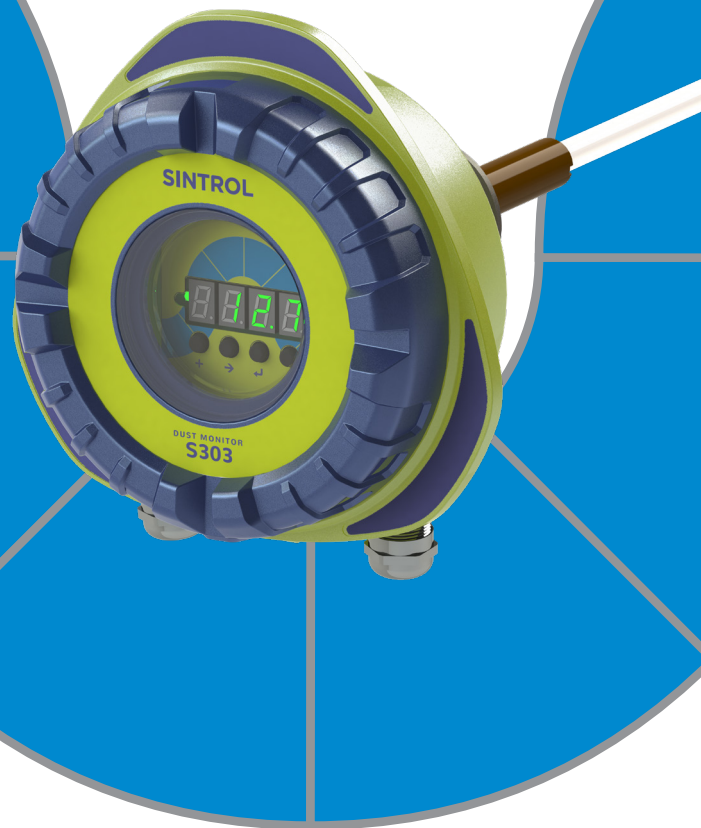


# S303 & S304 DUST MONITORS



CE

 **RoHS2**  
2011/65/EU

S303 - Process Monitor

S304 - Emission Monitor

Software and Networking

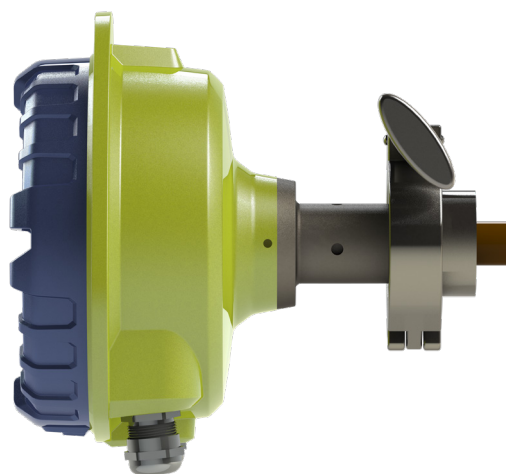
  
**SINTROL**  
For Good Measure

# S303 Process Monitor & S304 Emissions Monitor

- Good value for money
- Easy start-up and commissioning
- Rugged design for harsh industrial conditions
- Proven technology
- Accurate dust measurement
- Extremely wide measurement range
- Detection limit of 0,01 mg/m<sup>3</sup>
- Multipoint calibration
- Normalized (instruments are all identical)
- Flow speed compensation (optional)
- Automatic Zero and Span check
- 4-20mA, RS485, USB, two status relays and wireless option
- Local display, user interface and 3 color status LEDs ●Alarm ●Alert ●Normal

Based on Sintrol's proven **Inductive Electrification Technology**, the S300 series has a detection limit of 0,01 mg/m<sup>3</sup>, while maintaining its globally recognized reliability and robustness. Available features allow the S300 series to be used for a wide variety of applications such as stack-, process- and filter house monitoring. It can be installed into process applications like baghouse, cyclone, dryer or other dust collection systems to monitor particulate emissions as well as filter performance.

