



# 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<br>Buyers Approval & Signatures |  |

|                             |                              |               |     |
|-----------------------------|------------------------------|---------------|-----|
| 文件编号Spec No.                |                              | 版本            | A/0 |
| 品名描述<br>Product Description | Acoustic / Tooth Brush Motor |               |     |
| 型号Part No.                  | VBL-1521-001                 |               |     |
| 送样日期Date                    |                              |               |     |
| 设计Designed by               | 审核Checked by                 | 批准Approved by |     |
|                             |                              |               |     |
| 2020.05.08                  | 2020.05.08                   | 2020.05.08    |     |

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## 文件版本/File colophon

| 修改号<br>Rev. No. | 日期<br>Rev. Date | 页码<br>Page No. | 修改项目<br>Revised Item        | 更改原因<br>Reason |
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**1. 适用范围/Scope of application**

本规格书适用于电动牙刷的驱动马达。

This specification sheet is applied for driving motor, which is for electric toothbrush.

**2. 使用条件/Standard operating condition**

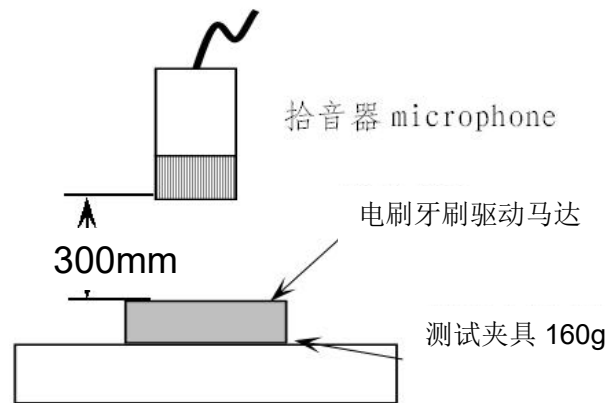
| NO. | 项目/Item                               | 规格/Specifications   |
|-----|---------------------------------------|---|
| 2-1 | 工作电压<br>Rated voltage                 | 3.6V DC   |
| 2-2 | 使用电压范围<br>Operating voltage range     | 3.3V~4.1V DC  |
| 2-3 | 驱动信号<br>Driving signal                | 250Hz~330Hz,<br>占空比 duty cycle is 30%-45%   |
| 2-4 | 典型信号<br>Typical signal                | 260Hz,<br>占空比 duty cycle is 40%   |
| 2-5 | 使用姿势<br>Motor position                | 全方向<br>Omni-direction   |
| 2-6 | 使用温度范围<br>Operating temperature range | -20°C~+60°C,<br>常湿 Ordinary humidity:65±20%RH   |
| 2-7 | 保存环境范围<br>Storage temperature range   | -30°C~+70°C,<br>常湿 Ordinary humidity:65±20%RH   |
| 2-8 | 测定条件<br>Measuring condition           | 20±3度 60±5%RH 在常温常湿下测试, 若对结果有任何疑问, 均以 20±3度, 相对湿度 60±5%环境下测试为准。<br>Measure at normal temperature and humidity (20°C±3°C, 60±5%RH) if there is any doubt about the result, it should be subject to the environment condition (20°C±3°C, 60±5%RH) |
| 2-9 | 外观<br>Appearance                      | 目视无机械损伤、无生锈腐蚀。<br>There should be no mechanical damage, or inadequate corrosion.  |

