

# PAN MOTOR

## K-Series Frameless Motor

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### Datasheet

- Frameless Design
- High Power Density
- Very Low Cogging Torque
- Brushless Inner Rotor with Permanent Magnet



# K-Series

## ➤ Frameless Design

The K Series is our company's frameless version of the internal rotor permanent magnet brushless motor, designed to achieve low cogging torque and high power density. We have opened up the chain of production and design to deeply and thoroughly optimise the motor globally, resulting in a fully integrated performance of the frameless motors of the K series.

## ➤ Brushless Inner Rotor with Permanent Magnet

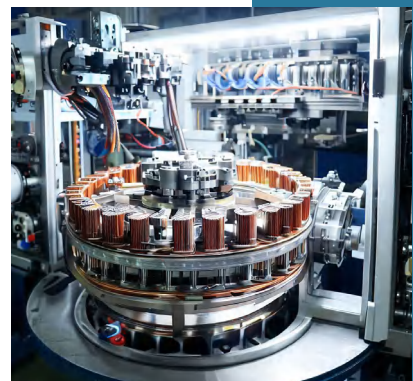
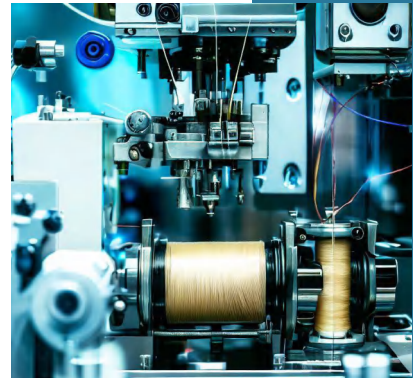
F series motor is brushless motor with permanent magnet inner rotor. Inner rotor is in contrast to outrunner motor: as the name suggests, the rotating rotor is physically positioned inside the stator. Inner rotor motor is preferred choice in vast majority of industrial applications due to its lower inertia and easier mechanical connection interface. Moreover, the inner rotor motor exhibits superior heat dissipation and cooling performance due to the absence of physical barriers for heat exchange between stator, housing and surrounding environment.

## ➤ Compared to Outer Rotors

In many applications such as robotics and drones, outer rotors are favoured for a number of reasons: 1. larger radius of air gap (the gap between stator and rotor) and therefore a higher torque; 2. lower difficulty and cost of manufacturing. However, outrunner motor has some inherent disadvantages: 1. difficult to seal, resulting in either vulnerability to ingress or need for extra protection; 2. difficult to cool; 3. limited mechanical connection options.

## ➤ Outstanding All-round Performance

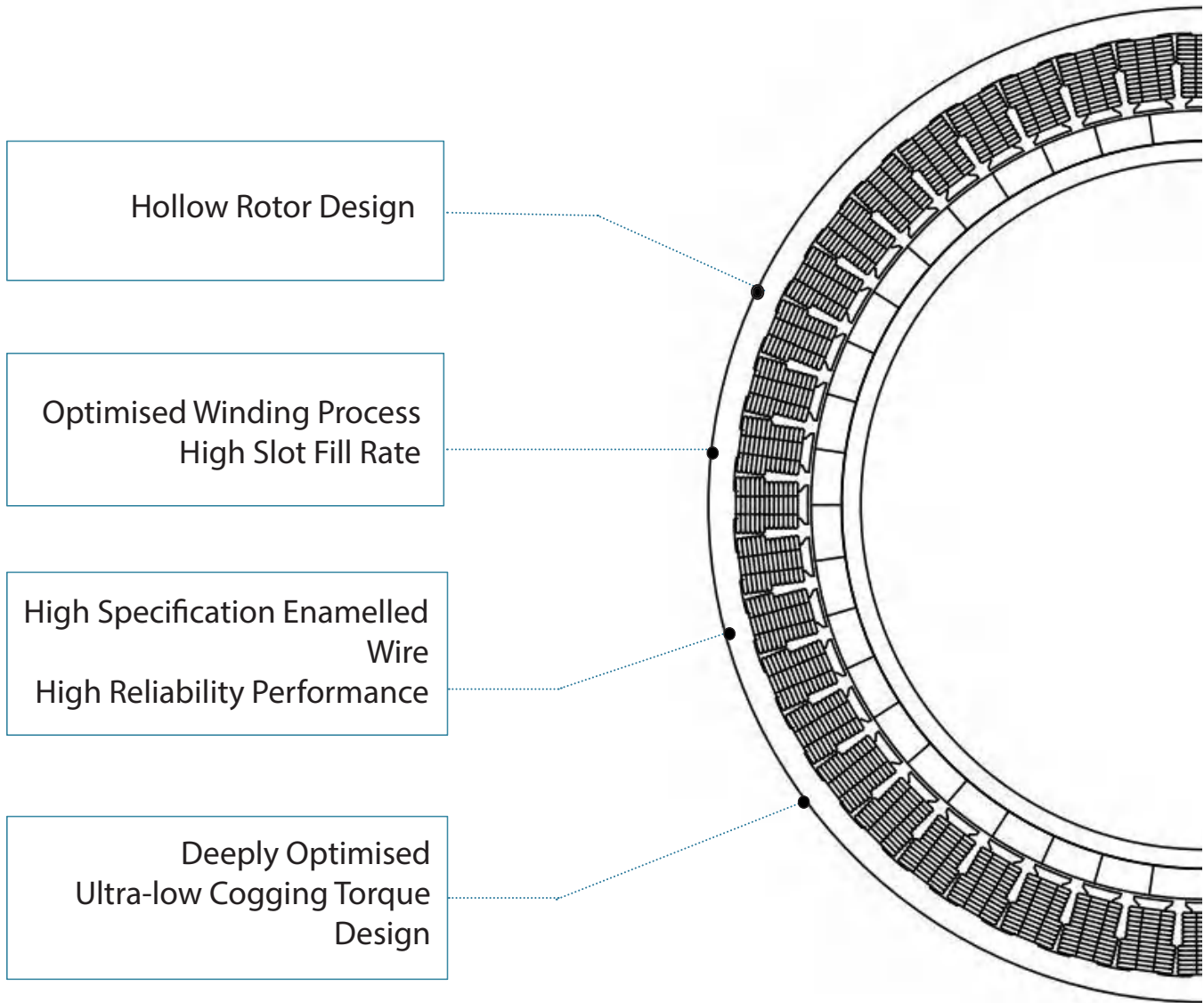
Compared to F series, the motor offers a more comprehensive performance. the K series has a very low cogging torque and can be optionally equipped with a very high power density. This makes the K series the perfect choice for applications seeking smooth, low-speed, high precision or high output power.



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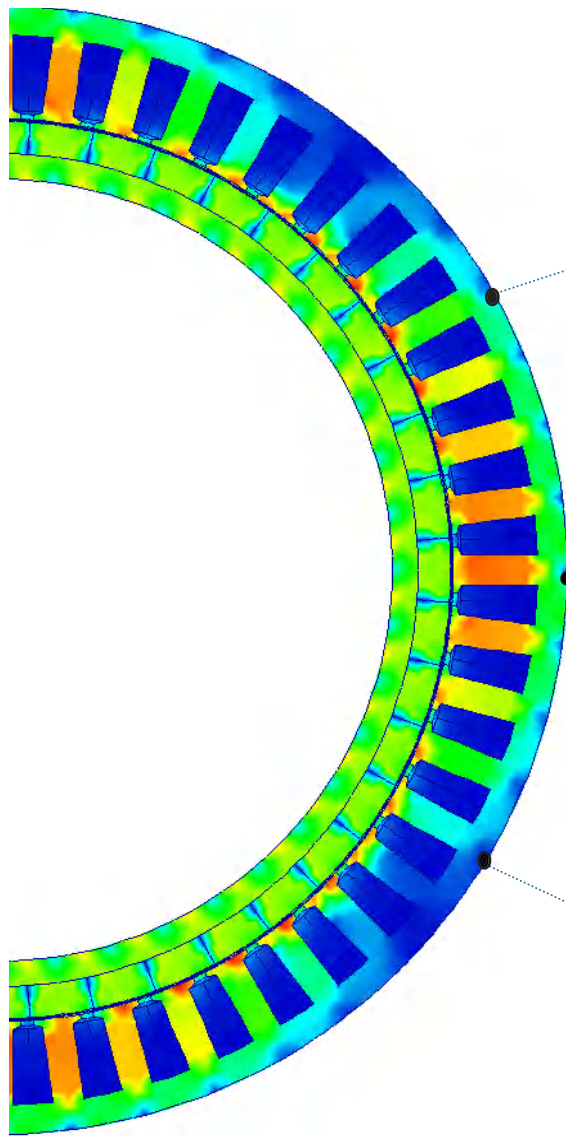
# Product Features



## Introduction

The K-Series motors are specifically designed for robotic applications where high torque capability is required.

You can seamlessly integrate the K-Series frameless inner rotor into your design, creating infinite possibilities for your design with the unprecedented torque capability.



Internal Rotor Design  
Excellent Thermal  
Performance

Large Diameter Hollow  
Shaft

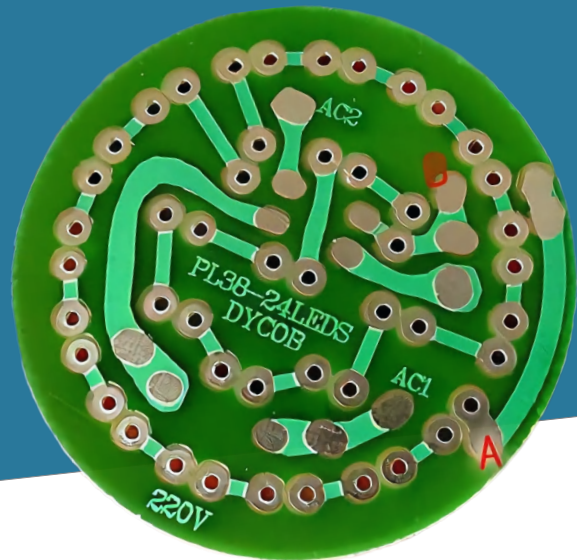
Excellent Power Density

## Customization

Due to diversity of applications of the motor, we offer a wide range of customisation options to meet your various needs.

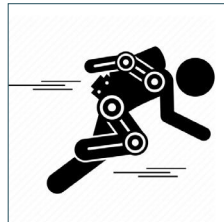
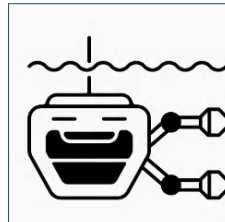
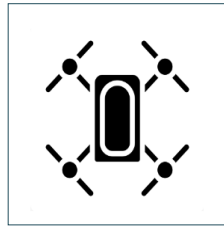
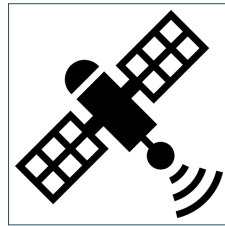
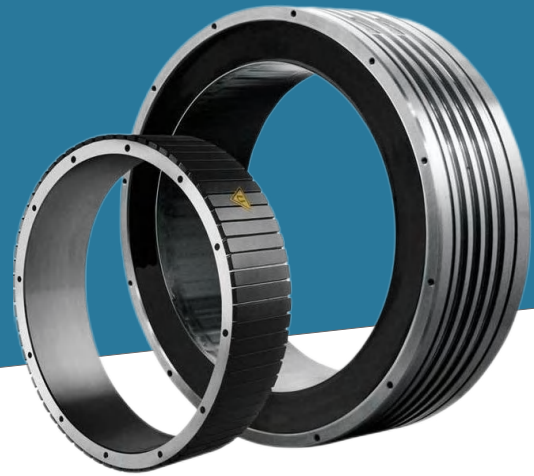
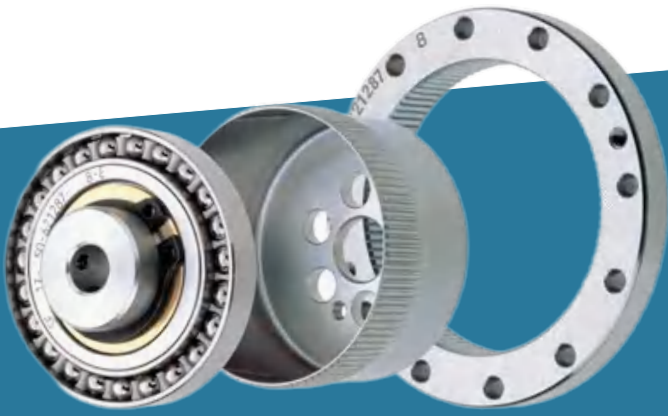
It includes, but are not limited to:

- Motor Size
- Mechanical Connection Interface
- KV Value or Peak Motor Speed
- Rated Current
- Special Insulation, Corrosion Protection Requirements
- Special Operating Environments
- Special Lifetime Requirements



## Product Features

- Frameless Design
- Inner Rotor Permanent Magnet Brushless Motor
- Highest Torque Density Ever
- Outstanding Power Density
- Minimal Weight
- High Reliability and Long Service Life
- Excellent Heat Dissipation
- Stator Diameters from 30mm to 150mm
- Applicable Voltage: 12V to 72V
- Torque Coverage: 0. 1Nm to 50Nm
- Optimised Cogging Torque
- Wide Range of Customization Options



## Applications

- Aerospace
- AGV and AGR
- Direct Drive without Gearbox
- Unmanned Aerial Vehicle (UAV)
- Exoskeleton Robot
- Gimbal Stabilizer
- Legged Robot
- Medical Device
- Robot Joint Actuator
- Underwater Robot

# Glossary

## 1 Stator Diameter [mm]

Nominal outer diameter of the stator of frameless motor.

## 2 Stator Axial Length (Excl. Cable) [mm]

Nominal axial length of the stator of frameless motor. The winding endings are included, and the dimensions occupied by the cables are not included.

## 3 Rotor Inner Diameter [mm]

Nominal inner rotor diameter of the frameless motor rotor. The inner diameter of the rotor can be reduced according to the customer's requirements, and it can be equipped with a mounting flange or other mechanical fixation; but it is generally difficult to expand.

## 4 Weight [g]

Frameless motor stator and rotor weight.

## 5 Stator Weight (Excl. Cable) [g]

The weight of the frameless motor stator. Stator weight includes standard cable.

## 6 Rotor Weight [g]

The weight of the frameless motor rotor. If the inner diameter of the rotor is be customized, the weight of the rotor will increase in general.

## 7 Rotor Inertia [kg mm<sup>2</sup>]

The moment of inertia of the frameless motor rotor. If the inner diameter of the rotor is customized, the moment of inertia will increase in general.

## 8 DC Drive Voltage (Typical) [V]

The DC drive voltage ( $V_{dc}$ ) range permitted for the frameless motor. The drive voltage determines the no-load speed of the motor, and they are linear to each other. Too low voltage may cause the motor to fail to start or too low a running speed, but it will not affect the life and safety of the motor. Excessive voltage will affect the life of the motor and may lead to premature

failure of the motor. The size of the driving voltage has no effect on the rated torque and the permitted continuous mechanical speed.

## 9 Rated Output Power @ Typical Voltage [W]

The frameless motor can output power for a long time under the typical driving voltage and the specified ambient temperature. Exceeding the specified ambient temperature will result in a drop in output power.

## 10 No Load Speed @ Typical Voltage [rpm]

The maximum speed that the frameless motor can reach without load at the typical driving voltage and the specified ambient temperature. When the driving voltage increases, the no-load speed also increases. In general, the no-load speed is proportional to the driving voltage.

## 11 Load Speed @ Typical Voltage [rpm]

The maximum speed that the frameless motor can reach when the output load is the rated torque under the typical driving voltage and the specified ambient temperature. When the driving voltage increases, the load speed also increases.

## 12 Continuous Mechanical Speed Limit [rpm]

Under the specified ambient temperature, when the motor outputs the rated torque, the permitted speed at which motor can run for the whole life span. The factors for limiting the permitted continuous mechanical speed are the mechanical strength of the rotor and the heat generation of the motor itself. The permitted continuous mechanical speed is an inherent characteristic of the motor and is independent of the drive voltage.

## 13 Rated Torque (105°C Temp. Rise) [Nm]

When the environment of the motor is at room temperature of 25 °C and under typical natural heat dissipation conditions, the temperature of the motor stator rises by 105 °C, that is, the torque that the motor can continuously output when it reaches 130 °C. The rated torque is an inherent characteristic of the motor, which has nothing to do with the driving voltage, but it is dependent of



the heat dissipation conditions. Poor heat dissipation conditions will reduce the rated torque.

#### 14 Rated Torque (55°C Temp. Rise) [Nm]

When the environment of the motor is at room temperature of 25 °C, the temperature of the motor stator rises by 55 °C, that is, the torque that the motor can continuously output when it reaches 80 °C. The rated torque is an inherent characteristic of the motor, which has nothing to do with the driving voltage, but it is dependent of the heat dissipation conditions. Poor heat dissipation conditions will reduce the rated torque.

#### 15 Rated Torque (Lasting 10s) [Nm]

The motor stator can output torque within 55 °C within 10 seconds.

#### 16 Rated Torque (Lasting 2s) [Nm]

The motor stator can output torque within 55 °C within 2 seconds.

#### 17 Rated RMS Current (105°C Temp. Rise) [A]

When the environment of the motor is at room temperature of 25 °C, the motor stator temperature rises by 105 °C, that is, the RMS line current that can be continuously fed when the motor reaches 130 °C.

#### 18 Rated RMS Current (55°C Temp. Rise) [A]

When the environment of the motor is at room temperature of 25 °C, the temperature of the motor stator rises by 55 °C, that is, the RMS line current that can be continuously fed when the motor reaches 80 °C.

#### 19 Peak RMS Current (Lasting 10s) [A]

The RMS line current that the motor stator can input within 55 °C instantaneously within 10 seconds.

#### 20 Peak RMS Current (Lasting 2s) [A]

The RMS line current that the motor stator can input within 55 °C instantaneously within 2 seconds.

#### 21 KV Constant [rpm/V]

The ratio of the no-load speed of the motor to the DC drive voltage of the bus. It should be noted that

the speed coefficient will increase with the increase of temperature. It will increase linearly by about 0.5-1.5% for every 10 °C .

#### 22 Back EMF Constant [Vs/rad]

The ratio of the motor's bus DC drive voltage to the back electromotive force. The back electromotive force (back EMF or BEMF) constant and the KV constant satisfy such relation: back EMF constant × KV constant = 60/2π. It should be noted that the back EMF constant will decrease as the temperature rises. It will decrease linearly by about 0.5-1.5% for every 10 °C .

#### 23 Torque Constant [Nm/A]

When the three phases of the motor are driven by sinusoidal current, the ratio of the motor torque to the peak value (amplitude) of any wire current. For example, when any line current is  $I_{\sin}(\omega t)$ , the torque constant is the corresponding torque  $T/I$ . It should be noted that the torque constant of the motor is usually non-linear, which means that in different current ranges, the relationship between the torque output by the motor and the current tends to saturate (the current increases by 2.0x times, the torque less than 2.0x), see  $T_i$  curve for details. Torque constant will also decrease with the increase of temperature, which will decrease linearly by about 0.5-1.5% per 10 °C . The relationship between RMS rated current and rated torque is: rated torque = torque coefficient × RMS rated current ×  $\sqrt{2}$

#### 24 Line Resistance [Ohm]

Resistance reading when connect any two among the three leads of the motor. It is important to note that line resistance increases as temperature rises. It will increase linearly by about 4% for every 10 °C .

#### 25 Line Inductance [H]

Inductance reading when connect any two among the three leads of the motor.

**26 d Axis Inductance [mH]**

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The d-axis inductance of the motor.

**27 q Axis Inductance [mH]**

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The q-axis inductance of the motor. Our motor adopts non-salient pole design, that is: q-axis inductance = d-axis inductance. For a delta-connected non-salient pole motor, q-axis inductance = d-axis inductance = line inductance  $\times 1.5$ ; for a star-connected non-salient pole motor: q-axis inductance = d-axis inductance = line inductance  $\times 0.5$ .

**28 Time Constant [ms]**

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The electrical time constant indicates the current rise characteristic with respect to the input voltage. That is, when the motor is applied with voltage, the current needs time to rise due to the inductance, and the electrical time constant has unit of time, which is the time required for the current to reach  $I=0.632V/R$  (that is, 63.2% of the steady-state current) starting from the moment of applying DC voltage  $V$ , where  $R$  is the DC resistance.

**29 Winding Connection**

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Whether the winding is delta or star connection. The winding connection method has no effect on the efficiency or harmonic characteristics of the motor.

**30 Poles [Stator N Rotor P]**

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The number of teeth of the motor stator and the number of poles of the rotor. Pay attention to distinguish between the number of poles and the number of pole pairs, and the two satisfy the relationship: number of poles = number of pole pairs  $\times 2$ .

**31 Motor Constant [Nm/sqrt (W) ]**

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The motor constant is the ratio of the torque of the motor to the square root of the ohmic losses. The motor constant is the key indicator to measure the torque performance and efficiency of the motor. The higher the motor constant, the lower the heat generated by the motor to produce the same torque.

**32 Max. Winding Temperature [°C]**

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The maximum permitted temperature at which the motor can run for a long time. Exceeding this temperature will reduce the life expectancy of the motor.

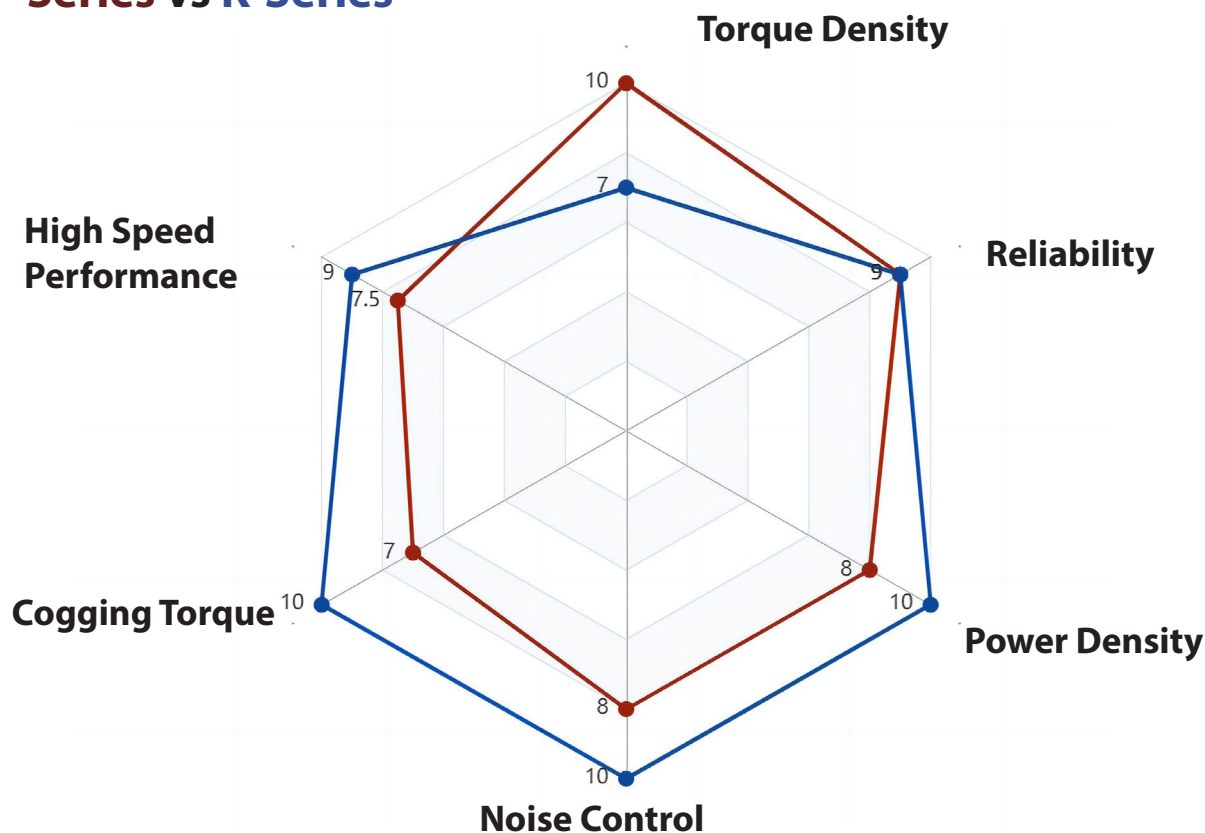
**33 Operating Ambient Temperature [°C]**

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Under one atmosphere pressure, the maximum permitted ambient temperature at which the motor can run for a long time. When the ambient temperature is high, motor shall be used at reduced power and torque.

# Performance Comparison

## F-Series vs K-Series



### Torque Density:

The ability to produce torque per unit volume or weight. the F-Series has the highest torque density in the world.

### High Speed Performance:

The performance of the motor during high speed operation. The K-Series is designed for high speed applications.

### Cogging Torque:

The smoothness of the torque of the motor in different positions. Cogging torque affects the motor's positioning accuracy and speed fluctuations at low speeds.

The K-Series offers excellent cogging torque performance.

### Noise Control:

The electromagnetic noise of the motor at high speeds. The K series is quieter.

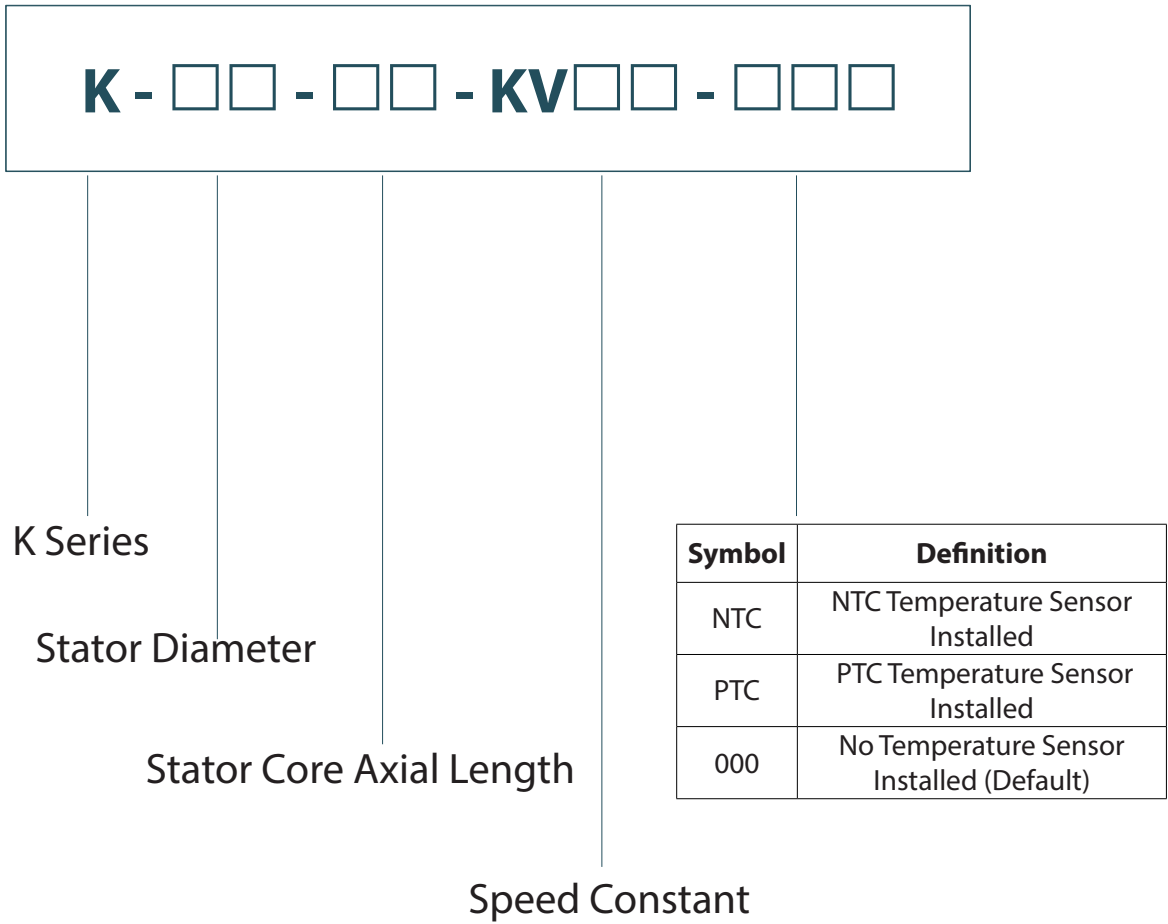
### Power Density:

The ability to output power per unit volume or weight.

### Reliability:

The ability of the motor to operate in harsh conditions. Both the F Series and K Series have excellent reliability.

# K Series-Nomenclature



Take K50-08-KV160-000 or K50-08-KV160 as an example:

This means that it is a product of the K series, that it has a nominal stator diameter of 50 mm, a Stator Core Axial Length of 8 mm, has a Kv (speed constant) of 160 rpm/V and is not installed with a temperature sensor.

