

Customized scalable Perfusion-Ready Single-Use-Bioreactor

CellRider for Semi-Continuous bio-manufacturing

October 2018



Per Stobbe



The building block's for **Perfusion-Ready-SUB's**

Ready to use
"right out of
the box"

PR-SUB Single-Use-Bioreactor

PR-SUB specifically designed for your application.

Scalable Vessel Volume (VV) from 2,1 - 13 liter. Allow your flexible Working Volume, your preferred impeller and aerator, desired length and hose brand, fit your existing PCS, etc.



SUP Single-Use-Pump

Your preferred Single-Use-Pump combined with your HFF and the CellRider PR-SUB.

Freedom to choose the pump your prefer. Being centrifugal or peristaltic or diaphragm.



SUS Single-Use-Sensor's

Single-Use-Sensor's which fit your existing Process-Control-System connections.

Parameters measured with VisiFerm, OneFerm, PICO biomass and level.



HFF Hollow-Fiber-Filter

Use your preferred size Hollow-Fiber-Filter(s) combined with the pump of your choice.



HighRider-2 PR-SUB

with Single-Use-Sensor's

Size 3,2 liter VV



HighRider-2 ATF

Perfusion-Ready

- HighRider-2 is a 3,2 liter Vessel Volume (VV) PR-SUB, pre-assembled and ready to use right out of the box.
- HighRider-2 facilitate from 400 - 2.000 ml Working Volume (WV).
- HighRider-2 connects via integrated dip tube, silicone hose and aseptic coupling to by you pre-assembled Hollow-Flow-Filter module and your standard ATF-2 unit.
- For use with your own C-24 controller.
- Single-Use-Sensor's (SUS) as required (and available).
- Check out thermal control below.



