



PRODUCT SPECIFICATION

(產品規格書)

產品名稱 Description	產品料號 Part No.	圖號 Drawing No.
Pitch 2.20mm Male Car Connector	5290-1S24TSAA01	5290-DS24-001

PRODUCT NAME (產品名稱)	DOCUMENT No.: (文件編號)	Rev. (版本)	OUPIIN
Pitch 2.20mm Male Car Connector (RoHS)	Q5290-PSS-K001	X3 (1800)	(歐品)
	Approved (核准)	Checked (審核)	Prepared (製作)
	Q.A. Section Chief	Ruru Chen	2022.12.15



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1. SCOPE 範圍

This product specification defines the product performance and the test methods to ascertain the performance of the ECU Connector, which is designed and manufactured by Oupiin Electronic Co.,Ltd. This product specification is applicable but not only for those part numbers which be shown in the cover page.

本產品規格書規定了由歐品電子有限公司生產的 ECU 型連接器，產品的特性及測試方法。本產品規格書適用於但不局限於封面所顯示的產品料號

2. REFERENCE DOCUMENTS 參考文件

MIL-STD-1344	Test method for electrical connector 電子連接器測試方法
MIL-STD-202	Test method for electrical components 電子零件測試方法
EIA364	Test method for electrical components 電子零件測試方法
JIS C 0051	Test method for electrical components 電子零件測試方法
MIL-G-45204C	Specification for gold plating 鍍金規格
IEC-512-3	IEC standard for current carrying capacity tests IEC 電流測試標準
UL498	UL standard for safety of attachment plug and receptacle UL 安規要求標準

3. FEATURE & DIMENSIONS 特徵及尺寸

3.1. PRODUCT DIMENSION 產品尺寸

These connectors shall have the dimensions as shown in drawing.

本產品的相關尺寸參考圖面。

3.2. PCB/PANEL LAYOUT 印刷電路板佈局

The recommended PCB layout is shown in drawing.

本產品適用的 PCB layout 參考圖面。

3.3. BILL OF MATERIAL 材料清單

Harmful material control follow the requirement of RoHS. The bill of material and product number is described in drawing.

有害物質控制符合RoHS指令要求。本產品使用的材料參見圖面。

3.4. MECHANICAL & ELECTRICAL CHARACTERISTIC 機械及電氣特性

The connector shall have the mechanical and electrical performance as described in Table I.

本產品的機械及電氣特性見附表一



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3.5. PACKAGING 包裝

Products shall be packaged according to requirements specified in purchase order for safe delivery, connector container and the packaging method are shown in package specification.

產品可依客戶指定要求包裝，包裝材料與包裝方式參見產品包裝規範

3.6. RATING CURRENT AND RATING VOLTAGE 額定電流與額定電壓

Rating current : 2.2 A

額定電流：2.2 A

Rating voltage : 12 V DC

額定電壓：12 V DC

3.7. OPERATING TEMPERATURE 使用溫度

Operating temperature range : -30°C ~+105°C

工作溫度範圍：-30°C ~+105°C

4. PERFORMANCE AND TEST DESCRIPTION 性能及測試

4.1. REQUIREMENT 要求

Product is designed to meet electrical, mechanical, and environmental performance requirements specified in Table I.

本產品設計符合附表一所述的機械，電氣及環境要求。

4.2. TEST CONDITION 測試條件

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

除非特別註明，所有測試在室溫條件下完成。

4.3. SAMPLE SELECTION 樣品選擇

Test samples shall be selected at random from current production. No test samples shall be reused.

Samples are pre-conditioned with 10 cycles of durability. Each group shall be containing 5 test samples.

測試樣品從現生產的產品中隨機抽取，所有測試過的樣品不得重複使用。樣品已預先插拔10次，每組測試有5個樣品。

4.4. TEST SEQUENCE 測試順序

Product qualification test sequence as shown in Table II.

