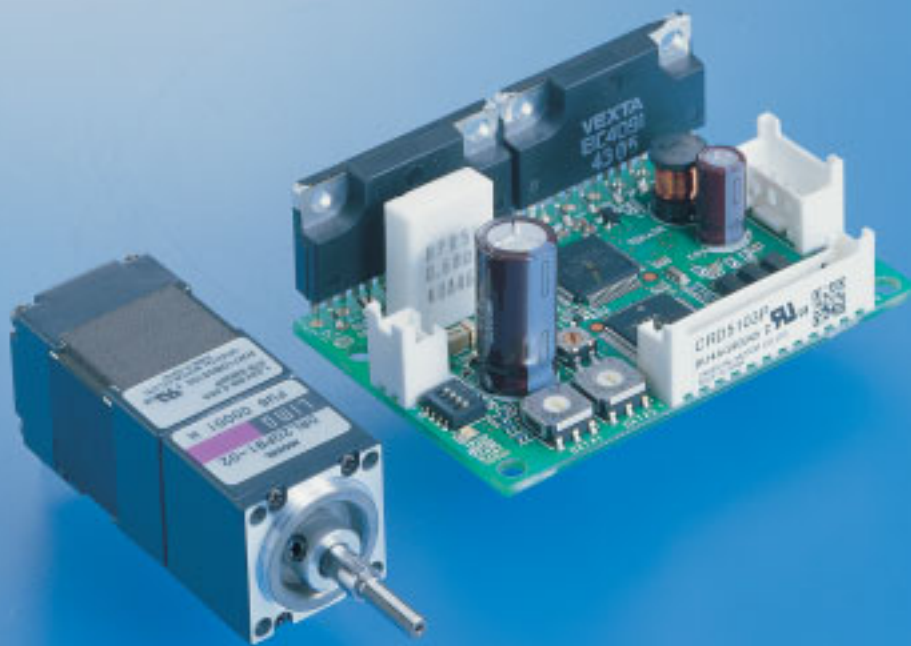


Compact Actuators **DRL Series**

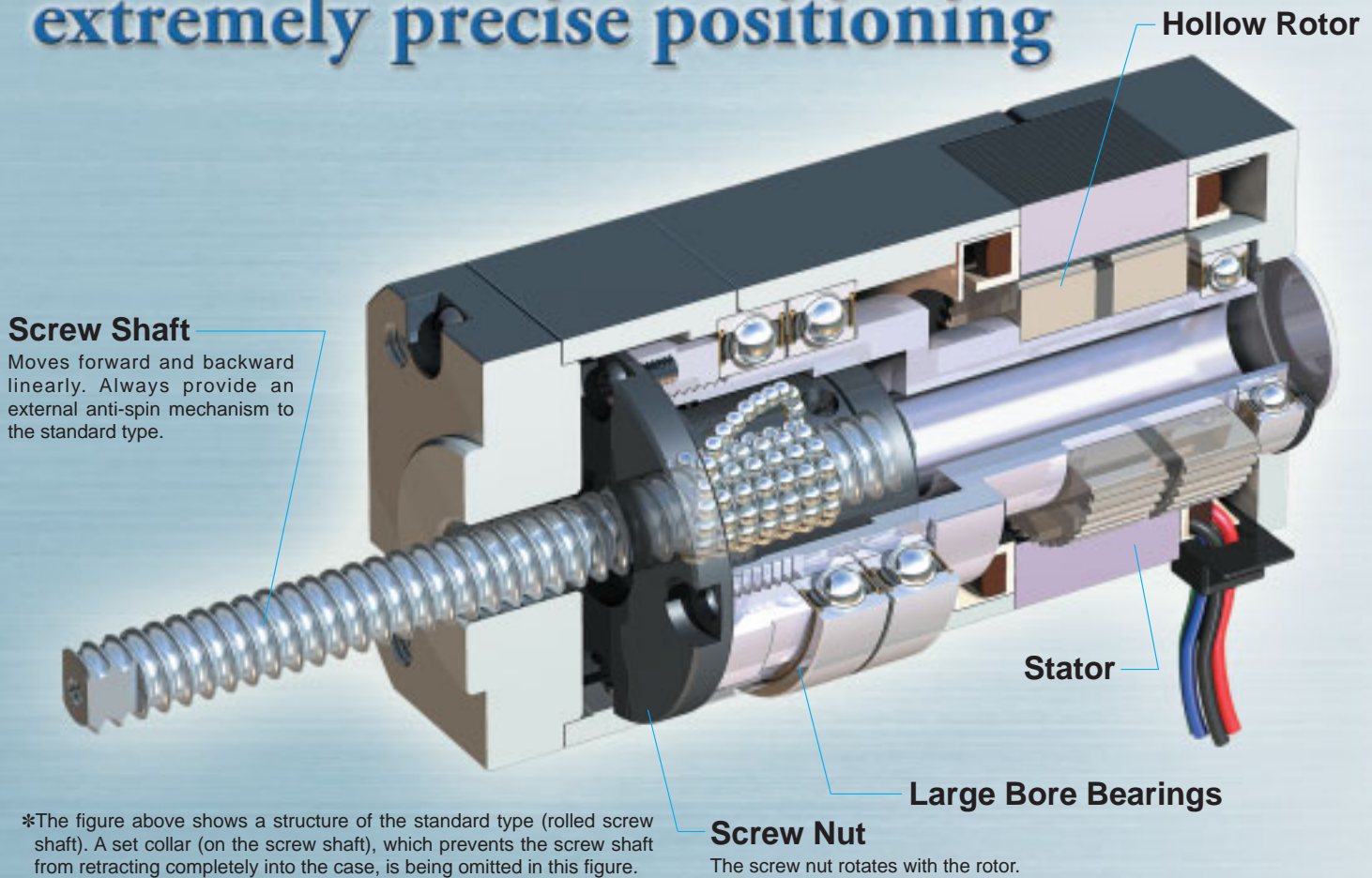
Screw Type	Ground Ball Screw / Rolled Ball Screw
Additional Function	With Adjusting Knob / With Electromagnetic Brake

The DRL Series motor-integrated compact actuator features a hollow rotor incorporating large bore thrust bearings. The drive mechanism adopts a 5-phase stepping motor with ball screw. The DRL Series achieves high positioning accuracy in a space-saving design.



**Actual
Size!**

The DRL Series of compact linear motion actuators is suitable for extremely precise positioning



A Wide Variety of Products





We offer actuators of four sizes according to the thrust force required. Both rolled and ground ball screws are available, depending on the accuracy required. Products with additional functions are also provided.

Combined Driver

CRD51□□P



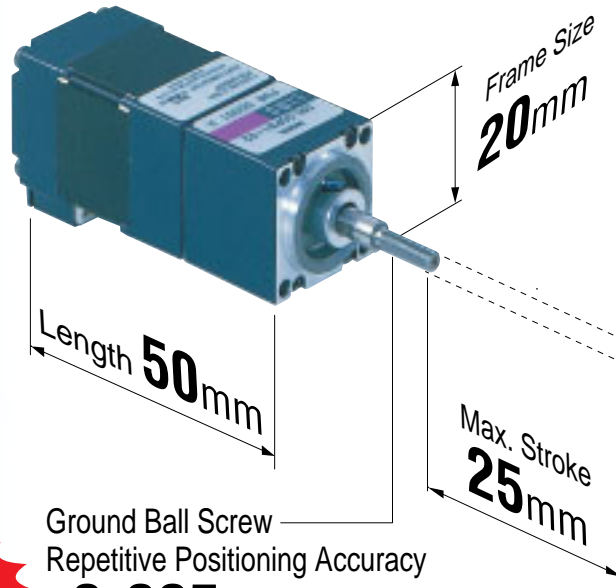
A high-function, user-friendly driver equipped with the Smooth Drive Function that implements microstep drive control automatically. The driver's 65 mm x 45 mm slim body helps achieve a significant reduction in the size of your equipment. The product certified to the CE Mark Standard and UL Standard means safe and reliable operation.

		DRL20						DRL28					
Frame Size		□20mm						□28mm					
Thrust Force		15N						30N					
Actuator Type													
		Standard Type			Guide Type			Standard Type			Guide Type		
Additional Function		None	With Electro-magnetic Brake	With Adjusting Knob	None	With Electro-magnetic Brake	With Adjusting Knob	None	With Electro-magnetic Brake	With Adjusting Knob	None	With Electro-magnetic Brake	With Adjusting Knob
Screw Type	Ground Ball Screw	NEW ●	—	NEW ●	NEW ●	—	NEW ●	NEW ●	—	NEW ●	NEW ●	—	NEW ●
	Rolled Ball Screw	—	—	—	—	—	—	●	—	●	●	—	●

Compact Design & High Positioning Accuracy

The compact and lightweight body houses the rotating components as well as the linear motion mechanism of the stepping motor. The **DRL** Series helps to achieve a significant reduction in the size of your equipment and system.

To meet the users' requirements for higher positioning accuracy, all models can be ordered with a ground ball screw specification (positioning repeatability: ± 0.005 mm).



Actual Size
DRL20PB1-02□

Improved Specifications

Ground Ball Screw
Repetitive Positioning Accuracy
 ± 0.005 mm

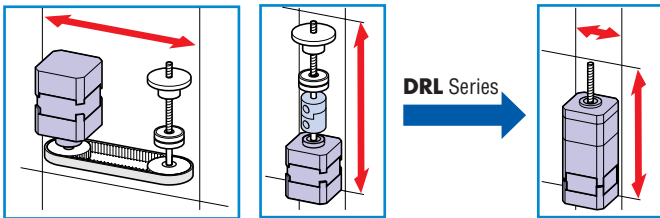
*The external anti-spin mechanism must be provided with the standard type. This enables screw shaft to move forward and backward (linearly).

Few Components, Simple Mechanism

The compact design of the **DRL** actuator allows for the elimination of the need to design, acquire and assemble the parts necessary to convert rotary to linear motion. The **DRL** actuator is a self-contained package consisting of a stepping motor with a hollow shaft rotor connected to a ball screw nut. Rotation of the nut initiates movement of the actual ball screw.

Reliable Design and Structure

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



**Few Components
Simple Mechanism**

Large Bore Bearing
+
Hollow Rotor



DRL42						DRL60					
□42mm						□60mm					
100N						300N					
<p>Standard Type</p>			<p>Guide Type</p>			<p>Standard Type</p>			<p>Guide Type</p>		
None	With Electro-magnetic Brake	With Adjusting Knob	None	With Electro-magnetic Brake	With Adjusting Knob	None	With Electro-magnetic Brake	With Adjusting Knob	None	With Electro-magnetic Brake	With Adjusting Knob
NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW
●	●	●	●	●	●	●	●	●	●	●	●

A Wide Lineup Meeting All Your Motion Needs

Frame Size and Drive Method

DRL20
DRL28
DRL42
DRL60

- Rolled ball screw type
- Ground ball screw type

Select an appropriate frame size based on the required thrust, and choose a suitable screw type based on the required accuracy.

Drive Method

Select either the ground ball screw type or rolled ball screw type.

DRL20	DRL28	DRL42	DRL60
Ground ball screw type			
—	Rolled ball screw type		

*DRL20 has no rolled ball screw type.

● In addition to the ground ball screw type and rolled ball screw type, the slide screw type is also available. For details, please contact Oriental Motor.

Shape

- Standard
- With guide

Select an optimal shape.

*If you choose the standard shape, you must provide an external anti-spin mechanism.

Additional Functions

- Electromagnetic brake
- Adjustment knob

Select an additional function(s) as necessary.

Accessories

- Optional cable
- Mounting plate

Utility accessories are also available.

Ground Ball Screw Type

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. Repetitive Positioning Accuracy: ± 0.005 mm.

Rolled Ball Screw Type

Ideal for general positioning applications where reliability and ease of use are given priority. The **DRL** rolled ball screw type is a standard actuator that adopts the same thrust and resolution specifications as with the ground ball screw type for added convenience.

Additional Functions

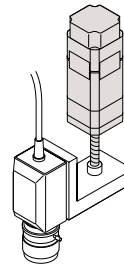
The standard type and guide type are available with an electromagnetic brake and/or adjusting knob as additional functions.

● With Electromagnetic Brake

The load position can be held even 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.

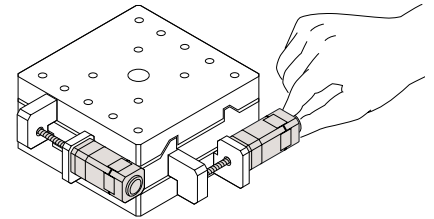
● With Adjusting Knob

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



With electromagnetic brake

The CCD camera's Z-position is held even when the power is cut off.

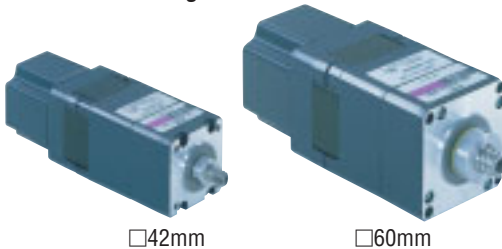


With adjusting knob

The X-Y stage position can be finely adjusted/moved with the power supply cut off.

