2-Phase Stepping Motor and Driver Package

CSK Series

Additional Information

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2-Phase Stepping Motor and Driver Package

CSK Series

The CSK Series combines a 2-phase stepping motor with a 24 VDC or 36 VDC\(^*\) input board level driver providing high torque, high resolution and low vibration in a compact package. High resolution and geared models are available.

\* CSK29\[بساطة\] models are 24 VDC input only.

### Features

- **High Torque**
  
  Maximum holding torque values are as follows:
  - CSK24\[بساطة\]: 22 oz-in (0.16 N·m) ~ 45 oz-in (0.32 N·m)
  - CSK26\[بساطة\]: 55 oz-in (0.39 N·m) ~ 191 oz-in (1.35 N·m)
  - CSK29\[بساطة\]: 310 oz-in (2.2 N·m) ~ 930 oz-in (6.6 N·m)

- **Powerful Gearheads**
  
  The spur (SH) geared models provide high torque. There are six gear ratios: 3.6:1, 7.2:1, 9:1, 10:1, 18:1, and 36:1.

- **High-Resolution Models**
  
  High-resolution models are available where the basic step angle (1.8°/step) for the two-phase stepping motors is cut in half to 0.9°/step (for full steps). The resolution is doubled from 200 steps per revolution for standard types to 400 steps per revolution. The high-resolution models can also be run in half-step mode to provide 800 steps per revolution. (Not available for CSK29\[بساطة\] models)

- **Compact Driver**
  
  The drivers produce a high output of 2A/phase at 24/36 VDC. They are compact in size W 3.03 in. (77 mm) \(\times\) D 2.83 in. (72 mm) \(\times\) H 1.22 in. (31 mm), due to a custom IC, surface mount technology and FET output stage.

- **Expanded Control Functions**
  
  These motors are equipped with an "Automatic Current Cutback" function and "Excitation Timing" output, which is handy for detecting the mechanical home position of the device. Internal switches can be used to set the step angle and pulse input type.

- **Highly Reliable Photocoupler Input**
  
  Photocouplers are used in the input/output signal section because they are not easily affected by external noise.

### Product Line

<table>
<thead>
<tr>
<th>Type</th>
<th>Power Supply Voltage</th>
<th>Maximum Holding Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1.65 in. (42 mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.22 in. (56.4 mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.35 in. (85 mm)</td>
</tr>
<tr>
<td>Standard</td>
<td>24/36 VDC[بساطة]</td>
<td>22 ~ 45 oz-in (0.16 ~ 0.32 N·m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>55 ~ 191 oz-in (0.39 ~ 1.35 N·m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>310 ~ 930 oz-in (2.2 ~ 6.6 N·m)</td>
</tr>
<tr>
<td>High-Resolution</td>
<td></td>
<td>1.77 ~ 7 lb-in (0.2 ~ 0.8 N·m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.8 ~ 35 lb-in (1 ~ 4 N·m)</td>
</tr>
<tr>
<td>SH Geared</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\* CSK29\[بساطة\] models are 24 VDC input only.
An example of a single-axis system configuration with the EMP400 Series controller.

### Product Number Code

#### Standard Type

**CSK** 2 4 5 - A T A

- **CSK Series**
- **Motor Frame Size**
  - 4: 1.65 in. sq. (42 mm) sq.
  - 6: 2.22 in. sq. (56.4 mm) sq.
  - 9: 3.35 in. sq. (85 mm) sq.
- ** Shaft Type**
  - A: Single Shaft
  - B: Double Shaft
- **Motor Case Length**
- **USA Version**
- **Terminal Block**

#### High-Resolution Type

**CSK** 2 4 5 M A T A

- **CSK Series**
- **Motor Frame Size**
  - 4: 1.65 in. sq. (42 mm) sq.
  - 6: 2.22 in. sq. (56.4 mm) sq.
- **Shaft Type**
  - A: Single Shaft
  - B: Double Shaft
- **Motor Case Length**
- **USA Version**
- **Terminal Block**
- **High-Resolution Type**

#### SH Geared Type

**CSK** 2 6 4 A T A - SG 10

- **CSK Series**
- **Motor Frame Size**
  - 4: 1.65 in. sq. (42 mm) sq.
  - 6: 2.22 in. sq. (56.4 mm) sq.
- **Shaft Type**
  - A: Single Shaft
  - B: Double Shaft
- **Motor Case Length**
- **USA Version**
- **Terminal Block**
- **Gear Ratio**
- **Gear Type**
  - SG: SH Spur Gear
Standard Type

Motor Frame Size: □ 1.65 in. (□ 42 mm), □ 2.22 in. (□ 56.4 mm)

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Single Shaft</th>
<th>Double Shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSK243-ATA</td>
<td>CSK243-BTA</td>
</tr>
<tr>
<td></td>
<td>CSK244-ATA</td>
<td>CSK244-BTA</td>
</tr>
<tr>
<td></td>
<td>CSK245-ATA</td>
<td>CSK245-BTA</td>
</tr>
<tr>
<td></td>
<td>CSK264-AT</td>
<td>CSK264-BT</td>
</tr>
<tr>
<td></td>
<td>CSK266-AT</td>
<td>CSK266-BT</td>
</tr>
<tr>
<td></td>
<td>CSK268-AT</td>
<td>CSK268-BT</td>
</tr>
</tbody>
</table>

- Maximum Holding Torque (oz-in (N·m))
  - CSK243-ATA: 22 (0.16)
  - CSK244-ATA: 36 (0.26)
  - CSK245-ATA: 45 (0.32)
  - CSK264-AT: 55 (0.39)
  - CSK266-AT: 127 (0.9)
  - CSK268-AT: 191 (1.35)

