



ABB MEASUREMENT & ANALYTICS | USER MANUAL

User Manual | OA-ICOS™

GLA131 Series Microportable Analyzer



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WARNING!

Using this analyzer in a manner not specified by ABB may result in damage to the analyzer and render it unsafe to operate.



WARNING!

Service to the analyzer must be performed only by certified service personnel trained on servicing this analyzer. User adjustments inside the analyzer are not necessary or recommended by the manufacturer.



WARNING!

Only authorized persons may open the analyzer cover or perform internal maintenance. Contact ABB for maintenance instructions and maintenance kits. Make sure the analyzer is unplugged before working with the internal components. Failure to do so may result in damage to the analyzer and electric shock.

Disclaimer

This document contains product specifications and performance statements that may be in conflict with other ABB published literature, such as product flyers and product catalogs. All specifications, product characteristics, and performance statements included in this document are suggested specifications only. In case of conflict between product characteristics in this document and specifications in the official ABB product catalogs, the latter takes precedence.

ABB reserves the right to make changes to the specifications of all equipment and software, and to the contents of this document, without obligation to notify any person or organization of such changes. Every effort has been made to ensure that the information contained in this document is current and accurate. Please contact ABB if you find any error in this document, so we can make appropriate corrections.

Cybersecurity

This product is designed to be connected to and to communicate information and data via a network interface. It is your 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). You shall establish and maintain any appropriate measures (such as, but not limited to, the installation of firewalls, application of authentication measures, encryption of data, 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 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.

Patent

The analyzer technology is protected by patents:

- 7,468,797
- 6,839,140
- 6,795,190
- 6,694,067

Copyright

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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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Fax: +1 418 877 2834

Technical Support: icos.support@ca.abb.com

Please contact icos.support@ca.abb.com and your local sales representative for more details.



Be prepared to provide the serial number or sales order number of the analyzer.

1 Introduction

This manual contains basic information on using the *LGR-ICOS™* GLA131 Series Microportable Analyzers, and analyzer operational and safety information.

This manual describes the analyzer menu and data screens. It also provides instructions to calibrate the analyzer to its traceable certified bottle gases, adjust data sampling rates, and data transfer through WiFi on the device that has established and secured a link with the analyzer.

Even though this user manual provides additional information on the hardware components and their particular functions, it is recommended to have qualified ABB service personnel resolve any issues with the analyzer.

2 Safety

The following pages provide important safety precautions.

Class of Laser Equipment

The analyzer is a Class 1 laser analyzer when the case cover is closed for normal operation, and the lock is installed.

Certification

The analyzer certifications are listed in Table 1.

Table 1: Analyzer Safety Certifications

Symbol	Standards Tested & Met
	2004/108/EU (EMC), EN61326-1

WEEE Directive

The analyzer is not subject to WEEE Directive 2002/96/EC (Waste Electrical and Electronic Equipment) or relevant national laws (for example, ElektroG in Germany).

The product must be disposed of at a specialized recycling facility. Do not use municipal garbage collection points. According to the WEEE Directive 2002/96/EC, only products used in private applications may be disposed of at municipal garbage facilities. Proper disposal prevents negative effects on people and the environment, and supports the reuse of valuable raw materials.

Labels

The following labels are at specific locations on or in the analyzer to identify hazardous areas.



Figure 1: Radiation Labels

These labels are located on the enclosure covering the ICOS cell. The fiber laser is visible only when the insulated enclosure is removed from the ICOS cell.

Operator Safety

When the case cover is closed and locked into position, the analyzer runs safely, without risk to the operator. Modifying the analyzer to operate with the case cover open can injure personnel.



Bypassing the analyzer interlock switch to open the case cover during analyzer operations can cause serious bodily injury. Even though the analyzer provides a second layer of protection, such as a laser cover to prevent the user from the invisible laser beam or any secondary reflection from the laser on a reflective surface, it is not recommended to modify the analyzer to operate in an unsafe condition.

Electrical Hazards

The analyzer poses no electrical hazards. The analyzer components operate at ≤ 6.8 V DC.

Laser Hazards



This analyzer is a Class 1 laser product.

There are one or two lasers (depending on your configuration) used in the analyzer. During normal operation, with the analyzer case cover closed and the lock installed, the analyzer spectroscopy instrument is a Class 1 Laser Product in accordance with *Title 21 Code of Federal Regulations, chapter 1, sub chapter J*.

The laser(s) in the analyzer are rated Class 3B, > 5 mW. The laser is enclosed and not accessible, unless the lock is removed, and the case cover is opened for servicing. Laser warning labels are on the enclosure covering the laser.



Figure 2: Laser Radiation Labels and Magnetic Interlock Switch

The analyzer laser is not field serviceable. Should a laser fail in the field, the analyzer must be shipped back to ABB for service repair.

The analyzer laser is equipped with a magnetic interlock switch. Whenever the case cover is open, the magnetic switch breaks contact from the magnetically encoded counterpart, and power is interrupted from the Laser Controller PCB in the analyzer, thus, disabling the laser.

Safety Provisions

Follow these precautions when dealing with all chemicals:

- Keep all chemical containers away from heat, sparks, and open flames.
- Use only on grounded equipment and with non-sparking tools.
- Store in a cool, dry, and well-ventilated place, away from incompatible materials.

If a spill occurs:

- Make sure all handling equipment is electrically grounded.
- Mop or wipe up, and then place all chemical-soaked items in containers approved by the US Department of Transportation (DOT) or the appropriate local regulatory agency.

Lithium-Ion Battery Hazard



CAUTION!

For analyzer functionality and user safety, only use batteries provided by ABB.

Rechargeable lithium-ion batteries are potentially hazardous and may present a serious fire hazard if damaged, defective, or improperly used. A fire may potentially occur in the following circumstances:

- The battery has been fully discharged and is not recharged shortly afterwards.
- Charging is attempted at temperatures below 0 °C (32 °F).
- The battery is exposed to liquids, especially salt water.
- Operating or charging a battery damaged from dropping or from shipping damage.
- Using a charger other than specifically designated for the particular battery.

Charging recommendation:

- Perform charging in a fire-safe area away from children or pets.
- Perform charging at a temperature between 0 °C to 45 °C (32 °F to 113 °F).
- Do not attempt to charge a battery that is bulging. Use only supplied charging cables and connections.
- A battery in good condition should only get slightly warm during charging. Any other conditions immediately terminate charging.

Disposal: Dispose the battery at a recycling center that processes lithium-ion batteries.

Text Formats and Warning Icons

Text Formats

This section describes text formats and warning icons used in this manual.

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

Warning Icons

Table 2 shows and describes the warning icons used in this manual.

Table 2: Warning Icon Descriptions

Icon	Meaning
 NOTE or IMPORTANT!	Emphasizes facts and conditions important to analyzer operation.
 WARNING! or CAUTION!	WARNING: Failure to comply may result in serious injury. CAUTION: Follow instructions carefully to avoid equipment damage or personal injury.
 WARNING!	Electrical Warning Icon: warns of potential electrical shock hazard.
 WARNING!	Laser Warning Icon: warns of potential laser hazard.

3 Product Specification

Table 3 lists analyzer product specifications. Figure 3 illustrates the overall dimensions of the analyzer. Figure 4 illustrates attached external components.

Table 3: Product Specification

Parameters	Specification
Physical Dimensions	Length: 34.7 cm (13.37 in) x Width: 29.5 cm (11.6 in) x Height: 14.8 cm (5.8 in) (see Figure 3)
Physical Weight	6.1 kg (13.5 lb) with internal battery
Power Source	Internal battery (see Figure 5) External power supply (battery charging)
Power Input	10-30 V DC or 110/240 V AC 35 watts: GLA131-GGA 27 watts: GLA131-GPC, GLA131-MEA 120 W power supply/charger included 99.9 watt-hour internal battery included, up to 3 hours autonomy
Operating Current	9 A (max.)

Standard Components

- Padlock – Qty 1
- Null modem cable – Qty 1
- Hose to Tube Adapter – Qty 2
- USB with user guide – Qty 1
- Power cable – Qty 1

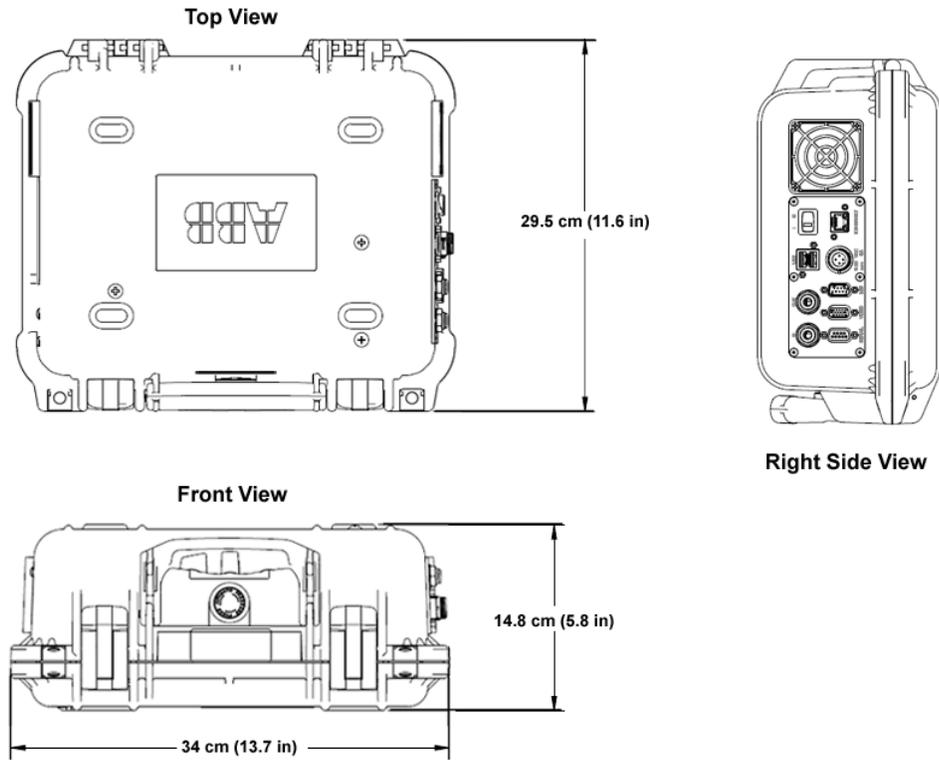


Figure 3: Analyzer Dimensions

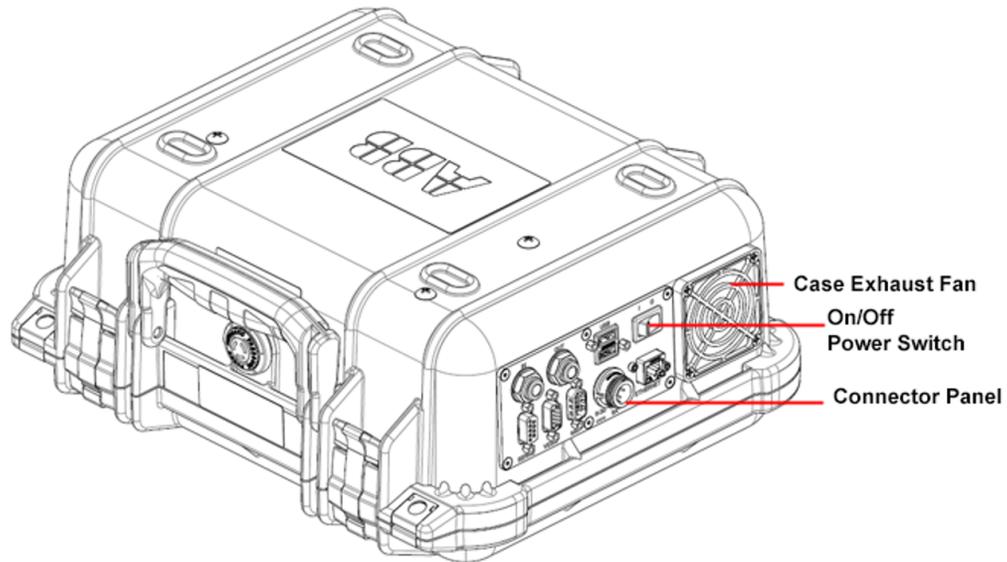


Figure 4: Analyzer Case Component Identification

Captive screw to secure or remove lithium-ion polymer battery



Lithium-ion polymer battery

Figure 5: Analyzer Replaceable Lithium-Ion Polymer Battery

Environmental Requirements

Table 4 defines the environment requirements of the analyzer during operational and non-operational conditions. Operation outside of these requirements may cause damage to the analyzer.

Table 4: Environment Requirements

Requirements	Specification
Operational Ambient Temperature	5 °C to 45 °C (41 °F to 113 °F)
Non-Operational Temperature ¹	4 °C to 50 °C (40 °F to 122 °F)
Relative Humidity	Below the dew point for the area, avoiding condensation on surfaces



WARNING!

To prevent damage to the analyzer, do not expose the analyzer to, or use the analyzer in, rain or snow.



CAUTION!

ABB does not endorse operation of any analyzer (including MicroGuard™) not certified for operation in hazardous locations continuously in air that contains methane levels higher than the lower flammability limit (LFL), where LFL for methane in air is 4.4% or 44,000 ppm.

¹ For maximum lithium-ion battery life and safety, the recommended storage temperature is between 4 °C to 25 °C (40 °F to 77 °F).

4 Features and Measurement Theory

The analyzer is a cavity-based spectroscopy instrument. The analyzer's cavity design enhances the absorption of laser light by the target gas molecule. This enhancement improves the signal-to-noise ratio over conventional laser sensors enabling trace gas measurement and sensitive monitoring. The type of gas the analyzer can measure is based upon the laser wavelength used. There are various models, each targeting gases that various industries monitor. All measurements are real-time.

Main Features

The analyzer's main features are:

- Measurement and processing time up to 10 Hz
- Reduced data cross-interference
- Sensitivity up to ppb

Connection Ports

This section describes the connections shown in Figure 6.

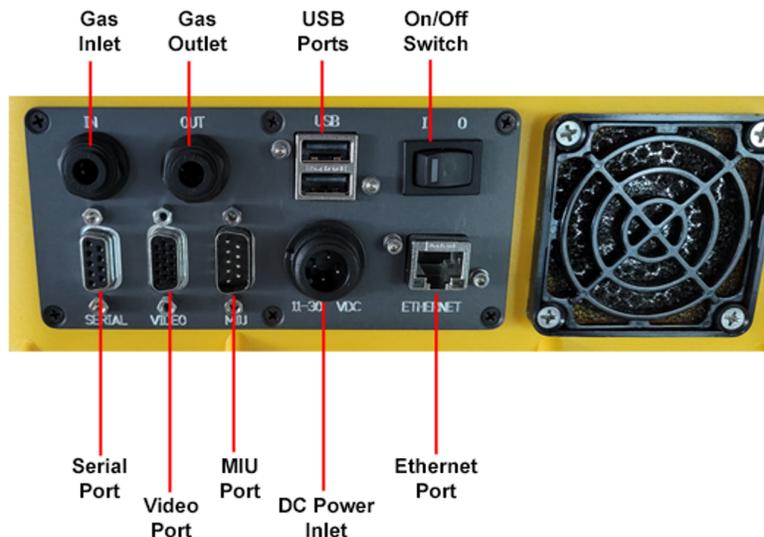


Figure 6: Connection Ports

Gas Inlet and Outlet

When connecting soft tubing to the gas inlet and outlet fittings use provided Hose to Tube Adapter.

Gas to be measured is connected to the ¼ inch push-connect *IN* port

The acceptable inlet gas-pressure range is 0 to 15 psig.

The ¼ inch push-connect *OUT* port may:

- Remain open, expelling non-hazardous gas into the air,
- Be routed to a different location or system, or
- Be recirculated through an enclosed gas-flux chamber.

Power

The analyzer is operational for up to 3 hours when using the internal battery only.

The battery may be recharged using the AC/DC power supply to the DC power inlet. This power supply contains a 10 A 32 V DC automotive fuse inside the external power-input harness.

There is also an optional battery charger (ACC-MICRO-BC) when extra batteries need to be charged outside the analyzer.



WARNING!

Do not use a battery other than the battery provided by ABB.

Data Interface

- USB ports – Used to transfer data to a USB memory device or connect a USB keyboard and mouse.
- Serial port (9 pin D-sub) – For real-time digital measurement output.
- Video port (15 pin D-sub) – Connects an external monitor to the analyzer.
- MIU port (9 pin D-sub) – For connecting to a Multiport Inlet Unit (optional).
- Ethernet port – Connects the analyzer to a local area network (LAN) and allows access to the data directory using an external computer.
- Modbus TCP - For reading analyzer process variables and health status via a Modbus master using the Modbus TCP version of the protocol.

