Overview

The Set BGA (**b**io**g**as **a**nalyzer) 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 CH_4 and CO_2 using the proven ULTRAMAT 23 IR analyzer. The concentrations of O_2 und H_2S 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.

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 (CO_2 and CH_4). 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_2S (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.								0			
Specification:											
Measured component CH_4											
• smallest adjustable measuring range: 0 ... 20%											
• largest adjustable measuring range: 0 ... 100%											
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.								1			
Specification:											
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%											
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.								2			
Specification:											
Measured component CO_2											
• smallest adjustable measuring range: 0 ... 0.5%											
• largest adjustable measuring range: 0 ... 2.5%											
Oxygen measurement											
Gas analyzer without oxygen sensor									A		
Electrochemical oxygen sensor; resistant to CO_2									B		
Specification:											
• smallest adjustable measuring range: 0 ... 5%											
• largest adjustable measuring range: 0 ... 25%											
• repeatability: approx. 0.05% O_2											
Paramagnetic oxygen measuring cell; no sensor wear									C		
Specification:											
• smallest adjustable measuring range: 0 ... 2%											
• largest adjustable measuring range: 0 ... 100%											
• repeatability: < 1% of smallest measuring range											
H_2S measurement											
Without H_2S sensor										A	
With H_2S sensor, 0 ... 5 ppm to 0 ... 50 ppm										D	

Selection and ordering data (continued)

Set BGA basic configuration, including flame arrestor	Article No. 7MB1955-										
	●	●	●	●	●	-	●	●	●	●	
Documentation											
German, 1 set (paper and CD)											0
English, 1 set (paper and CD)											1
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**

Options	Order code
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	• 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 Nl/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
Connection systems	Metric (6 mm) or imperial (1/4") selectable
Dimensions	
Set BGA measuring system (W × H × D)	600 × 781 × 600 mm
Sample preparation (W × H × D)	600 × 600 × 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
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_2S	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	• 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.