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Instruction Manual

BactoLink

Connectivity Module

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1 General user information

1.1 Intended Use

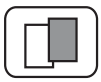
BactoLink is intended to function alongside BactoSense and BactoSense Multi by establishing a remote connection between the instrument and your PC. This connection is initiated through the BactoHub portal using HTTPS and your web browser. The BactoHub portal serves as the access point for BactoLink and the associated BactoSense devices. It's important to note that the connection to your instrument remains active for 30 minutes and must be re-established after this period.

1.2 Pictograms

All pictograms used in this document are explained below:

Additional information about the current topic.

Practical procedures when working with the BactoSense.



The screenshot is an example and may differ from the current device.

1.3 Overview BactoLink

BactoLink consists of an antenna, an ethernet cable and a Power-over-Ethernet (PoE) injector. The PoE injector is connected to the Power Supply of the BactoSense (Multi).

1.3.1 Prerequisites

Before using BactoLink, ensure the following prerequisites are met:
The instrument has at least Software Version 2.2 or above.
DHCP and HTTPS must be activated within the Instrument settings.
Optionally, if GUI relay is required activate VNC in the instrument settings.
Ensure that you have access to an account at hub.bnovate.com. If a new account is required you can request one at support@bnovate.com.

1.3.2 Power-over-Ethernet (PoE) Injector

The PoE-Injector delivers power to the antenna through an Ethernet connection. Both the Ethernet cable connection and the power connection to the BactoSense (Multi) are permanently integrated into this device. It includes a port for the power cable provided with the BactoSense (Multi) Power Supply unit. The final connection involves linking the Ethernet to the antenna. For comprehensive installation guidelines, please consult the “Installation” chapter.

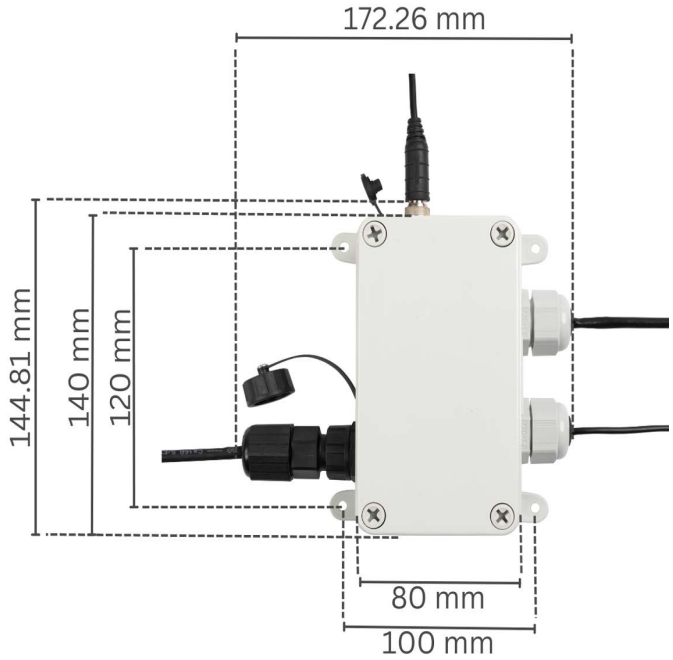


Figure 1-1Dimensions of the PoE injector. PoE injector height is 65.5 mm from feet to the top.

1.3.2.1 Mechanical Specifications

Table 1-1 Mechanical Specifications of the PoE injector

Materials	Polycarbonate (PC)
Connector	RJ45, Power Connector
Protection	IP67
Dimensions	165 x 165 x 54 mm (LxHxW)
Operating Temperature	5°C to 30°C

1.3.3 Antenna

The antenna is connected to the PoE Injector via an Ethernet cable. The antenna houses the SIM card for mobile connections (4G/LTE, 3G, 2G) to the BactoSense (Multi).
Information on the mountain bracket can be found in chapter “Mounting BactoLink”.

