MARS® Tool light Manual

PC software for readings, data logging and adjustment

INFRA.sens® · ULTRA.sens® · KOMBI.sens® · HUMI.sens® · O2.sens · Thermobox



Document	Manual (translation of the original German manual)
Document number	BA001-MT-EN
Revision	1.0, 11/2026
Valid for	MARS® Tool light version 0.0.18 and later · gas measurement modules acc. to BA001-EN
Language	English (US)

Wi.Tec-Sensorik GmbH
Schepersweg 41–61
46485 Wesel
Germany
Phone +49 281 206578-20
info@witec-sensorik.de
www.witec-sensorik.de

Copyright © 2026 Wi.Tec-Sensorik GmbH. All rights reserved.

No part of this document may be reproduced by any means, in whole or in part, without the prior written consent of Wi.Tec-Sensorik GmbH.

This document has been prepared with the utmost care. However, Wi.Tec-Sensorik GmbH assumes no responsibility for errors or omissions or for any damage resulting from them. Subject to change of software and documentation.

MARS® (Multi Analyse Research Software) is a word mark of Wi.Tec-Sensorik GmbH.

All trademarks or registered trademarks mentioned are the property of their respective owners.

This revision supersedes the previous MARS Tool light Manual (revision V1.0, 01/2024). In case of doubt, the German original version shall prevail.

Contents

0 About this manual....4
0.1 Scope....4
0.2 Target audience....4
0.3 Related documents....5
0.4 Conventions....5
0.5 Revision history....5
1 Safety....6
1.1 Intended use....6
1.2 Safety notices for working with the software....6
2 System requirements and accessories....7
3 Installation and program start....8
3.1 Download....8
3.2 Installation....8
3.3 Starting the program....8
4 Connecting to the module....9
4.1 Connection via RS232....9
4.2 Connection via CAN....10
4.3 Disconnecting and exiting the program....10
5 User interface....11
5.1 Data Logging tab....12
5.2 Sensor config tab....14
5.3 Calibration Ch1 to Ch4 tabs....17
5.4 Diagnosis tab....18
5.5 Save/Load Settings tab....19
6 User levels....20
6.1 Changing the user level....21
7 Displaying and logging readings....22
7.1 Displaying readings....22
7.2 Logging measurement data (CSV)....22
7.3 Chart view....23
7.4 Panel view (Data Panel)....24
8 Adjustment....26
8.1 Check intervals and procedure....26
8.2 Zero-point adjustment....27
8.3 Span-point adjustment....27
9 Saving and loading parameters....28
9.1 Saving parameters....28
9.2 Loading parameters....28
10 Troubleshooting....29
Appendix A – Glossary and abbreviations....30

0 About this manual

This manual describes how to operate the PC software MARS® Tool light (MARS® = Multi Analyse Research Software). With MARS® Tool light you read out measured values and parameters of Wi.Tec gas measurement modules, log measurement data, adjust the zero and span point, and back up the module parameters.

Installation, electrical connection, safety and the principles of module adjustment are described in the Operating Manual BA001-EN. Read it before using MARS® Tool light for the first time.

0.1 Scope

Applies to	Version / variant
Software	MARS® Tool light, version 0.0.18 and later
Gas measurement modules	INFRA.sens®, ULTRA.sens®, KOMBI.sens®, HUMI.sens®, O2.sens
Electronics	Base board V1.8.x / V1.9.x / IR-compact V2.0.x · Thermobox V5
Interfaces	RS232 (standard), CAN

Table 1: Scope of this manual

This manual applies to MARS® Tool light version 0.0.18 and later. Compared with earlier versions, it offers, among other things:

- support for the digital O2.sens,
- storage of the operating hours in the XML parameter file (Section 9),
- automatic reading of all sensor parameters as soon as the COM port to the module is opened (Section 4.1),
- the user interface layout and user levels introduced with version 0.0.14 (Section 6).

M&C module variants are no longer supported. Some figures are taken from version 0.0.14; appearance and labeling may differ slightly from your version. The installed version is shown at the bottom of the program window (“Build”).

0.2 Target audience

This manual is intended for integrators, operators and service personnel who commission, check and adjust gas measurement modules. Basic knowledge of Windows PCs and gas measurement technology, and qualification as described in BA001-EN, Section 1.3, are required.

0.3 Related documents

Document	Content	Source
Operating Manual Gas Modules (BA001-EN)	Safety, connection, adjustment intervals, zero and span gases, status byte, troubleshooting	Download
Quick Start Guide (BA001-QS-EN)	Short version for unpacking and connecting	Download
Communication Manual	RS232, CAN, Modbus, CANopen protocols; registers, status byte, device ID	Download
Data sheet or technical specification of the module	Measuring range, channel assignment, technical data	included in the delivery

Table 2: Related documents

0.4 Conventions

- Safety notices are classified by hazard level (BA001-EN, Section 1.4).
- Instructions consist of prerequisites, numbered steps and result.
- Software buttons are shown in bold in square brackets, e.g. **[Write]**. Tabs, fields and messages are written as displayed by the software, e.g. the “Sensor config” tab.
- Orange item numbers in the screenshots refer to the legend table below the figure.
- Gas measurement channels are called Ch1 to Ch4 (not to be confused with the formula CH_4 for methane).
- Abbreviations are explained in the glossary (Appendix A).

0.5 Revision history

Revision	Date	Change
V1.0	01/2024	MARS Tool light Manual, software V0.0.14.0 and later
1.0	11/2026	New edition for software version 0.0.18 and later in the layout of the gas module documentation; aligned with BA001-EN Rev. 1.0

Table 3: Revision history

1 Safety

MARS® Tool light changes parameters of the gas measurement module. Incorrect settings lead to incorrect readings. Also observe the safety notices in the Operating Manual BA001-EN (Section 1).

1.1 Intended use

MARS® Tool light is used exclusively to read out Wi.Tec gas measurement modules via RS232 or CAN, log measurement data, adjust the zero and span point, and save or load module parameters. The software is not part of a safety function and is not intended for gas warning or personal protection purposes.

1.2 Safety notices for working with the software

⚠ WARNING

Toxic or asphyxiating gases during adjustment

During adjustment, zero and span gases flow through the module. Span gases such as CO, NO, SO_2 or NH_3 are toxic; nitrogen in high concentration displaces atmospheric oxygen.

- ▶ Connect the gas outlet to an exhaust line (BA001-EN, Section 6.7).
- ▶ Check the gas path for leaks before adjustment (BA001-EN, Section 6.6).
- ▶ Observe the safety data sheet of the span gas.

! NOTICE

Incorrect readings due to wrong parameters

Changed adjustment, range or damping values immediately affect the readings and outputs of the module.

- ▶ Back up the module parameters to an XML file before any change (Section 9).
- ▶ Use the Advance and Expert user levels only with trained personnel (Section 6).
- ▶ After each change, check the readings with zero and span gas.

! NOTICE

Interruption of the measurement

[System Reset] restarts the module. During the restart, the interfaces, analog and digital outputs do not provide valid values. Adjustment also changes the readings and outputs.

- ▶ Inform the higher-level control system or plant operator beforehand and inhibit the outputs if necessary.

