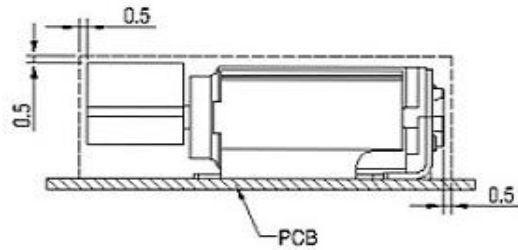
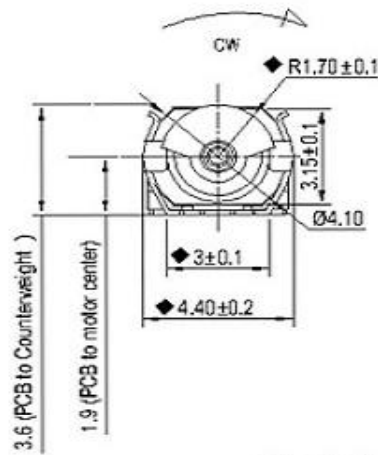
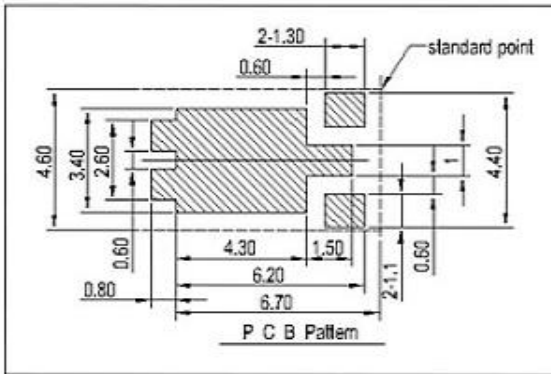
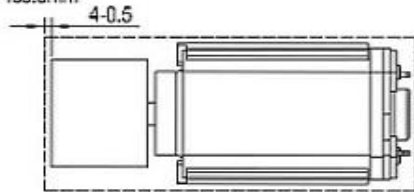


Rev.	Description	Date
G1		

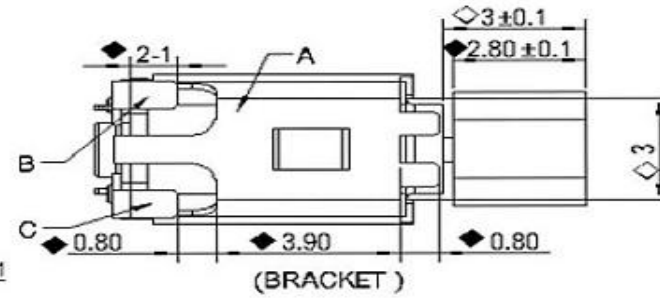


Minimum clearance between motor and housing walls is 0.5mm

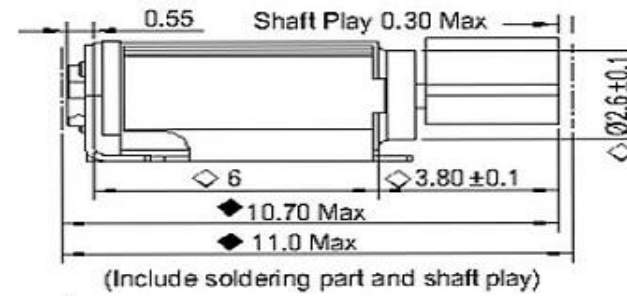


3.6 (PCB to Counterweight)

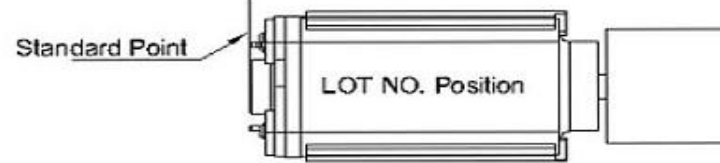
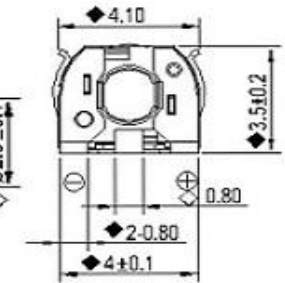
1.9 (PCB to motor center)



(BRACKET)



(Include soldering part and shaft play)



