

# FUTURA

# sensor catalog

Advanced capacitance based cell density  
measurement technology

ABER

**ABER**

Continually setting the standard for real-time biomass measurements, from the pioneers of capacitance based biomass monitoring.

[www.aberinstruments.com](http://www.aberinstruments.com)



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# Setting the benchmark

Aber's pioneering work in the development and use of dielectric instrumentation to monitor biomass, by measuring cell membrane capacitance and media conductivity, has regularly set new standards. In the biotech market, our current FUTURA is seen as the benchmark in determining live cell concentration online in bioreactors.

## Principle of ABER's Cell Capacitance Technology

Cells with intact plasma membranes can be considered to act as tiny capacitors under the influence of an electric field. The non-conducting nature of the plasma membrane allows a build up of charge. The resulting capacitance can be measured: it is dependent upon the cell type and is directly proportional to the membrane bound volume of these viable cells.

The capacitance (pF/cm) that the Aber technology measures can easily be converted into other units such as cells/ml, g/L etc. Other units can also be derived from the raw capacitance measurements, depending on the application for which the Aber system is used.

FUTURA also measures the Conductivity of the medium, in millisiemens per centimeter (mS/cm). Conductivity is not used to measure biomass but is indicative of the production or utilization of ions by the cell suspension. The ABER system & probe provides an electrical field and measures LIVE cell concentration online.

## Widely adopted

Aber's proven performance and specialized knowledge as pioneers of capacitance technology is demonstrated by the fact that Aber Sensors are widely adopted by the world's leading biotech companies in both R&D and cGMP with over 90% of all capacitance based sensors used in manufacturing supplied by Aber.

## Manufacturing ready

The robustness and proven performance of Aber's sensors make them the first choice for manufacturing, providing a clear and consistent scalable pathway from R&D and process development all the way through to cGMP manufacturing. This is further enhanced by the 2 year warranty on all reusable sensors with extensive support at hand from Aber's global team and experienced network. With Instrument verification and certification packages available, our customers can rest assured that compliance is covered.

# A measured approach to optimising performance, experience and outcomes

Our biomass capacitance technology centres around providing live on-line biomass reading – typically Cells/ml or g/l for different applications:

## Cell culture process development and manufacturing

Aber Instruments' technology can be applied to in both R&D and manufacturing processes to monitor:

- Suspension cell
- Micro-carrier culture and packed beds
- Cell culture – Manufacturing
- Controlling constant cell concentrations

## Microbial applications

And, equally our technology is successfully deployed in microbial applications to measure:

- Bacterial fermentations
- High density yeast fermentations
- Pichia fermentations
- Mycelial fermentations

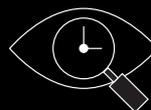
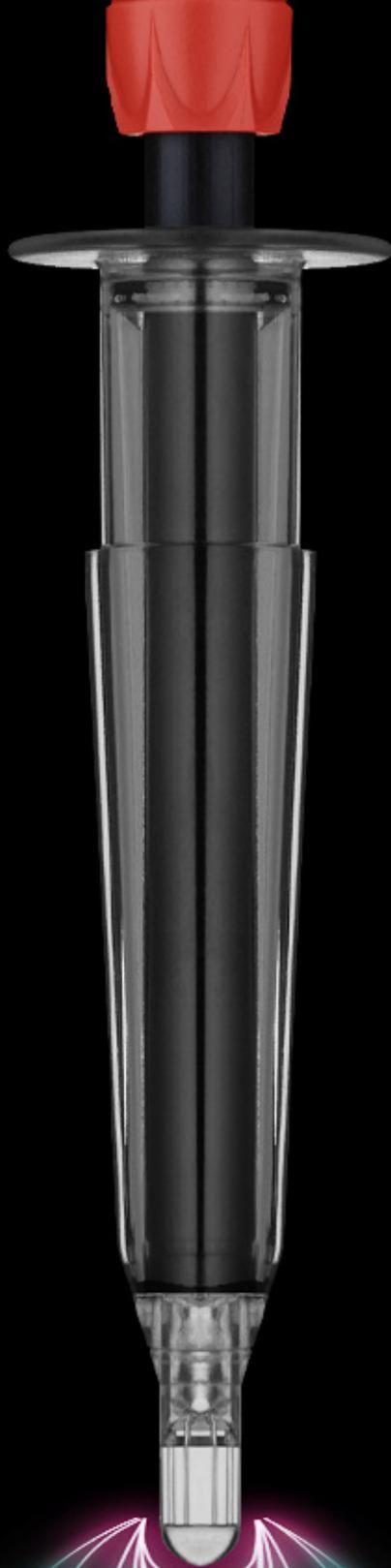
Our tech offers the unique opportunity for real time, accurate measurement and control of biomass concentrations in bioreactors at both laboratory and industrial scale, bringing significant scientific, operational and commercial benefits in terms of cost reduction and improved product quality.

## Features

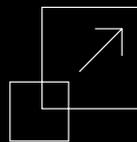
- Fully automated 'plug and play' solutions for rapid cell expansion
- Quick and simple process monitoring
- Automated process control and modelling
- Automated substrate feed strategies
- Harvest point determination
- Optional time of infection for viral production

## Benefits

- Lower risk of contamination
- Reduced risk of unrepresentative samples (due to minimising the requirement for manual handling)
- Free up lab time



Real time monitoring



Sensors for conventional & single use bioreactors



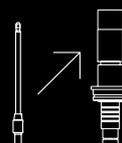
Used & trusted for cGMP applications



Maximise production



Control complex feed rates



Capacitance technology provider of the largest range - Including single-use

# FUTURA system overview

## Sensors and head amplifiers



### 12 mm Probe

For small bioreactors  
Headplate mounting



### Standard Remote

For restricted space



### 25 mm Probe

For larger bioreactors DN25 port



### Standard FUTURA

For larger bioreactors

The FUTURA system's three primary hardware components are:  
 The Probe, the FUTURA Instrument (Head Amplifier) and the Transmitter.  
 For the validation & testing of these system components please refer to  
 the FUTURA test equipment on page 36.

Transmitter(s)		Software
		 <p><b>FUTURA Tool</b>            Used to set up FUTURAs            for connecting to the            various transmitters</p>
<p><b>Connect 1</b>            Single channel, Current Loop,            Modbus, USB</p>	<p><b>V350 - Panel</b>            1 Channel Current Loop            Colour Touch screen</p>	
		
<p><b>Connect 4</b>            4 channel, Current Loop,            Modbus, USB</p>	<p><b>V350 - Wall Mount</b>            1 Channel Current Loop            Colour Touch screen</p>	 <p><b>FUTURA SCADA</b>            Capable of frequency            scanning to provide            additional cell information.            Can be used for retroactive            data analysis. Includes            OPC option</p>
		
<p><b>Connect xtra</b>            Single channel, USB &amp;            choice of comms types            via Anybus modules</p>		

FUTURA sensors

# Sensors for all applications

Aber Instruments has a wide range of probes to suit all applications, the 12mm diameter probes ideal for small bioreactors and 25mm diameter for larger vessels, typically used in manufacturing / production environments. Now, with the introduction of FUTURA neo<sup>cr</sup> our capacitance technology is available for Thermo Scientific S.U.B's.

All probes are electro-polished and passivated with options for USP class VI and FDA CFR21 177 certificates. By default a probe is shipped with a standard certificate of traceability. If you wish to have a full breakdown of all the materials used in the production of a probe then please order the 'Probe Certificate of Conformance' package for each probe. Contact ABER if you wish to see an example of the documentation you will receive.



Single-use  
FUTURA neo<sup>cr</sup> single-use sensor for Thermo Scientific S.U.B.s . See page 22



12mm  
Benchtop, headplate mounted



25mm  
Large Vessels, side mounted  
Standard O-ring

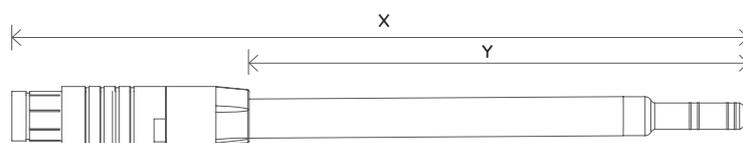


25mm  
Large Vessels, side mounted

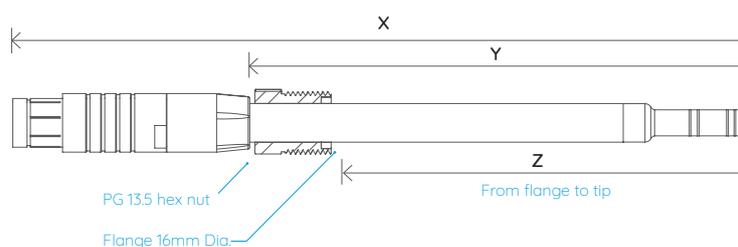


# FUTURA sensors

## 12mm Annular probes



Part Number	Description	X	Y
6531-52	12 X 120mm Annular Probe	223	152
6532-52	12 X 220mm Annular Probe	323	252
6530-52	12 X 320mm Annular Probe	423	352
6534-52	12 X 450mm Annular Probe	555	482



Part Number	Description	X	Y	Z
6531-52/PG	12 X 120mm Annular Probe - Pre fitted PG 13.5 Nut	223	152	128
6532-52/PG	12 X 220mm Annular Probe - Pre fitted PG 13.5 Nut	323	252	228
6530-52/PG	12 X 320mm Annular Probe - Pre fitted PG 13.5 Nut	423	352	328
6534-52/PG	12 X 450mm Annular Probe - Pre fitted PG 13.5 Nut	555	482	458

All PG probes are shipped with a PTFE washer & high temperature O'ring

Part Number	Description	X	Y	Z
6570-52	12 x 320mm Annular probe 13.5 Nut for KleenPak connector	320	n/a	n/a

For additional information please email [support@aberinstruments.com](mailto:support@aberinstruments.com)