Standard Type

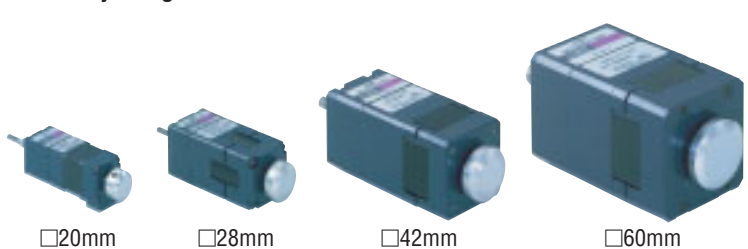
With Electromagnetic Brake



□42mm

□60mm

With Adjusting Knob



□20mm

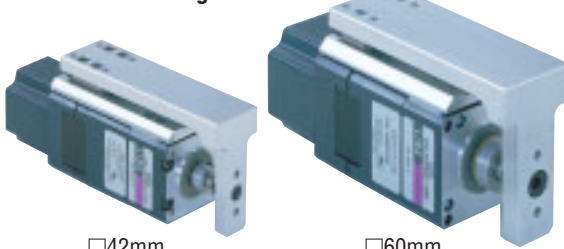
□28mm

□42mm

□60mm

Guide Type

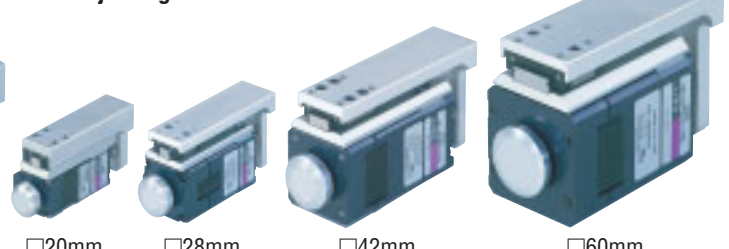
With Electromagnetic Brake



□42mm

□60mm

With Adjusting Knob



□20mm

□28mm

□42mm

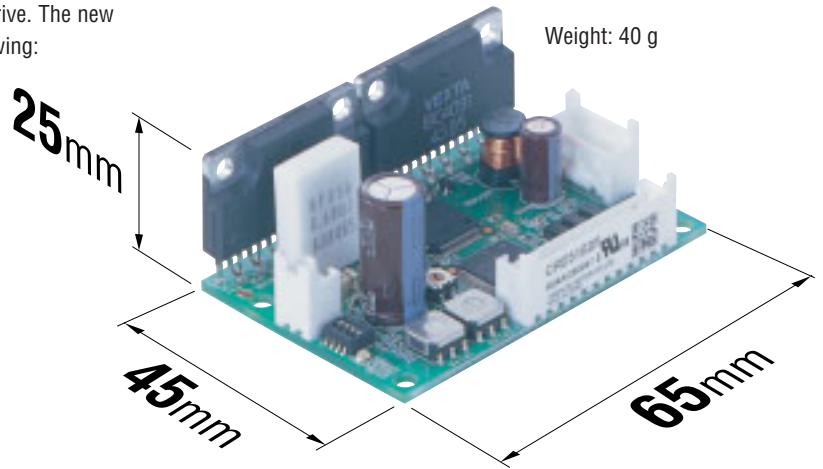
□60mm

Compact, Lightweight Microstep Driver (CRD51□□P)

● Compact DC input board driver meeting the space-saving needs of future

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

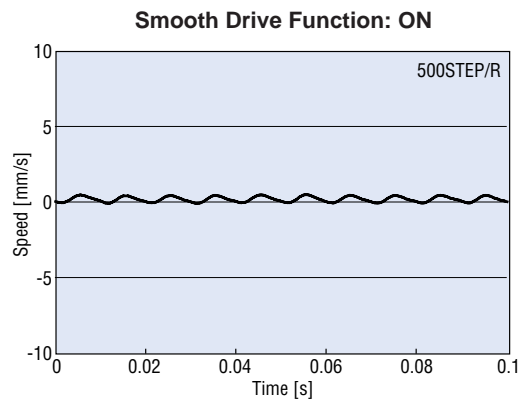
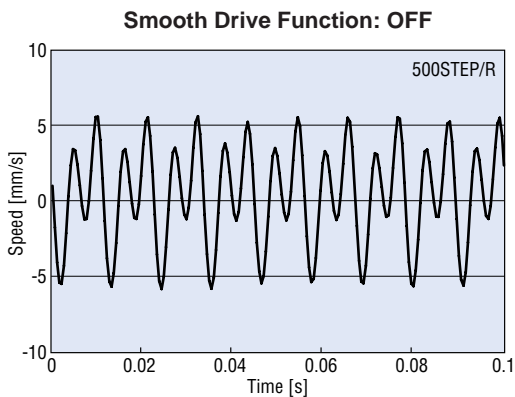
- Smooth Drive Function
- 1-pulse/2-pulse input mode switching
- 25 microstep drive resolutions
- Power LED
- Photocoupler input
- Connector with safety lock (by Molex)
- Conforming to major safety standards



● Smooth Drive Function embodies quieter operation

The Smooth Drive Function automatically controls the motor's microstep drive operation at the same travel and speed 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.

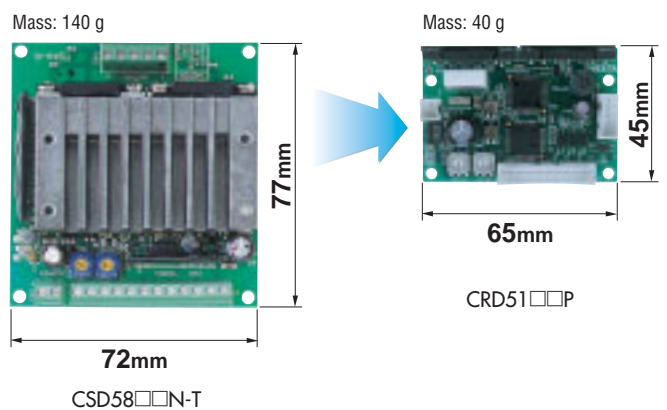
Comparison of Speed Fluctuation



● 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 approx. 47% in size compared with a conventional full-step driver.

Comparison of Driver Size and Weight



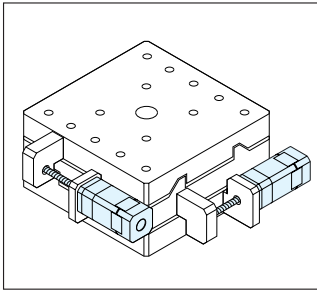
● Conforming to major overseas safety standards

The actuator and CRD driver are designed to the various major safety standards acknowledged overseas, including the UL Standard and EN/IEC standards. They bear the CE mark as proof of compliance with EMC Directive.

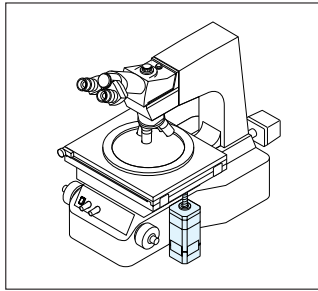


Applications

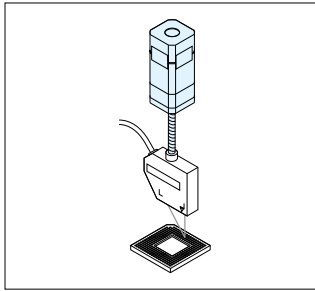
Drive mechanism for a micrometer head X-Y stage



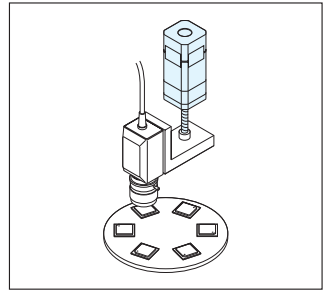
Vertical fine-tuning of table position



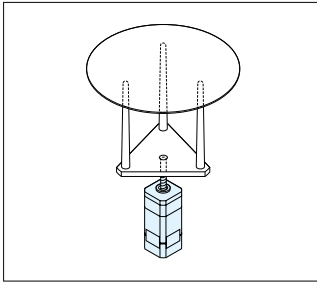
Fine-tuning of sensor position



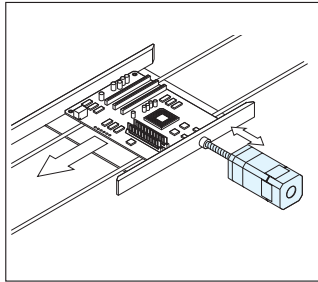
Focusing of a CCD camera



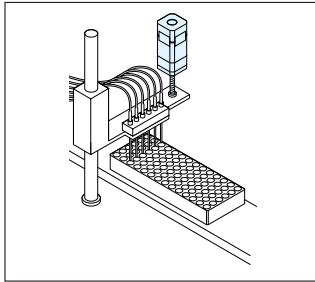
Pin lifter



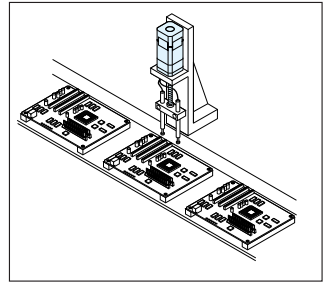
Centering of board



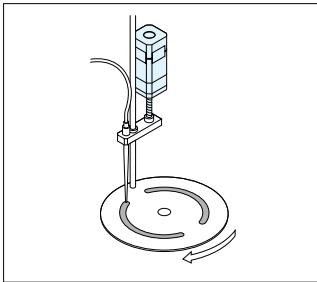
Automatic micro-plate dispensing



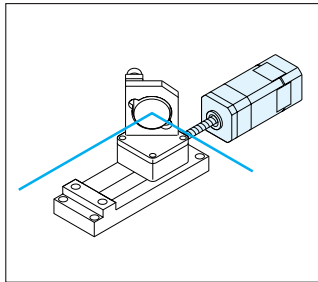
Vertical movement of probe



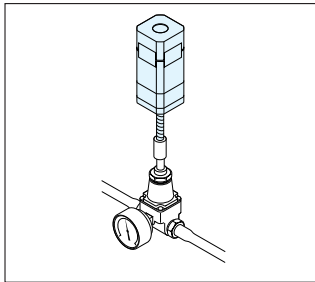
Fine tuning of nozzle position



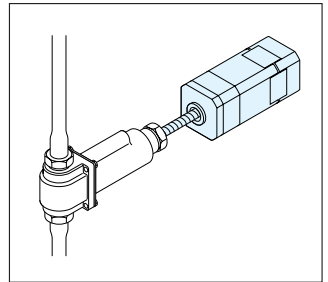
Adjusting a mirror positioning device



Fine-tuning of flow-rate regulator valve setting

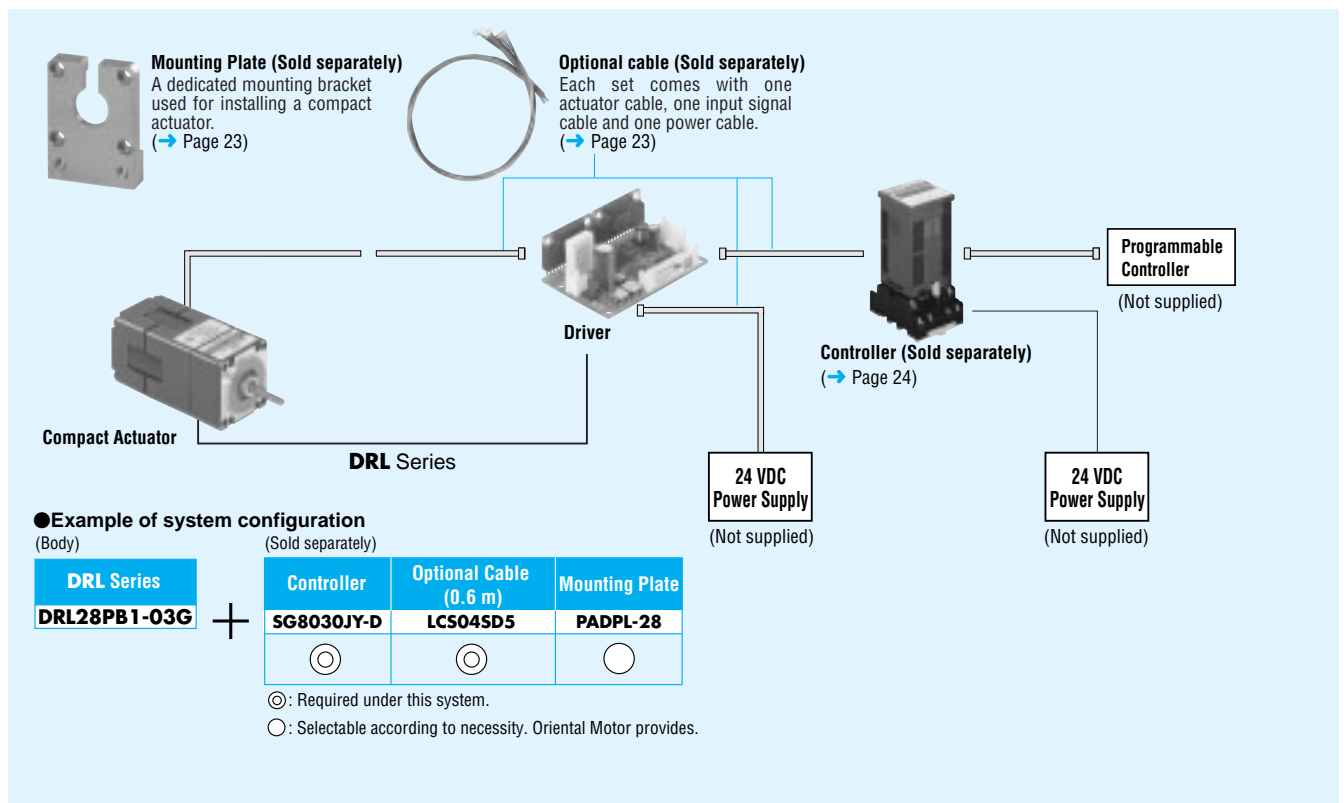


Driving a pump actuator device



System Configuration

A sample system configuration with **SG8030** Series controller (with 1-axis control connector).



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

Product Number Code

DRL 28 P A 1 G - 03 N G

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

Product Number Code

①	DRL Series	④	Screw Type A: Rolled Ball Screw B: Ground Ball Screw	⑦	Stroke 02: 25 mm (DRL20) 03: 30 mm (DRL28) 04: 40 mm (DRL42) 05: 50 mm (DRL60)
②	Frame Size 20: <input type="checkbox"/> 20 mm 28: <input type="checkbox"/> 28 mm 42: <input type="checkbox"/> 42 mm 60: <input type="checkbox"/> 60 mm	⑤	Pitch (Lead) 1: 1 mm (DRL20, DRL28) 2: 2 mm (DRL42) 4: 4 mm (DRL60)	⑧	Additional Functions None: With no additional function M: With electromagnetic brake N: With adjusting knob
③	Motor Type P: Stepping Motor	⑥	Type None: Standard Type (Without Guide) G: Guide Type	⑨	Driver Type G: CRD51□□P

Product Line

Ground Ball Screw

Frame Size (mm)	Type	Additional Function	None	With Electromagnetic Brake	With Adjusting Knob
			Model	Model	Model
□20	Standard Type		DRL20PB1-02G	—	DRL20PB1-02NG
	Guide Type		DRL20PB1G-02G	—	DRL20PB1G-02NG
□28	Standard Type		DRL28PB1-03G	—	DRL28PB1-03NG
	Guide Type		DRL28PB1G-03G	—	DRL28PB1G-03NG
□42	Standard Type		DRL42PB2-04G	DRL42PB2-04MG	DRL42PB2-04NG
	Guide Type		DRL42PB2G-04G	DRL42PB2G-04MG	DRL42PB2G-04NG
□60	Standard Type		DRL60PB4-05G	DRL60PB4-05MG	DRL60PB4-05NG
	Guide Type		DRL60PB4G-05G	DRL60PB4G-05MG	DRL60PB4G-05NG

Rolled Ball Screw

Frame Size (mm)	Type	Additional Function	None	With Electromagnetic Brake	With Adjusting Knob
			Model	Model	Model
□28	Standard Type		DRL28PA1-03G	—	DRL28PA1-03NG
	Guide Type		DRL28PA1G-03G	—	DRL28PA1G-03NG
□42	Standard Type		DRL42PA2-04G	DRL42PA2-04MG	DRL42PA2-04NG
	Guide Type		DRL42PA2G-04G	DRL42PA2G-04MG	DRL42PA2G-04NG
□60	Standard Type		DRL60PA4-05G	DRL60PA4-05MG	DRL60PA4-05NG
	Guide Type		DRL60PA4G-05G	DRL60PA4G-05MG	DRL60PA4G-05NG

Safety Standards and CE Marking

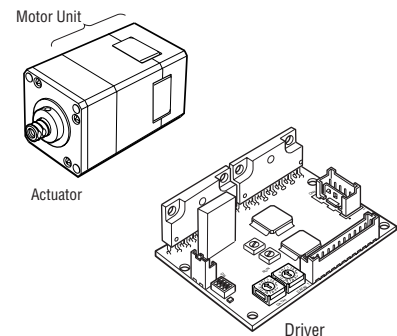
Motor Model	Standards	Certification Body	Standards File No.	CE Marking
SM□P SM□PG SM□PM SM□PH SM□PGM SM□PGH	UL60950 CSA C22.2 No.60950	UL	E208200	EMC Directives

*The box (□) in the model name represents the code for frame size.

