

# 晶圓廠 TEL LPCVD-SIN 爐管PM保養程序

## PM Maintenance Procedure for LPCVD - SIN Furnace Tubes in Wafer

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## 晶圓廠 TEL LPCVD-SIN 爐管PM保養程序

# PM Maintenance Procedure for LPCVD - SIN Furnace Tubes in Wafer

壹、目的：

### I. Purpose：

使機台維持最佳狀況、降低 DOWN TIME。

Enables the machine to maintain the best condition, reduce DOWN TIME

貳、適用時機：

### II. Application Time

一、SIN：

1.小 PM： $40 \pm 10, 80 \pm 10$ 。

Small PM:  $40 \pm 10, 80 \pm 10$ .

2.大 PM： $120 \pm 14$ 。

Large PM:  $120 \pm 14$ .

二、THIN SIN：

1.小 PM： $150 \pm 15$ run。

Small PM： $150 \pm 15$ run。

2.大 PM： $300 \pm 30$ run。

Large PM： $300 \pm 30$ run。

三、機臺異常須 PM 時。

3. When abnormal machine shall PM

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四、更換製程須 PM 時。

4. When replacing process shall PM

伍、年度歲修須 PM 時 (一律大 PM)。

5. Annual repair to be PM when the time (all large PM).

\*\* 遇特殊情況時，在機臺狀況允許下，可適度將 PM 時機 “±值” 放寬至三倍以內作 PM。

When special circumstances, allow the machine status, the timing may be appropriate to PM "± value" relaxed to three times less than for PM

參、執行規則：

### III. Implement Rules

小PM→大PM(1PM)→小PM→大PM(2PM)→小PM→大PM(3PM)→小PM→大PM(4PM) →小PM→大PM(1PM)

以此類推 And so on

肆、使用材料：

### IV. Used Material

IPA (異丙醇)，無塵布，O-RING .....等。

IPA (isopropyl alcohol), clean cloth, O-RING ..... and so on

伍、使用設備：

### V. Used Equipment

公制六角扳手，活動扳手，十字一字起子，TUBE SLIDER...等。

Metric hex wrench, adjustable wrench, Phillips flat head screwdriver, TUBE SLIDER ...  
and so on.

陸、安全事項：

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## VI. Safety Precautions

一、石英配件易碎，拆裝請小心，並請於拆裝石英過程，全程配戴棉手套 & 護目鏡，避免遭石英割傷 & 造成眼部傷害。

1. Quartz accessories are fragile, please be careful when disassembling and assembling, and please wear cotton gloves & goggles during the process of disassembling and assembling the quartz to avoid being cut by the quartz and causing eye damage.

二、MANIFOLD 及外管重量不輕,請注意拆裝之安全。

2. MANIFOLD and outer tube is not a light weight, please pay attention to safety of disassembly.

三、待內外管溫度低於 150°C (面板顯示) 時，才可執行拆管，並於拿取內外管時，請全程配戴隔熱手套，以避免灼傷。

3. When the temperature of the inner and outer tubes is lower than 150°C (displayed on the panel), the tube can be dismantled. When handling the inner and outer tubes, please wear heat-resistant gloves to avoid burns.

四、請使用手推車搬運內外管於酸房與機臺之間，並將內外管放置於台車上時，請配戴隔熱手套，以避免灼傷。

4. Please use a trolley to carry the inner and outer pipes between the acid room and the machine, and when placing the inner and outer pipes on the platform, please wear heat-resistant gloves to avoid burns.

五、測試 Main Valve 開與關請用專用治具，測試中切勿將手伸入 Main Valve 內部，以免夾傷。

5. Test Main Valve opening and closing with a special fixture, the test do not reach into the Main Valve internal to avoid crush

六、使用化學品,應穿戴防護器具。

6. Use chemicals, wear protective equipment

七、PM 拆下之零件並分解，再拿至震盪槽 CLEAN，震完後管內以 DI 沖洗再以 AIR 吹乾

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以上動作有水漬噴濺，必須穿戴護目鏡或防護器具，避免造成眼部傷害。

7. PM remove the parts and disassemble them, then take them to the shock tank CLEAN.  
After the earthquake, rinse the tubes with DI and then dry them with AIR.  
The above actions are splashed with water and must be worn with goggles or protective gear to avoid eye damage.

八、於PM 時使用 low vacuum clean 零件，必須配戴耳罩避免耳部噪音之傷害。

8. Use low vacuum clean parts for PM and wear earmuffs to avoid ear noise.

九、拆裝管 & 調整承接時請使用護墊保護膝蓋。

9. Use pads to protect knees when removing tubes & adjusting sockets.

十、烤箱溫度高於 50°C 時，拿取 Parts 請全程配戴隔熱手套，以避免灼傷。

10. When the oven temperature is higher than 50°C, please wear heat-resistant gloves when handling Parts to avoid burns.

柒、操作步驟：

## VII. Operating Procedure

### ● 小PM保養程序

#### Small PM maintenance procedures

一、將 BOAT 上的 DUMMY WAFER 以 T-BAWL 取下(RUN MODE 下之DUMMY UNLOAD)。

1. The DUMMY WAFER BOAT on to remove the T-BAWL (DUMMY UNLOAD RUN MODE under).

二、將PEDESTAL COVER、PEDESTAL 5-fin、PEDESTAL 7-fin取下拿至洗管間供酸房人員清洗(圖一)。

2. The PEDESTAL COVER, PEDESTAL 5-fin, PEDESTAL 7-fin tube is removed to get to the room for an acid wash room cleaning staff (Figure 1)

三、使用 VL-800 MANU MODE 下之MAUNAL 或 ADJUST 的 MOTION 5 將 BOAT CLAMP 鬆

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開後將BOAT拿至洗管間供酸房人員清洗。

3. Use the VL800 MANUAL MODE under the MAUNAL or ADJUST MOTION 5 BOAT CLAMP will be released after the BOAT to get to wash room for the acid cleaning room staff

四、拆VACUUM PIPE、COLD TRAP。

4. Demolition VACUUM PIPE, COLD TRAP

五、將 TRAP 的螺絲鬆開後將 TRAP 分解，將 VACUUM PIPING 上的 MANTLE HEATER 拆下，把 COLD TRAP、VACUUM PIPING 送至超音震盪 2 HOURS 後拿起送至烤箱烘烤 2 HOURS 後待冷卻拿出即可供下次使用。

5. TRAP will be loose after the release of the TRAP, VACUUM PIPING on the MANTLE HEATER removed, the COLD TRAP, VACUUM PIPING sent to the supersonic shock 2 HOURS picked up after the oven baked 2 HOURS to be cooled out Available for next use.

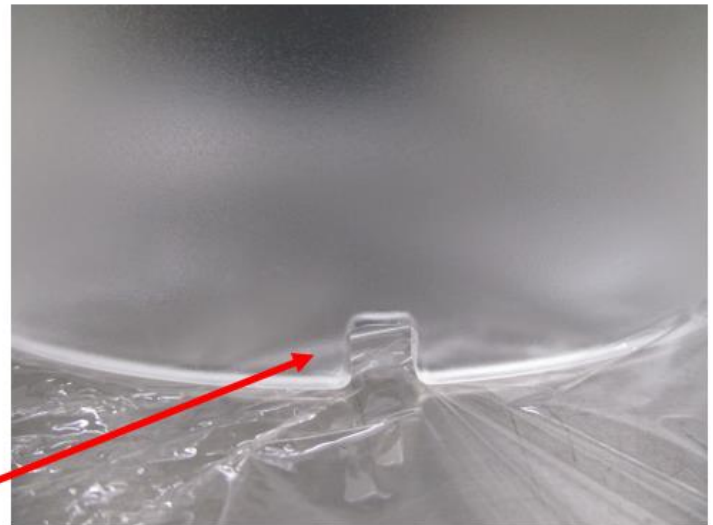
六、組裝：程序與拆管程序相反，不再贅述，亦請注意安全。

6. Assembly: the program and the demolition of the contrary, not repeat them, please note that security

\*\* 裝 Pedestal 前檢查石英是否有破裂(整體皆需確認，缺口處需特別注意無破裂，如附圖) & 量測重量，若有破裂或重量小於1020g則不使用。

\*\* Before installing the Pedestal, check whether the quartz is cracked (the whole should be confirmed, and special attention should be paid to no cracks at the notch, as shown in the picture) & Measure the weight, if it is cracked or the weight is less than 1020g, do not use it.

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**確認 Pedestal 缺口處無破裂**

\*\* 裝PEDESTAL前須以水平儀檢查 CAPPING FLANGE 邊緣對角四點之水平狀態，若有偏差則須調整至最佳狀態。

\*\* Before the installation of PEDESTAL to be level to check CAPPING FLANGE four points on the edge of the horizontal state, if the deviation must be adjusted to the best condition

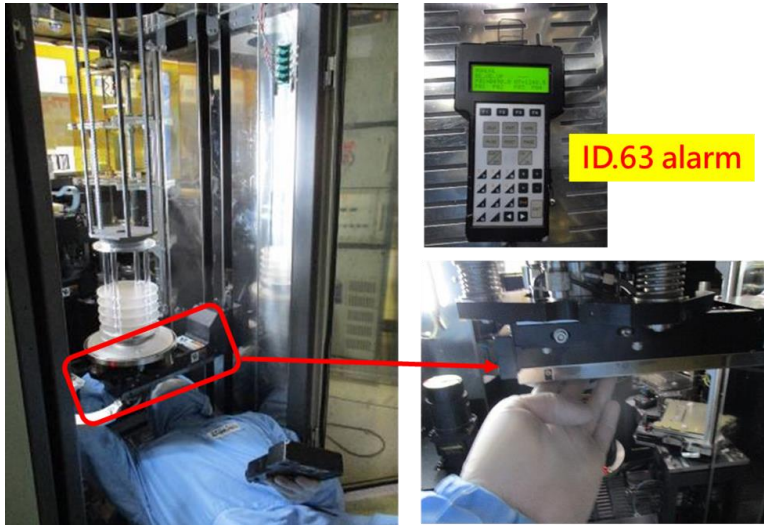
\*\* 裝完PEDESTAL後，以水平儀檢查其與 BOAT 接合面之水平是否合乎要求，若有偏差則須調整至最佳狀態(參考技資G3363-1010)，手壓鐵板測試 elevator 下方 EMG-STOP switch 功能正常(VL-800 需有 ID.63 alarm)，再將 BOAT 置上保溫筒並伸入管內檢查是否會刮管，若有刮管之慮則須調整使之不刮管。

\*\* After installing the PEDESTAL, use a spirit level to check whether the level of the joint surface with the BOAT meets the requirements. If there is any deviation, adjust it to the best state (refer to technical material G3363-1010), and test the function of the



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EMG-STOP switch under the elevator by hand pressing the iron plate If it is normal (VL-800 needs ID.63 alarm), put the BOAT on the insulation tube and extend it into the tube to check whether it will scrape the tube.



