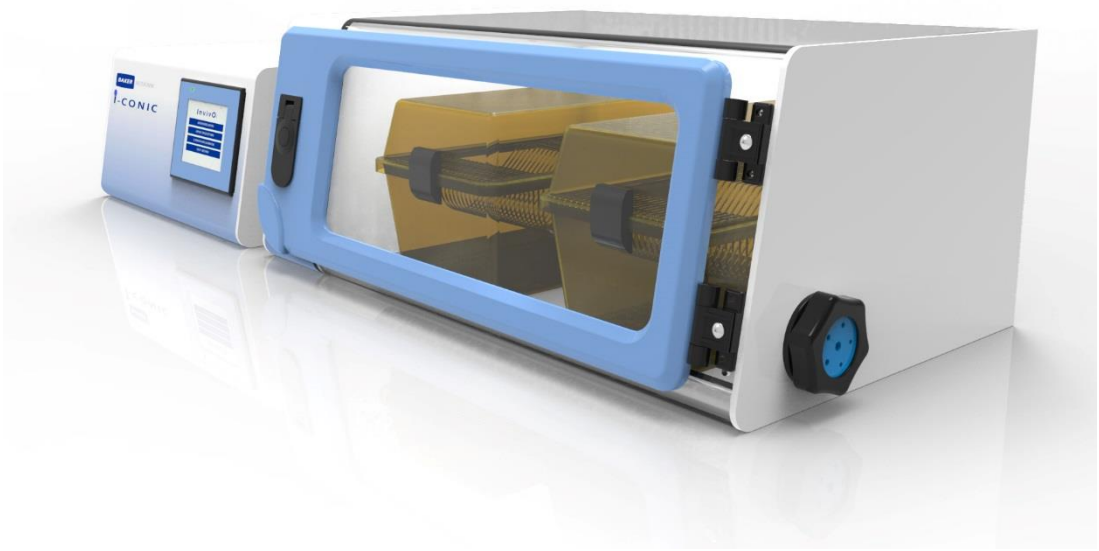
BAKER RUSKINN

User Manual UM-045

$VelO_2x$

Physiological Oxygen System



$VelO_2x$ System

Affix Serial Number Sticker Here

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INTRODUCTION

Please read this manually carefully before use and familiarise yourself with all aspects of using the VelO_2x system. The Baker Company and Ruskinn Technology Ltd do not accept any responsibility for accidents to personnel or damage to the VelO_2x resulting from incorrect use.

The VelO_2x system comprises of an ICONIC gas controller and a Culture Chamber. The ICONIC controls the gases with the sensors located in the culture chamber for precise control of the working atmosphere. Hypoxic conditions are created using Nitrogen (N_2) and Oxygen in Nitrogen (O_2/N_2) to achieve the desired atmosphere. The user can select the Oxygen concentration from 0.1% to 20.9%.

The many unique features of the VelO_2x system are covered in detail in this manual. It is recommended that the user be fully conversant with the instruction and procedures, and that the operator familiarises themselves with all aspects and functions of the system before it is commissions to maintain optimum performance.

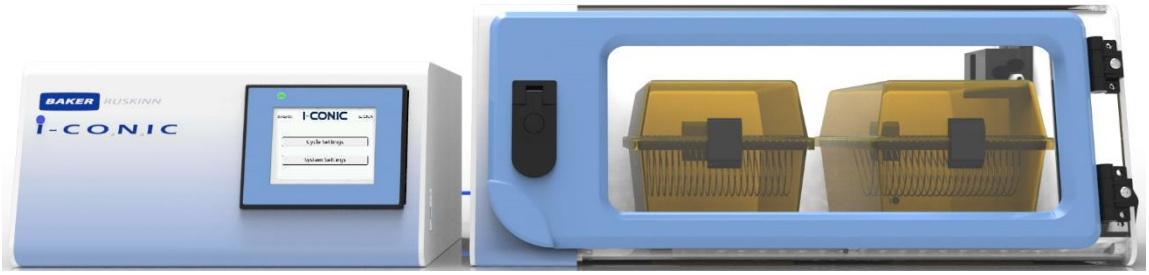


Figure 1: ICONIC Gas Controller with Culture Chamber

SAFETY INSTRUCTIONS

Baker and/or Ruskinn do not take any responsibility for damages caused by using the equipment for other purposes than described in this installation manual.

- The mains appliance coupler and plug are the AC mains supply isolation device and must be easily accessible when installed.
- In case of emergency disconnect the VelO$_2$x from the AC Mains Outlet.
- Ensure that the connecting cable is not squeezed or bent when the unit is being installed or moved.
- All installation work and adjustments to the unit must be carried out by qualified personnel. Work performed by persons with insufficient technical knowledge may adversely affect the performance of the unit or cause physical injury or damage to the equipment.
- All servicing and repairs must be carried out by a qualified customer service engineer. Only genuine spare parts must be used.
- In case of damage to the VelO$_2$x disconnect the System from the mains outlet and contact your local distributor.
- All covers and lids must only to be removed by a qualified service engineer.
- Nothing should be placed on the top of the ICONIC.
- A power cord is supplied with the VelO$_2$x system and should be used to connect to the mains outlet. If a replacement is required it must be adequately rated for the application.
- All cables and pipes should be routed to ensure that they do not pose a trip hazard.
- Mains supply Voltage fluctuation must not exceed ±10% of the nominal Voltage.
- Gas regulators must be used for each gas supply. A 2 stage regulator is recommended. Over pressure could damage the VelO$_2$x system.
- Only the gases specified in this user manual may be used.
- All gas bottles must be adequately secured before connection to the ICONIC.
- The end user is responsible for all materials and equipment places inside the Culture Chamber.
- The VelO$_2$x system must not be operated at an ambient temperature over 30°C.
- The cooling fan covers and cooling vents must not be covered or blocked.
- The weight limit for the Culture Chamber internal floor is 30kg and must be evenly distributed.
- There should be no naked flames close to the VelO$_2$x System.
- The use of radioactive materials if strictly prohibited.

