smartGAS Calibration Tool

- Installation Guide -



blue performance

smartGAS Calibration Tool - Installation Guide -Edition 01/10_2017



Described product

smartGAS Calibration Tool

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1 For your safety

- Read the instructions carefully before using the product.
- Follow the instructions. The user must fully understand and follow the instructions. The product may only be used according to its purpose.
- Regulatory regulations and directives concerning this product must be observed.
- When using gases, the relevant safety data sheets must be observed.

Meaning of the characters used

The following character is used in this document to identify related information or key information.

NOTE Information on the use of the product.



2 About smartGAS Calibration Tool

2.1 What is the smartGAS Calibration Tool meant for?

The smartGAS Calibration Tool simplifies the commissioning of smartGAS sensors. With the smartGAS Calibration Tool, you are able to read out the state of the sensor and the current measured values. The Modbus address of the sensor can also be changed.

The smartGAS Calibration Tool also allows you to readjust the Zero and the Span of smartGAS sensors in order to adapt them to changed ambient conditions. The function and the high measuring performance of smartGAS sensors can be ensured by a regular adjustment with the smartGAS calibration tool. The adjustment will be documented by an automatically generated service report.

2.2 Which sensors are supported?

The smartGAS Calibration Tool supports the smartGAS sensors of the EVO series from firmware version 5.17. The smartGAS Calibration Tool can also be used in conjunction with the CONNECT INTERFACE.

2.3 System Requirements

The smartGAS Calibration Tool requires a Windows PC with the following specifications:

- Windows 7 or higher (x86 or x64)
- 1GHz dual-core processor, 2GB RAM, 200MB free space
- The application is based on Microsoft .NET Framework 4.6.1*

2.4 Connection with sensors / accessories

For an optimal result of the calibration of a smartGAS sensor, smartGAS Mikrosensorik recommends using the corresponding accessories. For the electrical connection of a smartGAS sensor to your computer, please use:

- Z6-000025: USB service adapter for EVO series sensors
- Z6-000026: USB service adapter when using CONNECT INTERFACE

^{*} In case that Microsoft .NET Framework 4.6.1 isn't on your Computer, it will be installed if necessary. For this reason an internet connection is reqired.



3 Installation & Getting started

3.1 Installation

- (1) Run the installation setup by clicking on "Setup.exe".
- (2) Optional: If there is no Microsoft .NET Framework, you will be informed and prompted to download the appropriate package and agree to the license agreement.
- (3) The installation wizard will guide you through the setup until the installation is completed.

3.2 Start smartGAS Calibration Tool

Start the smartGAS Calibration Tool via the **desktop shortcut** or via **Start > smartGAS** (folder) **> smartGAS Calibration Tool.**



3.3 Product activation

The first use of the smartGAS Calibration Tool requires product activation. This requires a license key. Simply type your license key into the provided field and click "OK" to activate the smartGAS Calibration Tool.

Product activation	
Welcome to smartGAS Calibration To Please enter license key to activate th	
You can <u>request a key</u> by web form.	•
opyright © 2017 nartGAS Mikrosensorik GmbH ww.smartgas.eu	OK

1 NOTE

If you do not have a license key, you can request it via "<u>request a key</u>" or contact your sales partner directly.

Note that the license key has a limited runtime. After expiration you need a new license key for a new activation.



4 Using smartGAS Calibration Tool

4.1 Welcome / Authentication

When you start the smartGAS Calibration Tool, you have to authenticate yourself with a username and a PIN. The PIN is: 2408. The user name is freely selectable and is used for the service report. The smartGAS Calibration Tool can be used after correct entry.





NOTE

The user name have to contain at least two characters. The authentication PIN is: 2408

4.2 Connecting

4.2.1 Port name

To connect the smartGAS Calibration Tool to a sensor, first select the appropriate port name and click "Next". Now search for the connected sensors.

KROSENSORIK	GAS					
Welcome	Connecting	Information	Zero adjustment	Span adjustn	nent Report	
lease use the sm	artGAS communication adapte	er to connect the smartGAS s	ensor(s) with the computer.			
		-				
		Port nam	•			
		COM8 COM14	e			
		сомв				
		COM8 COM14				
		COM8 COM14				
		COM8 COM14				
		COM8 COM14				



1 NOTE

If no port name is displayed, check the USB service adapter and computer connection. Also check if the USB service adapter is recognized by Windows and the driver has been installed correctly. You can check this using the Windows Device Manager.

