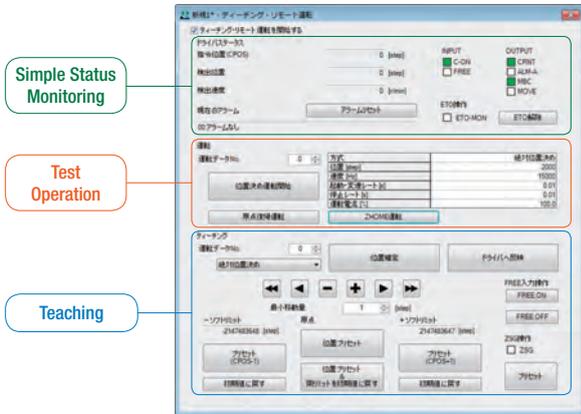
The support software can be downloaded from the Oriental Motor website. The media is also available (for free).

Teaching/Remote Operation

From the support software, you can easily set a home position or drive the motor. You can use this function for teaching or trial operation before connecting to the host system.

I/O Monitoring

You can monitor input signals, and output forcibly output signals. Use function for wire connection with the host system or check network I/O operations.



Various Monitor Functions

Waveform Monitoring

Similar to using an oscilloscope, the motor drive condition and output signal status can be checked. Use this during the startup of the device and when adjusting.



Alarm Monitor

If an error occurs, you can check the error details, operation condition at the time of error occurrence, and measures to be taken.



Status Monitoring

In addition to the speed, motor, temperature of the driver, and load factor, you can monitor other items including rotation amount accumulated from the start of use. Signals can be output for each item as needed, achieving efficient maintenance.



- ① The actual position is detected for the command position.
- ② The actual speed is detected for the command speed.
- ③ The temperatures of the encoder of the motor and the inside of the driver are detected.
- ④ This shows the current load factor to the output torque at the speed during rotation as 100%.

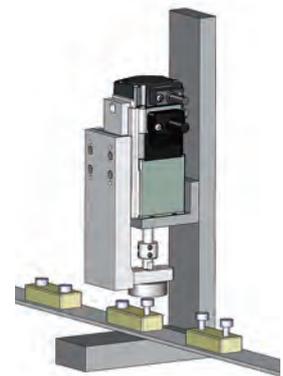
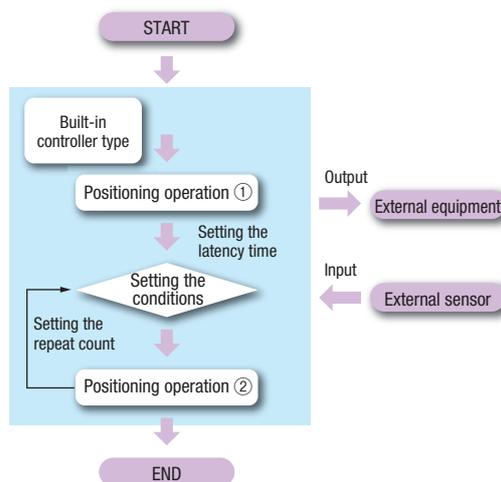
Supporting multi-monitoring, the software allows you to perform remote operation or teaching while monitoring the operational status.

Sequence Function Simplifies Main Program

The built-in controller type of the AZ Series provides a rich variety of sequence functions including timer setting for link operations or intervals between operations, conditional branching, and number of loops. This helps to simplify sequence programs in the host system.

For a Built-in Controller Type

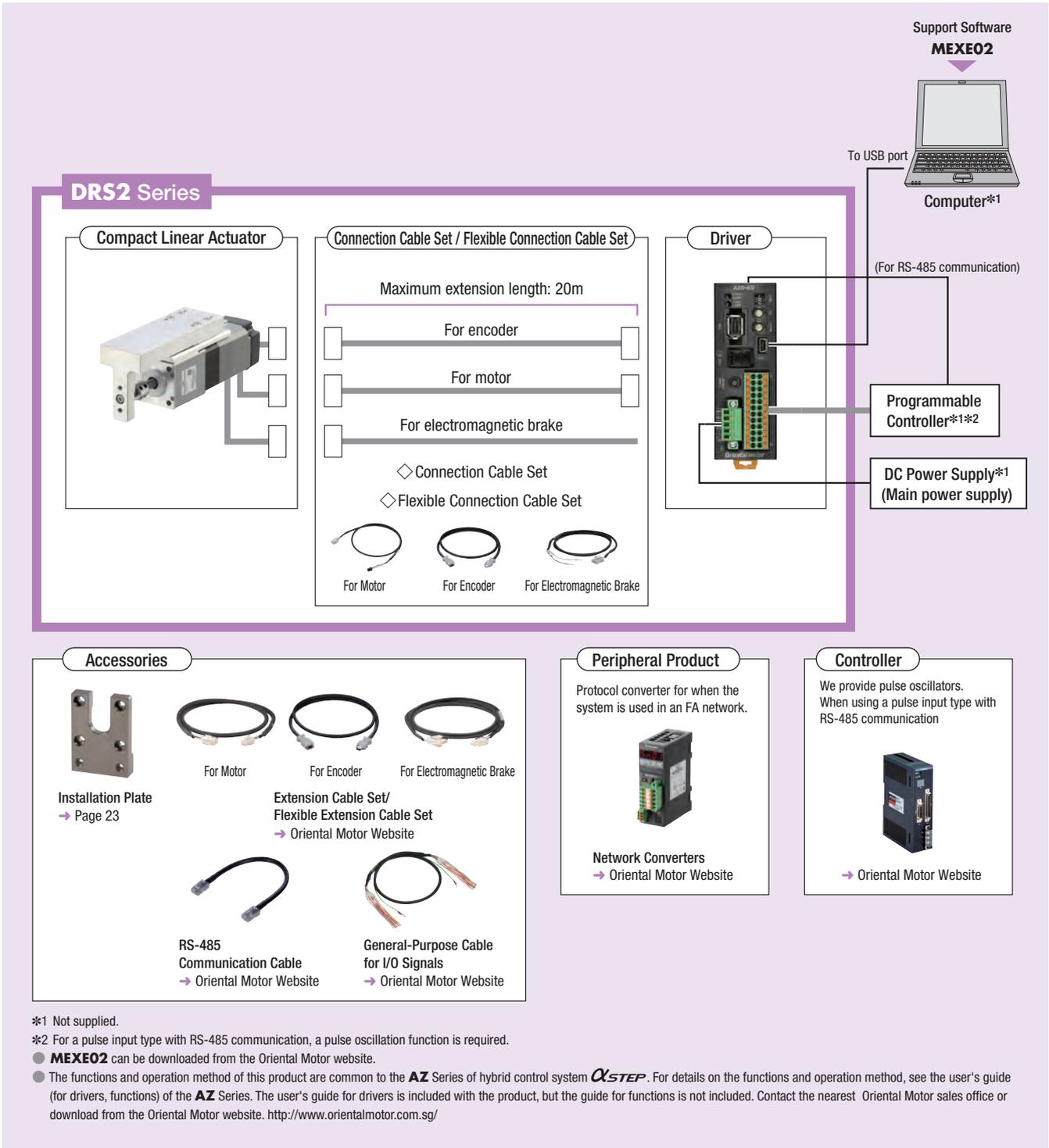
- No. of positioning operation data items that can be set (up to 256 points)
- No. of general-purpose I/O points (10 points for input and 6 points for output)
- No. of communication I/O points (16 points for input and 16 points for output)



System Configuration

When using a motorized actuator with electromagnetic brake and a built-in controller type driver or a pulse input type driver with RS-485 communication feature

The figure below shows a sample configuration which includes a built-in controller type driver and which uses I/O control or RS-485 communication. The actuator, driver, and connection cable set/flexible connection cable set need to be separately provided.



System Configuration Example

DRS2 Series			Accessories	
Compact Linear Actuator	Driver	Connection Cable Set	Installation Plate	General-Purpose Cable for I/O Signals (1 m)
DRSM42RG-04A2AZMK	AZD-KD	CC030VZFB2	PADRL-42	CC16D010B-1

