



# 愛立德電子（香港）有限公司

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### 產品規格書 SPECIFICATION

客戶名稱Buyer Name	
客戶代碼Buyer Code	
客戶料號Buyer Part No.	
產品名稱Part Name	SMD Type Micro Vibration Motor
產品型號Part No.	IND-SMD-003
規格書號Specification No.	IND19012
發佈日期Date of Release	2014/12/23
存貨編碼Inventory Code	

貴司確認本產品樣品後，在決定採購本產品之前，請您仔細閱讀本產品規格說明書，並在客戶承認欄內簽名及蓋章並回傳此頁給我司相關人員備案。After you approve the product samples, please read this specification carefully and return this page to us with your signature and company chop in below Customer Approval table before you decide to purchase this product.

客戶承認欄 Customer Approval			
	工程 Engineering	品質 Quality	採購 Procurement
簽名及蓋章 Signature & Company Chop			
日期Date			

愛立德工廠承認欄 INEED Factory Approval			
	編制 Prepared by	審核 Checked by	批准 Approved by
簽名及蓋章 Signature & Company Chop	魏友平 Wei Youping	江豐春 Jiang Fengchun	章啟策 Zhang Qice
日期Date	2014/12/8	2014/12/15	2014/12/23

## 規格書目錄INDEX OF SPECIFICATION

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### 1. 目錄及修訂履歷/Index & History of Revision

日期Date	版本Revision	修訂內容Contents of Revision	頁碼Page	修訂人Revised by
23/Dec/14	A1	新制訂First Release	10	魏友平Wei YP

## 2. 適用範圍/General Scope

本規格書適用於表面貼裝回流焊型號: IND-SMD-003。

This specification applies to the SMT type vibration motor, part no. IND-SMD-003.

## 3. 使用條件/Operating Conditions

No.	專案/Item	規格/Specification
3.1	額定電壓 Rated voltage	2.7V DC
3.2	使用電壓範圍 Operating voltage	2.3~3.2V DC
3.3	旋轉方向 Rotatio no rientation	CW(clockwise)
3.4	馬達位置 Motor position	全方位 All positions
3.5	額定負荷 Rated load	擺錘重 (按外型圖規定) Vibratino Weight (as specified in outline drawing)
3.6	使用環境 Operating environment	-20 ~ 70°C, 0 ~ 95%RH; No condensation of moisture.
3.7	保存環境 Storage environment	-40 ~ 85°C, 0 ~ 95%RH; No condensation of moisture.

## 4. 測量條件/Measuring Conditions

一般情況下, 馬達可以在5~35°C, 相對濕度30~90%RH的環境中測試。為了保證一致性, 測試應在下表規定內進行。  
Normally, it should be tested at 5~35°C, 30~90%RH. To ensure the coherence, it must be tested according to the below table.

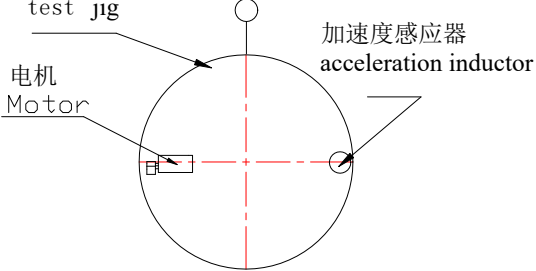
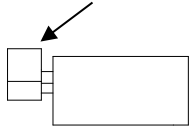
No.	專案/Item	規格/Specification
4.1	溫度 Temperature	20±2°C
4.2	濕度 Humidity	65%±5% RH
4.3	位置 Motor position	馬達水準放置/lay motor horizontally