## K50 Specification K50-08

Type	K50-08		
	KV160	KV330	KV570
Stator Diameter [mm]	50	50	50
Stator Axial Length (Excl. Cable) [mm]	19	19	19
Rotor Inner Diameter [mm]	24.75	24.75	24.75
Weight [g]	74	74	74
Stator Weight (Excl. Cable) [g]	53	53	53
Rotor Weight [g]	21	21	21
Rotor Inertia [kg mm <sup>2</sup> ]	4	4	4
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	130	130	130
No Load Speed @ Typical Voltage [rpm]	7800	15700	27200
Load Speed @ Typical Voltage [rpm]	7290	15060	26430
Continuous Mechanical Speed Limit [rpm]	7800	7800	7800
Rated Torque (105°C Temp. Rise) [Nm]	0.17	0.17	0.17
Rated Torque (55°C Temp. Rise) [Nm]	0.1	0.1	0.1
Rated Torque (Lasting 10s) [Nm]	0.42	0.42	0.42
Rated Torque (Lasting 2s) [Nm]	0.77	0.77	0.77
Rated RMS Current (105°C Temp. Rise) [A]	2.43	4.9	8.4
Rated RMS Current (55°C Temp. Rise) [A]	1.46	2.91	5
Peak RMS Current (Lasting 10s) [A]	6.1	12.1	21
Peak RMS Current (Lasting 2s) [A]	12.1	24.3	42.1
KV Constant [rpm/V]	164	327	567
Back EMF Constant [Vs/rad]	0.0584	0.0292	0.0168
Torque Constant [Nm/A]	0.05	0.025	0.0144
Line Resistance [Ohm]	0.995	0.249	0.0829
Line Inductance [H]	0.364	0.0909	0.0303
d Axis Inductance [mH]	0.153	0.0383	0.0383
q Axis Inductance [mH]	0.21	0.0526	0.0526
Time Constant [ms]	0.365	0.365	0.365
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	12N14P	12N14P	12N14P
Motor Constant [Nm/sqrt(W) ]	0.0579	0.0579	0.0579
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K50 Specification K50-13

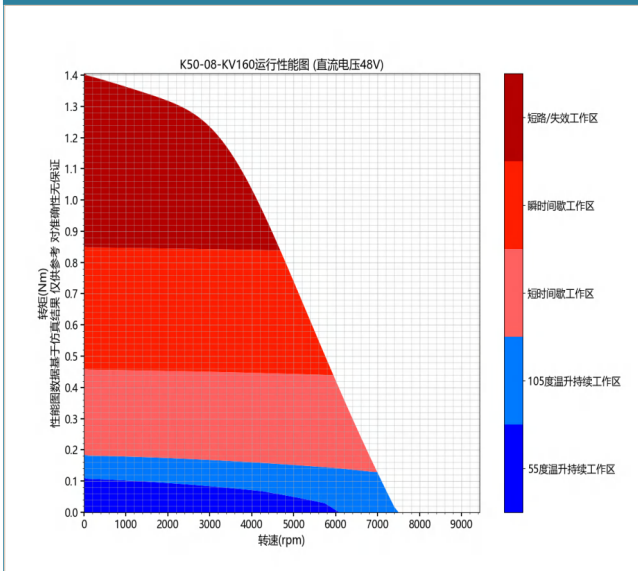
Type	K50-13		
	KV100	KV200	KV350
Stator Diameter [mm]	50	50	50
Stator Axial Length (Excl. Cable) [mm]	24	24	24
Rotor Inner Diameter [mm]	24.75	24.75	24.75
Weight [g]	113	113	113
Stator Weight (Excl. Cable) [g]	79	79	79
Rotor Weight [g]	34	34	34
Rotor Inertia [kg mm <sup>2</sup> ]	7	7	7
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	120	220	220
No Load Speed @ Typical Voltage [rpm]	4800	9600	16700
Load Speed @ Typical Voltage [rpm]	4410	9190	16200
Continuous Mechanical Speed Limit [rpm]	7800	7800	7800
Rated Torque (105°C Temp. Rise) [Nm]	0.28	0.28	0.28
Rated Torque (55°C Temp. Rise) [Nm]	0.17	0.17	0.17
Rated Torque (Lasting 10s) [Nm]	0.68	0.68	0.68
Rated Torque (Lasting 2s) [Nm]	1.25	1.25	1.25
Rated RMS Current (105°C Temp. Rise) [A]	2.43	4.9	8.4
Rated RMS Current (55°C Temp. Rise) [A]	1.46	2.91	5
PeaK RMS Current (Lasting 10s) [A]	6.1	12.1	21
PeaK RMS Current (Lasting 2s) [A]	12.1	24.3	42.1
KV Constant [rpm/V]	101	201	349
Back EMF Constant [Vs/rad]	0.0948	0.0474	0.0274
Torque Constant [Nm/A]	0.0812	0.0406	0.0234
Line Resistance [Ohm]	1.27	0.318	0.106
Line Inductance [H]	0.558	0.14	0.0465
d Axis Inductance [mH]	0.233	0.0582	0.0582
q Axis Inductance [mH]	0.326	0.0814	0.0814
Time Constant [ms]	0.439	0.439	0.439
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	12N14P	12N14P	12N14P
Motor Constant [Nm/sqrt(W) ]	0.0831	0.0831	0.0831
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K50 Specification K50-26

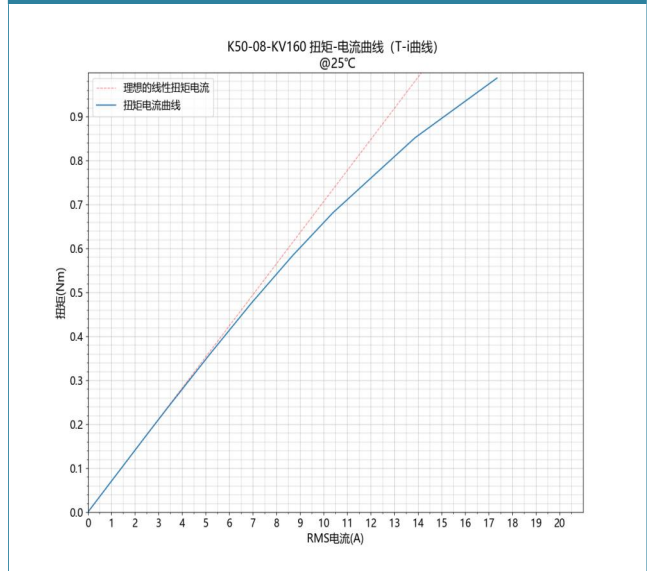
Type	K50-26		
	KV50	KV100	KV170
Stator Diameter [mm]	50	50	50
Stator Axial Length (Excl. Cable) [mm]	37	37	37
Rotor Inner Diameter [mm]	24.75	24.75	24.75
Weight [g]	213	213	213
Stator Weight (Excl. Cable) [g]	144	144	144
Rotor Weight [g]	69	69	69
Rotor Inertia [kg mm <sup>2</sup> ]	14	14	14
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	120	260	450
No Load Speed @ Typical Voltage [rpm]	2400	4800	8300
Load Speed @ Typical Voltage [rpm]	2100	4490	8000
Continuous Mechanical Speed Limit [rpm]	7800	7800	7800
Rated Torque (105°C Temp. Rise) [Nm]	0.56	0.56	0.56
Rated Torque (55°C Temp. Rise) [Nm]	0.33	0.33	0.33
Rated Torque (Lasting 10s) [Nm]	1.36	1.36	1.36
Rated Torque (Lasting 2s) [Nm]	2.5	2.5	2.5
Rated RMS Current (105°C Temp. Rise) [A]	2.43	4.9	8.4
Rated RMS Current (55°C Temp. Rise) [A]	1.46	2.91	5
Peak RMS Current (Lasting 10s) [A]	6.1	12.1	21
Peak RMS Current (Lasting 2s) [A]	12.1	24.3	42.1
KV Constant [rpm/V]	50	101	174
Back EMF Constant [Vs/rad]	0.19	0.0948	0.0548
Torque Constant [Nm/A]	0.162	0.0812	0.0469
Line Resistance [Ohm]	2	0.499	0.166
Line Inductance [H]	1.06	0.266	0.0887
d Axis Inductance [mH]	0.439	0.11	0.11
q Axis Inductance [mH]	0.626	0.156	0.156
Time Constant [ms]	0.533	0.533	0.533
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	12N14P	12N14P	12N14P
Motor Constant [Nm/sqrt(W) ]	0.133	0.133	0.133
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

# K50-08-KV160

K50-08-KV160 Operation Performance Chart (at 48V DC)

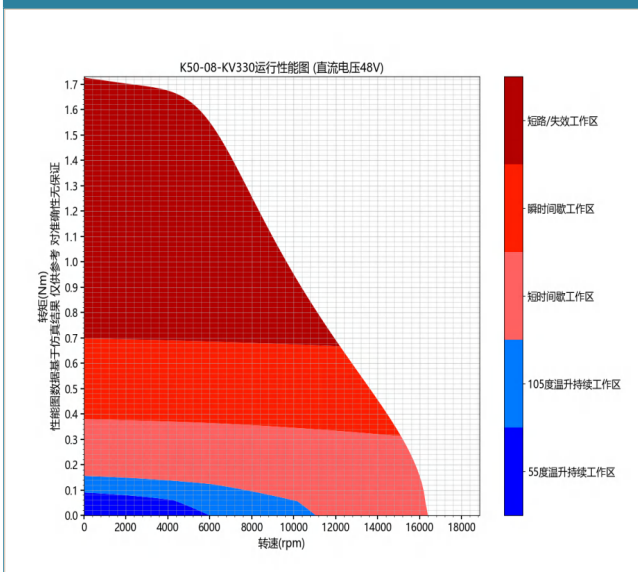


K50-08-KV160 Torque-Current Curve @25°C (T-i curve)

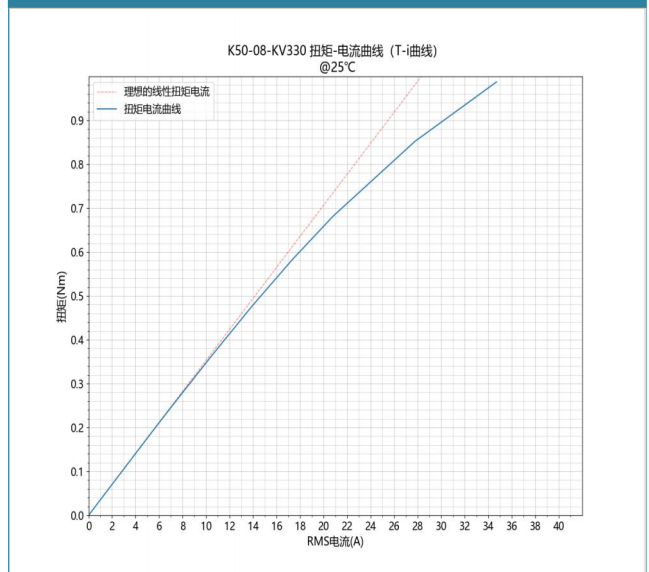


# K50-08-KV330

K50-08-KV330 Operation Performance Chart (at 48V DC)



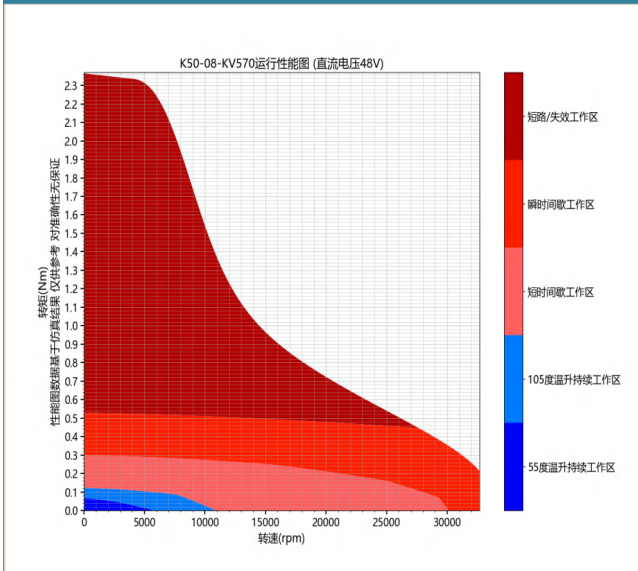
K50-08-KV330 Torque-Current Curve @25°C (T-i curve)



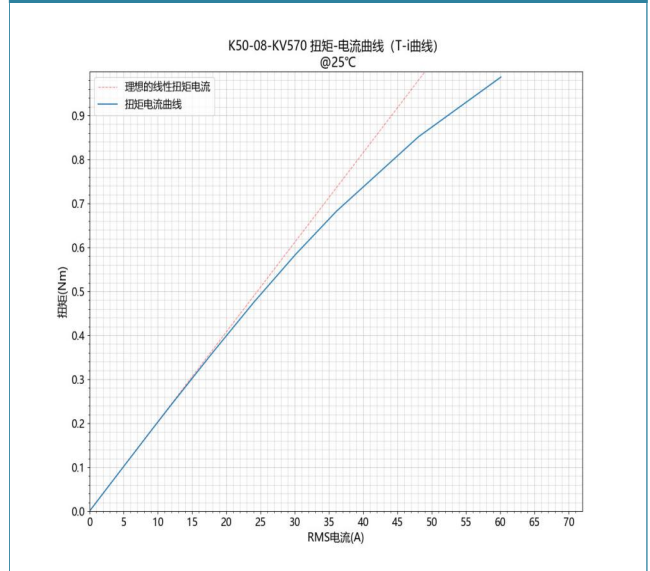


# K50-08-KV570

K50-08-KV570 Operation Performance Chart (at 48V DC)

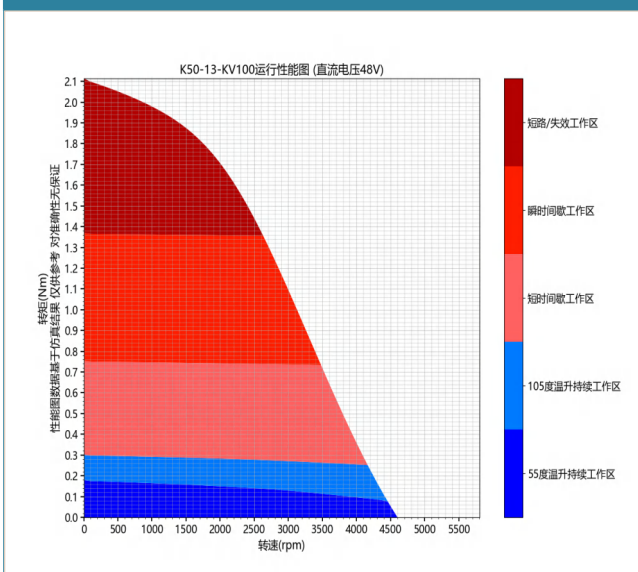


K50-08-KV570 Torque-Current Curve @25°C (T-i curve)

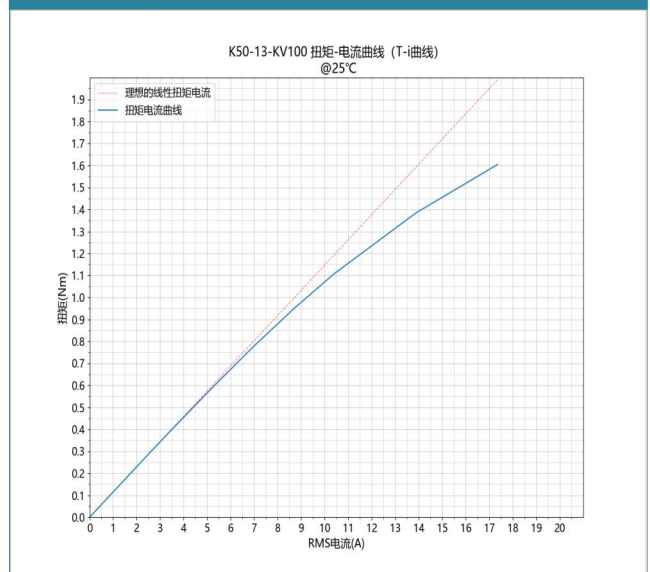


# K50-13-KV100

K50-13-KV100 Operation Performance Chart (at 48V DC)

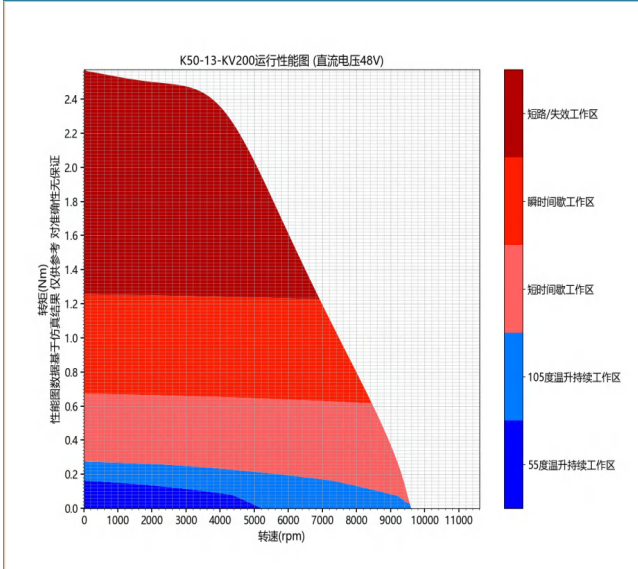


K50-13-KV100 Torque-Current Curve @25°C (T-i curve)

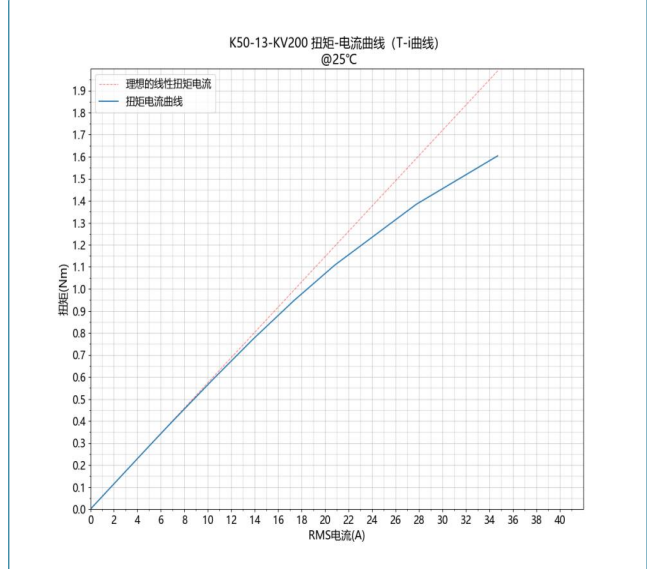


# K50-13-KV200

K50-13-KV200 Operation Performance Chart (at 48V DC)

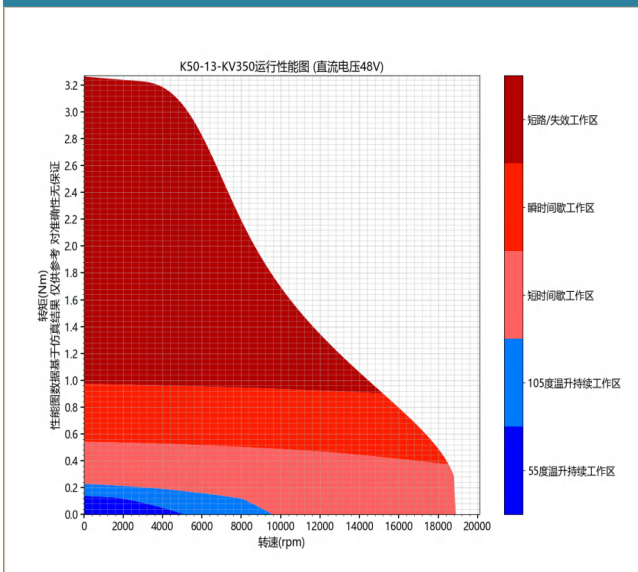


K50-13-KV200 Torque-Current Curve @25°C (T-i curve)

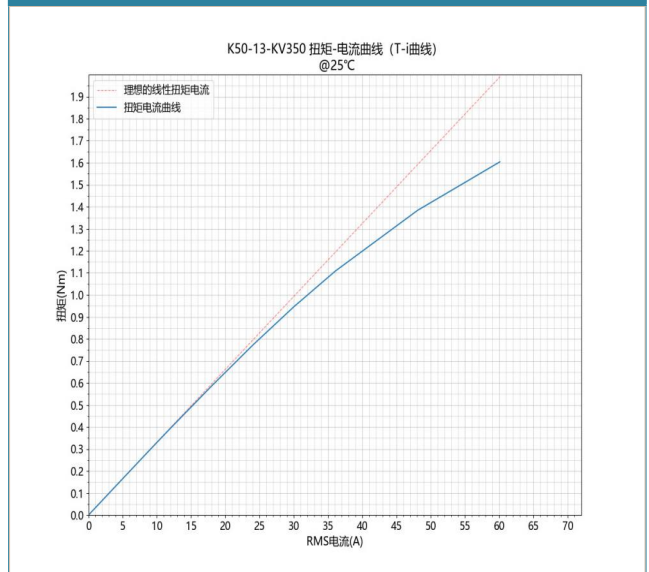


# K50-13-KV350

K50-13-KV350 Operation Performance Chart (at 48V DC)

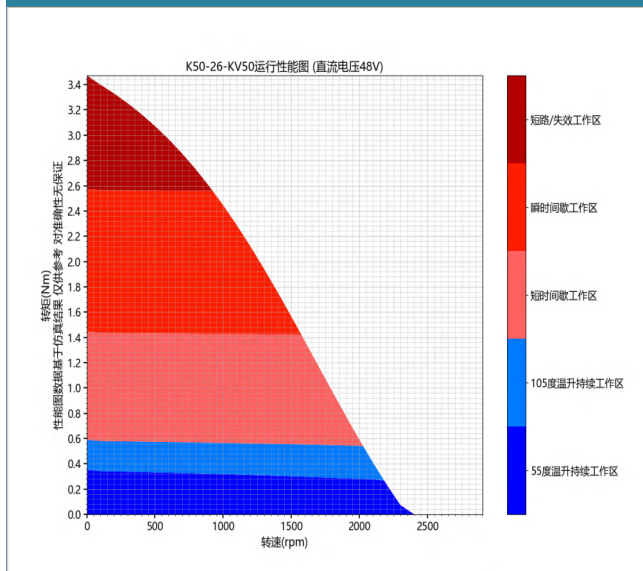


K50-13-KV350 Torque-Current Curve @25°C (T-i curve)

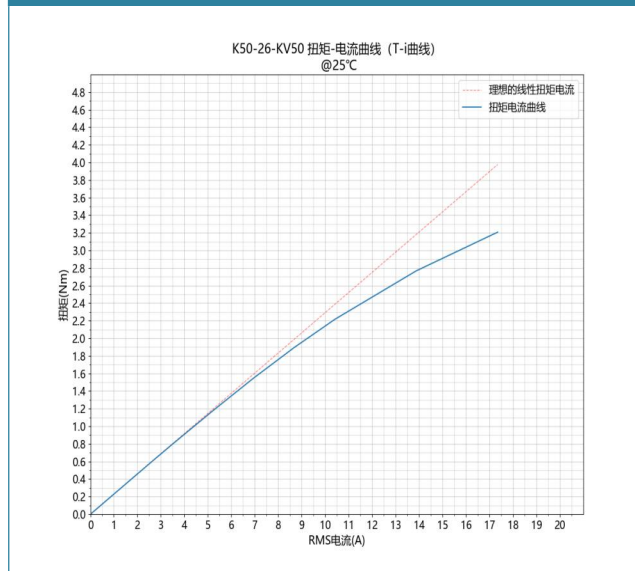


# K50-26-KV50

K50-26-KV50 Operation Performance Chart (at 48V DC)

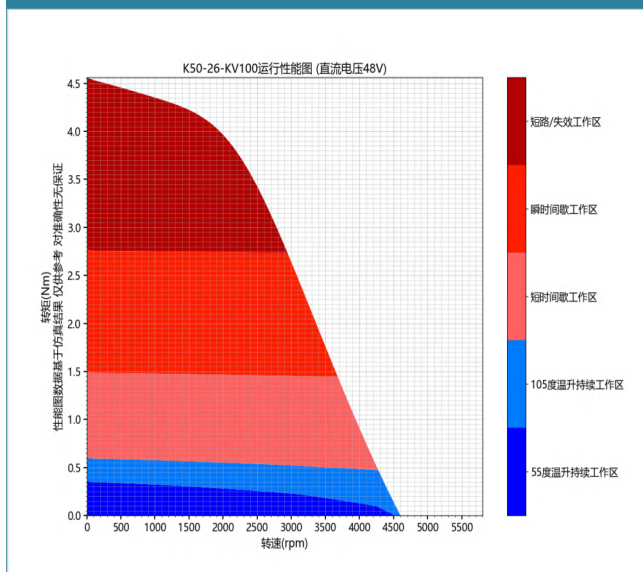


K50-26-KV50 Torque-Current Curve @25°C (T-i curve)

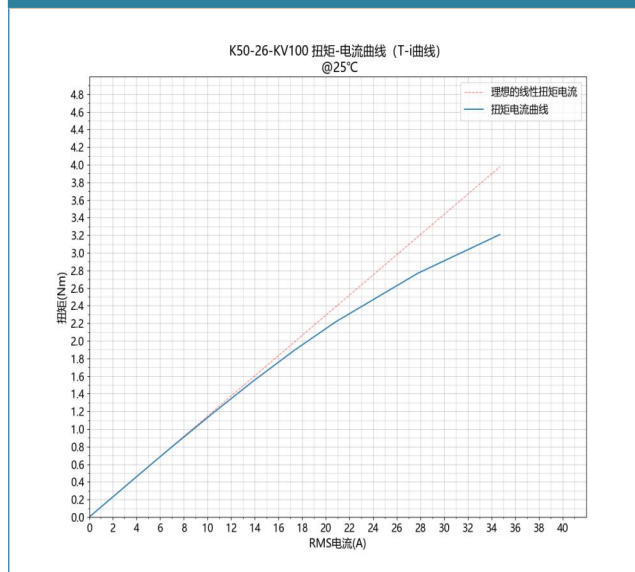


# K50-26-KV100

K50-26-KV100 Operation Performance Chart (at 48V DC)

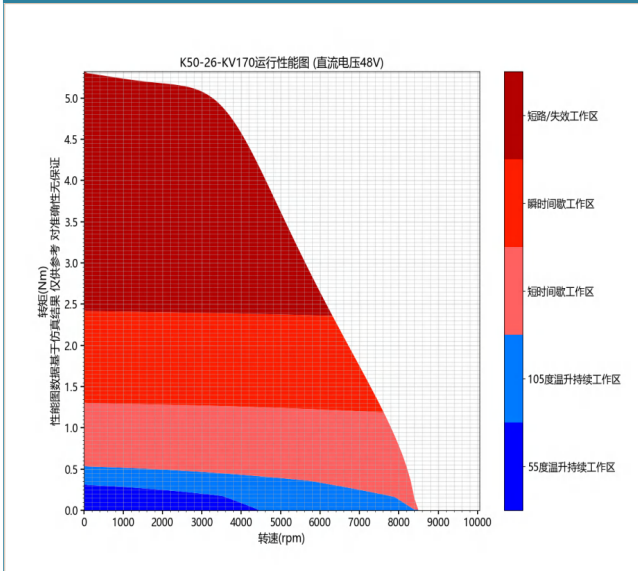


K50-26-KV100 Torque-Current Curve @25°C (T-i curve)

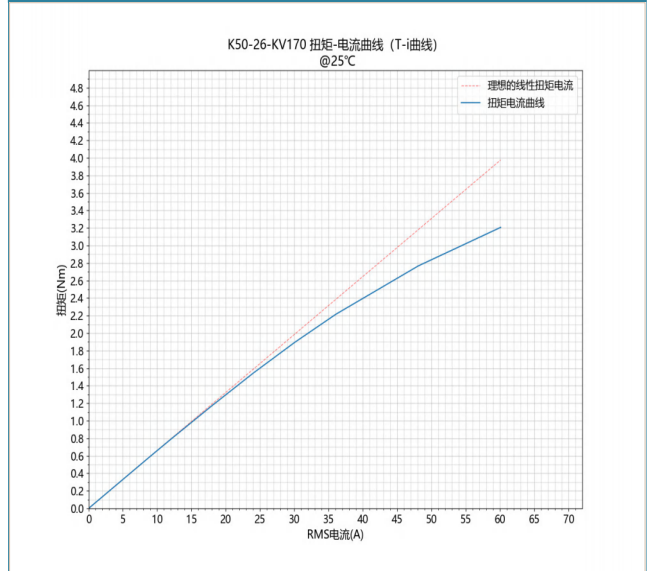


# K50-26-KV170

K50-26-KV170 Operation Performance Chart (at 48V DC)



K50-26-KV170 Torque-Current Curve @25°C (T-i curve)



## K60 Specification F60-08

Type	F60-08		
	KV85	KV170	KV290
Stator Diameter [mm]	60	60	60
Stator Axial Length (Excl. Cable) [mm]	19	19	19
Rotor Inner Diameter [mm]	30	30	30
Weight [g]	107	107	107
Stator Weight (Excl. Cable) [g]	83	83	83
Rotor Weight [g]	24	24	24
Rotor Inertia [kg mm <sup>2</sup> ]	7	7	7
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	120	190	190
No Load Speed @ Typical Voltage [rpm]	4000	8000	13900
Load Speed @ Typical Voltage [rpm]	3580	7480	13190
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	0.33	0.33	0.33
Rated Torque (55°C Temp. Rise) [Nm]	0.2	0.2	0.2
Rated Torque (Lasting 10s) [Nm]	0.79	0.79	0.79
Rated Torque (Lasting 2s) [Nm]	1.36	1.36	1.36
Rated RMS Current (105°C Temp. Rise) [A]	2.43	4.9	8.4
Rated RMS Current (55°C Temp. Rise) [A]	1.46	2.91	5
PeaK RMS Current (Lasting 10s) [A]	6.1	12.1	21
PeaK RMS Current (Lasting 2s) [A]	12.1	24.3	42.1
KV Constant [rpm/V]	84	167	290
Back EMF Constant [Vs/rad]	0.114	0.0571	0.033
Torque Constant [Nm/A]	0.0977	0.0489	0.0282
Line Resistance [Ohm]	1.31	0.329	0.11
Line Inductance [H]	0.829	0.207	0.069
d Axis Inductance [mH]	0.352	0.0881	0.0881
q Axis Inductance [mH]	0.476	0.119	0.119
Time Constant [ms]	0.63	0.63	0.63
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.0984	0.0984	0.0984
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K60 Specification K60-13

