



AirCheck ✓ Notebook

AeroTrak LPC Instructions

RENTAL PROGRAM:

A pre-paid label is included.

Rental Period: _____ Return Date: _____

Call for pick up no later than the above return date to avoid additional rental fees.

AeroTrak LPC: Operating Instructions

Warning



The AeroTrak LPC is a sensitive laboratory analytical instrument.

Do not connect to any compressed air or gas source that has not received a **passing Pre-Test** from Trace Analytics. Failure to follow this procedure may damage the instrument, invalidate any tests, and incur penalties, up to and including replacement of the instrument.

Do not run LPC tests without air flow. This can damage the instrument.

If you have questions, **STOP** and call Trace Analytics at **800-247-1024**.

The printouts and CSV data files received from this instrument (see *page 5*) and the Log Sheet are your record of testing results. If your purchase order included AirCheck Reports from Trace Analytics, return a copy of the Log Sheet with the Laser Particle Counter. Indicate which Log Numbers should be used to generate reports.

Inventory List

Please carefully check the inventory list below.

If any items are missing, **STOP** and call Trace Analytics at **800-247-1024** before proceeding.

- AeroTrak Laser Particle Counter
- High-Pressure Diffuser
- Power Cable and Adaptor
- (2) White LPC Background Filters
- (4) 1/4" x 5' Black Particle-Free Tubing
- (4) 5/8" x 3' Clear Particle-Free Tubing
- (2) Stainless Steel Background Filters
- (4) 1/4" Female NPT to 1/4" Tube Fitting
- Accessory Pack for quick connect

Not Provided: • Isopropanol, Semi-Conductor Grade • USB Flash Drive

Overview

1. Connect AeroTrak Laser Particle Counter (LPC) to an appropriate power source:

 -110V AC using the included power cable and adaptor.

Important: *Sampling outlet pressure must be a minimum of 40 psig and under no circumstances may it be higher than 100 psig.*

2. Perform the LPC Background Filter Test procedure (*see page 2*).

**note - LPC Background Filter Test must be performed at every sampling location.*

3. Attach the LPC to compressed air outlet using supplied fittings and tubing per the *Flow Diagram* below.

4. Perform the Tubing Background Test procedure (*see page 3*).

**note - Tubing Background Test must be performed at every sampling location.*

5. Perform Location Sampling (*see pages 4*), using the included Log Sheet.

6. Return all items to the shipping case, and return to Trace Analytics using the included shipping label.

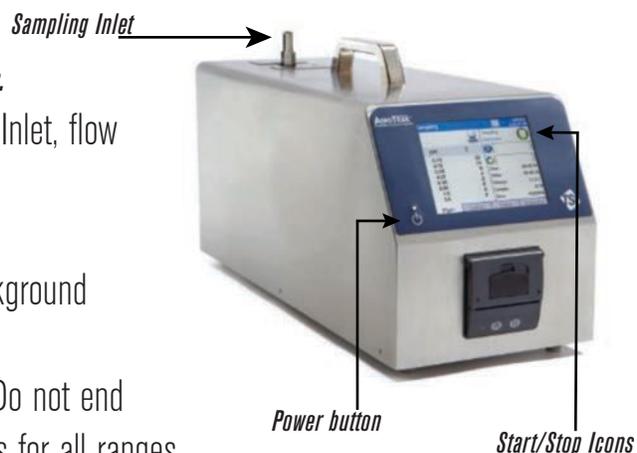


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LPC Background Filter Test

** This step ensures the AeroTrak is functioning properly and reads zero particles*

1. Remove black cap from LPC Sampling Inlet.
**Do not allow inlet to be uncovered for more than a few seconds.*
2. Attach White LPC Background Filter to LPC Supply Inlet, flow arrow pointing down. **Never touch inside the filter tubing*
3. Turn on AeroTrak by pressing the power button.
4. Press the Green Play icon  to begin LPC Background Sampling.
5. Unit will automatically run 5 consecutive samples. Do not end sampling until all data channels reach zero particles for all ranges.
If results are not near zero after the 5 samples, contact Trace Analytics.
6. When the instrument zeros for a full cycle, proceed to tubing background test.
7. Remove White LPC Background Filter and place in its anti-static plastic bag.
8. Replace the black cap to the LPC sampling inlet between tests.



