



FlowLab *Plus*[™]

Flexible, plug-&-play flow chemistry systems



FlowLab *Plus*[™]

Plug-and-play, modular, multi-channel flow chemistry reactor systems



- Plug-and-play flow chemistry reactor system
- Choose from 2 to 4 pumps
- Choose from HotCoil[™], HotChip[™], Polar Bear *Plus* Flow[™], or GSM[™] reactor modules
- FlowControl II[™] automated system control and data logging software
- Optional in-line Flow-UV detector and/or fraction collector
- WLAN remote control

FlowLab *Plus*[™] is a flow chemistry reactor system comprised of a series of plug-and-play modules. The system can be quickly reconfigured by adding or removing units to adapt the flow path to suit a specific project. Similarly, the system can be readily upgraded over time to accommodate new modules and functionality as it becomes available.

All FlowLab *Plus* systems are built around a central **Binary Pump** dual-channel reagent delivery module (BPM). An additional BPM or up to 2 standalone HPLC pumps may be added to provide additional flow channels. Pumps can be fitted with 10ml/min or 50 ml/min pump heads.

A maximum of 4 standalone reactor modules can be added. A fraction collector, autosampler (for automatic filling of reagent sample loops) and an in-line UV/Vis detector are also available.

2-Channel systems are supplied with control software that is compatible with manual control of up to 4 reactor modules and permits basic automation. Upgrading to a 3 or 4 channel system or adding a fraction collector requires upgrading the control software to **FlowControl II[™]**.

Building your system:

FlowLab Plus Basic systems combine the **Binary Pump** dual channel reagent delivery module with up to 4 reactor modules. These systems can be operated in either manual or automated modes.

FlowLab Plus Advanced systems can be expanded to include up to 4 pumps and are also compatible with a fraction collector and/or autosampler for automated filling of sample loops. These systems require the optional **FlowControl II** software and can be programmed to run up to 100 sequential experiments.

Pumps: At the heart of every **FlowLab Plus™** system is the Uniqsis **Binary Pump Module™**. This is a dual channel reagent delivery system that incorporates all the necessary pressure sensors, injection loops and valves needed to build a custom flow chemistry reactor system. The **BPM** is available with 316L stainless steel, Hastelloy C-276, or PTFE acid-resistant flow path versions.



Binary Pump Module

This unit has its own control software which can be used to run a single automated experiment in combination with up to 4 reactor modules. However, when the system is controlled using **FlowControl II** software, up to 2 additional pumping channels may be added. These may be either standalone HPLC pumps, or another BPM to provide up to 4 independent reagent delivery inputs.

Reactors: Connect up to 4 reactor modules by ethernet and control them using the Binary Pump control software. Currently, available reactors include the **HotCoil™**, **HotChip™**, **Polar Bear Plus Flow™** (cryogenic coil reactor), **Polar Bear Plus GSM™** (cryogenic 'chip' reactor). These modules are compatible with all existing Uniqsis coil, and chip (GSM) reactors.



HotChip™ heated GSM reactor



HotCoil™ heated coil reactor



Polar Bear Plus GSM™ reactor



Polar Bear Plus Flow™ reactor

The **HotChip** and **Polar Bear Plus GSM** are dedicated plate reactor modules for GSMs — the latter with active heating and cooling control.

Any of the coil reactor modules can be converted to a multi-position column reactor module by added the **HotColumn™** adaptor accessory shown opposite). Both stainless steel and adjustable glass column reactors are available.

Software: The standard **BPM** is supplied with control software that can either be used to control the system manually, or to program and run a *single* automated experiment with basic logging capability.



In order to run a *series* of reactions automatically – for example to perform reaction optimisation or reagent profiling – and/or add a fraction collector, it is necessary to upgrade to **FlowControl II** software.

FlowControl II also allows integration of the Flow-UV™ UV/vis in-line spectrometer and can be used to programme up to 100 independent sequential reactions.

In addition, FlowControl II software automatically saves complete experimental methods and configurations and logs all associated data such that experiments can be repeated, modified and repeated, or simply re-analysed at a later date. The software outputs files in .txt or .xls format for direct import into electronic lab notebooks

Inline detector:

The Uniqsis Flow-UV UV/vis inline spectrophotometer can be included to provide real-time monitoring of axial dispersion. This is a full spectrum (200-1000nm) solid state instrument with a fixed wavelength option.

The high pressure flow cell can be positioned anywhere in the flow path. The output from the spectrometer is shown graphically in the FlowControl II control software. This is useful in order to direct product collection.

Alternatively, the Flow-UV can be used to automatically detect and collect reaction products according to pre-determined criteria. All the data generated is archived automatically.



Automated loop filling (Auto-LF):



Although the Binary Pump Module benefits from the inclusion of high pressure sample injection loops, these need to be filled manually for each experiment. This can become tedious.