## 5. 機械要求/Mechanical Specifications

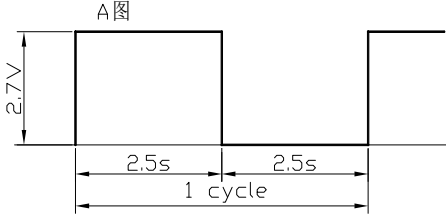
No.	專案/Item	規格/Specification	測定條件/備註 Measuring conditions/Remark
5.1	外觀 Appearance	不應有明顯的機械損傷、銹蝕和固定夾鬆動等現象。 No evidence of mechanical damage, rust, corrosion, lose of the grip etc.	目視檢查 Visual examination
5.2	軸向間隙 Shaft end play	0.3mm MAX	軸沿著軸向可以移動的距離 Distance of axial play on shaft
5.3	尺寸 Dimensions	見外形圖 As specified in outline drawing	使用遊標卡尺或千分尺測量 Test with vernier caliper or micrometer
5.4	振子重量 Weight of Mass	0.15g±10%	精密天平scale
5.5	電機品質 Weight of Motor	0.45g±10%	精密天平scale
5.6	振子軸向拔出力 Pull force of the counter weight along the shaft	3kgf Min	破壞性測試，對振子沿著軸向施加推力 Devastating test, bring pushing force to the bracket along the horizontal shaft.

## 6. 性能特徵/Performance & Characteristics

No.	專案/Item	規格/Specification	測定條件/備註 Measuring conditions/Remark
6.1	額定轉速 Rated speed	15,000±2,500rpm	在額定電壓和額定負載下。 At rated voltage and rated load .
6.2	額定電流 Rated current	80mA Max	
6.3	啟動電壓 Starting voltage	2.3V DC Max	在額定負載下轉子的任意位置。 At rated load any position of rotor.
6.4	堵轉電流 Stall current	100 mA Max	在額定電壓下鎖定振動輪,測電機電流 Measure current at locked counterweight in rated
6.5	端子阻抗 Terminal resistance	40±6Ω	在兩接觸腳之間測量 Test between the two touch pins
6.6	絕緣電阻 Insulation resistance	1MΩ Min	在50V 直流電壓下，端子和機殼間進行測量 Test between terminal and case at DC 50V
6.7	機械噪音 Mechanical noise	小於50分貝. A計權 50db (A) Max 50	見下圖: See below
	<p>額定電壓下，背景雜訊≤25 dB(A),電機軸向水準固定在測試夾具上(100g)，拾音器沿軸向正對電機平面，距離10cm</p> <p>At rated voltage and scene noise as 25dB (A) Max, the shaft is horizontally fastened to the test jig (100g). The Microphone faces the plane of motor along the shaft. The distance is 10cm.</p>		

No.	專案/Item	規格/Specification	測定條件/備註 Measuring conditions/Remark
	振動量 Vibration Strength	0.3G	見下圖 See below
6.8	<p>額定電壓下, 電機固定在 <math>\phi 50*18</math> 的鋁制板夾具(約100g)的左邊, 夾具垂直懸空或放在海棉墊上. 將加速度感應器用雙面膠粘在電機所對應的夾具的右邊 (如圖所示). 使用 VM-83 振動儀, 參數設置如下:</p> <p>加速度(m/s<sup>2</sup>): 30            HPF(HZ): 50            LPF(HZ): 300            探測方式: EQ (P-P) -Max Hold</p> <p>At rated voltage, fasten the motor upto the left of aluminium-board jig (size: <math>\phi 50*18</math>), which is upright and hanged in the air or upon the sponge. Adhibit the acceleration inductor to the right side of the jig with double-faced tape (as right drawing). Use the apparatus VM-83, the parameter is as below:</p> <p>Acceleration(m/s<sup>2</sup>): 30            HPF(HZ): 50            LPF(HZ): 300            Detection mode: EQ(P-P)-Max Hold</p>	<p>測試夾具 test jig</p> <p>电机 Motor</p> <p>加速度感應器 acceleration inductor</p>  <p>振子擺頭方向: 軸向            Direction of counterweight: along the shaft.</p> 	

