Rapidox 1100-OPT-MAX Oxygen Analyser

Software Instruction Manual

D11-218-1

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1   Introduction

The Rapidox 1100-OPT-MAX O_2 analyser is supplied with Windows software that allows the user to remotely reconfigure the analyser and perform live time data logging. The unit can be remotely calibrated and an on-screen LCD emulator allows the PC screen to become a remote display.

1.1   Models covered by this manual

This manual describes the following product variants in the Rapidox 1100 family.

> **Note:** although the software for these analysers is very similar not all features are available for all models.

- Rapidox 1100-OPT-MAX

1.2   Software Features

The software has been tested successfully on most language machines including Chinese, Korean & Japanese and all current versions of Windows operating system.

> **Note:** The software is 'regionally aware' and will therefore accept and display data using the decimal separator that is set in the PC's Regional Settings in the Control Panel. For example, in the UK or US, you might enter the value 2.5 - in continental Europe this would normally be entered as 2,5 assuming the PC's Regional Settings have been set up to use ',' as the decimal separator.

1.3   Software Installation

The software is installed automatically from the USB memory stick supplied. If auto-installation does not start then you can click the Windows START button and select RUN. Type X:\setup.exe where X is the drive letter of your USB drive. Alternatively access the memory stick drive from Windows Explorer or the 'My Computer' icon on your desktop and double-click on the 'Setup.exe' programme. Follow the on-screen instructions to install the programme onto the hard drive. Once installed, you can access the programme by clicking START - PROGRAMS – Rapidox Software.

2   Getting Started

2.1   Connecting

To connect the Rapidox analyser to a computer you will need a suitable USB to RS232 converter cable. These are readily available from computer supplies shops or can be purchased directly from Cambridge Sensotec. We strongly recommend that you select a cable that uses FTDI chipset technology as these tend to give the most reliable connections.

Figure 1: USB to RS232 converter cable required to connect to the Rapidox

Make sure that the cable is connected to a free USB port on your computer and the drivers have correctly installed. Switch on the Rapidox unit before starting the software. Once started, the software will scan through the available COM ports until it finds the Rapidox. The following home screen will be displayed:
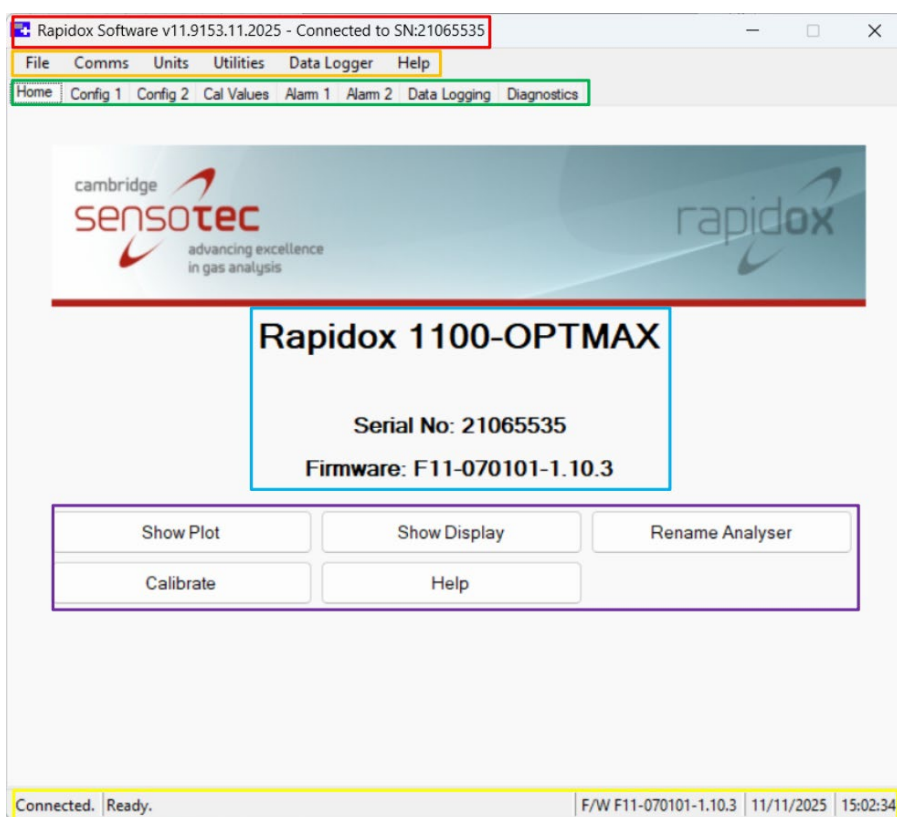

Figure 2: Rapidox home screen. Actual values may differ from those shown above depending on the model.

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▭	The window pane header shows the software version and the connected Rapidox Serial number.
▭	Menu Bar. Click on a title to view the drop-down menu sub-headings.
▭	Tabs menu. Click on the tab name to view each individual screen in the main panel.
▭	This displays the serial number and firmware of the analyser.
▭	These quick-link buttons are used to access important functions directly from the home screen.
▭	The status bar shows the result of the last action, or any error messages as well as the current data and time.

The home page can be accessed at any time by clicking on the tab labelled 'Home'

2.1.1   On Screen Help

You can access the on-screen help facility at any time by clicking on the help menu on the menu bar and select the 'Help' option or press F1. There is also a quick link button on the home screen. A full instruction manual is displayed in pdf format.

2.2   Renaming the Analyser

You can give the analyser a name which will help to identify it if you are working with multiple machines. Click on the quick-link button labelled 'Rename Analyser':
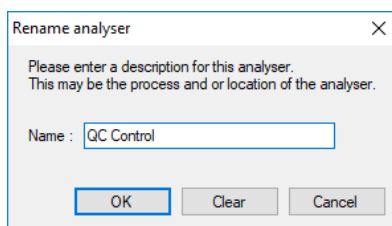
Figure 3: Rename the Analyser

Press OK to save the new name and return to the home page where the name will display until next changed:

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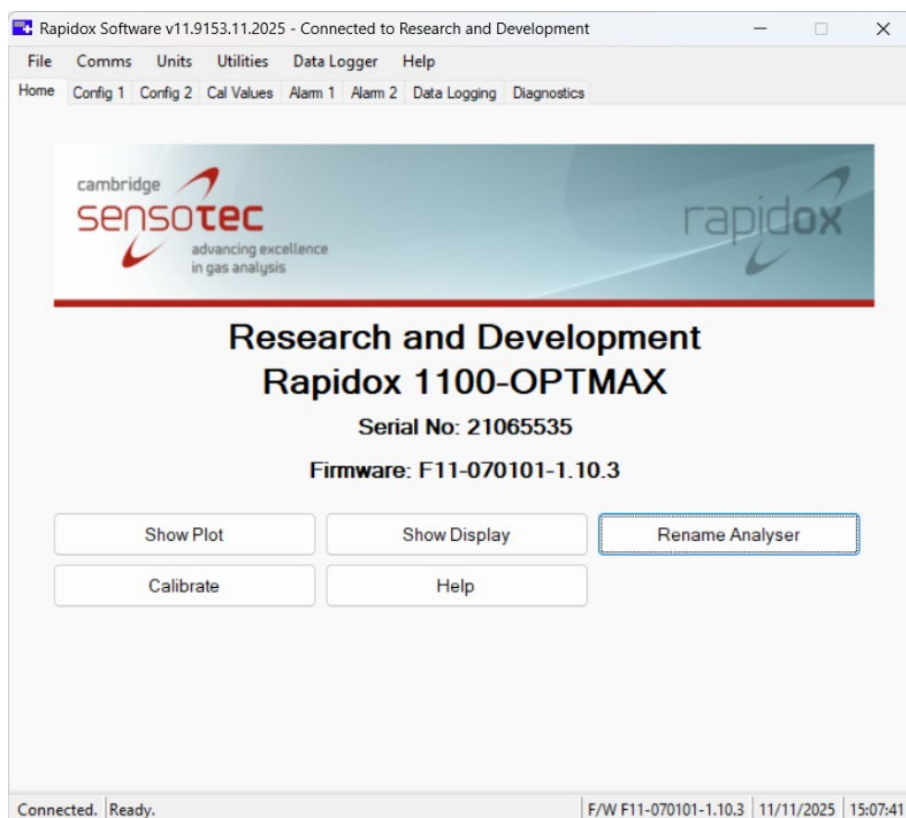
Figure 4: Homepage showing the new name of the Rapidox

3 On Screen LCD

It is possible to display an LCD emulator on the PC monitor. This reproduces the display on the Rapidox unit and is convenient if you are some distance away from the machine. To activate the LCD select the UTILITIES menu and select the LCD on option or use the quick-link button on the home screen.   This will display a window showing the LCD that can be positioned independently anywhere on the desktop.
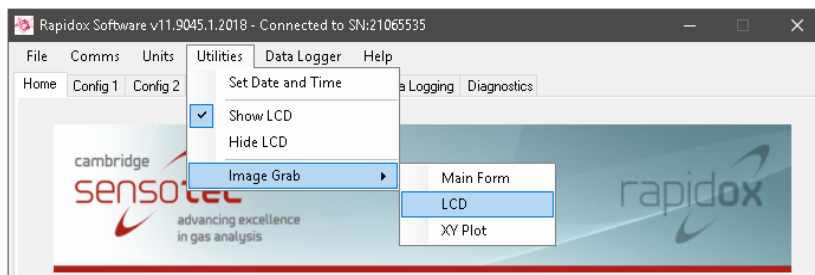
Figure 5: Open the LCD emulator window using the Utilities menu
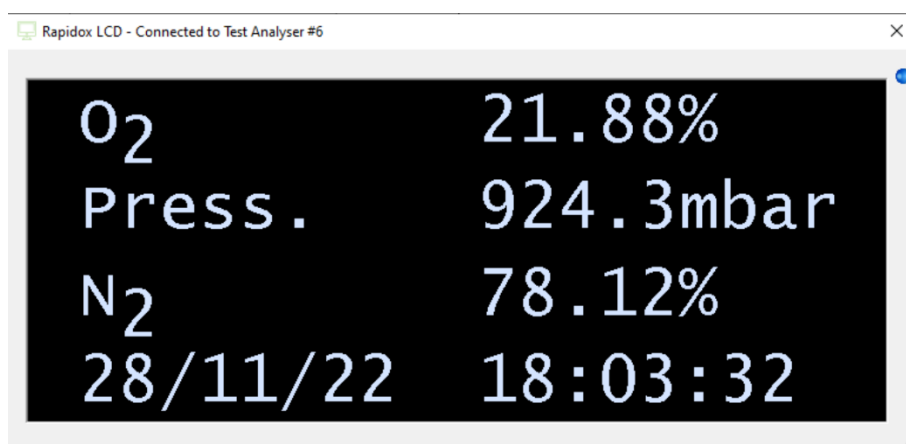
Figure 6: On-screen LCD emulator in default colouring

