

SIGMATECH 白光 (White Light Collimator)式 UltraMap 桌上型半自動機種,UM-200-BT-FP 簡易 操作說明

此手冊提供 Sigmatech 客戶簡單的操作步驟,本手冊未提 到的功能,請參閱原廠手冊。若有任何不明瞭之處,請聯繫 科豐國際有限公司.

量測參數: 晶圓厚度(Wafer thickness)、彎曲度(Bow)、翹 曲度(Warp)



1 開機

 1.1.檢查:因本機所處環境粉塵較多,於使用前請以廠用空氣清除粉塵.,再開 啟電源。使用高壓空氣清潔時需間接噴,不可直接鏡頭以免粉塵刮傷鏡頭,花崗 岩平台可以用一般衛生紙,但是擦拭光學鏡頭絕對都要使用鏡頭拭淨紙。

1.2. 確認量測機台主高壓空氣源 20-30PSI(量測機台前方壓力表 MAIN AIR)

1.3. 平台氣源 5PSI. 壓力皆正常。(量測機台前方壓力表 STAGE AIR) 通常都會有氣壓存在於 AIR BEARING, 關機時也不會消失.

1.4.復歸前方 EMO 紅色按鈕(輕輕的順時針旋轉並向外拉)

1.5. 開啟以下各電源: 電腦 + 螢幕 + 機台電源(機台前方綠色按鈕) +上感測 頭控制器(UPPER PROBE)+下感測頭控制器(LOWER PROBE).

1.6. 在電腦進入 Windows 畫面後, 會見到 Sigmatech 的主程式 ICON 在桌面上。

1.7. 按兩下執行桌面上的 Sigmatech 的主程式, 會見到機台執行初始劃動作, Stage 移動並回到起始位置, 開機即完成。

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2. 進入操作環境及基本動作測試:一般使用可省略基本動作測試。

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2.1 從 WINDOWS 的桌面主畫面點選兩下操作軟體,稍待片刻會出現以下畫面:

2.1.1 軟體開啟:開啟 START 選項,點選登入(LOGIN)選項,輸入使用者密碼:密碼共有三個層級,(共有操作員,維修員,工程師三個層級)。目前這三個層級的密碼都是"12345",輸入後按 ENTER.層級設定有使用功能差異性,最低階的只能做量測及儲存的動作,高階的有權可以修改及設定參數。



2.1.2 基本動作測試: CALIBRATION 選項是測試量測位置的移動能力。一般都 是機器測試時在用:四個綠色箭頭分別控制前後左右的方向,對話框內是 已設定的點,左邊" MOVE TO"的方塊按了就會到對應的位置。

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3 設定: MEASUREMENT 選項是執行量測動作的:有五個選項 (RECIPE, WAFER, DATA FILTER, PROCESS INFO, WAFER IDS)





3.1 先設定量測模式 RECIPE

3.1.1 先給這個量測模式一個名稱. (156x156 或是 125x125 或是任何名稱都可以).

3.1.2 定義量測的點數及位置,選定的點會以紅色顯示(目前看到五點).對應的 X-Y 座標顯示在右邊的對話框.點的選擇可以滑鼠直接點選,也可以用輸入 的方式選取.(加點:ADD. 插入:INSERT. 移除:ROMOVE 全部清除:CLEAR ALL).連擊兩次點座標可以直接刪除該點.

3.1.3 WAFER:

3.1.3.1 WAFER SIZE:定義量測物件大小(藍色圓形區, 200mm). 選取點必在區域內.

3.1.3.2 GRID SIZE:網格點的大小,目前定義 10mm. 如果選擇 5mm. 會看到格子與 10mm 模式一樣, 差別在於 5mm 可選非交叉點, 而 10mm 只可選交叉點.

3.1.4 定義好量測模式,儲存檔案(選取"SAVE"按鈕)

3.1.5 開始量測(MEASURE), 直接可跳 ITEM 4 的畫面操作.