## 7. 可靠性/Reliability

No.	專案/Item	測試條件/Specification	判定標準/Judgment
7.1	壽命 Life	<p>A圖</p>  <p>6-1-1 壽命試驗            按A圖常溫常濕下共迴圈300000次            Cycle 300000times in the ordinary temperature and humidity.</p> <p>6-1-2 高溫壽命試驗            按A圖55°C下共迴圈53000次            Cycle 53000times in the 55°C.</p> <p>6-1-3 低溫壽命試驗            按A圖-20°C下共迴圈53000次            Cycle 53000times in the -20°C.</p>	<p>電氣性能變化率表:</p> <ol style="list-style-type: none"> <li>1) 額定轉速: 指標不低於初始值-30%; 不高於初始值+50%</li> <li>2) 額定電流: 指標在初始值<math>\pm 30\%</math>以內。</li> <li>3) 起動電壓: 不大於2.3V直流電壓。</li> </ol> <p>1) Rated speed: Data-30% Initial Min, Data+50% Initial Max.            2) Rated current: Data <math>\pm 30\%</math> Max.            3) Starting voltage: 2.3V DC Max.</p> <p>每20000次後進行電氣性能測試, 迴圈100000次後, 電機應符合電氣性能變化率表要求, 300000次後電機能運轉。            every 20,000 cycles to measure the all electrical characteristic After 100000, the motor's performance should accord with below requirements:            After 300,000 cycles The vibrator should operate.</p> <p>每20000次後進行電氣性能測試, 電機性能應符合電氣性能變化率表要求。            every 20,000 cycles to measure the all electrical characteristic. After 53000, the motor's performance should accord with below requirements:</p>

No.	專案/Item	測試條件/Specification	判定標準/Judgment
7.2	低溫貯存放置 Low temperature storage test	溫度Temperature: $-40\pm 2^{\circ}\text{C}$ 時間Time: 96h	電氣性能變化率表: 1) 額定轉速: 指標不低於初始值-30%; 不高於初始值+50% 2) 額定電流: 指標在初始值 $\pm 30\%$ 以內。 3) 起動電壓: 不大於2.3V直流電壓。 1) Rated speed: Data-30% Initial Min, Data+50% Initial Max. 2) Rated current: Data $\pm 30\%$ Max. 3) Starting voltage: 2.3V DC Max.
7.3	高溫貯存放置 High temperature storage test	溫度Temperature: $80\pm 2^{\circ}\text{C}$ 時間Time: 96h	
7.4	濕度放置 Humidity exposure	溫度Temperature: $60\pm 2^{\circ}\text{C}$ 濕度Humidity: 90~95%RH 放置時間Exposure time: 96h	在常溫常濕下放置4h後，電機性能應符合電氣性能變化率表要求 After 4h exposure in the ordinary temperature and humidity, the motor's performance should accord with below requirements:
7.5	熱衝擊貯存試驗 High/Low temperature humidity cycle test	 溫度: $-40^{\circ}\text{C} \leftrightarrow 80^{\circ}\text{C}$ , 濕度: 85% Temperature: $-40^{\circ}\text{C} \leftrightarrow 80^{\circ}\text{C}$ humidity: 85% Test cycle: 6 cycles	在常溫常濕下放置4h後，電機性能應符合電氣性能變化率表要求 After 4h exposure in the ordinary temperature and humidity, the motor's performance should accord with below requirements:
7.6	熱衝擊試驗 Thermal shock resistance test	溫度 $-40^{\circ}\text{C}$ 至 $80^{\circ}\text{C}$ ，時間30Min,共迴圈50次 ( $-40^{\circ}\text{C} \leftrightarrow 80^{\circ}\text{C}$ ), duration time 30 minutes 50 cycles	在常溫常濕下放置4h後，電機性能應符合電氣性能變化率表要求 After 4h exposure in the ordinary temperature and humidity, the motor's performance should accord with below requirements:
7.7	振動 Vibration	全振幅Full swing: 1.5mm (p-p) 頻率Frequency: 10 to 55Hz 週期Cycle: 20min (10~55~10Hz) 方向Orientation: x、y、z 時間Time: 2h	在常溫常濕下放置4h後，電機性能應符合電氣性能變化率表要求 After 4h exposure in the ordinary temperature and humidity, the motor's performance should accord with below requirements:
7.8	自然跌落 Free fall	試驗狀態: 將馬達固定在約100克(包括馬達本身)的物體上, 落向水泥地面。 高度: 1.5m 方向: $\pm x, \pm y, \pm z$ 次數: 每個方向2次 Test state: Fasten the motor onto a object(100g) and then let it fall down to the ground. Height: 1.5m Orientation: $\pm x, \pm y, \pm z$ Times: 2 times per orientation	在常溫常濕下放置4h後，電機性能應符合電氣性能變化率表要求 After 4h exposure in the ordinary temperature and humidity, the motor's performance should accord with below requirements:

