



Sunset
Laboratory Inc.

Model 4 Online OC/EC/eBC/BrC/TC Monitor

Near-real time results:

- Organic Carbon
- Elemental Carbon
- Black Carbon(eBC/Abs660nm)
- Real-time
- Brown Carbon(BrC/Abs405nm)
- Real-time
- Total Carbon



Notice

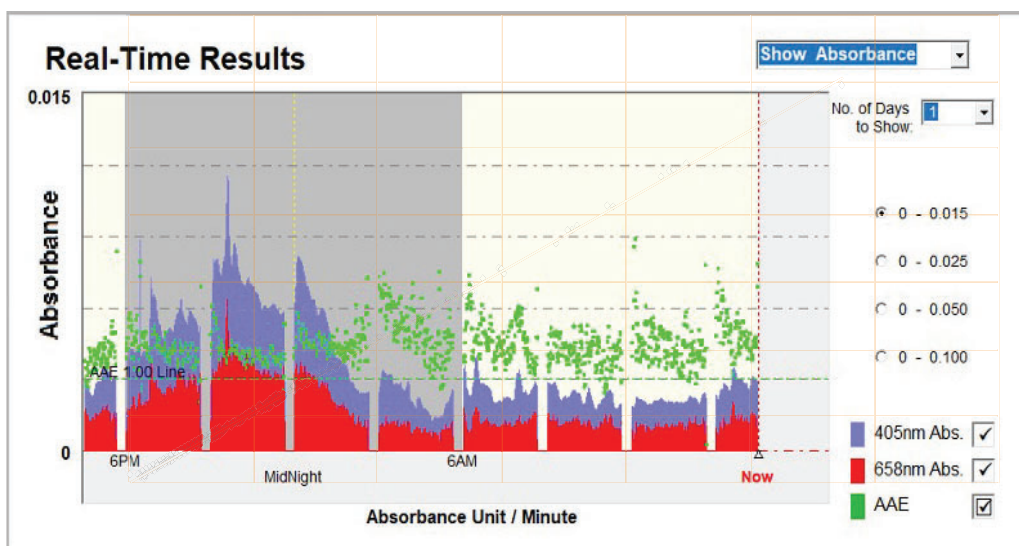
For further details about the Model 4 OC/EC/BC please contact us or one of our local representatives.

Contact details can be found on the Partners page of our web-site or we may be contacted directly.



