

T3STER SI Control Software_V2301

基本介面操作 SOP



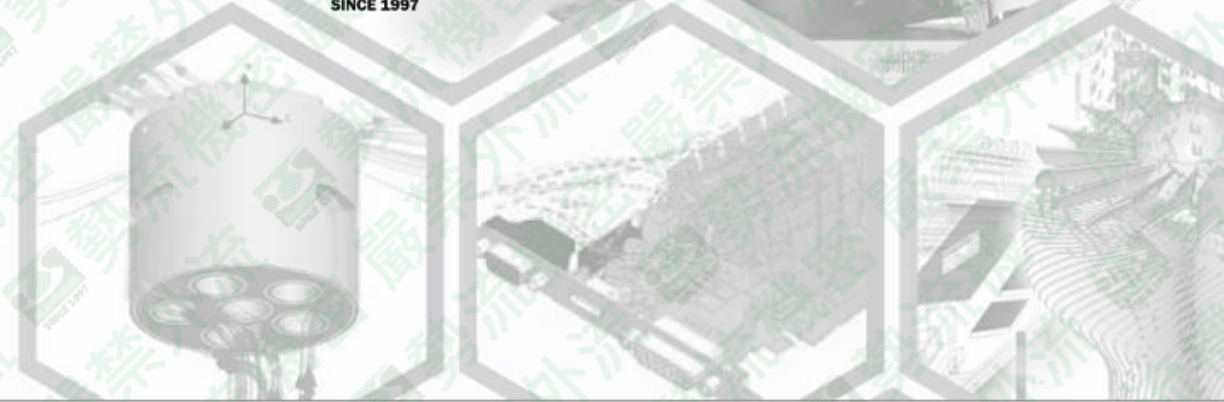
-  Willy
-  PID 精密儀器事業部
-  willy@flotrend.com.tw
02-27266269 ext. 225



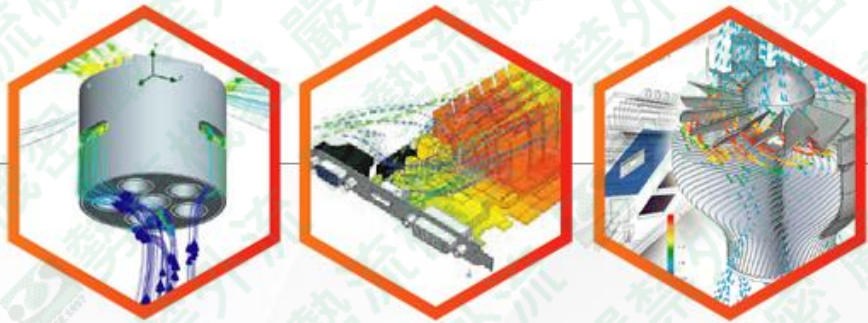
Outline

- 機台啟動說明
- 操控介面說明
- 元件接線操作說明
- 軟體執行流程說明
 - T3STER SI
 - T3STER SI + 10A/150V Booster
- 附錄
 - A-變溫Vf 測試SOP
 - B-TH800使用說明
 - C-HXM Divider除法器使用說明
 - D-Repeat功能說明



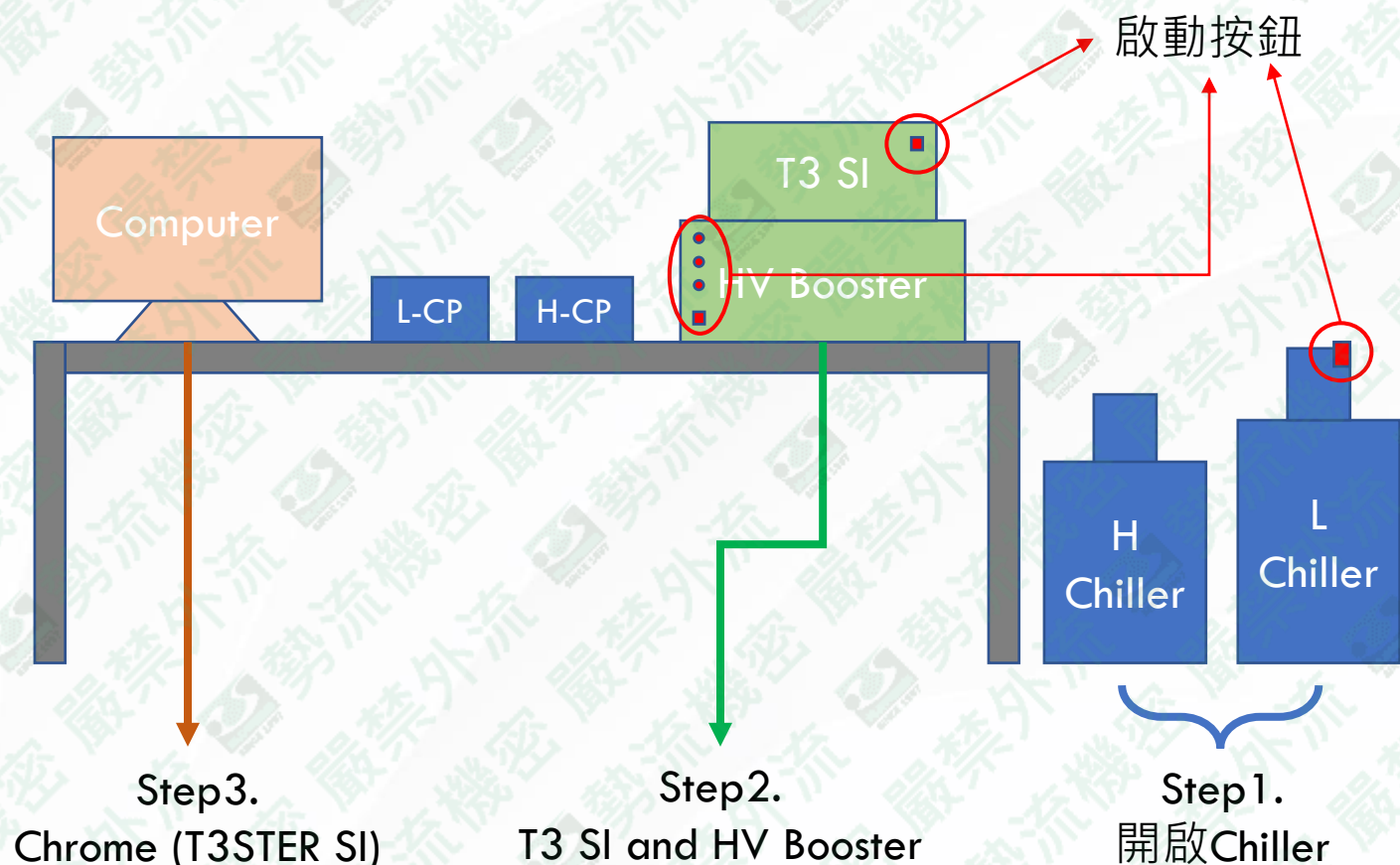


機台啟動說明



機台啟動說明 L-Chiller (1/2)

機台放置位子與開機順序



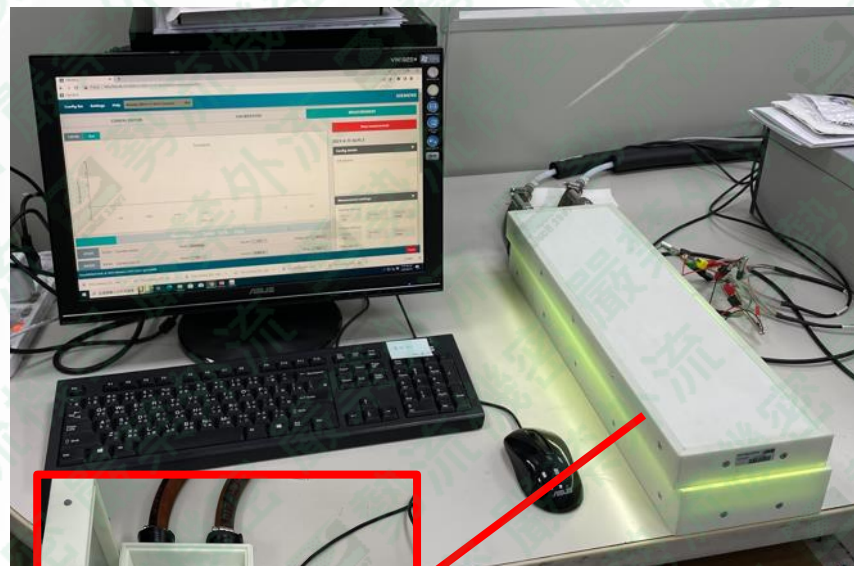
代號說明

- L-CP : Low Temp. Cold-Plate (-40~100°C)
- H-CP: High Temp. Cold-Plate (0~150°C)
- L Chiller : Low Temp. Julabo
- H Chiller : High Temp. Julabo
- T3 SI : T3ster SI (2A/10V)
- HV Booster : High Voltage Booster (10A/150V)



機台啟動說明 L-Chiller (2/2)

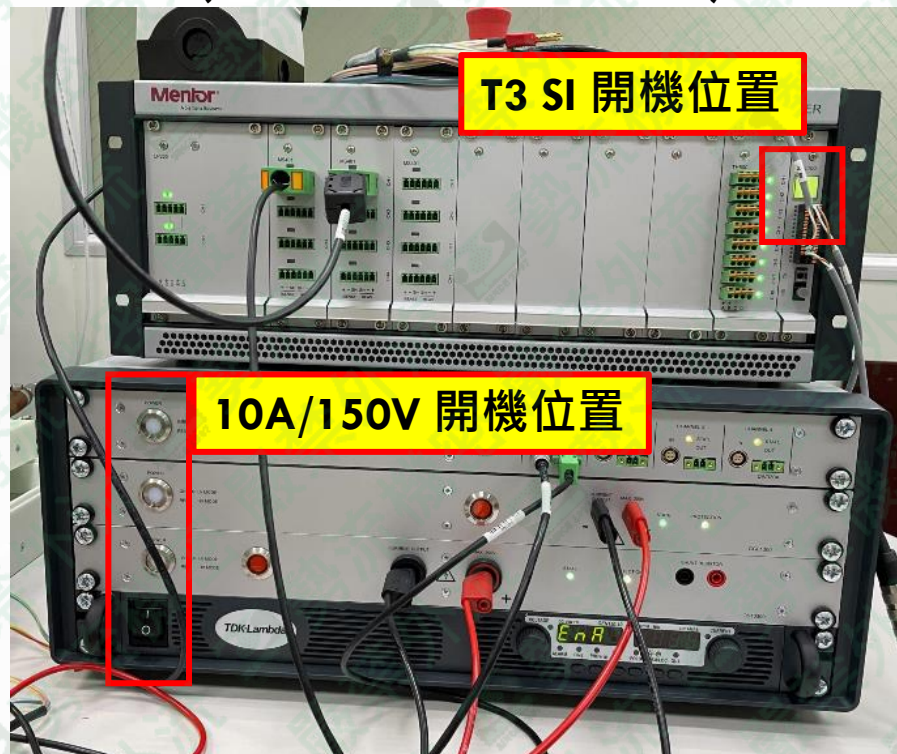
Step3



元件放置位置

Step2

(Booster 要使用再開即可)



T3 SI 開機位置

10A/150V 開機位置

Step1

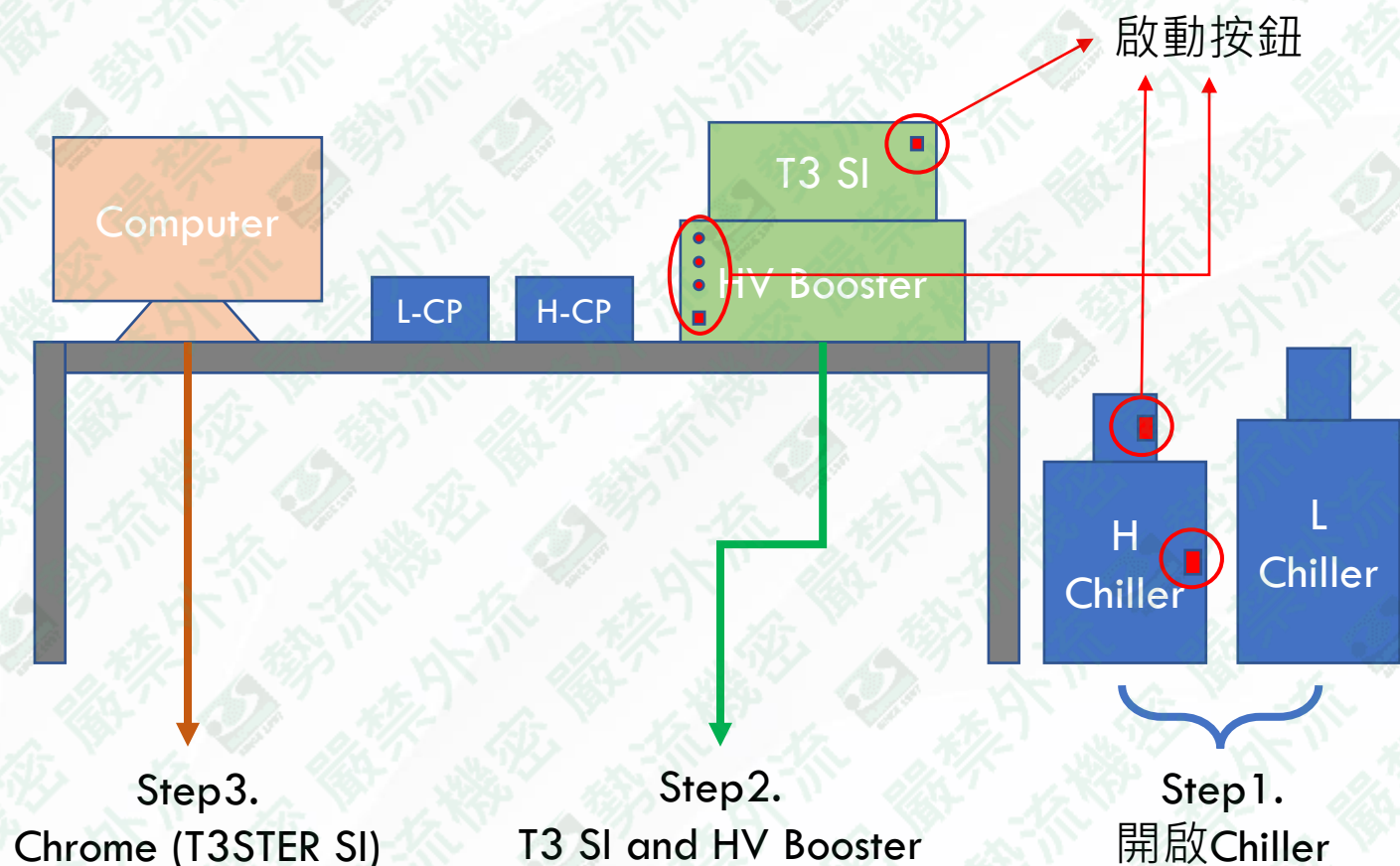


Julabo 開機



機台啟動說明 H-Chiller (1/2)

機台放置位子與開機順序



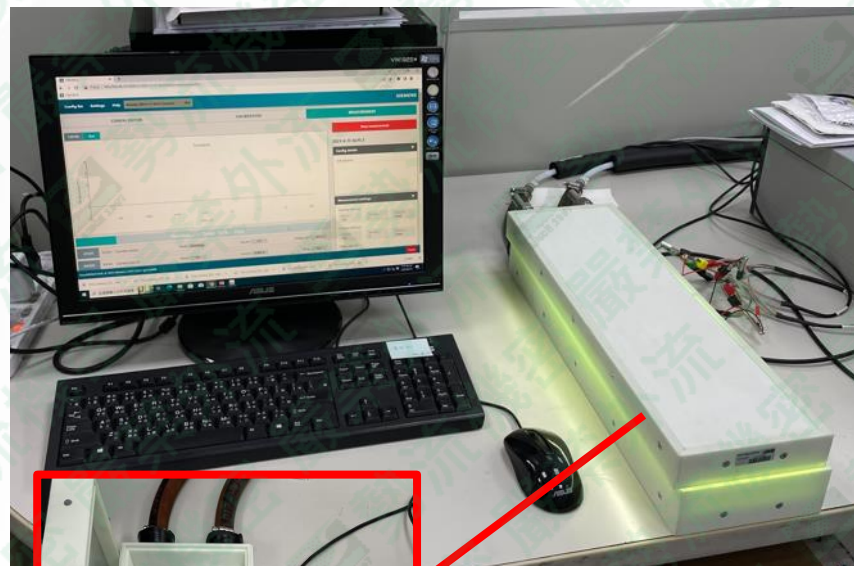
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機台啟動說明 H-Chiller (2/2)

