



# 产品规格书

PRODUCT SPECIFICATION

客户名称Buyer Name	
客户料号Buyer Part No.	
客户承认签章 Buyers Approval & Signatures	

文件编号Spec No.		版本	A/1
品名描述 Product Description	圆柱铁芯贴片马达 Cylindrical core SMT Motor		
型号Part No.	Z43FM1B8230001L		
送样日期Date			
设计Designed by	审核Checked by	批准Approved by	
陳满	陈满	陈满	
2020-12-01	2020-12-01	2020-12-01	

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## 1. 结构形式/Construction Form

本规格书适用于移动电话的振动马达。

This datasheet is stipulated for vibration motor for mobile phone.

NO.	项目/Item	规格/Specifications
1-1	电机结构 Motor construction	Φ4.1 圆柱形铁芯直流电机 Φ4.1 DC Cored motor
1-2	换向片数 Number of phases	3 组换向片 3-phases
1-3	磁极数 Number of magnet poles	两极 (外置磁极型式) 2-poles (Inner magnet type)
1-4	线圈 Coil construction	铁芯线圈 Iron-cored coil
1-5	整流技术 Rectifying method	采用高精度电刷和换向器 Precious brush and commutator

## 2. 使用条件/Standard Operating Condition

NO.	项目/Item	规格/Specifications
2-1	额定电压 Rated voltage	DC3.0V
2-2	使用电压范围 Operating voltage range	DC 2.3~3.6V
2-3	旋转方向 Rotating direction	CW / CCW
2-4	使用温度范围 Operating temperature range	-30℃~+70℃

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### 3.测试条件/Testing Condition

NO.	项目/Item	规格/Specifications
3-1	温度 Temperature	20℃ ±2
3-2	湿度 Humidity	45% ~85%RH
3-3	电源电压 Power supply, voltage source	直流电源或电池 3.0V DC power supply or battery 3.0V
3-4	马达安放状态 Posture of motor	水平/Horizontal

### 4.贮存环境/Storage Environment

NO.	项目/Item	规格/Specifications
4-1	贮存温度 Storage temp	-40℃ ~+85℃
4-2	相对湿度 Relative humidity	5%~95% (No condensation of moisture/无水汽 凝结)

### 5.电气特性/Electrical Characteristic

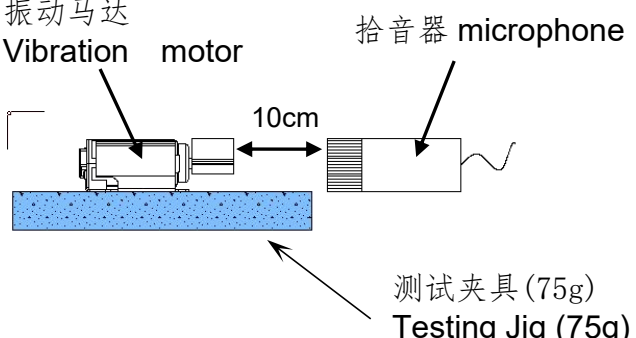
NO.	项目/Item	单位 /Unit	规格/Spec.	条件/Condition
5-1	额定转速 Rated speed	rpm	12000 ±2500	额定电压:DC 3.0V Rated voltage:DC 3.0V
5-2	额定电流 Rated current	mA	85 Max	在额定电压和额定负载下测试 /Measure at rated voltage and rated load
5-3	启动电流 Starting current	mA	100 Max	在额定电压下锁定振动轮，测电机 电流（2/3R 极端电阻处，不在电刷 和整流子两点接触的位置）/Measure current at locked counter weight ( R2.1 ×3.0) in rated voltage(2/3R R:1 extreme resisting rate,Not in the position when the brushes contact the commutator at the two contact points)

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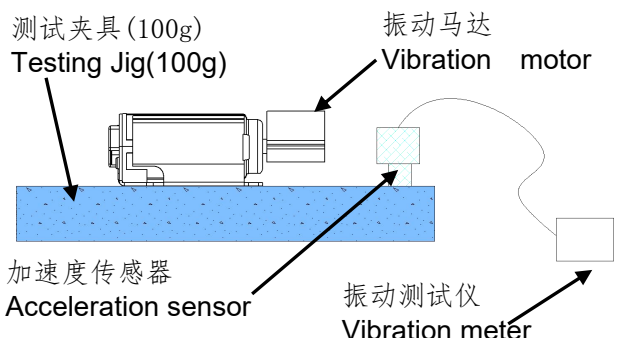
5-4	启动电压 Starting voltage	V	2.3 Max	DC2.3V电压下, 开/关为1个循环, 共3个循环 On/off-1cycle,total 3cycles under DC 2.3V
5-5	端子阻抗 Terminal resistance	$\Omega$	单相 1phase:33 $\pm$ 5	正极和负极之间 Between positive and negative
5-6	绝缘电阻 Insulation resistance	M $\Omega$	10Min	测量机壳和引线之间。 测试电压直流100V。 Measuring between case and lead wire.Test voltage DC 100V

