



产品规格书

PRODUCT SPECIFICATION

| | |
|--|--|
| 客户名称Buyer Name | |
| 客户料号Buyer Part No. | |
| 客户承认签章 Buyers Approval & Signatures | |

| | | | |
|-----------------------------|---------------------------------|---------------|-----|
| 文件编号Spec No. | | 版本 | A/0 |
| 品名描述 Product Description | 圆柱贴片马达 Cylindrical SMT Motor | | |
| 型号Part No. | VZ43FC1A6730098U | | |
| 送样日期Date | | | |
| 设计Designed by | 审核Checked by | 批准Approved by | |
| | | | |
| 2022.02.09 | 2022.02.09 | 2022.02.09 | |

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1. SCOPE

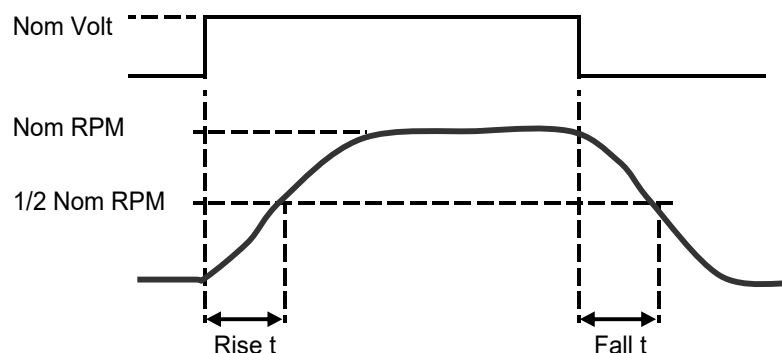
This document contains specific electrical and mechanical characters, critical characteristics, reliability tests, packaging condition, quality assurance, reflow profile and etc..

2.MECHANICAL CHARACTERISTIC

- | | |
|---|-------------------------|
| 2.1. Mechanical drawing | See appendix 2 |
| 2.2. Axial play of shaft | 0.3 mm Max |
| 2.3. Counter weight density: | 17.0 g / cc Min (0.63g) |
| 2.4. Mechanical noise of motor operating at rated speed: | 50 dB Max A-weighting |
| Background noise 26dB.(Measured distance 10 cm, see appendix 1 Figure 1.1). | |

3.ELECTRICAL CHARACTERISTICS

- | | |
|---|--------------------------------------|
| 3.1. Vibrator positioning: | Horizontal |
| 3.2. Operating voltage: | DC 1.3V |
| 3.3. Operating voltage range: | 1.1– 1.7V |
| 3.4. Load current at operating voltage: | 105 mA Max |
| 3.5. Starting current at operating voltage: | 130 mA Max |
| 3.6. Insulation resistance and voltage break down: | at 50V DC, 1M Ω Min and above |
| 3.7. Terminal resistance: | 10.6 \pm 2.0 Ω |
| 3.8. Load speed: | 9000 \pm 2000 rpm |
| 3.9. Rotation direction: | C.W. & C.C.W |
| 3.10. Motor vibration Force: | 1.25 Gp Min |
| (The G-force is 1.25Gp min when the motor is under the loading of 100g at rated voltage, see appendix 1 Figure 1.2) | |
| 3.11. Rise time (see picture 1) | 80 ms Max |
| 3.12. Rree Fall time (see picture 1) | 100 ms Max |



