



LabKit reactor system with 5 dosings, rectification with distillate weighing, phase separation and sampling



LabKit dual stage reaction system with 6 dosings, product processing and CIP function



LabKit with 2 l glass reactor for pressures up to 5 bar



LabKit automatic polymerisation device, 25 bar, product bottling, CIP function, endoscopic camera

What's LabKit?

LabKit units are custom build reaction systems for batch or continuous reactions in chemistry, pharmaceutical, bio- or food technology. They are laboratory reactors as well as pilot plants or miniplants, for multiple stage synthesis, distillation, rectification, extraction or crystallization. Single, multistage and parallel reactor systems are available.

A large range of components, from reactors made of glass or metal, devices for stirring, gas, liquids and solids dosing systems, for the control of temperature, pressure, pH and other parameters allow the realisation of nearly every demand. LabKit reaction systems are suited for:

- ▶ **Scale-Up,**
- ▶ **Process development,**
- ▶ **Process optimisation,**
- ▶ **Small scale production,**
- ▶ **Instruction etc.**

Beginning with automated laboratory reactors up to multi-reactor systems with automatic product processing - everything is possible. Sampling from the reactor, electric reactor lifting device, CIP are some of the potentials. Upgrading for reaction calorimetry may be done also for existing systems.

Assembling a laboratory reaction system using single components like pH-controller, dosing controller, vacuum controller, data acquisition system, process controller etcetera is not the best solution. Where the lack of control over the whole system limits those multicomponent systems, LabKit outperforms them with its automation system LAB-manager. LAB-manager combines all these devices in a single DIN housing.

The advantages:

- **Advice, design, fabrication, assembly, implementation and training from one source**
- **Customized from your recommendations**
- **Calculable time and effort**
- **Open system, easy handling**
- **Expansion possible: automatic sampling, product processing, CIP function, online analytics, reaction calorimetry...**
- **Space saving construction**
- **Optimal use of laboratory resources by 24 hour operation**
- **Best reproducibility**
- **Quality gains**
- **Relief from routine work**
- **Reduction of risks**

The automation:

Due to the multifunctional and easy to use automation with the HiTec Zang LAB-manager system, even complex demands may be solved by users without special knowledge in automation techniques. This compact device may be mounted by the reaction system, a control cabinet is unnecessary. Standardized connectors support all usual sensors, actuators and laboratory devices like balances and even analyzers.

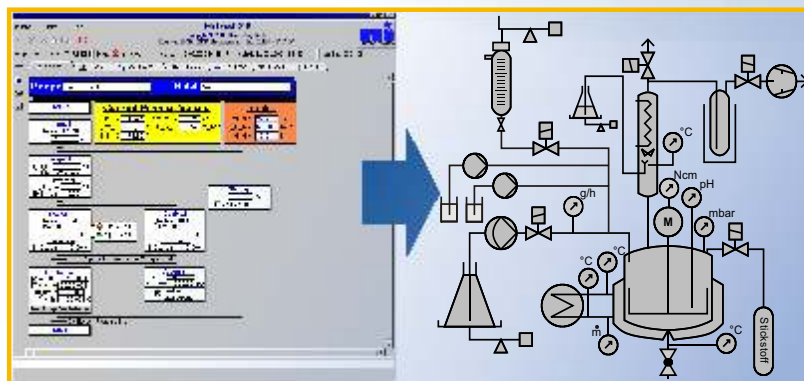
With the graphical recipe editor HiBatch and the unit operations library you are able to build self documenting recipes of any complexity.