Plumbing Diagram

The internal flow of gas through the analyzer is shown in Figure 7.

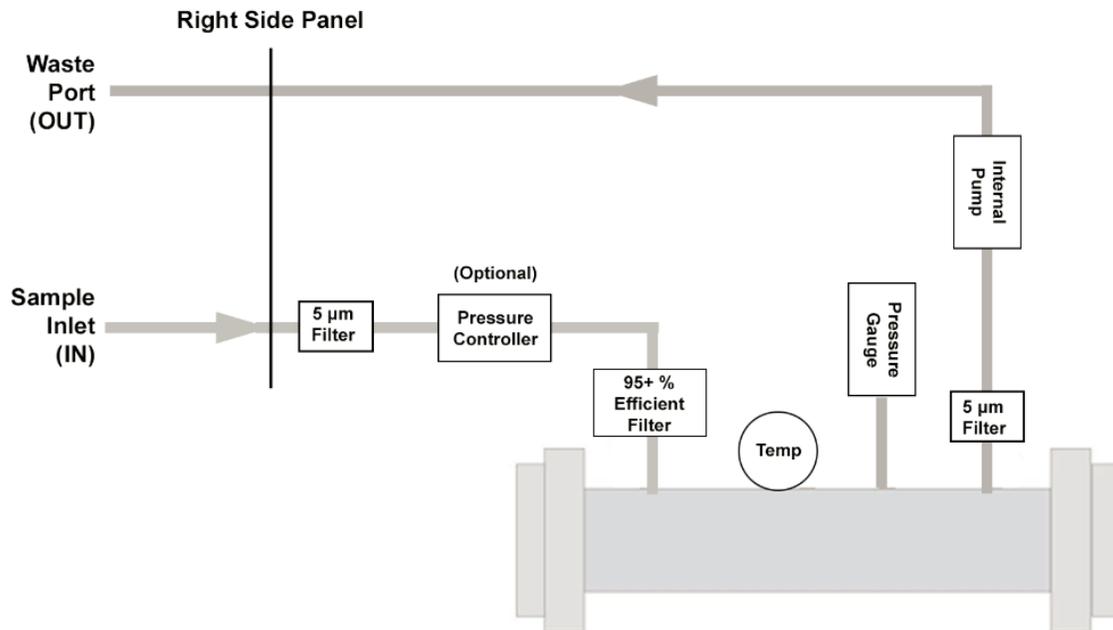


Figure 7: Plumbing Diagram

The gas enters the sample inlet (IN) and is initially filtered through a 5 μm screen filter. It then enters the optional pressure controller, which regulates the pressure to maintain a specific set point. Before the gas travels through the optical cell to the pump, it passes through an additional filter that is greater than 95% efficient at removing particles that are 0.01 μm diameter or larger. Finally, the gas passes through a second 5 μm screen filter before the pump as it exits through the waste (OUT) port.

Services and Ports

Table 5 lists the ports, services, and software, which support the ICOS software.

Table 5: Ports and Services

Port	Service	Function
22/tcp	Secure Shell (SSH)	Remote shell login
445/tcp	SMB Version 2 or higher	File sharing
2222/tcp	Modbus/TCP	Data streaming (option)
5900/tcp	TCP/VNC	Remote login
20002/tcp	WebSocket	WebSocket (option) (full-duplex over single TCP)

5 User Interface Operation



WARNING!

To maximize cybersecurity, users are advised to change all passwords from their default value.

Malware Protection

The analyzer's operating system runs Xubuntu 18.04LTS. ABB runs an anti-virus scanner on each disk image at the factory to ensure no malware is inadvertently included.

Set Up Communication

To establish communication and operate the analyzer, the following options are available:

- **SSH:** For remote shell login. Use your preferred SSH client (for example, Putty) and log in using the IP address and SSH password.
- **Samba:** For sharing the data directory on the network. Using the explorer, navigate to: \\<IP-ADDRESS>\lgrdata, then log in with the Samba password.
- **VNC Viewer:** For remote login. Data transfer via VNC is not encrypted, however, authentication credentials are. By default, VNC is not activated on the analyzer. To enable VNC, navigate to **Setup > Security**. Refer to *VNC Viewer User Interface* for setup instructions.

WiFi Setup

1. Power on the analyzer by pressing the Power button on the case right side.
2. On the tablet, cell phone, or laptop, go to the WiFi symbol to access all available networks your device can see.
3. From the available network list, select the network (SSID) marked on the analyzer label. It should read: *GL-MT300N-V2-SN-XXXXX*, where *XXXXX* is the variable. Once selected, enter the corresponding password (key) from the same label on the analyzer for access. (See Figure 8.)



Figure 8: Access WiFi

4. Log in:
 - a. Open a Web browser (Chrome/Firefox is recommended).
 - b. Visit <http://192.168.8.1>. You will be directed to the login page.
 - c. Enter the default password, **123456789**.
5. Change the Web-interface admin password for the router:
 - a. On the left side of the screen, navigate to **MORE SETTINGS > Admin Password**. (See Figure 9).

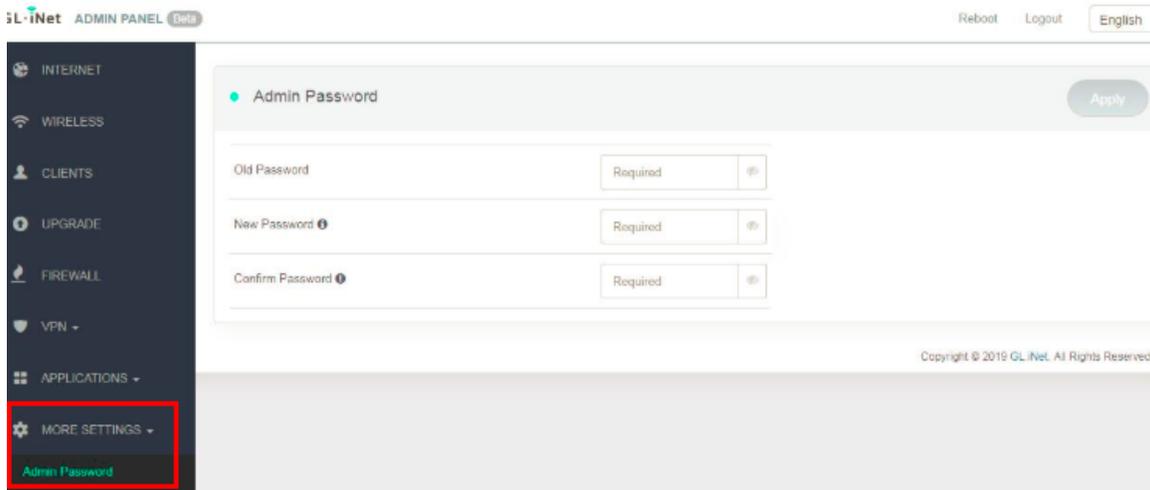


Figure 9: Admin Password Panel

- b. Input your default password, **123456789**, in the **Old Password** field.
 - c. Input your new password in the **New Password** field. The new password must be at least five characters long.
 - d. Click **Apply**.
6. Change the Wireless Key (WiFi password):
- a. On the left side of the screen, click **WIRELESS** (see Figure 10).

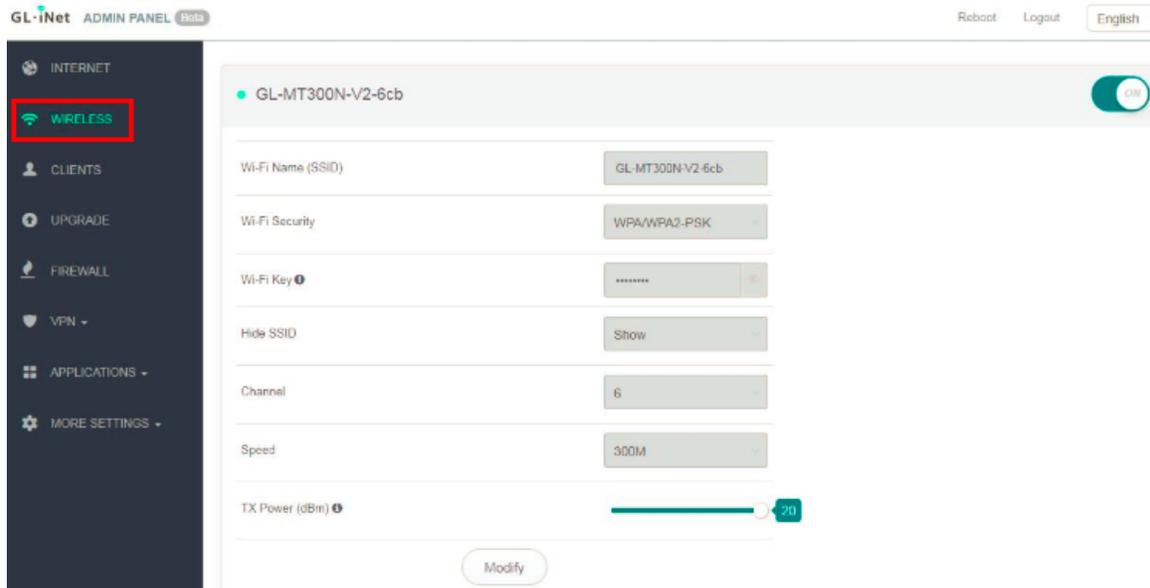


Figure 10: Wireless Settings Panel

- b. Input the new WiFi password in the **WiFi Key** field. The new password must be at least six characters long.
- c. Click **Modify**.
- d. Click **Apply** to save the changes (see Figure 11).

GL-MT300N-V2-6cb

Wi-Fi Name (SSID) GL-MT300N-V2-6cb

Wi-Fi Security WPA/WPA2-PSK

Wi-Fi Key *****

Hide SSID Show

Channel 6

Speed 300M

TX Power (dBm) 20

Cancel Apply

Figure 11: Save New WiFi Password

VNC Viewer User Interface

The VNC Viewer® application must be installed on a tablet, cell phone, or laptop PC, to allow a wireless remote-control connection between the analyzer and the interface.

The analyzer uses VNC Viewer® by RealVNC Limited for communication between the user and the analyzer. VNC Viewer, shown in Figure 12, can be downloaded from Play Store for Android devices, App Store Apple OS devices, or directly from the RealVNC Internet site for PC or Mac installation.

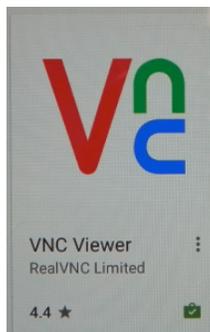


Figure 12: Play Store VNC Viewer

Once VNC Viewer is downloaded and installed on the tablet, cell phone, or laptop, power on the analyzer, then select the **VNC** icon shown in Figure 13.



Figure 13: VNC Icon

The following procedure is for an Android device with a newly installed VNC application to establish communication with the analyzer using VNC.

1. Tap or click on the VNC application to execute it: The screen shown in Figure 14 appears.

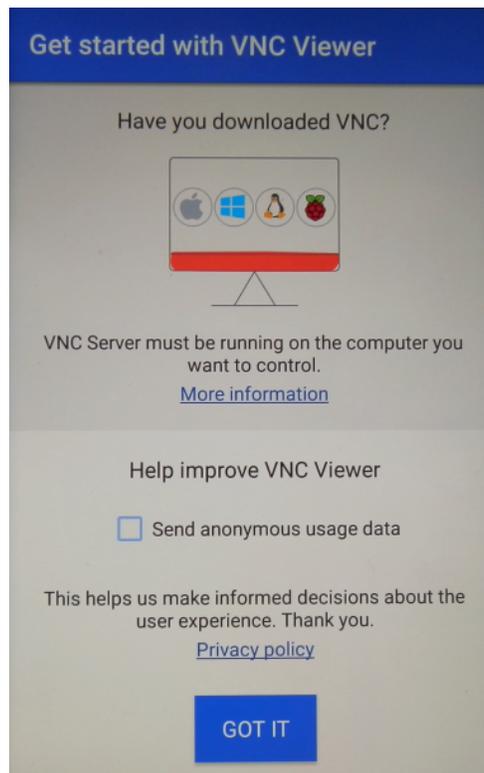


Figure 14: VNC Get Started Screen

2. Tap or click **GOT IT**.
3. When VNC cannot determine the source server from its database, it displays a *No connections* message, as shown in Figure 15: Tap or click the + symbol.

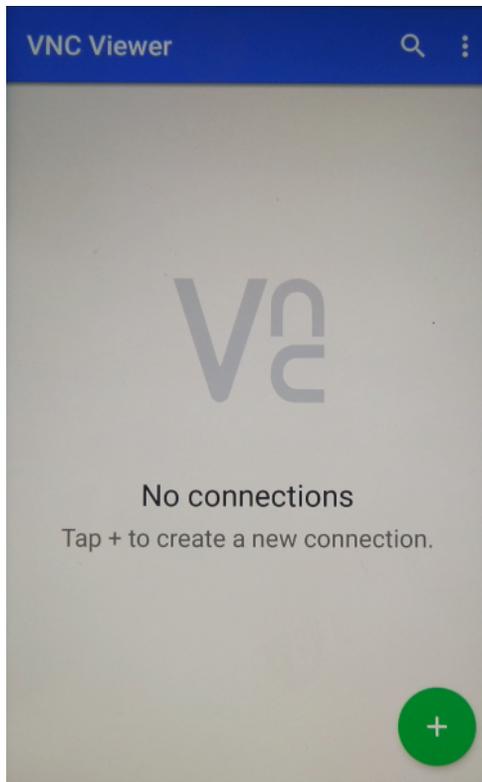


Figure 15: No Connections

4. The *New connection* screen appears. Enter the *Address* parameter of the *New connection: Wireless IP* on the analyzer label, as shown in Figure 16.
5. Enter the name of the device to be connected under *Name*. The *Name* parameter shown in Figure 16 is only an example.

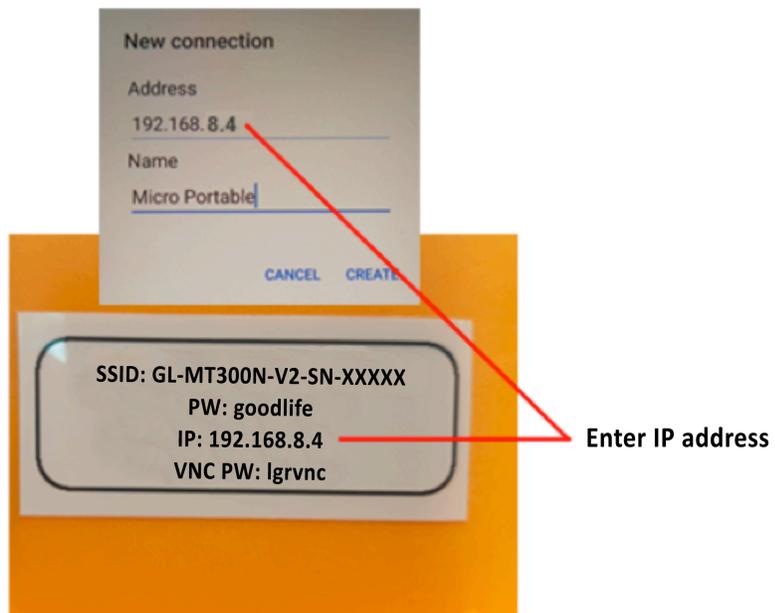


Figure 16: New Connection Server (Analyzer) Address

6. Tap or click **CREATE** to create the VNC communication network.
7. Enter the password for the VNC Viewer to the analyzer: **lgrvnc** (see Figure 17).



This is the default password for VNC and can be changed by the user.

