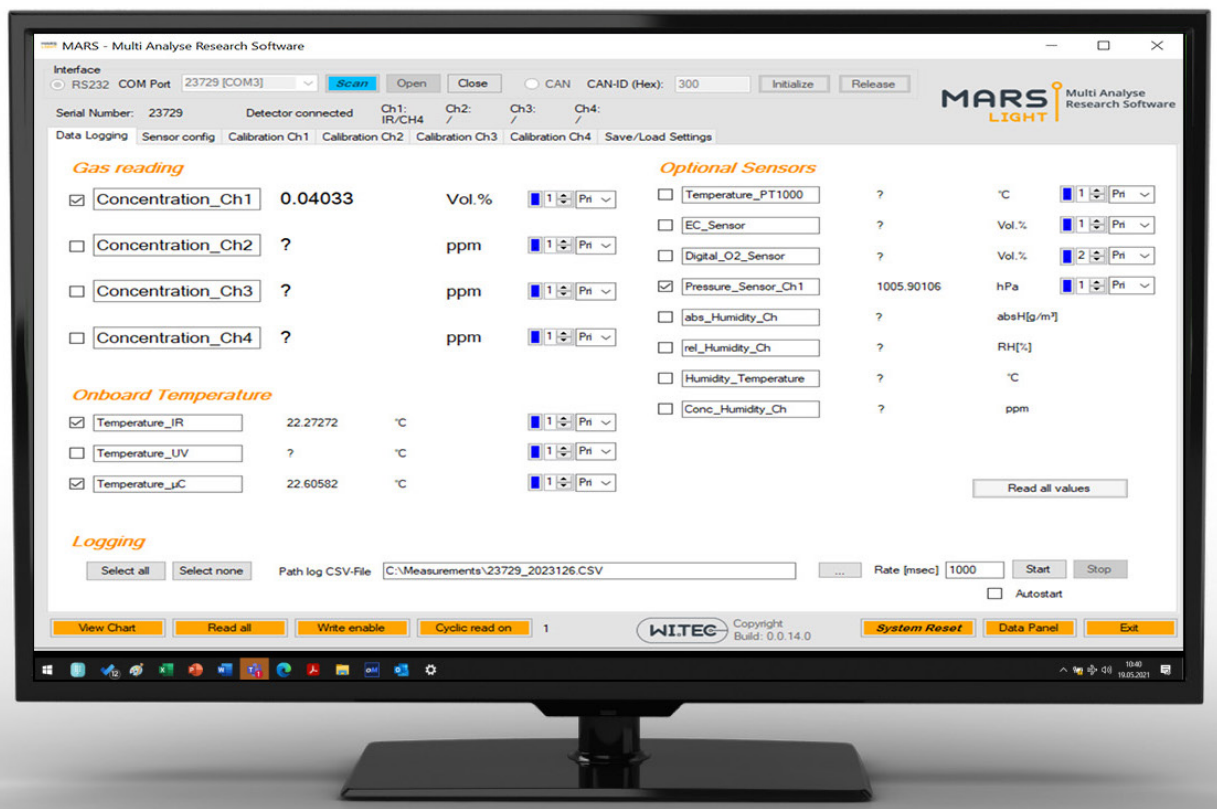
MARS light

Multi analyzer & research software user manual



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Micro-Hybrid Electronic GmbH
Heinrich-Hertz-Str. 8
07629 Hermsdorf | Germany

T +49 36601 592-0
contact@microhybrid.com
www.microhybrid.com

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1. General

The MARS$_{light}$ light enables data logging of all relevant parameters from the sensor (chart and data).
The main user level of this software can read important parameters and set zero- and endpoint of the gas channels.

Note: To load the calibration data and some other sensible parameters the user can type a password to entry into an advanced user mode. The password is given after request and only in special cases.

