

Overview



The Set BGA (**biogas analyzer**) is a standardized system for stationary, continuous operation for the analysis of landfill gas, sewage gas or biogas.

Benefits

Standardized complete system

The standardized complete system has a modular configuration and can thus be used at various measuring locations for different measuring tasks.

- Simple and fast to configure
- Field-tested and matched Set in rugged industrial design
- Extremely high long-term stability
- The Set BGA is based on the proven ULTRAMAT 23

Field-proven, reliable technologies

- Autocalibration function with ambient air reduces the maintenance requirements
- Detonation protection in accordance with EN 12874
- Modular system design based on long-term tested components
- LEL sensor for cabinet monitoring (optional)

Simple operation

- Intuitive menu guidance
- Configuration on large displays with plain text
- Two freely-configurable limits per measured component

Application

The efficiency of biogenic production processes and optimum operation of the plant largely depends on continuous monitoring of the biogas composition. The basic version of the Set BGA analyzes CH₄ and CO₂ using the proven ULTRAMAT 23 IR analyzer. The concentrations of O₂ and H₂S are optionally measured using electrochemical sensors and also converted into output signals of 4 to 20 mA. In this manner, the Set BGA contributes to operational safety and explosion protection in addition to process optimization.

The modular design of the system takes into account the physical conditions of the gas with regard to temperature and moisture in that various gas preparation components for heating or drying the sample gas can be configured as required.

The gas mixture can be explosive at critical concentration ratios between methane and oxygen. Even if such critical gas compositions occur extremely rarely, the danger of ignition must nevertheless be avoided. For this reason, the Set BGA is designed with a high safety standard and even the basic version is equipped with flow monitoring and detonation protection in accordance with EN 12874 in the sample gas path. To increase safety even further, a gas sensor for monitoring the ambient air can be connected as an option.

It is also possible to monitor up to six measuring points using an optional sample switching cabinet. In this case the sample flows are sucked in continuously using a powerful pump in order to achieve fast measuring times.

Analytical Application Sets

Biogas analysis

Set BGA

Design

The Set BGA consists of the following components:

- ULTRAMAT 23 analyzer with four measured components max.
- Analyzer cabinet with modularly configurable gas preparation components
- Cabinet for measuring point switchover (option)
- Heated line (option)

The ULTRAMAT 23 is selectable with two IR components (CO₂ and CH₄). Furthermore, the configuration can be equipped with an electrochemical oxygen sensor and/or an electrochemical hydrogen sulfide sensor. The corresponding measuring ranges are listed in the table below.

| Measured component | Smallest measuring range | Largest measuring range |
|------------------------|--------------------------|-------------------------|
| CO ₂ | 0 ... 20% | 0 ... 100% |
| CH ₄ | 0 ... 20% | 0 ... 100% |
| O ₂ | 0 ... 5% | 0 ... 25% |
| H ₂ S (low) | 0 ... 5 ppm | 0 ... 50 ppm |

The ULTRAMAT 23 calibrates the IR components and the electromechanical oxygen sensor automatically with ambient air. Calibration with calibration gas is recommended once a year or after oxygen sensor replacement. In order to comply with the technical specification data, the hydrogen sulfide sensor must be calibrated every three months. An appropriate calibration gas is therefore required. It is supplied to the analyzer through a manually switchable ball valve.



