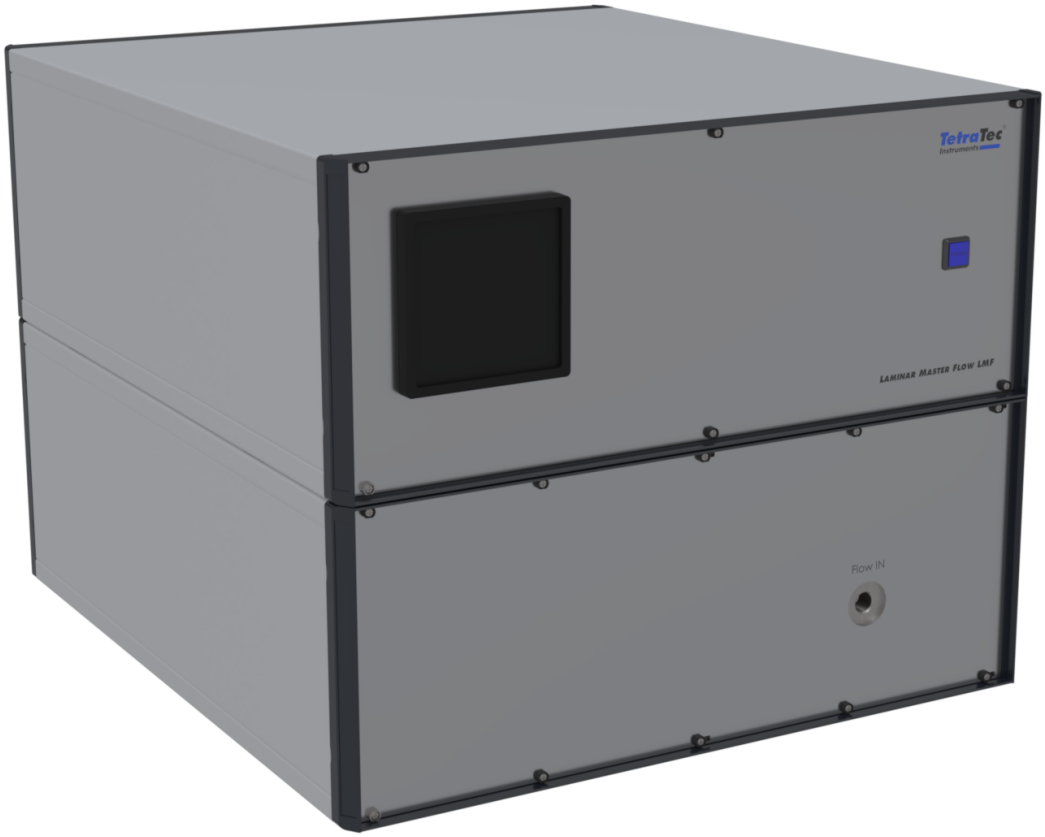
TetraTec® Instruments



FLOW MEASUREMENT SYSTEM

CoM4.Gallery

Defined volumetric flows from critically operated nozzles

TETRATEC INSTRUMENTS GMBH · STEINENBRONN · GERMANY

01 — THE SYSTEM

A standard that generates the flow itself.

Critically operated nozzles decouple the volumetric flow from the back pressure: once the flow reaches sonic velocity in the narrowest cross-section, pressure fluctuations downstream no longer act back on it. This removes one of the largest sources of measurement uncertainty.

1:200
TURNDOWN PER UNIT
within approx. 5 mL/min to approx. 35 L/min in suction mode

0.1 %
ACCURACY OF READING
Measurement uncertainty (k=2) ±0.5 % of reading, suction mode

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

THE ESSENTIALS

Critically operated nozzles
The mass flow depends only on inlet pressure and temperature. Pressure fluctuations downstream do not act back on it.

Binary-graded nozzle groups
Up to eight nozzles per group in a fixed binary graduation. From these, the controller sets the volumetric flow with the resolution of the smallest step.

Two measurands instead of many
Only inlet pressure and temperature enter the mass flow – fewer inputs mean fewer sources of error.

Nozzle without mechanism
The nozzle itself has no moving parts. There is no wear and therefore no wear-related drift of the characteristic curve.

Accredited calibration
Flow, pressure, temperature and humidity calibrated to DIN EN ISO/IEC 17025 in our own laboratory (D-K-17589-01-00).

Integrates into the plant
Ethernet interface and CoM4.SYS controller, operated via a 4-inch touch display or by higher-level control systems.

WHY A GENERATOR AND NOT A METER

A flow meter records what something else generates and inherits its fluctuations. The CoM4.Gallery generates the volumetric flow itself and keeps it stable through the critical nozzle – independently of whatever is connected downstream.