- **Unmatched user friendliness**
- **NAMUR automation conformity**
- **Simple graphical recipe control**
- **GLP documentation conformity**
- **Access via network (e.g. from your office)**
- **Telephone support**



The possibilities:

- ▶ Temperature control
- ▶ Pressure and vacuum control
- ▶ pH control with acid and/or base, titration
- ▶ Dosing of liquids, gravimetric and volumetric, with pump or gas pressure
- ▶ Dosing of solids and gases
- ▶ Continuous distillate weighing
- ▶ Continuous reactor weighing
- ▶ Reflux boiling, distillation, rectification
- ▶ Single and multistage reactions
- ▶ Automatic drain valve/ Phase separation
- ▶ Reaction calorimetry
- ▶ Serial or parallel multireactor systems
- ▶ Stirring with rotational speed and torque Control
- ▶ Automated sampling and bottling
- ▶ Product processing
- ▶ Recipe control following the NAMUR unit operation concept
- ▶ Online analytics



LabKit modules:

You may choose between different frameworks, vessels, apparatuses, instrumentation and automation apparatus.

Elaborate details, like a reactor lift with electric actuation, facilitate your work. Additional features like solids dosing or reaction calorimetry are available.

LabKit systems are delivered turnkey ready and are placed into operation at your site.

Modules:

Frameworks	Square profiles made of anodized aluminium, SS retention vessel, power distribution. Optional SS framework with powder coated connectors.
Reactors	0,25 ...100 l double wall reaction vessels, PTFE drain valve, reactor lid with central stirrer neck and up to 8 additional necks, glass up to 10 bar, SS up to 300 bar, special materials.
Reactor lift	Electrical acuated lift for the reaction vessel.
Stirrer motors	ViskoPakt and ViskoPakt-rheo precision stirrer motors, rotational speed control, torque measurement
Stirrer blades	Propeller,impeller, blade and anchor stirrer, other on request.
Gravimetric dosing	Gravimetric dosing with GraviDos (controlled dropping funnel) or with pump and balance.
Volumetric dosing	Dosing with diaphragma pump, peristaltic pump, ...
Dosing small volumes	Dosing with syringe pump.
Gas dosing	Gas dosing with Mass Flow Controller.
Solids dosing	SoliDos solids dosing device, suitable for vacuum .
Automatic drain valve/ phase separation	GLP valve optional. With electric or pneumatic actuator.
Heating/cooling systems	Thermostatted circulation oil baths from Huber, Julabo, Lauda etc. With control by LAB-manager
Sensors	Temperature probes Pt100 for reactor inner temperature, thermostat temperature,steam temperature (opt.). pressure (opt.), pH (at pressures up to 10 bar). Monitoring of temperatures with shutdown procedure
Pressure control	Pressure sensor, e.g. 0 bis 1,6 bar. Optional dual sensors for increased precision at low pressure.
Vacuum control	Chemistry vacuum pump with cold trap. Sensor 0 ... 1,6 bar. Pressure control 0,1 mbar ... 1 bar. Vent valve, vacuum control valve.
Pressure control/Inerting	Pressure control module (Standard 1,6 bar) combined with inert gas supply. Inert gas valve and vent valve with control. Optional pressure regulator.
Overpressure protection	Spring loaded overpressure ball valve made from glass, 0,1 bar for unpressurized systems. Rupture disk for pressure systems, pressure relief valves.
Simple inerting	Inert gas delivered by a solenoid valve with control (only for unpressurized systems with vent line). Optionally pressure regulator and vent valve.
Reflux boiling/Distillation/ Rectification	Jacketed condenser, steam temperature probe. Continuous distillate weighing with balance 0,01...4100 g. Packed column.
Reactor weighting	Up to 100 kg, resolution < 1g at 7kg load.
Reflux divider	Solenoid actuated reflux divider, controlled reflux ratio
pH control, titration	Two AlfaDos dosing systems (optional GraviDos or dosing pumps) for acid and base with controller.
Automatic sampling and dispensing	Automatic sampling, with multiposition valve (up to 12 positions) or with AutoSam liquid handling system (up to 60 positions).
Miscellaneous functions	Extraction with phase separation(PhaDec/PhaSep), filtration, CIP etc..
Reaction calorimetry	Heat flow and heat balance calorimetry, opt. Online data evaluation, controlled calibration heater
Extended temperature range	Extension of heating/cooling system and seals to higher or lower temperatures on request.
Materials with media contact	Predominantly borosilicate glass, PTFE, PVDF, Viton, SS 1.4571 (other materials on request).

Other functionalities and customized solutions on request.



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