

SUPPLEMENTARY OPERATING INSTRUCTIONS

Analyzer Module OXOR-E for Series GMS800



Description
Operating Functions
Maintenance
Technical Data



Document Information

Described Product

Product name: Analyzer Module OXOR-E
Basic device: Series GMS800 gas analyzers

Document ID

Title: Supplementary Operating Instructions OXOR-E
Part No.: 8013035
Version: 2.0
Release: 2012-12

Manufacturer

SICK AG
Erwin-Sick-Str. 1 · D-79183 Waldkirch · Germany
Phone: +49 7641 469-0
Fax: +49 7641 469-1149
E-mail: info.pa@sick.de

Trademarks

Viton is a trademark of DuPont Performance Elastomers.
Other product names used in this document may be trademarks and are only used for identification purposes.

Original documents

The English edition 8013035 of this document is an original document of the manufacturer.

SICK AG assumes no liability for the correctness of an unauthorized translation.

Please contact the manufacturer in case of doubt.

Legal information

Subject to change without notice

© SICK AG. All rights reserved.

Glossary

PC	Personal Computer
SOPAS	SICK Open Portal for Applications and Systems: Family of computer programs to set parameters, capture and calculate data.
SOPAS ET	SOPAS Engineering Tool: PC application program to configure modular system components.

Warning Symbols



Hazard (general)



Hazard by toxic substances



Hazard for environment/nature/organisms

Signal Words

WARNING

Risk or hazardous situation which *could* result in severe personal injury or death.

CAUTION

Hazard or unsafe practice which *could* result in personal injury or property damage.

NOTICE

Hazard which *could* result in property damage.

Information Symbols



Important technical information for this product



Nice to know



Supplementary information



Link to information at another place

1	Important Information	5
1.1	Service life of the oxygen sensor	6
1.2	Application limitations	6
1.3	Additional documentation/information	6
2	Product Description	7
2.1	Product characteristics	8
2.2	Product variants	8
2.3	Measuring principle	9
3	Functions in SOPAS ET	11
3.1	Menu functions in SOPAS ET – in own menu branch	12
3.2	Menu functions in SOPAS ET – in Gas module menu branch	14
3.3	Explanation of the menus in SOPAS ET	16
3.4	Explanation of functions	18
3.4.1	Logbook in SOPAS ET	18
3.4.2	Upload (data synchronization)	18
3.4.3	Damping	19
3.4.4	Drift limit values	20
3.4.5	Deleting adjustment results	20
4	Adjustment Information	21
4.1	Setting parameters and controlling adjustments	22
4.2	Adjustment interval	22
4.3	Simplifications for adjustments	22
5	Maintenance	23
5.1	Information on shutting down	24
5.2	Service life of the oxygen sensor	24
5.3	Spare parts	24
5.4	Renewing the oxygen sensor	25
5.4.1	Built-in versions	25
5.4.2	Exchange procedure behind the front panel	26
6	Technical Data	27
6.1	Installation location requirements	28
6.2	Metrological specifications	28
6.3	Technical gas specifications	29
6.4	Materials with sample gas contact	29
6.5	Measuring ranges	29
6.6	Approvals	29
6.7	Auxiliary power supply for the module	29

OXOR-E

1 Important Information

Application limitations
Additional documentation

1.1 **Service life of the oxygen sensor**

The Analyzer module OXOR-E uses an electrochemical cell as oxygen sensor. The electrochemical cell has a limited service life and probably needs to be replaced several times during the overall operating time (detailed information → p. 24, §5.2).

1.2 **Application limitations**

Usage

Unfavorable sample gas compositions, e.g. aerosols or high SO₂ concentrations can shorten the service life of the electrochemical cell (→ p. 24, §5.2).

Assembly

Operate oxygen sensors upright (see “UP” marking).

- ▶ Assemble the S800 enclosure so that the base of the enclosure is horizontal.



- ▶ Whenever possible, keep the oxygen sensor upright even when stored as a spare part.

1.3 **Additional documentation/information**

This document supplements the Operating Instructions for GMS800 gas analyzers. It extends the “GMS800” Operating Instructions with technical information on the OXOR-E.

- ▶ Observe the Operating Instructions delivered with the “GMS800”.



The “GMS800” Operating Instructions also specify all further documents belonging to the individual device.



NOTICE:

- ▶ Pay primary attention to any individual information provided.

OXOR-E

2 Product Description

Measuring principle

Measuring ranges

2.1 Product characteristics

The Analyzer module OXOR-E is a measuring module for Series GMS800 gas analyzers. It is suitable to measure the oxygen concentration in standard applications.



Analyzer module OXOR-P can meet higher requirements.

2.2 Product variants

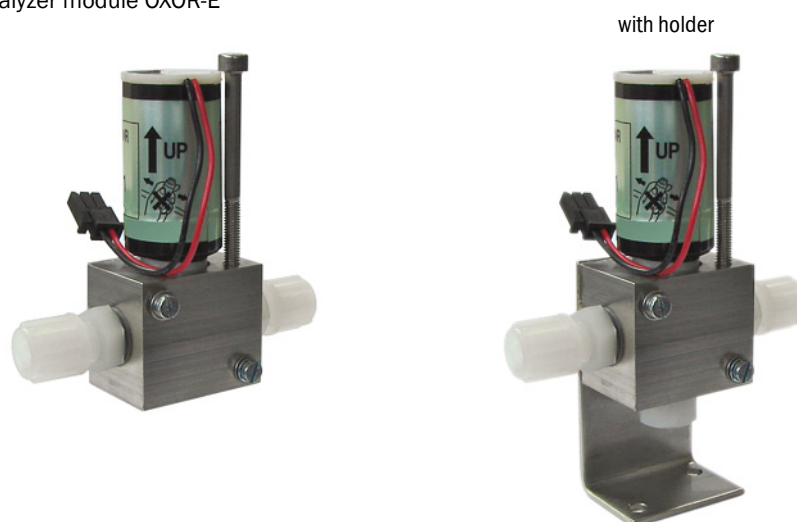
There are several options for integrating the Analyzer module OXOR-E in the GMS800:

Constructive integration	Electronic connection	Integration in "SOPAS ET"
With own holder inside the enclosure	On the Gas module	In the Gas module menu branch (→ p. 14, §3.2)
	As independent module	In own menu branch (→ p. 12, §3.1)
Behind the front panel [1]	As independent module	

[1] Only possible in S810 enclosure (→ p. 25, Fig. 5)

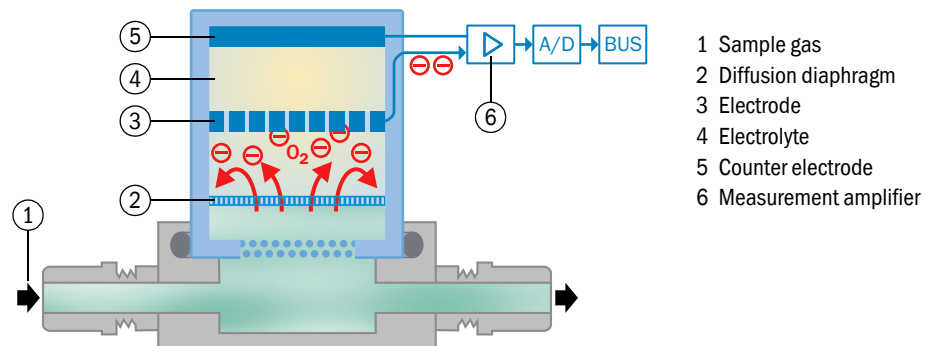
Fig. 1

Analyzer module OXOR-E



2.3 Measuring principle

Fig. 2 Measuring principle



The OXOR-E module is an electrochemical cell filled with an electrolyte. O_2 can diffuse in the electrolyte through a PTFE diaphragm and is converted chemically on an electrode. The electrical charges formed in this manner create the current that can be used as measuring effect.



- Electrochemical cell service life → p. 24, §5.2
- Information on shutting down → p. 24, §5.1

Subject to change without notice

OXOR-E

3 Functions in SOPAS ET

Menu functions in the PC program “SOPAS ET”

Menu tree

Explanations



- Instructions for the PC program “SOPAS ET” → User Information for the program
- Exemplary menu representations → Technical Information “Basic Control Unit (BCU)” (contains information for operating with SOPAS ET)

3.1 Menu functions in SOPAS ET – in own menu branch

Only valid when the Analyzer module is connected as an independent module.

User level:	<input type="radio"/> Operator (standard)	<input type="radio"/> Authorized operator
Access rights:	<input type="radio"/> Viewing	<input checked="" type="radio"/> Setting up/starting

Directory	Menu contents	O	A	Explanation
OXOR		<input type="radio"/>	<input type="radio"/>	
Measuring value display		<input type="radio"/>	<input type="radio"/>	
Measuring component 1	Component	<input type="radio"/>	<input type="radio"/>	→ p. 16 [1]
	Measured value	<input type="radio"/>	<input type="radio"/>	→ p. 16 [2]
	Unit	<input type="radio"/>	<input type="radio"/>	→ p. 16 [3]
Measuring component 2 [1]		<input type="radio"/>	<input type="radio"/>	
Measuring component 3 [1]		<input type="radio"/>	<input type="radio"/>	
Measuring component 4 [1]		<input type="radio"/>	<input type="radio"/>	
Diagnosis		<input type="radio"/>	<input type="radio"/>	
Module state	Failure	<input type="radio"/>	<input type="radio"/>	→ p. 16 [4]
	Maintenance request	<input type="radio"/>	<input type="radio"/>	
	Function(s) active	<input type="radio"/>	<input type="radio"/>	
	Uncertain state	<input type="radio"/>	<input type="radio"/>	
Logbook	Pos. Date Source ...	-	<input type="radio"/>	→ p. 18, §3.4.1
Operating hours	h	-	<input type="radio"/>	→ p. 16 [5]
Measuring component 1		<input type="radio"/>	<input type="radio"/>	
Name / unit	Component	<input type="radio"/>	<input checked="" type="radio"/>	→ p. 16 [1]
	Unit	<input type="radio"/>	<input type="radio"/>	→ p. 16 [2]
State	Failure	<input type="radio"/>	<input type="radio"/>	→ p. 16 [4]
	Maintenance request	<input type="radio"/>	<input type="radio"/>	
	Function(s) active	<input type="radio"/>	<input type="radio"/>	
	Uncertain state	<input type="radio"/>	<input type="radio"/>	
Validation measurement (QAL3)	Zero point	<input type="radio"/>	<input type="radio"/>	
	Reference point	<input type="radio"/>	<input type="radio"/>	
Measuring component 2 [1]		<input type="radio"/>	<input type="radio"/>	
Measuring component 3 [1]		<input type="radio"/>	<input type="radio"/>	
Measuring component 4 [1]		<input type="radio"/>	<input type="radio"/>	
Parameter		<input type="radio"/>	<input type="radio"/>	
Sampling point	Description	-	<input checked="" type="radio"/>	→ p. 16 [6]
RS485 interface	Module address	-	<input type="radio"/>	→ p. 16 [7]
	Baud rate	-	<input checked="" type="radio"/>	→ p. 16 [8]
	Data bits	-	<input checked="" type="radio"/>	
	Stop bits	-	<input checked="" type="radio"/>	
	Parity	-	<input checked="" type="radio"/>	
Measuring component 1		<input type="radio"/>	<input type="radio"/>	
Physical meas. range	Component	<input type="radio"/>	<input checked="" type="radio"/>	→ p. 16 [1]
	Unit	<input type="radio"/>	<input type="radio"/>	→ p. 16 [3]
	Start value	<input type="radio"/>	<input type="radio"/>	→ p. 16 [9]
	End value	<input type="radio"/>	<input type="radio"/>	→ p. 16 [10]
	Base value	<input type="radio"/>	<input type="radio"/>	→ p. 16 [11]
	Measuring channel	<input type="radio"/>	<input type="radio"/>	→ p. 16 [12]
	Precision	<input type="radio"/>	<input type="radio"/>	→ p. 16 [13]
Damping		-	<input checked="" type="radio"/>	
Damping (el. T90%)	Time constant [s]	-	<input checked="" type="radio"/>	→ p. 19, §3.4.3
Dynamic damping	Status [On/Off]	-	<input checked="" type="radio"/>	
	Time constant [s]	-	<input checked="" type="radio"/>	
	Threshold	-	<input checked="" type="radio"/>	
Measuring component 2 [1]		<input type="radio"/>	<input type="radio"/>	
Measuring component 3 [1]		<input type="radio"/>	<input type="radio"/>	
Measuring component 4 [1]		<input type="radio"/>	<input type="radio"/>	

