FlexyPAT

Individual automation solution

FlexyPAT stands for a modular and flexible Process Automation Technology (PAT). In addition to customised all-in-one solutions, the modular concept facilitates the integration of existing customer-owned hardware. Not only does this reduce the cost but it also speeds up the automation process and increases user acceptance.

Your advantages

- Intuitive and flexible recipe control
- Modular design and cost-effective extension options
- Plug&Play technology for sensors and actuators
- Variety of reactors available
- Electronic lab journal
- Alarm concept for unsupervised operation
- Existing devices can be integrated
- Up to 6 reactors can be controlled via a single PC

Typical areas of application

- Process development
- Process engineering
- Process Analytical Technology (PAT)
- Scale-up/Scale-down
- Kilo-lab/small-scale production
- Morphology
- Thermal-physical process technology

schmizo swiss scientific glass

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The applications

FlexyPAT

FlexyPAT enables optimal automation of conventional double-jacketed reactors, whether it is for research and process development or for use in the scale-up lab.

The range extends from small volumes up to several litres. For vacuum or pressure applications, the modular FlexyPAT automation technology and PC-based control allow you to reproduce and fully document all chemical processes.

Areas of application

Thanks to its extremely intuitive and flexible recipe control software, FlexyPAT constantly adapts to your requirements, whether it is for process development, process engineering or scale-up/scale-down. Optional HFC calorimetry allows even inexperienced users to evaluate thermal safety investigations.

Functions & Options

A variety of functions are already available in the basic version and further options can be implemented easily at any time:

- Temperature regulation, jacket or reactor
- Stirrer speed measurement and regulation
- Stirrer torque measurement
- Gravimetric or volumetric dosing
- pH measurement and control
- Minutely detailed logging
- Automatic distillation with reflux divider and boiling point detection [1]
- Pressure/vacuum measurement and control [1]
- Hydrogenation function [1]
- Isothermal heat flow calorimetry [1]
- Automatic solubility curve calculation [1]
- Option to integrate online sensors (turbidity measurement, mid IR FTIR, particle size analyser, etc.) [1]

[1] optional
[2] other ranges/volumes/materials on request

The Technology

Costomised

FlexyPAT is a standardised yet modular Process Automation Technology offering cost-effective, customer-specific "on demand" solution, even for constantly changing requirements. The option to integrate existing lab equipment, even from third-party suppliers, is almost unlimited.

Thanks to its intelligent sensor recognition technology, FlexyPAT can be reconfigured in no time at all and can be extended with virtually no restrictions. The modular design of FlexyPAT combines a high degree of flexibility and the best possible protection for your investment.

System components

As a turnkey product, FlexyPAT contains the following components:

- Reactor frame and electronic modules
- FlexySys application software with basic functionality
- PC with Win7 and MS Office [1]
- 1 litre double-jacketed reactor, glass, complete [2]
- Heating/cooling thermostat, range –20°C to 200°C, complete [2]
- Stirrer motor up to 2000 rpm [2]
- 1 function set for gravimetric, temperature-controlled dosing, with pump and scales [2]

Modules

The basic version already offers sufficient modules for the most common applications: :

UVM universal module with:

- 8x universal plug-in slots for measuring input of temperature/voltage/current, or measuring output of voltage/current, or digital on/off

COM communication module for:

- 4x RS232 connections to communicate with peripheral devices (scales, thermostats, stirrers, etc.)

NET network module with:

- 5x network connections for 10/100M Ethernet

PSM power supply module for:

- Power output to supply power to sensors/actuators and other modules

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The apparatus

Synergies

The synergy created by the glass manufacturer, system engineering and automation specialist offers customers optimal solutions to suit their specific needs. This combination makes it possible to provide complete individual applications with the best possible customer value, even for long-term projects.

Individual

Individual options are available not only in automation, but also in plant engineering and in the layout of glass reactors. The standard range does not just include dead-volume-free ground outlet valves, with or without an integrated temperature sensor; the customer can also make special requests, for example for additional connections for a wide range of applications.