The default image is black with white text but this can be changed to suite your own preference. Right click over the screen to see options to change the colour of the background and the colour of the text. Alternatively choose one of the pre-set colours e.g. 'retro LCD'
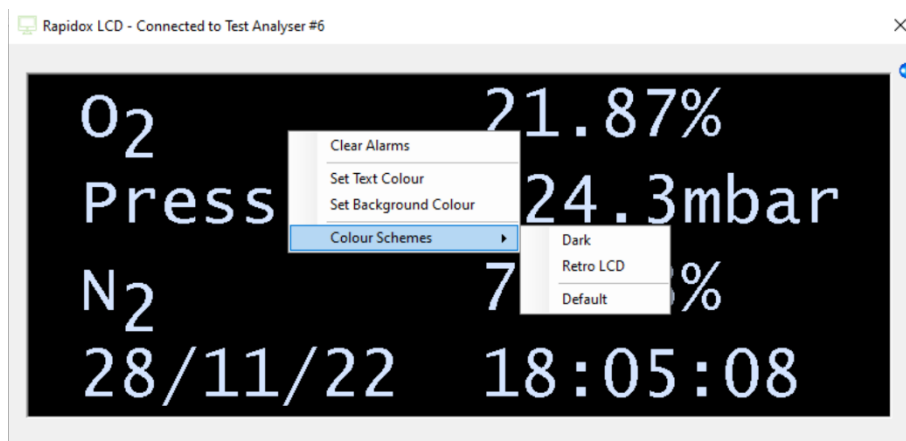
Figure 7: Right click on the LCD panel to choose different colour options

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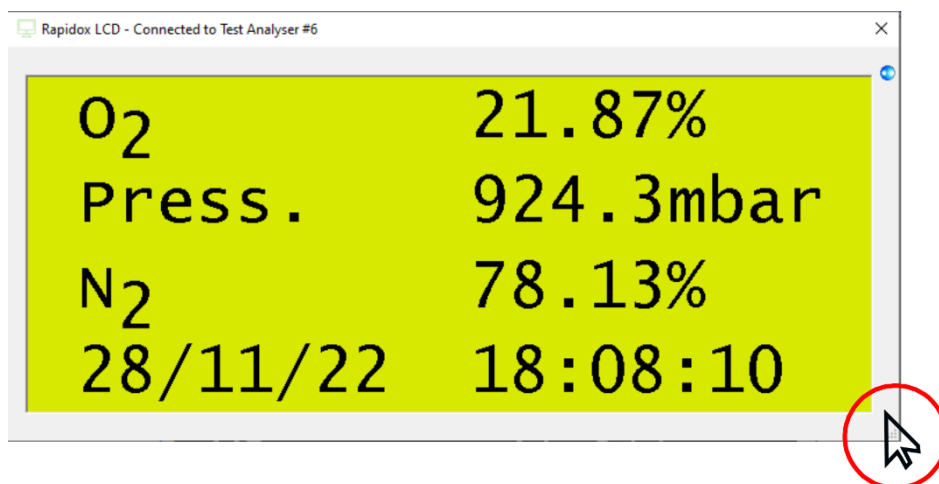
Figure 8: Example showing 'Retro LCD' selected.

The LCD window can be resized right up to full screen by stretching the bottom RH corner. Click and hold your mouse in the circled area to resize. The size and position of the screen are remembered for next time.

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4   Analyser Configuration

The on-screen edit boxes contain variables that can be reprogrammed into the Rapidox in the same manner as using the front panel keypad. For a full description please refer to the relevant section in this manual.

The user can choose whether to use ppm or percent notation to edit the text boxes, where appropriate, by selecting the 'Units' menu and clicking on 'Percent' or 'ppm'. To access a field, either click inside it or use the TAB key to scroll through them.

The analyser configuration tabs allow the user to view and set new parameters that can be loaded into the Rapidox. For example the pump speed can be changed from here. The configuration is split into two tabs labelled as 'Config 1' and 'Config 2' on the tabs menu. Values and settings can be modified and then written across to the Rapidox when ready. Once written to the Rapidox, the new variables remain permanent until overwritten.
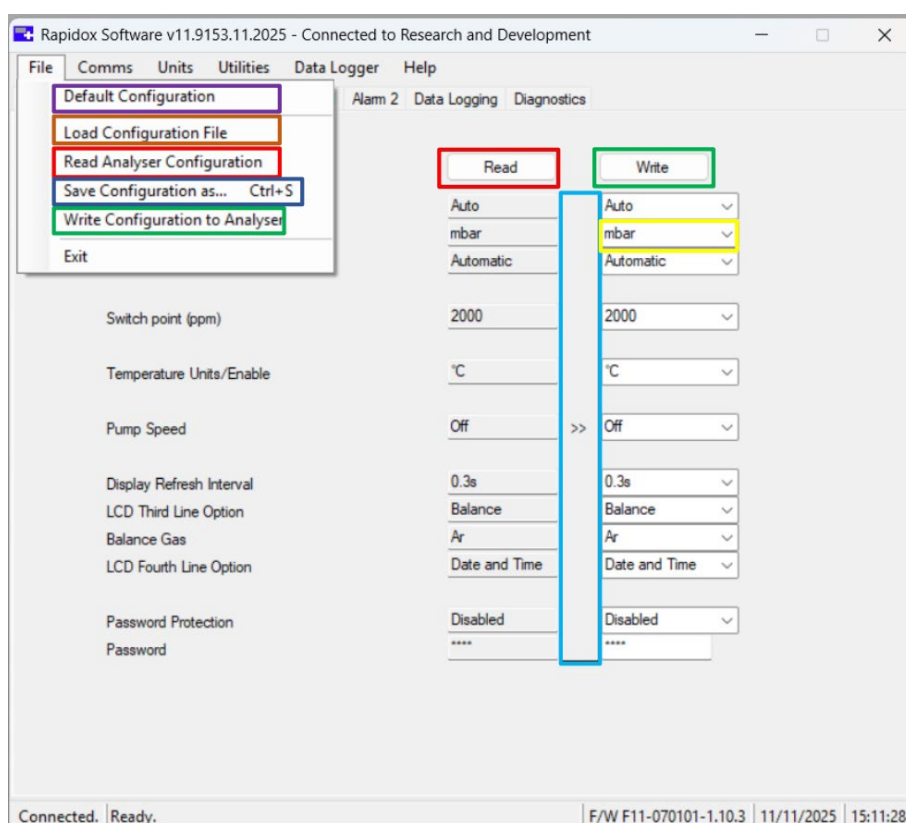
Figure 9: Config 1 tab with key elements highlighted. Exact parameters on display vary between models

Click Read to update the columns below with the present settings from the Rapidox analyser.

Use the Copy button to tranfer all the settings across into the edit box column.

Make any changes to the configuration in the right-hand column. Changes values remain red in colour until they are copied over to the Rapidox.

When ready press Write to send all the changes back to the analyser or select 'Write Configuration to the Analyser' from the File menu.

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Default Configuration: If at any time you wish to restore the machine to its factory default settings select 'Default Configuration' from the File menu to load these values. The software will search for a unique '.rxc' file that is loaded onto the PC during the software installation. The filename is 2100***.rxc where *** is the last three digits of the serial number located on the rear of the machine. This file is also located on the USB memory stick that came with the machine. Normally this file is located in 'My Documents' directory but if the software cannot locate it then it will ask you for the serial number to help it search.

Load Configuration: A saved data set can be reloaded at any time by selecting 'Load Configuration File' from the File menu and then selecting the folder where the configuration files have been stored. With the correct rxc file loaded into the 'Read' columns, simply click >> (copy) to transfer the defaults into the edit boxes and then click the 'Write' button to load it back into the Rapidox.

Note: if a password option has been enabled you will be asked for the correct password to proceed with this operation.

To save a configuration (e.g., if several people share the same instrument) click the long copy ('>>') button (between the 'Read' and 'Write' columns) in order to transfer the data into the edit boxes, select 'Save Configuration as' from the 'File' menu and choose a filename. This data set can be subsequently reloaded at any time by selecting 'Load Configuration File' from the File menu and then selecting the folder where the configuration files have been stored.