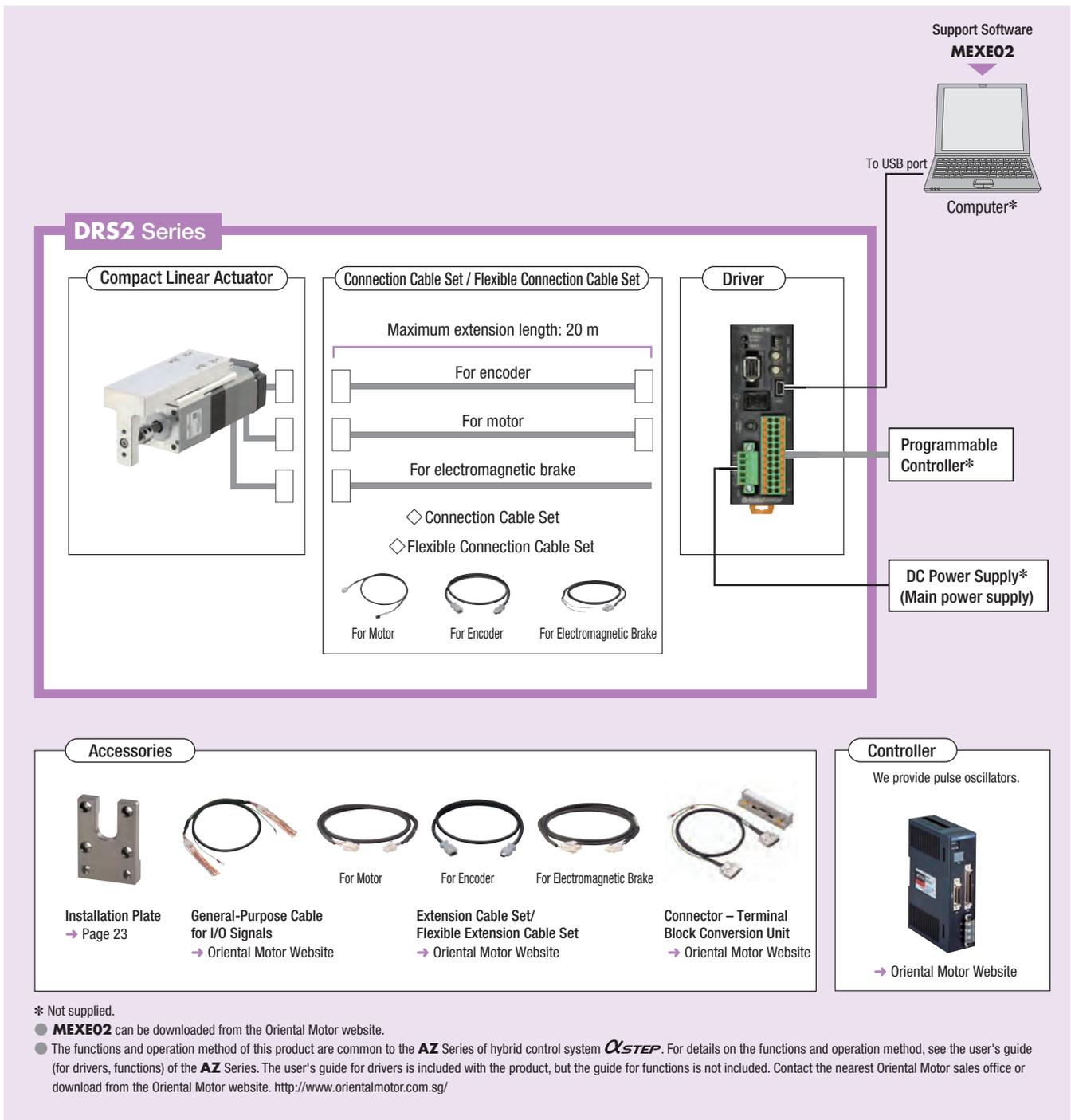
The system configuration shown above is an example. Other combinations are available.

Note

The motor cable and electromagnetic brake cable from the motor cannot be directly connected to a driver. To connect the motor to the driver, use a connection cable.

● When using a motorized actuator with electromagnetic brake and a pulse input type driver

The figure below shows a sample configuration of a single axis system which uses a programmable controller (equipped with a pulse oscillator). The actuator, driver, and connection cable set/flexible connection cable set need to be separately provided.



● System Configuration Example

DRS2 Series			+	Controller	Accessories		
Compact Linear Actuator	Driver	Connection Cable Set			Installation Plate	General-Purpose Cable for I/O Signals (1 m)	Connector – Terminal Block Conversion Unit (1 m)
DRSM42RG-04A2AZMK	AZD-K	CC030VZFB2		EMP401-1	PADRL-42	CC16D010B-1	CC50T10E

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

Note

● The motor cable and electromagnetic brake cable from the motor cannot be directly connected to a driver. To connect the motor to the driver, use a connection cable.

Product Number Code

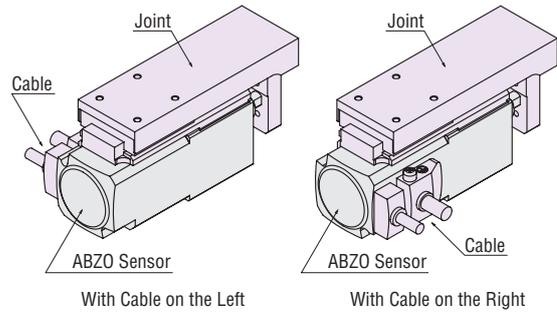
Compact Linear Actuator

DRSM 42 R G - 04 A 2 AZ M K

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

①	Series Name	DRSM: DRS2 Series
②	Frame Size	42: 42 mm 60: 60 mm
③	Cable Orientation*	R: Right L: Left Blank: Type without Guide
④	Shape	G: Type with Guide Blank: Type without Guide
⑤	Stroke	04: 40 mm 05: 50 mm
⑥	Ball Screw Type	A: Rolled Ball Screw B: Ground Ball Screw
⑦	Lead	2: 2 mm 4: 4 mm 8: 8 mm
⑧	Installed Motor	AZ: AZ Series
⑨	Electromagnetic Brake	A: Without Electromagnetic Brake M: With Electromagnetic Brake
⑩	Motor Specifications	K: DC Power Supply Input Specifications

*The cable orientation can be specified only for actuators without guide.
The cable orientation represents the cable orientation viewed from the encoder (ABZO sensor) with the joint on the top.



Driver

AZD - K D

① ② ③

①	Driver Type	AZD: AZ Series Driver
②	Power Supply Input	K: 24 VDC/48 VDC
③	Type	D: Built-in Controller Type X: Pulse Input Type with RS-485 Communication Blank: Pulse Input Type

Connection Cable Set/Flexible Connection Cable Set

CC 050 V Z F B 2

① ② ③ ④ ⑤ ⑥ ⑦

①		CC: Cable		
②	Length	005: 0.5 m	010: 1 m	015: 1.5 m
		020: 2 m	025: 2.5 m	030: 3 m
		040: 4 m	050: 5 m	070: 7 m
		100: 10 m	150: 15 m	200: 20 m
③	Reference Number			
④	Applied Model	Z: For AZ Series		
⑤	Cable Type	F: Connection Cable Set R: Flexible Connection Cable Set		
⑥	Description	Blank: For Motors without Electromagnetic Brake B: For Motors with Electromagnetic Brake		
⑦	Type	2: For DC Power Supply Input		

Product Line

Compact Linear Actuator

- ◇ Type with Guide
- Rolled Ball Screw



With Electromagnetic Brake

Electromagnetic Brake	Lead [mm]	Cable Orientation	Product Name
Without Electromagnetic Brake	2	Right	DRSM42RG-04A2AZAK
		Left	DRSM42LG-04A2AZAK
	8	Right	DRSM42RG-04A8AZAK
		Left	DRSM42LG-04A8AZAK
With Electromagnetic Brake	2	Right	DRSM42RG-04A2AZMK
		Left	DRSM42LG-04A2AZMK
	8	Right	DRSM42RG-04A8AZMK
		Left	DRSM42LG-04A8AZMK

- ◇ Type with Guide
- Ground Ball Screw



With Electromagnetic Brake

Electromagnetic Brake	Lead [mm]	Cable Orientation	Product Name
Without Electromagnetic Brake	2	Right	DRSM42RG-04B2AZAK
		Left	DRSM42LG-04B2AZAK
With Electromagnetic Brake		Right	DRSM42RG-04B2AZMK
		Left	DRSM42LG-04B2AZMK

◇ Type without Guide
Rolled Ball Screw



With Electromagnetic Brake

Electromagnetic Brake	Lead [mm]	Product Name
Without Electromagnetic Brake	2	DRSM42-04A2AZAK
	8	DRSM42-04A8AZAK
	4	DRSM60-05A4AZAK
With Electromagnetic Brake	2	DRSM42-04A2AZMK
	8	DRSM42-04A8AZMK
	4	DRSM60-05A4AZMK

◇ Type without Guide
Ground Ball Screw



With Electromagnetic Brake

Electromagnetic Brake	Lead [mm]	Product Name
Without Electromagnetic Brake	2	DRSM42-04B2AZAK
With Electromagnetic Brake		DRSM42-04B2AZMK

● Driver

◇ Built-in Controller Type



◇ Pulse Input Type with RS-485 Communication



◇ Pulse Input Type



Product Name
AZD-KD

Product Name
AZD-KX

Product Name
AZD-K

● Connection Cable Set/Flexible Connection Cable Set

Use a flexible connection cable set if the cable will be bent.

◇ For Motors/Encoders



Type	Length L (m)	Product Name
Connection Cable Set	0.5	CC005VZF2
	1	CC010VZF2
	1.5	CC015VZF2
	2	CC020VZF2
	2.5	CC025VZF2
	3	CC030VZF2
	4	CC040VZF2
	5	CC050VZF2
	7	CC070VZF2
	10	CC100VZF2
	15	CC150VZF2
	20	CC200VZF2
Flexible Connection Cable Set	0.5	CC005VZR2
	1	CC010VZR2
	1.5	CC015VZR2
	2	CC020VZR2
	2.5	CC025VZR2
	3	CC030VZR2
	4	CC040VZR2
	5	CC050VZR2
	7	CC070VZR2
	10	CC100VZR2
	15	CC150VZR2
	20	CC200VZR2

◇ For Motors/Encoders/
Electromagnetic Brakes



Type	Length L (m)	Product Name
Connection Cable Set	0.5	CC005VZFB2
	1	CC010VZFB2
	1.5	CC015VZFB2
	2	CC020VZFB2
	2.5	CC025VZFB2
	3	CC030VZFB2
	4	CC040VZFB2
	5	CC050VZFB2
	7	CC070VZFB2
	10	CC100VZFB2
	15	CC150VZFB2
	20	CC200VZFB2
Flexible Connection Cable Set	0.5	CC005VZRB2
	1	CC010VZRB2
	1.5	CC015VZRB2
	2	CC020VZRB2
	2.5	CC025VZRB2
	3	CC030VZRB2
	4	CC040VZRB2
	5	CC050VZRB2
	7	CC070VZRB2
	10	CC100VZRB2
	15	CC150VZRB2
	20	CC200VZRB2

■ Accessories

● Actuator

Accessories	Operating Manual
Type	
For All Types	1 set

● Driver

Accessories	Connector	Operating Manual
Type		
For All Types	Connector for CN4 (1 pc.) Connector for CN1 (1 pc.)	1 set

● Connection Cable Set/Flexible Connection Cable Set

Accessories	Operating Manual
Type	
Connection Cable Set	—
Flexible Connection Cable Set	1 set

How to Read Specifications Table

For Compact Linear Actuator (Rolled ball screw of type with guide)

Actuator Product Name	Cable Orientation: Right		DRSM42RG-04A2AZAK	DRSM42RG-04A2AZMK	DRSM42RG-04A8AZAK	DRSM42RG-04A8AZMK
	Cable Orientation: Left		DRSM42LG-04A2AZAK	DRSM42LG-04A2AZMK	DRSM42LG-04A8AZAK	DRSM42LG-04A8AZMK
① Lead	mm		2		8	
② Electromagnetic Brake (Power off activated type)			Not provided	Provided	Not provided	Provided
③ Ball Screw Type			Rolled			
④ Repetitive Positioning Accuracy	① End	mm	±0.01			
	② Top	mm	±0.02			
⑤ Lost Motion	mm		0.05 or less			
⑥ Minimum Traveling Amount	mm		0.001			
⑦ Permissible Moment	Static Permissible Moment	N-m	Mp: 1.3 Mv: 1.0 Mr: 2.5			
	Dynamic Permissible Moment	N-m	Mp: 1.3 Mv: 1.0 Mr: 2.5			
⑧ Transportable Mass	Horizontal	kg	10	10	5	5
	Vertical	kg	-		-	
⑨ Thrust	N		~200		~50	
⑩ Pushing Force	N		400		100	
⑪ Holding Force	N		200	200	50	50
⑫ Stroke	mm		40			
⑬ Maximum Speed	mm/s		50		200	

● Some products may have limitations and notes on use. For details, see notes on respective product pages.

