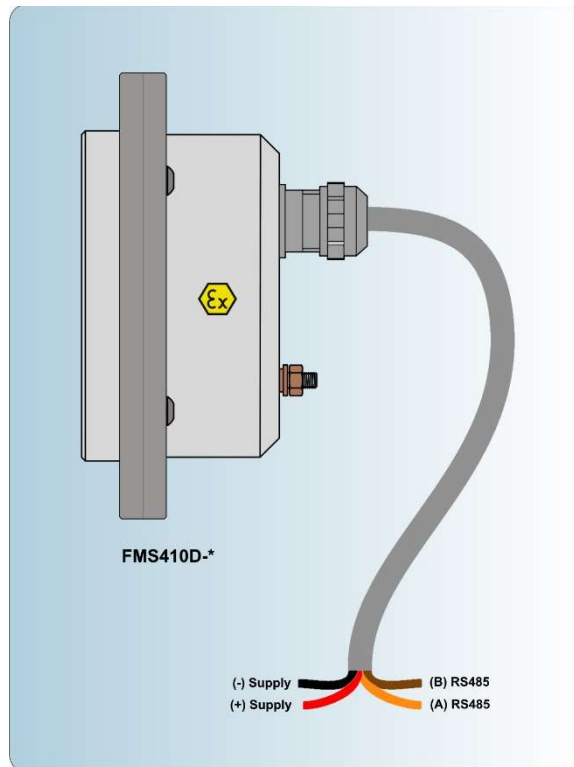


## Operating instructions

# FSI410iD

# FMS410D-\*



### Variants:

Moisture sensor <b>FMS410D-K</b>	Sensor with POM cup/measuring orifice
Moisture sensor <b>FMS410D-C</b>	Sensor with POM cup and ceramic orifice plate
Moisture sensor <b>FMS410D-T</b>	Sensor with PTFE cup/measuring orifice
Moisture sensor <b>FMS410D-S</b>	Sensor with Teflon cup and ceramic orifice plate

**Operating instructions for:**

Moisture sensor FMS410D-\* for the dust Ex area

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**Disclaimer**

We have checked the contents of this publication for conformity with the hardware and software described. However, deviations cannot be ruled out, so we cannot guarantee complete conformity. The information in this publication is checked regularly. Corrections and additions will be made in the following version. We are grateful for any suggestions for improvement.

**Subject to technical changes**

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## Safety regulations and instructions

### Follow the instructions for installation:



**Note:** Installation, operation and maintenance may only be carried out by qualified personnel.

The applicable safety guidelines (including the national safety guidelines), accident prevention regulations and general technical regulations must be observed when installing and operating the appliance.



**Note:** The circuits in the sensor must not be accessed.

Do not repair the sensor yourself, but replace it with an equivalent sensor. Repairs may only be carried out by the manufacturer.



**Note:** The sensor is suitable for use in Zone 20

The safety-relevant data can be found in the operating instructions and in the ATEX certificate (EU type examination certificate or other certificates, if necessary).

## Classification of the instructions

This manual contains instructions that you must observe for your personal safety and to prevent damage to property. The instructions are highlighted by a warning triangle and shown as follows, depending on the degree of danger.



### **DANGER**

means that death or serious bodily injury will occur, if the appropriate precautions are not taken.



### **WARNING**

means that death or serious bodily injury may occur, if the appropriate precautions are not taken.



### **CAUTION**

with a warning triangle means that minor bodily injury may occur, if the appropriate precautions are not taken.

### **CAUTION**

without warning triangle means that material damage may occur, if the appropriate precautions are not taken.



means that an undesirable result or condition will occur, if the corresponding notice is not observed.



is important information about the product, the handling of the product or the part of the documentation to which particular attention is drawn, and compliance with which is recommended.

In addition to these instructions in this publication, the generally applicable safety and accident prevention regulations must be observed. If the information contained in this brochure is not sufficient in any case, our telephone service is at your disposal for further information. Please read this document carefully before installation and commissioning.

### **CE mark**

This product meets the specifications of the EMC Directive 2014/30/EU

## **General**

This appliance has left the factory in a technically safe condition. In order to maintain this condition and to ensure safe operation of the appliance, the instructions and warnings given in these operating instructions must be observed by the user.

### **ATTENTION**

For reasons of clarity, these instructions do not contain all detailed information on all types of this product and cannot take into account every conceivable case of installation, operation or maintenance. Should you require further information, or should particular problems arise that are not covered in sufficient detail in the instructions, you can request the necessary information by telephone.

