

# 單相定子線圈綜合測試設備

(型號：SWT 555-FMC)

## 1. 前言

本設備(型號：SWT 555-FMC)適用於單相 750W(1Hp)以下，T 型、L 型最多三速型式風扇馬達定子測試；測試準確且操作容易，有效節省測試時間，提高產品品質。本公司尚有多種其他測試設備，提供客戶不同需求。

## 2. 測試項目

- 2.1. 直流電阻測試：測試範圍 20.00 $\Omega$ /200.0 $\Omega$ /2000 $\Omega$  三段選擇
- 2.2. 層間短路測試：測試電壓 0.5~5kV，顯示面積比、面積差比、電暈量
- 2.3. 耐壓測試：測試電壓 AC 0~5kV，洩漏電流設定 0~40.00mA
- 2.4. 絕緣測試：測試電壓 DC10~6000V，絕緣電阻量測範圍 0.1~50000 M $\Omega$
- 2.5. 電流測試(含轉向測試)：試驗電壓 2 $\Phi$  AC5V~100V 3A(Max.)；可判定轉向

## 3. 測試順序及功能說明

- 3.1. 手動測試：選擇欲測試項目(on PC)後，按下測試按鈕，即可進行單項測試；放開測試按鈕，立即停止測試
- 3.2. 自動測試：  
按下測試按鈕，機台依序由直流電阻(一)測試→直流電阻(二)測試→直流電阻(三)測試→直流電阻(四)測試→層間短路(一)測試→層間短路(二)測試→層間短路(三)測試→交流耐壓測試→絕緣電阻測試→電流測試(含轉向測試)→停止測試
- 3.3. 自動測試中，若有不良立刻停止測試，並以燈號及蜂鳴器顯示不良
- 3.4. 層間短路測試器 SDT-06 可於電腦基準檔設定標準波
- 3.5. 層間短路測試器 SDT-06 畫面顯示內容：顯示面積比(A)、面積差比(D)、電暈量(C)
- 3.6. 各項測試時間可於電腦基準檔中設定測試時間。預設測試 cycle time 約 15 秒(不含上下料時間)(預設測試時間：電阻\*4 次\*0.5 秒，層間\*3 次\*1.8 秒，耐壓\*1 次\*1 秒，絕緣\*1 次\*1 秒，電流\*1 次\*2 秒)
- 3.7. A、B 兩組定子交互測試，但不可同時進行測試
- 3.8. 應用軟體：
  - 3.8.1. 測試工件線圈基準檔檔案管理系統：新增，編輯，刪除，快速查詢，複製等功能
  - 3.8.2. 測試資料檔案管理系統：快速查詢，列表預覽等功能
  - 3.8.3. 測試取值與基準檔比較
  - 3.8.4. 品管數量累計功能(分項記錄)
  - 3.8.5. 電腦畫面顯示內容
    - (a). 直流電阻測試：顯示電阻量測值，並與基準檔上、下限比較判定(顯示 OK 或 NG)
    - (b). 層間短路測試：顯示面積比、面積差比、電暈量，並與基準檔上限比較判定(顯示 OK 或 NG)
    - (c). 耐壓測試：顯示洩漏電流量測值，並與基準檔上、下限比較判定(顯示 OK 或 NG)
    - (d). 絕緣測試：顯示絕緣電阻量測值，並與基準檔下限比較判定(顯示 OK 或 NG)
    - (e). 電流測試：顯示電流量測值，並與基準檔上、下限比較判定(顯示 OK 或 NG)
    - (f). 轉向測試：顯示量測轉向(CW/CCW)，並與基準檔設定轉向判定(顯示 OK 或 NG)

#### 4. 部品規格

##### 4.1. 直流電阻測試單元：

- 4.1.1 廠牌：制宜(CHUYI)
- 4.1.2 測試方法：以四端子法量測
- 4.1.3 顯示方式：4 位式數字電表，精度 $\pm 0.5\%$  of F.S，顯示於電腦測試畫面上
- 4.1.4 測試範圍：20.00 $\Omega$ /200.0 $\Omega$ /2000 $\Omega$  三段選擇
- 4.1.5 溫度補償：以 20 $^{\circ}\text{C}$  為基準值