CAUTION: Asphyxiation Risk

The VelO$_2$x system uses Nitrogen (N_2) as part of normal use with the volume released externally is inconsequential. In the event of a leak or malfunction this gas release may become excessive. DO NOT OPERATE this unit in a SMALL ENCLOSURE such as a small room or closed cabinet. An accidental release of Nitrogen could create an asphyxiating atmosphere in a small space.

If the equipment is not use in a manor specified by the manufacturer, the protection provided by the equipment may be impaired.

Failure to adhere to these safety instructions could cause serious injury and will invalidate the VelO$_2$x system warranty. Ruskinn Technology limited accepts no responsibility for any accident, injury or loss caused by unsafe operation of the VelO$_2$x system.

REGULATORY COMPLIANCE

WEEE:

This equipment must be disposed of in accordance with the Waste from Electrical and Electronic Equipment (WEEE) Directive

This product must not be treated as household waste. Instead, it shall be handed over to an appropriate collection point for the recycling of electrical and electronic equipment.

If in doubt, please return this equipment to Ruskinn Technology Ltd who will correctly dispose of it for you. We strongly recommend that this product is returned to RTL at the end of its useful life.

Symbols

Before using the VelO₂x system, please ensure that you are familiar with the symbols.

Symbol	Meaning
	Refer to user manual.
~	Alternating current
O	Off
I	On
	Functional Earth Connection
	Protective Earth Connection
	Caution, do not remove covers. No end user serviceable parts behind covers. Please refer to this manual in all cases where this symbol appears, in order to find out the nature of the Potential Hazard and actions to be taken in order to avoid the Hazard.
	Warning, this equipment contains high voltage circuitry.
	Contains material or substances that may be hazardous to human health. Please refer to your local biohazardous material handling procedure for further advice on the handling and disposal of these items.
	The VelO₂x system contains hazardous components and must not be disposed of at a household waste site. Instead it should be taken to the appropriate collection point for the recycling of electrical and electronic equipment.
	USB socket
	Date of manufacture in format YYYY MM

Table 1: List of Symbols

TRANSPORT AND STORAGE

When not in use, the VelO2x system must only be stored under the following environmental conditions:

- Temperature – Between 0°C and 30°C

Storage outside of this range may damage the VelO2x System.

LOCATION AND HANDLING OF THE VELO2X SYSTEM

Location

Ruskinn Technology Ltd recommends the VelO2x system be situated on a suitably constructed level work floor that is clear of all obstructions.

In particular, it is important to ensure that the system is:

- Kept out of drafts, i.e. opening / closing of doors and windows, air conditioning vents
- Kept out of direct sunlight
- Kept away from refrigerators and / or freezers

It is recommended that 300mm should be allowed on each side of the system to enable suitable access to the unit for daily use, maintenance and service requirements.

Please note: the above does not cater for gas supply as these are dependent on end user applications (either gas bottle supply and/or piped supply)

Environmental Operating Conditions

The VelO2x System should only be operated under the following environmental conditions:

- Temperature – Between 15°C and 30°C
- Humidity – Between ambient and 90% RH, Non-Condensing

The system must be located in a well-ventilated area.

SERVICE REQUIREMENTS

Electrical Supply Requirements

The ICONIC must be connected to a mains power supply. A power cord is supplied to connect the ICONIC to the mains supply. If an alternative power cord is used is must be rated appropriately for the power requirements of the ICONIC, refer to Table 2. The ICONIC must be connected to a protective earth.

To ensure safe operation of the ICONIC, it must be connected to a supply of the correct voltage and frequency as stated on the rating label shown at the rear of the unit. The mains supply voltage fluctuations must not exceed +/- 10% of the nominal mains voltage. The input voltage and frequency for ICONIC are:

Voltage Range	Frequency	Nominal Power	Rated Current	Rated Power
220 to 240 Vac	50/60Hz	35W	0.5A	115W
110 to 120 Vac	50/60Hz	35W	1.0A	115W
100 Vac	50/60Hz	35W	1.15A	115W

Table 2: Electrical Service Requirements

Please note that the applicable ratings for the ICONIC configuration are detailed in the labelling at the rear of the product as shown in Figure 2.

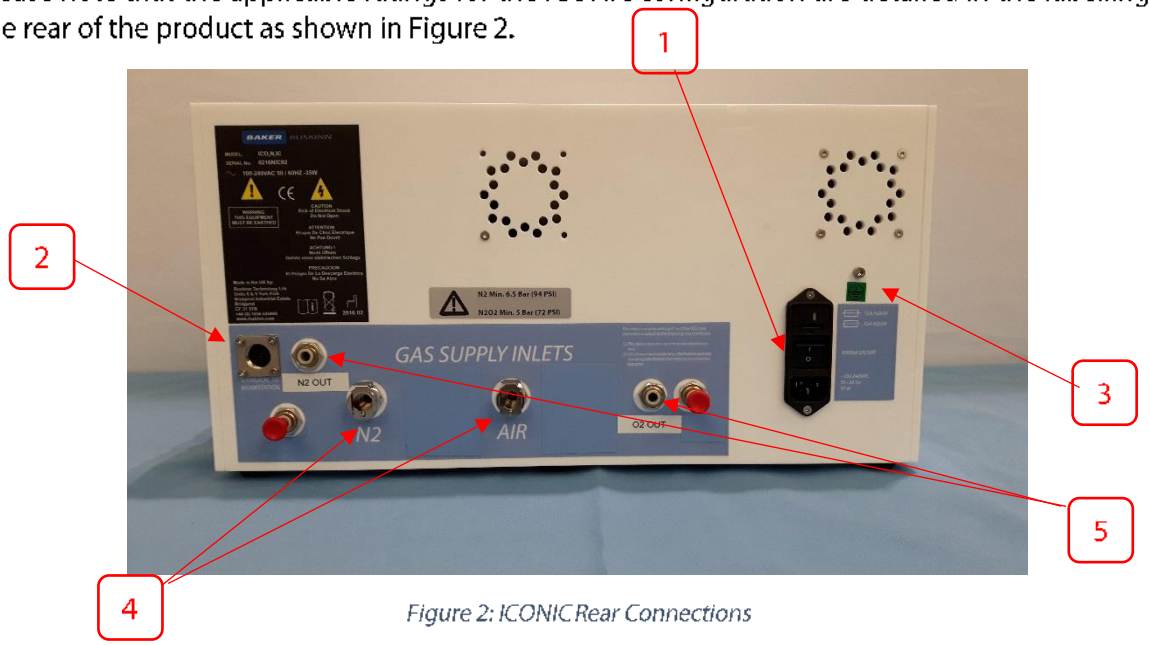


Figure 2: ICONIC Rear Connections

1. Mains Input Connector (C13)
2. VelO2x Electrical Connector
3. External Earth Point
4. Input Gas Connections
5. VelO$_2$x Gas Connectors

