GASERA

Multi-Gas Analyzer: F10

Reliable gas monitoring with cantilever enhanced photoacoustic technology

F10
GAS ANALYZER

F10 Concept

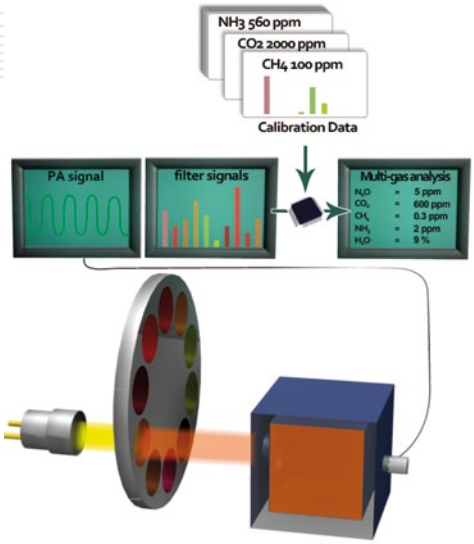
The F10 is based on photoacoustic infrared technology. It has pulsed IR source and 10 distinct spectral bands in the mid-IR region defined by narrow band-pass optical filters.

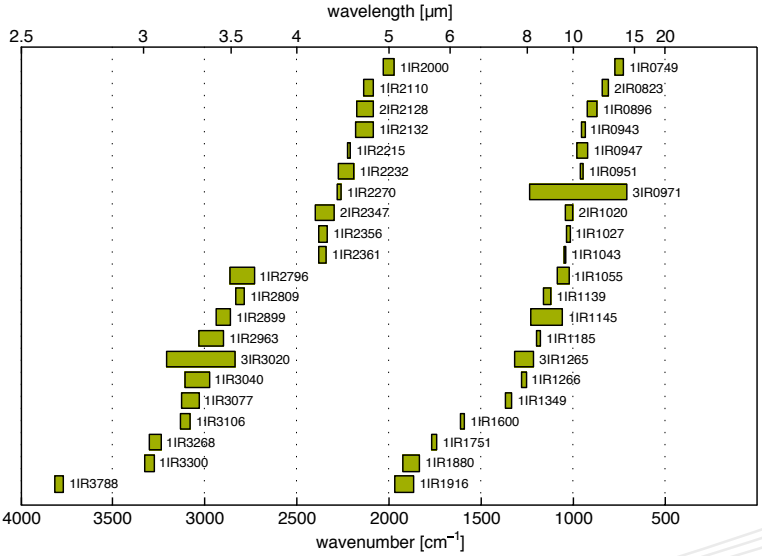
Mechanical chopper is not required due to the use of an electronically pulsed IR source. High sensitivity is obtained by utilizing the patented cantilever based optical microphone technology.

Multi-component analysis

High selectivity is achieved by choosing up to 10 optical filters with narrow spectral bands for target gases as well as interfering gases. All installed optical filters are used with each gas compound. Several spectral regions can be used for a single gas to minimize the cross-sensitivity. Analysis is based on a modified classical least squares fit of sample response to calibration data.

Photoacoustic technology allows high sensitivity from short optical path length which has been further improved with novel model-based non-linear compensation. This provides linear dynamic range of over five orders of magnitude.

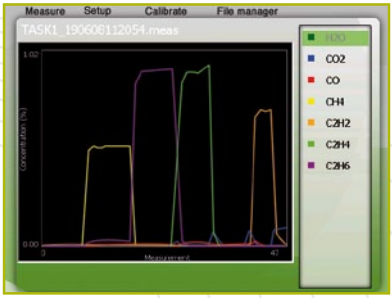




Selection of standard optical filters

Features include

- Simultaneous measurement of up to 9 gases. F10 can be configured for various applications with the relevant set of optical filters
- High selectivity with sub-ppm detection limits
- Wide dynamic range. Full scale analysis without range adjustment.
- High stability providing long calibration period. Very little regular maintenance required.
- User-friendly calibration procedure with single point calibration
- Built in 2-point sampling
- Analysis from very low gas volume
- Tolerance for humidity
- Wide operational temperature range
- Equipped with self test routine
- High-resolution graphical display with user-friendly menus
- Versatile programming of measurement tasks
- Presentation of the measurement results of all gases both numerically and in graphical form
- Built in trend view for monitoring tasks, no external computer required
- No consumables required



