Sintrol´s Advanced Solutions
for Data Logging, Networks and Wireless Communication
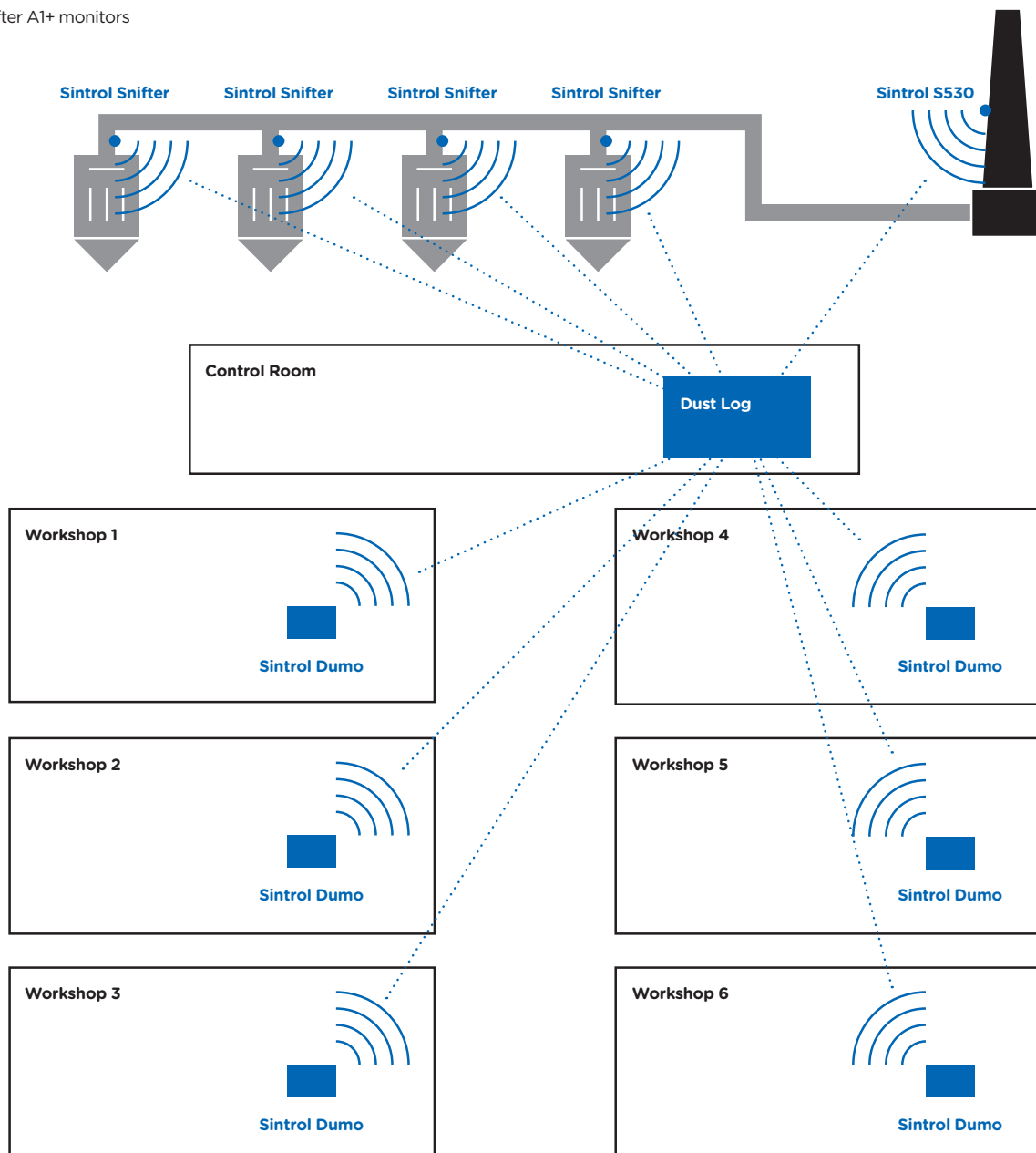
SINTROL
For Good Measure