Subject to change without notice

Directory	Menu contents	O	A	Explanation
Adjustment		○	○	
Measuring component 1		○	○	
Drift limit value	Zero point	-	○	→ p. 20, §3.4.4
	Reference point	-	○	
Adjustment results		○	○	
Adjustment result	Zero point	○	○	→ p. 16 [14]
	Reference point	○	○	
Drift values	Zero point	○	○	→ p. 16 [14]
	Reference point	○	○	
Delete results	[Delete]	-	●	→ p. 20, §3.4.5
Measuring component 2 [1]		○	○	
Measuring component 3 [1]		○	○	
Measuring component 4 [1]		○	○	
Maintenance		-	○	
Maintenance flag	[On]/[Off]	-	●	→ p. 16 [15]
Configurations		-	○	
User settings	[Backup]	-	●	→ p. 16 [16]
	[Restore last user settings]	-	●	
	[Restore next to last user settings]	-	●	
Factory settings	[Restore]	-	●	→ p. 16 [17]
Factory settings		○	○	
Identification		○	○	
ID numbers	Serial number	○	○	→ p. 17 [18]
	Material number	○	○	
	Hardware version	○	○	
	Software version	○	○	
	Software date	○	○	
Production release	Year Month Day	-	○	→ p. 17 [19]

[1] If fitted.

3.2 Menu functions in SOPAS ET – in Gas module menu branch

Only valid when the Analyzer module is connected to the Gas module.

User level:		0 Operator (standard)	A Authorized operator	
Access rights:		○ Viewing	● Setting up/starting	
Directory	Menu contents	0	A	Explanation
OXOR		○	○	
Measured value display		○	○	
Gas pressure [1]		○	○	
Gas flow [1]		○	○	
Gas humidity[1]		○	○	
Oxygen	Component	○	○	→ p. 16 [1]
	Measured value	○	○	→ p. 16 [2]
	Unit	○	○	→ p. 16 [3]
Diagnosis		○	○	
Module state	Failure	○	○	→ p. 16 [4]
	Maintenance request	○	○	
	Function(s) active	○	○	
	Uncertain state	○	○	
Logbook	Pos. Date Source ...	○	○	→ p. 18, § 3.4.1
Operating hours	h	-	○	→ p. 16 [5]
Gas pressure [1]		○	○	
Gas flow [1]		○	○	
Gas humidity[1]		○	○	
Oxygen		○	○	
Name / unit	Component	○	●	→ p. 16 [1]
	Unit	○	○	→ p. 16 [2]
State	Failure	○	○	→ p. 16 [4]
	Maintenance request	○	○	
	Function(s) active	○	○	
	Uncertain state	○	○	
Validation measurement (QAL3)	Zero point	○	○	
	Reference point	○	○	
Parameter		○	○	
Sampling point	Description	-	●	→ p. 16 [6]
RS485 interface	Module address	-	○	→ p. 16 [7]
	Baud rate	-	●	→ p. 16 [8]
	Data bits	-	●	
	Stop bits	-	●	
	Parity	-	●	
Gas pressure [1]		○	○	
Gas flow [1]		○	○	
Gas humidity[1]		○	○	
Oxygen		○	○	
Physical meas. range	Component	○	●	→ p. 16 [1]
	Unit	○	○	→ p. 16 [3]
	Start value	○	○	→ p. 16 [9]
	End value	○	○	→ p. 16 [10]
	Base value	○	○	→ p. 16 [11]
	Measuring channel	○	○	→ p. 16 [12]
	Precision	○	○	→ p. 16 [13]
Damping		○	○	
Damping (el. T90%)	Time constant [s]	-	●	→ p. 19, § 3.4.3

