



# PRODUCT SPECIFICATION

## 产品规格书

Customer Name 客户名称	Alexia			
Customer Project/ Project No. 客户项目名称/项目编号	/			
Product Name 产品名称	空心杯电机			
Part No. 产品型号	QX10A2-076241-A0C			
File Number 文件编号	QX10A2-076241-A0C-05			
Product Specification Number 产品规格书编号	GGLJC2017041001/114512			
REV. 版次	1.0			
<b>Product meet the requirements of ROHS</b> <b>产品符合 ROHS 要求</b>				
Customer Approved 客户确认	Checking 核 对	Inspection 审 查	Approval 批 准	Date 日 期
QX Approved 本公司确认	Drawing 编 制	Checking 审 核	Approval 批 准	Date 日 期
			范圣秉 2017-04-12	

**深圳市双环全新机电股份有限公司**  
**QX MOTOR CO.,LTD**

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**重要提示 IMPORTANCE NOTES:**

1. If there is any argument on motor performance and/or life, judgment is to be made base on this specification only.  
如对电机的性能和/或寿命有任何争议，仅基于此规格书作出判断。
2. Customer has the responsibility to ensure that the motor can satisfy the requirement of your application.  
客户方有责任确认该电机能满足您的使用要求。
3. In the event that an official specification is not present by customer; this document will specify the agreed technical specification with a performance curve data and outline drawing.  
如果贵公司未提供技术规格，该文件将详细叙述与贵公司商定的技术规格包括特性曲线数据和外形图。
4. Within the limitation to satisfy this specification, QX has the convenience to change the materials, sizes and shapes of components of the motor for the purpose of improving quality, and/or performance, and/or production efficiency.  
在满足规格的条件下，我司可以改变零件材料、尺寸及形状来改善品质，和/或性能，和/或生产效率。
5. After the receipt of this specification, customer should send a signed copy to QX before you issued purchase order for the confirmation on acknowledgement. QX regard it as the receipt of this specification acknowledged if customer fails to return the confirmation to us within the described period.  
收到此规格书后，贵司应于下订单之前将规格书副本签回以示贵司已确认。如贵司未能在规定时间内签回副本，我司将认为贵司已收到并承认该规格书。

## 更改记录

### Revised Record

Rev. 版次	Date 日期	Reason for change 更改原因	Designed 编制	Checked 审核	Approval 批准



### 1. 结构形式 Construction-form

NO. 序号	Item 项目	Contents 内容
1.1	Motor construction 电机结构	10mm cylindrical Coreless cup DC motor 直径为 10mm的空心杯直流电机
1.2	Number of magnet poles 磁极极数	2-poles (inner magnet type) 2 极(磁钢内置)
1.3	Coil construction 线圈结构	Cylindrical moving coil 圆柱型线圈
1.4	Rectifying method 换向方式	Metal brush and commutator 金属电刷换向器装置

### 2. 标准使用条件 Standard operating condition

NO 序号	Item 项目	Specification 规格	Condition / Remark 条件/备注
2.1	Rated voltage 额定电压	DC 3.0V	Added to both ends of the terminal voltage 加在端子两端的电压
2.2	Rated load 额定负荷	A2 风叶	
2.3	Rotation direction 旋转方向	CW 顺时针方向	When viewed from output side with +ve voltage applied to +ve terminal 从输出端看, 并且电压正极接端子正 极
2.4	Motor position 摆放位置	Any position 任意位置	
2.5	Voltage range for use 工作电压范围	DC 2.0V~4.2V	
2.6	Current range for use 工作电流范围	≤ 300mA	
2.7	Operating conditions 使用环境	-5°C~60°C 15%~90%RH	ordinary humidity常规湿度 no condensation of moisture不凝露
2.8	Storage conditions 贮存环境	-10°C~70°C 15%~75%RH	ordinary humidity常规湿度 no condensation of moisture/不凝露

### 3. 产品测试环境条件 Environmental Test Conditions

NO. 序号	Item 项目	Environmental condition 测试环境条件
3.1	Temperature 温度	20±2°C
3.2	Humidity 湿度	60±5% RH

