

Compact Linear Actuators **DRLII Series**

FLEX Built-In Controller Type
Pulse Input Type

This product integrates the stepper motor with a ball screw to achieve linear motion. Performance is improved by reducing the number of components such as couplings to make equipment more compact and by utilizing high-precision positioning technology.

Repetitive
Positioning
Accuracy
 ± 0.003 mm

Max. Thrust
Force
300 N



DRLII

Compact Linear Actuators

DRLII Series

This is the birth of the **DRLII** Series, providing short-stroke linear motion and high-precision positioning with immediate stops and no vibration.

This product integrates a stepper motor with a ball screw to achieve linear motion.

Two types of drivers are available, a pulse input type, and a highly functional built-in controller type that supports FLEX and increases system configuration flexibility.

Performance is improved by reducing the number of components such as couplings to make equipment more compact and by utilizing high-precision positioning technology.



Repetitive Positioning Accuracy ± 0.003 mm

Max. Thrust Force **300** N

Max. Stroke **100** mm

FLEX What is FLEX?

FLEX is a general term for products supporting I/O control, Modbus (RTU) control and FA network control via a network converter.

These products enable simple connection and simple control, shortening the total lead time for system configuration.

Efficient

Significantly Reduced Man-Hours and Time Required for Design

The compact body houses the entire linear motion mechanism.

The use of conventional internally-produced parts is no longer required, thus reducing the time for equipment design and parts selection. Moreover, this reduces the time required for assembly and installation accuracy adjustment and increases your production efficiency.

Compact

More Compact and Lightweight Equipment

A structure with a hollowed-out rotor is featured, with the ball screw stored inside.

Since the coupling, ball screw bearing, and other parts you provide yourself are no longer required, a more compact and lightweight equipment is achieved.

Price

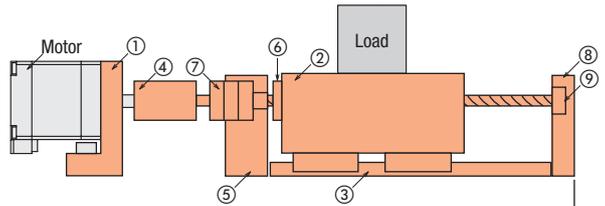
Reasonable Price

While achieving significant improvements in performance, the actuator is offered at a reasonable price.

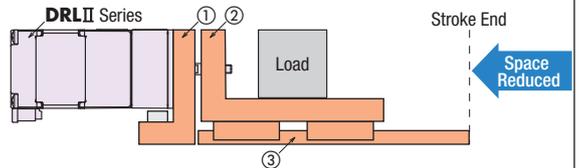
Comparison of Number of Components

Example of configuration when work piece is moved same stroke

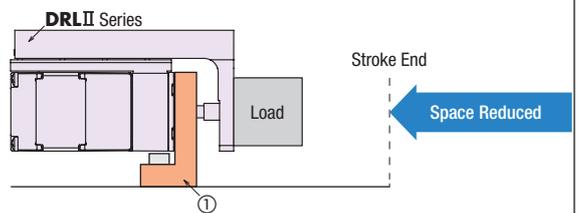
◇ Number of components (when internally produced) : 9



◇ Number of components (when DRL II Series standard type used) : 3



◇ Number of components (when DRL II Series guide type used) : 1



[Parts Used] ① Installation Plate ② Transportation Table ③ Linear Guide
 ④ Coupling ⑤ Fixed Side Block ⑥ Ball Screw ⑦ Fixed Side Bearing
 ⑧ Support Side Block ⑨ Support Side Bearing

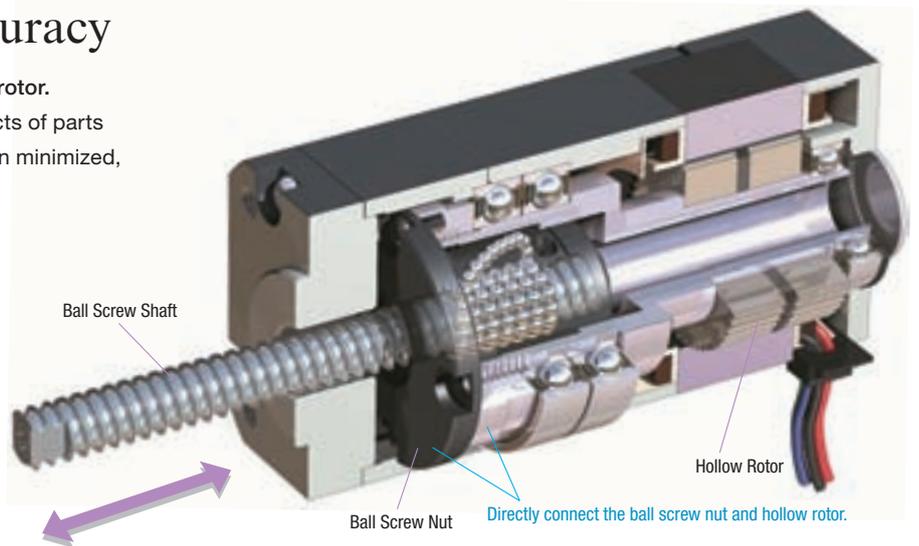


ACTUATOR

Actuator Features

High Positioning Accuracy

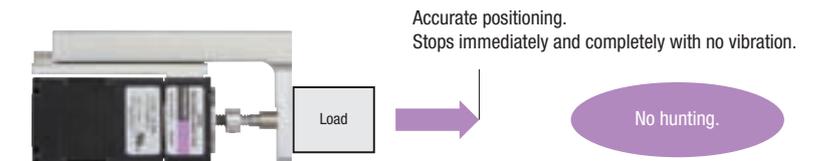
The ball screw nut is linked with the hollow rotor. Through the coupling rigidity and other aspects of parts combination, the impact of backlash has been minimized, achieving high-precision positioning.



[Repetitive Positioning Accuracy]	
Ground Ball Screw: ± 0.003 mm	Rolled Ball Screw: ± 0.01 mm

A stepper motor is used that stops immediately and without vibration.

The **DRLII** Series uses stepper motors. Because this is a stepper motor, the positioning precision per step is high and the motor can be moved forward and back accurately. Also, since the fine movement of the shaft (called hunting) does not occur when stopping, the stop position can be held correctly.



Internal Structure

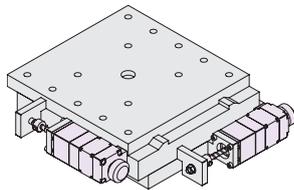
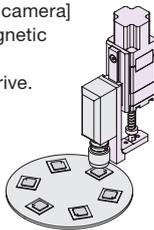
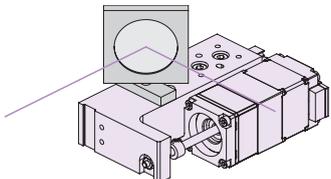
The **DRLII** Series features a structure in which the rotor is hollowed out and the ball screw is stored inside. The rotation of the hollow rotor rotates the ball screw nut and by setting up an anti-spin mechanism* on the tip of the ball screw, the ball screw shaft is moved in a linear manner.

There are two types of ball screws: the ground ball screw for fine feed and high-precision positioning and the rolled ball screw which is reliable for ordinary positioning.

Because the ball screw shaft is stored in the hollow rotor section, the maximum stroke is secured with the shortest overall length. Also, a large bore bearing is positioned on the outer circumference of the ball screw nut in order to directly receive the large thrust loads generated in linear motion.

* Not necessary for the guide type and table type.

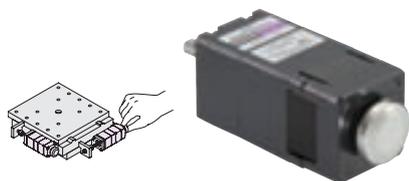
3 Types to Select According to Your Application

Product Line	Standard Type	Guide Type	Table Type
External View	 <p>This type can be used incorporated directly into your equipment or with a load transfer guide outside the actuator.</p>	 <p>This type has a guide attached with which the load can be fixed to the actuator. Direct load installation is easy.</p>	 <p>This type has a guide attached with which the load can be fixed to the actuator. Load installation and main unit installation are easy and transportation is possible as the top of moving parts are kept low.</p>
Stroke [mm]	25~100	25~50	25, 30
Thrust Force [N]	15~300	15~300	15, 30
Typical Applications For other applications, refer to Page 11.	<p>[X-Y table]</p> 	<p>[Focusing drive for a camera] *Use the electromagnetic brake type for vertical direction drive.</p> 	<p>[Spectrometer]</p> 

Additional Functions

Each type is available with an "electromagnetic brake" or "adjusting knob" as additional functions.

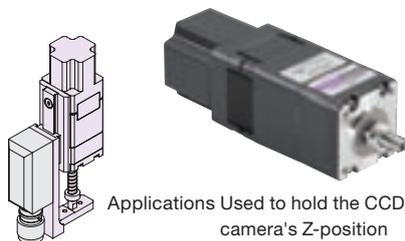
With Adjusting Knob



Applications The X-Y stage position can be finely adjusted/moved when the power is OFF.

The load position can be adjusted manually when the power is OFF.
This function is useful during maintenance of the equipment.

Electromagnetic Brake Type



Applications Used to hold the CCD camera's Z-position when the power is OFF.

The load position can be held when the power is OFF.
Since the load will not fall in the event of a power failure or disconnection, you can safely use equipment in which the load moves at vertical direction.

The standard type **DRL28**, **DRL42**, and **DRL60** are also available with a long stroke.





Built-In Controller Type **FLEXO**

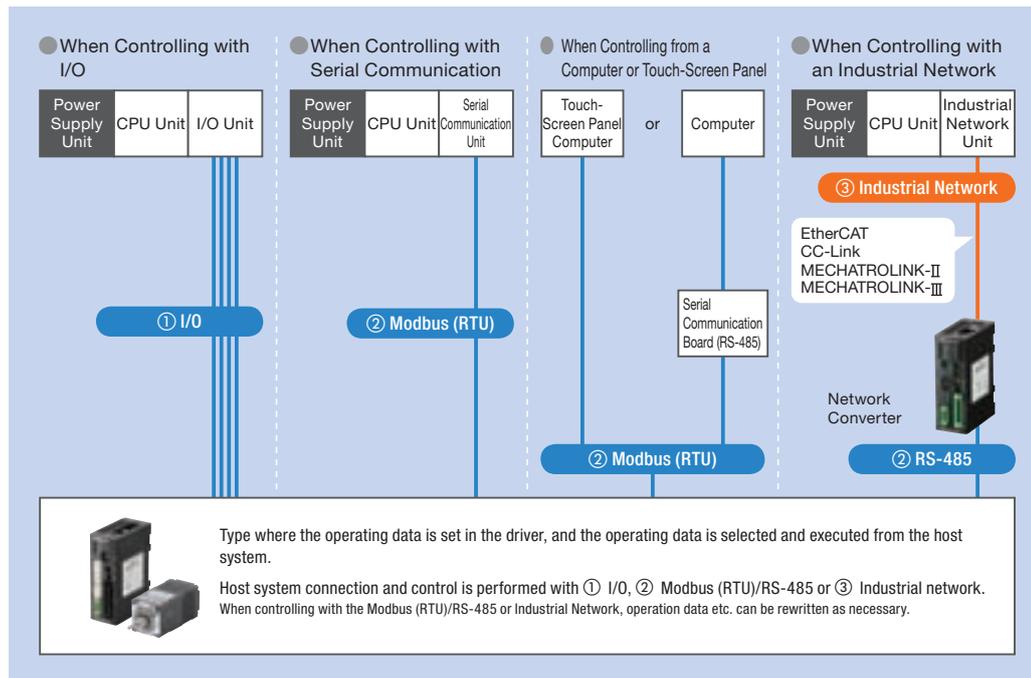


Pulse Input Type

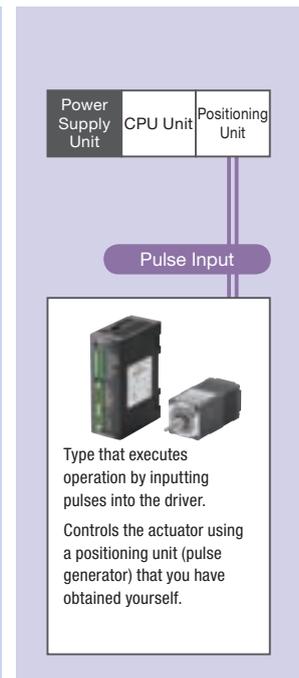
2 Driver Types Selectable by System Configuration

For the **DRLII** Series driver, you can select from 2 driver types according to your host system.

<Built-In Controller Type **FLEXO**>



<Pulse Input Type>



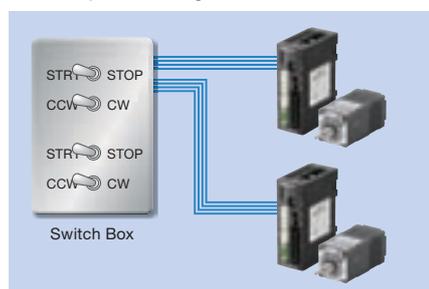
Built-In Controller Type **FLEXO**

Connecting Method

① I/O

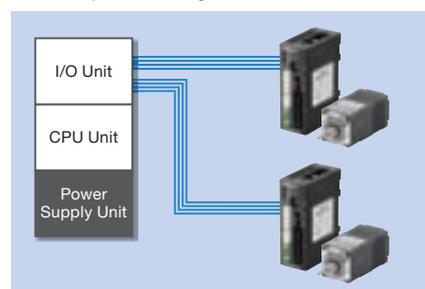
Because the positioning unit (pulse generator) function is built in to the driver, you can build an operation system using I/O by directly connecting to a switch box or PLC. Because a positioning unit is not necessary on the PLC side, space is saved and the system is simplified.

● Example of Using a Switch Box



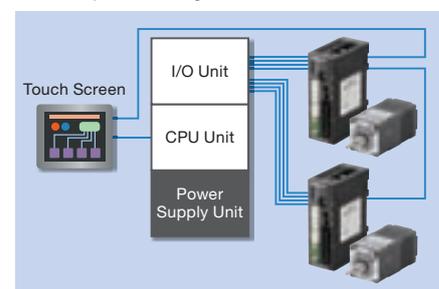
Because operating data is set in the driver, the actuator can be started and stopped simply by connecting a switch you have on hand. Control can be performed easily without using PLC.

● Example of Using PLC



When using PLC, you can build an operation system by connecting directly to an I/O unit. Because a positioning unit is not necessary on the PLC side, space is saved and the system is simplified.

● Example of Using PLC and a Touch Screen



Normally, the actuator is started and stopped with I/O. Changing the operating data settings and displaying the monitors and alarms is performed with the touch screen using Modbus (RTU) communication. When there is a lot of setup work, changes can be easily performed on the touch screen, and the burden of creating ladders is reduced.

② Modbus (RTU)/RS-485

Operating data and parameters can be set and operation commands can be input using RS-485 communication.

Up to 31 drivers can be connected to each serial communication unit.

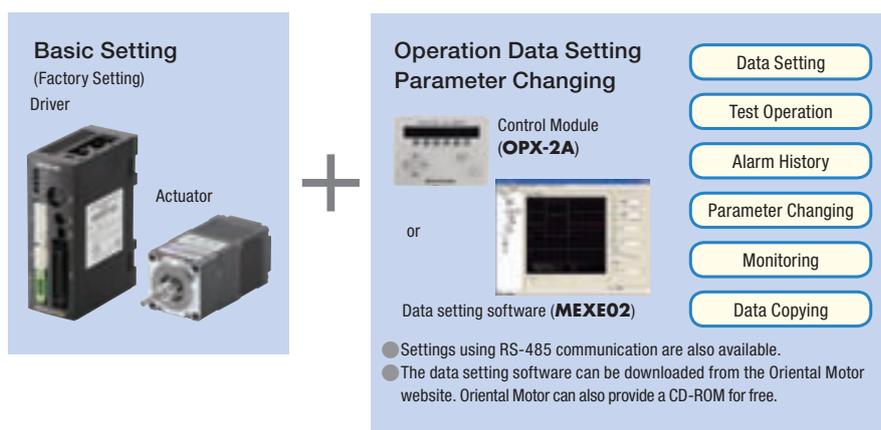
Also, there is a function that enables the simultaneous start of multiple axes. The protocol supports Modbus (RTU), enabling connection with devices such as touch-screen panel computers and PCs.

③ Industrial Network

Using a network converter (sold separately) enables support with EtherCAT communication, CC-Link communication, and MECHATROLINK communication. Operating data and parameters can be set and operation commands can be input using various communication methods.

System Configuration

Because the driver has the information necessary for actuator operation, the burden on the host PLC is reduced. The system configuration when using multi-axis control has been simplified. Settings are configured using a control module (sold separately), data setting software or RS-485 communication.



Operation Types

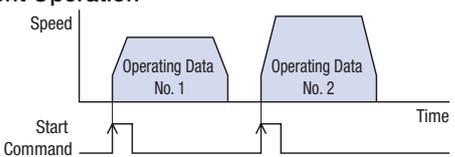
In the **FLEX** built-in controller type, the operating speed and traveling amount of the actuator are set with operating data, and operation is performed according to the selected operating data. There are 4 operation types.

Item		Content		
Common	Control Method	I/O Control		
		RS-485 Communication	Network converter connection Modbus RTU protocol connection	
	Position Command Input	Setting with operating data number Command range for each point: -8388608~8388607 [steps] (Setting Unit: 1 [step])		
	Speed Command Input	Setting with operating data number Command Range: 0~1000000 [Hz] (Setting Unit: 1 [Hz])		
	Acceleration/Deceleration Command Input	Set with the operating data number or parameter. Command Range: 0.001~1000.000 [ms/kHz] (Setting Unit: 0.001 [ms/kHz])		
Return-To-Home Operation	Return-to-Home Modes	2-Sensor Mode	A return-to-home operation that uses a limit sensor (+LS, -LS).	
		3-Sensor Mode	A return-to-home operation that uses a limit sensor and home sensor.	
		Position Preset	A function where P-preset is input at the desired position to confirm the home position. You can set the home position to the desired value.	
Positioning Operation	Number of Positioning Points	63 points (No. 1~63)		
	Operating Modes	Incremental mode (Relative positioning)		
		Absolute mode (Absolute positioning)		
	Operation Functions	Independent Operation	A PTP (Point to Point) positioning operation.	
		Linked Operation	A multistep speed-change positioning operation that is linked with operating data.	
		Linked Operation 2	A positioning operation with a timer that is linked with operating data. The timer (dwell time) can be set 0~50.000 [sec]. (Setting Unit: 0.001 [sec])	
Start Methods	Operating Data Selection Method	Starts the positioning operation when START is input after selecting M0~M5.		
	Sequential Method (Sequential positioning)	Starts the positioning operation in sequence from operating data No. 1 each time START is input.		
Continuous Operation	Number of Speed Points	63 points (No. 1~63)		
	Speed Change Method	Change the operating data number.		
Other Operations	JOG Operation	Execute regular feed by inputting +JOG or -JOG.		

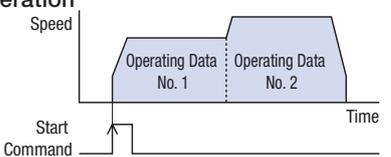
Positioning Operation

<Operation Functions>

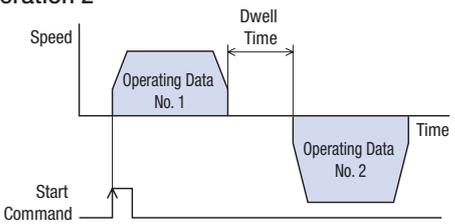
• Independent Operation



• Linked Operation



• Linked Operation 2

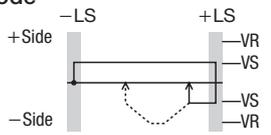


<Start Methods>

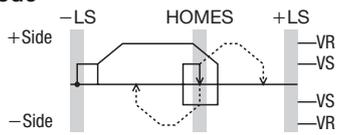
- Operating Data Selection Method
- Sequential Positioning

Return-To-Home Operation

• 2-Sensor Mode

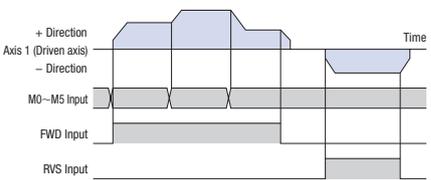


• 3-Sensor Mode



• Position Preset

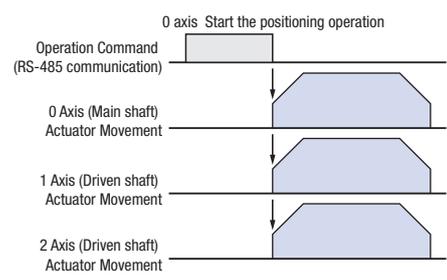
Continuous Operation



• Group Transmission Function

(via RS-485 communication or network converter)

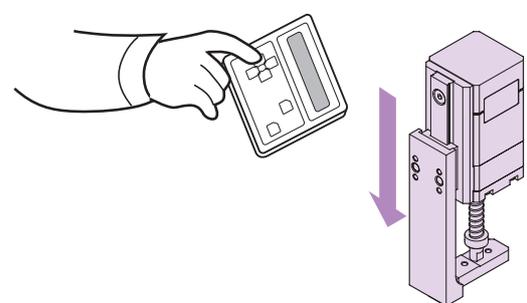
You can configure a group of multiple axes connected using RS-485 communication and send commands by group. You can also perform simultaneous start and simultaneous operation for multiple axes.



• Teaching Function

Teaching can be performed using the **OPX-2A** control module (sold separately) or the **MEXE02** data setting software*. Move the table to the target position and store the position data at this time as the positioning data.

*The data setting software can be downloaded from the Oriental Motor website. Oriental Motor can also provide a CD-ROM. For details, please contact the nearby Oriental Motor sales office.



• PLS-OUT Output Function

• Synchronous Operation Possible

This outputs signals with the same number of pulses and pulse speed as the command value. The PLS-OUT signal and DIR-OUT signal (rotation direction signal) can be input to another driver to drive the actuator for another axis.

• Used for Position Count

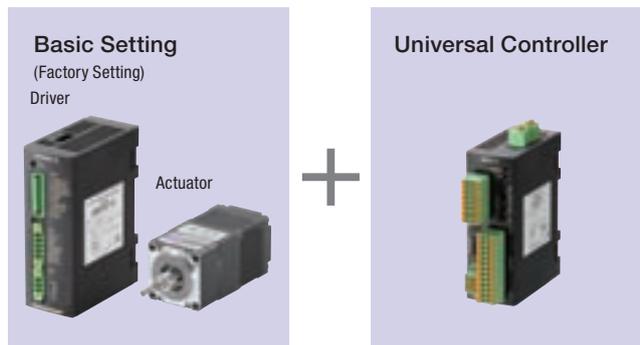
The command position to the actuator can be checked by counting the output signals.

Pulse Input Type

System Configuration

Type that executes operation by inputting pulses into the driver.

Drive the actuator using the positioning unit (pulse generator) you are familiar with.

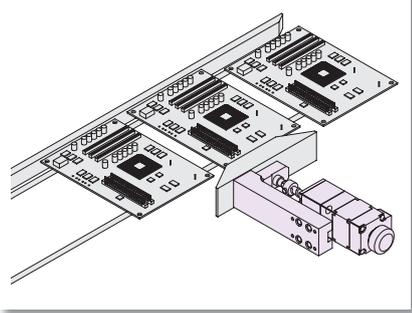


Driver Function

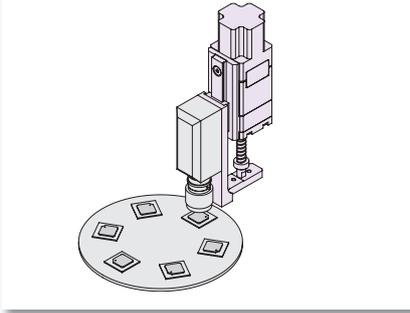
Function	Overview
Selection of Pulse Input Mode	You can select the 1-pulse input or 2-pulse input (negative logic) mode with the pulse input mode select switch (SW2-1).
Resolution Setting	You can set the resolution with the resolution setting switch (SW1).
AWO (All windings off) Input	This is an input signal for shutting down the current flowing to the actuator.
CS (Step angle switching) Input	You can select the resolution.
ACDOFF (Automatic current cutback release) Input	This input signal is used to disable the current cutback function.
TIM (Timing) Output	This is output each time the rotor rotates 7.2 degrees.