Driver Model	Standards	Certification Body	Standards File No.	CE Marking
CRD5103P CRD5107P CRD5114P	UL60950 CSA C22.2 No.60950	UL	E208200	EMC Directives

*When the system is approved under various safety standards, the approved model name for various safety standards are the motor unit and driver name.

*Approved Conditions (UL60950): Class III equipment, SELV Circuit, Pollution Degree 2



Specifications

● Actuator Unit: Ground Ball Screw, Standard Type

Model	DRL20PB1-02G DRL20PB1-02NG	DRL28PB1-03G DRL28PB1-03NG	DRL42PB2-04G DRL42PB2-04NG	DRL42PB2-04MG	DRL60PB4-05G DRL60PB4-05NG	DRL60PB4-05MG
Motor Type	5-Phase Stepping Motor					
Screw Type	Ground Ball Screw					
Electromagnetic Brake	Not equipped	Not equipped	Not equipped	Equipped	Not equipped	Equipped
Max. Vertical Transportable Mass *1 kg	1.5	3	10			30
Maximum Speed *2 mm/s	20	24	30			32
Maximum Acceleration m/s ²	0.2	0.2	0.4			0.26
Maximum Thrust Force *3 N	15	30	100			300
Maximum Holding Force						
At Excitation *4 N	15	30	100			300
At Non-Excitation N	0	0	0	0	0	0
Electromagnetic Brake N	—	—	—	100	—	300
Repetitive Positioning Accuracy mm	±0.005					
Lost Motion mm	0.05					
Resolution *5 mm	0.002	0.002	0.004			0.008
Pitch (Lead) mm	1	1	2			4
Stroke mm	25	30	40			50
Mass (Mass with adjusting knob) kg	0.08 (0.08)	0.18 (0.19)	0.6 (0.6)	0.8	1.3 (1.35)	1.7
Actuator Dimensions No.	[1]	[2]	[4]	[5]	[6]	[7]

● Actuator Unit: Rolled Ball Screw, Standard Type

Model	DRL28PA1-03G DRL28PA1-03NG	DRL42PA2-04G DRL42PA2-04NG	DRL42PA2-04MG	DRL60PA4-05G DRL60PA4-05NG	DRL60PA4-05MG
Motor Type	5-Phase Stepping Motor				
Screw Type	Rolled Ball Screw				
Electromagnetic Brake	Not equipped	Not equipped	Equipped	Not equipped	Equipped
Max. Vertical Transportable Mass *1 kg	3	10		30	
Maximum Speed *2 mm/s	24	30		32	
Maximum Acceleration m/s ²	0.2	0.4		0.26	
Maximum Thrust Force *3 N	30	100		300	
Maximum Holding Force					
At Excitation *4 N	30	100		300	
At Non-Excitation N	0	0	0	0	0
Electromagnetic Brake N	—	—	100	—	300
Repetitive Positioning Accuracy mm	±0.02				
Lost Motion mm	0.1				
Resolution *5 mm	0.002	0.004		0.008	
Pitch (Lead) mm	1	2		4	
Stroke mm	30	40		50	
Mass (Mass with adjusting knob) kg	0.18 (0.19)	0.6 (0.6)	0.8	1.3 (1.35)	1.7
Actuator Dimensions No.	[3]	[4]	[5]	[6]	[7]

*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°C to +10°C).

DRL20: 13 mm/s, **DRL28:** 15 mm/s, **DRL42:** 20 mm/s, **DRL60:** 24 mm/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).

*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.

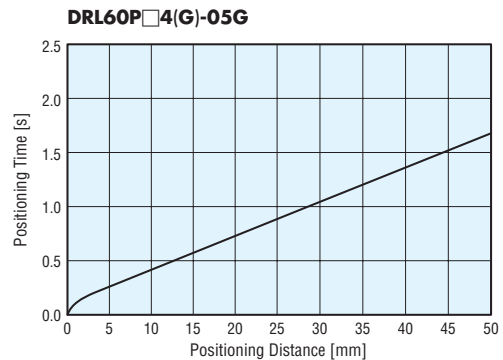
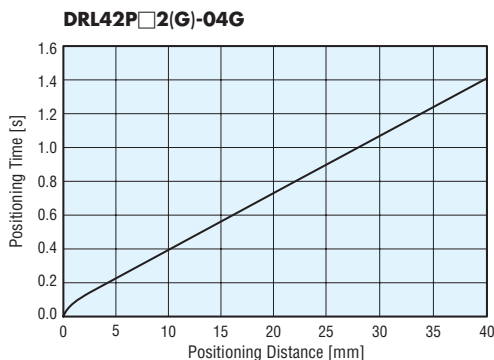
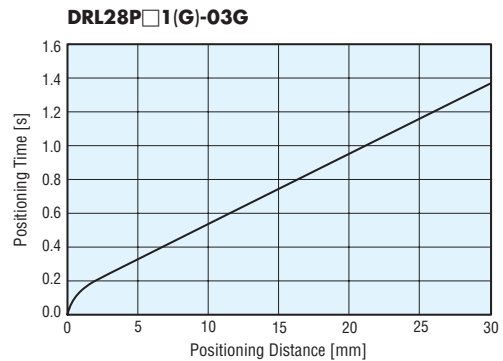
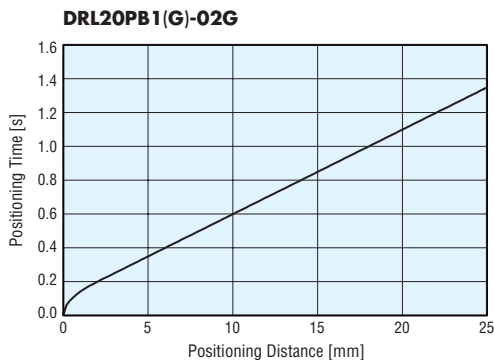
Note: Use the actuator in conditions where its surface temperature will not exceed 90°C.

The repetitive positioning accuracy is measured at a specified temperature under a specified load.

Minimum Positioning Time

The graph below represents the value when moving of the recommended speed and acceleration rate.

Common to ground ball screw and rolled ball screw.



● Actuator Unit: Ground Ball Screw, Guide Type

Model	DRL20PB1G-02G	DRL28PB1G-03G	DRL42PB2G-04G	DRL42PB2G-04MG	DRL60PB4G-05G	DRL60PB4G-05MG
	DRL20PB1G-02NG	DRL28PB1G-03NG	DRL42PB2G-04NG			
Motor Type	5-Phase Stepping Motor					
Screw Type	Ground Ball Screw					
Electromagnetic Brake	Not equipped	Not equipped	Not equipped	Equipped	Not equipped	Equipped
Max. Horizontal Transportable Mass (Fig. A) kg	0.5	1		2		3
Max. Vertical Transportable Mass (Fig. B)* ¹ kg	1	1.5		5		15
Maximum Speed * ² mm/s	20	24		30		32
Maximum Acceleration m/s ²	0.2	0.2		0.4		0.26
Maximum Thrust Force * ³ N	15	30		100		300
Maximum Holding Force	At Excitation* ⁴ N		At Non-Excitation N		Electromagnetic Brake N	
	15	30	0	0	0	0
	0	0	0	0	0	0
	—	—	—	100	—	300
Maximum Load Moment N·m	Mp:0 My:0 Mr:0	Mp:0 My:0 Mr:0	Mp:0.5 My:0.25 Mr:0.8		Mp:0.6 My:0.35 Mr:2.2	
Repetitive Positioning Accuracy mm	①±0.005 ②±0.01		①±0.005 ②±0.01			
Lost Motion mm	0.05					
Resolution * ⁵ mm	0.002		0.004		0.008	
Pitch (Lead) mm	1		2		4	
Stroke mm	25		30		50	
Mass (Mass with adjusting knob) kg	0.14 (0.15)	0.25 (0.26)	0.8 (0.8)	1	1.8 (1.85)	2.2
Actuator Dimensions No.	⑧	⑨	⑩	⑪	⑫	⑬

● Actuator Unit: Rolled Ball Screw, Guide Type

Model	DRL28PA1G-03G	DRL42PA2G-04G	DRL42PA2G-04MG	DRL60PA4G-05G	DRL60PA4G-05MG	
	DRL28PA1G-03NG	DRL42PA2G-04NG		DRL60PA4G-05NG		
Motor Type	5-Phase Stepping Motor					
Screw Type	Rolled Ball Screw					
Electromagnetic Brake	Not equipped	Not equipped	Equipped	Not equipped	Equipped	
Max. Horizontal Transportable Mass (Fig. A) kg	1	2		3		
Max. Vertical Transportable Mass (Fig. B)* ¹ kg	1.5	5		15		
Maximum Speed * ² mm/s	24	30		32		
Maximum Acceleration m/s ²	0.2	0.4		0.26		
Maximum Thrust Force * ³ N	30	100		300		
Maximum Holding Force	At Excitation* ⁴ N		At Non-Excitation N		Electromagnetic Brake N	
	30	0	0	0	0	0
	0	0	0	0	0	0
	—	—	100	—	300	
Maximum Load Moment N·m	Mp:0 My:0 Mr:0	Mp:0.5 My:0.25 Mr:0.8	Mp:0.6 My:0.35 Mr:2.2			
Repetitive Positioning Accuracy mm	±0.02					
Lost Motion mm	0.1					
Resolution * ⁵ mm	0.002	0.004		0.008		
Pitch (Lead) mm	1	2		4		
Stroke mm	30	40		50		
Mass (Mass with adjusting knob) kg	0.25 (0.26)	0.8 (0.8)	1	1.8 (1.85)	2.2	
Actuator Dimensions No.	⑨	⑩	⑪	⑫	⑬	

*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°C to +10°C).

DRL20: 13 mm/s, **DRL28:** 15 mm/s, **DRL42:** 20 mm/s, **DRL60:** 24 mm/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).

*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.

The repetitive positioning accuracy is measured at a specified temperature under a specified load.

● Maximum Transportable Mass

Figure A

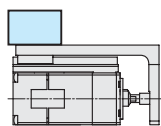
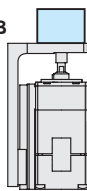
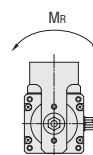
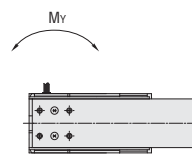
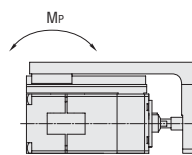


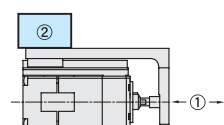
Figure B



● Load Moment



● 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.

Specifications

Electromagnetic Brake Specifications (Common to standard type and guide type)

Type of Brake	Power Off Activated Type
Power Input Voltage/Current	DRL42: 24 VDC $\pm 5\%$ 0.08A DRL60: 24 VDC $\pm 5\%$ 0.25A
Brake Activate/Release Time	Activate Time: 20 ms Release Time: 30 ms
Rating	Continuous

Driver Specifications

CRD51□□P

Driver Model		CRD5103P	CRD5107P	CRD5114P
Power Source*	Voltage	24 VDC $\pm 10\%$		
	Current	0.7A	1.4A	2.5A
Input Signals	Input Signal Circuit	Photocoupler input, Input resistance 220 Ω , Input current 10 to 20 mA Photocoupler ON: +4.5 V to 5.25 V, Photocoupler OFF: 0 to 1 V (Voltage between terminals)		
	Pulse Signal (CW Pulse Signal)	Step command signal (CW direction operation command signal at 2-pulse input mode), Negative logic pulse input Pulse width: 1 μ s minimum, Pulse rise/fall time: 2 μ s maximum, Pulse duty 50% maximum Screw shaft moves one step forward when the pulse input is switched from photocoupler ON to OFF. Maximum input pulse frequency: 500 kHz (when the pulse duty is 50%)		
	Rotation Direction Signal (CCW Pulse Signal)	Rotation direction command signal, Photocoupler ON: CW, Photocoupler OFF: CCW, Pulse width: 1 μ s minimum, Pulse rise/fall time: 2 μ s maximum, Pulse duty 50% maximum CCW direction operation command signal at 2-pulse input mode, Negative logic pulse input Pulse width: 1 μ s minimum, Pulse rise/fall time: 2 μ s maximum, Pulse duty 50% maximum Screw shaft moves one step backward when the pulse input is switched from photocoupler ON to OFF. Maximum input pulse frequency: 500 kHz (when the pulse duty is 50%)		
	Resolution Select Signal	Resolution specified in DATA1 when "photocoupler OFF" Resolution specified in DATA2 when "photocoupler ON"		
	All Windings OFF Signal	When in the "photocoupler ON" state, the current to the actuator is cut off. When in the "photocoupler OFF" state, the current level set by the RUN switch is supplied to the actuator.		
	Automatic Current Cutback Release Signal	When in the "photocoupler ON" state, the automatic current cutback at actuator standstill function is released. When in the "photocoupler OFF" state, the automatic current cutback function is activated after actuator stops (approximately 100 ms).		
Output signals	Output Signal Circuit	Photocoupler, Open-collector output, External use condition: 24 VDC maximum, 10 mA maximum		
	Excitation Timing Signal	The signal is output every time the excitation sequence returns to the initial stage "0". (photocoupler ON) When resolution set at 1 (0.72°/step): Signal is output every 10 pulses When resolution set at 10 (0.072°/step): Signal is output every 100 pulses		
Functions	Automatic current cutback, Resolution select, Pulse input mode select, Smooth drive function, All windings off, Excitation timing			
Cooling Method	Natural Ventilation			
Mass	0.04 kg			
Dimensions No.	14			

*The power source input current value represents the maximum current. (The input current varies according to the pulse frequency.)

General Specifications

This is the value after rated operation at normal temperature and normal humidity.

