Standard AC Motors

Torque Motors
Torque motors are designed to provide high starting torque and sloping characteristics (torque is highest at zero speed and decreases steadily with increasing speed), and operate over a wide speed range. They also provide stable operation, especially in the low speed range or under a locked rotor condition.

### Features

**The Speed Can Vary Widely, Depending on the Sloping Characteristics**

Torque motors have a high starting torque and sloping characteristics, allowing easy speed control simply by changing the voltage supplied to the motor. (The motor torque varies in proportion to the square of the voltage.)

**Voltage Control of Torque Motors**

The method most commonly used to control voltage is by phase control using a triac. As shown in Fig. 1, by changing the phase angle “alpha” at which the triac switches, the input voltage is controlled as represented by the shaded areas of the graph. When adjusting the speed or the torque, an external voltage adjuster is necessary.

**Suitable for Winding Applications**

In an application where an object is released continuously at a constant speed and wound up with constant tension, the torque must be doubled and the speed must be halved if the diameter of the winding spool is doubled.

**Locked Rotor Operation is Available**

Unlike induction motors or reversible motors, torque motors are designed to provide a stable torque even under locked rotor conditions or at very low speed (nearly locked rotor condition). They are suitable for pushing applications that require static torque, or for loads that are under locked rotor conditions at the end of processes.

Motors of 115 VAC input can operate continuously at 60 VAC. When used at voltages above 60 VAC, these motors have short time ratings. They have a 5 minutes rating at 115 VAC.

**Use as a Brake**

By using the motor in the braking region of the speed – torque characteristics, it can serve as a brake. Constant tension control can be achieved by applying a DC excitation.
Application as a Brake

A torque motor has the following two characteristics that allow it to be used as a brake:

Reverse-phase brake: Brake characteristics obtained when AC voltage is applied to the motor and the motor is rotated in the direction opposite to the rotational magnetic field

Eddy-current brake: Brake characteristics obtained when DC voltage is applied to the motor

Unlike a brake pack or an electromagnetic brake that stop the motor, these reverse-phase brake and eddy-current brake characteristics are suited for winding mechanisms and other applications where tension (back-tension) control is required.

Application as a Reverse-Phase Brake

When a torque motor is used as a reverse-phase brake, connect the motor according to the connection diagram and apply AC voltage.

The motor operates at a speed balanced with the load according to the speed – torque characteristics, when the motor is not receiving any force that turns it in the direction opposite to the rotational magnetic field.

To use a torque motor as a brake, force the motor to rotate in the direction opposite to the rotational magnetic field at a torque greater than the starting torque of the motor. Then, the torque motor rotates in the direction opposite to the rotational magnetic field while generating a certain brake force.

Fig. 2 shows an example of speed – brake torque characteristics. When a reverse-phase brake is used, a large brake force can be obtained at the speed of 0 r/min. The reverse-phase brake is suitable for applications where tension force is required even when the motor is at standstill.

Application as an Eddy-Current Brake

When a torque motor is used as an eddy-current brake, connect the red and white leadwires of the torque motor in series, as shown in Fig. 3, and apply DC voltage. At this time, insulate the black leadwire so that it will not contact any other part of the circuit.

Fig. 4 shows an example of speed – brake torque characteristics. The brake torque varies depending on the applied voltage and speed. When the speed is 0 r/min, the brake torque becomes 0 N·m (0 oz-in). The brake torque increases as the speed increases, and stabilizes once the speed reaches a certain high level. A similar brake force can also be achieved whether the motor is rotating in the forward or reverse direction.

An eddy-current brake is suitable for applications where tension force is required at high-speed operations or at bi-directional operations.
Features and Types of Gearheads

- **Long Life, Low Noise GN-S Gearhead is Available**
  Adopting innovative technologies and structure, the “long life, low noise GN-S gearhead” achieves a long rated life of 10000 hours, twice as long as the level of a conventional gearhead. Also, the gearhead is designed for low noise.
  
