iVAS ROAM

Unit Operation Manual

Version 1.1

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Pharmagraph is a division of Acquisition Systems Ltd.

Contents

Getting Started

Overview of the iVAS Roam

The iVAS Roam is a battery powered compact microbiological air sampler with integral flow measurement for use in Grade B, C, and D cleanroom environments. It is intended to be used to draw air across a 90mm petri-dish at volumetric flow rates of 100 l/min and 50 l/min. Sample information is stored in internal memory to be transferred to a PC later.

The iVAS Roam includes a 2D barcode reader for reading petri-dish IDs and two NFC RFID readers for inputting user and location information.

Safety Notices

	**DANGER** Risk of fire or explosion. Plugging the power supply into the AC mains in the presence of flammable substances or vapours can cause a fire. To prevent fire or explosion do not plug the power supply into the AC mains in the presence of flammable substances or vapours.
	**WARNING** California Proposition 65: This product can expose you to chemicals including carbon black, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov
	**WARNING** The iVAS Roam contains moving parts. Risk of operator injury if the device is operated with the aluminium mounting plate not secured in place. To avoid injury do not remove the aluminium mounting plate.
	**WARNING** The iVAS Roam should only be charged using the power supply that it is provided with.

Radio compliance

This device complies with Part 15 of the FCC Rules, and contains licence-exempt transmitters/receivers that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s).

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

No changes shall be made to the equipment without the manufacturer's permission as this may void the user's authority to operate the equipment.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Part Identification

Compatible with ISO 24998 90 mm Petri Dishes
HEPA filtered exhaust
4.3” Capacitive Touch Screen Display
Internal 14.4V, 96 Wh Li-ion battery
20 Programmable Sample Recipes
50 Programmable Users
Programmable Start Delay
2D barcode reader
2x NFC RFID readers

Module dimensions
Sieve head diameter: 104 mm
Dimensions: 26 x 20 x 14 cm
Weight: 2.6 kg

Active Flow Control to Flow Rates of 50 lpm and 100 lpm
Air flow control error: ± 4 % of l/min value

Sample plates: 90mm diameter +1mm/-5mm, 13mm to 17mm height.
Calculated D_{50}: 1.1µm @ 100 l/min, 1.6µm @ 50 l/min

Environmental
Operating temperature 0 to 40°C
Storage temperature -20 to 60°C

Charging the iVAS Roam

The following instructions should be followed to charge the battery of the iVAS Roam:

- Connect the USB-C Power Supply supplied with the iVAS Roam to the USB-C Port on the rear of the unit.
- Connect the USB-C Power Supply to the mains supply
- Turn on the mains supply and allow the unit to charge to 100 %

Please leave around 4 hours for the unit to charge to 100 % from empty.

Installation

To fit the sieve head, align the flat spots at the bottom of the sieve head with the bayonet pins on the top of the iVAS Roam, then lower the sieve head onto the iVAS Roam and twist until the sieve head is held securely. To remove the sieve head, twist until it becomes loose and lift off.

The iVAS Roam should be carried using the carrying handle. When carrying the iVAS Roam, ensure the sieve head is either properly secured or removed.

Before use, ensure the iVAS Roam is placed on a hard, flat, and level surface. Do not block the exhaust port.

Operation

WARNING

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

The iVAS Roam is turned on and off with a short press of the power button.

The iVAS Roam can be reset by holding the power button for over 15 seconds.

The iVAS Roam is operated using the Touch Screen Display.

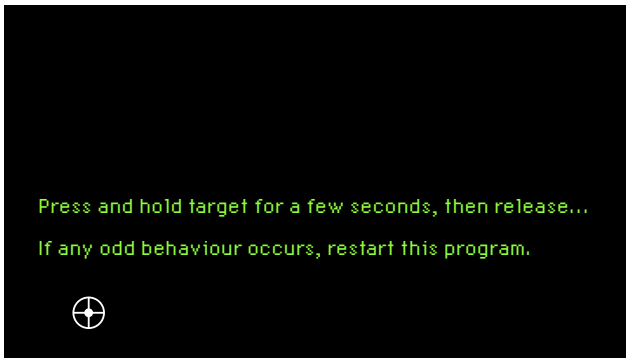
The battery is charged by connecting a 20V d.c. supply of at least 45W to the USB-C Port. The iVAS Roam should only be charged using the power supply provided. All functions of the iVAS Roam can be used while the battery is being charged, but this will increase the time taken to fully charge the battery.

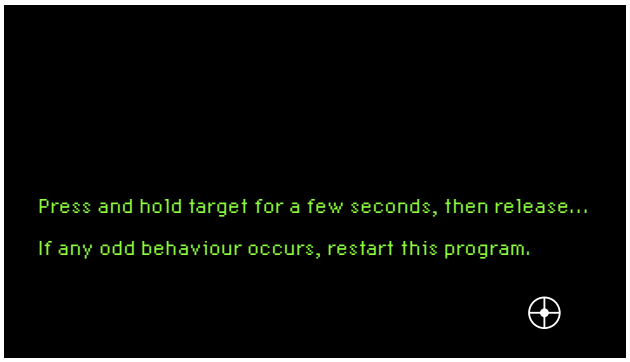
NOTE: The battery will not be charged when connected to a PC.

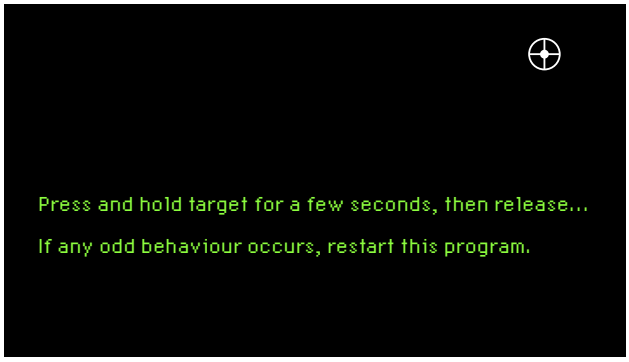
The iVAS Roam is setup and configured using the iVAS Roam Manager application, which is a PC based Windows application. The iVAS Roam Manager application requires the iVAS Roam to be connected to the PC using a USB 3.0 cable. The iVAS Roam Manager application is also used to download historical sample records stored on the iVAS Roam. For more information refer to the iVAS Roam Manger application and manual.

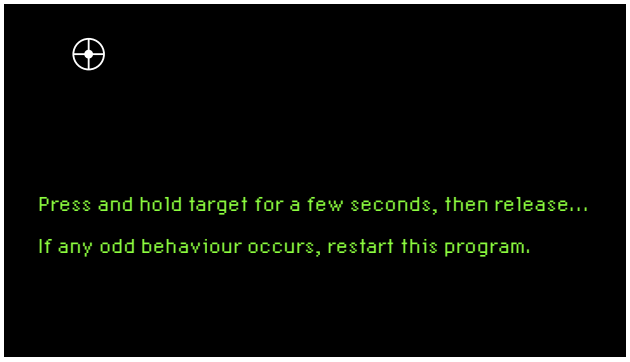
Touch Screen Calibration

The iVAS Roam screen calibration can be initiated from a PC running the iVAS Roam Manager application, while the iVAS Roam is connected to it via USB-C. Once initiated by the PC the iVAS Roam will display the screen calibration program, the on-screen instructions can be followed to calibrate the screen.



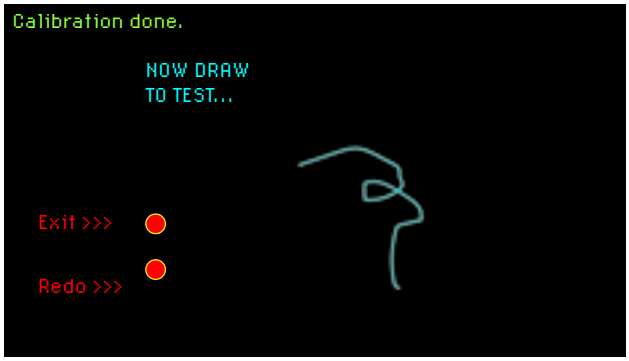






Once complete, the operator can assess the calibration by drawing on the screen. If the calibration is successful, then press ‘Exit’ to complete. Press ‘Redo’ to try the calibration again.

On completion, press the screen to return to the home screen.

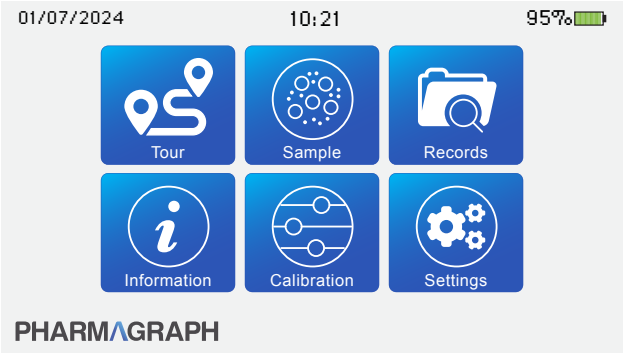


If any problems occur throughout the calibration procedure, press and hold the power button to reset the unit, the screen calibration can then be re-run from the iVAS Roam Manager application.

Home screen

The operator can navigate the features of the device from the buttons on the home page, this includes:

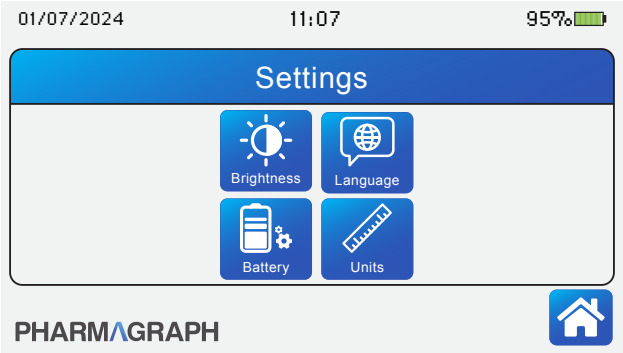
- **Tour** – Run multiple samples in different locations.
- **Sample** – Run a single sample.
- **Records** – View the sample records on the device.
- **Information** – View device information and run a unit diagnostic test.
- **Calibration** – View the calibration data of the device.
- **Settings** – Configure the device settings.



Device Settings

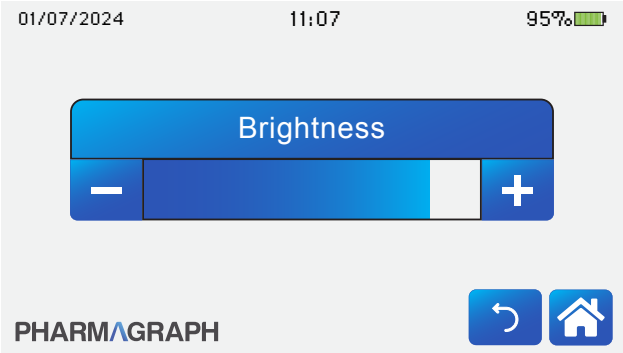
The following settings can be viewed and adjusted on the device settings page:

• Brightness • Language • Battery • Units



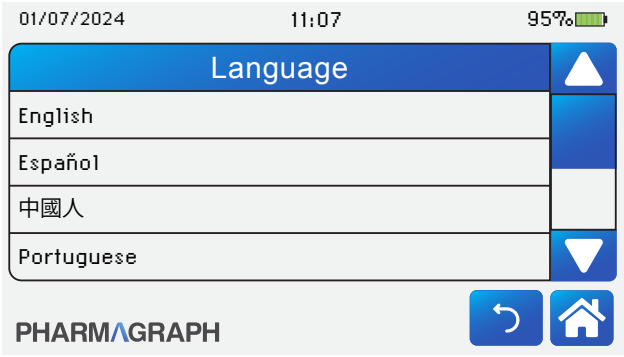
Setting the brightness

To change the screen brightness level, navigate to the brightness settings page, then use the + and – buttons to increase and decrease the brightness level.



Setting the language

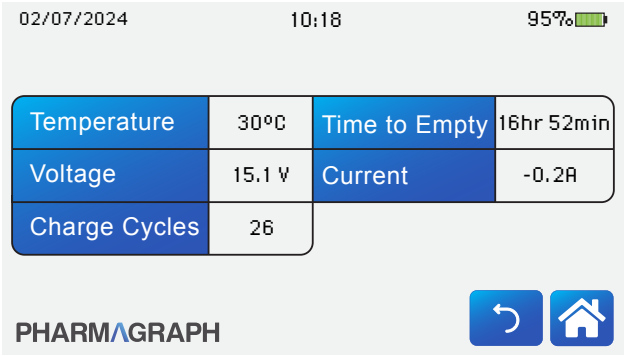
To change the language on the unit level, navigate to the language settings page, then select the required language from the list. The language can also be set from the iVAS Roam Manager application.

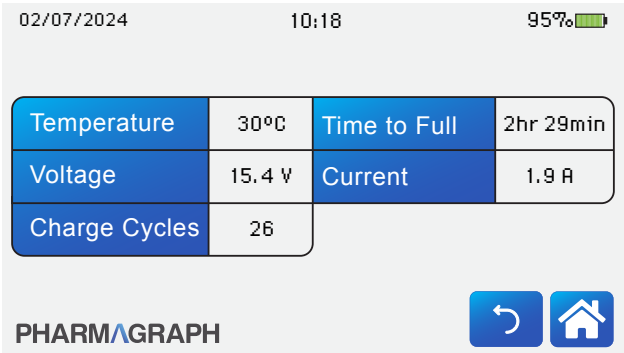


Battery Information

To view the unit battery information, navigate to the battery settings page. On this page the following battery information can be monitored:

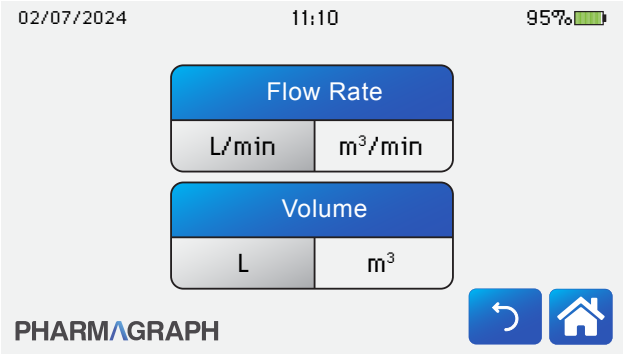
- Temperature
- Voltage
- Current
- Charge Cycles
- Charge time to full battery
- Estimated battery time remaining





Setting the units

To change the variable units on the device, navigate to the unit settings page, then select the required units. The flow rate can be viewed in either Litres per minute or metres cubed per minute. The volume can be viewed in litres or metres cubed.



Setting the petri dish

As outlined in Section 1 the 90 mm Petri dish is supported within the unit on 3 crank shaped supports. These supports can be adjusted to vary the height of the Petri dish and to ensure that it is centralised once placed within the unit. To aid in this process, every iVAS Roam unit is supplied with a Petri dish Setting Tool shown in Figure 1.

Figure 1 – Petri dish Setting Tool

The setting tool is used for both setting the height of the medium and centralising the Petri dish. The diameter settings are stepped in and marked at diameters 83, 85, 87, 89 and 91 to the left of the upstand and for even diameters 84, 86, 88 and 90, to the right of the upstand. They can be used for rotating the crank handles to centralise the Petri dish. The top of the upstand is used to set the level for the Petri dish medium.

Setting the height of the medium

In order to set the crank supports to obtain the optimum distance between the top of the agar and the bottom of the aspirating head the following equipment will be required:

- The Petri dish setting tool
- A Petri dish of the type is intended to be used filled with the desired volume of agar solution.

Using the equipment listed above, the crank supports should be adjusted as follows:

- The setting tool should be laid between the cranks as shown in Figure 2

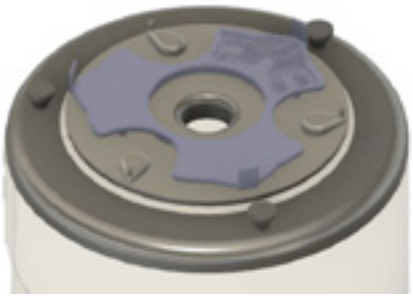


Figure 2 – Setting Tool Placement for height adjustment

- The Petri dish is now placed on the crank supports as shown in Figure 3

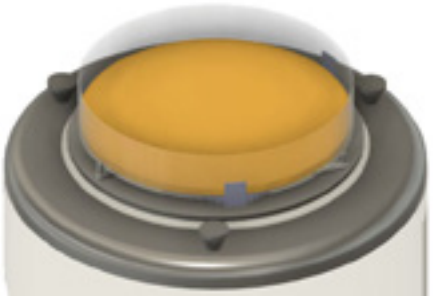


Figure 3 – Petri dish placed on crank supports

- Select any of the three setting tool upstands and slide it into contact with the side of the Petri dish to prevent parallax error when setting the medium level to the top of the upstand.
- Estimate the height adjustment required, the top of the agar solution needs to be level with the top of the plastic upstands.
- Remove the Petri dish and adjust the height of the crank supports adjacent to the plastic upstand by turning the cranks, clockwise to lower, anticlockwise to heighten, looking down onto the crank. Adjust the height, bearing in mind that one full rotation of the crank will give a height adjustment of 0.8mm.
- Should the crank's final position result in the pin being under the Petri dish, the crank can be pulled upward (approximately 2mm) to disengage it, rotated to be outboard of the Petri dish and pushed back down to engage. Re-engagement is possible every 60° of rotation. This will not alter the height setting.

- Reposition the Petri dish on the crank supports to check that top of the agar is now level with the top of the plastic upstand. Readjust the adjacent crank supports if necessary.
- Proceed, selecting the next setting tool upstand in a clockwise direction, repeating the above steps until the height of the medium has been set in all three positions.

Centralising the Petri dish

Ascertain the outside diameter of the base of the Petri dish - it will be an odd or even number of mm. The Setting Tool should be laid on the cranks as shown in Figure 4. In this example, an odd mm sized Petri dishes is to be used so the first crank pin is near the odd mm markings.

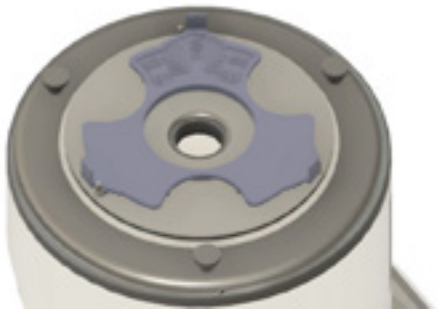


Figure 4 - Setting Tool placement for plate centralisation (odd diameters shown)

The setting tool should be centralised with the upstand edges in contact with the crank pins – left edges for odd sizes and right edges for even sizes. The cranks can then be adjusted as follows to provide plate centralisation:

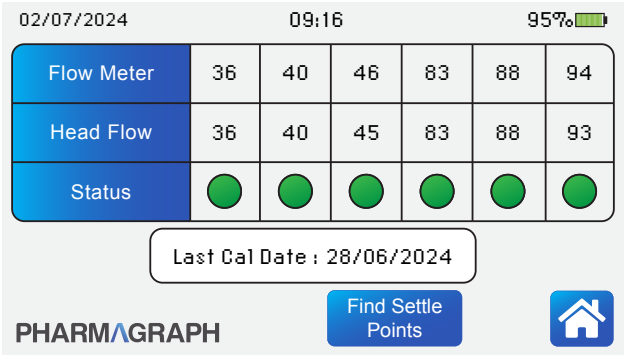
- Rotate the Setting Tool away from the pins slightly to make some room then turn the first crank towards the upstand until the pin engages in the desired diameter step. You may need to rotate the tool again to achieve this.
- Now, **without moving the setting tool**, turn the remaining two cranks until they touch the relevant step in the setting tool.
- The setting tool can now be removed since the Petri dishes will now be automatically centralised at the correct height.

