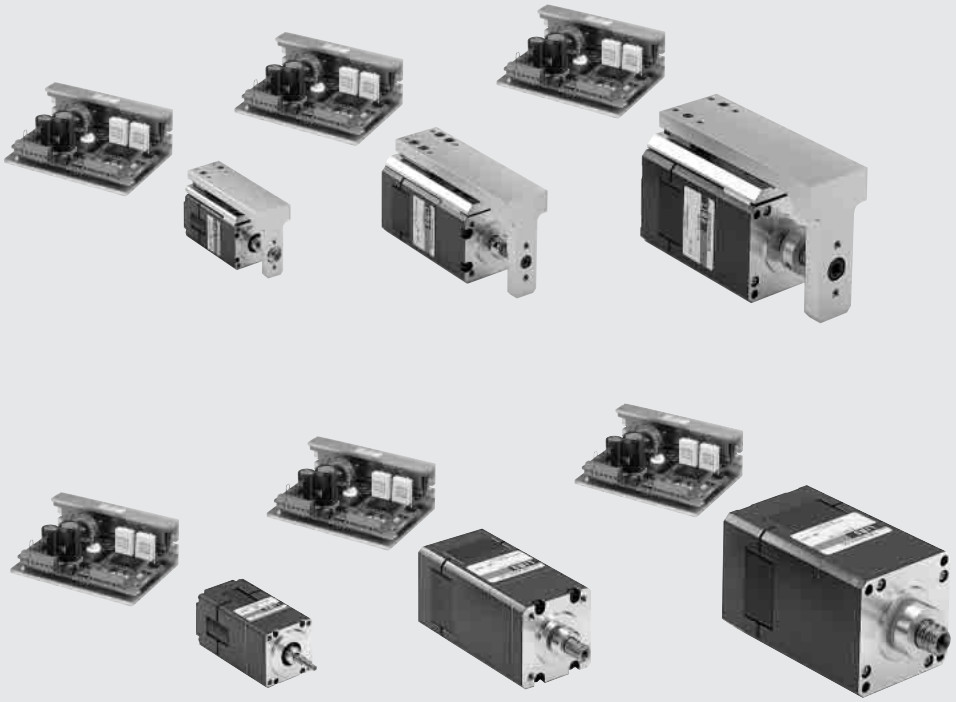


Compact Linear Actuators
DRL Series

Additional Information

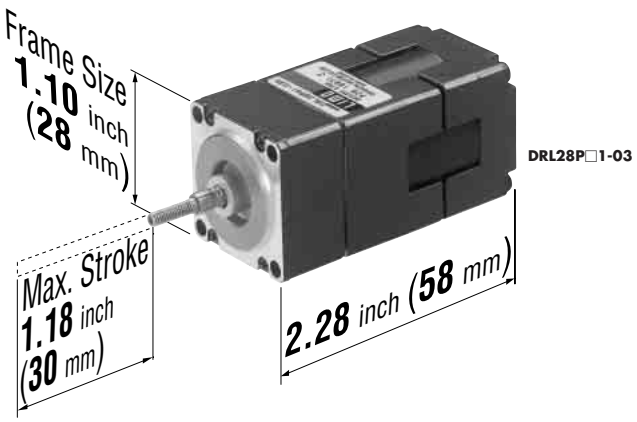
Compact Linear Actuators

DRL Series

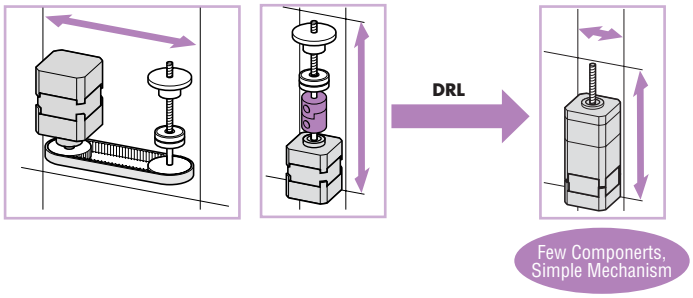
The **DRL** Series of compact linear motion actuators use a new 5-phase stepping motor which incorporates a ball screw. These are combined with 5-phase 24 VDC microstepping drivers with photocoupler inputs for extremely precise positioning.

● Compact Design

The compact design of the **DRL** actuator allows for the elimination of extra parts such as couplings belts and pulleys. The **DRL** actuator is a self-contained package consisting of a stepping motor with a hollow shaft rotor connected to a ball screw nut. Rotation of the nut initiates movement of the actual ball screw.



To enable linear motion of the screw on an actuator without a guide, provide an external anti-rotation mechanism.

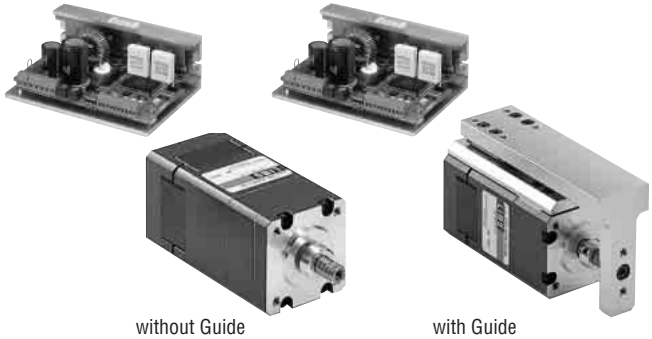


● Microstepping Drivers

The driver features a microstepping mechanism that electronically divides the basic step angle of the motor, thus enabling high resolution and low-vibration operation at low speeds.

● Reliable Design and Structure

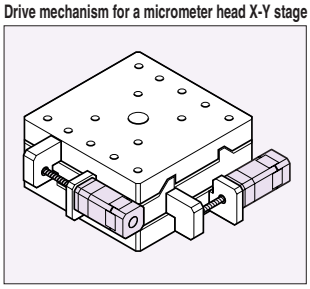
The drive mechanism employs a 5-phase stepping motor with ball screw. The hollow rotor shaft incorporates large bore bearings for the direct handling of thrust loads. Minimizing the number of parts involved in linear conversion results in higher reliability.



