

# Instruction Manual

## CO2 Transmitter feel FC

### 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:

### 1.2 Intended purpose and foreseeable misuse

The feel FC CO2 transmitter is used to record the measured variable CO2 and convert it into a proportional measuring 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

The unit 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 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.

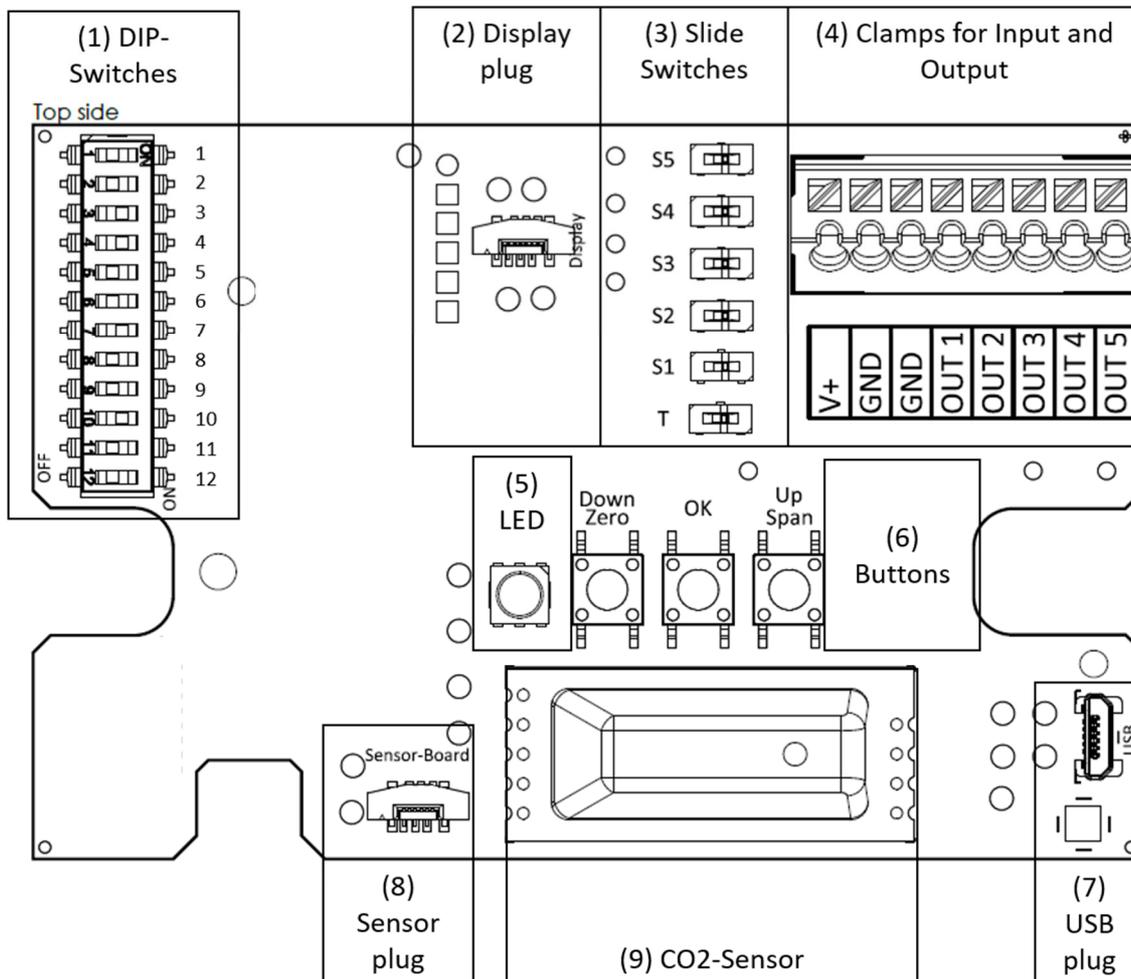


Figure 1 Connection, control and display elements

- (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

### 3.3 Connection

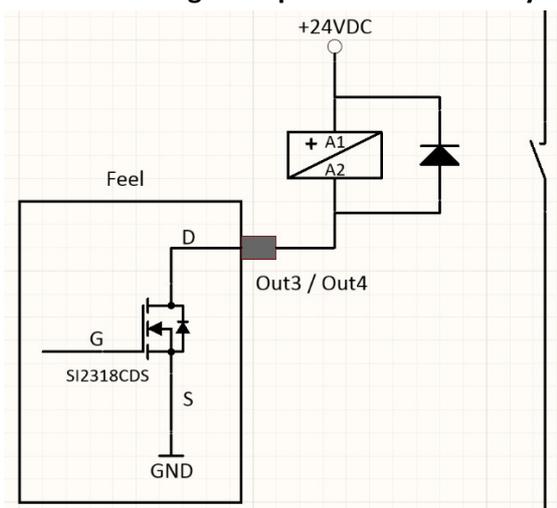
Feed the input and output lines through the cable glands attached to the housing and clamp them to the terminals provided (see 3.2 (4) Clamps for Input and Output):

