Gas Calibration/Dilution System (GCS)

Sonic orifice technology

Accurately prepare reference gas standards

Gas calibration and analytical system performance validation depends on knowing how to accurately dilute gas standards. Our high-end dilution system, based on a laser-calibrated orifice, is the result of over 30 years of experience in the field, so you can count on unparalleled precision.

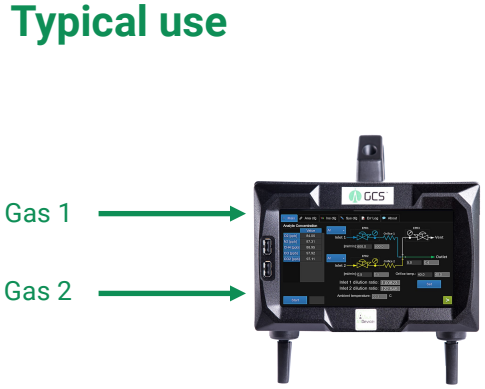
Features

- Sonic orifice technology with high dilution ratios from 1:2 to 1:3500 (Custom up to 1:10000)
- High precision (<0.5%rel.)
- High sample integrity with purged electronics pressure regulator
- Advanced mathematical model to enhance precision and stability
- Heated flow path up to 200°C
- User configurable orifice
- Optional inert flow path for sulfur and reactive gas analysis
- NIST traceable certificate available

Applications

- Ultra-trace analyzers calibration / validation
- Ultra-trace N_2 and O_2 calibration / validation
- Portable calibration system for on-site calibration
- Gas analyzer manufacturing/quality control
- Gas standard preparation
- Gas analyzer performance validation
- Research and development

