

转矩电动机 TORQUE MOTOR

特征 Feature

- 具有垂下特征，可调速范围宽大 The Speed Can Vary Widely, Depending on the Sloping Characteristics

转矩电动机由于起动转矩大，具有垂下的特征，因此，能够通过改变电压进行调速。（电动机的转矩与电压的平方成正比）

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

- 适用于卷取作业 Suitable For Winding Applications

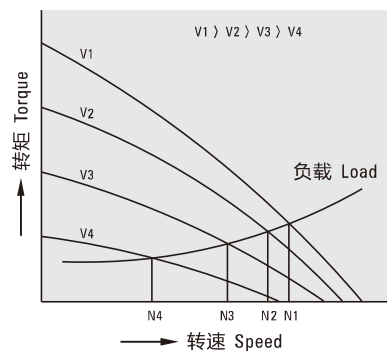
以固定的张力连续卷取定速运转的物体时，若卷轴机直径增大至2倍，则电动机的输出转矩亦增大至2倍，而电动机转速则减半。作业时须保持这一比例关系。

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.

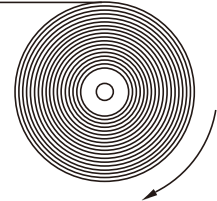
- 可作为制动使用 Use As A Brake

电动机在转速-转矩特性的制动领域，可作为制动来使用。此外，也可以通过直流励磁进行固定张力控制。

By using the motor in the braking region of the speed-torque characteristics, it can serve as a brake. Constant tension operation can be achieved by applying a DC voltage.



恒定张力卷绕
Constant Tension Wind Up



制动器 Brake



转速-转矩特性图的阅读方法 How To Read Speed - Torque Characteristics

转矩电动机的转矩几乎与电压的平方成正比变化。通过改变电动机通电电压，就能够得到各电压下分别具有垂下特性的转速-转矩特性曲线。

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

负载转矩为T0时，将电压调整为100V、80V、60V的话，电动机会分别以N1、N2、N3转速旋转。如上所述，通过改变电压，能够很简单地改变转速。

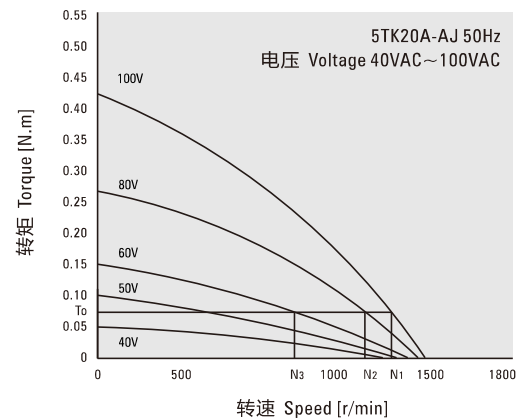
When the voltage is changed to 100 VC, 80 VC and 60 VC while the load torque is T0, the motor rotates at the speeds N1, N2 and N3 respectively. Thus, the speed can be changed easily by varying the voltage.

使用转矩电动机时，请了解必需的转矩和转速，根据是连续使用还是短时间使用，参照转速-转矩特性作出选择。在堵转状态下使用时，选择基准只考虑转矩。

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

用于连续运转等会造成温度上升问题的场合时，可通过选用较大输出功率的产品以调整电压方式控制转速、转矩。

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.



■ 转矩电动机电压控制方法 Voltage Control Of Torque Motors

电压控制的一般方法是，使用双向可控硅中等的相位控制方式。是一种如图所示，通过改变触发双向可控硅的相位角 α ，使输入电压像斜线部分那样变化的控制方法。

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 α at which the triac switches, the input voltage is controlled as represented by the phase angle areas of the graph.

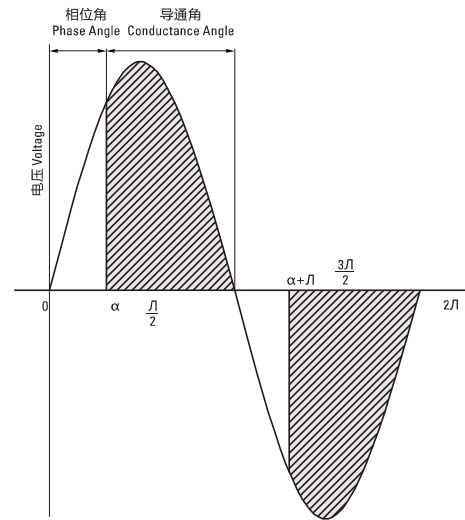


图-1 相位控制
Fig.1 Phase Control

■ 装有减速器时的输出转矩 Gear Motor – Torque Table

由于具有垂下特性，因此，转矩电动机可以实现从停止状态到最高转速之间的任一转速。装有减速器·中间减速器时的容许转矩，请参照转速转矩特性曲线图，根据所使用的转速和转矩，按照下面的公式算出。