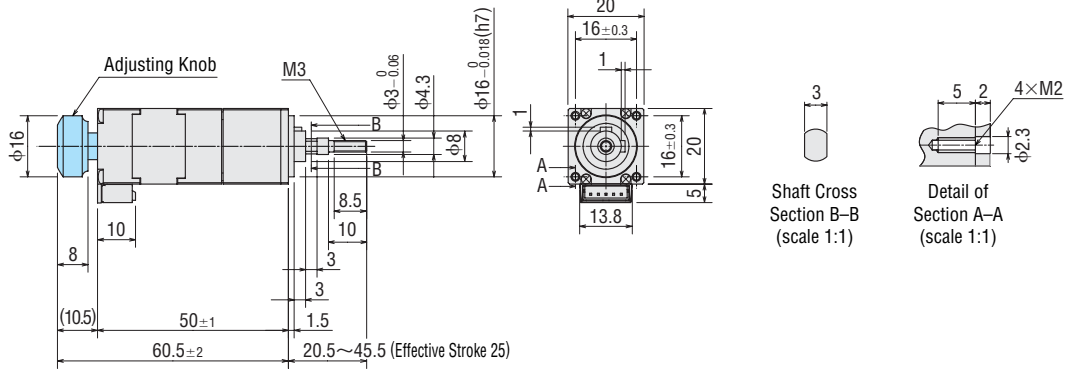
Specifications	Actuator Unit	Driver Unit
Motor Insulation Class	Class B (130°C) [Recognized as Class A (105°C) by UL standard]	—
Insulation Resistance	100M Ω minimum when measured by a 500 VDC megger between the windings and casing.	—
Dielectric Strength	Sufficient to withstand 1.0 kV (DRL20 and DRL28: 0.5 kV) at 50 Hz applied between the windings and the frame for one minute.	—
Operating Environment (In Operation)	Ambient Temperature	0°C~+40°C (nonfreezing)
	Ambient Humidity	85% or less (noncondensing)
	Atmosphere	No corrosive gases, dust, water or oil

Note: Do not measure insulation resistance or perform the dielectric strength test while the actuator and driver are connected.

Dimensions scale 1: 2, unit= mm

● Actuator Unit: Standard Type

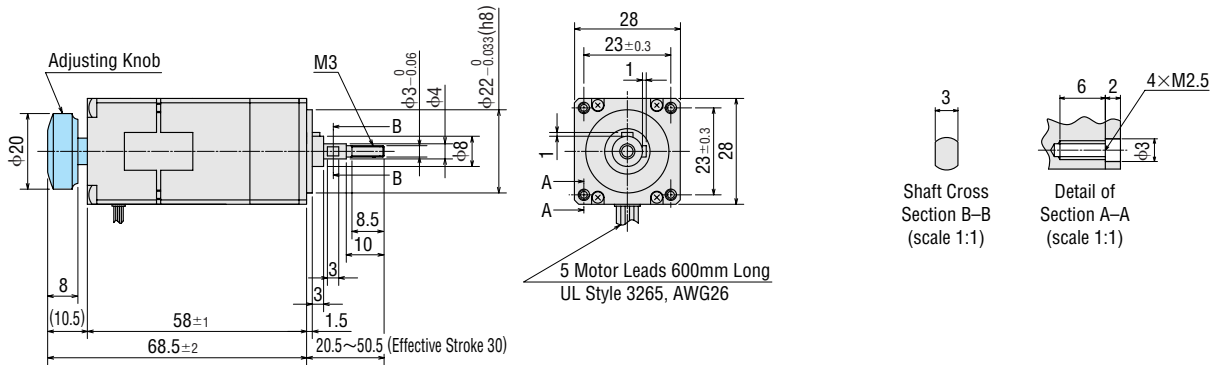
	Actuator Model	Mass
① DRL20PB1-02G (Without additional function)	DRL20PB1-02	0.08kg
DRL20PB1-02NG (With adjusting knob)	DRL20PB1-02N	0.08kg



● The actuator comes equipped with a motor cable with connector (0.6 m).
UL Style 3265, AWG24

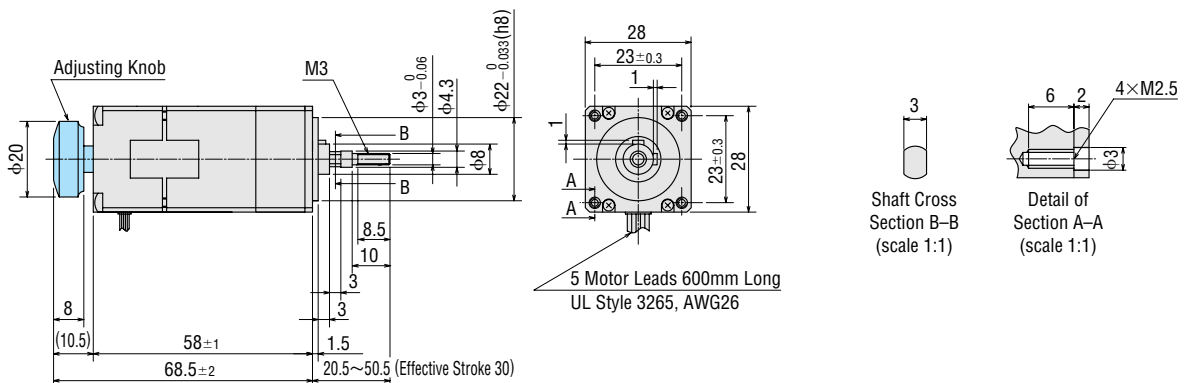
*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

	Actuator Model	Mass
② DRL28PB1-03G (Without additional function)	DRL28PB1-03	0.18kg
DRL28PB1-03NG (With adjusting knob)	DRL28PB1-03N	0.19kg



*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

	Actuator Model	Mass
③ DRL28PA1-03G (Without additional function)	DRL28PA1-03	0.18kg
DRL28PA1-03NG (With adjusting knob)	DRL28PA1-03N	0.19kg

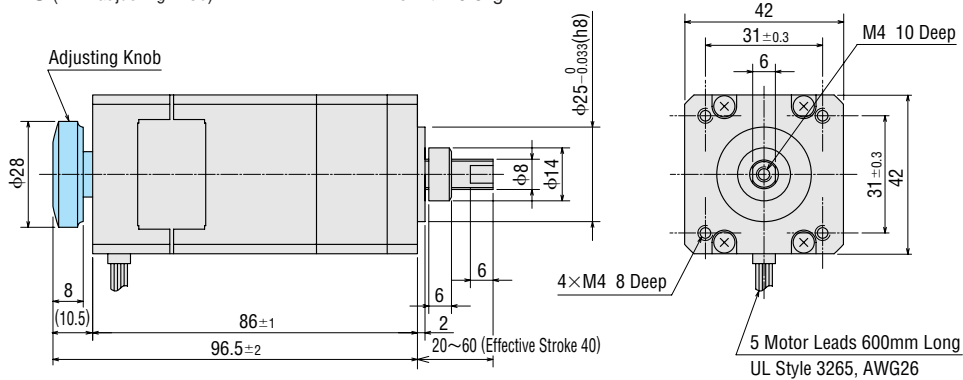


*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

Dimensions

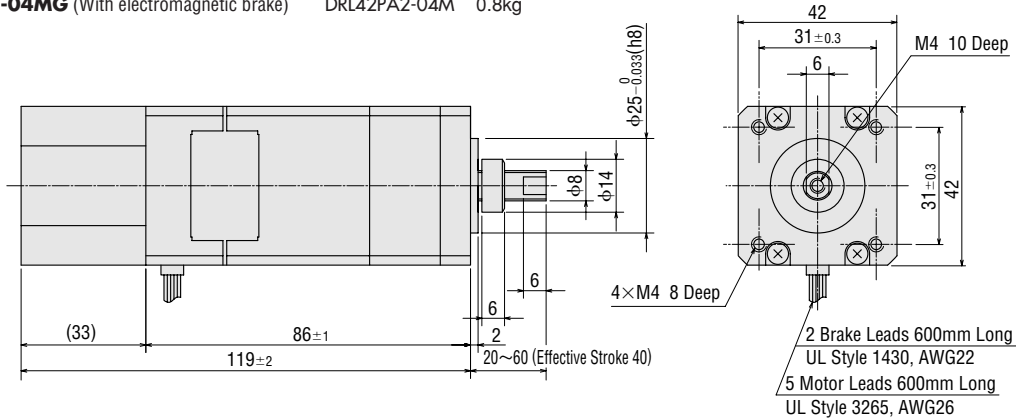
scale 1: 2, unit= mm

	Actuator Model	Mass
4 DRL42PB2-04G (Without additional function)	DRL42PB2-04	0.6kg
DRL42PA2-04G (Without additional function)	DRL42PA2-04	0.6kg
DRL42PB2-04NG (With adjusting knob)	DRL42PB2-04N	0.6kg
DRL42PA2-04NG (With adjusting knob)	DRL42PA2-04N	0.6kg

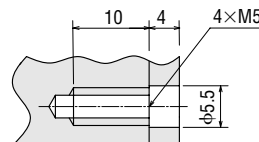
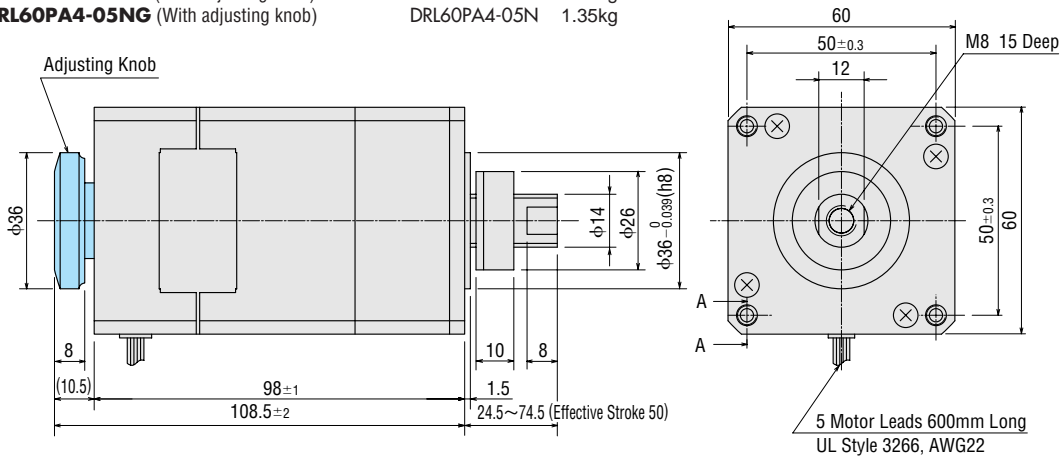


*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

	Actuator Model	Mass
5 DRL42PB2-04MG (With electromagnetic brake)	DRL42PB2-04M	0.8kg
DRL42PA2-04MG (With electromagnetic brake)	DRL42PA2-04M	0.8kg



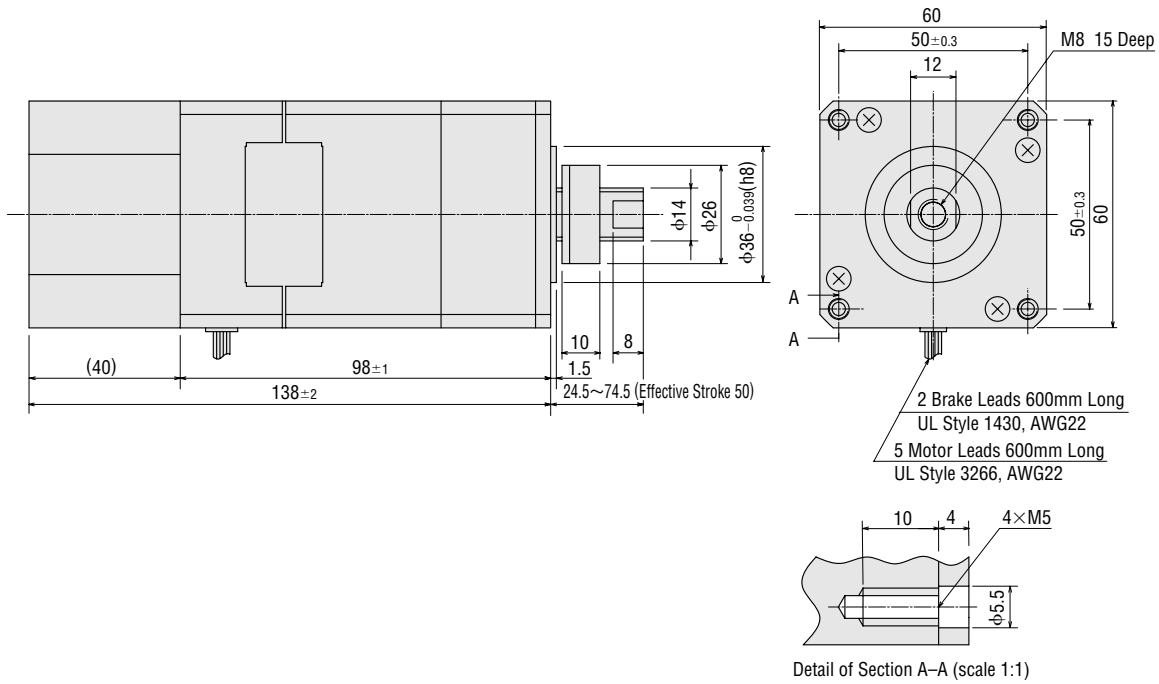
	Actuator Model	Mass
6 DRL60PB4-05G (Without additional function)	DRL60PB4-05	1.3kg
DRL60PA4-05G (Without additional function)	DRL60PA4-05	1.3kg
DRL60PB4-05NG (With adjusting knob)	DRL60PB4-05N	1.35kg
DRL60PA4-05NG (With adjusting knob)	DRL60PA4-05N	1.35kg



Detail of Section A-A (scale 1:1)

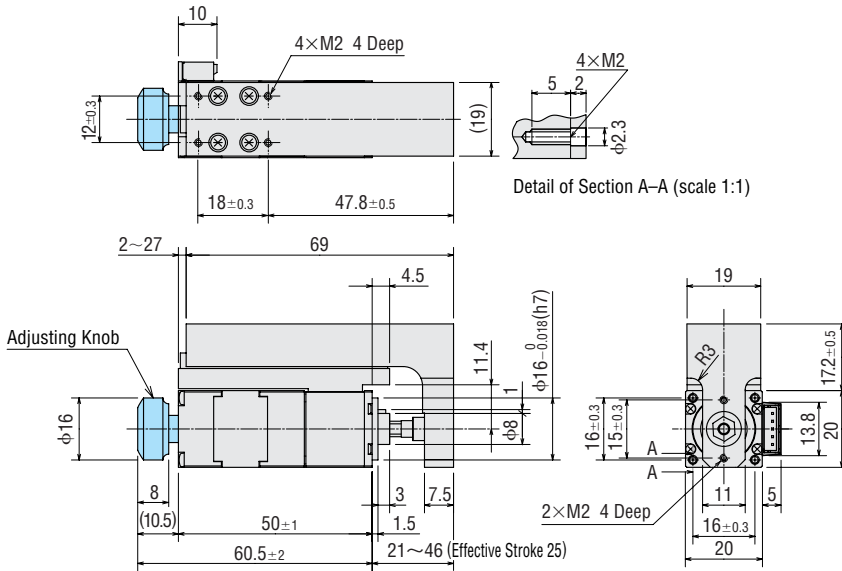
*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

