

EMS WATCHDOG PS-1 COMPLIANT OPACITY/DUST MONITOR

The EMS WatchDog PS-1 provides continuous, low maintenance, precision measurement of Opacity and Dust (mg/m³). It is designed for monitoring visible smoke in the exhaust gas of industrial combustion or air filtration processes.



Manufacturing and Servicing Opacity & Dust Monitors Since 1990



**Environmental Monitor Service, Inc. PO Box 4340, Yalesville, CT 06492
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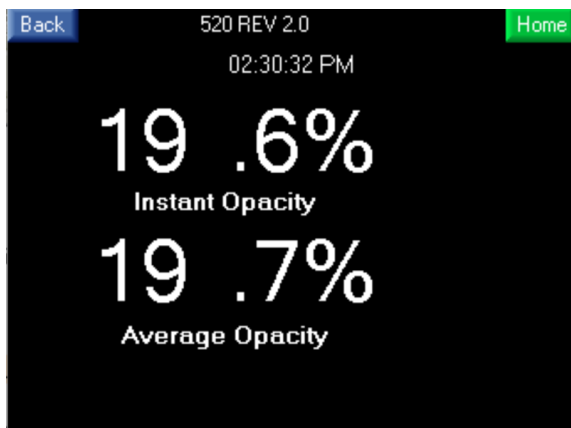
EMS WATCHDOG PS-1 OPACITY & DUST MONITOR



Shown with Optional 5.7" Controller

Key Features

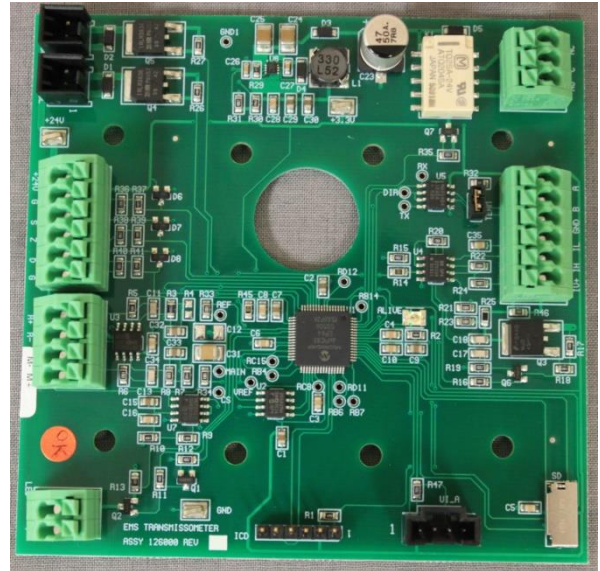
- ✓ ASTM D 6216 and 40 CFR 60 PS-1 Compliant
- ✓ Microprocessor Controlled
- ✓ RS485, Modbus Communication, Optional Ethernet and Wireless
- ✓ Dual beam measurement with Green LED Source
- ✓ Standar 4.3" Color Touch Screen User Interface
- ✓ 5 Numerical and 3 Trend Display Screen Choices
- ✓ User Selectable Output Definition of % Opacity, Dust or Optical Density.
- ✓ Automatic (Internal or External) and Manual On-Line Calibration
- ✓ Multiple Levels of Password Protected Settings and Diagnostics
- ✓ Meets PS-11 requirements



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System and Measurement Principle

The EMS WatchDog PS-1 system consists of an optical transceiver mounted on one side of the stack and a retro reflector mounted on the other. The LSEM (LED Source Electronic Modulation) measurement beam is projected across the stack to a retro reflector, which reflects it back across the stack. The output of the transceiver is sent to the touch screen user interface via Modbus RS485 where the signal is analyzed and displayed. This intuitively designed controller includes five selectable displays and four 4-20mA outputs.



Transceiver Microprocessor Board

Applications

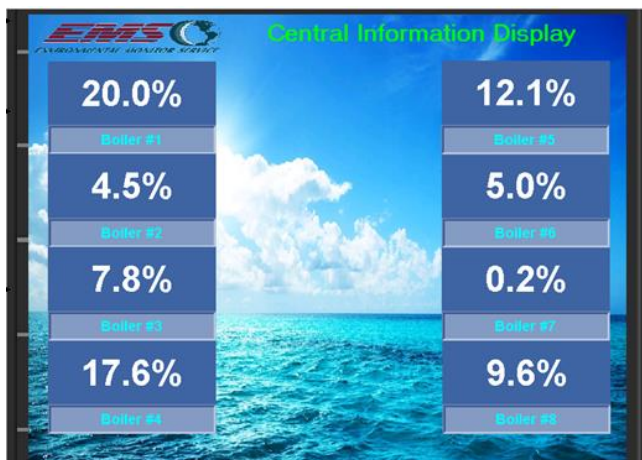
- ✓ Power Plants
- ✓ Boilers
- ✓ Electrostatic Precipitators
- ✓ Filter Bag Houses
- ✓ Refineries
- ✓ Cement Plants
- ✓ Combustion Furnaces
- ✓ Process Industries



