



# 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	圆柱振动马达 Cylinder Vibration Motor		
型号Part No.	VZ4TH5B1241993L		
送样日期Date			
设计Designed by	审核Checked by	批准Approved by	
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2021.03.09	2021.03.09	2021.03.09	

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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电机。

This datasheet is stipulated for vibration motor, which is for mobile phone.

NO.	项目/Item	规格/Specifications
1-1	电机结构 Motor construction	$\phi 4$ 圆柱形无铁芯直流电机 $\phi 4$ cylindrical DC coreless 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 (内置磁极型式) 2-poles (Inner magnet type)
1-4	线圈 Coil construction	空心杯式线圈 Columnar 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 2.4~3.6V
2-3	旋转方向 Rotating direction	CW / CCW
2-4	使用温度范围 Operating temperature range	-30°C~+70°C

**3.测试条件/Testing condition**

NO.	项目/Item	规格/Specifications
3-1	温度 Temperature	20°C±3
3-2	湿度 Humidity	45% ~85%RH
3-3	电源电压 Supply voltage	直流电源或电池 3.0V DC power supply or battery 3.0V
3-4	电机安放状态 Posture of motor	水平/竖直 Horizontal / Vertical

**4.贮存环境/Storage environment**

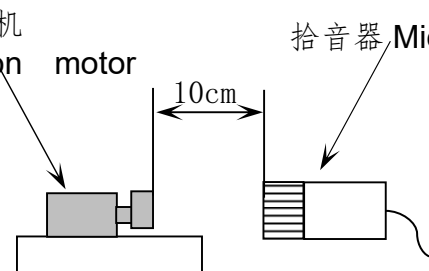
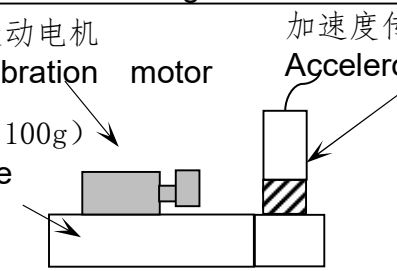
NO.	项目/Item	规格/Specifications
4-1	贮存温度 Storage temp	20±3°C
4-2	相对湿度 Relative humidity	45%~85% RH

**5.电气特性/Electrical characteristic**

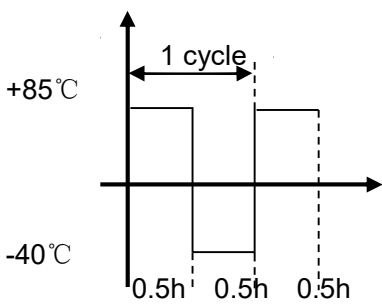
NO.	项目/Item	单位 /Unit	规格/Spec	条件/Condition
5-1	额定转速 Rated speed	rpm	14000±2500	额定电压/Rated voltage: DC 3.0V
5-2	额定电流 Rated current	mA	85Max	额定电压/Rated voltage: DC 3.0V
5-3	启动电流 Starting current	mA	100Max	在额定电压下锁定振动轮，测电机电流/Measure current at locked counterweight in rated voltage
5-4	启动电压 Starting oltage	V	2.0Max	在额定负荷下电机的任一位置都能转动/The motor can be rotated at any position under rated load

5-5	端子阻抗 Terminal resistance	Ω	37 (1±20%) Ω	正极和负极之间/ Between positive and negative
5-6	绝缘电阻 Insulation resistance	MΩ	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 .
5-7	耐电压 Dielectric voltage	mA	1Max	在电机的机壳和引线间施加交流电 110V, 历时 1 分钟。/ Supply with AC 110V between a lead wire and motor case during 1 minute.

