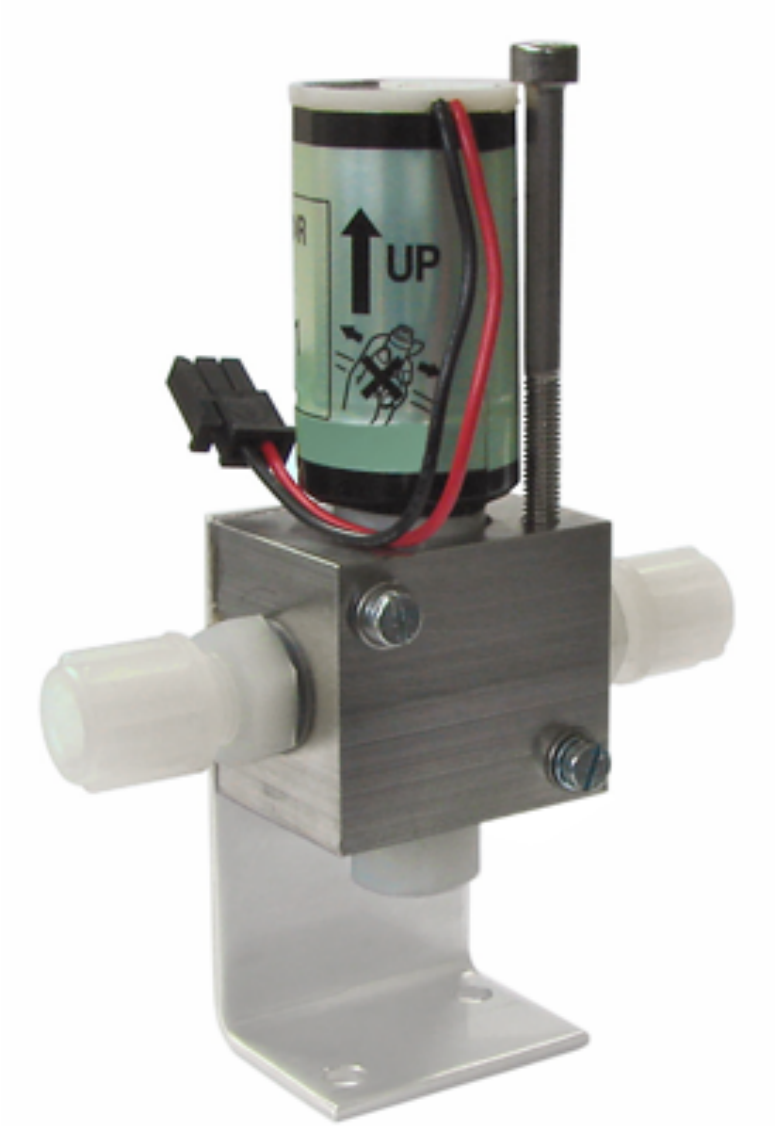
Operating Instructions
Analyzer Module OXOR-E

for Series GMS800



Endress+Hauser
People for Process Automation

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

Manufacturer
Endress+Hauser SICK GmbH+Co. KG
Bergener Ring 27
01458 Ottendorf-Okrilla
Germany

Legal information

Original document
This document is an original document of Endress+Hauser SICK GmbH+Co. KG.

CE

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

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 SO_2 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.

