

## TROUBLESHOOTING MODULE LEAKS

In order to isolate the location of leaks in a flexiVent FX set-up, please perform the following steps and send the results to Technical Support.

1. Make sure that all the tubing is tightly attached. Further, check the tubing for signs of cracking. If cracks are visible, please replace the tubing
2. Make sure that the manometer oil is at the zero position. Block the end tubing of the manometer with your thumb and apply a pressure using the syringe to confirm that the manometer itself holds pressure

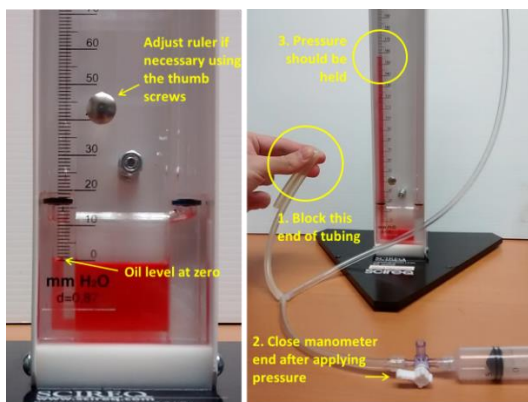


Figure 1. A sealed manometer is needed for leak testing

3. If working with a nebulizer set-up, prior to carrying out the calibration steps, make sure that the nebulizer head is filled either with saline or water so as to form a seal and prevent a leak in the system
4. Remove the FX adaptor from the system and try to examine the o-rings on the adaptor piece for any signs of cracking. Try adding a bit of vacuum grease on each of the o-rings before connecting the adaptor back to the system

5. Perform an extended cleaning of the expiratory line. The procedure is the same as that followed during typical cleaning but in this protocol, cleaning solution should remain in the line for 15-20 minutes before flushing it out. Flush the cleaning solution through the line a number of times following this extended cleaning. Finally, please dry the expiratory line through ventilation, ensuring that a test load is attached
6. After extended cleaning, launch the software and perform fresh channel calibrations per usual and proceed to dynamic tube calibration. Block the y-tubing of the FX adapter during closed calibration. What is the RL value from the Deep Inflation calibration? If this step still indicates a leak in the system, proceed to step 7
7. Close the active session of flexiWare and disconnect the cord that connects the power supply to the flexiVent



Figure 2. The back of the FX, power port indicated

- Remove the y-tubing adapter. Place a quick-connect onto the inspiratory port (left), connect tubing, then apply 300 mmH<sub>2</sub>O of pressure with the manometer. What is the pressure after 10 seconds?



Figure 3. Testing the inspiratory port of the FX

**NOTE:** Always close the 3-way valve on the manometer side after applying pressure with the syringe, as this prevents the pressure built up from pushing the plunger backwards.



Figure 4. how to close the manometer

- Move the quick-connect into the middle port and apply 300 mmH<sub>2</sub>O. What is the pressure after 10 seconds?



Figure 5. Testing the Pao port of the FX

- Move the quick-connect into the expiratory port (right) and apply 300 mmH<sub>2</sub>O. What is the pressure after 10 seconds?



Figure 6. Testing the Expiratory port of the FX

- Place the quick-connect into the air/gas intake on the back of the module (top) and apply 300 mmH<sub>2</sub>O. What is the pressure after 10 seconds?



Figure 7. Testing the air intake port

- Place the quick-connect into the air/gas exhaust on the back of the module (bottom) and apply 300 mmH<sub>2</sub>O. What is the pressure after 10 seconds?



Figure 8. Testing the air exhaust port

- Remove the quick-connect. Reconnect the y-tubing adapter but remove the y-tubing. Apply 300 mmH<sub>2</sub>O to the inspiratory port on the tubing adapter (left).

What is the pressure after 10 seconds?



Figure 9. Testing the inspiratory cartridge+ inspiratory side of the adapter

- Apply 300 mmH<sub>2</sub>O to the expiratory port on the tubing adapter (right). What is the pressure after 10 seconds?



Figure 10. Testing the Expiratory cartridge and expiratory side of the adapter

- Reconnect the cord that connects the flexiVent to the power supply. Launch the software, perform channel calibration per usual and proceed to dynamic tube calibration. Block the inspiratory port of the adapter during closed calibration. What is the RL value from the Deep Inflation calibration in this configuration?

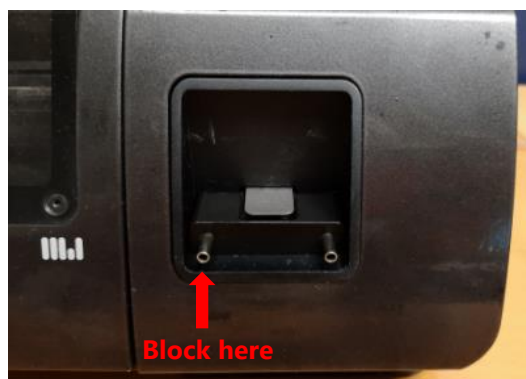


Figure 11. Testing inspiratory + adapter seal within flexiWare

- Replace the Y-tubing. Place the quick-connect on the air/gas exhaust port on the rear of the module (bottom). Add a short length of tubing to the quick-connect and clamp it tightly. Re-perform the dynamic tube calibration while blocking the y-tubing per usual. What is the RL value from the Deep Inflation calibration in this configuration?



Figure 12. Testing expiratory + adapter +Y-tubing

- Remove the clamped tubing from the exhaust port on the back of the module. Regardless of the results above, proceed to an experimentation session with a test load (e.g. syringe) attached to the y-tubing and start default ventilation. Run for 30-60 seconds. Stop ventilation and remove the test load. Re-perform the dynamic tube calibration per usual. What is the RL value from the Deep Inflation calibration now?

18. Note down the results obtained after following each step in the protocol and send the results to techsupport

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