1. Calibration pre-checks

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INTRODUCTION

Use the procedure to ensure your monitor is fit for calibration. It involves checking key operating parameters such as flow rates and changing the gas inlet filter.

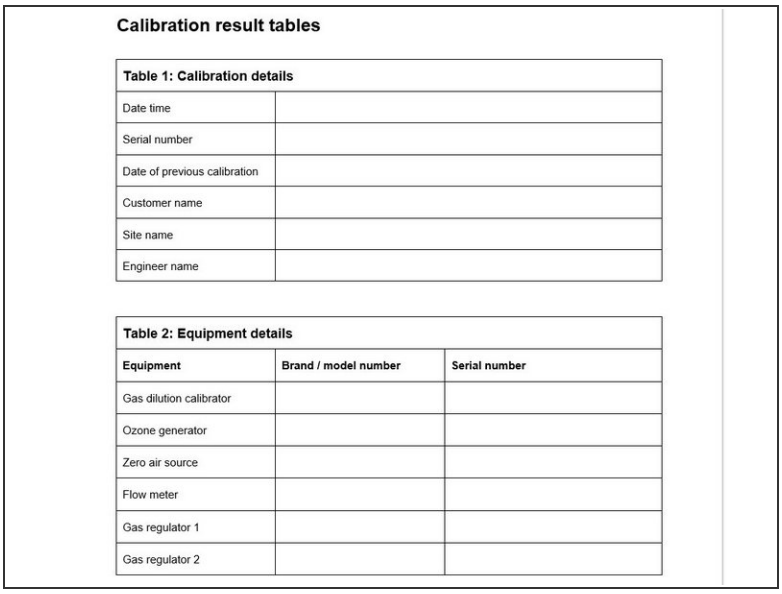
TOOLS:

- Large Phillips head screwdriver (1)

PARTS:

- Gas inlet filters (1)
- Flowmeter - TSI 4140 (1)
- Luer cap (1)
- Sample pump (1)

Step 1 — Record basic information



Calibration result tables

Table 1: Calibration details	
Date time	
Serial number	
Date of previous calibration	
Customer name	
Site name	
Engineer name	

Table 2: Equipment details		
Equipment	**Brand / model number**	**Serial number**
Gas dilution calibrator		
Ozone generator		
Zero air source		
Flow meter		
Gas regulator 1		
Gas regulator 2		

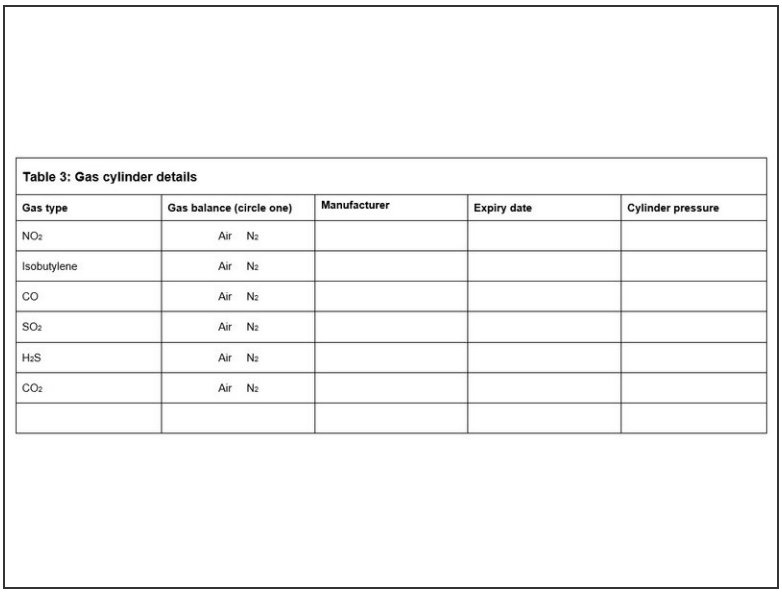


Table 3: Gas cylinder details				
Gas type	**Gas balance (circle one)**	**Manufacturer**	**Expiry date**	**Cylinder pressure**
NO_2	Air N_2			
Isobutylene	Air N_2			
CO	Air N_2			
SO_2	Air N_2			
H_2S	Air N_2			
CO_2	Air N_2			

- Download the calibration results form at the end of this user guide.
- Fill in tables 1, 2 and 3.

