MAP-PAK 2

O₂

Headquarters Address:
Unit 2,
Shannon Free Zone West,
Shannon,
Co. Clare, V14 PX03
Ireland.

T:	+353 61 471632
F:	+353 61 471042
E:	sales@agc-instruments.com
W:	www.agc-instruments.com

AGC
INSTRUMENTS
Gas Chromatography since 1965
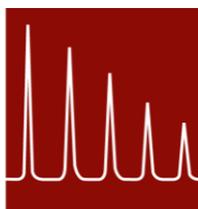
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About Map-Pak 2 O2

Map-Pak 2 O2 is the fifth generation of Modified Atmosphere Packaging analysers and the second generation of the Map-Pak handheld gas analysers from AGC Instruments. It is a portable gas analyser specifically designed for measuring the gaseous content of modified atmosphere packaging within the food industry.

The analyser measures the Oxygen (O_2) content in gas packed food items. The operator can then assess whether the correct level O_2 is achieved, in order to keep the food item fresh and appealing for as long as possible.

Map-Pak 2 O2 is designed around the needs of the operator in that, it is easy to understand, records are taken quickly, and the settings are easily adjustable.

Symbols Used Throughout this Document

Note:

Warning:

Specifications

Range	0-100%
Sensor Lifetime	O_2 Sensor: 2 years typically
Sample Time	≤10 seconds (High Volume)
Sample Volume	Low**:** 6mL
	Medium: 30mL
	High: 50mL
Dimensions	L=190 W=79 D=47 [mm]
Weight	337 Grams
Display	3" Touch Screen Display
Accuracy	O_2 Sensor: ±1% (Full Scale)

Accessories Included

Description	Quantity
USB Cable (for Charging & Data Transfer)	1
Universal Mains Adapter	1
Instruction Manual	1
Certificate of Test	1
Accessories Kit Box	1
Hydrophobic Filters	3
Needles	5
Septa	100
Needle Probe & Sample Line	1
Carry Case	1

To order further parts please contact the distributor from whom you purchased this instrument or AGC Instruments directly via email:

sales@agc-instruments.com or call us at: +353 61 471632.

Tubing

Particle Filter

Probe

Needle

Sample Inlet Connection

Recessed
Probe Holder

3" Touch Screen

MAP-PAK 2

10:32   09/12/2020
Product: Product 1 Weight 1
Customer: Customer 1
Operator: Operator 1
Line: Line 1
Vol: Medium

Press

to Measure

Menu

O₂

Power ON/OFF
Button

SAMPLE
Button

AGC
INSTRUMENTS
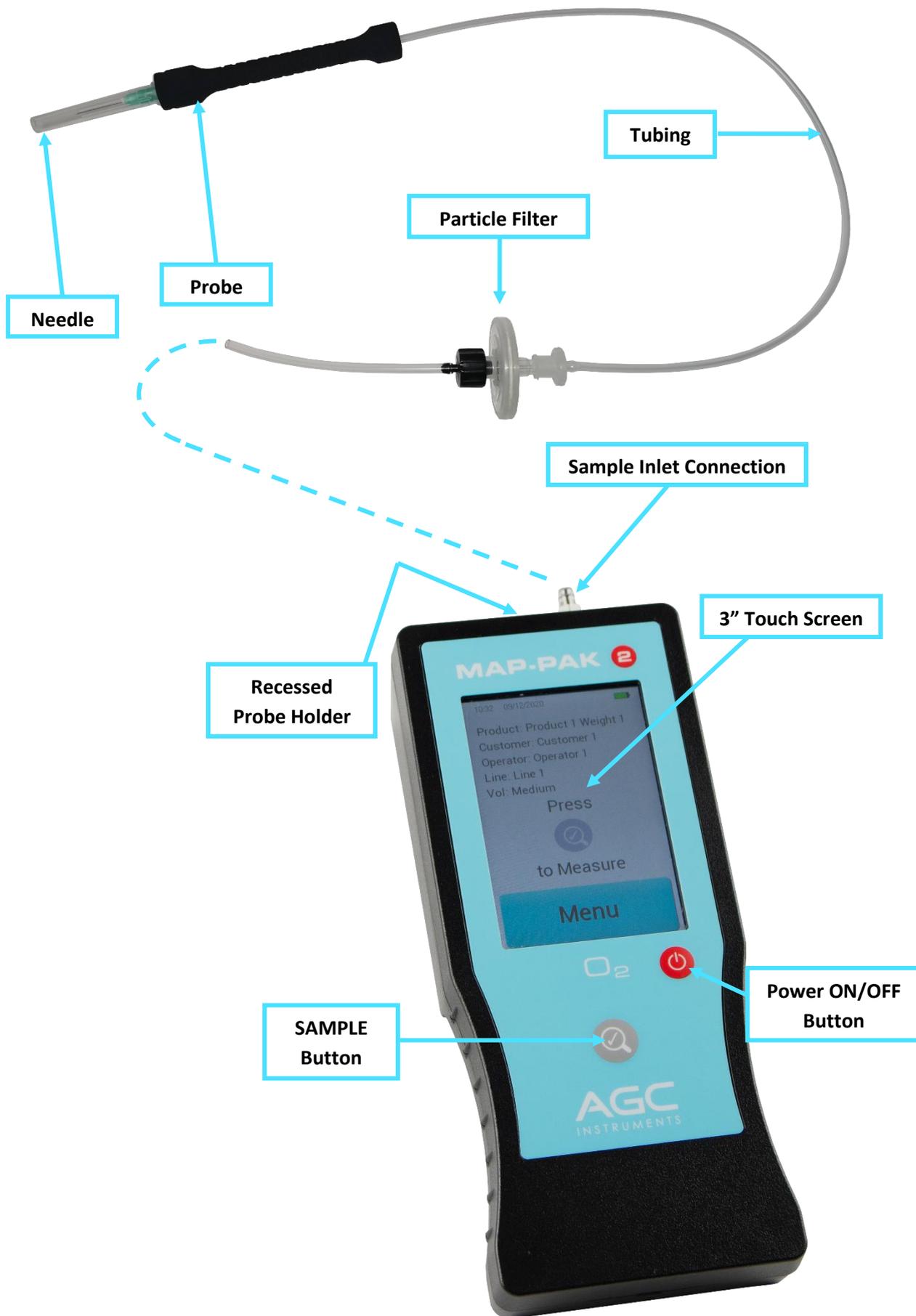
The Map-Pak 2 sample probe is designed to ensure no gas leakages and so that fittings can be changed with ease. The needle is a luer lock connection which is twisted to secure to the top of the probe body. The end of the tubing is simply pushed onto the end of the Sample Inlet fitting on the top of the analyser.
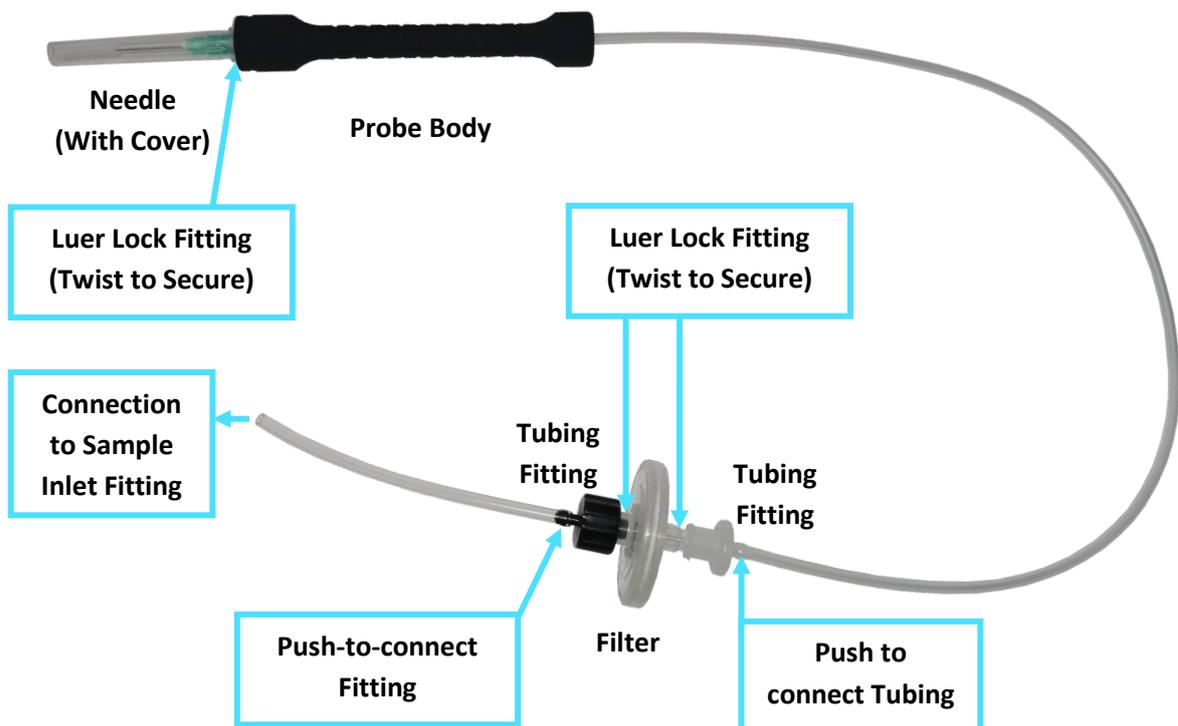
ENSURE THAT ALL FITTINGS ARE SECURE TO PREVENT LEAKS. HOWEVER, DO NOT OVERTIGHTEN AS THIS MAY BREAK THE CONNECTORS.

The Map-Pak 2 Analyser has a 3" Resistive Touch Screen display. A slight pressure must be applied with the user's finger when selecting the on-screen options. A suitable stylus may be used also.

 IT IS NOT ADVISED TO USE ANY SHARP OBJECTS TO OPERATE THE TOUCH SCREEN.

 DO NOT USE BALLPOINT PENS, SCREW DRIVERS, PENCILS, ETC.

To ensure that the Touch Screen remains effective, please follow these precautions:

❖ Wipe off water drops on display area immediately.

❖ If the display's surface is soiled, wipe it clean with absorbent cotton or soft cloth.

❖ Continuous operation in high temperature or high humidity environments may accelerate LED backlight exhaustion and reduce luminance dramatically.

❖ Displays can be scratched or broken if excessive force is applied.

The Map-Pak 2 O2 is delivered fully assembled.

