# What to do if Merlin fails it's leak test

The leak test used on Merlin is very sensitive. The machine will fail if the leak is more than 1ml per second at a pressure of 57cm $H_2O$.

**A failure will be indicated** if the Merlin screen shows the text "TARGET PRESSURE NOT REACHED" or "LOW INSP PRESSURE" and the piston is heard to rewind and begin the test again.

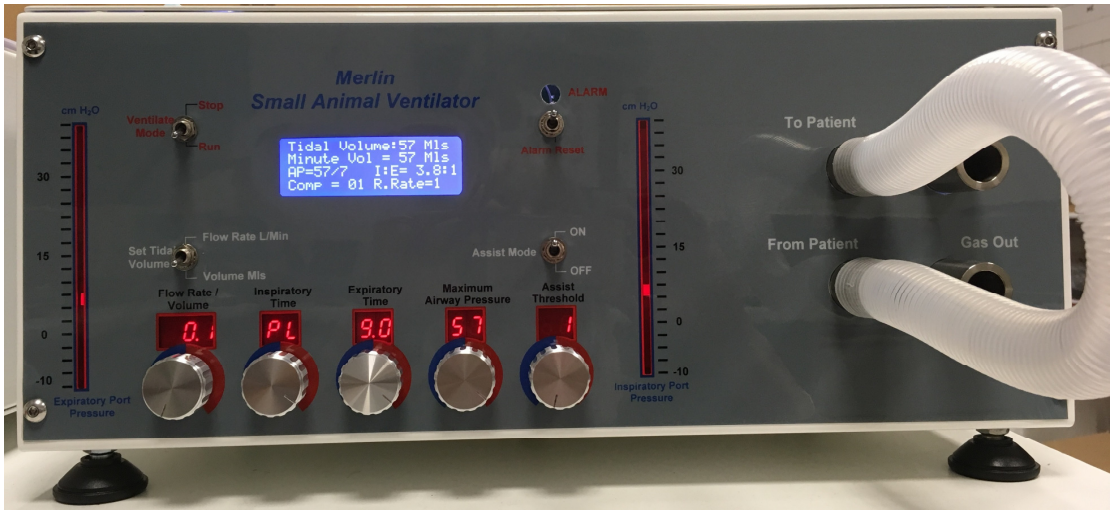
**A pass is indicated** if the Airway Pressure reaches 57cm. At this point the pressure will be released through the Gas Out port and the piston will rewind and start the test again. The measured Tidal Volume on the screen on the top line should be less than 100mls.

If Merlin does fail the leak test, the first thing to do is to ensure that the leak test was conducted properly. To run a leak test the following settings should be used:

**Inspiratory Time** : turned fully clockwise to read PL
**Flow control**: set to 0.1L/min
**Maximum Airway**: Pressure: set to 57

**Expiratory Time**: Value not important, as not involved in the leak test
**Assist Value**: Make sure Assist Mode is off. The Assist Value is not important as not involved in the leak test

A single short length of 22mm tubing should be connected from the To-Patient port, to the From-Patient port. Make sure there are no leaks in this tube.



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The second thing to do is to determine the extent of the leak.
With the above setup, increase the flow rate to 0.2L/min and repeat the test. If this test completes successfully then the leak is very minor and the machine can still be used until it can be serviced. If Merlin fails the leak test at flows of 0.2L/min or more then the machine should not be used.

If the leak is found to be above 0.2L/min or if you want to try and locate the leak follow the steps below:

1. Configure the machine for a standard leak test at 0.1L/min
2. Remove all hoses and connectors from the 4 gas ports
3. Fit a stopper (or use your thumb) to the To-Patient port
4. Run the leak test again


If the leak test fails now, then the leak is inside the machine (see the section - ***Internal Leak*** below)

If the leak test is successful then the leak is not in the chamber, connecting hose, internal filter or the inspiratory valve. The only remaining component to check is the expiratory valve. Connect a 22mm hose from the **To-Patient** port to the **From-Patient** port. Run the standard leak test again. It should fail as this is the same test as the initial test. Now fit a stopper (or use your thumb) to block the Gas-Out port and repeat the test.


