GreyScan ETD-100 Operator's Manual

GREYSCAN

GSNF-0002-M-ETD-100

GreyScan ETD-100
Operator's Manual

July 2021

The GreyScan ETD-100 product is displayed and written as the **device**.

The following components are included with the device.
Ensure all the components are present before setting up the device.

- Device X 1
- Device Pelican Case X 1
- Power Supply Adapter X 1 (AC 90W Meanwell GST90A24-P1M)
- Reagent Cartridge X 1 (shipped separately)
- Sample Trap Holder X 1
- Sample Filter X 1
- Sample Filter Retainer X 1

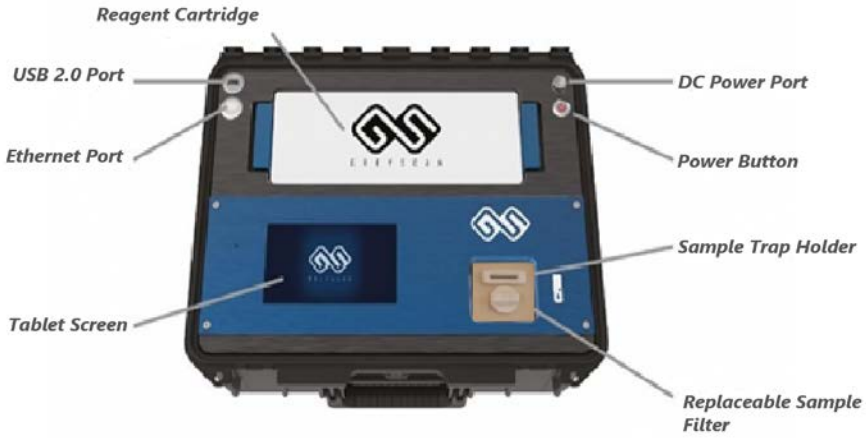

Figure 1: Device Top View

WARNING
ONLY USE CERTIFIED ETD-100 CONSUMABLES WITH THE DEVICE
THIS INCLUDES SWABS, REAGENTS AND FILTERS.
USE OF ANY OTHER CONSUMABLE ITEMS DOES NOT GUARANTEE SPECIFIED ETD-100 PERFORMANCE AND MAY VOID THE WARRANTY.

1 Table of Contents

2 Document Control

2.1 Users

This manual is intended for end Users of the ETD-100 (device):

- Operators and supervisors
- Distribution and service partners
- Sales and technical teams

2.2 Document Scope

This document provides the device operating, handing and maintenance instructions for the device.

This manual describes all features within the device. The precise configuration of your device can vary according to territory, regulator and optional accessories. As a result, some features described in this manual may not be available on your device. For advice about features described here which are not available on your device please contact the GreyScan service team.

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3 Preface

3.1 Introducing the GreyScan Device

The ETD-100 is the world's first automated Explosive Trace Detection (ETD) device to detect homemade inorganic explosives based on nitrates, chlorates and perchlorates.

GreyScan sets the global standard for inorganic ETD and extends the current security capabilities by complementing commercially available Ion Mobility Spectrometry (IMS) explosive trace detectors.

To operate the device effectively, please follow the instructions contained in this Operator's Manual.
This includes following key conventions in the trace detection industry, with some explained in this Operator's Manual.

3.2 Glossary Of Terms

Term	Definition
CZE	Capillary Zone Electrophoresis
Device	GreyScan ETD-100
Enclosure Lid	The Enclosure Lid is the lid of the black pelican case containing the device.
ETD	Explosive Trace Detection
Filter Slot	The Filter Slot is the space designed to contain the Sample Filter. Users will only see the Filter Slot if the Sample Filter is removed.
Device Enclosure	The device enclosure is the black Pelican case containing the device.
Reagent Cartridge	The Reagent Cartridge is contained within the device. It is self-contained and contains the fluidics required to operate the device.
Sample Filter	The Sample Filter is a consumable component that can be replaced by the User, and filter samples for analysis.
Sample Trap Holder	The Sample Trap Holder is a consumable component that can be replaced by the user. Its function is to hold a sample Swab for testing. .
Sample Trap Holder Slot	The Sample Trap Holder Slot is the space designed to contain the Sample Trap Holder. Users will only see the Slot if the Sample Trap Holder is removed.
Swab	The Swab is the medium used to collect trace samples from test subjects. Subjects are wiped with the Swab, and the Swab is inserted into the Sample Trap Holder for testing.
Operator	User of the device as part of the day to day operation.
Supervisor	A super User responsible for the configuration of the device, regular maintenance and basic trouble shooting.
UI	User Interface
Electropherogram	A graphical representation of sample peaks detected during the device separation process.
FAT	File Allocation Table. This is a Windows formatted file system storage device.
KNO_3	Compound representation of Potassium Nitrate.
$KCLO_3$	Compound representation of Potassium Chlorate.
$KClO_4$	Compound representation of Potassium Perchlorate.

4 Technical Specifications

4.1 System Specification

Connectivity	Ethernet, Wi-Fi, USB2.0
Weight	17.1 kg (37.7 lb). with Reagent Cartridge fitted 14.5 kg (32.0 lb). Reagent Cartridge not installed. 2.6 kg (5.7 lb). Reagent Cartridge
Analysis Time	Less than 1 Minute
Start-up Time	10 - 15 Minutes
Dimensions	(W x D x H) 48.8 cm x 38.6 cm x 22.9 cm (19.20" x 15.20" x 9.00")
Operating Temperature	5°C to 40°C (40°F to 104°F)
IP Rating	IP63. Pelican case closed. IP2X. Pelican case open, Reagent Cartridge installed.
Explosives Detection	Nitrates (NO3), Chlorates (ClO3), Perchlorates (ClO4)
Limit of Detection	20-60 ng range (depending on the specific ion)
Calibration Type	Automatic Self-Calibration
Operating Voltage	DC: 24VDC, 3.75A MAX AC: 100-240 VAC, 50-60 Hz
Maximum Rated Power	90W
Detection Alarm	Audible/Visual (Configurable)
Reagent Cartridge Capacity	Approximately 1500 scans. Actual capacity is dependent on usage cases
Sample Filter Life	500 scans. Actual filter life is dependent on swabbed material.
NFC/RFID	13.56MHz

5 Installation and Setup

5.1 Setup Method

1. Unpack the device and Reagent Cartridge
    - Ensure the cardboard packaging and support material are retained for future shipment.
2. Install the Reagent Cartridge (If not already fitted)
    - Refer to Section 5.2 Installation of the Reagent Cartridge.
3. Install the Sample Trap Holder (If not already fitted)
    - Refer to Section 5.3 Installation of the Sample Trap Holder.
4. Install the Sample Filter (If not already fitted)
    - Refer to Section 5.4 Installation of the Sample Filter and Sample Filter Retainer
5. Plug in the power cable
    - Plug the DC power adapter plug into the device DC power port.
    - Insert the AC plug of the power adapter into a wall power outlet.
    - The Meanwell GST90A24-P1M power adapter and cable suitable must not be substituted with any other power cable or adapter.
6. Turn on the device
    - Press the power button on the device. It should illuminate red.
    - The PIN code Screen will take approximately 30 seconds to load.
    - Enter the password PIN code provided with the GreyScan ETD-100 Quick Start Guide.
7. Calibration
    - Once the device is turned on, allow the device to complete internal calibration/initialisation tests. This will take 10-15 minutes to complete.
    - When internal calibration is complete, the **INSERT SWAB** Screen will be displayed, and the device is ready for use.

5.2 Installation of the Reagent Cartridge

Reagent Cartridge Installation Method

1. Remove the Reagent Cartridge from the packaging and open the device lid.
2. Check the Reagent Cartridge has not expired (Expiry Date is printed on the side of the Reagent Cartridge).
3. Remove the reagent transport protection caps on each fluidic port (if fitted) and return the caps in the sealed bag provided for future storage or transport (Refer to Section 7.2).

Figure 2: Reagent Transport Protection Caps

4. Position the Reagent Cartridge as illustrated.
5. Lower the Reagent Cartridge into the device and push down firmly until the Reagent Cartridge is seated.

Figure 3: Reagent Cartridge Orientation

6. Push down on the two blue handles on either side of the Reagent Cartridge until they click into place.

5.3 Installation of the Sample Trap Holder

Sample Trap Holder Installation Method

1. Remove the Sample Trap Holder from the plastic packaging and insert into the Sample Trap Holder slot. Lower until the top lip is in contact with the device's front cover plate.
2. Insert the Sample Trap Holder as illustrated into the swab slot with the large open circle facing forward. Refer to Figure 6: Swab and Filter Correct Installation (Top View).

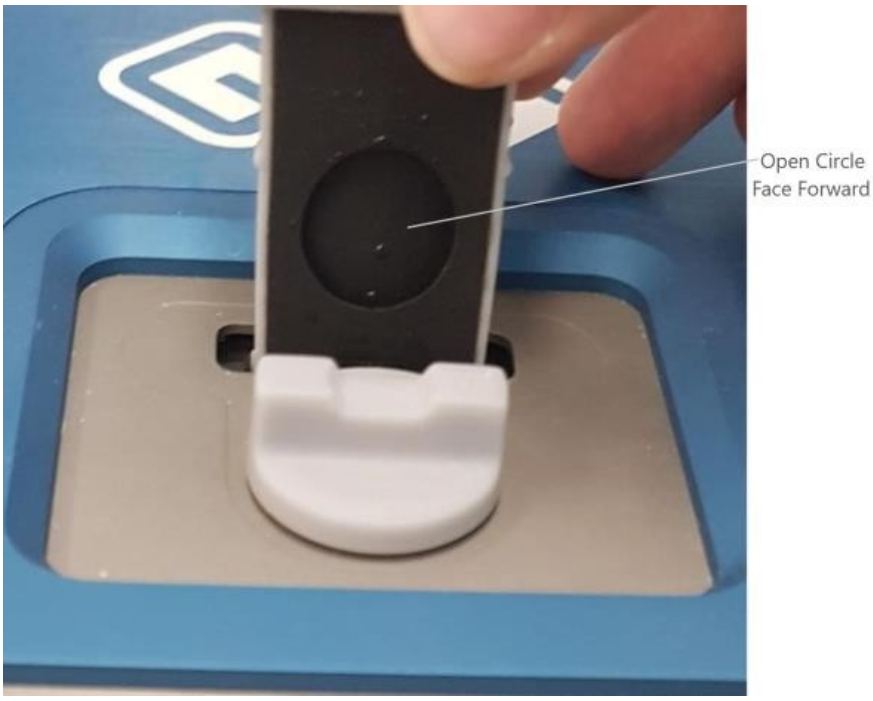


Figure 4: Sample Trap Holder Orientation

5.4 Installation of the Sample Filter and Sample Filter Retainer

Sample Filter Installation Method (FIRST TIME ONLY)

1. When the device is shipped, the Sample Filter Assembly will not be installed. There will be a sticker/tape on top of the filter slot. Remove the sticker/tape and following these installation instructions.
2. Remove the Sample Filter Assembly from the filter bag. It comprises two parts affixed together. The first part is the Sample Filter itself (refer to Figure 5 Top item) and the second part is the Sample Filter Retainer (refer to Figure 5 Bottom item).
3. Insert the Sample Filter into the Sample Filter Retainer. Refer to Figure 5:Sample Filter Rotation Orientation.
4. To correctly insert the Sample Filter/Sample Retainer Assembly, the lugs on both the top and bottom sections must align with the Sample Filter Slot in the device.
5. Fully insert the Sample Filter into the Sample Filter Slot then rotate the filter clockwise to lock the filter into place. The bottom of the Sample Filter Retainer rotates a small amount independent of the top (Sample Filter).

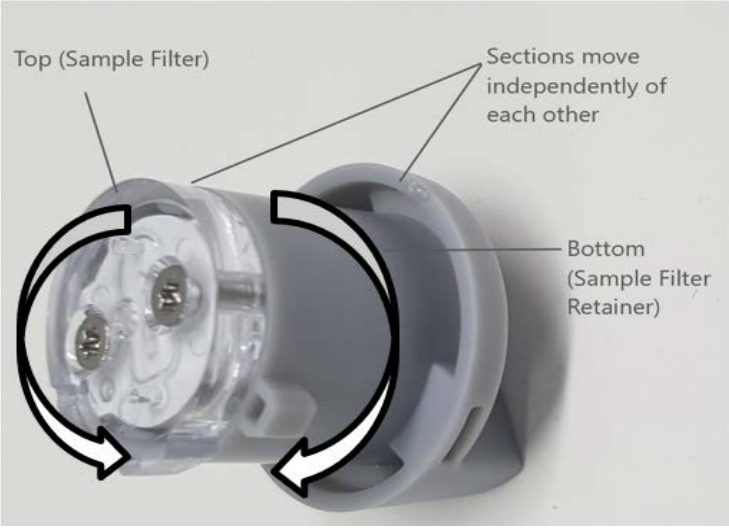


Figure 5:Sample Filter Rotation Orientation

Figure 6: Swab and Filter Correct Installation (Top View)

Sample Filter Installation Method
(FOR EVERY USE AFTER INITIAL INSTALLATION)
Refer to Section 8.3

6 Everyday Use - Operator

6.1 Startup and User Login

To log in to the device:

1. Make sure the device power cable is plugged in, via the adaptor into a wall power outlet that is switched on.
2. Turn the device on by depressing the Power Button. The LED will illuminate red to indicate the device is on.
3. Once the device has powered up, the GreyScan logo splash Screen will be displayed, followed by the PIN code Screen. The PIN code Screen may take up to 30 seconds to load.

Figure 7: Device splash Screen

NOTE: NOT ALL DEVICE SOFTWARE FUNCTIONS WILL BE AVAILABLE TO ALL USERS. ACCESS LEVELS DIFFER DEPENDING ON PERMISSIONS ASSIGNED TO USER LOGINS.

