

QUANTACHROME

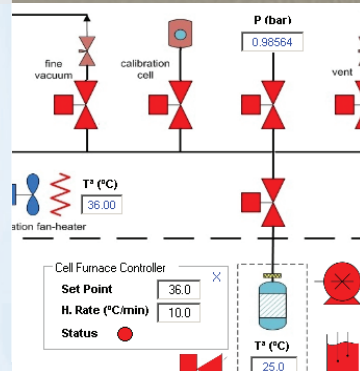
iSorb HP1 | HP2

high pressure gas sorption analyzer

HP1 one-station
HP2 two-station

ISOTHERMS
PCT CURVES
HEATS OF ADSORPTION

iSORB HP1 | HP2

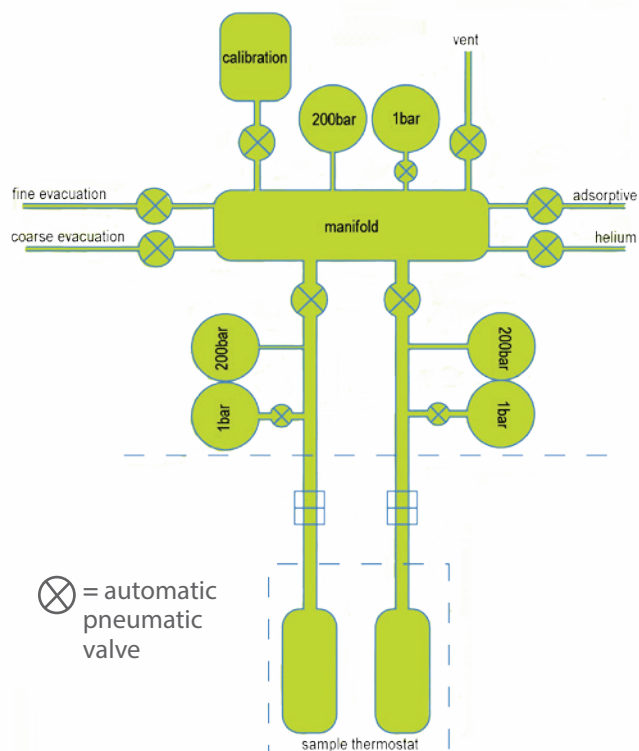


INTRODUCTION

High pressure gas sorption has become an important characterization measurement for the study of sorbent materials primarily in the fields of carbon dioxide and methane sequestration, and of hydrogen storage whether by physisorption mechanisms or hydride formation. It is also a commonly employed method in the study of microporous materials for gas separation. Volumetric measurements offer a robust, fully automated means of recording full adsorption and desorption isotherms over a wide range of pressures and temperatures. These instruments are sometimes referred to as Sieverts apparatus.

OVERVIEW

The **iSorb** series is a family of four such analyzers; one and two-sample models each available with an upper pressure limit of 100bar or 200bar. Each analyzer is equipped with a built-in vacuum pump system, either a rotary oil-pump or a turbo pump-based system according to the end-user's preference, and sample degassing capability. The one-sample model, the **iSorb-HP1**, uses four pressure transducers for improved measurement accuracy over the entire pressure range from as low as 0.0005 bar. The two-sample model, the **iSorb-HP2**, employs no less than six transducers... two in each of the sample stations and a further two in the dosing manifold. This arrangement not only ensures the wide pressure range capability but also allows simultaneous measurement capability on two samples.



SAMPLE HANDLING

The stainless steel construction of both internal gas lines and sample cell assures both chemical compatibility and safe operation, and the PC software constantly shows the pressures within the system together with any appropriate warnings. Safe manipulation of the sample cell, for example after the analysis, is guided by on-screen prompts. Samples can be prepared by degassing in-situ, thereby minimizing transfer of sample cells.



This degassing is done automatically by the instrument following a protocol programmed in the software. Adjustable degassing parameters include ramp rate, hold temperature, time under vacuum, final temperature and backfill state (vacuum or backfilled).

MORE APPLICATIONS

Hydrides can be studied further using an optional expansion kit. This option allows the kinetics of formation and decomposition to be studied for one or more cycles at user defined temperatures.

