AUSTRALIAN OXYTROL SYSTEMS

Oxygen Analyzer
AOS O2TA 2200 Manual

Version 1.0, May 2019

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AOS O2TA 2200 Technical Specification

1 Description

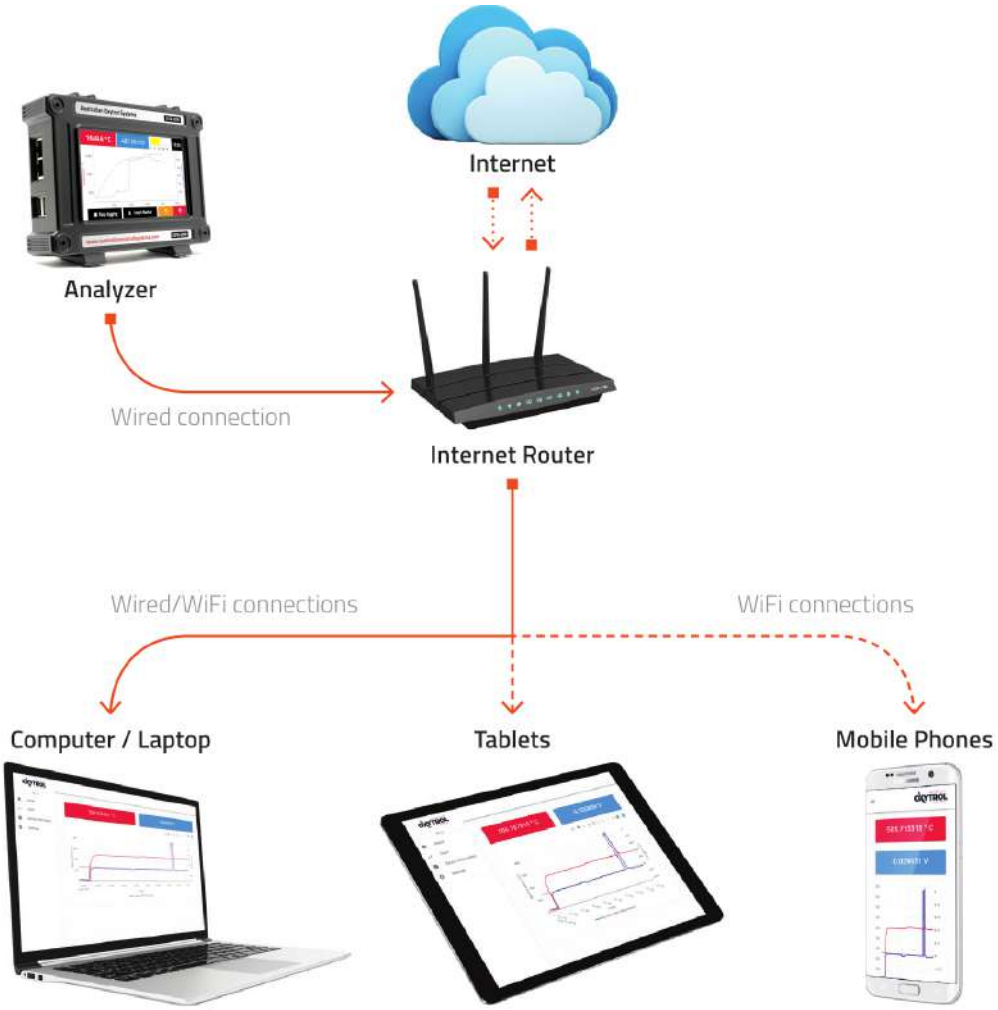
The Oxygen Analyzer (AOS O2TA 2200) enables you to receive readings from any of the Australian Oxytrol Systems' oxygen probes, and thermocouples. It displays temperature and oxygen concentration readings, allowing visualisation of data over time. It provides indication of the environment, namely oxidizing or reducing, and can record 48 hours of data to a USB flash drive. All that is needed for it to function is a connection to power and an oxygen probe.

Features

- Real-time:
  - temperature and oxygen level readings
  - graphing of temperature and oxygen levels
  - display of oxidation or reduction
- Record and log continuous data to a USB flash drive
- Display real-time temperature in Celsius, Fahrenheit, and Kelvin
- Graphical representation of Oxygen and Temperature data over time
- Oxygen concentration in mV or partial-pressure of Oxygen. The partial pressure value is in units of percent, ppm, or scientific notation, depending on the order of magnitude
- Automatic scale and update of graph scale as the data-set grows
- Record the oxygen level and temperature at every given time point to a CSV file on a USB flash drive
- Mark a point in time that is represented graphically as well as in the logged file
- Configurable battery backed up real time clock
- Display the data graph full screen if desired
- Configurable scale
- B, N, E, R, J, S, K, & T type thermocouples supported
- Connect to web app and monitor remotely
- Software upgrade facility
- Sampling supports up to 48 hours at up to 4 samples per second. Recommended sample rate settings for logging periods are as follows, to avoid creating overly large files:
  - 48 hours at 1 sample per second;
  - 24 hours at 2 samples per second;
  - 12 hours at 4 samples per second.

1.1 Connectivity

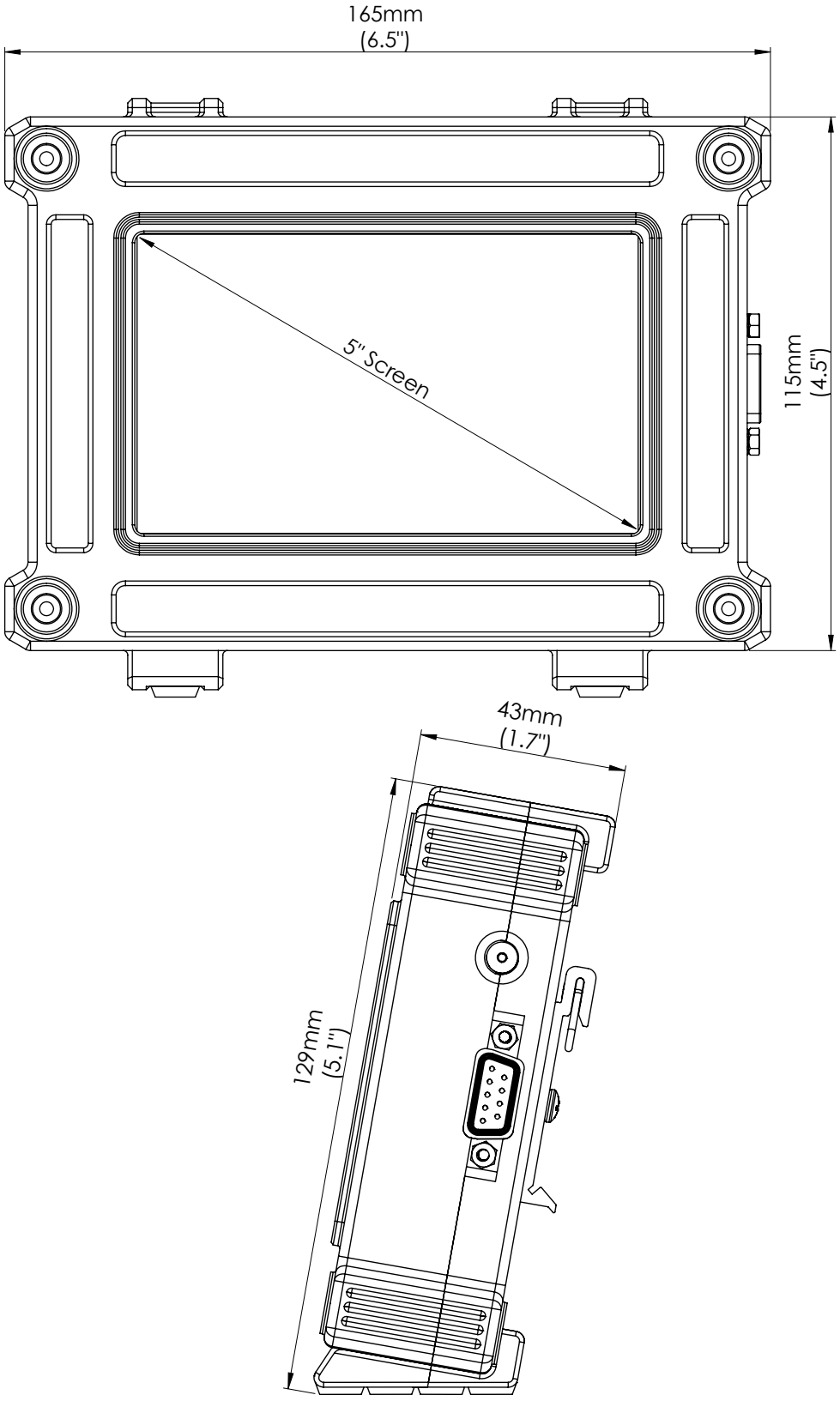
Remote viewing is enabled via wifi or network connection, if the analyzer is connected via ethernet to an appropriate router. The probe can be monitored via the webapp, using a phone, tablet or laptop.



