FlowLab™, FlowLab Cold™ & FlowLab Col™

Affordable, modular flow chemistry systems

UNIQSIS
Accessible flow chemistry

interchim®

FlowLab™

Low cost, entry level, 2 channel flow chemistry system

- **2 High pressure pumps with integrated pressure transducers**
- **HotCoil™ heated coil reactor station**
- **FlowLab™ automated system control software with data logging**
- **Wi-Fi remote control**
- **Quickly save and reload experiments**
- **Supplied with 5.0 ml stainless and 5.0 ml PTFE coil reactors and back pressure regulator**

FlowLab™ is an affordable and easy-to-use entry level flow chemistry system that is ideal for education, training and for those wishing to try flow chemistry without the associated costs of a sophisticated fully automatic system.

The system comprises of 2 high pressure pumps, a **HotCoil™** coil reactor station and **FlowLab** system control software. A 5ml PTFE and a 5ml 316L stainless steel coil reactor and a fixed back pressure regulator (BPR) are included. The computer, pumps and **HotCoil** are connected over a LAN using an Ethernet HUB. In this way, the system can be operated remotely by Wi-Fi allowing the control computer to be conveniently positioned outside the fume cupboard and away from chemicals.

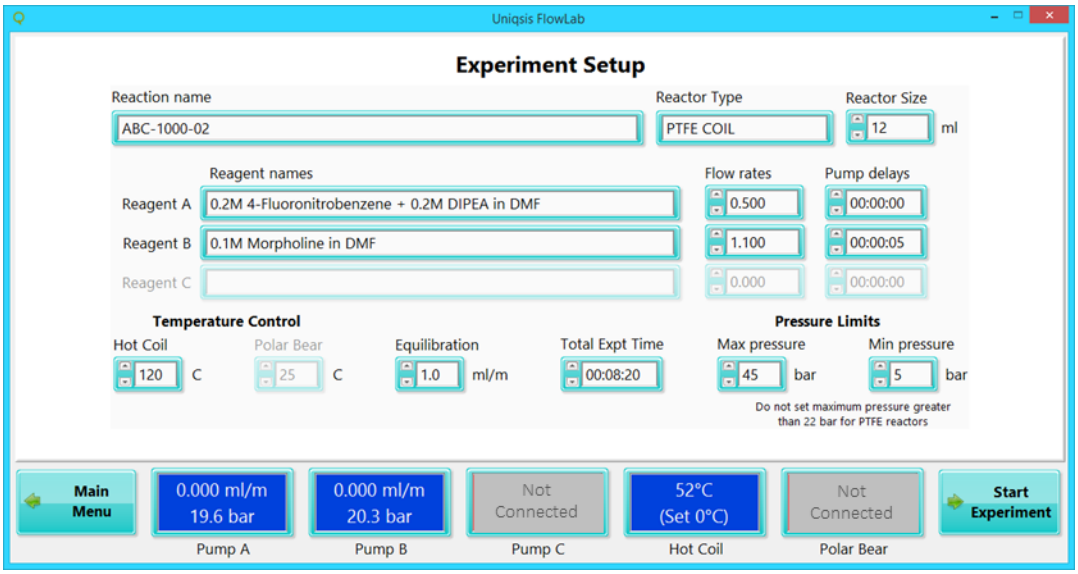
Optionally available is a manual outlet collect/waste selection valve (UQ1029) and, as shown above, a stand to help minimise the space required in the fume cupboard.

The pumps have a combined flow rate range of 0.01 to 20ml/min and will operate up to 100bar (200bar is available as an option). Each pump has a built in pressure transducer and safe operating pressure limits can be set by the user. The reagents are mixed at a “T”-piece and then flow through the coil reactor and into a collection bottle. Back pressure is set by a fixed back pressure regulator cartridge positioned in-line with the flow stream.

