MicroGuard™ solution
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1 Preface

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Disclaimer

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Cyber Security Disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is operator’s sole responsibility to provide and continuously ensure a secure connection between the product and your network or any other network (as the case may be). Operator shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB, Inc. and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

Customer Support

ABB provides product support services worldwide. To receive product support, either in or out of warranty, contact the ABB office that serves your geographical area, or the office indicated below:

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Text Formats and Warning Icons

Text Formats
– *Italicized* text is used for emphasis in text and also to emphasize the names of screens or text fields.
– **Bold** text is used to show text that you type in fields and also button choices that you enter.

Table 1 shows and describes the icons used in this manual.

Table 1 Warning Icon Descriptions

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="icon.png" alt="NOTE OR IMPORTANT!" /></td>
<td>Emphasizes facts and conditions important to analyzer operation</td>
</tr>
<tr>
<td><img src="icon.png" alt="WARNING!" /></td>
<td>General Warning Icon: gives general safety information that must be followed to avoid hazardous conditions.</td>
</tr>
</tbody>
</table>
2 Introduction

Scope

This manual describes accessing and using the MicroGuard™ solution. It details the software features as well as how to update latest versions of the mobile application, which are referred to as APK files, and how to transfer data both from MicroGuard™ and MobileGuard™.

Figure 1 depicts the MicroGuard™ in use.

Nomenclature

<table>
<thead>
<tr>
<th>Reference in manual</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MicroGuard™</td>
<td>Analytical solution comprised of the GLA131 Series Microportable analyzer and a set of peripherals and advanced software features. The solution uses an analytical system designed to determine the exact location of a natural gas leak in the most rapid and efficient way. Refers to both MicroGuard™ and MicroGuard™ Lite solutions.</td>
</tr>
<tr>
<td>GLA131 Series Microportable</td>
<td>Portable analyzer based on the patented OA-ICOS laser technology to measure the methane concentration in ambient air with highest sensitivity, selectivity and speed. Refers to both: • GLA131-MEA analyzer, measuring both methane (CH₄) and ethane (C₂H₆); part of MicroGuard™ solution • GLA131-CH₄ analyzer, measuring methane (CH₄); part of MicroGuard™ Lite solution</td>
</tr>
</tbody>
</table>

MicroGuard™ Features

The following summarizes the MicroGuard™ solution features.

- Application: The mobile application serves as an extension of the GLA131 Series Microportable technology. It can display various gases in real time through the application and can assist in identifying methane and ethane emissions.
- Handle: The handle is designed for user comfort and to hold both the Nautiz X6 hand-held device and wand in place while surveying designated areas.
- Wand: The wand has been designed as an extension of the analyzer input port with a collapsible feature for easy storage.
- Device: The Nautiz X6 hand-held device is a rugged Android device, suitable for field testing and acting as the interface for the mobile application.
- Inlet tubing: The inlet tubing connects to the GLA131 Series Microportable and serves as an extension with the wand to intake gas at the desired location.
3 System Hardware

Overview

MicroGuard™ solutions include the following hardware as standard scope of supply:

- Nautiz X6 hand-held device (NX6) – Handheld’s rugged Android phablet.
- Backpack from Explorer Case – to carry the GLA131 Microportable analyzer. Straps secure the analyzer in place, and backpack straps provide ease of use and mobility.
- Wand and Tip – an inlet extension of the analyzer.
- Handle – to grip and guide the wand with ease. Holds the NX6 to allow for real-time data monitoring during surveying.
...3 System Hardware

Parts and Tools

MicroGuard™ Parts
Table 2 lists the content of the MicroGuard™ accessory kit.

Table 2 MicroGuard™ Accessory Kit and Parts

<table>
<thead>
<tr>
<th>Part</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MicroGuard™ Complete Accessory Kit</td>
<td>ACC-MICROGUARD</td>
</tr>
<tr>
<td>Accessory Case</td>
<td>SPA-MCG-CASE</td>
</tr>
<tr>
<td>Nautiz X6 Hand-held Device</td>
<td>SPA-MCG-PHABLET</td>
</tr>
<tr>
<td>Bluetooth Dongle</td>
<td>ACC-BT</td>
</tr>
<tr>
<td>Backpack</td>
<td>ACC-MICRO-BP</td>
</tr>
<tr>
<td>Handle</td>
<td>SPA-MCG-HANDLE</td>
</tr>
<tr>
<td>Wand</td>
<td>SPA-MCG-WAND</td>
</tr>
<tr>
<td>Wand Tip</td>
<td>SPA-MCG-WANDTIP</td>
</tr>
</tbody>
</table>

Nautiz X6 Hand-Held Device

Components
See Figure 5 for NX6 components. The converter plugs will vary, depending on user requirements.

Features
See Figure 6 for NX6 front-panel features.

See Figure 7 for NX6 rear-panel features.
...3 System Hardware

Specifications

Table 3 lists the NX6 specifications.

Table 3 Nautiz X6 Specifications

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Life</td>
<td>3.8V 8000 mAh (30.4 Wh)</td>
</tr>
<tr>
<td>Drop/Shock</td>
<td>26 drops from 1.2 m (4 ft)</td>
</tr>
<tr>
<td>Sand/Dust</td>
<td>IP67, IEC 60529</td>
</tr>
<tr>
<td>Water</td>
<td>IP67, IEC 60529</td>
</tr>
</tbody>
</table>

**NOTE**

For more information, refer to the Nautiz X6 website at https://www.handheldgroup.com/handheld-rugged-mobile-computers/rugged-handhelds/nautiz-x6/specs/

Backpack

The backpack from Explorer Case has the following features:
- Made of ballistic nylon.
- Wraps around the case and easily locks with Velcro and large safety clip.
- Retractable, padded backpack straps are fully adjustable.
- Waist belt helps to secure the pack.
- Accessory pocket with Velcro flap closure.