2 System requirements and accessories

In addition to the gas measurement module, you need the following to operate MARS® Tool light:

Component	Requirement
PC	Windows 10 or 11, free USB port
Software	MARS® Tool light (download, Section 3.1)
RS232 interface	USB/RS232 adapter (item no. 2001552) with driver installed
RS232 data cable	Item no. 2002204 (IR-compact), 2001207 (V1.9.x and Thermobox), 2000592 (V1.8.x) – on order only
CAN interface (optional)	Only the PCAN-USB CAN-USB adapter from PEAK-System (item no. IPEH-002021; Wi.Tec item no. 2002089) with driver installed
Power supply	24 V DC, galvanically isolated; current consumption up to 400 mA depending on module, Thermobox V5 with heater min. 2 A (BA001-EN, Section 7.1)

Table 4: System requirements

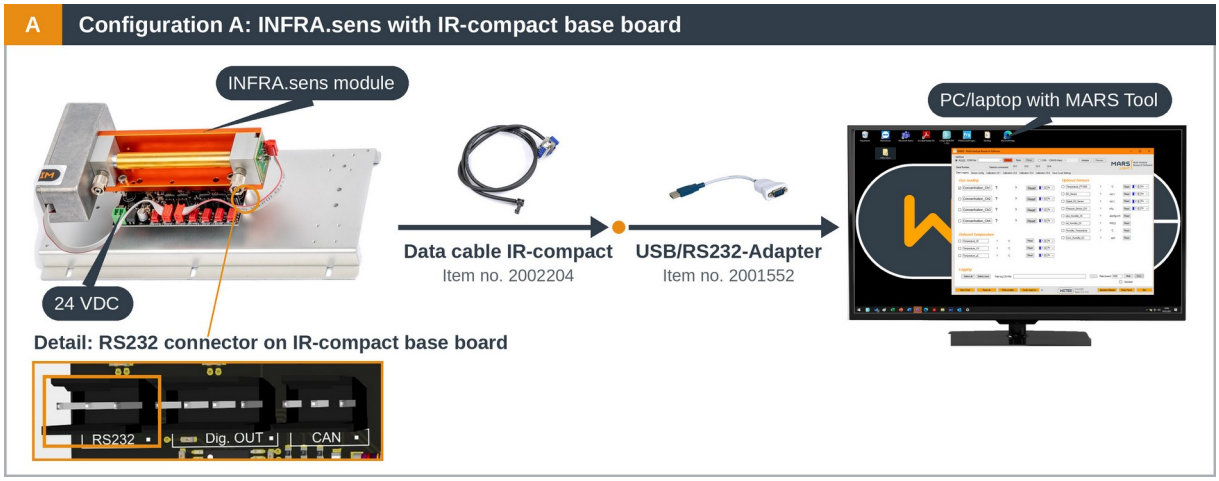

Figure 1: Example: connection between INFRA.sens (IR-compact base board) and PC. Further configurations: BA001-EN, Section 8

Information

The serial interface of the module must be set to RS232 (not Modbus). For modules with the Modbus option, check the DIP switch (BA001-EN, Section 7.6).

3 Installation and program start

3.1 Download

The latest version of MARS® Tool light is available for download on the Wi.Tec website:

https://www.witec-sensorik.de/en/downloads/software/

After completing the form, you will receive the download link by e-mail. The software package contains the setup and this manual.

Download MARS® Tool light

3.2 Installation

Prerequisite: PC with Windows 10 or 11; administrator rights recommended for the installation.

1. Download and unpack the software package via the download link.
2. Run the setup file and install MARS® Tool light.
3. Connect the USB/RS232 adapter; the associated driver must be installed.
4. In the Windows Device Manager, check the assigned COM port under “Ports (COM & LPT)”.

✔️ **Result:** MARS® Tool light is installed and the adapter is available as a COM port.

3.3 Starting the program

Start MARS® Tool light from the Start menu or the desktop shortcut. The program window opens with the “Data Logging” tab (Section 5.1).

Information

If no COM ports are displayed or settings are not saved, start MARS® Tool light with administrator rights: right-click the program icon > “Run as administrator”.

4 Connecting to the module

4.1 Connection via RS232

Prerequisite: Module is connected to 24 V DC, LED2 flashes at 1 Hz; data cable and USB/RS232 adapter are connected; MARS® Tool light is running.

1. Click **[Scan]**. While all COM ports are being scanned, the button is red; it then turns blue again.
2. Select the module in the “COM Port” drop-down list. The entry shows serial number and port, e.g. “23729 [COM3]”. The serial number is on the nameplate (BA001-EN, Section 3.9).
3. Click **[Open]**. The software immediately reads all sensor parameters of the module; no separate **[Read]** is required.

✔ **Result:** “Serial Number” shows the serial number, “Detector connected” the channel assignment Ch1 to Ch4 (e.g. “Ch1: IR/CH4”).

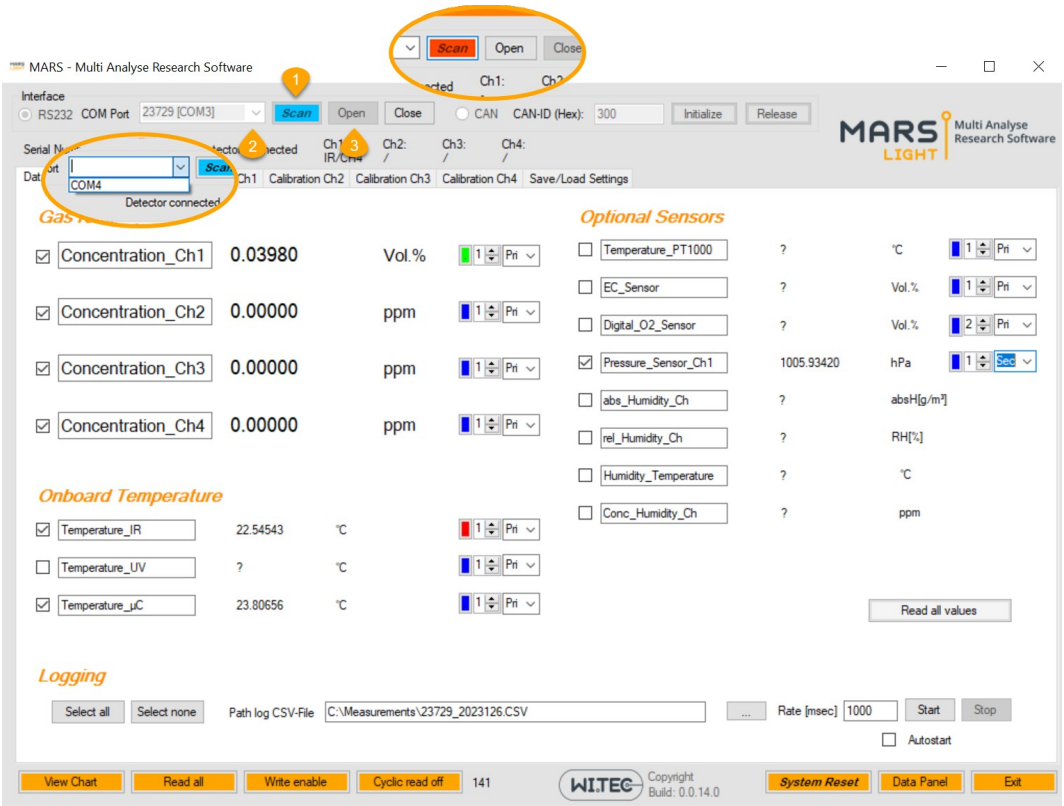

Figure 2: Establishing the connection: 1 [Scan], 2 select module, 3 [Open]

> **Information**
> If no module is found, check power supply, cable and COM port (Section 10).

4.2 Connection via CAN

NOTICE

Use only the PEAK PCAN-USB adapter

MARS® Tool light supports only the PCAN-USB adapter from PEAK-System (item no. IPEH-002021) for CAN. Adapters from other manufacturers cannot establish a connection.

▶️ Install the PEAK driver before first use.

Prerequisite: PCAN-USB adapter from PEAK-System (Section 2) is installed and connected to the CAN bus of the module; termination resistors are set (BA001-EN, Section 7.5). The CAN parameters of the module (protocol, baud rate, receive address) are known; they are set via RS232 in the “Sensor config” tab (Section 5.2).

