

## Product Data Sheet

PDS 105-4000.A01

May, 2006

# OPM 4000 Opacity Dust Density Monitor

The OPM 4000 Opacity Dust Density Monitor is a high performance opacity monitoring system with double-pass transmissometer that meets or exceeds Revised PS-1 and ASTM D 6216.

## FEATURES

- Digital display: instant percent opacity, average percent opacity and time to next calibration
- Alphanumeric display for system set-up and fault diagnostics display
- 3 bar graphs: instant opacity, average opacity and window dust
- U.S. Environmental Protection Agency (EPA) approved zero/span calibration technique
- Communications: Modbus (RS-485 )
- Stack exit correlation: permanent factory setting
- Sensor location service module: digital display for percent correlated opacity, T2, manual zero and span initiate and transceiver current loop test jacks
- Insensitive to ambient light
- Double pass optical system
- Thru-the-lens (TTL) alignment
- Light source rated for greater than 5 years
- Electronic modulated light source
- Customer selectable averager
- Calibration cycle control: remote, manual and timed
- System and fault diagnostics display
- Measures from 3 to 53 ft. (1-16M)



Emerson's Rosemount Analytical OPM 4000 high performance opacity monitoring system with double-pass transmissometer 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 instructions will have your monitor up and running in just a few hours.

Emerson has taken the approach to design equipment with accuracy, maintenance and serviceability as the most important features. The Rosemount Analytical OPM 4000 Opacity Dust Density Monitor is designed with state-of-the-art modular packaging that keeps ease-of-service in mind. The OPM 4000 offers a built-in TTL (through-the-lens) alignment system, where the alignment target can be viewed through a window on the transceiver. Adjustments to changes in alignment are provide by a 3-point alignment system that is integral to the air plenum. This ensures 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 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 4-20 mA loop. The service module is very useful for trouble shooting or during environmental 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.

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## 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 opened and closed. Large, 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. Should service ever be required, the sensors can be removed; just swing open and lift-off the pivot pins.

## SPECIFICATIONS

### 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>
Display Resolution:	0.1% opacity	
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 LEDs:	Run, alarm, operate, cal in progress	
High Opacity Set Point:	0-100% of full scale	
High Opacity Delay:	Adjustable 0-300 Seconds	
High 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 maximum (two additional optional)	
OPLR (Exit Correlation Lx / 2*Lt):	0.2 to 3.0	
Cal Cycle Initiate:	Local, remote and timed adjustable 1 to 24 hours	
Enclosure:	NEMA 13, IP65, 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)	
Ambient Temperature Limits:	-4° to +130° F (-20° to +54°C) (Cold weather option available.)	
Process Gas:	Up to 750°F (400°C), standard (higher available-contact factory)	

Power Requirements:	120 VAC (+/- 15%), 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:

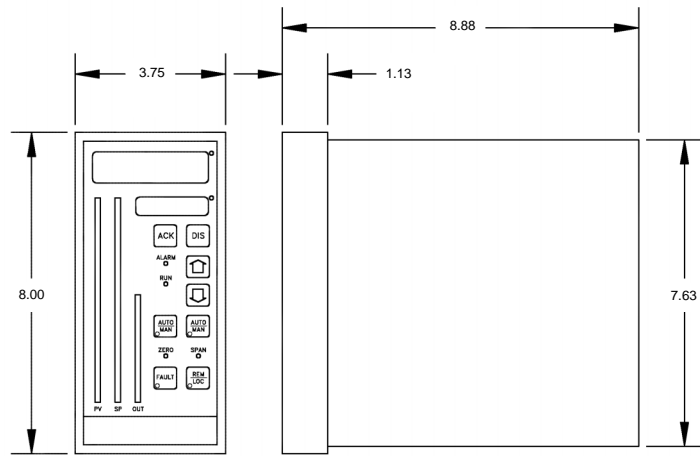
Display:	5/8 inch (15.9 mm), 4-digit LED, selectable for percent opacity and percent transmittance
Local Zero/Span:	Manual on demand
Test Jacks:	Transceiver to remote control current loop
Diagnostics:	Loss of power, current loop open, maintenance mode