The ICONIC is double pole fused (Live and Neutral) for protection against over current draw. The fuses fitted are based on the voltage range applicable, see Table 3 for details:

Voltage Range	Mains Input Fusing
220-240 Vac	T5A H250V
100 Vac, 110-120 Vac	T5A H250V

Table 3: Fuse Ratings

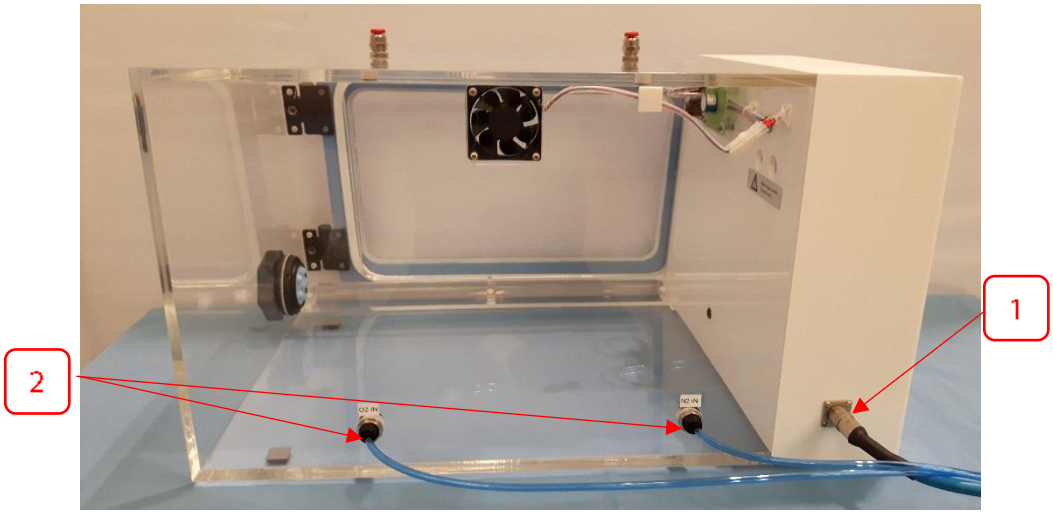


Figure 3: Culture Chamber Rear Connections

1. ICONIC Electrical Connector (C13)
2. ICONIC Gas Connectors

Gas Supply Requirements

Please refer to the attached Addendum for the gas supply requirements as these are specific to each VelO$_2$x system.

VELO$_2$X SYSTEM OVERVIEW

Front Views

The ICONIC and VelO$_2$x are shown below in Figure 4 and Figure 5 respectively.