1. In the “Interface” area, select the “CAN” option.
2. Enter the receive address of the module in hexadecimal in the “CAN-ID (Hex)” field (field “CAN_ID_REC”, e.g. 300).
3. Click **[Initialize]**.

✔️ **Result:** The software communicates with the module via CAN. Click **[Release]** to disconnect.

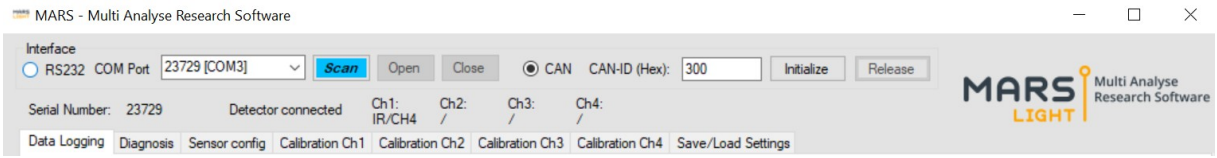

Figure 3: Interface area with CAN option selected

4.3 Disconnecting and exiting the program

- **[Close]** closes the RS232 connection; **[Release]** releases the CAN adapter.
- **[Exit]** closes the program and saves the user interface settings (channel designators, colors, storage paths).

5 User interface

The program window is divided into four areas:

- **Interface** (top): selection of RS232 or CAN, **[Scan]**, **[Open]**, **[Close]**, **[Initialize]**, **[Release]**.
- **Status line**: serial number and channel assignment of the connected module.
- **Tabs**: Data Logging, Sensor config, Calibration Ch1 to Ch4, Save/Load Settings; from user level Advance additionally Diagnosis.
- **Function bar** (bottom): **[View Chart]**, **[Read all]**, **[Write enable]**, **[Cyclic read on]**, **[System Reset]**, **[Data Panel]**, **[Exit]**.

Tab	Content	User level
Data Logging	Display and log readings, chart	Standard
Diagnosis	Modulation values and raw voltages (service)	Advance
Sensor config	Module information, status byte, damping, CAN, alarm levels, AZF, zero point of all channels	Standard (read)
Calibration Ch1 … Ch4	Zero and span point per channel, unit, range	Standard
Save/Load Settings	Save and load module parameters as XML	Standard (save)

Table 5: Tabs of the user interface

Information

Greyed-out buttons (e.g. **[Write]**) are locked at the current user level. User levels and rights: Section 6.

5.1 Data Logging tab

The tab shows the readings of the gas channels (“Gas reading”), the onboard temperatures (“Onboard Temperature”: IR source, UV unit, microcontroller) and optional sensors (“Optional Sensors”: e.g. PT1000, electrochemical sensor, digital O2.sens, pressure sensor, humidity). Fields without an associated sensor remain empty.

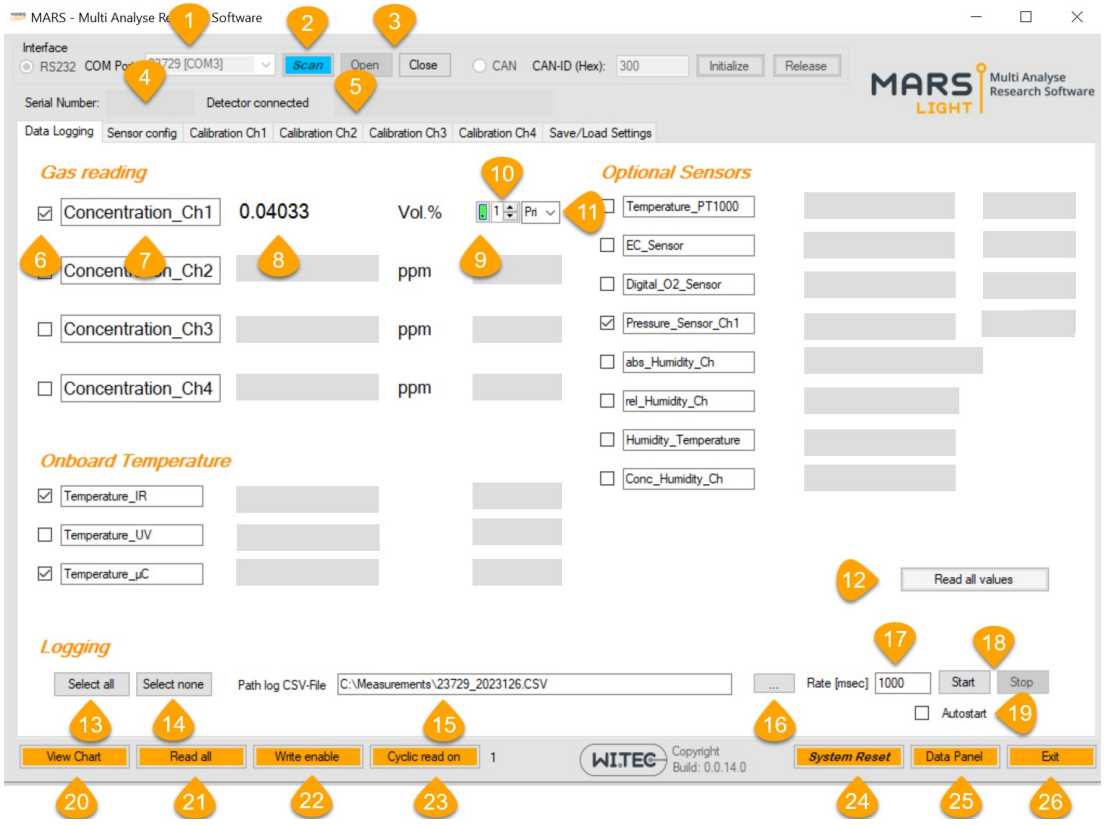

Figure 4: Data Logging tab

1	COM Port – selects the port or module	14	[Select none] – deselects all channels
2	[Scan] – scans all COM ports for connected modules	15	Path log CSV-File – path and name of the log file
3	[Open] / [Close] – opens or closes the connection; all sensor parameters are read on opening	16	[…] – selects the storage location in Explorer
4	Serial Number – serial number of the module	17	Rate [msec] – logging interval, minimum 100 ms
5	Detector connected – channel assignment of the module	18	[Start] / [Stop] – starts or stops logging to the CSV file
6	Check box – selects the channel for data logging and chart	19	Autostart – starts data logging automatically
7	Channel designator, freely editable (saved)	20	[View Chart] – chart view in a separate window
8	Reading with unit (ppm, ppb, vol.%)	21	[Read all] – reads all values from the module
9	Line color in the chart	22	[Write enable] – password prompt for a higher user level
10	Line thickness in the chart	23	[Cyclic read on] – cyclic reading independent of data logging (for chart and direct feedback)
11	Chart axis: Pri = primary, Sec = secondary	24	[System Reset] – restarts the module (software reset)
12	[Read all values] – reads all values of the tab once	25	[Data Panel] – panel view with the most important readings
13	[Select all] – selects all channels	26	[Exit] – closes the program and saves the settings

Table 6: Controls on the Data Logging tab

5.2 Sensor config tab

The tab shows module information and contains the settings for damping, CAN interface, alarm thresholds of the radiation sources, and the auto-zero function. **[Read]** reads a value, **[Write]** writes it to the module.