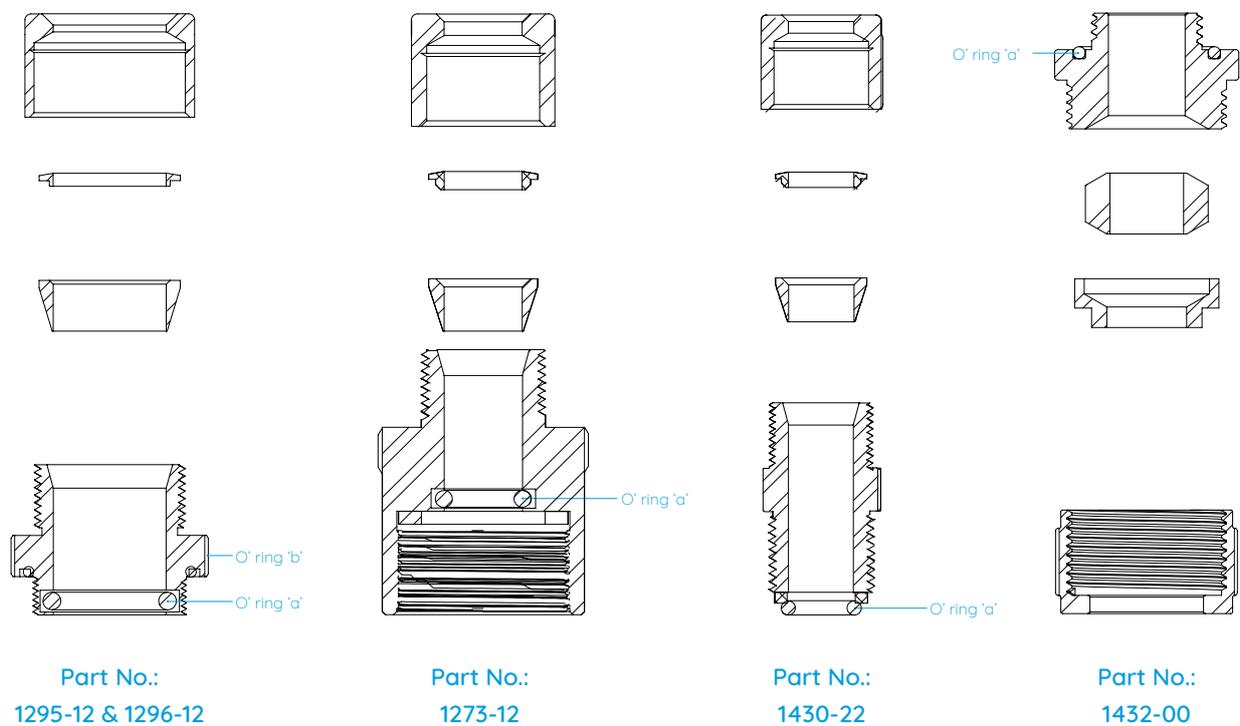
Part Number	Description
1899-30	Set of O-ring and washer for 12mm Annular probes with pg13.5 (Pack of 4)



# FUTURA sensors

## Port adaptors

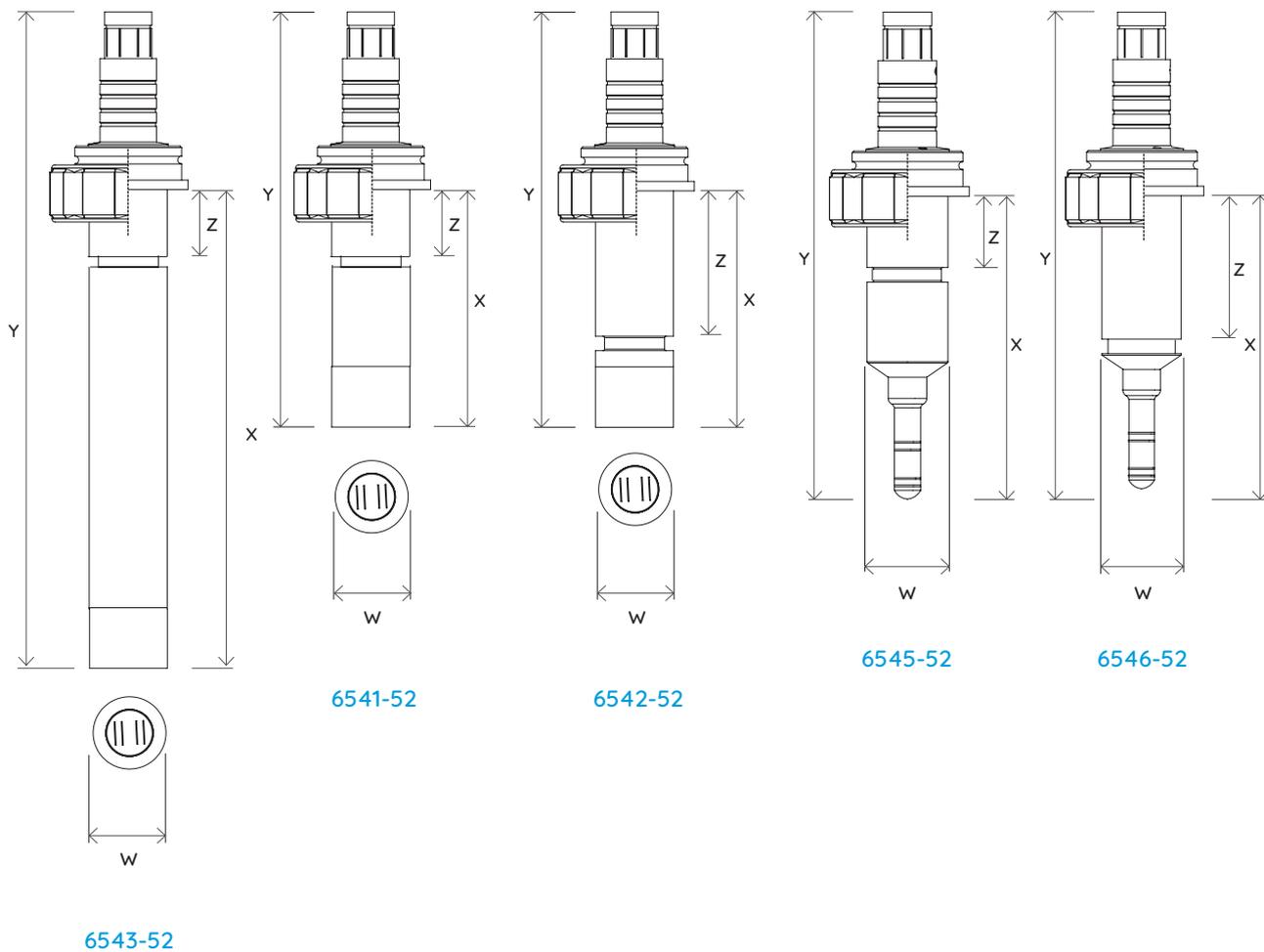
The port adaptors are designed to allow the 12mm straight Aber probes to be fitted into either Braun or Applikon 19mm (3/4") top plate, female port fitting. The New Brunswick version is similar but fits a male threaded port on either the top plate or side entry port. The o-rings provide a seal and the nut with nylon ferrules lock the probe in place.



Part No.	Description	Wetted O'ring 'a'	Sealing O'ring 'b'	Sealing Washer 'c'	Mating thread
1295-12	12mm probe to 19mm Braun Sartorius metric port	Silicone FDA 10.78 x 2.62	EPDM 26.7 x 1.78	-	26 x 1 mm PITCH
1296-12	12mm Probe to 3/4 Inch BSP (Applikon)	Silicone FDA 10.78 x 2.62	EPDM 26.7 x 1.78	-	3/4" BSP
1273-12	12mm probe to 19mm New Brunswick metric port	Silicone FDA 10.78 x 2.62	-	Silicone FDA 19 x 3.5 x 2	26 x 1 mm PITCH
1430-22	PG 13.5 Adaptor for 12 mm probes	Silicone FDA 10.78 x 2.62	-	-	PG 13.5
1432-00	Port Adapter 12mm probe to M18x1.5 Male (Applikon)	Silicon FDA	-	-	M18 x 1.5 mm PITCH

# FUTURA sensors

## 25mm Flush and annular probes



Part Number	Description	Dimensions (mm)			
		W	X	Y	Z
6541-52	25 X 75 mm Flush Probe, Standard O-ring, Retained Ring	25	75	132	22
6542-52	25 X 75 mm Flush Probe, Braun Safety Ports, Retained Ring	25	75	132	46
6543-52	25 X 175 mm Flush Probe, Retained Ring	25	175	239	22

\*All 25mm probes (except Tri-clamp) are supplied with a retained ring part number 1844-02 and circlip