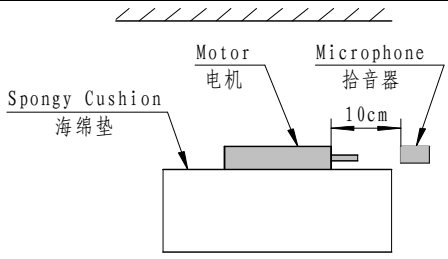


3.3	Motor Position 电机体位	Shaft Horizontal 轴伸水平
3.4	Power Supply 电源	直流稳压电源 DC 3.0V ± 2%

**NOTE:** All data shall be based on the measurement under the temperature  $20 \pm 2^\circ\text{C}$  and humidity  $60 \pm 5\%$  RH, however the range of temperature  $5 \sim 35^\circ\text{C}$  and humidity  $45 \sim 85\%$  RH if there is no doubt about the judgment.

**备注:** 所有的数据在温度  $20 \pm 2^\circ\text{C}$ ，湿度  $60 \pm 5\%$  RH的条件下测定。在对判定不发生异议时，也可在温度  $5 \sim 35^\circ\text{C}$ ，湿度  $45 \sim 85\%$  RH的环境下测试。

**4. 机械特性 Mechanical Characteristic**

NO. 序号	Item 项目	Measuring condition 测试条件	Specification 规格
4.1	Configuration 外观尺寸	Vernier caliper 游标卡尺	As specified in outline drawing 参考外形图纸
4.2	Appearance 外观	Visual examination 目测	No obvious evidence of mechanical damage、crack、rust and stain 无明显机械划痕、裂缝、锈迹、污点
4.3	Weight 重量	Plate balance 0.1g 架盘天平 精度 0.1g	$\leq 4.1\text{g}$
4.4	Shaft end play 轴向间隙	Vernier caliper or Dial indicator 游标卡尺或百分表	$(0.05 - 0.3)\text{ mm}$
4.5	Mechanical Noise 机械噪声	 <p>Test site: Class of semi-free field At rated voltage and free load, Back ground noise: 25 dB(A) Max, Fix the motor in a test jig (Shaft Horizontal). Microphone is faced to the flat of motor and recedes by 10cm 测试场地：类半自由声场 额定电压，空载运行，背景噪声 <math>\leq 25\text{ dB(A)}</math>，电机固定在测试夹具上(轴伸水平)，拾音器沿轴向正对电机平面，距离 10 cm。</p>	$\leq 55\text{dB(A)}$

**5. 电气性能 Electrical characteristics**



NO. 序号	Item 项目	Measuring condition 测试条件	Specification 规格
5.1	No-Load current 空载电流	At Rated voltage and no load 额定电压及无负荷下测试	$\leq 40\text{mA}$
5.2	No-Load speed 空载转速		$18500\text{rpm} \pm 15\%$
5.3	Rated Load 额定负荷	At Rated voltage and rated load 额定电压及标准负荷下测试	A2 风叶
5.4	Rated current 额定电流		$\leq 160\text{mA}$
5.5	Rated speed 额定转速		$15000\text{rpm} \pm 10\%$
5.6	Stall current 堵转电流		At rated voltage and shaft lock 额定电压及锁定电机轴条件下测试
5.7	Insulation resistance 绝缘电阻	At DC 100V, measured between housing case and terminal. 在 100V 直流电压下, 电机引线与外壳间测量	$\geq 10\text{M}\Omega$

6. 信赖性试验 Reliability Test

NO. 序号	Item 项目	Test condition 试验条件	Requirements 判定基准
6.1	Low temperature storage 低温放置	Temperature温度: $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Time时间: 72h	2 hours after the test, in the condition of the normal temperature and normal humidity, the motor should conform to the requirements of the items 7.1 and 7.2. 试验后, 在常温常湿条件下放置 2 小时后, 电机应满足 7.1、7.2 的规定
6.2	High temperature exposure 高温放置	Temperature 温度: $+65^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Time时间: 72h	
6.3	Humidity test 湿度测试	Temperature温度: $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Humidity湿度: 90%~95% RH Time时间: 72h	
6.4	Thermal Shock test 热冲击试验	Temperature温度: $-30^{\circ}\text{C} \sim 70^{\circ}\text{C}$ Time时间: 2h Circle cycle循环周期数: 10times 	4 hours exposed in the normal temperature and humidity after the test, the motor should conform to the requirements of the items 7.1 and 7.2. 试验后, 在常温常湿下放置 4 小时, 电机应满足 7.1、7.2 的规定