1.1 Surface description data logging

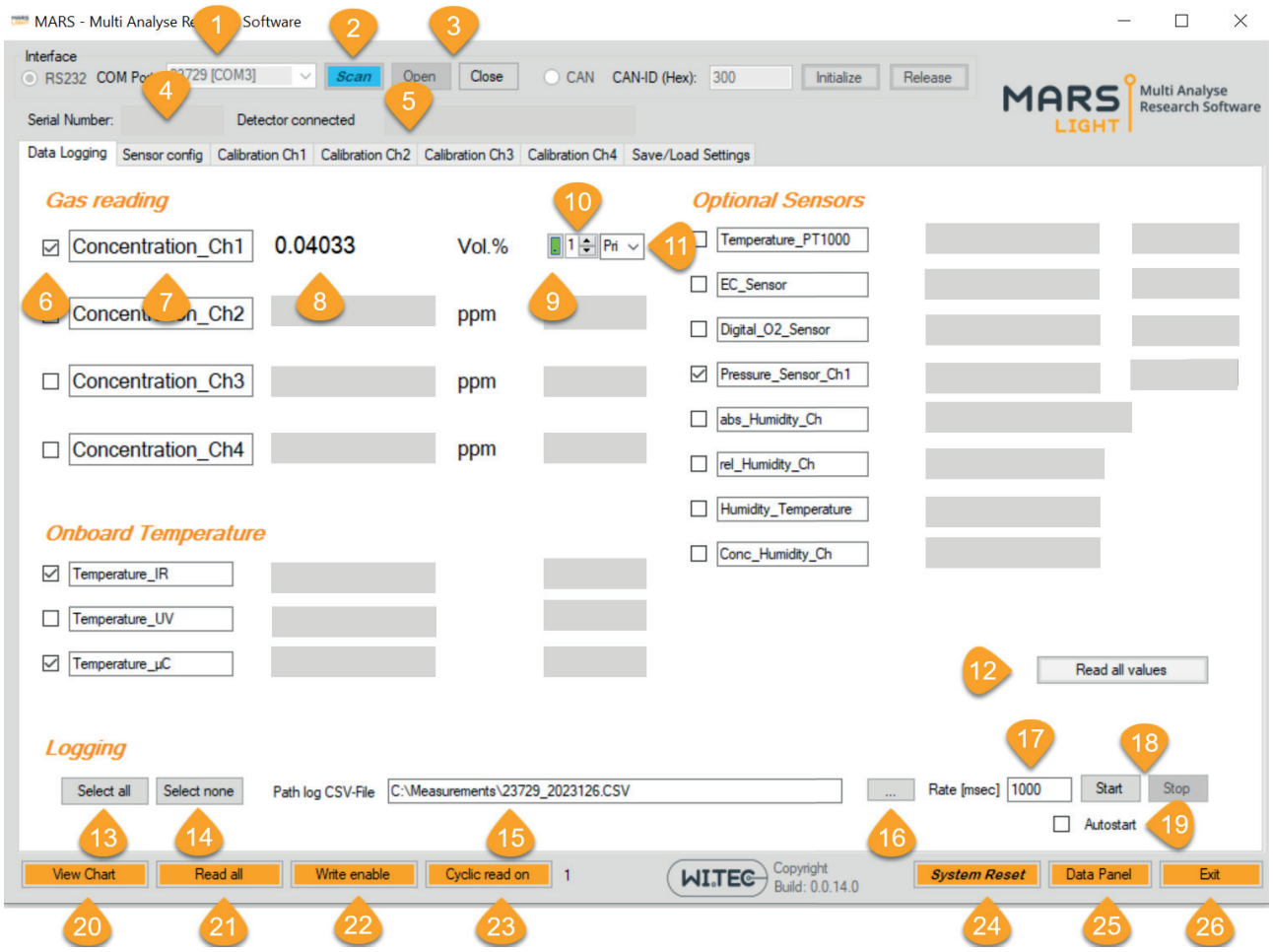

Figure 1: Surface description data logging tab

1	Sensor configuration tab active
2	Serial number from connected sensor
3	Hardware revision mainboard
4	Firmware revision controller
5	Operating hours since assembly
6	Manufacturing date of assembly
7	Status Byte shows the actual system status (see details 1.2.1)
8	Gas-channel 1 and 2 damping configuration (see details 1.2.2)
9	Gas-channel 3 and 4 damping configuration (see details 1.2.2)
10	CAN protocol selection to CANbus or CANopen
11	Sensor configuration tab active high
12	CAN receive address (slave address)
13	CAN transmit address (Master address)
14	CAN baudrate can be set to [125k, 250k, 500k, 1000k]
15	NodeID only for CANopen communication
16	Set alarm UVLED1 level in percent to change status byte if the value is below the threshold
17	Set alarm UVLED2 level in percent to change status byte if the value is below the threshold
18	Set alarm IRLAMPlevel in percent to change status byte if the value is below the threshold
19	Shows the actual intensity level in percent
20	Shows the actual intensity level in percent
21	Shows the actual intensity level in percent
22	Autozero function control, in combination AZF board the sensor can freeze the readings during calibration
23	Interval time for the automatic zero calibration [min, h, d]
24	Rinse / purge time with zero gas [sec]

1.2 Surface description sensor config

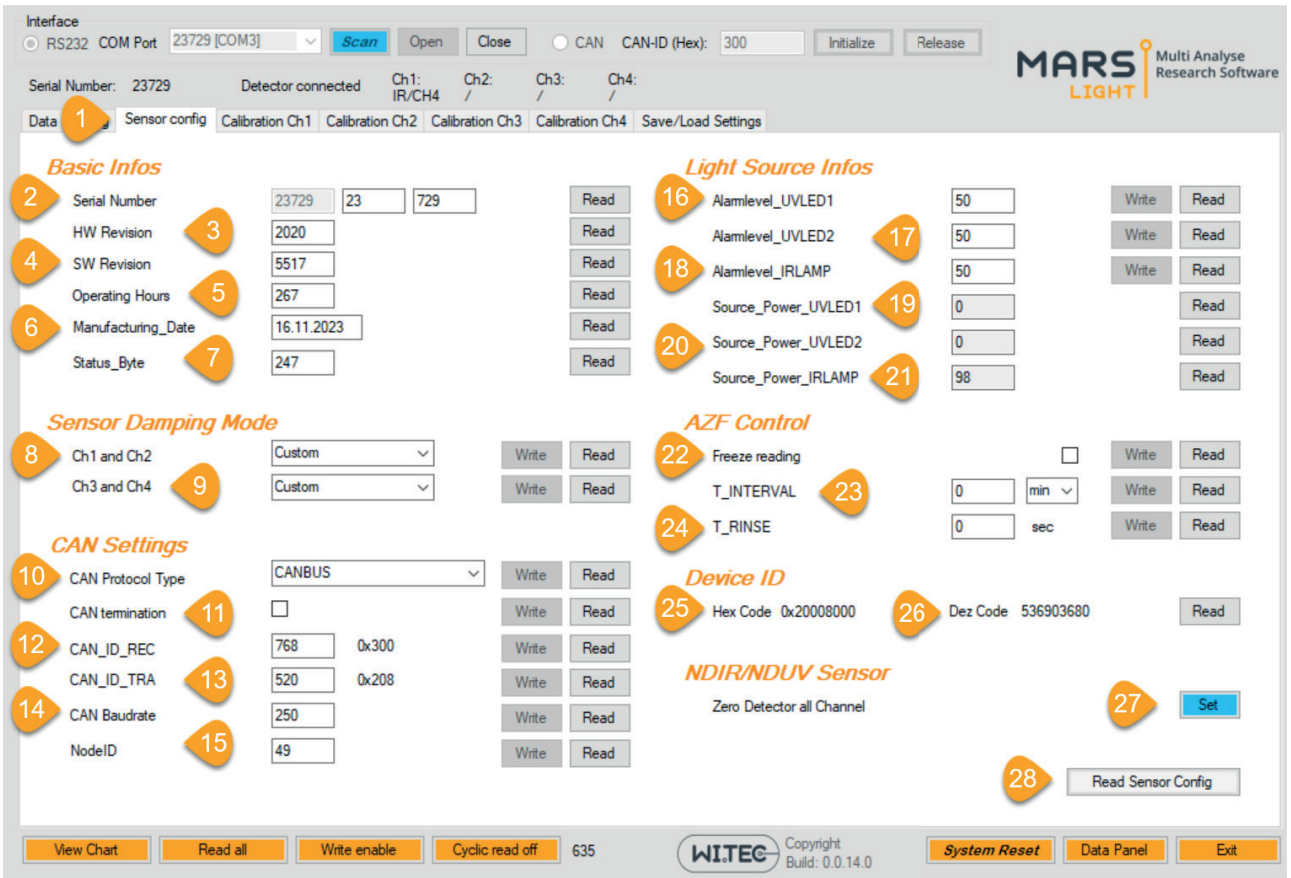

Figure 2: Surface description of sensor configuration tab

1	Selects the serial COM port
2	Scans available sensor(s) and port(s)
3	Opens/ closes selected COM port; reads configuration of sensor
4	Display of connected serial number
5	Display of sensor configuration
6	Selects/ de-selects channel for logging and chart view
7	Channel and function designators, free editable (stored in configuration)
8	Measurement values ppm, ppb, or Vol.-%
9	Colour for the plotted line (chart view)
10	Thickness of the plotted line (chart view)
11	Selects primary or secondary axis (chart view)
12	Reads all measurement values
13	Selects all channels for logging and chart
14	De-selects all channels for logging and chart view
15	Storage path and file name for data logging file
16	Select storage path with MS Explorer
17	Time interval for logging the data in milliseconds, minimum 100 msec
18	Starts/ stops data logging into *.csv file
19	N/A
20	Opens chart view in separate window
21	Reads all measurement values
22	Open the password manager
23	Starts measurement cycle independently from data logging. Useful for chart view and direct feedback values
24	Restarts the complete sensor (software reset)
25	Shows a front panel view with the main important readings
26	Close the software and store all relevant settings

1.2.1 Status byte

IR detected	NA	NA	NA	IR level error	NA	NA	NA	Satus code		Status LED
Bit 0	Bit 1	Bit2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	hex	dez	
0	1	1	1	1	1	1	1	7F	127	red
1	1	1	1	1	1	1	1	7F	255	red
1	1	1	1	0	1	1	1	7F	247	green

1.2.2 Damping mode

Setting	Response	Signal performance
Slow	30 sec	High
Medium	6 sec	Normal
Fast	3 sec	Normal
Peak	1 sec	Low
Custom*	TBD	TBD

1.3 Surface description calibration for each channel

The Calibration tabs for the different gases are very similar to each other, but the marked fields are in the same place in each tab.