- Rotor Inertia J (oz·in² (kg·m²))
  - CSK243-ATA: 0.191 (35 × 10⁻⁴)
  - CSK244-ATA: 0.3 (54 × 10⁻⁴)
  - CSK245-ATA: 0.37 (68 × 10⁻⁴)
  - CSK264-AT: 0.66 (120 × 10⁻⁴)
  - CSK266-AT: 1.64 (300 × 10⁻⁴)
  - CSK268-AT: 2.6 (480 × 10⁻⁴)

- Rated Current (A/phase)
  - CSK243-ATA: 0.95
  - CSK244-ATA: 1.2
  - CSK245-ATA: 1.8

- Basic Step Angle (°)
  - Single Shaft: 1.2
  - Double Shaft: 2

- Power Source
  - 24 VDC ± 10% 1.4 A
  - 36 VDC ± 10% 1.4 A

- Excitation Mode
  - Full Step (2 phase excitation): 1.8°/step
  - Half Step (1-2 phase excitation): 0.9°/step

- Weight (lb. (kg))
  - Motor: 0.46 (0.21)
  - Driver: 0.29 (0.13)

- Dimension No.
  - Motor: [1]
  - Driver: [2]

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Speed — Torque Characteristics

How to Read Speed-Torque Characteristics → Page C-10

- 24 VDC

CSK243-BTA

Power Input: 24 VDC  Current: 0.95 A/Phase (2 Phases ON)

With Dampers: D4CL-5.0F  JL = 0.186 oz·in² (34 × 10⁻⁴ kg·m²)

Pullout Torque vs. Speed

Driver Input Current vs. Speed

CSK244-BTA

Power Input: 24 VDC  Current: 1.2 A/Phase (2 Phases ON)

With Dampers: D4CL-5.0F  JL = 0.186 oz·in² (34 × 10⁻⁴ kg·m²)

Pullout Torque vs. Speed

Driver Input Current vs. Speed

CSK245-BTA

Power Input: 24 VDC  Current: 1.2 A/Phase (2 Phases ON)

With Dampers: D6CL-6.3F  JL = 0.3 (54 × 10⁻⁴ kg·m²)

Pullout Torque vs. Speed

Driver Input Current vs. Speed

CSK266-BT

Power Input: 24 VDC  Current: 2.0 A/Phase (2 Phases ON)

With Dampers: D6CL-6.3F  JL = 0.3 (54 × 10⁻⁴ kg·m²)

Pullout Torque vs. Speed

Driver Input Current vs. Speed

Note: The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.
Note: The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.
Standard Type

Motor Frame Size: □ 3.35 in. (□ 85 mm)

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Single Shaft</th>
<th>Double Shaft</th>
<th>CSK296-ATA</th>
<th>CSK299-ATA</th>
<th>CSK2913-ATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Holding Torque oz-in (N·m)</td>
<td>310 (2.2)</td>
<td>620 (4.4)</td>
<td>930 (6.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotor Inertia J oz-in² (kg·m²)</td>
<td>7.7 (1400×10⁻⁶)</td>
<td>14.8 (2700×10⁻⁶)</td>
<td>22 (4000×10⁻⁶)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated Current A/phase</td>
<td>4.5</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Step Angle</td>
<td>1.8°</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Source</td>
<td>24 VDC ±10% 5.5 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Excitation Mode
- Full Step (2 phase excitation): 1.8°/step
- Half Step (1-2 phase excitation): 0.9°/step

Weight
- Motor lb. (kg): 3.7 (1.7) | 6.2 (2.8) | 8.4 (3.8)
- Driver lb. (kg): 0.44 (0.2)

Dimension No.
- Motor: 3
- Driver: 7

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Speed — Torque Characteristics

How to Read Speed-Torque Characteristics → Page C-10

CSK296-BTA

- Power Input: 24 VDC Current: 4.5 A/Phase (2 Phases ON)
- With Damper: D9CL-12.7F, Jₕ = 4.8 oz-in² (870×10⁻⁶ kg·m²)

CSK299-BTA

- Power Input: 24 VDC Current: 4.5 A/Phase (2 Phases ON)
- With Damper: D9CL-12.7F, Jₕ = 4.8 oz-in² (870×10⁻⁶ kg·m²)

CSK2913-BTA

- Power Input: 24 VDC Current: 4.0 A/Phase (2 Phases ON)
- With Damper: D9CL-12.7F, Jₕ = 4.8 oz-in² (870×10⁻⁶ kg·m²)

Note: The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Single Shaft</th>
<th>Double Shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSK243MATA</td>
<td>CSK244MATA</td>
</tr>
<tr>
<td>Maximum Holding Torque</td>
<td>22 (0.16)</td>
<td>36 (0.26)</td>
</tr>
<tr>
<td>Rotor Inertia J</td>
<td>0.191 (35 x 10^-3)</td>
<td>0.3 (54 x 10^-3)</td>
</tr>
<tr>
<td>Rated Current</td>
<td>0.95 A/phase</td>
<td>1.2 A/phase</td>
</tr>
<tr>
<td>Basic Step Angle</td>
<td>0.9°</td>
<td>1.2°</td>
</tr>
</tbody>
</table>

### Power Source
- 24 VDC ±10% 1.4 A
- 36 VDC ±10% 1.6 A

### Excitation Mode
- Full Step (2 phase excitation): 0.9°/step
- Half Step (1-2 phase excitation): 0.45°/step

### Weight
- Motor lb. (kg): 0.53 (0.24), 0.66 (0.3), 0.81 (0.37), 0.99 (0.45), 1.5 (0.7), 2.2, 2.1
- Driver lb. (kg): 0.29 (0.13)