Table 4 Backpack Specifications

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>1.36 kg (3 lb)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>30.48 cm (12 in) × 25.4 cm (10 in) × 20.32 cm (8 in)</td>
</tr>
</tbody>
</table>
...3  System Hardware

Hardware Installation and Assembly

1  Insert the analyzer into the backpack, securing it in place with the backpack straps that loop underneath the analyzer’s handle. There is a second backpack strap that should be clipped around the analyzer for added security.

2  Insert the NX6 into the wand by angling it to fit the curved piece at the end of the frame into the end of the tablet.

3  Press the other end of the tablet in place with the metal brackets: It should now be secured in place.

4  Insert the inlet tubing into the analyzer inlet port.

NOTE

Do not put on the backpack yet.
System Hardware

5 Turn on the analyzer.

6 Put on the backpack.

**NOTE**

If the backpack does not fit, adjust the backpack shoulder straps so that the backpack fits properly.

7 Take the end of the wand (the other end has been attached to the inlet of the analyzer) and secure it into the handle with the screw. Unscrew the clip at the bottom of the handle to loosen the clip.

The clip does not have to be unscrewed all the way.

You are now ready to begin using the MicroGuard™ mobile application on the NX6.

**Analyzer Power-On**

Turn on the analyzer. Refer to GLA131 Series Microportable user manual, document #3KXG167001R4601.
4 Communications Configuration

Overview
Connection must be established between the MicroGuard™ software system and the GLA131 Series Microportable prior to streaming data in the mobile application. Turn on the analyzer prior to launching the mobile application.

Local Data Stream Configuration
Once the MicroGuard™ software system is installed, several additional steps must be taken to ensure the various software components are properly mounted and configured.

Network Communications Configuration

Network Map
Figure 16 illustrates the MicroGuard™ network configuration. Only the Android device communicates with the analyzer through Bluetooth. The analyzer does not communicate with the internet, and all traffic to and from the analyzer is limited to Bluetooth.

Security Configuration

System Ports
Bluetooth: Data streams from the analyzer to the mobile application via Bluetooth.

The application requires access to the following TCP port on the intranet: 20002 Websocket data stream from analyzer.

Ensure that this port is not blocked by any firewall software on the intranet or internet.

ABB, Inc. bears no responsibility for security vulnerabilities introduced by opening ports beyond that specified here.

System Services
The services provided by the MicroGuard™ solution include the following:
• Bluetooth pairing from the NX6 and the analyzer to stream data from the analyzer
• GPS to display maps and location

System Software
The MicroGuard™ solution does not require further software installed beyond the mobile application.

Communication interfaces
In addition to providing a means for streaming data in real time, TeamViewer can also be deployed for troubleshooting in communication with Field Service.

Security Controls
The security configurations necessary for security controls is to change passwords from their default value as instructed in the initial launch of the mobile application.
5 System Software

Overview

The MicroGuard™ mobile application is a user-interface (UI) software that displays real-time gas concentrations in conjunction with maps displaying GPS location. Data files generated by the application are stored locally on the android device and can also be uploaded to your Google Drive storage in real time. In addition to storing data, the application also provides PDF data reports immediately following closing the collection of data called a walk package.

⚠️ IMPORTANT!

The NX6 is not GMS certified with Verizon: It is recommended to use a SIM card from AT&T or T-Mobile because these are the only carriers certified with the NX6. GMS certification applies to the use of Google applications.

Recommended Security Settings

⚠️ WARNING!

For cybersecurity reasons, users are advised to change all passwords from their default value including OS and application-level passwords.

- Users are advised to install malware protection software.
- ABB recommends that users enable Verified Boot on the Android OS.

Application Level

Application Feature Overview

The following provides an overview of the application features.

- Header – displays analyzer and connection status:
  - Overall analyzer status: Green with a checkmark indicates a normal operating condition, yellow with an exclamation mark indicates a warning state, and red with an X indicates an alarm state. (See Figure 18.) If the status is yellow or red, the pressure, temperature, or ringdown of the analyzer is out of its normal operating condition: Check the analyzer for specific details.

![Figure 18  MicroGuard™ Application Overview](image)

- Analyzer battery charge level status. A gray battery indicates the application is waiting for a response from the analyzer for the battery status (see Figure 19).

![Figure 19  Overall Analyzer Status](image)

- Analyzer battery charge level status. A gray battery indicates the application is waiting for a response from the analyzer for the battery status (see Figure 19).

![Figure 20  Battery Status](image)
...5 System Software

- Cellular data or WiFi connection status. See Figure 20 for details.
- Bluetooth device connection status: Black indicates the Bluetooth device is connected; red indicates no connection. See Figure 20 for details.

![Connection Icons](image)

Figure 21  Connection Icons

- Map – displays survey route and user-selected information.
- Menu – set which features you want shown in the map and how these features are displayed, set alarm thresholds and other walk package settings, shut down the analyzer, and log out of the application. Refer to the Application-Specific Screens section for details.
- User location – current location.
- REC – select to start and stop recording of data collection. Refer to the Recording Icon section for details.
- Measured gas in in parts per million (ppm) . For example, figure 17 displays CH$_4$ 1.76 (1.76 ppm of methane).
- Time trace graph – displays a time trace graph of gas data when data are being recorded.