2 Specifications

Environmental				
Parameter	Minimum	Typical	Maximum	Unit
Operating temperature	-20	30	70	°C
Storage	-30	20	80	°C
Electrical				
Parameter	Minimum	Typical	Maximum	Unit
Input power	–	12	–	V DC
Power consumption	–	20	–	Watts
Oxygen input	-2.0	–	2.0	VDC
Oxygen uncertainty	-1000	–	1000	mVDC 0.01%
Temperature input	-2.0	–	2.0	VDC
Temperature uncertainty	–	0.7	–	°C
Temperature accuracy	–	0.5	–	at 25°C
Oxygen Input Impedance	100	–	6	GΩ|| pF
Temperature Input Impedance	1	–	0.95	MΩ|| pF
Mechanical				
Parameter	Minimum	Typical	Maximum	Unit
Height	–	129	–	mm
Width	–	165	–	mm
Depth	–	43	–	mm
Weight	–	600	–	g
Thermocouples				
Type	Minimum	Typical	Maximum	Unit
B	250/482	–	1820/3308	°C/F
E	-200/-328	–	1000/1832	°C/F
J	-210/-346	–	1200/2192	°C/F
K	-200/-328	–	1372/2501.6	°C/F
N	-200/-328	–	1300/2372	°C/F
R	-50/-58	–	1768.1/3214.58	°C/F
S	-50/-58	–	1768.1/3214.58	°C/F
T	-200/-328	–	400/752	°C/F

3 Mechanical



4 What comes in the kit

1. Oxygen analyzer
2. Power lead
3. Connector cable

5 General Measurement Setup

Key to accurate measurements of the oxygen concentration of the gaseous environments is the measurement setup, namely:

1. Probe location;
2. Electrical interface;
3. Measurement instrumentation;
4. Reference air and air flow rate.

5.1 General Setup

Ideal electrical interface to the probe will have the following characteristics, and include a diaphragm air pump to supply the clean reference air.

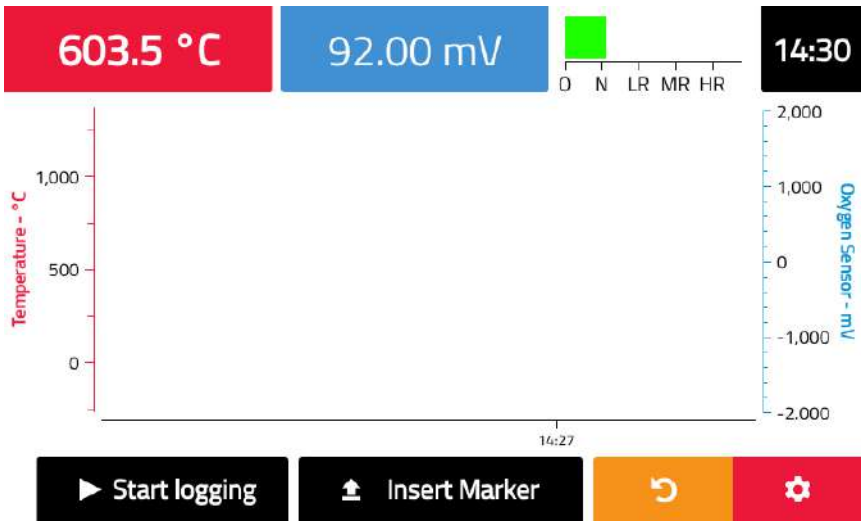
Oxygen Sensor Measurement Instrument		
Parameter	Typical	Unit
Ideal input impedance	1	TΩ
Input voltage range	± 2000	mV
Filter	50 – 60	Hz

Thermocouple Measurement Instrument		
Parameter	Typical	Unit
Ideal input impedance	10	MΩ
Input voltage range	± 100	mV
Filter	50 – 60	Hz

6 Functionality

6.1 Turning on the unit

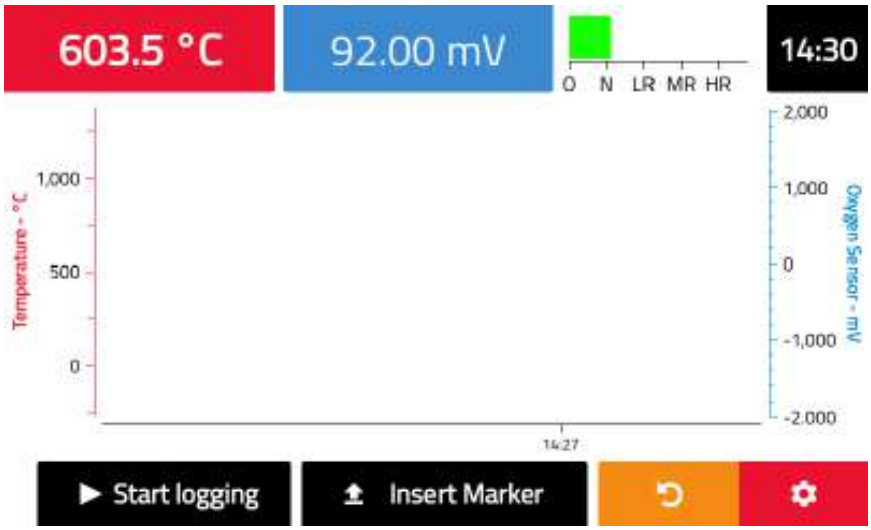
1. Plug in the unit. It will power on and display "disconnected" if it is not plugged into an appropriate probe.
2. Ensure that the power and connection cables are plugged in.
3. Ensure that a USB storage device is plugged in if you wish to store logged data
4. Wait until the page seen below appears.



