



titan

**continuous processing
scale-up**

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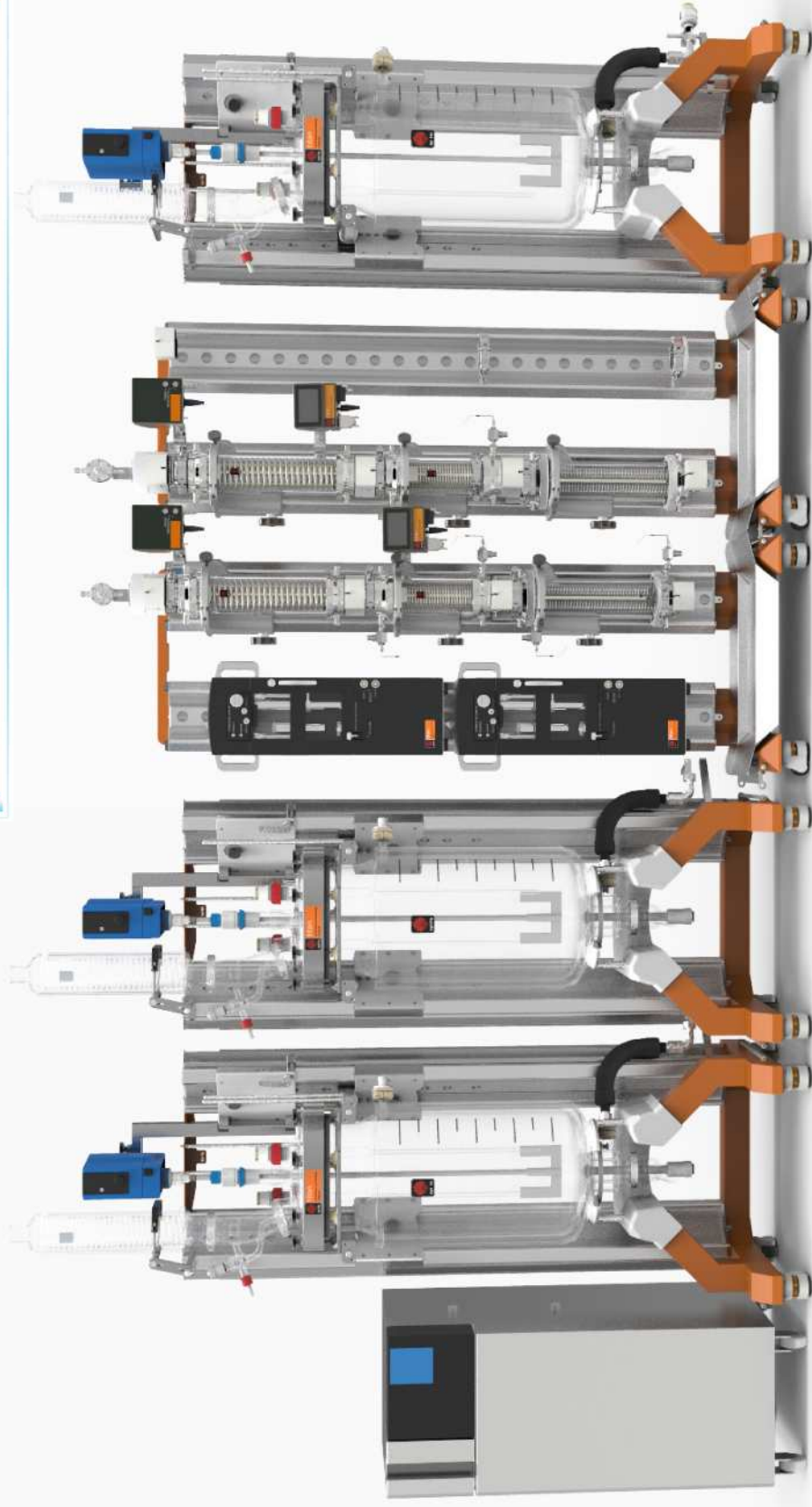
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The future of safe and reliable continuous flow scale-up



"Our vision has been to revolutionize flow chemistry and offer complete continuous processing solutions from lab scales through to manufacture. The future of continuous flow scale-up is finally here with the release of Titan."

Mark Gilligan, CEO, Blacktrace Group

» titan

Titan is a revolutionary continuous chemical processing system for production scales from kilo lab, through pilot plant, to manufacturing.

