

产品规格说明书

PRODUCT SPECIFICATION

|                 |                                     |                               |                       |
|-----------------|-------------------------------------|-------------------------------|-----------------------|
| FILED BY BUYER  | 客户名称<br>Buyer Name                  |                               |                       |
|                 | 客户料号<br>Buyer Part No.              |                               |                       |
|                 | 客户承认签章<br>Buyer Approved Signatures |                               |                       |
| FILED BY LEADER | 文件编号<br>Spec No.                    | leader-3320                   |                       |
|                 | 品名<br>Part Name                     | 无刷振动马达<br>BLDC Vibrator Motor |                       |
|                 | 型号<br>Model No.                     | LBM0620A3320F                 |                       |
|                 | 样品承认日期<br>Date Samples Approved     |                               |                       |
|                 | 作成 Designed by                      | 检讨 Checked by                 | 承认 Approved by        |
|                 | 张亭亭<br>2022. 07. 21                 | 张 冠 军<br>2022. 07. 21         | 王 远 东<br>2022. 07. 21 |

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# 规格书内容

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1. 适用范围/ Applicable Scope

本说明书适用于无刷振动电机LBM0620A系列。  
This specification applies to BLDC Vibrator Motor LBM0620A series.

2. 使用条件/ Operating Conditions

| 项目/Item |                               | 规格/Specification                                                                                 |
|---------|-------------------------------|--------------------------------------------------------------------------------------------------|
| 2-1     | 额定电压<br>Rated voltage         | 3.0V DC                                                                                          |
| 2-2     | 使用电压范围<br>Operating voltage   | 2.7~3.3V DC                                                                                      |
| 2-3     | 旋转方向<br>Rotation              | CW(clockwise)<br>Lead Wire Red(+), Blue(-)连接基准<br>Based on connecting lead wire Red(+), Black(-) |
| 2-4     | 使用环境<br>Operating environment | -20~+60℃, 10~90%RH                                                                               |
| 2-5     | 保存环境<br>Storage environment   | -30~+70℃, 10~90%RH                                                                               |

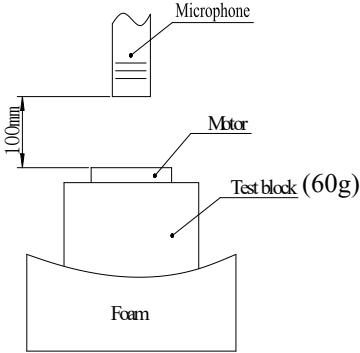
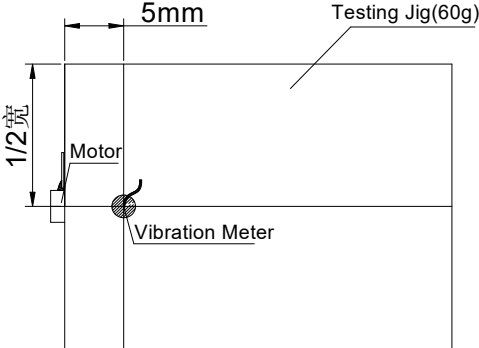
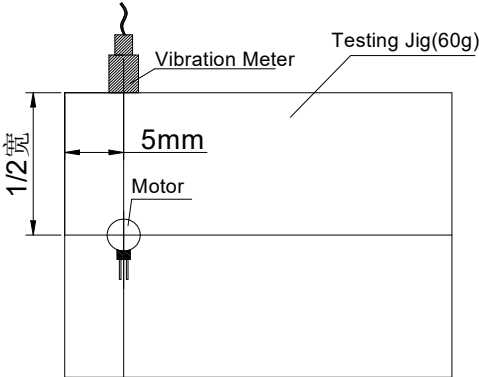
3. 测定条件/ Testing Conditions

| 项目/Item |                 | 规格/Specification           |
|---------|-----------------|----------------------------|
| 3-1     | 温度 Temperature  | 25±3℃                      |
| 3-2     | 湿度 Humidity     | 65±20% RH                  |
| 3-3     | 气压 Air Pressure | 1013±40 hPa                |
| 3-4     | 电源 Power        | 稳压直流电流 Constant DC Current |

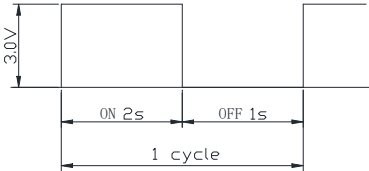
4. 初期电气性能/ Initial Electrical Characteristics

