



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	圆柱直流马达 Cylindrical DC motor		
型号Part No.	VZ4TJ1B0370011L		
送样日期Date			
设计Designed by	审核Checked by	批准Approved by	
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2021.12.10	2021.12.10	2021.12.10	

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更改记录/Change the record

修改号 Rev. No.	日期 Rev. Date	页码 Page No.	修改项目 Revised Item	更改原因 Reason
A/0	2021.10.22	/	产品颁布/ Release for Production	
A/1	2021.12.10	/	Changed company name from JINLONG MACHINERY to VYBRONICS, changed part # from Z4TJ1B0370011L to VZ4TJ1B0370011L	Rebranding

1. 结构形式/Construction Form

本规格书适用于振动电机 VZ4TJ1B0370011L.

This specification sheet is stipulated for vibration motor VZ4TJ1B0370011L.

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 Power supply, voltage source	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

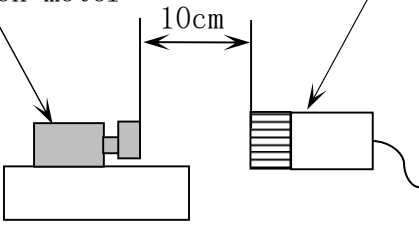
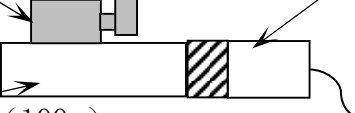
NO.	项目/Item	规格/Specifications
4-1	贮存温度 Storage temp	-30°C~+70°C
4-2	相对湿度relative humidity	45%~85% RH

5. 电气特性/Electrical characteristic

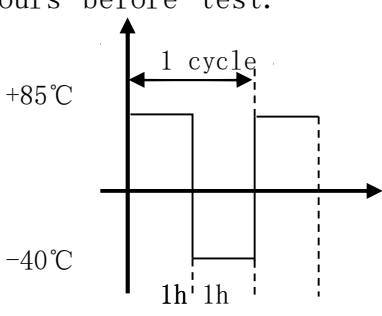
NO.	项目/Item	单位 /Unit	规格/Spec	条件/Condition
5-1	额定转速 Rated speed	rpm	14000±2500	额定电压/Rated voltage: DC 3.0V
5-2	额定电流Rated current	mA	95Max	额定电压/Rated voltage: DC 3.0V
5-3	启动电流Starting current	mA	125Max	在额定电压下锁定振动轮, 测 电机电流/Measure current at locked counterweight in rated voltage
5-4	启动电压Starting voltage	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	30 (1±20%) Ω	正极和负极之间/ Between positive and negative
5-6	绝缘电阻 Insulation resistance	M Ω	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	0.9±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	Gms Gp	0.8 Min 1.1 Min	振动电机 Vibration motor 加速度传感器 Accelerometer  测试夹具 (100g) Test Fixture (100g) 额定电压/Rated voltage : DC 3.0V

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 $-30\pm 2^{\circ}\text{C}$ 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 $-30\pm 2^{\circ}\text{C}$ for 96hours, 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 to $50\pm 2^{\circ}\text{C}$, 90%~95%R. H. for 96 hours and then return to normal temperature and humidity for 2hours 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。/Confirmed to operating of motor during 12 cycles as following test condition and then return to normal temperature and humidity for 2 hours before test. <div style="text-align: center;">  </div>
7-5	振动试验 Vibration test	将电机固定在100g的塑料夹具上，按以下要求进行试验/The motor that is attached to a 100g jig (plastic housing) and test according following condition: <ol style="list-style-type: none"> 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 perpendicular directions 5) 持续时间/Duration:每个方向 0.5小时（共1.5小时）/0.5

		hour in each direction (1.5 hours intotal)
7-6	跌落试验 Drop test	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 on the concrete floor. 高度/Height: 1.5m 方向/Direction: $\pm X$, $\pm Y$, $\pm Z$ 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.

▶ 判定标准/Judgment standard

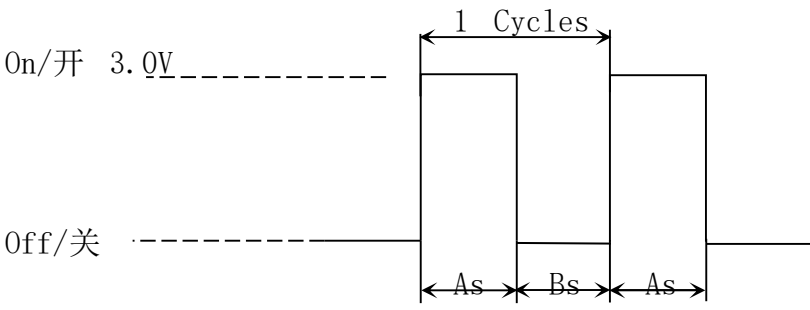
试验后，测试数据必须符合以下规格：

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	<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, often wet, 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> 

▶ 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;

- 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

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 FOR USE

(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, it can 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 be careful, not to be contacted fluid substances(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 periods of 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H₂S、SO₂、NO₂等/Corrosive gas such as H₂S、SO₂、NO₂ 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 That 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.