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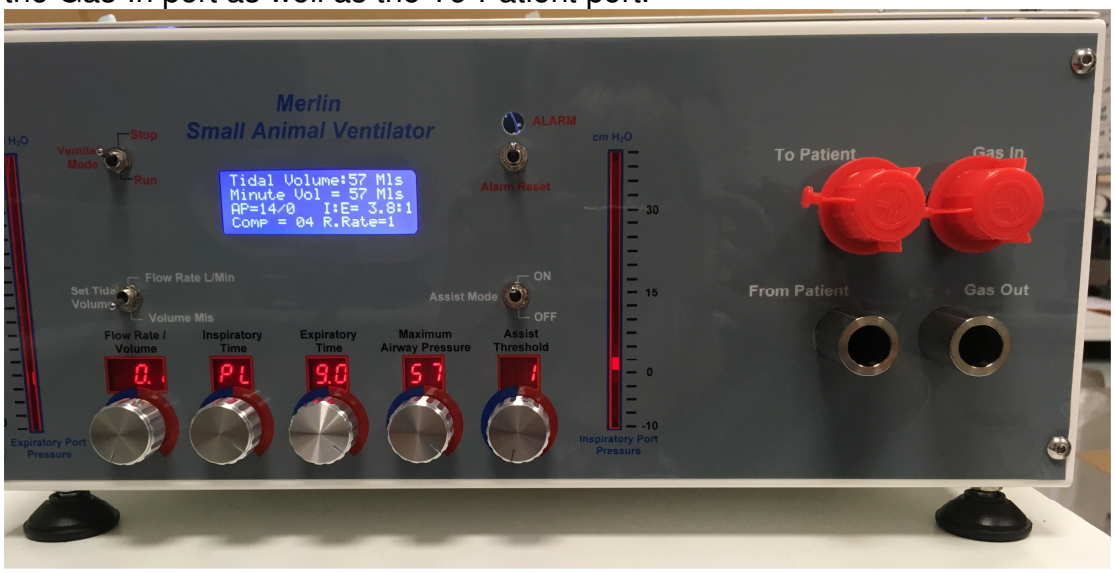
If the leak test is successful then the expiratory valve is leaking. Return the unit for servicing or repair.

**Internal Leak**

If the leak test with the To-Patient port occluded fails, then the leak must be inside the machine and there are 2 possibilities - a leaking inspiratory valve or a leaking internal hose/filter.
To test the inspiratory valve, repeat the standard leak test with a stopper on the Gas-In port as well as the To-Patient port.




If the leak test is successful, there is a problem with the inspiratory valve.
If the leak test fails, then there is a problem with the internal hosing/filter.
In that case, look through the blue Perspex top and identify the 22mm hose running from the end of the chamber to a large bacterial filter and then to the back of the inspiratory valve. Does it look normal? Has it, or the filter moved?



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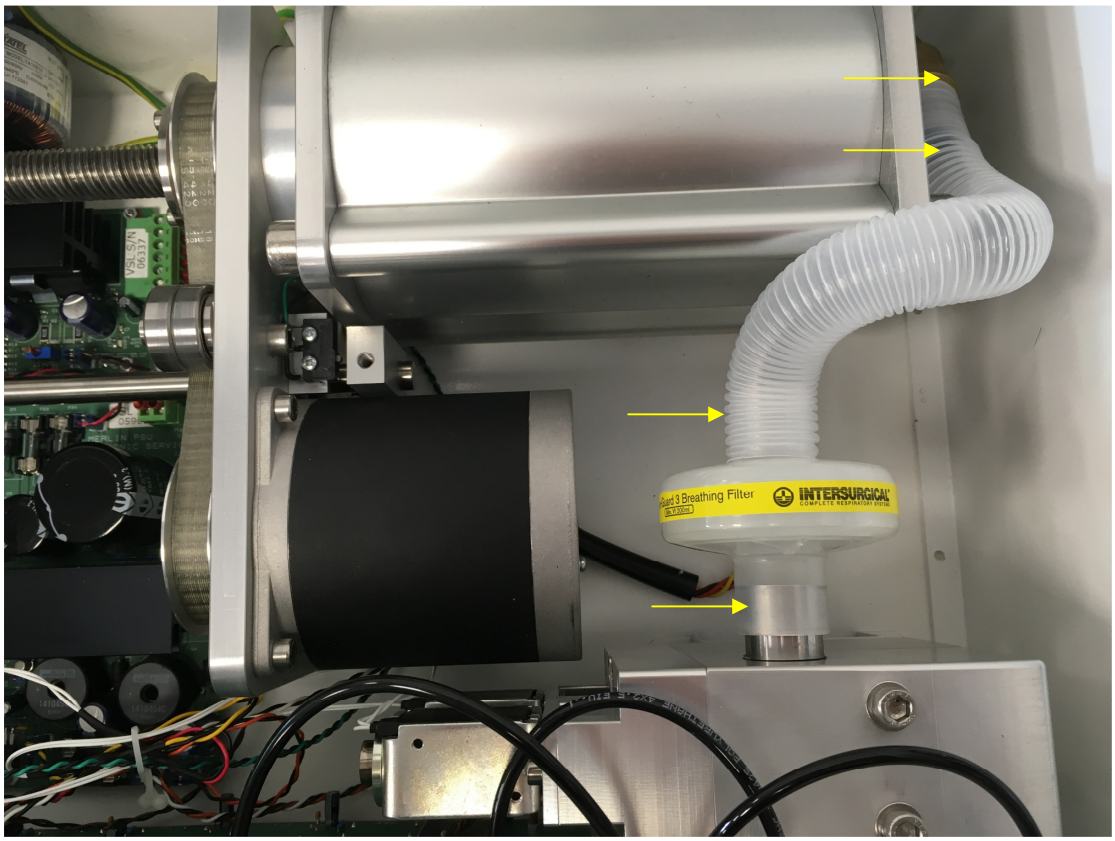
If you are unsure, then to proceed further you will need to remove the top lid from the Merlin machine to check these items.

