

 **Met One Instruments, Inc.**

BAM 1020 Beta Attenuation Mass Monitor

**Now with Remote Desktop
Control and Touch Screen Display**

**More than 20,000 Met One Instruments
BAM 1020 Beta Attenuation Mass
Monitors have been sold to date.
The BAM 1020 provides unsurpassed
accuracy, reliability and simplicity.
This translates into better data quality
and lower cost of operation compared
to other commonly used mass monitors.**



Advantages

Technology

Beta attenuation mass monitors are indifferent to the chemical composition of the particulate matter whose mass density is being measured. As the name implies, beta attenuation mass monitors measure only mass. No assumptions concerning the physical or optical properties of the sampled particulate matter are necessary. Its sensitivity to diesel exhaust is no different than it is to Arizona road dust or to salt spray. This translates into reliable mass measurement any time at any place.

Reliability

The BAM 1020 has a field-proven record of reliability even in the most challenging environments and particulate concentrations.

Continuous Improvement

The Met One Instruments BAM 1020 has benefited from continuous improvement. Over time, functionality, performance and reliability have advanced.

The latest generation of BAM 1020 incorporates a new generation of microprocessor and advanced electronics allowing remote operation, enhanced communications and unsurpassed flexibility.

The BAM 1020 is directly compatible with our COMET Cloud data service.



BAM 1020 now has full remote desktop in addition to standard touch screen display.

Features

- US-EPA Equivalent Method for PM₁₀, PM_{2.5}, and PM_{10-2.5} monitoring
- Long term unattended remote operation of up to 60 days between site visits
- Full remote Desk Top Control using supplied COMET software
- Expanded optional meteorological sensor interface using Met One Instruments Multi-Measurement 7500 Protocol
- Very low operating costs
- Span check membrane standard
- Fast and easy field audits
- Bench top or rack mount operation in mobile or stationary shelters
- Rugged anodized aluminum, stainless steel, and baked enamel construction
- Highly accurate, reliable, and mechanically simple flow system
- Hourly filter advances minimize effects of semi-volatile compounds
- Advanced Smart Heater technology precisely controls sample relative humidity
- Integrated data logger allows the connection of up to two multi-parameter meteorological sensors
- Data retrieval through RS-232 or RS-485 serial ports using direct PC connections or digital data collection systems

Full Remote Operation and Touch Screen Display

Operation

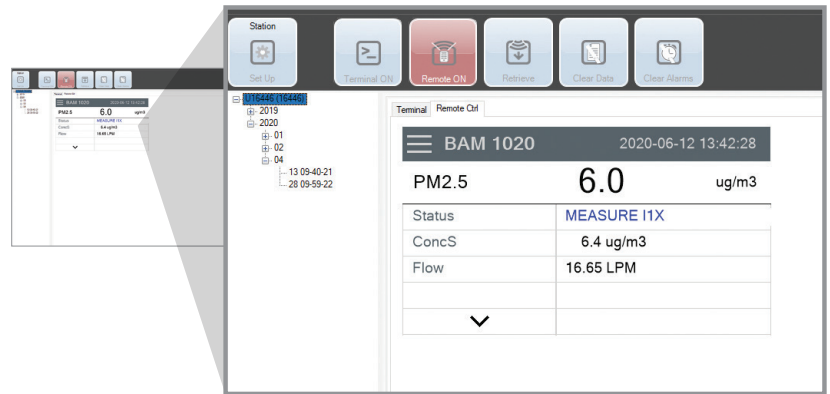
At the beginning of each sample hour, a small ¹⁴C (carbon-14) source emits a constant source of high-energy electrons (known as beta rays) through a spot of clean filter tape. These beta rays are detected and counted by a sensitive scintillation detector to determine a zero reading. The BAM 1020 then advances this spot of tape to the sample nozzle, where a vacuum pump pulls a measured and controlled amount of outside air through the filter

tape, loading it with ambient particulate matter. At the end of the sample hour, this dust spot is placed back between the beta source and the detector, thereby causing an attenuation of the beta ray signal which is used to determine the mass density of the particulate matter on the filter tape. The mass density and sampled volume are used to calculate the volumetric concentration of particulate matter in ambient air.

Touch Screen Display

Standard desk top capability allows operational checks, data validation and reporting from distant locations. Using the supplied COMET software control of the BAM 1020 is simple, which presents a graphical representation of the actual BAM 1020 screen display with full remote control.

The front door mounted high-visibility touch screen maintains all of the existing functionality of the previous generation of BAM 1020 in a modern, logical and intuitive format for easy menu navigation.