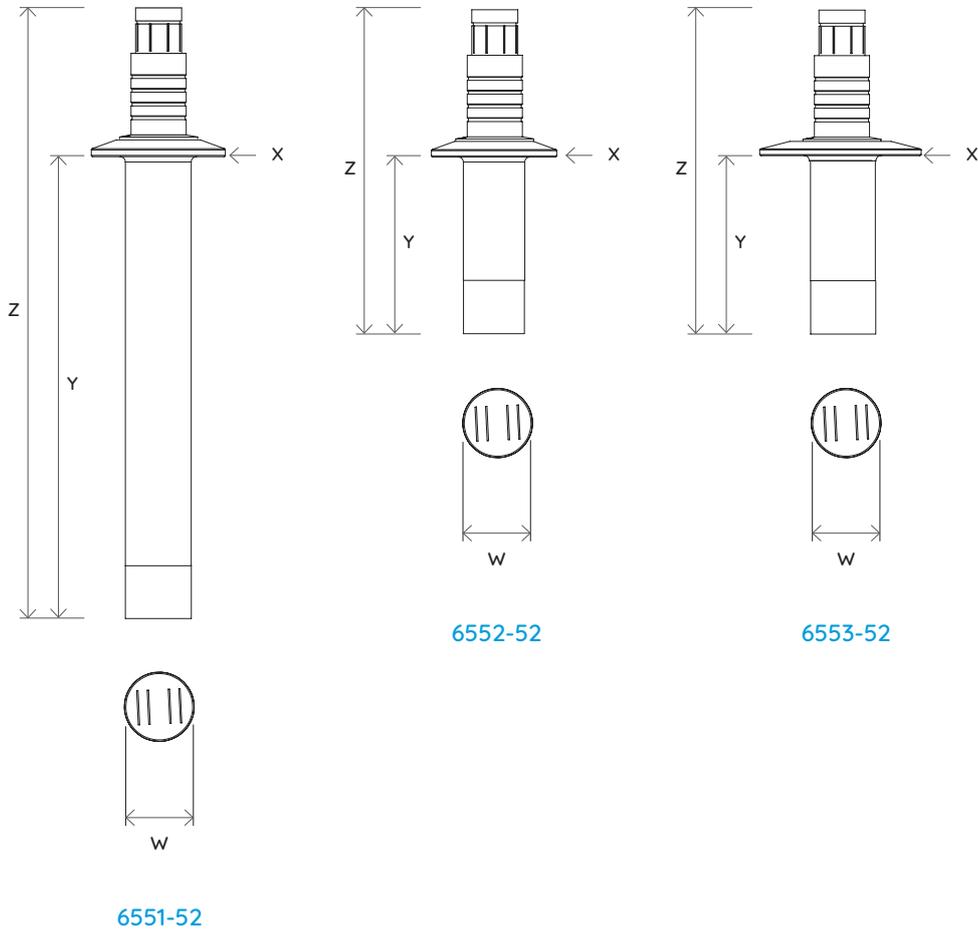
Part Number	Description	Dimensions (mm)			
		W	X	Y	Z
6545-52	25 X 96 mm Annular Probe, Standard O-ring, Retained Ring	25	96	154	22
6546-52	25 X 96 mm Annular Probe, Braun Safety Ports, Retained Ring	25	96	154	47

\*All 25mm probes (except Tri-clamp) are supplied with a retained ring part number 1844-02 and circlip



# FUTURA sensors

## Tri Clamp probes



Part Number	Description	Dimensions (mm)			
		W	X	Y	Z
6551-52	Probe Flush Electrodes 25 x 175mm Stainless Steel / Fortron with size 1 – 1.5” . Tri-clamp flange, can be used with NovAseptic ports.	25	50.4 (1.984”)	175	225
6552-52	Probe Flush Electrodes 25 x 70 mm Stainless Steel / Fortron with size 1 – 1.5” . Tri-clamp flange, can be used with NovAseptic ports.	25	50.4 (1.984”)	70	120
6553-52	25 x 70mm, 2” Tri-clamp flange, NovAseptic Ports	25	50.8 (2.00”)	70	120

Standard FUTURA and  
Standard Remote FUTURA

# Lightweight and compact for small spaces

Our 3rd generation head-amplifiers are the main processing units of the FUTURA system and deliver robust signal power and processing for the FUTURA sensors.

## Standard Futura

Lightweight housing suitable for most bioreactors and is ideal for 25mm diameter side mounted probes and 12mm probes on vessels where the centreline of the probe is greater than 15mm from the centreline of the vessel. (Supplied with a 2 metre cable).

## Standard Remote Futura

Standard Remote Futura is designed for smaller vessels where the available head space is often limited due to tight configuration of ports and Stirrer motor. It incorporates a slim, light-weight pre-amplifier making it ideal for small bioreactors with as low as 100ml working volume. The main Futura housing can be mounted away from the bioreactor vessel. (Up to a maximum of 1 metre).

Standard Futura



Standard  
Remote  
Futura



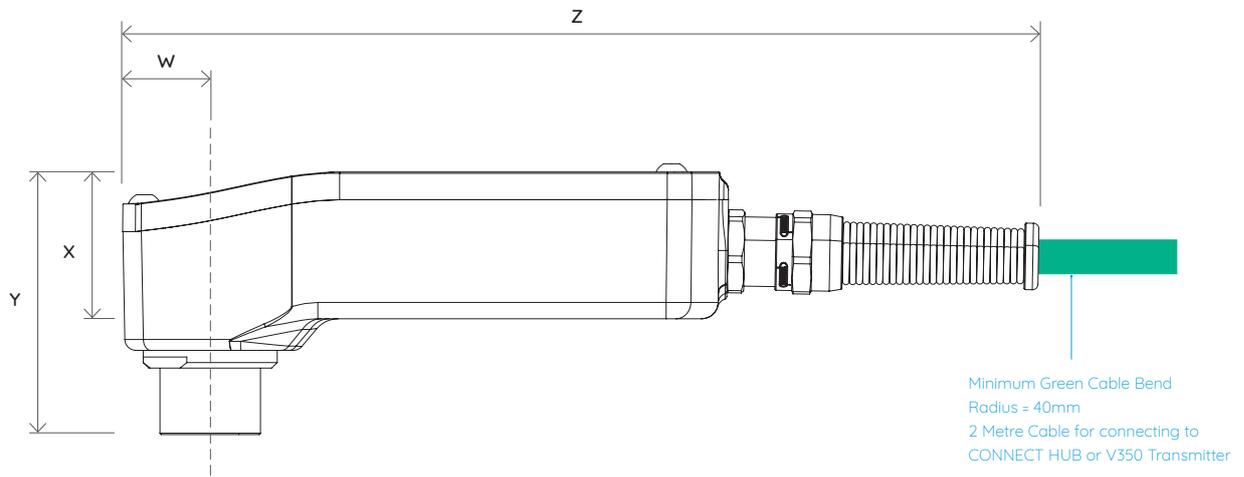


**ABER**  
TRUSTED TECHNOLOGY

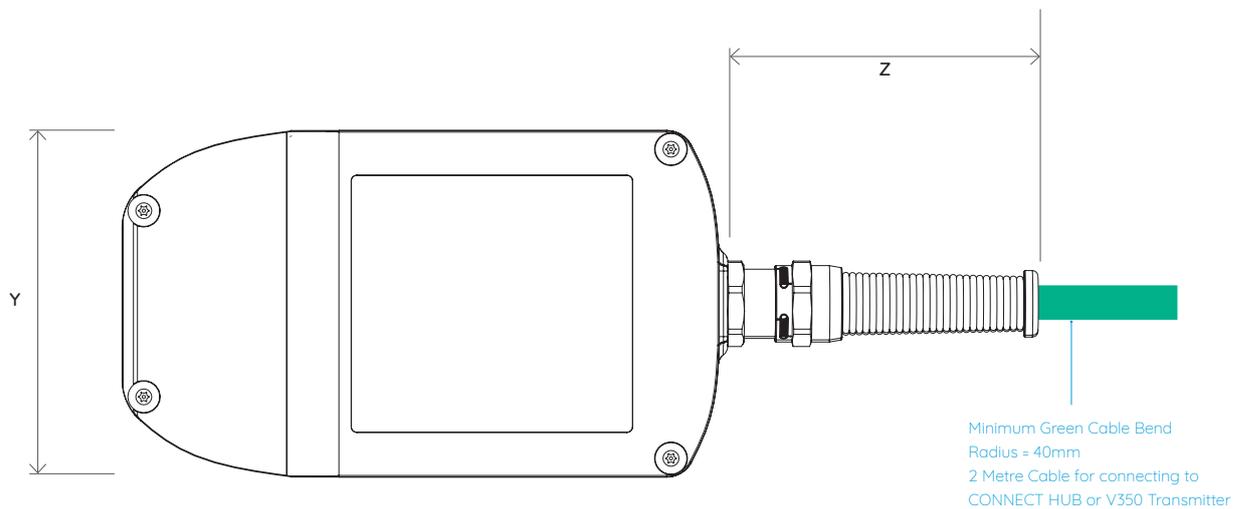
**FUTURA**

# FUTURA

## Standard Futura



Part Number	Description	Dimensions (mm)			
		W	X	Y	Z
2330-00	Standard Futura	15	27	47	164



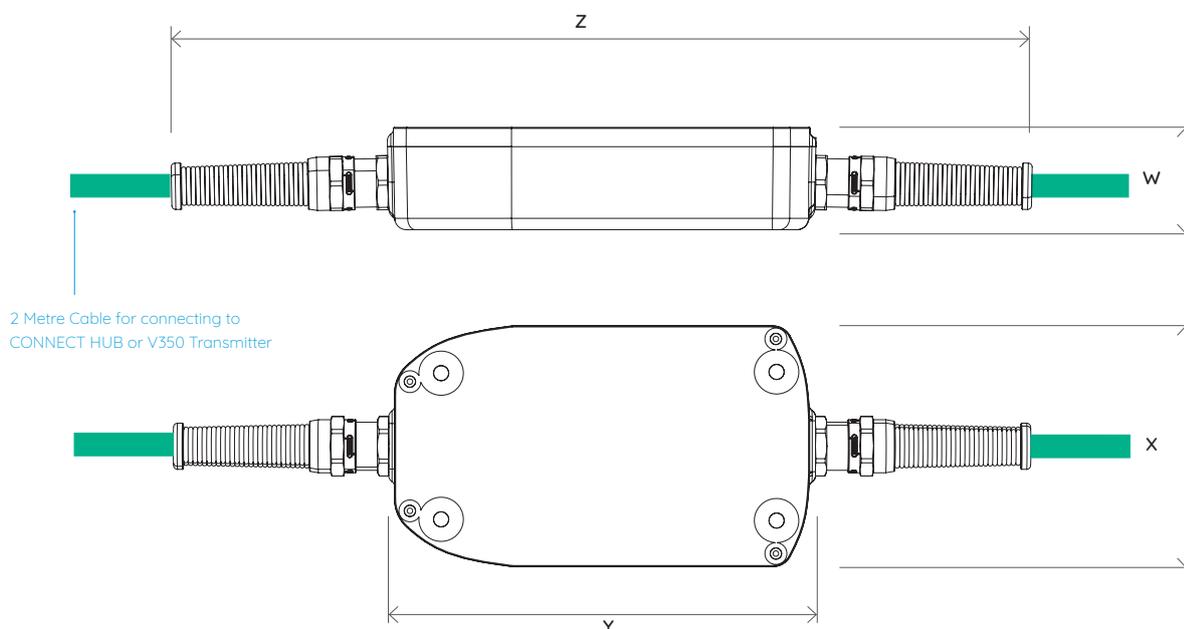
Part Number	Description	Dimensions (mm)			
		W	X	Y	Z
2330-00	Standard Futura	-	-	62	56