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Smart Service Module (SSM)

The newly developed **Smart Service Module** is located inside the stainless-steel weather cover and utilizes Modbus communication over RS485 (2 wire) cable connected to the transceiver and control unit. Many of the control unit functions are accessible at the sensor location. This service module is useful for trouble shooting, PM/Audits and setup. It also eliminates the necessity for a second technician at the mounting location



Central Information Display (CID)

Optional Accessories/Services

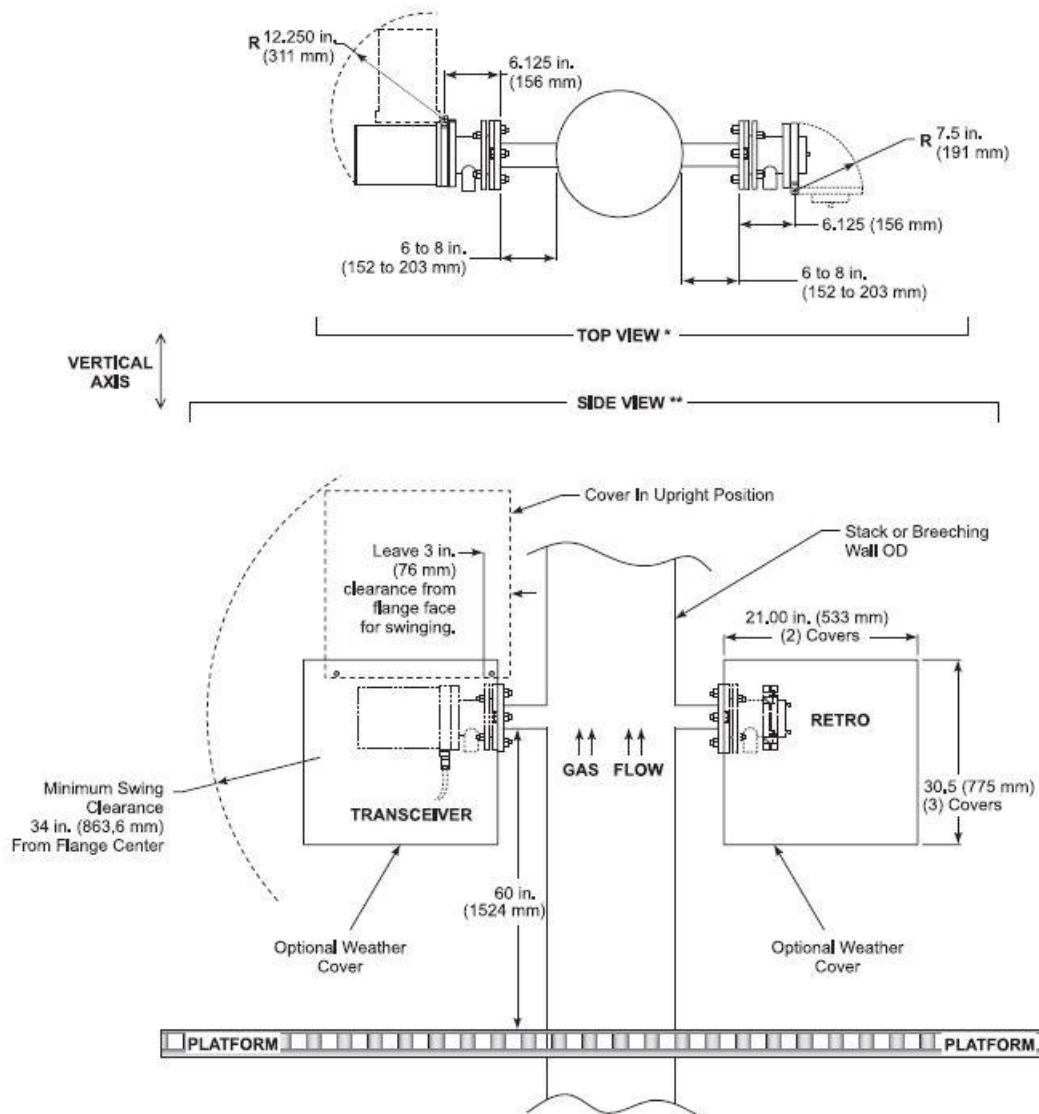
- ✓ Stainless Steel Weather Covers
- ✓ Customizable CID (Central Information Display)
- ✓ Wireless Communications
- ✓ Custom Engineering
- ✓ Startup and Certification
- ✓ Procedure 3 Required Off-Stack Zero Kit
- ✓ Certified Neutral Density Filter sales and calibration
- ✓ Flange Adapters