Application

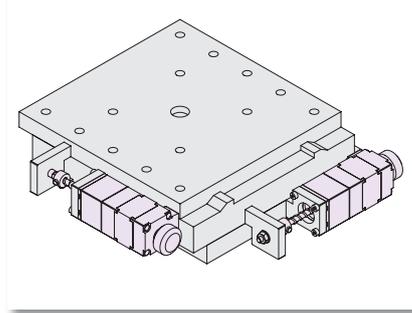
Centering of a Board



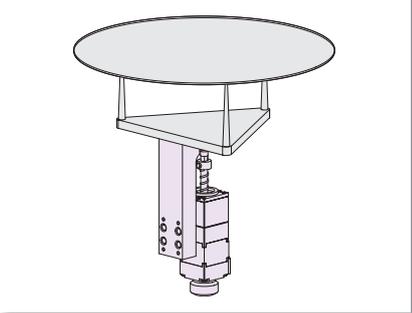
Focusing of a CCD Camera



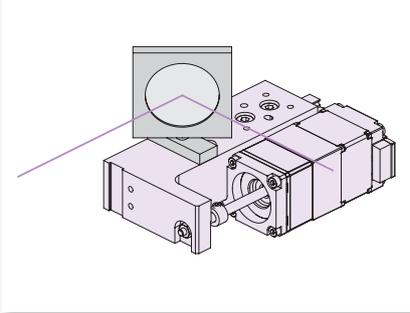
Driving Mechanism for Micrometer Head X-Y Stage



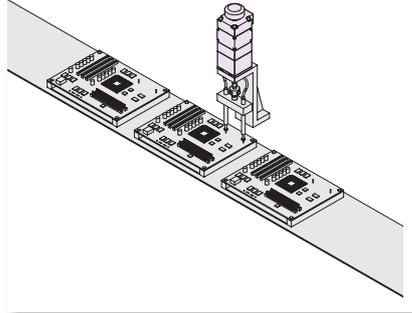
Pin Lifter



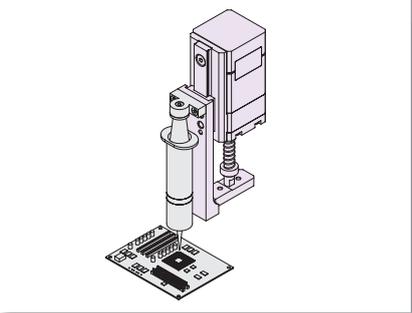
Adjusting a Mirror Positioning Device



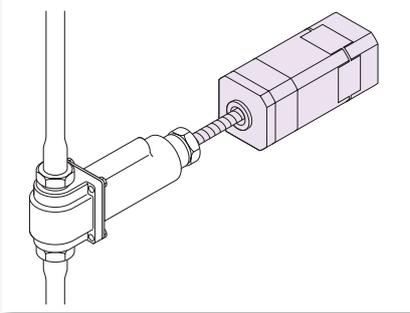
Vertical Operation of Probes



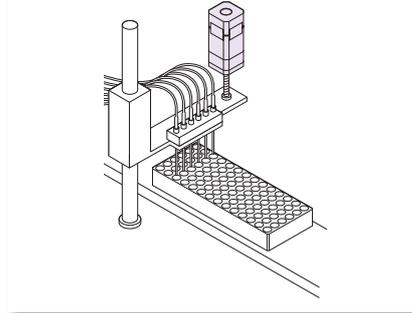
Driving a Dispenser



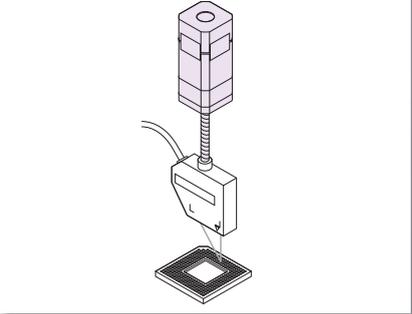
Driving a Pump Actuator Device



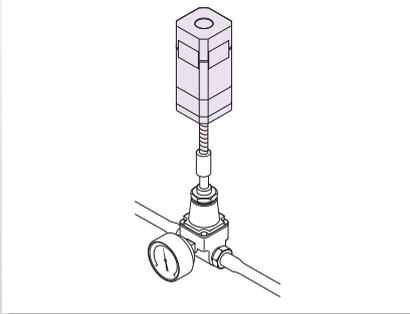
Automatic Micro-Plate Dispensing



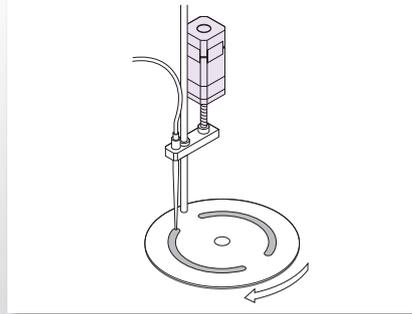
Fine-Tuning of Sensor Position



Fine-Tuning of Flow-Rate Regulator Valve Setting



Fine-Tuning of Nozzle Position



How to Read the Specifications Table

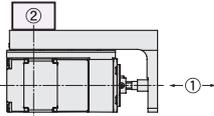
For DRL20V Table Type

Actuator

① Repetitive Positioning Accuracy [mm] ±0.003		② Lost Motion [mm]		Ground Ball Screw: 0.02		③ Max. Load Moment [N·m] Mp:0.4 My:0.4 Mr:0.8		Traveling Parallelism [mm] 0.03		
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal	Vertical*2				
DRL20V-02B1P□-K□	25	Ground	1	0.002	1.5	1.5	15	15	20	0.2

① 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.



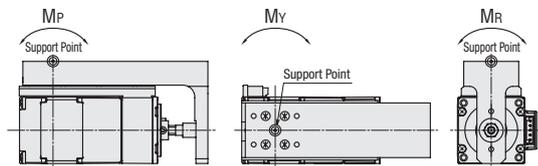
① Repetitive positioning accuracy is measured at the tip of the guide. ② Repetitive positioning accuracy is measured on the linear guide.
If footnote ① or ② is not indicated, then the accuracy values are identical.

② Lost Motion

Positioning error that occurs when positioning to a specific point in the opposite direction.

③ Max. Load Moment

Force that tries to rotate the guide is applied when the center (gravity) of the actuator guide and load have an offset. This refers to the maximum force that can be applied to the guide.



④ Traveling Parallelism

Runout in the height between the actuator table installation surface and the top surface of the table.

⑤ Stroke

The maximum distance the load can be pushed and pulled.

⑥ Lead

Distance the screw shaft moves in the linear direction in one motor rotation.

⑦ Resolution

Distance the screw shaft moves with one pulse input.

⑧ Max. Transportable Mass

• Horizontal Direction

This is the maximum mass that can be moved under rated conditions when the actuator is used in the horizontal direction. For the standard configuration the thrust force is reduced by the amount of frictional resistance of the sliding surface and the mass of a guide, therefore the value cannot be shown.

• Vertical Direction

This is the maximum mass that can be moved under rated conditions when the actuator is used in the vertical direction.

Figure A

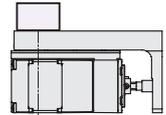
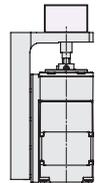


Figure B



⑨ Max. Thrust Force

Maximum thrust force at constant-speed operation with no load to the screw shaft.

⑩ Max. Holding Force

The maximum holding force is the holding force when the automatic current cutback function is ON (Standstill current: 50%).

The holding force is 0 when the power is OFF. The maximum holding force for the electromagnetic brake is the same value as the maximum holding force.

⑪ Max. Speed

Max. speed allowed when transporting the maximum transportable mass.

⑫ Max. Acceleration

Max. acceleration allowed when transporting the maximum transportable mass.

Product Number Code

DRL 20 G - 02 B 1 P N - K D

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

①	Series Name	DRL: DRLII Series
②	Frame Size	20: □20 mm 28: □28 mm 42: □42 mm 60: □60 mm
③	Configuration	Blank: Standard Type G: Guide Type V: Table Type
④	Stroke	02~10: 25~100 mm
⑤	Ball Screw Type	A: Rolled Ball Screw B: Ground Ball Screw
⑥	Lead	1: 1 mm 2: 2 mm 4: 4 mm 8: 8 mm
⑦	Motor Type	P: Standard M: High Resolution
⑧	Additional Function	Blank: No Function N: Adjustment Knob Type M: Electromagnetic Brake Type
⑨	Voltage	K: 24 VDC
⑩	Driver Type	B: Pulse Input D: FLEX Built-In Controller

Features

How to Read
Specifications Table

System
Configuration

Specifications and
Dimensions
Standard Type

Specifications and
Dimensions
Guide Type

Specifications and
Dimensions
Table Type

General
Specifications

Specifications, Dimensions,
Connections
Driver

Combination
List

Accessories

Selection
calculation

System Configuration

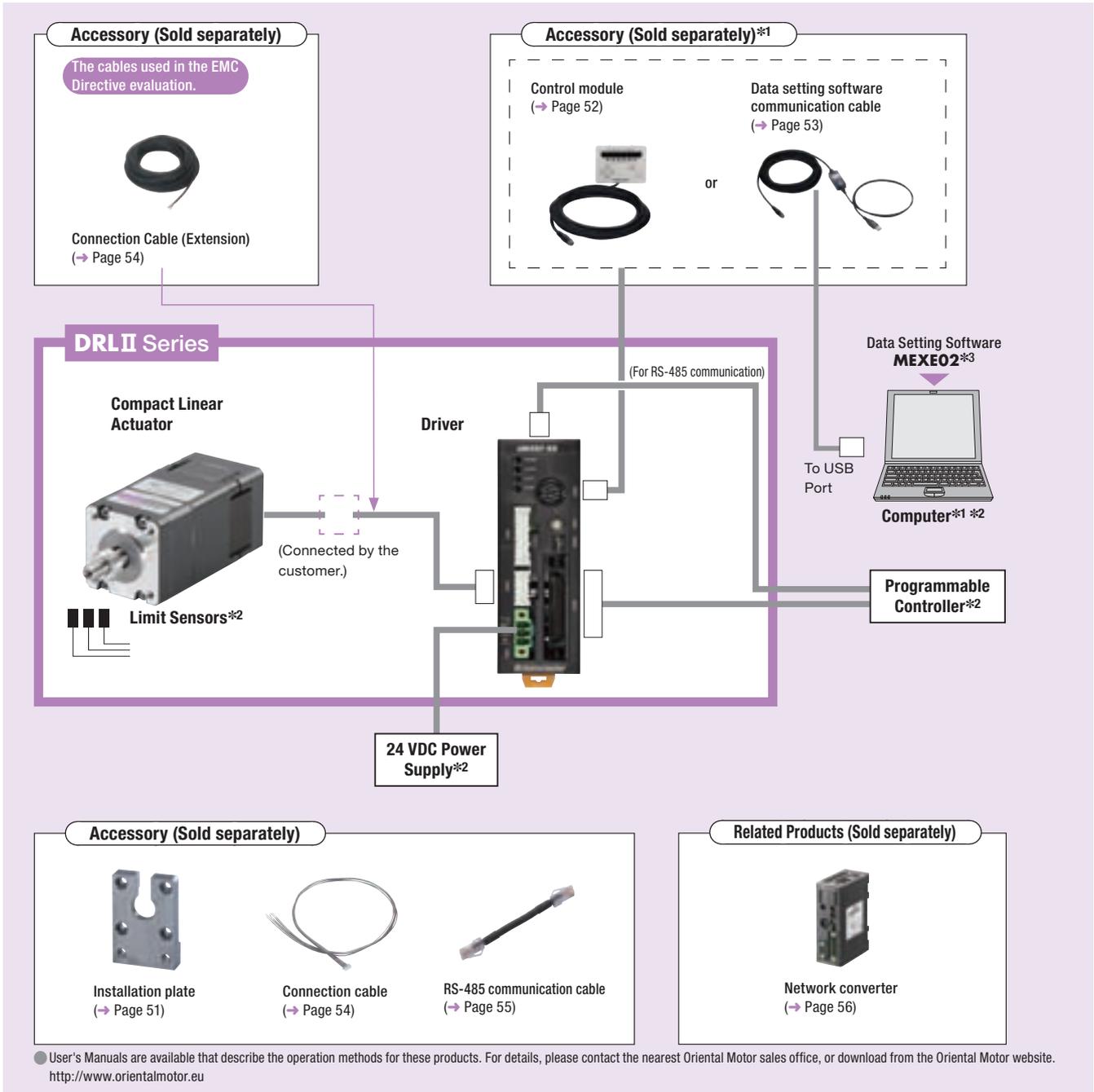
● FLEX Built-In Controller Type

An example of a configuration using I/O control or RS-485 communication is shown below.

*1 Required for I/O control drive.

*2 Not supplied.

*3 The data setting software can be downloaded for free from the Oriental Motor website.



● System Configuration Example

DRLII Series DRL42-04A2P-KD	+	Sold Separately		
		Control Module OPX-2A	Connection Cable (Extension) - 5 m CC05PK5	Installation Plate PADRL-42

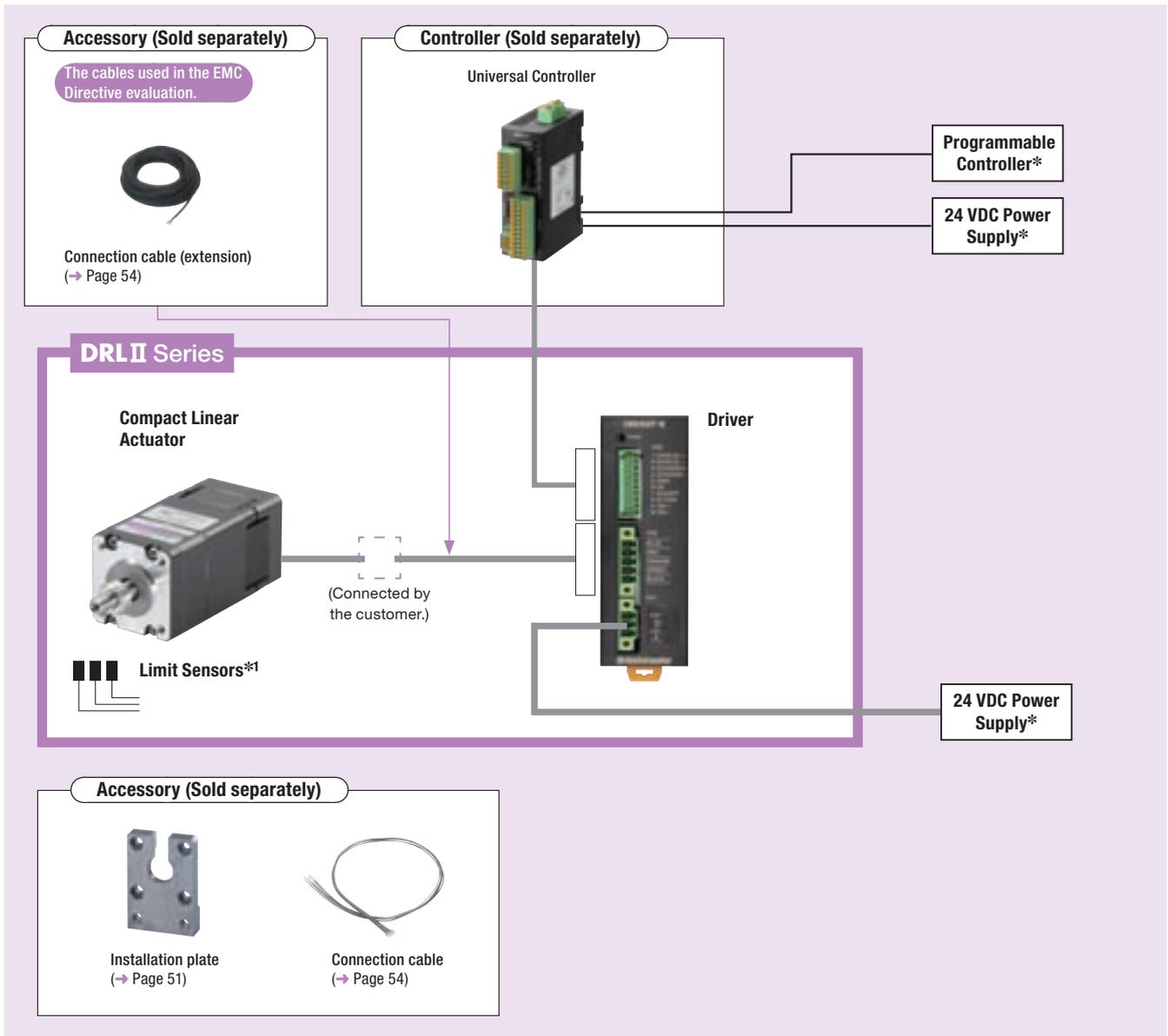
● The system configuration shown above is an example. Other combinations are available.

System Configuration

Pulse Input Type

An example of a single-axis system configuration with the **SCX11** controller is shown below.

* Not supplied.



System Configuration Example

DRLII Series DRL42-04A2P-KB	+	Sold Separately		
		Controller SCX11	Connection Cable (Extension) · 5 m CC05PK5	Installation Plate PADRL-42

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

Standard Type **DRL20 24 VDC**



Max. Thrust Force: 15 N, Stroke: 25 mm

Specifications

Actuator **(RoHS)**

Repetitive Positioning Accuracy [mm]	±0.003	Lost Motion [mm]	Ground Ball Screw: 0.02
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Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal	Vertical*2				
DRL20-02B1P □- K □	25	Ground	1	0.002	—	1.5	15	15	20	0.2

● A symbol indicating the additional function **N** (adjustment knob type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.

● **B** (pulse input) or **D** (built-in controller) indicating the driver type is entered in the box □ in the product name.

*1 Sixteen resolutions can be set.

*2 When the power is turned off, or when in an all windings off situation, 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.

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

*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF.

*5 Use the actuator at a maximum speed of 13 mm/s for the operating temperature range of 0 to 10°C.

Note

● Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Product Line

Ground Ball Screw

◇ Built-In Controller **(FLEX)**

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL20-02B1P-KD	25	1	Standard	—
DRL20-02B1PN-KD	25	1	Standard	Adjusting Knob

— The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL20-02B1P-KB	25	1	Standard	—
DRL20-02B1PN-KB	25	1	Standard	Adjusting Knob

— The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Standard Type DRL28 24 VDC

Max. Thrust Force: 30 N, Stroke: 30 mm/60 mm



Specifications

Actuator (RoHS)

Repetitive Positioning Accuracy [mm]	Rolled Ball Screw: ±0.01 Ground Ball Screw: ±0.003	Lost Motion [mm]	Rolled Ball Screw: 0.05 Ground Ball Screw: 0.02		CE					
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal	Vertical*2				
DRL28-03A1P□-K□	30	Rolled	1	0.002	-	3	30	30	40	0.2
DRL28-06A1P-K□	60									
DRL28-03B1P□-K□	30	Ground		0.001	-	3	30	30	24	
DRL28-06B1P-K□	60									
DRL28-03B1M□-K□	30									

● A symbol indicating the additional function **N** (adjustment knob type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.

● **B** (pulse input) or **D** (built-in controller) indicating the driver type is entered in the box □ in the product name.

*1 Sixteen resolutions can be set.

*2 When the power is turned off, or when in an all windings off situation, 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.

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

*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF.

*5 Use the actuator at a max. speed of 15 mm/s for the operating temperature range of 0 to 10°C and at a max. speed of 24 mm/s for temperatures above 10°C but no greater than 15°C.

Use a maximum speed of 12 mm/s for the operating temperature range of 0 to 10°C for a high-resolution stepper motor.

Note

● Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Product Line

Rolled Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28-03A1P-KD	30	1	Standard	-
DRL28-03A1PN-KD	30	1	Standard	Adjusting Knob
DRL28-06A1P-KD	60	1	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28-03A1P-KB	30	1	Standard	-
DRL28-03A1PN-KB	30	1	Standard	Adjusting Knob
DRL28-06A1P-KB	60	1	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Ground Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28-03B1P-KD	30	1	Standard	-
DRL28-03B1PN-KD	30	1	Standard	Adjusting Knob
DRL28-03B1M-KD	30	1	High Resolution	-
DRL28-03B1MN-KD	30	1	High Resolution	Adjusting Knob
DRL28-06B1P-KD	60	1	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28-03B1P-KB	30	1	Standard	-
DRL28-03B1PN-KB	30	1	Standard	Adjusting Knob
DRL28-03B1M-KB	30	1	High Resolution	-
DRL28-03B1MN-KB	30	1	High Resolution	Adjusting Knob
DRL28-06B1P-KB	60	1	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Standard Type DRL42 24 VDC

Max. Thrust Force: 100 N, Stroke: 40 mm/100 mm



Specifications

Actuator (RoHS)

Repetitive Positioning Accuracy [mm]	Rolled Ball Screw: ±0.01 Ground Ball Screw: ±0.003	Lost Motion [mm]	Rolled Ball Screw: 0.05 Ground Ball Screw: 0.02							
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal	Vertical*2				
DRL42-04A2P □-K□	40	Rolled	2	0.004	-	10	100	100	30	0.4
DRL42-10A2P □-K□	100									
DRL42-04A8P □-K□	40		8	0.016		3	30	30	120	1
DRL42-10A8P □-K□	100									
DRL42-04B2P □-K□	40	Ground	2	0.004	-	10	100	100	30	0.4
DRL42-10B2P □-K□	100									
DRL42-04B2M □-K□	40		8	0.002		10	100	100	15	0.2
DRL42-10B2M □-K□	100									



- A symbol indicating the additional function **N** (adjustment knob type) or **M** (electromagnetic brake type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.
- **B** (pulse input) or **D** (built-in controller) indicating the driver type is entered in the box □ in the product name.
- *1 Sixteen resolutions can be set.
- *2 When the power is turned off, or when in an all windings off situation, 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.
- *3 The max. thrust force is measured during constant-speed operation in the horizontal direction with no load applied to the moving parts (screw shaft and joint). Thrust force varies with load mass and acceleration.
- *4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF. The maximum holding force for the electromagnetic brake is the same value as the maximum holding force when the power is ON.
- *5 Use the actuator at a maximum speed of 20 mm/s for a lead of 2 mm and 80 mm/s for a lead of 8 mm for the operating temperature range of 0 to 10°C.

Note

- Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Product Line

Rolled Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL42-04A2P-KD	40	2	Standard	-
DRL42-04A2PN-KD	40	2	Standard	Adjusting Knob
DRL42-04A2PM-KD	40	2	Standard	Electromagnetic Brake
DRL42-04A8P-KD	40	8	Standard	-
DRL42-04A8PN-KD	40	8	Standard	Adjusting Knob
DRL42-04A8PM-KD	40	8	Standard	Electromagnetic Brake
DRL42-10A2P-KD	100	2	Standard	-
DRL42-10A8P-KD	100	8	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator, CN4), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL42-04A2P-KB	40	2	Standard	-
DRL42-04A2PN-KB	40	2	Standard	Adjusting Knob
DRL42-04A2PM-KB	40	2	Standard	Electromagnetic Brake
DRL42-04A8P-KB	40	8	Standard	-
DRL42-04A8PN-KB	40	8	Standard	Adjusting Knob
DRL42-04A8PM-KB	40	8	Standard	Electromagnetic Brake
DRL42-10A2P-KB	100	2	Standard	-
DRL42-10A8P-KB	100	8	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

Ground Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL42-04B2P-KD	40	2	Standard	-
DRL42-04B2PN-KD	40	2	Standard	Adjusting Knob
DRL42-04B2PM-KD	40	2	Standard	Electromagnetic Brake
DRL42-04B2M-KD	40	2	High Resolution	-
DRL42-04B2MN-KD	40	2	High Resolution	Adjusting Knob
DRL42-04B2MM-KD	40	2	High Resolution	Electromagnetic Brake
DRL42-10B2P-KD	100	2	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator, CN4), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL42-04B2P-KB	40	2	Standard	-
DRL42-04B2PN-KB	40	2	Standard	Adjusting Knob
DRL42-04B2PM-KB	40	2	Standard	Electromagnetic Brake
DRL42-04B2M-KB	40	2	High Resolution	-
DRL42-04B2MN-KB	40	2	High Resolution	Adjusting Knob
DRL42-04B2MM-KB	40	2	High Resolution	Electromagnetic Brake
DRL42-10B2P-KB	100	2	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

Standard Type DRL60 24 VDC

Max. Thrust Force: 300 N, Stroke: 50 mm/100 mm



Specifications

Actuator (RoHS)

Repetitive Positioning Accuracy [mm]	Rolled Ball Screw: ±0.01 Ground Ball Screw: ±0.003	Lost Motion [mm]	Rolled Ball Screw: 0.05 Ground Ball Screw: 0.02		CE					
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal	Vertical*2				
DRL60-05A4P □-K□	50	Rolled	4	0.008	-	30	300	300	40	0.26
DRL60-10A4P -K□	100									
DRL60-05B4P □-K□	50	Ground		0.004	-	30	300	300	22	
DRL60-10B4P -K□	100									
DRL60-05B4M □-K□	50									

● A symbol indicating the additional function **N** (adjustment knob type) or **M** (electromagnetic brake type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.

● **B** (pulse input) or **D** (built-in controller) indicating the driver type is entered in the box ■ in the product name.

*1 Sixteen resolutions can be set.

*2 When the power is turned off, or when in an all windings off situation, 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.

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

*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF. The maximum holding force for the electromagnetic brake is the same value as the maximum holding force when the power is ON.

*5 Use the actuator at a maximum speed of 32 mm/s for the operating temperature range of 0 to 15°C.

Note

● Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Product Line

Rolled Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL60-05A4P-KD	50	4	Standard	-
DRL60-05A4PN-KD	50	4	Standard	Adjusting Knob
DRL60-05A4PM-KD	50	4	Standard	Electromagnetic Brake
DRL60-10A4P-KD	100	4	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator, CN4), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL60-05A4P-KB	50	4	Standard	-
DRL60-05A4PN-KB	50	4	Standard	Adjusting Knob
DRL60-05A4PM-KB	50	4	Standard	Electromagnetic Brake
DRL60-10A4P-KB	100	4	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

Ground Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL60-05B4P-KD	50	4	Standard	-
DRL60-05B4PN-KD	50	4	Standard	Adjusting Knob
DRL60-05B4PM-KD	50	4	Standard	Electromagnetic Brake
DRL60-05B4M-KD	50	4	High Resolution	-
DRL60-05B4MN-KD	50	4	High Resolution	Adjusting Knob
DRL60-05B4MM-KD	50	4	High Resolution	Electromagnetic Brake
DRL60-10B4P-KD	100	4	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator, CN4), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL60-05B4P-KB	50	4	Standard	-
DRL60-05B4PN-KB	50	4	Standard	Adjusting Knob
DRL60-05B4PM-KB	50	4	Standard	Electromagnetic Brake
DRL60-05B4M-KB	50	4	High Resolution	-
DRL60-05B4MN-KB	50	4	High Resolution	Adjusting Knob
DRL60-05B4MM-KB	50	4	High Resolution	Electromagnetic Brake
DRL60-10B4P-KB	100	4	Standard	-

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

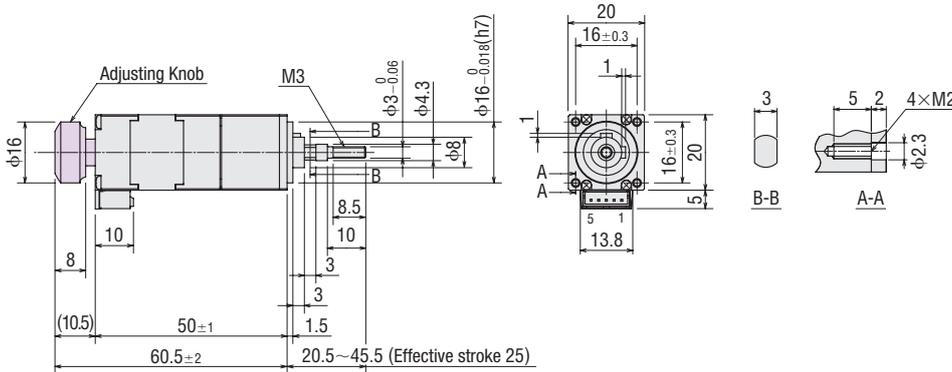
Features
How to Read Specifications Table
System Configuration
Specifications and Dimensions Standard Type
Specifications and Dimensions Guide Type
Specifications and Dimensions Table Type
General Specifications
Specifications, Dimensions, Connections, Driver
Combination List
Accessories
Selection calculation

Dimensions (Unit = mm)

Actuator Standard Type

1 DRL20

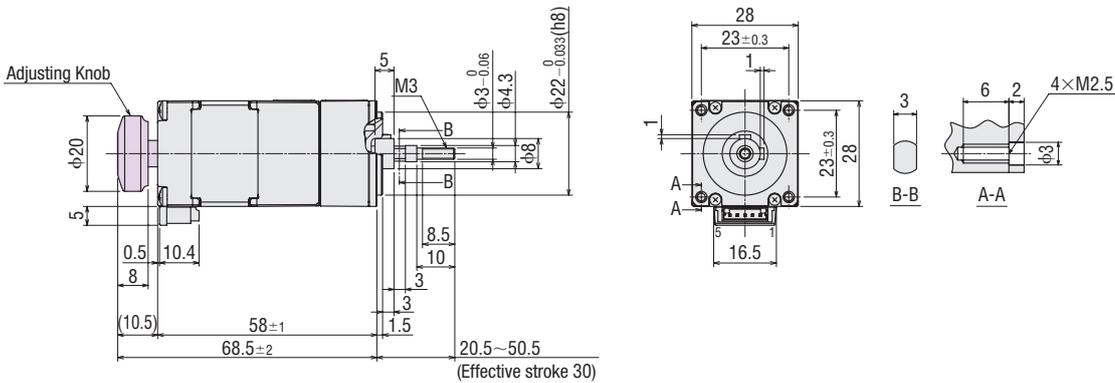
Product Name	Actuator Product Name	Mass kg
DRL20-02B1P-K ■	DRLM20-02B1P-K	0.08
DRL20-02B1PN-K ■	DRLM20-02B1PN-K	0.08



● Comes with a connection cable (0.6 m). UL Style 3265, AWG24

2 DRL28

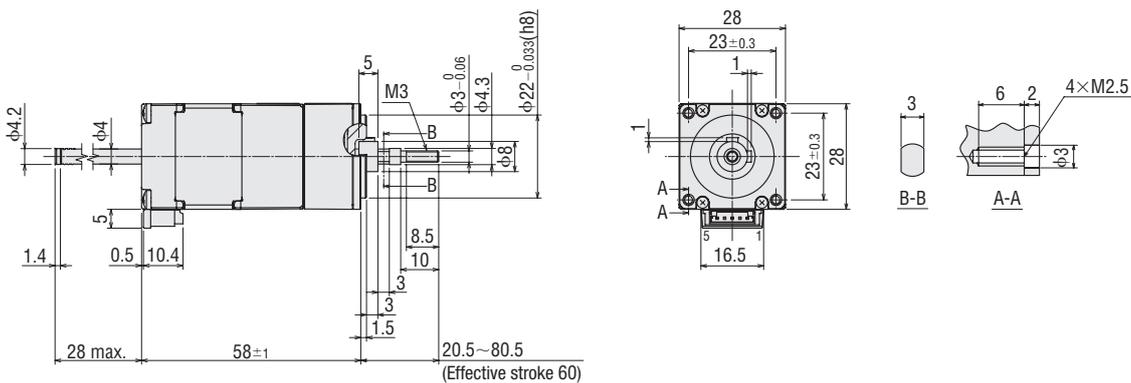
Product Name	Actuator Product Name	Mass kg
DRL28-03A1P-K ■	DRLM28-03A1P-K	0.18
DRL28-03A1PN-K ■	DRLM28-03A1PN-K	0.19



● Comes with a connection cable (0.6 m). UL Style 3265, AWG24

3 DRL28

Product Name	Actuator Product Name	Mass kg
DRL28-06A1P-K ■	DRLM28-06A1P-K	0.18



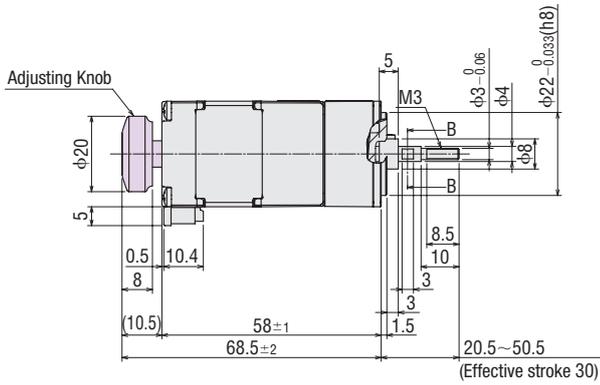
● Comes with a connection cable (0.6 m). UL Style 3265, AWG24

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box ■ in the product name.