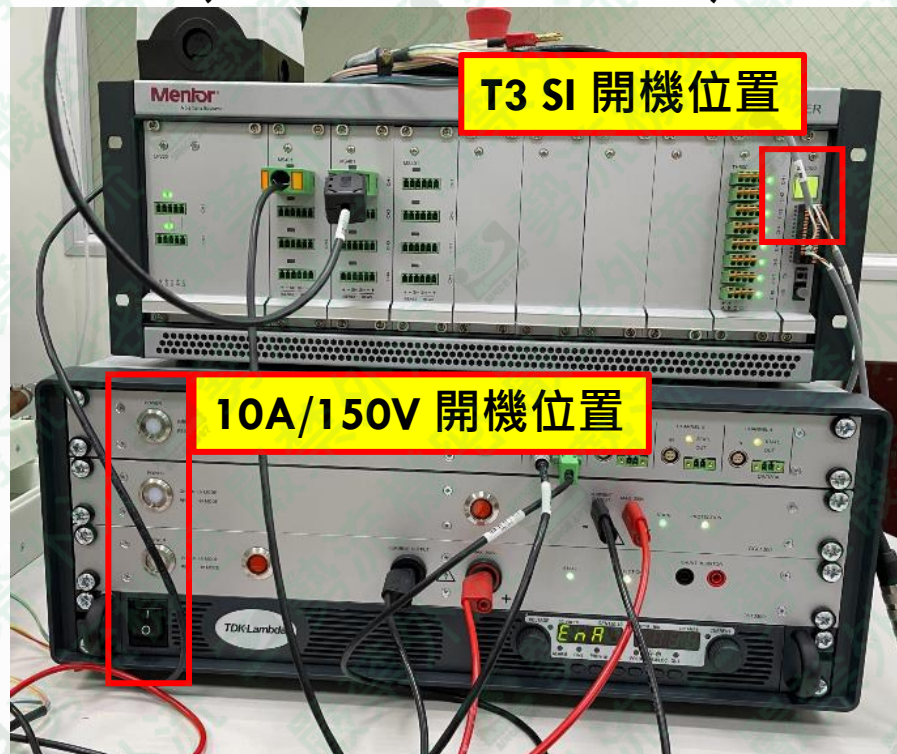
Step3



元件放置位置

Step2

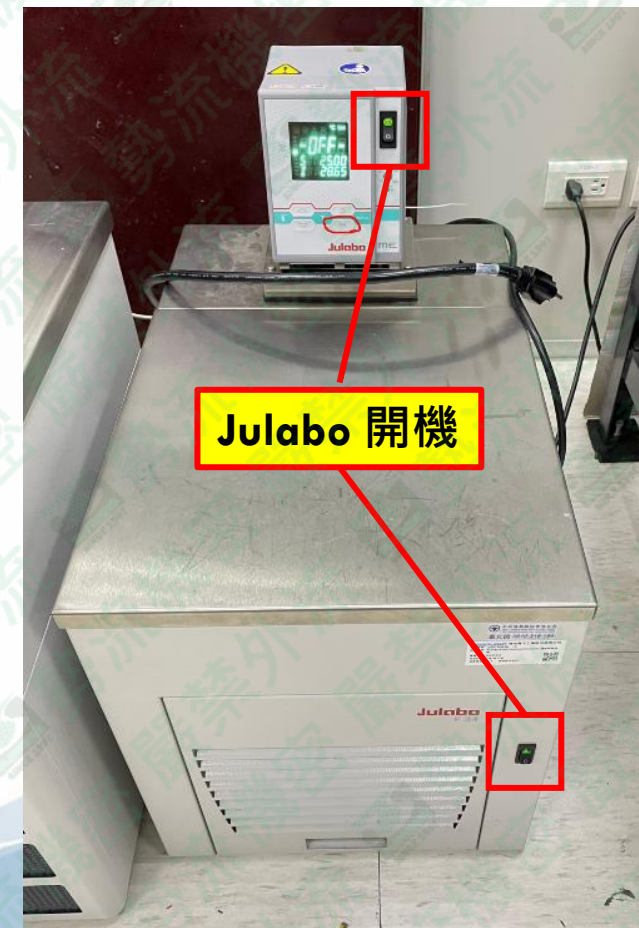
(Booster 要使用再開即可)



T3 SI 開機位置

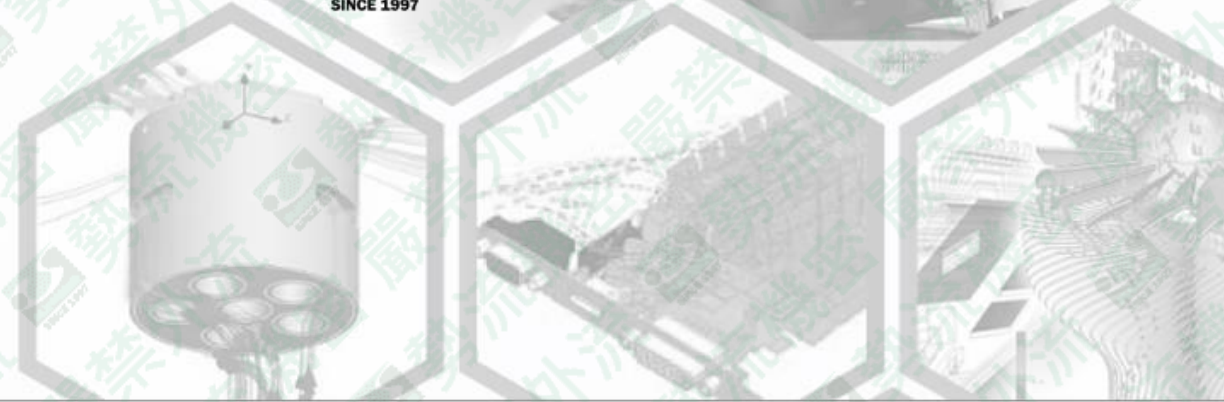
10A/150V 開機位置

Step1

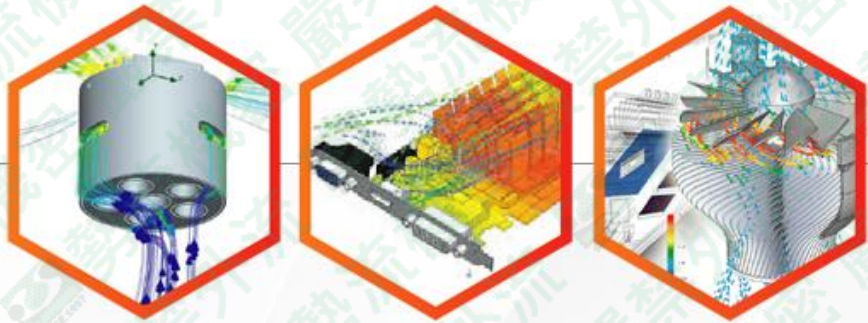


Julabo 開機





元件接線操作說明



元件接線操作說明 (1/2)

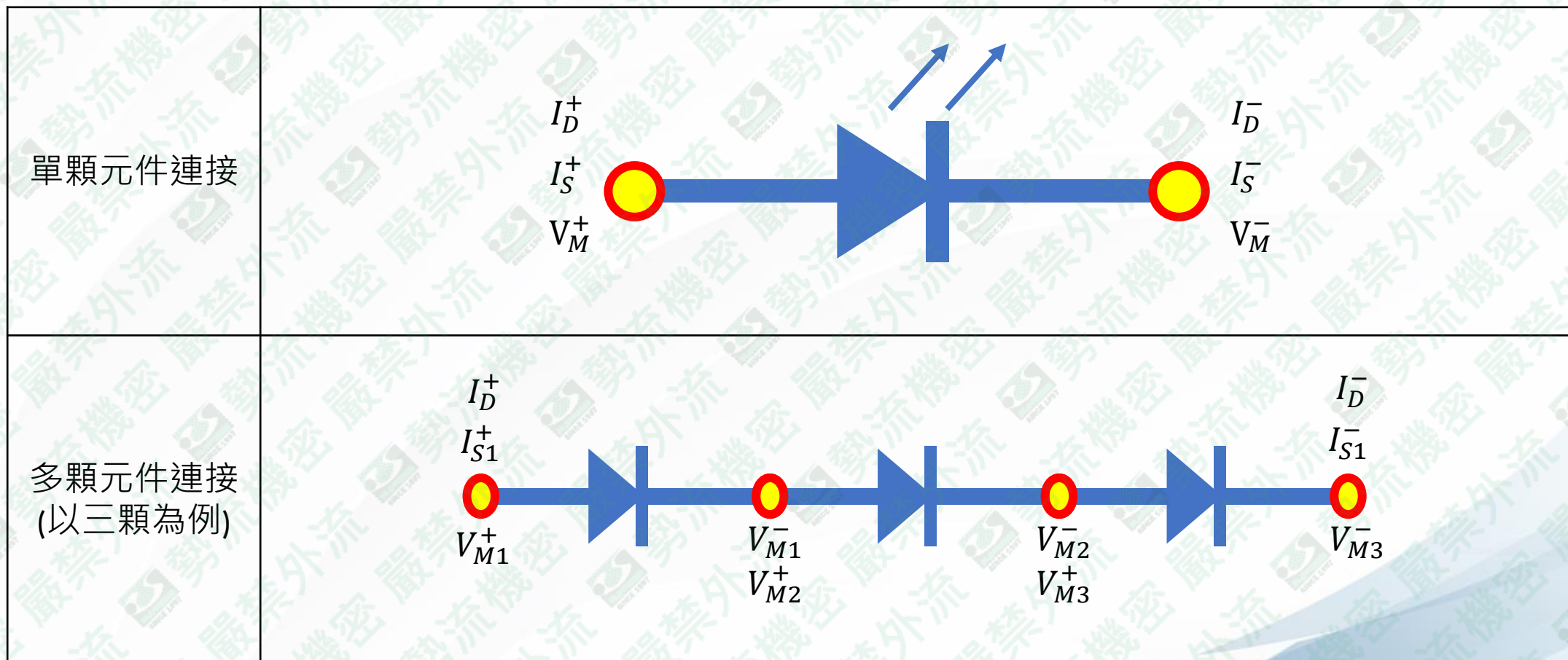
• T3STER SI線材介紹

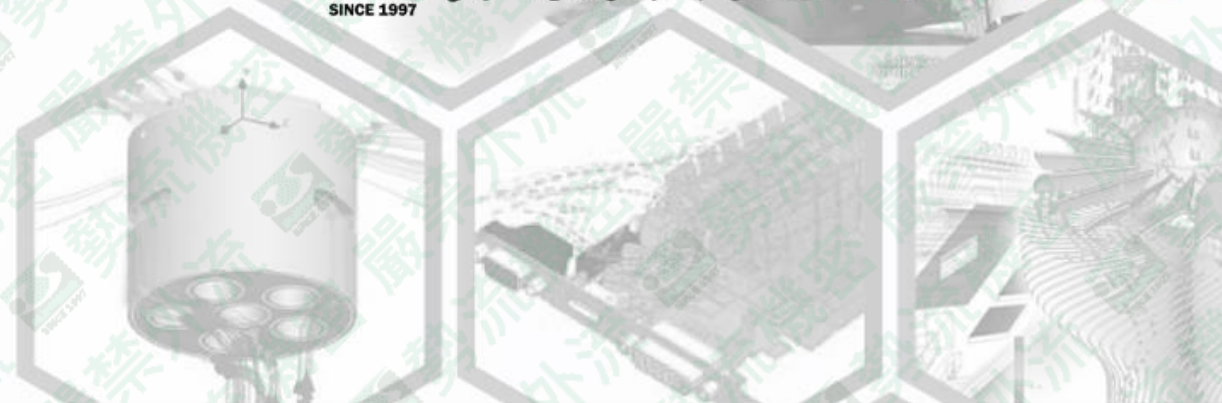
線材名稱	LP220 電流線材(2W)	MS401 量測/感測電流線材 (2W)	MS401 量測/感測電流線材 (4W)
功能說明	<ul style="list-style-type: none"> - 5 Pin 綠色排插 - 只有正負兩極插頭 (I_D^+ 紅頭 / I_D^- 黑頭) - 負責加熱元件 	<ul style="list-style-type: none"> - 6 Pin 綠色排插 - 只有正負兩極2個插頭 ($I_S^+ V_M^+$ 紅黃線-紅頭 / $I_S^- V_M^-$ 藍綠線-黑頭) - 負責給感測電流與量測元件電壓 	<ul style="list-style-type: none"> - 6 Pin 綠色排插 - 正負兩極4插頭 - 感測電流 (I_S^+ 黃線-黃頭 / I_S^- 綠線-綠頭) - 量測電壓 (V_M^+ 紅線-紅頭 / V_M^- 藍線-黑頭)
線材外觀			



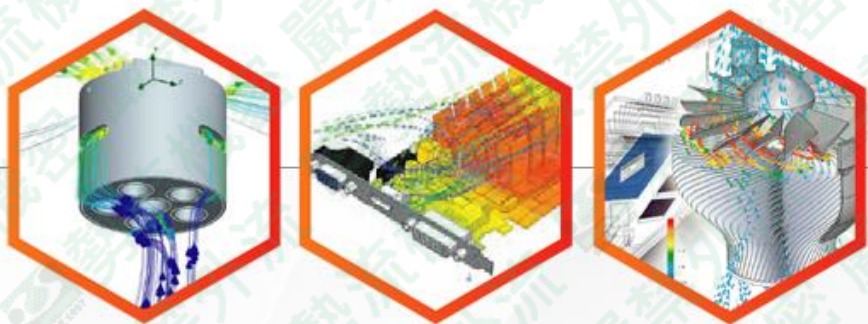
元件接線操作說明 (2/2)

• T3STER SI 單元件接法介紹







軟體執行流程說明



操控介面說明(1/4)

1. 點選Chrome瀏覽器 ，並選擇T3STER SI 連結  T3STER SI。
2. 操作主頁面有三項主頁籤如下：

Config list

- Create new config
- Import config

Settings

- Thermostat Setup
- External Devices
- License
- Other Options

Help

- Simcenter Micred T3STER SI Quick Stark Guide
- Simcenter Micred T3STER SI User Guide
- Open Source Software Component Documentation
- T3STER SI Control Software Release Highlights
- T3STER SI Control Software Release Notes
- API script example: Single diode measurement (Python code)



操控介面說明(2/4)

- **Config list** : 紀錄以往測試之專案，可藉由點選個專案項目，可快速取出該專案測試時之相關參數。

Config list

Settings

Help

SIEMENS

Config list

Create new config

Import config

▶

2023/3/22 下午12:20

Config editor

Calibration

Measurement

⋮

▶

2023/2/14 上午8:49

Config editor

Calibration

Measurement

⋮

▶

2023/2/2 上午8:52

Config editor

Calibration

Measurement

⋮

▶

2023/1/4 上午9:23

Config editor

Calibration

Measurement

⋮

▶

2023/6/7 上午11:33

Config editor

Calibration

Measurement

⋮

▶

2023/6/6 下午4:43

Config editor

Calibration

Measurement

⋮

▶

2023/6/5 上午10:53

Config editor

Calibration

Measurement

⋮

▶

2023/6/2 上午10:31

Config editor

Calibration

Measurement

⋮

▶

2023/6/2 上午9:20

Config editor

Calibration

Measurement

⋮

▶

2023/5/25 上午11:25

Config editor

Calibration

Measurement

⋮

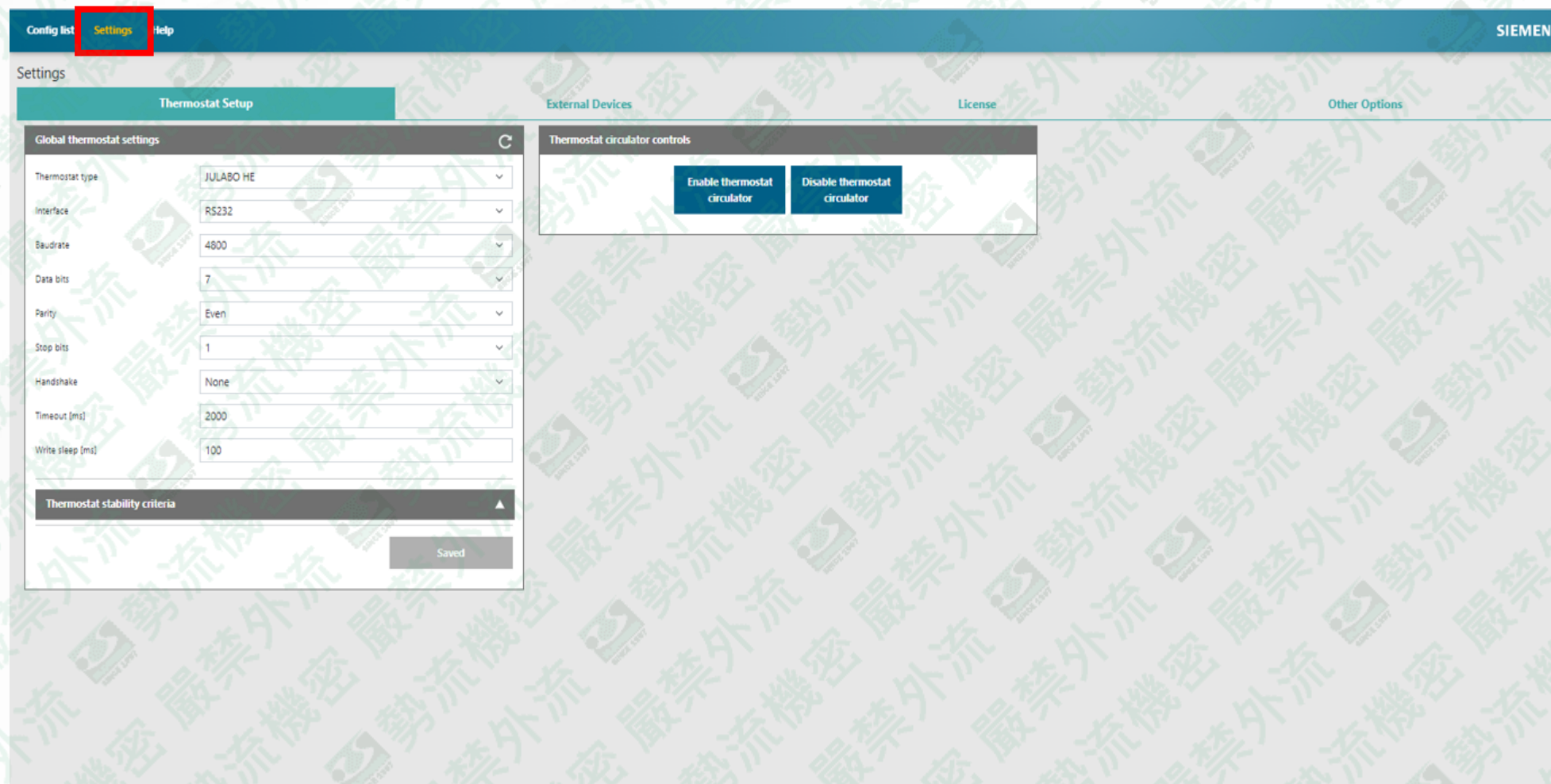
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Power



操控介面說明(3/4)

- **Settings** : 溝通各式溫控機台、**Booster**，確認 **License** 通行許可認證等頁面。



Config list **Settings** Help

SIEMENS

Settings

Thermostat Setup External Devices License Other Options

Global thermostat settings

Thermostat type: JULABO HE

Interface: RS232

Baudrate: 4800

Data bits: 7

Parity: Even

Stop bits: 1

Handshake: None

Timeout [ms]: 2000

Write sleep [ms]: 100

Thermostat stability criteria

Saved

Thermostat circulator controls

Enable thermostat circulator Disable thermostat circulator



操控介面說明(4/4)

- **Help** : 確認機台版本，並可藉由此頁面下載該版本之使用手冊、安裝手冊、版本更新事項等文件資料。



The screenshot displays the 'Help' section of the Siemens Simcenter Micred T3STER SI Control Software interface. The top navigation bar includes 'Config list', 'Settings', and 'Help' (highlighted with a red box). The main content area is titled 'About Simcenter™ Micred™ T3STER™ SI Control Software' and shows the software version as 2301, Build v5.0.1-g4124af6b. The left sidebar lists various documentation links, including 'Simcenter™ Micred™ T3STER™ SI Quick Start Guide', 'Simcenter™ Micred™ T3STER™ SI User Guide', 'Open Source Software Component Documentation', 'Simcenter™ Micred™ T3STER™ SI Control Software Release Highlights', 'Simcenter™ Micred™ T3STER™ SI Control Software Release Notes', and 'API script example: Single diode measurement (Python code)'. The main content area includes the Siemens logo, 'Copyright and Legal Notices', and a section for 'License Grant and Conditions'.