**3. 特性/Electrical characteristic**

| NO. | 项目/Item   | 规格/SPEC.                    | 条件-备注/Condition-Remark  |
|-----|---|-----------------------------|---|
| 3-1 | 额定频率<br>Rated frequency                         | 250 Hz                      | 选用频率范围建议 Frequency range recommendation: 230-265HZ  |
| 3-2 | 额定电流<br>Rated current                           | <700mA                      | 额定电压、额定负载、额定频率 40%占空比<br>Rated voltage, rated load and rated frequency 40% duty cycle   |
| 3-3 | 堵转电流<br>Locked-rotor current                    | <1200 mA                    | 在 3.6V 条件下, 在额定电压与额定频率测试马达堵转电流<br>Test locked-rotor current under the condition of 3.6 V, at rated voltage and rated frequency.                           |
| 3-4 | 堵转马达承受程度<br>Locked-rotor motor's bearing degree | 马达不坏<br>Motor get no damage | 堵转马达 0.5H<br>Locked-rotor motor for 0.5H.   |
| 3-5 | 扭矩<br>Torque                                    | 160gf. cm MIN               | 在额定电压, 平衡位置的扭力, 测试在额定电压 3.6V<br>Torsion at rated voltage, balance position, test at rated voltage of 3.6V.  |
| 3-6 | 带载扭矩<br>Torque on load                          | 160gf. cm MIN               | 在额定电压, 平衡位置的扭力, 测试在额定电压 3.6V, 刷头带载 100g<br>Torsion at rated voltage, balance position, test at rated voltage of 3.6V and the brush head loaded with 300g. |
| 3-7 | 摆幅<br>Amplitude of oscillation                  | 5.5°                        | 在额定电压, 平衡位置的扭力, 测试在额定电压 3.6V<br>Torsion at rated voltage, balance position, test at rated voltage of 3.6V.  |

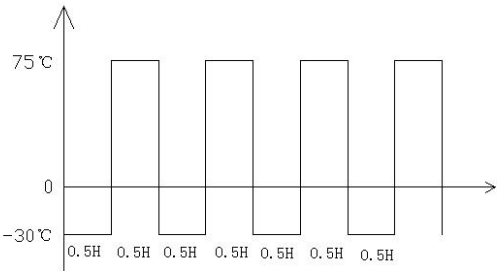
|      |  |             |  |
|------|--|-------------|--|
| 3-8  | 带载摆幅<br>Amplitude of oscillation on load | 5.5°        | 在额定电压，平衡位置的扭力，测试在额定电压 3.6V，刷头带载 100g，摆幅不变<br>Torsion at rated voltage, balance position, test at rated voltage of 3.6V and the brush head loaded with 300g, amplitude of oscillation remains no change.  |
| 3-9  | 工作噪音<br>Operating noise                  | <50dB       | 额定电压及负载下测试，噪音传感器距轴 30cm（轴向）/背景噪音 30dB(A) MAX<br>Measured at rated voltage and rated load, the distance from noise sensor to shaft should be 30cm (axial direction) /Background noise 30dB(A) MAX   |
| 3-10 | 马达轴向压力<br>Motor axial pressure.          | >10kg       | 测试马达轴向在向下压时力度，要求大于 10kg，不可有马达外观变形与马达总长等尺寸变小不良现象<br>When do a lower pressure on motor for testing motor axial pressure, the force requirement should be greater than 10kg, and there should be no motor appearance deformation or motor overall length or other size decreasing phenomenon. |
| 3-11 | 阻抗/<br>Resistance                        | 4.2 ± 40% Ω | 在两接触脚之间测量/Measure between two contact terminals.   |
| 3-12 | 绝缘电阻/<br>Insulating resistance           | 10M Ω MIN   | 100V DC 在接触脚与机壳间测量 /At DC 100 V, test between the contact terminal&housing.  |

电动牙刷驱动马达噪音测试方法：  
Driving motor for electric toothbrush noise  
measurement method



背景噪音为 Background noise: 30dB

**5. 可靠性试验/Reliability Test**

| NO  | 项目/Item                              | 条件/Condition  |
|-----|--------------------------------------|---|
| 5-1 | 高湿贮存试验<br>High humidity storage test | <p>在<math>40\pm 2^{\circ}\text{C}</math>, <math>90\pm 5\%RH</math>的环境下放置48小时, 然后在常温常湿下恢复4h后测试。</p> <p>Exposed at <math>40\pm 2^{\circ}\text{C}</math>, <math>90\pm 5\%RH</math> for 48hours, then return to normal temperature and humidity for 4 hours before test.</p> <p>判定依据Judge criterion:<br/>                     测试完成后马达表面无外观不良, 马达无振动异常, 无噪音与电性参数符合承认书规格。</p> <p>After test completed, the motor should have no appearance or vibrating defect, no noise and electrical parameters conform to the specification.</p>  |
| 5-2 | 温冲试验<br>Thermal shock test           | <p>马达按照以下试验条件放置 48 个周期, 然后在常温常湿下放置 4 小时后测试。</p> <p>Put the motor under below testing condition for 48 cycles, then return to normal temperature and humidity for 4 hours before test.</p> <p>试验条件/Test condition:</p>  <p>高低温转换时间: <math>\leq 15\text{ S}</math></p> <p>Transfer time between high temperature and low temperature: <math>\leq 15\text{ S}</math></p> <p>判定依据Judge criterion:<br/>                     测试完成后马达表面无外观不良, 马达无振动异常, 无噪音与电性参数符合承认书规格。</p> <p>After test completed, the motor should have no appearance or vibrating defect, no noise and electrical parameters conform to the specification.</p> |



