

# JEOL JEM-1230 Operating Instructions

The following procedure is a general operating procedure that the majority of users will apply when working on the JEOL TEM. Please remember that the following should be used only as a starting point for your particular work. The settings can be modified to produce the best images of your samples. With that in mind please remember to return the scope to the standard mode of operation for the next user.

## Logging on:

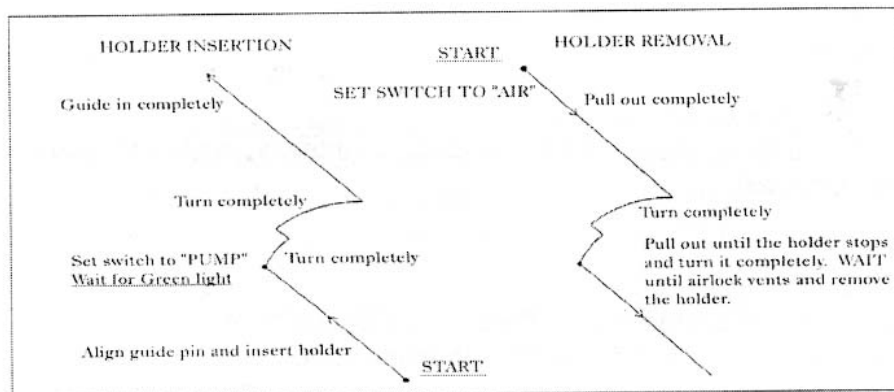
In the right field choose [LOGIN...]. In the center field highlight the [USER] box. Backspace to erase previous user's name and enter your own (the software is case-sensitive). Press [ENTER]. Highlight [PASSWORD] and enter your 4-digit password. Hit [ENTER], then [APPLY].

## Loading grid into the holder:

Place grid holder into white grid loading platform. Loosen screws with small screwdriver. Rotate small copper arm counterclockwise for grid placement. Place grid in the round indent, sample side up. Rotate copper arm clockwise until arm is on top of grid, flush with the top of the holder. Tighten screws to secure grid. Use small tool to open end of specimen rod by inserting tool and pulling back towards handle, while the end is open, place holder onto the post in the resulting space. Release tool to secure holder onto the end of the specimen rod.

## To insert specimen holder into column:

1. Select [MONITOR] in the right field of the CRT and then select [VACUUM COND]. All should be at [READY] state and read ~ 40 with the exception of the reserve tank [R.T.] and the specimen holder.
2. Align the specimen holder guide pin with groove in the goniometer opening and push in to the stop. **Do not turn.**



Specimen holder motion diagrams

3. Pulling out gently on the switch, toggle the goniometer switch from [AIR] to [PUMP]. You should hear the valve opening and then the gurgle of the rotary pump.
4. Once the [SPC] field on the vacuum monitor reaches 50, get a good grip on the specimen holder and turn clockwise about 15° until it stops, then allow it to go into the chamber about 0.5cm.
5. Still with a good grip turn clockwise about 75° until it stops and slowly allow it to go into the goniometer until the black tab on the specimen holder is seated into the goniometer.

6. Select [HT] in the Head field of the CRT and confirm that the HT is at 120 KV and is ON. In the Center field, confirm that the Beam Current is set to a maximum of 10 $\mu$ A and click to turn it ON. There will be a short delay before you notice illumination on the screen.

**Alignment: These steps should be done at the beginning of your session.**

**To correct Z axis:**

1. In left screen, click on [Z Cont..]. The [Z Control] screen appears.
2. Click on [Auto Z], focus image, and then click on OK.
3. Refocus image if necessary.

**Centering the beam:**

1. Condense the beam to crossover using the [BRIGHTNESS] knob on the function box (FB).
2. Push the [BEAM SHIFT] button to the right of the [BRIGHTNESS] knob. The right mouse button of the white mouse is now the beam centering control.
3. Center the beam while the right mouse button is depressed.
4. Deselect [BEAM SHIFT].

**Centering the Objective aperture:**

Usually performed when returning to Mag mode after using Low Mag.

1. Insert desired Objective Lens aperture.
2. Depress [DIFF] button (FB)
3. Adjust [DIFF FOCUS] (FB) to focus diffraction spot.
4. Center the objective aperture around the diffraction spot with aperture X,Y controls.
5. Return to Mag mode.

**Using the Gatan Digital Imaging camera/software:**

**Please consult CMRF staff for a brief tutorial on digital imaging parameters.  
Make sure the temperature read out on the Gatan First Light Controller shows -25°C.**

1. Focus and center the area of interest on the microscope screen. Spread the beam (current density should read  $\sim 10\text{pA}/\text{cm}^2$ ).
2. Make sure the Gatan computer and monitor are on and open the Gatan DigitalMicrograph software.
3. Choose [-] in the upper left hand corner of the microscope CRT. Click on [SCREEN] to raise the phosphorus screen and expose the CCD to the beam.
4. In the [CAMERA VIEW] box, select [SEARCH] mode beside [SETUP] then check the box beside [CAMERA INSERTED].

5. Select [START VIEW] and you will see a continuous, quick scan of your sample taken at low resolution.
6. Use [ACQUIRE IMAGE] to take a high quality image.
7. To save, select the disk icon in the [SAVE DISPLAY AS]. Name the file and select the desired file format.
8. To go back to viewing your sample on the microscope screen, select [STOP VIEW] and click on [SCREEN] on the microscope CRT to lower the screen.
11. When finished using the digital camera, deselect [CAMERA INSERTED] and close the program.

**Shutting Down:**

1. Lower the magnification.
2. Spread the beam so that the brightness fills the screen.
3. Turn off [BEAM CURRENT].

**To Remove Specimen Holder:**

1. Pulling out gently, toggle goniometer switch from "Pump" to "Air". Pull specimen holder **straight out** of goniometer (about 7cm) until it stops then turn counter-clockwise (about 75°) until it stops. Let go. Nothing should happen.
2. Pull specimen holder **straight out** of goniometer (about 0.5cm) until it stops then turn counter-clockwise (about 15°) until it stops. Let go. You will hear the goniometer venting to air and the green light will turn off. On the CRT the "Vacuum" SPC field should now read "Air". Wait for the SPC value to get to about 230.
3. Gently remove the holder **straight out** from the goniometer. If there is resistance wait another 10 seconds and try again.
4. Remove your sample from the specimen holder.
5. Log off of TEM PC and Gatan Digital image system and record usage information in the log book.