① Lead

Distance the screw shaft moves linearly in one motor rotation.

② Electromagnetic Brake (Power off activated type)

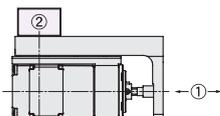
The product has types with and without an electromagnetic brake of power off activated type. Choose the type with electromagnetic brake for vertical drive.

③ Ball Screw Type

The product has rolled and ground ball screw types. Choose according to required accuracy.

④ Repetitive Positioning Accuracy

A value indicating the amount of error that is generated when positioning is performed repeatedly to the same position in the same direction. (The repetitive positioning accuracy is measured at a constant temperature under a constant load).



The repetitive positioning accuracy is measured on the end for ① and the linear guide for ②. Other items are common unless specified.

⑤ Lost Motion

A value indicating the amount of error that is generated when positioning is performed to the same position in a different direction.

⑥ Minimum Traveling Amount

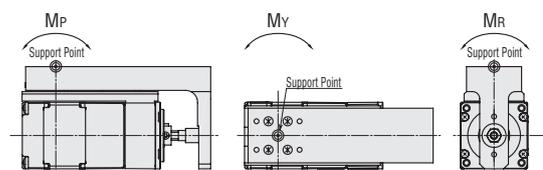
The traveling amount for each pulse, set by default.

⑦ Permissible Moment

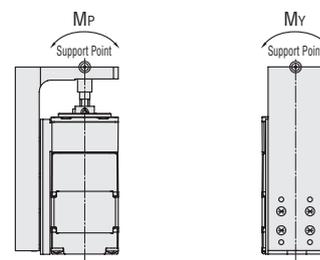
When the load is placed in a position eccentric from the actuator guide, force making the guide rotate applies. In this case, it indicates the maximum force applied to the guide.

The dynamic permissible moment is the moment allowed during operation. The static permissible moment is the moment allowed during static conditions.

• Horizontal Direction



• Vertical Direction



⑧ Transportable Mass

• Horizontal Direction (Figure A)

Maximum mass that can be moved under operating performance in the horizontal direction of the actuator.

• Vertical Direction (Figure B)

Maximum mass that can be moved under operating performance in the vertical direction of the actuator.

Figure A

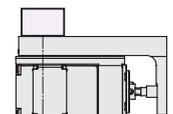
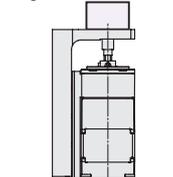


Figure B



⑨ Thrust

Force that pushes the load when speed is constant.

⑩ Pushing Force

The pressure applied to the load during the pushing operation.

⑪ Holding Force

Holding force when the motor is stopped or when the electromagnetic brake is operating, while power is supplied.

⑫ Stroke

Maximum distance to transport or push/draw the load.

⑬ Maximum Speed

Maximum speed to transport the load.

Compact Linear Actuator Specifications

Type with Guide

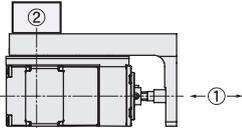


Frame Size 42 mm

Actuator Product Name	Cable Orientation: Right		DRSM42RG-04A2AZAK	DRSM42RG-04A2AZMK	DRSM42RG-04A8AZAK	DRSM42RG-04A8AZMK	DRSM42RG-04B2AZAK	DRSM42RG-04B2AZMK	
	Cable Orientation: Left		DRSM42LG-04A2AZAK	DRSM42LG-04A2AZMK	DRSM42LG-04A8AZAK	DRSM42LG-04A8AZMK	DRSM42LG-04B2AZAK	DRSM42LG-04B2AZMK	
Lead	mm		2			8		2	
Electromagnetic Brake (Power off activated type)			Not provided	Provided	Not provided	Provided	Not provided	Provided	
Ball Screw Type			Rolled				Ground		
Repetitive Positioning Accuracy	① End	mm	±0.01				±0.003		
	② Top	mm	±0.02				±0.005		
Lost Motion	mm		0.05 or less				0.02 or less		
Minimum Traveling Amount	mm		0.001						
Permissible Moment	Static Permissible Moment	N-m	Mp: 1.3			Mr: 1.0	Mr: 2.5		
	Dynamic Permissible Moment	N-m	Mp: 1.3			Mr: 1.0	Mr: 2.5		
Transportable Mass	Horizontal	kg	10	10	5	5	10	10	
	Vertical	kg	—		—		—		
Thrust	N		~200			~50		~200	
Pushing Force	N		400			100		400	
Holding Force	N		200	200	50	50	200	200	
Stroke	mm		40						
Maximum Speed	mm/s		50			200		50	

Note

- The maximum speed may decrease depending on the ambient temperature and motor cable length.
- Repetitive positioning accuracy



The repetitive positioning accuracy is measured on the end for ① and the linear guide for ②.
Other items are common unless specified.

Type without Guide



Frame Size 42 mm

Actuator Product Name	DRSM42-04A2AZAK	DRSM42-04A2AZMK	DRSM42-04A8AZAK	DRSM42-04A8AZMK	DRSM42-04B2AZAK	DRSM42-04B2AZMK
Lead	2		8		2	
Electromagnetic Brake (Power off activated type)	Not Provided	Provided	Not Provided	Provided	Not Provided	Provided
Ball Screw Type	Rolled				Ground	
Repetitive Positioning Accuracy	mm		±0.01		±0.003	
Lost Motion	mm		0.05 or less		0.02 or less	
Minimum Traveling Amount	mm					
Transportable Mass	Horizontal	kg	40	10	40	40
	Vertical	kg	—	20	5	20
Thrust	N		~200		~200	
Pushing Force	N		400		400	
Holding Force	N		200	200	50	200
Stroke	mm					
Maximum Speed	mm/s		50		200	

Note

- The maximum speed may decrease depending on the ambient temperature and motor cable length.



Frame Size 60 mm

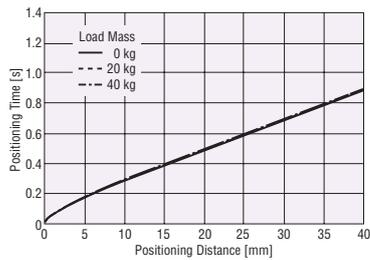
Actuator Product Name	DRSM60-05A4AZAK		DRSM60-05A4AZMK	
Lead	mm	4		
Electromagnetic Brake (Power off activated type)		Not Provided		Provided
Ball Screw Type		Rolled		
Repetitive Positioning Accuracy	mm	±0.01		
Lost Motion	mm	0.05 or less		
Minimum Traveling Amount	mm	0.001		
Transportable Mass	Horizontal	kg	50	50
	Vertical	kg	—	50
Thrust	N	~500		
Pushing Force	N	500		
Holding Force	N	500	500	
Stroke	mm	50		
Maximum Speed	mm/s	50		

Positioning Distance – Positioning Time

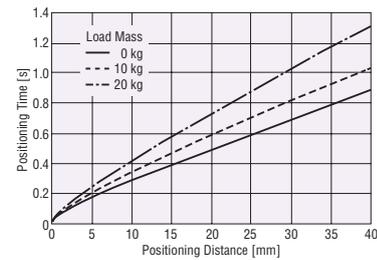
● Frame Size 42 mm/Power Supply Voltage 24 VDC

◇ Lead 2 mm

● Horizontal Direction Installation

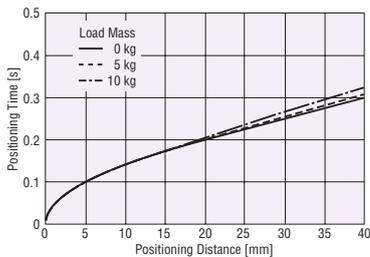


● Vertical Direction Installation

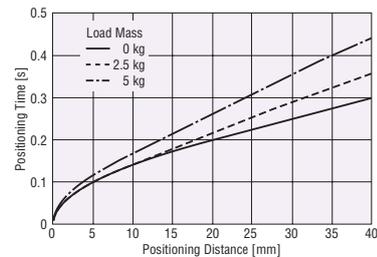


◇ Lead 8 mm

● Horizontal Direction Installation



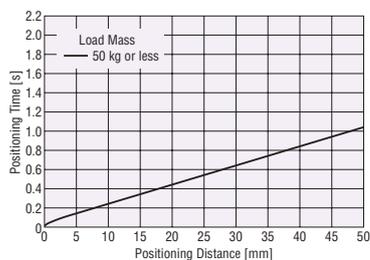
● Vertical Direction Installation



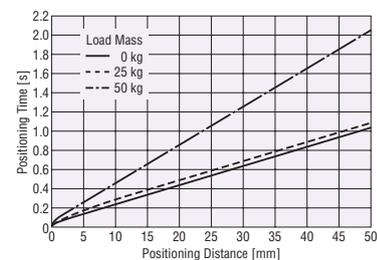
● Frame Size 60 mm/Power Supply Voltage 24 VDC