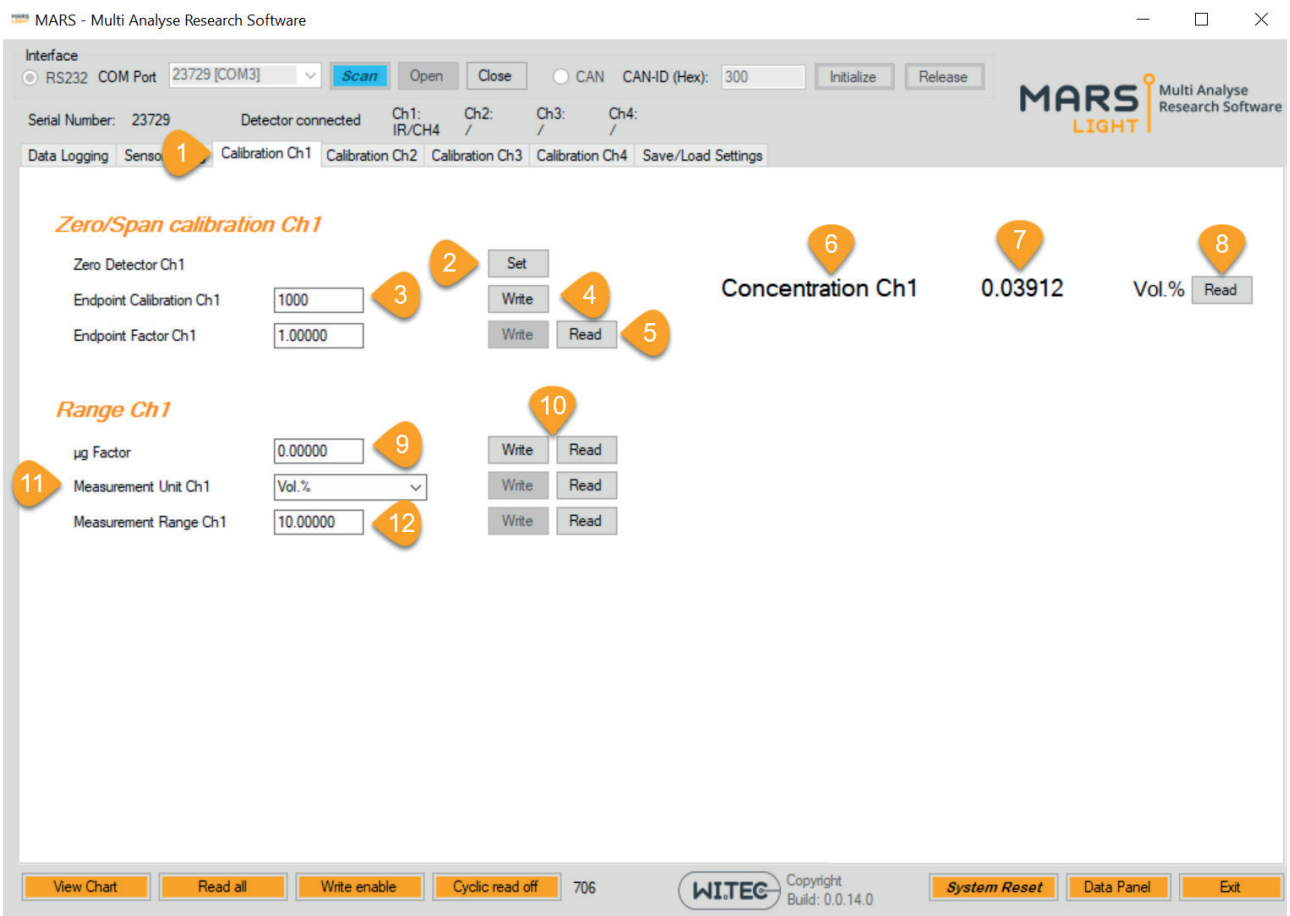

Figure 3: Surface description of calibration CH1 tab

1	Calibration CH1 tab
2	Set zero calibration – purge (1min) gas without content of target gas and press set
3	Endpoint calibration – type in the value of the expected gas concentration
4	Press write the sensor calculate the calibration factor and store it permanently
5	Read / Write the endpoint calibration factor, factory default: 1.00
6	Label actual reading
7	Actual reading to have an feedback during the calibration
8	After press the button the value is updated
9	Custom factor to recalculate the concentration out with another factor
10	Read / Write the custom defined factor (default: 0.00)
11	Read the measurement unit for the selected channel
12	Read the measurement range for the selected channel

