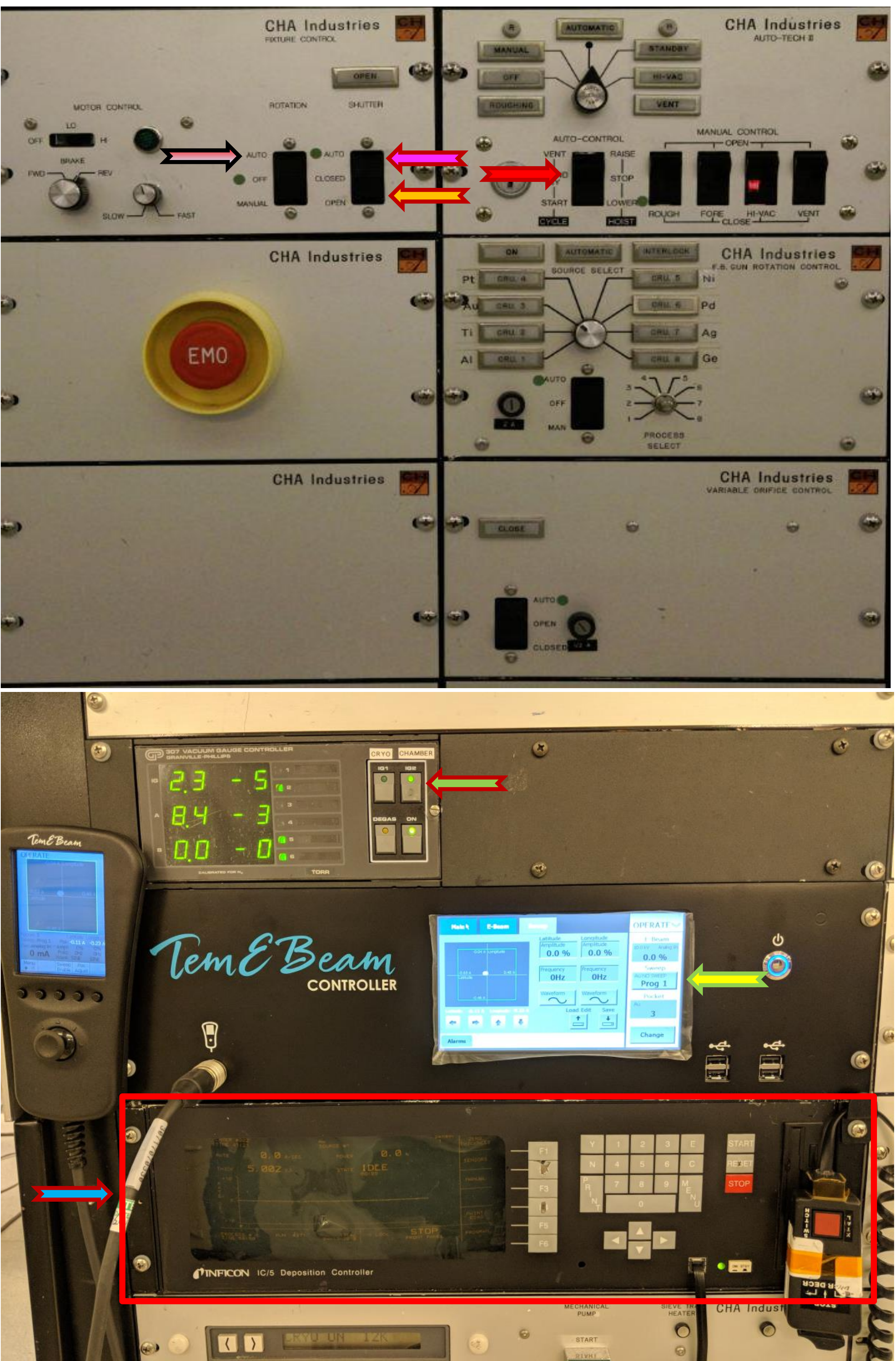
E-Beam 4 Operating Procedure

1. Ensure the previous user has finished their process and has unloaded their samples.
2. Vent the process chamber via the CHA Industries Auto Tech II.
3. Open the shutter, inspect each of the sources materials you intend on evaporating or load your personal source. All sources must cover the bottom of the pocket at a minimum. Manual pocket selection is explained in the (**Sweep Controller**) instruction page.
   3.1. If the Au source weight falls below the minimum as specified below then add the appropriate amount of material prior to deposition.
      3.1.1. Source Weight: Minimum Au=85g Maximum Au=90g.
      3.1.2. Vacuum out the hearth pocket prior to replacing the source material
      3.1.3. If source material is being added make sure it is placed under the existing source except for Au and materials in pocket 8 that are in a crucible.
      3.1.4. If you drop source material pellets in the system you must find them.
4. Set the shutter toggle switch to "Auto".
5. For lift-off processes the standard tooling should be used. For a conformal coating the planetary should be installed.
6. If using the Lift-Off tooling ensure the uniformity shield is properly aligned.
7. Load your samples.
8. Replace the upper glass slide.
9. Clean the sealing surface with a lint free wipe and IPA.
10. Check the Xtal life and replace if necessary (**Replacing the Xtal**).
11. Pump down the system via the CHA Industries Auto Tech II.
12. You must stay at the system until it crosses over to Hi Vac.
13. Turn on the Ion Gauge by pressing the **IG2** switch.
14. Allow the chamber to pump down to 3.0E-6 (at the minimum). This should take approximately an hour.
15. Set up your program via the Inficon IC5 Controller. (**Setting up the Program**)
16. Enable the sweep via the EBC **(Sweep Controller).**
17. Turn on Substrate Rotation.
18. Run the deposition process (**Running a Process**).
19. Vent the process chamber via the CHA Industries Auto Tech II.
20. Remove your samples.
21. Weigh the Au source, if you used it, and replenish it to 85g.
22. Pump the system down.
23. You must stay at the system until it crosses over to Hi Vac.
24. Record your run information in the log book.
25. Clean and organize the work surface.