  [Details of long life, low-noise GN-S gearhead ➔ Page A-21]

- **The Motor Bearing Life is Twice as Long as a Conventional Type**
  A motor’s life is determined by its bearing. We adopted high-performance bearing grease to lubricate this important component. As a result, the bearings of motors last twice as long as our conventional bearings.

- **Protective Earth Terminal on the Motor**

- **RoHS Compliant**
  Torque motors conform to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.
  
  [Details of RoHS Directive ➔ Page G-38]

---

### Types of Gearheads (RoHS)

<table>
<thead>
<tr>
<th>Gearhead</th>
<th>Applicable Motor</th>
<th>Rated Life (hours)</th>
<th>Low Noise</th>
</tr>
</thead>
<tbody>
<tr>
<td>GN Type Pinion Shaft</td>
<td>3 W–20 W (1/250 HP–1/38 HP)</td>
<td>10000</td>
<td></td>
</tr>
<tr>
<td>GN Type Pinion Shaft</td>
<td>3 W–20 W (1/250 HP–1/38 HP)</td>
<td>5000</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- The right-angle gearheads cannot be combined.
## System Configuration

### Torque Motors

Motor (Pinion shaft)

AC Power Supply (Main power supply)

Capacitor Cap (Included)

Capacitor (Included)

### Gearheads

Parallel Shaft Gearheads

### Accessories (Sold separately)

1. Mounting Brackets
   - Dedicated mounting bracket for the motor and gearhead.
   - Page A-288

2. Flexible Couplings
   - Clamp type coupling that connects the motor or gearhead shaft to the driven shaft.
   - Page A-292

### No. - Product Name - Overview

<table>
<thead>
<tr>
<th>No.</th>
<th>Product Name</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mounting Brackets</td>
<td>Dedicated mounting bracket for the motor and gearhead.</td>
</tr>
<tr>
<td>2</td>
<td>Flexible Couplings</td>
<td>Clamp type coupling that connects the motor or gearhead shaft to the driven shaft.</td>
</tr>
</tbody>
</table>

### Example of System Configuration

Torque Motor (Sold separately) + Long Life, Low Noise Gearhead (Sold separately)

<table>
<thead>
<tr>
<th>Torque Motor (Pinion shaft)</th>
<th>Long Life, Low Noise Gearhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>4T10GN-AW2U</td>
<td>4GN25SA</td>
</tr>
</tbody>
</table>

Mounting Bracket + Flexible Coupling

<table>
<thead>
<tr>
<th>Mounting Bracket</th>
<th>Flexible Coupling</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOL4U10</td>
<td>MCL30F06F06</td>
</tr>
</tbody>
</table>

Gearheads cannot be combined with round shaft type motors.

The system configuration shown above is an example. Other combinations are available.
**Product Number Code**

**Motor**

5 T K 20 GN - AW 2 U

- **Motor Frame Size**
  - 2: 60 mm (2.36 in.)
  - 3: 70 mm (2.76 in.)
  - 4: 80 mm (3.15 in.)
  - 5: 90 mm (3.54 in.)
- **Motor Type**
  - T: Torque Motor
- **Series**
  - K: K Series
- **Output Power (W)**
  - (Example) 20 W (1/38 HP)
- **Motor Shaft Type, Type of Pinion**
  - A: Round Shaft
  - GN. GNS: Type Pinion Shaft
- **Power Supply Voltage**
  - AW: Single-Phase 110/115 VAC
  - CW: Single-Phase 220/230 VAC

**Gearhead**

5 GN 50 SA

- **Gearhead Frame Size**
  - 2: 60 mm (2.36 in.)
  - 3: 70 mm (2.76 in.)
  - 4: 80 mm (3.15 in.)
  - 5: 90 mm (3.54 in.)
- **Type of Pinion**
  - GNS: Type Pinion Shaft
- **Gear Ratio**
  - (Example) 50: Gear Ratio of 50:1
  - 10X: denotes the decimal gearhead of gear ratio 10:1
- **Included Capacitor**
  - U: For Single-Phase 110/115 VAC
  - E: For Single-Phase 220/230 VAC

