

Standard AC Motors

# Torque Motors

Overview

Three-Phase Induction Motors

Induction Motors

Reversible Motors

Electromagnetic Brake Motors

Clutch & Brake Motors

Low-Speed Synchronous Motors

Torque Motors

Torque Motors

IP67 Watertight, Dust-Resistant Motors

Brake Pack

AC Speed Control Motors

AC input DSC

# Torque Motors



For detailed information about regulations and standards, please see the Oriental Motor website.



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



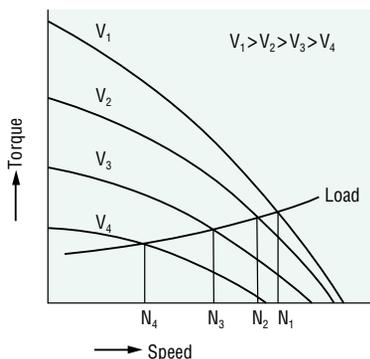
See Full Product Details Online  
[www.orientalmotor.com](http://www.orientalmotor.com)

- Manual
- Specifications
- Dimensions
- CAD
- Characteristics
- Connection and Operation

## Features

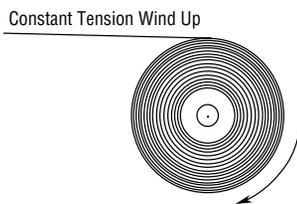
### ● The Speed Can Vary Widely, Depending on the Sloping Characteristics

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.

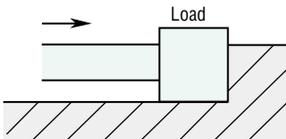


### ● Locked Rotor Operation is Available

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.

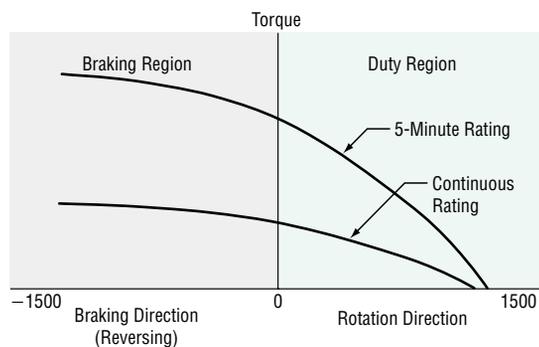
#### Note

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.



### ● 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. 1 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.

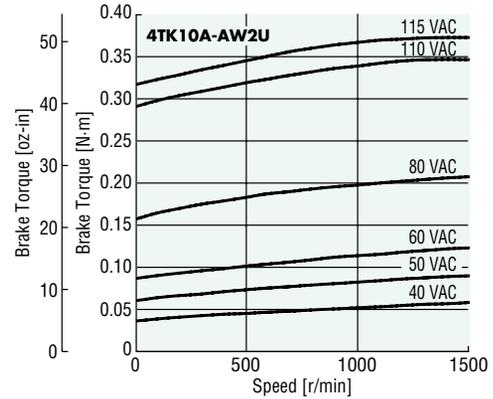
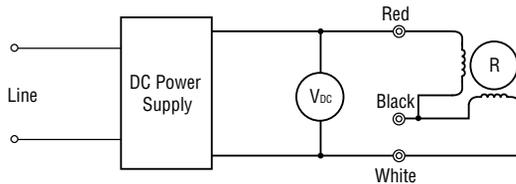


Fig. 1  
Example of Speed – Brake Torque Characteristics with Reverse-Phase Brake (Reference values)

### 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. 2, and apply DC voltage. At this time, insulate the black leadwire so that it will not contact any other part of the circuit.

Fig. 3 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**

- The black leadwire should be insulated.

Fig. 2  
Connection Diagram for Eddy-Current Brake

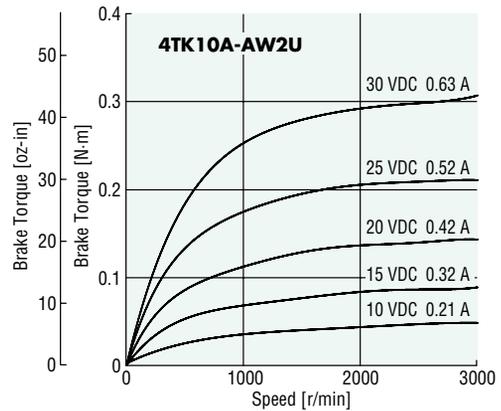


Fig. 3  
Example of Speed – Brake Torque Characteristics with Eddy-Current Brake (Reference values)

**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.

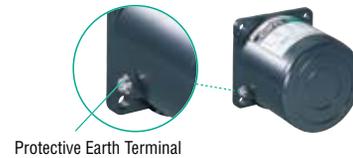
● **Conforms to Major Standards and Global Power Supply Voltages**

Torque Motors are recognized by UL and CSA, and certified under the China Compulsory Certification System (CCC System). CE Marking is used in accordance with the Low Voltage Directive. Also, our wide range of products includes those that meet the power supply voltages of major countries in Asia, North America and Europe.