1.4 Surface password manager

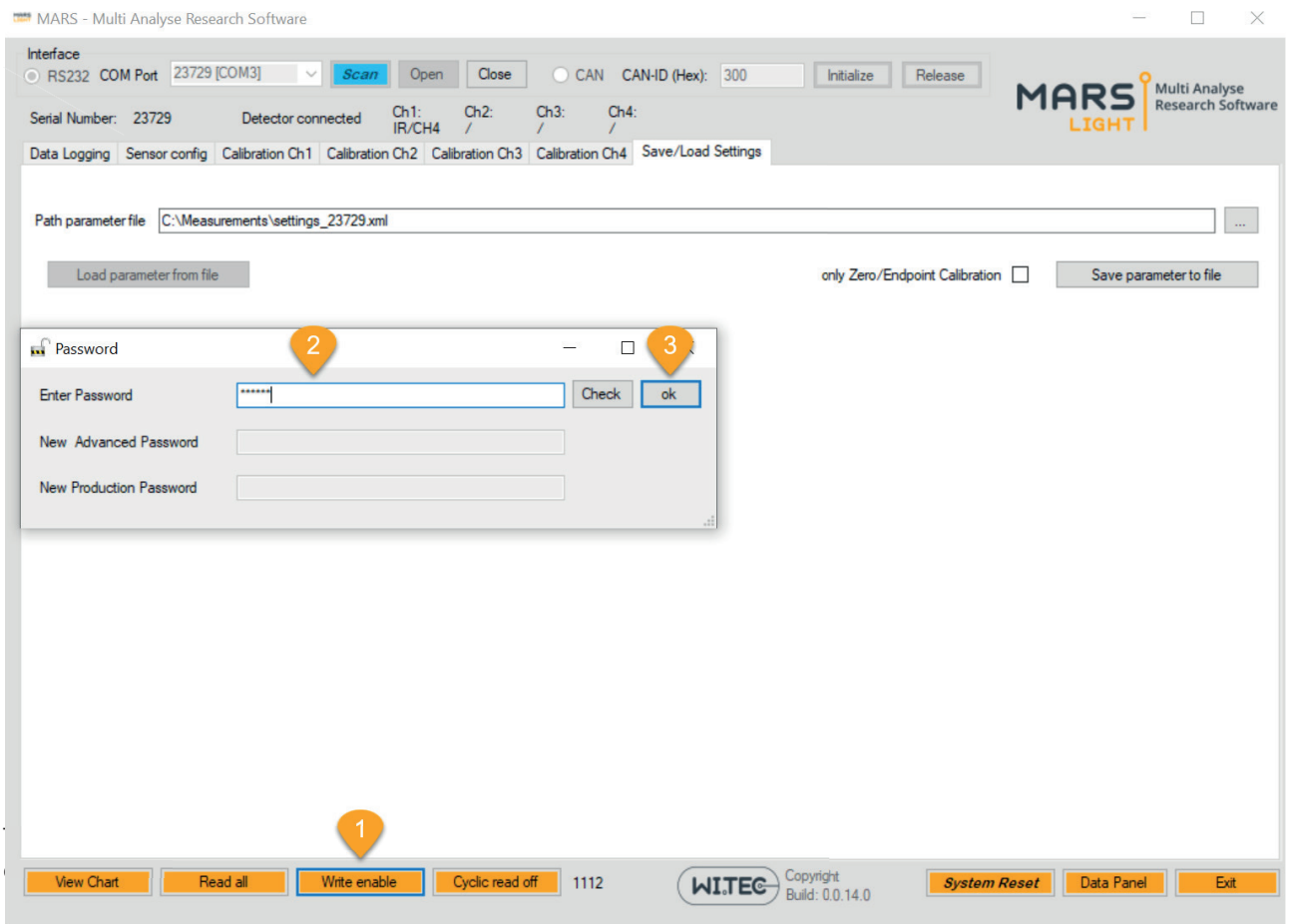

Figure 4: Surface Description of Production Tab

1	Click write enable to start the password manager
2	Select the user role:
	a. Standard – no password b. Advance – **Adv123** c. Expert – **Exp456**
3	Press [**OK**] if the password is selected

1.4.1 User level

Function	User „Standard“	User „Advance“	User „Expert“
Read data logging	x	x	x
Read sensor config	x	x	x
Set zero/endpoint calibration	x	x	x
Read calibration Chx	x	x	x
Save the sensor parameter to XML	x	x	x
Set alarm level IR source		x	x
Set AZF function		x	x
Set measurement unit/range		x	x
Load parameter from XML		x	x
Sensor diagnosis values (ADC, modulation)		x	x
Set sensor damping values			x
Set CAN settings			x
Set endpoint factor direct			x
Ext. sensor tab (calibration ext. sensors)			x
Bootloader mode (firmware tab)			x

1.5 Surface description save / load settings

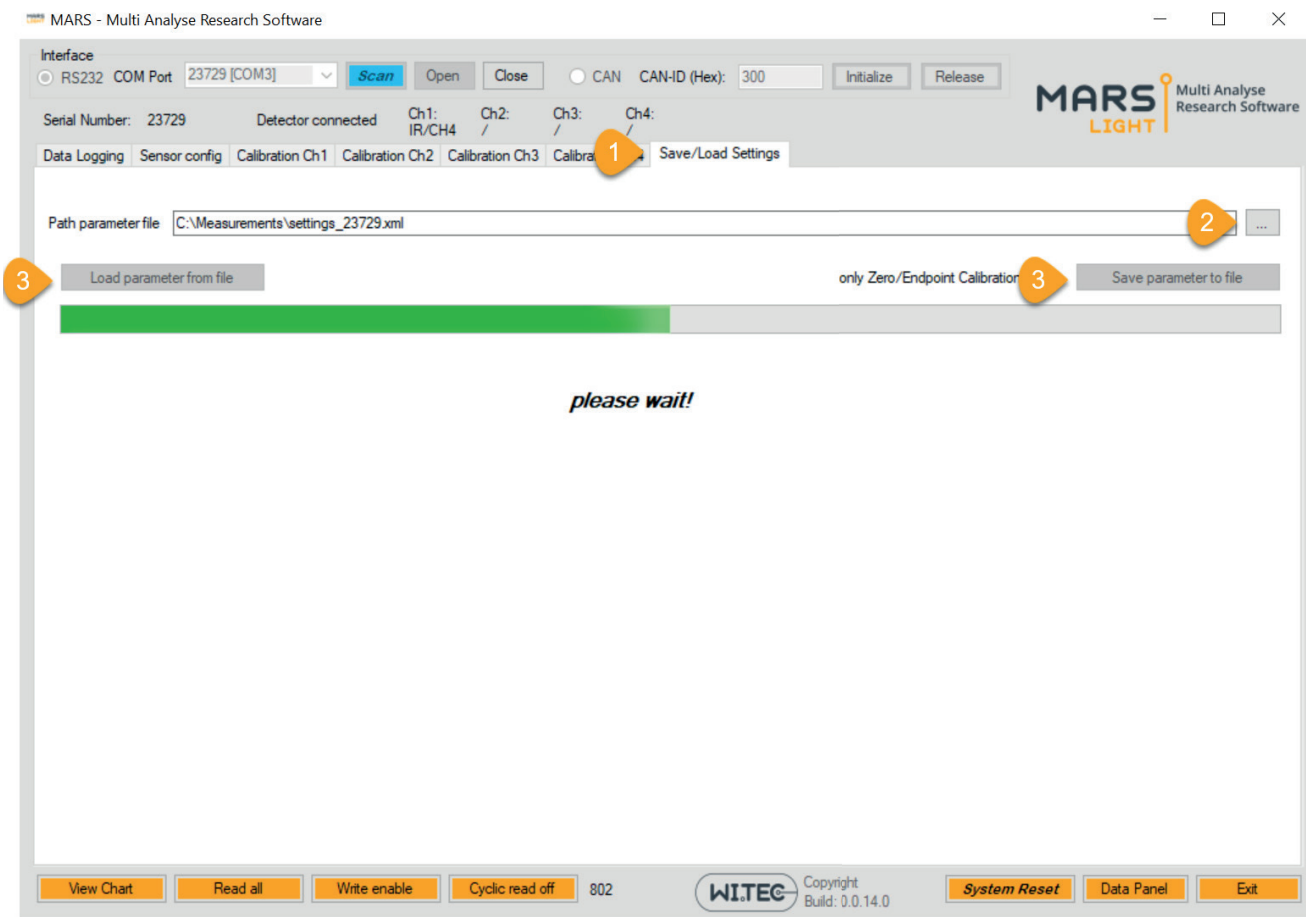

Figure 5: Surface description of save / load settings tab

1	Save / load Settings tab. All sensor parameters can be saved or loaded via XML file
2	Select the relevant path to store the sensor settings or load
3	Save or load the parameter

