

Beta-Attenuation Mass Monitor

**BAM
1020**

Features:

- U.S. EPA Federal Equivalent Method for PM₁₀ and PM_{2.5}
- Long term, unattended remote operation
- Very low operating costs
- Data retrieval through RS-232 port
- Internal datalogger included which allows up to six additional air quality or meteorological measurements
- Automatic 'span' check once per hour
- Operates with Met One Instruments MicroMet Plus or Comet Software
- Data memory accessible from main menu

Met One Instrument's BAM-1020 beta attenuation mass monitor has U.S. EPA designation as a Federal Equivalent Method (FEM) for PM₁₀ (EQPM-0798-122) and PM_{2.5} (EQPM-0308-170) monitoring. It has corresponding certifications in the United Kingdom, Korea, and China for automatic monitoring and recording of PM₁₀ concentrations.

The BAM-1020 may be equipped with other optional sampling inlets. The BAM-1020 can also be configured for the monitoring of total suspended particulate (TSP).



The Model BAM-1020 Beta Attenuation Mass Monitor

The BAM-1020 is manufactured using a time-proven design offering its users the highest level of reliability, performance and agreement with the FRM. This design insures low maintenance and servicing costs, as well as minimal manpower requirements for its routine operation.

Operation

The BAM-1020 is controlled by an advanced microprocessor system that makes it fully automatic. At the beginning of

the sampling period, beta ray transmission is measured across a clean section of filter tape. This section of filter tape is then mechanically advanced to the sampling inlet. Particulate matter is then drawn into the sample inlet and deposited on the filter paper. At the completion of the sampling period, the filter tape is returned to its original location and the beta ray transmission is re-measured. The difference between the two measurements is used to



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determine, with exceptional accuracy, the particulate concentration.

The mass density is measured using the technique of beta attenuation. A small ^{14}C beta source (60 μCi) is coupled to a sensitive detector that counts the emitted beta particles.

The filter tape is placed between the beta source and the detector. As the mass deposited on the filter tape increases, the measured beta particle count is reduced according to a known equation.

Design & Construction

The Filter Tape Transport System is based upon a design that has been used for over two decades in Japan. The transport reflects the quality and precision of superior design. Responding to the requirements of current data validation requirements, an improved electronic measurement system was developed using the microprocessor controller and data logger. All operations of the unit are displayed with the 8 line by 40 character display.

An RS-232 serial interface is used for data transfer and instrument operations status. This interface is often used with modem for remote communications.

A second output-only port may be used with a printer or computer. Output may be set for data printout or one of two diagnostic modes.

Analog voltage or current outputs of concentration values with special error coding and contact closures for error conditions are included.

Data Validation

The BAM-1020 is always evaluating its operation to ensure highest confidence and the highest quality data recovery of any unit of its type. The user may select various criteria for data validation, including flow statistics, power failures, and error codes. An error log is maintained with the date, hour and type of error. These data are available during routine data recovery.

For the benefit of users not using the serial port, the analog output informs the user that the BAM-1020 has a question about data or operation. The operator may then use the optional modem connection to verify diagnostics or a computer to interrogate the error log during the next site visit.

Span Check

Reliable, accurate measurements are assured with the automatic span check conducted each cycle. Should the instrument fail to perform to specification an error is logged in memory and data is flagged. Span measurements are made by an automatic insertion of a reference membrane in the measurement path each hour.

Specifications

Range:	0-.1, .2, .25, .5, 1, 2, 5, 10 mg/m^3
Cycle:	1 hour
Detection Limit:	1 $\mu\text{g}/\text{m}^3$ on 24 hrs 5 $\mu\text{g}/\text{m}^3$ on 1 hour
Resolution:	$\pm 1 \mu\text{g}/\text{m}^3$
Accuracy:	$\pm 8\%$ of indication for 1 hour mode, $\pm 2\%$ compared to FRM for 24 hour mode
Beta Source:	^{14}C , 60 μCi
Filter Tape:	Continuous Glass Fiber Type
Flow Rate:	0-20 SLM user adjustable
Data Storage:	200 days (1 hour sample)
Power:	100-230 VAC, 50/60 Hz
Temperature Range:	-30°C to $+60^\circ\text{C}$ (0-90% RH, Non-condensing)
Dimensions (mm)	310(H)x430(W)x400(D)