## 8. 環境管理物質/Environmental Management Materials

8.1 本產品應符合RoHS指令要求和無鹵素要求。

The product should be in compliance with RoHS requirements:

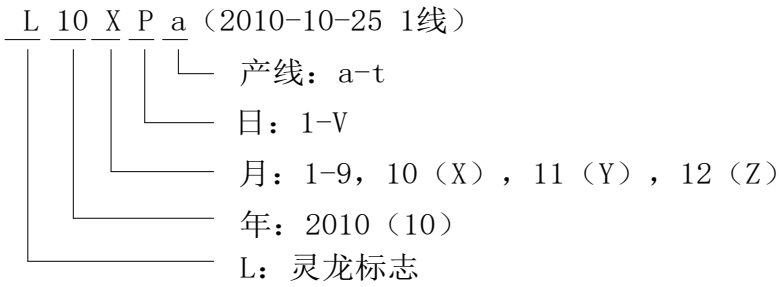
* 鎘及其化合物最大允許含量為100PPM Cadmium and Compound:100PPM Max
* 鉛及其化合物最大允許含量為1000PPM Lead and Compound:1000PPM Max
* 汞及其化合物最大允許含量為1000PPM Hydrargyrum and Compound:1000PPM Max
* 六價鉻及其化合物最大允許含量為1000PPM +6 Chromium and Compound:1000PPM Max
* 多溴聯苯及其化合物最大允許含量為1000PPM PBB and Compound:1000PPM Max
* 多溴二苯醚及其化合物最大允許含量為1000PPM PBDE and Compound:1000PPM Max
* 氯溴兩種鹵素之和最大允許含量為1500PPM The allowed content of Cl,Br is 1500PPM Max for total.
* 氯鹵素最大允許含量為900PPM The allowed content of Cl is 900PPM Max.
* 溴鹵素最大允許含量為900PPM The allowed content of Br is 900PPM Max.

8.2 本品含有以下物質,是RoHS指令豁免項

The product contains below materials,which are released from RoHS:

品名 Part No.	材質 Material	含有物質 Substance Included	最大允許含量 Max Content	部品重量 Parts Weight
含油軸承 Bearing with Oil	銅合金 Copper Alloy	鉛 Lead	40000PPM	≈0.016g