	Actuator Model	Mass
7 DRL60PB4-05MG (With electromagnetic brake)	DRL60PB4-05M	1.7kg
DRL60PA4-05MG (With electromagnetic brake)	DRL60PA4-05M	1.7kg



● Actuator Unit: Guide Type

	Actuator Model	Mass
8 DRL20PB1G-02G (Without additional function)	DRL20PB1G-02	0.14kg
DRL20PB1G-02NG (With adjusting knob)	DRL20PB1G-02N	0.15kg



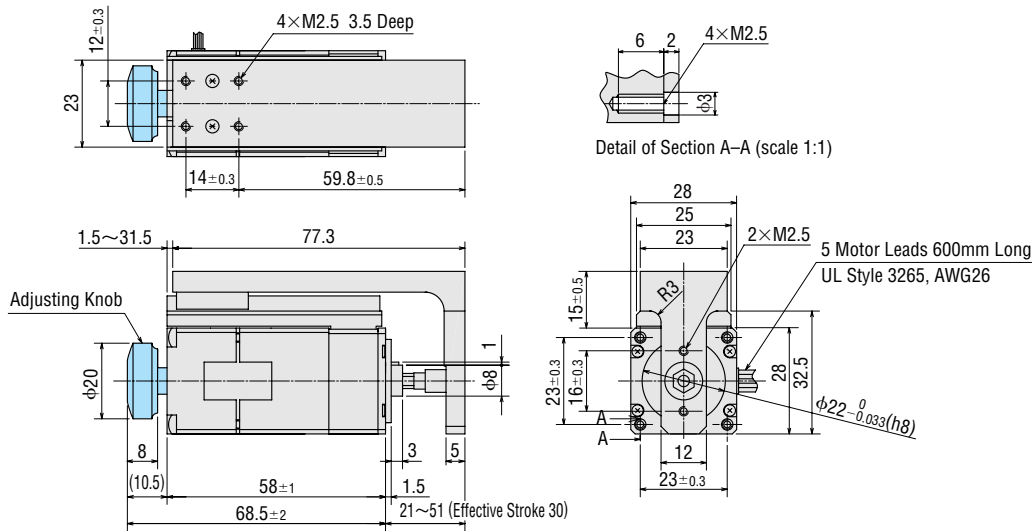
- The actuator comes equipped with a motor cable with connector (0.6 m).
UL Style 3265, AWG24

*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

Dimensions

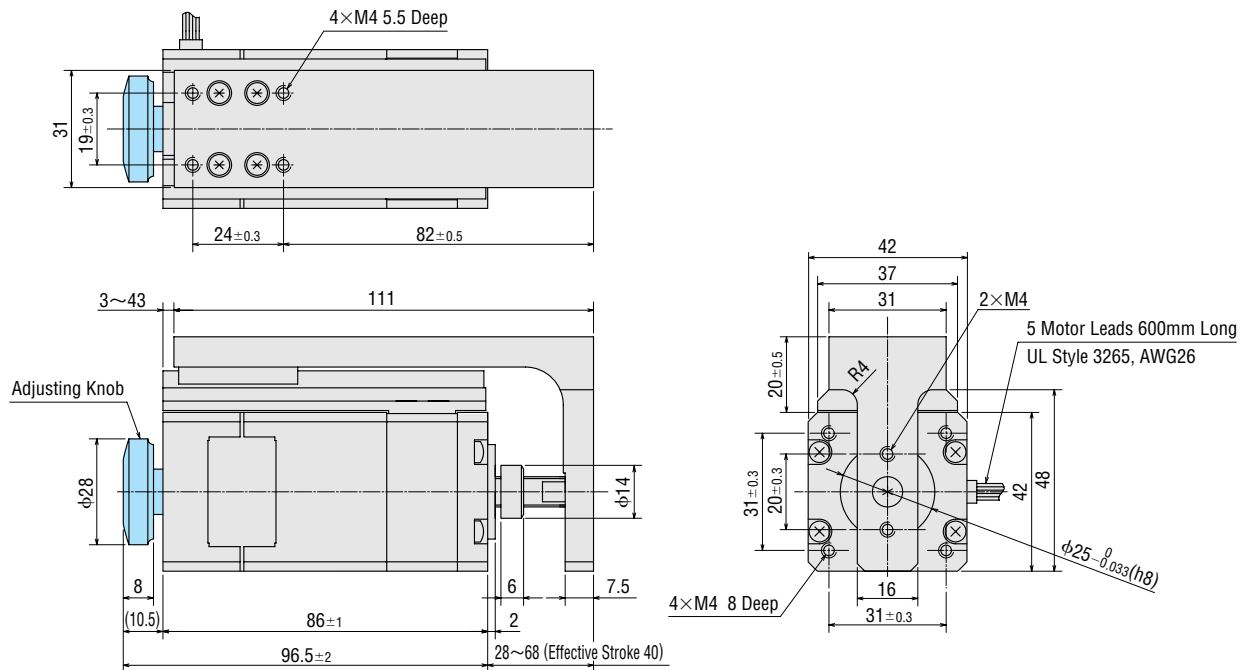
scale 1: 2, unit= mm

	Actuator Model	Mass
9 DRL28PB1G-03G (Without additional function)	DRL28PB1G-03	0.25kg
DRL28PA1G-03G (Without additional function)	DRL28PA1G-03	0.25kg
DRL28PB1G-03NG (With adjusting knob)	DRL28PB1G-03N	0.26kg
DRL28PA1G-03NG (With adjusting knob)	DRL28PA1G-03N	0.26kg



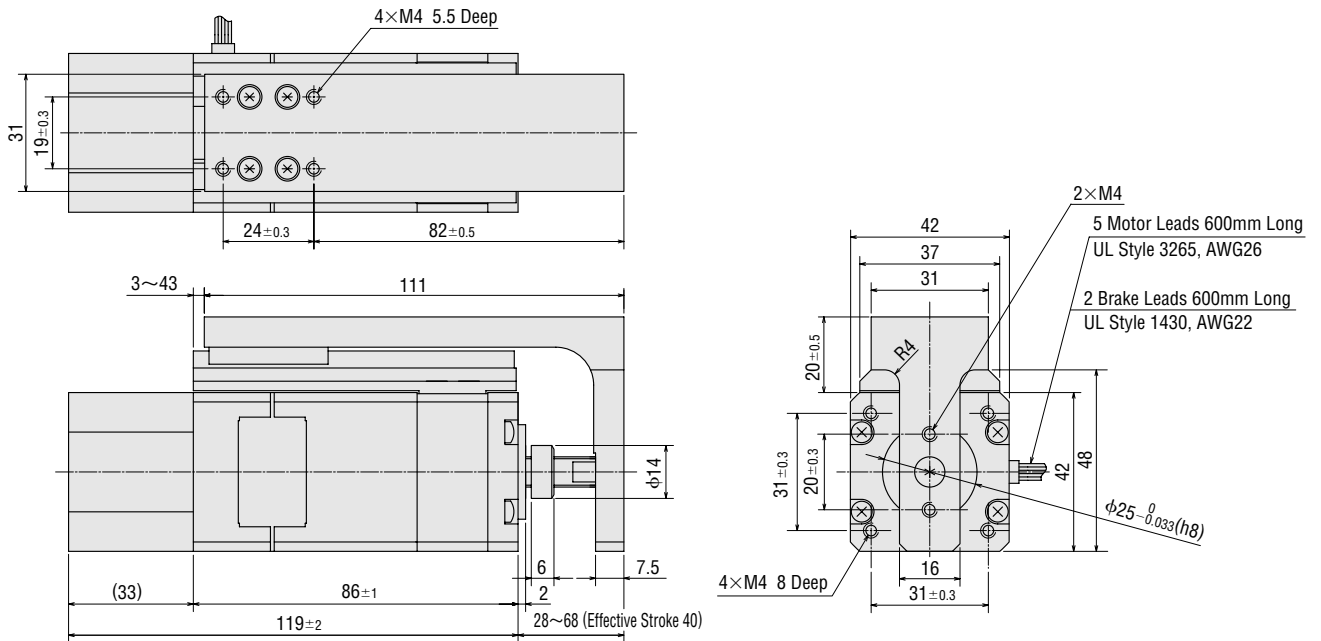
*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

	Actuator Model	Mass
10 DRL42PB2G-04G (Without additional function)	DRL42PB2G-04	0.8kg
DRL42PA2G-04G (Without additional function)	DRL42PA2G-04	0.8kg
DRL42PB2G-04NG (With adjusting knob)	DRL42PB2G-04N	0.8kg
DRL42PA2G-04NG (With adjusting knob)	DRL42PA2G-04N	0.8kg

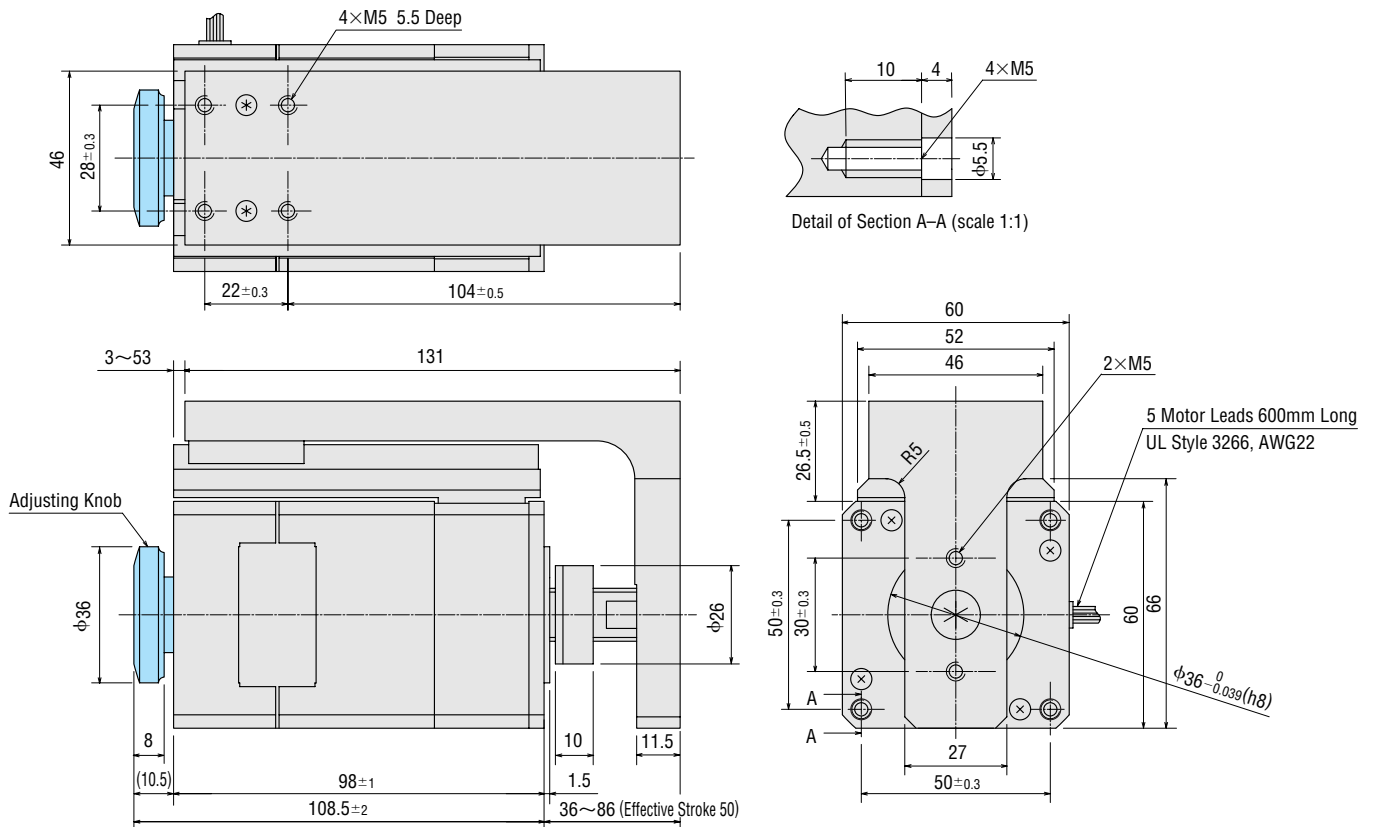


*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

	Actuator Model	Mass
11 DRL42PB2G-04MG (With electromagnetic brake)	DRL42PB2G-04M	1kg
DRL42PA2G-04MG (With electromagnetic brake)	DRL42PA2G-04M	1kg



	Actuator Model	Mass
12 DRL60PB4G-05G (Without additional function)	DRL60PB4G-05	1.8kg
DRL60PA4G-05G (Without additional function)	DRL60PA4G-05	1.8kg
DRL60PB4G-05NG (With adjusting knob)	DRL60PB4G-05N	1.85kg
DRL60PA4G-05NG (With adjusting knob)	DRL60PA4G-05N	1.85kg

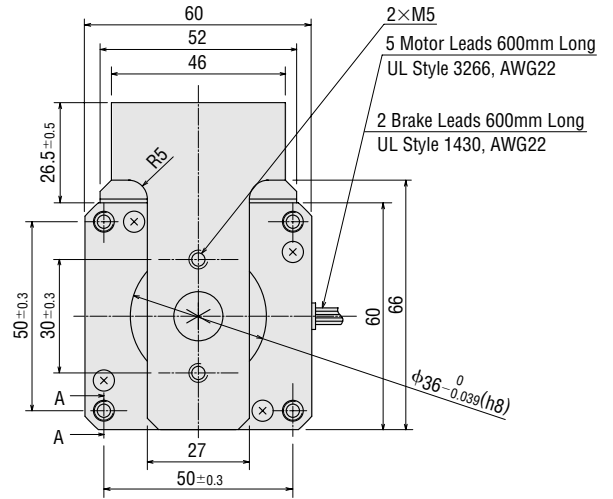
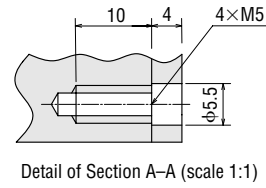
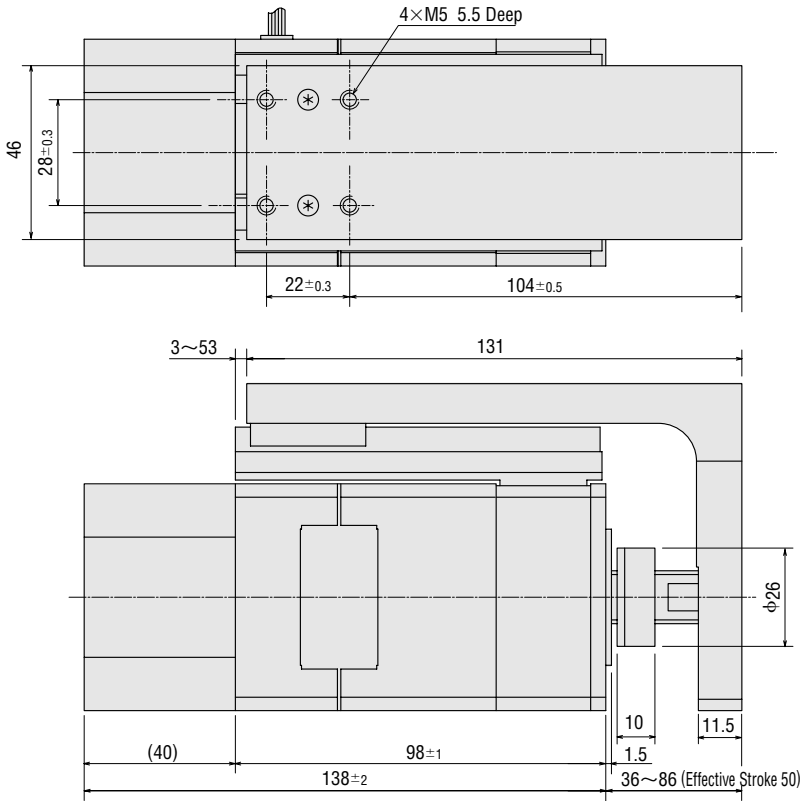


*This dimensional drawing applies to a configuration with adjusting knob. If this is not used, the shaft and adjusting knob shown in area should be ignored.