##### 4.2. 層間短路測試單元：

- 4.2.1 廠牌：ECG
- 4.2.2 型號：DWX-05A
- 4.2.3 測試電壓：0.5-6kV，數位設定測試電壓(100V Step)，精度 $\pm 0.5\%$  of F.S
- 4.2.4 測試電感範圍：最大 10  $\mu\text{H}$
- 4.2.5 顯示螢幕：640\*480 Dots(VGA)，8.4" TFT Color LCD，4-Color Display
- 4.2.6 判定方式：  
和儲存之 Master 波形比較，根據波形面積比，波形面積差比，電暈量判定
- 4.2.7 連線介面：RS232

##### 4.3. 耐壓絕緣測試單元：

- 4.3.1 廠牌：華儀
- 4.3.2 型號：SE 7430
- 4.3.3 交流耐壓部分：
  - (a). 測試電壓：AC 0~5kV(0.01kV/step)
  - (b). 電壓錶精度： $\pm 1.5\%$  rdg.  $\geq 500\text{V}$
  - (c). 洩漏電流
    - ◆ 洩漏電流範圍：0~40.00mA
    - ◆ 洩漏電流精度： $\pm 2\%$  rdg.+6 counts
  - (d). 判定方法：洩漏電流高於設定上限值或低於下限時，警報信號輸出(洩漏電流顯示於人機測試畫面上)
- 4.3.4 絕緣電阻部分
  - (a). 測試電壓：DC10~6000V，電壓精度：0~1000V $\pm 1.5\%$  rdg.+2counts
  - (b). 準確度：500~6000V
    - ◆  $\pm 2\%$  rdg.+2 counts，0.1-999.9 M $\Omega$
    - ◆  $\pm 5\%$  rdg. +2 counts，1000-9999 M $\Omega$
    - ◆  $\pm 15\%$  rdg. +2 counts，10000-50000 M $\Omega$
  - (c). 判定方法：量測絕緣電阻低於設定下限值，警報信號輸出(絕緣電阻顯示於電腦測試畫面上)
- 4.3.5 連線介面：RS232

##### 4.4. 電流測試單元(含轉向測試機構)：

- 4.4.1. 試驗電壓：2 $\Phi$  AC5V~100V 3A (Max.)，可手動無段調整電壓
- 4.4.2. 電壓量測：AC 100.0 V，精度 $\pm 1.0\%$  of F.S，顯示於人機測試畫面上
- 4.4.3. 電流量測：AC 5.00 A，精度 $\pm 1.0\%$  of F.S，顯示於人機測試畫面上
- 4.4.4. 轉向測試：模擬轉子檢測，可做 CW/CCW 檢出(依附於電流測試)

#### 4.5. 分離式工業電腦及應用軟體

##### 4.5.1. 分離式工業電腦主機(研華)

包含：

CPU：Intel P4-2.8GHZ

1GB DDRRAM

250GB 硬碟

DVD-RW

##### 4.5.2. 19 "LCD 彩色螢幕及螢幕裝置架

##### 4.5.3. Windows 7 Home Edit 繁體中文版

#### 4.6. 高壓切換回路組成：

4.6.1. 高壓線：耐壓 DC 30 kV

4.6.2. 高壓切換開關：耐壓 DC 10kV 以上

#### 4.7. 定子放置台 A、B 兩組：

可調整式定子放置台及 5 Pin 快速接線夾\*兩組

#### 4.8. 裝置箱：

4.8.1. 尺寸約：1000<sup>W</sup>\*1000<sup>D</sup>\*1800<sup>H</sup>mm(參考尺寸)，附活動輪

4.8.2. 顏色：由貴公司提供指定色卡

### 5. 設備需求

5.1. 電源：3Φ AC 220V 50/60Hz 10A(由 貴公司提供)

5.2. 氣壓源：5kg-cm<sup>2</sup> 以上 (由 貴公司提供)

5.3. 設備接地：接地電阻低於 50Ω (由 貴公司提供)

### 6. 附件

6.1. 中文操作說明書：二本

6.2. 制宜廠內校驗報告書：一份

### 7. 保固

自驗收完成日起保固一年。倘在保固期限內於正常狀況下所導致之故障本公司均予免費維修(僅限台灣地區)；若非台灣本島地區，請 貴公司以電子郵件或傳真方式通知本公司故障情形，經雙方溝通研判故障情形後，由本公司以電子郵件或傳真方式指導 貴公司修復之；若以電子郵件或傳真方式仍無法排除故障時，請 貴公司將故障部品寄給本公司，由本公司免費修復後再寄還 貴公司，由 貴公司更換之。但若由於下列之原因使設備無法運轉，則不在此保固範圍：