![Open Application](image)

Figure 22  Open Application

3  Log into the application: Enter your username and password (see Figure 22).
4  Launch the application (see Figure 22).

5  Verify connection to WiFi: The map should auto-locate to the user position.

![User Position](image)

Figure 24  User Position

Operational Overview

There are two user accounts for the mobile application: admin and tech. These two users are designed so that the tech users can survey areas using operational settings chosen by the admin user. Refer to the User Management Roles and Privileges section for a list of what each user has access to within the application.

The following is a sequential overview of starting, using, and closing the MicroGuard™ application.

For details on starting the application, refer to the Software Startup section.

For details on using the application features, refer to the Application Level section.

1  Turn on the analyzer. Refer to GLA131 Series Microportable user manual, document #3KXG167001R4601.
2  Open the MicroGuard™ application.
5 System Software

6 Verify Bluetooth connection: The Bluetooth icon should be black (see Figure 20). If the icon is red, connect to Bluetooth as shown in Figure 24.

7 It is recommended to set the following parameters before collecting data:
   - Threshold alarm – for details, refer to the Settings section.
   - Aggregation emissions distance – for details, refer to the Settings section.
   - Live gas to display in the time trace – for details, refer to the Live Gas section.
   - Any loaded drive packages for emission regions to investigate – for details, refer to the Data Packages section.

8 Select Record (REC) to collect data.
...5  System Software

9  The Time trace graph below the map defaults to display methane (see Figure 17). If desired, go to Menu > Live Gas to toggle to another target gas, if appropriate, before or during data collection (refer to the Live Gas section). Each gas has a user threshold in ppm, as well. If you want to change these values, go to Menu > Settings > Threshold alarm (refer to the Settings section); otherwise they will remain at their defaulted values. In order to do this with each gas, the gas must be toggled.

10 When finished collecting data, select REC to close the file and generate the PDF report.

⚠️ NOTE
After selecting REC, the analyzer stops streaming data to the hand-held device, but continues to measure and record data.

11 To check the report:
- Select the Menu > Data packages > Walk Packages (see Figure 26). The easiest way is to sort by date in descending order and note the files by timestamp.
- Tap the Report icon (see Figure 26): The PDF report automatically appears (see Figure 27). Continue scrolling through the page to view the full scope of the report. This file can also be transferred to your computer to be viewed off of the hand-held device.
...5 System Software

12 To return to the application, tap the back arrow at the upper left of the screen.

13 When finished with all data collection, shut down the analyzer through the application (see Figure 28).

14 Wait for the Bluetooth icon to turn red: This indicates the analyzer is ready to shut down.

15 Manually power off the analyzer. (Refer to the user manual of the analyzer purchased with your system.)

16 Log out of the application: Select Menu > Logout, then tap the checkmark (see Figure 30). (For details, refer to the Logout section.)

17 To verify the application is no longer running on the Android device, select the overview button (square icon) in the bottom, right-hand side of the screen.

18 Tap the X to exit the application. (Figure 32)

19 Swipe right or select CLEAR ALL.
...5 System Software

Updating

Application file package (APK) Validation

MicroGuard™ APK is digitally signed by ABB using SHA1 with RSA algorithm. Only APKs with the following fingerprints are guaranteed by ABB:


Each MicroGuard™ release will also have an SHA256 checksum associated with each APK. This guarantees the APK was not altered by signature or by malware. See the release notes for each version's checksum. The following process describes how to verify the APK's checksum.

- The update package download will be available to download via ICOS Support Service announcement.
- The package contains the user manual, release notes, and APK.
- The download link is password protected.
- In order to verify the APK was not altered, verification of the checksum is recommended.

Verify the APK checksum as follows:

1. Open Windows PowerShell and navigate to the location of the APK file. (i.e. `cd /path/to/APK`)
2. Run command `Get-FileHash` on the APK file (see Figure 33).
3. Verify the Hash shown in the terminal matches that of the APK version stated in the Release Notes (snippet shown below in Figure 34).
4. Once the checksum has been verified, continue to install the APK. (Refer to Install APK File via USB.)
...5 System Software

Install APK File via USB

The following describes installing the APK file via USB.

1. Turn on the hand-held device (NX6) and go to the home screen.

2. If you want to see the current version, press and hold the application icon to see the more info pop-up for the application, then scroll to the bottom to see the current version. To install a new apk version, uninstall the application via this same window. Then follow the steps below for installing the new apk version.

3. Select the arrow icon (Figure 35) to access the Applications menu.

4. Select the Settings icon. (Figure 36)

5. Select Connected Devices (Figure 37): The Connected Devices screen appears.

6. Select USB. (Figure 38)

Figure 36 Home Screen

Figure 37 Settings Icon

Figure 38 Connected Devices

Figure 39 Select USB
...5 System Software

7 Select Transfer files from the menu. (Figure 39)

8 A File Explorer Window opens on the computer. Click the Nautiz_X6 option in the left side panel if it does not automatically display. Double-click Internal shared storage. (Figure 40)

9 Click the Download folder. (Figure 41)

10 Copy the APK file to this folder. (Figure 42)

11 Once the APK file has been transferred, disconnect the NX6 and install the application.

12 On the NX6, select the Files application and navigate to the Downloads folder.

13 Click ABB MicroGuard [current version].apk to install.

14 The Android Operating System will warn against side loading applications on the device. To continue installing the application, select Continue, Install, then Install Anyway.
...5  System Software

Figure 46  Select Install

A screen appears indicating the application has installed successfully.

