gas-lab Q1

Gas quality analyser

Applications

- Gas quality measurement for generic natural gases
- Measurement for control and regulation

Brief information

The gas-lab Q1 is a gas quality analyser for natural gases. The device works quickly, continuously and without flame. It provides online metering of the values calorific value, standard density, CO_2 concentration and other characteristic gas parameters necessary for billing and control purposes. The device carries out a fully automatic calibration using methane gas, other utilities such as carrier gas or complex calibration gas mixtures are not necessary for operation.

The correlative metering procedure of the gas-lab Q1 is based on the determination of the infrared absorption and thermal conductivity of the gas being analysed. The field of application covers the entire range of natural gases with a single calibration. Besides calorific value, standard density and CO_2 concentration, other gas parameters such as the Wobbe index, net calorific value and methane number are also determined. In addition, a model analysis for natural gases including the components CH_4...C_8H_{18}, CO_2 and N_2 is also drawn up.

The metering system consists of two components, an EX-proofed metering unit and a control unit. The metering unit can be installed within a hazardous area near the pipeline and makes it possible to take samples very quickly without the need for a time consuming and costly installation. The control unit can be installed up to 1000 m away from the metering unit and is used for control, evaluation and display purposes as well as for registration and communication. As with all of the devices in the gas-net series, the Q1 can be operated and the archive read out via remote control. The control unit is equipped with ports for input and output cards with analogue and digital interfaces for monitoring and controlling the peripheral equipment of the device as well as communicating via MODBUS.

Due to the fact that the metering is quick and continuous, the gas-lab Q1 is suitable for metering, control and regulation purposes; practical examples of applications include the control of gas mixing plants and gas turbines. Approved by the German institute of metrology (PTB), the gas-lab Q1 is also used for fiscal metering in small stations. The gas-lab Q1 stands out on account of the low capital investment and maintenance costs and its user-friendly operation.

Main features

- Fast, continuous measurement
- Approved by German PTB
- Simple operation
- Small investment and maintenance costs

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Technical data	
Primary measurements and ranges	Gross calorific value H_s 8.4 – 13.1 kWh/m³ (30.4 – 47.2 MJ/m³) Standard density ρ 0.711 – 0.970 kg/m³ CO_2-concentration xCO_2 0 – 5 mol %, optional 0 – 20 mol % (Reference state: combustion 25 °C, volume 0 °C, other reference states optional)
Measurement uncertainty	H_s: ≤0.4 %, ρ: ≤0.8 %, xCO_2: ≤0.2 mol % H_s: ≤0.2 %, ρ: ≤0.4 % optional with individual gas calibration
Repeatability	H_s: ≤0.1 %, ρ: ≤0.1 %, xCO_2: ≤0.1 mol %
Derived measurements	Wobbe index, net CV, rel. density, sat. gross/net CV, methane number and calculated model gas composition (CH_4…C_8 H_{18}, N_2, CO_2)
Range of appropriate gases	Generic natural gases CH_4: 75 –100 mol% CO_2: 0 – 5 mol%, optional 0 - 20 mol% C_2+: 0 – 15 mol% O_2: 0 – 2 mol% N_2: 0 – 20 mol% others <0.1 mol%
Calibration gas	Methane (purity >3.5) with automatic calibration cycle
Gas management	Integrated 3-channel double block and bleed device for the process gas, calibration gas and optional test gas (remote verification possible)
Operational pressure/ consumption	- Inlet pressure 200 mbar to 5 bar (basic configuration), 30 l/h (without bypass) - Inlet pressure 200 mbar to 100 bar with optional high pressure reduction unit
Dynamics	Analysis rate: c. 1/s, reaction time 10 s, optional 5 s, t90: 20 s, optional 10 s (bypass if applicable)
Power supply	24 V DC, 30 W
Environment	Sensor unit: IP 54, 5 - 40 °C, with additional housing: -20 – 55 °C Controller unit: IP 20, 0 – 40 °C
Interfaces	3 digital outputs, 4 analogue outputs, optionally expandable I/O boards, serial interface for parameter setting and local readout, DSfG interface, optional Modbus interface, optional modem for remote control and data retrieval
Data logger	Integrated logging of H_s, ρ, xCO_2 and derived measurements as mean values (e.g. on hourly basis) or current values. Integrated logging of measurement system status and external events. Data retrieval locally via serial I/O or remotely via optional modem
Approvals	ATEX, EMC, PTB (National institute for metrology in Germany)

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