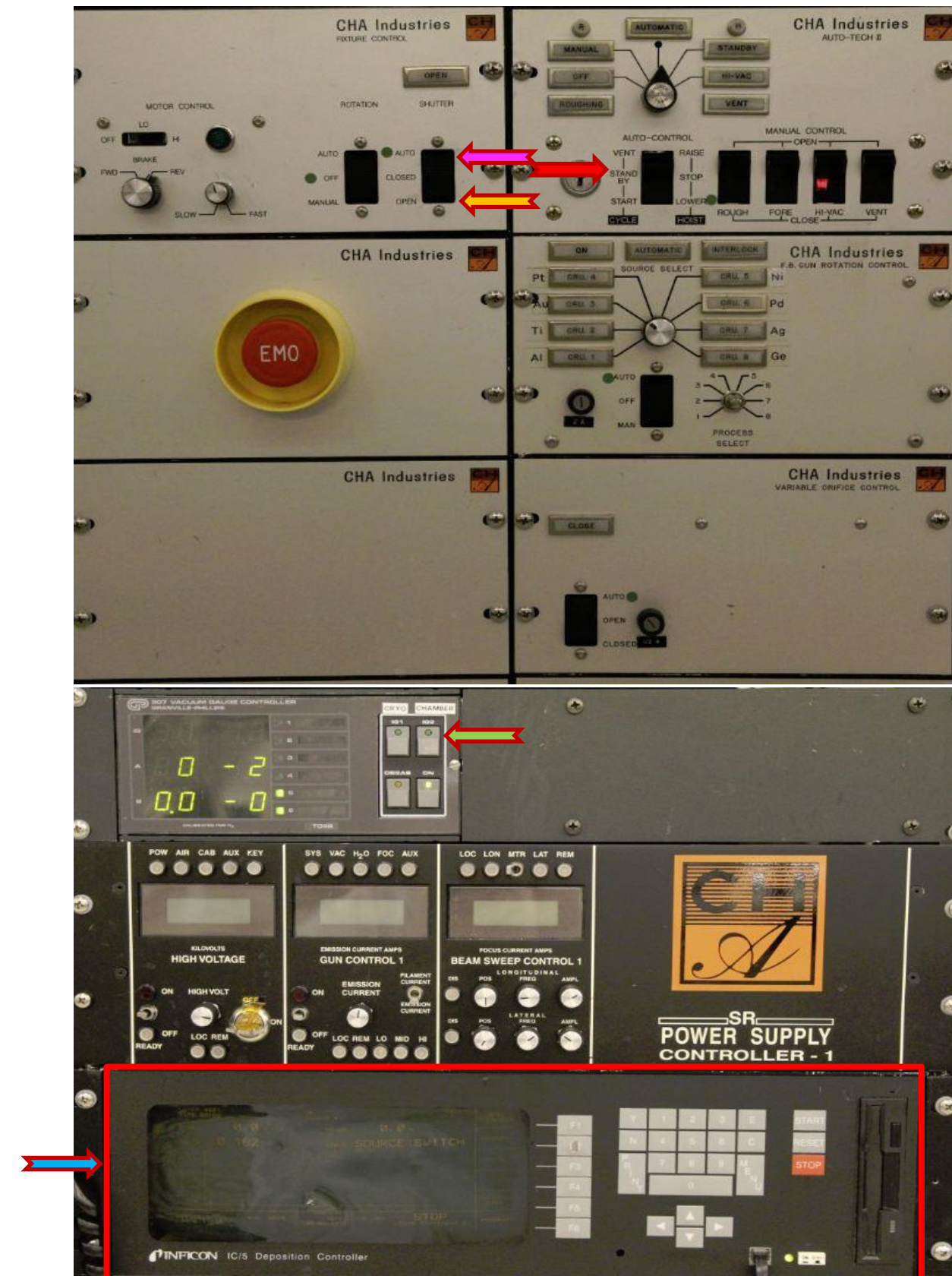


E-Beam 4 Operating Procedure








E-Beam 4 Operating Procedure

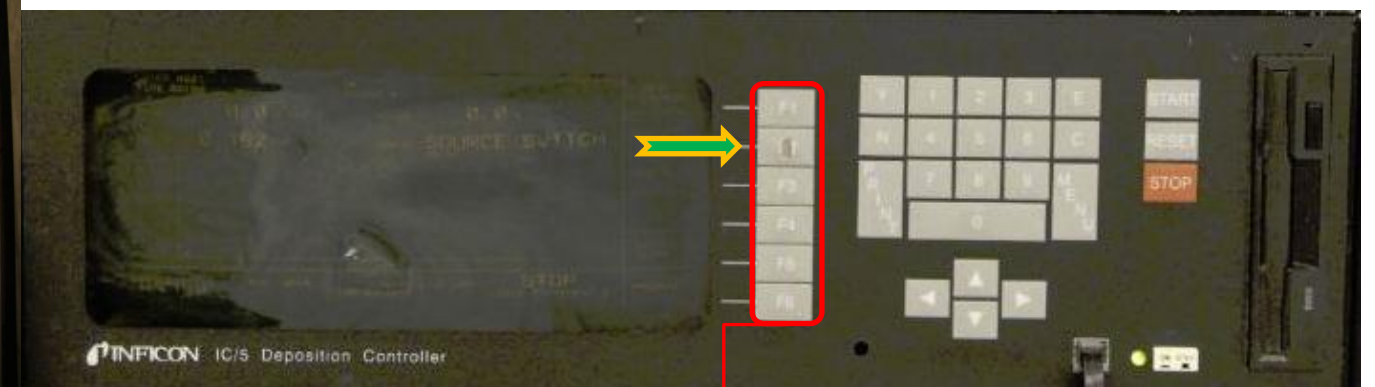
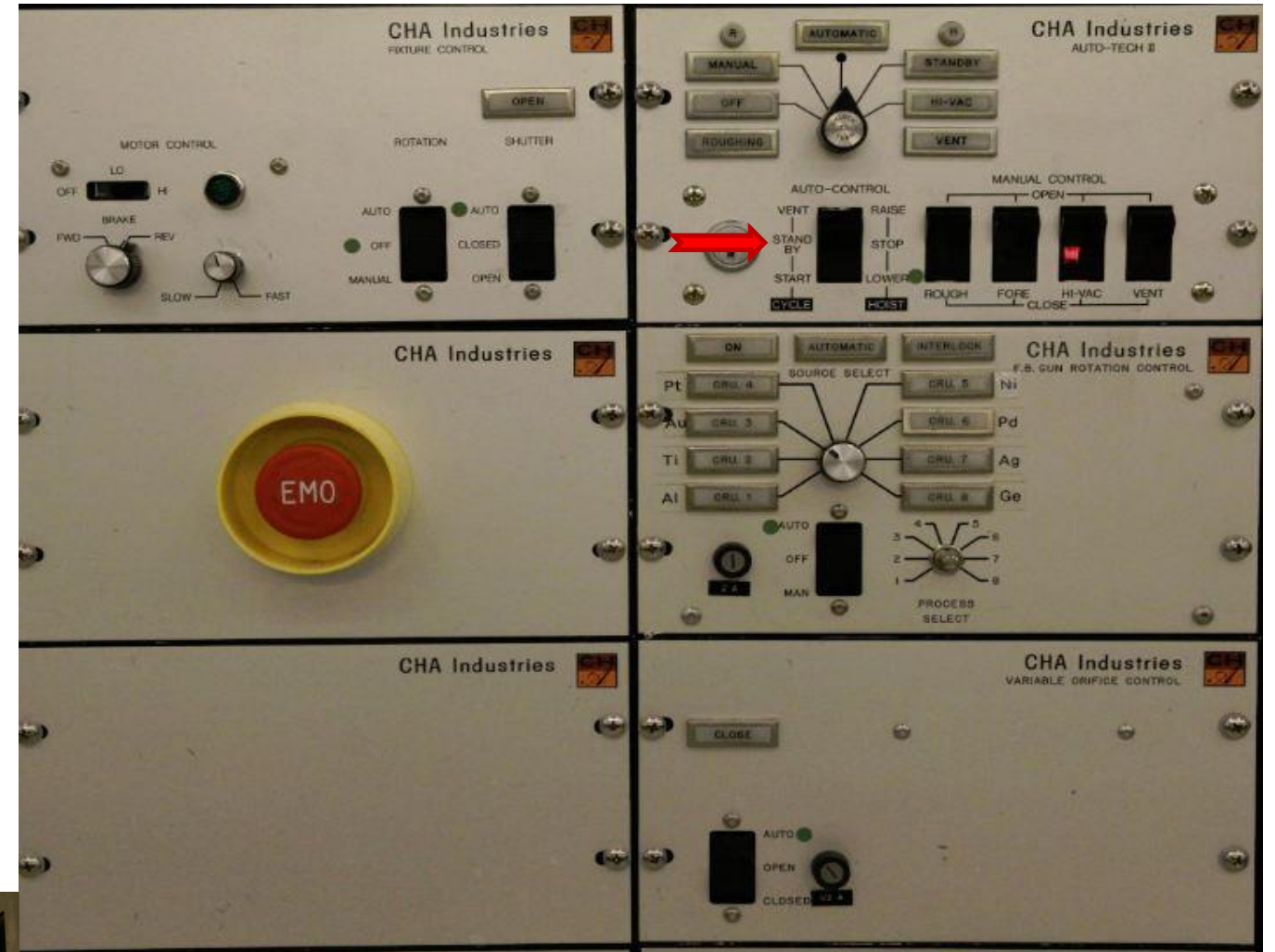
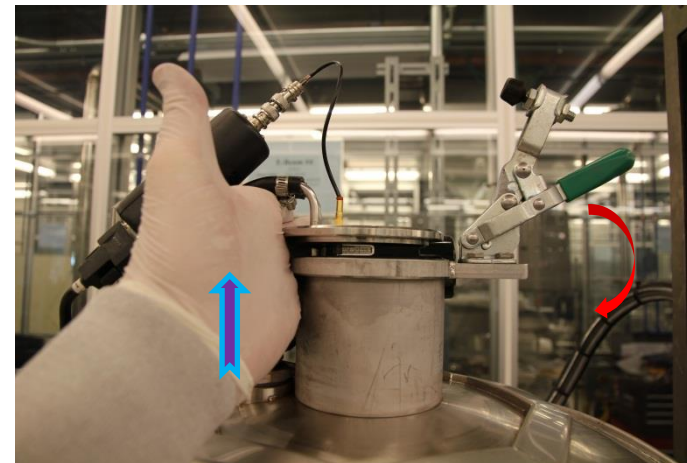
1. Ensure the previous user has finished their process and has unloaded their samples.
2. Vent the process chamber via the CHA Industries Auto Tech II. ←
3. Open the shutter, remove and weigh each of the sources materials you intend on evaporating or load your personal source. Your personal source material must also meet the minimum weight requirements. ←
- 3.1. If the Au source weight falls below the minimum as specified below then add the appropriate amount of material prior to deposition. **Never add non-precious metals to public sources.**
 - 3.1.1. Minimum Source Weight: Au=85g
 - 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 on top of the existing source.
 - 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 45 minutes to an hour.
15. Set up your program via the Inficon IC5 Controller. ← ([Setting up the Program](#))
16. Run the deposition process ([Running a Process](#)). (**Never sweep the beam without prior authorization**)
17. Vent the process chamber via the CHA Industries Auto Tech II. ←
18. Remove your samples.
19. Weigh the Au source, if you used it, and replenish it to 85g. **Never add non-precious metals to public sources.**
20. Pump the system down.
21. You must stay at the system until it crosses over to Hi Vac.
22. Record your run information in the log book.
23. Clean and organize the work surface.



