

COMBIMASS[®]

Technical Data
COMBIMASS[®] GA-s
Version 2013-01



BIOGAS ANALYZER STATION COMBIMASS® GA-s

For decades now, Binder has been supplying leading plant manufacturers with innovative systems for industrial gas flow measurement. In the last few years, the demand for reliable, precise and cost-effective measuring systems for biogas, sewage gas and landfill gas has increased significantly. Since the composition of these gases changes over time, the linking of flow measurement and gas analysis brings great advantages:

- Always providing the most precise quantity measurement, even in changing conditions
- Cost advantages by avoiding the doubling up of components
- Attractive additional functions by linking the data from both systems.

Modern biogas fermentation plants cannot meet commercial and environmental requirements without appropriate measuring and analysis technique. For the economical operation of the fermentation plant it is likewise necessary to consider the gas composition and quantity of the individual digester stages.

Gas analysis stations require a high technical expenditure, which settles in the long run also in the purchase price and in maintenance costs, to achieve long-term accuracy and reliability. If several gas analysis stations are used, not only the acquisition and maintenance costs will add up, but also measurement uncertainties, so that a trend is promptly recognizable hardly. If an analysis station must be returned for maintenance no current data during this time will be available for the control of the process and recognize trends of gas composition. While using Binder's portable analyzer in the COMBIMASS® GA-s Docking station, a spare unit can be supplied by Binder during maintenance and repair times.

While the gas composition (except during on and driving off phase) in liquid fermentation plants changes usually only very slowly over the day, the gas flow is subject to certain short term fluctuations, as they are caused for example by the agitator or different humidity content under variations in temperature. Therefore it is appropriate that at each digester a thermal mass flow meter is installed firmly and connected with the Docking station.

Regarding gas quality a current measurement per hour is completely sufficient. The individual measuring points at the digester can be connected using thin hoses with the Docking station, internal single solenoid valves switch between the measuring points and the PC in the station successively evaluates data. With our Docking Station COMBIMASS® GA-s an almost unlimited number of sample points can be analysed automatically.

In dry bed fermentation stages the measuring cycle must be if necessary adapted. Here not only the gas flow but also the gas composition change substantially more strongly. The methane concentration can from 15 to 70 Vol.-% vary. A combination of the measurement of volume with the gas analysis is inevitable, if the values are to exhibit an acceptable accuracy.

It presents itself in addition at landfills, to measure only at the generator the gas quality automatically and far distant sampling points/ boreholes at the different fields portable. For this the mobile analyzer can be taken out from the station, which keep running measurements of flow and corrected with the last gas analysis values. The data can be read out using an USB-cable and special Software.

A low-priced alternative represents the analyzer GA-e, which cannot be used contrary to the GA-m for portable measurements (without losing the advantage of the spare equipment during main-

tenance/ repair). The GA-e analyzes the methane content on IR basis only and computes the CO₂-part. Electro-chemical cells for oxygen and H₂S are available also for the GA-e unit.

SMART FEATURES

- Automatic analysis of up to 5 standard gas components
- Analyzer station with automatic sampling for max. 13 sampling points
- Strong biogas pump, easy field-replacable fine-filter
- Implementation of thermal dispersion gas flowmeter (m³/h at standard conditions) with automatic correction of flow based on actual gas composition possible as an option
- Implementation of humidity probes for calculation of dry gas flow possible as an option (humidity correction in waterdamp saturated gases can be done directly in the gas flowmeter)

APPLICATIONS VERSATILITY

- Methaneous gases from biogas fermentation plants (liquid as well as solid waste fermentation)
- Sewage gas from digester at wastewater treatment plants
- Landfill gas

