

1. General 一般事項

1.1 Scope : This specification covers the requirements for single key switches which have no keytop.
(TACT SWITCHES: MECHANICAL CONTACT).

適用範圍: 本規格書適用於不含鍵帽之單鍵開關(觸壓式開關:機械式接點)

1.2 Operating Temperature Range $-40\sim+85^{\circ}\text{C}$ (normal humidity *normal press.)

使用溫度範圍: $-40\sim+85^{\circ}\text{C}$ (常濕常壓條件下)

1.3 Storage Temperature Range $-40\sim+85^{\circ}\text{C}$ (normal humidity *normal press.)

存放溫度範圍: $-40\sim+85^{\circ}\text{C}$ (常濕常壓條件下)

1.4 Test conditions : The standard test conditions shall be $5\sim35^{\circ}\text{C}$ in temperature, 45~85% RH and 860~1060mbar in atmospheric pressure. Should any doubt arise in judgement, tests shall be conducted at $20\pm 2^{\circ}\text{C}$, 65±5% RH, and 860~1060mbar.

試驗狀態: 若無特別規定限制, 則以溫度 $5\sim35^{\circ}\text{C}$, 相對濕度 45~85%, 氣壓 860~1060mbar 之標準狀態測之。但對此標準狀態之測定值發生判定疑問或有特別要求則以基準狀態(溫度 $20\pm 2^{\circ}\text{C}$, 相對濕度 65±5%, 氣壓 860~1060mbar) 為準測定

2. Appearance, construction and dimensions. 外觀, 構造, 尺寸

2.1 Appearance : There shall be no defects that affect the serviceability of the product.

外觀: 不得有影響製品機能之缺陷。

2.2 Construction dimensions : Shall conform to the assembly drawings. 構造及尺寸: 必須與組立圖符合。

3. Type of actuation : Tactile feedback

動作型式: 有觸感之反饋

4. Contact arrangement: 1 poles 1 throws (Details of contact arrangement are given in the assembly drawings.)

接點構成: 單極單投式(詳細如組立圖所示)

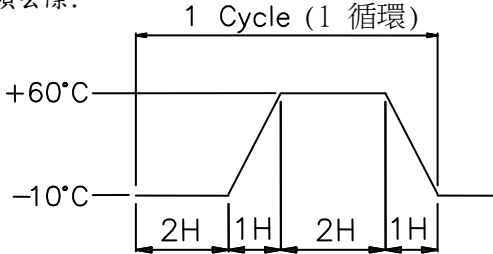
5. Maximum ratings : 最大額定: DC 12 V 20 mA 或 DC 12 V 50 mA