NOTE: The minor rotation of the cranks to achieve Petri dish centralisation will have negligible effect on the height setting.

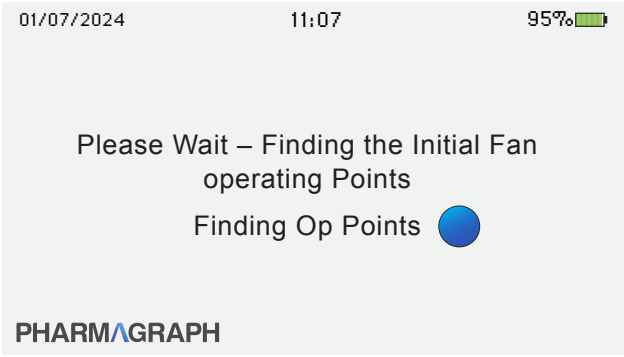
Calibration

The iVAS Roam should be calibrated once every 6 – 12 months to ensure that the internal flow rate and environmental sensor measurements are still within the specified tolerance. The iVAS Roam can only be calibrated using Pharmagraph's AC8900 Air Sampler Calibrator.

The latest calibration results and date can be viewed by pressing the calibration button from the home screen.



From the calibration screen the operator can run the 'Find Settle Points' function. This will run a program that will find the initial fan drive setpoints at 50 L/m and 100 L/m. The operator will be reminded to insert a petri dish when running the program as this provides more accurate results.



Configuring the iVAS Roam

The configuration of the iVAS Roam's Sampling Recipes, Users, Areas, Locations and Tours is done using the iVAS Roam Manager application. For information on iVAS Roam Manager application please see the Application's manual.

Principle of Operation

The iVAS Roam has been designed to draw air from the surrounding area through a series of identical circular holes towards a 90 mm Petri dish. The number and size of the holes has been selected to ensure a high quality D50 value while keeping the impact velocity of the particles down.

The iVAS Roam contains a rotating fan that pulls air through the unit. The iVAS Roam unit measures the airflow through the unit by measuring the pressure drop across a controlled orifice along with its on-board barometric pressure and air temperature sensors to calculate a volumetric flow rate.

The iVAS Roam provides a constant flow rate throughout the sample by performing a PID control loop of the calculated volumetric flow rate vs. volumetric flow rate setpoint for the current sample (set to either 100 or 50 l/min). Within 30 seconds of the start of an Intermittent or Continuous sample if the iVAS Roam does not achieve a flow rate within ±10 % of the setpoint, then the iVAS Roam will raise an alarm and abort the sample.

To accommodate a variety of plate designs and fill depths, the 90 mm Petri dish supports on the iVAS Roam have been designed to be raised and lowered. See the previous section for more details. The iVAS Roam centralises the Petri dish using 3 pins which are integral to the plate height adjusters.

While the fan is running, the iVAS Roam monitors the fan speed the iVAS Roam detects that either the fan fails to start, then it will raise an alert.

The iVAS Roam has 2 fully configurable run time methods for Single Sample, Intermittent Sampling. In Single Sample and Intermittent run time modes the iVAS Roam will run the fan at the desired flow rate for long enough to draw a target volume of air across the Petri dish. The run time methods are discussed in more detail in the following subsections and the key sampling parameters that need to be defined for each method are discussed in the following subsections.

Which run time method is performed along with key sampling parameters for each run time method are defined in the Sampling Recipe. The iVAS Roam allows for up to 20 sampling recipes to be predefined within the unit.

When performing a single sample, the sampling recipe is selected by the user when configuring the sample. Each sample tour has a predefined sample recipe that will be performed at each sampling location on the tour. Recipes and tours are explained in further detail in the iVAS Roam Manager application manual.

Single Sample Mode

In Single Sample Mode the iVAS Roam controls the fan speed so that it achieves the flow rate setpoint defined by the selected sampling recipe.

During each Single Sample, the iVAS Roam integrates the measured flow rate to determine the volume of air that has been sampled in the current run time as shown in Figure 2. When the iVAS Roam determines that volume sampled is greater than the target volume defined in the sampling recipe it stops the fan and completes the Single Sample.

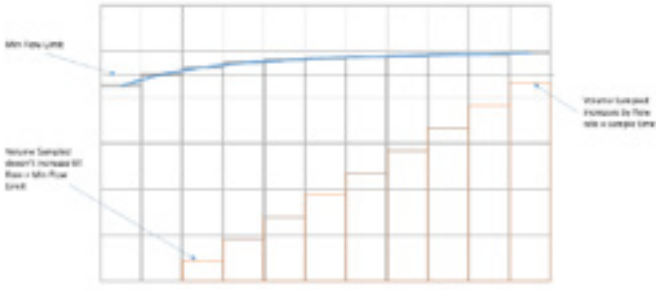


Figure 5 – Volume Integration

While in the Single Sample Mode the iVAS Roam provides the operator with the following parameters:

- Percentage complete
- Time left to complete sample in seconds
- Total time required to complete the sample in seconds
- Current time the head has been run for in this sample in seconds
- Estimated volume of air that has been drawn across the petri dish (m^3)

Upon starting a Single Sample Mode run, the iVAS Roam drives the fan according to parameters captured during the unit's calibration for the currently selected flow rate. It allows the fan to get to speed then begins to monitor the flow rate. Once the measured flow rate is within ±10 % of the flow rate setpoint, the iVAS Roam controls the fan speed and starts to calculate the volume sampled as shown in Figure 5.

If the measured flow rate does not settle to within ±10 % of the flow rate setpoint within 30 seconds of sample start, the iVAS Roam will raise the "Failed to Achieve Flow" alarm and abort the sample.

Intermittent Mode

In Intermittent Sampling mode the iVAS Roam splits the run time required to achieve the target volume at the desired flow rate into a series of intermittent shorter samples. The number of shorter samples used, along with the interval between the start of each shorter sample, are defined as part of the sampling recipe.

An example of how the iVAS Roam can configured in Intermittent mode can be seen below:

- **Desired flow rate:** 100 l/min head
- **Total target sample volume:** 1 m^3
- **Number of sampling periods:** 4 separate periods
- Time between the start of each period 20 minutes apart
- In this case an operator would set the parameters on iVAS Roam as follows:
  - **Target volume:** 1 m^3
  - **Interval:** 1200 sec (20 min)
  - **No. runs:** 4

The iVAS Roam would then calculate the volume that needs to be sampled in each sampling period using the following formula:

$$\text{Sampling Period Volume } (m^3) = \frac{(\text{Target Volume } (m^3))}{(\text{No Sampling Periods})}$$

For this example, the iVAS Roam would set the Sampling Period Volume = 0.25 m^3.

During each sampling period, the iVAS Roam integrates the measured flow rate to determine the volume of air that has been sampled. When the iVAS Roam determines that volume sampled in this period is greater than the Sampling Period Volume, it stops the fan and awaits the start of the next Sampling Period.

A representation of the above example can be seen below:

Sampling Period	Sampling Period	Sampling Period	Sampling Period
Interval	**Interval**	**Interval**	

NOTE: in this example the head will perform 4 run time periods but only 3 whole intervals such that the overall time is 62.5 mins, i.e. 3 x Interval + 1 x Run Time.

While in Intermittent Sample Mode the iVAS Roam provides the operator with the following parameters:

- Percent of run time complete
- An estimate of the time left to complete whole sample in seconds
- An estimate of the overall time it will take to complete the sample in seconds
- The overall time the head has been run for in this sample in seconds
- The time the head has been run for in the current run time period in seconds
- Overall volume of air that has been drawn across the petri dish (m^3) during all the Sampling Periods so far.

Upon commencing each sampling period, the iVAS Roam drives the fan using the PWM demand captured for the current flow rate during the unit's calibration to allow the fan to get to speed. It also starts to monitor the flow rate. Once the measured flow rate is within ±10 % of the flow rate setpoint the iVAS Roam will perform the PID control of the Fan speed and start to calculate the volume sampled as shown in Figure 5.

If the measured flow rate does not settle to within ±10 % of the flow rate setpoint within 30 seconds of the sample being started, then the iVAS Roam will raise a "Failed to Achieve Flow" alarm and abort the sample. The Failed to Achieve Flow alarm raised will give an indication of if the Flow Rate observed was too high or too low.

While the iVAS Roam is in the period between the end of one runtime period and the start of the next the fan parameter alarms will be disabled to prevent spurious alarms. During the initial 5 second period of each period, the alarm checking logic is also disabled to prevent spurious alarms while the device is getting up to speed.

If the operator specifies parameters such that the interval period is shorter than the theoretical amount of time required for each Sampling Period Volume, the iVAS Roam will automatically set the interval period equal to double the theoretical time required. For example, if an operator initially sets up the device as follows:

- Target Volume = 1 m^3, Flow Rate = 100 l/min
- No. runs = 10
- If the interval was set to 0 it would be modified to 120 sec

If the operator decides instead to have only 2 runtime samples, then the iVAS Roam will automatically update the parameters as follows:

- Target Volume = 1 m^3
- No. runs = 2
- Interval = 600 sec

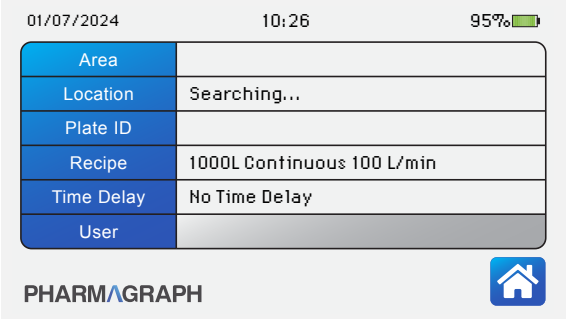
Performing a Sample

Pressing the sample button on the home screen will display the sample summary screen. The following section explains how to setup and run a single sample. The sample setup differs if the unit is configured with the RFID enabled or disabled.

Area and Location selection

RFID Enabled

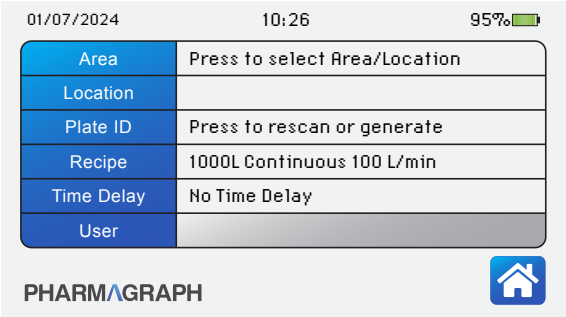
On pressing of the sample button, the summary screen will be displayed; the unit will begin searching for a location RFID tag.



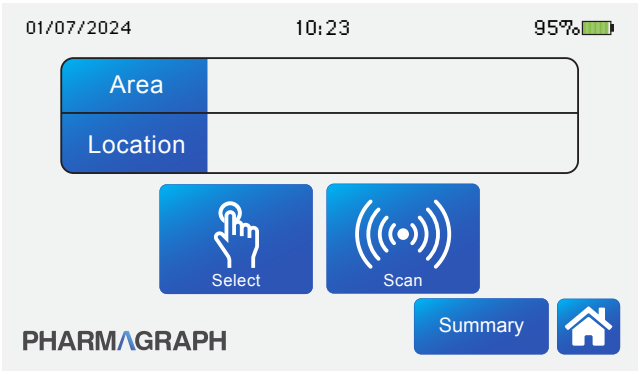
Place the unit on top of a location RFID marker to scan the location information using the base RFID scanner. If a location is associated with the scanned RFID marker, it will be displayed on the screen.

If there is no location RFID detected for over 10 seconds, the screen will display 'No RFID found'. If the scanned RFID location information doesn't match any of the locations on the device, the screen will display 'No Location Found'.

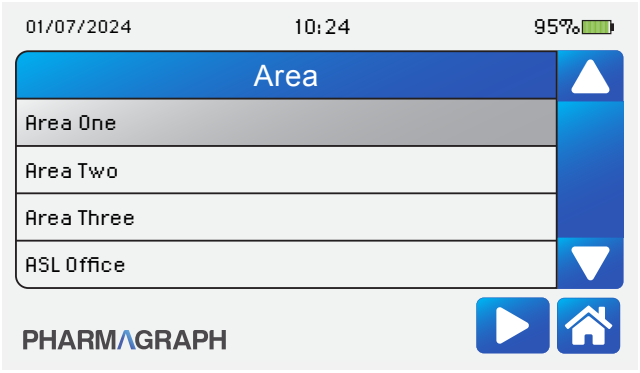
If the location RFID detection times out or fails to find a location, the screen will display 'Press to Select Area/ Location'. The operator can then press the area or location display boxes to load the area and location selection screen



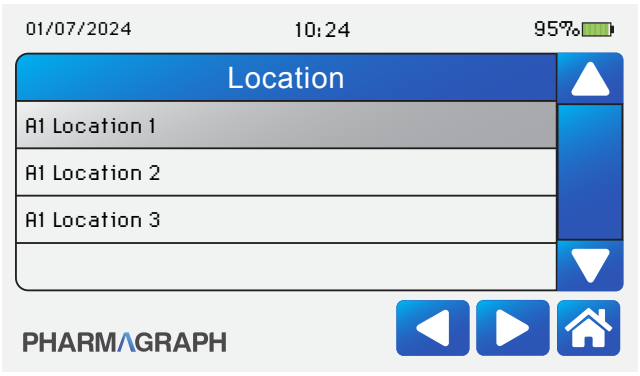
From the Area and Location selection screen, the operator can select where they want the upcoming sample to take place.



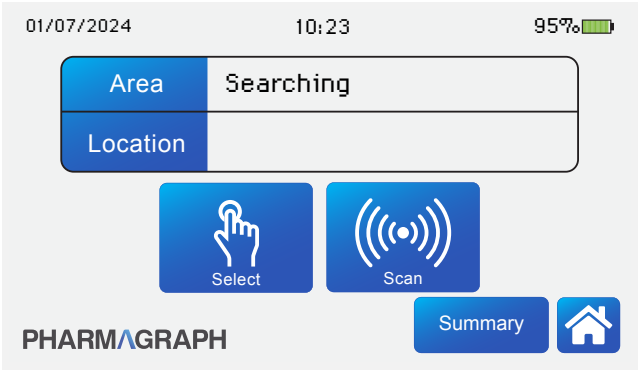
Pressing the 'Select' button will display all the areas that have been pre-loaded onto the device. The operator can select any area from the list.



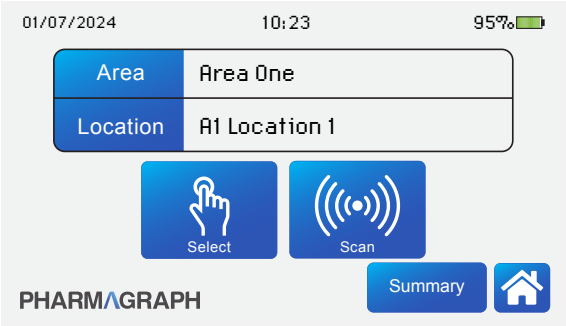
On the selection of an area the operator will be able to choose a location in this area.



Alternatively, the operator can press the 'Scan' button that will set the base RFID to start scanning.



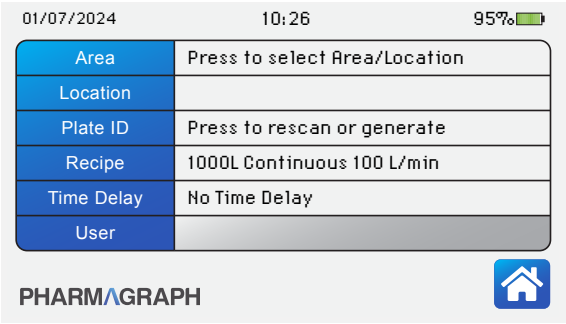
The device will determine what location it is in by association with the unique RFID detected. If the device doesn't detect an ID tag it will display 'No RFID Found'.



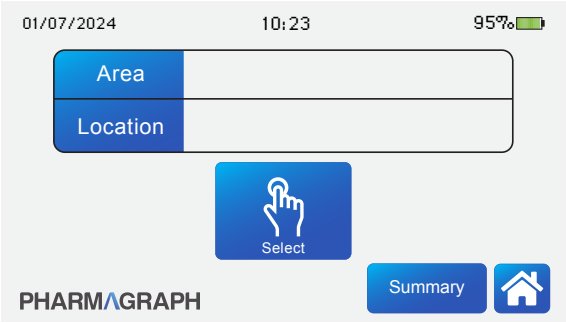
Pressing the summary button from the area and location selection screen will return the operator to the sample summary screen.

RFID Disabled

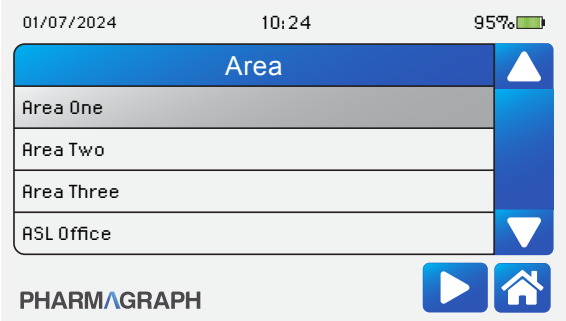
On pressing of the sample button, the summary screen will be displayed; the unit will display 'Press to select Area/ Location'. The operator can then press the area or location display boxes to load the area and location selection screen



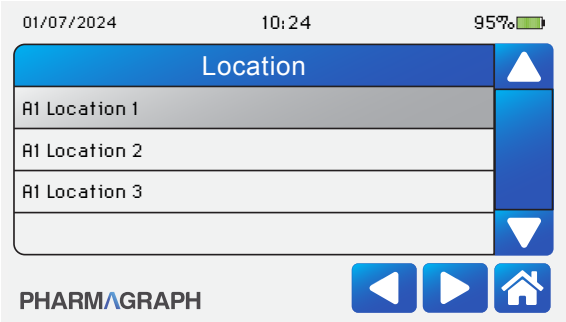
From the Area and Location selection screen, the operator can select where they want the upcoming sample to take place.