Flow Diagram

- A. Stainless Steel Tubing Background Filter
- B. 1/4" OD Black Particle-Free Tubing
- C. High-Pressure Diffuser
- D. 5/8" Clear Particle-Free Tubing
- E. LPC Supply Inlet



Tubing Background Test

1. Set the point of use air flow for between 40-100 psi. Once set, close the sampling port.
2. Unscrew the black and silver caps from the stainless steel background filter. Attach the provided stainless steel background test filter to the sampling point. There are quick connects available for use if needed.

****Ensure the air flow arrow points away from the sampling point.***

3. Unscrew the silver caps from both ends of the black tubing. Attach one end of the black tubing to the stainless steel background test filter. Attach the other end of the black tubing to the high pressure diffuser on the side labeled "air inlet".



Tubing Background Test Cont.

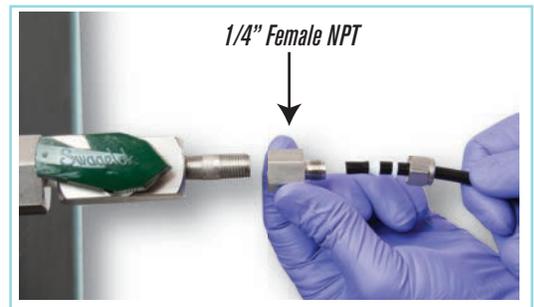
5. Attach one end of the clear hose to the open end of the high pressure diffuser. *Do not over tighten*
6. Attach the other end of the clear hose to the top of the LPC.
7. Open the sampling port (DO NOT EXCEED 100 PSI) **Air must be flowing before beginning the test.**
8. Press the play button to run tests. The unit will run 5 consecutive tests automatically. If you do not see 0 particles on all data points, replace tubing and repeat procedure. Follow decontamination procedures as needed.
9. Once the testing cycle reads 0 particles for all ranges, record completion on the Log Sheet.
10. Close the sampling port. Remove the stainless steel tubing background filter and replace the caps.
11. Mark the data sheet under "Background Tests Complete" before moving on to location sampling.

Point of Use Must Pass Pre-Test!!

Location Sampling

Point of Use Must Pass Pre-Test!!

1. Once the stainless steel background filter has been returned to its bag and placed in the case, attach the black tubing to the point of use.
2. Enter Sampling Location information onto log sheet.
3. Press green 'start' icon  to begin Location Sampling. 5 consecutive one-minute samples will be run.
4. Review results of multiple samples. Stop the test once results are consistent, and choose a end-time for reporting.
5. Close point of use and follow disassembly procedures. Replace all caps to hoses, high pressure diffuser, and LPC.
6. Print necessary data and then turn off AeroTrak by pressing and the power button.



Viewing Real-Time Sample Data

µm	Σ ft ³
0.10	2
0.15	0
0.20	0
0.25	0
0.30	0
0.50	0
1.00	0
5.00	0

1. Top Reporting Banner displaying location, date, run-time status, and current time.

2. Sampling Data Table displaying the particle size channels and related particle counts.

μ = particle size in μm .

Δ = number of particles detected of the specified size.

Σ = **cumulative** number of all particles detected of the specified size and larger

*See page 5 for instructions on interpreting data per ISO 8573-1.

Interpreting Printer Output

Inst Model Serial #	9110-01 91101946006	← The model/ID of the particle counter that produced the data.
Sample 1 of 5 Sample # 1		
Start Time	1/24/2020, 10:53:46AM	← A date/time stamp indicating the Start Time of the sample.
End Time	1/24/2020, 10:54:46AM	← A date/time stamp indicating the End Time of the sample, and the number of the sample.
Zone	None	
Location	Unknown	
Recipe	Default	
Sample Time	00:01:00	
Volume	28.3 L	← Volume: amount of air tested in liters
Instrument Status:	OK	
Particles / m ³ :		
Size	Cumul Alarm	
0.10	0	
0.15	0	
0.20	0	
0.25	0	
0.30	0	
0.50	0	
1.00	0	
5.00	0	
		← Columns: μ = particle size in μm . Note: Trace has pre-programmed the LPC to report particles/m ³
		← Particle Size Channels, indicating Number of Particles at that size, and Sum of Particles at the indicated size and larger.
Inst Model Serial #	9110-01 91101946006	
Sample 2 of 5		

Data Reporting



The printouts and CSV data files received from this instrument and the Log Sheet are your record of testing results. If your purchase order included AirCheck Reports from Trace Analytics, return a copy of the Log Sheet with the Laser Particle Counter. Indicate which Log Numbers should be used to generate reports.

