

Torque Motors

3 W, 6 W, 10 W, 20 W

● Connection Information ●
 Technical reference → Page G-1
 Safety standards → Page H-2

These torque motors conform to safety standards. By providing an external voltage adjustment device, the speed and torque of the motor can be adjusted.

TM Series torque motor and power controller packages which include a power controller by which torque can be easily adjusted are also available.

● Torque motor and power controller packages **TM** Series → Page C-178



● For detailed product safety standard information including standards, file number and certification body, please visit www.orientalmotor.eu.



Gearheads shown in the photograph are sold separately.

Product Line

● Motors (RoHS)

For the single-phase 100 VAC, the single-phase 110/115 VAC and the single-phase 200 VAC models, please contact the nearest Oriental Motor sales office.

Output Power	Product Name	
	Pinion Shaft Type	Round Shaft Type
3 W	2TK3GN-AW2J	2TK3A-AW2J
	2TK3GN-AW2U	2TK3A-AW2U
	2TK3GN-CW2J	2TK3A-CW2J
	2TK3GN-CW2E	2TK3A-CW2E
6 W	3TK6GN-AW2J	3TK6A-AW2J
	3TK6GN-AW2U	3TK6A-AW2U
	3TK6GN-CW2J	3TK6A-CW2J
	3TK6GN-CW2E	3TK6A-CW2E
10 W	4TK10GN-AW2J	4TK10A-AW2J
	4TK10GN-AW2U	4TK10A-AW2U
	4TK10GN-CW2J	4TK10A-CW2J
	4TK10GN-CW2E	4TK10A-CW2E
20 W	5TK20GN-AW2J	5TK20A-AW2J
	5TK20GN-AW2U	5TK20A-AW2U
	5TK20GN-CW2J	5TK20A-CW2J
	5TK20GN-CW2E	5TK20A-CW2E

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

Product Number Code

5 T K 20 GN - CW 2 E

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

● Parallel Shaft Gearheads (Sold separately)

◇ Long Life, Low Noise **GN-S** Gearhead (RoHS)

Applicable Motor Output Power (Pinion shaft)	Gearhead Product Name	Gear Ratio
3 W	2GN□S	3~180
	2GN10XS (Decimal gearhead)	
6 W	3GN□S	3~180
	3GN10XS (Decimal Gearhead)	
10 W	4GN□S	3~180
	4GN10XS (Decimal gearhead)	
20 W	5GN□S	3~180
	5GN10XS (Decimal gearhead)	

● Gear ratio and rotation direction of gearhead → Page C-14

The following items are included in each product.

Gearhead, Mounting Screws, Parallel Key*, Operating Manual
 *Only for the products with a key slot on the output shaft

Note

● The right-angle gearheads cannot be used.

①	Motor Frame Size	2 : 60 mm 3 : 70 mm 4 : 80 mm 5 : 90 mm
②	Motor Type	T : Torque Motors
③	Series Name	K : K Series
④	Output Power (W)	(Example) 20 : 20 W
⑤	Motor Shaft Type, Type of Pinion	A : Round Shaft GN : GN Type Pinion
⑥	Power Supply Voltage	AW : Single-Phase 100 VAC, 110/115 VAC CW : Single-Phase 200 VAC, 220/230 VAC
⑦		2 : RoHS Directive-Compliant
⑧	Included Capacitor	J : Capacitor for Single-Phase 100 VAC and 200 VAC U : Capacitor for Single-Phase 110/115 VAC E : Capacitor for Single-Phase 220/230 VAC

● The product name listed on the motor nameplate does not include the code (**J**, **U** and **E**) that indicates the type of capacitor.

Certification regarding various safety standards is acquired for the product name on the motor nameplate, please visit www.orientalmotor.eu.