Software

Success factor

The "FlexySys" software is intuitive and easy to use. It is quick to set up and enjoys a high level of acceptance, impressing its users with its flexibility.

Manual mode

The easily comprehensible functions and the clear overview of the equipment make the introduction to lab automation quick and easy, even for inexperienced users. All the functions are available in manual mode.

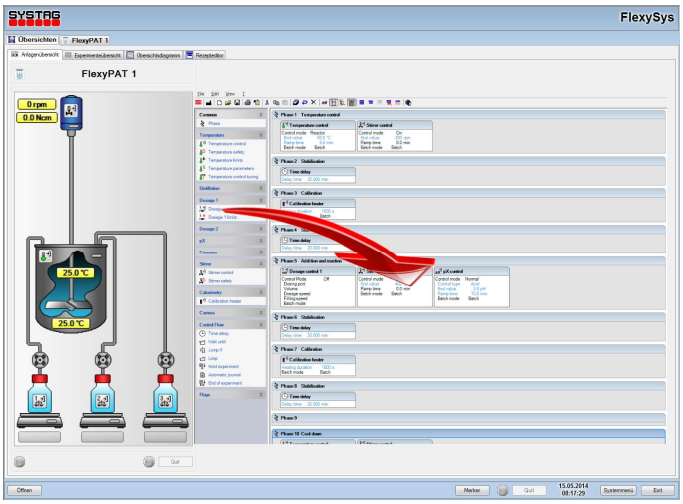
Recipe mode

A "drag and drop" recipe editor is available to automate more complex processes. This includes an integrated plausibility test, alarm and monitoring functions, right through to automatic webcam control, so you can also document your experiments with images.

Simple sequencing of the basic functions (temperature, dosing, stirring, etc.) creates a recipe in no time at all, with a permanent manual correction option "on the fly".

Lab journal

All actions made either manually or via recipe control, are fully logged in an electronic lab notebook (MS Word, GxP compliant). All the reports are available to the user in both graphic and tabular form, without the need for long-winded exporting or formatting.



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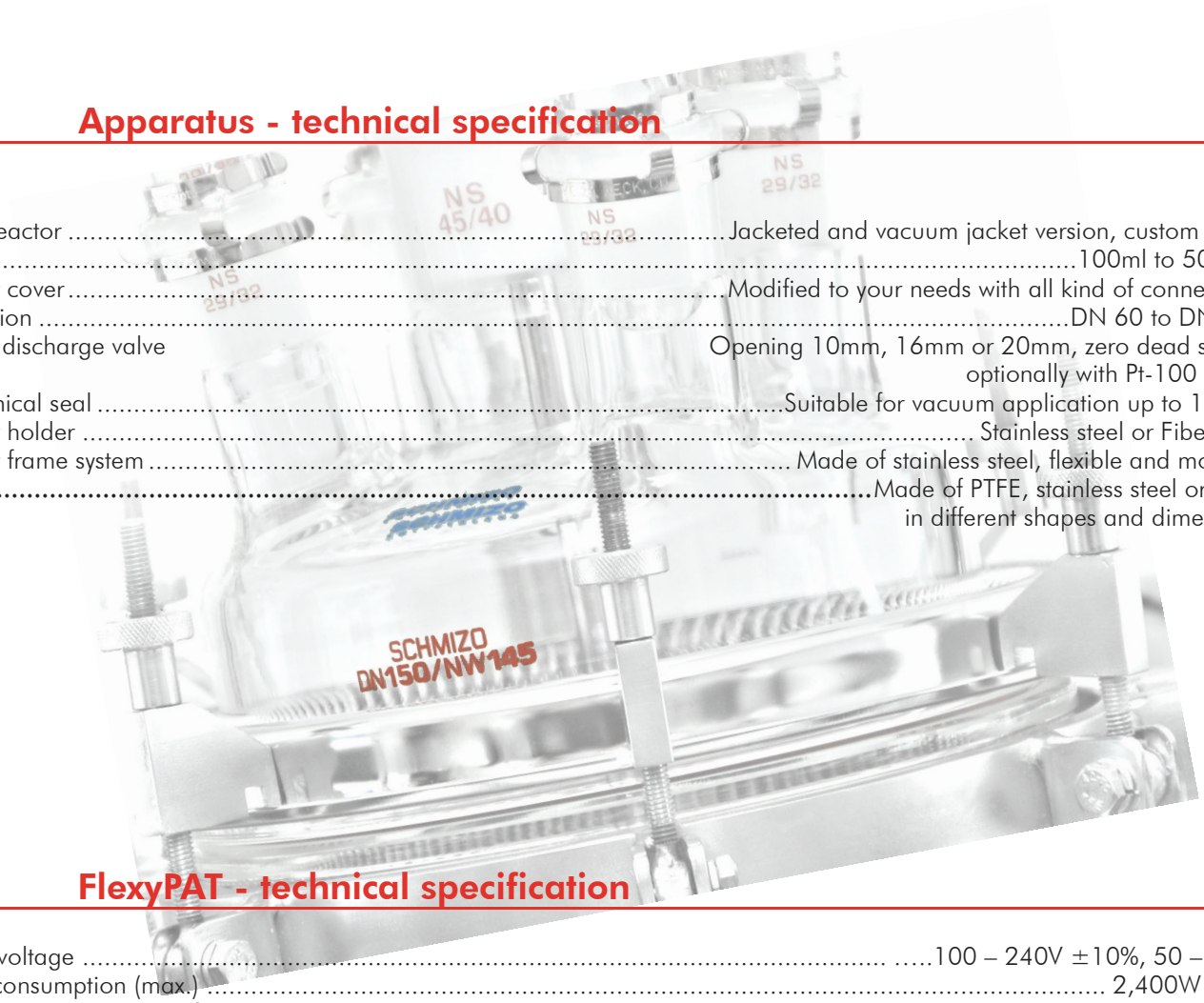
Apparatus - technical specification



