



# 重庆市灵龙电子有限公司

CHONGQING LINGLONG ELECTRONIC CO., LTD.

## 承 认 书

### SPECIFICATION FOR APPROVAL

客 户Customer:

\_\_\_\_\_

客户编码Encoding:

\_\_\_\_\_

物料描述Description:

步进电机

\_\_\_\_\_

规格型号Part No:

24BYJ48-020064200-0003

\_\_\_\_\_

客 户 确 认/ Customer Approved

料 号/ Part No.

签 章/ Signatures

| 料 号/ Part No. | 签 章/ Signatures |
|---------------|-----------------|
|               |                 |

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存货编码/Stock 30901000021

拟制/Drawn 李正洪

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批准/Approved 章启策





## 产品规格书/specification

No

LNLON-27500

版本Revision

A.1

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2020-6-12

存货编码/Stock code.: 30901000021

## 1. 适用范围/General

本规格书适用于重庆灵龙电子有限公司所提供的产品:

24BYJ48-020064200-0003

The specification is applicable to lnlon's part:

24BYJ48-020064200-0003

## 2. 使用条件/Operating condition

| No  | 项目/Item                       | 规格/Specification  |
|-----|-------------------------------|---|
| 2-1 | 额定电压<br>Rated voltage         | DC 5V   |
| 2-2 | 相数<br>Phase                   | 4 相   |
| 2-3 | 激磁方法<br>Excitation method     | 1-2相激磁<br>1-2 Phase Excitation                              |
| 2-4 | 驱动方式<br>Excitation mode       | 双向驱动<br>Bipolar   |
| 2-5 | 减速比<br>Reduction ratio        | 1 / 64  |
| 2-6 | 步距角 (输出轴)<br>Step angle       | 0.087890625°  |
| 2-7 | 使用环境<br>Operating environment | -20~60°C, 0~95% (RH)<br>无水气凝结<br>No coagulation of moisture |
| 2-8 | 保存环境<br>Storage environment   | -40~85°C, 0~95% (RH)<br>无水气凝结<br>No coagulation of moisture |


## 3. 测量条件/Measuring condition

一般情况下, 马达可以在5~35°C, 相对湿度45~75% (RH) 的环境中测试。为了保证一致性, 测试应在下表规定内进行  
Normally, it should be tested under 5~35°C, 45~75% (RH). To ensure the coherence, it must be tested according to the below chart.

| No  | 项目/Item           | 规格/Specification |
|-----|-------------------|------------------|
| 3-1 | 温度<br>Temperature | 20±2°C           |
| 3-2 | 湿度<br>Humidity    | 65%±5% RH        |
|     |                   |                  |

## 4. 机械外观要求/Mechanical appearance requirements

| No  | 项目/Item          | 规格/Specification   | 测定条件/备注<br>Measuring conditions/Remark                  |
|-----|------------------|--|---|
| 4-1 | 外观<br>Appearance | 不应有明显的机械损伤、锈蚀和输出轴松动等现象<br>No evidence of machanical damage, rust corrision, loosening of the grip and so on. | 目视检查<br>Visual examination                              |
| 4-2 | 尺寸<br>Dimensions | 见外形图<br>As specified in outline drawing  | 使用游标卡尺或千分尺测量<br>Test with vernier caliper or micrometer |