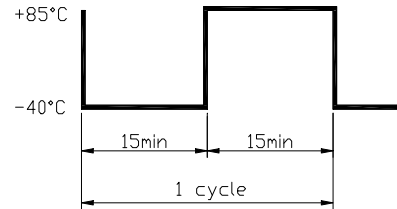
| 项目/Item |                               | 规格/Specification | 条件/Condition                                                                                                                                                                                                                                                                                     |
|---------|-------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4-1     | 额定转速<br>Rated Speed           | 13000 Min rpm    | 额定电压下和额定负载下。<br>At rated voltage and rated load.                                                                                                                                                                                                                                                 |
| 4-2     | 额定电流<br>Rated Current         | 80 mA Max        |                                                                                                                                                                                                                                                                                                  |
| 4-3     | 起动电流<br>Starting Current      | 150mA Max        | 在最小启动电压下启动，测试时需要注意，在调整适用的电压后需要断电一次，使转子进行复位。不允许从低电压到高电压连续向上调整。<br>Start at the minimum starting voltage, the test need to pay attention to adjust the applicable voltage after the need for a power cut to reset the rotor. Continuous upward adjustment from low to high voltage is not allowed. |
| 4-4     | 起动电压<br>Starting Voltage      | 2.5V DC Max      |                                                                                                                                                                                                                                                                                                  |
| 4-5     | 绝缘电阻<br>Insulation Resistance | 10MΩ Min         | 在100V直流下，导线和机壳间测量<br>At DC 100V between lead wire and case.                                                                                                                                                                                                                                      |
| 4-6     | 响应时间<br>Response Time         | ≤190ms           | 额定电压至90%全振幅时的响应时间<br>Response Time at rated voltage to 90% full amplitude.                                                                                                                                                                                                                       |
| 4-7     | 线圈阻抗<br>Coil impedance        | 12±20%Ω          | 解剖拆解马达后.直接测试线圈两端电阻<br>After disassembling the motor, measure the resistance at both ends of the coil directly.                                                                                                                                                                                   |