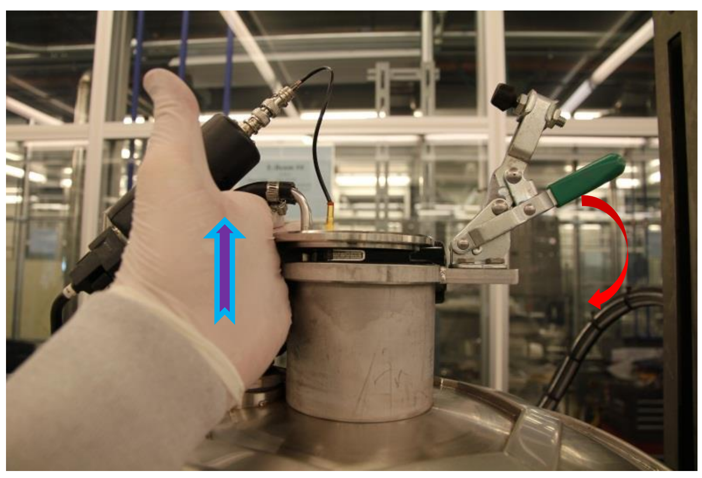
E-Beam 4 Operating Procedure

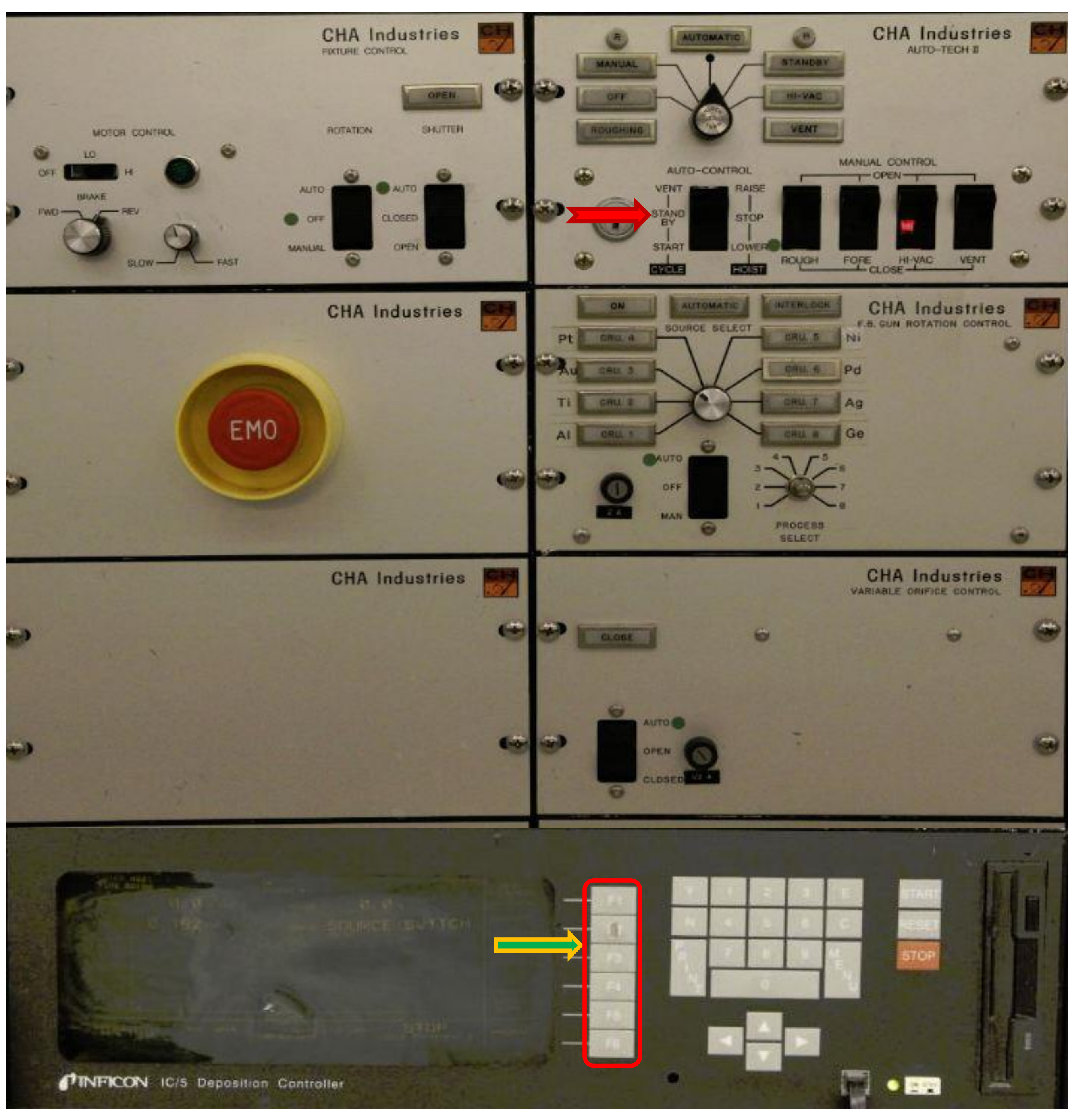


E-Beam 4 Operating Procedure

Replacing the Xtal

1. Check the life of the Xtal by pressing the F2 key (Sensors) from the main screen of the Inficon IC5 controller. The value in the "Xtal Actual" column needs to be greater than 125. If it is less than 125 then replace the Xtal.
2. Press the F6 key to return to the Main Menu on the IC5.
3. Lower the bell jar as if you were going to begin pumping down the system using the CHA Industries Auto Tech II by toggling the "Auto-Control" switch to the "Start-Lower" position.
4. Once the chamber lowers completely toggle the switch on the Auto Tech II from the down position of "Start-Lower" to the intermediate position of "Stand By". Do not switch to "Stand By" until the chamber has completely lowered.
5. Remove the Xtal assembly from the top of the system and lay it on the system working surface. Use extreme caution not to lift by or place any pressure on the coaxial signal cable.
6. Pull the metal Xtal holder out of the mount and place it face down on a lint free wipe.
7. Push the Crystal Snatcher tool into the back of the retainer and pull it straight out. Flip the Xtal holder upside down to eject the old Xtal and place the old Xtal in the precious metal reclaim box on top of the working surface.
8. Place a new Xtal in the Xtal holder. Do not touch a new Xtal with your fingers.
9. Push the Crystal Snatcher tool and retainer back into the Xtal holder and remove the Crystal Snatcher tool.
10. Place the Xtal assembly back into the Xtal receptacle and place that assembly back into the top of the process chamber and secure it with the green handled clamp.
11. Continue the Process Chamber Pump Down procedure by toggling the "Auto-Control" switch to "Start-Lower".