Directory	Menu contents	O	A	Explanation
Adjustment		○	○	
Oxygen		○	○	
Drift limit value	Zero point	-	○	→ p. 20, §3.4.4
	Reference point	-	○	
Adjustment results		○	○	
Adjustment result	Zero point	○	○	→ p. 16 [14]
	Reference point	○	○	
Drift values	Zero point	○	○	→ p. 16 [14]
	Reference point	○	○	
Delete results	[Delete]	-	●	→ p. 20, §3.4.5
Maintenance		-	○	
Maintenance flag	[On]/[Off]	-	●	→ p. 16 [15]
Configurations		-	○	
User settings	[Backup]	-	●	→ p. 16 [16]
	[Restore last user settings]	-	●	
	[Restore next to last user settings]	-	●	
Factory settings	[Restore]	-	●	→ p. 16 [17]
Factory settings		○	○	
Identification		○	○	
ID numbers	Serial number	○	○	→ p. 17 [18]
	Material number	○	○	
	Hardware version	○	○	
	Software version	○	○	
	Software date	○	○	
Production release	Year	-	○	→ p. 17 [19]
	Month	-	○	
	Day	-	○	

[1] Only displayed when the associated sensor is fitted in the Gas module

3.3

Explanation of the menus in SOPAS ET

No.	Description	Explanation
1	Component	Name of measuring component
2	Measured value	Actual measured value of measuring component
3	Unit	Physical unit of measured value
4	Failure	LED symbol <ul style="list-style-type: none"> ● <i>Significance</i>: Module not ready for operation ● <i>Possible causes</i>: Malfunction, defect
	Maintenance request	LED symbol <ul style="list-style-type: none"> ● <i>Significance</i>: Advance warning before internal technical limits reached. ● <i>Possible causes</i>: Drift limit, operating hours, lamp intensity
	Function(s) active	LED symbol <ul style="list-style-type: none"> ● <i>Significance</i>: At least one internal function active that impairs or hinders normal module measuring function. ● <i>Possible causes</i>: Adjustment procedure running, validation measurement running
	Uncertain state	LED symbol <ul style="list-style-type: none"> ● <i>Significance</i>: Actual measured values are unreliable. ● <i>Possible causes</i>: Heating up phase, internal over/under temperature, adjustment procedure programming not plausible
5	Operating hours	Number of operating hours of the Analyzer module
6	Description	Freely selectable text for module name
7	Module address	Internal CAN bus address of module (defined by hardware setting in module)
8	Baud rate	Transfer speed (standard: 9600)
	Data bits	Number of data bits (standard: 8) The GMS800 only uses the 7-bit range (ASCII code 0 ... 127) but can also communicate in 8-bit format.
	Stop bits	Number of stop bits (1 or 2; standard: 2)
	Parity	Additional identification for automatic monitoring of character transfers; [Even], [Odd], [None]. - Standard: None
9	Start value	Start value of physical measuring range
10	End value	End value of physical measuring range
11	Base value	Internal physical bases value of measuring range
12	Measuring channel	Internal measuring channel for measuring component
13	Precision	[On] = higher measuring precision is available for measuring range 2 (effective in range 0 ... 20% of physical measuring range)
14	Drift values	<ul style="list-style-type: none"> ● Last = since last adjustment ● Total = since last drift calculation initialization
15	Maintenance flag	[On] = Status "Maintenance" is activated (here as signal for active maintenance work)
16	User settings	<ul style="list-style-type: none"> ● Backup = Save a copy of the actual module settings. ● Restore = Overwrite the actual module settings with a saved copy. ^[1]
17	Factory settings	Overwrite the actual module settings with the original settings from the factory. ^[1] <ul style="list-style-type: none"> ► <i>Recommendation</i>: Save the current module settings first (→ "User settings").

No.	Description	Explanation
18	Serial number	Individual module serial number
	Material number	Identification number of module version
	Hardware version	Module electronics version number
	Software version	Module software version number
	Software date	Module software revision
19	Production release	Module date of manufacture

[1] A warm start is then done automatically.

3.4 Explanation of functions

3.4.1 Logbook in SOPAS ET

The Logbook Table shows the last 20 internal messages.

Fig. 3 Menu “[Module name]/Diagnosis/Logbook” in the PC program “SOPAS-ET” (example)

1	2	3	4	5	6	7
Position	Date	Time	Source	Message No.	Status	Count
1	12-07-02	08:19:10	UNOR-MUL...	E gas pump off	Off	1
2	12-07-02	08:19:09	UNOR-MUL...	U temperatures	Off	1
3	12-07-02	08:19:09	UNOR-MUL...	U heater 1	Off	1
4	12-07-02	08:11:47	UNOR-MUL...	U heater 2	Off	1
5	12-07-02	08:10:21	UNOR-MUL...	U heater 3	Off	1
6	12-07-02	08:09:04	UNOR-MUL...	U heater 5	Off	1
7	12-07-02	08:08:05	UNOR-MUL...	U heater 4	Off	1
8	12-07-02	08:06:32	UNOR-MUL...	C start check	Off	1
9	12-07-02	08:06:32	UNOR-MUL...	U start check	Off	1
10	12-07-02	08:04:37	UNOR-MUL...	C adjustment cuvette ac...	Off	1
11						0
12						n

Column	Meaning
1	Sequential number in Logbook
2	Time of last message change
3	
4	“System” = measuring system (hardware) “MV” = measuring component (measurement)
5	Short message text, e.g. “F measured value”. The character prefix classifies the message: F = Failure C = Check (adjustment/validation) U = Uncertain (extra information) M = Maintenance E = Extended (status message)
6	Current message status
7	Total count of activations

3.4.2 Upload (data synchronization)

Only applicable when the “SOPAS ET” PC software is used. Not applicable for systems without control unit (special versions).

The new data are not transferred automatically to “SOPAS ET” after settings for a module have been changed with the menu functions of the control unit. “SOPAS ET” continues using the previous data.

- To transfer the current data of a module to “SOPAS ET”: Start the “Upload all parameters from device” function in “SOPAS ET” once.