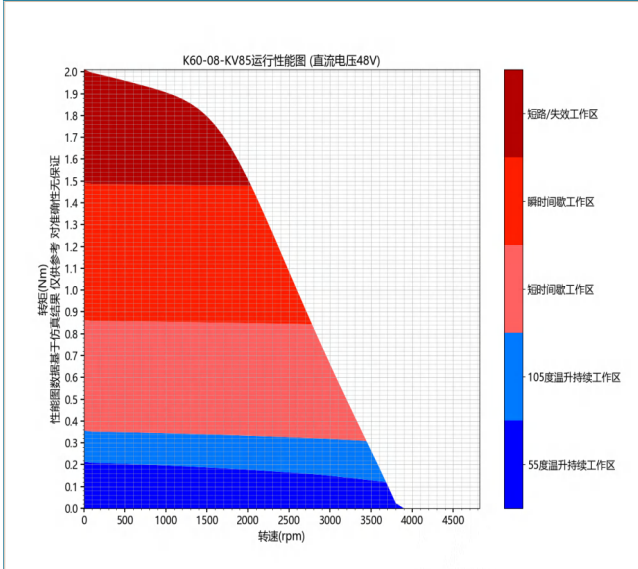
Type	K60-13		
	KV50	KV100	KV180
Stator Diameter [mm]	60	60	60
Stator Axial Length (Excl. Cable) [mm]	24	24	24
Rotor Inner Diameter [mm]	30	30	30
Weight [g]	164	164	164
Stator Weight (Excl. Cable) [g]	125	125	125
Rotor Weight [g]	39	39	39
Rotor Inertia [kg mm <sup>2</sup> ]	11	11	11
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	120	250	310
No Load Speed @ Typical Voltage [rpm]	2400	4900	8500
Load Speed @ Typical Voltage [rpm]	2140	4550	8060
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	0.54	0.54	0.54
Rated Torque (55°C Temp. Rise) [Nm]	0.33	0.33	0.33
Rated Torque (Lasting 10s) [Nm]	1.29	1.29	1.29
Rated Torque (Lasting 2s) [Nm]	2.2	2.2	2.2
Rated RMS Current (105°C Temp. Rise) [A]	2.43	4.9	8.4
Rated RMS Current (55°C Temp. Rise) [A]	1.46	2.91	5
Peak RMS Current (Lasting 10s) [A]	6.1	12.1	21
Peak RMS Current (Lasting 2s) [A]	12.1	24.3	42.1
KV Constant [rpm/V]	51	103	178
Back EMF Constant [Vs/rad]	0.186	0.0928	0.0536
Torque Constant [Nm/A]	0.159	0.0794	0.0458
Line Resistance [Ohm]	1.73	0.433	0.144
Line Inductance [H]	1.32	0.329	0.11
d Axis Inductance [mH]	0.557	0.139	0.139
q Axis Inductance [mH]	0.758	0.19	0.19
Time Constant [ms]	0.759	0.759	0.759
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.139	0.139	0.139
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K60 Specification K60-26

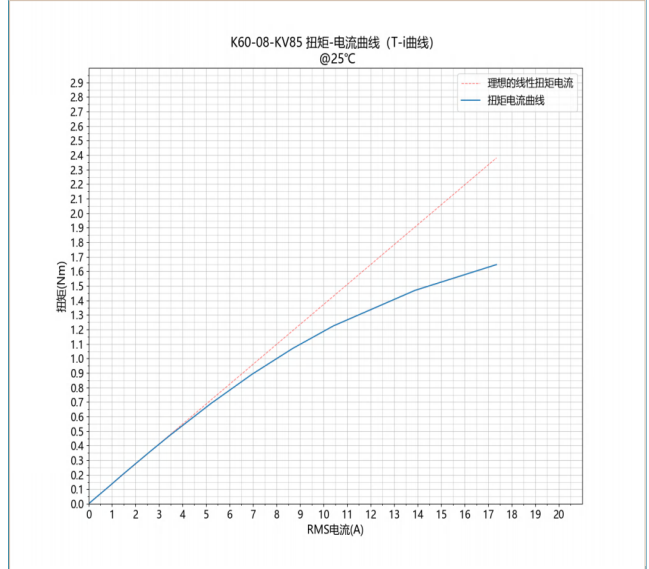
Type	K60-26		
	KV25	KV50	KV90
Stator Diameter [mm]	60	60	60
Stator Axial Length (Excl. Cable) [mm]	37	37	37
Rotor Inner Diameter [mm]	30	30	30
Weight [g]	312	312	312
Stator Weight (Excl. Cable) [g]	234	234	234
Rotor Weight [g]	78	78	78
Rotor Inertia [kg mm <sup>2</sup> ]	23	23	23
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	110	250	450
No Load Speed @ Typical Voltage [rpm]	1200	2400	4200
Load Speed @ Typical Voltage [rpm]	990	2190	3950
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	1.09	1.09	1.09
Rated Torque (55°C Temp. Rise) [Nm]	0.65	0.65	0.65
Rated Torque (Lasting 10s) [Nm]	2.6	2.6	2.6
Rated Torque (Lasting 2s) [Nm]	4.4	4.4	4.4
Rated RMS Current (105°C Temp. Rise) [A]	2.43	4.9	8.4
Rated RMS Current (55°C Temp. Rise) [A]	1.46	2.91	5
PeaK RMS Current (Lasting 10s) [A]	6.1	12.1	21
PeaK RMS Current (Lasting 2s) [A]	12.1	24.3	42.1
KV Constant [rpm/V]	26	51	89
Back EMF Constant [Vs/rad]	0.371	0.186	0.107
Torque Constant [Nm/A]	0.318	0.159	0.0917
Line Resistance [Ohm]	2.82	0.704	0.235
Line Inductance [H]	2.58	0.645	0.215
d Axis Inductance [mH]	1.09	0.272	0.272
q Axis Inductance [mH]	1.49	0.373	0.373
Time Constant [ms]	0.916	0.916	0.916
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.218	0.218	0.218
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

# K60-08-KV85

K60-08-KV85 Operation Performance Chart (at 48V DC)

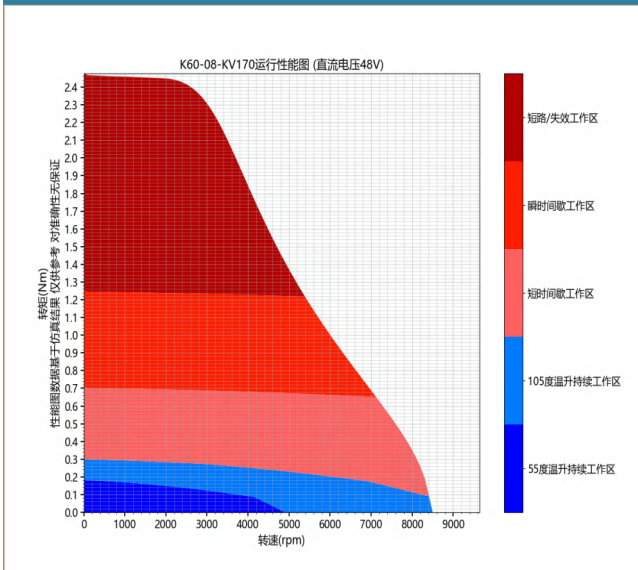


K60-08-KV85 Torque-Current Curve @25°C (T-i curve)

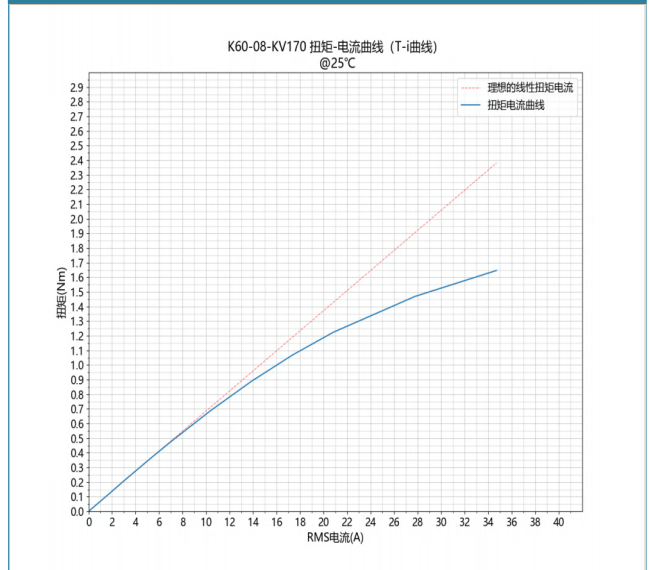


# K60-08-KV170

K60-08-KV170 Operation Performance Chart (at 48V DC)



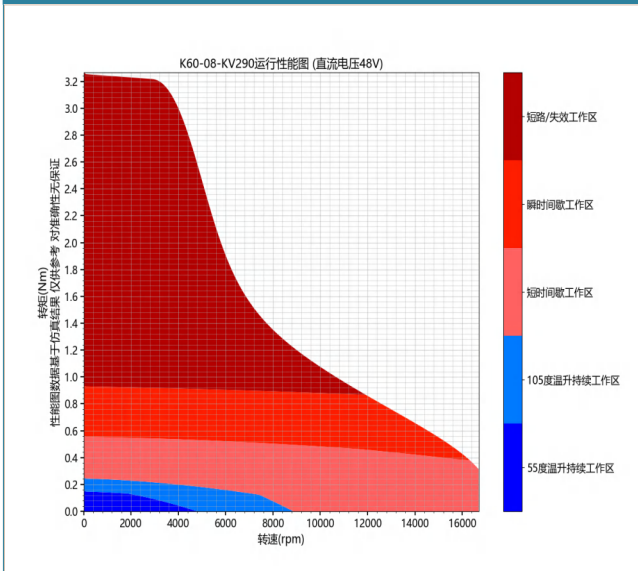
K60-08-KV170 Torque-Current Curve @25°C (T-i curve)



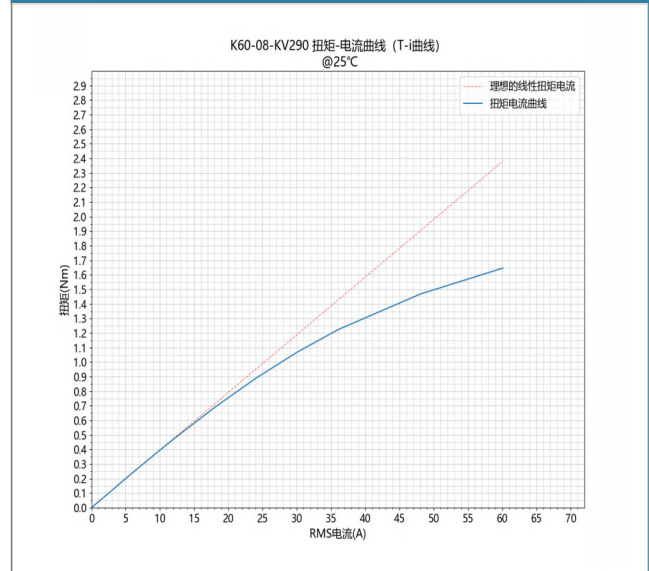


# K60-08-KV290

K60-08-KV290 Operation Performance Chart (at 48V DC)

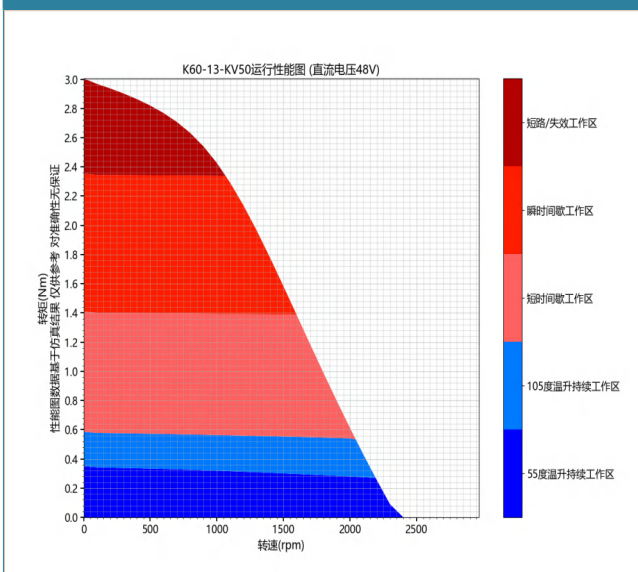


K60-08-KV290 Torque-Current Curve @25°C (T-i curve)

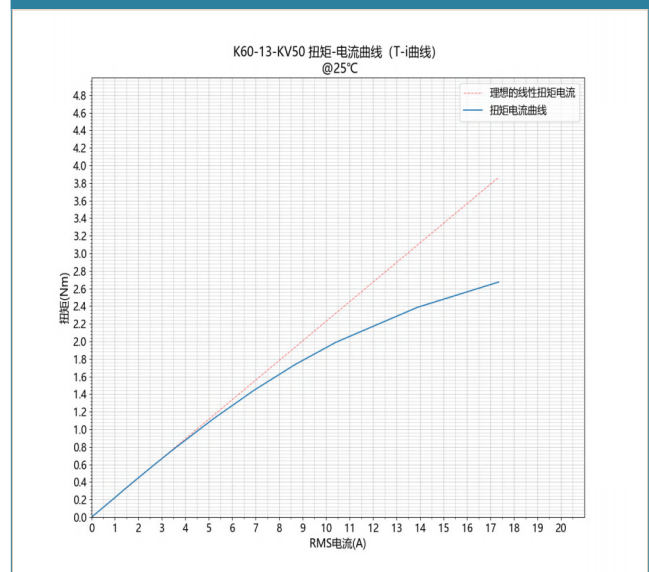


# K60-13-KV50

K60-13-KV50 Operation Performance Chart (at 48V DC)

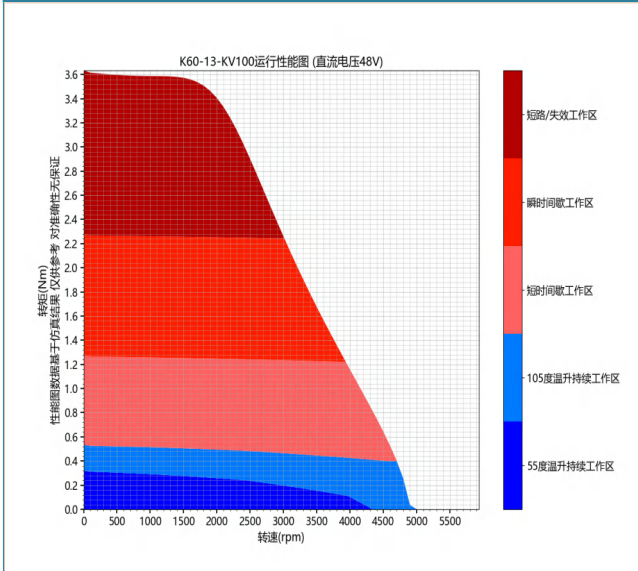


K60-13-KV50 Torque-Current Curve @25°C (T-i curve)

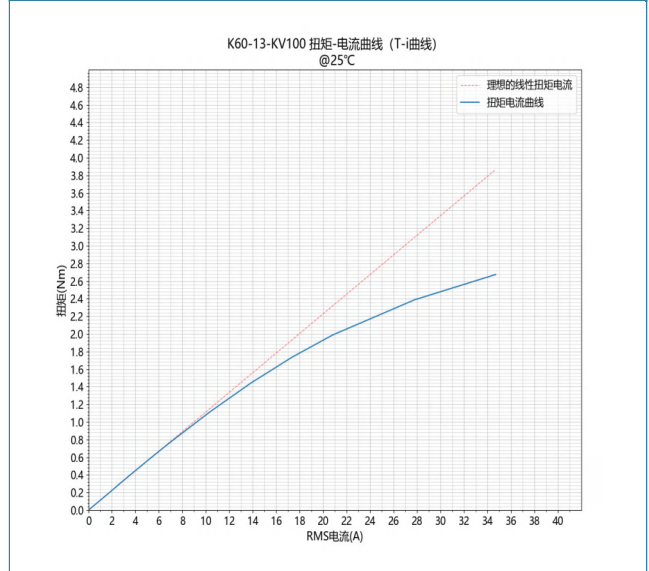


# K60-13-KV100

K60-13-KV100 Operation Performance Chart (at 48V DC)

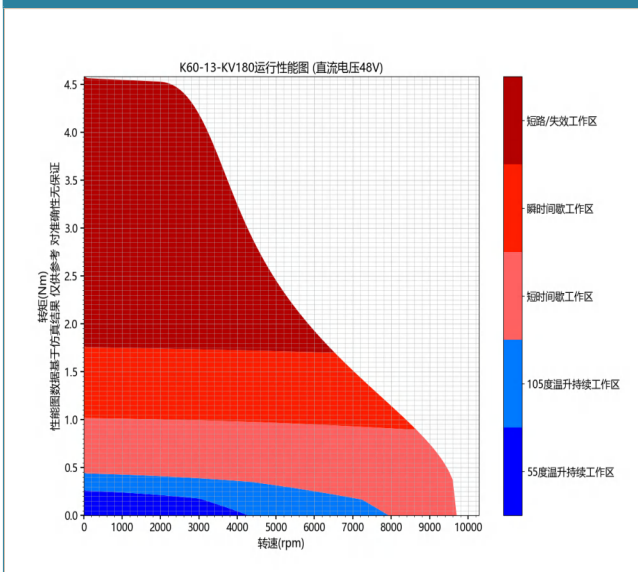


K60-13-KV100 Torque-Current Curve @25°C (T-i curve)

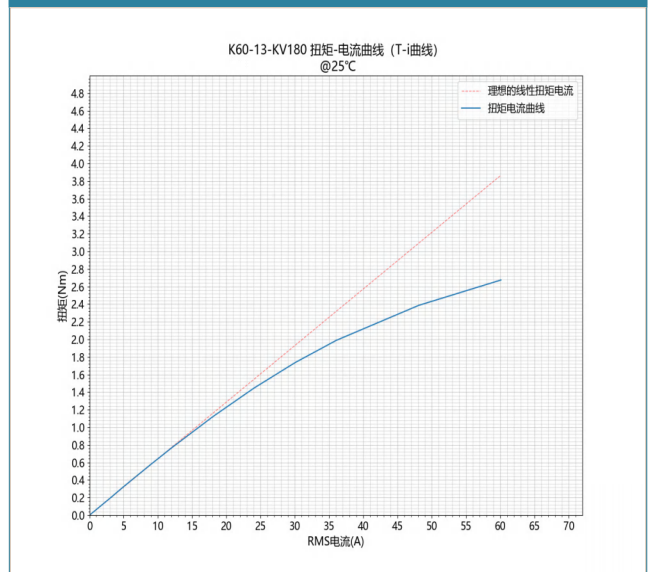


# K60-13-KV180

K60-13-KV180 Operation Performance Chart (at 48V DC)

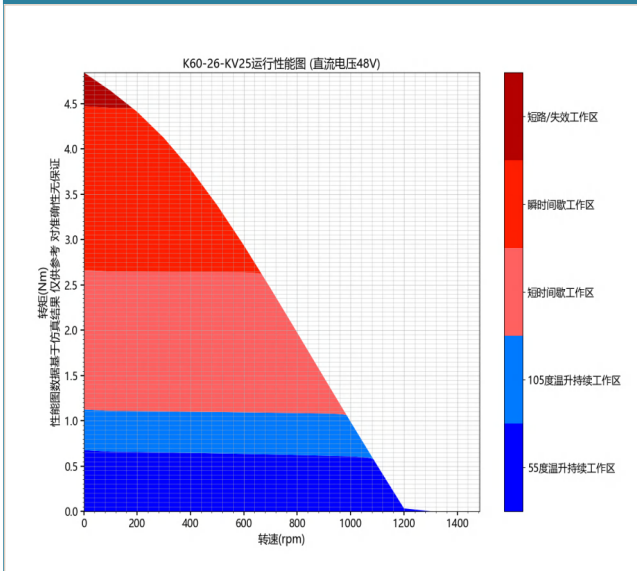


K60-13-KV180 Torque-Current Curve @25°C (T-i curve)

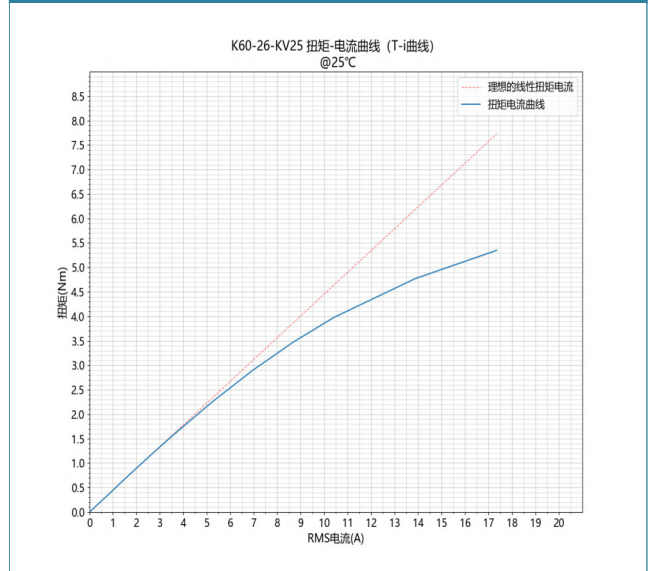


# K60-26-KV25

K60-26-KV25 Operation Performance Chart (at 48V DC)

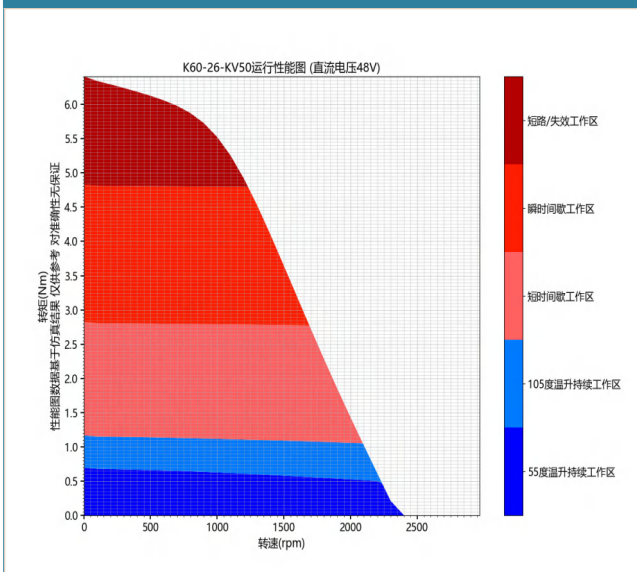


K60-26-KV25 Torque-Current Curve @25°C (T-i curve)

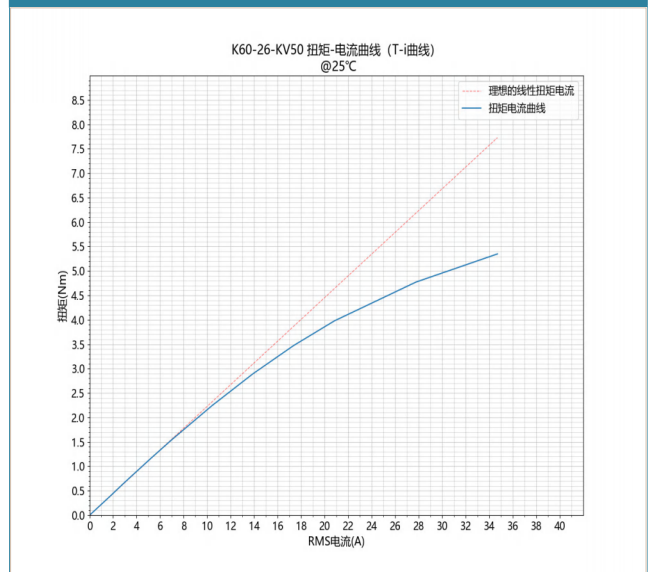


# K60-26-KV50

K60-26-KV50 Operation Performance Chart (at 48V DC)

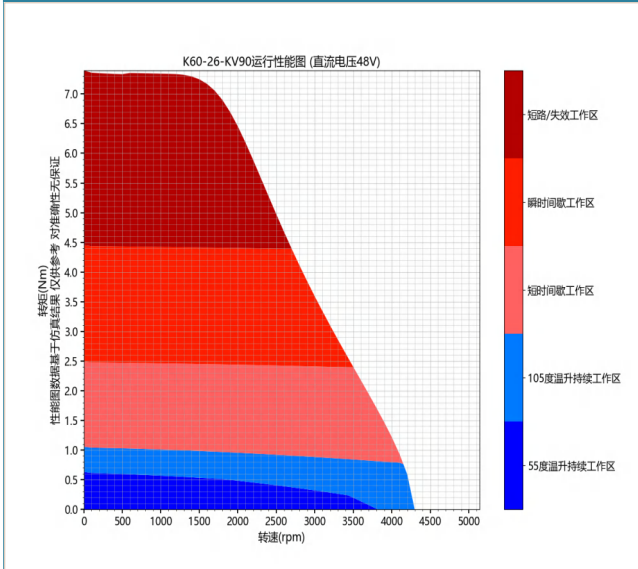


K60-26-KV50 Torque-Current Curve @25°C (T-i curve)

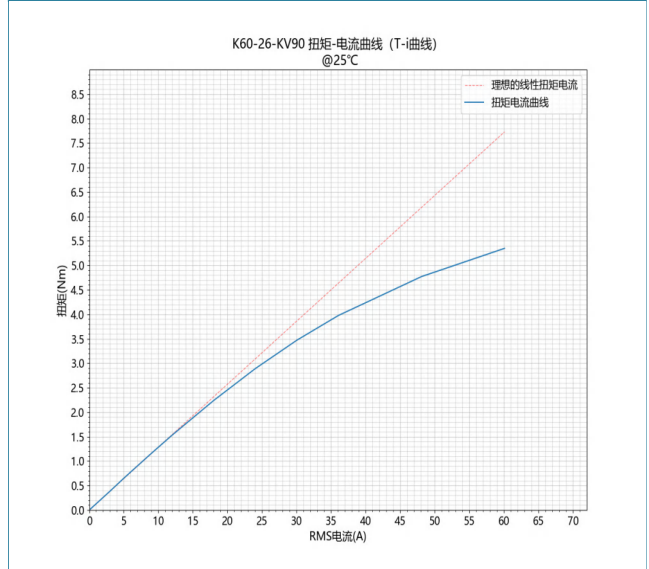


# K60-26-KV90

K60-26-KV90 Operation Performance Chart (at 48V DC)



K60-26-KV90 Torque-Current Curve @25°C (T-i curve)



## K68 Specification K68-08

Type	K68-08		
	KV75	KV150	KV260
Stator Diameter [mm]	68	68	68
Stator Axial Length (Excl. Cable) [mm]	19	19	19
Rotor Inner Diameter [mm]	34	34	34
Weight [g]	139	139	139
Stator Weight (Excl. Cable) [g]	105	105	105
Rotor Weight [g]	34	34	34
Rotor Inertia [kg mm <sup>2</sup> ]	13	13	13
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	150	260	260
No Load Speed @ Typical Voltage [rpm]	3500	7100	12400
Load Speed @ Typical Voltage [rpm]	3170	6640	11710
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	0.46	0.46	0.46
Rated Torque (55°C Temp. Rise) [Nm]	0.28	0.28	0.28
Rated Torque (Lasting 10s) [Nm]	1.07	1.07	1.07
Rated Torque (Lasting 2s) [Nm]	1.77	1.77	1.77
Rated RMS Current (105°C Temp. Rise) [A]	2.97	5.9	10.3
Rated RMS Current (55°C Temp. Rise) [A]	1.78	3.6	6.2
PeaK RMS Current (Lasting 10s) [A]	7.4	14.9	25.7
PeaK RMS Current (Lasting 2s) [A]	14.9	29.7	51.5
KV Constant [rpm/V]	75	149	259
Back EMF Constant [Vs/rad]	0.128	0.064	0.0369
Torque Constant [Nm/A]	0.109	0.0547	0.0316
Line Resistance [Ohm]	1.15	0.288	0.0959
Line Inductance [H]	0.757	0.189	0.063
d Axis Inductance [mH]	0.297	0.0742	0.0742
q Axis Inductance [mH]	0.46	0.115	0.115
Time Constant [ms]	0.658	0.658	0.658
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.118	0.118	0.118
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K68 Specification K68-13

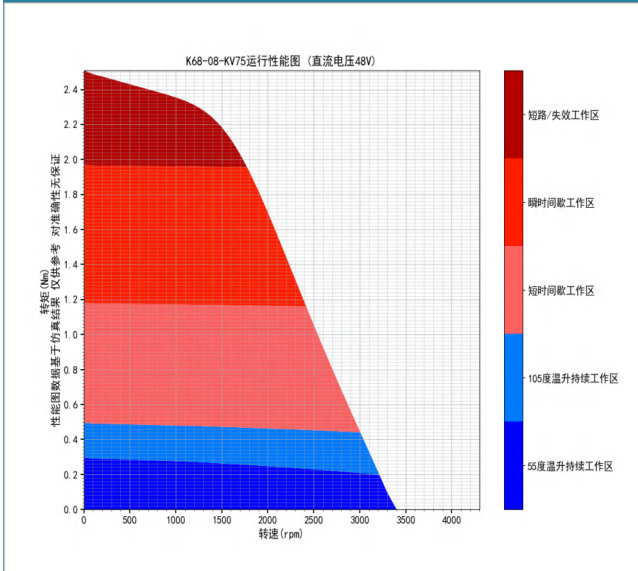
Type	K68-13		
	KV45	KV90	KV160
Stator Diameter [mm]	68	68	68
Stator Axial Length (Excl. Cable) [mm]	24	24	24
Rotor Inner Diameter [mm]	34	34	34
Weight [g]	213	213	213
Stator Weight (Excl. Cable) [g]	157	157	157
Rotor Weight [g]	56	56	56
Rotor Inertia [kg mm <sup>2</sup> ]	21	21	21
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	140	310	420
No Load Speed @ Typical Voltage [rpm]	2200	4400	7600
Load Speed @ Typical Voltage [rpm]	1900	4030	7160
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	0.74	0.74	0.74
Rated Torque (55°C Temp. Rise) [Nm]	0.45	0.45	0.45
Rated Torque (Lasting 10s) [Nm]	1.74	1.74	1.74
Rated Torque (Lasting 2s) [Nm]	2.9	2.9	2.9
Rated RMS Current (105°C Temp. Rise) [A]	2.97	5.9	10.3
Rated RMS Current (55°C Temp. Rise) [A]	1.78	3.6	6.2
Peak RMS Current (Lasting 10s) [A]	7.4	14.9	25.7
Peak RMS Current (Lasting 2s) [A]	14.9	29.7	51.5
KV Constant [rpm/V]	46	92	159
Back EMF Constant [Vs/rad]	0.208	0.104	0.06
Torque Constant [Nm/A]	0.178	0.0889	0.0513
Line Resistance [Ohm]	1.49	0.373	0.124
Line Inductance [H]	1.2	0.299	0.0996
d Axis Inductance [mH]	0.465	0.116	0.116
q Axis Inductance [mH]	0.73	0.182	0.182
Time Constant [ms]	0.801	0.801	0.801
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.168	0.168	0.168
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K68 Specification K68-26