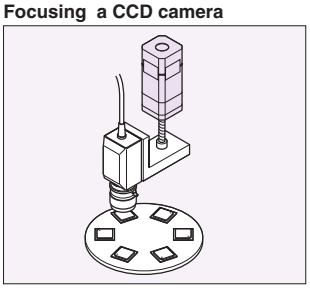
without Guide　　with Guide

■ Applications

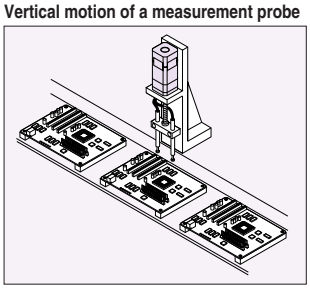
Drive mechanism for a micrometer head X-Y stage



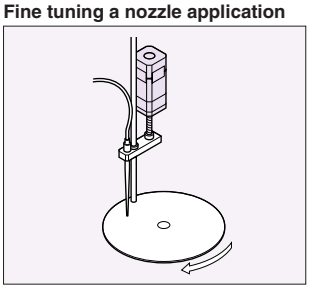
Focusing a CCD camera



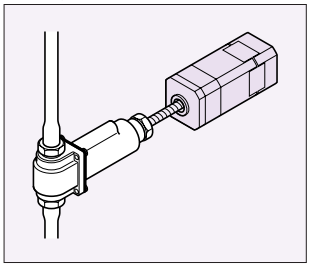
Vertical motion of a measurement probe



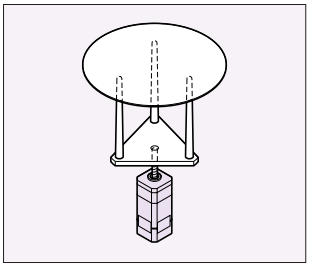
Fine tuning a nozzle application



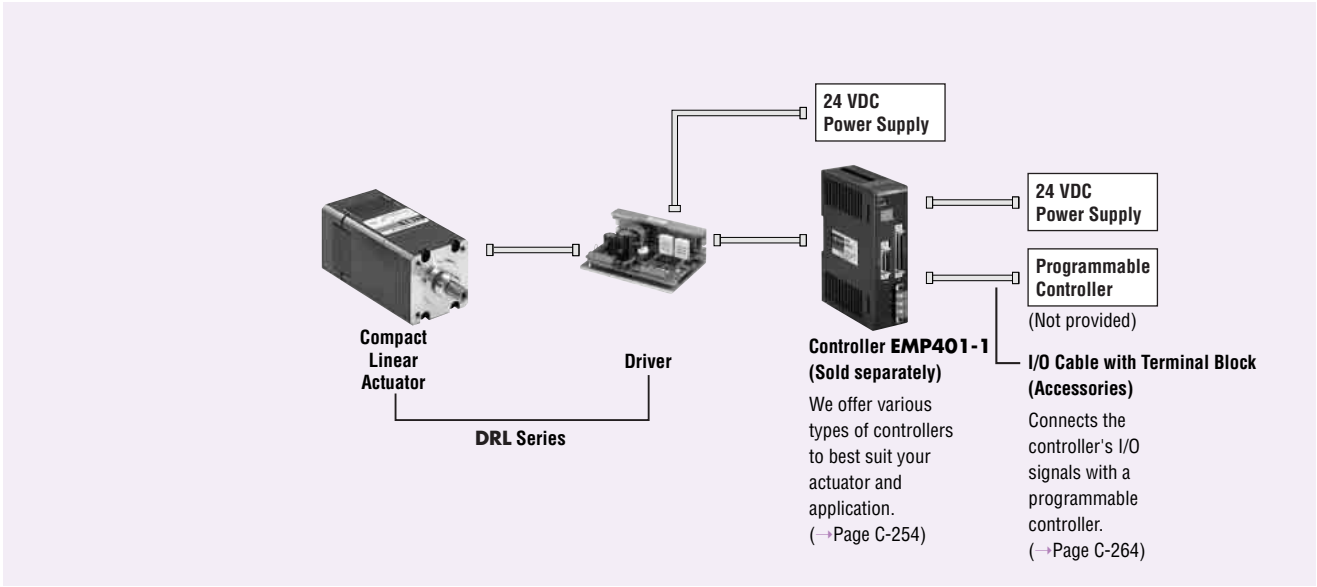
Driving a pump actuator device



Silicon wafer pin lifter



System Configuration



An example system configuration with an **EMP401-1** controller (with 1-axis control connector).

Product Number Code

DRL 42 P A 2 G- 04 D

- **DRL** Series
- **Actuator Frame Size**
  - **28**: 1.10 in. sq. (28 mm sq.)
  - **42**: 1.65 in. sq. (42 mm sq.)
  - **60**: 2.36 in. sq. (60 mm sq.)
- **Motor Type**
  - **P**: Stepping Motor
- **A**: Rolled Ball Screw
- **B**: Ground Ball Screw
- **Lead**
  - **1**: 0.039 in./rev. (1 mm/rev.) **[DRL28]**
  - **2**: 0.079 in./rev. (2 mm/rev.) **[DRL42]**
  - **4**: 0.157 in./rev. (4 mm/rev.) **[DRL60]**
- **Guide**
  - **G**: With Guide
  - **None**: Without Guide
- **Stroke***
  - **03**: 1.18 in. (30 mm) **[DRL28]**
  - **04**: 1.57 in. (40 mm) **[DRL42]**
  - **05**: 1.97 in. (50 mm) **[DRL60]**
- **Driver Type**
  - **D**: DFC51□□T

* The stroke can be extended. For details, please contact Oriental Motor.

Product Line

Rolled Ball Screw Repetitive Positioning Accuracy ±0.00079 inch (±0.02 mm)	**DRL28PA1-03D**	**DRL42PA2-04D**	**DRL60PA4-05D**	**DRL28PA1G-03D**	**DRL42PA2G-04D**	**DRL60PA4G-05D**
Ground Ball Screw Repetitive Positioning Accuracy ±0.00039 inch (±0.01 mm)	**DRL28PB1-03D**	**DRL42PB2-04D**	—	**DRL28PB1G-03D**	**DRL42PB2G-04D**	—
Motor Frame Size	1.10 in. sq. (28 mm sq.)	1.65 in. sq. (42 mm sq.)	2.36 in. sq. (60 mm sq.)	1.10 in. sq. (28 mm sq.)	1.65 in. sq. (42 mm sq.)	2.36 in. sq. (60 mm sq.)
Maximum Thrust Force	6.7 lb. (30 N)	22 lb. (100 N)	67 lb. (300 N)	6.7 lb. (30 N)	22 lb. (100 N)	67 lb. (300 N)
Type	**Standard**			**Guide**		

Specifications

Standard Type

Model		DRL28PA1-03D	DRL28PB1-03D	DRL42PA2-04D	DRL42PB2-04D	DRL60PA4-05D
Motor Type		5-Phase Stepping Motor				
Drive Method		Rolled Ball Screw	Ground Ball Screw	Rolled Ball Screw	Ground Ball Screw	Rolled Ball Screw
Maximum Transportable Mass *1 lb. (kg)	Vertical	6.6 (3)	6.6 (3)	22 (10)	22 (10)	66 (30)
Acceleration	ft./s^2 (m/s^2)	0.66 (0.2)	0.66 (0.2)	1.31 (0.4)	1.31 (0.4)	0.85 (0.26)
Acceleration/Deceleration Rate (Basic)	ms/kHz	10 or more	10 or more	10 or more	10 or more	30 or more
Maximum Speed *2	in./s (mm/s)	0.94 (24)	0.94 (24)	1.18 (30)	1.18 (30)	0.94 (24)
Maximum Thrust Force *3	lb. (N)	6.7 (30)	6.7 (30)	22 (100)	22 (100)	67 (300)
Maximum Holding Force at Excitation	lb. (N)	6.7 (30)	6.7 (30)	22 (100)	22 (100)	67 (300)
Holding Force at Non-Excitation	lb. (N)	0	0	0	0	0
Repetitive Positioning Accuracy *5	in. (mm)	±0.00079 (0.02)	±0.00039 (0.01)	±0.00079 (0.02)	±0.00039 (0.01)	±0.00079 (0.02)
Lost Motion	in. (mm)	0.0039 (0.1)	0.002 (0.05)	0.0039 (0.1)	0.002 (0.05)	0.0039 (0.1)
Resolution (Basic)	in. (mm)	0.000079 (0.002)	0.000079 (0.002)	0.00016 (0.004)	0.00016 (0.004)	0.00031 (0.008)
Lead	in. (mm)	0.039 (1)	0.039 (1)	0.079 (2)	0.079 (2)	0.157 (4)
Stroke	in. (mm)	1.18 (30)	1.18 (30)	1.57 (40)	1.57 (40)	1.97 (50)
Weight	lb. (kg)	0.40 (0.18)	0.40 (0.18)	1.3 (0.6)	1.3 (0.6)	2.9 (1.3)
Ambient Temperature		32 °F～+104 °F (0 °C～+40 °C)				

