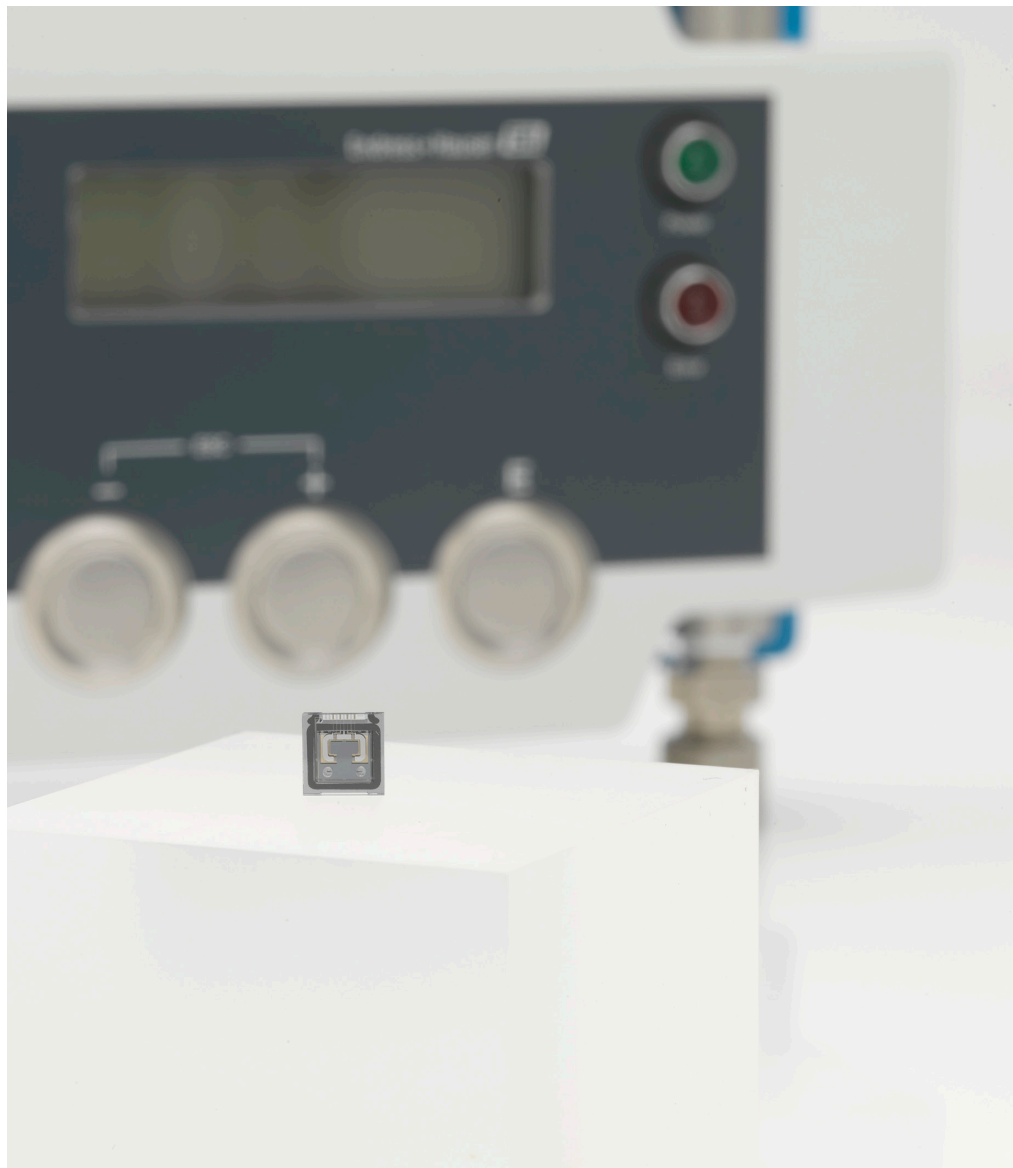


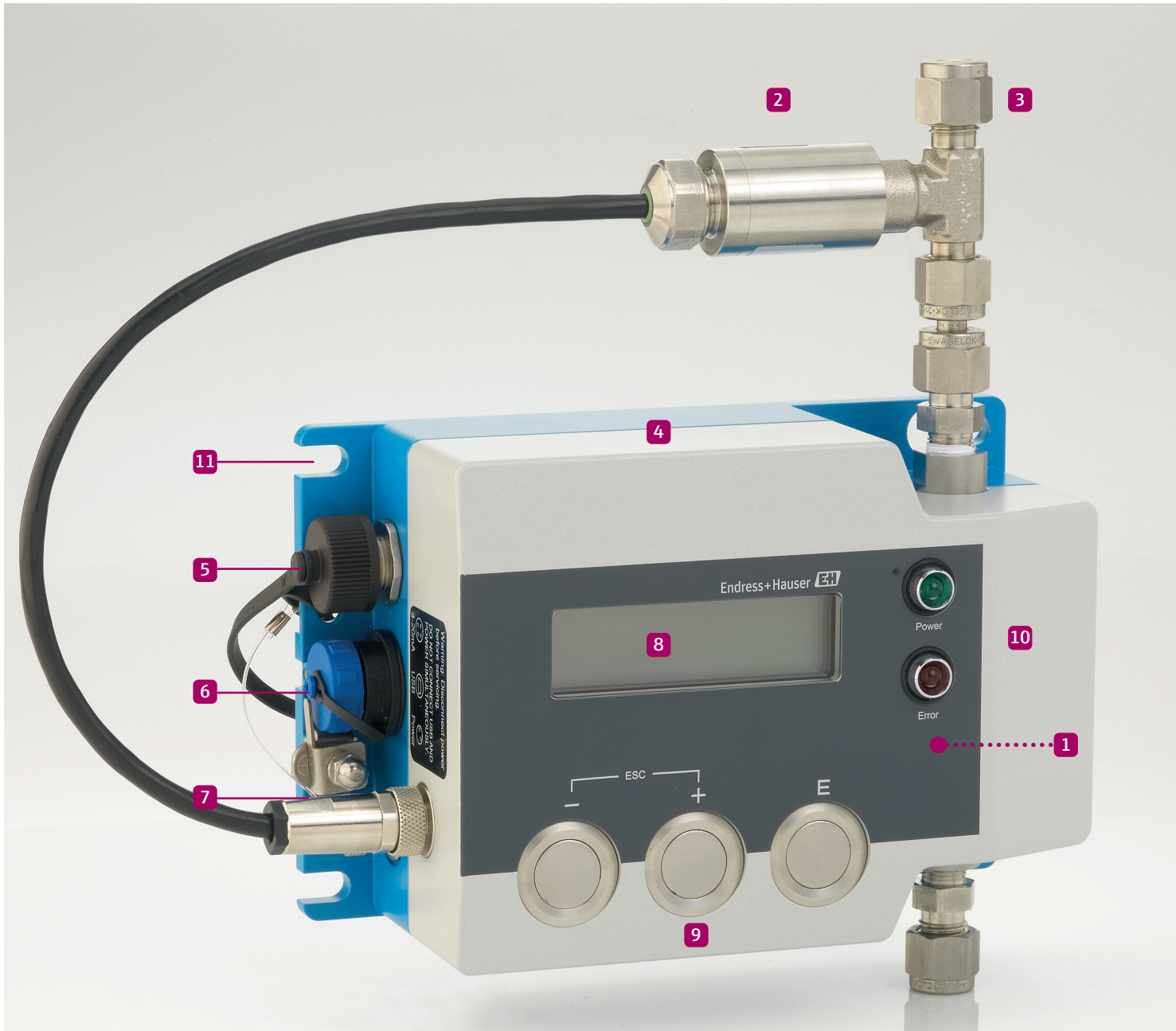
Nanomass Gas Density

MEMS density measurement –
precise and continuous
monitoring of gas quality

Reliable, continuous measurement of gas quality and concentration

- In-situ measurement of density and concentration of gases and gas mixtures
- Maximum reliability and product quality: process monitoring in real time
- Integrated pressure and temperature measurement: continuous calculation and output of reference density or concentration without additional hardware
- Cost-effective operation:
 - Easy installation
 - Only tiny sample quantities required
 - Customer-specific parameterization (optional)
- Low maintenance:
 - No carrier gas necessary
 - No replacement of sensors or electrolytes
- The gas quality can be traced at any time thanks to the integrated data logger (optional)
- Pipe vibrations have no effect on measurement quality thanks to high resonance frequency of the density measurement