Note: The *.xml file can be edit with a standart XML viewer

Please note: We recommend to save the XML parameter before you are plan to change some settings

2. Equipment

You need additional equipment to connect your sensor

- IA power supply 24 VDC (300 mA)
- PC with Windows 7 or newer
- Data cable (not included)
- USB to RS232 serial adapter (e.g. FTDI CHIPI-X10)
- In case of CAN Bus PEAK-CAN USB

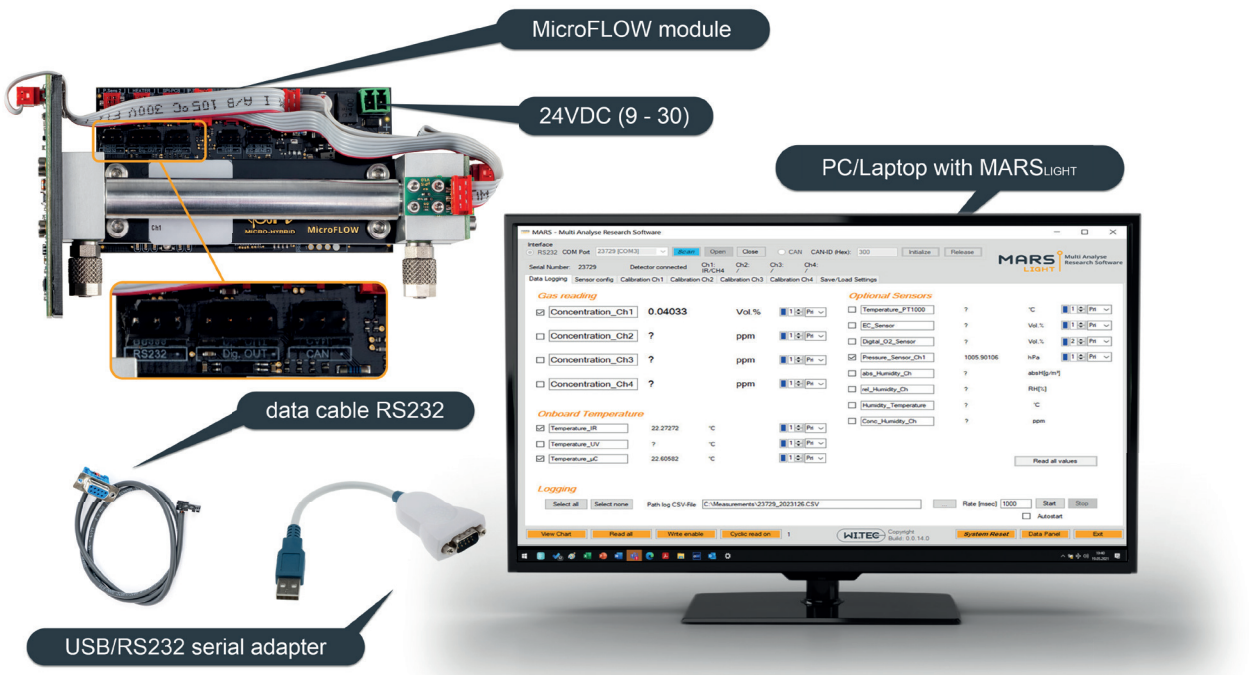

Figure 6: Connection between the module and the PC / laptop

2.1 Starting the program

The program directly started from the directory, it is not necessary to install anything.

Right click on MARS_Tool.exe and open with administration rights!

Connect the sensor with a serial data cable on the COM port and power the sensor.