4.1   Config 1 Tab

All options on Config 1 page are selected from a list of pre-set choices given to you. The options can vary slightly depending on the model type and may appear greyed out if not applicable.
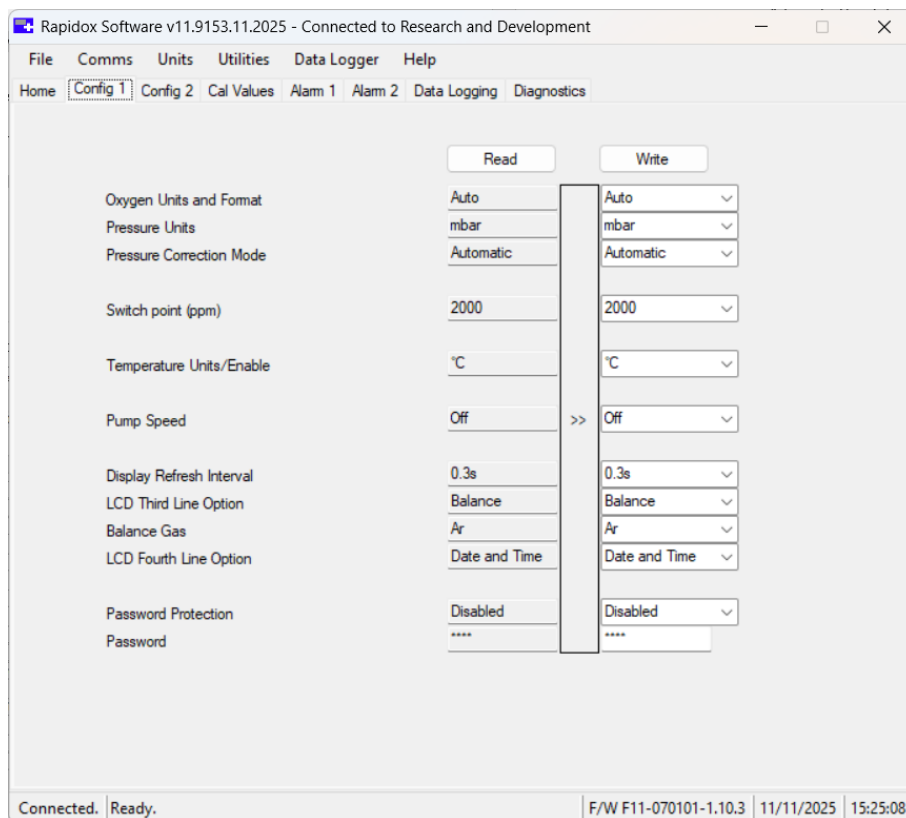

Figure 10: Configuration 1 page. Actual values used may differ from those shown above depending on the model.

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1) **O₂ Units & Format:** Use the drop-down menu to select AUTO, %, PPM, EXPONENTIAL PPM,. The default setting is AUTO.

2) **Pressure Units:** Use to select MBAR, KPa, TORR, BAR or PSI as the unit for pressure measurement. The default setting is MBAR.

3) **Pressure Correction Mode:** Use to select NONE or AUTOMATIC. The default setting is AUTO.

4) **Switch Point:** Use to select the oxygen value at which point the high range (%) sensor switches over to the low range (ppm) sensor. Options are 500ppm, 1000ppm, 1500ppm & 2000ppm with the default set to 1000ppm.

5) **Temperature Units:** Use to select between none °C and °F

6) **Pump Speed:** Use to select a pump flow value from 10-100% or OFF. The default is 70%.

7) **Display Refresh interval:** Use to select a refresh rate for the LCD (min 0.1, max 1.5 sec). The default is 0.3 seconds.

8) **LCD Third Line Option:** Use this to select what is displayed on the third line of the display. Choose from TEMPERATURE, BALANCE or NONE. Note that when BALANCE is selected a new drop down option appears allowing you to select the gas name for the balance gas.

9) **Balance Gas:** Use this to select the balance gas label from N_2, Ar, CO_2, He, H_2 or BALANCE

10) **LCD Fourth Line Option:** Use this to select what is displayed on the fourth line of the display. Choose from DATE & TIME, TEMPERATURE or NONE.

11) **Password Protection:** The password is factory disabled and set to 0000. Use the drop-down menu to enable or disable the password feature and the password box **** can be used to enter a new password if required.

Note: you will be prompted to enter the original password to make any changes to the password or its status:
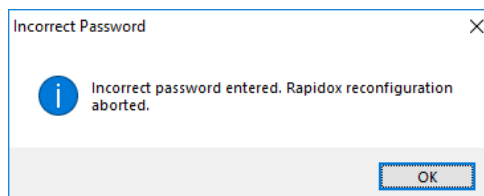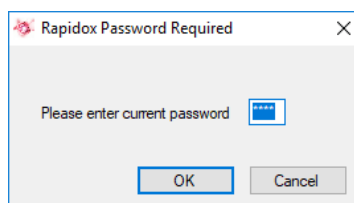

Figure 11: Password prompt menu screens.

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4.2   Config 2 Tab

All options on Config 2 are values that the user can change by entering new ones.
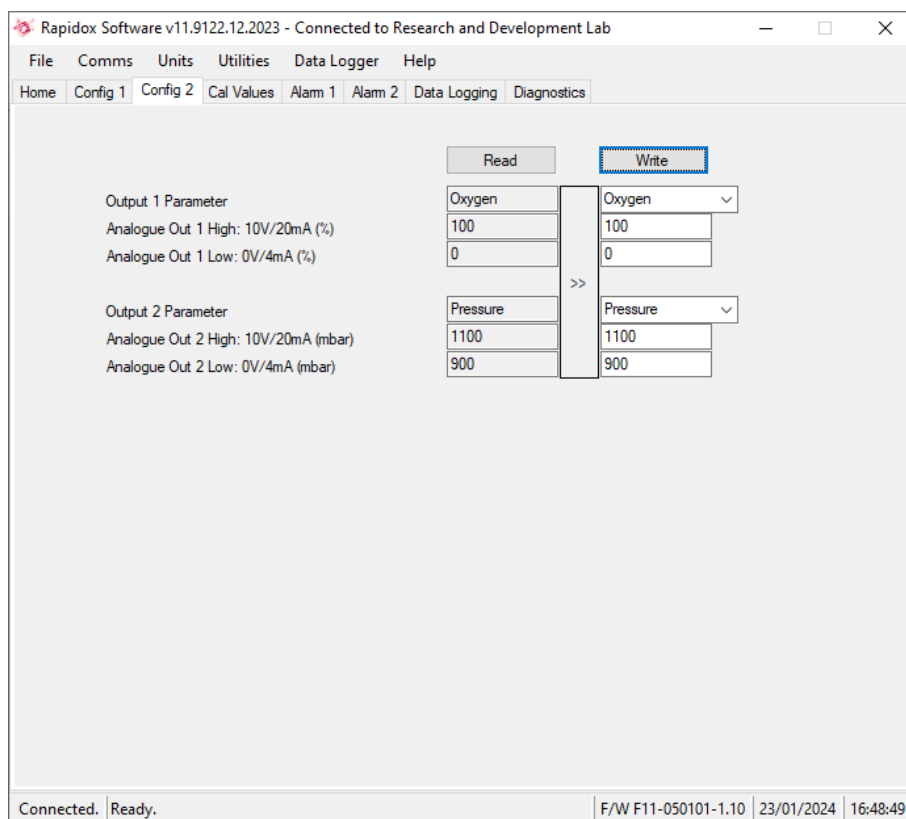

Figure 12: Configuration 2 page. Actual values used may differ from those shown above depending on the model. Note that pressure is absolute on this analyser model.

1) **Output 1 Parameter:** Use the drop down to select between OXYGEN, PRESSURE or BALANCE. The balance gas option will allow the current balance gas calculation on line three of the display to be assigned as an analogue output.

2) **O_2 Analogue Output (0V/4mA & 10V/20mA):** Use these two boxes to set the High and Low oxygen values for the analogue outputs labelled on the rear panel of the instrument. For example shown above if you want 4mA to represent 0.5ppm and 20mA to represent 210,000ppm then enter these two values into the appropriate boxes. The value can be entered either in % or ppm depending on the units selected. The default is %. The default values are 25% for the high setting and 0.001% for the low setting.

3) **Output 2 Parameter:** Use this drop down box to select between OXYGEN, PRESSURE or BALANCE. The balance gas option will allow the current balance gas calculation on line three of the display to be assigned as an analogue output

4) **Analogue Output (0V/4mA & 10V/20mA):** Use these two boxes to set the High and Low auxiliary (oxygen pressure or balance gas) values for the analogue outputs (6) on the rear panel of the instrument. For example shown above if you want 0V/4mA to represent 900mbara and 10V/20mA to represent 1100mbara then enter these two values into the appropriate boxes. The pressure units are displayed in the same units as selected on the Config 1 page.

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4.3   Cal Values Tab

The values on this page are shown for information purposes and can not be adjusted by the user. To calibrate the instrument please use the menu system on the analyser following the instructions in the main user manual.

Figure 13: Calibration Values are displayed here

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4.4   Alarms Tabs

There are two alarm tabs, one for each alarm. They are both identical in nature and described together in this section.
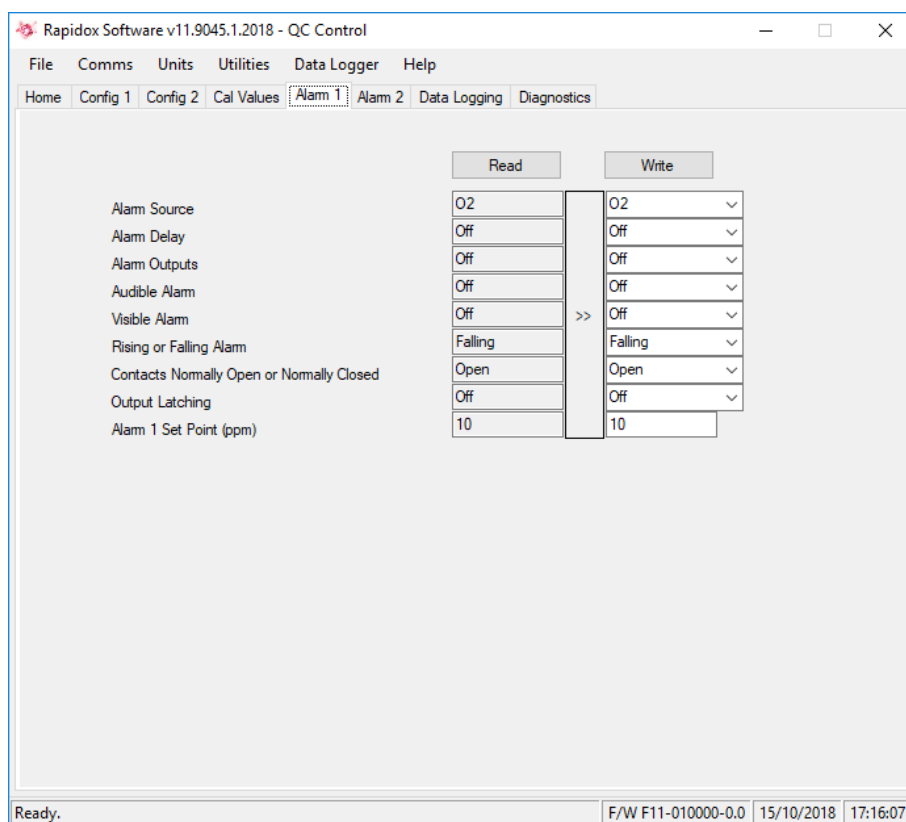
Figure 10: Alarm configuration screen. Actual values used may differ from those shown above depending on the model.