(Example) Product Name: **5TK20GN-CW2E**

→ Motor nameplate and product approved under various safety standards:
5TK20GN-CW2

● Gearhead product number code → Page C-24

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









Contact
 TEL

Germany: 00800 22 55 66 22 UK/Ireland: 01256-347090 Italy: 02-93906346
 France: 01 47 86 97 50 Other Countries: 00800 22 55 66 22

Introduction
 Induction Motors
 Reversible Motors
 Constant Speed Motors
 Electromagnetic Brake Motors
 V Series
 TM Series Torque Motors
 Torque Motors
 Watertight, Dust-Resistant Motors
 Right-Angle Gearheads
 Brake Pack
 Accessories
 Installation


Specifications 



Product Name and Type		Time Rating (When rotor is locked)	Voltage VAC	Frequency Hz	Starting Torque mN·m	Max. Output Power W	Speed at Max. Output Power r/min	Torque at Max. Output Power mN·m	Current at Max. Output Power A	Input at Max. Output Power W	Capacitor μF
Pinion Shaft Type	Round Shaft Type										
 2TK3GN-CW2E	 2TK3A-CW2E	5 minutes	220	50	70	3	750	39	0.220	45	1.5
			230						0.240	50	
			220	60	70	3.5	900	38	0.215	45	
			230						0.230	50	
		Continuous	115	50	18	0.8	750	10	0.095	10	
				60	25	1.2	900	13	0.130	14	
 3TK6GN-CW2E	 3TK6A-CW2E	5 minutes	220	50	140	6	750	78	0.390	70	2.5
			230						0.440	80	
			220	60	150	8	900	87	0.320	70	
			230						0.350	75	
		Continuous	115	50	45	1.8	750	24	0.145	15	
				60	55	2.6	900	28	0.210	24	
 4TK10GN-CW2E	 4TK10A-CW2E	5 minutes	220	50	220	10	750	130	0.41	80	3.0
			230						0.45	90	
			220	60	210	12	900	130	0.39	80	
			230						0.40	80	
		Continuous	115	50	65	2.8	750	35	0.18	20	
				60	70	3.3	900	35	0.24	25	
 5TK20GN-CW2E	 5TK20A-CW2E	5 minutes	220	50	350	20	750	260	0.63	120	4.0
			230						0.68	130	
			220	60	350	20	900	220	0.53	115	
			230						0.54	120	
		Continuous	115	50	85	4.5	750	60	0.26	29	
				60	100	5.5	900	60	0.30	34	

● The product name listed on the motor nameplate does not include the code (E) that indicates the type of capacitor.

Certification regarding various safety standards is acquired for the product name on the motor nameplate.

: This indicates that there is 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 automatically. Be sure to turn the power supply off before inspecting.

General Specifications

Item	Specifications
Insulation Resistance	The measured value is 100 MΩ or more when a 500 VDC megger is applied between the windings and the case after rated operation under normal ambient temperature and humidity.
Dielectric Strength	No abnormality is judged even with application of 1.5 kVAC at 50 Hz or 60 Hz between the windings and the case for 1 minute after rated operation under normal ambient temperature and humidity.
Temperature Rise	A gearhead or equivalent heat radiation plate* is connected and the temperature rise with windings is measured at 80°C or less using the resistance change method after rated operation under normal ambient temperature and humidity.
Thermal Class	130 (B)
Overheat Protection	Built-in Thermal Protector (automatic return type) 3 W Type Open: 130±5°C, Close: 90±15°C Other Types Open: 130±5°C, Close: 82±15°C
Operating Ambient Temperature	-10~+40°C (non-freezing)
Operating Ambient Humidity	85% max. (non-condensing)
Degree of Protection	IP20

*Heat radiation plate size (Material: Aluminum)

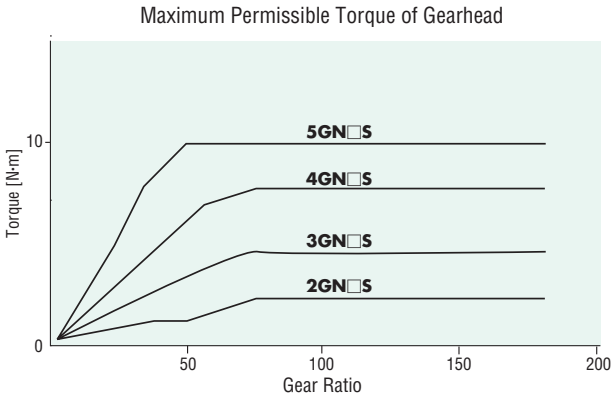
Motor Type	Size (mm)	Thickness (mm)
3 W Type	115×115	5
6 W Type	125×125	
10 W Type	135×135	
20 W Type	165×165	

Gearmotor – Torque Table

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 attached can be calculated according to the following formula using the speed and torque determined from the graph of the speed – torque characteristics.

$$\begin{aligned} \text{Gearhead output shaft speed} \quad N_G &= \text{Motor speed} \times 1/\text{Gearhead gear ratio} \\ \text{Gearhead output shaft torque} \quad T_G &= \text{Motor torque} \times \text{Gearhead gear ratio} \times \text{Gearhead transmission efficiency} \end{aligned}$$

The output torque of gearhead must be lower than the maximum permissible torque.