● The dimensions of [1] and [2] apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded ■ areas.

4 DRL28

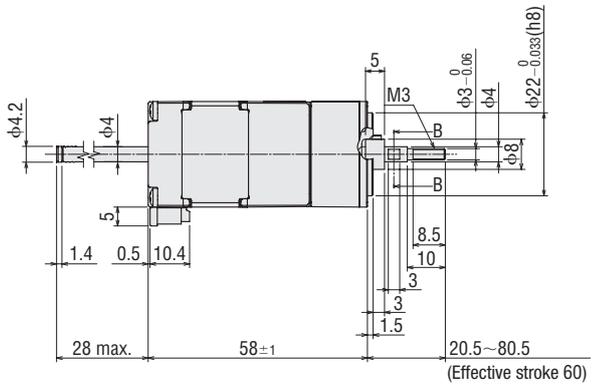
Product Name	Actuator Product Name	Mass kg
DRL28-03B1P-K ■	DRLM28-03B1P-K	0.18
DRL28-03B1PN-K ■	DRLM28-03B1PN-K	0.19
DRL28-03B1M-K ■	DRLM28-03B1M-K	0.18
DRL28-03B1MN-K ■	DRLM28-03B1MN-K	0.19



● Comes with a connection cable (0.6 m). UL Style 3265, AWG24

5 DRL28

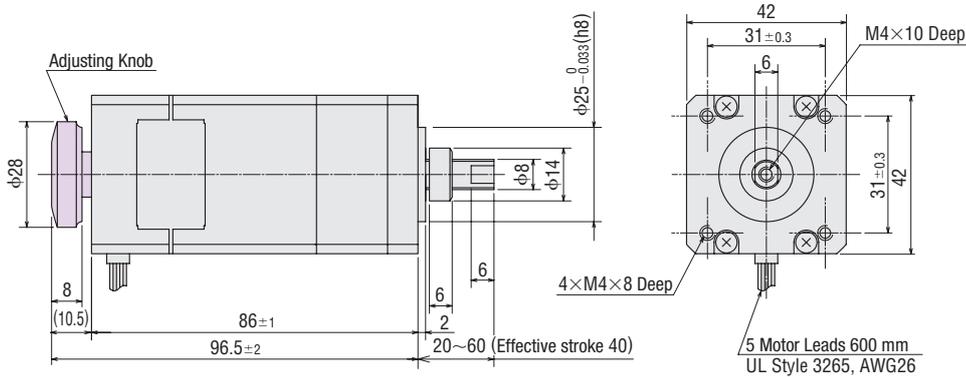
Product Name	Actuator Product Name	Mass kg
DRL28-06B1P-K ■	DRLM28-06B1P-K	0.18



● Comes with a connection cable (0.6 m). UL Style 3265, AWG24

6 DRL42

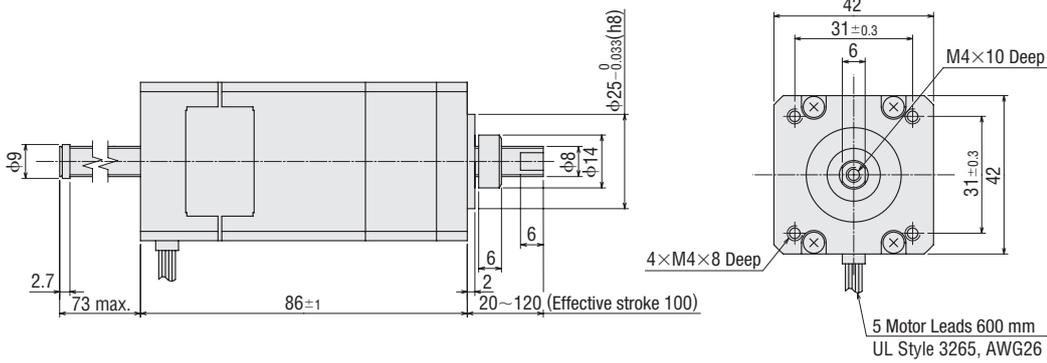
Product Name	Actuator Product Name	Mass kg
DRL42-04□2P-K ■	DRLM42-04□2P-K	0.6
DRL42-04□2PN-K ■	DRLM42-04□2PN-K	0.6
DRL42-04A8P-K ■	DRLM42-04A8P-K	0.6
DRL42-04A8PN-K ■	DRLM42-04A8PN-K	0.6



- **A** (rolled ball screw) or **B** (ground ball screw) indicating the ball screw type is entered in the box □ in the product name.
- **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box ■ in the product name.
- The dimensions of [4] and [6] apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded [] areas.

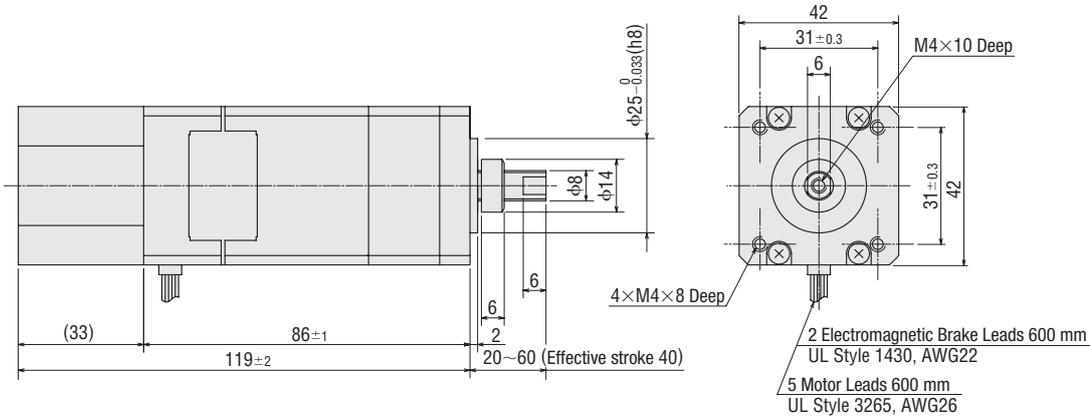
7 DRL42

Product Name	Actuator Product Name	Mass kg
DRL42-10 □ 2P-K ■	DRLM42-10□2P-K	0.63
DRL42-10A8P-K ■	DRLM42-10A8P-K	0.63



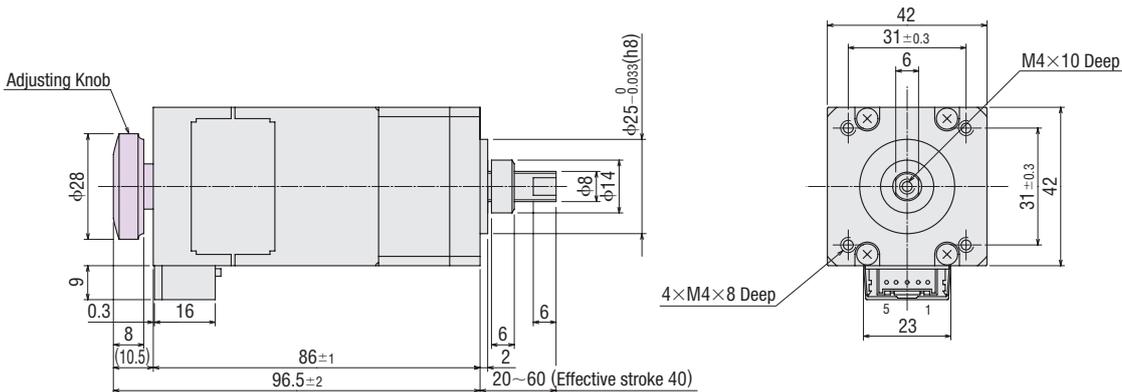
8 DRL42

Product Name	Actuator Product Name	Mass kg
DRL42-04 □ 2PM-K ■	DRLM42-04□2PM-K	0.8
DRL42-04A8PM-K ■	DRLM42-04A8PM-K	0.8



9 DRL42

Product Name	Actuator Product Name	Mass kg
DRL42-04B2M-K ■	DRLM42-04B2M-K	0.6
DRL42-04B2MN-K ■	DRLM42-04B2MN-K	0.6

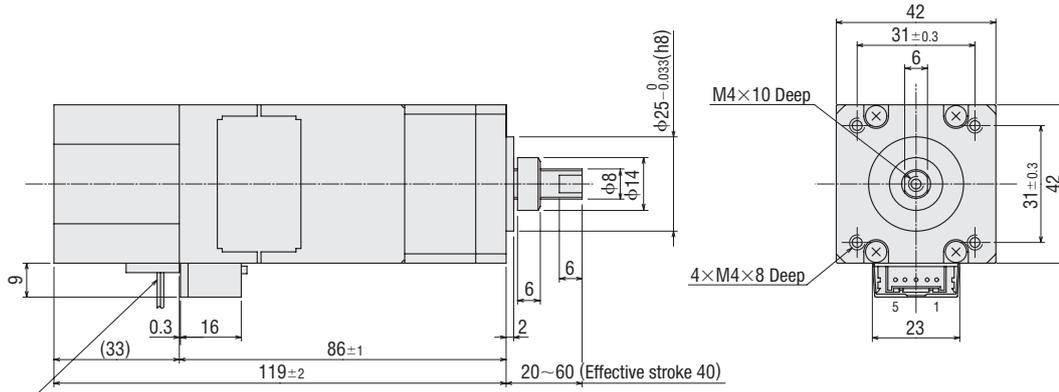


● Comes with a connection cable (0.6 m). UL Style 3265, AWG22

- **A** (rolled ball screw) or **B** (ground ball screw) indicating the ball screw type is entered in the box □ in the product name.
- **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box ■ in the product name.
- The dimensions of [9] apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded □ areas.

10 DRL42

Product Name	Actuator Product Name	Mass kg
DRL42-04B2MM-K <input type="checkbox"/>	DRLM42-04B2MM-K	0.8

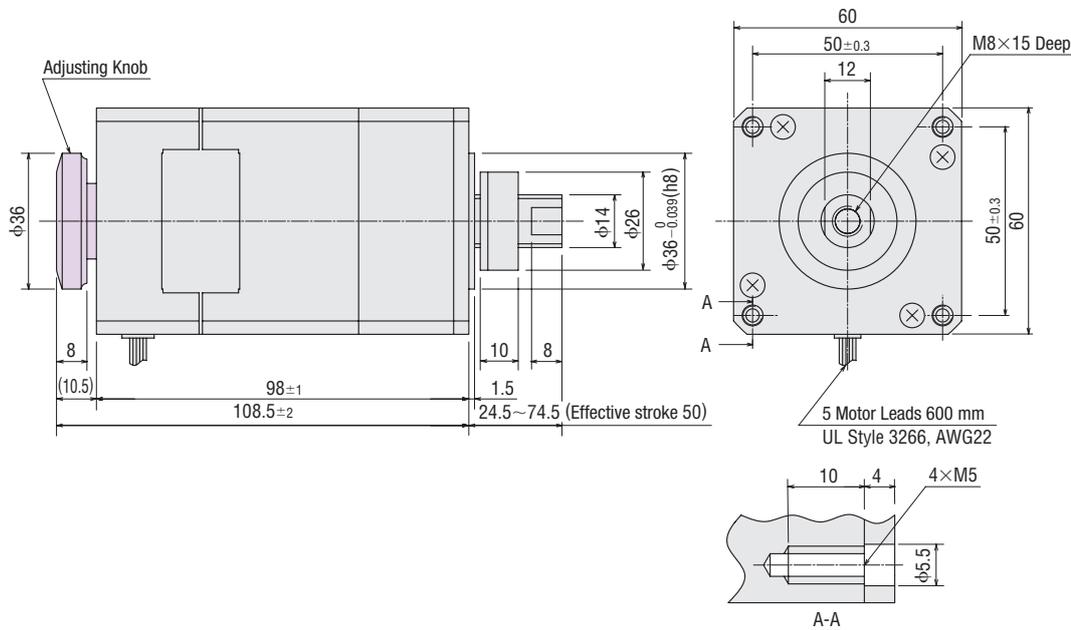


2 Electromagnetic Brake Leads 600 mm
UL Style 1430, AWG22

● Comes with a connection cable (0.6 m). UL Style 3265, AWG22

11 DRL60

Product Name	Actuator Product Name	Mass kg
DRL60-05 <input type="checkbox"/> 4P-K <input type="checkbox"/>	DRLM60-05 <input type="checkbox"/> 4P-K	1.3
DRL60-05 <input type="checkbox"/> 4PN-K <input type="checkbox"/>	DRLM60-05 <input type="checkbox"/> 4PN-K	1.35

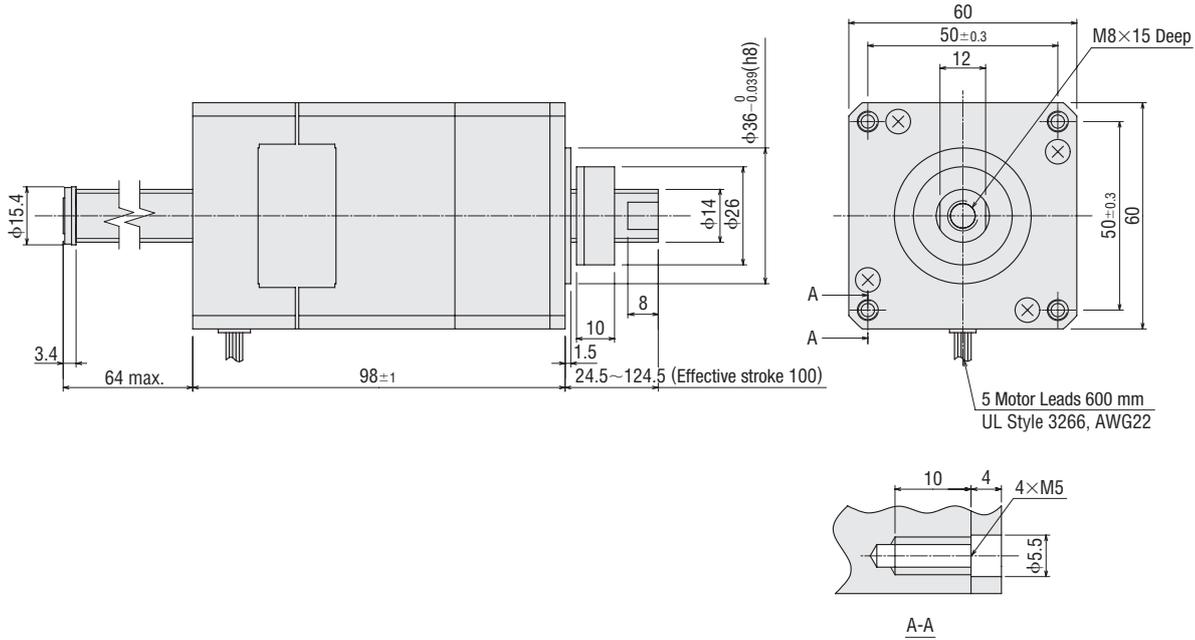


5 Motor Leads 600 mm
UL Style 3266, AWG22

- **A** (rolled ball screw) or **B** (ground ball screw) indicating the ball screw type is entered in the box in the product name.
- **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box in the product name.
- The dimensions of 11 apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded areas.

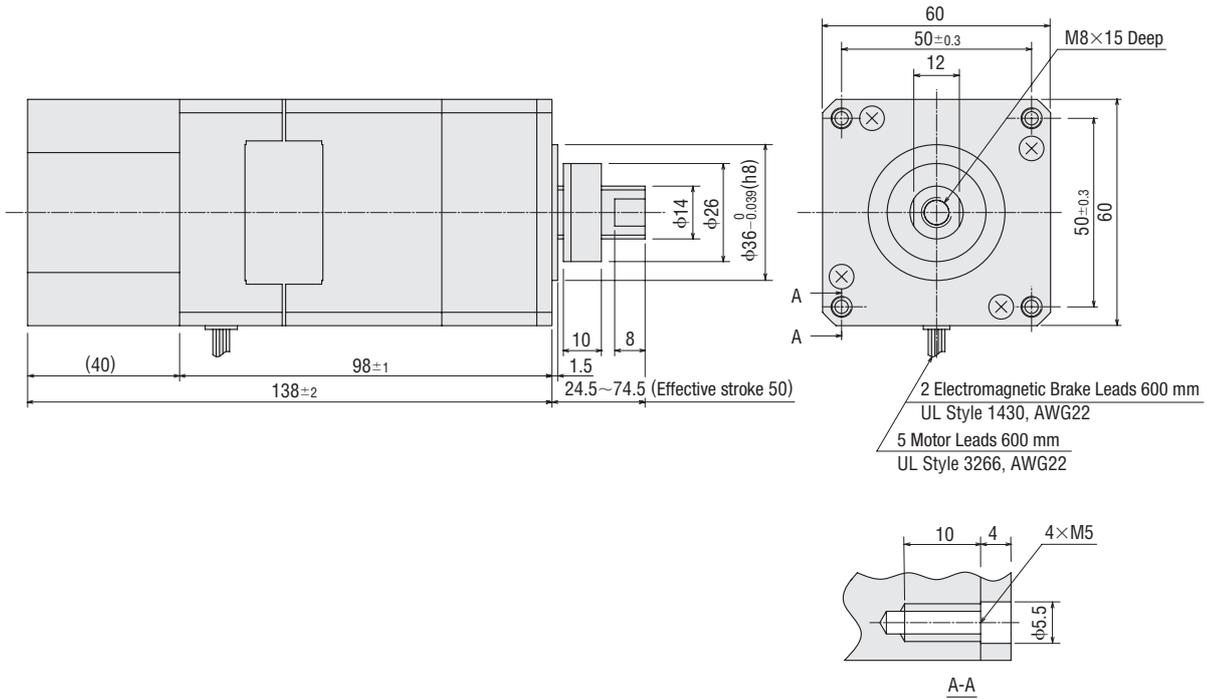
12 DRL60

Product Name	Actuator Product Name	Mass kg
DRL60-10 □ 4P-K ■	DRLM60-10□4P-K	1.38



13 DRL60

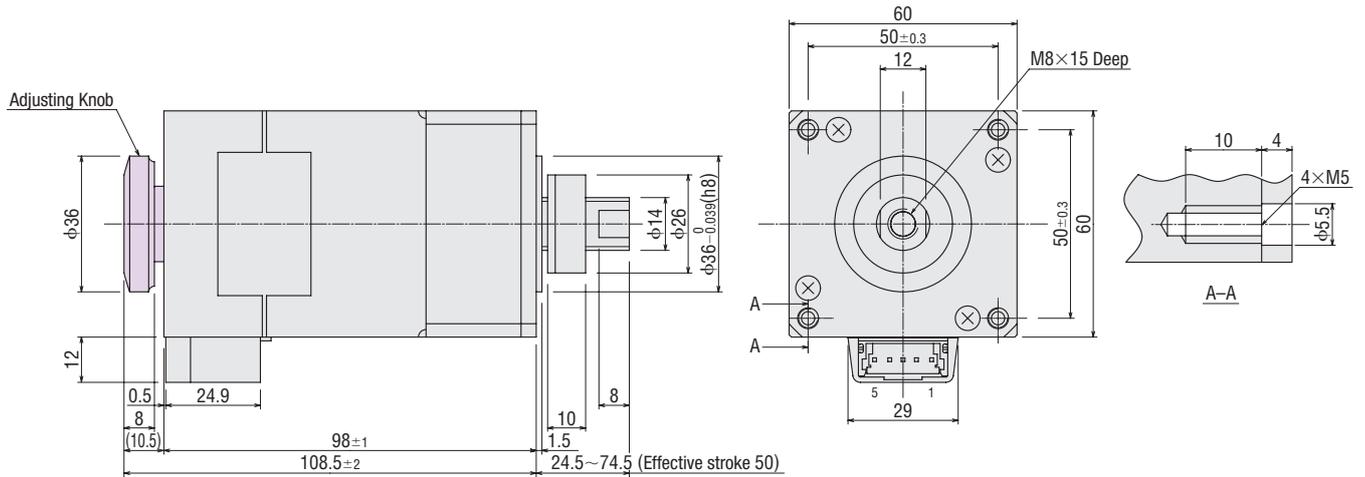
Product Name	Actuator Product Name	Mass kg
DRL60-05 □ 4PM-K ■	DRLM60-05□4PM-K	1.7



● **A** (rolled ball screw) or **B** (ground ball screw) indicating the ball screw type is entered in the box □ in the product name.
 ● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box ■ in the product name.

14 DRL60

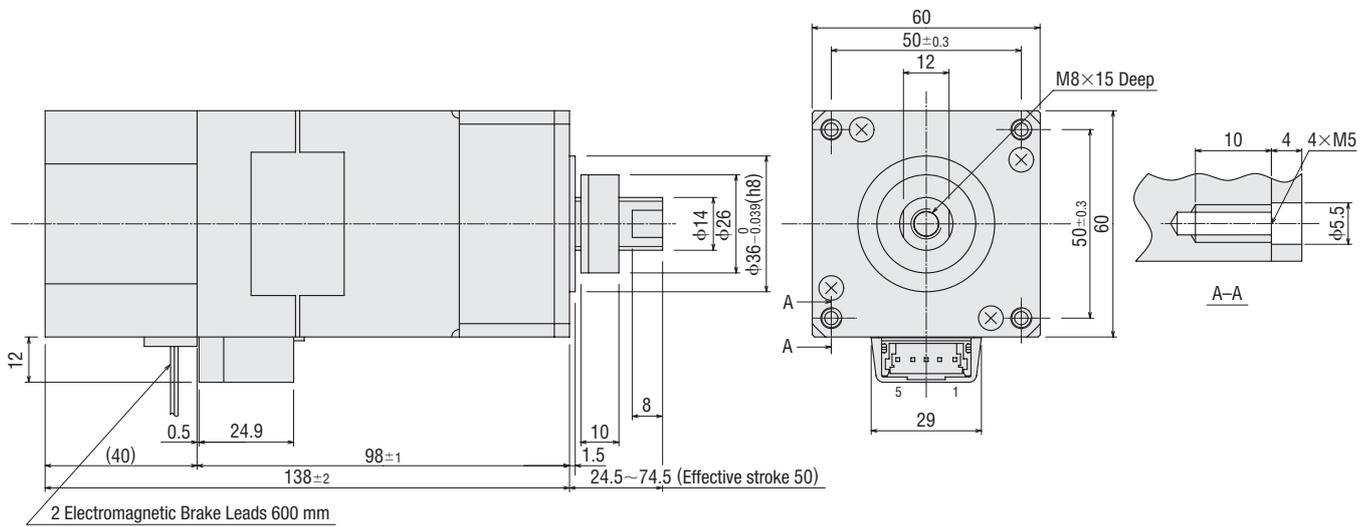
Product Name	Actuator Product Name	Mass kg
DRL60-05B4M-K 	DRLM60-05B4M-K	1.3
DRL60-05B4MN-K 	DRLM60-05B4MN-K	1.35



● Comes with a connection cable (0.6 m). UL Style 3266, AWG22

15 DRL60

Product Name	Actuator Product Name	Mass kg
DRL60-05B4MM-K 	DRLM60-05B4MM-K	1.7



2 Electromagnetic Brake Leads 600 mm
UL Style 1430, AWG22

● Comes with a connection cable (0.6 m). UL Style 3266, AWG22

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box in the product name.

● The dimensions of 14 apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded areas.

