GLA133 Series
UAV-Microportable analyzers

Contents

Contents

⚠ 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 Disclaimer

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

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:
ABB Inc. Measurement & Analytics
3400, rue Pierre-Ardouin
Quebec, (Quebec) G1P 0B2 Canada

Tel: 1 800 858 3847 (North America)
Tel: +1 418 877 2944 (Worldwide)
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.

⚠ *NOTE*

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

1   Introduction

This manual contains information on using the ABB GLA133 Series UAV-Microportable Analyzer, including operational and safety information.

This manual describes the analyzer software menu and data screens. It also provides instructions to calibrate the analyzer to its traceable certified bottle gases, adjust data sampling rates, and transfer data via 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   Standard Scope of Supply

The following items are provided as standard scope of supply:

Table 1: Standard Scope of Supply Items

Item Description	Quantity
ABB GLA133 Series UAV-Microportable analyzer	1
Power cable for analyzer (connection to 120/240 V outlet)	1

3   Recommended Tools

The following lists recommended tools (customer-supplied).
– ³⁄₃₂ inch Allen wrench
– Threadlocker Loctite 243

4   Safety

The following pages provide important safety precautions.

Intended Use

Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using under qualified personnel, or making unauthorized alterations, releases the manufacturer from any liability for any resulting damage. Also, if the equipment is used in a manner not specified by the manufacturer, it may impair the protection provided by the equipment. This makes the manufacturer's warranty null and void. The device must be used by properly trained personnel when measurements in ambient air are required. Any use with background gases presenting toxic, corrosive and/or explosive properties is not intended and may result in serious injuries.

Sound

There are no specific instructions regarding noise level for this analyzer.

Class of Laser Equipment

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

⚠ **WARNING!**
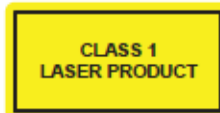
CLASS 1 LASER PRODUCT

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser Notice no.50, dated june 24, 2007 and IEC 60825-1:2014

This analyzer is a Class 1 laser product that complies with:

• 21 CFR 1040.10 and 1040.11
• EN 60825-1:2014

The laser is classified as a Class 3B when exposed.

WARNING
CLASS 3B INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED. AVOID EXPOSURE TO THE BEAM.

AVERTISSEMENT
RAYONNEMENT LASER INVISIBLE DE CLASSE 3B EN CAS D'OUVERTURE ET LORSQUE LA SÉCURITÉ EST NEUTRALISÉE. EXPOSITION AU FAISCEAU DANGEREUSE.

AA020920-01 B

...4 Safety

> ⚠ **WARNING!**
>
> **Only ABB engineers/ABB service personnel or ABB certified partners may open the analyzer cover or perform internal maintenance or Service the laser.**
>
> Failure to do so may result in damage to the analyzer and electric shock.
>
> ABB repairs ensures high quality level of service. Our highly skilled engineers mean that all certifications remain valid on all devices.

> ⚠ **WARNING!**
>
> **For maintenance or service**, please contact your local sales representative or ABB service support at: icos.support@ca.abb.com
>
> **Using this analyzer in a manner not specified by ABB may result in damage to the analyzer and render it unsafe to operate.**

Certification

The analyzer certifications are listed in Table 2.

Table 2: Analyzer Safety Certifications

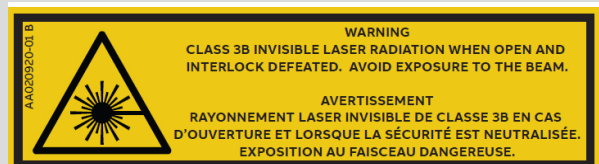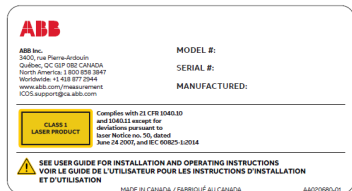| Symbol	Standards Tested & Met
CE	EMC Directive, Radio Directive, Low Voltage Directive, Laser Safety, RoHS and WEEE
FDA	Title 21 Code of Federal Regulations, 1040.10 and 1040.11 except for deviations pursuant to Laser Notice no.50, Dated June 24,2007 and IEC 60825-1: 2014

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 three labels are on or in the analyzer to identify hazardous areas. The first two labels are located on the carbon fiber plate on the bottom of the analyzer. The last label is located on the laser enclosure adjacent to the OA-ICOS cell.

Table 3: Radiation Labels

Label	Description
WARNING CLASS 3B INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED. AVOID EXPOSURE TO THE BEAM. AVERTISSEMENT RAYONNEMENT LASER INVISIBLE DE CLASSE 3B EN CAS D'OUVERTURE ET LORSQUE LA SÉCURITÉ EST NEUTRALISÉE. EXPOSITION AU FAISCEAU DANGEREUSE.	The laser is rated Class 3B (invisible laser radiation) when the housing is open. Only ABB engineers/ABB service personnel or ABB certified partners may open the analyzer cover or perform internal maintenance or service the laser.
ABB Inc. nameplate with MODEL #, SERIAL #, MANUFACTURED, CLASS 1 LASER PRODUCT	Name plate label with Laser class information showing that it is a Class 1 laser product. Refer to the user guide for installation and operating instructions.
DANGER INVISIBLE LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM DIODE LASER MAX. POWER: 25mW CLASS IIIb Laser Product	The fiber laser radiation is visible only when the laser enclosure is removed.

...4   Safety

The following two labels give important information regarding the UAV-analyzer integration process and the wireless connection to the analyzer. Both labels are located on the carbon fiber plate on the bottom of the analyzer.

Table 4: Important Labels

Label	Description
WARNING APPLY LOCTITE 243 THREADLOCKER TO ALL SCREWS WHEN ASSEMBLING **AVERTISSEMENT** AU MOMENT DE L'ASSEMBLAGE, APPLIQUER SUR TOUTES LES VIS UN ENDUIT FREIN POUR FILETS LOCTITE 243	Threadlocker Loctite 243 should be applied to all external screws in the UAV-analyzer integration process (refer to the *HoverGuard™ Solution System Manual* (document number 3KXG167006R4601) for details).
SSID: RUT240_XXXX PASSWORD: XXXXXXXX IP: 192.168.1.XXX	Wireless communications parameters. The passwords associated with the IP address (VNC, SSH, Samba) are given in Table 10 of this manual.

Operator Safety

When the cover is closed, and the analyzer interlock switch is locked into position and not bypassed, the analyzer runs safely, without risk to the operator. Modifying the analyzer to operate with the cover open can injure personnel.

> ⚠ **WARNING!**
>
> 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 itself poses no electrical hazards. The individual analyzer components operate at ≤ 30 V DC at relatively low currents. However, the electrical connection between the UAV and analyzer can pose an electrical hazard because it carries a current that may be > 1 A.

Laser Hazards

> ⚠ *NOTE*
>
> This analyzer is a Class 1 laser product.

During normal operation, with the cover closed, the analyzer is a Class 1 Laser Product in accordance with Title 21 Code of Federal Regulations, chapter 1, sub chapter J.

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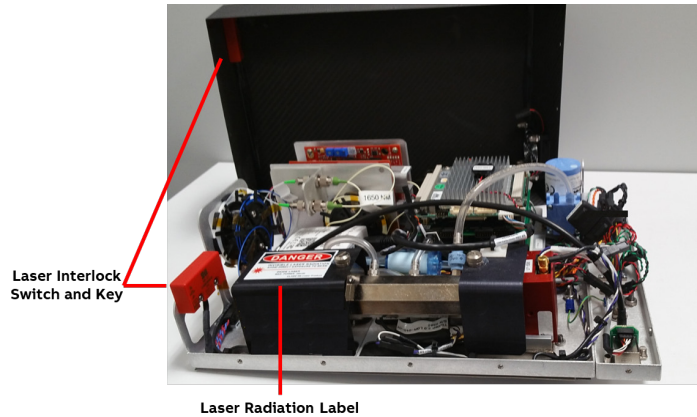

Laser Interlock Switch and Key

Laser Radiation Label

Figure 1   Laser Radiation Label and Laser Interlock Switch and Key

...4 Safety

Internal Laser-Interlock Switch

The internal laser-interlock switch disables the laser by removing its power: This prevents exposure and eye damage caused by the class 3B laser from primary and secondary reflections in the OA-ICOS module. The laser interlock switch and key are shown in Figure 1. The switch is located on the left side panel toward the front top corner of the analyzer. The physical key is mounted on the shroud. When lowered so that the switch and key are in close proximity, it signals the Laser Controller/Driver board that the interlock is closed, enabling power to the laser(s).