### 9. 批號說明/Indication of Lot No.

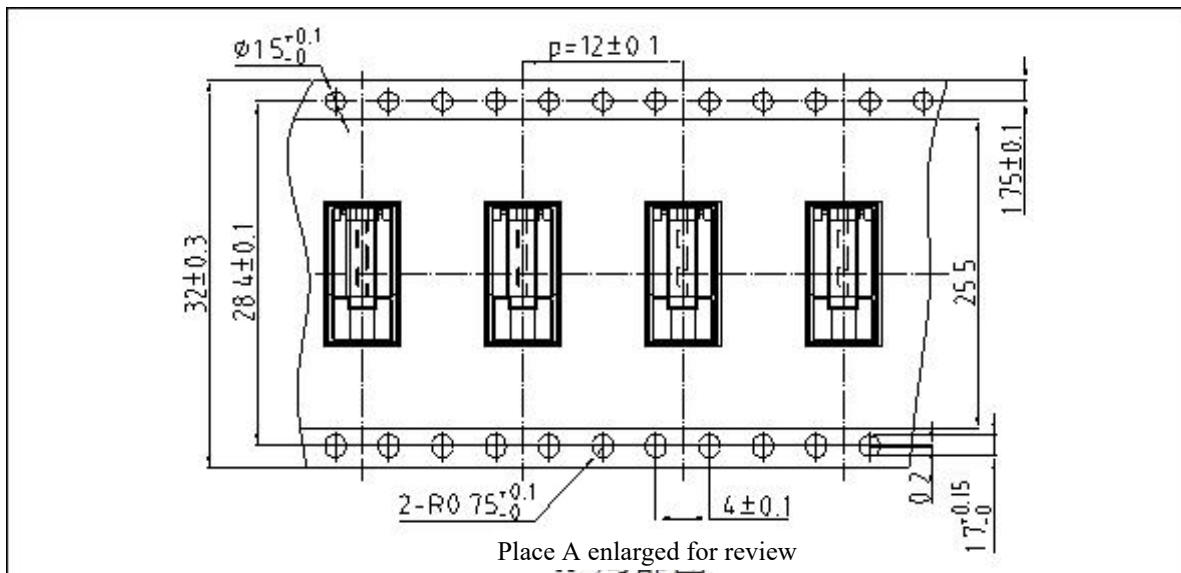


注：产线特性（即为圆柱/驱动/贴片）根据产品型号而定  
 喷码长度根据 $\phi 4$  马达长度设定

日期	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
打印	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
日期	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
打印	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	
产线	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
打印	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
产线	17	18	19	20												
打印	q	r	s	t												