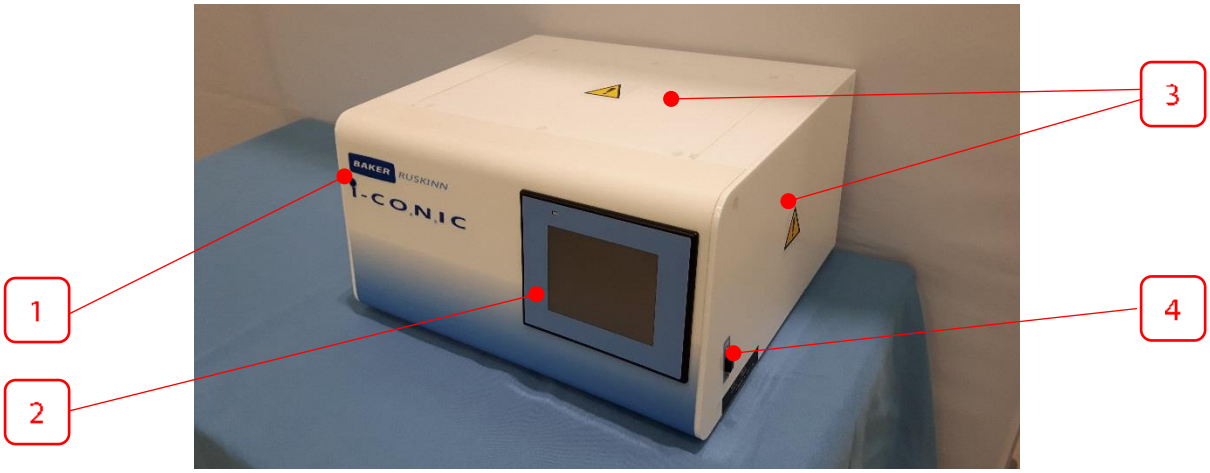


Figure 4: ICONIC

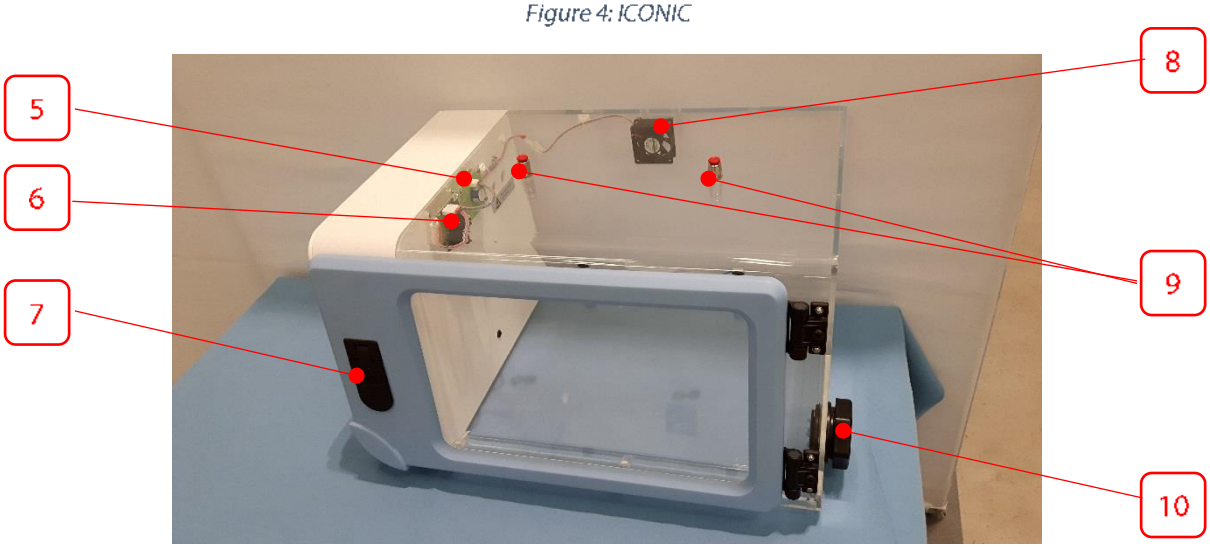


Figure 5: VelO$_2$x

1. Mains Power Indicator
2. Touch Screen
3. Access Panels – Service Only
4. USB Port for USB Data Logging
5. Oxygen Sensor
6. Carbon Dioxide Sensor
7. Door Latch
8. Fan
9. Cable Glands
10. Universal Port

Left Side View

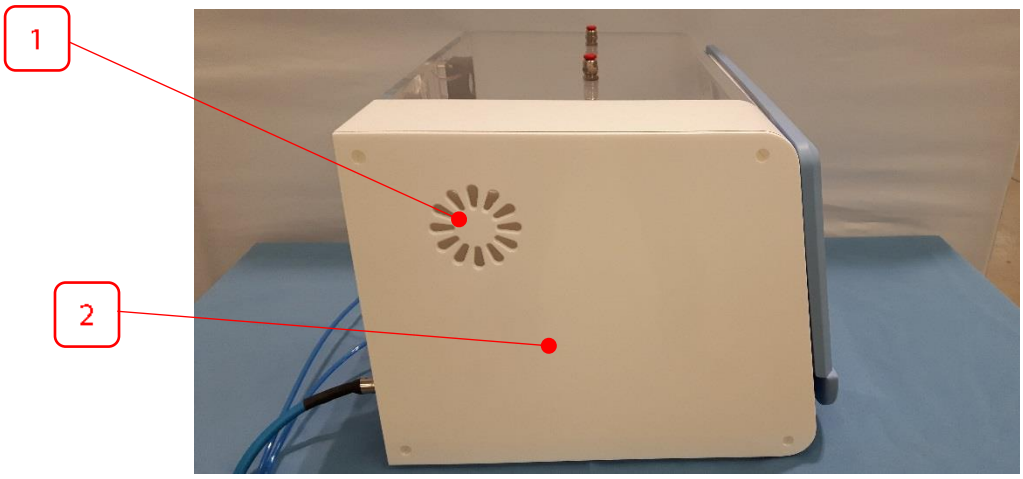


Figure 6: Left Side End Panel of the Culture Chamber

1. Ventilation Hole – Do Not Block
2. Access Panel – Service Only

USING THE VELO$_2$X SYSTEM

Using the interlock

The VelO$_2$x allows the user to control the Oxygen concentration in a small enclosure for the study of cyclic low oxygen. The Oxygen concentration is controlled by the ICONIC gas mixer, which follows the program defined by the user.

Chamber Overview

The VelO$_2$x consists of 4 main components;

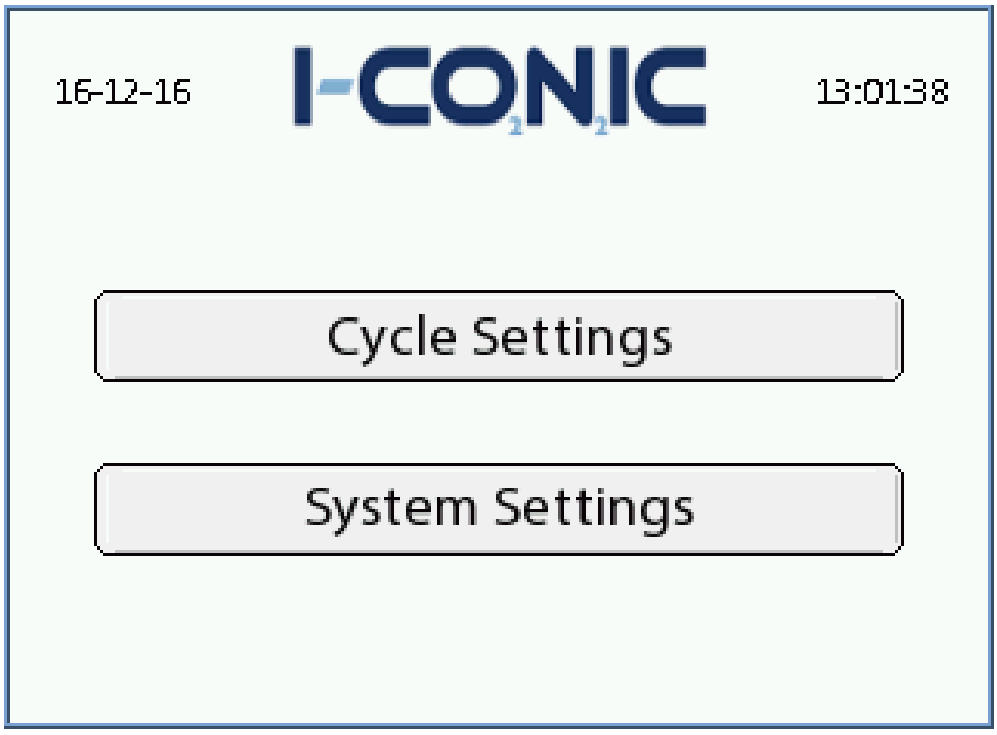
- Outer door.
- Main Working Area
- Gas Sensors.
- Universal Port.