七、調整 BOAT 與PEDESTAL COVER承接時晃動的程度至最小後調整BOAT及BOAT LOCK的位置。  
(參考技G3363-1010)

7. Adjust BOAT and PEDESTAL COVER to undertake when the degree of shaking to the minimum after adjustment BOAT and BOAT LOCK position. (Reference technology G3363-1010)

八、T-BAWL 傳送CHECK(參考技資G3363-1010) , 只需CHECK FORK-5即可。

8. T-BAWL sends CHECK (refer to G3363-1010), only CHECK FORK-5

九、測試氣聲：

9. Test gas sound

(1). 將CAP升至P04位置。

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Raise the CAP to the P04 position

- (2). 將 MODEL 3200 切換成 MANUAL MODE。

Change the MODEL 3200 to MANUAL MODE

- (3). 關所有進 TUBE 的 GAS VALVE。

Close all GAS VALVE in TUBE

- (4). 開 SV，ATM燈熄面後馬上關SV並通N2破大氣。

Open SV, ATM lights off immediately after the off SV and N2 break the atmosphere.

- (5). ATM亮起後將CAP緩緩下降，CHECK有管內壓力是否為大氣。

ATM light will slowly drop CAP, CHECK whether the pressure inside the tube for the atmosphere.

- (6). 如果有氣往裡吸或是往外噴則調整760TORR SWITCH。

If there is gas to the inside or outside the spray is to adjust 760TORR SWITCH

- (7). 重複動作直至無氣聲為止。

Repeat until there is no sound

十、高溫PURGE：

#### X. High temperature PURGE

- (1). 將CAP連同BOAT一起升至 POSITION 4。

The CAP is raised to POSITION 4 along with BOAT

- (2). 將 MODEL 3200 切換成 MANUAL MODE。

Change the MODEL 3200 to MANUAL MODE

- (3). 關所有進 TUBE 的 GAS VALVE。

Close all GAS VALVE in TUBE.

- (4). 開 SV 小抽，待管內壓力低於 5 TORR 時再開 MV大抽。

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Open SV small pumping, to be under pressure when the tube is less than 5 TORR MV open again.

(5). 將所有 N2 GAS打開。

Turn all N2 GAS on.

(6). PURGE後即可進行高溫測漏。

PURGE can be carried out after the high temperature leak detection

十一、高溫測漏:

XI. High temperature leak detection

(1). 關所有GAS VALVE直至壓力抽至 0.00 TORR。

Off All GAS VALVE until the pressure is evacuated to 0.00 TORR.

(2). 關 SV、MV 作測漏，規格為漏率小於0.03 TORR/ 130 SEC

Off SV, MV do leak detection, specifications for the leakage rate is less than 0.03 TORR / 130 SEC

十二、如果測漏不過則請進行抓漏，找出漏處並解決後再作測漏，直至漏率合乎規格。

XII. If leaky, but please carry out leaks, to find the leak and solve the leak after the leak until the rate of compliance

十三、檢查各TAPE HEATER是否毀損，電壓是否在110V，加熱是否正常。檢查VACUUM PIPING 上的 MANTLE HEATER 否毀損，加熱是否正常，溫度是否在80±10度。

XIII. Check whether the TAPE HEATER damage, the voltage is 110V, heating is normal. Check the VACUUM PIPING on the MANTLE HEATER no damage, heating is normal, and the temperature is 80±10 degree.

十四、將機台內部及四周用LOW VACCUM與IPA 清潔乾淨。

XIV. Clean the inside and around the machine with LOW VACUUM and IPA

十五、將機台復歸為STANDBY狀態，通知EA TEST RUN，於記錄本上註明做TEST RUN並簽名。

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XV. The machine will be reverted to STANDBY state, notify the EA TEST RUN, the note on the record to do TEST RUN and signature

\*\*TEST RUN：即 RUN 一個平常 RUN 貨的 RECIPE 以量測其厚度，PARTICLE。如果均合乎規格即可交給生產線 RUN 貨，小PM保養工作至此完成。

\*\* TEST RUN: RUN a normal RUN goods RECIPE to measure its thickness, PARTICLE. If all meet the specifications to the production line RUN goods, small PM maintenance work is complete.

## ● 大PM(1PM/2PM/3PM/4PM)保養程序

Large PM (1 PM / 2 PM / 3 PM / 4 PM) maintenance procedures

一、降溫前，請確認 GAS CABINET 內，SIH2CL2 REGULATOR 是否有漏液，若有異常漏液則需立即將 REGULATOR 更換新品。

1. Before cooling down, please confirm whether there is leakage from the SIH2CL2 REGULATOR in the GAS CABINET. If there is abnormal leakage, replace the REGULATOR with a new one immediately.



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二、降溫：將208V POWER OFF。

2. The cooling: 208V POWER OFF.

三、將 BOAT 上的 DUMMY WAFER 以 T-BAWL 取下(RUN MODE 下之DUMMY UNLOAD)。

3. The DUMMY WAFER BOAT on to remove the T-BAWL (DUMMY UNLOAD RUN MODE under)

四、將PEDESTAL COVER、PEDESTAL 5-fin、PEDESTAL 7-fin取下，用六角扳手將PEDESTAL TABLE 的螺絲鬆開取下 DUST TRAY、T/C PORT、COVER後一同拿至洗管間供酸房人員清洗。

4. The PEDESTAL COVER, PEDESTAL 5-fin, PEDESTAL 7-fin removed with an Allen wrench to loosen the screws removed PEDESTAL TABLE DUST TRAY, T / C PORT, get together to wash after COVER between tube for acid house cleaning staff.

五、使用 VL-800 MANU MODE 下之MAUNAL 或 ADJUST 的 MOTION 5 將 BOAT CLAMP 鬆開後將BOAT拿至洗管間供酸房人員清洗。

5. Use the VL800 MANUAL MODE under the MAUNAL or ADJUST MOTION 5 BOAT CLAMP will be released after the BOAT to get to wash room for the acid cleaning room staff.

六、當爐管溫度降至150℃以下時可進行拆管,其步驟如下: (為促進降溫速度，可將 DOOR SHUTTER 打開。其方法為 MANUAL 或 ADJUST 的 MOTION 3至P02->MOTION 4 至P02)

6. When the temperature of the furnace tube drops below 150°C, the tube can be dismantled, and the steps are as follows: (In order to accelerate the cooling speed, the DOOR SHUTTER can be opened. The method is MOTION 3 to P02->MOTION 4 to P02 of MANUAL or ADJUST)

(1). 以 "十" 字起子將遮蓋 MANIFOLD 的 PANEL 取下。

To "十" screwdriver to remove the cover MANIFOLD's PANEL

(2). 以六角扳手鬆開 DOOR SHUTTER 的螺絲後取下 DOOR SHUTTER。

Loosen the DOOR SHUTTER screw with a hexagonal wrench and remove the DOOR SHUTTER

\*\* VL-800 之MOTION 3 及 MOTION 4 均須在 POSITION 2，MOTION 1 不可超過POSITION 2。

\*\* MOTION 3 and MOTION 4 of VL-800 shall be at POSITION 2 and MOTION 1 must not exceed POSITION 2.

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\*\* 鬆開螺絲時須用另一隻手扶著 DOOR SHUTTER 防止其掉下。

\*\* To release the screw, hold the DOOR SHUTTER with the other hand to prevent it from falling

(3). 拆 SiH<sub>2</sub>Cl<sub>2</sub>、NH<sub>3</sub> INJECTOR。

Remove SiH<sub>2</sub>Cl<sub>2</sub>, NH<sub>3</sub> INJECTOR

(4). 拆 PS1 接頭、VACUUM PIPE、COLD TRAP。

Remove the PS1 connector, VACUUM PIPE, COLD TRAP

(5). 拆內管，步驟如下(所提即的各部位名稱請參考圖二)：

Remove the inner tube, the steps are as follows (referred to the name of each part please refer to Figure 2)

(5-1). 將MANIFOLD INSTALLATION JIG 放在CAPPING FLANGE上。

Place MANIFOLD INSTALLATION JIG on CAPPING FLANGE

(5-2). 將INNER JIG 放在MANIFOLD INSTALLATION JIG 上,其POSITIONING BLOCK 須對準MANIFOLD INSTALLATION JIG 上的LOCATION GROOVE。

Place INNER JIG on MANIFOLD INSTALLATION JIG with POSITIONING BLOCK at LOCATION GROOVE on MANIFOLD INSTALLATION JIG

(5-3). 將ROTARY HANDLE 轉至 " LOCK " 位置。

Move the ROTARY HANDLE to the "LOCK" position

(5-4). 檢查 VL-800 MOTION 1 (SET □ M01 □ SPD )之速度是否為100，如果不是請改成100。

Check if the speed of VL-800 MOTION 1 (SET M01 SPD) is 100, if not, please change to 100.

(5-5). 將 VL-800 MOTION 1 往上升，注意與MANIFOLD INSTALLATION JIG 交接是否平穩，如不平穩請調整之，如果平穩則繼續上升。當MANIFOLD INSTALLATION JIG 接近 MANIFOLD 時請注意 INNER JIG上的POSITIONING BLOCK 須對準MANIFOLD 上的POSITIONING BLOCK，當B/E上的彈簧稍微壓縮時即停止上升。



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Move the VL-800 MOTION 1 to the rising position. Note that the connection to the MANIFOLD INSTALLATION JIG is stable. If it is not stable, adjust it. If it is stable, continue to rise. When MANIFOLD INSTALLATION JIG is close to MANIFOLD Note that the POSITIONING BLOCK on the INNER JIG should be aligned with the POSITIONING BLOCK on the MANIFOLD and stop rising when the spring on the B / E is slightly compressed

(5-6). 將ROTARY HANDLE 轉至" FREE " 位置。

Move the ROTARY HANDLE to the FREE position

(5-7). 將 VL-800 MOTION 1往下降，速度宜緩慢，可自VACUUM PIPE HOLE 中觀察內管下降情形，當B/E降至接近TUBE SLIDER 時請小心，勿使內管晃動。

The VL-800 MOTION 1 should be lowered to a slow speed. The inner tube descent can be observed from the VACUUM PIPE HOLE. Be careful not to let the inner tube swerve when the B / E is reduced to near the TUBE SLIDER.

(5-8). B/E 續降至POSITION 1後取下內管、INNER TUBE HOLDER、INNER JIG。

B / E continued down to POSITION 1 after the removal of the inner tube, INNER TUBE HOLDER, INNER JIG.

(6). 拆N2 INJECTOR。

Remove N2 INJECTOR.