**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	/	无划痕、 锈蚀、污 迹等不良现象 /No scar, rust, stain and dent	目测/Visual
6-2	尺寸 Size	mm	详见外 形 图 /See outline drawing	使用游标卡尺和千分尺测量/ Use vernier caliper and micrometer to measure
6-3	电机重量 Motor Weight	g	0.85±10 %	用天平测量/Use scale
6-4	机械噪音 Mechanical Noise	dB	50 Max	振动电机 Vibration motor  拾音器 Microphone 额定电压/Rated voltage : DC 3.0V 背景噪音/Back ground noise: 30dB Max. 拾音器沿轴向正对电机平面/Microphone faces the plane of motor along the shaft
6-5	振动量 Vibration Strength	Grms	0.8 Min	振动电机 Vibration motor  测试夹具 (100g) Test Fixture (100g) 加速度传感器 Accelerometer 额定电压/Rated voltage : DC 3.0V
		Gp	1.1 Min	

**7. 环境试验/Environmental test**

NO	项目/Item	条件/Condition
7-1	高温贮存试验 High temperature storage test	在 $80\pm 2^{\circ}\text{C}$ 的环境下放置96小时, 然后在常温常湿下恢复2小时后测试。/Exposed at $80\pm 2^{\circ}\text{C}$ for 96hours, then return to normal temperature and humidity for 2 hours before test.
7-2	低温贮存试验 Low temperature storage test	在 $-40\pm 2^{\circ}\text{C}$ 的环境下放置96小时, 然后在常温常湿下恢复2小时后测试。/Exposed at $-40\pm 2^{\circ}\text{C}$ for 96 hours, then return to normal temperature and humidity for 2 hours before test.
7-3	湿热试验 Humidity test	将电机置于 $50\pm 2^{\circ}\text{C}$ 、90~95%R.H.的环境下96 小时, 然后在室温下放置2 小时, 进行恢复, 而后进行测试。/Expose the motor under the environment of $50\pm 2^{\circ}\text{C}$ , 90~95%R.H. for 96 hours and then return to normal temperature and humidity for 2 hours before test.
7-4	高低温试验 Heat cycle test	确保电机在下图所示的条件下放置 12 个周期, 在室温下恢复 2 小时后, 进行测试。/ Assure the motor be placed under below testing conditions for 12 cycles, and then put the motor at normal temperature and humidity for 2 hours until further test. <div style="text-align: center;">  <p>The diagram shows a square wave representing temperature cycles. The vertical axis is temperature, with +85°C at the top and -40°C at the bottom. The horizontal axis is time. One cycle consists of a 0.5h dwell at +85°C, a 0.5h dwell at -40°C, and a 0.5h dwell at -40°C before the next cycle begins. A dashed vertical line marks the end of the first cycle.</p> </div>
7-5	振动量试验 Vibration test	将电机固定在100g的塑料夹具上, 按以下要求进行试验/Fix the motor on a 100g jig (plastic housing),and then make test according to below requirements: 1) 振频范围/Vibration frequency range:10-55Hz 2) 全振幅/Total amplitude:1.5mm 3) 振频变化/Sweep ratio:10~55~10Hz 约2分钟/approximate 2 min 4) 振动方向/Direction of vibration:三个垂直方向/Three



		<p>perpendicular directions</p> <p>5)持续时间/Duration:每个方向10分钟（共30分钟）/ 10 minutes in each direction (30 minutes each)</p>
7-6	<p>跌落试验 Drop test</p>	<p>电机放在大约100g（包括电机）重的物体上自由落下到水泥地板上。/Set the motor on the heavy block about 100g weight (include the motor) and drop the motor onto the concrete floor.</p> <p>高度/Height: 1.5m</p> <p>方向/Direction: <math>\pm X</math>, <math>\pm Y</math>, <math>\pm Z</math></p> <p>次数/Times: 每一平面下落2次，共计12次。/Two drops per plane for a total of 12 drops.</p>

