Standard AC Motors

**Torque Motors**

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Torque Motors

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.)

● 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.

Note

● When using a motor in a locked rotor operation, the output torque becomes very large. The output torque of the gearhead must be lower than the maximum permissible torque. Also, ensure that the load does not hit an object and stop, since this can cause damage to the gearhead due to the shock.

● By providing an external voltage adjustment device, the motor torque can be adjusted.
● Suitable for Winding Applications
● Conforms to standards.

Use as a Brake
Torque motors can also generate a braking force when rotated in the opposite direction to the motor by an external force, etc. The brake characteristics of torque motors are called "reverse-phase brake". The range expressed by the normal speed – torque characteristics is called the duty region, while the range where the motor functions as a reverse-phase brake is called the braking region.
How to Use in a Brake Application

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.

Note

● When a torque motor is used as a brake, continuous operating time varies depending on the specific conditions.

● If a torque motor is combined with a gearhead, keep the speed to 2400 r/min or below.
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.

<table>
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<tr>
<th>Gearhead Type of Pinion</th>
<th>Output Power Type of Pinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>GN Type Pinion Shaft</td>
<td>3 W–20 W (1/250 HP–1/38 HP)</td>
</tr>
</tbody>
</table>

Note:
The right-angle gearheads cannot be combined.

features

motor torque can be adjusted with ease
You can set/adjust motor torque using the internal torque potentiometer of the power controller.

Power Controller TMP-1

The Power Controller TMP-1 makes torque adjustment easy.
A new power controller developed for Oriental Motor's torque motors that allows for easy adjustment of torque. A perfect choice for winding applications, push-motion mechanisms and other situations where torque must be adjusted.

product line

<table>
<thead>
<tr>
<th>Power Supply Voltage</th>
<th>Product Name</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Phase 110/115 VAC</td>
<td>TMP-1</td>
<td>$123.00</td>
</tr>
</tbody>
</table>

Features

motor torque can be adjusted with ease
You can set/adjust motor torque using the internal torque potentiometer of the power controller.
System Configuration

- Torque Motors
  - Motor (Pinion shaft)
  - AC Power Supply (Main power supply)
  - Capacitor Cap (Included)

- Accessory (Sold separately)
  - Mounting Brackets
  - Flexible Couplings

- Gearhead (Sold separately)
  - Parallel Shaft Gearheads

- Peripheral Equipment (Sold separately)
  - Power Controller TMP-1

- Capacitor (Included)

Overview, Product Series
- Constant Speed Motors
- Three-Phase Induction Motors
- Single-Phase Induction Motors
- Reversible Motors
- Electromagnetic Brake Motors
- Clutch & Brake Motors
- Low-Speed Synchronous Motors

Torque Motors
- Watertight, Dust-Resistant Motors
- Right-Angle Gearheads
- Linear Heads
- Brake Pack
- Accessories
- Installation

CAD Data
Manuals
www.orientalmotor.com
TEL: (800) 468-3982
E-mail: techsupport@orientalmotor.com

C-175
**Product Number**

**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: 20 W (1/38 HP)

- Motor Shaft Type, Type of Pinion: A: Round Shaft

- Gearhead, Type Pinion shaft Type: Round Shaft Type

- Power Supply Voltage: AW: Single-Phase 110/115 VAC

- Included Capacitor: U: For Single-Phase 110/115 VAC

The U and E at the end of the product name indicate that the unit includes a capacitor. These letters are not listed on the motor nameplate.

When the motor is approved under various standards, the product name on the nameplate is the approved product name.

(Example) Model: 5TK20GN-AW2U

- Motor nameplate and product approved under various standards: 5TK20GN-AW2U

**Gearhead**

5 GN 50 SA

- Gear Ratio (Example): 50: Gear Ratio of 50:1

- Type of Pinion: GN: GN Type Pinion

- Gear Ratio: 10X denotes the decimal gearhead of gear ratio 10:1

- SA: Long Life, Low Noise

Note: The right-angle gearhead cannot be combined.

