



維盟科技有限公司
Evowave Technology Co., Ltd.

規格書 / Specification

Description:	Linear Vibration Motor
Part No.:	LB103015WXX
Date:	2015/04/24

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EVOWAVE COMPONENT SPECIFICATION

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1.0 Revision History :

REVISION	DATE	ORIGINATED BY	REASON FOR CHANGE	MANAGER APPROVAL
0	13-12-11	H.S.KIM	Preliminary	S.S.KIM
1	14-01-14	H.S.KIM	CONNECTOR WIRE CHANGE - Twist Type --- Page (11) ADD UV HEIGHT MANAGEMENT STANDARDS - Max 1.90mm (From Bottom of Motor) --- Page (11)	S.S.KIM
2	14-01-24	H.S.KIM	CONNECTOR WIRE CHANGE - Twist Type → Wire Type --- Page (11)	S.S.KIM
3	14-02-19	H.S.KIM	CONNECTOR WIRE CHANGE - Wire Type → Twist Type --- Page (11)	S.S.KIM
4	14-12-02	H.S.KIM	FLUX LEAKAGE AND IMPROVED VIIBRATION FORCE CHANGE - Case Material Change Bs → SUS - Cover Material and shape Change BS → SCP - Vibrator Weight Change 1.050g → 1.120g - F-pcb Change shape and attachment methods Adhesive Tape → Tape + Solder method - Spec flux leakage and measurement insertion Case directions : Max 15 / Min 0 Gauss Cover directions : Max 15 / Min 0 Gauss --- Page (5, 6,11)	S.S.KIM

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2.0 Product Description

Evowave part number LB103015WXX is designed in accordance to Evowave components Specification.

3.0 Environmental characteristics

3.1) Operating Temperature Ranges $-25^{\circ}\text{C} \sim +70^{\circ}\text{C}$

3.2) Storage Temperature Ranges $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

4.0 Measurement Conditions

No.	Item	Specification
4-1	Temperature	$20^{\circ}\text{C} \pm 5^{\circ}\text{C}$
4-2	Humidity	65%RH \pm 20%RH
4-3	Rated Input Voltage	2.0 Vrms AC, Sinewave
4-4	Input Voltage Range	0.1 ~ 2.05 Vrms AC
4-5	Input Frequency	205 Hz
4-6	Operating Attitude	Refer to Figure 3.0

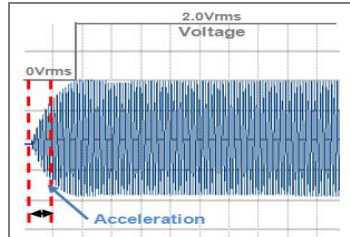
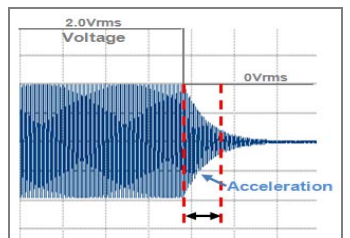
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5.0 Specifications

Measurement Standard : Refer to No.4 Measurement Conditions

No.	Item	Specification	Condition
5-1	Resistance	23 ohm +/- 10%	
5-2	Rated Current	Max 90 mArms	Input Source : 205Hz, 2.0Vrms AC sinewave
5-3	Acceleration	1.25 ~ 1.80 G	Input Source : 205Hz, 2.0Vrms AC sinewave
5-4	Frequency Characteristics	Refer to Figure 1.0	Frequency Characteristics
5-5	Noise	Max 50 dBA	10cm distance from microphone, Input Voltage : 2.0Vrms AC, sinewave
5-6	Noise by mechanical Touch (Noise_T)	Max 35 dBA	Input Source : 2.0Vrms AC sinewave
5-7	Noise by High Frequency (Noise_B)	Max 35 dBA	Input Source : 2.0Vrms AC sinewave
5-8	Noise by THD (Total Harmonic Distortion)	Max 25%	Input Source : 2.0Vrms AC sinewave
5-9	Ringing Force	Max 0.45 G	Input Source : 0.2Vrms AC sinewave
5-10	Insulation Resistance	Min 10 Mega Ohm	100V DC Input, between Case and L/W
5-11	Rising Time	Max 50ms	Turn on the power, Half Maximum Vibration reaching time 
5-12	Falling Time	Max 80ms	Turn off the power, Half Maximum Vibration reaching time 
5-13	Leakage Flux	Case & Cover direction Max 15 / Min 0 Gauss	1mm Intervals(non-magnetic material) is centered measures (Figure 2.0)