5. 机械性能/ Mechanical Characteristics

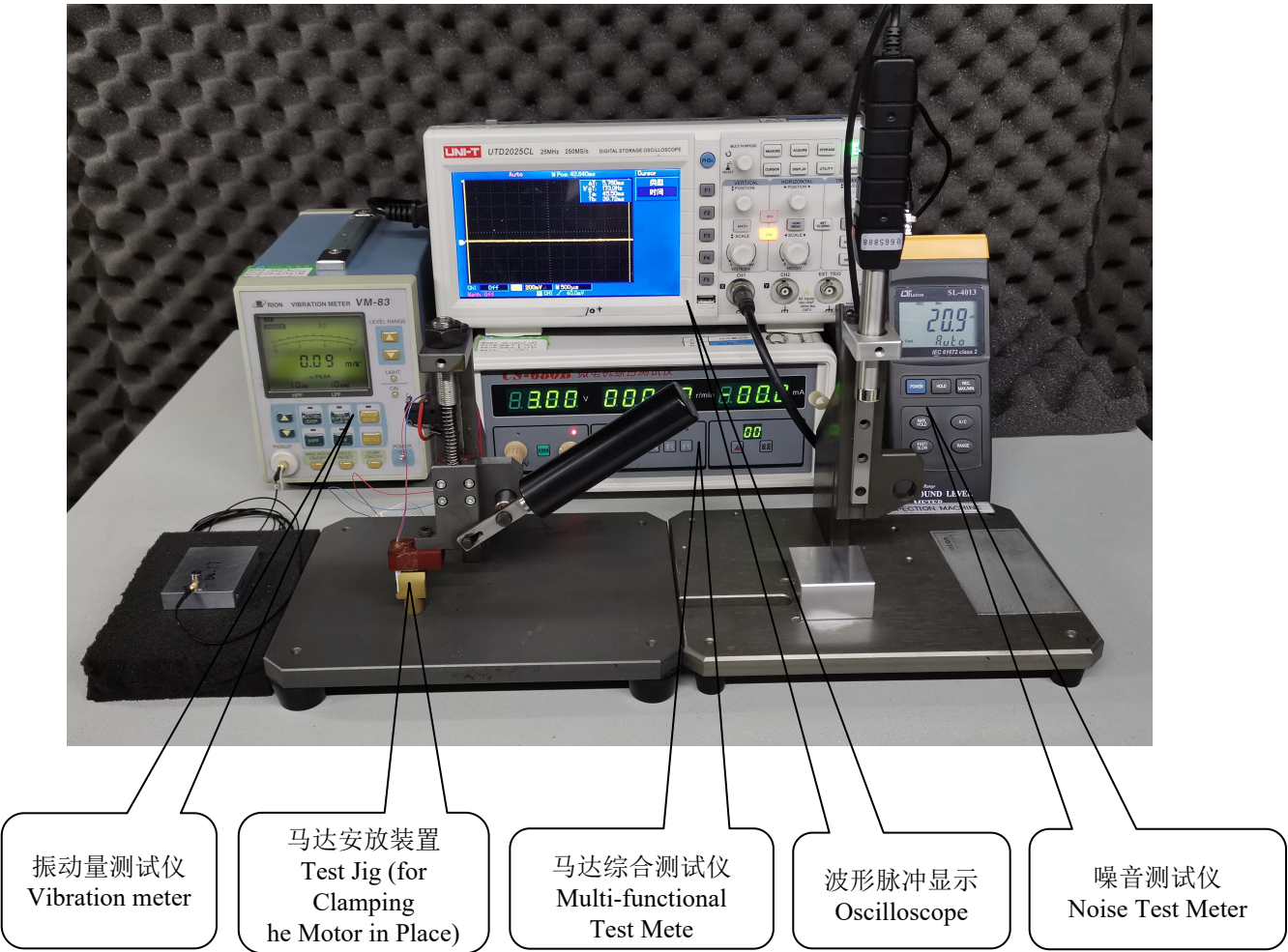
| 项目/Item |                                                                                                                                                                                                                                                                                             | 规格/Specification                                                                                                                                                                                                                                                                                |           |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 5-1     | 单体马达重量<br>Unit Motor Weight                                                                                                                                                                                                                                                                 | 使用电子秤测量<br>Use An electronic balance to measure                                                                                                                                                                                                                                                 | 0.34g±10% |
| 5-2     | 机械噪音<br>Mechanical noise                                                                                                                                                                                                                                                                    | 小于50分贝. A计权<br>≤50dB (A)                                                                                                                                                                                                                                                                        |           |
|         | 在额定电压下。<br>背景噪音：不大于25dB.A计权<br>电机轴向水平固定在约60g测试夹具上，<br>拾音器沿轴向正对电机平面。<br>测试距离100mm<br>At rated voltage and scene noise as 25dB (A)Max,<br>the shaft is horizontally fastened to the test jig (60g).<br>The Microphone faces the plane of<br>motor along The shaft .<br>The distance is 100mm. |                                                                                                                                                                                                               |           |
| 5-3     | 振动测定<br>Vibration Test                                                                                                                                                                                                                                                                      | 0.35Gms≥(Peak)                                                                                                                                                                                                                                                                                  |           |
|         |                                                                                                                                                                                                                                                                                             | <br>侧面放置<br><br>正面放置<br>测试治具需放在Min 20mm的15倍发泡海棉上<br>Test fixture should be placed on 15 times foam sponge with Min 20 mm |           |