The S300 series is also often used for process control in applications where the dust levels need to follow designated limits. The onboard relays of the S300 series can be used as a dust level ALERT / ALARM signal. The mA output and the RS485 interface makes the instrument ideal for trend monitoring applications. Very short response time is a typical characteristic of Sintrol's dust monitors, enabling early detection of malfunctions in the dust removal process and prevention of expensive product loss to the environment.



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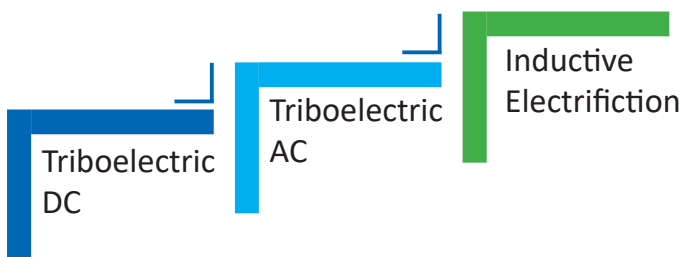
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## Features

X Standard, ○Optional, -blank- Not Available	S303	S304
Rugged IP65 rated Aluminum pressure casted enclosure	X	X
Quick clamp process connection for easy installation	X	X
Green, yellow and red LED for status indication	X	X
Auto Setup function for efficient commissioning	X	X
Two dry contact relays to indicate dust alert and dust alarm	X	X
24 VDC and 80 to 230 VAC power supply options	X	X
USB interface for convenient connection during commissioning	X	X
DustTool PC-software for parametrization and setup	X	X
Normalized during production to ensure identical instruments and quality	X	X
Linearized during production to standard test dust (Arizona Road Dust)	X	X
RS485 (1) to communicate with Modbus RTU to your control system	X	X
RS485 (2) to communicate with Sintrol protocol to your PC and DustTool	X	X
Bright green illuminated 4- digit display and buttons for local setup and status	X	X
Isolated and active mA-output, to indicate the status $\geq 21$ mA or $\leq 3.6$ mA is used (NAMUR)	X	X
Zero & span check with automatic drift compensation	X	X
Calibration possibility to read directly $\text{mg}/\text{m}^3$		X
Flow speed compensation by the mA-output of a third party measurement device		X
Wireless Network capability to avoid cabling cost and extensive installation	○	○

## Inductive Electrification Technology

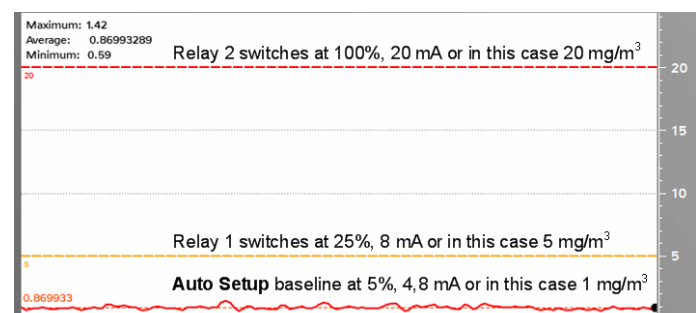


The measurement of Sintrol dust monitors is based on particles interacting with an isolated probe mounted into a duct or stack. When moving particles pass nearby or hit the probe, a signal is induced. This signal is then processed through a series of Sintrol's advanced algorithms to filter out the noise and provides the most accurate dust measurement. Classic **triboelectric technology** is based on the DC signal, which is caused by particles making contact with the sensor to transfer charges. Inductive Electrification Technology is based on the Triboelectric AC signal. It is more sensitive and minimizes the influence of sensor contamination, temperature drift and velocity changes than DC. By using Inductive Electrification Technology, it is likely to reach a detection limit as low as  $0.01 \text{ mg}/\text{m}^3$ .