Product documentation

- Simcenter™ Micred™ T3STER™ SI Quick Start Guide
- Simcenter™ Micred™ T3STER™ SI User Guide
- Open Source Software Component Documentation
- Simcenter™ Micred™ T3STER™ SI Control Software Release Highlights
- Simcenter™ Micred™ T3STER™ SI Control Software Release Notes
- API script example: Single diode measurement (Python code)

About Simcenter™ Micred™ T3STER™ SI Control Software

Simcenter™ Micred™ T3STER™ SI Control Software
Version 2301
Build v5.0.1-g4124af6b

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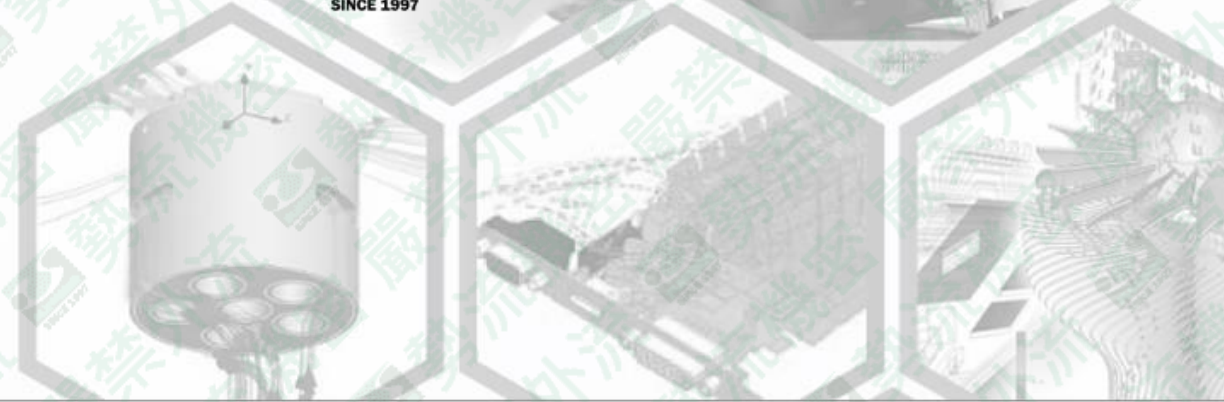
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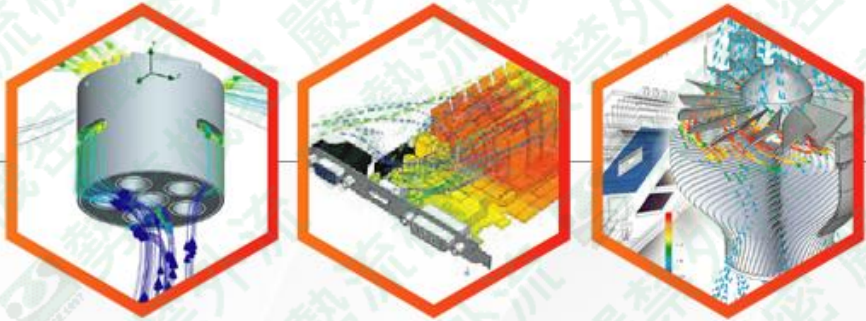
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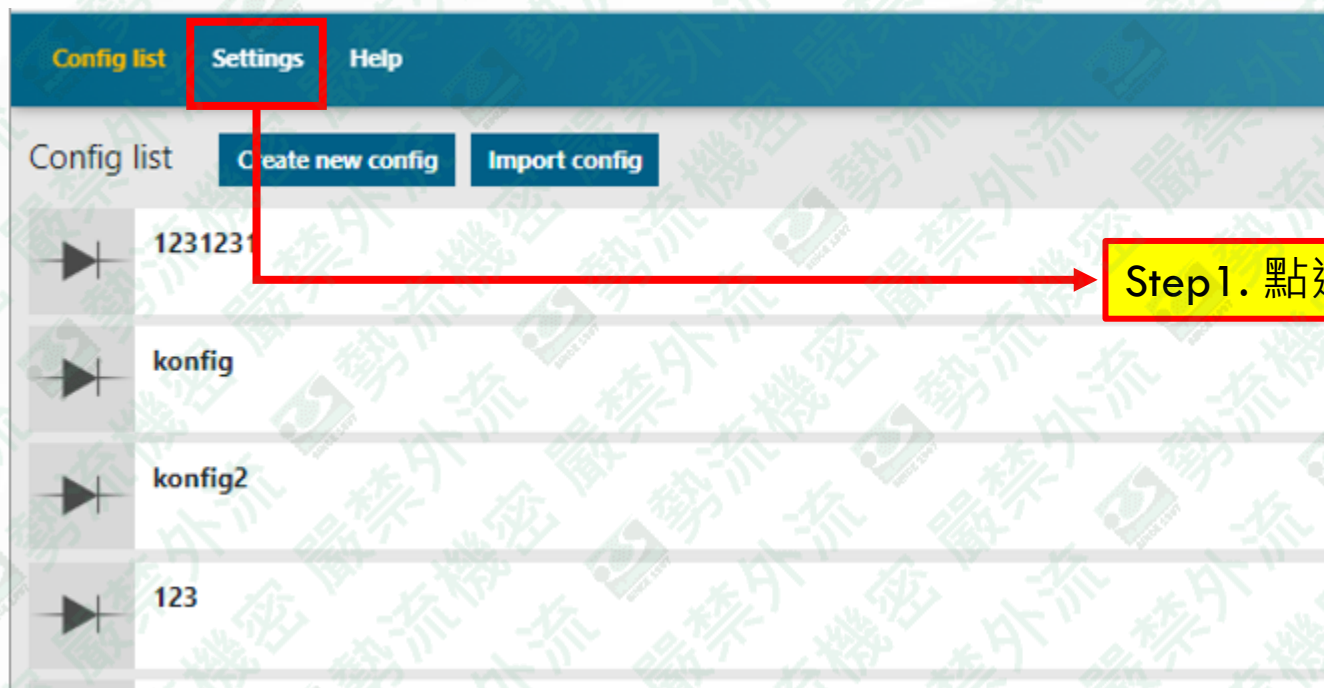


測試流程說明 (T3STER SI)



測試流程說明 (1/16)

1. 依序開啟各式機台電源，Julabo → T3STER SI/HV Booster → 電腦控制軟體連接。
2. 點選Chrome瀏覽器 ，並選擇T3STER SI 連結  T3STER SI。
3. 進入 T3STER SI 主頁後—以下流程可執行測試：



Step1. 點選Setting 連接相關機台通訊協定



測試流程說明 (2/16)

[Config list](#)
[Settings](#)
[Help](#)

Settings

Thermostat Setup

External Devices

License

Global thermostat settings

Thermostat type

JULABO HE

Interface

RS232

Baudrate

4800

Data bits

7

Parity

Even

Stop bits

1

Handshake

None

Timeout [ms]

2000

Write sleep [ms]

100

Thermostat stability criteria

Saved

Thermostat circulator controls

Enable thermostat circulator

Disable thermostat circulator

Step2. 點選 Enable thermostat circulator

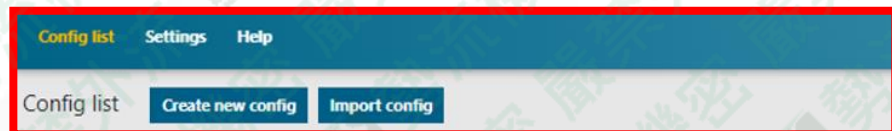
若連接成功，將跳出以下資訊

Thermostat circulator enabled.

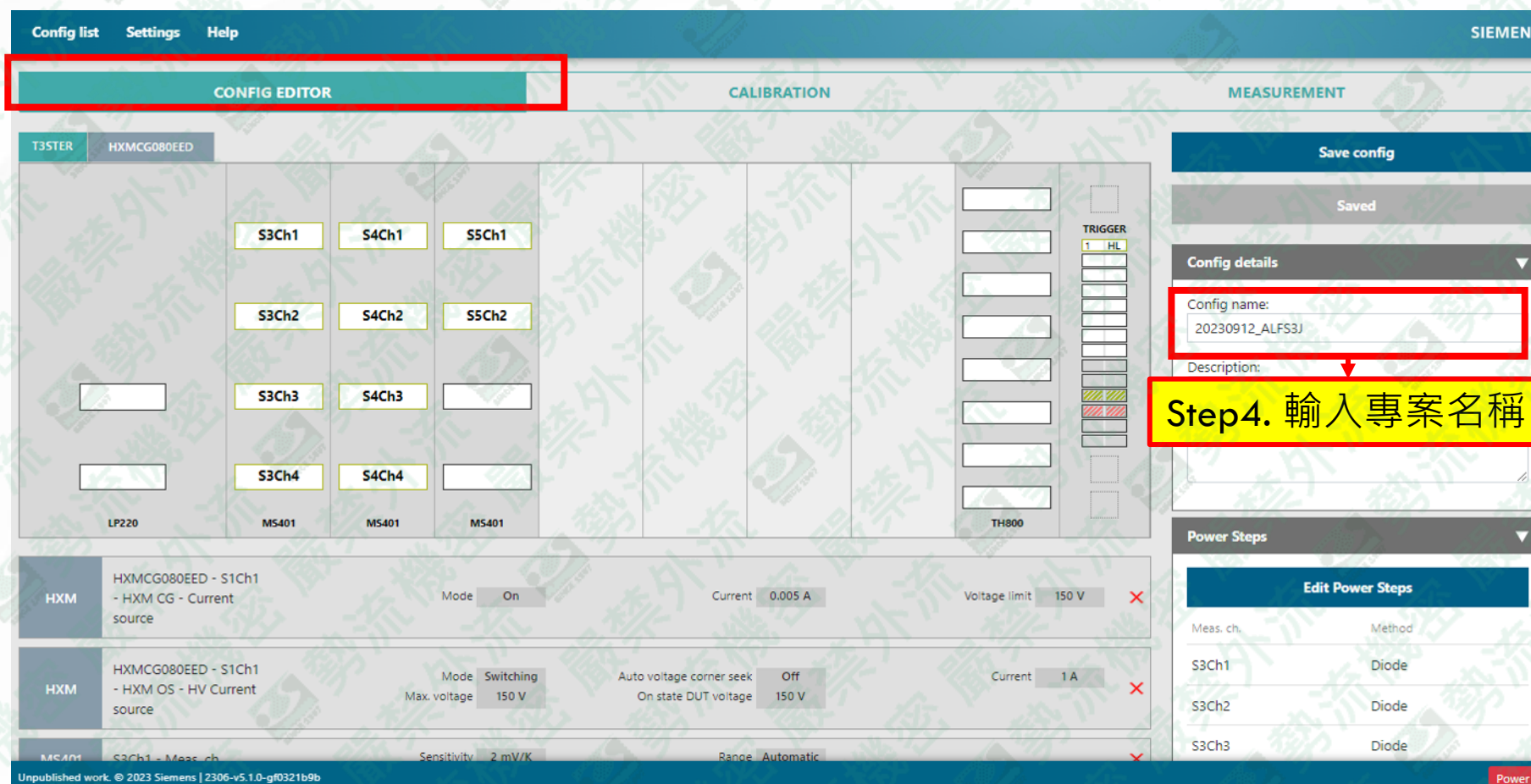
Hide



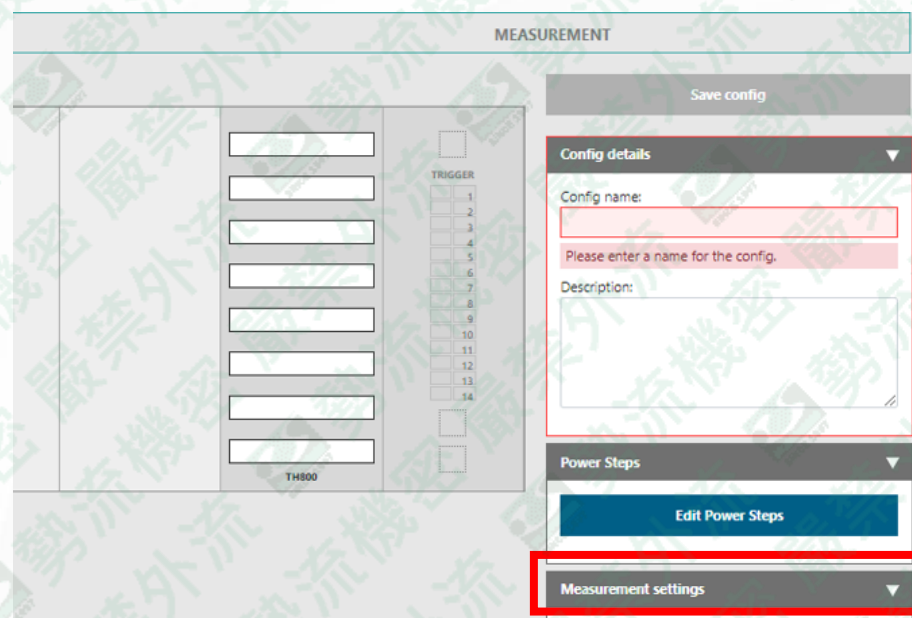
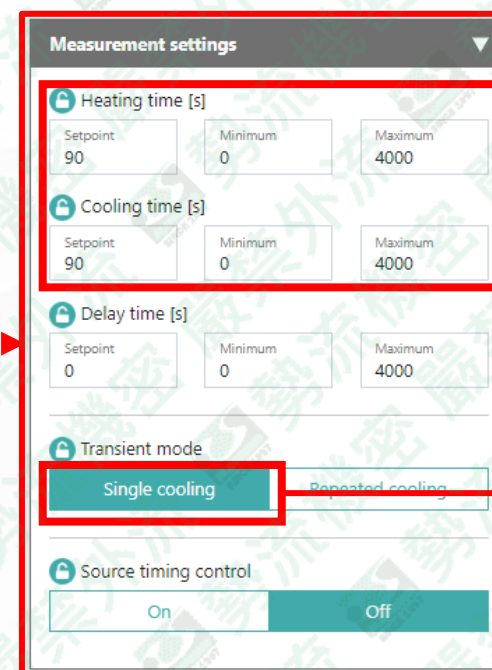
測試流程說明 (3/16)



Step3. 點選 Comfig list ，並再點選Create new config 。



測試流程說明 (4/16)

Step5. 輸入加熱、量測時間

Ex: 一般離散式元件Heating time:90s、Cooling time:90s即可

Step6. 點選Single cooling

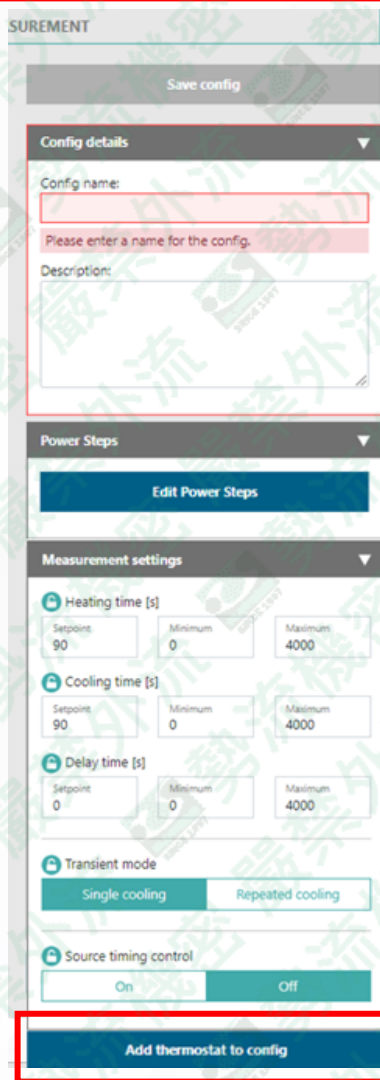
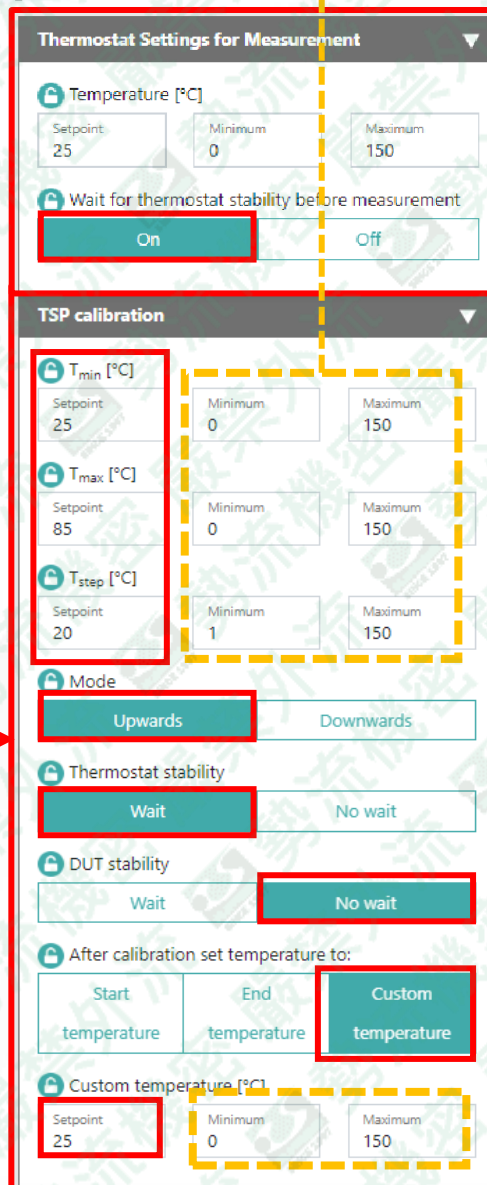
Single cooling 一次量測
Repeated cooling 重複量測

