



**Snifter
ATEX22 VERSION**

User Manual

Version 1.4
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Distributor

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1. INTRODUCTION

This manual describes how to install and use SINTROL's triboelectric dust monitor Snifter. Sintrol shall not be liable for any loss or damage whatsoever arising from use of any information or details therein, or omission or error in this manual, or any misuse of the product.

1.1. Safety

Snifter requires 12- 24 VDC power supply. Although 12-24VDC voltage level is considered safe, the process gas or dust particulates can be hazardous to health.

Sensor is designed for explosive environments fulfilling following ATEX requirements. The Snifter ATEX22 version sensor can be installed in ATEX zone 22 areas.

CE  II 3 GD
Ex mb nL IIC T6

Ex mD, IP 65. T80 °C
VTT 07 ATEX 029X

NOTE! Junction Box for ATEX22 sensor is not atex approved and cannot be installed in the hazardous area.



Take appropriate precautions when installing the monitor:

Unless the process conditions are known to be entirely safe, suitable precautions must be taken before any entry is made into the duct for installation or maintenance purposes.

- The unit may be installed in ducting, containing particulate, hazardous to health.
- The particulate may be inflammable, explosive or toxic
- The gas can be hot and pressurised

1.2. Product overview

Sintrol Snifter Atex22 model consist of two parts: Atex22 sensor which fulfills the ATEX requirement mentioned before and Junction Box which must be installed in the safe zone. **Neither of these parts should be used separately but always together.**

The Snifter Atex22 Dust monitor is a microprocessor-based, self-adjusting device, equipped with two solid state alarm relays and indication LED in front cover of the Atex22 sensor. Junction Box provides two electromechanical relays which are controlled by Atex22 sensor's solid state relays.

The Snifter is designed for filter bag leak detection. It can also be used to detect blockage or stoppage in pneumatic transport and bulk solids handling. It is a compact unit with the sensor and control electronics built into one IP65 enclosure, which has been specifically designed for easy installation and operation. The Atex22 sensor is designed for applications at up to 2 bar and 140 °C.

1.3. How does it work?

The Snifter uses proven and reliable triboelectric technology where the interaction of particles with the sensor rod causes a small electrical charge to pass between the particulate and sensor.

It is this small electric charge that provides the signal monitored by the electronics, the signal generated is proportional to the dust level even if particles accumulate on the sensor. Experience has shown that this method of monitoring dust level in gases offers accurate results with minimum maintenance.

