NEED-FOR-POWER MOTOR™

Model No.

NFP-WS0934

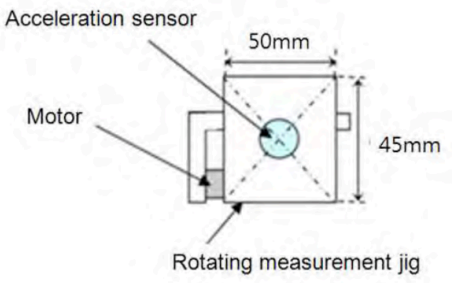
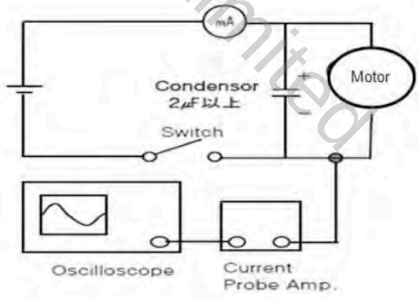
1. Application

This article regulates the relevant technical requirements and test methods of model NFP-WS0934 BLDC Coin Vibration Motor.

2. Contents

NO.	Item	Specification
2-1	Operating Voltage Range	DC 2.7V ~ 3.3V
2-2	Storage Temperature Range	(-)40 ~ (+)85 °C
2-3	Operating Temperature Range	(-)30 ~ (+)70 °C However, there is 45% decrease of rated load speed of the section 7-3 at -30°C compared to +25°C.
2-4	Operating Position	All Direction

3. Standard Test Condition

NO.	Item	Specification
3-1	Temperature	20±15% °C
3-2	Humidity	65%±20% RH
3-3	Measurement Voltage	DC 3.0V
3-4	 Standard Measurement State  Inspection Circuit Diagram - Jig : 50 x 46 x 45mm [Material is POM] - Weight: 150g - The vibrator is Clamped firmly (0.5~1Kg pressure) on a test fixture	

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4. Judgment Environmental Condition

NO.	Item	Condition
4-1	Temperature	20±15% °C
4-2	Humidity	65%±20% RH

5. Test Tolerance

Test set-ups and equipment shall be capable of maintaining following condition, unless otherwise specified.

NO.	Item	Condition
5-1	Room Temperature & Humidity	20±15%°C/65±20%RH
5-2	Test Chamber Temperature	Limits ± 3°C
5-3	Voltage	Limits ± 0.15V

6. Electrical Characteristics

NO.	Item	Test Condition	Condition
6-1	Rated Voltage	/	DC 3.0V
6-2	Rotating Direction	CW [Lead Wire Red(+), Black(-) CW [Lead Wire Red to (+), Black to (-)]	CW
6-3	Rated Load Speed	It is based on the standard measurement condition of the section 4.	11,500 ± 2,500 rpm
6-4	Rated Load Current		80 mA max
6-5	Starting Current		175 mA max
6-6	Starting Voltage	Motor 4-1, 4-2, 4-4 On/Off . Motor On/Off test based on the standard measurement condition of the section 4-1, 4-2, and 4-4.	DC 2.5 V max
6-7	Insulation Voltage	Measured between terminal and case with DC 100V Megger.	10 MΩ min

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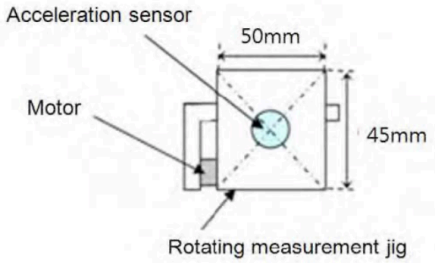
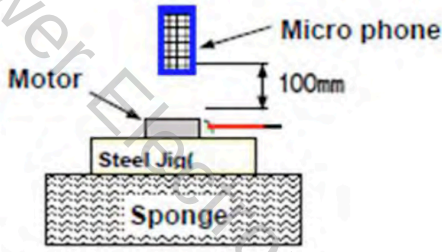
7. Mechanical Characteristics

