

Operation Procedure for PHOTO1 Suss MicroTec MJB3

Start Up

1. Turn on the two toggle switches on the manometer box
2. Verify that the air pressure, vacuum, and nitrogen dial readings on the manometer box are OK. (If they are not, contact SMIF staff and do not proceed with starting up the system).
3. Turn the power on to the Constant Intensity Controller (CIC) and wait until the display reads “rdy” (Ready)
4. Press the start button on the CIC to turn on the lamp. If the lamp does not ignite after the firing sequence, press the start button again. When the lamp ignites, the display will read “COLD” for about 3 minutes, and will then read “rdy”
5. Verify the CIC settings
 - a. CIS should be in constant intensity mode (either CI1 lit or CI2 lit)
 - CI1: Adjusts power to lamp to maintain constant intensity at 365nm
 - CI2: Adjusts power to lamp to maintain constant intensity at 405nm
 - b. Pressing the CI1 or CI2 key for more than three seconds but less than 5 seconds will display the intensity set value and cause the SET LEVEL indicator to illuminate. The power (in Watts) can be displayed by pressing the DS key. The arrow keys will be activated, and the operator can select the desired exposure intensity by using the up and down arrow keys. When the desired value is reached, pressing the CI key again will cause the information to be stored.

Note, the standard intensity settings are:

14 mW/cm² for 365nm (CI1)

25 mW/cm² for 405nm (CI2)

These settings are chosen in order to operate the lamp at an optimum value. For most applications, you should not need to change these settings. That is, you should keep the intensity settings at this level, and adjust the exposure time for the desired exposure dose. If you do change one or both of these settings, you must change them back to the standard settings when you are done.

6. Turn the power on to the MJB3 aligner
7. Turn on the microscope illumination (if needed)

Operation

8. Load photomask
 - a. Place mask on bottom side of mask holder, with chrome side of mask facing up
 - b. Depress the “Vacuum Mask” button and check that the mask is held firmly in place
 - c. Insert the mask holder over the alignment stage and clamp it in place

9. Load substrate
 - a. Pull the transport slide to the right, out of the alignment stage
 - b. Place substrate on the exposure chuck
 - c. Push the transport slide back into the alignment stage
10. Bring substrate into contact (Wedge error compensation and Z adjustment)
 - a. Move the separation lever to the contact position (toward the back)
 - b. Move the contact lever to the contact position (toward the back)

The “Contact” indicator should illuminate. This operation also accomplishes wedge error compensation.
 - c. The substrate should contact the mask at about 2/3 of the throw of the contact lever. If this is not the case, adjust the Z-height as follows:
 - i. Bring the substrate out of contact by moving the contact lever toward the front
 - ii. Adjust the z height using the thickness adjustment knob. Moving the knob clockwise will lower the chuck and moving the knob counter-clockwise will raise the chuck
 - iii. Re-check the contact setting by moving the contact lever to the contact position.

Note: Never adjust the Z variable thickness knob with the contact lever in the contact position.
11. Select the exposure mode
 - a. Soft contact: ST and Soft Contact illuminated
 - b. Hard contact: ST illuminated only
 - c. Vacuum contact: HP illuminated (Note – you must use a chuck equipped with a vacuum gasket to operate in vacuum contact mode)
12. Align the substrate to the photomask (if required)
 - a. Move separation level to separation position (toward front). The “Contact” indicator will go out and the “Separator” indicator will illuminate. This separates the substrate from the mask by about 50µm so that the substrate stage is free to move in relation to the mask.
 - b. Use the X, Y, and Theta micrometers to align the substrate to the mask
 - c. Move the separation lever back to the contact position (toward the back). The “Separator” indicator will go out and the “Contact” indicator will illuminate.
 - d. Verify the wafer to mask alignment. For checking the alignment in vacuum contact, press the “Vacuum Chamber” button.
 - e. If alignment is not satisfactory, repeat steps a-d
13. Expose
 - a. Set the exposure time and units
 - b. Press the “Expose” button
14. Unload substrate
 - a. Move contact lever to the front to bring the substrate out of contact with the mask
 - b. Pull the transport slide to the right, out of the alignment stage
 - c. Remove substrate from the exposure chuck
 - d. Load next substrate and repeat Steps 8-12.

15. Unload Photomask
 - a. Unclamp the mask holder and remove it from the alignment stage
 - b. Place mask holder upside down on work surface and press “Mask Vacuum” to release the photomask
 - c. Remove the photomask from the mask holder
16. Return the CIC intensity settings to their standard values:
 - 14 mW/cm² for 365nm (CI1)
 - 25 mW/cm² for 405nm (CI2)
17. Complete entries in PHOTO1 operation log

Shut Down

Only perform shut-down if the MJB3 is not going to be used later in the day

18. Turn the power off on the CIC
19. **WAIT 20 MINUTES**

This is VERY important to allow the N2 flow to cool the lamp before turning off the other systems
20. Turn the power off to the MJB3 aligner
21. Turn the power off to the microscope lamp on the MJB3 aligner
22. Turn off the two toggle switches on the manometer box