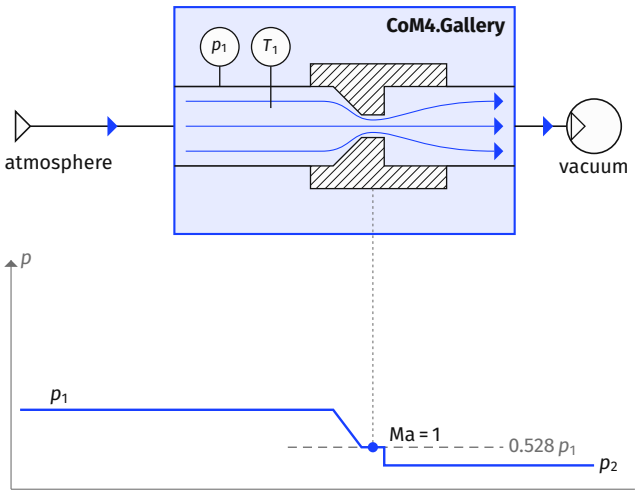
Operating principle

When the pressure ratio across a nozzle falls below the critical value – about 0.528 for air – the flow reaches the speed of sound in the narrowest cross-section. From that point on the mass flow through the nozzle is determined and depends only on the inlet pressure and the temperature upstream. What happens downstream of the nozzle no longer reaches the measuring cross-section.

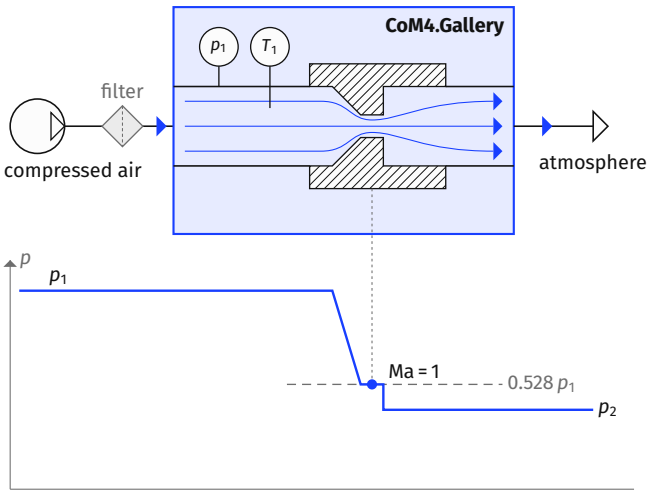
The CoM4.Gallery uses this as a standard: the nozzles have a fixed binary graduation and are combined into groups of up to eight. The CoM4.SYS controller switches the combination that yields the required volumetric flow and converts it to standard or reference conditions using the pressure, temperature and humidity of the gas.

OPERATING MODES

Suction mode



Pressure mode



SUCTION MODE

The gas enters at ambient pressure; a vacuum downstream of the nozzle gallery establishes the critical pressure ratio. The medium is the ambient atmosphere, and its pressure is the inlet pressure. It changes only very slowly, so short-term measurements are extremely stable.

PRESSURE MODE

The gas is supplied to the nozzles at positive pressure. The mass flow increases with the inlet pressure, which allows larger flow rates. The medium is compressed air, clean, dry and non-condensing; inert, non-flammable gases on request.

TYPICAL APPLICATIONS

- Calibration of flow meters in the laboratory
- Testing of mass flow controllers and meters
- Generation of defined volumetric flows for test benches
- Quality assurance in production lines
- Comparative measurements and interlaboratory comparisons
- Traceability of working standards

> *A volume flow your calibration chain can rely on – independent of back pressure.*

02 — DESIGN

Matched to your calibration task.

VERSIONS

- Desktop enclosure 19 ", 8 U, with or without handles
- Rack enclosure for installation in the test bench

ACCESSORIES

- HUMTMP temperature and humidity probe
- Filter and oil/water separator to ISO 8573-1 for pressure mode
- Factory or DAkkS calibration certificate

KEY SPECIFICATIONS

Limits, suction mode	**approx. 5 mL/min to 35 L/min**
Limits, pressure mode	**approx. 12 mL/min to 200 L/min**
Turndown per unit	**1:200**
Accuracy, suction mode	**< 0.1 % of reading**
Accuracy, pressure mode	**< 0.15 % of reading**
Meas. uncertainty, suction	**±0.5 % of reading (k=2)**
Meas. uncertainty, pressure	**±0.65 % of reading (k=2)**
Inlet pressure, suction mode	**0.8–1.2 bar abs.**
Inlet pressure, pressure mode	**2.5–7 bar abs.**
Power supply	**90–260 VAC, max. 80 W**
Temperature	**0–50 °C**
Humidity	**0–90 % RH**
Degree of protection	**IP 20**
Interface	**Ethernet, USB 2.0**
Enclosure	**495.5 × 449 × 354 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.

We will design the nozzle gallery for your range.

REQUEST A DESIGN

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