◇ Lead 4 mm

● Horizontal Direction Installation



● Vertical Direction Installation

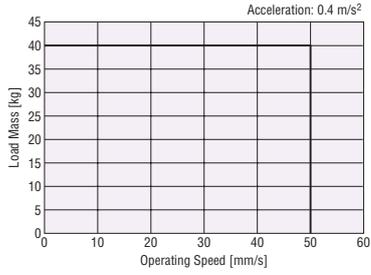


Operating Speed – Load Mass

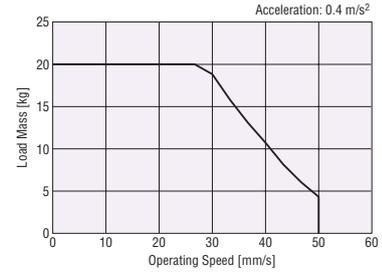
● Frame Size 42 mm/Power Supply Voltage 24 VDC

◇ Lead 2 mm

● Horizontal Direction Installation

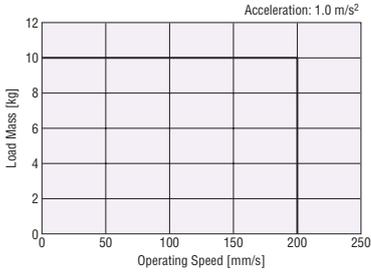


● Vertical Direction Installation

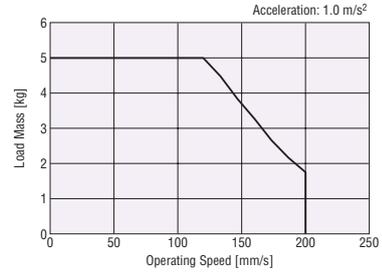


◇ Lead 8 mm

● Horizontal Direction Installation



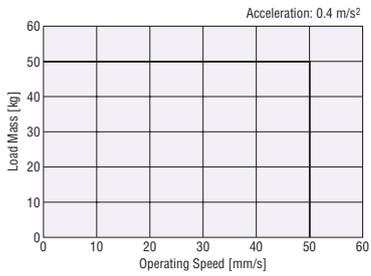
● Vertical Direction Installation



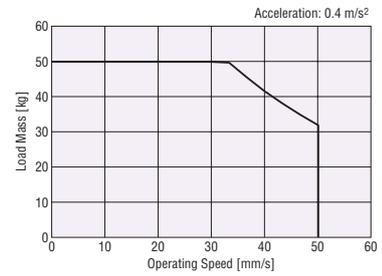
● Frame Size 60 mm/Power Supply Voltage 24 VDC

◇ Lead 4 mm

● Horizontal Direction Installation



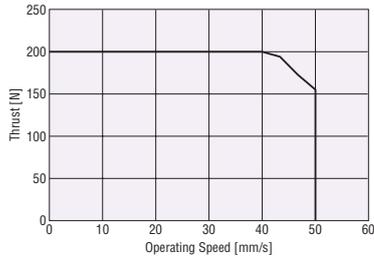
● Vertical Direction Installation



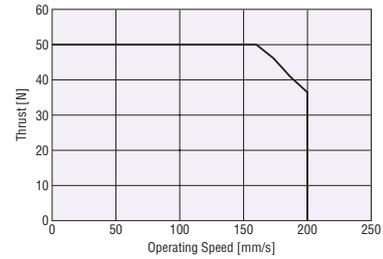
Operating Speed – Thrust

● Frame Size 42 mm/Power Supply Voltage 24 VDC

◇ Lead 2 mm

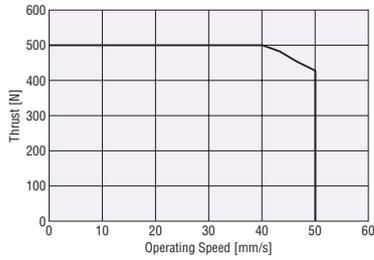


◇ Lead 8 mm



● Frame Size 60 mm/Power Supply Voltage 24 VDC

◇ Lead 4 mm

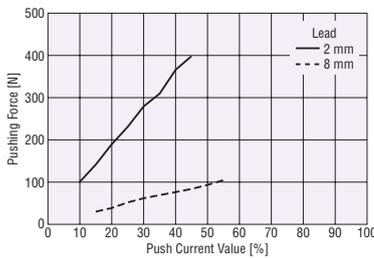


Actual Pushing Force Value

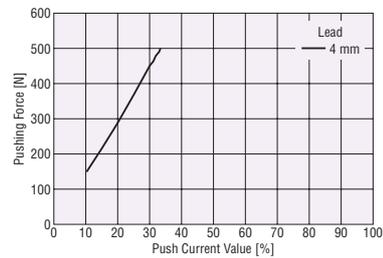
This section shows reference data of the push current values and the pushing force of the **DRS2** Series.

When using, check the actual pushing force.

● Frame Size 42 mm



● Frame Size 60 mm



- The characteristic diagrams above show the averages of measurement results of pushing during horizontal operation of the **DRS2** Series.
- The relationship between the pushing current and the pushing force differs depending on the following conditions. Check with actual equipment.
 - Installation conditions (horizontal or vertical installation)
 - Load conditions of the equipment
- The upper limit of the push-motion operating speed is 6 mm/s.

Power Supply Input Specifications

Actuator Product Name		DRSM42	DRSM60
Power Supply Input	Voltage	24 VDC±5%*	24 VDC±5%*
	Input Current	48 VDC±5%	48 VDC±5%
A	Without Electromagnetic Brake	1.72	2.45
	With Electromagnetic Brake	1.8	2.7

*For the electromagnetic brake type, the 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended by 20 m using a cable.

Electromagnetic Brake Specifications

Product Name	DRSM42	DRSM60
Type	Power off activated type	
Power Supply Voltage	24 VDC±5%*	
Power Supply Current	A	0.08
Brake Activate Time	ms	20
Brake Release Time	ms	30
Time Rating	Continuous	

*For the electromagnetic brake type, the 24 VDC±4% specification applies if the wiring distance between the motor and driver is extended by 20 m using a cable.

General Specifications

	Actuator	Driver
Heat-Resistant Class	130(B)	—
Insulation Resistance	The measured value is 100 MΩ or more when a 500 VDC megger is applied between the following locations: · Case – Motor windings · Case – Electromagnetic brake windings*1	The measured value is 100 MΩ or more when a 500 VDC megger is applied between the following locations: · Protective earth terminal – Power supply terminal
Dielectric Strength Voltage	No abnormality is found with the following application for 1 minute: · Case – Motor windings 1.0 kVAC 50 Hz or 60 Hz · Case – Electromagnetic brake windings*1 1.0 kVAC 50 Hz or 60 Hz	—
Operating Environment (In operation)	Ambient Temperature	0~+40°C (Non-freezing)*2
	Ambient Humidity	85% or less (Non-condensing)
	Atmosphere	Use in an area without corrosive gases and dust. The product should not be exposed to water, oil or other liquids.
Degree of Protection	IP00	IP10
Range of Multiple Rotation Inspection at Power OFF	±900 rotations (1800 rotations)	

*1 Electromagnetic brake type only

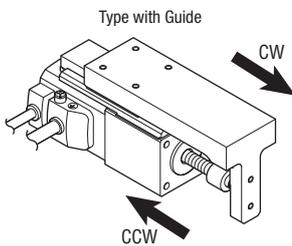
*2 Under the Oriental Motor's measurement conditions

Note

- When measuring insulation resistance or performing a dielectric strength voltage test, be sure to disconnect the motor from the driver beforehand. Also, do not conduct these tests on the ABZO sensor section of the motor.

Traveling Direction

The traveling direction of joint is set by default as follows:



Dimensions (Unit = mm)

Compact Linear Actuator

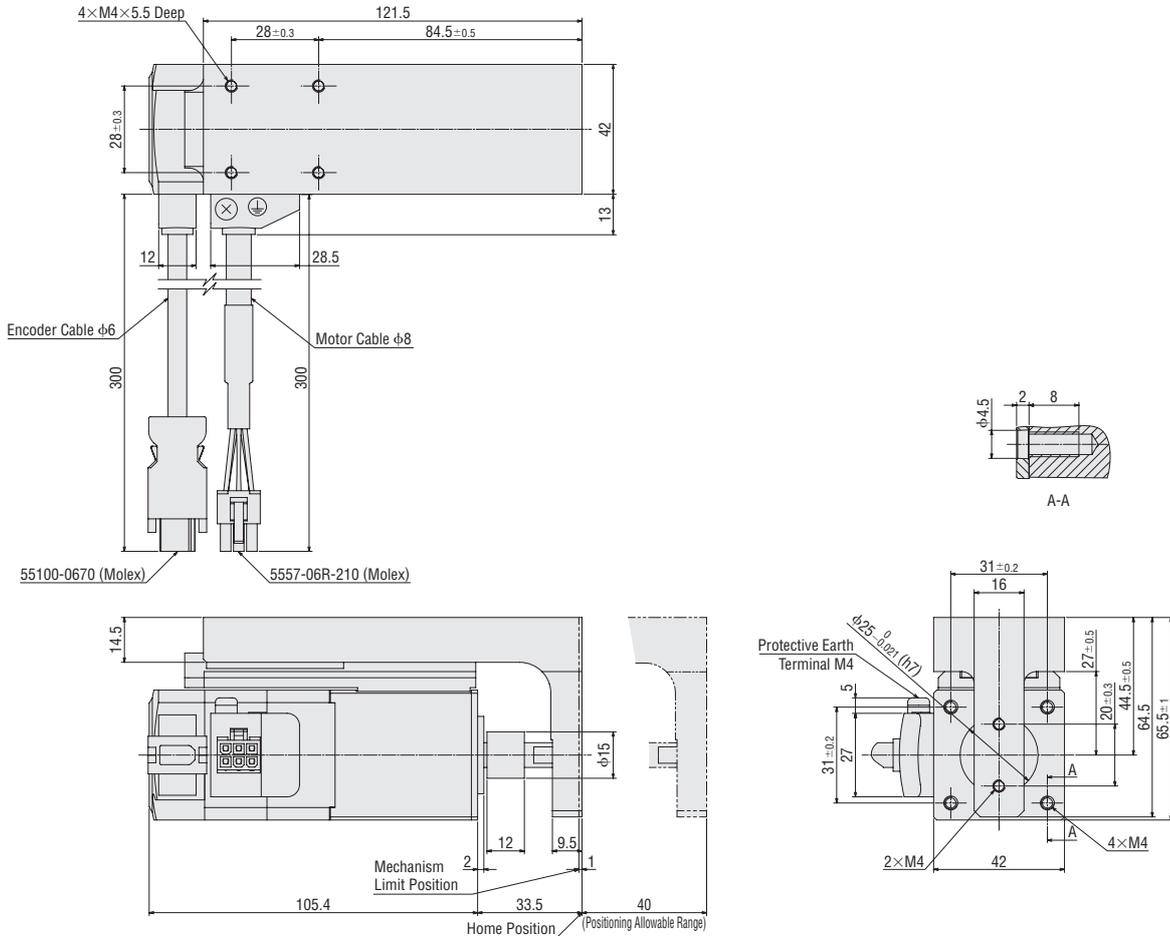
◇ Type with Guide (With cable on the right)