4. Enter the relevant Operator or Admin/Lab User PIN code using the touch Screen digits as illustrated in Figure 8. The circles on the bottom left of the Screen will turn blue as digits are entered.

NOTE: A DEFAULT PIN CODE WILL BE PROVIDED DURING ETD-100 OPERATOR TRAINING AND IS ALSO PROVIDED IN THE QUICK START GUIDE.

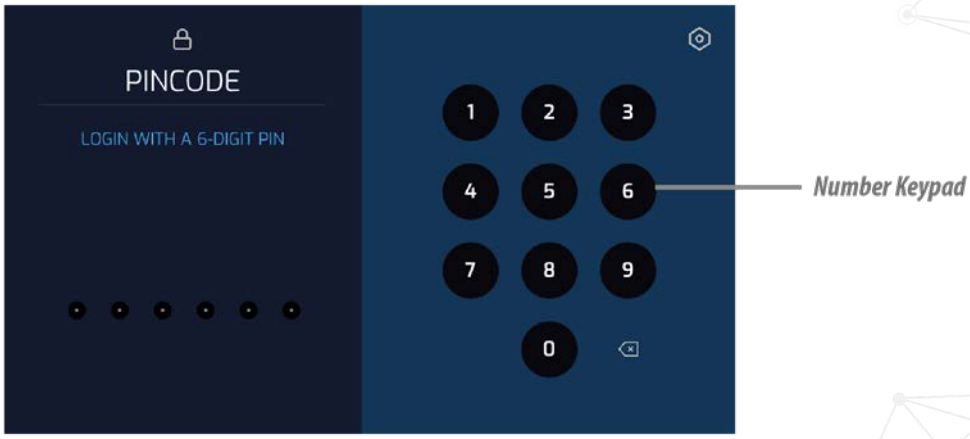


Figure 8: PIN Code Screen

5. After login an **INITIALISING** Screen displays until the device is ready to operate (normally in 10-15 minutes).
6. The Settings button can be pressed during the initialising process to review stored files. Refer to Section 6.2.2 The Settings Screen.

Figure 9: Initialising Screen

NOTE: WHEN THE DEVICE IS POWERED UP IT WILL BEGIN INTIALISING(CALIBRATING). THE DEVICE MAY HAVE COMPLETED THE CALIBRATION PROCESS WHILE THE USER IS COMPLETING THE LOGIN PROCESS.

7. If the User enters an incorrect PIN, the 6 circles on the left of the PIN code Screen will turn red indicating incorrect PIN entry.
8. Following three failed login attempts, the User will be locked out of the device for 1 minute or until a Supervisor unlocks the User account.

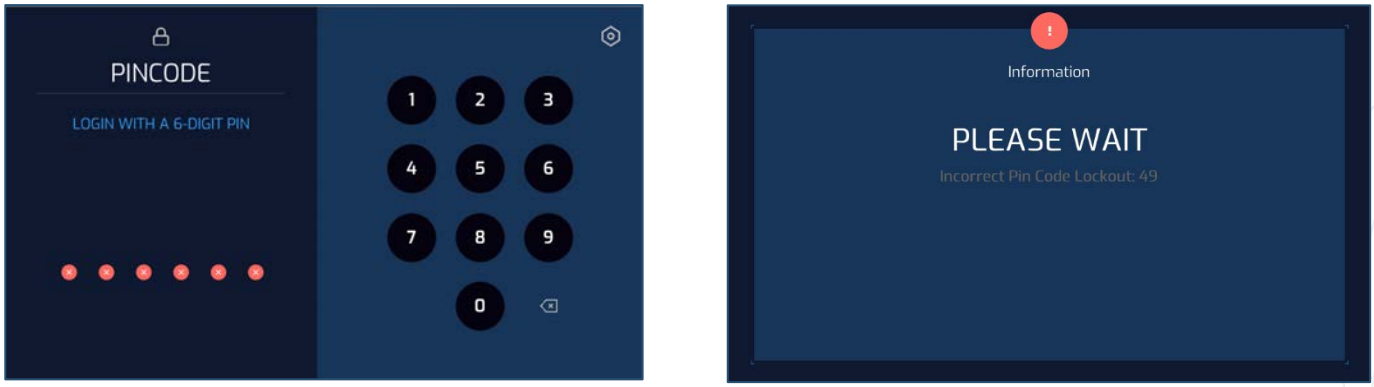


Figure 10: Incorrect PIN code Entry and Lock Out Screen

NOTE: FOLLOWING THREE FAILED LOGIN ATTEMPTS, THE USER WILL BE LOCKED OUT OF THE DEVICE FOR 1 MINUTE

9. Once the device is finished calibrating, **INSERT SWAB** indicates the device is ready for a test sample.

Figure 11: Insert Swab Screen

6.2 Device User Interface

The device user interface has been designed to be simple and effective for Users. All navigation between menus and screens on the device are performed using the touchscreen.
The following sections describe the device User Interface.

6.2.1 The INSERT SWAB Screen

Figure 12: INSERT SWAB Screen (No Labels)

The **INSERT SWAB** Screen is the default screen for the device when waiting for a test sample.
The horizontal bars on the left of the screen indicate the status of the: filter, consumable reagent fluids and battery.
Consumable items need to be replaced periodically when expired or, in the case of the filter, if the baseline of the electropherogram is 'noisy' and the battery needs to be kept charged. If any indicators drop below a threshold, a prompt will be displayed indicating that attention is required and the bar will turn red. Refer to Section 8.1 Maintenance Overview.

The **SETTINGS BUTTON** on the **INSERT SWAB** Screen  is used to access the Settings Screen.
The Settings Screen is described in Section 6.2.2.

The bottom section of the **INSERT SWAB** Screen has a button. Once a Swab has been inserted, pressing the **PROCEED** button PROCEED will begin the device test sequence. See Section 6.3 Collecting and Testing a Sample on how to process a test sample.

If required, a Sample ID can be entered BEFORE a sample is analysed by pressing on the Sample ID field and entering a Sample ID name using the on-screen keyboard. Note: Invalid characters are replaced with '_' to allow data to be recorded to files. Tagging scans with a Sample ID can be helpful as the label can be searched for. See 9.2.1: Sample Management Screen.

Figure 13: Enter New Sample ID

6.2.2 The Settings Screen

The Settings Screen gives the user access to different options including exporting data, device maintenance and Network Settings. Each button is described in Table 1 below.

The Settings Screen is not the same for all users. Supervisors and users with more permissions have access to a wider range of functions.

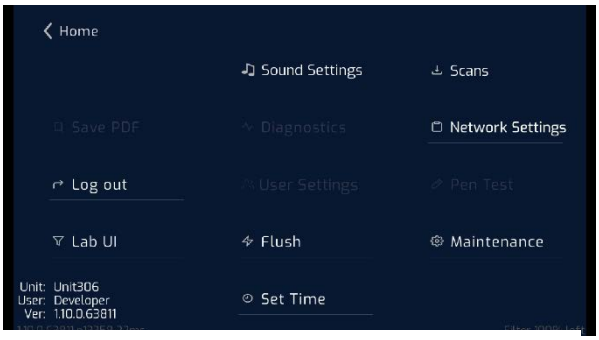


Figure 14: Settings Screen

Button	Description
Home	Home button. Takes the user back to the INSERT SWAB Screen.
Save PDF	Save PDF button. Saves a PDF and CSV file of the previous test scan to file via USB (refer to Section 6.5). Note: Save PDF doesn't appear until after the first scan of the session.
Log out	Logout button. Logs the current user out of the device and reverts to the login Screen (refer to Section 6.10).
Lab UI	Lab UI button. Opens the Lab User Interface.
Sound Settings	Sound settings button. Allows the User to edit sound settings. (refer to Section 9.5 Sound Settings).
Network Settings	Network settings button. Allows the User to view and edit network settings. (refer to Section 9.3 Network Settings)
Diagnostics	Diagnostics button.
Flush	Flush button. Begins a system flush. Users will see the Flush in Progress Screen (See Section 6.3.4 FLUSH IN PROGRESS Screen).
Set Time	Set time button. Opens the Set Time Screen for users to change the system date and time.
Scans	Scans button. Opens the Scans Menu.

Button	Description
Maintenance	**Maintenance button. Opens the Maintenance Menu (See Section 8.2).**

Table 1: Settings Screen Button Functions

6.3 Collecting and Testing a Sample

6.3.1 Testing a Sample

The device is designed to detect certain inorganics that can be used to manufacture home-made explosives (HMEs).

A sampling Swab is required for sample testing with the device. The Swab sample area and alignment hole is illustrated in the figure below.

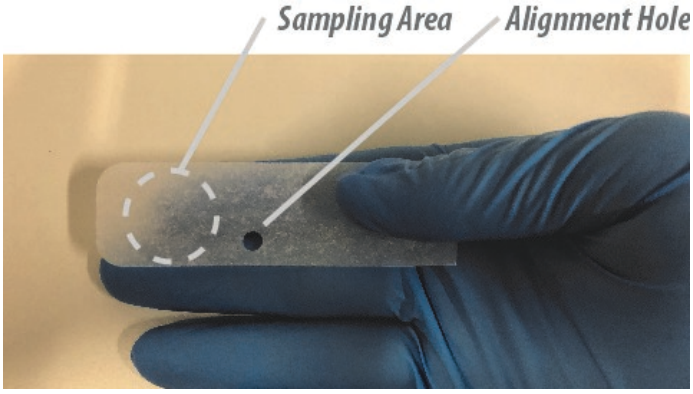


Figure 15: Sampling Swab

IMPORTANT:

- Always wear Vinyl (powder free) gloves.
- **Do not use Nitrile or Latex gloves**. These types of gloves contain trace elements detectable by the device.
- Do not use the same Swab more than once.
- Do not place the Swab onto any surface other than that being swabbed.
- Avoid touching the sample area as touching the sample area may result in a false reading.
- When in storage/transit keep the Swab box and gloves in a sealed bag.
- Never leave the Swab box open as it may be exposed to contamination.

To collect a sample:

1. Hold the Swab as illustrated in Figure 15. Ensure the alignment hole is as illustrated in Figure 15.
2. Apply the Swab to the sample target area. Only hold the Swab as illustrated with the finger directly behind the sample area. Only swipe the sample Swab in one direction. Apply firm pressure by the finger whilst swabbing.

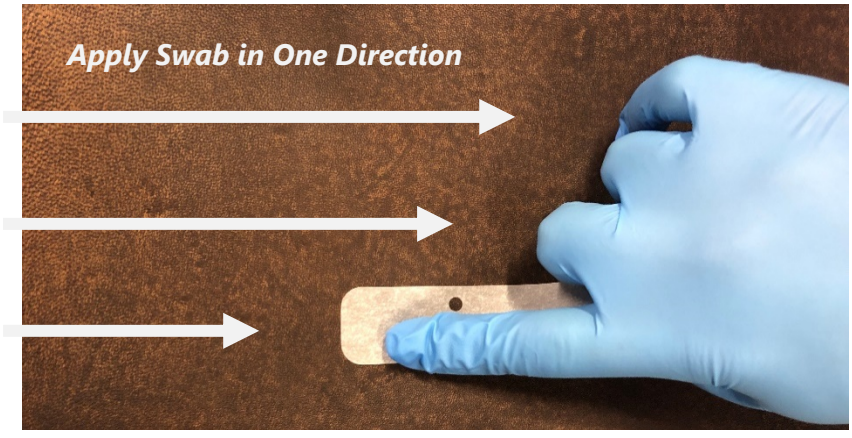


Figure 16: Swabbing Technique

To perform a sample test:

1. Navigate the device touchscreen to show the **INSERT SWAB** Screen.
2. Once the **INSERT SWAB** Screen is displayed, insert the Swab into the Sample Trap Holder. Ensure the Swab position is as illustrated with the round edges entering the Sample Trap Holder first, and the alignment hole located on the right as per Figure 17.

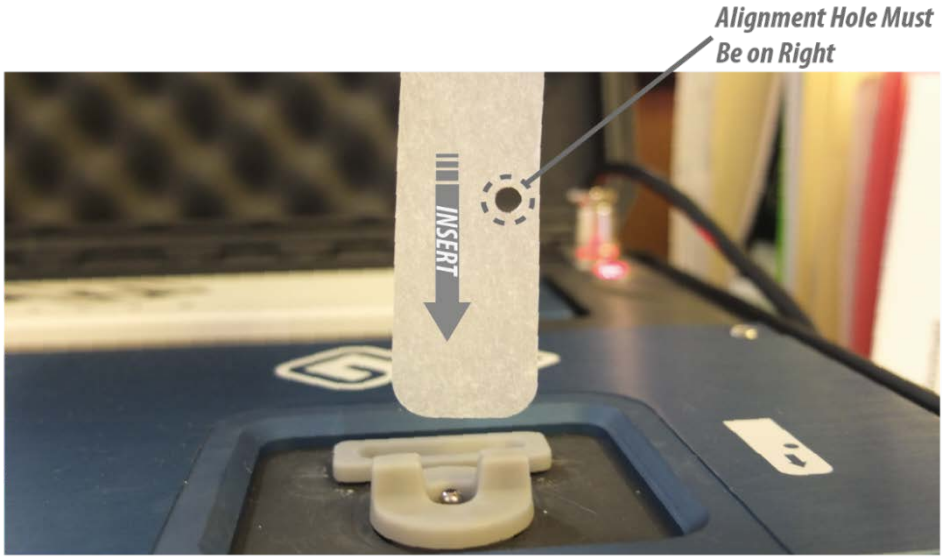


Figure 17: Swab Insertion Correct Orientation

3. Press the **PROCEED** PROCEED Button to commence the processing of a sample Swab.
4. The device will now begin testing the Swab sample. Testing takes up to 1 minute. A **SCANNING** on screen message is displayed whilst the sample is being tested (processed).