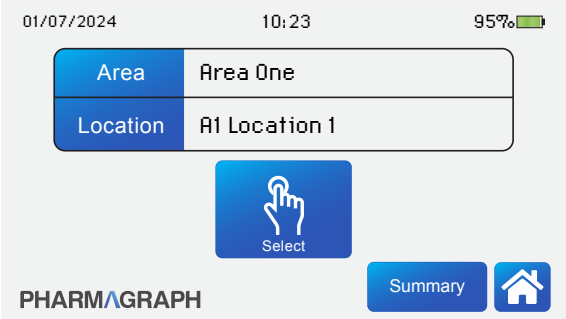
Pressing the 'Select' button will display all the areas that have been pre-loaded onto the device. The operator can select any area from the list.



On the selection of an area the operator will be able to choose a location in this area.



The chosen area and location will be displayed on the screen. Pressing the summary button will return the operator to the sample summary screen.



Petri dish identification

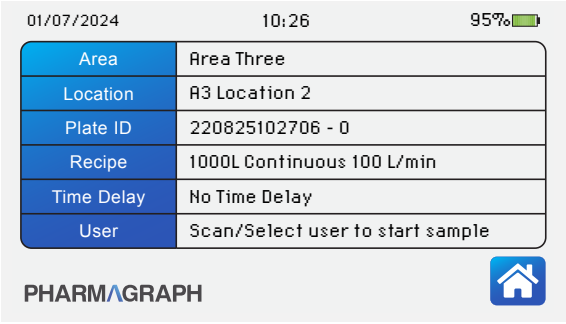
The operator can assign an ID to the test petri dish that will be saved in the record of the sample. This can be done in two ways.

Option 1: The unit will automatically generate a plate ID in the form DDMMYYHHmmSS-SN, based off the date, time and serial number of the unit.

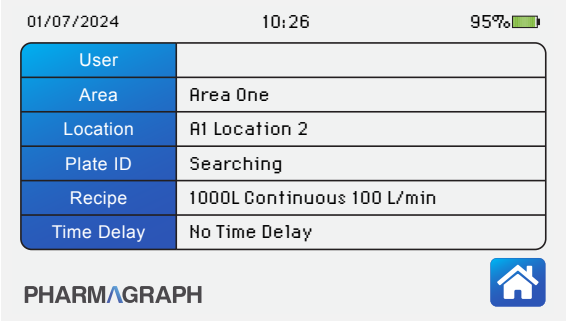
Option 2: Using the in-built barcode scanner to scan a custom barcode on the petri dish.

The default method of petri dish identification can be configured in the iVAS Roam Manager application.

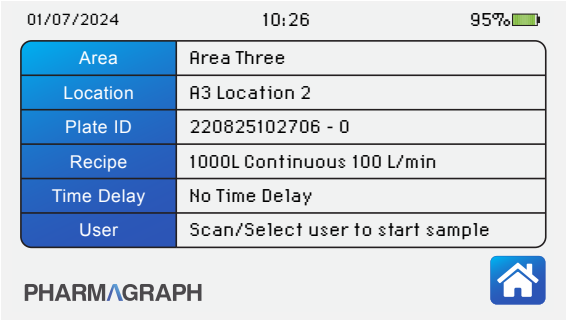
If option 1 is chosen, after the selection of an area and location, a petri dish ID will be automatically generated on the summary screen.



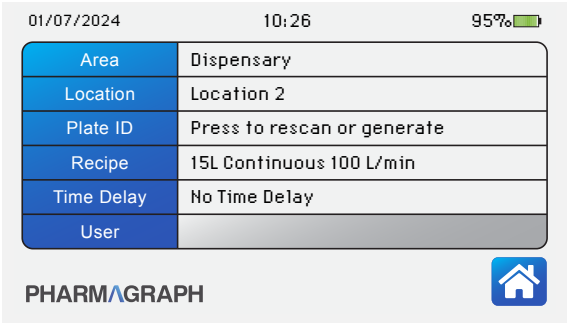
If option 2 is chosen, on the selection of an area and location, the barcode scanner will illuminate and start searching for a barcode.



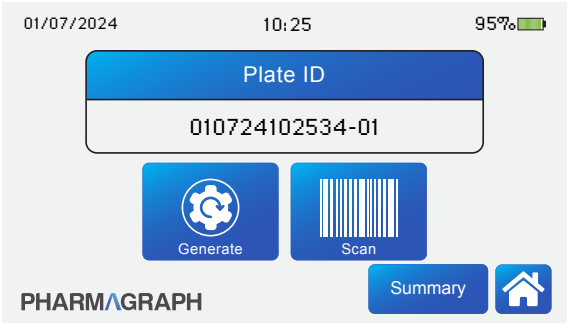
Presenting a barcode to the scanner that is 40 characters or less will turn off the scanner and display the scanned barcode on the screen. Presenting a barcode with over 40 characters will display ‘Invalid Barcode’.



If no barcode is detected or an invalid barcode is scanned, the screen will display ‘Press to rescan or generate‘.



Pressing the plate ID display box will navigate the operator to the plate ID selection screen. From this screen the operator can generate or scan a plate ID if they failed to do so previously, or if a change is required.

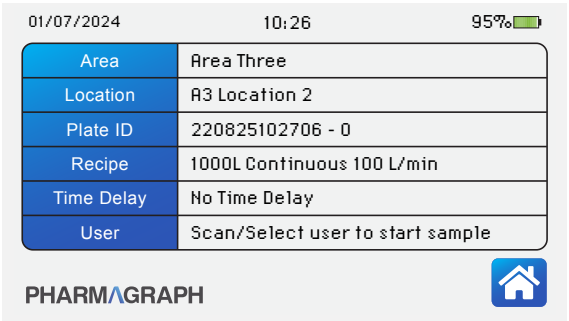


Pressing the summary button from the plate ID selection screen will take the operator back to the sample summary screen.

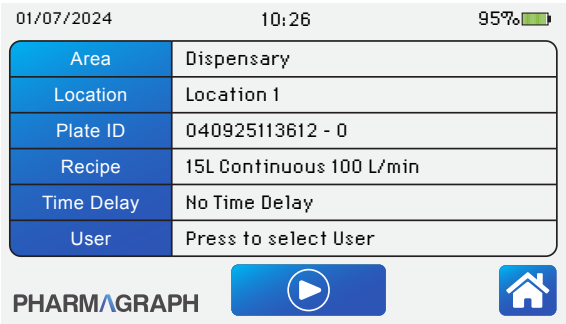
User selection

RFID Enabled

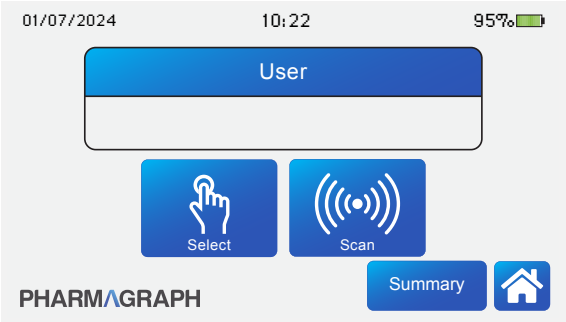
On the selection of the sampling area / location and the plate ID, the summary screen will display ‘Scan / Select user to start sample’.



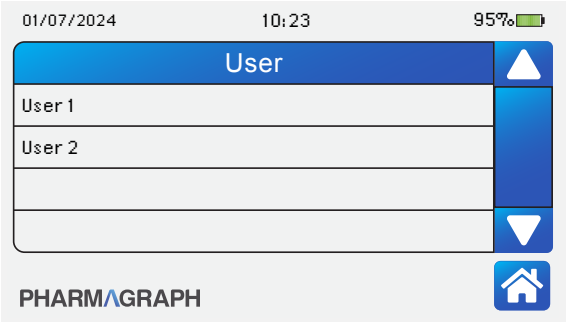
To start the sample, hold the RFID card of a user to the side RFID scanner. The user associated with the card will be displayed on the screen. The sample will then begin.



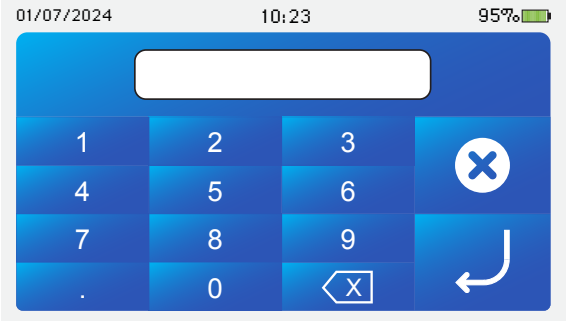
Pressing the user selection box will display the user selection screen. From this screen the operator can identify themselves using the RFID side scanner by pressing the ‘Scan’ button.



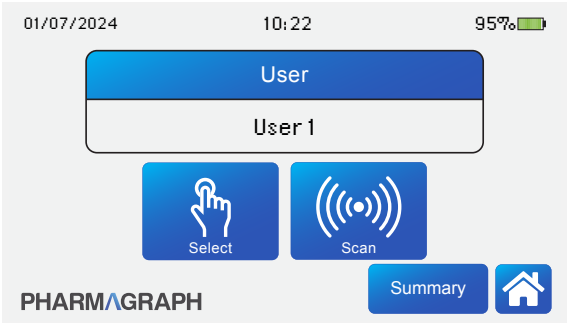
Alternatively, pressing the ‘Select’ button, will bring up a list of all the users on the device, that can then be pressed to be selected.



When selected from the list, the operator will be prompted to input a 4- or 8-digit pin specific to the user.

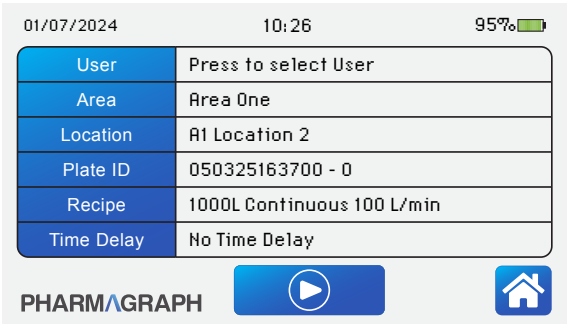


The chosen user will be displayed on the user selection screen, pressing ‘Summary’ will return the operator to the sample summary screen. On return to the sample summary screen, if all sample variables have been configured the sample will begin.

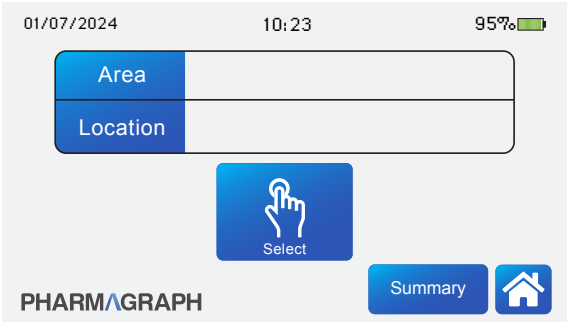


RFID Disabled

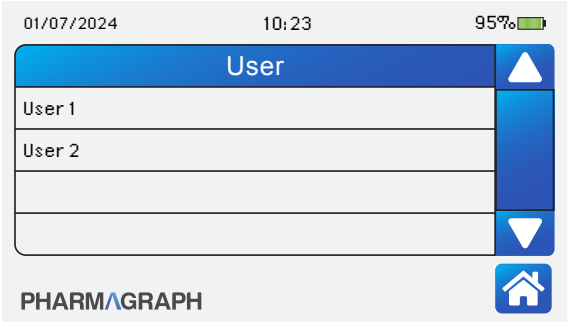
On the selection of the sampling area / location and the plate ID, the summary screen will display ‘Press to select User’.



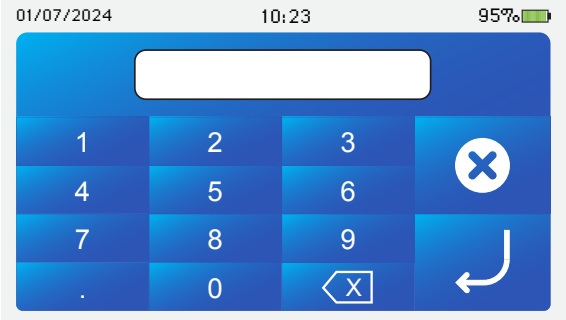
Pressing the user selection box will display the user selection screen.



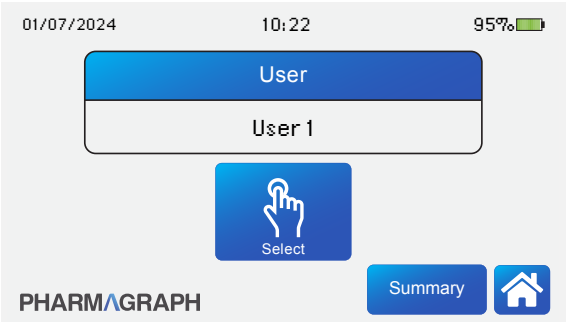
Pressing the ‘Select’ button, will bring up a list of all the users on the device, that can then be pressed to be selected.



When selected from the list, the operator will be prompted to input a 4- or 8-digit pin specific to the user.



The chosen user will be displayed on the user selection screen, pressing ‘Summary’ will return the operator to the sample summary screen. On return to the sample summary screen, if all sample variables have been configured the sample will begin.

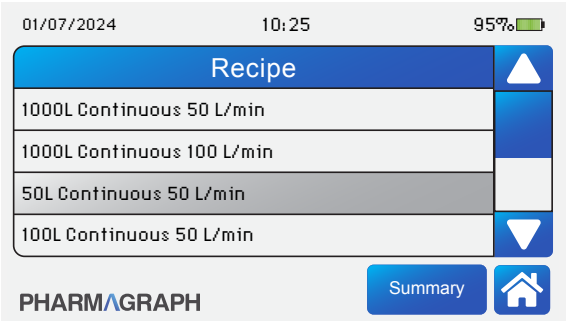


Recipe selection

The sample recipes are pre-configured using the iVAS Roam Manager. The recipes are defined by:

- Target volume
- Flow rate
- Continuous or Intermittent sampling

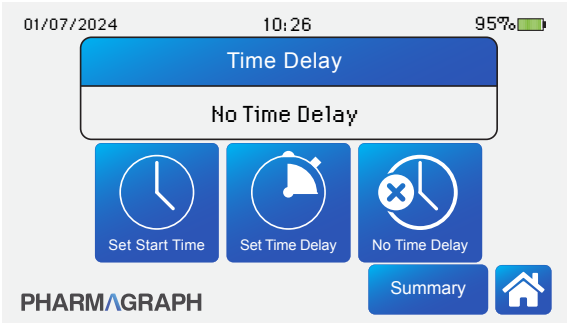
Press the recipe display box on the sample summary screen to bring up the recipe selection list. The recipe required for the sample can be selected from the list. Press the ‘Summary’ button to return to the sample summary screen.



The selected recipe will be displayed on the sample summary screen. The last recipe used will be saved and used again for the next sample unless changed

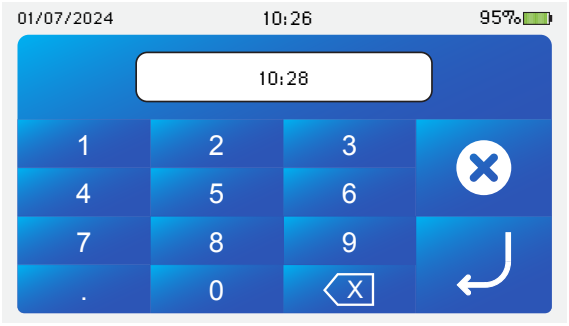
Time delay setup

A time delay can be added to the start of a sample. Pressing the time delay section on the summary screen will load the time delay selection screen. Pressing ‘No Time Delay’ sets no time delay on the start of the sample.

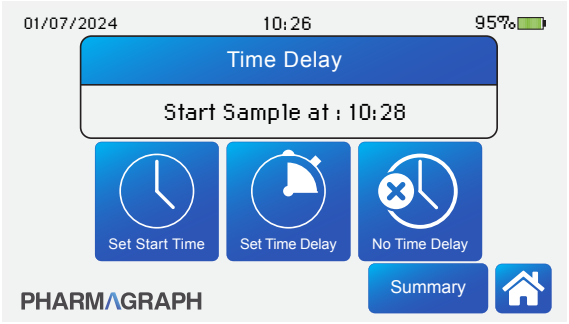


The time delay can be set as a countdown in minutes/ seconds or set so the sample starts at a specific time.

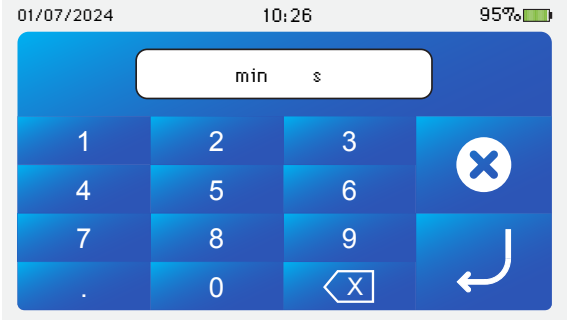
To start the sample at a specific time, press the ‘Set start time’ button, this will display a keyboard. The operator can input the sample start time they require in 24hr clock.



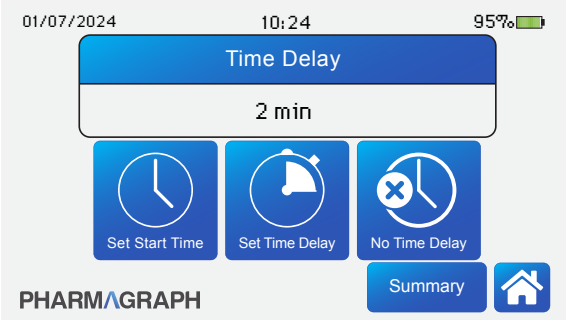
Pressing enter will return the operator to the time delay page and the chosen start time will be displayed.



To set the length of delay before the sample in minutes/ seconds, press the ‘Set time delay’ button. This will display a keyboard; the operator can input the sample delay required in minutes and seconds



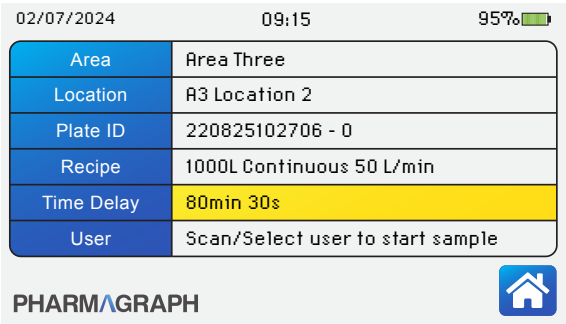
Pressing enter will return the operator to the time delay page and the time delay will be displayed.



If the time delay is set to greater than 1 hour, the screen will show a pop-up to warn the operator. As setting a time delay of this length may indicate an error has been made.

Pressing the summary button will return the operator to the sample summary screen, the selected time delay will be displayed.