3.4.3

Damping**Constant damping**

When "damping" has been programmed, the average value from the current measured value and the previous measured values (floating averaging) are displayed instead of the current measured value.

Possible uses include:

- Damping metrological measured value fluctuations (noise)
- Smoothing fluctuating measured values when only the average value is relevant

Damping is done in the Analyzer module and therefore affects all measured value displays and outputs. It is also active during an adjustment procedure.



- Increasing damping normally increases the reaction time (90% time) of the gas analysis system accordingly.
- Reducing damping can possibly increase the measurement signal "noise" (measuring turbulence).
- Time constant = 0 s means: No damping.

**CAUTION: Risk of incorrect adjustment**

The "Measuring time, test gas" must be at least 150% of the set damping time constant during adjustments.

- ▶ *When damping has been reset or increased:* Check whether adjustment settings need to be adapted.

Dynamic damping

"Dynamic damping" serves to compensate measured value fluctuations without significantly increasing the reaction time. Dynamic damping is automatically deactivated when the measured value changes rapidly and strongly as against "normal" damping. This allows "smoothing" continuous minor measured value fluctuations but rapid measured value changes are still displayed without delay. Dynamic behavior is determined with the "Threshold" parameter:

- When the measured values change only slowly, dynamic damping functions as constant damping.
- When the difference of successive measured values is greater than the set limit, dynamic damping is terminated automatically and remains disabled as long as the measured values continue to change rapidly.
- Dynamic damping is active again when measured value differences are below the limit again (which means measured values changes remain slight).

Dynamic damping also affects all measured value displays and outputs.

3.4.4 Drift limit values

Purpose

Analyzer module drifts are caused, for example, by contamination, mechanical changes or aging effects. The total drift (i.e. the deviation from original state) increases gradually. It is not practical to keep compensating an ever increasing total drift through computation. Inspect and reset the Analyzer module when total drift has become very large.

Drift limit values monitor total drift automatically. These also protect against erroneous adjustments.

Functionality

After every adjustment, an Analyzer module compares the calculated total drift with the drift limit value. Drift limit value violation is reported in two stages:

- Status “M” (Maintenance request) is activated when the total drift reaches 100 ... 120% of the drift limit value.
- Status “F” (Failure) is activated when the total drift reaches more than 120% of the drift limit value.
- When an adjustment procedure shows that a calculated drift has reached more than 150% of the drift limit value, the result from this adjustment procedure is ignored and the previous adjustment remains valid.



- The drift limit values are set in the factory (standard value: 10%).
- A Service function is available to reset all drift values to “0” (Drift reset). This is useful after Analyzer module maintenance when this has established a new original state.

3.4.5 Deleting adjustment results

The “Delete results” function deletes all determined drift values of a measuring component. Drift limit values then refer to new drift values.

The data of the previous adjustment which was performed before are then no longer displayed. Test gas settings (e. g. nominal value) are not changed.



CAUTION: Risk of incorrect adjustment

If very large drift values are displayed after a manual adjustment procedure (→ Operating Instructions “Basic Control Unit (BCU)”), a test gas used probably did not match the relevant test gas setting or gas feed was interrupted – and the adjustment result was still accepted.

- ▶ Do not delete incorrect adjustment results, but repeat the adjustment carefully.



- ▶ Do not use the deletion of adjustment results to nullify large drift values caused by extensive physical changes of an Analyzer module. Instead, clean the Analyzer module or perform an adjustment.^[1]
- ▶ *After an Analyzer module has been cleaned, altered or exchanged:* Delete the relevant adjustment results and perform an adjustment.

[1] By the manufacturer's Customer Service or authorized skilled persons with appropriate training.

OXOR-E

4 Adjustment Information

Parameter setting
Control
Test gases
Simplifications

4.1 Setting parameters and controlling adjustments

The control unit controls the adjustments.

- ▶ Individual adjustment of each shown measuring component and each measuring range.
- ▶ Programming of the adjustment parameters for each measuring component of the GMS800 → Technical Information “Basic Control Unit (BCU)”
- ▶ Manual start of an adjustment procedure → Operating Instructions of the control unit

4.2 Adjustment interval

- ▶ Adjust the Analyzer module OXOR-E in regular intervals. *Recommendation:* Weekly.
- ▶ General information concerning purpose, prerequisites and frequency of adjustments → “Series GMS800” Operating Instructions

4.3 Simplifications for adjustments



Basic information on the test gases → Operating Instructions “Series GMS800”

Zero point adjustments, omitting

Zero point adjustment is not required due to the characteristics of the electrochemical cell. Zero point adjustments for O₂ are not necessary when measuring component O₂ is measured with the Analyzer module OXOR-E.



This allows you to use air for zero point adjustment of all other measuring components of the GMS800 (as long as no metrological or physical reasons speak against using air). Just make sure that air is not used for a zero point adjustment for O₂.

Reference point adjustments with air

Air can be used for reference point adjustment for the O₂ measurement when the end value of the O₂ measuring range is at least 21 percent by volume.



You need just air as span gas for routine adjustments when your GMS800 is not only fitted with the Analyzer module OXOR-E but also the UNOR/MULTOR Analyzer module and this is fitted with the adjustment unit (option). Use the air for zero point adjustment of the UNOR/MULTOR measuring components and for reference point adjustment of measuring component O₂. Use the adjustment unit for reference point adjustment of the UNOR/MULTOR measuring components.

OXOR-E

5 Maintenance

Information on shutting down
Service life of the oxygen sensor
Renewing the oxygen sensor
Spare parts

5.1 Information on shutting down



The electrochemical cell is used up when in contact with air even when it is not in operation.