|  |                               |  |            |             |
|--|-------------------------------|--|------------|-------------|
|  | 产品规格书/specification           |  | No         | LNLON-27500 |
|  |                               |  | 版本Revision | A.1         |
|  | 存货编码/Stock code.: 30901000021 |  | 页码Page     | 3 of 10     |
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| No   | 项目/Item                                     | 规格/Specification                  | 测定条件/备注<br>Measuring conditions/Remark                   |
|------|---|-----------------------------------|--|
| 4-3  | 电机质量<br>Mass                                | 30.8±10%g                         | 精密天平scale  |
| 4-4  | 绝缘等级<br>Insulation class                    | Class F for Coil                  | 155°C Max.   |
| 4-5  | 扭力传送<br>Torque transfer                     | SHAFT/轴                           |  |
| 4-6  | 顿转转矩<br>Detent torque                       | 500gf-cm Min                      | 不通电状态下的自定位转矩<br>Self setting torque without power supply |
| 4-7  | 输出轴强度<br>Output shaft strength              | 2Kgf 10 sec                       | 径向强度/Radial strength                                     |
|      |   | 2Kgf 10 sec                       | 抗拉强度/tensile strength                                    |
|      |   | 2Kgf 10 sec                       | 抗压强度/compressive strength                                |
| 4-8  | 引出线拉拔强度<br>Lead wire strength               | 1Kgf 历时10 秒 (初回, 静负荷)             | Between motor and lead wire                              |
|      |   | 1Kgf 历时10 秒 (初回, 静负荷)             | Between lead wire and terminal                           |
| 4-9  | 齿轮运行强度<br>Gear running strength             | 30个循环后无障碍, 卡死等不良<br>Give 30 cycle | 1个循环包括输出轴以180° /秒的速度正反向旋转                                |
| 4-10 | 输出轴间隙<br>Output shaft clearance             | 3.5度 Max                          |  |
| 4-11 | 电机绕组温升<br>Temperature rise of motor winding | 50K Max                           | At 100PPS, 5V DC /马达通5V直流电压<br>(电阻法测量电机温升)               |

#### 5. 性能特征/Performance and characteristics

| No  | 项目/Item                              | 规格/Specification | 测定条件/备注<br>Measuring conditions/Remark   |
|-----|--------------------------------------|------------------|--|
| 5-1 | 阻抗<br>Resistance                     | 20Ω ± 10%        | At 25°C<br>Each phase/每相   |
| 5-2 | 噪音<br>Noise                          | 40 dB Max        | At 25°C<br>Each phase/每相   |
| 5-3 | 最大自启动周波数<br>Max. starting pulse rate | 500 PPS Min      | 5V Steady voltage 1-2pahse driving to load/<br>无负载   |
| 5-4 | 最大应答周波数<br>Max. slewing pulse rate   | 1000 PPS Min     | 5V Steady voltage 1-2pahse driving to load/<br>无负载 (Continuius driving, by 10<br>ppsincrement/连续每次10 PPS 加速) |
| 5-5 | 输出转矩<br>Pull put torque              | 600gf-cm Min     | At 400PPS, 5V DC /马达通5V直流电压<br>(OT测试输出转矩方法)  |
| 5-6 | 绝缘耐压<br>Dielectric Strength          | 1mA Max          | 在端子和外壳加上600V交流电压1s<br>600V AC, 1sec between case and coil  |
| 5-7 | 绝缘阻抗<br>Insulation impedance         | 100MΩ Min        | 在端子和外壳加上500V直流电压<br>500V DC, between case and coil   |