1.   Remove the Map-Pak 2 O2 from the carry case remove the sample probe from the internal holder opening at the top of the unit.

2.   Remove the needle cover if one is attached.

3.   Ensure that the fittings are secure and that there are no holes/tears in the tubing.

4.   If changing the sample probe in the future, simply remove the tubing from the Sample Inlet fitting at the top of the unit and insert the end of the tubing from the new Sample Probe.

Sample Inlet Connection

Connection Point to Sample Inlet Connection

THE NEEDLE TIP IS SHARP SO CAUTION MUST BE TAKEN SO AS NOT TO COME IN CONTACT WITH IT. ALWAYS REPLACE THE PROBE IN THE INTERNAL HOLDER WHEN NOT IN USE.

IT IS RECOMMENDED THAT ALL CONNECTIONS ARE CHECKED EACH DAY BEFORE USE.

THE CORRECT FILTER AND NEEDLES MUST BE USED WITH THE MAP-PAK 2 UNIT AT ALL TIMES. FAILURE TO DO SO WILL CAUSE DAMAGE TO THE PUMP AND SENSORS.

Map-Pak 2 is powered by a High-Capacity Lithium Polymer Battery. Given normal usage, the analyser should last approximately 8 hours when fully charged. The battery has a typical lifespan of 2 to 3 years.

The analyser must be charged completely before use.

A Universal Charger and USB cable are supplied to charge this analyser from the mains power. Please connect the Micro USB into the connection at the bottom of the analyser and connect the USB to the 2.1A connection on the Universal Charger which can be connected to the mains power supply.

Micro USB Connection

Once the unit is plugged in, a message will appear to select the correct action. Select 'Charge Unit' followed by 'OK'. A Volt symbol will appear beside the battery icon to show that the unit is charging.

Charging Volt Symbol
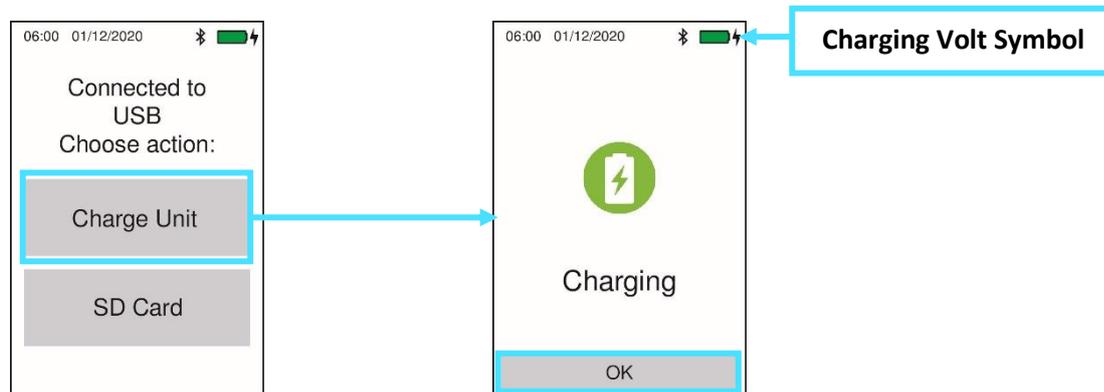
To Charge the Battery from flat to 100% at room temperature (with auto shutdown set to 60 seconds), takes approximately 5 hours 20 minutes.

PLEASE ENSURE THAT THE AUTO SHUTDOWN TIMER IS SET TO 'ON' <u>OR</u> THAT THE UNIT IS TURNED OFF WHEN CHARGING. IF THE UNIT IS LEFT ON AND THE AUTO SHUTDOWN TIMER IS SET TO 'OFF', THEN THE ANALYSER CAN TAKE UP TO 17 HOURS TO CHARGE AS THE SCREEN WILL USE POWER AS IT CHARGES.

The analyser will automatically start charging when connected to a power source even if the 'Charge Unit' prompt is not selected or the unit is powered off.

The level of power remaining is displayed via a battery symbol on the interface when in use.

Battery Level Indicator
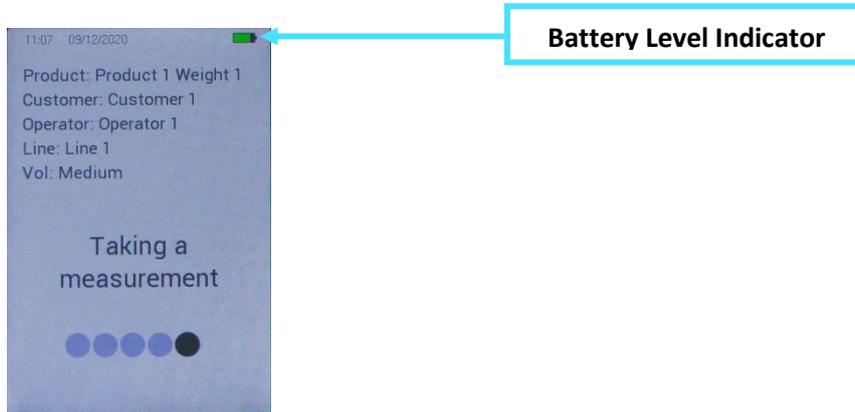
A BATTERY LOW WARNING WILL COME ON WHEN THE BATTERY IS AT A CRITICALLY LOW LEVEL. ONCE THE USER SELECTS 'OK' THE UNIT WILL POWER DOWN. PLUG THE UNIT INTO THE CHARGER AND LEAVE IT SWITCHED OFF FOR AT LEAST 1 HOUR TO ALLOW THE BATTERY TO CHARGE AND REACH AN ACCEPTABLE LEVEL BEFORE OPERATION.
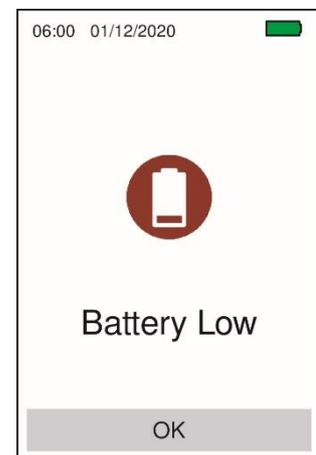
THE BATTERY IS NOMINALLY 2500 MAH AND 'LOSES' ABOUT 31% OF ITS CAPACITY AT REFRIGERATED TEMPERATURES (0 TO -3° C). IT RECOVERS THIS CAPACITY BUT IT IS ADVISED TO AVOID PROLONGED EXPOSURE TO LOW TEMPERATURES.

THE ANALYSER ISSUES A WARNING IF TRYING TO CHARGE AT NEGATIVE TEMPERATURES, BUT IT CANNOT PREVENT CHARGING. IT WILL DAMAGE THE BATTERY IF CHARGED AT NEGATIVE TEMPERATURES.

Place the unit in the carry case and away from cold areas when storing for prolonged periods of time to protect the lifespan of the battery and screen.

The analyser is switched ON by pressing and holding the **Power** button.

To switch the analyser OFF, press the **Power** button <u>once</u>.

Power Button

Pressing and holding the Power button when turning off the unit will bring the user through the set-up process when the unit is powered on again.

When powering on the Map-Pak 2 Analyser, the following loading screen will display first. The Software version is shown on this screen and this should be noted when contacting AGC Instruments or your local Distributor when trying to diagnose any issues that may arise.
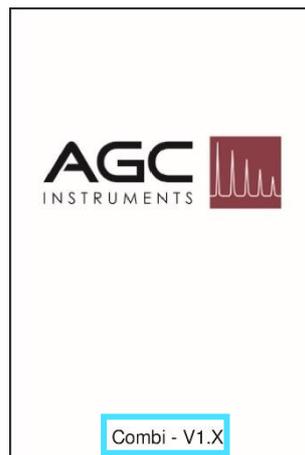
The analyser is fitted with an Auto-Shutdown function which acts as a Power Saver for the Battery.

From the menu, select 'Settings' followed by 'Auto-Shutdown'.

When turned ON or OFF via the slider selector, the user can then set how long after being unused that the analyser turns the analyser to 'Sleep' mode whereby the screen is switched off.

During 'Sleep' mode, the user can touch the screen at any time to turn it back on.

If it enters 'Sleep' mode and after 15 minutes, there is still no action, then the analyser shuts down completely.
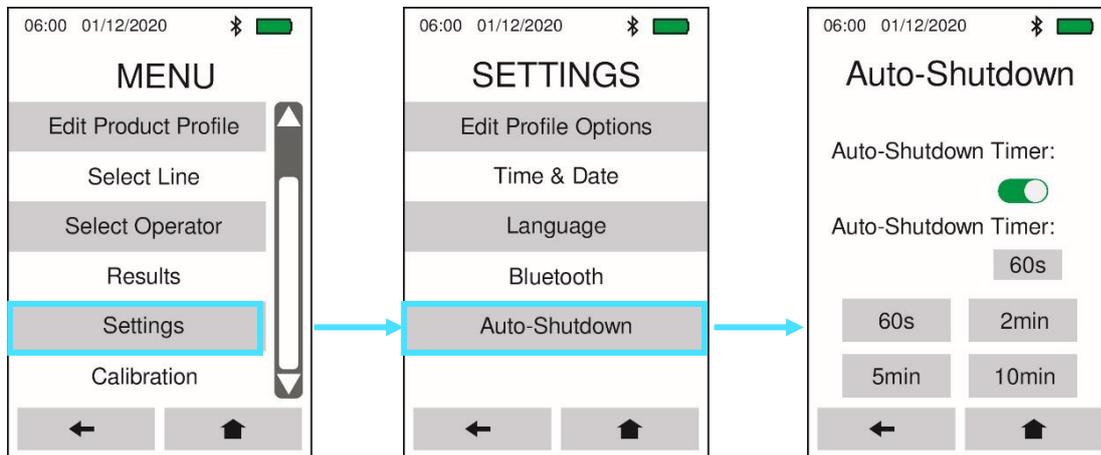
If the analyser is charging, it will continue to do so after entering 'Sleep' mode or if it switches off.

Product Profiles

The Map-Pak 2 Analyser has an innovative 'Product Profile' system. It can be onerous to set up the Product Profile parameters, but once this is done, it is easy to create and select from the Product Profiles. It is recommended that sufficient time is spent setting up the analyser and these product profiles in order to gain the best benefit of this system.

