

# Sartoflow® Study

Your Best Assistant in Ultra  
and Diafiltration



## Description

The Sartoflow® Study will prove to be your best assistant in ultra- and diafiltration applications. This manual benchtop crossflow system has been optimized for ultrafiltration, microfiltration and diafiltration applications used in many downstream processes.

It will assist you by conveniently displaying interactive prompts for easy guidance through entire sequences, that will enable you to be more productive during the purification of monoclonal antibodies, vaccines or protein solutions.

This innovative system is ideal for flexible use in laboratory environments for process development and clinical trials, as well as for small-scale production batches. Several standardized options are available to enable you to obtain just the right system, exactly tailored to meet your individual requirements.



The system can also be upgraded with additional options if your requirements change during process development or production.

This crossflow system is equipped with our DCU-4 control unit that readily communicates with Sartorius, BioPAT® Scada, MFCS software.

The Sartoflow® Study can be configured to accept either Sartocon® Slice or full-sized Sartocon® cassettes. As a result, this gives you an exceptionally wide range of membrane areas from 0.1 to 2.1 m<sup>2</sup>. The system's unique compact design has an ultralow loop volume of ~200 ml, enabling you to concentrate even small process batches with optimal product recovery.

The Sartoflow® Study can be run in demanding production environments.

## Filtration Module

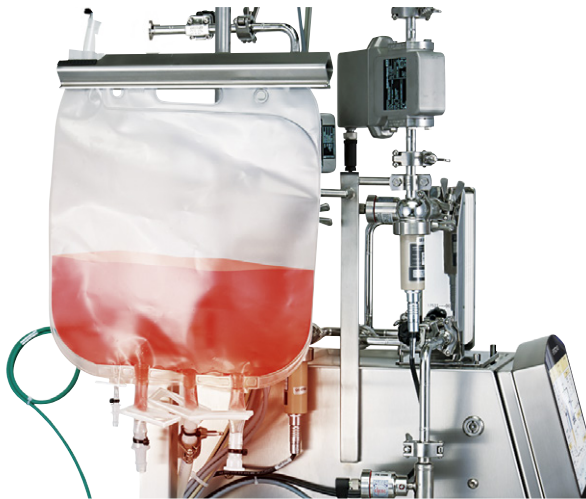
The filtration module includes a Sartocon® Slice holder – or as an option, a holder for full-sized Sartocon® Eco cassettes, three pressure sensors, a flow meter in the permeate line, a four-piston diaphragm recirculation pump (0.7 m<sup>3</sup>/h @ 4 bar) and a load cell for level control.

One or two peristaltic feed pumps are optionally available, making it possible to load product or buffer as a discrete process step.

## Recirculation Module

The recirculation tank uses a load cell for level control. The Sartoflow® Study is available with a 10 L polypropylene tank; a cylindrical 10 L stainless steel tank with a conical base and with an optional sight glass; a double-jacket vessel for cooling; and, for single-use crossflow bags used in place of tanks, a bag stand to accommodate 5 L, 10 L or 20 L single-use crossflow bag sizes. All control functions are fully operable whether you run the system with a polypropylene tank, a stainless steel tank or a single-use bag.

The stainless steel tanks are equipped with a vortex breaker and a dip tube to prevent foaming.



Bag

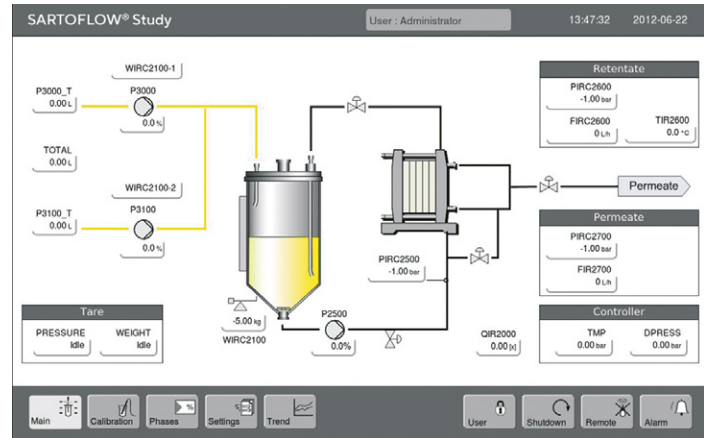


Tank

# Control Functions

All control and alarm functions are set and displayed on the 12" touch screen. The screen displays all signal readouts, set point controllers and trend curves, ensuring user friendly operation. It enables immediate process control, even when you change parameters on the fly. Active controllers and alarms are visualized on the main display.

