KRONOS is a benchtop automatic Tangential Flow Filtration (TFF) system. KRONOS can handle up to 0.5 m² total filtration area and is equipped with multiple modules making it the ideal system for innovative process development as long as for automatic process sequence. Kronos covers a wide range of applications such as batch and fed batch ultrafiltration, microfiltration and diafiltration.

Typical applications include the following:
- Basic research
- Scale-up and scale-down studies
- Process development and optimization

KRONOS can be used for:
- Biopharmaceutical
- Biofuels research and manufacturing
- Vaccines
- Food and beverage biotechnologies
- Bioremediation
- Bioplastics
- Cosmeceutical
- Nutraceutical

Flexibility
the best membrane for each separation process

OPTIMIZING
The ratio cost/profit
Benefits

- **Powerful/Accurate brushless motor**: From 1 to 2000 RPM. Online absorbed Torques (Nm) and Power (W) measurements obtaining an indirect density indication of the culture broth.

- **Modbus Digital Hamilton sensors**

- **Fully removable and cleanable jacket**

- **Small footprint to maximize lab space efficiency**

- **Safety: pressure release valve included in each unit**

- **Available in 3 different volumes**: 2L, 5L, 10L.

- **Removable vessel**

- **Remote access via PC, tablet/smartphone**

- **Remote control for after sale assistance**

- **Integrated NPW test**

- **Automatic process sequence Filtrate flow control**

- **User-friendly process management Innovative filter history management**

- **Flexibility: the best membrane for each separation process**
Flexibility

**Kronos** can be equipped with several type of membranes (hollow fiber, cassettes, ceramic) and is designed following the most updated criteria of cGMP.

The control cabinet includes all the functions for parameters measurement and control: intelligent sensors, wireless connection, easy load pumps, recirculation vessels and valves module conveniently located.

Solaris technicians are on tap to evaluate together with the customer the best membranes available on the market (in terms of materials, geometrical configuration and operative parameters), for:

- concentrating with the best efficiency
- avoiding the problem of the gel layer
- increasing the efficiency in Diafiltration choosing the most suitable membrane.

**Modbus Hamilton sensors**

**Why a digital sensor?**

Hamilton sensors has been integrated into Solaris PCS and Leonardo software giving the user the benefit of having a unique platform.

Fully compensated digital sensors, store and transmit all relevant sensor data, including calibration and diagnostic information.
Options

**Transfer module**
- **Supply pump**: Peristaltic pump for diafiltration and large volume ultrafiltration.
- **Triple inlet valve**: Automated valves for highly automated filtration process.

**Permeate module**
- **Filtrate pressure flow control pump**: Included flow meter to prevent membrane fouling in microfiltration.
- **pH measurement**: Inline pH sensor.
- **Conductivity measurement**: Inline conductivity sensor.

**Vessel upgrade options**
- **pH measurement**
- **Weight measurement through load cell**
- **Conductivity measurement**
- **Temperature measurement**
- **Level control via Sensor**
- **Extra safety during manual operation**

**Holder option**
- **Hollow fiber holder**: For single hollow fiber cartridge.
- **Manifold for 3 hollow fiber cartridges**
- **Cassette holder**: From various manufacturers.

**Chiller**
- **Optionally KRONOS can be equipped with a chiller for heat removal from your culture minimizing lab water usage**
- **Using this system you don’t need a water supply line in your lab**
- **Cost-effective cooling of fermenters**
- **Easy operation**
- **Refrigerant level monitoring**

**Chiller data sheet**
- **Working temperature range**: -10°C / +40°C
- **Temperature stability**: ±0.5
- **Power consumption**: 0.7 kW
- **Filling volume range**: 2-8 L
- **Cooling output at 20°C (measured with ethanol)**: 0.25-0.60 kW
- **Cooling output at 10°C (measured with ethanol)**: 0.20-0.50 kW
- **Cooling output at 0°C (measured with ethanol)**: 0.15-0.36 kW
- **Cooling output at -10°C (measured with ethanol)**: 0.09-0.15 kW
- **Pump pressure max.**: 0.35-1.30 bar
- **Pump flow max.**: 16-35 L/min
- **Dimensions**: 600x550x465 mm

**Kronos 0.5**
- **Total Volume (liters)**: 2.0, 5.0, 10.0
- **Hold up volume**: 70 ml
- **Max. operating pressure**: 4 bar (g)
- **Membranes available**: Cassettes, Hollow fiber, Ceramic

**Vessel Data**
- **Design**: Borosilicate Glass vessel with conical bottom.
- **Materials**: Vessel: Borosilicate Glass.
- **Drive**: Brushless Motor Direct Assembly.
- **RPM**: 1-2000 RPM, Accuracy 1 RPM.
- **Impeller**: Marine Impeller.
- **Weight**: Load cell.

**PCS and Software**
- **PCS**: S.S Cabinet AISI 304.
- **HMI**: 23” Touch screen.
- **Software**: SCADA Solaris Software Control Galileo.
- **Data Extraction**: Through USB port or Ethernet.
- **Graph trends On-line displaying and Printing**.
- **On-line parameter calibration**.
- **Alarms Management**.
- **Event recording**.
- **Multipassword level**.
- **Integrated NWP test**.

**Data sheet**

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