Drawn	Bruce	08/28/2020	Unit: mm	
Checked			Kysan Electronics	
Eng Appr.			www.kysanelectronics.com	
Mfg Appr.			info@kysanelectronics.com	
Q.A.				
SKU:	1112212		Size :A4	Weight(g):
			Scale	

1. 范围 SCOPE

此文件包含产品电气性能、关键特性、信赖性试验、品质控制等资料。

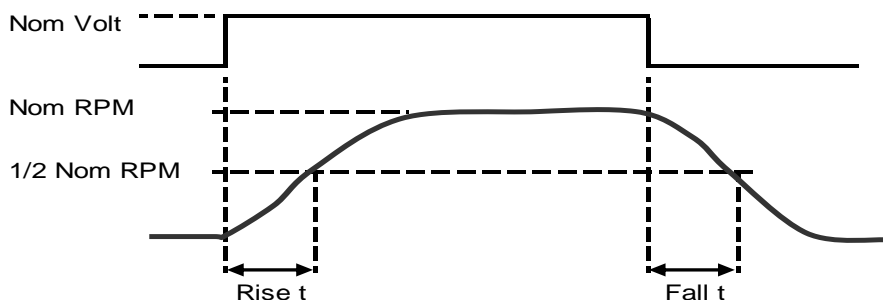
This document contains specific electrical and mechanical characters, critical characteristics, reliability tests, quality assurance and etc...

2. 机械特征 MECHANICAL CHARACTERISTIC

- | | |
|--|-----------------------|
| 2.1. 马达外观图纸/Mechanical drawing | See appendix 2 |
| 2.2. 轴向间隙/Axial play of shaft | 0.3 mm Max |
| 2.3. 平衡块密度/Counter weight density: | 17.0 g / cc Min |
| 2.4. 机械噪音/Mechanical noise of motor operating at rated speed:
背景噪音 26dB(测试距离 10 cm, 见附 1)
Background noise 26dB.(Measured distance 10 cm, see appendix 1). | 50 dB Max A-weighting |

3. 电气特性 ELECTRICAL CHARACTERISTICS

- | | |
|---|--------------------------------------|
| 3.1. 马达摆放位置/Vibrator positioning: | 水平摆放/ Horizontal |
| 3.2. 额定电压/Operating voltage: | DC 2.7 V |
| 3.3. 使用电压范围/Operating voltage range: | 2.3– 3.0V |
| 3.4. 负荷电流/Load current at operating voltage: | 75 mA Max |
| 3.5. 锁住电流/Starting current at operating voltage: | 90 mA Max |
| 3.6. 绝缘强度/Insulation resistance and voltage break down: | at 50V DC, 1M Ω Min and above |
| 3.7. 马达阻抗/Terminal resistance: | 33.0 \pm 3.0 Ω |
| 3.8. 额定转速/Load speed: | 14000 \pm 3000 rpm |
| 3.9. 旋转方向/Rotation direction: | C.W. & C.C.W |
| 3.10. 起动时间/RPM Rise time (see picture 1) | 60ms Max |
| 3.11. 停止时间/RPM Fall time (see picture 1) | 80ms Max |



Picture 1 起动时间和停止时间/RPM rise and fall time

- 3.12 起动电压: 标准使用状态下, 电压 2.3V 时各位置点应无停止。(振子缓慢运转 360°)
Standard loaded starting voltage: Under standard loaded condition, towards C.W. rotor shall move in all position at 2.3V (counterweight should be turned slowly at 360°)

所有尺寸及电性能测试应在室温和普通湿度下进行

All mechanical and electrical measurements should be measured at room temperature and ordinary humidity.

4. 附加信息 ADDITIONAL INFORMATION

- 4.1. 马达重量/Vibrator weight 0.63g
4.2. 振子推出力/Pull out strength of counter weight and shaft 30N Min
4.3. 振动量测试要求 测试治具需悬浮在半空中
Acceleration level at nominal RPM (Grms) (test jig mounted in freely suspended)
4.4. 回转数和电流会随温度而变化(功能温度 -20°C 至 +70°C 之间)
Speed and current variation (function of temperature, -20°C to +70°C)

5. 关键特性 CRITICAL CHARACTERISTICS

- 5.1. 主要尺寸/Functional dimensions
5.2. 负载电流/Rated current at specified rotating speed
5.3. 负载转速/Operating speed at operating voltage
5.4. 堵转电流/Starting current at operating voltage
5.5. 起动电压/Min. starting Voltage