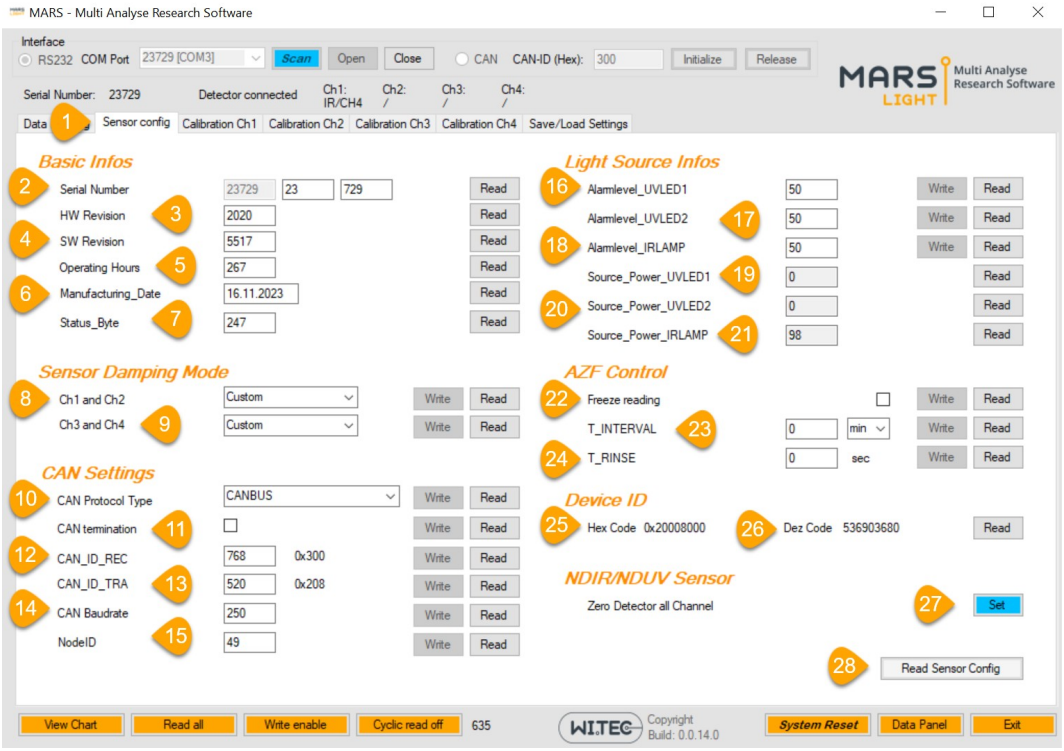

Figure 5: Sensor config tab

1	Sensor config tab	15	NodeID – CANopen only
2	Serial Number – serial number	16	Alarmlevel_UVLED1 – alarm threshold in %; the status byte changes if the intensity falls below it
3	HW Revision – hardware revision of the base board	17	Alarmlevel_UVLED2 – as 16
4	SW Revision – firmware revision of the microcontroller	18	Alarmlevel_IRLAMP – as 16 (factory setting 50 %)
5	Operating Hours – operating hours since manufacture	19	Source_Power_UVLED1 – current intensity in %
6	Manufacturing_Date – date of manufacture	20	Source_Power_UVLED2 – current intensity in %
7	Status_Byte – system status, decimal (Section 5.2.1)	21	Source_Power_IRLAMP – current intensity in %
8	Damping Ch1 and Ch2 (Section 5.2.2)	22	Freeze reading – freezes the readings during automatic zero-point adjustment (AZF, Section 5.2.3)
9	Damping Ch3 and Ch4	23	T_INTERVAL – interval of the automatic zero-point adjustment [min, h, d]
10	CAN Protocol Type – CANBUS or CANopen	24	T_RINSE – purge time with zero gas [s]
11	CAN termination – 120 Ω termination resistor between CANH and CANL	25	Device ID – hex code
12	CAN_ID_REC – receive address (slave), with hex display	26	Device ID – decimal code
13	CAN_ID_TRA – transmit address (master), with hex display	27	Zero Detector all Channel [Set] – sets the zero point of all channels (Section 8.2)
14	CAN Baudrate – 125, 250, 500 or 1000 kbit/s	28	[Read Sensor Config] – re-reads the complete configuration

Table 7: Controls on the Sensor config tab

5.2.1 Status byte

MARS® Tool light shows the status byte in decimal in the “Status_Byte” field, e.g. 247 (= 0xF7). It indicates whether the radiation sources are detected and whether their signal level is above the alarm level (items 16 to 18). The meaning of the individual bits is given in BA001-EN, Section 11.2, the complete code table in the Communication Manual.

5.2.2 Damping (Sensor Damping Mode)

Damping smooths the measurement signal. Stronger damping reduces noise but increases the response time. The setting applies to two channels together (Ch1/Ch2 and Ch3/Ch4); it can be changed at the Expert user level.

Setting	Response time of electronics	Signal performance
Slow	30 s	high
Medium	6 s	normal
Fast	3 s	normal
Peak	1 s	low
Custom	application-specific, factory-set	–

Table 8: Damping modes

The total response time (t_{90}) of the measuring system also depends on flow rate, tubing length and cell volume (BA001-EN, Section 6.5).

5.2.3 Auto-zero function (AZF Control)

In combination with the auto-zero function (AZF) accessory, the module adjusts the zero point automatically at fixed intervals. “T_INTERVAL” sets the interval, “T_RINSE” the purge time with zero gas before the zero point is set. With “Freeze reading”, the module holds the last reading at the outputs during this time. Connection and function of the AZF: BA001-EN, Section 10.7 and BA001-EN, Section 14.1.

5.3 Calibration Ch1 to Ch4 tabs

The Calibration Ch1 to Ch4 tabs have the same layout; the controls are in the same position on each tab. The figure shows channel Ch1.