HighRider-5 PR-SUB

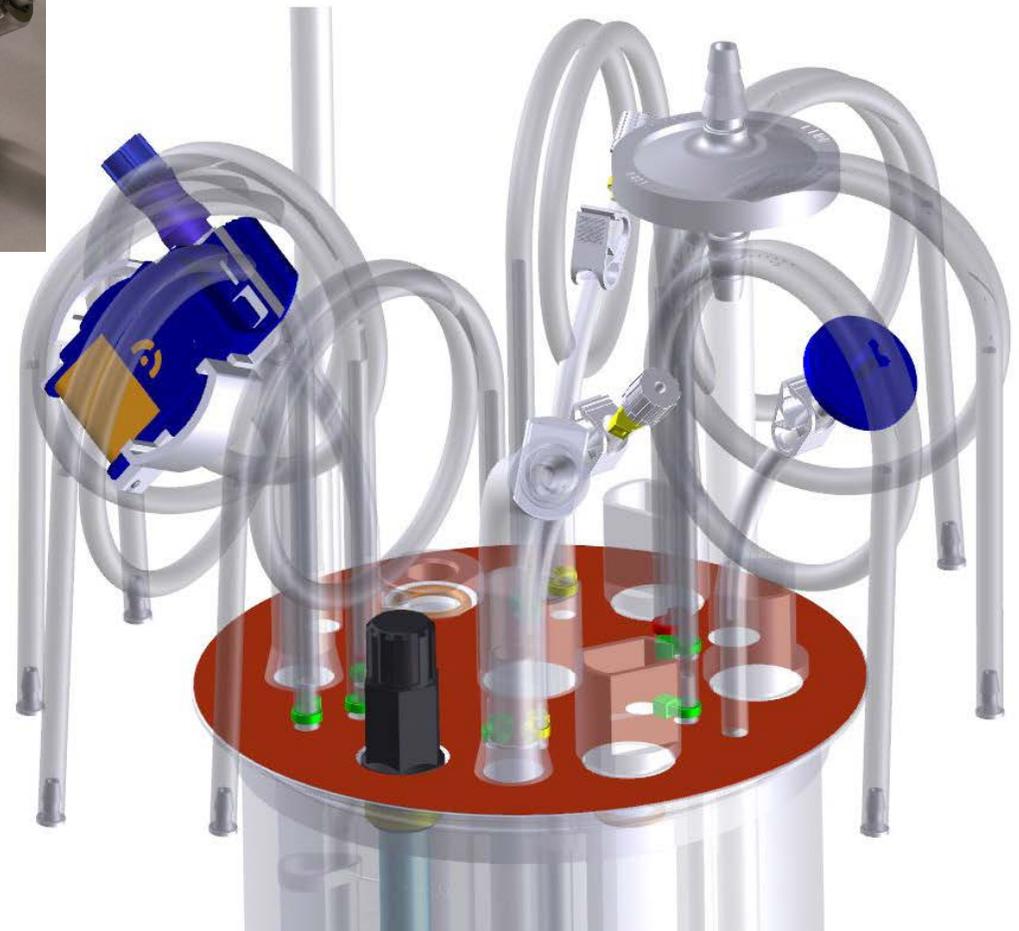
with perfusion dip tube

Size 5,7 liter VV



HighRider-5 ATF Perfusion-Ready

- HighRider-5 is a PR-SUB, pre-assembled and ready to use right out of the box
- HighRider-5 connects via integrated dip tube, silicone hose and aseptic coupling to by you pre-assembled Hollow-Flow-Filter module and your standard ATF-2 unit
- For use with your own C-24 controller
- Single-Use-Sensor's (SUS) as required (and available)
- Check out thermal control below