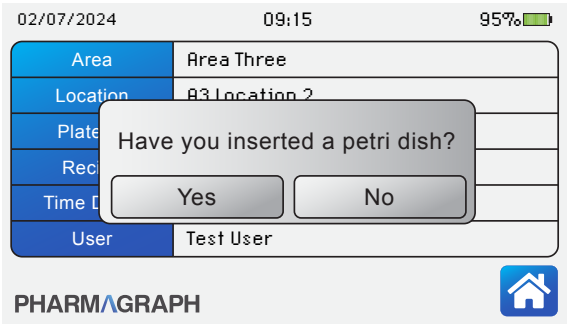
The summary screen will highlight any time delay greater than 1 hour, as this could indicate an error has occurred in setting the time delay



If a time delay is set at the start of a sample this delay will be saved and used for all samples until cleared. However, if the sample is set to start at a specific time the time delay will be cleared after running, to avoid errors related to the sample start time.

Petri dish pop-up

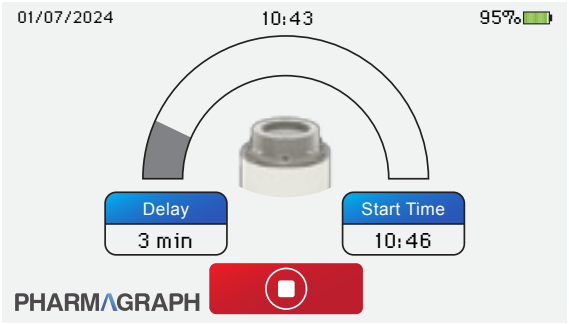
If configured in the iVAS Roam Manager application, a pop-up will be displayed on sample start to remind the user to check they have inserted a petri dish and associated a plate ID. Pressing 'Yes' will begin the sample. Pressing 'No' will close the pop up and the unit will continue to show the sample summary screen.



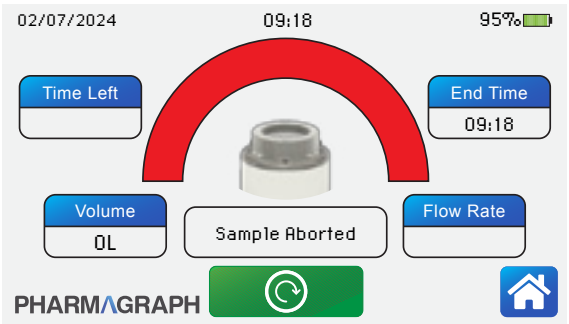
Sample Running

Sample Time Delay

If the sample has been started and a time delay has been set, the sample time delay screen will be displayed. The sample time delay screen will display the remaining delay and the estimated start time of the sample. The annulus will fill in grey and indicate the progress of the time delay.



If the sample is aborted during the time delay, the sample aborted screen will be displayed. This will display the time the sample was aborted and give the operator the ability to restart the sample or return to the home screen.

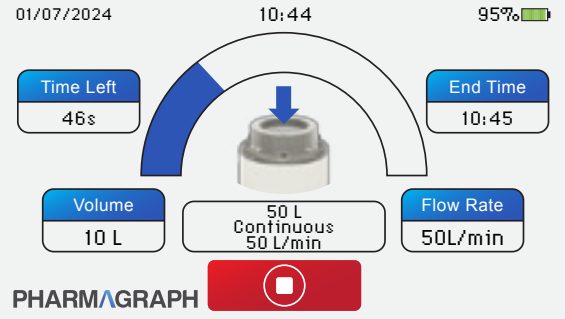


Sample Running Screen

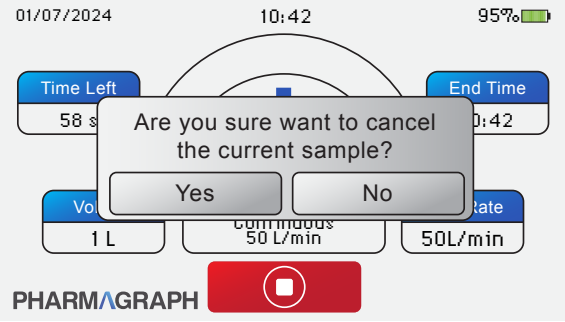
After the sample time delay has completed or if one hasn't been set, the sample will begin and the sample running screen will be displayed.

The sample running screen will display:

- The time left to run in the sample
- The estimated end time of the sample
- The volume sampled
- The flow rate
- The sample recipe
- The percentage of sample completion

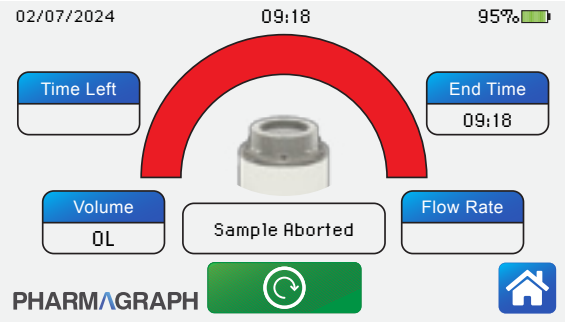


Pressing the sample abort button will bring up a pop-up to confirm the operator wants to abort the sample.



Pressing 'Yes' will stop the sample and show the sample aborted screen. Pressing 'No' will close the pop-up and continue the sample.

The sample aborted screen will display the time the sample was aborted and give the operator the ability to restart the sample or return to the home screen.



Sample Failure Modes

The device will not complete a sample in the following situations:

Loss of power during sampling
The device completely powers off or runs out of battery during a sample.

Sample manually aborted
The user has aborted the sample before completion.

Fan failed to start / Fan failure during sample
The fan fails to start or fails during the sample.

Potential Causes:

- The fan has become disconnected from the unit
- The fans wires have been damaged
- A fault with the fan internally

Low flow rate fail
The sample will fail if the flow rate is less than 10% of the target for over 30 seconds, after the initial startup time.

Potential Causes:

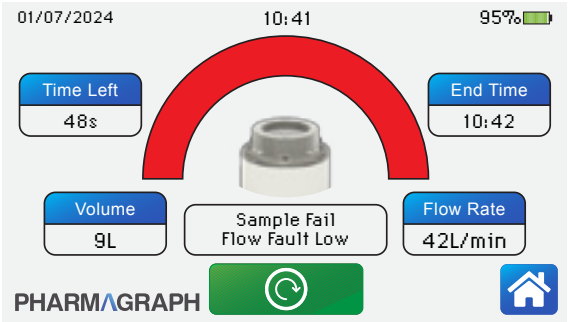
- Blockage in the head or exhaust
- Issue with the pressure sensor or pressure tubes
- Calibration or settle point issue
- Incorrect petri dish positioning or filling

High flow rate fail
The sample will fail if the flow rate is greater than 10% of the target for over 30 seconds, after the initial startup time.

Potential Causes:

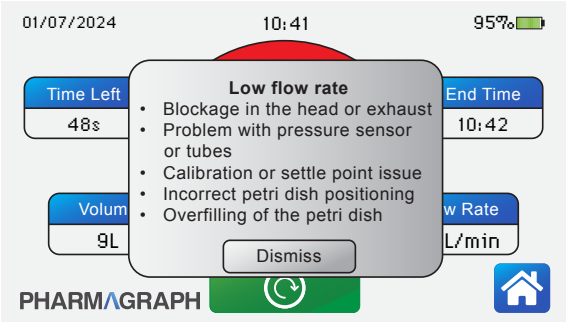
- Sieve head not attached
- Issue with the pressure sensor or pressure tubes
- Calibration or settle point issue
- Incorrect petri dish positioning or filling
- No petri dish inserted

If the sample fails to complete the completion bar will turn red with the reason being displayed in the status box, as shown below:



A buzzer will sound on sample failure, touch the screen to silence.

Pressing the sample failure box will bring up a pop-up that will try to suggest a reason for why the sample may have failed in this way. A buzzer will sound on sample failure, touch the screen to silence.

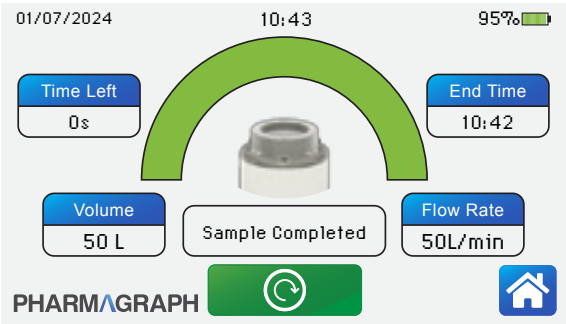


A sample can be repeated if the operator presses the repeat sample button, or the operator can press the home button to return to the home screen.

Sample Completion

If the sample completes successfully the sample completed screen will be displayed, which will show the total volume sampled, the sample flow rate, the time the sample ended and the sample completion annulus will flash green. A buzzer will sound on completion, touch the screen to silence.

A buzzer will sound on completion, touch the screen to silence.



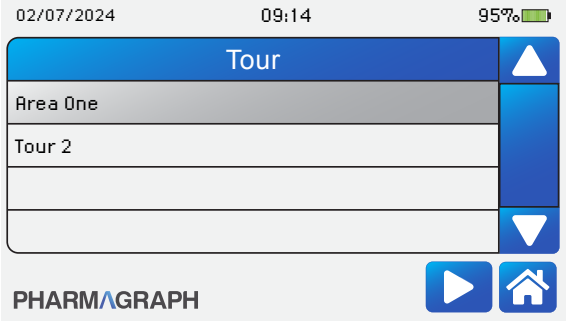
A sample can be repeated if the operator presses the repeat sample button, or the operator can press the home button to return to the home screen.

Performing a Tour

A tour is a series of samples at multiple locations, the locations can be in different areas or all in the same area. The following describes how a tour can be setup and executed. Tours can be configured and uploaded to the device from the iVAS Roam Manager application.

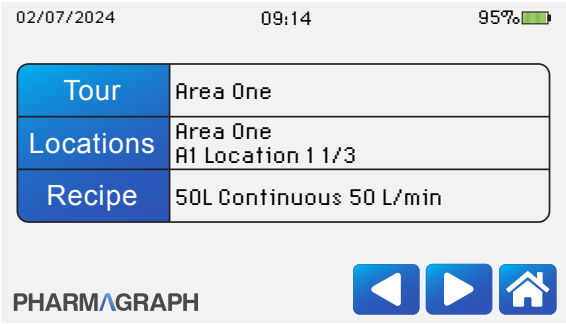
Tour selection

Pressing tour on the home page will display the list of pre-configured tours for the operator to select from.

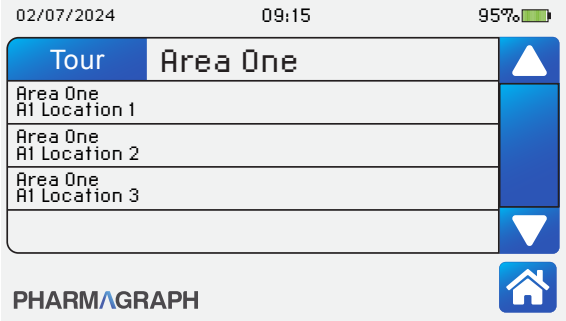


Tour Information

On the selection of a tour, pressing the next page arrow will display the tour information. This includes the tour name, tour recipe, the first area and location and the total number of sample locations.



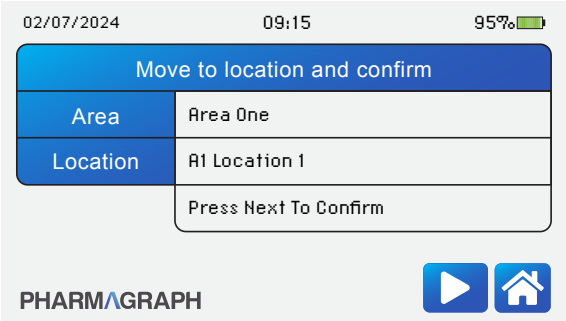
The tour locations section can be pressed and expanded to view all the locations in the tour.



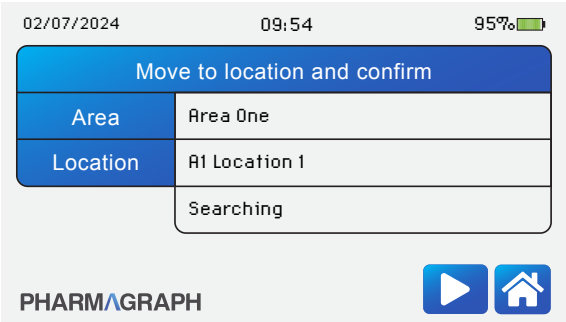
Pressing the Start button will begin the tour, taking the operator to the tour location confirm screen.

Tour Location Confirmation

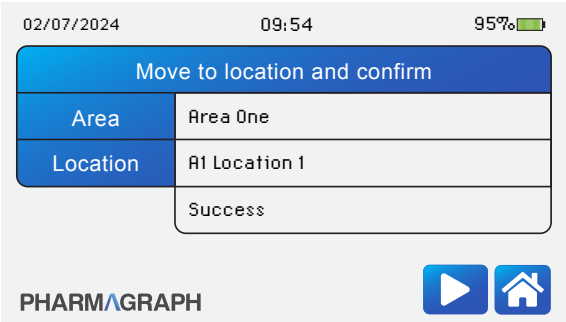
The tour location confirmation screen will instruct the operator which location to move the unit to for the upcoming tour sample.



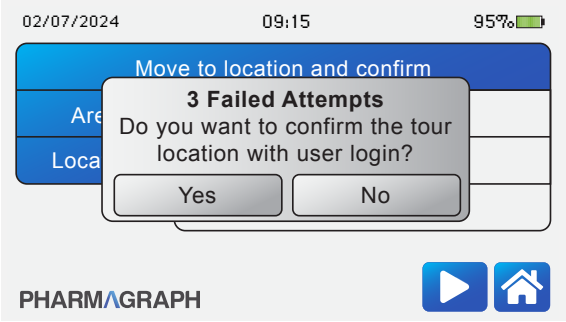
If the unit is RFID enabled and the tour RFID setting pop-up has been turned on in the iVAS Roam Manager application, when the operator presses the next button, the unit will scan the base RFID to identify if the unit is at the correct location. If the RFID is disabled or the RFID confirm setting is turned off, pressing the next button will take the operator to the tour summary screen.



The unit will confirm it's at the correct location if it detects the pre-configured RFID location marker matches the location that the unit is expecting. If the unit is at the correct location the screen will display 'Success' and go to the tour summary screen.



If the operator is at the wrong location the screen will display 'Wrong Location'. If the wrong location or no location is detected 3 times the screen will display a pop-up asking the operator if they want to confirm the location with a user login instead. Pressing yes will take the operator to the tour summary screen.



If the location has no RFID assigned to it the screen will display the message ‘No RFID Assigned – Confirm by User Login’ and the operator will be taken straight to the tour summary screen when pressing the next button.

Tour Summary

The screen will display a summary of the tour, showing which variables can be configured. The tour name, location and recipe are greyed out as they cannot be edited at this stage. The user, plate ID and time delay can be pressed.

Petri dish identification

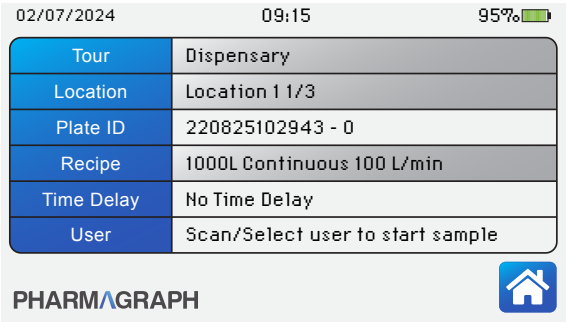
The operator can assign an ID to the test petri dish that will be saved in the record of the sample. This can be done in two ways.

Option 1: The unit will automatically generate a plate ID in the form DDMMYYHHmmSS-SN, based off the date, time and serial number of the unit.

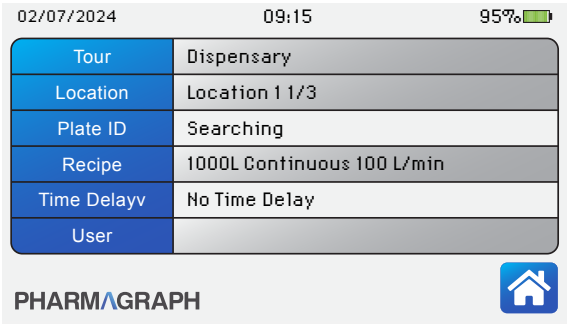
Option 2: Using the in-built barcode scanner to scan a custom barcode on the petri dish.

The default method of petri dish identification can be configured in the iVAS Roam Manager application.

If option 1 is chosen, after the selection of an area and location, a petri dish ID will be automatically generated on the tour summary screen.

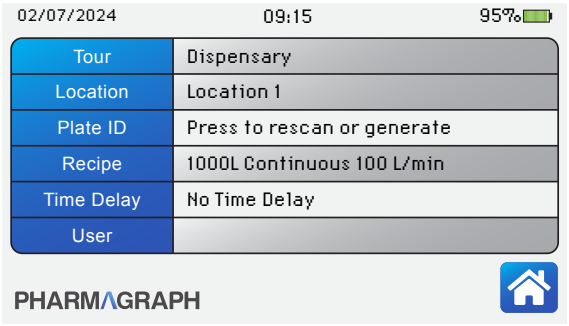


If option 2 is chosen, on the selection of an area and location, the barcode scanner will illuminate and start searching for a barcode.

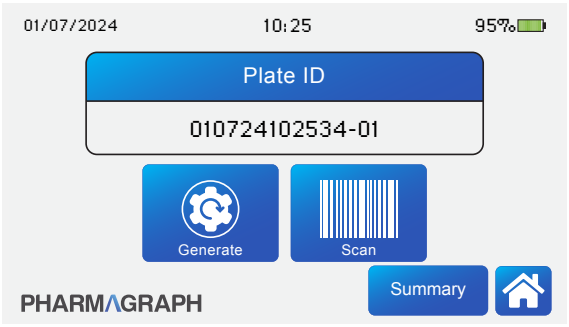


Presenting a barcode to the scanner that is 40 characters or less will turn off the scanner and display the scanned barcode on the screen. Presenting a barcode with over 40 characters will display ‘Invalid Barcode’.

If no barcode is detected or an invalid barcode is scanned, the screen will display ‘Press to rescan or generate‘.



Pressing the plate ID display box will navigate the operator to the plate ID selection screen. From this screen the operator can generate or scan a plate ID if they failed to do so previously, or if a change is required.

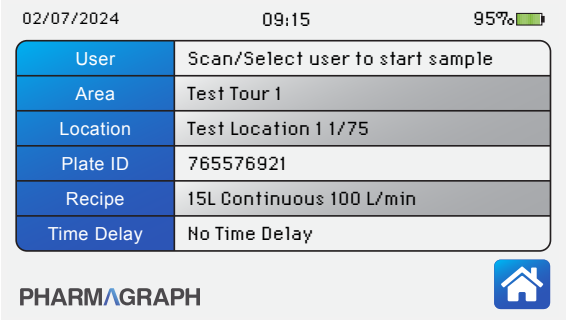


Pressing the summary button from the plate ID | selection screen will take the operator back to the tour summary screen.