Guide Type

Model		DRL28PA1G-03D	DRL28PB1G-03D	DRL42PA2G-04D	DRL42PB2G-04D	DRL60PA4G-05D
Motor Type		5-Phase Stepping Motor				
Drive Method		Rolled Ball Screw	Ground Ball Screw	Rolled Ball Screw	Ground Ball Screw	Rolled Ball Screw
Maximum Transportable Mass *1 lb. (kg)	Horizontal (See Figure A)	2.2 (1)	2.2 (1)	4.4 (2)	4.4 (2)	6.6 (3)
	Vertical (See Figure B)	3.3 (1.5)	3.3 (1.5)	11 (5)	11 (5)	33 (15)
Acceleration	ft./s^2 (m/s^2)	0.66 (0.2)	0.66 (0.2)	1.31 (0.4)	1.31 (0.4)	0.85 (0.26)
Acceleration/Deceleration Rate (Basic)	ms/kHz	10 or more	10 or more	10 or more	10 or more	30 or more
Maximum Speed *2	in./s (mm/s)	0.94 (24)	0.94 (24)	1.18 (30)	1.18 (30)	0.94 (24)
Maximum Thrust Force *3	lb. (N)	6.7 (30)	6.7 (30)	22 (100)	22 (100)	67 (300)
Maximum Holding Force at Excitation	lb. (N)	6.7 (30)	6.7 (30)	22 (100)	22 (100)	67 (300)
Holding Force at Non-Excitation	lb. (N)	0	0	0	0	0
Maximum Load Moment *4	oz-in (N·m)	MP: 0 MY: 0 MR: 0	MP: 0 MY: 0 MR: 0	MP: 71 (0.5) MY: 35 (0.25) MR: 113 (0.8)	MP: 71 (0.5) MY: 35 (0.25) MR: 113 (0.8)	MP: 85 (0.6) MY: 49 (0.35) MR: 310 (2.2)
Repetitive Positioning Accuracy *6	in. (mm)	±0.00079 (0.02)	① ±0.00039 (0.01) ② ±0.00079 (0.02)	±0.00079 (0.02)	±0.00039 (0.01)	±0.00079 (0.02)
Lost Motion	in. (mm)	0.0039 (0.1)	0.002 (0.05)	0.0039 (0.1)	0.002 (0.05)	0.0039 (0.1)
Resolution (Basic)	in. (mm)	0.000079 (0.002)	0.000079 (0.002)	0.00016 (0.004)	0.00016 (0.004)	0.00031 (0.008)
Lead	in. (mm)	0.039 (1)	0.039 (1)	0.079 (2)	0.079 (2)	0.157 (4)
Stroke	in. (mm)	1.18 (30)	1.18 (30)	1.57 (40)	1.57 (40)	1.97 (50)
Weight	lb. (kg)	0.55 (0.25)	0.55 (0.25)	1.76 (0.8)	1.76 (0.8)	4.0 (1.8)
Ambient Temperature		32 °F～+104 °F (0 °C～+40 °C)				

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

*2 Use each actuator at the maximum speeds or below in a low-temperature environment.

Model	Ambient Temperature	Maximum Speed in./s (mm/s)
DRL28	32°F～50°F (0°C～+10°C)	0.59 (15)
DRL42		0.79 (20)
DRL60		0.79 (20)

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

*4 The maximum load moment is measured from the center of the load-mounting taps on the linear-guide side.

*5 The repetitive positioning accuracy is measured at a specified temperature under a specified load. Refer to "Repetitive Positioning Accuracy of **DRL** Series" on page F-51 to ensure the repetitive positioning accuracy stated in the specification sheet.

*6 The repetitive positioning accuracy is measured at a specified temperature and load. If footnote ① or ② is not indicated, then the repetitive positioning accuracy values are identical.
① Repetitive positioning accuracy is measured at the end of the guide.
② Repetitive positioning accuracy is measured on the linear-guide.

Note: Use the actuator in conditions where its surface temperature will not exceed 194°F (90°C). The actuator may give off a significant amount of heat, depending on the conditions of operation.

Maximum Transportable Mass

Figure A

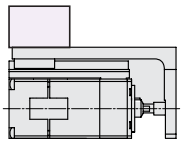
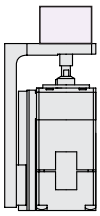
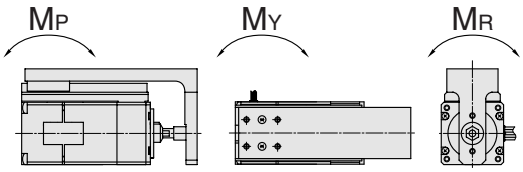


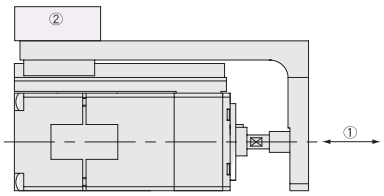
Figure B



Load Moment *4



Repetitive Positioning Accuracy *6

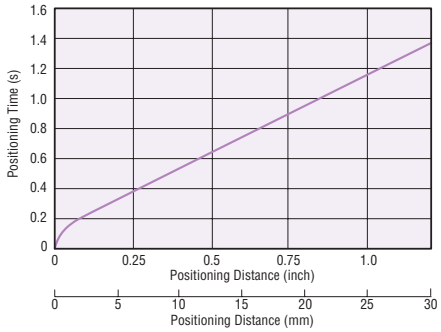


① Repetitive positioning accuracy is measured at the tip of the guide.
② Repetitive positioning accuracy is measured on the linear-guide.
If footnote ① or ② is not indicated, then the accuracy values are identical.

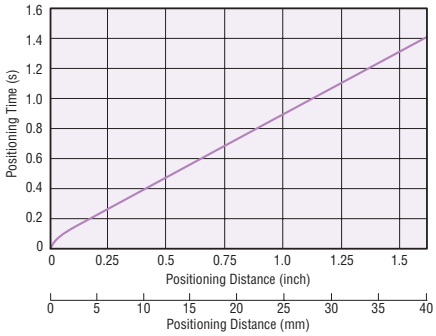
Minimum Postioning Time

You can verify the indicated positioning time from positioning distance.
The graphs below show the data for maximum speed, acceleration and maximum transportable mass. For recommended operating conditions, please refer to page F-51.