Operating the outer door

The outer door is released by using the push button latch on the front left side. This will release the retaining mechanism to allow the door to by pulled open for the loading and unloading of materials. Once the materials have been loaded, the door can be shut using the push button to secure in place.

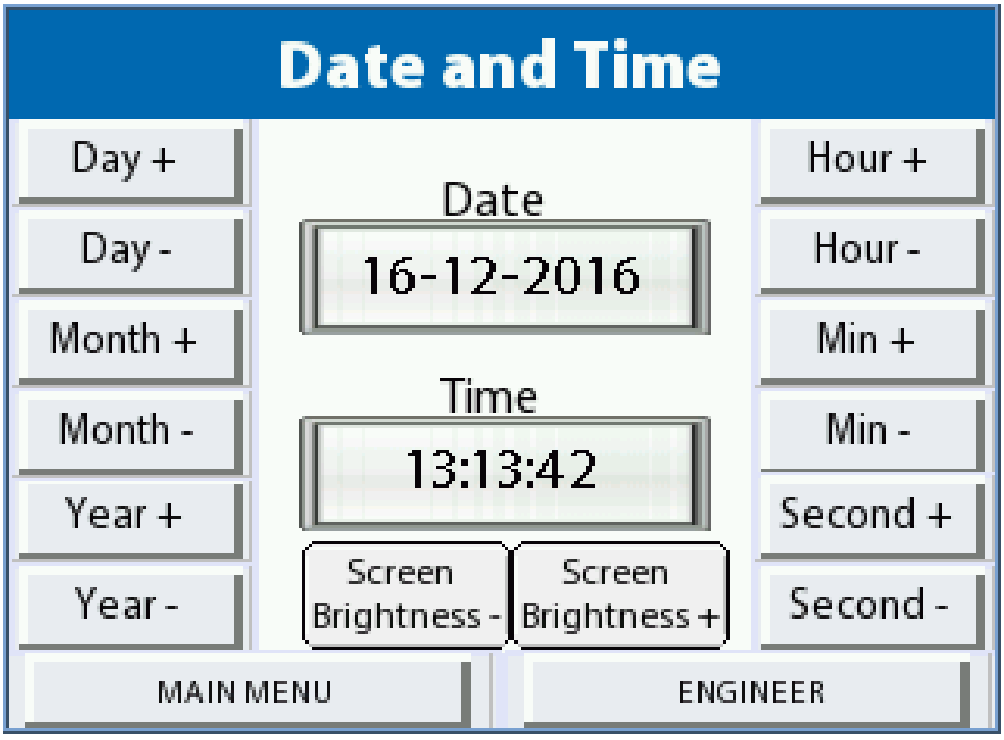
POWERING UP THE SYSTEM

On Power on the Baker Ruskinn logo screen will appear while the gas mixer is powering up and will display Screen 1 when ready for use.



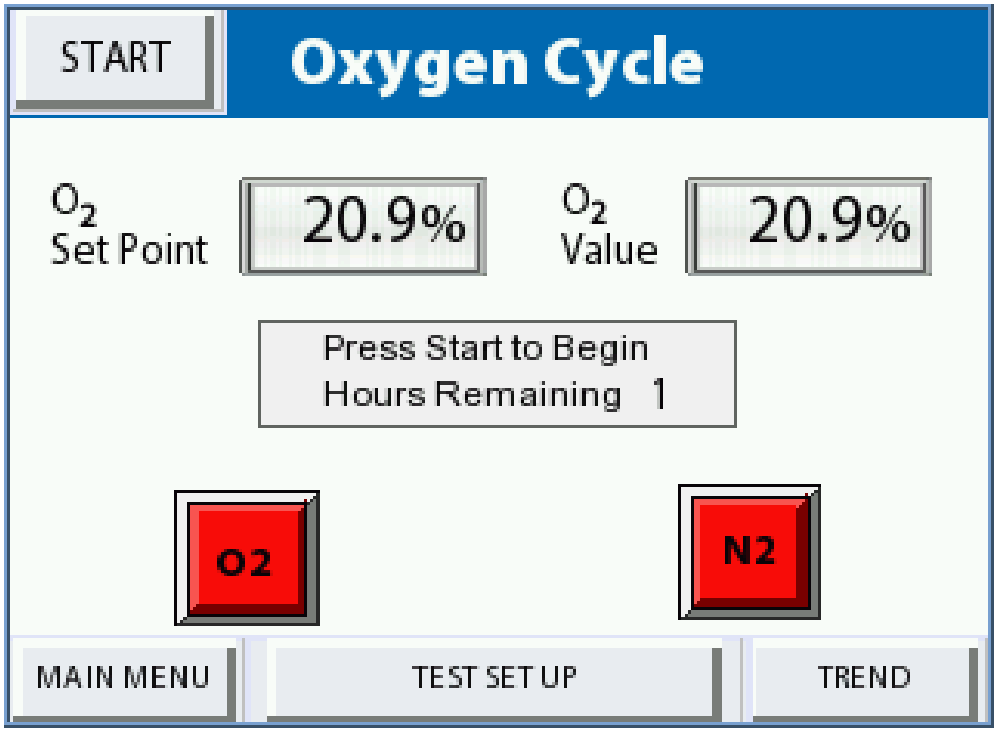
Screen 1: Main Menu

The Settings screen can be accessed from the main menu to adjust the time / date and the screen brightness if required.