Dimensions

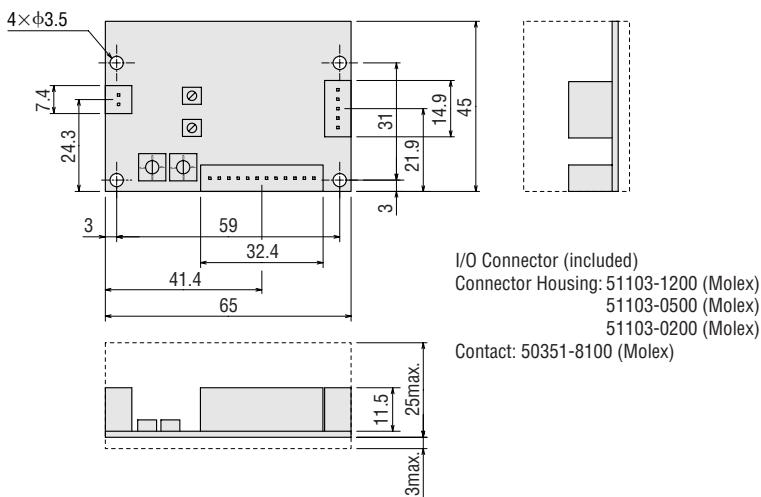
scale 1:2, unit= mm

	Actuator Model	Mass
13 DRL60PB4G-05MG (With electromagnetic brake)	DRL60PB4G-05M	2.2kg
DRL60PA4G-05MG (With electromagnetic brake)	DRL60PA4G-05M	2.2kg



Driver Unit (scale: 1/4)

14 Driver Model: CRD5103P, CRD5107P, CRD5114P
Mass: 0.04kg



Note: When assembling the connector, use the hand-operated crimp tool for contact 57295-5000 (Molex). The crimp tool is not provided with the products. They must be furnished separately.
Optional cables, the lead wires with connectors, are available as optional parts (sold separately).
Optional Cable → Page 23

Actuator & Driver Combinations

Ground Ball Screw

Type	Additional Functions	Model	Actuator Model	Driver Model
Standard Type	None	DRL20PB1-02G	DRL20PB1-02	CRD5103P
	With Adjusting Knob	DRL20PB1-02NG	DRL20PB1-02N	CRD5103P
	None	DRL28PB1-03G	DRL28PB1-03	CRD5107P
	With Adjusting Knob	DRL28PB1-03NG	DRL28PB1-03N	CRD5107P
	None	DRL42PB2-04G	DRL42PB2-04	CRD5107P
	With Electromagnetic Brake	DRL42PB2-04MG	DRL42PB2-04M	CRD5107P
	With Adjusting Knob	DRL42PB2-04NG	DRL42PB2-04N	CRD5107P
	None	DRL60PB4-05G	DRL60PB4-05	CRD5114P
Guide Type	With Electromagnetic Brake	DRL60PB4-05MG	DRL60PB4-05M	CRD5114P
	With Adjusting Knob	DRL60PB4-05NG	DRL60PB4-05N	CRD5114P
	None	DRL20PB1G-02G	DRL20PB1G-02	CRD5103P
	With Adjusting Knob	DRL20PB1G-02NG	DRL20PB1G-02N	CRD5103P
	None	DRL28PB1G-03G	DRL28PB1G-03	CRD5107P
	With Adjusting Knob	DRL28PB1G-03NG	DRL28PB1G-03N	CRD5107P
	None	DRL42PB2G-04G	DRL42PB2G-04	CRD5107P
	With Electromagnetic Brake	DRL42PB2G-04MG	DRL42PB2G-04M	CRD5107P
Guide Type	With Adjusting Knob	DRL42PB2G-04NG	DRL42PB2G-04N	CRD5107P
	None	DRL60PB4G-05G	DRL60PB4G-05	CRD5114P
	With Electromagnetic Brake	DRL60PB4G-05MG	DRL60PB4G-05M	CRD5114P
	With Adjusting Knob	DRL60PB4G-05NG	DRL60PB4G-05N	CRD5114P

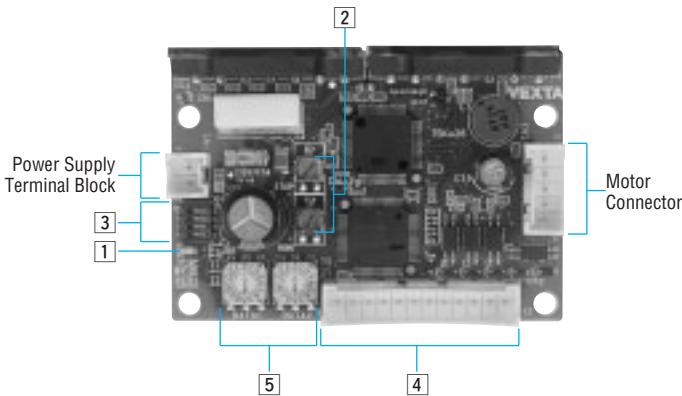
Rolled Ball Screw

Type	Additional Functions	Model	Actuator Model	Driver Model
Standard Type	None	DRL28PA1-03G	DRL28PA1-03	CRD5107P
	With Adjusting Knob	DRL28PA1-03NG	DRL28PA1-03N	CRD5107P
	None	DRL42PA2-04G	DRL42PA2-04	CRD5107P
	With Electromagnetic Brake	DRL42PA2-04MG	DRL42PA2-04M	CRD5107P
	With Adjusting Knob	DRL42PA2-04NG	DRL42PA2-04N	CRD5107P
	None	DRL60PA4-05G	DRL60PA4-05	CRD5114P
	With Electromagnetic Brake	DRL60PA4-05MG	DRL60PA4-05M	CRD5114P
	With Adjusting Knob	DRL60PA4-05NG	DRL60PA4-05N	CRD5114P
Guide Type	None	DRL28PA1G-03G	DRL28PA1G-03	CRD5107P
	With Adjusting Knob	DRL28PA1G-03NG	DRL28PA1G-03N	CRD5107P
	None	DRL42PA2G-04G	DRL42PA2G-04	CRD5107P
	With Electromagnetic Brake	DRL42PA2G-04MG	DRL42PA2G-04M	CRD5107P
	With Adjusting Knob	DRL42PA2G-04NG	DRL42PA2G-04N	CRD5107P
	None	DRL60PA4G-05G	DRL60PA4G-05	CRD5114P
	With Electromagnetic Brake	DRL60PA4G-05MG	DRL60PA4G-05M	CRD5114P
	With Adjusting Knob	DRL60PA4G-05NG	DRL60PA4G-05N	CRD5114P

Connection and Operation

[CRD51□□P]

Names and Functions of Driver Parts



1 Power Input Display

Color	Function	ON Condition
Green	Power supply indication	When the power is input.

2 Current Adjustment Potentiometers

Marking	Potentiometer Name	Function
RUN	Motor Operating Current Adjustment Potentiometer	For adjusting the operating current of the motor.
STOP	Motor Standstill Current Adjustment Potentiometer	For adjusting the standstill current of the motor.

3 Function Switches

Marking	Switch Name	Function
1P/2P	Pulse Input Mode Switch	Switches between 1-pulse input mode and 2-pulse input mode.
OFF/SD	Smooth Drive Function Switch	Enables or disables the Smooth Drive Function.
R2/R1	Resolution Select Switch	Switches the base resolution between R1 and R2.

4 Input/Output Signals

Marking	I/O	Pin No.	Signal Name	Function
CN2	Input Signals	1	Pulse Signal (CW Pulse Signal)	Operation command pulse signal (CW direction operation command pulse signal in 2-pulse input mode)
		2	Rotation Direction Signal (CCW Pulse Signal)	Rotation direction signal (Photocoupler "ON" = CW, photocoupler "OFF" = CCW (CCW direction operation command pulse signal in 2-pulse input mode))
		3	All Windings OFF Signal	Turns off the output current to the motor so that the motor shaft can be rotated by external force.
		4	Resolution Select Signal	Switches to the resolution set in DATA1 and DATA2.
		5	Current Cutback Release Signal	Disables the automatic current cutback function.
		6	Excitation Timing Signal	This signal is output when the excitation sequence is in step "0."
		7	Output Signals	
		8		
		9		
		10		

5 Resolution Setting Switches

Indicator	Switch Name	Functions
DATA1	Resolution Setting Switches	Each switch can be set to the desired resolution from the 16 resolution levels.
DATA2		

[DRL20, DRL28]

R1			R2		
Resolution Setting Switch DATA1 DATA2	Division Number 1	Resolution 1 (mm)	Resolution Setting Switch DATA1 DATA2	Division Number 2	Resolution 2 (mm)
0	1	0.002	0	×2.5	0.005
1	2	0.001	1	×1.25	0.004
2	2.5	0.0008	2	1.6	0.00125
3	4	0.0005	3	2	0.001
4	5	0.0004	4	3.2	0.000625
5	8	0.00025	5	4	0.0005
6	10	0.0002	6	6.4	0.0003125
7	20	0.0001	7	10	0.0002
8	25	0.00008	8	12.8	0.00015625
9	40	0.00005	9	20	0.0001
A	50	0.00004	A	25.6	0.000078125
B	80	0.000025	B	40	0.00005
C	100	0.00002	C	50	0.00004
D	125	0.000016	D	51.2	0.0000390625
E	200	0.00001	E	100	0.00002
F	250	0.000008	F	102.4	0.00001953125

[DRL42]

R1			R2		
Resolution Setting Switch DATA1 DATA2	Division Number 1	Resolution 1 (mm)	Resolution Setting Switch DATA1 DATA2	Division Number 2	Resolution 2 (mm)
0	1	0.004	0	×2.5	0.01
1	2	0.002	1	×1.25	0.008
2	2.5	0.0016	2	1.6	0.0025
3	4	0.001	3	2	0.002
4	5	0.0008	4	3.2	0.00125
5	8	0.0005	5	4	0.001
6	10	0.0004	6	6.4	0.000625
7	20	0.0002	7	10	0.0004
8	25	0.00016	8	12.8	0.0003125
9	40	0.0001	9	20	0.0002
A	50	0.00008	A	25.6	0.00015625
B	80	0.00005	B	40	0.0001
C	100	0.00004	C	50	0.00008
D	125	0.000032	D	51.2	0.000078125
E	200	0.00002	E	100	0.00004
F	250	0.000016	F	102.4	0.0000390625

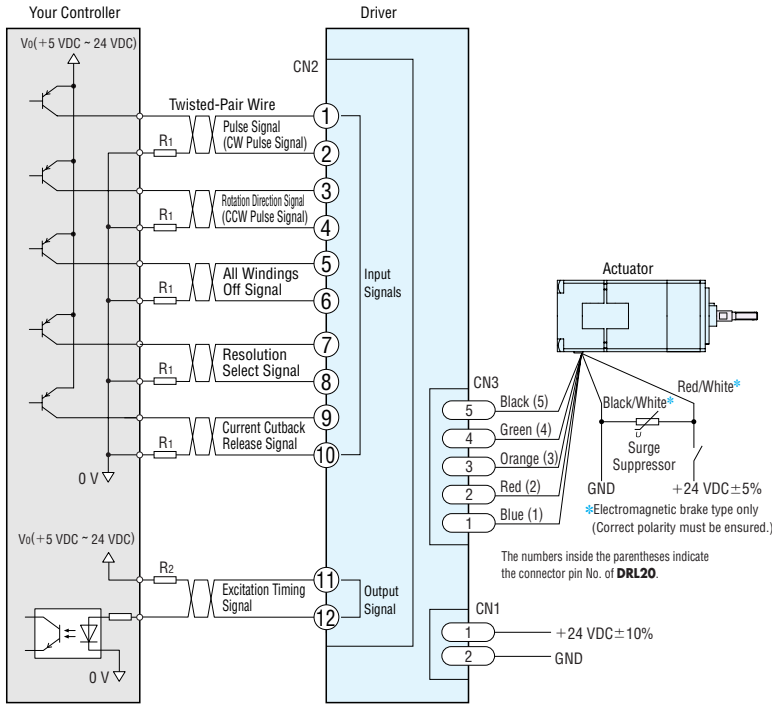
[DRL60]

R1			R2		
Resolution Setting Switch DATA1 DATA2	Division Number 1	Resolution 1 (mm)	Resolution Setting Switch DATA1 DATA2	Division Number 2	Resolution 2 (mm)
0	1	0.008	0	×2.5	0.02
1	2	0.004	1	×1.25	0.016
2	2.5	0.0032	2	1.6	0.005
3	4	0.002	3	2	0.004
4	5	0.0016	4	3.2	0.0025
5	8	0.001	5	4	0.002
6	10	0.0008	6	6.4	0.00125
7	20	0.0004	7	10	0.0008
8	25	0.00032	8	12.8	0.000625
9	40	0.0002	9	20	0.0004
A	50	0.00016	A	25.6	0.0003125
B	80	0.0001	B	40	0.0002
C	100	0.00008	C	50	0.00016
D	125	0.000064	D	51.2	0.00015625
E	200	0.00004	E	100	0.00008
F	250	0.000032	F	102.4	0.000078125

Notes:

- Resolution = Base resolution / Division number
- The division numbers that can be specified by the C/S (resolution select) signal are limited to those selected in resolution 1 or resolution 2.
- Do not change the C/S input or resolution select switch while the actuator is operating. It may cause the actuator to malfunction.