Gearhead Product Name	Gearhead Gear Ratio	Gearhead Transmission Efficiency
2GN□S	3~18	81%
3GN□S	25~36	73%
4GN□S	50~180	66%

- Gearheads and decimal gearheads are sold separately.
- A number indicating the gear ratio is entered where the box □ is located within the gearhead product name.
- The rotation direction of the gearhead shaft may differ from the motor shaft rotation direction depending on the gear ratio of the gearhead. Gear ratio and rotation direction of gearhead → Page C-14

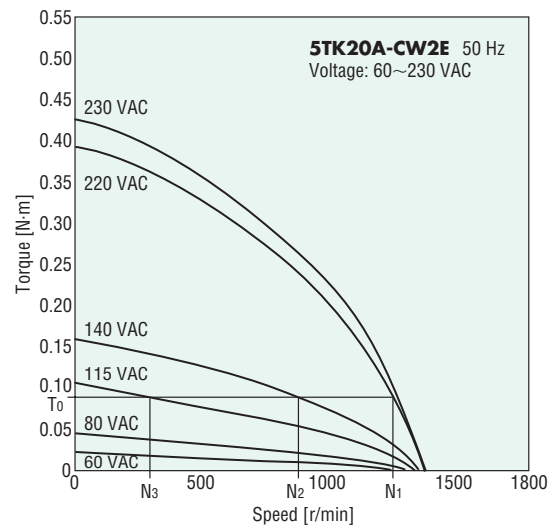
How to Read Speed – Torque Characteristics

The torque of the torque motor is approximately proportional to the square of the voltage. When the voltage supplied to the motor is changed, the speed – torque characteristics curve shifts to have sloping characteristics (torque is highest at zero speed and decreases steadily with increasing speed) that correspond to each voltage.

When the voltage is changed to 220 VAC, 140 VAC and 115 VAC while the load torque is T_0 , the motor rotates at the speeds N_1 , N_2 and N_3 , respectively. Thus, the speed can be changed easily by varying the voltage.

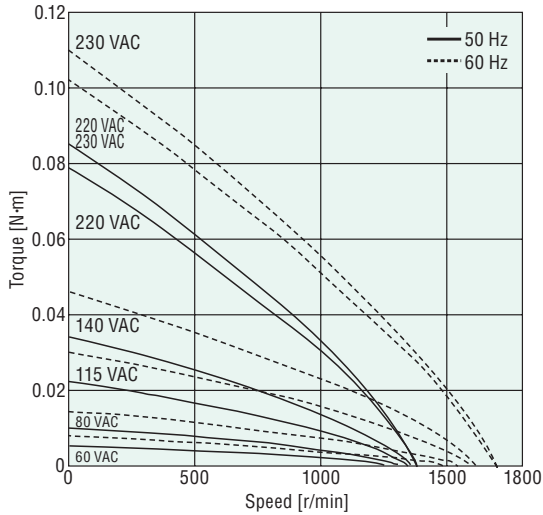
When choosing a torque motor, first determine the required torque and speed. Then, determine whether the motor should be operated under continuous duty or limited duty and check the speed – torque characteristics. When used under locked rotor conditions, only the torque factor is considered.

The temperature rise of the motor may cause a problem during continuous duty. In this case, choose a product with a large output appropriate to continuous duty and control the voltage to control the torque and speed.