Scan the QR code to visit
our website

Real-time optical measurements at 405nm and 660nm



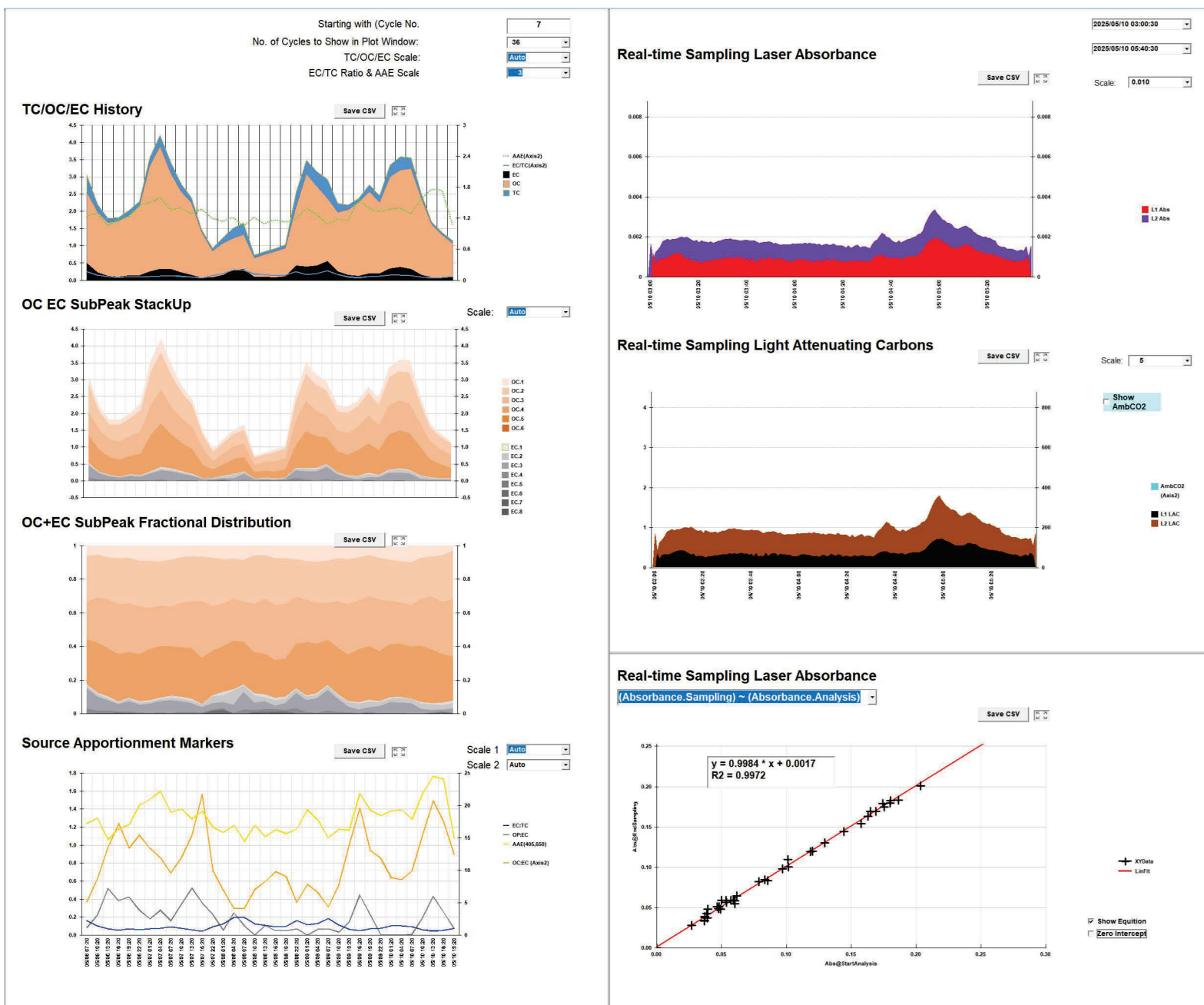
The Model 4 is the only U.S. EPA ETV verified Black Carbon Monitor (REPORT: EPA/600/R-14/308)