减速器输出轴转速 NG = 电动机转速 $\times 1/\text{减速器减速比}$

减速器输出轴转矩 TG = 电动机转矩 $\times \text{减速器减速比} \times \text{减速器传动效率}$

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

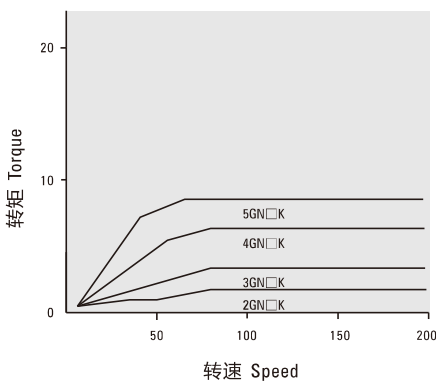
Speed of gearhead output shaft NG = Motor speed $\times 1/\text{gearhead gear ratio}$

Output torque of gearhead TG = Motor torque $\times \text{Gearhead gear ratio} \times \text{Gearhead efficiency}$

■ 请注意，减速器的输出轴转矩不可大于减速器的最大的最大容许转矩

Please note, the output torque of the gearhead must be lower than the maximum permissible torque

● 减速器的最大容许转矩 Maximum Permissible Torque Of Gearheads



减速器型号 Gearhead Model	减速器减速比 Gearhead Gear Ratio	减速器传动效率 Gearhead Efficiency
2GN□K	3~18	81%
3GN□K	25~36	73%
4GN□K	50~200	66%
5GN□K		

- 减速器、中间减速器另售。
Gearheads and decimal gearheads are sold separately.
- 减速器型号的□中为减速比的数值
Enter the gear ratio in the box (□) within the model name

规格Specifications

● 3W、6W、10W、20W

型号Model · 类型 Type 导线型 Lead Wire Type		使用额定 (堵转) Rating at Locked Rotor	电压 Voltage V	频率 Frequency Hz	起动转矩 Starting Torque mN.m	最大输出 功率 Max. Output Power W	最大输出功 率时转速 Speed at Max. OutputPower r/min	最大输出功 率时转矩 Torque at Max. OutputPower mN.m	电容器容量 Capacitor μF
齿轮轴型 Pinion Shaft	圆轴型 Round Shaft								
2TK3GN-A	2TK3A-A	5MIN 连续CONT	110	50	69	3.2	750	41	7.0/250
			60		25	1.3		16	
		5MIN 连续CONT	110	60	69	3.2	900	37	6.0/250
			60		25	1.3		11	
2TK3GN-C	2TK3A-C	5MIN 连续CONT	220	50	69	3.2	750	41	1.5/450
			140		25	1.2		16	
		5MIN 连续CONT	220	60	69	3.2	900	37	1.2/450
			140		25	1.2		11	
3TK6GN-A	3TK6A-A	5MIN 连续CONT	110	50	134	6.0	750	80	8.0/250
			60		68	2.5		36	
		5MIN 连续CONT	110	60	134	6.5	900	74	7.0/250
			60		68	2.8		30	
3TK6GN-C	3TK6A-C	5MIN 连续CONT	220	50	134	6.0	750	80	2.0/450
			140		68	2.5		36	
		5MIN 连续CONT	220	60	134	6.5	900	74	1.5/450
			140		68	2.8		30	
4TK10GN-A	4TK10A-A	5MIN 连续CONT	110	50	235	10	750	127	10.0/250
			60		74	3.0		46	
		5MIN 连续CONT	110	60	25	10	900	127	8.0/250
			60		69	3.0		38	
4TK10GN-C	4TK10A-C	5MIN 连续CONT	220	50	265	10	750	127	2.5/450
			140		98	3.0		46	
		5MIN 连续CONT	220	60	225	10	900	127	2.0/450
			140		90	3.0		38	
5TK20GN-A	5TK20A-A	5MIN 连续CONT	110	50	363	20	750	224	15.0/250
			60		137	6.0		76	
		5MIN 连续CONT	110	60	294	26	900	216	12.0/250
			60		108	6.0		64	
5TK20GN-C	5TK20A-C	5MIN 连续CONT	220	50	363	20	750	224	3.5/450
			140		137	6.0		76	
		5MIN 连续CONT	220	60	294	26	900	216	3.0/450
			140		108	6.0		64	

●各种安全规格以电动机铭牌上的型号取得认证。

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