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6.0 Acceleration Response Graphs

Evowave measured LB103015WXX per test fixture and its acoustic measurement drawing.

Figure 1.0

Typical frequency spectrum measurement

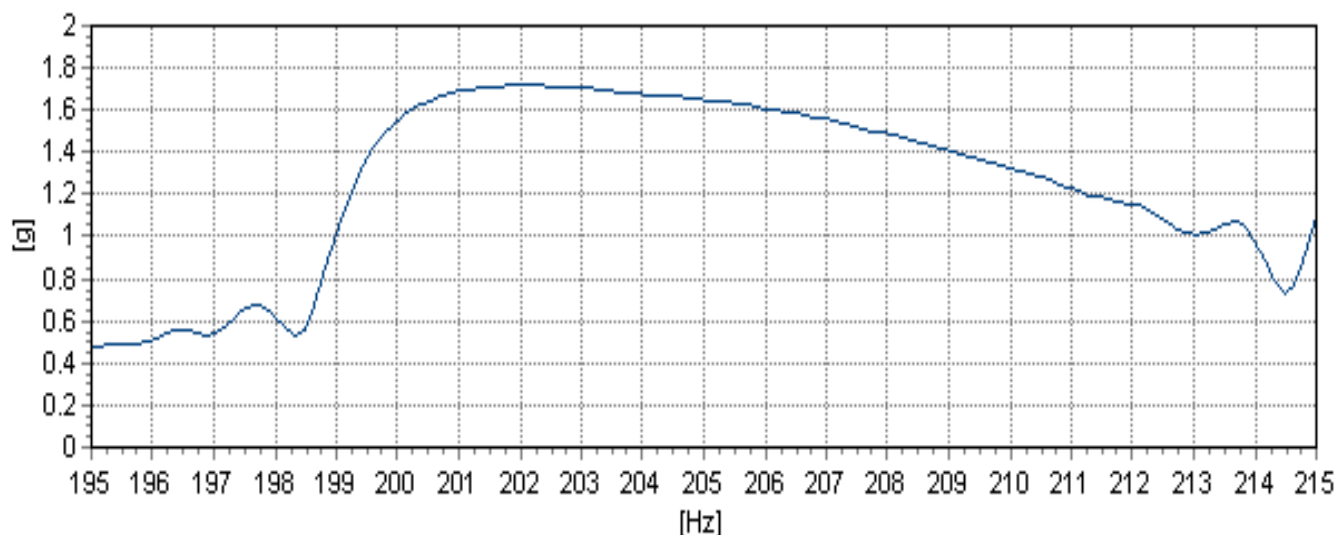
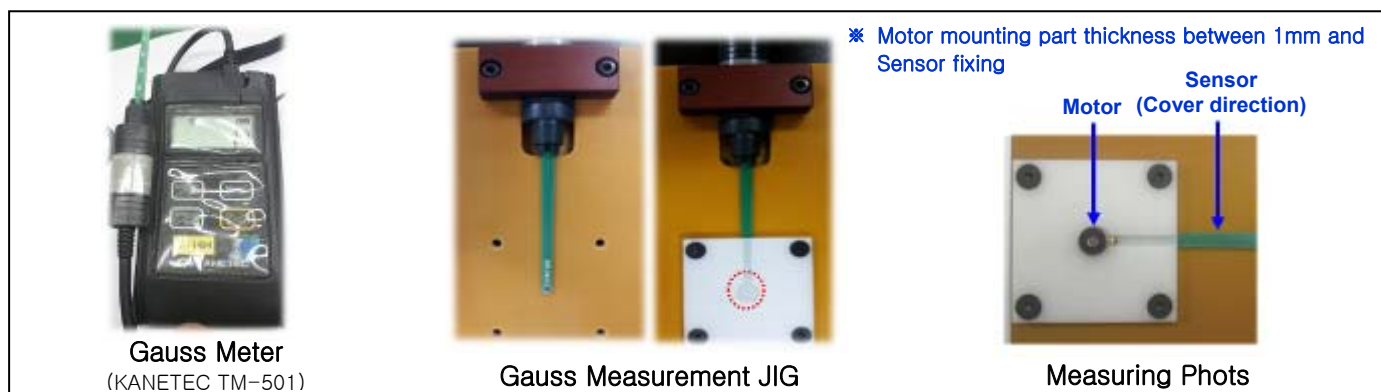