Typical use



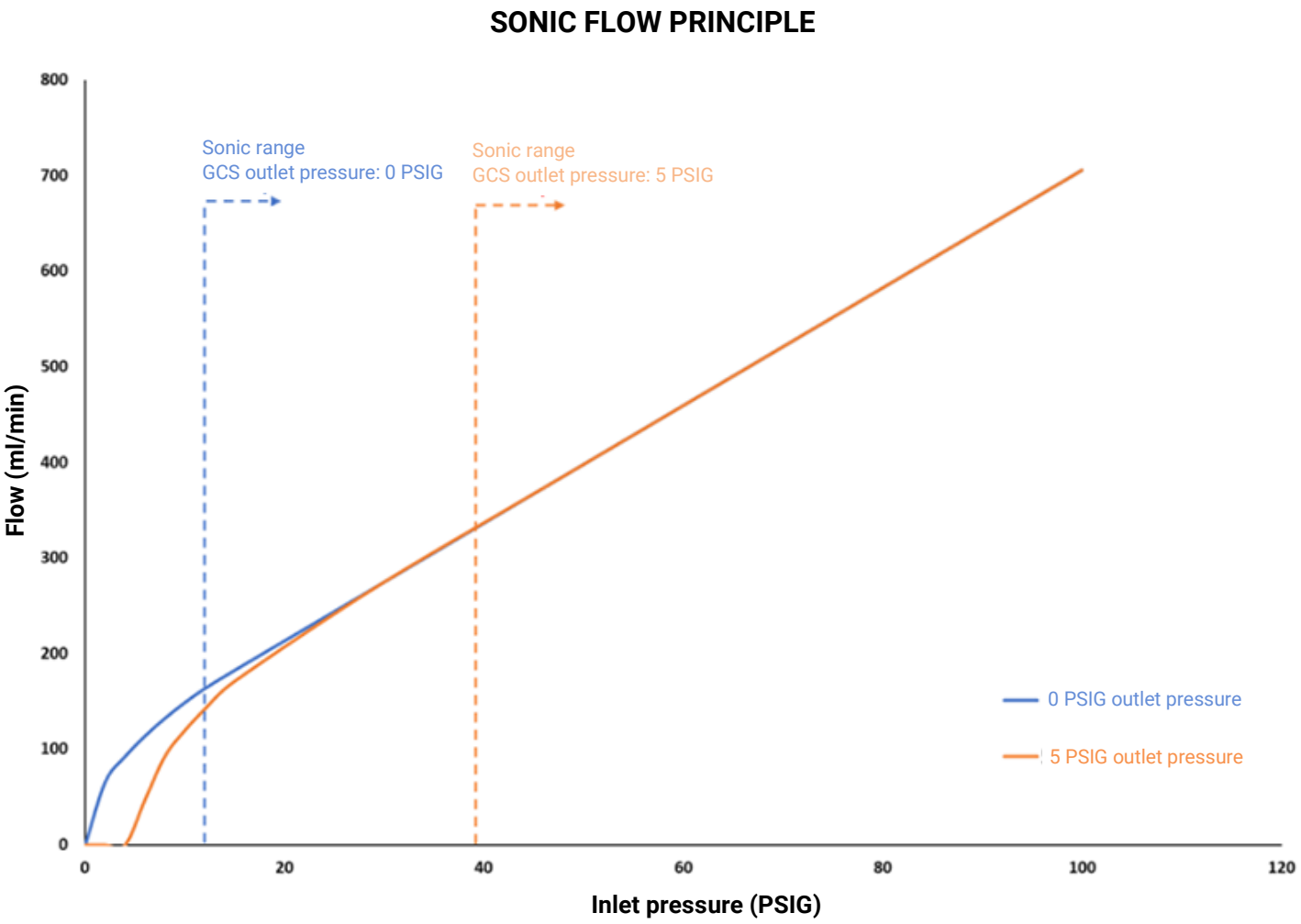
Gas Calibration system

miniMOv Gas Chromatogram with **SCS** Thermal desorber

Technology

Sonic orifice technology principle

Our dilution system is based on laser-calibrated orifice technology, allowing for greater dilution ratio flexibility as well as greater precision than traditional mass flow type systems. In sonic flow mode, the flow through the orifice is a function of the inlet pressure alone – it's not influenced in any way by outlet pressure. All orifices are laser-adjusted and calibrated using an NIST (National Institute of Standards and Technology)-calibrated coordinate measuring machine (CMM) to optically measure the orifice diameter. When combined with our ultra-stable, temperature-compensated electronics pressure controller (EPC), this technology offers unsurpassed performance.



Ultra-trace sulfurs calibration in fuel-cell grade hydrogen (H_2)

ASDevices KA8000Ex analyzes the purity of hydrogen to be used in hydrogen vehicule for the 2022 Winter Olympics. The GCS calibration system is used to accurately calibrate the instrument at 50 ppb.

The same GCS was used during SAT (Site Acceptance Test) to do dilution down to 1 ppb H_2S.

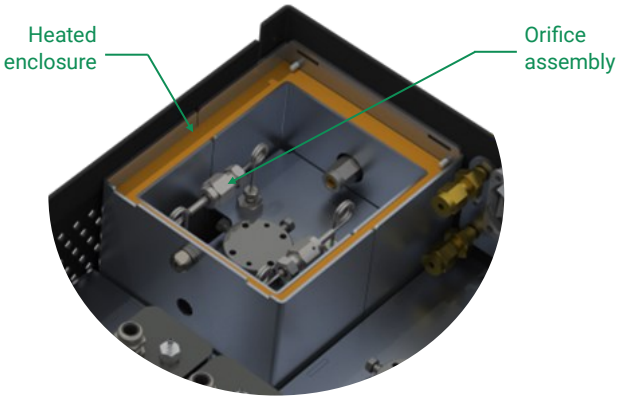
Solution highlights

Higher precision

Precision can only be achieved with highly exact, stable components. Our sonic orifices are laser drilled into stainless steel gaskets, ensuring that the orifice's properties remain stable over time.

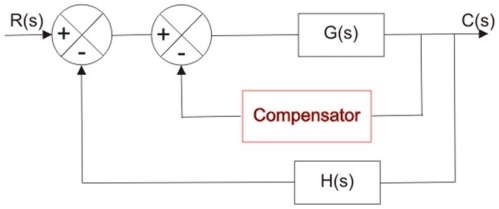
Enhanced stability

Pressure and temperature must be stable. That's why we use a highly stable, temperature-compensated pressure sensor in our electronics pressure controller (EPC). What's more, the orifices are installed inside a heated, adjustable enclosure, and the temperature can be adjusted up to 200 ℃ to better accommodate your gas sample.



