

# EMS520 PS-1 COMPLIANT OPACITY/DUST MONITOR

*The EMS520 provides continuous, low maintenance, precision measurement of Opacity and Dust (mg/m<sup>3</sup>). 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**



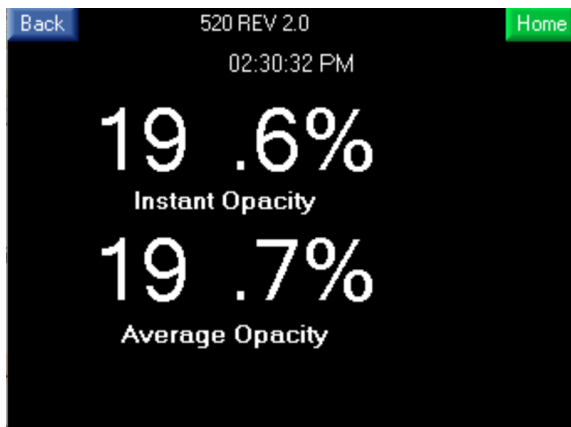
**Environmental Monitor Service, Inc. PO Box 4340, Yalesville, CT 06492**  
**Ph. 203.935.0102, Fax 203.634.6663 Email: sales@emsct.com**

# EMS520 OPACITY & DUST MONITOR



## Key Features

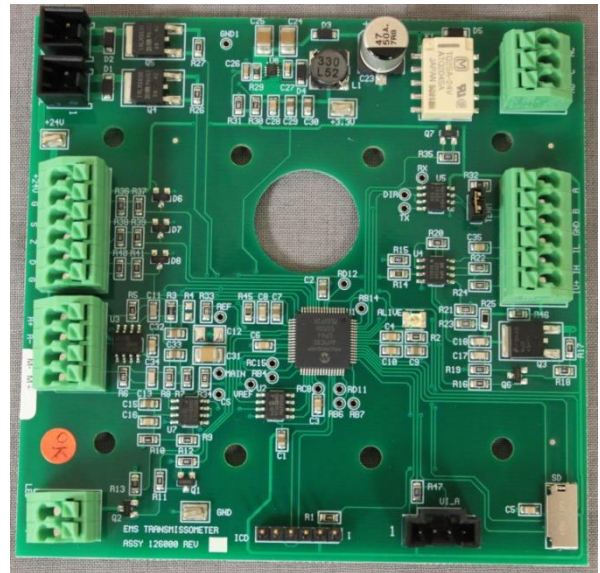
- ✓ ASTM D 6216 and 40 CFR 60 PS-1 Compliant
- ✓ Microprocessor Controlled
- ✓ RS485, Modbus Communication, Optional Ethernet and Wireless
- ✓ Dual beam measurement with Green LED Source
- ✓ 5.7" Color Touch Screen User Interface
- ✓ 5 Numerical and 3 Trend Display Screen Choices
- ✓ User Selectable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



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## *System and Measurement Principle*

The EMS520 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 an option for four 4-20mA outputs.



Transceiver Microprocessor Board

## *Applications*

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

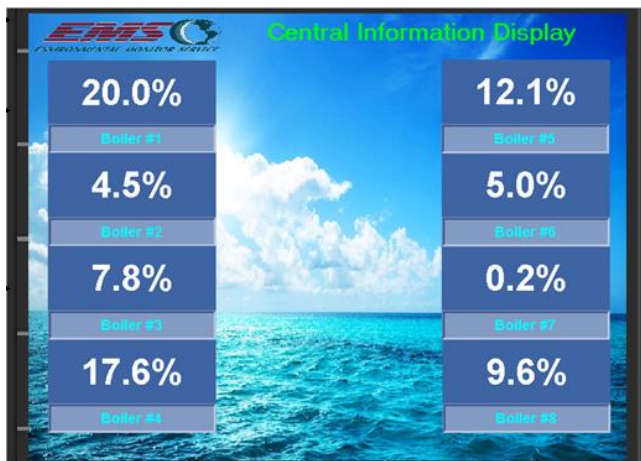




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## Smart Service Module (SSM)

