Jetta Motor

版本号：A0

# 产品规格书

PRODUCT SPECIFICATION

| | | |
|---|---|---|
| FILLED BY JETTA | 文件编号<br>Spec No. | JETTA-000 |
| | 品名<br>Part Name | 圆柱直流马达<br>Cylindrical DC Motors |
| | 型号<br>Model No. | JT4I2V3-X9N |
| | 批准<br>Approval | JETTA |

| | | |
|---|---|---|
| FILLED 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 | |

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**更改记录/ Revision History**

| 版本<br>Version | 更改详情<br>Detail spec changes | 日期<br>Date |
|---|---|---|
| A0 | 初始规格/Preliminary spec | 2018-04-17 |
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**1.结构形式/Construction Form**

本规格书适用于公司制造的应用于移动电话的振动电机。
This datasheet is stipulated for vibration motor, which is manufactured by JETTA.for mobile phone.

| NO. | 项目/Item | 规格/Specifications |
|---|---|---|
| 1-1 | 电机结构<br>Motor construction | φ4 圆柱形无铁芯直流电机<br>φ4 cylindrical DC coreless motor |
| 1-2 | 换向片数<br>Number of phases | 3 组换向片<br>3-phases |
| 1-3 | 磁极数<br>Number of magnet poles | 两极 (内置磁极型式)<br>2-poles (Inner magnet type) |
| 1-4 | 线圈<br>Coil construction | 空心杯式线圈<br>Columnar coil |
| 1-5 | 整流技术<br>Rectifying method | 采用高精度电刷和换向器<br>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<br>Rated voltage | DC3.0V |
| 2-2 | 使用电压范围<br>Operating voltage range | DC 2.5~3.6V |
| 2-3 | 旋转方向<br>Rotating direction | CW / CCW |
| 2-4 | 使用温度范围<br>Operating temperature range | -30℃~+70℃ |

**3.测试条件/Testing Condition**

| NO. | 项目/Item | 规格/Specifications |
|---|---|---|
| 3-1 | 温度<br>Temperature | 20℃±3 |
| 3-2 | 湿度<br>Humidity | 45% ~85%RH |
| 3-3 | 电源电压<br>Supply voltage | 直流电源或电池 3.0V<br>DC power supply or battery 3.0V |
| 3-4 | 电机安放状态<br>Posture of motor | 水平/竖直<br>Horizontal / Vertical |

**4.贮存环境/Storage Environment**

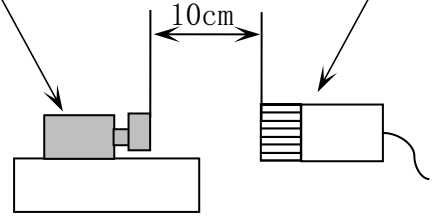
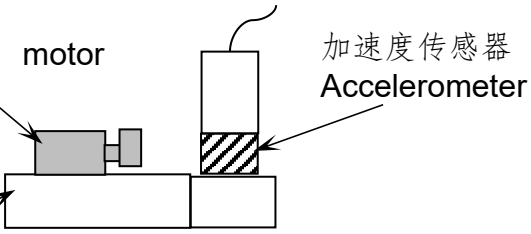
| NO. | 项目/Item | 规格/Specifications |
|---|---|---|
| 4-1 | 贮存温度<br>Storage temp | 20℃±3 |
| 4-2 | 相对湿度<br>Relative humidity | 65±5% RH |

**5.电气特性/Electrical Characteristic**

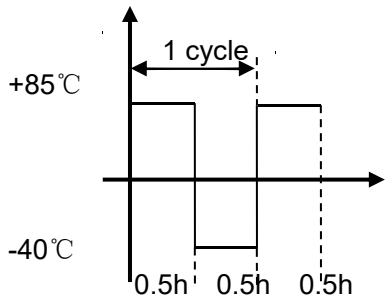
| NO. | 项目/Item | 单位<br>/Unit | 规格/Spec | 条件/Condition |
|---|---|---|---|---|
| 5-1 | 额定转速<br>Rated speed | rpm | 14000±2500 | 额定电压/Rated voltage:<br>DC 3.0V |
| 5-2 | 额定电流<br>Rated current | mA | 85Max | 额定电压/Rated voltage:<br>DC 3.0V |
| 5-3 | 启动电流<br>Starting current | mA | 100Max | 在额定电压下锁定振动轮，测电机电流/Measure current at locked counterweight in rated voltage |
| 5-4 | 启动电压<br>Starting voltage | V | 2.3Max | 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<br>Terminal resistance | Ω | 37（1±20%）Ω | 正极和负极之间/<br>Between positive and negative |
| 5-6 | 绝缘电阻<br>Insulation resistance | MΩ | 10Min | 测量机壳和引线之间,测试电压直流100V。/<br>Measuring between case and lead wire.Test voltage DC 100V . |
| 5-7 | 耐电压<br>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。/<br>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 | 0.85±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 10cm  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 | 0.8 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 |
| | | Gp | 1.1Min | |