Connection Diagrams



Connecting Input Signal

- Keep the input signal V_0 between 5 VDC and 24 VDC. When V_0 is equal to 5 VDC, the external resistance R_1 is not necessary. When V_0 is above 5 VDC, connect R_1 to keep the current between 10 mA and 20 mA. For example: When V_0 is 24 VDC R_1 : 1.5~2.2 k Ω , 0.5 W or more
- Keep the output signal voltage V_0 between 5 VDC and 24 VDC, current 10 mA or less. When V_0 is above 10 mA, connect R_2 to keep the current 10 mA or less.

Power Supply

- Use a power supply that can supply sufficient input current. When power supply capacity is insufficient, a decrease in actuator output can cause the following malfunctions:
- Actuator does not move properly at high-speed (insufficient thrust)
 - Slow actuator startup and stopping

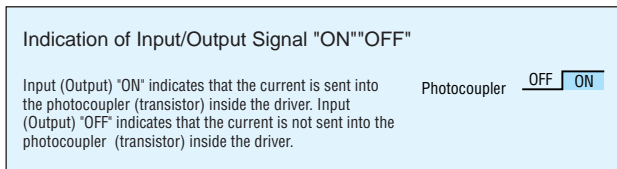
Connecting a Power Supply for Electromagnetic Brake

- Connect the red/white lead from the actuator to the +24 V terminal on the DC power supply and the black/white lead to the GND terminal. (The electromagnetic brake leads have polarity. The electromagnetic brake will not operate if the leads are connected in reverse polarity.)
- For the electromagnetic brake, use a power supply of 24 VDC $\pm 5\%$, 0.1 A or above for **DRL42**, or 24 VDC $\pm 5\%$, 0.3 A or above for **DRL60**.
- To connect the electromagnetic brake to the DC power supply, use a shielded cable of AWG24 (0.2 mm²) or above and keep the wiring distance to a minimum. Be sure to use the supplied surge suppressor to protect switch contact and suppress noise.

Notes:

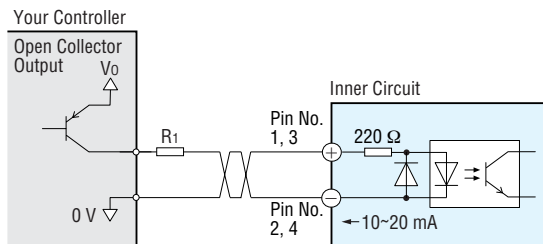
- Use twisted-pair wire of AWG 24 to AWG 22 (0.2 mm² to 0.3 mm²) and 2 m or less in length for the signal line.
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.
- Use cable of AWG 22 (0.3 mm²) for the power line. When assembling the connector, use the hand-operated crimp tool or the crimp optional cable (sold separately). The crimp tool is not provided with the package. They must be furnished separately.
- Signal lines should be kept at least 2 cm away from power lines (power supply lines and actuator lines). Do not wire the signal lines with the power lines in the same duct or bundle them together.
- If noise generated by the motor lead wires cause a problem, inset the ferrite core into the motor lead wire.
- Incorrect connection of DC power input will lead to driver damage. Make sure that the polarity is correct before turning the power on.

Description of Input/Output Signals



[PLS (CW), DIR. (CCW) Signal Input]

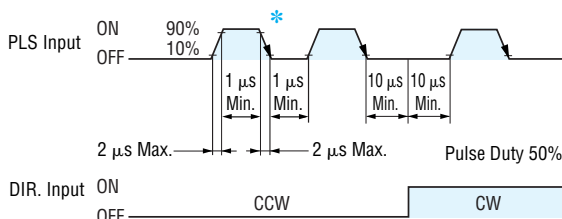
Input Circuit and Sample Connection



Note:

- Keep the input signal voltage V_0 between 5 VDC and 24 VDC. When V_0 is equal to 5 VDC, the external resistance R_1 is not necessary. When V_0 is above 5 VDC, connect R_1 to keep the current between 10 mA and 20 mA.

Pulse Waveform



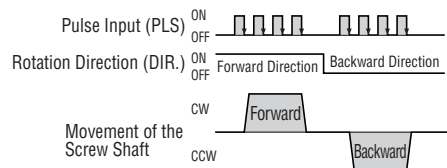
*The shaded area indicates when the photocoupler diode is ON. The actuator moves when the photocoupler state changes from ON to OFF.

*The minimum interval time when changing rotation direction is 10 μ s. This value varies greatly depending on the actuator type and load inertia.

Pulse Input Mode

[1-Pulse Input Mode]

The 1-pulse input mode uses Pulse (PLS) and Rotation Direction (DIR.) signals. When the PLS input is switched from ON to OFF during the DIR. input is ON, the screw shaft moves one step forward. When the PLS input is switched from ON to OFF during the DIR. input is OFF, the screw shaft moves one step backward.

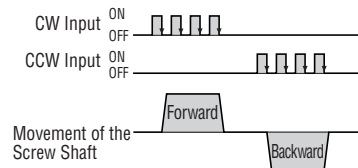


[2-Pulse Input Mode]

The 2-pulse input mode uses CW and CCW pulse signals. When the CW input is switched from ON to OFF, the screw shaft moves one step forward. When the CCW input is switched from ON to OFF, the screw shaft moves one step backward.

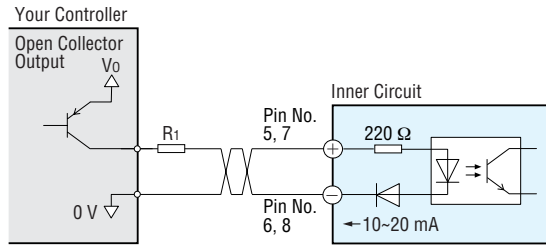
Note:

- Factory setting is 2-pulse input.



All Windings Off (A.W. OFF) /Resolution Select (C/S) /Automatic Current Cutback Release (C.D. INH.) Input

◇ Input Circuit and Sample Connection



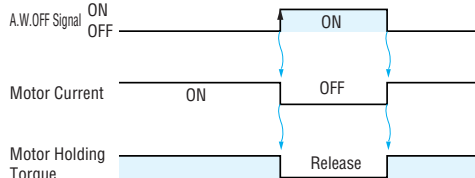
Note:

- Keep the input signal voltage V_o between 5 VDC and 24 VDC. When V_o is equal to 5 VDC, the external resistance R_1 is not necessary. When V_o is above 5 VDC, connect R_2 to keep the current between 10 mA and 20 mA.

◇ All Windings Off (A.W. OFF) Input

Pin No. ⑤, ⑥

- This signal is used when moving the screw shaft for manual positioning.
- When the A.W.OFF input is turned to ON, the motor current turns off and the actuator loses its holding torque.
- When the A.W.OFF input is turned to OFF, the motor current turns on and the actuator regain its holding torque.



Note:

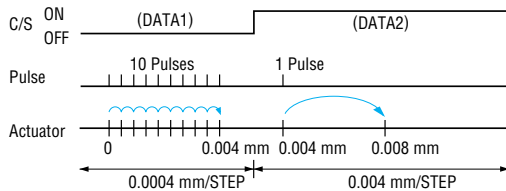
- When operating the actuator, this switch must be "OFF".

◇ Resolution Select (C/S) Input

Pin No. ⑦, ⑧

- This signal is used to switch between two resolutions set by resolution setting switch (DATA1, DATA2). When the "Resolution Select" signal is in the "photocoupler OFF" state, the resolution set by resolution select switch DATA1 is selected. When the "Resolution Select" signal is in the "photocoupler ON" state, the resolution set by resolution select switch DATA2 is selected.

Example: Changing the resolution from 0.0004 mm (10 divisions) to 0.004 mm (1 division)(DRL42)



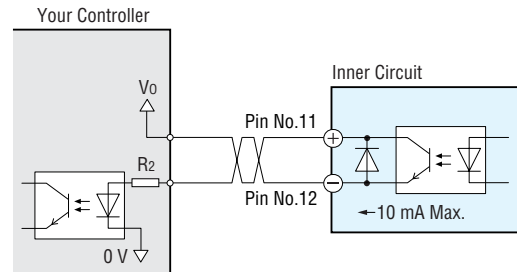
◇ Current Cutback Release (C.D.INH) Input Signal

Pin No. ⑨, ⑩

- Turning the C.D.INH input to "ON" will disable the automatic current cutback function when the actuator is at standstill. Turning the C.D.INH input to "OFF" will enable the automatic current cutback function. When the automatic current cutback function is enabled, the output current to the motor will be automatically reduced within approx. 0.1 second after the pulse input is stopped, thus suppressing heat generation from the motor and driver.

Excitation Timing (TIMING) Output

◇ Output Circuit and Sample Connection

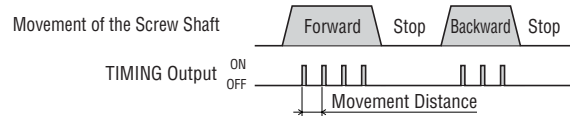


Note:

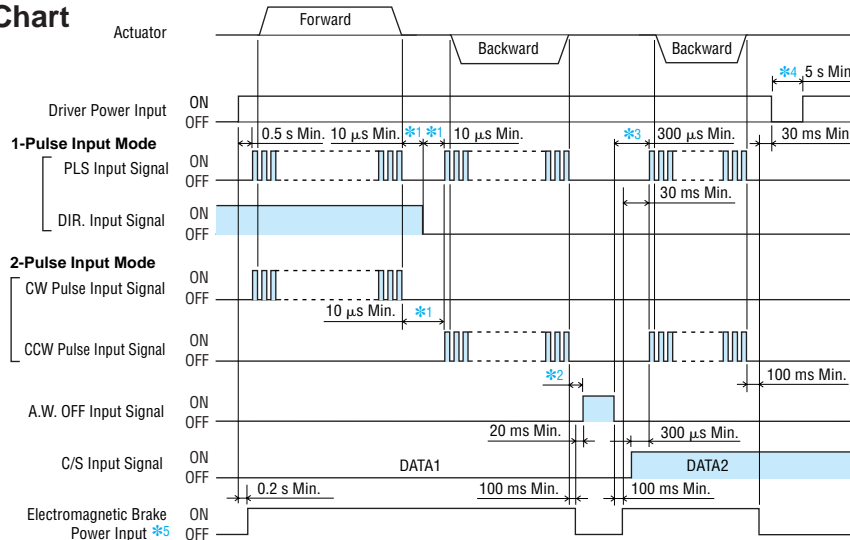
- Keep the output signal voltage V_o between 5 VDC and 24 VDC, current 10 mA or less. When V_o is above 10 mA, connect external resistance R_2 as shown in the figure to keep the current 10 mA or less.

This signal is used for precise home detection, etc. The timing output comes on every particular amount (see the chart below) of the screw shaft movement.

Model	Movement Distance of the Screw Shaft
DRL20	0.02 mm
DRL28	0.02 mm
DRL42	0.04 mm
DRL60	0.08 mm



● Timing Chart



The shaded section indicates that the photocoupler is on.

- *1. Switching time to change direction (1-pulse input mode), and switching time to change CW, CCW pulse (2-pulse input mode) 10 μ s is shown as a response time of circuit. The actuator may need more time.
- *2. Depends on load inertia, load torque, and starting frequency.
- *3. Never input a step pulse signal immediately after switching the "All Windings Off" signal to the "photocoupler OFF" state. The actuator may not start.
- *4. Wait at last 5 seconds before turning on the power again.
- *5. Only for electromagnetic brake type

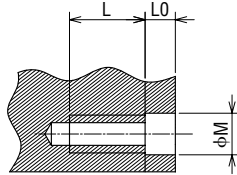
Before Using a Actuator

Installing an Actuator

Installation Method

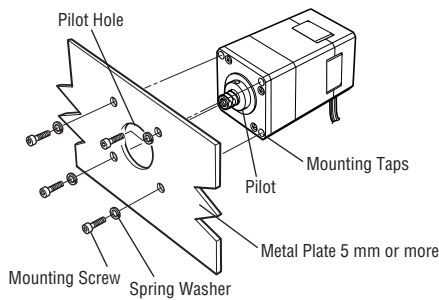
1. Insert the pilot located on the actuator mounting surface into the metal plate's countersunk hole or through-hole.
2. Install the actuator to a metal plate or a device with mounting screws, using mounting tap of the actuator (①), or using a mounting plate (②) (accessories).

● Details of Mounting Tap (Unit = mm)



Model	Nominal Diameter	Tightening Torque N·m	Dimension of Mounting Tap (mm)		
			φM	L0	L (Effective Depth)
DRL20	M2	0.4	2.3	2	5
DRL28	M2.5	0.6	3	2	6
DRL42	M4	1.8	—	—	8
DRL60	M5	5.0	5.5	4	10

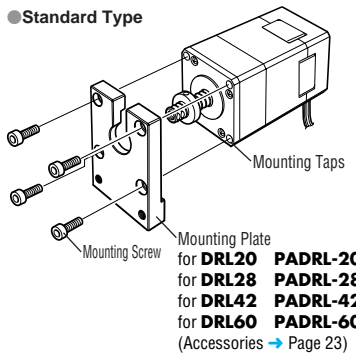
① Using Mounting Taps of an Actuator



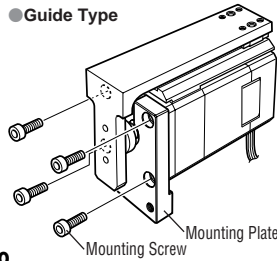
(The figure shows installation for standard type)

② Using a Mounting Plate (Accessory)

● Standard Type



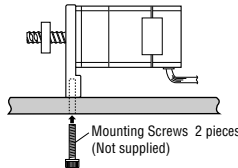
● Guide Type



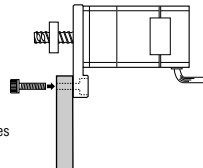
(Accessories → Page 23)

There are three ways of mounting an actuator to device.

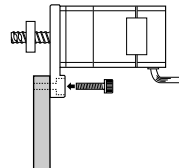
● A Type



● B Type



● C Type



Mounting Screws 2 pieces
(Not supplied)

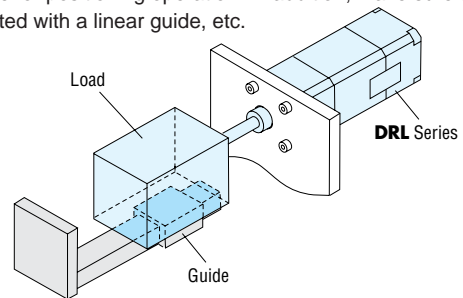
Installation Conditions

Install the actuator in a place satisfying following conditions, or the product may be damaged.