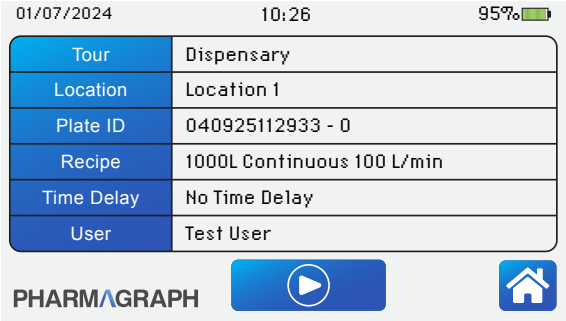
User selection

RFID Enabled

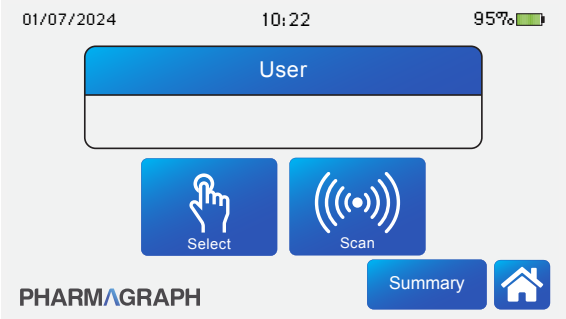
On the selection of the plate ID, the tour summary screen will display ‘Scan / Select user to start sample’.



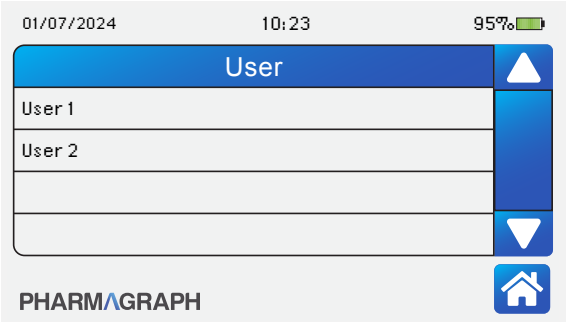
To start the sample, hold the RFID card of a user to the side RFID scanner. The user associated with the card will be displayed on the screen. The sample will then begin.



Pressing the user selection box will display the user selection screen. From this screen the operator can identify themselves using the RFID side scanner by pressing the ‘Scan’ button.

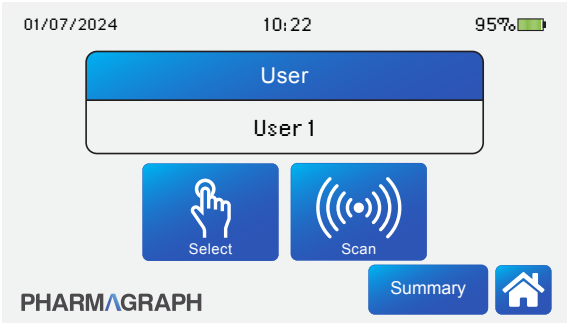


Alternatively, pressing the ‘Select’ button, will bring up a list of all the users on the device, that can then be pressed to be selected.



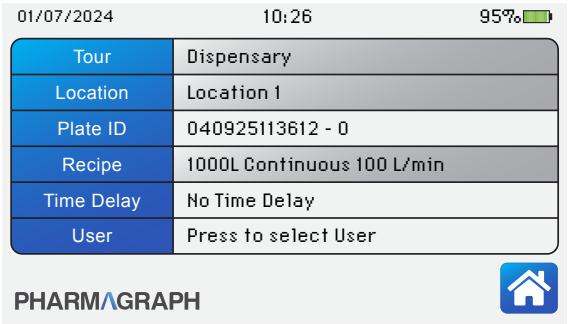
When selected from the list, the operator will be prompted to input a 4- or 8-digit pin specific to the user.

The chosen user will be displayed on the user selection screen, pressing ‘Summary’ will return the operator to the tour summary screen. On return to the tour summary screen, if all variables have been configured the sample will begin.

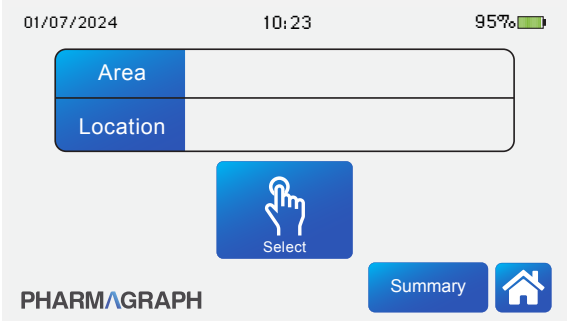


RFID Disabled

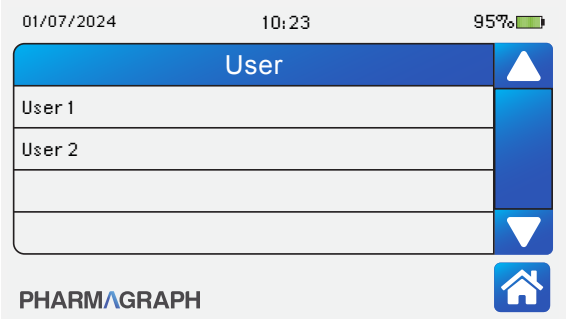
On the selection of the plate ID, the summary screen will display ‘Press to select User’.



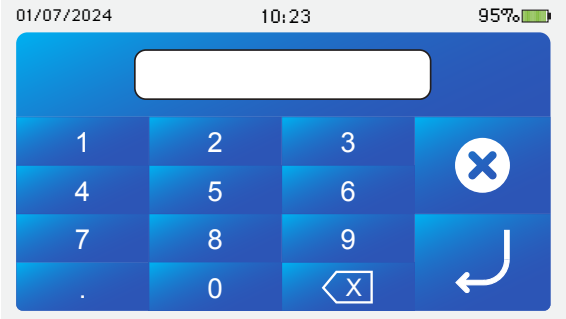
Pressing the user selection box will display the user selection screen.



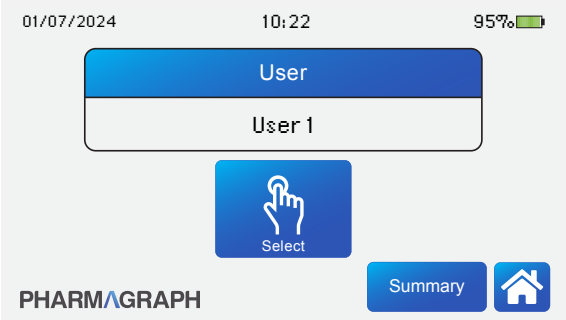
Pressing the ‘Select’ button, will bring up a list of all the users on the device, that can then be pressed to be selected.



When selected from the list, the operator will be prompted to input a 4- or 8-digit pin specific to the user.

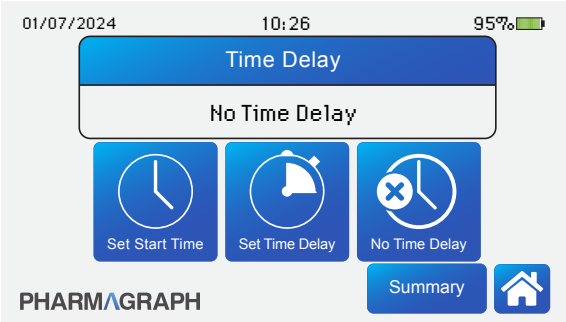


The chosen user will be displayed on the user selection screen, pressing ‘Summary’ will return the operator to the tour summary screen. On return to the tour summary screen, if all sample variables have been configured the sample will begin.



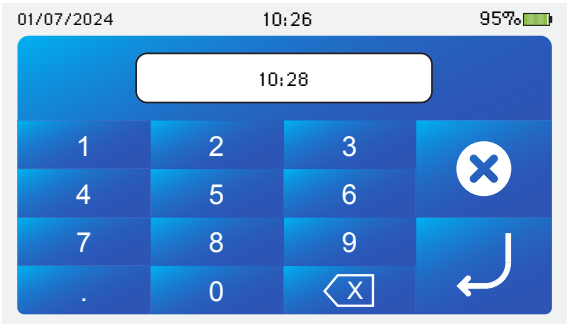
Time delay setup

A time delay can be added to the start of a tour sample. Pressing the time delay section on the summary screen will load the time delay selection screen. Pressing ‘No Time Delay’ sets no time delay on the start of the sample.

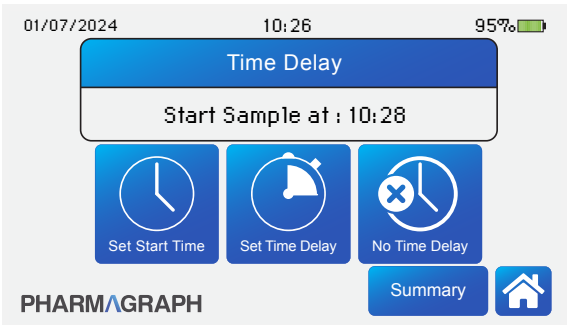


The time delay can be set as a countdown in minutes/seconds or set so the sample starts at a specific time.

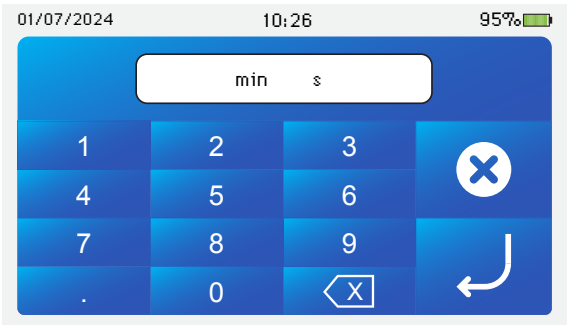
To start the sample at a specific time, press the ‘Set start time’ button, this will display a keyboard. The operator can input the sample start time they require in 24hr clock.



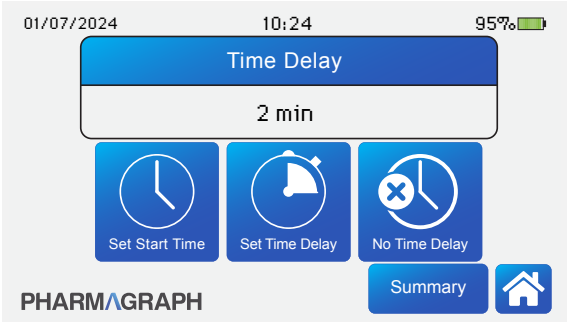
Pressing enter will return the operator to the time delay page and the chosen start time will be displayed.



To set the length of delay before the sample in minutes/seconds, press the ‘Set time delay’ button. This will display a keyboard; the operator can input the sample delay required in minutes and seconds.



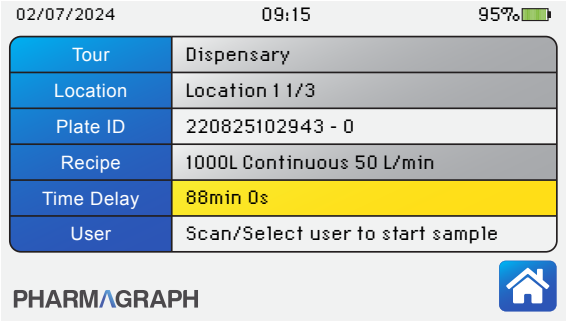
Pressing enter will return the operator to the time delay page and the time delay will be displayed.



If the time delay is set to greater than 1 hour, the screen will show a pop-up to warn the operator. As setting a time delay of this length may indicate an error has been made.

Pressing the summary button will return the operator to the tour summary screen, the selected time delay will be displayed.

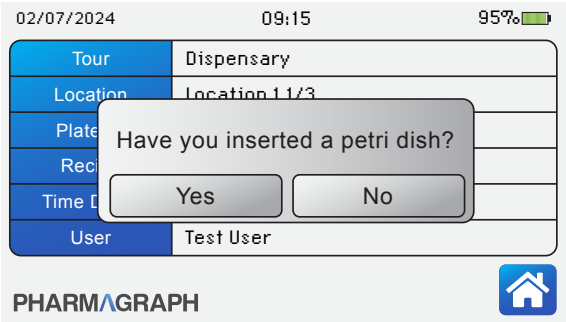
The summary screen will highlight any time delay greater than 1 hour, as this could indicate an error has occurred in setting the time delay.



If a time delay is set at the start of a sample this delay will be saved and used for all samples until cleared. However, if the sample is set to start at a specific time the time delay will be cleared after running, to avoid errors related to the sample start time.

Petri dish pop-up

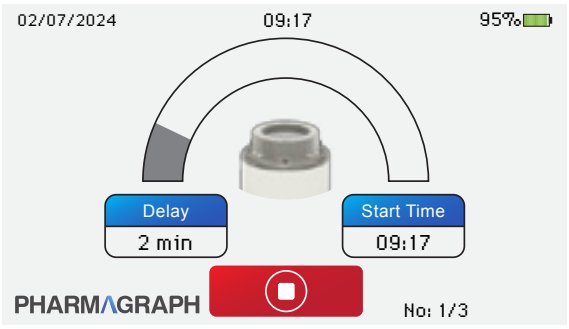
If configured in the iVAS Roam Manager application, a pop-up will be displayed on sample start to remind the user to check they have inserted a petri dish and associated a plate ID. Pressing 'Yes' will begin the sample. Pressing 'No' will close the pop up and the unit will continue to show the tour summary screen.



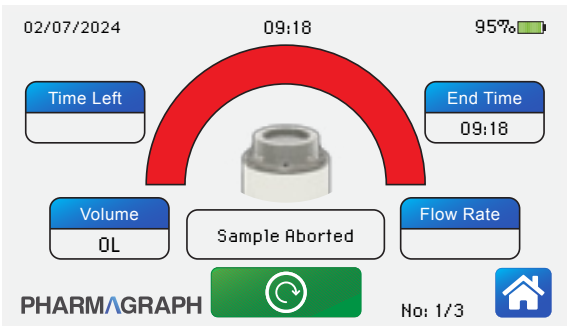
Tour Running

Sample Time Delay

If the sample has been started and a time delay has been set, the sample time delay screen will be displayed. The sample time delay screen will display the remaining delay and the estimated start time of the sample. The annulus will fill in grey and indicate the progress of the time delay.



If the sample is aborted during the time delay, the sample aborted screen will be displayed. This will display the time the sample was aborted and give the operator the ability to restart the sample or return to the home screen.

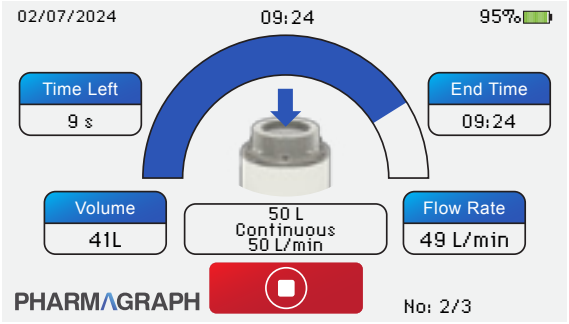


Tour Running Screen

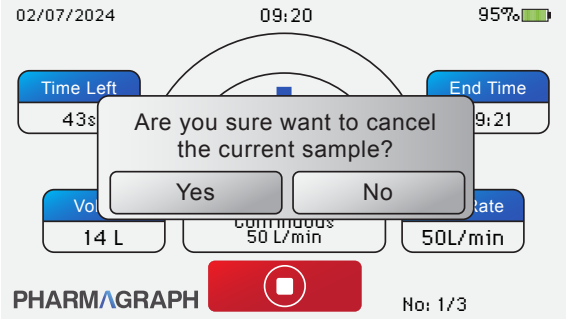
After the sample time delay has completed or if one hasn't been set, the sample will begin and the tour running screen will be displayed.

The sample running screen will display:

- The time left to run in the sample
- The estimated end time of the sample
- The volume sampled
- The flow rate
- The sample recipe
- The percentage of sample completion
- The location number within the tour

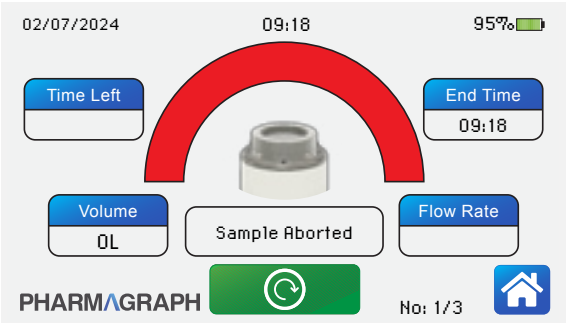


Pressing the sample abort button will bring up a pop-up to confirm the operator wants to abort the sample. Pressing 'Yes' will stop the sample and show the sample aborted screen. Pressing 'No' will close the pop-up and continue the sample.



Pressing 'Yes' will stop the sample and show the sample aborted screen. Pressing 'No' will close the pop-up and continue the sample.

The sample aborted screen will display the time the sample was aborted and give the operator the ability to restart the sample or return to the home screen.



Sample Failure Modes

The device will not complete a sample in the following situations:

Loss of power during sampling

The device completely powers off or runs out of battery during a sample.

Sample manually aborted

The user has aborted the sample before completion.

Fan failed to start / Fan failure during sample

The fan fails to start to or fails during the sample.

Potential Causes:

- The fan has become disconnected from the unit
- The fans wires have been damaged
- A fault with the fan internally

Low flow rate fail

The sample will fail if the flow rate is less than 10% of the target for over 30 seconds, after the initial startup time.

Potential Causes:

- Blockage in the head or exhaust
- Issue with the pressure sensor or pressure tubes
- Calibration or settle point issue
- Incorrect petri dish positioning or filling

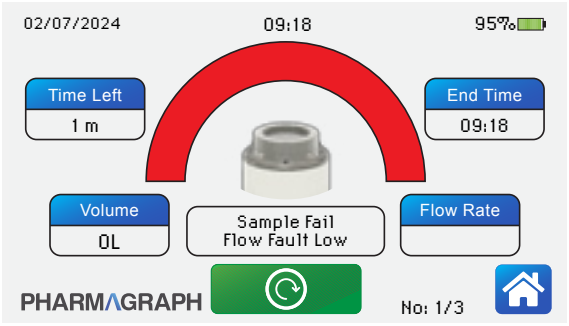
High flow rate fail

The sample will fail if the flow rate is greater than 10% of the target for over 30 seconds, after the initial startup time.

Potential Causes:

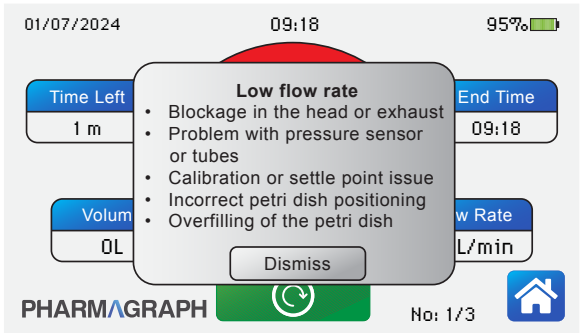
- Sieve head not attached
- Issue with the pressure sensor or pressure tubes
- Calibration or settle point issue
- Incorrect petri dish positioning or filling
- No petri dish inserted

If the sample fails to complete the completion bar will turn red with the reason being displayed in the status box, as shown below:



A buzzer will sound on sample failure, touch the screen to silence.