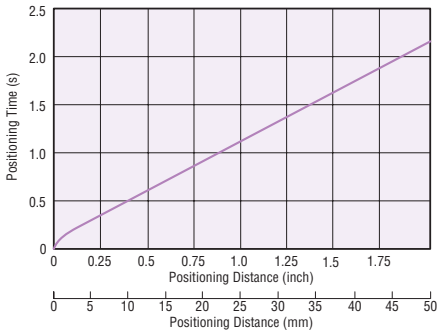
◆ DRL28P□1(G)-03D



◆ DRL42P□2(G)-04D



◆ DRL60PA4(G)-05D



Driver Specifications

Model		DFC5107T	DFC5114T
Power Source	Voltage	24 VDC ±10 %	
	Current *1	1 A	2 A
Maximum Input Pulse Frequency		500 kHz	
Input Signals	Input Mode	Photocoupler input Signal voltage Photocoupler "ON": +4.5～+5 V Photocoupler "OFF": 0～+1 V Pulse, Direction Rotation: 10～20 mA, input resistance 220 Ω All Windings OFF, Step Angle Select: 5 VDC, 10～15 mA, input resistance 470 Ω	
	Pulse Signal	Step command pulse signal (CW direction operation command signal at 2-pulse input mode) Pulse with: 1 μs minimum, pulse rise/fall: 2 μs maximum. The motor moves on the pulse's falling edge (negative logic pulse input)	
	Rotation Direction Signal	Rotation direction command signal Photocoupler "ON": CW, Photocoupler "OFF" : CCW (CCW direction operation command signal in 2-pulse input mode) Pulse with: 1 μs minimum, pulse rise/fall: 2 μs maximum. The motor moves on the pulse's falling edge (negative logic pulse input)	
	Resolution Select Signal	Resolution specified in DATA1 when photocoupler is OFF. Resolution specified in DATA2 when photocoupler is ON.	
	All Windings OFF Signal	When in the "photocoupler ON" state, the output current to the actuator is cut off. When in the "photocoupler OFF" state, the operating current set by the RUN potentiometer is supplied to the actuator.	
Output Signal	Output Mode	Photocoupler, Open collector output, External usage conditions 24 VDC maximum, 10 mA maximum.	
	Excitation Timing Signal	The signal is output each time the excitation sequence returns to the initial stage "0". (Photocoupler: ON) e.g. 0.72°/step (resolution 1): Signal output every 10 pulses; 0.072°/step (resolution 10): Signal output every 100 pulses	
Cooling Method		Natural ventilation	
Weight lb. (kg)		0.44 (0.2)	

*1 The input power current supplied to the driver represents the maximum input value (which varies with pulse speed).

General Specifications

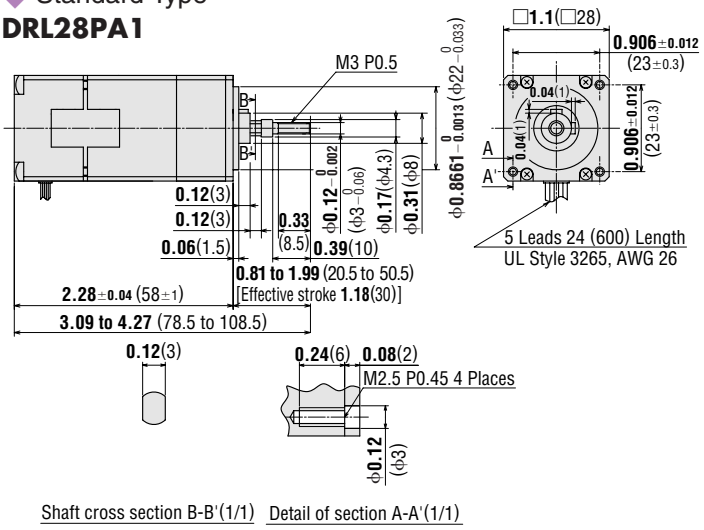
	Actuator	Driver
Insulation Resistance	100 MΩ minimum under normal temperature and humidity, when measured by a 500 VDC megger between the windings and casing.	—
Dielectric Strength	Sufficient to withstand 1.0 kV (**DRL28**: 0.5 kV), 50 Hz power applied between the windings and casing for one minute under normal temperature and humidity.	—

Dimensions Scale 1/2, Unit = **inch** (mm)

Actuator

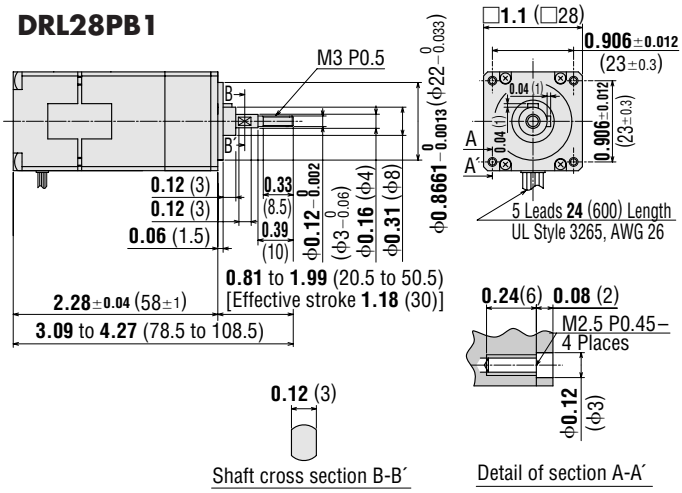
Standard Type

DRL28PA1



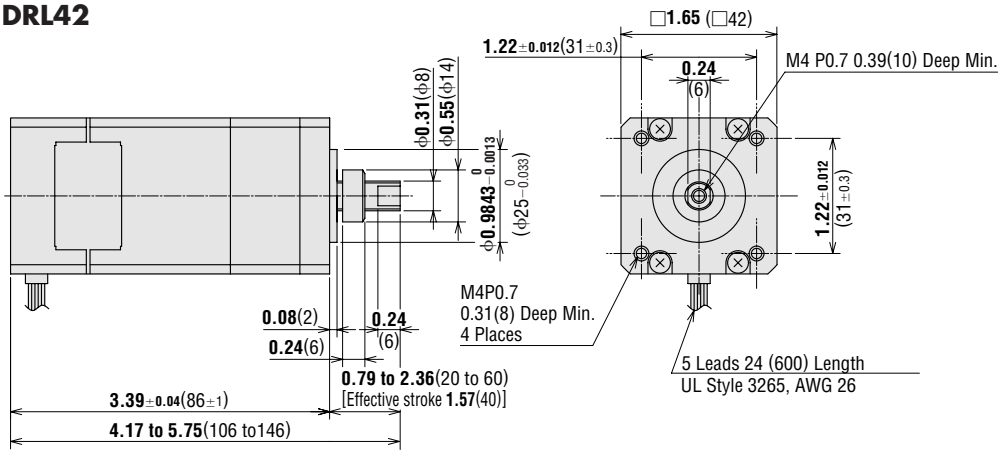
Model	Actuator Model	Weight lb.(kg)	DXF
DRL28PA1-03D	DRL28PA1-03	0.40 (0.18)	D468

