



High-Performance Continuous Flow Chemistry Systems

Robust • Accurate • Flexible • Safe

UNIQSIS
Accessible flow chemistry

interchim®

Flow chemistry systems from Uniqsis

Uniqsis specialises in the design of meso-scale continuous flow chemistry systems for a wide range of applications in chemical and pharmaceutical research. Our aim is to make flow chemistry easily accessible to both novices and experienced users.

To that end, we offer the **FlowSyn™** range of integrated systems which handle everything from homogeneous single reactions to complex multi-step, multi-reagent reactions. Functionality can be further enhanced by adding optional modules such as gas addition, microwave and binary pump modules.

Within the **FlowSyn** system, two high pressure pumps operating at up to 100 bar deliver reagents, via a mixer, into electrically heated flow reactors. Back pressure regulators pressurise the system, allowing solvents to be superheated to a maximum of 150 °C to 260 °C depending on the flow-path material.*

Reaction outputs can be fractionated or optimised at steady state, after which the system automatically flushes itself ready for the next experiment. The whole process, from start to finish, is controlled via the integral **FlowSyn** interface.

*Choice of PTFE, stainless steel or Hastelloy®



Fully integrated systems for total ease of use

FlowSyn - 2 or 4 channel system

Our entry-level FlowSyn system - a compact, fully integrated, easy-to-use continuous flow reactor for single reactions with two reagents. Combine with the Uniqsis Binary Pump Module for 4-channel operation.

- Carry out superheated reactions up to +260 °C (100 bar)
- Wide range of coil, chip and column reactors available in a variety of materials for optimal chemical compatibility
- Run seamless scale up reactions up to 60 ml and 80 ml/min (FS Maxi)



FlowSyn Multi-X - multiple experiments



A convenient multi-experiment package for automating sequential reactions, the FlowSyn Multi-X fraction collector is controlled without the need for a separate PC. Capable of running unattended, it will perform up to 10 sequential experiments and collect the results as fractions or steady state samples. Our most popular system.

- Automatically performs sequential reaction profiling and optimisation
- Runs optimisation experiments unattended
- Choice of 'optimisation' or standard 'fractionation' protocols

Fully integrated systems for total ease of use

FlowSyn Auto-LF - 2 or 4 channel system

A fully automated system that efficiently runs combinatorial library or optimisation experiments employing multiple reagent inputs under varying reaction conditions. Simultaneous loop filling and fraction collection saves valuable time, while integrated wash steps prevent cross-contamination.

- Automate up to 10 experiments with multiple combinatorial reagent inputs
- Powerful intuitive PC interface for real time reaction monitoring and data logging
- Stacked small format XYZ sampler/fraction collector minimises space requirements
- In-built automated wash protocols
- No unreliable sample injection ports to worry about
- Septum-piercing liquid handling ensures reagent solutions are preserved
- Air bubbles prevent sample dispersion on loop loading



Modular systems for total flexibility

Uniqsis Binary Pump Module - the basis for a modular system

If you need complete flexibility and/or prefer to build your own continuous flow chemistry system from scratch, then Uniqsis can help.

The Uniqsis Binary Pump Module (BPM) can fulfil the dual role of a stand-alone two-channel reagent delivery system and a control hub for a bespoke continuous flow system. Simply add a PC-based control program and your choice of reactor modules. You can also link two BPMs together to create a four-channel reagent delivery system.

In addition to the new BPM, we offer a wide range of add-on modules to enable you to create a complete flow system according to your application needs.

- Dual high pressure pumping (100 bar*)
- All stainless steel high pressure components
- Integrated mixer module
- 3 Hastelloy pressure transducers as standard
- Perfluoropolymer flow path option
- Chemically resistant back pressure regulators
- Integrated fraction collector control
- Dedicated user-friendly control software

* 200 bar option on request



Expand the capabilities of your chosen system

Cooling and heating

Uniqsis offers three options— the Polar Bear *Plus* Flow™ and FlowSyn Cooling Module, both for cooling and heating, and the Polar Bear™ for cooling only. All can be used in combination with FlowSyn or the Uniqsis Binary Pump Module.

Polar Bear *Plus* Flow™ (-40 °C to +150 °C)

A state-of-the-art heating and cooling reactor module for flow chemistry applications, the Polar Bear *Plus* Flow is completely self-contained and very easy to use. No need for cardice, refrigerants or heat transfer fluids.

- Compact and portable - can easily be relocated in and out of fume cupboards
- A nitrogen purge can be connected to prevent icing up
- Compatible with all standard Uniqsis FlowSyn coil and chip reactors



FlowSyn with Polar Bear *Plus* Flow

FlowSyn Cooling Module (-70 °C to +150 °C)*

In combination with a recirculating chiller and a FlowSyn or Binary Pump Module, this unit can control reactions between -70 °C and +150 °C. With a heating recirculator and suitable thermal fluid it can control reactions from ambient to +150 °C. The external circulator is controlled via the FlowSyn interface.