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3.2.1 LAYER DEFINITION:選擇 單層或是多層,貴公司產品是使用單層.選"1"

- 3.2.2 SURFACE FEATURES: WAFER 有 無 抛 光 (POLISH).
- 3.2.3 GENERAL WAFER SHAPE: WAFER 形狀有無彎曲(WARP)
- 3.2.4 POINT IN CLUSTER: 每個位置取多少點作量測均值.目前設定9點.
- 3.2.5 Type:顯示上下鏡頭的選用赫茲.U為上(upper).L為下(lower)
- Data filter:可過濾數據,區分合格與不合格的數據.不合格的以淺白色字樣讀 出但是不顯示.畫面左方是針對整片 wafer.右方是針對單一位置的多 點量測
- Process Info:區分為無限(OPEN)跟定數兩種選項.選擇無限選項時可一直執行 量測最後完成再將所有數據存檔.定數選項在執行數字定義的測量 次數之後,軟體就會提醒您"完成了本批次,請執行資料存檔".通 常這是因為可能一批有好幾盒,一盒可能裝數片 wafer.

Wafer ID: 給每片 wafer 識別碼, 區分批號跟序號.



4.1 放置 WAFER 於平台, 並點選" START"按鈕. 就開始量測, 如以下畫面.

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	Press 'Start' to start measuring.		
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			User Level: Engineer
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4.2 如果要更換新 WAFER, 於第一片量測後依照對話框顯示的資料換上第二片 WAFER, 並按" START" 按鈕. 下圖為已量測兩組數據的畫面. 量測完成後 按"FINISHED"按鈕即可. Surface A 是下鏡頭的數據.

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	Press 'Finished' if done measuring.	
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5. 顯示: 以下畫面是量測結果:相關數據如下說明

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5.1 CURRENT VIEW:目前顯示的數據方式.有厚度(THICKNESS),形狀(SHAPE),慣 用模式(CUSTOM)

5.1.1 厚度模式(THICKNESS):可顯示 平均厚度,最小厚度,最大厚度. TTV, TIR

5.1.2 形狀模式(SHAPE): MIN BACK, MAX BACK, WARP, BOW, SORI FRONT, SORI BACK

5.1.3 慣用模式(CUSTOM):厚度模式跟形狀模式的綜合顯示.

6. 資料運用: 分為 XXXX. CSV, XXXX(SUMMARY). CSV, XXXXX. MAP 三種

6.1 XXXX.CSV 格式:可以 MS OFFICE 的 EXCEL 軟體讀取數據.

6.2 XXXX(SUMMARY). CSV 格式:可以 MS OFFICE 的 EXCEL 軟體讀取數據.

6.3 XXXX. MAP 格式:可以顯示於本機內的 WAFERMAP 軟體.一次量測會產生三種 數據(分別是 FRONT, BACK, THIN). 在進入 WAFERMAP 環境 之後,讀取格式為 XXXX. MAP 的檔案.可將數據轉化成 2D 或



是 3D 的各種圖形.

6.4 如果需要畫面作資料:可以使用電腦的 print screen 按鈕, 再以小畫家軟體 貼上同時按 Ctrl &V 兩個按鈕即可.

7. 備品耗材:

7.1 光學感應頭控制器的光源:
品名及售價: Halogen display/Optic lamp
廠牌及編號: OSRAM/64602/50W/12V/G6,35/NAED 54607
常態壽命: 1000Hrs

7.2 保險絲(FUSE):控制器兩台各有一個,量測機一台有三個,總計五個.

裝機細節說明:

- 1. 設備裝置的桌子需穩固,如果獨立桌會震動,可以靠牆邊藉助牆面的強度.
- 2. 電源延長線需獨立不與其他設備共用,以免受其他機器電磁干擾.
- 3. 主空氣源以 20-30psi 進入,轉到 air bearing 為 5psi. 氣源是隨時都供應 air bearing. 主氣源建議加裝過濾器以便排除水分(三點組合過濾套件).
- 4. 開機前檢查:

可先輕輕移動 air bearing 到四個角. 確認可以順暢的運動. 開機後, air bearing 就由電腦接管, 無法隨意推動.