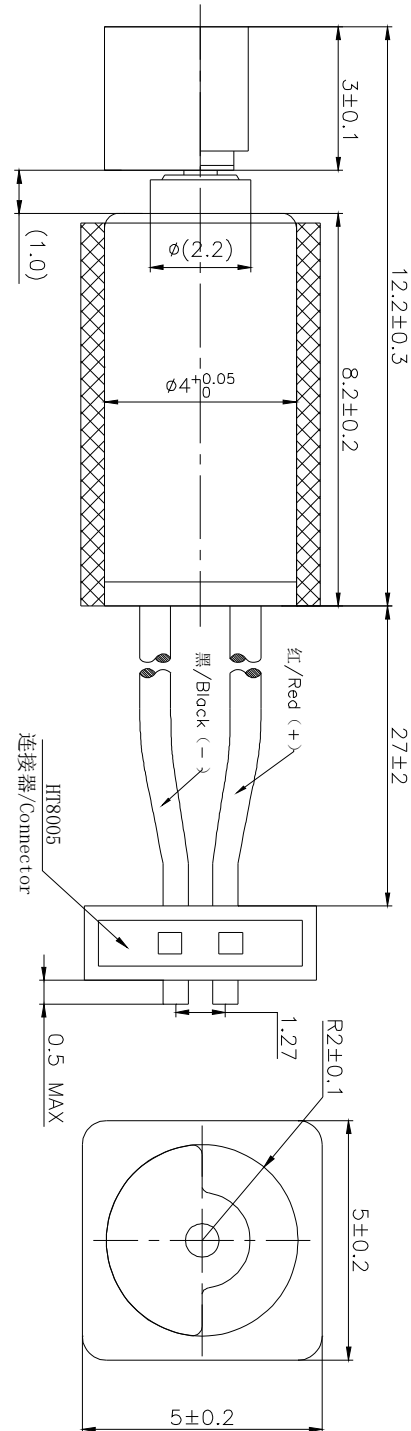
(7) 电刷和换向器的相互作用，有可能产生轻微的电噪音。/Due to interaction between brush and commutator, there is a possibility to occur electrical noise slightly.

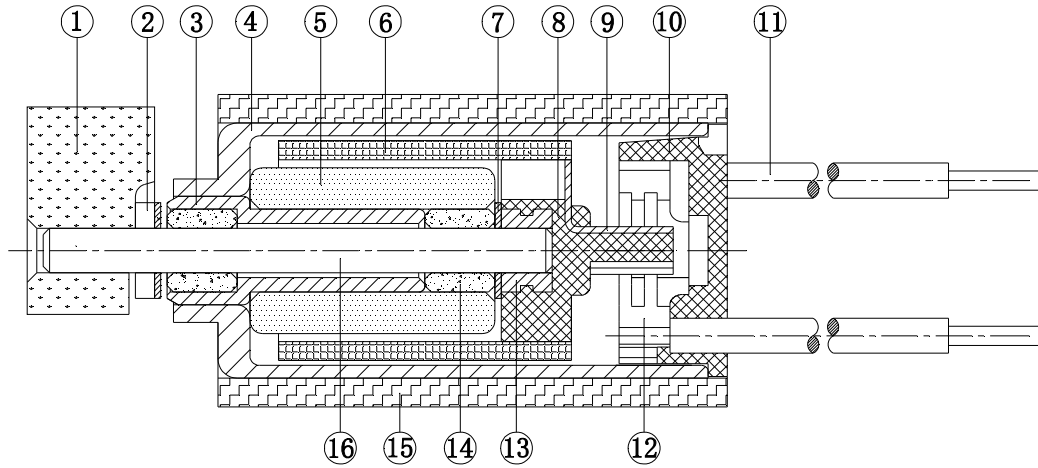
(8) 因测试设备有误差，允许有±5%偏差。/ Because there is error of the measurement equipment ,permit the standard of the rotational frequency to ±5%.

(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/skills requirement

1. 额定电压/Rated voltage:DC 3.0V
2. 额定电流/Rated current:90mA 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:125mA Max
6. 端子阻抗/Terminal resistance:30 (1±10%) Ω
7. 轴向间隙/Axial clearance:0.3mm Max
8. 引线规格/Lead spec: AWG32 UL3302
9. 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



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	电源线/Power line	AWG32 UL3302
12	电刷/Brush	AgPd50/MX215
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 require

- (1) 每个吸塑盒里放100个电机。/100 vibrators in each plastic capsule.
- (2) 每30个吸塑盒上盖一个吸塑盒盖，用胶带捆做一捆。/Every 30 capsules as a group put a plastic cover on the group and wrap it in tape.
- (3) 每2捆按图中的叠放方式放入一个外包箱（440×220×200）。/Every 2 bundle are put into an outer case with a size of (440×220×200) 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.