Transportation and Storage of Boxed Analyzers

When transporting and storing boxed analyzers:

- Analyzers may be shipped in non-pressurized aircraft.
- Analyzers are fragile: Do not drop or smash boxed analyzers.
- Do not store analyzers outside in wet weather.
- Do not stack boxes.
- Analyzers may be safely stored at temperatures between 4 °C and 50 °C (40 °F and 122 °F).

> ⚠ *NOTE*
>
> Save the original shipping materials to use when returning the analyzer to ABB if factory service or repair is needed.

Table 5 lists and describes the safety icons on ABB shipping boxes. Follow these instructions when transporting and storing boxed analyzers.

Table 5: Transportation and Storage Icon Descriptions

Icon	Meaning
☂	Store your analyzer in a sheltered, dry area. Do not let the box get wet.
↑↑	Transport and store the analyzer box with the arrows on the box pointing up.
FRAGILE	The analyzer is fragile. Transport carefully. Do not drop the box.

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 6 shows and describes the warning icons used in this manual.

Table 6: 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.

5   Product Specification

Table 7 lists analyzer product specifications. Figure 2 illustrates the overall dimensions of the analyzer. Figure 2 gives relevant dimensions of the analyzer, while Figure 3 illustrates the connector panel and external fan.

Table 7: Product Specification

Icon	Meaning
Physical Dimensions	Length: 33.96 cm (13.37 in) x Width: 22.45 cm (8.84 in) x Height: 10.61 cm (4.18 in) (see Figure 2)
Physical Weight	3 kg (6.6 lbs) max.
Power Source	External DC power supply via 120/240 V AC outlet or UAV batteries
Power Input	11-30 V DC 35 W (GLA131-GGA) 27 W (GLA131-GPC/CH4)
Operating Current	5 A (max.)
Fuse	5 A/ 32 VDC automotive fuse, Fast-blow fuse
Altitude	2000 m (6562 ft)
Operational Temperature	5 to 45 °C (41 to 113 °F)
Humidity	<99%, non-condensing
Installation category	II
Pollution degree	2

> ⚠ *NOTE*
>
> The main supply voltage fluctuations are not to exceed ± 10 % of the nominal supply voltage.
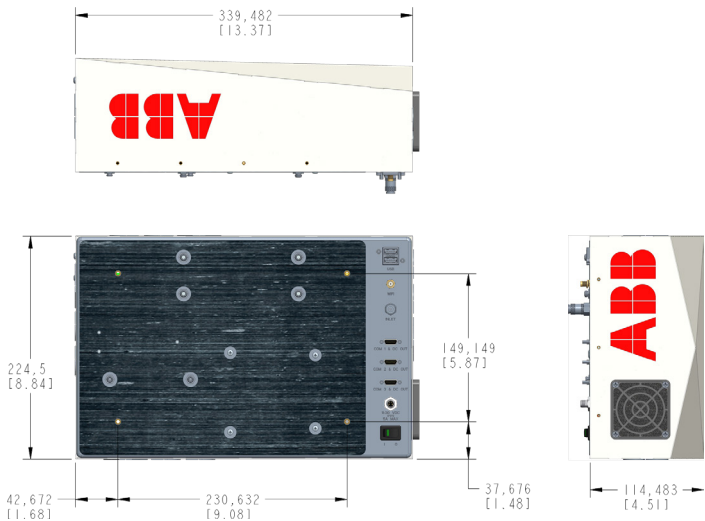

Figure 2   Analyzer Dimensions

Figure 3   Analyzer Case Component Identification

...5   Product Specification

Environmental Requirements

Table 8 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 8: Environment Requirements

Requirements	Specification
Operational Ambient Temperature	5 °C to 45 °C (41 °F to 113 °F)
Non-Operational Temperature	4 °C to 50 °C (40 °F to 122 °F)
Relative Humidity	Below the dew point for the area, avoiding condensation on surfaces
Maximum Impact Force Allowable	< 10 G

Performance Specifications

Table 9: Performance Specifications

Parameters	Specifications
Measurement Accuracy	+/- 1% of NIST Traceable Gas Standards
Sampling Rate	0.01-10 Hz

6   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. ABB provides a variety of models, each targeting gases that various industries monitor. All measurements are real-time.

Connection Ports

This section describes the connections shown in Figure 4.
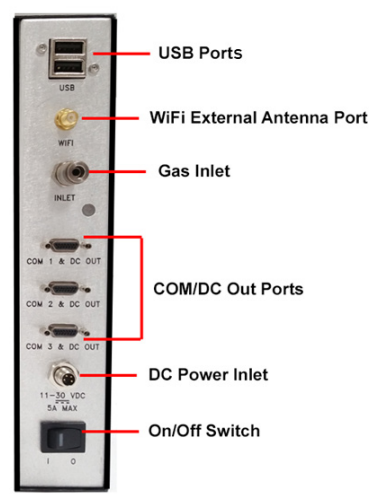

Figure 4   Connection Ports

Gas Inlet

The gas to be measured is connected to the ¼ inch push-connect *INLET* port.
During normal operation, the pump draws the sample through the analyzer inlet and exhausts the sample through the ventilation holes of the case. The acceptable inlet gas-pressure range is 0 to 15 psig.

Power

The analyzer is powered 11-30 V DC to the DC power inlet with a 5 A / 32 VDC automotive fuse inside the power-input harness. Power can be supplied using the 120/240 V power cable supplied with the analyzer or from the UAV batteries (if applicable, refer to the *HoverGuard™ Solution System Manual* , document number 3KXG167006R4601).

Data Interface

- USB ports – used to transfer data to a USB memory device or connect a USB keyboard and mouse.
- WiFi External Antenna port – allows for wireless connection to the analyzer via an externally connected antenna. Note that the external antenna, packaged with the analyzer, must be attached prior to powering on the analyzer.
- COM/DC Out ports (15 pin Micro-D Connector) – real-time digital input and output measurement data, as well as power, +5 V DC and +12 V DC, for external devices (for example, anemometer, auto pilot). See Figure 5 for pinouts.
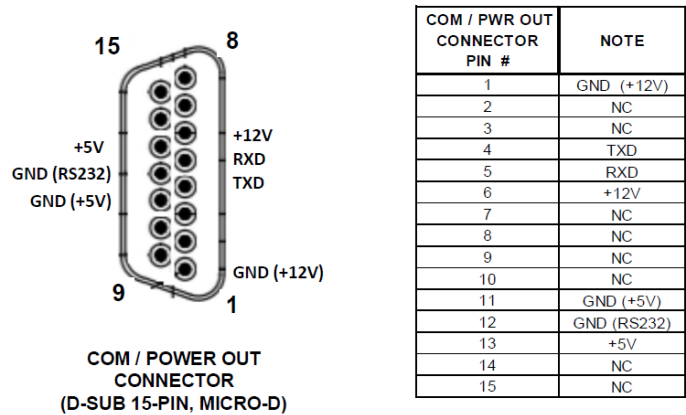

COM / PWR OUT CONNECTOR PIN #	NOTE
1	GND (+12V)
2	NC
3	NC
4	TXD
5	RXD
6	+12V
7	NC
8	NC
9	NC
10	NC
11	GND (+5V)
12	GND (RS232)
13	+5V
14	NC
15	NC

COM / POWER OUT CONNECTOR (D-SUB 15-PIN, MICRO-D)

Figure 5   COM/DC Out Pinouts

Plumbing Diagram

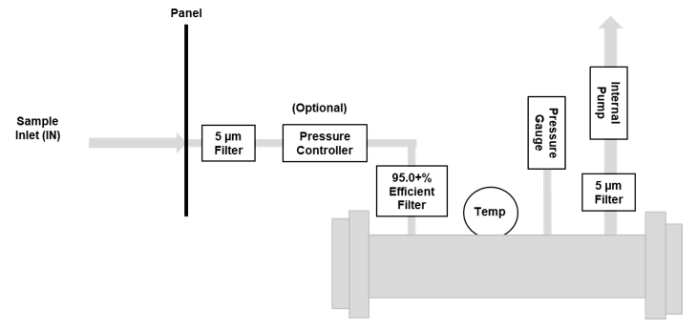The internal flow of gas through the analyzer is shown in Figure 6.

Figure 6   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 setpoint. 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. The gas then passes through a second 5 µm screen filter before the pump as it exits through the ventilation holes in the analyzer cover.

7   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, you must first login remotely using SSH and run an activation script. Refer to *VNC Server First-Time Activation* on page 15 for setup instructions.