※重複量測設定流程請參照附錄D



測試流程說明 (5/16)

Step7. 點選Thermostat config

※所有溫度設定中的最高溫(Maximum)與最低溫(Minimum)的溫度差需<150°C

Step7-1. 輸入量測時溫度，選擇On

Step7-2. 確認校正溫度區間

- Tmin 最低溫
- Tmax 最高溫
- Tstep 每多少溫度記錄一次電壓

Ex: 一般設定Tmin:25°C、Tmax:85°C，若曲線為高線性相關，後續Tj量測過程中溫度若超出範圍的部分不需重量

Step7-3. 量測模式

- Mode 溫度上/下測試模式
- Thermostat Stability 溫度穩態與否
- DUT Stability 元件電壓穩態與否

Step7-4. 校正完自訂溫度設定

- Start Temp. 起始溫度
- End Temp. 結束溫度
- Customer 自訂溫度

自訂溫度不一定為25°C，依據使用者需求設定即可
※ 請勿超過冰水機規格



測試流程說明 (6/16)

Step8. 確認大小電流輸出條件

T3STER

LP220加熱源(2組)

S1Ch1
Select channel function:
Current source

LP220

MS401量測源(12組)

S3Ch1
Select channel function:
Current source
Measurement channel
Both

- 小電流輸出
- 量測通道
- 以上兩者同時開啟

MS401 MS401 MS401

熱電偶(8組)

TH800

TRIGGER
1
2
3
4
5
6
7
8
9
10
11
12
13
14

※熱電偶設定流程請參照附錄B



測試流程說明 (7/16)

Step9. 確認大小電流輸出條件

Step9-1. MS401 感測電流介面(Current Source)



MS401 S4Ch1 - Current source Mode On Current 0 A Range 10 V

Settings

- Output mode: ☒ Off ☒ On
- Range: ☒ 0.200 A $|V_{out}| < 10\text{ V}$ ☐ 0.100 A $10\text{ V} < |V_{out}| < 20\text{ V}$ ☐ 0.050 A $20\text{ V} < |V_{out}| < 40\text{ V}$
- Current [A]: Setpoint 0

感測電流輸入

Step9-2. MS401 量測介面(Measurement Channel)



MS401 S1Ch1 - Meas. ch. + Divider Sensitivity 2 mV/K Range 20 V ($\pm 10\text{ V}$)

Settings

- Sensitivity [mV/K]: 2
- Auto range: ☒ On ☐ Off
- Range: Full scale: 20 V, $V_{in}: \pm 10\text{ V}$

Apply all

Step9-3. LP220 加熱源設定介面 (Current Source)



LP220 S1Ch2 - Current source Mode Switching Current 1 A Voltage limit 10 V

Settings

- Output mode: ☐ Off ☒ Switching ☐ On
- Current [A]: Setpoint 1
- Voltage limit [V]: Setpoint 10
- Source switching delay (rising) [μs]: Setpoint 0 Minimum -16383 Maximum 16383
- Source switching delay (falling) [μs]: Setpoint 0 Minimum -16383 Maximum 5000

加熱電流輸入

加熱電流下的元件電壓限制



測試流程說明 (8/16)

Config list
Settings
Help

CONFIG EDITOR

T3STER

S3Ch1

S1Ch1

LP220

MS401

MS401

MS401

CALIBRATION

MEASUREMENT

Save config

Config details

Config name:

Please enter a name for the config.

Description:

Power Steps

Edit Power Steps

LP220	S1Ch1 - Current source	Mode: Switching	Current: 0 A	Voltage limit: 0 V
MS401	S3Ch1 - Current source	Mode: On	Current: 0 A	Range: 10 V
MS401	S3Ch1 - Meas. ch.	Sensitivity: 2 mV/K	Range: 20 V (±10 V)	

設定值將顯示於此欄

設定完成將會有以上顯示條列

Step10. 確認Power Step計算

Measurement settings

Heating time [s]

Setpoint: 30

Minimum: 0

Maximum: 4000

Cooling time [s]

Setpoint: 30

Minimum: 0

Maximum: 4000

Delay time [s]

Setpoint: 0

Minimum: 0

Maximum: 4000

Source timing control

On

Off



測試流程說明 (9/16)

Step10. 確認Power Step計算

CONFIG EDITOR

CALIBRATION

MEASUREMENT

T3STER

LP220

MS401

MS401

Power Step editor

T3STER

S1Ch1

LP220

S3Ch1

MS401

MS401

MS401

Select Power Step calculation method for all channels

Apply for all measurement channels

Select Power Step calculation method

S3Ch1

Diode

Diode — $P_{step} = ||V_{meas,heat} \cdot (I_{drive} + I_{sense})$

S3Ch1

S1Ch1

+

S1Ch1

+

Save

Cancel

Source timing control

On

Off

Step10-2. 選擇感測電流

Step10-3. 選擇加熱電流

Step10-1. 選擇Diode

Step10-4. Save

25

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測試流程說明 (10/16)

Config list
Settings
Help

CONFIG EDITOR

T3STER

S3Ch1

S1Ch1

LP220

MS401

MS401

MS401

CALIBRATION

MEASUREMENT

Step 11. Save Config後才可執行 CALIBRATION and MEASUREMENT

Save config

Config details

Config name:

Please enter a name for the config.

Description:

Power Steps

Edit Power Steps

Meas. ch.

Method

S3Ch1

Measurement settings

Heating time [s]

Setpoint

Minimum

Maximum

Cooling time [s]

Setpoint

Minimum

Maximum

Delay time [s]

Setpoint

Minimum

Maximum

LP220

S1Ch1 - Current source

Mode

Switching

Current

0 A

Voltage limit

0 V

MS401

S3Ch1 - Current source

Mode

On

Current

0 A

Range

10 V

MS401

S3Ch1 - Meas. ch.

Sensitivity

2 mV/K

Range

20 V (±10 V)

備註：在CONFIG EDITOR的頁籤中，若都已設定完成，後續CALIBRATION and MEASUREMENT 確認完感測電流下的電壓值後，即可直接執行測試。

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Power



Step12. 點選CALIBRATION 準備執行元件校正

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測試流程說明 (12/16)

Step12. 點選CALIBRATION 準備執行元件校正 (正在執行校正畫面)

SIEMENS

CONFIG EDITOR
CALIBRATION
MEASUREMENT

Layout
Plot



Step 3/4 - 28.90°C (29.00°C)

LP220	S1Ch1 - Current source	Mode Switching	Current 0 A	Voltage limit 10 V
MS401	S5Ch1 - Current source	Mode On	Current 0.01 A	Range 10 V
MS401	S5Ch1 - Meas. ch.	Range 20 V (±10 V)		

Start calibration

Disable sources
Enable sources

Config details

Description:

TSP calibration

T_{min} [°C]

Setpoint

25

Minimum

-30

Maximum

160

T_{max} [°C]

Setpoint

85

Minimum

-30

Maximum

160



測試流程說明 (13/16)

Step12. 點選CALIBRATION 準備執行元件校正 (校正完畫面)



測試流程說明 (14/16)

Config list
Settings
Help
Running: Silanna_SMD 30D_0.5mmx0...
SIEMENS

CONFIG EDITOR

CALIBRATION

MEASUREMENT

T3STER

Plot

Step 13. Start measurement 執行測試

Start measurement

Disable sources

Enable sources

Config details

Description:

Measurement settings

Heating time [s]

Setpoint

Minimum

Maximum

Cooling time [s]

Setpoint

Minimum

Maximum

LP220	LP220	MS401	MS401	MS401	MS401	MS401	MS401
		S5Ch1					
S1Ch1							

LP220

S1Ch1 - Current source

Mode

Switching

Current

0 A

Voltage limit

10 V

MS401

S5Ch1 - Current source

Mode

On

Current

0.01 A

Range

10 V

MS401

S5Ch1 - Meas. ch.

Sensitivity

2 mV/K

Range

20 V (±10 V)



測試流程說明 (15/16)

Step13. Start measurement 執行測試 (正在執行測試畫面)

CONFIG EDITOR

CALIBRATION

MEASUREMENT

Layout

Plot



Measurement pending: waiting for thermostat stabilization, 25.14°C (25.00°C)

LP220	S1Ch1 - Current source	Mode	Switching	Current	0 A	Voltage limit	10 V
MS401	S5Ch1 - Current source	Mode	On	Current	0.01 A	Range	10 V
MS401	S5Ch1 - Meas. ch.	Sensitivity	2 mV/K	Range	20 V (±10 V)		

Stop measurement

Disable sources

Enable sources

Config details

Description:

Measurement settings

Heating time [s]

Setpoint

Minimum

Maximum

90

0

4000

Cooling time [s]

Setpoint

Minimum

Maximum

90

0

4000

31



測試流程說明 (16/16)

Step13. Start measurement 執行測試 (正在執行測試畫面)

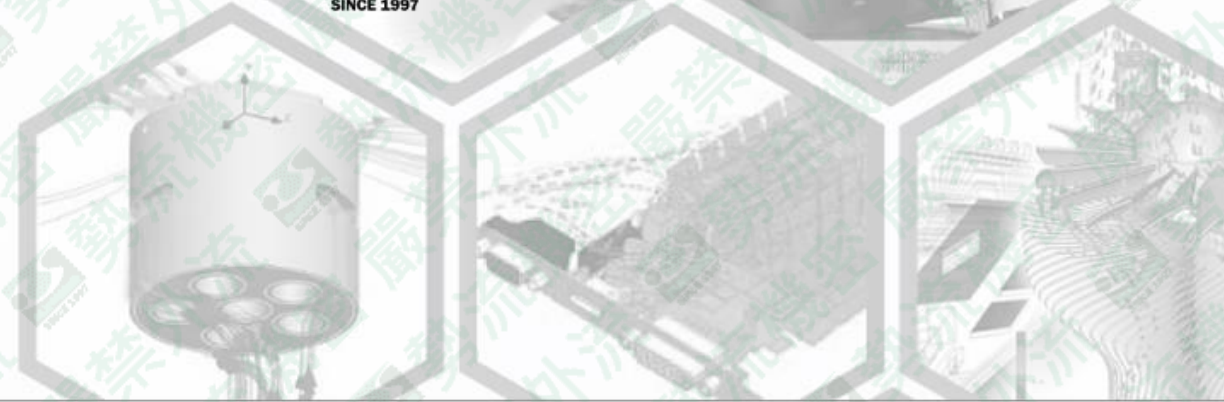


Step13-1.儲存所有量測結果
可在此增加檔名

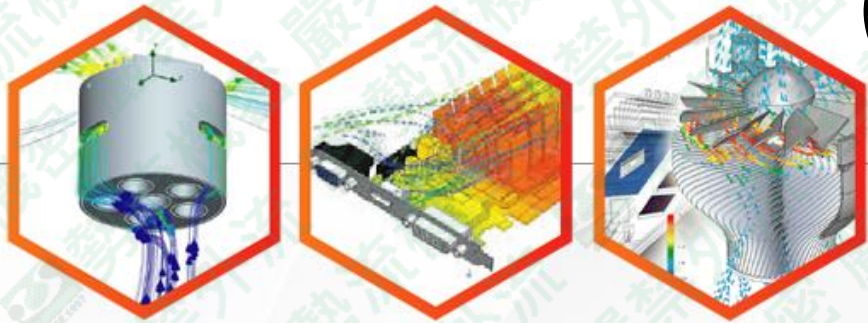
備註:

- Heating(PAR) (RAW) 為加熱時的數據表現
- Cooling(PAR)(RAW)為降溫量測時的數據表現(分析熱阻的檔案，務必儲存)





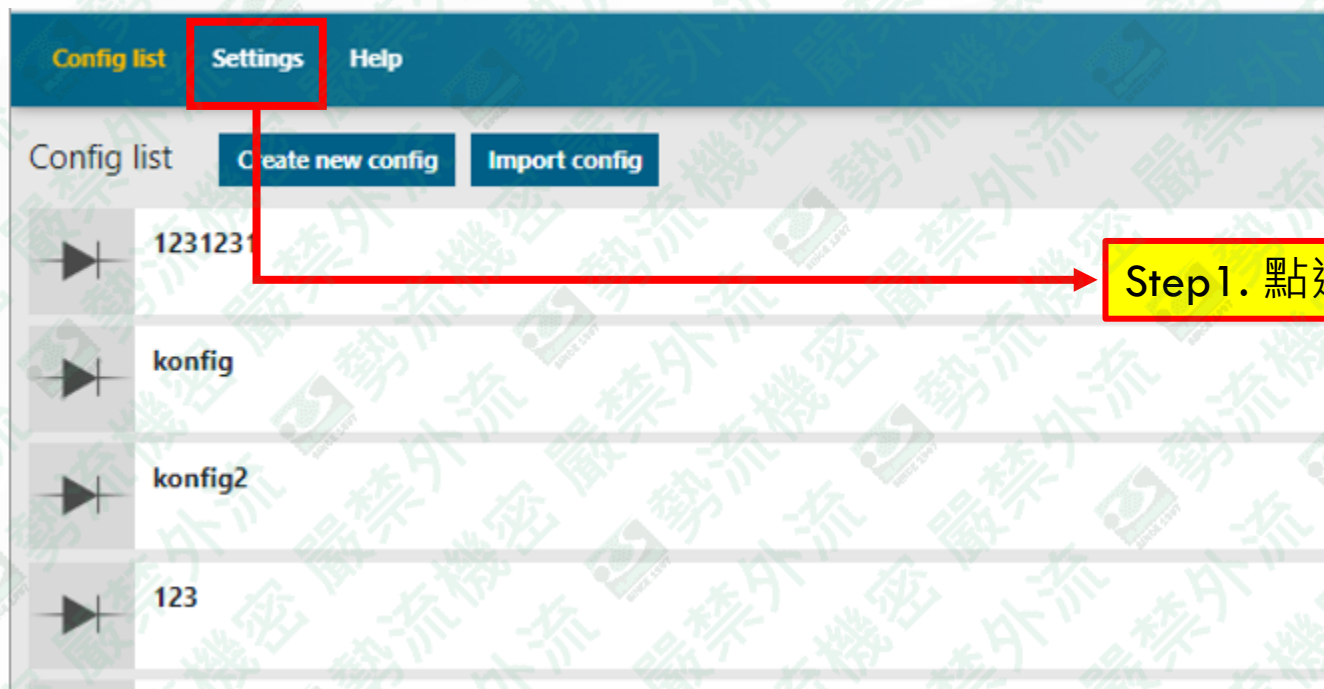


測試流程說明 (T3STER SI + Booster 10A/150V)



Booster 10A/150V 測試流程說明 (1/17)

1. 依序開啟各式機台電源，Julabo → T3STER SI/HV Booster → 電腦控制軟體連接。
2. 點選Chrome瀏覽器 ，並選擇T3STER SI 連結  T3STER SI。
3. 進入 T3STER SI 主頁後—以下流程可執行測試：



Step1. 點選Setting 連接相關機台通訊協定



Booster 10A/150V 測試流程說明 (2/17)



Config list Settings Help

Settings

Thermostat Setup

External Devices License

Global thermostat settings

Thermostat type: JULABO HE

Interface: RS232

Baudrate: 4800

Data bits: 7

Parity: Even

Stop bits: 1

Handshake: None

Timeout [ms]: 2000

Write sleep [ms]: 100

Thermostat stability criteria

Saved

Thermostat circulator controls

Enable thermostat circulator

Disable thermostat circulator

Step2. 點選 Enable thermostat circulator
若連接成功，將跳出以下資訊

Thermostat circulator enabled. Hide



Booster 10A/150V 測試流程說明 (3/17)



Config list Settings Help

Settings

Thermostat Setup External Devices License Other Options

Available Devices Booster configurations Modular device configurations

Setup new serial device

Reinitialize external hardware

Port	Address	Device	Type	Serial
RS485 2		HXM-OS-MAIN-1.21-0372-080F2C	HXMOS	HXMOS080F2C
RS485 6		HXM-DIV-MAIN-1.1-0367-080EEB	HXMDIV	HXMDIV080EEB
RS485 10		LAMBDA,GEN150-10	TDKPSU	251B374-0008
RS485 20		HXM-CG-MAIN-1.20-0357-080EED	HXMCG	HXMCG080EED

