

SC7640 vacuum checks and pirani settings.

Please note, some of the following will require access to the inside of the instrument. Take great care to isolate the mains power.

For correct operation of the SC7640 sputter coater it is important to know the vacuum status of the instrument.

The Pirani gauge - located on the pumping manifold beneath the vacuum chamber, makes vacuum measurement.



At the point of 'final test' in the factory, the lowest vacuum reading is set to 2×10^{-2} mbar.

After use over a long period it is likely that the reading of the Pirani gauge will be affected. The most likely cause is contamination of the filament.

This can be cleaned by 'washing' the filament in clean alcohol. To do this, remove the gauge from its manifold, part fill with alcohol, place your finger over the open end and shake the gauge. Tip out the alcohol onto a tissue and look at the debris that was washed out.



Repeat this until there is no longer anything being washed from the gauge.



Set the SC7640 to MANUAL and start the sequence. Make sure that the leak valve is closed and after 10 minutes observe the vacuum level. If the pump is in good order and there are no leaks, then the vacuum

should be reading 2×10^{-2} mbar.

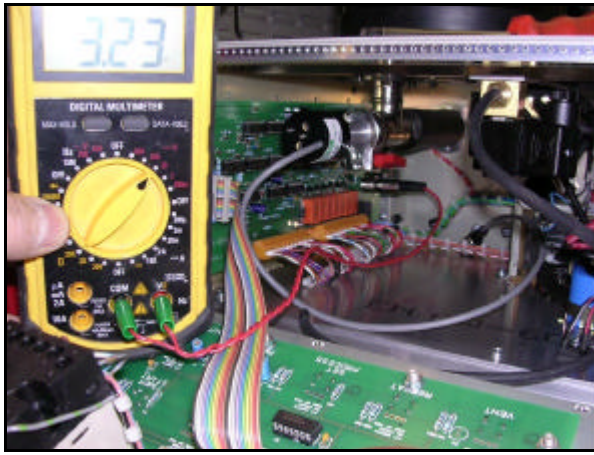
If the reading is higher this will be due to a vacuum leak or a gauge calibration error.

Gauge calibration.

Do not adjust the gauge until:-

- 1/. You have checked the reference voltage 3.2v
- 2/. You are satisfied that the instrument has no leaks, or are able to attach the gauge directly to the rotary pump.

The calibration of the Pirani gauge is set against a reference voltage of 3.2v between pins 2 and 4 on the 5-pin DIN connector of the Pirani gauge. As the power needs to be on the safest way to measure this is to make up a test lead.



Adjustment for 3.2v is done by the adjustment pot RV1, which is the top pot at the back end of the main board. Take great care and use a suitable extended adjusting tool. Do not adjust any other pots at this stage.



With the gauge being pumped, either directly by the rotary pump, which is the best option, or by the coater, it will now be possible to adjust the gauge set pots. These are situated on the back end of the Pirani gauge head and represent the two ends of the adjustment scale.

Start off by venting the gauge, and setting the atmosphere pot so that the gauge reads ATM (left side of the pressure meter). Then pump the gauge and allow the reading to stabilise. Now adjust the vacuum pot for 2×10^{-2} mbar. Go back and forward between the atmosphere setting and the vacuum setting, until no error exists. On occasions it will be found to be impossible to calibrate the gauge to read a low vacuum. This will be due to degradation of the filament, which will require the gauge head to be replaced. The part number of the gauge head is 500020110.

Testing the pressure of the SC7640.

The next test is to operate the coater with the leak valve closed. With a pressure of less than 4×10^{-2} mbar and a voltage of around 1kv it should not be possible to generate a plasma in the glass chamber.

Care should be taken not to hold the sputter voltage at maximum during this low pressure test as it may cause breakdown on the Teflon isolators in the sputter head. This will be seen as 'flicking' of the current needle and small pressure bursts. Once this has occurred it may be necessary to replace these isolators. See the service notes on sputter head care.

Provided that the coater is operating well at this point with normal operating values, the coater could be considered operational.

If however, the coater is giving sputter current at low pressures, with the leak valve closed, there is likely to be a vacuum leak. It is recommended that you pay attention to the following:-

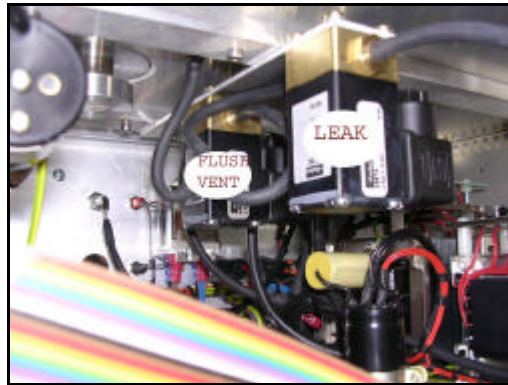
- 1/. Replace the chamber, head and manifold seals using parts from the service kit SC7640-OKIT.

2/. Replace the black rubber tube within the coater. Part number for a 2m length is 351270380

3/. Make sure that the tube fitting into the base plate of the coater chamber is not leaking. It should be re-fitted with thread sealing compound if in doubt.



4/. If the chamber pressure is still high enough to generate plasma in the chamber, you should inspect the 'leak' and 'vent/flush' solenoid valves, which are located under the chamber.



If either one of the valves are leaking this will continue to let gas into the chamber. Closing the gas inlet at the back of the chamber and running the coater through its pump down cycle will give an indication of this fault as the inlet pressure will be low and the leak rate reduced. In this condition there may be no plasma but venting the gas inlet may give an increase in the plasma again.

Two kinds of valves were fitted on the SC7640; both types of valve will be susceptible to trapping debris in the valve seal through venting to dusty gas. Take the valve apart and clear any 'dirt' from the seal.

At the end of this service, please remember to replace all tubes, in particular, those to the front panel valve.