

# Instruction and Operation Manual

# S201

## Dew Point Sensor



Dear Customer,

Thank you for choosing our product.

The operating instructions must be read in full and carefully observed before you start up the device. The manufacturer cannot be held liable for any damage that occurs as a result of non-observance or non-compliance with this manual.

Should the device be tampered with in any manner other than a procedure that is described and specified in the manual, the warranty is canceled and the manufacturer is exempt from liability.

The device is destined exclusively for the described application.

SUTO offers no guarantee for the suitability for any other purpose. SUTO is also not liable for consequential damage resulting from the delivery, capability or use of this device.

Revision: 2024-1

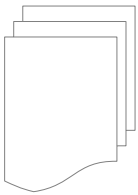


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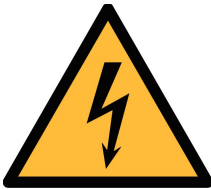
## 1 Safety instructions



**Please check if this instruction manual matches with the product type.**

Please observe all notes and instructions indicated in this manual. It contains essential information which must be observed before and during installation, operation and maintenance. Therefore this instruction manual must be read carefully by the technician as well as by the responsible user / qualified personnel.

This instruction manual must be available at the operation site of the dew point sensor at any time. In case of any obscurities or questions, regarding this manual or the product, please contact the manufacturer.



### **WARNING!**

#### **Compressed air!**

**Any contact with quickly escaping air or bursting parts of the compressed air system can lead to serious injuries or even death!**

- Do not exceed the maximum permitted pressure range (see sensors label).
- Only use pressure tight installation material.
- The system must be pressure-less during maintenance work.



### **WARNING!**

#### **Voltage used for supply!**

**Any contact with energized parts of the product, may lead to a electrical shock which can lead to serious injuries or even death!**

- Consider all regulations for electrical installations.
- The system must be disconnected from any power supply during maintenance work.
- Any electrical work on the system is only allowed by authorized qualified personal.

**ATTENTION!****Permitted operating parameters!**

**Observe the permitted operating parameters, any operation exceeding this parameters can lead to malfunctions and may lead to damage on the instrument or the system.**

- Do not exceed the permitted operating parameters.
- Make sure the product is operated in its permitted limitations.
- Do not exceed or undercut the permitted storage and operation temperature and pressure.

**General safety instructions**

- It is not allowed to use the product in explosive areas.
- Please observe the national regulations before/during installation and operation.

**Remarks**

- It is not allowed to disassemble the product.
- Always use spanner to mount the product properly.

**ATTENTION!****Measurement values can be affected by malfunction!**

**The product must be installed properly and frequently maintained, otherwise it may lead to wrong measurement values, which can lead to wrong results.**

**Storage and transportation**

- Make sure that the transportation temperature of the sensor without display is between  $-30 \dots +70^{\circ}\text{C}$  and with display between  $-10 \dots +60^{\circ}\text{C}$ .
- For transportation it is recommended to use the packaging which comes with the sensor.
- Please make sure that the storage temperature of the sensor is between  $-20 \dots +50^{\circ}\text{C}$ .
- Avoid direct UV and solar radiation during storage.
- For the storage the humidity must be  $<95\% \text{ rH}$ , no condensation.

## 2 Registered trademarks

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SUTO®	Registered trademark of SUTO iTEC
MODBUS®	Registered trademark of the Modbus Organization, Hopkinton, USA
HART®	Registered trademark of the HART Communication Foundation, Austin, USA

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## 3 Application

The S201 is a dew point sensor which is designed to monitor the dew point in industrial application within the permissible operating parameters. These parameters can be found in the technical data section.

The S201 can measure the following values:

- Temperature of the compressed air or gas.
- Humidity of the compressed air or gas.
- Dew point of the compressed air or gas.

The default factory settings are: temperature in °C, Humidity in % rH and dew point in °C Td. Other units can be programmed by the optional display or the service kit.

The S201 dew point sensor is not developed to be used in explosive areas. For the use in explosive areas please contact the manufacturer.

The S201 dew point sensor is mainly used in compressed air systems in industrial environment.

## 4 Features

- Dew point sensor for low dew point applications down to -60°C Td.
- Long term stability.
- Graphic display.
- Relay output.
- IP65 casing provides robust protection in rough industrial environment.
- Very fast response time ensures safe and reliable indication whenever dew points are out of valid ranges.
- Can be installed directly into dryers through G ½" thread.
- High accuracy of  $\pm 2^{\circ}\text{C}$  Td dew point.