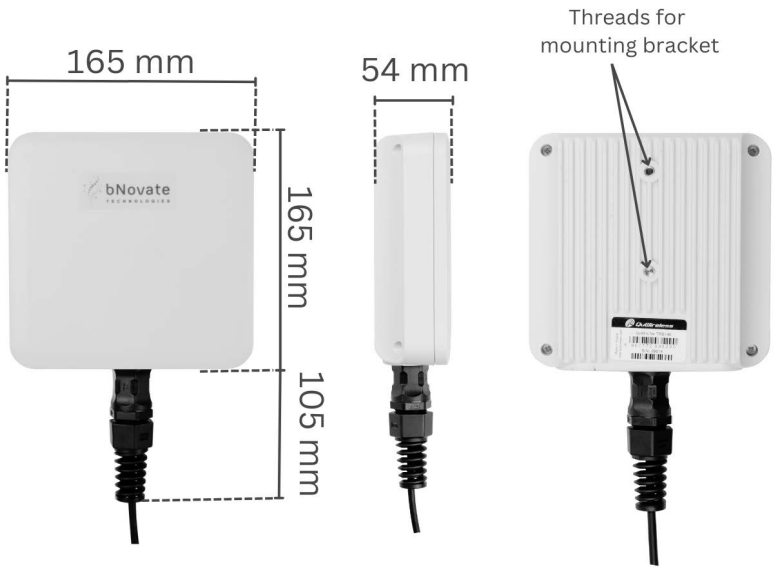


Figure 1-2Perspectives and dimensions of the antenna

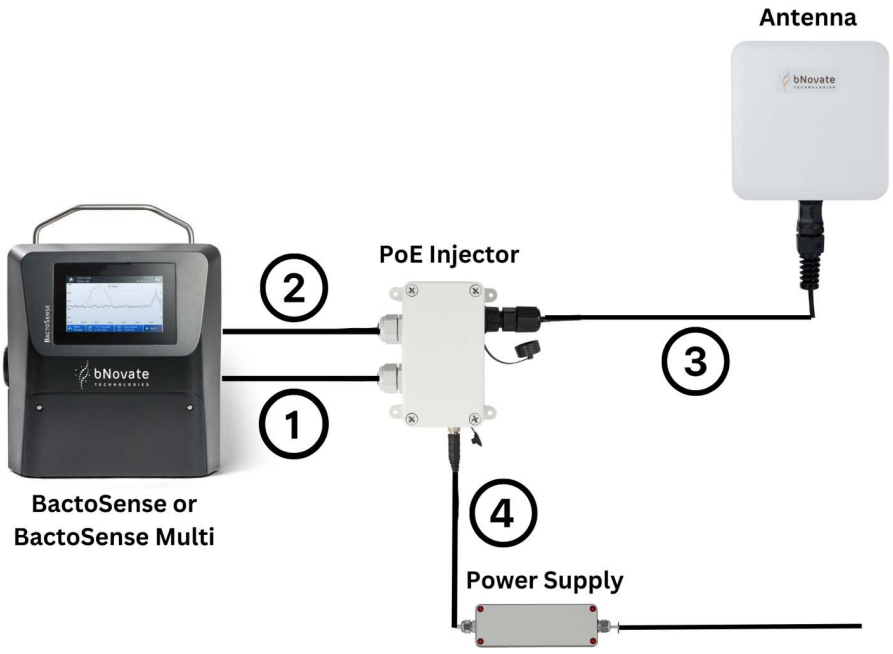
1.3.3.1 Mechanical Specifications

Table 1-2 Mechanical Specifications of the antenna

Materials	ABS, PC, FR4
Connector	RJ45
Protection	IP67
Dimensions	165 x 165 x 54 mm (LxHxW)
Weight	0.8 kg
Operating Temperature	-40°C to 80°C

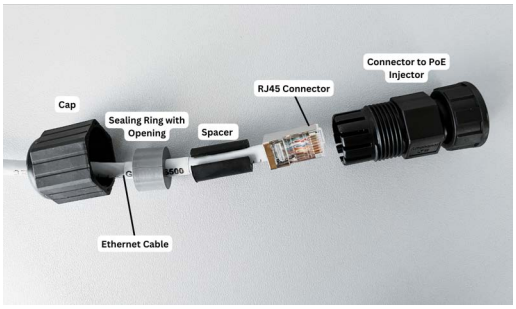
2 Installation

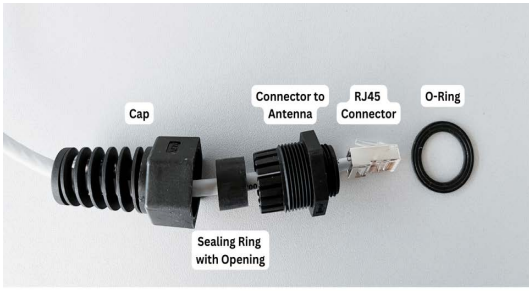
2.1 Instrument Connections



①	Ethernet connection between PoE-Injector and RJ45 port of BactoSense (Multi)
②	Power connection between PoE-Injector and power port of BactoSense (Multi)
③	Ethernet connection between PoE-Injector and antenna
④	Power supply to PoE-Injector. Note: The power supply is delivered with BactoSense, not with BactoLink.