6. 环境特性 ENVIRONMENTAL CHARACTERISTICS

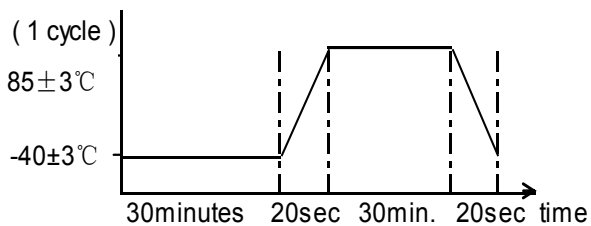
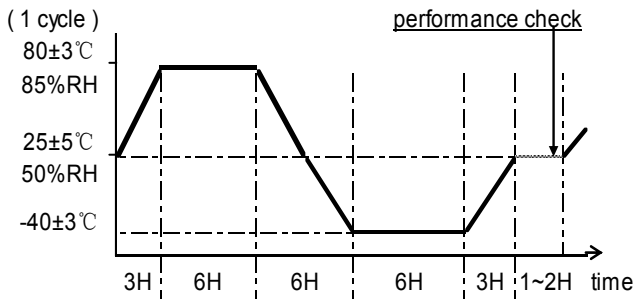
- 6.1. 使用温度/Operating temperature ranges: -20°C to +70°C
6.2. 储存温度/Storage temperature ranges: -40°C to +85°C

7. 可靠性试验 RELIABILITY TESTS

- 7.1 我们的产品已通过以下信赖性试验, 试验前后均对产品的回转数、负荷电流、锁住电流、起动电压、绝缘内阻进行检测 (试验品: 10pcs)

We have already performed reliability tests and measure nom rotation speed, nom load current, nom resistance, nom starting currents and nom starting voltage before and after tests, please check following table1 for detail reliability test information. Each test we use at least 10 samples for verification.

	项目/Items	试验条件/Test conditions	判断基准/Judgment
7.2	低温保存试验 Low temperature storage test	低温测试/ Storage test, -40±3 °C /96h, 常温放置 1-2h, 使用测试治具/ recovery 1~2h, Measurements with test jig.	
7.3	高温保存试验 High temperature storage test	高温测试/ Storage test 80±3°C /96h, 常温放置 1-2h, 使用测试治具/ recovery 1~2h, Measurements with test jig.	
7.4	温湿度循环测试 Temperature cyclic test	温度循环测试/ Storage test 温湿度条件/ Temperature & humidity: +80±3°C/6h(RH85%); -40±3°C/6h 间转换, 温度转换时间 6 小时, 共 24 小时一个循环, 共进行 6 个循环/-40±3°C/6h with 6h maximum transition time between temperatures. 24h/cycles, totally 6 cycles. 常温放置 1~2h, 使用测试治具./ Recovery 1~2h. Measurements with test jig.	无机械损伤. 无出现外观异常. (转速变化范围: Max +/-30%) No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM)
7.5	温度冲击试验 Thermal shock test	温度冲击测试/ Storage test 温湿度条件/ Temperature & humidity: -40±3°C/30 分钟; +85±3°C/30 分钟, 温度转换时间为 20 秒内. 每小时为一个循环, 共运行 50 个循环/ 1h/cycle,totally50cycles. 常温放置 1~2h. 使用测试治具 Recovery 1~2h. Measurements with test jig.	