Figure 2.0

Leakage flux measurement method



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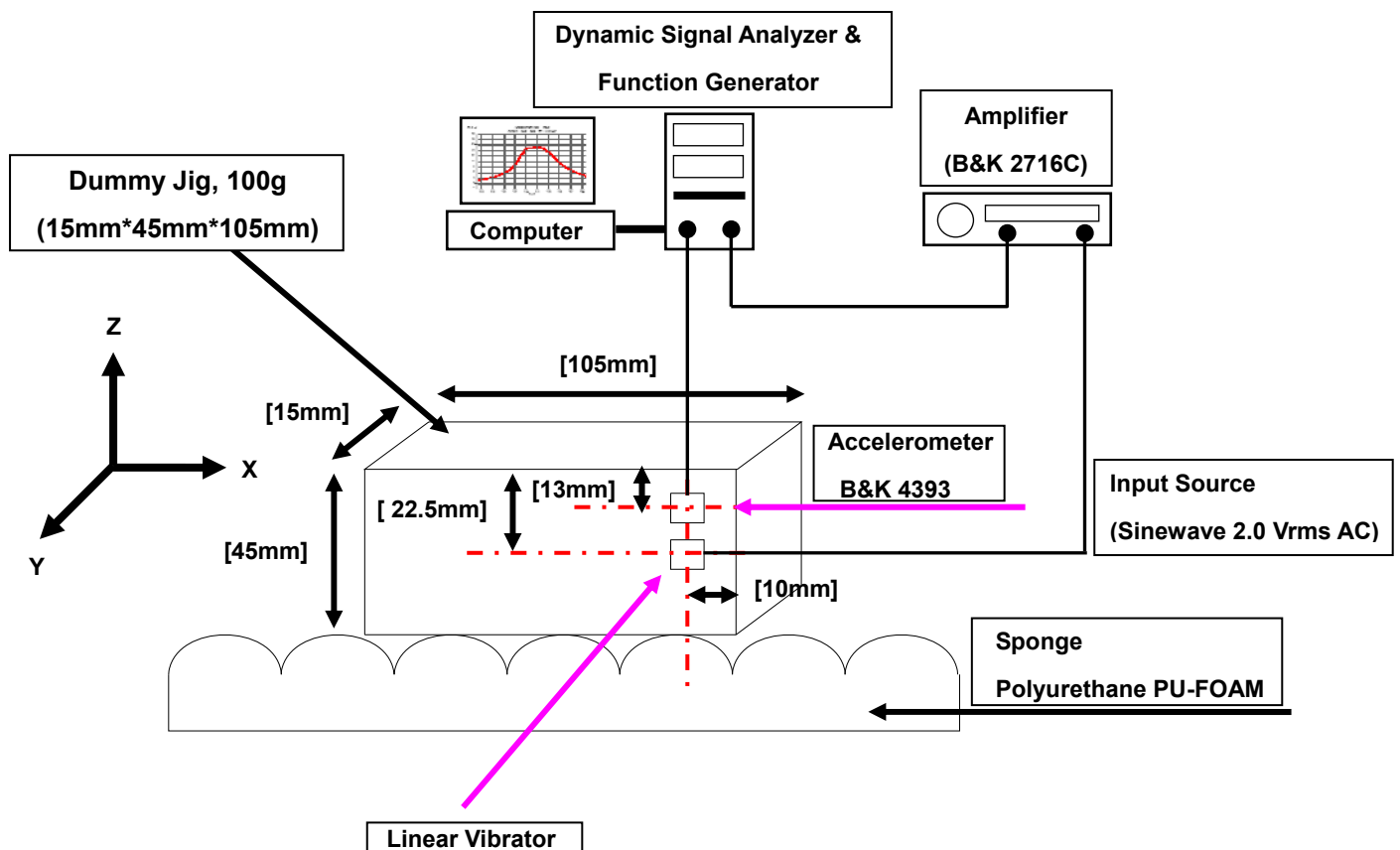
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7.0 Acceleration Testing Methods