2.2 Connection of Antenna and PoE-Injector

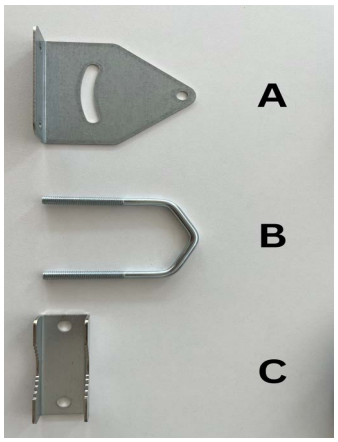
	WORK STEP	ADDITIONAL INFO / IMAGE
1.	Open the bag that contains the ethernet cable	
2.	Open the bag that holds the PoE injector. Inside, there should be a second bag containing a connector. Proceed to open this second bag. It should contain the following parts: • Cap • Sealing ring with opening • Spacer • Connector to PoE Injector Line them up on the ethernet cable like shown to the right.	
3.	• Guide the RJ45 connector into the connector of the PoE injector. Both connectors allow for only one orientation. • Push the RJ45 connector as far to the front as possible. Push the spacer and sealing ring into the connector to PoE injector. • Screw the Cap on the Connector, gently pushing all the parts on the ethernet cable together. • Screw until hand-tight. • The resulting fitting is a bayonet fitting to the PoE injector	
4.	Take the other side of the ethernet cable and align it in front of you.	
5.	In the package that contains the antenna there should be the following parts: • Antenna Connector • O-ring	

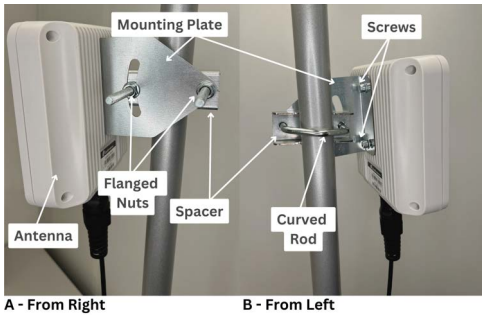
	WORK STEP	ADDITIONAL INFO / IMAGE
6.	Unscrew the connector and push the sealing ring out. The curved rod from chapter "Mounting BactoLink" may be used to do this, if this proves hard to do.	
7.	Align the parts of the antenna connector on the ethernet cable like shown on the picture on the right. ⚠ Note: The critical sequence involves connecting the RJ45 connector to the antenna first, securing the connector to the antenna, and finally, mounting the cap to prevent the cable from being locked beneath the seal.	
8.	Push the RJ45 connector lightly into the connector to the antenna. See that the little stub on the RJ45 is within the antenna.	
9.	Push the sealing ring into the connector to the antenna.	

	WORK STEP	ADDITIONAL INFO / IMAGE
10.	Put the O-ring on the connector to the antenna and connect the RJ45 connector.	
11.	Screw the connector to the antenna in the antenna.	
12.	Screw the cap on the connector to the antenna. The final assembly should look like the picture to the right.	

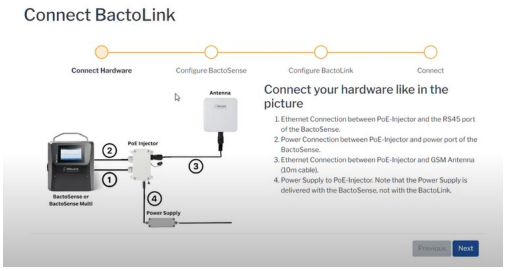
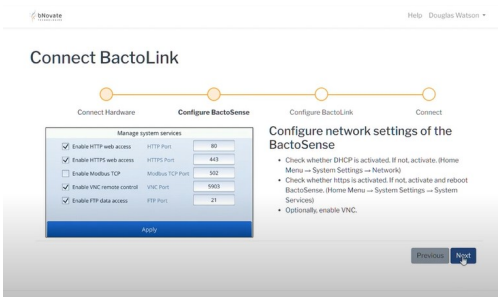
2.3 Mounting BactoLink