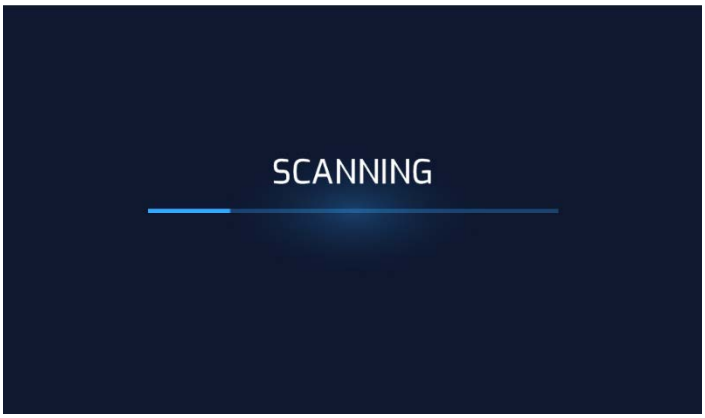


Figure 18: Scanning Screen

5. After the sample has been tested a results screen will be displayed indicating a Pass (**green** indicator), a Warning (**red** indicator), or an Invalid Sample - Overload (**white** indicator) as illustrated in Figure 19. The Swab should then be removed and disposed.

NOTE: INITIALLY, THE RESULTS SCREEN WILL PROMPT THE USER TO WAIT. THIS INDICATES THE SYSTEM IS RUNNING A FLUSH SEQUENCE. USERS MUST WAIT UNTIL THEY SEE THE PROCEED BUTTON ON THE RESULTS SCREEN TO CONTINUE.

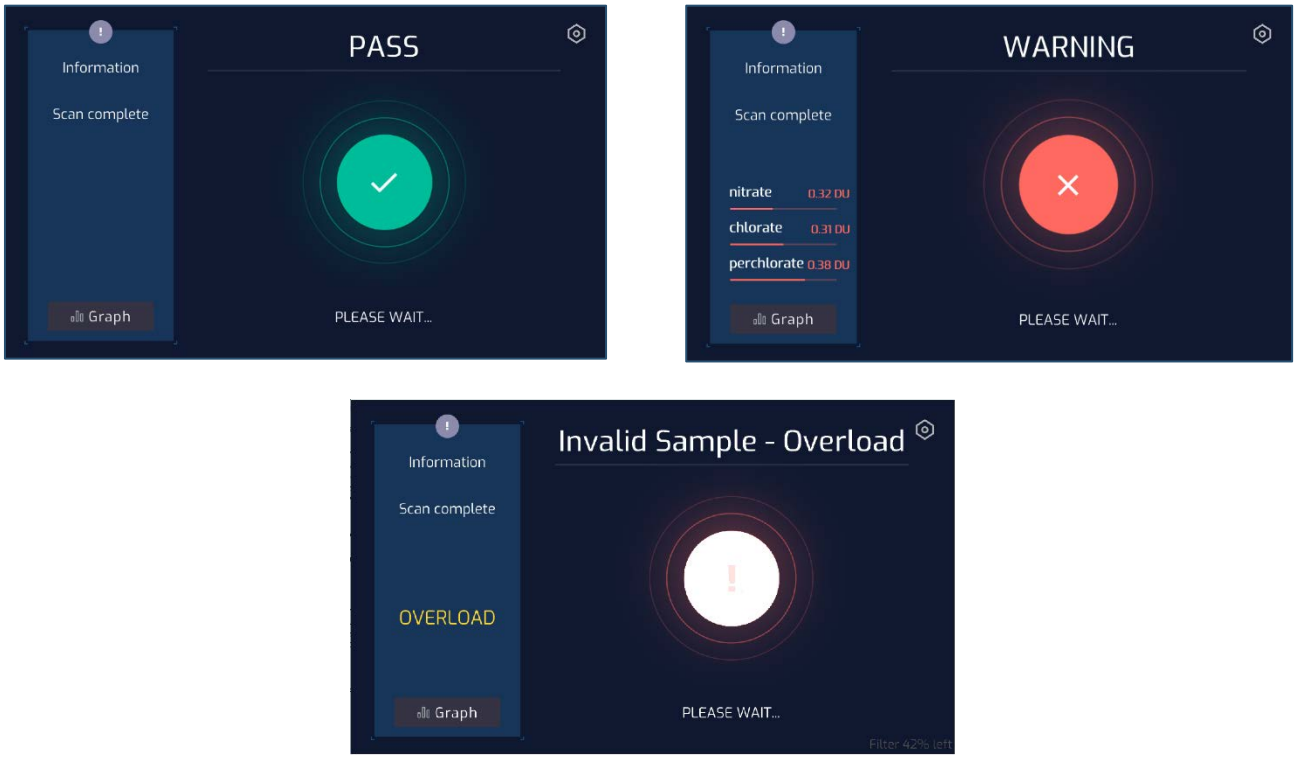


Figure 19: PASS, WARNING and OVERLOAD Screens (Wait)

6. Once the User is ready to move onto the next test, the **PROCEED** button can be pressed to prepare the device for the next test. The **INSERT SWAB** Screen will be displayed.

6.3.2 Results Screens

Following a sample test, the User will be presented with either a **Pass** Screen, **Warning** Screen or **Invalid Sample – Overload** Screen.

If the sample does not contain inorganic material, the **PASS** Screen will be displayed. The device will automatically initiate a flush sequence to prepare for a new sample. The User will be able to **CONTINUE** to the next sample test.

If the sample indicates a sample test alert i.e. one or more of analytes detected: Chlorates, Perchlorates or Nitrates above a defined level have been found, the **WARNING** Screen will be displayed. The User will be prompted to remove the Swab. Once the Swab has been removed and the User has pressed **CONTINUE**, the device will run an extended flush followed by a sample test to ensure that the next sample will not be contaminated. If the sample detects an overload of a substance and does not identify Chlorates, Perchlorates or Nitrates above the defined threshold, the **OVERLOAD** screen will be displayed. The User will be prompted to remove the Swab. Once the Swab

has been removed and the User has pressed **CONTINUE**, the device will run an extended flush followed by a sample test to ensure that the next sample will not be contaminated.

The figures below illustrate the screens that will be seen following a swab testing.

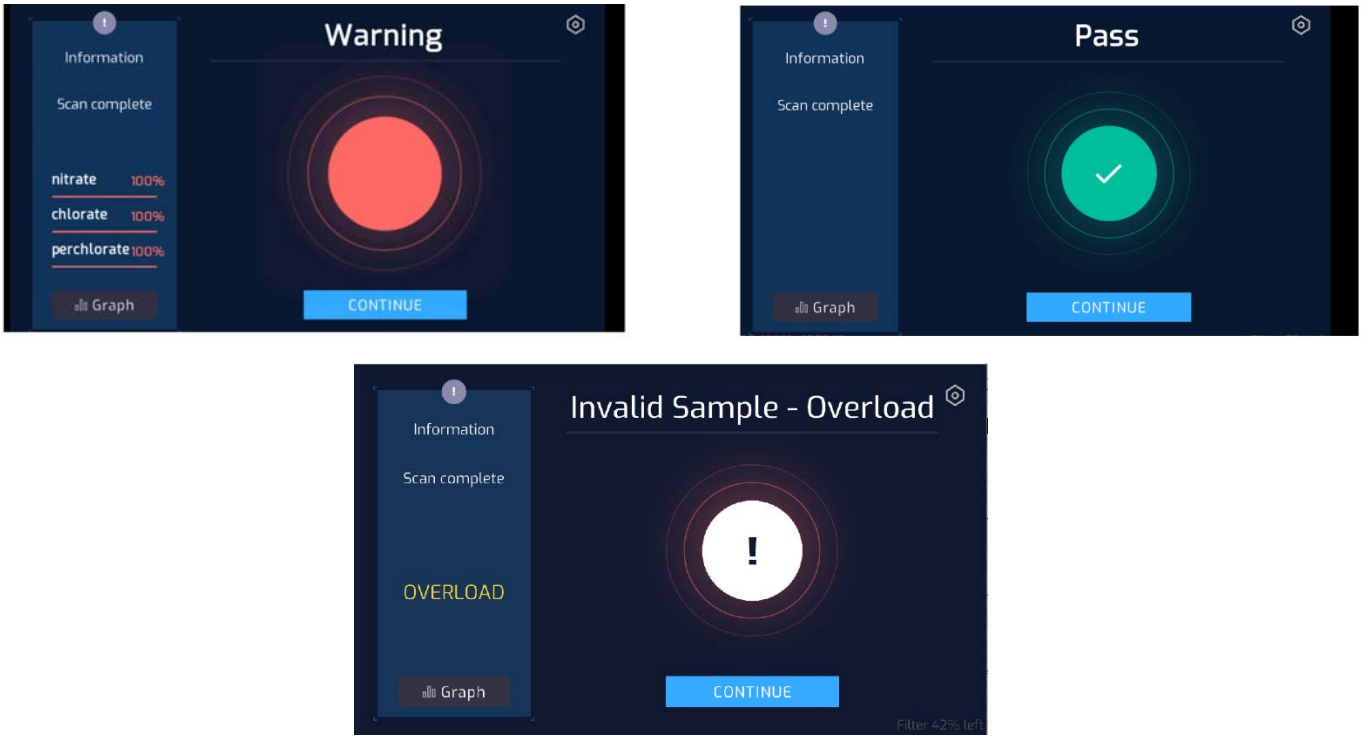


Figure 20: PASS, WARNING and OVERLOAD Screens (CONTINUE)

The **PASS** Screen will be displayed after a swab has been tested and cleared of inorganic material.

A "**PLEASE WAIT**…" prompt will be displayed for a few seconds after testing is complete. The Graph Button Graph will show the User the Electropherogram for the previously run sample test. Once on the Electropherogram page, the User can use the back button to return to the **PASS** Screen. Once the CONTINUE button CONTINUE is displayed, it can be used to return the User to the **INSERT SWAB** Screen.

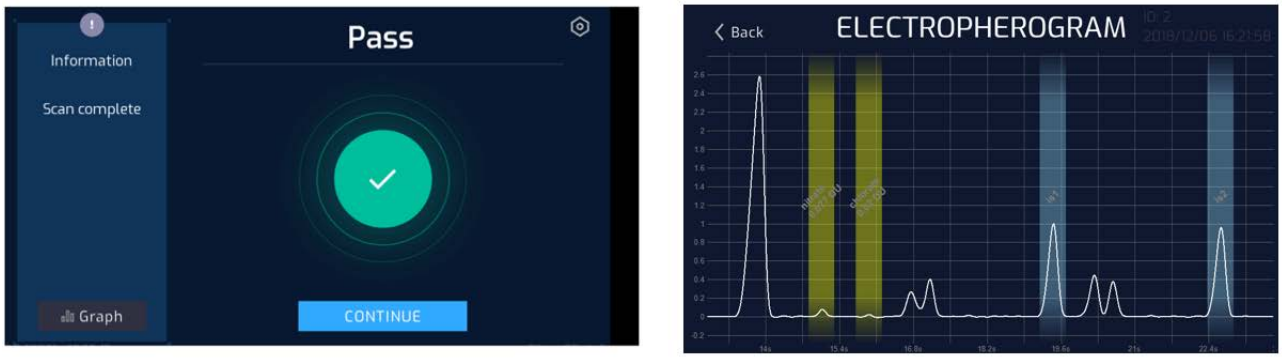


Figure 21: PASS Screen and Electropherogram Results

The **WARNING** Screen will be displayed after the device has detected inorganic materials on a swab. The ion breakdown detected is displayed in the left-hand part of the screen with an indication of the amount.

A "**PLEASE WAIT**…" prompt will be displayed initially after testing is complete. The Graph Button Graph will illustrate the user the Electropherogram for the previously run sample test. Once on the Electropherogram page, the User can use the Back Button to return to the **WARNING** screen. Once the CONTINUE Button CONTINUE is displayed, it can be used to take the User to the **REMOVE SWAB** Screen and commence a full device flush.

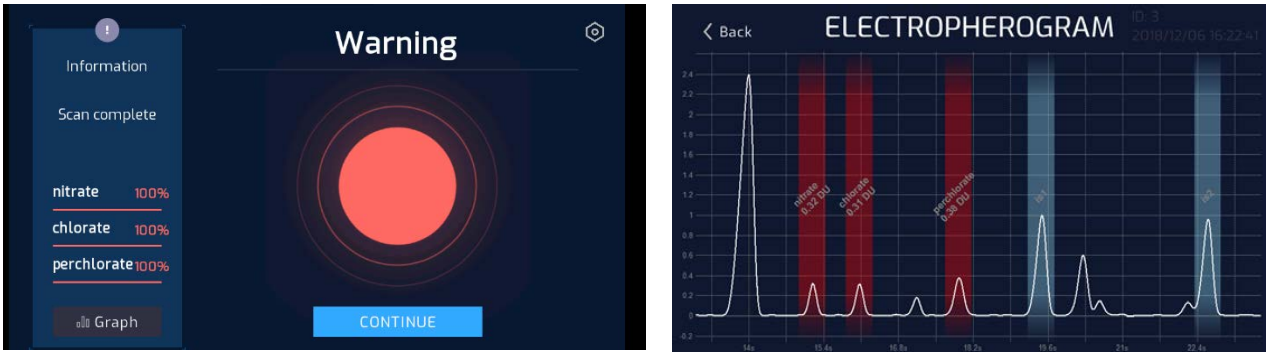


Figure 22: WARNING Screen and Electropherogram Results

Following a sample test the device will allow the User to view the sample Electropherogram by pressing the Graph Button Graph on the results screen.

Once the User has navigated to the Electropherogram Screen, there will be differing color schemes depending on the results of the test.

A red highlight indicates a sample test **WARNING**.

Alert thresholds are different for Nitrate, Chlorate and Perchlorate.

The alert threshold for each ion is based on background environmental levels.

The color breakdown and the corresponding alert thresholds are described in the tables below.

Alert thresholds are factory configurable and are documented in the device configuration manual supplied with the device.

