

COMBIMASS[®]

Technical Data

COMBIMASS[®] GA-m / GA-e

Version 2013-05



PORTABLE GAS ANALYZER COMBIMASS® GA-m/ GA-e

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.

The new series of extremely robust, maintenance-poor and efficient portable measuring instruments COMBIMASS® GA-m series represents a milestone in the development of mobile gas analyzers. All common requirements of the analysis of fermentation gas, sewer gas and dump gas from landfills are optimally fulfilled.

Due to easy to service structure, with modules plug-in and user replaceable battery packs, the systems can be extended at any time and upgraded to the newest technology. The powerful internal gas pump makes also measurements in gases with negative pressure possible without any problem. Depending on operation ranges of gases and ambient requirements, the analyzer can be supplied also with ATEX approval for zone 1 and 2 (Ex ib IIB T1).

The data can be stored measuring sampling point-referred and can be read out to the PC. The internal data logger is very efficient.

Servicing contracts with supply of spare devices ensure an availability of 365 days in the year.

For reliable and cost-effective operation, modern gas engines in biogas, sewage gas and landfill gas plants need a minimum gas quality, the monitoring and recording of which is usually demanded by the engine manufacturer and the plant's insurance. The monitoring of engine efficiency gives early warning of damage and helps to minimize it. Taking current gas consumption and gas generation into account permits optimized performance control.

Binder offers the perfect solution for these tasks: a precise portable thermal dispersion mass flow meter combined with the portable biogas analyzer. Deviations of measured values due to changing gas composition, humidity, pressure and temperature are compensated automatically, data will be shown on the display, can get stored and transferred to the PC.

The portable instrument can be put into the COMBIMASS® Docking station GA-s as a "2-in-1-solution" to expand it to an automatic, stationary analysis station with firm measuring program and many auxiliary options like integrated temperature, mass of gas and pressure measurement (for correction of gas flow by humidity and actual gas composition) as well as transmission of the data to the local PLC. A special economical instrument GA-e is available to analyse CH₄, O₂ and H₂S only. It can be used in the analyser cabinet only and doesn't contain a battery and gas pump.

SMART FEATURES

- up to 7 gas analysis channels in an explosion-proof portable instrument

- optical infra-red analyser with temperature compensation
- powerful internal sampling pump
- user replaceable sample micro-filter
- field replaceable/rechargeable battery pack
- up to 5 electro-chemical sensors plug-in expandable
- optional biogas mass flow measurement in Nm³/h with optional insertion sensor (incl. flow correction based on actual gas composition)
- optional portable temperature probe available
- static pressure measurement as an option available

APPLICATIONS VERSATILITY

- Methaneous gases from biogas fermentation plants (liquid as well as biowaste fermentation)
- Sewage gas from digester at wastewater treatment plants
- Landfill gas
- Special instruments for exhaust gases, finding of hidden people in container or lorries etc. can be supplied (see overview instruments with available gas sensors)

TECHNICAL DATA BIOGAS ANALYZER GA-m

ATEX classification	EEx ib IIB T1 (Zone 1, 2)
Ambient temperature	+5 to +40°C
Gas quality	+5 to +40°C, 10-90% rel. humidity
Protection class	IP54
Capacity gas pump	400 ml/min
Size / weight	approx. 200 x 100 x 60mm / 750g (depends on No. of gas cells)
Infrared CH ₄ analysis	0-100%
Infrared CO ₂ analysis	0-10,000 ppm (1%) / 0-10% / 0-100%
Electrochemical O ₂ analysis	0-25%
Electrochemical H ₂ S analysis ¹⁾	0-200 ppm / 0-2,000 ppm / 0-5,000 ppm / 0-10,000 ppm
Customized gas modules ¹⁾	possible, f.e. H ₂ 0-1,000 ppm, CO 0-1,000 or 0-2,000 ppm
Recalibration	with testgas 1-2x per year (depends on frequency of use)
Gas flow at standard conditions (compensated by pressure and temperature)	0.25-25.0 Nm ³ /s 0 -12,000 Nm ³ /hr, depends on pipe size (max. DN400)
Operation range of the temperature probe	-10 to 100°C
Operation range static pressure measurement	- 400 to + 400 mbar

Operation time of the battery	10 hours typical / loading cycle
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TECHNICAL DATA