Set BGA measuring system



2-stream sample preparation

Selection and ordering data

| Set BGA basic configuration, including flame arrestor | Article No. 7MB1955- ● ● ● ● ● - ● ● ● ● ● | | | | | | | | | |
|--|---|--|--|--|--|--|--|---|---|---|
| Click on the Article No. for online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| Unavailable combinations are shown in PIA Life Cycle Portal as "not permitted". | | | | | | | | | | |
| Gas connections, external | | | | | | | | | | |
| 6 mm | | | | | | | | 0 | | |
| ¼ inch | | | | | | | | 1 | | |
| Sample conditioning | | | | | | | | | | |
| Without gas cooling | | | | | | | | | A | |
| Passive cooling (supplied separately) | | | | | | | | | B | |
| Peltier cooler, integrated in Set BGA enclosure | | | | | | | | | C | |
| Enclosure design: | | | | | | | | | | |
| Not heated | | | | | | | | | A | |
| Electrically heated | | | | | | | | | B | |
| Pump design | | | | | | | | | | |
| Internal pump in analyzer | | | | | | | | | 1 | |
| External pump, fitted in Set BGA enclosure | | | | | | | | | 2 | |
| Auxiliary power | | | | | | | | | | |
| 120 V AC, 60 Hz | | | | | | | | | 0 | |
| 230 V AC, 50 Hz | | | | | | | | | 1 | |
| 110 V AC, 50 Hz | | | | | | | | | 2 | |
| 220 V AC, 60 Hz | | | | | | | | | 3 | |
| Infrared measured components | | | | | | | | | | |
| Version with one measured component (CH ₄) Highly selective ULTRAMAT 23 single-beam infrared gas analyzer for measuring methane; mounted in 19-inch rack unit for installation in wall cabinet. <u>Specification:</u> Measured component CH ₄ • smallest adjustable measuring range: 0 ... 20% • largest adjustable measuring range: 0 ... 100% | | | | | | | | | | 0 |
| Version for 2 measured components Highly selective ULTRAMAT 23 single-beam infrared gas analyzer for measuring carbon dioxide and methane; mounted in 19-inch rack unit for installation in wall cabinet. <u>Specification:</u> 1st measured component CO ₂ • smallest adjustable measuring range: 0 ... 20% • largest adjustable measuring range: 0 ... 100% 2nd measured component CH ₄ • smallest adjustable measuring range: 0 ... 20% • largest adjustable measuring range: 0 ... 100% | | | | | | | | | | 1 |
| Version with one measured component (CO ₂) Highly selective ULTRAMAT 23 single-beam infrared gas analyzer for measuring carbon dioxide; mounted in 19-inch rack unit for installation in wall cabinet. <u>Specification:</u> Measured component CO ₂ • smallest adjustable measuring range: 0 ... 0.5% • largest adjustable measuring range: 0 ... 2.5% | | | | | | | | | | 2 |
| Oxygen measurement | | | | | | | | | | |
| Gas analyzer without oxygen sensor | | | | | | | | | | A |
| Electrochemical oxygen sensor; resistant to CO ₂ <u>Specification:</u> • smallest adjustable measuring range: 0 ... 5% • largest adjustable measuring range: 0 ... 25% • repeatability: approx. 0.05% O ₂ | | | | | | | | | | B |
| Paramagnetic oxygen measuring cell; no sensor wear <u>Specification:</u> • smallest adjustable measuring range: 0 ... 2% • largest adjustable measuring range: 0 ... 100% • repeatability: < 1% of smallest measuring range | | | | | | | | | | C |
| H₂S measurement | | | | | | | | | | |
| Without H ₂ S sensor | | | | | | | | | | A |
| With H ₂ S sensor, 0 ... 5 ppm to 0 ... 50 ppm | | | | | | | | | | D |
| Documentation | | | | | | | | | | |
| German, 1 set (paper and CD) | | | | | | | | | | 0 |
| English, 1 set (paper and CD) | | | | | | | | | | 1 |