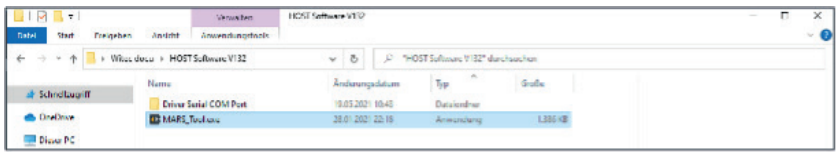

Figure 7: USB stick Witec docu > HOST Software V132 > MARS_Tool.exe

2.2 Connecting the sensor

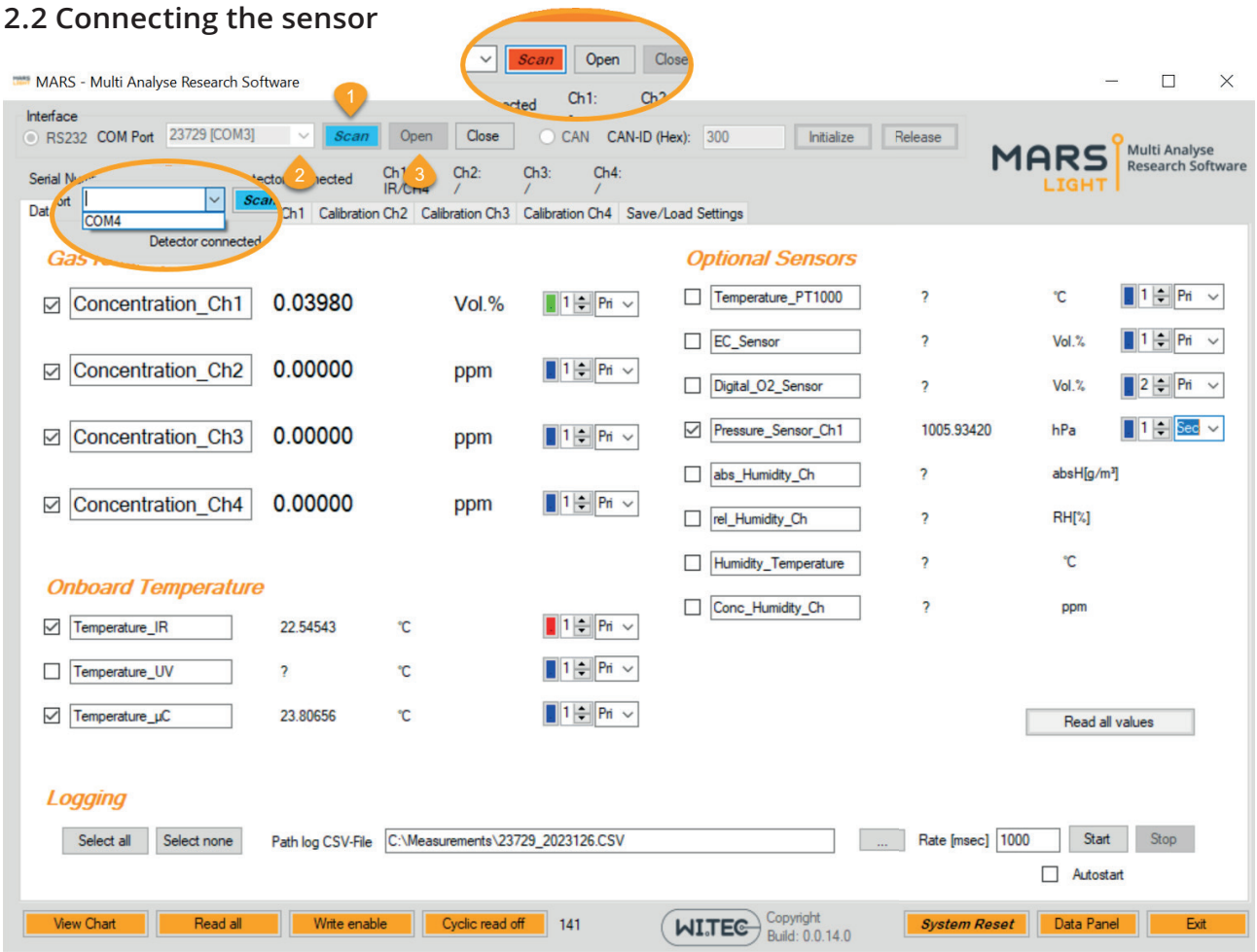

Figure 8: Starting a measurement

1	Click the button [**scan**] it will change from blue to red in the time when it scans the COM ports from your PC, when it is ready the button change to blue again
2	Click on the dropdown menu and choose the serial number from your sensor you will find it on the label (see Fehler! **Verweisquelle konnte nicht gefunden werden.**) or on the sample cellEndpoint calibration – type in the value of the expected gas concentration
3	click the button [**open**] > serial number and sensor configuration are displayed

2.3 Zero- and end-point calibration

For a high accurate gas measurement, it is necessary to check the zero-point and span-point on a regular basis.

- Zero check every 24 h
- Span check every week

In case of a deviation (e.g. > 2 % of span) the MARS$_{light}$ has a function to set the zero- and span-point easily.

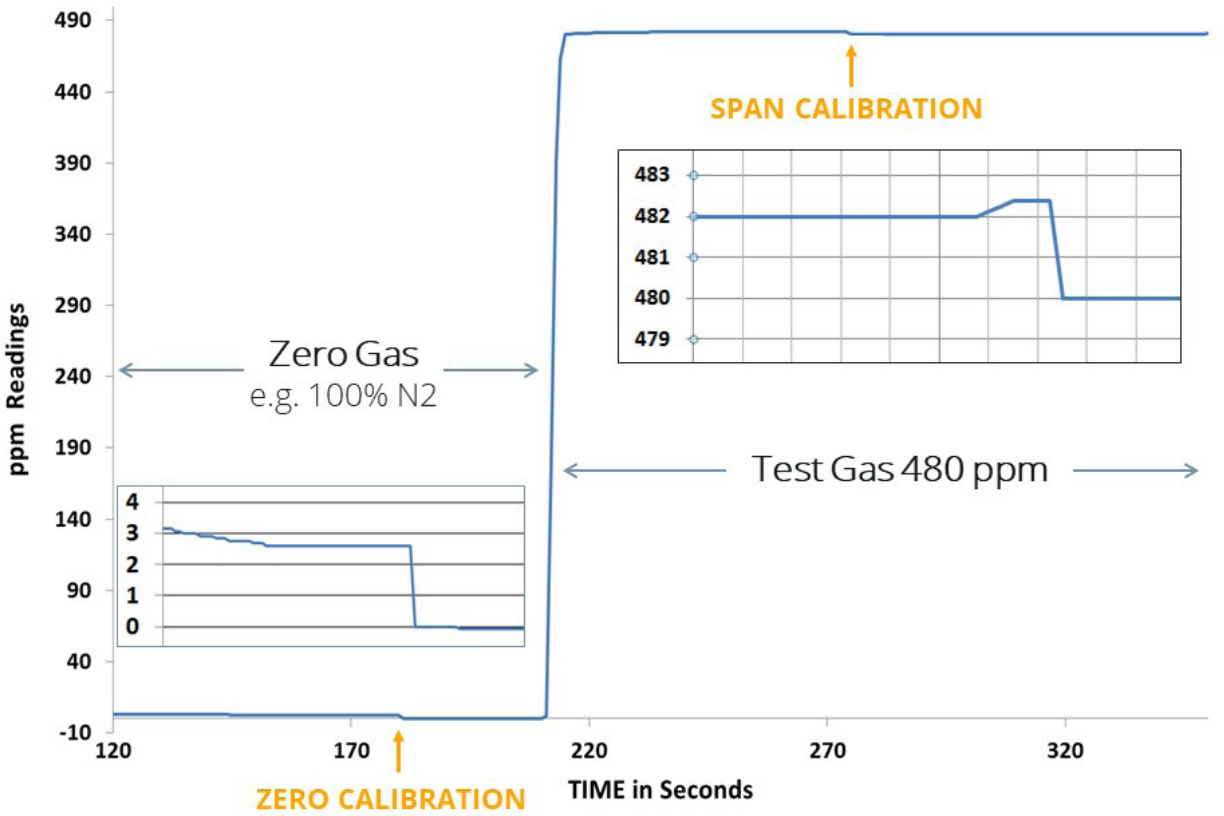

Figure 9: The behaviour of the concentration readings during zero- and span-point calibration

2.3.1 Zero-point calibration

Purge the entire gas measurement system with a sufficient volume (1 l/min) of zero gas (e.g. N2, Ar, H2 or cleaned air) and wait until the gas concentration reading is stable (< 1 % F.S.).

