

»The RITTER Fermalyzer«
Measurement & Analysis of Biogas in One Go



*"Worldwide -
with the precision
of the original!"*

THE FERMALYZER

BIOGAS BATCH FERMENTATION + MULTIGAS ANALYSIS

Biogas Batch Fermentation

- › 9 or 18 fermentation bottles (0.5/1/2 ltr)
- › Gas volume measurement by 9 or 18 MilliGascounters
- › Automated data acquisition of gas volume and flow rate

MultiGas Analysis

- › Analysis of CH₄ & CO₂ from up to 18 gas sources
- › Temperature & pressure compensation
- › Automated data acquisition in real time



**Simultaneous
gas analysis
of CH₄ and CO₂
by up to
18 IR sensors**

www.ritter.de/en/the-fermalyzer

Biogas batch fermentation system with automatic gas analysis for laboratory use

IN
REAL
TIME

Ritter
Made in Germany

Biogas is a renewable energy source that is obtained by fermenting organic material. A clever system for optimizing the biogas process is the so-called RITTER Biogas Batch Fermentation System. With the option of integrating an automatic RITTER "MultiGas" analysis in the same cycle and even in real time, another important component for effective biogas research is elegantly integrated. We call it: »The FermAlyzer«

Biogas Batch Fermentation

The great advantage of the RITTER Biogas Batch Fermentation System is that the fermentation bottles are tempered on all sides in the well known and self-engineered RITTER heating oven. In contrast to the temperature control of the fermentation bottles in a water bath, this prevents uncontrolled cooling of the upper part of the bottle due to ambient air and air currents.

Furthermore, the RITTER PMMA Fermentation Bottles (0.5/1/2 ltr) can be easily removed from the top of the heating oven for brief visual inspections, even during fermentation. Three different stirring blades are available to achieve optimum adaptation to the viscosity of the fermentation substrate.

With the maximum of 18 RITTER PMMA Fermentation Bottles, 3 blank samples, 3 cellulose samples and 4 different fermentation substrates can be tested simultaneously as triplets.

The software supplied enables:

- ▶ Recording and standardization of volume and flow rate of up to 18 MilliGascounters in real time
- ▶ Data storage in the PC and on an SD card in the interface module »SIM« for data recovery in the event of a power failure
- ▶ Control of the stirrers (speed, interval mode)
- ▶ Setting the temperature of the heating oven (thermostatted)
- ▶ The rack made of aluminum profiles and stainless-steel shelves offers space for up to 18 MilliGascounters and up to 18 optional CO₂ absorption bottles.

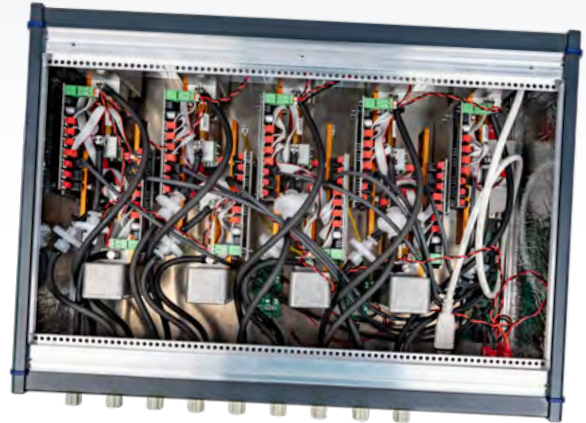
MultiGas Analysis

Methane and carbon dioxide gas concentrations are measured using the precise and proven RITTER »MultiGas« Infrared Modules NDIR (non-dispersive IR sensor). As the concentrations can reach values of over 50% by volume, the respective measuring ranges have been designed for the range from 0 to 100% by volume.

Both gas concentrations of CO₂ and CH₄ are determined using the NDIR method. This method is based on the selective absorption of infrared radiation by the different gas molecules.

RITTER »MultiGas« NDIR Modules use a multi-channel detector with which both gases can be detected simultaneously in just one sample cell. This has the advantage that both gas concentrations are measured at the same time.

The parallel measurement eliminates time shifts that inevitably occur when switching individual fermentation vessels, for example. Furthermore, continuous measurement results are obtained, which contribute to a more precise analysis of the fermentation process.

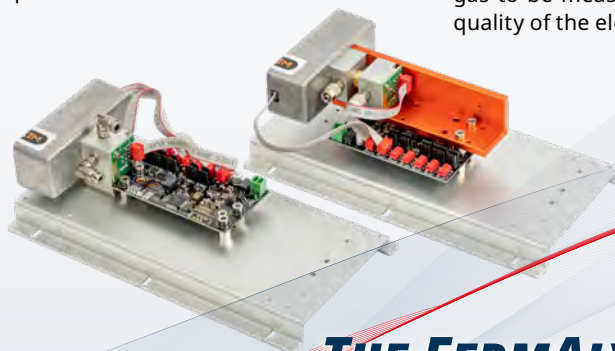


RITTER »MultiGas« NDIR Modules have a very high measuring accuracy of 1%. To achieve this, the following measuring errors are compensated electronically:

- ▶ Temperature compensation between 5°C and 45°C
- ▶ Air pressure compensation between 600hPa and 1200hPa
- ▶ Carrier gas dependency between CO₂ and CH₄
- ▶ High long-term stability with a reference measurement

By using a gold-plated measurement cuvette, changes in the reflection properties can also be effectively prevented so that the long-term stability can be significantly improved.

The measured temperature and pressure values required for compensation are recorded directly in the measurement cuvette using microsensors. This provides the exact physical data of the gas to be measured and improves the quality of the electronic compensation.



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