產品品質測試順序見附表二



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Table I : Test Requirements and Methods

附表一：測試要求與方法

Items 項目	Requirements 要求	Test Methods 測試方法
1. Confirmation of Product 產品確認	Product shall be conforming to the requirements of applicable product drawing. 產品必須符合相關產品圖面的要求	Visually, dimensions and functionally inspected per applicable product drawing. 依相關產品圖面，檢查產品的外觀、尺寸及功能
2. Contact Resistance 接觸阻抗	8 mΩ Max. initial 初始值最大 8 mΩ 16 mΩ Max. After test 測試後最大 16mΩ	Subject mated contacts assembled in housing to closed circuit of 10 mA max. At open circuit voltage of 20 mV max. Refer to the attached picture : 03. 所述固定在外殼裡的端子連結到一個封閉回路中測試，電流 10 mA，開放迴路電壓為 20 mV max. 參考附圖：03
3. Voltage drop 壓降	8 mV/A Max. initial 初始值最大 8mV/A 16 mV/A Max. After test 測試後最大 16 mV/A	Use 1A current to Test connector voltage drop. Refer to the attached picture : 03. 用 1A 電流測試連接器的壓降 參考附圖：03
4. Dielectric Withstanding Voltage 耐電壓	Sample must withstand test potential of 1000 V AC for 1 minute, current leakage must be 0.3 mA Max. 樣品必須承受測試電壓 1000V AC，時間一分鐘，漏電流不大於 0.3 mA	Measure by applying test potential between the adjacent contacts, and between the contacts and ground in the mated connector. Refer to the attached picture : 04 測試產品端子間以及端子與接地間的電壓 EIA-364-21 Method B 參考附圖：04
5. Insulation Resistance 絕緣阻抗	100 MΩ Min. 最小 100 MΩ	Measure by applying test potential between the adjacent contacts, and between the contacts and ground in the mated connector. (500 V DC ±10%) Refer to the attached picture : 04. 測試產品端子間以及端子與接地間的電阻 (500V DC±10%) EIA-364-21 參考附圖：04



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<p>6. Leak current 漏電流</p>	<p>3mA Max 3mA 以下</p>			<p>Put a pair of connectors in 60±5°C and humidity of 90%~95% for 1 hr. Voltage : 14 V DC Refer to the attached picture : 05. 將一對連接器置於 60±5°C 和 90%~95% 的濕度下放置 1 小時 電壓：14V DC 參考附圖：05</p>
<p>7. Temperature Rise Test 溫升測試</p>	<p>截面積 (mm²)</p>	<p>額定電流 (A)</p>	<p>溫度 (°C) Max.</p>	<p>A pair of connector contacts series continuity test temperature change. 在通電的情況下端子與線材接觸部分的溫度上升測試</p>
	<p>0.5</p>	<p>2.2</p>	<p>60</p>	
<p>8. Overload power up 超載通電</p>	<p>There will be no sparks during the test. 試驗中不會冒出火花</p>			<p>Connector matching, power-on plug-in test after connecting any circuit in series. Refer to the attached drawing for power-on conditions : 06. 連接器匹配，串聯任一迴路後上電插拔測試通電條件參考附圖：06</p>
<p>9. Vibration Sinusoidal High Frequency 高頻正弦振動</p>	<p>Instant disconnection of more than 1µs is not allowed. The test requirements of the test group must be met. 不允許出現超過 1 µs 的瞬斷 必須滿足測試組的測試要求</p>			<p>Vibration cycle : (20-200-20 Hz) / 3 minute Acceleration : 44.1m/s² Vibration direction : X,Y,Z Time : 3 H Refer to the attached picture : 07. 振動週期：(20-200-20 赫茲) / 3 分鐘 加速度：44.1m/s² 振動方向：X,Y,Z 時間：3 小時 參考附圖：07</p>
<p>10. Mechanical Shock 機械沖擊</p>	<p>The instantaneous interruption cannot exceed 1 µs, and the contact resistance cannot exceed 7Ω. 瞬斷不能超過 1 µs 以上，接觸阻抗不能超過 7Ω.</p>			<p>Acceleration : 980 m/s² Shock wave type : half sine wave Time : 6 ms Impact times : X, Y, Z axis, 6 times each, 18 times in total Refer to the attached picture : 07. 加速度：980 m/s² 衝擊波類型：正弦半波 時間：6 毫秒 衝擊次數：X、Y、Z 軸向，各 6 次，共 18 次 參考附圖：07.</p>