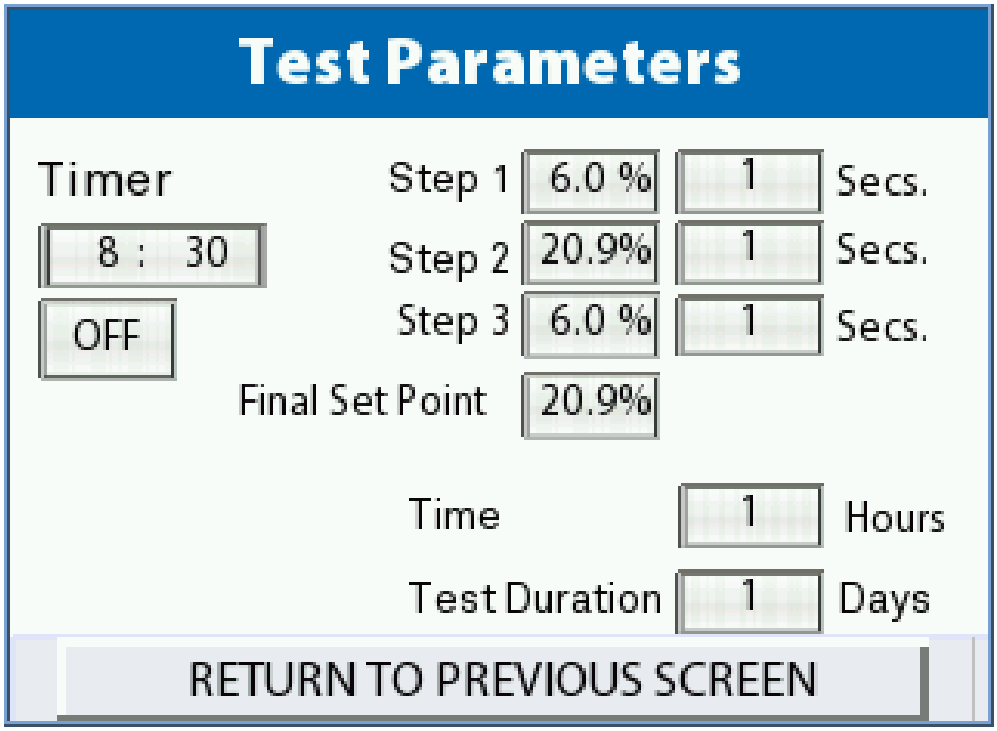
Screen 2: System Settings

To start the gas control select Cycle Settings on the main menu and the Oxygen cycle screen will appear:



Screen 3: Oxygen Cycle

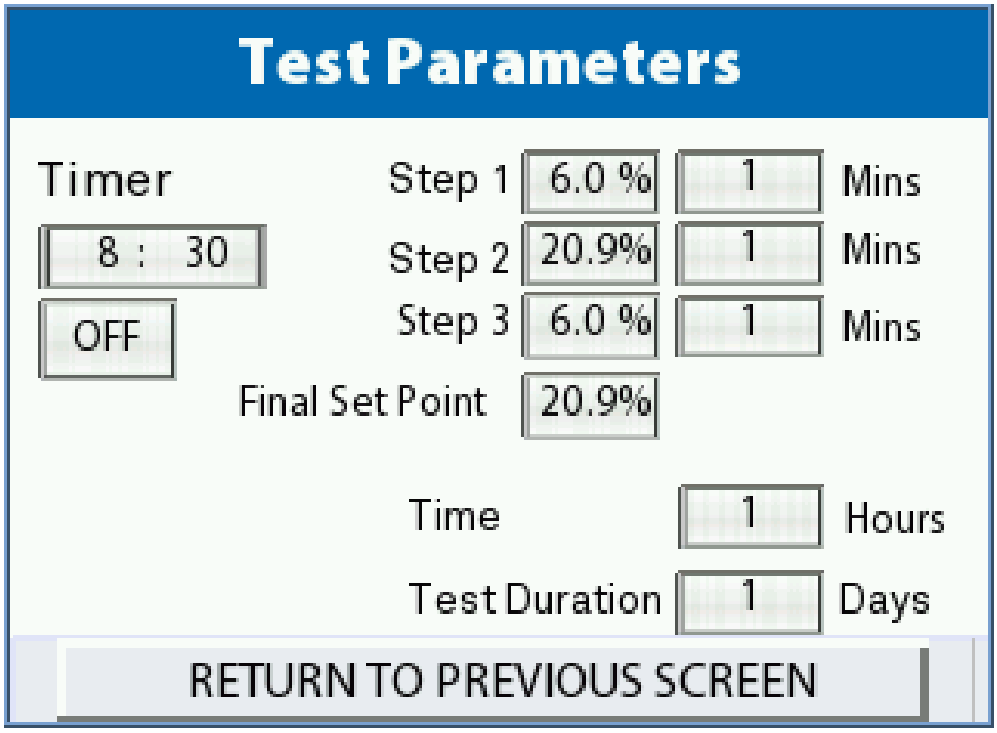
To define the cycle parameters press the Test Set-Up button to open Screen 4:



Screen 4: Test Parameters (1)

All of the cycle parameters can be entered on this screen.

If the cycle running time required is in minutes then pressing the seconds text on this screen will toggle them to minutes as shown in Screen 5:



Screen 5: Test Parameters (2)

Note: each "mins / secs" toggle individually so to change them all you will have to press each of them.

Each of the step Oxygen set-points can be set between 0.1% and 20.9%, and the times can be set from 0 to 99999 seconds or minutes. This "mins / secs" is the dwell time after the system has achieved the Oxygen set-point. For Continual ramping set the time to 1 second.

If only 1 or 2 steps are required then set the duration of the step to 0 and the set-point to the same as the previous step and the ICONIC will skip the step.