***Results verified by US-EPA ETV Testing to be equivalent to US-EPA Reference Method (less than +/-4%)



Real-Time & nReal-Time Source Apportionment

Real-Time 660nm & 405nm Absorbance

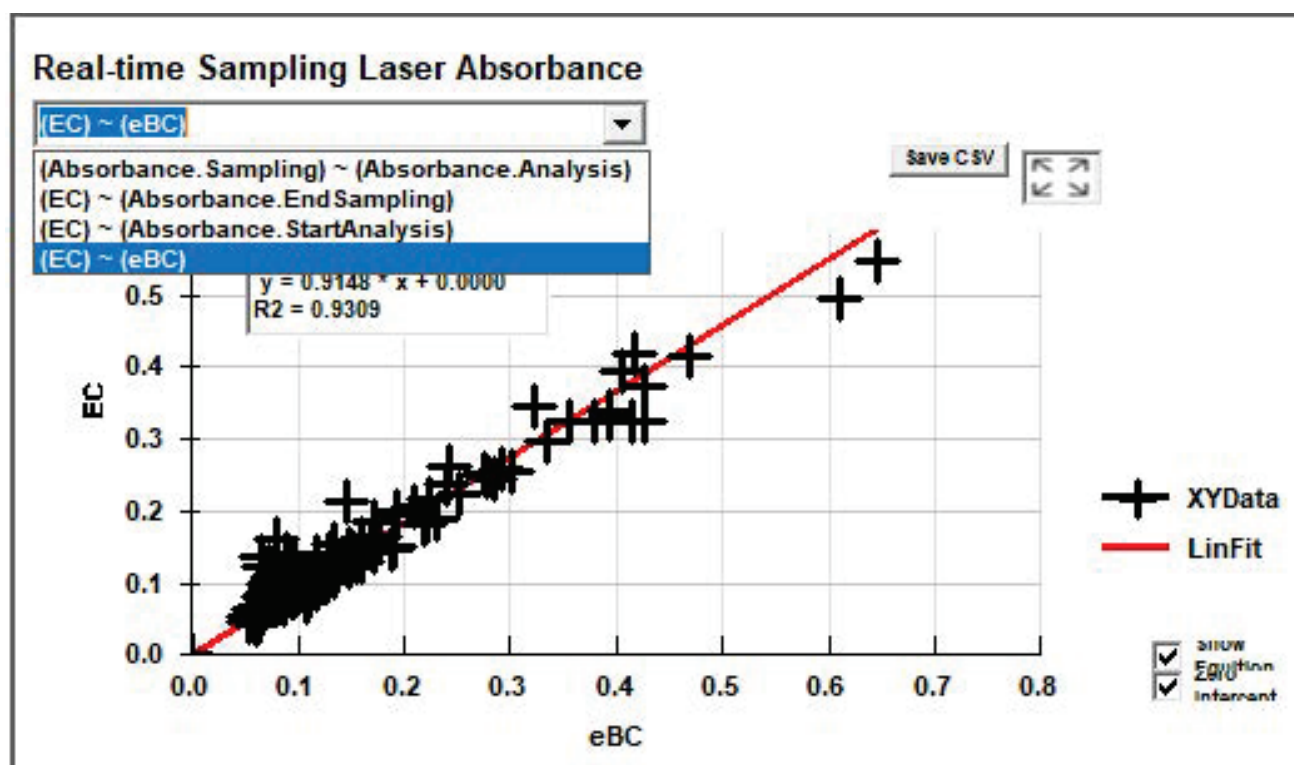


OC, EC, BC, and BrC Peak Fractions in Near Real-Time

*Software upgrades for older M4G units may be available, sans the 405nm data.
Please contact Sunset Lab for compatibility.

Elemental Carbon AND Black Carbon

- One instrument, One filter, One collection
- Both EC & BC Measurements and Correlations
- Easy-to-see EC and Absorbance Comparisons
- Compare EC and eBC from the same sample, time and location



Elemental Carbon (EC)	Black Carbon (BC)
Elemental carbon is the core of the soot particle. OCEC measurement either evolves off or pyrolyzes OC species.	Black carbon is the cumulative measurement of all light-absorbing particulate matter (LAPM) on a filter (quartz or Teflon), assumed to be carbon.
Measurement Type: Chemical	Measurement Type: Optical
Requires a carbon detector (FID or NDIR)	Carbon is assumed (not directly measured chemically)
Multiple accepted government methods (NIOSH 5040, EUSAAR-2, IMPROVE-A)	No universally accepted method
No reference standard for EC (many OC standards exist)	No reference standard
Near-real-time measurement possible	Particle size and morphology dependent
More sophisticated hardware required	Requires correction factor to compare to EC (via OCEC measurements)
Less interference at higher loadings (no loading effects)	Subject to optical/loading effects

Model 4 OCEC Instrument Specifications

Physical dimensions

1. 17" x 15" x 10.5" Standard Rack mount cabinet
2. Wt; approximately 35 pounds

Power Requirements

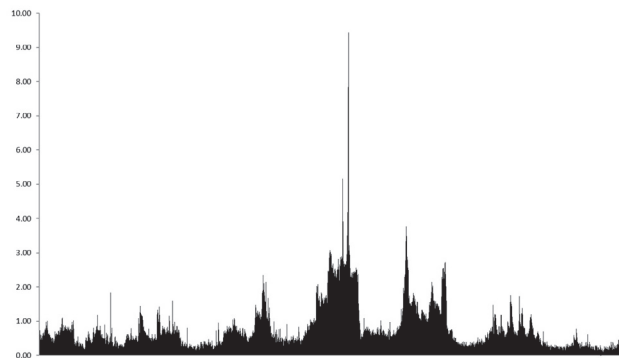
120 VAC/15 A or 220VAC/8A (Must specify at time of order)

