

# GM32

In-situ Gas Analyzer,  
Measuring Probe Version

GM32, GM32 LowNO<sub>x</sub>, GM32 TRS

**SICK**  
Sensor Intelligence.



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### **Described Product**

Product name: GM32  
Variants: GM32 GMP (certified according to EN 15267)  
GM32 LowNOx GMP (certified according to EN 15267)  
GM32 GPP  
GM32 LowNOx GPP  
GM32 TRS-PE GPP

### **Manufacturer**

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### **Original document**

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## Contents

<b>1</b>	<b>About this document.....</b>	<b>6</b>
1.1	Symbols and document conventions .....	6
1.1.1	Warning symbols.....	6
1.1.2	Warning levels / signal words .....	6
1.1.3	Information symbols .....	7
1.2	Main instructions for operation .....	7
1.3	Intended use .....	7
1.3.1	Purpose of the device.....	7
1.4	Product identification.....	7
1.5	Responsibility of user.....	7
1.6	Additional documentation/information.....	8
<b>2</b>	<b>Product description .....</b>	<b>9</b>
2.1	Product description.....	9
2.1.1	Device versions.....	9
2.1.2	TRS calculation .....	10
2.1.3	Device variants .....	10
2.1.4	Options .....	11
2.2	SOPAS ET (PC program) .....	11
2.3	Reference cycle.....	11
2.4	Check cycle.....	11
2.5	GM32 design .....	13
2.5.1	Measuring probe.....	13
2.6	Purge air unit (for GMP measuring probe) .....	13
2.6.1	Light sources.....	14
<b>3</b>	<b>Preparing the gas duct side .....</b>	<b>15</b>
3.1	Preparing the sampling point .....	15
3.1.1	Checking the scope of delivery .....	15
3.2	Overview of the installation steps (duct-side work).....	16
3.2.1	Work steps (overview) .....	17
3.2.2	Installing the flange with tube on the gas duct .....	17
3.3	Installing the connection unit .....	18
3.4	Installing the purge air unit (for GMP probe) .....	18
3.5	Laying the electrical connection lines .....	19
3.5.1	General information.....	21
3.5.2	Connecting I/O interfaces (option).....	21
3.5.2.1	Default values for interfaces .....	22
3.5.3	Laying the electrical connection lines to the SR-unit.....	23
3.5.4	Preparing the power supply.....	24
<b>4</b>	<b>Start-up.....</b>	<b>25</b>
4.1	Necessary technical knowledge for start-up.....	25
4.2	Required material (not included in the scope of delivery) .....	27
4.3	Overview of assembly steps .....	28







4.4	Transport safety devices .....	29
4.5	Installing the device flange on the purge air fixture .....	30
4.6	Aligning the measuring probe in flow direction .....	31
4.6.1	When the probe alignment has to be set .....	31
4.7	For the GPP probe: Electrical connection .....	32
4.8	Electrical connection of the SR-unit.....	33
4.9	Switching on the power supply of the GM32.....	33
4.10	For GMP probe: Start-up of the purge air supply.....	33
4.11	Installing the measuring probe in the gas duct.....	34
4.12	Installing the SR-unit on the device flange.....	36
4.13	Optical fine alignment of the SR-unit.....	36
4.14	OPC .....	37
4.14.1	OPC interface.....	38
4.15	Installing weatherproof covers (option).....	39
<b>5</b>	<b>Operation .....</b>	<b>41</b>
5.1	Recognizing an unsafe operating state .....	41
5.2	Operator panel.....	42
5.2.1	Status indicators (LEDs) .....	42
5.2.2	Button assignment .....	42
5.2.3	Contrast setting.....	42
5.2.4	Language .....	43
5.2.5	Menu tree .....	43
5.2.5.1	Diagnosis .....	44
5.2.5.2	Check cycle .....	45
5.2.5.3	Alignment check (automatic optical alignment check; option) .....	45
5.2.5.4	Adjustments.....	45
5.2.5.5	Maintenance.....	47
<b>6</b>	<b>Maintenance.....</b>	<b>48</b>
6.1	Maintenance plan (operator) .....	48
6.1.1	Recommended expendable and wearing parts for 2 years operation .....	48
6.2	Preparation work .....	48
6.3	Swiveling out and removing the SR-unit.....	49
6.4	Visual inspection.....	49
6.5	Cleaning the window .....	50
6.6	Checking and replacing the desiccant cartridges.....	50
6.7	Replacing the sender lamp and LED for GM32 LowNOx .....	51
6.7.1	Tools required.....	51
6.7.2	Sender lamp with LED unit .....	51
6.8	Cleaning the purge air unit.....	53
<b>7</b>	<b>Clearing malfunctions.....</b>	<b>54</b>
7.1	Safety instructions when clearing malfunctions .....	54