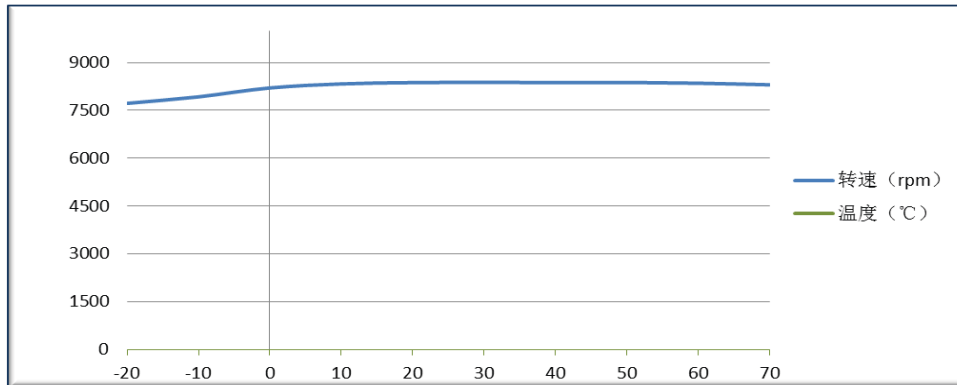
Picture 1 RPM rise and fall time

- 3.13 Standard loaded starting voltage: Under standard loaded condition, towards C.W. rotor shall move in all position at 1.1V (counterweight should be turned slowly at 360°)

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

4.ADDITIONAL INFORMATION

- 4.1. Vibrator weight 1.5g
- 4.2. Pull out strength of counter weight and shaft 50N Min
- 4.3. Acceleration level at nominal RPM (Grms) (test jig mounted in freely suspended)
- 4.4. Speed and current variation (function of temperature, -20°C to +70°C)
- 4.5. Installation/Pressing force : <20N
- 4.6. Assembled state/Continuous force: <5N


5. CRITICAL CHARACTERISTICS

- 5.1. Functional dimensions
- 5.2. Rated current at specified rotating speed
- 5.3. Operating speed at operating voltage
- 5.4. Starting current at operating voltage
- 5.5. Min. starting Voltage

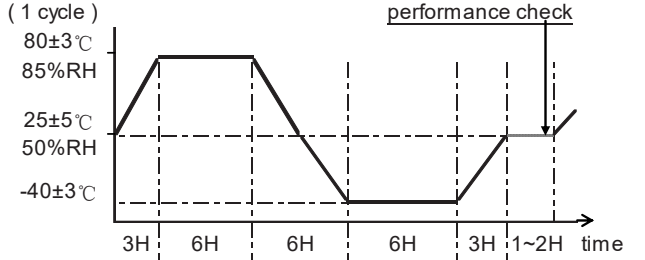
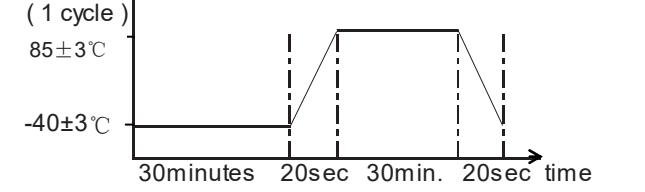
6. ENVIRONMENTAL CHARACTERISTICS

- 6.1. Operating temperature ranges: -20°C to +70°C
- 6.2. Storage temperature ranges: -40°C to +85°C

7.RELIABILITY TESTS

7.1 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.

| | Items | Test conditions | Judgment |
|-----|------------------------------|---|---|
| 7.2 | Low temperature storage test | Storage test -40±3°C/96h, recovery 1~2h Measurements with test jig. | No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM) |

| | | | |
|-----|--------------------------------|--|--|
| 7.3 | High temperature storage test | Storage test $80\pm 3^{\circ}\text{C}/96\text{h}$, recovery 1~2h Measurements with test jig. | No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM) |
| 7.4 | Temperature cyclic test | Storage test Temperature & humidity: $+80\pm 3^{\circ}\text{C}/6\text{h}(\text{RH}85\%)$; $-40\pm 3^{\circ}\text{C}/6\text{h}$ with 6h maximum transition time between temperatures. 24h/cycles, totally 6 cycles. Recovery 1~2h. Performance check daily. Measurements with test jig.  | No mechanical damage. Reduced performance of vibrator. (Max +/-30% variation of nom RPM) |
| 7.5 | Thermal shock test | Storage test Temperature & humidity: $-40\pm 3^{\circ}\text{C}/30\text{minutes}$; $+85\pm 3^{\circ}\text{C}/30\text{minutes}$ with a 20sec maximum transition time between temperatures. 1h/cycle, totally 50 cycles. Recovery 1~2h. Measurements with test jig.  | No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM) |
| 7.6 | Room temperature lifetime test | Operational test: apply operating voltage Temperature & humidity: $25\pm 3^{\circ}\text{C}$, RH 50% On/off time: 2.5s on/off, 300,000 cycles. Performance check: before, after test and every 20,000 cycles. Recovery 1-2h. Measurements with test jig. | No mechanical damage. <u>After 100,000cycles:</u> Normal performance of vibrator. (Max +/-30% variation of nom RPM) <u>After 300,000cycles:</u> The vibrator should operate. |

