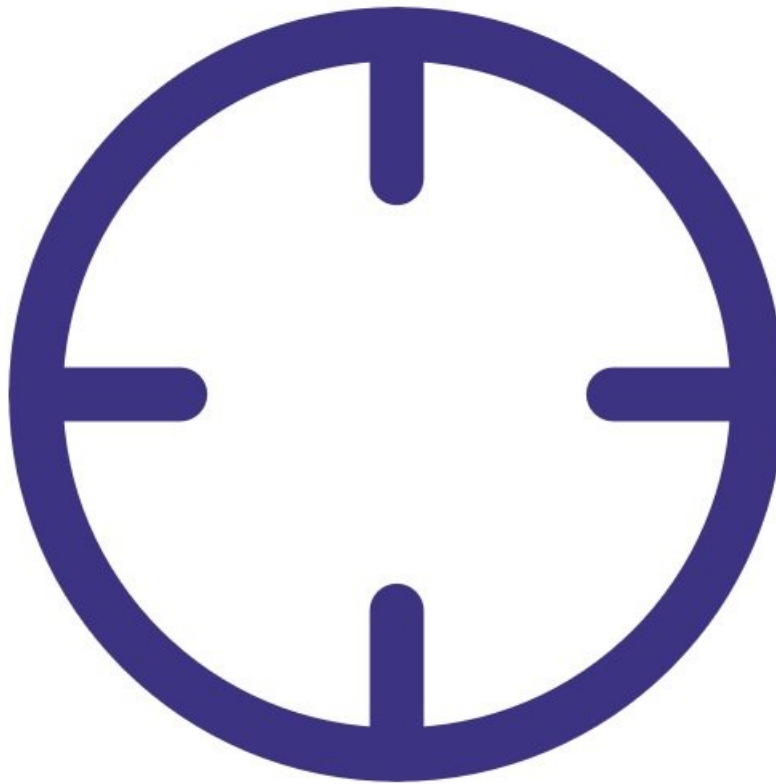




Check zero using auto cycle

Written By: Tanya Taylor



INTRODUCTION

Over time some particulate is inevitably deposited on the optics inside the optical engine. These deposits cause some scattering of light and result in a false positive reading, even in the absence of particle matter in the sample air. To limit this “drift” in the reading, the particle monitor executes an automatic auto zero cycle every 24 hours. The purpose of a zero cycle is to set a new baseline in absence of any particulate matter.

The zero cycle works by switching off the sample pump and switching on a purge (zero) pump. The flow rate during the zero cycle is reversed and is a positive flow out the particle inlet. The flow rate is approximately 0.2 to 0.6 LPM.

Particle matter concentrations during the zero cycle should read 0 or close to 0 (within the range ± 3 $\mu\text{g}/\text{m}^3$). If you're seeing negative numbers larger than -3 $\mu\text{g}/\text{m}^3$ in your data, it's likely the auto zero cycle isn't working correctly.

Note: The particle profiler doesn't have an auto zero cycle.

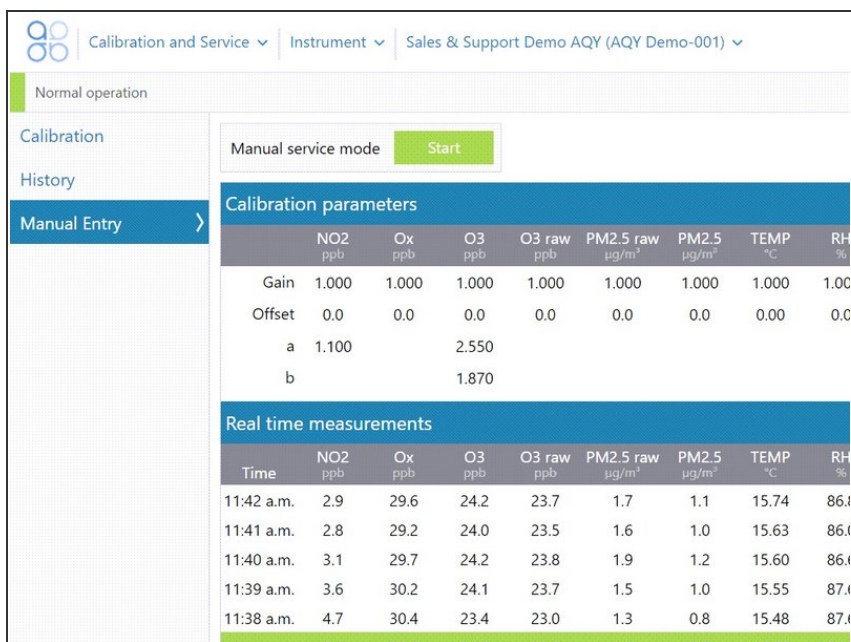
To understand how often you should perform this service activity, [click here](#).