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

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

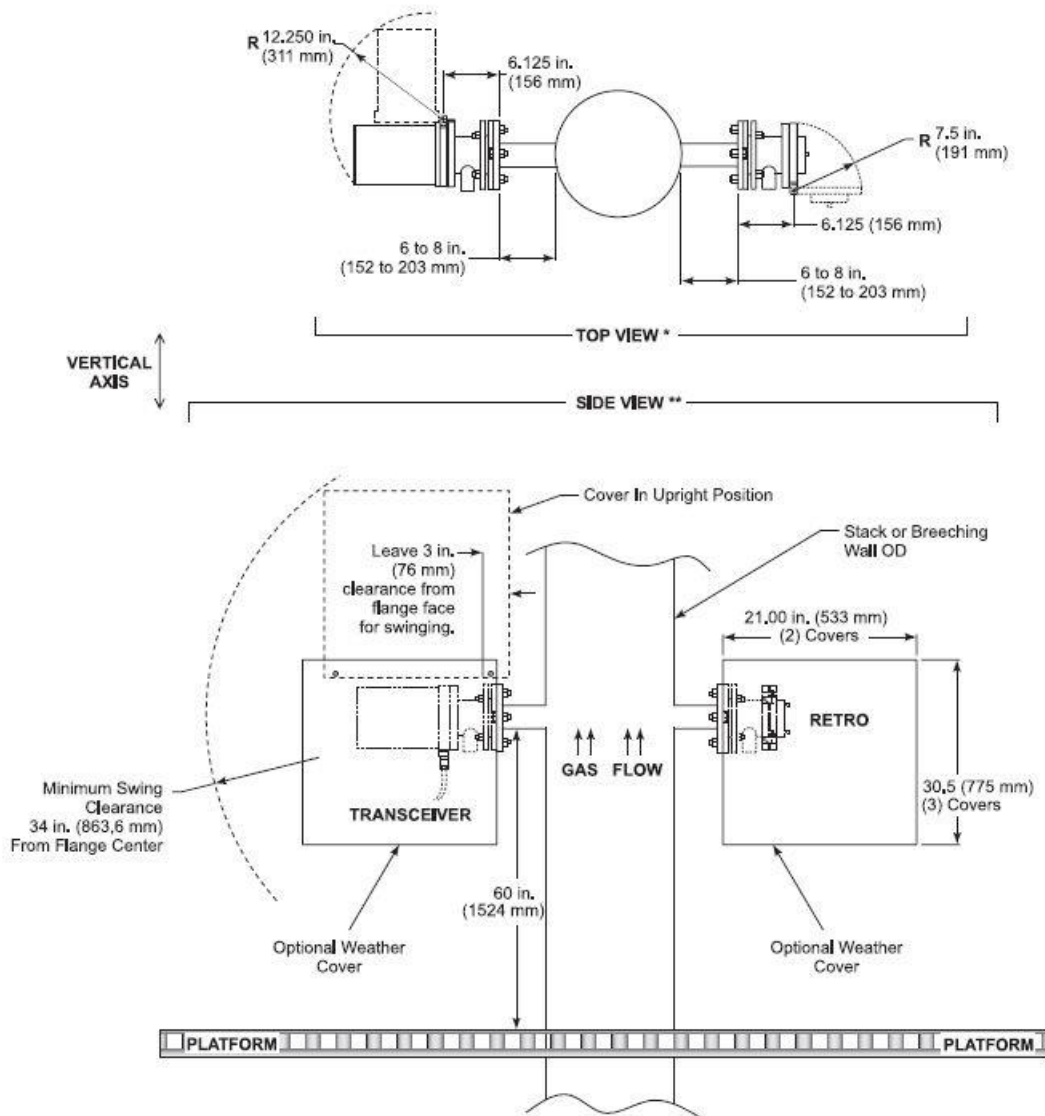
<b>Severe Weather Cover:</b>	
<b>Material</b>	<b>308 Stainless Steel</b>
<b>Quick release pins</b>	<b>2 for bottom and 2 for top release.</b>
<b>Mounting</b>	<b>3 inch IPS, 150# flange. Others available.</b>
<b>Standard Blower</b>	<b>Single phase, 110/220VAC 50/60Hz</b>
<b>Max stack pressure</b>	<b>+/- 5-inch WC, with the proper installation of purge blowers.</b>
<b>Wind Speed</b>	<b>&lt; 60 mph</b>
<b>Ambient temperature limits</b>	<b>-40°F to 130°F (-40°C to 54°C)</b>
<b>Protection for</b>	<b>Transceiver and Retro-reflector components; purge blowers.</b>

