

Operation of the contact mask aligner

Canon PPC 210 Projection Print Camera

Start-up Procedure:

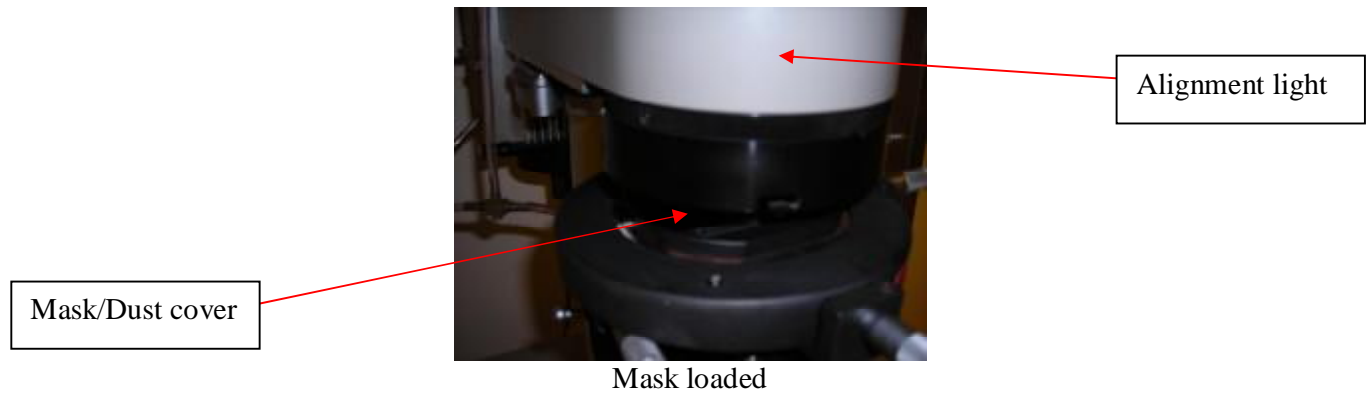
1. Start the grey pump in the service corridor behind the aligner
2. Open the valve for the Nitrogen gas
3. Plug in the power for the air conditioning and HEPA filter unit
4. In the “Turn Table” group put the switches in “single” and “cylinder work” positions.
5. in the “shutter release control” group put the switches in “non release” and “with alignment” positions
6. In the exposure group put thee switch in “manual off” position.
7. Plug in the power cord for the PPC and power supplies
8. Start the PPC by pushing the “power” button
9. Turn on the power supply for the mercury lamp
10. Press the “start” button on the mercury lamp power supply and hold it for 1-3 seconds (you should hear a sharp sound from the power supply)
11. Wait for 30-40 minutes for the mercury lamp to warm up.





Exposing:

1. Turn on the power for the yellow alignment light.
2. Place your mask in the mask holder and turn on mask vacuum
3. Put your sample in the centre of the sample holder
4. Press the “start” button to rotate the stage, the expose indicator should now be on. Remove any previously exposed samples.
5. Move the “wafer focus” to zero position
6. Focus on your sample
7. Focus the mask on your sample using the “mask focus”
8. Make a rough alignment of your pattern
9. Move “wafer focus” to the 100 μm position
10. Align your sample
11. Set the exposure time on the timer using the outer scale
12. Flip the switch for release to “automatic release” position.
13. Move the microscope to the left edge to start exposure.
14. If you have more samples to expose, return to point 3
15. Flip the Turn table switch to “Cylinder no work” position
16. Flip to release switch to “non release” position
17. Press the “Start” button to rotate the stage.
18. Remove your sample
19. Put the microscope back in a centred position
20. Turn of the alignment lamp.
21. When exposing next sample start from 1





Mask Focus

Wafer Focus

System shut down:

1. Turn of the vacuum for the mask and remove the mask
2. Move the microscope to a centred position if this is not already done. Not doing this can damage the “automatic release” mechanism that starts the exposure.
3. Place the silicon wafer on the mask holder to prevent dust from falling into the optical column.
4. Turn of the yellow alignment light if this is not already done
5. Turn of the mercury lamp power supply
6. Turn of the power for the PPC
7. Unplug the power cords for the power supplies and the PPC.
8. Wait for 30 min and then turn of the nitrogen flow and the grey pump in the service corridor.
9. Unplug the air conditioning/HEPA unit.

General information and operating tips

If you can't focus on your sample (i.e. it is too low or too high) you can slowly turn the “Pressure” valve on the right side of the PPC to raise and lower the stage. If the stage doesn't move, reduce the pressure to minimum and slowly start to increase it. At some point the sample holder will start to move up and down in a pulsing movement, this indicates that the pressure is just below the lower threshold. By slowly increasing the pressure from this point you should be able to move the stage. Please do note that the pressure and position of the stage also has an upper limit.



Pressure Control

In “cylinder no work” mode the stage can be rotate time and again but it will not raise the stage and it will not be possible to start an exposure, this mode is good for unloading the last sample in a series.

In “Cylinder work” mode the stage can only be rotated once and then the PPC will go into exposure mode. If you don’t want to expose for some reason but want to rotate the stage to remove your sample press the “Stop” button once to enter emergency stop mode and end the expose mode, then press it again to end the emergency stop mode.

In “non release” mode the system will not start an exposure if the microscope is moved to the left edge; this can be good while aligning so you don’t accidentally start an exposure while looking into the microscope.

In “automatic release mode” the system will start the exposure when the microscope reaches the left edge; this is how you normally start the exposure.

When you move the “wafer focus” you will also lose some fine alignment, therefore always do your fine alignment after using the “wafer focus”. Not using the “wafer focus” will result in poor resolution. This has no effect if your smallest structure is 20 or so microns, but it is necessary to achieve higher resolution.

The mercury lamp of the aligner only generates a uniform dosage in the central part of the sample holder make sure this is where your pattern is.

If your mask is much bigger than the holder and you worry about scratching patterns on the edge there is a piece of clean room paper cut so that it will cover the edge of the holder to prevent scratching.

Don’t forget to cover the column when turning of system or the optical part will get dirty.

Don’t forget to unplug the cables or some of the transformers and power stabilizers will overheat.

Please turn of the yellow light while not aligning since this generates quite a lot of heat and don’t need to heat up before use.

Let the mercury lamp cool down before turning of the pump, this will greatly increase its life time.

If you accidentally turn of the mercury lamp let it cool down for at least 40 minutes before turning it back on, otherwise it could be damaged or explode and the resulting mercury fumes are very toxic.

Check if someone else wants to use the system after you before turning of the mercury lamp.

If leaving for lunch leave the mercury lamp on, it takes more damage from being turned on then from running for 1 hour. If leaving for a longer period of time, turn it off, it has a limited life time (1000 hours or so).

If you notice that the exposure times start to increase a lot (3-5 times longer than usual), call someone who is responsible for the system, the mercury lamp might be getting old and has to be changed or it might just be out of alignment. If the lamp is getting old the risk of explosion increases.