PARTS:

- [Flowmeter - TSI 4140](#) (1)
 - [Zero filter and flow assembly](#) (1)
-

Step 1 — Enter service mode



Normal operation

Calibration

History

Manual Entry


Manual service mode Start

Calibration parameters								
	NO2 ppb	Ox ppb	O3 ppb	O3 raw ppb	PM2.5 raw µg/m³	PM2.5 µg/m³	TEMP °C	RH %
Gain	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Offset	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0
a	1.100		2.550					
b			1.870					

Real time measurements								
Time	NO2 ppb	Ox ppb	O3 ppb	O3 raw ppb	PM2.5 raw µg/m³	PM2.5 µg/m³	TEMP °C	RH %
11:42 a.m.	2.9	29.6	24.2	23.7	1.7	1.1	15.74	86.1
11:41 a.m.	2.8	29.2	24.0	23.5	1.6	1.0	15.63	86.1
11:40 a.m.	3.1	29.7	24.2	23.8	1.9	1.2	15.60	86.1
11:39 a.m.	3.6	30.2	24.1	23.7	1.5	1.0	15.55	87.1
11:38 a.m.	4.7	30.4	23.4	23.0	1.3	0.8	15.48	87.1

- [Enter service mode](#) so any fluctuations in the data caused from this activity can be excluded from air quality reports.

Step 2 — Start auto zero cycle



Diagnostics and Advanced ▾ Teramb - Aterro Municipal - Particles and Gases (AQMG5 10062015-424) ▾



Normal operation

Diagnostics
Download Data
Module Settings >

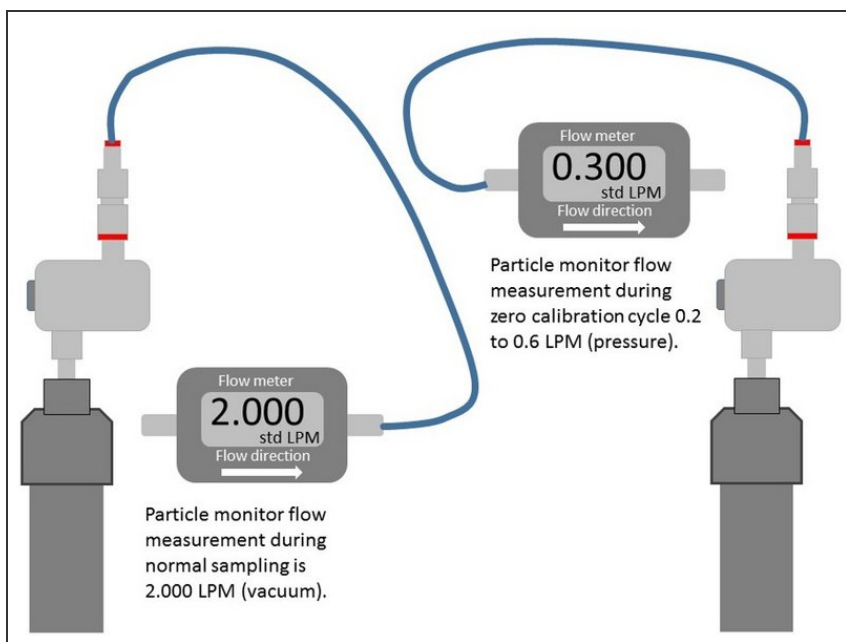
Module	Version	H0	H1	H2	H3	TIMA	TIMR	TEMA	TEMR	PWML
CO	1.0	4.56	29.92	0	50	2	10	5	0	175
NO2	6.0	3.38	0.677	0.835	0	40	50	220	325	41
SO2	2.0	0	90.90736	0	4	40	40	5	0	4
PM2.5	6.2	0.011392	1	46.1998	96.118	720	5	580	45	2
PM10	6.2	0.001087	1	375.6306	55.944	720	5	580	45	3
WS	6.1	0	0.7	0.01	96.5	720	24	580	500	60
WD	6.1	0	0.7	0.01	96.5	720	24	580	500	60
RAIN	6.1	0	0.7	0.01	96.5	720	24	580	500	60
HAIL	6.1	0	0.7	0.01	96.5	720	24	580	500	60
PRESS	6.1	0	0.7	0.01	96.5	720	24	580	500	60
Pyran	1.0	-0.04166	84.9	240	0	30	20	580	500	60
AIR T	6.1	0	0.7	0.01	96.5	720	24	580	500	60
AIR RH	6.1	0	0.7	0.01	96.5	720	24	580	500	60
ITEMP	1.0	30	0.2	1	0.2	0	2	35	-5	0
TEMP	1.0	30	0.2	1	0.2	0	2	35	-5	0
RH	1.0	30	0.2	1	0.2	0	2	35	-5	0