● **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**



■ **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.



● **Types of Gearheads**

Gearhead		Applicable Motor		Rated Life (hours)	
Type of Gearhead	Type of Pinion	Output Power	Type of Pinion		
Parallel Shaft	Long Life, Low Noise GN-S Gearhead	GN Type Pinion Shaft	3 W~20 W (1/250 HP~1/38 HP)	GN Type Pinion Shaft	10000

**Note**

● The right-angle gearheads cannot be combined.

■ **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**

Power Supply Voltage	Product Name	List Price
Single-Phase 110/115 VAC	<b>TMP-1</b>	\$123.00
Single-Phase 220/230 VAC		



Power Controller for Torque Motors (**TMP-1**)

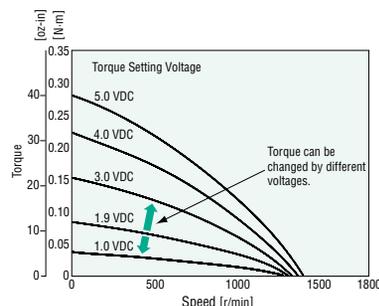
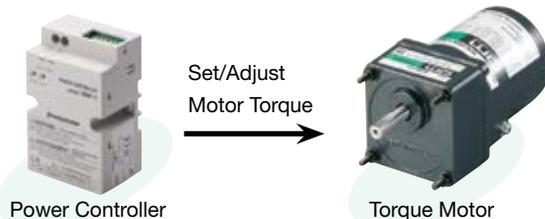


Torque Motor and Gearhead (Torque Motor, gearhead and power controller sold separately)

■ **Features**

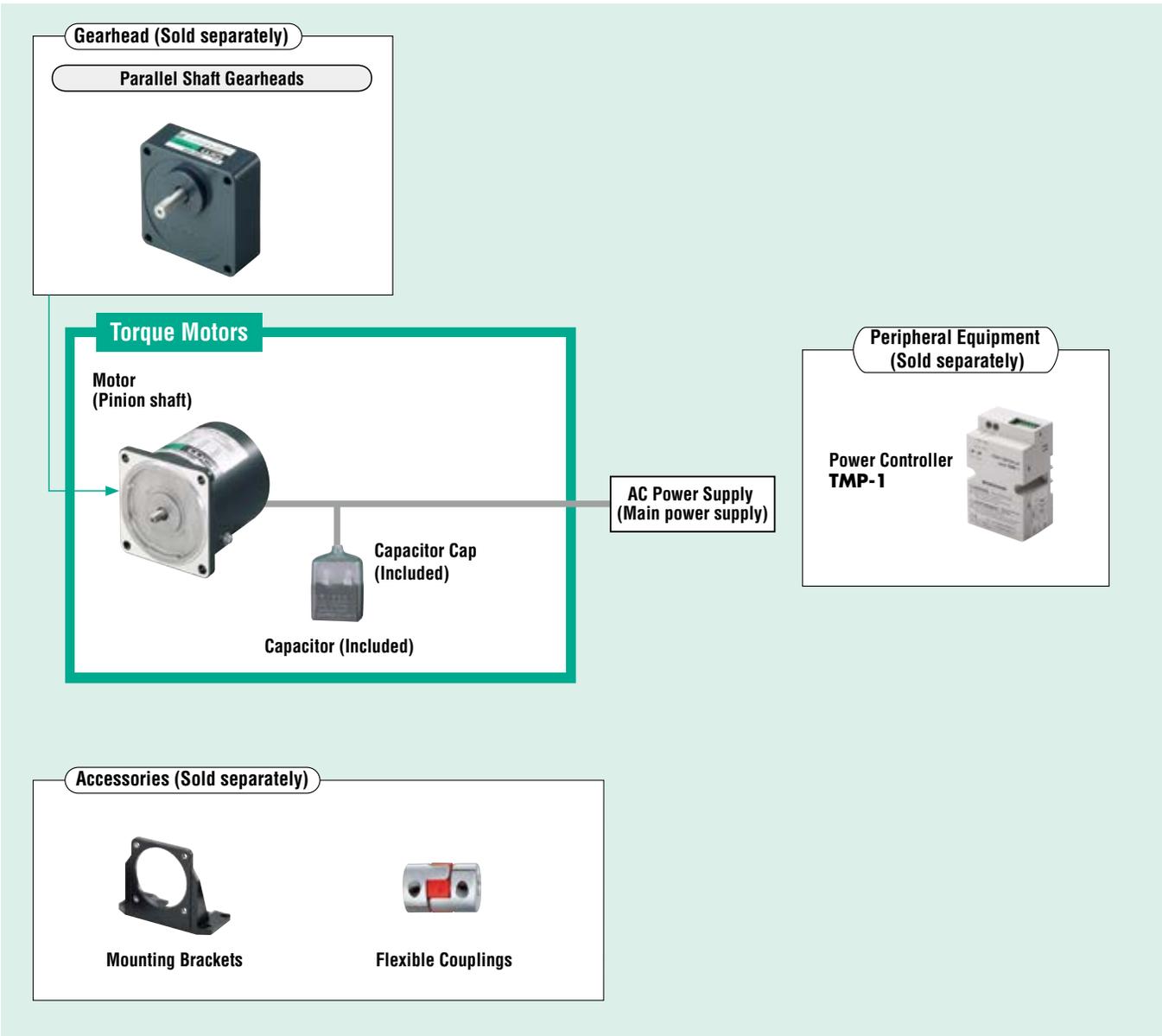
● **Motor Torque can be Adjusted with Ease**