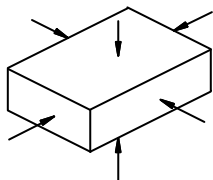
6. Electrical performance 電氣性能

	Property 項目	Test conditions 試驗條件	Performance 判定基準		
6.1	Contact resistance 接觸阻抗	Applying a static load twice the actuating force to the center of the metal contact measurements shall be made with a 1 kHz small-current contact resistance meter. 將兩倍於動作力之靜負荷加於金屬彈片之中央以 1 k Hz 小電流接觸阻抗計測定之。	100 m ohm max. 100 mΩ 以下		
6.2	Insulation resistance 絕緣阻抗	Measurements shall be made following application of DC 100V potential across terminals and across Terminals and frame for one minute . 以 DC 100V 之電壓加於端子相互間及端子與外框間 1 分鐘測定之	100 M ohm min. 100 MΩ 以上		
6.3	Dielectric with standing voltage 耐電壓	AC 250V (50~60Hz) shall be applied across terminals and across terminals and frame for one minute. 以 AC 250V (50~60Hz) 之電壓加於端子相互間及端子與外框間 1 分鐘測定之	There shall be no breakdown. 不可有絕緣破壞之現象		
6.4	Bounce 接點之瞬間接觸跳動時間	Lightly striking the center of the metal contact at a rate encountered in normal use (3 to 4 operations per sec) bounce shall be tested at "ON" and "OFF". 以 3~4 次/秒之正常使用速度輕輕地敲打金屬彈片之中央, 開關在"開"及"關"之位置均需測定之	"ON" and "OFF": 10 m sec max. "開"及"關": 10 m sec 以下。		
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7. Mechanical performance 機械性能								
Property 項目		Test conditions 試驗條件			Performance 判定基準			
7.1	Actuating force 動作力	Placing the switch such that the direction of switch operation is vertical and then gradually increasing the load applied to the center of the metal contact the maximum load required for the metal contact to come to a stop shall be measured. 將開關之操作部置於垂直方向,並在金屬彈片之中央逐漸增加荷重,直到金屬彈片不動為止,量取施力期間之最大荷重值。			As showing in assembly drawing. 依組立圖上規定。			
7.2	Travel 移動量	Placing the switch such that the direction of switch operations vertical and then applying a static load twice the actuating force to the center of the metal contact the travel distance for the metal contact to come to a stop shall be measured. 將開關之操作部置於垂直方向,並在金屬彈片之中央加兩倍於動作力之靜負荷測量金屬彈片被壓到不動時之移動距離。			+0.20 0.15 -0.05 mm			
7.3	Return force 復歸力	The sample switch is installed such that the direction of switch operation is vertical and upon depression of the stem in its center the whole travel distance the force of the metal contact to return to its free position shall be measured. 將開關之操作部置於垂直方向,並在金屬彈片之中央施力,使之移動全行程距離再測量其復歸至原來位置之力量。			As showing in assembly drawing. 依組立圖上規定。			
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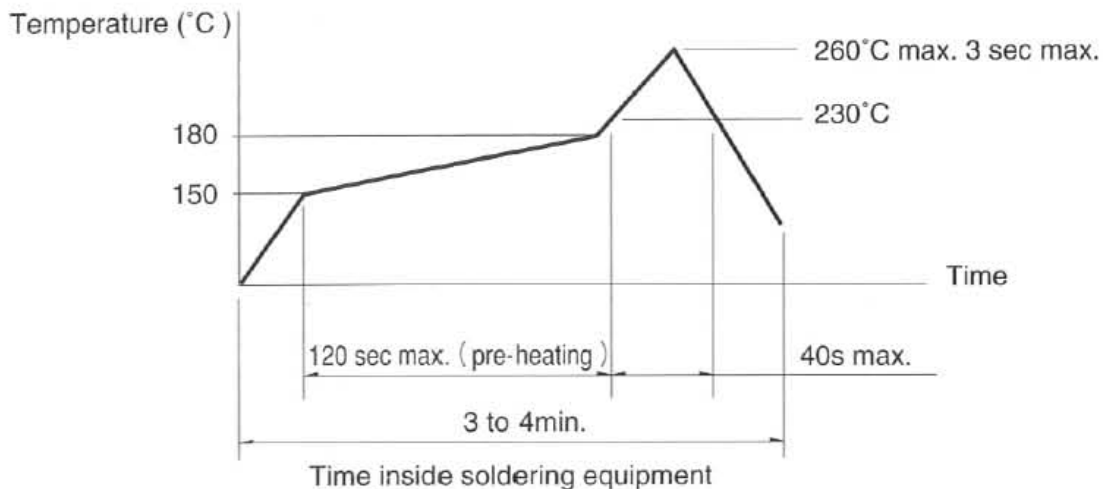
SFNRW-001		SFNRW SWITCHES SPECIFICATIONS SFNRW 觸壓式製品規格書			97.07.18		
8. Weather-proof 耐候性能							
Property 項目		Test conditions 試驗條件			Performance 判定基準		
8.1	Resistance to low temperatures 耐寒性能	Switch for testing being kept in the conditions at $-40\pm 2^{\circ}\text{C}$ in temperature for 96 hours, and in a normal ambient condition for one hour, then to be measured within one hour. Drops of water being taken away. $-40\pm 2^{\circ}\text{C}$ 放置 96 小時試驗後, 置於常溫常溼中 1 小時, 除去水滴後, 在 1 小時內測定之			Item 6 Item 7.1, 7.2 同 6 項 同 7.1, 7.2 項		