Refresh Export

 Make sure the external zero filter isn't on your sharp cut cyclone.

- To manually start the auto zero cycle, enter the **Diagnostic and Advanced** app and select **Module Settings** from the side menu.
- Find the TIMA parameter for your particle monitor (it should be 720).
- Change this value to 1 by clicking in the cell and typing 1.
- Save the setting change.
-  You'll hear a change in sound coming from the monitor.
-  The auto zero cycle takes about 6 minutes to complete.

Step 3 — Measure flow rate



- During the auto zero cycle, attach a 0-2.5 LPM volumetric flowmeter to your monitor's sharp cut cyclone.
 - If using a rotameter, connect the flow assembly tube to the bottom port of the flowmeter.
 - Measure the positive flow coming out of the inlet.
- i** You should see a 0.2 to 0.6 positive flow. It doesn't need to be a specific value, but it must be at least 0.2. If no flow is measured, there may be an issue with the zero cycle or purge pump.

Step 4 — Check concentrations

Left Screenshot: Diagnostics Menu

Normal operation

Diagnostics and Advanced ▾ Instrument ▾

Normal operation

Diagnostics ▾

Select parameter: PM10 ▾ Averaging period: 1 minute ▾ Pause Export

Time	PM10 (µg/m³)	Run time (Hours)	Pressure (mBar)	Laser current (mA)	Raw signal (Hz)	Bench temperature (°C)
11:42 PM	1.39	7663.000	1017.000	20.800	101.583	44.000
11:41 PM	1.39	7663.000	1017.000	20.800	101.833	44.000
11:40 PM	1.39	7663.000	1017.000	20.800	104.000	44.000
11:39 PM	1.38	7663.000	1017.000	20.800	102.667	44.000
11:38 PM	1.38	7663.000	1017.000	20.800	101.667	44.000
11:37 PM	1.29	7663.000	1017.000	20.800	103.667	44.000
11:36 PM	1.48	7663.000	1017.000	20.800	99.667	44.000
11:35 PM	1.36	7663.000	1017.000	20.800	107.167	44.000
11:34 PM	1.33	7663.000	1017.000	20.800	103.333	44.000
11:33 PM	1.38	7663.000	1017.000	20.800	101.833	44.000
11:32 PM	1.40	7663.000	1017.000	20.800	103.167	44.000
11:31 PM	1.42	7663.000	1017.000	20.800	100.167	44.000
11:30 PM	1.46	7663.000	1017.000	20.800	103.167	44.000
11:29 PM	1.41	7663.000	1017.000	20.800	101.500	44.000
11:28 PM	1.50	7663.000	1017.000	20.800	102.000	44.000
11:27 PM	1.48	7663.000	1017.000	20.800	102.417	44.000
11:26 PM	1.42	7663.000	1017.000	20.800	101.500	44.000
11:25 PM	1.53	7663.000	1017.000	20.800	101.500	44.000
11:24 PM	1.49	7663.000	1017.000	20.800	103.167	44.000
11:23 PM	1.34	7663.000	1017.000	20.800	102.750	44.000
11:22 PM	1.54	7663.000	1017.000	20.800	103.083	44.000
11:21 PM	1.46	7663.000	1017.080	20.800	102.583	44.000
11:20 PM	1.47	7663.000	1017.170	20.800	102.500	44.000
11:19 PM	1.42	7663.000	1017.250	20.800	106.667	44.000
11:18 PM	1.47	7663.000	1017.170	20.800	105.500	44.000
11:17 PM	1.39	7663.000	1017.080	20.800	101.833	44.000
11:16 PM	1.42	7663.000	1017.000	20.800	105.667	44.000