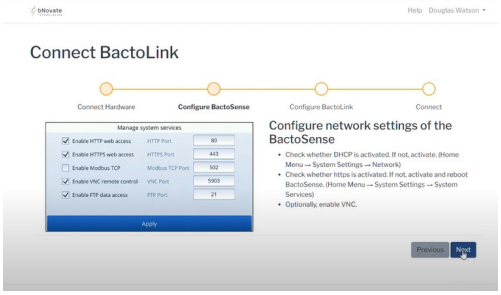
BactoLink includes a mounting set for connecting the antenna to cylinder or square-shaped objects, pipes or rods.

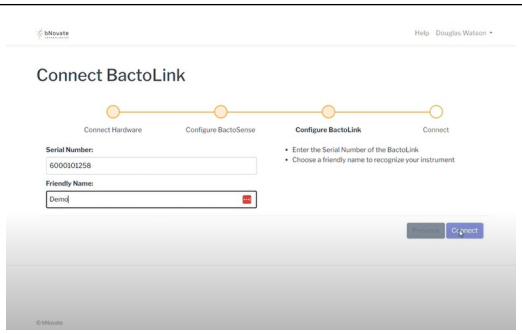
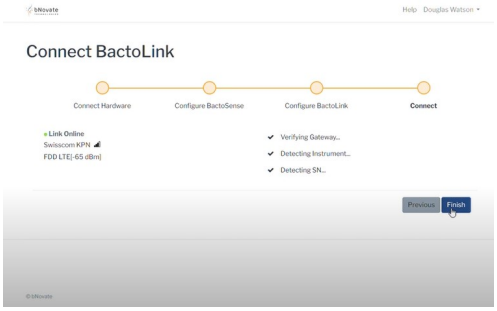
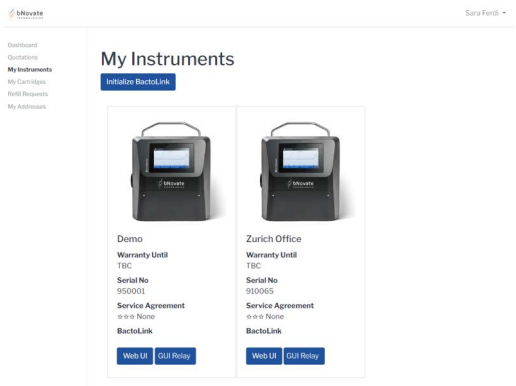
	WORK STEP	ADDITIONAL INFO / IMAGE
1.	Open the package containing the antenna for the BactoLink. Inside, you will find a mounting bracket and the necessary components for assembly.	
2.	Take out the mounting bracket. It consists of three essential parts: A. Mounting Plate: This is a flat piece of metal designed to be attached to the BactoLink. B. Curved Rod: A bent rod holds the BactoLink in place. C. Spacer: A small component maintaining the distance between the curved rod and the mounting plate.	
3.	Locate the two screws with washers provided in the antenna package. These will be used to secure the mounting plate to the BactoLink.	
4.	Position the mounting plate on your BactoLink. Insert the screws through the holes in the mounting plate and then into the corresponding holes on the BactoLink. Ensure that the washers are placed between the screw heads and the mounting plate. Using an Allen key (5 mm), tighten the screws until the mounting plate is securely attached to the BactoLink.	

	WORK STEP	ADDITIONAL INFO / IMAGE
5.	Locate the two flanged nuts provided in the antenna package. These will be used to secure the spacer and curved rod to the mounting plate.	
6.	Now, the curved rod and spacer will be attached to the mounting plate. Position the curved rod and spacer onto the mounting plate in the desired orientation.	 A - From Right B - From Left
7.	Insert two flanged nuts onto the threaded end of the curved rod. Hand tighten or use an Allen wrench (13 mm) until no movement of the flanged nuts is possible, and the BactoLink is securely attached.	