2. INSTALLATION

2.1. Selecting the installation location

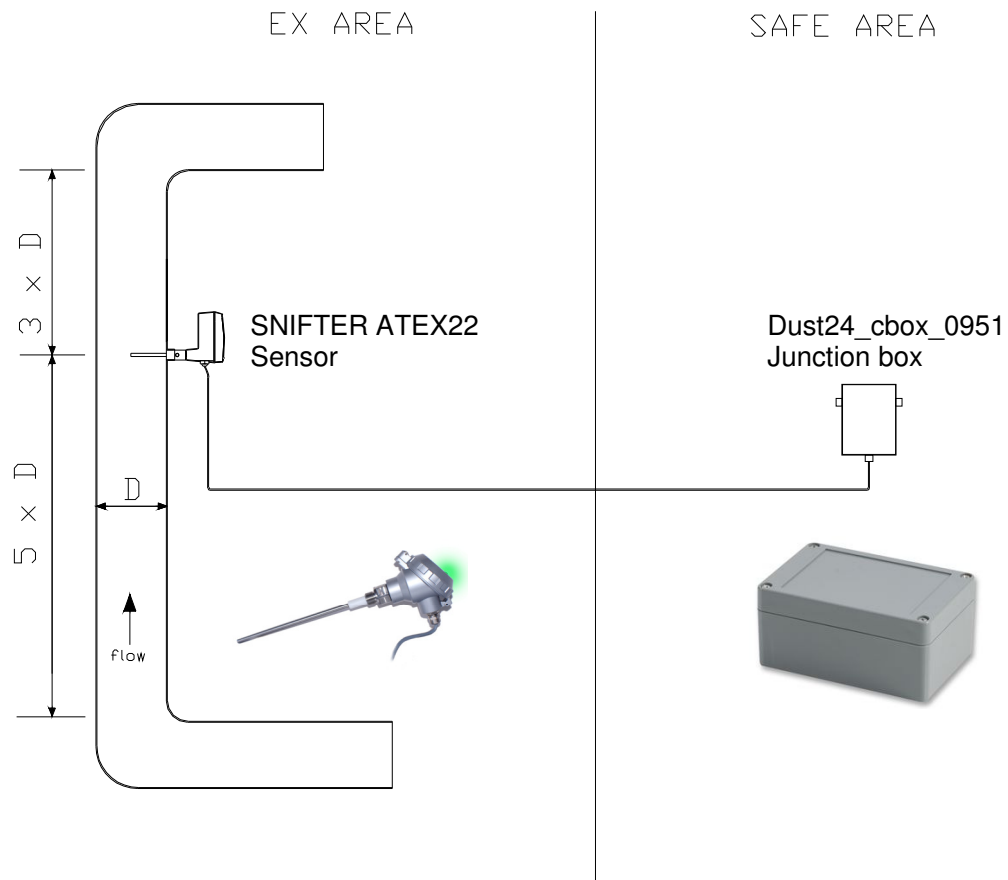


Figure 1. General layout presentation of Snifter ATEX22-model installation

The best location for installation of the Atex22 sensor is in a section of duct where the particulate has an even distribution and the flow is as laminar as possible. This is to ensure that the sensor rod comes into contact with a representative flow of particles.

The ideal position would be in a section of duct, having no bends, valves, dampers or other obstructions for a distance equal to at least three duct diameters downstream or upstream (preferable 5 x duct diameter). See figure 2.

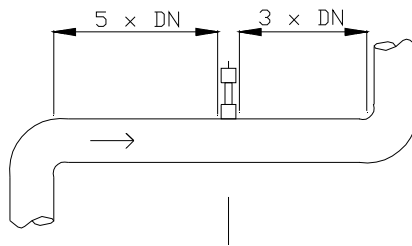


Figure 2. Recommended distances to duct bends (DN=Duct Diameter)

In some applications, a compromise must be made and the sensor will have to be fitted in a position that satisfies the majority of above requirements. The sensor must be attached to metal ductwork so that they will be electrically shielded from interference and be provided with a ground reference.

1. The unit shall be installed in a position, where the gas flow passes the sensor rod in a 90° angle.
2. In round cross-section ducts, the unit can be installed in any position above the horizontal axis (between 9 o'clock and 3 o'clock). See figure 3a.
3. For square cross-section ducts, the unit must be positioned in the middle of the top or in the middle of one of the sides. See figure 3b.
4. Although the sensor is not affected by vibration, very high vibration levels should be avoided.
5. The sensors must not be installed in direct sunlight or in areas where the ambient temperature is above 60 °C.