Furthermore, we would like to point out that the contents of the instructions are not part of a previous or existing agreement, promise or legal relationship or are intended to change these. All obligations of Mütec Instruments GmbH arise from the respective purchase contract, which also contains the complete and solely valid warranty provisions. These contractual warranty provisions are neither extended nor limited by the explanations in the instructions.

The content reflects the technical status at the time of printing. We reserve the right to make technical changes in the course of further development.

### **WARNING**

The correct and safe operation of this moisture sensor requires proper transportation, storage and installation as well as careful maintenance. The moisture sensor may only be used for the purposes specified in these operating instructions.

### **DISCLAIMER**

All modifications to the moisture sensor, unless expressly in the operating instructions, are the responsibility of the user.

### **QUALIFIED PERSONNEL**

are persons who are familiar with the installation, assembly, commissioning and operation of the product and who have the appropriate qualifications for their work, e.g:

- Training or instruction or authorization to operate and maintain devices/systems in accordance with the safety engineering standard for electrical circuits, high pressures and aggressive and hazardous media.
- For devices with explosion protection: training or instruction or authorization to carry out work on electrical circuits for potentially explosive systems.
- Training or instruction in accordance with safety engineering standards in the care and use of appropriate safety equipment.


### **CAUTION**

Electrostatic sensitive modules can be destroyed by voltages that are far below the threshold of human perception. These voltages already occur when you touch a component or electrical connections of an assembly without being electrostatically discharged. The damage that occurs to a module due to an overvoltage cannot usually be detected immediately, but only becomes noticeable after a long period of operation



## 1 General information for installation and operation

### Labeling according to Directive 2014/34/EU:

Checkpoint \_\_\_\_\_ **0158**  **II (2) G**

Device group \_\_\_\_\_

Associated equipment with external circuits \_\_\_\_\_  
for connection to category 2 devices \_\_\_\_\_

for explosive mixtures of air and flammable substances \_\_\_\_\_  
Gases, vapors or mists \_\_\_\_\_

### Marking of the type of protection:

associated electrical operating \_\_\_\_\_  
Medium according to European standard \_\_\_\_\_

Type of protection \_\_\_\_\_

EPL (Equipment Protection Level) \_\_\_\_\_

Equipment group \_\_\_\_\_

**[Ex ia Ga] IIC**

### Safety instructions

The moisture sensor must be taken out of operation and secured against unintentional operation if it must be assumed that safe operation is no longer possible. Reasons for this assumption may be

- Visible damage to the device
- Failure of the electrical function
- Longer storage at temperatures above 85 °C
- Heavy transportation stress

Before the sensor is put back into operation, a professional routine test in accordance with DIN EN 61010, Part 1 must be carried out. This test should always be carried out by the manufacturer. Repair work on Ex devices may only be carried out in accordance with §9 of the Ex Ordinance (Elex V).

### Intended use

The **FMS410D**-\* moisture sensor is used for inline measurement of the relative product moisture in bulk materials and solids. It may be operated as safe equipment in the dust Ex area of zone 20.

The maximum ambient temperature range of the **FMS410D-C** and **FMS410D-K** moisture sensors of 0 °C to +70 °C must not be exceeded or fallen below.

The maximum ambient temperature range of the **FMS410D-S** and **FMS410D-T** moisture sensors of 0 °C to +80 °C must not be exceeded or fallen below.

### Installation and commissioning



The measuring aperture of the **FMS410D-K** must be protected from UV light.  
The measuring aperture of the **FMS410D-T** must be protected from UV light.

For safe operation of the **FMS410D**-\*, it is strongly recommended that it is firmly connected to the equipotential bonding system by means of a protective conductor connection to the marked 4 mm threaded bolt on the rear of the housing.  
The solid screw connection with a corresponding cable lug enables the connection of cable cross-sections up to a maximum of 4 mm<sup>(2)</sup>.

Assembly/disassembly, installation, operation and maintenance may only be carried out by qualified personnel in the sense of the automation industry in compliance with the relevant regulations and these operating instructions. During installation, the technical data of the **FMS410D**-\* moisture sensor for the interface and the value of the supply voltage must be observed.