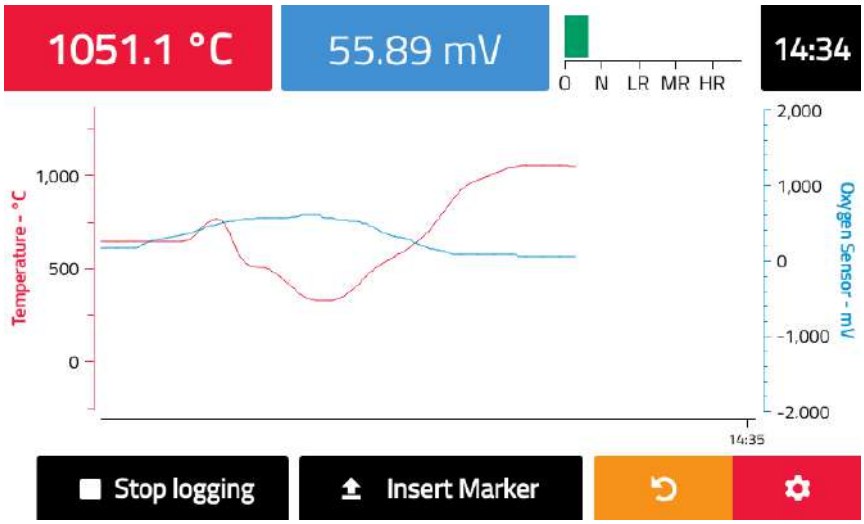
6.2 Start and reset

When the Oxygen analyzer is turned on, it will not start collecting data until you press the "Start logging" button. Follow these steps to achieve this:

1. Follow the instructions found in 6.1
2. Edit any configuration settings as desired (see 7).
3. Press the "Start Logging" button as seen below to start the data collection.



The unit will collect new readings at a rate of 4 Hz and will continue doing so until the unit is powered off (not recommended) or the "Stop" button, as seen below, is pressed.

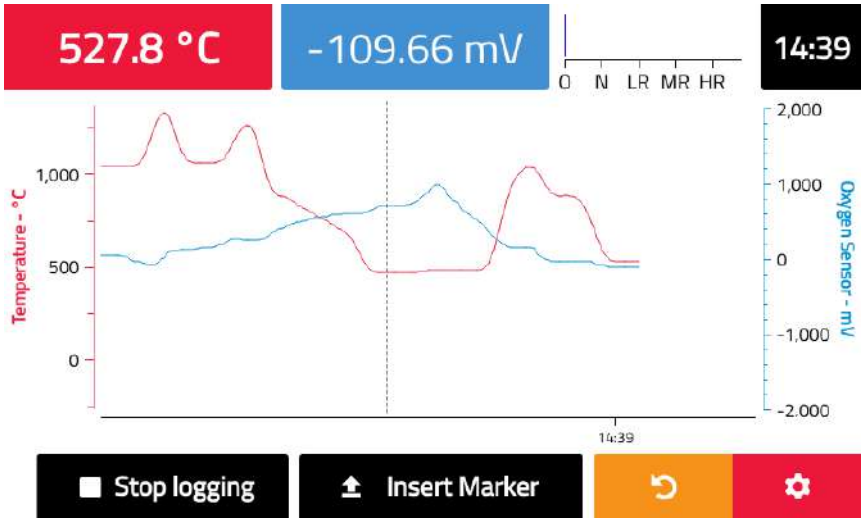


The black "Stop" button will stop the logging. You can then restart logging by pressing the "Start" button again.

The yellow "Reset" button will reset the graph and immedately resume logging.

6.3 Using the marker(s)

On the home screen of the unit, there is an Insert Marker button, as seen below.



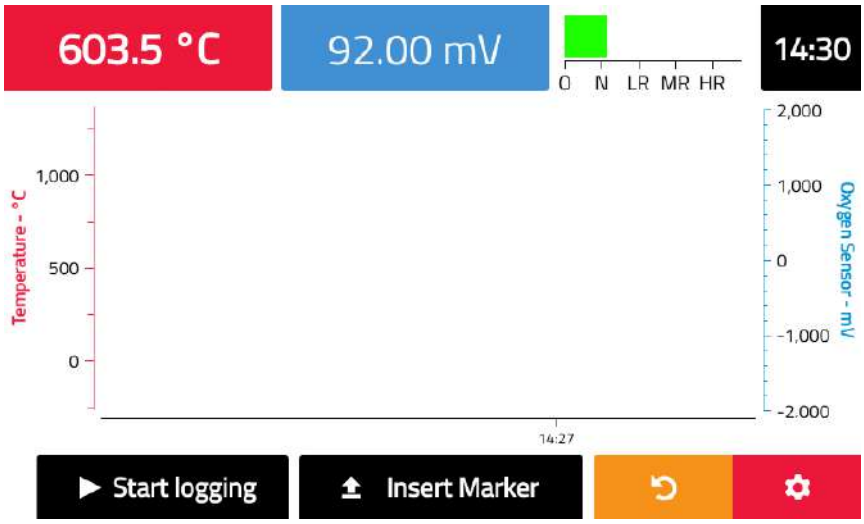
This button will place a marker at the next reading after it was pressed. It will visually show this as a vertical line on the graph (as seen above) and it will mark that point in time in the CSV file if the data is being recorded.

6.4 Full Screen Mode

To enter full screen mode, shown below, touch anywhere on the graph while it is logging. Pressing the screen again will return you to normal display.

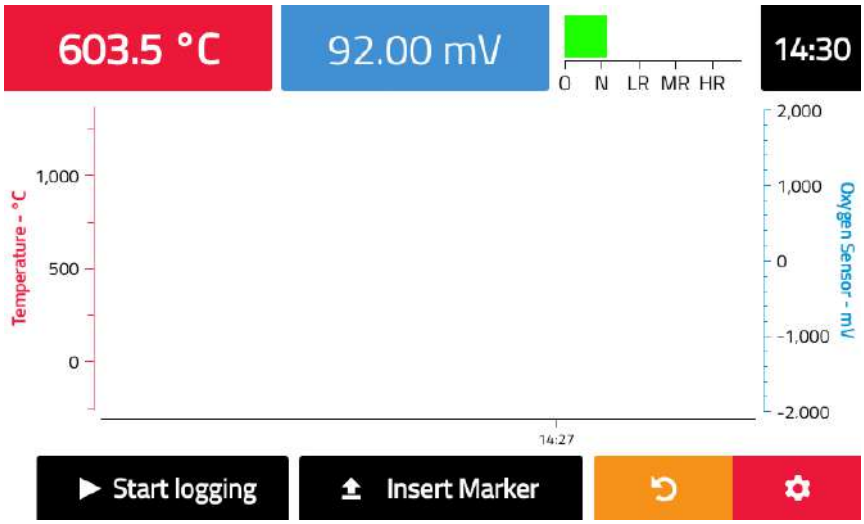
6.5 Switching between Celsius, Fahrenheit and Kelvin

To switch between Celsius, Fahrenheit and Kelvin, press the red Temperature indicator at the top left of the screen, shown below.