## 5 Technical data

### 5.1 General

<b>CE</b>	
Parameters	Standard unit dew point: °C Td Standard unit temperature: °C other units: °F, K Standard unit humidity: % rH
Principle of measurement	Capacitive method
Sensor	Polymer
Measuring medium	Non-corrosive gases
Measuring range	Dew point: -60 ... +20°C Td Relative humidity: 0 ... 90% rH Temperature: -30 ... +70°C
Ambient temperature	-20 ... +50°C
Ambient humidity:	0 ... 100% rH
Operating pressure	-0.1 ... 5.0 MPa
Housing material	PC + ABS
Material of the sensor head and the screwing	Stainless steel sinter filter pore size < 30 µm
Protection class	IP65
Dimensions	See dimensional drawing on the page 9
Display	128 x 64 pixel, with backlight
Screwing thread	G ½" thread (ISO 228/1); UNF 5/8" thread (on request)
Weight	226 g

### 5.2 Electrical data

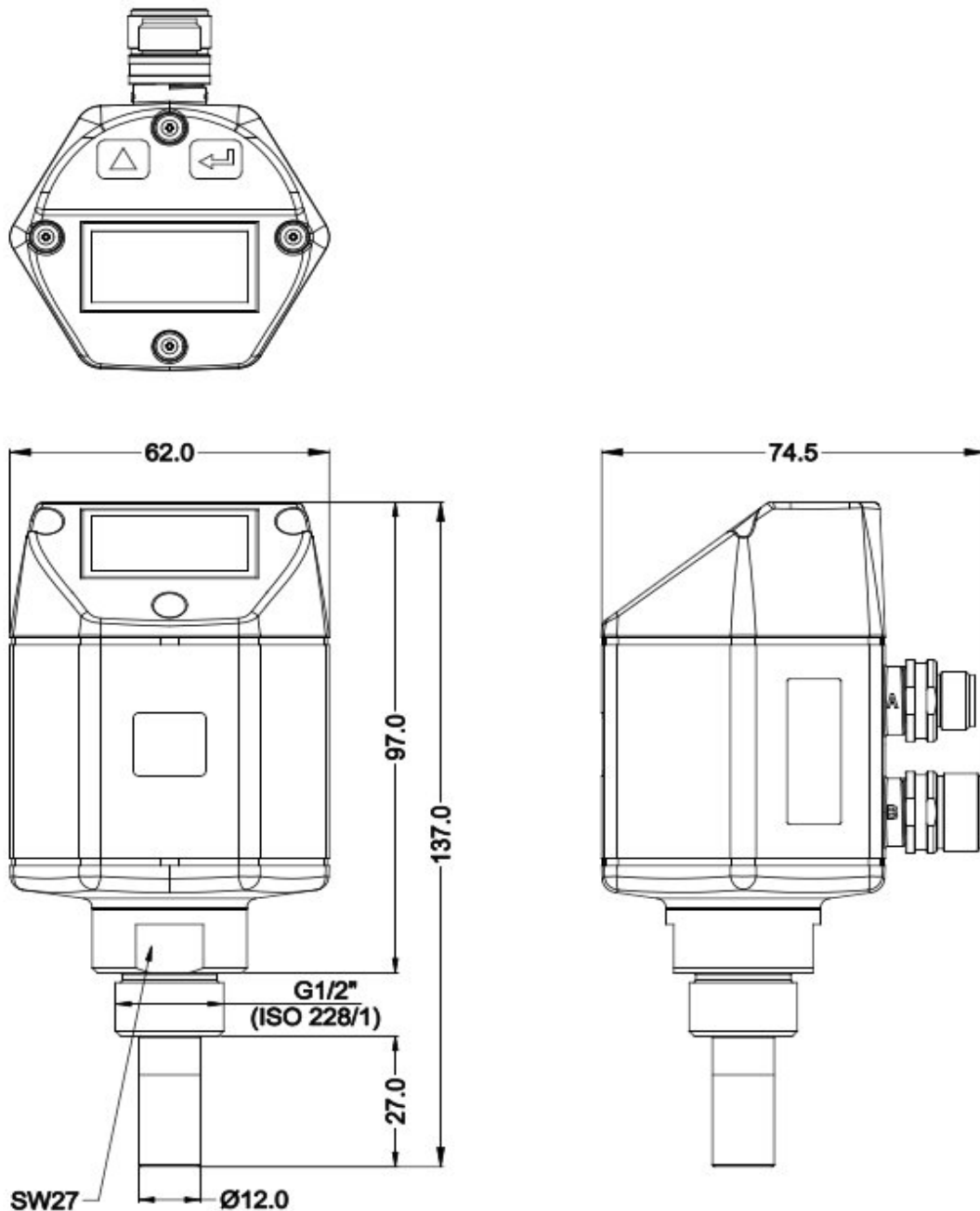
Power supply	12 ... 30 VDC / 100 mA
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### 5.3 Output-signals