The Product Profiles are comprised of the following parameters:

1. Customer   Name of Customer or Company Name.
2. Product   Name of Product.
3. Weight   Weight of Product.
4. O_2 Alarms   High and Low alarms for O_2 Results.
5. Volume   'HIGH', 'MEDIUM' or 'LOW' gas sample volume
                     depending on the packaging size.

The name of the Product Profile is then taken from the Customer/Product/Weight parameters.

For example: AGC Beef 500g

Upon first use of the analyser, the user will be guided through the set-up of these product profiles. Up to 20 Product Profiles can be made and these can be selected by pressing 'Select Product Profile' from the Menu.
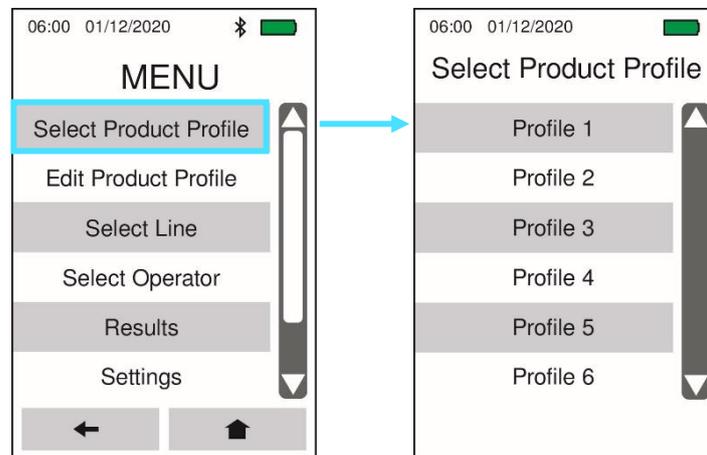
At any time, the user can edit the Product Profiles by selecting 'Edit Product Profile' from the Menu followed by the Profile they wish to change.

Different 'Customer', 'Product', 'Weight' or 'Volume' options can be selected, and the Alarm values can be re-entered on the Numeric keypad that appears.
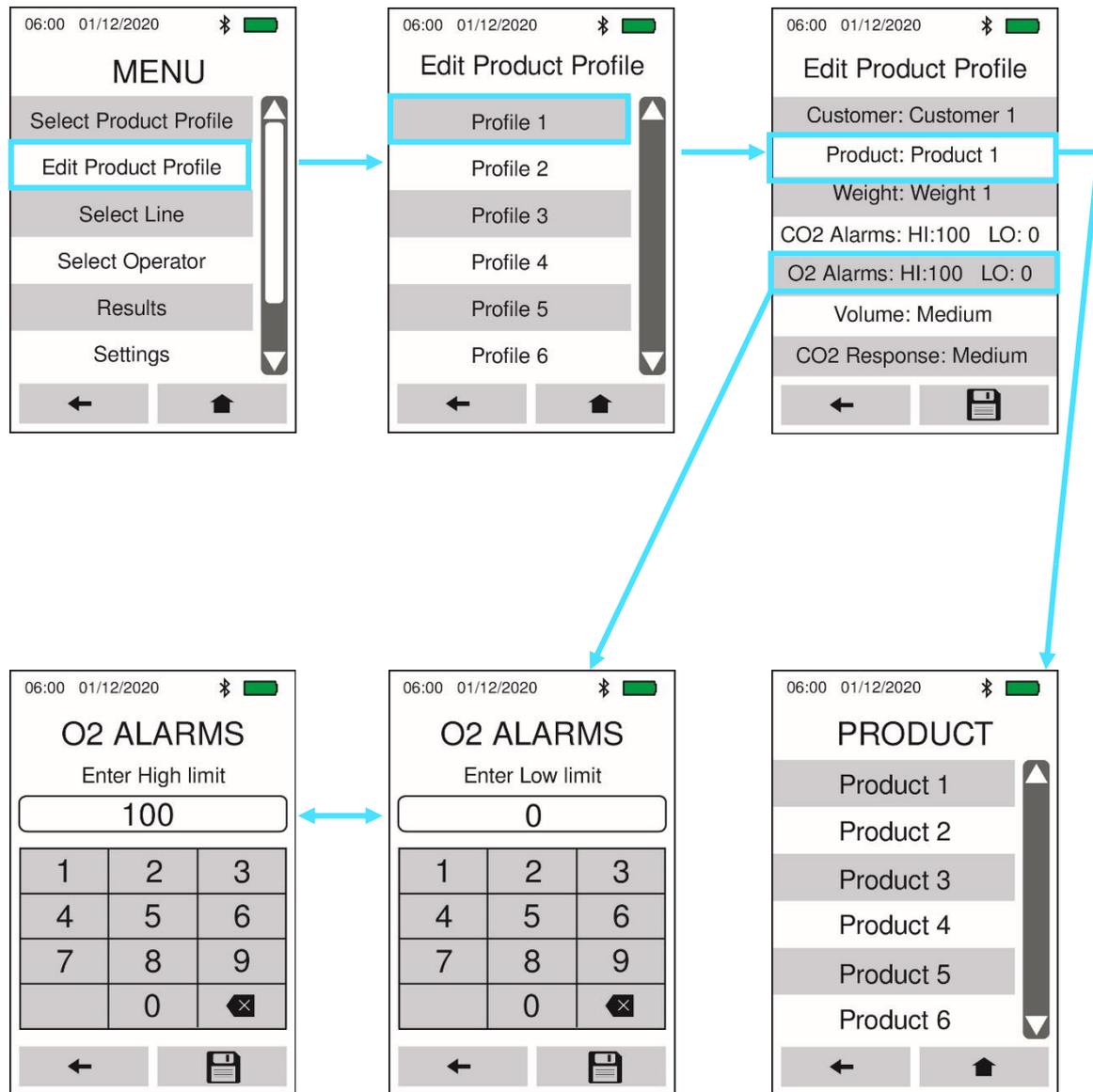
The screens shown above are from the Map-Pak 2 Combi model. No 'CO2 Alarms' or 'CO2 Response' options will be visible on the Map-Pak 2 O2 Model.

To edit the Customer, Product and Weight variables, select 'Settings' followed by 'Edit Profile Options' followed by the parameter that the user wishes to add to or change existing options.
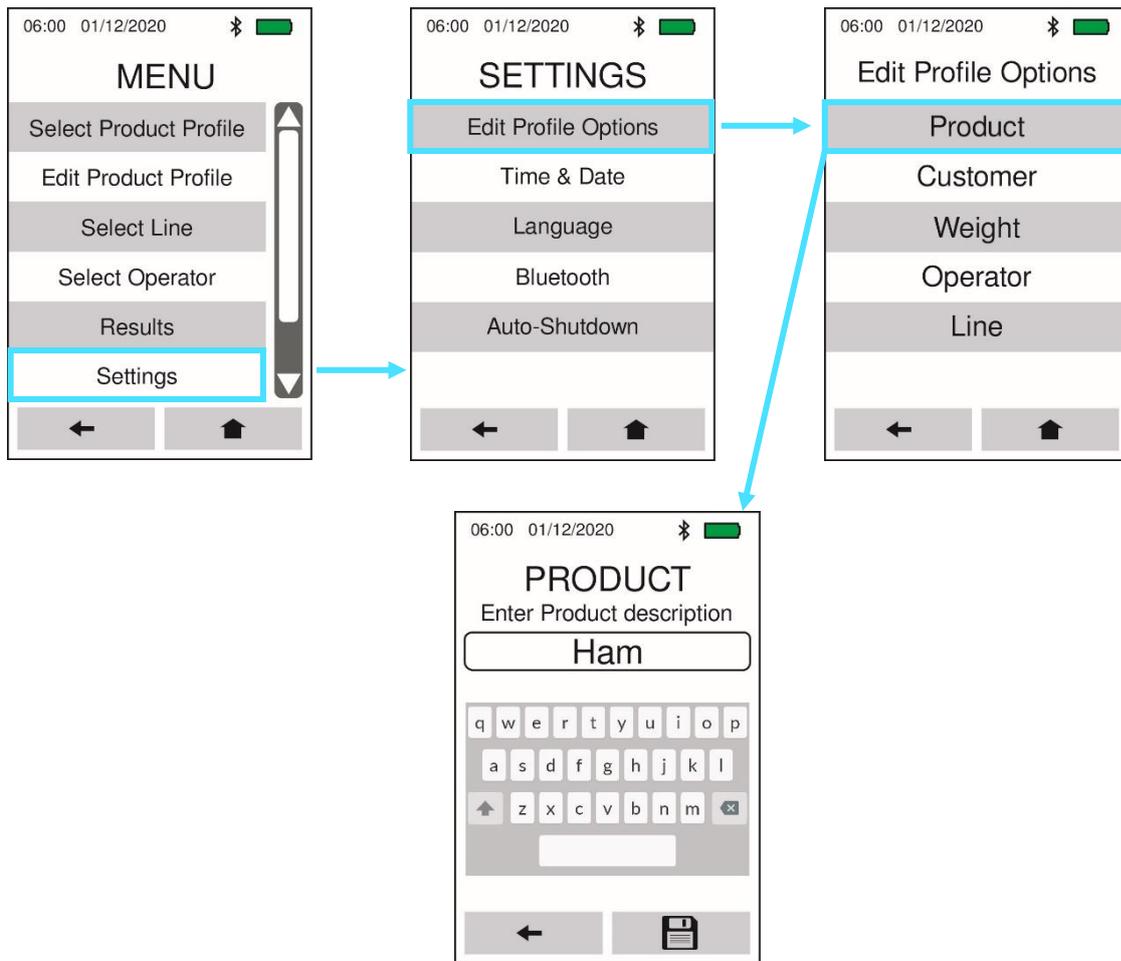
When editing the Product Profile options a numeric keypad appears. The '123#' button on the bottom right-hand corner of this keypad can be pressed to add in numbers and the user can toggle back to the letters keypad by pressing the 'abc' button on the numeric keypad.

