

規 格 書

SUBMISSION OF SPECIFICATION

產品名稱（PRODUCT NAME）：步進電機

產品型號（PRODUCT MODEL）：28BYJ48

客戶部品號（CUSTOMER PART NUMBER）：28BYJ48

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| 編制 DRAWN | 校對 CHECKED | 審核 APPROVED |
| <div>用戶確認（ACKNOWLEDGEMENT）：</div> <div>於__年__月__日確認此規格書 ACKNOWLEDGEMENT DATE： /MONTH /DAY /YEAR</div> <div>確認人（ACKNOWLEDGED）：</div> <div>蓋 章（SEALED）：</div> | | |
| <div>U產品供貨單位（SUPPLIER）：</div> <div>產品用戶單位（CUSTMER）：</div> | | |

- 確認記載專案：AFFIRM THE FOLLOWING ITEMS
- 1、電性能及參數：

1、ELECTRIC PERFORMANCE AND PROPERTIES
- 2、機械性能：

2、MECHANICAL PERFORMANCE AND PROPERTIES
- 3、環境性能：

3、ENVIRONMENTAL PERFORMANCE AND PROPERTIES
- 4、使用壽命試驗：

4、ENDURANCE TEST
- 5、摩擦耐久試驗：

5、FRICTION MECHANISM ENDURANCE TEST

規格書 (Specification)

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| | | | 編制日期 (ISSUE DATE) : | 2011. 03. 22 |
| 型號 (MODEL) | 28BYJ48 | 圖號 (DWG.No.) | 28BYJ48 | |
| (1) | 電性能及參數 (ELECTRICAL PERFORMANCE AND PROPERTIES) | | | |
| 1-1 | 相數 | 4 相 | | |
| | Number of phase | 4 phase | | |
| 1-2 | 驅動方式 | 1-2 相勵磁單極驅動 | | |
| | Drive mode | 1-2 phase excitation unipolar drive | | |
| 1-3 | 步距角 | 5.625 ⁰ /64 (輸出軸), 減速比 1/64 | | |
| | Step angle (output shaft) | 5.625 ⁰ /64 (output shaft) ,gear reduction ration1/64 | | |
| 1-4 | 電壓 | 5VDC(電機端子) | | |
| | Voltage | 5VDC(motor energized voltage) | | |
| 1-5 | 線圈電阻 | 50Ω±7%/相 25℃ | | |
| | Resistance per phase | 50Ω±7%/phase at 25℃ | | |
| 1-6 | 最大空載牽出頻率 | >900pps | | |
| | Max response frequency | >900pps | | |
| 1-7 | 最大空載牽入頻率 | >500pps | | |
| | Max starting frequency | >500pps | | |
| 1-8 | 牽入轉距 | >300gf. cm / 5VDC 100pps | | |
| | Pull in torque | >300gf. cm / 5VDC 100pps | | |
| 1-9 | 絕緣電阻 (Insulation resistance) | | | |
| | 在引接線和外殼之間施加 500VDC, 測得絕緣電阻大於 10MΩ。 | | | |
| | Insulation resistance between motor leadwire and dead metal parts shall be over 10MΩ measured with 500 VDC megaohmmeter. | | | |
| 1-10 | 電氣強度 (Dielectric breakdown of insulation) | | | |
| | 在引接線和外殼之間施加 50/60Hz 500VAC, 時間 1 分鐘, 洩漏電流設置為 1mA, (或 50/60 Alternating potential is applied between motor leadwire and dead metal under the Hz 600VAC, 時間 1 秒鐘, 洩漏電流設置為 1mA), 應無擊穿或閃絡。 | | | |
| | following condition and requirement. Product shall show no abnormality. | | | |
| | Applied voltage | Time | Leak current | |
| | 600 VAC 50/60Hz | 1 second | 1 mA | |
| | Or 500 VAC 50/60 Hz | 1 minute | 1 mA | |
| 1-11 | 電機繞阻溫升 (Temperature rise of motor bobbin coil) | | | |
| | 電機在 5VDC 100HZ, 空載運行條件下, 電機溫升達到穩定狀態時, 用電阻法測量電機 | | | |
| | Temperature rise of motor bobbin coil shall not exceed 60 deg K when operated in | | | |
| | 溫升應不大於 60K。 | | | |
| | no load condition at 5 VDC and 100pps (pulse per sec)until temperature rise of. | | | |
| | motor bobbin coil gets constant,measured by resistance method. | | | |
| (2) | 機械特性 (MECHANICAL PERFORMANCE AND PROPERTIES) | | | |
| 2-1 | 外觀 (Outside view) | | | |
| | 電機在規定使用狀態下, 應無影響使用的生鏽, 變形等缺陷。 | | | |
| | Outside view shall be free from any damage and discoloration which may cause | | | |
| | failure at rated operating conditions. | | | |

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| (3) | 2-2 | 電機結構及尺寸 (Motor structure and size) 電機外形，結構及尺寸應符合圖紙要求 Outside view, structure and size shall match the drawing. | |
| | 2-3 | 重量 (Weight) 電機重約 45 克 Product shall weight about 45 g. | |
| | 2-4 | 輸出軸摩擦力矩 (Frictional torque of output shaft) 輸出軸摩擦力矩為 1000—2000gf.cm. Frictional torque shall be as follows 1000—2000gf.cm | |
| | 2-5 | 噪音 (Noise level) 電機在 5VDC/100Hz 條件下空載運行，距電機 10cm 處測得噪音值不大於 40dB (A 計權) Noise level of motor shall be less than 40 dB energized with 5 VDC and 100 pps in no load condition, measured 10 cm from motor. | |
| | 2-6 | 輸出軸強度 (Shaft Strength) 徑向強度 | |