NO.	Item	Specification	Condition
7-1	Vibration Force	- Vibration Force: 1.4Grms (AVG.) - 50 x 46 x 45mm [Material is POM] - Weight : 150g - The vibrator is Clamped firmly (0.5~1Kg pressure) on a test fixture, 	It is referred to the rated load speed of the section 7-3
7-2	Mechanical Noise	- Motor shall be fixed on Jig by adhesive tape - Jig Material 	50dB 50dB MAX 24dB
7-3	Weight	/	about 1.0g

8. Reliability Test

NO.	Item	Test Condition	Specification
8-1 8-2	Life Test	<table><tr><td></td><td></td><td></td></tr><tr><td></td><td>Room Temp. & Humi. L/T</td><td>High Temp. & Humi. L/T</td></tr><tr><td>Voltage</td><td>DC 3.0V</td><td>DC 3.0V</td></tr><tr><td>Temperature</td><td>20±15℃</td><td>40℃</td></tr><tr><td>Humidity</td><td>65±20% RH</td><td>90% RH</td></tr><tr><td>Life cycles</td><td>1,000,000 cycles</td><td>300,000 cycles</td></tr><tr><td>Duty Cycle</td><td>0.5 sec ON / 0.5 sec OFF</td><td>0.5 sec ON / 0.5 sec OFF Motor shall be fixed on Jig by adhesive tape. (Refer to the section 4-4)</td></tr></table>	/

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NO.	Item	Test Condition	Specification
8-3	Composite Test	Conduct the continuous running for 10 hours as following then storage at 60°C 90% for 500hours	(Rated Load Speed: Initial value±20%, or within rated load speed) (Rated Load Current: Initial value±30%)
8-4	Low Temperature Storage Performance	Exposed to -40°C for 500 hours and then room temperature for 4 hours.	
8-5	High Temperature Storage Performance	Exposed to +85°C, 60%RH for 500 hours and then room temperature for 4 hours.	
8-6	High Temperature and Humidity Storage Performance	Exposed to +60°C, 90%RH for 500 hours and then room temperature for 4 hours.	
8-7	Thermal Shock Test	Total 200cycles at -40°C and +85°C for 30min each (1cycle=1 H) Temperature Change Time < 5min Motor shall be measured after exposure at room temperature for 4 hours.	
8-8	Drop Test	Dummy set (about 130g) motor shall be dropped onto concrete plate. 3times each side of 6 directions from a height of 150cm, total 18 times.	
8-9	Vibration Test	Standard-packed motor is subjected to sine wave 10Hz~55Hz. X, Y, Z directions for 2 hours each, total 6 hours.	

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Table 1. Evaluation items after reliability test

NO.	Item	Specification
1-1	Rated current	Rated Load Current: Initial value ±30%
1-2	Rated speed	Rated Load Speed: Initial value±30%, or within rated load speed
1-3	Acoustic noise	50dB(A) max.
1-4	Others	No deformation, crack, separation of parts.

※ **A dummy jig for free-drop**

Mass : 100gr ± 10%
Size : 110 X 65 X 16 mm
Material : POM
Thickness of the cushion tape : 1.0mm
(Compressive ratio : 50%)
The upper case is faced to the cushion tape

9. Caution

NO.	Item	Specification
9-1	Operating Range	When using on the operating condition different from a standard, a problem can be generated to the performance and the life of a product.
9-2	Storage	Avoid from placing motor for long term of six months under environmental condition of high temperature or extreme humidity, or motor may be deteriorated.
9-3	Motor Handling	To handle the motor, hold the case softly. Motor: Do not bring a magnetized object or attracted object by the magnet of motor, or such object may deteriorate a performance of motor. Input short to the motor due to mis-operating, Drive IC of the motor inside can be damaged. To avoid this problem, please add capacitor of 2uF or more between the power lines in parallel with the motor. Driver IC: Supplying voltage more than DC 4.5V can damage the driver IC
9-4	Motor Usage	- Motor must be installed in device within 6 months of our ship date. For best reliability, it is recommended that the motor be exercised by powering it up for 3 seconds when the device is powered on.

