

AB-M Mask Aligner (OL-2) User Manual

Important Note

1. **Don't turn off the lamp power**
2. **Don't turn off the machine power**
3. **Do not use any type of tapes to cover the vacuum holes on substrate chuck**
4. **Contact CIMS staff immediately if anything unusual**

Steve Shepard: 5-9012, or Jiangdong Deng: 5-3396

General Perspective

Lightsource System and Intensity

A 1000Watt DUV lightsource used in this system has a broad band spectrum from 200nm to ~450nm. However, the current system is configured in the mid-UV range of 350-450nm by using band-pass mirrors. The light intensity at 405nm wavelength is about 50 mW/cm², and is ~ 24 mW/cm² at 365nm wavelength.

Wafer Chuck Selection:

- 3" Chuck:** For 3" samples, round or square
- 2" Chuck:** For 2" samples, round or square
- Small Chuck:** For 5 mm to 1" samples, square

Typical Operating Procedure

1. *Start-up Lightsource*

In the event that system is in a full 'shutdown' condition (i.e., system and lightsource power off), you must first bring the lightsource into operation. To start up the lightsource, complete the following procedures

1.1 Turn the POWER switch on the front of the intensity controller to the ON position.

Press the "power on/off" button on the aligner (left-hand side) so it lights up. Warm up for ~ 5 minutes.

1.2 Press and hold "START" switch to produce ignition of the mercury arc lamp.

1.3 Check to make sure that the cooling fans are operating.

2 System Checking and Initialization

2.1 Turn all pneumatic switches to 'OFF' position

2.2 Turn on "POWER" switch to activate shutter timer module

2.3 Set timer to desired exposure time.

2.4 Make sure the alignment optics and the lightsource are at "HOME" positions.

2.5 Bring the Z-knob ('chuck') down a little bit (there's arrows on the dial showing which way is down and which is up). Don't bring the z down too far, otherwise it will get stuck!!

2.6 Turn on the microscope, flip the switch on the Nikon light control box and adjust the voltage setting.

3 Loading Substrate and Mask

3.1 Raise the mask frame by switching "Mask Frame" to "raise"

3.2 Choose the proper chuck which is suitable for the sample. There are 3 of each available. You can replace them by unscrewing the bronze screws and popping off the small vacuum line. Make sure all pneumatic lines of the chuck are connected properly.

3.3 Position substrate on chuck, switch on the substrate vacuum line ("sub vac")

3.4 Lower the mask frame, and place mask in the holder. Push it up against all four alignment screws. Pull the mask vacuum knob to vacuum clamp the mask.

4 Alignment and Exposure

4.1 Switch "ALIGN" button to bring alignment optics (microscope) over the mask.

4.2 Use the clutch on the z-knob (the clutch is the smaller knob on the top of the big base) to bring up the sample, slowly. Turn the clutch knob counter clockwise until the clutch begins "click" (into a jerky motion). At this time, you may see the diffraction pattern caused by the substrate coming in contact with the mask.

4.3 Align mask to substrate. Bring the z-knob down a little bit at first, then adjust the x-, y- micrometer and the theta knob on the left, while looking in the microscope.

The microscope can be move around by using the two buttons on the back of the black handle grip.

- 4.4 Repeat step 3.6 to bring sample and mask into contact again.
- 4.5 Press and hold the little button below the frame (“depress for chuck leveling”- on the left near the theta micrometer). Then turn the clutch slowly in the up direction until is “click” again. This levels the substrate and the mask.
- 4.6 Switch “CONTACT Vacuum” to “ON” position
- 4.7 Switch “ALIGN” button to bring alignment optics (microscope) back to “Home” position.
- 4.8 Make sure the “auto-expose” switch under the timer is flipped to “off”. Flip the “light source” switch on the right from “home” to “expose”. The system will automatically bring the exposure source over tolling module.
- 4.9 Press the button “Auto Exposure”, then the system will start to expose. DON’T stare at the light during exposing.

5 Unloading and Shut-down

- 5.1 Switch “HOME/EXPOSE” to “HOME” to bring system to “LOAD/UNLODAD” position
- 5.2 Switch “CONTACT Vacuum” to the “OFF” position
- 5.3 Switch “MASK RAISE” to lift mask assembly
- 5.4 Switch “sub vac” to “OFF” position
- 5.5 Unload the substrate
- 5.6 Lower the mask frame
- 5.7 Turn of the microscope power
- 5.8 Full out the log sheet