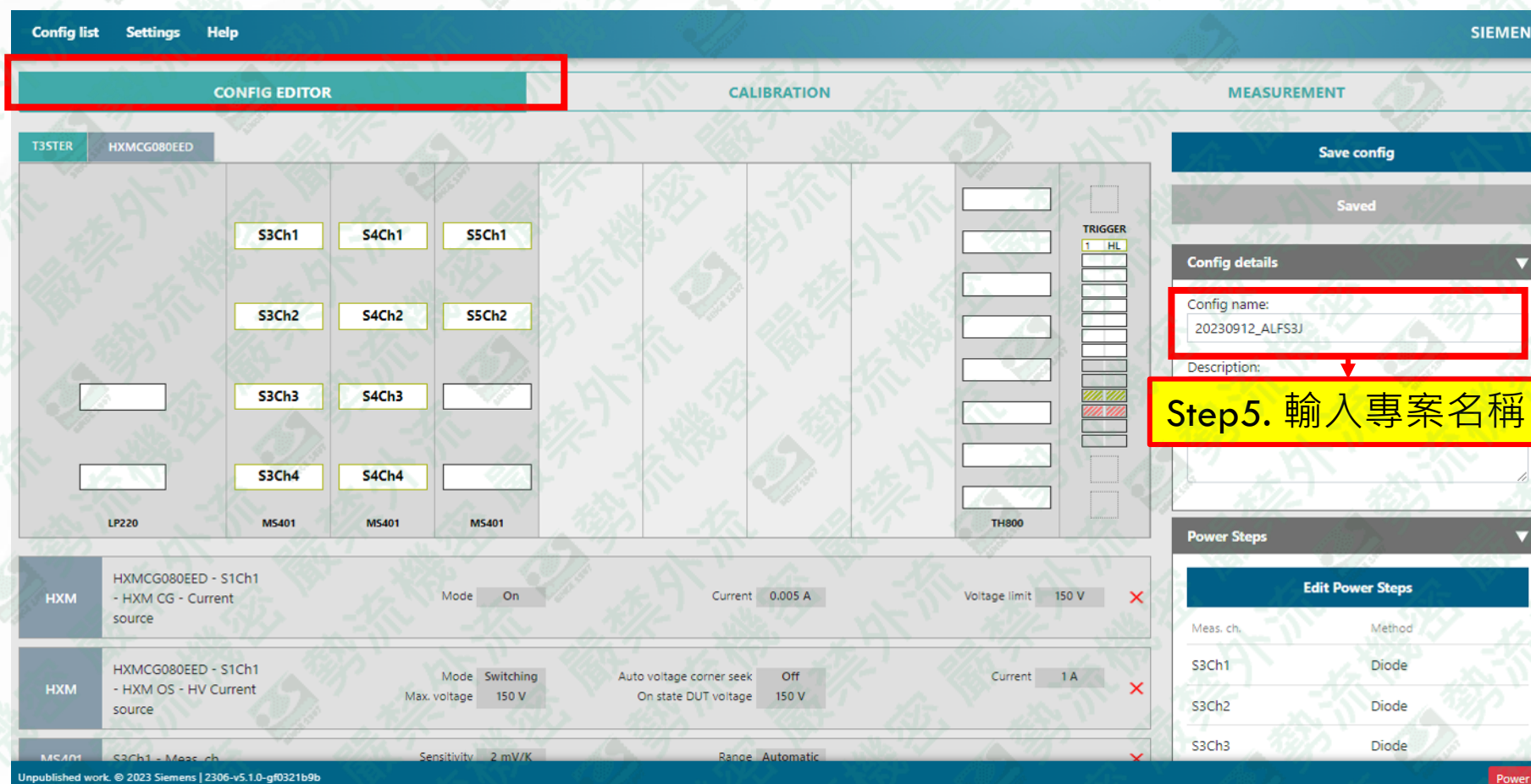
Step3. 進入 External Devices 頁面
 點選 Reinitialize external hardware 重新整理連接
 若連接成功，右邊資訊欄的文字顏色會由淺色變深色



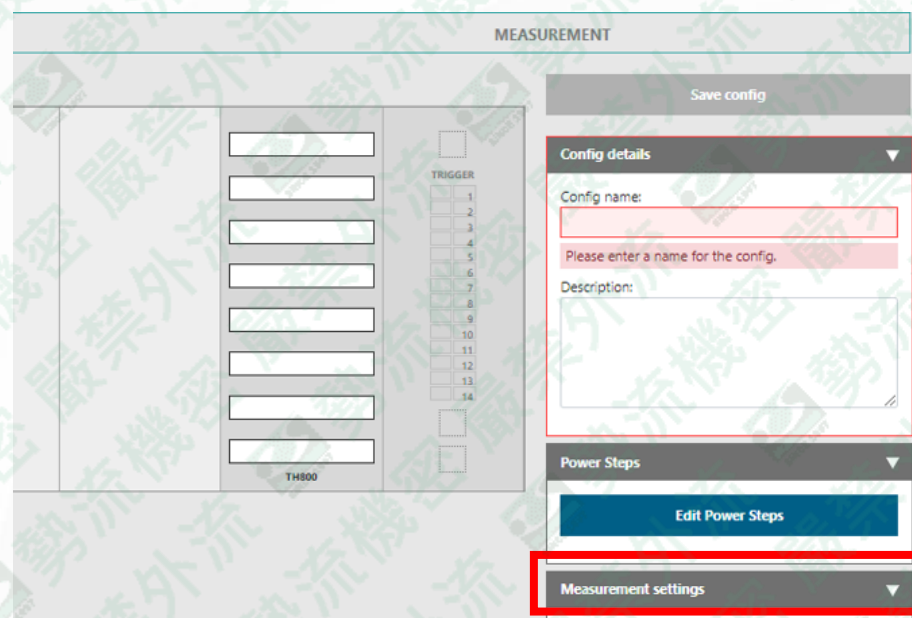
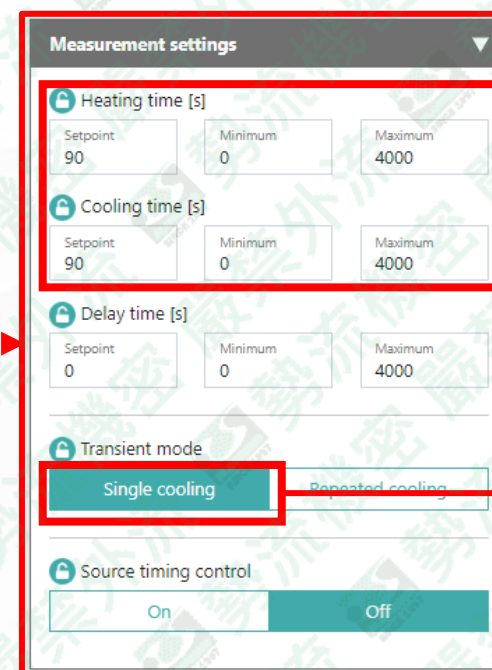
Booster 10A/150V 測試流程說明(4/16)



Step4. 點選 Comfig list ，並再點選Create new config 。



Booster 10A/150V 測試流程說明(5/16)

Step6. 輸入加熱、量測時間

Ex: 一般離散式元件Heating time:90s、Cooling time:90s即可

Step7. 點選Single cooling

Single cooling 一次量測
Repeated cooling 重複量測

※重複量測設定流程請參照附錄D



Booster 10A/150V 測試流程說明(6/16)



勢流科技

SIEMENS

Step8. 點選Thermostat config

SUREMENT

Save config

Config details

Config name:

Please enter a name for the config.

Description:

Power Steps

Edit Power Steps

Measurement settings

Heating time [s]

Setpoint: 90 Minimum: 0 Maximum: 4000

Cooling time [s]

Setpoint: 90 Minimum: 0 Maximum: 4000

Delay time [s]

Setpoint: 0 Minimum: 0 Maximum: 4000

Transient mode

Single cooling Repeated cooling

Source timing control

On Off

Add thermostat to config

Thermostat Settings for Measurement

Temperature [°C]

Setpoint: 25 Minimum: 0 Maximum: 150

Wait for thermostat stability before measurement

On Off

TSP calibration

Tmin [°C]

Setpoint: 25 Minimum: 0 Maximum: 150

Tmax [°C]

Setpoint: 85 Minimum: 0 Maximum: 150

Tstep [°C]

Setpoint: 20 Minimum: 1 Maximum: 150

Mode

Upwards Downwards

Thermostat stability

Wait No wait

DUT stability

Wait No wait

After calibration set temperature to:

Start temperature End temperature Custom temperature

Custom temperature [°C]

Setpoint: 25 Minimum: 0 Maximum: 150

※所有溫度設定中的最高溫(Maximum)與最低溫(Minimum)的溫度差需<150°C

Step8-1. 輸入量測時溫度，選擇On

Step8-2. 確認校正溫度區間

- Tmin 最低溫
- Tmax 最高溫
- Tstep 每多少溫度記錄一次電壓

Ex: 一般設定Tmin:25°C、Tmax:85°C，若曲線為高線性相關，後續T_i量測過程中溫度若超出範圍的部分不需重量

Step8-3. 量測模式

- Mode 溫度上/下測試模式
- Thermostat Stability 溫度穩態與否
- DUT Stability 元件電壓穩態與否

Step8-4. 校正完自訂溫度設定

- Start Temp. 起始溫度
- End Temp. 結束溫度
- Customer 自訂溫度

自訂溫度不一定為25°C，依據使用者需求設定即可
※ 請勿超過冰水機規格



Booster 10A/150V 測試流程說明 (7/17)

Step9. 確認大小電流輸出條件



The screenshot shows the T3STER software interface for the HXMC080EED device. The main window displays the MS401 measurement source configuration (12 channels). A red box highlights the 'Select channel function' dropdown menu, which is set to 'Measurement channel'. A yellow box highlights the 'Step9-1. 量測通道' label. To the right, the 'Trigger configuration settings' window is open, showing 'Trigger 1' selected. A yellow box highlights the 'Step9-2. 選擇Trigger 1 · 並按Save' instruction. The 'Save' button is also highlighted with a red box.

※測電壓超過80V才需設定除法器量，設定方法請參照附錄C



The screenshot shows the T3STER software interface for the HXMC080EED device. The main window displays the HXM Divider configuration (4 channels). A yellow box highlights the 'Step10. 10A/150V Booster 介面說明' instruction. Below the divider configuration, the HXM CG measurement source (1 channel) is shown, with a red box highlighting the 'I_{meas}' label. The HXM OS heating source (1 channel) is also shown, with a red box highlighting the 'I_{heat}' label. The Trigger connection (1 channel) is shown, with a red box highlighting the 'Trigger' label and the '1' in the dropdown menu.



Booster 10A/150V 測試流程說明 (8/17)

Step11. 確認大小電流輸出條件

Step11-1. HXM CG 感測電流介面 (Current Source)

HXM HXMC080EED - S1Ch1 - HXM CG - Current source Mode On Current 0 A Voltage limit 0.6 V

Settings

Output mode ☒ Off ☒ On

Current [A] Setpoint 0 Minimum -0.1 Maximum 0.1

Voltage limit [V] Setpoint 0.6 Minimum 0.6 Maximum 300

感測電流輸入

感測電流下的元件電壓限制

Step11-2. HXM OS 感測電流介面 (HV Current Source)

HXM HXMC080EED - S1Ch1 - HXM OS - HV Current source Auto voltage corner seek Off On state DUT voltage 0 V Current 0 A

Settings

Output mode ☐ Off ☐ On ☒ Switching

Auto voltage corner seek ☒ Off ☐ On

Current [A] Setpoint 0 Minimum 0 Maximum 10

Maximum DUT voltage [V] Setpoint 0 Minimum 0 Maximum 150

On-state DUT voltage [V] Setpoint 0 Minimum 0 Maximum 150

加熱電流輸入

加熱電流下的元件電壓限制

Step11-3. MS401 量測介面 (Measurement Channel)

MS401 S6Ch1 - Meas. ch. Sensitivity 2 mV/K Range 20 V (±10 V)

Settings

Sensitivity [mV/K] 2

Auto range ☒ On ☐ Off

Range Full scale: 20 V, V(in): ±10 V

Apply all

Auto range可先選on，若量測結果out of range再選擇 off，並選擇合適範圍

Booster 10A/150V 測試流程說明 (9/17)

The screenshot displays the SIEMENS M5401 configuration software interface. The top navigation bar includes 'Config list', 'Settings', 'Help', and 'Running: 869754'. The main workspace is divided into three tabs: 'CONFIG EDITOR', 'CALIBRATION', and 'MEASUREMENT'. The 'CONFIG EDITOR' tab is active, showing a table of components and their settings. A yellow box highlights the 'S5Ch1' component, and a red box highlights the 'HXM' and 'MS401' components. A yellow callout box points to the 'S5Ch1' component with the text '設定值將顯示於此欄' (Settings will be displayed in this column). A red callout box points to the 'HXM' and 'MS401' components with the text '設定完成將會有以上顯示條列' (After completion, the following display list will be shown). The right side of the screen shows the 'MEASUREMENT' tab with 'Power Steps' and 'Measurement settings' sections.

Component	Mode	Current	Voltage limit
HXM	On	0 A	0.6 V
HXM	Switching	0 A	0.6 V
MS401	S5Ch1 - Meas. ch. + Divider	0 A	0.6 V

Setting completion will result in the following display list:

- Mode: On
- Current: 0 A
- Voltage limit: 0.6 V
- Auto voltage corner seek: Off
- On state DUT voltage: 0 V
- Sensitivity: 2 mV/K
- Range: 20 V (± 10 V)



Booster 10A/150V 測試流程說明 (10/17)

Step12. 確認Power Step計算

Power Step editor

T3STER HXMC0800EED

LP220

S5Ch1

MS401 MS401 MS401 MS401 MS401 MS401

TRIGGER

Select Power Step calculation method for all channels

Apply for all measurement channels

Step12-1. 選擇Diode

Select Power Step calculation method

S5Ch1 Diode

Diode $P_{step} = |V_{meas,heat} \cdot (I_{drive} + I_{sense})|$

S5Ch1

Step12-2. 選擇感測電流

Sense

HXMC0800EED - S1Ch1 - HXM CG

Step12-3. 選擇加熱電流

Drive

HXMC0800EED - S1Ch1 - HXM OS

Save Cancel

Step12-4. Save

HXM HXMC0800EED - S1Ch1 - HXM OS - HV Current source

Mode Switching

Max. voltage 0 V

On state DUT voltage 0 V

Current 0 A

Delay time [s]

Setpoint 0 Minimum 0 Maximum 4000

Source timing control

Output mode Off On Switching



Booster 10A/150V 測試流程說明 (11/17)

Config list
Settings
Help

CONFIG EDITOR

T3STER

S3Ch1

S1Ch1

LP220

MS401

MS401

MS401

CALIBRATION

MEASUREMENT

Save config

Config details

Config name:

Please enter a name for the config.

Description:

Power Steps

Edit Power Steps

Meas. ch.

S3Ch1

Measurement settings

Heating time [s]

Setpoint

30

Minimum

0

Maximum

4000

Cooling time [s]

Setpoint

30

Minimum

0

Maximum

4000

Delay time [s]

Setpoint

0

Minimum

0

Maximum

4000

LP220

S1Ch1 - Current source

Mode

Switching

Current

0 A

Voltage limit

0 V

MS401

S3Ch1 - Current source

Mode

On

Current

0 A

Range

10 V

MS401

S3Ch1 - Meas. ch.

Sensitivity

2 mV/K

Range

20 V (±10 V)

Step13. Save Config後才可執行

CALIBRATION and MEASUREMENT

備註：在CONFIG EDITOR的頁籤中，若都已設定完成，後續CALIBRATION and MEASUREMENT 確認完感測電流下的電壓值後，即可直接執行測試。

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Power



Step14. 點選CALIBRATION 準備執行元件校正

- 電壓設定若超過50V按下Enable、Start calibration後需要按下藍色按鈕

Booster 10A/150V 測試流程說明 (13/17)

Step15. 點選CALIBRATION 準備執行元件校正 (正在執行校正畫面)

SIEMENS

CONFIG EDITOR
CALIBRATION
MEASUREMENT

Layout
Plot

Tsp calibration

Step 3/4 - 28.90°C (29.00°C)

LP220	S1Ch1 - Current source	Mode	Switching	Current	0 A	Voltage limit	10 V
MS401	S5Ch1 - Current source	Mode	On	Current	0.01 A	Range	10 V
MS401	S5Ch1 - Meas. ch.	Range 20 V (±10 V)					

Start calibration

Disable sources
Enable sources

Config details

Description:

TSP calibration

T_{min} [°C]

Setpoint 25

Minimum -30

Maximum 160

T_{max} [°C]

Setpoint 85

Minimum -30

Maximum 160



Booster 10A/150V 測試流程說明 (14/17)

Step16. 點選CALIBRATION 準備執行元件校正 (校正完畫面)

SIEMENS

CONFIG EDITOR
CALIBRATION
MEASUREMENT

T3STER
Plot



LP220	S1Ch1 - Current source	Mode	Switching	Current	0 A	Voltage limit	10 V
MS401	S5Ch1 - Current source	Mode	On	Current	0.01 A	Range	10 V
MS401	S5Ch1 - Meas. ch.	Range	20 V (±10 V)				

Start calibration

Disable sources
Enable sources

Download results

Measurement Parameters

S4Ch1 - TspCalib (TCO)

TSP calibration

T_{min} [°C]

Setpoint
25

Minimum
-30

Maximum
160

T_{max} [°C]

Setpoint
85

Minimum
-30

Maximum
160

Step16-1. 點選後即下載元件校正之TCO檔案



Booster 10A/150V 測試流程說明 (15/17)

Config list
Settings
Help
Running: Silanna_SMD 30D_0.5mmx0...
SIEMENS

CONFIG EDITOR

CALIBRATION

MEASUREMENT

T3STER

Plot

Step17. Start measurement 執行測試

Start measurement

Disable sources

Enable sources

Component	Channel	Mode	Current	Voltage limit	Range
LP220	S1Ch1 - Current source	Mode: Switching	Current: 0 A	Voltage limit: 10 V	
MS401	S5Ch1 - Current source	Mode: On	Current: 0.01 A		Range: 10 V
MS401	S5Ch1 - Meas.				