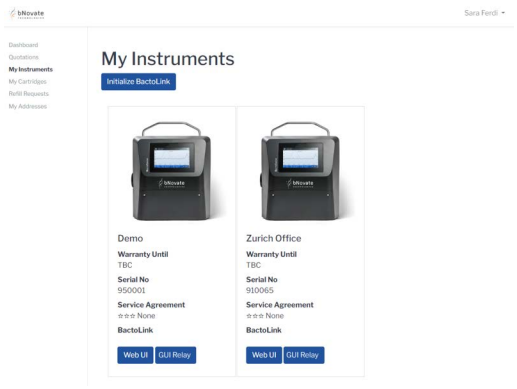
2.4 First installation of BactoLink

	WORK STEP	ADDITIONAL INFO / IMAGE
1.	Check whether the instrument is running on Software Version 2.2 or higher and upgrade if necessary. If you need a software upgrade contact support@bnovate.com.	
2.	To connect to the BactoHub, scan the 2D barcode on the backside of the antenna (picture to the right is exemplary) and enter your BactoHub credentials, composed of the username and password you chose earlier for BactoHub. If you do not have a BactoHub account, contact support@bnovate.com.	
3.	Power off the instrument and connect the devices like described in Chapters 2.1and 2.2	
4.	Power on the device.	
5.	Ensure DHCP is activated. If not activate it. (Home Menu > System Settings > Network) Do not power cycle the instrument immediately.	

	WORK STEP	ADDITIONAL INFO / IMAGE
6.	Ensure HTTPS for access to WebUI is activated and assigned to port 443. If not, activate and reboot BactoSense. (Home Menu > System Settings > System Services) ⚠ HTTPS is necessary for BactoLink to function. Power cycle the instrument or perform optionally step 7.	
7.	If GUI relay (remote desktop) is needed, ensure VNC is activated and assigned to port 5900. (Home Menu > System Settings > System Services) ⚠ Be aware that with GUI relay your actions on the screen are visible to others, either standing in front of the instrument or remotely connected. Confidential information might be shared. Power cycle the instrument.	

	WORK STEP	ADDITIONAL INFO / IMAGE
8.	Configure BactoLink via the BactoLink serial number and a user-friendly name. Click on “Connect”.	
9.	Wait until the instrument is connected, then click on “Finish”.	
10.	The instrument with BactoLink will appear in BactoHub in your instrument list as shown on the right. Two connection possibilities are given: WebUI and GUI relay. Once the connection is established, the window will open in a separate tab. The connection will be valid for 30 min. If this time frame is exceeded, a new connection will need to be made.	

2.5 Reconfiguration of BactoHub

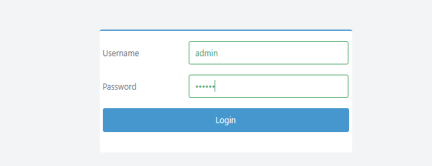
	WORK STEP	ADDITIONAL INFO / IMAGE
1.	Reconfigure BactoLink by clicking on the button “Initialize BactoLink” below the “My Instruments” header. Enter the necessary data: Instrument s/n and user friendly name. Press continue.	
2.	Finish the steps 2-9 from chapter 2.4. You can now access your devices through WebUI and GUI relay.	

3 Remote Connections

There are two connection possibilities: WebUI and the remote desktop of the GUI relay, which are described in the following chapters.

3.1 Web User Interface (WebUI)

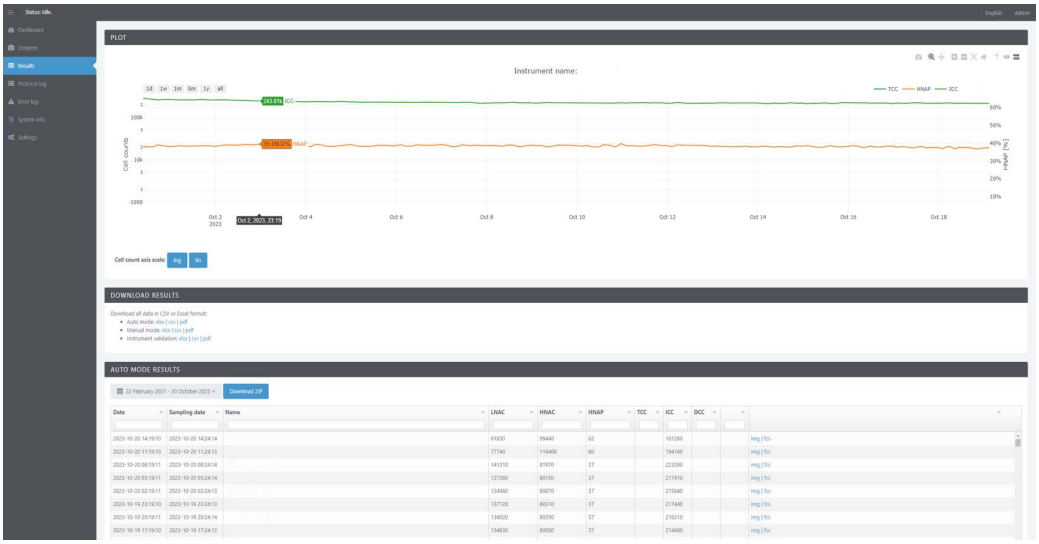
The Web User Interface allows access to data on BactoSense (Multi) via the RJ45 port. Clicking on the WebUI button in the BactoHub establishes the connection via BactoLink. If you reboot BactoSense through the Web User Interface, you need to reload your web page as well.