Figure 49  App Installed Screen

The ABB MicroGuard™ application should now appear under all applications.

Third-Party Software Requirements

Software upgrades on the NX6 are provided by Handheld. For any assistance needed, contact Technical Support at icos.support@ca.abb.com

15 Google Play Protect could also prompt you to send the application for scanning: Select DON'T SEND. MicroGuard™ APKs are scanned by three different anti-virus applications prior to each release.

Figure 47  Select Install Anyway

Figure 48  Select Don’t Send
...5 System Software

Screens

Log-in Screen
The version of the application will be displayed below the name. All license details can be found on lower left.

![Example of Log-in Screen](image)

Figure 50 Example of Log-in Screen

User Management Roles and Privileges

Table 5 lists MicroGuard™ features and the two different user roles and privilege levels.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Tech</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toggle Target indication</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Toggle Survey areas</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Toggle Driver comments</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Toggle Comments markers</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Toggle Emission markers</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Toggle Map follows me</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Toggle Leaks markers</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Comments and markers – Add</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Comments and markers – Search</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Comments and markers – Filter</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Comments and markers – Sort</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Comments and markers – Display</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Live gas</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Data drive packages</td>
<td>Accessible</td>
<td>Changeable</td>
</tr>
<tr>
<td>Data walk packages upload</td>
<td>Accessible</td>
<td>Changeable</td>
</tr>
<tr>
<td>Data walk packages report</td>
<td>Accessible</td>
<td>Changeable</td>
</tr>
<tr>
<td>Data packages loading</td>
<td>Changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Bluetooth devices</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Settings – Threshold Alarm</td>
<td>Visible (but not accessible)</td>
<td>Changeable</td>
</tr>
<tr>
<td>Settings – Color palette</td>
<td>Visible (but not accessible)</td>
<td>Changeable</td>
</tr>
<tr>
<td>Settings – Emission aggregation</td>
<td>Visible (but not accessible)</td>
<td>Changeable</td>
</tr>
<tr>
<td>Settings – Graph and walk line</td>
<td>Visible (but not accessible)</td>
<td>Changeable</td>
</tr>
</tbody>
</table>
...5 System Software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Tech</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Settings – Google drive</td>
<td>Enabled</td>
<td>Able to log into all accounts</td>
</tr>
<tr>
<td>Settings – Analyzer Type</td>
<td>Visible (but not accessible)</td>
<td>Changeable</td>
</tr>
<tr>
<td>Settings – Map provider</td>
<td>changeable</td>
<td>Changeable</td>
</tr>
<tr>
<td>Setting – Change password</td>
<td>Enabled (each tech user will have their own account log in credentials)</td>
<td>Enabled and can reset others</td>
</tr>
<tr>
<td>Command – Analyzer shutdown</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Logout</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Command – Walk Start</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Command – Walk Stop</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Saturated Alert</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>General Status icon</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Battery icon</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Network icon</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>Bluetooth icon</td>
<td>Enabled</td>
<td>Enabled</td>
</tr>
</tbody>
</table>

Application-Specific Screens

The following describes features accessible from the Menu icon, and describes the data recording (REC) icon.

![Menu Features](image)

Figure 51  Menu Features
...5 System Software

Toggles

Tap the Menu icon, then select Toggles to access the Toggles menu (see Figure 52). From this menu, you can turn on or off which graph features you want shown in the home screen and loaded drive packages.

In Figure 52, all of the toggles are turned on: The selection is highlighted in black, and the toggle is in the right (enabled) position. If a toggle is turned off, the selection is highlighted in white, and the toggle is in the left (disabled) position. Except for the Map follows me icon, if a toggle is turned on, the icon appears in the map.

Figure 53 Toggles Menu
5 System Software

Toggles are as follows:

- **Target indication** – displays the drive emissions (this is the triangle indicated on the map. Tap the icon in the map to display details indicated in a balloon message.
- **Survey areas** – displays the drive path or walk path.
- **Driver comments** – turns the display of comments and photos off and on. Tap the icon in the map to display details of comments and photos.
- **Comments markers** – turns on display of user comments during a drive (see Figure 53). Tap the comment icon in the map to display its information. The information will show up in a balloon message.
- **Emission markers** – displays emissions.
- **Map follows me** – when on, the screen auto-zooms to the current location and centers it in the display screen, even when the packages are loaded. Turning this toggle off lets you manually scale and move the map.
- **Leaks markers** – leaks are displayed that are measured during the walk package (see Figure 54). Emissions are displayed as leaks only if the measured value is above the user-set threshold within the settings tab. Tap the icon in the map to display detailed information, such as the type of gas and leak amount.

Comments and Markers

Tap the Menu icon, then select **Comments and markers** to access the Comments and markers menu (see Figure 55).

During a walk package, comments, photos, and videos can be added to each file. When either a drive or walk package is loaded, select this icon to view additional comments and information that was added. This feature can only be added to walk packages while they are being recorded. The information gathered in this feature will be attached in the associated PDF report of the walk package. All added comments can also be edited after they have been saved as long as the walk package is still in progress. This can be accessed by either selecting the comment marker within the application and then selecting the information pop-up bubble or through the Comments and markers tab. As seen in Figure 56, a list of created comments will appear in the list and can either be deleted by selecting the trash can or edited by selecting the arrow on the right of the trash can.