7.2	Error diagnosis Tables .....	55
7.2.1	Device not functioning.....	55
7.2.2	Measured values clearly incorrect.....	55
7.2.3	Sample gas penetrating .....	55
7.2.4	Corrosion on probe or flanges.....	56
7.2.5	Measured value blinks .....	56
7.3	Error messages .....	56
7.3.1	Example of an error message .....	56
7.3.2	Error messages.....	57
7.4	Inadequate purge air supply (for GMP probe) .....	61
7.5	Malfunctions on the connection unit .....	61
<b>8</b>	<b>Shutdown .....</b>	<b>62</b>
8.1	Shutdown.....	62
8.1.1	Shutdown .....	62
8.1.2	Disassembly .....	62
8.2	Storage .....	63
8.3	Environmentally compatible disposal/recycling .....	63
<b>9</b>	<b>Specifications.....</b>	<b>64</b>
9.1	Conformities .....	64
9.1.1	Electrical protection.....	64
9.2	System: GM32.....	65
9.2.1	System GM32 Standard .....	65
9.2.2	System GM32 TRS-PE .....	66
9.2.3	Sender/receiver unit .....	67
9.2.4	Open measuring probe (GMP).....	67
9.2.5	Gas-testable measuring probe (GPP).....	67
9.2.6	Connection unit.....	68
9.3	Modbus Register Mapping.....	69
9.3.1	Mapping of GM32 measuring components .....	69
9.3.2	Mapping for GM32 in general .....	70
9.3.3	Mapping of Modbus input values.....	71
9.3.4	Table Bitmap "Status" .....	71
9.3.5	Bitmap Table "Failure" .....	72
9.3.6	Bitmap Table "Maintenance Request" .....	72
9.3.7	Bitmap Table Function "Check" and "Out of Specification" .....	72
9.3.8	Bitmap Table "Extended" .....	73
9.3.9	Table "Operating States" .....	73
9.4	Dimensions.....	74

## 1 About this document

### 1.1 Symbols and document conventions

#### 1.1.1 Warning symbols

Symbol	Significance
	Hazard (general)
	Hazard by voltage
	Hazard by explosive substances/mixtures
	Hazard by unhealthy substances
	Hazard by high temperature or hot surface
	Hazard for the environment/nature/organic life

#### 1.1.2 Warning levels / signal words

##### **DANGER**

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

##### **WARNING**

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



##### **CAUTION**

Hazard or unsafe practice which could result in less severe or minor injuries.

##### **NOTICE**


Hazard which could result in property damage.

**1.1.3 Information symbols**


Symbol	Significance
	Important technical information for this product
	Important information on electric or electronic functions

**1.2 Main instructions for operation**


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	<p><b>WARNING: Danger resulting from escaping gas when the SR-unit is swiveled out</b></p> <p>Excess pressure in the gas duct can cause hot and/or noxious gases to escape when the SR-unit is swiveled out.</p> <ul style="list-style-type: none"> <li>▶ Swivel the SR-unit out only when you have taken suitable safety measures.</li> </ul>
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	<p><b>CAUTION: If the hinge pin has not been correctly inserted, the SR-unit can drop when swiveled out.</b></p> <ul style="list-style-type: none"> <li>▶ Check the hinge pin is completely pressed down before swiveling the SR-unit out (see <a href="#">“Install the SR-unit:”, page 36</a>).</li> </ul>
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	<p><b>CAUTION: Danger of contamination caused by purge air failure (for GM32 with GMP probe)</b></p> <ul style="list-style-type: none"> <li>▶ If a failure of the purge air supply occurs, take immediate measures to protect the measuring system (see <a href="#">“Error messages”, page 56</a>).</li> </ul>
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**1.3 Intended use**

**1.3.1 Purpose of the device**

The GM32 serves exclusively for emission and process monitoring of gases in industrial plants.

GM32 measures continuously directly in the gas duct (in-situ).

**1.4 Product identification**

Product name	GM32
Product variant	Version with measuring probe
Manufacturer	SICK AG · Erwin-Sick-Str. 1 D-79183 Waldkirch · Germany
Location of type plates	Sender/receiver unit: On the right side and on the intermediate enclosure Connection unit: On the right side and inside For GMP probe: On the purge air fixture For GPP probe: On the flange fixture

**1.5 Responsibility of user**

**Designated users**

The GM32 may be operated by competent persons only who, based on their device-specific training and knowledge of the device as well as knowledge of the relevant regulations, can assess the tasks given and recognize the dangers involved.

### Correct use

- ▶ Use the device only as described in these Operating Instructions.  
The manufacturer bears no responsibility for any other use.
- ▶ Perform the specified maintenance work.
- !▶ Do not remove, add or modify any components to or on the device unless described and specified in the official manufacturer information.  
Otherwise:
  - Any warranty by the manufacturer becomes void.
  - The device could become dangerous.

### Special local conditions

- ▶ Follow all local laws, regulations and company-internal operating directives applicable at the installation location.

### Retention of documents

These Operating Instructions:

- ▶ Must be available for reference.
- ▶ Must be passed on to new owners.

## 1.6 Additional documentation/information

- ▶ Pay attention to the supplied documents.

### Additional instructions

The following documents are applicable in addition to these Operating Instructions:

- Technical Information GM32 (option)
- Operating Instructions for purge air supply SLV4 (for GMP probe)
- Operating Instructions, "Modular I/O System" (option)
- Final inspection record
- CD-ROM with SOPAS ET



## 2 Product description

### 2.1 Product description

The GM32 gas analyzer serves for continuous measurement of gas concentrations in industrial plants.