TECHNICAL DATA DOCKING STATION GA-S

- Wall housing cabinet (free-standing installation as an *option* available): 400x400x200, IP22, 24 VDC, with SPC and 4,3" display module for the indoor-installation in a safe area (room shall be controlled separately)
- Admission for the analyzer, powerful sample pump and encapsulated solenoid valves for two sampling points, power supply of the analyzer
- All required valves, software extension etc. to connect a testgas bottle for calibration of the analyzer, without taking it out of the cabinet
- hard- and software for measuring function, flushing of the cells after the measurement
- external power supply box (*option* only), cabinet is operated with 24 VAC for safety reason
- Automatic correction of integrated gas flowmeter for actual gas composition and humidity (calculation of dry gas flow at standard conditions acc. DIN 1343)
- Automatic bolting device of the gas channels, if the analyzer was taken out
- Various alarm settings and transfer to the PLC possible as an *option*
- Multilingual menu guidance using touch screen or buttons
- Integration of LEL-room control with alarm to the PLC in case of leakage possible as an *option*
- Gas feed-back from analyzer into the gas pipe possible as an *option*

TECHNICAL DATA

No. of gas sampling points	2 (can be expanded as an <i>option</i> up to 13))
No. of analog input channels	4 (2 for flow and 2 for humidity signals, can be expanded as an <i>option</i> up to 2x13 signals total)
Size of the cabinet	400 x 400 x 200 (Standard cabinet up to 5 gas sampling points, if more required the cabinet will become bigger)
Installation place	Indoors, room controlled and ventilated by separate means <i>Option:</i> fully climatized and ventilated cabinet IP54 for outdoor installation, incl. internal LEL-control and alarm, special versions for sea and desert climate are available too
Ambient temperature	+5 to +40°C, humidity < 80% rel., non corrosive
Gas quality	+5 to +40°C, 10-90% rel. humidity
Protection class	IP22
Weight	Basic version 13,7 kg (without GA-e/GA-m) Max. version 14,5 kg (with all gas channels, 5 gas sampling points, without GA-e/GA-m)
Operation voltage	24 VDC <i>Option:</i> 230 VAC ±10%, 50 Hz (with external power supply box)
Power consumption	50 W/h for the analyzer cabinet only Power consumption for outdoor installation depends on specific equipment
Data storage (<i>option</i>)	On a USB-stick (daily, weekly or monthly file storage)
Data transfer (<i>option</i>)	Ethernet Modbus TCP Modbus RTU (RS 485) Profibus DP Analogsignal 4-20 mA with moduls 4x 4-20 mA Module 1: CH ₄ , O ₂ , H ₂ S, actual gas flow Module 2: CO ₂ , Gas 5, Gas 6, Gas 7 Module 3: actual power, gas temperature, water contents, specific calorific value
Telecommunication	<i>Option:</i> using a direct wire connection, a safe Internet-connection or GSM/GPRS
Power gas pump	500 ml/min (during sampling)
Gas pre-treatment	Fine filter Depending on the application, if necessary (<i>option</i> only): Coalescence filter with housing for water, pressure controller, flaming arrestor
Size of pipe connection	∅ 6 mm / ∅ 4 mm (1 mm wall thickness)

TYPICAL ACCURACIES

Gas	Operation Range	Typical Accuracy ¹⁾	Typical T ₉₀ -Time/ Typical Measuring Time
Methane (CH ₄)	0 - 100 Vol.-%	0,2 Vol.-% @ 5 Vol.-% 1 Vol.-% @ 50 Vol.-% 2 Vol.-% @ 100 Vol.-%	50 s 120 s
Carbon dioxide (CO ₂)	0 - 100 Vol.-%	0,1 Vol.-% @ 10 Vol.-% 1 Vol.-% @ 50 Vol.-% 2 Vol.-% @ 100 Vol.-%	40 s 120 s
Oxygen (O ₂)	0 - 25 Vol.-%	0,5 Vol.-%	40 s 120 s
H ₂ S	0 - 200 / 2,000 ppm 0-5,000/ 10,000 ppm	1 % @ 10 % of full scale 3 % @ 100 % of full scale	60 s 120 s
H ₂	0 – 1,000 ppm	3 % of full scale	30 s 90 s
¹⁾ at delivery respectively after recalibration			

IMPRESSUM

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