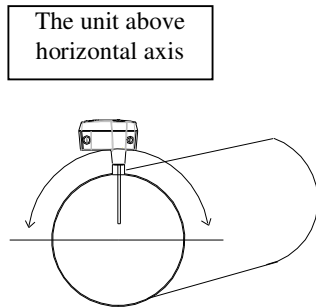


Figure 3a. Round cross-section duct

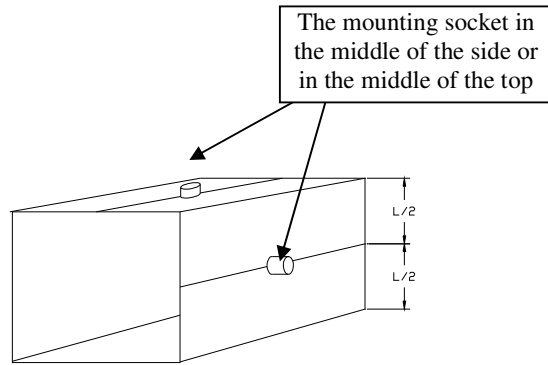


Figure 3b. Square cross-section duct

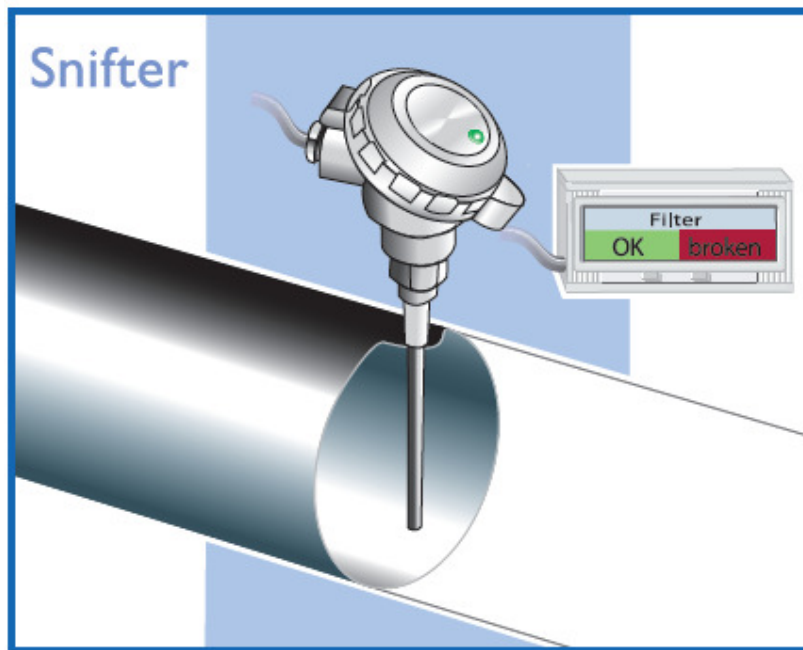


Figure 4. Atex22 sensor installed on a duct

NOTE !

The sensor must not contact the opposite wall or any other obstacle inside the duct. The only allowed interaction with sensor is dust particles.

2.2. Installing the sensor

Once the location of the unit has been selected, the sensor with BSPT 1/2" male thread can be installed to process adapter with 1/2" female thread. Make sure the installation is in the right position, insert the sensor inside the adapter and rotate the sensor until the connection is tight.

NOTE!

Make sure the Snifter's 1/2" male thread process connection makes the contact to metal duct i.e. ground potential. If the duct or channel where Snifter is mounted is not of metal, the grounding must be done by using separate grounding wire so the enclosure of Snifter is firmly grounded.

Sensor rod instead must not contact to the duct's opposite wall or any other obstacle inside the duct. The only allowed interaction with the sensor rod is the flowing dust particles.

2.3. Installing the Junction Box

Connect the sensor only to a Junction Box, which is designed for Atex22 sensor. The junction box cannot be installed in potentially explosive atmosphere. See figure 1 in page 5.

Junction Box provides additional functionalities for Snifter unit, such as:

- 45° tilted connectors for easy usage.
- remote auto-setup button on the cover of the box.
- two additional electromechanical relays (AC: 240VAC / 6A, DC: 30VDC / 15 A) substitute Atex22 sensor solid state relay signals.
- Junction Box includes required slow blow fuses for Atex22 sensor.

Box is provided with three cable glands attached in the sides for the cabling and one auto setup button mounted on the face of the box. (See figure 5.)

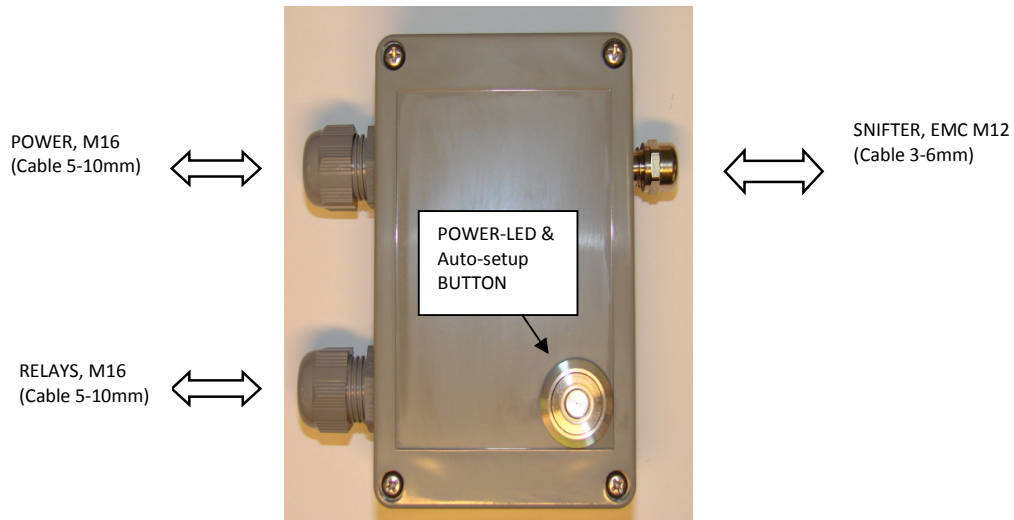


Figure 5. Junction Box

3. WIRING

Required voltage for Sniffer Atex22 model is 12-24 VDC.