7.6	常温寿命试验 Room temperature lifetime test	测试条件/ Operational test: 标准使用电压/ apply operating voltage 温湿度/ Temperature & humidity: 25±3℃, RH 50% 运行条件/ On/off time: 2.5s on/off, 300,000 cycles. 性能检测/ Performance check: 每 20,000 次后进行. 常温放置 1-2h. 使用测试治具. Recovery 1-2h. Measurements with test jig.	试 100,000 次后无机械损伤 / No mechanical damage <u>After 100,000cycles:</u> :(转速变化范围: Max +/-30%) 测试 300,000 次后马达能正常运转/(Max +/-30%variation of nom RPM) <u>After 300,000cycles:</u> The vibrator should perate.
7.7	高温寿命试验 High temperature lifetime test	测试条件/ Operational test: 标准使用电压/ apply operating voltage 温度/ Temperature : 55±3℃ 运行条件/ On/off time: 2.5s on/off, 53,000 cycles. 性能检测/ Performance check: 每 20,000 次后进行. 常温放置 1-2h. 使用测试治具 Recovery 1~2h. Measurements with test jig.	无机械损伤. 无出现外观异常. (转速变化范围: Max +/-30%)
7.8	低温寿命试验 Low temperature lifetime test	测试条件/ Operational test: 标准使用电压// apply operating voltage 温度/ Temperature: -20±3℃ 运行条件/ On/off time:2.5s on/off, 53,000 cycles. 性能检测/ Performance check: 每 20,000 次后进行. 常温放置 1-2h. 使用测试治具 Recovery 1~2h. Measurements with test jig.	No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM)
7.9	硫化试验 H ₂ S corrosion test	测试条件/ Storage test: 气体浓度/ Concentration: 3±1ppm 温湿度/ Temperature & humidity: 40±3℃, RH 80% 暴露时间/: Exposure time 24hours	无机械损伤. 无出现外观异常. (转速变化范围 : Max +/-30%)
7.10	跌落试验 Free Fall	马达固定在试验盒内.(试验盒重 100g), 跌落高度 1.5 m 于钢板或混凝土上, 每个面各 3 回. 使用测试治具. Mount the vibrator in the dummy box.(dummy box weight 100g), Drop height 1.5 m onto concrete. 3 times in each 6 directions. Measurements with test jig.	No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM)

7.11	自由震荡试验 Random vibration test	3axes, 10minutes per axis, 6.06Grms		无机械损伤. 无出现外观异常. (转速变化范围: Max +/-30%) No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM)
		Frequency (Hz)	A.S.D.(G ² /Hz)	
		20	0.0098	
		80	0.04	
		350	0.04	
		2000	0.0069	
		Measurements with test jig.		
7.12	冲击试验 Shock test	试验时间及方向/ Time of test and direction: 6 个方向, 每个方向三次, 共 18 次/3times in each 6 direction. Total 18 times. 加速度/ Acceleration: 半个正弦曲线 500G/ Half-sinusoidal 500G 持续时间/ Duration:2ms		

Table1 Reliability test

8. 理想出货及储存状态 EXPECTED SHIPPING AND STORAGE CONDITIONS

8.1. 相对湿度/Relative humidity 15%~70%

8.2. 温度/Temperature -5°C~40°C

8.3. 二氧化硫平均值/Sulphur dioxide average 0.3 mg/m³

8.4. 硫化氢平均值/Sulphuretted hydrogen average 0.1 mg/ m³

8.5. 储存周期/Storage period 12 months

(马达自生产日起须每 12 个月转动一次/Vibrator has to be rotated at least once within 12 mouths from the date of receipt)

9. 品质保证 QUALITY ASSURANCE

所有关键参数须 100% 控制。“◆”符号在整个工序中用于鉴别关键参数。量产品正式承认前我们使用工序能力分析对量产中所有关键参数进行管控, 基于之前的工作, 产品的最终品质控制精益求精。

All critical parameters are 100% in control. The symbols “◆” apply to all parameters identified as critical parameters in all process. And before mass production approval, we use Process Capability Study (PCS) to conduct all critical parameters in mass production. Based on PCS the final quality controls will be agreed.

量产控制项目/Quality assurance for mass production:

- 批合格率/Lot acceptance rate (LAR)
- 直通率/First pass yield (FPY)
- 出货质量控制基准/Outgoing quality level

每批出货产品均包含出货检测数据/Each final packing containing Out-going inspection data sheet (n=35pcs)

检测项目/Inspection item: 负荷转速/Load speed
负荷电流/Load current
堵转电流/Starting current
起动电压/Starting voltage
阻抗值/Coil resistance

- 客户返品率/Customer reject material rate
- 客户满意度/Customer satisfaction
- Cpk/Cp

10. 材料 MATERIALS

- 平衡块/Counterweight
- 电刷/Brush
- 换向器/Commutator
- 外壳/Case
- 端子/Terminal
- 支架/Bracket
- 垫圈/Washer
- 端盖/End cover
- 轴承/Bearing
- 磁铁/Magnet
- 铜线/Copper wire
- 轴/Shaft
- 铁芯/Core
- 变阻/Varistor (optional)

P.S.: 所有产品材料均能满足 2002/95/EC 和 公司有害物质管控要求 Fu Ge-III-TD-001.

All the materials included in vibrator can meet 2002/95/EC & Fu Ge RoHS requirement

Fu Ge-III-TD-001.