Glass reactor	Jacketed and vacuum jacket version, custom made
Volume	100ml to 5000ml
Reactor cover	Modified to your needs with all kind of connections
Dimension	DN 60 to DN 150
Bottom discharge valve	Opening 10mm, 16mm or 20mm, zero dead space, optionally with Pt-100 probe
Mechanical seal	Suitable for vacuum application up to 1 mbar
Reactor holder	Stainless steel or Fiberglass
Reactor frame system	Made of stainless steel, flexible and modular
Stirrer	Made of PTFE, stainless steel or glass in different shapes and dimensions

FlexyPAT - technical specification

Supply voltage	100 – 240V ±10%, 50 – 60Hz
Power consumption (max.)	2,400W (10A)
Power capacity (provided for stirrer, metered addition, scales, etc.)	2,000W
Temperature range	10 – 35°C
Humidity	80% (non-condensing)
Protection class	IP44
Surface finish	stainless electro-polished/powder-coated
Dimensions of FlexyPAT Tool (excl. mobile trolley)	550 mm (W) x 835 mm[1] (H) x 500 mm (D)
Weight	30 kg (depends on expansion stage)
Measuring input, temperature	x4, resolution 0.01 K, range −150°C – 400°C
Measuring input, voltage	x8[2], resolution 25 mV, range 0 – 10 V
Measuring input, current	x8[2], resolution 50 mA, range 0 (4) – 20 mA
Control output, voltage	x8[2], resolution 25 mV, range 0 –10 V
Control output, current	x8[2], resolution 50 mA, range 0 (4) – 20 mA
Control output, digital On/Off	x8[2], 24V, 2A
FlexyBUS expansion connections	x2
Network connections for 10/100M Ethernet	x2, RJ45, for CAT 5e cable
RS-232 connections (to communicate with stirrer, thermostat, scales, etc.)	x4

[1] Arch height and suspension mast can be dismantled if necessary, lower heights also available

[2] Two measuring inputs for current and voltage and three control outputs for current, voltage and "digital On/Off" are available for each socket. The number of inputs and outputs actually accessible when using preassembled cables (recommended) is smaller.

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