6. 耐久性能/ Reliability Characteristics

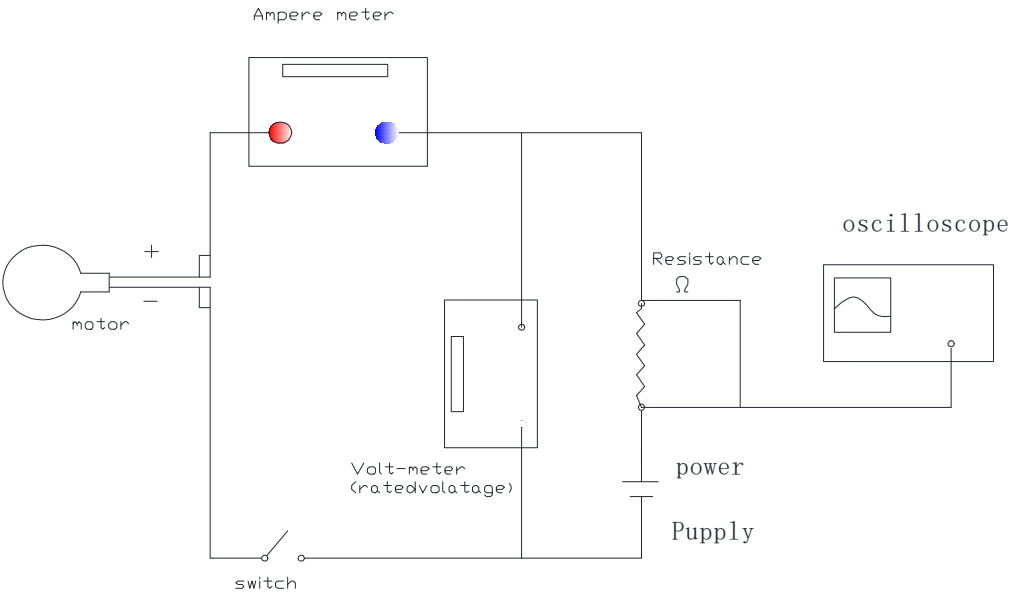
| 项目/Item |                                                                      | 规格/Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 判定标准/Judgment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6-1     | 低温放置<br>Low<br>Temperatur<br>e<br>Exposure                           | 温度 /Temperature: $-40\pm 2^{\circ}\text{C}$<br>放置时间 / Exposure time : 96h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>在常温常湿下放置4h后，电机性能应符合以下要求。</p> <p>1.额定转速:指标不低于初始值-30%；<br/>不高于初始值+50%</p> <p>2.额定电流:指标不低于初始值-30%；<br/>不高于初始值+50%</p> <p>3.起动电压:不大于2.5V直流电压.</p> <p>4.端阻：不大于初始值<math>\pm 15\%</math></p> <p>5.绝缘电阻：大于<math>3\text{M}\Omega/3\text{M}\Omega</math> Min（DC 100V）</p> <p>After 4h exposure in the ordinary temperature and humidity, change rates of the motor's performance should accord with below requirements:</p> <p>1.Rated speed:Data-30% Initial Min, Data+50% Initial Max.</p> <p>2.Rated current: Data-30% Initial Min, Data+50% Initial Max.</p> <p>3.STARTING VOLTAGE: not more than 2.5 v DC voltage</p> <p>4.End Resistance:Terminal Resistance: no more than <math>\pm 15\%</math> of initial value</p> <p>5. Insulation Resistance: Greater Than 3m/3m Min (DC 100V)</p> |
| 6-2     | 高温放置<br>High<br>Temperatur<br>e<br>Exposure                          | 温度 /Temperature: $+ 70\pm 2^{\circ}\text{C}$<br>放置时间 / Exposure time : 96h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6-3     | 高温高湿储<br>存<br>High<br>temperature<br>and high<br>humidity<br>storage | 温度 /Temperature: $55\pm 2^{\circ}\text{C}$ .<br>湿度 /Humidity: $93\pm 3\%\text{RH}$<br>放置时间 / Exposure time : 96h<br>恢复：室温4H<br>Recovery: Room Temperature 4H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6-4     | 高温寿命<br>High<br>temperature<br>life                                  | 在额定电压下<br>At rated voltage<br>温度： $40\pm 2^{\circ}\text{C}$ .<br>Temperature: $40\pm 2^{\circ}\text{C}$ .<br>断电时序： ON 2s. OFF 1s, 1cycle.<br>Power outage sequence: On 2s. Off 1s,1cycle.<br>荷重： 60g<br>Weight: 60g<br>方向：方向以正面朝上平放<br>Direction: The direction is placed face up<br>寿命： 24H<br>Life span: 24H                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6-5     | 寿命<br>Life                                                           | 在额定电压下 At rated voltage<br>温度： 常温 Temperature: room temperature<br>断电时序： ON 2s. OFF 1s<br>Power outage sequence: On 2s. Off 1s<br>荷重： 60g Weight: 60g<br>方向：方向以正面朝上平放.正面朝下平放和侧放.每2H转换一次方向<br>Direction: The direction is placed face up. Face down and side down .change direction every 2H<br>固定：固定力度5-8N.确保固定稳定牢靠<br>Firm up: firm up 5-8. Make sure the firm up is firm<br> <p>试验循环次数：<br/>极限：499200Cycle(416H）（停振次数<math>\leq 6</math>次）<br/>认证：115200Cycle(96H）（停振次数<math>\leq 3</math>次）<br/>例行：86400Cycle(72H）（停振次数<math>\leq 3</math>次）<br/>恢复： 2H</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| 项目/Item |                          | 规格/Specification                                                                                                                                                                                                                                                                                                                                   | 判定标准/Judgment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6-6     | 滚筒试验<br>Barrel roll test | 滚筒高度: 1.0M    Height: 1.0M<br>滚筒次数: 300次.    