



SUPERCritical FLUID TECHNOLOGIES, INC.

Supercritical Fluid Extractions, Reactions and High Pressure Chemistry
www.supercriticalfluids.com

HPR-Series High Pressure Chemical Reactors



*Innovative Leadership in Supercritical Fluids
and High Pressure Chemistry*

www.supercriticalfluids.com



HPR-Series High Pressure Chemical Reactors



- Stirred Reactor Vessel from 50 ml to 4 Liter Capacity
- Operate up to 10,000 psi (689 Bar / 68.9 MPa) and 350°C
- Magnetic Drive Mixing
- Safety Rupture Disc Assembly
- Integrated Controller Modules
- Optional Reagent Addition Modules
- Optional Vessel Windows (<150°C Operation)
- Camera Assemblies
- Custom Reactor Sizes, Materials of Construction, Pressure and Temperature of Operation Available

HPR-Series High Pressure Reactors

The HPR-Series High Pressure Reactors have been developed for demanding research and process optimization applications. Designed and constructed to individual specifications, each reactor may be custom tailored to its intended use. A high degree of versatility is achieved through the many options and accessories that are available for these reactors. In addition to the wide range of laboratory reactors described here, Supercritical Fluid Technologies has extensive experience with larger, highly specialized systems.

The bench-top HPR-Series reactors' range in size from 50 ml to 4 liters and may be operated up to 10,000 psi and 350°C. Various closure mechanisms including Hand Tight, Bolted Closure, and Modified Bridgeman Closure are available based on the pressure and temperature conditions of operation. Additionally, custom metals of construction for the reactor can be employed depending on the chemical environment for the reaction.

The reactors are equipped with magnetically coupled impellers for optimal mixing. All high pressure components are ASME compliant design (code stamp available) and protected by a rupture disc for safe operations. These laboratory bench top models are ideal for applications where repetitive use makes convenience a necessity. A few examples include: catalytic studies, polymerization, hydrogenation, oxidation, isomerization,

and dehydrogenation. All reactors are supplied as ready-to-use instruments requiring only utility connections prior to operation. The reactors are compact instruments that fit easily into a fume hood. Their modular design makes it easy and cost-effective to alter the unit's basic configuration, adapting it to meet new or evolving application needs.

All functions are controlled by integrated control modules that offer various levels of control. Depending on which controller is chosen, optional features include: closed loop temperature control, closed loop speed control, pressure indication, over-temperature limit control, ramp/soak programming of temperature and mixer speed.

Options for the HPR-Series Reactors include: vessel windows (<150°C operation only), additional ports, cooling coils, cooling/heating jackets, sample loops, baffles, reagent addition pumps, and reagent addition modules.

Standard Features

Support Structure: Corrosion resistant bench stand

Power Requirements: 220 VAC, 50/60 Hz

Heater: Stainless steel sheathed ceramic heater, 220 VAC, 50/60 Hz.

Process Valves: 1/8" OD Compression Fitting, two 2-way straight valves (1/4" OD Compression Fitting, two 2-way straight valves available)

Safety Head: Union style with rupture disc: 1/8" OD Compression Fitting

STANDARD VESSEL PORTS SIZE / LOCATION

Agitator:	Top head, center
Rupture disc connection:	1/4" Cone Threaded Fitting
(2) Process connection:	1/8" OD Compression Fitting
Sampling tube:	1/8" OD Compression Fitting
Cooling coil:	in & out 1/8" OD Compression Fitting

Agitator Drive Assembly

Mixer: SFT Model K-3, K-6, and K-10 magnetic drive mixers, 6 in-lbs. torque, 1/4 HP

Drive: DC variable speed drive, 115/1/60 Impeller: Gaspersator standard, custom options available; application dependent

Operating Speed: 0-2500 RPM, subject to process conditions

Operating Pressure Options: 3,000 psi, 6,000 psi, and 10,000 psi

Optional Accessories (may not be available in all vessels):

- Cooling coil: 1/8" OD tube, U shaped
- Sample tube: 1/8" OD tube
- Additional ports
- Windows (<150°C operation only)
- Internal baffles

Integrated Control Modules



◀ RxTrol Sr.

The RxTrol Sr. utilizes a microcontroller to perform all PID, ramp/soak, and interlock functions. The microcontroller and power control components are located in the module which may reside on a bench top. The digital display and pushbuttons are located on the operator panel on the face of the cabinet.

- Closed Loop Temperature Control
- Closed Loop Agitator Speed Control
- Pressure Indication (including transducer)
- Over Temperature Limit Control
- Ramp/Soak Programming of Temperature and Speed (5 ramp/soak segments)
- Temperature, Speed and Pressure on Screen Plotting
- PID Auto-tuning
- Temperature, Pressure and Speed Alarms with Alarm History Storage
- Flash Drive Communications Port for Download of Data and Moving to PC.
- 12 x 12 Nema 12 Console



◀ RxTrol Jr.

The RxTrol Jr. provides three mode (PID) control of process temperature based on the measurement of the internal vessel and vessel wall temperature. Vessel temperature is altered by varying the average power supplied to the vessel's electrical heater. The system also includes a limit control based on the temperature measured at the outside vessel wall (between the vessel's exterior wall and the heater).

- Closed Loop Temperature Control
- Over Temperature Limit Control
- Open Loop Adjustment and Indication of Agitator Speed
- Ramp/Soak Programming of Temperature Segments (3 segments)
- Digital Display of Process Temperature Heater Temperature
- 12 x 12 Nema 12 Console



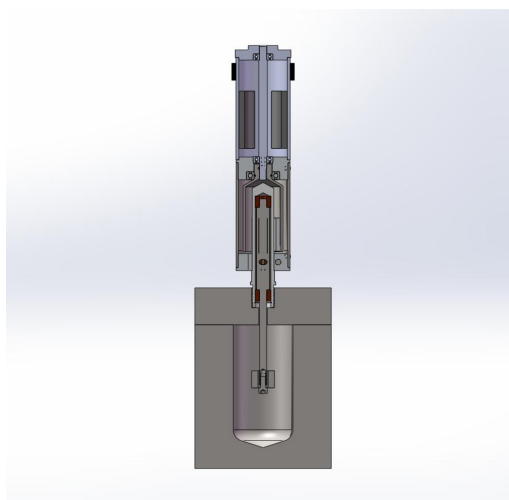
◀ **RxTrol B.**

The RxTrol B. utilizes (2) closed loop temperature sensors (wall/interior mounting), and open loop agitator speed control via 0-100% power output.

- Closed Loop (PID) Process Temperature Control
- Overtemperature (Vessel OD) Limit Control
- Open Loop Agitator Speed Control via 0-100% Knob
- Ramp/Soak Programming of Temperature (64 Levels)
- Digital Display of Process Temperature Heater Temperature
- 8 x 8 NEMA 12 Console

Areas of Investigation

- Alkylation
- Amination
- Biotechnology
- Carboxylation
- Catalytic reduction
- Fermentation
- Halogenation
- Hydrolysis
- Isomerization
- Nitration
- Oxidation
- Polymerization
- Hydrogenation and dehydrogenation
- Toxic/hazardous substance processing



**SFT
Magnetic
Mixers**



P/N: SFT-HPRS-SPEC

9/12