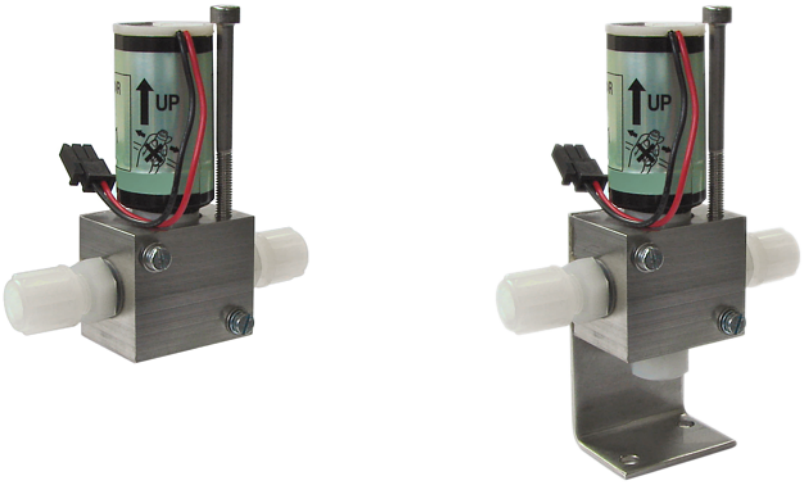
2.2 Product variants

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	

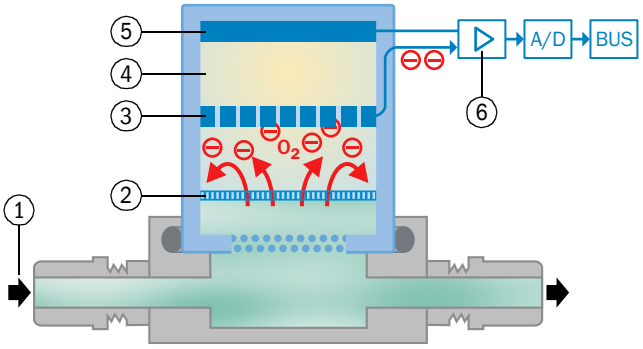
[1] Only possible in S810 enclosure (→ p. 25, Fig. 5)

Fig. 1 Analyzer module OXOR-E



2.3 Measuring principle

Fig. 2 Measuring principle



1 Sample gas
2 Diffusion diaphragm
3 Electrode
4 Electrolyte
5 Counter electrode
6 Measurement amplifier

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

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:	O	Operator (standard)	A	Authorized operator
Access rights:	○	Viewing	●	Setting up/starting

Directory	Menu contents	O	A	Explanation
OXOR		○	○	
Measuring value display		○	○	
Measuring component 1	Component	○	○	→ p. 16 [1]
	Measured value	○	○	→ p. 16 [2]
	Unit	○	○	→ p. 16 [3]
Measuring component 2 [1]		○	○	
Measuring component 3 [1]		○	○	
Measuring component 4 [1]		○	○	
Diagnosis		○	○	
Module state	Failure	○	○	
	Maintenance request	○	○	→ p. 16 [4]
	Function(s) active	○	○	
	Uncertain state	○	○	
Logbook	Pos. | Date | Source | ...	–	○	→ p. 18, §3.4.1
Operating hours	h	–	○	→ p. 16 [5]
Measuring component 1		○	○	
Name / unit	Component	○	●	→ p. 16 [1]
	Unit	○	○	→ p. 16 [2]
State	Failure	○	○	
	Maintenance request	○	○	→ p. 16 [4]
	Function(s) active	○	○	
	Uncertain state	○	○	
Validation measurement (QAL3)	Zero point	○	○	
	Reference point	○	○	
Measuring component 2 [1]		○	○	
Measuring component 3 [1]		○	○	
Measuring component 4 [1]		○	○	
Parameter		○	○	
Sampling point	Description	–	●	→ p. 16 [6]
RS485 interface	Module address	–	○	→ p. 16 [7]
	Baud rate	–	●	
	Data bits	–	●	→ p. 16 [8]
	Stop bits	–	●	
	Parity	–	●	
Measuring component 1		○	○	
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]	–	●	
Dynamic damping	Status [On/Off]	–	●	→ p. 19, §3.4.3
	Time constant [s]	–	●	
	Threshold	–	●	
Measuring component 2 [1]		○	○	
Measuring component 3 [1]		○	○	
Measuring component 4 [1]		○	○	

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	○	○	
	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]	–	●	
	[Restore last user settings]	–	●	→ p. 16 [16]
	[Restore next to last user settings]	–	●	
Factory settings	[Restore]	–	●	→ p. 16 [17]
Factory settings		○	○	
Identification		○	○	
ID numbers	Serial number	○	○	
	Material number	○	○	
	Hardware version	○	○	→ p. 17 [18]
	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:	O	Operator (standard)	A	Authorized operator
Access rights:	○	Viewing	●	Setting up/starting

Directory	Menu contents	O	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	○	○	
	Maintenance request	○	○	→ p. 16 [4]
	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	○	○	
	Maintenance request	○	○	→ p. 16 [4]
	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	–	●	
	Data bits	–	●	→ p. 16 [8]
	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	○	○	
	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]	–	●	
	[Restore last user settings]	–	●	→ p. 16 [16]
	[Restore next to last user settings]	–	●	
Factory settings	[Restore]	–	●	→ p. 16 [17]
Factory settings		○	○	
Identification		○	○	
ID numbers	Serial number	○	○	
	Material number	○	○	
	Hardware version	○	○	→ p. 17 [18]
	Software version	○	○	
	Software date	○	○	
Production release	Year	–	○	
	Month	–	○	→ p. 17 [19]
	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 ● *Significance:* Module not ready for operation ● *Possible causes:* Malfunction, defect
	Maintenance request	LED symbol ● *Significance:* Advance warning before internal technical limits reached. ● *Possible causes:* Drift limit, operating hours, lamp intensity
	Function(s) active	LED symbol ● *Significance:* At least one internal function active that impairs or hinders normal module measuring function. ● *Possible causes:* Adjustment procedure running, validation measurement running
	Uncertain state	LED symbol ● *Significance:* Actual measured values are unreliable. ● *Possible causes:* 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	● 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	● Backup = Save a copy of the actual module settings. ● Resture = 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] ► *Recommendation:* 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