## Sintrol's Unique Auto Setup Function

The **Auto Setup** function is a unique Sintrol Dust Monitor feature which allows for a simple, user friendly setup. During the auto setup procedure, which is done in normal process conditions, the dust monitor will automatically adapt to the process conditions and set the measuring range and alarms accordingly. At normal conditions the instrument will show green light and the mA output is set to 5% of range.

In case the measuring point is before the filtration system, the **Auto Setup** baseline could be several  $\text{g}/\text{m}^3$  and after the filtration system the auto setup baseline could be only a few  $\text{mg}/\text{m}^3$ . In both cases, no manual range setup is required.

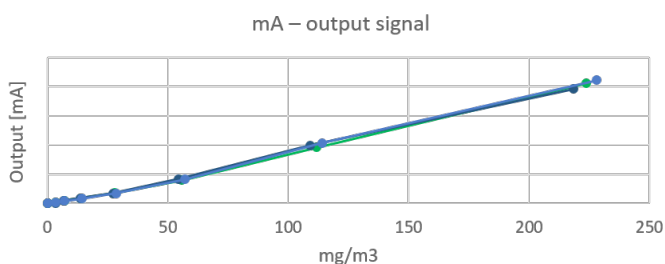


## Proven Technology

Since 1993, Sintrol has become a globally recognized dust monitoring supplier with over 17.000 installations in more than 50 countries. The measuring principle has evolved into a proven standard for dust monitoring needs.

Extensive tests of S300 have been carried out in Finland and Germany. The results showed excellent linearity over various dust types. The graph below illustrates the mA output on standard test dust ISO 12103 medium (Arizona Road Dust).

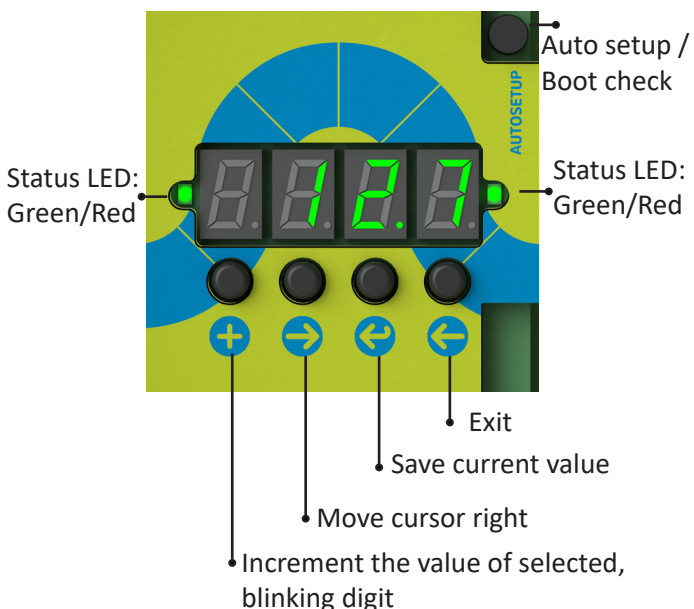
Temperature tests showed close to no impact over the whole temperature range.



## Local Display and Interface

The S303 and S304 are equipped with a local user interface for setup and adjusting the instrument. Based on a 4-digit, 7-segment display, the operator can see the actual measuring values in mA, % or mg/m³. With the 4-button interface the operator can navigate and change the most important operating parameters.

Next to the display, a separate key is installed to locally start the Auto Setup procedure.



## Return of Investment

This example calculation shows the payback period and cash flow over 3 years based on the loss of product which is caused by a small leakage in the filtration system.