The Auto-LF™ upgrade package includes a syringe pump and autosampler that automatically fills up to 4 sample loops selecting from up to 44 individual reagents prior to each experiment.

When combined with a suitable fraction collector, this enables FlowLab Plus systems to be programmed to automatically synthesise focused combinatorial compound libraries.

By utilising a separate autosampler and fraction collector, sample loops can be filled with reagents for the next experiment whilst the product from the current experiment is still being collected. This can significantly accelerate throughput for long experiment sequences.

Fraction Collectors:

The addition of a fraction collector is a cost-efficient upgrade that can greatly expand the scope and capabilities of an R&D flow reactor system.

FlowLab Plus flow reactor systems can be upgraded to include either a single or a 4-rack fraction collector.

These are compatible with a range of different sample collection racks and can be utilised to perform simple product fractionation or to take small aliquots for analysis, whilst simultaneously collecting a bulk sample in a separate collection vial.



FlowLab *Plus* Example Systems:

FlowLab *Plus* Basic with 2 Reactor Modules



- UQ1022S Binary Pump Module, 2x10ml/min, $P_{max}=40$ bar
- UQ1025-1 HotCoil™ coil heater, RT-260°C
- UQ3005 Coil reactor kit (2ml, 14ml PTFE and 2.5ml, 5ml, 20ml 316L SS)
- UQ1022-38 Equipment Stand, small
- UQ7000 Spare Parts Kit, fittings and tubing

FlowLab *Plus* Advanced with 2 Reactors, Fraction Collector and Flow UV:



- UQ1022S Binary Pump Module, 2x10ml/min, $P_{max}=40$ bar
- UQ1025-1 HotCoil™ coil heater, RT-260°C
- UQ1048 HotChip™ GSM ('chip') heater, RT-230°C
- UQ1100 Flow-UV™, in-line UV/Vis spectro photometer, 200-1000nm
- UQ1102 In-line, high pressure flow cell
- UQ1030 Fraction Collector, single collection rack
- UQ9000 FlowControl II™ software
- UQ3005 Coil reactor kit (2ml, 14ml PTFE and 2.5ml, 5ml, 20ml 316L SS)
- UQ5108 Glass Mixer, 20ml
- UQ1022-45 Equipment Stand, large
- UQ7000 Spare Parts Kit, fittings and tubing

FlowLab *Plus* Basic with 2 Reactors and Flow UV:



- UQ1022S Binary Pump Module, 2x10ml/min, $P_{max}=40$ bar
- UQ1025-1 HotCoil™ coil heater, RT-260°C
- UQ1048 HotChip™ GSM ('chip') heater, RT-230°C
- UQ1100 Flow-UV™, in-line UV/Vis spectro photometer, 200-1000nm
- UQ1102 In-line, high pressure flow cell
- UQ3005 Coil reactor kit (2ml, 14ml PTFE and 2.5ml, 5ml, 20ml 316L SS)
- UQ5108 Glass Mixer, 20ml
- UQ1022-35 Equipment Stand, small
- UQ7000 Spare Parts Kit, fittings and tubing

FlowLab *Plus* Options & Accessories

Core modules:

UQ1022S	Binary Pump Module, dual channel reagent delivery module
UQ1062	HPLC pump with pressure transducer, 10ml/min
UQ1025-1	HotCoil™ coil heater
UQ1048	HotChip™ GSM ('chip') heater
UQ1053	Polar Bear <i>Plus</i> Flow™
UQ5110	Polar Bear <i>Plus</i> GSM™
UQ1050-M2	Cold Coil MkII™, requires recirculator
UQ1030	Fraction Collector, single collection rack
UQ1040	Fraction Collector, 4 collection racks
UQ1094	Auto-LF™, automated sample loop filling upgrade
UQ1100	Flow-UV™, in-line UV/Vis spectrophotometer, 200-1000nm
UQ1102	In-line, high pressure flow cell (incl optical fibres)

Coil reactors (examples):

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)

Column reactors (examples):

UQ1035-2	HotColumn Adaptor™ with 2 column modules for 15mm OD columns
UQ5002	Glass column kit, 2 x 15mm OD, 2 fixed, 1 adjustable end fittings.

GSM ('chip') mixers/reactors:

UQ1053-001	Polar Bear Plus Chip integration holder
UQ5102	Small GSM, 2 channel, 2ml
UQ5106	Small GSM, 3 channel, 1.0ml
UQ5107	Large GSM, 2 channel, 10ml
UQ5108	Large GSM, 2 channel, 20ml

Software:

UQ9000	FlowControl II™ software, including laptop and Wi-Fi router
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Accessories:

UQ1022-38	Equipment Stand, small
UQ1022-45	Equipment Stand, large
UQ9002	50ml/min pump head for HPLC pumps
U-469T	Back pressure cartridge holder, PTFE
P-700U-KIT	Inert back pressure regulator cartridges (5, 10, 20, 30, 40 bar)
UQ7000	Spare Parts Kit, fittings and tubing

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