| 7.7 | Free Fall | 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) | | | | | | | | | | | | |
|-------------------------------------|----------------------------|---|---|--|----------------|----------------------------|----|--------|----|------|-----|------|------|--------|---|
| 7.8 | Random vibration test | <table border="1" data-bbox="438 544 997 752"> <tr> <td colspan="2">3axes, 10minutes per axis, 6.06Grms</td> </tr> <tr> <th>Frequency (Hz)</th> <th>A.S.D.(G²/Hz)</th> </tr> <tr> <td>20</td> <td>0.0098</td> </tr> <tr> <td>80</td> <td>0.04</td> </tr> <tr> <td>350</td> <td>0.04</td> </tr> <tr> <td>2000</td> <td>0.0069</td> </tr> </table> Measurements with test jig. | 3axes, 10minutes per axis, 6.06Grms | | Frequency (Hz) | A.S.D.(G ² /Hz) | 20 | 0.0098 | 80 | 0.04 | 350 | 0.04 | 2000 | 0.0069 | No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM) |
| 3axes, 10minutes per axis, 6.06Grms | | | | | | | | | | | | | | | |
| Frequency (Hz) | A.S.D.(G ² /Hz) | | | | | | | | | | | | | | |
| 20 | 0.0098 | | | | | | | | | | | | | | |
| 80 | 0.04 | | | | | | | | | | | | | | |
| 350 | 0.04 | | | | | | | | | | | | | | |
| 2000 | 0.0069 | | | | | | | | | | | | | | |
| 7.9 | Shock test | Time of test and direction: 3times in each 6 direction. Total 18 times. Acceleration: Half-sinusoidal 500G Duration:2ms | No mechanical damage. Normal performance of vibrator. (Max +/-30% variation of nom RPM) | | | | | | | | | | | | |

Table1 Reliability test

8. EXPECTED SHIPPING AND STORAGE CONDITIONS

| | |
|------------------------------------|------------------------|
| 8.1. Relative humidity | 15%~70% |
| 8.2. Temperature | -5°C~40°C |
| 8.3. Sulphur dioxide average | 0.3 mg/m ³ |
| 8.4. Sulphuretted hydrogen average | 0.1 mg/ m ³ |

9.QUALITY ASSURANCE

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.

Quality assurance for mass production:

- Lot acceptance rate (LAR)
- First pass yield (FPY)
- Outgoing quality level
 - Each final packing containing Out-going inspection data sheet (n=35pcs)
 - Inspection item: Load speed
 - Load current
 - Starting current
 - Starting voltage
 - Coil resistance
- Customer reject material rate
- Customer satisfaction
- Cpk/Cp