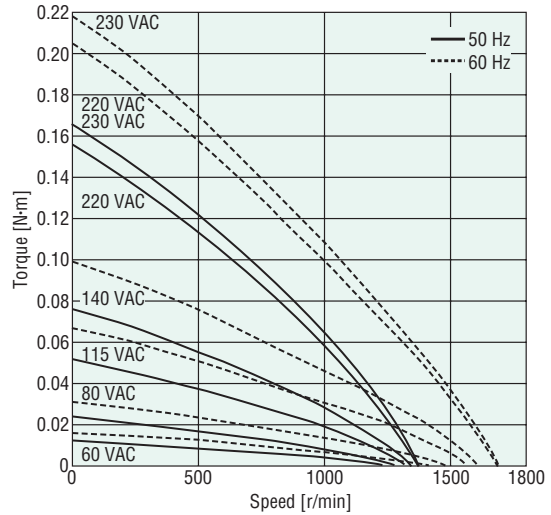


Speed – Torque Characteristics (Reference values)

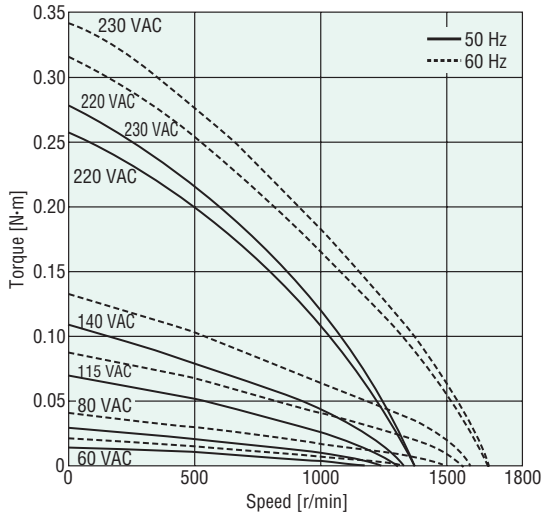
2TK3GN-CW2E, 2TK3A-CW2E



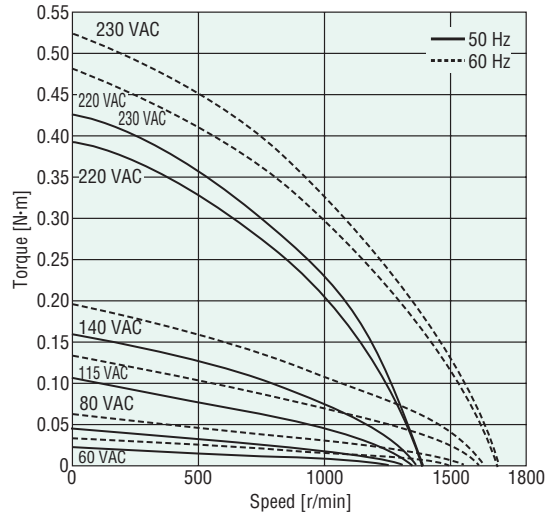
3TK6GN-CW2E, 3TK6A-CW2E



4TK10GN-CW2E, 4TK10A-CW2E



5TK20GN-CW2E, 5TK20A-CW2E



Dimensions (Unit = mm)

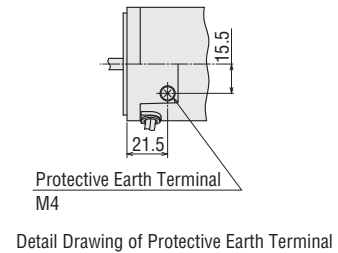
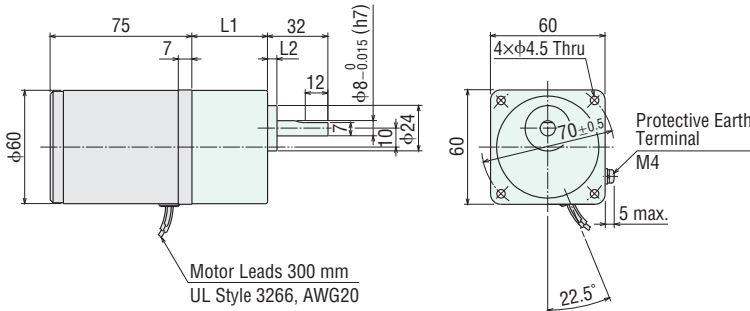
- Mounting screws are included with gearheads. Dimensions of mounting screws → Page C-254
- A number indicating the gear ratio is entered where the box □ is located within the gearhead product name.

