LUMASENSE™ TECHNOLOGIES

Fermentation Monitor – INNOVA 1313

Uses:

- Production control
- Process control
- Process development
- Laboratory process screening

Features:

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

Introduction

The Fermentation Monitor – INNOVA 1313 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 three 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 does not demand highly skilled operators and the acoustic measurement principle ensures that calibrations are only required every six to twelve 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 Multipoint Sampler – INNOVA 1309 and tubing. The sample flow rate to the monitor is 130 ml/minute.

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 through recalibration is only required every six to twelve months, it is easily

Fermentation Monitor – INNOVA 1313

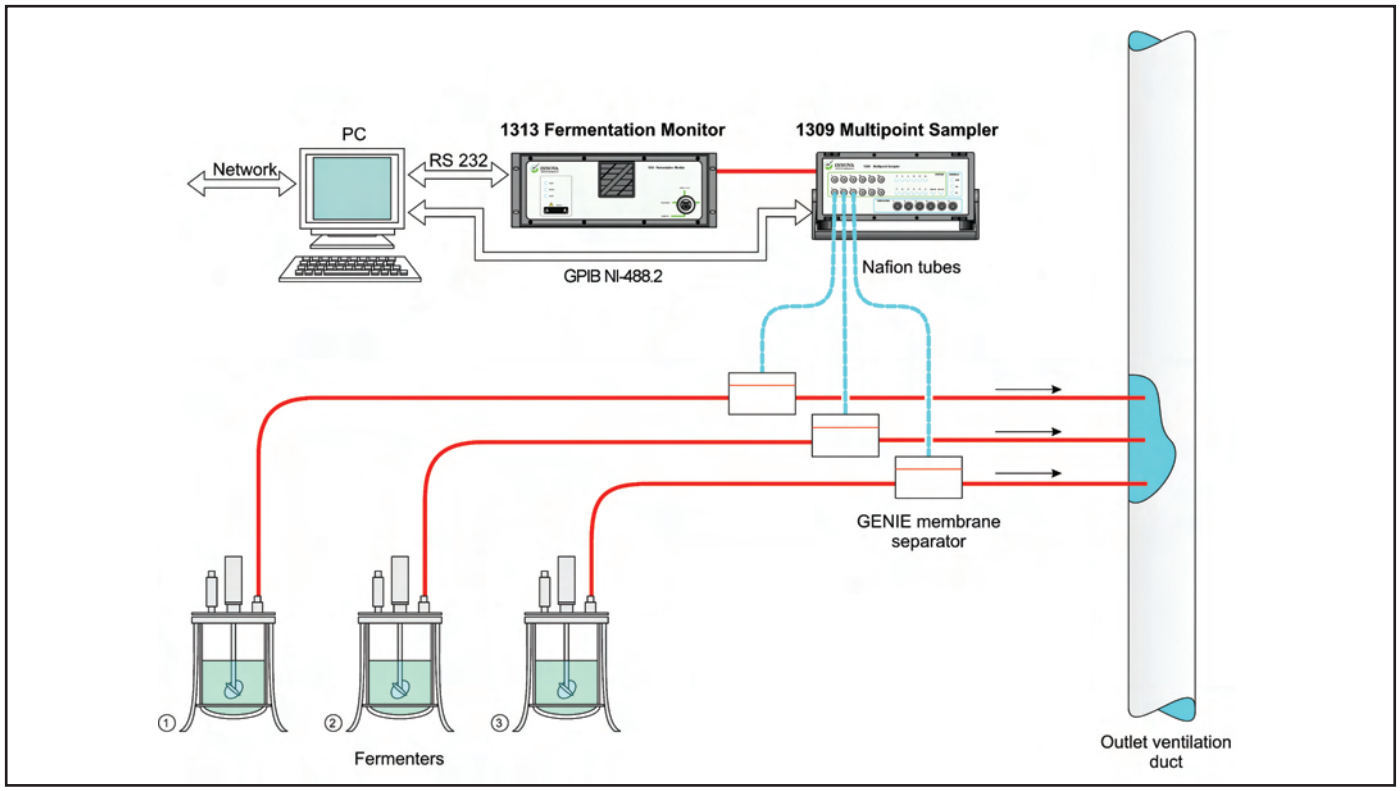


Fig. 1 A typical set-up to integrate the Fermentation Monitor – INNOVA 1313 together with the Process Control Computer.

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 – BZ6009

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

Process Control Computer

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

Using an RS–232 serial link, the process computer is connected to the PC running the BZ6009 PC Software (see Fig. 1). This provides access to the control and data registers within the 1313. The monitor's measurement parameters can be set-up 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. The digital output interfaces with the PC software BZ6009.

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 units Multipoint Sampler – INNOVA 1309. 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 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 LumaSense Technologies' ability to provide complete solutions, including rack mountings, tubing and filters, enables the monitor to be used in any scale of process plant.

Specifications – INNOVA 1313

WARNING!
This is not Ex-safe. The 1313 must not be placed in areas with flammable gases/ vapors 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 vapor, could damage the monitor. Ask your local LumaSense Technologies 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

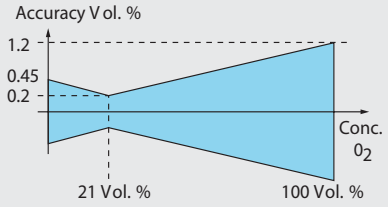
REFERENCE CONDITIONS:
The detection limits and accuracies given below apply in vibration free environments, and in the following reference conditions 101.3 kPa, 60% RH, 20°C, ambient O_2 is 20.66% (20.95% when referred to dry conditions) and ambient CO_2 400 ppm

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

HYDROCARBONS (ref. Methane):
Range: 0 to 10 vol%
Detection Limit (2 x RMS noise):
20 ppm (1 s response time)
Accuracy: better than ±(0.004 vol% + 3% of reading) from 0 to 3 vol%
Gain Drift: ±2% fs/30days

CARBON DIOXIDE:
Range: 0 to 10 vol%
Detection Limit: 200 ppm (1s response time)
Accuracy: ±(0.10 vol% + 3% of reading)
Gain Drift: ± 2% fs/30 days

OXYGEN:
Range: 0 to 100 vol%
Gain Drift: ± 2% fs/30days
Accuracy:



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: 25V AC/DC, 100 mV

ENVIRONMENT LIMITS:
Barometric Pressure Range: 700 to 1100 mBar

WARM-UP TIME:
30 min. for full specifications

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

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

COMPUTER REQUIREMENTS:

PC (MINIMUM) Pentium 4 processor or compatible, 512 MB RAM CD-ROM drive

Windows XP with service pack 2

VGA color graphics adapter output

At least one serial (RS-232) or USB port using RS-232 to USB converter

IEEE interface card from National Instruments GRIB NI-488.2 (if operated with a *Multipoint Sampler – INNOVA 1309).*

CE	**COMPLIANCE WITH STANDARDS:** 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) (+104°F)
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: 750m/s^2 **IEC 68-2-29:** Bump: 1000 bumps at 250 m/s^2

Ordering Information – INNOVA 1313

Fermentation Monitor – INNOVA 1313
Includes the following accessories:

- BZ 6009 PC software
- BZ 5170 Test and service program for 1313
- Main Cable
- Reference Manual
- User Guide

Optional Accessory

- RS-232 to USB converter JV 0901
- Multipoint Sampler – INNOVA 1309

Further Information:

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

For information about specific applications and accessories, consult your LumaSense Technologies representative.

LumaSense Technologies reserves the right to change specifications and accessories without notice.

LUMASENSE™ TECHNOLOGIES

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