Highlight Color	Corresponding Detection Level
Red	High Level (≥100% of **configured threshold**)
Orange	Medium Level (33% - 99% of **configured threshold**)
Yellow	Low Level (5% - 32% of **configured threshold**)
Grey	No Detection (0% - 5% of **configured threshold**)
Blue	Internal Standard

Table 2: Electropherogram Highlight Color Details

Examples of colored Electropherograms can be seen in Figure 23 and Figure 24.

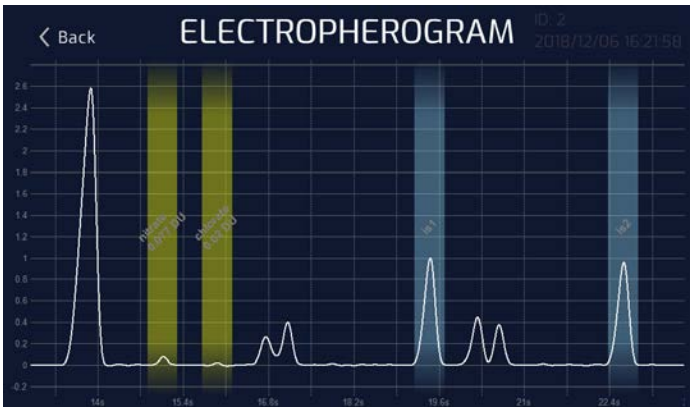


Figure 23: Electropherogram with Yellow and Blue Highlight

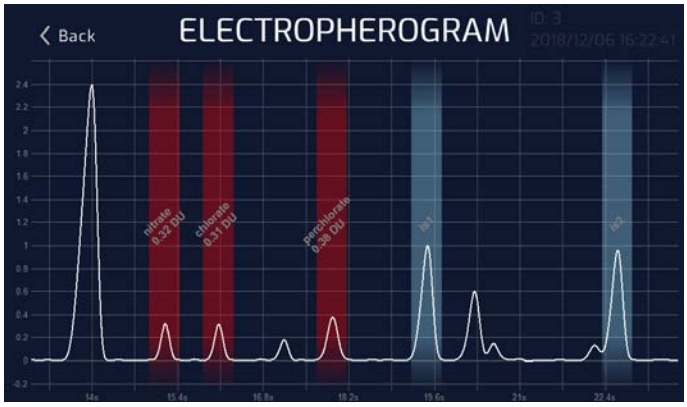


Figure 24: Electropherogram with Red and Blue Highlights

6.3.3 REMOVE SWAB Screen

The **REMOVE SWAB** Screen will display after a sample test **WARNING** and the User has proceeded from the **WARNING** Screen. This screen will prompt the User to remove the Swab and discard.

Once the User has removed the Swab, the **PROCEED** button PROCEED is used to begin the full device flush to prepare for a new test sample.

Figure 25: Remove Swab Screen

6.3.4 FLUSH IN PROGRESS Screen

The **FLUSH IN PROGRESS** Screen indicates the device is flushing. This occurs automatically after a sample test **WARNING** is detected to wash out any residual compound before inserting a new Swab. This screen will also be displayed after the User initiates a manual flush from the Settings Screen. The device flush is complete when the progress bar is full: at this point the screen will display the **INSERT SWAB** screen for the next test sample.

Figure 26: Flush in Progress Screen

A manual flush can be initiated from the Settings Screen by pressing the Flush button 

.

This can be a useful troubleshooting tool if the device is experiencing errors.

Refer to Section 10 Troubleshooting for further guidance.

NOTE: FOLLOWING A SAMPLE TEST WARNING, THE DEVICE WILL AUTOMATICALLY RUN A BLANK SAMPLE TO REMOVE ANY CONTAMINATION BEFORE A NEW SAMPLE CAN BE RUN. WHILE THIS IS OCCURING THE USER WILL SEE THE FLUSH IN PROGRESS SCREEN.

6.4 False Positives

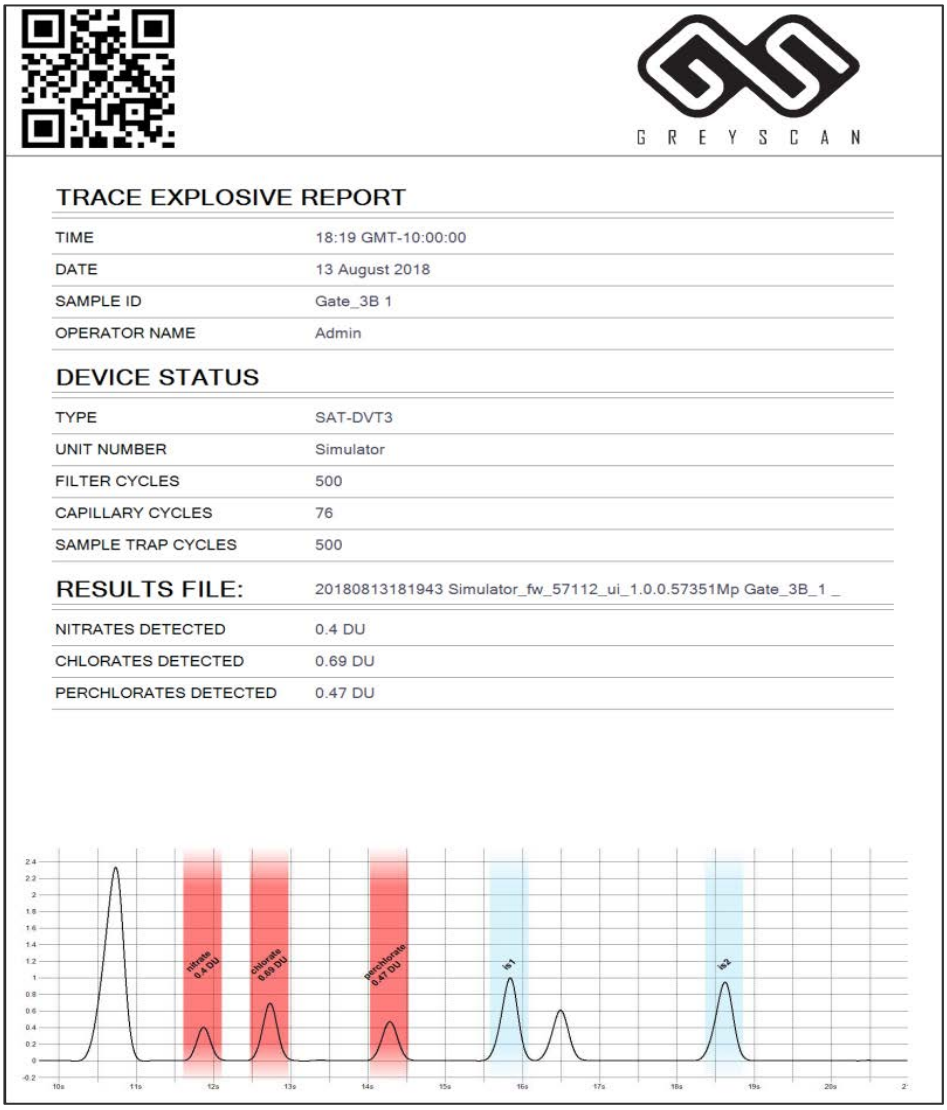
If the device is unable to determine the result of a sample test the User will be displayed the **PASS** result screen followed by a flush. This can occur for several reasons and may require the User to re-run a sample test. If the **PASS->FLUSH** result reoccurs frequently the device may need to be serviced.

A "**PLEASE WAIT**…" prompt will be displayed initially after the test has been run. The Graph button will show the User the Electropherogram for the previously run sample test. While on the Electropherogram page the User can use the Back button to return to the **PASS** Screen. Once the **PROCEED** button is displayed it can be used to commence a device flush to prepare for a new sample test. This will return the User to the **INSERT SWAB** Screen.

6.5 Saving Results as a PDF

The **Save PDF** button located on the home screen allows the User to generate a PDF report for the sample test just performed. This will export that run's result sample test as a PDF and CSV file onto a USB memory stick or downloaded if the device is connected to the internet.

To generate a PDF report, insert a USB flash drive into the device's USB input. Navigate to the Settings Screen and press the **Save PDF** button. A PDF report will be generated with data from the last scan. Once the **Save PDF** button has been pressed it will turn grey indicating the system has begun to export the data file. Following a successful export, the **Save PDF** button will display a green tick. If the **Save PDF** button displays a red cross the export has been unsuccessful. Check to ensure the USB flash drive is fully inserted into the USB input and retry the export procedure. An example of a PDF report is illustrated in Figure 27.



GREYSCAN

TRACE EXPLOSIVE REPORT

TIME	18:19 GMT-10:00:00
DATE	13 August 2018
SAMPLE ID	Gate_3B 1
OPERATOR NAME	Admin

DEVICE STATUS

TYPE	SAT-DVT3
UNIT NUMBER	Simulator
FILTER CYCLES	500
CAPILLARY CYCLES	76
SAMPLE TRAP CYCLES	500

RESULTS FILE: 20180813181943 Simulator_fw_57112_ui_1.0.0.57351Mp Gate_3B_1 _

NITRATES DETECTED	0.4 DU
CHLORATES DETECTED	0.69 DU
PERCHLORATES DETECTED	0.47 DU

Figure 27: Sample PDF Report

6.6 Conducting a Verification Pen Test

A pen test is a verification test that can be conducted by the user to confirm the device is correctly alerting to threats as designed. A properly functioning device should detect Nitrate, Chlorate and Perchlorate at default alert levels.
To run a pen test:

1. If the verification pen has not been used in the previous hour, shake the pen and then wipe a small line on a scrap surface to ensure it is leaving a fluid line.
2. Always check the manufacture date of the verification pen. It should be replaced **1** year from the manufacture date. Always store verification pens in a bag or container. E.g. zip lock bag separate from swabs to avoid the risk of contamination.
3. Draw a diagonal 15mm line across the Swab sampling area with the verification pen as illustrated below. Allow the Swab to dry for 30 seconds before proceeding.

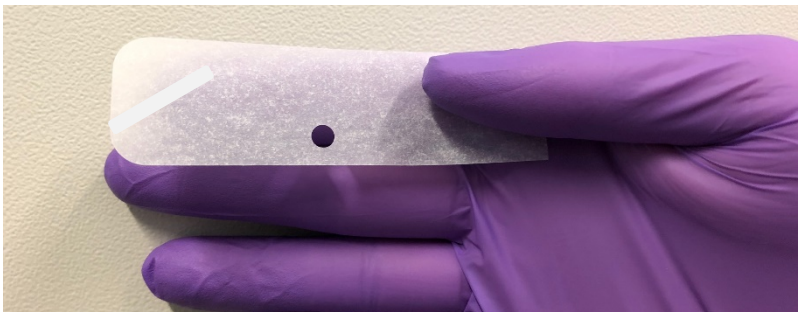


Figure 28: Pen Test Swabbing Technique

4. With the **INSERT SWAB** Screen displayed, insert the Swab into the Sample Trap Holder.
5. Press the Proceed button PROCEED. Once the Swab is correctly inserted into the Sample Trap Holder to begin sample testing.
6. After a pen test the **WARNING** Screen should be displayed with Nitrate, Chlorate and Perchlorate detected to verify the device is correctly identifying threats. A PDF report generated after running a pen test will reveal the sample test alert was due to a pen test and not a real threat.

If the result of a pen test is a **PASS**, the User should follow the basic troubleshooting techniques detailed in the troubleshooting section of this manual (refer to Section 10).

6.7 Homogeneous Versus Heterogeneous Samples

Users should ensure that samples are spread evenly over the collection area to ensure a homogenous sample (i.e. spread over the area that will be eluted when tested) rather than heterogeneous (i.e. all in one spot).
When swabbing a surface use a wipe motion that spreads the analyte over the collection area, rather than a "press and scrape" which tends to keep the analyte in one spot on the Swab.
Heterogeneous analytes can lead to inconsistent results.
When testing analytes in a laboratory, avoid "direct deposit on swab" testing. Instead, let the analyte dry onto a substrate such as PTFE or glass, then swab the substrate.

6.8 Taking a Blank Sample

A blank sample is a verification test that can be conducted by the User to confirm that the device is not returning false positive results. A properly functioning device should show the **PASS** Screen following a blank sample test
To run a blank sample:

1. While on the **INSERT SWAB** Screen, insert a blank Swab into the Sample Trap Holder.
2. Press the Proceed button PROCEED once the Swab is correctly inserted into the Sample Trap Holder to begin sample testing.
3. After a blank sample test the **PASS** Screen should be displayed verifying the device is not returning false positives.

4. Users should note that Swabs used may contain a small amount of nitrate and so a small nitrate peak visible on the Electropherogram should not be considered a fail of this check.

If the result of a blank sample test is an **ALERT**, the User can try basic troubleshooting techniques detailed in the troubleshooting section of this manual (refer to Section 10).

6.9 Service Screen

The **SERVICE REQUIRED** Screen is designed to inform the User that the device requires servicing. This screen will be displayed when service level errors occur that cannot be fixed by the User.The notification will provide the User with an indication of the source of the issue. If the service screen is observed, try restarting the device to solve the problem. If the service notification continues to be displayed contact the GreyScan service team.

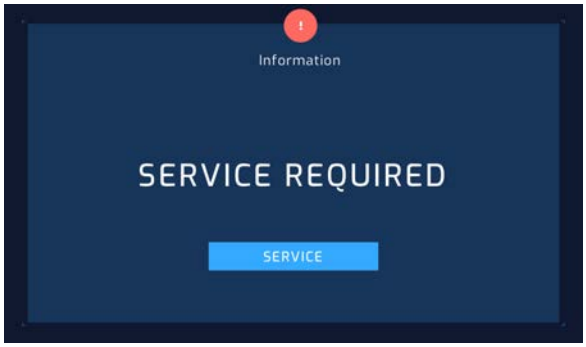


Figure 29: Service Screen

6.10 Logging Out

To log a User out of the device, navigate to the Settings Screen and press the **Log Out** button 

. This will log the current User out of the device and display the **PIN Code** Screen to allow a new User to log in.