The sensor comes with two meter power and signal cable ready connected. There are 4 pairs (8 wires) in the same cable, two wires for 12-24 VDC, and two for relays. All these 8 wires should be connected to Junction Box.

NOTE! If the two meter sensor cable is not enough to reach from Ex area to safe area the cable must be extended, Junction Box is not allowed to installed in Ex area.

WIRE NO	WIRE COLOUR	FUNCTION	
1	WHITE	reserved	Not in use
2	BROWN	reserved	Not in use
3	GREEN	Start auto setup	contact to signal cable shield to start the auto setup
4	YELLOW	reserved	Not in use
5	GREY	Input power voltage	V- (0VDC)
6	PINK	Input power voltage	V+ (12 - 24 VDC)
7	BLUE	solid sate relay 1	V (12-24 VDC, I _{max} = 70 mA)
8	RED	solid sate relay 2	V (12-24 VDC, I _{max} = 70 mA)

Table 1. Wire numbers and colour coding for Atex22 sensor

3.1. Connecting Atex22 sensor and Junction Box

Before connecting cables inside the Junction Box, prepare cables for terminal screw connection and tighten them well with the glands. Ensure good connection with EMC cable gland.

Wire signals to appropriate terminals, as described below. Typical Atex22 sensor signal cable colours are noted in brackets. However, always check the right signal colouring from table 1 to ensure correct connections.