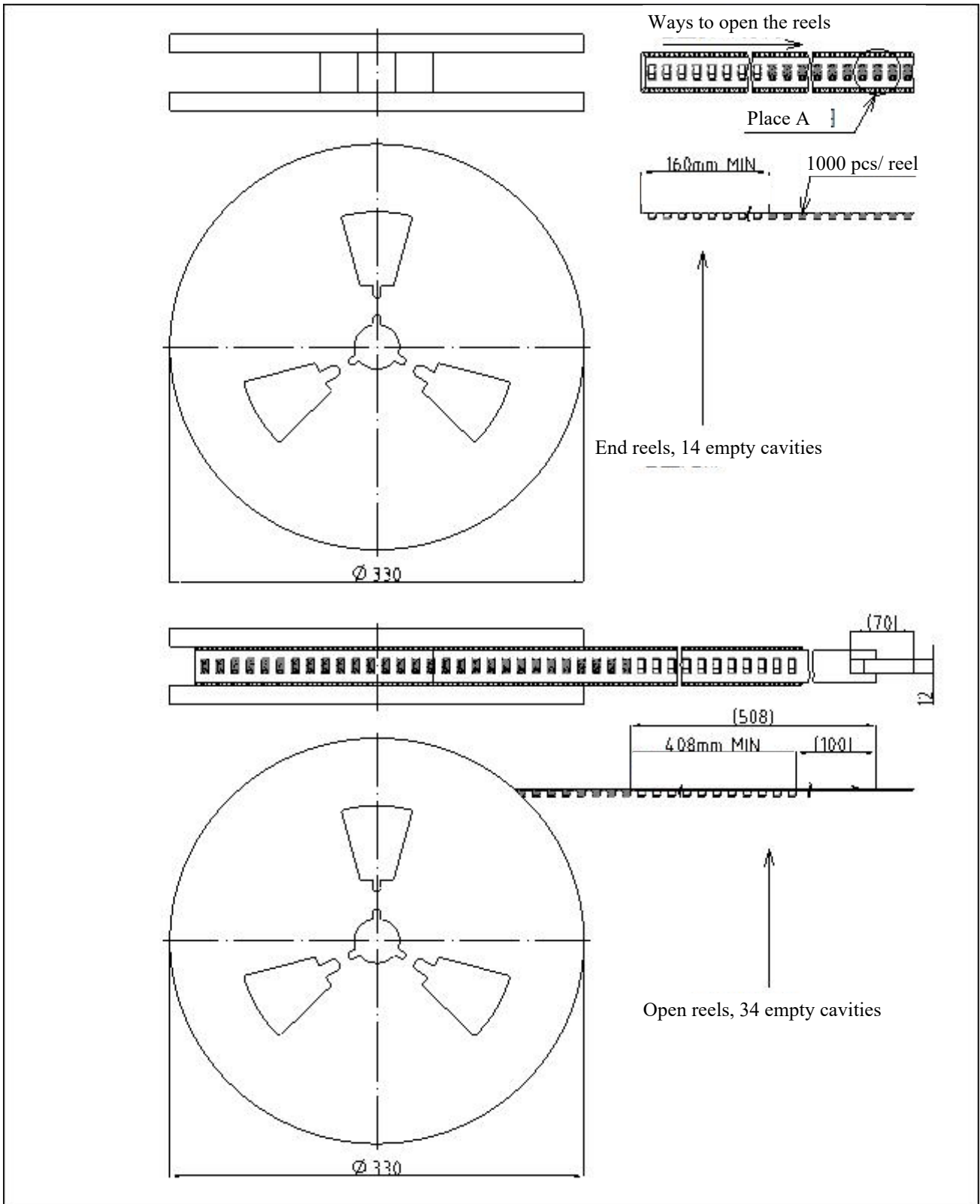
### 10. 包裝圖/Packaging

#### 10.1 最小包裝/Smallest Packaging Unit

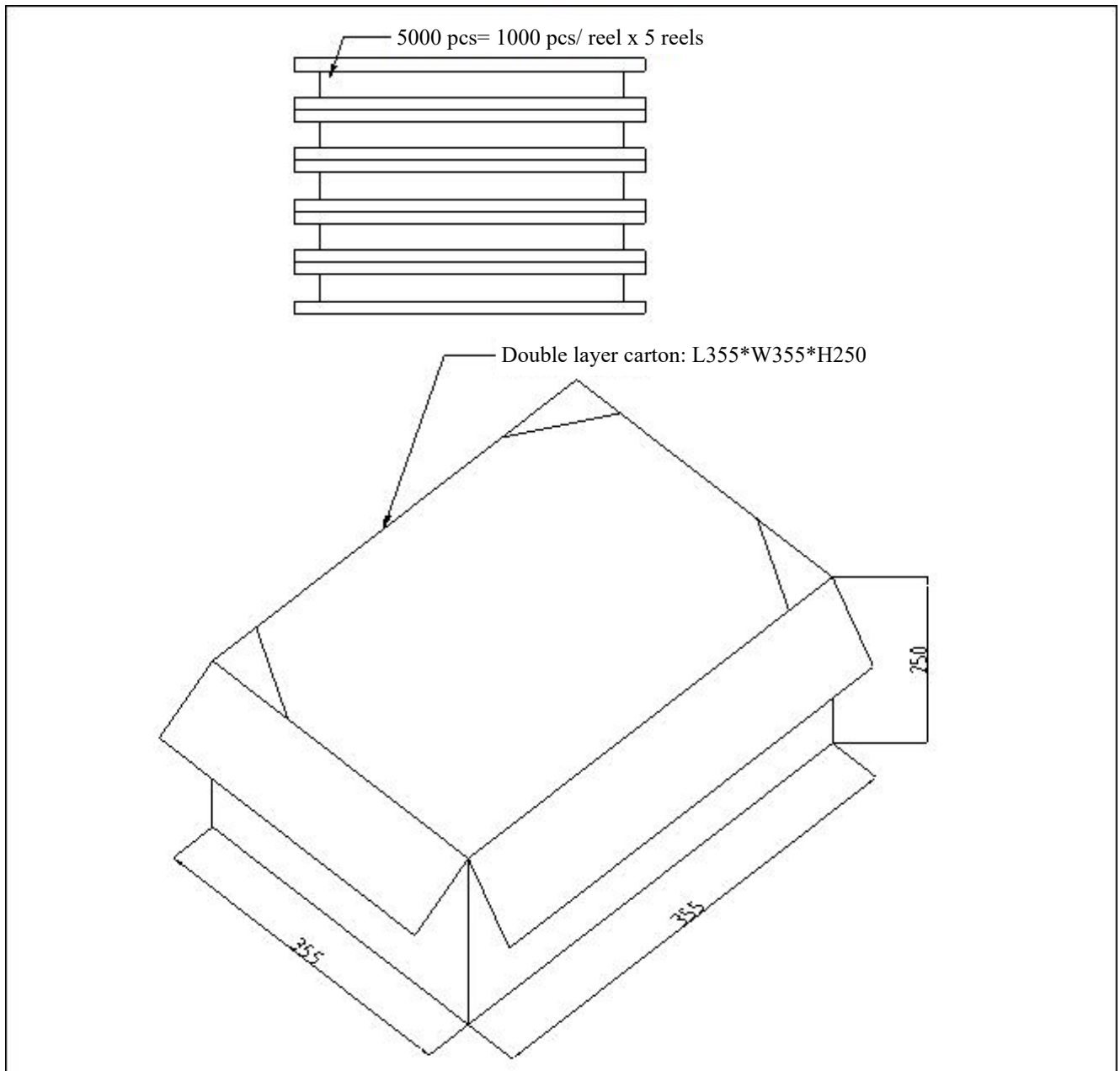