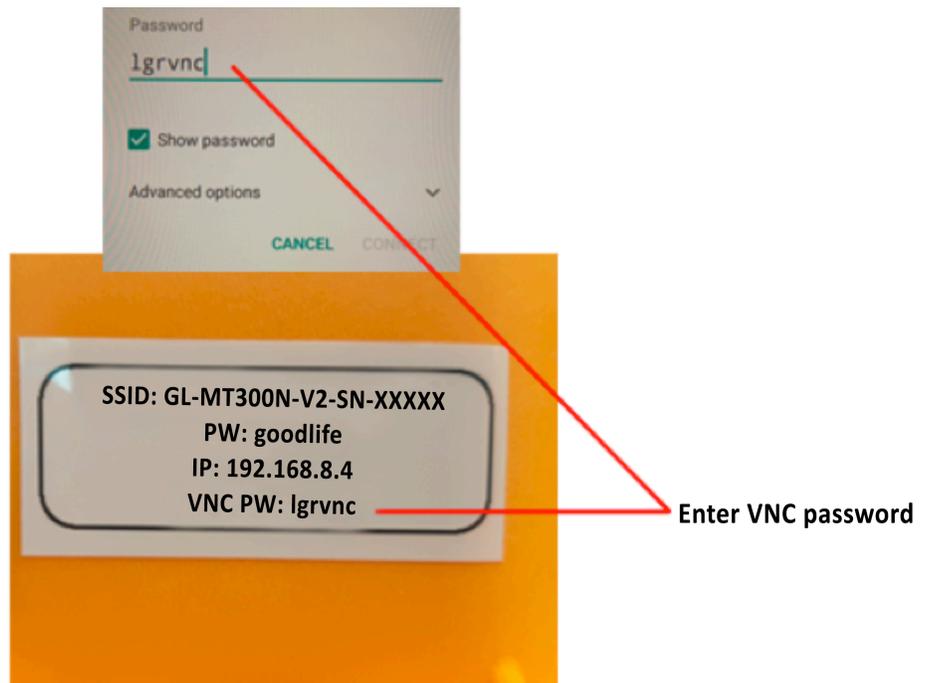


Figure 17: VNC Network Password Screen

8. Select **CONNECT**: The VNC application displays an informational message indicating the VNC attempt at connection (see Figure 18).

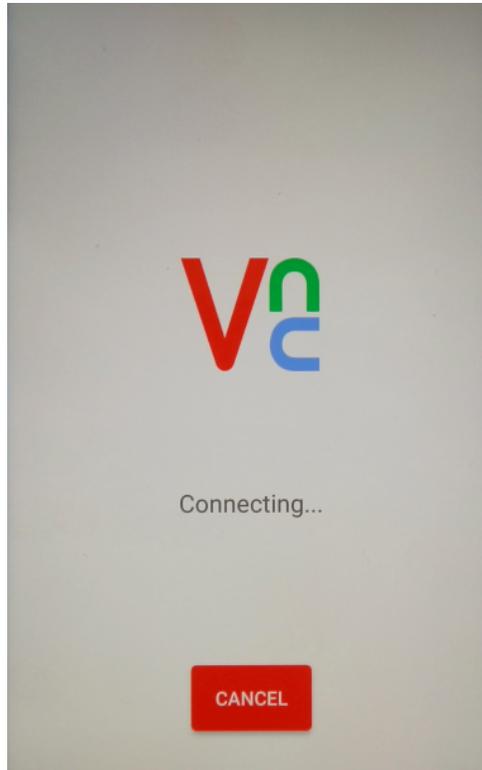


Figure 18: VNC Attempting Connection Screen

Log In

To access the analyzer user interface features, log into the system as follows:

1. Click the **Security** button on the Control Bar (see Figure 19).



Figure 19: Control Bar Security Button

2. For initial login, use the default Linux credentials for the username and password (see Figure 20), as follows:

User: lgr

Password: 3456789



WARNING!

If you change and forget this password, you will not be able to recover it without a factory restore.



NOTE

There is only one Linux account.

A screenshot of a login dialog box titled 'Login To Access Menu Options'. It contains two input fields: 'Username:' with the text 'lgr' and 'Password:' with masked characters represented by black dots. Below the password field is a 'Show Password:' checkbox, which is currently unchecked. At the bottom of the dialog are two buttons: 'Cancel' and 'Login'.

Figure 20: Login Dialog Box

3. Click **Login**.

Security Button

Once logged in, the **Security** button also lets you do the following:

- Change a user password
- Add a new user
- Log out of the system

Change User Password

Upon commissioning of the analyzer, all passwords should be changed. Table 6 lists the default passwords.

Table 6: Default Passwords

lgr	3456789
ssh	3456789
samba	lgrsmb
vnc	lgrvnc
Wireless Key	goodlife
Wireless Router Admin Password	123456789

To change a user password, perform the following:

1. Click the **Security** button: The dialog box shown in Figure 21 appears.



Figure 21: Security Dialog Box After Login

2. Click **Change Password**: The *Change Password* dialog-box appears.

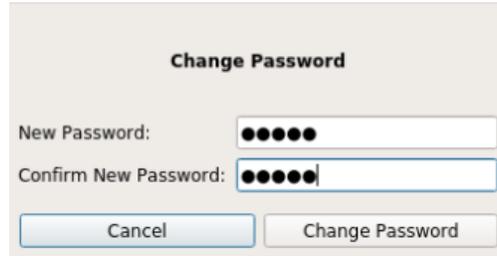
A screenshot of a 'Change Password' dialog box. The dialog has a title bar that says 'Change Password'. It contains two text input fields: 'New Password:' and 'Confirm New Password:'. Both fields are filled with six black dots. Below the fields are two buttons: 'Cancel' on the left and 'Change Password' on the right.

Figure 22: Change Password Dialog-Box

3. Enter the new password in the **New Password** field.
4. Re-enter the new password in the **Confirm New Password** field.
5. Click **Change Password**.



WARNING!

If you forget the new password, it is not recoverable.



WARNING!

The *lgr* password is the same for SSH. If you change the *lgr* password, the SSH password also changes.

Add New User



Only users belonging to the Admin and Service groups can add new users.

To add a new user, perform the following:

1. Click the **Security** button: The dialog box shown in Figure 21 appears.
2. Click **Add User**: The *Add User* dialog box shown in Figure 23 appears.

User Name: John_s
Password: ●●●●●●
Confirm Password: ●●●●●●
Group Name: Admin
Cancel Add New User

Figure 23: Add User Dialog-Box

3. Enter a username in the **User Name** field.
4. Enter a password in the **Password** field.
5. Re-enter the new password in the **Confirm Password** field.
6. Select a group from the **Group Name** drop-down menu: **Admin**, **Service**, or **User**.
7. Click **Add New User**.

If you try to add a user and are in the User group (instead of the Admin or Service group), the following dialog box appears, and you must cancel the action.

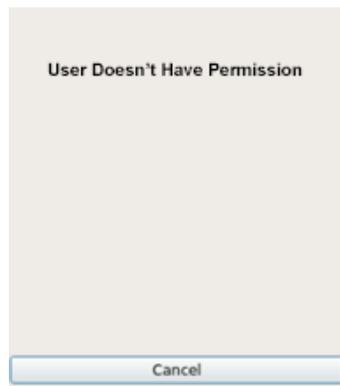


Figure 24: Permission Denied

Log Out

To log out of the system, click the **Security** button, then click **Log Out**.

Control Bar

The Control Bar (see Figure 25) lets you select the type of information to display: **Display**, **Rate**, **Files**, **Setup**. In addition, **Exit** to shut down the analyzer.



Figure 25: Control Bar

Select an option by tapping the required button on the touchscreen tablet/phone. Adjust the screen size and zooming using the pinch-and-expand motion of your fingers on the tablet screen as you would on a regular tablet for zooming.

Display

In the Control Bar, the **Display** button (see Figure 25) lets you select the desired screen:

- *Numeric* (Figure 26)
- *Spectrum* (Figure 27)
- *Timechart* (Figure 29)
- *Alarm Status* (Figure 31)

Numeric Display

The *Numeric* display is the default display and one of the simplest screens for go/no-go decisions based strictly on gas concentration measurements. Sample gas is measured in parts per million (ppm). The resolution unit auto-adjusts. Figure 26 shows an example of a GLA131-GGA numeric readout of the last measurements of CH₄, H₂O, CO₂, CH₄ (Dry), and CO₂ (Dry) in parts per million (ppm). The displayed numeric readout may vary, depending on the analyzer type. In addition, the analyzer color-coded operational status is indicated (for details on color coding, refer to *Alarm Status Display*).

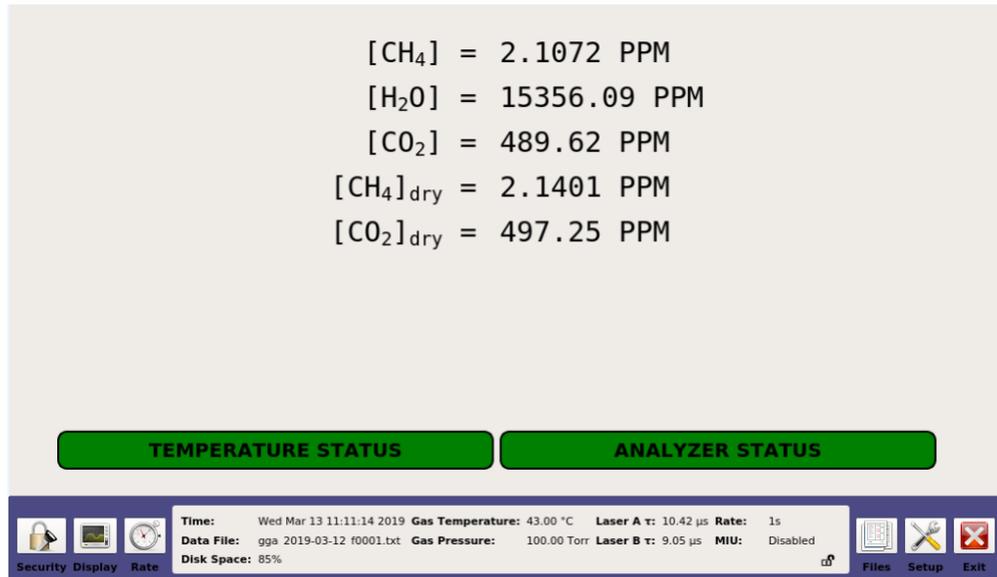


Figure 26: Numeric Display Screen

Spectrum Display

The sample *Spectrum* display provides additional information on the measured gas: the analyzer sensitivity level shown in the Transmitted Intensity diagram, absorption level, theoretical fit of the targeted gas, and ringdown time indicating the need to clean the high-reflectivity mirrors.

The analyzer may optionally be a dual-laser system. For example, the GLA131-GGA has a **drop-down selector** in the lower right portion of the *Spectrum* display which lets you toggle between the two lasers:

- Laser 1 (also referred to as laser A) displays CH₄ and H₂O peaks. (Figure 27)
- Laser 2 (also referred to as laser B) displays the CO₂ peak. (Figure 28)

The measured concentrations are shown in parts per million (ppm) on the bottom of the *Spectrum* display.

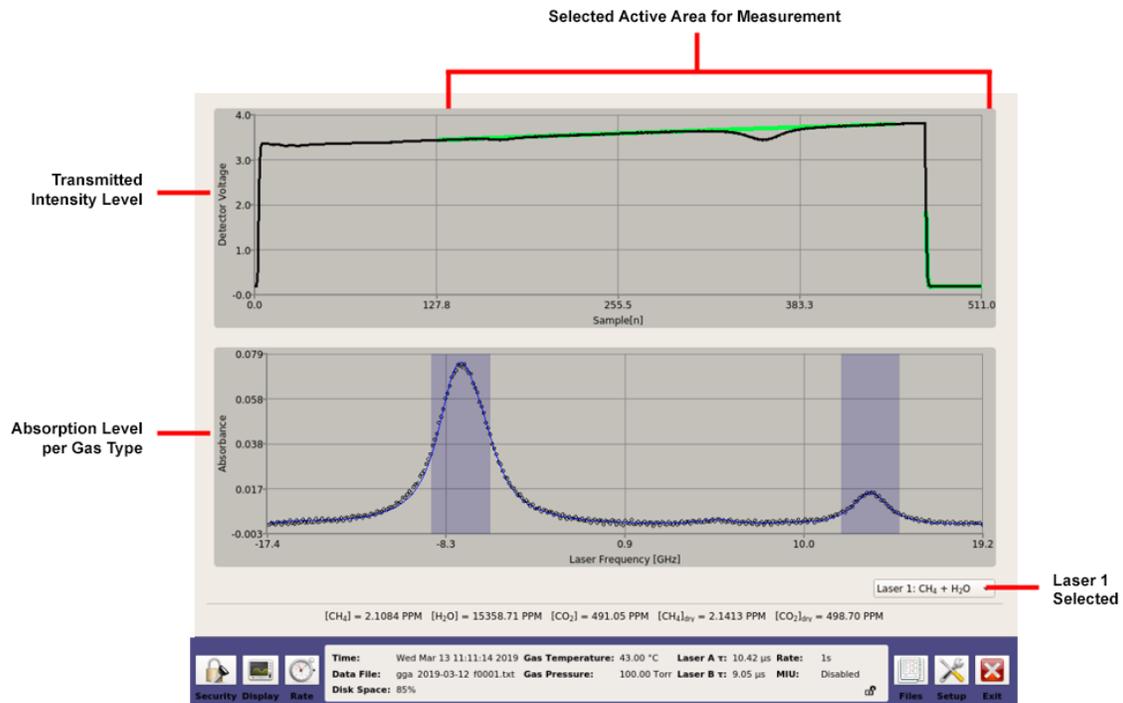


Figure 27: Spectrum Display Screen for Laser 1

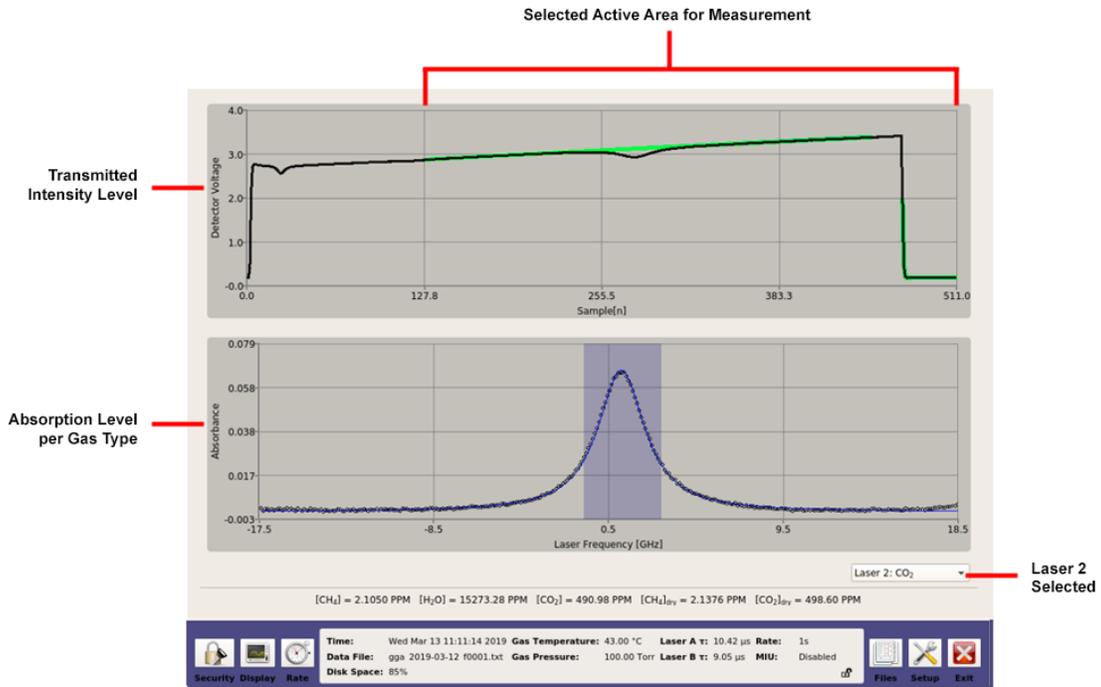


Figure 28: Spectrum Display Screen for Laser 2

The transmitted intensity also provides important information about the analyzer measurement module light source. A drop in intensity may indicate an issue with the laser, detector, ICOS module mirrors, or supporting electronics board. This information is helpful when contacting ABB service about the issue.

Timechart Display

The *Timechart* display (see Figure 29) provides the absorption (in ppm or ppb) of the sample gas measured. The black line represents the trace of measured concentrations at a customizable interval rate.

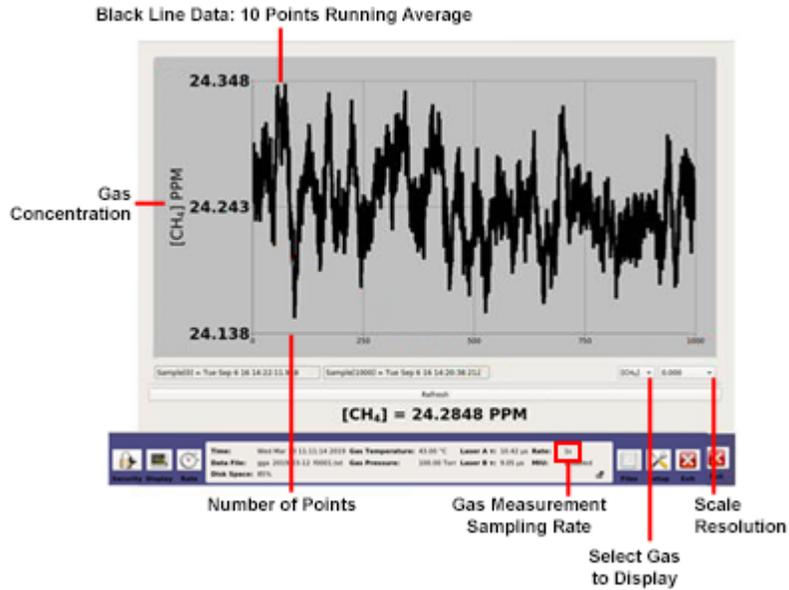


Figure 29: Timechart Display

Refresh in the *Timechart* display (see Figure 30) refreshes the screen to display the sampling data with a new starting point.