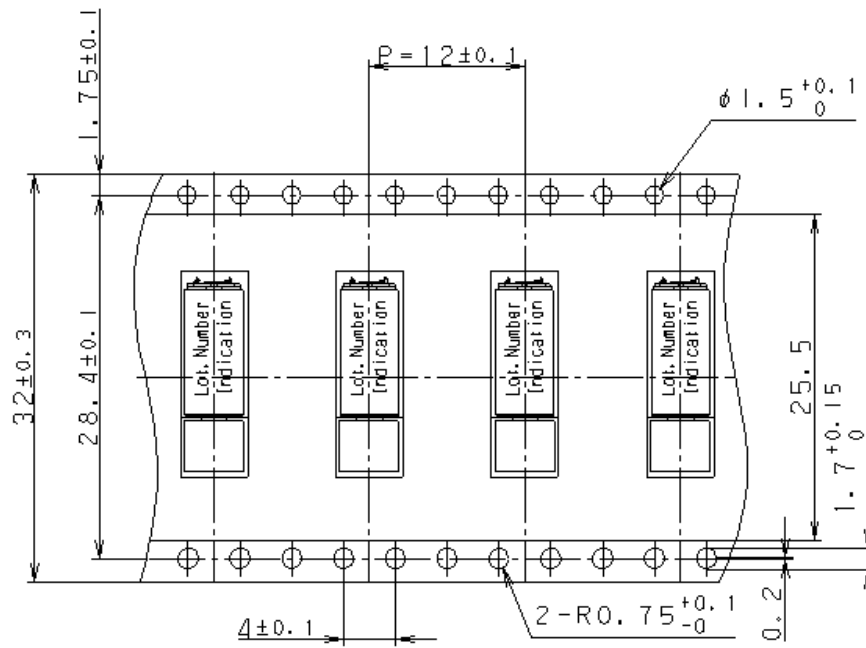
10. MATERIALS

- Counterweight
- Brush
- Commutator
- Case
- Terminal
- Bracket
- Washer
- End cover
- Bearing
- Magnet
- Copper wire
- Shaft
- Core
- Varistor

P.S.: All the materials included in vibrator can meet 2002/95/EC & Vybronic RoHS requirement