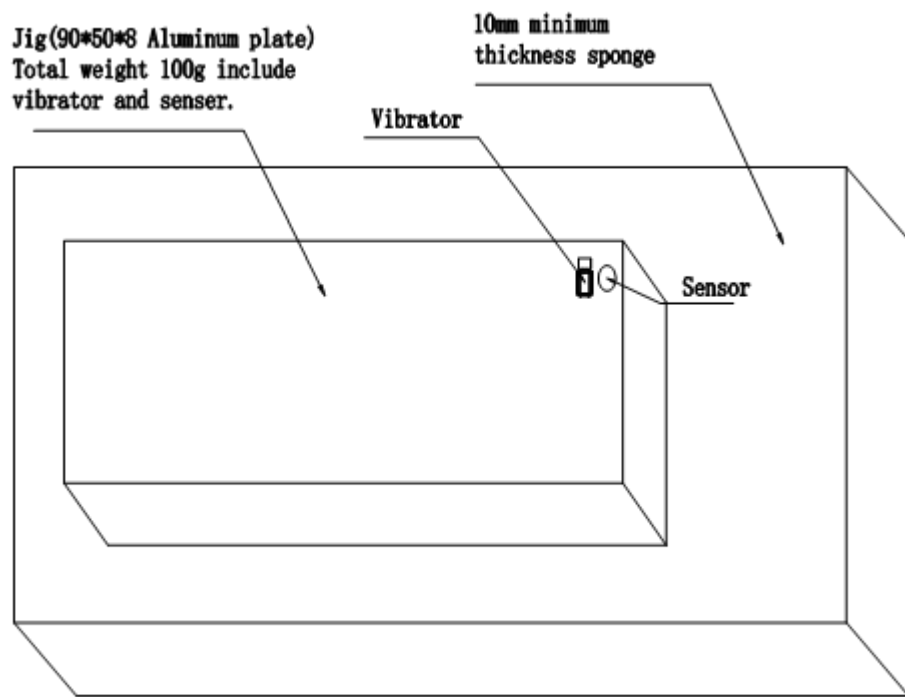
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## 6. 机械特性/Mechanical Characteristics

NO	项目/Item	单位/Unit	规格/Spec.	条件/Condition
6-1	外观 Appearance	/		目测/Visual
6-2	尺寸 Size	mm	见外形图/See outline of drawing	使用游标卡尺和千分尺测量/Use vernier caliper and micrometer to measure
6-3	马达重量 Motor Weight	g	0.7±0.2g	使用天平测量/Use scale
6-4	轴抗拉强度 Shaft pull strength	Kgf	5 MIN	沿轴向施加拉力，保持5秒钟。/Pull shall be applied along with direction for 5s.
6-5	机械噪音 Mechanical Noise	dB	50 MAX	<p>振动马达 Vibration motor</p> <p>拾音器 microphone</p>  <p>10cm</p> <p>测试夹具 (75g) Testing Jig (75g)</p> <p>马达：被固定/Motor : be fixed 额定电压:DC 3.0V/Rated voltage : DC 3.0 V 背景噪音： 25dB MAX. Back ground noise: 25dB MAX. 拾音器沿轴向正对电机平面 Microphone faces the plane of motor along the shaft</p>

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6-6	振动量 Vibration Strength	Grms	0.6 MIN	 <p>测试夹具 (100g) Testing Jig(100g)</p> <p>振动马达 Vibration motor</p> <p>加速度传感器 Acceleration sensor</p> <p>振动测试仪 Vibration meter</p> <p>马达: 被固定/Motor: be fixed. 额定电压: DC 3.0V/Rated voltage : DC 3.0V .</p>
		Gp	0.84 MIN	
6-7	响应时间 Responsive Time	ms	65	30ms 达到 50%振感,65ms 达到 100% 振感/ Motor vibration sense reach to 50% within 30ms,and 100% within 65ms.