- ▶ *When the gas analyzer is shutdown or stored (recommendation):* Close off the sample gas path of the gas analyzer gas-tight to prevent contact with ambient air.

5.2 Service life of the oxygen sensor

Limited service life

- The electrochemical reaction slowly uses up the electrolyte in the oxygen sensor. The oxygen sensor must therefore be renewed in certain intervals.
- Unfavorable sample gas compositions can shorten the normal service life. *Example:* Aerosols, high SO₂ concentrations.

Recommended maintenance interval

- ▶ As preventative measure, renew the oxygen sensor after about two years operating time (→ p. 25, §5.4).

Criteria for the end of the service life

- Reaction time of the O₂ measurement slowly increases.
- Reference point drift for O₂ increases quickly, i.e. O₂ sensitivity decreases rapidly.



Drift is checked automatically during adjustments (→ p. 20, §3.4.4).

5.3 Spare parts

Part No.	Description	Comprises
2054673	Spare parts set, oxygen sensor	<ul style="list-style-type: none"> ● Oxygen sensor (with sealing ring) (→ Fig. 4) ● Locking varnish [1]
2048615	Spare part set, OXOR-E	<ul style="list-style-type: none"> ● Oxygen sensor ● Holder (base) for oxygen sensor ● PVDF screw-in joint for hose 6/4 mm ● PVDF screw plug G1/8" ● Fixing screw ● Locking varnish[1]

[1] For fixing screw



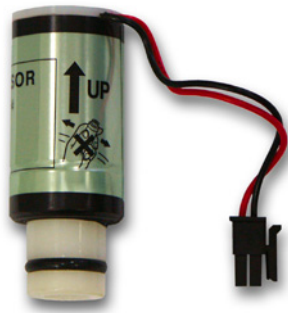
- ▶ Whenever possible, store the oxygen sensor upright in a cool location (see marking "UP" → Fig. 4).
- ▶ Store the oxygen sensor packed airtight or keep the opening in the connection gas-tight (as delivered).
- ▶ Maintain the allowable storage temperature: -20 ... +60 °C.



- Longer storage periods shorten the oxygen sensor service life.
- ▶ Do not store the oxygen sensor as spare part for longer periods.

Fig. 4

Oxygen sensor



5.4

Renewing the oxygen sensor

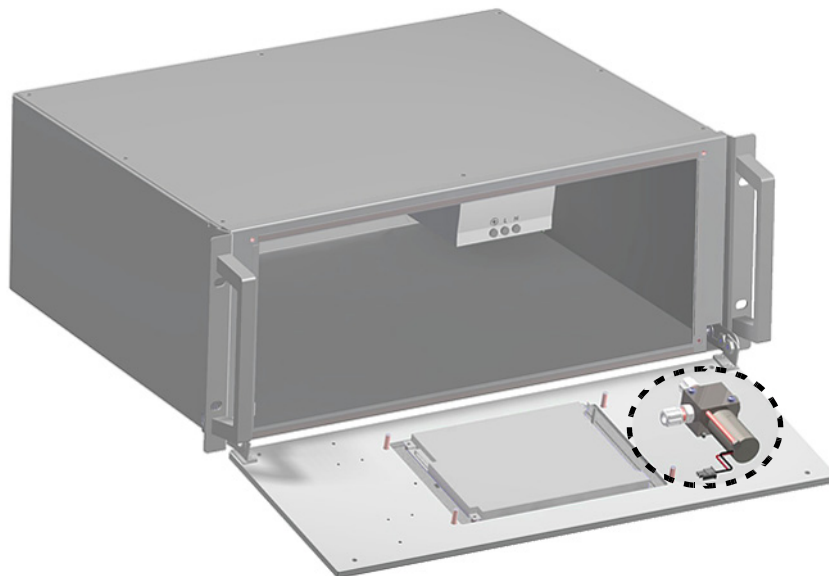
5.4.1

Built-in versions

- On standard built-in versions, the Analyzer module OXOR-E is fitted on a mounting bracket inside the device. The GMS800 enclosure has to be opened to renew the sensor. Only authorized skilled persons may carry out this work.
 - ▶ Have the sensor on standard versions renewed by the manufacturer's Customer Service.
- In the S810 19" enclosure, the Analyzer module OXOR-E can be fitted behind the front panel. It is accessible when the front panel is swiveled down (→ Fig. 5).
 - ▶ For versions fitted behind the front panel, either follow the described procedure carefully (→ §5.4.2) or have the sensor renewed by the manufacturer's Customer Service or by authorized skilled persons.

Fig. 5

Analyzer module OXOR-E behind the S810 enclosure front panel



5.4.2

Exchange procedure behind the front panel

Information

**WARNING: Health hazards through dangerous gases**

If the sample gas could be a risk to health or dangerous:

- ▶ Thoroughly purge sample gas paths with a neutral gas (e.g. nitrogen) before opening components carrying sample gas.

**CAUTION: Hazards through incorrect assembly**

Oxygen sensor and base must be connected gas-tight. Ensure

- ▶ the sealing ring is intact
- ▶ sealing surfaces are smooth and free from dust.

Otherwise sample gas can escape during operation and measurements can be erroneous.

**CAUTION: Hazards for the environment**

The oxygen sensor contains acid.

- ▶ Dispose of the spent oxygen sensor in the same manner as a battery.



To simplify fitting: Apply a thin film of high vacuum grease (high quality glass grease) to the sealing ring of the oxygen sensor. Do not use any other materials here.