### Dimension No.
- Motor: [1]
- Driver: [2]

### How to Read Specifications Table

#### Speed — Torque Characteristics

**How to Read Speed-Torque Characteristics**

- **24 VDC**
- **CSK243MATA**
- **CSK244MATA**
- **CSK245MATA**
- **CSK264MATA**
- **CSK266MATA**
- **CSK268MATA**

**Note:** The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.
### 36 VDC

#### CSK243MBTA

- **Power Input:** 36 VDC
- **Current:** 0.95 A/Phase (2 Phases ON)
- **With Damper D4CL-5.0F:** $J_L = 0.186 \text{ oz-in} \cdot \text{sec} \ (34 \times 10^{-6} \text{ kg-m}^2)$
- **Pulse Input: 10 kHz, Pulse Duty 50%**

#### CSK244MBTA

- **Power Input:** 36 VDC
- **Current:** 1.2 A/Phase (2 Phases ON)
- **With Damper D4CL-5.0F:** $J_L = 0.186 \text{ oz-in} \cdot \text{sec} \ (34 \times 10^{-6} \text{ kg-m}^2)$

#### CSK245MBTA

- **Power Input:** 36 VDC
- **Current:** 1.2 A/Phase (2 Phases ON)
- **With Damper D4CL-5.0F:** $J_L = 0.186 \text{ oz-in} \cdot \text{sec} \ (34 \times 10^{-6} \text{ kg-m}^2)$

#### CSK264MBT

- **Power Input:** 36 VDC
- **Current:** 2.0 A/Phase (2 Phases ON)
- **With Damper D6CL-6.3F:** $J_L = 0.77 \text{ oz-in} \cdot \text{sec} \ (140 \times 10^{-6} \text{ kg-m}^2)$

#### CSK266MBT

- **Power Input:** 36 VDC
- **Current:** 2.0 A/Phase (2 Phases ON)
- **With Damper D6CL-6.3F:** $J_L = 0.77 \text{ oz-in} \cdot \text{sec} \ (140 \times 10^{-6} \text{ kg-m}^2)$

#### CSK268MBT

- **Power Input:** 36 VDC
- **Current:** 2.0 A/Phase (2 Phases ON)
- **With Damper D6CL-6.3F:** $J_L = 0.77 \text{ oz-in} \cdot \text{sec} \ (140 \times 10^{-6} \text{ kg-m}^2)$

### Notes

- The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.
SH Geared Type
Motor Frame Size: 1.65 in. (42 mm)

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Single Shaft</th>
<th>Double Shaft</th>
<th>Single Shaft</th>
<th>Double Shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSK243ATA-SG3.6</td>
<td>CSK243ATA-SG7.2</td>
<td>CSK243ATA-SG9</td>
<td>CSK243ATA-SG36</td>
</tr>
<tr>
<td></td>
<td>CSK243BTA-SG3.6</td>
<td>CSK243BTA-SG7.2</td>
<td>CSK243BTA-SG9</td>
<td>CSK243BTA-SG36</td>
</tr>
<tr>
<td>Maximum Holding Torque (lb-in)</td>
<td>1.77 (0.2)</td>
<td>3.5 (0.4)</td>
<td>4.4 (0.5)</td>
<td>4.9 (0.56)</td>
</tr>
<tr>
<td>Rotor Inertia J (oz-in²)</td>
<td>0.191 (35 x 10⁻⁶)</td>
<td>0.25 (3.5 x 10⁻⁶)</td>
<td>0.38 (6.5 x 10⁻⁶)</td>
<td>0.49 (8.5 x 10⁻⁶)</td>
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<tr>
<td>Rated Current (A/phase)</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>Basic Step Angle</td>
<td>0.5°</td>
<td>0.5°</td>
<td>0.5°</td>
<td>0.5°</td>
</tr>
<tr>
<td>Gear Ratio</td>
<td>3.6:1</td>
<td>7.2:1</td>
<td>9.1</td>
<td>10:1</td>
</tr>
<tr>
<td>Permissible Torque (lb-in)</td>
<td>1.77 (0.2)</td>
<td>3.5 (0.4)</td>
<td>4.4 (0.5)</td>
<td>4.9 (0.56)</td>
</tr>
<tr>
<td>Permissible Speed Range (rpm)</td>
<td>0~500</td>
<td>0~250</td>
<td>0~200</td>
<td>0~180</td>
</tr>
</tbody>
</table>

### How to Read Specifications Table
Note: Direction of rotation of the motor and that of the gear output shaft are the same for the gear ratios 3.6:1, 7.2:1, 9:1 and 10:1. It is opposite for 18:1 and 36:1 gear ratios.

### Speed — Torque Characteristics

![Speed-Torque Characteristics Graphs](image)

**Note:** The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.
36 VDC

**CSK243BTA-SG3.6**
- Power Input: 36 VDC
- Current: 0.95 A/Phase (2 Phases ON)
- With Damper D4CL-5.0F: \( J_L = 0.186 \text{ oz-in}^2 (34 \times 10^{-3} \text{ kg·m}^2) \)

**CSK243BTA-SG7.2**
- Power Input: 36 VDC
- Current: 0.95 A/Phase (2 Phases ON)
- With Damper D4CL-5.0F: \( J_L = 0.186 \text{ oz-in}^2 (34 \times 10^{-3} \text{ kg·m}^2) \)

**CSK243BTA-SG9**
- Power Input: 36 VDC
- Current: 0.95 A/Phase (2 Phases ON)
- With Damper D4CL-5.0F: \( J_L = 0.186 \text{ oz-in}^2 (34 \times 10^{-3} \text{ kg·m}^2) \)

**CSK243BTA-SG10**
- Power Input: 36 VDC
- Current: 0.95 A/Phase (2 Phases ON)
- With Damper D4CL-5.0F: \( J_L = 0.186 \text{ oz-in}^2 (34 \times 10^{-3} \text{ kg·m}^2) \)