7.环境试验/Environmental Test

| NO | 项目/Item | 条件/Condition |
|---|---|---|
| 7-1 | 高温贮存试验<br>High temperature storage test | 在80±2℃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±2℃ for 96hours, then return to normal temperature and humidity for 2 hours before test. |
| 7-2 | 低温贮存试验<br>Low temperature storage test | 在 -30±2℃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±2℃ for 96 hours, then return to normal temperature and humidity for 2 hours before test. |
| 7-3 | 湿热试验<br>Humidity test | 将电机置于50±2℃、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 the motor under the environment of 50±2℃, 90~95%R.H. for 96 hours and then return to normal temperature and humidity for 2 hours before test. |
| 7-4 | 高低温试验<br>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。/ Assure the motor be placed under below testing conditions for 12 cycles, and then put the motor at normal temperature and humidity for 2 hours until further test.<br> |
| 7-5 | 振动量试验<br>Vibration test | 将电机固定在100g的塑料夹具上，按以下要求进行试验/Fix the motor on a 100g jig (plastic housing),and then make test according to below requirements：<br>1)振频范围/Vibration frequency range:10-55Hz<br>2)全振幅/Total amplitude:1.5mm<br>3)振频变化/Sweep ratio:10~55~10Hz 约2分钟/approximate 2 min<br>4)振动方向/Direction of vibration:三个垂直方向/Three |

| | | |
|---|---|---|
| | | perpendicular directions<br>5)持续时间/Duration:每个方向10分钟（共30分钟）/<br>10 minutes in each direction (30 minutes each) |
| 7-6 | 跌落试验<br>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 onto the concrete floor.<br>高度/Height：1.5m<br>方向/Direction：±X，±Y，±Z<br>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

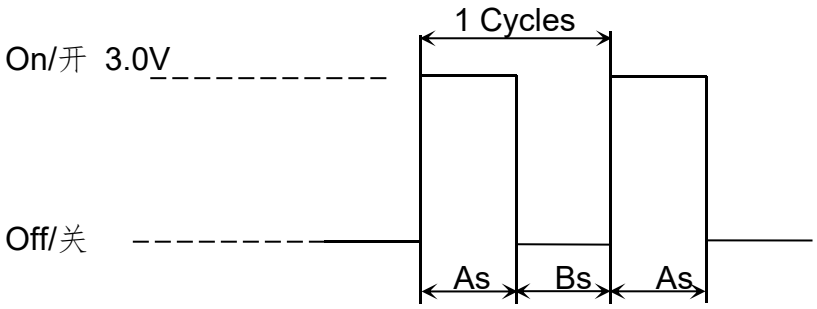
ⓐ试验后，测试数据必须符合以下规格：

After test, measured data must be satisfied as following specifications;

- 启动电压/Starting voltage: DC 2.0V 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±15%以内。/Changing rate must be within ±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<br>Life test | 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 in ambient humidity, 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).<br>模式/mode A=1, B=1, S=200,000<br> |

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 2.0V 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.
- 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≤1000ppm

镉及其化合物最大允许含量为100ppm/Cadmium and cadmium compounds≤100ppm

汞及其化合物最大允许含量为1000ppm/Mercury and Mercury compounds≤1000ppm

六价铬化物最大允许含量为1000ppm/Hexavalent chromium compounds≤1000ppm

多溴联苯(PBB)最大允许含量为1000ppm/Polybrominated biphenylethers≤1000ppm

多溴联苯醚(PBDE)最大允许含量为1000ppm/Polybrominated diphenylethers≤1000ppm

邻苯二甲酸二异丁酯(DIBP)最大允许含量为1000ppm /DIBP≤1000ppm

邻苯二甲酸二丁酯(DBP)最大允许含量为1000ppm /DBP≤1000ppm

邻苯二甲酸苄酯(BBP)最大允许含量为1000ppm/BBP≤1000ppm

邻苯二甲酸二(2-乙基己基)酯(DEHP)最大允许含量为1000ppm/DEHP≤1000ppm

六溴环十二烷(HBCDD)最大允许含量为1000ppm/HBCDD≤1000ppm

溴Br最大允许含量为900ppm/Br≤900ppm

氯Cl最大允许含量为900ppm/Cl≤900ppm

溴加氯之和最大允许含量 为1500ppm/Br+Cl≤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**