1) **Alarm Source:** Use the drop-down box to assign a detector to the alarm. If you want the alarm to be based on O_2 readings, select oxygen from the drop-down list. The choices are: OXYGEN BALANCE GAS or PRESSURE. The default setting is OXYGEN.

2) **Alarm Delay:** If required use the drop -down menu to select a delay period before the alarm will trigger. Having a short delay prevents noise spikes causing a false alarm. The default is OFF.

3) **Alarm Outputs:** This option enables or disables the alarms on the rear panel (labelled Alarm High +/- and Alarm Low +/-). Make sure these are enabled if you wish to use the signals from the alarm circuit. The default setting is OFF.

4) **Audible Alarm:** This option enables or disables the audible buzzer fitted to the Rapidox internally. When an alarm condition occurs the buzzer will emit a continuous noise to alert the operator. The default setting is OFF.

5) **Visible Alarm:** This option enables or disables the visual warning on the front display. When enabled and an alarm condition occurs the message 'ALARM 1' or 'ALARM 2' will flash on the display to show which value is in alarm. The default setting is OFF.

6) **Rising or falling Alarm:** This option allows the alarm to be set as a rising or falling type. If the alarm is rising then the reading must rise above the set-point for the alarm to be activated. If the alarm is falling then the reading must fall below the set-point for the alarm to activate. The default setting is FALLING.

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7) **Contacts Normally Open or Normally Closed:** This option allows the user to programme how the relay contacts are set on the rear panel. Normally Open means that the contacts are open circuit when an alarm is not activated and Normally Closed means that the contacts are closed when the alarm is not activated. The default setting is NORMALLY OPEN.

8) **Output Latching:** This option sets the alarm to latching or non-latching mode. See the main instruction manual for details of how this feature works.

9) **Alarm Setpoints:** Use this box to programme the set-point value at which you want the alarm to activate. The units are in %, ppm or mbar depending on which sensor you have assigned to the alarm.

Once you have finished editing all the parameters, select 'Write Configuration to Analyser' from the file menu or click on the 'Write' button on any of the tabs and the new data set will be written to the Rapidox. The Rapidox is reprogrammed using the new configuration. The software then reads the new settings back from the Rapidox and displays them in the boxes on the left-hand side confirming that the configuration was successful.

4.5   Cancelling a Latching Alarm

If a latching alarm activates then the alarm will remain on the Rapidox until it is cancelled by pressing the "ESC" button on the front panel. The latching alarm can also be cancelled remotely from the software by right clicking on the display emulator window and selecting "Clear Alarms":

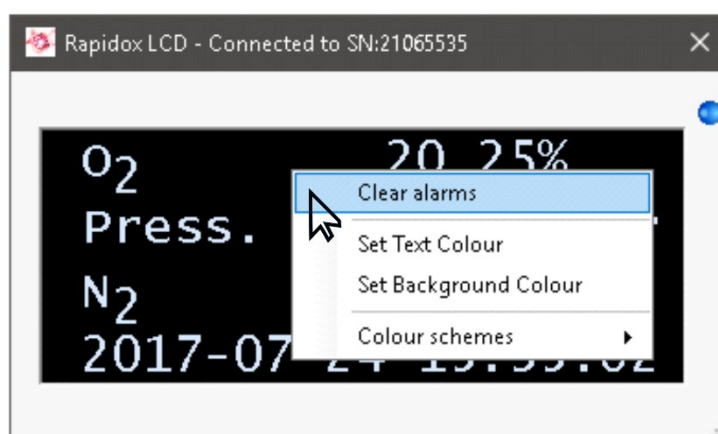*Figure 14: Right Click on the display panel to clear a latching alarm*

Note: If the alarm state is still active then the latching alarm will clear for a few seconds before re-enabling itself. The only way to permanently clear a latching alarm is to make sure the Rapidox reading is out of an alarm condition first. This is a standard safety feature to prevent users clearing an alarm before conditions recover.

5   Data Logging

The Rapidox software includes a full data logging facility. Data can be saved to a file automatically at regular intervals and the format is compatible with modern spreadsheet programmes such as MS-Excel. A live-time graphing facility is also included which has many powerful features.

> **Note**: the data logging facility will only function if the analyser is in NORMAL run mode.

5.1   Data Acquisition Tab

Click on the tab labelled 'Data Acquisition' to display the following page. The options can vary slightly depending on the model type and may not be visible if not applicable.
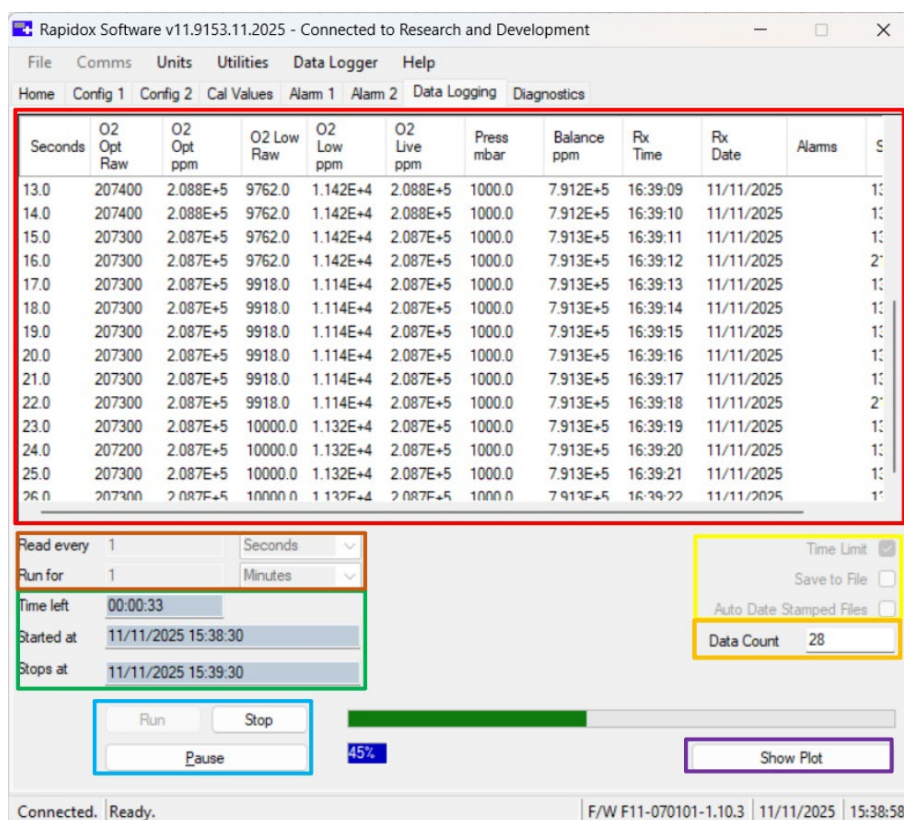
Figure 17: Data Logging page

During logging, data from the analyser is shown in the central area of this page. The data is displayed in the following columns: time (in seconds), sensor signal (in mV), O$_2$ value in the units of choice, pressure in the units of choice, time (in regional format), the date (in regional format), and alarm status (displays either ALARM1, ALARM2 or ALARM1&2 if activated).

Select how frequently you want to take readings and, if time limit is enabled, how long to log for.

Check the 'Time Limit' box if you want to run the logging for a set period. Check 'Save to file' if you want to save the log, Check 'Auto Date Stamped Files' if you are intending to log for a long time period >12 hours.

Displays information about how long the logging has been running for and low long is remaining.

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	Shows the total number of data points collected so far.
	Use these buttons to Run, Pause or Stop the logging.
	Click here to open the live plotting feature.

5.2 Running the Data Logger

If you wish to save the data into a file for later use, check the 'Save to File' box before selecting 'Run' from the Data Logger menu. You will be prompted for a file name and location before data logging commences. The file and path information will appear in the box at the top of the page labelled 'Data File Name'. If you forget to select file saving before starting a run, you will nevertheless be prompted at the end as to whether you wish to save the run data.

The green progress bar displays the state of completion of the run, and the blue box to the right of it the same information as a percentage. You can stop the run at any time by selecting 'Stop' from the Data Logger menu. The Status bar at the bottom of the page gives information about the data logging operation.

Once data logging is complete you may open the text format data file using any compatible spreadsheet programme such as MS Excel, and use the data to generate plots and reports.

You can open the NOTES window at any time by selecting NOTES from the 'Data Logger' drop down menu. A small text box appears in which you can type a text message. This NOTE is then saved as a header in the data file set and can be viewed along with the data.