■因火災、水災、地震、雷擊等不可抗力因素所造成之損壞

■人為操作/使用失當所引起之故障或損壞, 例如超過合約之規範範圍, 其原因由雙方會同判定之

■消耗零件之正常損壞

■合約內記載之貴公司提供之零件

■其他不是明顯屬於本公司之責任範圍內

# Single-phase stator winding tester

(Model : SWT 555-FMC)

## 1. Introduction

This tester(Model : SWT 555-FMH) is applicable for single-phase, below 750W(1HP), T/L-type, max. 3-speed fan motor stator test. Test accurate and easy to operate, save test time, improve product quality. Our company has other test equipment to provide customer with different needs.

## 2. Test item

- 2.1. DC resistance test : Range 20.00Ω/200.0Ω/2000Ω 3 sections
- 2.2. Layer short test : Test voltage 0.5-5kV, Show area ratio, area difference ratio, corona
- 2.3. AC puncture test : Test voltage AC0~5kV, leakage current setting 0~40.00mA
- 2.4. Insulation resistance test : Test voltage 10~6000Vdc, insulation resistance range 0.1-50000MΩ
- 2.5. Current test(Include rotation direction test) : Test voltage 2Φ AC5V~100V 3A(Max.). Judge rotation direction

## 3. Test function and procedure

- 3.1. Manual test : Select test item(on PC), press test button to start test, release test button to stop test
- 3.2. Auto test :  
Press test button and the test would start as following : DC resistance 1→DC resistance 2 →DC resistance 3→DC resistance 4→Layer short 1→Layer short 2→Layer short 3→ AC puncture →Insulation resistance →Current test (Include rotation direction test)→Stop
- 3.3. During auto test : If there is any abnormal, test will stop immediately, show indicator lights and buzzer alarm.(Press reset button to reset)
- 3.4. Layer short tester SDT-06 can set the base wave on PC
- 3.5. Layer short tester SDT-06 display : Area compare(A), Area different compare(D), Corona(C)
- 3.6. Each test time can be set in PC base file. Preset cycle time about 15s(Without loading and unloading time)( Preset test time : Resistance \*4 time\*0.5s. Layer short \*3 time \*1.8s. Puncture \*1 time \*1s. Insulation \*1 time\*1s. Current \*1 time\*2s)
- 3.7. A, B Channel can test alternately, but can't test at the same time
- 3.8. Application software :
  - 3.8.1. Test base files management system : Add, edit, delete, quick search, copy
  - 3.8.2. Test data management system : Search, preview
  - 3.8.3. Capture test data compare with the base values
  - 3.8.4. To record the OK&NG amount of each test item and total OK&NG
  - 3.8.5. Computer screen display
    - (a). DC resistance test : Show resistance measurement value, compared with the base Hi and Lo limits.(Show OK/NG)
    - (b). Layer short test : Show area ratio(A), area difference ratio(D), corona(C) Compared with the base Hi limits.(Show OK/NG)
    - (c). AC puncture test : Show leakage current measurement value, Compared with the base Hi and Lo limits.(Show OK/NG)
    - (d). Insulation resistance test : Show insulation resistance measurement value, Compared with the base Lo limits.(Show OK/NG)
    - (e). Current test : Show current measurement value, compared with the base Hi and Lo limits.(Show OK/NG)

- (f). Rotation direction test : Show measurement rotation direction (CW/CCW), compared with the base rotation direction. (Show OK/NG)

#### 4. Component specification

##### 4.1. DC resistance test :

4.1.1. Brand : CHUYI

4.1.2. Test method : Four-terminal method

4.1.3. Display : 4 digital meter, accuracy  $\pm 0.5\%$  of F.S, display on HMI

4.1.4. Range : 20.00 $\Omega$ /200.0 $\Omega$ /2000 $\Omega$  3 sections

4.1.5. Temperature compensate : Convert into the value of 20 $^{\circ}$ C

##### 4.2. Layer short test :

4.2.1 Brand : ECG

4.2.2 Model : DWX-05A

4.2.3 Test voltage : 0.5-5kV, Digital setting test voltage (100V Step), Accuracy  $\pm 0.5\%$  of F.S

4.2.4 Inductor range : 10  $\mu$  H(max)

4.2.5 Display : 640\*480 dots(VGA), 8.4" TFT color LCD, 4-Color display

4.2.6 Compare mode: Make comparison between the sample oscillation wave and the test oscillation wave, With a compare voltmeter to make hi/low limit setting, In order to judge automatically