Wireles Solution with Central Data Logging

In addition to our measurement devices, Sintrol's Wireless Monitoring System makes it easier to connect, track, manage and control a network of dust monitors. Using any combination of Sintrol's dust monitors*, the entire system can be integrated and set up via our RF network and managed with our DustLog 8 software. While installing cables around a plant has been the common practice for decades, it can be an expensive and inconvenient setup. Additionally, having to manage the installation and commissioning in the plant can be diffi cult, especially when monitors are placed in diffi cult to reach places or under extreme temperatures.

*Except Snifter A1+ monitors

With the Wireless Monitoring System, each monitor has the ability to communicate via RF with any other monitor as well as with the control room. Each monitor has a range of over 1 km and can act as a repeater within the network so installation is easy, simple and less costly than traditional methods. DustLog 8 enables the operator to see and control all monitors in the network, providing access to change parameters, see data history and alarms, and map all the monitors in the plant. Below is an example of a Wireless Monitoring System that can be done by combining our monitors with the RF network and DustLog 8:
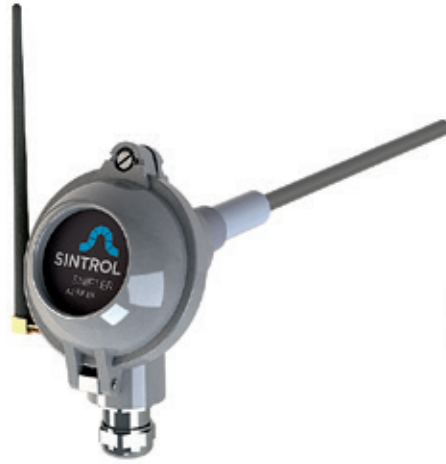
Sintrol Dumo   Sintrol Snifter   Sintrol S500

Sintrol Dust Control Systems

A plant may have different units and dust measurement needs requiring the use of a variety of monitors. Any combination of our monitors* can be connected wirelessly within the same network. The DustLog 8 recognizes each type of monitor within the network and provides access to the parameter settings for each monitor. All signals and alarms are charted in one location for easy access and management. To break down the example on the previous page, we can find several applications being tied into one system.

Ambient Air Monitoring

Multiple measuring points for ambient dust concentrations can be networked using a Dumo with RF networking in each workshop. All monitors can be connected easily and managed directly from the control room. Each individual dust concentration can be seen from one screen along with any alarms that notify the operator when dust levels go above the programmed thresholds.

Broken Bag Detection

Plants that have multiple baghouses spread out can install a Snifter on the outlet duct of each baghouse and transport the data to a single DustLog 8 control point wirelessly. All parameters can be adjusted remotely from the control room giving the user easy access to the device without needing to physically reach the monitor. Alarms will also give quick notification for any breaches in the filtration system.

Emissions Monitoring

When larger end users have multiple official measurement points, the S500 monitors allow convenient access and management of the dust measurement devices. All trends and real time dust concentrations can be centrally managed for multiple stack emissions. Calibration programming, parameter adjustments and alarm notifications can all be accessed from the control room eliminating the need for climbing to the stack.

*Except Snifter A1+ monitors

Frequency: 868 MHz or 915 MHz ISM frequency band
Transmit power: +12 dBm
Receiver sensitivity: ~ -110 dBm
Bandwidth: Up to 500 kbps

Sintrol Network with Wireless RF Option

With the world moving in the direction of wireless technology, the S510 is able to be networked using our own RF platform. This reduces cabling costs for the plant operators and eases installation with a fully integrated, easy to use RF connection. Each monitor has a range of up to 1 km (0.6 mi) and can act as its own repeater within the network, which can further reduce costs to the system. With directional antennas the range can be extended to over 10 km (6.2 mi).