ⓘ These tables record basic details like date and time, site name, engineer's name, and the equipment that will be used during the calibration.

Step 2 — Inspect site

Table 4: Site inspection	
Check the local surroundings to see if anything has changed which could influence the ongoing ambient gas measurements.	
Observations	

- When arriving onsite, it's important to make sure no new emission sources or obstructions have appeared since the last visit.
- Inspect the local surroundings and check for local point source emissions such as open fires or exhaust emissions from a newly positioned generator.
- Check for obstructions which may affect the measurements, such as a new fence.
- Record your observations in table 4 of the calibration form.

Step 3 — Turn on calibrators

Because the AirCal 1000 and Ozone Calibration Source take at least 30 minutes to warm up and become stable, now is a good time to turn both on.

- Turn on the AirCal 1000 calibrator and switch on the pump override switch on the back panel.
- If you're calibrating ozone, turn on your Ozone Calibration Source and set it to deliver 0.1 ppm ozone. This allows time for the lamp to stabilize at 0.1 ppm.

Step 4 — Check monitor's exterior

Table 5: Monitor pre-checks

Before opening the door		
Description	**Observation / reading**	**Pass / fail / done**
Put monitor into service mode		
Gas inlet secure		
Particle inlet secure		
Door locks are operational		
If calibrating an AQM 65, check the internal temperature is correct and stable		
Measure gas inlet flow rate		
Previously measured flow rate		
After opening the door		
Replace inlet filters		
Measure flow rate again		
Go to section 6 if required then record final inlet flow rate here		

- Fill in table 5 by completing the steps 2,3 and 4 in this user guide.
- Put the monitor into service mode.
- Check the gas inlet is secure.
- Check the particle inlet is secure.
- Check the door locks are operational.

Step 5 — Check internal temperature

⚠ This step only applies to AQM 65 monitors.

- If calibrating an AQM 65, check the internal temperature has been stable at the correct temperature.
- If the internal temperature isn't correct, you must address this before attempting a calibration.

Step 6 — Check inlet flow rate

- Measure and record the gas inlet flow rate.
- Record the previously measured flow rate. (You should find this in the monitor's journal.)
- Open the monitor door and replace the gas inlet filer. Try to minimize the time the door is open so the sensors can quickly re-stabilize.
- Measure and record the flow rate again.
- If the inlet rate has changed from the previously recorded rate by less than ± 20 %, check the gas connections for obvious leaks, then use the flow adjustment valve to correct the flow. If the adjustment is unsuccessful, go to table 6 in the calibration form.
- If the inlet flow has changed from the previously recorded rate by more than ± 20 %, go to table 6.

Step 7 — Module flow rates

Table 6: Individual module flow rates, leak check and bypass valve adjustment										
Check all gas connections	Pass / fail									
Leak check sampling manifold	Pass / fail									
	$NO_2 (O_x)$	NO_2 (direct)	NO_x	O_3	CO	VOC	SO_2	H_2S	CO_2	Total flow
Flow rate last measured										
Flow rate measured now										
If flow rate is the same, pass If changed, fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail
If all the modules show reduced flow and there is no leak, adjust the bypass valve	Yes / no									
Flow rate following adjustment										
If flow rate is the same as last measured, pass If changed, fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail	Pass / fail
What was the reason for the change in flow rate?										

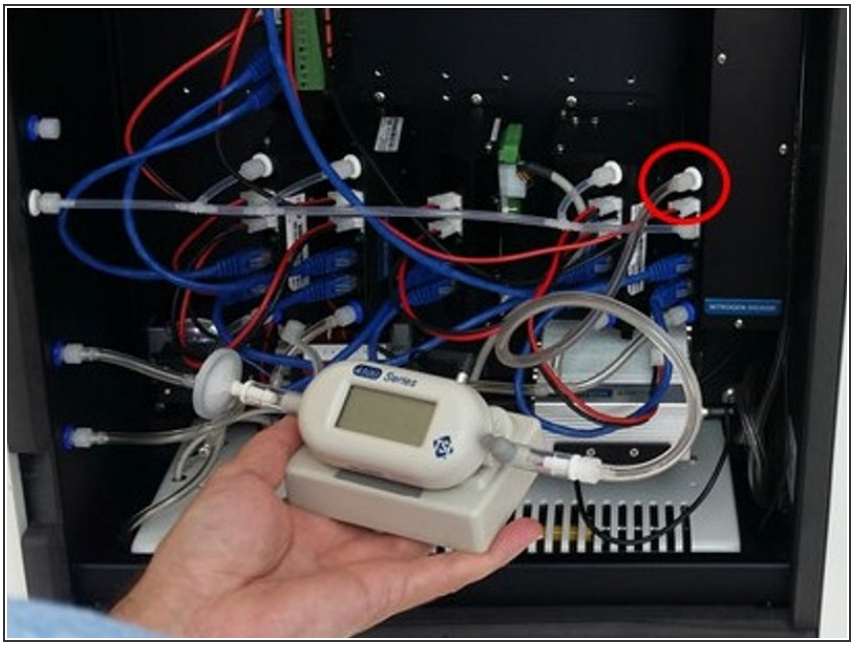
⚠ You only need to complete table 6 if the inlet flow rate was more than ± 20 % of the previously measured rate, or if using the flow adjustment valve to correct the inlet flow didn't work.