WiFi Setup

1 Connect the external antenna (provided with the analyzer) to the WiFi external antenna port (see Figure 4).

2 Power on the analyzer by pressing the power button on the connector panel to the On position.

3 On the tablet, cell phone, or laptop, go to the WiFi symbol to access all available networks your device can see.

4 From the available network list, select the network (SSID) marked on the analyzer label. It should read: *RUT240_xxxx*, where xxxx varies from analyzer to analyzer. Once selected, enter the corresponding password (key) from the same label on the analyzer for access. The password consists of eight characters (XXXXXXXX) that vary from analyzer to analyzer. (Figure 7)
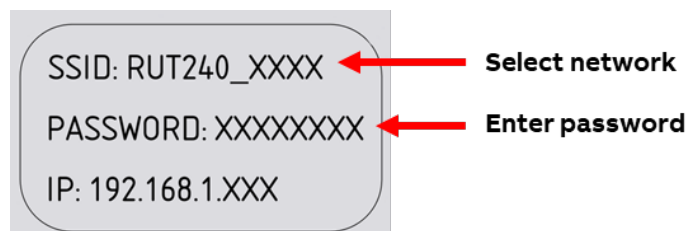

SSID: RUT240_XXXX ← Select network
PASSWORD: XXXXXXXX ← Enter password
IP: 192.168.1.XXX

Figure 7   Access WiFi

5 Log in:
a. Open a Web browser (Chrome/Firefox is recommended).
b. Visit http://192.168.1.1. You will be directed to the login page.
c. Enter the default username/password, **admin/ Lgr123456789.**

6 Change the Web-interface admin password for the router:
a. On the per right-hand side of the screen, navigate to **System > Administration**. (Figure 8)
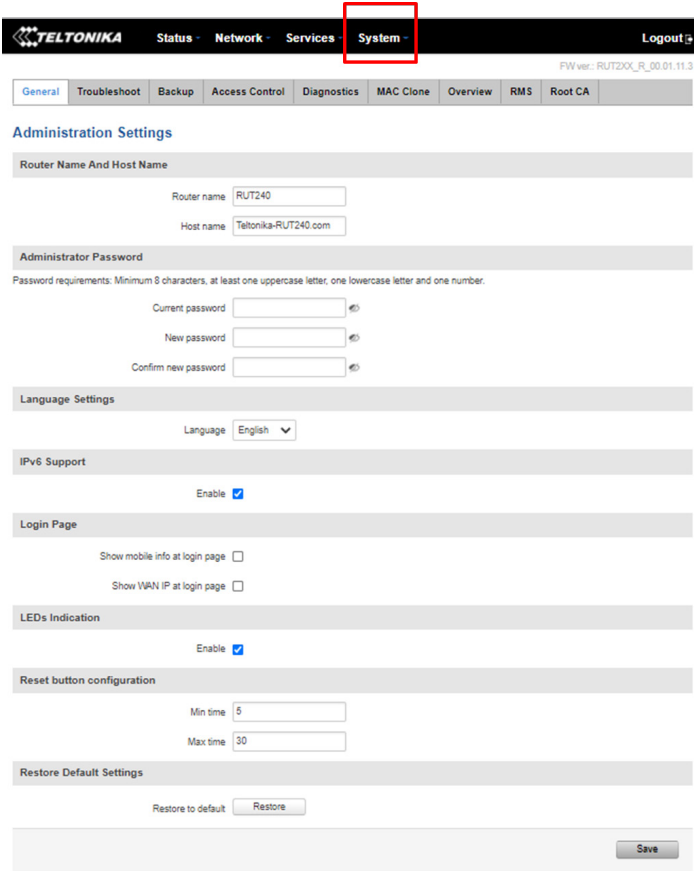
...7   User Interface Operation

Figure 8   Admin Password Panel

b. Input your default password, **Lgr123456789**, in the **Current Password** field.

c. Input your new password in the **New Password** field. The new password must have at least one uppercase letter, one lower case letter, one number and be least six characters long.

d. Click **Save**.

7 Change the Wireless Key (WiFi password):

a. On the left side of the screen, click **Network > Wireless**. To the right of the SSID, click **Edit**. Click on the **Wireless Security** tab and click to show the **Key**. (Figure 9)
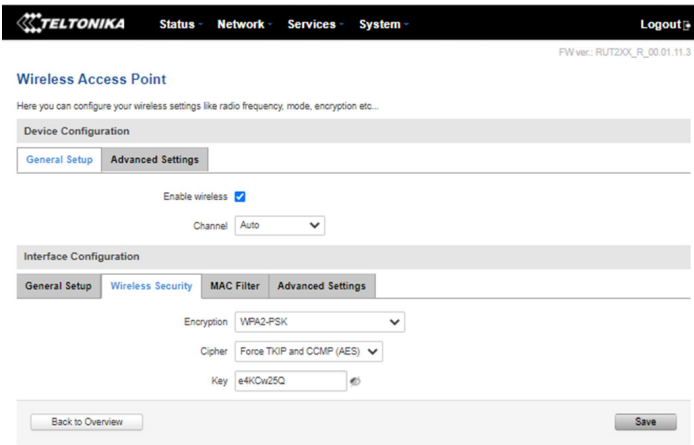
Figure 9   Wireless Settings Panel

b. Input the new WiFi password in the **WiFi Key** field. The new password must be at least six characters long.
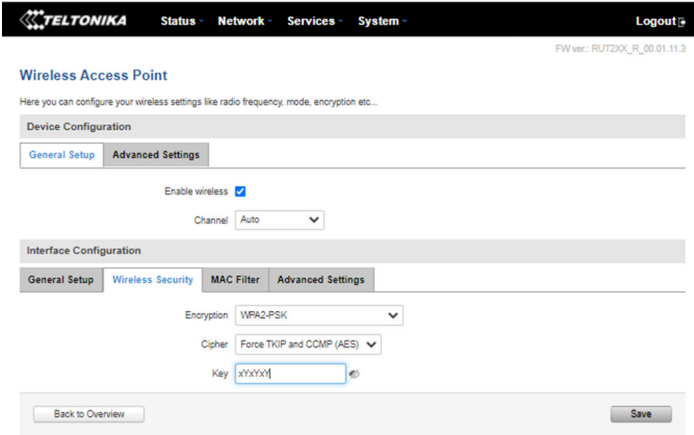
c. Click **Save**. (Figure 10)

Figure 10   Save New WiFi Password

...7   User Interface Operation

VNC Server First-Time Activation

By default, the VNC server is not active on a new factory analyzer because it uses an unencrypted communication protocol. To enable VNC connections, you must perform a one-time activation of the VNC server. This is done through a remote SSH connection, as shown in Figure 11.

1   Use an SSH client to remote login using the analyzer IP address.
    a. User: lgr
    b. Password: **3456789** (the default SSH password)

2   Type the following command into the prompt to execute the activation script:

    ./enableVnc.sh

3   Type **yes** at the prompt to accept the security disclaimer.

4   The VNC server should now be running and will automatically start each time the analyzer is powered on.

Figure 11   Remote SSH Session to Activate the VNC Server

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 (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 (www.realvnc.com).
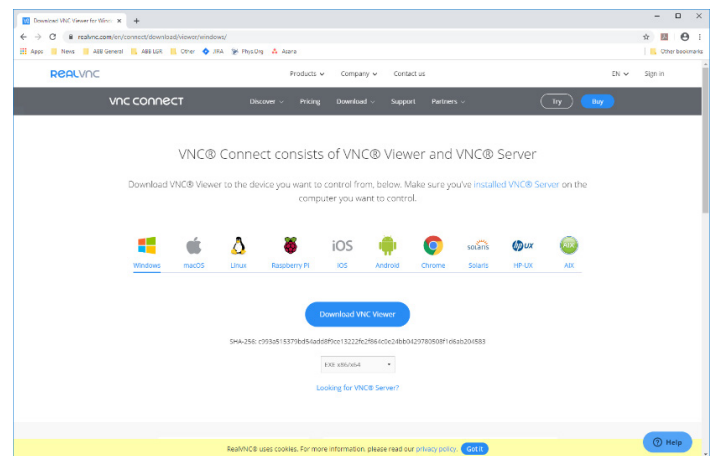

Figure 12   VNC Viewer Download Page

The following procedure is for a Windows machine to establish communication with the analyzer using VNC Viewer. A label showing the SSID, network key, and analyzer IP address is affixed to the bottom of the analyzer. (If the key has been changed as described in Step 7 in the *WiFi Setup* section above, use the new key.)

1   Connect to the analyzer's WiFi network:
    a. Once VNC Viewer is downloaded and installed on the tablet or laptop, power on the analyzer and wait approximately 2 minutes for the WiFi router to boot up completely.
    b. **Connect** the computer or laptop to the analyzer WiFi network.

2   Search the available networks to find an SSID in the form, *RUT240_xxxx* (where xxxx varies with the analyzer) and click Connect.

3   Enter the network security key: from Figure 7 (or modified security key).

4   Ensure that a network connection is made.

...7   User Interface Operation

> ⚠ *NOTE*
>
> You will no longer have internet access.

5 Establish communication with the analyzer using VNC:
a. Find the VNC icon shown in Figure 13. (Check the *Windows Start men*u application list).