DRL28PB1



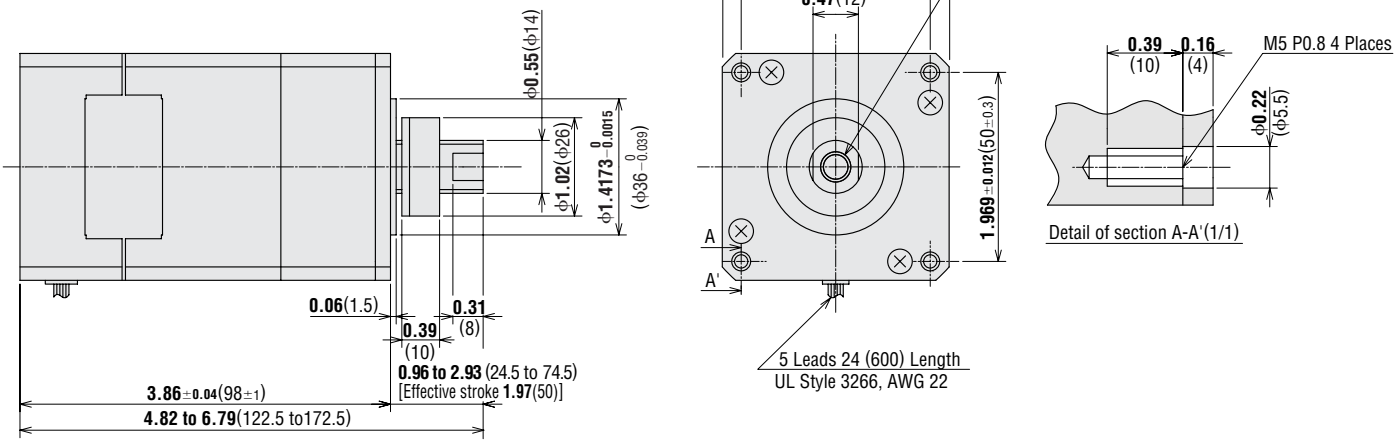
Model	Actuator Model	Weight lb.(kg)	DXF
DRL28PB1-03D	DRL28PB1-03	0.40 (0.18)	D455

DRL42



Model	Actuator Model	Weight lb.(kg)	DXF
DRL42PA2-04D	DRL42PA2-04	1.3 (0.6)	D361
DRL42PB2-04D	DRL42PB2-04		