The S510 is further enhanced by the introduction of Sintrol's software packages. S510 monitors can be managed and parameterized with the complimentary DustTool PC Software. This offers a convenient platform to initiate auto setup and adjust the parameters of the monitor. DustLog 8 gives the user full access to all monitors within the network in one location, with a reporting tool, mapping function and real time trend monitoring graphs of the process.
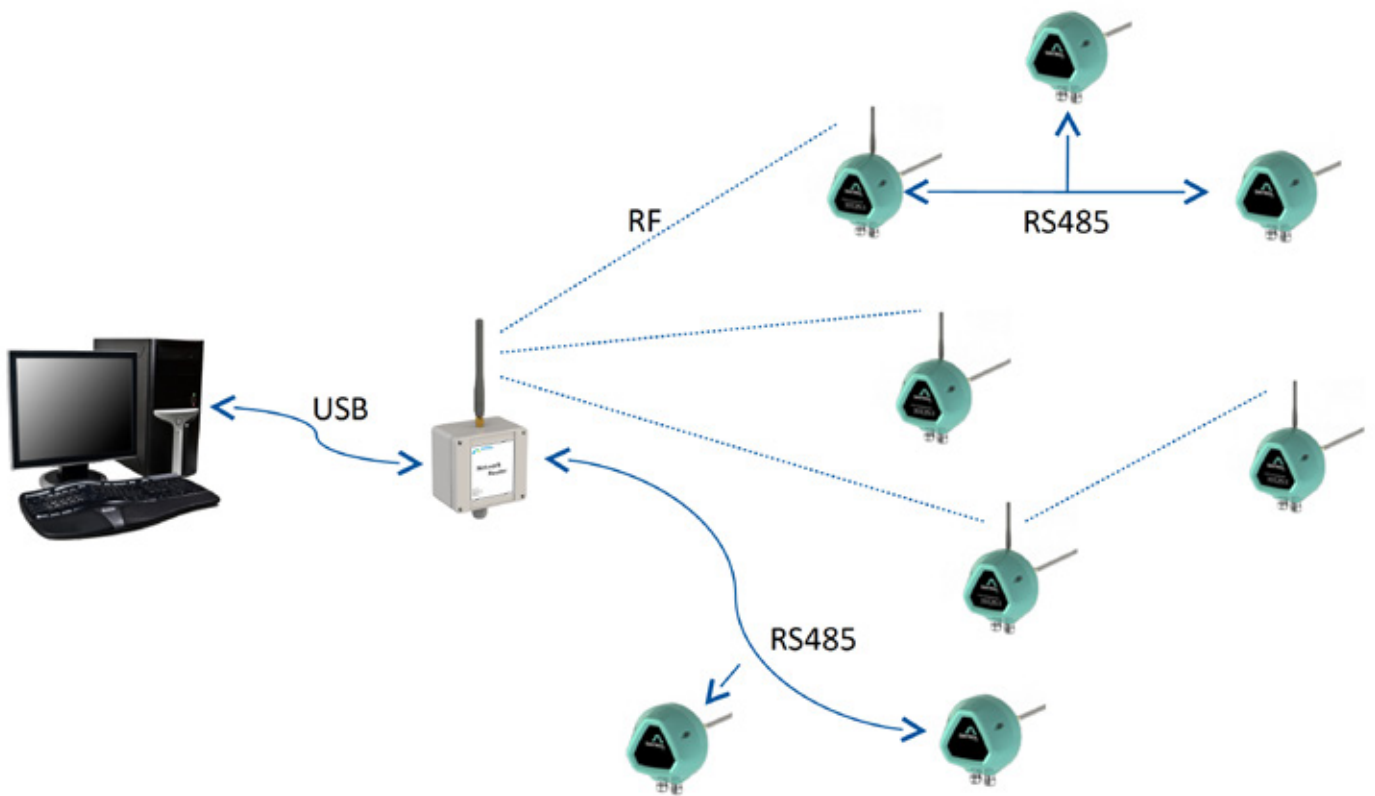
Amongst its many features are:

- Range up to 1 km (0.6 mi) even without line of sight
- **No repeaters** necessary (each instrument can operate as a repeater itself)
- Remarkable **savings due to no cabling** costs
- **No galvanic connection**, no need for barriers
- **Safe operation** due to remote access of devices in difficult places and conditions

- **Self-organizing network** without a need to manually parameterize settings.
- **Reduced commissioning** time and cost
- Works within the **ISM bands** with no need for licenses or permits
- **15 available channels, each is able to include 250 instruments (3750 in total)**

DustLog 8

DustLog 8 is the premier central management solution for dust measurement equipment. It gives plant operators full control over the network of dust monitors with efficient parameterizing, reporting and networking functions on an easy to use interface. By unifying all of Sintrol's latest technology into one management tool, DustLog 8 brings not only greater convenience and usability, but also improves plant efficiency, network management and worker safety for the end user.

The DustLog 8 PC software can be connected via a network router to the dust monitors. RS485, Modbus and RF are supported.

As Sintrol's S510 is equipped with RS485, USB and RF networking capabilities, all devices will automatically network themselves in the most optimal manner without any manual parameterization. When the system needs to be extended with additional monitors, the software will locate and identify the new devices automatically. Regardless of the number of units spread around the plant or factory, you can communicate to all of the devices from one computer. Additionally, the easy user interface gives the plant full control of the device's parameters so they can be read, sent or configured directly from the control room.

Not only is it more efficient to be able to manage multiple devices from one location, it also improves worker safety by keeping people away from dangerous installation locations in the plant.

Whether for internal usage or government authorities, a wide range of reports can be generated to see historical trends in the measurement with monthly, daily or hourly self-explaining graphs.

For official emissions reporting, the measurement history can be logged and analyzed over a period of time to give regulators the information they need. For trend monitoring and broken bag detection, plant operators can quickly see historical trends of the filter systems to optimize the filtration systems.

Amongst its many features are:
- Data acquisition and processing
- Comprehensive data storage
- Remote parameterization (averaging time, alarm limits, alarm delay times, etc.)
- Remote calibration of the mA and mg/m^3 outputs
- Remote auto setup function and history based calibration
- Export data to third party softwares (e.g. MS Excel)
- Measurement history and reporting functionality
- Offsite data storage into multiple supported database servers
- Automatic setup and network management with multiple instruments and connections (RF or wires)
  - It can combine different physical connections (RF or wires) within the same network.
- Real time monitor views of various measurement points
- Compatible with PostgreSQL, SQLite, SQL Server
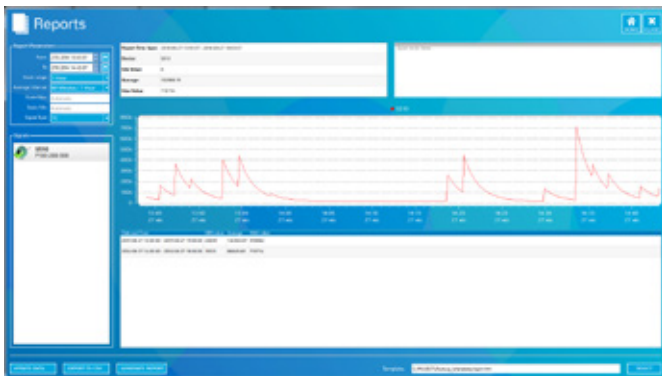
Data logging chart
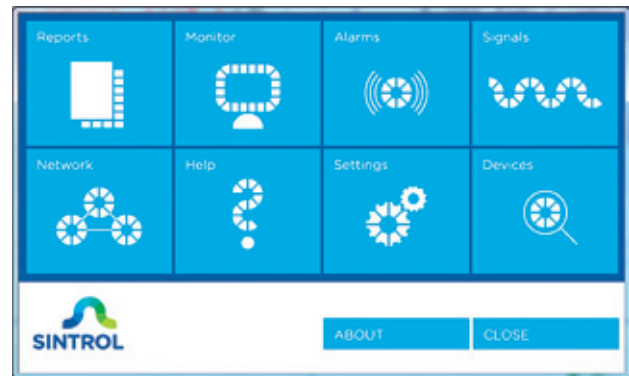
DustLog8 menu