Figure 13   VNC Icon

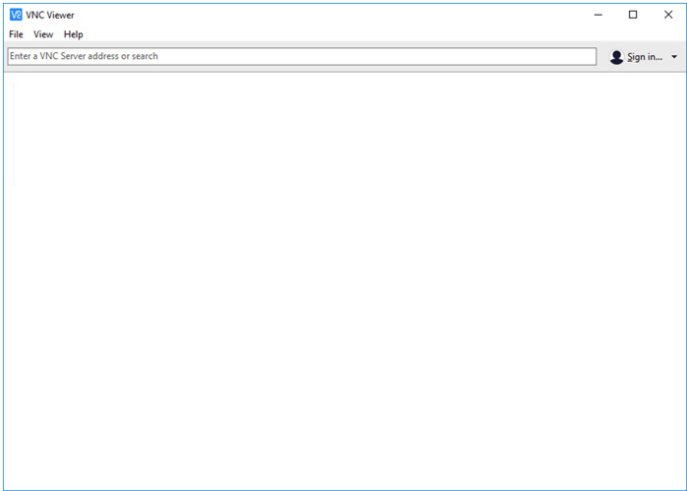b. Click on the **VNC icon** to execute the application; the screen shown in Figure 14 appears.

Figure 14   VNC Get Started Screen

c. Enter the IP address of the analyzer. (Figure 7) The format of the IP address is 192.168.1.XXX, where XXX consists of three digits that vary from analyzer to analyzer.
d. When prompted, enter the password: **lgrvnc**.

The analyzer's software display should appear within the VNC Viewer window.

Log In

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

1 Click the **Security** button on the *Control Bar*. (Figure 15)

Click to log in

Figure 15   Control Bar Security Button

2 For initial login, use the default Linux credentials for the username and password (Figure 16), 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*
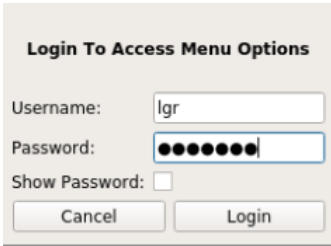>
> There is only one Linux account.

Figure 16   Login Dialog Box

3 Click **Login**.

...7   User Interface Operation

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 10 lists the default passwords.

Table 10: Default Passwords

Default Passwords	
lgr	3456789
ssh	3456789
samba	lgrsmb
vnc	lgrvnc
Wireless Key	See Figure 7
Wireless Router Admin Password	Lgr123456789

To change a user password, perform the following:
1   Click the **Security** button: The dialog box shown in Figure 17 appears.
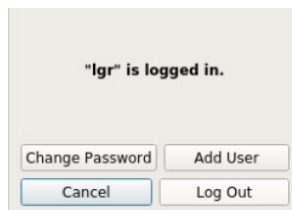

Figure 17   Security Dialog Box After Login

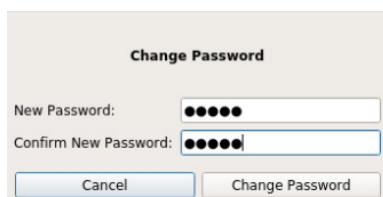**2**   Click **Change Password**: The *Change Password* dialog-box appears, as shown in Figure 18.

Figure 18   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.**

> ⚠ *NOTE*
>
> The *lgr* password is the same for SSH. If you change the lgr password, the SSH password also changes.
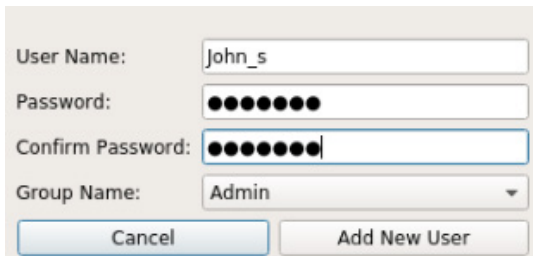
...7   User Interface Operation

Add New User

> ⚠ **NOTE**
>
> 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.

2 Click **Add User:** The *Add User* dialog box shown in Figure 19 appears.

Figure 19   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 20)
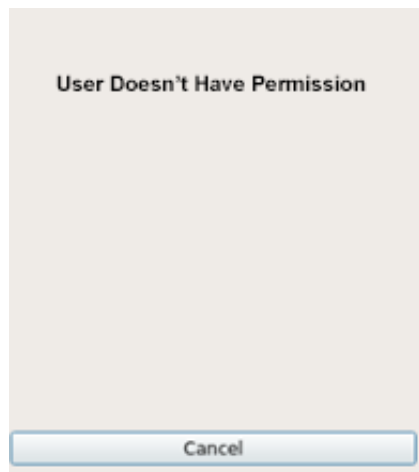

Figure 20   Permission Denied

Log Out

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

Control Bar

The *Control Bar* lets you select the type of information to display: (Figure 21)

- Display
- Rate
- Files
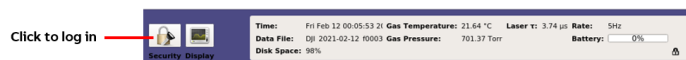- Setup
- Exit (to shut down the analyzer)

Figure 21   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.

...7   User Interface Operation

Display

In the Control Bar, the **Display** button (see Figure 21) lets you select the desired screen:
- *Numeric* (Figure 22)
- *Spectrum* (Figure 23)
- *Timechart* (Figure 24 and Figure 25)
- *Alarm Status* (Figure 26)

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 22 shows an example of numeric readout of the last measurements of CH_4, H_2O, CO_2, CH_4 (Dry), and CO_2 (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).
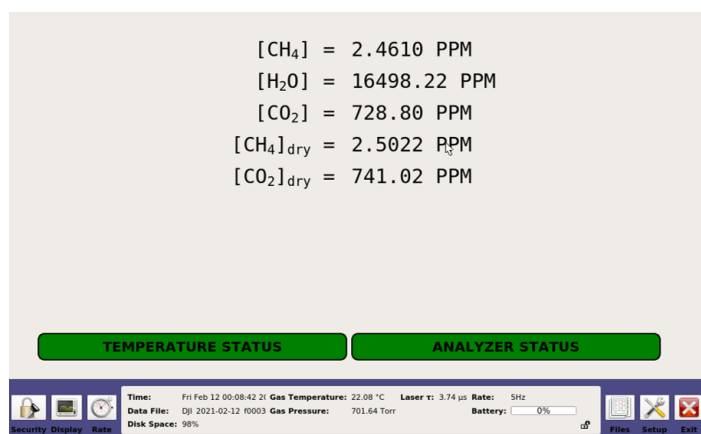

Figure 22   Numeric Display Screen

Spectrum Display

The sample *Spectrum* display provides additional information on the measured gas: the analyzer sensitivity level shown in the Transmitted Intensity diagram, the absorption level, a theoretical fit to the measured target gas(es), and the ringdown time which is indicative of whether or not the high-reflectivity mirrors require cleaning.

The *Spectrum* screen displays peaks related to different gases. The measured concentrations are shown in ppm on the bottom of the *Spectrum* display. (Figure 23)
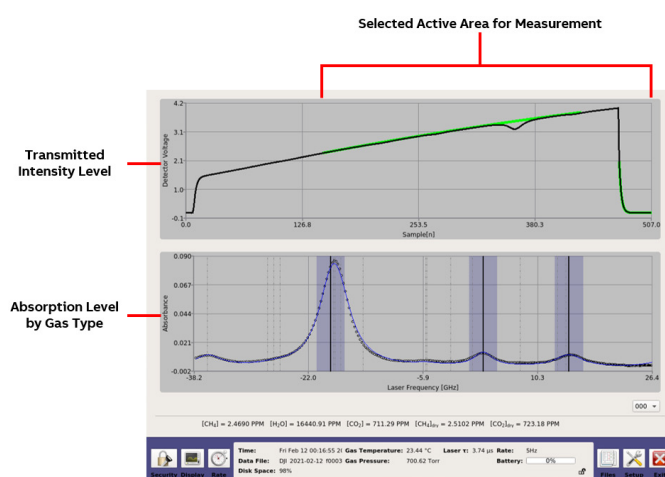

Figure 23   Spectrum Display Screen

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, OA-ICOS module mirrors, or supporting electronics board. This information is helpful when contacting ABB service about the issue.