(7). 拆PADDLE T/C。

Demolition of PADDLE T / C

(8). 拆外管，步驟如下(所提及的各部位名稱，請參考圖三)：

Remove the outer tube, the following steps (the names of the parts mentioned, please refer to Figure 3)

(8-1). 將B/E 往上升，與MANIFOLD INSTALLATION JIG 交接時須注意是否平穩，如不平穩請調整

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之；如果平穩，則可繼續上升。接近MANIFOLD 時須注意LOCATION GROOVE 要對準MANIFOLD 的POSITIONING BLOCK，當B/E 的彈簧稍微壓縮時即停止上升。

B / E to rise, and MANIFOLD INSTALLATION JIG handover should pay attention to whether the smooth, if not smooth, please adjust; if smooth, you can continue to rise. Close to the MANIFOLD should be careful LOCATION GROOVE to MANIFOLD the POSITIONING BLOCK, when the spring B / E is slightly compressed to stop rising.

- (8-2). 將MANIFOLD CHILLING WATER BELLOW 快速接頭與機台分離並纏繞於B/E旁，然後鬆開4顆固定MANIFOLD 的螺絲 (LOCK HANDLE)。

Separate the MANIFOLD CHILLING WATER BELLOW connector from the machine and wrap it around the B / E, then loosen the four MANIFOLD screws (LOCK HANDLE).

- (8-3). 將B/E 往下降，須注意MANIFOLD 是否一同下降，降至POSITION 3 附近時須提防勿使MANIFOLD 碰撞到BOAT TRANSFER，在與TUBE SLIDER 交接時亦不要引起 太大晃動，當B/E 降至POSITION 1即停住。

The B / E to decline, we must pay attention to MANIFOLD whether the decline in the vicinity of POSITION 3 to beware of not to make MANIFOLD collision BOAT TRANSFER, in conjunction with the TUBE SLIDER teach also do not cause too much shaking when B / E down to POSITION 1 is stopped.

- (8-4). 鬆開固定外管的BOLT 上的螺絲後取下BOLT，TEFLON RING。

Loosen the screws on the BOLT securing the outer tube and remove the BOLT, TEFLON RING

- (8-5). 取下外管、O-RING、O-RING HOLDER、MANIFOLD。

Remove the outer tube, O-RING, O-RING HOLDER, MANIFOLD

\*\* 拆下的石英配件須拿至洗管間由酸房人員負責清洗並準備一套以俾進行裝管。



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\*\* Removal of quartz fittings to be taken to the wash room by the acid room staff responsible for cleaning and prepare a set to serve for the tube

(8-6). 大保養均需使用菜瓜布將硬體 manifold ,sport ring ,賓士盤刷洗清潔 (如附圖)。

For large maintenance, use a melon cloth to clean the hardware manifold, the sport ring, and the guest plate (as shown in the attached figure).



七、將COLD TRAP的螺絲鬆開後將COLD TRAP 分解。將 VACUUM PIPING 上的 MANTLE HEATER 拆下，以活動扳手將 MANIFOLD 上的 CHILLING WATER BELLOW 拆下後，把 MANIFOLD、COLD TRAP、VACUUM PIPING 送至超音震盪 2 HOURS 後拿起送至烤箱烘烤 2 HOURS 後即可供下次使用。

7. COLD TRAP will be released after the collapse of the COLD TRAP. Remove the MANTLE HEATER on the VACUUM PIPING, remove the CHILLING WATER BELLOW from the MANIFOLD with the adjustable wrench, and transfer the MANIFOLD, COLD TRAP, VACUUM PIPING to the ultrasonic vibration 2 HOURS and then lift to the oven for baking 2 HOURS You can use it for the next time.

\*\* SIN COOLER OVER TEMP ALARM 時需將該 COOLER 更換。

\*\* SIN COOLER OVER TEMP ALARM Replace this COOLER

\*\* SIN 4PM 須將接 MANIFORD 之 GAS TUBE (BELLOW)、ELBOW 各三條及 PRESSURE TUBE (BELLOW)、ELBOW、GAUGE PORT 等拆下並分解(1PM、2PM、3PM只需拆PRESSURE TUBE (BELLOW)、ELBOW、GAUGE PORT即可)，再拿至震盪槽 CLEAN (至少震兩小時)，震完後管內以 DI

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沖洗數次再以 AIR 吹乾，接著拿至烤箱烘烤 (50°C以上，須烘烤一小時以上)，在取出裝上機臺前須再以 AIR 吹淨管內之 POWDER (需以無塵布按住 PIPING 另一端出口，直到白布上無任何可目視 POWDER為止) 再行裝上。

\*\* SIN 4PM to be connected MANIFOLD GAS TUBE (BELLOW), ELBOW the three and PRESSURE TUBE (BELLOW), ELBOW, GAUGE PORT, such as dismantling and decomposition (1 PM, 2PM, 3PM only PRESSURE TUBE (BELLOW), ELBOW, GAUGE PORT), and then take to the shock tank CLEAN (at least two hours of shock), after the tube to DI washed several times to AIR dry, then take to the oven baking (50 ° C or more, to be baked Hour), in the removal of the machine must be installed on the AIR before the purge of the POWDER (with a clean cloth to be held down PIPING the other end of the export, until the white cloth without any visual POWDER so far)

\*\* PM 完CHECK及調整 B/E DRIVER VOLTAGE(SPEC RUN/STOP : 0.38+-0.04/0.18+-0.02V) · 若異常請更換新品。

\*\* PM complete CHECK and adjust B / E DRIVER VOLTAGE (SPEC RUN / STOP: 0.38 + -0.04 / 0.18 + -0.02V), if the exception please replace the new

\*\* PM 後拆下機臺正面COVER CLEAN CARRIER & STAGE ASSEMBLY & 機台內部周圍環境 (COUNT/ORIENT/BODY..)。

\*\* (COUNT / ORIENT / BODY ..) after removal of the front of the machine COVER CLEAN CARRIER & STAGE ASSEMBLY & the machine inside the environment (COUNT / ORIENT / BODY ..).

七、如遇4PM時則進行以下步驟否則跳過：

7. In the case of 4PM when the following steps or skip:

APC + MV 清潔及校正組裝程序。(附圖五)

APC + MV cleaning and calibrate install procedure.(Figure 5)

操作程序：

(1). 至樓將該機台PUMP 停機。

To the floor will be the machine PUMP downtime

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(2). 將 MODEL 3200 切換成 MANUAL MODE 。

Change the MODEL 3200 to MANUAL MODE

(3). 將APC CLOSE 。

Will APC CLOSE

(4). 將SV及其ELLOW拆下並將ELLOW送至震盪槽 CLEAN 。

Remove the SV and its ELLOW and send the ELLOW to the shock tank CLEAN

(5). 將VV1、VV2拆下並將其連接之ELLOW和與小砲管連接之ELLOW拆下送震盪槽 CLEAN 。

Remove VL1, VV2 and connect it to the ELLOW and small gun connected ELLOW sent to send shock tank CLEAN.

(6). 先將APC電源接頭拔除後將APC訊號連接頭拔下。使用兩隻活動板手將APC 螺絲鬆開後取下  
CLEAN 。

Unplug the APC connector after unplugging the APC power connector. Remove the APC screw with two movable wrenches and remove the CLEAN

(7). 將砲管拆下送至震盪槽 CLEAN 。

Remove the gun barrel to the shock tank CLEAN

(8). 拆下MV並將上方6顆螺絲鬆開，取下上蓋後將MV BELLOW取出，用IPA清潔MV內部及BELLOW  
清潔乾淨後更換內部O-RING並組裝復歸。

Remove the MV and loosen the upper 6 screws, remove the cover after the MV BELLOW out, with IPA clean MV and BELLOW clean internal replacement O-RING and re-assembly

(9). 將氣管插入MV 氣管接頭後作通氣、洩氣動作，檢查MV是否正常上下作動。

Insert the trachea into the MV tube connector for ventilation, deflation action, check the MV is up and down the normal action

(10). 將COOL TRAP與MV間之小砲管拆下送至震盪槽 CLEAN 。

Remove the small barrel between COOL TRAP and MV to CLEAN.

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\*\*BELLOW及大、小砲管至少震兩小時，震完後管內以 DI 沖洗數次再以 AIR 吹乾，接著拿至烤箱烘烤 (50°C以上，須烘一小時以上)，在取出裝上機臺前須再以 AIR 吹淨管內之 POWDER再行裝上。

\*\* BELLOW and large and small barrels at least two hours after the earthquake, after the tube to DI washed several times to AIR dry, and then take to the oven baking (50 ° C or more, to be baked for more than an hour) Remove and install the machine before the need to re-AIR POWDER re-installed within the purge.

八、APC 清潔完成後執行APC開關角度測試(未拆除則否)。

8. APC cleaning is completed after the implementation of APC switch angle test (not removed if not).

(1). 先將APC訊號接頭接上後將APC電源接頭插上。

Connect the APC connector to the APC power connector.

(2). 將APC open/close反覆數次，觀察APC是否有打滑現象、硬體角度(附圖FIG-6)、show出角度是否正確(OPEN : 500±10 / CLOSE : 25 ±5)

APC open / close repeated several times to observe whether the APC slip phenomenon, the hardware angle (Figure FIG-6), show the angle is correct(OPEN: 500 ± 10 / CLOSE: 25 ± 5)

(3). 打滑現象細指為GEAR動作但是葉片無動作，或MOTOR動作GEAR無動作：

將screw-2及screw-3共8顆screw鎖緊(附圖四)。

Slip phenomenon Fine action for GEAR but leaves no action, or MOTOR action GEAR

No action:

Screw-2 and screw-3 a total of 8 screw locking (Figure 4).

(4). APC CLOSE角度不對：

APC CLOSE angle wrong:

(4-1). 將APC close，看葉片有無在1mm處。

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Close the APC, see whether the blade at 1mm.

(4-2). 若無則將screw-2(4顆)鬆開，將葉片調整至1mm，再將screw-2鎖緊，再將APC OPEN再CLOSE。

If not, then screw-2 (4) release, adjust the blade to 1mm, then screw-2 lock, then APC OPEN and then CLOSE.