Times: 300 times.<br>滚筒速率: 13±1次/分钟<br>Speed: 13±1 times/Minute<br>荷重: 100g    Load 100g                                                                                                                                                                                                              | <p>在常温常湿下放置4h后, 电机性能应符合以下要求。</p> <p>1.额定转速:指标不低于初始值-30%; 不高于初始值+50%</p> <p>2.额定电流:指标不低于初始值-30%; 不高于初始值+50%</p> <p>3.起动电压:不大于2.5V直流电压.</p> <p>4.端阻: 不大于初始值±15%</p> <p>5.绝缘电阻: 大于3MΩ/3MΩ Min (DC 100V)</p> <p>After 4h exposure in the ordinary temperature and humidity, change rates of the motor's performance should accord with below requirements:</p> <p>1.Rated speed:Data-30% Initial Min, Data+50% Initial Max.</p> <p>2.Rated current: Data-30% Initial Min, Data+50% Initial Max.</p> <p>3.STARTING VOLTAGE: not more than 2.5 v DC voltage</p> <p>4.End Resistance:Terminal Resistance: no more than ± 15% of initial value</p> <p>5. Insulation Resistance: Greater Than 3m/3m Min (DC 100V)</p> |
| 6-7     | 热冲击<br>Heat stock test   |  <p>30min一个循环, 共50循环<br/>30 Min a cycle, total 50 cycles</p>                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6-8     | 振动<br>Vibration          | 全振幅: 1.5mm (p-p)<br>Full amplitude: 1.5 mm (P-P)<br>加速度: 3G<br>Acceleration: 3G<br>周期: 90min (10-500Hz)<br>Period: 90 Min (10-500 hz)<br>方向: X.Y.Z<br>Direction: X.Y.Z                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6-9     | 自然跌落<br>Free fall        | 试验状态: 将马达固定在约60克(包括马达本身)的物体上, 落向水泥地面。<br>高度: 1.5m    方向: ±x, ±y, ±z<br>反正面各5次.侧面各2次.总计18次<br>Test state: Set the motor to a block of an approx. 60g weight (including the motor) and drop it onto the concrete floor.<br>Height: 1.5m<br>Direction :±x, ±y, ±z<br>Five on the front, two on the side. That makes 18                                | <p>试验恢复2h.试验部件出现不可擦拭的锈迹.试验时间满足以下时间要求</p> <p>1.马达外壳24h</p> <p>2.FPC(NiAu)24h</p> <p>3.磁钢和磁轭48h</p> <p>Test Time: For component requirements see remarks test resume 2H. The test component showed a non-erasable rust. The test time meets the following time requirements</p> <p>1. Motor Housing 24h</p> <p>2. fpc (niau)24h</p> <p>3. Magnetic Steel and yoke 48h</p>                                                                                                                                                                                                                                                                                                                                      |
| 6-10    | 盐雾试验<br>Salt spray test  | 浓度: 5%NaCl溶液<br>Concentration: 5% NACI solution<br>PH值: 6.5-7.2<br>Ph: 6.5-7.2<br>试验槽温度: 35±2°C<br>Temperature of test tank: 35 ± 2 ° C<br>盐雾沉就降量: 1-2ml/80cm²h<br>Salt spray deposition: 1-2 ml/80 CM H<br>恢复时间: 用清水冲洗后恢复2H<br>Recovery Time: 2 H after rinsing with water<br>试验时间: 给部件要求见备注<br>Test Time: see remarks for component requirements |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