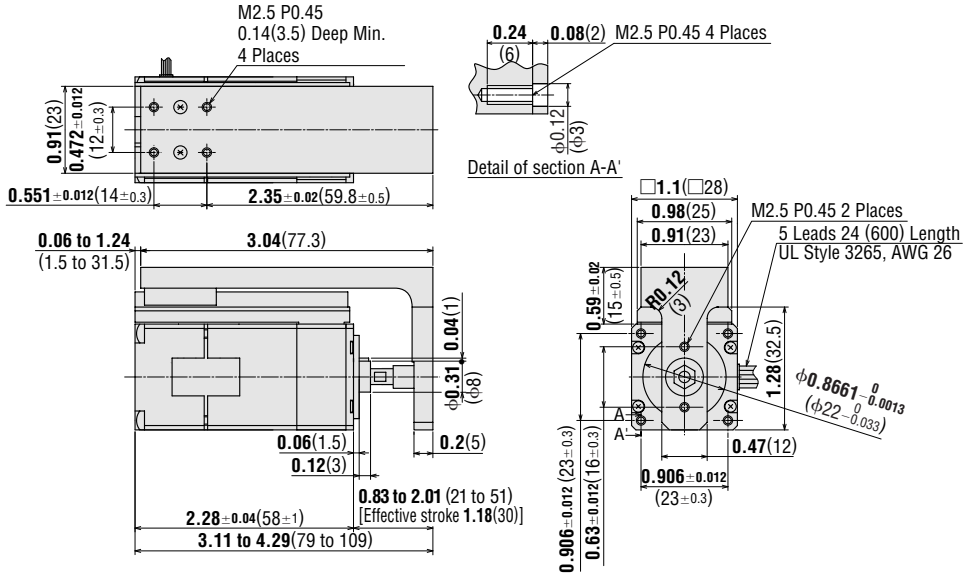
DRL60



Model	Actuator Model	Weight lb.(kg)	DXF
DRL60PA4-05D	DRL60PA4-05	2.9 (1.3)	D362

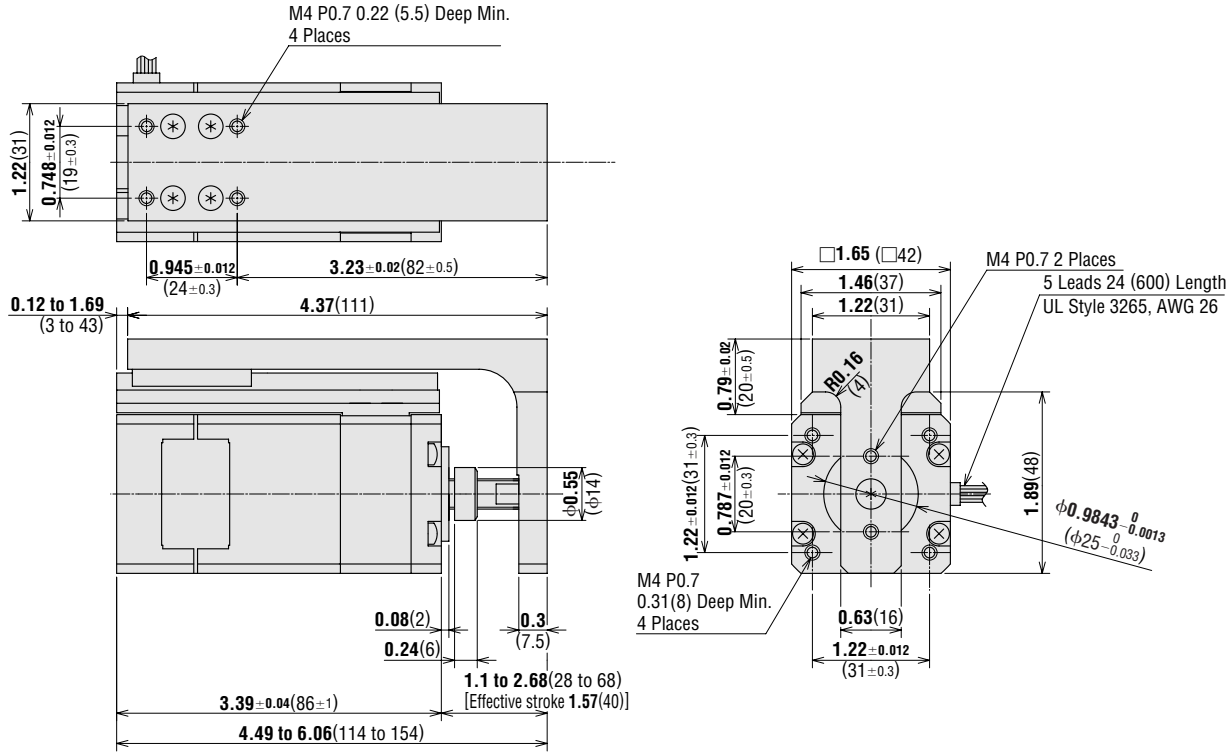
◆ Guide Type

DRL28



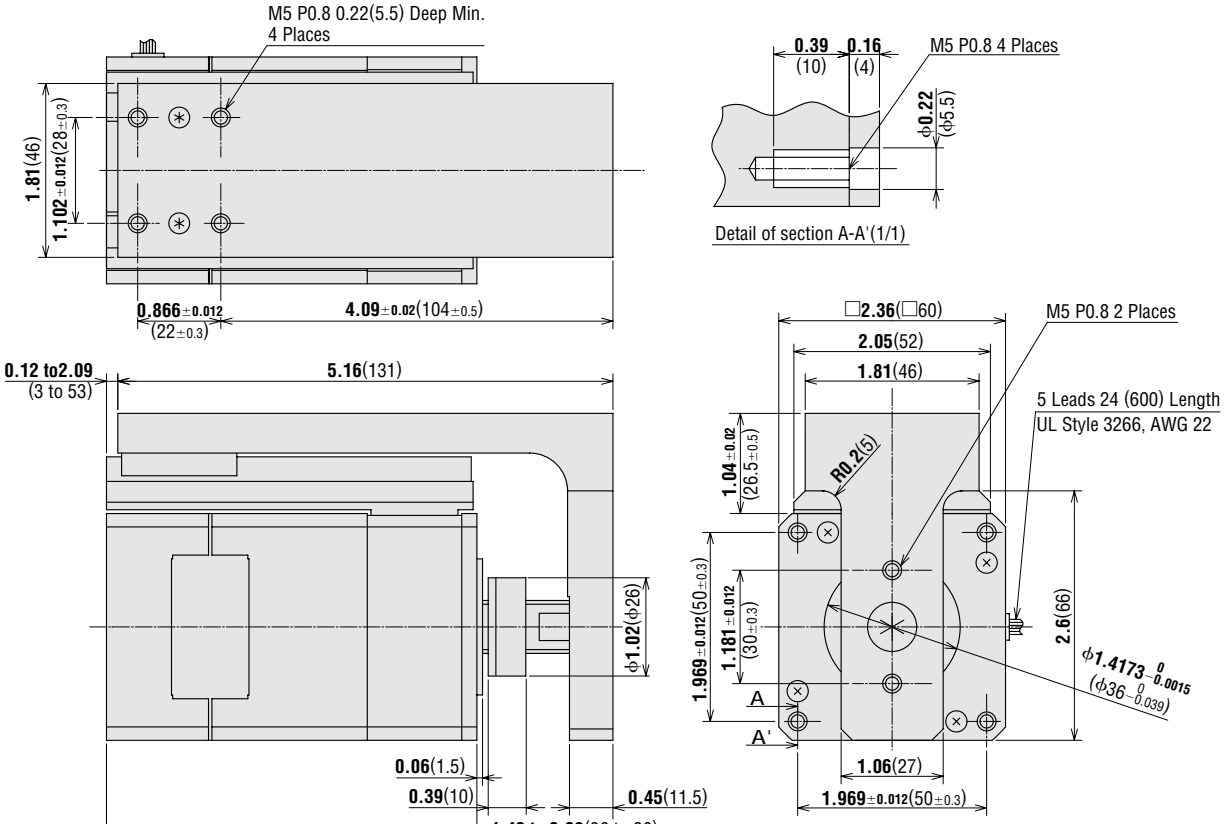
Model	Actuator Model	Weight lb.(kg)	DXF
DRL28PA1G-03D	DRL28PA1G-03	0.55 (0.25)	D456
DRL28PB1G-03D	DRL28PB1G-03		

DRL42



Model	Actuator Model	Weight lb.(kg)	DXF
DRL42PA2G-04D	DRL42PA2G-04	1.76 (0.8)	D364
DRL42PB2G-04D	DRL42PB2G-04		

DRL60



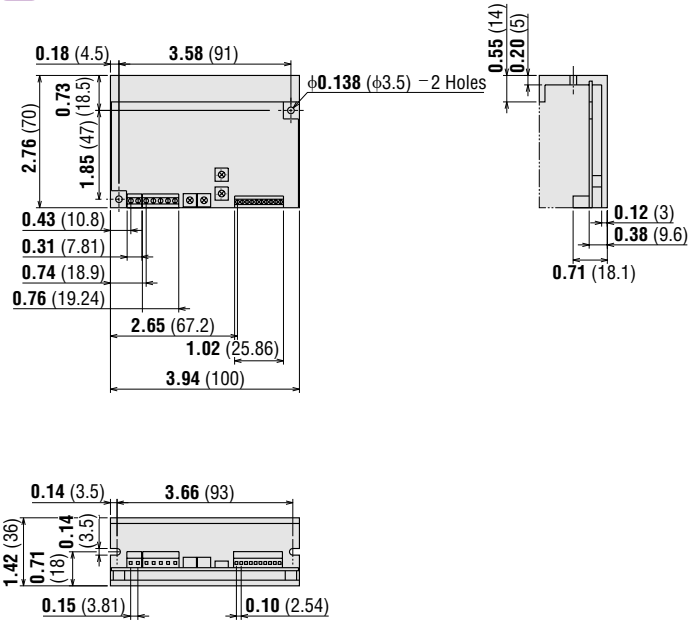
Model	Actuator Model	Weight lb.(kg)	DXF
DRL60PA4G-05D	DRL60PA4G-05	4.0 (1.8)	D365
DRL60PB4G-05D	DRL60PB4G-05		

● Driver

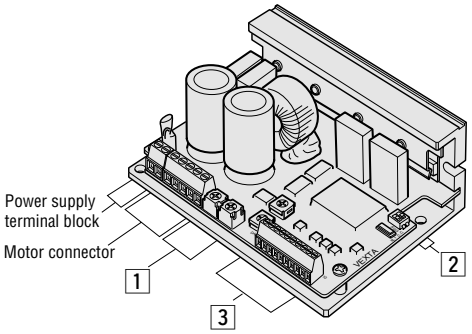
DFC5107T, DFC5114T

Weight: 0.44 lb. (0.2 kg)

DXF B285U



Connection and Operation



1 Current Adjustment Potentiometers

Indicator	Potentiometer Name	Functions
RUN	Motor run current potentiometer	Adjusts the motor running current
STOP	Motor stop current potentiometer	Adjusts the current at the motor standstill

