

### 2/4 m<sup>2</sup> Hollow Plate™ MF/UF Pilot Plants

The SANI Membranes Hollow Plate™ MF/UF Pilot Plants can be used for membrane screening, process development, pilot production and in smaller production setups. The Pilot Plants are designed to work with all the Hollow Plate™ technology membrane filtration benefits, where a larger flow over the membrane leads to very uniform Trans Membrane Pressures and an option to run at very low pressures. The standard Pilot Plants comes in a PLC controlled and a manual version with 2,1 or 4,2 m<sup>2</sup> membrane area as standard. The standard Pilot Plants can be customized to a given application. SANI Membranes can also design and produce a custom Pilot Plant from scratch - tailored for your specific application and special needs.

The PLC controlled Pilot Plant can be operated 24-7 via flexible and easy programming. The process parameters (pressures, flows, temperatures, frequencies etc.) are automatically logged for later analysis. The Pilot Plants can run flow controlled or pressure controlled programs during production and CIP programs for periodic cleaning cycles. All programs are 100% flexible and can be designed for the application at hand and modified during testing. The retentate and the CIP process can be temperature controlled through cooling/heating. Retentate and permeate can be sampled during operation. The PLC controlled Pilot Plant can be customized to a given application by adding additional instruments and functionalities.

The Manual Pilot Plant is operated via frequency converters, analog valves and instruments. Samples of retentate and permeate is taken manually. The Manual Pilot Plant can be customized to a given application by adding inline heat exchanger, thermometers, manometers, flowmeters etc.

The 2,1 m<sup>2</sup> version is equipped with a Hollow Plate™ Pilot Module - HPPM06 - with 6 Hollow Plate™ Pilot Elements. The 4,2 m<sup>2</sup> version is equipped with a Hollow Plate™ Pilot Module - HPPM12 - with 12 Hollow Plate™ Pilot Elements. The Hollow Plate™ Pilot Elements has individual permeate outlets which makes simultaneously testing of up to 12 different membranes possible. The modules are designed with several inspection windows, making visual inspection of the membranes possible during production and CIP.

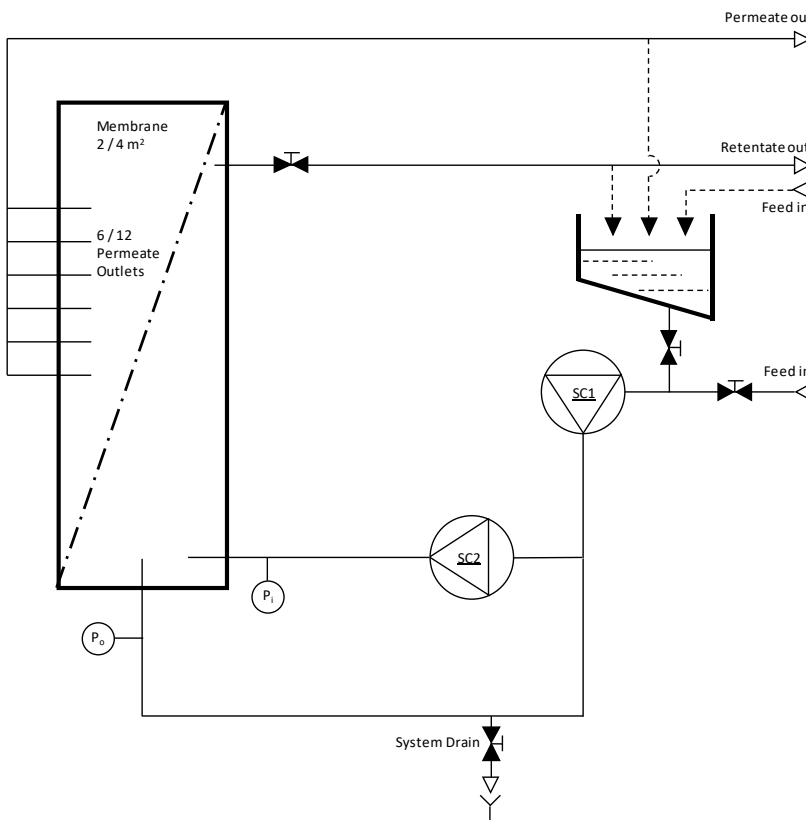
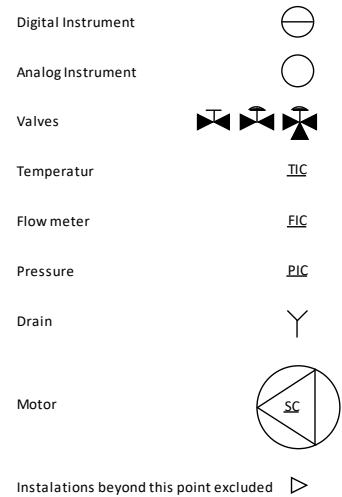
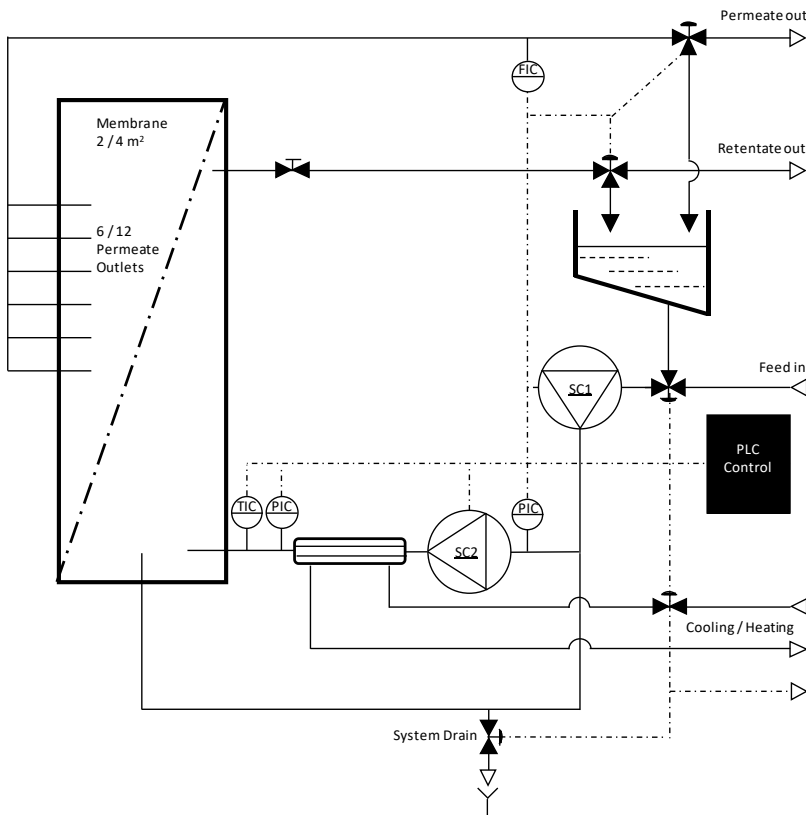