<b>EMS520 Opacity/Dust Control unit:</b>		<b>Environmental Monitor Service, Inc.</b>	
<b>Enclosure</b>	<b>IP65/NEMA4X (when panel mounted), 197x146.6x68.5mm (7.75" x 5.77" x2.7").</b>		
<b>Graphic Display</b>	<b>5.7" Viewing area, 256 color, Icon driven</b>		
<b>Approvals</b>	<b>CE, UL, cUL</b>		
<b>Measurement Ranges</b>	<b>-5 to 100% Opacity, 0-2 Optical Density, 0-2000 mg.</b>		
<b>Display Resolution</b>	<b>0.1 for Opacity and mg, 0.001 O.D.</b>		
<b>Process Display screens</b>	<b>5 Numerical, 3 Trends.</b>		
<b>Home Screen Navigation with virtual touch keypad for data entry</b>	<b>Touch Icons for information and user interface for Calibration, Fault, Alarms, Settings, Displays, Service and About.</b>		
<b>Battery back up</b>	<b>7 years typical at 25°C</b>		
<b>S.D. Card</b>	<b>Back up by SD memory card. Storage for data logs, alarm history, data tables, backup ladder, HMI, and OS.</b>		
<b>Alarm Reset</b>	<b>Automatic and manual.</b>		
<b>Cal cycle initiate</b>	<b>Manual, Remote and Internal Clock.</b>		
<b>OPLR (Exit Correlation Lx / 2*Lt)</b>	<b>0.3 to 1.0</b>		
<b>Environment</b>	<b>Inside cabinet IP20 / NEMA1 (case), Panel mounted IP65 / NEMA4X (front panel), Operational temperature 0 to 50°C (32 to 122°F), Storage temperature -20 to 60°C (-4 to 140°F), Relative Humidity (RH) 5% to 95% (non-condensing)</b>		
<b>EMS provided 24Vdc Supply</b>	<b>Input: 90-240 VAC, 50/60 Hz, 0.55 amp +10%;</b>		
<b>Network</b>	<b>Protocol: MODBUS, type RS-485.</b>		

<b>EMS520 Smart Service Module</b>	<b>Environmental Monitor Service, Inc.</b>
<b>Enclosure</b>	<b>Stainless Steel when in EMS WC, NEMA 4X plastic when stand alone.</b>
<b>Graphic Display</b>	<b>1.5x2.25" Viewing area, LED Backlight</b>
<b>Approvals</b>	<b>CE, UL, cUL</b>
<b>Network</b>	<b>Protocol: MODBUS type RS-485.</b>
<b>RCU Display Resolution</b>	<b>0.1 for Opacity RCU, mg, 0.01 O.D. with DUST RCU</b>
<b>Process Display screens</b>	<b>Local display for, Sensor data, Service selections, Fault displays.</b>
<b>Home Screen Navigation with touch keypad for data entry</b>	<b>Information and user interface for Calibration.</b>
<b>Battery back up</b>	<b>Memory held 7 years typical at 25°C</b>
<b>NA</b>	<b>NA</b>
<b>Alarm Reset</b>	<b>Automatic and manual.</b>
<b>Cal cycle initiate</b>	<b>Manual, Remote and Internal Clock.</b>
<b>NA</b>	<b>NA</b>
<b>Environment</b>	<b>Panel mounted IP65 / NEMA4X (front panel), Operational temperature 0 to 50°C (32 to 122°F), Storage temperature -20 to 60°C (-4 to 140°F), Relative Humidity (RH) 5% to 95% (non-condensing)</b>
<b>EMS provided 24Vdc Supply</b>	<b>Input: 90-240 VAC, 50/60 Hz, 0.55 amp +10%</b>
<b>Network</b>	<b>Protocol: MODBUS (ASCII or RTU mode), type RS-485, optically isolated, RS-232.</b>
<b>2-wire to EMS Control Unit (RCU)</b>	<b>RS485 Modbus to Control Unit</b>