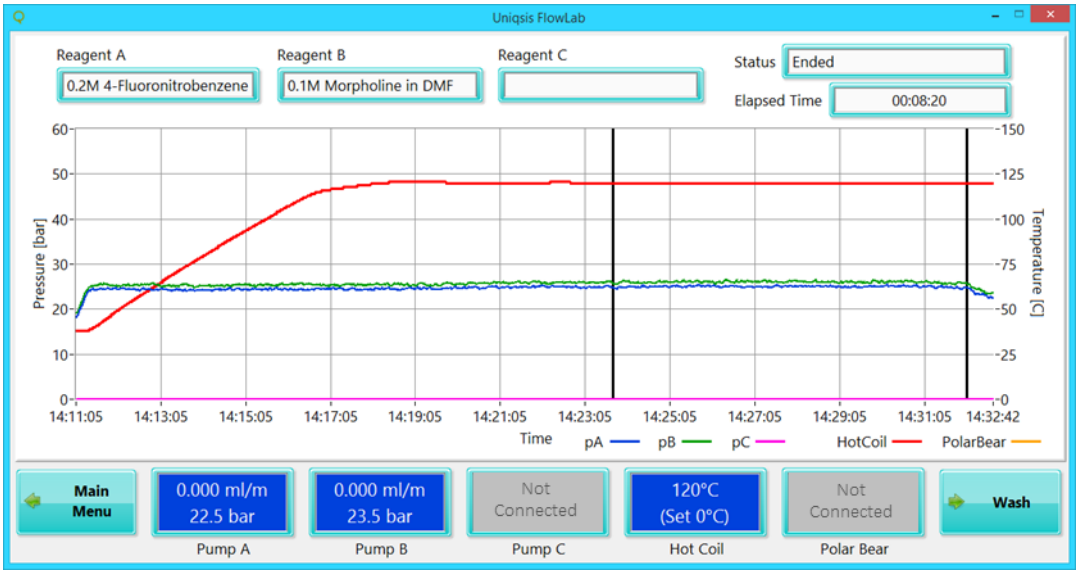
The **FlowLab** application affords control of the system via a 'step-through' interface that is straightforward to use. Specific control screens allow users to modify system settings and perform automated priming and wash functions in addition to designing new, or loading previous, experiments. Reactions can be run automatically on a time basis, and reaction progress is monitored in real-time from a plot of temperature and pressures. The reagents used can be entered in text fields and logged data is automatically saved.

For operational safety, **FlowLab** software monitors pressure and temperature and will automatically shut down if there is a blockage, leakage or overheating occcurs.

Straightforward experiment setup ...



Real-time monitoring of temperatures and pressures ...



UQ1026 Uniqsis FlowLab™ system comprises:

Pumps: HPLC pumps with pressure transducers and manual inlet selection valves; 0.01 to 10.0 ml/min, P_{max}=100bar (2 each)

Reactor module: **HotCoil** reactor station ambient to 260°C (300°C option)

Coil reactors: 5.0ml stainless steel and 5.0ml coil reactors (1 each),

Computer: Laptop with **FlowLab** control application installed

Accessories: PTFE "T"-piece mixer and connecting tubing
100psi Fixed back pressure regulator and PEEK holder
Bottles and caps
Ethernet Hub and Wi-Fi router

FlowLab Cold™

2 Channel entry-level, flow chemistry system with active cooling

- 2 High pressure pumps with integrated pressure transducers
- Polar Bear *Plus* Flow™ cryogenic reactor module (-40°C to +150°C)
- FlowLab™ automated system control software with data logging
- Wi-Fi remote control
- Quickly save and reload experiments
- Optional chip holder
- Active cooling

FlowLab Cold™ is based around the same core components as **FlowLab** but the **HotCoil** reactor module is replaced by the Polar Bear *Plus* Flow cryogenic module. This allows experiments to be performed from –40°C to +150°C. No liquid nitrogen or card-ice is required when operating in sub-ambient mode.

A key advantage is the inclusion of active cooling which assists both in the temperature control of exothermic reactions and accelerates equilibration to new experiment conditions that require a lower reaction temperature

FlowLab Cold is compatible with all standard Uniqsis coil reactors and can also be fitted with an optional holder to accommodate Uniqsis glass static mixer/reactor chips. These give more reproducible mixing and temperature control in comparison to a simple 'T'-piece mixer.