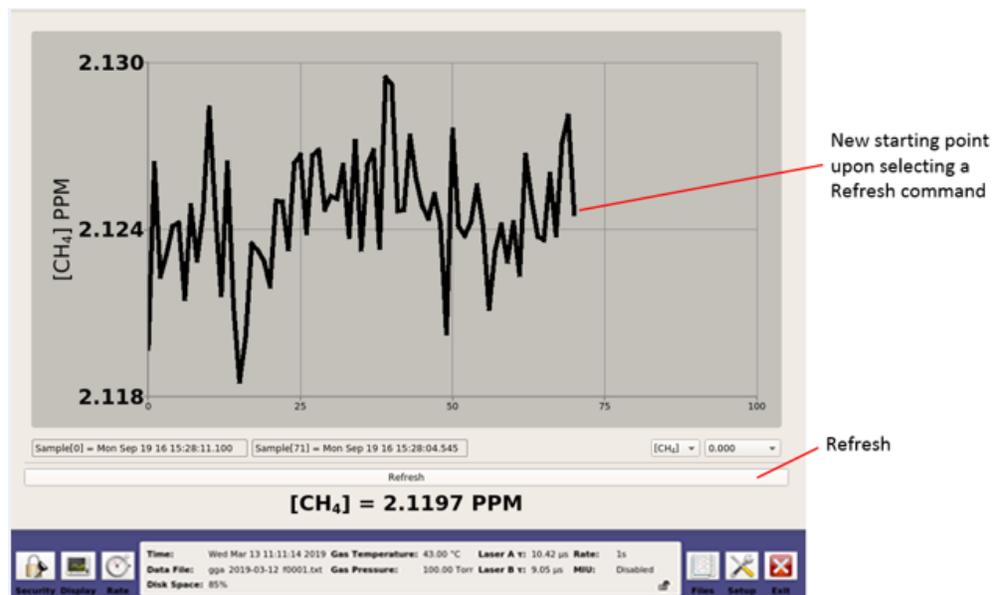


Figure 30: Timechart Refresh Display

Alarm Status Display

The *Alarm Status* display, shown in Figure 31 and Figure 32, indicates the real-time analyzer operational status. The status uses traffic-light color indication. **Green** indicates no problem. **Yellow** indicates the analyzer is out-of-spec or maintenance is soon required. **Red** indicates there is a problem, and maintenance is immediately required. Error messages for each alarm can be displayed by selecting the relevant alarm button: After the button is selected, a pop-up window appears displaying the messages.

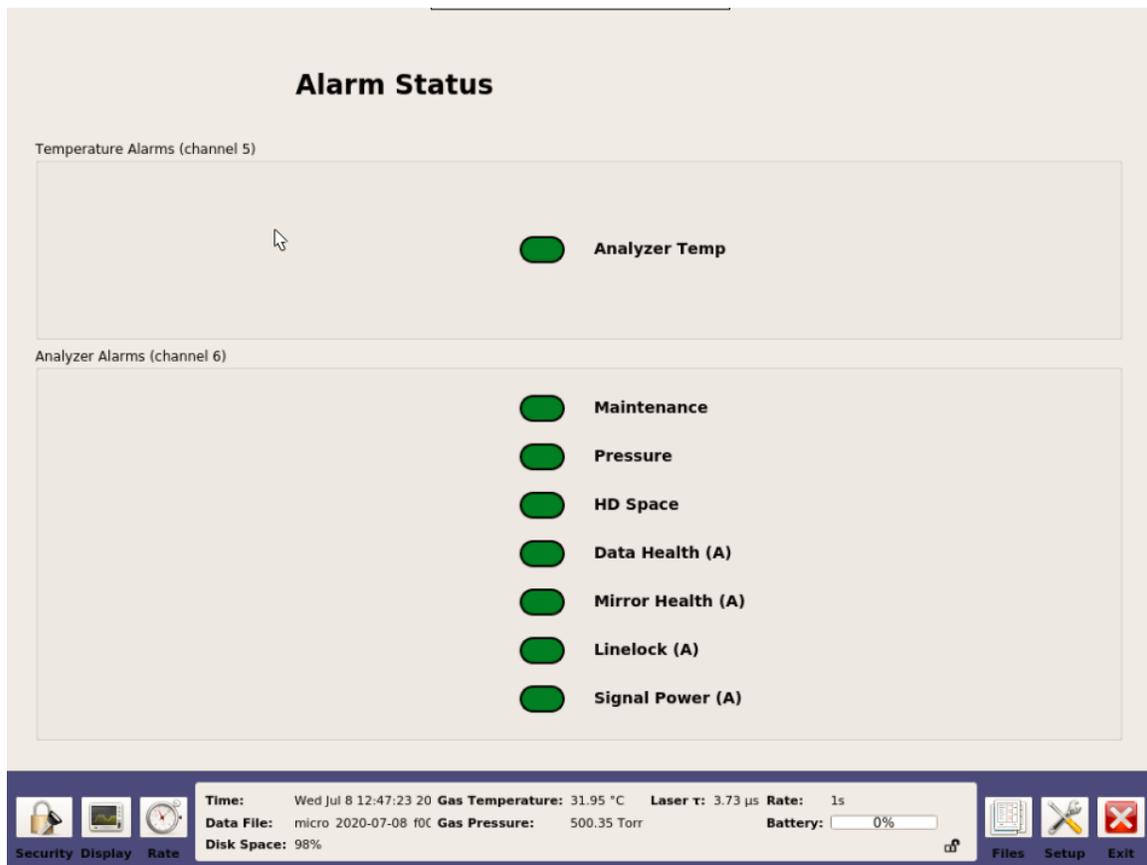


Figure 31: Alarm Status Display – GLA131-GPC

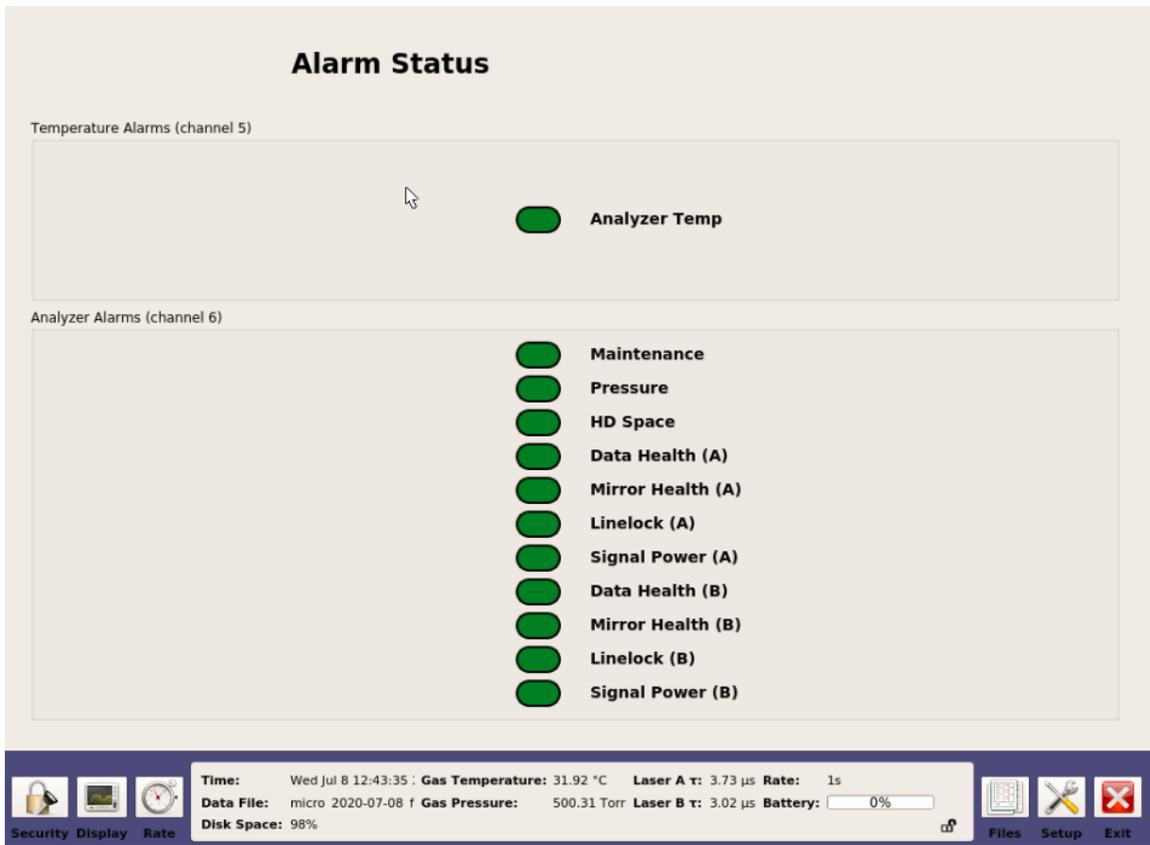


Figure 32: Alarm Status Display – GLA131-GGA

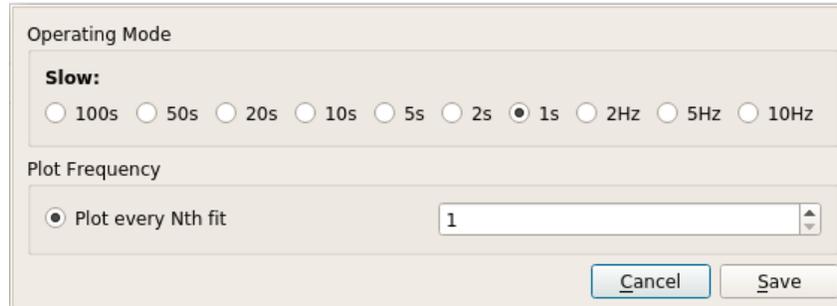
Table 7 describes the analyzer alarm status.

Table 7: Analyzer Alarm Status

Warning / Alarm	UI Display	Detected Problem
Alarm	Data Health (A)/(B)	Laser A and/or B goodness of fit is poor
Alarm	Pressure	Pressure is not in operating range
Alarm	HD Space	Disk space is low, deleting oldest files
Alarm	Mirror Health (A)/(B)	Mirror health has degraded; clean mirrors
Alarm	Linelock (A)/(B)	Laser A and/or B peak position is outside of control range, contact customer support
Alarm	Signal Power (A)/(B)	Laser A and/or B power has degraded, contact customer support
Alarm	Maintenance	Maintenance timer exceeds 380 days
Warning	Data Health (A)/(B)	Laser A and/or B goodness of fit is poor
Warning	Pressure	Pressure is noisy
Warning	HD Space	Disk space is low
Warning	Mirror Health (A)/(B)	Mirror health is degrading; clean mirrors soon
Warning	Linelock (A)/(B)	Laser A and/or B peak position is outside of control range, contact customer support
Warning	Signal Power (A)/(B)	Laser A and/or B power has degraded, contact customer support
Warning	Maintenance	Maintenance timer exceeds 360 days
No issue		No warning/alarm

Rate Button

The **Rate** button on the Control Bar changes the rate at which data are written to the log file. Figure 33 displays the *Rate Control Adjustment* pop-up box which appears when the **Rate** button is clicked.



The dialog box is titled "Rate Control Adjustment" and is divided into two main sections. The first section, "Operating Mode", contains a "Slow:" label and a row of radio buttons with the following options: 100s, 50s, 20s, 10s, 5s, 2s, 1s, 2Hz, 5Hz, and 10Hz. The "1s" option is currently selected. The second section, "Plot Frequency", contains a radio button labeled "Plot every Nth fit" which is also selected, followed by a text input field containing the number "1". At the bottom right of the dialog are two buttons: "Cancel" and "Save".

Figure 33: Rate Control Screen

The *Operating Mode* radio buttons select the rate at which data are acquired. It is recommended to set the data acquisition rate between 1 Hz and 10 Hz. All data sampled are written into the data file and plotted on the time chart. Longer averaging periods (or equivalently, slower data acquisition rates) yield better measurement precision than shorter averaging periods.

Use the **Plot every Nth fit** radio button to automatically set the rate at which the data are updated on the Main panel display. For example, if you set the value to 5, a data point will be saved every 5 seconds.

File Transfer Menu

Use the *File Transfer* menu to access data collected by the analyzer.

- Each time the analyzer is re-started, the most recent file name is displayed in the form: mgga_2022-12-29_f0001.txt, where the:
 - First set of characters represent the analyzer model (mgga).
 - Next set of characters represents the date (yyyy-mm-dd).
 - Last set of characters are a serial number.
- The serial number counts upward to provide up to 10,000 unique file names each day.
- If the analyzer is left in continuous operation, a new data file is automatically created every 24 hours to keep data file sizes manageable.

Standard Data File

Data files are written in text (ASCII) format and contain labeled columns displaying:

- Timestamp of each recorded measurement
- Gas concentration
- Cell pressure (Torr)
- Cell temperature (Celsius)
- Ambient temperature (Celsius)
- Ringdown time (microseconds)

The format can be changed in the *Time/Files* menu of the *Setup* panel. (Figure 40)

Figure 34 shows a typical data file.

Time,	[CH4]_ppm,	[CH4]_ppm_sd,	[H2O]_ppm,	[H2O]_ppm_sd,	[CO2]_ppm,
11/16/2017 14:32:17.025,	1.899413e+00,	0.000000e+00,	3.951746e+02,	0.000000e+00,	3.909035e+02,
11/16/2017 14:32:17.226,	1.886235e+00,	0.000000e+00,	3.750896e+02,	0.000000e+00,	3.895215e+02,
11/16/2017 14:32:18.204,	1.897474e+00,	0.000000e+00,	2.705034e+02,	0.000000e+00,	3.915712e+02,
11/16/2017 14:32:19.189,	1.898177e+00,	0.000000e+00,	4.005718e+02,	0.000000e+00,	3.908344e+02,
11/16/2017 14:32:20.156,	1.895078e+00,	0.000000e+00,	4.120824e+02,	0.000000e+00,	3.915692e+02,
11/16/2017 14:32:21.136,	1.894028e+00,	0.000000e+00,	4.269311e+02,	0.000000e+00,	3.908023e+02,
11/16/2017 14:32:22.111,	1.897651e+00,	0.000000e+00,	3.892464e+02,	0.000000e+00,	3.913812e+02,
11/16/2017 14:32:23.085,	1.896892e+00,	0.000000e+00,	3.465505e+02,	0.000000e+00,	3.911982e+02,
11/16/2017 14:32:24.066,	1.898895e+00,	0.000000e+00,	3.562836e+02,	0.000000e+00,	3.913012e+02,
11/16/2017 14:32:25.041,	1.894560e+00,	0.000000e+00,	3.325825e+02,	0.000000e+00,	3.918638e+02,
11/16/2017 14:32:26.018,	1.898246e+00,	0.000000e+00,	3.428583e+02,	0.000000e+00,	3.915302e+02,
11/16/2017 14:32:26.998,	1.895619e+00,	0.000000e+00,	4.100324e+02,	0.000000e+00,	3.912913e+02,
11/16/2017 14:32:27.971,	1.895556e+00,	0.000000e+00,	2.666621e+02,	0.000000e+00,	3.909508e+02,
11/16/2017 14:32:28.951,	1.896705e+00,	0.000000e+00,	3.193251e+02,	0.000000e+00,	3.905767e+02,

Figure 34: Beginning of a Typical Data File for a GLA131-GGA

For each measurement there is an adjacent column reporting the standard deviation of the measurement (with sd suffix).

- The standard deviation is zero when the analyzer is running at 1 Hz, because no averaging of data has occurred.
- At speeds slower than 1 Hz, the standard error of the average is reported.
- At the end of each data file are encoded listings of settings used by the analyzer for that data file. Settings are typically stored for diagnostic or troubleshooting purposes.