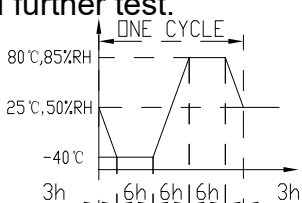


Simulation Vibration test method



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## 7. 可靠性试验/Reliability Test

NO	项目/Item	条件/Condition
7-1	高温贮存试验 High temperature storage test	在+80℃的环境下放置96小时, 然后在常温常湿下恢复4小时后测试。 Exposed at +80℃ for 96hours, then return to normal temperature and humidity for 4 hours before test.
7-2	低温贮存试验 Low temperature storage test	在-40℃的环境下放置96小时, 然后在常温常湿下恢复4小时后测试。 Exposed at -40℃ for 96hours, then return to normal temperature and humidity for 4 hours before test.
7-3	湿热试验 Humidity test	在温度+40℃, 湿度90%的环境下放置48小时, 然后在常态下放置4小时后测试。/Expose the motor under the environment of+ 40℃,90%HR for 48 hours,then place the motor at normal temperature for 4 hours until further test.
7-4	高低温试验 Heat cycle test	<p>确保电机在下图所示的条件下放置一个周期(马达表面避免有水汽凝结), 然后在室温下恢复4小时后, 进行测试。/Assure the motor be placed under below testing conditions for one cycle(no condensation of moisture is allowed on the surface of motor), then put the motor at normal temperature for 4 hours until further test.</p> 
7-5	振动试验 Vibration test	<p>将马达固定在100g的塑料夹具上, 按以下要求进行试验:</p> <ol style="list-style-type: none"> <li>1)振频范围:10-55Hz</li> <li>2)全振幅1.5mm</li> <li>3)振频变化10-55-10 约10分钟</li> <li>4)振动方向:三个垂直方向</li> <li>5)持续时间:每个方向10分钟 (共30分钟)</li> </ol> <p>Fix the motor on a 100g jig (plastic housing),and then make test according to below requirements:</p> <ol style="list-style-type: none"> <li>1)Vibration frequency range: 10~55Hz</li> <li>2)Total amplitude: 1.5mm</li> <li>3)Sweep ratio: 10~55~10Hz approximate 10min</li> <li>4)Direction of vibration: Three perpendicular directions</li> <li>5)Duration: 10min(30min in total)</li> </ol>

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7-6	跌落试验 Drop test	<p>将马达电机放在大约60g（包括电机）重的物体上,从1.5米的高度跌落到20mm厚的硬木板上，跌落18次。/Set the motor to a fixture of approx.60g(include the motor) and drop it freely from the height of 1.5 meters to the hard wood board of 20mm thick, repeat dropping for 18 times.</p> <p>高度/Height : 1.5m 方向/Direction : ±X, ±Y, ±Z 次数/Times : 每一平面下落3次，共计18次/Three drops per plane for a total of 18 drops.</p>
7-7	盐雾试验 Salt spray test	<p>电机放置盐雾试验箱，试验箱内湿度35%，盐溶液浓度5±1%；PH值为6.5-7.2；盐雾沉降量为1-2ml/80cm；浓度为5%的中性盐溶液中24小时。持续期满，清洗试验样品表面，用干净的棉布擦拭后进行检测，要求马达外观、振动功能良好，表面无腐蚀现象。</p> <p>Put the motor in the salt spray test box for 24 hours, the humidity in the test case should be 35%, concentration of salt solution be 5± 1 %, PH value be 6.5-7.2, the precipitation of salt fog be 1-2ml/80cm, and the neutral salt solution should be with a concentration of 5%. At the end of the period, clean the surface of the tested sample, and then do further test once wiped with a clean cotton cloth. The appearance and vibrating function of the motor are required to be in good condition, and the surface should be free of corrosion.</p>

▶ 判定标准/Judgment standard

① 试验后，测试数据必须符合以下规格：

After test, measured data must be satisfied as following specifications;

- 启动电压: DC2.3V MAX.
- Starting voltage: DC2.3V MAX.
- 额定转速: 变化率在初始值的+30%~-20%以内。
- Rated speed: changing rate must be within +30%~-20% of initial value.
- 额定电流: 变化率在初始值的+20%~-30%以内。
- Rated current: changing rate must be within +20%~-30% of initial value.
- 端子阻抗: 变化率在初始值的±15%以内。
- Terminal resistance: changing rate must be within ±15% of initial value.

② 外形结构无异常。

There should be no abnormalities in appearance and structure.