▶ 判定标准/Judgment standard

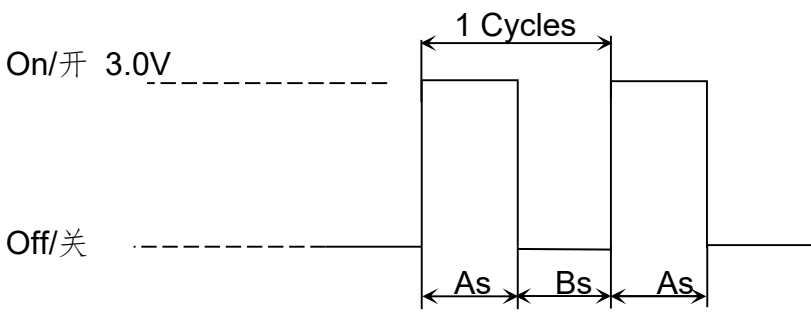
试验后，测试数据必须符合以下规格：

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

- 启动电压/Starting voltage: DC 2.3V Max.
- 额定转速/Rated speed: 变化率在初始值的+50%~-30%以内/ Changing rate must be within +50%~-30% of initial value.
- 额定电流/Rated current: 变化率在初始值的+50%~-30%以内。/Changing rate must be within +50%~-30% of initial value.
- 端子阻抗/Terminal resistance: 变化率在初始值的 $\pm 15\%$ 以内。/Changing rate must be within  $\pm 15\%$  of initial value.

外形结构无异常。/There should be no abnormalities in appearance and structure.

**8. 寿命试验/Life test**

NO	项目/Item	条件/Condition
8-1	寿命试验 Life test	<p>在常温、常湿下，将 DC 3.0V 不断地施加在电机的正负极上，按 A 秒开、B 秒关为一个周期，运行 S 个周期（如下图所示）。 /At room temperature in ambient humidity, the DC 3.0V will continue to be applied to the positive and negative electrode, according to A seconds, B seconds off for a cycle, run S cycle (as shown below).</p> <p>模式/mode A=1, B=1, S=100,000</p>  <p>The diagram shows a square wave pulse representing the DC 3.0V application. The pulse width is labeled 'As' (On/开 3.0V) and the gap between pulses is labeled 'Bs' (Off/关). A bracket above the pulse and gap is labeled '1 Cycles'.</p>

**▶ 判定标准/Judgment standard**

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/Starting voltage: DC 2.3V Max.
- 额定转速/Rated speed: 变化率在初始值的+60%~-30%以内/ Changing rate must be within +60%~-30% of initial value.
- 额定电流/Rated current: 变化率在初始值的+60%~-30%以内。/Changing rate must be within +60%~-30% of initial value.
- 噪音/Noise: 电机应能正常启动，无异常机械噪音。/Should not fail in starting, Should not be unusual mechanical noise.

## 9. 环保要求/Environment Protections

本产品所有零部件符合欧盟RoHS指令(2011/65/EU,(EU)2015/863)/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 ROHS (2011/65/EU,(EU)2015/863), 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100ppm/Cadmium and cadmium compounds $\leq$ 100ppm