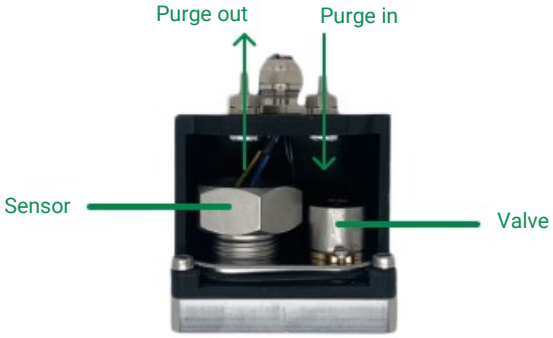
Advanced stabilization algorithm

Our GCS software contains an advanced algorithm that optimizes and compensates various parameters in real-time to offer ultra accurate and stable dilutions.



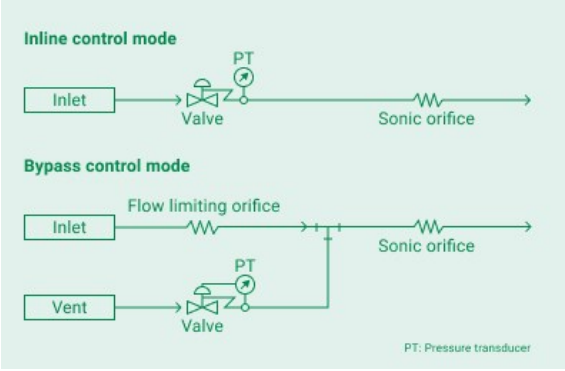
Leak integrity

As expert in ultra-trace N2 analysis, we understand how serious a leak can be. That's why all the components in our proprietary-design electronics pressure controller (EPC) are encapsulated in an enclosure that can be purged using an inert gas such as argon or helium, voiding the effects of any ambient leak. It's an innovative design – one that ensures that sample integrity is preserved.



Two flow path configurations

We offer two sample flow configurations: Inline and bypass. For reactive mixtures, the intelligent gas calibration system (iGCS) can be configured with a by-pass control mode, so that the sample is never in contact with control elements such as the valve and pressure sensor.



SPECIFICATIONS	
TECHNOLOGY	Sonic orifice based on ISO 6145-6 Precision laser drilled calibrated stainless steel orifice
PRESSURE CONTROLLER	- Temperature compensated pressure sensor - Purged enclosure - Electronically controlled - Inline or Bypass configuration
ACCURACY FLOW (SONIC MODE)	< 0.25% set point
REPEATABILITY FLOW (SONIC MODE)	< 0.10% set point
ACCURACY DILUTION (SONIC MODE)	< 0.50%
DILUTION RANGES (BASED ON AIR SAMPLE MATRIX)	1:2 to 1:3500 (Custom up to 1:10000)
FLOW RANGES (BASED ON AIR SAMPLE MATRIX)	Orifice configuration dependant
INLET PRESSURE RANGE	120 PSIG
OUTLET PRESSURE RANGES	Ambient to 20 PSIG
INLET AND OUTLET FITTINGS	1/8 LipLok (Backward compatible with Swagelok™ double ferrule)
OPERATING TEMPERATURE	5 °C to 45 °C
DIMENSIONS	133 x 202 x 330 mm
VOLTAGE	90 to 260 VAC universal power supply
COMPLIANCE	CE and ROHS compliant

Orifice models

ORIFICE MODEL	Diameter (um)	HELIUM FLOW (Air) [ml/min]		OUTLET PRESSURE
		Minimum @ 15 PSIG	Maximum @ 100 PSIG	
A	5	1.17 (0.43)	4.51 (1.68)	Ambient
B	7	2.28 (0.85)	8.84 (3.29)	Ambient
C	10	4.67 (1.73)	18.03 (6.70)	Ambient
D	15	10.50 (3.90)	40.57 (15.08)	Ambient
E	25	29.18 (10.85)	112.70 (41.90)	Ambient
F	50	116.72 (43.40)	450.82 (167.61)	Ambient
G	75	262.62 (97.64)	1014.34 (377.12)	Ambient
H	100	466.88 (173.58)	1803.26 (670.43)	Ambient
I	150	1050.49 (390.56)	4057.34 (1508.46)	Ambient
J	200	1867.53 (694.32)	7213.05 (2681.72)	Ambient

Dilution range examples

CALIBRATION GAS ORIFICE	DILUTION GAS ORIFICE	SONIC MODE Dilution ratio	
		Minimum	Maximum
H	I	1	10
D	I	27	387
C	I	59	868
B	I	120	1784
A	I	235	3452

User configurable orifice

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