- Inside an enclosure installed indoors (with ventilation holes provided)
- An ambient temperature: 0°C to +40°C (nonfreezing)
- An ambient humidity: 85% or less (noncondensing)
- Not exposed to an explosive atmosphere, toxic gases (sulfurized gas, etc.) or liquid
- Not exposed to direct sunlight
- Not exposed to significant amounts of dust or iron powder
- Not exposed to water (rain, water droplets), oil (oil droplets) or other liquid
- Not exposed to air having high salt content
- Not exposed to continuous vibration or excessive impact
- Not subjected to significant electromagnetic noise caused by welding machines, power equipment, etc.
- Not exposed to radioactive materials, magnetic field or vacuum conditions

Anti-spin Mechanism

The moving part of the standard actuator does not have an anti-spin mechanism. Always provide an external anti-spin mechanism, such as a guide for positioning operation. In addition, make sure the load is supported with a linear guide, etc.

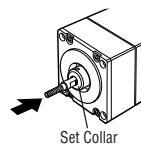


Installing a Load

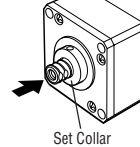
◇ Standard Type

1. Retract the screw shaft until it stops at the set collar.

DRL20, DRL28

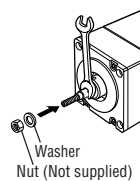


DRL42, DRL60

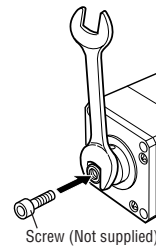


2. Holding the flat section of the screw shaft with a wrench, affix the load with a screw (or nut, in the case of the **DRL20** and **DRL28**).

DRL20, DRL28



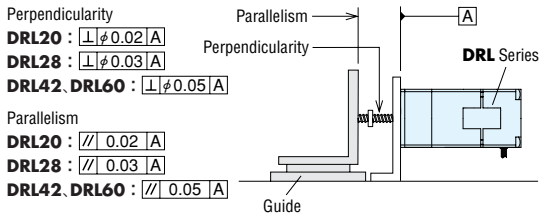
DRL42, DRL60



Model	Nominal Diameter of Screw/Nut
DRL20	M3 Nut
DRL28	M3 Nut
DRL42	M4 Screw
DRL60	M8 Screw

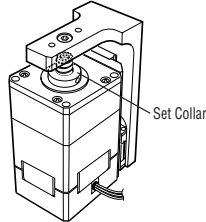
● Installation Accuracy

When connecting a load, ensure the installation accuracy specified below. Poor installation accuracy may result in a malfunction or shortened service life.



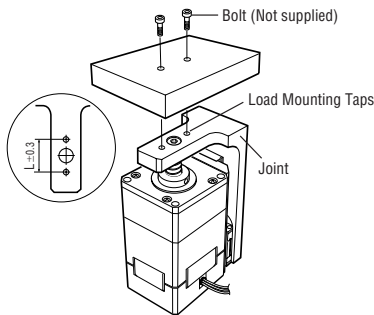
◇ Guide Type

1. Retract the screw shaft until it stops at the set collar.



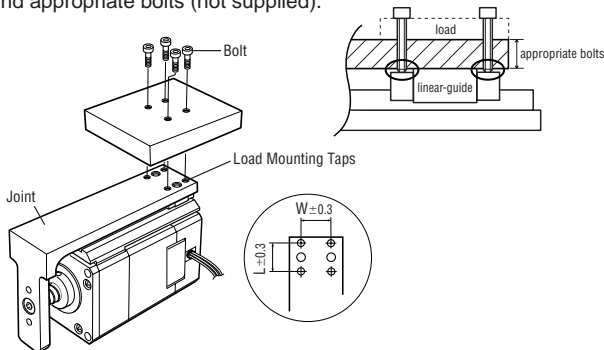
2. Affix the load with a screw.

- When using load-mounting taps on the screw-shaft side
Install the load using load-mounting taps on the L-shaped bracket and the appropriate bolts (not supplied).



Model	Nominal Diameter of Bolt	Tightening Torque N·m	Effective Depth mm	L mm
DRL20	M2	0.4	4	15
DRL28	M2.5	0.6	5	16
DRL42	M4	1.0	7.5	20
DRL60	M5	2.0	11.5	30

- When using load-mounting taps on the linear-guide side
Install the load using load-mounting taps on the L-shaped bracket and appropriate bolts (not supplied).



Model	Nominal Diameter of Bolt	Tightening Torque N·m	Effective Depth mm	L mm	W mm
DRL20	M2	0.4	4	18	12
DRL28	M2.5	0.6	3.5	14	12
DRL42	M4	1.0	5.5	24	19
DRL60	M5	2.0	5.5	22	28

Notes:

- When installing a load to the guide type, do not disconnect the ball screw from the L-shaped bracket. This may cause an offset when assembling, resulting in malfunction.
- Do not apply an overhung load to the L-shaped bracket of the guide type. Also, do not apply a load moment to the L-shaped bracket of the **DRL20** and **DRL28** guide actuator. Doing so may result in a malfunction or shortened service life.
- When transporting, remove the load installed to the actuator, or damage may be caused to the equipment.

■ Precautions in Handling

- Do not loosen the compact actuator's mounting screws or attempt to disassemble the unit.
- The accuracy and other data are measured at a specific temperature and load.
- When transporting the equipment in which the actuator is installed, be sure to remove the load from the screw axis.

■ Precautions for Operation

- The surface temperature of the actuator should be kept at 90°C or less during operation.
- Although the actuator has a built-in stopper for the ball screw, it may lock up or become damaged due to impact if it hits the stroke end. Do not allow the actuator to hit the stroke end or the equipment.

■ Repetitive Positioning Accuracy

Take proper precautions in order to ensure observance of the repetitive positioning accuracy requirements provided in the specifications.

① Sufficient Rigidity for Peripheral Equipment

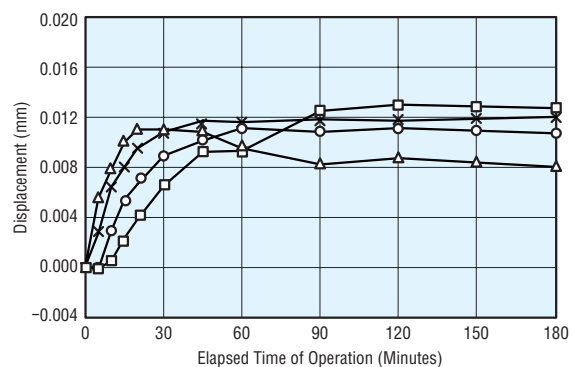
- The linear guides and other mechanical components to be used with the actuator should have rigidity sufficient to withstand the load mass and external forces. Insufficient rigidity may cause deflection, which will prevent the actuator from meeting the requirements defined in the specifications.
- The mounting brackets used for installation of the actuator and the work piece attachment brackets should also have rigidity sufficient to withstand the load mass and external forces. Insufficient rigidity may cause deflection, which will prevent the actuator from meeting the requirements defined in the specifications.

② Sensor

- Use a high-accuracy home position sensor (e.g. photomicrosensor). Home positioning accuracy is not included as part of the repetitive positioning accuracy.

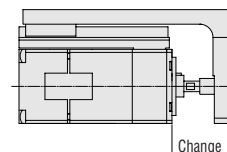
③ Temperature Rise in Actuator

- The actuator may generate a significant amount of heat, depending on the drive conditions. The heat thus generated will cause the internal ball screw to elongate, resulting in displacement as shown in the figure below (reference data). To minimize the temperature dependent effects on the repetitive positioning accuracy, control the input current to the actuator and provide a design that allows for adequate heat ventilation in peripheral areas.



▲ **DRL20PB1G-02G** × **DRL28PB1G-03G**
 ○ **DRL42PA2G-04G** □ **DRL60PA4G-05G**

Conditions
 Current down : Off
 Operation duty : 80%
 Measurement method: Using a laser displacement meter



Accessories (Sold Separately)

Optional Cables

As an option for DC input drivers, lead wires with a connector are available.

Crimping is not necessary, and the connection with the actuator, power supply, input/output signal is also easy. The optional cable includes three cables (for motor, power supply and input/output signal).



Applicable Driver	Model	Length (m)
CRD51□□P	LCS04SD5	0.6

Motor Cables

These lead wires with connectors are available for connection with **DRL20**, eliminating the need for assembling a connector. (A motor cable of 0.6 m is included with the actuator and driver packages.)



Model	Length (m)
LC5N06A	0.6
LC5N10A	1

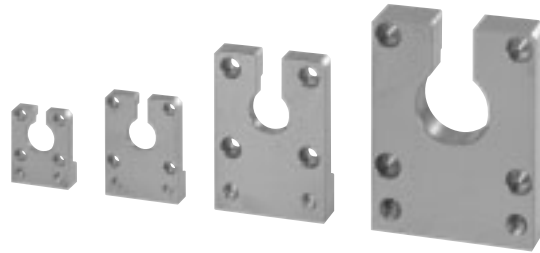
Mounting Plate

A dedicated mounting bracket used for installation of the **DRL** Series actuator. Each mounting plate comes with mounting screws for fastening the actuator to the plate. (The customer must provide screws for installing the plate to the equipment.)

Material: Iron

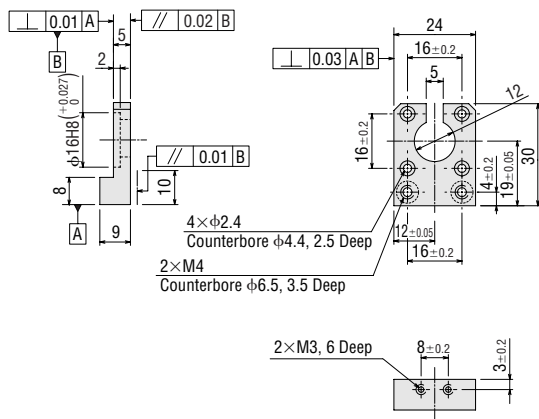
Surface treatment: Electroless nickel plating

Applicable Actuator	Model	Mass (g)
DRL20PB1(G)-02G	PADRL-20	25
DRL28PB1(G)-03G	PADRL-28	45
DRL42PB2(G)-04G	PADRL-42	165
DRL60PB4(G)-05G	PADRL-60	570

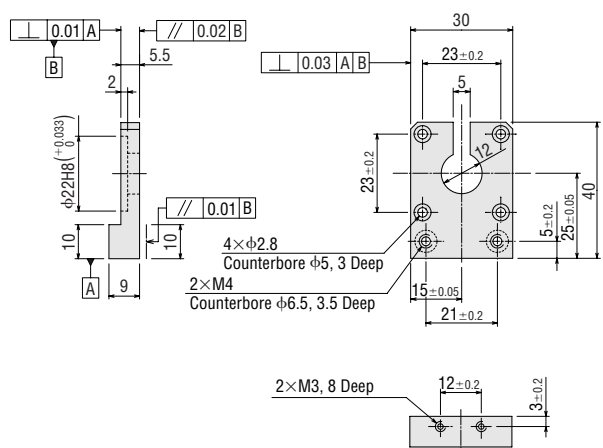


Dimensions scale 1: 2, unit = mm

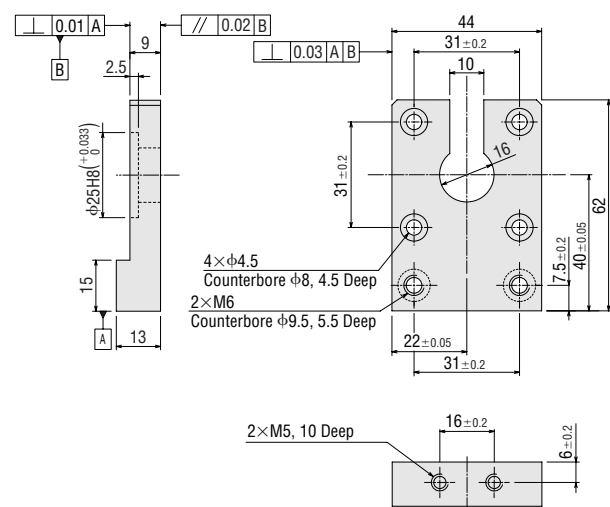
PADRL-20



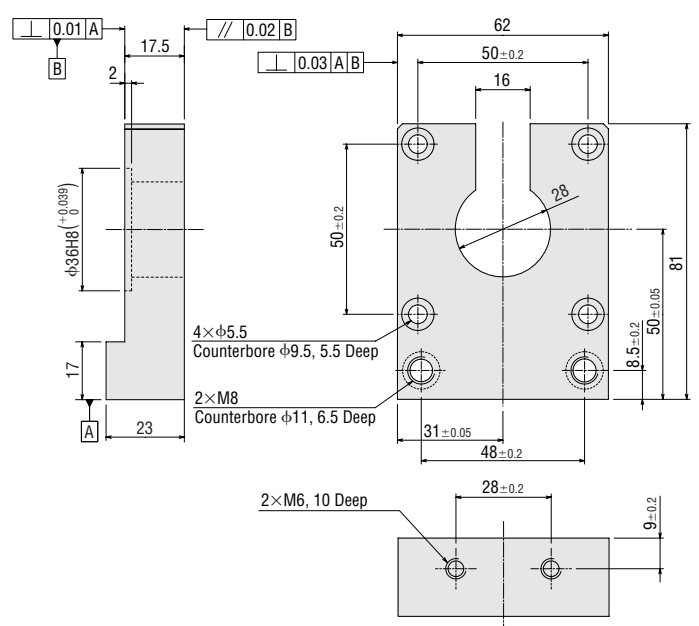
PADRL-28



PADRL-42



PADRL-60



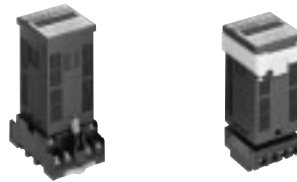
Stepping Motor Controller SG8030JY

Features

The **SG8030J** is a compact controller that switches between two control methods according to the application: sequential positioning and data selection positioning.

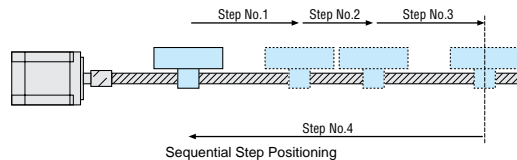
With sequential positioning mode, you execute up to four positioning control operations in the pre-determined sequence by just inputting the start command from the programmable controller. In data selection positioning mode, positioning is controlled by selecting one of four sets of pre-registered positioning data and inputting the start command from the programmable controller.

- An S-shaped acceleration/deceleration pattern (jerk-limit control) reduces the motor vibration during operation
- Select operating modes using a programmable controller
- Step pulse rate up to 200 kHz
- 1-pulse output mode/2-pulse output mode selectable



DIN Rail Mounting Model Recessed Mounting Model

Type	Model
DIN Rail Mounting Model	SG8030JY-D
Recessed Mounting Model	SG8030JY-U



This product is manufactured at a plant certified with the international standards **ISO 9001** (for quality assurance) and **ISO 14001** (for systems of environmental management).

Specifications are subject to change without notice.
This catalogue was published in June, 2005.



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