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11. Mated Force 插入力	70 N max. 70N 最大	Test speed 25~100mm/minute 測試速度 25~100mm/分鐘
12. Unmated Force 拔出力	70N max. 70N 最大	Test speed 25~100mm/minute 測試速度 25~100mm/分鐘
13. Latch Strength 卡扣強度	100N Min 100N 以上	After the connector is matched, the latch matching strength. Test speed 100mm/minute 連接器匹配後，卡扣匹配強度 操作速度：100 mm/minute
14. Terminal Retention Force 端子保持力	30N Min. 30N 最小	Test speed 25~100mm/minute 測試速度 25~100mm/分鐘
15. Durability 耐久性	10 times. 10 次	A pair of connectors are manually inserted and unplugged 10 times. 一對連接器手動插拔 10 次
16. Thermal Shock 溫度沖擊	The test requirements of the test group must be met. 必須滿足測試組的測試要求	Temperature range from -40°C to +100°C. Start from -40°C, after 30 minutes, change to +100°C, total 1000 cycles. 溫度變化範圍：-40°C ~ +100°C。從 -40°C 開始 30 分鐘後，換到 +100°C，共 1000 個循環
17. Humidity 恆溫恆濕	The leakage current is 1 mA or less. 漏電流 1mA 以下	Temperature : 60±5°C Relative Humidity : 90-95%. Duration : 96 Hours Voltage : 14V. Refer to the attached picture : 05. 溫度：60±5°C 相對濕度：90-95% 持續時間：96 小時 電壓 14 V 參考附圖：05
18. Industrial Gases 工業氣體 SO ²	The test requirements of the test group must be met. 必須滿足測試組的測試要求	Test Condition : After Connector Mating Gas condition : SO ² 25ppm Environmental conditions : 25°C & 75% R.H. Time : 96 hours 測試條件：連接器匹配後 氣體條件：SO ² 25ppm 環境條件：25°C & 75% R.H. 時間：96 小時



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<p>19. High Temperature 高溫測試</p>	<p>The test requirements of the test group must be met. 必須滿足測試組的測試要求</p>	<p>Subject product to 120±3°C for 120 hours continuously. 產品置於 120±3°C 連續 120 小時</p>
<p>20. Low Temperature 低溫測試</p>	<p>The test requirements of the test group must be met. 必須滿足測試組的測試要求</p>	<p>Subject product to -40±3°C for 120 hours continuously. 產品置於 -40±3°C 連續 120 小時</p>
<p>21. Humidity/ Temperature Cycles 溫濕度循環</p>	<p>The test requirements of the test group must be met. 必須滿足測試組的測試要求</p>	<p>After product pairing, 10 times a cycle Test conditions refer to the attached picture : 08 產品對配後，10 次一個循環 測試條件參考附圖：08</p>
<p>22. Dust 耐塵性</p>	<p>The test requirements of the test group must be met. 必須滿足測試組的測試要求</p>	<p>15kg of JIS R 5210 cement, sprayed by diffusion for 10 seconds every 15 minutes, needs to do 8 cycles, and needs to be plugged and unplugged after every 2 cycles. 15 公斤的 JIS R 5210 的水泥，以每 15 分鐘擴散噴 10 秒鐘，須做 8 個循環，每 2 個循環後須進行一次插拔</p>
<p>23. Compound environment testing 複合環境</p>	<p>The instantaneous interruption should not exceed 1 μs, and the contact resistance should not exceed 7Ω. The test requirements of the test group must be met. 瞬斷不得超過 1 μs 以上，接觸阻抗不能超過 7Ω。 必須滿足測試組的測試要求</p>	<p>Test temperature : 80°C Vibration cycle : (20-200-20 Hz) / 3 minute Acceleration : 44.1m/s² Vibration direction : X,Y,Z Time : 300 H Refer to the attached picture : 09. 測試溫度：80°C 振動週期：(20-200-20 赫茲) / 3 分鐘 加速度：44.1m/s² 振動方向：X,Y,Z 時間：300 小時 通電電流：參考附圖：9</p>
<p>24. Condensation test 冷凝測試</p>	<p>The test requirements of the test group must be met. 必須滿足測試組的測試要求</p>	<p>It was placed in a 0°C thermostat for 10 minutes, then it was placed in a 80°C, 90~95% R.H. incubator for 30 minutes, a total of 48 cycles, and the leakage current was monitored during the test. 置於 0°C 恆溫槽中 10 分鐘，然後即將其置於 80°C，90~95% R.H. 恆溫槽中 30 分鐘，共 48 次一個循環，在測驗期間監測漏電流</p>