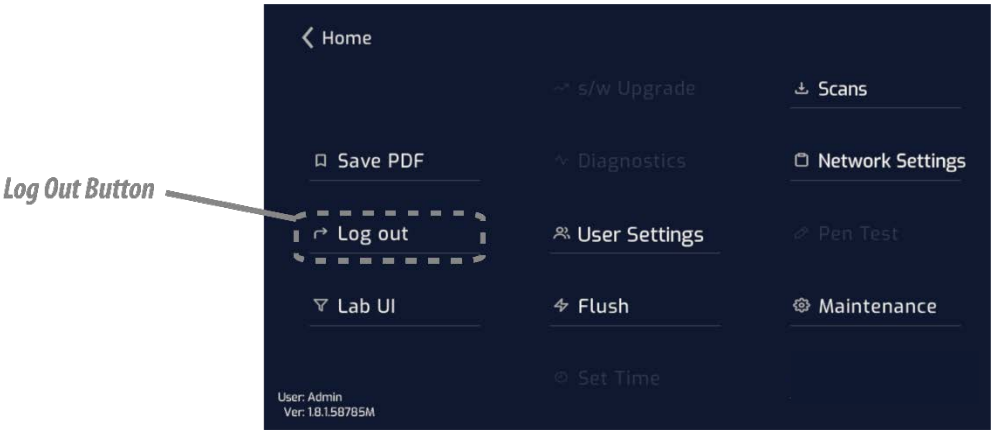


Figure 30: Log Out Button Location

6.11 Taking a Sample with a Sampling Wand

A sampling wand can be used to collect a sample. The overview of the sampling wand can be seen in Figure 31.

Figure 31: Sampling Wand Overview

To use a Sampling Wand:

1. Unlock the snap fit locking device and open the sampling wand lever.
2. Insert a blank sample Swab into the sampling wand following the orientation illustrated on the sampling wand illustrated in Figure 32: Correct Swab Orientation (Sampling Wand).
3. Snap the locking device closed.

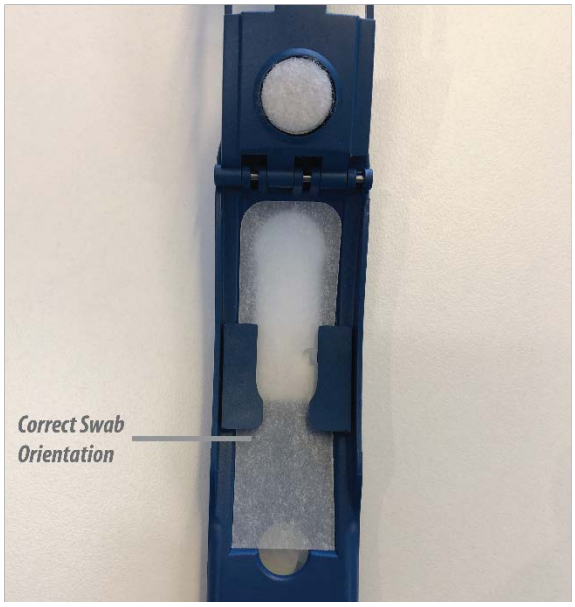


Figure 32: Correct Swab Orientation (Sampling Wand)

4. The Sampling Wand is now ready to collect a sample. For more information on testing a sample see refer to Section 6.3.1.

NOTE: GREYSCAN DO NOT RECOMMENDED THE USE OF A SAMPLING WAND FOR SAMPLE COLLECTION. IT IS RECOMMENDED THE USER FOLLOWS THE INSTRUCTIONS DESCRIBED IN SECTION 6.3

7 Storage & Transport

7.1 Device Preparation for Storage and Transport

To prepare the device for short term storage or transport:

1. Power off the device by pressing the **POWER** button.
2. Disconnect the AC Power Cable from the wall power outlet.
3. Disconnect the DC Power Cable from the device DC Power Port by rotating the locking clasp anti-clockwise and removing the DC Power Cable.
4. Remove the Sample Trap Holder and Sample Filter.
5. Cover the Sample Filter and Sample Trap Holder slots with Sellotape or Kapton tape.
6. Remove the Reagent Cartridge. Refer to Section 8.4 Changing the Reagent Cartridge.
7. Install the transport protection caps over each fluidic port. These caps were removed during installation and setup. Ensure the red cap is installed onto the top port with the red marking. Refer to Section 5.2 Installation of the Reagent Cartridge.

Note: Steps 4, 5 and 6 are not required if the device is simply being moved between locations for use at a different place.

8. If the Pelican Case has been supplied with a mesh storage area, then verify all loose components are securely stowed.
9. Close the device Enclosure Lid and lock the clips in place. To lock the clips, push them down and towards the device Enclosure. They will click into place when secure.

Figure 33: Device Enclosure Top View (Closed)

7.2 Packing the Device for Transport

To prevent damage during transit the device must be returned to its original shipping package.
Ensure the following steps are completed to prepare the device for shipping:

1. All steps from Section 7.1 have been completed.
2. Place the device into the shipping package referring to the figure below.

Figure 34: Device Original Packaging

7.3 Packing the Reagent Cartridge for Transport

To prevent damage during transit the Reagent Cartridge if being returned to the manufacturer or if being shipped by a third party should be packed in its original shipping package.
Ensure the following steps are completed to prepare the Reagent Cartridge for shipping:

a. Install the plastic bag onto the Reagent Cartridge and seal with tape.
b. Install the cardboard end supports onto the Reagent Cartridge.
c. Insert the Reagent Cartridge with the end supports into the transport box.
d. Install the cardboard side packing supports.
e. Close and seal the lid.

Figure 35: Reagent Cartridge Original Packaging

7.4 Handling Guidelines

WARNING
THE DEVICE CONTAINS REAGENT FLUIDS AND COMPONENTS WHICH MAY BE SENSITIVE TO ROUGH HANDLING.

When carrying the device, follow the guidelines below to minimize personal injury or potential damage to the device:

1. Always use the device handle while carrying the device.
2. When lifting or lowering the device, ensure the user/carrier bends their knees.
3. Always ensure the device is gently placed onto any surface.

8 Routine Maintenance

8.1 Maintenance Overview

Routine maintenance must be performed by a trained User to allow the device to maintain optimal running conditions. The following table outlines the basic maintenance tasks and how often they should be performed.

Maintenance Task	Daily	Weekly	Monthly	When Notified	As Needed	Notes
Switch the device on and run 5 samples		✓				If the device is not used every day several samples must be run at least once per week to minimize reagent build up within the system and to maintain capillary function.
Clean top plate and touch screen (as needed)	✓					Use disposable alcohol wipes to clean the top plate and touch screen. Under no circumstances are chemical cleaners to be used to clean the device.
Flush Swab trap					✓	Remove Swab Trap and rinse with deionized water.

Table 3: Basic Maintenance Tasks

NOTE: TO EXTEND THE LIFE OF DEVICE CAPILLARY THE DEVICE MUST BE TURNED ON AT LEAST ONCE PER WEEK AND RUN THROUGH FIVE SAMPLES. THIS ENSURES THE DEVICE IS INITIALISED, FLUSHED AND FUNCTIONING AS INTENDED.

8.2 The Maintenance Screen

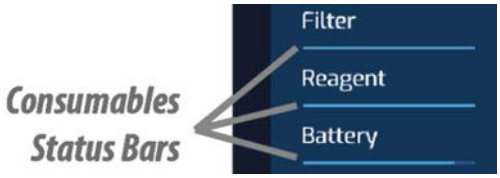


Figure 36: Consumable Status Bars

The device consumable components require replacement when empty. The User must perform the appropriate maintenance tasks when the consumable status bars on the **INSERT SWAB** Screen are at zero.

The consumable status bars are at zero when there is no longer any light blue color in the status bar. Navigate to the maintenance screen from the Settings Screen (to be logged in as Admin or Lab User) to begin performing required maintenance tasks.

Figure 37: Maintenance Screen

The maintenance screen helps the User keep track of basic maintenance tasks. The maintenance screen should be accessed once the consumable status bars reach zero and a maintenance task for the device is required. Each of the tasks on the maintenance screen can be performed by the User.

Refer to the appropriate sections below on how to perform maintenance tasks.

To begin a maintenance task, press the button for the maintenance task that is to be completed. A pop up will be displayed which indicates the system is ready for the component to be changed. Once the consumable item has been replaced, press the **Done** button DONE to return back to the maintenance screen. Pressing the **Back** button on the top left of the maintenance screen will begin a full system system check to ensure the component has been installed correctly and that the device is ready to run a sample test.

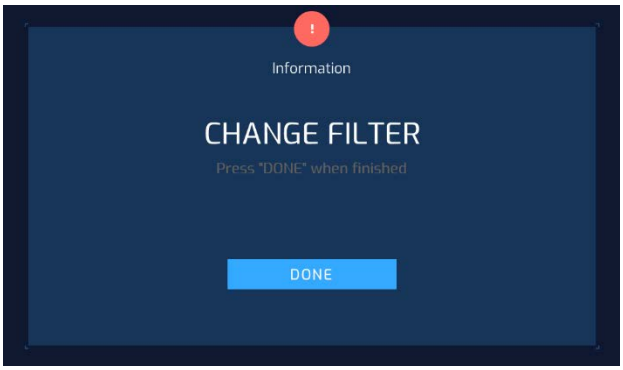


Figure 38: Change Filter Maintenance Screen

NOTE: ENSURE THE MAINTENANCE SCREEN IS USED WHEN REPLACING THE CONSUMABLE COMPONENTS. THE RELEVANT TASK SHOULD BE SELECTED BEFORE COMMENCING ANY MAINTENANCE TO ENSURE THE DEVICE IS READY FOR MAINTENANCE.

8.3 Changing the Sample Filter

The Sample Filter (which forms part of the Sample Filter Assembly) is a consumable.
The Sample Filter is the bottom part of the Sample Filter Assembly (refer to Section 5.4, Figure 5)
The device monitors the Sample Filter life and will inform the User when the Sample Filter requires replacement.
The User may also replace the Sample Filter as part of routine maintenance or trouble shooting.
To replace the filter:

1. Press the Settings button first.
2. Log out if initially logged in as an Operator. Login as an Admin or Lab User.
3. Repeat Step.1.
4. Navigate to the Maintenance screen on the device touch screen.
5. Press the *Change Filter* button on the Maintenance screen.
6. Remove the entire Sample Filter Assembly from the Filter Slot by rotating the Sample Filter Assembly anti-clockwise to the position of 8am to 2pm.
7. Remove the used Sample Filter by rotating anti-clockwise and removing the Sample Filter from the Sample Filter Holder. Discard the used Sample Filter. Install a new Sample Filter by rotating clockwise.
8. Install the Sample Filter Assembly Holder (fitted with the new Sample Filter) into the Filter Slot. Refer to Section 5.3 Installation of the Sample Filter.
9. Press the Done button on the maintenance pop up to return to the Maintenance screen.
10. On the Maintenance screen, press the Back and Calibrate button to begin a device flush to prepare for testing (the message the User will observe on the screen is CALIBRATING).

8.4 Changing the Reagent Cartridge

The reagent fluids in the Reagent Cartridge are a consumable.
The device monitors fluid usage and will inform the User when the Reagent Cartridge requires replacement.
To replace the Reagent Cartridge:

1. Navigate to the Maintenance screen on the device touch screen. (while logged in as an Admin or Lab User)
2. Press the Change Reagent button on the Maintenance screen before performing any other actions.
3. Press down on the two blue handles on either side of the Reagent Cartridge and then release the pressure. The handles should make a clicking noise and be in a raised position after the User pushes down on the handles and releases.
4. Take hold of both blue handles and raise the Reagent Cartridge out of the Reagent Cartridge container.

Figure 39: Reagent Cartridge Orientation

5. Check the new Reagent Cartridge has not expired
   (The expiry date is printed on the side of the Reagent Cartridge).
6. Position the new Reagent Cartridge as illustrated.
7. Lower the Reagent Cartridge into and push down firmly until the Reagent Cartridge is seated.
8. Push down on the two blue handles either side of the Reagent Cartridge until they click into place.

8.5 Changing the Sample Trap Holder

The Swab Trap Holder is designed to be replaced when needed i.e if there is a residual contamination problem from run to run; as this indicates that there may be contamination of the actual holder and washing with water does not solve the problem.
To replace the Sample Trap Holder:

1. Navigate to the Maintenance screen on the device touch screen while logged in as an Admin or Lab User.
2. Press the *Change Sample Trap* button on the Maintenance screen before performing any other actions.
3. Remove the old Sample Trap Holder by pulling it out of the Swab Slot and discard.

4. Take the new Sample Trap Holder and insert into the Swab Slot with the large circle facing towards the Sample Filter.
5. Following the installation of a new Sample Trap Holder, press the Done button on the maintenance pop up to return to the Maintenance screen.
6. On the Maintenance screen, press the Back and Calibrate button to begin a device flush to prepare for testing. (the message the User will observe on the screen is CALIBRATING)

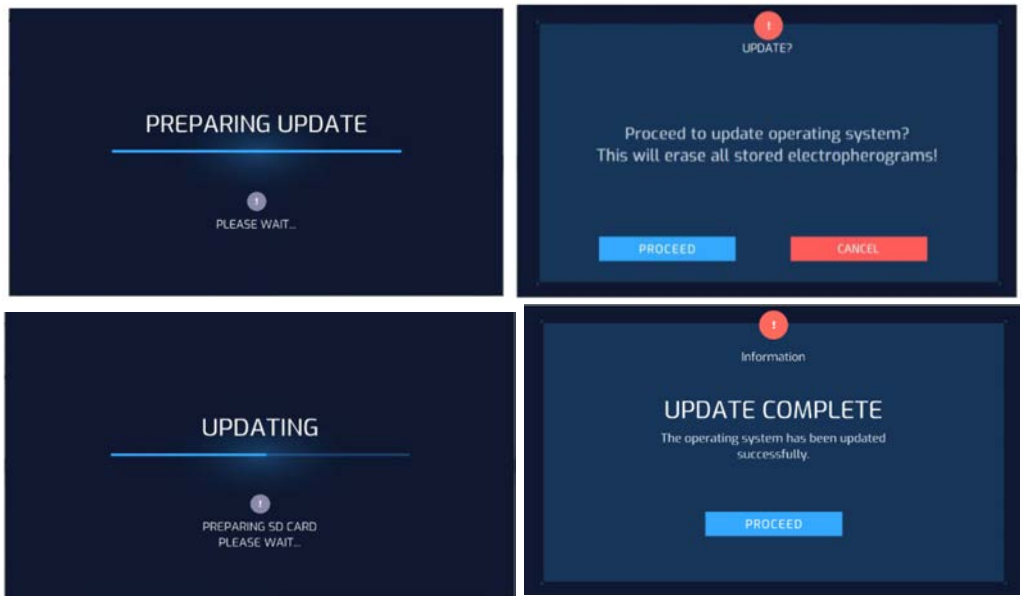
9 Advanced Features - Supervisor

Supervisors with increased permissions to device configuration will have access functions not available to Operators with basic User permissions. Such Operators with will not have access to the below advanced software features.

