Emissions Control and Monitoring Equipment

Datatest Industries
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www.datatest-inc.com
Who is Datatest?

- Datatest is a Privately Held Company
- Employee owned
- 21 Employees
- Established in 1971
Where are Datatest systems used?

- Coal and Gas fired utilities
- Chemical refineries
- Oil refineries
- Incinerators
- Almost any plant where combustion is an integral part of the process
What does Datatest do?

- Broken Bag Detectors
- Oxygen Analyzers
- Combustibles Analyzers
- Opacity Monitors
- NOx Analyzers
INSTRUMENT LINE-UP

Triboelectric

- Model 201LP Triboelectric Probe
- Model 3127 Process Particulate Monitor

Opacity

- Model DT109S Single Pass Opacity – non-compliant
- Model DT109D Dual Pass Opacity – non-compliant
- Model DT1000 Dual Pass Opacity - EPA Compliant

Combustion and Gas Monitors

- Model DT3000 Oxygen Analyzer
- Model DT3006 Oxygen/Combustible Analyzer
- Model DT5000 NOx Analyzer
MODEL 201LP – Triboelectric Probe

Process Monitoring

Redkoh’s Model 201LP is a three wire triboelectric device that measures process particulate levels on a real time basis.

The 201LP is powered by an external 24V dc supply. Its continuous 4-20 ma output can be connected directly to a PLC, recorder, or digital readout. Changes in the 4-20 ma output are directly related to changes in the concentration of particulate in the gas stream.

Applications for the 201LP monitor include but are definitely not limited to process control, dry solid levels, and environmental applications such as:

• Bag house / fabric filter
• Process Ducts
• Packaging Stations
• Feeders
• Cyclone Separators
• Storage Silos

Using an array of monitors on bag house compartments and/or outlet ducts is an excellent means of detecting broken bags before an emissions exceedences are reached.
MODEL 201LP – Triboelectric Probe

Broken Bag Detection

The Model 201LP monitor uses the Triboelectric principle to measure the electrical charge imparted by dust particles as they strike the probe. The charge picked up by the probe is converted to an electrical current, which is measured by the electronic system.

The 201LP is a cost-effective device for multiple compartment bag house applications. It is sensitive enough to not only detect broken bags, but also to detect the presence of worn bags.

Features

• Stainless steel probe lengths are available from 6” to 48” in 6” increments. Custom sizes can be supplied.

• Standard 3-wire configuration with 4-20 mA output

• Single opening to duct via ½” NPT coupling.

• Electronics can be supplied separate from the probe for high temperature applications.
Model 201LP

3 WIRE TRIBOELECTRIC BAG BREAK DETECTOR

Custom lengths with flange mounting available

5 Measurement Ranges – 0-10PA/100PA/1NA/10NA/100NA

Probe to PLC (readout) up to 1000 ft

24VDC @ 20mA power input
# 3 WIRE TRIBOELECTRIC BAG BREAK DETECTOR

## Measurement System

<table>
<thead>
<tr>
<th>Operating Principle:</th>
<th>Triboelectric</th>
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<tbody>
<tr>
<td>Power Supply:</td>
<td>24VDC</td>
</tr>
<tr>
<td>Sensitivity:</td>
<td>0.0005 gr/dscf (1 mg/m3)</td>
</tr>
<tr>
<td>Output:</td>
<td>4-20 ma</td>
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## Environmental

<table>
<thead>
<tr>
<th>Probe Operating Temp:</th>
<th>Up to 400°F; high temp available.</th>
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<tbody>
<tr>
<td>Probe Material:</td>
<td>316 SS with Teflon insulator</td>
</tr>
<tr>
<td>Enclosure:</td>
<td>NEMA 4 / IP66</td>
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## Dimensions

<table>
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<tr>
<th>Electronic Enclosure:</th>
<th>5.5”H by 2.9”W by 3.12”D</th>
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<tbody>
<tr>
<td>Active Probe Length:</td>
<td>6” to 48” in 6” increments</td>
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Model RK3127 - Process Particulate Monitor

The Model RK3127 Process Particulate Monitor is designed to operate with the model 201LP triboelectric probe.