- » **Complete systems:** For development and scale-up of flow processes
- » **Highly flexible and modular:** Ability to quickly rearrange modules in minutes enables a wide variety of chemical processes to be performed
- » **High performance:** Ideally suited for high mass transfer and heat transfer reactions
- » **Extremely high chemical resistance:** Glass, fluoropolymer, Hastelloy, and Elgiloy wetted parts
- » **Scalability:** Modules can be quickly added or removed to modify both complexity and desired output of the process
- » **Easy to use:** Modules connect together in minutes and clip onto state-of-the-art intelligent framework, both floor standing and bench top
- » **Reliable and robust:** Designed for long term use in demanding manufacturing environments
- » **Manual or fully automated control**

» from lab scale

» to pilot plant

» to manufacturing

» specifications



Laboratory Scale

Titan modules can be scaled to fit your specific process for the development of a chemical process at the lab scale.

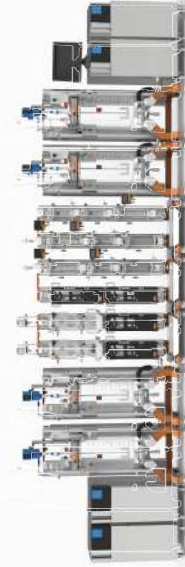
Our bench-top framework of Titan modules to be assembled on a lab bench cupboard.



Pilot Plant

Titan modules can be scaled to fit your specific process for quick and easy evaluation of chemical processes.

Our floor-standing framework allows you to scale up your process on the plant floor or in walk-in fume cupboards.



Manufacturing

Using the same continuous framework as the pilot scale, you can move straight up to full-scale production with minimal fuss.

The systems can produce up to a tonne (process dependent) of product per day.

Titan systems are designed with built-in safety features.

Reactor volumes: 64 mL and 250 mL reactors can be added in series to cover a wide volume range

Production rates: Output suitable for laboratory, pilot plant and manufacturing environments

System flow rates: 1 mL/min to 1 L/min

Pump flow rates: Up to 250 mL/min

Temperature range: -80°C to 250°C

Types of processes: Suited for both fast reactions with high mass transfer and heat transfer requirements, and slow reactions. Designed for use with multiple phases

Chemical compatibility: Glass, fluoropolymers, Hastelloy, and Ethilyn welded parts

Automation: Control process parameters from the modules, via Titan software, or via an existing PLC or plant software

Safety: Interlocks, anti-sampler pressure detection, and auto shut down features

Titan Syringe Pump

The pump offers extremely low flow rates (down to 0.001 mL/min) and high flow rates (up to 200 mL/min) with low resistance - all wetted parts are made from 316L stainless steel. Full automation. Full automation.



Titan Reactors

Titan features various reactor modules that can be quickly connected together to create single- or multi-step, and multi-phase reactors.

Pre-reaction Heat Exchanger
Cooling liquid prior to the reaction.

Post-reaction Heat Exchanger
Cooling liquid after the reaction, typically back to near ambient temperature.

Titan Reactor Frame

The framework enables the reactor modules to be easily clipped on and off. The frame can be quickly clipped together. The frame is made from a durable, adjustable swivelling mechanism and integrated electrical and control cables.

Titan Reagent Store & Product Collection

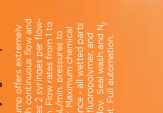
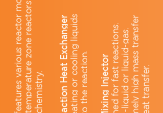
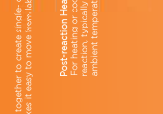
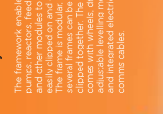
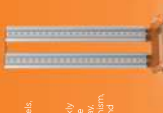
Temperature controlled reagent and product collection. Collector features a powerful stirrer. Optional full automatic reagent dispensation is available. The collector is mounted on a frame with vessel sized from 1L to 50 L. Quick vessel and stirrer changes.

Titan Temperature Control

Titan Reactor Controllers work with ONE system to accurately control the temperature of the reactor and Titan Store simultaneously.

Titan Accessories

A wide range of accessories is available for control of Titan reactors, including: Baskets, Dip Tubes, Cooling Jackets, and Shelves. The Titan Pressure Controller is available for control of up to 20 bar. Full range of accessories, please contact Synto.



Titan is designed and manufactured by Syrris, the world's longest established provider of laboratory scale flow chemistry systems.

Syrris' network of offices in the UK, USA, Japan, India and Brazil plus over 35 distributors worldwide offer local service and support.



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