

Operating instructions | Multi transmitter feel FM

Online version



Datasheet



1 Introduction

1.1 Notes on the operating instructions

These operating instructions are intended to ensure optimum installation, commissioning, operation and maintenance of the device and must be read prior to these actions. Keep this documentation handy and accessible to every user in order to be able to refer to it if necessary. If any difficulties should nevertheless arise during commissioning or operation, please do not make any unauthorized modifications to the device. Doing so could jeopardize your warranty claim. In such cases, please contact us immediately:

FSM AG | Erich-Rieder-Straße 2 | D-79199 Kirchzarten | Tel: +49 7661 9855 0 | Mail: messtechnik@fsm.ag

1.2 Intended purpose and foreseeable misuse

The feel FM multi-measuring transducer is used to record various measured variables such as differential pressure, temperature, humidity, VOC and CO₂ and convert them into a proportional measurement signal. The device may only be used in the specified measuring range. Do not use the device in potentially explosive atmospheres. No liability is accepted for damage resulting from improper use. In this case, warranty claims become invalid. Unauthorized structural modifications as well as additions or conversions to the device are prohibited.

2 Notes for your safety

To avoid danger to all persons involved, this device must only be installed and commissioned by qualified and trained personnel. Furthermore, persons using this device must take measures to protect themselves from direct contact with the live parts and must have read and understood these instructions.

3 Installation and startup

3.1 Mounting

Wall mounting: The device is mounted on the wall using the snap-in frame supplied. The mounting frame is attached to the wall with dowels and screws. The feel transmitter is then snapped into the mounting frame. Mount the device on a vertical, smooth surface and ensure that the device is not mounted in the immediate vicinity of sources of interference or heat.

Duct mounting: The unit is mounted directly to a ventilation duct using the duct flange provided. The duct flange is mounted to the appropriate duct opening using the self-tapping screws supplied. The sensor tube is inserted through the duct flange to the desired depth and secured with the locking screw. Make sure that the device is not mounted in the immediate vicinity of sources of interference or heat.

3.2 Connection, control and display elements

The figure below shows all connection, control and display elements of the transmitter board and describes their functionality.