Up to four (4) 201LP probes can be connected to each monitor.

The Model 201LP monitor uses the Triboelectric principle to measure the electrical charge imparted by dust particles as they strike the probe.

The charge picked up by the probe is converted to an electrical current, which is measured by the Process Particulate Monitor and is displayed in line graph form on a color LCD screen, along with peak and baseline threshold indicators.

The RK3127 is an all in one Broken Bag Detector giving the customer all the information he needs to confirm the presence of a leaking bag.
RK3127 Process Particulate Monitor

- 120 or 240 VAC Operation
- Will Monitor Up To Four LP201 Probes
- ¼ VGA Graphical Color Readout
- Adjustable Alarm Set Points Per Probe
- Standalone or connected to Remote electronics over RS232/485/422 Modbus RTU
Process Particulate Monitor

Set-up Screen

Display Screen Showing Four Probes
The Model DT109 is the perfect solution for monitoring visible emissions where a compliance system is not required. It has applications other than stacks, such as dust from conveyor systems and broken bag detection systems.

The Model DT109 allows for continuous monitoring of emission levels which helps compliance to EPA limits at all times. In fabric filters when bags become worn or ripped, there is an immediate alarm and indication in the recorder reading.

The Model DT109 is perfect for applications where multiple ducts lead to a common stack allowing identification of problem source. Operators are alerted to a possible over emission problem that could cause a violation of emissions standards.

- Measures opacity as well as mass emissions
- Process monitoring with instant and average 4-20 mA outputs
- Modbus RTU Interface
- RS232/422/485 serial port available
- Simple and cost effective
DT109D NON-COMPLIANCE DOUBLE PASS OPACITY MONITOR
MODEL DT109S NON-COMPLIANCE SINGLE PASS OPACITY MONITOR

Operates over a distance of up to 30 Ft

- Measures opacity as well as mass emissions
- Process monitoring with instant and average 4-20 mA outputs
- Modbus RTU Interface
- RS232/422/485 serial port available
- Operates over a distance of up to 30 Ft
- Simple and cost effective
MODEL DT1000 - COMPLIANCE OPACITY MONITOR
Operates over a distance of up to 40 Ft

The Datatest Model DT1000 is a microprocessor based, double pass U.S. EPA (Environmental Protection Agency) compliant opacity monitor.

• The microprocessor creates excellent stability and reliability plus the use of patented glass fiber optic technology in the stack components further enhances the performance.

• The Model DT1000 was designed and is still unmatched in having the fewest stack mounted electronics.

• Serial ports and 0-20 mA recorder interfaces are provided.

• The controller is offered in a rack, panel or NEMA 4 wall mount enclosure.
MODEL DT1000

EPA COMPLIANT OPACITY MONITOR

- Stack Exit Correction
- Audit Device Included
- Automatic Zero and Span
- Calibration Check
- Single Light Source and Detector
• Tested to ASTM D6216 for EPA certification
• 4% Lens Dusting Alarm – Hard Contact – Common Fault
• Purge Air Blowers Separate from Transceiver and Retroreflector
• Zero, Span and Reference Checked Continuously
MODEL DT1000

EPA COMPLIANT OPACITY MONITOR

NEMA 4 Cabinet

Lamp Power Supply Box
MODEL DT1000

EPA COMPLIANT OPACITY MONITOR

Blower Box
MODEL DT 3000 – Oxygen Analyzer

The Datatest Model DT3000 is a Zirconia sensor, microprocessor based, oxygen analyzer.

The DT3000 comes with probe configurations for temperatures up to 1800°F.

The microprocessor based controller provides long-term stability and reliability, plus optional features for controlling back purge, calibration gas injection, and self-calibration.

Modbus RTU serial port and 4 - 20 mA output are standard.