Procedure

Preparation:	<ol style="list-style-type: none"> 1 Interrupt sample gas feed to the GMS800 (e.g. close valve, switch pump off). 2 Shut the GMS800 down. 3 If necessary, feed a neutral gas instead of sample gas into the sample gas path of the GMS800 to flush the sample gas out of the GMS800 (see warning information).
Removing:	<ol style="list-style-type: none"> 1 Loosen the front panel screws. Now swivel the front panel downwards. 2 Remove the oxygen sensor fixing screw. 3 Disconnect the oxygen sensor connection cable (plug connection). 4 Pull the oxygen sensor out of the base.
Fitting:	<ol style="list-style-type: none"> 1 Inspect the sealing surface in the base; clean when necessary. 2 Carefully insert the new oxygen sensor in the base. 3 Apply locking varnish to the fixing screw thread. 4 Turn the fixing screw in again and tighten "hand tight" to fix the oxygen sensor in position. 5 Connect the connection cable (plug connection).
Start up:	<ol style="list-style-type: none"> 1 Close the front panel. 2 <i>Recommendation:</i> Carry out a leak tightness check (→ "Series GMS800" Operating Instructions). 3 Put the GMS800 back into operation. 4 <i>Recommendation:</i> Check that the oxygen sensor functions. <ul style="list-style-type: none"> ▶ O₂ measured value immediately after restarting with air as sample gas: → 20 percent by volume (when allowed by measuring range). ▶ O₂ measured value with O₂-free sample gas (zero gas, N₂): ≈ 0 percent by volume. 5 Carry out reference point adjustment for measuring component O₂.

OXOR-E

6 Technical Data

Ambient conditions
Sample gas specifications
Metrological specifications

6.1 Installation location requirements

Geographic height at installation location:	≤ 2500 m altitude [1]
Ambient air pressure:	700 ... 1200 hPa
Jolts:	< 2.7 g
Fitting position influence (tilted position influence)	No influence for constant tilted position up to ±15° [2]

[1] Higher altitudes can be realized (option); compensation for height influence.

[2] Perform an adjustment after changing the fitting position.

6.2 Metrological specifications

Measured variable:	O ₂ volume concentration
Possible measuring ranges: [1]	
– Standard:	0 ... 25% by vol. O ₂
– Smallest measuring range:	0 ... 10% by vol. O ₂
Detection limit (3σ): [2]	< 0.3% of measurement span
Linearity deviation:	< 1% of measurement span
Zero point drift	≤2% of the smallest measuring range per month
Reference point drift:	≤ 2% of measured value per week
Ambient temperature influence:	
– Zero point:	< 1% of measurement span per 10 K
– Reference point:	< 1% of measurement span per 10 K
Air pressure influence [3]	
– Without pressure compensation:	< 1% of measured value per 1% pressure change
– With automatic pressure compensation: [4] [5]	≤ 0.1% of measured value per 1% pressure change
Sample gas volume flow influence (throughflow dependency) [6]	< 1% of measured value
Mains voltage/mains frequency influence: [7]	< 0.5% of smallest measurement span
Display delay (T _{90 total}):	Typical 20 s [8]
Run-in time:	None

[1] Actual measuring range, see specification of individual device.

[2] With constant electronic damping with time constant T_{90, el.} = 15 s.

[3] *When the sample gas outlet is open:* Atmospheric pressure influence.
When the sample gas outlet is fed back to the process: Process gas pressure influence.

[4] *When the sample gas outlet is open:* Option "Baro correction".
When the sample gas outlet is fed back to the process: Option "Sample gas pressure correction".

[5] Effective range: 700 ... 1300 hPa.

[6] In range 10 ... 60 l/h.

[7] Within the specified voltage and frequency ranges.

[8] For sample gas volume flow = 60 l/h.

6.3 Technical gas specifications

Allowable sample gas temperature: [1]	0 ... 45 °C (32 ... 113 °F) [2]
Allowable sample gas dew point:	Below ambient temperature
Particles in the sample gas:	Free from dust and aerosols [3]
Allowable sample gas pressure [4]	
- For gas paths with hoses:	-200 ... +300 hPa (-0.2 ... +0.3 bar)
- For gas paths with pipes:	-200 ... +1000 hPa (-0.2 ... +1.0 bar)
Sample gas volume flow [1]	
- Minimum:	5 l/h (83 cm ³ /min)
- Maximum:	100 l/h (1660 cm ³ /min) [5]
- With built-in gas pump: [6]	30 ... 60 l/h (500 ... 1000 cm ³ /min)
- Standard:	30 l/h (500 cm ³ /min)

[1] Keep constant during operation.

[2] *When a sample gas cooler is used:* Always above the cooler temperature (dew point).

[3] When entering the gas analyzer.

[4] Relative to the ambient/atmospheric air pressure.

[5] In potentially explosive atmospheres: Observe approval requirements.

[6] Option in Gas module.

6.4 Materials with sample gas contact

Component	Material
Measuring cell	Viton B, PVDF, stainless steel 1.4571, FEP
Base	

6.5 Measuring ranges

Measuring component	Measuring range	
	Technical	Performance-tested [1]
O ₂	10 % by vol.	25 % by vol.
	25 % by vol.	