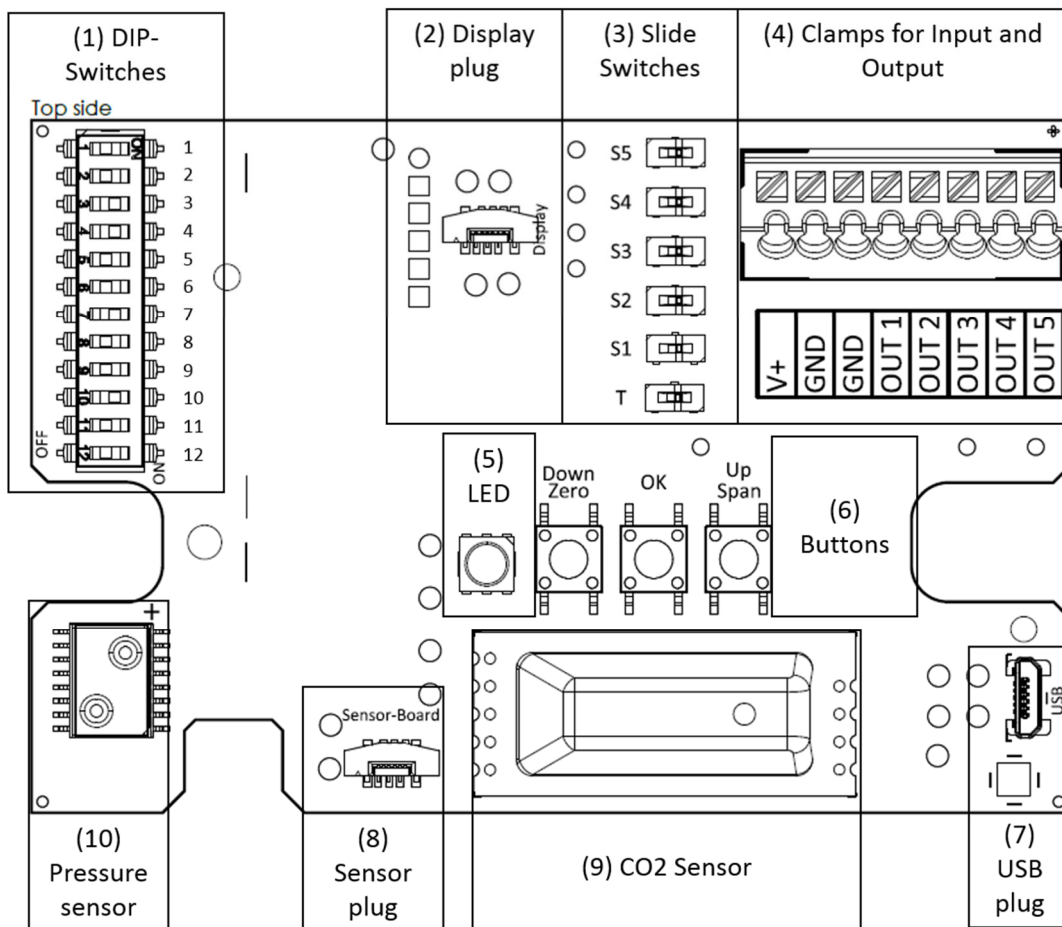


Figure 1 Connection, control and display elements

- (1) **DIP-Switches:** for configuration of different parameters like measuring range or output signal
- (2) **Display plug:** Connector plug to display cable
- (3) **Slide switches:** for switching the outputs between current to voltage output
- (4) **Clamps for Input and Output:** Push-in terminals for power supply and output signals
- (5) **LED:** multicolor status LED for displaying operating and error states
- (6) **Buttons:** Pushbutton for adjustment at defined adjustment points
- (7) **USB Plug:** USB connector for connecting the transmitter to a PC
- (8) **Sensor plug:** Connecting plug to a sensor tube
- (9) **CO2-Sensor:** Sensor element for measuring the CO2 concentration
- (10) **Pressure sensor:** Sensor element for measuring differential pressure

3.3 Connection

Feed the input and output lines through the cable glands attached to the housing and clamp them to the terminals provided (see 3.2 (4) *Clamps for Input and Output*):

| Line | Clamp |
|---|-------|
| Supply + / L | V+ |
| Supply - / GND | GND |
| Output VOC + (with analog variant) Modbus A (with RS485 variant)* | OUT 1 |
| Output Temperature + (with analog variant) Modbus B (with RS485 variant)* | OUT 2 |
| Output Humidity + | OUT 3 |
| Output Differential pressure + | OUT 4 |
| Output CO2 + | OUT 5 |
| Outputs - / GND | GND |

*On the last device in the Modbus topology, the terminating resistor must be set via switch T (position on the right). The detailed Modbus protocol can be downloaded via the following link:

https://measure.fsm.ag/fileadmin/Messtechnik-PDFs/Feel_Modbus_Protokoll_english.pdf

4 Setting and configuration via DIP switch

Note: A configuration of the parameters via DIP switch (see 3.2 (1) DIP switches) can only be done if the DIP switch 12 is set to OFF.

4.1 Setting the measuring range

You can adapt the respective desired measuring range of the different sensors to your application via DIP switches (see 3.2 (1) *DIP switches*). The respective setting options can be found in the following table

| Parameter | Measuring range | DIP switch positions |
|--------------------------|---|-----------------------|
| VOC | No configuration possibility | - |
| Temperature and Humidity | 0...100% rH -40... 80 °C | DIP 1 OFF DIP 2 OFF |
| | 0...100% rH -20... 60°C | DIP 1 ON DIP 2 OFF |
| | Enthalpy: -50... 400 kJ/kg -40... 80°C | DIP 1 OFF DIP 2 ON |
| | Abs. Humidity: 0... 150 g/m ³ -40... 80 °C | DIP 1 On DIP 2 ON |

| | | |
|---|-----------------|-----------------------------------|
| Differential pressure | 0... 100% FS | DIP 4 OFF DIP 5 OFF DIP 6 OFF |
| | 0... 75% FS | DIP 4 ON DIP 5 OFF DIP 6 OFF |
| | 0... 50% FS | DIP 4 OFF DIP 5 ON DIP 6 OFF |
| | 0... 25% FS | DIP 4 ON DIP 5 ON DIP 6 OFF |
| | -100... 100% FS | DIP 4 OFF DIP 5 OFF DIP 6 ON |
| | -75... 75% FS | DIP 4 ON DIP 5 OFF DIP 6 ON |
| | -50... 50% FS | DIP 4 OFF DIP 5 ON DIP 6 ON |
| | -25... 25% FS | DIP 4 ON DIP 5 ON DIP 6 ON |
| CO2 (5000 ppm Variant) No configuration possibility for 2000 ppm variant | 0... 5000 ppm | DIP 3 OFF |
| | 0... 2000 ppm | DIP 3 ON |