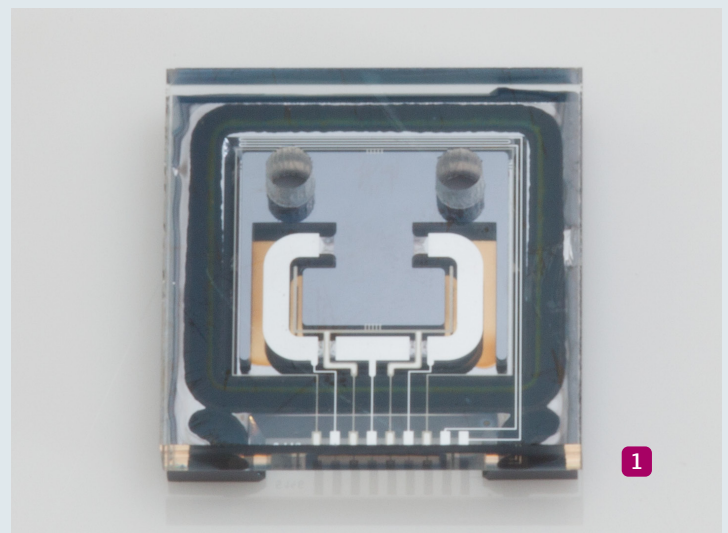




How the density measurement works

The centerpiece of the Nanomass Gas Density measuring system is a MEMS chip with a microchannel that is permanently excited at its resonance frequency. The natural frequency of this oscillation is directly correlated to the mass and density of the fluid (gas) that flows through the system. The higher the density of the fluid – and thus its inertia – the lower the resonance frequency of the oscillating microchannel. The oscillation frequency is therefore a direct measure of the fluid density.

! Note! The density of gaseous fluids depends greatly on the pressure and temperature. For this reason, Nanomass Gas Density also measures these two process variables and then directly calculates – together with the measured frequency – the reference density without any additional effort.



1 MEMS chip with microchannel

- Installed in a bypass to the main line
- With density sensor (Resonating tube technology)
- With temperature sensor (for calculating the reference density, average mole mass or concentration)

2 Pressure sensor

For calculating the reference density, average mole mass or concentration

3 Process connection

1/4" SWAGELOK pipe fitting

4 Housing

Made of powder-coated aluminum

5 2 current outputs

4–20 mA connector

6 Device connector for interfaces

USB or RS232 interface

7 Energy supply

DC 8 to 30 V

8 Liquid crystal display

2-line with 20 characters each, backlit

9 Pushbuttons

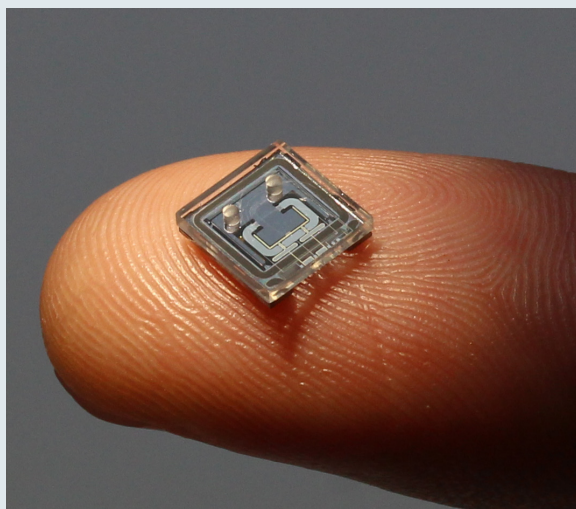
- Input of value ranges (e.g. measuring range)
- Selection of gas mixtures, displayed measuring variables (density, pressure, temperature), etc.

