TetraTec® Instruments



FLOW MEASUREMENT SYSTEM

CoM4.Flow-Quattro

Measuring and controlling from 2 to 20,000 NmL/min

TETRATEC INSTRUMENTS GMBH · STEINENBRONN · GERMANY

01 — THE SYSTEM

One instrument for a turndown of 1:10,000.

Four cascaded laminar flow elements are permanently installed, and the instrument automatically switches to the element that suits the current flow. What otherwise requires several measuring sections and several computing units is done by one assembly – with a measurement uncertainty below one per cent across the entire range.

1:10,000
TURNDOWN
2 to 20,000 NmL/min air*

0.2 %
ACCURACY OF READING
Measurement uncertainty (k=2) < 0.75 % of reading

17025
DIN EN ISO/IEC
accredited, D-K-17589-01-00

THE ESSENTIALS

Four LFE channels, turndown 1:10,000

Flows from 2 NmL/min to 20,000 NmL/min* in one instrument, with automatic range switching.

Measuring or controlling

The same instrument measures the flow, controls it and doses – measuring and control in one system.

Pressure and vacuum operation

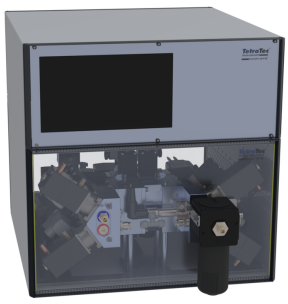
Operation with inlet pressure or against atmosphere, likewise under vacuum across the entire measuring range.

Integrates into the plant

Ethernet interface and CoM4.SYS controller, automatable via interfaces for parameter exchange and virtual PLC signals.

* NmL/min: standard volumetric flow, related to 1,000 mbar, 20 °C and 0 % RH; it corresponds to a defined particle flow, which can be converted into a mass flow using the standard density (from temperature and pressure).

INSIDE THE INSTRUMENT – FOUR ELEMENTS IN ONE ENCLOSURE



WHY DIFFERENTIAL PRESSURE

A laminar flow element delivers a differential pressure that is directly proportional to the volumetric flow – with orifice plates and Venturi tubes it enters quadratically. For the same differential pressure sensor the usable turndown is therefore about three times as large. That is the reason why four elements suffice here and twelve are not needed.

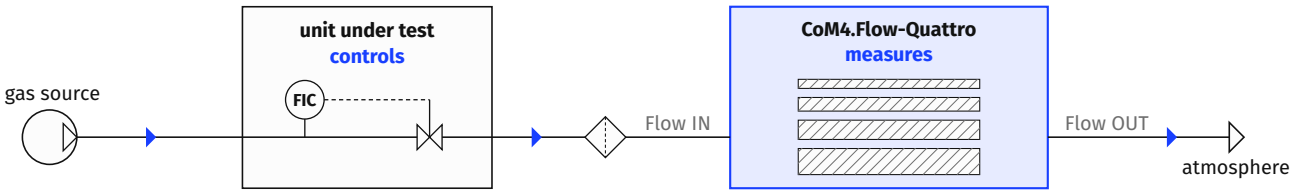
Operating principle

A laminar flow element produces a swirl-free flow through fine capillaries in which, owing to boundary effects, gas velocities cannot become too high. The resulting differential pressure is directly proportional to the volumetric flow according to the law of Hagen-Poiseuille – unlike orifice plates or Venturi tubes, where the differential pressure enters quadratically. We supplement the linear Hagen-Poiseuille approach with a so-called UniFlow correction, which also takes into account the influence of density and viscosity. This makes the linearised results more reliable in pressure or vacuum operation.

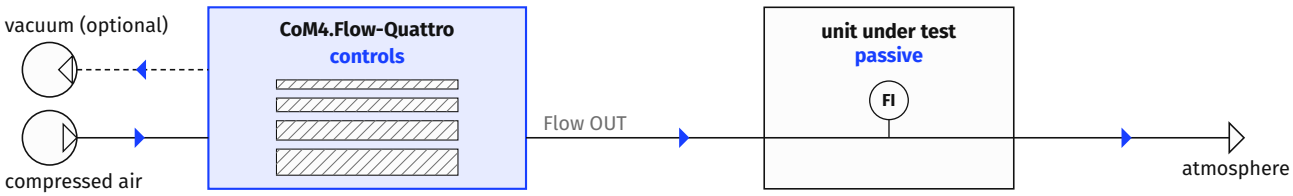
The CoM4.Flow-Quattro uses this relationship four times over: four staggered elements each cover one section of the measuring range, and the CoM4.SYS controller selects the appropriate element itself. Absolute pressure, temperature and humidity are measured as well and enter the gas property calculation, so that mass flow and standard volumetric flow follow from the same measurement.

OPERATING MODES

Measuring mode



Control mode



MEASURING MODE

The unit under test controls pressure or standard volumetric flow itself. The CoM4.Flow-Quattro measures the standard volumetric flow set by the unit under test at its outlet and serves as the reference.

CONTROL MODE

The CoM4.Flow-Quattro sets a specified standard volumetric flow and holds it. The unit under test behaves passively – suitable for calorimetric and comparative methods.

TYPICAL APPLICATIONS

- Quality assurance in production lines
- Calibration of flow and pressure sensors
- Development and testing of gas and air components
- Dosing tasks with controlled standard volumetric flow
- Leak and functional testing
- Comparative measurements in the laboratory

> *One instrument from 2 to 20,000 NmL/min: fewer measuring sections in your test setup.*

02 — DESIGN

Matched to your test task.

VERSIONS

- Desktop enclosure 19 ", 10 U, with or without handles
- Rack enclosure for installation in the test bench

ACCESSORIES

- For the reference calculation at the unit under test: gauge pressure sensor and HUMTMP temperature and humidity probe
- Factory or DAkkS calibration certificate

KEY SPECIFICATIONS

Flow rate air	**2–20,000 NmL/min**
Turndown	**1:10,000**
Accuracy	**< 0.2 % of reading**
Measurement uncertainty (k=2)	**< 0.75 % of reading**
Power supply	**90–260 VAC, max. 80 W**
Differential pressure	**0–50 mbar**
Absolute pressure	**0.8–1.2 bar**
Temperature	**0–50 °C**
Interface	**Ethernet, USB 2.0**
Enclosure	**449 × 444 × 495 mm**

Complete data in the technical datasheet.

FROM ENQUIRY TO RECURRING CALIBRATION

1 **Record the measuring task**
Measuring range, type of gas, test volume, cycle time and operating conditions – the design follows from these.

2 **Design and calibrate the instrument**
Assembly, calibration in our own accredited laboratory, calibration certificate with stated uncertainty.

3 **Integrate and support**
Integration into your production, training and the recurring calibration at the agreed interval.

Technology – tailored to your measuring task

REQUEST A DESIGN

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