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Guide Type **DRL20G** 24 VDC

Max. Thrust Force: 15 N, Stroke: 25 mm



Specifications

Actuator (RoHS)

Repetitive Positioning Accuracy [mm]	①±0.003 ②±0.01	Lost Motion [mm]	Ground Ball Screw: 0.02		Max. Load Moment [N·m]		M _P :0.1 M _Y :0.05 M _R :0.15			
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal (Figure A)	Vertical*2 (Figure B)				
DRL20G-02B1P □-K□	25	Ground	1	0.002	0.5	1	15	15	20	0.2

● A symbol indicating the additional function **N** (adjustment knob type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box □ in the product name.

*1 Sixteen resolutions can be set.

*2 When the power is turned off, or when in an all windings off situation, 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.

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

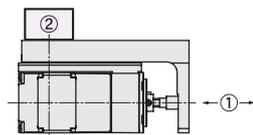
*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF.

*5 Use the actuator at a maximum speed of 13 mm/s for the operating temperature range of 0 to 10°C.

Note

● Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

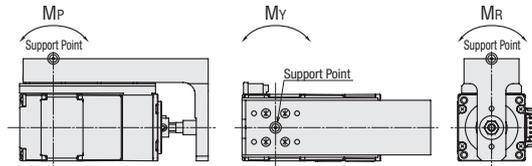
Repetitive positioning accuracy



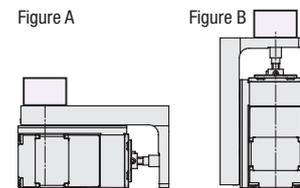
① Repetitive positioning accuracy is measured at the tip of the guide. ② Repetitive positioning accuracy is measured on the linear guide.

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

Load Moment



Max. Transportable Mass



Product Line

Ground Ball Screw

◆ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL20G-02B1P-KD	25	1	Standard	—
DRL20G-02B1PN-KD	25	1	Standard	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◆ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL20G-02B1P-KB	25	1	Standard	—
DRL20G-02B1PN-KB	25	1	Standard	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Guide Type **DRL28G** 24 VDC

Max. Thrust Force: 30 N, Stroke: 30 mm



Specifications

Actuator (RoHS)

Repetitive Positioning Accuracy [mm]	Rolled Ball Screw: ± 0.01 Ground Ball Screw: ① ± 0.003 , ② ± 0.01	Lost Motion [mm]	Rolled Ball Screw: 0.05 Ground Ball Screw: 0.02	Max. Load Moment [N·m]			Mp:0.13	My:0.07	Mr:0.3	
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal (Figure A)	Vertical*2 (Figure B)				
DRL28G-03A1P □-K□	30	Rolled	1	0.002	1	1.5	30	30	40	0.2
DRL28G-03B1P □-K□		Ground		0.001						
DRL28G-03B1M □-K□										

● A symbol indicating the additional function **N** (adjustment knob type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box □ in the product name.

*1 Sixteen resolutions can be set.

*2 When the power is turned off, or when in an all windings off situation, 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.

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

*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF.

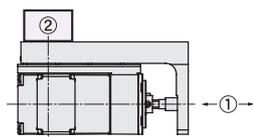
*5 Use the actuator at a max. speed of 15 mm/s for the operating temperature range of 0 to 10°C and at a max. speed of 24 mm/s for temperatures above 10°C but no greater than 15°C.

Use a maximum speed of 12 mm/s for the operating temperature range of 0 to 10°C for a high-resolution stepper motor.

Note

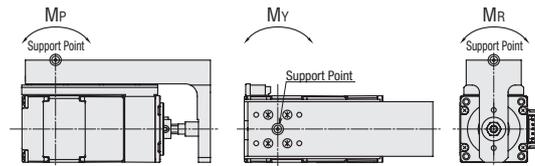
● Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Repetitive positioning accuracy

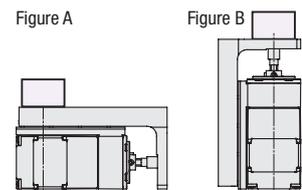


① Repetitive positioning accuracy is measured at the tip of the guide. ② Repetitive positioning accuracy is measured on the linear guide.
If footnote ① or ② is not indicated, then the accuracy values are identical.

Load Moment



Max. Transportable Mass



Product Line

Rolled Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28G-03A1P-KD	30	1	Standard	—
DRL28G-03A1PN-KD	30	1	Standard	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28G-03A1P-KB	30	1	Standard	—
DRL28G-03A1PN-KB	30	1	Standard	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Ground Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28G-03B1P-KD	30	1	Standard	—
DRL28G-03B1PN-KD	30	1	Standard	Adjusting Knob
DRL28G-03B1M-KD	30	1	High Resolution	—
DRL28G-03B1MN-KD	30	1	High Resolution	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28G-03B1P-KB	30	1	Standard	—
DRL28G-03B1PN-KB	30	1	Standard	Adjusting Knob
DRL28G-03B1M-KB	30	1	High Resolution	—
DRL28G-03B1MN-KB	30	1	High Resolution	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Guide Type **DRL42G** 24 VDC

Max. Thrust Force: 100 N, Stroke: 40 mm



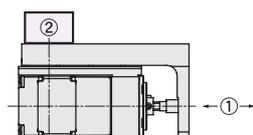
Specifications

Actuator (RoHS)

Repetitive Positioning Accuracy [mm]	Rolled Ball Screw: ±0.01 Ground Ball Screw: ①±0.003, ②±0.01	Lost Motion [mm]	Rolled Ball Screw: 0.05 Ground Ball Screw: 0.02	Max. Load Moment [N·m]	M _P :0.5 M _Y :0.25 M _R :0.8										
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]					
					Horizontal (Figure A)	Vertical*2 (Figure B)									
DRL42G-04A2P □-K□	40	Rolled	2	0.004	2	5	100	100	30	0.4					
DRL42G-04A8P □-K□			8	0.016							3	30	30	120	1
DRL42G-04B2P □-K□		Ground	2	0.004							5	100	100	30	0.4
DRL42G-04B2M □-K□				0.002											

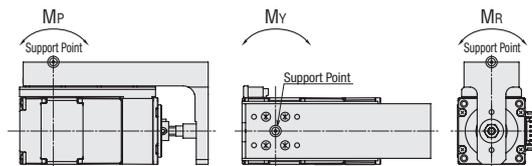
- A symbol indicating the additional function **N** (adjustment knob type) or **M** (electromagnetic brake type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.
 - **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box □ in the product name.
 - *1 Sixteen resolutions can be set.
 - *2 When the power is turned off, or when in an all windings off situation, 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.
 - *3 The max. thrust force is measured during constant-speed operation in the horizontal direction with no load applied to the moving parts (screw shaft and joint). Thrust force varies with load mass and acceleration.
 - *4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF. The maximum holding force for the electromagnetic brake is the same value as the maximum holding force when the power is ON.
 - *5 Use the actuator at a maximum speed of 20 mm/s for a lead of 2 mm and 80 mm/s for a lead of 8 mm for the operating temperature range of 0 to 10°C.
- Note**
- Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Repetitive positioning accuracy

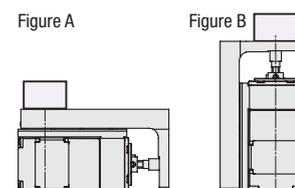


① Repetitive positioning accuracy is measured at the tip of the guide. ② Repetitive positioning accuracy is measured on the linear guide.
If footnote ① or ② is not indicated, then the accuracy values are identical.

Load Moment



Max. Transportable Mass



Product Line

Rolled Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL42G-04A2P-KD	40	2	Standard	—
DRL42G-04A2PN-KD	40	2	Standard	Adjusting Knob
DRL42G-04A2PM-KD	40	2	Standard	Electromagnetic Brake
DRL42G-04A8P-KD	40	8	Standard	—
DRL42G-04A8PN-KD	40	8	Standard	Adjusting Knob
DRL42G-04A8PM-KD	40	8	Standard	Electromagnetic Brake

The following items are included in each product.
Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator, CN4), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual
*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL42G-04A2P-KB	40	2	Standard	—
DRL42G-04A2PN-KB	40	2	Standard	Adjusting Knob
DRL42G-04A2PM-KB	40	2	Standard	Electromagnetic Brake
DRL42G-04A8P-KB	40	8	Standard	—
DRL42G-04A8PN-KB	40	8	Standard	Adjusting Knob
DRL42G-04A8PM-KB	40	8	Standard	Electromagnetic Brake

The following items are included in each product.
Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual
*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

Ground Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL42G-04B2P-KD	40	2	Standard	—
DRL42G-04B2PN-KD	40	2	Standard	Adjusting Knob
DRL42G-04B2PM-KD	40	2	Standard	Electromagnetic Brake
DRL42G-04B2M-KD	40	2	High Resolution	—
DRL42G-04B2MN-KD	40	2	High Resolution	Adjusting Knob
DRL42G-04B2MM-KD	40	2	High Resolution	Electromagnetic Brake

The following items are included in each product.
Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator, CN4), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual
*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

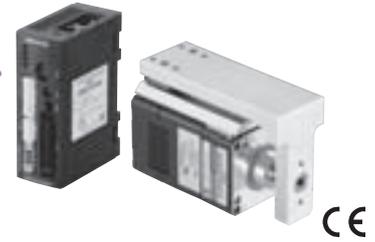
◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL42G-04B2P-KB	40	2	Standard	—
DRL42G-04B2PN-KB	40	2	Standard	Adjusting Knob
DRL42G-04B2PM-KB	40	2	Standard	Electromagnetic Brake
DRL42G-04B2M-KB	40	2	High Resolution	—
DRL42G-04B2MN-KB	40	2	High Resolution	Adjusting Knob
DRL42G-04B2MM-KB	40	2	High Resolution	Electromagnetic Brake

The following items are included in each product.
Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual
*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

Guide Type **DRL60G 24 VDC**

Max. Thrust Force: 300 N, Stroke: 50 mm



Specifications

Actuator (RoHS)

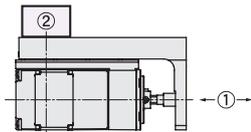
Repetitive Positioning Accuracy [mm]	Rolled Ball Screw: ± 0.01 Ground Ball Screw: ① ± 0.003 , ② ± 0.01	Lost Motion [mm]	Rolled Ball Screw: 0.05 Ground Ball Screw: 0.02	Max. Load Moment [N·m]	Mp:0.6 Mv:0.35 MR:2.2					
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]		Max. Transportable Mass [kg]	Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
				Horizontal (Figure A)	Vertical*2 (Figure B)					
DRL60G-05A4P □-K■	50	Rolled	4	0.008		3	300	300	40	0.26
DRL60G-05B4P □-K■		Ground		0.004						
DRL60G-05B4M □-K■				0.004						

- A symbol indicating the additional function **N** (adjustment knob type) or **M** (electromagnetic brake type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.
- **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box ■ in the product name.
- *1 Sixteen resolutions can be set.
- *2 When the power is turned off, or when in an all windings off situation, 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.
- *3 The max. thrust force is measured during constant-speed operation in the horizontal direction with no load applied to the moving parts (screw shaft and joint). Thrust force varies with load mass and acceleration.
- *4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF. The maximum holding force for the electromagnetic brake is the same value as the maximum holding force when the power is ON.
- *5 Use the actuator at a maximum speed of 32 mm/s for the operating temperature range of 0 to 15°C.

Note

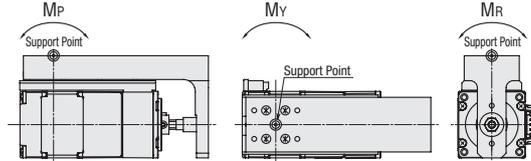
- Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Repetitive Positioning Accuracy

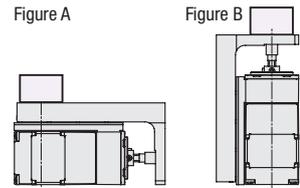


① Repetitive positioning accuracy is measured at the tip of the guide. ② Repetitive positioning accuracy is measured on the linear guide.
If footnote ① or ② is not indicated, then the accuracy values are identical.

Load Moment



Max. Transportable Mass



Product Line

Rolled Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL60G-05A4P-KD	50	4	Standard	—
DRL60G-05A4PN-KD	50	4	Standard	Adjusting Knob
DRL60G-05A4PM-KD	50	4	Standard	Electromagnetic Brake

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator, CN4), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL60G-05A4P-KB	50	4	Standard	—
DRL60G-05A4PN-KB	50	4	Standard	Adjusting Knob
DRL60G-05A4PM-KB	50	4	Standard	Electromagnetic Brake

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

Ground Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL60G-05B4P-KD	50	4	Standard	—
DRL60G-05B4PN-KD	50	4	Standard	Adjusting Knob
DRL60G-05B4PM-KD	50	4	Standard	Electromagnetic Brake
DRL60G-05B4M-KD	50	4	High Resolution	—
DRL60G-05B4MN-KD	50	4	High Resolution	Adjusting Knob
DRL60G-05B4MM-KD	50	4	High Resolution	Electromagnetic Brake

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator, CN4), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL60G-05B4P-KB	50	4	Standard	—
DRL60G-05B4PN-KB	50	4	Standard	Adjusting Knob
DRL60G-05B4PM-KB	50	4	Standard	Electromagnetic Brake
DRL60G-05B4M-KB	50	4	High Resolution	—
DRL60G-05B4MN-KB	50	4	High Resolution	Adjusting Knob
DRL60G-05B4MM-KB	50	4	High Resolution	Electromagnetic Brake

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Surge Suppressor*1, Connection Cable (for Actuator Connector)*2, Operating Manual

*1 Only for electromagnetic brake type *2 Only for high-resolution motor type

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Accessories

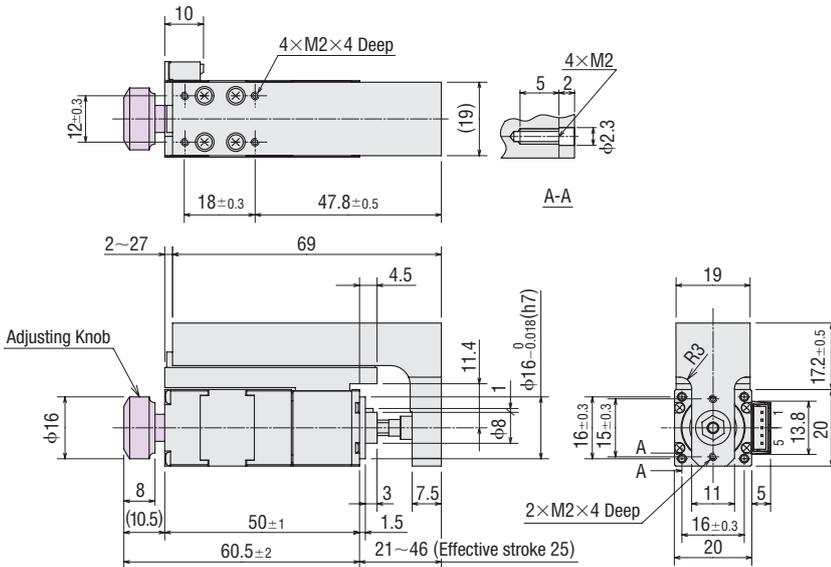
Selection calculation

Dimensions (Unit = mm)

Actuator Guide Type

1 DRL20G

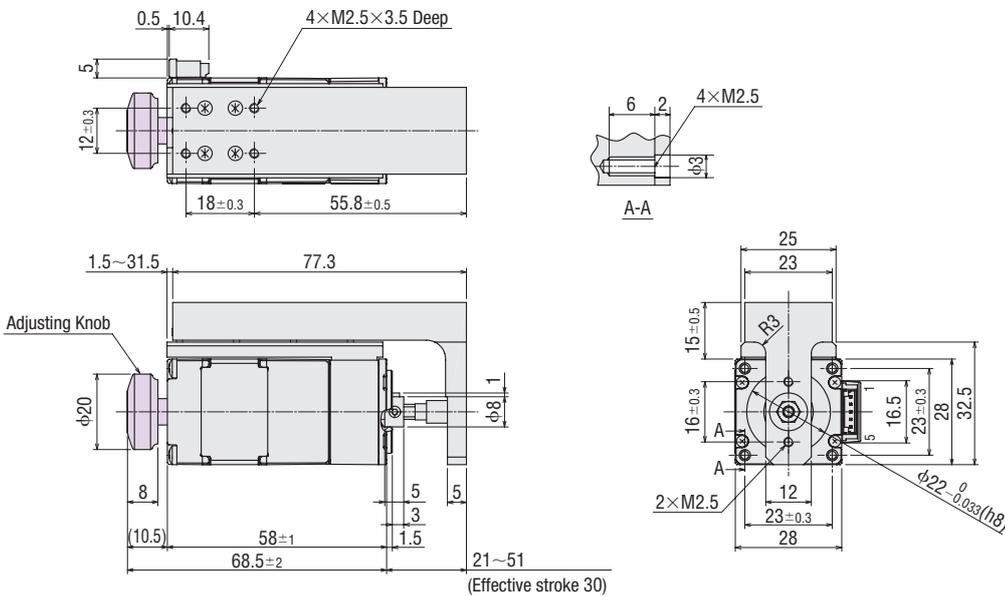
Product Name	Actuator Product Name	Mass kg
DRL20G-02B1P-K	DRLM20G-02B1P-K	0.14
DRL20G-02B1PN-K	DRLM20G-02B1PN-K	0.15



● Comes with a connection cable (0.6 m). UL Style 3265, AWG24

2 DRL28G

Product Name	Actuator Product Name	Mass kg
DRL28G-03□1P-K	DRLM28G-03□1P-K	0.26
DRL28G-03□1PN-K	DRLM28G-03□1PN-K	0.27
DRL28G-03B1M-K	DRLM28G-03B1M-K	0.26
DRL28G-03B1MN-K	DRLM28G-03B1MN-K	0.27



● Comes with a connection cable (0.6 m). UL Style 3265, AWG24

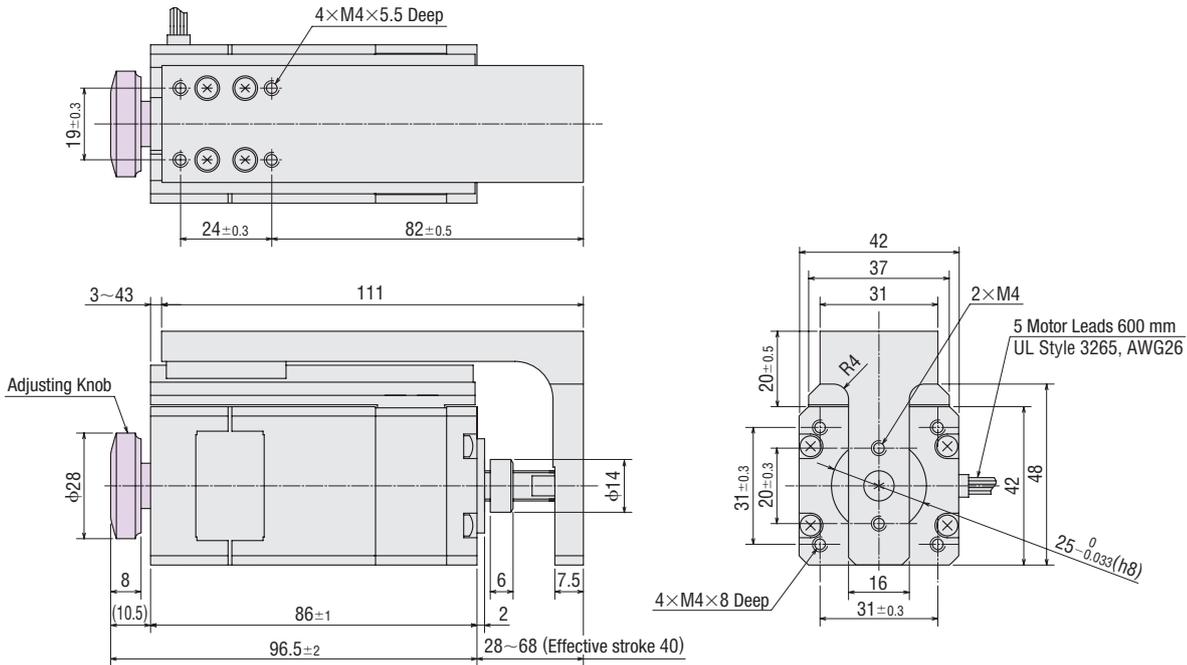
● **A** (rolled ball screw) or **B** (ground ball screw) indicating the ball screw type is entered in the box □ in the product name.

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box ■ in the product name.

● The dimensions of [1] and [2] apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded □ areas.

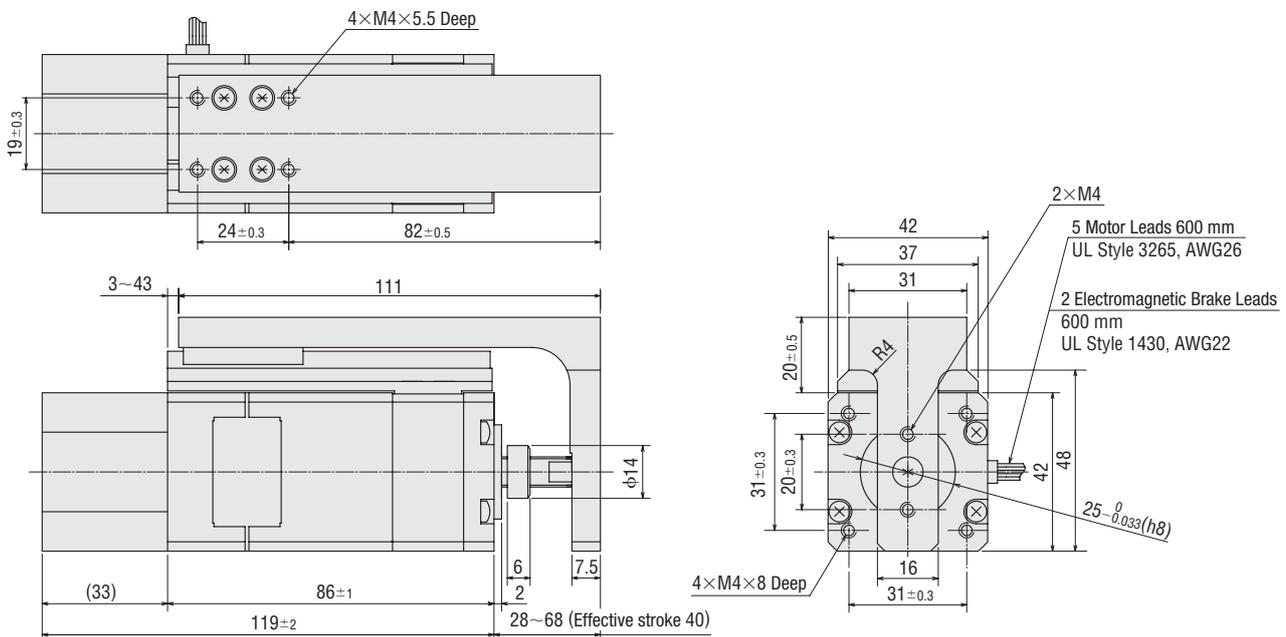
3 DRL42G

Product Name	Actuator Product Name	Mass kg
DRL42G-04 □ 2P-K ■	DRLM42G-04□2P-K	0.8
DRL42G-04 □ 2PN-K ■	DRLM42G-04□2PN-K	0.8
DRL42G-04A8P-K ■	DRLM42G-04A8P-K	0.8
DRL42G-04A8PN-K ■	DRLM42G-04A8PN-K	0.8



4 DRL42G

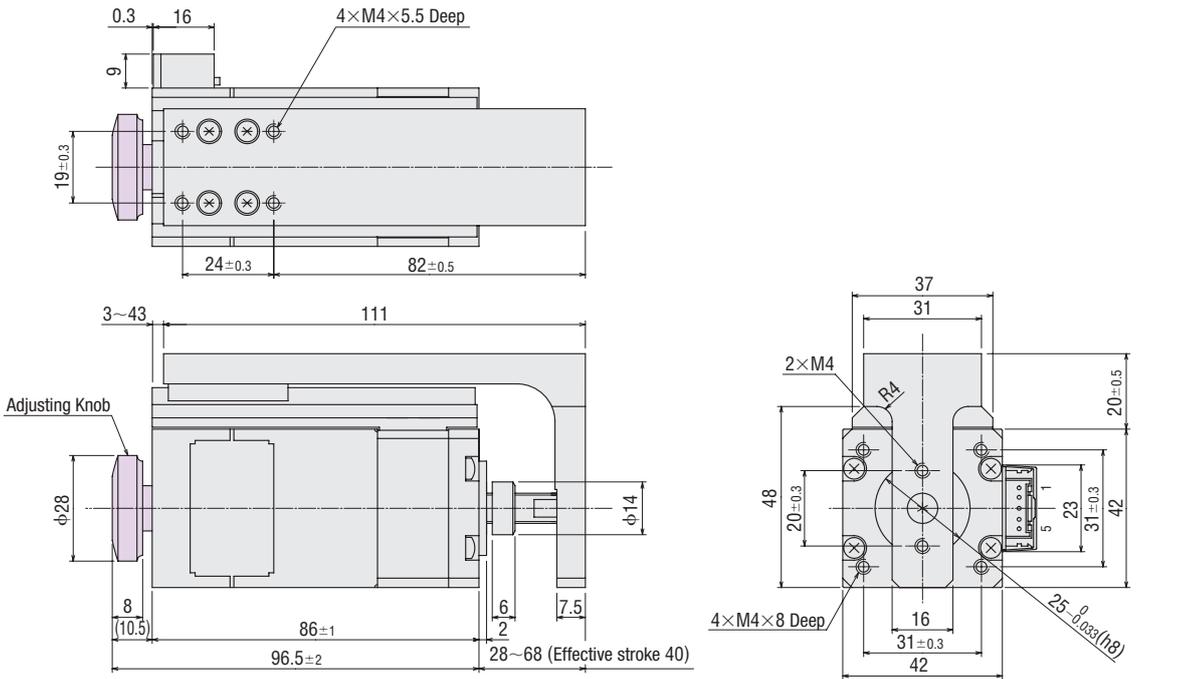
Product Name	Actuator Product Name	Mass kg
DRL42G-04 □ 2PM-K ■	DRLM42G-04□2PM-K	1
DRL42G-04A8PM-K ■	DRLM42G-04A8PM-K	1



- **A** (rolled ball screw) or **B** (ground ball screw) indicating the ball screw type is entered in the box □ in the product name.
- **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box ■ in the product name.
- The dimensions of [3] apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded □ areas.