Config details

Description:

Measurement settings

Heating time [s]

Setpoint: 90

Minimum: 0

Maximum: 4000

電壓設定若超過50V按下Enable、Start measurement 後需要按下藍色按鈕



Booster 10A/150V 測試流程說明 (16/17)

Step18. Start measurement 執行測試 (正在執行測試畫面)

CONFIG EDITOR

CALIBRATION

MEASUREMENT

Layout

Plot



Measurement pending: waiting for thermostat stabilization, 25.14°C (25.00°C)

LP220	S1Ch1 - Current source	Mode	Switching	Current	0 A	Voltage limit	10 V
MS401	S5Ch1 - Current source	Mode	On	Current	0.01 A	Range	10 V
MS401	S5Ch1 - Meas. ch.	Sensitivity	2 mV/K	Range	20 V (±10 V)		

Stop measurement

Disable sources

Enable sources

Config details

Description:

Measurement settings

Heating time [s]

Setpoint

Minimum

Maximum

90

0

4000

Cooling time [s]

Setpoint

Minimum

Maximum

90

0

4000

49



Booster 10A/150V 測試流程說明 (17/17)

Step19. Start measurement 執行測試 (正在執行測試畫面)

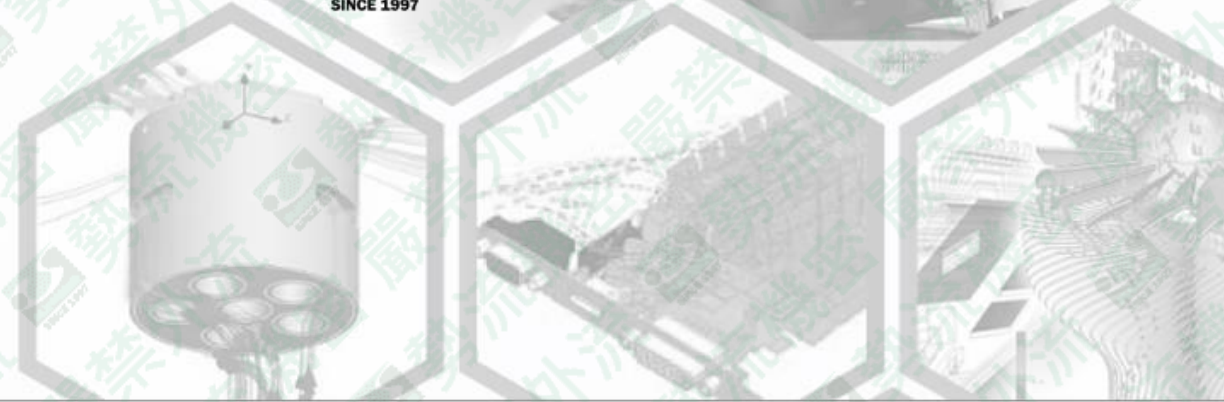


Step19-1.儲存所有量測結果

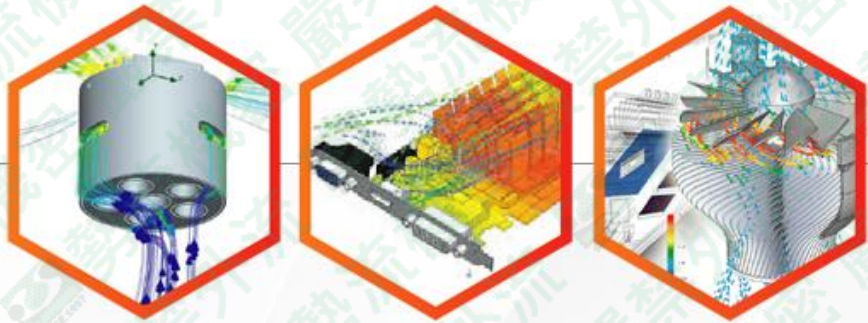
備註:

- a. Heating(PAR) (RAW) 為加熱時的數據表現
- b. Cooling(PAR)(RAW)為降溫量測時的數據表現





附錄A-變溫Vf 測試SOP



流程說明

1. 開啟冰水機、T3STER SI、10A/150V Booster (總電壓電流高於2A10V、1A20V、0.5A40V請開啟Booster)。
2. 創建新測試專案，請於CONFIG EDITOR 設定完相關參數。
3. 進入 MEASUREMENT 介面，設定**測試時間**、**測試溫度**，溫度-40 °C ~100 °C使用LC平台，溫度0 °C ~150 °C 使用HC 平台。
4. 確認測試參數、元件擺設都沒問題，即可按下start measurement 執行量測。
5. 儲存Cooling or Heating 檔案，選擇PAR(或PARX)檔下載即可。
6. 使用T3ster master開啟紀錄相關電壓數據。



步驟說明圖 (1/5)

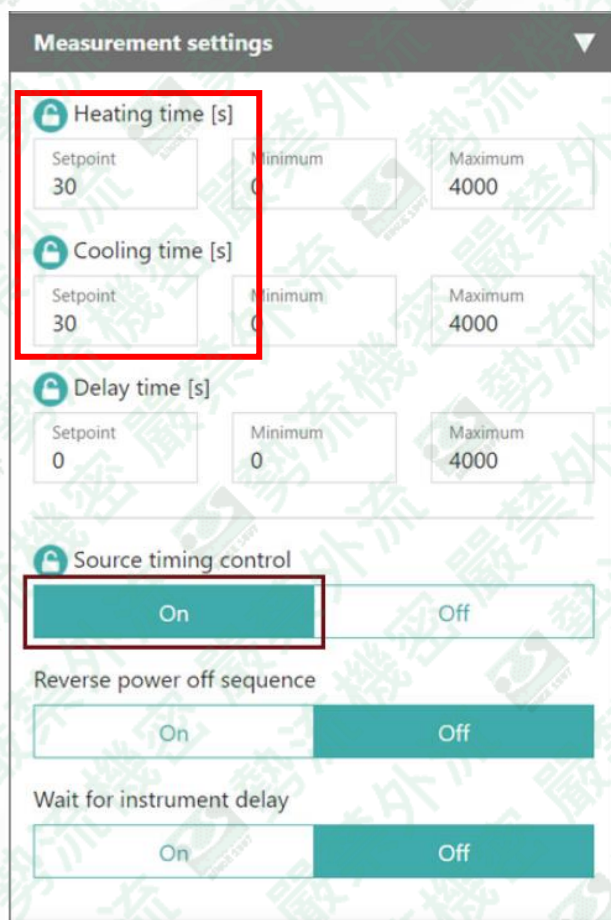
1. 開啟冰水機、T3STER SI、10A/150V Booster (總電壓電流高於2A10V、1A20V、0.5A40V請開啟Booster)。
2. 創建新測試專案，請於CONFIG EDITOR 設定完相關參數。



步驟說明圖 (2/5)

- 進入 MEASUREMENT 介面，設定測試時間、測試溫度，溫度-40 °C ~100 °C使用LC平台，溫度0 °C ~150 °C使用HC 平台。

(Heating time 設定預計測試時間，Cooling time 設定5s即可，並在Thermostat Settings中設定欲測試溫度)



Measurement settings

Heating time [s]

Setpoint: 30, Minimum: 0, Maximum: 4000

Cooling time [s]

Setpoint: 30, Minimum: 0, Maximum: 4000

Delay time [s]

Setpoint: 0, Minimum: 0, Maximum: 4000

Source timing control

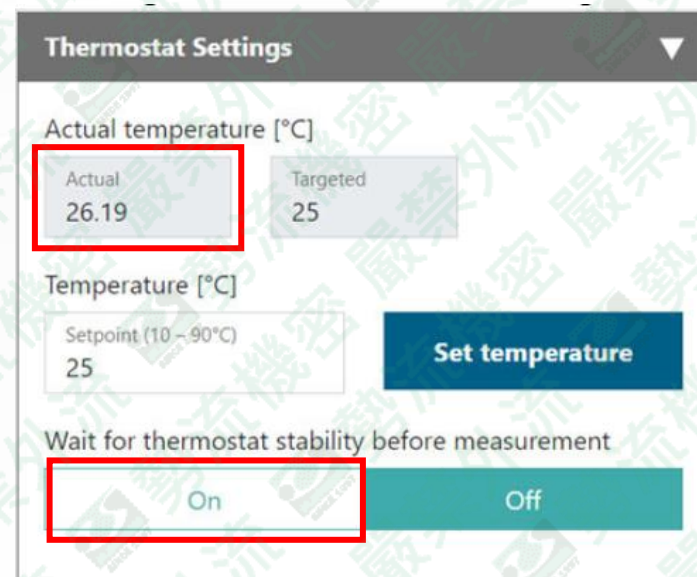
On (selected), Off

Reverse power off sequence

On, Off (selected)

Wait for instrument delay

On, Off (selected)



Thermostat Settings

Actual temperature [°C]

Actual: 26.19, Targeted: 25

Temperature [°C]

Setpoint (10 ~ 90°C): 25

Set temperature

Wait for thermostat stability before measurement

On (selected), Off



步驟說明圖 (3/5)

4. 確認測試參數、元件擺設都沒問題，即可按下 **start measurement** 執行量測。

Config list
Settings
Help
Running: Silanna_SMD 30D_0.5mmx0...

CONFIG EDITOR

CALIBRATION

MEASUREMENT

T3STER

Plot

		S5Ch1								
S1Ch1										
LP220	LP220	MS401	MS401	MS401	MS401	MS401	MS401	MS401	MS401	

LP220

S1Ch1 - Current source

Mode

Switching

Current

0 A

Voltage limit

10 V

MS401

S5Ch1 - Current source

Mode

On

Current

0.01 A

Range

10 V

MS401

S5Ch1 - Meas. ch.

Sensitivity

2 mV/K

Range

20 V (±10 V)

Start measurement

Disable sources

Enable sources

Config details

Description:

Measurement settings

Heating time [s]

Setpoint

90

Minimum

0

Maximum

4000

Cooling time [s]

Setpoint

90

Minimum

0

Maximum

4000



步驟說明圖 (4/5)

5. 儲存Cooling or Heating 檔案，選擇PAR檔下載即可，隨後使用T3ster master開啟紀錄相關電壓數據。



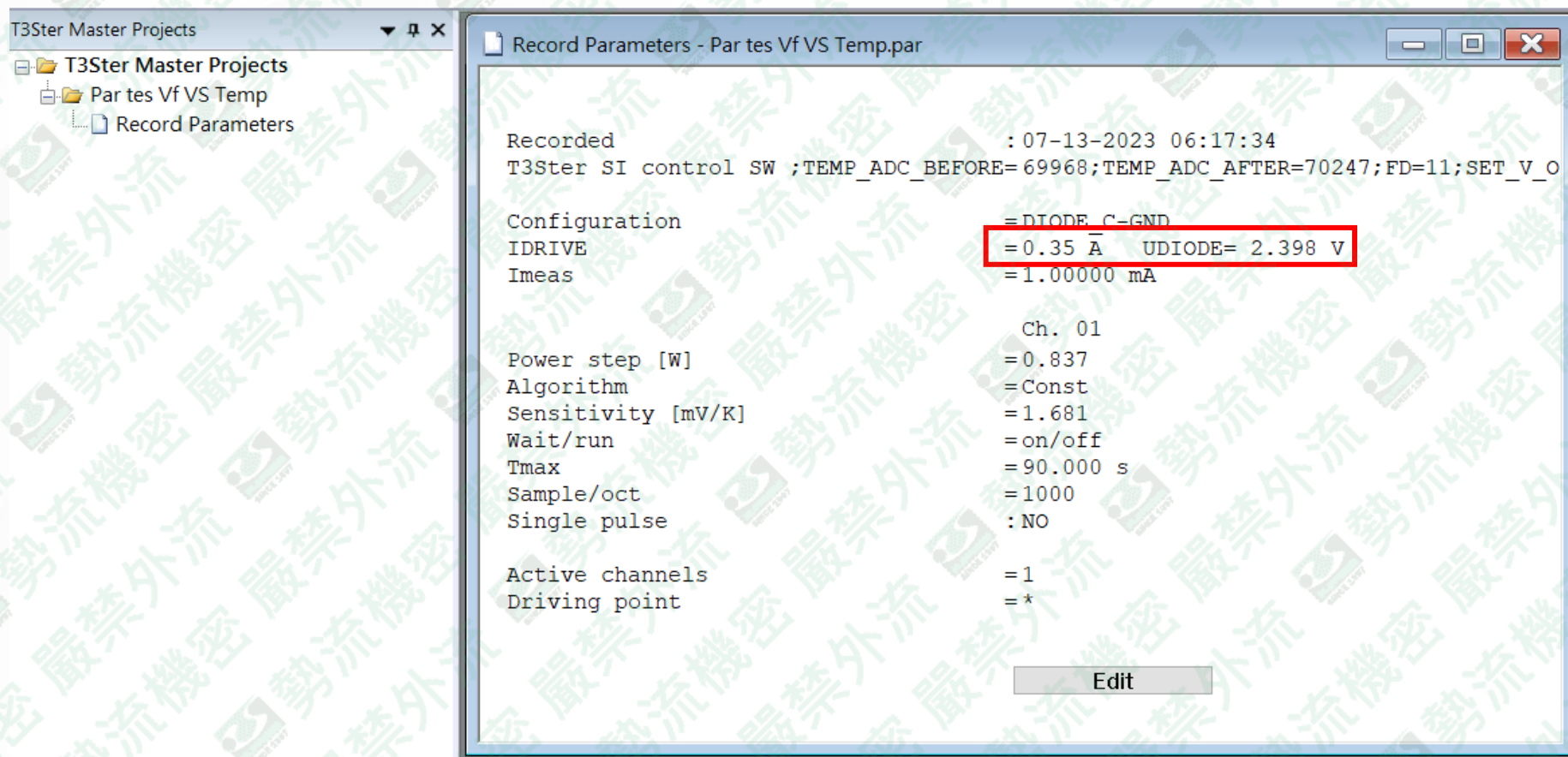
備註:

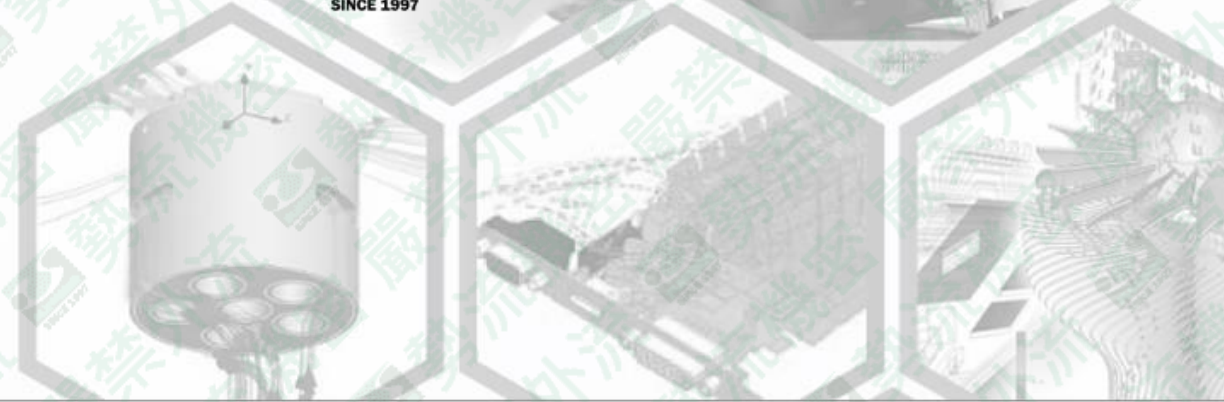
- Heating(PAR) (RAW) 為加熱時的數據表現
- Cooling(PAR)(RAW)為降溫量測時的數據表現



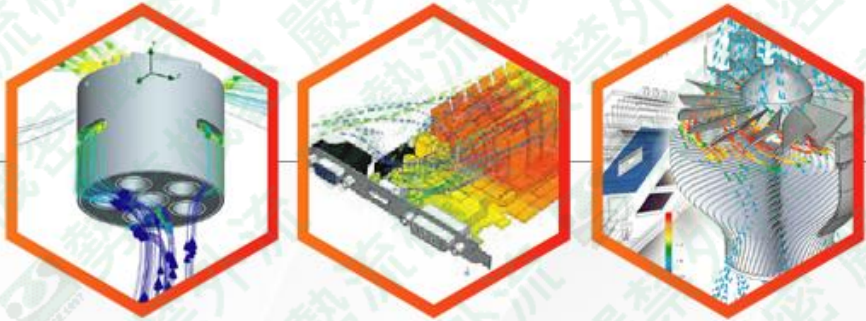
步驟說明圖 (5/5)