Transfer Data Files

To transfer data files from the analyzer solid-state drive (SSD) to a USB storage device:

1. Click the **Files** button on the Control Bar (Figure 25) to access the *File Transfer* menu. (Figure 35)
2. Insert a USB storage device into the USB port on the side panel of the analyzer.
3. Click the **Mount USB** button. (Figure 35)

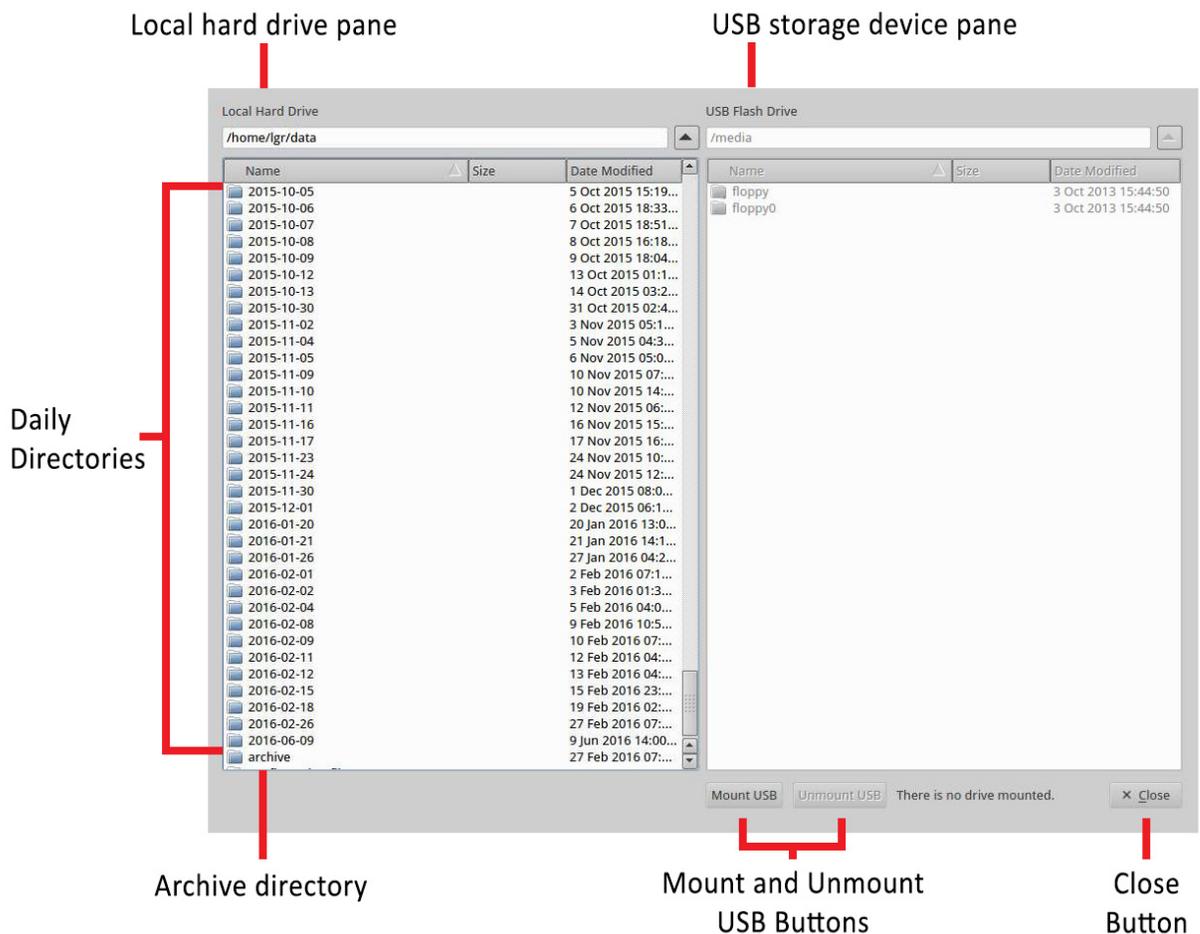


Figure 35: File Transfer Menu: Local Hard Drive (Left Pane) and USB Flash Drive (Right Pane)

4. Transfer data files from the analyzer SSD to a USB storage device by dragging and dropping the files from the hard drive pane to the USB device pane. Use the left mouse button to highlight one or multiple files in the window.
 - The directory windows default to the local hard drive on the left screen and the USB memory device on the right.
 - Navigate through folders, create new folders, and delete files and folders.



USB drives should be no larger than 8 GB. They must be FAT32.

When you have finished transferring files:

5. Click the **Unmount USB** button, then wait for the *Safe to Remove USB Memory Device* message, before removing the USB memory device.



Removing the USB memory device before seeing the *Safe to Remove USB Memory Device* pop-up message may result in loss of data.

6. Click **Close** to exit the *File Transfer* menu.

Directory Types in Local Hard Drive

The analyzer SSD contains two types of directories:

- Daily
- Archive

Daily Directory

The local hard drive (Figure 35) creates a daily folder containing new data files for each day that the analyzer operates.

To access the data files for a specific date, double-click the folder. Each file from that day is displayed in chronological order. (Figure 36)

Each file is a single zipped .txt file, using the following convention:

mgga_YYYY-MM-DD_f0000.txt.zip.

Examples of files in the daily directory are shown in Figure 36.

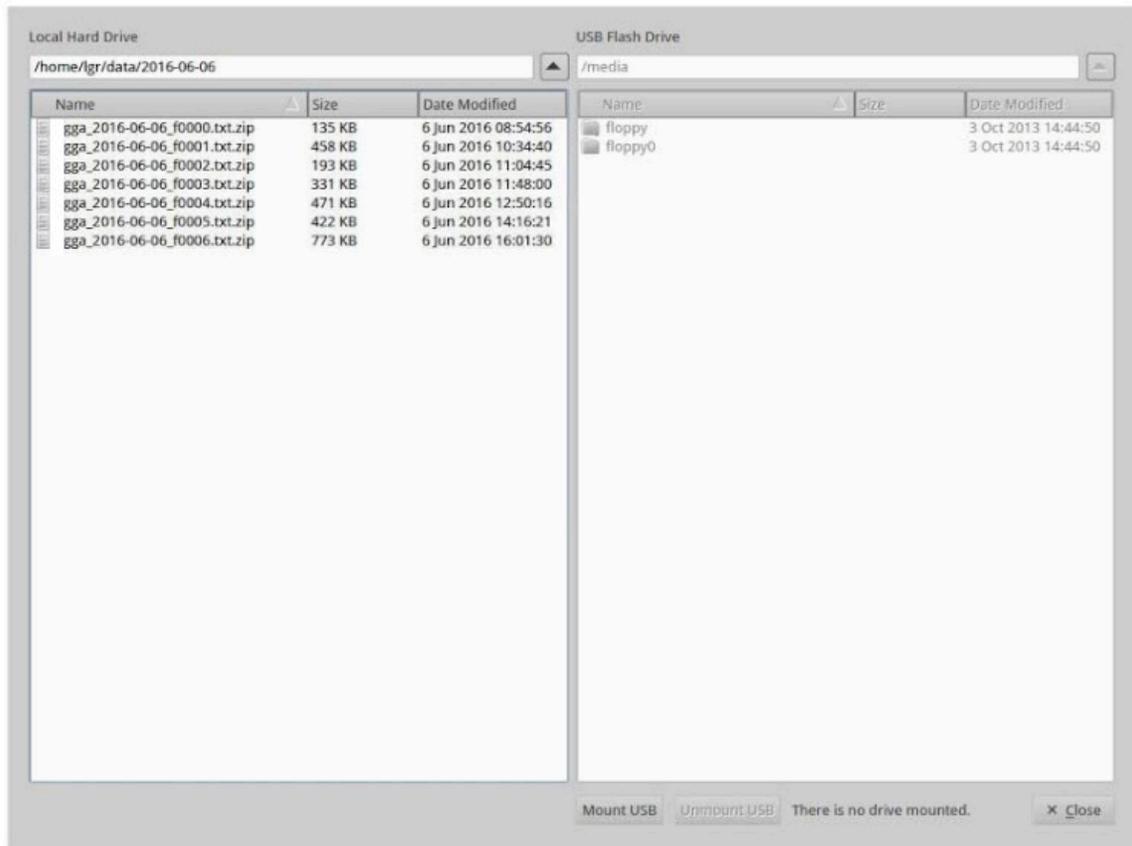


Figure 36: Daily Directory

Archive Directory

The local hard drive (Figure 35) creates an archived folder containing zipped files organized by date. (Figure 37)

To access the archived files, double-click the **Archive** folder. (Figure 35)

Each file is a single zipped .txt file, using the following convention: YYYY-MM-DD.zip. Each zipped file contains the data files for the day that the analyzer operated.

Examples of files in the archive directory are shown in Figure 37.

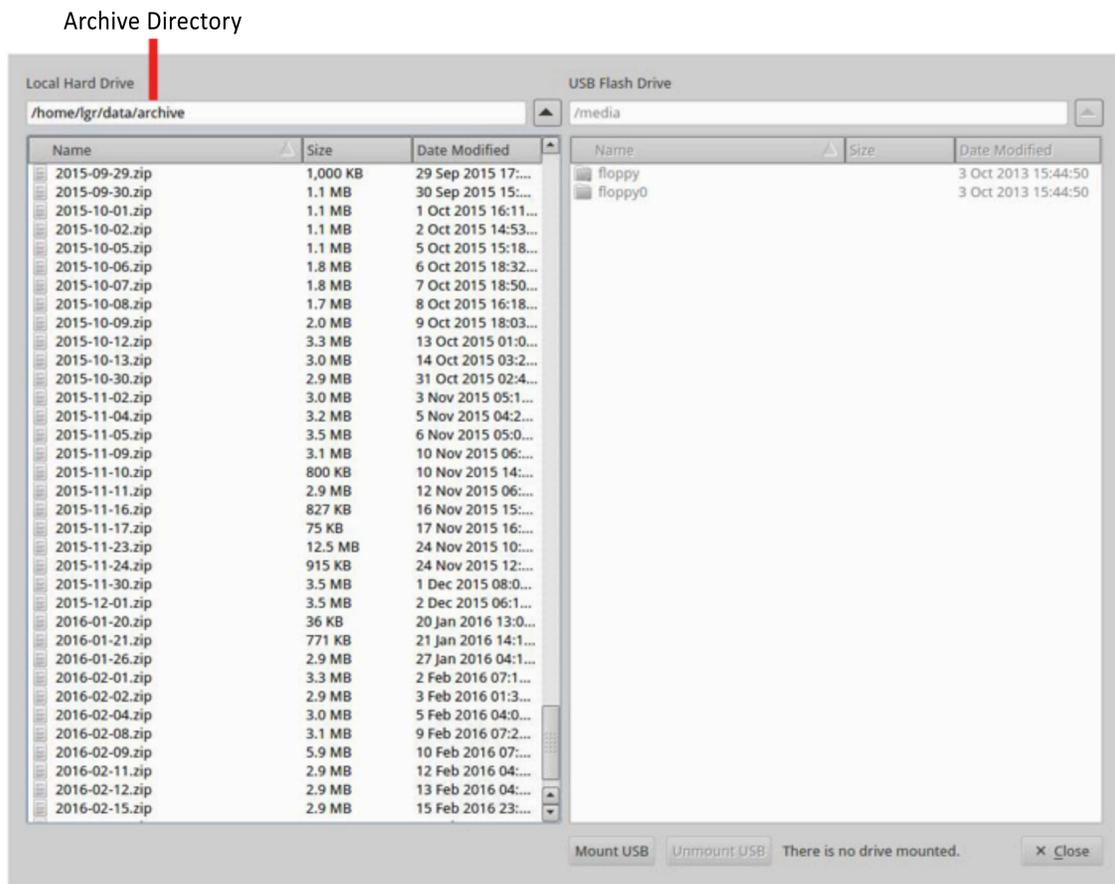


Figure 37: Archive Directory

File Transfer Error Screen

The *File Transfer Error* screen (Figure 38) displays when:

- The USB key does not have enough storage space.
- The device is not recognized.

Try again with a correctly inserted USB device.



Figure 38: File Transfer Error

Setup Button

Click **Setup** on the Control Bar to access the *Setup* screen, which provides additional configuration and service menus: The **Time/Files** tab is displayed by default (see Figure 39).

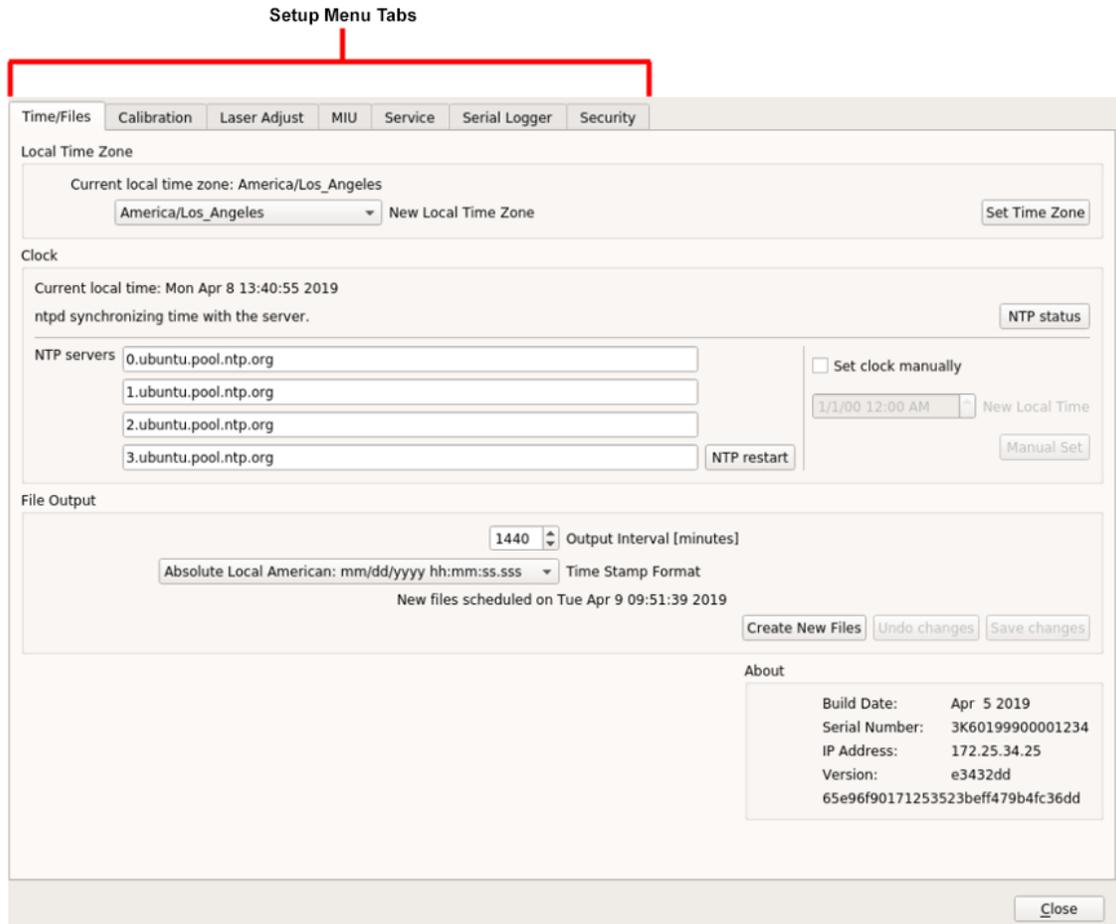


Figure 39: Setup Screen

Setup screen menu tabs are:

- **Time/Files:** Set time and file format.
- **Calibration:** Single-point calibration using a known reference standard.
- **Laser Adjust:** Manually fine-tune laser wavelength for goodness of fit (GOF) if necessary.
- **MIU:** Configure the optional Multi-Port Inlet Unit.
- **Service:** Technicians can check on the analyzer status.
- **Serial Logger:** Change how data reported at the RS-232 port are configured. Refer to the *Serial Logger* section on page 58.
- **Modbus Logger:** View the Modbus data stream and analyzer alarm status and change certain Modbus settings from the default configuration. Refer to the *Modbus TCP* section on page 60.

- **Security:** Change security settings including changing passwords; adding, deleting, and assigning users; and returning the system to default settings. Refer to the *Security* section on page 67.

Time/Files

Click the **Time/Files** tab to access the *Time/Files* menu. This screen lets you adjust the time zone, manually set the clock, and adjust the format of data files. Contents may vary, depending on analyzer types.