Analytical Application Sets

Biogas analysis

Set BGA

Selection and ordering data (Continued)

| | | |
|--|--------------------------------|---------------------|
| Set BGA basic configuration, including flame arrestor | Article No. 7MB1955- | ● ● ● ● ● - ● ● ● ● |
| French, 1 set (paper and CD) | | 2 |

| Options | Order code |
|---|------------|
| Add "-Z" to article number and then add order code | |
| Settings | |
| Heated sample gas line, self-regulating, Ex-proof | |
| • Length: 5 m, supplied separately | A01 |
| • Length: 10 m, supplied separately | A02 |
| • Length: 15 m, supplied separately | A03 |
| • Length: 20 m, supplied separately | A04 |
| • Length: 25 m, supplied separately | A05 |
| • Length: 30 m, supplied separately | A06 |
| • Length: 35 m, supplied separately | A07 |
| Communication | |
| • PROFIBUS PA interface | A12 |
| • PROFIBUS DP interface | A13 |
| Fast loop design and sample switching | |
| • 2-stream sample switching with Logo and external pump | B02 |
| • 3-stream sample switching with Logo and external pump | B03 |
| • 4-stream sample switching with Logo and external pump | B04 |
| • 5-stream sample switching with Logo and external pump | B05 |
| • 6-stream sample switching with Logo and external pump | B06 |
| Gas sensor for leak monitoring of the Set BGA system | |
| • Alarm monitoring: 20% LEL methane | C01 |

Technical specifications

| Set BGA | |
|-----------------------------|--|
| Installation | |
| Ambient temperature | 5 ... 38 °C, with cabinet heating ± 0 °C |
| Place of installation | Indoor/outdoor installation (configurable) |
| Gas inlet conditions | |
| Sample gas pressure | <ul style="list-style-type: none"> With pump, depressurized suction mode, selectable with internal or external pump Provision must be made for a pressure reduction for pressures greater than 1 200 mbar absolute |
| Pump performance | Adjustable to 60 ... 80 NI/h |
| Sample gas temperature | Max. 45 °C, with moisture saturation |
| Power supply | |
| Supply 1 | 200 ... 240 V AC, 47 ... 63 Hz |
| Supply 2 | 100 ... 120 V AC, 47 ... 63 Hz |
| Power consumption | Approx. 180 VA (without cooler and sample preparation) |
| Connection systems | |
| Teflon hose | With PVDF screwed glands |

Technical specifications (Continued)

| Set BGA | |
|--------------------------------------|---|
| Connection systems | Metric (6 mm) or imperial (1/4") selectable |
| Dimensions | |
| Set BGA measuring system (W x H x D) | 600 x 781 x 600 mm |
| Sample preparation (W x H x D) | 600 x 600 x 220 mm |
| Weight | |
| Set BGA measuring system | Approx. 50 kg |
| Sample preparation | Approx. 22 kg |
| System design | |
| System housing | 3-part sheet-steel enclosure with inspection window |
| Degree of protection | IP54 |
| Cabinet conditioning | Fan |
| Cooling system | Peltier cyclone cooler (optional) |
| Sample preparation | Max. six sample streams can be controlled using Logo module with fast loop pump in separate enclosure |
| Analog outputs | Per component 0/2/4 ... 20 mA; NAMUR, floating, max. load 750 Ω |

Technical specifications (Continued)

| Set BGA | |
|---|---|
| Measured components / measuring ranges | |
| CH ₄ | 0 ... 100 vol.% to 0 ... 20 vol.% (NDIR) |
| CO ₂ | 0 ... 100 vol.% to 0 ... 20 vol.% (NDIR) |
| O ₂ | 0 ... 25 vol.% to 0 ... 5 vol.% (electrochemical or paramagnetic optionally selectable) |
| H ₂ S | 0 ... 5 ppm to 0 ... 50 ppm (electrochemical); optional |
| Safety assemblies | |
| Assembly 1 | Detonation protection F501 |
| Assembly 2 | Flow measurement with limit monitoring at the output |
| Assembly 3 | LEL monitoring (optional) |
| Comment | <ul style="list-style-type: none"> • The system concept of the Set BGA is based on the pre-configured ULTRAMAT 23 solutions (7MB2335-..., 7MB2337-...) • The technical performance data concerning the measuring response corresponds to the catalog data of the ULTRAMAT 23. The pre-configured version does not contain any ULTRAMAT 23 add-ons or retrofitting sets. |