Frame Size 42 mm

2D & 3D CAD

Product Name	Mass kg	2D CAD
DRSM42RG-04A2AZAK DRSM42RG-04B2AZAK DRSM42RG-04A8AZAK	1.10	D7595

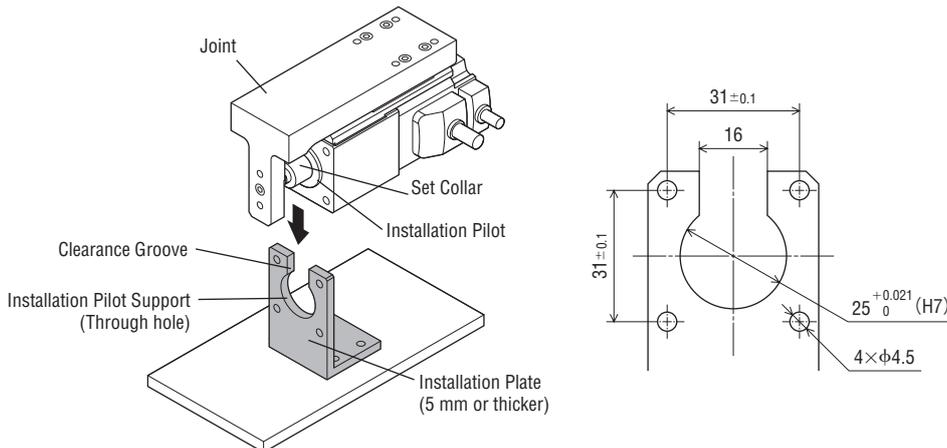
● For CAD data, please download from our website.
<http://www.orientalmotor.com.sg/>



● The above figure is an outline drawing of the cable on the right. For outline drawing of the cable on the left, see our website.
<http://www.orientalmotor.com.sg/>

Dimensions for Installation Plate (Unit = mm)

Prepare a through hole for the installation pilot support and the clearance groove for the ball screw shaft on the installation plate.



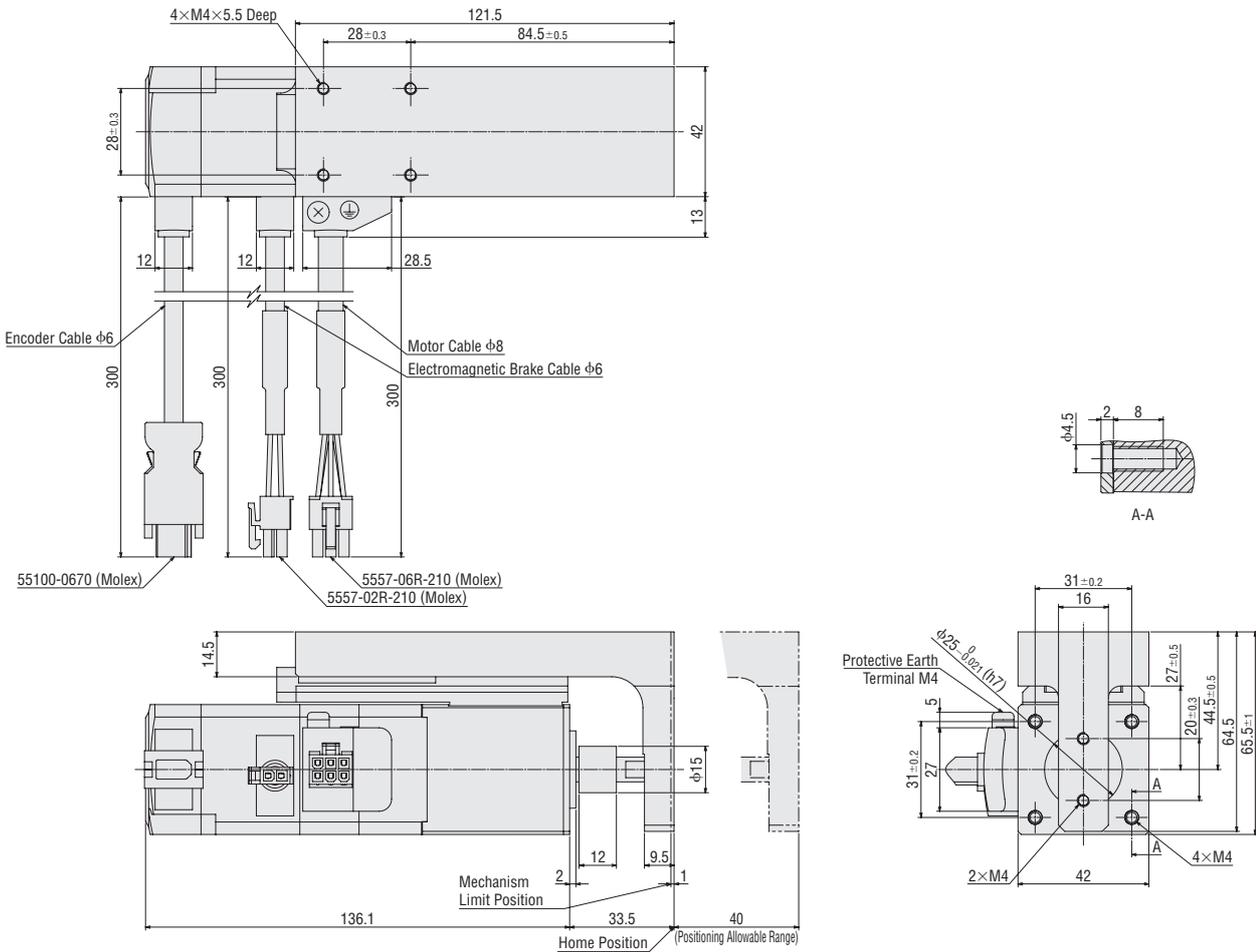
● For details of installation, see page 24.

◇ Type with Guide With Electromagnetic Brake (With cable on the right)
 Frame Size 42 mm

2D & 3D CAD

Product Name	Mass kg	2D CAD
DRSM42RG-04A2AZMK DRSM42RG-04B2AZMK DRSM42RG-04A8AZMK	1.30	D7598

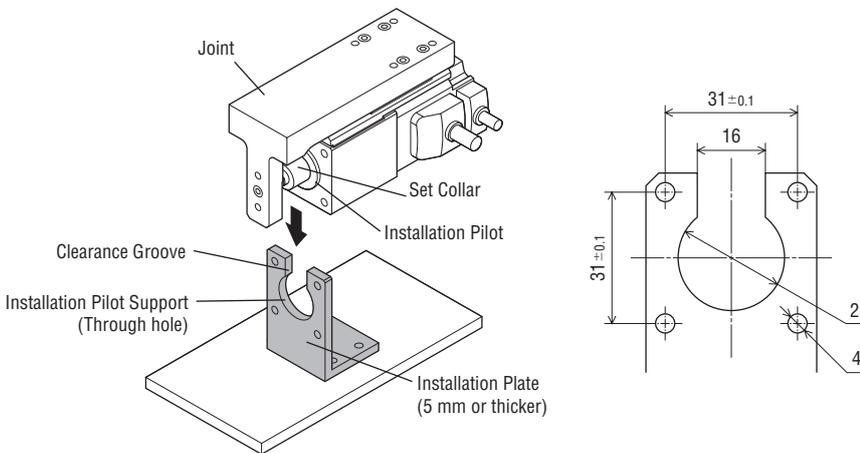
● For CAD data, please download from our website.
<http://www.orientalmotor.com.sg/>



● The above figure is an outline drawing of the cable on the right. For outline drawing of the cable on the left, see our website.
<http://www.orientalmotor.com.sg/>

Dimensions for Installation Plate (Unit = mm)

Prepare a through hole for the installation pilot support and the clearance groove for the ball screw shaft on the installation plate.



● For details of installation, see page 24.