Error Conditions

The AeroTRAK will indicate if it detects an operating condition that may prevent it from giving an accurate analysis.



- Blue Wrench Icon will appear if an operational error has occurred. *Contact Trace Analytics if this icon appears.*



- This icon will appear if there is insufficient flow through the instrument. *Contact Trace Analytics for troubleshooting if unable to achieve adequate air flow.*



- This icon will appear if the battery is very low. *Connect the AeroTRAK to the power source.*

Interpreting Data per ISO 8573-1:2010

1. ISO 8573-1:2010 Classes 1-5 specify Purity Classes for maximum number of particles, identified by particle size, maximum number of particles per m³. Confirm reading is in m³
2. Particle size ranges identified by ISO 8573-1:2010 are specified in microns (μ):
 - 0.1 < d ≤ 0.5 μm
 - 0.5 < d ≤ 1.0 μm
 - 1.0 < d ≤ 5.0 μm
 - >5.0 μ
3. The Sampling Data Table displays the particle size channels and related particle counts.
 - “Size” = particle size in microns.
 - “Cumul Alarm” = number of particles detected of the specified size.
4. To evaluate data according to ISO 8573-1:2010 specification, always use the Delta (Δ) column.
 - 0.1 - ≤0.5 μm = Δ column, add 0.1, 0.15, 0.2, 0.25, and 0.3 channels. In the example, there are 12,870 particles in this range.
 - 0.5 - ≤1.0 μm = Δ column, 0.5 channel.
 - 1.0 - ≤5.0 μm = Δ column, 1.0 channel.
 - ≥5.0 μm = Δ column, 5.0 channel.

Note: ISO 8573-1 states “where it is determined that there are particles with a size greater than 5μ, then the classification of 1 to 5 cannot be applied.”

Sample 1 of 5	
Sample # 1	
Start Time	1/24/2020, 10:53:46AM
End Time	1/24/2020, 10:54:46AM
Zone	None
Location	Unknown
Recipe	Default
Sample Time	00:01:00
Volume	28.3 L
Instrument Status: OK	
Particles / m3:	
Size	Cumul Alarm
0.10	0
0.15	0
0.20	0
0.25	0
0.30	0
0.50	0
1.00	0
5.00	0

ISO 8573-1:2010 Purity Classes Compressed Air Particle Contaminant Maximum Limits

Purity Class	0.1 < d ≤ 0.5 μm*	0.5 > d ≤ 1.0 μm	1.0 > d ≤ 5.0 μm	> 5.0 μ
1	20,000	400	10	0
2	400,000	6,000	100	0
3	-	90,000	1,000	0
4	-	-	10,000	0
5	-	-	100,000	0

Detecting and Correcting Sampling Equipment Contamination

Avoiding contamination from the environment

1. Keep the fittings (tubing plugs and device caps) in place when not sampling.
2. Keep the plugs and caps in a closed zip bag during sampling. Do not allow ambient particulate to accumulate on the fittings.
3. Keep sample path components in provided zip bags when not sampling.