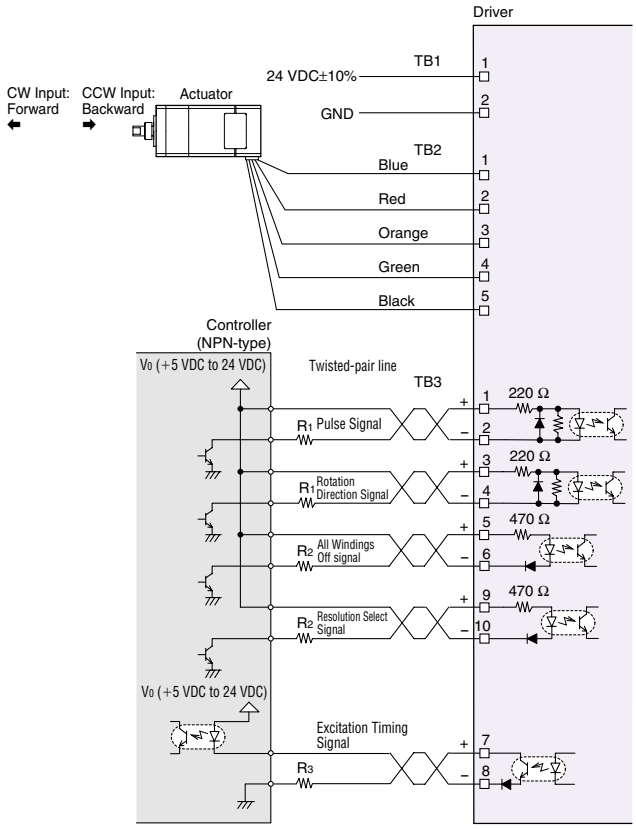
2 Function Select Switches

Indicator	Switch Name	Functions
2P/1P	Pulse input mode switch	Switches between 1-pulse input and 2-pulse input
C.C./OFF	DC check switch	Used when adjusting the motor's running current. When running the motor, always have this switch set to OFF. The factory setting is OFF.

3 Input/Output Signals

Indicator	Input/Output	Terminal No.	Signal Name
TB3	Input signal	1	Pulse Signal (CW Pulse Signal)
		2	
		3	Rotation Direction Signal (CCW Pulse Signal)
		4	
		5	All Windings Off Signal
		6	
	Output signal	7	Excitation Timing Signal
		8	
	Input signal	9	Resolution Select Signal
		10	

Connection Diagrams



Notes:

- Keep the input signal voltage Vo between 5 VDC and 24 VDC. When Vo is equal to 5 VDC, the external resistances R_1 and R_2 are not necessary. When Vo is above 5 VDC, connect R_1 and R_2 to keep the current as follows:
  Pulse, Rotation Direction: 10 mA to 20 mA max.
  All Windings OFF, Resolution Select: 10 mA to 15 mA max.
- Keep the output signal voltage Vo between 5 VDC and 24 VDC. When Vo is equal to 5 VDC, the external resistance R3 is not necessary. When Vo is above 5 VDC, connect R3 to keep the current below 10 mA max.
- Use twisted-pair wire of AWG 24 to AWG 22 and 6.6 feet (2 m) or less in length for the signal line.
- Suitable wire size for the TB1, TB2 and TB3 terminal block is between AWG20 and 26. Use AWG 20 for power supply lines.
- Use spot grounding to ground the driver and external controller.
- Signal lines should be kept at least 3.94 inches (10 cm) away from power lines (power supply lines and motor lines). Do not bind the signal line and power line together.
- If noise generated by the motor lead wires cause a problem, try shielding the motor lead wires with conductive tape or wire mesh.
- Incorrect connection of DC power input will lead to driver damage. Make sure that the polarity is correct before turning the power on.

Description of Input/Output Signals

Pulse Input and Rotation Direction Input

1-Pulse Input Mode

Pulse Signal

"Pulse" signal is input to the Pulse – terminal. When the photocoupler state changes from "ON" to "OFF", the screw shaft moves one step. The output direction of a screw shaft is determined by the rotation direction signal.

Rotation Direction Input

The "Rotation Direction" signal is input to the D/CCW – terminal. A "photocoupler ON" signal input commands the screw shaft to move forward. A "photocoupler OFF" signal input commands the screw shaft to move backward.

2-Pulse Input Mode

CW Pulse Signal

"Pulse" signal is input to the P/CW – terminal. When the photocoupler state changes from "ON" to "OFF", the screw shaft moves one step forward.

CCW Pulse Signal

"Pulse" signal is input to the D/CCW – terminal. When the photocoupler state changes from "ON" to "OFF", the screw shaft moves one step backward.

All Windings Off (A.W. OFF) Input

When the "All Windings Off" (A.W. OFF) signal is in the "photocoupler ON" state, the current to the motor is cut off and motor torque is reduced to zero.
This signal is used when moving the motor by external force or manual home positioning.

Resolution Select (C/S) Input

When the "Resolution Select" signal is in the "photocoupler OFF" state, the resolution set by step resolution select switch DATA1 is selected. When the "Resolution Select" signal is in the "photocoupler ON" state, the resolution set by step resolution select switch DATA2 is selected.
This signal can be used to change the motor speed or amount of rotation without altering the input pulses.

Excitation Timing (TIMING) Output

When the motor-excitation state is in the excitation home position (step [0]), the driver switches on the timing output. The motor-excitation state is reset to the excitation home position when the power supply is switched on. The timing output comes on every particular amount (see the chart below) of the screw shaft movement, being synchronized with the pulse input. When the pulse signals are input at an integer multiple of the number of pulses required for the screw shaft to move this particular amount (see the chart below), it is possible to check whether or not the driver is operating normally by monitoring the timing output.

Model	Movement Distance of the Screw Shaft [inch (mm)]
DRL28	0.00079 (0.02)
DRL42	0.0016 (0.04)
DRL60	0.0031 (0.08)

Notes:

- When using the timing output, stop the motor's output shaft at an integer multiple of a particular amount (see the chart above).
- When switching the resolution using the C/S (resolution switch) input, do this with the motor stopped and the timing output on.

Resolution Selection

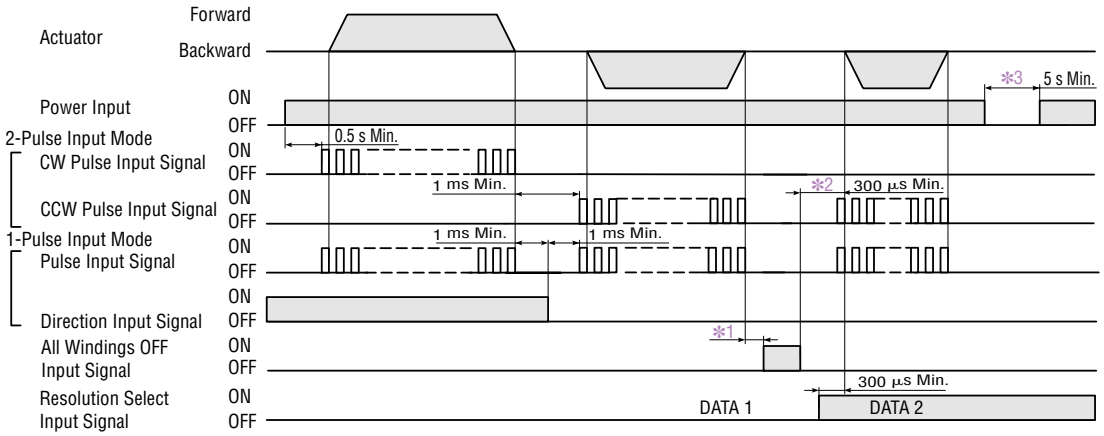
The motor speed and step distance can be changed without changing the input pulse frequency by switching the resolution switch. The resolution is set with resolution setting switches DATA1 and DATA2. DATA1 and DATA2 each have 16 settings from which one resolution each can be selected. The resolution that can be set are shown in the table below.