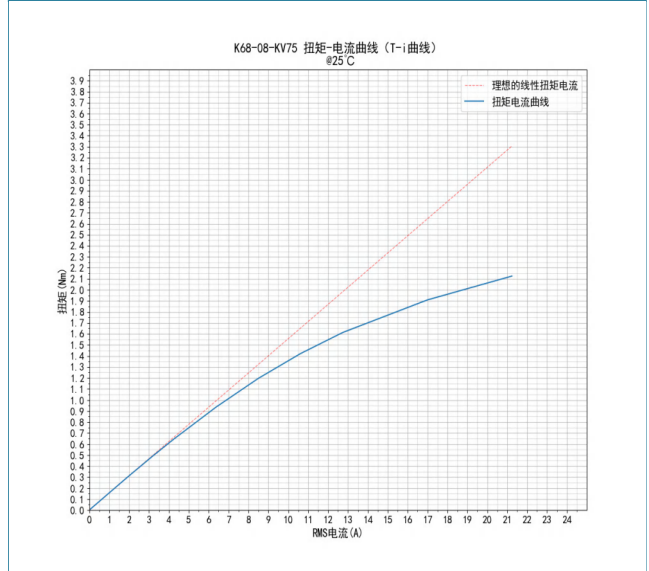
Type	K68-26		
	KV25	KV45	KV80
Stator Diameter [mm]	68	68	68
Stator Axial Length (Excl. Cable) [mm]	37	37	37
Rotor Inner Diameter [mm]	34	34	34
Weight [g]	405	405	405
Stator Weight (Excl. Cable) [g]	294	294	294
Rotor Weight [g]	111	111	111
Rotor Inertia [kg mm <sup>2</sup> ]	42	42	42
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	130	300	540
No Load Speed @ Typical Voltage [rpm]	1100	2200	3800
Load Speed @ Typical Voltage [rpm]	880	1950	3510
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	1.49	1.49	1.49
Rated Torque (55°C Temp. Rise) [Nm]	0.89	0.89	0.89
Rated Torque (Lasting 10s) [Nm]	3.5	3.5	3.5
Rated Torque (Lasting 2s) [Nm]	5.8	5.8	5.8
Rated RMS Current (105°C Temp. Rise) [A]	2.97	5.9	10.3
Rated RMS Current (55°C Temp. Rise) [A]	1.78	3.6	6.2
PeaK RMS Current (Lasting 10s) [A]	7.4	14.9	25.7
PeaK RMS Current (Lasting 2s) [A]	14.9	29.7	51.5
KV Constant [rpm/V]	23	46	80
Back EMF Constant [Vs/rad]	0.416	0.208	0.12
Torque Constant [Nm/A]	0.355	0.178	0.103
Line Resistance [Ohm]	2.38	0.594	0.198
Line Inductance [H]	2.34	0.584	0.195
d Axis Inductance [mH]	0.903	0.226	0.226
q Axis Inductance [mH]	1.43	0.358	0.358
Time Constant [ms]	0.982	0.982	0.982
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.266	0.266	0.266
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

# K68-08-KV75

K68-08-KV75 Operation Performance Chart (at 48V DC)

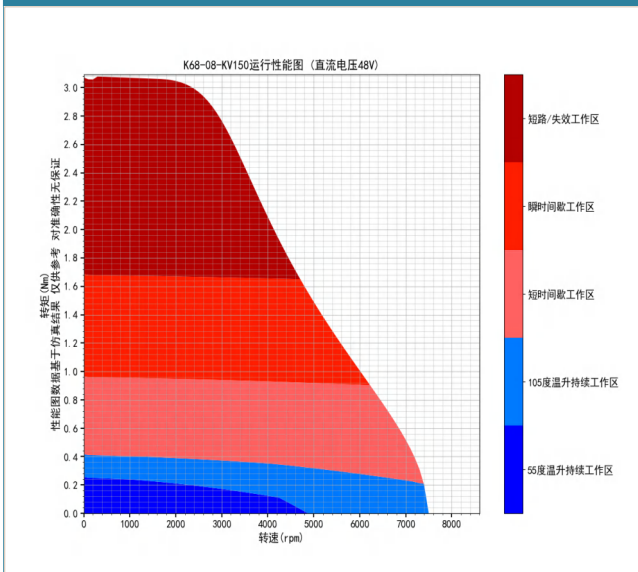


K68-08-KV75 Torque-Current Curve @25°C (T-i curve)

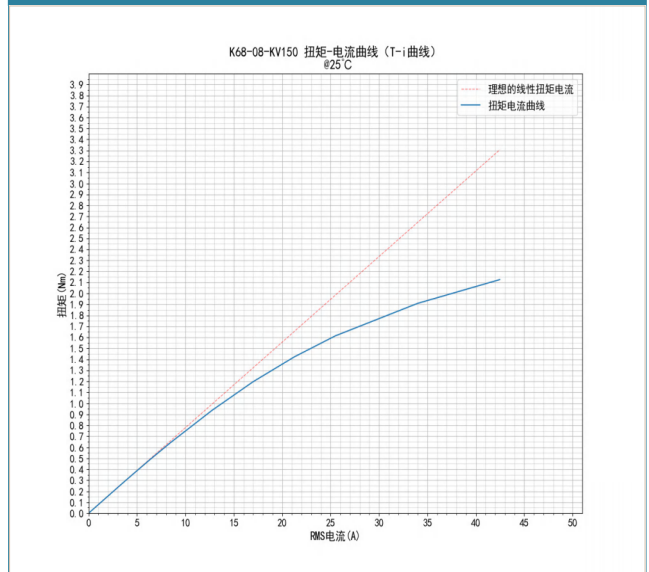


# K68-08-KV150

K68-08-KV150 Operation Performance Chart (at 48V DC)



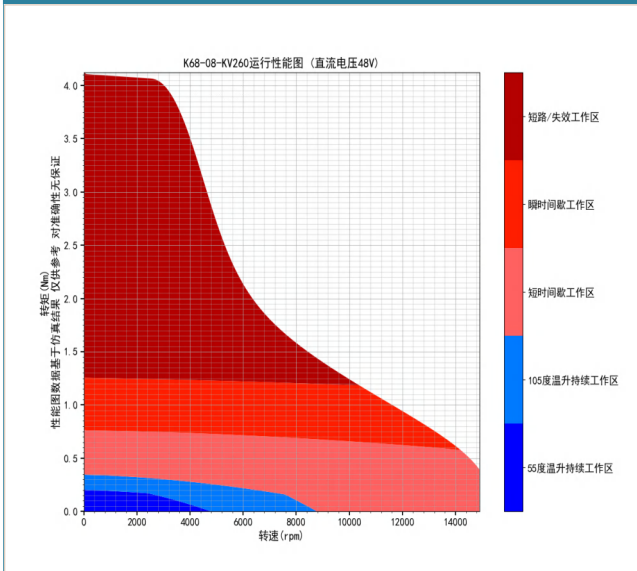
K68-08-KV150 Torque-Current Curve @25°C (T-i curve)



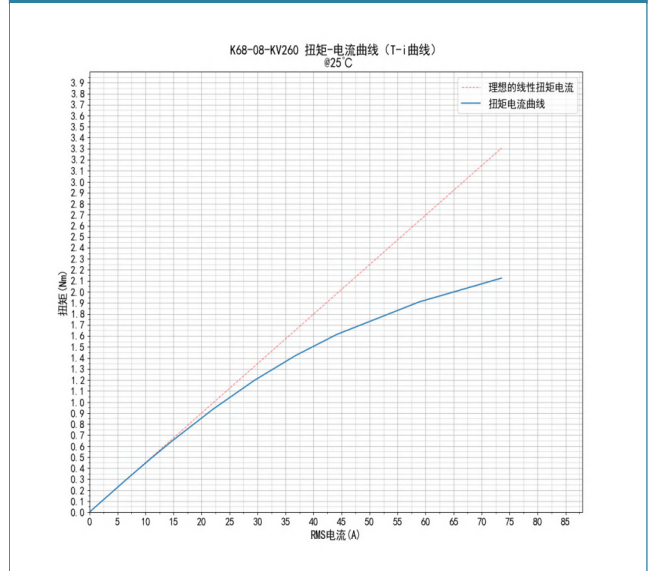


# K68-08-KV260

K68-08-KV260 Operation Performance Chart (at 48V DC)

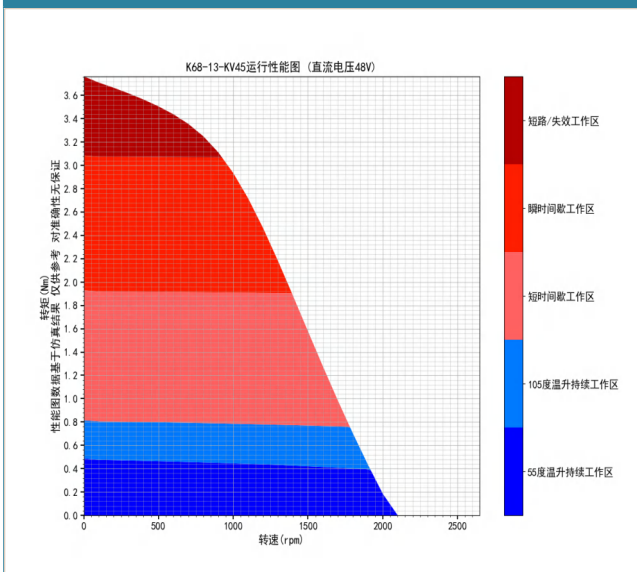


K68-08-KV260 Torque-Current Curve @25°C (T-i curve)

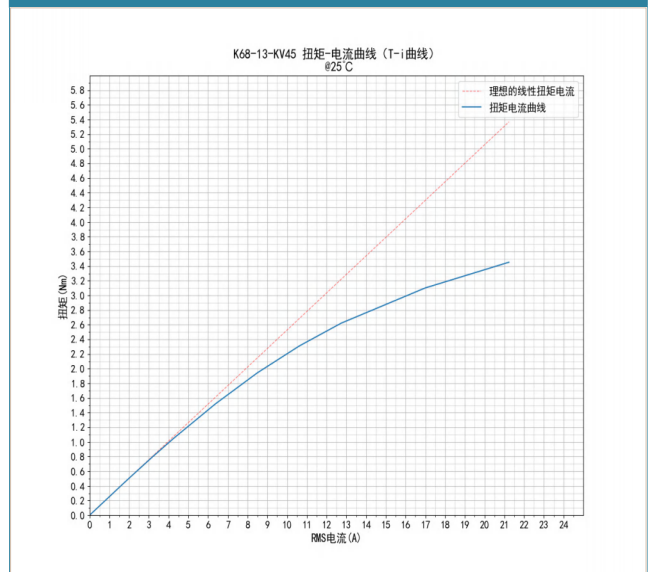


# K68-13-KV45

K68-13-KV45 Operation Performance Chart (at 48V DC)

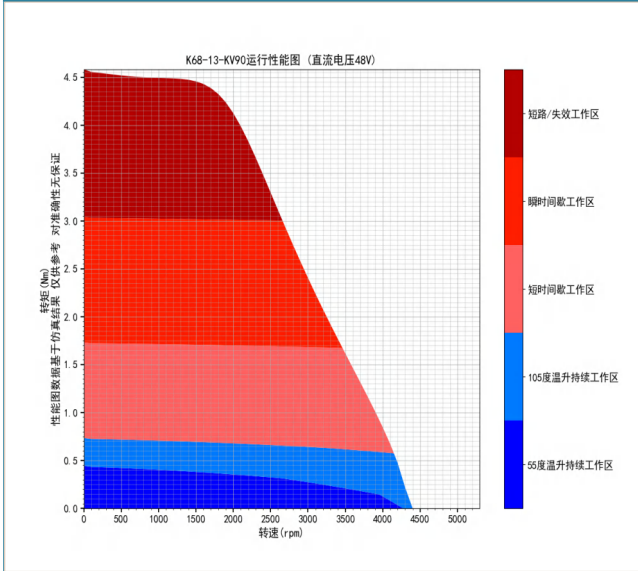


K68-13-KV45 Torque-Current Curve @25°C (T-i curve)

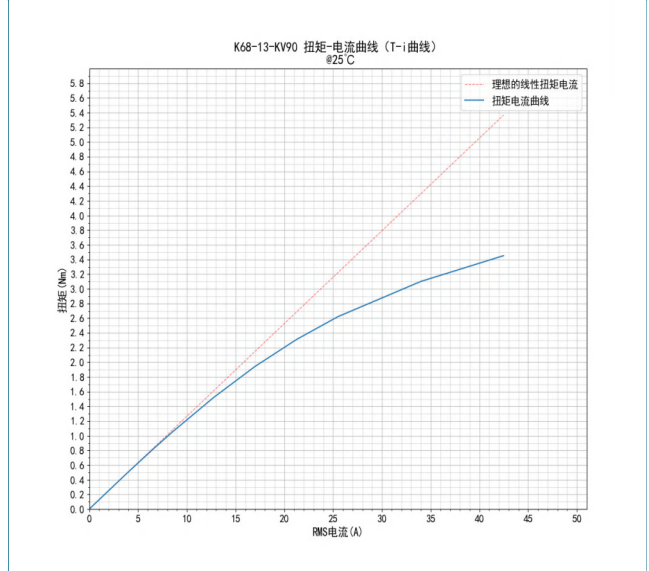


# K68-13-KV90

K68-13-KV90 Operation Performance Chart (at 48V DC)

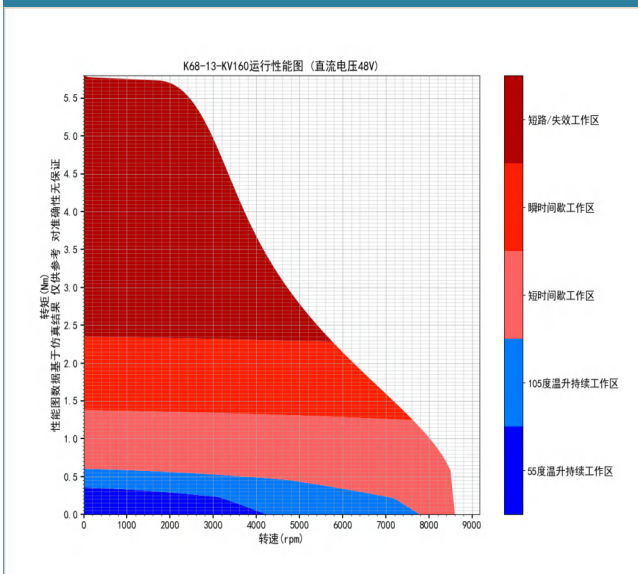


K68-13-KV90 Torque-Current Curve @25°C (T-i curve)

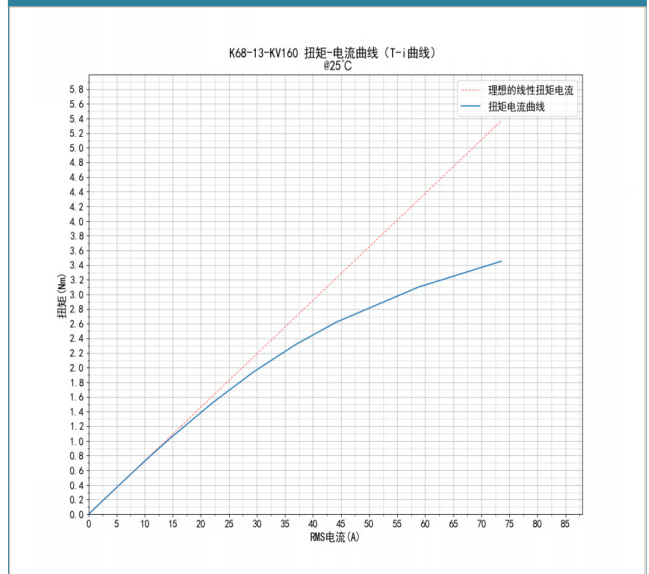


# K68-13-KV160

K68-13-KV160 Operation Performance Chart (at 48V DC)

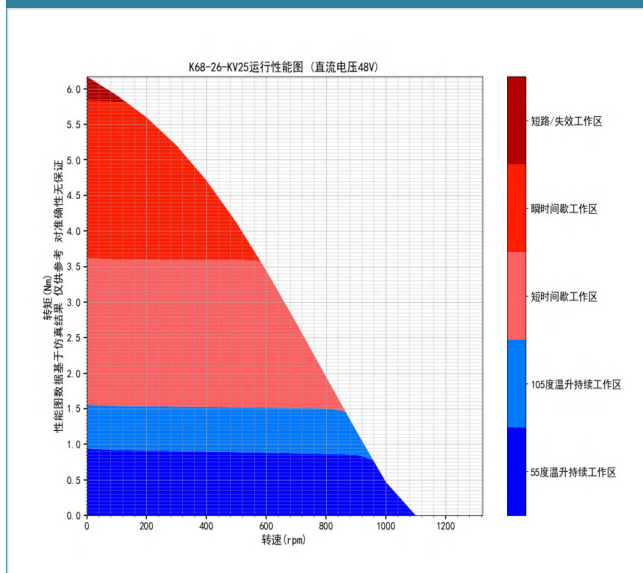


K68-13-KV160 Torque-Current Curve @25°C (T-i curve)

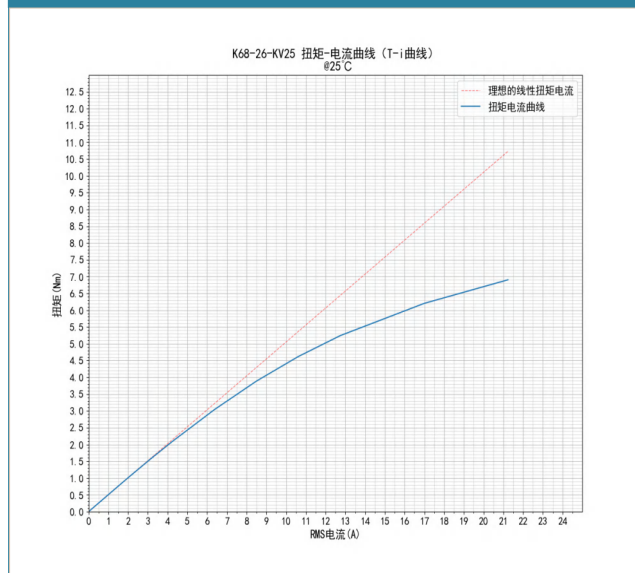


# K68-26-KV25

K68-26-KV25 Operation Performance Chart (at 48V DC)

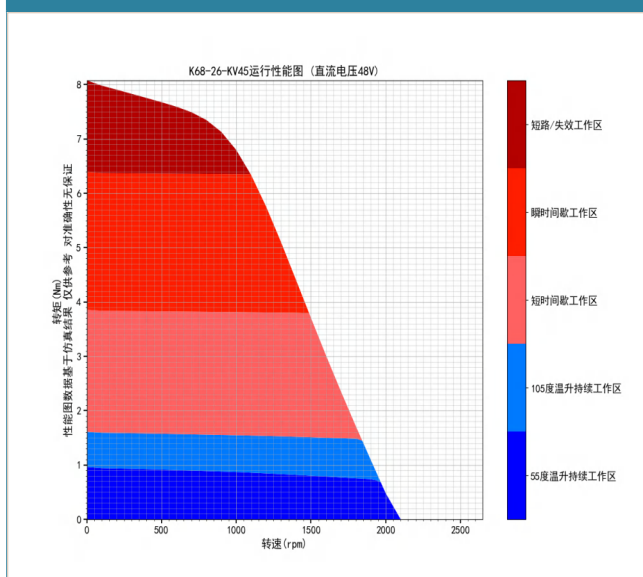


K68-26-KV25 Torque-Current Curve @25°C (T-i curve)

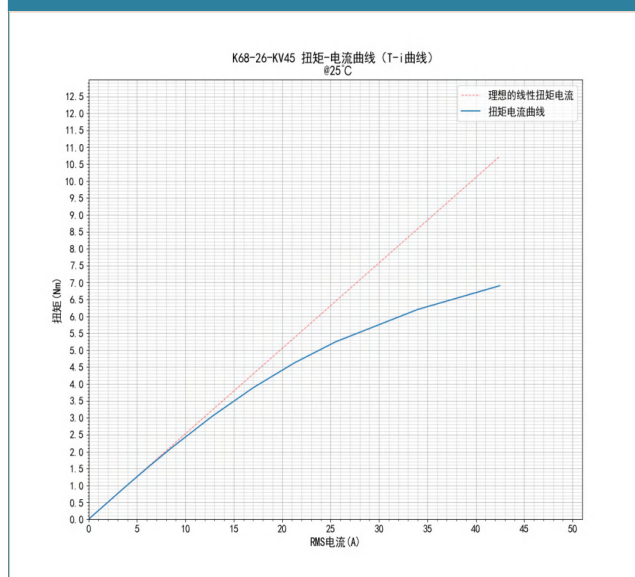


# K68-26-KV45

K68-26-KV45 Operation Performance Chart (at 48V DC)

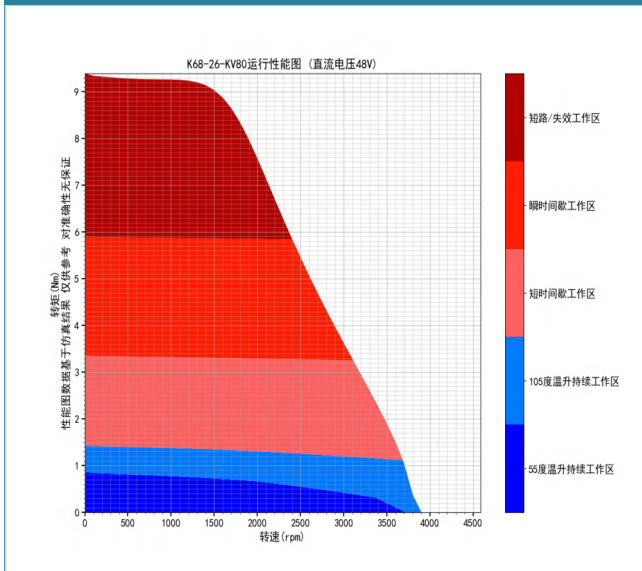


K68-26-KV45 Torque-Current Curve @25°C (T-i curve)

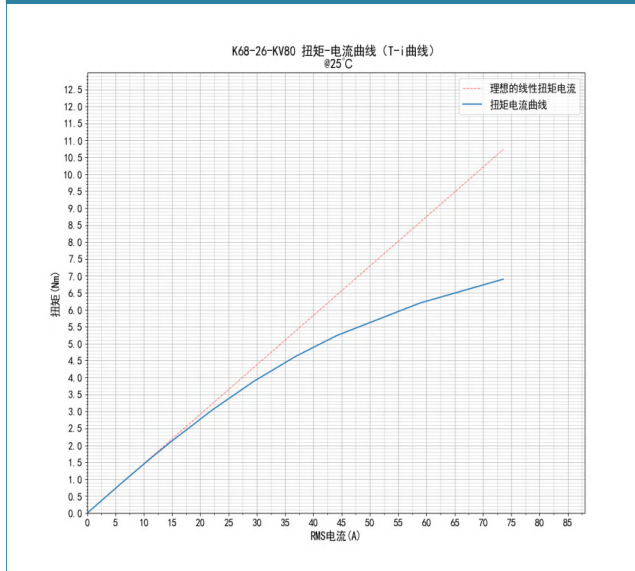


# K68-26-KV80

K68-26-KV80 Operation Performance Chart (at 48V DC)



K68-26-KV80 Torque-Current Curve @25°C (T-i curve)



## K76 Specification K76-08

Type	K76-08		
	KV60	KV120	KV210
Stator Diameter [mm]	76	76	76
Stator Axial Length (Excl. Cable) [mm]	19	19	19
Rotor Inner Diameter [mm]	38	38	38
Weight [g]	182	182	182
Stator Weight (Excl. Cable) [g]	132	132	132
Rotor Weight [g]	50	50	50
Rotor Inertia [kg mm <sup>2</sup> ]	24	24	24
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	180	370	380
No Load Speed @ Typical Voltage [rpm]	2900	5800	10100
Load Speed @ Typical Voltage [rpm]	2580	5440	9620
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	0.67	0.67	0.67
Rated Torque (55°C Temp. Rise) [Nm]	0.4	0.4	0.4
Rated Torque (Lasting 10s) [Nm]	1.6	1.6	1.6
Rated Torque (Lasting 2s) [Nm]	2.7	2.7	2.7
Rated RMS Current (105°C Temp. Rise) [A]	3.6	7.1	12.4
Rated RMS Current (55°C Temp. Rise) [A]	2.14	4.3	7.4
PeaK RMS Current (Lasting 10s) [A]	8.9	17.9	30.9
PeaK RMS Current (Lasting 2s) [A]	17.9	35.7	61.9
KV Constant [rpm/V]	61	122	211
Back EMF Constant [Vs/rad]	0.156	0.0782	0.0452
Torque Constant [Nm/A]	0.133	0.0665	0.0384
Line Resistance [Ohm]	1.08	0.27	0.0899
Line Inductance [H]	0.715	0.179	0.0596
d Axis Inductance [mH]	0.316	0.079	0.079
q Axis Inductance [mH]	0.4	0.0999	0.0999
Time Constant [ms]	0.663	0.663	0.663
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.148	0.148	0.148
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K76 Specification K76-13

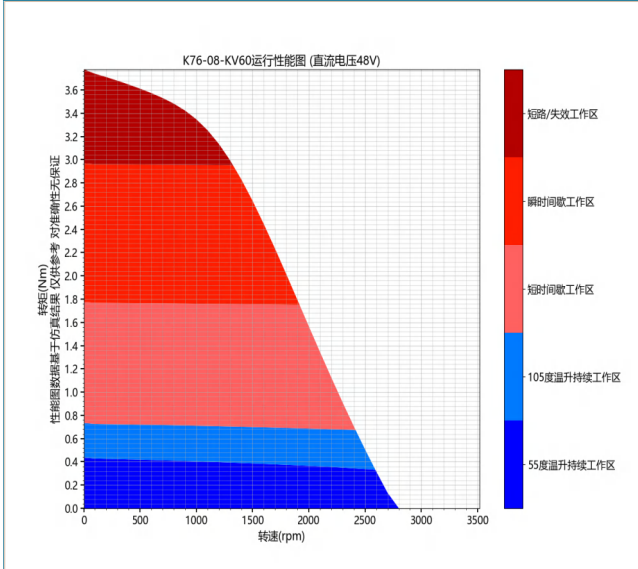
Type	K76-13		
	KV40	KV75	KV130
Stator Diameter [mm]	76	76	76
Stator Axial Length (Excl. Cable) [mm]	24	24	24
Rotor Inner Diameter [mm]	38	38	38
Weight [g]	277	277	277
Stator Weight (Excl. Cable) [g]	196	196	196
Rotor Weight [g]	81	81	81
Rotor Inertia [kg mm <sup>2</sup> ]	40	40	40
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	170	370	610
No Load Speed @ Typical Voltage [rpm]	1800	3600	6200
Load Speed @ Typical Voltage [rpm]	1540	3300	5880
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	1.08	1.08	1.08
Rated Torque (55°C Temp. Rise) [Nm]	0.65	0.65	0.65
Rated Torque (Lasting 10s) [Nm]	2.6	2.6	2.6
Rated Torque (Lasting 2s) [Nm]	4.4	4.4	4.4
Rated RMS Current (105°C Temp. Rise) [A]	3.6	7.1	12.4
Rated RMS Current (55°C Temp. Rise) [A]	2.14	4.3	7.4
PeaK RMS Current (Lasting 10s) [A]	8.9	17.9	30.9
PeaK RMS Current (Lasting 2s) [A]	17.9	35.7	61.9
KV Constant [rpm/V]	38	75	130
Back EMF Constant [Vs/rad]	0.254	0.127	0.0734
Torque Constant [Nm/A]	0.216	0.108	0.0623
Line Resistance [Ohm]	1.38	0.345	0.115
Line Inductance [H]	1.12	0.279	0.0931
d Axis Inductance [mH]	0.491	0.123	0.123
q Axis Inductance [mH]	0.627	0.157	0.157
Time Constant [ms]	0.811	0.811	0.811
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.212	0.212	0.212
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K76 Specification K76-26

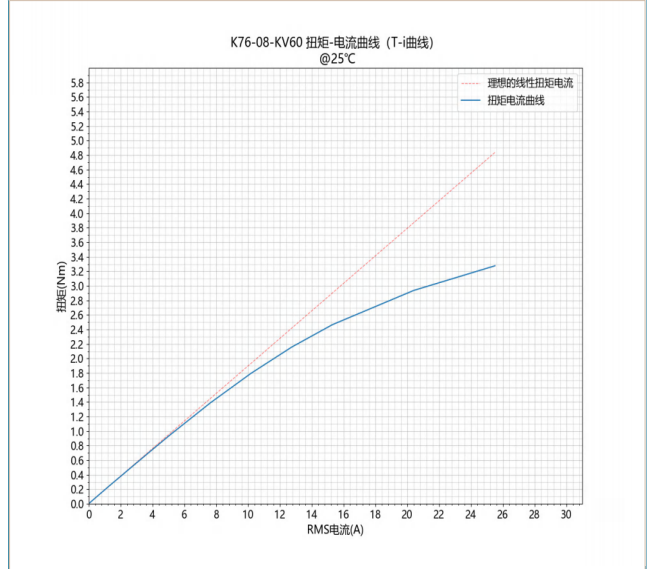
Type	K76-26		
	KV20	KV40	KV65
Stator Diameter [mm]	76	76	76
Stator Axial Length (Excl. Cable) [mm]	37	37	37
Rotor Inner Diameter [mm]	38	38	38
Weight [g]	523	523	523
Stator Weight (Excl. Cable) [g]	361	361	361
Rotor Weight [g]	162	162	162
Rotor Inertia [kg mm <sup>2</sup> ]	80	80	80
DC Drive Voltage (Typical) [V]	12-48(48)	12-48(48)	12-48(48)
Rated Output Power @ Typical Voltage [W]	160	360	650
No Load Speed @ Typical Voltage [rpm]	900	1800	3100
Load Speed @ Typical Voltage [rpm]	710	1590	2880
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	2.2	2.2	2.2
Rated Torque (55°C Temp. Rise) [Nm]	1.3	1.3	1.3
Rated Torque (Lasting 10s) [Nm]	5.2	5.2	5.2
Rated Torque (Lasting 2s) [Nm]	8.8	8.8	8.8
Rated RMS Current (105°C Temp. Rise) [A]	3.6	7.1	12.4
Rated RMS Current (55°C Temp. Rise) [A]	2.14	4.3	7.4
PeaK RMS Current (Lasting 10s) [A]	8.9	17.9	30.9
PeaK RMS Current (Lasting 2s) [A]	17.9	35.7	61.9
KV Constant [rpm/V]	19	38	65
Back EMF Constant [Vs/rad]	0.509	0.254	0.147
Torque Constant [Nm/A]	0.432	0.216	0.125
Line Resistance [Ohm]	2.16	0.54	0.18
Line Inductance [H]	2.16	0.54	0.18
d Axis Inductance [mH]	0.945	0.236	0.236
q Axis Inductance [mH]	1.22	0.304	0.304
Time Constant [ms]	1	1	1
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.339	0.339	0.339
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