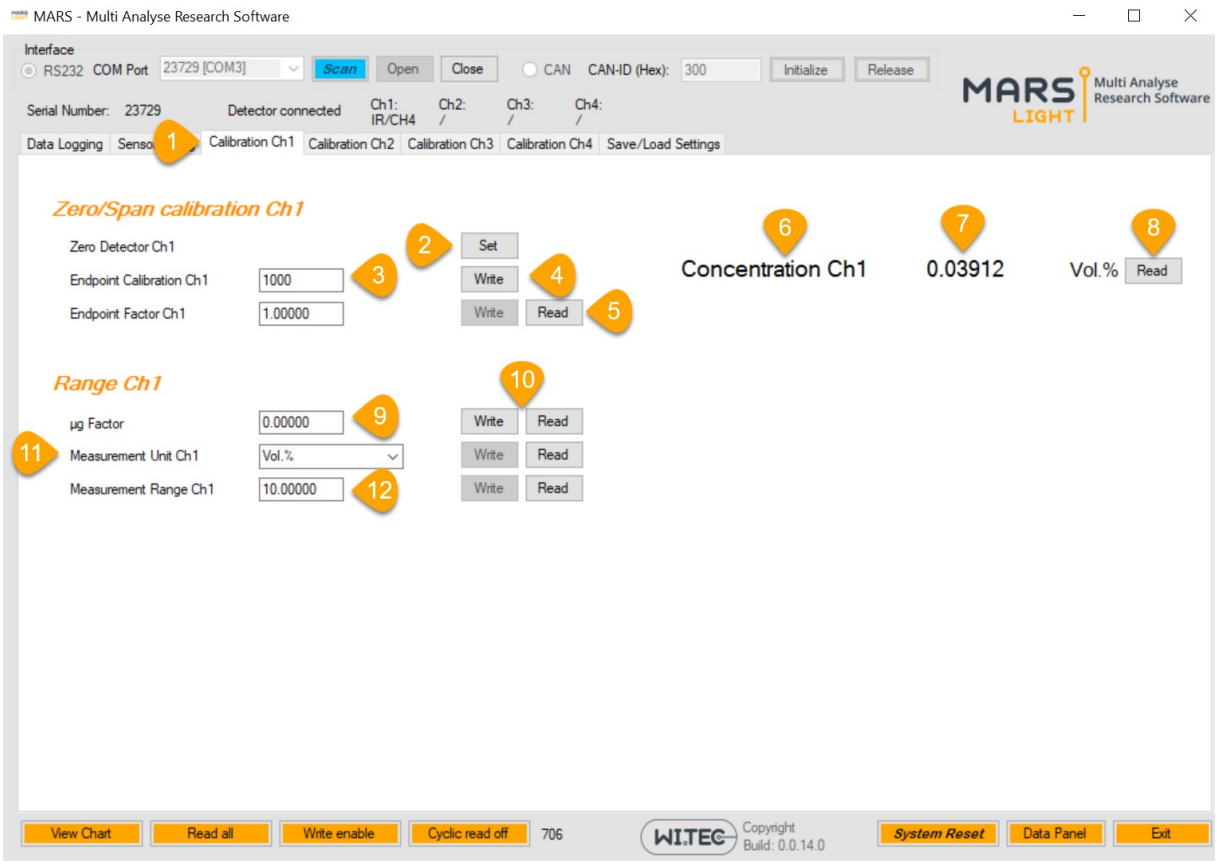

Figure 6: Calibration Ch1 tab

1	Calibration Ch1 tab (Ch2 to Ch4 accordingly)	**7**	Current reading for feedback during adjustment
2	Zero Detector Ch1 [Set] – sets the zero point of this channel (Section 8.2)	**8**	[Read] – updates the reading
3	Endpoint Calibration Ch1 – enter the span gas concentration	**9**	µg Factor – factor for converting the concentration into another unit (e.g. µg/m³)
4	[Write] – sets the span point; the module calculates the span factor and stores it permanently	**10**	[Write] / [Read] – writes or reads the factor
5	Endpoint Factor Ch1 – reads the span factor; direct writing at Expert level only; factory default 1.00000	**11**	Measurement Unit Ch1 – measurement unit of the channel
6	Label of the reading	**12**	Measurement Range Ch1 – full scale; also defines the scaling of the analog output (BA001-EN, Section 14.2)

Table 9: Controls on the Calibration Ch1 tab

5.4 Diagnosis tab

The Diagnosis tab is displayed from the Advance user level. It contains the modulation values of the channels (“Modulation values”) and the raw voltages of reference and measuring channel (“Voltage raw values”, ADCRef and ADCMeas). These values are used for troubleshooting together with Wi.Tec Service. As on the Data Logging tab, individual values can be selected, logged and displayed in the chart.

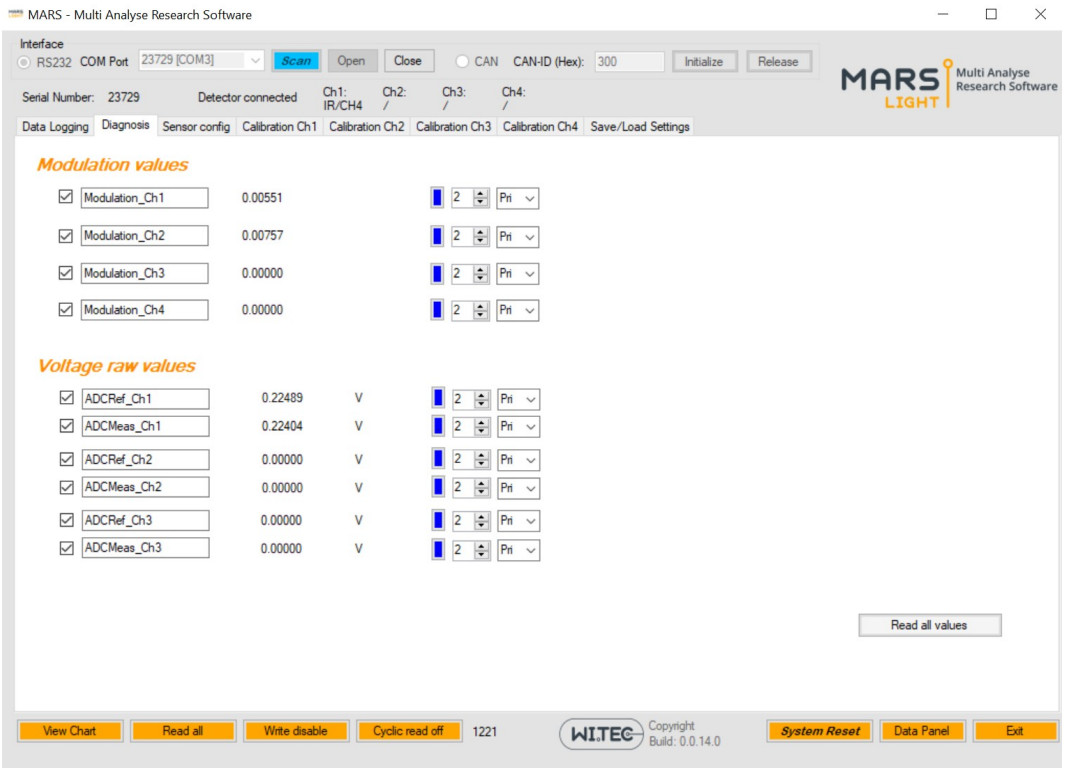

Figure 7: Diagnosis tab (from Advance user level)

5.5 Save/Load Settings tab

On this tab you save all module parameters to an XML file or load them from a file into the module. Operation: Section 9.

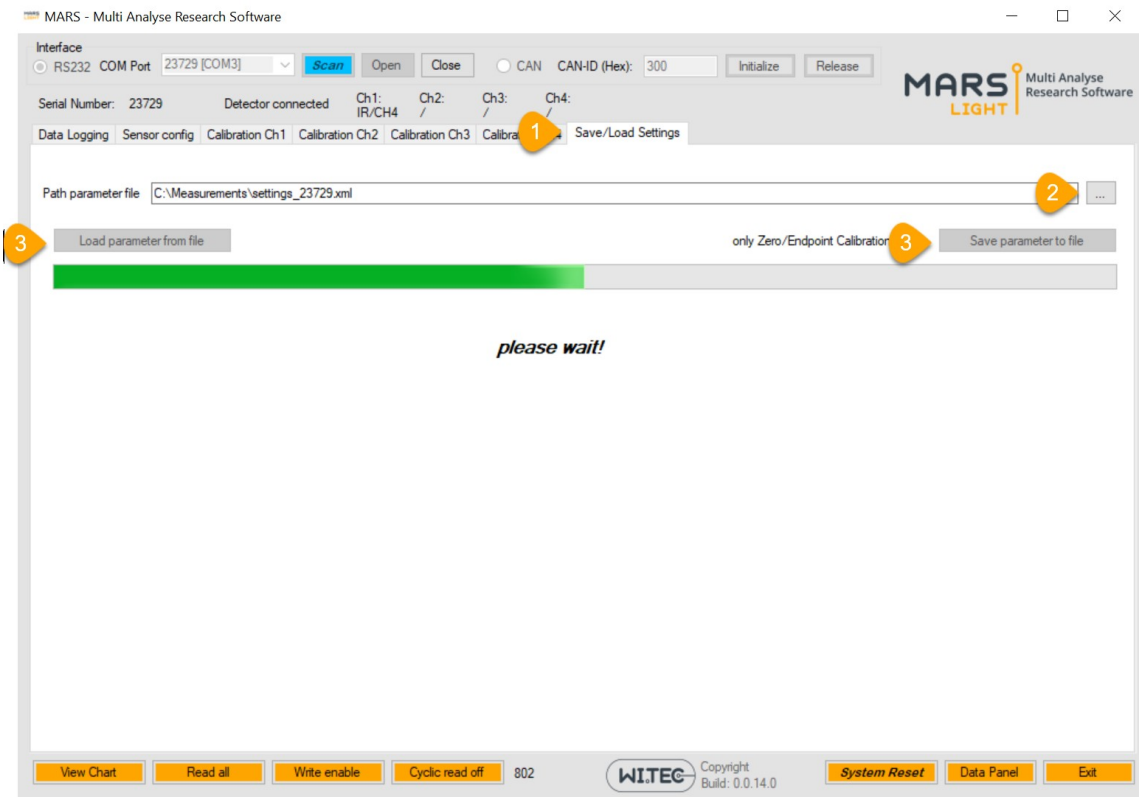

Figure 8: Save/Load Settings tab

1	Save/Load Settings tab	3	[Load parameter from file] / [Save parameter to file] – loads or saves parameters; option “only Zero/Endpoint Calibration” transfers only the adjustment values
2	Path parameter file with […] – location and name of the parameter file		

Table 10: Controls on the Save/Load Settings tab

6 User levels

MARS® Tool light starts at the Standard user level. It allows reading all important values, data logging, and zero and span adjustment. Parameters that fundamentally change the measuring behavior of the module are protected by the Advance and Expert user levels.