- One or more modules can fail the flow check, but others can pass. Calibration can continue on modules that pass.
- Modules that fail can be removed and checked without affecting the calibration on the remaining modules.

Step 8 — Check for leaks

- Check the individual gas connections for obvious leaks. If a leak is found, correct it.
- Perform a leak check on the sampling manifold. If a leak is found, correct it.

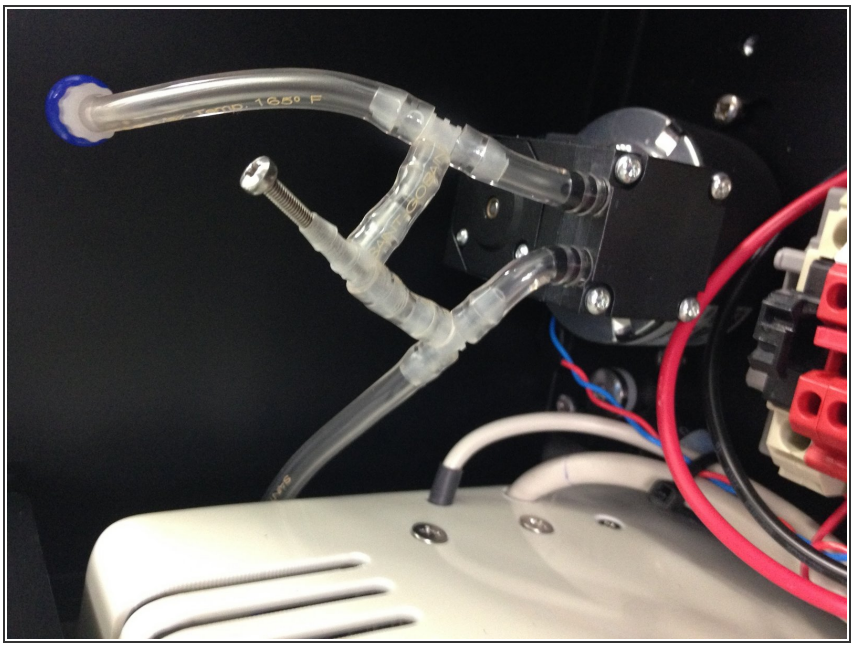
Step 9 — Measure flow rates



It's important to have a high-quality flowmeter such as the TSI 4040 or the Bios Defender DryCal.

- Record the individual flow rates the last time they were measured.
- Measure and record today's individual flow rates. Record the total flow.
- For each module, if the flow rate now equals the previously measured flow rate (± 20 % LPM), pass that module. Otherwise fail it.
- If no specific module is causing a problem and all module flow rates are low, adjust the flow rate using the bypass valve.

Step 10 — Adjust bypass valve



- If no specific module is causing a problem and all module flow rates are low, adjust the flow rate using the bypass valve.
- Re-measure and record flow rates for each module.
- If the flow rate now equals the previously measured flow rate, pass it.

Step 11 — Remove module

- For those modules which don’t have the correct flow rate and can’t be corrected with the bypass valve, perform a leak check or check for blockages.
- If the problem can’t be corrected, remove the module and cap off the gas connections. Record fail in the form.

  The total flow rate is reduced when a module is removed.

If the door is left open for the purpose of finding a leak or removing a module, the gas modules will become unstable and you'll need to wait 1 – 2 hours to allow the sensors to re-stabilize.

For further support, contact Technical Support.