

Karl Suss Mask Aligner Operating Instructions

This machine is to be used by authorized personnel only. For training contact the Cleanroom Engineer or Manager

Reserve equipment and start a session in iLabs.

- Verify the power is on. The controller is located underneath the table, and it should read 275W. If this is not the case, contact the cleanroom engineer and wait until the machine is ready.
- Select the mask to be used and make sure it is clean on both sides.
- Loosen the two mask holder knobs on the left-hand side of the mask holder. The mask holder may now be taken out - slide **carefully** towards you.
- Place the mask to be used onto the mask holder with the chrome (brown side) facing towards you, try to align it straight with the top of the holder. Push the "VACUUM MASK" button to pull vacuum on the mask. Verify that the mask is held in place by the vacuum.
- Turn the holder over and gently insert the holder with the mask into place. When the mask is in place the shiny silvery side should be facing up.
- Tighten the mask holder in place by turning the knobs clockwise. **Do not overtighten!**
- Pull gently on the red transport slide on the right side of the mask holder to bring out the wafer chuck. Place wafer/sample in the center of the wafer chuck. Make sure the wafer/sample is right side (photoresist coated) up. Always orient the wafer with the "flat" in exactly the same location (direction) and **gently** slide the mechanism back into place.
- On the left side of the aligner (below the aligning handle) there is a "Contact Lever". Take hold of the lever and rotate it **counterclockwise** 180 degrees. This should bring the wafer into contact with the mask. It will also activate the "Contact" light on the front panel. If the light does not illuminate, contact Sarah Dahl or Gregg Cure immediately and discontinue use.

While rotating the contact lever, watch the wafer come up under the mask. If it does not come up high enough or pushes the wafer up too hard, make adjustments using height control knob located at the bottom of the front of the machine.

- Adjust the exposure time with the setting box located on the very right side of the front control panel. Press the top or bottom buttons to select the proper exposure time. Typical exposure time for AZ 3312 or AZ 1512 is 6-7 seconds. Experimentation will determine the exact times needed for individual projects, different photoresists, or other materials.
- To expose the wafer, press the "Expose" button on the right front panel of the aligner. The button light will illuminate, the lamp housing will come forward and the lamp shutters will open exposing the wafer to ultraviolet light. When the exposure time is complete the shutter will close and the housing will retreat to its home position.
- The exposure process is finished. Turn the "contact lever" on the left side of the machine towards the front of the machine, clockwise 180 degrees. The contact light will go off. The wafer should descend with the chuck and can be removed by pulling out with the red transport slide on the right hand side of the mask holder. If the wafer has been in very hard contact with the mask it may stick to the mask and not descend with the chuck. In this case, raise the chuck back under the wafer using the "Contact Lever" on the left side of the machine and allow several seconds for the wafer to drop to the chuck. To dislodge the wafer it may be necessary to tap very gently on the top side of the mask.
- When the wafer is on the chuck pull the chuck out using the red transport slide to the right. Remove the wafer and develop.
- Remove the mask and return it to its box and put it away.
- Reinsert the mask holder and gently semi-tighten the knobs.

Alignment Instructions:

- Obtain the correct mask in place and put the wafer to be aligned in contact with the mask.
- Pull the "separation lever" toward the front of the machine until it stops. The lever is located on the left side of the aligner in front of the "contact lever". This should give sufficient separation for alignment, and the "contact" light will go out as the "separation" light illuminates.

If there is not sufficient separation for alignment set the machine back into "contact" mode and make adjustments with the wafer height knob. After adjustment set the machine back for "separation".

- The wafer can now be aligned to the mask using the X, Y, and Theta micrometers. The operator can easily scan the microscope over the substrate in either the X or Y direction, or both simultaneously, by using the precision microscope manipulator. The buttons on the handle of the scanning mechanism can be pressed to move the microscope one at a time or together.
- When satisfactory alignment has been achieved, move the wafer back into contact with the mask by pushing the separation lever all the way to its rearmost position until the separation light goes out and the contact light re-illuminates. The wafer is now ready for exposure.
- Verify that the time is set for the correct time and press the expose button.
- When the exposure is finished, rotate the contact lever to the forward position. Verify that the wafer is sitting on the chuck.
- Pull the chuck transport slide out and remove the wafer.
- Remove the mask and put it away.
- Replace the mask holder and gently semi-tighten the knobs.