6.5	Drop test 跌落试验	Direction方向: x,y,z High高度: 1.5m Times: 2 times each direction 跌落次数: 每个方向各 2 次 Test state: The motor is set into a rigid cubic plastic housing approximately weight 40g and fall free on the concrete floor 试验状态: 将电机放在重约 40 克的刚性较好的塑料盒子里, 自由地跌落至混凝土地面上	After having finished the test, the motor should conform to the requirements of the items 7.1 and 7.2. 试验结束后, 电机应满足 7.1、7.2 的规定
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**7. 信赖性试验后的要求 Requirement After Reliable Test**

NO. 序号	Item 项目	Specification 规格
7.1	Rated speed 额定转速	Initial data 初始值 ± 30%
7.2	Rated Current 额定电流	Initial data 初始值 ± 30%
7.3	Insulation resistance 绝缘电阻	≥ 1MΩ
7.4	Starting voltage 起动电压	≤ 1.0V

**8. 包装要求 PACKAGE REQUIRE**

NO. 序号	Item 项目	Specification 规格 (L*W*H)	Inner parts name and quantity 内装件品名及数量	
8.1	Tray 内包装盒	297×223×25	Motor 电机	100pcs
8.2	Inner box 内包装箱	300×225×230	Tray 内包装盒	10pcs
8.3	Outer box 外包装箱	600×450×460	Inner box 内包装箱	8pcs

**9. 注意事项 CAUTIONS**

**1) 使用容差 ALLOWABLE RANGE FOR USE**

Pay attention to voltage and current ranges for use ,and use the vibration motor in the condition accordance with this specifications ,or the life and performance should be considerably reduced.

注意电压及电流的使用范围, 并且在本标准规定情况下使用电机, 否则将相应降低电机的使用寿命和性能。

**2) 移动电机 MOVE YOUR MOTOR**

Please deal with the motors gently, you should make use of the outer case as possible as you can.

拿电机时, 应轻拿轻放, 应尽可能地利用外壳部分

Do not press the product with more than 5 kgf or drop it. It can cause the transformation of performance



or external appearance.

请勿将其跌落或加以超过 5 公斤的压力。否则会引起电机的外部形态和电气特性的改变

### 3) 储存 STORAGE

Storage temperature:  $-10^{\circ}\text{C}\sim 70^{\circ}\text{C}$

Storage relative humidity: 15%~75%

Avoids storing in high temperature、high humidity or corrosive gas environment.

储存温度:  $-10^{\circ}\text{C}\sim 70^{\circ}\text{C}$

储存湿度: 15%RH~75%RH

避免放置在高温、潮湿及有腐蚀性气体的环境中。

### 4) 使用电机 HANDLING OF MOTOR

-to handle and hold the vibration motor case softly.

-do not bring magnetized object near or contact with the surface of motor to avoid of performance being deteriorated.

-pay attention to the handling and working environments of motor, because such objects as iron powder if attracted by motor magnet, will cause noise characteristic deterioration, thus reducing the reliability.

小心拿取、使用。

避免放置在磁性物体附近或接触其表面，这将影响其功效。

注意操作环境，尤其注意若铁粉被磁铁吸附，将出现噪音问题，降低使用寿命

Please do not operate or store the motor near magnet or magnetic devices.

请勿靠近磁体或有磁场的装置存放或运行电机

### 5) 安装您的电机 MOUNTING YOUR MOTOR:

Some QX motors provide tapped holes in the motor housing for you to use to mount your motor. Please take care not to use screws so long that they can interfere with components inside the motor.

部分全新电机都在电机定子上提供了安装孔用来安装您的电机，请注意不要使用过长的螺钉以避免损坏电机内部元件。

Bearing bosses are also used for mounting motors. Please avoid excessive clamping forces on these areas.