This system can be operated remotely by Wi-Fi and the FlowLab control software auto-detects both the pumps and reactor module present.

UQ1026-C Uniqsis FlowLab Cold™ system comprises:

Pumps:	HPLC pumps with pressure transducers and manual inlet selection valves; 0.01 to 10.0 ml/min, P_{max} =100bar (2 each)
Reactor module:	**Polar Bear *Plus* Flow** cryogenic reactor station –40°C to 150°C
Coil reactors:	5.0ml and 14.0ml PTFE HT coil reactors (1 each),
Computer:	Laptop with **FlowLab** control software and flow chemistry toolbox apps. installed
Accessories:	PTFE 'T'-piece mixer and connecting tubing 100psi Fixed BPR cartridge and PEEK holder Bottles and caps Ethernet Hub and Wi-Fi router

FlowLab Column™

2 Channel system for catalytic flow chemistry

- 2 High pressure pumps with integrated pressure transducers
- HotCoil reactor module fitted with HotColumn adaptor (up to +260°C)
- 300°C option available
- 316L Stainless steel column reactor and flow path
- In-line back pressure regulators
- FlowLab™ automated system control software with data logging

FlowLab Column™ is an alternative configuration of the **FlowLab** system designed specifically for high temperature and pressure catalytic flow chemistry applications. At the heart of the system is a **HotCoil** heated reactor module fitted with a **HotColumn** adaptor. This can hold up 6 stainless steel HPLC columns in individual insulated holders. This configuration facilitates scale up whereby the required number of identical columns are simply connected in series.
Different diameter stainless steel columns and holders are available.

The flow path is constructed from 316L stainless steel and can operate at up to 100bar (200bar option) and 260°C (300°C option). Pressure regulating non-return valves are fitted before the column reactor to prevent the possibility of back flow into the pumps at any time.

Glass columns may also be accommodated, albeit at a lower P_{max}.

UQ1026-Col Uniqsis FlowLab Column™ system comprises:

Pumps:	HPLC pumps with pressure transducers and manual inlet selection valves; 0.01 to 10.0 ml/min, P_{max} =100bar (2 each).
Reactor module:	**HotCoil** heated reactor station fitted with **HotColumn** adaptor, 260°C (300°C option)
Column reactor:	3/8”OD x 7mm ID x 100mm 316L SS column reactor with frits and end pieces (1x complete, 3x spare column barrels)
Computer:	Laptop with **FlowLab** control software and flow chemistry toolbox apps. pre-installed
Accessories:	316L Stainless steel ‘T’-piece mixer and connecting tubing 2x 100psi fixed BPR cartridge non-return valves 500psi Fixed BPR cartridge and SS holder Bottles and caps Ethernet Hub and Wi-Fi router

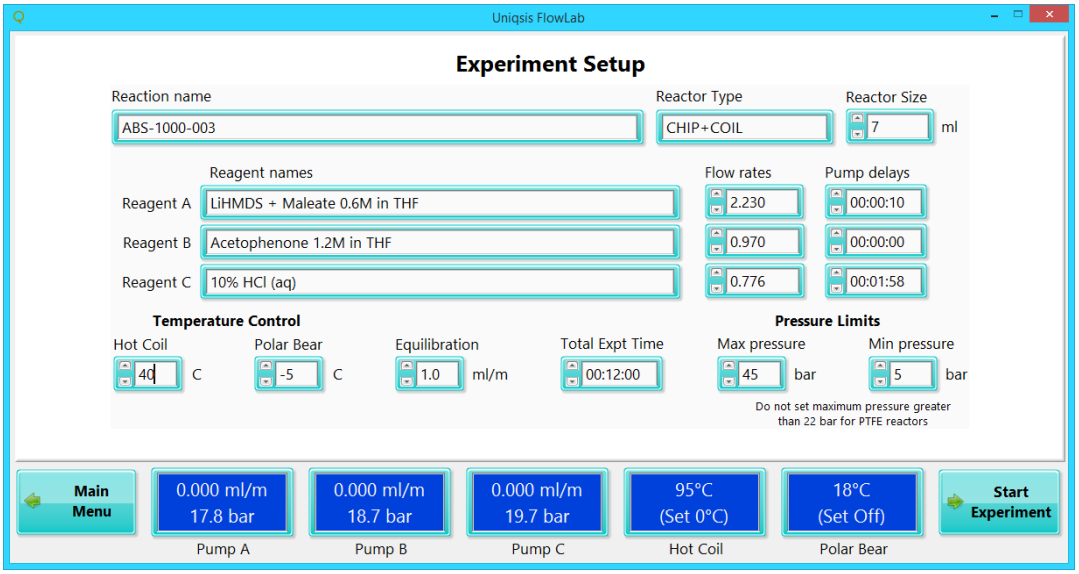
Uniqsis FlowLab™ optional extras:

A wide range of optional accessories are compatible with **FlowLab**. These include coil reactors in sizes ranging from 2.0ml to 60ml constructed of PTFE, PFA, 316L stainless steel, Hastelloy® or copper tubing, a selection of standard (PEEK) or chemically inert (Hastelloy® and perfluoropolymer) in-line back pressure regulator cartridges (5-50bar) and for convenience a manual outlet selection valve (UQ1029).

The **HotCoil** coil reactor can be fitted with the **HotColumn™** accessory (shown opposite). This can accommodate up to 6 column reactors for catalytic or scavenging applications and holders that fit different sized columns can be specified.

FlowLab can be further upgraded by adding an additional 3rd HPLC pump (supplied complete with manual inlet selection valve), or the addition of a 2nd reactor module. A combination of a **HotCoil** and a **Polar Bear Plus Flow** is particularly attractive since it gives an operational temperature range of –40°C to 300°C. As shown in the example below, the **FlowLab** control software is pre-configured to auto-detect these additional modules:

Setup screen with 3 pumps and both a HotCoil and Polar Bear Plus Flow ...



Flow-UV™ inline UV detector for flow chemistry

An inline **Flow-UV™** detector can also be added to monitor dispersion and help to determine the optimum point at which to begin and end product collection.

The high pressure flow cell can be conveniently inserted at any position in the flow path.

Multiple wavelengths may be monitored simultaneously.

Examples of Options & Accessories

UQ1028	HPLC pump with manual inlet selection valve, 10ml/min
UQ1022-38	FlowLab stand, 380mm
UQ1022-45	FlowLab stand, 450mm
UQ1029	Manual outlet collect/waste selection valve
UQ9002	50ml/min pumps heads for HPLC pumps
UQ3003	Stainless steel coil reactor set (2.5ml, 5ml, 10ml, 20ml)
UQ3005	HT coil reactor kit (2ml, 14ml PTFE HT and 2.5, 5ml, 20ml stainless steel)
UQ1035-2	HotColumn adaptor with 2 column modules for 15mm OD columns (columns not included)
UQ5002	Glass column kit, 2 x 15mm OD, 2 fixed, 1 adjustable end fittings.
UQ1053-001	Polar Bear Plus Chip integration holder
U-469	Back pressure cartridge holder, stainless steel
U-469T	Back pressure cartridge holder, PTFE
P-762U	Inert back pressure regulator cartridge (5 bar blue)
P-763U	Inert back pressure regulator cartridge (10 bar red)
P-766U	Inert back pressure regulator cartridge (20 bar red)
P-765U	Inert back pressure regulator cartridge (30 bar green)
P-795U	Inert back pressure regulator cartridge (40 bar black)
P-7000U-Kit	Set of 5 chemically inert BPR cartridges (5, 10, 20, 30 and 40 bar)

All system components are CE marked and are covered by a 12 month warranty against component malfunction and defective workmanship.

UQ1025 HotCoil Flow Reactor Heater — Specification	
Dimensions (on bench)	230mm (w) x 250 mm (d) x 280 mm
Power supply (Total)	220V, 1000VA or 110V, 1000VA
Weight	6.0 kg
System footprint	500 (w) x 450 (d)

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