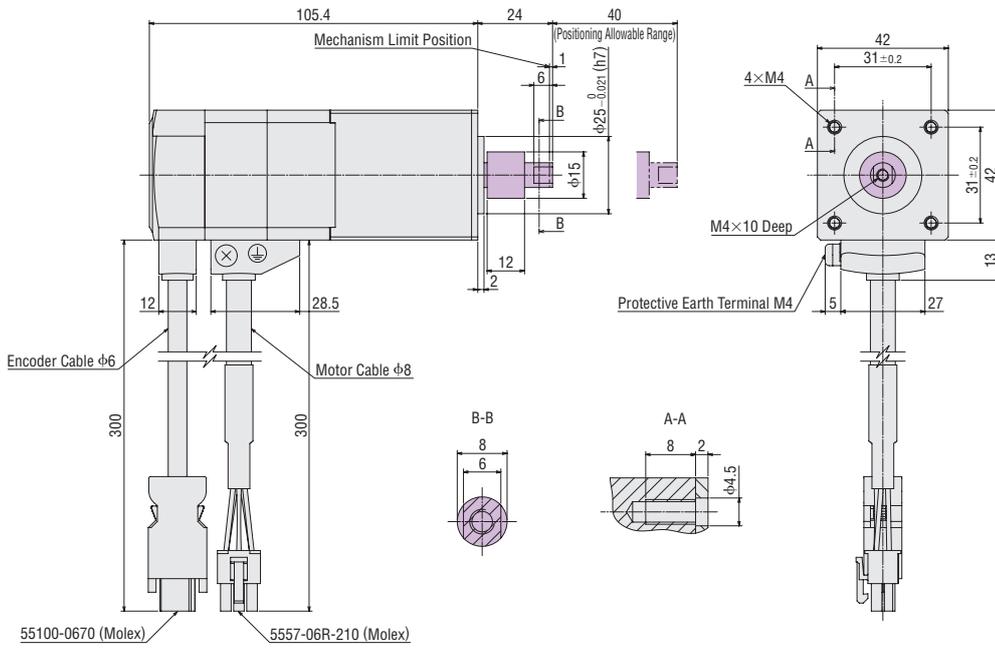
◇ Type without Guide

Frame Size 42 mm

2D & 3D CAD

Product Name	Mass kg	2D CAD
DRSM42-04A2AZAK DRSM42-04B2AZAK DRSM42-04A8AZAK	0.68	D7594

● For CAD data, please download from our website.
<http://www.orientalmotor.com.sg/>

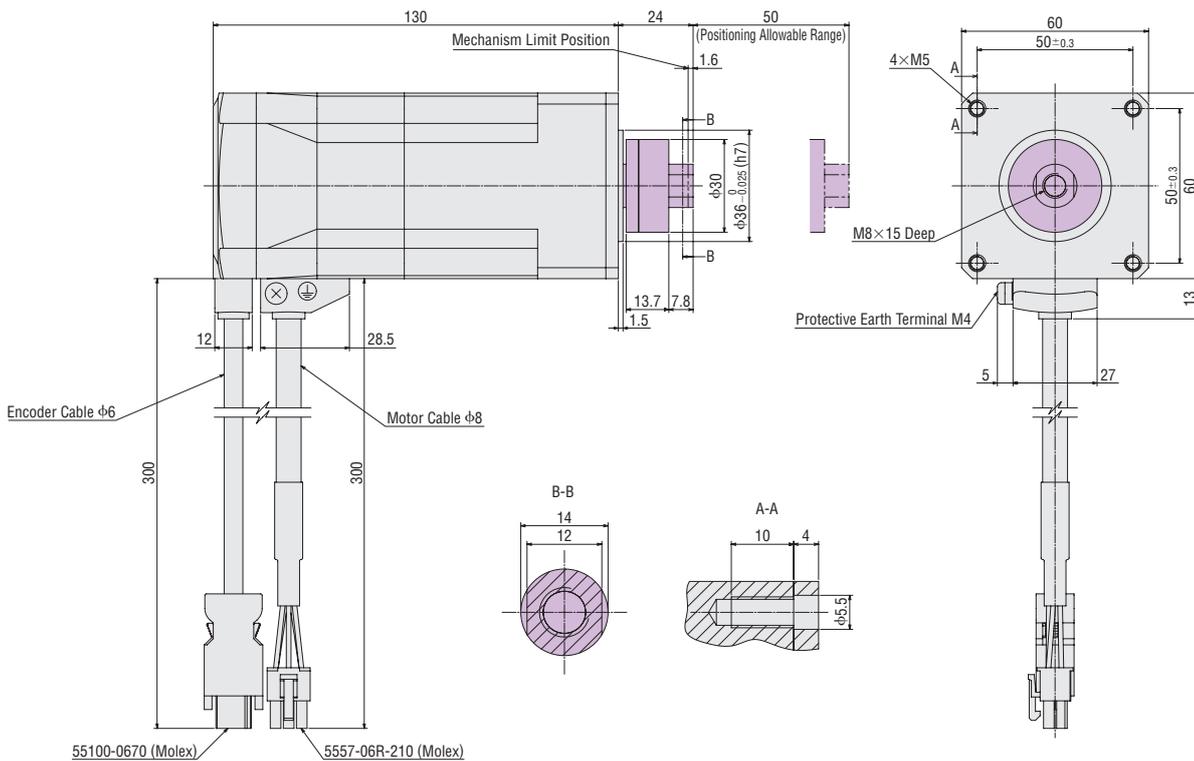


Frame Size 60 mm

2D & 3D CAD

Product Name	Mass kg	2D CAD
DRSM60-05A4AZAK	1.6	D7638

● For CAD data, please download from our website.
<http://www.orientalmotor.com.sg/>



● Part is flexible.

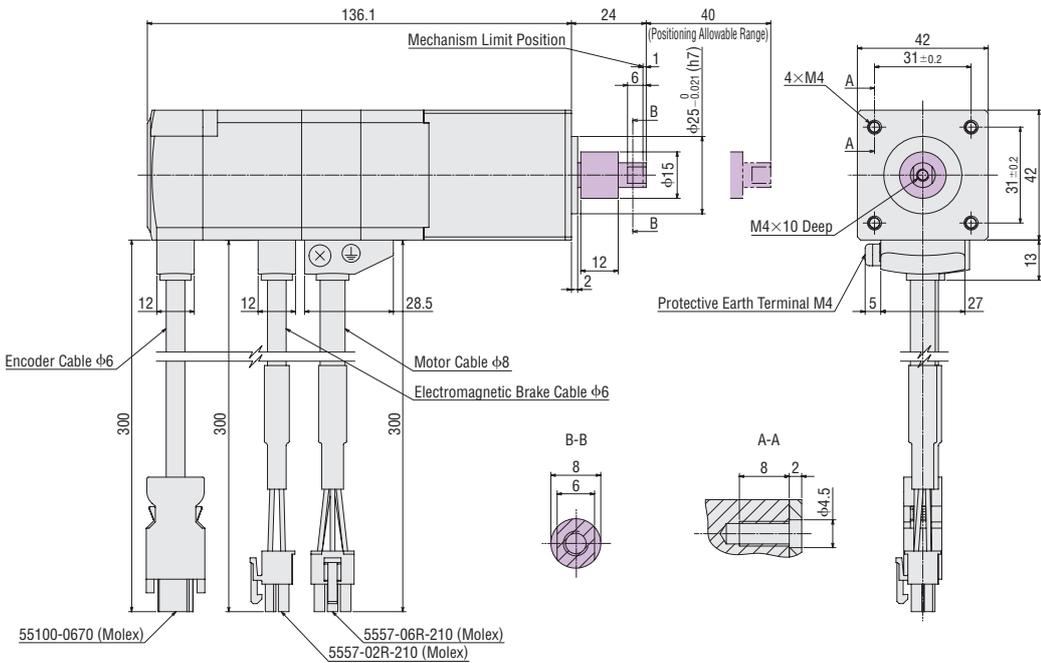
◇ Type without Guide With Electromagnetic Brake

Frame Size 42 mm

2D & 3D CAD

Product Name	Mass kg	2D CAD
DRSM42-04A2AZMK DRSM42-04B2AZMK DRSM42-04A8AZMK	0.85	D7597

● For CAD data, please download from our website.
<http://www.orientalmotor.com.sg/>

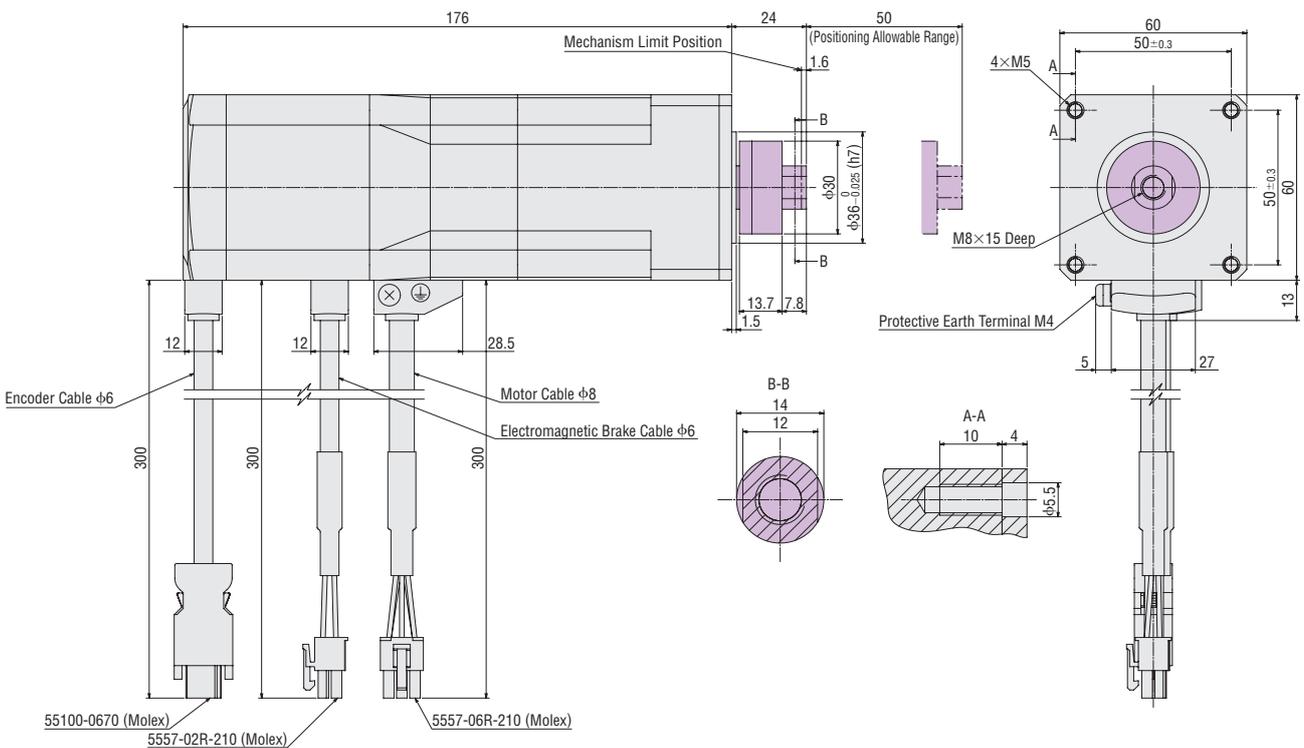


Frame Size 60 mm

2D & 3D CAD

Product Name	Mass kg	2D CAD
DRSM60-05A4AZMK	2.0	D7639

● For CAD data, please download from our website.
<http://www.orientalmotor.com.sg/>



● Part is flexible.