3 W

◇ Motor/Gearhead

Motor Product Name	Gearhead Product Name	Gear Ratio	L1	L2
2TK3GN-CW2E	2GN□S	3~18	30	5
		25~180	40	

Mass: Motor 0.7 kg
Gearhead 0.4 kg

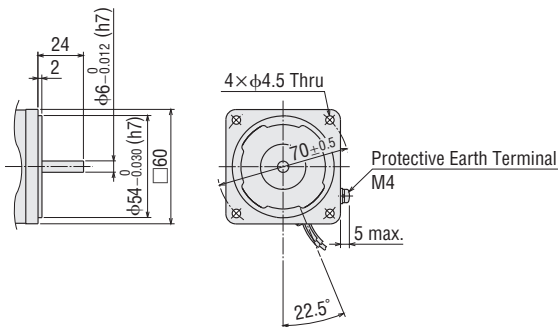


◇ Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

2TK3A-CW2E

Mass: 0.7 kg

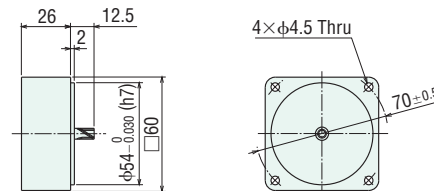


◇ Decimal Gearhead

This product can be attached to the **2TK3GN** type.

2GN10XS

Mass: 0.2 kg

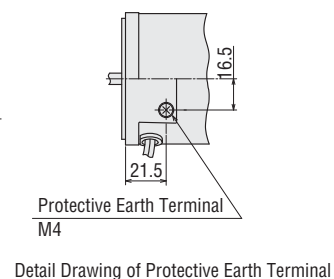
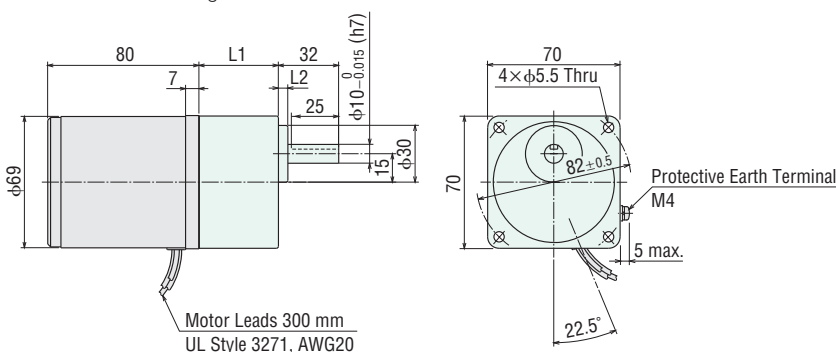


6 W

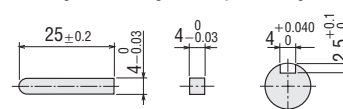
◇ Motor/Gearhead

Motor Product Name	Gearhead Product Name	Gear Ratio	L1	L2
3TK6GN-CW2E	3GN□S	3~18	32	5
		25~180	42	

Mass: Motor 1.1 kg
Gearhead 0.55 kg



◇ Key and Key Slot (The key is included with the gearhead.)

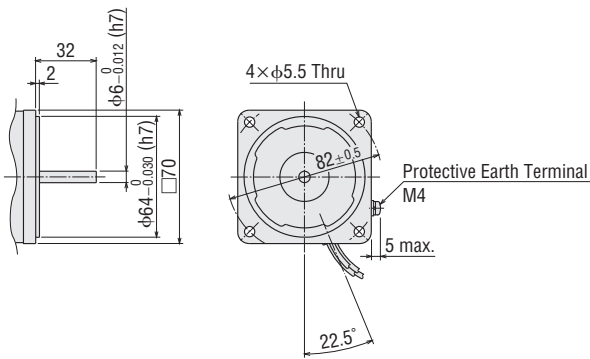


◇ Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

3TK6A-CW2E

Mass: 1.1 kg

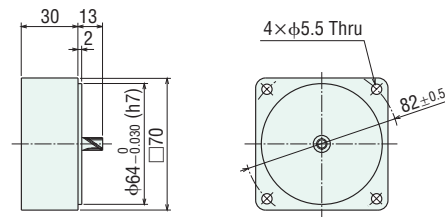


◇ Decimal Gearhead

This product can be attached to the **3TK6GN** type.