7. 标准测量方法/ Standard Measuring Method



8. 测量方法及回路图/ Measuring Method & Circuit Map





|                   |                   |                     |      |
|-------------------|-------------------|---------------------|------|
| 2022.07.21(REV,0) | 说明书/Specification | 编号/No.: leader-3320 | 6/10 |
|-------------------|-------------------|---------------------|------|

**9. 使用时注意事项/ Caution in Use**

- 9-1.与规格不同使用的情况下,性能和寿命会发生问题.希望注意电压使用范围.  
You might encounter functional and life problems if you use it different from the standard . Please be careful of the range of use, like voltage etc.
- 9-2. MOTOR使用时,一定要把图纸上的lead wire (+极)端子连接在供电电源的 (+极), (-极) 端子连接在供电电源的(-极)后使用, 否则电机会烧坏。  
Motor use, be sure to draw on the lead wire (+ Pole) terminal connected to the power supply (+ Pole) , (- pole) terminal connected to the power supply (- pole) after use, otherwise the MOTOR will burn out
- 9-3. 在有害GAS及高温高湿的场所保管对马达造成不良因素所以请注意保管。  
Please be careful of that the storage in high temperature and humidity and noxious gas might causehindrances to motors.
- 9-4.为了减少马达旋转时因检查失误电源端子短路时 导致 Drive IC 损伤。为了防止损伤 Drive I C 电源端子间(+, -) 把 2μF以上的电容器并列链接 在 Motor 后实施检查是安全措施  
Drive IC can be damaged by power plug short due to careless test. In order to prevent d amage of Driver IC, please connect 2μF condenser to motor in a row(parallel connection) with power plug(+/-).
- 9-5.拿取马达时,尽可能的轻拿Case部分. Please hold the case part lightly as much as you can when you use motors.
- 9-6.为保护Drive IC, 请不要施加DC 3.8V以上.  
Please do not use above DC 3.8V for preventing Driver IC.
- 9-7.马达接近磁性物质或接触时会降低马达性能, 因此避免接近强磁场。  
Please avoid being near and contacting magnetic materials like magnet which might enc ounter functional problems.
- 9-8.能够自我吸附的物质 (铁, 粉末) 及灰尘等与马达混放时会出现转动不良, 异常音等, 会使马 达的性能下降及信赖性受影响,因此取用及作业时应注意环境清洁。  
If some materials(metal, powder) and dust become mixing condition in the motor it migh t cause feature declines by occurring rotation faulty and abnormal sound so please be cl ean the working environment and careful when you deal with the motor.
- 9-9.注意请不要浸泡在液态物质如：水或酒精中。  
Please be careful of not soaking in liquid like water or alcohol.
- 9-10.包装方法：(参照包装图) 只有在客户要求下变更可能。  
Packing method :Refer to packing drawing. But, it could be changed on user’ s demand.
- 9-11.无法保证满足本式样范围以外使用的情况。  
It can’ t guarantee if the motors are used out of the range of fulfilling this specification.
- 9-12.本式样书内容的变更及追加是在双方协议下实施。  
Any further conditions or change of this APPROVAL REQUEST take effect by mutual consent.
- 9-13若电机或电机应用产品存放时间超过6个月, 使用前必须采取措施激发启动电机若干次, 以保证电机后续工作正常。  
If the motor or motor application products are stored for more than 6 months, measures must be taken to activate the motor several times before use to ensure the subsequent normal operation of the motor.





10. 环境管理物质/ Environmental Management Materials:

10-1 本产品应符合RoHS 指令要求和无卤素要求。  
The product should be in compliance with RoHS/ REACH requirements:  
★ 镉及其化合物最大允许含量为100PPM  
Cadmium and Compound: ≤100PPM  
★ 铅及其化合物最大允许含量为1000PPM  
Lead and Compound: ≤ 1000PPM  
★ 汞及其化合物最大允许含量为1000PPM  
Hydrargyrum and Compound: ≤ 1000PPM  
★ 六价铬及其化合物最大允许含量为1000PPM  
+6 Chromium and Compound: ≤ 1000PPM  
★ 多溴联苯及其化合物最大允许含量为1000PPM  
PBB and Compound: ≤ 1000PPM  
★ 多溴二苯醚及其化合物最大允许含量为1000PPM  
PBDE and Compound: ≤ 1000PPM  
★ 氯溴两种卤素之和最大允许含量为1500PPM  
The allowed content of Cl and Br is 1500PPM Max for total.  
★ 氯卤素最大允许含量为900PPM  
The allowed content of Cl is 900PPM Max.  
★ 溴卤素最大允许含量为900PPM  
The allowed content of Br is 900PPM Max.  
10-2 本品所含有以下物质是RoHS指令豁免项  
The below substance contained in the motor is exempted from RoHS directives:

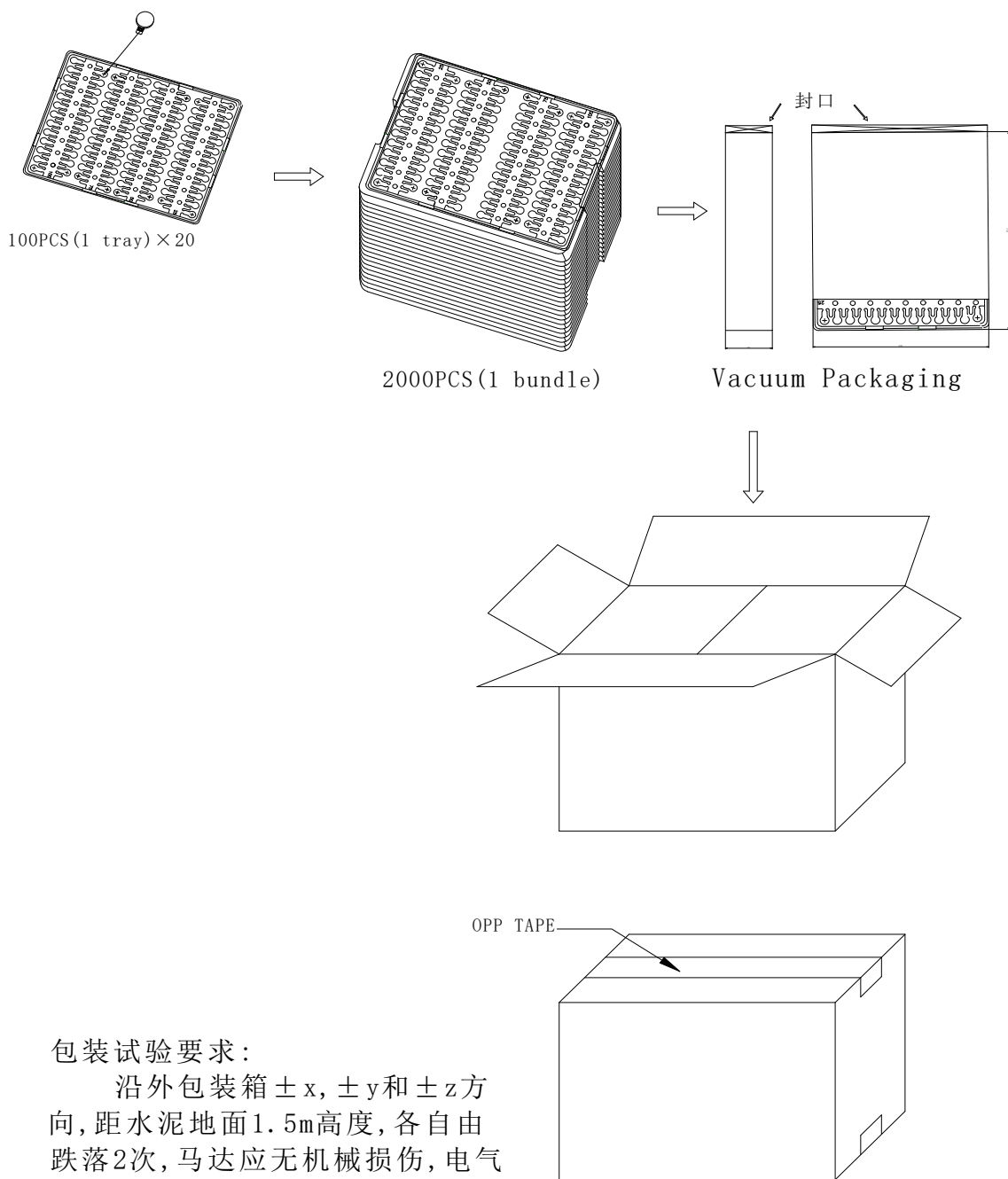
| 序号<br>NO. | 品名<br>Part Name                      | 材质<br>Material      | 含有材质<br>Harzadaous Substance | 允许容量<br>Limited Content | 部品重量<br>Weight of Part |
|-----------|--------------------------------------|---------------------|------------------------------|-------------------------|------------------------|
| #1        | 含油轴承<br>Ph: 6.5-7.2<br>Oiled Bearing | 铜合金<br>Copper Alloy | 铅 Pb                         | ≤4%                     | ≈0.03g                 |

11.关键镀层及材质参数要求Key coating and material parameters requirements

| 序号<br>NO. | 部品名称<br>Name of part  | 要求<br>Demands                                                                       | 材料<br>Materials                                     |
|-----------|-----------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------|
| 11-1      | 外部FPC<br>External FPC | 接触PAD电镍金<br>Contact Pad Electric Nickel Gold<br>2u m≤Ni≤7u m<br>0.055u m≤Au≤0.12u m | 聚醯亚胺<br>Polyimide<br>无胶基材<br>Non-adhesive substrate |
| 11-2      | 内部FPC<br>Intetnal FPC | 焊接部镀锡厚度<br>Thickness of tin plating on welding part<br>10u m≤Sn 20u m               | 聚醯亚胺<br>Polyimide<br>无胶基材<br>Non-adhesive substrate |