...7   User Interface Operation

Timechart Display

The *Timechart* display (Figure 24) provides the absorption (in ppm) of the sample gas measured. The black line represents the trace of measured concentrations at a customizable interval rate.
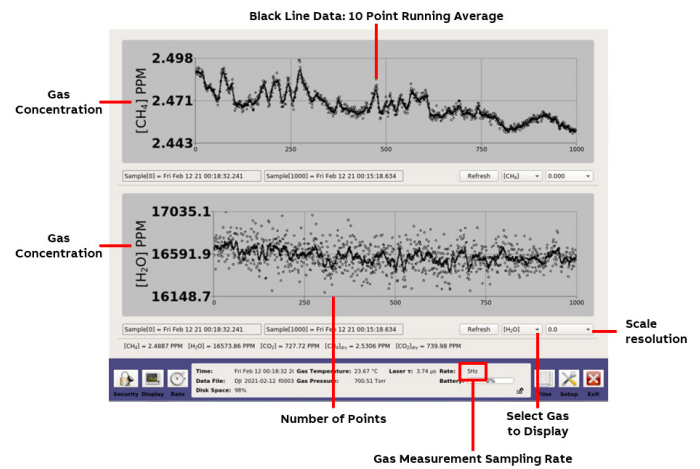

Figure 24   Spectrum Display Screen

The **Refresh** button in the *Timechart* display (Figure 25) refreshes the screen to display the sampling data with a new starting point.
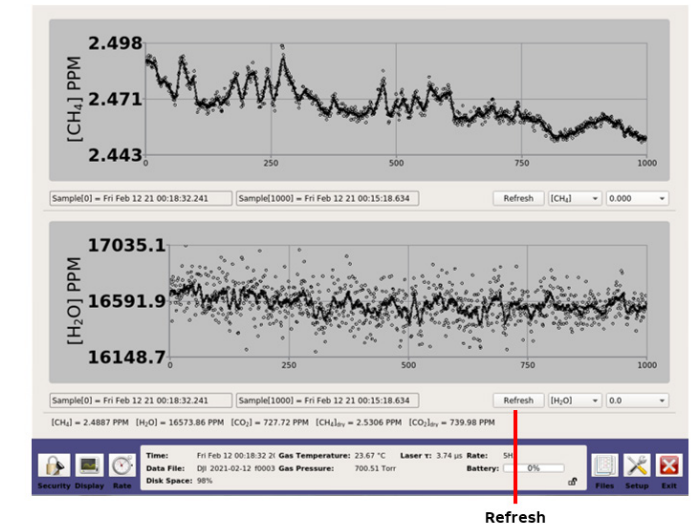

Figure 25   Timechart Refresh Display

Alarm Status Display

The *Alarm Status* display (Figure 26) 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.
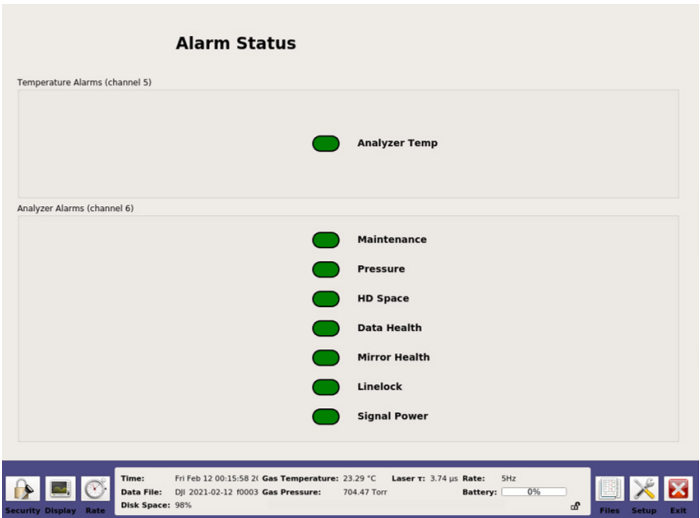

Figure 26   Alarm Status Display

...7   User Interface Operation

Table 11 describes the analyzer alarm status.

Table 11: Analyzer Alarm Status

Warning / Alarm	UI Display	Detected Problem
Alarm	Data Health	Laser 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	Mirror health has degraded; clean mirrors
Alarm	Linelock	Laser peak position is outside of control range, contact customer support
Alarm	Signal Power	Laser power has degraded, contact customer support
Alarm	Maintenance	Maintenance is needed on system now
Warning	Data Health	Laser goodness of fit is poor
Warning	Pressure	Pressure is noisy
Warning	HD Space	Disk space is low
Warning	Mirror Health	Mirror health is degrading; clean mirrors soon
Warning	Linelock	Laser peak position is outside of control range, contact customer support
Warning	Signal Power	Laser power has degraded, contact customer support
Warning	Maintenance	Maintenance is needed on system soon
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 27 displays the *Rate Control pop-up box*, which appears when the **Rate** button is clicked.

Figure 27   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 (5 Hz is the default value). 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.

...7 User Interface Operation

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: DJI_ Analyzer Serial Number_2023-12-29_f0001.txt, where the:
  – First set of characters represent the analyzer model (DJI).
  – Next set of characters represent the analyzer serial number
  – Next set of characters represent the date (yyyy-mm-dd).
  – Last set of characters give the data file name (fxxxx.txt), where xxxx is the 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 33)

Figure 28 shows a typical data file.

Figure 28   Beginning of a Typical Data File

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, an encoded list of settings used by the analyzer for that data file may be inserted. These settings are typically stored for diagnostic or troubleshooting purposes. This output is suppressed by default.

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 21) to access the *File Transfer* menu. (Figure 29)

2   Insert a USB storage device into the USB port on the side panel of the analyzer.

3   Click the **Mount USB** button. (Figure 29)
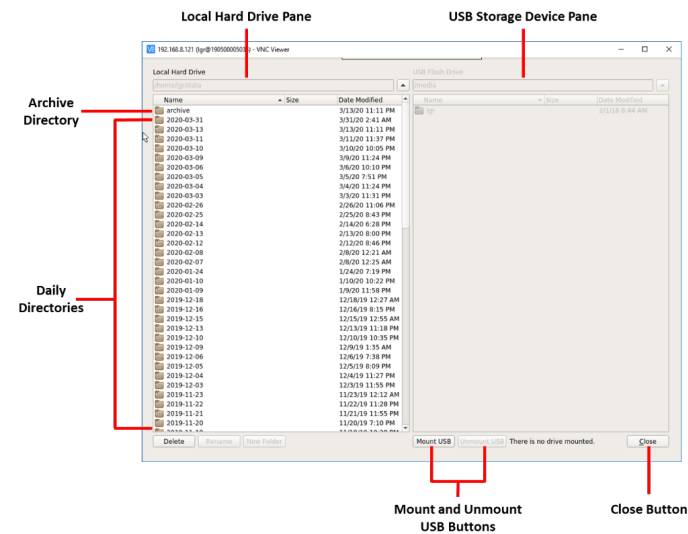
Figure 29   File Transfer Menu: Local Hard Drive (Left Pane) and USB Flash Drive (Right Pane)

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.

⚠ *NOTE*

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.

...7   User Interface Operation

> ## ⚠ *NOTE*
>
> 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 30) 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 30)

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

DJI_Analyzer Serial Number_YYYY-MM-DD_f0000.txt.zip

Examples of files in the daily directory are shown in Figure 30.
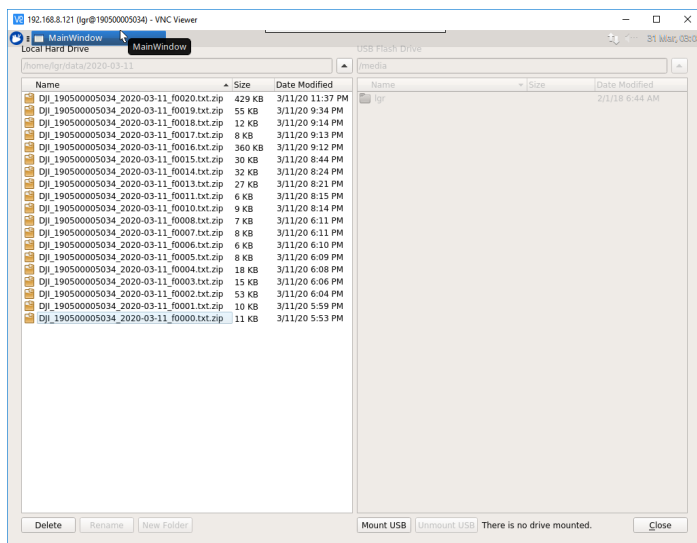
Figure 30   Daily Directory

Archive Directory

The local hard drive (Figure 29) creates an archived folder containing zipped files organized by date. (Figure 31)
To access the archived files, double-click the **Archive** folder. (Figure 29)

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 31.