3GN10XS

Mass: 0.3 kg



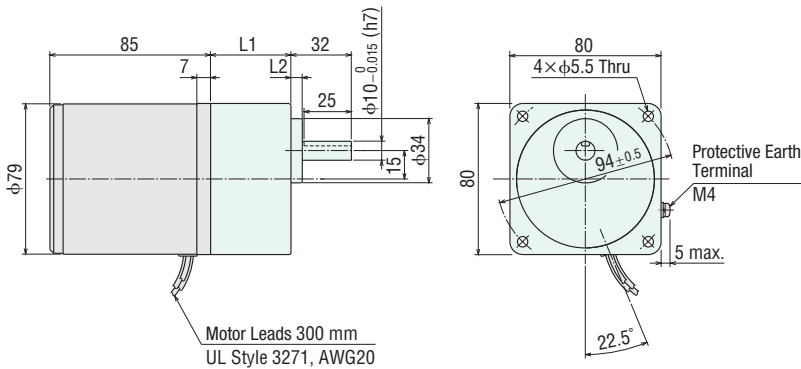
● 10 W

◇ Motor/Gearhead

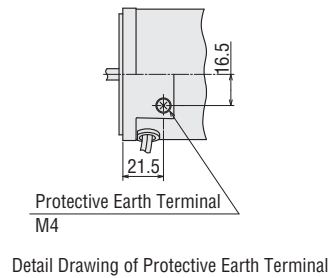
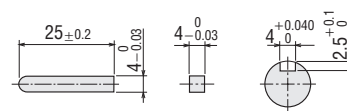
Motor Product Name	Gearhead Product Name	Gear Ratio	L1	L2
4TK10GN-CW2E	4GN□S	3~18	32	6
		25~180	42.5	

Mass: Motor 1.5 kg

Gearhead 0.65 kg



◇ Key and Key Slot (The key is included with the gearhead.)

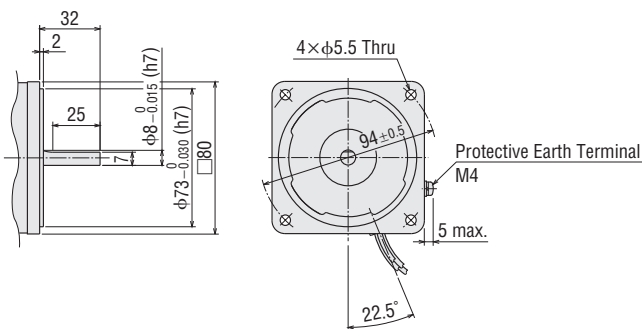


◇ Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

4TK10A-CW2E

Mass: 1.5 kg

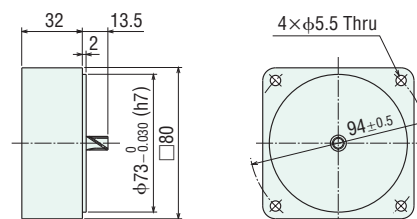


◇ Decimal Gearhead

This product can be attached to the **4TK10GN** type.

4GN10XS

Mass: 0.4 kg

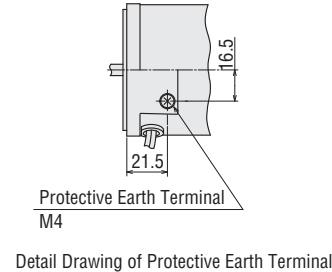
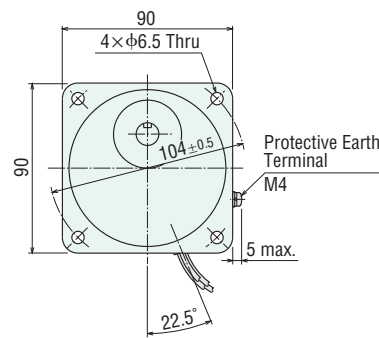
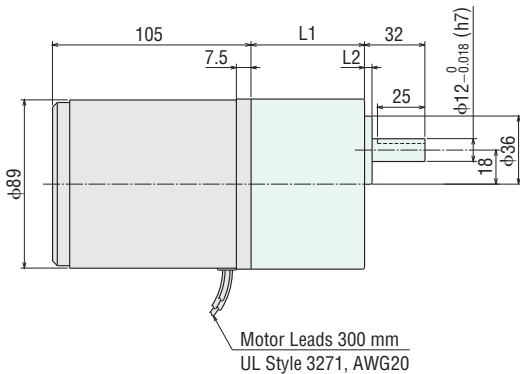