(4-3). 此時APC SHOW 25，若不是則將SCREW-1鬆開轉動potentiometer，此時APC會SHOW出不同角度(數字)，將APC數字調整至 $25 \pm 5$ 內。(轉動potentiometer除了APC數字會變化外，葉片也會動作)重覆上述動作將APC CLOSE調整至1mm處及APC SHOW  $25 \pm 5$ 內。(附圖FIG-6)

At this point APC SHOW 25, if not the SCREW-1 will rotate the potentiometer release, this time APC SHOW out different angles (number), the APC number adjusted to  $25 \pm 5$  within. (Turn the potentiometer in addition to the APC number will change, the blade will move), repeat the above action will APC CLOSE adjusted to 1mm and APC SHOW  $25 \pm$  within. (FIG.6)

(5). APC OPEN角度不對：

APC OPEN Angle wrong:

將APC OPEN看APC是否SHOW  $500 \pm 10$ ，不是則調整APC CONTROLLER的GAIN至正確位置(葉片不會動作)。(附圖四)

Will APC OPEN see APC is SHOW  $500 \pm 10$ , not the adjustment APC CONTROLLER the GAIN to the correct location (leaves will not action). (Figure 4)

九、Burn box 清潔程序(附圖六)

9. Burn box cleaning procedure.(Figure 6)

操作程序：

(1). 戴上呼吸防護器具及防護手套。

(2). 拆下 BURN BOX COVER，以活動板手固定之螺帽及 WASHER，將拆下之零組件擺放適當位

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置。

- (3). 將 BURN BOX COVER DORP UP，拿起 O-RING 置於無塵布上，以 LOW VACUUM 口朝向 BURN BOX 內緣，並以起子刮除附著於 WALL 上之 POWDER，CLEAN COVER 表面，清除乾淨。
- (4). 用 IPA 擦拭 O-RING 及 SEAL RANGE 處及整個 BODY。
- (5). 固定 O-RING 於 COVER SEAL 處，並對準 BURN BOX 內緣套入 BODY 之螺孔，拿取拆下之螺帽 WASHER 旋轉固定之，以防 POWDER 外漏。
- (6). 清除週邊之 POWDER 沉積物，用預先準備之透明夾鏈袋，裝入沾有沉積物之無塵布及手套等，袋口密封繫實丟入酸類 (藍色小方型垃圾桶) 結束 BURN BOX MAINTENANCE 之 PROCEDNRE。

#### Operation section:

- (1). Wear respiratory protective gear and protective gloves.
- (2). Remove the BURN BOX COVER and place the removed components in the proper position with the nut and WASHER fixed by the movable wrench.
- (3). Place the BURN BOX COVER DORP UP, pick up the O-RING on the clean cloth, and point the LOW VACUUM port to the BURN.  
The inner edge of the BOX is scraped off with a screwdriver to remove the POWDER, CLEAN COVER surface attached to the WALL.
- (4). Wipe O-RING and SEAL RANGE with IPA and the entire BODY.
- (5). Fix O-RING at COVER SEAL and insert the BODY screw hole into the inner edge of BURN BOX. Take the removed nut WASHER and fix it to prevent POWDER from leaking.
- (6). Remove the surrounding POWDER deposits, use a transparent zipper bag prepared in advance, and put in a dust-free cloth and gloves with deposits. The bag mouth seal is thrown into the acid (blue small square trash can). PRORNDNRE of BURN BOX MAINTENANCE.

十、組裝：

#### X. Assembly:



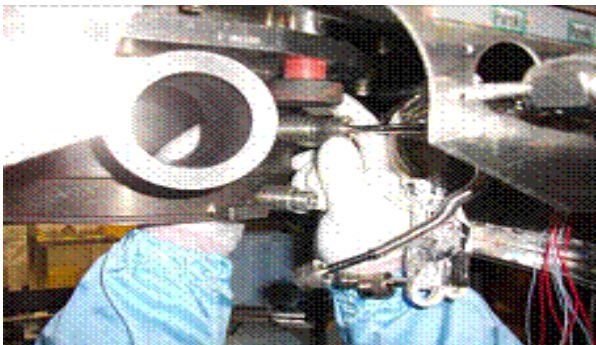
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程序與拆管程序相反，不再贅述，亦請注意安全。

Procedures and demolition procedures contrary, not repeat them, please note that security.

\*\* injector 安裝手法：安裝時先將 gas bellow 接頭鎖入 2/3 以上；以兩手內外輔助(內:輕推 injector 至定位，外:扶住 bellow 接頭並往內鎖緊)至安裝完成。(如圖解)

\*\* Injector installation: Install the gas bellow connector into the 2/3 or more; with both hands inside and outside assistance (within: push the injector to positioning, outside: hold the bellow connector and inward locking) to the installation is complete. (As illustrated)



## 額外補充技巧：

STEP1：先將 INJECTOR 插入 Tube 管口 & 套上 O-ring

STEP2：將 Gas bellow 接頭插入並將其鎖上幾牙(請水平地對準管口，不要歪斜插入又硬鎖牙，會造成 QUARTZ BREAK)

如何判斷是否水平?? 若鎖牙感到困難不順 => 請重調整 Angle 再次鎖入

STEP3：鎖上 2/3 後 -> 將 INJECTOR 往前推 -> 再鎖上幾牙 -> 直到用手轉不動後 -> 使用 Tool 鎖緊 (請使用雙手，一手請輕扶 INJECTOR，防止 INJECTOR 傾斜，一手鎖緊 Gas bellow)

訣竅：當快完全地鎖緊時，可以稍微將 INJECTOR 傾斜，再順勢鎖緊 => 便能夠使 INJECTOR 保持垂直狀態

## Additional tips：

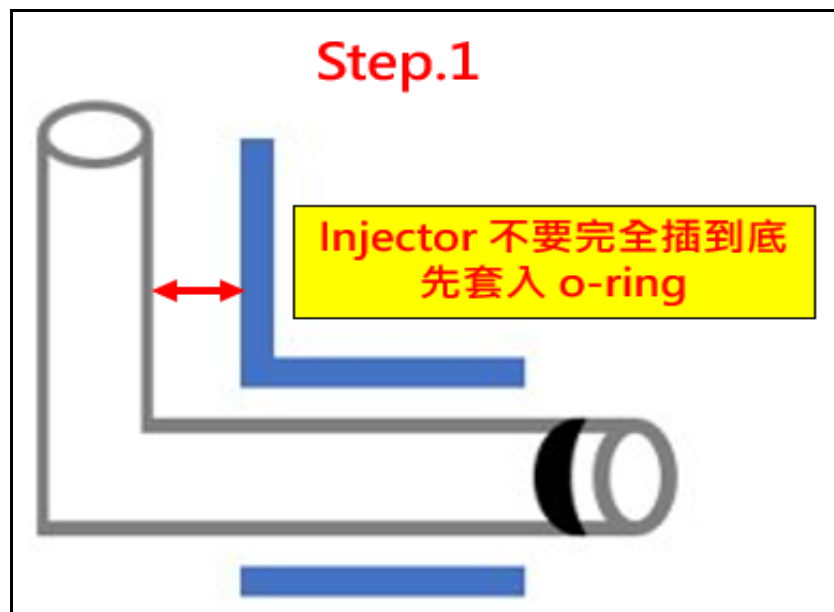
STEP1：First, Insert injector into the inside of the tube nozzle and place O-ring on it.

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STEP2 : insert gas bellow connector into the outside of the tube nozzle and tighten it a few turns(Remember, you need to tighten gas bellow connector a few turns in horizontal. If you feel it's too difficult to tighten, adjust the direction of installation to horizontal, and then tighten it again to prevent the quartz from breaking.)

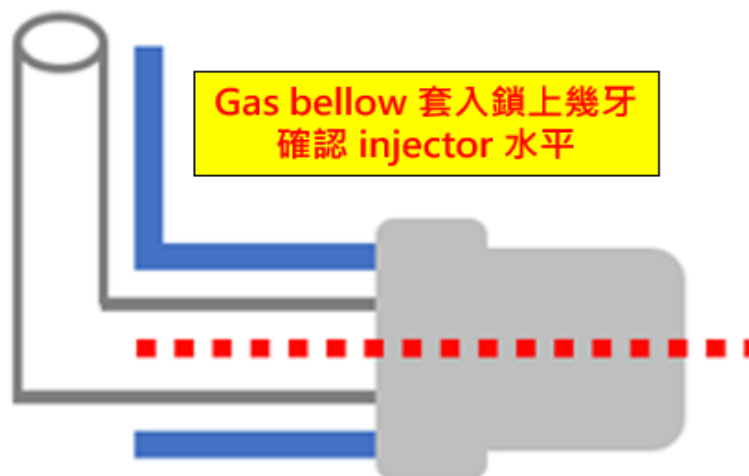
STEP3 : "After tightening a few turns → Push the injector forward → Tighten a few more turns → Until it can no longer be turned by hand → Use a tool to tighten (please use both hands: one hand gently support the injector to prevent it from tilting, while the other hand tightens the gas bellow connector).

Tip: When it's almost fully tightened, you can slightly tilt the injector, and then continue to tighten, which will help keep the injector in a vertical position."

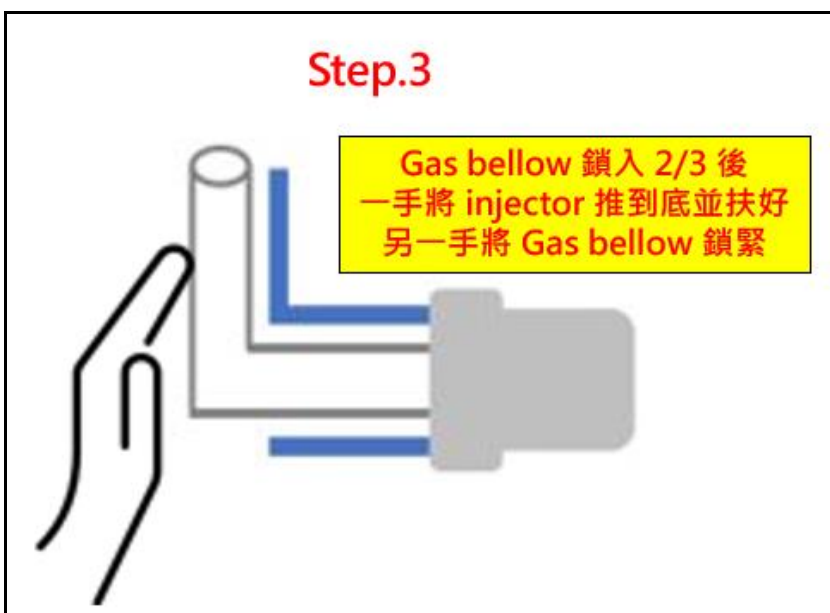




## Step.2



## Step.3



\*\* PUMP開啟前須先確認以LOCAL方式開啟。

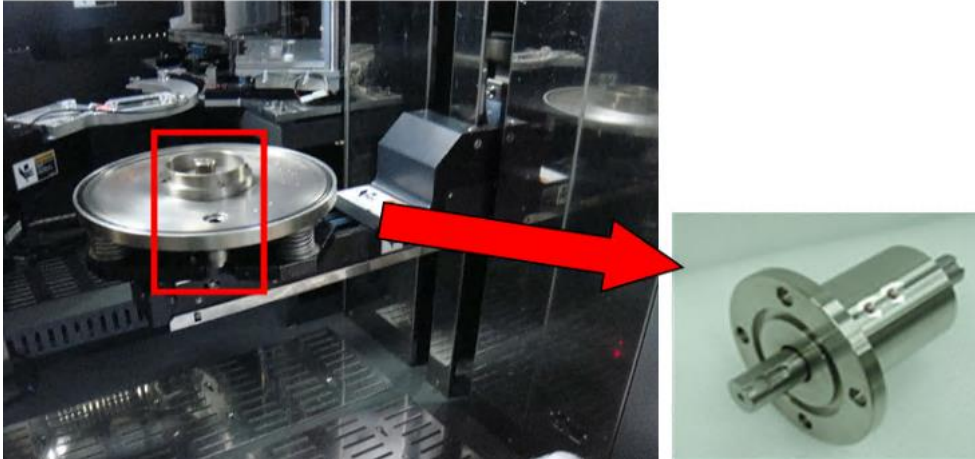
\*\* PUMP must be confirmed before opening to LOCAL way to open.