### Transceiver/Reflector:

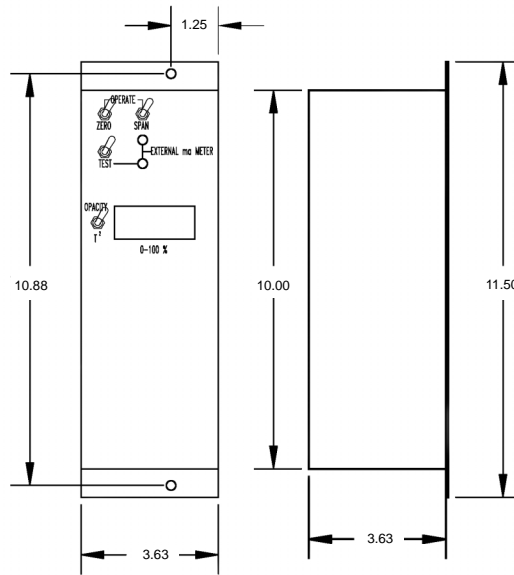
Enclosure:	NEMA 4 watertight enclosure
Path Length:	3 to 40 feet, 0.9 to 12 meters standard
Optical System:	Double pass
Light Source Aging Compensation:	Automatic
Light Source Life:	> 5 years
Alignment Verification:	Passive built-in, through-the-lens system
Mounting Flanges:	3 inch IPS, 150 lb. pipe flange
Ambient Light Immunity:	Solid-state electronic light modulation

### Design and performance:

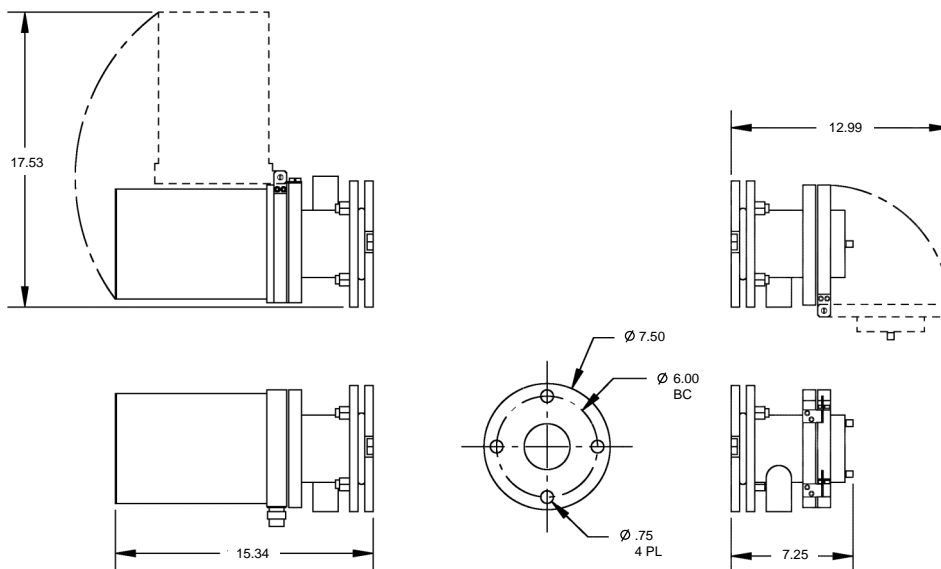
Peak and Mean Spectral Response:	Photopic; 515 to 585 nm, less than 10% of peak response outside 400 to 700 nm
Relative Spectral Response:	<10%
Angle of View:	< 4.0° from optical axis
Angle of Projection:	< 4.0° from optical axis
Calibration Error/Accuracy:	+/- 1% of full scale
Response time:	< 10 second
Zero Drift:	< 0.5%
Calibration Drift:	< 0.5%
Operational Period:	In excess of PS-1 required 336 hours
Zero/Span Calibration:	Manual or automatic with zero mirror and neutral density filter