轴承固定座也是用来安装您的电机的，对此安装区域请避免过度用力。

When mounting your motor, please try not to completely close or around the motor, motor should be set aside space for heat dissipation

在安装电机时，请尽量不要完全紧贴或包住电机，应为电机留出散热空间。

It is preferable not to use features on the motor such as ventilation holes for location means. It is possible that these features may change as new or modified tooling is used in the future.

最好不要利用电机表面的特征来固定电机，例如：通风孔。这样将可能会改变这些特征。

Any ventilation holes in the motor should not become blocked in your product without consultation with QX.

如未咨询我司，装入贵司产品中的电机上的任何通风孔都不可以堵死。

If adhesives are to be used to mount you motor care must be taken to avoid any adhesive getting into the bearing areas or motor.





如果使用粘合剂安装电机，必须注意粘合剂不能进入轴承区域或电机内部。

#### 6) 电机接线 CONNECTION YOUR MOTOR:

Whatever means you are to use to connect your supply to your motor please take care not to use so much force or heat that you cause distortion to components inside the motor.

不论使用任何方式将您的电源连接到您的电机，请注意不能用过大的力或过高的温度，否则会造成电机内部零件变形。

Motor terminal: Soldering temperature: 350°C, Soldering time: 1sec.

电机端子接线: 焊锡温度: 350°C 焊锡时间: 1 秒

#### 7) 电机连轴 COUPLING YOUR MOTOR:

If you intend to couple a gear or a fan or some other item to your motor shaft during assembly, always remember that unusual radial and axial loads transmitted to the motor from the coupling during operation of the motor can have serious effects on the life of the bearings. If you have any concerns about this please consult with QX.

装配过程中，如果电机出轴端欲衔接齿轮、风叶等其它配件，请牢记，如果安装不当，电机运转时一种非正常的径向或轴向负荷将通过连接加载到电机，这种负荷将对轴承寿命造成严重影响。如果您对此有任何担心，请咨询我司。

#### 8) 过负荷 OVERLOADS:

Small high power motors are subject to very fast temperature rises. Take care not to apply excessive voltage to the motor or to operate it at stall or near stall for prolonged periods without first consulting with QX.

体积小、功率高的电机通常温升高；如未咨询我司，使用时请注意不能加过高的电压，不能运行在堵转或接近堵转状态过长时间。

#### 9) 危险环境 HAZARDOUS ENVIRONMENTS:

The degree of protection against corrosion on QX motors is satisfactory only for normal environments. There are small sections of the housing in which some bare metal is exposed and is susceptible to corrosion. It is advisable not to store or use motors in corrosive environment without consultation with QX.

我司电机在正常环境中的抗腐蚀能力是符合要求的，但机壳上有少许区域存在的裸露金属对腐蚀比较敏感，因此未经咨询请不要在腐蚀环境中储存或使用电机，

#### 10) 其它说明 OTHERS:

The motor may cause slight electronic noise due to the contact between brush and commutator.

当换向器和电刷接触时，电机发出轻微的电噪音

The motor has a strong magnet so please be aware that it has a magnetic force on the surface of the bracket.

电机内部有很强力的磁铁，所以机壳表面也存在磁力

It is allowable to have a few spots on the surface or edge of case.