5 DRL42G

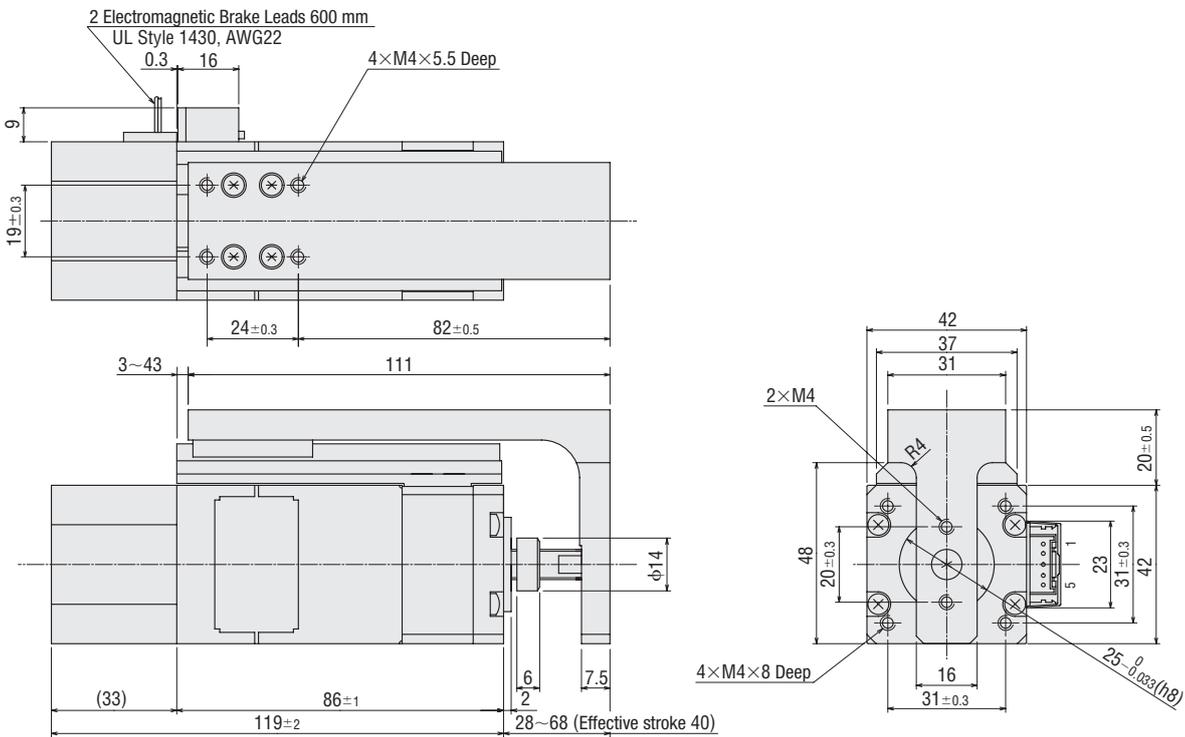
Product Name	Actuator Product Name	Mass kg
DRL42G-04B2M-K 	DRLM42G-04B2M-K	0.8
DRL42G-04B2MN-K 	DRLM42G-04B2MN-K	0.8



● Comes with a connection cable (0.6 m). UL Style 3265, AWG22

6 DRL42G

Product Name	Actuator Product Name	Mass kg
DRL42G-04B2MM-K 	DRLM42G-04B2MM-K	1



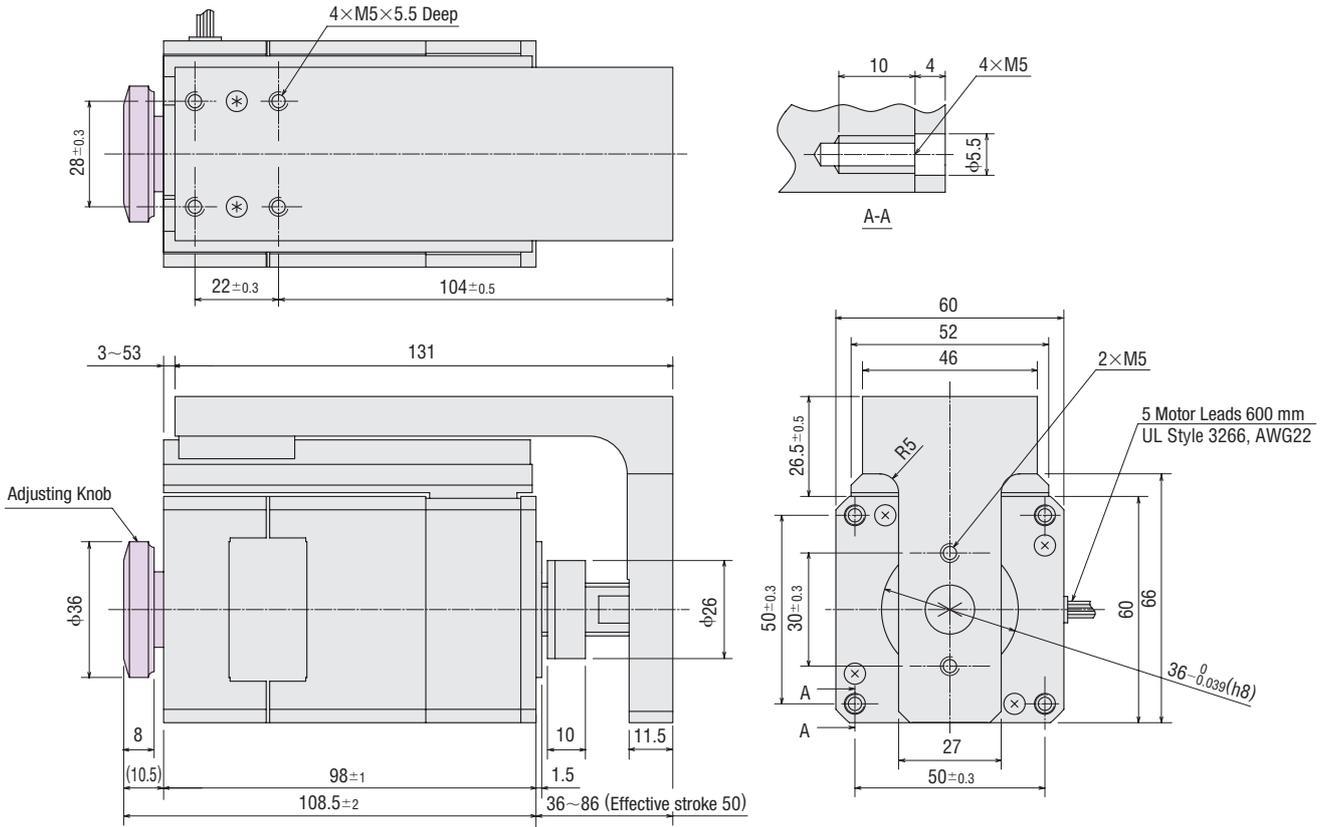
● Comes with a connection cable (0.6 m). UL Style 3265, AWG22

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box in the product name.

● The dimensions of 5 apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded areas.

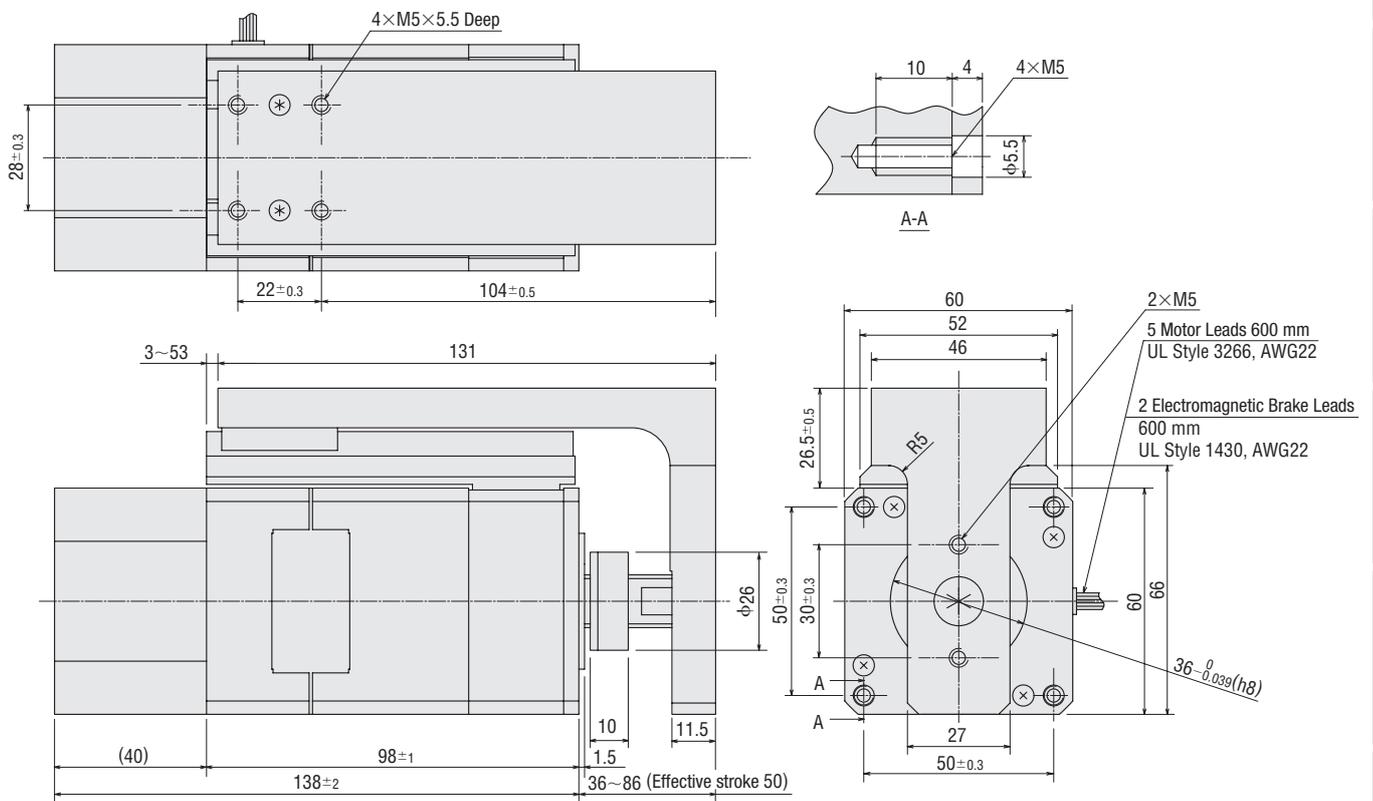
7 DRL60G

Product Name	Actuator Product Name	Mass kg
DRL60G-05 □ 4P-K ■	DRLM60G-05□4P-K	1.8
DRL60G-05 □ 4PN-K ■	DRLM60G-05□4PN-K	1.85



8 DRL60G

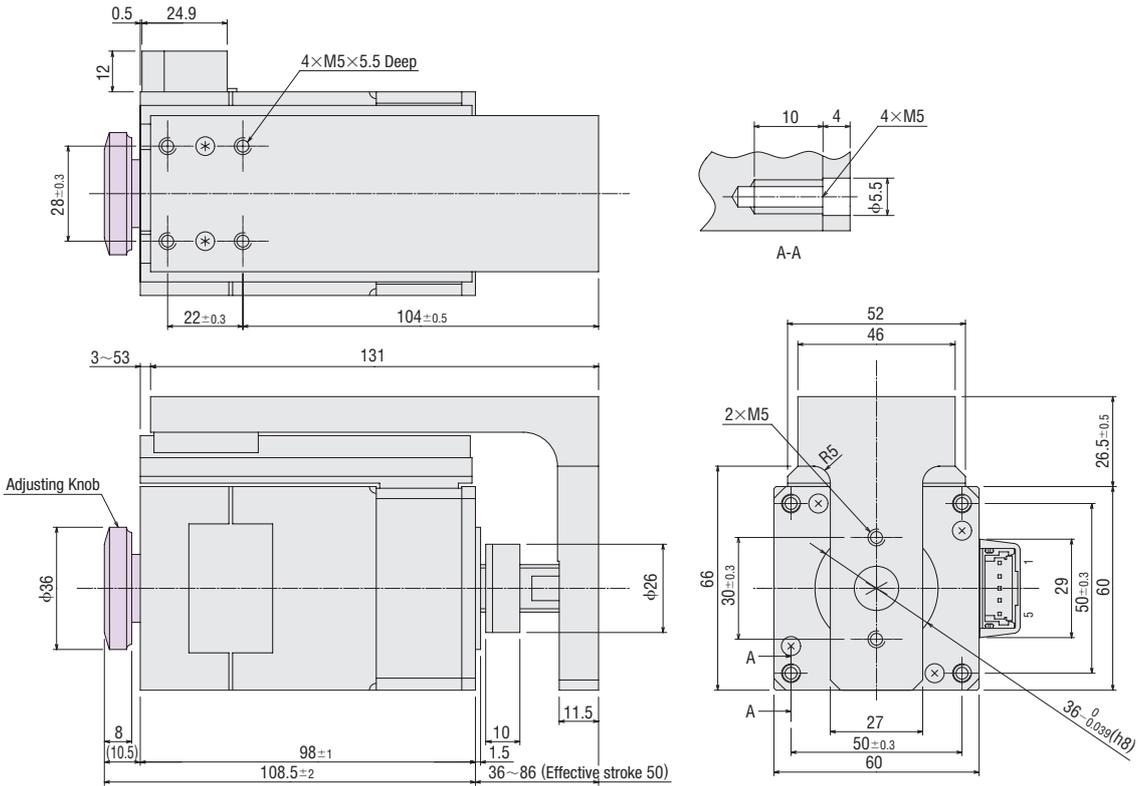
Product Name	Actuator Product Name	Mass kg
DRL60G-05 □ 4PM-K ■	DRLM60G-05□4PM-K	2.2



- **A** (rolled ball screw) or **B** (ground ball screw) indicating the ball screw type is entered in the box □ in the product name.
- **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box ■ in the product name.
- The dimensions of [7] apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded areas.

9 DRL60G

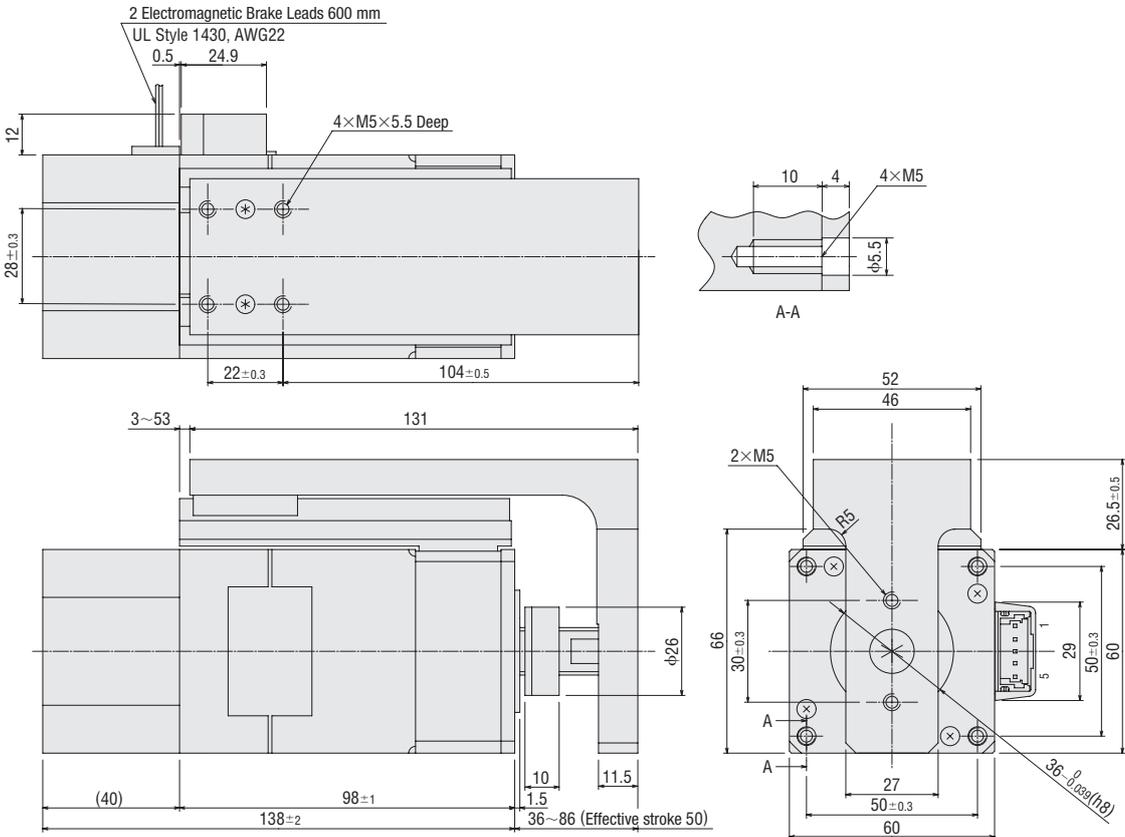
Product Name	Actuator Product Name	Mass kg
DRL60G-05B4M-K 	DRLM60G-05B4M-K	1.8
DRL60G-05B4MN-K 	DRLM60G-05B4MN-K	1.85



● Comes with a connection cable (0.6 m). UL Style 3266, AWG22

10 DRL60G

Product Name	Actuator Product Name	Mass kg
DRL60G-05B4MM-K 	DRLM60G-05B4MM-K	2.2



● Comes with a connection cable (0.6 m). UL Style 3266, AWG22

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box in the product name.

● The dimensions of **9** apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded areas.

Table Type **DRL20V 24 VDC**

Max. Thrust Force: 15 N, Stroke: 25 mm



Specifications

Actuator (RoHS)

Repetitive Positioning Accuracy [mm]	±0.003	Lost Motion [mm]	Ground Ball Screw: 0.02		Max. Load Moment [N·m]		MP:0.4	MY:0.4	MR:0.8	
					Traveling Parallelism [mm]		0.03			
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal	Vertical*2				
DRL20V-02B1P□-K□	25	Ground	1	0.002	1.5	1.5	15	15	20	0.2

● A symbol indicating the additional function **N** (adjustment knob type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box □ in the product name.

*1 Sixteen resolutions can be set.

*2 When the power is turned off or in an all windings off situation, 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.

*3 The max. thrust force is measured during constant-speed operation in the horizontal direction with no load applied to the moving parts (screw shaft and joint).

Thrust force varies with load mass and acceleration.

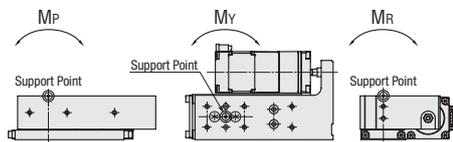
*4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF.

*5 Use the actuator at a maximum speed of 13 mm/s for the operating temperature range of 5 to 15°C.

Note

● Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Load Moment



Product Line

Ground Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL20V-02B1P-KD	25	1	Standard	—
DRL20V-02B1PN-KD	25	1	Standard	Adjusting Knob

— The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◇ Pulse Input

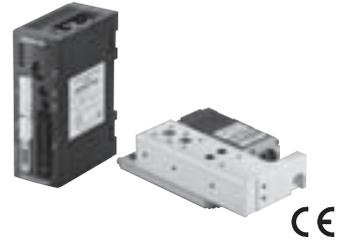
Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL20V-02B1P-KB	25	1	Standard	—
DRL20V-02B1PN-KB	25	1	Standard	Adjusting Knob

— The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Table Type **DRL28V 24 VDC**

Max. Thrust Force: 30 N, Stroke: 30 mm



Specifications

Actuator (RoHS)

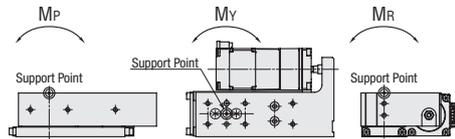
Repetitive Positioning Accuracy [mm]	Rolled Ball Screw: ± 0.01 Ground Ball Screw: ± 0.003	Lost Motion [mm]	Rolled Ball Screw: 0.05 Ground Ball Screw: 0.02	Max. Load Moment [N·m]	MP:0.7 My:0.7 Mr:1.5					
				Traveling Parallelism [mm]	0.03					
Product Name	Stroke [mm]	Ball Screw Type	Lead [mm]	Resolution*1 (Resolution of 1) [mm]	Max. Transportable Mass [kg]		Max. Thrust Force*3 [N]	Max. Holding Force*4 [N]	Max. Speed*5 [mm/s]	Max. Acceleration [m/s ²]
					Horizontal	Vertical*2				
DRL28V-03A1P □-K□	30	Rolled	1	0.002	3	3	30	30	40	0.2
DRL28V-03B1P □-K□		Ground								

- A symbol indicating the additional function **N** (adjustment knob type) is entered in the box □ in the product name. If there is no additional function, no code is entered in the box □.
- **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box □ in the product name.
- *1 Sixteen resolutions can be set.
- *2 When the power is turned off, or when in an all windings off situation, 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.
- *3 The max. thrust force is measured during constant-speed operation in the horizontal direction with no load applied to the moving parts (screw shaft and joint). Thrust force varies with load mass and acceleration.
- *4 The maximum holding force at excitation is the value when the automatic current cutback function is ON (Standstill Current: 50% of the rated current). The holding force is 0 when the power is OFF.
- *5 Use the actuator at a maximum speed of 10 mm/s for the operating temperature range of 5 to 15°C and at a maximum speed of 24 mm/s for temperatures above 15°C but no greater than 20°C.

Note

- Use the actuator in conditions where its surface temperature will be 90°C max.. The repetitive positioning accuracy is measured at a constant temperature under a constant load.

Load Moment



Product Line

Rolled Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28V-03A1P-KD	30	1	Standard	—
DRL28V-03A1PN-KD	30	1	Standard	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28V-03A1P-KB	30	1	Standard	—
DRL28V-03A1PN-KB	30	1	Standard	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Ground Ball Screw

◇ Built-In Controller (FLEX)

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28V-03B1P-KD	30	1	Standard	—
DRL28V-03B1PN-KD	30	1	Standard	Adjusting Knob

The following items are included in each product.

Actuator, Driver, Power Connector (CN1), Connection Cable (for I/O Signals, CN2), Connection Cable (for Actuator Connector, CN4), Connection Cable (for Actuator Connector), Operating Manual

◇ Pulse Input

Product Name	Stroke [mm]	Lead [mm]	Motor Type	Additional Function
DRL28V-03B1P-KB	30	1	Standard	—
DRL28V-03B1PN-KB	30	1	Standard	Adjusting Knob

The following items are included in each product.

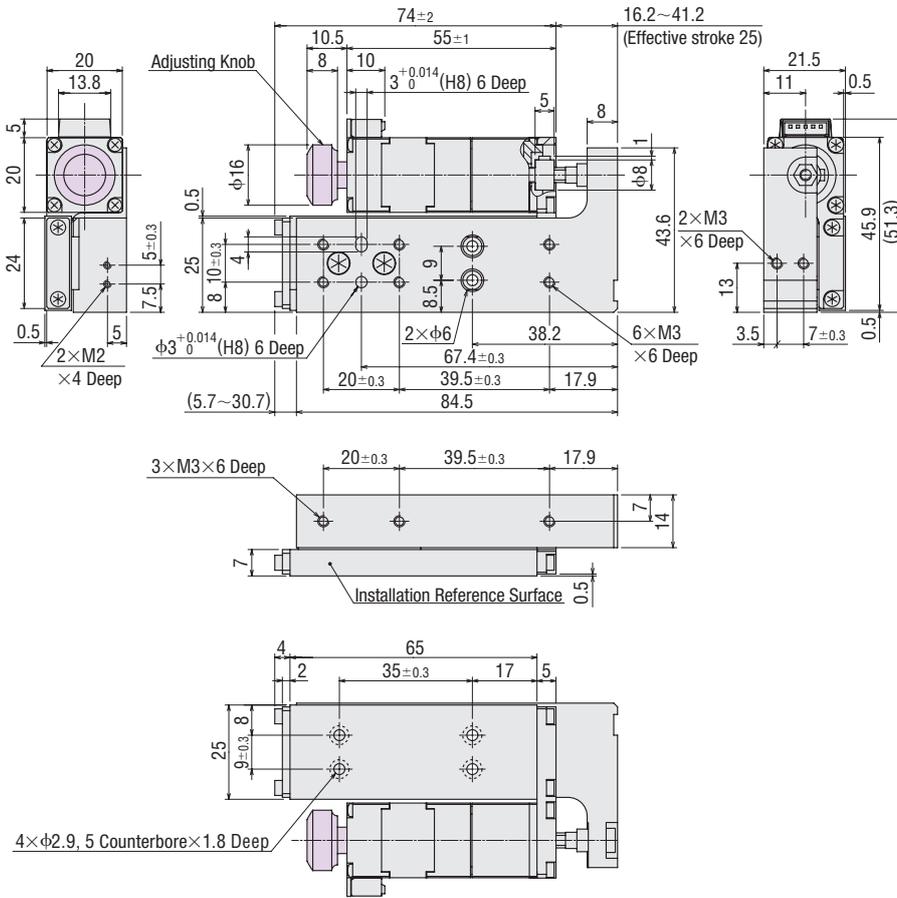
Actuator, Driver, Power Connector (CN1), Connector for Actuator (CN2), Connector for I/O Signals (CN3), Connection Cable (for Actuator Connector), Operating Manual

Dimensions (Unit = mm)

Actuator Table Type

1 DRL20V

Product Name	Actuator Product Name	Mass kg
DRL20V-02B1P-K	DRLM20V-02B1P-K	0.24
DRL20V-02B1PN-K	DRLM20V-02B1PN-K	0.25



● Comes with a connection cable (0.6 m). UL Style 3265, AWG24

● **B** (pulse input) or **D** (built-in controller type) indicating the driver type is entered in the box in the product name.

● The dimensions apply to a configuration with an adjusting knob. For products without additional functions, the adjusting knob does not exist for the shaded areas.