CHA Industries
FIXTURE CONTROL
OPEN
MOTOR CONTROL
ROTATION
SHUTTER
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HI
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SLOW
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MANUAL
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CHA Industries
AUTO-TECH II
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STANDBY
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HI-VAC
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LOWER
HOIST
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CHA Industries
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CHA Industries
E.B. GUN ROTATION CONTROL
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AUTOMATIC
INTERLOCK
SOURCE SELECT
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CRU. 5
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Au
CRU. 3
CRU. 6
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CRU. 7
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CRU. 1
CRU. 8
Ge
AUTO
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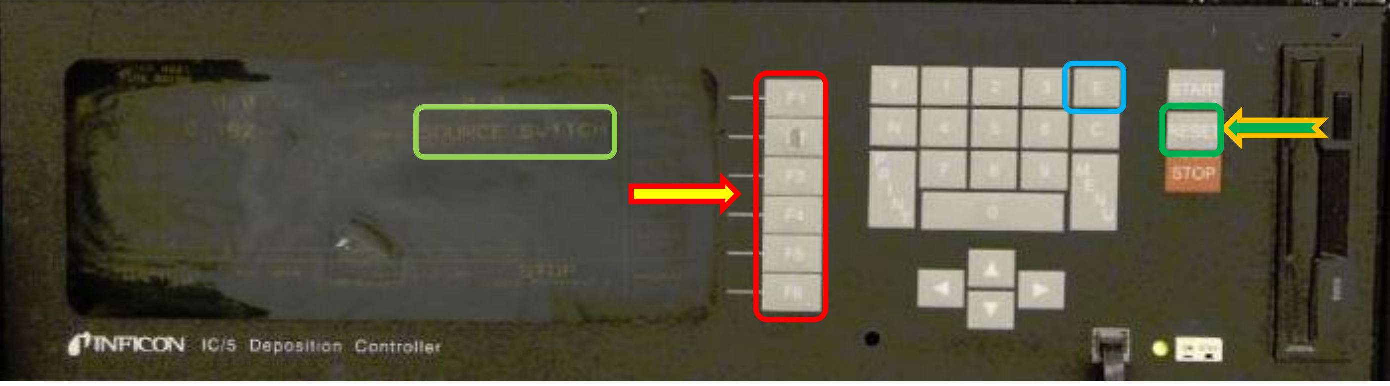
MAN
PROCESS SELECT
CHA Industries
CHA Industries
VARIABLE ORIFICE CONTROL
CLOSE
AUTO
OPEN
CLOSED
F1
F3
F4
F5
F6
START
RESET
STOP
MENU
INFICON IC/5 Deposition Controller

E-Beam 4 Operating Procedure

Setting Up The Program

1. Ensure the Inficon IC5 Deposition Controller is in the "Ready" state. If it is not then press the "Reset" soft key on the front panel.
2. Press the "F6" "Program" soft key.
3. Press the "F2" "Process Directory" soft key. Never Edit "F1" "Material Directory".
4. Use the Arrow keys to move the cursor to the material/stack of materials you wish to deposit. If the material or stack is not listed on the page you are viewing try the "F1" "Page Forward" or "F2" "Page Back" keys to navigate to the proper screen.
5. Once you have placed the cursor over the proper material/flow press the "F5" "Process" button to edit the rate and thickness. Make sure you check both pages even on single material processes by pressing "F1" "Page Forward".
   5.1. Set the "Final Thickness" and "Thickness Limit" to the same value and set your desired "Rate". Use the "E" soft key to enter each variable. 1um is the maximum allowed for Au. 0.5um for all other materials unless approved by Nanofab Staff.
6. Press the "F6" key until you are back to the "Process Directory" then press the "F4" "Select Active Process" key.
7. Press the "F6" key until you are back at the top menu.



E-Beam 4 Operating Procedure

Sweep Controller

General Info:

1. When a function is enabled, whether it is Beam Position Adjust, High Voltage, Emission Current, Sweep or Pocket Position Select, the alpha numeric characters representing that function will change from Black (disabled) to White (enabled).

For Automatic Process Control:

1. Log into the EBC controller if necessary. The password is "0"
2. Select "Operation" for Automatic Control.
3. Press the "Pocket" button to home the hearth rotation (only necessary when first logging in).
4. Enable the Sweep by pressing the "Sweep" button.