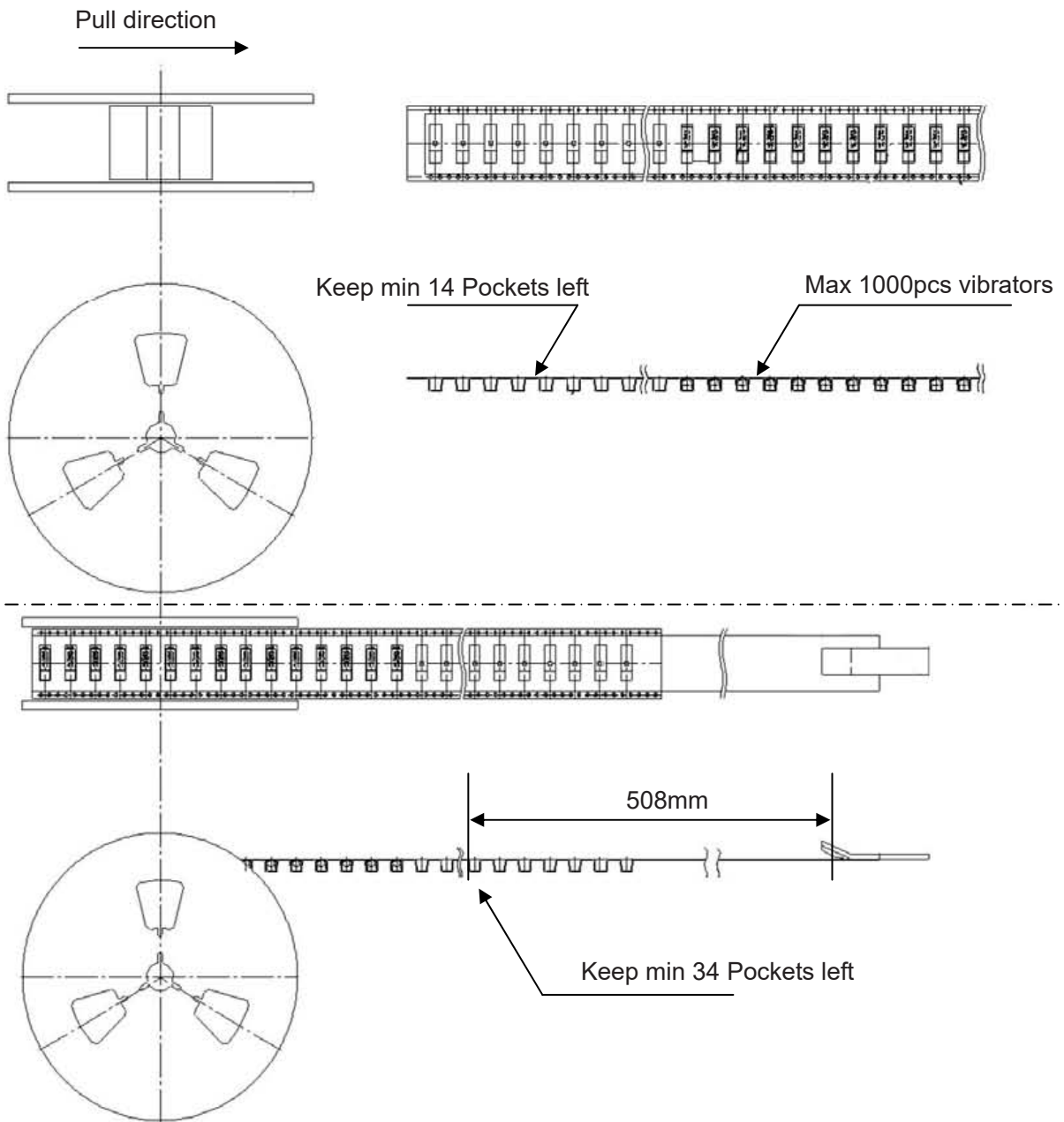
11. PACKAGING CONDITION

11.1 Smallest packing



Picture 3 Smallest packing condition

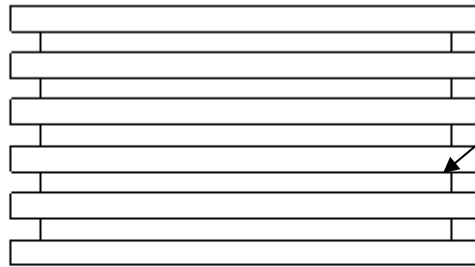
11.2 Reel packing condition



Picture 4 Reel packing condition

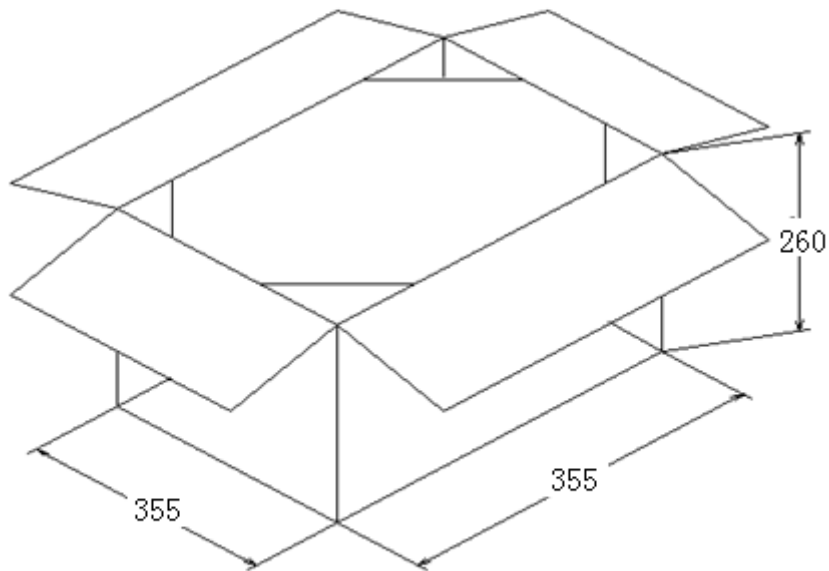
11.3 Final packing condition

1000pcs/reel X 6reel= total 6000pcs



During the vibrator handle or shipping, counterweight must be faced to upper side.