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

邻苯二甲酸二异丁酯(DIBP)最大允许含量为1000ppm /DIBP $\leq$ 1000ppm

邻苯二甲酸二丁酯(DBP)最大允许含量为1000ppm /DBP $\leq$ 1000ppm

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

邻苯二甲酸二(2-乙基己基)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

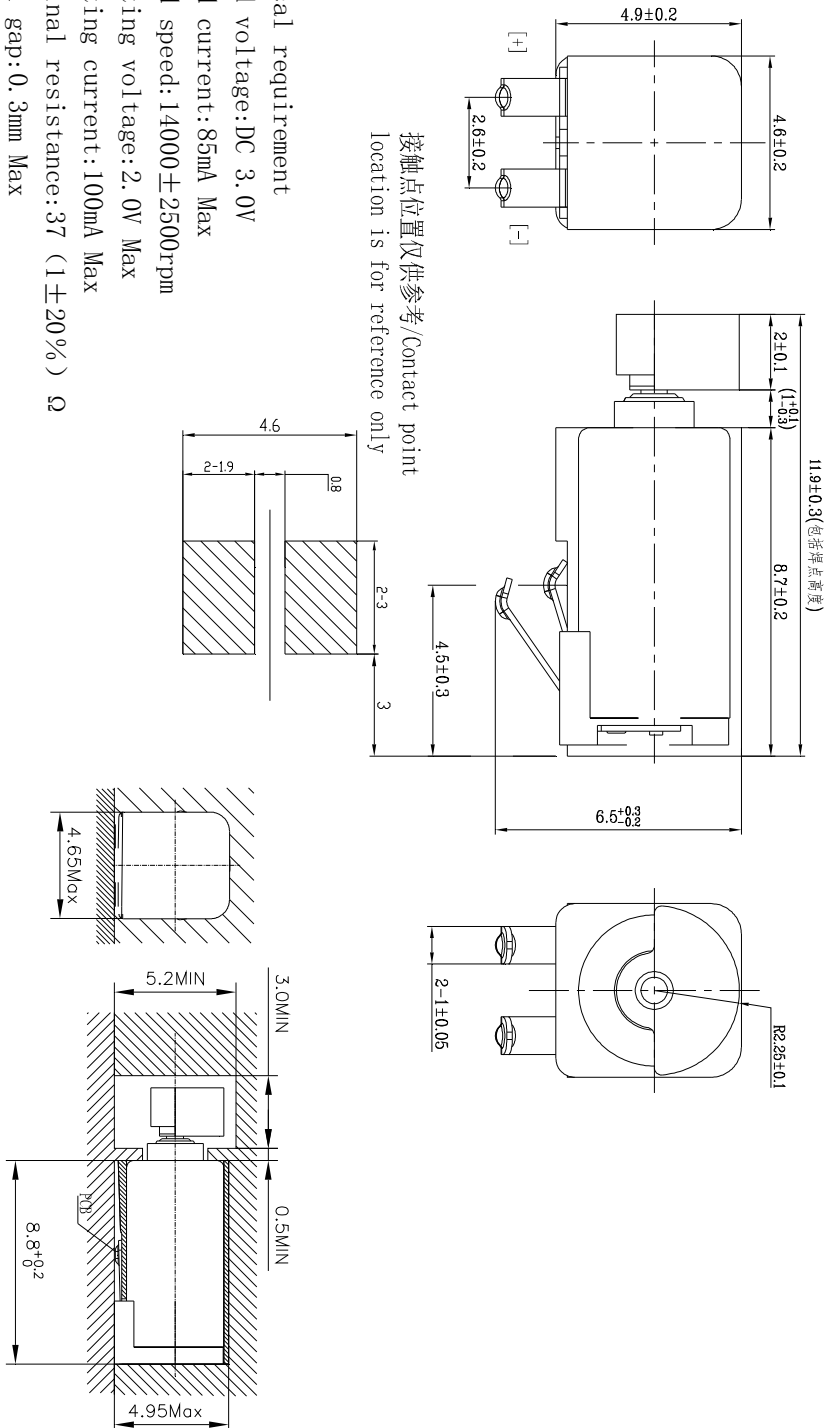
包装材料环保管控要求：Pb, Cd, Hg, Cr+6 : 4种物质总和 $<$  100ppm (其中, Cd $<$ 50ppm)