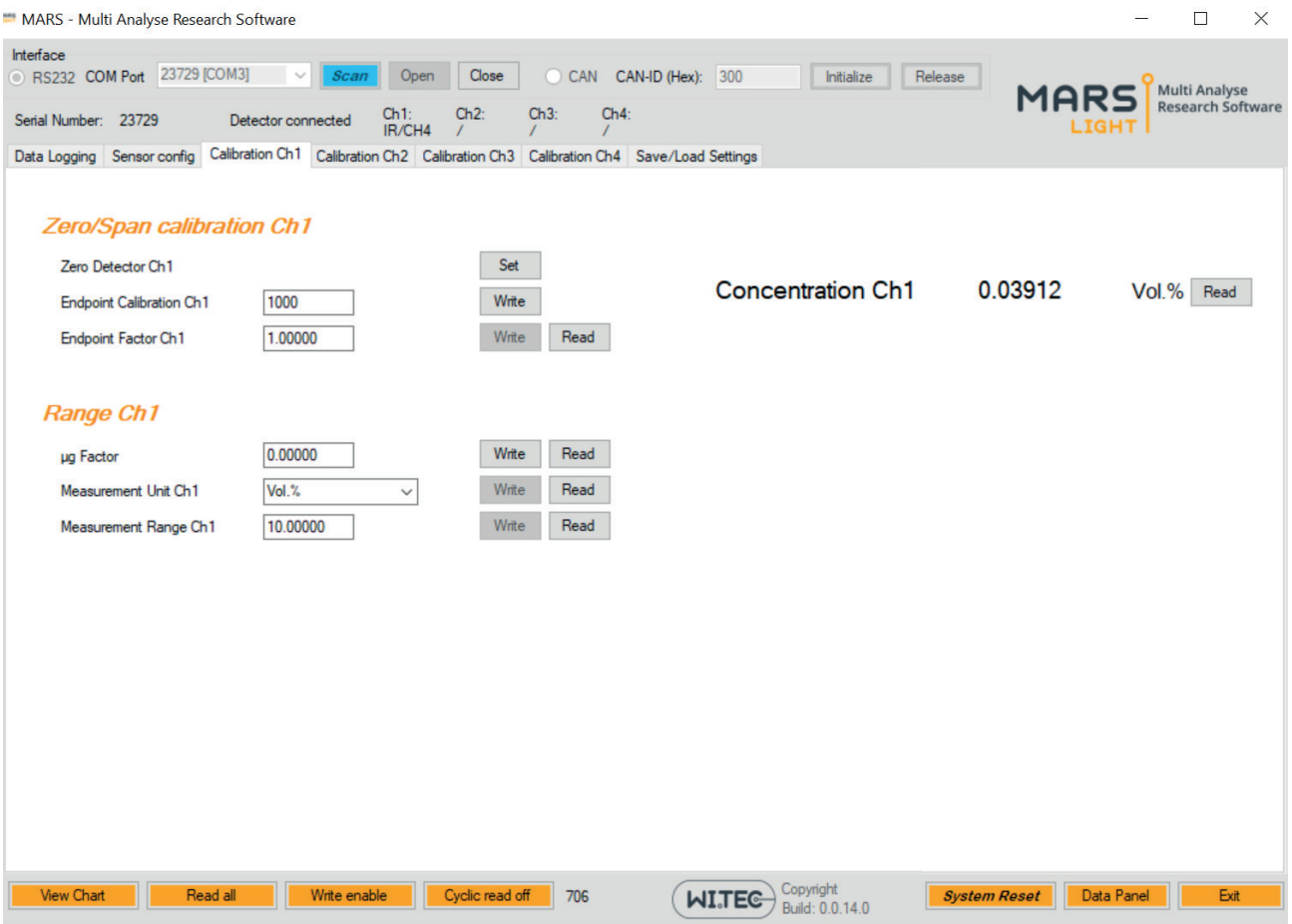

Figure 10: Zero-point calibration

1	Click the button [**Set**] behind zero detector all channel
2	Click the button [**ja**] to do a zero-point calibration › The concentration reading is now 0.0000 ppm

2.3.2 End-point calibration

For setting the endpoint it is necessary to use a well-known concentration of test gas. If you use a certified test gas-bottle (cylinder) you will find the gas concentration value on the label or in the provided certificate (e.g. 1000.00 pp CO2)

- Before applying the end-point calibration, it is important to do a zero-point calibration with N2 (inert gas) to set the offset to zero
- Make sure that the test gas concentration does not deviate more than 10 % from F.S.
- Purge the entire gas measurement system with sufficient volume (1 l/min) of test gas and wait until the gas concentration reading is stable (< 1% of span).