LowRider-1 PR-SUB

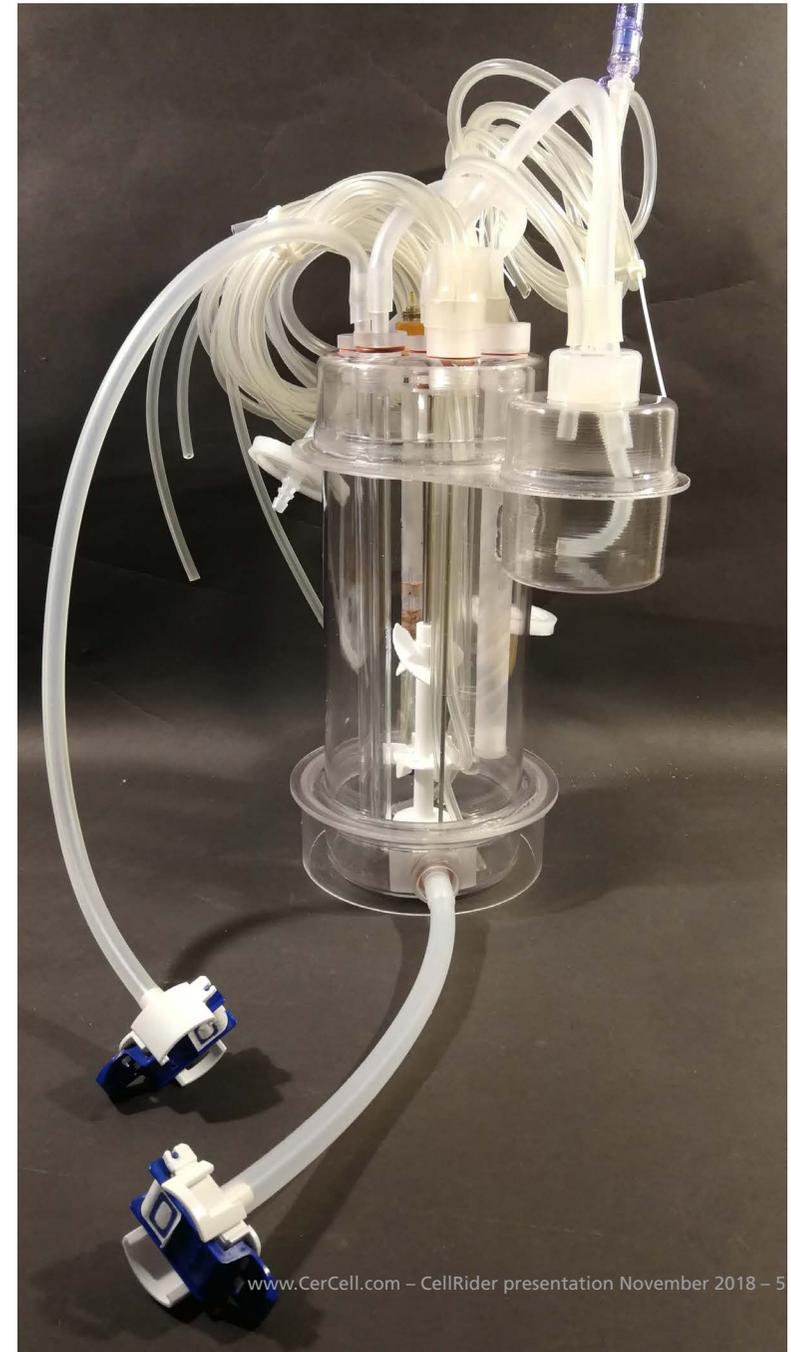
with bottom outlet

Size 2,1 liter VV



LowRider-1 Perfusion-Ready

- LowRider-1 is all pre-assembled and ready to use right out of the box
- LowRider-1 designed for connection to your own preferred pump and HFF
- PR-SUB outlet / pump inlet connection at bottom with aseptic connector
- Retentate return from HFF via aseptic connector through the head plate and dip tube
- Fully customized PR-SUB
- Single-Use-Sensor's (SUS) as required (and available)
- Check out thermal control below



LowRider-2 PR-SUB

for connection to centrifugal SUP

Size 3,2 liter VV



LowRider-2 Perfusion-Ready

- LowRider-2 is all pre-assembled and ready to use right out of the box
- LowRider-2 designed for connection to your own preferred pump and HFF
- PR-SUB outlet / pump inlet connection at bottom with aseptic connector
- HFF retentate return via aseptic connector trough the head plate and dip tube
- Fully customized PR-SUB
- Single-Use-Sensor's (SUS) as required (and available)
- Check out thermal control below



LowRider-5 PR-SUB

with thermal water jacket

Size 5,7 liter VV



LowRider-5 Perfusion-Ready

- LowRider-5 is all pre-assembled 5,7 liter VV and ready to use right out of the box.
- Perfusion-Ready for connection to your own Hollow-Fiber-Filter's and centrifugal pump of your own choice.
- Fully customized PR-SUB design.
- Single-Use-Sensor's (SUS) as required (and available).
- Magnetic-Stirrer-Table driven (MST).
- Head plate driven agitation (HPD).
- Any number, type, size, and mix of impeller's and turbine's.



LowRider-10 PR-SUB

with Single-Use-Sensor's

Size 13 liter VV



LowRider-10 Perfusion-Ready

- LowRider-10 is all pre-assembled and ready to use right out of the box
- Perfusion-Ready for connection to your own centrifugal pump and Hollow-Fiber-Filter's of your own choice.
- Fully customized PR-SUB design.
- Single-Use-Sensor's (SUS) as required (and available).
- Head plate driven agitation (HPD).
- Any number, type, size, and mix of impeller's and turbine's.



Pre-installed **Single-Use-Sensor's** measure DO, pH, bio-mass, temperature and level

The complete PR-SUB family as standard include pre-installed Single-Use-Sensor's (SUS) for DO, pH, and level. Mounted vertically through the head-plate.

Depending on PR-SUB size the PICO Futura capacitance bio-mass SUS mounted vertical through head plate or horizontal at bottom.

For accurate DO measurements we pre-install either **VisiWell** or **PolarWell**. Use the optical or polarographic Re-Usable-Sensor (RUS) supplied with your PCS.