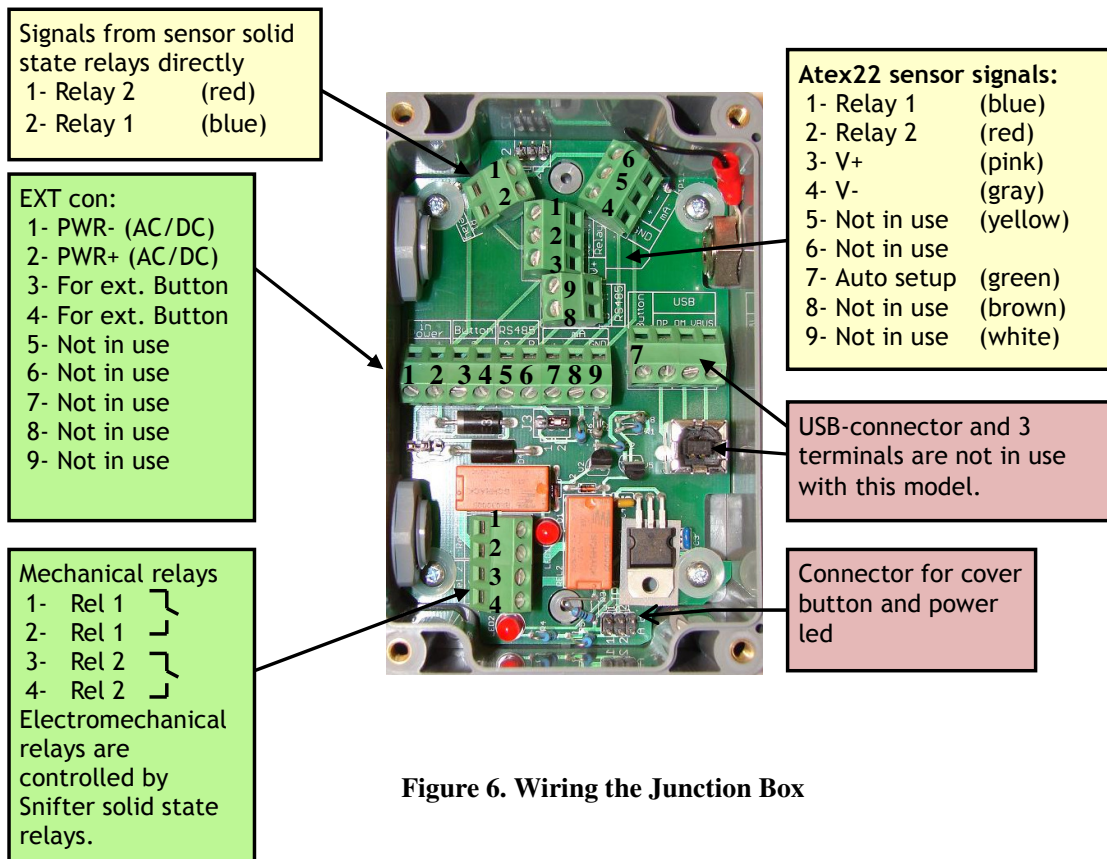


Figure 6. Wiring the Junction Box

Connect the 8 wires from Atex22 sensor as defined in figure 6 above (Atex22 signals).

Connect the 12-24 VDC power supply to the external connector (EXT con) terminals 1 and 2. **The power plus to Atex22 sensor is secured with a 500mA slow blow (T) fuse.**

Relays

Junction Box has two additional electromechanical relays (AC: 240VAC / 6A, DC: 30VDC / 15 A), which are controlled by Atex22 sensor solid state relays.

There is also possibility to use directly Atex22 sensor solid state relays. Connect the relay load, continuous maximum load 70mA, between the output wire and power supply minus wire. **Each relay output is secured with a 100mA slow blow (T) fuse.** See figure 6 above.

Solid state relay operating

- When a relay is ON (i.e. makes a contact), it connects its output to power supply plus (+) potential (pink wire).
- When the relay is OFF, the output is pulled to power supply minus (-) potential (grey wire) by a weak resistor, to allow relay status check using a voltmeter if no relay load is connected to the output.

Auto setup

When Atex22 sensor is connected to the Junction Box the auto setup can be started by pressing the button on the cover of the Junction Box for 2 seconds.

The running of the auto setup is indicated by blinking led in the Atex22 sensor front cover. Auto setup is done after 10 minutes and the Snifter Atex22 is ready for use.

NOTE!

If the Junction Box is wrongly grounded to local ground, it can make a very harmful ground current loop and Snifter Atex22 doesn't work correctly.

NOTE 1:

All signals inside Junction Box should be always connected to some terminal. In case the manual advises some signals not to be connected, it is advisable to connect them anyway with incoming terminals. Just do not connect or use those mentioned signals in EXT connector. This way any loose signal cables cannot cause short circuit within the enclosure.

NOTE 2:

If relays are used to connect high voltage power lines, keep in mind, that separated top right corner of the PCB board will contain deadly voltages. Always ensure that relay connector voltage is shut down, before opening the enclosure.

Jumpers in a Junction Box circuit board

There are 3 different jumpers J1, J2 and J3 in a Junction Box circuit board. These jumpers are for adjusting functionality. See the list below.

Jumper	Position 1	Position 2
J1	Chassis as Button GND	Power in GND as button GND
J2	Not in use	Not in use
J3	Not in use	Not in use

NOTE! In Snifter Atex22-model the Jumpers must be positioned in the following way.

J1- Position 1

J2- not needed

J3- not needed

NOTE !

When Atex22 sensor is used in ATEX zone 22 environment. following external protection fuses are needed to add to the power supply and output signal wires.

Wire6 (PINK COLOR) shall be protected externally using a slow blow 500mA fuse, with > 30Vrated voltage and > 30A breaking capacity.

Wire7 (BLUE COLOR) shall be protected externally using a slow blow 100mA fuse, with > 30V rated voltage and > 30A breaking capacity.


Wire8 (RED COLOR) shall be protected externally using a slow blow 100mA fuse, with > 30V rated voltage and > 30A breaking capacity.

JUNCTION BOX includes these above mentioned slow blow fuses.

4. TECHNICAL SPECIFICATION

ATEX22 sensor specifications	
Measurement objects	Solid particles in a gas flow
Particle size	0,3 µm or larger
Measurement range	From 0,1 mg/m ³
Range setup	Automatic
Temperature	Max 140 °C
Pressure	2 bar
Gas velocity	Min. 4 m/s
Humidity	95% RH (non-condensing)
Measurement principle	Electrostatic charge detection
Damping time	3s – changeable 1-300 seconds at factory
Output signals	2 solid state relays (70mA)
Junction Box fuses	For power input voltage: a slow blow 500mA fuse, with > 30V rated voltage and > 30A breaking capacity. For each solid state relay: a slow blow 100mA fuse, with > 30V rated voltage and > 30A breaking capacity.
Alarm settings	Alert - 5 x normal dust level Alarm - 20 x normal dust level
Ambient temperature	- 20 ... + 60 °C
Probe	SS 316 L (220 mm)
Enclosure	Aluminium
Protection category	IP65
Power supply	12-24 VDC
Power consumption	3 W
Cable (power + signal)	4 pair, shielded
Process connection	BSPT 1/2" male thread (standard) female 1/2" welding socket (option)
Weight	Approx. 0,7 kg

