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GAS QUALITY MEASURING DEVICE

GQS 400-F

This compact device contains a microthermal sensor in combination with a critical nozzle. From the signals of the sensors, the quantities calorific value, relative density, methane number and Wobbe index are determined by a correlative method.

METHOD OF OPERATION AND CONSTRUCTION

Method of Operation

Thermal conductivity, specific heat and relative density of various gases can be measured based on a micro-thermal CMOS sensor, in combination with a critical nozzle and a switching valve. From these quantities, the device determines superior calorific value, relative density, methane number and Wobbe index for non-custody transfer applications.

Compared to process gas chromatographs, the merchantable solution for determining gas com- positions, this self-contained device requires neither recalibration nor reference gases, is robust, compact and inexpensive. By the fact that neither a carrier gas nor a calibration gas is needed, the operating costs are very low. It is ideally suited for process control, natural gas vehicles (NGVs), industrial burners or combined heat and power plants.

Construction and Versions

As basic version the pure measuring unit (transmitter GQS 400-FT) is available. In the extended version, the measur- ing unit is mounted on a metal plate for wall mounting, together with an inlet filter, pressure reducer and adjustable bypass (GQS 400-FS). Optionally, this plate can be mounted together with a heater in a plastic housing with viewing window.

The GQS 400 can be calibrated for different gases. If the measuring range is restricted (for example H-gas or L-gas instead of standard natural gas), a higher measuring accuracy is achieved. The following versions are possible:

- Natural gas standard (wide measuring range)
- Natural gas H-gas (calibrated for H-gases)
- Natural gas L-gas (calibrated to L-gases)
- Raw biogas (dried and desulphurised)
- Biomethane (conditioned biogas)

Calibration also includes factory parameterization of the measuring unit for various units and standard conditions. The following units are possible for calorific value and Wobbe index: kWh/m³, MJ/m³, BTU/ft3 or kcal/m³.

FEATURES AND TECHNICAL DATA

Features

- **Combustion-free measuring method**
  No undesired heat is produced and no air must be supplied.
- **No influence of the environment**
  Atmospheric pressure and ambient temperature variations do not affect measurements. No air conditioning is required at the place of installation.
- **Explosion protection**
  Intrinsically safe, suitable for use in Ex zone 1.
- **Low on maintenance**
- **No carrier or auxiliary gas required**
- **Short measuring cycle time**
- **No recalibration time required**
- **Low operation costs**

Additional Features with Mounting plate / Case

- **Test gas inlet**
  with manual switching by valves.
- **Bypass for measuring gas**
  to increase the flow in the inlet pipe, with adjusting valve and rotameter
- **Heater**
  for version in case, with fixed value thermostat
- **Rack**
  as accessory for the version in case

Technical Data			
Measuring range	Hs = 28 50.0 MJ/m³		
Accuracy	Superior calorific value (Hs) Relative density Wobbe index (Ws) Methane number	≤ ± 1 MJ/m3 ≤ ± 0.005 ≤ ± 1 MJ/m3 ≤ ± 3 absolute	
Repeatability	± 0.5 MJ/m³ / ± 0.003 / ± 0.5 MJ/m³ / ± 2 absolute		
Measuring cycle time	approx. 30 seconds		
Gas consumption	approx. 0.1 l_n/measurement		
Temperature range	-10 ... 55°C		
Media	dry, neutral gases (10 µ filtering)		
Permitted overload	9.0 bar(a)		
Back-pressure on the output side	≤ 1.4 bar(a)		
Base conditions (Tc / Tb)	25°C / 0°C, 15°C / 15°C, 0°C / 0°C, 25°C / 20°C, 15°C / 0°C		
Output signal	Modbus-RTU (RS-485 2-wire)		
Supply voltage	10.5 to 36 V/DC		
Power requirement	< 1.0 W		
Explosion protection	II 2G Ex ib IIC T4 Gb		
	Transmitter	**On mounting plate**	**In plastic case**
Dimensions (mm)	L x W x H: 213 x 80 x 137	H x W: 652 x 422	H x W x D: 746 x 520 x 250
Weight	2.0 kg	approx. 8 kg	approx. 18 kg
Pressure range	3.5 bar(a) to 6 bar(a)	6 bar(a) to 18 bar(a) Optional: to 100 bar(a)	6 bar(a) to 18 bar(a) Optional: to 100 bar(a)
Gas inlet	G⅛“ oder 4 mm inside thread	G⅛“, 4 mm oder 6 mm on Swagelok connection	G⅛“, 4 mm or 6 mm on Swagelok connection
Gas outlet	G⅛“ oder 4 mm	12 mm pipe	12 mm pipe

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ONE STEP AHEAD

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Technical data is subject to change without notice.

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