\*\* 測試磁性流體(轉子)轉動時，是否有異音及抖動狀況，若有異常則更換之

\*\* When testing the rotation of a magnetic fluid (rotor), check for any abnormal noises or

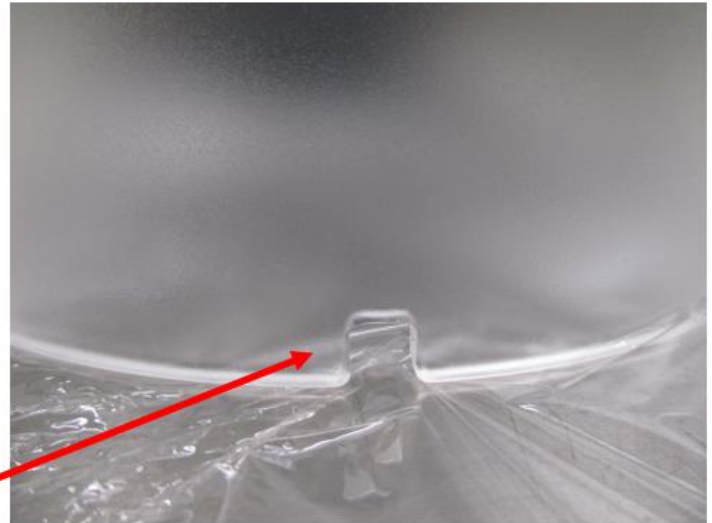
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vibrations. If any abnormalities are found, replace it.



- \*\* 將磁性流體(轉子)拆下清潔，將 coating 刮除後使用 low vacuum 清潔乾淨，再將其裝回
- \*\* After scraping off the coating, clean it thoroughly with low vacuum, and then reassemble it.
- \*\* 裝 Pedestal 前檢查石英是否有破裂(整體皆需確認，缺口處需特別注意無破裂，如附圖) & 量測重量，若有破裂或重量小於1020g則不使用。
- \*\* Before installing the Pedestal, check whether the quartz is cracked (the whole should be confirmed, and special attention should be paid to no cracks at the notch, as shown in the picture) & Measure the weight, if it is cracked or the weight is less than 1020g, do not use it.

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**確認 Pedestal 缺口處無破裂**

\*\* 裝PEDESTAL前須以水平儀檢查 CAPPING FLANGE 邊緣對角四點之水平狀態，若有偏差則須調整至最佳狀態。

\*\* Before loading PEDESTAL, check the level of CAPPING FLANGE four points on the edge of the edge, if there is any deviation to be adjusted to the most Good condition.

\*\* 裝完PEDESTAL COVER後，以水平儀檢查其與 BOAT 接合面之水平是否合乎要求，若有偏差則須調整至最佳狀態(參考技資G3363-1010)，手壓鐵板測試 elevator 下方 EMG-STOP switch 功能正常(VL-800 需有 ID.63 alarm)，再將 BOAT 置上保溫筒並伸入管內檢查是否會刮管，若有刮之慮則須調整使之不刮管。

\*\* After installing the PEDESTAL, use a spirit level to check whether the level of the joint surface with the BOAT meets the requirements. If there is any deviation, adjust it to the best state (refer to technical material G3363-1010), and test the function of the EMG-STOP switch under the elevator by hand pressing the iron plate If it is normal (VL-800 needs ID.63 alarm), put the BOAT on the insulation tube and extend it into the

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tube to check whether it will scrape the tube.



十一、調整 BOAT 與PEDESTAL COVER承接時晃動的程度至最小後調整BOAT及BOAT LOCK的位置。

(參考技G3363-1010)

11, adjust BOAT and PEDESTAL COVER to undertake when the degree of shaking to a minimum after the adjustment BOAT and BOAT LOCK position.

(Reference technology G3363-1010)

十二、測試氣聲：

12. the test sound of gas:

(1). 將CAP連同PEDESTAL COVER 升至P04位置。

Raise the CAP and PEDESTAL COVER to the P04 position.

(2). 將 MODEL 3200 切換成 MANUAL MODE。

Switch the MODEL 3200 to MANUAL MODE.

(3). 關所有進 TUBE 的 GAS VALVE。

Close all GAS VALVE in TUBE.

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(4). 開 SV , ATM燈熄面後馬上關SV並通N2破大氣。

Open the SV, ATM lights immediately after the surface off SV and N2 break the atmosphere.

(5). ATM燈亮起後將CAP緩緩下降，CHECK有管內壓力是否為大氣。

ATM lights will slowly decline in CAP, CHECK whether there is pressure tube atmosphere.

(6). 如果有氣往裡吸或是往外噴則調整760TORR SWITCH

Adjust the 760TORR SWITCH if there is gas in or out

(7). 重複動作直至無氣聲為止

Repeat until there is no sound

十三、低溫PURGE：

XIII. Low temperature PURGE:

(1). 將CAP連同PEDESTAL COVER升至 POSITION 4。

Raise CAP together with PEDESTAL COVER to POSITION 4.

(2). 將 MODEL 3200 切換成 MANUAL MODE。

Switch the MODEL 3200 to MANUAL MODE.

(3). 關所有進 TUBE 的 GAS VALVE。

Close all GAS VALVE in TUBE.

(4). 開 SV 小抽，待管內壓力低於 5 TORR 時再開 MV大抽。

Open SV small pumping, to be under pressure when the tube is less than 5 TORR open MV big pumping.

(5). 將所有 N2 GAS打開。

Turn on all N2 GAS.

(6). PURGE後即可進行低溫測漏。

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PURGE can be measured after the low temperature leak.

十四、T-BAWL 傳送CHECK(參考技資G3363-1010) , 只需CHECK FORK-5即可。

14. T-BAWL transmission CHECK (reference technology G3363-1010), only CHECK FORK-5 can.

(1). 每次 BPM need clean counter sensor with air gun。

Every time BPM needs clean counter sensor with air gun.

LP 管:每次 BPM clean 一次。

LP pipe: every time BPM clean time.

十五、低溫測漏：

15. low temperature leak detection:

(1). 關所有GAS VALVE直至壓力抽至 0.00 TORR。

Close all GAS VALVE until the pressure reaches 0.00 TORR.

(2). 關 SV、 MV 作測漏，規格為漏率小於0.03 TORR/ 130 SEC

Off SV, MV for leak detection, specifications for the leakage rate is less than 0.03 TORR / 130 SEC

十六、如果測漏不過則請進行抓漏，找出漏處並解決後再作測漏，直至漏率合乎規格。

16. If the leak, but please leak, find the leak and then solve the leak, until the leak rate in line with specifications.

十七、低溫測漏通過即可將208V POWER打開升溫。

17. Through the low temperature leak detection can be 208V POWER open heating.

十八、作升溫PURGE：

18. Heating PURGE:

升溫PURGE方式同低溫PURGE，不同點是 B/E 需連同PEDESTAL COVER、BOAT一起至P04。

Heating PURGE mode with low temperature PURGE, different is the B / E with PEDESTAL



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COVER, BOAT together to P04.

十九、高溫測漏：

19. High temperature leak detection:

方法與規格皆和低溫測漏同，如果不過表示有漏須抓漏，直至通過方可進行下一步驟。

Methods and specifications are the same with the low temperature leak, but if there is leakage to be leaked, until the next step can be carried out.

二十、檢查各TAPE HEATER是否毀損，電壓是否在110V，加熱是否正常。檢查VACUUM PIPING 上的 MANTLE HEATER 否毀損，加熱是否正常，溫度是否在 $80 \pm 10$ 度，TAPE HEATER如果毀損或加熱異常請立即更換。

20. Check whether the destruction of the TAPE HEATER, the voltage is 110V, heating is normal. Check MANTLE on VACUUM PIPING HEATER No damage, heating is normal, and the temperature is  $80 \pm 10$  degree, TAPE HEATER if damaged or abnormal heating, please immediately replace.

二十一、將機台內部及四周用LOW VACCUM與IPA 清潔乾淨。

21. The machine inside and around with LOW VACCUM and IPA clean.

二十二、SPM/BPM 請 Check CAP Flow Meter 浮球 動作 & 機台 alarm 功能是否正常。

22. SPM / BPM Please Check CAP Flow Meter float action & machine alarm function is normal.



二十三、SPM/BPM 檢查電磁閥有無漏氣或脆化，若有不良則更換。

23. SPM/BPM Check the solenoid valve for air leakage or embrittlement, and replace it if

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it is defective.

二十四、Normal-Open Valve 電磁閥每5年定期更換一次。

24. Normal-Open Valve solenoid valves are regularly replaced every 5 years.

二十五、將機台復歸為STANDBY狀態，通知EA TEST RUN，於記錄本上註明做TEST RUN並簽名。

TEST RUN：即 RUN 一個平常 RUN 貨的 RECIPE 以量測其厚度，PARTICLE。如果均合乎規格即可交給生產線 RUN 貨，大PM保養工作至此完成。

25. The machine will revert to STANDBY state, notify the EA TEST RUN, in the note on the record to do TEST RUN and signature.

TEST RUN: RUN a normal RUN goods RECIPE to measure the thickness, PARTICLE. If they are in line

Grid to the production line RUN goods, large PM maintenance work is complete.

二十六、機台 TEST RUN 後，設備工程師需於機台 STANDBY 時，確認 PS1 PRESSURE=30TORR。

26. The machine TEST RUN, the equipment engineers need to STANDBY machine, the confirmation PS1PRESSURE = 30TORR.

二十七、歲修期間機台負責全廠 PUMP DOWN SIH2CL2 GAS 程序步驟如下：

27. During the repair process is responsible for the whole plant PUMP DOWN SIH2CL2 GAS procedure steps are as follows:

(1). Gas pump down 機台抽氣前，請先更換 vacuum piping & bellow & cold trap。

Gas pump down Before pumping from the machine, please replace the vacuum piping & bellow & cold trap first.



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## VAC PIPING & bellow



## COLD TRAP



- (2). 將機台抽真空抽至底壓(<0.01 TORR)。

Pump the vacuum pump down to the base pressure (<0.01 TORR).