# K76-08-KV60

K76-08-KV60 Operation Performance Chart (at 48V DC)

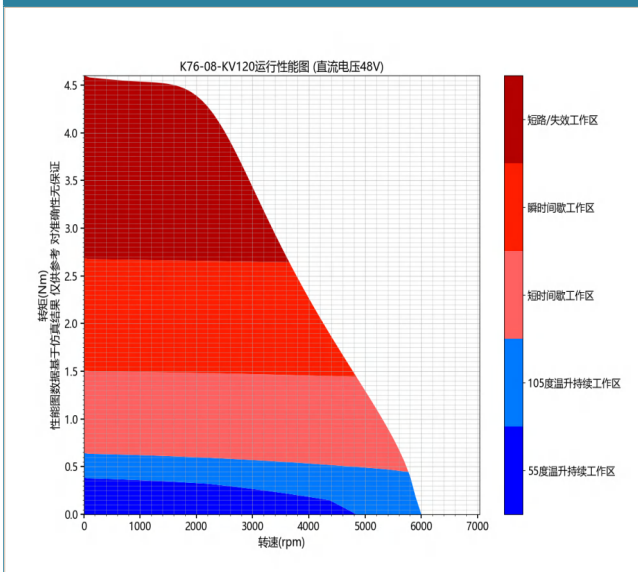


K76-08-KV60 Torque-Current Curve @25°C (T-i curve)

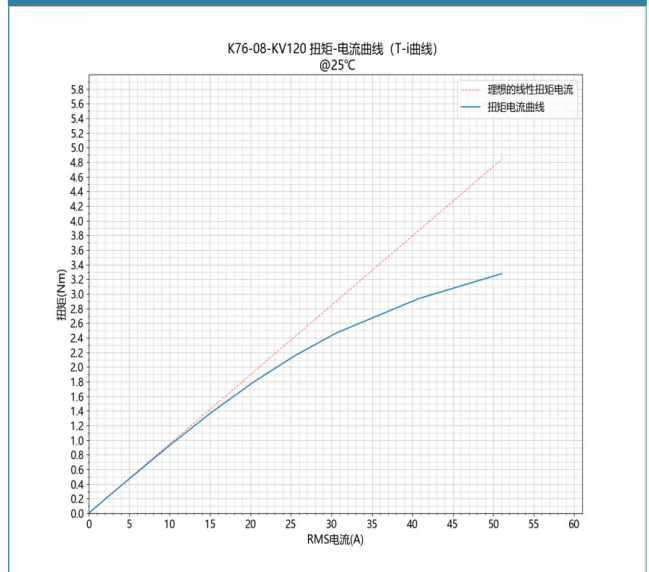


# K76-08-KV120

K76-08-KV120 Operation Performance Chart (at 48V DC)



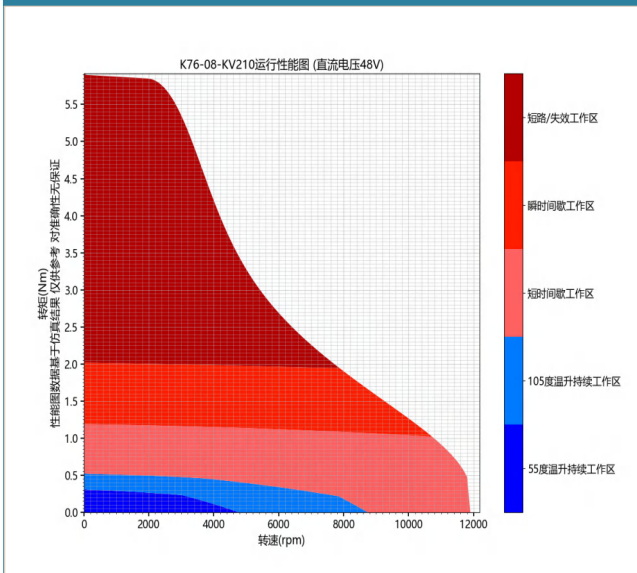
K76-08-KV120 Torque-Current Curve @25°C (T-i curve)



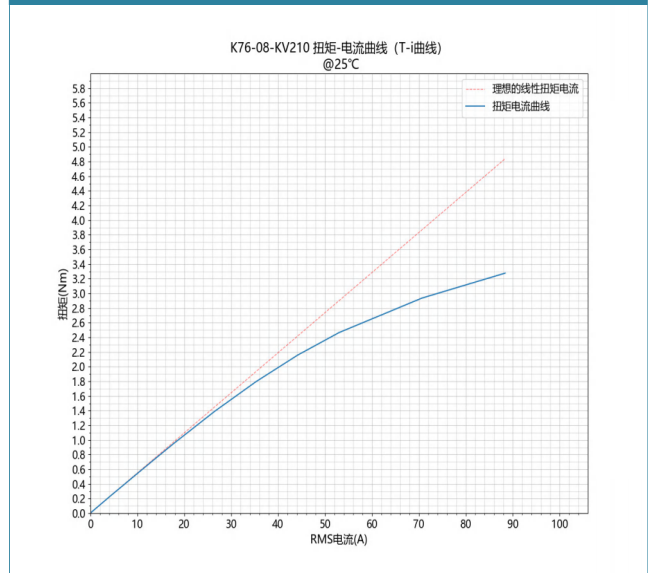


# K76-08-KV210

K76-08-KV210 Operation Performance Chart (at 48V DC)

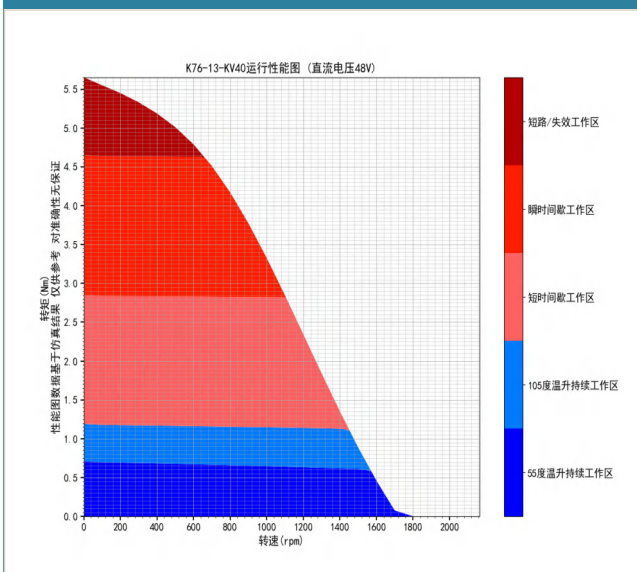


K76-08-KV210 Torque-Current Curve @25°C (T-i curve)

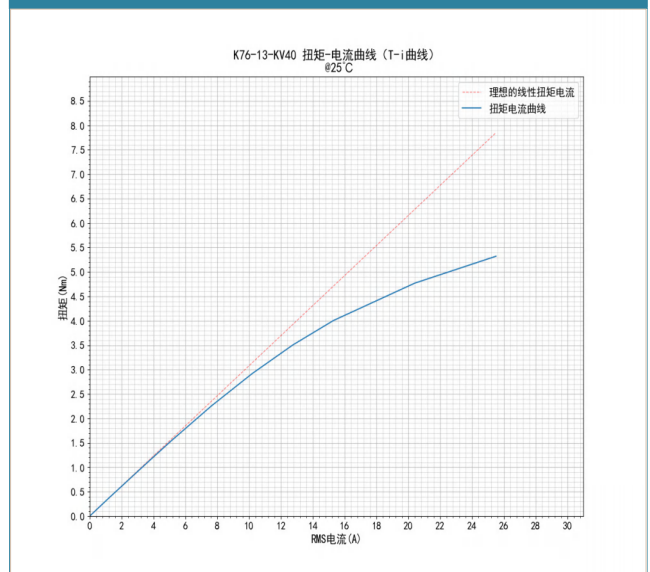


# K76-13-KV40

K76-13-KV40 Operation Performance Chart (at 48V DC)

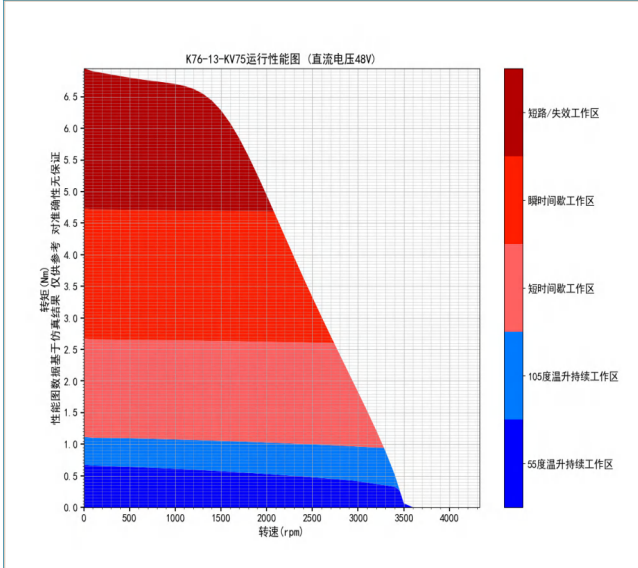


K76-13-KV40 Torque-Current Curve @25°C (T-i curve)

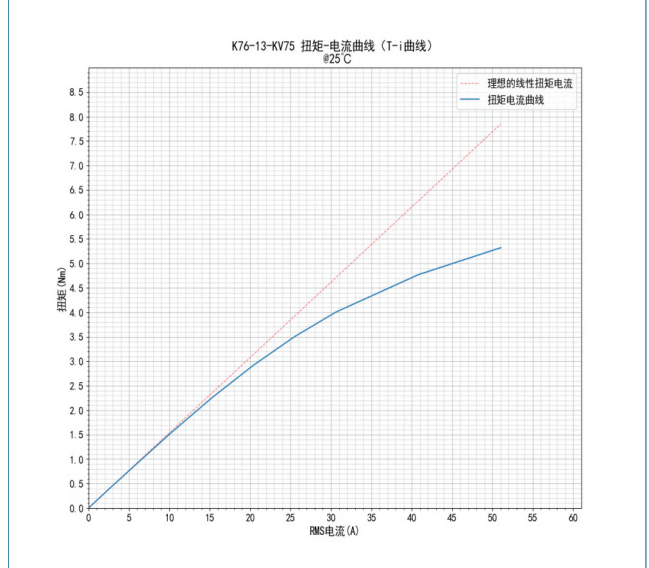


# K76-13-KV75

K76-13-KV75 Operation Performance Chart (at 48V DC)

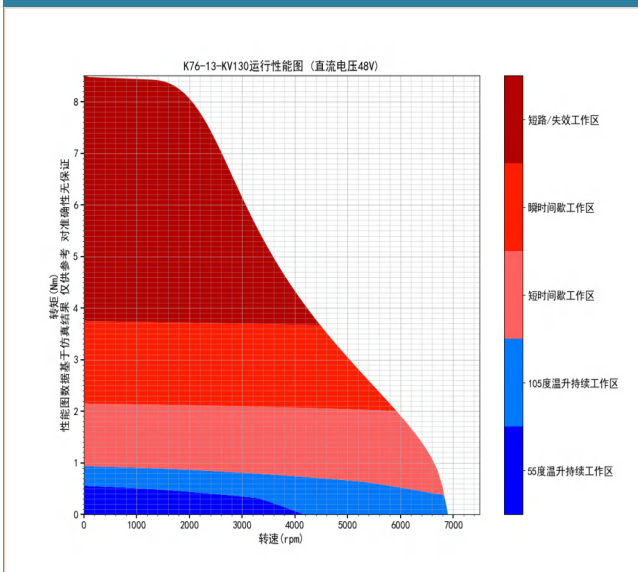


K76-13-KV75 Torque-Current Curve @25°C (T-i curve)

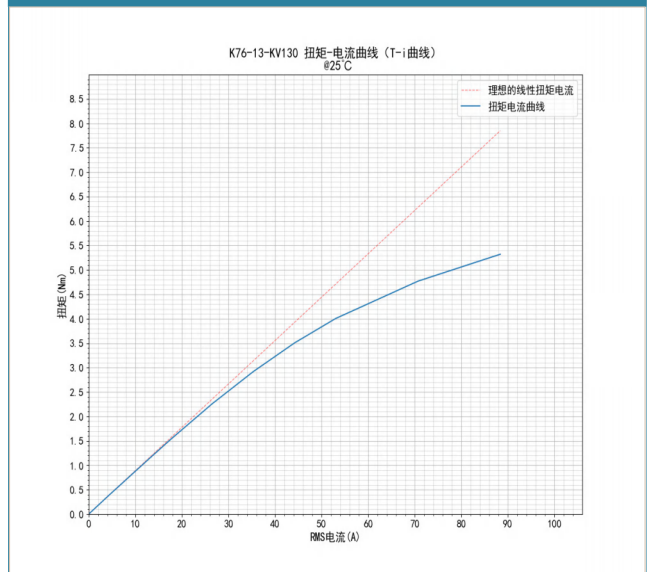


# K76-13-KV130

K76-13-KV130 Operation Performance Chart (at 48V DC)

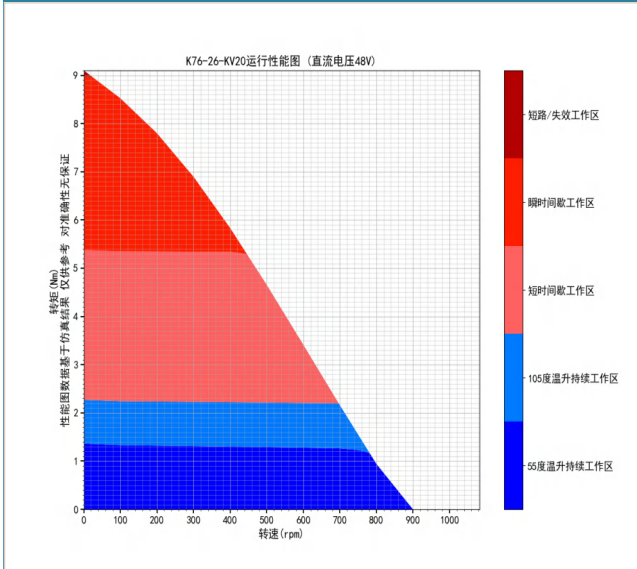


K76-13-KV130 Torque-Current Curve @25°C (T-i curve)

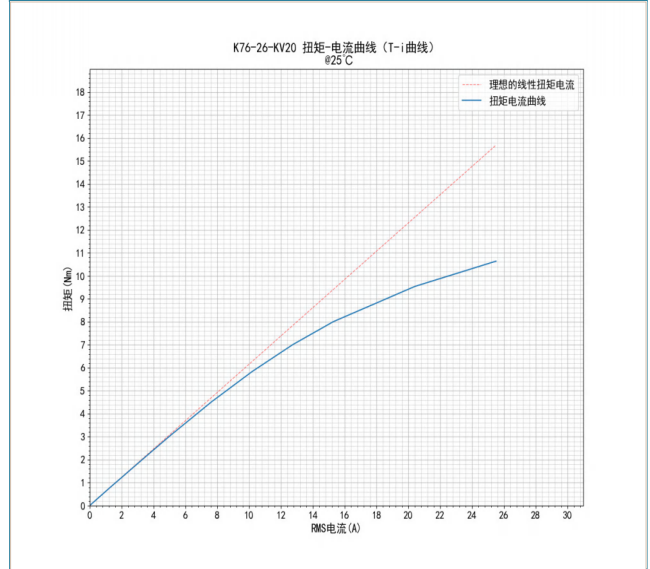


# K76-26-KV20

K76-26-KV20 Operation Performance Chart (at 48V DC)

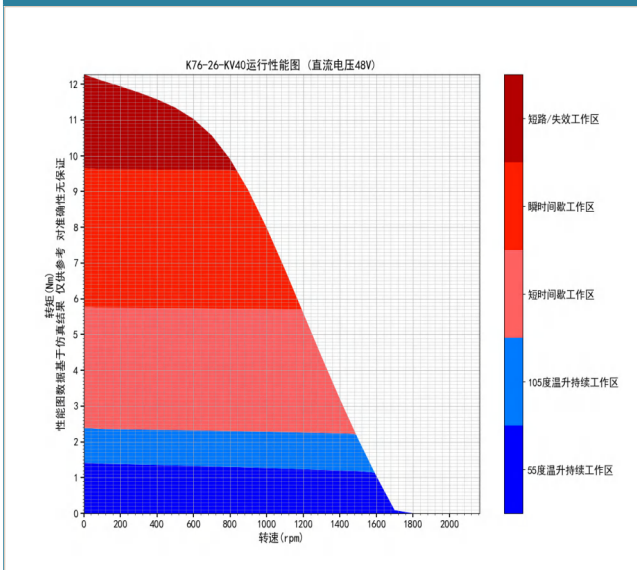


K76-26-KV20 Torque-Current Curve @25°C (T-i curve)

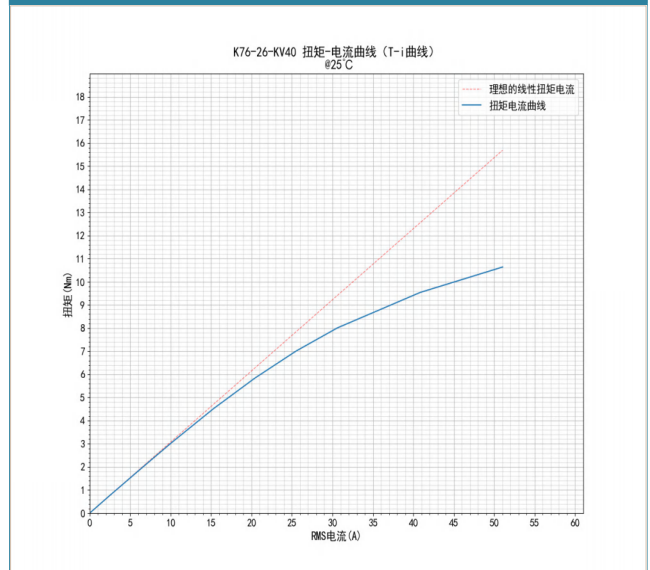


# K76-26-KV40

K76-26-KV40 Operation Performance Chart (at 48V DC)

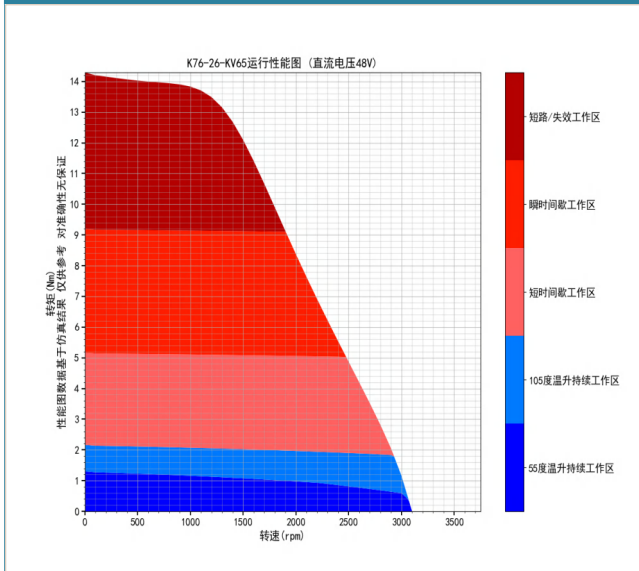


K76-26-KV40 Torque-Current Curve @25°C (T-i curve)

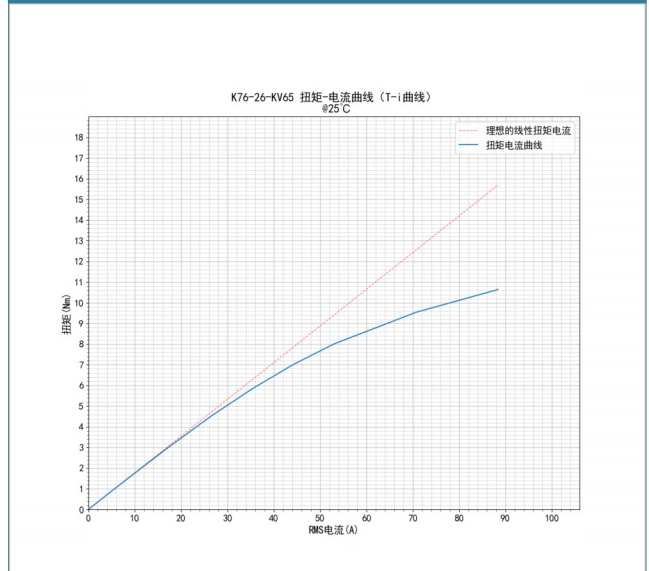


# K76-26-KV65

K76-26-KV65 Operation Performance Chart (at 48V DC)



K76-26-KV65 Torque-Current Curve @25°C (T-i curve)



## K85 Specification K85-08

Type	K85-08		
	KV50	KV100	KV170
Stator Diameter [mm]	85	85	85
Stator Axial Length (Excl. Cable) [mm]	19	19	19
Rotor Inner Diameter [mm]	42.5	42.5	42.5
Weight [g]	245	245	245
Stator Weight (Excl. Cable) [g]	189	189	189
Rotor Weight [g]	56	56	56
Rotor Inertia [kg mm <sup>2</sup> ]	33	33	33
DC Drive Voltage (Typical) [V]	12-60(48)	12-60(48)	12-60(48)
Rated Output Power @ Typical Voltage [W]	230	490	650
No Load Speed @ Typical Voltage [rpm]	2300	4700	8100
Load Speed @ Typical Voltage [rpm]	1970	4180	7420
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	1.14	1.14	1.14
Rated Torque (55°C Temp. Rise) [Nm]	0.68	0.68	0.68
Rated Torque (Lasting 10s) [Nm]	2.5	2.5	2.5
Rated Torque (Lasting 2s) [Nm]	3.7	3.7	3.7
Rated RMS Current (105°C Temp. Rise) [A]	4.9	9.9	17.1
Rated RMS Current (55°C Temp. Rise) [A]	2.96	5.9	10.3
PeaK RMS Current (Lasting 10s) [A]	12.3	24.7	42.7
PeaK RMS Current (Lasting 2s) [A]	24.7	49.4	85.5
KV Constant [rpm/V]	49	98	170
Back EMF Constant [Vs/rad]	0.195	0.0975	0.0563
Torque Constant [Nm/A]	0.165	0.0824	0.0476
Line Resistance [Ohm]	0.92	0.23	0.0767
Line Inductance [H]	1.02	0.254	0.0847
d Axis Inductance [mH]	0.443	0.111	0.111
q Axis Inductance [mH]	0.573	0.143	0.143
Time Constant [ms]	1.1	1.1	1.1
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.198	0.198	0.198
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K85 Specification K85-13

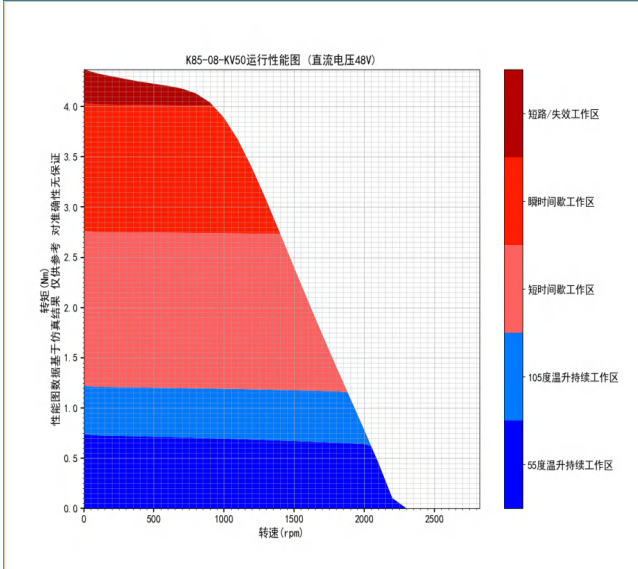
Type	K85-13		
	KV30	KV60	KV100
Stator Diameter [mm]	85	85	85
Stator Axial Length (Excl. Cable) [mm]	24	24	24
Rotor Inner Diameter [mm]	42.5	42.5	42.5
Weight [g]	365	365	365
Stator Weight (Excl. Cable) [g]	274	274	274
Rotor Weight [g]	91	91	91
Rotor Inertia [kg mm <sup>2</sup> ]	54	54	54
DC Drive Voltage (Typical) [V]	12-60(48)	12-60(48)	12-60(48)
Rated Output Power @ Typical Voltage [W]	220	490	880
No Load Speed @ Typical Voltage [rpm]	1400	2800	5000
Load Speed @ Typical Voltage [rpm]	1170	2540	4540
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	1.85	1.85	1.85
Rated Torque (55°C Temp. Rise) [Nm]	1.11	1.11	1.11
Rated Torque (Lasting 10s) [Nm]	4.1	4.1	4.1
Rated Torque (Lasting 2s) [Nm]	6	6	6
Rated RMS Current (105°C Temp. Rise) [A]	4.9	9.9	17.1
Rated RMS Current (55°C Temp. Rise) [A]	2.96	5.9	10.3
PeaK RMS Current (Lasting 10s) [A]	12.3	24.7	42.7
PeaK RMS Current (Lasting 2s) [A]	24.7	49.4	85.5
KV Constant [rpm/V]	30	60	104
BacK EMF Constant [Vs/rad]	0.317	0.158	0.0915
Torque Constant [Nm/A]	0.268	0.134	0.0773
Line Resistance [Ohm]	1.16	0.29	0.0967
Line Inductance [H]	1.6	0.4	0.133
d Axis Inductance [mH]	0.695	0.174	0.174
q Axis Inductance [mH]	0.905	0.226	0.226
Time Constant [ms]	1.38	1.38	1.38
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.287	0.287	0.287
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K85 Specification K85-26

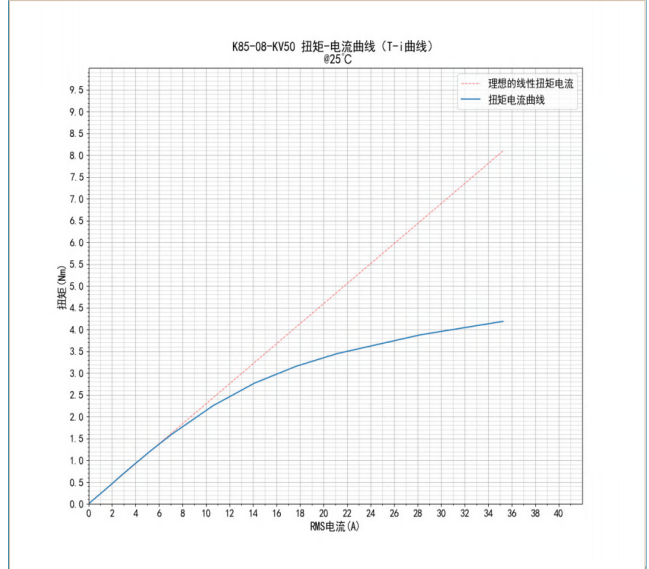
Type	K85-26		
	KV15	KV30	KV50
Stator Diameter [mm]	85	85	85
Stator Axial Length (Excl. Cable) [mm]	37	37	37
Rotor Inner Diameter [mm]	42.5	42.5	42.5
Weight [g]	678	678	678
Stator Weight (Excl. Cable) [g]	497	497	497
Rotor Weight [g]	181	181	181
Rotor Inertia [kg mm <sup>2</sup> ]	109	109	109
DC Drive Voltage (Typical) [V]	12-60(48)	12-60(48)	12-60(48)
Rated Output Power @ Typical Voltage [W]	200	470	860
No Load Speed @ Typical Voltage [rpm]	720	1400	2500
Load Speed @ Typical Voltage [rpm]	530	1220	2220
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	3.7	3.7	3.7
Rated Torque (55°C Temp. Rise) [Nm]	2.2	2.2	2.2
Rated Torque (Lasting 10s) [Nm]	8.2	8.2	8.2
Rated Torque (Lasting 2s) [Nm]	11.9	11.9	11.9
Rated RMS Current (105°C Temp. Rise) [A]	4.9	9.9	17.1
Rated RMS Current (55°C Temp. Rise) [A]	2.96	5.9	10.3
PeaK RMS Current (Lasting 10s) [A]	12.3	24.7	42.7
PeaK RMS Current (Lasting 2s) [A]	24.7	49.4	85.5
KV Constant [rpm/V]	15	30	52
Back EMF Constant [Vs/rad]	0.634	0.317	0.183
Torque Constant [Nm/A]	0.535	0.268	0.154
Line Resistance [Ohm]	1.79	0.447	0.149
Line Inductance [H]	3.12	0.779	0.26
d Axis Inductance [mH]	1.35	0.337	0.337
q Axis Inductance [mH]	1.77	0.442	0.442
Time Constant [ms]	1.74	1.74	1.74
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.462	0.462	0.462
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

# K85-08-KV50

K85-08-KV50 Operation Performance Chart (at 48V DC)