**Product Line**

**Motor**

- **Output Power**
  - 3 W (1/250 HP)
  - 6 W (1/125 HP)
  - 10 W (1/75 HP)
  - 20 W (1/38 HP)
- **Pinion Shaft Type**
  - 2TK3GN-AW2U
  - 2TK3GN-CW2E
  - 3TK6GN-AW2U
  - 3TK6GN-CW2E
  - 4TK10GN-AW2U
  - 4TK10GN-CW2E
  - 5TK20GN-AW2U
  - 5TK20GN-CW2E
- **Round Shaft Type**
  - 2TK3A-AW2U
  - 2TK3A-CW2E
  - 3TK6A-AW2U
  - 3TK6A-CW2E
  - 4TK10A-AW2U
  - 4TK10A-CW2E
  - 5TK20A-AW2U
  - 5TK20A-CW2E

- The following items are included in each product:
  - Motor, Capacitor, Capacitor Cap, Operating Manual

**Parallel Shaft Gearhead (Sold separately)**

- **Long Life, Low Noise GNS Gearhead**
  - **Applicable Motor Output Power (Pinion shaft type)**
  - 3 W (1/250 HP)
  - 6 W (1/125 HP)
  - 10 W (1/75 HP)
  - 20 W (1/38 HP)
  - **Gearhead Model**
    - 2GN_SA
    - 3GN_SA
    - 4GN_SA
    - 5GN_SA
  - **Gear Ratio**
    - 3.6, 5.6, 7.5, 9, 12.5, 15
      - 18.25, 30, 36, 50, 60, 75, 90, 100, 120, 150, 180
- **Parallel Shaft Gearhead**
  - **Gearhead Type**
    - 2GN_KA
    - 3GN_KA
    - 4GN_KA
    - 5GN_KA
  - **Gearhead Model**
    - 2GN_KA
    - 3GN_KA
    - 4GN_KA
    - 5GN_KA
  - **Gear Ratio**
    - 3 - 180

- The following items are included in each product:
  - Gearhead, Mounting Screws, Operating Manual