The logbook function stores alarms, set points and user's log changes. All logbook inputs can be read into the optional MFCS/Win Scada software program and can be personalized using three-level password protection.

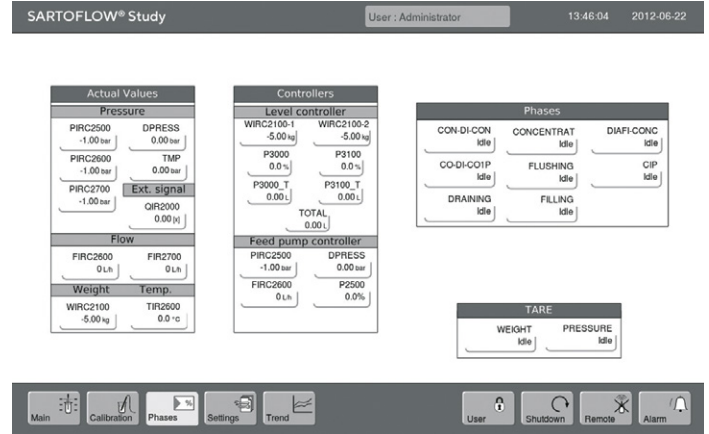


DCU-4 Touch Screen

# Process Sequences

You can use predefined parameters to automatically run customized sequences for concentration, diafiltration (UF | DF), rinsing, filling, draining, CIP steps and tare functions.

All Sartoflow® Study units are equipped with feed pressure and level controllers for operating the system at user-defined set points. The feed pressure controller keeps the feed pressure constant by controlling the pump speed (the feed pressure is the defined value). Delta P and the retentate flow are controlled by the recirculation pump speed.



Process Sequences

## Data Acquisition

Data are collected using an external PC (not part of the equipment supplied) connected to the Sartoflow® Study system over an ethernet interface. Scada MFCS software for data acquisition, batch management and visualization is included in the Sartoflow® Study package.

In addition, you can easily integrate this system into existing MFCS networks with Sartorius bioreactors or fermenters and incubation shakers.

## cGMP Production Environment

Optionally validated MFCS/Win software can be upgraded with our 21 CFR Part 11 and S88 recipe option. The BioPAT® MFCS/Win OPC specifies the communication of real-time data between control devices from different manufacturers. This convenient option offers you the possibility of connecting the Sartoflow® Study to Delta V.

Sartoflow® Study will assist you by conveniently displaying interactive prompts for easy guidance through the following phases that are available on systems with installed peristaltic pumps:

Con-Di-Con	Used to concentrate the product to a predefined level and to diafilter the product subsequently - followed by concentration to a final level.
Concentration	Used to concentrate the product to a predefined final level.
Diafi-Conc	Diafiltration of the product. At the end of this phase, the product is concentrated to a predefined volume.
CIP	Used to clean the system, including all valves, pipework and tank, by using WFI, acidic or alkaline solutions.
Flushing	Used to rinse the system by flushing the pipework and tank with WFI, acidic or alkaline solutions.
Drain   harv	Used to drain or harvest the product from the system.
Filling	Used to fill the tank or bag with the product.
Weight	Automatically zeros the load cell before changing to a different phase.
Pressure	Automatically zeros all pressure sensors before using a different phase.

Just select and start the phases on the control panel, and the DCU-4 will then execute the steps automatically. Interactions or process end will be indicated by text messages.

Sartoflow® Study is a modular system offering numerous standard and optional features:

## Modules

- Standard module
  - Filtration module 230 VAC | 50 Hz 2.5 Amp, 120 VAC | 60 Hz 4 Amp:
  - Four-piston diaphragm feed pump,
  - Sartocon® Slice filter holder, three pressure sensors, one flow meter in the permeate line, one load cell, a touch screen with DCU-4 control and Scada MFCS software for data acquisition.