- (3). 將SIH2CL2氣體管路通至CHAMBER TUBE內之AIR VALVE OPEN，此時開始抽SIH2CL2氣體。

Connect the SIH2CL2 gas line to the AIR VALVE OPEN in the CHAMBER TUBE, and start pumping the SIH2CL2 gas.

- (4). 抽氣體持續2~3分鐘後,開始將機台SIH2CL2 MFC旁BYPASS手動閥慢慢開啟,同時監看CHAMBER PRESSURE,其壓力需<1 TORR。

Pumping gas for 2 to 3 minutes, the machine will start next to SIH2CL2 MFC BYPASS manually open the valve slowly, while monitoring CHAMBER PRESSURE, The pressure required <1 TORR.

- (5). 此機台必須抽到CHAMBER PRESSURE等於0.00 TORR，且SIH2CL2 Regulator指針須至-76kgf/cm<sup>2</sup>。

The machine must be pumped to CHAMBER PRESSURE equal to 0.00 TORR and the SIH2CL2 Regulator pointer to -76 kgf / cm<sup>2</sup>.

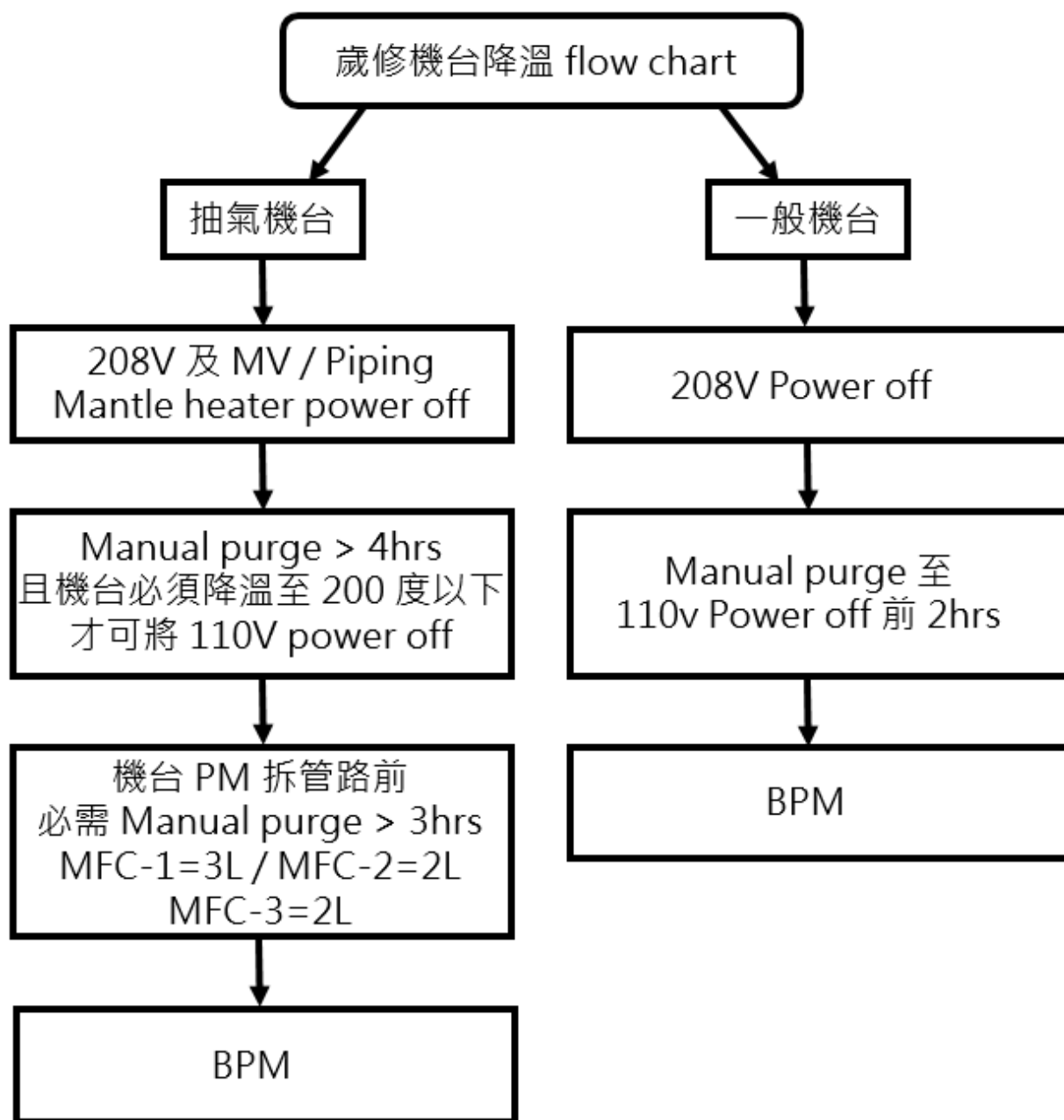
- (6). 回報GAS PUMP DOWN OWNER(S500) 已完成。

The GAS PUMP DOWN OWNER (S500) is complete.

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- (7). 若完成SIH2CL2 PUMP DOWN則當DCS管路作N2保壓 ,請將機台內SIH2CL2 MANUAL VALVE CLOSE 。  
If the SIH2CL2 PUMP DOWN is complete, the DCS piping will be held in N2. Please set SIH2CL2 MANUAL VALVE CLOSE.
- (8). 將機台208V 及 MV / PIPING MANTLE HEATER POWER OFF , 降溫並持續 PG 。  
Turn the machine 208V and MV / PIPING MANTLE HEATER POWER OFF, cool down and continue the PG.
- (9). 機台須持續 PURGE CHAMBER至少 4 小時且機台必須降溫到200度以下才可以將110V POWER OFF 。  
PURGE CHAMBER must be continued for at least 4 hours and the machine must be cooled down to 200 ° C to 110V POWER OFF.
- (10). CHAMBER PURGE時N2量為MFC1 3L / MFC2 2L / MFC3 2L (VENT N2 / NH3 N2 / SIH2CL2 N2 ) 。  
CHAMBER PURGE The amount of N2 is MFC1 3L / MFC2 2L / MFC3 2L (VENT N2 / NH3 N2 / SIH2CL2 N2).
- (11). 機台PM前需PURGE 3小時,PIPING之MANTLE HEATER 需至室溫才能拆除真空管路 。  
Before Machine PM have to purge 3 hours, PIPING the MANTLE HEATER required room temperature to remove the vacuum line.

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(12). BPM 拆管前請先隔離 gas detector

Please isolate the gas detector before dismantling the BPM

(13). 以 gas portable 偵測爐管口是否有 DCS 讀值，若偵測到讀值請持續以 low vacuum 對爐管口

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持續吸氣 15mins，若無讀值則繼續下一步驟

Use gas portable to detect whether there is a DCS reading at the furnace nozzle. If the reading is detected, please continue to inhale the furnace nozzle with low vacuum for 15 minutes.

If there is no reading, continue to the next step

- (14). 拆 vacuum piping 偵測 cold trap 內部是否有 DCS 讀值，若偵測到讀值請持續以 low vacuum 對 cold trap 持續吸氣 15mins，若無讀值則繼續下一步驟

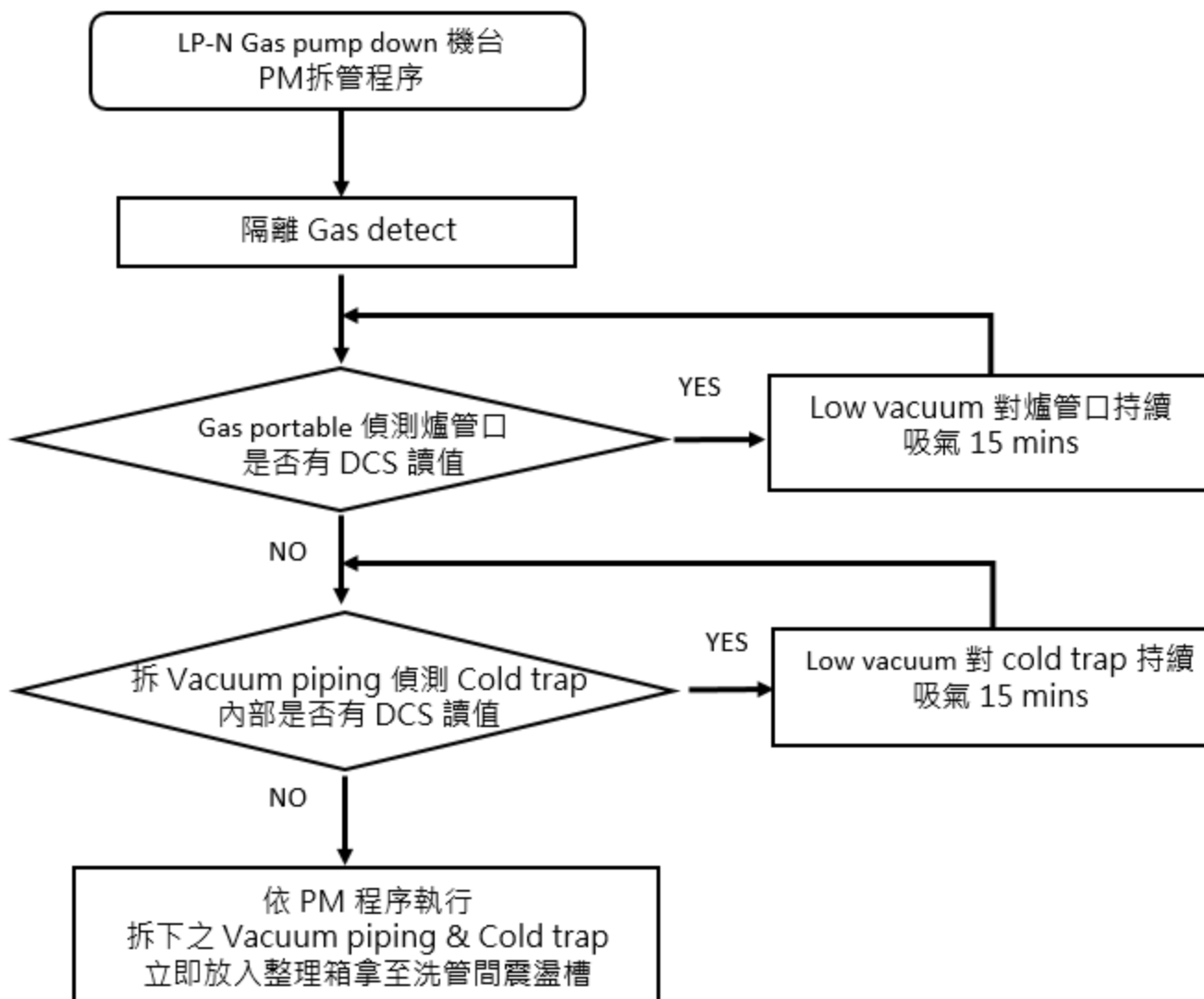
Remove the vacuum piping to detect whether there is a DCS reading inside the cold trap.