[1] Approvals → § 6.6

6.6 Approvals

Conformities	OXOR-E
EN 15267-3	●
EN 14181	●
2000/76/EC (17th BImSchV)	●
2001/80/EC (13th BImSchV)	●
27th BImSchV	●

6.7 Auxiliary power supply for the module

Voltage supply:	24 VDC
Power input:	≤ 5 W

A		F	
Additional documentation (information)	6	Factory settings, restoring	15
Adjustment		Failure	16
- Adjustment interval	22	Function(s) active	16
- Adjustment procedure (information)	22		
- Parameter settings/settings	22	G	
- Reference point adjustments with air	22	Glossary	2
- Simplifications	22		
- Zero point adjustments, omitting	22	H	
Adjustment result	13, 15	Hardware version (display)	13
Adjustment results	13, 15		
Air pressure		I	
- At installation location	28	ID numbers	13
- Influence	28	Identification	13
Altitude (installation location)	28	Information symbols	2
Ambient conditions at installation location	28		
Application limitations	6	J	
Approvals	29	Jolts	28
Auxiliary power supply	29		
		L	
B		Logbook	12, 18
Backup (user settings)	13, 15		
Backup copy (user settings)	13, 15	M	
Base value (display)	16	Maintenance	
Baud rate	16	- Oxygen sensor, renewing	25
Built-in versions	25	- Service life of the oxygen sensor	24
		Maintenance flag	13, 15
C		Maintenance interval	24
Conformities	29	Maintenance request	16
Constant damping	19	Maintenance: Renewing the oxygen sensor	25
		Material number	13
D		Materials with sample gas contact	29
Damping		Measuring cell	9
- Constant damping (el. T90%)	19	Measuring channel (display)	16
- Dynamic damping	12, 19	Measuring components	
- el. T90% (constant damping)	12	- Display name and physical unit	12
Data bits	16	- Displaying physical measuring ranges	12, 14
Description (sampling point)	16	- Show status	12
Detection limit	28	Measuring precision	28
Diagnosis	12	Measuring principle	9
Disposal	26	Measuring ranges	29
Drift		Measuring value display	
- Viewing actual values	13, 15	- Constant damping	19
- Viewing drift limit values	13, 15	- Dynamic damping	19
Drift (specification)	28	- In SOPAS ET	12
Drift limit values	20	Menu functions in SOPAS ET	12, 14
Dynamic damping	12, 19	Metrological specifications	28
		Module address	16
E		Module state	12
el. T90% (constant damping)			
- Explanation	19		
- Menu function	12		
Electrochemical cell (measuring principle)	9		
End value (display)	16		

O		
Measuring range 2	12, 14	
Operating hours	12, 14	
Oscillations	28	
Oxygen sensor		
- Adjustment functions in SOPAS ET	15	
- Measuring principle	9	
- Renewing (procedure)	25	
- Service life, maintenance interval	24	
Oxygen sensor, renewing	25	
Oxygen sensor, replacing	25	
P		
Parity	16	
Power input	29	
Precision (display)	16	
Pressure (sample gas)	29	
Product characteristics	8	
Product description	7	
Product variants	8	
Production release	13	
Production settings, restoring	13	
Q		
QAL3	12, 14	
R		
Reference point adjustments with air	22	
RS485 interface	12	
S		
Safety information		
- Drift reset	20	
Sample gas		
- Application limitations	6	
- Materials with sample gas contact	29	
- Physical conditions	29	
Serial number	13	
Service life of the oxygen sensor	24	
Settings	13, 15	
Settings, backup/restore	13, 15	
Signal words	2	
Software date	13	
Software version	13	
SOPAS ET		
- Important information	18	
- Menu functions	12, 14	
Start value (display)	16	
Stop bits	16	
Symbols (explanation)	2	
T		
Technical Data		
- Power input	29	
Technical data	27	
- Air pressure, altitude	28	
- Allowable tilted position	28	
- Ambient conditions	28	
- Jolts	28	
- Materials	29	
- Measuring ranges		
- Specifications	29	
- Metrological specifications	28	
- Technical gas requirements	29	
- Voltage supply	29	
Technical gas requirements	29	
Temperature (sample gas)	29	
Threshold (dynamic damping)	12	
Tilted position	28	
Time constant		
- el. T90% (constant damping)	12	
- for dynamic damping	12	
U		
Uncertain state	16	
Upload all parameters from device	18	
User settings, backup/restore	13, 15	
V		
Validation measurement (result)	12, 14	
Voltage supply	29	
Volume flow (sample gas)	29	
W		
Warning symbols, warning levels	2	
Z		
Zero point adjustments	22	

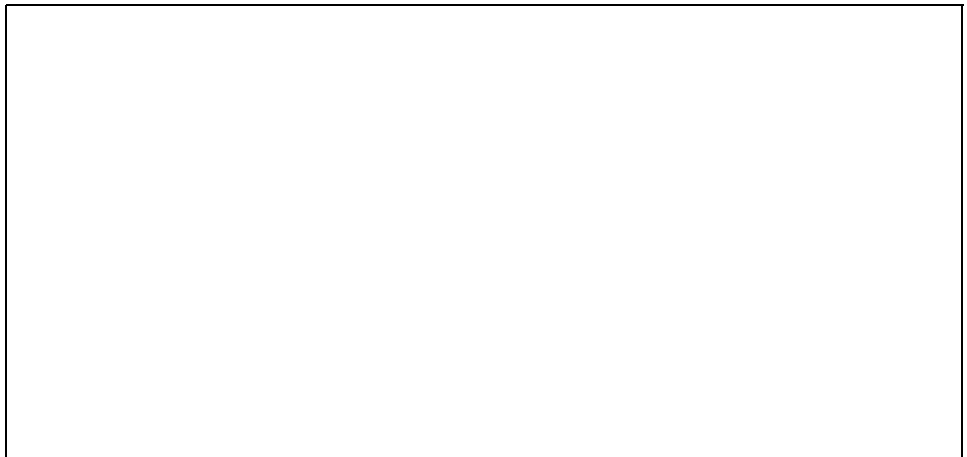
OXOR-E

8013035/V.2.0/2012-12 | Subject to change without notice

SICK worldwide

You will find our local subsidiary
or agency at:

www.sick.com



Your local sales and service partner