Figure 3.0

Linear Vibrator Method of Measurement



7.1) Linear Vibrator / Accelerometer mounting position (Refer to Figure 3.0)

- Linear Vibrator should be mounted to position of 15mm direction (Y-direction) on Dummy jig
- Also, Accelerometer should be mounted to measure Y-direction vibration on Dummy jig

7.2) Dummy Jig position

- 15mm*105mm plane of Dummy Jig should be located on Sponge
- At measurement of acceleration, Dummy Jig should be stabilized

7.3) Measurement of Acceleration

- Acceleration of Linear Vibrator should be measured 2~3 second later when source inputted (2.0Vrms AC, sinewave)
- For the precise measurement, Acceleration of Linear Vibrator should take average data from 3 times repeating

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8.0 Reliability Tests

Evowave design process incorporates through testing of prototype and production components. Each component design must pass the following tests prior to production release. Production Statistical Process Control (SPC) will take lot samples and also measure to the following tests. Our goal is understand yield and maintain a production yield of 97% or higher.

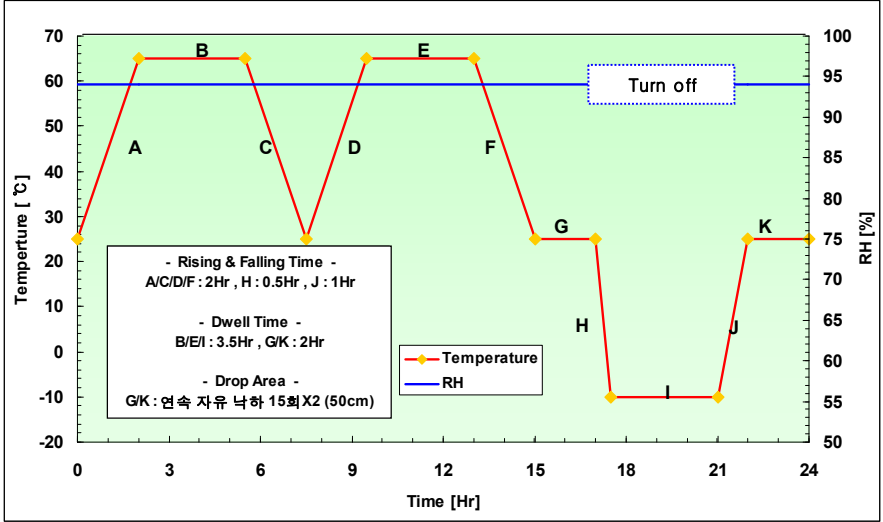
- 8.1) Following completion of environmental tests and four hours of room temperature environmental stabilization. Each component shall be measured to all electrical, acoustic and mechanical specifications.
- 8.2) Component shall be considered acceptable if measured parameters meet electrical and mechanical specification requirements.
- 8.3) Component shall be considered acceptable with acceleration variance of 30% from initial value.