9.1 Software Upgrades

Device software upgrade requires a single USB key to update the operating system, controller bootloader, controller firmware application, backend and local frontend. Software upgrades can also be deployed remotely provided the device is connected to a network that the User permits GreyScan to have access to.
To upgrade the device's software using a USB key:

1. Upgrade the operating system first by copying the operating system update onto the USB key (The USB must not have any other files).
2. POWER down the device if it is powered ON and insert the USB containing the software upgrade package.
3. POWER ON the device by pressing the Power button.
4. The device may restart during this process. Follow the prompts on the following screens.



5. POWER OFF the device and POWER ON again.

To upgrade the software remotely the User needs to contact a GreyScan service team and enable the network connectivity (refer to Section 9.3.2)

9.2 File Management

9.2.1 Sample Management Screen

To view, save and delete specific can files, press the 

button on the Settings Screen. This will take the User to the sample management screen.

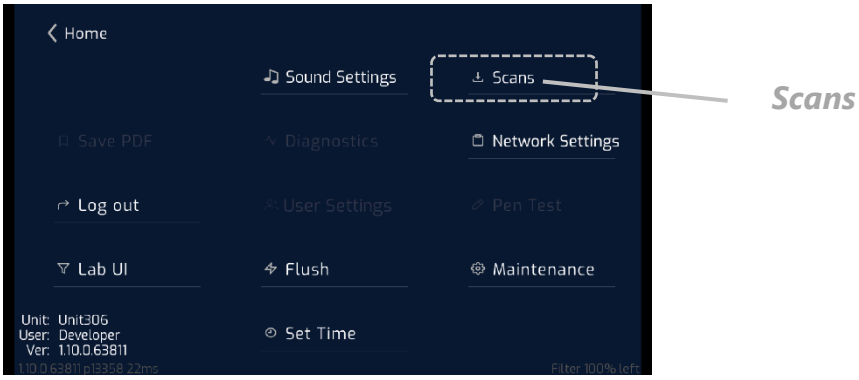


Figure 40: Sample Management Button Location

When on the sample management screen, the User will be displayed a sorted list of dates on which samples were run. Select a date on the touchscreen to display all the scan results from that date. Use the blue arrows to scroll up and down through the sorted scan dates. The Back button will first return the User to the list of dates, then the Settings Screen.

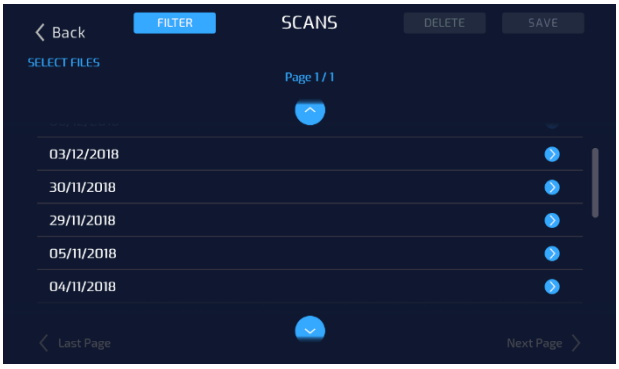


Figure 41: Sample Management Screen

The User can press the FILTER button to search through all scans saved on the device. The User will see the following filter options:

- Scan Result: PASS / WARNING / Other
- Sample ID
- Date Range (DD/MM/YYY)

Enter the desired search parameters using the touchscreen and press the OK button to begin the search. The CLEAR button will clear all filter options.

9.2.2 File Management

Once the User has selected a date, the screen will show a list of scans matching the filter criteria. The list shows the time, sample name and result for each scan, sorted by the time at which each scan was conducted in descending order. The scans for a given date are divided into pages, each with one hundred scans. To navigate within a page, either drag the list or use the blue arrow buttons to scroll up and down. The Next Page and Last Page buttons move to the next and previous pages, respectively.

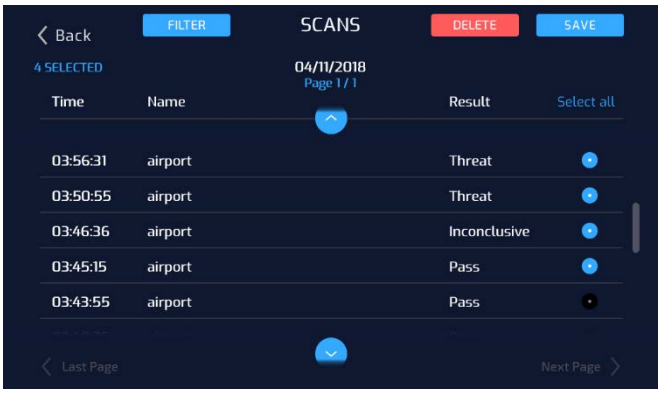


Figure 42: Sample Management Files

The User can select and save specific scans in the sample management screen. To save scans:

1. Select scans that need to be saved by pressing the circle to the right of the desired scan so that the circle turns blue. Alternatively, the User can press the Select all button to select all scans on the current page. Pressing Select all twice in succession will deselect all scans on the current page.
2. Once desired scans have been selected, press the Save button SAVE to save the selected scans. Ensure a USB flash drive is inserted before pressing the Save button.
3. A save progress pop up will appear to inform the User when the save has been completed.

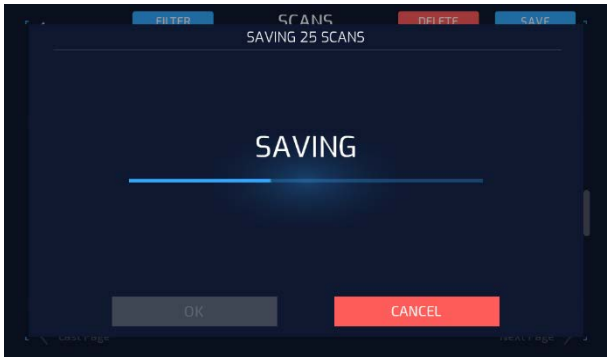


Figure 43: Save Scan Progress Bar

To Delete Scans:

1. Select scans that can be deleted by pressing the circle to the right of the desired scan so that the circle turns blue. Alternatively, the User can press the Select all button.
2. Once desired scans have been selected, press the DELETE button DELETE.
3. The User will be asked to confirm deletion, as the operation cannot be undone. Press the PROCEED button PROCEED to continue, or the CANCEL button CANCEL to abort.
4. A delete progress pop-up will appear to inform the User when the files have been deleted.

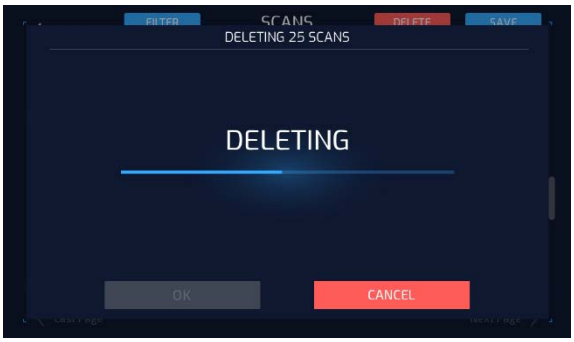


Figure 44: Delete Scan Progress Bar

9.3 Network Settings

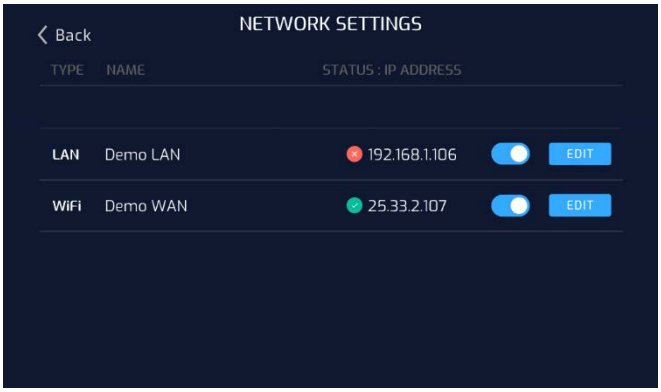


Figure 45: Network Settings Screen

The device can be connected to the Internet via either a LAN or wireless network. To view and edit device network settings, navigate to the Network Settings Screen by pressing the Network Settings button on the Settings Screen.

On the Network Settings Screen, the User will be displayed the type, status and IP address of different network connections.

The status column will indicate which, if any, network connections are active. A green tick indicates the network connection is active, and a red cross indicates the network connection is inactive.

Pressing the blue switch button will turn the associated network connection on and off. To see details of each network connection, press the desired connection on the touchscreen. The network connection details will be displayed as illustrated in Figure 46. The Wi-Fi Settings Screen will show available Wi-Fi networks.

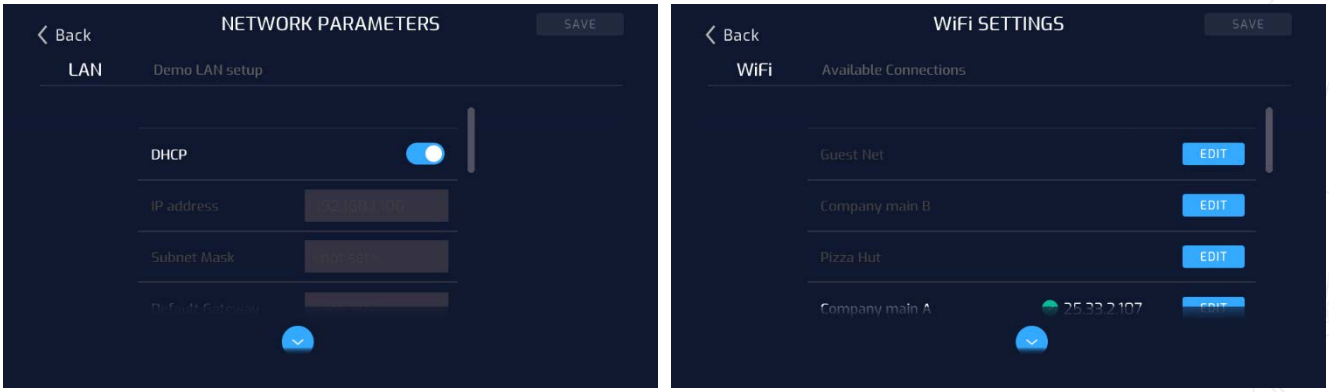


Figure 46: LAN Network Parameters and Wi-Fi Settings Screens

9.3.1 Wi-Fi Network Connections

Available and saved Wi-Fi connections will be displayed in the Wi-Fi Settings Screen. Users will be able to remove, edit, and add new Wi-Fi connections to the device.

NOTE: ONLY WPA (AES) WI-FI NETWORKS ARE SUPPORTED.

To edit a saved Wi-Fi connection:

1. Navigate to the Wi-Fi Settings Screen from the Network Settings Screen.
2. Press the EDIT button [EDIT] next to the network connection that requires editing.
3. Once the EDIT button has been pressed, use the touchscreen to modify Wi-Fi elements. The blue arrow buttons can be used to scroll through the list.
4. Press the SAVE button [SAVE] to save any changes and return to the Wi-Fi Settings Screen. If no changes have been made, press the Back button to return to the Wi-Fi Settings Screen.

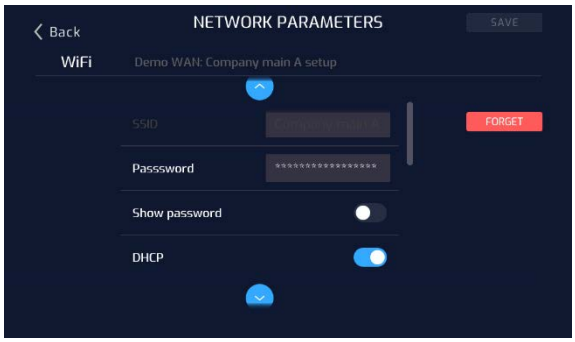


Figure 47: Wi-Fi Connection Edit

To remove a saved Wi-Fi connection:

1. Navigate to the Wi-Fi Settings Screen from the Network Settings Screen.
2. Press the EDIT button [EDIT] next to the network connection that needs to be removed.
3. Once the EDIT button has been pressed the Wi-Fi connection parameters will be displayed. Press the FORGET button [FORGET] to remove the Wi-Fi connection from the saved Wi-Fi connections.
4. Once the FORGET button is pressed, the User will return to the Wi-Fi Settings Screen.

To connect to a Wi-Fi network seen on the Wi-Fi connection Screen for the first time:

1. Press the EDIT button [EDIT] next to the desired network connection.
2. Using the touchscreen press the password field and enter the password associated with the Wi-Fi connection using the on-screen keyboard.