**Product Line**

**Motor**

<table>
<thead>
<tr>
<th>Output Power</th>
<th>Power Supply Voltage</th>
<th>Pinion Shaft Type</th>
<th>Round Shaft Type</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 W (1/250 HP)</td>
<td>Single-Phase 110/115 VAC</td>
<td>2TK3GN-AW2U</td>
<td>2TK3A-AW2U</td>
<td>$119.00</td>
</tr>
<tr>
<td>6 W (1/125 HP)</td>
<td>Single-Phase 220/230 VAC</td>
<td>2TK3GN-CW2E</td>
<td>2TK3A-CW2E</td>
<td>$124.00</td>
</tr>
<tr>
<td>10 W (1/75 HP)</td>
<td>Single-Phase 110/115 VAC</td>
<td>3TK6GN-AW2U</td>
<td>3TK6A-AW2U</td>
<td>$125.00</td>
</tr>
<tr>
<td>20 W (1/38 HP)</td>
<td>Single-Phase 220/230 VAC</td>
<td>3TK6GN-CW2E</td>
<td>3TK6A-CW2E</td>
<td>$130.00</td>
</tr>
<tr>
<td>3 W (1/250 HP)</td>
<td>Single-Phase 110/115 VAC</td>
<td>4TK10GN-AW2U</td>
<td>4TK10A-AW2U</td>
<td>$134.00</td>
</tr>
<tr>
<td>6 W (1/125 HP)</td>
<td>Single-Phase 220/230 VAC</td>
<td>4TK10GN-CW2E</td>
<td>4TK10A-CW2E</td>
<td>$142.00</td>
</tr>
<tr>
<td>10 W (1/75 HP)</td>
<td>Single-Phase 110/115 VAC</td>
<td>5TK20GN-AW2U</td>
<td>5TK20A-AW2U</td>
<td>$156.00</td>
</tr>
<tr>
<td>20 W (1/38 HP)</td>
<td>Single-Phase 220/230 VAC</td>
<td>5TK20GN-CW2E</td>
<td>5TK20A-CW2E</td>
<td>$162.00</td>
</tr>
</tbody>
</table>

The following items are included with each product:

- Motor, Capacitor, Capacitor Cap, Operating Manual

**Parallel Shaft Gearhead (Sold separately)**

<table>
<thead>
<tr>
<th>Applicable Motor Output Power (Pinion shaft)</th>
<th>Product Name</th>
<th>Gear Ratio</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 W (1/250 HP)</td>
<td>2GN SA</td>
<td>3.6, 5, 6.75, 9, 12.5, 15, 18</td>
<td>$76.00</td>
</tr>
<tr>
<td>3 W (1/250 HP)</td>
<td>2GN10X5 (Decimal gearhead)</td>
<td>25, 30, 36</td>
<td>$77.00</td>
</tr>
<tr>
<td>6 W (1/125 HP)</td>
<td>3GN SA</td>
<td>3.6, 5.6, 7.5, 9, 12.5, 15, 18</td>
<td>$81.00</td>
</tr>
<tr>
<td>6 W (1/125 HP)</td>
<td>3GN10X5 (Decimal gearhead)</td>
<td>25, 30, 36</td>
<td>$89.00</td>
</tr>
<tr>
<td>10 W (1/75 HP)</td>
<td>4GN SA</td>
<td>3.6, 5.6, 7.5, 9, 12.5, 15, 18</td>
<td>$83.00</td>
</tr>
<tr>
<td>10 W (1/75 HP)</td>
<td>4GN10X5 (Decimal gearhead)</td>
<td>25, 30, 36</td>
<td>$90.00</td>
</tr>
<tr>
<td>20 W (1/38 HP)</td>
<td>5GN SA</td>
<td>3.6, 5.6, 7.5, 9, 12.5, 15, 18</td>
<td>$97.00</td>
</tr>
<tr>
<td>20 W (1/38 HP)</td>
<td>5GN10X5 (Decimal gearhead)</td>
<td>25, 30, 36</td>
<td>$118.00</td>
</tr>
</tbody>
</table>

The following items are included with each product:

- Gearhead, Installation Screws, Operating Manual

For details (specifications, characteristics, dimensions and others) on these products please refer to either to our website, contact technical support or your nearest Oriental Motor sales office.

www.orientalmotor.com/catalog