

# EMS412 ASTM D 6216 AND PS-1 COMPLIANT OPACITY/DUST MONITOR

*The EMS412 provides continuous, low maintenance, precision measurement of Opacity or Dust. It is designed for monitoring visible smoke in the exhaust gas of industrial combustion or air filtration processes.*



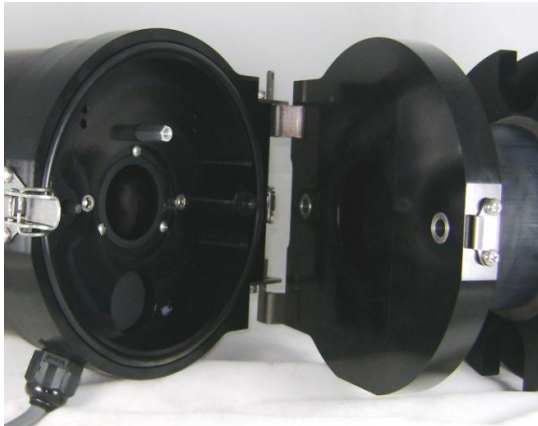
**Manufacturing and Servicing Opacity & Dust Monitors Since 1990**



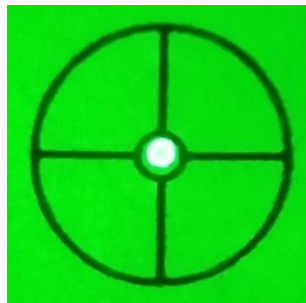
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# EMS412

## Key Features



- ✓ ASTM D 6216 and 40 CFR 60 PS-1 Compliant (Opacity Version)
- ✓ Meets PS-11 requirements (Dust Option)
- ✓ RS485, Modbus Communication, Optional Ethernet and Wireless
- ✓ Green LED Light Source
- ✓ Upgraded Optics (50% Less Sensitive to Misalignment)
- ✓ Dual Beam Measurement
- ✓ Communications via 4-20 mA loop and MODBUS
- ✓ Measurement output -5 to 99% Opacity (Opacity Version)
- ✓ Output “hold” while in calibration is ideal for process control (Dust Option)
- ✓ Measurement output in mg/m<sup>3</sup>, Opacity or Optical Density (Dust Option)
- ✓ 3 User selectable displays (Opacity)
- ✓ 5 User selectable displays (Dust Option)



# EMS412

## *System and Measurement Principle*

The EMS412 system consists of an optical transceiver mounted on one side of the stack and a retro reflector mounted on the other. The green LED LSEM (Light 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 microprocessor RCU where signals are analyzed. This user friendly controller includes selectable displays and two 4-20mA outputs.



## *Applications*

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



# EMS412

## **Smart Service Module (SSM)**

The newly developed **Smart Service Module** is located in the stainless steel weather cover and utilizes Modbus communication over RS485 (2 wire) cable connected to the control unit. Many of the control unit functions are accessible at the sensor location. This service module is useful for trouble shooting and audits it eliminates the necessity for a second technician at the mounting location



## **Optional Accessories**

- ✓ Stainless Steel Weather Covers
- ✓ Wireless Communications
- ✓ Air Blower/Mover System
- ✓ Certified Neutral Density Filter sales and calibration
- ✓ Flange Adapters
- ✓ Flange Mounted Optical Alignment Tool
- ✓ Upgrade Kits for Many Competitors Models



Transceiver/ Reflector:	
Enclosure	NEMA 4 watertight enclosure. Power 120/240VAC, 50/60Hz. +/- 10%, Transceiver 65va, Service Module 60va.
Path Length	Standard 2 to 15 feet, 0.6 to 4.6 meters. (Available - Up to 50Ft based on application)
Optical System	Double Pass
Reflector	Distance dependent
Light Source Aging Compensation	Automatic
Light Source Life	62,000 hours (> 7 years) Field replaceable without removal
Ambient Temperature Limits	-40 to +130° F (-40 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)

Severe Weather Cover:	
Material	308 Stainless Steel
Quick release pins	2 for bottom and 2 for top release.
Mounting	3 inch IPS, 150# flange. Others available.
Standard Blower	Single phase, 110/220VAC 50/60Hz
Max stack pressure	+/- 5 inch WC, with the proper installation of purge blowers.
Wind Speed	< 60 mph
Ambient temperature limits	-40°F to 130°F (-4°C to 54°C)
Protection for	Transceiver and retro-reflector components, purge blowers.