Sweep Position Adjustment:

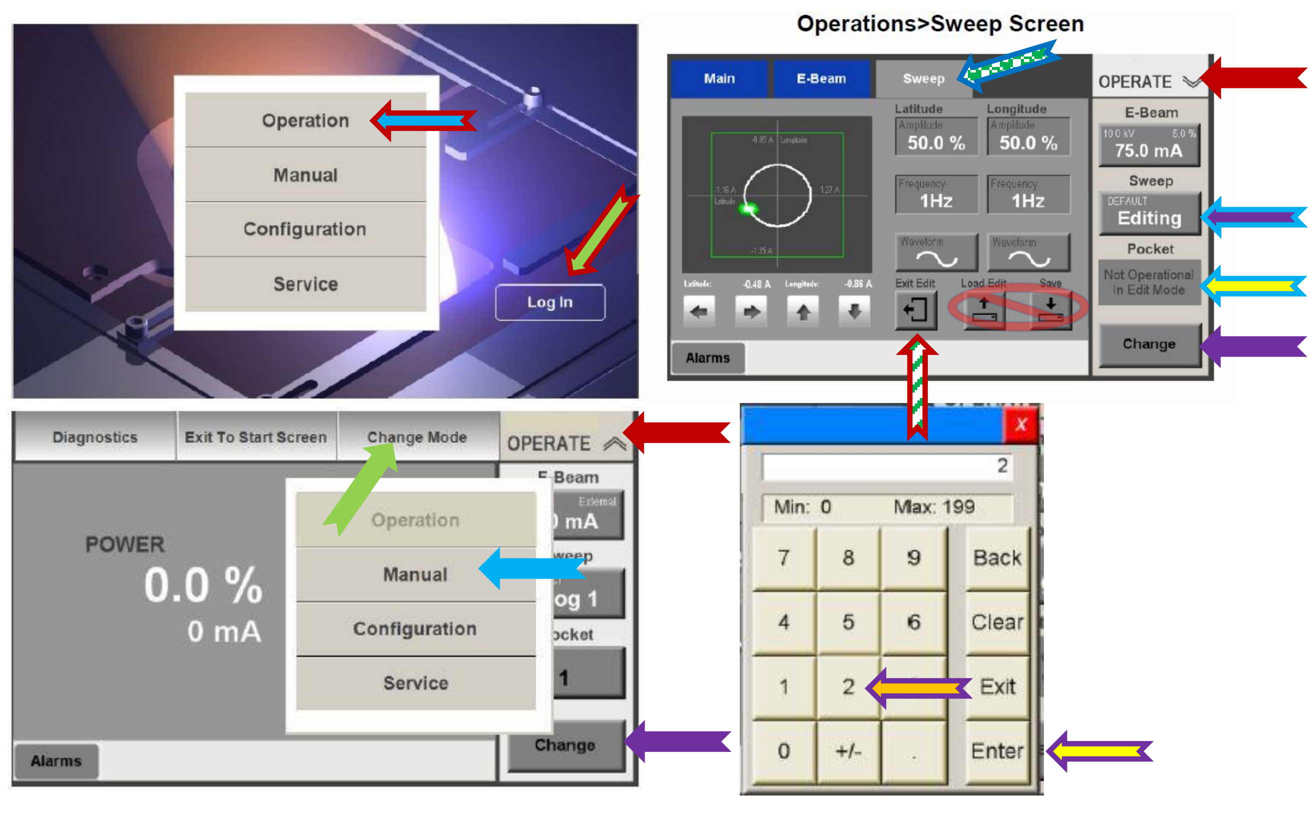
1. From the Remote Controller press the "Menu" button until "Pos Adjust" is displayed.
2. Press the button directly below "Pos Adjust".
3. While looking through the Process Chamber View Port use the Joy Stick to move the beam into position. There is a slight delay from the time you press the Joy Stick to the time the beam actually moves (approximately 1 second). Beam Position Limits have been defined so it is impossible to move the beam off of the source material.
4. On the EBC Main Display (Sweep Tab) there will be 3 options given. "Exit Edit", "Load Edit" and "Save". Do not select any of them. Allow that layer to finish evaporation then press the "Exit Edit" button. **Never select "Save".**