Figure 31   Archive Directory

...7   User Interface Operation

File Transfer Error Screen

The *File Transfer Error* screen (Figure 32) 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 32   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. (Figure 33)
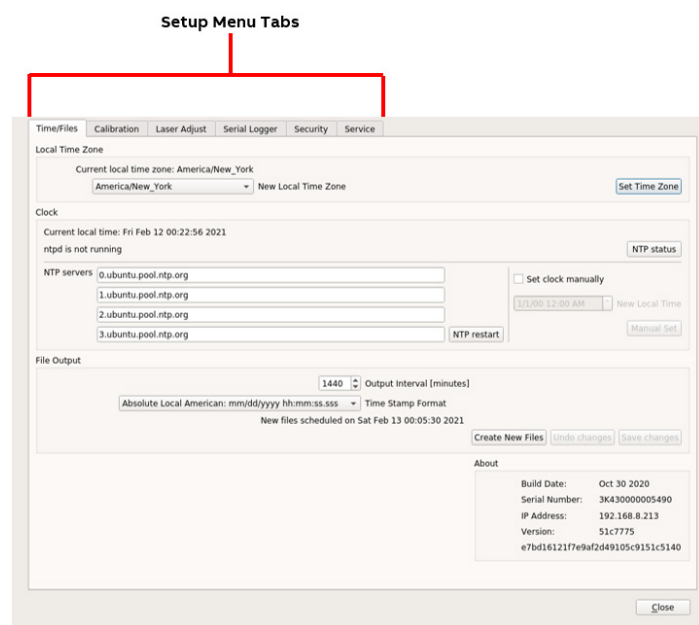
Figure 33   Setup Screen

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.
- **Serial Logger**: Change how data reported at the RS-232 ports are configured. Refer to the *Serial Logger* section in page 27.
- **Security**: Change security settings including changing passwords; adding, deleting, and assigning users; and returning the system to default settings. Refer to the *Security* section.
- **Service**: Technicians can check on the analyzer status.

Time/Files

Click the **Time/Files** tab to access the *Time/Files* menu. (Figure 34) 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.
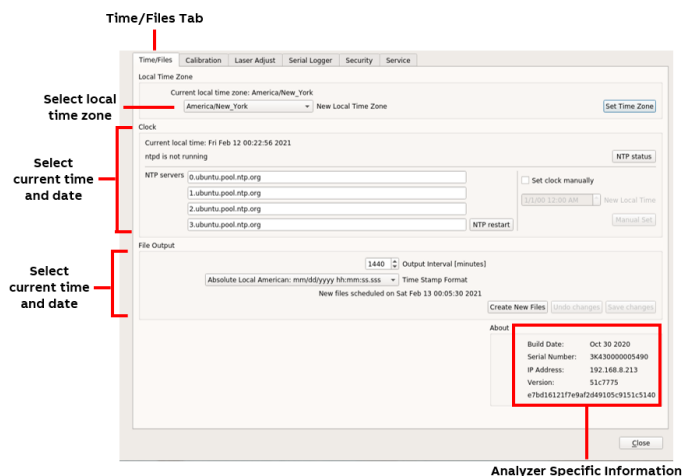
Figure 34   Time/Files Menu

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 12.

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

...7   User Interface Operation

Table 12: 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. 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

To perform a gas calibration, connect the traceable, regulated bottle gas to the analyzer gas-inlet (see Figure 6).

1   Click **Setup**, then the **Calibration** tab (Figure 35).

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.

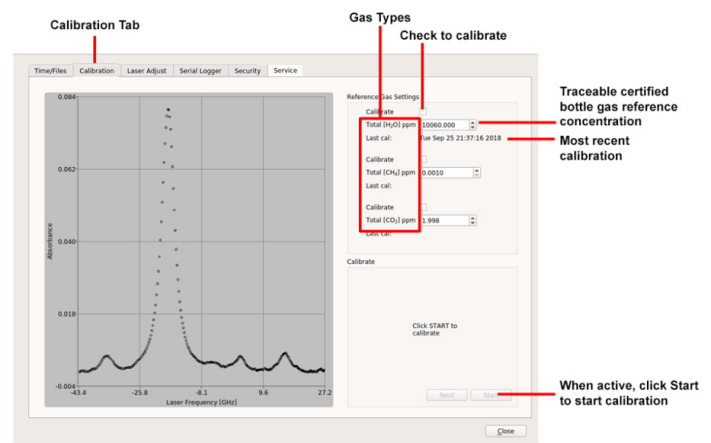7   Click **Close** to exit the *Calibration* screen.

Figure 35   Calibration Tab

...7 User Interface Operation

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 36)
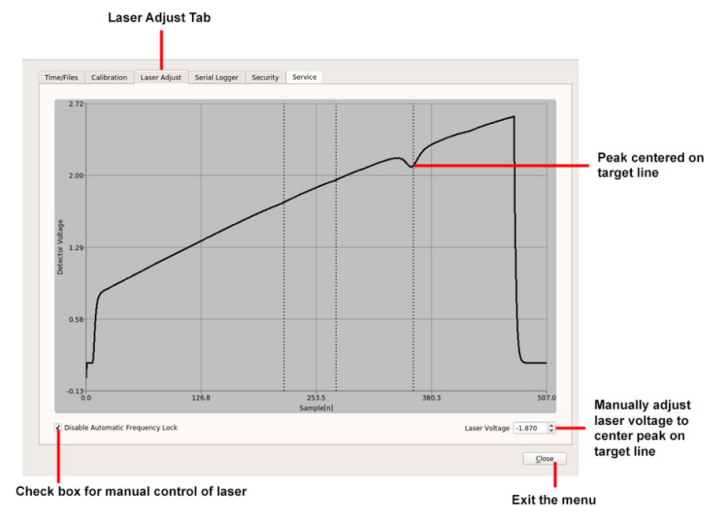

Figure 36   Laser Voltage Adjust

Laser adjustment may be required for the following reasons:
- The laser wavelength has drifted beyond the target range of the analyzer.
- The analyzer is operating outside the recommended temperature range.

The *Laser Adjust* screen displays the current gas-sample measurement intensity profile and the corresponding absorption frequency by dips in the profile. The vertical, dotted lines in the same profile screen are the expected target absorption line. When the absorption line is locked to the dip minimum, it is referred to as *Linelock*. If the line and the dip minimum are not aligned, the laser wavelength should be shifted to have the bottom of the profile dip to center on the dotted line, the theoretical target. To achieve this, adjust the voltage driving the laser temperature to move the laser to the operating wavelength.

To manually adjust the laser wavelength:

1   Click the **Setup** button on the *Control Bar.* (Figure 21)

2   Select the **Laser Adjust** tab at the top of the screen. (Figure 36)

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   De-select the **Disable Laser Frequency Lock** checkbox. The software resumes automatic tracking and control of the laser wavelength.

6   Click **Close** to exit the menu and return to the *Main panel*.

Figure 36 shows the laser voltage adjusted so that the absorption peak is centered on the target line.

Service

ABB-trained field service engineers monitor the performance of the analyzer via the *Service* screen. (Figure 37)

- 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.
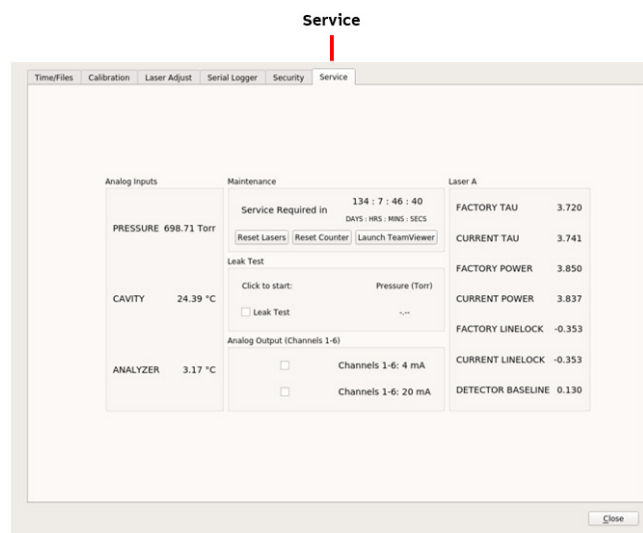

Figure 37   Service Screen

...7   User Interface Operation

Serial Logger

Click the **Serial Logger** tab to access the *Serial Logger* menu. Here, you can change how data reported at the RS-232 ports are configured. (Figure 38)
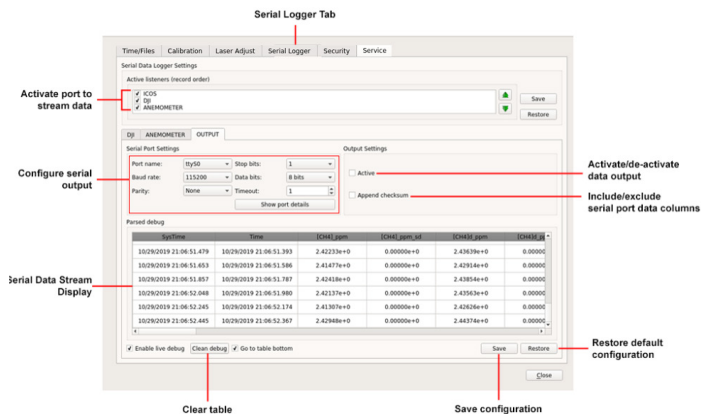

Figure 38   Serial Logger Menu

> ⚠ *NOTE*
>
> 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 **DJI** (or **MAVLINK**). Check the adjacent box to activate the port; uncheck to de-activate.