Pressing the sample failure box will bring up a pop-up that will try to suggest a reason for why the sample may have failed in this way.

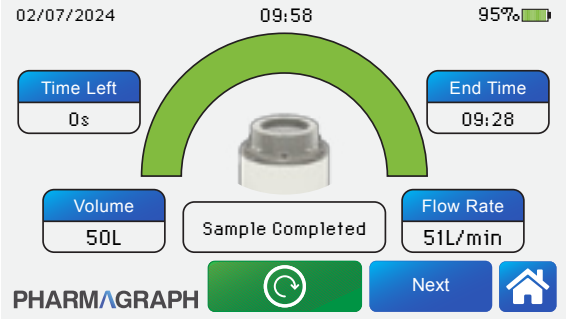


A sample can be repeated if the operator presses the repeat sample button, or the operator can press the home button to return to the home screen.

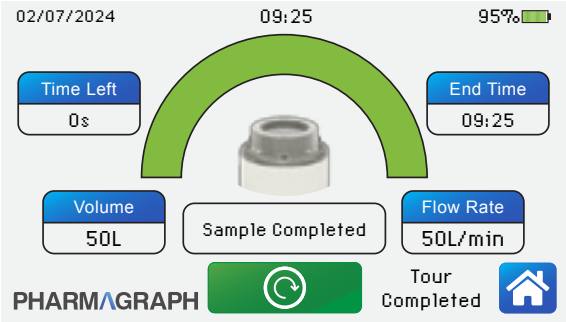
Tour Sample Completion

If the sample completes successfully the sample completed screen will be displayed, which will show the total volume sampled, the sample flow rate, the time the sample ended, and the sample completion annulus will flash green. A buzzer will sound on completion, touch the screen to silence.

If it's not the last location in the tour the next tour location button will appear, when pressed the operator will be taken to the confirm tour location screen, to begin the process of sampling the next tour location.



If the last location in the tour has been sampled the screen will display 'Tour Completed'.



The sample can be repeated if the operator presses the repeat sample button, or the operator can press the home button to return to the home screen.

Sample Data Logs

Records of the samples that are performed by the iVAS Roam are logged to the internal memory. The following parameters are logged for each sample:

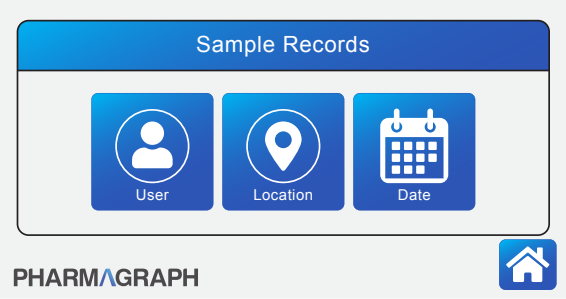
- Sample Start Date/Time,
- Sample End Date/Time,
- Sample Status (Complete, Failed, Aborted),
- Volume of air sampled,
- Average Flow Rate the air was sampled at,
- Plate ID,
- Area and Location that the sample was taken at,
- User who started the sample,
- Sample Recipe
  - Demanded Volume
  - Demanded Flow Rate
  - No Intervals
  - Time between Intervals

The iVAS Roam's internal memory can store 2500 sample records. These records can either be viewed on the iVAS Roam's screen or downloaded to a PC either by integration into enVigil or by using the iVAS Roam Manager application.

Viewing Data on the iVAS Roam

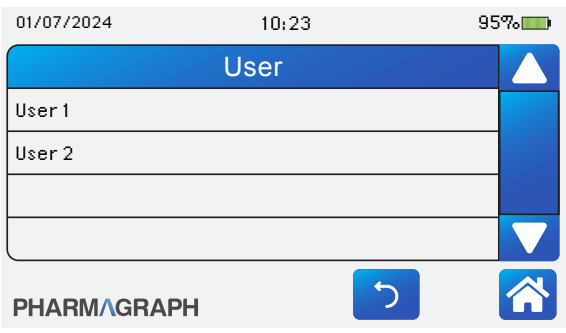
The records menu (shown below) on the iVAS Roam can be viewed by pressing the Records button on the Home screen. Sample records can be viewed on the iVAS Roam either by:

- User
- Area and Location
- Date Range



View user data

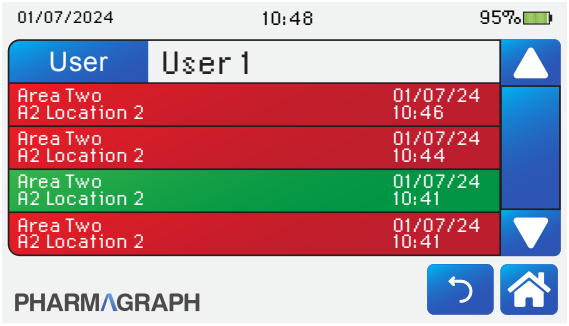
After selecting to filter the records by user, a list of the users on the device will be displayed. The operator can then select which user they want to view the records for.



An overview of the selected user records will be shown, displaying:

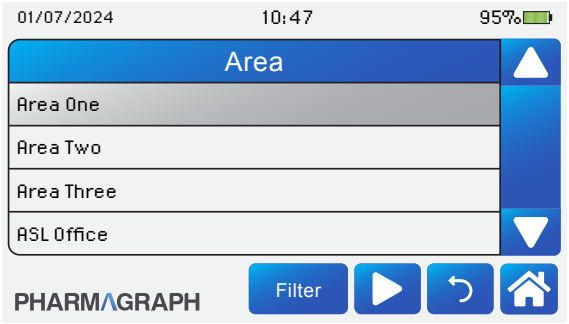
- Date (From newest to oldest)
- Start time
- Area
- Location
- Status (Green = Pass, Red = Fail)

To view more details of a specific sample, press the touchscreen to select it.



View area and location data

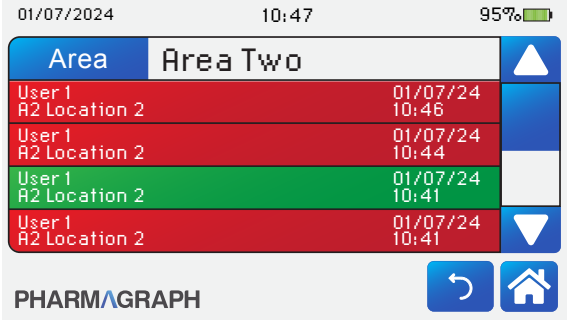
When selecting to filter the records by area, a screen showing a list of all the currently configured areas will be displayed. The operator can then select which Area they want to view the records for, then press filter.



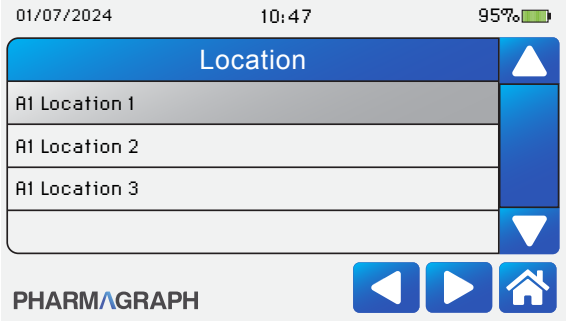
An overview of the selected Area records will be shown, displaying:

- Date (From newest to oldest)
- Start time
- User
- Location
- Status (Green = Pass, Red = Fail)

To view more details of a specific sample, press the touchscreen to select it.



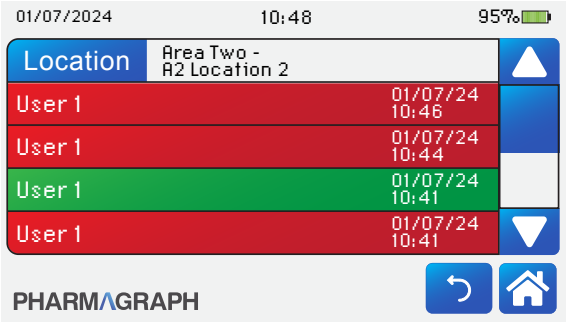
When selecting to filter the records by Location, after selecting the area press the next arrow to view the location list to select from.



An overview of the selected Location records will be shown, displaying:

- Date (From newest to oldest)
- Start time
- User
- Status (Green = Pass, Red = Fail)

To view more details of a specific sample, press the touchscreen to select it.

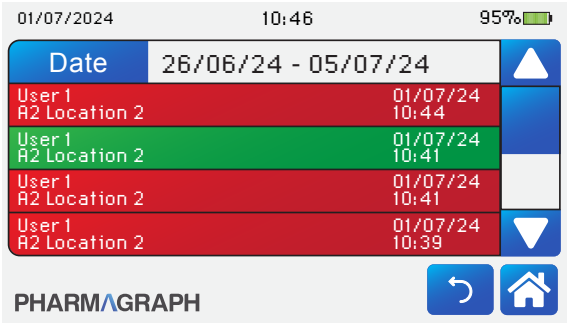


View data within date range

When selecting to filter the records by date, a screen showing a calendar will be displayed. By selecting a to and from date, the 100 most recent records between these dates will be displayed.

An overview of the selected date records will be shown, displaying:

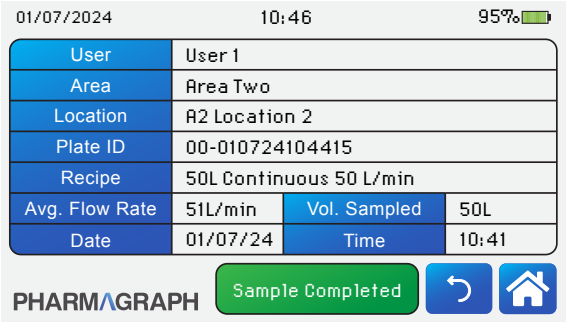
- Date (From newest to oldest)
- Start time
- User
- Location
- Status (Green = Pass, Red = Fail)



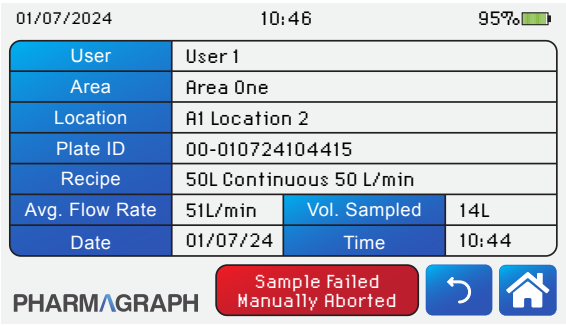
View full sample data

A full display of the sample can be viewed on selection, showing the following:

- User
- Area
- Location
- Plate ID
- Recipe
- Average flow rate
- Volume sampled
- Date
- Start time
- Sample status

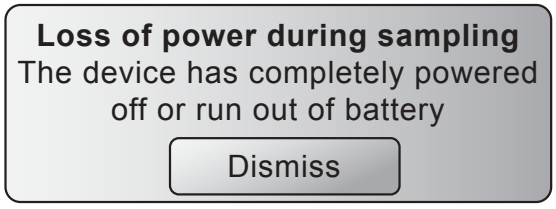


When a sample fails or is aborted this will be displayed in the full sample data. The potential causes can be displayed by a pop-up on the screen, the pop up can be accessed from the status bar at the bottom of the sample record.

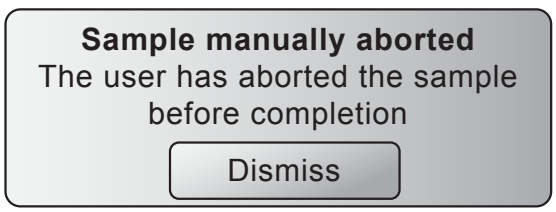


The sample failure pop-ups are as follows:

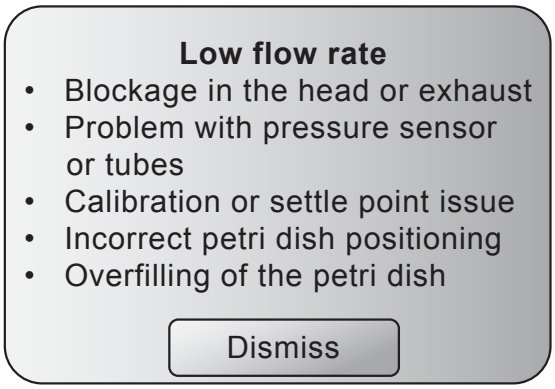
Loss of power during sampling



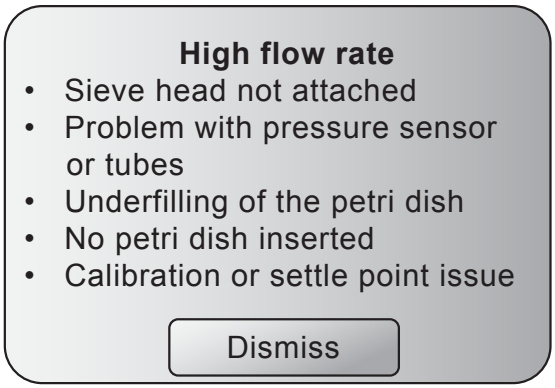
Sample manually aborted



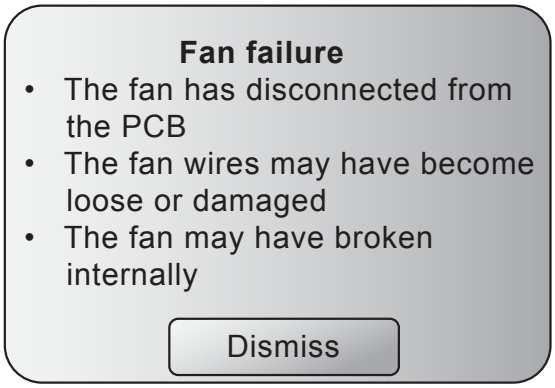
Low flow rate fail



High flow rate fail



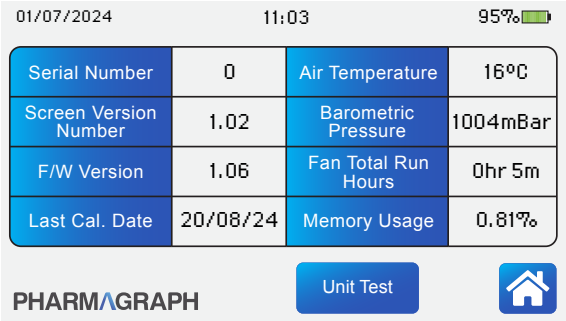
Fan failure



Unit information and self-test

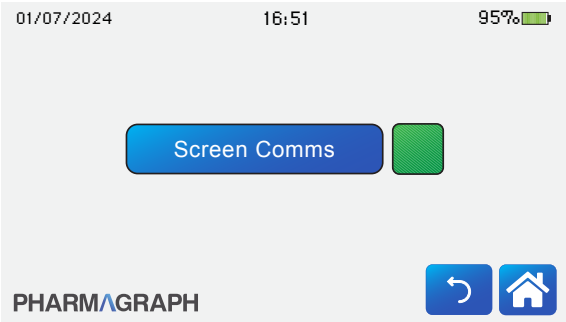
Pressing the information button from the home screen will display a list of the unit and system information, this page displays the following:

- Unit serial number
- Screen version number
- System firmware version
- The date of the last calibration
- The temperature reading from the in-built sensor
- The barometric pressure reading from the in-built sensor
- The total run time of the fan
- The percentage of the sample record memory used

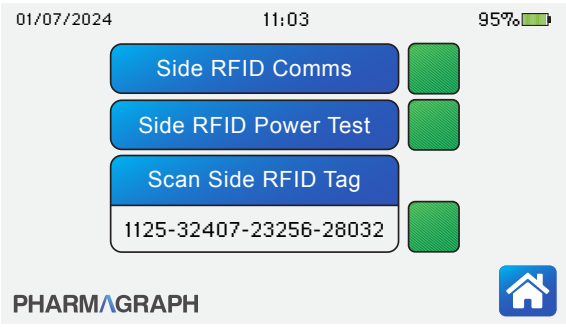


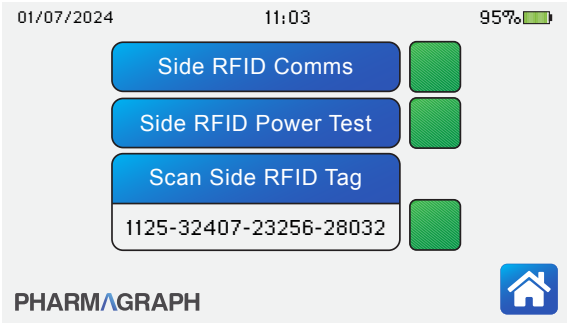
In the event of an issue with the device a 'Unit Test' can be run from the unit information screen as a diagnostic tool to find the issue.

The unit test starts by testing the screen communications and part number.

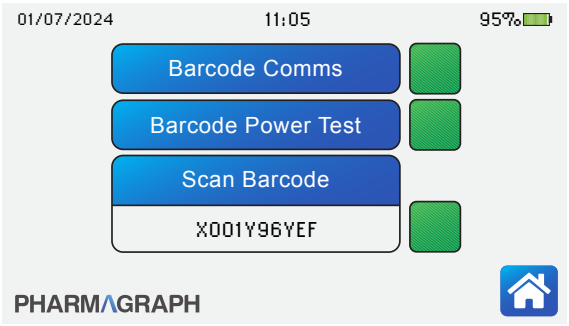


Then the side and base RFID readers are tested. This tests their communication with the main unit, the ability to control their power switches and if they can read an RFID tag successfully.

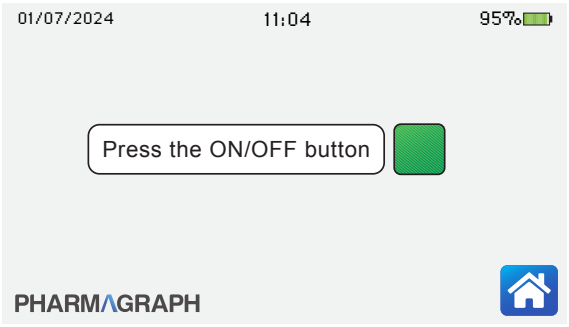




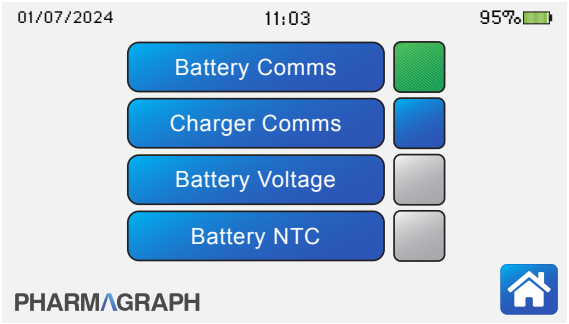
The in-built barcode scanner is tested next. This tests the communications of the barcode scanner, the power switch control and ensuring the scanner can read a barcode successfully.



