

# 产品规格说明书

## PRODUCT SPECIFICATION

FILED BY BUYER	客户名称 Buyer Name	
	客户料号 Buyer Part No.	
	客户承认签章 Buyer Approved Signatures	

FILED BY LEADER	文件编号 Spec No.	leader-3419	
	品名 Part Name	无刷振动马达 BLDC Vibrator Motor	
	型号 Model No.	LBM0620A3419F	
	样品承认日期 Date Samples Approved		
	作成 Designed by	检讨 Checked by	承认 Approved by
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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 Rated voltage 3.0V DC
2-2	使用电压范围 Operating voltage 2.7~3.3V DC
2-3	旋转方向 Rotation CW(clockwise) Lead Wire Red(+), Blue(-)连接基准 Based on connecting lead wire Red(+), Black(-)
2-4	使用环境 Operating environment -20~+60°C, 10~90%RH
2-5	保存环境 Storage environment -40~+80°C, 10~90%RH

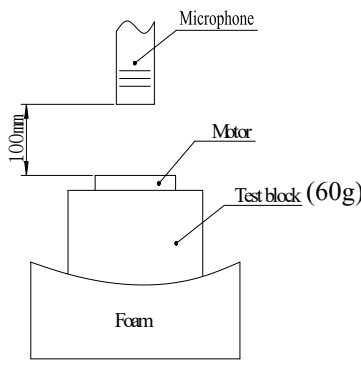
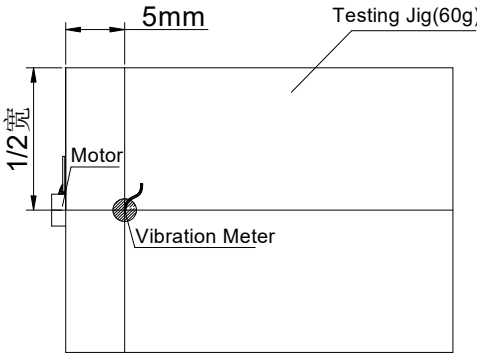
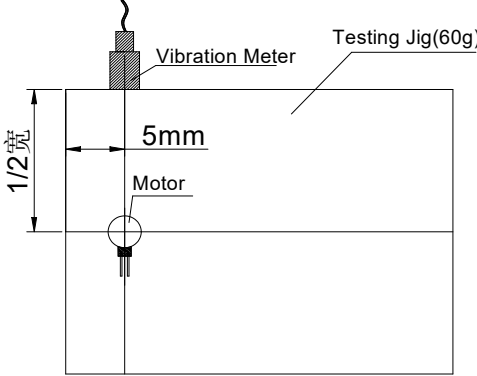
### 3. 测定条件/ Testing Conditions

项目/Item	规格/Specification
3-1	温度 Temperature 25 ± 3°C
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

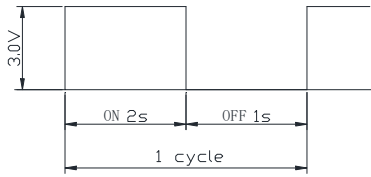
### 4. 初期电气性能/ Initial Electrical Characteristics

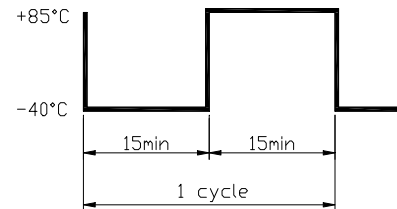
项目/Item	规格/Specification	条件/Condition
4-1	额定转速 Rated Speed 13000 rpm Min	额定电压下和额定负载下。 At rated voltage and rated load.
4-2	额定电流 Rated Current 80 mA Max	
4-3	起动电流 Starting Current 150mA Max	在最小启动电压下启动，测试时需要注意，在调整适用的电压后需要断电一次，使转子进行复位。不允许从低电压到高电压连续向上调整。 Start at the minimum starting voltage, the test need 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 Starting Voltage 2.5V DC Max	
4-5	绝缘电阻 Insulation Resistance 10MΩ Min	在100V直流下，导线和机壳间测量 At DC 100V between lead wire and case.
4-6	响应时间 Response Time ≤190ms	额定电压至90%全振幅时的响应时间 Response Time at rated voltage to 90% full amplitude.
4-7	线圈阻抗 Coil impedance 12 ± 20%Ω	解剖拆解马达后.直接测试线圈两端电阻 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 Unit Motor Weight	使用电子秤测量 Use An electronic balance to measure	$0.34g \pm 10\%$
5-2	机械噪音 Mechanical noise	小于50分贝. A计权 $\leq 50dB (A)$	
	在额定电压下。 背景噪音：不大于25dB.A计权 电机轴向水平固定在约60g测试夹具上， 拾音器沿轴向正对电机平面。 测试距离100mm At rated voltage and scene noise as 25dB (A)Max, the shaft is horizontally fastened to the test jig (60g). The Microphone faces the plane of motor along The shaft . The distance is 100mm.		
5-3	振动测定 Vibration Test	$0.35Gms \geq (\text{Peak})$	 <p>侧面放置</p>  <p>正面放置</p> <p>测试治具需放在Min 20mm的15倍发泡海绵上 Test fixture should be placed on 15 times foam sponge with Min 20 mm</p>