PS-1 Transceiver/ Reflector Specifications:	
Enclosure	NEMA 4 watertight enclosure.
Sensors	NEMA 4 Anodized Aluminum
Path Length	Distance dependent.
Optical System	PS-1 Double Pass, LED
Reflector	Distance dependent.
Light Source Aging Compensation	Automatic
Light Source Life	62,000 hours (> 7 years) Field replaceable
Ambient Temperature Limits	0 to +130° F (-17 to +54° C) (Cold weather option available).
Process Gas	Up to 750° F (400 ° C),
Alignment Verification	Built-in through-the-lens system standard
Mounting Flanges	3 inch IPS, 150# flange. Others available.
Ambient Light Immunity	Solid-state modulation (Meets ASTM D6216)

Design and performance: Meet or exceeds 40 CFR 60 appendix B, PS-1 and ASTM D 6216	
Spectral Response	Peak 500 to 600nm, less than 10% of peak response outside 400 to 700 nm.
Angle of View/Angle of Projection	AV <4°, AP <4°.
Calibration Error/accuracy	+/- 1% of full scale
Response time	< 10 second
24 Hour Zero/Calibration Drift	< 0.5% / < 0.5%
Operational Period	In excess of 336 Hrs.
Zero/Span Calibration	Manual or Push button for automatic gain, LED, Zero,Span and linearity calibration
Process gas	Up to 750 ° F (400 ° C) standard, higher available-contact factory.

EMS PS-1 WatchDog Specifications:		Environmental Monitor Service, Inc.	
Enclosure Cut Out	IP65/NEMA4X (when panel mounted), 91x122.5mm (3.6" x 4.8"). Power 24Vdc +/- 10%.		
Sensors	NEMA 4 Anodized Aluminum		
EMS provided 24Vdc Supply	Input: 90-240 VAC, 50/60 Hz, 0.55 amp +10%		
Color Graphic Display	4.3" Viewing area, LED Backlight		
Approvals	CE, UL, cUL		
Measurement Ranges	-5 to 99% Opacity		
Display Resolution	0.1 for Opacity		
Process Display screens	Selectable Display pages.		
Battery back up	7 years typical at 25°C		
4-20mA Outputs	Two (2), 800 ohms max individually customer selected F.S. ranges and modes.		
Relay Contacts	6 relays for alarms, Field programmable.		
Alarm Reset	Automatic and manual.		
Cal cycle initiate	Manual on demand, Remote initiated or Internal Clock.		
Opacity Exit Correlation (Lx / 2*Lt)	0.3 to 1.0		
Environment	Operational temperature 0 to 50°C (32 to 122°F).		
Network	Protocol: MODBUS (ASCII or RTU mode), type RS-485		

WatchDog Smart Service Module (SSM) Specifications:		Environmental Monitor Service, Inc.
Enclosure	Stainless Steel when in EMS WC, NEMA 4X plastic when stand alone.	
Graphic Display	1.5x2.25" Viewing area, LED Backlight	
Approvals	CE, UL, cUL	
Network	Protocol: MODBUS type RS-485.	
RCU Display Resolution	0.1 for Opacity RCU, mg, 0.01 O.D. with DUST RCU	
Process Display screens	Local display for, Sensor data, Service selections, Fault displays.	
Home Screen Navigation with touch keypad for data entry	Information and user interface for Calibration.	
Battery back up	Memory held 7 years typical at 25°C	
Cal cycle initiate	Manual push button	
Environment	Operational temperature 0 to 50°C (32 to 122°F)	
EMS provided 24Vdc Supply	Input: 90-240 VAC, 50/60 Hz, 0.55 amp +10%	
2-wire to EMS Control Unit (RCU)	RS485 Modbus to Control Unit	



***Note 1:** The top view represents the transceiver and retro reflector assemblies with their swing clearances. Optional weather covers are not shown.

****Note 2:** The side view represents the installation and swing clearance dimensions for the optional weather covers.