Serial Port Settings

Use the **DJI** (or **MAVLINK**), **ANEMOMETER**, and **OUTPUT** tabs to configure the selected serial port(s) that stream data. Figure 38 shows the *Serial Logger* menu with the **OUTPUT** tab selected.

> ⚠ *NOTE*
>
> 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.

...7   User Interface Operation

Security

Click **Setup** on the *Control Bar* (Figure 21), then click the **Security** tab to access the *Security* screen. (Figure 39) 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.
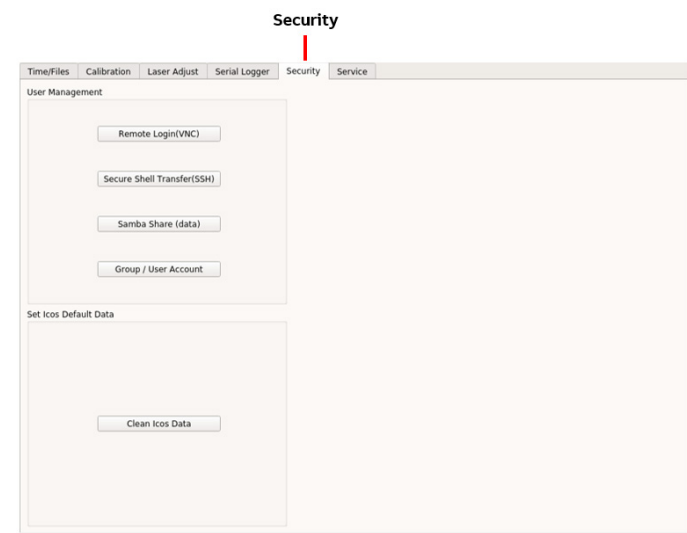
Figure 39   Security Screen

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 (Figure 33), click the **Security** tab.

2   Click **Remote Login (VNC)**: The dialog box shown in Figure 40 appears. Click **Enable**.

> ⚠ ***NOTE***
>
> The VNC server is disabled by default because transfer via VNC is not secured. However, authentication credentials are sent securely.
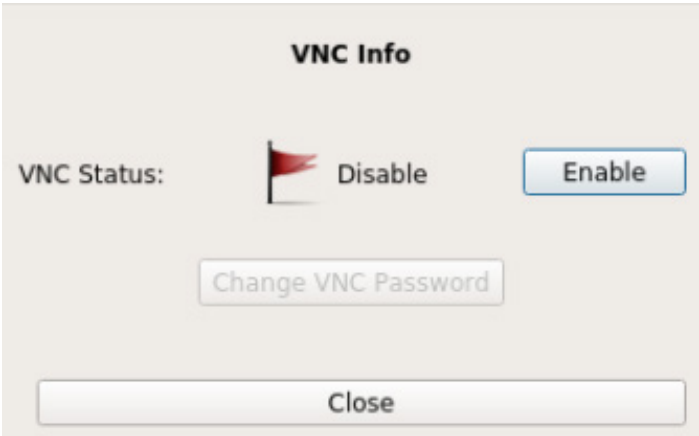
Figure 40   Remote VNC Login

3   A message appears stating the connection to the VNC Server will not be encrypted, as shown in Figure 41.
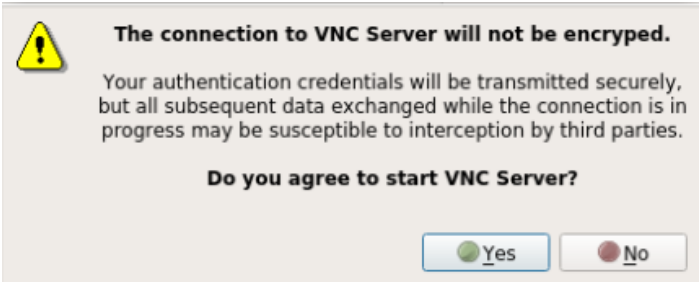
Figure 41   VNC Server Warning Message

...7   User Interface Operation

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. Click **Change VNC Password**: (Figure 42)
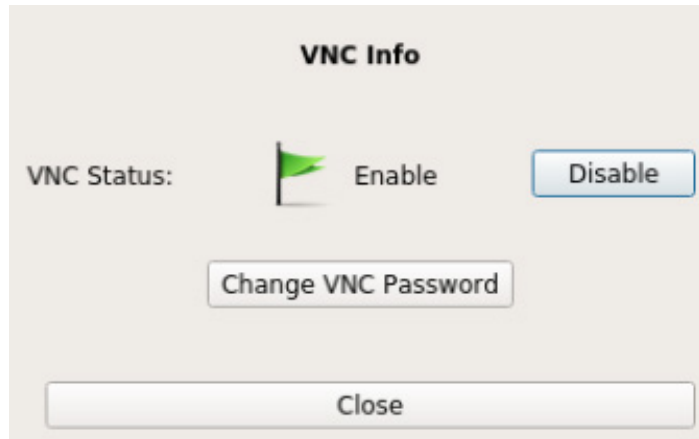
Figure 42   VNC Server Enabled

5 The *Change VNC Password* dialog-box appears. (Figure 43)
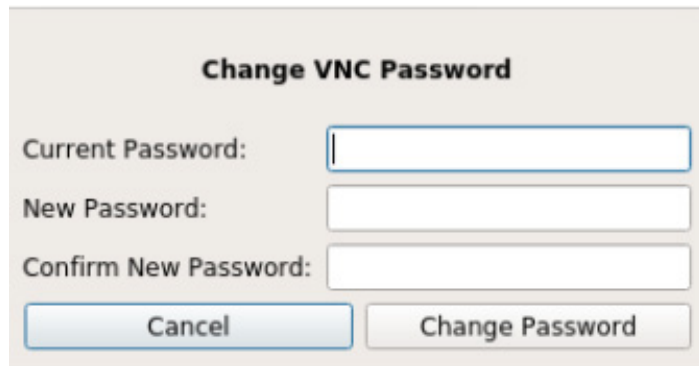
Figure 43   Change VNC Password Dialog-Box

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 (Figure 33), click the **Security** tab.

2 Click **Secure Shell Transfer (SSH)**. (Figure 39) The *Change SSH Password* dialog-box appears. (Figure 44)

Figure 44   Change SSH Password Dialog-Box

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

⚠ *NOTE*

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**.

...7   User Interface Operation

Change Samba Share Password

To change the Samba Share password, perform the following:

1 From the *Setup* screen (Figure 33), click the **Security** tab.

2 Click **Samba Share (data)**. (Figure 39) The *Change Samba Password* dialog-box appears. (Figure 45)

Figure 45   Change Samba Password Dialog-Box

3 Enter the **lgr Password**. (The default lgr 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, **lgr**, which cannot be deleted. Refer to Table 13 for user level access.

Table 13: 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)	✔	🔒	🔒

✔	Changeable
🔒	Read Only
✘	Not Accessible

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.

...7   User Interface Operation

Add User

To add a user, perform the following:

> ⚠ *NOTE*
>
> Only users belonging to the Admin and Service groups can add new users.

1 From the *Setup* screen (Figure 33), click the **Security** tab.

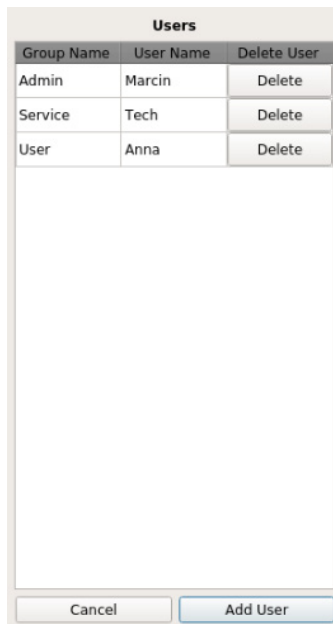**2** Click **Group/User Account**. (Figure 39)   The *Users* dialog-box appears. (Figure 46)

Figure 46   Group/User Dialog-Box

3 Click **Add User**: The *Add User* dialog box 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 appears, and you must cancel the action.

Delete User

To delete a user, perform the following:

> ⚠ *NOTE*
>
> Only users belonging to the Admin and Service groups can delete users.

1 From the *Setup* screen (Figure 33), click the **Security** tab.

2 Click **Group/User Account**. (Figure 39) The *Users* dialog box 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 appears, and you must cancel the action.