Analog output	Signal: 4 ... 20 mA, 3 wire
Analog output scaling	4 mA = -60°C Td 20 mA = +20°C Td
Relay output	NO, 32 VDC, 500 mA

## 6 Dimensional drawing



## 7 Installation

Before installing the sensor, please make sure that all components listed below are included in your package.

Qty	Description	Item No.
1	Dew Point Sensor	S699 0406
2	M12 connector	C219 0059
1	Instruction manual	No P/N
1	Calibration certificate	No P/N

### 7.1 Installation requirements

The device is for indoor use only! At an outdoor installation, it must be protected from solar radiation and rain.

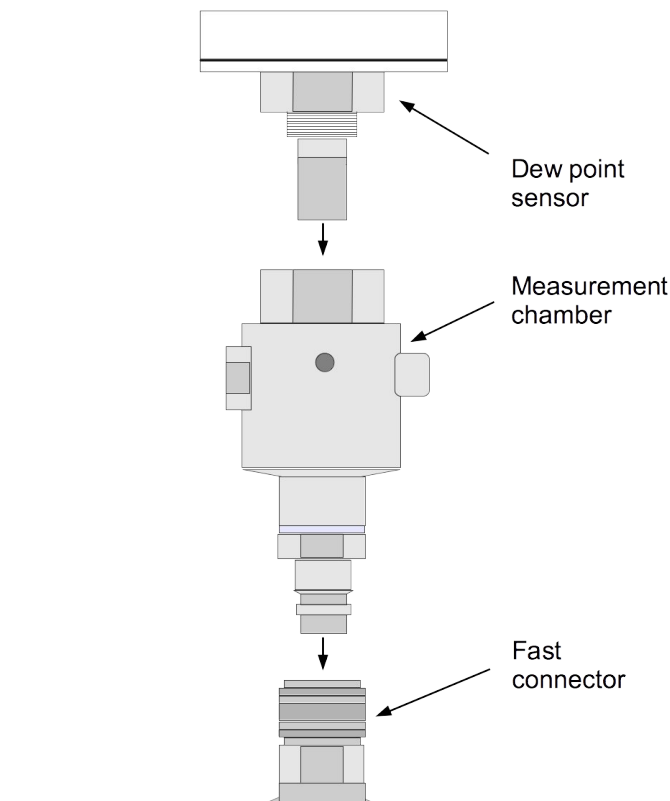
- It is strongly recommend not to install S201 permanently in a wet environment, which usually exists right after a compressor outlet.
- The flowing air or gas must pass the sensor tip for a proper measurement. This can be realized with a measurement chamber.

For an installation without the measuring chamber, you must insert the device to the required depth, as described in section 7.2.2 Install without measurement chamber.

## 7.2 Installation procedure

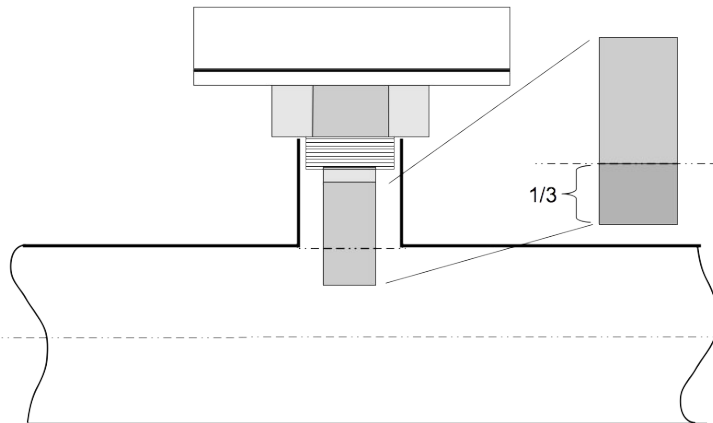
The following steps explain the procedure of an appropriate installation.