10 LEDs (status display)

- "Power" (supply voltage, data transmission active)
- "Error" (device alarm/fault indication)

11 Screw slots

For mounting on walls



Cost-effective, precise gas density measurement

Density, temperature and pressure measurement using a single device

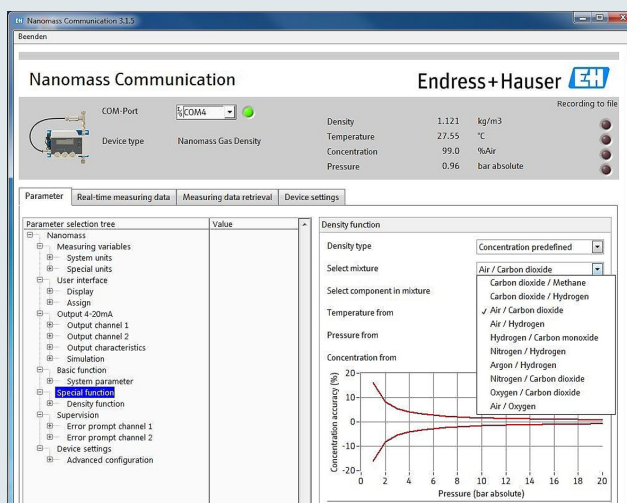
In many industries, large quantities of gases and gas mixtures are produced and used in a wide variety of production processes every day. Precise measurement of gas quality plays an increasingly important role in process monitoring, particularly with respect to gas density measurement.

Nanomass Gas Density is a highly precise measuring device that operates with innovative MEMS technology and carries out simultaneous measurement of gas density, pressure and temperature of the fluid around the clock. This provides unique opportunities for reliable, efficient process control:

- **Reliable control** of the gas quality – e.g. for gases that are supplied to the pipe network, such as biogas and natural gas
- **Efficient monitoring** of blending processes – e.g. producing two-component gases for welding systems or other production processes using the integrated concentration package (optional)
- **Precise control** of admixtures – e.g. adding air to combustion gas to optimize the combustion process



Operation made easy

The easy-to-read, illuminated on-site display and three operating push buttons make commissioning the Nanomass a breeze. The intuitive user menu guides you through the function matrix step by step and allows you to configure the Nanomass quickly and easily. You can also use the "Nanomass Communication" operating tool to run the device via a digital interface on a laptop. With two current outputs you can feed the device data into a process control system and manage the data there.



Technical data

Nanomass Gas Density	
Display/Operation	<ul style="list-style-type: none"> ▪ 2-line backlit display with push buttons ▪ Configuration via local display and operating tools possible ▪ With USB or RS232 interface
Housing material	Powder-coated aluminium housing
Power supply	DC 8 to 30 V
Ambient temperature	-20 to +60 °C (-4 to +140 °F)
Degree of protection	IP65/67 (Type 4 enclosure)
Outputs	2 outputs: 4-20 mA (passive)
Nominal diameter	DN 0.7 (1/36")
Measured variables	Density, temperature, pressure, reference density, average molar mass, concentration
Fluids	Suitable for non-corrosive, non-condensing, inflammable or non-inflammable gases and gas mixtures (except Helium)
Process connection	1/4" SWAGELOK pipe fittings
Measuring range	0 to 30 kg/m ³ (0 to 0.03 g/cm ³ , 0 to 0.03 SGU)
Max. process pressure	max. 20 bara (290 psia)
Fluid temperature	-20 to +60 °C (-4 to +140 °F)
Max. measured error	<ul style="list-style-type: none"> ▪ Density (Gas): ±0.1 kg/m³ ▪ Temperature: ±0.5 °C ▪ Pressure: ±0.02 bar
Ex approvals	ATEX, IECEx, UL C/US Cl. I
Subject to modification	

The Nanomass Gas Density measuring system fulfills EMC requirements according to IEC/EN 61326 and NAMUR NE21. It also conforms to the requirements of the EU and ACMA directives and thus carries the  and the  mark.

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