Figure 48: Connecting to a New Wi-Fi Network

To Add a Wi-Fi connection that is not seen on the Wi-Fi connection Screen list:

1. Ensure the User has both the SSID and password for the desired Wi-Fi connection.
2. Scroll to the bottom of the available connection list on the Wi-Fi Settings Screen using the blue arrow buttons.
3. Once the User reaches the bottom of the list, press the ADD button ADD.
4. The Wi-Fi SSID and password fields can be entered by pressing on each field. This will bring up the on-screen keyboard for the User to enter the details.

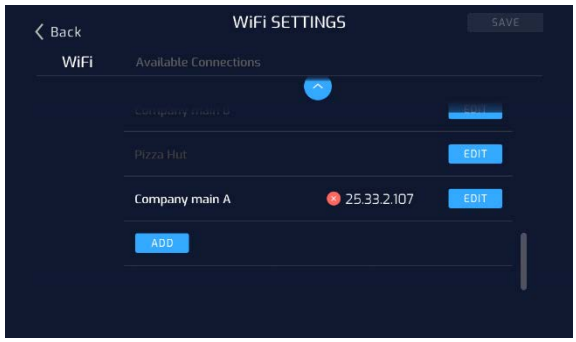


Figure 49: Adding a New Wi-Fi Network

5. Once SSID and password details have been entered press the save button. This will return the User to the Wi-Fi Settings Screen.
6. If successful, a green tick marker indicates that the newly added Wi-Fi connection is active.

9.3.2 LAN Network Connections

LAN Network details will be displayed on the LAN Network Parameters Screen. To edit a LAN connection:

1. Navigate to the LAN Network Parameters Screen from the Network Settings Screen.
2. Press the EDIT button EDIT next to the network connection.
3. Once the EDIT button has been pressed, use the touchscreen to modify LAN connection elements. The blue arrow buttons can be used to scroll through the list.

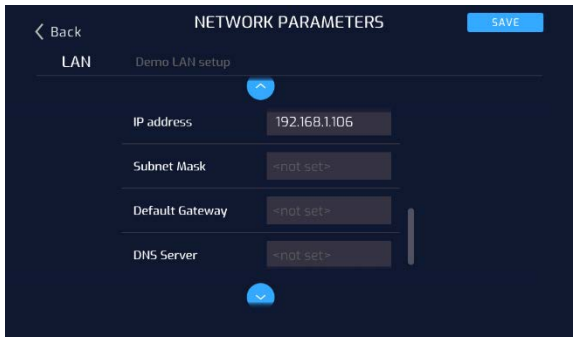


Figure 50: LAN Network Connection Edit

4. Press the SAVE button SAVE to save any changes and return to the LAN Network Parameters Screen. If no changes have been made, press the Back button to return to the LAN Network Parameters Screen.

9.4 Installing Remote Frontend

Install the Remote Frontend by extracting the GSN-1518-0113-33 zip file (provided by GreyScan) to a system or PC folder where the User has write access. It is recommended to install the Remote Frontend on a short file path to avoid file export issues. Installation and execution of this software must only be completed after the device has been set up. The Remote Frontend can be connected to a device via Wi-Fi or Ethernet. A direct Ethernet connection is recommended.

1. Create a shortcut on the User's desktop to run the GreyScanFrontend.exe file.
2. Double click on the GreyScanFrontend.exe file to execute the Remote Frontend software installation.

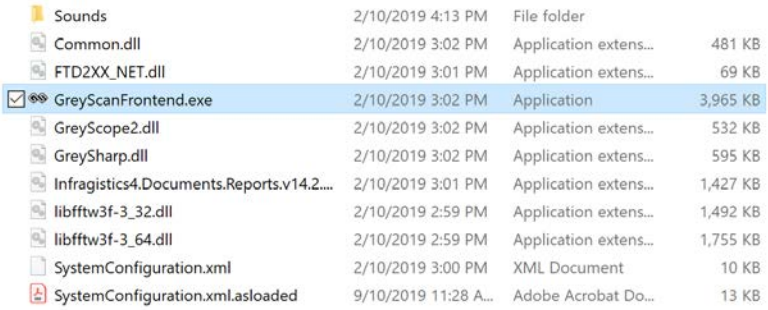


Figure 51: Remote Frontend .exe file

3. For **Wi-Fi connection**, obtain the IP address of the device from Network Settings (once the device is connected to Wi-Fi) and enter the IP address into the IP address field dialogue box (illustrated below):

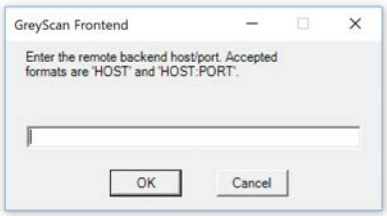


Figure 52: Remote Frontend IP address field (Wi-Fi)

4. Press OK
5. Remote Frontend connection will establish and a login screen will appear on the PC's desktop.

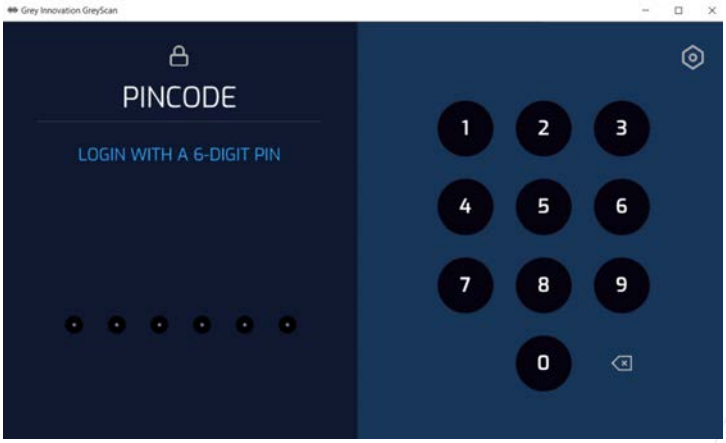


Figure 53: Remote Frontend login screen

6. **Note**: For Wi-Fi connection, both the device and PC should be connected to the same network.
7. For **LAN or Ethernet** connectivity, connect the device directly to a PC's Ethernet port configured for DHCP (a typical default configuration).
8. Use the NETWORK PARAMATERS Screen to configure the device.
9. Press the EDIT 

button.
10. Parameters can be configured with DHCP off.

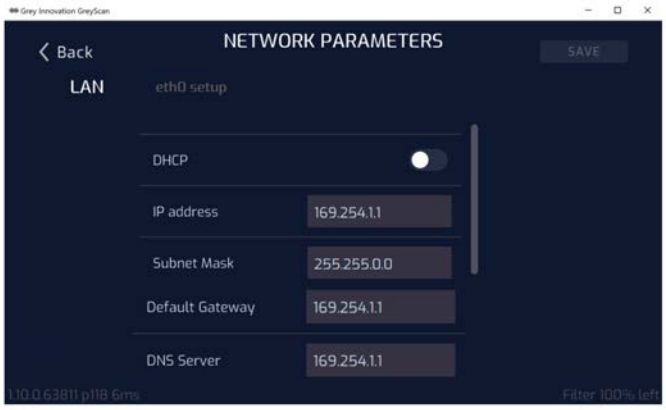


Figure 54: Network Parameters

11. Enter the IP address **169.254.1.1**
    (DHCP: Disabled IP: 169.254.1.1)
12. Enter the Subnet Mask **255.255.0.0**
13. Enter the Default Gateway **169.254.1.1**
14. Enter the DNS Server **169.254.1.1**
15. Press SAVE
16. Double click on the GreyScanFrontend.exe file
17. Enter the IP address **169.254.1.1** into the IP address field dialogue box (illustrated below) and press OK.

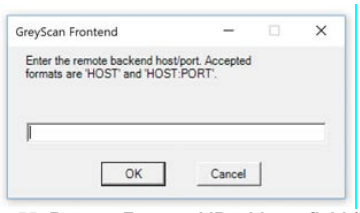


Figure 55: Remote Frontend IP address field (LAN)

9.5 Sound Settings

To view and edit the device sound settings, navigate to the Sound Settings Screen by pressing the Sound Settings button on the Settings Screen.

On the Sound Settings Screen, the User can change the volume of all sound effects and select sounds that will be played at different events. The different events are described in Table 4. All sounds will be played at the same volume which can be adjusted by the User as illustrated below.

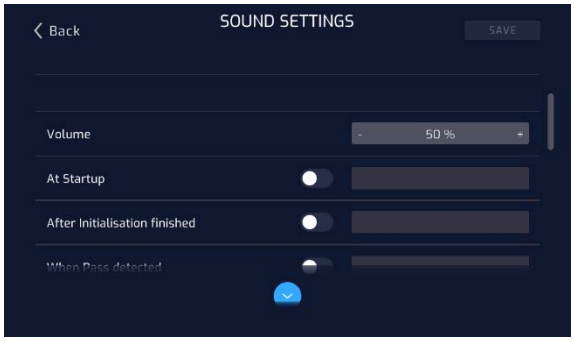


Figure 56: Sound Settings Screen

Event	Description
At startup	At startup when the GreyScan splash screen is displayed for the first time.
After initialization finished	At the end of initialization when the GreyScan ETD-10 is ready to run scans.
When PASS detected	At the end of a scan when the result is a PASS.
When threat detected	At the end of a scan when the result is a threat.

Table 4: Summary of available sound events

9.5.1 Change Volume

To change the volume of all sound effects, press the - or + buttons next to the volume display in the Sound Settings Screen to decrease or increase the volume. Save the new volume setting by pressing the SAVE button.

9.5.2 Enable Sound

To enable a sound on the Sound Settings Screen (52), press the Switch button next to the event. To select a different sound file, press the button right next to the Switch button and the Sound Selection Screen will be displayed as illustrated in Figure 57.

Select a sound file by selecting the button next to the file. A preview of every sound can be played by clicking on the corresponding PLAY button. When the desired sound has been selected, return to the Sound Settings Screen by pressing the Back button. The new sound file is now associated with that event. To save the new configuration, press the SAVE button.

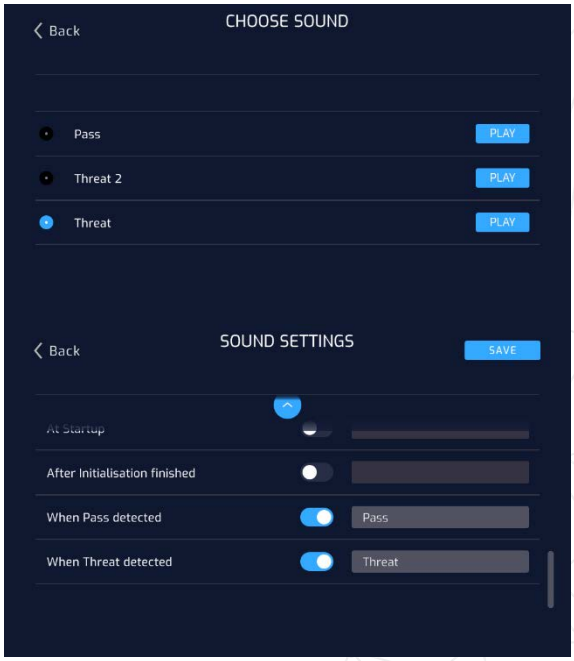


Figure 57: Sound Settings Screen with enabled sounds

9.5.3 Disable Sound

To disable a sound, press the blue Switch button next to the event in the Sound Settings Screen followed by the SAVE button.

9.6 Set Time

The User can set the time, date and time zone on the device according to the following conditions:

1. **Admin**, **Lab**, **Production** and **Developer** can set the time, date and time zone.
    - **Operators** do not have authorisation
2. If the **Set Time Automatically** button is turned on by swiping right, the User can select the time zone by pressing the bar labelled **Timezone**. Once pressed, the User can select the required time zone from the list.
   Note: The device needs to be connected to the Internet. If the device is not connected to the Internet, **Set Time Automatically** will retain the pre-set time settings which will appear in the display screen.
3. If the device is not connected to the Internet, the User can still change the Timezone by selecting **Set Time** then Timezone and choosing an appropriate time zone. In this mode the displayed time will not automatically adjust for daylight saving.

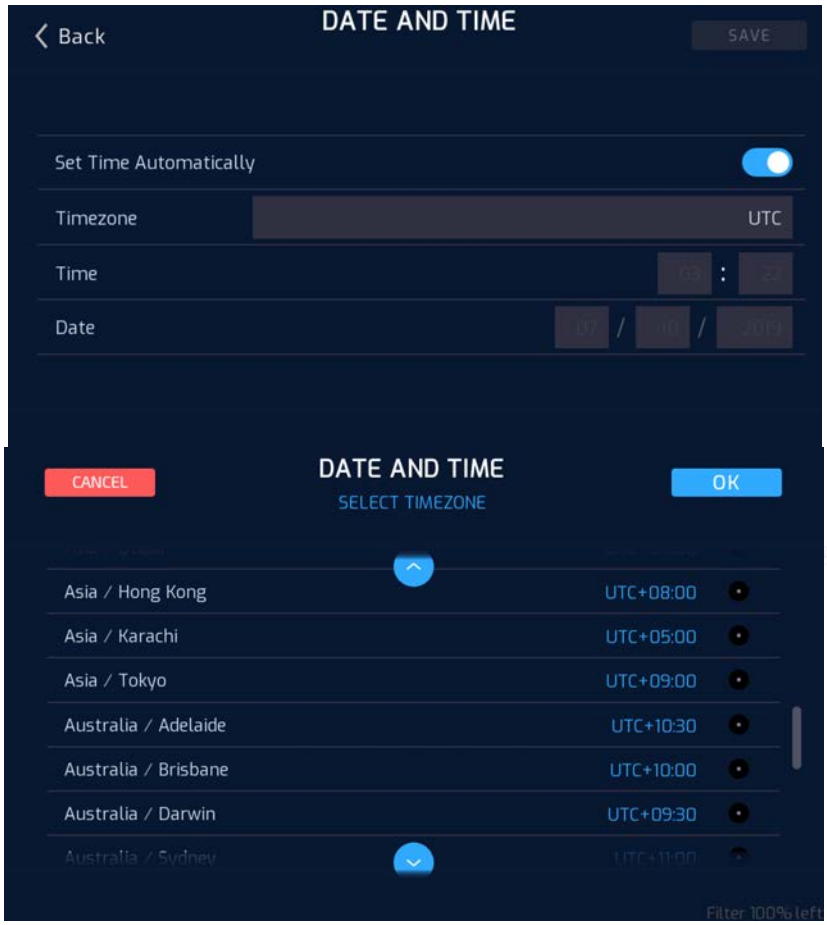


Figure 59: Date and Time

4. If the User does not wish to connect the device to the Internet, the **Timezone**, **Time** and **Date** can be set by turning off the **Set Time Automatically** button (swipe left). Once OFF, the three fields can be manually configured as illustrated below:

Figure 60: Timezone Screen

5. Press **SAVE** and the device will restart the software.
6. If the device is transported from one location to another and time is not reset or the time zone has not been updated, the scan file name will reference the UTC and the offset to UTC (reflecting the time zone in which the device is located).