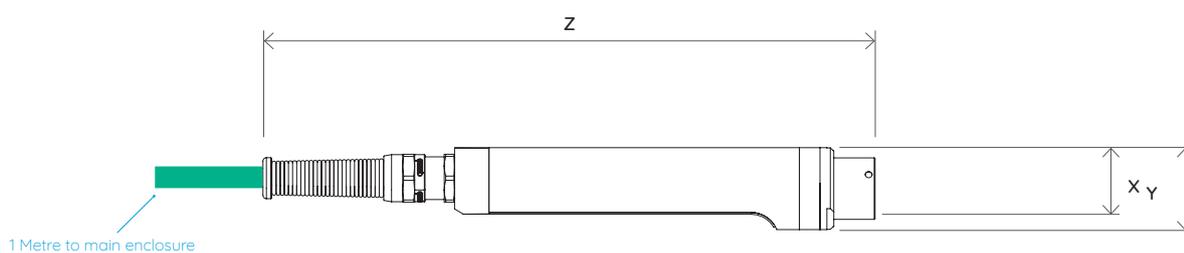
Frequency Range:	50KHz to 20MHz
Measuring Ranges:	Capacitance: 0.0 to 400 pF/cm Conductivity: 1.0 to 40 mS/cm (Higher ranges available with compatible probes)
Cell Concentration Range:	Depends on cell sizes but typically: Yeast (6 $\mu\text{m}$ ): $10^6$ Cells/ml to $10^{10}$ Cells/ml Bacteria (1 $\mu\text{m}$ ): $10^9$ Cells/ml to $10^{13}$ Cells/ml Animal Cell (12 $\mu\text{m}$ ): $10^5$ Cells/ml to $10^9$ Cells/ml Plant Cell (50 $\mu\text{m}$ ): $10^3$ Cells/ml to $10^7$ Cells/ml
Resolution:	Resolution: 0.1 pF/cm. Bacteria typically 2g/L dry weight or $2 \times 10^9$ Cells/ml for E. Coli. Yeast or Animal Cells 0.05g/L or $1 \times 10^5$ Cells/ml The relationship of these capacitance values to biomass levels depend upon the cell type and cell line
Accuracy:	Better than $\pm 3\%$ or $\pm 2\%$ of the reading
Stability:	Better than $\pm 0.2$ pF/cm at constant temperature with standard conductivity solution of $\sim 12$ mS/cm
Linearity:	Better than $\pm 1\%$ over 100 pF/cm
Precision:	$< \pm 0.5$ pF/cm, no filter active
Power Supply:	24V DC power is typically supplied by an Aber CONNECT Hub running on 110V AC to 240V AC mains.
Environmental:	IP65 rated ; Recommended ambient operating temperature range: 5°C to 40°C
Weight:	Main enclosure: 211g ; Remote enclosure: 203g

# FUTURA

## Standard Remote Futura



Part Number	Description	Dimensions (mm)			
		W	X	Y	Z
2343-00	Standard Remote Futura (Main enclosure)	27	62	110	221



Part Number	Description	Dimensions (mm)			
		W	X	Y	Z
2343-00	Standard Remote Futura (Remote enclosure)	-	19	24	110

The dimensions from the top plate of a vessel and a (top mounted) motor should be such that the motor is higher than 118 mm from the plate and more than 7.4 mm from the centre line of the port holding the ABER probe.



Frequency Range:	50KHz to 20MHz
Measuring Ranges:	Capacitance: 0.0 to 400 pF/cm Conductivity: 1.0 to 40 mS/cm (Higher ranges available with compatible probes)
Cell Concentration Range:	Depends on cell sizes but typically: Yeast (6 $\mu\text{m}$ ): $10^6$ Cells/ml to $10^{10}$ Cells/ml Bacteria (1 $\mu\text{m}$ ): $10^9$ Cells/ml to $10^{13}$ Cells/ml Animal Cell (12 $\mu\text{m}$ ): $10^5$ Cells/ml to $10^9$ Cells/ml Plant Cell (50 $\mu\text{m}$ ): $10^3$ Cells/ml to $10^7$ Cells/ml
Resolution:	Resolution: 0.1 pF/cm. Bacteria typically 2g/L dry weight or $2 \times 10^9$ Cells/ml for E. Coli. Yeast or Animal Cells 0.05g/L or $1 \times 10^5$ Cells/ml The relationship of these capacitance values to biomass levels depends upon the cell type and cell line.
Accuracy:	Better than $\pm 3\%$ or $\pm 2\%$ of the reading
Stability:	Better than $\pm 0.2$ pF/cm at constant temperature with standard conductivity solution of $\sim 12$ mS/cm
Linearity:	Better than $\pm 1\%$ over 100 pF/cm
Precision:	$< \pm 0.5$ pF/cm, no filter active
Power Supply:	24V DC typically supplied by an Aber CONNECT Hub running on 110V AC to 240V AC mains.
Environmental:	IP65 rated ; Recommended ambient operating temperature range: 5°C to 40°C
Weight:	Main enclosure: 211g ; Remote enclosure: 203g

FUTURA neo<sub>tr</sub>

# Setting the standard for single-use

Our single-use viable biomass sensors are available for use with a range of Thermo Scientific Single-Use Bioreactors via a Thermo Scientific port SV20716.

With the development of single-use systems, Aber continues to expand its range of solutions available for use from R&D and pilot scale through to manufacturing.

For recommendations on suitable products for your application, please contact [sales@aberinstruments.com](mailto:sales@aberinstruments.com)

FUTURA neo<sub>tr</sub>  
headamp



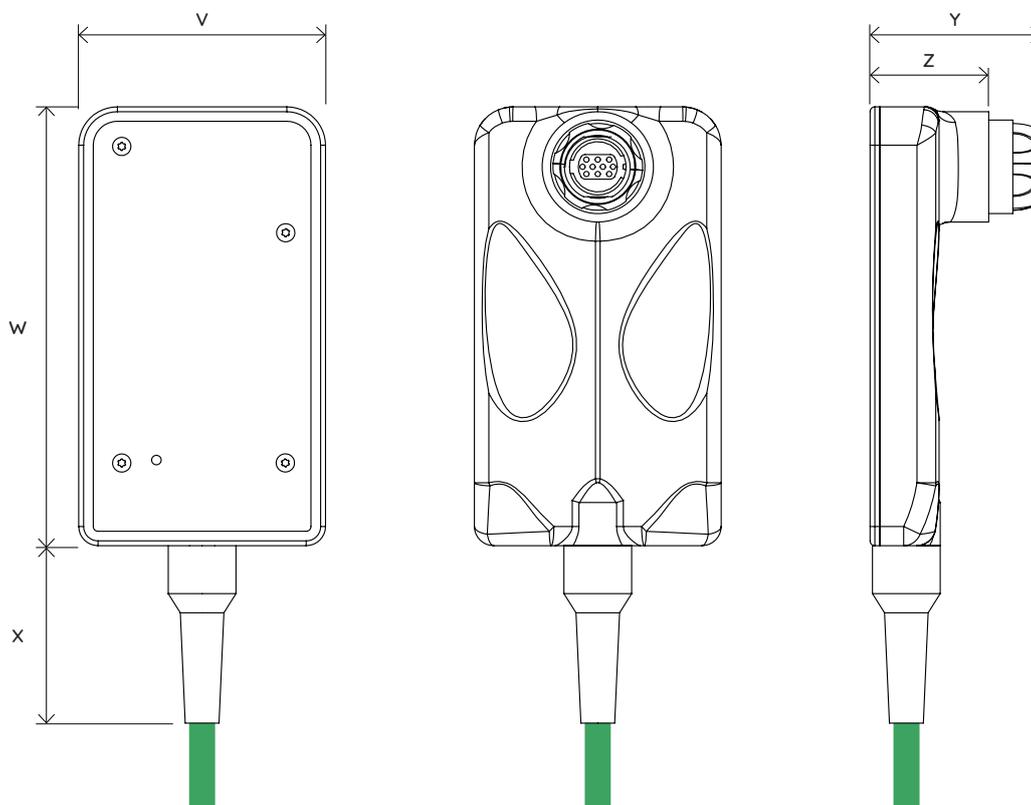
FUTURA neo<sub>tr</sub>  
single-use sensor



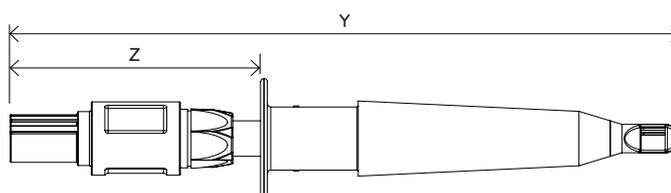


# FUTURA

## FUTURA neo<sub>tf</sub>



Part Number	Description	Dimensions (mm)				
		V	W	X	Y	Z
5360-00	FUTURA neo <sub>tf</sub> (Head Amplifier)	51	91.5	37	34.7	24.5



Part Number	Description	Dimensions (mm)	
		Y	Z
5340-00	FUTURA neo <sub>tf</sub> single-use sensor for Thermo Scientific S.U.B.s	140	55

Part Number	Description
5341-00	FUTURA neo <sub>tf</sub> signal simulator - Zero Value
5342-00	FUTURA neo <sub>tf</sub> signal simulator - High 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 <sup>6</sup> cells/ml to 10 <sup>10</sup> Cells/ml Bacteria (1 µm): 10 <sup>9</sup> cells/ml to 10 <sup>13</sup> Cells/ml Animal Cell (12 µm): 10 <sup>5</sup> cells/ml to 10 <sup>9</sup> Cells/ml Plant Cell (50 µm): 10 <sup>3</sup> cells/ml to 10 <sup>7</sup> Cells/ml
Resolution:	Resolution: 0.1 pF/cm. Bacteria typically 0.2g/L dry weight or 2x10 <sup>9</sup> Cells/ml for E. Coli. Yeast or Animal Cells 0.05g/L or 1 x10 <sup>5</sup> 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

# FUTURA

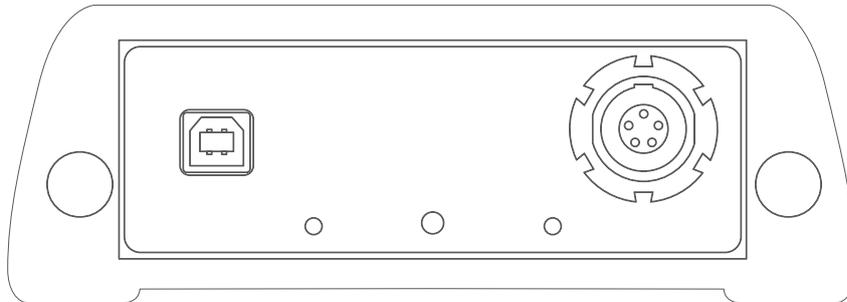
## Connect options for FUTURA neo<sub>tf</sub>

The Connect is a transmitter that is used with a single FUTURA neo<sub>tf</sub> instrument.