...7   User Interface Operation

Set OA-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 OA-ICOS default settings, perform the following:

1 From the *Setup* screen, click the **Security** tab.

2 Click **Clear Icos Data**: The *Clear Icos Data* dialog-box shown in Figure 47 will appear.
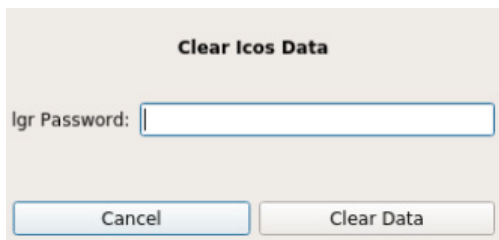
Figure 47   Clear Icos Data Dialog-Box

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 48 appears.

Figure 48   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*. (Figure 21) When the dialog box appears with the question, Do you wish to *shutdown*?, click **OK**. (Figure 49)

Figure 49   Shutdown Dialog-Box

8   Service

> ## ⚠ WARNING!
>
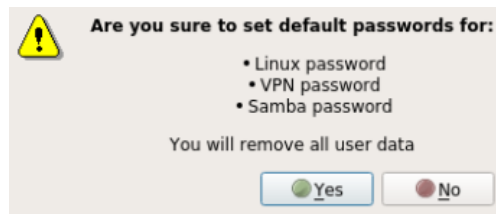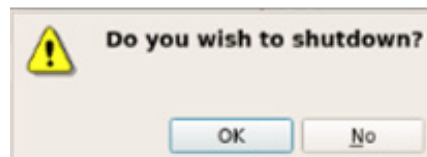> Only authorized persons may open the analyzer cover or perform internal maintenance. Contact ABB for maintenance instructions and maintenance kits. Make sure the analyzer is unplugged before working with the internal components. Failure to do so may result in damage to the analyzer and exposure to hazardous radiation.

Cleaning the Analyzer

There is no preventive maintenance to perform on the analyzer apart from the occasional clean-up of the casing.

Cleaning the Instrument Exterior Casing

To clean the exterior casing, wipe it with a damp cloth.

Preventive Maintenance

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

The analyzer 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 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.

Daily Operation Checklist

Table 14 describes routine maintenance tasks that keep your analyzer operating smoothly.

Table 14: Maintenance Checklist

Frequency	Task
	On the *Spectrum* display, verify that the spectrum is correct. The spectrum should appear as shown in Figure 23.
Every 1-2 days	• 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 Spectrum 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 36)

Recommended Maintenance

The recommended maintenance steps, when health metrics suggest maintenance is needed, are:
- OA-ICOS mirror cleaning
- Inline particulate filter replacement
- Solid-state drive (SSD) disk space

…8   Service

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.

⚠ 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.

Periodically note the ringdown time. Since a significant reduction in ringdown time can occur:

- It is recommended that a mirror cleaning kit (MTN-CLEAN-1V) be kept on hand to minimize analyzer downtime.
- If further maintenance is required, contact ABB 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 for details), and/or when the gas pressure reading on the *Control Bar* increases. (Figure 50)
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*, the current amount of available disk space is displayed.

Current hard-drive space available

Figure 50   Current Disk Space Available

Fuse Replacement

If one of the fuses blows or is otherwise damaged, the analyzer automatically turns off. There is one fuse in the analyzer: 5 A fuse for the DC power input. This fuse is available at auto parts stores: input fuse, automotive, 5 A 32 V DC blade, ATO/ATC, color – tan

Figure 51   5 A Fuse

To replace a fuse:
1 Power down the analyzer.

2 If connected, disconnect the analyzer inlet gas line, using push-connect.

3 Disconnect the analyzer power plug.

4 Move the analyzer to a flat surface.

5 Open the case by removing the 14 screws using a ³⁄₃₂ inch Allen wrench, then removing the cover, to expose its internal components.
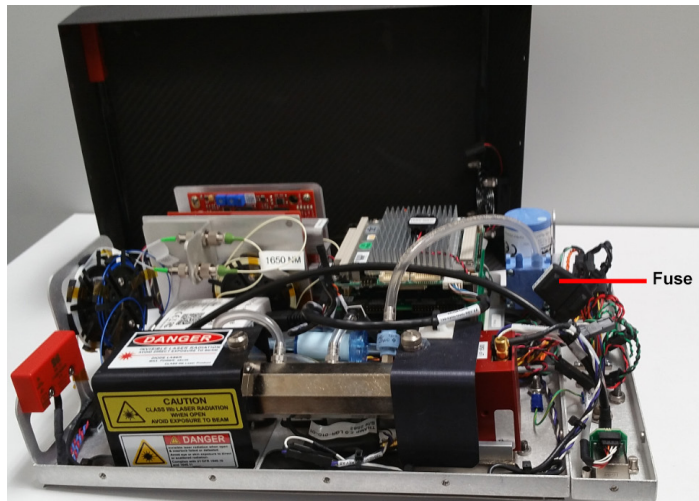
6 Locate the fuse. (Figure 52)

Figure 52   Analyzer Fuse Location

7 Remove the fuse from the fuse fixture: Pull the cover off, then slide the fuse out. Figure 53 shows the fuse with the cover removed.
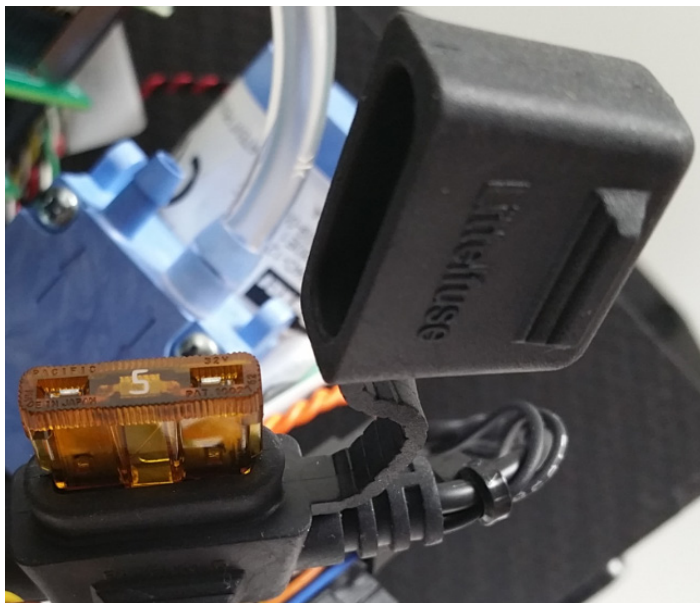

Figure 53   Fuse with Fuse Cover Removed

8 Insert the new fuse into the fuse holder, then attach the fuse cover.

9 Place the cover on the analyzer.

10 Install the 14 screws using Loctite 243 and a $\frac{3}{32}$ inch Allen wrench.

11 Move the analyzer back to the original location.

12 Re-connect the analyzer power plug.

> ### ⚠ NOTE
> Use Threadlocker Loctite 243 for the screws used to attach the shroud to the baseplate.

Analyzer Cover Maintenance

The shroud is designed to minimize the weight of the analyzer cover, while also protecting the analyzer components and eliminating external light sources from entering the optical path. If gaps occur at the shroud seams, they should be re-sealed with an opaque epoxy. If more significant issues occur with the shroud, please contact ABB service.

Appendix A   Spare Parts and Kits

Mirror Cleaning Kit

• Part number: MTN-CLEAN-1V

Spare Parts Kits

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

Spare Filters

• Part number: SPA-MICRO
   – Includes: replacement filters

Spare Analyzer Shroud

• Part number: SPA-133-SHROUD
• Includes: shroud, fan assembly, and necessary screws

Spare Router

• Part number: SPA-133-ROUTER
• Includes: router and cable extending to analyzer panel

Appendix B   Packaging and Shipping the Analyzer

1   Obtain and print an RMA form from ABB (email icos.support@ca.abb.com).

2   Disconnect all connections from the analyzer. Return the external antenna with the analyzer.

3   Cover the gas inlet.

4   Carefully place the analyzer in the plastic bag, then tape the bag shut to protect the analyzer from dust and other particulate matter during shipping. Place the external antenna in a small plastic bag and tape to the analyzer plastic bag.

5   The foam packaging material may be notched in specific places to account for protrusions. Place the appropriate half of the foam insert into the bottom of the box.

6   Place the analyzer in the box.

7   Place the top foam insert into the box.

8   Tape the box shut using packing tape. It is advised to tape along all three edges of the top flaps on the box.

9   Tape the RMA form to the outside of the box.

10 Ship to:

ABB Inc.
Measurement and Analytics
Att: Service Department

3400, rue Pierre-Ardouin
Quebec, (Quebec) G1P 0B2
Canada

—
ABB Inc.
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