## 6. 耐久性能/ Reliability Characteristics

项目/Item		规格/Specification	判定标准/Judgment
6-1	低温放置 Low Temperature Exposure	温度 /Temperature: $-40 \pm 2^{\circ}\text{C}$ 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% ; 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<math>\pm 15\%</math></p> <p>5.绝缘电阻: 大于<math>3\text{M}\Omega/3\text{M}\Omega \text{ Min}</math> (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 <math>3\text{m}/3\text{m Min}</math> (DC 100V)</p>
6-2	高温放置 High Temperature Exposure	温度 /Temperature: $+80 \pm 2^{\circ}\text{C}$ 放置时间 / Exposure time : 96h	
6-3	高温高湿储存 High temperature and high humidity storage	温度 /Temperature: $60 \pm 2^{\circ}\text{C}$ . 湿度 /Humidity: $93 \pm 3\%\text{RH}$ 放置时间 / Exposure time : 96h 恢复: 室温4H Recovery: Room Temperature 4H	
6-4	高温寿命 High temperature life	在额定电压下 At rated voltage 温度: $40 \pm 2^{\circ}\text{C}$ . Temperature: $40 \pm 2^{\circ}\text{C}$ . 断电时序: ON 2s. OFF 1s, 1cycle. Power outage sequence: On 2s. Off 1s, 1cycle. 荷重: 60g Weight: 60g 方向: 方向以正面朝上平放 Direction: The direction is placed face up 寿命: 24H Life span: 24H	
6-5	寿命 Life	<p>在额定电压下 At rated voltage 温度: 常温 Temperature: room temperature 断电时序: ON 2s. OFF 1s Power outage sequence: On 2s. Off 1s 荷重: 60g Weight: 60g 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 Direction: The direction is placed face up. Face down and side down .change direction every 2H 固定: 固定力度5-8N.确保固定稳定牢靠 Firm up: firm up 5-8. Make sure the firm up is firm</p>  <p>试验循环次数: 极限: 499200Cycle(416H) (停振次数<math>\leq 6</math>次) 认证: 115200Cycle(96H) (停振次数<math>\leq 3</math>次) 例行: 86400Cycle(72H) (停振次数<math>\leq 3</math>次) 恢复: 2H</p>	

项目/Item		规格/Specification	判定标准/Judgment
6-6	滚筒试验 Barrel roll test	滚筒高度: 1.0M Height: 1.0M 滚筒次数: 300次. Times: 300 times. 滚筒速率: 13±1次/分钟 Speed: 13±1 times/Minute 荷重: 100g Load 100g	
6-7	热冲击 Heat stock test	 <p>30min一个循环, 共50循环 30 Min a cycle, total 50 cycles</p>	<p>在常温常湿下放置4h后, 电机性能应符合以下要求。</p> <ol style="list-style-type: none"> <li>1.额定转速:指标不低于初始值-30%; 不高于初始值+50%</li> <li>2.额定电流:指标不低于初始值-30%; 不高于初始值+50%</li> <li>3.起动电压:不大于2.5V直流电压.</li> <li>4.端阻: 不大于初始值±15%</li> <li>5.绝缘电阻: 大于3MΩ/3MΩ Min (DC 100V)</li> </ol>
6-8	振动 Vibration	<p>全振幅: 1.5mm (p-p) Full amplitude: 1.5 mm (P-P) 加速度: 3G Acceleration: 3G 周期: 90min (10-500Hz) Period: 90 Min (10-500 hz) 方向: X.Y.Z Direction: X.Y.Z</p>	<p>After 4h exposure in the ordinary temperature and humidity, change rates of the motor's performance should accord with below requirements:</p> <ol style="list-style-type: none"> <li>1. Rated speed: Data-30% Initial Min, Data+50% Initial Max.</li> <li>2. Rated current: Data-30% Initial Min, Data+50% Initial Max.</li> <li>3. STARTING VOLTAGE: not more than 2.5 v DC voltage</li> <li>4. End Resistance: Terminal Resistance: no more than ± 15% of initial value</li> <li>5. Insulation Resistance: Greater Than 3m/3m Min (DC 100V)</li> </ol>
6-9	自然跌落 Free fall	<p>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。 高度: 1.5m 方向: ±x, ±y, ±z 反正面各5次.侧面各2次.总计18次 Test state: Set the motor to a block of an approx. 60g weight (including the motor) and drop it onto the concrete floor. Height: 1.5m Direction : ±x, ±y, ±z Five on the front, two on the side. That makes 18</p>	
6-10	盐雾试验 Salt spray test	<p>浓度: 5%NaCl溶液 Concentration: 5% NACI solution PH值: 6.5-7.2 Ph: 6.5-7.2 试验槽温度: 35±2°C Temperature of test tank: 35 ± 2 ° C 盐雾沉就降量: 1-2ml/80cm²h Salt spray deposition: 1-2 ml/80 CM H 恢复时间: 用清水冲洗后恢复2H Recovery Time: 2 H after rinsing with water 试验时间: 给部件要求见备注 Test Time: see remarks for component requirements</p>	<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> <ol style="list-style-type: none"> <li>1.马达外壳24h</li> <li>2.FPC(NiAu)24h</li> <li>3.磁钢和磁轭48h</li> </ol> <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> <ol style="list-style-type: none"> <li>1. Motor Housing 24h</li> <li>2. fpc (niau)24h</li> <li>3. Magnetic Steel and yoke 48h</li> </ol>