## 2 ATEX relevant data

### Moisture sensor FMS410D-C and FMS410D-K

**Ex certificate for FMS410D-C/K IBExU18 ATEX 1069 Issue 1**



II 1D Ex ta IIIC T135 °C Da  
0 °C ≤ Ta ≤ +70 °C

<b>Conformity</b>	EN IEC 60079-0:2018 EN 60079-31:2014	General requirements Protection by enclosure "t"
Nominal voltage	U <sub>rated</sub>	< 20 VDC
Rated current	I <sub>rated</sub>	< 50 mA
Interface	RS485	
Ambient g temperature range	T <sub>ambient</sub>	0 °C to +70 °C
Process temperature range	T <sub>process</sub>	0 °C to +70 °C

### Moisture sensor FMS410D-T and FMS410D-S

**Ex certificate for FMS410-T/S**

IBExU18 ATEX 1069 Issue 1



II 1D Ex ta IIIC T150 °C Da  
0 °C ≤ Ta ≤ +80 °C

<b>Conformity</b>	EN IEC 60079-0:2018 EN 60079-31:2014	General requirements Protection by enclosure "t"
Nominal voltage	U <sub>rated</sub>	< 20 VDC
Rated current	I <sub>rated</sub>	< 50 mA
Interface	RS485	
Ambient temperature range	T <sub>ambient</sub>	0 °C to +80 °C
Process temperature range	T <sub>process</sub>	0 °C to +90 °C

## 3 Technical data of the moisture sensor FMS410D-\*

### Interface

Protocol:	MODBUS, RTU mode
RS485:	Half-duplex, terminated
Baud rate:	19200 bps

### Supply

Power supply:	<20 VDC, <50 mA
---------------	-----------------

### Conformity

EMC Directive 2014/30/EU: EN 61000-6-2, EN 61000-6-4, EN 61326-1

### General data

#### Ambient conditions for FMS410D-C/K

Perm. operating temperature:	0 °C ... +70 °C
Storage/transport:	-10 °C ... +85 °C
Perm. moisture during operation:	10 % ... 95 % r.h. without condensation

### Ambient conditions for FMS410D-S/T

Perm. operating temperature:	0 °C ... +80 °C
Storage/transport:	-10 °C ... +85 °C
Perm. moisture during operation:	10 % ... 95 % r.h. without condensation

### Mechanical data

Housing:	Stainless steel 1.4301
Protection class:	IP 67 according to EN 60529
Weight:	approx. 1050 g
Connection cable:	Shielded cable, 4-core, min. 0.5 mm <sup>2</sup>
Cable length:	as required up to max. 250 m