**CSK243BTA-SG18**
- Power Input: 36 VDC
- Current: 0.95 A/Phase (2 Phases ON)
- With Damper D4CL-5.0F: \( J_L = 0.186 \text{ oz-in}^2 (34 \times 10^{-3} \text{ kg·m}^2) \)

**CSK243BTA-SG36**
- Power Input: 36 VDC
- Current: 0.95 A/Phase (2 Phases ON)
- With Damper D4CL-5.0F: \( J_L = 0.186 \text{ oz-in}^2 (34 \times 10^{-3} \text{ kg·m}^2) \)

**Note:** The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.
SH Geared Type  Motor Frame Size: 2.36 in. (60 mm)

### Specifications

#### Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Single Shaft</th>
<th>Double Shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSK264ATA-SG3.6</td>
<td>CSK264ATA-SG7.2</td>
<td>CSK264ATA-SG9</td>
</tr>
<tr>
<td>CSK264ATA-SG10</td>
<td>CSK264ATA-SG18</td>
<td>CSK264ATA-SG36</td>
</tr>
<tr>
<td>Maximum Holding Torque</td>
<td>8.8 (1)</td>
<td>17.7 (2)</td>
</tr>
<tr>
<td>Rotor Inertia J (oz·in² (kg·m²))</td>
<td>0.66 (120 × 10⁻⁶)</td>
<td></td>
</tr>
<tr>
<td>Rated Current (A/phase)</td>
<td>2.0</td>
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</tr>
<tr>
<td>Basic Step Angle</td>
<td>0.5°</td>
<td>0.25°</td>
</tr>
<tr>
<td>Gear Ratio</td>
<td>3.6:1</td>
<td>2:1</td>
</tr>
<tr>
<td>Permissible Torque (lb-in (N·m))</td>
<td>8.8 (1)</td>
<td>17.7 (2)</td>
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<tr>
<td>Permissible Speed Range (r/min)</td>
<td>0~500</td>
<td>0~250</td>
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<td>Power Source</td>
<td>24 VDC ±10% 2 A or 36 VDC ±10% 2 A</td>
<td></td>
</tr>
<tr>
<td>Excitation Mode</td>
<td>Full Step</td>
<td>Half Step</td>
</tr>
<tr>
<td>Weight (Motor)</td>
<td>1.7 (0.75)</td>
<td></td>
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<tr>
<td>Weight (Driver)</td>
<td>0.29 (0.13)</td>
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<tr>
<td>Dimension No. (Motor)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Dimension No. (Driver)</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

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**Note:** Direction of rotation of the motor and that of the gear output shaft are the same for the gear ratios 3.6:1, 7:2:1, 9:1 and 10:1. It is opposite for 18:1 and 36:1 gear ratios.

### Speed — Torque Characteristics

#### How to Read Speed-Torque Characteristics  Page C-10

#### 24 VDC

**CSK264BTA-SG3.6**

- Power Input: 24 VDC
- Current: 2.0 A/Phase (2 Phases ON)
- With Damper D6CL-6.3F
- Jₜ = 0.77 oz·in² (140 × 10⁻⁶ kg·m²)

**CSK264BTA-SG10**

- Power Input: 24 VDC
- Current: 2.0 A/Phase (2 Phases ON)
- With Damper D6CL-6.3F
- Jₜ = 0.77 oz·in² (140 × 10⁻⁶ kg·m²)

**CSK264BTA-SG7.2**

- Power Input: 24 VDC
- Current: 2.0 A/Phase (2 Phases ON)
- With Damper D6CL-6.3F
- Jₜ = 0.77 oz·in² (140 × 10⁻⁶ kg·m²)

**CSK264BTA-SG9**

- Power Input: 24 VDC
- Current: 2.0 A/Phase (2 Phases ON)
- With Damper D6CL-6.3F
- Jₜ = 0.77 oz·in² (140 × 10⁻⁶ kg·m²)

**CSK264BTA-SG18**

- Power Input: 24 VDC
- Current: 2.0 A/Phase (2 Phases ON)
- With Damper D6CL-6.3F
- Jₜ = 0.77 oz·in² (140 × 10⁻⁶ kg·m²)

**CSK264BTA-SG36**

- Power Input: 24 VDC
- Current: 2.0 A/Phase (2 Phases ON)
- With Damper D6CL-6.3F
- Jₜ = 0.77 oz·in² (140 × 10⁻⁶ kg·m²)

**Note:** The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.
36 VDC

CSK264BTA-SG3.6

Power Input: 36 VDC  Current: 2.0 A/Phase (2 Phases ON)
With Damper D6CL-6.3F  Jc = 0.77 oz-in² (140 × 10⁻⁴ kg·m²)

- Full Step 0.5°/step
- Half Step 0.25°/step

Current [A]

Pulse Speed [kHz]

CSK264BTA-SG7.2

Power Input: 36 VDC  Current: 2.0 A/Phase (2 Phases ON)
With Damper D6CL-6.3F  Jc = 0.77 oz-in² (140 × 10⁻⁴ kg·m²)

- Full Step 0.25°/step
- Half Step 0.125°/step

Current [A]

Pulse Speed [kHz]

CSK264BTA-SG9

Power Input: 36 VDC  Current: 2.0 A/Phase (2 Phases ON)
With Damper D6CL-6.3F  Jc = 0.77 oz-in² (140 × 10⁻⁴ kg·m²)

- Full Step 0.1°/step
- Half Step 0.05°/step

Current [A]

Pulse Speed [kHz]

CSK264BTA-SG10

Power Input: 36 VDC  Current: 2.0 A/Phase (2 Phases ON)
With Damper D6CL-6.3F  Jc = 0.77 oz-in² (140 × 10⁻⁴ kg·m²)

- Full Step 0.18°/step
- Half Step 0.09°/step

Current [A]

Pulse Speed [kHz]

Note: The pulse input circuit responds up to approximately 10 kHz with a pulse duty of 50%.