There is no spacebar but there is a hyphen and other characters that can be used to space out multiple words. However, it is best to keep the description brief.
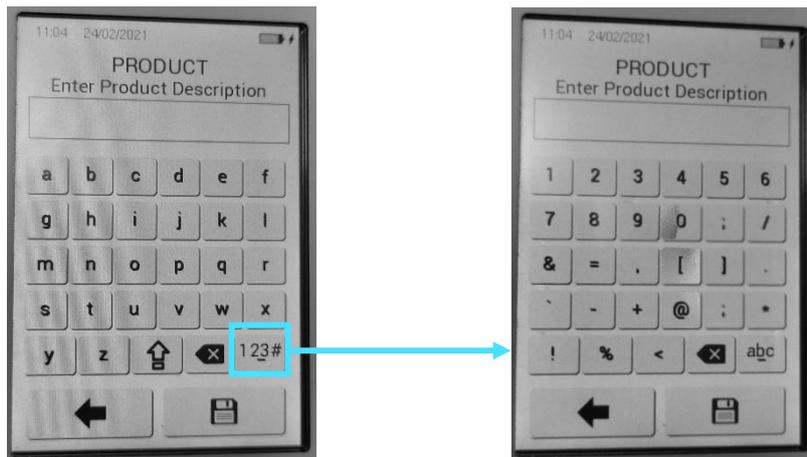
O₂ Alarms

The Map-Pak 2 O2 analyser has High and Low alarms that can be set for the Oxygen (O_2) measurements.

With the alarm function, operators can set a pass/fail setting so that any measurements outside of the limitations set, will be indicated by a 'Fail' message. Measurements within the limitations set will display a 'Pass' message.

The alarm function is set within the Product Profiles and once selected; a numeric keypad appears to enter the values required.

When setting the alarm values, the user must consider the variables which affect readings: Packaging Machinery Margin of Errors and the Accuracy of the Sensors.

For example, a company measuring '**0% O₂**' should set the alarms based on the following calculations:

O_2 Sensor Accuracy (@ 1% O_2)	±0.25%
Packaging Equipment Margin of Error (Estimate)	±0.75% to ±1.25%
Total Margin of Error	±1% (or ±1.5%)
O₂ High Alarm	**1% (or 1.5%)**
O₂ Low Alarm	**100%****

***The low alarm is not required as the lower this figure is the better, therefore, it is best to set it to 100% so it is never triggered unnecessarily.*

The industry standard for measuring '0% O₂' is less than 1% or 1.5% O₂ as it can never be fully eradicated from food packaging due to the sealing process involved.

Where higher levels of Oxygen are being measured (e.g. Red Meat) the O₂ Sensor has a stated margin of error of ±1% so adding in the packaging machinery margin, it can be set to ±2% or more.

The Volume function refers to the volume of gas measured by the Map-Pak unit depending on the size of the food packaging and therefore the gas sample volume available. Where food packages are large enough and enough gas is present, this setting should always be set to 'HIGH' to allow faster and more accurate results.

The Volume function is set within the Product Profiles and once selected, three options appear: LOW, MEDIUM, or HIGH.

LOW Volume:
This setting sets the pump and analysis duration to take a sample of 6mL from a pack.
MEDIUM Volume:
This setting sets the pump and analysis duration to take a sample of 30mL from a pack.
HIGH Volume:
This setting sets the pump and analysis duration to take a 50mL from a pack.

If the 'LOW' option is selected, please allow a few samples for the readings to stabilise.

The Needle Blockage alarm will be displayed if there is not enough gas volume in the package to be sampled or in the event of an actual needle blockage. Please ensure that the correct gas volume setting is selected based on the food packaging size.
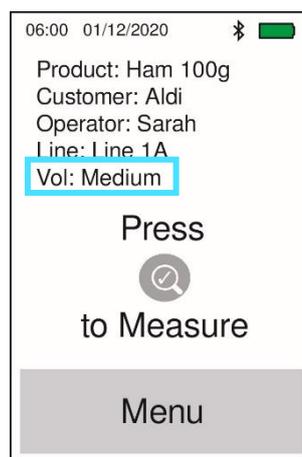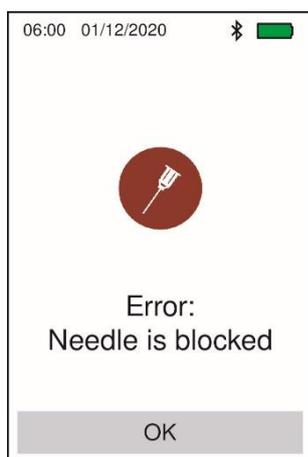
Please check the volume of gas available in the food packaging in order to choose the best volume of gas to be measured by the analyser. The Volume will be shown on the Home Screen as a reference also.

THE SLOW RESPONSE AND LOW VOLUME SHOULD NEVER BE SELECTED TOGETHER AS THIS WILL REQUIRE NUMEROUS SAMPLES TO ACHIEVE AN ACCURATE READING. MEDIUM RESPONSE AND HIGH VOLUME IS THE OPTIMAL SETTING.

Select Operator

Every time the analyser is turned on, the user will be asked to select the Operator.

These can be edited by selecting 'Settings' from the Menu followed by 'Edit Profile Options' and 'Operator'. Selecting any of the Operator names will make a numeric keypad appear so that a new name can be inputted.
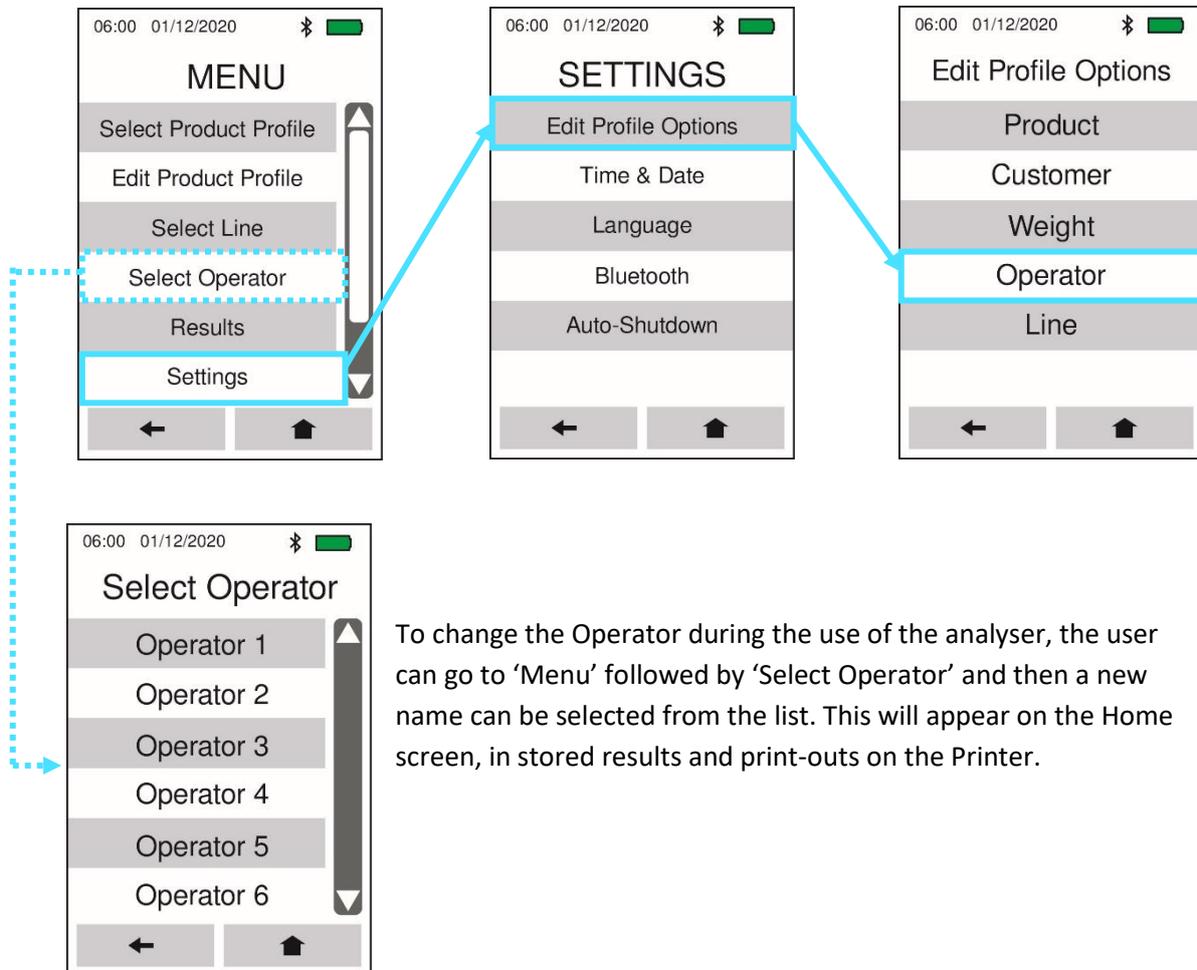
To change the Operator during the use of the analyser, the user can go to 'Menu' followed by 'Select Operator' and then a new name can be selected from the list. This will appear on the Home screen, in stored results and print-outs on the Printer.

Operator IDs are independent of the Product Profiles and will have no effect on these. The selected Operator ID can be viewed on the Home Screen.
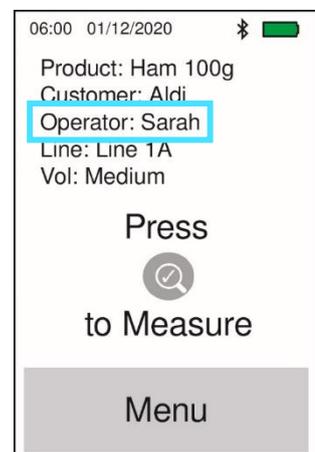
The User can select from a number of 'Line' options where multiple production lines exist in a production facility.

These can be left as is (labelled 'Line 1', 'Line 2'…etc.) or edited by selecting 'Settings' from the Menu followed by 'Edit Profile Options' and 'Line'. Selecting any of the Operator names will make an alpha-numeric keypad appear so that a new reference can be inputted.