Function	Standard	Advance	Expert
Read and log data	✔	✔	✔
Read sensor configuration	✔	✔	✔
Set zero and span point	✔	✔	✔
Read Calibration Ch1 … Ch4	✔	✔	✔
Save parameters to XML file	✔	✔	✔
Set alarm level of radiation sources		✔	✔
Configure auto-zero function (AZF)		✔	✔
Set measurement unit and range		✔	✔
Load parameters from XML file		✔	✔
Diagnosis values (ADC, modulation)		✔	✔
Set damping			✔
Change CAN settings			✔
Write span factor directly			✔
Adjust external sensors			✔
Bootloader mode (firmware update)			✔

Table 11: Rights of the user levels

User level	Password
Standard	no password (level after program start)
Advance	Adv123
Expert	Exp456

Table 12: User level passwords

Information

The Advance and Expert user levels are intended for trained personnel. Do not pass the passwords on to unauthorized persons.

6.1 Changing the user level

Prerequisite: Password for the required user level is available.

1. Click **[Write enable]** in the function bar. The “Password” window opens.
2. Enter the password in the “Enter Password” field (passwords: see Section 6).
3. Click **[ok]**.

✔ **Result:** The functions of the user level are unlocked; additional tabs (e.g. Diagnosis) are displayed and the button now reads **[Write disable]**.

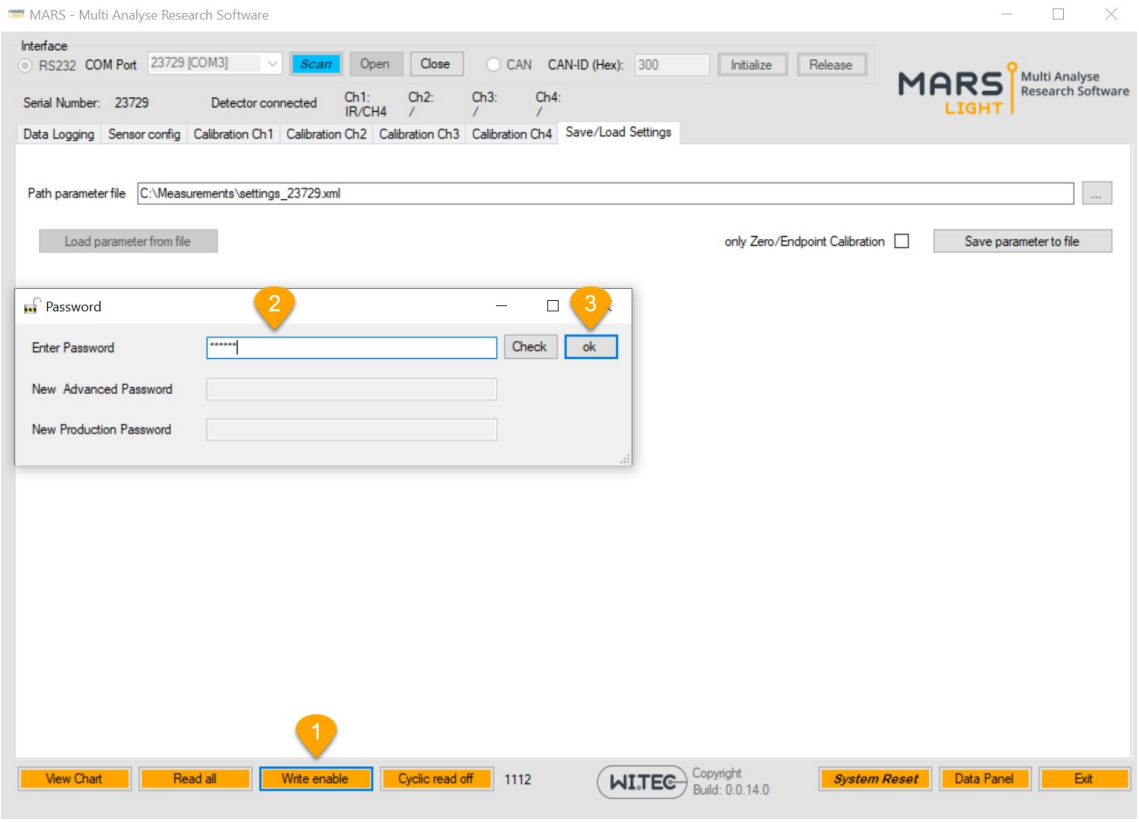

Figure 9: Changing the user level: 1 [Write enable], 2 enter password, 3 [ok]

7 Displaying and logging readings

7.1 Displaying readings

Prerequisite: Connection to the module is established (Section 4).

1. On the Data Logging tab, select the required channels (check boxes or **[Select all]**).
2. Click **[Cyclic read on]**. The readings are updated continuously. For a single query, **[Read all values]** is sufficient.

✔ **Result:** The readings of the selected channels are displayed with their unit.

7.2 Logging measurement data (CSV)

Prerequisite: Connection to the module is established.

1. Select the channels to be logged.
2. Use **[…]** to set the location and name of the log file. Default: “C:\Measurements\<serial number>_<date>.CSV”.
3. Enter the logging interval in the “Rate [msec]” field (minimum 100 ms).
4. Click **[Start]**.
5. To finish, click **[Stop]**.

✔ **Result:** The CSV file contains time stamps and the values of the selected channels; it can be evaluated with Microsoft Excel, for example.

> **Information**
> Choose the interval to suit the measurement duration: at 100 ms, 36,000 records are created per hour.

7.3 Chart view

[View Chart] opens a separate window showing the selected channels over time. **[Copy to Clipboard]** copies the chart to the clipboard; **[Beenden]** (close) closes the window.

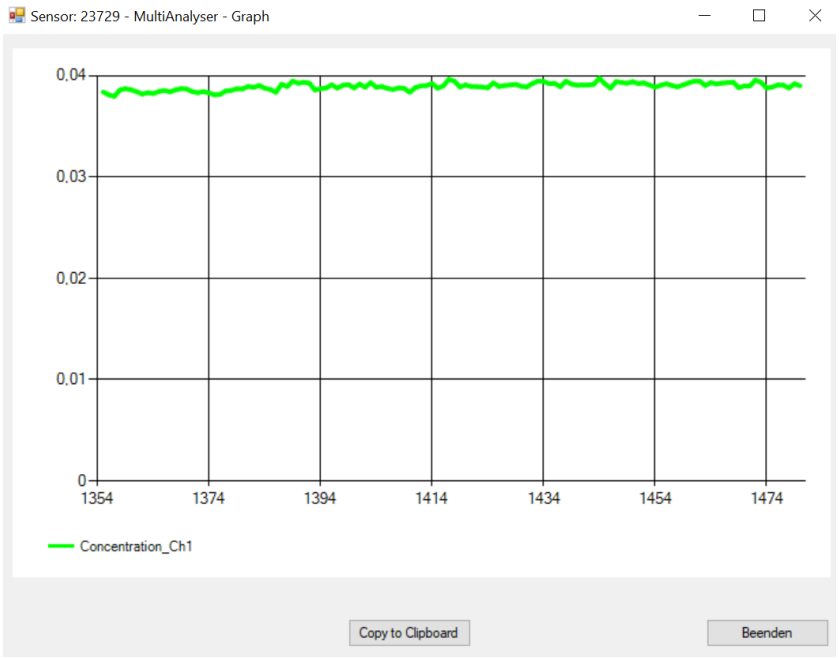

Figure 10: Chart view

Line color, line thickness and axis are set per channel on the Data Logging tab (items 9 to 11 in Figure 4). Clicking the color field opens the Windows color dialog.

