# COMBIMASS®

Technical Data

COMBIMASS® GA-s Click!

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BINDER
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# GAS ANALYZER STATION COMBIMASS® GA-s Click!

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 modular analyzer system COMBIMASS® GA-s Click!, the operator can replace himself easy all different kind of modules for gases, valves and pumps. Old modules can be sent to Binder for refurbishment.

To increase the accuracy of the $H_2S$-analysis, the gas can be feed over several gas modules with different operation ranges.

Actual accuracy can be checked automatically by using the Auto-Calibration Check, to give the operator an indication about required recalibration of gas modules. Auto-Calibration Function will recalibrate the gas modules automatically.

Data can be transferred to the PLC using standard communications or can be stored on a web-server. So customer can access the data worldwide. Alarms can be transferred web-based via e-mail or short messages on the portable phone.

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 Analyzer 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 Analyzer station GA-s Click!, internal single solenoid valves switch between the measuring points and the PC in the station successively evaluates data. With our COMBIMASS® GA-s Click! System an almost unlimited number of sample points can be analysed automatically. The sampling sequency is flexible and can differ between the sampling points

In dry bed fermentation stages the measuring cycle must be if necessary adapted. Here not only the gas flow but also the gas composition changes 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.

# SMART FEATURES

- Automatic analysis of up to 7 standard gas components
- Analyzer station with automatic sampling for max. 10 sampling points
- All components are mounted in modules and fixed on DIN-rails in the cabinet
- Strong biogas pump, easy field-replacable fine-filter
- Flexible measuring sequences for single sampling points and splitting of the gas way possible
- Implementation of thermals dispersion gas flowmeter ($m^3/h$ at standard conditions) with automatic correction of flow based on actual gas composition possible as an option
- Implementation of gas temperature probes for calculation of dry gas flow possible as an option

# 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 ANALYZER STATION GA-s Click!

- Wall housing cabinet with SPC and display module for the indoor-installation in a safe area
- DIN-rails for admission of the various modules (gas, valve, pump,..)
- hard- and software for measuring function, flushing of the cells and connection hoses/pipes (“sample-and-purge”) after each measurement
- external power supply box, cabinet is operated with 24 VAC for safety reason
- setting of different limits for gas compositions, which will lead to an alarm
- flexible sampling sequence for the different sampling points and splitting of the gas way possible to increase accuracy of analysis
- Multilingual menu guidance

| | |
|---|---|
| No. of sampling points | 1 (expandable up to 10) |
| Size of the cabinet | 800 x 600 x 300 |

## TECHNISCHE DATEN

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|---|---|
| Installation place | Indoors, room controlled and ventilated by separate means<br>*Option:* fully climatized and ventilated cabinet IP54 for outdoor installation, incl. internal LEL-control and alarm |
| Ambient temperature | +5 to +40°C, humidity < 80% rel., non corrosive |
| Gas quality | +5 to +40°C, 10-90% rel. humidity |
| Protection class | IP 22 |
| Weight | appprox. 30,0 kg standard version biogas |
| Operation voltage | 230 VAC ±10%, 50 Hz (for the power supply box)<br>24 VDC (for the cabinet only) |
| Power consumption | Depends on the design of the cabinet |
| Recalibration | Using test gas channel input (*option* only) by user<br>Auto-Calibration Check / Auto-Calibration Function |
| Data transfer *(option)* | Ethernet Modbus TCP<br>Modbus RTU (RS 485)<br>Profibus DP<br>analog signal 4-20 mA and others on request |
| Power gas pump | 500 ml/min (during sampling, but only a small part is used for analyses) |
| Gas pre-treatment | Fine filter in the gas sampling box and directly under the cabinet<br>*Option*: pressure controller |
| Size of pipe connection | Ø 6 mm / Ø 4 mm (1 mm wall thickness) |

# TYPICAL ACCURACIES

| GAS | OPERATION RANGE | TYPICAL ACCURACY[1)] | TYPICAL $T_{90}$-TIME/ TYPICAL SAMPLING TIME |
|---|---|---|---|
| Methane ($CH_4$) | 0 - 100 Vol.- % | 1,5 Vol.-% @ 50 Vol.-%<br>3 Vol.-% @ 70 Vol.-%<br>3 Vol.-% @ 100 Vol.-% | 20 s<br>90- 120 s |
| Carbon dioxyde ($CO_2$) | 0 - 100 Vol.-% | 0,3 Vol.-% @ 5 Vol.-%<br>3 Vol.-% @ 40 Vol.-%<br>3 Vol.-% @ 100 Vol.-% | 20 s<br>60 – 90 s |
| Oxygen ($O_2$) | 0 - 25 Vol.-% | 0,5 Vol.-% @ | 60 s<br>90 - 120 s |
| Hydrogen sulphide ($H_2S$) | 0 – 10.000 ppm | 250 ppm @ 5.000 ppm<br>500 ppm @ 10.000 ppm | 120 s<br>120 - 180 s |
| Hydrogen sulphide ($H_2S$) | 0 – 5.000 ppm | 45 ppm @ 1.500 ppm<br>250 ppm @ 5.000 ppm | 90 s<br>90 – 120 s |
| Hydrogen sulphide ($H_2S$) | 0 – 2.000 ppm | 45 ppm @ 1.500 ppm | 90 s<br>90 – 120 s |
| Hydrogen sulphide ($H_2S$) | 0 – 500 ppm | 25 ppm @ 500 ppm | 90 s<br>90 – 120 s |
| Hydrogen sulphide ($H_2S$) | 0 – 200 ppm | 10 ppm @ 200 ppm | 60 s<br>60 - 90 s |
| Hydrogen sulphide ($H_2S$) | 0 – 100 ppm | 5 ppm @ 100 ppm | 60 s<br>60 - 90 s |
| Hydrogen sulphide ($H_2S$) | 0 – 50 ppm | 2 ppm @ 50 ppm | 60 s<br>60 – 90 s |
| Hydrogen ($H_2$) | 0 – 1.000 ppm | 50 ppm @ 1.000 ppm | 30 s<br>90 s |
| Hydrogen ($H_2$) | 0 – 30 Vol.-% | 1 Vol.-% @ 100% of full scale | 20 s<br>60-90 s |
| Carbon monoxide (CO) | 0 – 1.000 ppm | 50 ppm @ 1.000 ppm | 60 s<br>90 – 120 s |
| Carbon monoxide (CO) | 0 – 30 Vol.-% | 1 Vol.-% @ 100% of full scale | 20 s<br>60-90 s |
| Ammonia ($NH_3$) [2)] | 0 – 1.000 ppm | 100 ppm @ 1.000 ppm | 90 s<br>90 – 120 s |

[1)] at delivery or after recalibration
[2)] use only under specific conditions which require confirmation by Binder

IMPRESSUM

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