



HYDROGENATION PLATFORM FOR SCALING UP CONTINUOUS FLOW REACTIONS

The **Phoenix Flow Reactor™** is an easy-to-use continuous flow reactor designed for high temperature/high pressure reactions, enabling the synthesis of novel compounds in a parameter space not achievable with standard laboratory equipment. Its versatility allows the users to fine-tune the reaction parameters, choose from loop or column reactors in various sizes, and with this, create a reaction system that suits the chemistry best.

The **H-Genie®** is a compact hydrogen generator that utilizes patented technology to produce 4.0 purity hydrogen gas from water at pressures up to 100 bar (14.5–1450 psi) at flow rates up to 1 NL/min. The system is designed to be used in any laboratory as a safer and simpler replacement for hydrogen cylinders and to expand your chemistry capabilities.



The combination of the H-Genie® with the Phoenix Flow Reactor™ offers unparalleled hydrogenation synthesis, scale-up, or catalyst testing capabilities.

Designed to be used safely in any discovery, development, process, petrochemical or catalyst screening lab, this hydrogenation platform combines in situ high pressure hydrogen generation from water with high temperature reactor capability and a precise gas data monitoring system. Chemists and chemical engineers can now run hydrogen-based experiments with homogeneous or heterogeneous catalysts up to 450°C and 100 bar, without the need for hydrogen cylinders or hydrogen infrastructure.

FEATURES

Safe: Hydrogen gas is generated on-demand, from the electrolysis of water, up to 1 NL/min gas flow rate. Safe enough to use in any lab. No more cylinders.

Versatile: Up to 450°C and 100 bar. Homogeneous and heterogeneous reactor sets are available.

Scalable: Range from self-fillable cartridges or pre-filled Catcarts® for catalyst optimization, to synthesis from milligram to kilogram scale quantities.

Precise: In-built mass flow controller to monitor hydrogen pressure and flow rate data. All data is exportable.

Fast: Temperature, hydrogen pressure and flow rate can be changed quickly on the fly for rapid optimization.

Simple: Easy to set up and learn how to use.

Modular: System set-ups can be customized as per customers' needs.

MODULES FOR THE H-GENIE® - PHOENIX FLOW REACTOR™ SYSTEM PLATFORM

PHOENIX FLOW REACTOR™

The Phoenix Flow Reactor™ is a versatile heater unit which can host various types of reactors, ranging from 4 mL to 40 mL loops made from PTFE, stainless steel or Hastelloy, or columns, pre-filled or loaded by the user, from 1 to 80 mL volume.

H-GENIE® BY THALESNANO ENERGY

The H-Genie® is a hydrogen generator that offers variable gas flow rates, reaction monitoring, and pressure capability for expanded and faster chemistry. It is an ideal solution to providing high-pressure hydrogen for both batch chemistry and flow chemistry applications.

HPLC PUMP

The HPLC pump is either a 10 mL/min or 50 mL/min (higher pump capacity can be provided on special request) capacity unit with built-in pressure sensor (inlet pressure sensor). It is recommended to have an extra HPLC pump if multiple inlets are needed for the application.

PRESSURE MODULE™

The Pressure Module™ generates the pressure in the reaction chamber. The module contains a system valve, a pressure sensor and a 3-way valve to set the outlet (to waste or to product collection). The maximum pressure is 200 bar.

GAS MODULE™

When the Gas Module™ is connected to the Phoenix Flow Reactor™ - H-Genie® platform, it allows, along hydrogen, the introduction of another gas, such as carbon monoxide, oxygen, syngas, etc. 14 different gases can be used up to 100 bar pressure, or any gas which characteristics are under the safety parameters of the system, widening the reactor's chemistry capabilities significantly. It is also possible to use more than one Gas Module™ and mixers to introduce more than one gas at the same time.

CONTROL MODULE™

The Control Module™ allows the control and visualization of the records of any connected modules via a touch screen. The automatic control of the parameters for the whole system plays an essential role in safety.

AVAILABLE REACTORS AND HOLDERS

Packed bed reactors:

- Pre-filled CatCarts® (30 mm, 70 mm long CatCarts®)
- MidiCarts™
- Metal-metal sealed cartridges with fittings from 1/8" OD to 1" OD with 125 mm and 250 mm lengths for custom applications.

Loops: 4, 8, 16 or 40 mL stainless steel, PTFE or Hastelloy loops

Custom-made reactors are available as well.



For more information, please visit
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