This instrument conforms to the following standards

	Electromagnetic Compatibility EMC - electrical equipment for measurement, control and laboratory use – EMC requirements	IEC 61326-1:2005 (First Edition)
	ATEX standards	EN 60079-0 EN 60079-15 EN 60079-18 EN 61241-0 EN 61241-18

Junction box specifications		
Operating voltage range		
	DC	12 – 24 VDC
Electromechanical relay contacts		
	Rated voltage	AC :250 VAC DC: 30 VDC
	Max current	AC: 6 A DC: 15A
	Breaking voltage	400 VAC
Gland sizes		
	1 x M12 (EMC) metal	3...6 mm cables
	2 x M16 plastic	5...10 mm cables
Enclosure		
	Material	ABS
	Color	Dark grey
	L x W x D	120 x 80 x 55 mm

5. DIMENSIONS

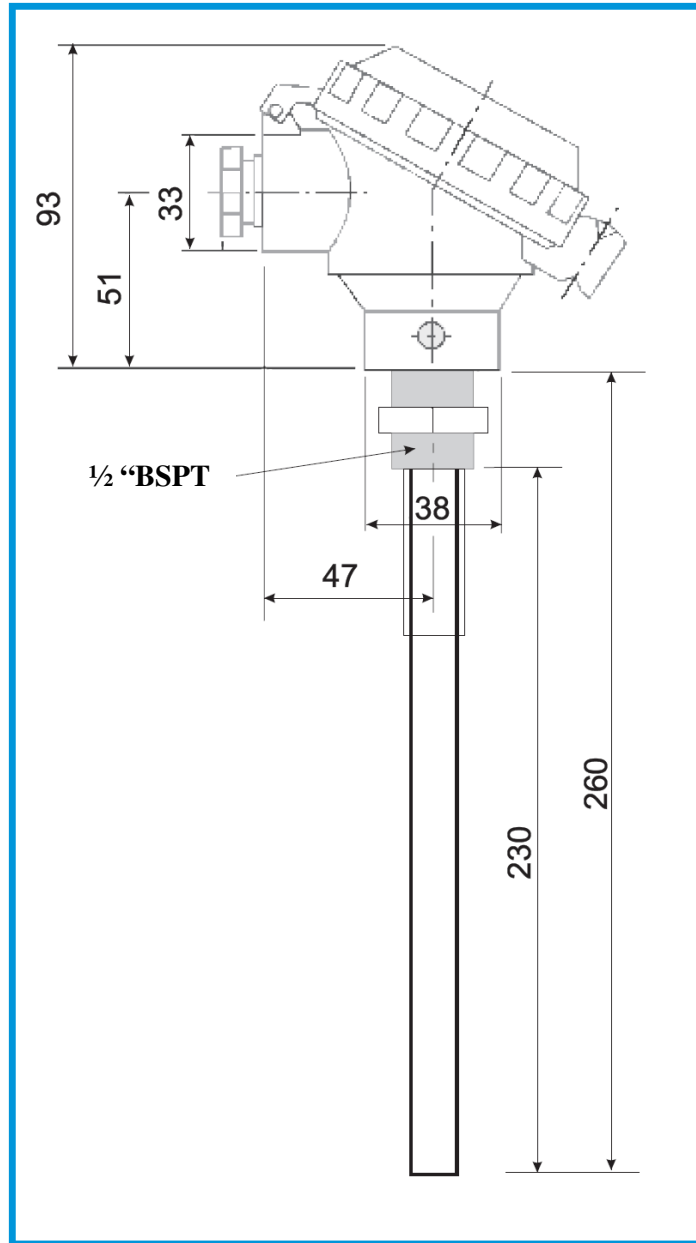


Figure 7. Structure and dimensions of Atex22 sensor

6. OPERATION

The Snifter Dust Monitor measures the dust level in a gas flow by monitoring electrostatic/-dynamic discharge when charged dust particles hit or pass near by the probe. There are two solid state relay contact alarm outputs and three colour indicator LED in front cover of the Atex22 sensor.