The PLC controlled Pilot Plant

- Gives you all the benefits of the Hollow Plate™ technology.
- Uses 6 or 12 0,35 m<sup>2</sup> Hollow Plate™ Pilot Elements - HPP.
- Operates 24/7 via intuitive programming of the PLC-controlled valves and motors.
- Flexible software for programming of stand-by, production, draining, CIP cleaning etc.
- Automated data logging of pressures, flow velocities, feed temperature, motor frequencies etc.
- Automated temperature control of the retentate is possible through the inline heat exchanger.
- The Pilot Plant can be flow controlled or pressure controlled through the intuitive programming.
- CIP cycles can be performed via the 40 L Feed/CIP tank with PLC controlled heating through the inline heat exchanger.
- The permeate outlets are as standard connected and the flowmeter enables flow control of the system.
- Individual permeate outlets from each Hollow Plate™ Pilot Element makes tests of up to 12 different membranes possible.
- Samples of retentate and permeate is taken manually.

The Manual Pilot Plant

- Gives you all the benefits of the Hollow Plate™ technology.
- Uses 6 or 12 0,35 m<sup>2</sup> Hollow Plate™ Pilot Elements - HPP.
- Operates with manual control of all functions.
- Temperature control of the retentate is possible through the inline heat exchanger (optional).
- CIP cycles can be performed via the 40 L Feed/CIP tank.
- Individual permeate outlets from each Hollow Plate™ Pilot Element makes tests of up to 12 different membranes possible.
- Samples of retentate and permeate is taken manually.