- Gas flow: 100.000 m³/h
- Allowable concentration after the filter: 5 mg/m³
- Dust concentration after filter damage: 100 mg/m³
- Product cost: 0,10 €/kg

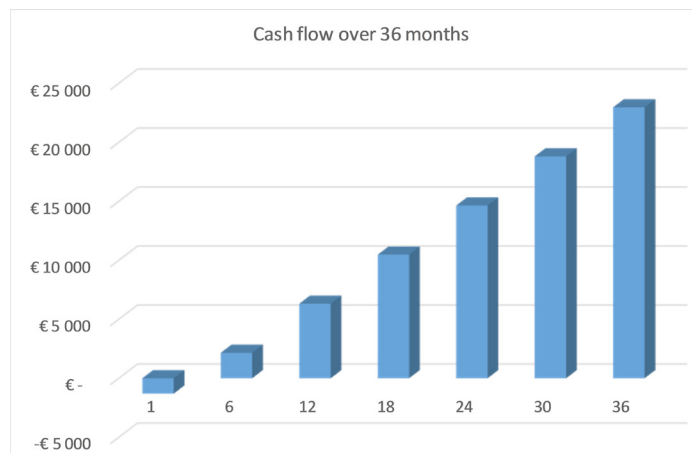
### This means:

Lost product: 84.000 kg/year, probably released to the environment.

**More than 20.000 € savings after 3 years.**

**And a payback time of less than 3 months.**

### Cash flow over 36 months



## Industries Served

Chemical

Energy

Metal

Cement

Pharma

Mining

Food

Paper

# Common Industrial Applications

## Fabric Filter Control



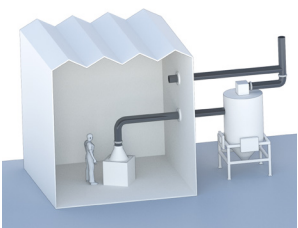
- Straightforward filter leak detection on an ALERT and ALARM signal base
- Filter performance monitoring and optimization on the mA output signal
- Minimize product loss by finding even the smallest leakages
- Identify broken solenoid valves
- Monitor pulse efficiency and reduce pulse rates
- Reduce consumption of compressed air
- Enable preventive maintenance
- Proactively reduce emergency downtime

## Monitor Pneumatic Conveying Systems



- Flow / No Flow indication
- Flowrate monitoring with S303 based on a mA output signal
- Receive an early warning over blockages in bulk and powder conveying systems
- Optimize flow rates in conveying systems
- Control fuel feed in boiler applications
- Assure that production is not reduced by a plugged filter

## Extraction and Air Circulation Systems



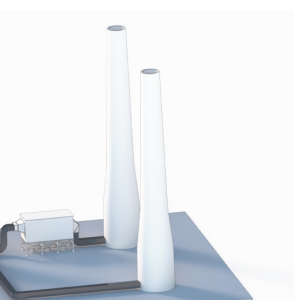
- Help improve clean air working conditions
- Compliance with regulations by monitoring the return air
- According to EN12779 each wood shop which operates an air circulation system bigger than 10.000 m<sup>3</sup>/h needs to be continuously monitored
- Control of the weld fumes removal process
- Immediate alarm in case of filter malfunction

## Measuring in hot conditions such as Steel-, Cement-, Chemical Production or Power Plants



- Detect damage in coke oven walls to avoid exhaust gases from leaking into the flue gas
- Different probes and coatings allow the measuring of particulate matter in harsh industrial conditions to up to 700 °C and 6000 kPa
- Conductive and sticky dusts as in e.g. carbon black applications can be measured with teflon coated probes
- Abrasive dusts as in e.g. steel manufacturing processes can be measured by using diamond coated probes

## Continuous Particulate Stack Measurements



- Emissions monitoring in small and medium sized stacks
- Enables power plants <50 MW to be compliant with the EU directive 2010 / 75 / EU / IED, art 32
- US-EPA, OSHA or other local authorities often require continuous measurements parallel to periodic gravimetric samplings



# Probes and Process Connections

The S300 series comes with a wide range of different probes and process connections. The new mechanical solutions reflect our field of experience over the last twenty years. Sintrol has engineered and developed the instrument to fit individual processes and demands based on customer needs.