5.2.1 Data Logging in the Background

It is possible to begin data logging and then minimise the windows to continue working with another application. To minimise the graph simply click on the minimise button on the blue title bar at the top of the window. You can then use the ALT + TAB keys to take you to other programmes already running. To return to the graph simply maximise from the start menu bar or press ALT + TAB again. If the graph does not redraw immediately select 'Zoom Full' from the View menu to redraw.

5.2.2 Changing the Data Logging Parameters Mid-run

Once the data logging has begun you may change the sample interval time by pausing the data logger and then entering a new value for the time interval. The data logger can then be resumed with the new values in place.

> **Note**: you cannot change units (e.g., seconds to hours) once logging has started. If you originally selected seconds then you may change the current value to a new value between 1 and 3600 seconds, if you originally selected minutes then you may change between 0.02 and 360 and if you selected hours you may change between 0.01 and 6 hours.

> **Note**: it is not possible to modify he original total length of time that the data logging will run for once a run has commenced.

5.2.3 Auto Date Stamped Files

If you are planning to run the data logger for extended periods of time then you should consider checking the 'Auto date stamped file' option. This feature will save the data at midnight for the previous twenty four hours and so on until the data-logging is complete OR the user interrupts. The data file is stored with a date suffix in brackets in yy-mm-dd format.

This feature ensures that data is saved periodically in sensible sized files. This will prevent the computer from crashing and will also ensure that the data is small enough to fit into an Excel spreadsheet

As an example, the user wishes to run the data-logger for seven days recording every minute starting at lunchtime on 12th November 2025. They start the data logger with the auto-date stamp function enabled. When prompted they give the filename as test1. In this situation the data logger will run from lunchtime to

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midnight and then save the first file as test1 (2025-11-12). The data logger then clears and continues for another twenty four hours until midnight the following day. The data is then stored as test1 (2025-11-13). This will continue for seven days when the data-logger will finish.

After this the user will have a sequence of files:

test1 (2025-11-12).txt
test1 (2025-11-13).txt
test1 (2025-11-14).txt

And so on. Combined together they represent all the data over the last seven days.

> **Note:** the Rapidox uses the computer clock and date to perform this action, so make sure that they are correct before starting a run. To view the data in its entirety the user would need to load each file in turn back into Excel to combine.

5.3   Live Time Graphing Screen

The Rapidox data-logging package includes a live-time graphing facility that allows you to monitor the progress of your data in a graphical format (see Figure 15). To access the graph click the button labelled 'Show Plot'. The graph will appear in a new window, and can be accessed at any time without disturbing a run that is already in progress. To close the window and return to the main data-logging page select 'Close Plot' from the File menu or click on the close window button. Click on the 'Properties' button to change the style and colours of the graph.
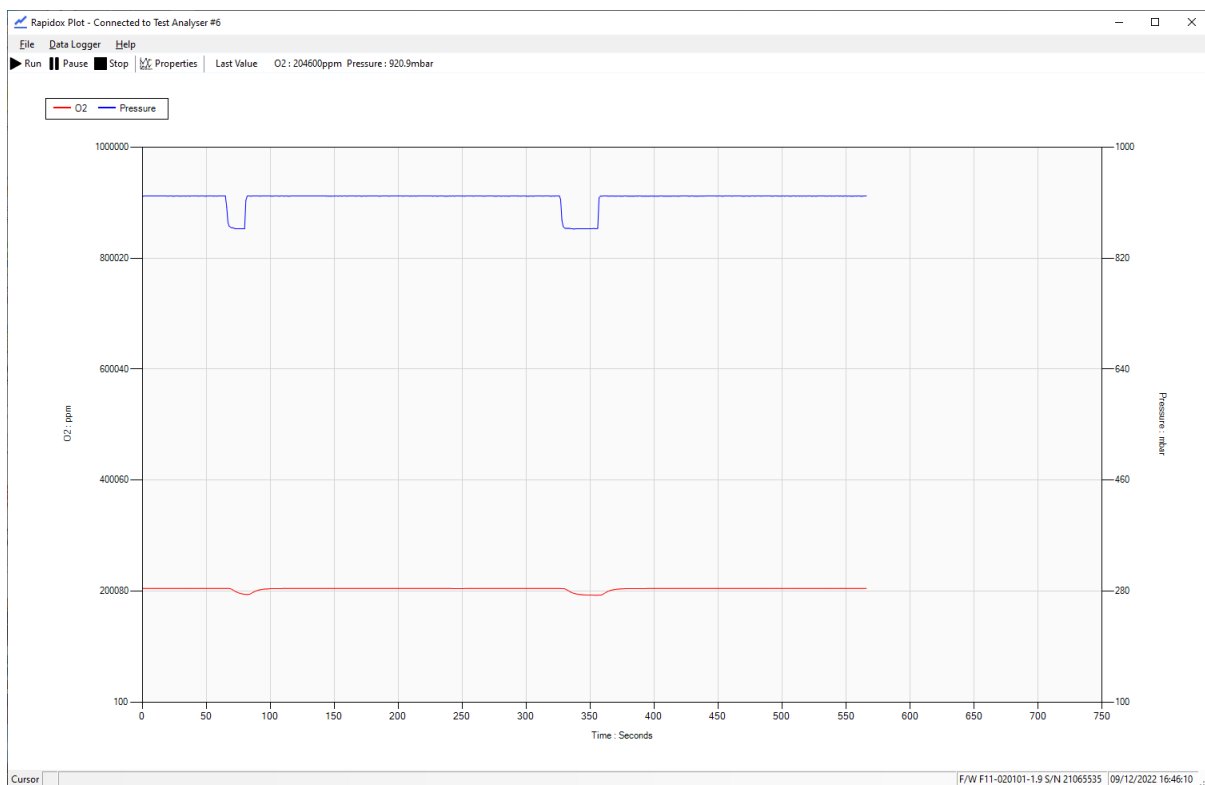

Figure 15: Live-time graphing screen showing O$_2$ Y1-scale (red) and a linear pressure Y2-scale blue) on the same graph together.

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5.4   Plot Properties

The properties of the plot can be modified to suit your needs by clicking on the button labelled 'Properties' or inside the legend or along any of the axes. The Plot Properties box will be displayed
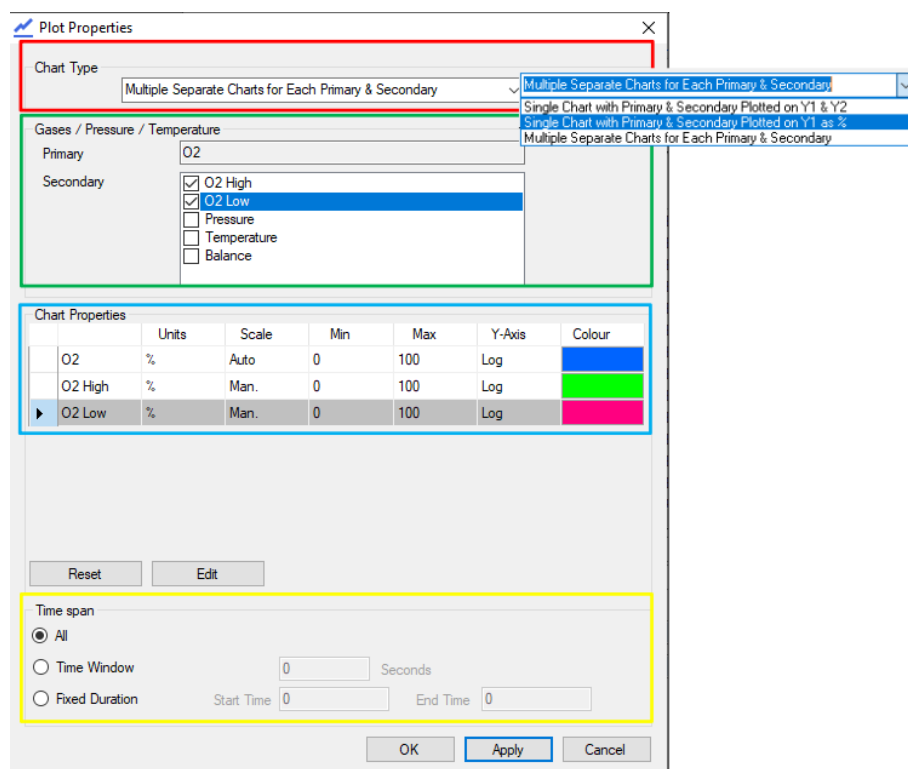

Figure 16: Chart Properties Window

Select the the type of graph you want to view using this drop-down menu:
a) *Single Chart with Primary & Secondary Plotted on Y1 and Y2*. This default is a single chart with two gases (O_2 and Pressure) plotted on the Y1 and Y2 axes.
b) *Single Chart with Primary & Secondary plotted on Y1 as %*. This chart option is more suitable for Rapidox analysers fitted with multiple sensors that all have different scales. The chart plots each sensor value in terms of percentage of the scale
c) *Multiple Separate Charts for each Primary & Secondary*. This will draw a separate graph for each gas or pressure or temperature depending on the excat configuration of the analyser.

The primary and secondary gases / pressure / temperature can be selected for plotting from here. The primary gas is always plotted on the Y1 axis and the secondary is on the Y2 axis.

The way the data are plotted can be changed by selecting the unit of choice and clicking 'Edit' to open the Trace Properties box shown in Figure 17 below

Select the time span of the X axis here – choose from displaying All the data or a specific Time Window or a Fixed Time Duration.

Once all your changes have been made click on Apply to view the result and OK to finish and close the Window.