## 7. 标准测量方法/ Standard Measuring Method



振动量测试仪  
Vibration meter

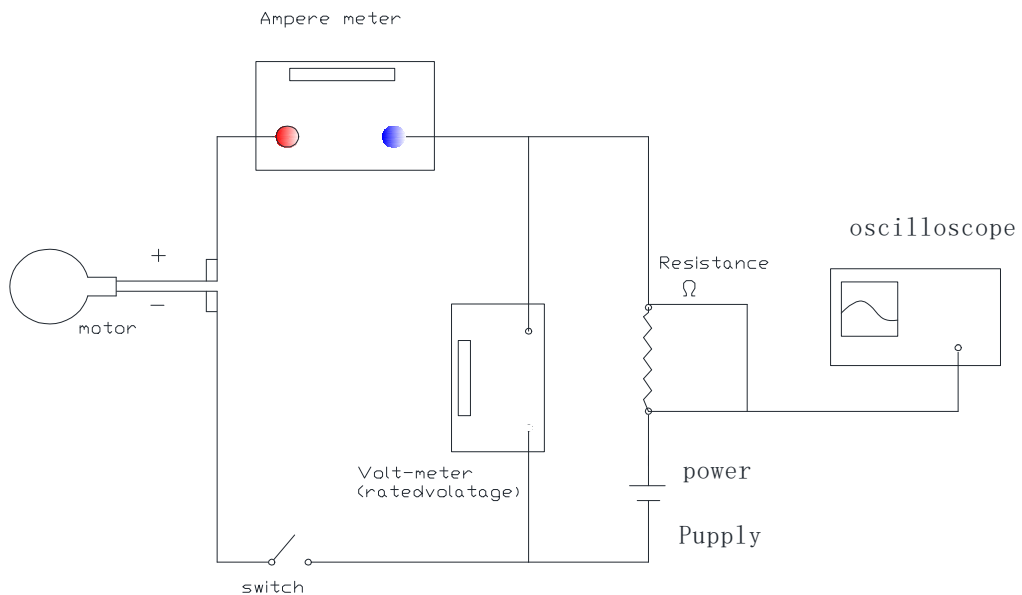
马达安放装置  
Test Jig (for  
Clamping  
the Motor in Place)

马达综合测试仪  
Multi-functional  
Test Mete

波形脉冲显示  
Oscilloscope

噪音测试仪  
Noise Test Meter

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



## 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 cause hindrances 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 IC 电源端子间(+, -) 把  $2\mu\text{F}$  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 damage of Driver IC, please connect  $2\mu\text{F}$  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 encounter 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 might cause feature declines by occurring rotation faulty and abnormal sound so please be clean 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马达必须在出厂后的六个月内组装到终端设备上。如马达超过6个月未使用, 建议在使用前首先通电激活马达(供电3-5秒), 以达到最佳振动效果。

The motor must be assembled to the terminal device within six months of shipping date. If the motor has not been used for more than six months, it is recommended to activate the motor with electricity (powered on for 3-5 seconds) before use to achieve the best vibration effect.