Icons at the top of the screen are as follows: **Add**, **Search**, **Filter**, and **Sort** (see Figure 55).

- **Add**: Tap the Add icon to add a text comment, photo, video, voice recording, or draw on the map. Tap the check to confirm or the X to cancel.

Figure 54 Comments Markers

- **Leaks markers icon**

Figure 55 Leaks Markers

- **Leaks markers icon**
...5 System Software

- Draw on map: Within this comment feature, you can draw on maps using three different colors and three different line widths.

  ![Draw on Map](image1)

  Figure 58 Draw on Map

- The paint brush enables the draw feature. Select the crosshair icon to move the map to draw on the desired location.

- To select color and line width, select the line icon on the left: The pop-up shown in Figure 58 appears – in this example, red and the narrowest line are selected. Select the checkmark to save the selection or the X to cancel the selection.

- To delete the line and draw a new one, select the trash can icon.

- To undo the last draw, select the back-arrow icon.

- To save the draw, select the checkmark in the upper right corner.

- To exit the drawing feature without saving, select the X.

  ![Select Color and Line Width](image2)

  Figure 59 Select Color and Line Width

- Search: Tap the Search icon to search comments and information. Type in the comment you want to search for.

  ![Comments and Markers Search Window](image3)

  Figure 60 Comments and Markers Search Window

- Filter: Tap the Filters icon to limit comments and information to display. Check the box next to the type of comments and information you want displayed, then tap the check to confirm or the X to cancel.

  ![Comments and Markers Filter Window](image4)

  Figure 61 Comments and Markers Filter Window

- Sort: Select the Sort icon to sort comments and information by name, date, or type in ascending or descending order. Select the radio button next to the method you want to sort, then tap the check to confirm or the X to cancel.

  ![Comments and Markers Sort Window](image5)

  Figure 62 Comments and Markers Sort Window
...5 System Software

Live Gas

Tap the Menu icon, select Live gas, then use the adjacent toggle to select the desired gas to view the measured ppm levels of a specific gas. Figure 62 shows an example of switching from methane to carbon dioxide. Depending on the analyzer type chosen, different live gas options will vary.

Figure 63 Live Gas Selection
...5 System Software

Data Packages

To access the Data packages menu as seen in Figure 65, tap the Menu icon, then select Data packages. From here there are three options: Drive Packages, Walk Packages, and Loaded Packages.

Drive Packages: Displays all drive package data. Each package will either have a cloud icon next to it or not. If there is not a cloud icon, this indicates that the package has been manually transferred. For details on how to transfer files manually, see section 6.8 Data Viewing. Figure 63 is an example in which Drive Packages is selected.

Walk Packages: Displays all walk package data. Each time “Rec” is selected to end a walk, a report is automatically generated and the data file can be found here. All data files will be stored locally and have three icons next to the file name as shown in Figure 64: a cloud, report, and square icon.

Let’s break down these icons:

Cloud icon are displayed as one of the three following options:

- Not Connected: indicates the package is not connected to the Google Drive and cannot be uploaded to the cloud.
- Ready for Upload: indicates the package is available to upload to the cloud. Tap to upload the file to Google Drive.
- Uploaded: indicates the package has been uploaded to the cloud.

Report Icon: Tap this icon to pull up the PDF report within the application.

Square Icon: Tap this icon to select the file to be loaded within maps.

Loaded Packages: Lists all files selected to be displayed within maps. Select files in this list to remove them from being displayed. Figure 65 is an example in which Loaded packages is selected.

However, if there is an icon, this indicates the file is associated with the user’s Google Drive account and its availability is associated by one of the following icons.

- A down-arrow means “ready for download.” It indicates that the Google Drive account is connected and the file is available to download locally to the hand-held device. Tap the icon to initiate download.
- A checkmark means “downloaded.” It indicates that the file has been downloaded to the hand-held device’s local storage and will be available to display in maps whether or not there is an internet connection. This is ideal for survey areas where connection is poor.

**NOTE**

If the Google Drive account is disconnected, there will not be any drive packages displayed. To connect to your account, enter your user credentials in the Google drive tab within Settings.
...5 System Software

![Loaded Packages Screen](image)

**Bluetooth Devices**

Tap the Menu icon, then select **Bluetooth devices** to access the Bluetooth devices menu (see Figure 66).

![Bluetooth Devices Menu](image)

The left side indicates which device is connected. If there is not a device connected, refresh devices in range by selecting the circular arrow. Once the device appears in the list which matches the licensed analyzer number following 3K60, select that option.

![Settings Menu](image)

**Settings**

Tap the Menu icon, then select **Settings** to access the Settings menu (see Figure 67).

There are two types of users for the Settings menu screens: **admin** and **tech**. **Admin** users can change settings in these screens. **Tech** users can check settings in these screens, but not change the settings, except for the **Settings - Google Drive** screen.

From this menu, **admin** users can adjust various settings for each walk package. Each time a change is made within these tab settings, select **Confirm** to apply the changes. In the example in Figure 67, **Threshold alarm** is selected and settings are specified.

Refer to Table 5 for **Settings** screens and the type of access available to **admin** and **tech** users.

The following describes each setting type:

- **Threshold alarm** – gas threshold for the displayed gas and audio sound (beep or click). The Geiger counter selected indicates that the alarm will sound faster as the measured CH₄ gets stronger. This feature will differ slightly in gases available for threshold settings depending on the analyzer type chosen.