## 10. 注意事项/Caution

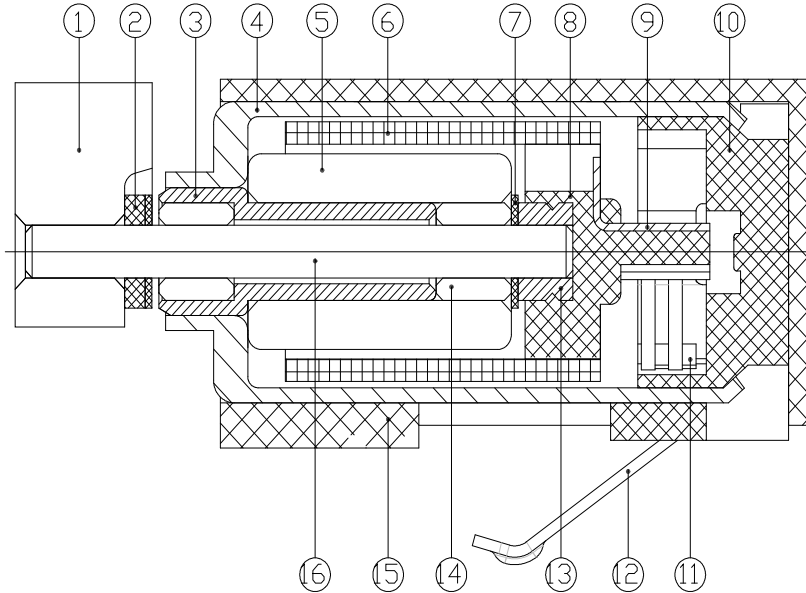
- (1) 该马达是微型精密产品，在运输过程中不要承受超过0.5 kgf的力，否则会引起外形或性能的变化。/As this motor is small and precise, do not press it over 0.5kgf force or while transportation, otherwise it will cause the transformation of performance or external appearance.
- (2) 请注意马达不要接触到液体性物质（比如：水，酒精等）。/ Please keep the motor away from liquid 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 long time,it may cause a decline in performance.
- (4) 马达不要在以下环境中使用。/Avoid using the motor in the following environment:
  - 高温和高湿的场所/High temperature and high humidity area.
  - 腐蚀性气体如H<sub>2</sub>S、SO<sub>2</sub>、NO<sub>2</sub>等/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) 请注意底盖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.
- (9) 马达通过ROHS认证。/This motor pass the system of ROHS certification.

**11.外形图/Outside view**

- 技术要求/Technical requirement
1. 额定电压/Rated voltage: DC 3.0V
  2. 额定电流/Rated current: 85mA Max
  3. 额定转速/Rated speed: 14000±2500rpm
  4. 启动电压/Starting voltage: 2.0V Max
  5. 启动电流/Starting current: 100mA Max
  6. 端子阻抗/Terminal resistance: 37 (1±20%) Ω
  7. 轴向间隙/Axial gap: 0.3mm Max
  8. 电机总长不包括轴向窜动间隙/The total length of the motor does not include the axial movement gap



安装图仅供参考/Installation diagram is for reference only

**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	振动轮/weight	钨合金/Tungsten alloy
2	定位片/Lock washer	聚酯薄膜/Polyester film
3	套管/Housing	易切钢/Steel alloy
4	机壳/Case	冷轧钢板/Steel board
5	磁钢/Magnet	钕铁硼/Nd-iron-boron
6	线圈/Coil	铜/Copper
7	垫片/washer	聚酯薄膜/Polyester film
8	塑料/Plastic	PBT
9	换向片/Commutator slice	CDF-2
10	端盖/Top Cover	PBT
11	电刷/Brush	AgPd50/MX215
12	接触片/Contact small plate	铍青铜/Beryllium bronze
13	轴套/Bushing ring	铍青铜/Beryllium bronze
14	含油轴承/Bearing	铜粉/Copper powder
15	胶套/Build in sheath	硅橡胶/Silica gel
16	钢轴/Shaft	SUS420J2

**13. 包装要求/Packaging requirement**

- (1) 每个吸塑盒里放50个电机。/50 vibrators in each plastic capsule.
- (2) 每25个吸塑盒上盖一个吸塑盒盖，用胶带捆成一捆。/Every 20 capsules as a group put a plastic cover on the group and wrap it in tape.
- (3) 每4捆按图中的叠放方式放入一个外包箱（315×315×185）。/Every 4 bundle are put into an outer case with a size of（315×315×185） by the ways stipulated as the drawing.
- (4) 数量、生产批号均写在外包装箱上。/Quantity and batch number are written on the surface of the outer case.