Double wall corrugated cardboard



Picture 5 Final packing condition

12. RECOMMENDED REFLOWPROFILE FOR VIBR ATOR

12.1 Definitions

Reflow Profile = Time vs. temperature plot

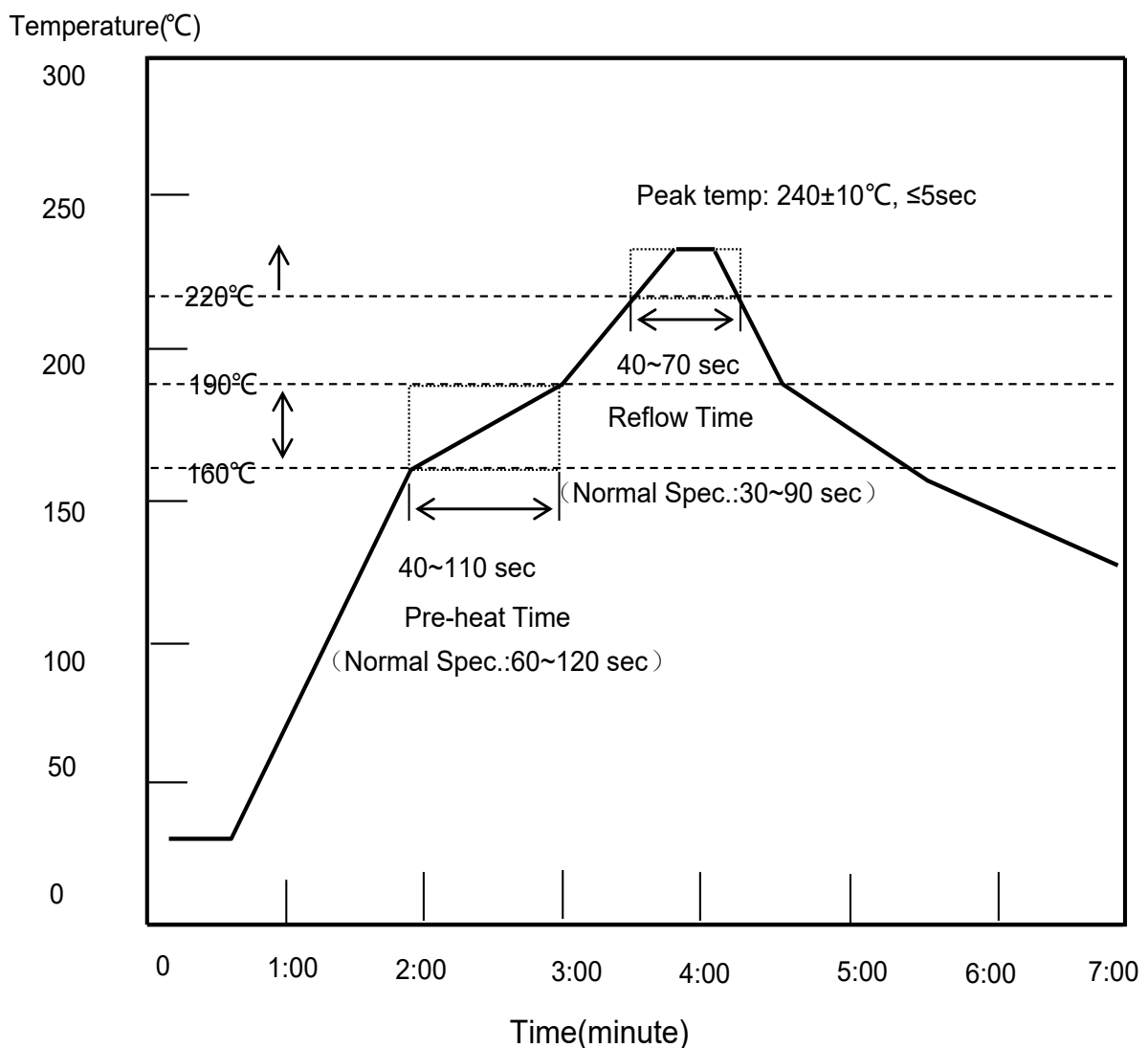
Peak temperature = Maximum temperature reached on the component

Convection = Forced air heating

12.2 Recommended temperature check method of reflow furnace

The reflow furnace used should be 100% convection reflow. Thermocouples should be securely attached to the top surface of vibrator to insure the temperature exposure is met. Profile should be recorded by data acquisition for future reference.