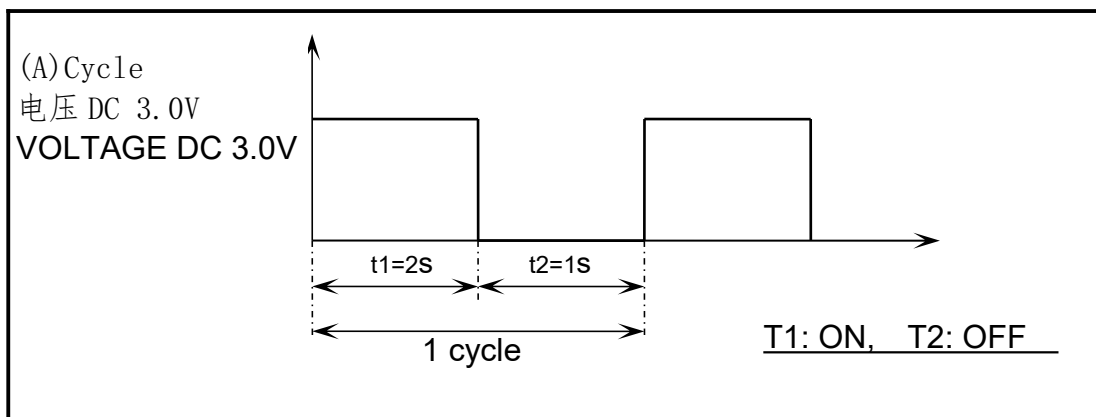
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## 8.寿命试验/Life Test

输入3.0V电压/Input voltage 3.0V.

带负载重量 (R1.8, t4.0大约0.4g) /Load counter weight (R1.8, t4.0 appx0.4g).

NO	项目/Item	条件/Condition
8-1	常温寿命试验 /Room Temperature Life Test	放置在室温25°C, 50%RH的湿度条件下/ Exposure at room temperature of 25°C, and humidity of 50%RH.
8-2	高温寿命试验/High temperature Exposure Life Test	放置在高温55°C的条件下/Exposure at high temperature of 55°C.
8-3	低温寿命试验 /Low temperature Exposure Life Test	放置在高温-20°C的条件下/Exposure at low temperature of -20°C.



### 8-1-1 常温寿命试验/Room Temperature Life Test

1.按A周期运行96小时/To maintain (A)cycle for 96hrs in the process of temperature shock.

### 8-2-1 高温寿命试验/High temperature Exposure Life test

1.按A周期运行48小时/To maintain(A)cycle under high temperature for 48hrs.

### 8-3-1 低温寿命试验/Low temperature Exposure Life test

1.按A周期运行48小时/To maintain(A)cycle under high temperature for 48hrs.

## ▶ 判定标准/Judgment standard

①试验后，测试数据必须符合以下规格：

After test, measured data must be satisfied as following specifications;

- 启动电压: DC2.3V MAX.
- Starting voltage: DC2.3V MAX.
- 额定转速: 变化率在初始值的+30%~-20%以内。
- Rated speed: changing rate must be within +30%~-20% of initial value.
- 额定电流: 变化率在初始值的+20%~-30%以内。
- Rated current: changing rate must be within +20%~-30%of initial value.

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## 9.环保要求/Environment Protections

本产品所有零部件符合欧盟RoHS2.0/无卤/REACH指令要求，具体环境有害物质管控限制如下：

This product conforms to the EU ROHS2.0, halogen-free and REACH certification, Specific content as follows:

铅及其化合物最大允许含量为1000ppm/Lead and Lead compounds $\leq$ 1000ppm

镉及其化合物最大允许含量为1000ppm/Cadmium and cadmium compounds $\leq$

1000ppm

汞及其化合物最大允许含量为1000ppm/Mercury and Mercury compounds $\leq$ 1000ppm

六价铬化物最大允许含量为1000ppm/Hexavalent chromium compounds $\leq$ 1000ppm

多溴联苯(PBB)最大允许含量为1000ppm/Polybrominated biphenylethers $\leq$ 1000ppm

多溴联苯醚(PBDE)最大允许含量为1000ppm/Polybrominated diphenylethers $\leq$

1000ppm

邻苯二甲酸二正丁酯(DBP)最大允许含量为1000ppm /DBP $\leq$ 1000ppm

邻苯二甲酸正丁基苄酯(BBP)最大允许含量为1000ppm/BBP $\leq$ 1000ppm

邻苯二甲酸(2-己基)己酯(DEHP)最大允许含量为1000ppm/DEHP $\leq$ 1000ppm

六溴环十二烷(HBCDD)最大允许含量为1000ppm/HBCDD $\leq$ 1000ppm

溴Br最大允许含量为900ppm/Br $\leq$ 900ppm

氯Cl最大允许含量为900ppm/Cl $\leq$ 900ppm

溴加氯之和最大允许含量为1500ppm/Br+Cl $\leq$ 1500ppm

REACH 指令按最新法规内容管控执行/The instructions are subject to the latest regulations

包装材料环保管控要求：Pb, Cd, Hg, Cr+6 : 4 种物质总和 < 100ppm (其中, Cd<50ppm)/

Environmental control requirements for packaging materials: Pb+Cd+Hg+Cr6 <

100ppm (其中, Cd<50ppm)

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## 10. 注意事项/Caution

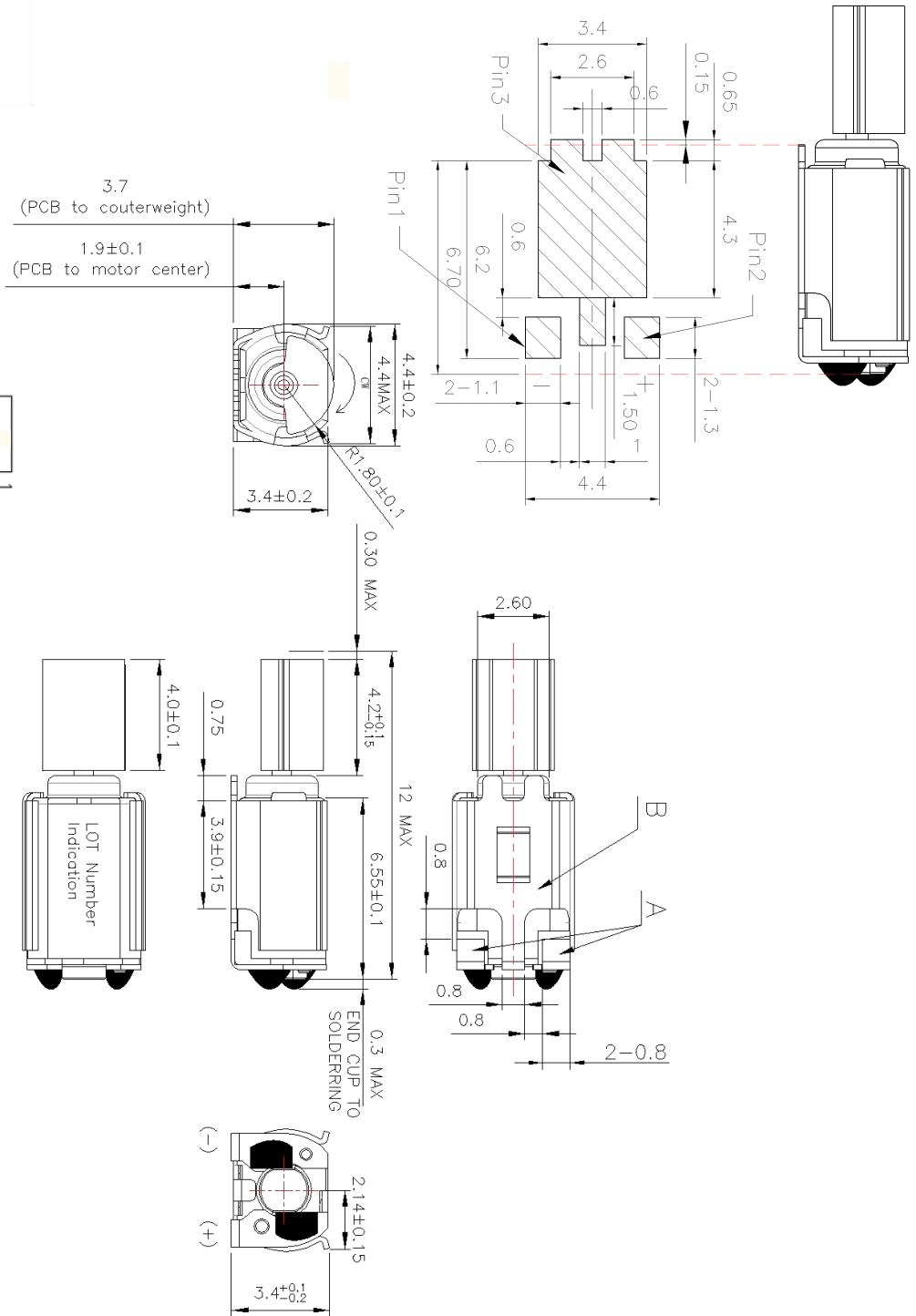
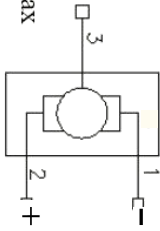
- (1) 该马达是微型精密产品，在运输过程中不要承受超过0.5 kgf的力，否则会引起外形或性能的变化。  