Instrument Package Includes

- Model 4G OCEC Instrument
- Latest Version of Operation & Calculation Software
- Parallel plate denuder
- Sampling pump
- 2.5 μ m sharp cut cyclone
- Sample Inlet Installation Kit
- Controlling Laptop Computer w/ Windows 10 Professional, Operation and Calculation Software

Performance Characteristics – real time, semi-continuous operation with typical time resolution from 30 minutes to 24 hours

1. 8 LPM sample rate typical
2. Sample analysis time; 6 – 20 minutes depending on analysis method
3. Time resolution; depends on requirements, but 1 hour is typical for a single instrument application (80% or better sampling duty cycle)
4. Sensitivity and Detection Limit (LDL):
 1. Range: TC - 0.2 to 600 μ g/cm²
 2. Range: OC - 0.2 to 600 μ g/cm²
 3. Range: EC - 0.2 to 30 μ g/cm²
 4. Range: BC (ie. Opt_EC) - 0.05 to 30 μ g/cm²
 5. Limit of Detection - 0.10 μ g/cm²
 6. Limit of Detection for BC - 0.05 μ g/cm²



5. Measurement Range:

1. Range for 2 Hour Sample Cycle: OC - 0.2 to 100 μ g/M³
2. Range for 2 Hour Sample Cycle: EC - 0.1 to 20 μ g/M³
3. Range for 2 Hour Sample Cycle: BC - 0.06 to 34 μ g/M³
4. Limit of Detection for 2 Hour Sample Cycle: OC - 0.2 μ g/M³
5. Limit of Detection for 2 Hour Sample Cycle: EC - 0.1 μ g/M³
6. Limit of Detection for 2 Hour Sample Cycle: BC - 0.06 μ g/M³

Measurement Method (User Configurable)

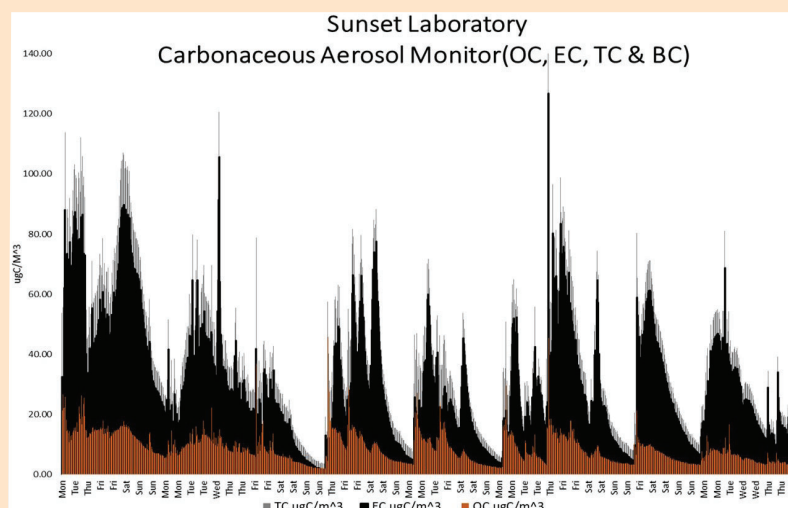
1. NIOSH 5040
2. EUSAAR2
3. Fast TOC with optical EC (BC)
4. IMPROVE-A temperature profile using TO/Transmission
5. User defined custom applications

Calibration

1. External Standard – Uses an external standard calibration gas. A fixed-loop volume of this gas is injected at the end of every analysis. All calculated results are referenced against this external standard.
2. Primary calibrations are referenced against sucrose solutions or NIST traceable gas standards. NIST traceable gas standards are USER provided and must be ordered separately if desired.

Support Gases to be supplied by customer:

1. He (99.999% or better) – Hydrocarbon and CO₂ < 1 ppm
2. 5% methane in Helium Balance – He (99.999%), Methane CP grade, certification to 2%.
3. 10% Oxygen in Helium Balance – (99.999% or better for both gases)



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