## 12. 包装/ Packaging:

### 无刷系列马达包装 Pack drawing of coin type

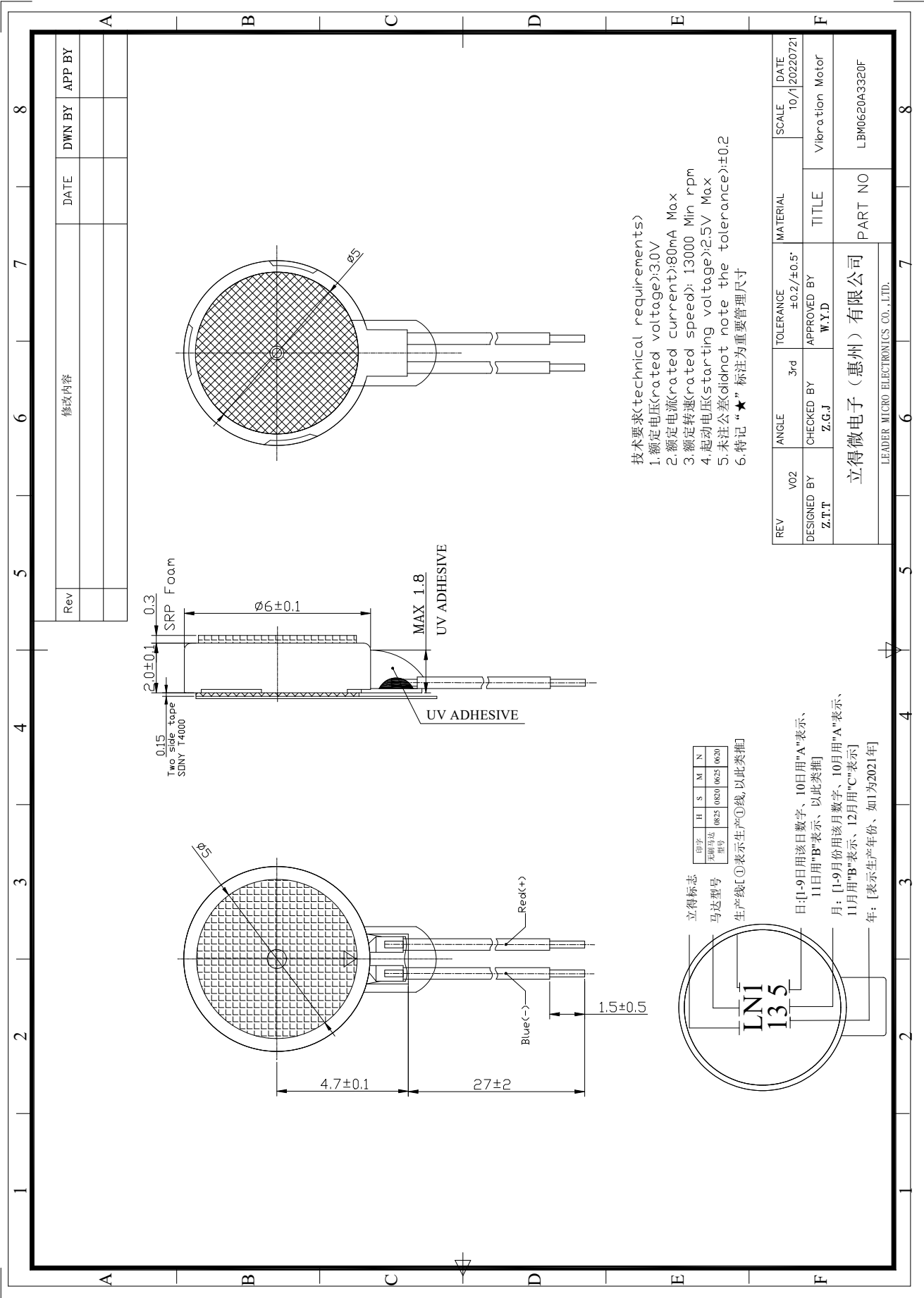


包装试验要求:

沿外包装箱 $\pm x$ ,  $\pm y$ 和 $\pm z$ 方向, 距水泥地面1.5m高度, 各自由跌落2次, 马达应无机械损伤, 电气性能仍符合标准要求。

立得微电子(惠州)有限公司  
技术开发部

13. 外形图/ Mechanical Drawing:



14. 更改记录/ Revision Records:

|                          |               |                 |                     |
|--------------------------|---------------|-----------------|---------------------|
| CUSTOMER<br>顾客           |               | SPEC NO<br>规格书号 | 编号/No.: leader-3320 |
| PRODUCT<br>MODEL<br>产品型号 | LBM0620A3320F | DATE<br>日期      | 2022.07.21          |

REVISION RECORDS  
修改记录表

| REV NO<br>修改号 | DATE<br>日期 | PAGE<br>页码 | REVISION ITEM<br>修改项目 | REASON<br>更改原因 |
|---------------|------------|------------|-----------------------|----------------|
| REV,0         | 2022.07.21 | /          | 产品发布                  |                |
|               |            |            |                       |                |
|               |            |            |                       |                |
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