As this motor is small and precise, do not press it over 0.5kgf force or while transportation, otherwise it will cause the transformation of performance or external appearance.
- (2) 请注意马达不要接触到液体性物质（比如：水，酒精等）  
Please keep the motor away from liquid substance (such as water, alcohol, etc.)
- (3) 不要在高温下长时间放置，否则有可能导致电机的性能下降。  
Do not expose the motor to high temperature for a long time, it may cause a decline in performance.
- (4) 马达不要在以下环境中使用：
  - 高温和高湿的场所
  - 腐蚀性气体如H<sub>2</sub>S、SO<sub>2</sub>、NO<sub>2</sub>等Avoid using the motor in the following environment.
  - High temperature and high humidity area.
  - Corrosive gas such as H<sub>2</sub>S、SO<sub>2</sub>、NO<sub>2</sub> etc.
- (5) 请不要在靠近磁铁或带有磁场的仪器旁边使用或存放马达。  
Please do not operate or store the motor adjacent to magnet or apparatus which has a magnetic field.
- (6) 请注意机壳的表面存在漏磁通量。  
Please be careful that there exists a leaking magnetic flux on the surface of bracket.
- (7) 电刷和换向器的相互作用，有可能产生轻微的电噪音。  
Due to interaction between brush and commutator, there is a possibility to occur electrical noise slightly.
- (8) 因测试设备有误差，允许有±5%偏差。  
Due to the measurement equipment error, there is a ± 5 % difference tolerance.