Features

How to Read Specifications Table

System Configuration

Specifications and Dimensions Standard Type

Specifications and Dimensions Guide Type

Specifications and Dimensions Table Type

General Specifications

Specifications, Dimensions, Connections Driver

Combination List

Accessories

Selection calculation

General Specifications

Specifications	Actuator	Driver	
		 Built-in Controller	Pulse Input
Heat-Resistant Class	130 (B) [Recognized as 105 (A) under the UL and CSA Standards.]	—	—
Insulation Resistance	The measured value is 100 MΩ or more when a 500 VDC megger is applied between the motor windings and the case.	The measured value is 100 MΩ or more when a 500 VDC megger is applied between the following locations: · FG Terminal – Power Input Terminal	
Dielectric Voltage	No abnormality is found between the motor windings and the case for 1 minute even with the following application: · DRL20 □, DRL28 □, DRL42 □ (high resolution): 0.5 kVAC, 50 Hz or 60 Hz · DRL42 □, DRL60 □ (high resolution): 1.0 kVAC, 50 Hz or 60 Hz · DRL60 □: 1.5 kVAC 50 Hz or 60 Hz	—	—
Operating Environment (In operation)	Ambient Temperature	0 to +40°C* (non-freezing) * For DRL20V and DRL28V , 5 to 40°C.	
	Ambient Humidity	85% Max. (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	IP20

Electromagnetic Brake Specifications

Type of Electromagnetic Brake	Power Off Activated Type
Power Supply Input Voltage/Current	DRL42 : 24 VDC ±5% 0.08 A DRL60 : 24 VDC ±5% 0.25 A
Brake Activation/Release Time	Activation Time: 20 ms Release Time: 30 ms
Time Rating	Continuous

Driver Specifications

Driver Type	 Built-in Controller	Pulse Input
Driver Product Name	LRD503-KD, LRD507-KD, LRD514-KD	LRD503-K, LRD507-K, LRD514-K
Power-Supply Input	24 VDC ±10% LRD503-KD: 0.7 A LRD507-KD: 1.4 A LRD514-KD: 2.5 A	24 VDC ±10% LRD503-K: 0.7 A LRD507-K: 1.4 A LRD514-K: 2.5 A
Max. Input Pulse Frequency	—	Line driver output by programmable controller: 500 kHz (When the pulse duty is 50%) Open collector output by programmable controller: 250 kHz (When the pulse duty is 50%)
Input Signal	Input Mode: Photocoupler Input	Input Mode: Photocoupler Input
		CW Pulse Signal (Pulse signal) CW (Forward) Direction Operation Command Pulse Signal (Operation command pulse signal when in 1-pulse input mode) Negative Logic Pulse Input, Pulse Width 1 μs min., Pulse Rise and Fall Time 2 μs max., Pulse Duty 50% max. The screw shaft moves one step forward when the pulse input is switched "ON" → "OFF."
		CCW Pulse Signal (Traveling direction signal) CCW (Backward) Direction Operation Command Pulse Signal (Traveling direction signal when in 1-pulse input mode - Photocoupler ON: CW, Photocoupler OFF: CCW) Negative Logic Pulse Input, Pulse Width 1 μs min., Pulse Rise and Fall Time 2 μs max., Pulse Duty 50% max. The screw shaft moves one step backward when the pulse input is switched "ON" → "OFF."
		All Windings Off Signal When the signal is photocoupler "ON", the output current to the actuator is cut off. When the signal is photocoupler "OFF", the output current is supplied to the actuator.
		Step Angle Select Signal When the signal is photocoupler "OFF", the step angle setting switch is selected; when the signal is photocoupler "ON", the basic step angle is selected.
		Automatic Current Cutback Release Signal When the signal is photocoupler "ON", the automatic current cutback function for actuator standstill is released. When the signal is photocoupler "OFF", the automatic current cutback function is activated after the actuator stops (approximately 100 ms).
Output Signal	Output Mode: Photocoupler and Open-Collector Output Line Driver Output PLS-OUT, DIR-OUT	Output Mode: Photocoupler and Open-Collector Output
		Excitation Timing Signal This signal is output when the excitation sequence is at STEP "0". (Photocoupler: ON) For a resolution of 1: The signal is output once every 10 pulses. For a resolution of 10: The signal is output once every 100 pulses.
Number of Positioning Data Sets	63 Points	—
Positioning Operation	One-Shot, Linked Operation, Linked Operation 2, Sequential	—
Other Operations	Jog Operation, Return-to-Home Operation, Continuous Operation, Test Operation	—
Control Module OPX-2A	○	—
Data Setting Software MEXE02	○	—
Function	Smooth Drive, Automatic Current Cutback, Step Angle Select, Pulse Input Mode Switch (Pulse input only), All Windings Off, Excitation Timing	
Cooling Method	Natural Cooling Method	

FLEX Built-In Controller Type RS-485 Communication Specification

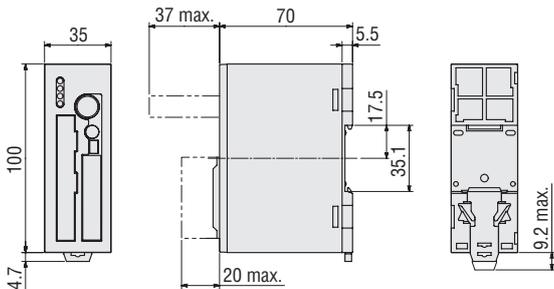
Protocol	Modbus protocol (Modbus RTU mode)
Electrical Characteristics	EIA-485 based, straight cable Use twisted-pair wire (TIA/EIA-568B CAT5e or higher is recommended), and set a max. total length of 50 m.
Communication Mode	Half-duplex communication, start-stop synchronization method (Data: 8 bits, stop bit: 1 bit/2 bits, parity: none/even numbers/odd numbers)
Baud Rate	9600 bps/19200 bps/38400 bps/57600 bps/115200 bps
Connection Type	Up to 31 can be connected to each programmable controller (master equipment).

Driver Dimensions (Unit = mm)

FLEX Built-In Controller Type

Driver Product Name: LRD503-KD, LRD507-KD, LRD514-KD

Mass: 0.2 kg



● Included

Power Connector (CN1)

Connector: MC1,5/3-STF-3,5 (Phoenix Contact)

Connection Cable (for I/O signals) (CN2, length 1 m)

Connector: FX2B-40SA-1.27R (Hirose Electric)

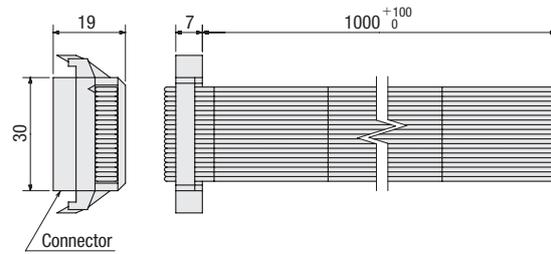
Connection Cable (for actuator connector) (CN4, length: 0.6 m)

Connector Housing: 51103-0500 (Molex)

Contact: 50351-8100 (Molex)

Applicable Crimp Tool: 57295-5000 (Molex)

◇ Connection Cable (for I/O signals, CN2)



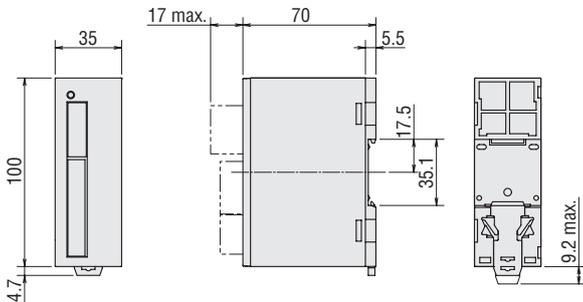
◇ Connection Cable (for actuator connector, CN4)



● Pulse Input Type

Driver Product Name: LRD503-K, LRD507-K, LRD514-K

Mass: 0.12 kg



● Included

Power Connector (CN1)

Connector: MC1,5/3-STF-3,5 (Phoenix Contact)

Actuator Connector (CN2)

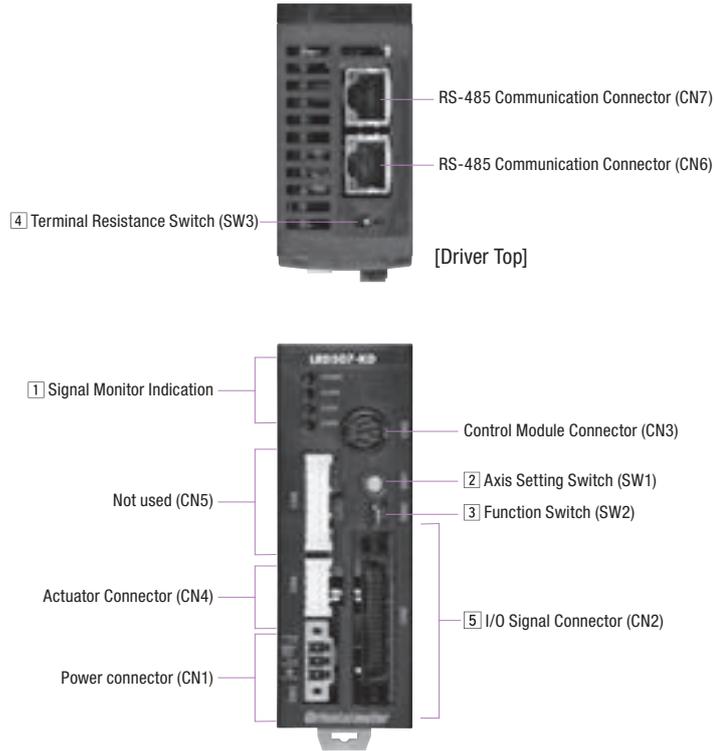
Connector: MC1,5/5-STF-3,5 (Phoenix Contact)

I/O Signal Connector (CN3)

Connector: FK-MC0,5/10-ST-2,5 (Phoenix Contact)

Connection and Operation (Built-in controller type)

Names and Functions of Driver Parts



1 Signal Monitor Display

◇ LED Indicator

Indication	Color	Function	Lighting Condition
POWER	Green	Power supply indication	When the power supply is input
ALARM	Red	Alarm Indication	When a protective function is activated (blinking)
C-DAT	Green	Communication Indication	When data is being received or sent
C-ERR	Red	Communication Error Indication	When a communication error has occurred

◇ Alarm Contents

Blink Count	Function	Operating Condition
2	Overheat Protection	When the temperature in the driver reaches approximately 85°C
3	Overvoltage Protection	When the internal voltage of the driver exceeds the permissible value
7	±LS Simultaneous Input	When both +LS and -LS are detected
	±LS Reverse Connection	When the LS opposite from the home direction is detected during return-to-home operation
	Return-to-Home Operation Abnormality	When the return-to-home sequence does not end normally
	HOMES Not Detected	When HOMES is not detected from +LS to -LS during a return-to-home operation in 3-sensor mode
	TIM, SLIT Signal Abnormality	When the TIM input or SLIT input is not detected during return-to-home operation
	Hardware Overtravel	When +LS or -LS is detected
	Software Overtravel	When the software limit is reached
	Return-to-Home Operation Offset Abnormality	When +LS or -LS is detected in offset movement in a return-to-home operation
	Operating Data Error	When an operating data error has occurred
	RS-485 Communication Error	When the set number of RS-485 communication consecutive errors is reached
9	RS-485 Communication Timeout	When an RS-485 communication timeout is detected
	Network Bus Error	When the bus goes OFF for the higher level network for the network controller during motor operation
	Network Converter Error	When an alarm is issued in the network converter
	EEPROM Error	When the saved driver data is damaged

2 Axis Setting Switch (SW1)

Indication	Function
SW1	Set when using with RS-485 communication. Sets the axis number (Factory Setting: 0).

3 Function Switch (SW2)

Indication	No.	Function
SW2	1	Sets the RS-485 baud rate (Factory Setting: ON).
	2	
	3	
	4	Sets the RS-485 connection destination (Factory Setting: OFF).

◇ Settings for RS-485 Communication Speed

No.	Baud Rate	9600 bps	19200 bps	38400 bps	57600 bps	115200 bps	250000 bps	312500 bps	625000 bps
1		OFF	ON	OFF	ON	OFF	ON	OFF	ON
2		OFF	OFF	ON	ON	OFF	OFF	ON	ON
3		OFF	OFF	OFF	OFF	ON	ON	ON	ON

◇ Settings for RS-485 Connection Destination

No.	Connection Destination	Network Converter	General Purpose Master Equipment
4		OFF	ON

4 Terminal Resistance Switch (SW3)

Indication	Function
SW3	Sets whether or not there is a terminating resistor (120 Ω) for RS-485 communication (Factory Setting: OFF). OFF: Terminating resistor not used ON: Terminating resistor used

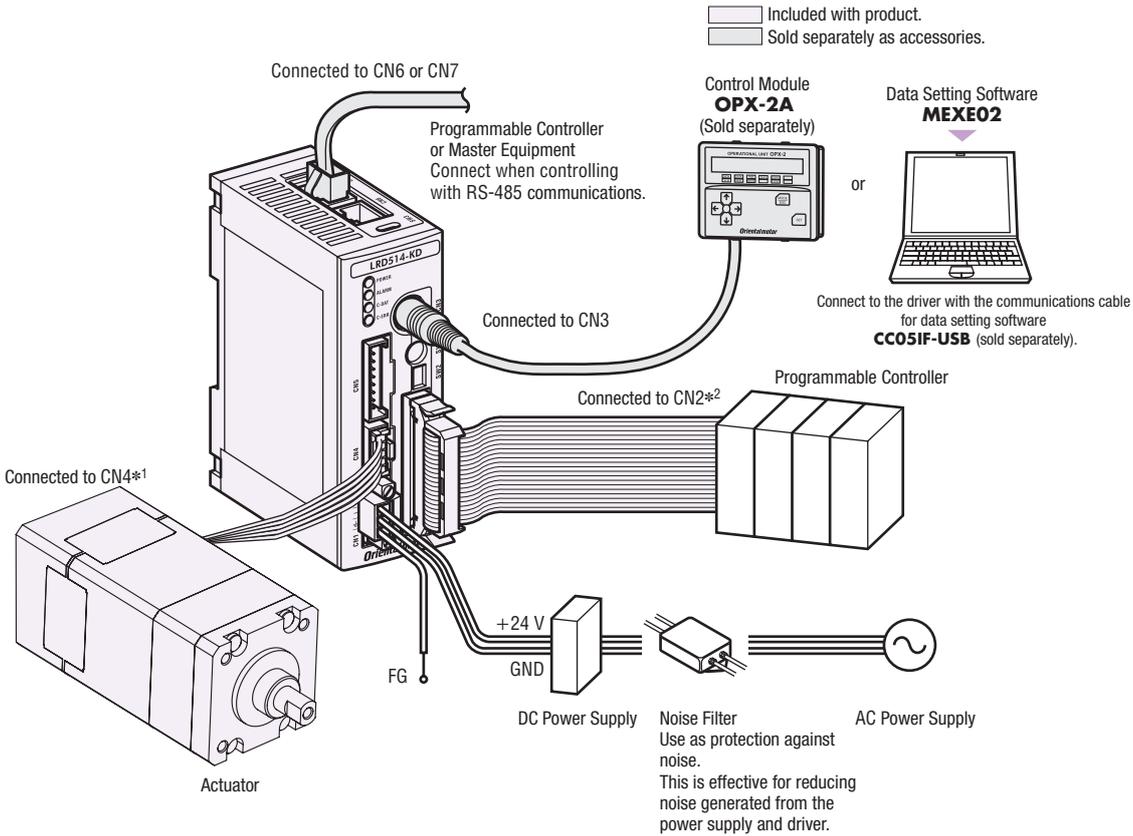
5 I/O Signal Connector (CN2, 40 pins)

Indication	I/O	Pin No.	Code	Signal Name
CN2	Input	A1	IN-COM0	Input common
		A2	START	Start Input
		A3	ALM-RST	Alarm Reset Input
		A4	AWO	All Windings Off Input
		A5	STOP	Stop Input
		A6	M0	Data Selection Input
		A7	M1	
		A8	M2	
		A9	M3	
		A10	M4	
		A11	M5	
		A12	HOME/P-PRESET	Return-to-Home/Position Preset Input
		A13	FWD	CW Rotation (Forward) Input
		A14	RVS	CCW (Reverse) Input
		A15	+LS	+Side Limit Sensor Input
		A16	-LS	-Side Limit Sensor Input
		A17	HOMES	Mechanical Home Sensor Input
		A18	SLIT	Slit Sensor Input
		A19	-	-
		A20	IN-COM1	Sensor Input Common
CN2	Output power	B1	MOVE+	Output During Actuator Drive
		B2	MOVE-	
		B3	ALM+	Alarm Output
		B4	ALM-	
		B5	OUT1+	Control Output 1*
		B6	OUT1-	
		B7	OUT2+	Control Output 2*
		B8	OUT2-	
		B9	OUT3+	Control Output 3*
		B10	OUT3-	
		B11	OUT4+	Control Output 4*
		B12	OUT4-	
		B13	-	-
		B14	-	-
		B15	PLS-OUT+	Pulse Output (Line driver output)
		B16	PLS-OUT-	
		B17	DIR-OUT+	Traveling Direction Output (Line driver output)
		B18	DIR-OUT-	
		B19	GND	GND
		B20	-	-

*Control outputs 1 (OUT1) to 4 (OUT4) set functions to be assigned according to parameter settings.
The initial values are OUT1 (AREA), OUT2 (READY), OUT3 (WNG), and OUT4 (HOME-P).

● Connection Diagram

◇ Connections with Peripheral Equipment

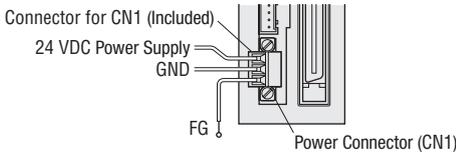


- *1 When the product or the driver is purchased, it comes with a 0.6 m connection cable.
- *2 When the product or the driver is purchased, it comes with a 1 m connection cable.
- Keep the wiring distance between the actuator and driver to 10 m max..

◇ Power Supply Connection

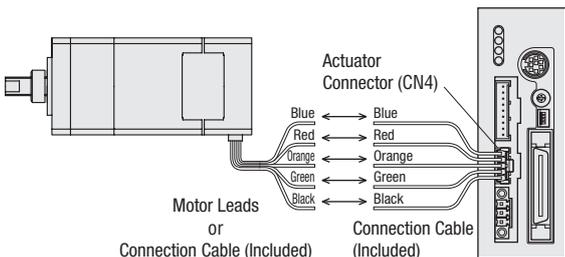
Use the included connector for CN1 to connect the power cable (AWG22: 0.3 mm²) to the driver's power connector (CN1). Connecting the DC power-supply input with the polarity reversed would damage the driver (circuits). Make sure that the polarity is correct before turning power on. Provide a power supply that can supply adequate input current. If the power supply capacity is inadequate, abnormalities such as the following occur.

- The actuator does not operate normally in high-speed operation.
- The actuator does not accelerate or decelerate as set.



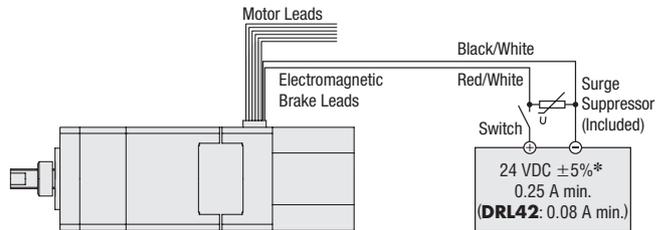
◇ Actuator Connection

Connect using the included connection cable (for actuator connector, CN4). The terminals and connectors required for connecting the motor leads and the connection cable are not included. For motor lead extension, use a wire of AWG22 (0.3 mm²) min.



◇ Connecting the Electromagnetic Brake

Use power supplies of 24 VDC±5%*, 0.25 A min. (for the **DRL42**, 0.08 A min.)



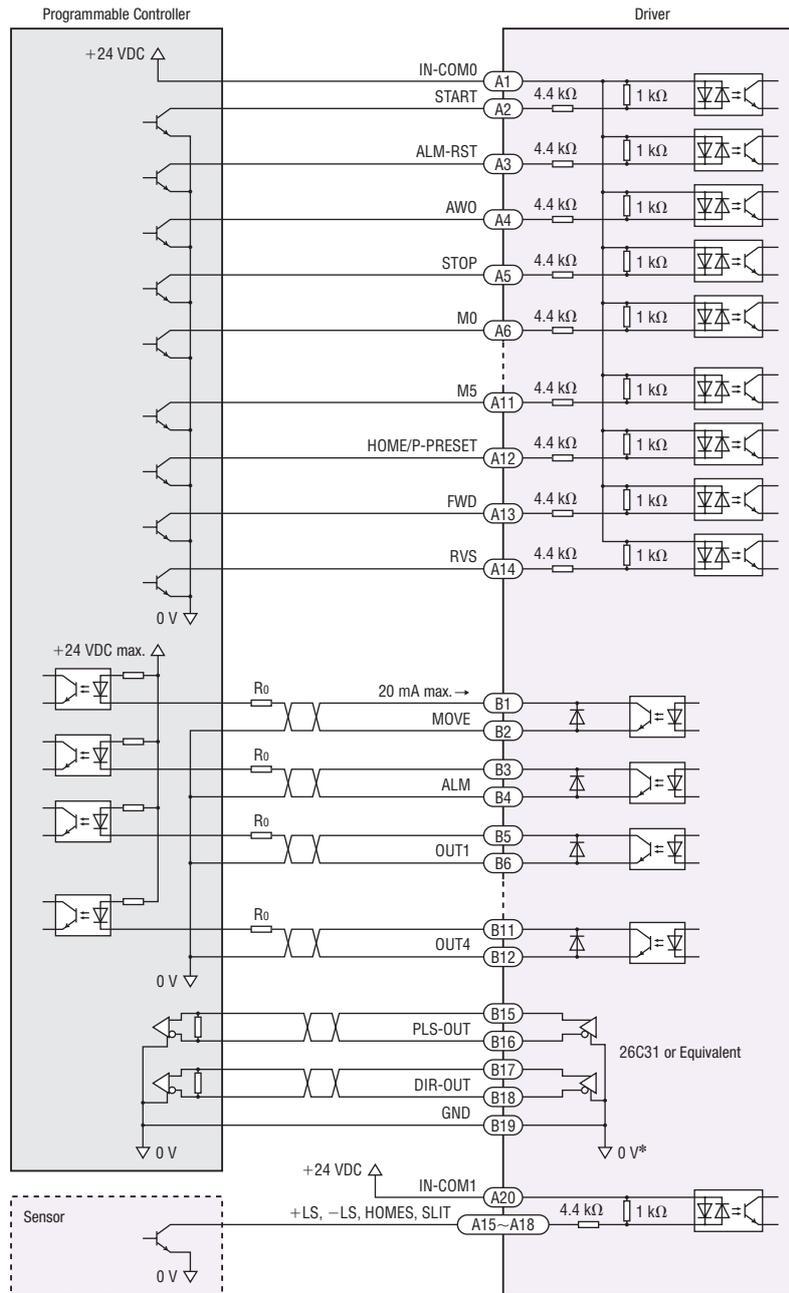
*If the wiring distance is extended by 20 m or more, the specification becomes 24 VDC ±4%.

Notes

- Applying voltage exceeding the specifications causes actuator failure.
- To protect the switch contacts and prevent noise, always connect a surge suppressor. (The surge suppressor is included with electromagnetic brake motors.)

◇ Connection to Programmable Controller

● Connection Diagram for Connection with Current Sink Output Circuit

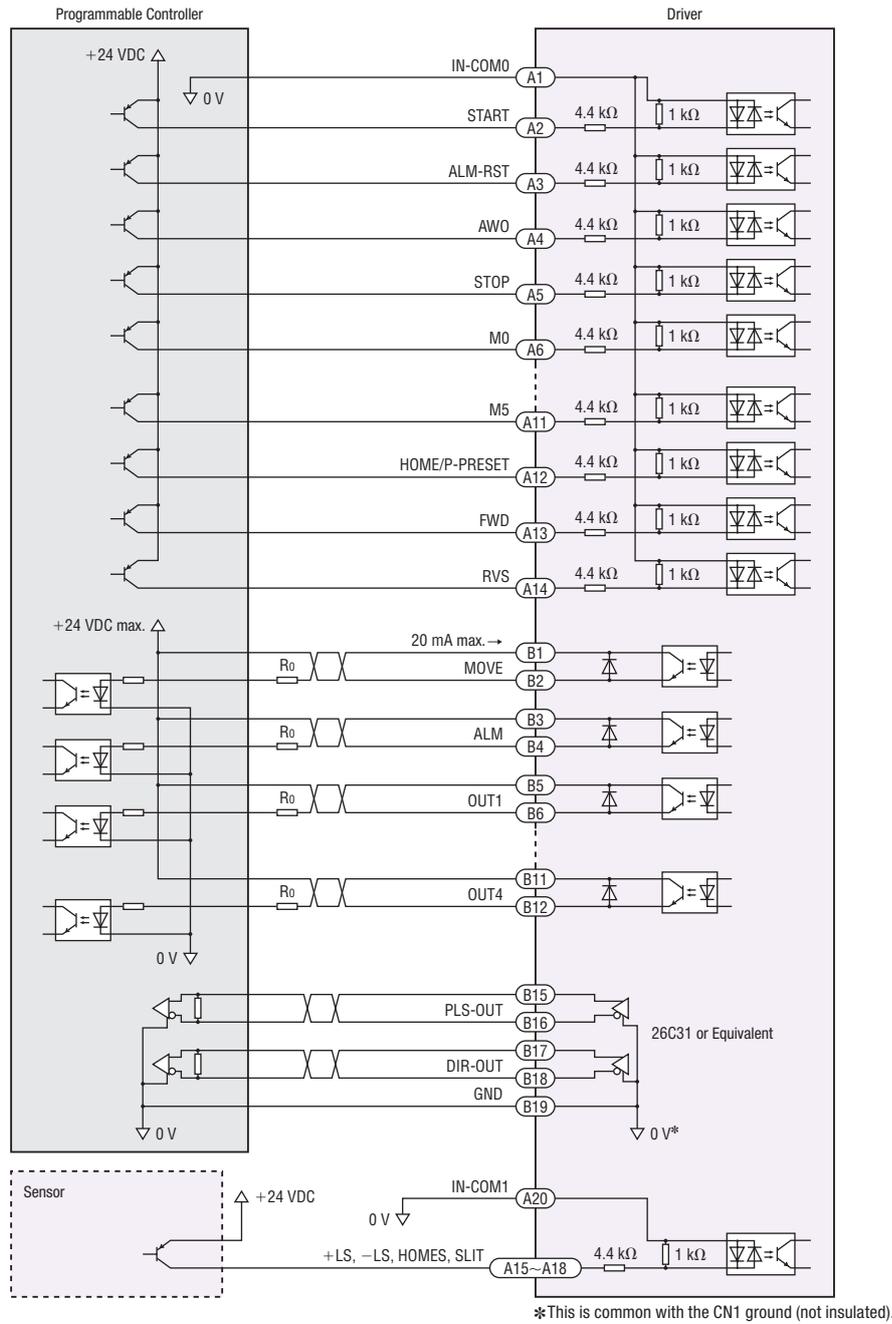


*This is common with the CN1 ground (not insulated).