**NOTE**

If the detected CH₄ level exceeds the range for the analyzer, a flashing red **Saturated** warning is displayed (see Figure 68).

The **Saturated** warning is also displayed when there is zero or negative data: If this occurs, check the analyzer **Laser Adjust** screen to see if the absorption peak is centered on the target line and adjust if needed. Refer to your analyzer’s user manual’s **Laser Adjust** section.
...5  **System Software**

Figure 68 shows the alarm going off with the red around CH₄ and the *Saturated* warning level above the time trace. The exclamation point icon in the map shows emission has crossed the threshold; this is also displayed for maximum levels in the time trace as red dots.

Figure 69  **Saturated Warning**

- Color palette – scale for the measured CH₄ levels associated with which color that will display in the walk path in the map during real time and in the generated report.

Figure 70  **Settings Color Palette**

- Emission aggregation – set the distance to group emissions measured above the set threshold value in Threshold alarm.

Figure 71  **Settings Emission Aggregation**

- Graph and walk line – select the walk length and displayed graph timeline length of the time trace graph below the map.

Figure 72  **Settings Graph and Walk Line**

- Google drive – log into your google drive account and tap **Connect**. This is prudent in order to load drive packages and upload walk packages to the drive within the application.

Figure 73  **Settings Google Drive**

- Map provider – select one of three options for displaying maps: Google, Open Street, and Gaode maps. Gaode maps is used specifically for users in Asia. The default is Google maps. To change, tap the desired map option and select **Confirm**: This closes and re-launches the application in the newly selected map option.

Figure 74  **Settings Map Provider**
...5 System Software

- Analyzer type – select the type of analyzer to measure gas(es). Changing the analyzer type changes the live gases displayed in the time trace graph.

- Change password – change your user password. After confirming the password, a Data saved message appears indicating the password is changed.

About

Tap the Menu icon, then select About to access the About screen (see Figure 76). From this screen, you can see the license details and load a new license.

Analyzer Shutdown

To shut down the analyzer, perform the following (see Figure 28):

1. Tap the Menu icon, scroll down, then select Analyzer shutdown.
2. When the Do you really want to shutdown the analyzer? message appears, select the checkmark below the message.

The Bluetooth icon in the header changes from black to red to indicate the Bluetooth connection is disabled. This is the recommended method, instead of turning the analyzer power button off. Allow for approximately 20 seconds to pass after shutting down through the application in order to allow the analyzer to complete its shutdown process before manually powering off the analyzer.

Logout

To log out, perform the following (see Figure 30).

1. Tap the Menu icon, scroll down, then select Logout to log out of the application.
2. When the Do you really want to logout? message appears, select the checkmark below the message.

Settings in the application are saved until the device is shut down.

Utility Asset Data Management

Under the Data packages tab, the application displays the amount of storage that has been used on the bottom left corner of the screen. When the data storage limits are being reached, a notification pops up. Refer to Data Storage for more information.

NOTE

This screen may be used at any time to change a password. When you initially log in with the default password, you are automatically prompted to change the password. For details, refer to the Software Startup section.
5 System Software

Analyzer Level

Refer to GLA131 Series Microportable user manual, document #3KXG167001R4601.
6 Using the System

Hardware Inspection
Inspect all pieces for damage and ensure the functional quality of the items below:

Analyzer:
- No loose wires.
- Nothing loose in the pelican case.
- Batteries are charging and operating normally.
- Analyzer turns on normally.
- Analyzer pump is on.
- Suction at the tip of the analyzer inlet.

**IMPORTANT!**
To prevent damage to the inlet tip, do not hit the tip against anything during emission investigations. If the tip happens to fall out, carefully insert the end of the tip back into the tubing.

- NX6: powers on and charges as normal.
- Inlet tubing:
  - Intact, not bent.
  - Secures into the analyzer inlet port as normal.
  - Secures in the handle as normal.
  - Filter tip is not bent or damaged.
- Handle:
  - All pieces intact.
  - Device frame holds the device.
  - Nothing is bent or out of place.
  - The screw for the wand operates normally.

System Power-On
1 Power on the Android device.
2 Turn on the analyzer. Refer to GLA131 Series Microportable user manual, document #3KXG167001R4601.

Software Startup
To start up the MicroGuard™ application, the analyzer and phablet must already be turned on. Then, perform the following:

**NOTE**
If at any time during use of MicroGuard™ you are prompted with messages similar to the following example, select the option to Cancel/Deny/Don't Send.

Figure 78  Cancel Message
1 Open the MicroGuard™ application.
2 Accept the terms and conditions of the purchase agreement.

Figure 79  Purchase Agreement Terms and Conditions
3 Log into the application: Enter your username and password. The default password is the same as the username.

There are two usernames: admin and tech.

**NOTE**
If five attempts are made at inputting an incorrect password, you will be locked out for one hour before another attempt can be made.
...Using the System

4 Tap the arrow to launch the application (see Figure 79).

5 For the initial launch, or if the password has not been changed from the default, a screen appears prompting you to change the default password (see Figure 80): Select the checkmark to access the Settings > Change Password screen (see Figure 81).

6 Enter the old, then the new password. The password must be minimum 8 characters.

7 Enter the new password in the Confirm Password field.

8 Tap Confirm.

9 Verify connection to WiFi or cellular data (see Figure 20): The map should auto-locate to the user position.

10 The Bluetooth should now pair automatically. If it does not, or if the GLA131 Series Microportable was purchased independent, not as part of either the MicroGuard™ or MicroGuard™ Lite solutions, refer to the MicroGuard™ Application and Analyzer Bluetooth Pairing section.