- Following gearheads are also available. For details, please refer to website (http://www.orientalmotor.com/) or contact the nearest Oriental Motor sales office.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2TK3GN-AW2U</td>
<td>2TK3A-AW2U</td>
<td>5 minutes</td>
<td>110</td>
<td>60</td>
<td>70</td>
<td>9.9</td>
<td>3.5</td>
<td>1/210</td>
<td>900</td>
<td>8.0</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>115</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2TK3GN-CW2E</td>
<td>2TK3A-CW2E</td>
<td>5 minutes</td>
<td>220</td>
<td>50</td>
<td>70</td>
<td>9.9</td>
<td>3</td>
<td>1/250</td>
<td>750</td>
<td>9.9</td>
<td>0.220</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>70</td>
<td>9.9</td>
<td>3.5</td>
<td>1/210</td>
<td>900</td>
<td>8.0</td>
<td>0.215</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3TK6GN-AW2U</td>
<td>3TK6A-AW2U</td>
<td>5 minutes</td>
<td>110</td>
<td>60</td>
<td>150</td>
<td>21</td>
<td>8</td>
<td>1/930</td>
<td>750</td>
<td>10.8</td>
<td>0.095</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>115</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3TK6GN-CW2E</td>
<td>3TK6A-CW2E</td>
<td>5 minutes</td>
<td>220</td>
<td>50</td>
<td>140</td>
<td>19.8</td>
<td>6</td>
<td>1/125</td>
<td>750</td>
<td>11.0</td>
<td>0.390</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>150</td>
<td>21</td>
<td>8</td>
<td>1/930</td>
<td>750</td>
<td>12.3</td>
<td>0.320</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4TK10GN-AW2U</td>
<td>4TK10A-AW2U</td>
<td>5 minutes</td>
<td>110</td>
<td>60</td>
<td>210</td>
<td>29</td>
<td>12</td>
<td>1/62</td>
<td>900</td>
<td>13.0</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>115</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4TK10GN-CW2E</td>
<td>4TK10A-CW2E</td>
<td>5 minutes</td>
<td>220</td>
<td>50</td>
<td>220</td>
<td>31</td>
<td>10</td>
<td>1/75</td>
<td>750</td>
<td>13.0</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>210</td>
<td>29</td>
<td>12</td>
<td>1/62</td>
<td>900</td>
<td>13.0</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5TK20GN-AW2U</td>
<td>5TK20A-AW2U</td>
<td>5 minutes</td>
<td>110</td>
<td>60</td>
<td>350</td>
<td>49</td>
<td>23</td>
<td>1/32</td>
<td>900</td>
<td>25.0</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>115</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5TK20GN-CW2E</td>
<td>5TK20A-CW2E</td>
<td>5 minutes</td>
<td>220</td>
<td>50</td>
<td>350</td>
<td>49</td>
<td>20</td>
<td>1/38</td>
<td>750</td>
<td>26.0</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>220</td>
<td>60</td>
<td>350</td>
<td>49</td>
<td>20</td>
<td>1/38</td>
<td>900</td>
<td>22.0</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>115</td>
<td>50</td>
<td>85</td>
<td>12.0</td>
<td>4.5</td>
<td>1/170</td>
<td>750</td>
<td>8.5</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contains a built-in thermal protector (automatic return type). If a motor overheats for any reason, the thermal protector is activated and the motor is stopped. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor power off before inspecting.

### General Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation Resistance</td>
<td>100 MΩ or more when 500 VDC megger is applied between the windings and the case after rated operation under normal ambient temperature and humidity.</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>Sufficient to withstand 1.5 kV AC at 50 Hz or 60 Hz applied between the windings and the case for 1 minute after rated operation under normal ambient temperature and humidity.</td>
</tr>
<tr>
<td>Temperature Rise</td>
<td>Temperature rise of windings is 80°C (140°F) or less measured by the resistance change method after rated operation under normal ambient temperature and humidity with connecting a gearhead or equivalent heat radiation plate.</td>
</tr>
<tr>
<td>Insulation Class</td>
<td>Class B [130°C (266°F)]</td>
</tr>
<tr>
<td>Overheat Protection</td>
<td>Built-in thermal protector (automatic return type)</td>
</tr>
<tr>
<td></td>
<td>3 W (1/250 HP) type: Open: 130 ± 5°C (266 ± 9°F), Close: 90 ± 5°C (194 ± 9°F)</td>
</tr>
<tr>
<td></td>
<td>Other type: Open: 130 ± 5°C (266 ± 9°F), Close: 82 ± 5°C (179.6 ± 9°F)</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>−10°C to +40°C (+14°F to +104°F) non-freezing</td>
</tr>
<tr>
<td>Ambient Humidity</td>
<td>85% or less (non-condensing)</td>
</tr>
<tr>
<td>Degree of Protection</td>
<td>IP20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor Type</th>
<th>Size: mm (in.)</th>
<th>Thickness: mm (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 W (1/250 HP) Type</td>
<td>115×115 (4.53×4.53)</td>
<td>5 (0.20)</td>
</tr>
<tr>
<td>6 W (1/125 HP) Type</td>
<td>125×125 (4.92×4.92)</td>
<td></td>
</tr>
<tr>
<td>10 W (1/75 HP) Type</td>
<td>135×135 (5.31×5.31)</td>
<td></td>
</tr>
<tr>
<td>20 W (1/38 HP) Type</td>
<td>165×165 (6.50×6.50)</td>
<td></td>
</tr>
</tbody>
</table>
How to Read Speed – Torque Characteristics

The motor torque varies approximately in proportion to the square of the voltage. When the voltage supplied to the motor is changed, speed – torque characteristics curves with a sloping characteristics (torque is highest at zero speed and decreases steadily with increasing speed) shifts to that of the corresponding voltage.