8.2	Heat resistance 耐熱性能	Switch for testing being kept in the conditions at $90\pm 2^{\circ}\text{C}$ in temperature for 96 hours, and in a normal ambient condition for one hour, then to be measured within one hour. $90\pm 2^{\circ}\text{C}$ 放置 96 小時試驗後, 置於常溫常溼中 1 小時, 在 1 小時內測定之			Item 6 Item 7.1, 7.2 同 6 項 同 7.1, 7.2 項		
8.3	Moisture resistance 耐溼性能	Switch for testing being kept in the conditions at $60\pm 2^{\circ}\text{C}$ in temperature and 90~95% RH for 96 hour and in a normal ambient condition for one hour then to be measured within one hour. Drops of water being taken away. 在溫度 $60\pm 2^{\circ}\text{C}$ 相對溼度 90~95% 放置 96 小時試驗後, 置於常溫, 常溼中 1 小時除去水滴後, 在 1 小時以內測定之			Contact resistance: 200 m ohm max. Insulation resistance: 100 M ohm min. Item 6.3, 6.4 Item 7.1, 7.2 接觸阻抗在 200 mΩ 以下 絕緣阻抗在 100 MΩ 以上 同 6.3, 6.4 項 同 7.1, 7.2 項		
8.4	Temperature cycling 耐溫度循環試驗	After 5 cycles of following conditions, the switch shall be allowed to stand under room temperature and humidity conditions for 1 hour and measurement shall be made within 1 hour after that. Water drops shall be removed. 以下記條件做 5 個週期的試驗後放置 1 小時以內測試之, 但是水珠必須去除。 			Item 6 Item 7.1, 7.2 同 6 項 同 7.1, 7.2 項		
8.5	Soldering 焊錫性能	After sprayed flux. 浸泡助焊劑後. Temperatures of solder : $230\pm 5^{\circ}\text{C}$. 焊錫溫度: $230\pm 5^{\circ}\text{C}$. Duration of dipping : 3 ± 0.5 seconds. 浸入時間: 3 ± 0.5 秒.			More than 75% of the dipped part shall recovered by solder. 浸泡部份須付著 75% 以上.		
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9. Endurance 耐久性能						
Property 項目		Test conditions 試驗條件			Performance 判定基準	
9.1	Operating life 有負載壽命試驗	Measurements shall be made following the test set forth below: (1). DC 5V 5mA resistive load . (2). Rate of operation 2 to 3 operations per second. (3). Depression : Upper limit of the actuating force. (4). Cycles of operation : 5×10^5 cycles(130gf, 160gf) 5×10^4 cycles(240gf) (1). DC 5V 5mA (阻抗負載). (2). 動作速度: 2~3 次/秒. (3). 壓下力量: 動作力之上限. (4). 動作次數: 5×10^5 次(動作力 130gf, 160gf) 5×10^4 次(動作力 240gf)			Contact resistance: 500 mΩ max 接觸阻抗: 500 mΩ 以下. Insulation resistance: 100 MΩ min 絕緣阻抗: 100 MΩ 以上 Bounce 20 m sec max. 接點之瞬間跳動時間 20msec 以下. Actuating force: ±30% of initial force. 動作力在初期值之±30%以內 Item 6.3 Item 7.2 同 6.3 , 7.2 項	
9.2	Vibration resistance 耐振動性	Measurements shall be made following the set forth below: 依下列設定方式測試: (1). Range of oscillation : 10 to 55 Hz 振動數範圍: 10~55 Hz (2). Amplitude pk-to-pk : 1.5 mm 全振幅: 1.5 mm (3). Cycle of sweep : 10-55-10 Hz in one minute approx. 掃瞄週期: 10-55-10 Hz 約 1 分鐘 (4). Mode of sweep: Logarithmic sweep or uniform sweep. 掃瞄振動之變化方式: 近似對數或直線 (5). Direction of oscillation: Three mutually perpendicular directions. 振幅方向: 相互垂直之三個方向(含柄移動之方向) (6). Duration of testing : 2 hours each for a total of 6 hours. 試驗時間: 各 2 小時(計 6 小時)			Item 6 Item 7.1, 7.2 同 6 項 同 7.1, 7.2 項	
9.3	Impact shock resistance 耐衝擊性	Measurements shall be made following the test set forth below: (1). Acceleration : $784m/s^2$ (2). Cycle of test : 3 times per direction , 18 times in total(6 directions). (1). 用 $784m/s^2$ 加速度 (2). 沿圖示 6 個方向, 每方向 3 次共 18 次.			Item 6 Item 7.1, 7.2 同 6 項 同 7.1, 7.2 項	
						