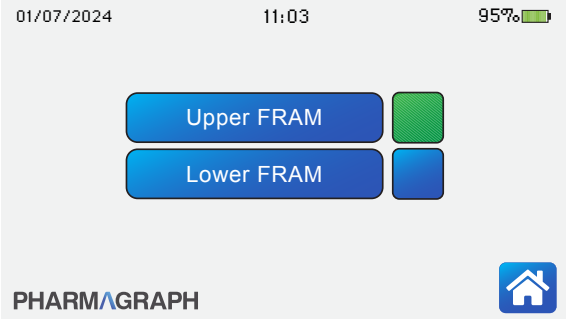
The ON/OFF button on the unit will then be tested. The operator will be asked to press the ON/OFF button, the unit will monitor if it receives a response.



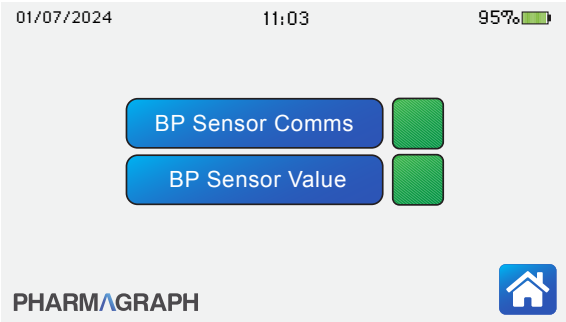
Next the battery and the battery charger will be tested. The includes testing the communications to each, the battery voltage reading and the battery NTC value.



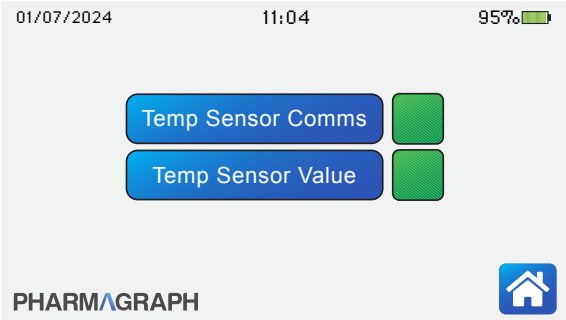
The upper and lower FRAM chips are tested next. They are where the sample record data is stored, so the test checks that data can be written and read from these chips.



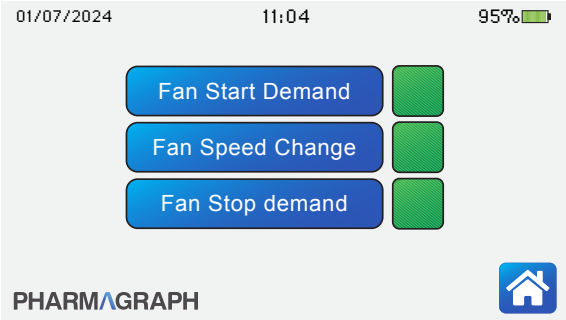
The in-built barometric pressure sensor is tested next, confirming it's communicating and returning a sensible value.



Next the unit temperature sensor will be tested, confirming it's communicating and returning a sensible value.

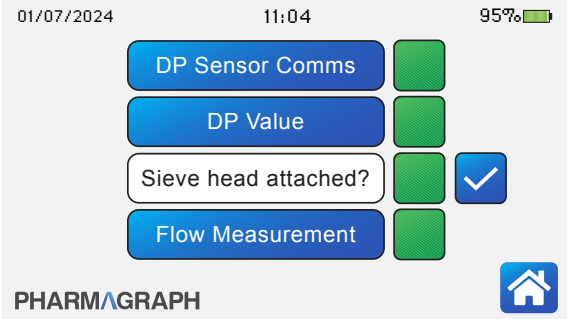


The fan will be tested next. This test will check the fan can be started, the speed can be changed and that the fan can be turned off.

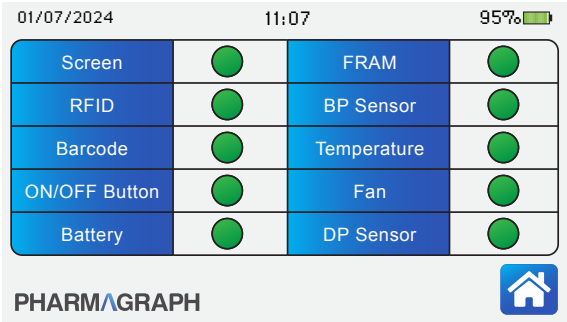


Finally, the differential pressure sensor of the unit will be tested. This test will check the communications and value read from the sensor when the unit has the fan off.

Then after ensuring the sieve head is attached the unit will run the fan, the test will then check if the pressure reading from the sensor equates to an expected flow measurement range.



After the test has completed the results will be displayed. The operator can press on a results section to view it more in depth.



Sampling Accessories

The iVAS Roam has 3 additional accessories that can be used. This includes a tripod, a remote sampling kit and a compressed gas sampling kit.

The following sections will describe the setup and use of these accessories.

Compressed Gas Sampling Kit

The compressed gas sampling kit is an attachment to the iVAS Roam that can be used to sample compressed gas lines. The compressed gas sampling kit can be used to sample the following gasses at pressures of 1.5 – 10 Bar at 100 L/m:

- Compressed Dry Air
- Nitrogen
- Argon
- Carbon Dioxide.

The compressed gas sampling kit is assembled in the following way:

Align the flats on the Hood with the flats in the Sieve Head and fully insert the Hood into the Sieve Head.

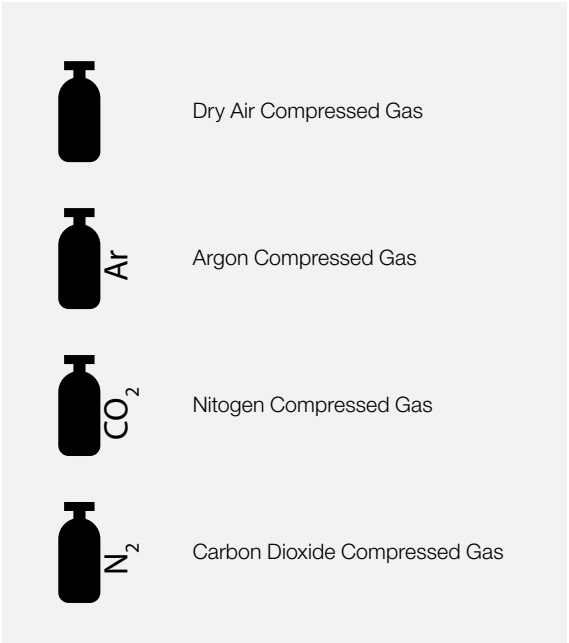
Rotate the Hood relative to the Sieve Head to lock the Hood into the Sieve Head.

Attach the valve assembly to the diffuser hood assembly, attach the required hose to the assembly.

Place the complete assembly onto the iVAS Roam Petri Support and rotate to engage.

Compressed Gas Sampling

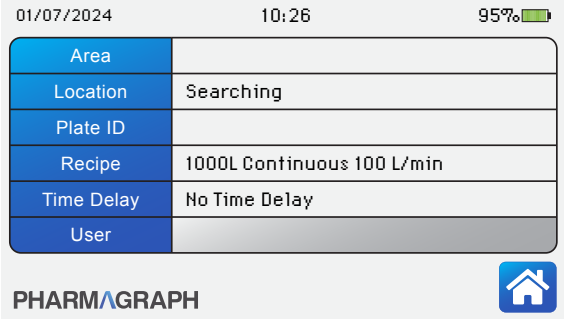
The iVAS Roam determines whether a sample is performed using the Compressed Gas Sampling Kit based on the Sampling Location selected. A Sampling Location is designated as a Compressed Gas Sample along with the Gas sampled using the iVAS Roam Manager software.

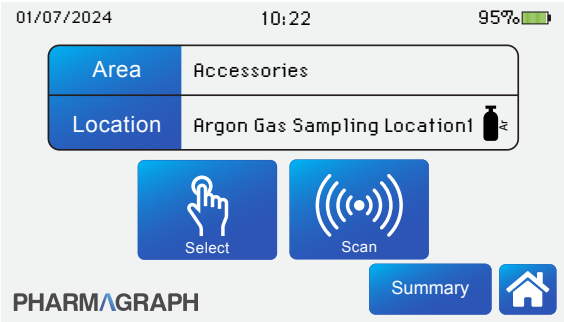


If a Sampling Location has been designated as a Compress Gas Location it will be represented by the following icons when being viewed on the device:

To start a compressed gas sample, press the ‘Sample’ button on the home screen, which will display the sample summary screen. A location can be selected using the RFID scanner or from the selection list.

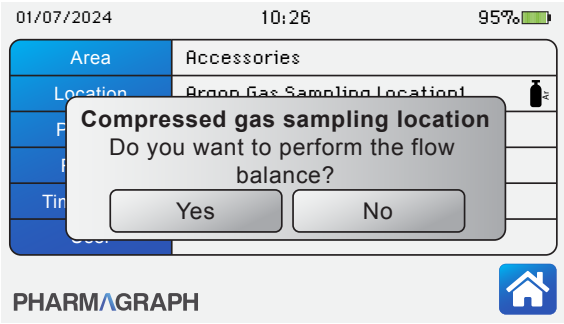
On the selection of a compressed gas sampling location a pop-up will appear on the sample summary screen. The pop-up will ask the operator ‘Do you want to perform the flow balance?’.



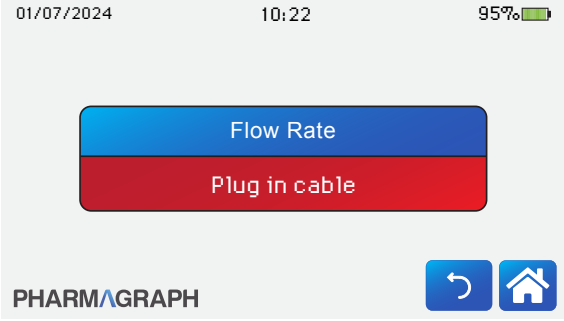


It is recommended that a flow balance is performed before every sample to ensure the flow rate is correct.

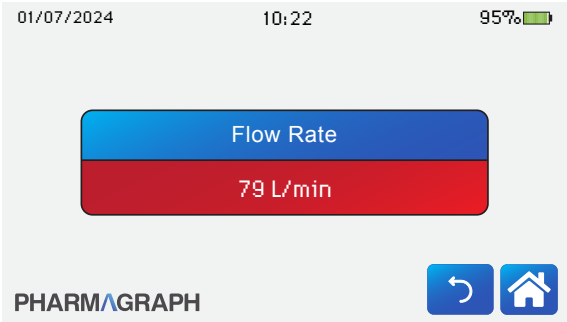
In a single sample pressing into the location select screen and returning to the summary screen will re display the pop up if the operator requires. In a tour pressing the recipe section will re display the flow balance pop up.



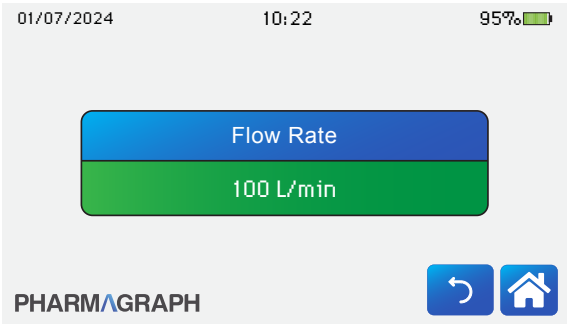
Selecting yes on the flow balance pop up will display the flow balance page. The screen will display ‘Plug in Cable’, if the unit detects the ball valve is not plugged in.



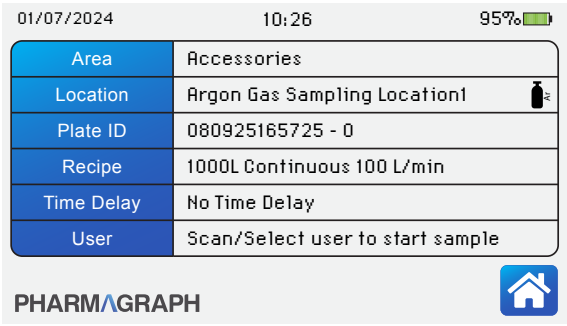
When the ball valve cable is plugged in the screen will display the live flow rate of the incoming compressed gas. This flow rate can be adjusted by turning the valve dial on the Compressed Gas Sampling Kit until a steady 100 L/m is reached.



When reaching 100 L/m +/- 2%, the flow rate will be displayed with a green background.



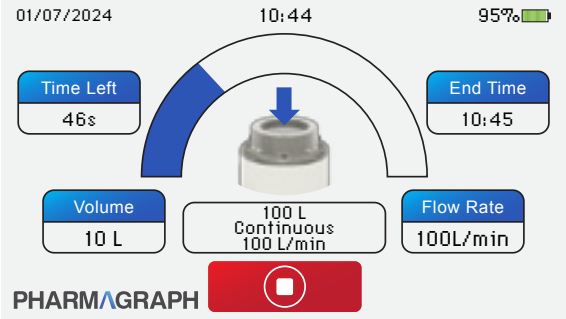
If the flow rate is held at 100 L/m +/- 2% for 10 seconds, the screen will return to the sample summary screen as a steady flow rate has been reached. The ball valve will then close again.



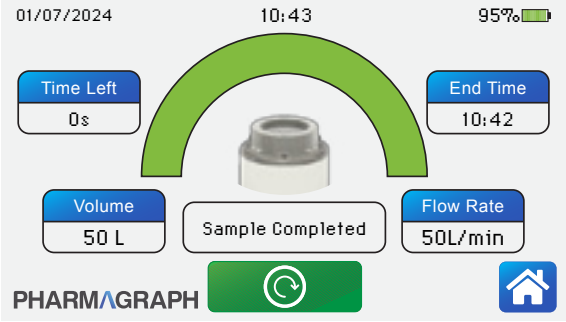
The operator can then set up the sample as described in the ‘Perform a Sample’ or ‘Performing a Tour’ Section.

The sample running screen will display:

- The time left to run in the sample
- The estimated end time of the sample
- The volume sampled
- The flow rate
- The sample recipe
- The percentage of sample completion



On completion, the sample completed screen will be displayed, this will show the total volume sampled, the sample flow rate, the time the sample ended, and the sample completion annulus will flash green. A buzzer will sound on completion, touch the screen to silence.



A sample can be repeated if the operator presses the repeat sample button, or the operator can press the home button to return to the home screen.

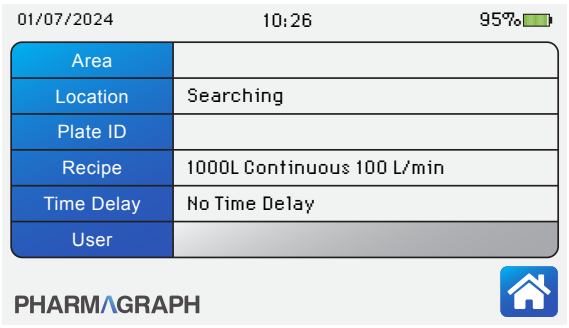
Remote Sampling Kit

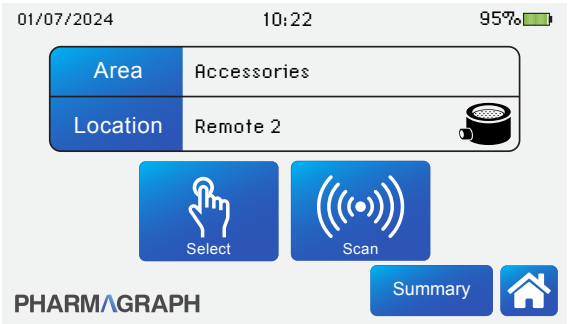
The remote sampling kit can be used to perform an iVAS Roam sample up to 10 meters away from the sampler. The set up is displayed in the image below:

Once the remote sampler is mounted to the iVAS Roam the operator can run a single sample or tour. The iVAS Roam determines whether a sample is performed using the Remote Sampling Kit based on the Sampling Location selected. A Sampling Location is designated as a Remote sampling location using the iVAS Roam Manager software.

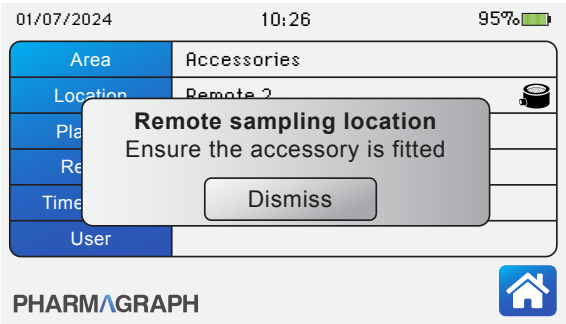
If a Sampling Location has been designated as a Remote Sampling Location it will be represented by the following icon when being viewed on the device:

To start a remote sample, press the ‘Sample’ button on the home screen, which will display the sample summary screen. A location can be selected using the RFID scanner or from the selection list.

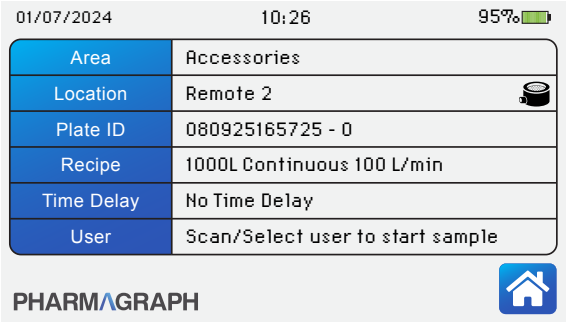




On the selection of a remote sampling location a pop-up will appear on the sample summary screen. The pop-up will remind the operator to check the remote sampling accessory is fitted.

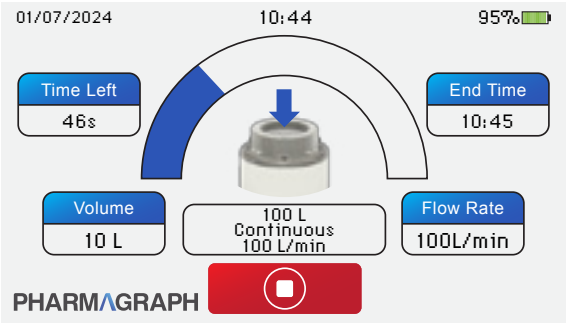


After dismissing the remote sampling location pop-up, The operator can then set up the sample as described in the 'Perform a Sample' or 'Performing a Tour' Section.

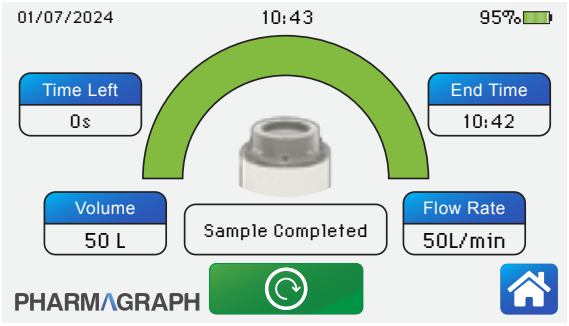


The sample running screen will display:

- The time left to run in the sample
- The estimated end time of the sample
- The volume sampled
- The flow rate
- The sample recipe
- The percentage of sample completion



On completion, the sample completed screen will be displayed, this will show the total volume sampled, the sample flow rate, the time the sample ended, and the sample completion annulus will flash green. A buzzer will sound on completion, touch the screen to silence.