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## 6. 可靠性/Reliability

| No  | 项目/Item  | 测试条件/Specification   | 判定标准/Judgment  |
|-----|--|--|--|
| 6-1 | 低温存放试验<br>Low temperature                              | 电机放置在-40℃环境中保存48小时，然后在常温恢复6小时以上。<br>The motor was stored at - 40 °C for 48 hours, and then recovered at room temperature for more than 6 hours.  | 试验后电机性能特征符合规格书要求<br>After the test, the performance characteristics of the motor meet the specification requirements |
| 6-2 | 高温存放试验<br>High temperature storage test                | 电机放置在80℃环境中保存48小时，然后在常温恢复6小时以上。<br>The motor was stored at 80 °C for 48 hours, and then recovered at room temperature for more than 6 hours.   | 试验后电机性能特征符合规格书要求<br>After the test, the performance characteristics of the motor meet the specification requirements |
| 6-3 | 高温高湿存放试验<br>High temperature and humidity storage test | 电机放置在85℃，90-95%RH 环境中保存48小时，然后在常温恢复6小时以上。<br>The motor was stored in 85 °C, 90-95% RH for 48 hours, and then recovered to normal temperature for more than 6 hours.                                      | 试验后电机性能特征符合规格书要求<br>After the test, the performance characteristics of the motor meet the specification requirements |
| 6-4 | 恒温恒湿试验<br>Constant temperature and humidity test       | 电机放置在40±2℃，90-95%RH 环境中96小时，然后常温中恢复1-2小时。<br>The motor was placed in 40 ± 2 °C, 90-95% RH environment for 48 hours, and then recovered in normal temperature for 1-2 hours.                              | 试验后电机性能特征符合规格书要求<br>After the test, the performance characteristics of the motor meet the specification requirements |
| 6-5 | 跌落试验<br>Drop test                                      | 电机在标准纸箱包装状态下从75CM 的高度自由跌落地板，以X, Y, Z三个方向各跌落一次。<br>The motor is free to fall from the height of 75cm to the bottom plate under the condition of standard carton packaging, once in X, y and Z directions. | 试验后电机性能特征符合规格书要求<br>After the test, the performance characteristics of the motor meet the specification requirements |



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| No  | 项目/Item            | 测试条件/Specification   | 判定标准/Judgment  |
|-----|--------------------|--|--|
| 6-6 | 振动<br>Vibration    | 全振幅Full swing:2mm (p-p)<br>频率Frequency:10 to 55Hz<br>周期Cycle:20min<br>(10~55~10Hz)<br>方向Orientation:x、y、z<br>时间Time:2h   | 试验后电机性能特征符合规格书要求<br>After the test, the performance characteristics of the motor meet the specification requirements |
| 6-7 | 热冲击试验<br>Drop test | 5个循环的热冲击试验, 1个循环包括:<br>在60℃温度下连续放置2 H, 然取出在常温放置30min, 再在-10℃的温度下放置2 H, 然后取出在常温下放置30min,<br>Five cycles of thermal shock test, one cycle includes: continuously placed at 60 °C for 2 h, then removed and placed at room temperature for 30 min, then placed at - 10 °C for 2 h, and then removed and placed at room temperature for 30 min | 试验后电机性能特征符合规格书要求<br>After the test, the performance characteristics of the motor meet the specification requirements |
| 6-8 | 寿命试验<br>life test  | 在电压: 5V DC 频率: 400PPS 负载:<br>500g. cm, 1-2Phase/exciting励磁条件下运行10000 Cycles<br>Cycles :逆转2圈, 停止10S, 顺转2圈, 停止10S 为一个循环。<br>Under the excitation condition of voltage: 5V DC, frequency: 400pps, load: 200g. cm, 1-2phase / exciting, 10000 cycles are operated<br>Cycles: reverse 2 full, stop 10s, clockwise turn 2, stop 10s as a cycle.  | 试验后电机性能特征符合规格书要求<br>After the test, the performance characteristics of the motor meet the specification requirements |



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7. 环境管理物质/Environmental management materials:

7.1 本产品应符合RoHS指令要求。

This product shall meet ROHS directive requirements;

\* 镉及其化合物最大允许含量为100PPM

Cadmium and Compound:100PPM Max

\* 铅及其化合物最大允许含量为1000PPM

Lead and Compound:1000PPM Max

\* 汞及其化合物最大允许含量为1000PPM

Hydrargyrum and Compound:1000PPM Max

\* 六价铬及其化合物最大允许含量为1000PPM

+6 Chromium and Compound:1000PPM Max

\* 多溴联苯及其化合物最大允许含量为1000PPM

PBB and Compound:1000PPM Max

\* 多溴联苯醚及其化合物最大允许含量为1000PPM

PBDE and Compound:1000PPM Max







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9. 包装要求/Packing requirements:

9-1: 每个包装盒里放50PCS电机, 包装盒尺寸为444\*300\*35

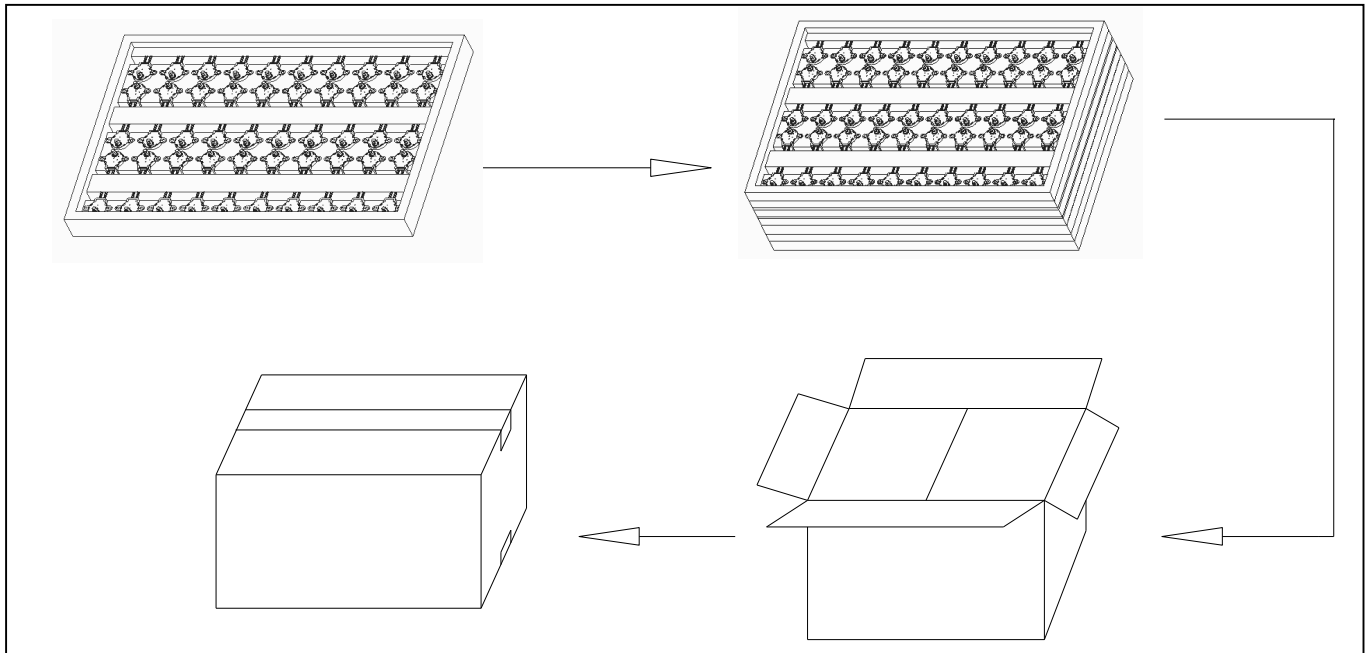
50pcs/pallet, pallet size 444\*274\*35

9-2: 每5盒放入一个外箱里, 数量为:250PCS, 外箱尺寸为455\*310\*140

2 inner-box/outer-box, Qty:250pcs. box size:455\*310\*140

9-3: 外箱封箱, 数量和生产批次, 均注明在外箱上面.

Seal the outer box and indicate the quantity, Lot No. on it.