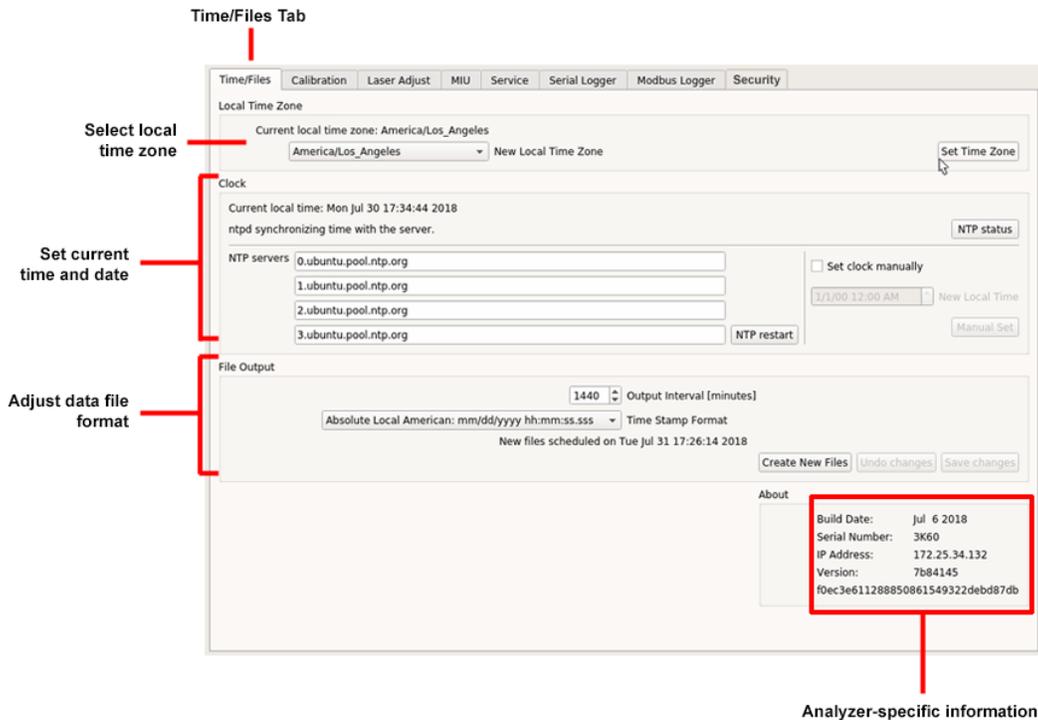


Figure 40: Time/Files Menu

Local Time Zone

The *Local Time Zone* menu lets you adjust the current local time zone by selecting an option from the drop-down selection box.

Clock

The *Clock* menu lets you manually adjust the current time and date settings.

File Output

The *File Output* menu lets you adjust the timestamp format of the data files. The available timestamp formats are listed in Table 8.

New file creation intervals (when running continuously) can be set by adjusting the value in the **Output Interval [minutes]** spinner control box.

Table 8: Timestamp Formats

Timestamp Name	Format
Absolute Local American	mm/dd/yyyy, hh:mm:ss.sss
Absolute Local European	dd/mm/yyyy, hh:mm:ss.sss
Absolute GMT American	mm/dd/yyyy, hh:mm:ss.sss
Absolute GMT European	dd/mm/yyyy, hh:mm:ss.sss
Relative Seconds After Power On	ssssss.sss
Relative Seconds in Hours, Minutes, Seconds	hh:mm:ss.sss

About

The *About* section displays analyzer-specific information, such as the:

- Current software build date
- Code version
- IP address
- Analyzer serial number

Calibration



WARNING!

It is not recommended for inexperienced users to perform a calibration without first contacting technical support.

Click the **Calibration** tab to access the *Calibration* screen. (Figure 41) This screen provides the tools to calibrate the analyzer without shipping it back to the factory. Before performing a calibration on the analyzer, have the following information available:

- Traceable regulated gas type
- Traceable regulated gas type concentration

Calibration Tab

Check to calibrate

Gas types

Traceable certified bottle gas reference concentration

Most recent calibration

When active, click Start to start calibration

Gas Type	Concentration (ppm)	Last Calibration
Total [H ₂ O]	2000.000	Thu Jul 19 14:04:42 2018
Total [CH ₄]	2.0000	Thu Jul 5 10:40:23 2018
Total [CO ₂]	750.000	Thu Jul 5 10:40:23 2018

Figure 41: Calibration Tab

To perform a gas calibration, connect the traceable, regulated bottle gas to the analyzer gas-inlet line (see Figure 41 for parameters referred to in the procedure):

1. Click **Setup**, then the **Calibration** tab.
2. Check the **Calibrate** box in the *Reference Gas Settings* pane.
3. Enter the gas concentration for the gas type using the arrow keys in the traceable certified bottle gas menu (below the **Calibrate** box).
4. Click **Start** to start the calibration.
5. Repeat Step 2 through 4 for all gases measured by the analyzer.
6. After the calibration is complete, click **OK**. The analyzer then resumes its normal measurement mode.
7. Click **Close** to exit the *Calibration* screen.

Laser Adjust

Click the **Laser Adjust** tab to access the *Laser Adjust* screen. Use the *Laser Adjust* screen to manually adjust the laser's wavelength, to compensate for any cumulative drift. (Figure 42)

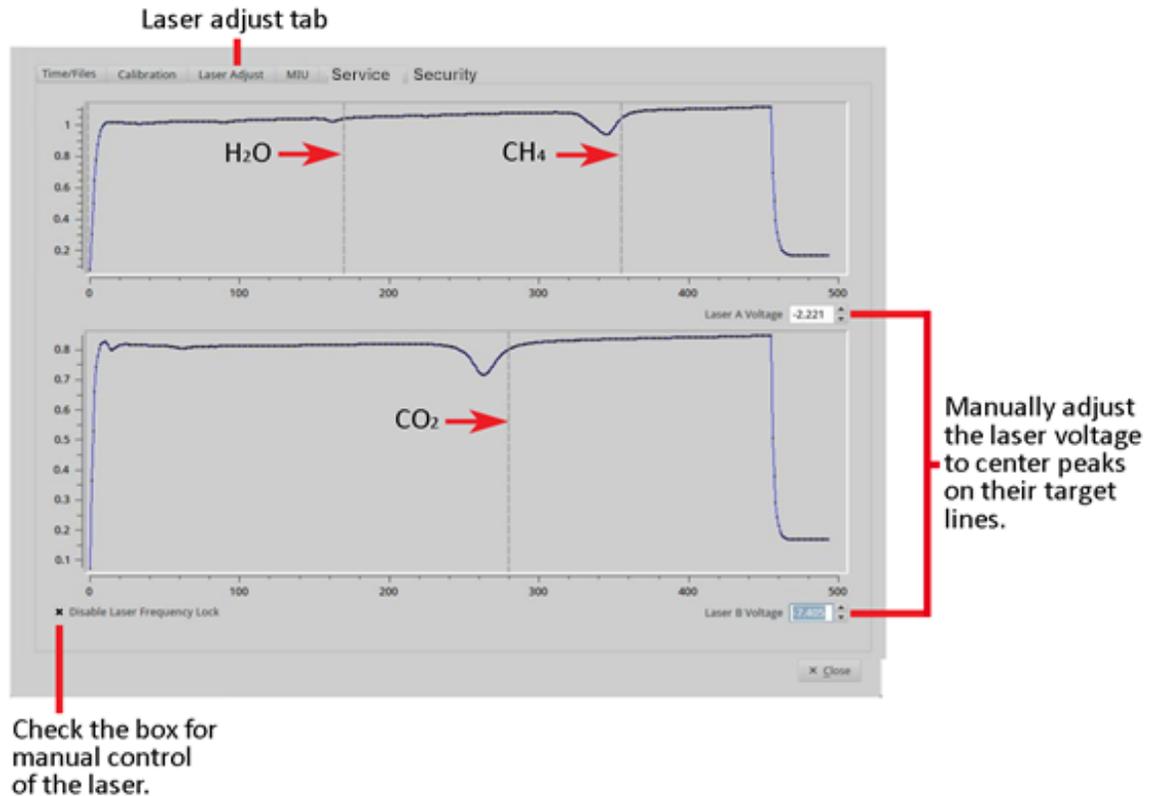


Figure 42: Absorption Peaks off Target Lines – Voltage Adjustment Required

Laser adjustment may be required if the analyzer has not been operated for a long time, and the laser's wavelength has drifted beyond the target range of the analyzer.



Do not operate the analyzer outside the recommended temperature range because this will result in unexpected behavior or failures.

Figure 42 shows an example of a GLA131-GGA with an offset between absorption peaks and target lines for laser A (top plot) and laser B (bottom plot). Both lasers require adjustment.

To manually adjust the laser wavelength:

1. Click the **Setup** button on the Control Bar. (Figure 25)
2. Select the **Laser Adjust** tab at the top of the screen. (Figure 42)
3. Select the **Disable Laser Frequency Lock** checkbox to allow manual control of the laser.
4. Adjust the Laser A Voltage using the arrow buttons to shift the peaks until they are centered on their respective target lines: **Up Arrow** - peaks adjust to the right; **Down Arrow** - peaks adjust to the left.
5. If applicable, adjust the Laser B Voltage (bottom plot) using the arrow buttons to shift the peaks until they are centered on their respective target lines: **Up Arrow** - peaks adjust to the right; **Down Arrow** - peaks adjust to the left.
6. De-select the **Disable Laser Frequency Lock** checkbox. The software resumes automatic tracking and control of the laser wavelength.
7. Click **Close** to exit the menu and return to the Main panel.

Figure 43 shows the laser voltage adjusted so that the absorption peak is centered on the target line.

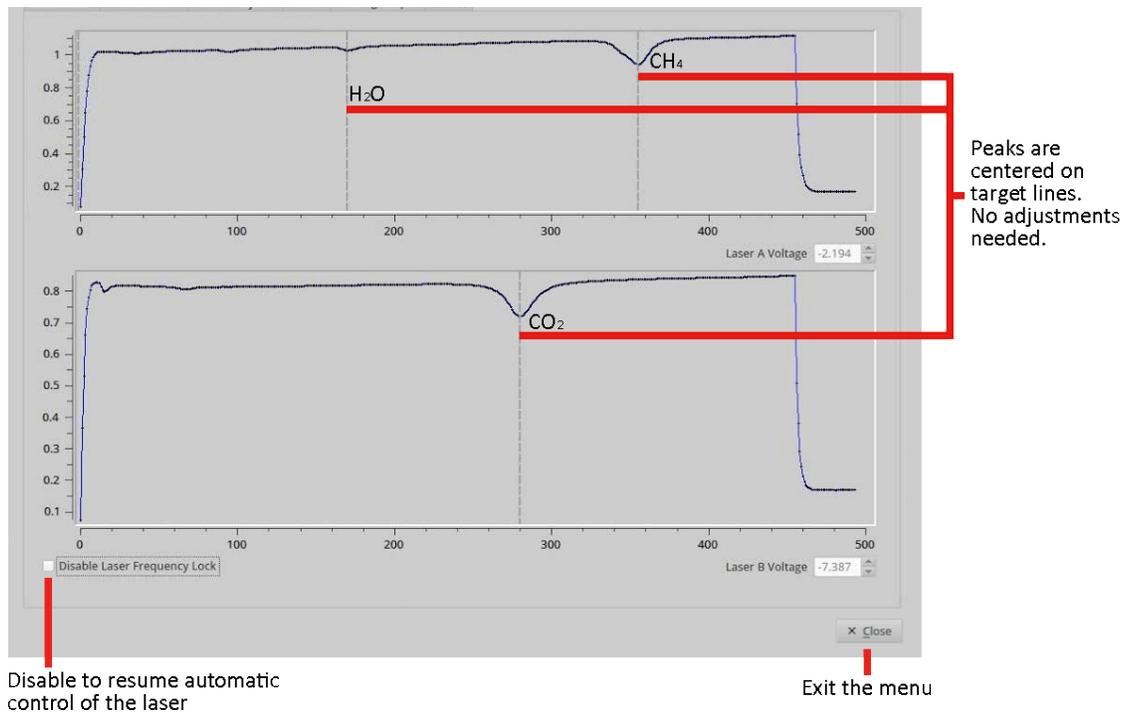


Figure 43: Absorption Peaks Centered Correctly on Target Lines

MIU

The (optional) Multi-Port Inlet Unit (MIU-8) is an ABB accessory that allows automated control of 8 inlet ports.

The MIU-8 directs samples of multiple unknown gases and multiple reference gases through a series of inlet ports and digitally controlled valves directly into the inlet port of the analyzer. The *MIU* menu (Figure 44) controls which gases are introduced into the inlet port of the analyzer, in what order, and for how long.

By sampling references periodically during an ongoing data run, you can post-correct the data for long-term drift when active calibration cannot be done.

MIU Tab

The screenshot shows the MIU control menu with the following components:

- Navigation tabs: Time/Files, Calibration, Laser Adjust, **MIU**, Analog Output, Service, Serial Logger, Modbus Logger, Security.
- Unknown Gas Valve Sequence** table:

Valve	Seconds	Description
MIU 1	1	
MIU 2	1	
MIU 3	1	
MIU 4	1	
MIU 5	1	
MIU 6	1	
MIU 7	1	
MIU 8	1	
unassigned	-1	
- Reference Gas Valve Sequence** table:

Valve	Seconds	Description
unassigned	-1	
- Control options:
 - MIU Enable
 - Start with reference gas valve sequence
 - Number of times to run the unknown gas sequence for each reference gas sequence:
- Buttons: Save Changes, Undo Changes, Close.

Figure 44: Control Menu for MIU

Service

ABB-trained field service engineers monitor the performance of the analyzer via the *Service* screen. (Figure 45)

- These settings determine the level of change that could affect measurement performance.
- The alarm threshold levels are analyzer-dependent and are set based upon the last fixed setting.
- The current maintenance time is displayed.
 - When the timer exceeds 360 days, the maintenance alarm will turn **yellow**.
 - When the timer exceeds 380 days, the maintenance alarm will turn **red**.
 - The timer can be reset by pressing the **Reset Counter** button. (Figure 45)

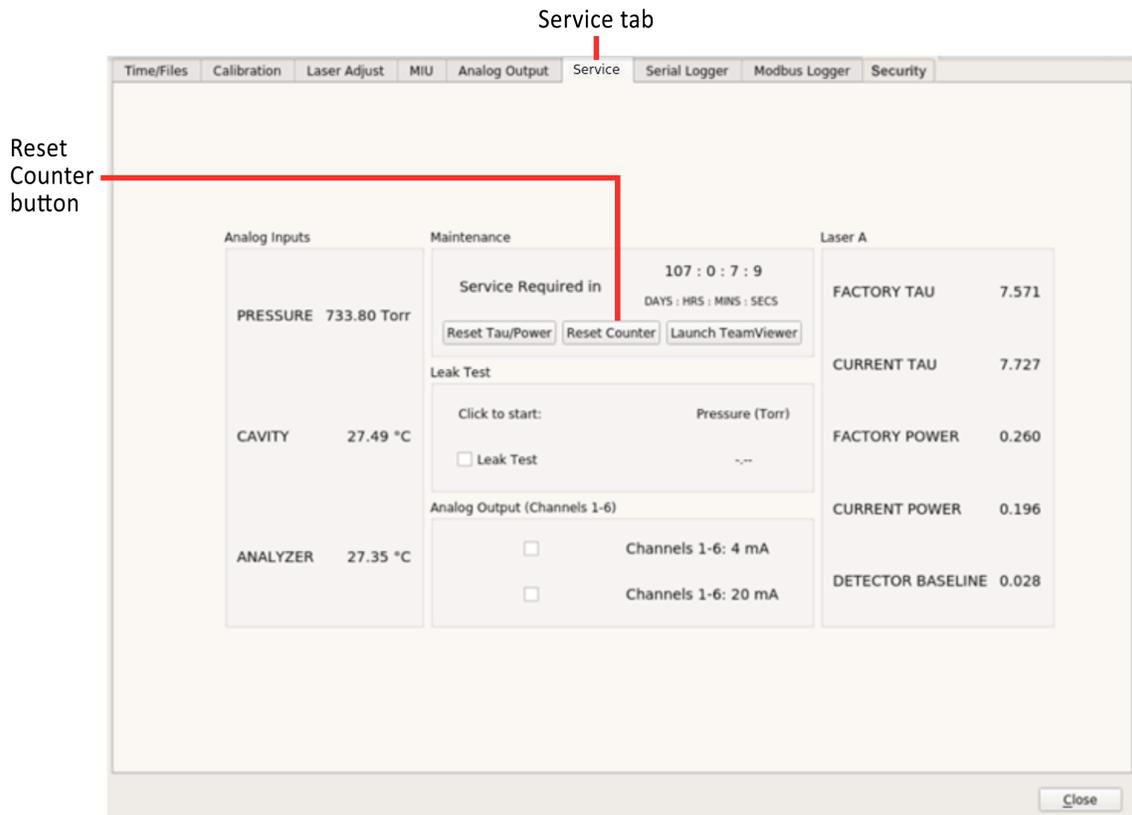


Figure 45: Service Screen

Data Output Logging

Serial Logger

Click the **Serial Logger** tab to access the *Serial Logger* menu, in which you can change how data reported at the RS-232 port are configured.

