

FUTURA

neo_{tf}

Single-use capacitance
based biomass sensors
for Thermo Scientific
single-use bioreactors

ABER





Introducing FUTURA neo_{tf}

ABER's capacitance technology can now be used in combination with single-use systems from Thermo Scientific via a pre-fitted insertion probe, guaranteeing sterility.

ABER's On-line Biomass Monitors measure viable cell density in real-time through capacitance readings, giving a continuous, in-situ representation of viable cell concentration, eliminating the need for offline sampling. All of our probes are ready for use in cGMP environments.

ABER offers the widest range of reusable and single-use sensors for your cell counting & monitoring needs, whether they be benchtop, scale-up or cGMP in single-use or reusable formats, our readings are comparable.

ABER's biomass monitoring technology will create value whatever the application, by bringing you real-time feedback on cell numbers and changes in conductivity. Improve your process knowledge, facilitating higher product quality & titers and delivering process efficiencies, giving you a superior product yield.

Control your processes based on critical parameters leading to increased repeatability and automated closed-loop control in your bioprocess 4.0 environment.

ABER offers scalable solutions to take you from process development through to your cGMP facility for single-use or reusable applications.

Improve your time to market with data driven process development.





Our technology

Our measurement principle is based on capacitance. In an alternating electrical field, viable cells behave like small capacitors due to a build-up of charge across the cell membrane. The charge from these capacitors is measured and can be strongly correlated to cell density. Non-viable cells do not hold charge and as such, are not measured by the technology.