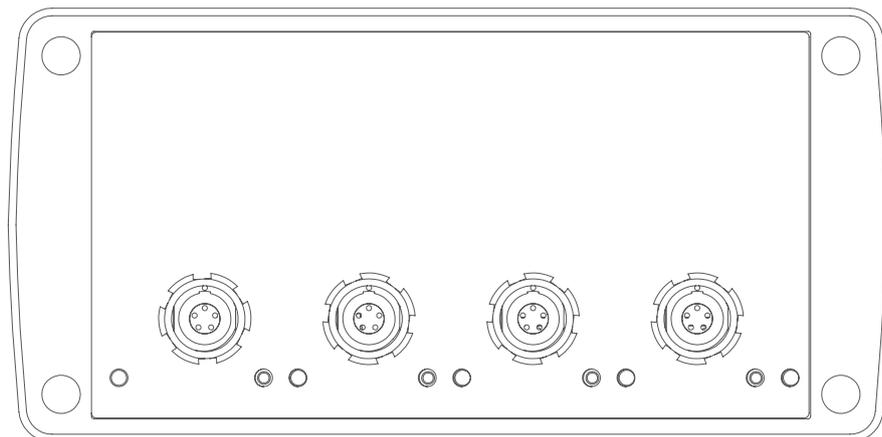
### Communication:

- Connects ABER's FUTURA equipment to a PC via a USB port.
- Single channel Connect provides FUTURA equipment with 2 x 4-20mA Analog (Current loop) outputs
- 4 channel Connect provides FUTURA equipment with 8 x 4-20mA Analog (Current loop) outputs.
- Provides FUTURA equipment with a Modbus Interface to SCADA or a controller

### Connect 1



### Connect 4



Part Number	Description
2801-00	FUTURA Connect 1 - for full technical specification see page 31
2820-00	FUTURA Connect 1 - Din Rail Mountable - for full technical specification see page 31
2814-00	FUTURA Connect 4 - for full technical specification see page 32



FUTURA Connect

# Multifunctional hub

The Futura Connect is a multifunctional hub (transmitter) that interfaces the Futura to external devices such as a PC or a bioreactor control system. It provides USB, Modbus and Current Loop (Analog) connections which allows the user to connect the Futura's signals to any bioreactor control system so that the Futura is fully integrated with your process system.

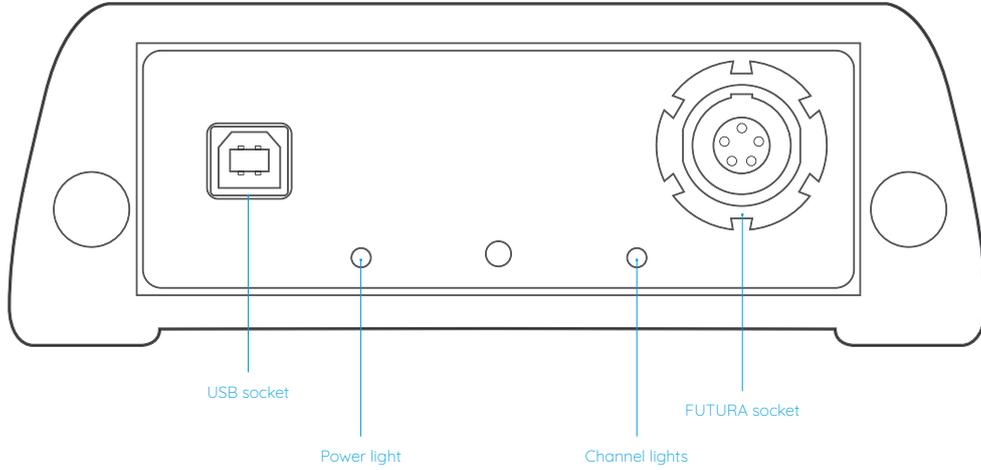
The Futura Connect hubs are available in one and four channel models and now with the introduction of the new Connect xtra single channel a wide selection of alternative communication outputs are available to choose from, giving greater flexibility in how you configure your system.



# FUTURA Connect

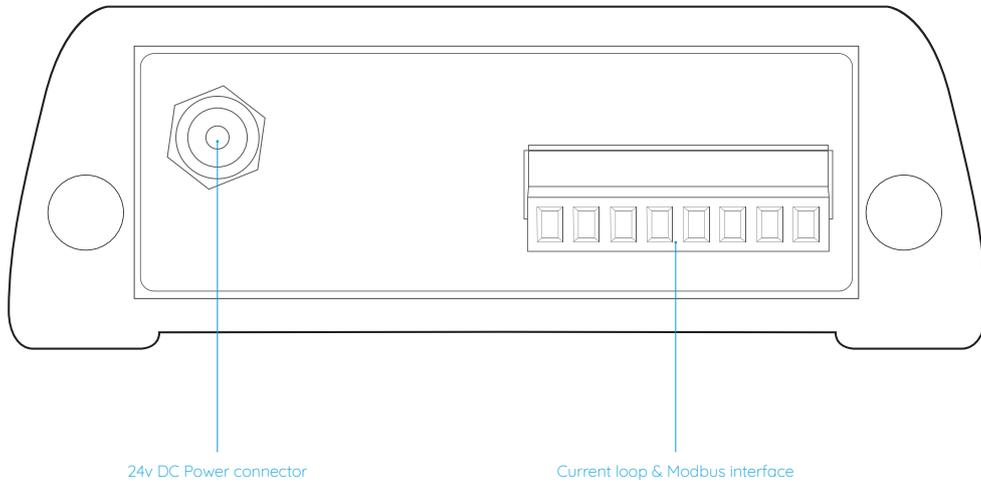


## Front

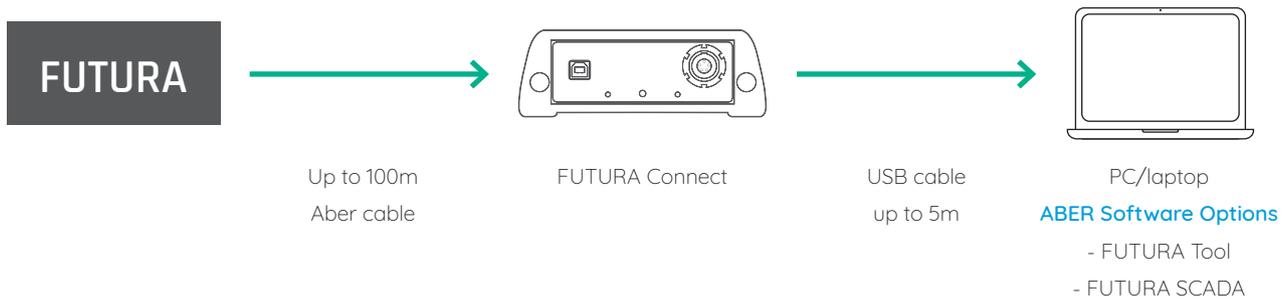


The Front panel provides the FUTURA sockets, with the rear providing both the current loop outputs and the Modbus connection point.