Common Specifications

- Input Signal Circuit
  - Photocoupler input, Input resistance 220 Ω, Input current 10~20 mA maximum
  - Photocoupler ON: +4.5~5 V, Photocoupler OFF: 0~1 V (Voltage between terminals)

- Pulse Signal (CW Pulse Signal)*
  - Step command pulse signal (CW step command pulse signal in 2-pulse input mode*)
  - Pulse width: 5 μs minimum, Pulse rise/fall: 2 μs maximum, Pulse duty: Max 50%
  - Motor moves when the photocoupler state changes from ON to OFF.
  - Maximum input frequency: 10 kHz (20 kHz for CSK29*) (when the pulse duty is 50%)

- Rotation Direction Signal (CCW Pulse Signal)*
  - Rotation direction signal  Photocoupler ON, CW, Photocoupler OFF: CCW
  - CCW step command signal in 2-pulse input mode*. Pulse width: 5 μs minimum, Pulse rise/fall: 2 μs maximum.
  - Pulse duty: Max 50% Motor moves when the photocoupler state changes from ON to OFF.
  - Maximum input frequency: 10 kHz (20 kHz for CSK29*) (when the pulse duty is 50%)

- All Windings Off Signal
  - When in the "photocoupler ON" state, the current to the motor is cut off and the motor shaft can be rotated manually.
  - When in the "photocoupler OFF" state, the current level set by the RUN switch is supplied to the motor.

- Output Signal Circuit
  - Photocoupler, Open-Collector Output
  - External use condition: 24 VDC maximum, 10 mA maximum

- Excitation Timing Signal
  - The signal is output every time the excitation sequence returns to the initial stage '0'. (Photocoupler: ON)
  - Full step: signal output every 4 pulses, Half step: signal output every 8 pulses

- Functions
  - Automatic current cutback, Step angle switch, Pulse input mode switch, Power supply voltage switch

- Driver Cooling Method
  - Natural ventilation

* CSK29* driver is 1-pulse input mode only.
### General Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Motor</th>
<th>Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation Class</td>
<td>Class B [266°F (130°C)]</td>
<td>—</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>100 MΩ minimum under normal temperature and humidity, when measured by a 500 VDC megger between the motor coils and the motor case.</td>
<td>—</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>Sufficient to withstand 1.0 kV (0.5 kV for CSK24, CSK24M), 60 Hz applied between the motor coils and casing for one minute, under normal ambient temperature and humidity.</td>
<td>—</td>
</tr>
</tbody>
</table>

#### Operating Environment

<table>
<thead>
<tr>
<th>Environment</th>
<th>Temperature</th>
<th>Humidity</th>
<th>Atmosphere</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient</td>
<td>Ambient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Temperature</td>
<td></td>
<td>No corrosive gases, dust, water or oil.</td>
</tr>
<tr>
<td>Humidity</td>
<td>Humidity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Temperature:**
  - Ambient: Temperature of the coil measured by the Change Resistance Method is 144°F (80°C) or less. (at standstill, two phases energized)
  - Ambient: Temperature rise of the coil measured by the Change Resistance Method is 144°F (80°C) or less. (at standstill, two phases energized)

- **Humidity:**
  - Ambient: Temperature rise of the coil measured by the Change Resistance Method is 144°F (80°C) or less. (at standstill, two phases energized)
  - Ambient: Temperature rise of the coil measured by the Change Resistance Method is 144°F (80°C) or less. (at standstill, two phases energized)

- **Atmosphere:**
  - Temperature: Temperature rise of the coil measured by the Change Resistance Method is 144°F (80°C) or less. (at standstill, two phases energized)
  - Temperature: Temperature rise of the coil measured by the Change Resistance Method is 144°F (80°C) or less. (at standstill, two phases energized)

- **Radial Play:**
  - Displacement in shaft position in the radial direction, when a 1.12 lb. (5 N) load is applied in the vertical direction to the tip of the motor's shaft.

- **Axial Play:**
  - Displacement in shaft position in the axial direction, when a 2.2 lb. (10 N) load is applied to the motor's shaft in the axial direction.

- **Concentricity:**
  - 0.002 inch (0.05 mm) T.I.R. (Total Indicator Reading) at top of output shaft.

- **Perpendicularity:**
  - 0.003 inch (0.075 mm) T.I.R.

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

### Permissible Overhung Load and Permissible Thrust Load

<table>
<thead>
<tr>
<th>Model</th>
<th>Overhung Load Distance from Shaft End [inch (mm)]</th>
<th>Thrust Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0.2 (5)</td>
</tr>
<tr>
<td>CSK24, CSK24M</td>
<td>4.5</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>CSK26, CSK26M</td>
<td>12.1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>67</td>
</tr>
<tr>
<td>CSK29</td>
<td>260</td>
<td>290</td>
</tr>
<tr>
<td>CSK243SG3.6 – 36</td>
<td>2.2</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>CSK264SG3.6 – 10</td>
<td>6.7</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>CSK264SG18, 36</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

*Unit = Upper values: lb./Lower values: N*

*The permissible thrust load [lb. (N)] shall be no greater than the motor mass.*
### Dimensions