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Table II : Product Qualification Test Sequence

附表二：產品測試順序

Test Description 測試描述	Test Group 測試分組													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1. Confirmation of Product (產品確認)	1,6	1	1,5	1,3	1,5	1,5	1,5	1,6	1,5	1,6	1,6	1,5	1,5,9	1,5
2. Contact Resistance (接觸阻抗)	2,7		2,6		2,6	2,6	2,6	2,7	2,6	2,7	2,7	2,6	2,6,10	
3. Voltage drop (壓降)	3,8		3,7		3,7	3,7	3,7	3,8	3,7	3,8	3,8	3,7	3,7,11	
4. Dielectric Withstanding Voltage (耐電壓)	10					9	9					9		
5. Insulation Resistance (絕緣阻抗)	11					8	8					8		2,6
6. Leak current (漏電流)							4							4
7. Temperature Rise Test (溫升測試)	4,9												4	
8. Overload power up (超載通電)												4		
9. Vibration Sinusoidal High Frequency (高頻正弦振動)										5			8	
10. Mechanical Shock (機械衝擊)											5			
11. Mated Force (插入力)		2												
12. Unmated Force (拔出力)		4												
13. Latch Strength (卡扣強度)	12	3		4	8	10	10							
14. Terminal Retention Force (端子保持力)		5												
15. Durability (耐久性)			4											
16. Thermal Shock (熱衝擊)					4									
17. Humidity (恆溫恆濕)							4							
18. Industrial Gases (工業氣體 SO ²)									4					



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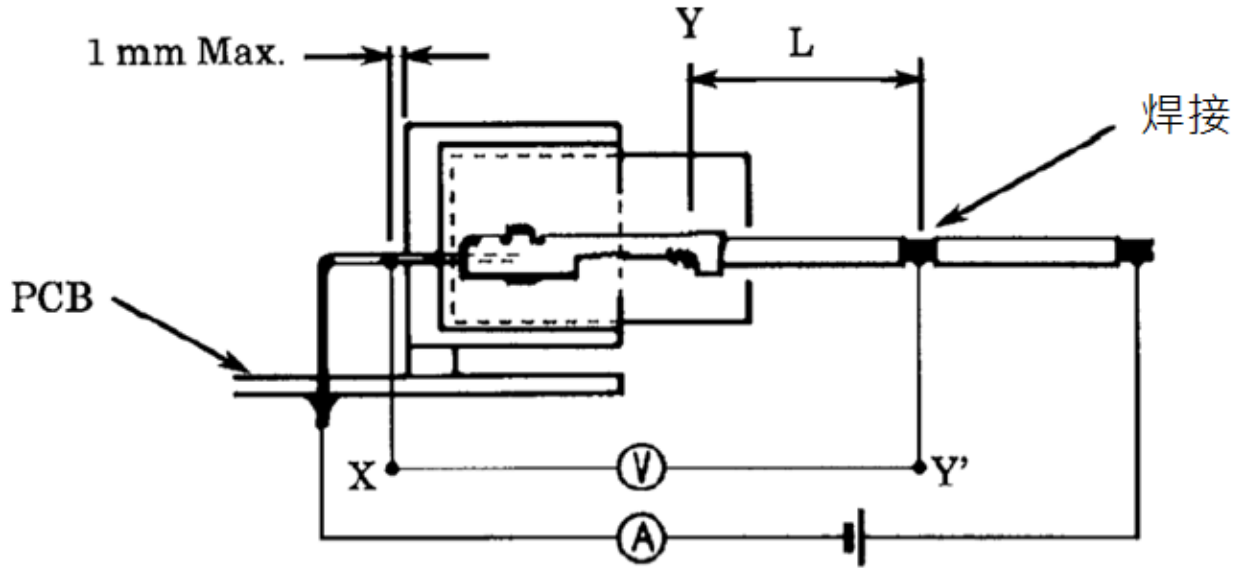
19. High Temperature (高溫測試)	5							4		4	4			
20. Low Temperature (低溫測試)				2										
21. Humidity/ Temperature Cycles (溫濕度循環)						4								
22. Dust (耐塵性)								5						
23. Compound environment testing (複合環境)													4	
24. Condensation test (冷凝測試)														3
Sample 樣品數	5	5	5	5	5	5	5	5	5	5	5	5	5	5