When the application automatically selects the available device, you can check the screen to see which analyzer is connected. The Bluetooth connection matches the analyzer serial number (see Figure 82).

11 Verify the map provider option is chosen.

12 Verify that the correct analyzer type is selected.

13 It is recommended to set the following parameters before collecting data:
   • Threshold alarm (Menu > Settings > Threshold alarm – refer to the Settings section)
   • Aggregation emissions distance (Menu > Settings > Emission aggregation – refer to the Settings section)
   • Any loaded drive packages for emission regions to investigate (Menu > Data packages > Drive Packages – refer to the Data Packages section)
...6 Using the System

Google Drive Account Log-in

If you will use Google Drive to store data, log into your Google Drive account as follows:
1. Select the Menu icon in the upper right corner, then select Settings (see Figure 84).

![Figure 85 Accessing Settings Menu](image)

2. Select Google drive (see Figure 85).

3. Tap Connect.

4. Enter your Google Drive account information.

![Figure 86 Log into Google Drive Account](image)

Standard Operation

MicroGuard™ streams data from the analyzer in real time and through a variety of features, has the ability to assist users in locating gas emissions. This data displays in the map and the graph below it. If any of the described features in the manual do not function as described, refer to the troubleshooting portion of the manual and contact Service.

Recording Icon

Tap the data recording icon (REC) to gather and record data from the analyzer: The data will be displayed in real time as a ppm graph in the ABB chart portion in the lower part of the screen.

![Figure 86 Log into Google Drive Account](image)

Figure 87 Data Recording Icon

Once the REC icon is tapped, it changes to a circular arrow, indicating initialization (see Figure 87).

![Figure 88 Data Recording Initializing](image)

When data are available, the REC icon turns red indicating data are being recorded. The data are displayed in a time-dependent graph on the bottom of the screen. (See Figure 88)
...6 Using the System

Report Generation

When finished collecting data, select REC to close the file and generate the PDF report. You can immediately go into Data Packages and look at the report. The easiest way is to sort by date in descending order and note the files by timestamp.

To view a walk report in PDF format:

1. Tap the Menu icon.
2. Select Data packages.
3. Select Walk Packages.
4. Tap the Report icon to open the report. See Figure 27 for an example of a report.

For details, refer to the Data Packages section.

A PDF report immediately populates within the application. Overall details regarding the walk date and location are at the top of the report. Any emissions detected over the user-set threshold are broken out into details in subsequent sections along with any photos and comments taken during the walk package.

**NOTE**

If Maps was not able to display during the walk package, screenshots of the map will not display in the report. You must have a strong enough WiFi or cellular connection.

**NOTE**

If comments and media gathered during a walk package do not appear in the report, contact Technical Support.

Data Viewing

There are multiple ways to view data from MicroGuard™ and MobileGuard™.

**MicroGuard™:**

Files generated from MicroGuard™ are available for viewing in three locations on the device:

- In the Documents folder of the Android device under **WalkPackages: Files > Documents > WalkPackages**
- Shown in data packages under the menu of the application: **Menu > Data packages > Walk Packages. Select the report icon** to view the PDF report. Select the box to display the data within maps of the application.
- In the Google Drive account (only possible if the file has first been uploaded)

Data files can also be transferred off of the device manually via USB for additional viewing of .shp and .kmz files through Google Earth.
...6 Using the System

MobileGuard™:
Data from the MobileGuard™ can be viewed within the maps display screen of the MicroGuard™ application. There are three methods to enable viewing:
- Transfer .drive files directly from the MobileGuard™ tablet to the MicroGuard™ hand-held device via USB or the provided USB-C cable.
- Connect to your Google Drive account. All Drive Packages stored in the cloud will load automatically and be displayed in a list under Menu > Data packages > Drive Packages of the application.
- Downloaded locally for offline use. Each file that is connected to the Google Drive account will have a cloud icon next to the file name (see section Data Packages for a more detailed explanation). This is ideal when survey areas have an unreliable internet and mobile data connection. Reminder: this is only possible with a connection to the Google Drive.

Regardless of the file type, all Drive packages generated by MobileGuard™ are shown in data packages under the menu of the application: Menu > Data packages > Drive Packages. Drive Packages can be loaded at anytime to be displayed within the maps display screen. It is particularly useful to load the package of the area under investigation prior to starting a walk package. The walk package data can then be displayed in parallel with the loaded drive package for ease of use in locating the estimated emission location. Any drive package data that is displayed while a walk package is being collected, will also be added in the PDF report following the close of that walk package.

Data Storage
Files generated from the data packages are stored in the following locations:
- Local: Documents folder
  If .drive files from drive packages were transferred from an external device to the hand-held device, they will be stored under: Files > Documents > DrivePackages on that hand-held device.
  If files were downloaded from the Google Drive account, they will be stored under: Files > Documents > DrivePackages
- Cloud (optional): Google Drive

⚠️ WARNING!
If the phablet is reaching its storage limit, software issues may occur, and warning notifications appear in the Data Packages screen: Transfer media off the phablet onto your computer.

System Shutdown
1 When finished with all data collection, shut down the analyzer through the application (see Figure 28):
   - Tap the Menu icon.
   - Scroll down.
   - Select Analyzer shutdown.
   - Select the checkmark below the message.