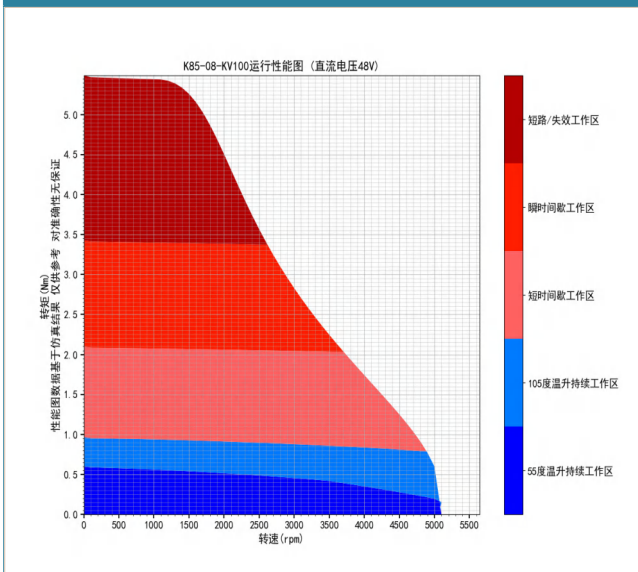


K85-08-KV50 Torque-Current Curve @25°C (T-i curve)

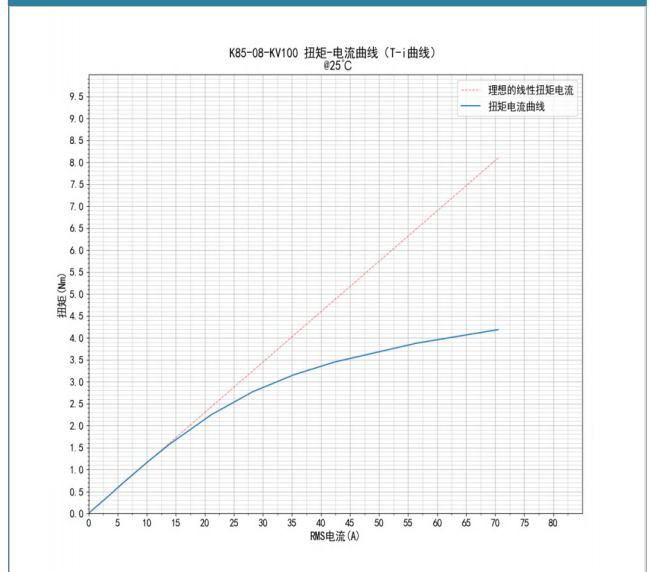


# K85-08-KV100

K85-08-KV100 Operation Performance Chart (at 48V DC)



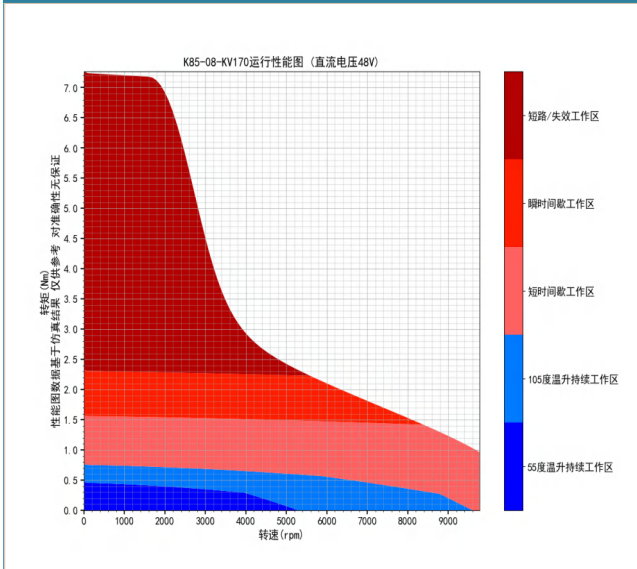
K85-08-KV100 Torque-Current Curve @25°C (T-i curve)



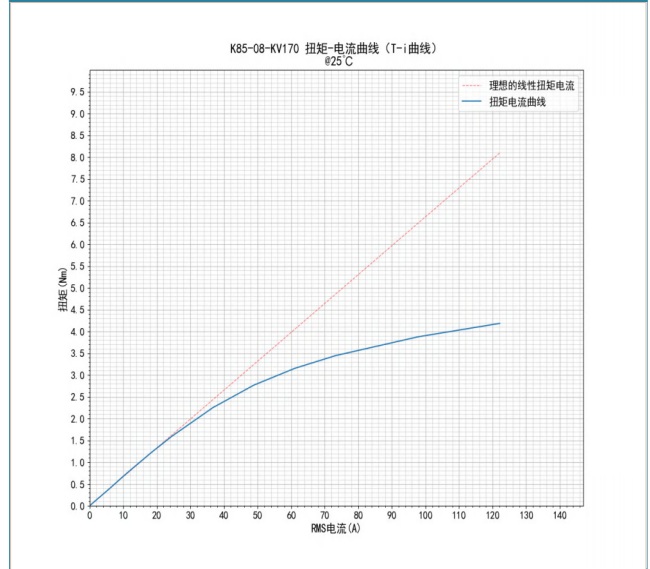


# K85-08-KV170

K85-08-KV170 Operation Performance Chart (at 48V DC)

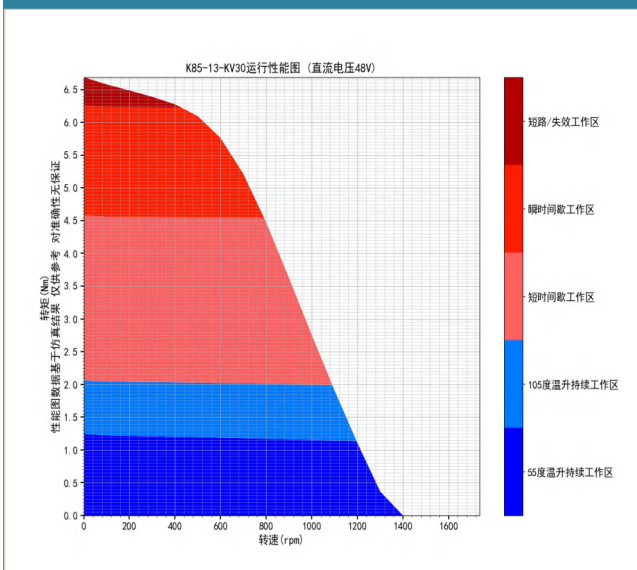


K85-08-KV170 Torque-Current Curve @25°C (T-i curve)

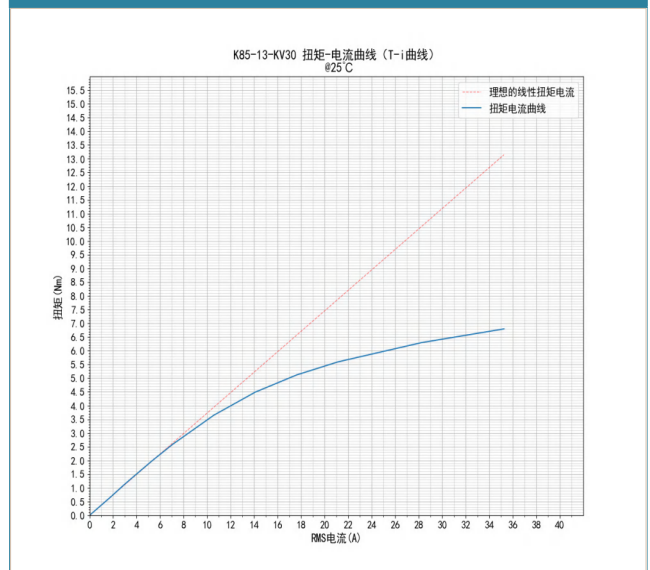


# K85-13-KV30

K85-13-KV30 Operation Performance Chart (at 48V DC)

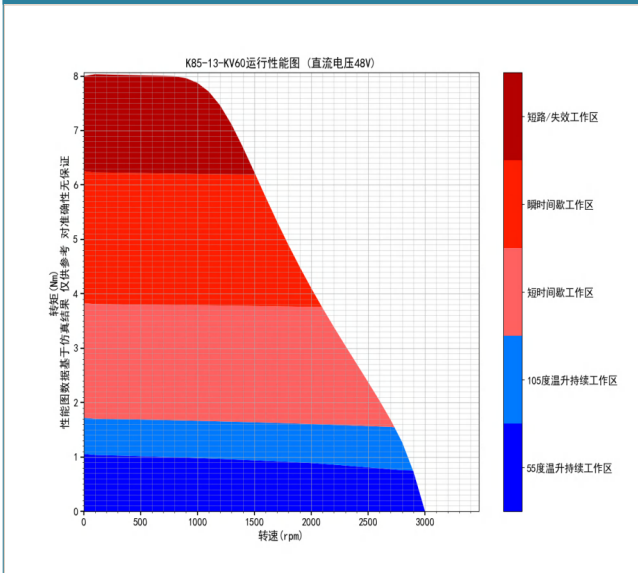


K85-13-KV30 Torque-Current Curve @25°C (T-i curve)

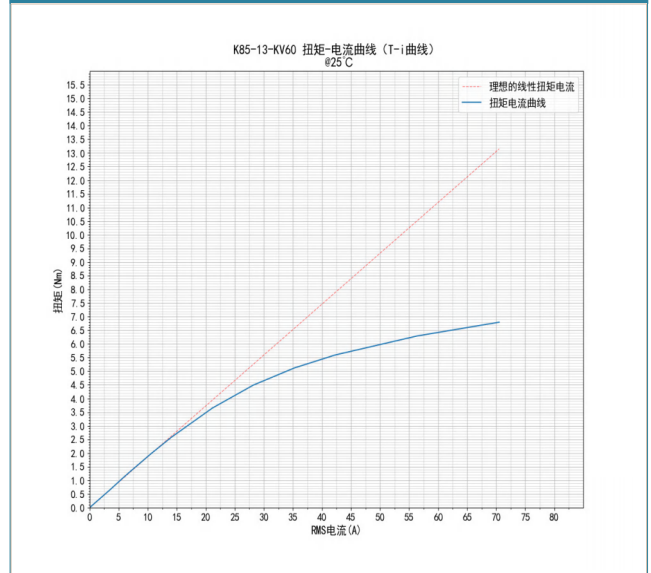


# K85-13-KV60

K85-13-KV60 Operation Performance Chart (at 48V DC)

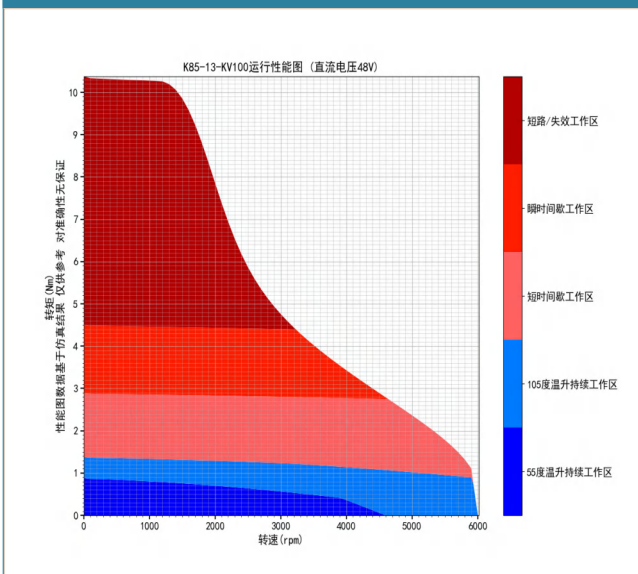


K85-13-KV60 Torque-Current Curve @25°C (T-i curve)

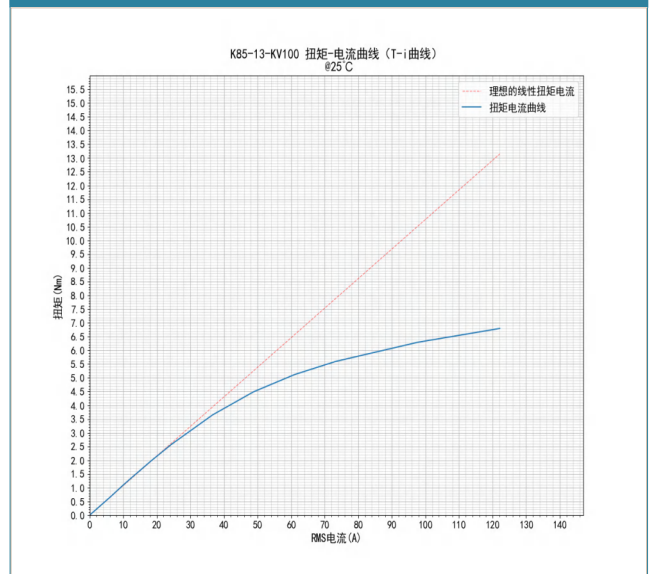


# K85-13-KV100

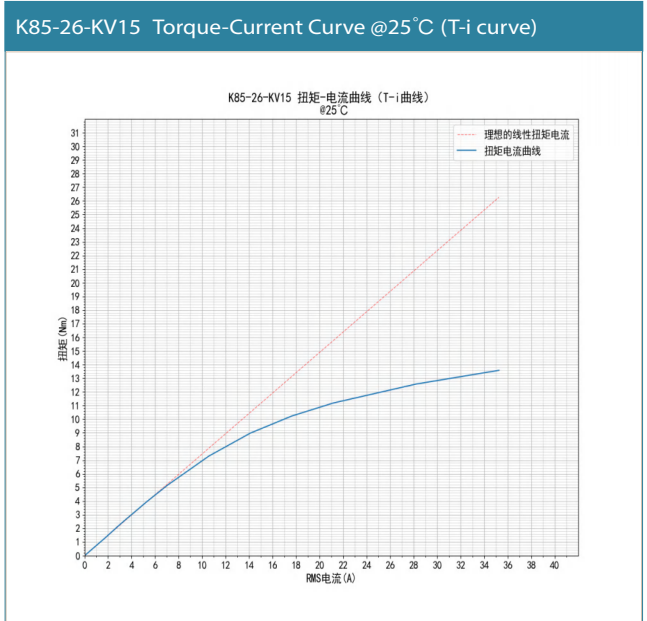
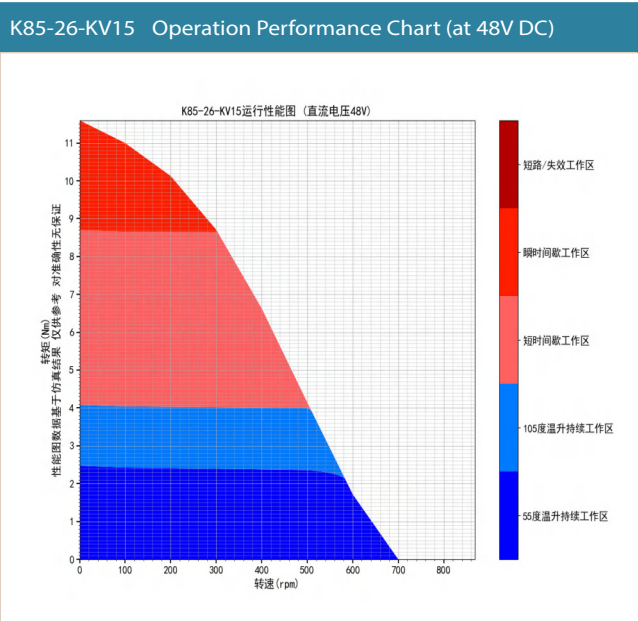
K85-13-KV100 Operation Performance Chart (at 48V DC)



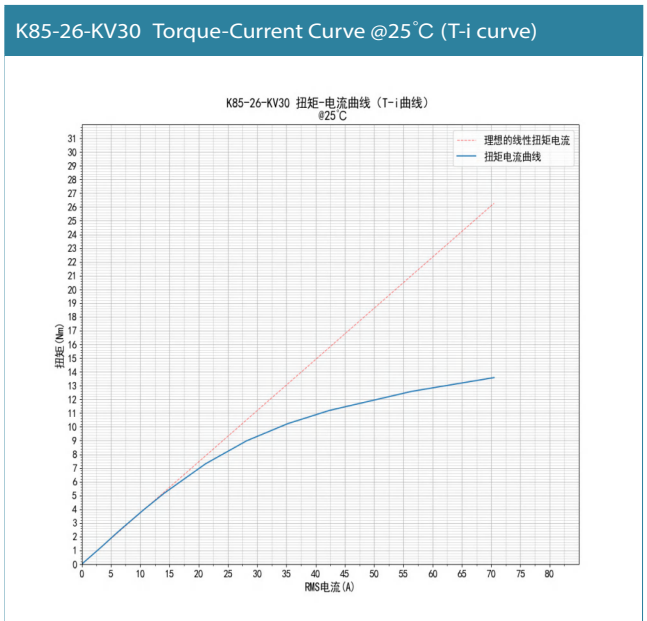
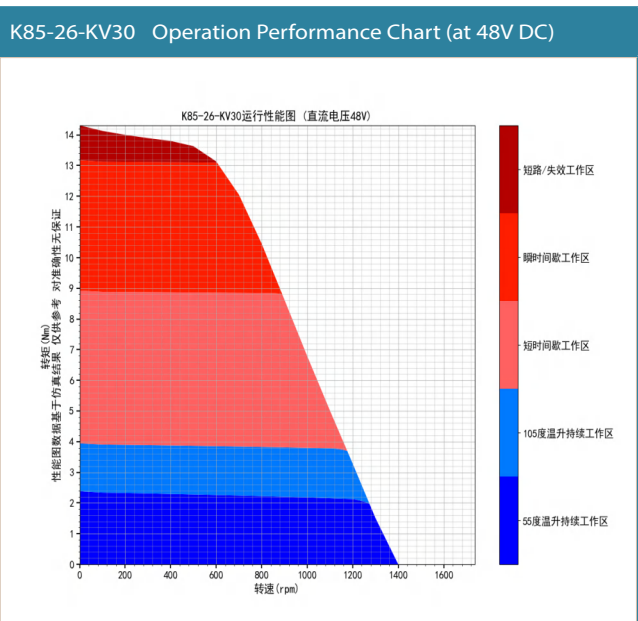
K85-13-KV100 Torque-Current Curve @25°C (T-i curve)



# K85-26-KV15

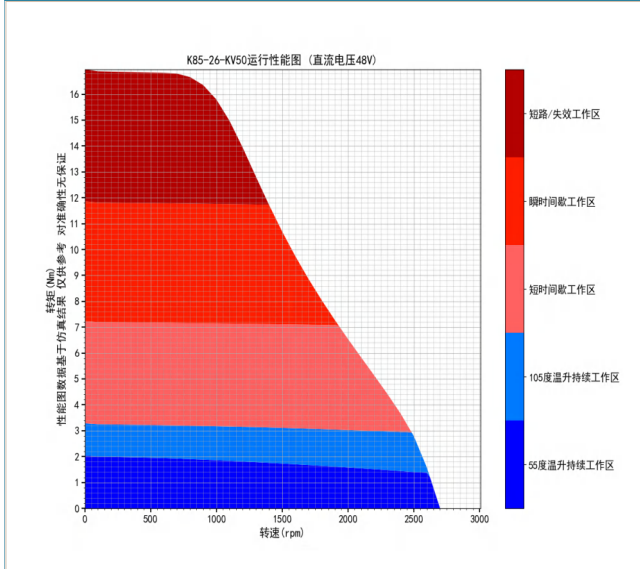


# K85-26-KV30

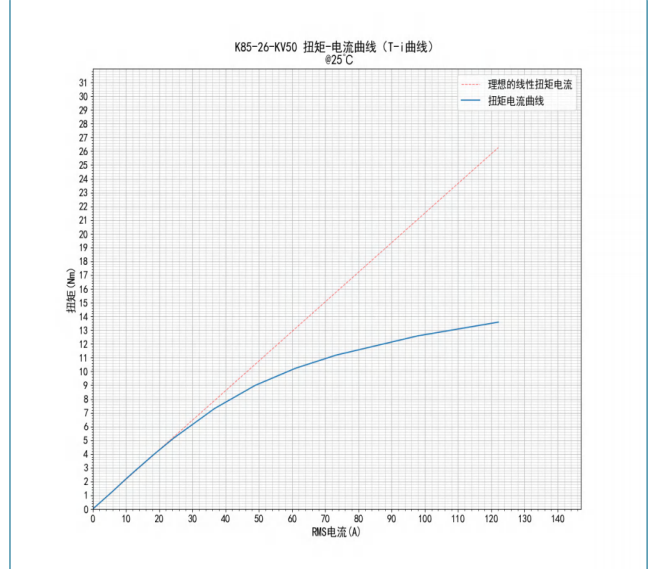


# K85-26-KV50

K85-26-KV50 Operation Performance Chart (at 48V DC)



K85-26-KV50 Torque-Current Curve @25°C (T-i curve)



## K94 Specification K94-08

Type	K94-08		
	KV55	KV110	KV190
Stator Diameter [mm]	94	94	94
Stator Axial Length (Excl. Cable) [mm]	20	20	20
Rotor Inner Diameter [mm]	47	47	47
Weight [g]	302	302	302
Stator Weight (Excl. Cable) [g]	237	237	237
Rotor Weight [g]	65	65	65
Rotor Inertia [kg mm <sup>2</sup> ]	47	47	47
DC Drive Voltage (Typical) [V]	12-60(48)	12-60(48)	12-60(48)
Rated Output Power @ Typical Voltage [W]	360	760	890
No Load Speed @ Typical Voltage [rpm]	2500	5100	8800
Load Speed @ Typical Voltage [rpm]	2200	4630	8180
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	1.57	1.57	1.57
Rated Torque (55°C Temp. Rise) [Nm]	0.94	0.94	0.94
Rated Torque (Lasting 10s) [Nm]	3.5	3.5	3.5
Rated Torque (Lasting 2s) [Nm]	5.2	5.2	5.2
Rated RMS Current (105°C Temp. Rise) [A]	7.4	14.8	25.6
Rated RMS Current (55°C Temp. Rise) [A]	4.4	8.9	15.4
PeaK RMS Current (Lasting 10s) [A]	18.5	37	64
PeaK RMS Current (Lasting 2s) [A]	37	73.9	128.1
KV Constant [rpm/V]	53	107	185
Back EMF Constant [Vs/rad]	0.179	0.0893	0.0515
Torque Constant [Nm/A]	0.151	0.0755	0.0436
Line Resistance [Ohm]	0.507	0.127	0.0422
Line Inductance [H]	0.609	0.152	0.0508
d Axis Inductance [mH]	0.269	0.0673	0.0673
q Axis Inductance [mH]	0.34	0.0849	0.0849
Time Constant [ms]	1.2	1.2	1.2
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.245	0.245	0.245
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K94 Specification K94-13

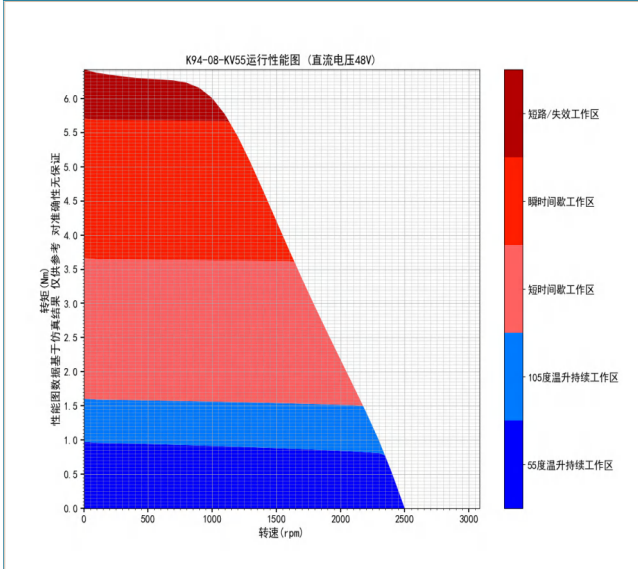
Type	K94-13		
	KV35	KV65	KV110
Stator Diameter [mm]	94	94	94
Stator Axial Length (Excl. Cable) [mm]	25	25	25
Rotor Inner Diameter [mm]	47	47	47
Weight [g]	449	449	449
Stator Weight (Excl. Cable) [g]	343	343	343
Rotor Weight [g]	106	106	106
Rotor Inertia [kg mm <sup>2</sup> ]	77	77	77
DC Drive Voltage (Typical) [V]	12-60(48)	12-60(48)	12-60(48)
Rated Output Power @ Typical Voltage [W]	350	750	1330
No Load Speed @ Typical Voltage [rpm]	1500	3100	5400
Load Speed @ Typical Voltage [rpm]	1320	2820	5020
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	2.5	2.5	2.5
Rated Torque (55°C Temp. Rise) [Nm]	1.53	1.53	1.53
Rated Torque (Lasting 10s) [Nm]	5.7	5.7	5.7
Rated Torque (Lasting 2s) [Nm]	8.4	8.4	8.4
Rated RMS Current (105°C Temp. Rise) [A]	7.4	14.8	25.6
Rated RMS Current (55°C Temp. Rise) [A]	4.4	8.9	15.4
PeaK RMS Current (Lasting 10s) [A]	18.5	37	64
PeaK RMS Current (Lasting 2s) [A]	37	73.9	128.1
KV Constant [rpm/V]	33	66	114
Back EMF Constant [Vs/rad]	0.29	0.145	0.0837
Torque Constant [Nm/A]	0.245	0.123	0.0708
Line Resistance [Ohm]	0.632	0.158	0.0527
Line Inductance [H]	0.949	0.237	0.0791
d Axis Inductance [mH]	0.417	0.104	0.104
q Axis Inductance [mH]	0.532	0.133	0.133
Time Constant [ms]	1.5	1.5	1.5
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.356	0.356	0.356
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K94 Specification K94-26

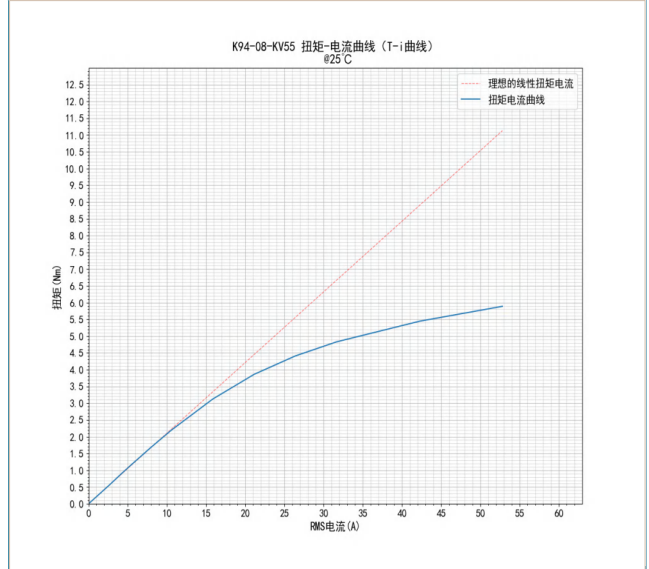
Type	K94-26		
	KV15	KV35	KV55
Stator Diameter [mm]	94	94	94
Stator Axial Length (Excl. Cable) [mm]	38	38	38
Rotor Inner Diameter [mm]	47	47	47
Weight [g]	831	831	831
Stator Weight (Excl. Cable) [g]	620	620	620
Rotor Weight [g]	211	211	211
Rotor Inertia [kg mm <sup>2</sup> ]	153	153	153
DC Drive Voltage (Typical) [V]	12-60(48)	12-60(48)	12-60(48)
Rated Output Power @ Typical Voltage [W]	330	730	1310
No Load Speed @ Typical Voltage [rpm]	790	1500	2700
Load Speed @ Typical Voltage [rpm]	620	1370	2470
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	5.1	5.1	5.1
Rated Torque (55°C Temp. Rise) [Nm]	3.1	3.1	3.1
Rated Torque (Lasting 10s) [Nm]	11.4	11.4	11.4
Rated Torque (Lasting 2s) [Nm]	16.8	16.8	16.8
Rated RMS Current (105°C Temp. Rise) [A]	7.4	14.8	25.6
Rated RMS Current (55°C Temp. Rise) [A]	4.4	8.9	15.4
PeaK RMS Current (Lasting 10s) [A]	18.5	37	64
PeaK RMS Current (Lasting 2s) [A]	37	73.9	128.1
KV Constant [rpm/V]	16	33	57
Back EMF Constant [Vs/rad]	0.58	0.29	0.167
Torque Constant [Nm/A]	0.49	0.245	0.142
Line Resistance [Ohm]	0.958	0.239	0.0798
Line Inductance [H]	1.83	0.458	0.153
d Axis Inductance [mH]	0.802	0.2	0.2
q Axis Inductance [mH]	1.03	0.258	0.258
Time Constant [ms]	1.91	1.91	1.91
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.579	0.579	0.579
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

# K94-08-KV55

K94-08-KV55 Operation Performance Chart (at 48V DC)

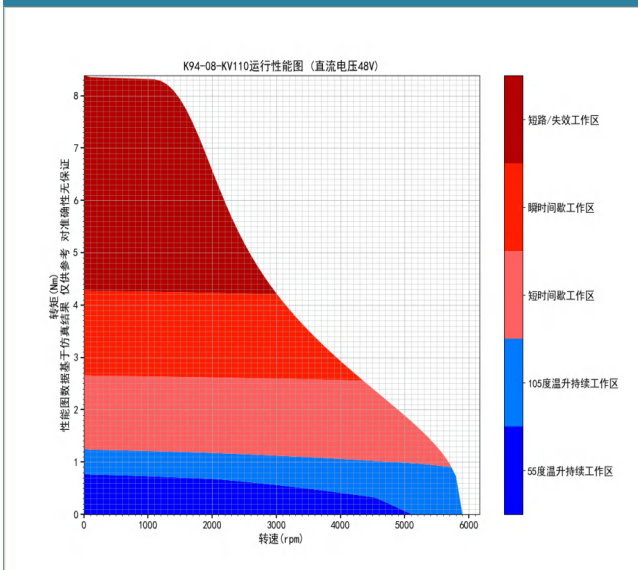


K94-08-KV55 Torque-Current Curve @25°C (T-i curve)