10.2 紙板包裝 Cardboard Packing Condition



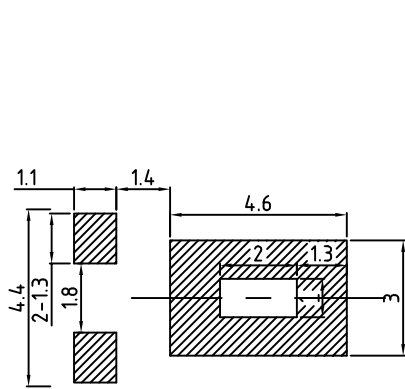
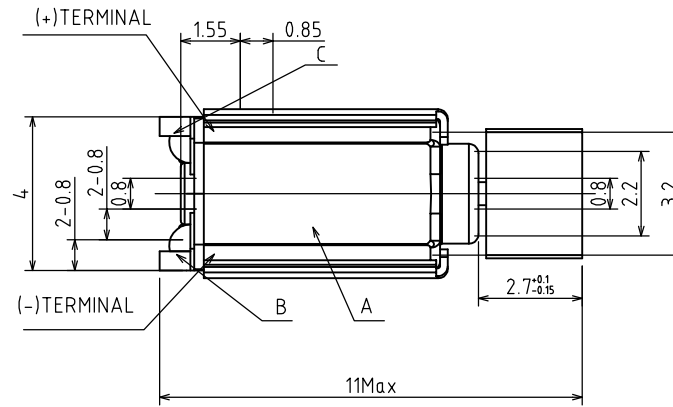
10.3最終包裝 Final Packing Condition