|            |  |   |
|------------|--|---|
| <p>5-3</p> | <p>跌落<br/>Drop test</p>                        | <p>将马达单体从0.5米的高度跌落到水泥地面上，六个面的每个面都跌落1次，再次将马达组装到手柄里面进行跌落，置于1.5米的高度，每个面跌落一次，共6次。</p> <p>Motor monomer falling from a height of 0.5 meters to the cement ground, six faces, each side drop 1 time, then assembly the motor into the handle and fall again, at the height of 1.5 meters, each face fell once, a total of 6 times.</p> <p>判定依据Judge criterion:<br/>测试完成后马达表面无外观不良, 马达无振动异常, 无噪音, 电性参数符合承认书规格。<br/>After test completed, the motor should have no appearance or vibrating defect, no noise and electrical parameters conform to the specification.</p> |
| <p>5-4</p> | <p>高低温工作<br/>High and low temperature work</p> | <p>DC3.6V供电（固定马达频率在260HZ，设定占空比为80%），工作状态：40℃/95%RH，-10℃/95%RH各4个小时，共10个循环。<br/>DC3.6 V power supply (fixed motor frequency at 260 hz, set the duty cycle of 80%), the working status: 40℃/RH 95%, -10℃/95% RH for four hours each, a total of 10 cycles.</p> <p>Decide on the basis of:<br/>判定依据Judge criterion:<br/>测试完成后马达表面无外观不良, 马达无振动异常, 无噪音, 电性参数符合承认书规格。<br/>After test completed, the motor should have no appearance or vibrating defect, no noise and electrical parameters conform to the specification.</p>   |

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|-----|--|--|
| 5-6 | <p style="text-align: center;">振动试验<br/>Vibration test</p> | <p>将马达单体，按以下要求进行试验：</p> <ol style="list-style-type: none"> <li>1) 扫频范围:10-55Hz/分钟</li> <li>2) 全振幅:1.5mm</li> <li>3) 振动方向:三个垂直方向</li> <li>4) 持续时间:每个方向1个小时（共3个小时）</li> </ol> <p>Test the motor monomer according following condition:</p> <ol style="list-style-type: none"> <li>1)Vibration frequency range: 10~55Hz/min</li> <li>2)Total amplitude: 1.5mm</li> <li>3)Direction of vibration: Three perpendicular directions</li> <li>4)Duration: 1 H for each direction (total 3 Hours)</li> </ol> <p>判定依据 Judge criterion:</p> <p>测试完成后马达表面无外观不良，马达无振动异常，无噪音，电性参数符合承认书规格。</p> <p>After test completed, the motor should have no appearance or vibrating defect, no noise and electrical parameters conform to the specification.</p> |
| 5-7 | <p style="text-align: center;">寿命<br/>Life test</p>        | <p>DC3.6V供电（固定马达频率在260HZ，设定占空比为40%）下持续工作5000H。 Dc3.6v power supply (fixed motor frequency at 260HZ, set duty cycle of 40%) and continue working for 5000H.</p> <p>判定依据Judge criterion:</p> <p>测试完成后马达表面无外观不良，马达无振动异常，无噪音与电性参数符合承认书规格。</p> <p>After test completed, the motor should have no appearance or vibrating defect, no noise and electrical parameters conform to the specification.</p>   |

## 6. 注意事项/CAUTION FOR USE

(1) 请注意马达不要浸入到液体性物质中（比如：水，酒精等）

Please keep the motor away from liquid substance (such as water, alcohol, etc.)