4.2.2 Connected sensors

Select one of the displayed sensors and click on "Next" to get more information about the sensor.

ecting Ir	nformation sor you wish to comm	Zero adjustment	Span adjustment	Report
w. Please select the sens	ior you wish to comm	sunicate with.		
Connected se	nsors			
Sensor type	PREMIUMEVO	State		
Serial number	20-1600-001	Target gas	CO2	
Firmware version	5.18	Measuring range	0-2000 ppm	
Sensor type	CONNECTEVO	State		
Serial number	20-1613-918	Target gas	CO2	
Firmware version	5.18	Measuring range	0-5000 ppm	
Sensor type	PREMIUMEVO	State		
Serial number	72-1600-139	Target gas	SF6	
Firmware version	5.22	Measuring range	0-100 Vol%	
			Refresh	
	Sensor type Serial number Firmware version Sensor type Serial number Firmware version Sensor type Serial number	Serial number 20-1600-001 Firmware version 5.18 Sensor type CONNECTIVO Serial number 20-1613-018 Firmware version 5.18 Sensor type Sensor type Sensor type Sensor type Sensor type PREMUMIVO Sensor type 72-1600-139	Sensor type PREMIUMEVO State Senial number 20-1600-001 Target gas Firmware version 5.18 Measuring range Sensor type CONNECTIVO State Sensor type CONNECTIVO State Firmware version 5.18 Measuring range Sensor type CONNECTIVO State Sensor type PREMIUMEVO State Sensor type PREMIUMEVO State Sensor type PREMIUMEVO State	Sensor type PREMIUMEVO State Serial number 20-1600-001 Target gas CO2 Firmware version 5.18 Measuring range 0-2000 ppm Senial number 20-1613-018 Target gas CO2 Firmware version 5.18 Measuring range 0-2000 ppm Senial number 20-1613-018 Target gas CO2 Firmware version 5.18 Measuring range 0-3000 ppm Sensor type PREMUMEVO State CO2 Servial number 72-1600-139 Target gas SF6 Firmware version 5.22 Measuring range 0-100 Vol%



If your sensor is not displayed, check the physical connection of the sensor. If necessary, restart the sensor by interrupting the power supply and search again.

4.3 Information

Here you get a detailed overview about the sensor information, the sensor status as well as the corresponding measured values in real time. If a CONNECT INTERFACE is used, the information is extended accordingly.



	AS			smartCAL Calibrati	on Tool 🛛 🔲 📃 🛛
/elcome	Connecting	Information	Zero adjustment	Span adjustment	Report
	tion CONNECTEVO 20-1613-918 5.18 18 CO ₂ 0-5000 ppm RFACE	ot possible. To perform an calibrati or minutes is recommended. Elive values Gas concentration Internal temperature Gas pressure Pressure compensated gas concentration Operation hours Settings	262 ppm 31 °C 998 mbar	Essary that the sensor is power State Operational Startup Communication System error	
					Confirm with "Next
				Previous Nex	t 🔗 Finish

The "Settings" button allows you to change the Modbus address of the sensor.





The Modbus address can be selected from 1 to 247. Click the "Next" button to go to Zero adjustment.



4.4 Zero adjustment

Before starting the Zero adjustment, you can optionally enter a reference number for the zero gas bottle. Use the "Start" button to start the Zero adjustment.

Use the "Next" button to skip the Zero adjustment and go to the Span adjustment.

	GAS			smartGAS Calibra	tion Tool 🛛 🔲 🗖
Welcome	Connecting	Information	Zero adjustment	Span adjustment	Report
To perform a zero	adjustment appropriate zero	gas has to be applied. For m	ore information please conside	er the manual.	
		Test gas r	eference no. (optional)		
			Start		
				Start zero a	djustment or skip with "Next
				Previous N	ext 🕜 Finish



Always use dry test gas for adjusting smartGAS sensors. A high purity of the test gas increases the accuracy of the adjustment.

NOTE

Always carry out a Zero adjustment with your smartGAS sensor first.