Serial Logger Tab

Time/Files Calibration Laser Adjust MIU Analog Output Service **Serial Logger** Modbus Logger Security

Serial Data Logger Settings

Active listeners (record order)

ICOS
 ANEMOMETER
 MAVLINK

MAVLINK ANEMOMETER **OUTPUT**

Serial Port Settings

Port name: NONE Stop bits: 1
Baud rate: 38400 Data bits: 8 bits
Parity: None Timeout: 1000

Output Settings

Active
 Append checksum

Parsed debug

SysTime	Time	[CH4]_ppm	[CH4]_ppm_sd	[H2O]_ppm	[H2O]_pp
07/30/2018 14:15:26.147	07/30/2018 14:15:26.001	2.05313e+0	0.00000e+0	1.57981e+4	0.00000
07/30/2018 14:15:26.568	07/30/2018 14:15:26.501	2.04891e+0	0.00000e+0	1.57701e+4	0.00000
07/30/2018 14:15:27.067	07/30/2018 14:15:27.002	2.04761e+0	0.00000e+0	1.59788e+4	0.00000
07/30/2018 14:15:27.567	07/30/2018 14:15:27.503	2.05151e+0	0.00000e+0	1.60024e+4	0.00000
07/30/2018 14:15:28.076	07/30/2018 14:15:28.003	2.04896e+0	0.00000e+0	1.60429e+4	0.00000
07/30/2018 14:15:28.571	07/30/2018 14:15:28.504	2.04901e+0	0.00000e+0	1.58051e+4	0.00000

Enable live debug Clean debug Go to table bottom

Save Restore

Close

Activate port to stream data

Configure serial output

Activate/de-activate data output

Include/exclude serial port data columns

Serial Data Stream Display

Clear table

Save configuration

Restore default configuration

Figure 46: Serial Logger Menu



Use a null modem serial cable to connect the analyzer serial port to an external computer.

Active Listeners (OPT-DATALOG Option)

Select which serial port(s) are available to stream data: **ICOS**, **ANEMOMETER**, or **MAVLINK**. Check the adjacent box to activate the port; uncheck to de-activate.

Serial Port Settings

Use the **MAVLINK**, **ANEMOMETER**, and **OUTPUT** tabs to configure the selected serial port(s) that stream data. Figure 46 shows the *Serial Logger* menu with the **OUTPUT** tab selected.



The **OUTPUT** tab corresponds to the *Active Listeners ICOS* tab.

Standard settings are provided for:

- Baud rate
- Parity
- Stop bits
- Data bits
- Timeout

The actual rate of the serial output is equal to the Logged File Rate (that is, 1 Hz) divided by the Rate specified in the *Rate Control Adjustment* panel.

You can also name the port.

Additional settings on the **OUTPUT** tab:

- Active – check this box to activate the port for data output. If unchecked, no data are output from the port.
- Append checksum – check this box to include serial port data columns in the output file.

Additional setting and display on the **ANEMOMETER** tab:

- Parser Settings – select the method to parse raw serial data into the correct format for data output.
- Raw data – displays the raw data output from the device on the selected serial port.

Parsed Debug

This panel displays the serial data stream.

- Enable live debug – check this box to enable the data stream from the port. If unchecked, no data appear in the table.
- Clean debug – click to clear the table of data.
- Go to the table bottom – check this box to scroll to the bottom of the table.

Save or Restore Configuration

To save the configuration, click **Save** (at the bottom of the screen), or **Restore** to return the configuration to the default setting.

Modbus TCP

The analyzer process variables and health status may be read by a Modbus master using the Modbus TCP version of the protocol.



WARNING!

The Modbus protocol is an unsecured protocol, as such, the intended application should be assessed to ensure that these protocols are suitable before implementation.

Modbus Logger

Click the **Modbus Logger** tab to access the *Modbus Logger* menu.

Modbus Logger Tab

Configure Modbus settings

Modbus Data Stream Display

Alarm Display

Show/hide alarms

Show/hide measurements

Restore default configuration

Save configuration

SysTime	Batt_v	Batt_v_sd	BATT_PERCENT	BATT_PERCENT_sd	[CH4]_ppm
07/30/2018 17:36:55.063	62.4701	0	0	0	-0.0120305

Figure 47: Modbus Logger Menu

Use this menu to view the Modbus data stream and analyzer alarm status.

You can also change certain Modbus settings from the default configuration including:

- Port name and server address
- Whether to display analyzer alarms and measurement:
 - Show alarms – check this box to display alarms. If unchecked, alarms are not displayed.
 - Show measurements – check this box to display Modbus measurements. If unchecked, measurements are not displayed.

- Click **Save** (at the bottom of the screen) or **Restore** to return the configuration to the default setting.

Register Ordering

The following describes the data order in the Modbus registers for the GLA131-GGA.

Analyzer Process Variables

The Modbus data ordering is structured to mirror the data in the analyzer’s local data file and output over the analyzer’s RS-232 serial stream: Each of these streams contain the same data and are interchangeable to provide the greatest flexibility for recording data.

The analyzer process variables and their order can be found in the local data file as a header or as listed in Table 9. These columns of data are mapped directly into the Modbus holding register starting at 040000. Except for the timestamp (*Epoch Time*), each process variable occupies two holding registers to represent a floating-point value. Both registers must be read to properly return the process variable of interest. Table 9 lists analyzer process variables, registers, and bit assignments.

Table 9: Analyzer Process Variables

Variable	Register	Data Format
Epoch Time (ms)	040000	Least Significant Bit (LSB)
	040001	
	040002	
	040003	Most Significant Bit (MSB)
[CH4]_ppm	040004	LSB
	040005	MSB
[CH4]_ppm_sd	040006	LSB
	040007	MSB
[CO2]_ppm	040008	LSB
	040009	MSB
[CO2]_ppm_sd	040010	LSB
	040011	MSB

Variable	Register	Data Format
[H2O]_ppm	040012	LSB
	040013	MSB
[H2O]_ppm_sd	040014	LSB
	040015	MSB
[CH4]d_ppm	040016	LSB
	040017	MSB
[CH4]d_ppm_sd	040018	LSB
	040019	MSB
[CO2]d_ppm	040020	LSB
	040021	MSB
[CO2]d_ppm_sd	040022	LSB
	040023	MSB
GasP_torr	040024	LSB
	040025	MSB
GasP_torr_sd	040026	LSB
	040027	MSB
GasT_C	040028	LSB
	040029	MSB
GasT_C_sd	040030	LSB
	040031	MSB
AmbT_C	040032	LSB
	040033	MSB
AmbT_C_sd	040034	LSB

Variable	Register	Data Format
	040035	MSB
RDO_us	040036	LSB
	040037	MSB
RDO_us_sd	040038	LSB
	040039	MSB
RD1_us	040040	LSB
	040041	MSB
RD1_us_sd	040042	LSB
	040043	MSB
Gnd	040044	LSB
	040045	MSB
Gnd_sd	040046	LSB
	040047	MSB
LTC0_v	040048	LSB
	040049	MSB
LTC0_v_sd	040050	LSB
	040051	MSB
LTC1_v	040052	LSB
	040053	MSB
LTC1_v_sd	040054	LSB
	040055	MSB
Batt_v	040056	LSB
	040057	MSB

Variable	Register	Data Format
Batt_v_sd	040058	LSB
	040059	MSB
BATT_PERCENT	040060	LSB
	040061	MSB
BATT_PERCENT_sd	040062	LSB
	040063	MSB
Fit_Flag	040064	LSB
	040065	MSB
MIU_VALVE	040066	LSB
	040067	MSB
MIU_DESC	040068	LSB
	040069	MSB

Figure 48 is an example of how the output appears as the line of text in the data file.

```
Time, [CH4]_ppm, [CH4]_ppm_sd, ...
07/10/2017 14:21:42.818, 1.91835e-02, 0.00000e+00, ...
```

Figure 48: Data File Output

Analyzer Warning and Alarm States

The analyzer health alarms are stored in the coil registers and follow the standard ABB system health ordering. Each alarm type consists of two coil registers: the first for a warning state and the second for an alarm state. The order for alarms is shown in Table 10.

Table 10: System Warning and Alarm Coil Register Configuration

Health Event	Warning Register	Alarm Register	Description
Reserved	00000	00001	Reserved for future use
Maintenance	00002	00003	System maintenance is required
Pressure	00004	00005	Pressure is not in operating range
HD Space	00006	00007	System data storage space is low
Data Health A	00008	00009	Laser A goodness of fit
Data Health B	00010	00011	Laser B goodness of fit
Mirror Health A	00012	00013	Mirror health has degraded for Laser A
Mirror Health B	00014	00015	Mirror health has degraded for Laser B
Linelock A	00016	00017	Laser A peak position is outside of control range
Linelock B	00018	00019	Laser B peak position is outside of control range
Signal Power A	00020	00021	Laser A power has degraded
Signal Power B	00022	00023	Laser B power has degraded

Cyclic Redundancy Check

No cyclic redundancy check (CRC) is included in the returned data frame because error-checking functionality is provided by the TCP/IP encapsulation.

Security

Click **Setup** on the Control Bar, then click the **Security** tab to access the *Security* screen (see Figure 49). This screen lets you change security settings including changing passwords; adding, deleting, and assigning users; and returning the system to default settings. Returning to default settings restores default passwords, removes all users except *lgr*, and deletes all data.

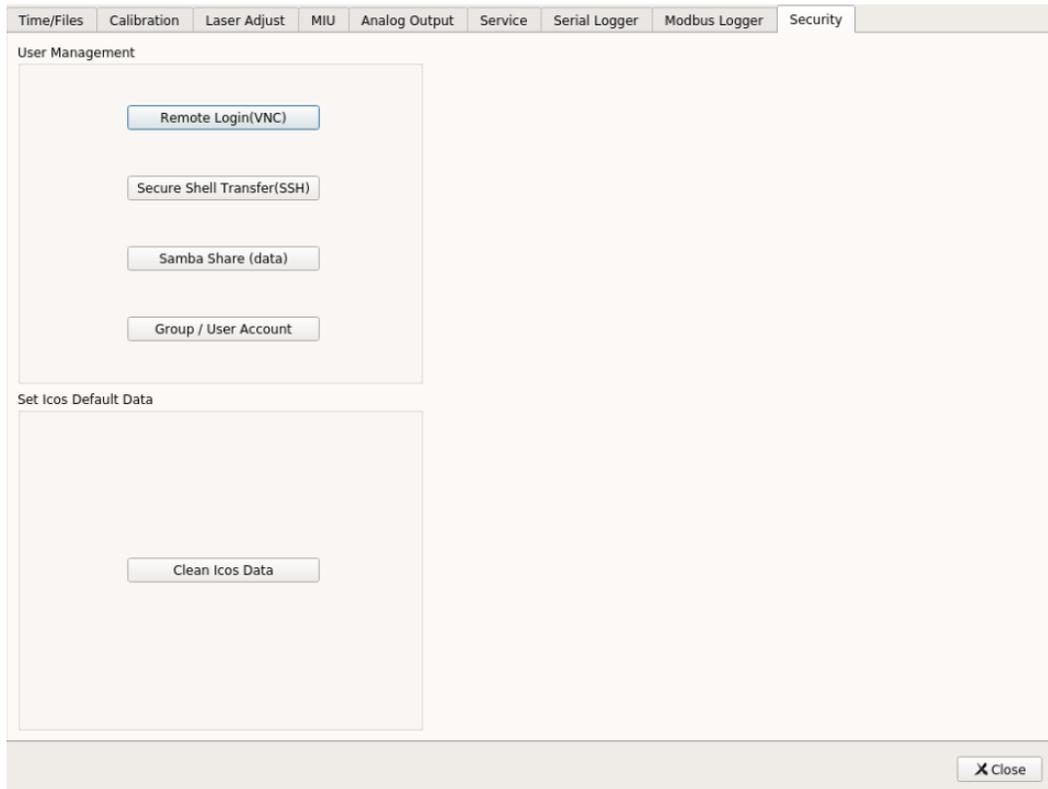


Figure 49: Security Screen

User Management

The *User Management* area lets you do the following:

- Change the VNC server password
- Change the SSH password
- Change the Samba Share password
- Add and delete users, and assign to groups

Change VNC Server Password

To change the VNC server password, perform the following:

1. From the *Setup* screen, click the **Security** tab.
2. Click **Remote Login (VNC)**: The dialog box shown in Figure 50 appears.



The VNC server is disabled by default because transfer via VNC is not secured. However, authentication credentials are sent securely.

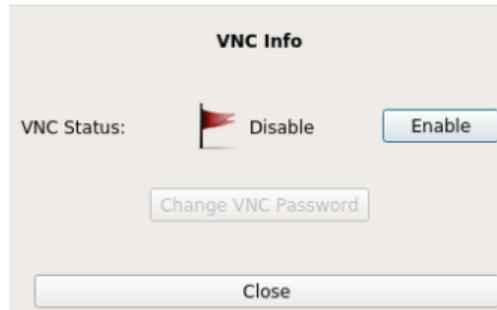


Figure 50: Remote VNC Login

3. Click **Enable**: A message appears stating the connection to the VNC Server will not be encrypted.

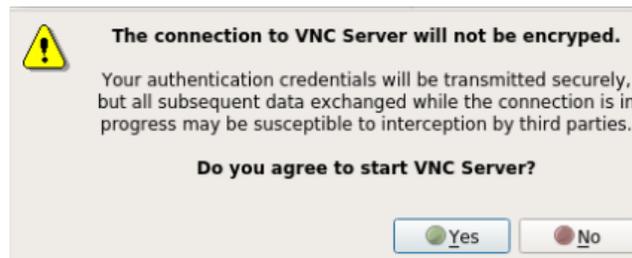


Figure 51: VNC Server Warning Message

4. To proceed, click **Yes**: The VNC server is enabled, and you can connect to the analyzer via the VNC interface. You can also disable the connection (see Figure 52).

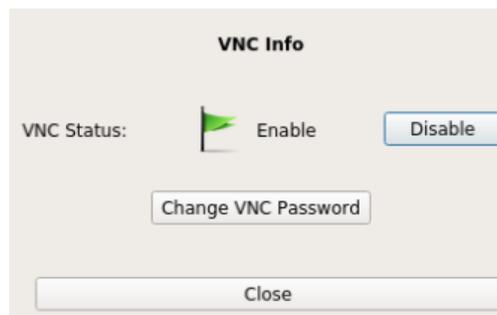


Figure 52: VNC Server Enabled

5. Click **Change VNC Password**: The *Change VNC Password* dialog-box appears.

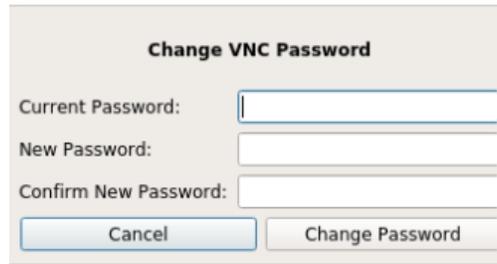
A dialog box titled "Change VNC Password" with three input fields: "Current Password:", "New Password:", and "Confirm New Password:". Below the fields are two buttons: "Cancel" and "Change Password".

Figure 53: Change VNC Password Dialog-Box

6. Enter the current VNC password in the **Current Password** field. (The default VNC password is *lgrvnc*.)
7. Enter the new password in the **New Password** field.
8. Re-enter the new password in the **Confirm New Password** field.
9. Click **Change Password**.

Change SSH Password

To change the SSH password, perform the following:

1. From the *Setup* screen, click the **Security** tab.
2. Click **Secure Shell Transfer (SSH)**: The *Change SSH Password* dialog-box appears.

A dialog box titled "Change SSH Password" with three input fields: "Current Password:", "New Password:", and "Confirm New Password:". Below the fields are two buttons: "Cancel" and "Change Password".

Figure 54: Change SSH Password Dialog-Box

3. Enter the current SSH password in the **Current Password** field. (The default SSH password is *3456789*.)



The SSH password is the same as the lgr password. If you change the SSH password, the lgr password will also be changed.

4. Enter the new password in the **New Password** field.
5. Re-enter the new password in the **Confirm New Password** field.
6. Click **Change Password**.

Change Samba Share Password

To change the Samba Share password, perform the following:

1. From the *Setup* screen, click the **Security** tab.
2. Click **Samba Share (data)**: The *Change Samba Password* dialog-box appears.