RF Network – Paper Machinery

At Sintrol, we are committed to implementing solutions for our customer's problems. Our products are based on our unique Inductive Electrification technology and developed using a flexible modular based platform that allows us to tailor our products for the customer. While many dust monitoring systems are tailored towards the government regulated emissions limits, there are intermediary measurement points that can be just as critical to the costs and regulatory compliance of the end user. Managing the filtration systems is not only good for emissions, but also a strong indicator to help with maintenance and overall plant costs

Sintrol Snifter

RF-receiver

Sintrol Snifter

Sintrol S303
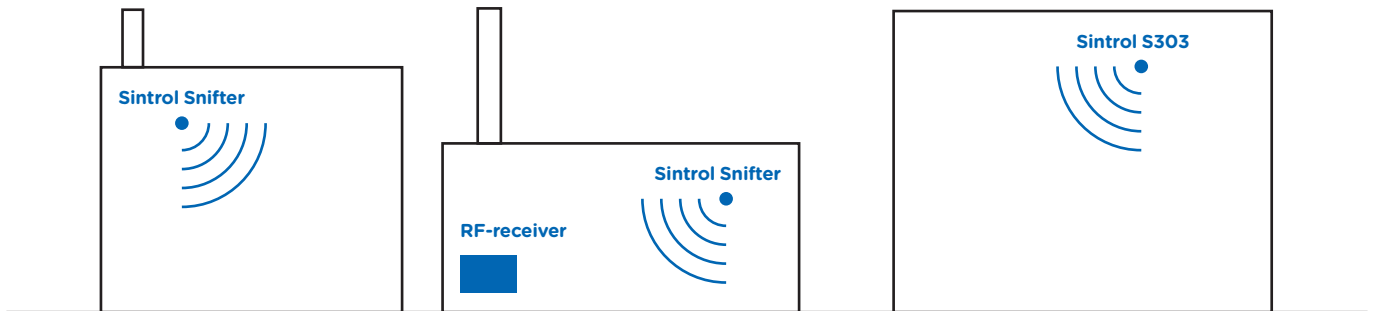
Objective
Measure dust concentration after filter units for early detection of broken bags. Due to heavy cabling costs, plant requested a wireless system of monitors.

Problem
A Finnish paper machinery plant did not have dust monitors installed in its plant and only used differential pressure gauges. After a large dust explosion in the factory causing large amounts of damage to the plant and the neighboring residential community, all filtration systems needed to be equipped with dust monitoring systems. Due to the difficult location of the installation points and the potentially heavy cost of cabling, the customer requested all monitors be connected wirelessly, if possible. The output from all of the monitors needed to be centrally routed to the control room and managed from there.

Solution
Using a combination of Snifters and S303 monitors, ten different devices were placed across four buildings spanning an area roughly 500 meters in diameter. All of the monitors were connected wirelessly using a RF network and the results displayed in the control room using our DustLog software. Using the easy auto setup feature, the monitors were able to identify the normal dust concentrations within 30 minutes of installation and were up and running.

Due to the wireless installation, the plant saved on cabling costs and reduced the installation and commissioning times. Since the monitors are able to rout themselves during setup, the commissioning time is minimized. With a range of over 1 km for the RF monitors, each monitor was able to independently reach the control room without the need for any repeaters. If needed, the monitors can also route data onwards within the network if greater geographical coverage is needed.