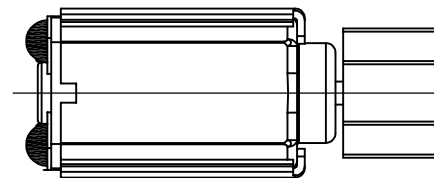
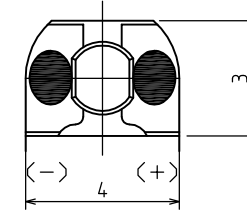
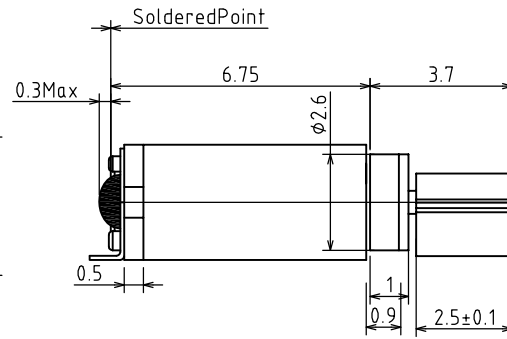
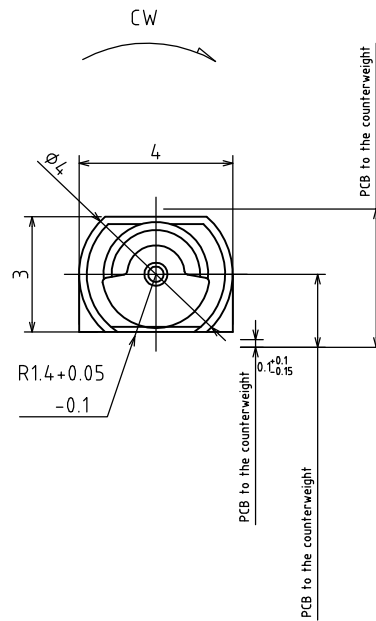
Net Weight/ Carton: 4KGS; Gross Weight/ Carton: 5.5KGS.

Technical requirement

- 1. Rated Voltage: 2.7v
- 2. Rated Current: 80mA Max
- 3. Rated Speed : 15000±2500rpm
- 4. Starting Voltage : 2.3V DC Max
- 5. Stall Current : 100mA Max
- 6. Operating Voltage: 2.3~3.2V DC



PCB Pod Layout(for ref.only)



NOTES:

- 1. The part is compliant with RoHS & REACH directives.
- 2. Tolerance of the A-B-C surface: +0.05/-0.03mm.
- 3. Unmarked tolerance: +/-0.1mm.

REVISIONS					DWN	CHKD	APPD	MODEL	UNIT mm	DATE	2014-12-23
										SCALE	<del>X</del>
								DWG NO	INNEED ELECTRONICS (HK) LIMITED		
	SYM	DESCRIPTION	REF NO	DWN	CHKD	05/5	/	/			

## 12. 使用時注意事項/Caution in Use

12.1 電機在運輸過程中應小心輕放，避免碰撞敲擊引起的電機機身和性能受損。

Please place the motors carefully in transportation to avoid any damage to the motor body or its electric function because of collision.

12.2 電機不能在高溫、高濕、帶有腐蝕性氣體的環境中貯存和使用，否則有可能導致電機的性能下降。

Please don't leave and use the motors in the environment of high temperature, high humidity and corrosion gas, or it would cause the function to fall down.

12.3 不能長時間用外力鎖死振動輪，以免燒壞線圈，電機不能工作。

Please don't lock up the vibrating wheel, or the coil would be burned up and the motors can't operate.

12.4 避免接觸或靠近強磁性物體，否則有可能導致電機性能下降。

Please prevent from magnetic objects, or it may cause the function fall down.

12.5 請在6個月內使用，在使用時和打開包裝時，請避免水氣凝結。

Please use the motors within six months and prevent them from coagulation of moisture when open the package and use them.

12.6 回流焊溫度(供參考) Temperature Curve of Reflow Soldering (for reference only):