During the Zero adjustment, the serial number of the sensor and its measured values are displayed in real time in the left half of the window. The status of the Zero adjustment and the operating conditions are displayed in the right half of the window.

			1	smartGAS Calibra	tion Tool 🛛 🔲 🔀
Welcome	Connecting	Information	Zero adjustment	Span adjustment	Report
To perform a zero ad	ljustment appropriate zero gas l	has to be applied. For m	ore information please conside	r the manual.	
	🛃 Live values		厚 Zero adjustment		
	Serial number Gas concentration	20-1612-730 638 ppm	Initialisation		
	Internal temperate		Zero gas conditio	ns	
	Gas pressure	1013 mbar	Gas concetrat	ion within range	
	Pressure compens gas concentration		Gas concetrat	ion stable	
			🔀 Cano	el 🔲 Accept	l .
				Previous N	ext 🕜 Finish

Status of Zero adjustment:

<u>/</u>	Initialisation: The measuring signal is checked to meet the conditions for adjustment.
	The adjustment is ready for takeover
	The adjustment is not ready for takeover. One or more criteria are not met.
	The adjustment is accepted and re-validated.
	The adjustment is successful and completed.
	The adjustment is not successful.

Please confirm the Zero adjustment with the "Accept" button. After that the Zero adjustment is completed with the new Zero point. You will then get the message: "Result 00: Successfully adopted". The Zero adjustment was thus successful.

1 NOTE

The other results or error codes can be found in the FAQs.

The "Cancel" button can be used to cancel the Zero adjustment. The old zero point is then restored.



4.5 Span adjustment

Before starting the Span adjustment, you must enter the concentration of your test gas so that the adjustment of the Span can be started. In addition you can optionally enter a reference number for the test gas bottle. Use the "Start" button to start Span adjustment. In the following, the adjustment of the Span follows the same procedure of the Zero adjustment. For explanation of the displayed information, see chapter 4.4. Use the "Next" button to skip the Span adjustment and go to the report.

	GAS			smartGAS Calibra	tion Tool 🛛 🚺 📃 🛛
Welcome	Connecting	Information	Zero adjustment	Span adjustment	Report
o perform a span	adjustment appropriate spar	i frest gas c The test g between i	oncetration please consid oncetration ppm ~ as concentration must be 300 ppm and 2800 ppm. eference no. (optional) n	Jer the manual.	
				Start span a	djustment or skip with "Next"
				Previous N	ext 🔗 Finish

NOTE

The "Reset span" button can be used to reset the Span of the sensor to the factory setting. Nevertheless, a new Span adjustment is recommended then.



5 Report

Here you find all important information about the adjustment and settings of your smartGAS sensor. The window contains general information about the software version and the user, the sensor information as well as information about the applied sensor adjustments. In addition, you have the option to enter individual comments.

	tGAS		smartGAS Calibration Tool				
Welcome	Connecting	Information	Zero adjustment	Span adjustment	Report		
The sensor info	rmation and calibration results a	re displayed here. Click "Fini	sh" to create a protocol.				
	General information	[ool v1.0.6495.19836	User name	smartGAS User			
	Sensor information						
	Sensor type	PREMIUMEVO	Target gas	CO2			
	Serial number Firmware version	20-1700-037 5.22	Measuring range Operation hours	0-2000 ppm 616 h			
	Modbus adress	37	CONNECT INTERFAC				
	Zero adjustment		🕜 Span adjustment				
	Result 00: Successful	ly adopted	Result 00: Successf	ully adopted			
	🔀 Comment						
	(Optional)						
					Print out repor	t with "Finish"	
			C.	Previous N	ext 🕑	Finish	

By clicking on the "arrow key" on the left side you can extend the display to the results of the Zero and Span adjustment and check again for completeness.

Zero adjustment			Ø	Span adjustment		
Result 00: Successful	lly adopted		\odot	Result 00: Successful	y adopted	
Date / time	17.10.2017 1	10:33:25		Date / time	17.10.2017 1	0:34:54
Test gas concentration	gas concentration 0 ppm			Test gas concentration	1998 ppm	
Test gas reference	N2 batch no	012834		Test gas reference	CO2 batch no	0.352678
Internal temperature	26 °C			Internal temperature	26 °C	
	As found	As left			As found	As left
Correction value	16484	16469		Correction value	10433	10491
Gas concentration	3 ppm	0 ppm		Gas concentration	1987 ppm	1998 ppm
				Span reset	Not done	

Click the "Finish" button to go to the print options to print the service report.