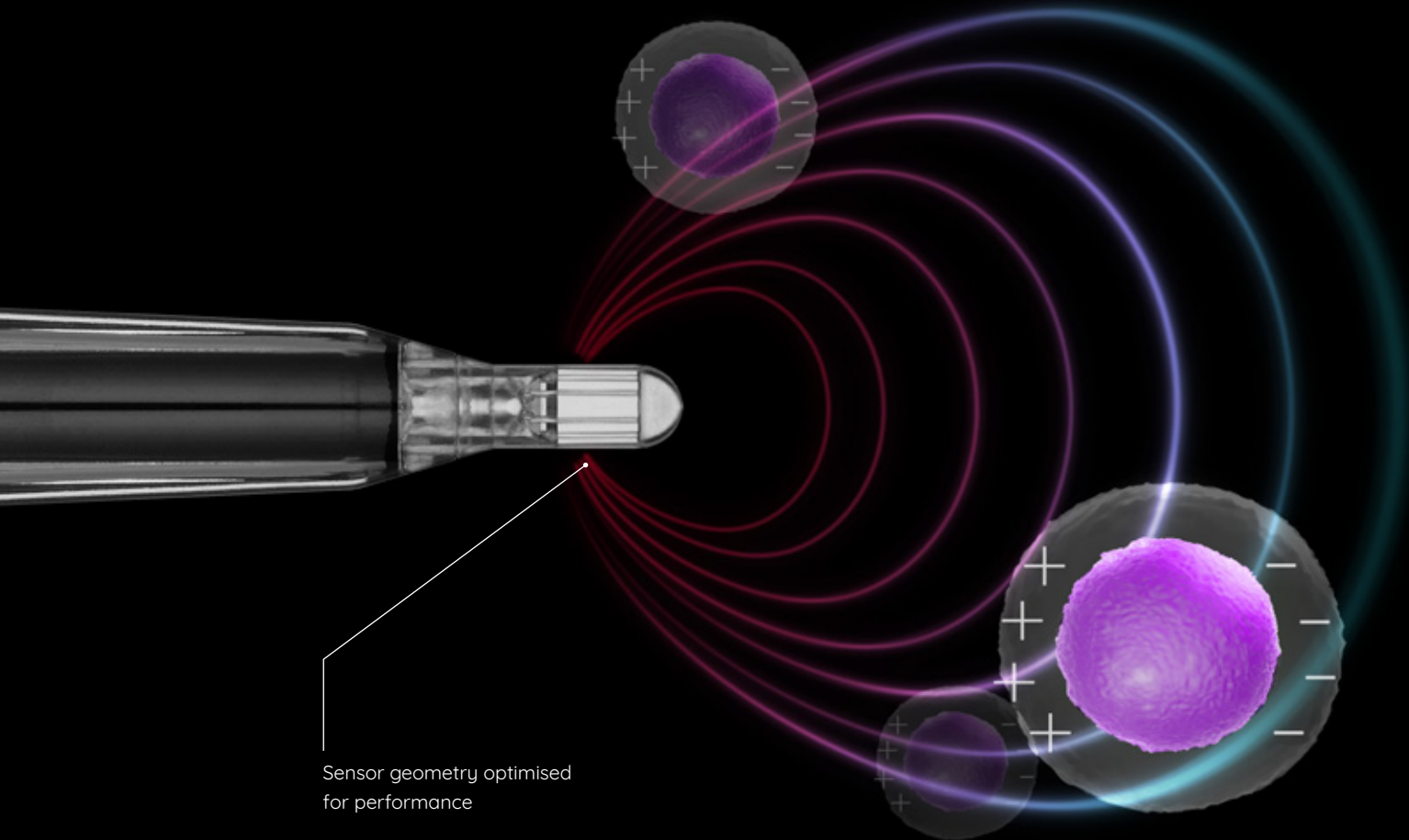
More than just a cell counter

Use ABER's frequency scanning capabilities to see changes occurring inside your cells. Whether this is early detection of apoptosis, viral infection or release, deteriorating health, changes in cell size & morphology ABER has the capability to detect this and provide you with actionable data.

This principle for measuring viable cells was introduced to the market by ABER instruments over 30 years ago, we have continually refined our capacitance technology to provide the very best biomass sensors to the bioprocess market.

With initiatives such as the FDA's PAT drive and the growth towards bioprocessing 4.0 for automated data capture, via on-line, real-time sensors, choosing the experts in capacitance makes perfect sense and can equip you to make comparable readings at all scales of bioprocessing.

ABER is trusted with the supply of it's biomass sensors to the world's leading biopharma companies who utilise ABER's real time cell density measurement technology in manufacturing with tailored solutions for the specific requirements of cGMP manufacturing bioprocesses. Enabling Bioprocess teams to precisely monitor and control their critical parameters with capacity to automate control protocol.



Sensor geometry optimised for performance

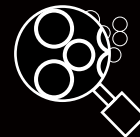
Key benefits of our single-use, manufacturing ready technology



Eliminate the need for regular sampling and congested labs



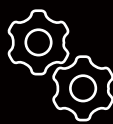
Track record of success in cGMP environments



Non-Disruptive Cell Density Measurements



Automate control of critical events throughout your process via a continuous data stream



Troubleshooting tool to detect source of process deviation



Fingerprint your process for real time detection of deviations



Improve the productivity and consistency of your process



Receive world-class support from the foremost experts in the technology



Reduce process contamination risk related to manual sampling





Comparable data, repeatable performance

The FUTURA neo_{tf} single-use sensor has been specifically designed for Thermo Scientific single-use bioreactors. FUTURA neo_{tf}'s measurements are comparable to those provided by ABER's reusable sensors and have gone through thorough and extensive application testing with industry partners. Delivering repeatable performance for every sensor used, making ABER's capacitance technology truly scalable.

The data shows consistent performance for each FUTURA neo_{tf} single-use sensor.

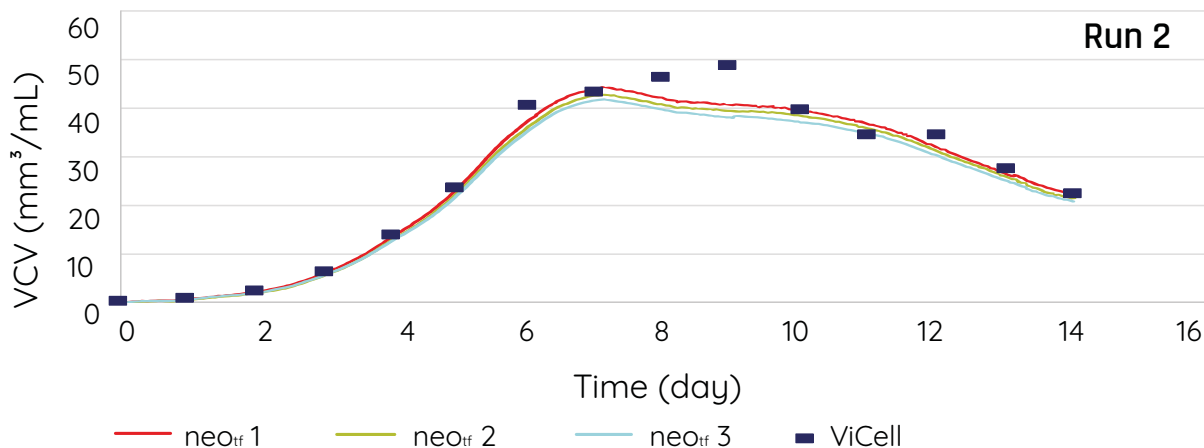


Chart taken from application note - Performance of FUTURA neo_{tf}, a novel single-use capacitance based biomass sensor for Thermo Scientific SUBs
Data courtesy Ben Madsen, Engineer, Thermo Scientific