### 7.2.1 Install with measurement chamber



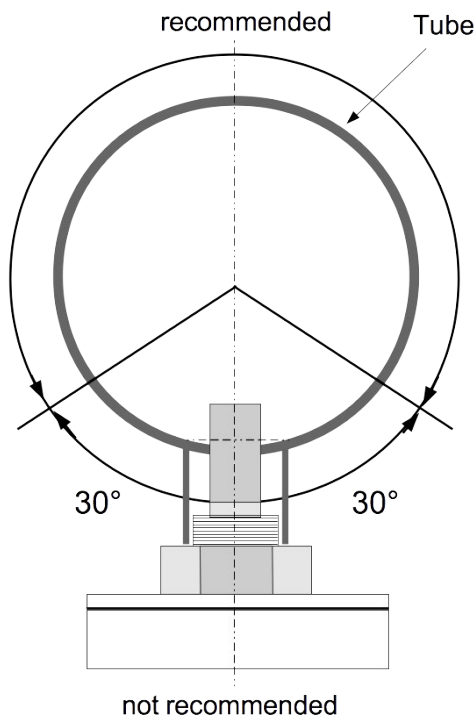
1. Connect the sensor with the measurement chamber.
2. Connect the sensor and the measurement chamber with the fast connector.

### 7.2.2 Install without measurement chamber



- Install the sensor only if the system is pressureless.
- Not less than 1/3 of the sensor tip should be inside of the pipe. For this please check the size of the nozzle.
- The inner thread must be G 1/2".

#### Remarks



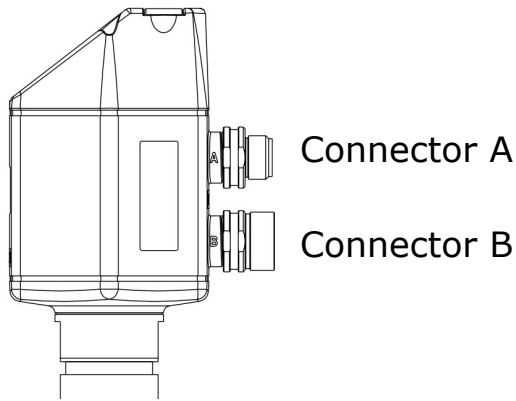
Please install the sensor only in the recommended area like you can see in the picture. A upside down installation is not permitted. Please consider that the distance to the vertical level must be  $>30^\circ$ .

### 7.2.3 Remove the sensor

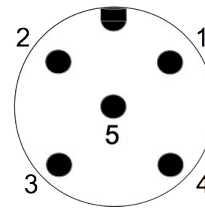
To remove the sensor unscrew the sensor from the measurement chamber or from the nozzle. Please observe that the system is pressure-less when the sensor is removed.

### 7.3 Electrical connection

The dew point sensor is equipped with two connectors "A" and "B". The cables are connected to the sensor through the M12 connector.



Pins of connector M12



view from the clamping side

#### Pin assignment connector M12

	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
Connector A	SDI	$-V_B$	$+V_B$	+I	N/A
Connector B	SEL	N/A	N/A	NO1	NO2
Wire color	brown	white	blue	black	grey

#### Legend to pin assignment

SDI Digital signal (internal use)

$-V_B$  Negative supply voltage

$+V_B$  Positive supply voltage

+I Positive 4 ... 20 mA signal

N/A Not applicable

NO1 Relay output

NO2 Relay output

SEL Internal signal



#### ATTENTION!

**Do not screw the M12 connector using force. Otherwise, it may damage the connecting pins.**

## 8 Signal outputs

### 8.1 Analog output

The sensor has an analog output range of 4 ... 20 mA. It is a 3-wire active analog output. This output is scaled to:

- 4 mA =  $-60^{\circ}\text{C Td}$
- 20 mA =  $+20^{\circ}\text{C Td}$

For other ranges, please contact the manufacturer. The analog output can be allocated to the temperature, the dew point and the humidity.

### 8.2 Relay output

The S201 has a relay alarm output. It is possible to monitor e.g. the dew point value and gives an alarm at a particular threshold value.

#### Alarm relay specifications:

Rating: 32 VDC / 500 mA

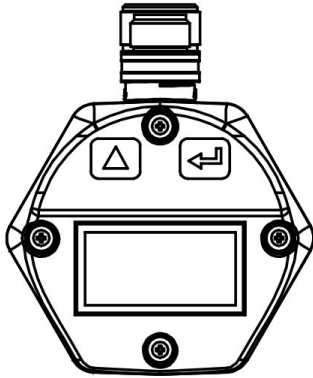
Please find the different states in the table below.