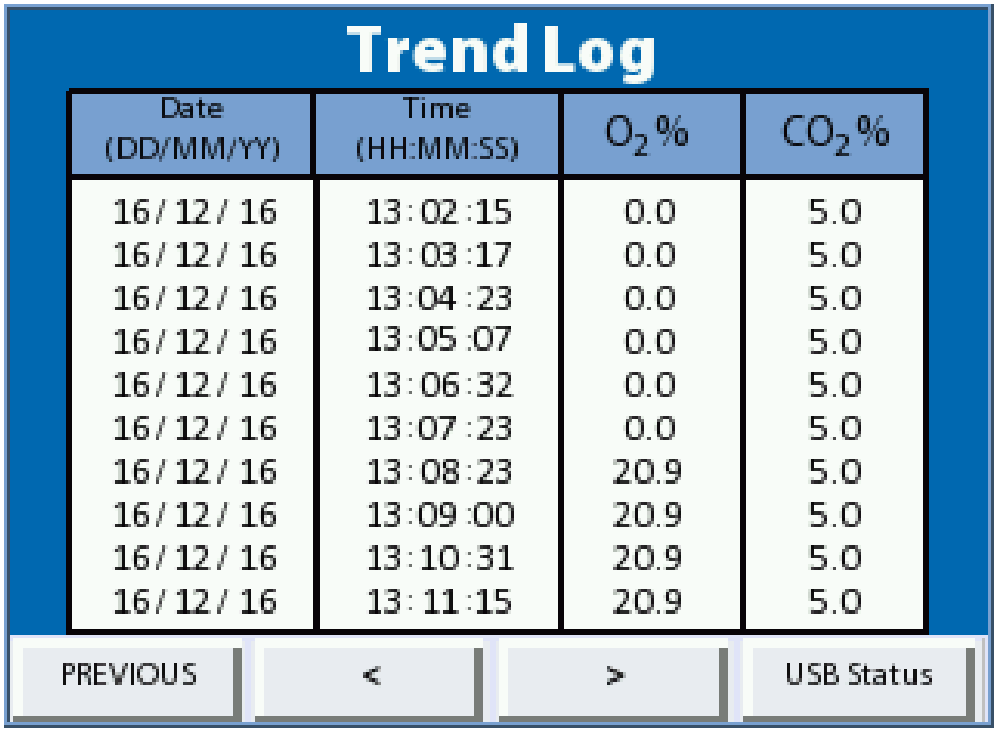
The time settings defines how long the cycling should run for in hours; at the end of the time the system will then control to the Final Set Point. The Hours can be set from 0 to 23.

The Test Duration sets how many days cycles are required from 1 to 99999.

The timer function allows the user to set a start time for the first cycle of the run. This can be toggled on / off by pressing the button.

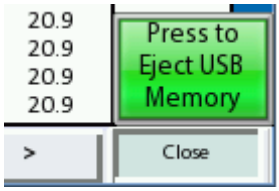
Once the settings are entered return to the Oxygen Cycle screen.

The trend log (Screen 6) can be accessed from Screen 3: Oxygen Cycle at any time.



Screen 6: Trend Log

From this screen you can access the last 2 hours of Oxygen and Carbon Dioxide measurement. You will also be able to eject the USB memory stick that stores all of the measurement data. The USB memory still should be stored in the ICONIC at all times and only removed to download data and then replaced. The ICONIC will not be able to log data for the time that the USB memory stick is removed.



Screen 7: USB Memory Eject Button

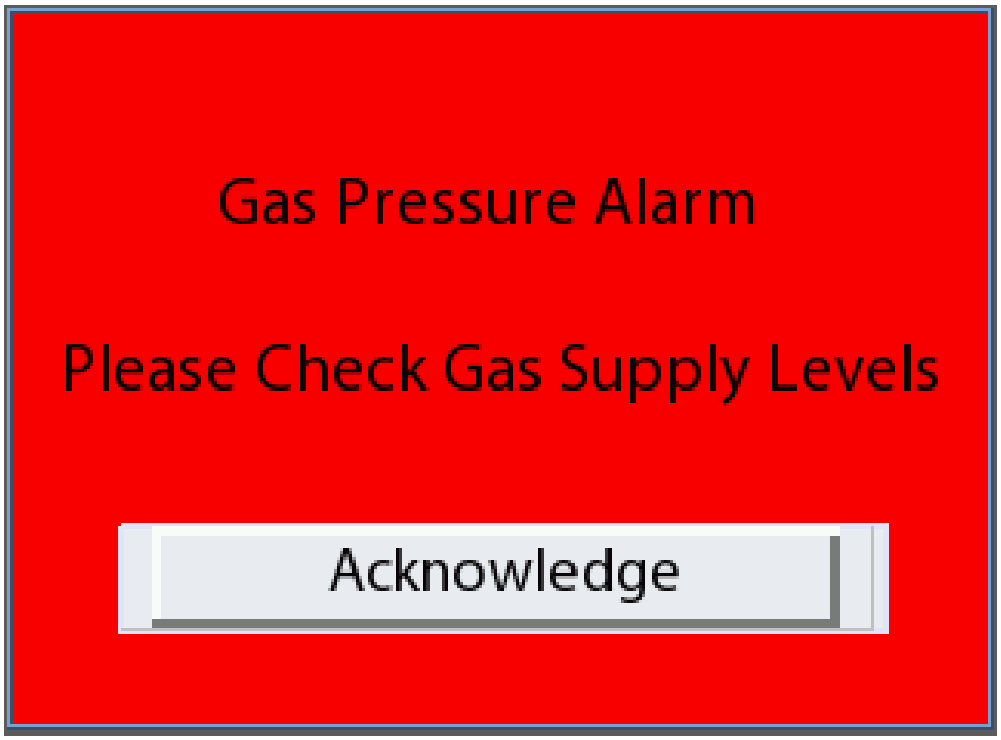
Screen 8: USB Memory Ejected

Warnings

There are various warning screens and icons to draw the user attention when required.

Input Gas Pressure Alarm

This screen will appear when the pressure on the required gas lines fall below the required minimum levels. Please refer to the Troubleshooting section for common problems and solutions



Screen 9: Input Gas Pressure Alarm

CLEANING AND SERVICE REQUIREMENTS

Service and Cleaning Overview

To maintain optimal performance of the chamber it must be serviced at regular intervals. Lists the servicing requirements, intervals and persons capable of performing the service are detailed in Table 4.