#### Motor

#### Standard Type, High-Resolution Type

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor Model</th>
<th>L1 (inch) (mm)</th>
<th>L2 (inch) (mm)</th>
<th>Weight (lb. (kg))</th>
<th>DXF</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSK243-ATA</td>
<td>PK243-01AA</td>
<td>1.3 (33)</td>
<td>—</td>
<td>0.46 (0.21)</td>
<td>B081U</td>
</tr>
<tr>
<td>CSK243MATA</td>
<td>PK243MAMA</td>
<td>1.89 (48)</td>
<td>0.53 (0.24)</td>
<td>0.46 (0.21)</td>
<td>B081U</td>
</tr>
<tr>
<td>CSK243-BTA</td>
<td>PK243-01BA</td>
<td>0.53 (0.24)</td>
<td>—</td>
<td>0.53 (0.24)</td>
<td>B081U</td>
</tr>
<tr>
<td>CSK243MBTA</td>
<td>PK243MBA</td>
<td>—</td>
<td>0.53 (0.24)</td>
<td>0.53 (0.24)</td>
<td>B081U</td>
</tr>
<tr>
<td>CSK244-ATA</td>
<td>PK244-01A</td>
<td>1.54 (39)</td>
<td>0.59 (0.27)</td>
<td>—</td>
<td>B082U</td>
</tr>
<tr>
<td>CSK244MATA</td>
<td>PK244MAMA</td>
<td>—</td>
<td>0.59 (0.27)</td>
<td>0.59 (0.27)</td>
<td>B082U</td>
</tr>
<tr>
<td>CSK244-BTA</td>
<td>PK244-01BA</td>
<td>2.13 (54)</td>
<td>0.66 (0.3)</td>
<td>—</td>
<td>B082U</td>
</tr>
<tr>
<td>CSK244MBTA</td>
<td>PK244MBA</td>
<td>0.66 (0.3)</td>
<td>—</td>
<td>0.66 (0.3)</td>
<td>B082U</td>
</tr>
<tr>
<td>CSK245-ATA</td>
<td>PK245-01AA</td>
<td>1.85 (47)</td>
<td>—</td>
<td>0.77 (0.35)</td>
<td>B083U</td>
</tr>
<tr>
<td>CSK245MATA</td>
<td>PK245MAMA</td>
<td>—</td>
<td>0.81 (0.37)</td>
<td>0.81 (0.37)</td>
<td>B083U</td>
</tr>
<tr>
<td>CSK245-BTA</td>
<td>PK245-01BA</td>
<td>2.44 (62)</td>
<td>0.77 (0.35)</td>
<td>—</td>
<td>B083U</td>
</tr>
<tr>
<td>CSK245MBTA</td>
<td>PK245MBA</td>
<td>0.81 (0.37)</td>
<td>—</td>
<td>0.81 (0.37)</td>
<td>B083U</td>
</tr>
</tbody>
</table>

**Motor Frame Size 1.65 in. (42 mm)**

- The length of machining on double shaft model is \(0.591 \pm 0.006\) (15 \(\pm 0.25\)).

**Motor Frame Size 2.22 in. (56.4 mm)**

- 6 Motor Leads 12 inch (300mm) Length
- UL Style 3265, AWG 22
- No. 4-40UNC 0.177 (4.5) Deep Min.
- 4 Holes

**Motor Frame Size 3.35 in. (85 mm)**

- 6 Motor Leads, 12 inch (300mm) Length
- UL Style 3265, AWG 20
- Shaft Cross (Section A-A)

*These dimensions are for double shaft models. For single shaft models, ignore the shaded areas.*

---

**Note:**

- L1 = 0.88 (2)
- L2 = 0.59 (0.006)
- Motor Frame Size
- Dimensions Scale 1/4, Unit = inch (mm)
- Motor
- Standard Type, High-Resolution Type
- Specifications/Characteristics
- System Configuration
- Features

---

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor Model</th>
<th>L1 (inch) (mm)</th>
<th>L2 (inch) (mm)</th>
<th>Weight (lb. (kg))</th>
<th>DXF</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSK266-BT</td>
<td>PK266-02B</td>
<td>2.13 (54)</td>
<td>2.76 (70)</td>
<td>—</td>
<td>B085</td>
</tr>
<tr>
<td>CSK266MBT</td>
<td>PK266MB</td>
<td>—</td>
<td>1.5 (0.7)</td>
<td>—</td>
<td>B085</td>
</tr>
<tr>
<td>CSK268-AT</td>
<td>PK268-02A</td>
<td>2.99 (76)</td>
<td>3.62 (92)</td>
<td>2.2 (1.0)</td>
<td>B086</td>
</tr>
<tr>
<td>CSK268MBT</td>
<td>PK268MB</td>
<td>—</td>
<td>—</td>
<td>2.2 (1.0)</td>
<td>B086</td>
</tr>
<tr>
<td>CSK244MATA</td>
<td>PK244MAMA</td>
<td>—</td>
<td>0.81 (0.37)</td>
<td>0.81 (0.37)</td>
<td>B083U</td>
</tr>
<tr>
<td>CSK244-BTA</td>
<td>PK244-01BA</td>
<td>2.13 (54)</td>
<td>0.59 (0.27)</td>
<td>—</td>
<td>B082U</td>
</tr>
<tr>
<td>CSK244MBTA</td>
<td>PK244MBA</td>
<td>0.66 (0.3)</td>
<td>—</td>
<td>0.66 (0.3)</td>
<td>B082U</td>
</tr>
</tbody>
</table>
**SH Geared Type**

4 Motor Frame Size □1.65 in. (□42 mm)

- The length of machining on double shaft model is 0.591 ± 0.04 (15 ± 0.2).

5 Motor Frame Size □2.36 in. (□60 mm)

- These dimensions are for double shaft models. For single shaft models, ignore the shaded areas.

