Nanofabrication Center, BCU
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E - Gun Machine: Work Instructions
1. Machine status:

1. Check the roughing pump in the service room. If it's off, turn it on.

2. Check on main screen (see pic 1), that the cryo pump is on, then there's a vacuum in the chamber and the water flow is on. Working temperature in the chamber is 12 – 15K, the base pressure in the chamber – at least 2.0*10⁻⁶ mbar.

3. Check the crystal health on the Maxtek panel (see pic 2). It should work properly till 50%.

4. Check water supply (on screen (control))

5. Open the file "Pockets", located on the desk top. Check the list of materials and the crucibles positions for both guns. If the crucibles are not in the right position, open it, take out one of the crucibles, put it into the plastic bag, label it, indicate the material name and purity, place into the vacuum box. Put the crucible with your material into the carousel, update the file, close the chamber and pump it.

2. Machine preparation:

1. Load a program of interest in the Maxtek. Go to "View/Edit Process" in the main menu (see pic 3), select the program, press "Start" button (see pic 2). Then select again the program, press again "Start" and then immediately "Abort" and "Reset".

2. Load the crucibles with materials and select a crucible of interest (see pic 4).

3. Check on the screen of the carousel, that the program's been loaded.
2. Click on the image of Fronted label and select the water position.

3. Switch the machine to Manual mode and press on "Scan" window.

4. Dispose:

Chamber (see pic).

Note: if the pumping time is too long and there's an "Error" in the last.

5. Switch to Manual mode.

6. Close the lid.

7. Click on "Load Done" button in the screen (see pic).

8. Wait for "Finish" in the last line of the log activity.

7. Take All To Chamber button in the screen (see pic).

8. Wait for "Finish" in the last line of the log activity.

9. Switch to Automatic mode.

1. Place a water on the holder (see pic 1) and attach it by the Kepton.

2. Place or Clips: The sample should not protrude the holder area.

3. Switch to Automatic mode.

4. Open the Load lock lid.

5. Place the holder inside the Load lock into the round opening in the.

6. Close the lid.

7. Click on "Load Done" button in the screen (see pic).

8. Wait for "Finish" in the last line of the log activity.

7. Take All To Chamber button in the screen (see pic).
14. Fill a note book: name, date, substrate type, material, thickness.
13. Adjust the deposition rate.
12. Open the shutter. Press "Zero" button in Maxhair. Immediatly (see pic2).
11. Increase the power to the right value for the material of interest.
10. Put on special dark glasses. Check through the lower window. Then...
9. Wait for about 15 min.
8. Increase slowly the power by the portable console to 3%.
(see pic2).
6. Regulate knobs under the joystick arm are set to zero values. The beam spot should be inside the crucible. Check that 4 block by the joystick arm (see pic4). Through the whole process the crucible should be on "Flame OFF" button.
5. Click again on the image of crucible with crucible's Click on the last column of buttons (position 1 - Gun1, position 2 - Gun2), between Gun1 and Gun2. Position 3 - Gun2.
4. Wait for 2 min.
3. Click on the image of crucible with crucible's Click on "Power" (see pic5).
2. When the thickness reaches the target value, close the shutter.
1. Decrease slowly the power to zero.
0.1. Switch off the Maxhair (button "Flame OFF").
0.1. Switch off the manual mode of the Maxhair.
0.1. Switch off the Maxhair (button "Flame OFF").
shutter closing or opening:

For quick selection, power supply and filament switching on/off:


screen on. Use Auto mode for Vent and Vacuum chamber. Load

1. There are two main modes in the machine: Auto and Manual (with

Important comments:

Gas:

machine in Manual mode, click on "Vent Valve" image and close the

Note: If after the door opening still there's a nitrogen flow, switch the

3. Release/close two hooks on the chamber door.

2. Press "Vent" button for opening and "Vacuum" for pumping.

1. Switch the machine to Automatic Mode.

6. Chamber opening/closing:

6. Close the lid.

5. Take out the holder.

4. Open the lid.

3. Check on "Unload ATM" (see pic).

In the last line of the log activity (see pic),

take the water to the load lock by the arm. Wait for "Finish"

(see pic7). Machine will pump the load lock. Open the gate and

2. Click on the image of table. Select "Water A" and "Load Lock"

1. Switch the machine to Automatic mode.

5. Water unloading:

2.0. Switch off the power supply (button "Power Supply OFF")
8. Before starting the machine, open the巡回数 of the machine.

In case of AUTO loading/unloading is not working switch to manual and press on "Screen".

In case of AUTOMATIC loading/unloading is not working switch to manual and press on "Screen".

If there is enough water, switch the water flow off in the pressure switch in the back panel of the machine, and switch in the case of program crashing no responsible switch the keypad.

In the upper corner of the screen (case pic). Service mode and click on "Reset all water" button, located in the 5. If during the deposition due to any problem the chamber was opened and the water was spilled directly from the heater, for regeneration procedure (takes several hours).

Open the machine. Switch it in Automatic mode to "Reheat" for regeneration. If the two pump is down (in red color), the machine can be started.

 material, especially if there is no data for that material in the Look-up button and measurement should be performed for the new material. Since a crystal and water are located on the different levels.

1. Since there's only one shifter, (for each gun) the system at the front of the machine, and then turn pressure, and water at least 2.10 x 10 psi.

2. For pump, open the巡回数 of "Vent valve".

When the pump is open, close "Vent valve" and open "Vent valve".
Operation buttons of the Maxtek controller.

The main window of the machine interface.
Picture: Operation buttons of the e-gun controller

Picture: Mainex screen with the main screen commands.
The power supply and the filament.
Load Lock Image with the operation buttons.

Image: Pop-up window with buttons for loading and unloading water.

Image: Arm and selection of the water position (in relation to guns).
Picture 10: Wafer holder.

Picture 9: Rotated table and carousel with crucibles images.
in case of AUTO loading/unloading is not working switch to manual and press on „Screen „

9. Upper corner of the screen (see pic). Service mode and check on „Reset all waters“ button, located in the
 When the chamber is open, switch to the
 opened and the water was unloaded directly from the
 If during the depression due to any problem the chamber was
 Procedure (takes several hours).

5. If the CY2 pump is down (in red color) the machine can't be
 material, especially if there's no data for that material in the
 In this case, rearrangement should be performed for the new
 3. Since a crystal and a water are located on the different levels,

Since there is only one shutter (for each gun) in the system and it

2. Water with opened shutter to learn the power and the depression
in the first process with a new material should be done without a
Heated material will expose the water to the depression. To prevent
 closing a view through the upper window, each opening of it with

When chamber is open close „vent valve „

For pump, open the roughing valve, open the roughing valve and wait at least for 5 min.

For vent: Close the gap between the main chamber and CY2 pump, and open „vent valve „