Product Data

1313 Fermentation Monitor

USES:

- ❍ Fermentation production control
- ❍ Fermentation process control
- ❍ Fermentation process development
- ❍ Fermentation laboratory process screening

FEATURES:

- ❍ Stability – long intervals between calibrations
- ❍ Low running costs
- ❍ Negligible maintenance costs
- ❍ Stand-alone operation
- ❍ Fast response time
- ❍ Wide dynamic range
- ❍ 19-inch rack mounting case
- ❍ 4 – 20 mA galvanic isolated analogue output
- ❍ PC software for calibration, set up and measurement via an RS – 232 socket
- ❍ Integrated control of multiplexer

Introduction

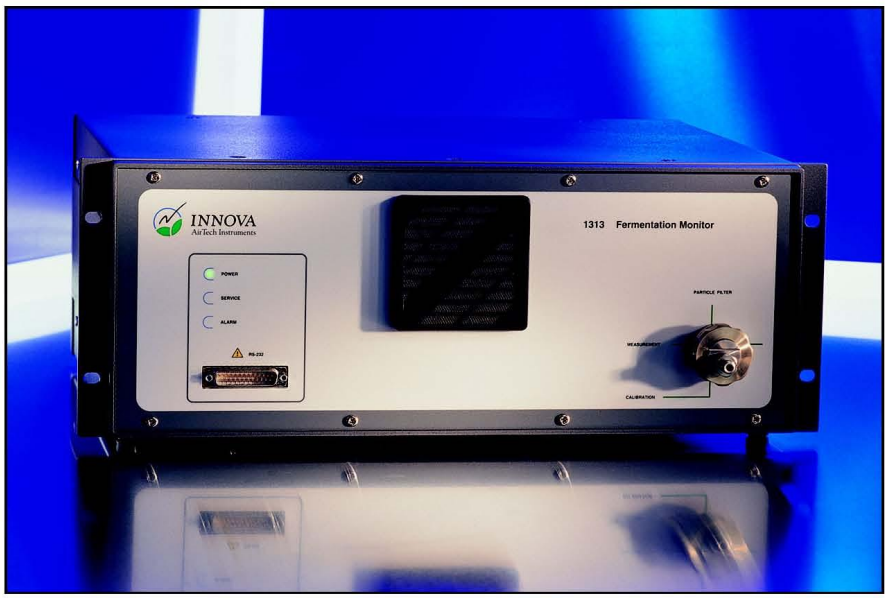
The 1313 Fermentation Monitor is designed for monitoring fermentation processes. The 1313 simultaneously measures the concentrations of oxygen, carbon dioxide and hydrocarbons, such as ethanol, methanol and methane. It can be integrated into permanent monitoring systems together with up to 3 multiplexers, enabling samples to be drawn from up to 36 sampling points to provide fast and accurate measurement results, even over wide concentration ranges.

The 1313 provides a low cost, quality solution. The instrument doesn't demand highly skilled operators and the acoustic measurement principle ensures that calibrations are only required every 6 to 12 months.

The PC software supplied with the monitor provides a user-friendly way to set up and calibrate the monitor prior to making measurements, and displays real-time measurement data graphically while measurements are being made.

Measuring

Measurement samples can be drawn from separate sample points in the process line and delivered to the monitor via a 1309 Multipoint Sampler and tubing. The sample flow rate to the monitor is 130 ml/minute. As the length of the tubing increases, so does the system's response time.



Measurement Methods

Two acoustic-based measurement methods are employed in the monitor: *photoacoustic spectroscopy* to measure the hydrocarbon and carbon dioxide concentrations and *magnetoacoustic spectroscopy* to provide oxygen concentrations.

The same microphone is used as a transducer for both measurement methods, providing a true real-time relationship between the measurements.

These measurement methods only require small quantities of sample gas, providing results for all three gases in approximately a second.

Calibration and Maintenance

Even though recalibration is only required every 6 to 12 months, it is easily achieved, *in situ*, using the easy-access RS – 232 socket and gas inlet on the front panel.

In addition to this, the monitor contains no consumable parts, thus keeping down time and maintenance costs to a minimum.

PC Software — BZ 6003

The dedicated PC software provides user-friendly procedures to set up and calibrate the monitor prior to measuring, displays measurement data as coloured graphics, and stores data on the PC's disk while measurements are being made.

Process Control Computer

The 1313 Fermentation Monitor can be integrated into a process system.

Using an RS–232 serial link, the process computer is connected to the PC running the BZ6003 PC Software (see Fig. 1). This provides access to the control and data registers within the 1313. The monitor's measurement parameters can be setup from the process computer and real-time measurement data received directly into the process computer. This is advantageous, as fine tuning of the processes can be automated.