## Standard Probe Including Quick Clamp

The S300 series comes with a 500 mm long probe, made of 316L stainless steel with Ryton as an insulator material. This probe withstands temperatures up to 200 °C and up to 300 kPa pressure. The quick clamp enables fast and easy removal of the instrument. This is beneficial especially in difficult process conditions where the probe might have to be cleaned regularly.



## Probe Lengths and Coatings (Optional)

A wide range of different probes are available as options to allow customized solutions.

Adhesive and wet dusts may create a conductive dust build up on the probe which will negatively influence on the monitor's accuracy and reliability.

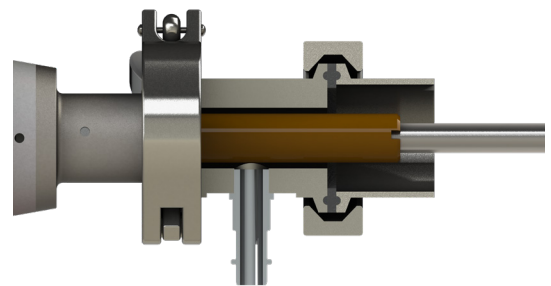
As **Inductive Electrification** is based on the transfer of electrostatic load from the probe to the amplifier, conductive dust build up may lead to a bridging effect from the probe to the grounded ductwork. To help avoid this bridging, Sintrol has developed a number of coatings for the different process conditions:

- a) Teflon coating for wet conditions < 250 °C in non ATEX areas
- b) Diamond coating for abrasive processes
- c) Salokote for wet conditions, max length 500 mm



## Air Purge (Optional)

Used in process conditions with high probability of dust build up on the probe. Air purge ensures that the base of the probe stays clean of dust build up.



## High Temperature Probe (Optional)

The high temperature probe can be used in process conditions up to 700 °C. The air purge option is not available with this probe. The flanges for the process connection can be chosen to meet customer specifications.

## High Pressure Probe (Optional)

The pressure probe can be used in process conditions up to 100 000 kPa. The air purge option is not available with this probe. The flanges for the process connection can be chosen to meet customer specifications.

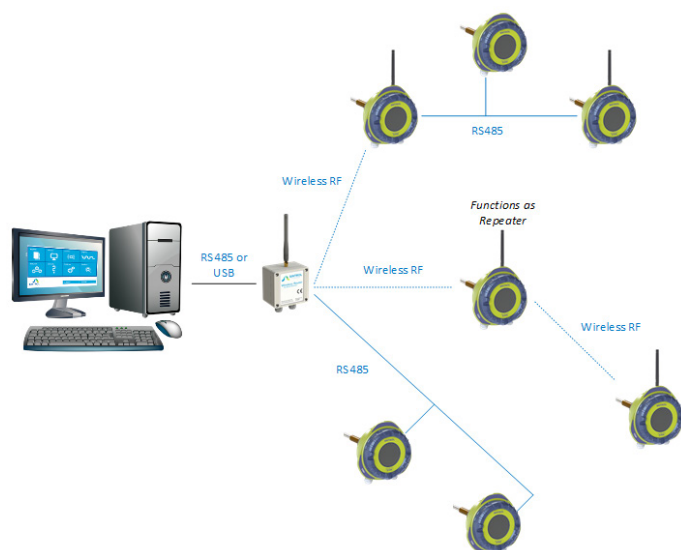


## Sintrol Network with Wireless Radio Frequency (RF) Option

The S300 series is able to be networked using the Sintrol RF platform. This reduces cabling costs and eases installation with a fully integrated, easy to use RF connection. Each monitor has a range of up to 1 km and can act as a repeater within the network. With directional antennas the range can be significantly extended.