Applications include

- Greenhouse gas
- Poultry, Swine, Agricultural
- Industrial safety and hygiene
- Ventilation measurements
- Leak detection
- Photo catalysis
- Fuel cell

Measurable gases include

- Hydrocarbons: CH4, C2H6, C2H2, C2H4, etc.
- Inorganics: CO2, CO, N2O, SO2, NO, NO2, NH3, NF3, SF6, H2O
- VOCs: acetone, ethanol, methanol, benzene, toluene, xylenes, formaldehyde etc.
- CFCs and PFCs: CF4, C2F6, R-134a, R 13, etc.
- Corrosives (at low levels): HF, HCl, HCN
- Anesthetics: isoflurane, sevoflurane, desflurane, enflurane

F10 includes the following:

- Optical filters for the application
- Zero-gas and humidity calibration
- Power cord
- Sample gas tube with particle filter
- Purge gas tube with particle filter
- User Manual

Optional accessories:

- Span calibration for the application
- Optical filters, current selection exceeds 40 different types
- Snap-in gas connectors
- Swagelok tube fittings
- 8-channel analog output module

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Technology

- Photoacoustic infrared spectroscopy with cantilever enhanced optical microphone
- Electronically pulsed IR source
- Gold coated gas cell stabilized to 50° Celsius temperature
- Patented ultra-sensitive optical microphone based on a MEMS cantilever sensor coupled with a laser interferometer to measure microscopic movement of the cantilever sensor
- 19" 3U housing for both table stand and rack mount installation
- Built in PC computer with 5,7" color VGA display in the front
- User interface of setting the alarm levels for concentrations of gases under monitoring
- Data storage capacity of approx. 2 GB. Sufficient for more than a year of continuous monitoring of 9 gases with the shortest sampling interval.
- Transfer of measurement results to memory stick via USB or to PC via USB, Ethernet or serial ports.
- Three gas connections in the rear. The two incoming gas lines, sample and purge gas line, are equipped with filters for dust and small particles.
- Compensation of the fluctuations of temperature and pressure within the operational conditions
- Cross-compensation of known interferents of the sample gas including water vapor

General

- Dimensions: 48,4 cm W x 13,9 cm H x 40,5 cm D (19,1 in W x 5,5 in H x 16,0 in D)
- Weight: Approx. 13 kg
- Total internal gas volume: 30 ml
- Gas connections:
  - Connector type: Push-in connector
  - Connector size: For 6/4 mm tubing
- Electrical connections:
  - Input voltage: 100 - 240 Vac, 50 - 60 Hz
  - Input power: 100W
  - Interface: Ethernet, USB1.2, RS-232, and RS-485

Environment

- Operational conditions:
  - Temperature range: 0 °C – 45 °C
  - Humidity range: Below 90% RH, non-condensing
  - Pressure range: Ambient level
  - Dust/water resistance: IP20 (IEC 529)
  - Shock/vibration endurance: Strong vibrations at 33 Hz frequency can affect the detection limit
- Storage conditions:
  - Temperature range: -20 °C – +60 °C
- Sample gas conditions:
  - Temperature: 0 – 49 °C, non-condensing
  - Pressure: 930 mbar – 1100 mbar
  - Moisture: Dew point +8 °C or higher
  - Gas flow: Approx 1 liters/minute
  - Particulates < 1 µm

Measurement specifications

- Response time: Dependent on the channel integration time (C.I.T.) and the gas exchange period defined. Typically from 30 seconds to few minutes.
- Detection limit: Gas dependent. Typically in the sub-ppm region.
- Dynamic range: Typically 5 orders of magnitude (i.e. 100 000 times the detection limit)
- Zero drift: ± Detection limit per 1 month
- Span drift: 3% of measured value per 1 month
- Repeatability: 1% of measured value in operational conditions at the calibration concentration
- Accuracy: Same as the calibration gas accuracy at the calibration concentration. Typically 2-5%.
- Temperature stability: Ambient temperature change within the operational temperature range will not cause drift
- Pressure stability: Sample gas pressure change within the pressure range will not cause drift

Standards

- Complies with the following standards or other standardization documents under the Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC: EN 50270: 2006, EN 61000-3-2: 2006, EN 61000-3-3: 1995 + A1: 2001 + A2: 2005, EN 61010-1: 2001
- Complies with the following safety standards: EN61010-1 (2001), IEC 61010-1 (2001), CAN/CSA-C22.2 No. 61010-1 (2004) and UL 61010-1 (2004 incl. rev. 2005)

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