6. 使用T3ster master開啟PAR檔案，叫出Record Parameters 視窗相關即可確認該電流下測試電壓表現。





附錄B – TH800使用說明



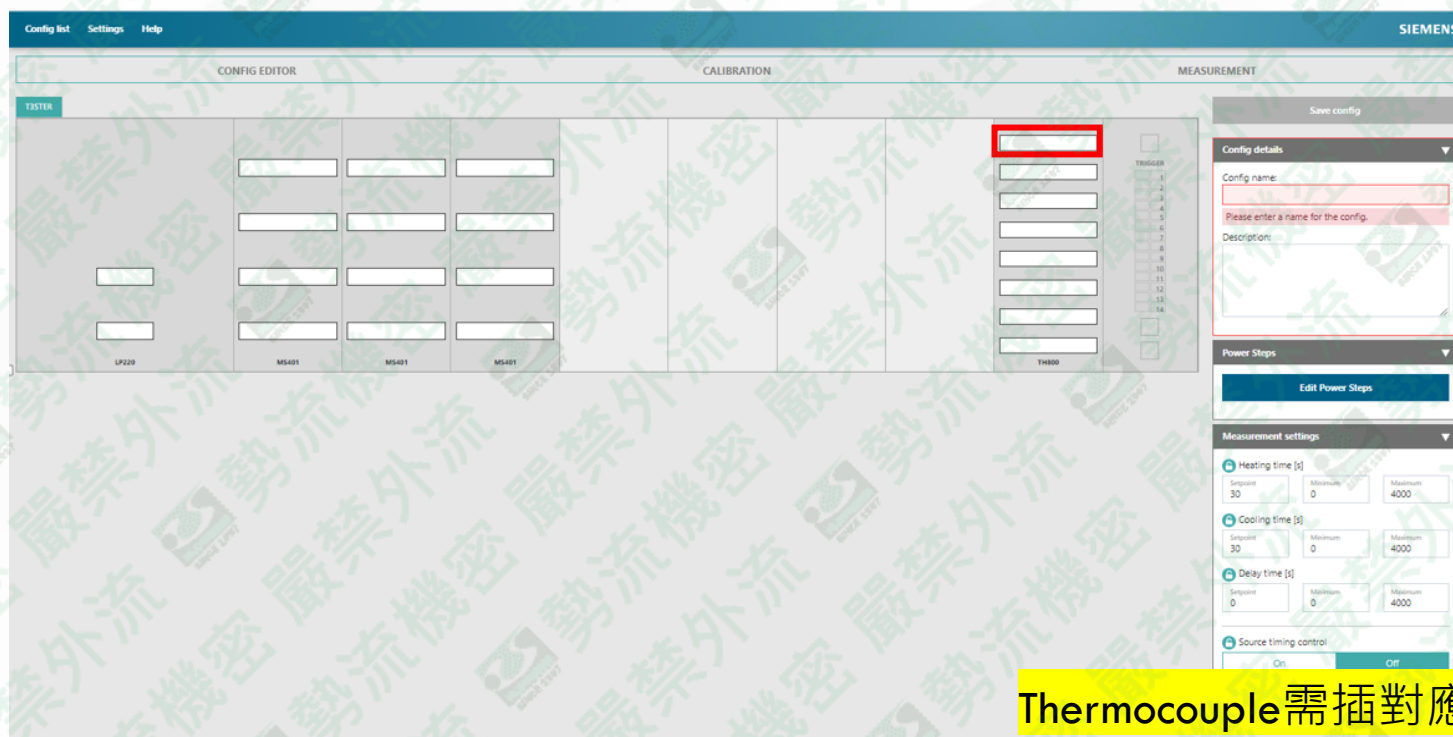
流程說明

1. 開啟冰水機、T3STER SI、10A/150V Booster (總電壓電流高於2A10V、1A20V、0.5A40V請開啟Booster)。
2. 創建新測試專案，請於CONFIG EDITOR 設定完相關參數。
3. 點選TH800介面，選擇正確形式熱電偶線，並在下拉選單中選擇所需條件。
4. 量測結束後，隨同熱阻量測結果在同步下載TH800之資訊即可。



步驟說明 (1/3)

1. 開啟冰水機、T3STER SI、10A/150V Booster (總電壓電流高於2A10V、1A20V、0.5A40V請開啟Booster)。
2. 創建新測試專案，請於CONFIG EDITOR 設定完相關參數。
3. 點選TH800介面，選擇正確形式熱電偶線，並在下拉選單中選擇所需條件。

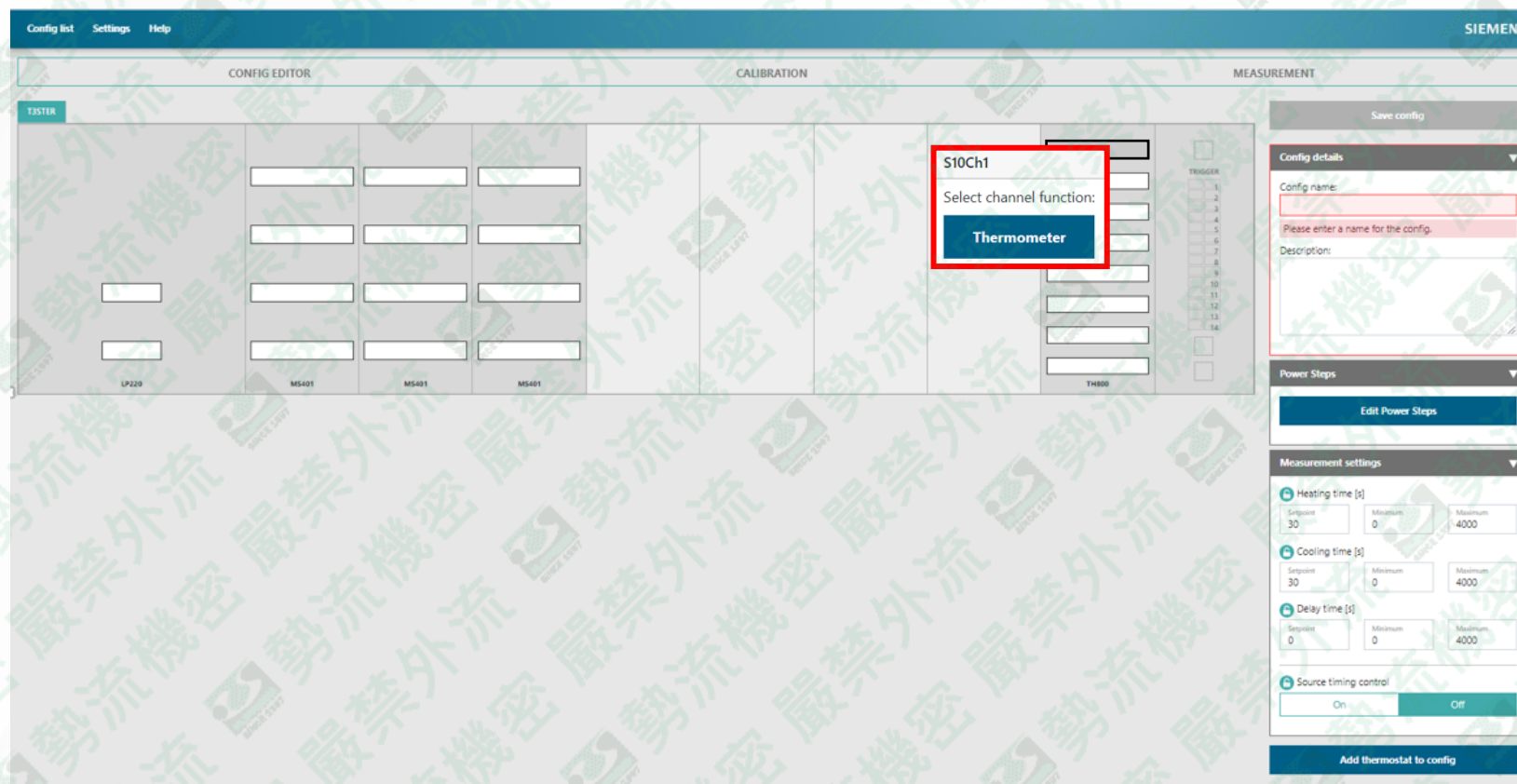


Thermocouple需插對應的位置上之正、負極



步驟說明 (2/3)

- 點選TH800介面，選擇正確形式熱電偶線，並在下拉選單中選擇所需條件。
- 量測結束後，隨同熱阻量測結果在同步下載TH800之資訊即可。

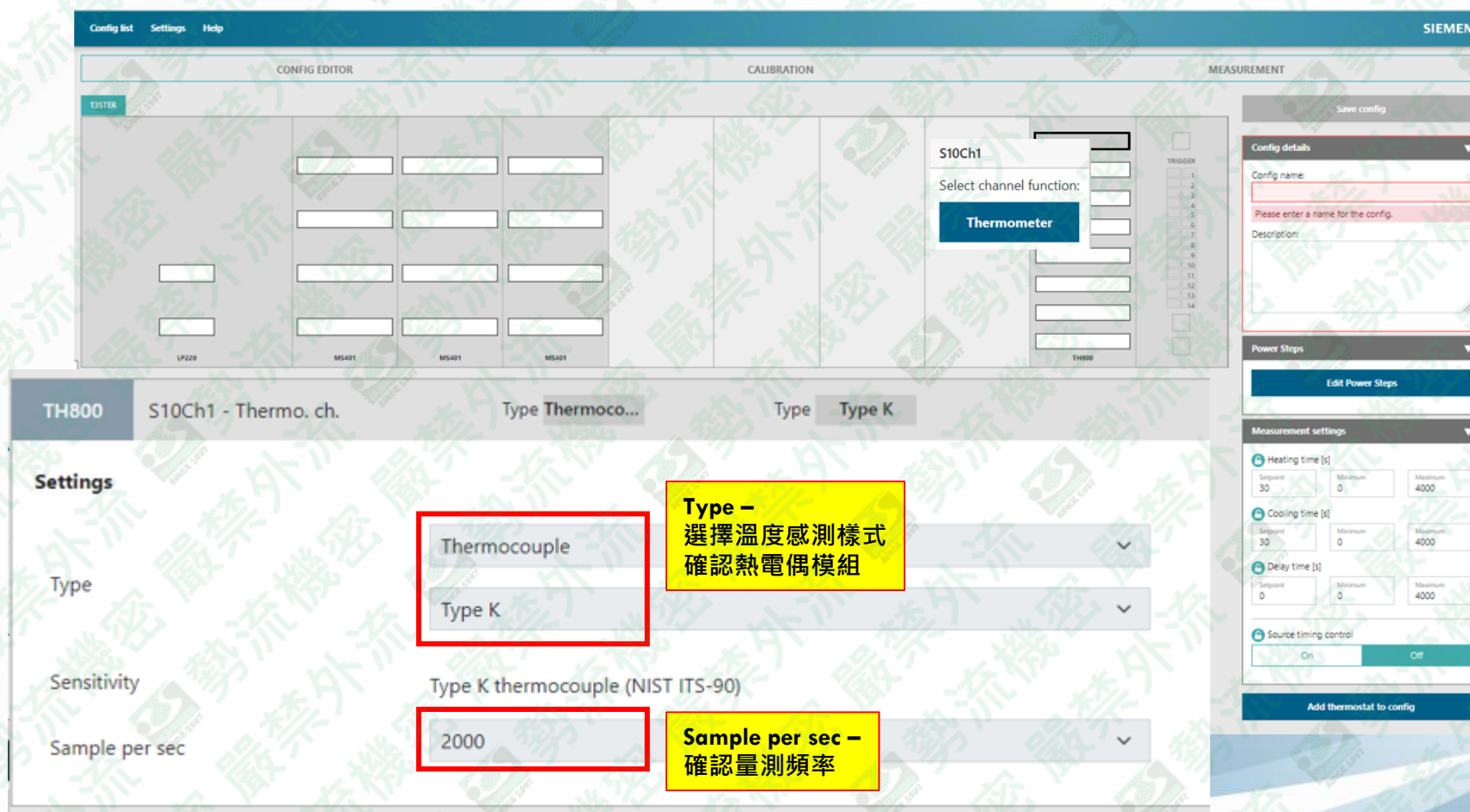


The screenshot displays the Siemens Config Editor software interface. The main window is titled 'CONFIG EDITOR' and is divided into three tabs: 'CONFIG EDITOR', 'CALIBRATION', and 'MEASUREMENT'. The 'CONFIG EDITOR' tab is active, showing a table with columns for 'YSTER', 'MS401', 'MS401', and 'MS401'. The 'TH800' tab is selected, and a dropdown menu is open, showing 'S10Ch1' and 'Select channel function: Thermometer'. The right sidebar contains a 'Save config' button, 'Config details' section with 'Config name' and 'Description' fields, 'Power Steps' section with an 'Edit Power Steps' button, and 'Measurement settings' section with 'Heating time [s]', 'Cooling time [s]', and 'Delay time [s]' fields. The 'Source timing control' is set to 'On'. A 'Add thermostat to config' button is at the bottom.



步驟說明 (3/3)

- 點選TH800介面，選擇正確形式熱電偶線，並在下拉選單中選擇所需條件。
- 量測結束後，隨同熱阻量測結果在同步下載TH800之資訊即可。



The screenshot displays the TH800 configuration interface. The 'Settings' section is visible, showing the following configuration:

- Type:** Thermocouple (selected)
- Type:** Type K (selected)
- Sensitivity:** Type K thermocouple (NIST ITS-90)
- Sample per sec:** 2000

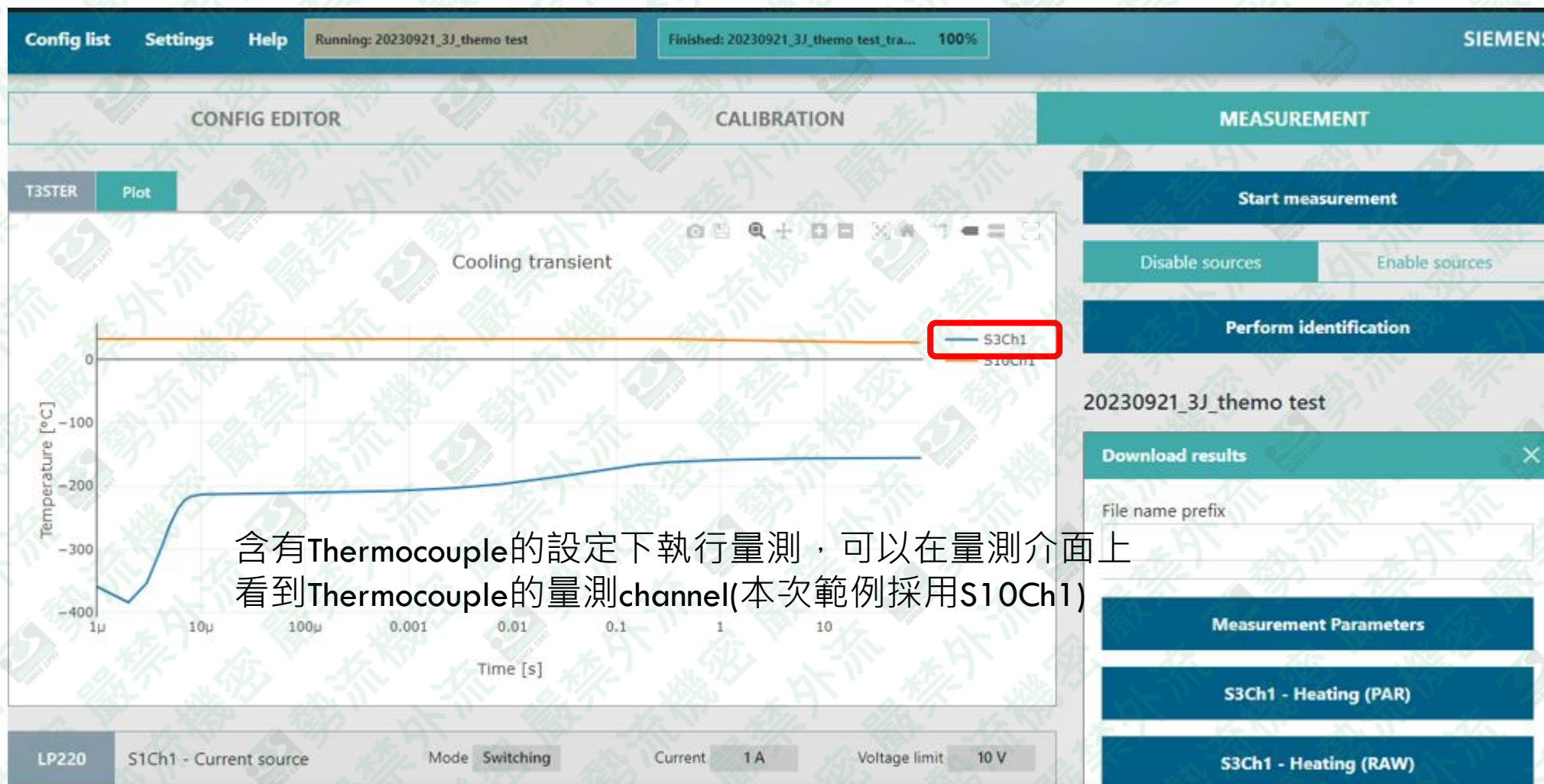
Annotations highlight the 'Type' and 'Sample per sec' settings:

- Type –** 選擇溫度感測樣式 確認熱電偶模組
- Sample per sec –** 確認量測頻率

The interface also shows a 'Config details' section on the right, including fields for 'Config name' and 'Description', and a 'Measurement settings' section with options for 'Heating time', 'Cooling time', 'Delay time', and 'Source timing control'.