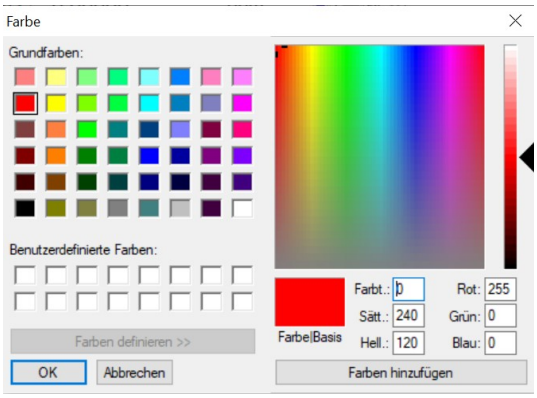

Figure 11: Color dialog for the line color

7.4 Panel view (Data Panel)

The panel view displays the most important readings in large format in the style of an instrument front panel – useful for demonstrations and diagnostics. **[Data Panel]** opens the view; a connection to the module must be established first (Section 4).

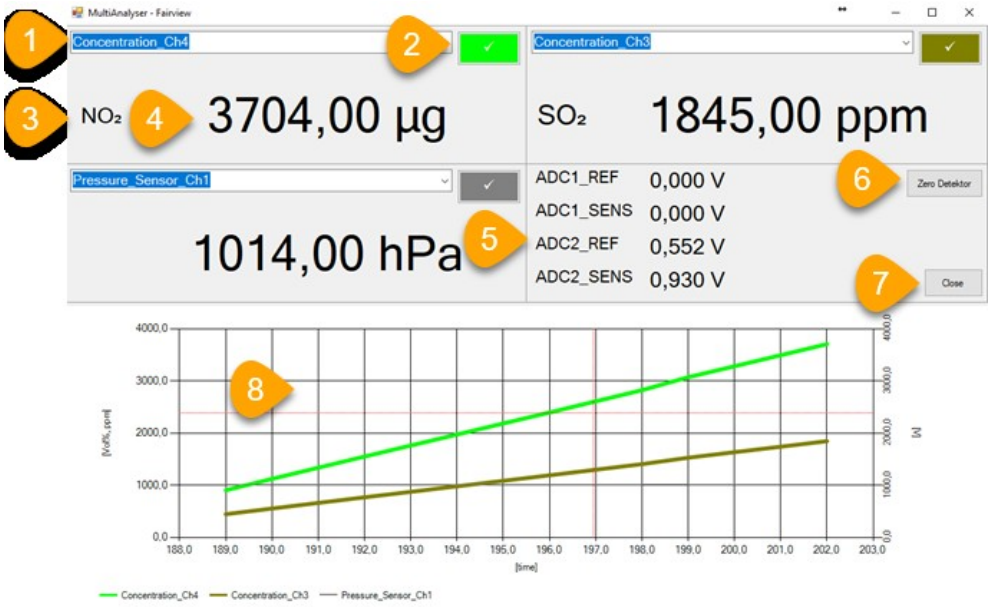

Figure 12: Data Panel view

1	Channel selection	5	Raw values of the preamplifiers (ADC_REF, ADC_SENS)
2	Data recording in the panel on/off	6	[Zero Detektor] – sets all channels to zero; use only with zero gas (e.g. N_2)
3	Gas component of the selected channel	7	[Close] – closes the panel view; the settings are saved
4	Current reading	8	Signal plot

Table 13: Controls of the panel view

- **Zoom:** hold down the left mouse button and drag an area in the chart.
- **Show values:** move the mouse pointer over the curve; a label shows the exact readings.

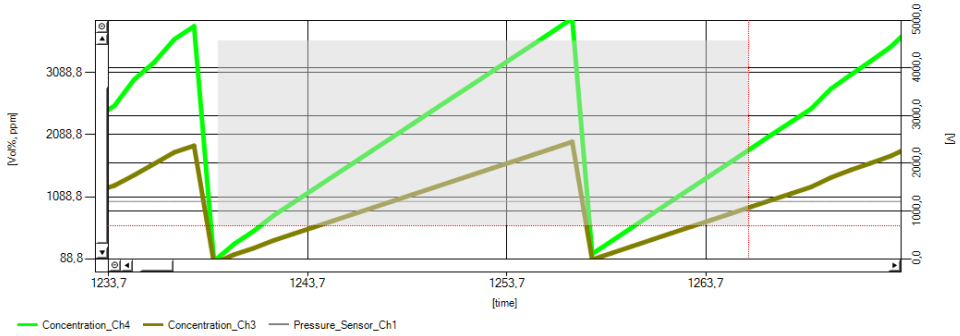

Figure 13: Panel view: marking an area to zoom

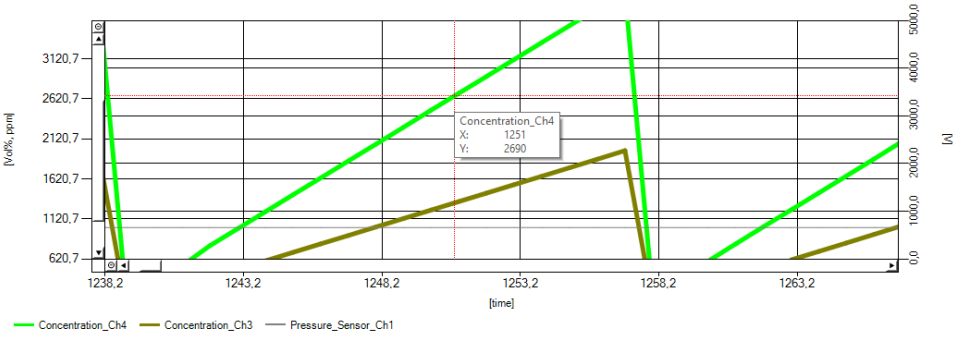

Figure 14: Panel view: label with readings

8 Adjustment

For accurate measurement, the zero and span point must be checked regularly and adjusted if they deviate. Suitable zero and span gases, waiting times and background information are described in BA001-EN, Section 10. This section describes the operating steps in MARS® Tool light.

8.1 Check intervals and procedure

Check	Recommended interval	Adjust if
Check zero point	weekly (or automatically with AZF)	Deviation > 2 % of full scale
Check span point	monthly	Deviation > 2 % of full scale

Table 14: Recommended check intervals (acc. to BA001-EN, Section 10.1)

Always adjust the zero point first and the span point immediately afterwards. The figure shows the typical behavior of the reading.