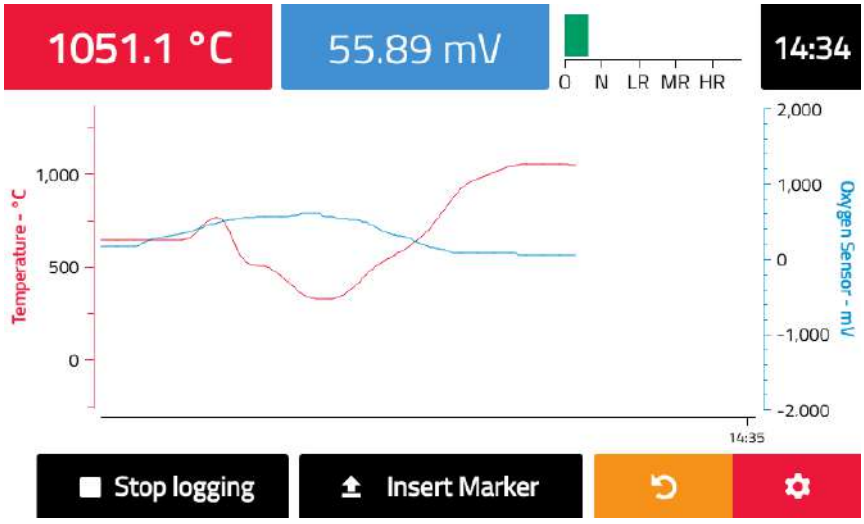
6.6 Switching between Partial Pressure of Oxygen and mV

To switch between the different representations of oxygen content, press the blue indicator at the top center of the screen, shown below, which will read either mV or a percentage/ppm value of oxygen.



6.7 Use of the Reduction and Oxidation bar graph

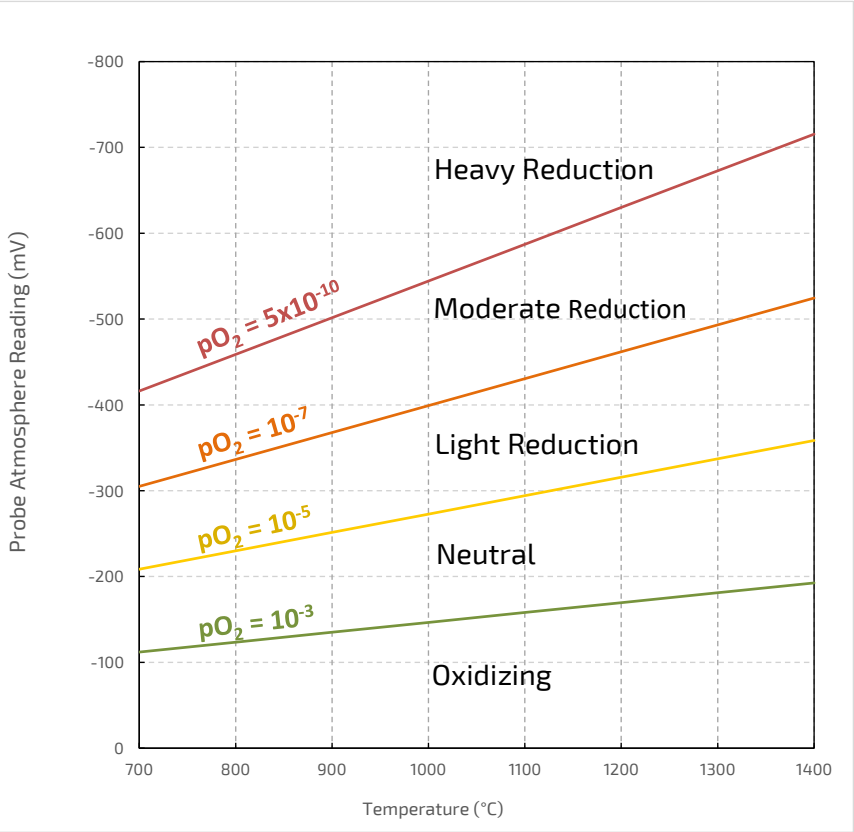
The oxidation and reduction is shown via a color-coded graph at the top right-hand side, shown below.



Oxidation and Reduction levels

The values are:
O Oxidizing
N Neutral
LR Light reduction
MR Moderate Reduction
HR Heavy Reduction

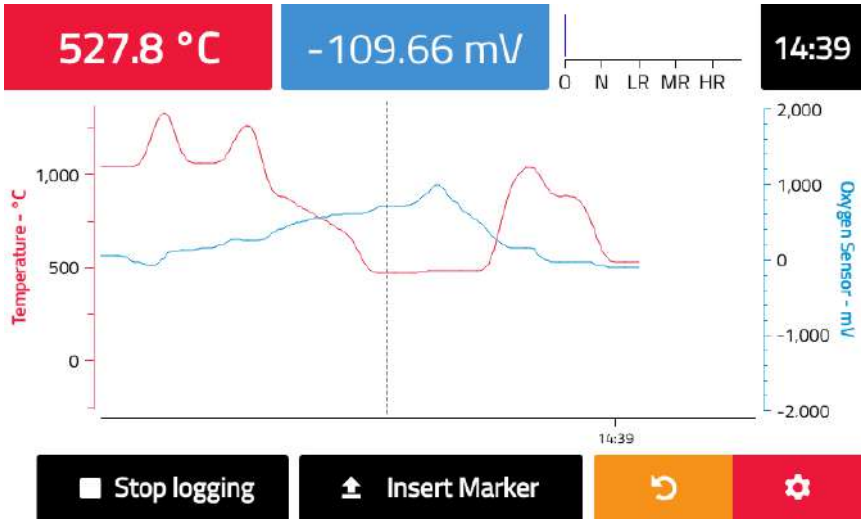
You can also see a graph of some of these values below.



7 Configuration Menu

The Oxygen analyzer contains a configuration menu, which can be used to alter a variety of settings including thermocouple type, graph time scale, graph time units, system time, system date and system updates.

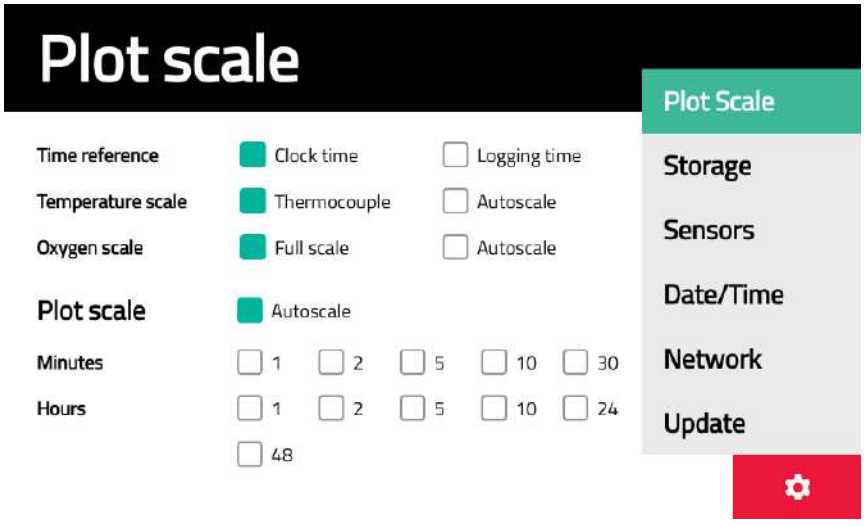
To access the configuration menu, press the "Configuration" button, indicated by a gear icon .