Notes

- Use the included cable with connector for the I/O signal cable and keep the wiring distance as short as possible.
- Use 24 VDC for the input signals. Using voltage exceeding the specifications can break elements.
- Use 24 VDC max. and current of 20 mA max. for the output signals. Using voltage exceeding the specifications can break elements.
Check the specifications for the connected equipment. If the current exceeds 20 mA, connect the external resistor R_0 .
- Connect a terminating resistor of 100 Ω min. between the line receiver inputs.
- Provide a distance of 100 mm min. between the signal lines and power lines (power supply lines, actuator lines). Do not run the signal lines in the same piping as power lines or bundle them with power lines.
- If noise generated by the actuator cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

● Connection Diagram for Connection with Current Source Output Circuit

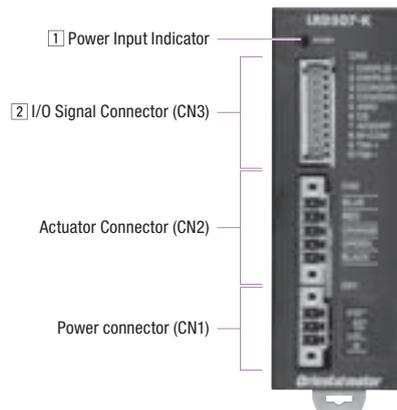
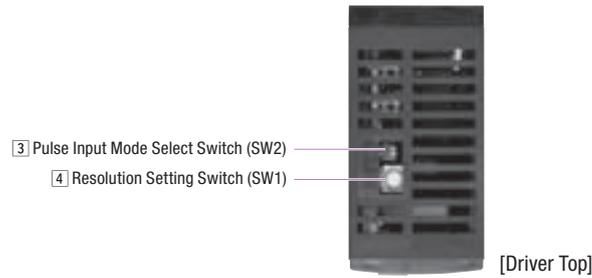


Notes

- Use the included cable with connector for the I/O signal cable and keep the wiring distance as short as possible.
- Use 24 VDC for the input signals. Using voltage exceeding the specifications can break elements.
- Use 24 VDC max. and current of 20 mA max. for the output signals. Using voltage exceeding the specifications can break elements. Check the specifications for the connected equipment. If the current exceeds 20 mA, connect the external resistor R_0 .
- Connect a terminating resistor of 100 Ω min. between the line receiver inputs.
- Provide a distance of 100 mm min. between the signal lines and power lines (power supply lines, actuator lines). Do not run the signal lines in the same piping as power lines or bundle them with power lines.
- If noise generated by the actuator cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

■ Connection and Operation (Pulse input type)

● Names and Functions of Driver Parts



1 Power Input Indicator

◇ LED Indicator

Color	Function	Lighting Condition
Green	Power supply indication	Lights up when the power supply is input.

2 I/O Signal Connector (CN3, 10 pins)

Indication	Input/output	Pin No.	Code	Signal Name
CN3	Input	1	CW (PLS) +	CW Pulse (Pulse)
		2	CW (PLS) -	
		3	CCW (DIR) +	CCW Pulse (Traveling direction)
		4	CCW (DIR) -	
		5	AWO	All windings off
		6	CS	Resolution Select
		7	ACDOFF	Automatic current cutback release
		8	IN-COM	Input common
Output power	9	TIM+	Timing	
	10	TIM-		

3 Pulse Input Mode Select Switch (SW2)

Indication	No.	Function
SW2	1	Switches the pulse input mode between 1-pulse input mode and 2-pulse input mode.
	2	Not used.

4 Resolution Setting Switch (SW1)

Indication	Function
SW1	Switch can be set to the desired resolution from the 16 resolution levels.

● Standard Type

Resolution Setting Switch		DRL20, 28 Lead 1 mm	DRL42 Lead 2 mm	DRL42 Lead 8 mm	DRL60 Lead 4 mm
SW1 Scale	Resolution	Resolution [mm]	Resolution [mm]	Resolution [mm]	Resolution [mm]
0	1	0.002	0.004	0.016	0.008
1	2	0.001	0.002	0.008	0.004
2	2.5	0.0008	0.0016	0.0064	0.0032
3	4	0.0005	0.001	0.004	0.002
4	5	0.0004	0.0008	0.0032	0.0016
5	8	0.00025	0.0005	0.002	0.001
6	10	0.0002	0.0004	0.0016	0.0008
7	20	0.0001	0.0002	0.0008	0.0004
8	25	0.00008	0.00016	0.00064	0.00032
9	40	0.00005	0.0001	0.0004	0.0002
A	50	0.00004	0.00008	0.00032	0.00016
B	80	0.000025	0.00005	0.0002	0.0001
C	100	0.00002	0.00004	0.00016	0.00008
D	125	0.000016	0.000032	0.000128	0.000064
E	200	0.00001	0.00002	0.00008	0.00004
F	250	0.000008	0.000016	0.000064	0.000032

● High-Resolution Motor Type

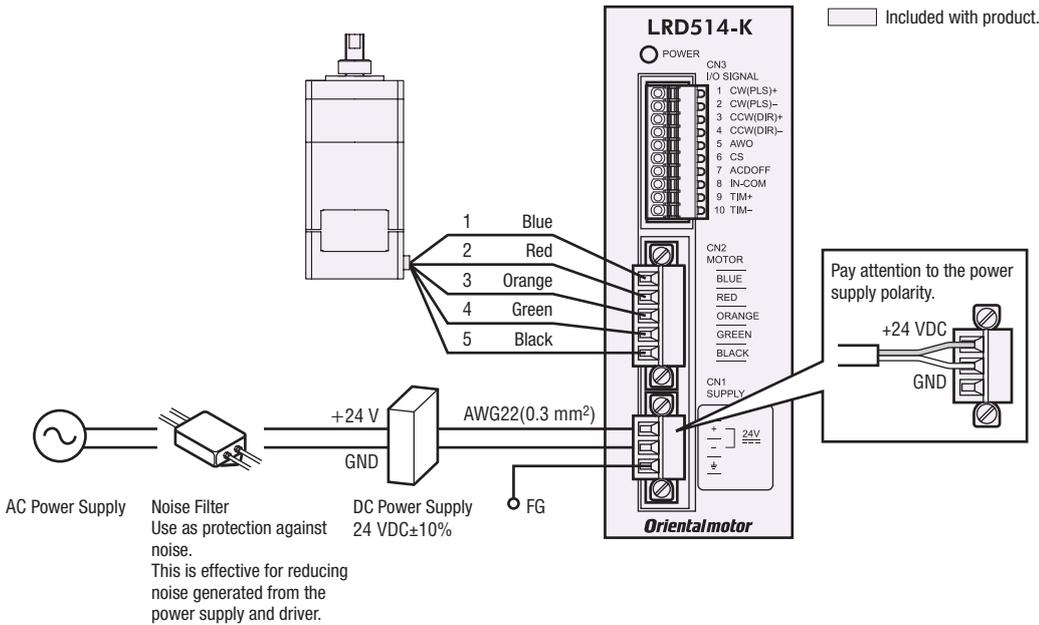
Resolution Setting Switch		DRL28 Lead 1 mm	DRL42 Lead 2 mm	DRL60 Lead 4 mm
SW1 Scale	Resolution	Resolution [mm]	Resolution [mm]	Resolution [mm]
0	1	0.001	0.002	0.004
1	2	0.0005	0.001	0.002
2	2.5	0.0004	0.0008	0.0016
3	4	0.00025	0.0005	0.001
4	5	0.0002	0.0004	0.0008
5	8	0.000125	0.00025	0.0005
6	10	0.0001	0.0002	0.0004
7	20	0.00005	0.0001	0.0002
8	25	0.00004	0.00008	0.00016
9	40	0.000025	0.00005	0.0001
A	50	0.00002	0.00004	0.00008
B	80	0.0000125	0.000025	0.00005
C	100	0.00001	0.00002	0.00004
D	125	0.000008	0.000016	0.000032
E	200	0.000005	0.00001	0.00002
F	250	0.000004	0.000008	0.000016

Notes

- The resolutions are theoretical values.
- The resolution is calculated by dividing the basic resolution by the number of microstep.
- Do not change the "Resolution Select" signal (CS) input or resolution select switch while the actuator is operating. This may cause a malfunction with the actuator.

● Connection Diagram

◇ Connections with Peripheral Equipment



◇ Power Supply Connection

Use the included connector for CN1 to connect the power cable (AWG22: 0.3 mm²) to the driver's power connector (CN1). Connecting the DC power-supply input with the polarity reversed would damage the driver (circuits). Make sure that the polarity is correct before turning power on. Provide a power supply that can supply adequate input current. If the power supply capacity is inadequate, abnormalities such as the following occur.

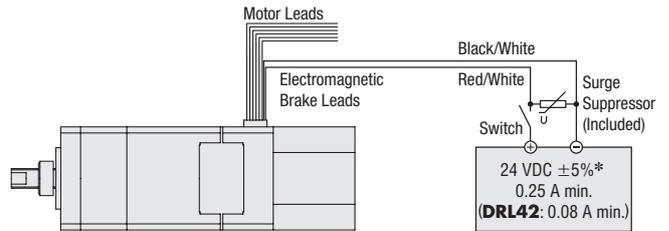
- The actuator does not operate normally in high-speed operation.
- The actuator does not accelerate or decelerate as set.

◇ Extension of Motor Lead

Use a wire of AWG22 (0.3 mm²) min.

◇ Connecting the Electromagnetic Brake

Use power supplies of 24 VDC ± 5%*, 0.25 A min. (for the **DRL42**, 0.08 A min.)



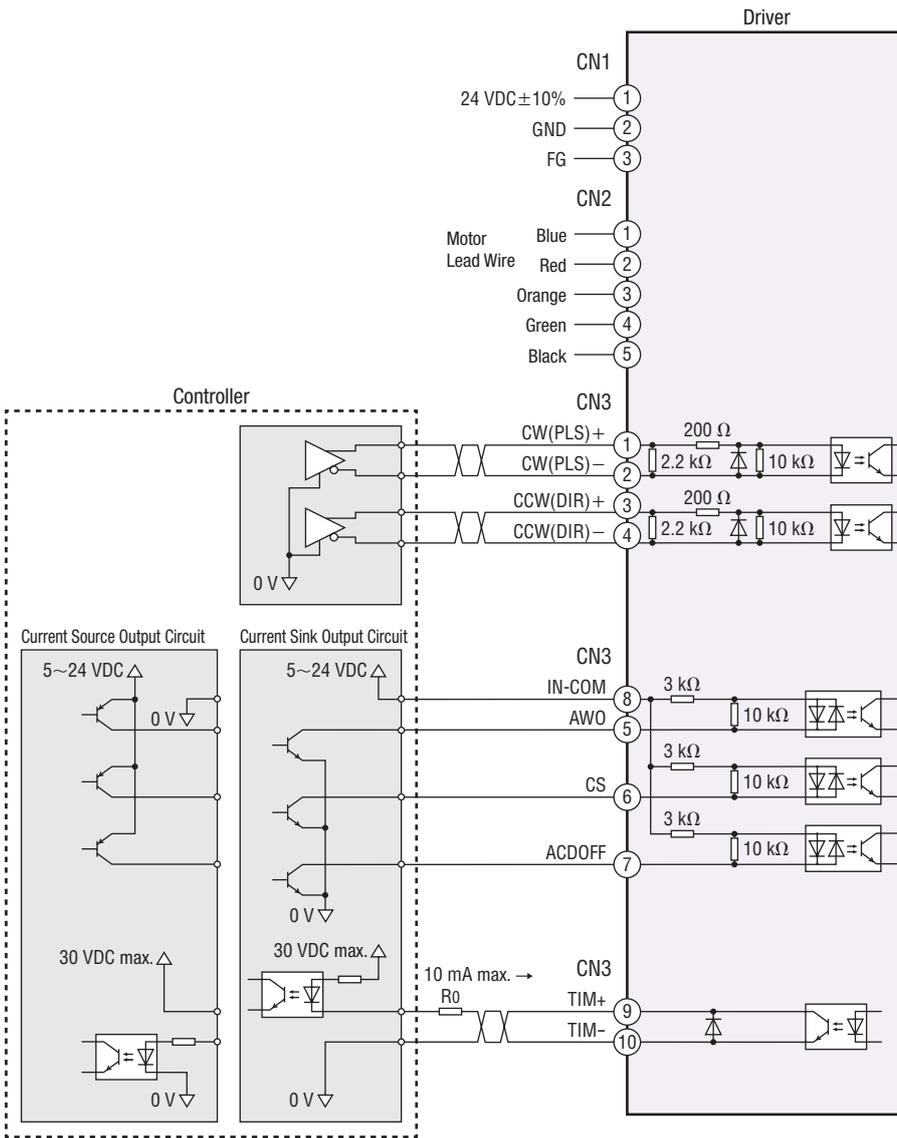
*If the wiring distance is extended by 20 m or more, the specification becomes 24 VDC ± 4%.

Notes

- Applying voltage exceeding the specifications causes actuator failure.
- To protect the switch contacts and prevent noise, always connect a surge suppressor. (The surge suppressor is included with electromagnetic brake motors.)

● Connection Diagram

◇ When the Pulse Input is the Line Driver



[Note on Wiring]

◇ I/O Signal Connection

- Input Signal
The external resistor is not needed when the voltage is 5 VDC. If voltage exceeding 5 VDC is applied, connect an external resistor R_1 so that the current is 7 to 20 mA.
Example) When V_o is 24 VDC, R_1 : 1.5 to 2.2 k Ω , 0.5 W min.
- Output Signal
Check the specifications of the connected devices. If the current exceeds 10 mA, connect the external resistor R_o .
- Use a twisted-pair wire of AWG26 to 20 (0.14 to 0.5 mm²).
- Since the maximum transmissible frequency drops as the pulse line becomes longer, keep the wiring length as short as possible (within 2 m).
- Provide a distance of 100 mm min. between the signal lines and power lines (power supply lines, actuator lines). Do not run the signal lines in the same piping as power lines or bundle them with power lines.
- If noise generated by the actuator cable or power supply cable causes a problem with the specific wiring or layout, shield the cable or use ferrite cores.

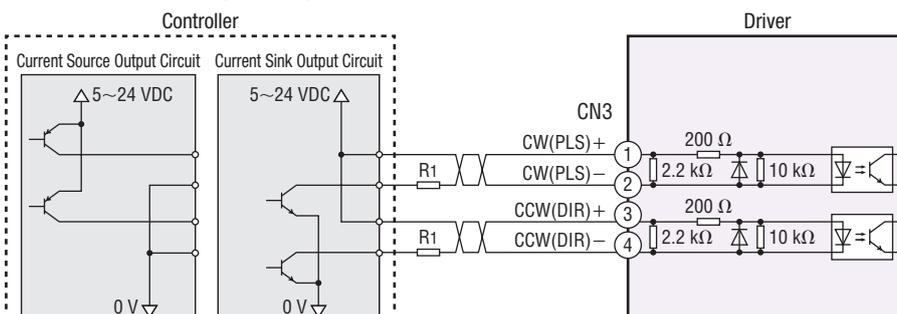
◇ Power Supply Connection

- Use a wire of AWG22 (0.3 mm²).
- Incorrect polarities of the DC power-supply input will lead to driver damage. Make sure that the polarity is correct before turning power on.

◇ Extension of Motor Lead

- Use a wire of AWG22 (0.3 mm²) min.

◇ When the Pulse Input is Open Collector



Features

How to Read Specifications Table

System Configuration

Specifications and Dimensions Standard Type

Specifications and Dimensions Guide Type

Specifications and Dimensions Table Type

General Specifications

Specifications, Dimensions Connections Driver

Combination List

Accessories

Selection calculation

List of Actuator and Driver Combinations

Built-In Controller

Product Line	Product Name	Actuator Product Name	Driver Product Name	
Standard Type	DRL20-02B1P-KD	DRLM20-02B1P-K	LRD503-KD	
	DRL20-02B1PN-KD	DRLM20-02B1PN-K		
	DRL28-03A1P-KD	DRLM28-03A1P-K		
	DRL28-03A1PN-KD	DRLM28-03A1PN-K	LRD507-KD	
	DRL28-06A1P-KD	DRLM28-06A1P-K		
	DRL28-03B1P-KD	DRLM28-03B1P-K		
	DRL28-03B1PN-KD	DRLM28-03B1PN-K		
	DRL28-06B1P-KD	DRLM28-06B1P-K		
	DRL28-03B1M-KD	DRLM28-03B1M-K		
	DRL28-03B1MN-KD	DRLM28-03B1MN-K	LRD507-KD	
	DRL42-04A2P-KD	DRLM42-04A2P-K		
	DRL42-04A2PN-KD	DRLM42-04A2PN-K		
	DRL42-04A2PM-KD	DRLM42-04A2PM-K		
	DRL42-10A2P-KD	DRLM42-10A2P-K		
	DRL42-04A8P-KD	DRLM42-04A8P-K		
	DRL42-04A8PN-KD	DRLM42-04A8PN-K		
	DRL42-04A8PM-KD	DRLM42-04A8PM-K		
	DRL42-10A8P-KD	DRLM42-10A8P-K		
	DRL42-04B2P-KD	DRLM42-04B2P-K		
	DRL42-04B2PN-KD	DRLM42-04B2PN-K		
	DRL42-04B2PM-KD	DRLM42-04B2PM-K		
	DRL42-10B2P-KD	DRLM42-10B2P-K	LRD514-KD	
	DRL42-04B2M-KD	DRLM42-04B2M-K		
	DRL42-04B2MN-KD	DRLM42-04B2MN-K		
	DRL42-04B2MM-KD	DRLM42-04B2MM-K		
	DRL60-05A4P-KD	DRLM60-05A4P-K		
	DRL60-05A4PN-KD	DRLM60-05A4PN-K		
	DRL60-05A4PM-KD	DRLM60-05A4PM-K		
	DRL60-10A4P-KD	DRLM60-10A4P-K		
	DRL60-05B4P-KD	DRLM60-05B4P-K		
DRL60-05B4PN-KD	DRLM60-05B4PN-K			
DRL60-05B4PM-KD	DRLM60-05B4PM-K			
DRL60-10B4P-KD	DRLM60-10B4P-K			
DRL60-05B4M-KD	DRLM60-05B4M-K			
DRL60-05B4MN-KD	DRLM60-05B4MN-K			
DRL60-05B4MM-KD	DRLM60-05B4MM-K			
Guide Type	DRL20G-02B1P-KD	DRLM20G-02B1P-K	LRD503-KD	
	DRL20G-02B1PN-KD	DRLM20G-02B1PN-K		
	DRL28G-03A1P-KD	DRLM28G-03A1P-K	LRD507-KD	
	DRL28G-03A1PN-KD	DRLM28G-03A1PN-K		
	DRL28G-03B1P-KD	DRLM28G-03B1P-K		
	DRL28G-03B1PN-KD	DRLM28G-03B1PN-K		
	DRL28G-03B1M-KD	DRLM28G-03B1M-K		
	DRL28G-03B1MN-KD	DRLM28G-03B1MN-K		
	DRL42G-04A2P-KD	DRLM42G-04A2P-K	LRD507-KD	
	DRL42G-04A2PN-KD	DRLM42G-04A2PN-K		
	DRL42G-04A2PM-KD	DRLM42G-04A2PM-K		
	DRL42G-04A8P-KD	DRLM42G-04A8P-K		
	DRL42G-04A8PN-KD	DRLM42G-04A8PN-K		
	DRL42G-04A8PM-KD	DRLM42G-04A8PM-K		
	DRL42G-04B2P-KD	DRLM42G-04B2P-K		
	DRL42G-04B2PN-KD	DRLM42G-04B2PN-K		
	DRL42G-04B2PM-KD	DRLM42G-04B2PM-K		
	DRL42G-04B2M-KD	DRLM42G-04B2M-K		
	DRL42G-04B2MN-KD	DRLM42G-04B2MN-K		
	DRL42G-04B2MM-KD	DRLM42G-04B2MM-K		
	DRL60G-05A4P-KD	DRLM60G-05A4P-K	LRD514-KD	
	DRL60G-05A4PN-KD	DRLM60G-05A4PN-K		
	DRL60G-05A4PM-KD	DRLM60G-05A4PM-K		
	DRL60G-05B4P-KD	DRLM60G-05B4P-K		
	DRL60G-05B4PN-KD	DRLM60G-05B4PN-K		
	DRL60G-05B4PM-KD	DRLM60G-05B4PM-K		
	DRL60G-05B4M-KD	DRLM60G-05B4M-K		
	DRL60G-05B4MN-KD	DRLM60G-05B4MN-K		
	DRL60G-05B4MM-KD	DRLM60G-05B4MM-K		
	Table Type	DRL20V-02B1P-KD		DRLM20V-02B1P-K
DRL20V-02B1PN-KD		DRLM20V-02B1PN-K		
DRL28V-03A1P-KD		DRLM28V-03A1P-K		LRD507-KD
DRL28V-03A1PN-KD		DRLM28V-03A1PN-K		
DRL28V-03B1P-KD		DRLM28V-03B1P-K		
DRL28V-03B1PN-KD		DRLM28V-03B1PN-K		

Pulse Input

Product Line	Product Name	Actuator Product Name	Driver Product Name	
Standard Type	DRL20-02B1P-KB	DRLM20-02B1P-K	LRD503-K	
	DRL20-02B1PN-KB	DRLM20-02B1PN-K		
	DRL28-03A1P-KB	DRLM28-03A1P-K		
	DRL28-03A1PN-KB	DRLM28-03A1PN-K	LRD507-K	
	DRL28-06A1P-KB	DRLM28-06A1P-K		
	DRL28-03B1P-KB	DRLM28-03B1P-K		
	DRL28-03B1PN-KB	DRLM28-03B1PN-K		
	DRL28-06B1P-KB	DRLM28-06B1P-K		
	DRL28-03B1M-KB	DRLM28-03B1M-K		
	DRL28-03B1MN-KB	DRLM28-03B1MN-K	LRD507-K	
	DRL42-04A2P-KB	DRLM42-04A2P-K		
	DRL42-04A2PN-KB	DRLM42-04A2PN-K		
	DRL42-04A2PM-KB	DRLM42-04A2PM-K		
	DRL42-10A2P-KB	DRLM42-10A2P-K		
	DRL42-04A8P-KB	DRLM42-04A8P-K		
	DRL42-04A8PN-KB	DRLM42-04A8PN-K		
	DRL42-04A8PM-KB	DRLM42-04A8PM-K		
	DRL42-10A8P-KB	DRLM42-10A8P-K		
	DRL42-04B2P-KB	DRLM42-04B2P-K		
	DRL42-04B2PN-KB	DRLM42-04B2PN-K		
	DRL42-04B2PM-KB	DRLM42-04B2PM-K		
	DRL42-10B2P-KB	DRLM42-10B2P-K	LRD514-K	
	DRL42-04B2M-KB	DRLM42-04B2M-K		
	DRL42-04B2MN-KB	DRLM42-04B2MN-K		
	DRL42-04B2MM-KB	DRLM42-04B2MM-K		
	DRL60-05A4P-KB	DRLM60-05A4P-K		
	DRL60-05A4PN-KB	DRLM60-05A4PN-K		
	DRL60-05A4PM-KB	DRLM60-05A4PM-K		
	DRL60-10A4P-KB	DRLM60-10A4P-K		
	DRL60-05B4P-KB	DRLM60-05B4P-K		
DRL60-05B4PN-KB	DRLM60-05B4PN-K			
DRL60-05B4PM-KB	DRLM60-05B4PM-K			
DRL60-10B4P-KB	DRLM60-10B4P-K			
DRL60-05B4M-KB	DRLM60-05B4M-K			
DRL60-05B4MN-KB	DRLM60-05B4MN-K			
DRL60-05B4MM-KB	DRLM60-05B4MM-K			
Guide Type	DRL20G-02B1P-KB	DRLM20G-02B1P-K	LRD503-K	
	DRL20G-02B1PN-KB	DRLM20G-02B1PN-K		
	DRL28G-03A1P-KB	DRLM28G-03A1P-K	LRD507-K	
	DRL28G-03A1PN-KB	DRLM28G-03A1PN-K		
	DRL28G-03B1P-KB	DRLM28G-03B1P-K		
	DRL28G-03B1PN-KB	DRLM28G-03B1PN-K		
	DRL28G-03B1M-KB	DRLM28G-03B1M-K		
	DRL28G-03B1MN-KB	DRLM28G-03B1MN-K		
	DRL42G-04A2P-KB	DRLM42G-04A2P-K	LRD507-K	
	DRL42G-04A2PN-KB	DRLM42G-04A2PN-K		
	DRL42G-04A2PM-KB	DRLM42G-04A2PM-K		
	DRL42G-04A8P-KB	DRLM42G-04A8P-K		
	DRL42G-04A8PN-KB	DRLM42G-04A8PN-K		
	DRL42G-04A8PM-KB	DRLM42G-04A8PM-K		
	DRL42G-04B2P-KB	DRLM42G-04B2P-K		
	DRL42G-04B2PN-KB	DRLM42G-04B2PN-K		
	DRL42G-04B2PM-KB	DRLM42G-04B2PM-K		
	DRL42G-04B2M-KB	DRLM42G-04B2M-K		
	DRL42G-04B2MN-KB	DRLM42G-04B2MN-K		
	DRL42G-04B2MM-KB	DRLM42G-04B2MM-K		
	DRL60G-05A4P-KB	DRLM60G-05A4P-K	LRD514-K	
	DRL60G-05A4PN-KB	DRLM60G-05A4PN-K		
	DRL60G-05A4PM-KB	DRLM60G-05A4PM-K		
	DRL60G-05B4P-KB	DRLM60G-05B4P-K		
	DRL60G-05B4PN-KB	DRLM60G-05B4PN-K		
	DRL60G-05B4PM-KB	DRLM60G-05B4PM-K		
	DRL60G-05B4M-KB	DRLM60G-05B4M-K		
	DRL60G-05B4MN-KB	DRLM60G-05B4MN-K		
	DRL60G-05B4MM-KB	DRLM60G-05B4MM-K		
	Table Type	DRL20V-02B1P-KB		DRLM20V-02B1P-K
DRL20V-02B1PN-KB		DRLM20V-02B1PN-K		
DRL28V-03A1P-KB		DRLM28V-03A1P-K		LRD507-K
DRL28V-03A1PN-KB		DRLM28V-03A1PN-K		
DRL28V-03B1P-KB		DRLM28V-03B1P-K		
DRL28V-03B1PN-KB		DRLM28V-03B1PN-K		

Accessory (Sold separately)

Installation Plate (RoHS)

Dedicated installation bracket used for installing a standard type or guide type actuator.

Each installation plate comes with installation screws for installing the actuator to the plate.

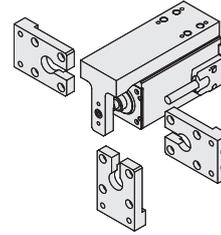
● Please furnish the installation screws for installing the installation plate to the equipment.

Material: Iron

Surface Treatment: Electroless nickel plating

Product Line

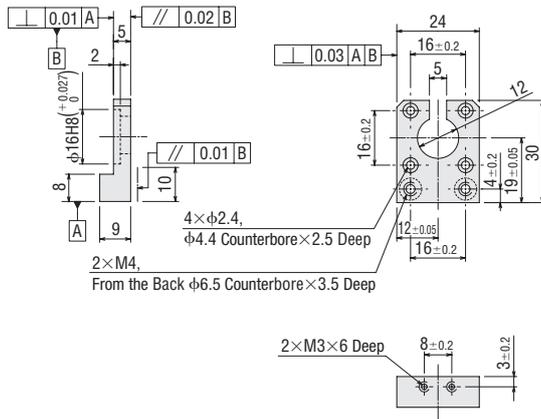
Product Name	Applicable Product	Mass (g)
PADRL-20	DRL20, DRL20G	25
PADRL-28	DRL28, DRL28G	45
PADRL-42	DRL42, DRL42G	165
PADRL-60	DRL60, DRL60G	570



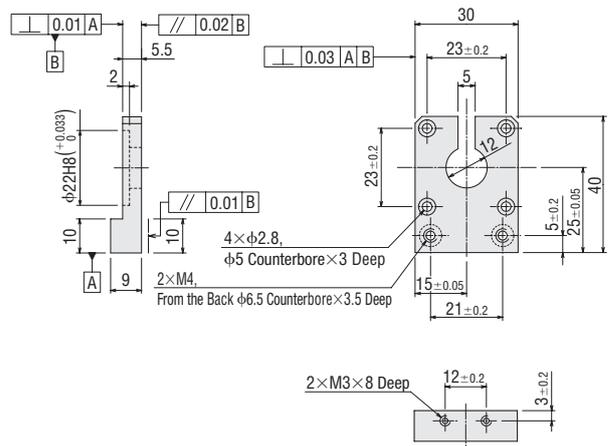
The actuator can be installed from one of three directions according to your equipment.
(The **PADRL-20** can only be installed from the bottom.)