A sample can be repeated if the operator presses the repeat sample button, or the operator can press the home button to return to the home screen.

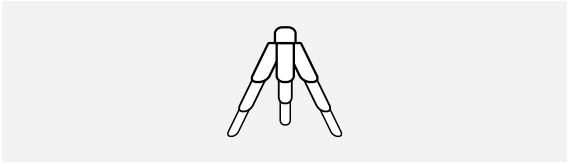
Tripod Sampling Kit

The tripod sampling kit can be used to perform an iVAS Roam sample on a tripod, allowing a sample to be taken at a specific location within a room.

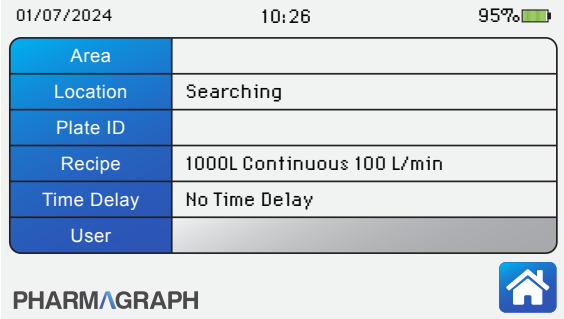
Once the iVAS Roam is mounted to the tripod the operator can run a single sample or tour.

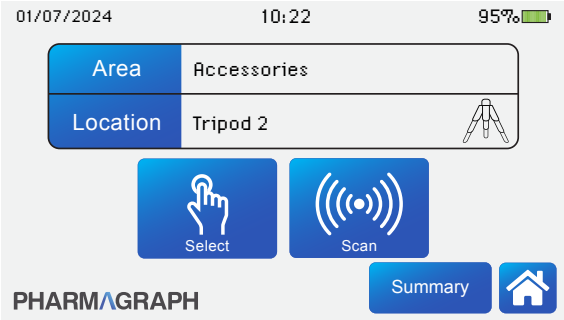
The iVAS Roam determines whether a sample is performed using the Tripod Sampling Kit based on the Sampling Location selected. A Sampling Location is designated as a Tripod sampling location using the iVAS Roam Manager software.

If a Sampling Location has been designated as a Tripod Sampling Location it will be represented by the following icon when being viewed on the device:

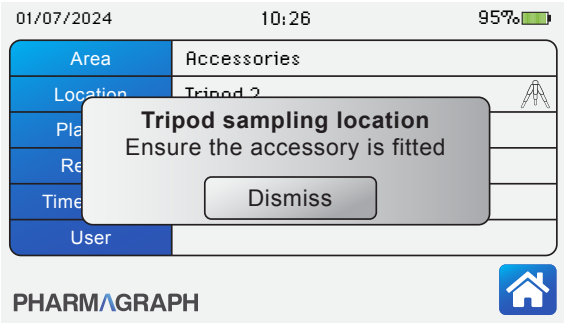


To start a tripod sample, press the ‘Sample’ button on the home screen, which will display the sample summary screen. A location can be selected using the RFID scanner or from the selection list.

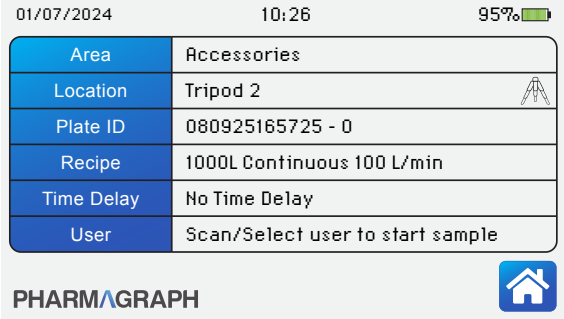




On the selection of a tripod sampling location a pop-up will appear on the sample summary screen. The pop-up will remind the operator to check the tripod sampling accessory is fitted.

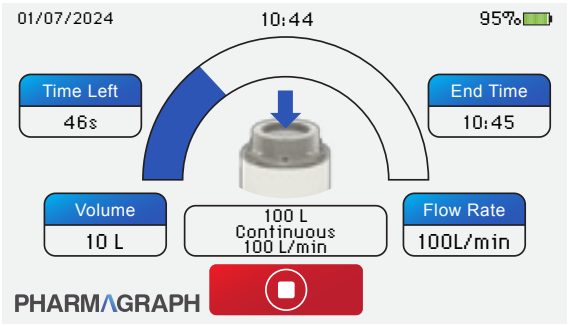


After dismissing the tripod sampling location pop-up, the operator can insert the petri dish and assign a plate ID. The sample recipe and time delay can be set. To start the sample the operator can scan an RFID card or select a user manually. The sample will start automatically after the selection of a user.

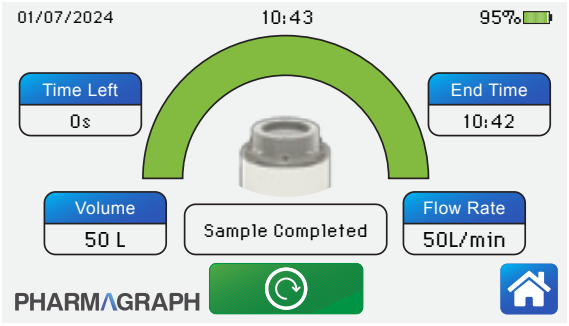


The sample running screen will display:

- The time left to run in the sample
- The estimated end time of the sample
- The volume sampled
- The flow rate
- The sample recipe
- The percentage of sample completion



On completion, the sample completed screen will be displayed, this will show the total volume sampled, the sample flow rate, the time the sample ended, and the sample completion annulus will flash green. A buzzer will sound on completion, touch the screen to silence.



A sample can be repeated if the operator presses the repeat sample button, or the operator can press the home button to return to the home screen.

Clean and Disinfect

Autoclave

The Sieve Head of the iVAS Roam is easily removed from the unit and can be cleaned using an Autoclave. None of the other parts of the iVAS Roam can be cleaned using an Autoclave as this could cause damage to the internal electrical components.

Cleaning Solutions

To clean the external surface of the iVAS Roam, spray a mild non-chlorine based disinfectant solution (such as Klercide Sporicidal Low Residue Peroxide) or 60-80% isopropanol/ water solution on a sterile tissue or wipe. Then wipe the iVAS Roam with the damp tissue/wipe.

Use another sterile tissue/wipe to dry the area before using the iVAS Roam.

WARNINGS

- Ensure that the iVAS Roam is powered off before starting to clean the unit in order to minimise the chance of electric shocks and damage to the unit
- Do not submerge any of the iVAS Roam components in any liquids
- Do not spray disinfectant solution directly into the iVAS Roam enclosure
- Do not use gases to disinfect the iVAS Roam
- Pharmagraph will void the warranty if the iVAS Roam is damaged due to the use of an unsuitable disinfectant solution or method

Manufacturer

Pharmagraph
Glossop House,
Hogwood Lane,
Finchampstead,
Wokingham,
Berkshire, UK.
RG40 4QW

Maintenance

There are no user serviceable parts. For any maintenance tasks (e.g. battery or filter replacement) please contact Pharmagraph, or one of Pharmagraph's authorised representatives.

APPENDIX A: Colony Forming Unit Correction Factors

The correction factors in Table 1. should be used along with the volume sampled to calculate the Colony Forming Units per m^3 using the following formula:

$$\text{Colony Forming Units} = \text{Estimated Viable Organisms} \frac{1000}{\text{Volume Sampled}}$$

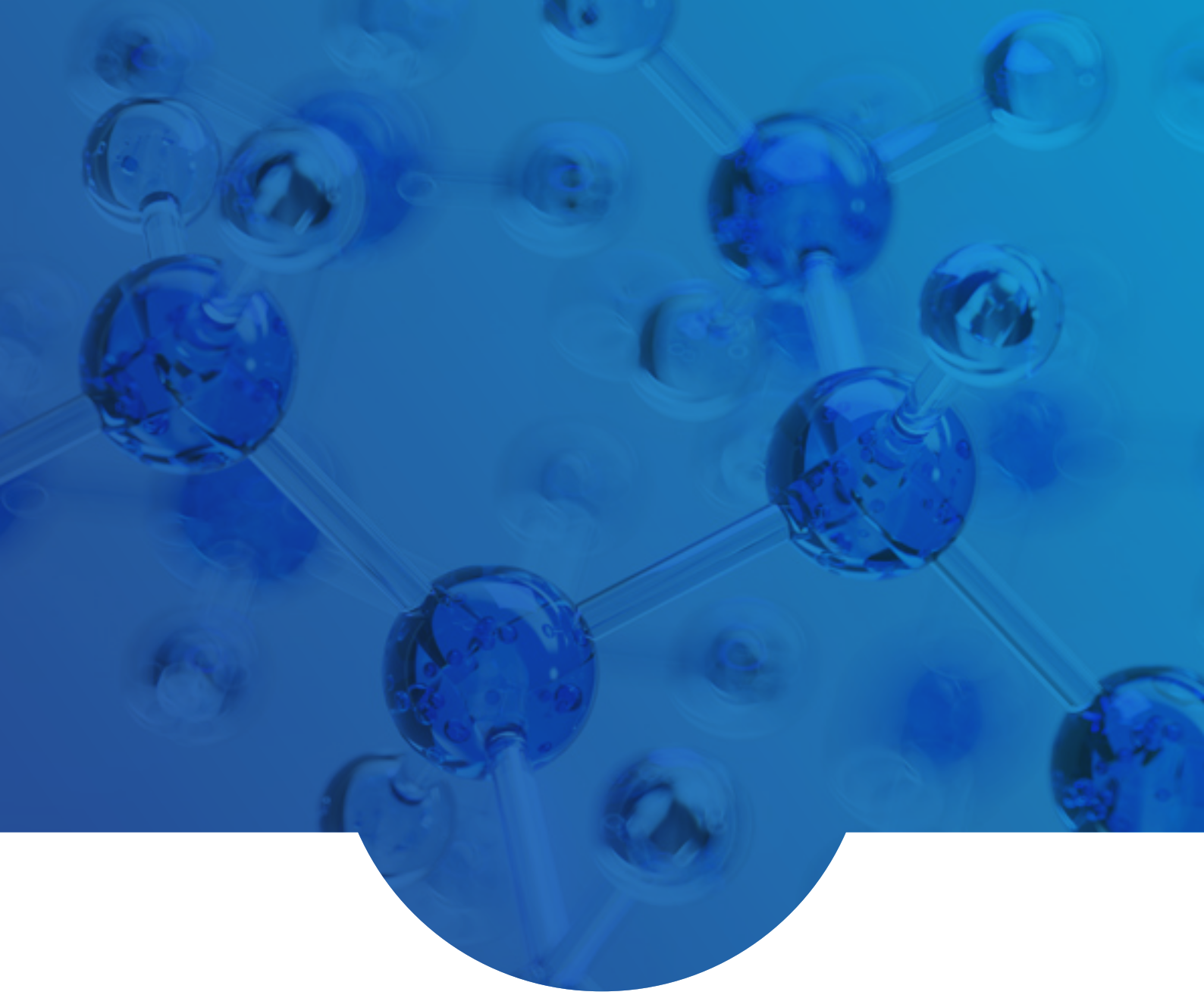
No Colonies Observed	Correction Factor	Estimated Viable Organisms	No Colonies Observed	Correction Factor	Estimated Viable Organisms
1	1.0119	1	37	1.0654	39
2	1.0132	2	38	1.0670	41
3	1.0146	3	39	1.0686	42
4	1.0160	4	40	1.0703	43
5	1.0174	5	41	1.0719	44
6	1.0188	6	42	1.0735	45
7	1.0202	7	43	1.0752	46
8	1.0216	8	44	1.0769	47
9	1.0231	9	45	1.0785	49
10	1.0245	10	46	1.0802	50
11	1.0259	11	47	1.0819	51
12	1.0273	12	48	1.0836	52
13	1.0288	13	49	1.0853	53
14	1.0302	14	50	1.0870	54
15	1.0317	15	51	1.0887	56
16	1.0332	17	52	1.0904	57
17	1.0346	18	53	1.0922	58
18	1.0361	19	54	1.0939	59
19	1.0376	20	55	1.0957	60
20	1.0391	21	56	1.0974	61
21	1.0406	22	57	1.0992	63
22	1.0421	23	58	1.1010	64
23	1.0436	24	59	1.1027	65
24	1.0451	25	60	1.1045	66
25	1.0466	26	61	1.1063	67
26	1.0481	27	62	1.1081	69
27	1.0497	28	63	1.1100	70
28	1.0512	29	64	1.1118	71
29	1.0528	31	65	1.1136	72
30	1.0543	32	66	1.1155	74
31	1.0559	33	67	1.1173	75
32	1.0574	34	68	1.1192	76
33	1.0590	35	69	1.1211	77
34	1.0606	36	70	1.1230	79
35	1.0622	37	71	1.1249	80
36	1.0638	38	72	1.1268	81
73	1.1287	82	114	1.2171	139

No Colonies Observed	Correction Factor	Estimated Viable Organisms	No Colonies Observed	Correction Factor	Estimated Viable Organisms
74	1.1306	84	115	1.2195	140
75	1.1326	85	116	1.2220	142
76	1.1345	86	117	1.2244	143
77	1.1365	88	118	1.2269	145
78	1.1384	89	119	1.2294	146
79	1.1404	90	120	1.2319	148
80	1.1424	91	121	1.2344	149
81	1.1444	93	122	1.2370	151
82	1.1464	94	123	1.2395	152
83	1.1484	95	124	1.2421	154
84	1.1505	97	125	1.2447	156
85	1.1525	98	126	1.2473	157
86	1.1546	99	127	1.2499	159
87	1.1566	101	128	1.2526	160
88	1.1587	102	129	1.2552	162
89	1.1608	103	130	1.2579	164
90	1.1629	105	131	1.2606	165
91	1.1650	106	132	1.2633	167
92	1.1671	107	133	1.2660	168
93	1.1693	109	134	1.2687	170
94	1.1714	110	135	1.2715	172
95	1.1736	111	136	1.2743	173
96	1.1758	113	137	1.2771	175
97	1.1779	114	138	1.2799	177
98	1.1801	116	139	1.2827	178
99	1.1824	117	140	1.2856	180
100	1.1846	118	141	1.2885	182
101	1.1868	120	142	1.2914	183
102	1.1891	121	143	1.2943	185
103	1.1913	123	144	1.2972	187
104	1.1936	124	145	1.3002	189
105	1.1959	126	146	1.3032	190
106	1.1982	127	147	1.3062	192
107	1.2005	128	148	1.3092	194
108	1.2028	130	149	1.3122	196
109	1.2052	131	150	1.3153	197
110	1.2075	133	151	1.3184	199
111	1.2099	134	152	1.3215	201
112	1.2123	136	153	1.3246	203
113	1.2147	137	154	1.3278	204
155	1.3309	206	196	1.4854	291
156	1.3341	208	197	1.4899	294

No Colonies Observed	Correction Factor	Estimated Viable Organisms	No Colonies Observed	Correction Factor	Estimated Viable Organisms
157	1.3374	210	198	1.4944	296
158	1.3406	212	199	1.4990	298
159	1.3439	214	200	1.5036	301
160	1.3472	216	201	1.5083	303
161	1.3505	217	202	1.5130	306
162	1.3539	219	203	1.5177	308
163	1.3572	221	204	1.5225	311
164	1.3606	223	205	1.5274	313
165	1.3640	225	206	1.5322	316
166	1.3675	227	207	1.5372	318
167	1.3710	229	208	1.5422	321
168	1.3745	231	209	1.5472	323
169	1.3780	233	210	1.5523	326
170	1.3816	235	211	1.5574	329
171	1.3852	237	212	1.5626	331
172	1.3888	239	213	1.5679	334
173	1.3924	241	214	1.5732	337
174	1.3961	243	215	1.5785	339
175	1.3998	245	216	1.5839	342
176	1.4036	247	217	1.5894	345
177	1.4073	249	218	1.5949	348
178	1.4111	251	219	1.6005	351
179	1.4150	253	220	1.6062	353
180	1.4188	255	221	1.6119	356
181	1.4227	258	222	1.6176	359
182	1.4266	260	223	1.6235	362
183	1.4306	262	224	1.6294	365
184	1.4346	264	225	1.6354	368
185	1.4386	266	226	1.6414	371
186	1.4427	268	227	1.6475	374
187	1.4468	271	228	1.6537	377
188	1.4509	273	229	1.6599	380
189	1.4551	275	230	1.6662	383
190	1.4593	277	231	1.6726	386
191	1.4636	280	232	1.6791	390
192	1.4679	282	233	1.6856	393
193	1.4722	284	234	1.6923	396
194	1.4766	286	235	1.6990	399
195	1.4810	289	236	1.7058	403
237	1.7126	406	278	2.0975	583
238	1.7196	409	279	2.1105	589
239	1.7266	413	280	2.1237	595

No Colonies Observed	Correction Factor	Estimated Viable Organisms	No Colonies Observed	Correction Factor	Estimated Viable Organisms
240	1.7338	416	281	2.1372	601
241	1.7410	420	282	2.1510	607
242	1.7483	423	283	2.1651	613
243	1.7557	427	284	2.1794	619
244	1.7632	430	285	2.1941	625
245	1.7709	434	286	2.2090	632
246	1.7786	438	287	2.2243	638
247	1.7864	441	288	2.2399	645
248	1.7943	445	289	2.2558	652
249	1.8023	449	290	2.2721	659
250	1.8105	453	291	2.2888	666
251	1.8187	457	292	2.3058	673
252	1.8271	460	293	2.3232	681
253	1.8356	464	294	2.3411	688
254	1.8442	468	295	2.3594	696
255	1.8530	473	296	2.3781	704
256	1.8618	477	297	2.3973	712
257	1.8708	481	298	2.4169	720
258	1.8800	485	299	2.4371	729
259	1.8893	489	300	2.4578	737
260	1.8987	494	301	2.4790	746
261	1.9082	498	302	2.5008	755
262	1.9180	503	303	2.5233	765
263	1.9278	507	304	2.5463	774
264	1.9379	512	305	2.5700	784
265	1.9480	516	306	2.5944	794
266	1.9584	521	307	2.6195	804
267	1.9689	526	308	2.6454	815
268	1.9796	531	309	2.6721	826
269	1.9905	535	310	2.6996	837
270	2.0016	540	311	2.7280	848
271	2.0128	545	312	2.7574	860
272	2.0243	551	313	2.7877	873
273	2.0359	556	314	2.8191	885
274	2.0478	561	315	2.8516	898
275	2.0599	566	316	2.8853	912
276	2.0722	572	317	2.9203	926
277	2.0847	577	318	2.9565	940
319	2.9942	955	325	3.2563	1058
320	3.0334	971	326	3.3072	1078
321	3.0743	987	327	3.3607	1099
322	3.1168	1004	328	3.4169	1121
323	3.1613	1021	329	3.4760	1144
324	3.2077	1039	330	3.5385	1168

Table 1 – VS8603 Correction Factors



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