For pH measurements use the PCS standard cabling with either AK9 or AS8 connector. Coupled to the pre-installed **pH SUS** made from glass or polymer.

Std. **temperature sensor** probe goes into the non-invasive well.

ConducCell is a high precision **conductivity** and **Pt1000 SUS** optionally pre-installed.



The unique **Single-Use-Sensor's** measures DO, pH, bio-mass and level

All pre-installed:

- Capacitance bio-mass
- Customized high quality pH
- Customized high quality DO
- Customized high quality level



Thermal control



The best thermal control for all 3.200 ml size PR-SUBs

Its all Plug & Play!

Heating-Support-Foot (HSF) that fits any of the CellRider 3.200 ml vessel's. Able to operate with small volumes starting from few hundred ml up to 2.000 ml.

Very easy installation of LowRider-2 and even HighRider-2 with bottom /horizontal broth exit.

Whatever happens ...

You can run the PR-SUB dry, forget media, thermo couple fall out, PCS breaks down ... this advanced HSF will never destroy the PR-SUB and leak out media or burn your fingers when trying to solve the problem!



Thermal control

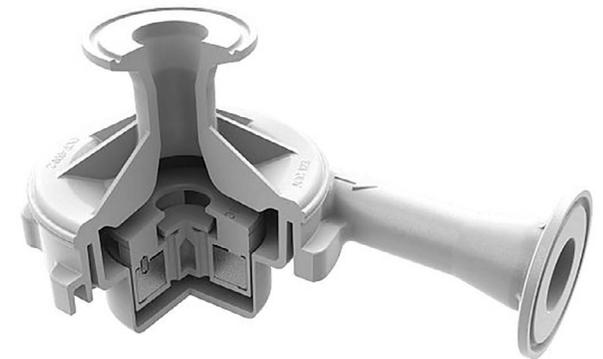
Heated LowRider-1 Perfusion-Ready

- LowRider-1 fits onto the MST supported inside the SUB-Support-Square (SSS) and surrounded by the Electrical-Heating-Blanket (EHB)
- Perfusion-Ready for connection to your own Hollow-Fiber-Filter's and pump of your own choice
- Magnetic-Stirrer-Table (MST) facilitates drive by any servo motor
- AseptiQuick couplings insure easy assembling with you HFF and SUP



Your Single-Use-Pump

peristaltic or centrifugal or diaphragm



Various accessories for PR-SUB's connection

Connect your HFF and pump assembly with sanitary coupling to outlet / inlet port and the PR-SUB ports is easy. CerCell as well as other suppliers offer various connection devices.

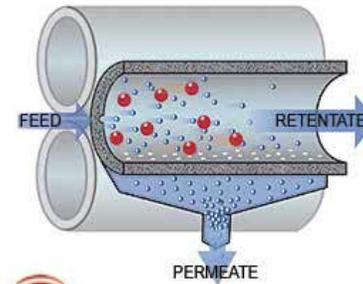


Your Hollow-Fiber-Filter separates at only 200 nm

Cross Flow Filtration is an efficient method for filtration and separation of solutions containing biomolecules, or particles such as viruses, bacteria or cellular material. It is a process whereby product flow (broth feed) is directed inside the multiple straw /tube shaped membranes with most of the solution as retentate circulated back into the SUB. A minimum of the broth feed pass tangentially across the membrane as permeate.

The rapid flow of broth along the membrane acts to 'sweep' the surface, reducing concentration polarization. It also prevents build-up of foulants that can plug the pores at the membrane surface. The rapid cross flow creates a pressure drop, which forces some of the feed solution and dissolved molecules that are smaller than the pores in the membrane, through the membrane filter as permeate.

The solution that passes through the membrane is referred to as filtrate or permeate. Molecules or particles larger than the membrane pores are retained in the feed, broth and effectively concentrated in the SUB.



Thank you for your attention

www.cercell.com