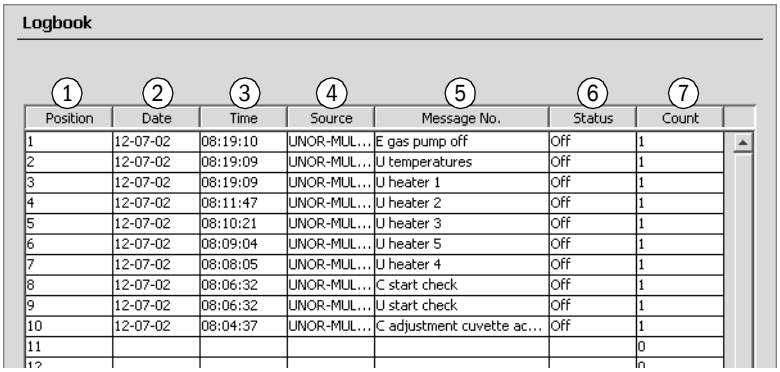
[1] A warm start is then done automatically.

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)



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						0

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.

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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 O_2 are not necessary when measuring component O_2 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 O_2.

Reference point adjustments with air

Air can be used for reference point adjustment for the O_2 measurement when the end value of the O_2 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 O_2. 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 SO_2 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 O_2 measurement slowly increases.
- Reference point drift for O_2 increases quickly, i.e. O_2 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	● Oxygen sensor (with sealing ring) (→ Fig. 4) ● Locking varnish [1]
2048615	Spare part set, OXOR-E	● 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).

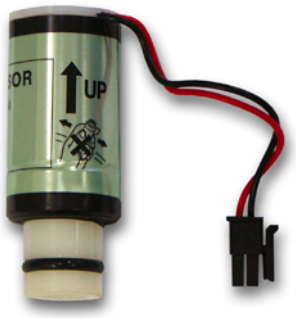
► Store the oxygen sensor packed airtight or keep the opening in the connection gas-tight (as delivered).

► 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

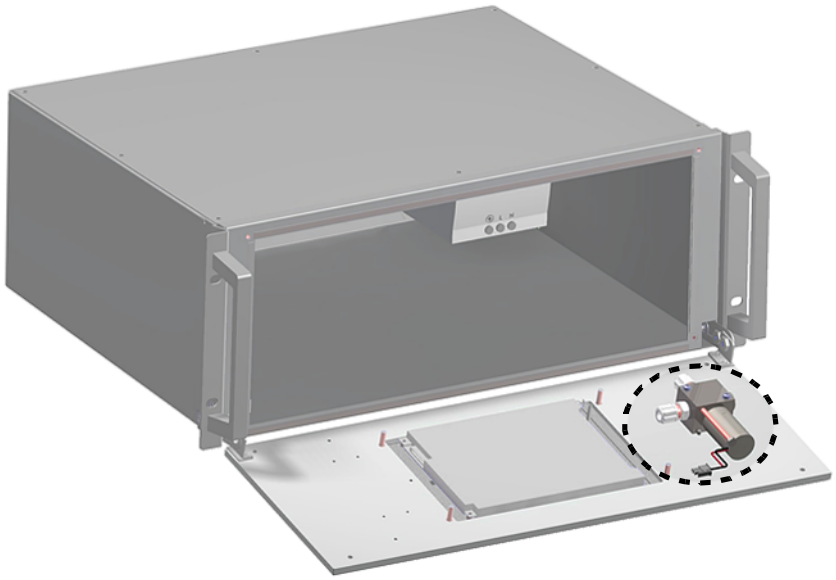


5.4 Renewing the oxygen sensor

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:	**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:	**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:	**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:	**1** Close the front panel. **2** *Recommendation:* Carry out a leak tightness check (→ “Series GMS800” Operating Instructions). **3** Put the GMS800 back into operation. **4** *Recommendation:* Check that the oxygen sensor functions. ► O_2 measured value immediately after restarting with air as sample gas: → 20 percent by volume (when allowed by measuring range). ► O_2 measured value with O_2-free sample gas (zero gas, N_2): ≈ 0 percent by volume. **5** Carry out reference point adjustment for measuring component O_2.

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

8029910/W793/V2-0/2012-12

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