Situation	Relay state
S201 is powered off	OPEN
S201 is powered on / no alarm value is reached	CLOSED
S201 is powered on / alarm value is reached	OPEN

The advantage of the normally open relay is, that both critical situations can be detected, not only if the alarm value is reached, also if the device has a power loss.

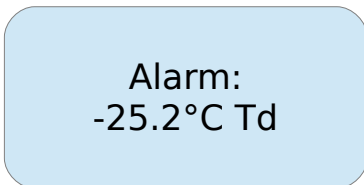
## 9 Sensor display

With the Sensor display it is possible to show the temperature, humidity and the dew point. Moreover it shows error messages and enables you to change the configuration setting of the sensor.



“Enter key” =

“Up key” =

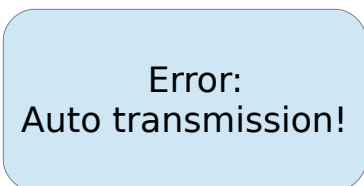


By pressing the Enter key the current alarm threshold value can be shown and it will go back to online value automatically in 3 seconds.

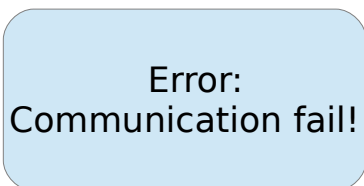
### 9.1 Starting process

After power up, the display starts automatically with an initialisation procedure. During the next eight seconds, the display will show the current software version and starts the connection to the sensor. Now the display enters the standard mode, showing the temperature, humidity and the dew point, alternately.

### 9.2 Error messages



For this case please contact a technician of the manufacturer.



As soon as the communication fails, the instrument will show this message. Please restart the power supply in most of the cases this will fix the problem. If the problems still exists please contact a technician of the manufacturer.

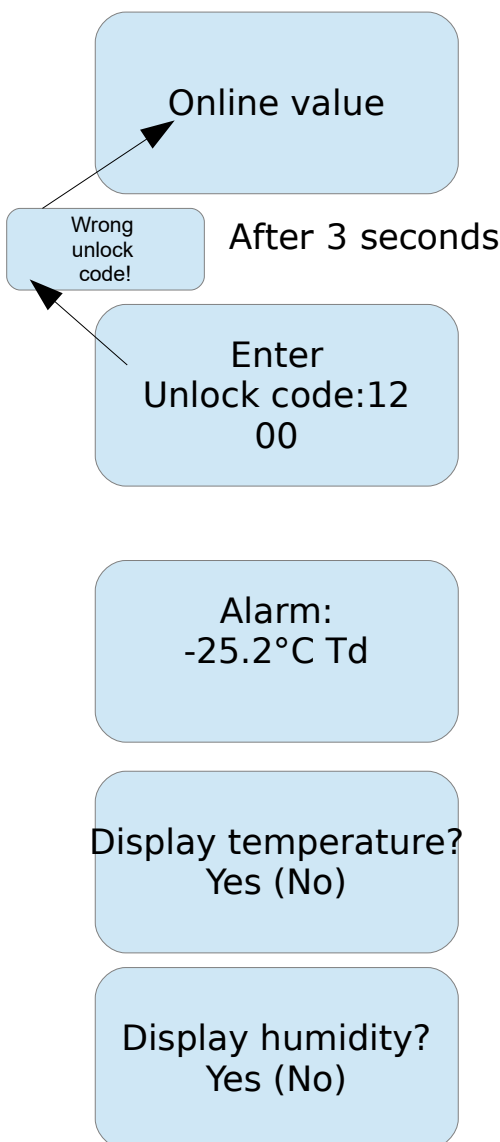
Error:  
Sensor unmatched!

If the sensor and the display settings are not matching, the instrument will show this message. Please contact a technician of the manufacturer.

### 9.3 Configuration using the display

The S201 is usually configured ex factory according to the ordered customer settings.

In case of settings must be changed, please observe the following steps.



1. At first keep the Enter key ( ↵ ) pressed for three seconds. Then the S201 will ask to enter the unlock key.

2. Enter the unlock code "12". The selected digit will be flashing. To modify the digit press up key ( Δ ), press the Enter key ( ↵ ) to confirm, and shift to the next digit or go to the next page.