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## 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:  $\leq 100\text{PPM}$

\* 铅及其化合物最大允许含量为1000PPM

Lead and Compound:  $\leq 1000\text{PPM}$

\* 汞及其化合物最大允许含量为1000PPM

Hydrargyrum and Compound:  $\leq 1000\text{PPM}$

\* 六价铬及其化合物最大允许含量为1000PPM

+6 Chromium and Compound:  $\leq 1000\text{PPM}$

\* 多溴联苯及其化合物最大允许含量为1000PPM

PBB and Compound:  $\leq 1000\text{PPM}$

\* 多溴二苯醚及其化合物最大允许含量为1000PPM

PBDE and Compound:  $\leq 1000\text{PPM}$

\* 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

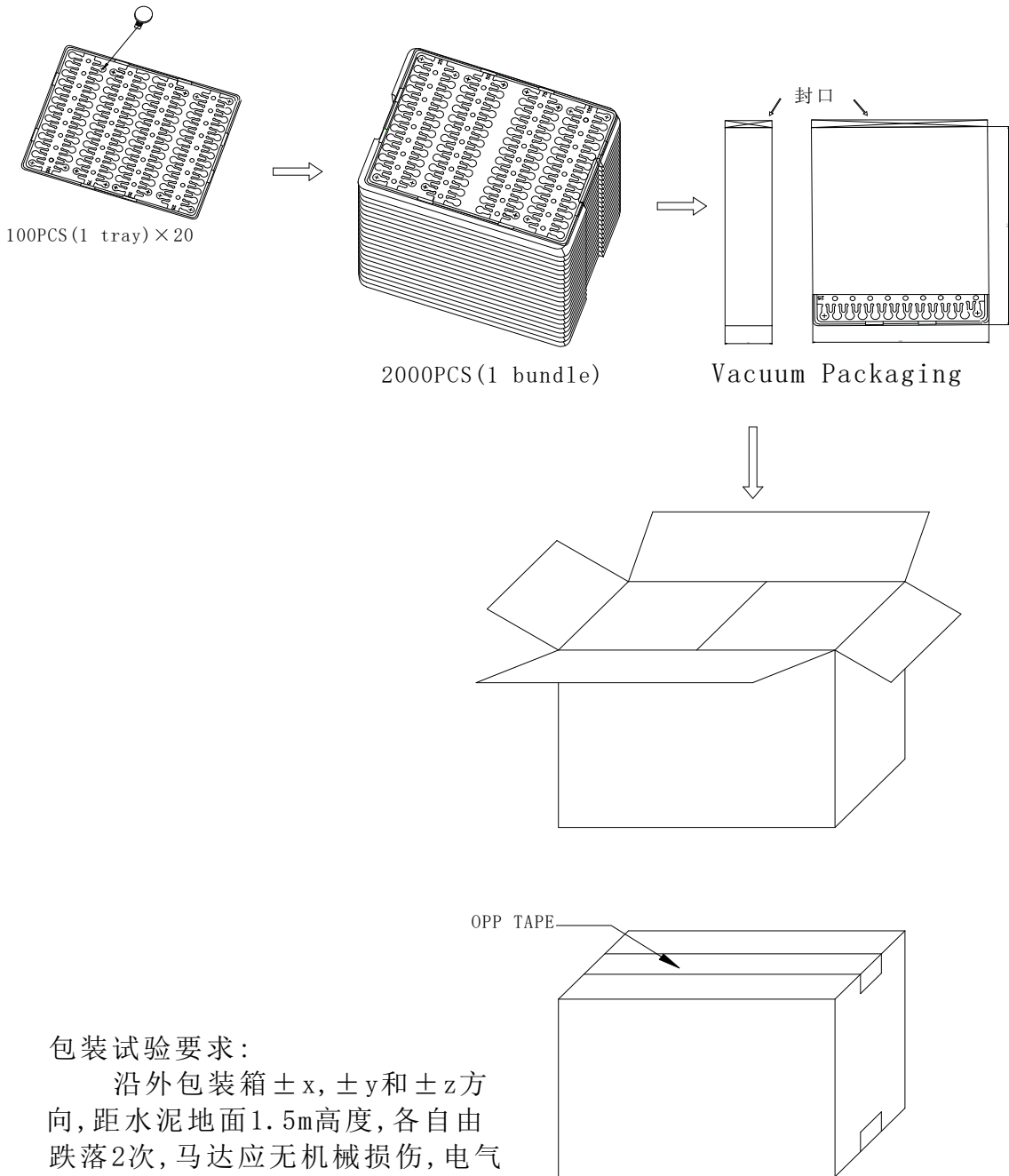
The allowed content of Cl is 900PPM Max.