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5.4.1   Trace Properties

The default colours used on the graph are set to blue for O_2 and red for pressure. To change the colours, units as well as the scale and limits use the Trace properties menu box.
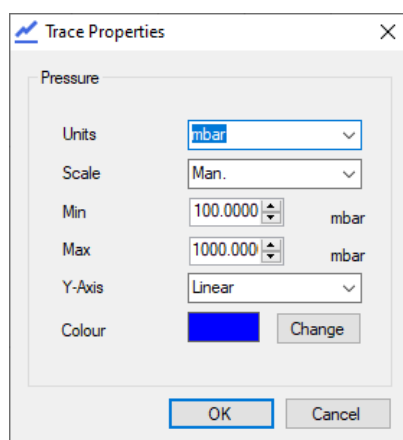

Figure 17: The Trace Properties menu allows the user to format axes and colours of individual plots.

5.4.2   Plot Colours

The default colours used on the graph are set to blue for O_2 and red for pressure. To change the colours use the Trace Properties Window shown above and click 'Change'. A colour palette window will appear (see Figure 18) and a new colour can either be chosen from a colour box, or for more variety, by clicking the 'Define Custom Colours >>' button. Click on 'OK' to select the new colour or 'Cancel' to return to the graph without change.

Figure 18: Plot colour palette menu accessed through the Chart Properties Window.

5.4.3   Zooming the Graph

The graph window can be stretched to a new size on the screen by placing the mouse in the graph pane and dragging an area where you want to zoom to before releasing the mouse button.

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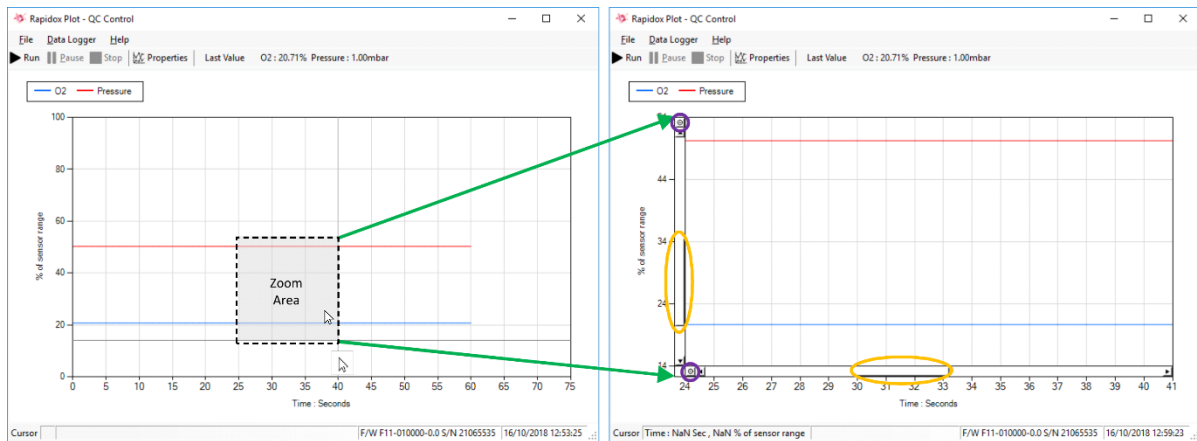
Figure 19: Zooming into an area of a graph by dragging the mouse

Use the sliders to scroll the chart left to right and up and down once in zoom mode.

Click on the Close buttons to return the graph to the normal size. There is one close button for each axis.

5.4.4   Printing Graphs

You can print the graph at any time by selecting 'Print Plot' from the File menu. This will bring up the printer dialogue box for your specific printer where you can choose various printing options. Make sure that the printer page is set to landscape to obtain a full size print out.

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5.5   Working with Spreadsheets

The data-logger saves data files in a standard comma separated ASCII text format which can be readily imported into spreadsheet programmes such as MS Excel, in order to produce plots and reports as desired. For specific information on how to import text files into your spreadsheet programme please refer to the help guide supplied with the programme.

Data is saved in comma separated value format, with a '.txt' file extension as the initial programme default. However, when entering the file name, you can instead select a '.csv' extension: the programme will register the last used file extension as the new default. The '.csv' extension is recognised by MS Excel, so that opening the file will automatically run MS Excel, and this may be of benefit if your regional decimal separator is period '.' rather than comma ','. However, if your decimal separator is comma, you should continue to use the '.txt' extension and open the file explicitly from within your spreadsheet programme, defining the field delimiter as 'comma' where appropriate.

5.6   Disaster Recovery

To prevent catastrophic loss of important data during a computer crash or power failure, the data is automatically saved point by point in a temporary file called 'Rapidox temporary data file 2100xxx.txt', where 2100xxx is the serial number of your Rapidox. This file is located in the same directory as the main Rapidox programme itself and can be renamed or copied to recover data that would otherwise be lost.

> **Note:** this file is overwritten each time 'Run' is selected from the 'Data Logger' menu so make sure all data is recovered successfully before starting another run.
>
> **Note:** during a run using the 'auto date stamped' feature, the temporary data file is wiped clean as soon as the previous data set has been saved successfully. In the case of a crash the temporary data file should be used to recover the last day's worth of data that was not saved to the hard disc.

5.7   Software Utilities

The utilities menu is located on the main file menu as shown in Figure 5 above. Here the LCD window can be opened and closed as well as setting the date and time.

5.7.1   Setting Analyser Date and Time

The current date and time of your PC are displayed on the configuration screen and can be loaded into the Rapidox by selecting the Utilities menu and clicking the 'Set date and time' option. This information is used in the RS232 data string for data logging purposes. Make sure that your PC clock is set correctly before using this function, as you cannot edit the date and time shown by the Rapidox software. The date and time formats displayed are those set in the PC's Regional Settings.

5.7.2   Image Grabber

This is a simple function to allow the user to copy the software screens into the Windows clipboard. This is useful for diagnosing problems; allowing a quick and simple way of sending the Sensotec technicians actual screen shots of the software. To recover the images simply press CTL+V to paste.

6 Remote Calibration

It is possible to calibrate the analyser using the software which is often a more convenient way and removes the need to constantly access the menu using the front panel keys.

6.1 About calibration

The two optical sensors are extremely stable and virtually drift free meaning that the factory calibration should be fine for most users. However periodic calibration is still highly recommended every twelve months to achieve full accuracy.

You can re-calibrate the Rapidox 1100-OPT-MAX analyser using any three calibration gases (LOW, MIDDLE & HIGH) as long as HIGH > MIDDLE > LOW and the MIDDLE gas falls within the sensor switching point range (500 - 2500ppm O_2). The cal gas values are factory set as LOW = 10ppm, MIDDLE = 1000ppm & HIGH = 209,500ppm, and we recommend that you don't change these unless you have a good reason. During each calibration, the two sensors are exposed to the correct calibration gas from a cylinder until the display reading is stable.

The OPT% sensor is calibrated using the HIGH and MIDDLE cal points and the OPTppm sensor is calibrated using the MIDDLE and LOW cal points. This means that the two sensors are locked together by the MIDDLE cal point and both sensors are calibrated at the same time in the same gas at the switchover point which guarantees a smooth transition from high to low during use.

You can calibrate the analyser HIGH using any calibration gas including air (20.95%) as long as it is >0.1% oxygen. For the MIDDLE calibration the oxygen value is restricted to between 500ppm (0.05%) and 2,000ppm (0.25%) since both sensors must be calibrated at the same time, in gas that is compatible with their scale. The LOW calibration can be completed on any gas <1000ppm including 6.0 N_2 for a zero point (0.00%).

Typically, the factory settings are:

- **HIGH** = 209,500ppm (20.95%) O_2 (fresh air can be used 20.954%)
- **MIDDLE** = 1000ppm (0.1%) O_2
- **LOW** = 10ppm (0.001%) O_2 (pure N_2 6.0 can be used for a zero point)

> **Note:** the calibration points are independent of each other so you can calibrate the analyser in any order you desire. However, you must ensure that **HIGH > MIDDLE > LOW**.

6.1.1 Before you start

1. Decide which gases you are going to use for calibration. If you constantly work at a specific range of compositions, it would be wise to obtain small cylinders of calibration gas with analysis certificates. Cambridge Sensotec can supply these.
2. you want to work in different units, select this using the Units menu on the software main window

> **Note:** You should always perform a **full** calibration to achieve good accuracy.

> **Note:** Under normal operation an annual calibration will prove sufficient. All Rapidox analysers can be returned to Cambridge Sensotec for a range of service and calibration options. Please contact us for further information.

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6.2   Software Calibration Menu

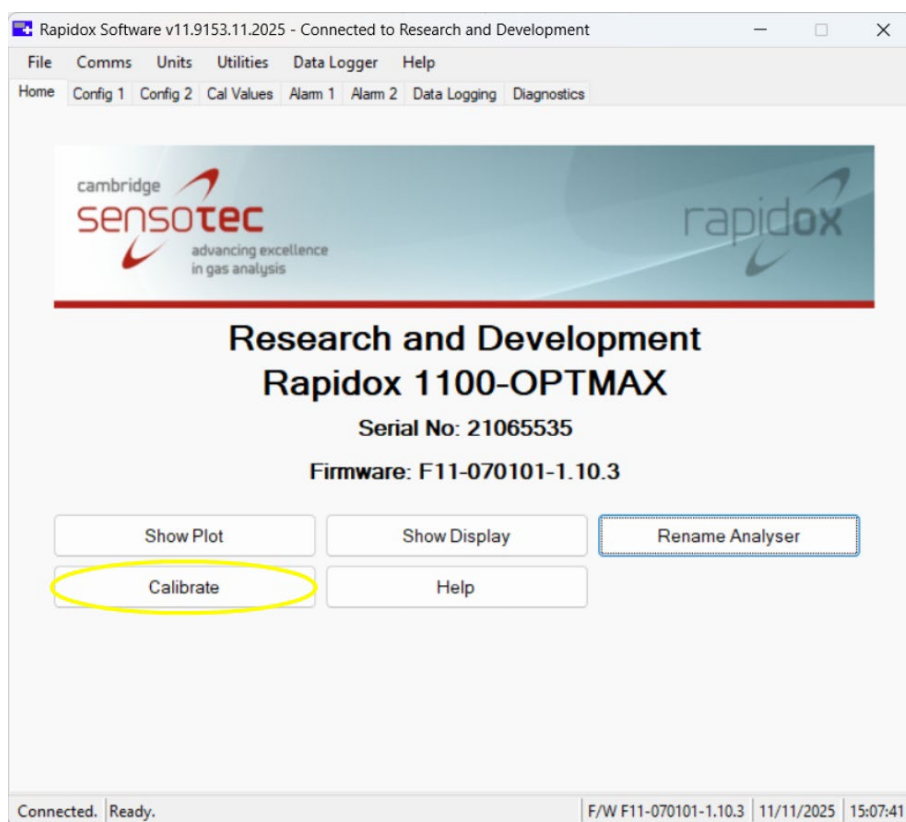The calibration menu is accessed from the Home page by clicking on the button labelled 'Calibrate'