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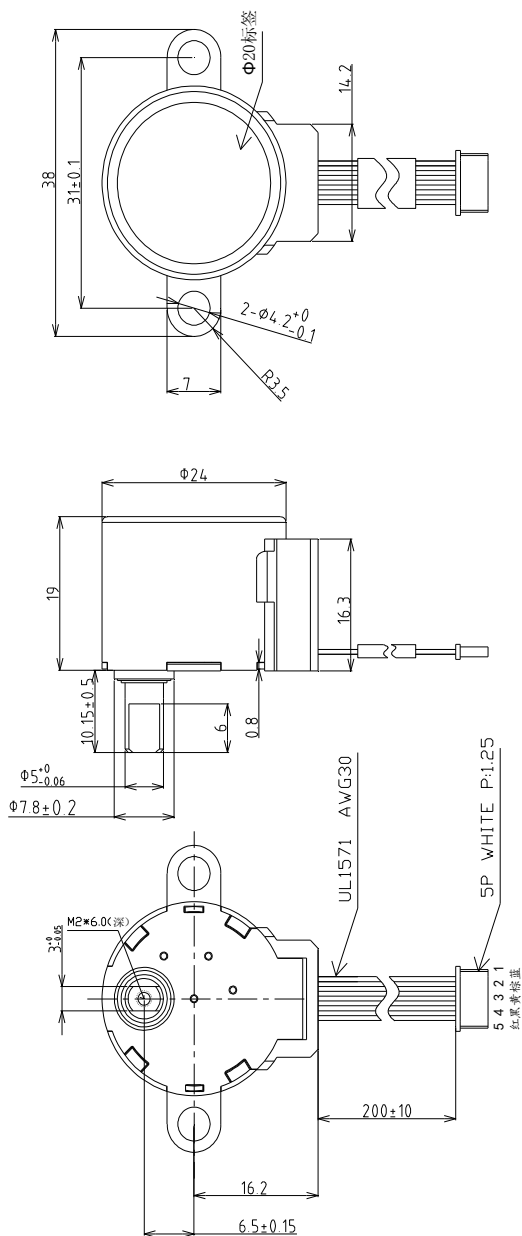
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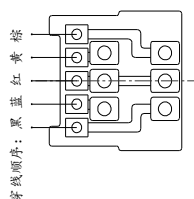
10. 电机外形图/Motor outline drawing:

技术要求:  
1 本产品需符合灵龙电子《供应商有害物质管理办法》



Output Shaft Rotation CW

|       |   |   |   |   |   |   |   |   |
|-------|---|---|---|---|---|---|---|---|
| Step  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Phase | 蓝 | 黑 | 黄 | 绿 | 红 | - | - | - |
|       | + | + | + | + | + | + | + | + |



|                        |               |               |          |
|------------------------|---------------|---------------|----------|
| 日期 DATE                | 修订内容 Revision | 拟制 Drawn      | 审核 Check |
|                        |               |               |          |
| 外形图<br>outline drawing |               |               |          |
| 版本 Revision            | 未注线性公差 TOL.   | 未注角度公差 Angles | 比例 Scale |
| A.1                    | ±0.2          | ±0.3°         | 6:1      |
| 单位 Unit                | mm            | mm            | mm       |
| 存货编码 Stock code        | 30901000021   |               |          |

重庆市灵龙电子有限公司  
CHONGQING LINGLONG ELECTRONIC CO., LTD.

- 1、额定电压: 5V DC;
- 2、相数: 4;
- 3、减速比: 1/64;
- 4、步距角: 5.625° /64;
- 5、驱动方式: 1-2相励磁;
- 6、直流电阻: 20Ω ±10% (25° C) ;
- 7、最大自启周波数: ≥500PPS;
- 8、最大应答周波数: ≥1000PPS;
- 9、输出转矩: ≥600gf.cm (5VDC, 400Hz) ;
- 10、顿转转矩: ≥500gf.cm
- 11、绝缘电阻: ≥50MΩ (500V);
- 12、绝缘介电强度: 600VAC/1mA/1s;
- 13、绝缘等级: ;
- 14、温升: <60K;
- 15、噪声: <40dB (A) (100Hz, 空载, 10cm) ;
- 16、端子引角规格: 5P\*1.25 ;
- 17、输出轴垂直度: 90±1°
- 18、轴向间隙: 0.05~0.3MM
- 19、括号内尺寸为参考尺寸, 未注公差按 GB/T1804-m级。