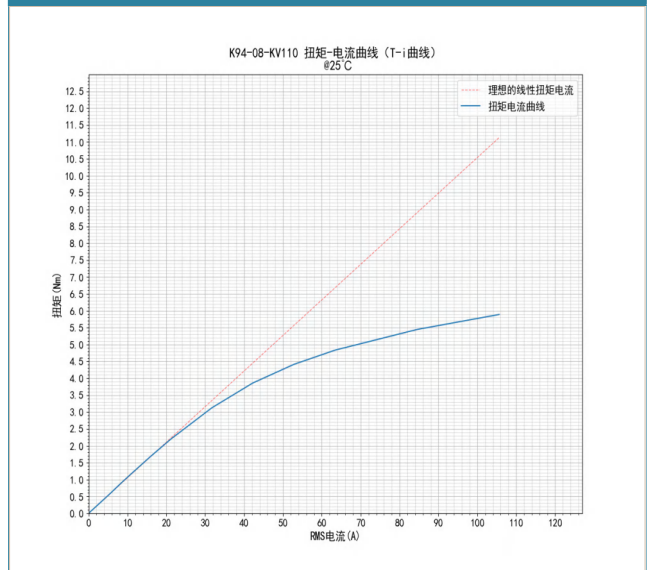


# K94-08-KV110

K94-08-KV110 Operation Performance Chart (at 48V DC)



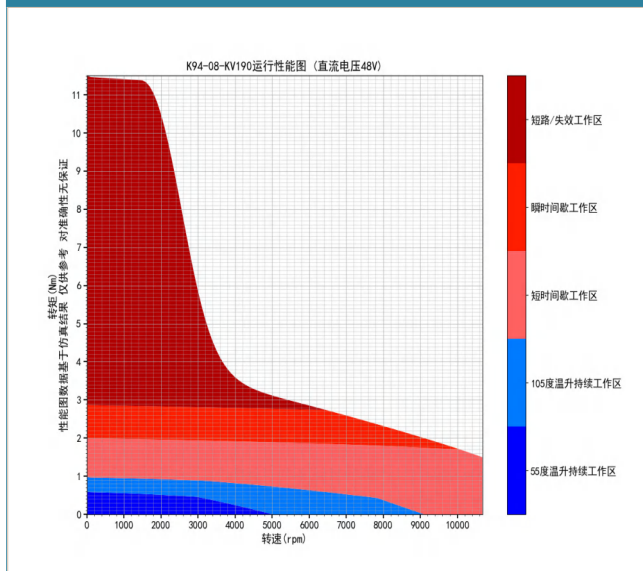
K94-08-KV110 Torque-Current Curve @25°C (T-i curve)



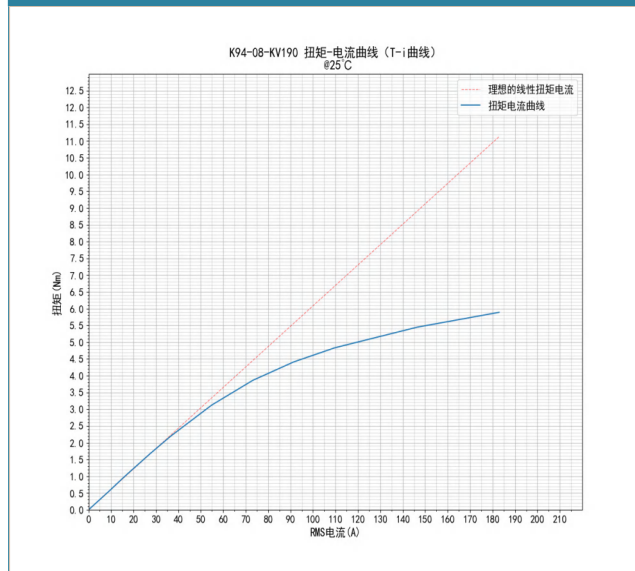


# K94-08-KV190

K94-08-KV190 Operation Performance Chart (at 48V DC)

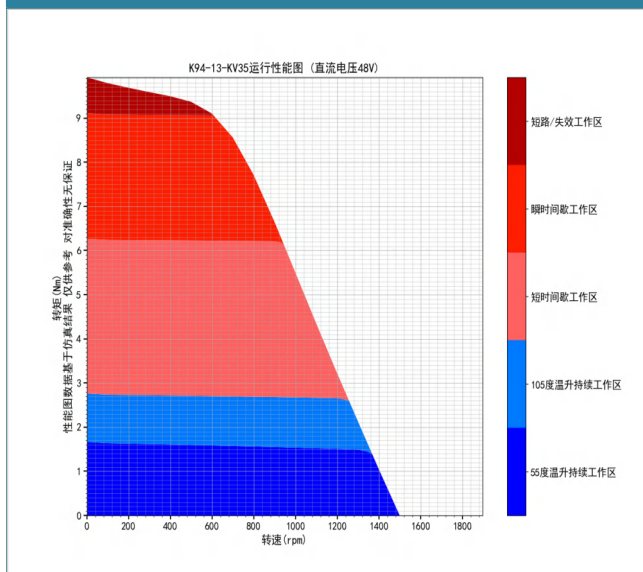


K94-08-KV190 Torque-Current Curve @25°C (T-i curve)

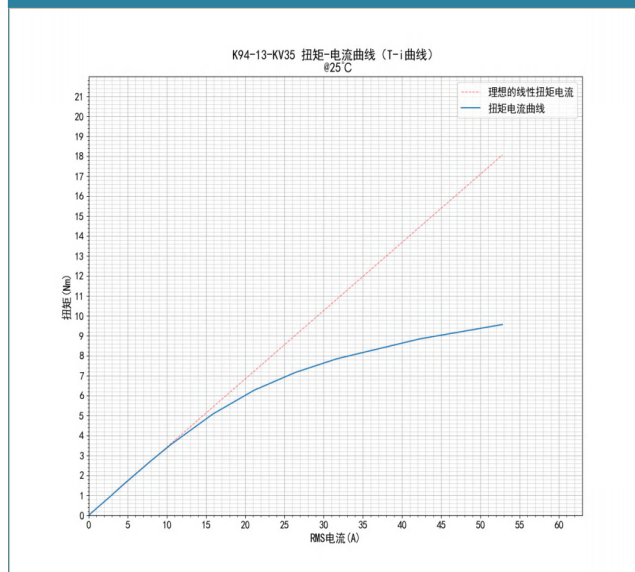


# K94-13-KV35

K94-13-KV35 Operation Performance Chart (at 48V DC)

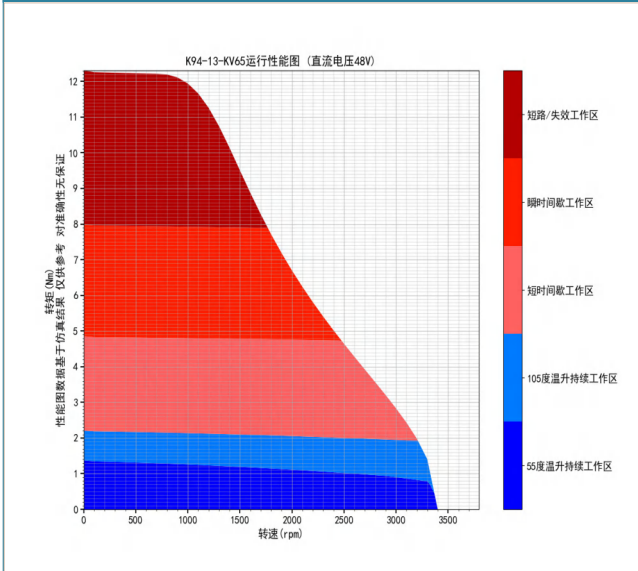


K94-13-KV35 Torque-Current Curve @25°C (T-i curve)

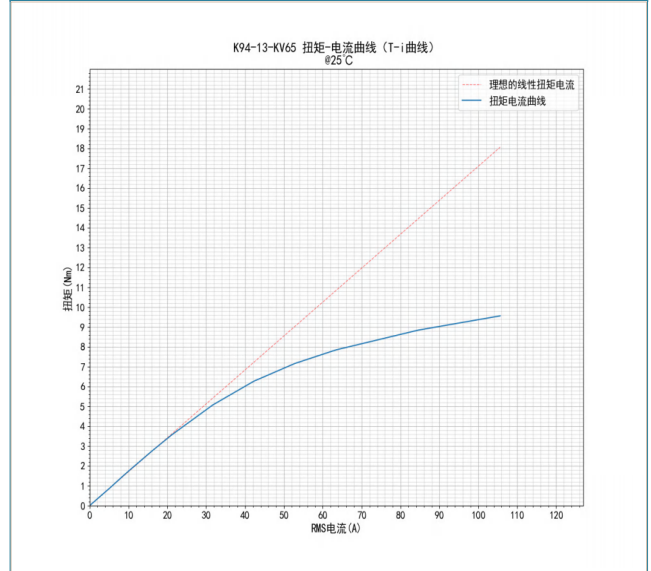


# K94-13-KV65

K94-13-KV65 Operation Performance Chart (at 48V DC)

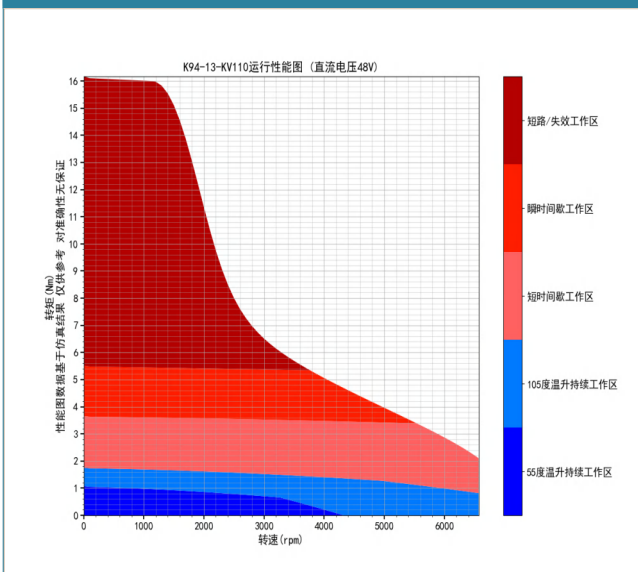


K94-13-KV65 Torque-Current Curve @25°C (T-i curve)

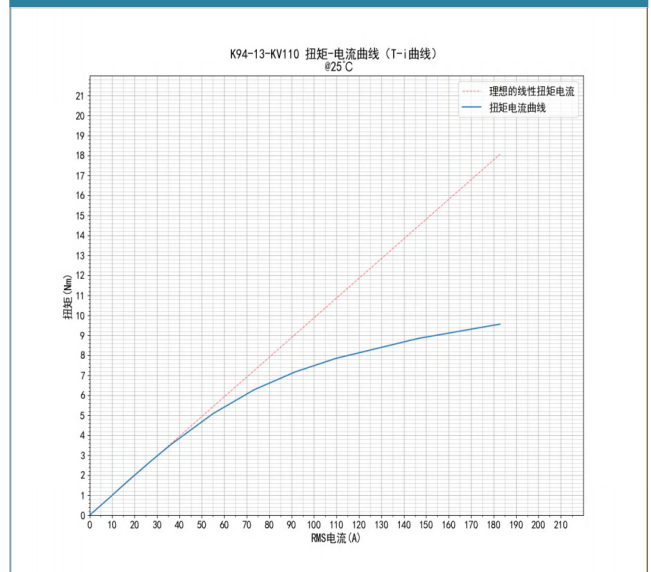


# K94-13-KV110

K94-13-KV110 Operation Performance Chart (at 48V DC)

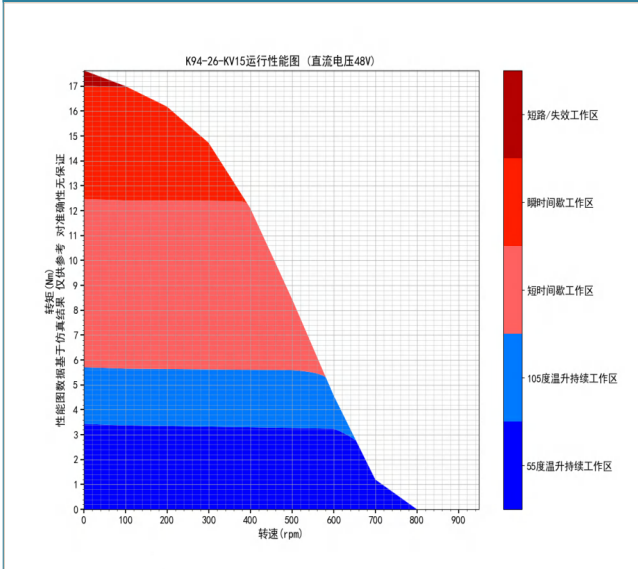


K94-13-KV110 Torque-Current Curve @25°C (T-i curve)

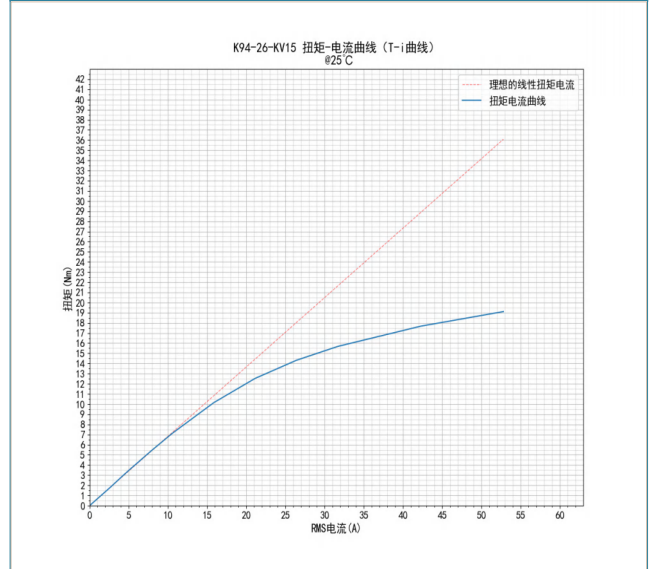


# K94-26-KV15

K94-26-KV15 Operation Performance Chart (at 48V DC)

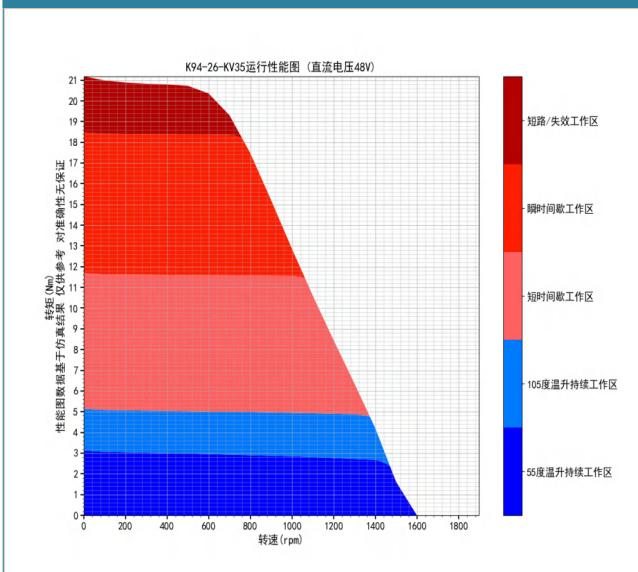


K94-26-KV15 Torque-Current Curve @25°C (T-i curve)

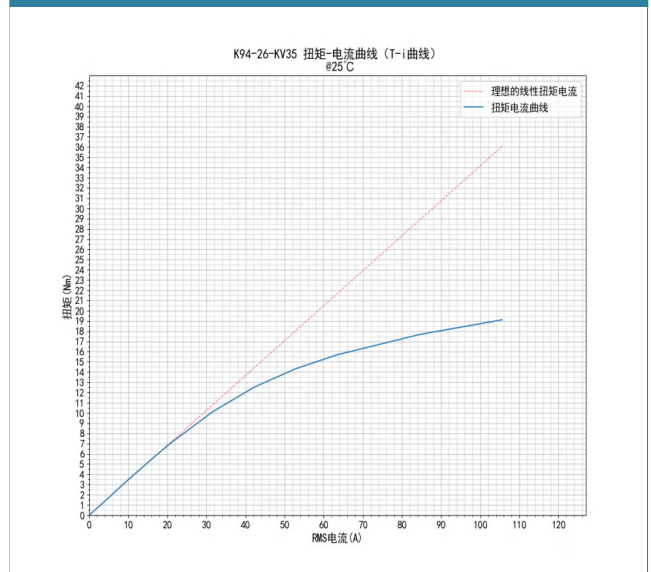


# K94-26-KV35

K94-26-KV35 Operation Performance Chart (at 48V DC)

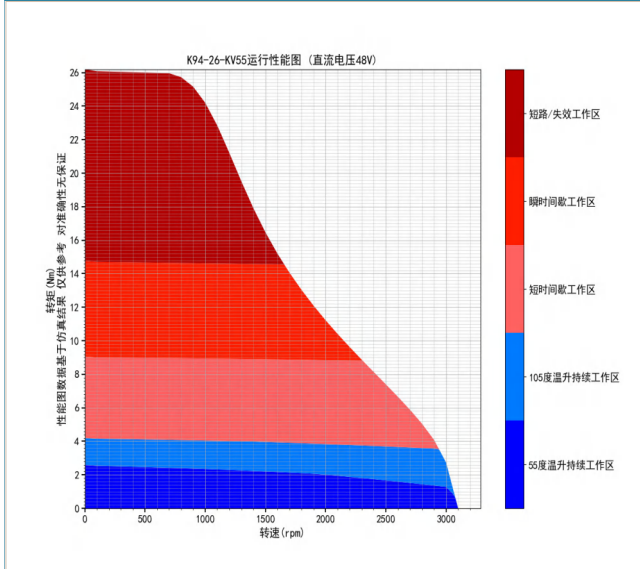


K94-26-KV35 Torque-Current Curve @25°C (T-i curve)

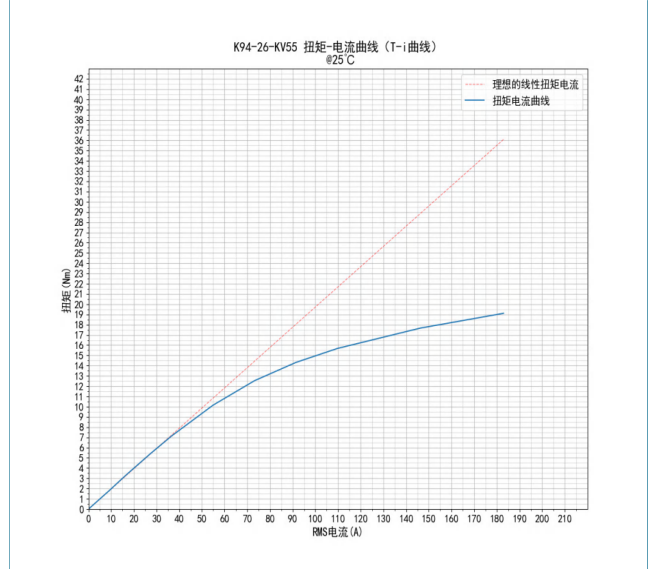


# K94-26-KV55

K94-26-KV55 Operation Performance Chart (at 48V DC)



K94-26-KV55 Torque-Current Curve @25°C (T-i curve)



## K115 Specification K115-08

Type	K115-08		
	KV40	KV85	KV150
Stator Diameter [mm]	115	115	115
Stator Axial Length (Excl. Cable) [mm]	20	20	20
Rotor Inner Diameter [mm]	57.5	57.5	57.5
Weight [g]	455	455	455
Stator Weight (Excl. Cable) [g]	364	364	364
Rotor Weight [g]	91	91	91
Rotor Inertia [kg mm <sup>2</sup> ]	98	98	98
DC Drive Voltage (Typical) [V]	12-100(48)	12-100(48)	12-100(48)
Rated Output Power @ Typical Voltage [W]	420	890	1340
No Load Speed @ Typical Voltage [rpm]	2000	4000	7000
Load Speed @ Typical Voltage [rpm]	1700	3630	6440
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	2.3	2.3	2.3
Rated Torque (55°C Temp. Rise) [Nm]	1.41	1.41	1.41
Rated Torque (Lasting 10s) [Nm]	5.2	5.2	5.2
Rated Torque (Lasting 2s) [Nm]	7.5	7.5	7.5
Rated RMS Current (105°C Temp. Rise) [A]	8.9	17.8	30.9
Rated RMS Current (55°C Temp. Rise) [A]	5.3	10.7	18.5
PeaK RMS Current (Lasting 10s) [A]	22.3	44.5	77.1
PeaK RMS Current (Lasting 2s) [A]	44.5	89.1	154.3
KV Constant [rpm/V]	42	85	147
Back EMF Constant [Vs/rad]	0.225	0.112	0.0649
Torque Constant [Nm/A]	0.189	0.0944	0.0545
Line Resistance [Ohm]	0.515	0.129	0.0429
Line Inductance [H]	0.659	0.165	0.0549
d Axis Inductance [mH]	0.293	0.0731	0.0731
q Axis Inductance [mH]	0.367	0.0917	0.0917
Time Constant [ms]	1.28	1.28	1.28
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.304	0.304	0.304
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K115 Specification K115-13

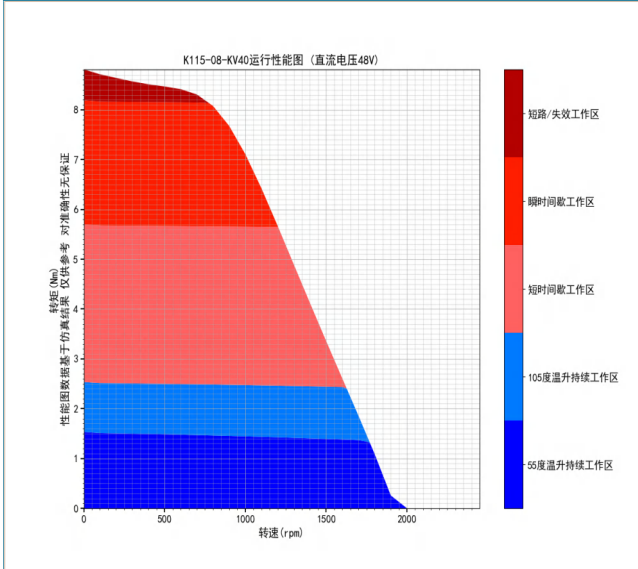
Type	K115-13		
	KV25	KV50	KV90
Stator Diameter [mm]	115	115	115
Stator Axial Length (Excl. Cable) [mm]	25	25	25
Rotor Inner Diameter [mm]	57.5	57.5	57.5
Weight [g]	674	674	674
Stator Weight (Excl. Cable) [g]	526	526	526
Rotor Weight [g]	148	148	148
Rotor Inertia [kg mm <sup>2</sup> ]	159	159	159
DC Drive Voltage (Typical) [V]	12-100(48)	12-100(48)	12-100(48)
Rated Output Power @ Typical Voltage [W]	400	880	1580
No Load Speed @ Typical Voltage [rpm]	1200	2500	4300
Load Speed @ Typical Voltage [rpm]	1020	2210	3950
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	3.8	3.8	3.8
Rated Torque (55°C Temp. Rise) [Nm]	2.3	2.3	2.3
Rated Torque (Lasting 10s) [Nm]	8.5	8.5	8.5
Rated Torque (Lasting 2s) [Nm]	12.2	12.2	12.2
Rated RMS Current (105°C Temp. Rise) [A]	8.9	17.8	30.9
Rated RMS Current (55°C Temp. Rise) [A]	5.3	10.7	18.5
PeaK RMS Current (Lasting 10s) [A]	22.3	44.5	77.1
PeaK RMS Current (Lasting 2s) [A]	44.5	89.1	154.3
KV Constant [rpm/V]	26	52	91
Back EMF Constant [Vs/rad]	0.365	0.183	0.105
Torque Constant [Nm/A]	0.306	0.153	0.0885
Line Resistance [Ohm]	0.629	0.157	0.0524
Line Inductance [H]	1.02	0.254	0.0846
d Axis Inductance [mH]	0.447	0.112	0.112
q Axis Inductance [mH]	0.568	0.142	0.142
Time Constant [ms]	1.61	1.61	1.61
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.446	0.446	0.446
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

## K115 Specification K115-26

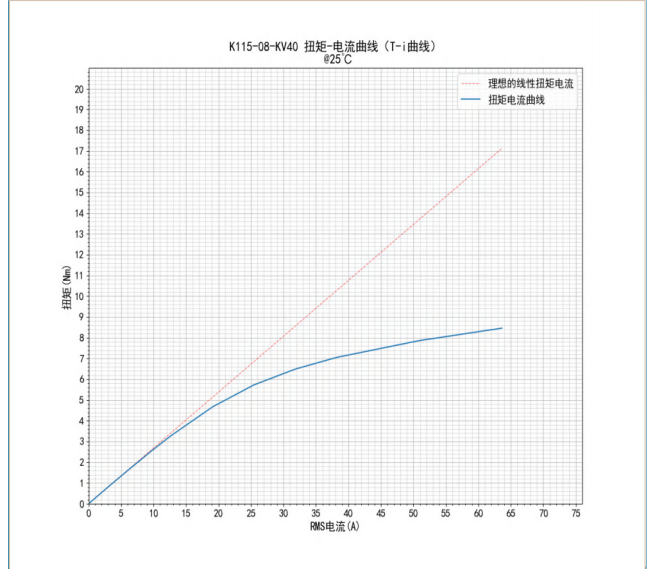
Type	K115-26		
	KV13	KV25	KV45
Stator Diameter [mm]	115	115	115
Stator Axial Length (Excl. Cable) [mm]	38	38	38
Rotor Inner Diameter [mm]	57.5	57.5	57.5
Weight [g]	1244	1244	1244
Stator Weight (Excl. Cable) [g]	947	947	947
Rotor Weight [g]	297	297	297
Rotor Inertia [kg mm <sup>2</sup> ]	317	317	317
DC Drive Voltage (Typical) [V]	12-100(48)	12-100(48)	12-100(48)
Rated Output Power @ Typical Voltage [W]	380	850	1550
No Load Speed @ Typical Voltage [rpm]	620	1200	2100
Load Speed @ Typical Voltage [rpm]	470	1070	1940
Continuous Mechanical Speed Limit [rpm]	5460	5460	5460
Rated Torque (105°C Temp. Rise) [Nm]	7.6	7.6	7.6
Rated Torque (55°C Temp. Rise) [Nm]	4.6	4.6	4.6
Rated Torque (Lasting 10s) [Nm]	17	17	17
Rated Torque (Lasting 2s) [Nm]	24.3	24.3	24.3
Rated RMS Current (105°C Temp. Rise) [A]	8.9	17.8	30.9
Rated RMS Current (55°C Temp. Rise) [A]	5.3	10.7	18.5
PeaK RMS Current (Lasting 10s) [A]	22.3	44.5	77.1
PeaK RMS Current (Lasting 2s) [A]	44.5	89.1	154.3
KV Constant [rpm/V]	13	26	45
Back EMF Constant [Vs/rad]	0.73	0.365	0.211
Torque Constant [Nm/A]	0.612	0.306	0.177
Line Resistance [Ohm]	0.925	0.231	0.0771
Line Inductance [H]	1.94	0.485	0.162
d Axis Inductance [mH]	0.85	0.212	0.212
q Axis Inductance [mH]	1.09	0.273	0.273
Time Constant [ms]	2.1	2.1	2.1
Winding Connection	Y	Y	Δ
Poles [Stator N Rotor P]	18N20P	18N20P	18N20P
Motor Constant [Nm/sqrt(W) ]	0.735	0.735	0.735
Max. Winding Temperature [°C]	130	130	130
Operating Ambient Temperature [°C]	-20 to 50	-20 to 50	-20 to 50

# K115-08-KV40

K115-08-KV40 Operation Performance Chart (at 48V DC)

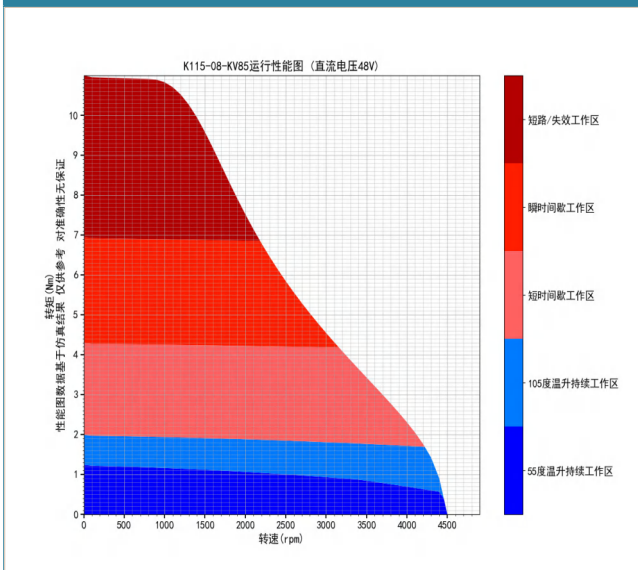


K115-08-KV40 Torque-Current Curve @25°C (T-i curve)

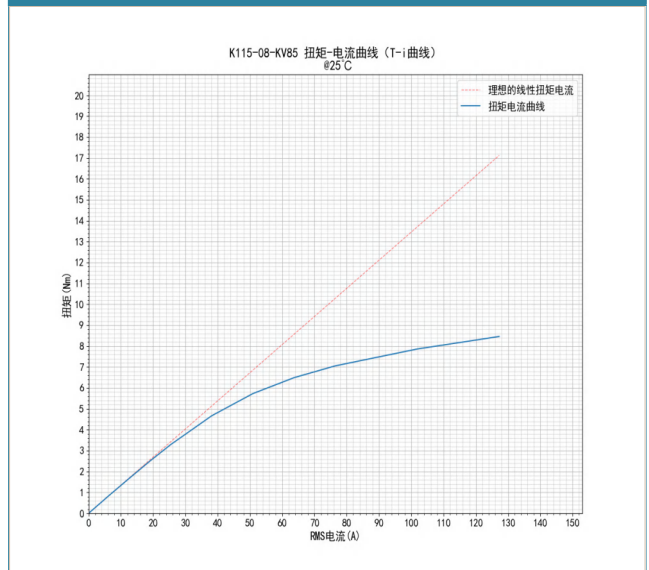


# K115-08-KV85

K115-08-KV85 Operation Performance Chart (at 48V DC)