## Recirculation Modules

- 10 L polypropylene vessel
- 10 L stainless steel tank
- 10 L stainless steel tank with a sight glass
- Double-jacket tank, 10 L, stainless steel, with a sight glass
- Bag holder for single-use crossflow bags

## Options

- Flow meter in the retentate line
- Temperature probe retentate
- 1<sup>st</sup> and | or 2<sup>nd</sup> peristaltic pump
- Sartocon® filter holder for up to three full-sized Sartocon® Eco cassettes

## Optional Software

- MFCS/Win standard software package
- Recipe control (S88) software module
- 21 CFR part 11 software module
- BioPAT® MFCS/Win OPC

## Consumables

Order Number	Crossflow Bag Specification
FBB111332	5 liters
FBB111333	10 liters
FBB111334	20 liters

## Technical Specification

Dimensions (H × L × W)	1,100 mm × 800 mm × 680 mm
Weight	~ 120 kg (~ 265 lbs.)
Electrical requirements	230 VAC   50 Hz 2.5 amp 120 VAC   60 Hz 4 Amp
Pump output	700 l/h @ 4 bar (60 psi)
Filter area	0.1–0.5 m <sup>2</sup> (optional 0.7–2.1 m <sup>2</sup> )
Minimum recirculation volume	~ 400 ml (with PP-vessel) ~ 200 ml (with stainless steel-vessel)
Material	Stainless steel (316 L)
Max. inlet pressure	4 bar (60 psi)
Weighing range	0 to 100 kg
Pump output	700 l/h @ 4 bar (60 psi)
Communication connection	Ethernet
IP-Standard	33



Sartoflow® Study filtration module with tank (316 L) module

# Sartocon® Eco New Hydrosart® Ultrafiltration Cassettes

## Order Information

Available types and order numbers

Type	Filter Area	Cut-Off	Order No.
Sartocon® cassettes	0.7 m <sup>2</sup>	10 kD	3M21443907E--SW
Sartocon® cassettes	0.7 m <sup>2</sup>	30 kD	3M21445907E--SW
Sartocon® cassettes	0.7 m <sup>2</sup>	100 kD	3M21446807E--SW
Sartocon® Slice cassettes	0.14 m <sup>2</sup>	10 kD	3M51443901E--SW
Sartocon® Slice cassettes	0.14 m <sup>2</sup>	30 kD	3M51445901E--SW
Sartocon® Slice cassettes	0.14 m <sup>2</sup>	100 kD	3M51446801E--SW

## Sartocon® Slice Cassettes

Ultrafilter Membrane	Area	MWCO	Part Number
Hydrosart® UF	0.1 m <sup>2</sup>	2 kD	3051441901E--SW
Hydrosart® UF	0.1 m <sup>2</sup>	5 kD	3051442901E--SW
Hydrosart® UF	0.1 m <sup>2</sup>	10 kD	3051443901E--SW
Hydrosart® UF	0.1 m <sup>2</sup>	30 kD	3051445901E--SW
Hydrosart® UF	0.1 m <sup>2</sup>	100 kD	3051446801E--SW
PESU UF	0.1 m <sup>2</sup>	1 kD	3051460901E--SW
PESU UF	0.1 m <sup>2</sup>	5 kD	3051462901E--SW
PESU UF	0.1 m <sup>2</sup>	8 kD	3051463401E--SW
PESU UF	0.1 m <sup>2</sup>	10 kD	3051463901E--SW
PESU UF	0.1 m <sup>2</sup>	30 kD	3051465901E--SW
PESU UF	0.1 m <sup>2</sup>	50 kD	3051465001E--SW
PESU UF	0.1 m <sup>2</sup>	100 kD	3051466801E--SW
PESU UF	0.1 m <sup>2</sup>	300 kD	3051467901E--SW
PESU UF	0.1 m <sup>2</sup>	Albumin	305146AL01K--SW

## Microfilter Membrane


Hydrosart® MF	0.1 m <sup>2</sup>	0.2 µm	3051860701W--SW
Hydrosart® MF	0.1 m <sup>2</sup>	0.45 µm	3051860601W--SW
PESU MF	0.1 m <sup>2</sup>	0.1 µm	3051545801W--SW

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