Integration of the monitor into the process systems is made easy by the monitor being able to communicate with the process computer with either the COMLI or OPTOMUX standard protocols.

Measurement Results

The monitor has both an analogue and a digital interface. The analogue interface provides 0–24 mA signals, which are suitable for connection to most process control computers or chart recorders. The digital output interfaces with the PC, and can provide measurement data for the graphics display and for storage.

Measurement data can be transferred using either of the interfaces, depending on which method best suits the systems requirements.

Multiplexing

The Fermentation Monitor can be connected to up to three 12-channel 1309 Multipoint Samplers. This enables a single 1313 to monitor 36 fermentors, concurrently. The dedicated PC software is capable of reporting these results either on screen or through the digital output channels.

Application

The 1313 Fermentation Monitor may be used in the monitoring and control of all scales of fermentation - from laboratory scale pilots to full-scale production plants.

The monitor only requires small quantities of gas, which makes it suitable for small fermentors. This, together with Innova AirTech Instruments ability to provide complete solutions, including rack mountings, tubing and filters, enables the monitor to be used in any scale of process plant.

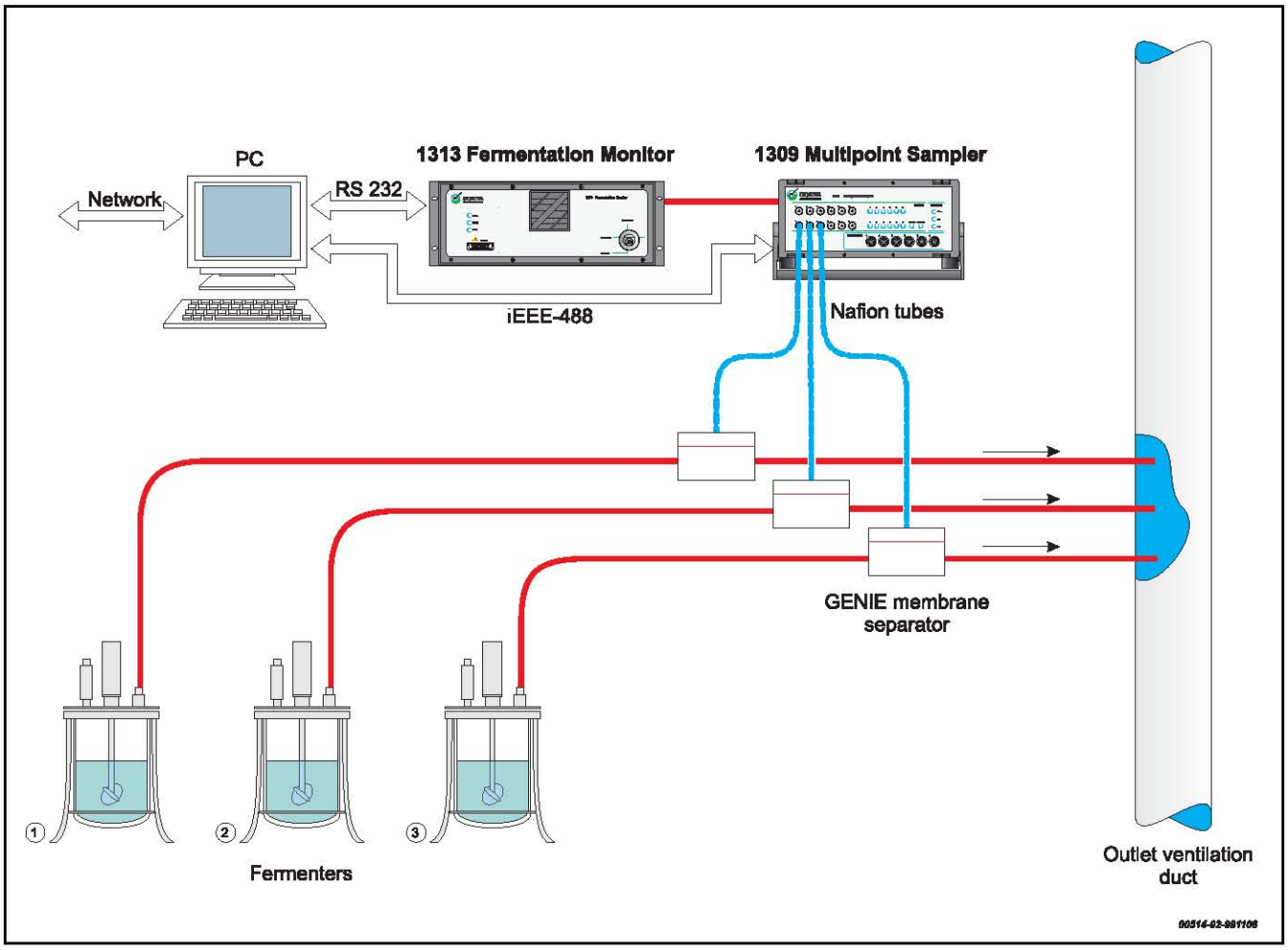


Fig. 1 A typical setup to integrate the 1313 Fermentation Monitor together with the Process Control Computer.

Specifications 1313 (Tentative)

WARNING! *This monitor is not Ex-safe. The 1313 must not be placed in areas with flammable gases/vapours in explosive concentrations, or be used to monitor explosive concentrations of these e.g. 10% methane must not be measured, but gases containing hydrocarbons equivalent to 10% methane can be measured. Also, monitoring of certain aggressive gases, or a very high concentration of water vapour, could damage the monitor. Ask your local INNOVA representative for further information.*

MONITORS:
Gases: Hydrocarbons, O_2 and CO_2

MEASUREMENT TECHNIQUES:
CO_2 & Hydrocarbons: photoacoustic infra-red spectroscopy
O_2: magnetoacoustic spectroscopy

GAS MONITORING:
Sample Flow Rate: 130 ml/min.
O_2 Reference Flow Rate: 35 ml/min.

OUTPUTS:
Digital: Conforms with the EIA standard RS–232 (equivalent to CCITT V.24)
Connector: 25-pin D-range male
Analogue: 0–24 mA user-definable outputs
D/A converter 16 bits