**BEFORE REMOVING THE MERLIN LID YOU MUST DISCONNECT THE MAINS POWER AND REMOVE THE POWER CORD**

Then undo the 8 screws holding the lid on and check the hose and filter connections. These may come loose during transit or through vibration, or with age they can crack or split. If the filter is cracked or there is a split on the hose, replace these parts.




**Note: Different models will have different hose configurations but all will feature a hose and filter running from the chamber to the valve assembly. Check the hose and filter for tightness of fit and/or cracks and splits.**

If no cause for the leak can be found contact your supplier to arrange a service or repair.



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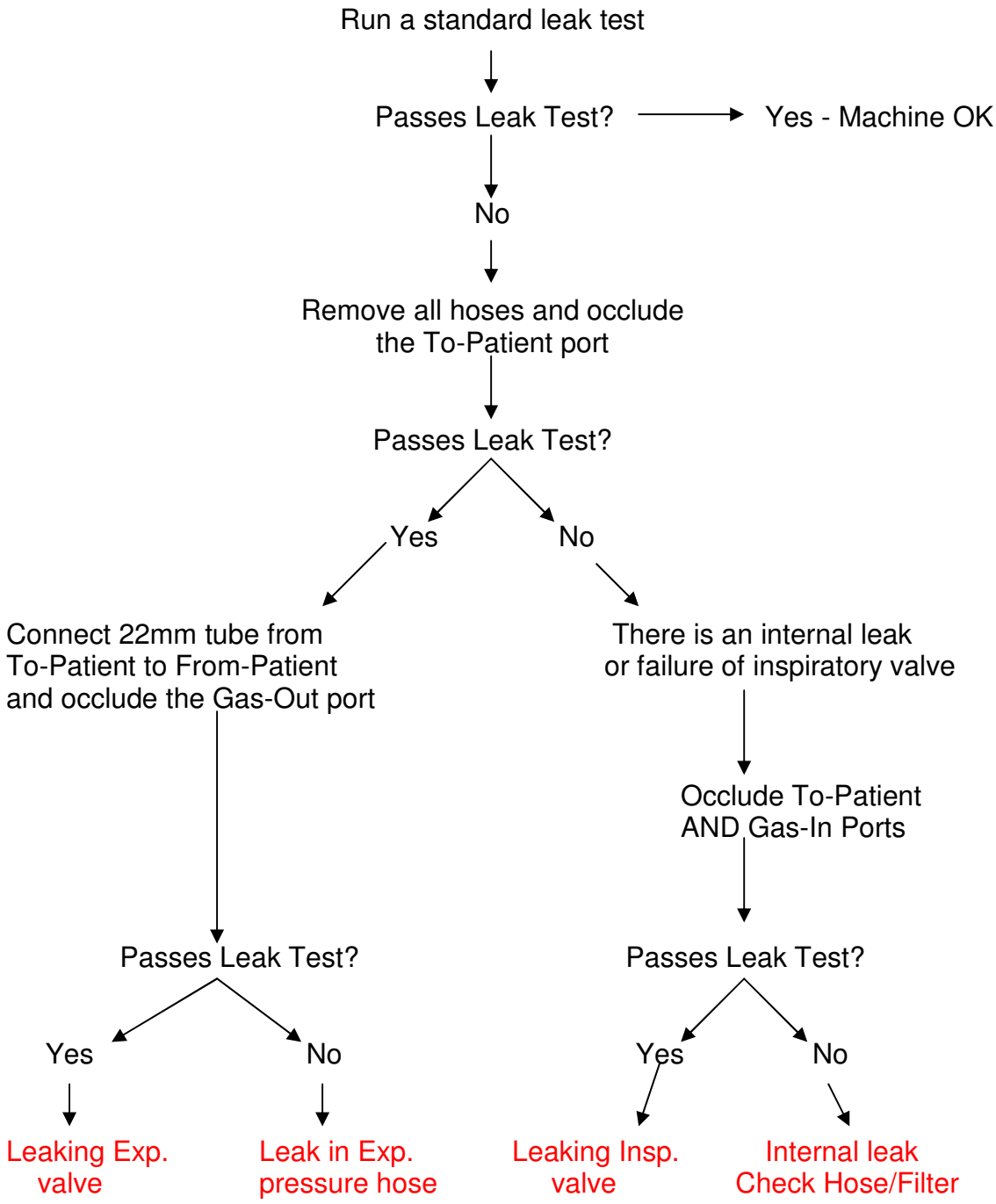
# Merlin Leak Test Flow Chart




If you have identified the source of the leak but are unable to fix it, contact your supplier for advice on how best to proceed.