<b>EMS520 Order Sheet</b>		
	Part # instructions: Choose one number from the left from each category to create the part number. Example EMS520-1-3-8-10-16	
1	EMS520 Premium Dual Beam Opacity/Dust Monitor System with 5.7" Color Touch Screen. Meets EPA PS-1 and ASTM D6216	
<b>Controller Options</b>		
3	Standard Controller RS485 Communications (NO Snap-in).	
4	Standard Controller with Snap-in (15 Relays, 18 Digital Inputs and 4 Analog (4-20mA) Outputs.	
<b>Measurement Path Length</b>		
5	Retro Assembly 3-15Ft.	
6	Retro Assembly >15Ft to 21Ft.	
7	Retro Assembly >21Ft to 40Ft.	
8	Retro Assembly >40Ft to 50Ft.	
9	Retro Assembly >50ft	
<b>Weather covers and Air Purge</b>		
10	Severe Weather Cover pair: Stainless Steel Construction.	
11	Severe Weather Covers with Single Air Purge Blower: Stainless Steel Construction.	
12	Severe Weather Covers with Dual Air Purge Blowers: Stainless Steel Construction.	
13	Pair of Opacity Air plenum Plant Air Adaptors, accepts 1/4" or 1/2" NPT	
14	Set of Two Negative Draft Filter Assemblies for Opacity Monitors	
15	None or N/A	
<b>PS-1 (Required for USA Only)</b>		
16	None or N/A	
17	Micro-turn 200 Opacity Audit Kit and On-Line Reflector Test Kit: Includes 3 Neutral Density Filters with Values to Meet PS-1 in Hard Carrying Case.	



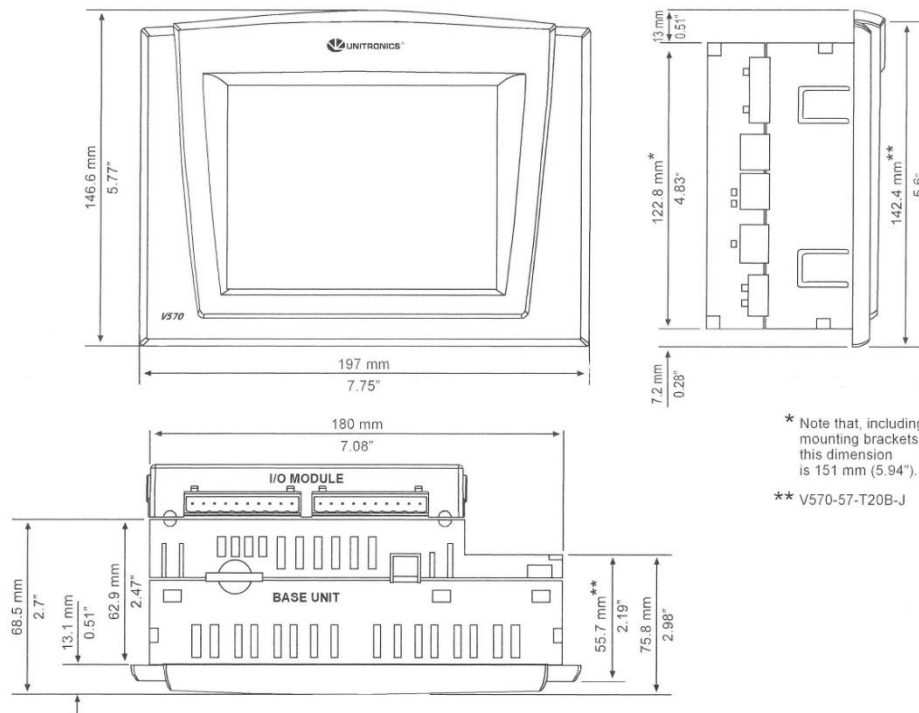


**\*Note 1:** The top view represents the transceiver and retro reflector assemblies with their swing clearances. Optional weather covers are not shown.

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

## Mounting

### Dimensions



\* Note that, including mounting brackets, this dimension is 151 mm (5.94").  
\*\* V570-57-T20B-J

Note that the LCD screen may have a single pixel that is permanently either black or white.