20 W

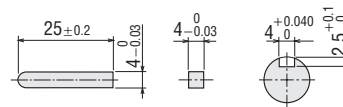
Motor/Gearhead

Motor Product Name	Gearhead Product Name	Gear Ratio	L1	L2
5TK20GN-CW2E	5GN□S	3~18	42	4
		25~180	60	

Mass: Motor 2.5 kg
Gearhead 1.5 kg



Key and Key Slot (The key is included with the gearhead.)

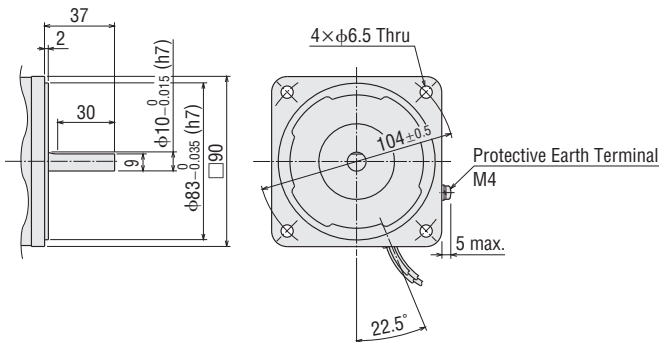


Shaft Section of Round Shaft Type

The motor's dimensions (excluding the shaft section) are the same as those of the pinion shaft types.

5TK20A-CW2E

Mass: 2.5 kg

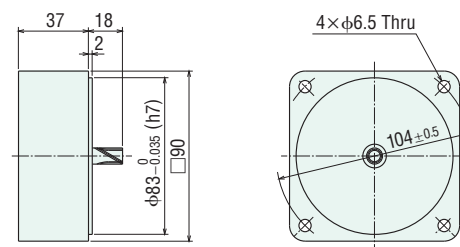


Decimal Gearhead

This product can be attached to the **5TK20GN** type.

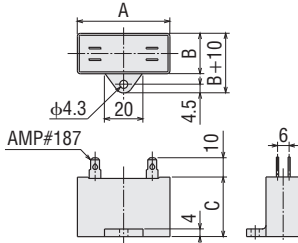
5GN10XS

Mass: 0.6 kg

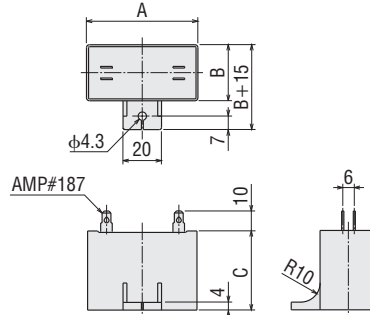


Capacitor (Included)

Dimensions Number ①



Dimensions Number ②



Capacitor Dimensions (mm)

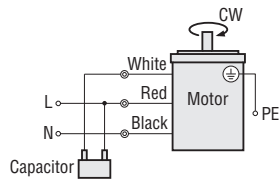
Product Name		Capacitor Product Name	A	B	C	Mass (g)	Dimensions No.	Capacitor Cap
Pinion Shaft Type	Round Shaft Type							
2TK3GN-CW2E	2TK3A-CW2E	CH15BFAUL	38	21	31	37	①	Included
3TK6GN-CW2E	3TK6A-CW2E	CH25BFAUL	48	21	31	42	①	
4TK10GN-CW2E	4TK10A-CW2E	CH30BFAUL	58	21	31	50	①	
5TK20GN-CW2E	5TK20A-CW2E	CH40BFAUL	58	23.5	37	73	②	

■ Connection Diagrams

- The rotation direction of the motor is as viewed from the output shaft of the motor. CW represents the clockwise direction, while CCW represents the counterclockwise direction.
- Product names in the connection diagrams refer to the pinion shaft type, but connection with the round shaft type is the same.

2TK3GN-CW2E, 3TK6GN-CW2E, 4TK10GN-CW2E, 5TK20GN-CW2E

Clockwise



Counterclockwise