(2) 不要将马达长时间放置在高温或高湿下，否则有可能导致电机的性能下降。

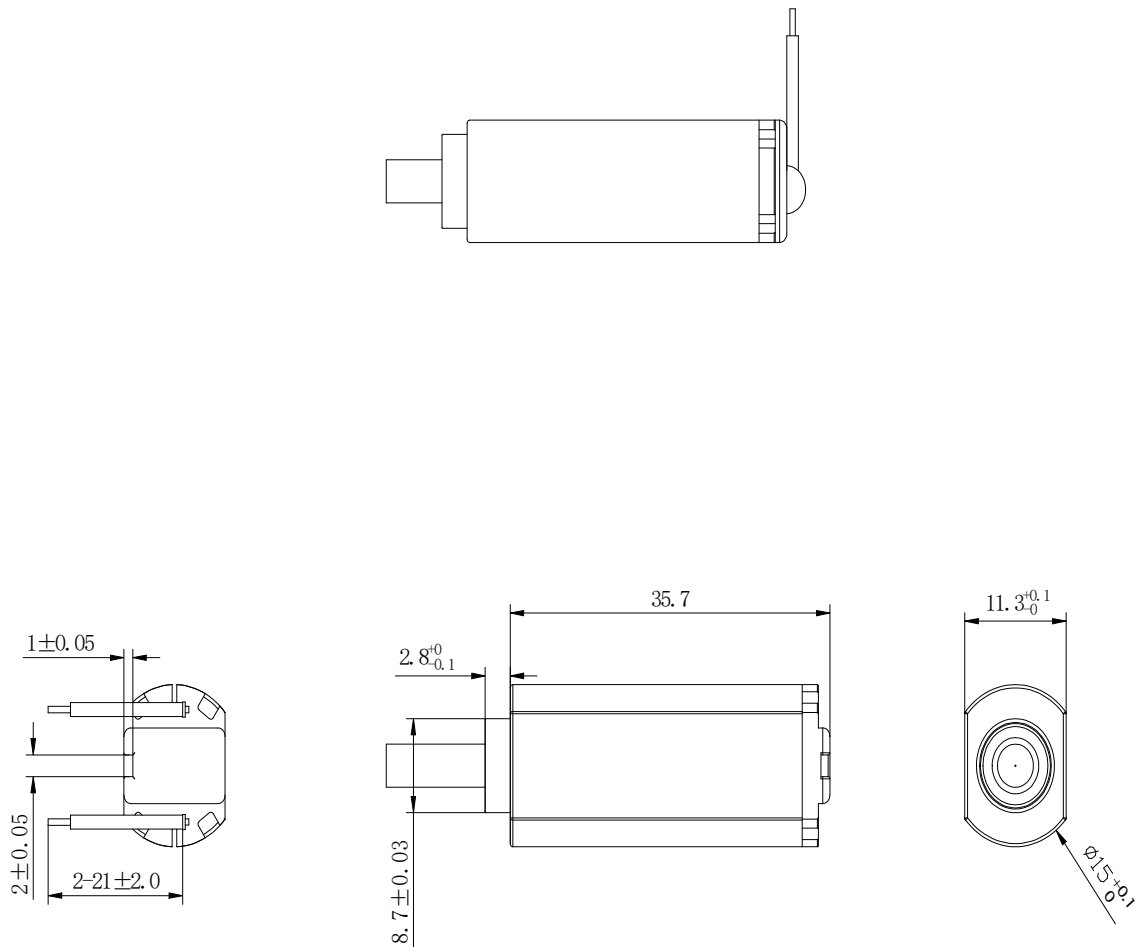
Do not expose the motor to high temperature or high humidity for a long time, it may lead to motor performance decline.

(3) 马达不要靠近腐蚀性气体如H<sub>2</sub>S、SO<sub>2</sub>、NO<sub>2</sub>等，否则会引起腐蚀。

Avoid using the motor near Corrosive gases (such as: H<sub>2</sub>S、SO<sub>2</sub>、NO<sub>2</sub> etc.), otherwise it may cause erosion

(4) 马达符合有关环境的法律和法规的要求（如ROHS、REACH、H/F等）

The motor complies with relevant environmental laws and regulations (such as: ROHS, REACH, H/F etc.)

**7. 外形图/Vibration outline drawing**

**技术要求:**

1. 引线为：26#AWG规格线，线色为：黑色
2. 电源线和漆包线焊锡需要穿孔焊线。
3. 轴偏转角度暂定为： $\pm 3^\circ$
4. 钢轴可根据客户需求定制。