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Switch Handling Precaution 使用上應注意事項

1. Reflow Soldering condition. Reflow 焊錫條件

Temperature 溫度



Time-Temperature Profile 時間-溫度曲線

1.1 Allowable frequency of reflow soldering process. 2 times max.

容許焊錫次數: 2次以下(恢復常溫時,才可進行第二次焊錫)

1.2 The thickness of Cream Solder:0.15~0.2 mm

錫膏塗抹之厚度:0.15~0.2 mm

2. In case an manual soldering apparatus is used for soldering adhere to the following conditions:

若以手動焊錫實施焊錫時,必須附帶下列條件:

Item 項目	Soldering condition 焊錫條件
(1) Soldering temperature 焊錫溫度	350°C max. 350°C 以下
(2) Continuous soldering time 連續焊錫時間	3 sec max. 3 秒以下

3. Other precautions 其它注意事項

(1) Following the soldering process do not try to clean the switch with a solvent or the like.
在焊錫過程中,不可用溶劑或類似品清洗開關。

(2) Safeguard the switch assembly against flux penetration from its top side.
焊錫時請注意防止助焊劑從開關頂部滲入。

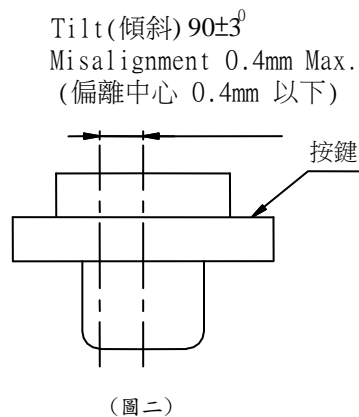
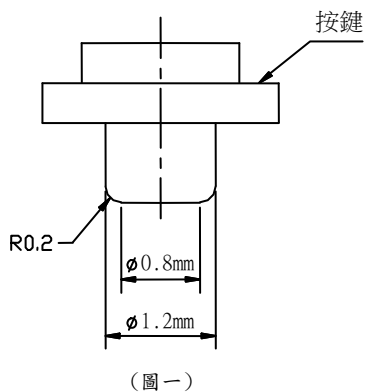
(3) Please have the products keep in close status and the storage time is 180 days guaranty agter delivering the goods at most.

為了避免保管場所的環境引起端子變色,未到使用之前,請勿拆封.TACT SW 的保存期限出貨後6個月內。

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4. Precautions in use **使用上注意事項**

- (1) Do not push except the actuating area.
除了操作部，以外之部份勿按押。
- (2) Dimensions of the tip of striking part(圖一). 按鍵前端之形狀尺寸
- (3) Operating conditions(圖二). 操作條件



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1. Scope : this specification outlines engineering of the taping for switches .