Right Screenshot: Module Settings

Normal operation

Diagnostics and Advanced ▾ Teramb - Aterro Municipal - Particles and Gases (AQM65 10062015-424) ▾

Normal operation

Diagnostics

Download Data

Module Settings ▸

Module	Version	H0	H1	H2	H3	TIMA	TIMR	TEMA	TEMR	PWML
CO	1.0	4.56	29.92	0	50	2	10	5	0	175
NO2	6.0	3.38	0.677	0.835	0	40	50	220	325	41
SO2	2.0	0	90.90736	0	4	40	40	5	0	4
PM2.5	6.2	0.011392	1	46.1998	96.117	720	5	580	45	2
PM10	6.2	0.001087	1	375.6306	55.9446	720	5	580	45	3
WS	6.1	0	0.7	0.01	96.5	720	24	580	500	60
WD	6.1	0	0.7	0.01	96.5	720	24	580	500	60
RAIN	6.1	0	0.7	0.01	96.5	720	24	580	500	60
HAIL	6.1	0	0.7	0.01	96.5	720	24	580	500	60
PRESS	6.1	0	0.7	0.01	96.5	720	24	580	500	60
Pyran	1.0	-0.04166	84.9	240	0	30	20	580	500	60
AIR T	6.1	0	0.7	0.01	96.5	720	24	580	500	60
AIR RH	6.1	0	0.7	0.01	96.5	720	24	580	500	60
ITEMP	1.0	30	0.2	1	0.2	0	2	35	-5	0
TEMP	1.0	30	0.2	1	0.2	0	2	35	-5	0
RH	1.0	30	0.2	1	0.2	0	2	35	-5	0

Refresh Export

- To view particle concentrations, open the **Diagnostics and Advanced** app and select **Diagnostics** from the side menu.
- During the auto zero cycle, the **Inlet** column reads **Zero** and the **PM µg/m3** values should be 0 or close to 0 (between ± 3 µg/m3).
- Compare the values with those taken during the zero filter check. They should be the same or very similar. If they're different, it's possible the sample filter is too dirty or there's a problem with the auto zero cycle.
- Return to **Module Settings** and reset the TIMA parameter from 1 to 720.

Step 5 — Record in journal

Instrument ▾ Air Quality Monitor (AQM65 04082015-437) ▾

All journal types ▾

User entry | Cloud user - John Wagner

1. Site Inspection:	No new local emission sources Instrument in good condition No obstructions to monitoring equipment	2. Instrument inspection: Cooling fan operational PM and gas inlet secure Instrument has been running at stable
3. Equipment:	Aeroqual Gas dilution calibrator: Aircal 1000 Aeroqual Ozone calibrator: AQM O3Cal Aeroqual Flow meter: AQM R7	4 Gas cylinders: CO 1000 ppm in Air (expiry March) SO2 20 ppm in Air (expiry December) NO2 20 ppm in Air (expiry November)
4. Flow rate check:	Expected flow rate = 0.450 ml per min, Measured flow rate = 0.452 ml per min Main inlet flow rate OK, individual module flow rates were not measured.	5. Open door and change gas inlet filter
6. Zero calibration	All modules passed zero calibration, all modules were stable and all offsets were within acceptable limits.	
7. Span Calibration	CO @ 10.00 ppm Module response was 8.95 ppm gain adjustment to 1.15 pass SO2 @ 0.2 ppm Module response was 0.210 ppm gain adjustment to 0.92 pass NO2 @ 0.2 ppm Module response was 0.090 ppm gain adjustment to 2.10 pass (module may need replacing soon contact Aeroqual)	
8 Pack up. Next scheduled calibration 3 months from now. June 2017.		

- [Record the results of this service activity in the monitor's journal.](#)
- [Exit service mode.](#)

For further support, contact [Technical Support](#).