### Amongst its many features are:

- Range up to 1 km (0.6 mi)
- If necessary, each instrument can operate as a repeater
- Remarkable savings due to no cabling costs and short commissioning
- Safe operation due to remote access of device in difficult places and conditions
- Self-organizing network function
- A combination of wired RS485 and RF network is possible
- Works within the open radio frequency bands with no need for licenses or permits (868 MHz or 915 MHz)
- Multiple available channels
- Up to 30 instruments in one system
- No need for barriers in the communication lines in hazardous zones

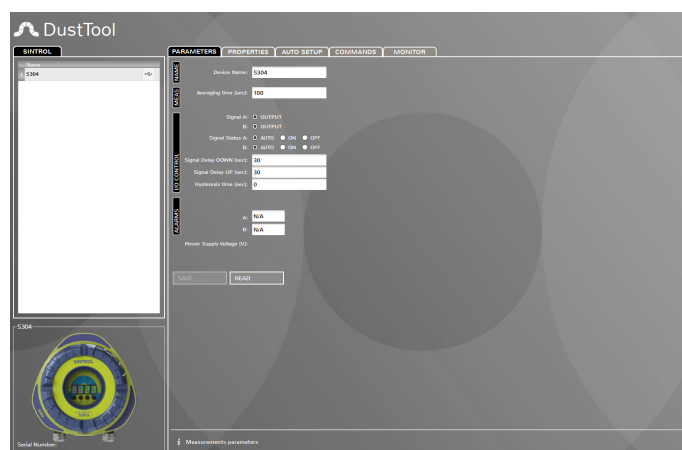


## DustTool Parametrization Software

The S300 series monitors can be managed and parameterized with the **DustTool** PC Software. This offers a convenient platform to view measurement results, to initiate the **Auto Setup** and adjust the parameters of the monitor.

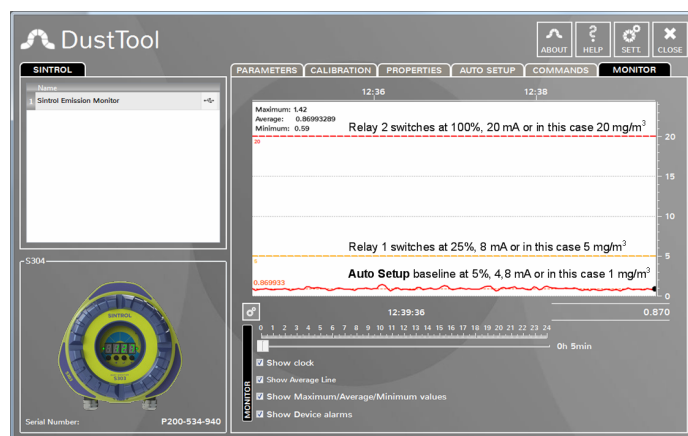
Just connect a USB cable directly to a USB connector or use a generic USB-to-RS485 converter and connect to the device's RS485 bus. **DustTool** will automatically detect the interface being used and connect to the device.