When the voltage is changed to 115 VAC, 80 VAC and 60 VAC while the load torque is T0, the motor rotates at the speeds N1, N2 and N3 respectively. Thus, the speed can be changed easily by varying the voltage.

When choosing a torque motor, first determine the required torque and speed. Then, determine whether the motor should be operated under continuous duty or limited duty and check the speed – torque characteristics. When used under locked rotor conditions, only the torque factor is considered.

The temperature rise of the motor may cause a problem during continuous operation. In this case, choose a motor with an output power large enough for continuous operation and adjust the voltage to control the torque and speed.

Output Torque of Gearmotor

Due to the sloping characteristics, torque motors can be operated over a wide speed range, from standstill to the maximum speed. The permissible torque when a gearhead and a decimal gearhead are connected can be calculated according to the following formula, using the speed and torque determined from the speed – torque characteristics.

\[
\text{Speed of gearhead output shaft } N_G = \text{Motor speed} \times \frac{1}{\text{gearhead gear ratio}}
\]

\[
\text{Output torque of gearhead } T_G = \text{Motor torque} \times \text{Gearhead gear ratio} \times \text{Gearhead efficiency}
\]

The output torque of gearhead must be lower than the maximum permissible torque.
# Speed – Torque Characteristics (Reference values)

### 2TK3GN-AW2U 2TK3A-AW2U

![Graph](image1.png)

### 2TK3GN-CW2E 2TK3A-CW2E

![Graph](image2.png)

### 3TK6GN-AW2U 3TK6A-AW2U

![Graph](image3.png)

### 3TK6GN-CW2E 3TK6A-CW2E

![Graph](image4.png)

### 4TK10GN-AW2U 4TK10A-AW2U

![Graph](image5.png)

### 4TK10GN-CW2E 4TK10A-CW2E

![Graph](image6.png)
**Dimensions**  
Unit = mm (in.)

- Mounting screws are included with gearheads. Dimensions for mounting screws ➔ Page A-310

---

**3 W (1/250 HP)**

**Motor/Gearhead**  
Mass: Motor 0.7 kg (1.54 lb.)  
Gearhead 0.4 kg (0.88 lb.)

![Diagram of motor and gearhead dimensions](image)

**Shaft Section of Round Shaft Type**  
The motor’s dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

2TK3A-AW2U  
2TK3A-CW2E  
Mass: 0.7 kg (1.54 lb.)

![Diagram of shaft section](image)

**Decimal Gearhead**  
Can be connected to 2TK3GN type.

2GN10XS  
Mass: 0.2 kg (0.44 lb.)

![Diagram of decimal gearhead](image)
6 W (1/125 HP)

Motor/Gearhead
Mass: Motor 1.1 kg (2.4 lb.)
Gearhead 0.55 kg (1.21 lb.)

Motor Leads 300 mm (12 in.) Length
UL Style 3271, AWG20

Shaft Section of Round Shaft Type
The motor’s dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

3TK6A-AW2U
3TK6A-CW2E
Mass: 1.1 kg (2.4 lb.)

4TK10GN-AW2U
4TK10GN-CW2E
Mass: 1.5 kg (3.3 lb.)

10 W (1/75 HP)

Motor/Gearhead
Mass: Motor 1.5 kg (3.3 lb.)
Gearhead 0.65 kg (1.43 lb.)

Motor Leads 300 mm (12 in.) Length
UL Style 3271, AWG20

Decimal Gearhead
Can be connected to 3TK6GN type.