**Driver**

6 CSD2109-T, CSD2112-T, CSD2120-T

Weight: 0.29 lb. (0.13 kg)  DXF B807U

7 CSD2140T, CSD2145T

Weight: 0.44 lb. (0.2 kg)  DXF B810U

- Enter the gear ratio in the box (□) within the model number.
**Connection and Operation**

**Stepping Motors**

### 1. Signal Monitor Display

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POWER</strong></td>
<td>Green</td>
<td>Power input display</td>
</tr>
</tbody>
</table>

### 2. Current Adjustment Potentiometers

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Name of Potentiometer</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RUN</strong> VR</td>
<td>Motor run current potentiometer</td>
<td>For adjusting the motor running current.</td>
</tr>
<tr>
<td><strong>STOP</strong> VR</td>
<td>Motor stop current potentiometer</td>
<td>For adjusting the motor current at standstill.</td>
</tr>
</tbody>
</table>

### 3. Function Select Switches

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Switch Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACD</strong></td>
<td>Automatic current cutback function select</td>
<td>Automatically decreases output current to motor at motor standstill.</td>
</tr>
<tr>
<td><strong>F/H</strong></td>
<td>Step angle select</td>
<td>Switches the motor’s step angle. F (Full Step): 1.8°/step, H (Half Step): 0.9°/step (F: 0.9°/step, H: 0.45°/step for High-Resolution Type)</td>
</tr>
<tr>
<td><strong>1P/2P</strong></td>
<td>Pulse input mode</td>
<td>Switches between 1-pulse input mode and 2-pulse input mode.</td>
</tr>
<tr>
<td><strong>24/36V</strong></td>
<td>Power supply voltage select</td>
<td>Changes power supply voltage. For 24 VDC and 36 VDC</td>
</tr>
</tbody>
</table>

### 4. Input/Output Signals (TB3)

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Indication</th>
<th>Input/Output</th>
<th>Signal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+PLS</td>
<td>Input</td>
<td>Pulse Signal</td>
</tr>
<tr>
<td>2</td>
<td>–PLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>+DIR.</td>
<td>Input</td>
<td>Rotation Direction Signal</td>
</tr>
<tr>
<td>4</td>
<td>–DIR.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>+C.OFF</td>
<td>Input</td>
<td>All Windings OFF Signal</td>
</tr>
<tr>
<td>6</td>
<td>–C.OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>+TIMING</td>
<td>Output</td>
<td>Timing Signal</td>
</tr>
<tr>
<td>8</td>
<td>–TIMING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>NC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Connection Diagrams**

**CSK24**, **CSK26**
**CSK24 M**, **CSK26 M**

---

2-phase stepping motor

Controller

V01

24/36 VDC

GND

TB1

R1

R1

TB2

R2

V02

Excitation Timing Output

All Windings Off Input

Rotation Direction Input

Pulse Input

Twisted-pair wire

---

**Power Supply**

Keep the input power voltage to 24 VDC ± 10% or 36 VDC ± 10%. Use a power supply that provides sufficient input current.

**Notes:**

- Keep the voltage V01 and V02 between 5 VDC and 24 VDC. When they are equal to 5 VDC, the external resistance R1 is not necessary. When they are above 5 VDC, connect R1 to keep the current between 10 mA and 20 mA, and connect R2 to keep the current below 10 mA.
- Use twisted-pair wire of AWG 24 or thicker and 6.6 feet (2 m) or less in length for the signal line.
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decreases.
- Suitable wire size for the TB1, TB2 and TB3 connector is between AWG 20 and 26. Use AWG 20 or thicker for motor lines (when extended) and power supply lines.
- Signal lines should be kept at least 3.9 inches (10 cm) away from power lines (power supply lines and motor lines). Do not bind the signal line and power line together.
- Use spot grounding to ground the driver and external controller.
- If noise generated by the motor lead wire causes 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 power on.

---

**Description of Input/Output Signals**

**Pulse (CW) Input and Rotation Direction (CCW) Input Signal**

**1-Pulse Input Mode**

**Pulse Input Signal**

"Pulse" signal is input to the PULSE/CW – terminal. When the photocoupler state changes from "ON" to "OFF", the motor rotates one step in a clockwise direction.

**Rotation Direction Input Signal**

The "Rotation Direction" signal is input to the DIR./CCW – terminal. A "photocoupler ON" signal input commands a clockwise direction rotation. A "photocoupler OFF" signal input commands a counterclockwise direction rotation.

**2-Pulse Input Mode**

**CW Pulse Input Signal**

"Pulse" signal is input to the PULSE/CW – terminal. When the photocoupler state changes from "ON" to "OFF", the motor rotates one step in a clockwise direction.

**CCW Pulse Input Signal**

"Pulse" signal is input to the DIR./CCW – terminal. When the photocoupler state changes from "ON" to "OFF", the motor rotates one step in a counterclockwise direction.

**All Windings Off Input Signal**

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. The motor output shaft can then be rotated freely by hand. This signal is used when moving the motor by external force or to the manual home position.

**Excitation Timing Output Signal**

The Excitation Timing signal is output once each time the excitation sequence returns to step “0” in synchronization with input pulse. The excitation sequence is designed to complete one cycle as the motor shaft rotates 7.2°.

A signal is output every 4 pulses in full step mode and every 8 pulses in half step mode. (When the “excitation timing” signal is output, the transistor turns ON.)
◆ Power Supply
Keep the input power voltage at 24 VDC ±10%. Use a power supply that provides sufficient input current.

Notes:
- Keep the voltage Vo between 5 VDC and 24 VDC. When Vo is equal to 5 VDC, the external resistance R1 is not necessary. When Vo is above 5 VDC, connect R1 to keep the current between 10 mA and 20 mA, and connect R2 to keep the current below 10 mA.
- Use twisted-pair wire of AWG 24 or thicker and 6.6 feet (2 m) or less in length for the signal line.
- Note that as the length of the pulse signal line increases, the maximum transmission frequency decrease. (→ Technical Reference Page F-36)
- Suitable wire size for the TB1, TB2 and TB3 connector is between AWG 20 and AWG 26. Use AWG 20 or thicker for motor lines (when extended) and power supply line.
- Signal lines should be kept at least 3.9 inches (10 cm) away from power lines (power supply lines and motor lines). Do not bind the signal line and power line together.
- Use spot grounding to ground the driver and external controller.
- If noise generated by the motor lead wire causes 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 power on.