Loading time battery	2 to 4 hours
Data logging	Up to 2.000 set of data, can be stored relative to specific sampling points
Communication / data transfer	With USB-cable and software data can be read out and stored as an EXCEL-sheet
Stationary use	With COMBIMASS® Docking station GA-s as an option

¹⁾ customized operation ranges can be supplied

OVERVIEW INSTRUMENTS

Gas	Operation range	GA-m1-IR	GA-m1-IR	GA-m1-EC	GA-m1-EC	GA-m2-mix	GA-m3-mix	GA-m4-mix	GA-m5-mix	GA-e ¹⁾
		only 1 IR	only 1 IR	only1 EC	Only 1 EC	1 IR + 1 EC	1 IR + 2 EC	1 IR + 3 - 5 EC	2 IR + 3 - 5 EC	1 IR + 2 EC
		ATEX	-	-	ATEX	-	-	ATEX	ATEX	ATEX
CO ₂	0-10,000 ppm		x			x	x			
	0-10%		x			x	x			
	0-100%	x						x	x	
CH ₄	0-100%	x						x	x	x
O ₂	0-25%			x	x	x	x	x	x	x
CO	0-1,000 ppm			x	x	x	x	x	x	
	0-2,000 ppm			x	x	x	x	x	x	
H ₂ S	0-200 ppm			x	x	x	x	x	x	x
	0-2,000 ppm				x			x	x	x
	0-5,000 ppm				x			x	x	x
	0-10,000 ppm				x			x	x	x
H ₂	0-1,000 ppm			x	x	x	x	x	x	
SO ₂	0-20 ppm				x			x		
	0-100 ppm			x	x	x	x	x		
NO	0-250 ppm			x	x	x	x	x		
NO ₂	0-20 ppm			x	x	x	x	x		
NH ₃	0-1,000 ppm			x	x	x	x	x	x	

IR ... gas analyzed by infrared technology

EC ... gas analyzed by electrochemical means

- ¹⁾ The GA-e is a special instrument for biogas application, which can be used in the analyzer station GA-s only. It doesn't contain a battery and a pump. It is fixed for 3 gases CH₄, O₂ and H₂S. Only the operation range of the H₂S-cell is flexible.

TYPICAL ACCURACIES GA-m/ GA-e

Gas	Operation Range	Typical Accuracy ¹⁾	Typical T ₉₀ -Time/ Typical Measuring Time
Methane (CH ₄)	0 to 100 Vol.-%	0,2 Vol.-% @ 5 Vol.-% 1 Vol.-% @ 50 Vol.-% 2 Vol.-% @ 100 Vol.-%	50 s 120 s
Carbon dioxide (CO ₂)	0 to 100 Vol.-%	0,1 Vol.-% @ 10 Vol.-% 1 Vol.-% @ 50 Vol.-% 2 Vol.-% @ 100 Vol.-%	40 s 120 s
Oxygen (O ₂)	0 to 25 Vol.-%	0,5 Vol.-%	40 s 120 s
H ₂ S	0 to 200 / 2,000 ppm 0 to 5,000/ 10,000 ppm	1 % @ 10 % of full scale 3 % @ 100 % of full scale	60 s 120 s
H ₂	0 to 1,000 ppm	3 % of full scale	30 s 90 s
NH ₃ ²⁾	0 to 1,000 ppm	1 % @ 10% of full scale 3 % @ 100% of full scale	90 s 180 s
CO	0 to 1,000 / 2,000 ppm	3 % of full scale	30 s 90 s

¹⁾ at delivery respectively after recalibration

²⁾ specific conditions of use must be discussed with Binder

Further options and probes for GA-m series

Property	Operation Range	Typical Accuracy	Resolution
Temperature	0 to 100°C	0.5°C	0.1 °C
Gas Flow	0 to 12,000 ¹⁾ Nm ³ /hr	2 % of actual reading	0.1 Nm ³ /hr
Gas Velocity	0.25 to 25 Nm/s	2 % of actual reading	0.01 Nm/s
Pressure	- 400 to 400 mbar	2 % of full scale	1 mbar

¹⁾ Depending on the nominal width of the pipe (max. 400 mm)

Standard Accessories for GA-m series

battery charger, carry case, sample pipe, manual, calibration certificate

Options: car-charger, temperature probe, portable flow meter, pressure measurement

IMPRESSUM

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