Language Options

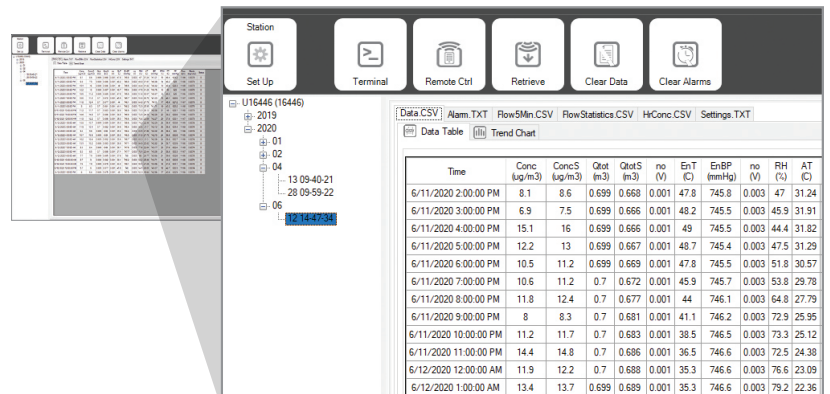
The BAM 1020 may be configured with English, Chinese, or other language operational screens and output reports.



Data Collection

All data files are accessible via an industry standard duplex RS-232 serial port using common terminal programs or Met One Instruments, Inc. software such as AirPlus®. The data is available in a variety of formats. Configuration files, error logs, and flow statistics are also available. Ethernet and USB data collection are standard.

The BAM 1020 is also fully compatible with our COMET Cloud service for cloud-based data collection, data display/monitoring and data storage.



Error Handling

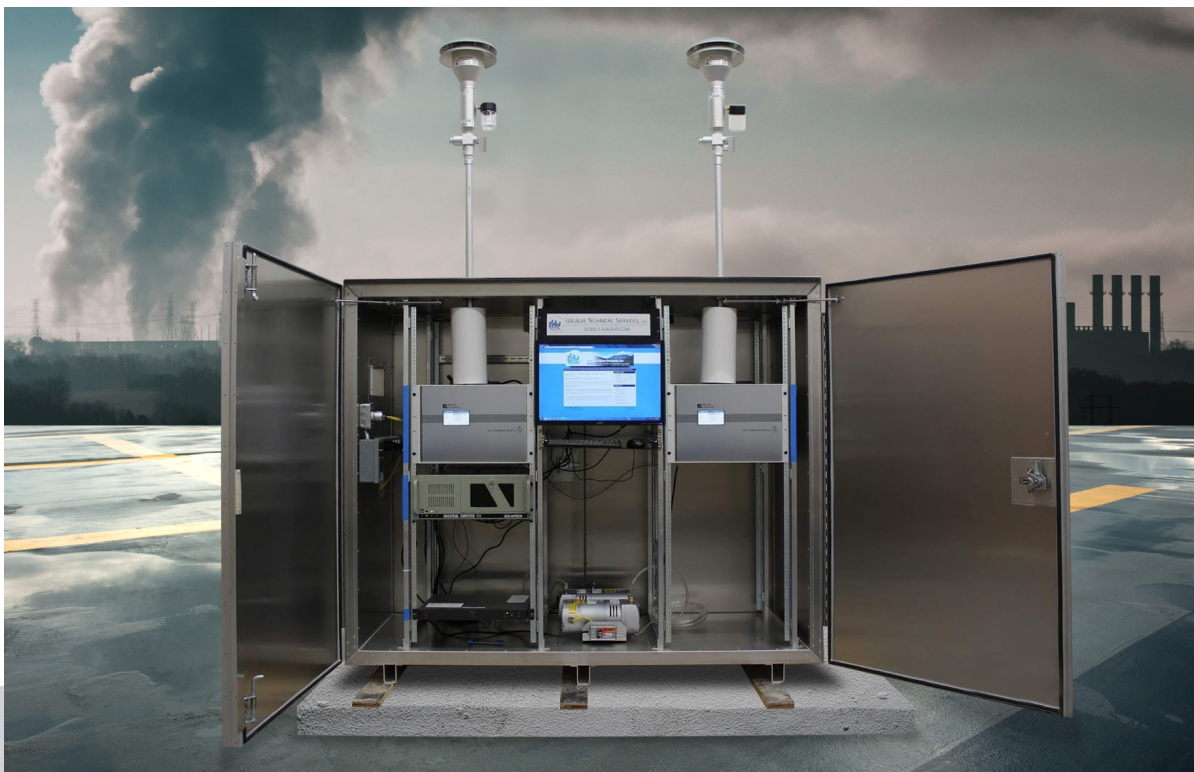
The BAM 1020 performs continuous evaluation of numerous criteria for data validation. These include flow statistics and a comprehensive set of error codes including power failures, flow failures, hardware failures, tape errors, nozzle errors, span check errors, beta count errors, and more.

Maintenance

The BAM 1020 is designed to run continuously for up to 60 days between site visits and maintenance. The BAM 1020 also contains a comprehensive self-test function which allows the unit to routinely test itself for any mechanical failures in the tape control system.