No.	Items	Conditions
8-1	Life test	Operation at rated Input voltage (2.0Vrms AC, Sinewave), Input Frequency (205Hz) for 1,000,000cycle, On(2sec)/Off(1sec).
8-2	Thermal shock test	-40°C ~ + 85°C in each of 2Hrs(1cycle), Total 15cycles. Transition time is 5 minutes max. After the test, the Vibrator should be measured after room-temperature storage for 4Hrs.
8-3	High temperature storage test	+70°C, 168Hrs, After the test, the Vibrator should be measured after room-temperature storage for 4Hrs.
8-4	Low temperature storage test	-30°C, 168Hrs, After the test, the Vibrator should be measured after room-temperature storage for 4Hrs.
8-5	Static humidity test	+50°C, 95%RH, 120Hrs, After the test, the Vibrator should be measured after room-temperature storage for 4Hrs.
8-6	Vibration test	Vibrator that is attached to a 100 gram dummy jig is vibrated with 2.2G, 10~55Hz/min for 10minutes in each of X,Y,Z axis.
8-7	Mechanical shock test	The Vibrator that is attached to a 100 gram dummy jig is dropped to a steel floor 80 times from 1.52 meter in height.
8-8	Free Drop test	The Vibrator that is attached to a 100 gram dummy jig is dropped to a steel floor from 50cm (200 times) and 100cm (100 times) in height.

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No.	Items	Conditions
8-9	Accelerated test	<p>-10°C ~ 65°C / 0~93% humidity condition 240 hours, And 15 times a day dropped in the 50cm height. (100g dummy jig)</p>  <p>Temperature [°C]</p> <p>Time [Hr]</p> <p>RH [%]</p> <p>Turn off</p> <p>- Rising & Falling Time - A/C/D/F : 2Hr , H : 0.5Hr , J : 1Hr</p> <p>- Dwell Time - B/E/I : 3.5Hr , G/K : 2Hr</p> <p>- Drop Area - G/K : 연속 자유 낙하 15회 X2 (50cm)</p>

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9.0 Caution for Use

9.1) Do not press the product with more than 0.5 kgf or drop it.

It can cause the transformation of performance or external appearance.

9.2) Don't use under the following conditions. It may cause a decline in performance.

- Do not drop into fluid (such as: water, alcohol, etc.)
- Do not keep at high temperature or high humidity for extended periods of times
- Do not use near gases which cause erosion.
- Please refrain from operating the vibrator near magnetic devices.

9.3) The vibrator has a strong magnet, so please be aware that it has a magnetic force on the surface bracket.

9.4) To optimize the vibration force, rated frequency and voltage could be changed
As to assemble condition.