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- (9) 接电端子扭曲、折弯次数不可多于 2 次。  
Current terminals should not be twisted or bent more than twice.
- (10) 被焊锡的端子局部受压不可多于2次。  
The portion when lead wire and terminal are soldered should not be under stressed more than twice.
- (11) 在马达通电时，不宜长时间锁住不转。  
Do not subject the motor under locked condition for long hours.
- (12) 不可向马达一侧强行挤压接电端子。  
Do not exert pressure by pushing the current terminals towards the direction of the internal motor.
- (13) 马达通过ROHS认证  
This motor pass the system of ROHS certification.
- (14)  
出厂检验报告附上 35 只马达特性数据和 CPK 值,其中  
包括:  
负载转速: rpm  
负载电流: m A  
堵转电流 (启动电流) : m A  
启动电压: 不考虑 CPK 值
- Attached to OQC report are 35 motors' characteristic data and CPK value, including:  
Loaded rotation: rpm.  
Loaded current: mA  
Lock current (Starting current): mA  
Starting voltage: without the consideration of CPK value .

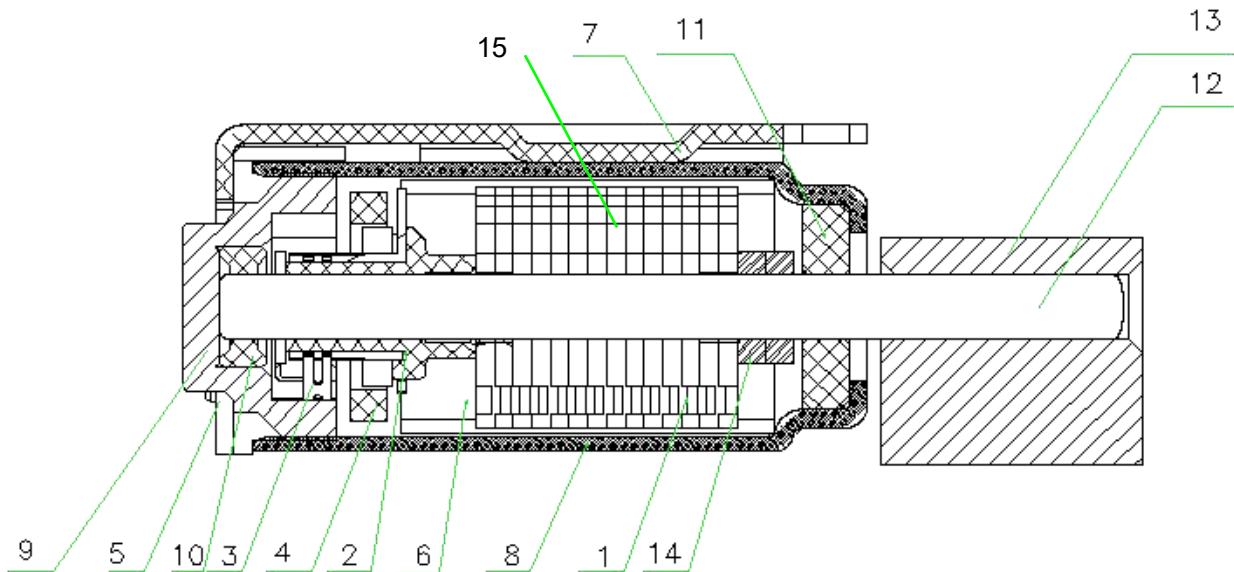
11.外形图/Outside View

技术要求/Technique requests:  
 1.电机轴向间隙0.3mm Max/  
 Axial play of shaft is 0.3mm max  
 when counterweight rotating;  
 2.A 面、B 面共面，A<sub>n</sub>、B 面的高度差为-0.03~+0.1mm/  
 Coplanarity Plane A and B are coplanar. altitude tolerance  
 of plane of A with B is -0.03~+0.1。



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## 12. 结构图及物料清单/Structure Drawing & BOM



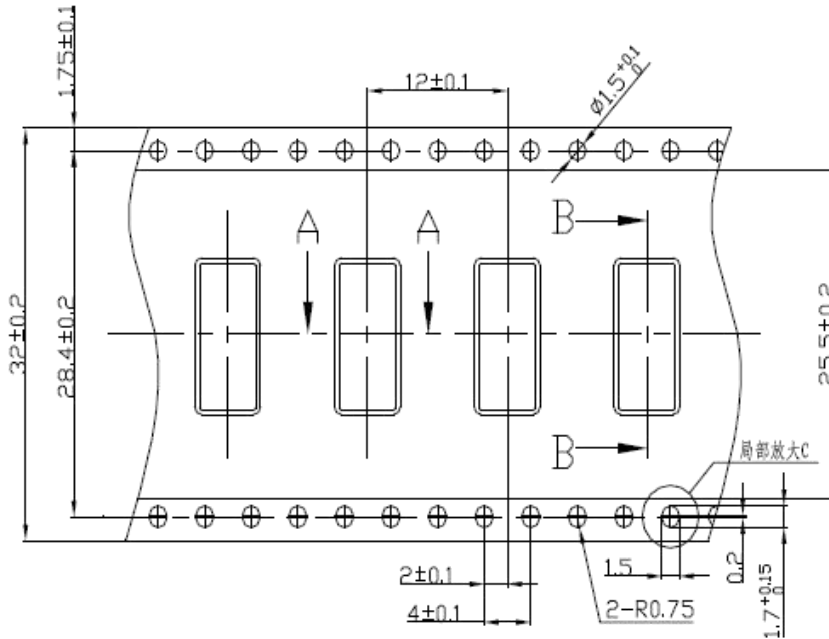
NO.	部件名称/Part name	材料名称/Material name
1	涂装铁芯/Iron core	20HTH1500
2	整流子/Commutator slice	SP-2/MX215/LCP
3	电刷/Brush	SP-1/MX96
4	变阻/Varistor	钛酸锶/SrTiO3
5	焊锡端子/Terminal	黄磷铜/Yellow phosphorus copper
6	磁钢/Magnet	钕铁硼/NdFeB
7	支架/Bracket	SUS301
8	机壳/Case	SPCC
9	基板/Brush board	PA46
10	外壳轴承/Bearing	铜铁基/Cu
11	基板轴承/bearing	铜铁基/Cu
12	钢轴/Shaft	DSR7B
13	分铜/Counterweight	钨合金/Tungsten alloy
14	套管/Casing	PA46
15	漆包线/Enamel Covered wire	铜线/Cu