This will open the settings screen, and will display the most recently used configuration window. The Plot Scale shown below. Along the right hand side, you can see buttons for viewing and configuring various options, including the time scale, time offset, time units, and thermocouple type.

7.1 Plot Scale and Auto-scaling

You can set the time, oxygen and temperature scales, or you can set them to autoscale. The auto scaling options will adjust the scale to fit all temperatures, oxygen readings and time for displayed data. We recommend using autoscaling for temperature, oxygen and time scales.



Plot scale

The plot scale can be set to autoscale, or to specific minute or hour values as shown above.

Time reference

The time scale can be relative to the logging time, or it can be the clock time as set in 7.3.1.

Temperature scale

The temperature can either be autoscaled) or can be the whole operating range of the thermocouple, as set in 7.3.

Oxygen scale

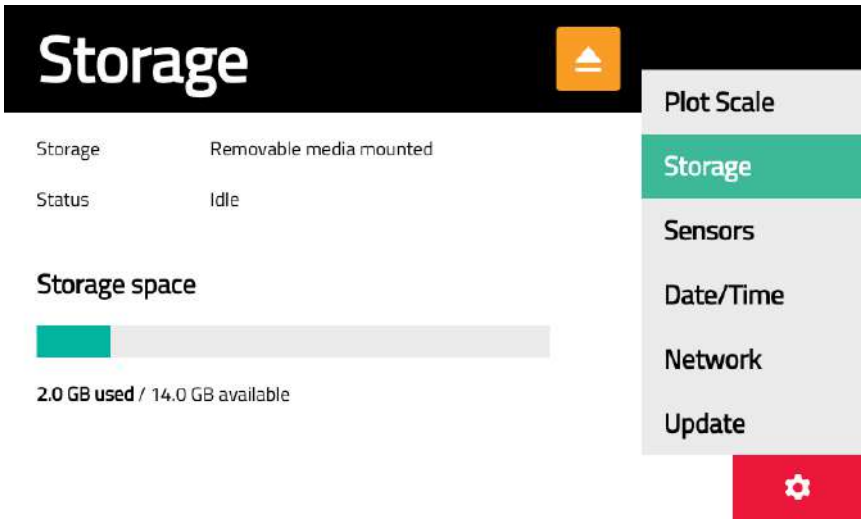
The oxygen scale can either be set to a full scale (values between -2000 mV and 2000 mV) or autoscale.

7.2 Storage

The Oxygen Analyzer has the ability to record all data to a comma separated values file (CSV file) on an external USB Flash Drive. The USB Flash Drive can be plugged into the USB port on located on the left hand side of the unit, as seen below.

The USB Flash Drive needs at least 50 MB of free space for recording. The used/available storage space is shown below.

To disconnect a USB device, press the yellow "Eject" button  and wait until the text next to Storage reads "Drive is safe to remove".



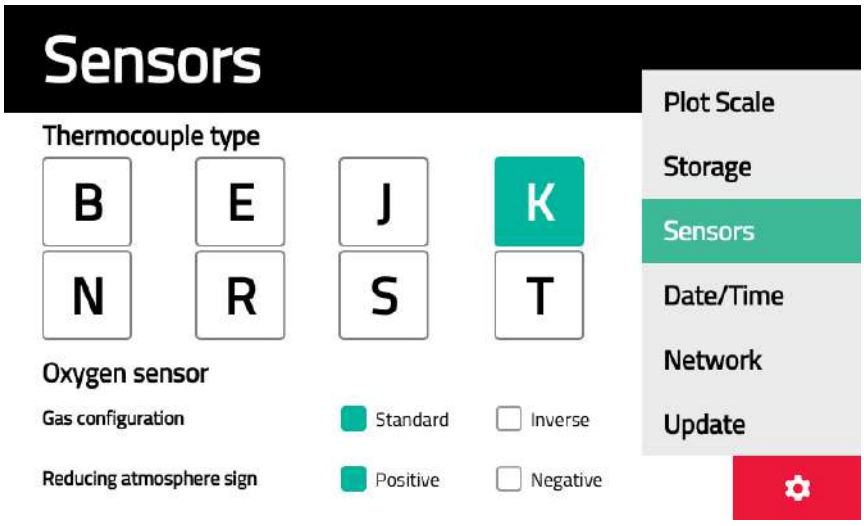
CSV file

The unit will place the log files in the root folder of the USB Flash Drive, regardless of what else is on the USB Flash Drive. The name of the CSV file created is based on the time and date that the "Record" button was first pressed. The file name convention is YYDDMM-HHMMSS.csv, referring to the date and time that the file was created.

You can open the file in software such as Microsoft Excel to be read and analyzed. The "Date" and "Time" columns describe the instant in time at which that reading was made. The "O2 (mv)" and the "Temperature (C)" columns are the readings from the sensor at each moment in time. The "Marker" column is always empty unless the "Marker" button is pressed as described in 6.3, at which point a 1 will be in the row at the time the button is pressed.

7.3 Configuring Sensors and Thermocouples

To change the thermocouple that your probe is using, or the way that the oxygen readouts appear, select the "Sensors" button in the right hand side links.



You can press on any of the eight thermocouple types to select the appropriate one.

Sensor options

Gas Configuration: in the standard configuration reference air is supplied to the internal surface of the sensor and the test gas is measured at the external surface of the sensor. In the inverse configuration reference air is supplied to the external surface of the sensor and the test gas is measured at the internal surface of the sensor.

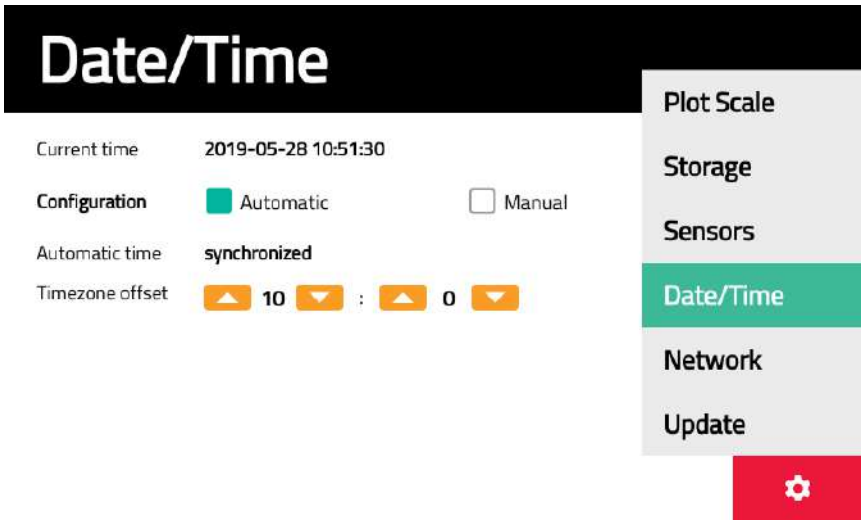
Reducing atmosphere sign: positive configuration follows the convention of reducing atmospheres yielding a positive signal, and the negative configuration follows the convention of reducing atmospheres yielding a negative signal.