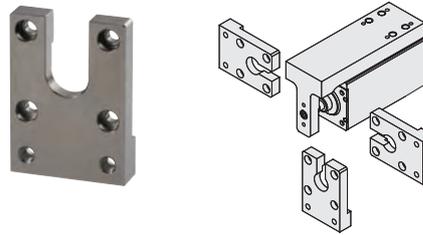
Installation Plate

Dedicated mounting bracket for installing actuators.
Screws between the actuator and the installation plate are included.

● Installation screws for installing to the equipment must be provided by the customer.

Material: Iron

Surface treatment: Black electroless nickel plating



The plate can be installed from three directions.

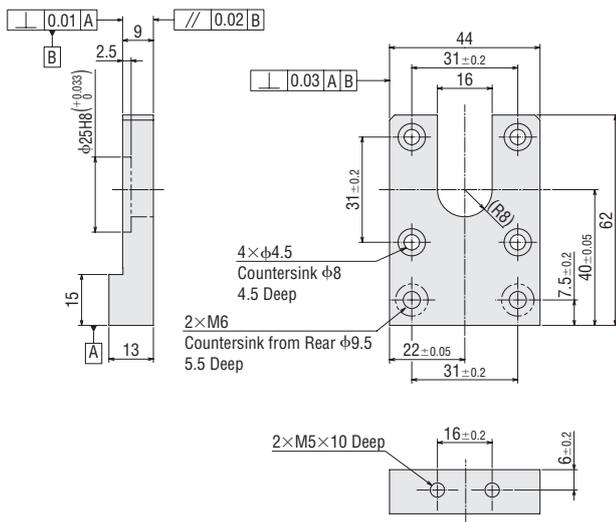
Product Line

2D & 3D CAD

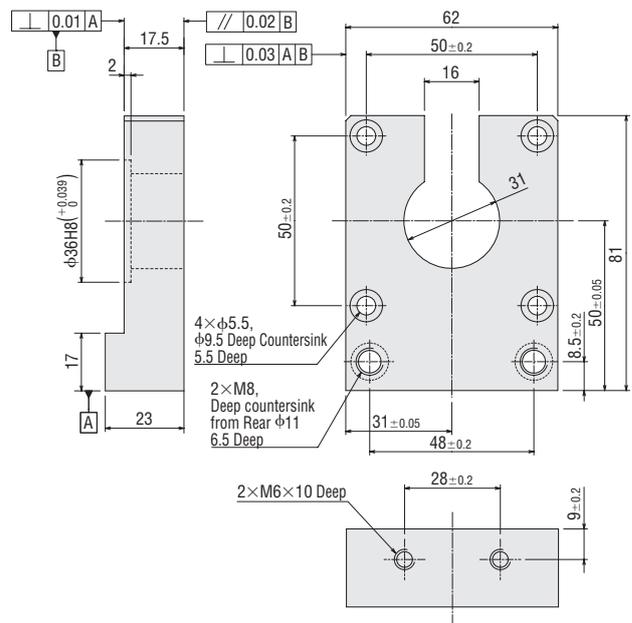
Product Name	Applicable Product	Mass (g)	2D CAD
PADRL-42	DRSM42	165	D466
PADRL-60	DRSM60	570	D2751

Dimensions (Unit = mm)

PADRL-42



PADRL-60

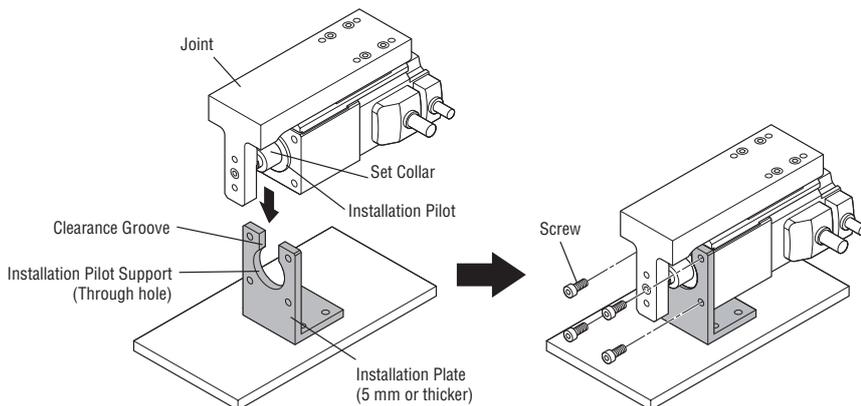


Installation (Common to DRS2 Series/DRLII Series)

This section shows how to install the types with/without a guide.

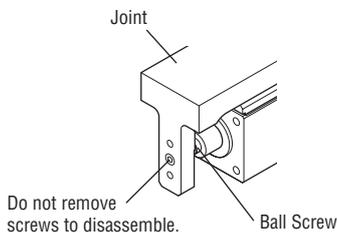
For descriptions common to **DRLII** and **DRS2** Series, the product names are listed as **DR□**.

Example of Installation for Type with Guide



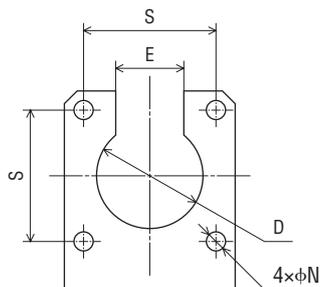
Note

● Do not remove the joint from the ball screw shaft. Otherwise, the accuracy to install the ball screw shaft is reduced, causing a malfunction. Removing the joint may cause the home position set by default to shift and break the equipment in unexpected operations.



Shape of Installation Plate

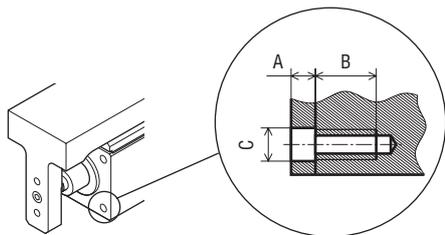
Prepare a through hole for the installation pilot support and the clearance groove for the ball screw shaft on the installation plate.



Product Name	D	E	S	φN
DRL20	16 ^{+0.018} ₀ (H7)	10	16±0.2	2.3
DRL28	22 ^{+0.021} ₀ (H7)	15	23±0.2	3
DR□42	25 ^{+0.021} ₀ (H7)	16	31±0.2	4.5
DRL60	36 ^{+0.025} ₀ (H7)	28	50±0.2	5.5

Unit: mm

Shape of Actuator Installation Hole



Product Name	Nominal Screw Diameter	Tightening Torque (N·m)	A	B	φC
DRL20	M2	0.4	2	5	2.3
DRL28	M2.5	0.6	2	6	3
DRL42	M4	1.8	—	8	—
DRSM42	M4	1.8	2	8	4.5
DRL60	M5	5	4	10	5.5

Unit: mm

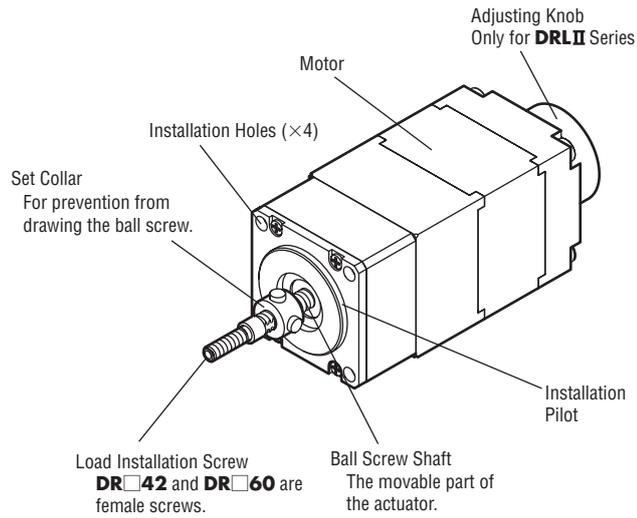
Installation Steps for Type without Guide

Names of Parts

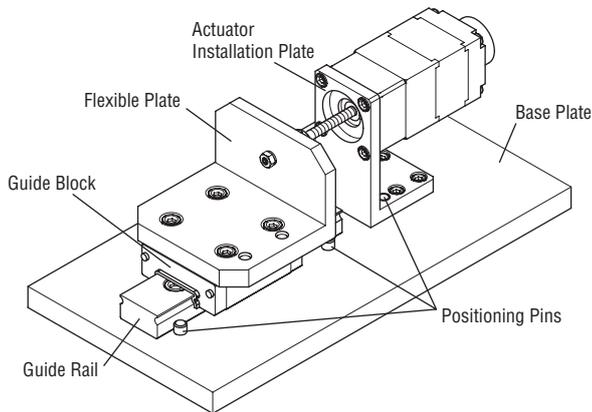
This section shows names of each part and those in a load installation example.