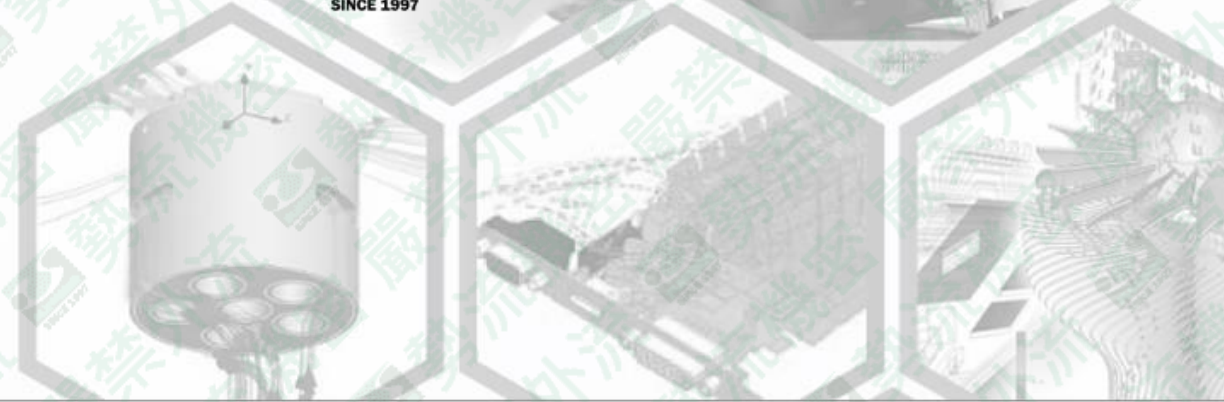


量測結果

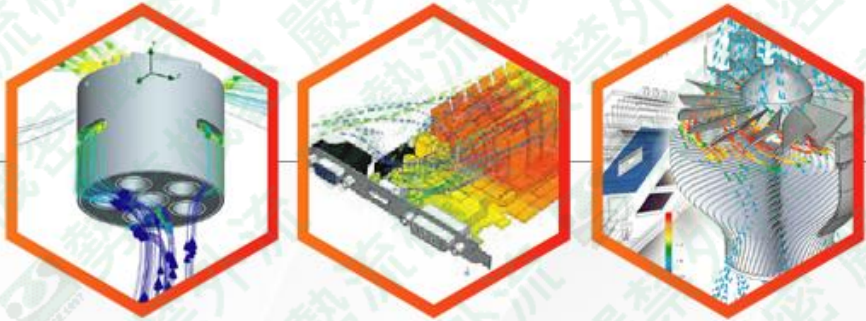


含有Thermocouple的設定下執行量測，可以在量測介面上看到Thermocouple的量測channel(本次範例採用S10Ch1)





附錄C – HXM Divider除法器使用說明



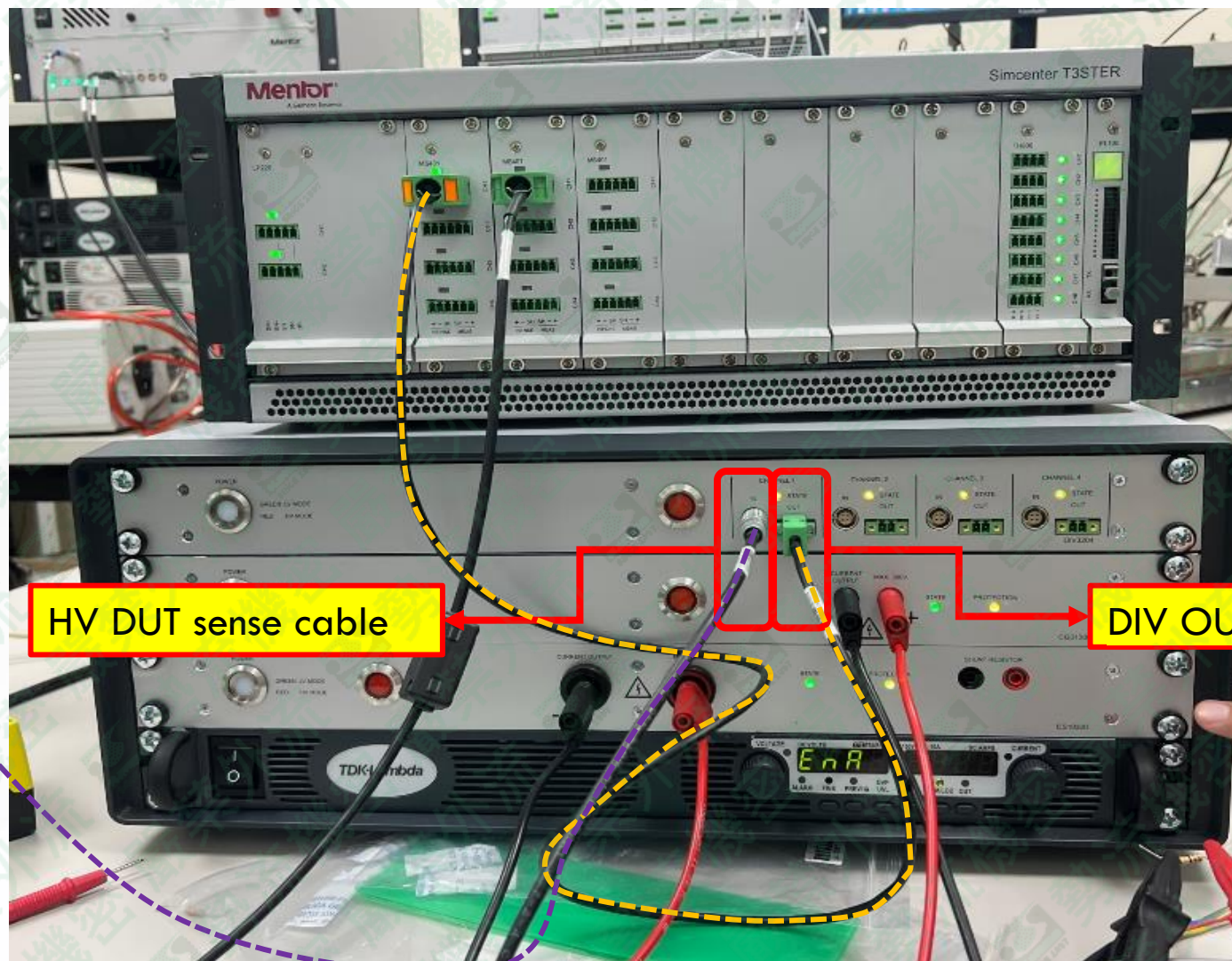
流程說明

1. 開啟冰水機、T3STER SI、10A/150V Booster。
2. 使用DIV OUTPUT cable連接T3STER SI MS401的channel與Booster的Divider(一組channel可連接一組Divider)。
3. HV DUT sense cable(4pin)連接Booster，其正、負的香蕉接頭接到欲量的高壓待測物測 (DUT)兩端點位置。
4. 創建新測試專案，請於CONFIG EDITOR 設定完其他相關參數。
5. 指定用來量測高電壓的MS401 channel並設定其為”measurement channel”。
6. 進入10A/150V Booster 介面，點選HXM Divider除法器，並點選對應的MS401 Channel。
7. 量測完後儲存Cooling or Heating 檔案，選擇PAR(或PARX)檔下載即可。
8. 使用T3ster master開啟紀錄相關電壓數據。



設備連接說明

HV待測物



HV DUT sense cable

DIV OUTPUT cable



Booster 10A/150V Divider設定說明 (1/2)

其他設定請參閱測試流程說明(T3STER SI + Booster 10A/150V)

HXM Divider目的為提升量測電壓範圍，可將MS401的電壓”量測範圍”提升至150V以上，有需要量測高壓才需設定，Divider本身僅有提升量測範圍用，無量測功能，故一組HXM Divider必須搭配一組MS401使用

MS401 量測源

S5Ch1

Step1. 在大小電流設定介面先設定預計用來量測HV的位置

S3Ch1

Select channel function:

- Current source
- Measurement channel
- Both

Step2. 指定完通道後將其設定為Measurement Channel

Save

Config details

Config name: HV test

Description:

Mode: On

0.001 A

Voltage limit: 20 V

Sensitivity: 2 mV/K

Range: 640 V (+3)

Booster HXM Divider除法器共有4組，故最高可提供4個MS401 channel進行連接



Booster 10A/150V 測試流程說明 (1/2)

10A/150V Booster 介面說明

※注意，此部分設置必須配合當下cable連接的Divider跟MS401 channel

T3STER

HXMC080EED

○ HXM Divider除法器(4組)

Divider Ch1

S1Ch1

HXM CG - 感測電流

I_{meas}

S1Ch1

HXM OS - 加熱電流

I_{heat}

S1Ch1

Trigger連接器(選1組)

Trigger

1

HXM CG

HXM OS

Step3. 進入Booster設定介面時，點選目前使用的Divider

CONFIG EDITOR

CALIBRATION

MEASUREMENT

T3STER

HXMC080EED

SSCh1

LP220

LP220

MS401

MS401

MS401

MS401

MS401

HXM

HXMC080EED - S1Ch1

- HXM CG - Current source

Mode On

Current 0.001 A

Voltage limit 20 V

SSCh1 - Meas. ch. +

SSCh1

Save

Save

Config details

Config name: HV test

Description:

Power Steps

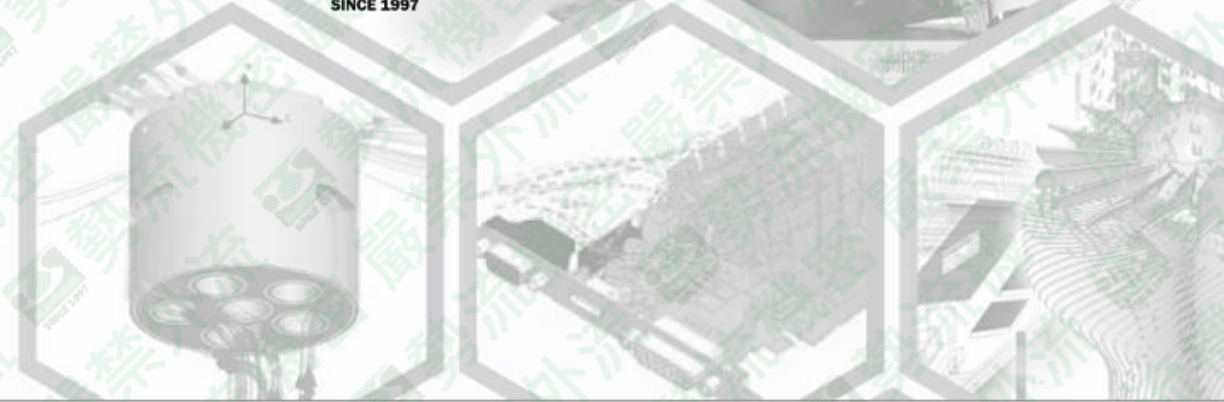
Edit Po

Meas. ch.

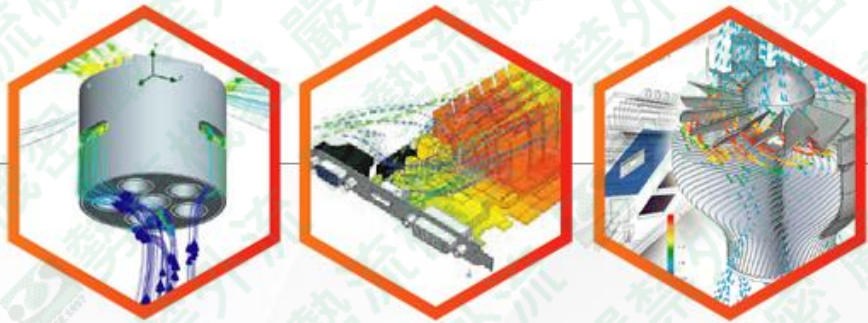
SSCh1

Step4. 點選目前對應的 MS401





附錄D – Repeat 功能說明



Repeat功能說明

T3STER SI操作軟體 Ver. 2306版，新增repeat量測功能，可自動採用同一條件進行多次量並取平均，若樣品本身訊號不穩，可採用此功能改善量測問題。測其他量測流程相同，請參閱**軟體執行流程說明**。僅在設定Measurement Setting的下拉選單中多做一步設定，repeat功能設定方法如下：

設定Measurement Setting的下拉選單

On

0.050 A

20 V < |V_{DUT}| < 40 V

Maximum 0.2

Current 4.5 A Voltage limit 5 V

Switching

Maximum 50

Maximum 30

Range 20 V (±10 V)

Range 20 V (±10 V)

S6Ch2 Diode

Measurement settings

Heating time [s]

Setpoint 90 Minimum 0 Maximum 4000

Delay time [s]

Setpoint 0 Minimum 0 Maximum 4000

Transient mode

Single cooling Repeated cooling

Repeat

Setpoint 3 Minimum 1 Maximum 100

Source timing control

Step1. 點選Repeat cooling

Step2. 設定要repeat的次數務必設定>2，否則等同無執行repeat的效果



Repeat量測後，存檔說明

※Repeat一次量測到所有MS401的channel(2個以上的設定)均會顯示在T3STER Master同一project中

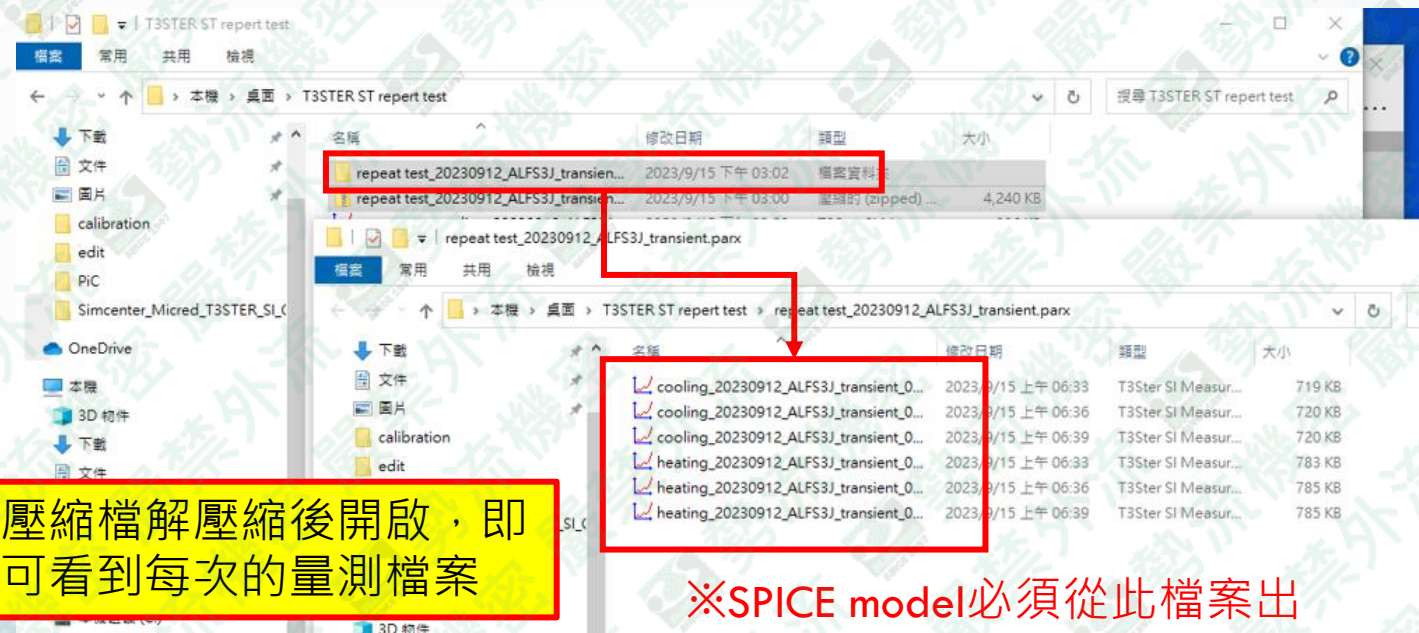
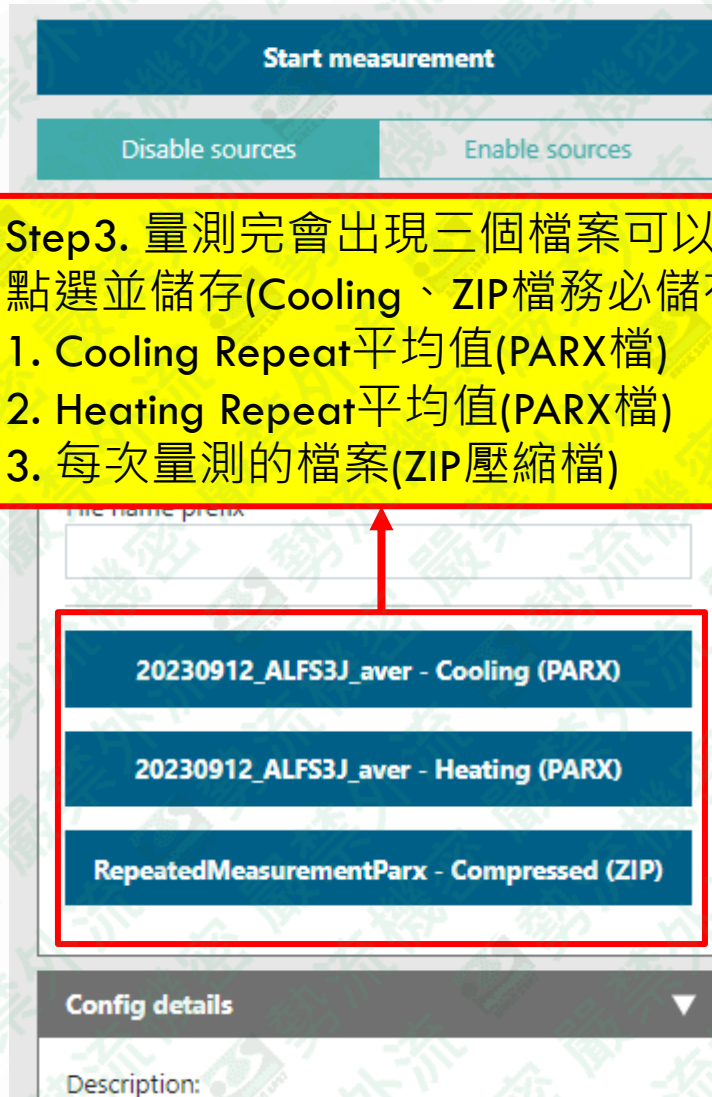
Step3. 量測完會出現三個檔案可以點選並儲存(Cooling、ZIP檔務必儲存)

1. Cooling Repeat平均值(PARX檔)
2. Heating Repeat平均值(PARX檔)
3. 每次量測的檔案(ZIP壓縮檔)

平均值的PARX檔需要採用T3STER Master 2301的版本以上

壓縮檔解壓縮後開啟，即可看到每次的量測檔案

※SPICE model必須從此檔案出





勢流科技 **SIEMENS**

詳細功能還請參考原廠手冊
Thank You for Your Attending



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