注：MechanicalShock

機械衝擊測試要求：衝擊高度：1m，路線長2.25m，2.25m線成拉直狀態，一端固定，帶有產品的一端做自由落體

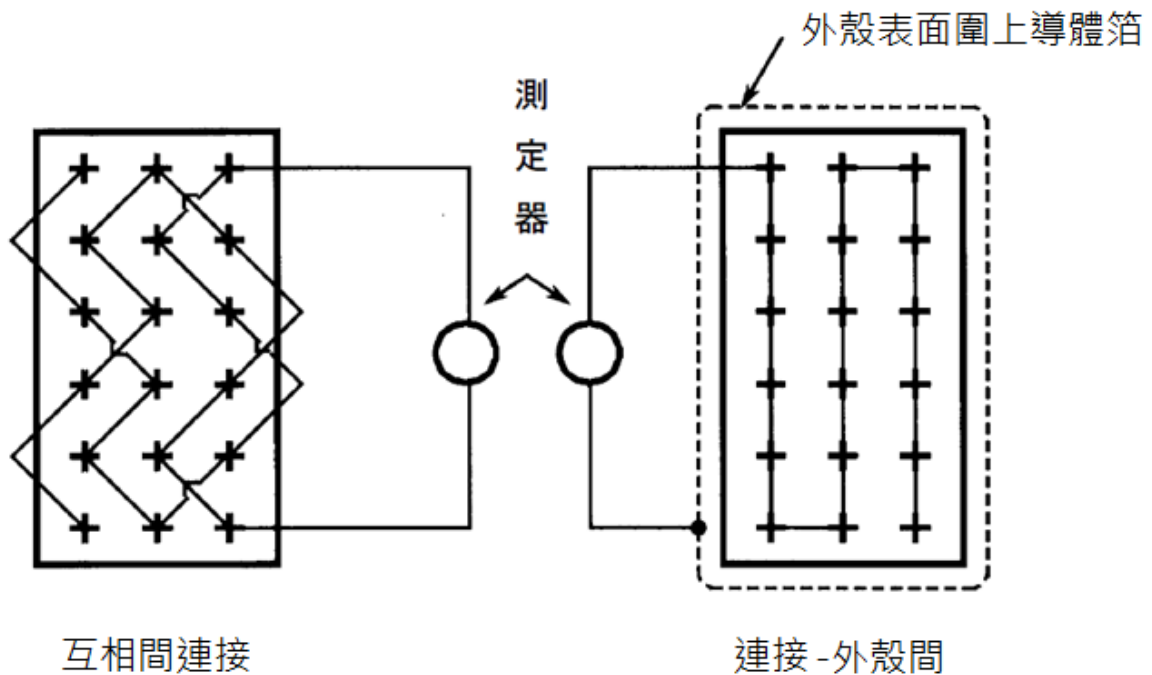
下面為測試條件示意圖：

附圖 03：

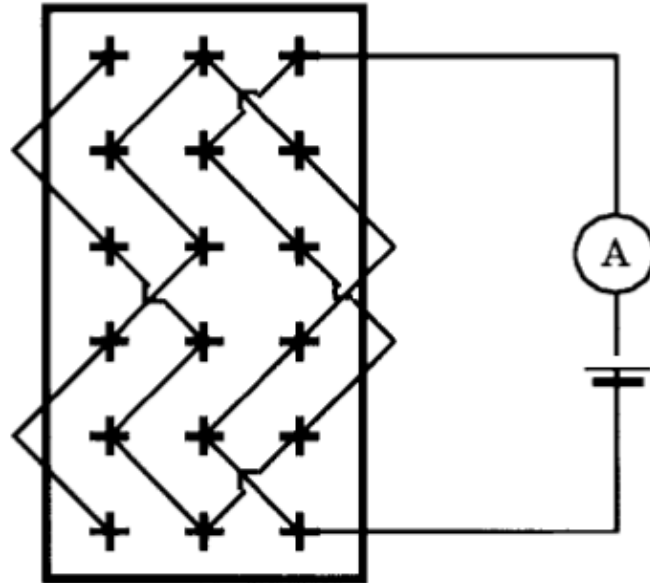


Y-Y'之間阻抗(L)須扣除