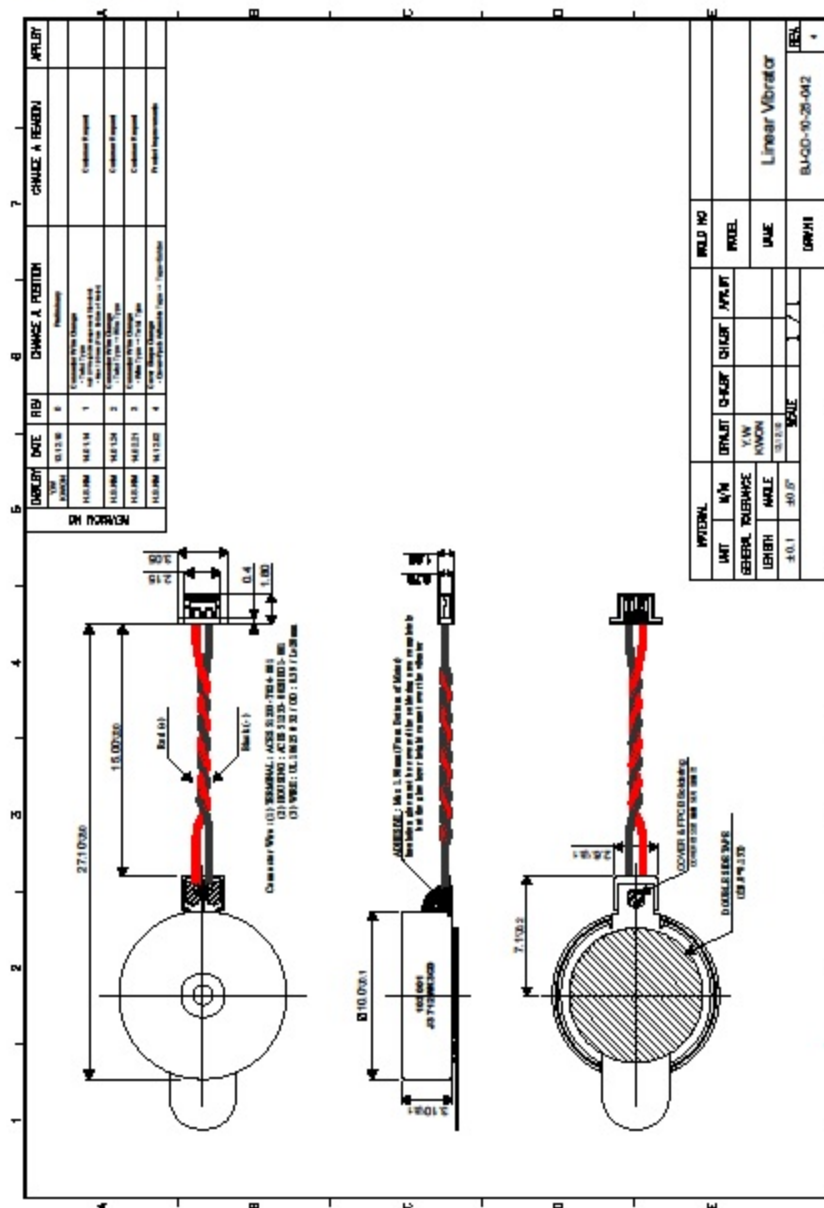
9.5) Packing : please refer to the packaging drawing.
(It can be modified by the request of the users.)

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10.0 Outline Drawing



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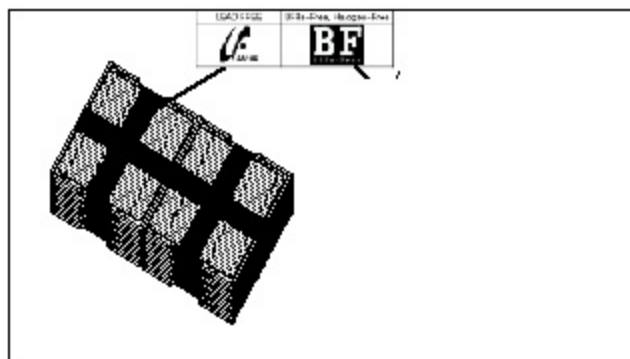
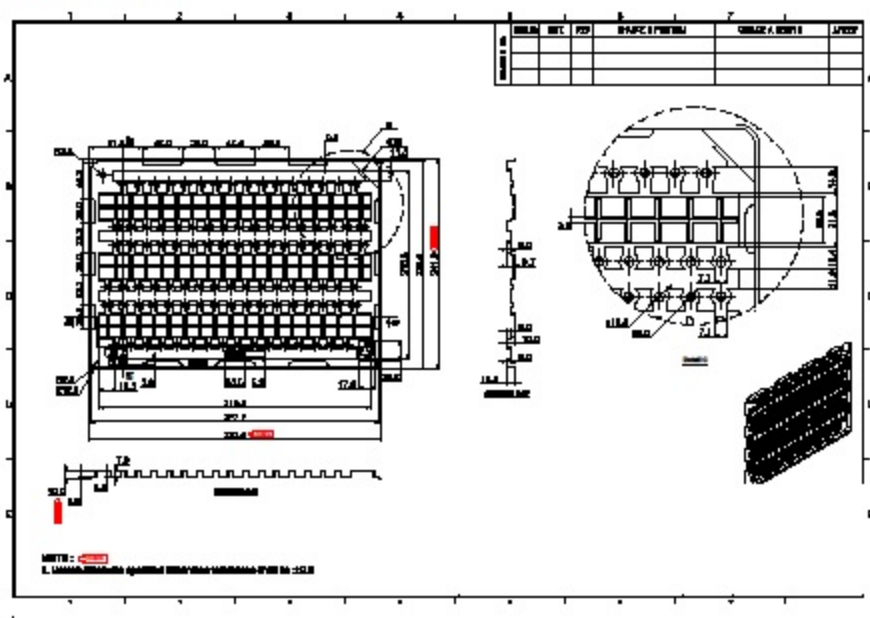
11.0 Product Packing