7.3.1 Setting The Time and Date

The time and date can be configured automatically or manually.

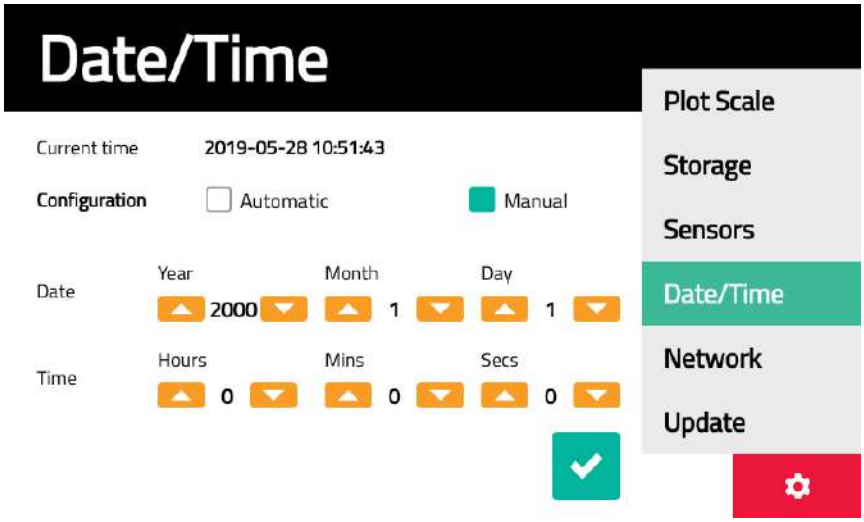
Automatic

For automatic time configuration, the automatic time will be in UTC so you will need to set a "timezone offset". For example, Australian Eastern Standard Time has an offset of +10:00 (UTC +10:00), while United States Central Time has an offset of - 5:00 (UTC +5:00).



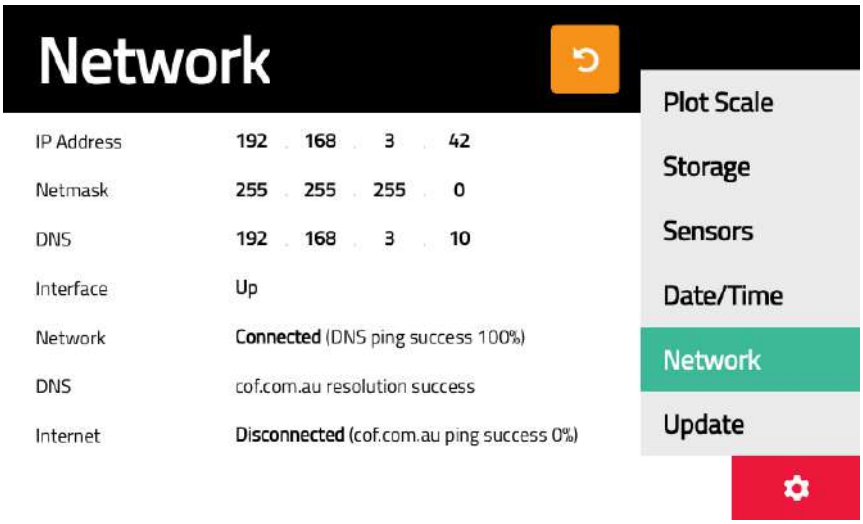
Manual

The time and date can also be set manually. Use the yellow arrows shown below to correct the time and date, then use the green "tick" icon to apply your changes.



7.4 Network

The Network page will show the connection status of your analyzer. If it is connected via Ethernet (ports marked below) and able to access the network, it will perform some lookups and show the status Connected.

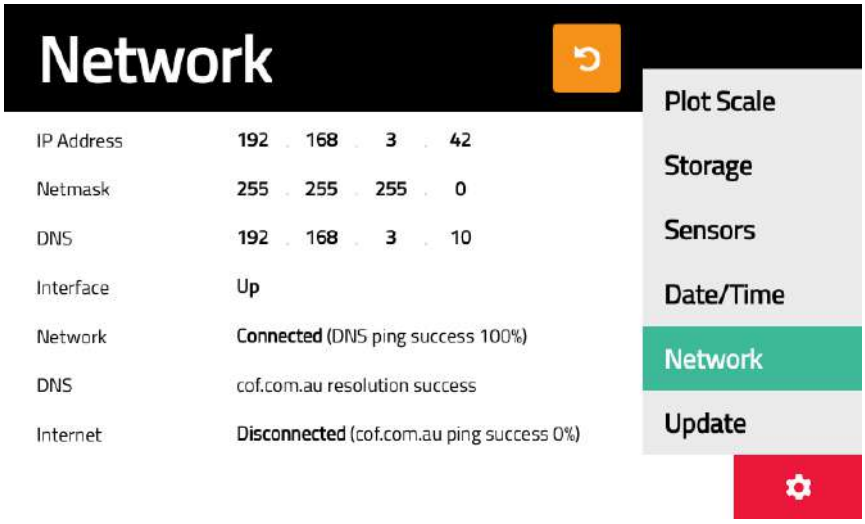


If it does not show this status, ensure that the analyzer is correctly plugged in with Ethernet cables (ports marked below), then press the yellow "Refresh" button .

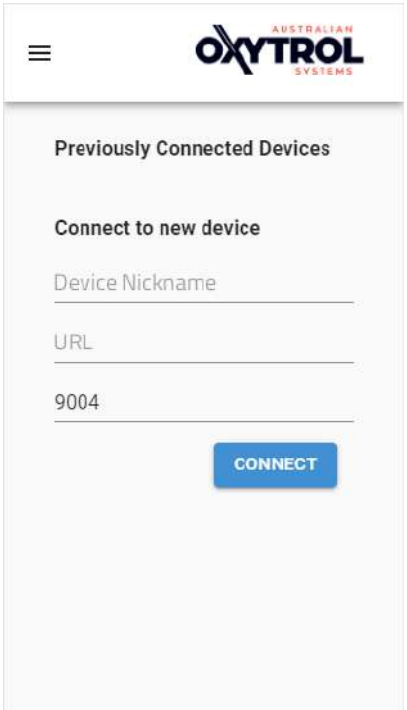
7.5 Remote viewing

The analyzer can be remotely viewed from a web browser or an Android or iOS device. To do this, follow these steps:

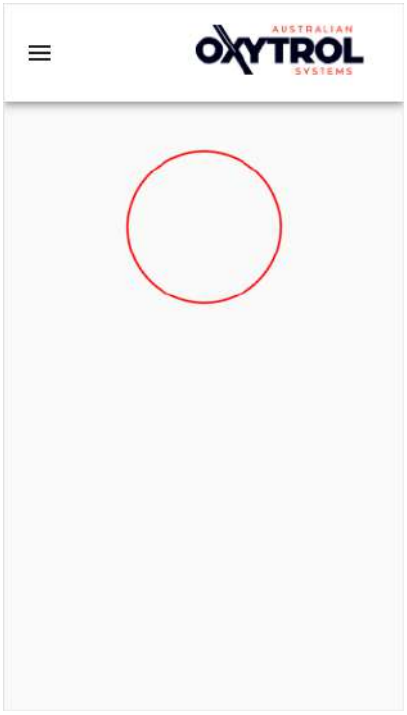
1. Make sure that an Ethernet cable is plugged in to the analyzer, and that it is connected to a network.
2. Open the network settings dialog (settings > Network), and check that the analyzer is connected to a network. If it is connected to a network it will have an IP address listed in the first row of the screen and the Network status (fifth line from the top of the dialog) will say 'Connected'.