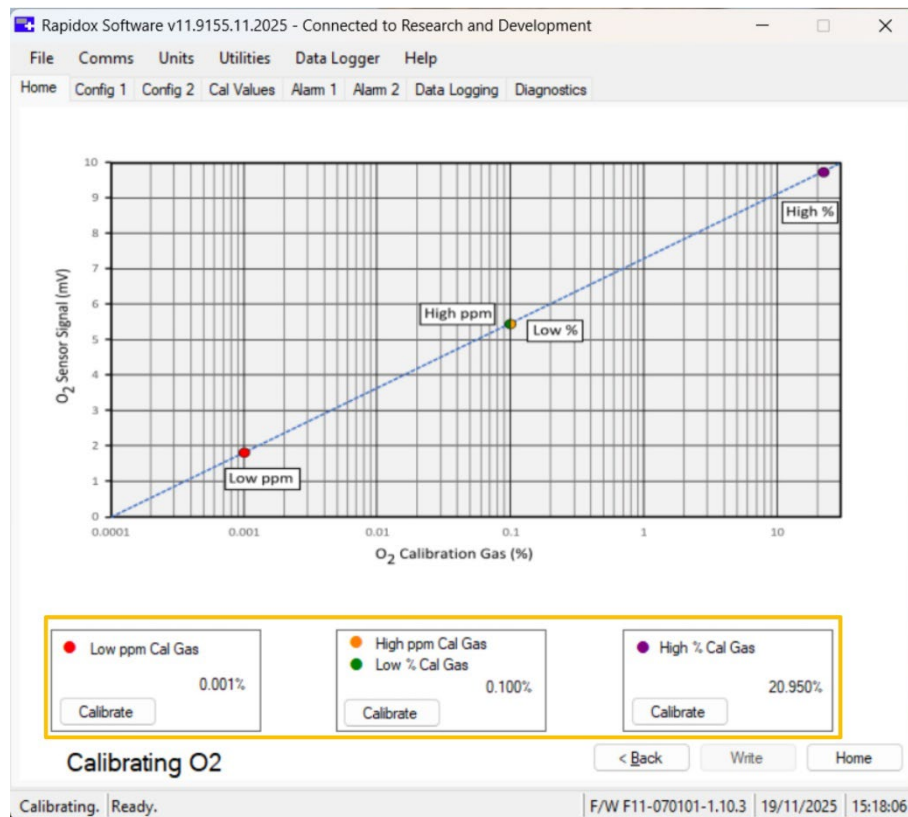Figure 20: Accessing the Calibration Software

Figure 21: The current calibration is displayed visually on a chart showing the LOW and HIGH points for both the ppm and % scale sensor.

The current calibration values are shown here in colour coded format. Simply click 'Calibrate' on the point of interest to continue

6.3   Example Calibration

As an example using air is shown. Clicking on "High % Cal Gas" calibrate button takes you to the actual calibration screen for this gas:
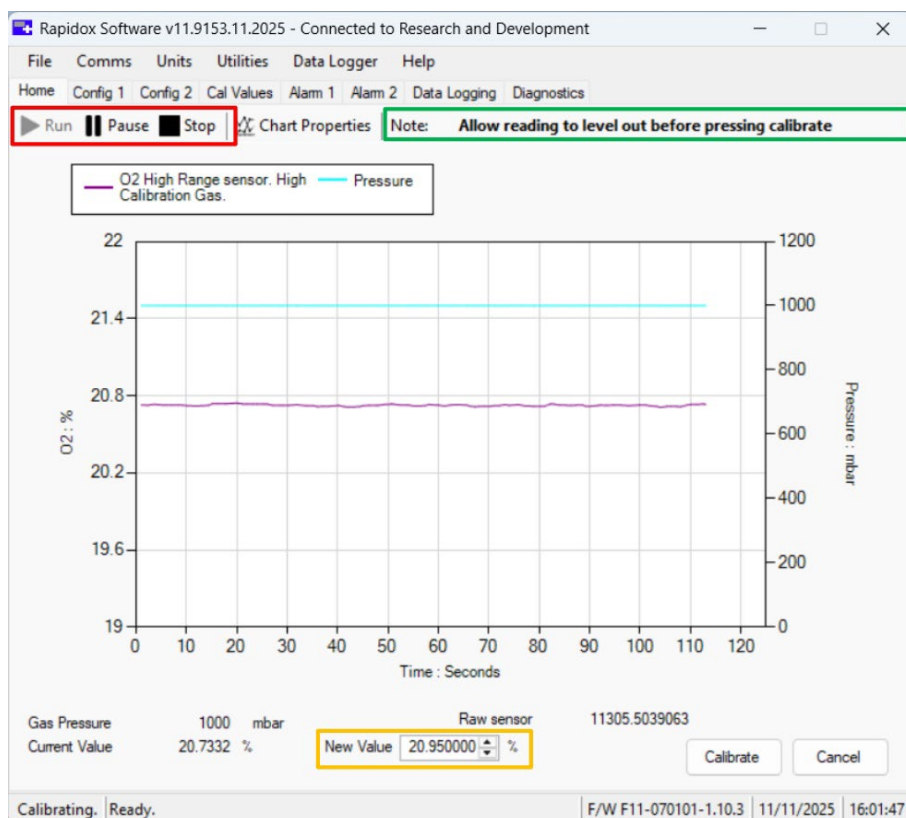
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Figure 22: Example showing the 'High| Cal point' calibration screen.

To start the calibration process click 'Run' to start data graphing.

The notes will prompt you what to do during the process of calibrating.

The value of the calibration gas you are using should be entered here either by typing or using the up and down arrows to make small changes. In this case the cal gas being used is fresh air (20.95%).
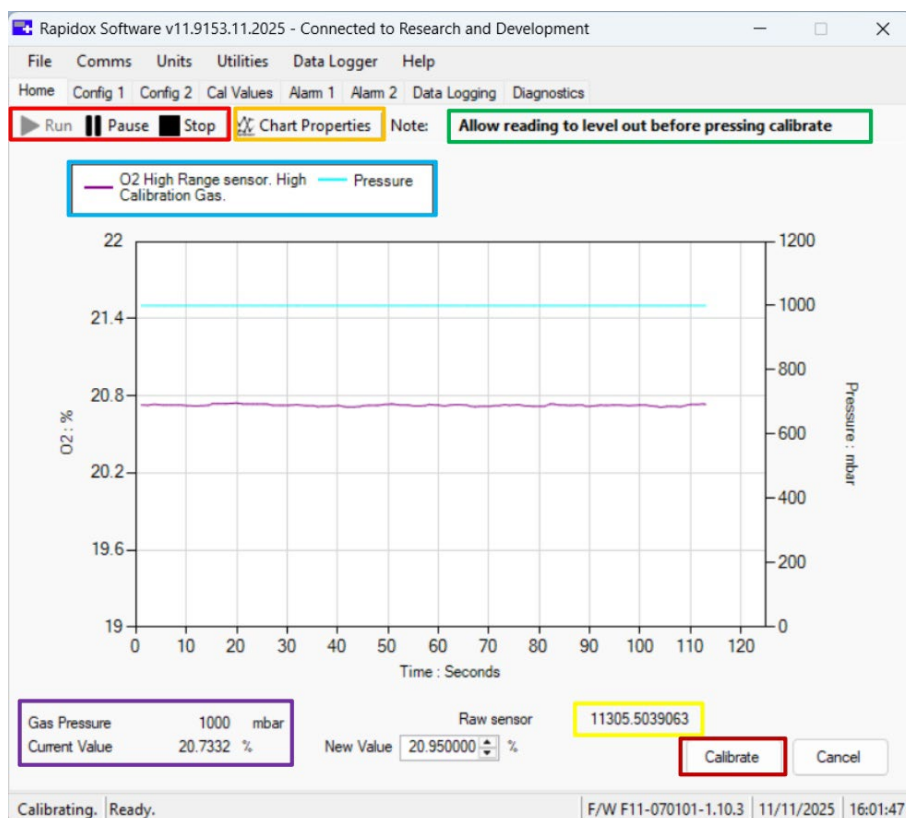
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Figure 23: Calibrating the High Gas with fresh air.

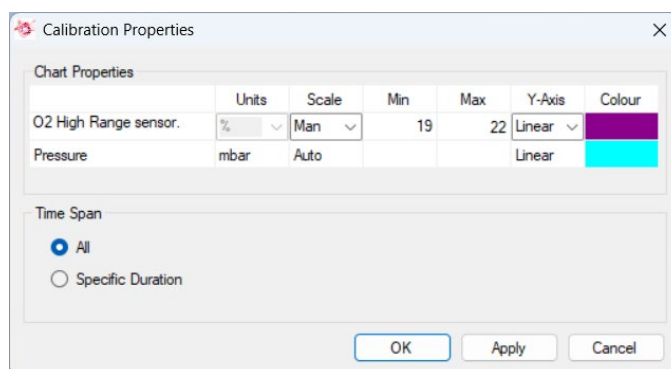|	
▭	Use Run, Pause or Stop to control the graphing
▭	The notes guide you as to what to do next – wait until the gas reading has levelled out completely before pressing 'Calibrate'
▭	Click on Chart Properties to adjust the chart settings. See Figure 24 below for details

Figure 24: Calibration Graph Properties window. Here you can customise the view of the graph. The colour for O_2 is locked and linked to the colours used in Figure 21.