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| 3-3 | 標準狀態如下 (Test conditions shall be as follows) . | | |
| | 溫度 (Temperature) | 20±2℃ | |
| | 相對濕度 (Relative Humidity) | 65±5% | |
| | 電機在 5~35℃，相對濕度為 45%~85%RH 的環境中測試應能滿足 1-5, 1-9, 1-10, 2-1, 2-2 These condition is applied to requirements in 1-5, 1-9, 1-10, 2-1, 2-2 and 2-3.. 和 2-3 的要求。 Actual test conditions of 5℃~35℃, 45%~85% applicable as far as test results are reliable. | | |
| 3-4 | 環境試驗 (Environmental test) | | |
| | 環境試驗後電機應能滿足 1-8, 1-10, 2-1, 和 2-5，2-7 的要求。 Motor shall satisfy requirements in 1-8 ~ 1-10, 2-1 and 2-5 ~ 2-7 after environmental test. | | |
| 3-4-1 | 耐濕試驗 (Humidity test) | | |
| | 電機在溫度為 40℃，相對濕度為 90% ~ 95%的環境中置放 48 小時，然後取出在常 Motor stored in ambient condition of 40℃ 90%~95% relative humidity for 溫下置放 30 分鐘。 48 hours then retrieved and stored in normal ambient condition for 30 minutes. | | |
| 3-4-2 | 耐高溫試驗 (High temperature storage test) | | |
| | 電機在溫度為 80℃，相對濕度為 90%~100%的環境中置放 48 小時，然後取出在常 Motor stored in ambient condition of 80℃, less than 50% relative humidity 溫下置放 30 分鐘。 for 48 hours then retrieved and stored in normal ambient condition for 30 minutes. | | |
| 3-4-3 | 耐低溫試驗 (Low temperature storage test) | | |
| | 電機在溫度為 -20℃，的環境中置放 48 小時，然後取出在常溫下置放 30 分鐘。 Motor stored in ambient condition of -20℃ for 48 hours then retrieved and stored in normal ambient condition for 30 minutes. | | |
| 3-4-4 | 熱衝擊試驗 (Thermal shock test) | | |
| | 5 個迴圈的熱衝擊試驗. 1 個迴圈包括：在 60℃溫度下連續置放 2 小時，然後取 5 cycles of thermal shock cycles. 1 cycle consists of successional storage 出在常溫下置放 30 分鐘；再在-10℃的溫度下置放 2 小時，然後取出在常溫下置 in 60℃ for 2 hours, storage in normal conditions, stored in -10℃ for 2 放 30 分鐘 . 電機測試應在電機在常溫下置放 30 分鐘後進行. hours and finally in normal condition again. Measurement shall be made after storage in normal ambient condition for 30 minutes. | | |
| 3-4-5 | 振動試驗 (Vibration test) | | |
| | 全振幅 2 mm，振動數 1000 c.p.m 的正弦波，在電機 X, Y，Z 三個方向分別進行振動， 曆 Motor shall withstand vibration test when subjected to a vibration of 1000 時 20 分鐘 . cpm with 2 mm full wave for 20 minutes in three directions respectively. | | |

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| | <p>3-4-6 衝擊或跌落試驗 (Shock or Dropping test)</p> <p>電機在 X, Y, Z 三個方向分別承受 80g 的衝擊力各 1 次; 或電機在裝箱狀態下, 從 75cm 高處, 以 Motor shall withstand without failure when added 80G shock force 1 time, X, Y and Z direction X, Y, Z 三個方向各跌落一次, 電機應正常.</p> <p>respectively, or dropped 1 time in X, Y, and Z direction from height of 75 cm to the concrete floor with motor in packaged condition.</p> | | |
| (4) | <p>壽命試驗 (ENDURANCE TEST)</p> <p>電機在 5 VDC 50 Hz, 150 gf.cm 的負荷狀態下, 經過 10000 小時 90° 正反方向旋轉, 電機應能 Motor shall satisfy requirements in 1-8, 1-9, 1-10 and 2-5 after 10,000 hours of 90° 能滿足 1-8, 1-9, 1-10 和 2-5 的要求, 牽入轉矩應能滿足 1-8 的要求.</p> <p>Back and forth continuous rotation in 150 gf.cm load, 5 VDC, 50 pps. Pull in torque shall satisfy 1-8.</p> | | |
| (5) | <p>摩擦機構耐久試驗 (FRICTION MECHANISM ENDURANCE TEST)</p> <p>電機輸出軸在經過 1000 次耐久迴圈試驗後, 摩擦力矩在 800-2500gf.cm, 1 個迴圈包括 180° 正 Frictional torque of output shaft shall be from 800gf.cm to 2500gf.cm after 1000 cycles 反兩個方向旋轉 (1 個迴圈約 1.5 秒)</p> <p>endurance test. 1 cycles consists of 180° back and forth rotation of output shaft and clutch mechanism must be slipped through this test.</p> | | |