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. 
2. The value in the "Xtal Life Actual" column needs to be greater than 125. If it is less than 125 then replace the Xtal.
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 removal tool into the back of the retainer and pull it straight out.
8. 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.
9. Place a new Xtal in the Xtal holder. **Do not touch a new Xtal with your fingers.**
10. Push the removal tool and retainer back into the Xtal holder and remove the removal tool.
11. 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.
12. Continue the Process Chamber Pump Down procedure by toggling the "Auto-Control" switch to "Start-Lower". 

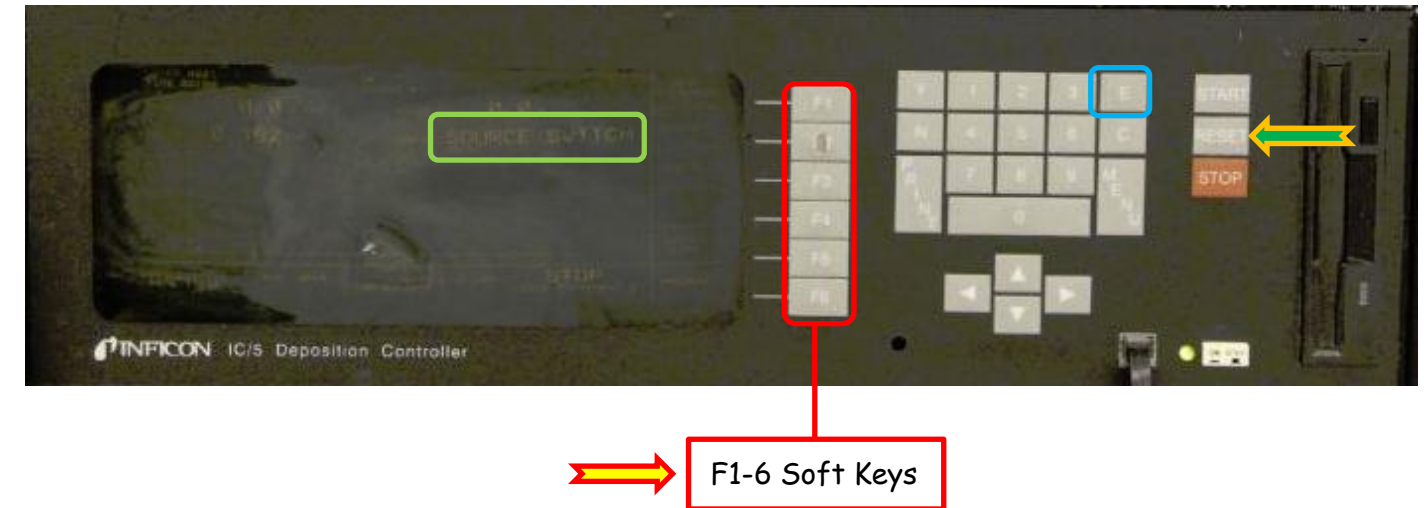


F1-6 Soft Keys

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.
 - 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.
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

Running A Process

- Using "IG2" ensure the process chamber has pumped down to at least $3.0E-6$ ←
- Turn on the breaker on the front panel of the High Voltage power supply.
- On the High Voltage and Sweep Controller, hold the High Voltage momentary switch in the up position until you hear 2 clicks (about 0.5 seconds) then release it. Now raise and release the momentary switch on "Gun Control 1" ←
- Set substrate rotation to Auto ← and set the shutter control to the "Auto" position. ←
- Set the Source Select to "Auto". ←
- Press "Start" on the IC5 Controller. **If the source selector has to switch pockets in order to select the correct material the High Voltage will be disabled and step 3 will have to be repeated once the hearth stops rotating.**
- If you are running a standard deposition make sure the "Amplitude" ○ adjustment is fully CCW for both axis and skip to step 13. **If you need to sweep a source material (speak with the tool owner before you use sweep during deposition. Never sweep any material without prior authorization from the tool owner)** continue to step 8.
- Wait until the IC5 displays "Soak 2" then set the shutter control to "Closed" ← and press the "F3" "Manual" soft key on the Inficon IC5.
- Turn the "Frequency" control knob for both axes fully CW then one turn CCW. Warning! This control is counter intuitive. CW decreases the frequency while CCW increases. ○
- Use the "Position" and "Amplitude" controls to set up the beam position and sweep. Note: Do not sweep Pt or Ni. For these materials (or if melting in a source) set the "Amplitude" for both axis to fully CCW. ○
- Once your sweep is set increase the frequency by turning the adjustment knob CCW several turns for both axis. ○○ If melting in a source use the manual pendent to increase power.
- Simultaneously** press the "F3" Auto key on the IC5 controller and switch the shutter control to "Auto". ←
- The beam will become visible at around 32% power. Using the beam position controls ○ center the beam on the source where the beam spot is most focused.
- 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.
- Turn off the High Voltage power supply. ←
- Turn off rotation. ←
- Turn off IG2. ←
- Vent the process chamber via the "Auto Tech II" controller. ←