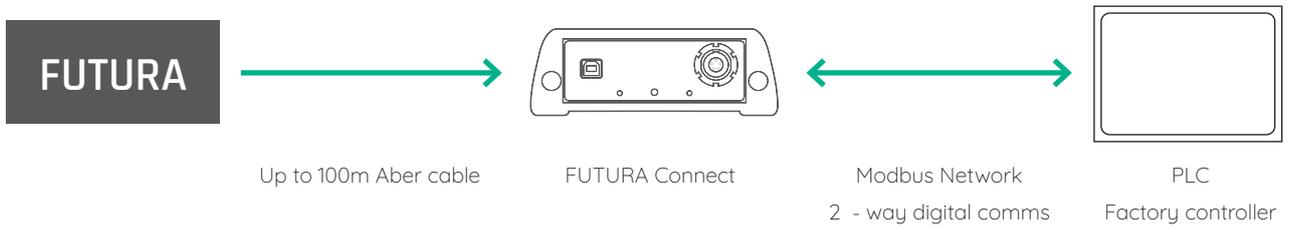
## Back



### A. FUTURA CONNECT USB

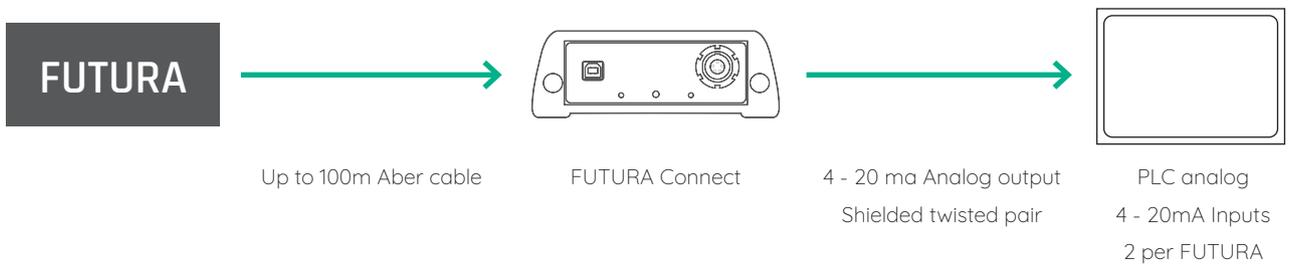


## B. FUTURA CONNECT - Modbus (Available on all versions of the CONNECTS)

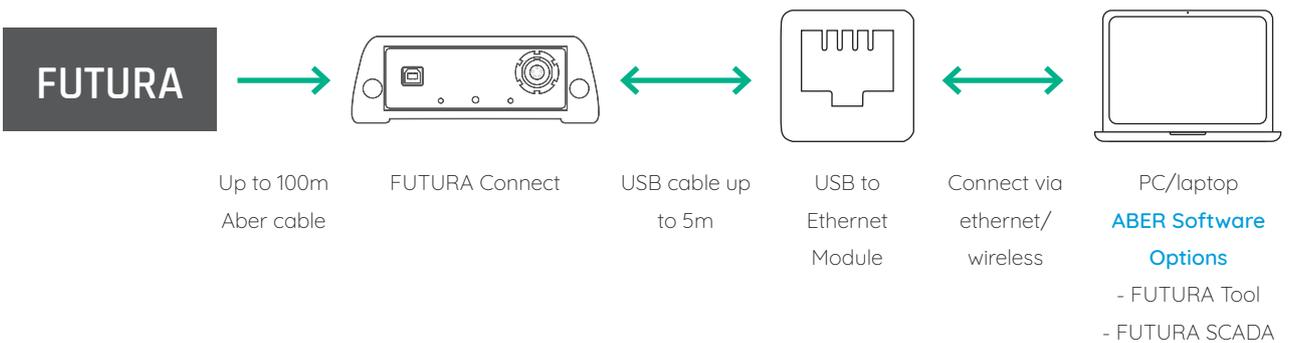


## C. FUTURA CONNECT - 4-20mA Analog output

(4 - 20mA Analog (Current loop) options are on every 1, 4 and 8 way CONNECT)



## D. FUTURA CONNECT - USB to Ethernet



### USB to Ethernet Module

Use an Ethernet module to add connectivity to your FUTURA CONNECT

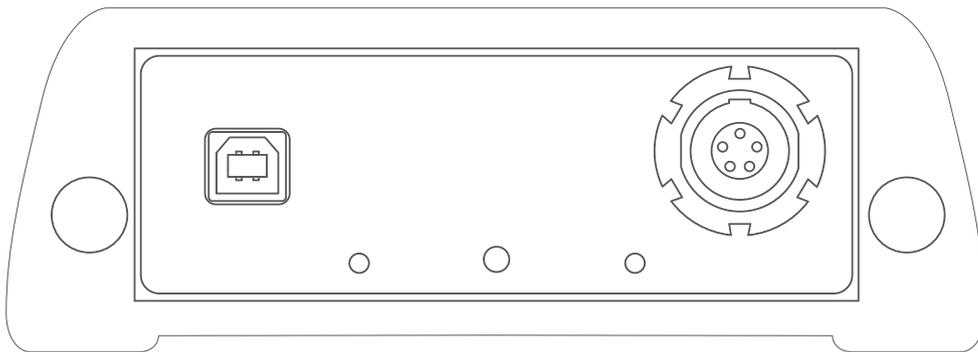
Part Number	Description
2801-36	USB to Ethernet Adaptor Module - Belkin FSL009uk or Similar

## E. FUTURA CONNECT Xtra

With the addition of the new FUTURA CONNECT Xtra, additional communication outputs are now available.

Please refer to page 27 for further detail or email support@aberinstruments.com

# FUTURA Connect 1



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

Dimensions	Height: 38 mm Width: 105 mm Depth: 145 mm Weight: 0.7 kg
Power Supply:	Desktop mains power supply, Aber part number: 2885-35 Nominally 110 to 240 volts AC 50/60Hz. Installation Category II
Power Consumption:	10W Maximum
Electrical Safety:	Must use Aber branded external power supply, part number: 2885-35
Environmental:	Safe ambient operating temperature range: 5°C to 40°C Recommended ambient operating temperature range: 15°C to 30°C Relative Humidity: < 85%. Pollution: Deg 2. (EN61010) Not Waterproof. Recommended operating altitude: < 2000m

# FUTURA

## Connect 4

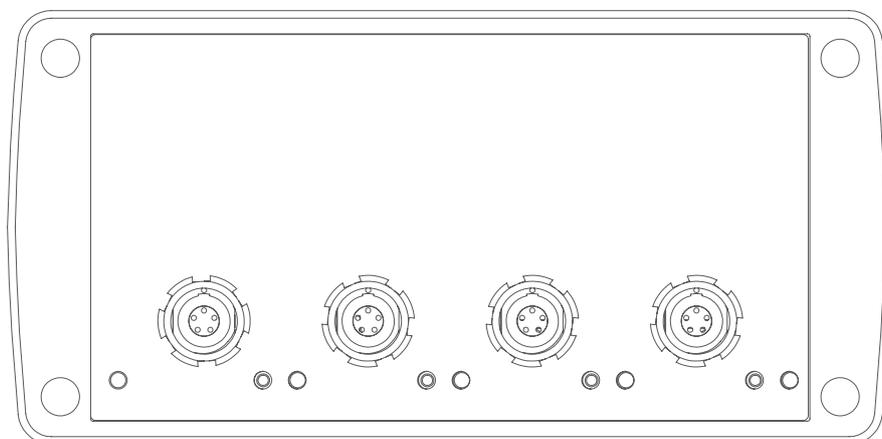
For use with up to four FUTURA and multiple bioreactors

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

Front



Part Number	Description
2814-00	FUTURA Connect 4
Dimensions	Height: 88 mm Width: 175 mm Depth: 132 mm Weight: 1.35 kg
Power Supply:	Desktop mains power supply. Aber part number: 2885-35 Nominally 110 to 240 volts AC 50/60Hz. Installation Category II
Power Consumption:	60W Maximum
Electrical Safety:	Must use Aber branded external power supply, part number: 2885-35
Environmental:	Safe ambient operating temperature range: 5°C to 40°C Recommended ambient operating temperature range: 15°C to 30°C Relative Humidity: < 85%. Pollution: Deg 2. (EN61010) Not Waterproof. Recommended operating altitude: < 2000m

# FUTURA

## Connect xtra



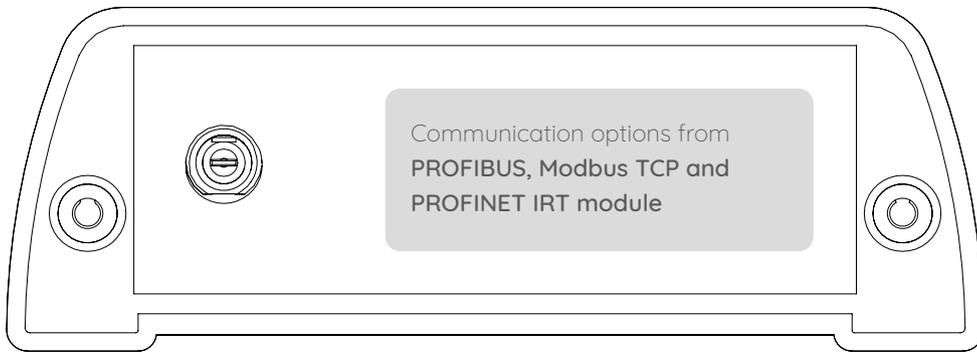
For use with one FUTURA and one bioreactor.

The FUTURA CONNECT provides power and communications to the FUTURA

Communication:

- Connects Aber's FUTURA equipment to a PC via a USB 2.0 port.
- Choose the most appropriate communication type (See Current Anybus module options.)
- Options from Anybus CompactCom M40 Module Include: PROFIBUS, Modbus TCP, PROFINET

Back



Part Number	Description
2815-00	FUTURA CONNECT Xtra (When ordering please specify PROFIBUS, Modbus TCP or PROFINET IRT module)

Dimensions	Height: 38 mm Width: 105 mm Depth: 145 mm Weight: 0.7 kg
Power Supply:	Desktop mains power supply. Aber part number: 2885-35 Nominally 110 to 240 volts AC 50/60Hz. Installation Category II
Power Consumption:	10W Maximum
Electrical Safety:	Must use Aber branded external power supply, part number: 2885-35
Environmental:	Safe ambient operating temperature range: 5°C to 40°C Recommended ambient operating temperature range: 15°C to 30°C Relative Humidity: < 85%. Pollution: Deg 2. (EN61010) Not Waterproof. Recommended operating altitude: < 2000m

## FUTURA V350 touch screens

# Local interfaces made for cGMP environments

### V350 panel and wall mount

The V350 modules are ideal when a local interface is required close to the bioreactor. The operator can input Futura settings and monitor process values locally via the touch screen.

#### V350 Panel mount

The V350 modules are ideal when a local interface is required close to the bioreactor. The operator can input Futura settings and monitor process values locally.

V350 Touch Panel Mount PLC with 3.5" TFT touch screen

- Connects to any single Futura option and is programmable for different applications
- Provides power to a single Futura
- Provides 2 x 4-20mA current loops for capacitance and conductivity
- Displays graphs of recorded data
- 1 Futura pass through USB connection
- 1 x Alarm Relay
- IP65 rated when mounted in a suitable panel

#### V350 Wall mount

The V350 modules are ideal when a local interface is required close to the bioreactor. The operator can input Futura settings and monitor process values locally.