外壳表面或边缘有少许斑点是允许的





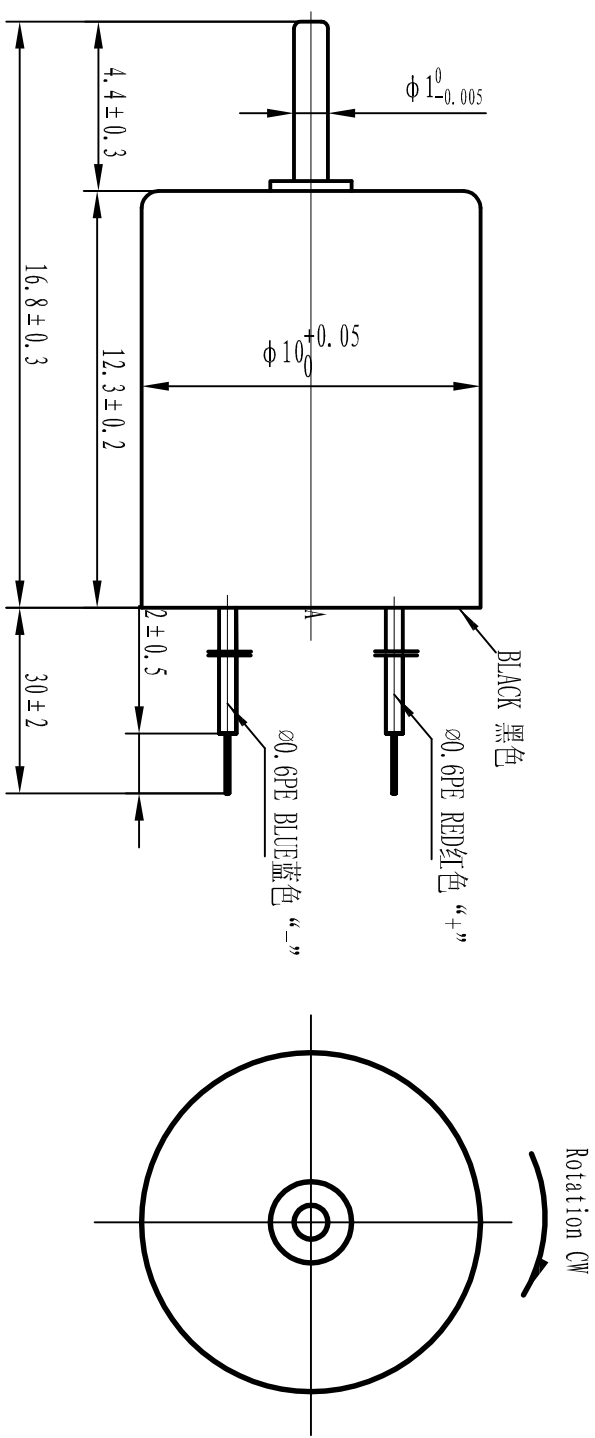
11) **ALWAYS REMEMBER** that QX has a professional technical support team for the solution of problems on our motors that used in new products or new applications. We are proud of our good working relationship with our customers and we will be most pleased if we can assist you to find a solution to any problem that you may encounter.

**请谨记：** 双环全新机电股份有限公司拥有一支专业的技术支持团队，致力于解决我们的电机在新的产品或新的应用中出现的问题，我们乐意与您建立良好的合作关系，我们乐意为您解决使用中遇到的各种问题。

#### 10. 附件 ATTACHMENT

- 1) 电机外形图 Motor Outline Drawing
- 2) 电机性能曲线图 Motor Performance Curve Drawing

————— END —————



NOTES:

- 1 DIRECTION OF ROTATION IS CLOCKWISE WHEN VIEWING MOTOR OUTPUT END WITH "+"
- 2 END PLAY : 0.05-0.3mm.
- 3 MEASURED WITH SHAFT IS PUSHED INTO A DIRECTION.

								Alexia				比例 5:1	深圳双环全新机电股份有限公司
标记		来历		签名		日期							
设计				审核		日期		阶段标记		数量		重量	
工艺				批准	范圣乘	20170412	S						外形图
													QX10A2-076241-A0C-05