9.7 User Access Overview

Software access levels will differ depending on permissions assigned to each User login. A breakdown of User software function access for Supervisors and Operators is detailed in Table 5.

Note: The Production login will only be used by Service technicians.

Permission	Operator1 (Level 3)	Operator2 (Level 3)	Laboratory (Level 2)	Admin (Level Z)	Production
Display devices	%	DU	DU	DU	DU
Run sample	Y	Y	Y	Y	Y
Show electropherogram	Y	Y	Y	Y	Y
Export last/saved report	Y	Y	Y	Y	Y
Export last/saved scan data	Y	Y	Y	Y	Y
Flush			Y	Y	Y
Maintenance mode			Y	Y	Y
Erase all electropherograms			Y	Y	Y
Restart/cancel self-test			Y	Y	Y

Network settings	Y	Y	Y
Date-time settings	Y	Y	Y
Sounds settings	Y	Y	Y
System information	Y	Y	Y
Lab User interface	Y	Y	Y
Lab UI sensor traces	Limited	All	All
Restart diagnostics		Y	Y
Run script		Y	Y
Trigger download		Y	Y
Schematic page		View	Control
Simulator commands			Y
Smartcard commands			Y
Production controls			Y
C4D commands			Y
Controller commands			Y
Reprocess			Y
Serial log			Y
Undock tabs			Y

Table 5: GreyScan User Access Summary

10 Troubleshooting

10.1 Part Identification

The part identification label is located on the device underneath the removable Reagent Cartridge.

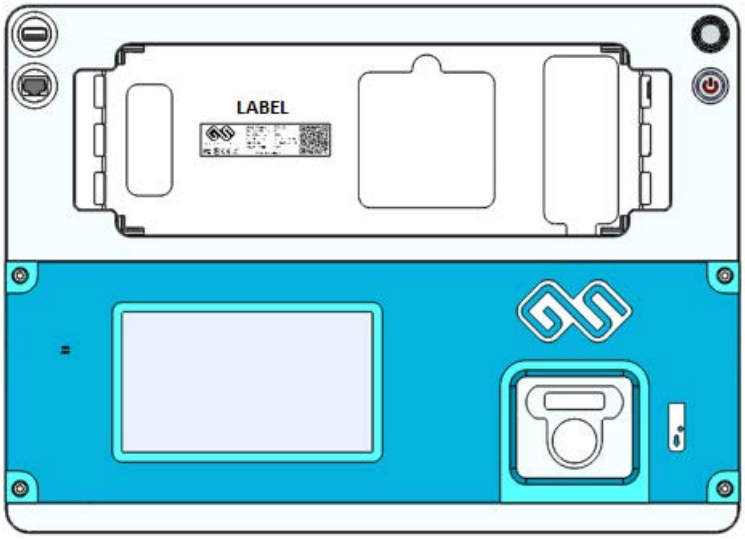


Figure 61: Device Label Location

Figure 62: Device Label

10.2 Basic Troubleshooting

Basic troubleshooting can be completed without the need for a trained service technician. The User can complete several tasks to ensure the device is functioning as intended. Errors that are known to occasionally occur include:

- Blank Swabs resulting in false positives following a threat sample test due to contamination remaining after a WARNING run
- Initialization is taking longer than expected
- Sample tests are inconclusive several times in succession
- Verification Pen tests are returning incorrect results

The Operator can follow the following troubleshooting steps when an error occurs. If the error persists after the Operator completes each of the tasks, a service technician may be required.

1. Run a manual flush by pressing the flush button on the Settings Screen
2. Replace the Sample Filter
3. Replace the Sample Trap Holder
4. Switch off the device. Once the device is turned off, turn on again and allow full initialization process
5. If the problem persists, call the GreyScan service team

10.3 Error Messages

If an error occurs, the User will be presented with an Error Screen:

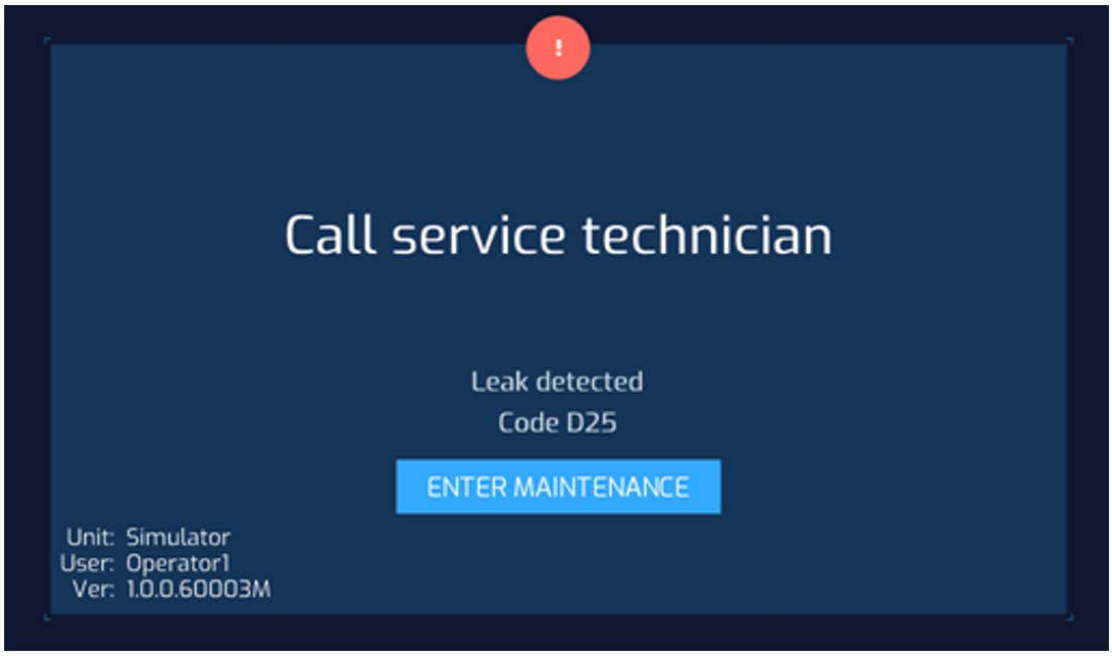


Figure 63: Example error Screen

The error code, details about the error and a suggested remedy is displayed. Below is a list of all the possible errors.

Code	Detail	Remedy
C11	Clamp fault	Call service technician

Code	Detail	Remedy
C12	Unexpected low pressure	Call service technician
C13	Unexpected low pressure	Call service technician
C14	Air detected	Replace filter and fluid cartridge
C15	Contamination detected	Call service technician
C16	HV high current	Restart diagnostics
C17	Capillary resistance	Restart diagnostics
C18	HV too high	Call service technician
C19	HV too low	Call service technician
C20	Hardware communication fault	Call service technician
C21	Hardware communication fault	Call service technician
C22	Hardware communication fault	Call service technician
C23	LV low current	Call service technician
C24	Unexpected low pressure	Call service technician
C25	Hardware communication fault	Call service technician
C26	Hardware communication fault	Restart Device
C27	Unexpected error	Call service technician
C28	Hardware communication fault	Restart Device
C29	Hardware communication fault	Restart Device
C30	Hardware communication fault	Restart Device
C31	Fluidic fault	Call service technician
C32	Clamp timeout fault	Call service technician
C33	SMC check failed	Call service technician
C34	Unexpected error	Call service technician
C35	Pump motor fault	Call service technician
C36	Unexpected error	Call service technician
C37	Clamp sensor fault	Call service technician
D15	No BGE detected	Replace fluid cartridge
D16	No BGE detected	Replace fluid cartridge
D17	No BGE detected	Replace fluid cartridge
D18	Capillary unprepared	Restart diagnostics
D19	Capillary blocked	Call service technician
D20	Elution unsuccessful	Replace filter and fluid cartridge
D21	Elution unsuccessful	Replace filter and fluid cartridge
D22	Elution unsuccessful	Replace filter and fluid cartridge
D23	No Elution detected	Replace filter and fluid cartridge
D24	No Elution detected	Replace filter and fluid cartridge
D25	Leak detected	Call service technician
D26	Hardware fault	Call service technician
D27	Unexpected high pressure	Replace fluid cartridge
D28	Unexpected high pressure	Replace fluid cartridge
D29	Unexpected high pressure	Replace fluid cartridge
D30	Unexpected high pressure	Replace fluid cartridge
D31	36 kV check failed	Call service technician
D32	36 kV check failed	Call service technician
D33	5 kV check failed	Call service technician

Code	Detail	Remedy
D34	Reagents expired	Replace fluid cartridge
D35	Reagents expired	Replace fluid cartridge
D36	Separation unsuccessful	Replace filter and fluid cartridge
D37	Unexpected error	Call service technician
D38	No BGE detected	Replace fluid cartridge
D39	No BGE detected	Replace fluid cartridge
D40	No BGE detected	Replace fluid cartridge
D41	No Elution detected	Replace filter and fluid cartridge
D42	No reagent cartridge detected	Replace fluid cartridge
D43	Unknown reagent cartridge detected	Replace fluid cartridge
D45	Initialisation timed out	Restart the device

Table 6: Error Messages

11 Legal

11.1 Disclaimers

Except as expressly set out in the Warranty (provided with your device) or as required by applicable law, GreyScan does not make nor give any representation or warranty to the owner or User of the device of any nature, express or implied including any implied warranty of merchantability and fitness for a particular purpose.
To the fullest extent permitted by law, GreyScan disclaims all liability, however arising and under any cause of action, in respect of special, punitive, exemplary indirect or consequential damages, loss of profit or loss of business opportunity, arising in respect of the device and its use or its inability to detect.
While the device is intended to provide an initial analysis as to the identification of unknown substances, this initial analysis ("Analysis") is not an absolute or conclusive identification and should be verified by using other appropriate techniques. GreyScan and its affiliates assume no liability for how the Analysis is used or interpreted by the User.
GreyScan endeavours to ensure that this manual is accurate in all respects. Should this manual have any error or omission, GreyScan disclaims any liability, except to the extent it cannot be excluded at law, for those errors or omissions.

11.2 Warranty Information

The device must be serviced (except for routine maintenance described in this manual) or repaired by a GreyScan Authorised Service Provider. If the device is serviced or repaired by any other person, the Warranty will be immediately voided and GreyScan takes no responsibility for and disclaims all liability in respect of the device after that time.

11.3 General Operation, Safety and Warnings

The device must be used in accordance with this manual and the GreyScan ETD-100 Quick Start Guide, training material and other related device documentation. At no time should a User operate the device in any other way. No User should seek to open or deconstruct all or any part of the device. Any such action will immediately void the Warranty.

11.4 Jurisdiction

This manual is governed by the laws of Victoria, Australia and any dispute in relation to this manual and the use of the device will be adjudicated within the exclusive jurisdiction of the courts of that State.

11.5 Trademarks and IP

GreyScan is the trademark of the GreyScan Australia Pty Ltd ACN 625 303 219 (GreyScan). By acquiring this device, you acquire no rights to or interest in the Trademark. The Trademark may not be used by any person except under license from GreyScan.
GreyScan has the rights to all intellectual property in respect of the device. By acquiring or using the device, you acquire no rights to or interest in such intellectual property.
You must not seek to circumvent GreyScan's intellectual property rights by seeking to analyse, decompile, reverse engineer or modify the device in any way. Any such action will immediately void any warranty provided in respect of the device (Warranty) and GreyScan reserves its right to take any action to protect its rights in such circumstances.

11.6 FCC and CANADA USER MANUAL WARNINGS:

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.

This device complies with Part 15 of the FCC Rules and 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 interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with the FCC and ISED Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and all persons during normal operation.

Warning: Any changes or modifications not expressively approved by the grantee could void the user's authority to operate this equipment.

AVERTISSEMENTS DU MANUEL DE L'UTILISATEUR FCC et CANADA :

Cet équipement a été testé et déclaré conforme aux limites d'un appareil numérique de classe A, conformément à la partie 15 des règles de la FCC. Ces limites sont conçues pour fournir une protection raisonnable contre les interférences nuisibles lorsque l'équipement est utilisé dans un environnement commercial. Cet équipement génère, utilise et peut émettre de l'énergie radiofréquence et, s'il n'est pas installé et utilisé conformément au manuel d'instructions, peut provoquer des interférences nuisibles aux communications radio. L'utilisation de cet équipement

dans une zone résidentielle est susceptible de provoquer des interférences nuisibles, auquel cas l'utilisateur devra corriger les interférences à ses frais.

Cet appareil est conforme à la partie 15 des règles de la FCC et aux RSS sans licence d'Innovation, Sciences et Développement économique Canada. L'exploitation est soumise aux deux conditions suivantes :
(1) Cet appareil ne doit pas provoquer d'interférences ; et
(2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Cet équipement est conforme aux limites d'exposition aux rayonnements de la FCC et d'ISED Canada établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et toutes les personnes pendant le fonctionnement normal.

Avertissement : Tout changement ou modification non expressément approuvé par le bénéficiaire peut annuler le droit de l'utilisateur à utiliser cet équipement.