The alarm relays arrangements. See next page table 2

- **Relay 2 is ON (=makes a contact) in normal operation.**
- **Relay 2 turns OFF and relay 1 ON** when dust level exceeds 5x normal dust level.
- **Both relays are ON** when dust level exceeds 20x normal.

Note: The electromechanical relays in Junction Box are controlled by the solid state relays with similar functionality.

The alarm threshold factory default values:

- Alert : > 5x normal dust level = Limit 1 value
- Alarm: > 20x normal dust level = Limit 2 value

Three state of Atex 22 sensor LED indicator

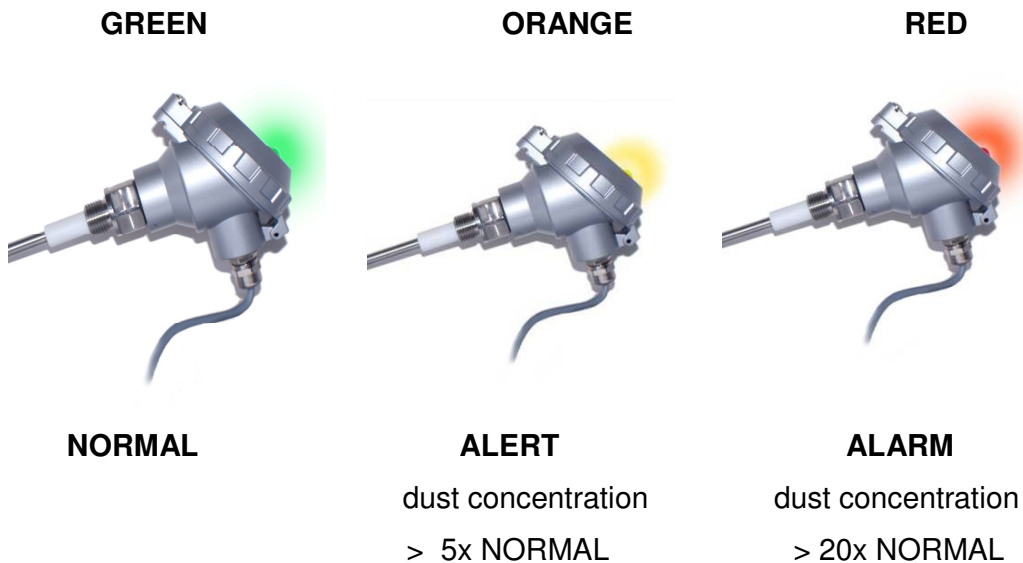
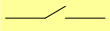
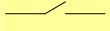
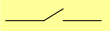
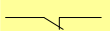
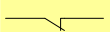
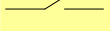
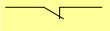
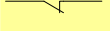


Table 2. Relay and LED indicator functions in Atex22 sensor

relay on/off	relay state	Signal level	led indicator	operation
Both relays OFF	 relay 1  relay 2	Power OFF or fault	OFF	Power OFF or failure
Relay 1 OFF Relay 2 ON	 relay 1  relay 2	Signal < Limit1	GREEN	Normal
Relay 1 ON Relay 2 OFF	 relay 1  relay 2	Limit1 < signal < Limit2	YELLOW	Alert
Both relays ON	 relay 1  relay 2	signal > Limit 2	RED	Alarm

7. AUTOMATIC SETUP

To be able to detect variations in dust flow, and to set the alarm so that it will be on if there is excessive dust flow, **you must determine the typical dust flow in the application when the process is operating normally.**

The unit has an AUTOMATIC SETUP function. AUTOMATIC SETUP sets the parameters in a way, that the relays give an alert when the dust concentration exceeds 5x the typical dust level and an alarm when 20x typical level is exceeded.

For AUTOMATIC SETUP you need to know that the process is running with **a normal dust flow rate**. The green LED indicator in the front cover blinks when AUTOMATIC SETUP PROCEDURE is going on.

AUTOMATIC SETUP procedure takes up to 10 minutes to be completed, green LED in front cover stops blinking after auto setup is done and Sniffer is ready for use.