   The Bluetooth icon in the header changes from black to red to indicate the Bluetooth connection is disabled.

2 Wait for approximately 20 seconds after the Bluetooth icon has turned red: At this point, the analyzer is ready to shut down.

3 Manually power off the analyzer.

4 Log out of the application: Tap the Menu icon, scroll down, then select Logout.

   Settings in the application are saved until the device is shut down.

5 Close the application before powering off the device as follows:
   - With the phone in its horizontal position, swipe the screen from right to left: This brings up the Android home toolbar.
   - Select the square icon, then Clear All.
   - Power off the device via the power button.
7  System Maintenance

Equipment Handling

Each item should be stored in its pelican case for proper handling - see Figure 90 for placement of items. Items should not be transported freely where there might be exposure to damage.

Software Handling

If needed, the activity of each user can be accessed to help with troubleshooting. Access of logs are controlled by the Android device.
To access user logs: While using the signed build, tap the ABB logo six times. The logs are then copied to Microportable/logs folder.

System Decommissioning

At the system’s end of service, it is important to securely decommission the supplied NX6 Android device so that user data is not compromised after disposal. This can be accomplished by doing a factory reset on the Android device.

Perform a factory reset as follows:
1 Select the arrow icon (Figure 35) to access the Applications menu.
2 Select the Settings icon. (Figure 36)
3 Select System.
4 Tap Reset.
5 Tap Erase all data (factory reset).
6 Tap Reset phone.

Maintenance and Spare Parts

For details on maintenance and spare parts for the analyzer, refer to the GLA131 Series Microportable user manual, document #3KXG167001R4601.
To replace MicroGuard™ solution components, refer to Table 2 for part numbers and contact your local sales representative and/or the factory support team at icos.support@ca.abb.com
8 Appendices

Acronyms

- APK - Android Package
- SIM - Subscriber identity module
- GMS - Google Mobile Services
- JSON - JavaScript Object Notation
- ppm - parts per million
- UI - user interface

Troubleshooting

Troubleshooting Tips
Refer to Table 6.

Table 6 Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive packages folder does not exist when transferring drive packages manually</td>
<td>Common problem related to newer Android devices</td>
<td>Unplug, then plug in, the USB cable a few times or restart the device. If this does not solve the problem, perform the following: 1. Go to Settings &gt; Apps &amp; Notifications. 2. Tap See all apps. 3. Tap three dots and select show system. 4. Find the external storage and media storage applications and clear data for both. 5. Restart the device.</td>
</tr>
<tr>
<td>Cannot connect to Google Drive</td>
<td>No internet connection. User access on your Google account must be managed for an unknown device</td>
<td>Connect to a strong internet connection.</td>
</tr>
<tr>
<td>Application crashes</td>
<td>An error in the application occurred</td>
<td>Close the application, restart the device, then re-launch the application.</td>
</tr>
<tr>
<td>Bluetooth is not connected on initial launch</td>
<td>Bluetooth pairing failed to remember the device</td>
<td>Connect to the analyzer listed in available devices within the application by performing the following: 1. Go to Menu. 2. Go to Bluetooth devices. 3. Refresh devices in range. 4. Select the serial number displayed in devices in range that matches the serial number of the analyzer. 5. If Bluetooth still fails to connect, refer to MicroGuard™ Application and Analyzer Bluetooth Pairing.</td>
</tr>
</tbody>
</table>
Appendices

MicroGuard™ Application and Analyzer Bluetooth Pairing

If the Bluetooth icon is red, this indicates the analyzer is not connected to the MicroGuard™ application via Bluetooth (see Figure 91). If this occurs, pair the application and analyzer with the Bluetooth device as follows. This procedure can also be followed for pairing new Android devices.

1. Turn on the analyzer.
2. Connect the analyzer to a monitor via a VGA cable or connect the analyzer remotely via VNC. (For instructions on connecting via VNC, refer to the GLA131 Series Microportable Analyzer User Manual, document #3KXG167001R4601)
3. Log into the analyzer software (lgr/3456789). See Figure 92.
4. Select the Setup > Bluetooth Daemon tab (see Figure 93).
5. Verify that the status for Bluetooth Daemon is running. If it does not, click the Run button.
6. Within 3 minutes, click Set Bluetooth visible.
7. Open the MicroGuard™ application.
8. Log into the application (admin/admin). If the password has been changed from the default password, admin, use the existing password.
9. If you are setting up Bluetooth pairing for a new device, ignore the prompt to change the password. Otherwise, this prompt will not appear if the password has already been changed.
10. Select Menu > Bluetooth devices (see Figure 24).
11. If the application is attempting to pair to something, tap Disconnect device.
12. Search for the new device: Select the circular arrow near the top right of the screen (see Figure 94).
13 Select the Bluetooth device that matches the analyzer serial number: Available devices populate on the right side - multiple devices may appear. Be sure to match the serial number of the analyzer to the serial number selected in devices to pair. (See Figure 95.)

14 A pairing prompt appears in the application. The pairing number should match the analyzer serial number: Select **Pair**. See Figure 96.

15 A pairing prompt also appears on the analyzer **Setup Bluetooth Daemon** tab: Select **Confirm**.

Packaging and Shipping

All MicroGuard™ pieces should be assembled and packaged in the pelican case as shown and described in **Equipment Handling**. The tubing should be disconnected from the wand to prevent damage of the quick disconnect clips. Additionally, the filter tip should be stored in such a manner without being bent.