If a reading is detected, please continue to inhale the cold trap with low vacuum for 15 minutes. If there is no reading, continue to the next step

- (15). 依正常 BPM 持續執行，拆下之 vacuum piping & cold trap 立即放入整理箱並拿至洗管間震盪槽震盪

Continue to execute according to the normal BPM. The removed vacuum piping & cold trap is immediately put into the sorting box and taken to the shaking tank between the washing tubes for shaking

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(16). 機台復機時請確認SIH2CL2 MANUAL VALVE必須是OPEN。

Please confirm that the SIH2CL2 MANUAL VALVE must be OPEN when the machine is in use.

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捌、生效與修訂

## 8. Effective with Amendment

本規範之公佈實施及其修訂核准層級皆依會簽/核決/分發依循範例為之。

The publication and implementation of this Code and its revised approval level are governed by the signing / approval / distribution follow-up example.

玖、附件

## 9. Attach

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SIN

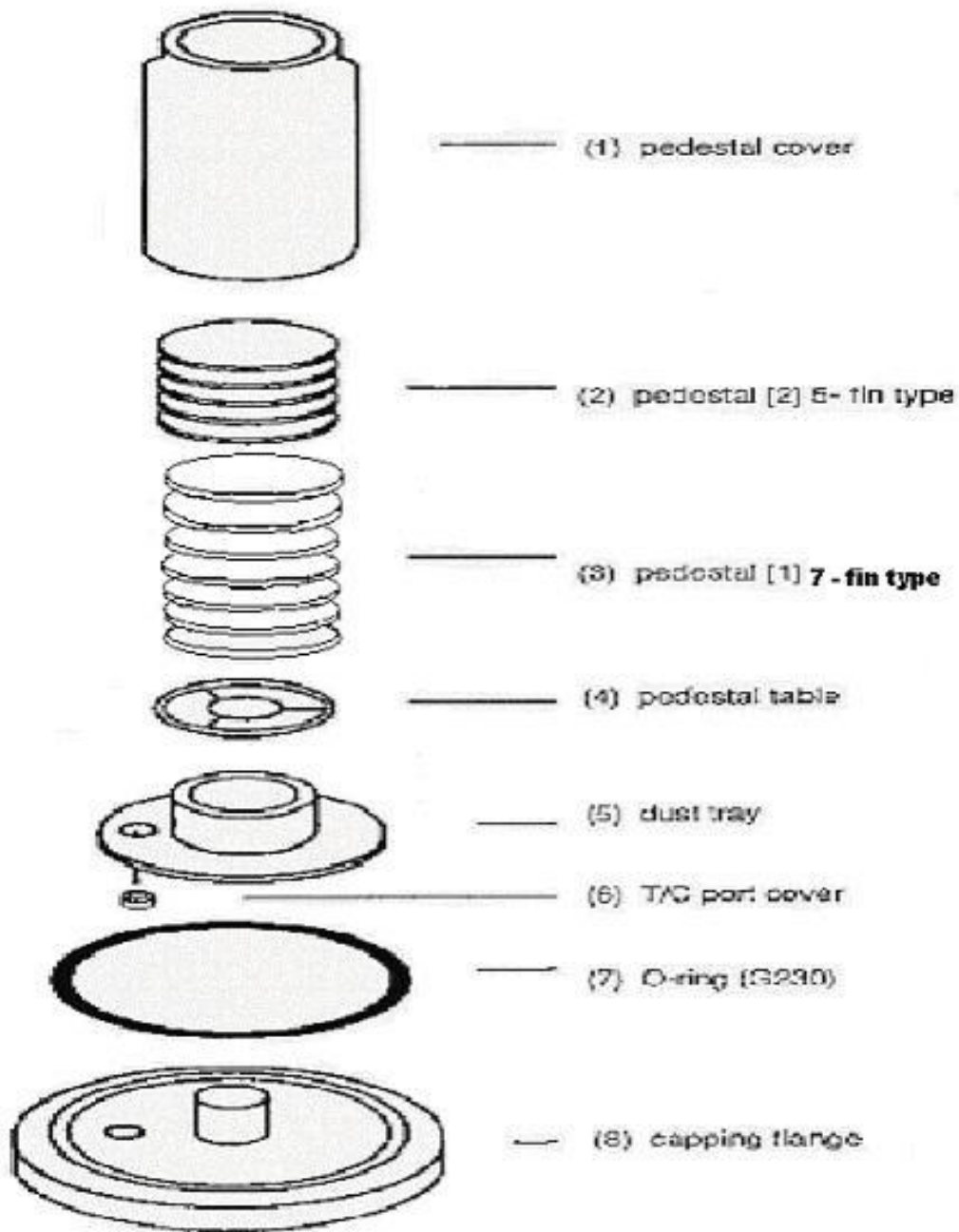
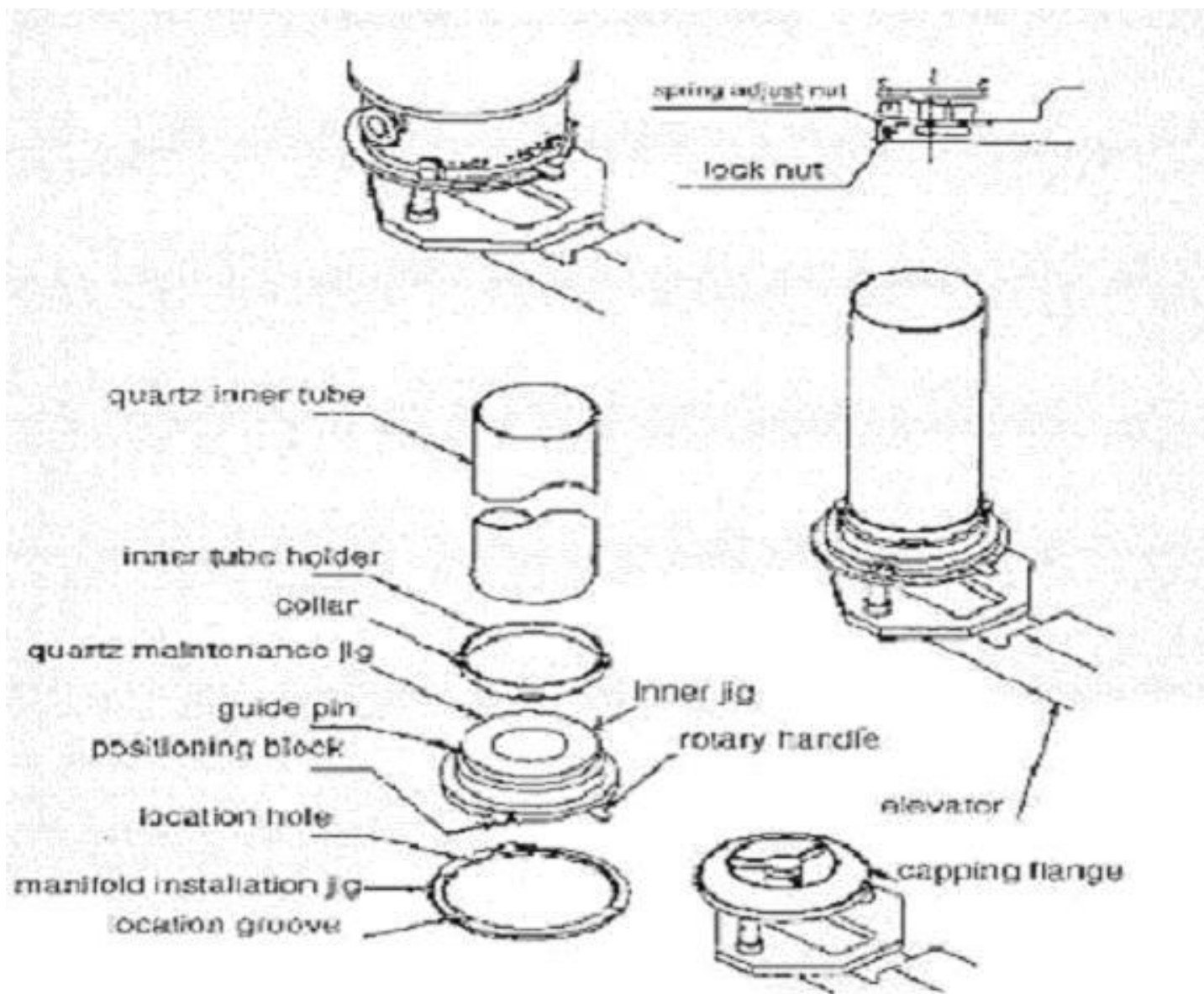


FIG. 2.