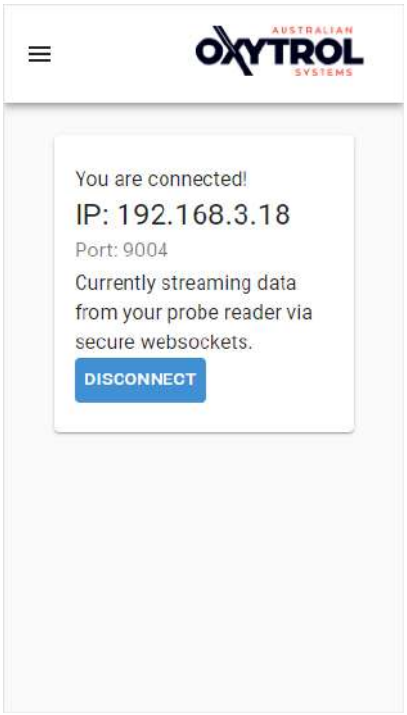
3. Open a web browser on the device from which you wish to view the analyzer data, and navigate to https://beta.remoteviewer.australianoxytrolsystems.com/
4. The first time you connect to a analyzer you will need to fill out the Device Nickname and IP Address fields in the form on the page. The nickname can be anything and is used as a convenient reference for the analyzer. The IP address is the IP shown on the Network screen.



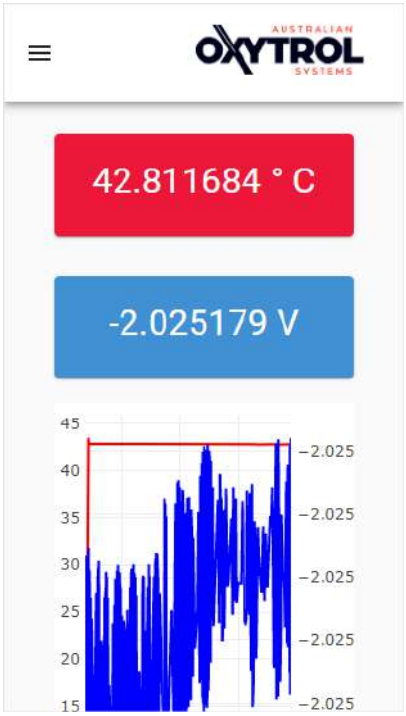
5. Press the connect button and the application will start the process of connecting to the analyzer.



6. The remote viewer will display a connected message once it has successfully connected to the analyzer.

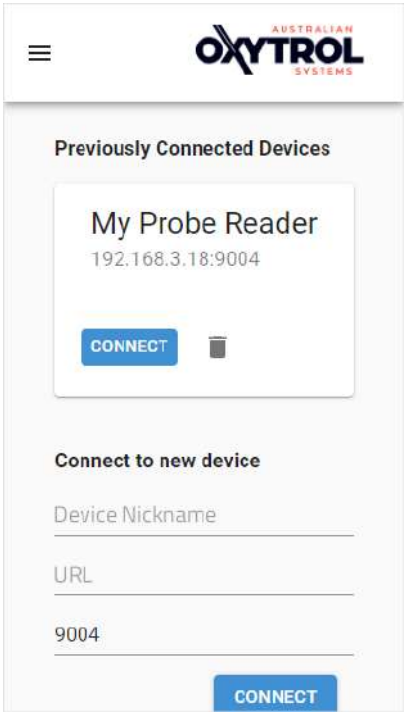


7. Once the device is connected you can click on Live Data in the navigation bar to go to a chart of the live data from the analyzer.



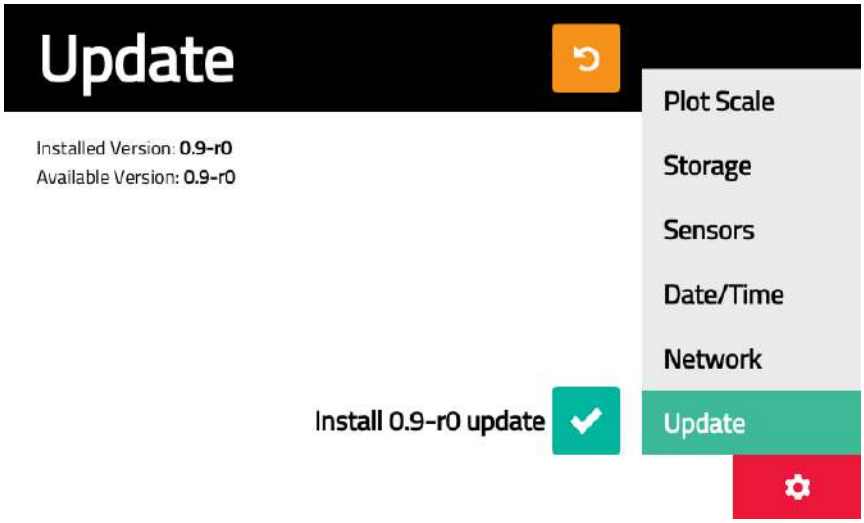
8. The 'Device Information' item in the navigation bar will take you to a listing of the device's information.

9. When the remote viewer is used subsequently, previous connections will be saved and shown in the 'Previously Connected Devices' area of the home screen.



7.6 Software Updates

The Software Update page shows the current installed software version. If the device is connected to the Internet, it will check for updates after you press the yellow "Refresh" button . If there is an update, you may install it by selecting the green "tick" button. Your device will automatically install the newest update, and restart when it is finished.



7.7 Error Messages

Disconnection Condition

The temperature and oxygen meters will both display "Disconnected" if no probe is connected to the analyzer.

Temperature Range Errors

If the measured temperature of the probe is higher or lower than range of the selected thermocouple (according to the NIST conversion tables), then the temperature meter will display "Over temp" or "Under temp" respectively.

Oxygen Range Display

The oxygen meter will display the millivolt signal in the range +-2000mV. However, because the oxygen concentration has to be calculated from the sensor millivolt reading it is possible to calculate oxygen concentrations greater than 100%. Regarding the oxygen meter when it is display oxygen concentration, it will display the oxygen concentration for values between 1% and 100%, between 100% and 110% it will display "> 100%", and above 110% it will display "Error". For oxygen concentrations below 1%, the meter will automatically switch to units of parts-per-million (ppm), and below concentrations of 1ppm it will switch to scientific notation.

8 Ordering information

To order an AOS O2TA 2200 Oxygen analyzer, please contact Australian Oxytrol Systems via the details listed below. We also offer a variety of oxygen probes, all compatible with the Oxygen analyzer.