\* 溴卤素最大允许含量为900PPM

The allowed content of Br is 900PPM Max.

## 11. 包装/ Packaging:

无刷系列马达包装  
Pack drawing of coin type

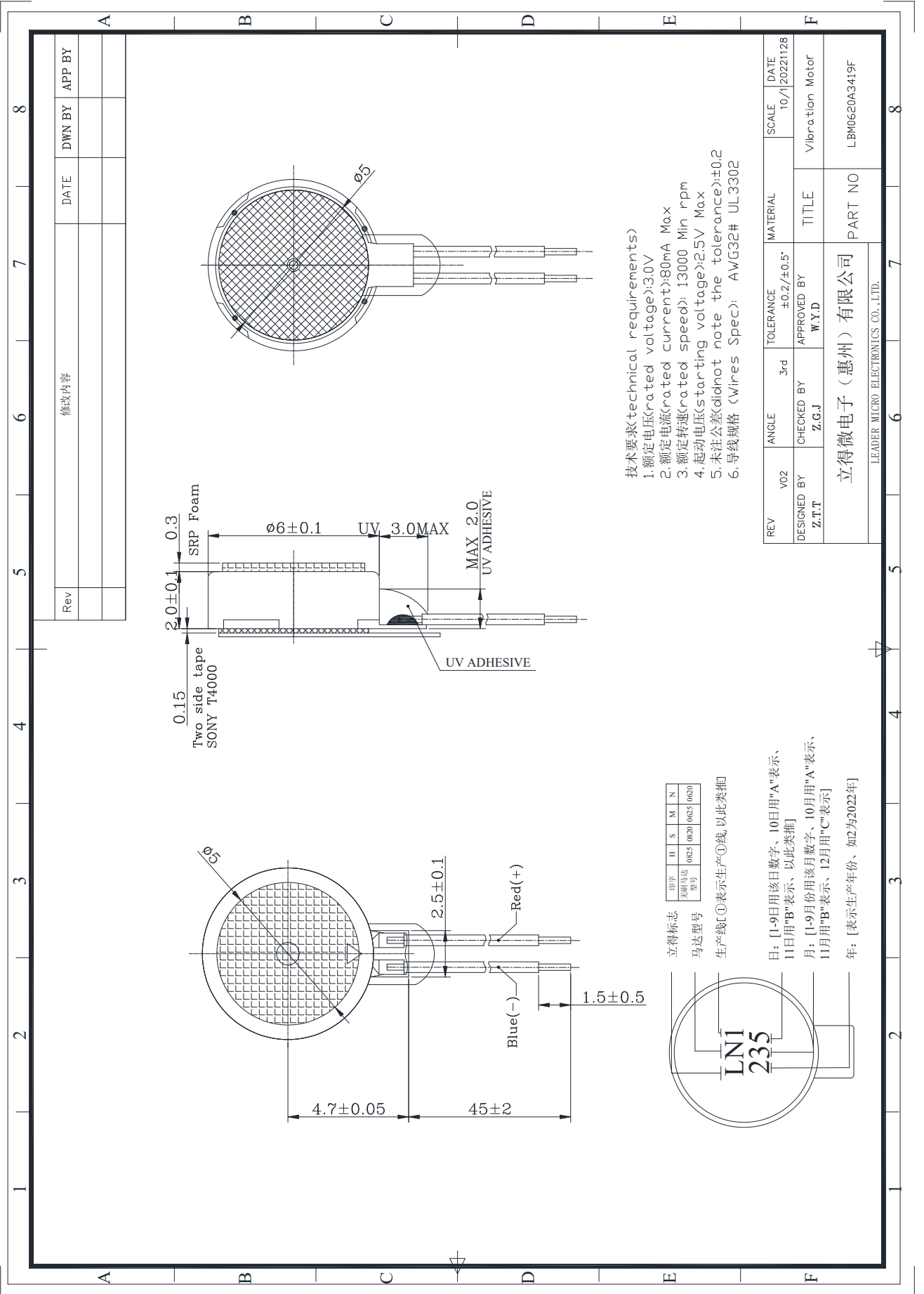


包装试验要求:

沿外包装箱±x, ±y和±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

12. 外形图/ Mechanical Drawing:



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### 13. 更改记录/ Revision Records:

CUSTOMER 顾客		SPEC NO 规格书号	编号/No.: leader-3419
PRODUCT MODEL 产品型号	LBM0620A3419F	DATE 日期	2022.11.28

### REVISION RECORDS 修改记录表

REV NO 修改号	DATE 日期	PAGE 页码	REVISION ITEM 修改项目	REASON 更改原因
REV,0	2022.11.28	/	产品发布	