EMS412 Opacity Control unit:	
Enclosure	IP65/NEMA4X (when panel mounted), 96x96x64mm (3.8" x 3.8" x2.58"). Power 24Vdc +/- 10%.
Power Requirements	24VDC (±4%), 40mA max. per unit.
Graphic Display	1.5x2.25" Viewing area, LED Backlight
Approvals	CE, UL, cUL
Measurement Ranges	-5 to 99% Opacity
Display Resolution	0.1 for Opacity
Process Display screens	3 Selectable pages, Instant, average, split screen.
Battery back up	7 years typical at 25°C
S.D. Card	Optional - Back up by SD memory card.
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 ( $L_x / 2 * L_t$ )	0.3 to 1.0
Environment	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)
Network	Protocol: MODBUS (ASCII or RTU mode), type RS-485, optically isolated, RS-232.

EMS412 Dust Control unit:	
Enclosure	IP65/NEMA4X (when panel mounted), 96x96x64mm (3.8" x 3.8" x2.58"). Power 24Vdc +/- 10%.
Power Requirements	24VDC ( $\pm 4\%$ ), 40mA max. per unit.
Graphic Display	1.5x2.25" Viewing area, LED Backlight
Approvals	CE, UL, cUL
Measurement Ranges	0-2000/Actual mg <sup>3</sup> , -5 to 100% Opacity, 0-2 Optical Density
Display Resolution	0.1 for Opacity and mg, 0.001 O.D.
Process Display screens	5 Selectable pages, mg, mg/O.D., O.D., mg/Opacity, Opacity
Battery back up	7 years typical at 25°C
S.D. Card	Optional - Back up by SD memory card.
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 ( $L_x / 2 * L_t$ )	0.3 to 1.0
Environment	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)
Network	Protocol: MODBUS (ASCII or RTU mode), type RS-485, optically isolated, RS-232.

<b>EMS412 Order Sheet</b>		
	Part # instructions: Choose one number from the left from each category to create the part number. Example EMS412-1-3-8-21, MSRP \$16,085.00	
1	EMS412 Premium Dual Beam Opacity Monitor System with Automatic Zero/Span Calibration Checks and Microprocessor Control Unit.	\$12,800.00
2	EMS412 Premium Dual Beam Dust Monitor System with Automatic Zero/Span Calibration Checks and Microprocessor Control Unit.	\$12,800.00
<b>Measurement Path Length</b>		
3	Retro Assembly 3-15Ft.	\$750.00
4	Retro Assembly >15Ft to 21Ft.	\$ 750.00
5	Retro Assembly >21Ft to 40Ft.	\$1,500.00
6	Retro Assembly >40Ft to 50Ft.	\$1,800.00
7	Retro Assembly >50ft	\$ -
<b>Weather covers and Air Purge</b>		
8	Severe Weather Cover pair: Stainless Steel Construction.	\$ 2,535.00
9	Severe Weather Covers with Single Air Purge Blower: Stainless Steel Construction.	\$3,950.00
10	Severe Weather Covers with Dual Air Purge Blowers: Stainless Steel Construction.	\$4,800.00
16	Pair of Opacity Air plenum Plant Air Adaptors, accepts 1/4" or 1/2" NPT	\$85.00
17	Set of Two Negative Draft Filter Assemblies for Opacity Monitors	\$87.00
18	None or N/A	\$ -
<b>PS-1 (Required for USA Only)</b>		
20	EPA 40 CFR 60 PS-1 and ASTM D 6216 Opacity Factory Certification Report	\$1,300.00
21	None or N/A	\$ -