V350 Wall Mount

Connects to any single Futura option and is programmable for different applications.

- Provides power to a single Futura
- Provides 2 x 4-20mA current loops for capacitance and conductivity
- Displays live trend graphs
- 1 Futura pass through USB connection
- 1 x Alarm Relay
- Stainless steel enclosure rated to IP65



Panel  
mount

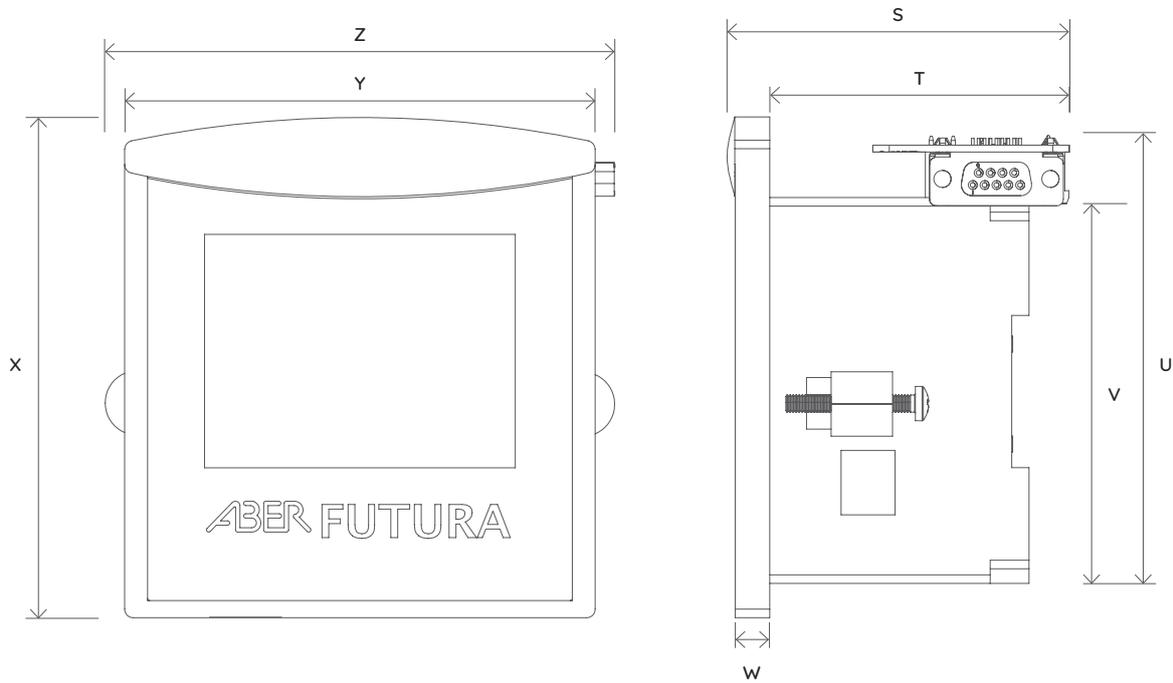


Wall  
mount



# FUTURA

## V350 panel mount



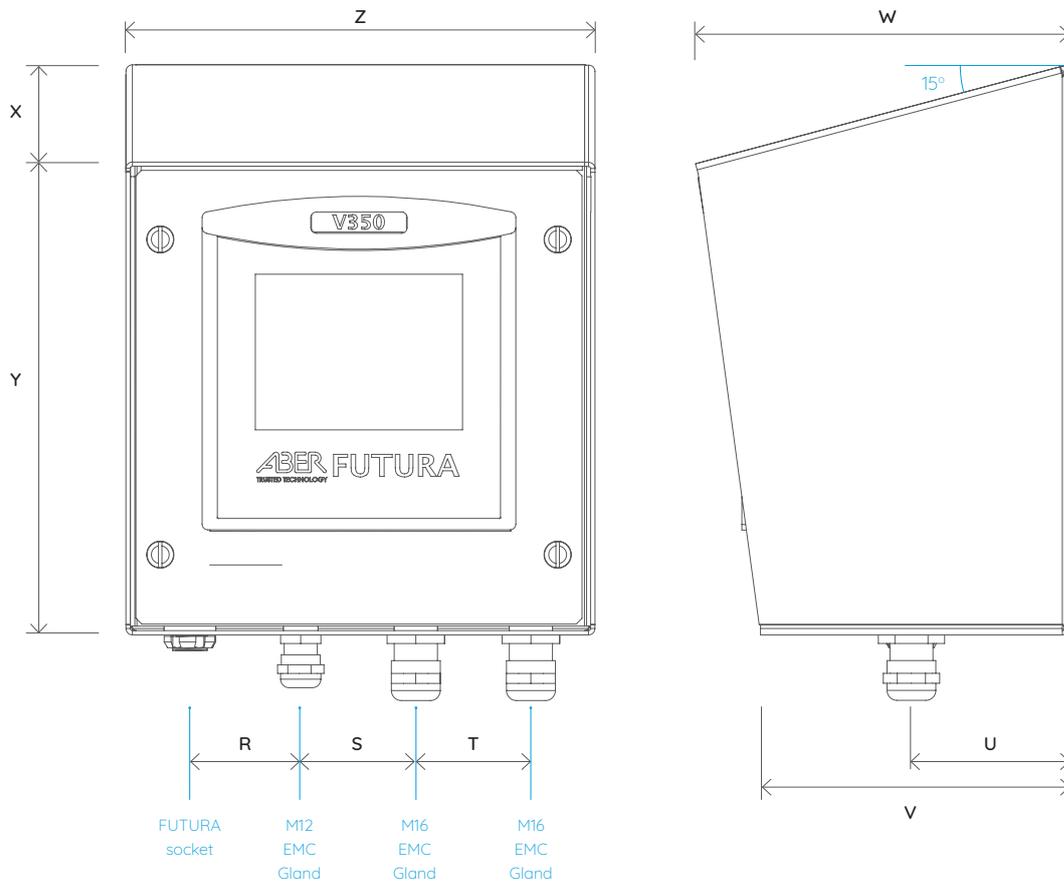
Part Number	Description	Dimensions (mm)							
		S	T	U	V	W	X	Y	Z
3551-00	V350 panel mount	77.6	60	119	90	8	114	109	118

Part Number	Description
3551-00	V350 panel mount
3525-30	V350 DC/DC Supply isolating converter
3531-30	V350 AC/DC Supply isolating converter

Measuring Ranges	Capacitance: 0 to 400pF/cm, equivalent Cells/ml Conductivity: 1 to 40mS/cm
Power Supply:	+24V DC
Power Consumption:	15W Maximum
Battery Backup:	7 years typical, at 25°C (Clock and Data Only)
Electrical Safety:	Must be mounted in a suitable EMC shielded enclosure & grounded. Refer to installation instructions.
Environmental:	IP65 for fascia, when mounted in suitable panel. Safe ambient operating temperature range: 5°C to 40°C Recommended ambient operating temperature range: 15°C to 30°C Relative Humidity: < 85%. Pollution: Deg 2. (EN61010) Recommended operating altitude: < 2000m

# FUTURA

## V350 Wall mount



Part Number	Description	Dimensions (mm)								
		R	S	T	U	V	W	X	Y	Z
3550-00	V350 wall mount	38.5	40	40	55	114	135	35	165	165

Measuring Ranges	Capacitance: 0 to 400pF/cm, equivalent Cells/ml Conductivity: 1 to 40mS/cm.
Power Supply:	+24V DC
Power Consumption:	15W Maximum
Battery Backup:	7 years typical, at 25°C (Clock and Data Only)
Electrical Safety:	Must be mounted in a suitable grounding system. Refer to installation instructions
Environmental:	Stainless steel enclosure is IP65 rated Safe ambient operating temperature range: 5°C to 40°C Recommended ambient operating temperature range: 15°C to 30°C Relative Humidity: < 85%. Pollution: Deg 2. (EN61010) Recommended operating altitude: < 2000m

## FUTURA Test equipment

# Performance check

### Probe Tester

The Probe Tester has been specially designed to carry out checks on the integrity of ABER FUTURA probes. The tester will automatically run through a sequence of tests checking a probe for internal corrosion and leakage between the electrodes. An additional test cable allows the user to check the continuity between each electrode and the Head Amplifier socket.

The complete test procedure checks the health of a probe and its ability to perform correctly. The Probe Tester has an LCD display that allows the user to quantify and track the changes of a probe condition. Using traffic light indicators and numeric values for record keeping. See Page 37 for Probe Tester Certificate part number.



### Signal simulator

The signal simulator, as the name suggests, simulates a capacitance and conductivity measurement, and is used to perform a functional test on the FUTURA.

For Signal Simulator Certificates and recalibration, please refer to page 37.