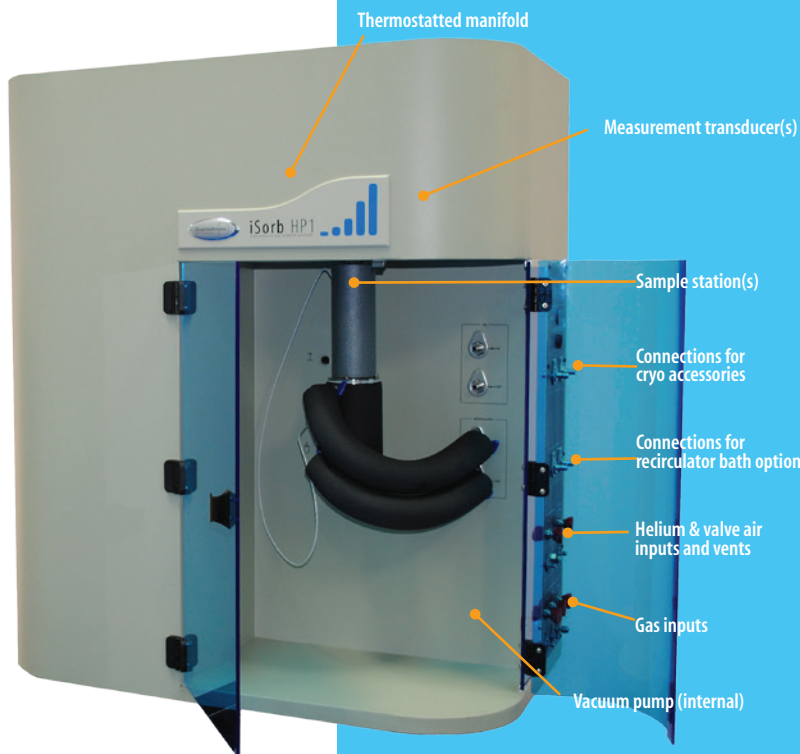
REAL HIGH PRESSURE CAPABILITY

For an extended supply of high pressure adsorptive (analysis gas) at up to 200bar, a heated booster option is available. Cylinder gas pressure is multiplied by the booster to provide adsorptive at pressures above those possible from a cylinder alone and can continue to provide high pressure gas even though the cylinder pressure drops as gas is being used.

See [Accessories](#).

TEMPERATURE RANGE

Sample temperature can be controlled in a variety of ways to suit the analysts needs. The recirculator option provides a working range of -20°C to 100°C. Above 100°C, the heating mantle provides temperatures of up to 400°C. A liquid nitrogen system is available complete with sample dewar, level control and reservoir dewar. A **cryocooler** system can also be connected for sub-ambient cooling <77K and does not require liquefied cryogenic gases. The measurement manifold is heated to 36°C and controlled to within 0.1°C; this allows the measurement of complete CO₂ isotherms up to the maximum instrument pressure (since the critical temperature of CO₂, i.e. above which it will not liquefy, is 31.1°C).



SPECIFICATIONS

PERFORMANCE	iSorb HP1	iSorb HP2
Analysis stations	1	2
Gas inputs	2 (optional 4)	2 (optional 4)
Max pressure data	200 bar ^a	200 bar ^a
Min pressure data	0.0005 bar	0.0005 bar
LP transducers	2(1 bar)	3 (1 bar)
HP transducers	2	3
Total transducer count	4	6
Transducer accuracy	<±0.05% f.s.	<±0.05% f.s.
Vacuum pump	internal	internal
Turbo pump option	yes	yes
Degas type	automatic	automatic
Degas ports	in-situ	in-situ
Heating Mantle (standard)	yes	yes
Max degas temp (°C)	400 ^b	400 ^b
Thermostatted bath (option)	yes	yes
Booster option	yes	yes
Thermostatted manifold	yes	yes
Gas inputs at side	for easy access	for easy access
PHYSICAL	iSorb HP1	iSorb HP2
Height (cm)	110	110
Width (cm)	100	100
Depth (cm)	60	60
Weight (kg)	140	148

^a or 100 bar for lower pressure model.

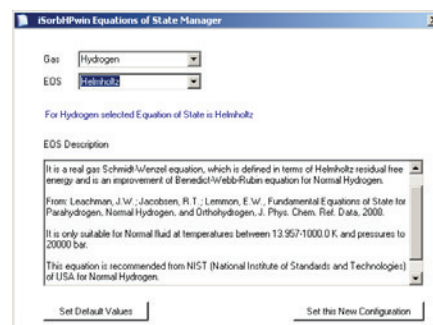
^b using heating mantle(s) provided.

SOFTWARE

The associated software allows the user to define a measurement in terms of target pressure points or dose amount for both adsorption and desorption, complete with custom equilibrium criteria, sample temperature (according to the heating /cooling device selected) and choice of equation of state (EOS)*:

- Schmidt-Wenzel type, defined in terms of Helmholtz Free Energy (NIST recommended)
- MBWR (Modified Benedict-Webb-Rubin type, Jacobsen 32-coefficients, NIST recommended)
- Lee-Kesler (generalized Benedict-Webb-Rubin)
- Peng-Robinson
- Soave-Redlich-Kwong
- Redlich-Kwong
- Van der Waals
- Ideal gas

* Not all EOS applicable for all gases



ACCESSORIES

BOOSTER

To ensure a constant supply of high pressure gas from a standard laboratory cylinder, an optional pressure booster is available. This compensates for the drop in cylinder pressure as gas is used for analyses.



RECIRCULATOR



Proper thermostating is essential for high pressure analyses. This liquid chiller/heater/circulator provides stable sample temperatures from -20° C up to 100° C. Temperature set via software. Includes special jacketed sample cell.

REGULATOR ASSEMBLIES

Quantachrome can provide high quality pressure regulators for optimum instrument performance. Complete with isolation valve and CGA cylinder connection.



Contact your local representative or call 1-800-989-2476 (in USA/Canada) to request pricing information.

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