GM32 is an in-situ measuring system which means measuring is done directly in the gas carrying duct.

- Measuring components: SO<sub>2</sub>, NO, NO<sub>2</sub> and NH<sub>3</sub> (device specific) as well as the reference variables temperature and pressure.
- GM32-TRS-PExx version: TRS components.  
(Only for kraft pulp mills. Only with GPP probe)
- Measuring principle: Differential Optical Absorption Spectroscopy (DOAS).

#### 2.1.1 Device versions

Version	Components measured	Component calculated
All	T, p	---
GM32-1	SO <sub>2</sub>	---
GM32-2	SO <sub>2</sub> , NO	NO <sub>x</sub>
GM32-3	SO <sub>2</sub> , NO, NO <sub>2</sub>	NO <sub>x</sub>
GM32-4	NO	NO <sub>x</sub>
GM32-5	SO <sub>2</sub> , NO, NH <sub>3</sub>	NO <sub>x</sub>
GM32-6	NO, NO <sub>2</sub> , NH <sub>3</sub>	NO <sub>x</sub>
GM32-7	NO, NO <sub>2</sub>	NO <sub>x</sub>
GM32-8	NO, NH <sub>3</sub>	NO <sub>x</sub>
GM32-9	SO <sub>2</sub> , NO, NO <sub>2</sub> , NH <sub>3</sub>	NO <sub>x</sub>
GM32-TRS-PE01	H <sub>2</sub> S	---
GM32-TRS-PE02	TRS <sup>[1]</sup>	TRS = H <sub>2</sub> S+CH <sub>3</sub> SH
GM32-TRS-PE03	H <sub>2</sub> S, SO <sub>2</sub> , NO	---
GM32-TRS-PE04	TRS, SO <sub>2</sub> , NO	TRS = H <sub>2</sub> S+CH <sub>3</sub> SH
GM32-TRS-PE05	H <sub>2</sub> S, SO <sub>2</sub> , NO, NH <sub>3</sub>	---
GM32-TRS-PE06	TRS, SO <sub>2</sub> , NO, NH <sub>3</sub>	TRS = H <sub>2</sub> S+CH <sub>3</sub> SH
GM32-TRS-PE07	TRS, H <sub>2</sub> S, CH <sub>3</sub> SH <sup>[2]</sup> , -(CH <sub>3</sub> ) <sub>2</sub> S <sup>[3]</sup> , (CH <sub>3</sub> ) <sub>2</sub> S <sub>2</sub> <sup>[4]</sup> , SO <sub>2</sub> , NO, NH <sub>3</sub>	TRS = H <sub>2</sub> S+CH <sub>3</sub> SH+ (CH <sub>3</sub> ) <sub>2</sub> S+2x(CH <sub>3</sub> ) <sub>2</sub> S <sub>2</sub>

- [1] Total reduced sulfurs  
 [2] Methyl mercaptan  
 [3] Dimethyl sulphide  
 [4] Dimethyl disulphide

### 2.1.2 TRS calculation

Converting TRS physical units ppm  $\leftrightarrow$  mg/m<sup>3</sup>

- TRS single components are conventionally oxidized thermally in the converter to SO<sub>2</sub>.
- The SO<sub>2</sub> difference in ppm from measurement before and after correction results from the TRS components.
- The direct measuring method of the GM32 (without converter) is adapted to this calculation convention.
- Since the H<sub>2</sub>S share on TRS is > 80%:  
The molecular weight of H<sub>2</sub>S serves as basis for converting the SO<sub>2</sub> difference to TRS in mg/m<sup>3</sup>N.

Example:

- SO<sub>2</sub> difference converter: 10 ppm = 15.18 mg/m<sup>3</sup>N
- GM32 TRS measured value: 20 mg/m<sup>3</sup>N = 13.18 ppm
- with H<sub>2</sub>S = 34 g/mol  
--> 1 ppm H<sub>2</sub>S = 34000 mg/mol / 0.0224 m<sup>3</sup>N/mol / 1000000 = 1.518 mg/m<sup>3</sup>N  
(under normal condition 0 °C).

### 2.1.3 Device variants

#### “Basic” variant

- Reference cycle (see “Reference cycle”, page 11): Correction of internal drifts. Zero point check.
- Automatic mirror tracking: Automatic adjustment of optical axis.
- Logbook: System messages are recorded in a logbook.
- Network: Ethernet interface (Modbus TCP, SOPAS ET, OPC server).

#### “Pro” variant

As “Basic” variant. In addition:

- TÜV performance tested for equipment subject to authorization (→ Technical Data).
- Check cycle, see “Check cycle”, page 11 : Reference cycle (as in the “Basic” variant), followed by a cycle to check and output the zero and check point.  
The check cycle creates the QAL3 values (quality assurance of automated measuring systems). The QAL3 values can be displayed with SOPAS ET.
- Operator panel: Measured values, operational state and malfunction messages are displayed in clear text on a monitor.
- QAL3 Tool (CUSUM chart).