You can set/adjust motor torque using the internal torque potentiometer of the power controller.



Speed - Torque Characteristics (Example)

## System Configuration



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### Product Number

● Motor

**5 T K 20 GN - AW 2 U**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Motor Frame Size	<b>2:</b> 60 mm (2.36 in.) <b>3:</b> 70 mm (2.76 in.) <b>4:</b> 80 mm (3.15 in.) <b>5:</b> 90 mm (3.54 in.)
②	Motor Type	<b>T:</b> Torque Motor
③	Series	<b>K:</b> K Series
④	Output Power (W)	(Example) <b>20:</b> 20 W (1/38 HP)
⑤	Motor Shaft Type, Type of Pinion	<b>A:</b> Round Shaft <b>GN:</b> GN Type Pinion Shaft
⑥	Power Supply Voltage	<b>AW:</b> Single-Phase 110/115 VAC <b>CW:</b> Single-Phase 220/230 VAC
⑦		<b>2:</b> RoHS-Compliant
⑧	Included Capacitor	<b>U:</b> For Single-Phase 110/115 VAC <b>E:</b> For Single-Phase 220/230 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-AW2**

● Gearhead

**5 GN 50 SA**

① ② ③ ④

①	Gearhead Frame Size	<b>2:</b> 60 mm (2.36 in.) <b>3:</b> 70 mm (2.76 in.) <b>4:</b> 80 mm (3.15 in.) <b>5:</b> 90 mm (3.54 in.)
②	Type of Pinion	<b>GN:</b> GN Type Pinion
③	Gear Ratio	(Example) <b>50:</b> Gear Ratio of 50:1 <b>10X</b> denotes the decimal gearhead of gear ratio 10:1
④		<b>SA:</b> Long Life, Low Noise <b>GN-S</b> Gearhead

Note

● The right-angle gearhead cannot be combined.

### Product Line

● Motor

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

The following items are included with each product.  
Motor, Capacitor, Capacitor Cap, Operating Manual

● Parallel Shaft Gearhead (Sold separately)

Applicable Motor Output Power (Pinion shaft)	Product Name	Gear Ratio	List Price
3 W (1/250 HP)	<b>2GN</b> □SA	<b>3, 3.6, 5, 6, 7.5, 9, 12.5, 15, 18</b>	\$76.00
		<b>25, 30, 36</b>	\$83.00
		<b>50, 60, 75, 90, 100, 120, 150, 180</b>	\$91.00
6 W (1/125 HP)	<b>2GN10XS</b> (Decimal gearhead)	<b>3, 3.6, 5, 6, 7.5, 9, 12.5, 15, 18</b>	\$77.00
		<b>25, 30, 36</b>	\$81.00
	<b>3GN</b> □SA	<b>50, 60, 75, 90, 100, 120, 150, 180</b>	\$97.00
		<b>3GN10XS</b> (Decimal gearhead)	\$82.00
10 W (1/75 HP)	<b>4GN</b> □SA	<b>3, 3.6, 5, 6, 7.5, 9, 12.5, 15, 18</b>	\$83.00
		<b>25, 30, 36</b>	\$90.00
	<b>4GN10XS</b> (Decimal gearhead)	<b>50, 60, 75, 90, 100, 120, 150, 180</b>	\$99.00
		<b>4GN10XS</b> (Decimal gearhead)	\$84.00
20 W (1/38 HP)	<b>5GN</b> □SA	<b>3, 3.6, 5, 6, 7.5, 9, 12.5, 15, 18</b>	\$97.00
		<b>25, 30, 36</b>	\$107.00
	<b>5GN10XS</b> (Decimal gearhead)	<b>50, 60, 75, 90, 100, 120, 150, 180</b>	\$118.00
		<b>5GN10XS</b> (Decimal gearhead)	\$103.00

The following items are included with each product.  
Gearhead, Installation Screws, Operating Manual

For details (specifications, characteristics, dimensions and more) on these products, please either refer to our website or contact technical support or your nearest Oriental Motor sales office.  
[www.orientalmotor.com](http://www.orientalmotor.com)

● A number indicating the gear ratio is entered where the box □ is located within the product name.