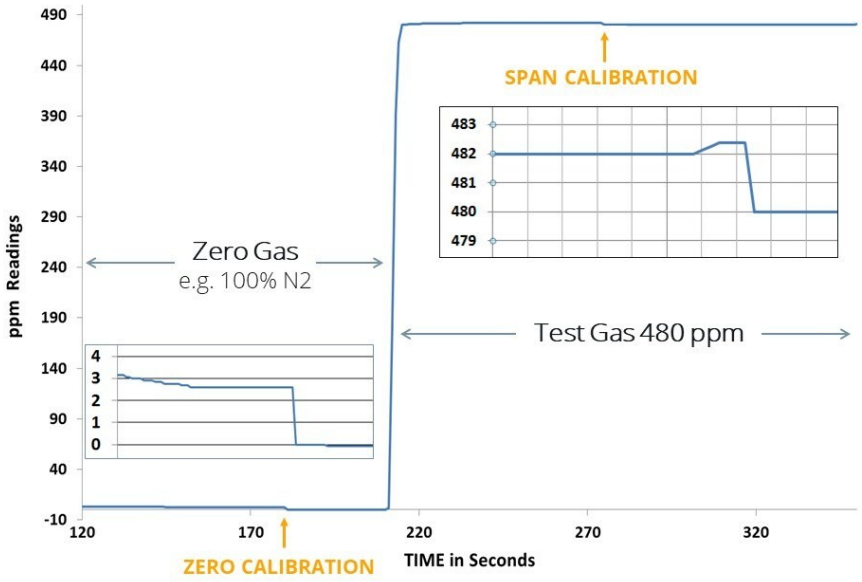

Figure 15: Behavior of the concentration reading during zero and span adjustment

8.2 Zero-point adjustment

Prerequisite: Module has been operating under stable conditions for at least 30 minutes; heated modules have reached their setpoint temperature. Connection to the module is established. Zero gas acc. to BA001-EN, Section 10.2 (e.g. N_2 5.0) is available.

1. Purge the entire measuring system with zero gas at a flow rate of 1 l/min.
2. Click **[Cyclic read on]** and wait until the reading is stable (fluctuation < 1 % of full scale).
3. Open the Sensor config tab and click **[Set]** next to “Zero Detector all Channel” (item 27).
4. Confirm the prompt “Are you sure? All Zero Detector parameters will be overwritten!” with **[Yes]**.

✔️ **Result:** The concentration reading of all channels shows 0.00.

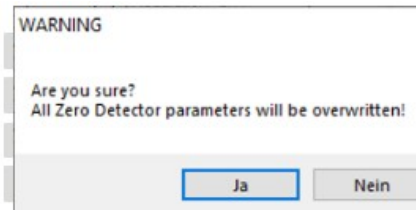

Figure 16: Confirmation prompt before setting the zero point

> **Information**
> If the measurement depends on the carrier gas or channels are to be adjusted individually, set the zero point channel by channel: Calibration Chx tab, “Zero Detector Chx” **[Set]** (item 2 on the Calibration tab). Notes on carrier gas: BA001-EN, Appendix A.3.

8.3 Span-point adjustment

Prerequisite: Zero-point adjustment with inert gas has been performed immediately beforehand. Span gas of known concentration (label or certificate of the cylinder) is available; the concentration is close to full scale and deviates from it by no more than 20 %.

1. Purge the entire measuring system with span gas at a flow rate of 1 l/min.
2. Wait until the reading is stable (fluctuation < 1 % of range). Wait longer for adsorbing gases such as SO_2 or NO_2.
3. Open the Calibration tab of the relevant channel.
4. Enter the span gas concentration in the “Endpoint Calibration Chx” field – in the measurement unit of the channel (“Measurement Unit” field), e.g. 480 for 480 ppm.
5. Click **[Write]**.
6. Use **[Read]** (item 8) to check that the reading matches the span gas concentration.
7. Shut off the span gas and switch back to sample gas.

✔️ **Result:** The reading matches the span gas concentration; the new span factor is stored in the module.

> **Information**
> Save the parameters to an XML file after the adjustment (Section 9). This allows the state to be restored if required.

9 Saving and loading parameters

All module parameters – including the operating hours – can be saved to an XML file and reloaded if required. Save the parameters after commissioning, after every adjustment, and before changing any settings.

9.1 Saving parameters

Prerequisite: Connection to the module is established.

1. Open the Save/Load Settings tab.
2. Use **[…]** to choose location and file name. Default: “C:\Measurements\settings_<serial number>.xml”.
3. Click **[Save parameter to file]**. A progress bar and “please wait!” are displayed.

✔️ **Result:** The XML file is saved at the selected location.

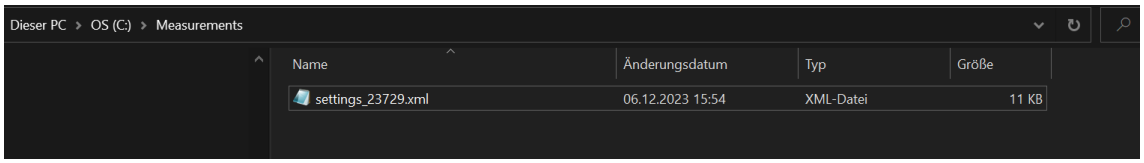

Figure 17: Saved parameter file in Windows Explorer

9.2 Loading parameters

NOTICE

Incorrect readings due to a parameter file from another module

A parameter file contains the adjustment and linearization data of exactly one module.

▶️ Only load files whose serial number matches the connected module.

▶️ Do not disconnect or switch off the module while loading.

Prerequisite: Advance or Expert user level (Section 6.1).

1. Open the Save/Load Settings tab.
2. Use **[…]** to select the parameter file.
3. Optionally activate “only Zero/Endpoint Calibration” to load only the adjustment values.
4. Click **[Load parameter from file]** and wait until the progress bar has completed.

✔️ **Result:** The parameters have been transferred to the module. Then check the readings with zero and span gas.

Information

The XML file can be viewed with a text editor or XML viewer. Only modify it after consulting Wi.Tec Service.

10 Troubleshooting

Fault	Possible cause	Remedy
No COM port in the drop-down list	Adapter not plugged in or driver missing; insufficient rights	Plug in adapter, install driver, check Device Manager; run program as administrator
[Scan] does not find a module	No power supply (LED2 not flashing), wrong or defective cable, interface set to Modbus, RS232 cable too long	Check power supply and polarity (BA001-EN, Section 7.1), use Wi.Tec data cable, check RS232/Modbus DIP switch and cable length (BA001-EN, Section 7.4)
Connection drops	USB power saving mode, interference on the line	Disable USB power saving in Device Manager, check grounding (BA001-EN, Section 7.2)
[Write] buttons greyed out	User level too low	Change user level (Section 6.1)
Readings are not updated	Cyclic reading switched off	Click [Cyclic read on] or [Read all values]
Log file is not created	Invalid path or no write permission	Create folder or choose another path; run program as administrator
Zero point not 0 after adjustment	Purge time too short, zero gas contains measured component, leak in gas path	Purge longer, check zero gas, leak test (BA001-EN, Section 6.6), repeat adjustment
Implausible span point	Zero point not adjusted immediately beforehand, concentration entered in wrong unit	Re-adjust zero point, check input and unit; load saved parameters if necessary (Section 9.2)
Status byte reports error or LED4 red	Signal level below alarm level, aged source, contaminated cell	Fault table in BA001-EN, Section 11.3; contact Wi.Tec Service

Table 15: Faults, causes and remedies

If a fault cannot be eliminated, contact Wi.Tec Service: phone +49 281 206578-20, info@witec-sensorik.de. Have the serial number, software build (shown at the bottom of the program window) and the saved parameter file ready.

Appendix A – Glossary and abbreviations

Term	Meaning
AZF	Auto-zero function: automatic zero-point adjustment with zero gas via valve/pump
CAN, CANopen	Field bus and the communication protocol based on it
COM port	Serial port of the PC, here via USB/RS232 adapter
CSV	Comma-separated values; text file with readings
F.S.	Full scale: upper value of the measuring range
NDIR / NDUV	Non-dispersive infrared / ultraviolet absorption
RS232	Serial interface of the module (115,200 baud, 8N1)
Span point	Adjustment point with span gas of known concentration
XML	Extensible Markup Language; format of the parameter file
Zero point	Adjustment point with zero gas not containing the measured component

Table 16: Glossary