The DT3000 is available as an INSITU or Extractive in either a rack, panel or NEMA 4 wall mount enclosure.
MODEL DT3000 INSITU ZIRCONIA OXYGEN ANALYZER

Control Unit in Panel Mount or Wall Mount NEMA 4 Configuration

Sensor and Thermocouple outputs displayed

Software settable and selectable for back purge, automatic calibration and $O_2\%$ scale

Sensitive, Accurate and Reliable

Stainless Steel Eductor supplied to cover all types of applications
MODEL DT 3000

CLOSE COUPLED EXTRACTIVE ZIRCONIA OXYGEN ANALYZER
MODEL DT3006 – Oxygen and Combustible (CO) Analyzer

The Model DT 3006 measures oxygen and total combustibles or carbon monoxide by using a pump system to draw a sample from a stack or duct over a relatively short distance to a pair of sensing cells.

The first cell is a Zirconia sensor for measuring the oxygen. The second is either a platinum catalytic bead sensor for total combustible or an electrochemical sensor for carbon monoxide. The sensor chosen depends upon the accuracy and the measurement levels required, and whether total combustibles or carbon monoxide is the gas to be measured.

The microprocessor control unit reads these cell signals and provides Digital and analog readings. The readings are displayed on the backlit 4 x20 character LCD over 4-20mA or via RS232/422/485 using Modbus RTU.

Housed in this cubicle are the Pump that draws the sample into the Oxygen and Combustible Cells, as well as the flow gauges and the calibration gas solenoids.
MODEL DT3006

A drain solenoid is also provided for the external moisture filter. The transformer is used for the heater in the Oxygen Cell.

The microcontroller outputs a 4-20mA signal for each sensor. A Modbus RTU serial port configured for RS232 or RS422 is available.

The microcontroller also has relay contacts to perform automatic back purge and calibration gas injection and remote alarm indication.

• Advantages
  • Microprocessor Controlled
  • Single Probe / Single Control Unit
  • Bowl Filtration/Moisture Removal System
  • Auto Calibration and Drain Capabilities
  • Probe Temperatures up to 1800°F
  • Modular Design
MODEL DT3006

OXYGEN & COMBUSTIBLE (CO) ANALYZER

Close Coupled Extractive

Zirconia Sensor for Oxygen

Catalytic Bead for Combustible (LEL or PPM)

Electrochemical for Carbon Monoxide (0-500 ppm or 0-2000 ppm)

Great for Trim Control Using O₂ and CO

Extractive System with separate Cabinet and Controller

Extractive Probe Included
**MODEL DT3006**

**Oxygen**
- Accurate: ± 1% of full scale
- Repeatable: ± 0.5% of full scale
- Range: 0-25%
- Sensitivity: 0.1%

**CO/Combustibles**
- Accurate: ± 5% of full scale
- Repeatable: ± 0.5% of full scale
- LEL – 0-100% (0-10% by volume)
- Carbon Monoxide in ppm range
The Datatest Model DT5000 is a Microprocessor NOx analyzer utilizing a chemiluminescent detector (CLD) for precise continuous measurement of the NOx concentration in stack gases.

The Model DT5000 analyzer delivers accurate measurement over a wide range.

The ¼ VGA backlit graphics display provides a continuous readout of the measured gas plus status such as alarms. The LCD and keypad also provide a pathway for calibration mode, and all other programmable parameters.

The Model DT5000 is scaled 0-250 ppm. Outputs on the system include 4-20 mA and a RS232/422/485 Modbus serial port.
Datatest has chosen molybdenum as the catalyst to be used in its heated, temperature controlled converter due to its prolonged system life, high efficiency (over 95%), and freedom from interferences that traditionally have affected other types of converters.