DATA1 and DATA2 are set to the scale corresponding to the resolution selected for each.

The resolution is changed with the resolution select signals.
Photocoupler "ON": The resolution set with DATA1 is selected.
Photocoupler "OFF": The resolution set with DATA2 is selected.

Resolution Setting Switches DATA1/DATA2	Number of Divisions	Actuator's Resolution [inch (mm)]		
		DRL28	**DRL42**	**DRL60**
0	1	0.000079 (0.002)	0.00016 (0.004)	0.00031 (0.008)
1	2	0.000039 (0.001)	0.000079 (0.002)	0.00016 (0.004)
2	2.5	0.000031 (0.0008)	0.000063 (0.0016)	0.00013 (0.0032)
3	4	0.00002 (0.0005)	0.000039 (0.001)	0.000079 (0.002)
4	5	0.000016 (0.0004)	0.000031 (0.0008)	0.000063 (0.0016)
5	8	0.0000098 (0.00025)	0.00002 (0.0005)	0.000039 (0.001)
6	10	0.0000079 (0.0002)	0.000016 (0.0004)	0.000031 (0.0008)
7	20	0.0000039 (0.0001)	0.0000079 (0.0002)	0.000016 (0.0004)
8	25	0.0000031 (0.00008)	0.0000063 (0.00016)	0.000013 (0.00032)
9	40	0.000002 (0.00005)	0.0000039 (0.0001)	0.0000079 (0.0002)
A	50	0.0000016 (0.00004)	0.0000031 (0.00008)	0.0000063 (0.00016)
B	80	0.00000098 (0.000025)	0.000002 (0.00005)	0.0000039 (0.0001)
C	100	0.00000079 (0.00002)	0.0000016 (0.00004)	0.0000031 (0.00008)
D	125	0.00000063 (0.000016)	0.0000013 (0.000032)	0.0000025 (0.000064)
E	200	0.00000039 (0.00001)	0.00000079 (0.00002)	0.0000016 (0.00004)
F	250	0.00000031 (0.000008)	0.00000063 (0.000016)	0.0000013 (0.000032)

Timing Chart



The shaded section indicates that the photocoupler is on.

✻1 Depends on load Inertia, load torque, and starting frequency.
✻2 Never input a step pulse signal immediately after switching the "All Winding Off" signal to the off state. The actuator may not start.
✻3 Wait at least 5 seconds before turning on the power.

Adjusting the Current

Adjusting the Motor Current

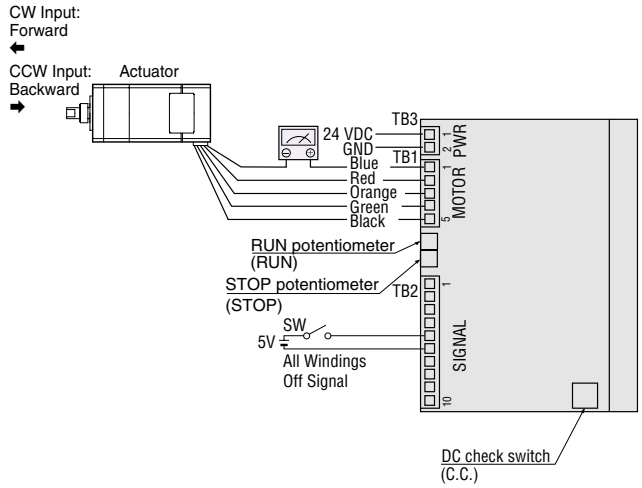
Use the "RUN" potentiometer to decrease the current and suppress the temperature rise in the motor/driver, or when there is sufficient motor torque and you want to suppress vibration by lowering the current.
Use the "STOP" potentiometer to readjust the current at motor standstill in relation to the holding-brake force.

Factory Settings

Running current: Rated current
Current at motor standstill: Approx. 50% of rated current
Follow the procedure below to adjust the motor current.

1 Connecting an Ammeter

Connect a DC ammeter as illustrated below.
Connect an ammeter between pin ① of TB2 connector and the actuator. Set all driver input signals to the "photocoupler OFF" state.



Note:
- Do not input pulse signals.

2 Adjusting the Motor Running Current

To adjust the motor running current, follow the procedure below:

1. Set the current-checking switch to the "photocoupler ON" state. Keep other signals in the "photocoupler OFF" state.
2. Turn on the power to the driver.
3. Use the "RUN" potentiometer to adjust the motor's running current.
4. When the power is turned on, the value measured by the ammeter represents the total current in two phases through the blue motor lead wire. The current for one phase is equivalent to one-half the ammeter value. (Example: To set the current to 1.0 A/phase, adjust the current level until the ammeter reads 2.0 A.)
5. When the running current has been adjusted, set the current-checking switch back to the "photocoupler OFF" state.

Notes:
- Be sure to use the motor at the rated current or below.
- Adjusting the running current will also change the current at standstill.

3 Adjusting the Current at Motor Standstill

To adjust the current at motor standstill, follow the procedure below:

1. Set the current-checking switch to the "photocoupler OFF" state. Keep other signals in the "photocoupler OFF" state.
2. Turn on the power to the driver.
3. Use the "STOP" potentiometer to adjust the motor's running current.
4. When the power is turned on, the value measured by the ammeter represents the total current in two phases through the blue motor lead wire. The current for one phase is equivalent to one-half the ammeter value. (Example: To set the current to 1.0 A/phase, adjust the current level until the ammeter reads 2.0 A.)

$$\text{Holding Torque [oz-in (N·m)]} = \frac{\text{Maximum Holding Torque [oz-in (N·m)]} \times \text{Current at Standstill [A]}}{\text{Motor rated current [A]}}$$

Notes:
- Always set the running current first, turn off the driver power and turn it back on, and then set the current at standstill. Setting the running current after current at standstill may change the current setting at standstill.
- Setting the current at motor standstill too low may affect the starting of the actuator or the position-holding action.

List of Actuator and Driver Combinations

Standard Type

Package Model	Actuator Model	Driver Model
DRL28PA1-03D	DRL28PA1-03	DFC5107T
DRL28PB1-03D	DRL28PB1-03	DFC5107T
DRL42PA2-04D	DRL42PA2-04	DFC5107T
DRL42PB2-04D	DRL42PB2-04	DFC5107T
DRL60PA4-05D	DRL60PA4-05	DFC5114T

Guide Type

Package Model	Actuator Model	Driver Model
DRL28PA1G-03D	DRL28PA1G-03	DFC5107T
DRL28PB1G-03D	DRL28PB1G-03	DFC5107T
DRL42PA2G-04D	DRL42PA2G-04	DFC5107T
DRL42PB2G-04D	DRL42PB2G-04	DFC5107T
DRL60PA4G-05D	DRL60PA4G-05	DFC5114T