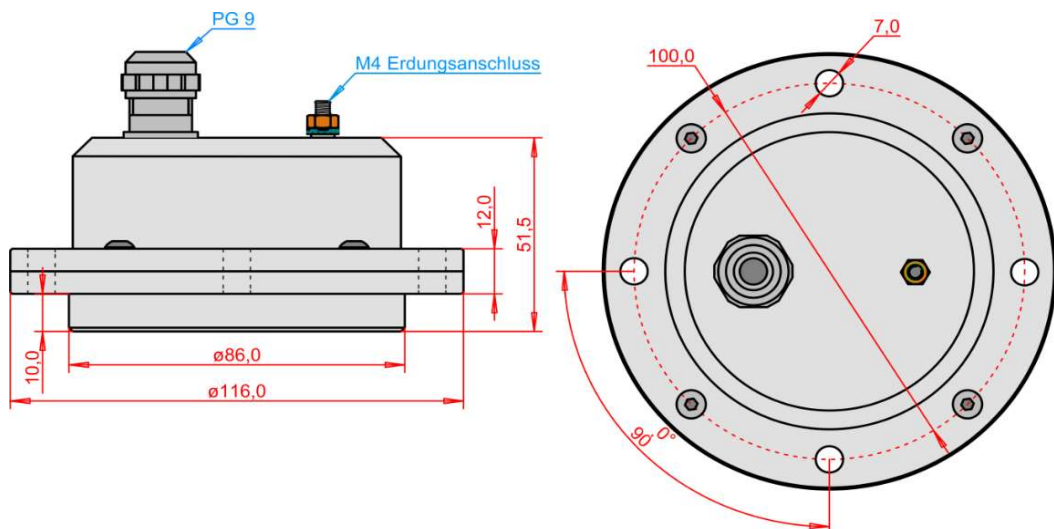
### Material of the measuring surface

FMS410D-K:	POM
FMS410D-T:	PTFE
FMS410D-C/S:	Ceramic

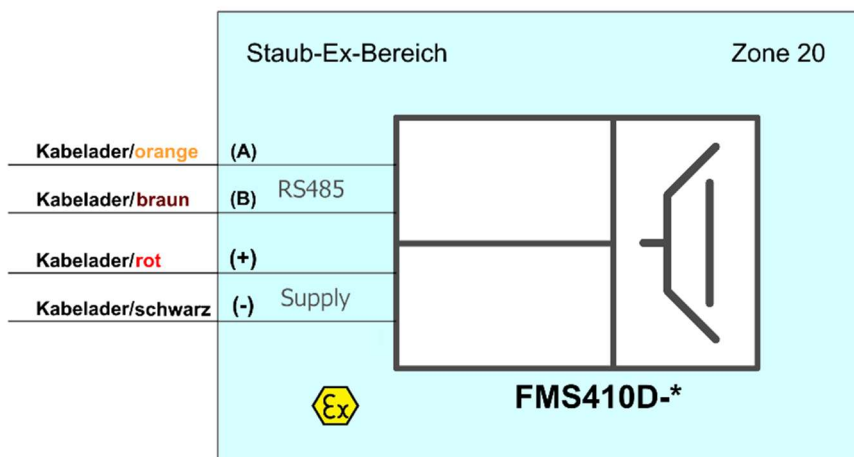
### Limit values

Compressive strength:	0.8 bar to 1.1 bar
Process temperature:	0°C to +70/+90 °C at the measuring orifice

### Dimensions

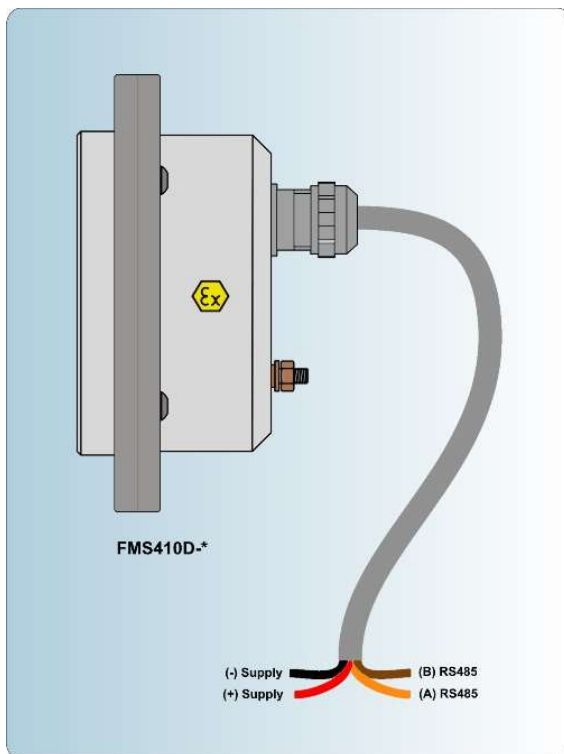


## 4 Block diagram of the FMS410D-\*





**5 Cable connection of the FMS410D-\* moisture sensor**



The cable shield is in the sensor connected to the earth contact. If the cable shield is also earthed at the end of the cable and there is a potential difference between the two earthing points, this can result in a more or less large equalizing current via the cable shield. Catalytic decomposition of the cable shield can thus be set in motion.



**6 Type plates of the FMS410D-\* moisture sensors**

<b>Mütec Instruments GmbH</b> Bei den Kämpen 26 D-21220 Seevetal	
Type: <b>FMS 410D-C</b>	T <sub>amb.</sub> : 0 to +70°C
CE 0158  II 1 D Ex ta IIIC T135 °C Da IBExU 18 ATEX 1069	
Range: 580T to 750T Dgt. Temp.: 15°C to 45°C	Date.: 2404 SN: 131201

<b>Mütec Instruments GmbH</b> Bei den Kämpen 26 D-21220 Seevetal	
Type: <b>FMS 410D-K</b>	T <sub>amb.</sub> : 0 to +70°C
CE 0158  II 1 D Ex ta IIIC T135 °C Da IBExU 18 ATEX 1069 Warning! Protect orifice plate from UV light!	
Range: 580T to 750T Dgt. Temp.: 15°C to 45°C	Date.: 2404 SN: 131201

<b>Mütec Instruments GmbH</b> Bei den Kämpen 26 D-21220 Seevetal	
Type: <b>FMS 410D-S</b>	T <sub>amb.</sub> : 0 to +80°C, T <sub>proc.</sub> : to +90°C
CE 0158  II 1 D Ex ta IIIC T150 °C Da IBExU 18 ATEX 1069	
Range: 580T to 750T Dgt. Temp.: 15°C to 45°C	Date.: 2404 SN: 131201

<b>Mütec Instruments GmbH</b> Bei den Kämpen 26 D-21220 Seevetal	
Type: <b>FMS 410D-T</b>	T <sub>amb.</sub> : 0 to +80°C, T <sub>proc.</sub> : to +90°C
CE 0158  II 1 D Ex ta IIIC T150 °C Da IBExU 18 ATEX 1069 Warning! Protect orifice plate from UV light!	
Range: 580T to 750T Dgt. Temp.: 15°C to 45°C	Date.: 2404 SN: 131201