Determine if contamination exists

1. If a low background cleanliness level is not required, it may be unnecessary to perform cleaning. As a guideline:
2. Run the LPC Background test (see [page 3](#)); the results should be zero for all particle ranges.
3. Run the Tubing Background test (see [page 4](#)); the results should be below those displayed below:

ISO 8573 Particle Class	Particle Size Range, μm	No. of Particles/ m^3	
		ISO 8573 Limit	Background Limit
1	0.1 - \leq 0.5	20,000	2,000
	0.5 - \leq 1.0	400	40
	1.0 - \leq 5.0	10	1
2	0.1 - \leq 0.5	400,000	40,000
	0.5 - \leq 1.0	6,000	600
	1.0 - \leq 5.0	100	10

4. If the Background Limits are exceeded, contamination may be a significant portion of the sample readings.

Cleaning air flow path components

Items needed for cleaning:

- \geq Isopropanol, semiconductor grade; must be purchased by you. e.g., Honeywell 17604, Sigma-Aldrich 40301
- Safe collection and disposal of isopropanol used in cleaning. While isopropanol is the primary component of rubbing alcohol, it should not be used without the appropriate safeguards. Consult the MSDS for the purchased isopropanol for safe handling.

Note Regarding the Matheson (Stainless Steel Tubing Background) Filter:

The only portion of the Matheson filter that will be contaminated is the point at which the 1/4" OD black tubing is attached. Clean by rinsing the external threads and throat with isopropanol from the wash bottle.

Hand-tighten the provided nut onto the threaded fitting.

Cleaning the Black Particle-Free Tubing

This includes both the 1/4" OD black tubing used to connect to the air outlet and the 5/8" OD tubing connected between the diffuser and the LPC.

1. Remove the stainless steel plugs from both ends.
2. Direct a stream of isopropanol inside the tubing.
3. Hand-tighten the plugs onto the end fittings.
4. Move the tubing so that the internal surfaces are thoroughly rinsed.
5. Remove the plugs and expel the isopropanol into a suitable container.
6. Repeat the rinsing procedure twice for a total of three.
7. With the two outlets facing downwards, allow the isopropanol to evaporate for about 30 seconds.
***wet or moist tubing shall NEVER be used. See isopropanol clear out**
8. Hand-tighten the plugs onto the tubing.

Isopropanol clear out before sampling

1. Assemble the sampling components EXCEPT do not attach the outlet end of the 1/2" OD black tubing to the LPC.
2. Connect the 1/4" OD black tubing to the compressed air supply.
3. Adjust the outlet pressure to 40-100 psig and allow the air flow to evaporate the isopropanol. This is accomplished when no liquid isopropanol is visible at the outlet of the 5/8" OD black tubing.

HPD II High Pressure Diffuser

After sampling a gas source with a high concentration of particles, it may be necessary to purge the diffuser with filtered gas to help remove contaminants in the system.

1. Remove the 1/4" OD black tubing from the LPC Supply Inlet.
2. With a length of clean 1/4" OD black tubing to the Matheson filter on the gas source, purge at up to 100 psig for as long as 10 minutes.

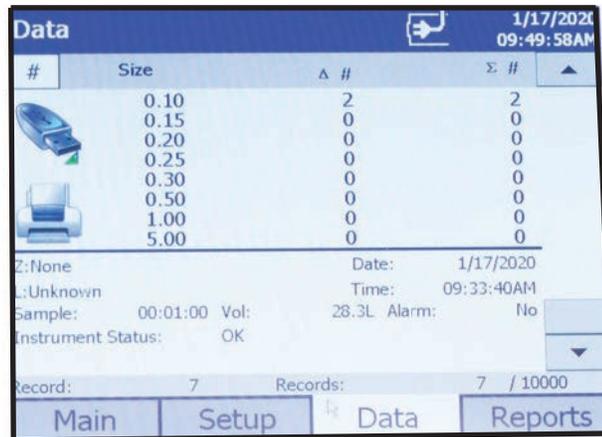
AeroTrak Laser Particle Counter (LPC)



NEVER ATTEMPT TO CLEAN THE LPC! Introduction of any liquid into the LPC will cause it to be inoperable and may cause irreparable damage to the sensing cell.

Printing a Selected Sample

1. From the main screen, press the tab that says *Data*.
2. Locate desired record numbers.
3. Click the printer icon.
4. Select the Zone to print, move over using the > carrot.
5. Select *Print*



Shipping

1. Return all caps to the equipment.
2. Replace all pieces into proper foam housing.
3. For return shipment, place LPC, High Pressure Diffuser and all pieces back into the custom case.
4. Include bubble wrap as needed and use the return shipping label to send back to Trace Analytics.