To change the 'Line' during the use of the analyser, the user can go to 'Menu' followed by 'Select Line' and then a new reference can be selected from the list. This will appear on the Home screen, in stored results and print-outs on the Printer.
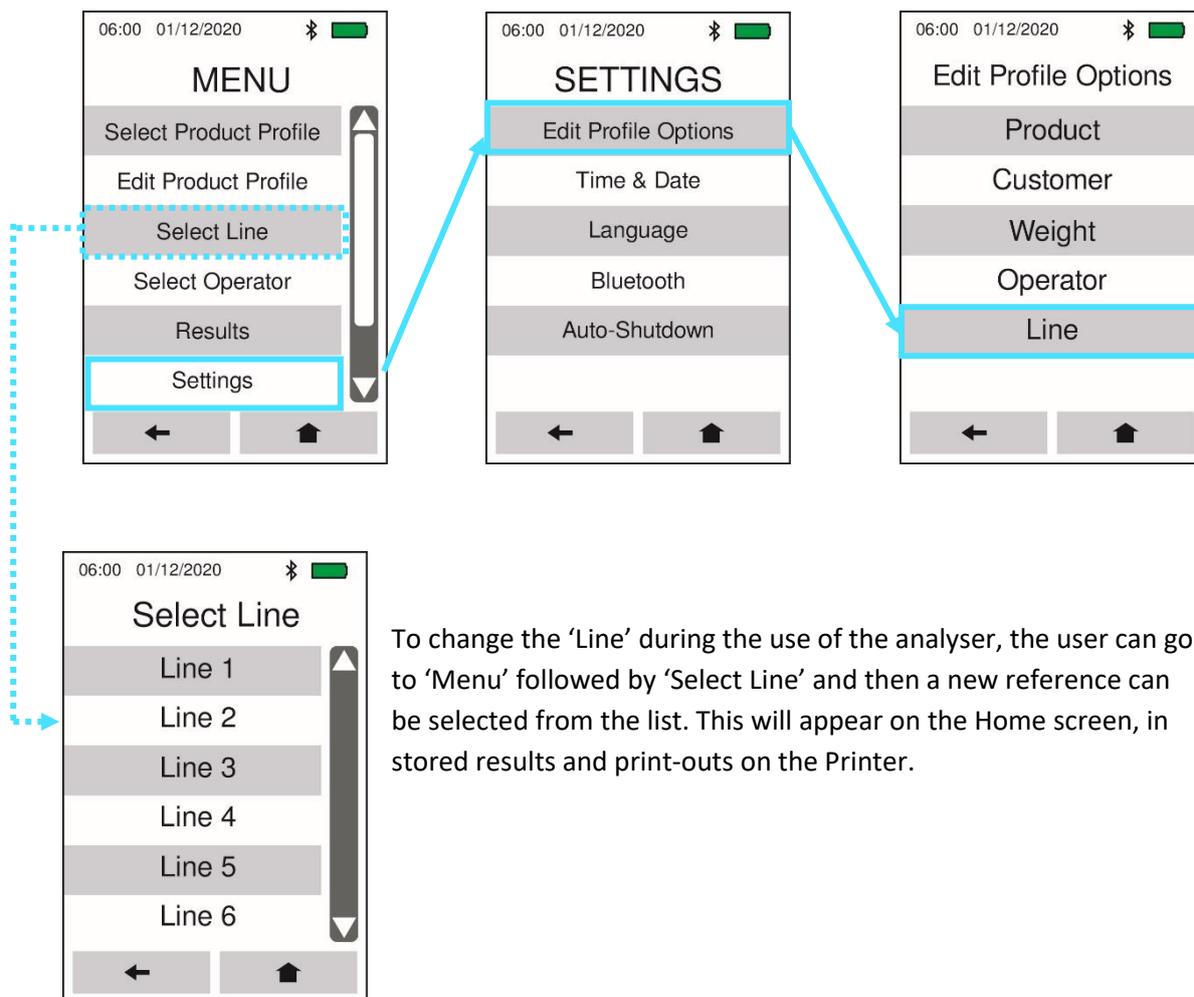
The Line IDs are independent of the Product Profiles and will have no effect on these. The selected Line ID can be viewed on the Home Screen.
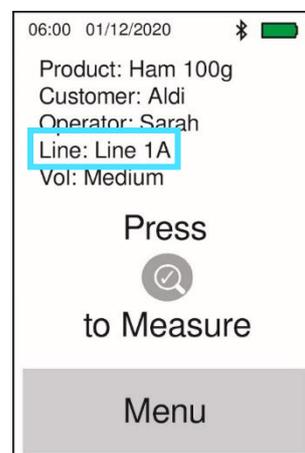
Once the Operator ID has been selected upon start-up of the analyser, the main display will be shown. This screen shows the following information:

- ❖ Product
- ❖ Customer
- ❖ Operator
- ❖ Line ID
- ❖ Volume

From here there are two options:
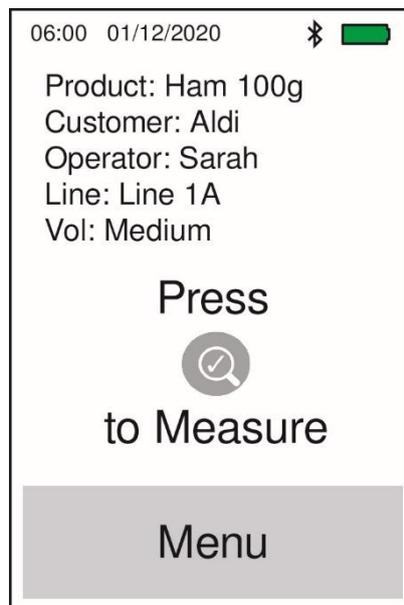
- ❖ Take a sample measurement by pressing the **Measure** button on the keypad

- ❖ Go to the **Menu** to access the functionality of the analyser.

ENSURE THE NEEDLE TIP IS VISIBLE AT ALL TIMES AND DOES NOT COME INTO CONTACT WITH THE CONTENTS OF THE FOOD IN THE PACKAGING. THE BEST WAY TO ACHIEVE THIS IS BY PIERCING THE SAMPLE PACK AT A 30 DEGREE ANGLE.

To take a sample:

- ❖ Place a septum on the sample pack at the point where the needle will pierce the protective film.

- ❖ Pierce the sample pack through the septum with the needle

- ❖ Draw sample in by pressing the **Sample** button on the keypad.

- ❖ To save the result of the measurement (and print the result if the Bluetooth printer is connected), press the icon highlighted below on the touch screen:
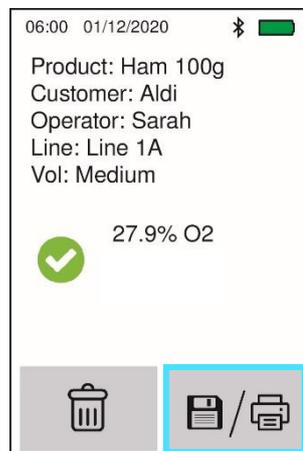
❖ To return to the main menu without saving the data, press the icon highlighted below on the touch screen:

```
┌─────────────────────────────┐
│ 06:00  01/12/2020    ≯ ▭    │
│                             │
│  Product: Ham 100g          │
│  Customer: Aldi             │
│  Operator: Sarah            │
│  Line: Line 1A              │
│  Vol: Medium                │
│                             │
│              27.9% O2       │
│      ✓                      │
│                             │
│   ┌────────┬────────┐       │
│   │  🗑     │ 💾/🖨  │       │
│   └────────┴────────┘       │
└─────────────────────────────┘
```

❖ If the measurement has failed, an additional button to view the alarms becomes available. Here the user can identify by how much the gas measurement is outside the limits set.
The User can then press OK to return to the Measurement screen.

```
┌─────────────────────────────┐     ┌─────────────────────────────┐
│ 06:00  01/12/2020    ≯ ▭    │     │ 06:00  01/12/2020    ≯ ▭    │
│                             │     │                             │
│  Product: Ham 100g          │     │         ALARMS              │
│  Customer: Aldi             │     │   O2                        │
│  Operator: Sarah            │     │                             │
│  Line: Line 1A              │  →  │   High limit: 100           │
│  Vol: Medium                │     │   Low limit:   0            │
│              88.8% O2       │     │                             │
│      ✗                      │     │                             │
│   ┌─────────────────────┐   │     │                             │
│   │    View Alarms      │   │     │                             │
│   └─────────────────────┘   │     │   ┌─────────────────────┐   │
│   ┌────────┬────────┐       │     │   │         OK          │   │
│   │  🗑     │ 💾/🖨  │       │     │   └─────────────────────┘   │
│   └────────┴────────┘       │     │                             │
└─────────────────────────────┘     └─────────────────────────────┘
```
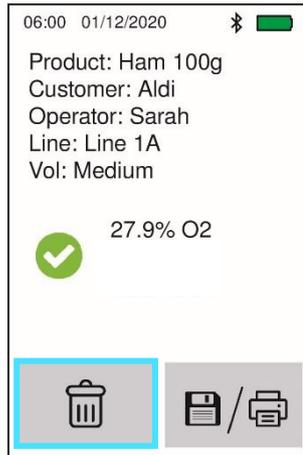
After the very first sample measurement or after changing gas mixtures, stable readings may take longer than expected.

For example, if you have taken an ambient reading of 20.9% O_2 in air and wish to measure packages containing less than 1% of O_2 then more samples may need to be taken to allow the sensor to adapt to the lower level. This is due to residual O_2 in the unit from previous gas samples. After this adaption process, subsequent samples will present stable results.

Error: Needle is Blocked

⚠️ **THE 'ERROR: NEEDLE IS BLOCKED' WARNING 'NEEDLE BLOCKAGE' MAY INDICATE A BLOCKAGE IN THE NEEDLE, SAMPLE PROBE BODY, FITTINGS OR TUBING. ALTERNATIVELY, AN INSUFFICIENT GAS VOLUME IN THE PACKAGE MAY BE THE CAUSE.**
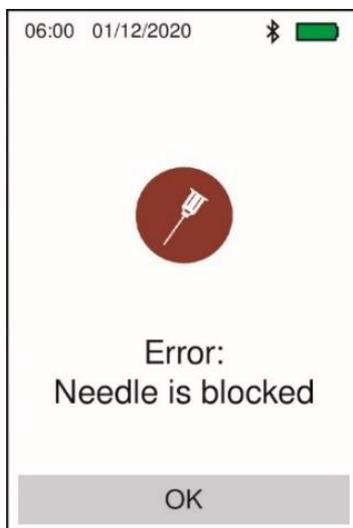
| ISSUE	SOLUTION
Low Sample Volume **due to lack of gas available in the food packaging**	The user should adjust the Volume Setting accordingly (e.g. switch to 'Low' if required).
Low Sample Volume **due to Contamination in the Sample Path**	The user should inspect the Sample Probe Body, Fittings, Tubing, Filter and Needle to see if any contaminants are visible. These should be replaced if required.
Low Sample Volume **due to Pump Failure**	The sound of the pump should be inspected to ascertain whether it is working OK. If the suction is affected, then it should be returned for replacement and re-calibration.