Standard Equipment

- Operation Manual and Quick Setup Guide
- Span Membrane
- Internal Flow Sensor and Flow Controller
- Internal Filter Temperature, Pressure, and Relative Humidity Sensors
- Serial Data Cable and Modular Power Cable
- Pump Control Cable and Air Tubing
- Rack Mounting Brackets and Hardware
- COMET Data Collection Software
- One Roll of 460180 Glass Fiber Filter Tape



Specifications BAM 1020 Beta Attenuation Mass Monitor

PARAMETER	SPECIFICATION
Measurement Principle:	Mass Concentration of Ambient Particulate Matter by Beta Attenuation
US-EPA Designations:	US-EPA PM ₁₀ Equivalent Method: EQPM-0798-122 US-EPA Class III PM _{2.5} Equivalent Method: EQPM-0308-170 US-EPA PM _{10-2.5} Equivalent Method: EQPM-0709-185
Range:	0 - 10 mg/m ³ (0 - 10,000 µg/m ³)
Analog Ranges:	0 - 0.1, 0.2, 0.5, 1, 2, 5, 10 mg/m ³ (others available)
Accuracy:	Exceeds all US-EPA designation requirements for PM ₁₀ , PM _{2.5} , and PM _{10-2.5}
Measurement Resolution:	0.1 µg/m ³
Instrument noise (1 hour):	Less than 2.4 µg/m ³ (less than 2.0 µg/m ³ typical). Auditable with zero filter test
Lower Detection Limit (2σ) (1 hour):	Less than 4.8 µg/m ³ (less than 4.0 µg/m ³ typical). Auditable with zero filter test
Lower Detection Limit (2σ) (24 hours):	Less than 1.0 µg/m ³ . Auditable with zero filter test
Measurement Cycle Time:	1 Hour (others available)
Flow Rate:	16.67 liters/minute. Actual flow
Filter Tape:	Continuous glass fiber filter, 30mm x 21m roll. > 60 day operation/roll
Span Check:	Manual; Automatic optional
Beta Source:	¹⁴ C (carbon-14), 60 µCi ±15 µCi (< 2.22 X 10 ⁶ Beq), Half-Life 5730 years
Beta Detector Type:	Photomultiplier tube with plastic scintillator
Operating Temp. Range:	0° to +50°C
Operating Humidity Range:	0-90% non-condensing
Humidity Control:	Actively controlled inlet heater module, 10% - 99% RH setpoint
Approvals:	US-EPA, MCERTS, CE, NRC, TUV, CNEMC, Korea
User Interface:	Graphic color touch screen display
Analog Output:	2 channels, voltage range 0-1 VDC, 0-2.5 VDC, 0-5 VDC
Serial Interface:	RS-232 2-way serial ports for PC or modem communications, USB
Contact Closure Specification:	1 channel, dry, Normally Open contact 12 VDC 0.5 A
Alarm Contact Closures:	Data Error, Tape Fault, Flow Error, Power Failure, Maintenance
Compatible Software:	Air Plus™, COMET™, HyperTerminal®
Error Reporting:	User-configurable. Available through serial port, display, and relay outputs
Memory:	14,000 records (1.6 years @ 1 record/hr)
Power Supply:	100 - 240 VAC, 50/60 Hz Universal input
Weight:	19 kg (42 lbs) without external accessories
Unit Dimensions:	H x W x D = 32 cm x 43 cm x 46 cm (12.5" x 17" x 18")

Specifications subject to change without notice.

BAM 1020 Accessories

The BAM 1020 must be configured with certain accessories in order to operate as a regulatory grade measurement device.

US-EPA PM₁₀ Equivalent Method (EQPM-0798-122)

- BX-801 Sample Inlet System with Support Braces
- BX-802 PM₁₀ Inlet
- BX-598 Digital Temperature Sensor or BX-597A Digital T, BP, RH Sensor
- BX-302 Valve Plus Hepa-filter or BX-305 Valve Only
- BX-827 (120 V) or BX-830 (230V) "Smart" Inlet Heater System



US-EPA PM_{2.5} Equivalent Method (EQPM-0308-170)

- BX-801 Sample Inlet System with Support Braces
- BX-802 PM₁₀ Inlet
- BX-808 "VSCC" PM_{2.5} Cyclone
- BX-597A Digital T, BP, RH Combination Sensor
- BX-302 Valve Plus Hepa-filter
- BX-827 (120 V) or BX-830 (230V) "Smart" Inlet Heater System

US-EPA PM_{2.5} Equivalent Method (EQPM-0715-266)

- BX-801 Sample Inlet System with Support Braces
- BX-802 PM₁₀ Inlet
- BX-809 URG PM_{2.5} Cyclone
- BX-597A Digital T, BP, RH Combination Sensor
- BX-302 Valve Plus Hepa-filter
- BX-827 (120 V) or BX-830 (230V) "Smart" Inlet Heater System

US-EPA PM_{10-2.5} Equivalent Method (EQPM-0715-266)

(Requires 2 BAM 1020 Monitors)

- BX-801 Sample Inlet System with Support Braces (2 Needed)
- BX-802 PM₁₀ Inlet (2 Needed)
- BX-808 "VSCC" PM_{2.5} Cyclone
- BX-597A Digital T, BP, RH Combination Sensor (2 Needed)
- BX-302 Valve Plus Hepa-filter
- BX-827 (120 V) or BX-830 (230V) "Smart" Inlet Heater System (2 Needed)



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