▭	The legend shows the colours for O_2 and pressure. Note that the O_2 colour is coded and fixed to match the previous windows. The pressure colour can be changed if required
▭	The current live readings for O_2 sensor and pressure are displayed here. The pressure reading needs to be atmospheric +/-25mbar for a successful calibration.
▭	A live mV reading is displayed to show the quality of the sensor. For information only.

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Press Calibrate to save the new value and return to the previous screen. A summary will be shown as in Figure 25 below:
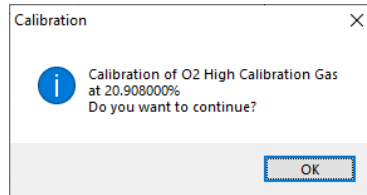

Figure 25: Confirmation of the new calibration settings are displayed

With the calibration completed for the first gas the user is returned to the window shown in Figure 21. The completed calibration points are indicated by a tick:

Figure 26: Calibration window indicating that the High gas calibration has been completed

If you want to reset a calibration simply right click over the green tick box to select undo.
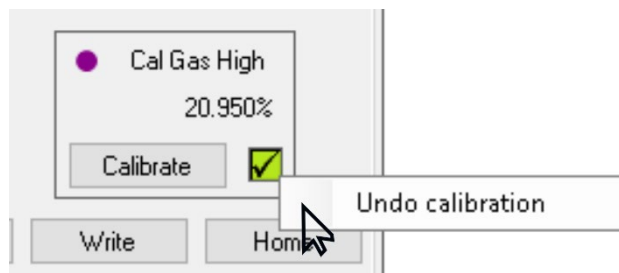

Figure 27: Undo a calibration

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Repeat the above process until you have completed all the calibration points, or some of them if you are only doing a partial calibration.

6.4 Programming the Calibration

The updated calibration is only sent to the Rapidox unit when you are finished and ready to update everything together. When ready click on the button labelled 'Write' to reveal:
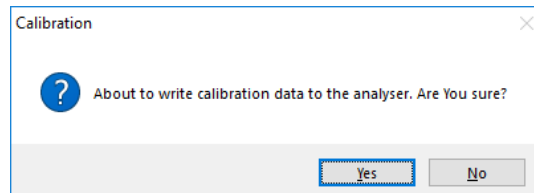

Figure 28: Message warning that the calibration is about to be sent to the Rapidox
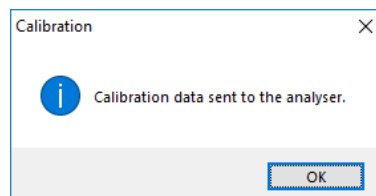

Figure 29: Confirmation that the Calibration was loaded into the Rapidox successfully

If you want to modify the number of calibration points press the 'Back' button. You will see a prompt confirming this is what you want to do. This will reset all calibrations that you have completed.
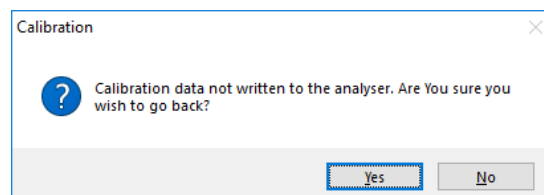

Figure 30: Prompt asking you if you really want to go Back without copying the calibration to the analyser

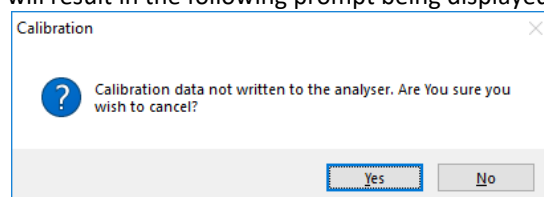Alternatively pressing 'Home' will result in the following prompt being displayed:

Figure 31: Prompt reminding you that you are trying to cancel without saving the calibration to the Rapidox.

7 Diagnostics

The Rapidox software includes a diagnostics page that is accessed from the tab labelled 'Diagnostics'. This screen will display various values and settings that are operating inside your machine. There is no editing possible on this page – it is purely for information and to enable technical support help you should you experience difficulties with your machine. You may be asked to record values from this page if trouble shooting is required.
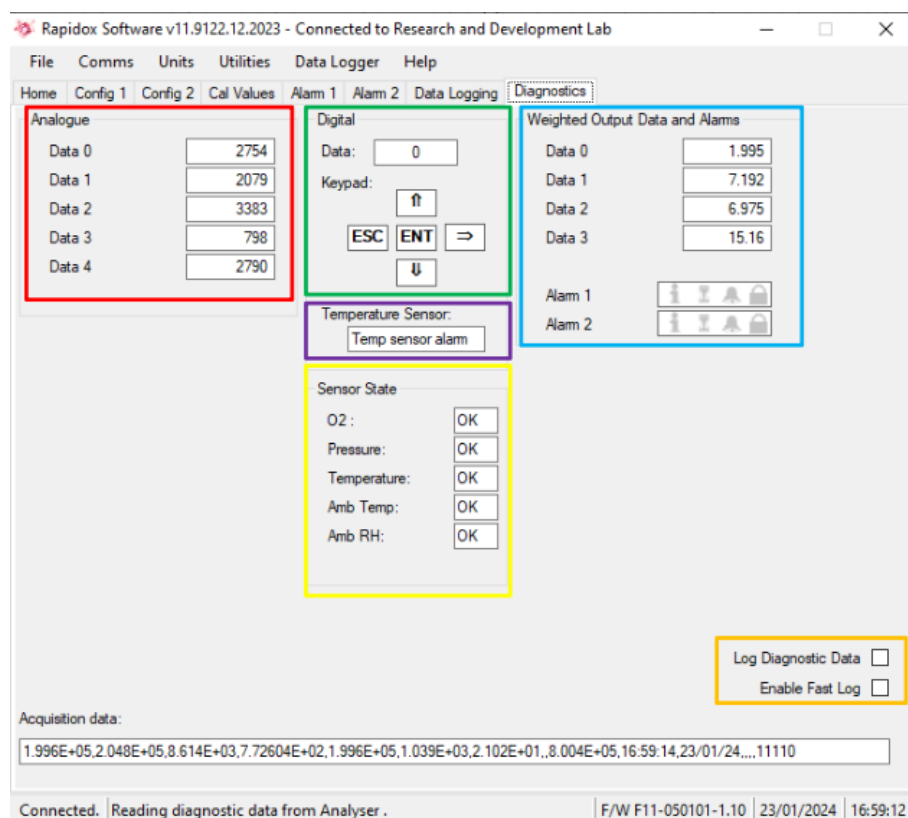

Figure 32: Rapidox Diagnostics Page. The exact layout of this screen varies from model to model.

Analogue: the live analogue values displayed in this pane are voltage measurements coming directly from the computer chip inside the analyser. They are for information purposes only but are a useful diagnostics tool for Sensotec staff, as unusual values can indicate a particular fault. To help Sensotec diagnose a fault please capture this window as shown above using the screen capture function described in section 5.7.2 above and e-mail it to support@cambridge-sensotec.co.uk

Digital: the digital signals coming directly from the computer chip inside the analyser can be monitored here. To test the keypad is working correctly try pushing the buttons and watching the panel. A correctly functioning key will turn the box red on the screen and the digital value for that particular key will show in the data box

Temperature Sensor: If the analyser has an external thermocouple correctly fitted (2100 and 3100 series only) then this will display a signal in the 'Temperature Sensor' box

Sensor State: these boxes should all indicate 'OK' on a healthy analyser.

Note: this family of analysers do not have other sensors fitted so all references to these on this screen are not relevant. The possible messages are 'OK' 'High' 'Low'

or 'Fault'. The High and Low messages indicate that the sensor is out of normal range. The fault message will only display if the sensor is disconnected or has failed in some way

Weighted Output Data: These values are being sent to the rear panel for the analogue outputs. Data 0 is an indication of the ambient pressure in mbar and Data 1-4 represent the values for O_2 and pressure being sent to the analogue output terminals for V and mA

Log Diagnostic Data: If you check this box then the software will automatically start to save a diagnostic file in the 'My Documents' directory called 'Rapidox diagnostics data XXXX.txt (where XXXX is the serial number of your machine). Selecting 'Enable Fast Log' will log the data at a much shorter interval to help with certain issues.

Note: Diagnostic data is logged every 6 seconds, or every second if your software has the "Enable fast log" check box.

Note: Logging diagnostic data is controlled entirely by the "Log diagnostic data" check box - logging starts as soon as it is checked, and stops when it's unchecked.

Note: If you switch to a different tab diagnostic data logging will be suspended, so the general rule when logging diagnostic data is check the "Log diagnostic data" check box and then leave the software alone until you want to stop logging.

Note: There is no file name option, so rename the last diagnostic data file before logging new diagnostic data.

Note: Diagnostic data contains raw data from the analyser as well as either status messages (such as "Sensor heating") or acquisition data as you would get from the normal data acquisition file. However, unlike normal data acquisition, it isn't suspended if the heater loses control. Diagnostic data saving will only be suspended if there's a comms glitch between the PC and the Rapidox, or if you try to interact with the Rapidox via software. The file is created at the start of the run, and as with the temporary data file, each data line is appended, so you can look at the file at any time. You can therefore have a look at the file at any time (for example by opening it in Notepad or by copying and saving it with a .CSV extension for Excel) and see whether there are any anomalies.

E-mail the file to support@cambridge-sensotec.co.uk so we can help diagnose the problem

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