📝 **The user can remove the needle from the sample probe and place their finger over the opening to see if the suction is adequate whilst the pump is running during an analysis.**

If changing food products or to packaging with a different concentration of gases, the system can be purged to adapt to the new gas mixture more efficiently.

❖   Insert the needle into the new package.

❖   <u>Double tap</u> the Sample button
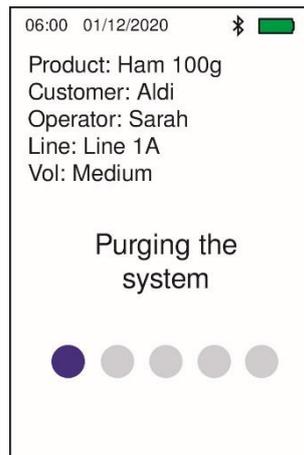
❖   It will then commence purging the unit with the new gas mixture.

   The Purge Function requires more than 50 mL of a gas sample as opposed to the 'Small' volume sample of 6 mL. Ensure that enough gas is present before selecting this option for use in a food package.
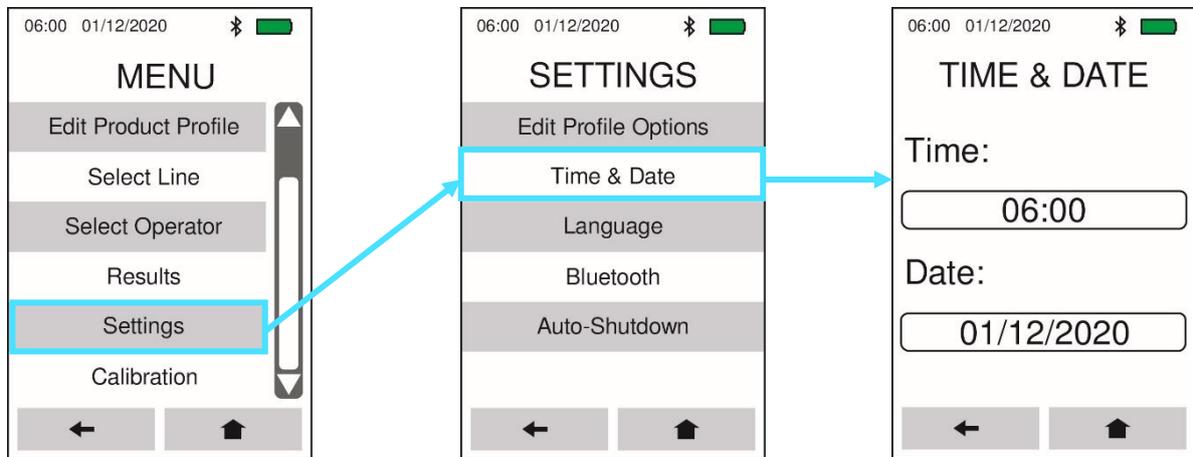
   The Purge Function doesn't produce a result as the purpose is to purge the sample path with the new gas to be measured.

Further measurements in a similar gas mix may be required to allow stable readings to be achieved.
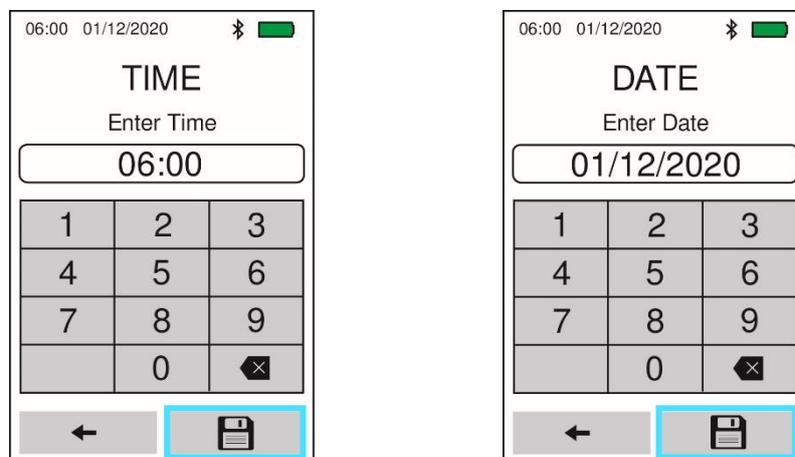
The Time and Date is set upon initial start-up of the analyser.

The user can change this by going to 'Menu', 'Settings' followed by 'Time & Date'.

The user can then simply select the time and/or date and a numeric keypad will appear to enter the correct values. The Save button (highlighted) can then be selected to set the updated Time and/or Date.

Language

The Map-Pak 2 Analysers are pre-loaded with over 8 Languages.

The Language is set upon initial start-up of the analyser.

The user can change this by going to 'Menu', 'Settings' followed by 'Language'.
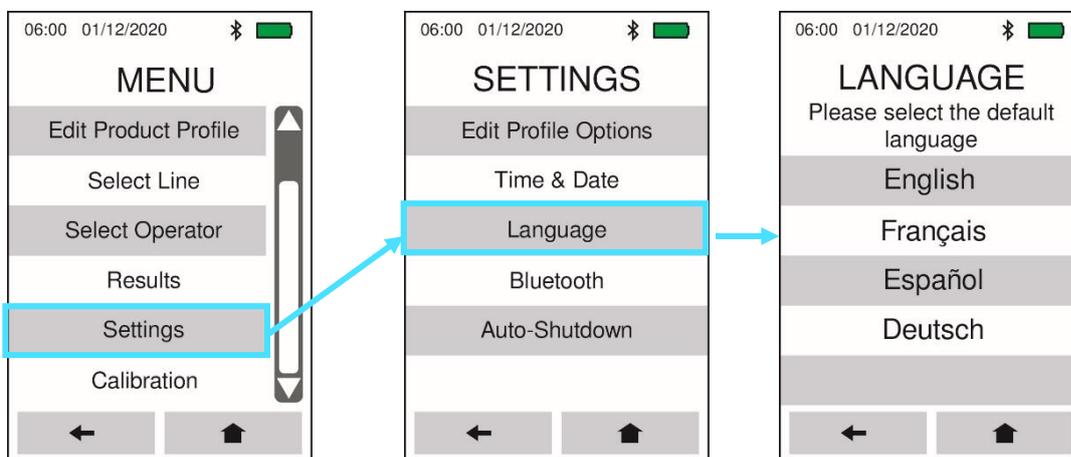
If a language is selected by accident and cannot be ready, then the user can press the corresponding buttons to get back to the Languages list. (e.g. Menu Button at the bottom of the Home Screen – 5th button down on Menu page – 3rd Button down on Settings page).

A Bluetooth® Printer is available to print the results on receipt size paper.

Using thermal paper, this printer requires no ink cartridges and has a high-capacity battery for a long working life between charges. This Printer can be charged using the same USB Cable and Power Supply for the Map-Pak Analyser.

To connect the Map-Pak 2 Analyser to the Bluetooth® Printer, turn on the Printer by pressing and holder the Power Button and place beside the Analyser. Turn on the Analyser and Select **MENU** – **Bluetooth** – **Scan for Printer** and then select the Printer from the list.
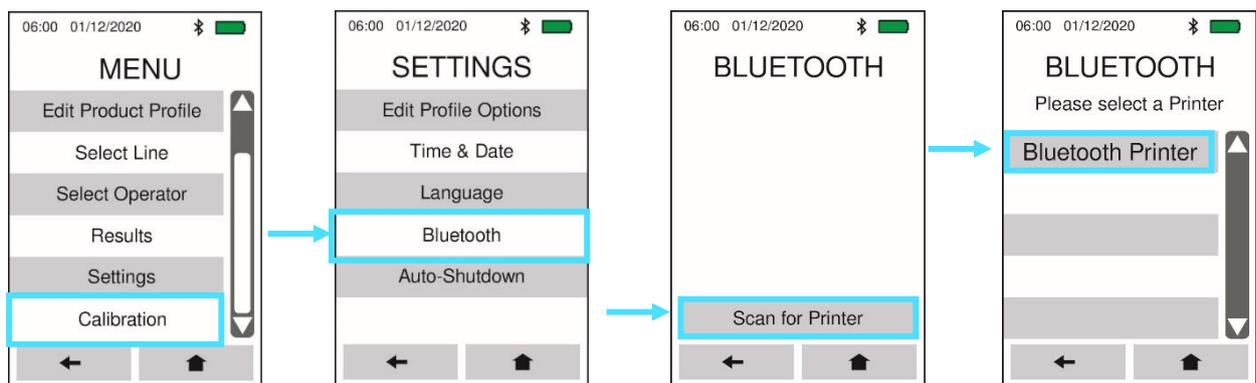
The Bluetooth® Printer has a range of 4-5 Metres from the Analyser with a clear line of sight. For best practice, ensure that the two units are close by one another (<2 metres).

Once the user selects the 'Save & Print' option (highlighted below) after a measurement, the results will be printed once the Printer is connected and ON.
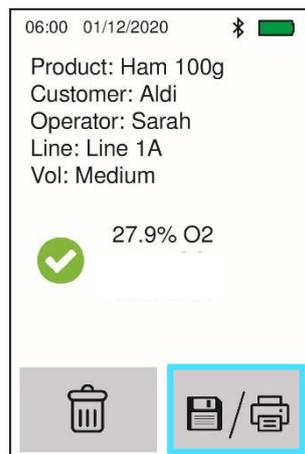
The print-outs will contain the following information:

- ❖ Product
- ❖ Customer
- ❖ Operator
- ❖ Line
- ❖ Volume

- ❖ Pass/Fail
- ❖ XX.X% O2

- ❖ TIME
- ❖ DATE

The user can then tear this Print-Out from the printer using the fine cutter.

If the Printer and Analyser are left powered on for more than 15 minutes and the analyser won't connect to the Printer turn off and on the analyser and reconnect.

When the Analyser is turned off, the Bluetooth connection is automatically disconnected, therefore, the user must reconnect to the Printer when powering back on.

