Specifications

Construction Materials

Custom built manifold: 316 stainless steel
Seals: Viton ® and Kalrez ® or equivalent
Tubing: 1/4 inch 316 stainless steel

Gas Flow Control

High accuracy digital mass flow controllers
Wide dynamic range - turndown ratio 1000:1
Carrier gas: dry air, nitrogen, CO_2 (<1%) in nitrogen

Temperature Control

Temperature controlled enclosure
Contains entire generation and measurement system
Control range: 5 °C to 85 °C
Temperature stability ± 0.05 °C over 6 hours
Temperature resolution 0.01 °C

Local sample heater
Control range: up to 300 °C
Heating ramp rates: up to 10 °C/min

Humidity Generation & Measurement

Water Reservoirs
500 mL easy-change reservoir
Heated to avoid evaporative cooling
Generation
Relative humidity range
- 0 to 98% RH for 5-60 °C [1]
- 0 to 85% RH for 60-85 °C [1]

Relative humidity generation performance
- Accuracy: ±0.5% RH [2]
- Resolution: ±0.1% RH
- Stability: ±0.1% RH over 6 hours

Measurement
Relative humidity continuous measurement
- Range 0-100%RH

Relative humidity measurement accuracy
- ±0.8% RH at 5-40 °C
- ±1.5% RH at 40-85 °C

CO_2 Generation and Measurement

Generation
Concentration range 0-100%vol, atmospheric pressure
CO_2 generation performance
- Accuracy: exact [3] or 0.5%vol of inlet concentration [4]

Measurement
Patented Speed of Sound Sensor
- Range: 0-100%vol [5]
- Accuracy: 0.1%vol up to 40%vol, 1% above

In line NDIR ppm sensor [6,7]
- Range 0-3%vol
- Accuracy: 40 ppm [5]

Weight Measurement

Ultrabalance Low Mass
Maximum load: 1000 mg
Mass change: ±150 mg
Resolution: 0. 01 µg
Balance noise: ≤ 0.3 µg [8]

Ultrabalance High Mass
Maximum load: 5000 mg
Mass change: ±1000 mg
Resolution: 0.1 µg
Balance noise: ≤ 3 µg [8]

Hardware Configuration

Standard
Mixing of two gas streams, with controlled humidity and CO_2 concentration, respectively [9]
Switching between different carrier gases e.g. Nitrogen and 400 ppm CO_2
Advanced
Two heated reservoirs for enhanced humidity generation at high CO_2 levels (up to 98% humidity in a pure CO_2 stream) [9]
Mixing and direct measurement of low CO_2 concentrations (ppm-level) through dedicated instrumentation [9]

System Information

Dimensions : 520 mm (W) x 980 mm (H) x 610 mm (D)
Weight: 80 kg (180 lb)
Electrical : 200-240 V, 50/60 Hz, 1500 VA

System Software

DVS Control Software
- Live data view and plotting
- Full control over all parameters
- Powerful custom methods and sequences
- Complex isotherm or isobar experiments
- Temperature changes in a single experiment
- Ramp or step methods available
- Intelligent (dm/dt) or time-based step equilibration criteria
- Multiple concentration or temperature cycles
- Automated video image or Raman spectra acquisition

DVS Analysis Software
- Automated isotherm calculation
- Full kinetics information during experiment
- Isotherm modeling
- Enthalpy (heat) of adsorption
- Permeability and diffusion modeling
- Surface area models

Software Options:

Standard (Included)
- Control software
- Standard analysis

Advanced (Optional)
- Advanced analysis suite
- Isotherm analysis suite

Footnotes
[1] Humidity factory calibrated at 25 °C and 70 °C. Calibrations at other temperatures upon request
[2] 1- σ confidence level with % RH based on SMS factory certified methods (Salt Calibration)
[3] When using pure CO_2 or a calibrated cylinder
[4] When mixing
[5] At 25 °C
[6] Only in advanced configuration
[7] Using ppm probe reduces maximum operating T to 60 °C
[8] Root mean square (averaged over 24 hours)
[9] Some measurement restrictions apply