3. Set alarm. The selected digit will be flashing. To modify the digit, press the Up key ( Δ ). Press the Enter key ( ↵ ) to confirm, and shift to the next digit or go to the next page.

4. Adjust to display the temperature. Press the Up key ( Δ ) to select "Yes" or "No". Press the Enter key ( ↵ ) to confirm and go to the next page.

5. Adjust to display the humidity. Press the Up key ( Δ ) to select "Yes" or "No". Press the Enter key ( ↵ ) to confirm and go to the next page.



Display dew point?  
Yes (No)

6. Adjust to display the dew point. Press the Up key (  $\Delta$  ) to select "Yes" or "No". Press the Enter key (  $\downarrow$  ) to confirm and go to the next page.

Display contrast  
Up - Change  
Enter - Okay

7. Adjust the display contrast. Press the Up key (  $\Delta$  ) to change the contrast. Press the Enter key (  $\downarrow$  ) to confirm and go to the next page.

Upside Down?  
Yes (No)

8. Set the display orientation. Press the Up key (  $\Delta$  ) to select "Yes" for upside down or "No" for normal view. Press the Enter key (  $\downarrow$  ) to confirm. The settings will be saved automatically.

System reset

9. Online measurement value will be shown in three seconds automatically.

**Notes:**

- To abort the entry process keep the enter key pressed for three seconds.
- Online value will be shown automatically if there is no key pressed for more than 20 seconds.

## 10 Optional extra accessories

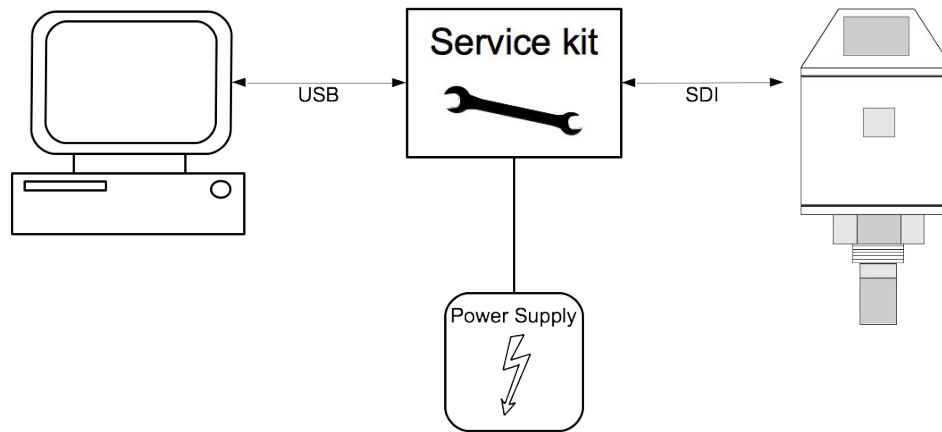
### 10.1 Measuring chambers

There are different types of measuring chambers for example Measuring chamber with fast connector, by-pass-by chamber with in and out connection, measuring chamber for dryer installation or high pressure chamber. For more information please contact your retailer or the manufacturer.

### 10.2 Service kit

The service kit is used to connect the sensor with the PC. Sensor parameters such as analog output scaling, alarm values, units etc. can be easily changed by using the service kit.

The diagram below shows the connection when using the optional service kit. Please ensure that also in this case the power supply of either S201 or of the service kit is connected because the USB port is not supplying enough power.



## 11 Calibration

The sensor is calibrated ex work. The exact calibration date is printed on the certificate which is supplied together with the sensor. The accuracy of the sensor is regulated by the on site conditions, parameters like oil, high humidity or other impurities can affect the calibration and furthermore the accuracy. However we recommend to calibrate the instrument at least once per year. The calibration is excluded from the instruments warranty. For the calibration service, please contact the manufacturer.

## 12 Maintenance

Please observe from time to time the sinter cap. If it appears to be dirty, it is recommended to replace it. For the replacement service, please contact the manufacturer.



### **ATTENTION!**

**A dirty/wet/contaminated sinter cap or sensor tip may lead to a longer response time and to wrong measurements.**

### 13 Disposal or waste



Electronic devices are recyclable material and do not belong in the household waste.

The sensor, the accessories and its packings must be disposed according to your local statutory requirements.

The dispose can also be carried by the manufacturer of the product, for this please contact the manufacturer.

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