11.1) Quantity : 100EA / Tray : 50Tray / BOX : 5,000EA

11.2) Dimension, Weight, Material

- Tray : 332 * 241 * 10, 50g, PS

- Box : 510 * 350 * 175

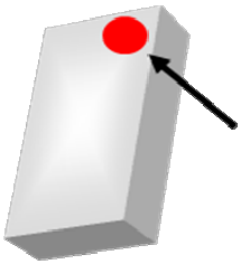
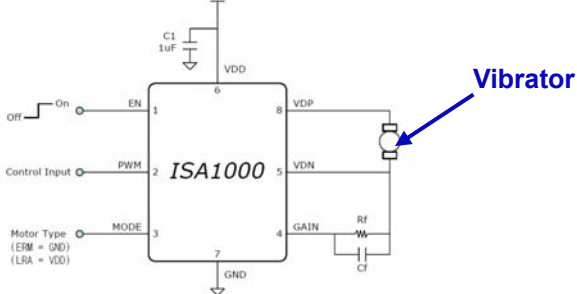
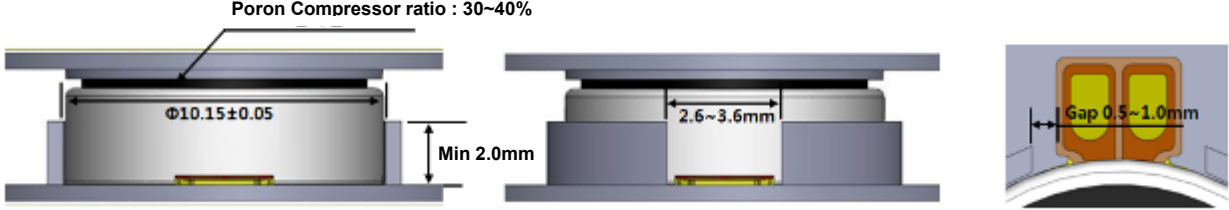


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12.0 Application Recommendation

No.	Contents
12-1	<p><Set Location></p> <ul style="list-style-type: none"> - To maximize the vibration force and optimize other characteristics, vibrator Location in set is recommended as corner of set. 
12-2	<p><Drive Circuit></p> <ul style="list-style-type: none"> - We recommend ISA1000 made by IMAGIS Technology to drive vibrator. <p style="text-align: center;">Typical Application</p>  <p style="text-align: center;">ISA1000 Typical Application Circuit</p>
12-3	<p><Set Assembly guide></p> <ul style="list-style-type: none"> - Cushion compressor ratio : 30~40% of original thickness. - LRA inside diameter guide : $\Phi 10.15 \pm 0.05$mm. - LRA assembly guide height : Min. 2/3 of LRA thickness. (Excluded adhesive thickness) - LRA FPCB clearance : 0.5mm~1.0mm per each side. 

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