範圍：本規格書適用於開關 taping(reel)包裝。

2. Construction : refer to product drawing .

零件構成：參考產品包裝仕様書。

3. Dimension : refer to product drawing .

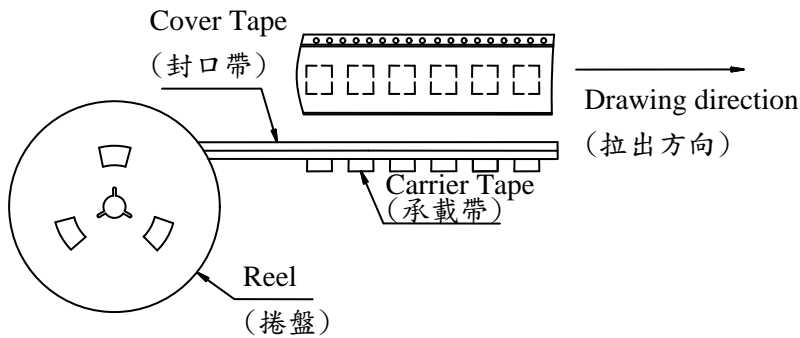
尺寸：參考產品包裝仕様書。

4. Taping package form

Taping 包裝形態

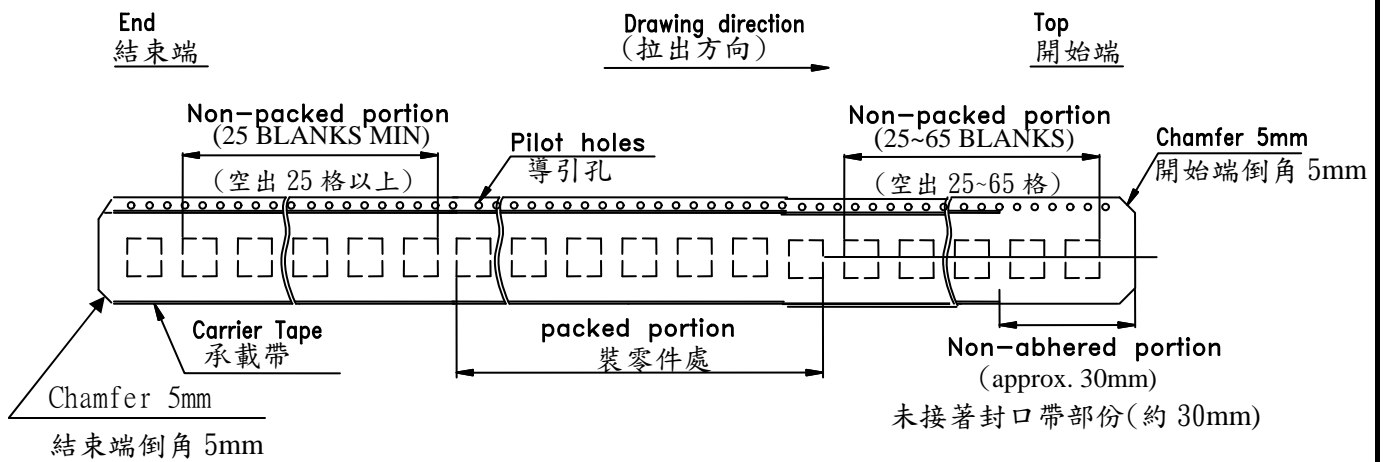
(1) Pilot hole of carrier tape shall be located in the right side of drawing direction .

承載帶導引孔之位置在拉出方向之右側。



(2) Detail of both ends of tape shall be as follows .

以下是承載帶從捲盤拉出方向之開始端&結束端詳細包裝說明。



(3) Cover tape shall not close the pilot hole or protrude from the carrier tape .

封口帶不可蓋住承載帶之導引孔或是突出隆起。

(4) There shall be no lack in packing .

包裝數量不可以缺少(不足)。

(5) Following items shall be marked on the reel .

捲盤須標示以下之項目

- FD Part NO. 福華零件號碼
- Customer model NO. 顧客產品號碼
- Quantity 數量
- Production lot NO. 製造批號

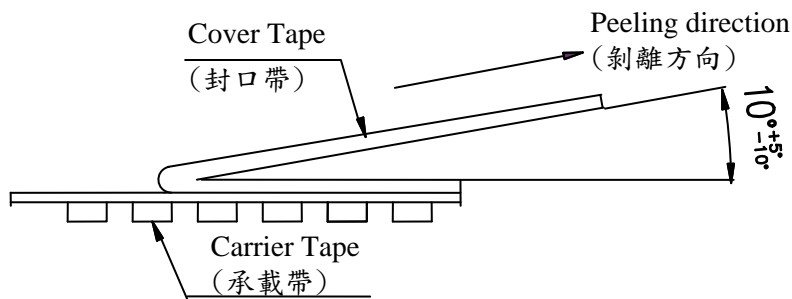
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5. Performance 性能

(1) Peeling strength of cover tape 封口帶之剝離強度

Peeling strength of cover tape shall be 10.2~71.4gf (0.2~0.7N) and tested as follows.

下圖是測試封口帶之剝離強度 10.2~71.4gf (0.2~0.7N) 之方法。



※封口帶之剝離速度是 300mm/分。

(2) Minimum bending radius of taping package

Taping 包裝之最小彎曲半徑

Falling off of the switch or breakage of taping package shall not occur at minimum bending radius of 25mm, minimum bending shall performed one time at on position.