6 Appendix

6.1 FAQs

(1) Where can I get a license key?

Use the "request a key" link for product activation or contact your sales partner.

(2) The smartGAS Calibration Tool does not find a COM-Port.

Ensure that the service adapter is properly connected to the PC and is recognized by Windows (see Windows Device Manager). Make sure you have correctly installed the driver for the service adapter. If not, reinstall it. A CD with the driver is included with the accessories.

(3) The smartGAS Calibration Tool does not find a sensor.

Make sure the smartGAS sensor is properly connected to the service adapter. Make sure that no other program accesses the COM port you are using. If the sensor cannot be found even after a restart, contact your sales partner to help you.

(4) I used the wrong calibration gas during calibration, can I calibrate the sensor again?

Yes you can perform the calibration again. The smartGAS sensors can be calibrated at any time. smartGAS always recommends the use of dry test gas with high quality. For a good result, the concentration of the test gas should correspond as precisely as possible to the maximum concentration of the smartGAS sensor. If the deviation is too high, the accuracy of the sensor can be reduced.

(5) Error Codes / Results at Zero & Span adjustment

Adjustment can end with the following results:

"Result 01: Not started"

The Zero or Span adjustment was not performed.

"Result 02: Canceled by user"

The zero or Span adjustment has been canceled by the user.

"Result 03: Canceled because of timeout"

Due to a timeout, the Zero or Span adjustment was exited.

"Result 04: Interrupted by communication error"

The Zero or Span adjustment was interrupted because of a communication error with the sensor.

"Result 05: Access denied - wrong serial number"

The Zero or Span adjustment could not be performed. Access to the sensor was denied because of the use of an incorrect serial number.

"Result 06: Gas concentration was outside the tolerance limit when tested"

The Zero or Span adjustment has not been carried out because the concentration of the zero or test gas is outside the permissible limits.

"Result 07: The span adjustment is rejected. The correction value was out of the valid range. The previous correction value is retained."

Span adjustment is out of range.



"Result 08: Adjustment cannot be started during warmup phase"

The Zero or Span adjustment was not carried out since the sensor is still in the warm-up phase.

"Result 09: Adjustment cannot be started because of sensor system error"

The Zero or Span adjustment could not be performed because the sensor is in a error condition.

"Result 0A: Adjustment cannot be started because firmware version must be at least 5.17 or higher" The Zero or Span adjustment could not be started since the firmware version of the sensor is too low. Only sensors with firmware version 5.17 or higher are supported.

"Result OB: Adjustment cannot be started because firmware version must be lower than 6.00" The Zero or Span adjustment could not be started because the firmware version of the sensor is too high.

6.2 Service report

....



smartGAS Calibration Tool
service report

16484

3 ppm

16469

0 ppm



smartGAS Calibration Tool	v1.0.6495.19836	Creation date time	17.10.2017 10:37:54
User name	smartGAS User	Page count	1 of 1
i Sensor information			
Sensor type	PREMIUMEVO	Target gas	CO ₂
Serial number	20-1700-037	Measuring range	0-2000 ppm
Firmware version	5.22	Operation hours	616 h
Modbus adress	37	CONNECT INTERFACE	Firmware version 1.16
Zero adjustment	5.21	Span adjustment Result 00: Successfully ado	oted
Result 00: Successfully adop	ted	Result 00. Successfully aut	preu
	ted 17.10.2017 10:33:25	Date / time	17.10.2017 10:34:54
Date / time Test gas concentration	17.10.2017 10:33:25	Date / time	17.10.2017 10:34:54
Result 00: Successfully adop Date / time Test gas concentration Test gas reference Internal temperature	17.10.2017 10:33:25 0 ppm	Date / time Test gas concentration	17.10.2017 10:34:54 1998 ppm

Correction value

Gas concentration

Span reset

10433

1987 ppm

Not done

10491

1998 ppm



Correction value

Gas concentration

measurement site no. 3 application: demo plant