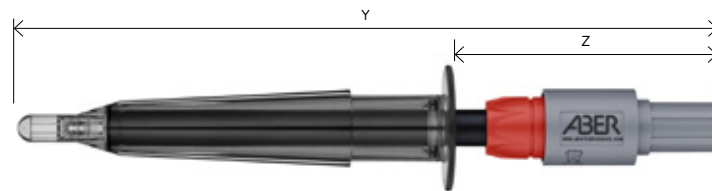
This demonstrates that the sensors exhibit a reliable signal to determine cell mass despite changing bioreactor conditions and that no sensor drifted from expected results through the cell runs. This is key to linking feed volumes based on cell mass and nutrient demands during fed-batch or perfusion cultures allowing for optimal performance of culture conditions to maximize cell production.

For the complete application note, please contact support@aberinstruments.com

Product specifications



Part Number	Description	Dimensions (mm)				
		V	W	X	Y	Z
5360-00	FUTURA neo _{HF} (Head Amplifier)	51	91.5	37	34.7	24.5



Part Number	Description	Dimensions (mm)	
		Y	Z
5340-00	FUTURA neo _{HF} single-use sensor for Thermo Scientific S.U.Bs	140	55

Part Number	Description
5341-00	FUTURA neo _{HF} signal simulator - High Value
5342-00	FUTURA neo _{HF} signal simulator - Zero Value



System technical specifications

Frequency Range:	50KHz to 20MHz
Measuring Ranges:	Capacitance: 0.0 to 400 pF/cm Conductivity: 1.0 to 40 mS/cm
Cell Concentration Range:	Depends on cell sizes but typically: Yeast (6 µm): 10 ⁶ cells/ml to 10 ¹⁰ Cells/ml Bacteria (1 µm): 10 ⁹ cells/ml to 10 ¹³ Cells/ml Animal Cell (12 µm): 10 ⁵ cells/ml to 10 ⁹ Cells/ml Plant Cell (50 µm): 10 ³ cells/ml to 10 ⁷ Cells/ml
Resolution:	Resolution: 0.1 pF/cm. Bacteria typically 0.2g/L dry weight or 2x10 ⁹ Cells/ml for E. Coli. Yeast or Animal Cells 0.05g/L or 1 x10 ⁵ Cells/ml The relationship of these capacitance values to biomass levels depends upon the cell type and cell line.
Accuracy:	Better than ± 3% of the reading
Stability:	Better than ± 0.2 pF/cm at constant temperature with standard conductivity solution of ~12 mS/cm
Linearity:	Better than ± 1% over 100 pF/cm
Precision:	<± 0.5 pF/cm, no filter active
Power Supply:	24V DC power is typically supplied by an ABER Connect running on 110V AC to 240V AC mains.
EMC Compliance:	Directive 2014/30/EU as demonstrated compliance to:EN 61326-1:2013 + EN 61326-2-1:2013. FCC: CFR47 Part15 Sub Part B Part 1: General
LVD Compliance:	Low Voltage Directive 2014/35/EU and complies with the following standards:EN61010: 2010
Weight:	225g

Sensor technical specification

Operating Temperature Range:	2°C - 40°C (36°F - 140°F)
Storage Temperature Range:	2°C - 25°C (36°F - 140°F)
Process Connection:	Via Thermo Scientific port SV20716
Sterilization:	Gamma ray sterilizable 25-45 kGy
Shelf Life:	3 years after irradiation, under appropriate storage conditions
Mechanical Pressure Resistance:	1bar
Wetted Materials:	Makrolon Rx2530, Platinum 99.99%, Dymax 1180-M-UR. Complies with the requirements of FDA-modified ISO 10993-1 and USP Class VI, 2019 BPOG L&E
Precision:	Better than ± 1% over 100 pF/cm
Approvals:	USP class VI & FDA for all wetted materials, factory calibration
Minimum probe clearance:	60mm *For further information on probe clearance please contact support@aberinstruments.com