附圖 04：



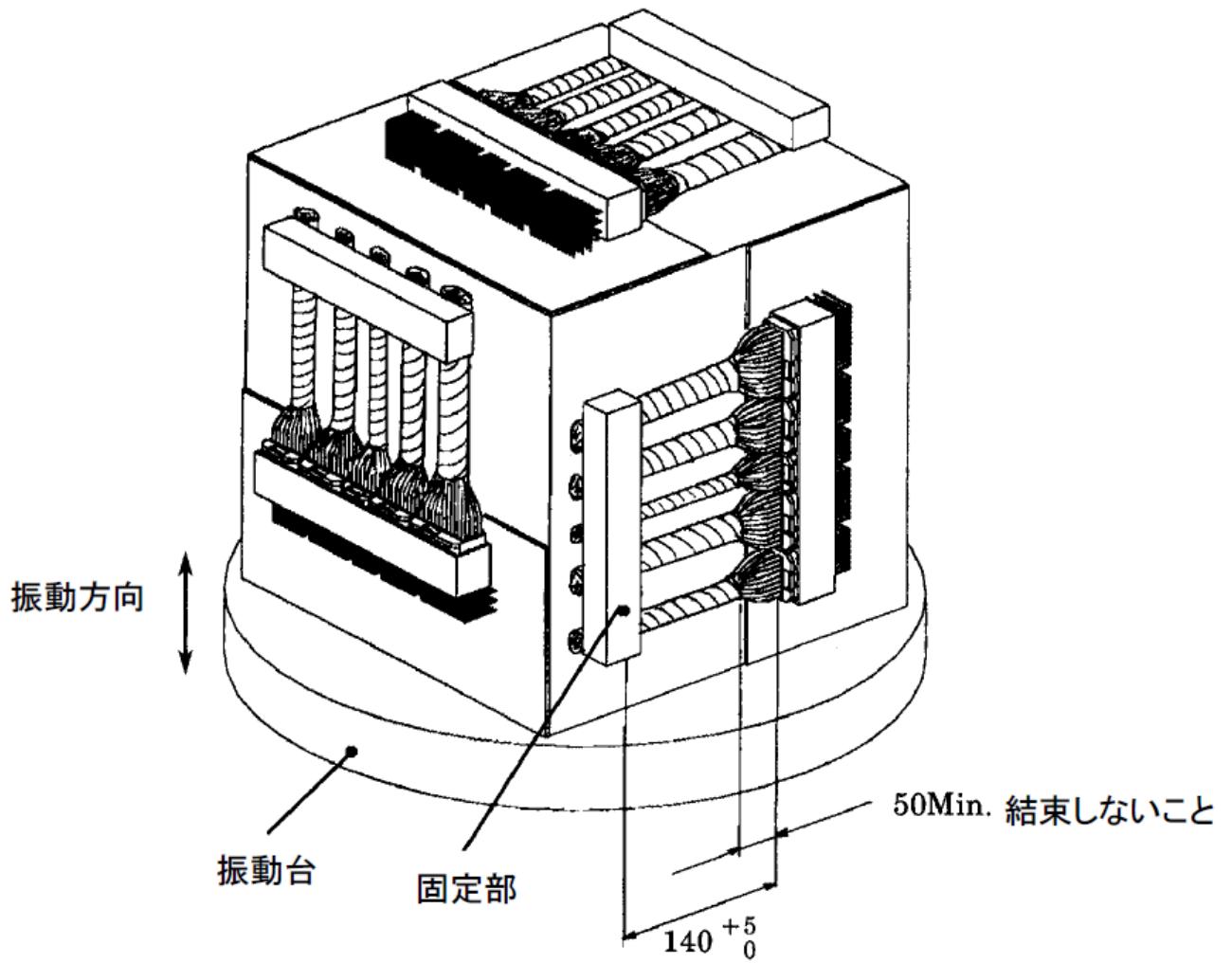
附圖 05：



附圖 06：

電線 (mm ²)	順序	試驗電流	時間
0.5	①	16.5	60 分
	②	20.2	200 秒
	③	22.5	5 秒
	④	30.0	1 秒

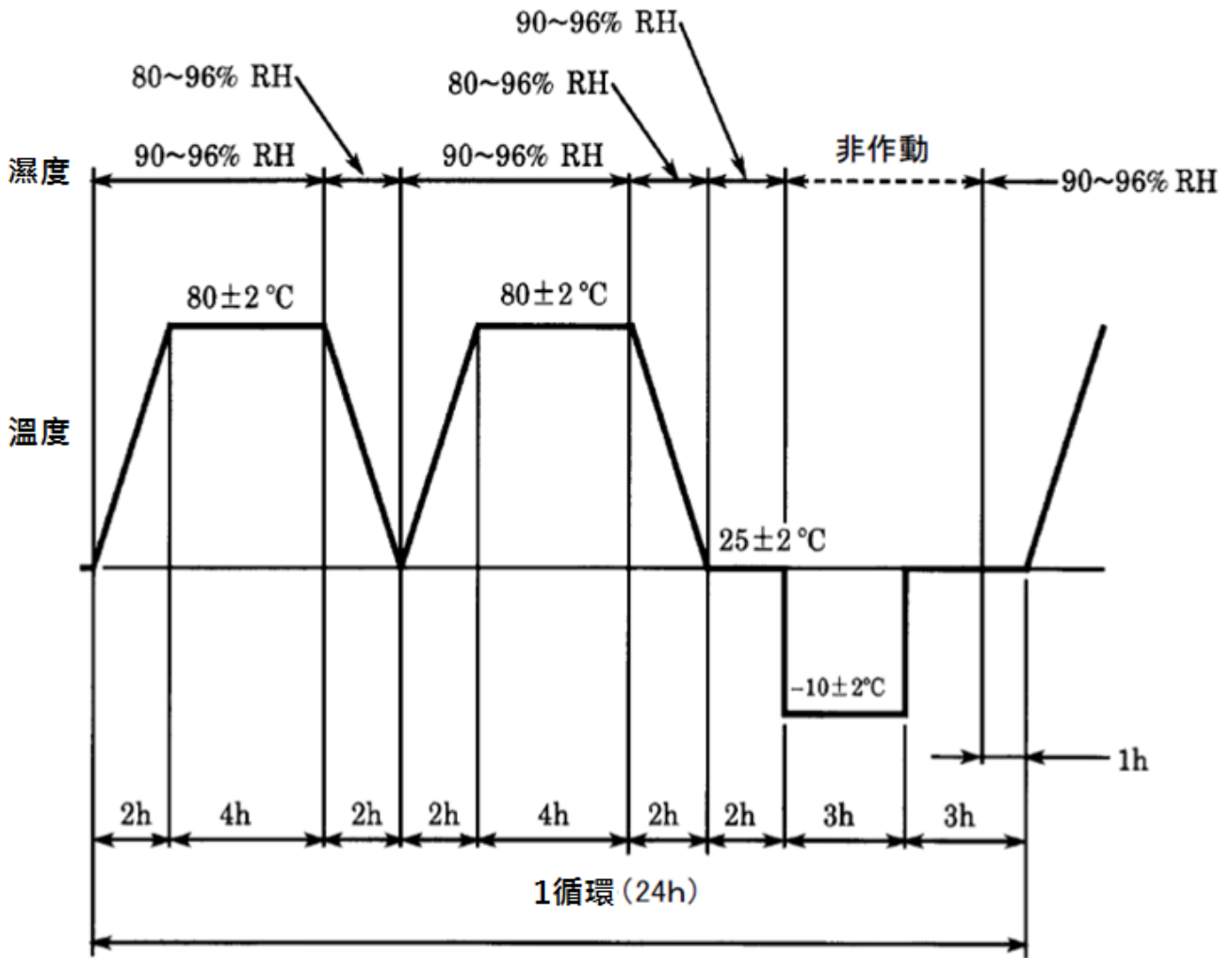
附圖 07 :





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附圖 08 :



附圖 09 :

端子型式		電線	通電條件	
端子	表面處理		試驗電流	45 分 ON 15 分 OFF
0.64 III	鍍錫	0.5 mm ²	1.2 A	300 循環
	部分鍍金	0.5 mm ²	10 mA	