The image shows a dialog box titled "Change Samba Password". It contains three text input fields: "Igr Password:", "New Samba Password:", and "Confirm New Password:". Below the fields are two buttons: "Cancel" and "Change Password".

Figure 55: Change Samba Password Dialog-Box

3. Enter the **Igr Password**. (The default Igr password is *3456789*.)
4. Enter the new password in the **New Samba Password** field.
5. Re-enter the new password in the **Confirm New Password** field.
6. Click **Change Password**.

Manage User Accounts

User Levels

The analyzer is shipped with one Admin user, **Igr**, which cannot be deleted. Refer to Table 11 for user level access.

Table 11: User Level Access

		Admin	Service	User
Display Screens	Numeric			
	Spectrum			
	Time Chart			
	Alarm Status			
Main Buttons	Rate			
	File Transfer			
	Setup			
	Exit			
Setup Panels	Time/Files			
	Calibration			
	Laser Adjust			
	MIU			
	Analog Output			
	Serial Logger			
	Service			
	Bluetooth Daemon			
	Security			
Security Panel	Change VNC password			
	Change SSH password			
	Change Samba password			
	User account management			
	Clean ICOS data (decommission)			

<i>Changeable</i>
<i>Read Only</i>
<i>Not Accessible</i>

The lgr user and users belonging to the Admin and Service groups can add new users and delete users using the *Group/User Account* screen.

Add User

To add a user, perform the following:



Only users belonging to the Admin and Service groups can add new users.

1. From the *Setup* screen, click the **Security** tab.
2. Click **Group/User Account**: The *Users* dialog-box shown in Figure 56 appears.

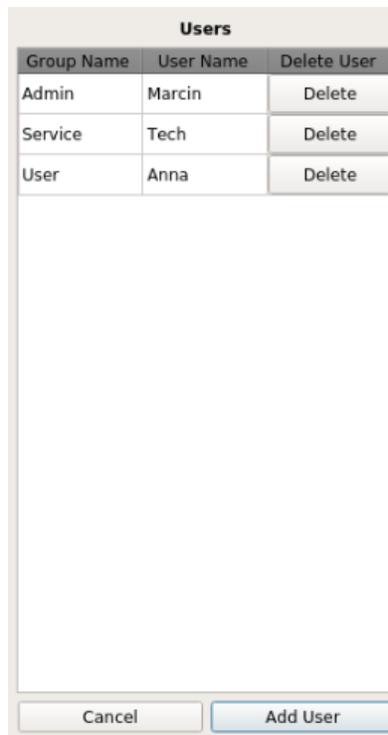


Figure 56: Group/User Dialog-Box

3. Click **Add User**: The *Add User* dialog box shown in Figure 23 appears.
4. Enter a username in the **User Name** field.
5. Enter a password in the **Password** field.
6. Re-enter the new password in the **Confirm Password** field.
7. Select a group from the **Group Name** drop-down menu: **Admin**, **Service**, or **User**.
8. Click **Add New User**.

If you try to add a user and are in the User group (instead of the Admin or Service group), a dialog box (Figure 24) appears, and you must cancel the action.

Delete User

To delete a user, perform the following:



Only users belonging to the Admin and Service groups can delete users.

1. From the *Setup* screen, click the **Security** tab.
2. Click **Group/User Account**: The *Users* dialog-box shown in Figure 56 appears.
3. Click **Delete** next to the user you want to delete.

If you try to delete a user and are in the User group (instead of the Admin or Service group), a dialog box (Figure 24) appears, and you must cancel the action.

Set ICOS Default Data

The *Set ICOS Default Data* feature removes all measurement data and created users, and disables the VNC server. This feature may be applicable when the analyzer is decommissioned or released from active service.

This feature requires the lgr user Linux account and does the following:

- Sets default passwords in the user management group
- Removes all measurement data and created users
- Disables the VNC server

To set the ICOS default settings, perform the following:

1. From the *Setup* screen, click the **Security** tab.
2. Click **Clean Icos Data**: The *Clear Icos Data* dialog-box shown in Figure 57 appears.



Figure 57: Clear Icos Data Dialog-Box

3. Enter the lgr user Linux password in the **lgr Password** field. (The default lgr user Linux password is 3456789.)

4. Click **Clear Data**: The message shown in Figure 58 appears.



Figure 58: Clear ICOS Data Message

5. Click **Yes**.

Analyzer Shutdown

To properly shut down the analyzer, perform a soft shutdown by first selecting **Exit** on the Control Bar. When the dialog box appears with the question, “*Do you wish to shutdown?*” (see Figure 59), click **OK**.



Figure 59: Shutdown Dialog-Box

6 Service



WARNING!

Use of controls or adjustments, or performance of procedures other than those specified, may result in hazardous radiation exposure.

The analyzer laser is not field serviceable. Should a laser fail in the field, the analyzer must be shipped back to ABB for service repair.

The analyzer laser is equipped with a magnetic interlock switch. Whenever the case cover is opened, the magnetic switch breaks contact from the magnetically encoded counterpart, and power is interrupted from the Laser Controller PCB in the analyzer, thus, disabling the laser.

Service to the analyzer itself must be performed only by certified service personnel trained on servicing this instrument. User adjustments inside the analyzer are not necessary or recommended by the manufacturer.

Basic Service Procedure



WARNING!

Only ABB certified maintenance personnel may unlock and open the analyzer housing or perform internal maintenance.

Before servicing the analyzer, perform the following procedure:

1. Turn off the analyzer power via the software.
2. Unplug the power supply or the battery kit.
3. Wait 10 seconds for the power to dissipate.
4. Make sure the analyzer is on a stable surface and on the right side (main label facing up). Unlock the padlock and open the analyzer cover.
5. Make sure all LEDs are off.

Spare Parts, Maintenance, and Accessories

Mirror Cleaning Kit

- Part number: MTN-CLEAN-1V

Spare Pump and Filters Kit

- Part number: SPK-131V2-LITE
- Includes: replacement pump and 5 µm filters (2)

Spare Parts Kit

- Part number: SPK-131V2
- Includes: replacement pump, filters, and pressure controller

Sampling Kit

- Part number: ACC-MICRO-KIT
- Includes: wand and shoulder strap

MicroGuard™ Accessory Kit

- Part number: ACC-MICROGUARD
- Turns a Microportable into a MicroGuard™ Portable Gas Leak Detection System
- Contact factory

Power Accessories

- Battery, part number: ACC-MICRO-B
- Microportable external battery charger, part number: ACC-MICRO-BC
- Power supply brick, part number: ACC-MICRO-AC
- External battery case, part number: ACC-DCMICRO



No battery is included with the ACC-DCMICRO - refer to your sales representative for dimensions and power requirements.

Preventive Maintenance

Daily Operation Checklist

Table 12 describes routine maintenance tasks that keep your analyzer operating smoothly.

Table 12: Maintenance Checklist

Frequency	Task
Every 1-2 days	<ul style="list-style-type: none">• On the <i>Spectrum</i> display, verify that the spectrum is correct. The spectrum should appear as shown in Figure 27 and Figure 28. Become familiar with the normal appearance of the spectrum (the best way of diagnosing analyzer performance). Any deviations from normal could indicate a problem with the analyzer.• Log the transmitted intensity displayed in the upper panel of the <i>Spectrum</i> screen. Any decrease in transmitted intensity could be indicative of dirty mirrors.• Log the analyzer pressure. Any decrease in pressure could be indicative of an obstruction in the flow system. An increase in pressure could be indicative of a leak in the system or a pump failure.
Every 3-6 days	Check the laser offset and adjust if necessary. (Figure 42 and Figure 43)

Recommended Maintenance

The recommended maintenance is:

- ICOS mirror cleaning
- Inline particulate filter
- Solid-state drive (SSD) maintenance
- Lithium-ion battery inspection

Mirror Ringdown Time and Maintenance

Measurement cell mirrors are protected from contamination by an internal inlet filter. With continued use, the mirrors may gradually decline in reflectivity.

If a significant change occurs in the mirror ringdown time (for example, greater than 20% reduction), the precision of the measurements may be reduced.

Periodically note the ringdown time. If a significant reduction in ringdown time occurs:

- Request a mirror cleaning kit from ABB or your local distributor.
- If further maintenance is required, contact ABB or your local distributor for service.
 - ABB call center: 1-800-858-3847 (North America) or +1 418-877-2944 (Worldwide)
 - ABB Technical Support: icos.support@ca.abb.com

Other Components

The inline particulate filter requires replacement once a year or when the measured data profile becomes thinner in the *Spectrum* display screen (GOF gets worse – refer to the Spectrum Display section on page 35 for details), and/or when the gas pressure reading on the Control Bar increases.

Solid-state drive (SSD) maintenance: It is recommended to check the amount of memory space available on the 120 GB SSD. Prior to collecting measurement samples, verify there is sufficient SSD space available. In the *Control Bar* (Figure 60), the current amount of available disk space is displayed.

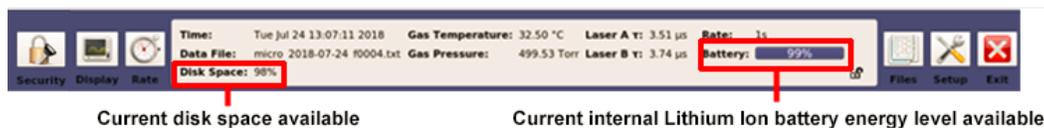


Figure 60: Current Disk Space Available

Should the analyzer shut down without a soft shutdown, the operating software may get corrupted and make the analyzer non-functional. You can monitor the internal lithium-ion battery energy level by checking the Control Bar. The lithium-ion battery contains a protective PCB to prevent over-charging and over-discharge to prevent damage to the battery. The lithium-ion battery takes approximately 8 hours to recharge completely. Inspect the lithium-ion battery for any bulge in its package and protective PCB sealing. A bulge in the battery indicates internal damage. Should the battery have a bulge, remove the battery and dispose it at an organization that recycles lithium-ion batteries.

Battery Replacement

The analyzer battery may be replaced if it fails or is at end of life due to multiple charge/discharge cycles.



CAUTION!

Always replace the battery only at an ESD protected station with proper personal grounding. Any operation requiring opening the analyzer case must be performed in a controlled environment with proper ESD protection and the analyzer powered off. Never open the analyzer without ESD protection.



CAUTION!

For analyzer functionality and user safety, only use batteries provided by ABB.

To replace the battery, perform the following: (Figure 61)

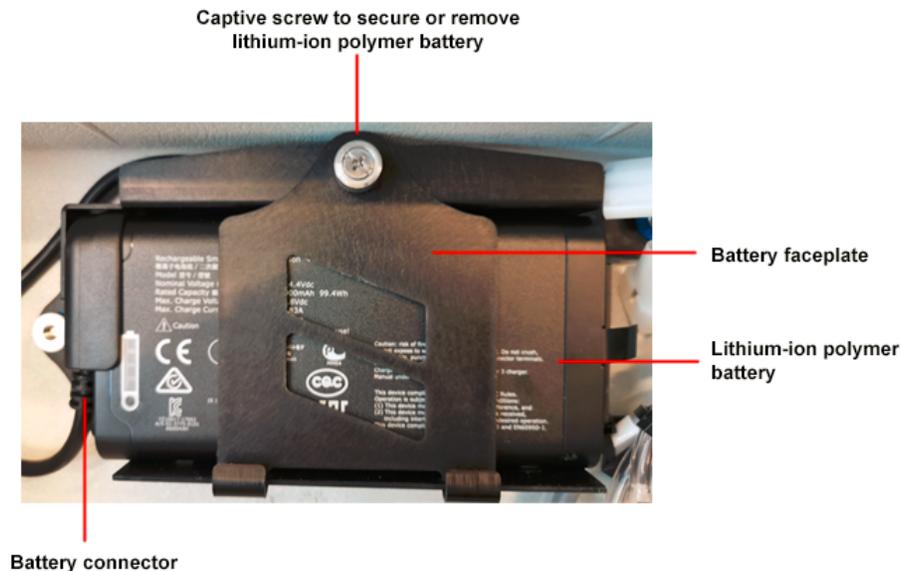


Figure 61: Battery Replacement

1. Ensure the analyzer power is OFF.
2. Open the case by unlatching two clamps next to the handle. (Figure 4)
3. Holding the battery in place, unscrew the captive Phillips screw securing the battery faceplate.

4. Rotate the faceplate downward.
5. Remove the battery from the case ensuring not to damage other components.
6. Unplug the battery connector.
7. Inspect the new battery for damage or bulging.
8. Plug in the battery connector to the new battery.
9. Place the new battery inside the faceplate and rotate the faceplate up.
10. Secure the faceplate to the battery with the captive screw.
11. Close the case and fully lock the two clamps.
12. Power up the analyzer and verify proper installation.



The battery automatically recharges when the analyzer power is on and plugged in to a power supply.

Fuse Replacement

If one of the fuses blows or is otherwise damaged, the analyzer automatically turns off. There are two fuses in the analyzer – one 5 A fuse for the battery input and one 10 A fuse for the power input. These fuses are available at auto parts stores.

- Battery input fuse, automotive, 5 A 32 V DC blade, ATO/ATC, color – tan (see Figure 62)
- Power input fuse, automotive, 10 A 32 V DC blade, ATO/ATC, color – red (see Figure 63)

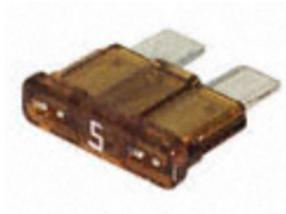


Figure 62: 5 A Fuse



Figure 63: 10 A Fuse

To replace a fuse:

1. Power down the analyzer.
2. Disconnect the analyzer power plug.
3. Disconnect the analyzer inlet and outlet exhaust gas lines.
4. Move the analyzer to a table where it can be worked on.
5. Open the case by unlatching two clamps next to the handle to expose its internal components.

6. Locate the fuse: See Figure 64 for locations (overall and close-up views).

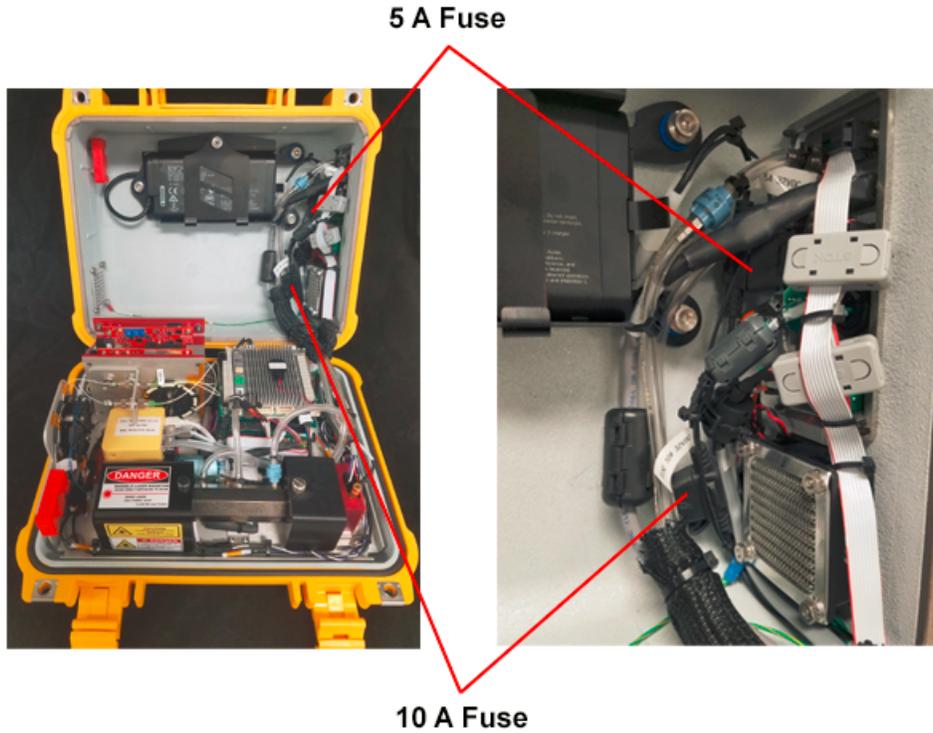


Figure 64: Analyzer Fuse Locations

7. Remove the fuse from the fuse fixture: Pull the cover off, then slide the fuse out. Figure 65 shows the fuses with the covers removed.



Figure 65: Fuses with Fuse Covers Removed

8. Insert the new fuse into the fuse fixture, then attach the fuse cover.
9. Close the analyzer case and fully lock the two clamps.
10. Move the analyzer back to the original location.
11. Re-connect the inlet and outlet exhaust lines to the analyzer.
12. Re-connect the analyzer power plug.



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