圖一 Fig 1





圖二 Fig 2



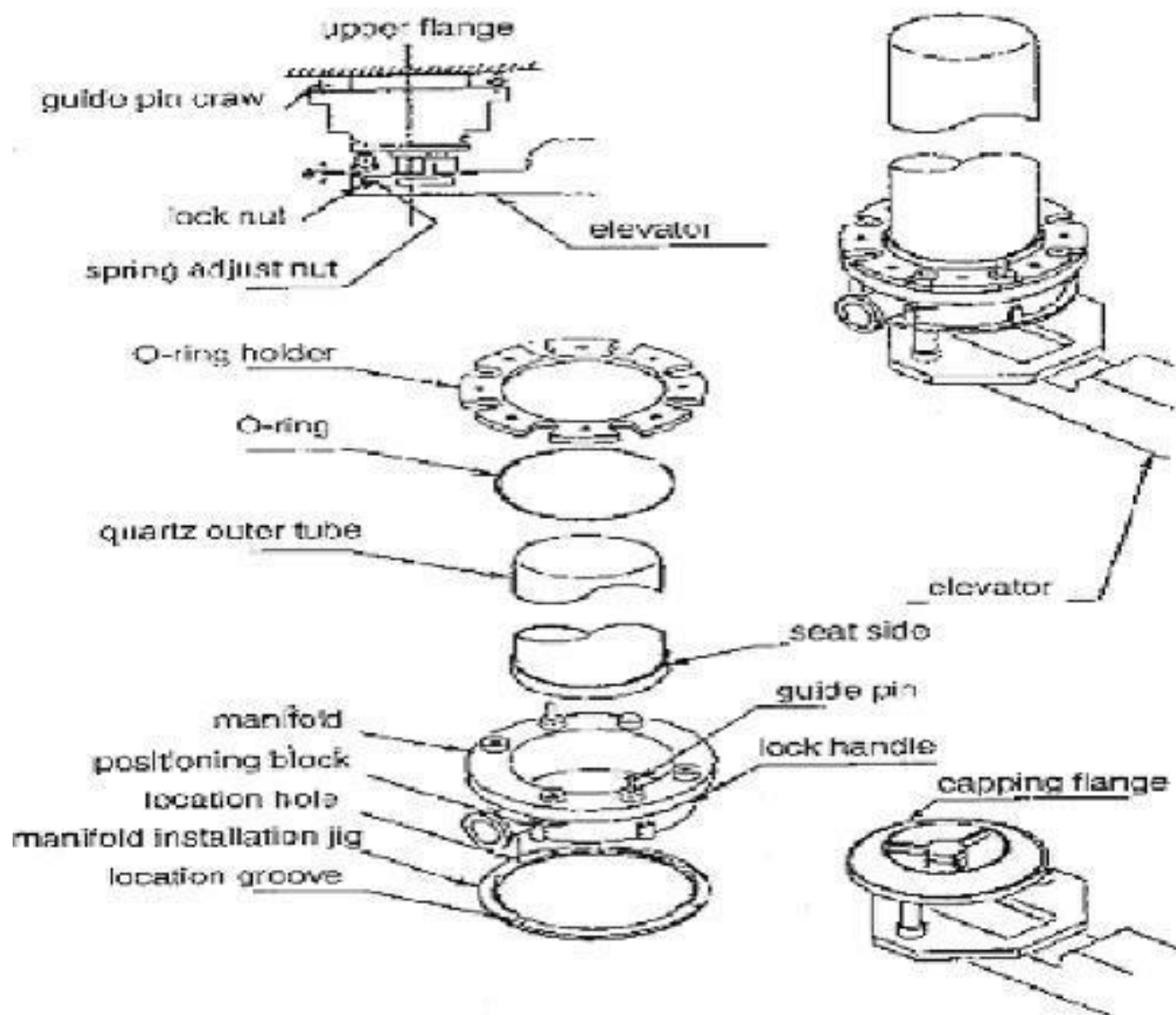
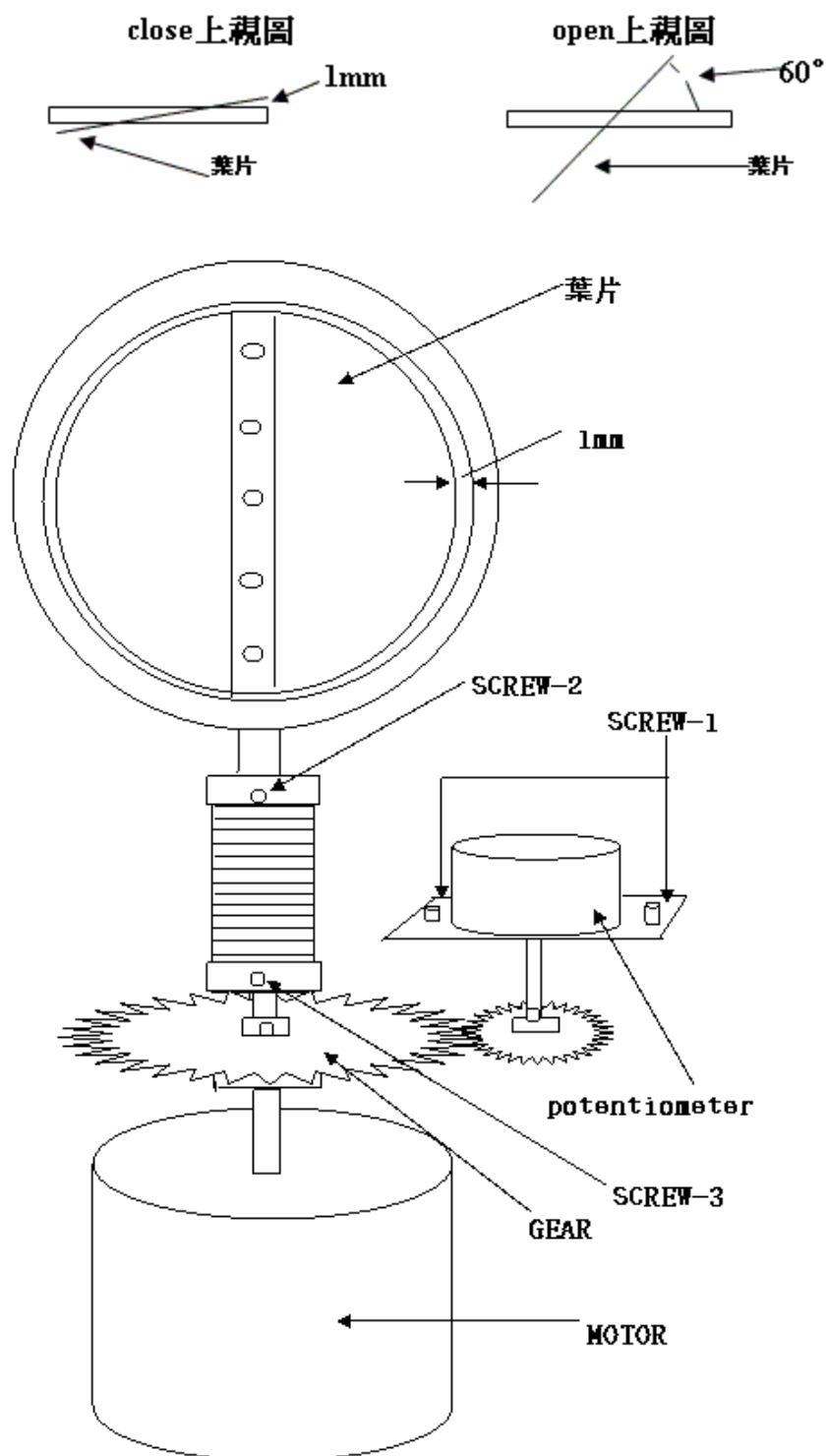


FIG. 5

圖三 Fig 3

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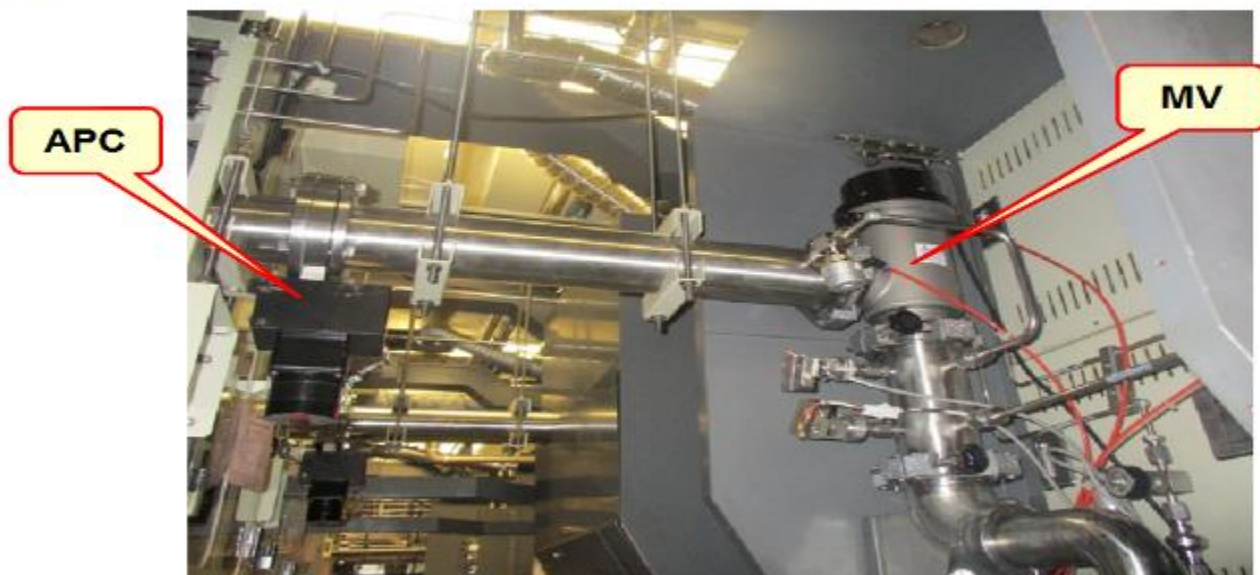
圖四 Fig 4

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圖五

Figure 5

**APC** - Automatic Pressure Controller  
**MV** - Main valve



## Remove APC Automatic Pressure controller



## Remove MV Main Valve



1. Disconnect air hose to solenoid valve



2. Remove 2 Clamp



3. Pull up slowly and remove MV

## APC Assembly and Cleaning Procedure



1. Remove APC shutter screw (x5)



2. Clean APC Parts using cloth and IPA then Install



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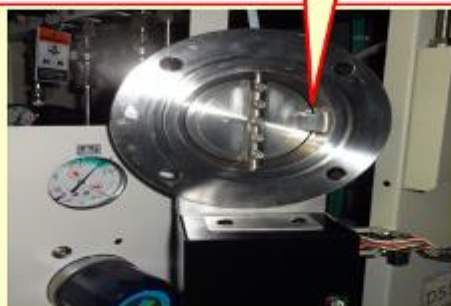
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## APC Test

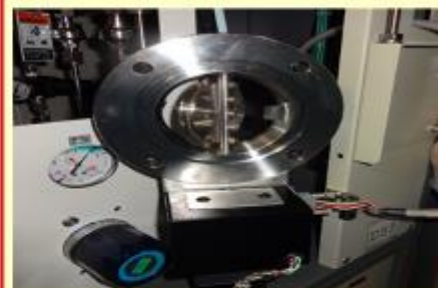
- in front of machine controller move APC set OPEN and CLOSE 3 times



1. Assemble APC and connect power supply



2. Move to CLOSE and check value  $\rightarrow 25 \pm 5$

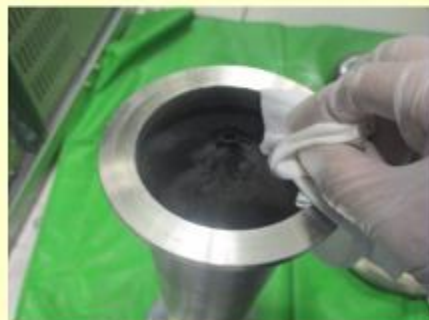
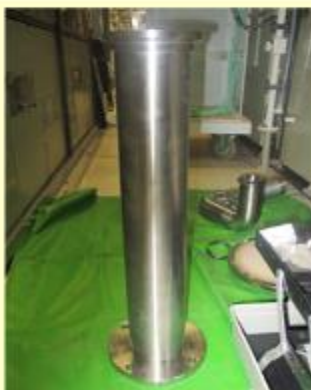


3. Move to OPEN and check value  $\rightarrow 500 \pm 5$

## Exhaust piping cleaning



1. Remove SV pipe to clean exhaust pipe



2. Bring down exhaust pipe and clean by cloth and IPA, then install

## MV Cleaning Procedure



圖六

Figure 6

## BURN BOX Cleaning Procedure