4.2 Setting the output signal

You can adapt the respective desired analog output to your application via slide switch S1 to S5 (see 3.2 (3) Slide switches) and DIP switch 7 (see 3.2 (1) DIP switches). The respective setting options can be found in the following table:

| Output | Output signal | Slide switch positions | DIP switch 7 position |
|----------------------------------|---------------|------------------------|-----------------------|
| VOC (1) | 0... 10 V | S1 right | OFF |
| | 2... 10 V | S1 right | ON |
| | 0... 20 mA | S1 left | OFF |
| | 4... 20 mA | S1 left | ON |
| Temperature (2) | 0... 10 V | S2 right | OFF |
| | 2... 10 V | S2 right | ON |
| | 0... 20 mA | S2 left | OFF |
| | 4... 20 mA | S2 left | ON |
| Humidity (3) | 0... 10 V | S3 right | OFF |
| | 2... 10 V | S3 right | ON |
| | 0... 20 mA | S3 left | OFF |
| | 4... 20 mA | S3 left | ON |
| Differential pressure (4) | 0... 10 V | S4 right | OFF |
| | 2... 10 V | S4 right | ON |
| | 0... 20 mA | S4 left | OFF |
| | 4... 20 mA | S4 left | ON |
| CO2 (5) | 0... 10 V | S5 right | OFF |
| | 2... 10 V | S5 right | ON |
| | 0... 20 mA | S5 left | OFF |
| | 4... 20 mA | S5 left | ON |

4.3 Setting the time constant

For the measurand differential pressure an extended time constant can be set, for other measurands this configuration option is not available. The time constant is the time at which the measuring system has reached 63% (t63) of the nominal value. The time constant can be set as follows via DIP switches 10 and 11 (see 3.2 (1) DIP switches):

| Parameter | Time constant | DIP switch positions |
|---------------------------------|------------------------------|-------------------------|
| VOC, Temperature, Humidity, CO2 | No configuration possibility | - |
| Differential pressure | 50 ms | DIP 10 OFF DIP 11 OFF |
| | 500 ms | DIP 10 ON DIP 11 OFF |
| | 2000 ms | DIP 10 OFF DIP 11 ON |
| | 4000 ms | DIP 10 On DIP 11 ON |

5 Setting and configuration via software

Customer software is available for the feel transmitter, which can be used to configure various parameters. Proceed as follows:

5.1 Installation of the software

- Download the "feel configuration software" in the download area of the web page of the feel series of transmitters: <https://measure.fsm.ag/en/home/products/multi-transmitter/feel-multi>
- If you do not have .NET 6.0 Desktop Runtime (v6.0.12) pre-installed, install it before using the application: ([Download link .NET 6.0 Desktop Runtime \(v6.0.12\)](#))
- Open the application "Configuration software feel (exe)".
- Under certain conditions, a Windows popup window will appear warning about using an unknown software. Click on "More information" and the button "Run anyway".

5.2 Commissioning a feel transmitter

5.2.1 Connecting the transmitter

- Connect the input lines to the designated clamps (see 3.2 (4) Clamps for Input and Output) to supply the transmitter.
- Set DIP switch 12 (see 3.2 (1) DIP switches) to ON to enable configurations via software.
- Connect the device to the PC with a micro USB cable type B (see 3.2 (7) USB plug).
- A new COM port appears on the start page of the software.
- Click on the "Connect" button next to the newly appeared COM port.

5.2.2 Reading out the transmitter data

- Via the menu item Home, the data of the transmitter such as article number, software version, hardware version, type code and previously configured options are displayed.
- It is possible to assign a customer-specific number for unique identification of the transmitter via the "Customer serial number" field.

5.3 Configuration of the transmitter

5.3.1 Unit

- Open the "Sensors" menu item and select the desired sensor.

- Click on the button next to the "Units" menu item.
- Select the desired unit.
- Click on the "Send" button to accept the settings and send the configuration to the connected transmitter

5.3.2 Measurement range

- Open the "Sensors" menu item and select the desired sensor.
- Change the values of the measuring range in the "Measurement range" field according to your application by entering the min and max values in the corresponding text field or moving the min and max bars on the slider.
- The output signal is then scaled according to the set measurement range, i.e. for a 0-10 V output, 0 volts corresponds to the set min value and 10 V corresponds to the set max value. The same applies to the other possible output signals such as 2-10 V, 0-20 mA and 4-20 mA.
- By clicking the "Send" button, the settings are accepted and the configuration is sent to the connected transmitter.

5.3.3 Adjustment

- Open the "Sensors" menu item and select the sensor you want to adjust.
- Fixed adjustment points are available at which the transmitter can be adjusted. The adjustment values differ depending on the measured variable and are displayed as text within the corresponding "Set" buttons.
- To adjust the sensor at the calibration point, this value must be generated with a suitable reference, e.g. in a suitable humidity generator or with the help of a salt pot. As soon as the reference has stably adjusted the calibration point, the transmitter can be adjusted at this point by pressing the respective

button, e.g. "set 11.3%rH" for sensor „Humidity“. If the value of the transmitter is >10% outside the setpoint, the buttons are grayed out and an adjustment is not possible..