Viewing and Downloading Results

With the large capacity internal SD Card, up to 10,000 measurements can be stored in the analyser. These results can be viewd by going to **MENU** followed by **RESULTS**. The latest results are at the top of this list. Up to 100 of the last results can be viewed in the analyser with the remainder stored in the SD Card which can be downloaded to a PC at any time.
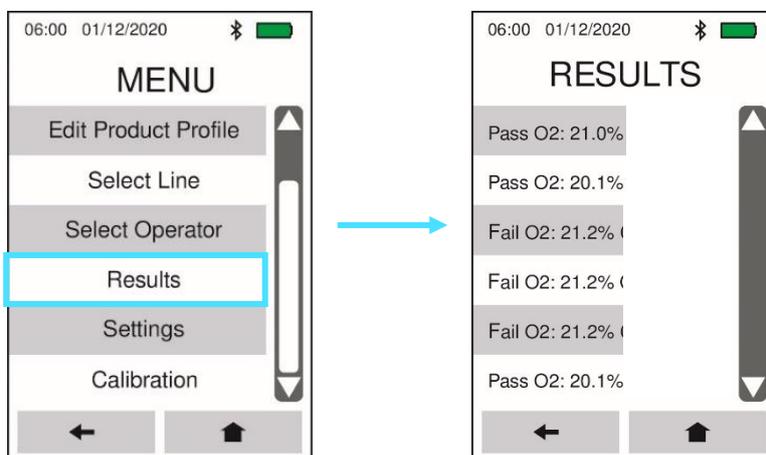
The Map-Pak 2 Analysers do not require any software to download results to a computer or laptop. Simply inserting the Micro USB connector from the cable provided into the bottom of the Map-Pak 2 Analyser and inserting the USB connector into the PC, the results can be copied easily. Once connected to the PC, the following message will appear on the Map-Pak screen:
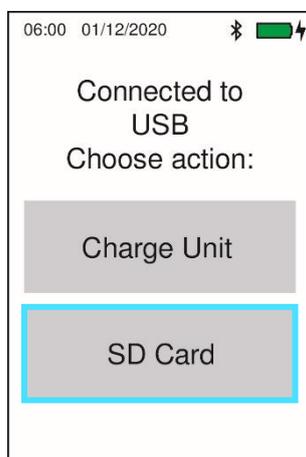
Select 'SD Card' as highlighted above and the folder will appear on the PC.

The user can then open the '**resultsSD**' file (CSV/Excel format) and save a copy to the desktop.

The CSV file will contain the following headings with all corresponding data underneath:

Time	Date	Operator	Line	Profile	Result	O2

The CSV/Excel Files may show an incorrect date such as '01/01/1980' but this can be ignored as the correct dates will be visible in the measurements file.

If the columns in the file do not adequately display the information please adjust the size and layout as per the options in the excel sheet.

To disconnect the Map-Pak 2 unit, simply unplug the USB cable. The unit will power off automatically to ensure that the data is protected. It can be powered back on straight away if required.

The results will continue to accumulate in the CSV/Excel file and the up-to-date results can be copied at any time.

⚠️ **THE ONLY CALIBRATION OPTION THAT IS AVAILABLE TO THE END-USER IS THE 'AMBIENT CALIBRATION'. THE USE OF OTHER CALIBRATION OPTIONS ARE LOCKED AS INCORRECT USAGE WILL CAUSE DAMAGE AND INACCURATE READINGS.**

For the Map-Pak 2 O2, there are three separate calibration processes:

1. **O2**   **Ambient**
2. O2   Span
3. O2   Zero

The only calibration option available to the end-user is the **O2 Ambient Calibration** which is detailed on the next page.

Full Calibration:

The full array of Calibration options is locked behind a passcode in the 'Factory Calibration' button. These should only be undertaken by AGC Instruments or a trained distributor in order to maintain the product's accurate reading. If you have the resources to carry out this calibration, then please contact us for more information.

We recommend that the full calibration procedure is done every 12 months.

To send the analyser in for testing and recalibration please see our contact details on the back of this User Manual or on our website: www.agc-instruments.com

Alternatively, please contact your local distributor.
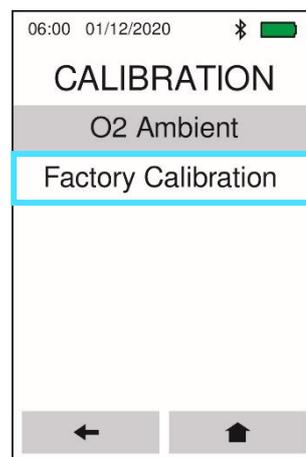
Ambient Calibration

In order to perform the **Ambient Calibration**:

❖ Hold the Sample Probe in the ambient air.

❖ Select '**Menu**' followed by '**Calibration**' and '**O2 Ambient**'.

❖ Press the '**Measure'** button.

❖ Observe display reading to confirm that it is correct.

The Oxygen level should read between 19.9% and 21.9% depending on the atmospheric conditions where the analyser is being calibrated.

❖ Press '**Calibrate**'.

❖ Once '**Calibration Complete**' is shown, the user can press the '**Home**' button to return to the Home Page.
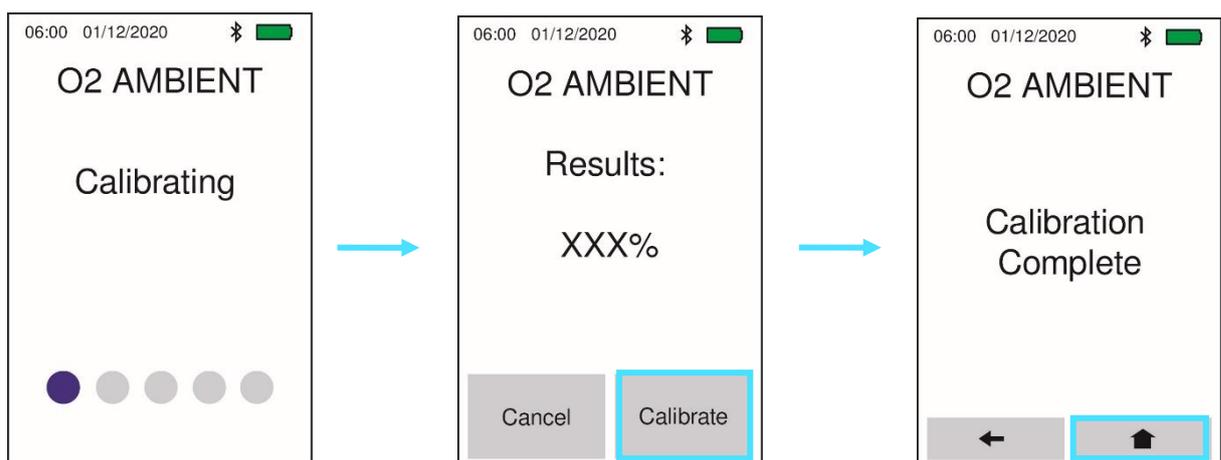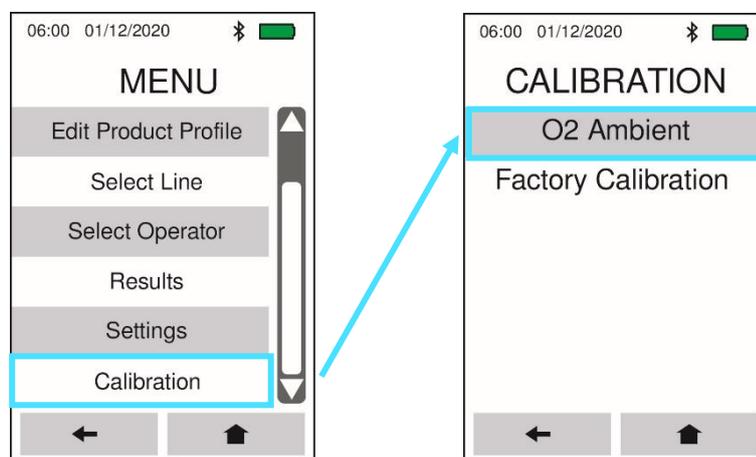
Generally, there should be no need to undertake the Ambient Calibration unless the readings are out of specification or it is required as part of a company's procedures.

Calibration should be carried out at the temperature in which the Map-Pak 2 unit will be used.

When the full Calibration is due after one year, a reminder will appear on the screen upon start-up of the analyser as shown below. The user can select **OK** to proceed to the home screen.

Optional Calibration Interface

The Calibration Interface is used for performing factory calibration options or for checking the accuracy of the Map-Pak 2 unit against a certified gas mixture. This device has an in-built filtration fitting and ensures that the flow is optimum for the Map-Pak to take a sample of the gas.

It is comprised of three main elements:

1. '**Sample In**'   Connection for the 1/8" tubing which can then be tightened to seal.
2. '**Sample Point**' Comprised of the in-built reusable septum for inserting the Map-Pak needle.
3. '**Sample Out**'   This vents any excess gas into the air.

⚠️ **THE MAXIMUM PRESSURE INPUT IS 3 BAR SO PLEASE ENSURE THAT THE GAS CYLINDER REGULATOR IS SET TO THE CORRECT PRESSURE.**

1. Set the gas pressure on the regulator attached the gas cylinder to 3 bar. Ensure that the gas flow is OFF to begin with.

2. Connect the 1/8" tubing from the gas cylinder to the '**Sample In**' connection which has a fitting that can be tightened against the tubing.

3. Turn ON the gas flow from the cylinder.

4. Insert the needle from the Map-Pak 2 into the blue septum in the '**Sample Point**'.

5. Press the Measure button ✓ on the analyser to begin the analysis.

6. Compare the Map-Pak 2 results to the certified gas mixture being measured.

General

Visually inspect the Sample Probe Body, Fittings, Tubing, Needles, and Filters for any contaminants and replace if required.

It is recommended to change the filters periodically (every few months depending on usage).

To clean the analyser, use a dry cloth.

When not in use, store the analyser in its carry case away from cold environments.

AVOID THE ANALYSER COMING INTO CONTACT WITH LIQUIDS!

IF THE MAP-PAK 2 IS USED IN AREAS WITH A LOW TEMPERATURE, THE UNIT SHOULD BE PLACED IN THE CARRY CASE AND MOVED TO AN AREA WITH AN AMBIENT TEMPERATURE FOR STORAGE WHEN NOT IN USE.

PLEASE CHECK THE NEEDLE, TUBING AND SAMPE PROBE ASSEMBLY REGULARLY. THE COMPLETE SAMPLING ASSEMBLY SHOULD BE REPLACED IF ANY DEBRIS IS NOTICED IN THE SAMPLING TUBING. IF DEBRIS IS ALLOWED ENTER THE ANALYSER IT MAY DAMAGE INTERNAL COMPONENTS OR INVALIDATE THE WARRANTY.