（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, otherwise it will 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 keep the motor away from liquid substance (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 long 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$H_2S$、$SO_2$、$NO_2$等/Corrosive gas such as $H_2S$、$SO_2$、$NO_2$ 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 which 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.Factory

（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）如有任何问题，工厂和客户双方应共同努力解决。/If any problems occur, both the user and Factory side shall try to solve the problem together.

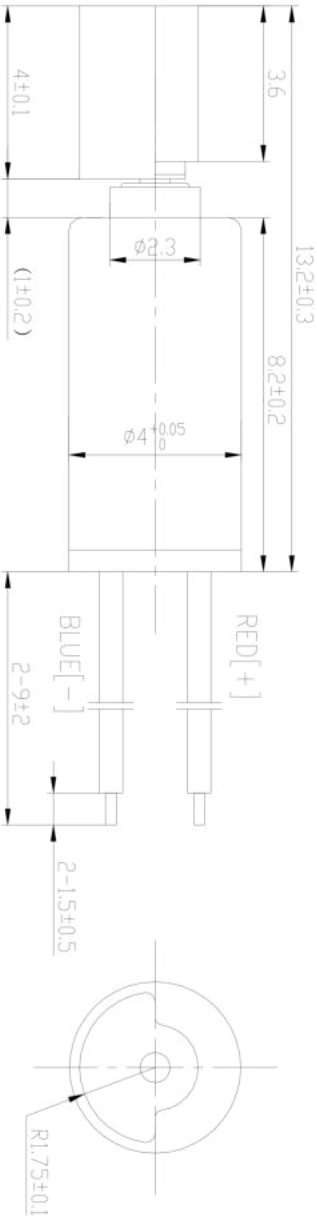
(9)因测试设备有误差，允许有±5%偏差。/ Due to the measurement equipment error, there is a ± 5 % difference tolerance.

（10）马达通过ROHS认证。/This motor pass the system of ROHS certification.

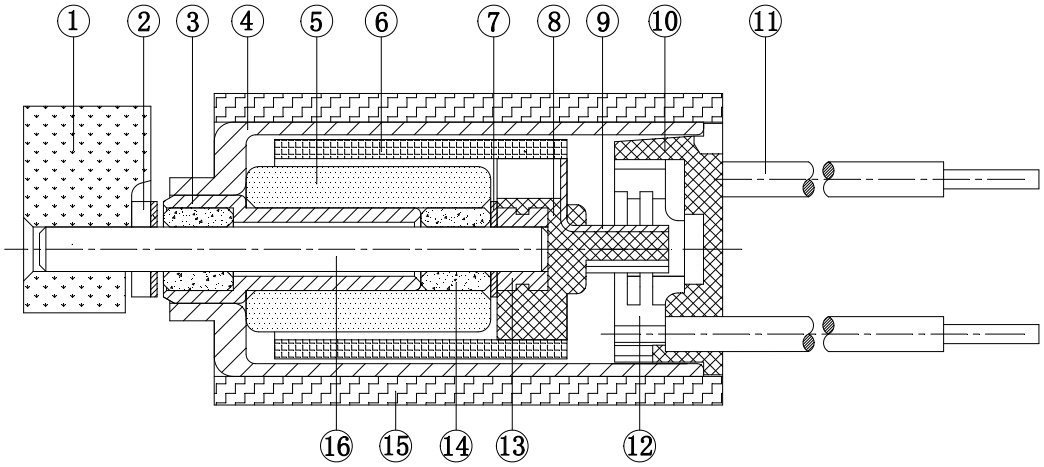
**11.外形图/Outside View**

技术要求/skills requirement

1. 额定电压/Rated voltage:DC 3.0V
2. 额定电流/Rated current:85mA Max
3. 额定转速/Rated speed:14000±2500rpm
4. 启动电压/Starting voltage:2.3V Max
5. 启动电流/Starting current:100mA Max
6. 端子阻抗/Terminal resistance:37（1±20%）Ω
7. 轴向间隙/Axial clearance:0.3mm Max
8. 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 | 引线/Power line | AWM3302 |
| 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 Requirement**

（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（440×220×160）。/Every 2 bundle are put into an outer case with a size of （440×220×160） 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.