# MOTOR PERFORMANCE CURVE

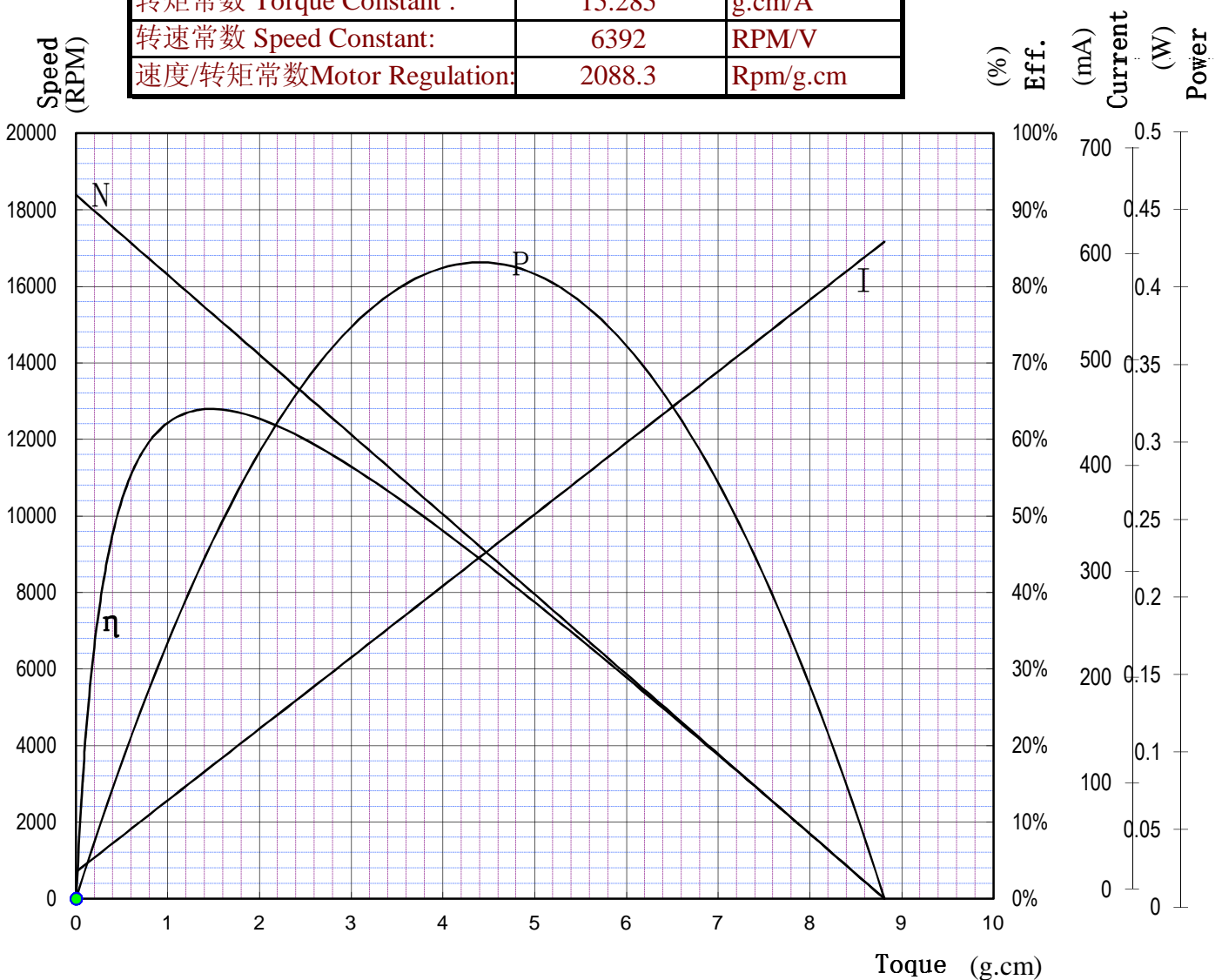
## 电机性能曲线

客户名称 Customer Alexia 额定电压 Rated Voltage 3 V/DC  
 电机型号 Motor Model QX10A2-076241-A0C 额定负荷 Rated Load A2风叶  
 测试日期 Test Date 20170412

注：本曲线图及下表数值为理论计算得出的参考值，仅用于描述电机性能变化规律，请勿据此制定规格标准。所有参数以规格书正文标准。

Parameters Table 性能参数表		F/L 空载	Eff (max) 最大效率点	P (max) 最大功率点	Stall 堵转点
转矩 Torque :	g.cm	0	1.48	4.40	8.81
转速 Speed :	RPM	18396	15315	9198	0
电流 Current :	mA	24.3	120.8	312.5	600.6
输出 Output :	W	0	0.23	0.42	0
效率 Efficiency :	%	0	63.98%	44.36%	0

特征参数 Parameters		
转矩常数 Torque Constant :	15.285	g.cm/A
转速常数 Speed Constant:	6392	RPM/V
速度/转矩常数 Motor Regulation:	2088.3	Rpm/g.cm



NOTES: Performance ( In an ambient temperature of 25 -30°C)  
 Motor tested rapidly to prevent significant temperature rise.

备注：电机测试环境温度：常温25 -30°C  
 电机测试迅速，以防止温度显著上升