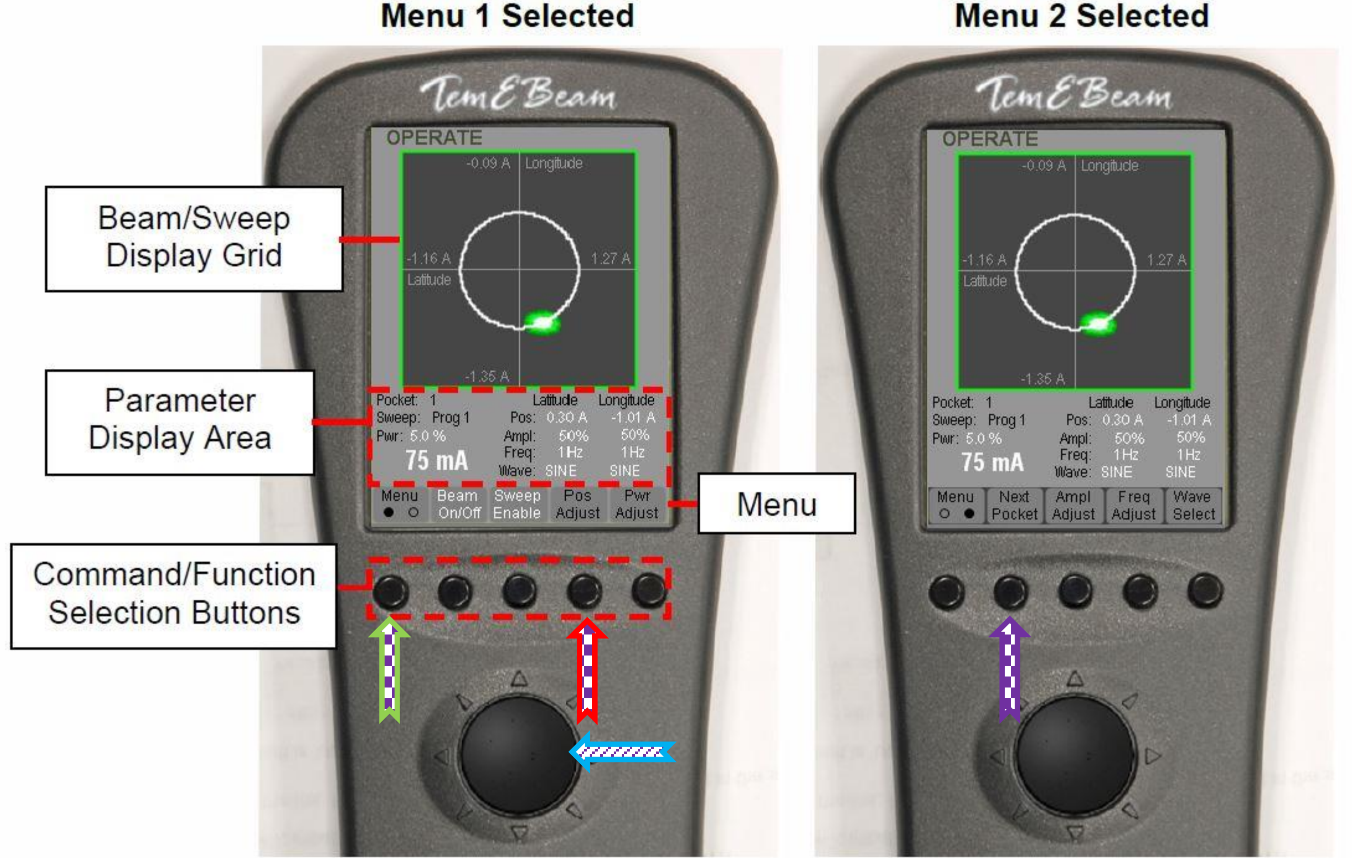
Manual Pocket Selection:

1. From the EBC Touch Screen, in the upper right corner touch "Operate".
   a. From the drop down at the top of the screen touch "Change Mode"
   b. Touch "Manual" from the pop-up menu.
   c. On the bottom right corner of the display touch "Change".
   d. On the right side of the display touch the button under the word "Pocket"
   e. From the pop-up menu press the number of the pocket you'd like to select and press "Enter".

   ----------Or--------
2. From the EBC Touch Screen, in the upper right corner touch "Operate".
3. Press Menu on the Remote Controller until "Next Pocket" is displayed.
4. Press the button directly under "Next Pocket"