AUTOMATIC SETUP

1. Ensure that the process is running in normal conditions.
2. Connect the 12-24 VDC power on.
3. Close the front cover of Junction Box.
4. Make sure that the monitor has been connected to process and powered for at least 10 minutes in order to warm up and to stabilise.
5. When Atex22 sensor is connected to the Junction Box the auto setup can be started by pressing for 2 seconds the button on the Junction Box cover.
6. Make sure the auto setup has started. (Green LED indicator in front cover of Atex22 sensor starts blinking.)
7. Wait for up to 10 minutes until the green LED stops blinking indicating the automatic setup procedure has finished.
8. The unit is ready for use.

8. MAINTENANCE

Snifter Dust Monitor needs very little maintenance. To achieve maximum reliable operation the recommended maintenance interval is 2 months.

Maintenance is done by removing the unit from the process and cleaning the sensor rod from dust build-up to prevent signal leakage to ground.

If the particles in the gas are sticky and tend to build up, the cleaning needs to be done more often.

9. TROUBLESHOOTING

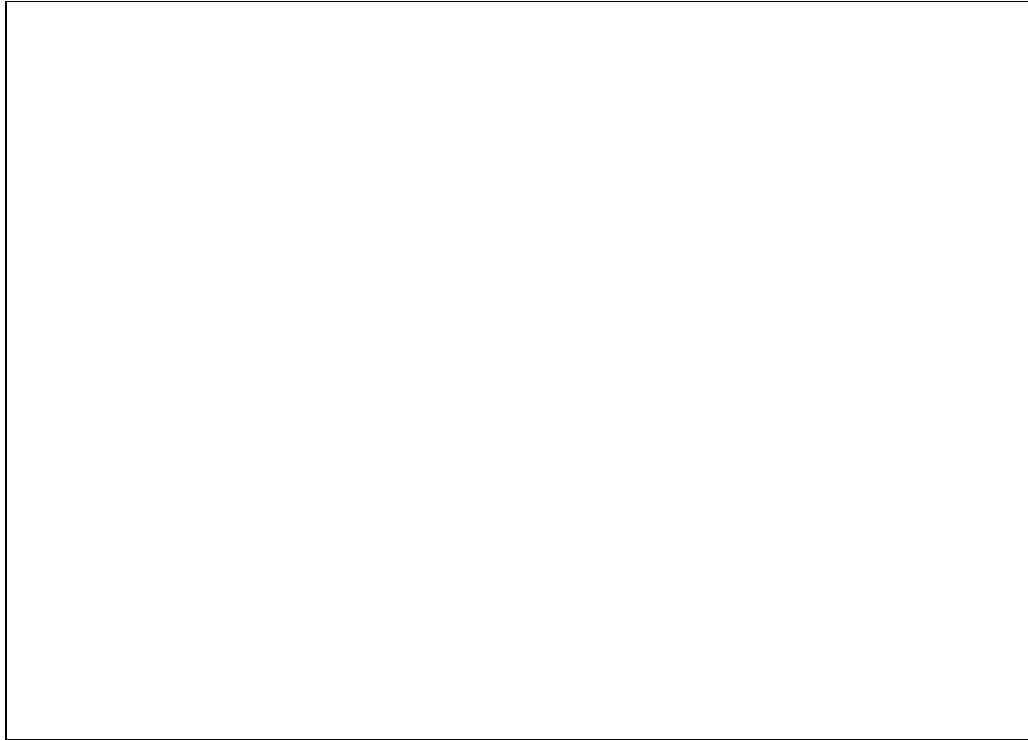
9.1. The Monitor is not giving relay output signal

1. Check the power and signal wiring are connected correctly.
2. Check the power is on (LED in cover glows).
3. Do the auto setup procedure
(Green LED starts blinking – stops when ready).

If the monitor is not giving any relay output signal after checks 1, 2 and 3 contact your local distributor.

9.2 The monitor is not responding after auto setup procedure.

1. Check that there is normal process going on and there were normal operation conditions during auto setup.
2. Check the power and signal wiring are connected correctly.
3. Check the signal is not leaking to ground.
 - There is NO contact between metal sensor probe and duct wall.
 - Ensure the gas is not condensing (causes signal leakage)
 - Check the sticky dust does not build up on the base of the sensor and no bridging between sensor probe and duct wall.



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