##### 4.3. AC puncture and insulation resistance test :

4.3.1 Brand : Extech electronics

4.3.2 Model : SE 7430

4.3.3 AC puncture :

(a). Test voltage : AC0~5kV(0.01kV/step)

(b). Accuracy :  $\pm 1.5\%$  rdg.  $\geq 500V$

(c). Leakage current

◆ Range : 0~40.00mA

◆ Accuracy :  $\pm 2\%$  rdg.+6 counts

(d). Decision : When the leakage current higher than Hi limit or lower then Lo limit, send alarm signal (Leakage current display on HMI)

4.3.4 Insulation :

(a). Test voltage : 10~6000Vdc, Accuracy 0~1000V  $\pm 1.5\%$  rdg.+2counts

(b). Range : 500~6000V

◆  $\pm 2\%$  rdg. +2 counts, 0.1-999.9 M $\Omega$

◆  $\pm 5\%$  rdg. +2 counts, 1000-9999 M $\Omega$

◆  $\pm 15\%$  rdg. +2 counts, 10000-50000 M $\Omega$

(c). Decision : When the insulation resistance is lower than setting value, send alarm signal (Insulation resistance display on HMI)

4.3.5 Interface : RS232

##### 4.4. Current test (Include rotation direction test) :

4.4.1. Test voltage : 2 $\Phi$  AC5V~100V 3A (Max), manual adjust

4.4.2. Voltage measurement : AC 100.0 V, accuracy  $\pm 1.0\%$  of F.S, display on PC

4.4.3. Current measurement : AC 5.00 A, accuracy  $\pm 1.0\%$  of F.S, display on PC

4.4.4. Rotation direction test : Simulate rotor, do CW / CCW detection (Combine with the current test)

#### 4.5. Industrial type computer and application software

##### 4.5.1. Industrial type computer,

Include :

CPU : Intel P4-2.8GHZ

1GB DDRRAM

250GB hard disk

DVD-RW

##### 4.5.2.19 "LCD screen and rack

Windows-7 home edit English version

#### 4.6. High voltage switching circuit :

4.6.1. High voltage cable : Pressure DC30kV

4.6.2. High voltage reed relay : Pressure DC10kV

#### 4.7. Fixture A, B :

Adjustable stator placement and 5 connector \*2

#### 4.8. Equipment box :

4.8.1. Size : 1000<sup>W</sup>\*1000<sup>D</sup>\*1800<sup>H</sup>mm(reference), with wheel

4.8.2. Color : According customer provided color code

### 5. Provide by customer

5.1. Power source : 3Φ AC 220V 50/60Hz 10A(Provide by customer)

5.2. Pneumatic supply : 5kg-cm<sup>2</sup> ( Provide by customer )

5.3. Equipment ground : Ground resistance value below 50Ω ( Provide by customer )

### 6. Documents

6.1. Operating manual : 2 set

6.2. Chuyi's calibration report : 1 set

### 7. Warranty

All of our equipment carry a one-year warranty which will enable from the date of acceptance. Within the warranty period, we would supply free repair service for any defective and malfunctioning parts emerges from normal operating conditions. If equipment has any problem, please contact us. We would have the discussion and judgment about the problem with you. After that, we would email the repair instruction manual to your company. If the problem could not be solved under the instructions, please send the defective parts to us, then we would send it back after the repairmen. The warranty does not cover damage caused by the following conditions and the repairmen is not for free.

■ Damage caused by any majeure factors.

■ Breakdown or damage caused by misuse, abuse and neglect; if the operations beyond the specified ranges of the contract; the malfunctioning factors shall be judged by both sides.

■ Normal wear and tear of consumable parts.

■ Damage caused by the parts supplied by customer, as stipulated on contracts.

■ The factor which is not caused by our company.