Action	Frequency	By
Clean chamber	After each use	End User
Deep clean chamber	3-6 months	End User

Table 4: Cleaning and Service Details

The correct cleaning agents must be used to clean the chamber. The use of incorrect cleaning agents will damage the chamber and invalidate the warranty. The following cleaning agents are permitted:

- Ethanol, laboratory grade at a maximum concentration of 70% by volume ethanol in distilled water.
- Isopropanol, laboratory grade at a maximum concentration of 70% by volume Isopropanol in distilled water.
- Tristel Fuse Sachet, 1 sachet diluted in 3 litres of distilled water, or Tristel Duo Foamer. Tristel Fuse Sachets and Duo Foamer are available from Ruskinn.
- Ruskinn anti-static cleaner.
- Distilled or de-ionised water.

No other cleaning agents are permitted.

The use of UV light is prohibited in the chamber as it will cause permanent damage. The use of UV Light within the chamber will invalidate the warranty.

Cleaning procedure – during and after each use

During use, clean any spills immediately using paper towels soaked in an appropriate cleaning agent. Wipe dry using a dry paper towel.

After each use;

- Remove all waste materials from the chamber.
- Wipe the chamber floor using paper towels soaked an appropriate cleaning agent and squeezed to remove excess fluid.
- Wipe the chamber floor clean using paper towels to dry.

Cleaning procedure – deep clean

Preparation:

- Open the main door.
- Remove any cells / media / samples etc... and store in an appropriate location.
- Switch off the System by disconnecting the mains power cord from either the rear of the unit or from the wall socket.
- Remove any other equipment installed from the chamber.

Cleaning:

- The components that require cleaning are;
    - Chamber floors.
    - Chamber side walls.
    - Chamber ceiling.
    - Front Door.
- For all chamber components, wipe with a paper towel soaked in an appropriate cleaning agent and squeezed to remove access liquid. Take care not to get cleaning agents on the fans or the sensors on the inner walls.
- Wipe dry using paper towels.
- For the front door ensure that both sides are cleaned.
- Clean any other equipment placed in the chamber following the manufacturer's instructions.

TROUBLESHOOTING

The System will not switch on

- Check the ICONIC is plugged in
- Check the Mains socket is switched on
- Check the ICONIC fuses have not blown
- Check the plug fuses have not blown

If all the above fail to switch the system on contact your local distributor.

Low Gas Pressure

The main causes for the ICONIC to identify low input gas pressures:

- The gas input pressure is set to low
    - Check the gas supply bottle pressure is set to the recommended levels defined in the Gas Supply Requirements section
- The gas bottle has run out
    - Check the gas supply bottle to make sure that it is not empty
- A gas connection between the bottle and the ICONIC has come undone
    - Inspect the gas supply line from the ICONIC to the bottle to check there it has not be disconnected

If all the above fail to clear the alarm then contact your local distributor or Ruskinn.

The System is only partially operational

If some features of the system are not working correctly then please contact your local distributor to arrange a service engineer visit

WARRANTY INFORMATION

Ruskinn Technology Limited warrants for the applicable time period that the VelO$_2$x will substantially perform in accordance with the user documentation. The terms of this Agreement do not affect or prejudice the statutory rights of a consumer acquiring the Ruskinn Technology Limited VelO$_2$x otherwise than in the normal course of a business.

THIS WARRANTY DOES NOT APPLY IN THE FOLLOWING CIRCUMSTANCES:

(A) IF THE Ruskinn Technology Limited VelO$_2$x HAS BEEN REPAIRED BY PERSONS NOT AUTHORIZED BY Ruskinn Technology Limited; OR

(B) THE Ruskinn Technology Limited VelO$_2$x and associated accessories/peripherals HAVE BEEN ALTERED, MODIFIED, OR MISUSED; OR

(C) THE Ruskinn Technology Limited VelO$_2$x IS USED WITH NON- Ruskinn Technology Limited COMPONENTS; OR

(D) THE Ruskinn Technology Limited VelO$_2$x OR A COMPONENT IS USED FOR OTHER USES (FOR EXAMPLE USE WITH OTHER CIRCUIT BOARDS OR SOFTWARE) OR

(E) THE Ruskinn Technology Limited VelO$_2$x HAS NOT BEEN MAINTAINED OR USED IN ACCORDANCE WITH THE INSTALLATION AND USER GUIDE. UNLESS PROHIBITED BY LAW, THIS WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, THE IMPLIED WARRANTY OF MERCHANTABILITY, OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING OR OF PERFORMANCE, CUSTOM OR USAGE OF TRADE. Ruskinn Technology Limited DOES NOT WARRANT THAT THE Ruskinn Technology Limited VelO$_2$x WILL FUNCTION ERROR FREE.

If within the Warranty Period, the Ruskinn Technology Limited VelO$_2$x does not conform to the express warranty set forth above, Ruskinn Technology Limited's sole obligation and Users sole remedy shall be, at Ruskinn Technology Limited's option: 1. to repair or replace the non-conforming component; or, 2. refund the purchase price.

LIMITATION OF LIABLITY.

UNLESS PROHIBITED BY LAW, Ruskinn Technology Limited WILL NOT BE LIABLE TO USER OR OTHERS FOR ANY OTHER DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES INCLUDING,

FOR EXAMPLE, LOST PROFITS, BUSINESS, INVESTMENTS, OR OPPORTUNITIES EVEN IF Ruskinn Technology Limited HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

The parties agree that Ruskinn Technology Limited total cumulative liability to User for direct damages for all causes under this Agreement shall not exceed £5,000,000 (FIVE MILLION UK STERLING POUNDS), or the price paid for the Ruskinn Technology Limited VelO$_2$x whichever is higher. Some states or countries may have laws which require liability rights different from those stated above. In such states or countries, the minimum required liability terms shall apply

DISPOSAL INFORMATION

VelO$_2$X contains hazardous components and must not be disposed of at a household waste site. Instead it should be taken to the appropriate collection point for the recycling of electrical and electronic equipment. Alternatively, please contact your local distributor for disposal instructions.

VelO$_2$X contains recyclable parts. Please contact your local distributor for more advice

.

CONTACT DETAILS

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