Dimensions (Unit = mm)

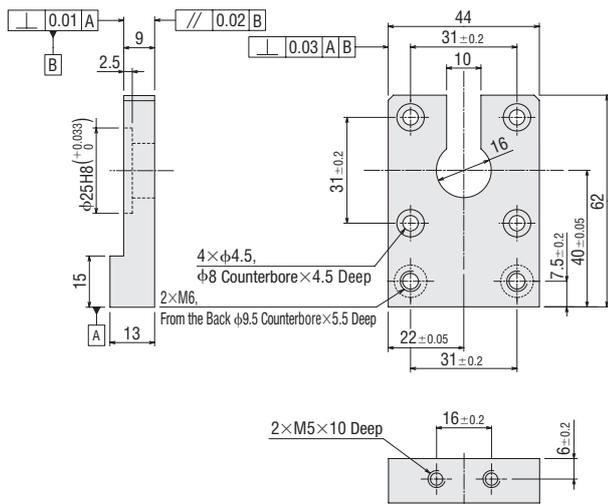
PADRL-20



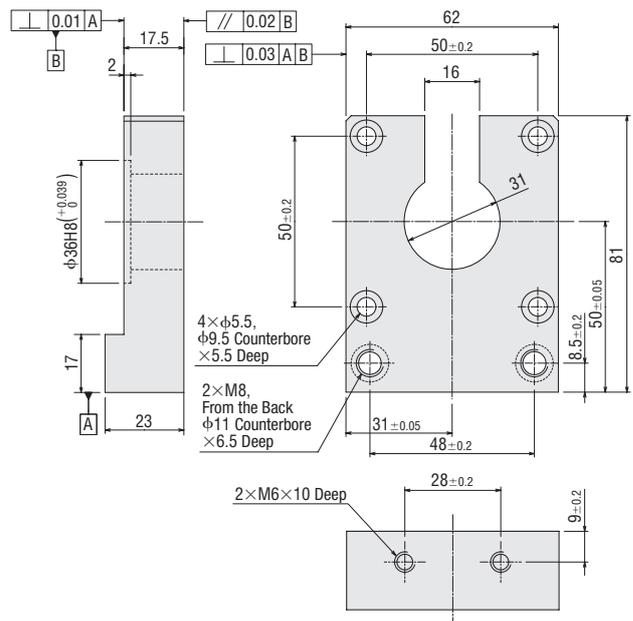
PADRL-28



PADRL-42



PADRL-60



Control Module RoHS

This enables you to perform operations such as setting the driver's internal parameters and setting or changing the data. It can also be used for operations such as speed and I/O monitoring and teaching.

Product Line

Product Name

OPX-2A

Specifications

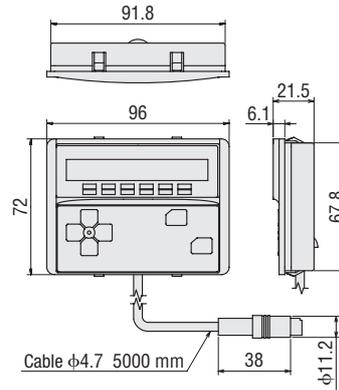
Indication	LED
Cable Length	5 m
Operating Ambient Temperature	0 to +40°C (Non-freezing)



Dimensions (Unit = mm)

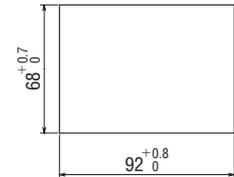
Control Module

Mass: 0.25 kg



Panel Cut-Out for Control Module

(Installation plate thickness 1~3 mm)



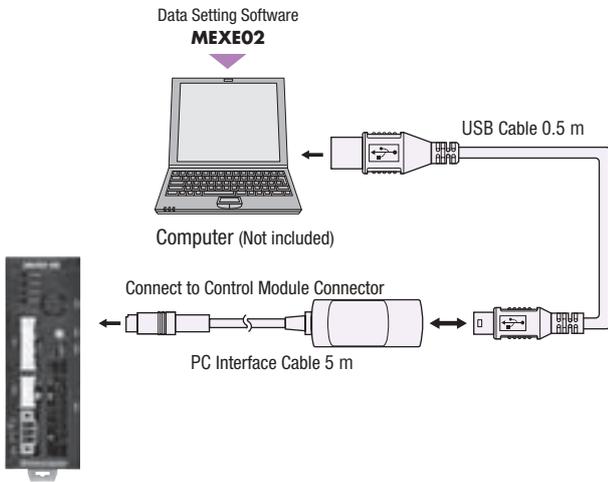
Data Setting Software Communication Cable (RoHS)

This communication cable is required for connecting to the computer on which the data setting software is installed.

Product Line

Product Name
CC05IF-USB

Connection between Computer and Driver



Note

- Connection with a computer requires installation of a dedicated driver.

◇ Data Setting Software **MEXE02**

The data setting software can be downloaded from the Oriental Motor website.

Oriental Motor can also provide a CD-ROM for the data setting software.

For details, please request from the website or contact your nearby Oriental Motor sales office.

<http://www.orientalmotor.eu>



● Operating Environment

◇ Operating System (OS)

- Microsoft Windows 2000 Professional Service Pack 4
Always apply Rollup 1, supplied by the Microsoft Corporation. Check if Rollup 1 has been applied with "Add/remove a program".

The following OS support 32-bit (x86) and 64-bit (x64) editions.

- Microsoft Windows XP Home Edition Service Pack 3
- Microsoft Windows XP Professional Service Pack 2
- Microsoft Windows XP Professional Service Pack 3*
- Microsoft Windows Vista Home Basic Service Pack 2
- Microsoft Windows Vista Home Premium Service Pack 2
- Microsoft Windows Vista Business Service Pack 2
- Microsoft Windows Vista Ultimate Service Pack 2
- Microsoft Windows Vista Enterprise Service Pack 2
- Microsoft Windows 7 Starter Service Pack 1
- Microsoft Windows 7 Home Premium Service Pack 1
- Microsoft Windows 7 Professional Service Pack 1
- Microsoft Windows 7 Ultimate Service Pack 1
- Microsoft Windows 7 Enterprise Service Pack 1
- Microsoft Windows 8

*Only 32-bit (x86) editions

◇ Computer

Recommended CPU*1	Intel Core processor, 2 GHz min. (must be compatible with OS)
Display	Video Adapter and Monitor with Resolution of XGA (1024×768) min.
Recommended Memory*1	32-bit (x86) edition: 1 GB min. 64-bit (x64) edition: 2 GB min.
Hard Disk*2	Free disk space of 30 MB min.
USB Port	USB 1.1 port
Disk Device	CD-ROM drive (for installing software)

*1 The operating conditions of the OS must be satisfied.

*2 Using **MEXE02** requires Microsoft .NET Framework 4 Client Profile. If it is not installed, it will be installed automatically. An additional max. of 1.5 GB of free space may be required.

Note

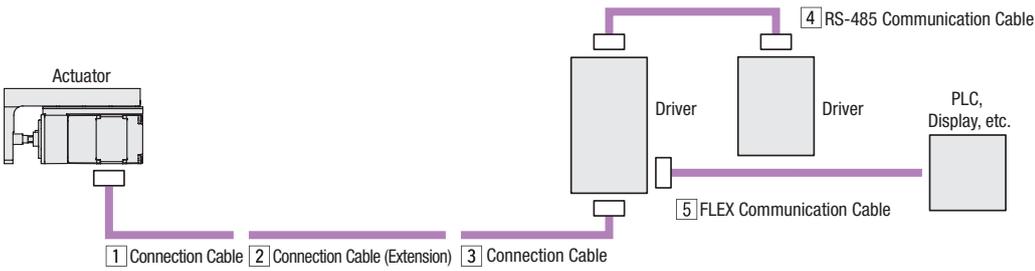
- The amount of memory and hard disk space required may vary with the system environment you use.

- Windows and Windows Vista are registered trademarks of the Microsoft Corporation in the United States and other countries.

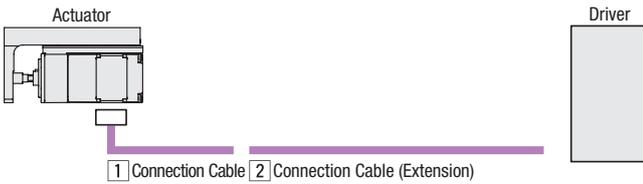
Cables

Cable System Configuration

◇ FLEX Built-In Controller Type



◇ Pulse Input Type



1 Connection Cable (RoHS)



Connection cables with lead wires with a connector crimped for connecting connector-coupled actuators. They eliminate the need for assembling the lead wire and connector. (Connector-coupled unit products come with a 0.6 m connection cable.)

2 Connection Cable (for extension) (RoHS)



These extension cables are used between the actuator and driver. Keep the wiring distance between the actuator and driver to 10 m max.

3 Connection Cable (RoHS)



This cable is convenient for connecting actuator lines for drivers with built-in controller. This is a lead wire with the connector already crimped on. (When a unit with built-in controller package or the driver is purchased, it comes with a 0.6 m connection cable.)

● Product Line

Product Name	Applicable Actuators	Length m	Conductor AWG
LC5N06A	DRL20	0.6	24 (0.2 mm ²)
LC5N10A	DRL28	1	
LC5N06B	DRL42	0.6	22 (0.3 mm ²)
LC5N10B	High-Resolution Motor	1	
LC5N06C	DRL60	0.6	22 (0.3 mm ²)
LC5N10C	High-Resolution Motor	1	

● The product names of applicable actuator products are described with characters by which the product name can be identified.

● Product Line

Product Name	Length m	Number of Conductors
CC05PK5	5	5
CC10PK5	10	

- Conductor Configuration: 5
- Size: AWG22 (0.3 mm²)
- Finished Outer Diameter: ϕ 7.2 mm
- Cable Rating: 105°C
- Outer Sheath: Oil-resistant, heat-resistant, non-migrating vinyl

● Product Line

Product Name	Application	Length m	Conductor AWG
LC5N06B	For Actuator Connection	0.6	22 (0.3 mm ²)
LC5N10B		1	

4 RS-485 Communication Cable (RoHS)

This cable is used to link drivers with **FLEX** built-in controllers in multi-axis operations. It also connects the network converter to the driver.



Product Line

Product Name	Length L (m)
CC001-RS4	0.1
CC002-RS4	0.25

5 FLEX Communication Cable

This cable is useful for connecting to equipment when using Modbus control of FLEX products with RS-485.

Two types of cables are available, the general purpose type with loose wire with a crimped terminal at one end, which is appropriate for connecting to PLC panels and various other equipment, and the dedicated type, which is equipped with a connector that can connect to programmable displays (touch screens) from Pro-face.

Product Line

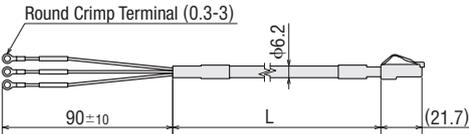
Product Line	Product Name	Length L (m)
General Purpose Type	CC02FLT	2
	CC05FLT	5
Dedicated Type Pro-face LT3000, GP4000, GP3000 Series for COM1	CC02FLT2	2
	CC05FLT2	5
Dedicated Type Pro-face GP3000 Series for COM2*	CC02FLT3	2
	CC05FLT3	5

*When using the cable for COM2, the CA4-ADP0NL-01 online adaptor accessory from Pro-face (sold separately) is required.

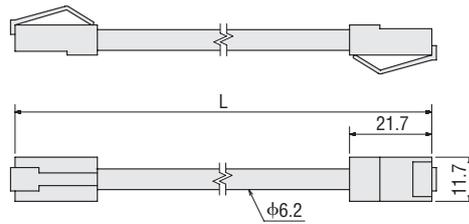
Dimensions (Unit = mm)

General Purpose Type

CC02FLT, CC05FLT



Dimensions (Unit = mm)



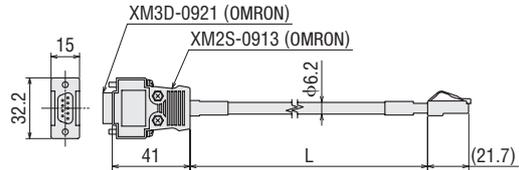
General Purpose Type



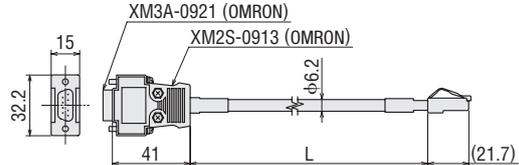
Dedicated Type

Dedicated Type

CC02FLT2, CC05FLT2



CC02FLT3, CC05FLT3



Network Converter RoHS

The network converter is a transducer that converts from the host communication protocol to Oriental Motor's unique RS-485 communication protocol. You can use the network converter to control products supporting Oriental Motor's RS-485 in the host communication environment.

Product Line

Network Type	Product Name
EtherCAT-Compatible	NETC01-ECT
CC-Link-Compatible	NETC01-CC
MECHATROLINK- II Compatible	NETC01-M2
MECHATROLINK- III Compatible	NETC01-M3



NETC01-ECT



NETC01-CC



NETC01-M2



NETC01-M3

Home Sensor Set for Table Type (RoHS)

This sensor set is for table types only. The consists of the photomicro sensor (with 1 m sensor cable), sensor plate, and shield plate. The screws needed for installation are also included.

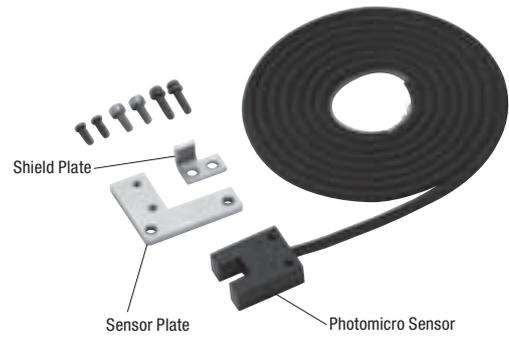
● The sensor for overrun detection is not included.

Product Line

Product Name	Applicable Product
PADRL-S20	DRL20V
PADRL-S28	DRL28V

Specifications

Sensor Product Name	PM-U24 (by SUNX)
Power Supply Voltage	5 to 24 VDC±10%, Ripple (P-P) 10% max.
Current Consumption	15 mA max.
Control Output	NPN Transistor and Open-Collector Output 30 VDC max., 50 mA max. Residual Voltage: 0.7 V max. (for load current of 50 mA)
Indicator LED	Detection Display (Red)
Sensor Logic	Normally Open/Normally Closed (Selectable, depending on connection)

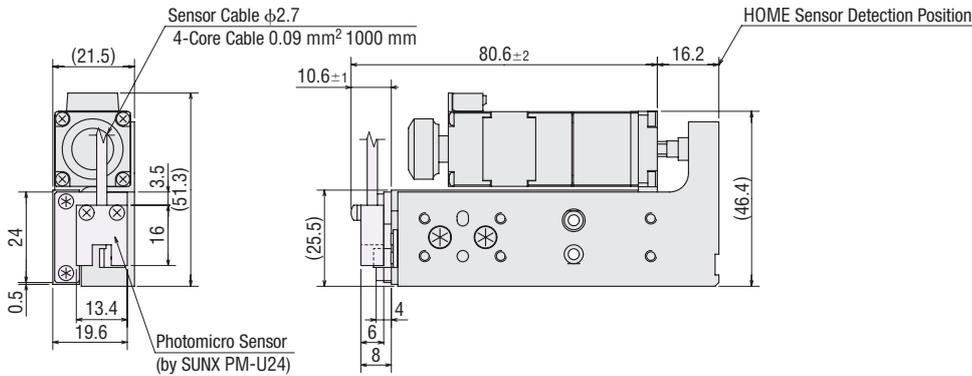


Installing the Home Sensor Set

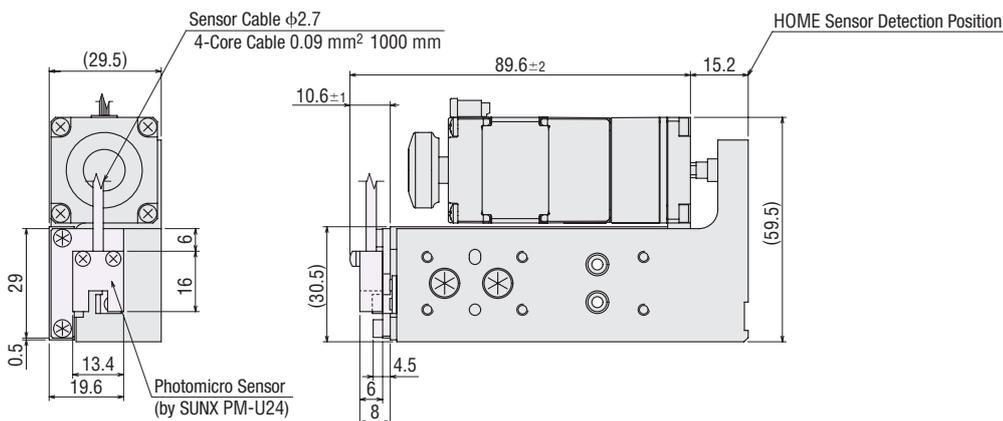
Set the operating conditions so that the operating ambient temperature stays at 40°C max. and the surface temperature of the actuator motor stays at 90°C max..

Dimensions for Sensor Installation Position (Unit = mm)

◇ DRL20V



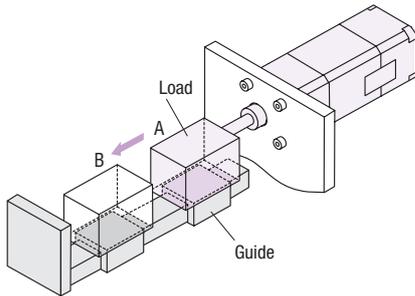
◇ DRL28V



● The shaded areas are the home-sensor set.

Selection Calculation

As illustrated below, the parameters listed below are required when selecting an actuator for transporting a load from A to B.



The required parameters are as follows:

- Mass of load (m) or thrust force (F)
- Positioning distance (L)
- Positioning time (T)

Among the parameters above, the thrust force and positioning time can be calculated using the equations below.

Calculate the Thrust Force

- ① Calculate the thrust force required when accelerating the load.

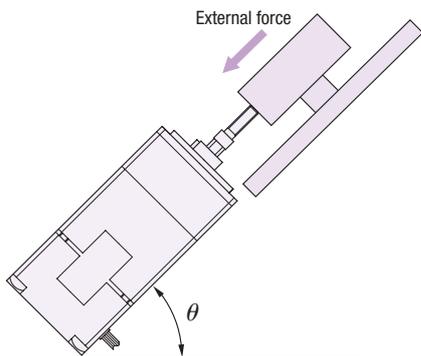
$$F_a = m \{ a + g (\sin \theta + \mu \cdot \cos \theta) \}$$

- ② Calculate the thrust force that allows for pushing and pulling.

$$F = F_{max} - F_a$$

If the external force of the load is smaller than F , push and pull are possible.

- F_{max} : Max. thrust force of the actuator [N]
- F_a : Required thrust force during acceleration/deceleration operation [N]
- F : Thrust force that allows for pushing or pulling of external force [N]
- m : Load mass [kg]
- a : Acceleration [m/s^2]
- g : Gravitational acceleration 9.807 [m/s^2]
- μ : Friction coefficient of the guide supporting the load 0.01
- θ : Angle formed by the traveling direction and the horizontal plane [$^\circ$]



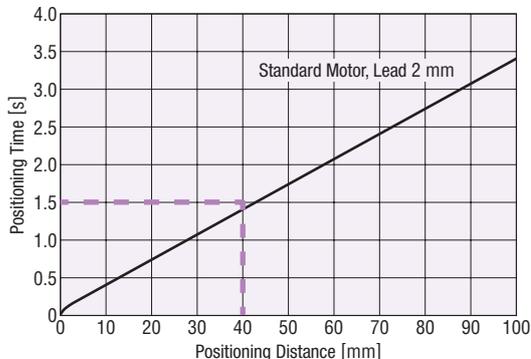
Calculate the Positioning Time

Check whether the actuator can perform the necessary positioning within the specified time. This can be done by obtaining a rough positioning time from the graph or by obtaining an accurate positioning time by calculation. The respective check procedures are explained below.

The actual operating time is subject to a small margin of error, so use the calculation only as a reference.

Obtaining from a Graph

Example) Check the positioning time when you provisionally select the **DRL42G-04A2P-KD** and drive a transport mass of 5 kg vertically a traveling amount of 40 mm. Check that the required specifications are within the product's specification values. Check the graph of **DRL42** positioning distance — positioning time.



Based on the above graph, it can be verified that the load can be positioned over 40 mm within 1.5 seconds.

Obtaining by Calculations

- ① Check the operating conditions.

Check the following conditions:
Installation direction, load mass, positioning distance, starting speed, acceleration, operating speed

- ② From the above operating conditions, check whether the drive pattern is the triangular drive or trapezoidal drive.

For the triangular drive, calculate the max. speed from the positioning distance, starting speed, acceleration and operating speed. If the calculated max. speed is below the operating speed, the drive pattern will be a triangular drive. If the calculated max. speed exceeds the operating speed, the drive pattern will be a trapezoidal drive.

$$V_{Rmax} = \sqrt{\frac{2 \cdot a_1 \cdot a_2 \cdot L}{a_1 + a_2} \cdot 10^3 + V_s^2}$$

$$V_{Rmax} \leq V_R \rightarrow \text{Triangular Drive}$$

$$V_{Rmax} > V_R \rightarrow \text{Trapezoidal Drive}$$

- ③ Calculate the positioning time.

<Trapezoidal Drive>

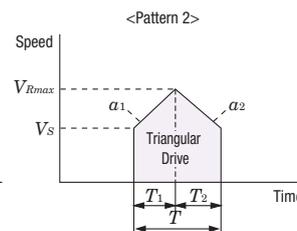
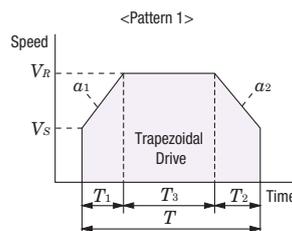
$$T = T_1 + T_2 + T_3$$

$$= \frac{V_R - V_s}{a_1 \times 10^3} + \frac{V_R - V_s}{a_2 \times 10^3} + \frac{L}{V_R} - \frac{(a_1 + a_2) \times (V_R^2 - V_s^2)}{2 \times a_1 \times a_2 \times V_R \times 10^3}$$

<Triangular Drive>

$$T = T_1 + T_2$$

$$= \frac{V_{Rmax} - V_s}{a_1 \times 10^3} + \frac{V_{Rmax} - V_s}{a_2 \times 10^3}$$



V_{Rmax} : Calculated max. speed of triangular drive [mm/s]

V_R : Operating speed [mm/s]

V_s : Starting speed [mm/s]

L : Positioning distance [mm]

a_1 : Acceleration [m/s^2]

a_2 : Deceleration [m/s^2]

T : Positioning time [s]

T_1 : Acceleration time [s]

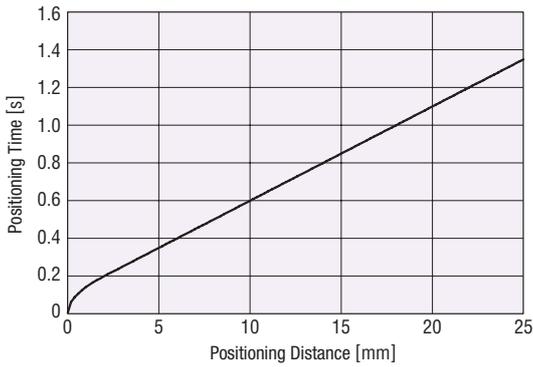
T_2 : Deceleration time [s]

T_3 : Constant speed time [s]

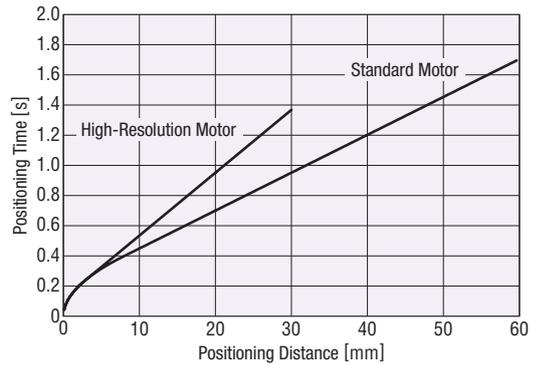
Positioning Distance – Positioning Time (Reference)

The positioning time (reference) can be checked from the positioning distance. The graphs below show the characteristics when operated at max. speed and max. acceleration.

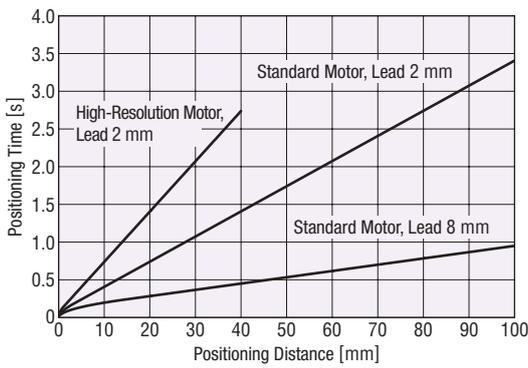
DRL20



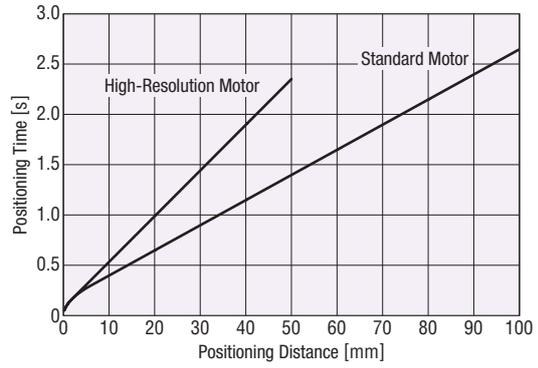
DRL28



DRL42



DRL60



● For the starting speed, use one of the following values.

DRL20, DRL28 : 0.2 mm/s max.

DRL42 (lead 2 mm) : 0.4 mm/s max.

DRL42 (lead 8 mm) : 1.6 mm/s max.

DRL60 : 0.8 mm/s max.

Orientalmotor

These products are manufactured at plants 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.
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