Line	Clamp
Supply + / L	V+
Supply - / GND	GND
Output CO2 + (with analog variant)   Modbus A (with RS485 variant)*	OUT 1
Modbus B (with RS485 variant)*	OUT 2
Output Open Collector 1 optional (24VDC and 1A, not short circuit proof)	OUT 3
Output Open Collector 2 optional (24VDC and 1A, not short circuit proof)	OUT 4
Output - / GND	GND

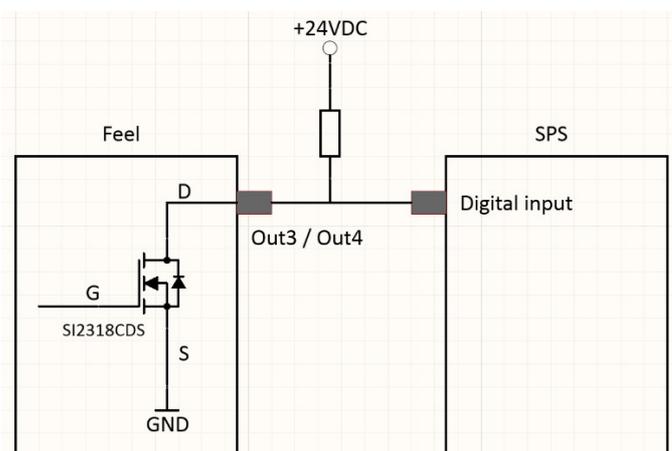
\*On the last device in the Modbus topology, the terminating resistor must be set via switch T (position on the right). The detailed Modbus protocol can be downloaded via the following link:

[https://measure.fsm.ag/fileadmin/Messtechnik-PDFs/Feel\\_Modbus\\_Protokoll\\_english.pdf](https://measure.fsm.ag/fileadmin/Messtechnik-PDFs/Feel_Modbus_Protokoll_english.pdf)

Connection diagram Open collector to relay:



Connection diagram Open collector to SPS:



## 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:

Scaling of the measuring range Variant 5000 ppm	DIP switch position 5
0... 5000 ppm	OFF
0... 2000 ppm	ON

*Note: For the variant 0... 2000 ppm the possibility of a measuring range scaling does not exist.*

## 4.2 Setting the output signal

You can adapt the respective desired analog output to your application via slide switch S1 (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 position	DIP switch position 7
CO2 (1)	0... 10 V	S1 rechts	OFF
	2... 10 V	S1 rechts	ON
	0... 20 mA	S1 links	OFF
	4... 20 mA	S1 links	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.
- The menu of the configuration software opens.

### 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 Measurement range

- Open the "Sensors" menu item.
- 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.

### 5.3.2 Adjustment

- Open the "Sensors" menu item.
- Fixed adjustment points are available at which the transmitter can be adjusted. The set points are displayed as text within the corresponding buttons "Set [VALUE]".
- To adjust the sensor at the respective adjustment point, this value must be generated with a suitable reference, e.g. in a nitrogen chamber. As soon as the reference has stably adjusted the adjustment point, the transmitter can be adjusted at this point by pressing the respective button, e.g. "Set 0 ppm". If the value of the transmitter is >10% outside the setpoint, the buttons are grayed out and an adjustment is not possible to avoid operating errors.

### 5.3.3 Output signals

- Open the „Outputs“ menu item.
- 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 new output scaling is sent to the transmitter via the "Send" button

- 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 slide switch S1 (see 4.1) (right position = voltage output; left position = current output).

### 5.3.4 Switching outputs (if available)

- Open the "Outputs" menu item.
- Select the output Output 3 or 4 to configure the open collector outputs.
- In the next step, select whether you want one or two switching thresholds.
- With a switching contact, the output is HIGH as soon as the set threshold is exceeded. When the threshold value is undershot, the output is LOW. With two switching contacts, the output is HIGH as long as the measured value is within the switching window and LOW as soon as it is outside the switching window.
- This logic can be inverted via "Invert the logic" = "Yes".
- Via the slider, the threshold values can be set in percentage steps of the measuring range end value, whereby the green area marks the "HIGH" and the red area the "LOW" range.
- By clicking on the "Send" button, the settings are accepted and the configuration is sent to the connected transmitter.

### 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 transmitter can be adjusted to eliminate nonlinearities or zero offsets. Proceed as follows:

- Using a suitable reference, generate the value of the respective set point (see table below) 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	Button
CO2	0 ppm	Down/Zero
	100% Full Scale (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 white	No communication with display	Check the connection cable to the display (see 3.2 (2) Display plug)
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.