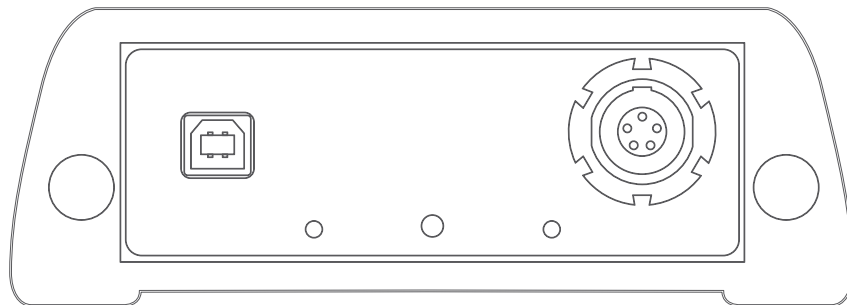
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Connect options for FUTURA neo_{TF}

The Connect 1 and Connect xtra are transmitters that can be used with a single Futura neo_{TF} instrument. They provide power and communications to the FUTURA Neo_{TF} head amplifier unit.

Communication:

- Connects Aber's FUTURA equipment to a PC via a USB port.
- The Connect 1 Provides FUTURA equipment with 2 x 4-20mA Analog (Current loop) outputs.
- The Connect 1 Provides FUTURA equipment with a Modbus Interface to SCADA or a controller
- The Connect Xtra offers communication options from the Anybus CompactCom M40 Module, the modules available for the connect xtra, include: PROFIBUS DPV1, Modbus TCP, Ethernet/IP or PROFINET IRT



Part Number	Description
2801-00	FUTURA Connect 1
2820-00	FUTURA Connect 1 - Din Rail Mountable
2815-00	FUTURA Connect Xtra
2816-00	FUTURA Connect Xtra - Din Rail Mountable



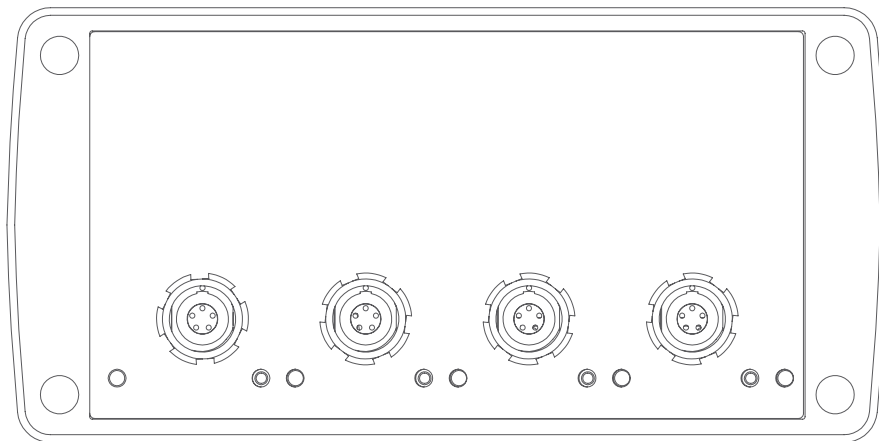
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Connect 4

For use with up to four FUTURA and multiple bioreactors
The FUTURA CONNECT provides power and communications to the FUTURA

Communication:

- Connects ABER's FUTURA equipment to a PC via a USB port.
- Provides FUTURA equipment with 8 x 4-20mA Analog (Current loop) outputs.
- Provides FUTURA equipment with a Modbus Interface to SCADA or a controller



Part Number	Description
2814-00	FUTURA Connect 4

ABER.

World-class support

Our team's expertise and know-how comes from working closely with our customers and partners. We are committed to developing a deep understanding of your aims and challenges.

Whether you have a question specifically regarding the FUTURA neo[®], or want to find out more about our technology in general or in relation to your bespoke application our team of expert engineers and scientists are on hand and happy to talk.

For more information regarding ABER Instruments' product suite and applications please contact our team:

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Visit our website at:

aberinstruments.com

The ABER logo is located in the bottom right corner of the page. It consists of the word "ABER" in a bold, teal, sans-serif font. The letters are slightly stylized, with the 'A' and 'B' having a unique shape. The logo is set against a dark grey background.