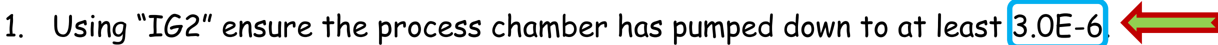
E-Beam 4 Operating Procedure



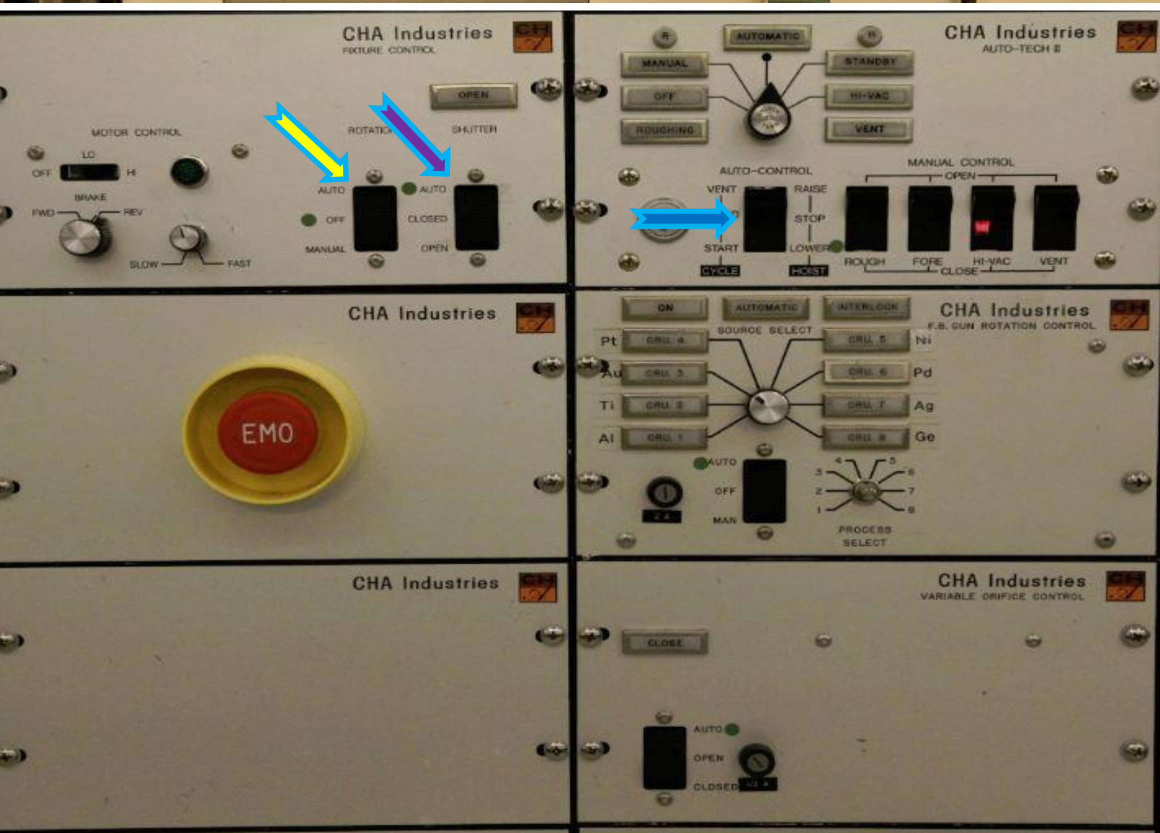


E-Beam 4 Operating Procedure

Running A Process



1. Using "IG2" ensure the process chamber has pumped down to at least 3.0E-6.
2. Enable the sweep from the EBC Controller.
3. Set substrate rotation to Auto and set the shutter control to the "Auto" position.
4. Press "Start" on the IC5 Controller.
5. The beam will become visible at around 5% power. The beam should be sweeping and fairly centered on the source. Adjust Sweep/Beam position if necessary via the Sweep Controller but DO NOT "Save" the modified beam sweep location. **Au Does Not Sweep but the Sweep must be enabled as it is used to position the Beam.**
6. When deposition is complete each source will cool for 5 minutes. Do not rotate the sources or vent the system until this step has completed.
7. Turn off rotation.
8. Turn off the sweep on the EBC Controller.
9. Turn off IG2.
10. Vent the process chamber via the "Auto Tech II" controller.


CHA Industries
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VENT
AUTO-CONTROL
VENT
RAISE
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MANUAL CONTROL
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ROUGH
FORE
HI-VAC
VENT
CLOSE
CHA Industries
EMO
CHA Industries
E.B. GUN ROTATION CONTROL
ON
AUTOMATIC
INTERLOCK
SOURCE SELECT
Pt
Au
Ti
Al
Ni
Pd
Ag
Ge
AUTO
OFF
MAN
PROCESS SELECT
CHA Industries
CHA Industries
VARIABLE ORIFICE CONTROL
CLOSE
AUTO
OPEN
CLOSED