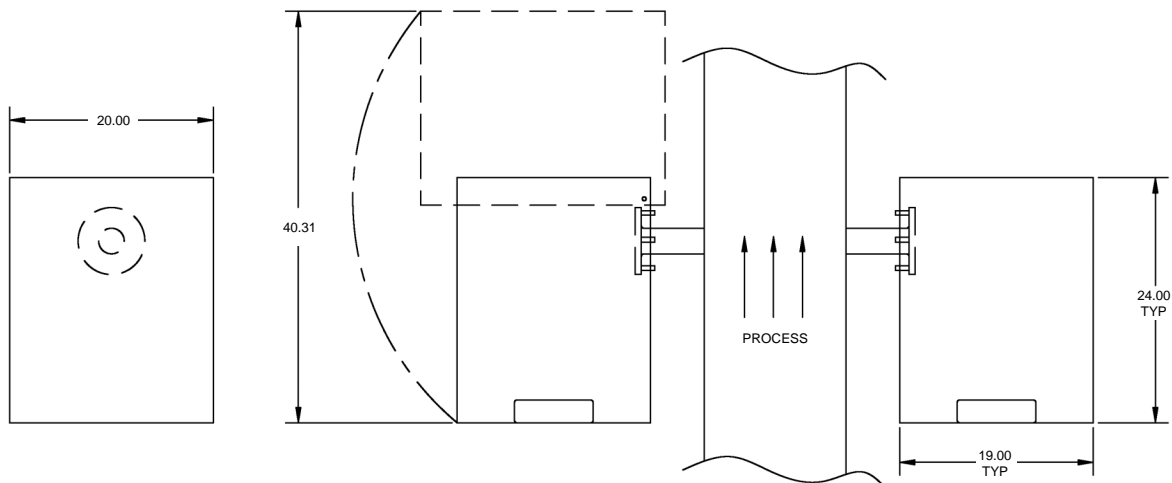
**OPM 4000 Control Unit**



**OPM 4000 Service Module**



**OPM Trans Retrofit**



OPM Covers

## MODEL OPM 4000 OPACITY/DUST DENSITY MONITOR

Model	Description
OPM 4000	Opacity/Dust Density Monitor
<b>Level 1 Intelligent Electronics</b>	
01	Basic Unit – Digital and Bargraph Display, (2) 4-20 mA Outputs, RS-232/485, Modbus
<b>Level 2 Transceiver and Path Length</b>	
11	3-15' Path Length
12	>15-21' Path Length
13	>21-40' Path Length
14	>40' Path Length
<b>Level 3 Weather Cover and Blowers</b>	
00	None
01	Weather Cover and Blowers
02	Weather Covers Only
<b>Level 4 Zero Jig Type</b>	
01	Zero Jig and Neutral Density Filters
02	Zero Jig Only

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### WORLD HEADQUARTERS

**Emerson Process Management  
Rosemount Analytical Inc.**  
6565 P Davis Industrial Parkway  
Solon, OH 44139 USA  
T 440.914.1261  
Toll Free in US and Canada  
800.433.6076  
F 440.914.1271  
e-mail: gas.csc@EmersonProcess.com  
www.raihome.com

### GAS CHROMATOGRAPHY CENTER AND LATIN AMERICA

**Emerson Process Management  
Rosemount Analytical Inc.**  
11100 Brittmoore Park Drive  
Houston, TX 77041  
T 713 467 6000  
F 713 827 3329

### ASIA-PACIFIC

**Emerson Process Management  
Asia Pacific Private Limited**  
1 Pandan Crescent  
Singapore 128461  
Republic of Singapore  
T 65 6 777 8211  
F 65 6 777 0947  
e-mail: analytical@ap.emersonprocess.com

### ROSEMOUNT ANALYTICAL EUROPE

**Emerson Process Management  
GmbH & Co. OHG**  
Industriestrasse 1  
63594 Hasselroth  
Germany  
T 49 6055 884 0  
F 49 6055 884209

### EUROPE, MIDDLE EAST AND AFRICA

**Emerson Process Management  
Shared Services Limited**  
Heath Place  
Bognor Regis  
West Sussex PO22 9SH  
England  
T 44 1243 863121  
F 44 1243 845354



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