



2100 Series

Hydrogen Purifier for Low Flow Applications

Description

Power+Energy's Models 2100H, 2100K and 2100M Hydrogen Purifiers provide a cost effective and convenient solution for obtaining ultra-pure hydrogen. The units have been designed to produce a continuous supply of low cost, ultra-pure hydrogen from commercial cylinders or an in-house hydrogen source. Total impurity levels of 9-9s are achievable with continuous operation for flow rates ranging up to 30 liters per minute. This easy-to-operate device offers the user many unique features such as compact design, a PC board that constantly monitors the purifier's status, comparing temperatures, rate of rise and multiple other details to insure that it operates safely and within precise guidelines. Each Hydrogen Purifier is fully Helium leak tested 3 times during assembly, and bench tested by our demanding QC staff before it can be called Power+Energy Hydrogen Purifier.

Principle of Operation

The Hydrogen Purifier consists of a 316L SS cell, incorporating a large diameter palladium alloy tube that acts as the diffusion element. Hydrogen gas is brought into contact with the *inner surfaces* of the palladium alloy tube which acts as a selective barrier, passing only atomic hydrogen through the tube wall, while excluding all other gases. Molecular hydrogen is adsorbed onto the surface where it is dissociated to become atomic hydrogen. The hydrogen gas diffuses through the lattice in a direction determined by the pressure gradient. The hydrogen atom recombines on the low pressure side of the membrane with another hydrogen atom and is desorbed as a hydrogen molecule.

The use of this "inside-out" technique for capturing ultra-pure hydrogen is superior to the small diameter tubing used in competitive models employing conventional "outside-in" methods. P+E's "inside-out" method produces cleaner ultra pure hydrogen because the outside surface of the large diameter tubing can be thoroughly cleaned.

Design Features

- Produces ultra-pure, 99.999999% (9-9s) low cost hydrogen
- Proportional, differential, integrating temperature controller
- Accelerated Life Testing insures reliability
- Reliable inside feed palladium cell design
- Lightweight, compact chassis
- All UPH 316L grade stainless steel micro or electro-polished
- Full-fusion welding to minimize outgassing
- Immune to power failure

Applications

Power+Energy's Hydrogen Purifiers are ideal for use in small MOCVD reactors, laboratories, universities and companies where ultra-pure hydrogen is required for applications involving: gas chromatography, metallurgy, hydrogenation, catalytic processes, controlled atmospheres, and nuclear research. Locally generated, ultra-pure hydrogen is an ideal source for carrier gas and flame ionization in gas chromatography and other low flow applications.

Process Specifications

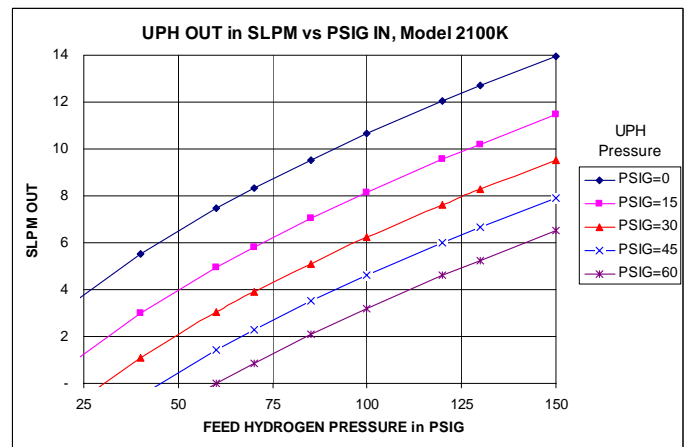
Ultra pure hydrogen flow rate	Model 2100H 6 SLPM Model 2100K 14 SLPM Model 2100M 30 SLPM
Hydrogen gas feed inlet pressure	150 PSIG
Ultra pure hydrogen outlet	> 0 PSIG
Hydrogen gas feed purity	~99.95%
Ultra pure hydrogen purity	99.999999% at UPH flow > 4 SLPM
Hydrogen bleed outlet	Typical 400cc per minute at 150 PSIG inlet
Operation	Automatic

Purifier Connections

All tubing connections on the back panel are 1/4" face seal fittings.

Mechanical Specifications

- Maximum pressure feed hydrogen 150 PSIG
- Pneumatic test 400 PSIG
- Helium leak test 1×10^{-9} scc/sec
- Tubing / cell material 316L stainless steel
- Finish on all UPH tubing electro-polished
- Finish on all UPH cell surfaces micro-polished
- Dimensions L x W x H 10' x 10' x 8' (254mm x 254mm x 203 mm)
- Weight 14 lbs (6.4 kg)
- Clearance area: 3cm from sides and 1inch from fan on back panel



Flow Curves for Model PE2100K. Flow curves are available for Models PE2100H and PE2100M on request.

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