12.3 Recommended reflow Profile for Pb-Free soldering



13. NOTES ON USE

- 13.1 Pay attention to the voltage and current ranges which applied to the vibrator, and use the vibrator in accordance with this specification, otherwise, it will reduce the life and performance of the vibrator.
- 13.2 Do not use hot gun to puff the surface of vibrator from PCB directly.
- 13.3 Do not locking the motor with current applied for long time, which may cause the motor to overheat and short circuit.
- 13.4 Do not exert pressure the terminals, otherwise, it will result in terminal deformation.
- 13.5 Do not bring magnetized objects near or contact with the surface of vibrator, which will demagnetize the magnetism of vibrator and result in noise failure.

Appendix 1

Figure 1.1: Mechanical noise measurements setup

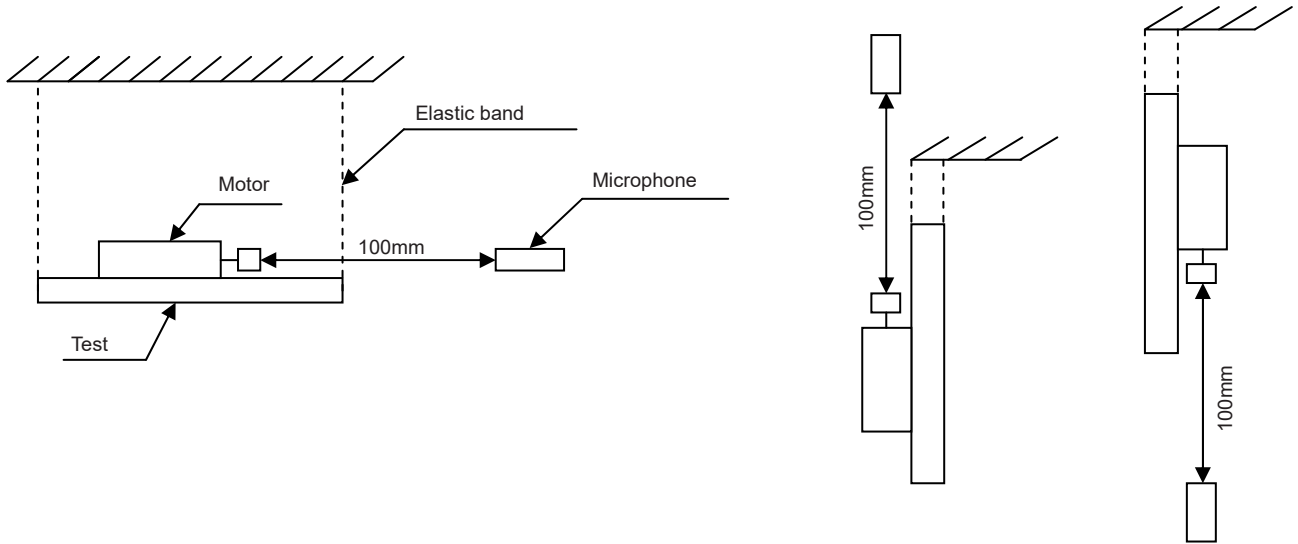
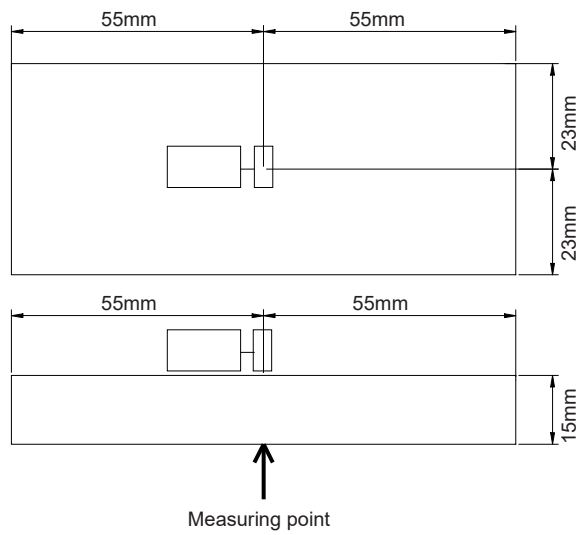


Figure 1.2: Test jig, weight 100g



Appendix 2