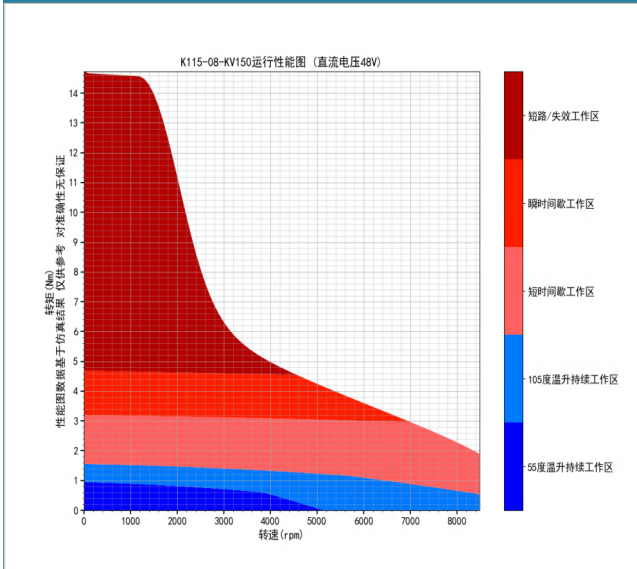
K115-08-KV85 Torque-Current Curve @25°C (T-i curve)



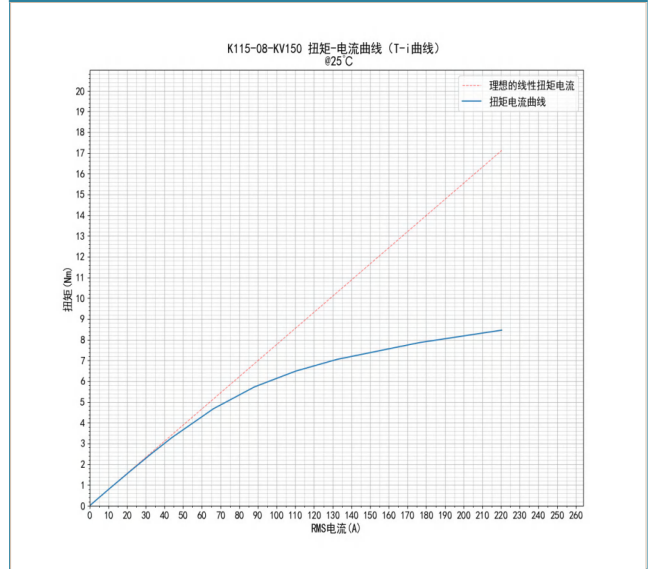


# K115-08-KV150

K115-08-KV150 Operation Performance Chart (at 48V DC)

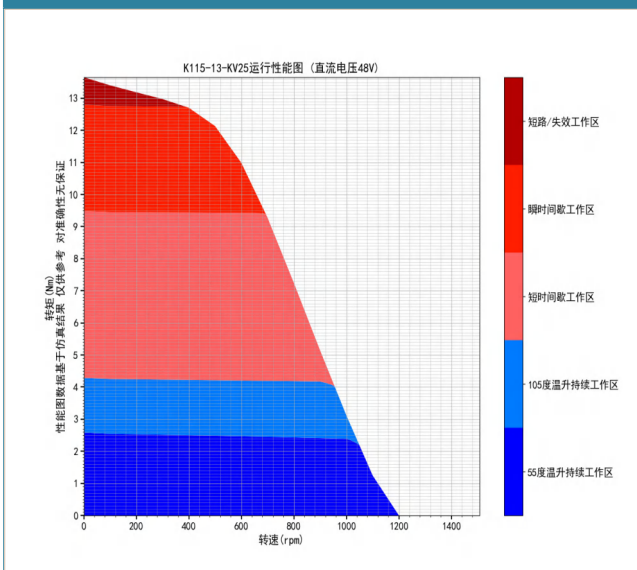


K115-08-KV150 Torque-Current Curve @25°C (T-i curve)

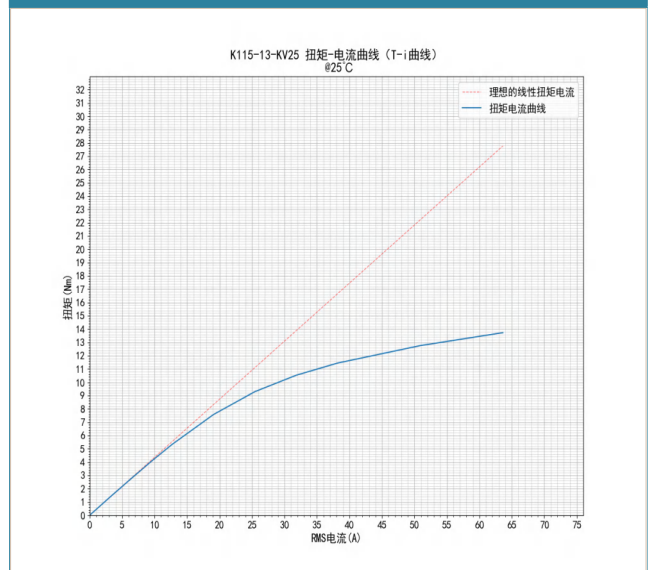


# K115-13-KV25

K115-13-KV25 Operation Performance Chart (at 48V DC)

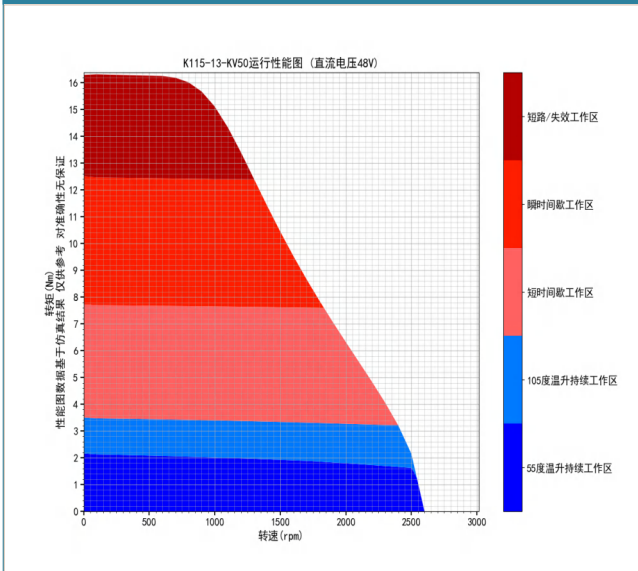


K115-13-KV25 Torque-Current Curve @25°C (T-i curve)

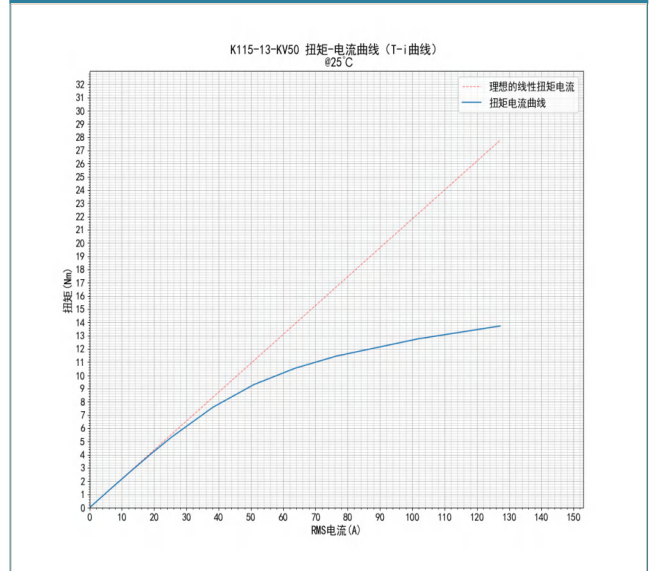


# K115-13-KV50

K115-13-KV50 Operation Performance Chart (at 48V DC)

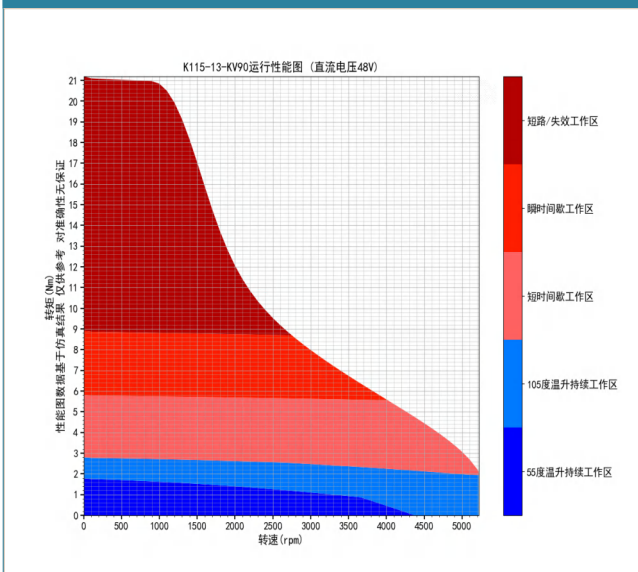


K115-13-KV50 Torque-Current Curve @25°C (T-i curve)

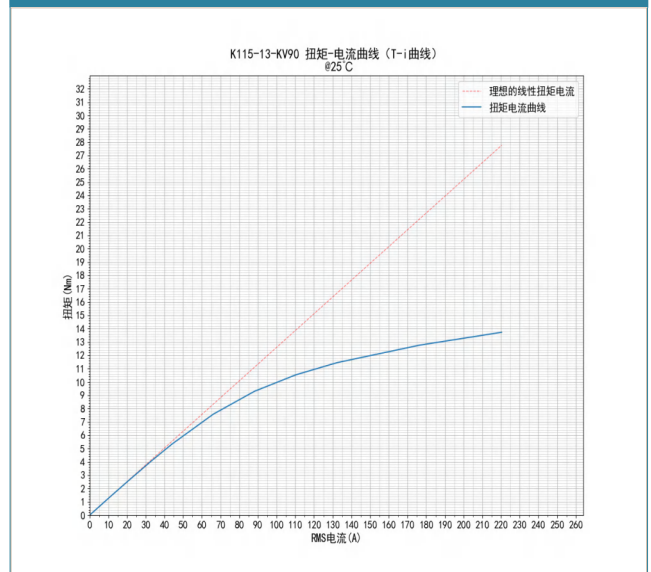


# K115-13-KV90

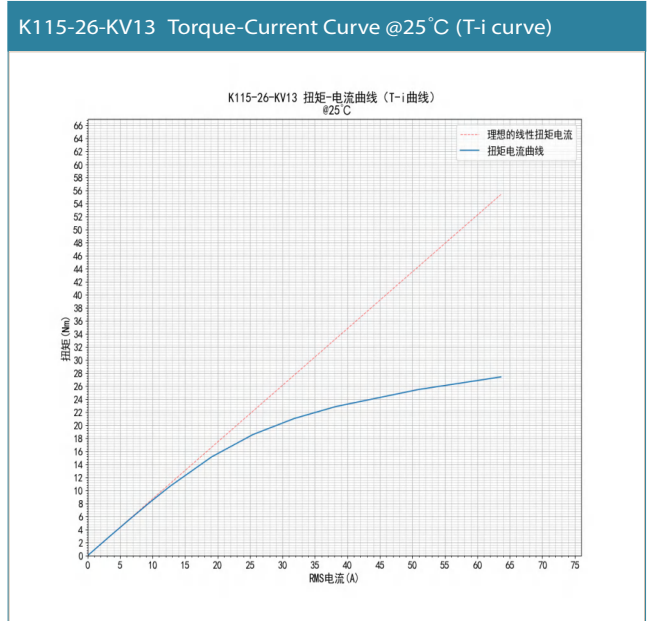
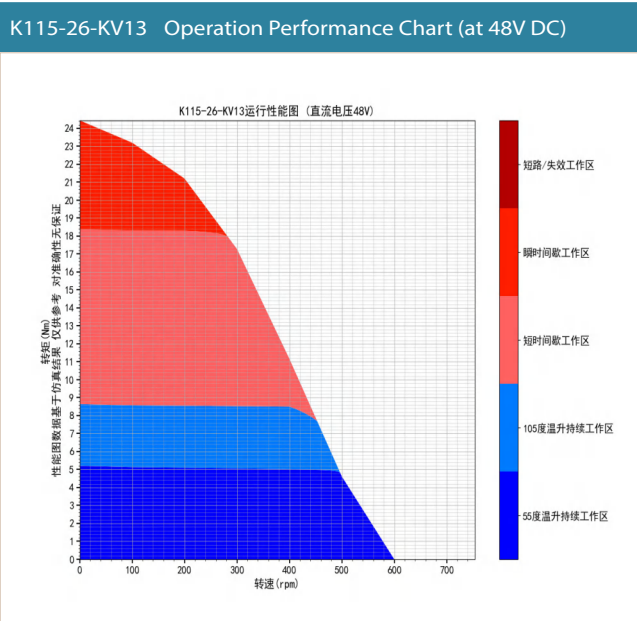
K115-13-KV90 Operation Performance Chart (at 48V DC)



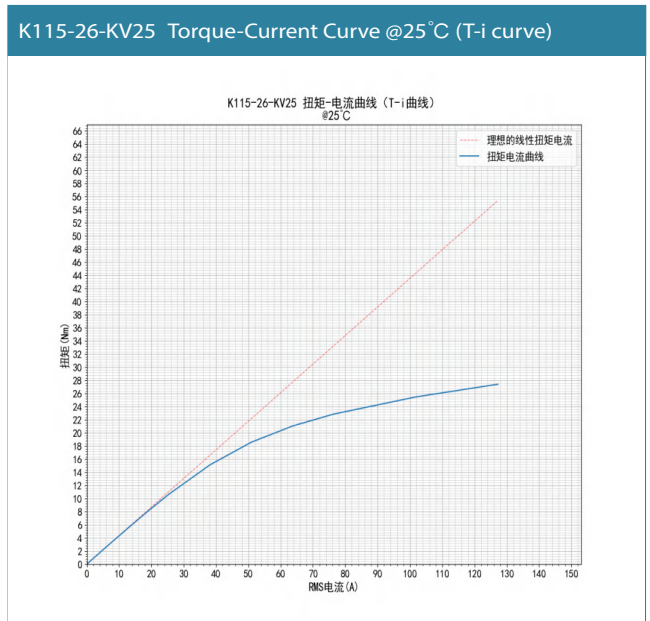
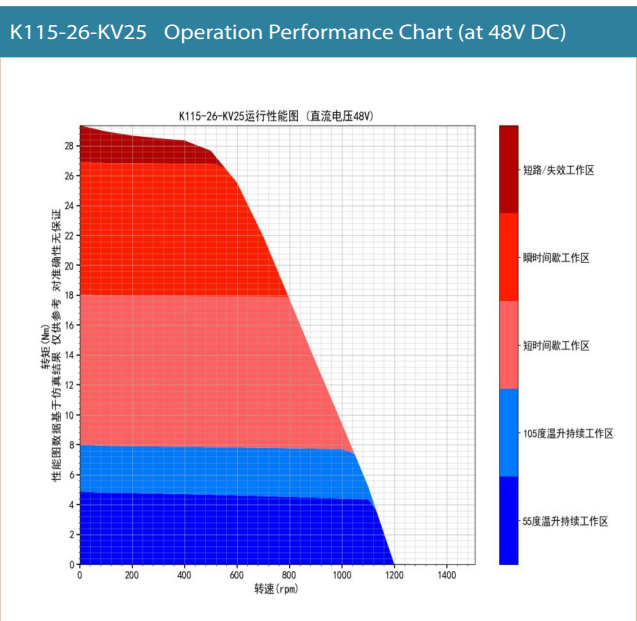
K115-13-KV90 Torque-Current Curve @25°C (T-i curve)



# K115-26-KV13

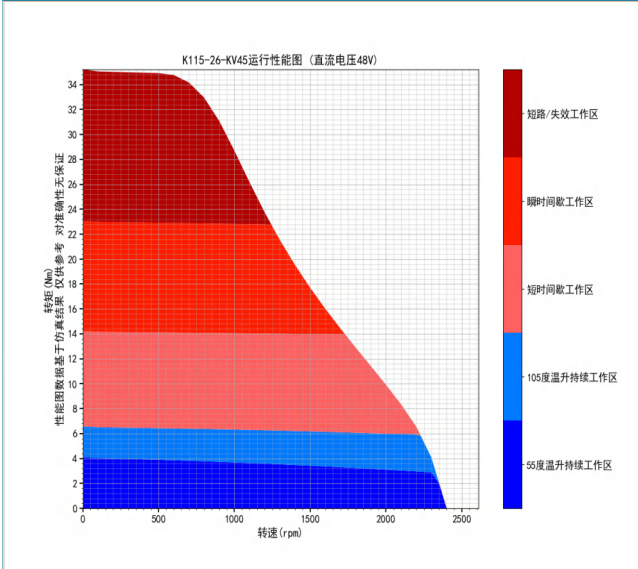


# K115-26-KV25

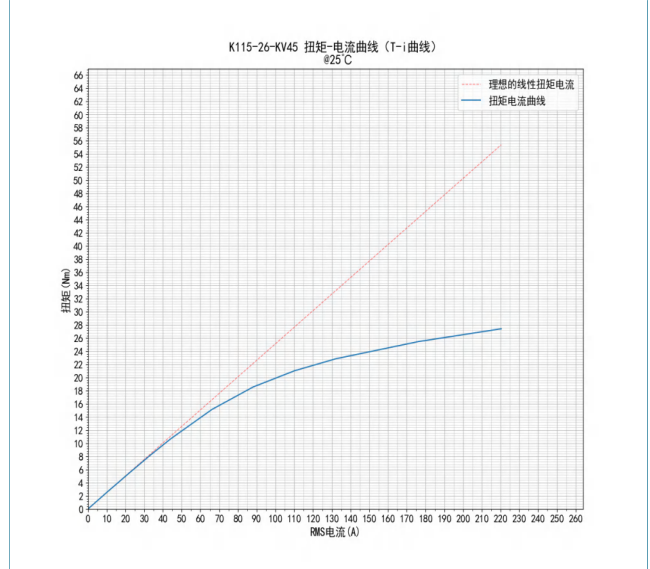


# K115-26-KV45

K115-26-KV45 Operation Performance Chart (at 48V DC)

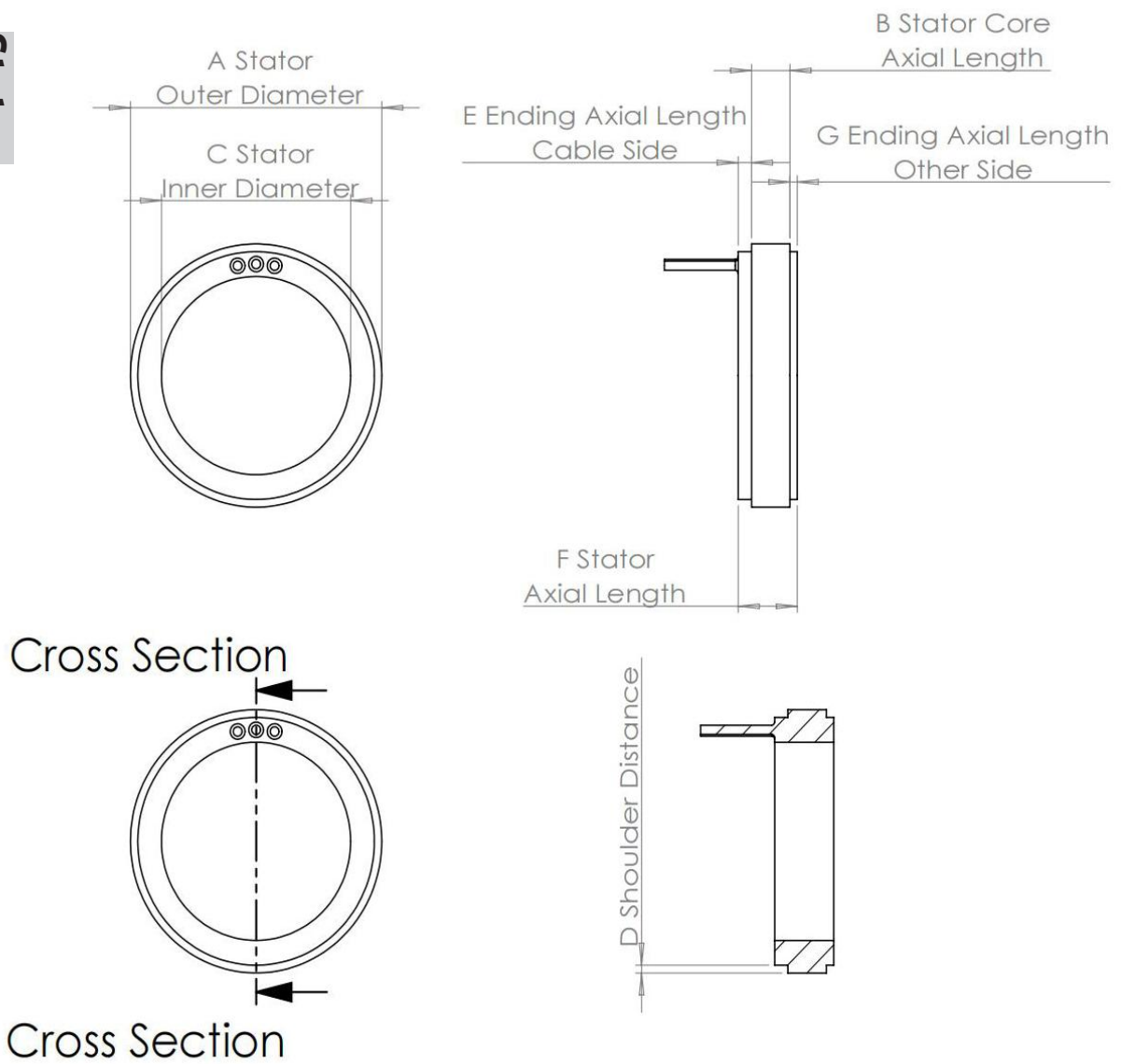


K115-26-KV45 Torque-Current Curve @25°C (T-i curve)

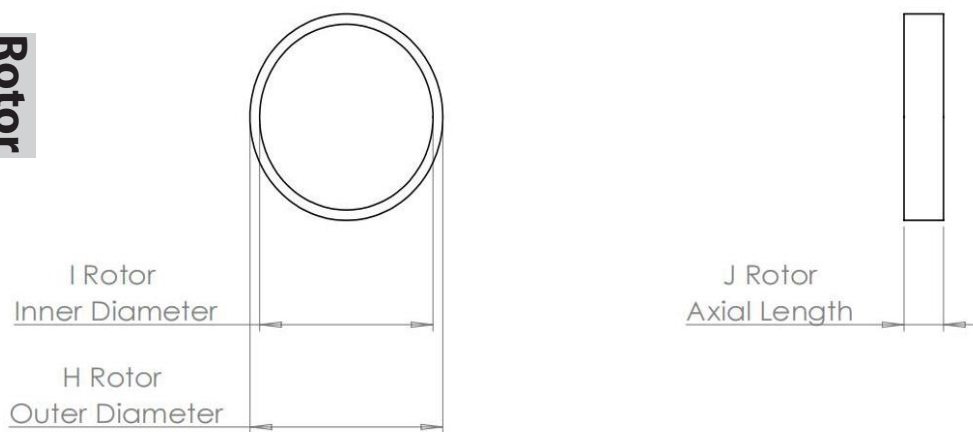


# Sizes and Tolerances

## Stator



## Rotor



## K50-08

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
50.00	8.00	32.80	1.00	7.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
h8 (-0.039, 0)	±0.20	JS9 ±0.031	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
17.00	4.00	32.30	24.75	8.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.031	H7 (0, +0.021)	±0.08

## K50-13

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
50.00	13.00	32.80	1.00	6.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
h8 (-0.039, 0)	±0.20	JS9 ±0.031	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
22.00	3.00	32.30	24.75	13.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.031	H7 (0, +0.021)	±0.08

## K50-26

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
50.00	26.00	32.80	1.00	7.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
h8 (-0.039, 0)	±0.20	JS9 ±0.031	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
35.00	4.00	32.30	24.75	26.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.031	H7 (0, +0.021)	±0.08

## K60-08

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
60.00	8.00	38.50	1.20	7.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
h8 (-0.046, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
17.00	4.00	38.00	30.00	8.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.021)	±0.08

## K60-13

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
60.00	13.00	38.50	1.20	7.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
H8 (-0.046, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
22.00	4.00	38.00	30.00	13.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.021)	±0.08

## K60-26

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
60.00	26.00	38.50	1.20	7.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
H8 (-0.046, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
35.00	4.00	38.00	30.00	26.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.021)	±0.08



## K68-08

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
68.00	8.00	43.80	1.20	7.00
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
H8 (-0.046, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
17.00	4.00	43.30	34.00	8.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.021)	±0.08

## K68-13

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
68.00	13.00	43.80	1.20	7.00
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
H8 (-0.046, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
22.00	4.00	43.30	34.00	13.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.021)	±0.08

## K68-26

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
68.00	26.00	43.80	1.20	7.00
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
h8 (-0.046, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
35.00	4.00	43.30	34.00	26.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.021)	±0.08

## K76-08

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
76.00	8.00	50.40	1.20	7.00
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
h8 (-0.046, 0)	±0.20	js9 ±0.037	(0, +0.40)	(-0.5, 0)
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
17.00	4.00	49.90	38.00	8.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.025)	±0.08

## K76-13

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
76.00	13.00	50.40	1.20	7.00
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
$h8 (-0.046, 0)$	$\pm 0.20$	$js9 \pm 0.037$	$(0, +0.40)$	$(-0.5, 0)$
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
22.00	4.00	49.90	38.00	13.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
$(-1, 0)$	$(-0.5, 0)$	$js9 \pm 0.037$	$H7 (0, +0.025)$	$\pm 0.08$

## K76-26

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
76.00	26.00	50.40	1.20	7.00
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
$h8 (-0.046, 0)$	$\pm 0.20$	$js9 \pm 0.037$	$(0, +0.40)$	$(-0.5, 0)$
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
35.00	4.00	49.90	38.00	26.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
$(-1, 0)$	$(-0.5, 0)$	$js9 \pm 0.037$	$H7 (0, +0.025)$	$\pm 0.08$

## K85-08

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
85.00	8.00	55.00	1.50	7.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
H8 (-0.054, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
17.00	4.00	54.50	42.50	8.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.025)	±0.08

## K85-13

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
85.00	13.00	55.00	1.50	7.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
H8 (-0.054, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
22.00	4.00	54.50	42.50	13.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.025)	±0.08

## K85-26

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
85.00	26.00	55.00	1.50	7.00
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
h8 (-0.054, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
35.00	4.00	54.50	42.50	26.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.025)	±0.08

## K94-08

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
94.00	8.00	60.30	1.50	7.50
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
h8 (-0.054, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
18.00	4.50	59.80	47.00	8.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.025)	±0.08

## K94-13

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
94.00	13.00	60.30	1.50	7.50
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
h8 (-0.054, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
23.00	4.50	59.80	47.00	13.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.025)	±0.08

## K94-26

A Stator Outer Diameter	B Stator Core Axial Length	C Stator Inner Diameter	D Shoulder Distance	E Ending Axial Length Cable Side
94.00	26.00	60.30	1.50	7.50
a Tolerance	b Tolerance	c Tolerance	d Tolerance	e Tolerance
h8 (-0.054, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
F Stator Axial Length	G Ending Axial Length Other Side	H Rotor Outer Diameter	I Rotor Inner Diameter	J Rotor Axial Length
36.00	4.50	59.80	47.00	26.00
f Tolerance	g Tolerance	h Tolerance	i Tolerance	j Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.025)	±0.08

## K115-08

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
115.00	8.00	72.80	1.50	7.50
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
$h8 (-0.054, 0)$	$\pm 0.20$	$JS9 \pm 0.037$	$(0, +0.40)$	$(-0.5, 0)$
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
18.00	4.50	72.30	57.50	8.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
$(-1, 0)$	$(-0.5, 0)$	$js9 \pm 0.037$	$H7 (0, +0.030)$	$\pm 0.08$

## K115-13

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
115.00	13.00	72.80	1.50	7.50
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
$h8 (-0.054, 0)$	$\pm 0.20$	$JS9 \pm 0.037$	$(0, +0.40)$	$(-0.5, 0)$
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
23.00	4.50	72.30	57.50	13.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
$(-1, 0)$	$(-0.5, 0)$	$js9 \pm 0.037$	$H7 (0, +0.030)$	$\pm 0.08$

# K115-26

<b>A</b> Stator Outer Diameter	<b>B</b> Stator Core Axial Length	<b>C</b> Stator Inner Diameter	<b>D</b> Shoulder Distance	<b>E</b> Ending Axial Length Cable Side
115.00	26.00	72.80	1.50	7.50
<b>a</b> Tolerance	<b>b</b> Tolerance	<b>c</b> Tolerance	<b>d</b> Tolerance	<b>e</b> Tolerance
h8 (-0.054, 0)	±0.20	JS9 ±0.037	(0, +0.40)	(-0.5, 0)
<b>F</b> Stator Axial Length	<b>G</b> Ending Axial Length Other Side	<b>H</b> Rotor Outer Diameter	<b>I</b> Rotor Inner Diameter	<b>J</b> Rotor Axial Length
36.00	4.50	72.30	57.50	26.00
<b>f</b> Tolerance	<b>g</b> Tolerance	<b>h</b> Tolerance	<b>i</b> Tolerance	<b>j</b> Tolerance
(-1, 0)	(-0.5, 0)	js9 ±0.037	H7 (0, +0.030)	±0.08



# Update Log

## Data Update Date [2023-05-23]

KS-20230426 Updated: Creation of documentation.

KS-20230506 Updated: Compared to KS-20230426, the data of Specifications for Stator Axial Length have been adjusted. The data of Tolerances for Ending Axial Length Cable Side and G Ending Axial Length Other Side have been adjusted.

KS-20230509 Updated: Compared to KS-20230506, the data of K85 Series for C Stator Inner Diameter and H Rotor Outer Diameter have been adjusted.

KS-20230523 Updated: Nomenclature for NTC/PTC/000 has been added to the NTC/PTC/000.

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