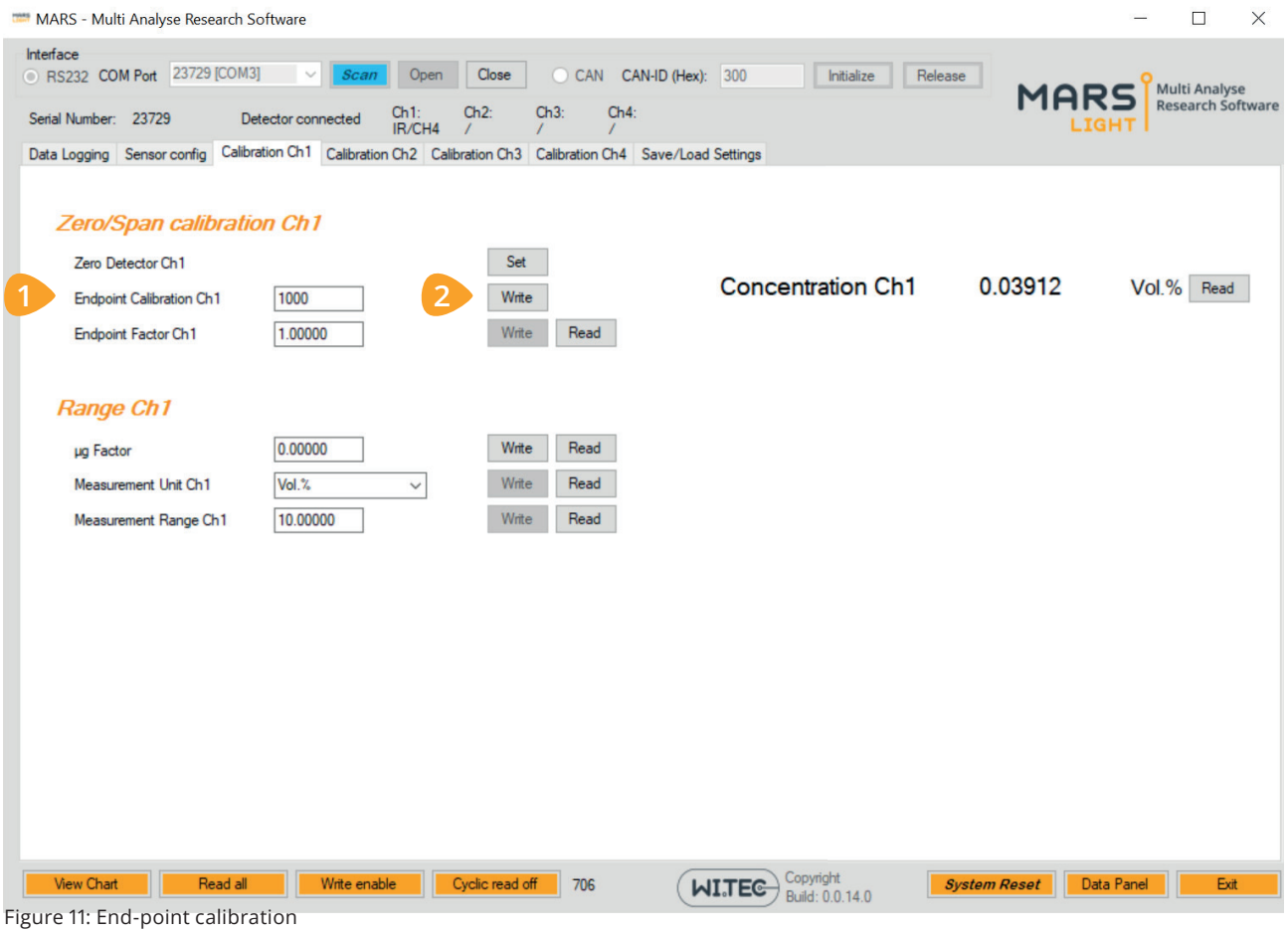

Figure 11: End-point calibration

1	Type the flowing test gas concentration in the textbox
2	Click the button [**write**] to do the end-point calibration

2.4 Panel view with data panel

In this mode you are capable to show the relevant measurement signal in front panel design mode. This can be useful thing to demonstrate the measurement or make some diagnostics with the sensor.

To open the data panel click the button [**Data Panel**] (see figure 1 button no. 25).

Note: before you can use the panel view you must have established a connection with the sensor (see sec. 2.2)

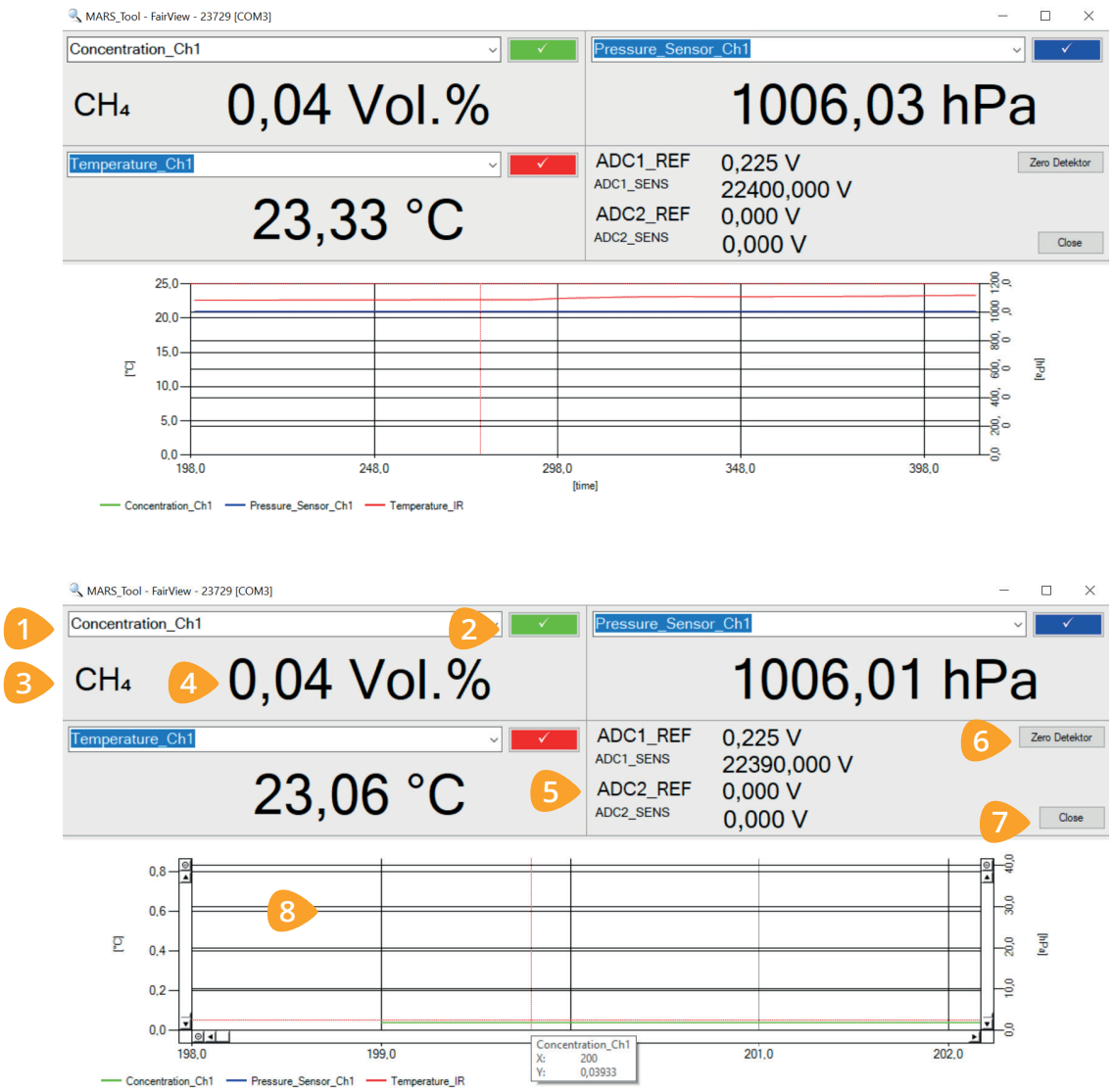

Figure 12: Data panel view

1	Data channel selection	5	Raw data values (preamp signals)
2	Activate / deactivate data logging	6	Sets all channel to zero (with inert gas N2, H2)
3	Gas component of the selected channel	7	Close panel view, the settings will be saved
4	Actual gas concentration readings	8	Signal plot

To open the data panel click the button [**Data Panel**] (see figure 1 button no. 25).

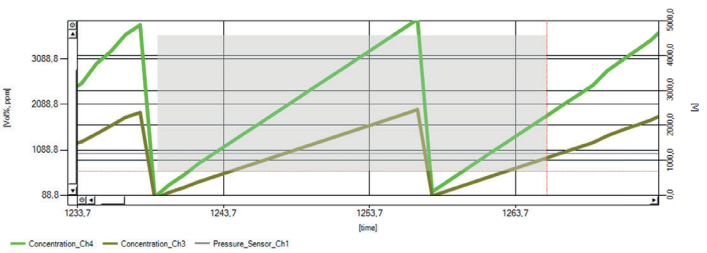

Figure 13: Data panel with zooming function

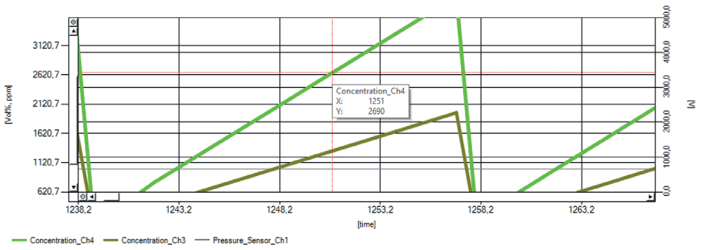

Figure 14: Data panel with label

If you move the mouse over the area, a label with the exact measurement values will be displayed.