System Characteristics

The systems operates on a license-free 868 MHz ISM frequency band which is divided in to different channels using 300kHz channel spacing. One network master can form a network with up to 250 dust monitors and multiple master devices can operate on the same area using a different communication channel.

The creation of a Sintrol DMS network is a fully automated process which requires minimal user intervention. The network is self-forming and self-routing which results in fast commissioning times and minimal disturbances of the production. For maximum geographical coverage of the radio network the monitors can route data onwards within the network. This results in a greatly improved coverage and minimizes the need for repeaters.

Repeater installation at a paper machine factory

Frequency: 868 MHz or 915 MHz ISM frequency band
Transmit power: +12 dBm
Receiver sensitivity: ~ -110 dBm
Bandwidth: Up to 500 kbps
Range: Up to 200 m outdoors (future versions up to 1 km)

Installation Example

S300 monitor with RF-Link installed at an outlet of a cyclone and at an exhaust stack

Measurement Example

The first commissioned system has now been in use for over a year and it has proved to be an easy to use solution for monitoring the performance, and the overall condition of the filtration system. Continuous on-line dust level monitoring has helped reduce the risks of atmospheric dust emissions and minimized the maintenance of filters.
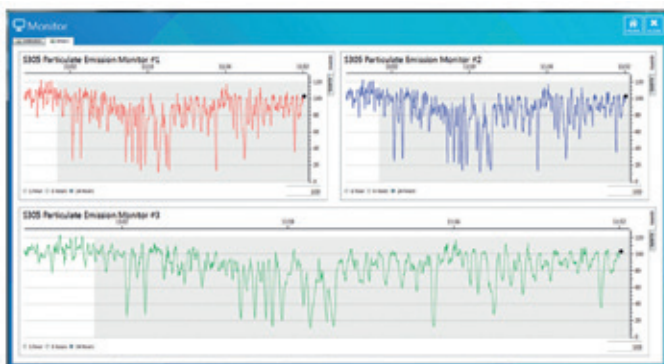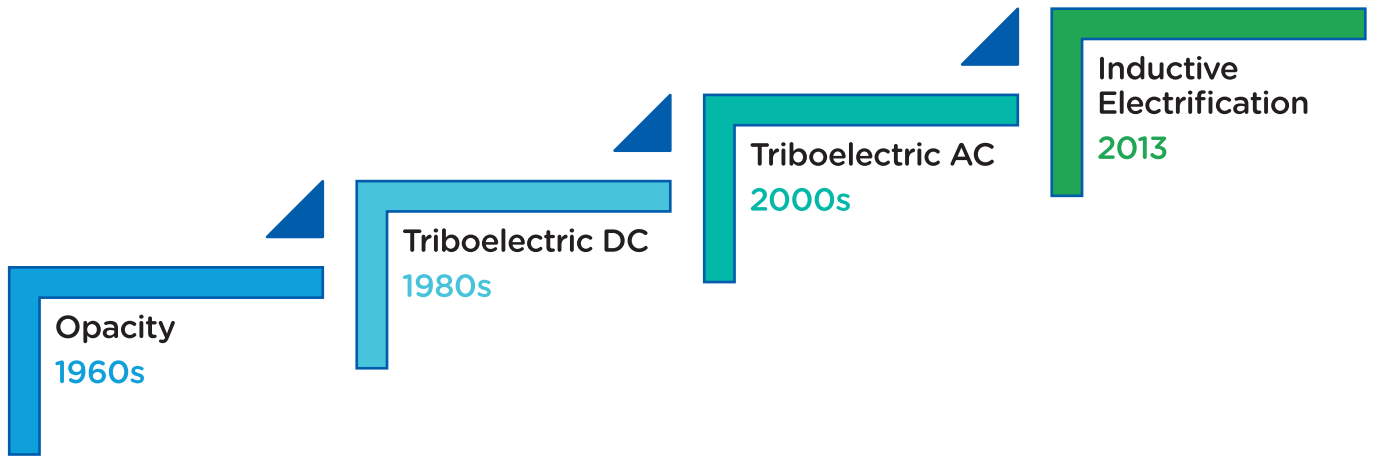