在最小彎曲半徑 25mm 時、將不會發生 Taping 包裝之開關脫離或破損，最小彎曲半徑在適當的位置上將被執行一次。

(3) Adhesion of the switch on cover tape 封口帶之黏著

Switch shall not adhere to the cover tape this test.

封口帶之剝離(黏著)強度試驗。

6. Packaging quantity 包裝數量

(1) The number of the switches. 開關數量

5000 switches shall be packed in a reel. 每捲 reel 包裝數量 5000 個

(2) The number of the reels. 捲盤數量

Seventeen reels at maximum, which contain 85,000 switches, shall be packed in a package.

每個包裝箱可裝 17 捲，計 85,000 個開關。

7. Storage condition 保存狀態

(1) Storage environment temperature at -20°C~50°C, humidity at 20~85% RH.

儲存環境溫度在 -20°C~50°C、濕度在 20%~85% RH。

(2) Storage in high temperature and high humidity shall be avoided.

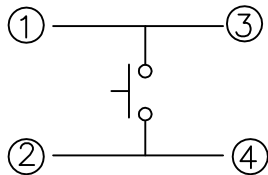
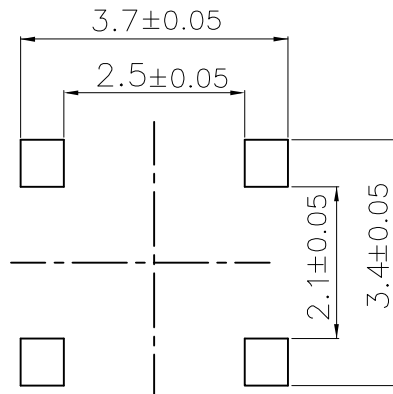
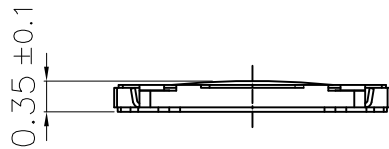
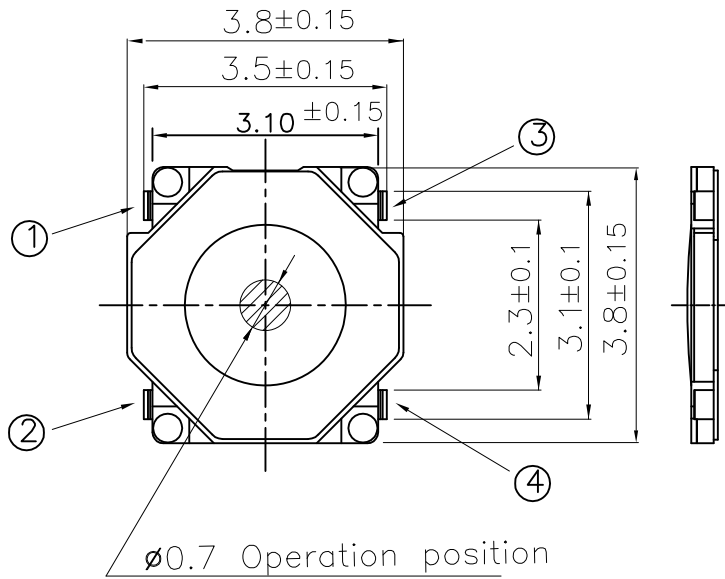
儲存時避免放置於高溫高濕下。

(3) Please have the products keep in close status and the storage time is 180 days guaranty agter delivering the goods at most.

為了避免保管場所的環境引起端子變色，未到使用之前，請勿拆封。TACT SW 的保存期限出貨後 6 個月內。

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Printed circuit board land dimensions
(When viewed from switch mounting face)

CIRCUIT DIAGRAM

SFNRWMA2030T	GOLD YELLOW	240±70	50Min
SFNRWMA2020T	GOLD YELLOW	160±50	50Min
SFNRWMA2010T	GOLD YELLOW	100±50	50Min
TYPE OF MODEL	MYLAR COLOR	ACTUATING FORCE (gf)	RETURN FORCE (gf)

零件號碼		名稱		材料		規格		處理		顏色	
			三角法	單位 mm	比例 10/1	SFNRW					
			承認	校對	設計	圖名	產品組立圖				
						圖號					
記號	年月日	承認	校對	設計							