Common mode isolation voltage: 1500 V RMS
Relay: Two separate relays; for high and low alarms of measured gases
Isolation Voltage: max 25 V AC/DC between relay output and ground
Max. load: 25 V AC/DC, 100 mA

ENVIRONMENTAL LIMITS:
Barometric Pressure Range: 700 to 1100 mBar

WARM-UP TIME:
30 min. for full specifications

DIMENSIONS:
Height: 175 mm (6.9 ins)
Width: 484 mm (19 ins)
Depth: 375 mm (14.7 ins)
Weight: approx. 11 kg (24.2 lbs)

POWER SUPPLY:
Voltage: 85 – 264 V AC
Frequency: 47.5 – 63 Hz
Power Consumption: 70 – 100 VA
Complies with Safety Class I of IEC Publication 536

COMPUTER REQUIREMENTS:
IBM® PC (minimum 80286 processor) or compatible
DOS 3.2 or better
EGA graphics adaptor or better
One serial port minimum

COMPLIANCE WITH STANDARDS:

CE	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive.
Safety	EN 61010–1 (1993) & IEC 1010–1 (1990): Safety requirements for electrical equipment for measurement, control and laboratory use.
EMC Emission	EN 50081–1 (1992): Generic emission standard. Part 1: Residential, commercial and light industry. EN 50081–2 (1993): Generic emission standard. Part 2: Industrial environment. CISPR 22 (1993): Limits and methods of radio disturbance characteristics of information technology equipment. Class B Limits. FCC Class B limits.
EMC Immunity	EN 50082–1 (1992): Generic immunity standard. Part 1: Residential, commercial and light industry. EN 50082–2 (1995): Generic immunity standard. Part 2: Industrial environment. **Note:** The above is guaranteed using accessories listed in this Product Data sheet only.
Temperature	IEC 68–2–1 & IEC 68–2–2: Environmental Testing. Cold and Dry Heat. Operating Temperature: +10 to +40°C (+50 to +104°F) Storage Temperature: –25 to +70°C (–13 to +158°F)
Humidity	IEC 68–2–3: 90% RH (non-condensing at 40°C)
Enclosure	IEC 529: IP 20
Mechanical	IEC 68–2–6: Vibration: 0.3 mm, 20 m/s^2, 10–500 Hz IEC 68–2–27: Shock: 750 m/s^2 IEC 68–2–29: Bump: 1000 bumps at 250 m/s^2

Ordering Information

1313	Fermentation Monitor

Includes the following accessories

BZ 6003	PC Software
BZ 5170	Test and Service program for 1313
Mains cable	
Reference Manual	
User Guide	

Further Information

An RS–232 cable is required to connect the monitor to your PC. This can be ordered separately, made-up to suit your needs (cable length and connections).

For information about your specific applications and accessories, please consult your *INNOVA* representative.

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