◇ Type without Guide

This figure shows the type without guide for **DRL28**.



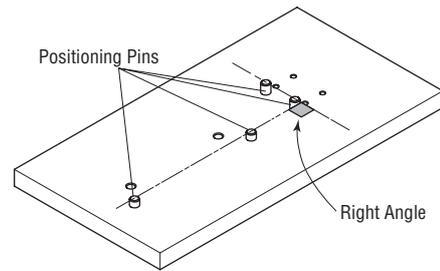
◇ Load Installation Example



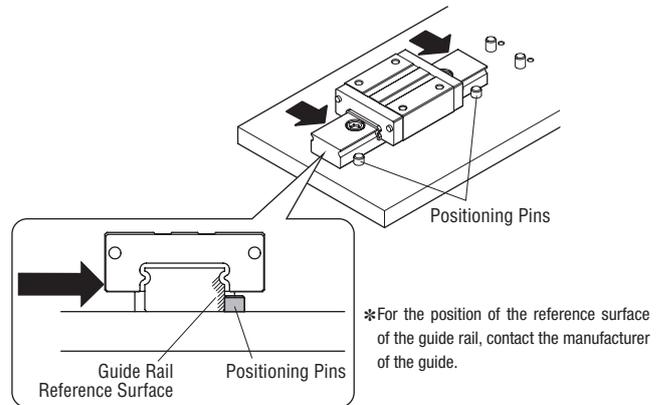
Installation Steps (Example)

Step1 Installing the Guide Rail

1. To position the guide rail and the actuator installation plate, install the positioning pins on the base plate.

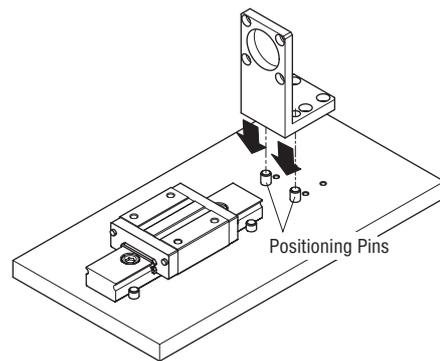


2. Pressing the reference surface of the guide rail against the positioning pins, fix it with screws.



Step2 Installing the Installation Plate

- Insert the actuator installation plate into the positioning pins on the base plate and fix it with screws.

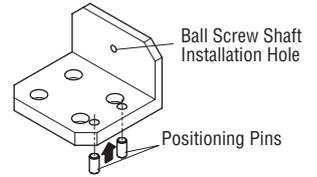
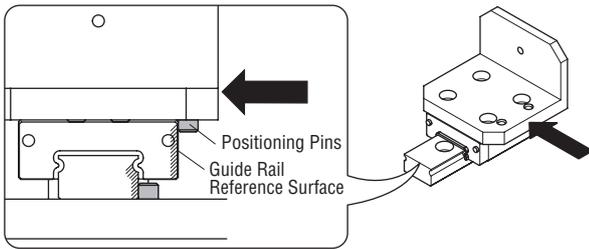


Step3 Installing the Flexible Plate

- If part precision centering is possible → ◇ Step3-A
- If part precision centering is not possible → ◇ Step3-B

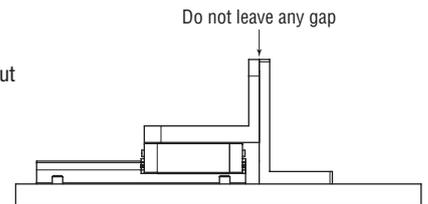
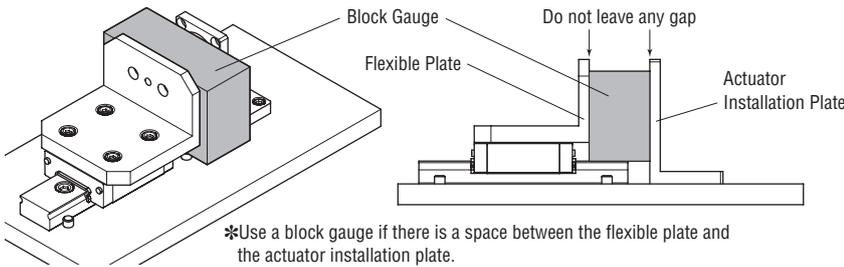
◇ Step3-A Installing the Flexible Plate (If part precision centering is possible)

1. To position the flexible plate and the guide block, install the positioning pins on the flexible plate.
2. Pressing the reference surface of the guide block against the positioning pins of the flexible plate, fix it with screws.

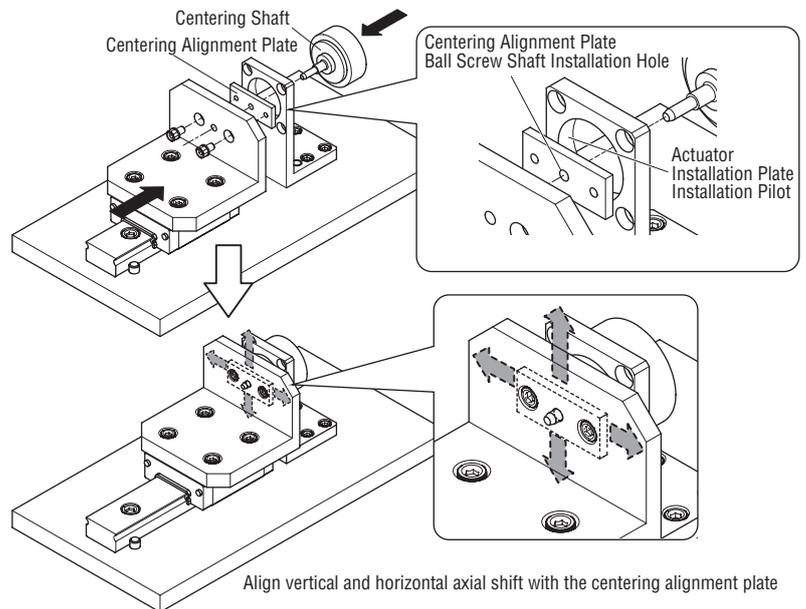


◇ Step3-B Installing the Flexible Plate (If part precision centering is not possible)

1. Install the flexible plate in either of the following ways:
 - Match the flexible plate and the actuator installation plate and fix them with screws not leaving any gap.
 - Insert a block gauge between the flexible plate and the actuator installation plate and fix them with screws without leaving any gap. If any gap is left, install the flexible plate again.

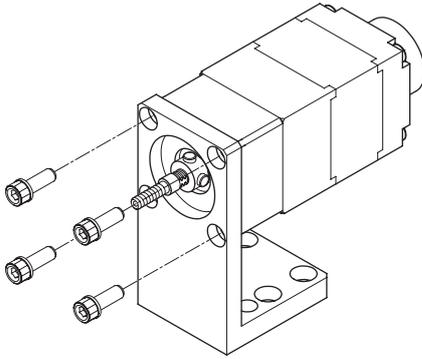


2. Using the centering shaft, align the axial center of the installation pilot of the actuator installation plate and the installation hole of the ball screw shaft on the centering alignment plate.
3. Slide the flexible plate back and force to check that it moves smoothly between the centering shaft and the flexible plate and then fix it. If the flexible plate does not move smoothly, move the centering alignment plate up and down and side by side to correct the axial shift.

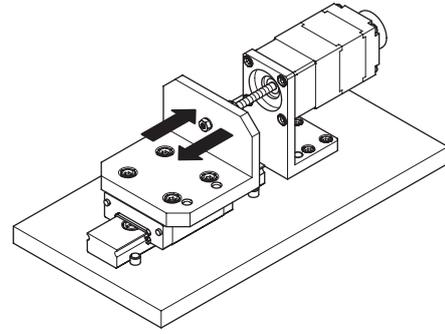


Step4 Fixing the Flexible Plate and the Ball Screw Shaft

1. Fix the compact linear actuator to the actuator installation plate with screws.

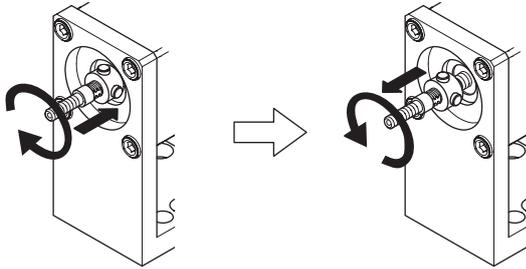


4. Run a test and check for no abnormal noise made from any part.

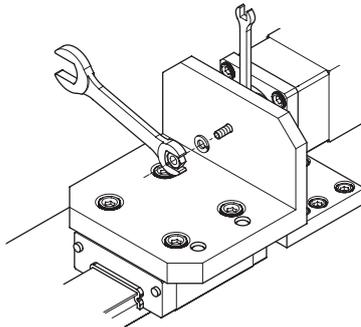


Product Name	Nominal Screw Diameter	Tightening Torque (N·m)
DRL20	M2	0.4
DRL28	M2.5	0.6
DR□42	M4	1.8
DR□60	M5	5

2. Press in the ball screw shaft until the set collar stops and then draw it out. The ball screw shaft should be drawn so that the set collar does not hit the actuator unit when tightening the shaft with a tool.



3. Insert the ball screw shaft into the installation hole for the shaft on the flexible plate and then fix with the nut. (Fix with a screw for **DR□42** or **DR□60**.)



Product Name	Nominal Screw Diameter	Tightening Torque (N·m)
DRL20 DRL28	M3 nut	0.6
DR□42	M4 screw	1.8
DR□60	M8 screw	5

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AZD3A-KM3	3-axis
AZD4A-KM3	4-axis

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Product Name	Number of Axis
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AZD3A-KED	3-axis
AZD4A-KED	4-axis

The following items are included in each product.
Driver, set of connectors for the driver, operating manual

Applicable Product Series

Motor	Motorized Actuators
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