9 Contact information

Australian Oxytrol Systems Pty Ltd
85 Wood Street
California Gully VIC 3556
Australia

P + 61 3 5446 1530
F + 61 3 5446 1215
W www.australianoxytrolsystems.com
E info@australianoxytrolsystems.com

10 Australian Oxytrol Systems Pty Ltd one (1) year limited warranty

10.1 Introduction

This is a limited warranty from Australian Oxytrol Systems Pty Ltd (as warrantor) that gives you specific legal rights.
You may also have other rights under specific consumer protection laws and regulations – if any (referred to in this warranty as "law") of the country, state or province in which the Product was purchased ("your jurisdiction"). This warranty is governed by and subject to law and is not intended to and does not exclude, limit or suspend any rights you have under law. Some or all of the limitations or exclusions described below may not apply to you.

For the purposes of this warranty –

AOS means Australian Oxytrol Systems Pty Ltd (Australian Business Number 59 007 371 824).

Product means any AOS – branded hardware product manufactured by or for AOS and identified by the AOS trademark, trade name, or logo affixed to it.

You means the original end-user and retail purchaser of a AOS Product.

AOS reserves the right to make changes at any time to:

1. Product hardware and software components and specifications; and
2. Terms and conditions governing Product use, service and repair; and
3. AOS services.

Such changes are entirely at AOS's discretion and may involve modification, upgrade, enhancement, replacement, deletion or abandonment.

10.2 Specific Warranty obligations

AOS warrants that its Product is free from defects in materials and workmanship under normal use for a period of one (1) year from the date of your purchase (the "Warranty Period"). Subject to law and the conditions set out below, if a Product is defective, AOS will decide whether to:

1. Repair the Product at no charge, using new parts or parts that are equivalent to the new in performance or reliability; or
2. Exchange the Product with either a new product or one that is equivalent to new in performance, reliability and functionality; or
3. Refund the purchase price of the product,

provided that your claim is made in accordance with this warranty and is received by AOS within the warranty period.
A replacement product or part assumes the remaining warranty of the original Product or ninety (90) days from the date of replacement or repair, whichever provides you with the longer coverage.

When a Product or part of a Product is exchanged, any replacement items become your property and the replaced item becomes AOS's property. Parts provided by AOS in fulfillment of its warranty obligation must only be used in the Product for which warranty service is claimed.

If AOS agrees to refund the purchase price of a Product, the refund can only be paid after you have returned that Product to AOS. All returned Products become AOS's property.

AOS does not make any representation that it will be able to repair or exchange any Product without loss of or corruption to programs and data.

10.3 Warranty exclusions and limitations

This limited warranty applied only to AOS Products and does not apply to any non–AOS hardware product or any software, even if packaged and sold with a AOS product. Manufacturers, suppliers, or publishers, other than AOS, may provide their own warranties to you, but AOS, in so far as permitted by law, provides itself "as is".

AOS Limited Warranty
Software (including system software) and hardware distributed by AOS with or without the AOS brand name is not covered under this warranty. Refer to the licensing agreement accompanying such software for details of your rights and obligations concerning its use.

AOS is not responsible for damage arising from failure to properly follow instructions relating to the Product's use.

This warranty does not apply to:

1. consumable parts, such as batteries, unless damage has occurred due to a defect in materials or workmanship; or
2. cosmetic damage, including but not limited to scratches, dents, and worn material on ports; or
3. damage caused by use with non-AOS products; or
4. damage caused by accident, abuse, misuse, or external causes (such as earthquake, fire or flood); or
5. damage caused by operating the product outside the permitted or intended uses described by AOS; or
6. damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of AOS or a AOS authorised service provider; or
7. modifications by someone else other than AOS to alter Product functionality or capability without AOS's written approval; or
8. any AOS Product where its serial number has been removed or defaced.

10.4 Important!

Opening a hardware Product may cause damage; such damage is not covered by this warranty. Only AOS or an authorised service provider should open and perform Product service.

To the extent permitted by law:
(1) this warranty and your rights under it are exclusive and are in lieu of any other oral, written, statutory, express or implied warranties, remedies and conditions; and
(2) AOS disclaims all other warranties, including but not limited to warranties of merchantability and fitness for a particular purpose and warranties against hidden or latent defects.

If AOS cannot lawfully disclaim statutory or implied warranties then, to the extent permitted by law, all such warranties will be limited in the duration of the express warranty and to the repair or replacement service or refund as determined by AOS in its absolute discretion.

No AOS reseller, agent, or employee is authorised to make any amendment, extension, or addition to this warranty.

If any term or condition of this warranty is held to be illegal or unenforceable, the legality of the enforceability of the remaining terms and conditions will not be affected or impaired.

Except as provided in this warranty and to the maximum extent permitted by law, AOS is not responsible for direct, special, incidental or consequential damages resulting from any breach of the warranty or condition, or under any clause, category of head of claim, including but not limited to loss of use; loss of revenue; loss of actual or anticipated profits (including loss of profits on contracts); goodwill; loss of reputation; loss of damage to or corruption of data; any or indirect or consequential loss or damage howsoever caused including the replacement of equipment and property, and costs of recovering, programming or reproducing any program or data stored in or used with the AOS Product and any failure to maintain the confidentiality of data stored on the AOS product.

AOS does not authorise use of and reliance on any AOS Product in safety critical situations, where the failure of AOS Product or its compromised performance or interrupted operation could cause or contribute to personal injury or death ("potentially life threatening situations" or "PLTS"). For the avoidance of doubt out of the arising use or misuse and operation of any of its Products in such circumstances.

AOS may be prepared to assist you to undertake a risk management assessment and prepare a protocol for your use of AOS Products in the context of the PLTS, but always on the basis that all such use (including misuse) remains entirely at your risk.

It is your responsibility to identify and comply with the law governing your use of the Product applicable in each jurisdiction in which the Product is to be used.

10.5 Obtaining Warranty Service

Before seeking warranty service, please first refer to AOS's online help resources identified in the Product documentation.

If the product is still not functioning properly, you should contact the AOS representatives or, if applicable, a AOS retail store, distributor or authorised service provider.

AOS will determine whether the Product requires service, and if so, AOS will advise you how, where and by whom the service will be performed.

It is important that you assist AOS to diagnose issues with your Product and that you follow AOS's warranty processes.

Service options, parts availability and response times vary according to the place in which service is requested. Please note that service options are subject to review and change by AOS at any time and AOS may restrict service to be performed in the place at which the Product was originally sold.

Upon receipt of the replacement Product or part, the original Product or part becomes the property of AOS and you agree to properly follow instructions, including if required, arranging the return of the original Product or part to AOS in a timely manner.

When providing service requiring the return of the original Product or part, AOS may require a credit card authorisation as security for the retail price of the replacement Product or part and applicable shipping costs. If you follow AOS's instructions, AOS will cancel the credit card authorisation, and you will not be charged for the Product or part and shipping costs. If you fail to return the replaced Product or part as instructed, AOS will charge your credit card for the authorised amount.

If you seek service in a country that is not the country of original purchase, you must comply with the relevant export requirements and be responsible for the payment of all duties, taxes, levies, fees and other charges including shipping and handling costs.

Where international service is available, AOS may repair or exchange defective Products and parts with comparable Products or parts that comply with local law.

AOS may require you provide proof of purchase details and or comply with registration or other requirements before providing warranty service,

AOS will collect, maintain and use your information in accordance with AOS's privacy policy.