Datalogging chart

Process conditions:
Dust concentration: 0.05...0.5 mg/m³ (normal operation)
Process temperature: Near ambient temperature
Ambient temperature: -30...+35 °C
Ambient humidity: 20...100 % RH
Air velocity: 5m/s and above

Inductive Electrification Technology

Opacity
1960s

Triboelectric DC
1980s

Triboelectric AC
2000s

Inductive Electrification
2013

Sintrol dust monitors are based on a unique Inductive Electrification technology. The measurement is based on particles interacting with an isolated probe mounted into the duct or stack. When moving particles pass nearby or hit the probe a signal is induced. This signal is then processed through a series of Sintrol's advanced algorithms to filter out the noise and provide the most accurate dust measurement output.
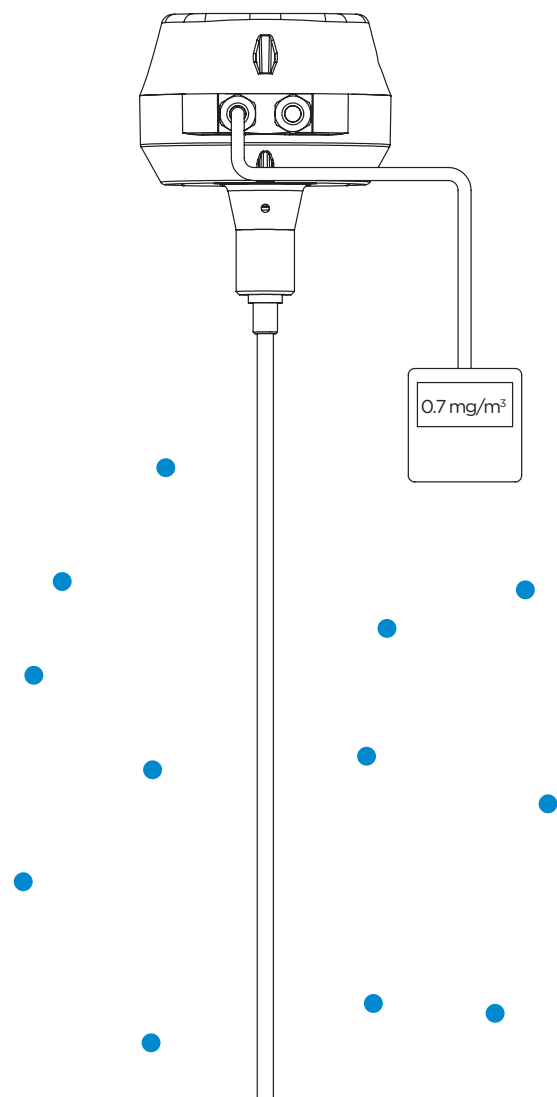
Classic triboelectric technology is based on the DC signal, which is caused by particles making contact with the sensor to transfer charges. Compared to DC based measurements, the Inductive Electrification technology is more sensitive and minimizes the influence of sensor contamination, temperature drift and velocity changes. By using the Inductive Electrification technology it is possible to reach dust concentration measurement thresholds as low as 0.01 mg/m^3.

Industrial Applications

Since **1993**, thousands of instruments have been delivered worldwide to satisfied customers in various industries and applications.

Filter Leak Detection
Process Monitoring
Emissions Monitoring

- Cement
- Chemical processing
- Metallurgical
- Foundries
- Pharmaceutical
- Fertilizers
- Wood processing
- Food industry
- Bakeries and flour mills
- Tobacco
- Animal feed processing
- Power plants
- Waste incinerators
- Pulp and paper

0.7 mg/m^3

Principle of Operation:

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