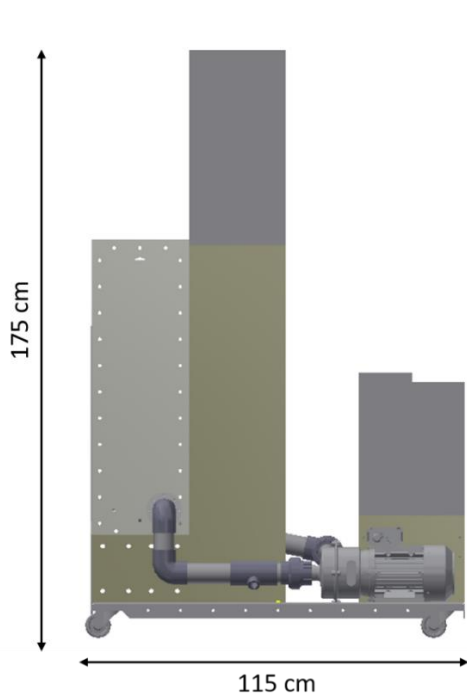


### The PLC-Controlled MF/UF Pilot Plant comprises

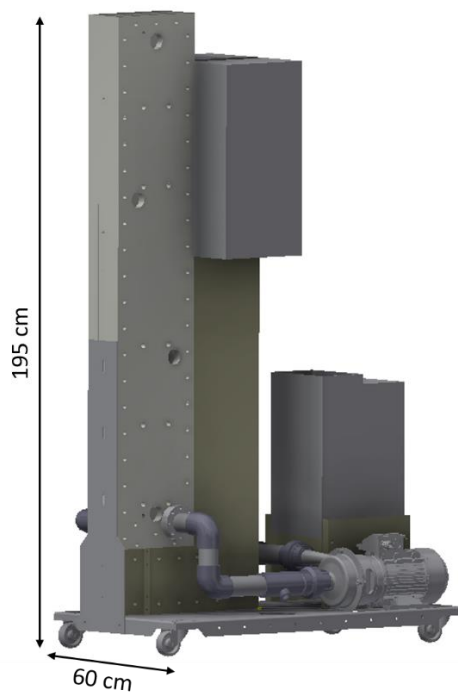
- 2 pumps; a feed pump and a circulation pump.
- 2 frequency converters
- 2 electronic pressure transducers (0-6 bar).
- 1 temperature transducer (0-100°C) (optional).
- 1 electronic flow meter at the permeate side (optional).
- 4 pneumatic valves.
- 1 inline heat exchanger (optional).
- 2 manual manometers (optional).
- Feed loop with all piping, flanges and fittings in stainless steel or PVC.
- 40 L Feed/CIP tank.
- 7" LCD screen.
- Software package with flexible programming
- Automated logging of all process parameters.

### The Manual Pilot Plant Comprises

- 2 pumps; a feed pump and a circulation pump.
- 2 frequency converters.
- 4 manual valves.
- 1 inline heat exchanger (optional).
- 2 manometers.
- Feed loop with all piping, flanges and fittings in stainless steel or PVC.
- 40 L Feed/CIP tank.



Pilot Plant with HPPM06 (2,1m<sup>2</sup> membrane)



Pilot Plant with HPPM12 (4,2m<sup>2</sup> membrane)

### Pilot Plant Data and Operating Conditions

Membrane Type	Hollow Plate™ Pilot Elements - HPP with most membranes (MF, UF, NF, RO) or filters (woven, sintered etc.)**
Membrane Area	HPPM06: 2,1 m <sup>2</sup> (6 x 0,35 m <sup>2</sup> ) and HPPM12: 4,2 m <sup>2</sup> (12 x 0,35 m <sup>2</sup> )
Dimensions (L x W x H)	2,1 m <sup>2</sup> (115 cm x 60 cm x 175 cm) and 4,2 m <sup>2</sup> (115 cm x 60 cm x 195 cm)
Pressurized Air Requirements*	6 bar
Pressure Pump	0,43 kW 400 V AC 2900 RPM frequency controlled Centrifugal Pump
Circulation Pump	2,2 kW 400V AC 2900 RPM frequency controlled Centrifugal Pump
Feed/CIP Tank	40 L
Dead Volume	6 L for 2,1m <sup>2</sup> and 9 L for 4,2m <sup>2</sup>
Instruments*	2 Frequency Converters 2 Electronic Pressure Transducers (0-6 bar) 1 Temperature Transducer (0-100°C) 1 Electronic Flow Meter at the permeate side
Viscosity Range, Apparent	1-1000 cP (e.g. Cream Cheese+), special pump options are necessary for very high viscosities
Temperature Range	5-85°C (membrane dependent)
Flow	Feed inlet 0-4 m <sup>3</sup> /h, circulation flow 0-15 m <sup>3</sup> /h.
Operating Pressure	0-4 bar

\*Standard PLC controlled Pilot Plant

\*\*See Product Sheets for the Hollow Plate Pilot Module and the Hollow Plate™ Pilot Element for detailed information on the module and membrane options.

### Module Data and Operating Conditions

Generic Design	Hollow Plate™. Fused Polypropylenes**
Membrane Type	Hollow Plate™ Pilot Elements - HPP - with most membranes (MF, UF, NF, RO) or filters (woven, sintered etc.) **
Membrane Area	HPPM06: 2,1 m <sup>2</sup> (6 x 0,35 m <sup>2</sup> ) and HPPM12: 4,2 m <sup>2</sup> (12 x 0,35 m <sup>2</sup> )
Dimensions (L x W x H)	HPPM06: (300 mm x 148 mm x 91 cm) and HPPM12: (300 mm x 148 mm x 164,4 cm)
Inspection Window Dimensions (number x D)	HPPM06: (6 x 50 mm) and HPPM12: (8 x 50 mm)
Feed Connections	1"NPT (or DS or Clamp)
Permeate + Retentate Connections	12 mm push-in fittings, or ½" / ½" NPT (or DS or Clamp)
Viscosity Range, Apparent	1-1000 cP (e.g. Cream Cheese+)
Temperature Range	5-50°C (operation) up to 80°C (CIP) *
pH Range	1-14 *
Cross Flow Velocity at Turbulent Flow	0,9 m/s, recommended Cross Flow Velocity 1,3 m/s (Water)
Operating Pressure	0-4 bar (CIP 1.5 bar)
Free Chlorine	Membrane dependent*

\* Depending on membrane specifications

\*\*See Product Sheets for the Hollow Plate Pilot Module and the Hollow Plate™ Pilot Element for detailed information on the module and membrane options.