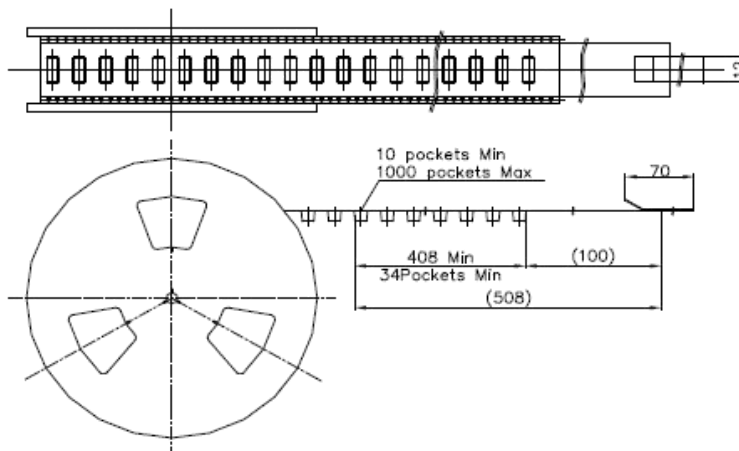
产品规格书/Specifications	日期/Date : 2020-12-01	
振动马达/Vibration motor: Z43FM1B8230001L	页码/Page : 17 / 18	版本/version: A/1

### 13. 包装要求/Packaging Requirement

#### 13.1 最小包装/Smallest Packing



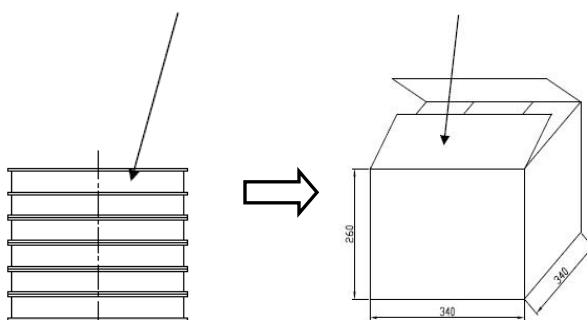
#### 13.2 卷轴包装/1 reel packing dimension



#### 13.3 最终包装/Final Packing Condition

双层波纹纸/Double wall corrugated cardboard (internal dimension)

1000pcs/1 reel x 5reel = 5000pcs

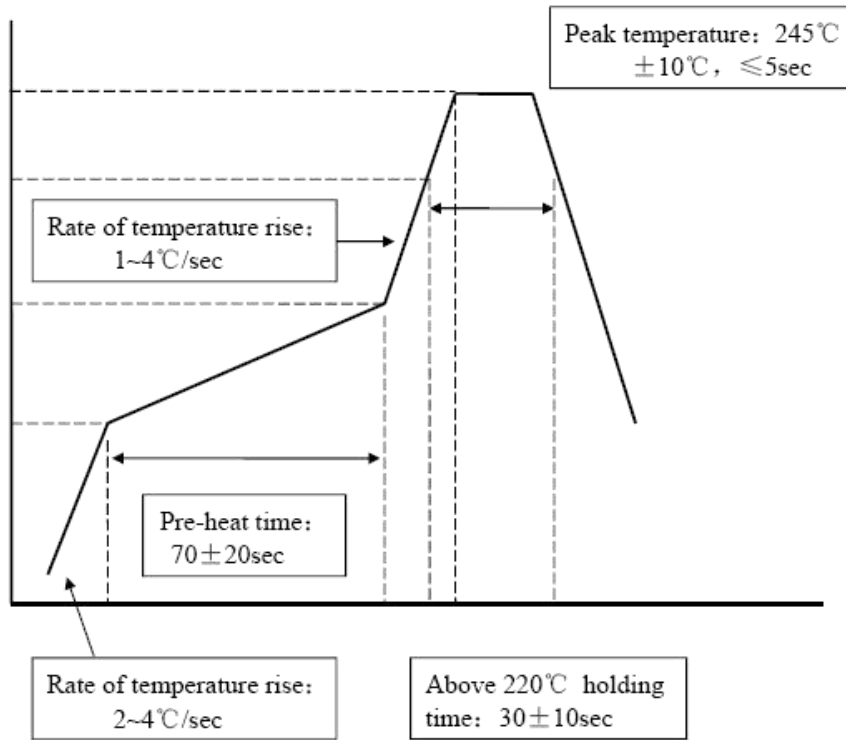


5个卷盘装入外箱, 数量共5000只;  
Put 5 reels into outer-box, total  
5000 Pcs.  
外箱尺寸: (长 340mm 宽: 340mm  
高: 260mm)  
Outer-box dimension:  
(L:340mm W:340mm H:260mm)

产品规格书/Specifications	日期/Date : 2020-12-01	
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14. 生产过程中回流老化后检查 /The inspection after reflowing is implemented in product process.

### Reflow Specification



Peak temperature maximum 245°C/5sec.