Part Number	Description
1486-00	FUTURA\ FUTURA pico Probe Tester

Part Number	Description
9051-00	Signal Simulator - Zero Value Only
9071-00	Signal Simulator - Mid Value Only
9052-00	Signal Simulator - High Value Only
9053-00	Signal Simulator - Clean Pulse Indicator Only



FUTURA Software, validation & calibration and extension cables

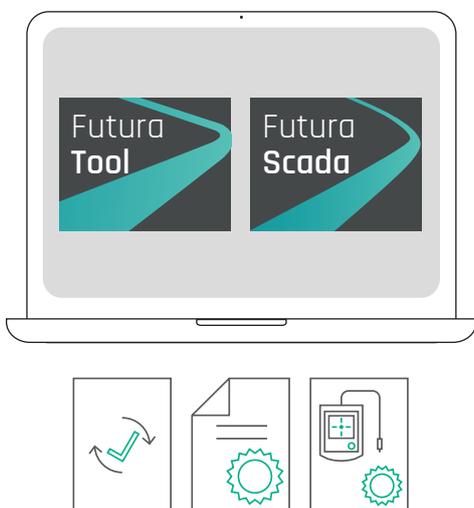
# Greater connectivity, analysis and mining capabilities

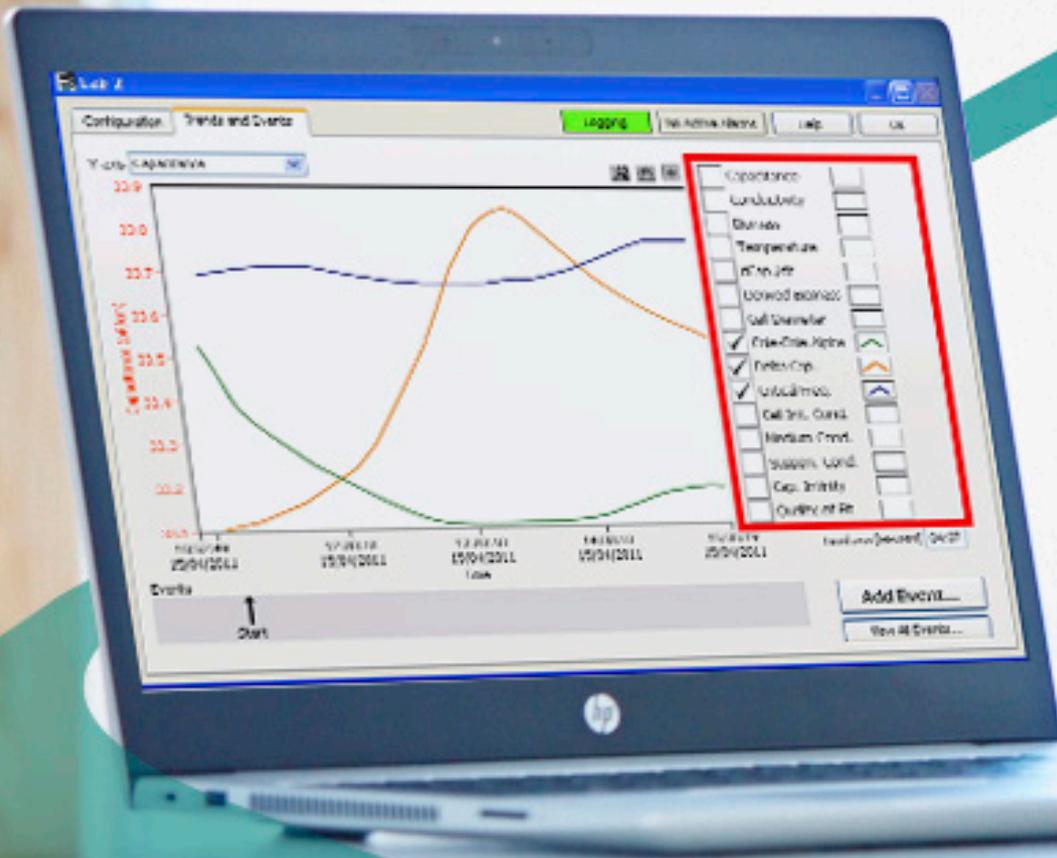
The capabilities of the FUTURA Biomass monitoring system is further enhanced when combined with the FUTURA Software developed by ABER. FUTURA Tool and FUTURA SCADA deliver greater online connectivity, data analysis & mining capabilities, providing better insights throughout your Online Biomass Process. Futura Tool is provided free of charge with the purchase of a Futura system.

From ABER Instruments' range of Biotech Products, our FUTURA product range includes the FUTURA Extension Cables. Our FUTURA inline and bulkhead extension cables are available in standard lengths from 5 meters.

Software and validation & calibration

Extension cables





# FUTURA Software



## FUTURA TOOL Setup Software

FUTURA TOOL enables the end user to:

- Configure FUTURAs for use with all Hub and Connect options and the V-350 PLC View diagnostic information and set-up appropriate controls  
Eg current loop scaling or Modbus baud rate
- Carry out custom probe calibrations, upgrade FUTURA firmware and collect diagnostic information about your process
- Collect and manage data acquisition, with limited multi frequency scanning capability

Part Number	Description
2860-35	FUTURA Tool Software (Included with purchase of a FUTURA system)



FUTURA SCADA is a GAMP 5 compliant software package that allows the end user on one screen to:

- Set up and then optimise each individual FUTURA system
- Provide continuous data collection for any number of FUTURA systems with an events time line.
- Provide frequency scanning to calculate some additional parameters (including delta C, critical frequency, Cole-Cole alpha) and derive information on the cells including cell bio-volume and diameter.
- Carry out retrospective analysis of separate data sets from different experiments - data is easily exported to excel via simple csv files.
- Monitor probe life parameters.
- Can also operate as an OPC server making capacitance and conductivity measurements across the different frequencies as well as the additional parameters available as tags for a third party SCADA.

Part Number	Description
2893-35	FUTURA SCADA Software - Includes Live Scanning and Post Processing Analysis
2895-35	Futura Scada - OPC activation License (Analyse Scanning data in real time)

If you are interested in transferring single frequency measurements via OPC, please contact [sales@aberinstruments.com](mailto:sales@aberinstruments.com)

### Minimum System requirements

- The minimum system requirements needed to run Futura SCADA are:
  - Microsoft Windows 7 SP1 or later
  - 2GB RAM or higher
  - 1.6GHz Intel Atom or higher
  - At least 20% free hard drive space, 5GB minimum
  - At least one free USB 2.0 port
  - Administration privileges in order to install all the programs parts
  - A screen resolution of at least 1336 x 768 pixels.



**IOQ validation package**

Full System validation documentation

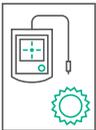
Part Number	Description
2330-60	IOQ Validation Package, Includes Certificates - One Futura with Connect 1 or V350
2814-60/01	IOQ Validation Package, Includes Certificates - Connect 4 with One Futura
2814-60/02	IOQ Validation Package, Includes Certificates - Connect 4 with Two Futuras
2814-60/03	IOQ Validation Package, Includes Certificates - Connect 4 with Three Futuras
2814-60/04	IOQ Validation Package, Includes Certificates - Connect 4 with Four Futuras



**Probe Certificate of Conformance**

By default a probe is shipped with a basic certificate of traceability. For manufacturing applications, a complete set of material certificates can be provided for all product contact materials.

Part Number	Description
6520-64	Probe Certificate of Conformance - For One Probe, Probe Not Included



**Signal Simulator Certificate & Signal Simulator Recalibration including certificates**

Signal simulator certificates show that the units are working within their functional specifications and have information on calibration dates and other important information used for validation purposes.

Part Number	Description
9051-60	Calibration Certificate for Zero Value Signal Simulator
9071-60	Calibration Certificate for Mid Value Signal Simulator
9052-60	Calibration Certificate for High Value Signal Simulator
9050-62	Signal Simulator Recalibration, 2 Values Set, Includes Certificate
9070-62	Signal Simulator Recalibration, 4 Values Set, Includes Certificate

Part Number	Description
1480-62	Probe Tester Recalibration, Includes Certificate
1486-62	FUTURA\FUTURA pico Probe Tester Recalibration, Includes Certificate

# FUTURA

## Inline extension cable

Part Number	Description
1630-24/5	5 Metre Extension Cable
1630-24/10	10 Metre Extension Cable
1630-24/15	15 Metre Extension Cable
1630-24/20	20 Metre Extension Cable
1630-24/25	25 Metre Extension Cable
1630-24/30	30 Metre Extension Cable

# FUTURA

## Bulkhead extension cable

For use with Panel mounted V350 and Panel isolated Connects

Part Number	Description
1635-24/1	1 Metre Bulkhead Extension Cable
1635-24/5	5 Metre Bulkhead Extension Cable
1635-24/10	10 Metre Bulkhead Extension Cable
1635-24/15	15 Metre Bulkhead Extension Cable



# Sales and support

## Sales enquiries & Orders

Please send your purchase orders or delivery schedule enquiries to:

[sales@aberinstruments.com](mailto:sales@aberinstruments.com)

+44 (0)1970 636 300

## Support Contact Details

For any technical queries you may have prior or post purchase for any Aber system, please initially direct them to:

[support@aberinstruments.com](mailto:support@aberinstruments.com)

+44 (0)1970 636 300

## Distributor Network

Aber operates through a global network of distributors, please find details of your local distributor at our website under the biotech distributor section or navigate via this link:

[www.aberinstruments.com/biotech-distributors](http://www.aberinstruments.com/biotech-distributors)

## Return Merchandise Authorization

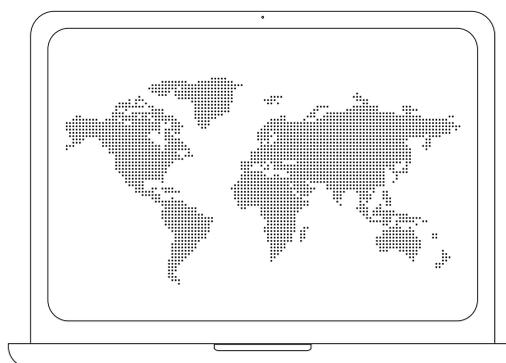
For any Return Merchandise Authorization (RMA) return, please request an RMA form from your local Aber distributor or directly from

[support@aberinstruments.com](mailto:support@aberinstruments.com)

This will ensure that the items pass through customs without any unnecessary cost or delay.

## Customer Resource Portal

[www.aberportal.com](http://www.aberportal.com)



The Aber Customer resource Portal for customers and distributors gives access to a range of product training materials in video, document and presentation form; guides & SOP's, webinars, system manuals and software packages, along with marketing support material for distributors. If you are an Aber customer or a current distributor, please send your portal login request to: [portal@aberinstruments.com](mailto:portal@aberinstruments.com)

## Software product key requests

Please direct your demo software key requests to: [support@aberinstruments.com](mailto:support@aberinstruments.com)

Part Number	Description
9000-27	Base charge part number for any system's repair assesment and full quote.

- On receiving the equipment Aber will asses the unit/s and repair work needed and inform you of the options, including a full quote.
- Repair work will not commence until the quote has been formally accepted and a purchase order received.
- Individual parts repair work will be assessed and charged on a piece by piece basis.



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