The Model DT5000 is in a package that is light and compact making it one of the easiest NOx analyzers to set-up and place on line,
Model DT 5000

Chemiluminescent Nitrogen Oxide (NOx) Analyzer

Chemiluminescent Detector

Microprocessor Based

Meets EPA Spec 40 CFR 60 Appendix B PS-2 and Appendix F

Range of 250 PPM

Rack Mount NOx Analyzer
CUSTOMER BASE

Examples of Original Equip Manufacturers and Value Added Resellers

- Industrial Boiler Manufacturers
- Boiler Installation & Service Companies
- Incinerator Manufacturers
- Incinerator Installation & Service Companies
- Bag house and/or Precipitator Manufacturers
- Bag house and/or Precipitator Installation & Service Companies
Examples Industrial, Commercial, & Institutional End Users

Automotive Manufacturing sites – power, fumes
Steel Foundries – Basic Oxygen Furnace, sinter plant, power boiler
Pulp & Paper - recovery and power boilers, lime kiln
Smelters - copper, lead, zinc
Cement – Kiln, power boiler
Petrochemical (Refineries) – CO, power boilers, cat cracker
Pharmaceuticals
Semiconductor
Pet Cemetery Cremation
CUSTOMER BASE CONT.

Examples of Commercial

Incinerators

Sludge--- Sewage Sludge mostly Municipal

Hazardous Waste

Medical Waste--- Mainly Hospitals

Trash (Tires) --- Private and Municipal

Examples of Institutional - Steam and Heating Plants:

Colleges and Universities

Hospitals

Large Business Complexes
INCINERATORS

United States monitoring requirements based on lbs/hr of waste burned:

If 200-400 lbs/h of waste is burned - Primary and secondary chamber temperature and oxygen level (DT3000 monitor) must be monitored.

If 400 lbs/hr or more of waste is burned – Primary and secondary temperature and a minimum of carbon monoxide plus oxygen (DT3006 monitor) must be monitored. If no wet scrubber is installed, opacity (DT109S/DT109D/DT1000 monitors—site specific) monitoring may also be required.
US Standards for the Use or Disposal of Sewage Sludge By Incineration

Monitoring requirements:

Total hydrocarbons, oxygen (DT3000 monitor) and flue gas moisture content must be monitored

OR

Carbon monoxide (DT3006 monitor) corrected to 7% O2, oxygen (DT3000 monitor) and flue gas moisture content must be monitored if operator can provide evidence that Carbon Monoxide consistently does not exceed 100 ppmv (parts per million by volume) corrected to 7% O2.
Boiler size: If the boiler produces 10,000,000 BTU (2.9MW) to 100,000,000 (29MW) BTU per hour Input, then the following is required.

Monitoring requirements dependant on fuel used:

If # 6 or Bunker C Oil is burned - Then Opacity (DT109D/S or DT1000 monitor) must be monitored.

If Coal or Wood is burned - Then Opacity (DT109D/S or DT1000 monitor) must be monitored.

Some areas may require gas analysis (CEMS – Continuous Emissions Monitoring System) on boilers fired by heavy oil, coal or wood, but it is not a Federal Requirement.
Boiler size: If the boiler produces 100,000,000 BTU (29 MW) to 250,000,000 BTU (73 MW) per hour input, then the following is required.

Monitoring requirements dependant on fuel used:

If Only Natural Gas is burned - Then NOx & O2 (DT5000 & DT3000 monitor) must be monitored.

If Natural Gas with Oil backup or # 2 Oil is burned - Then NOx & O2 (DT5000 & DT3000 monitor) and Opacity (DT109D/S or DT1000 monitor) must be monitored.

If Natural Gas with # 4, # 6 or Bunker C Oil is burned - Then NOx (DT5000 monitor & SO2 & O2 (DT3000 monitor) & Opacity (DT109D/S or DT1000 monitor) must be monitored.

If Coal is burned - Then NOx (DT5000 monitor & SO2 & O2 (DT3000 monitor) & Opacity (DT109D/S or DT1000 monitor) must be monitored.

If Wood is burned - Then NOx (DT5000 monitor & SO2 & O2 (DT3000 monitor) & Opacity (DT109D/S or DT1000 monitor) must be monitored.
QUESTIONS?