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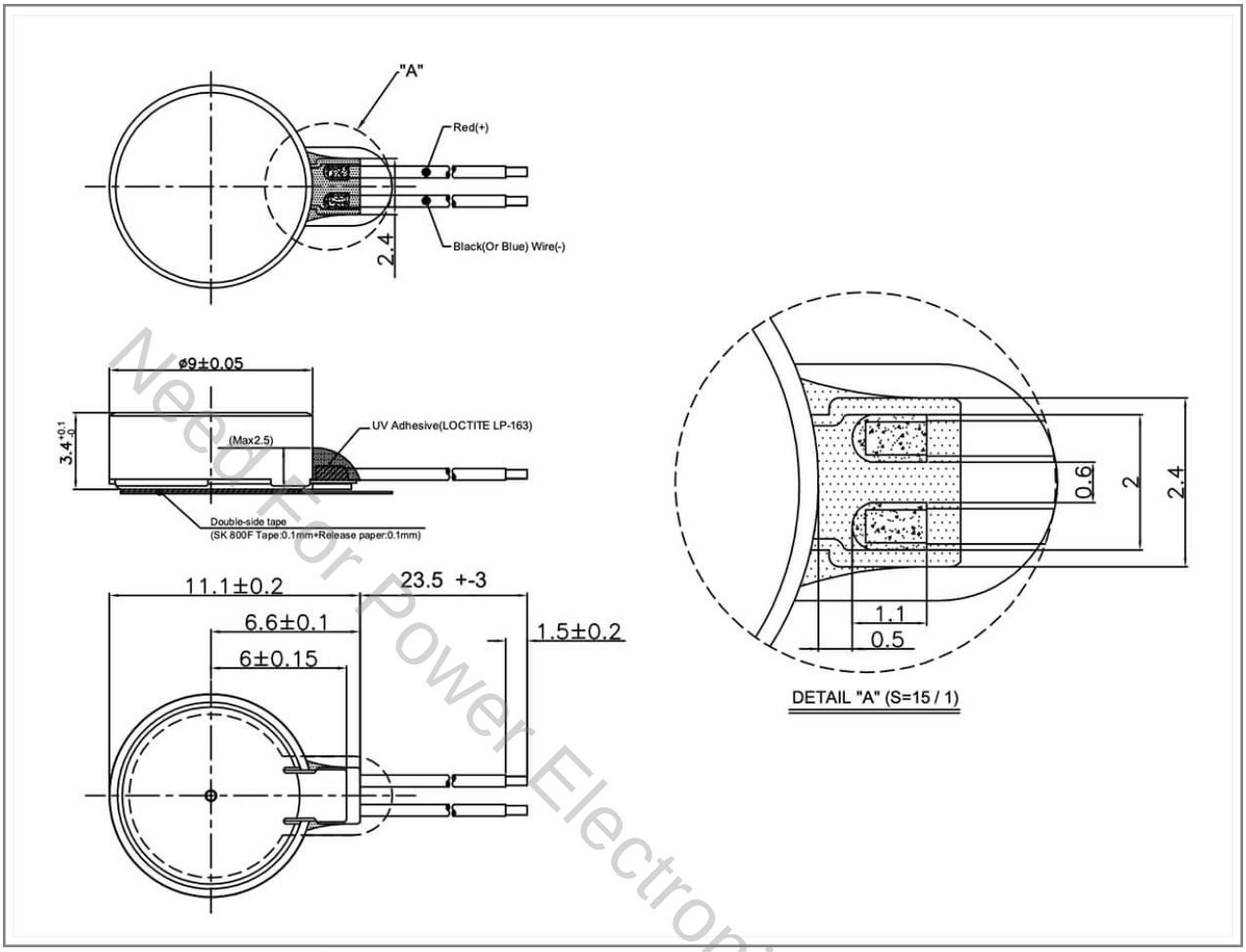
10. Specification Change

NO.	Item
10-1	Even when there is any change to this specification, change application report which has the information of details of the change, lot of product, and etc shall be presented to customer before that change being carried out. And mutual discussion may be necessary before the change being carried out. Revision history shall be recorded on to the specification sheet when the change record and approval may be required.

11. Outline Drawing



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