5. 標準 開機/關機 程序:此程序的目的在於避免開機時起始電壓跟電流衝壞設備.同時為了避免本機的光學鏡頭光纖與電腦衝突(光學 滑鼠之類的).請於電腦開機完成之後再開光學鏡頭控制 器.

開機程序:

電腦+螢幕-→光學鏡頭控制器(probe)→量測機台



110V/10A 110V/?A \rightarrow AC12V/4.2A 110V/?A \rightarrow DC24V/? A

關機程序:可不需要關機,燈泡及電能會損耗能源. 量測機台→光學鏡頭控制器→電腦+螢幕

- 6. Air bearing 的調整:以手輕觸,如果感覺震動,代表 air bearing 的空氣流量 不均匀.這會干擾量測精度.請調整三個位置的空氣流量控 制螺絲.(在 air bearing 的背面可看到三個空氣噴出孔). 待調整到無震動即為正確.然後拿標準片,於邊緣設定三個 位置做測量,重複多次直到三點的測出數據一致.調整時會 聽到空氣流出的嘶嘶聲.這是正常的,等調整好了之後就會 安靜無聲.調整好之後,再將 set nut(size 6mm)鎖緊就完成 了.
- 7.上下鏡頭的對齊:先拿一張直角的紙張立在花崗岩平台,利用紙張的直角去對 準上下鏡頭.上鏡頭可以用旋鈕控制上下滑動.(前.後.左.右) 初步對正之後,然後將紙張懸置於上下鏡頭之間.下鏡頭會在 紙張上打出光暈,再將上鏡頭的光點對準在光暈正中間.
- 8. 固定式下鏡頭的調整:打開機台正前方的蓋子,可以看到兩個固定螺絲,小心 鬆開螺絲就可以調整,但要注意別讓下鏡頭掉了.
- 9. 光學鏡頭:須注意使用赫茲(Hz),赫茲的選用是依照 wafer 的形式而定. 抛光 面選用高赫茲(因為高赫茲的速度快,可以避開拋光片的光反射因 素.).未拋光的 wafer 選用低赫茲.(因為無光反射問題). 赫茲的變換 請按控制器的F3 按鈕切換,上下控制器顯示的 INT 數據顯示赫茲選 用適合與否,在0跟99 都是不適合的設定.單面拋光片子要注意量測 拋光面的控制器設定方式.
- 10. 數據樣板:裝機時,設備能力的再現性及精度驗證需使用拋光標準片才能取得正確數據.另外可多次量測平台上的標準塊規.再請客戶提供要量測的驗證片,用三種方式去確保精度.
- 11. 塊規的更換:在 air bearing 上面有一個塊規, 此塊規是每次量測的起始點跟 收尾閉合點. 在更換塊規時, 請注意塊規座上是否有溝槽. 固定螺 絲鎖上會不會造成塊規彎曲. 如果溝槽不合, 可先改用 Epoxy 膠 固定.



- 12. 在 calibration 的視窗,有四個綠色的手動箭頭.只要按了箭頭就可以控制 air bearing 的移動.當移動到所要的位置時,按 record 按鈕就會將目前 的位置告訴電腦軟體.這在原廠裝機時已經設定好了,平時不需變動.
- 13. 量測時, 請先確定量測點都避開 air bearing 的骨架...可以先用空機跑一次量 測動作. 確定每個點都避開, 就可以正式開始量測. 沒避開的點數據會明 顯不同
- 14 本機的鏡頭有效區間是 0~600um. 如果高低點差超過. 量測的數據就會有部份 失真. 原廠建議值為掐頭去尾各 20um, 亦即是 20~580um.
- 15. 花崗岩平台下方的運動滑軌, 如果有髒污, 請擦拭以減少摩耗, 增進壽命.
- 16.使用空氣槍清潔時:請注意不要直接噴,需採用間接噴,主要是因為怕粉塵在 空氣槍強力作用之下,會刮傷光學鏡頭.
- 17. 紅色的 EMO 按鈕是 110V 主電源轉換到 24V 的內部控制點. 如果需維修, 請注意 本機於插電時仍有 110V 的外部電力.

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