● Description of Input/Output Signals

Pulse Input Signal
"Pulse" signal is input to the PULSE – terminal. When the photocoupler state changes from "ON" to "OFF", the motor rotates one step. The direction of rotation is determined by the rotation direction signal.

Rotation Direction Input Signal
The "Rotation Direction" signal is input to the DIR. – terminal. A "photocoupler ON" signal input commands a clockwise direction rotation. A "photocoupler OFF" signal input commands a counterclockwise direction rotation.

All Windings Off Input Signal
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. The motor output shaft can then be rotated freely by hand. This signal is used when moving the motor by external force or to the manual home position.

Excitation Timing Output Signal
The signal is output once each time the excitation sequence returns to step "0" in synchronization with input pulse. The excitation sequence is designed to complete one cycle as the motor shaft rotates 7.2°. A signal is output every 4 pulses in full step mode and every 8 pulses in half step mode. (When the "excitation timing" signal is output, the transistor turns ON.)
### Note:

1. Wait a period of time to allow the motor oscillations to end before inputting the "All Windings Off" signal. This time varies with the load inertia, the load torque and the starting pulse rate. The signal input must be stopped before the motor stops.
2. Never input a step pulse signal immediately after switching the "All Windings Off" input signal to the "photocoupler OFF" state or the motor may lose synchronism. In general, a minimum interval of 300 ms is required.
3. The motor will not operate properly if a pulse signal is input when either the CW or CCW pulse is in the "photocoupler ON" state.

The shaded area indicates when the photocoupler is ON.

### Note:

1. After turning off the power supply, wait at least 5 seconds before turning it on again.
2. Wait a period of time to allow the motor oscillations to end before inputting the "All Windings Off" signal. This time varies with the load inertia, the load torque and the starting pulse rate. The signal input must be stopped before the motor stops.
3. Never input a step pulse signal immediately after switching the "All Windings Off" signal to "photocoupler OFF" state, or the motor may lose synchronism. In general, a minimum interval of 300 ms is required.

The shaded area indicates when the photocoupler is ON.
Adjusting the Output Current

**CSK24**, **CSK26**

**CSK24M**, **CSK26M**

**Adjustment Method**
The rated output current is set at the factory. When it is necessary to change the current setting, follow the procedures described below.

**Connecting Voltmeter**
Insert the voltmeter test probes [approximately 0.18 inch (2.1 mm)] as shown below. The current value for one phase is equivalent to the voltage shown by the voltmeter. (ex: voltmeter voltage 1 V = 1 A/Phase)

Adjusting the Motor Running Current
To set the "Automatic Current Cutback" function to inactive (SW1: OFF):
(1) Adjust the motor operating current with the RUN potentiometer. It can be adjusted from 0.3 A/phase to the rated value of the driver.
(2) The motor operating current is set for the rated current at the time of shipping. The RUN potentiometer can be used to lower the operating current to reduce temperature rise in the motor/driver, adjust torque margin and reduce vibration.

Note:
• The motor RUN current should be less than the motor rated current.

Adjusting the Current at Motor Standstill
To set the "Automatic Current Cutback" function to active (SW1: ON):
(1) Adjust the current at motor standstill with the STOP potentiometer. It can be adjusted from 25% to 50% of the run operating current (0.3 A minimum).
(2) At the time of shipping, the current at motor standstill is set for 40%. The STOP potentiometer readjusts the current to the value required to produce enough holding torque.

\[
\text{Holding torque (oz-in (N·m))} = \frac{\text{Maximum holding torque (oz-in (N·m)) \times Current at motor standstill (A)}}{\text{Motor rated current (A)}}
\]
Motor Running Current
1. Set the step angle to full step. Set the jumper socket for the step angle switch (FULL/HALF) to "FULL".

2. Disable the automatic current cutback function. Set the jumper socket for automatic current cutback function (C.C/A.C.D) to "C.C".

3. Turn on the power supply. Wait until the motor reaches its operating current.

4. Manipulate the potentiometer for adjusting the motor operating current (RUN VR). Adjust the potentiometer using an insulated screwdriver. The sum of the two DC ammeter readings indicates the current per motor phase. Be sure to adjust the current to the motor’s rated current or below.

Example: When the DC ammeter readings indicate 1.05 A and 0.95 A respectively, the output current per motor phase is 2.0 A.

5. Turn off the power supply.

Motor Standstill Current
1. Set the step angle to full step. Set the jumper socket for the step angle switch (FULL/HALF) to "FULL".

2. Enable the automatic current cutback function. Set the jumper socket for automatic current cutback function (C.C/A.C.D) to “A.C.D.”.

3. Turn on the power supply. Wait until the motor reaches its standstill current.

4. Manipulate the potentiometer for adjusting the motor standstill current (STOP VR). Adjust the potentiometer using an insulated screwdriver. The sum of the two DC ammeter readings indicates the current per motor phase. Be sure to adjust the current to 40 percent of the motor’s rated current or below.

Example: When the DC ammeter readings indicate 1.05 A and 0.95 A respectively, the output current per motor phase is 2.0 A.

5. Turn off the power supply.

This completes the adjustment of the motor running current.

This completes the adjustment of the motor standstill current.
### List of Motor and Driver Combinations

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
<th>Motor Model</th>
<th>Driver Model</th>
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*Enter A (single shaft) or B (double shaft) in the box (□) within the model number.*