- Integral probe for precise temperature monitoring
- Compatible with FlowSyn coil and chip reactors
- Patented coil reactor clamping mechanism



Binary Pump Module with FlowSyn Cooling Module

*Requires external chiller and/or heating recirculator

Polar Bear™ High Performance Chiller Unit (ambient to -88°C)

Developed in a collaboration between Cambridge University, UK and Cambridge Reactor Design, UK the Polar Bear stand-alone chiller unit delivers fast and efficient cooling down to -88°C without the need for solid CO₂, solvents or heat transfer fluids.^{1,2}

The vacuum-jacketed glass cover supplied with the coil reactor module is fitted with a nitrogen purge to prevent ice formation so the reactor remains clearly visible at all times.

- Dedicated cryogenic reactor module for flow chemistry applications
- Fast, precise cooling without the need for cardice, liquid nitrogen or heat transfer fluids
- Compatible with all Uniqsis coil and chip reactors
- Reactor can accommodate multiple coils to allow pre-cooling of reagent solutions prior to mixing.
- Maximum coil reactor volume 52 ml.

1. D. L. Browne, M. Baumann, B. H. Harji, I. R. Baxendale, S.V. Ley, *Org. Lett.*, **2010**, 13, 3312.

2. Polar Bear™ is manufactured by Cambridge Reactor Design Ltd.



FlowSyn with Polar Bear cryostatic reactor module

Microwave-assisted continuous flow chemistry (CF-MAOS)

ArrheniusOne™ Flow Microwave Module

In combination with FlowSyn or the Uniqsis Binary Pump Module, the ArrheniusOne microwave module provides a system for continuous-flow, microwave-assisted organic synthesis (CF-MAOS). The system delivers faster synthetic processes, easier scale up, and a safer solution that uses significantly less energy than conventional batch microwave approaches.

- Quickly and safely scale up microwave chemistries
- Rapid heat-up and cool-down
- Rapidly optimise reaction conditions



Gas-dependent flow chemistry

GAM I Plus and GAM II Gas Addition Modules

The GAM I provides a safe and efficient means of performing gas-liquid reactions under continuous flow conditions. Rapid diffusion of pressurised gas through gas-permeable tubing quickly creates a gas saturated solvent stream for gas-dependent reactions. GAM I Plus includes a convenient Portable Gas Reservoir for easy access to gas in the lab.

In GAM II, gas is supplied directly to a coil reactor which is fitted to either the FlowSyn coil heating module or to the stand-alone FlowSyn cooling module. The heated or cooled gas is then drawn through the membrane into the flow stream on demand.

- Compatible with a wide range of reactive and organic solvents
- Can be combined with FlowSyn or the Uniqsis Binary Pump Module.



Gas Addition Module GAM1



Gas Addition Module GAM2

*Requires external chiller and/or heating recirculator

Other accessories

Reactor modules — column, coil and chip reactors



Column reactors (to +150 °C)*

The FlowSyn column heater accepts standard 10mm id x 100mm glass columns with adjustable end fittings, and adapts for columns of different sizes. Users can choose which reagents, catalysts and/or scavengers to pack into the columns.

- Adjustable column length for varying reaction scale and minimal dead volume
- Easy exchange of columns

*compatible only with FlowSyn systems

Coil reactors (to +260 °C)



FlowSyn's electronically controlled coil reactors heat up rapidly and retain a uniform temperature throughout the whole reaction. Coils are designed for quick and easy change-over, and the tubing can easily be re-wound in the event of a blockage. For optimum mixing and temperature control, combine with a FlowSyn mixer block/chip reactor for reagent pre-heating and pre-mixing.

- Wide range of sizes up to 60 ml for mg to kg reactions
- Range of tube materials for optimal chemical compatibility
- Glass insulated cover for optimal temperature control and safety

Other accessories

Reactor modules — column, coil and chip reactors

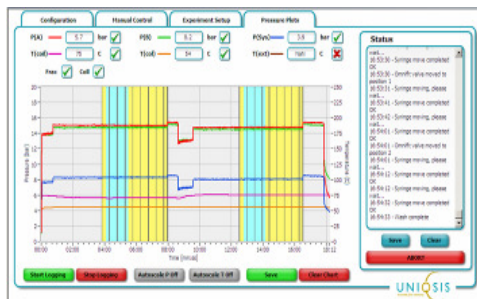


Mixer blocks/chip reactor (to +150°C)

The Uniqsis 2- and 3-channel borosilicate glass mixer block/chip reactor is designed for high throughput applications, fast mixing-dependent reactions and fast, highly exothermic reactions requiring temperature control. For heating and cooling, the mixer block can be attached to the FlowSyn column module or to the FlowSyn cooling module.

- Rapid, efficient temperature-controlled mixing
- Choice of A + B or (A + B) + C static mixer geometries
- Simple screw connections

Real-time data logging package



Uniqsis have developed an invaluable auxiliary PC package for use with the FlowSyn that allows full real-time data-logging of system and pump pressures, and reactor temperatures.

The easy-to-use software is also able to display fractionation data when a fraction collector is attached (Multi-X) and the pressure and temperature data can be saved to a log file and exported.

Highly recommended!

More information



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