

# Model 1304 Opacity Monitor

THE EMS 1304 Opacity Monitor Is a High Performance Opacity Monitoring System with Double-Pass Transmissometer. Meets or exceeds the 40 CFR 60 appendix B, PS-1 and ASTM D 6216

**High Performance Opacity Monitoring System** with Double-Pass Transmissometer does not have to mean complicated -[The Model 1304](#) uses field proven and time tested optics and circuitry that is simple yet accurate. Each monitor and all its components are of the highest quality, pre-tested at the factory to your site specifications. The simple to follow instructions will have your monitor ready for service in hours after mechanical and electrical installation has been completed.

EMS has taken the approach to design equipment with accuracy, maintenance and serviceability as the most important features. The EMS 1304 Opacity monitor is designed with state of the art modular packaging with serviceability in mind.



A built-in TTL (through-the-lens) alignment system. The alignment target can be viewed through a window on the transceiver. Adjustments to changes in alignment are by a 3-point alignment system that is integral to the air plenum. This insures optimum reliability while enabling the system to be easily serviced and maintained in the field by plant service personnel.



**Service module with digital display-** The service module located in the S.S. Weather cover is used to pass signals to and from the transceiver and control unit, display opacity via digital meter, initiate maintenance zero and span cycles and insertion of external current meter in the transceiver to control unit 4-20mA loop. The

service module is very useful for trouble shooting or during EPA audits as the correlated opacity can be displayed on the DPM. This feature eliminates the necessity for a second person and sometimes-difficult communication between the control unit and the sensor locations.

### **Swing Away Sensor**

The swing away sensor makes cleaning the windows a breeze. Both sensors have alignment pins to assure no change in alignment after the sensors have been open and closed. S.S. heavy-duty latches make for an air and water tight seal. The sensors are attached to the air plenum by two drop on pivot pins. This makes for easy installation and should service ever be required easy removal, just swing open and lift off the pivot pins.

### **Scope of Supply**

- Measuring head
- Reflector
- Stack Service module with display
- Remote display and operating panel
- 1 air purge fan
- Other options available

MODEL 1304 OPACITY MONITOR COMES WITH MANY STANDARD FEATURES :

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- Digital display: instant % Opacity, average % Opacity and time to next cal
- Alphanumeric display for system set up & fault diagnostics display in English
- 3 Bar graphs: instant opacity, average opacity and window dust.
- Communications: Modbus (RS-485 )
- Sensor location service module: digital display for % correlated Opacity, T2, manual zero & span initiate and transceiver current loop test jacks.
- Insensitive to ambient light, Double pass optical system, Thru the lens (TTL) alignment
- Electronic modulated light source rated for >6 years. Replaceable without removing the transceiver from the stack.
- Calibration cycle control: remote, manual and timed.
- System & fault diagnostics display in English

# 1304 Opacity Specifications

Environmental Monitor Service, Inc.

## Remote control unit:

Numeric Digital Display 5/8 inch (15.9 mm), 4-digit LED	Selectable for Instantaneous opacity, Average Opacity. Optional mg/m <sup>3</sup>
Opacity range and resolution	-5 to 100% opacity, 0.1% Opacity (mg/m <sup>3</sup> optional)
Alphanumeric 8 character LED (0.2") Fault Display	Air purge low, No Stack Power, T2 4-20 Lost/low, Maintenance Mode, Window Dust, Zero Cal Fail, Span Cal Fail, Manual Cal.
Bargraph	Left/Right: 51 segments LED (5.1") for instant/average opacity. 20 segment LED (2.1") for window dust and drift in %opacity
Operator Indicating LED's	Run, Alarm, Operate, Cal in progress
High Opacity Set Point	0-100% of full scale
High Opacity Delay	Adjustable 0-300 Seconds
Hi Opacity Alarm Reset	Automatic
Open Transistor Collector Outputs	Four selectable
Dry Contacts	Two selectable (option: two additional)
Instantaneous Opacity and Average Outputs	4-20 mA grounded reference, 800 ohms max. (two additional optional) Note: at -5% opacity outputs go to 3.2mA. to meet ASTM and PS-1 specifications.
OPLR (Exit Correlation Lx / 2*Lt)	0.3 to 3.0
Cal cycle initiate	Local, remote and timed Adjustable 1 to 24 hours
Enclosure	NEMA 13, Height: 7.38" x Wide: 3.00: x Depth: 7.75", Weight: 6 lbs.
Ambient Temperature Range	+0° to +50° C ( +32° to + 122° F)
Power Requirements	120 VAC (+/- 10%), 50/60 Hz, 22VA
Network	Protocol: Modbus (ASCII or RTU mode), type RS-485, optically isolated, RS-232 with telephone modular handset connector.
Configuration	Speed: 1200-38,400 baud, type RS-232 and RS-485

## Transceiver Service module:

Display	5/8 inch (15.9 mm), 4-digit LED, selectable for % Opacity and % Transmittance
Local zero/span	Manual on demand
Test jacks	Transceiver to remote control current loop
Diagnostics	Loss of power, Current loop open, maintenance mode.

## Transceiver/ Reflector:

Enclosure	NEMA 4 watertight enclosure.
Path Length	2 to 15 feet, 0.6 to 4.6 meters. Longer available
Optical System	Double Pass
Light Source Aging Compensation	Automatic
Light Source Life	> 6 years, Field replaceable without removal of the transceiver from the stack.
Ambient Temperature Limits	-4° to +130° F (-20° to +54° C) (Cold weather option available.)
Alignment Verification	Passive Built-in through-the-lens system
Mounting Flanges	3 inch IPS, 150# pipe flange
Ambient Light Immunity	Per ASTM D6216 <2% opacity, Solid-state electronic light modulation

<b>Design and performance:</b>	<b>Meet or exceeds 40 CFR 60 appendix B, PS-1 and ASTM D 6216-03</b>
Peak and Mean Spectral Response	Photopic; 515 to 585 nm, less than 10% of peak response outside 400 to 700 nm
Relative spectral response	<10%
Angle of View	< 4.0° from optical axis
Angle of Projection	< 4.0° from optical axis
Calibration Error/accuracy	+/- 1% of full scale
Response time	< 10 second
24 Hour Zero Drift	< 0.5%
24 Hour Calibration Drift	< 0.5%
Operational Period	In excess of PS-1 required 336 Hrs.
Zero/Span Calibration	Manual or automatic with zero mirror and neutral density filter
<b>Measurement Medium Conditions:</b>	
Gas Composition	Not Critical
Static Pressure	Single blower: -10 to +5" of H <sub>2</sub> O ; Dual Blowers: -15 to +15" H <sub>2</sub> O
Humidity	Must be Non-condensing
Process gas	Up to 750° F (400° C), standard (higher available-contact factory)

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