5.3.4 Output signal

- Open the "Outputs" menu item.
- Select the output that you want to scale. The symbol below the headings "Output 1", "Output 2" etc. shows you which measured variable is output via which output. (Note: For transmitters with only one measurand, this submenu does not exist and you jump directly to the submenu of the single output).
- Change the values of the output in the "Voltage range" field to scale the voltage output or in the "Current range" field to scale the current output according to your application. Using the slider, voltage and current output can be scaled in parallel.
- The button "Send" sends the new output scaling to the transmitter.
- The figure below the configuration levels shows to which terminals the output lines should be connected.

Note: Switching between current and voltage output must be done physically on the board via the slide switch S1 to S5 (see 4.1) (right position = voltage output; left position = current output).

5.3.5 Display image

- Open the "Display" menu item to configure the representations on the display.
- The "Color Theme" field can be used to adjust the colors on the display according to your requirements.
- Click on the "Send" button to apply the settings and send the configuration to the connected transmitter.

6 Service and maintenance

6.1 Adjustment

If necessary, the individual sensors can be adjusted to eliminate non-linearities or zero offsets. Two set points are available for the measured variables temperature, humidity, differential pressure and CO₂, at which the transmitter can be adjusted. Proceed as follows:

- Use DIP switches 8 and 9 (see 3.2 (1) DIP switches) to set the measurand that you want to adjust. Which DIP position must be set for which measurand can be seen in the table below.
- Generate with the help of a suitable reference the value of the respective set point for the selected measurand at which you want to make an adjustment.
- Press either the "Down/Zero" or "Up/Span" button (see 3.2 (6) Buttons). Which button has to be pressed for which set point can be seen in the table below.
- The transmitter is now adjusted at the desired point. If the current measured value is +/- 10% outside the set point, no adjustment is made to avoid false conditions.

| Parameter | Set-Point | DIP switch positions | Buttons |
|-----------|---------------------------|----------------------|---------|
| VOC | No adjustment possibility | - | - |

| | | | |
|------------------------------|--|-----------------------|-----------|
| Temperature | 5°C | DIP 8 OFF DIP 9 OFF | Down/Zero |
| | 50°C | | Up/Span |
| Humidity | 11,3% rH | DIP 8 ON DIP 9 OFF | Down/Zero |
| | 75,3% rH | | Up/Span |
| Differential pressure | 0 Pa | DIP 8 OFF DIP 9 ON | Down/Zero |
| | 100% FS (e.g. 1hPa, 10hPa, 100hPa or 1000 hPa) | | Up/Span |
| CO2 | 0 ppm | DIP 8 ON DIP 9 ON | Down/Zero |
| | 100% FS (e.g. 2000 ppm or 5000 ppm) | | Up/Span |

6.2 Error messages and notes

Various operating states and error messages can be displayed via the LED on the board (see 3.2 (5) LED) and an optionally installed display. The table below describes the displayed messages and LED states. If the error that has occurred is not listed, please contact FSM AG as soon as possible or send the device in for repair with a meaningful error description.

| Status indicator | Operating status | Troubleshooting |
|---|--|---|
| LED flashes green | OK | - |
| LED flashes blue | The transmitter is in the adjustment process | - |
| LED flashes pink | There is currently a reset of the transmitter | - |
| LED flashes orange | No communication with humidity/temperature/VOC sensor tube | Check the connection cable to the sensor tube (see 3.2 (8) Sensor plug) |
| LED flashes white | No communication with display | Check the connection cable to the display (see 3.2 (2) Display plug) |
| LED flashes orange and white alternately | No communication with display and no communication with humidity/temperature/VOC sensor tube | Check the connection cable to the display (see 3.2 (2) Display plug) and check the connection cable to the display (see 3.2 (2) Display plug) |
| Display shows error E001 | No communication with humidity/temperature/VOC sensor tube | Check the connection cable to the sensor tube (see 3.2 (8) Sensor plug) |
| Display shows error E003 | The calibration values for the humidity/temperature/VOC sensor have been reset to the default values | Check the measured values and carry out an adjustment if necessary (see 6.1 Adjustment) |
| Display shows error E005 | The VOC sensor element is defective | Send the device for repair, specifying the error code |
| Display shows error E006 | The temperature sensor element is defective | Send the device for repair, specifying the error code |
| Display shows error E007 | The humidity sensor element is defective | Send the device for repair, specifying the error code |
| Display shows error E008 | The pressure sensor element is defective | Send the device for repair, specifying the error code |
| Display shows error E009 | The CO2 sensor element is defective | Send the device for repair, specifying the error code |

7 Disposal



Note

Incorrect disposal can be hazardous to the environment. Device components and packaging materials must be disposed of in an environmentally friendly manner in accordance with the country-specific waste treatment and disposal regulations.