

# Air Quality

[www.campbellsci.com/air-quality](http://www.campbellsci.com/air-quality)

## Benefits of Our Systems

1. Meteorological measurements can meet EPA's PSD guidelines.
2. Compatible with a variety of third-party gas analyzers, visibility sensors, and particulate monitors.
3. Systems are compatible with continuous emission monitoring (CEM) sensors such as flow rate, opacity, temperature, and pressure.
4. Ability to monitor entire network of field stations from a single PC via wireless communications.
5. Station portability allows optimal siting—and relocation if necessary.
6. Powerful on-board instruction sets provide measurements and auto-calibrations specific to each gas analyzer and site.
7. A network of 20 stations can be polled every 60 s allowing real-time decision-making to satisfy public health concerns.
8. Systems can incorporate other measurements, such as water quality, slope stability, and leak detection.
9. Systems can monitor efficiency of pollution abatement systems.



*Gas and particulate concentrations, as well as meteorological conditions that affect air quality, can be monitored locally and regionally with a network of stations.*

Campbell Scientific's systems for unattended, long-term monitoring of air quality parameters provide unmatched reliability and versatility. Our systems measure meteorology, ambient gas and particulate concentrations, stack emissions, and visibility. Our equipment is in use at smelters, refineries, tailings, mines, landfills, construction sites, manufacturing and processing plants, and industrial and hazardous waste sites. Key components of our systems are dataloggers, sensors or analyzers, and communications devices, which can be customized for each site.

## Dataloggers

Our stations are based around a programmable datalogger that measures the sensors, then processes, stores, and transmits the data. Our low-power dataloggers have programmable execution intervals, wide operating temperature ranges, on-board instructions, and ample input channels for commonly used sensors. Wind processing algorithms, including the Yamartino method of computing standard deviation of wind direction, are standard in the datalogger instruction sets. Our dataloggers interface directly to most sensors, eliminating external signal conditioning.

Data are typically output in the units of your choice (e.g., wind speed in mph, knots,  $m s^{-1}$ ). Measurement rates and data recording intervals are independently programmable, allowing calculation of 15-minute, hourly, and daily data values from 1-minute or 1-second measurements, for example. Atypical events can trigger alarms and cause additional data to be recorded. The program can be modified at any time to accommodate different sensor configurations or new data processing requirements. Channel capacity can be expanded using multiplexers.



CR10X

## Sensors, Analyzers, and Monitors

Almost any meteorological sensor can be measured by our dataloggers, allowing stations to be customized for each site. Typical sensors used on our stations include, but are not limited to: wind speed and direction, solar radiation, delta temperature (SRDT), temperature (air, water, soil), relative humidity, precipitation, and barometric pressure. In some locations, hydrological sensors provide additional measurements, such as water quality of a nearby stream.

A wide range of gas analyzers can be used with our systems. Many gas analyzers output a user selectable 1, 5, or 10 Vdc signal proportional to the concentration of the gas being measured. The datalogger measures the voltage directly and then scales the voltage into the appropriate concentrations, in ppm or ppb. Control ports on the datalogger are programmed to open and close solenoids to complete the daily self-calibration. Commercially available gas analyzers measure concentrations of SO<sub>2</sub>, H<sub>2</sub>S, O<sub>3</sub>, NO<sub>x</sub>, NO, NO<sub>2</sub>, CO, CO<sub>2</sub>, CH<sub>4</sub>, and THC (total hydrocarbon).

The beta-gage type of particle sampler (PM10 or PM2.5) typically has a voltage output that our dataloggers can measure directly. Our dataloggers can also measure most flow sensors and opacity meters. On-board processing instructions use concentration and flow data to compute stack emissions.

## Data Retrieval

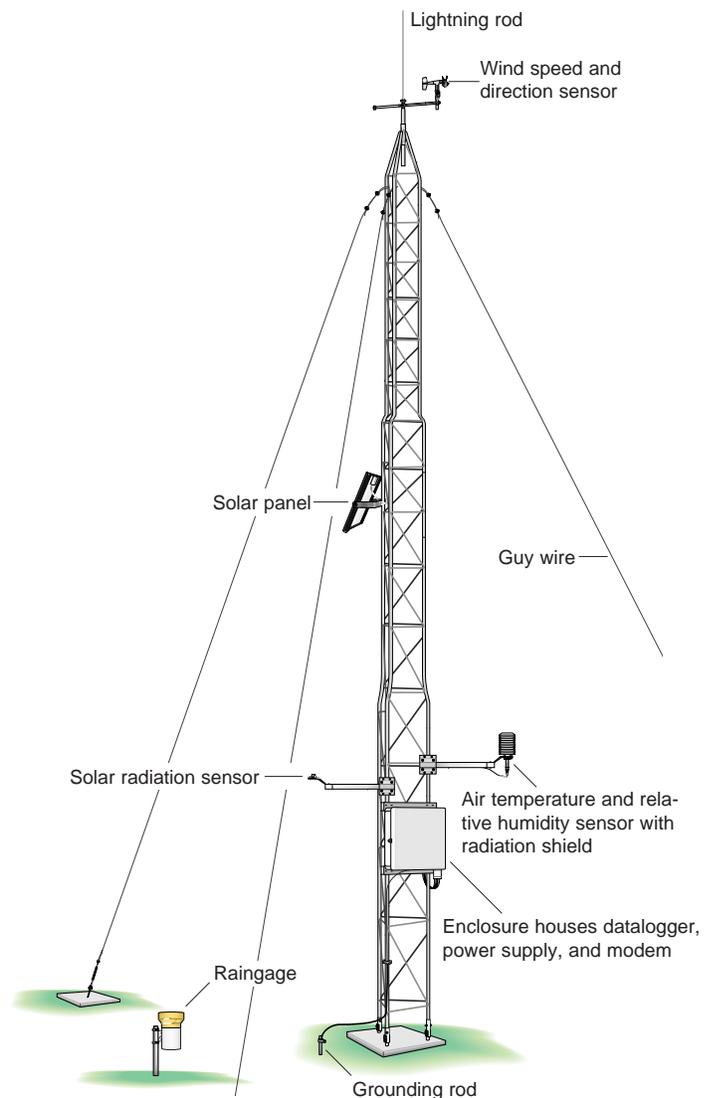
We offer multiple communication options for data retrieval which can be mixed within the same network. Telecommunication options include short-haul, telephone (landline, voice-synthesized, cellular), radio frequency, LAN, and satellite. On-site options include storage module, card storage module, and laptop computer.

## Software

Our PC-based support software simplifies the entire monitoring process, from programming to data retrieval to data display and analysis. Our software automatically manages data retrieval from networks or single stations. Robust error-checking ensures data integrity. We can even help you post your data to the Internet.



*This station, located in the Jarbridge Wilderness Area in Nevada, measures visibility as part of a long-term study to protect scenic views in U.S. parks and wildernesses.*



*Typical 10 Meter Tower Station*