It is recommended that the analyser be sent to the distributor from whom you bought it from or directly to AGC Instruments for calibration testing every 12 months. This ensures that the readings remain consistent and accurate. A reminder will come up on the screen when calibration falls due.

Insufficient maintenance may result in inaccurate measurement results or damage to the analyser.

1. **The Oxygen reading is only showing 19.9% to 21.9% every time I take a reading.**

   a. *Are all the connections secure on the sample probe?*

   Ensure that the Luer Lock and any push-fit connections on the sample probe are secure.

   Ensure that the Sample Probe Body is intact (i.e. no cracks).

   b. *Are there holes or tears in the tubing?*

   Even the smallest hole or tear will cause an air leak which is what the analyser will then measure, hence the 20.9% (or thereabouts) reading.

   c. *Does the pump sound like it is operating normally?*

   The user can check by removing the needle and placing a finger over the opening to see if suction exists.

   If not, it is not drawing in any new samples and hence why the reading is 'stuck' on a particular measurement reading.

   d. *Is there an air leak in the food packaging / food packaging machinery?*

   The best way to check this and the accuracy of the analyser is to use another analyser to verify the results. If another analyser is not available, then the user can check another food package from another production line as a comparison.

2. **The readings differ greatly from my current gas mixture.**

   a. ***Has the Ambient Calibration function been undertaken?***

   This may correct the calibration of the analyser. The user can check the ambient air readings thereafter as well as the food packaging. If the bad readings persist but the readings in air are accurate (20.9% O_2 ±1%), then the food packaging may be the problem. Check a different food package from another production line with the analyser if possible. Alternatively, check the food packaging with a different analyser if possible. If the other analyser readings are OK, then the analyser with the bad readings must be returned to AGC Instruments or an authorised distributor for re-calibration.

   b. ***When was the O_2 Sensor last changed?***

   The lifespan of the O_2 Sensor is typically 2 years, so if it is coming up to this or has passed this timescale, then it probably requires a replacement. This can reach its end of life without any forewarning.

   <u>Note</u>: An O_2 Sensor may deplete faster than 2 years if it is constantly used to measure concentrations of Oxygen greater than 20.9% (e.g. red meat packaging with >60% O_2).

   c. ***Is it the first reading of a new gas mixture or a reading straight after an ambient air reading?***

   After the very first sample measurement or after changing gas mixtures, stable readings may take longer than expected. For example, if you have taken an ambient reading of 20.9% O_2 in air and wish to measure packages containing less than 1% of O_2 then more samples may need to be taken to allow the sensor to adapt to the lower level. This is due to residual O_2 in the unit. After this adaption process, subsequent samples will present stable results. The *PURGE FUNCTION* can be utilised to expedite this process.

   d. ***Is the correct Volume option selected for the product?***

   If the food packaging is large (e.g. meat trays, salad bags…etc.) and the amount of gas is sufficient, setting the Volume to '**HIGH**' will allow better readings as the Sensor array will have ample gas to sample from and will eradicate any older gas samples from the sample path which may be hindering the results.

e. ***Have the Sensor Accuracy figures, and the Packaging Machinery margins of error been considered?***

For the Map-Pak 2 Analyser, the O_2 Sensor has a stated accuracy of ±1% (Full Scale) so therefore, any O_2 reading can have a difference of +1% or -1%.

This must be combined with the margins of error on the packaging machinery which can be a few percent also and must be considered when assessing the results of the measurements.

A good way to ascertain the behaviour of the analyser is to test five separate food packages from the same product line one after the other and record each result. Then take 2-3 air samples and record each result also. This information will reflect upon how the sensors are operating and whether the measurements are consistent. Please have these results to hand if you need to contact AGC Instruments or an authorised Distributor for support.

3. The Needle Blockage alarm is showing constantly.

a. ***Low Sample Volume due to lack of gas available in the food packaging***

The user should adjust the Volume Setting accordingly (e.g. switch to 'Low' if required).

b. ***Low Sample Volume due to Contamination in the sample path***

The user should inspect the Sample Probe Body, Fittings, Tubing, Filter and Needle to see if any contaminants are visible. These should be replaced if required.

c. ***Low Sample Volume due to Pump Failure***

The sound of the pump should be inspected to ascertain whether it is working OK. If the suction is affected, then it should be returned for replacement and re-calibration.

The user can remove the needle from the sample probe and place their finger over the opening to see if the suction is adequate whilst the pump is running during an analysis.

4. **The pump is making an unusual noise.**

   If the pump makes unusual noises, then this may indicate failure. The correct filters must be always used with the Map-Pak 2 to prevent damage to the pump. Contaminants such as foodstuff, dust particles and liquids will damage the internal pump membrane (and sensor array) and cause them to cease operating.

5. **The analyser has a frozen screen or distorted contents or is stuck in a loop.**

   Turn on an off the unit to reboot the analyser. It should operate normally when turned on again.

6. **The analyser will not turn on.**

   The battery may need to be charged prior to using the Map-Pak 2 analyser. If this does not solve the problem, the battery may need to be replaced.

7. **The screen is fading.**

   a. Unusually Low or High Temperatures could be affecting the LCD screen. The unit must be stored in the carry case in an area with an ambient temperature when not in use.
   b. The battery may need to be charged or replaced (if after 2-3 years).
   c. The screen needs to be replaced.

**8. There is a gas alarm showing even though the results are correct.**

There are high and low alarms which can be set by the user for the Oxygen readings. With the alarm function, operators can set a pass/fail setting so that any measurements outside of the limitations set, will be indicated by a Fail message. Measurement within the limitations set will display a Pass message. Please check these alarms to see if they are set correctly for your gas mixtures and expected results and adjust if required.
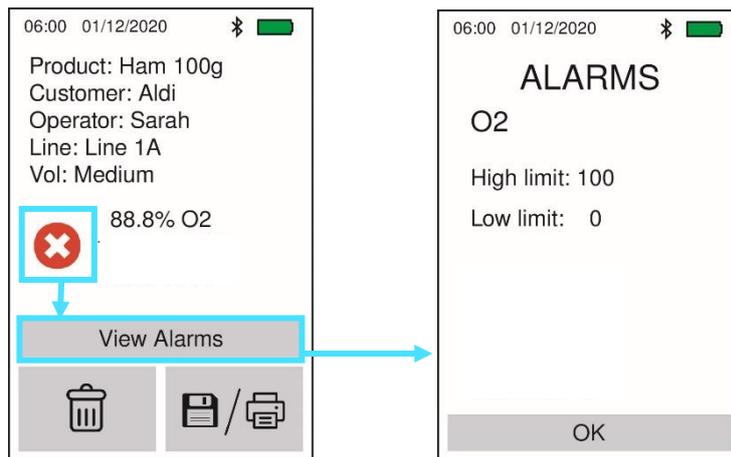
9. The Screens are blank when the unit is turned on.

Reboot the Analyser by turning it OFF and then ON again.

If the problem persists, then the SD Card may be loose.

Please contact AGC Instruments or your local Distributor.

10. The SD Card Warning is appearing when the unit is turned on.
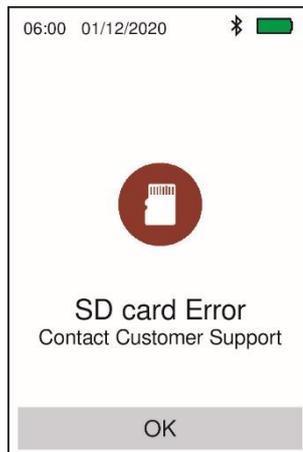
The SD Card may be loose. Please contact AGC Instruments or your local Distributor.

The text on this warning may be incoherent if the SD card has been completely disconnected inside the instrument.

This Product has been designed and manufactured with high quality materials and components, which can be recycled and reused.

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC so should not be disposed of in normal waster. In some locations the radioactive source has additional disposal requirements; please consult AGC Instruments Ltd. for details of our recycling and disposal program for this product.

For users outside the European Union, consult local authorities for correct disposal or contact AGC Instruments Ltd

All Instruments sold by AGC Instruments are warranted for a period of one year against defects in materials and workmanship. The terms of this warranty are as follows:

1. The warranty period begins with the shipping date of the equipment to the original purchaser.

2. Certain parts such as batteries, septa, particle filters etc. are expendable in normal use and their service life is unpredictable. Such expendable items are not covered by this warranty.

3. All requests for service or repair under this warranty must be received within the warranty period by AGC Instruments Ltd. or its authorised representative.

4. All repairs, adjustments, and other service under this warranty shall be performed free of charge to the purchaser. However, warranty service and repairs shall be limited to equipment malfunctions which, in the opinion of AGC Instruments Ltd, are due to traceable defects in original material or workmanship. Instrument malfunctions caused by abuse or neglect of the equipment are expressly not covered by this warranty.

5. Instrument parts which have been repaired or replaced during the warranty period are themselves warranted only for the remaining unexpired portion of the original one year warranty.

6. Repairs, adjustments, and service performed after expiration of the one-year warranty period shall be charged to the purchaser at the then current prices for parts, labour, and transportation.

7. This warranty attaches to the equipment itself and is not limited to the original purchaser. Unexpired portions of the warranty are thus transferable to the subsequent owners.

8. AGC Instruments Ltd expressly disclaims any liability to users of its products for consequential damages of any kind arising out of or connected with the use of its products.

9. Except as stated in Sections 1 through 8 above, AGC Instruments Ltd makes no warranty, expressed or implied (either in fact or by operation of law), statutory or otherwise; and, except as stated in Sections 1 through 8 above, AGC Instruments Ltd shall have not liability under any warranty, expressed or implied (either in fact or by operation of law), statutory or otherwise.

10. Statements made by any person, including representatives of AGC Instruments Ltd which are inconsistent or in conflict with the terms of this warranty shall not be binding upon AGC Instruments Ltd unless reduced to writing and approved by an officer of the Company.

Support

If you need to speak with an AGC Instruments Engineer:

Please Call: +3535 61 471632

<u>or</u>

Email: support@agc-instruments.com

We will be able to assist you with any questions you may have.

If you need to return your Map-Pak 2 analyser for a routine repair, or annual maintenance, please contact your local distributor or AGC Instruments for an RMA Number.

<u>Shipping Address:</u>

AGC Instruments Ltd

Unit 2,

Shannon Free Zone West,

Shannon, Co. Clare, V14 PX03

Ireland.

<u>Contact Details:</u>

Telephone: +353 61 471632

Fax: +353 61 471042

Email: sales@agc-instruments.com

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