3GN10XS
Mass: 0.3 kg (0.66 lb.)

4TK10GN-AW2U
4TK10GN-CW2E

Motor Model Gearhead Model Gear Ratio L DXF
3TK6GN-AW2U 3TK6GN-CW2E 3GN 3 – 18 32 (1.26) 447AU
25 – 180 42 (1.65) 447BU

Enter the gear ratio in the box within the model name.
Shaft Section of Round Shaft Type
The motor’s dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

**4TK10A-AW2U**
**4TK10A-CW2E**
Mass: 1.5 kg (3.3 lb.)

**5TK20A-AW2U**
**5TK20A-CW2E**
Mass: 2.5 kg (5.5 lb.)

**6TK30A-AW2U**
**6TK30A-CW2E**
Mass: 3.0 kg (6.6 lb.)

Motor/Gearhead
Mass: 1.5 kg (3.3 lb.)
Gearhead: 1.5 kg (3.3 lb.)

Decimal Gearhead
Can be connected to 4TK10GN type.

4GN10XS
Mass: 0.4 kg (0.88 lb.)

5GN10XS
Mass: 0.6 kg (1.32 lb.)

Enter the gear ratio in the box (□) within the model name.
Capacitor Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacitor Model</th>
<th>A (in.)</th>
<th>B (in.)</th>
<th>C (in.)</th>
<th>Mass (oz.)</th>
<th>Dimension No.</th>
<th>Capacitor Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>2TK3GN-AW2U</td>
<td>2TK3A-AW2U</td>
<td>CH60CFAUL</td>
<td>0.38</td>
<td>0.21</td>
<td>0.31</td>
<td>0.122</td>
<td>0.24</td>
</tr>
<tr>
<td>2TK3GN-CW2E</td>
<td>2TK3A-CW2E</td>
<td>CH15BFAUL</td>
<td>0.38</td>
<td>0.21</td>
<td>0.31</td>
<td>0.122</td>
<td>0.37</td>
</tr>
<tr>
<td>3TK6GN-AW2U</td>
<td>3TK6A-AW2U</td>
<td>CH90CFAUL</td>
<td>0.48</td>
<td>0.225</td>
<td>0.315</td>
<td>0.124</td>
<td>0.45</td>
</tr>
<tr>
<td>3TK6GN-CW2E</td>
<td>3TK6A-CW2E</td>
<td>CH25BFAUL</td>
<td>0.48</td>
<td>0.225</td>
<td>0.315</td>
<td>0.124</td>
<td>0.42</td>
</tr>
<tr>
<td>4TK10GN-AW2U</td>
<td>4TK10A-AW2U</td>
<td>CH110CFAUL</td>
<td>0.58</td>
<td>0.23</td>
<td>0.31</td>
<td>0.122</td>
<td>0.49</td>
</tr>
<tr>
<td>4TK10GN-CW2E</td>
<td>4TK10A-CW2E</td>
<td>CH30BFAUL</td>
<td>0.58</td>
<td>0.23</td>
<td>0.31</td>
<td>0.122</td>
<td>0.50</td>
</tr>
<tr>
<td>5TK20GN-AW2U</td>
<td>5TK20A-AW2U</td>
<td>CH140CFAUL</td>
<td>0.58</td>
<td>0.23</td>
<td>0.35</td>
<td>0.138</td>
<td>0.61</td>
</tr>
<tr>
<td>5TK20GN-CW2E</td>
<td>5TK20A-CW2E</td>
<td>CH40BFAUL</td>
<td>0.58</td>
<td>0.23</td>
<td>0.37</td>
<td>0.146</td>
<td>0.73</td>
</tr>
</tbody>
</table>

Connection Diagrams

The direction of motor rotation is as viewed from the shaft end of the motor. CW represents the clockwise direction, while CCW represents the counterclockwise direction.

Connection diagrams are also valid for the equivalent round shaft type.

Clockwise

Counter-clockwise