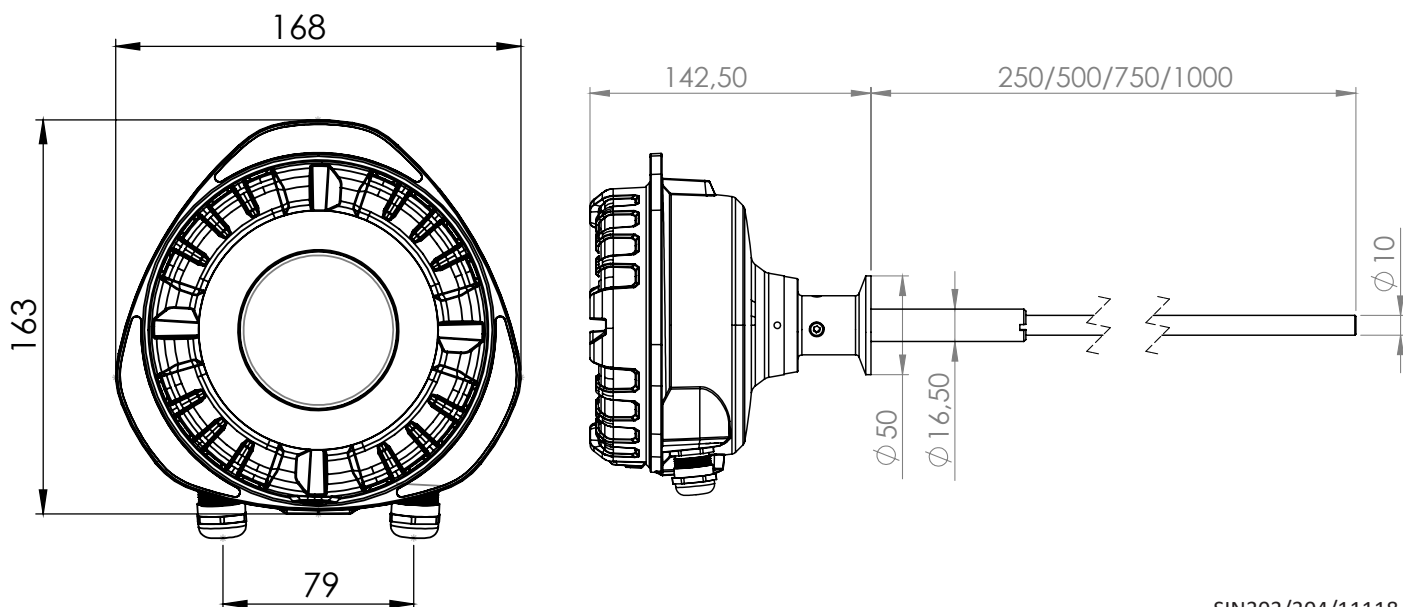
On the parameters page, you can modify the operating parameters of the connected Dust meter. From the settings view you have full control over software parameters, like network access and password protection.



On the monitor view of the DustTool PC software it is possible to follow the dust levels online.

Monitor view is intended to help users when setting up parameters manually.





SIN303/304/11118

Product Name	S303, S304
Measurement objects	Total Suspended Particles (TSP)
Measurement range	Detection Limit 0,01 mg/m <sup>3</sup> Maximum Range up to several g/m <sup>3</sup> , depending on conditions
Measurement principle	Inductive Electrification
Protection code	IP65
Power supply	24 VDC and 80-240 VAC
Power consumption	Up to 10 W
Output signals	<ul style="list-style-type: none"> <li>Two dry contact Relays, max 5A@30VDC / 5A@240VAC</li> <li>Isolated 4-20 mA output loop</li> </ul>
Communication interface	<ul style="list-style-type: none"> <li>2 x Serial communication RS-485</li> <li>USB</li> <li>Radio frequency (RF) (only on RF models)</li> </ul>
Communication protocol	<ul style="list-style-type: none"> <li>Modbus RTU (RS-485)</li> <li>Sintrol network (USB, RF and RS-485)</li> </ul>
<b>Ambient Conditions</b>	
Temperature	-40°C to +60 °C (-40 °F to 140 °F)
<b>Materials and Weight</b>	
Enclosure / casing	Aluminum
Weight	1,5 kg (3,3 lbs)
<b>Process conditions</b>	
Temperature	Max 200 °C (392 °F) default, optionally up to 700 °C (1292 °F)
Pressure	Max 300 kPa default, optionally up to 6000 kPa
Humidity	Max 95% RH (non-condensing)
<b>Wireless Communication (only for RF models)</b>	
Frequency band	868 MHz or 915 MHz, 15 channels
Transmitting power	Up to +23 dBm, user adjustable
Receiver sensitivity	-110 dBm
Communication protocol	Proprietary Sintrol Network protocol
Typical range	<ul style="list-style-type: none"> <li>868 MHz Version</li> <li>Up to 1000 m (3280 ft) in urban environment</li> <li>NOTE: The RF communication range is highly affected by the surrounding structures and other RF devices.</li> </ul>