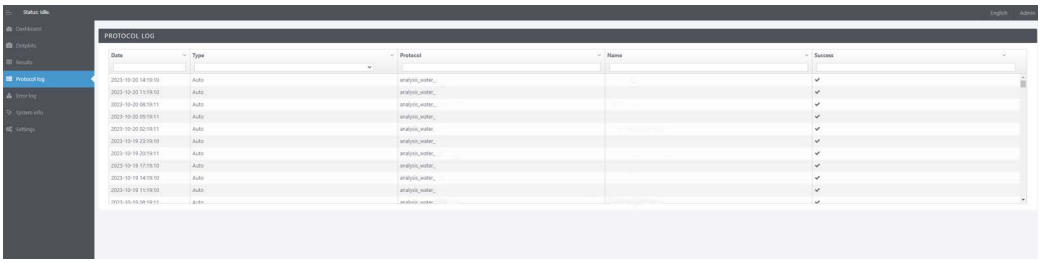
Password	Enter the credentials when prompted (Username - Basic, Advanced, Admin, or Service - and the respective chosen BactoSense device password).

Dashboard	Provides an overview of the latest measurement results, instrument status and Warnings if a Cartridge is expired.

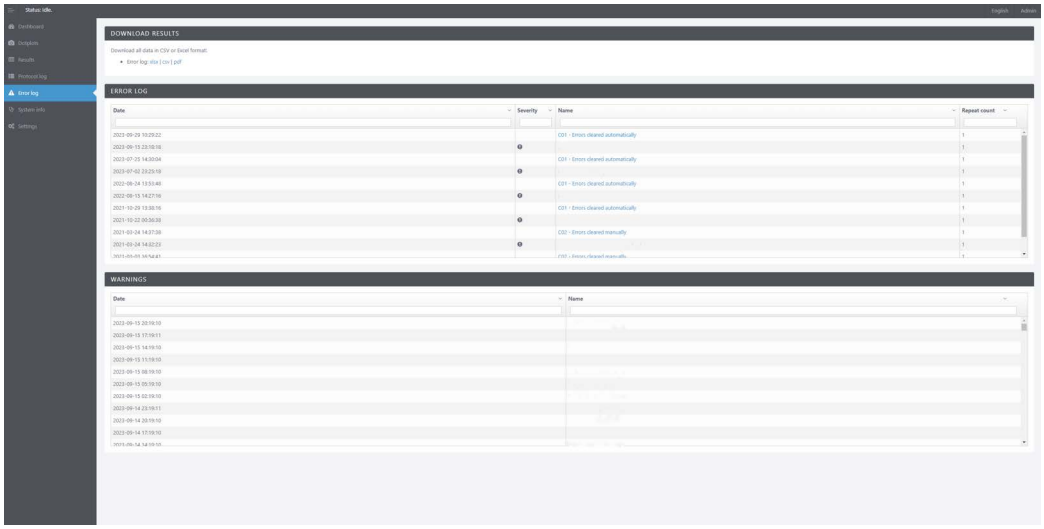
Dotplots	Showcasing a video using recent measurements. It's important to note that loading may require some time, depending on the connection. Therefore, it's advisable to initially set the animation speed to 1. Once the images are fully loaded, higher animation speeds can be used. Additionally, this setup should offer download options in both GIF and FCS formats.



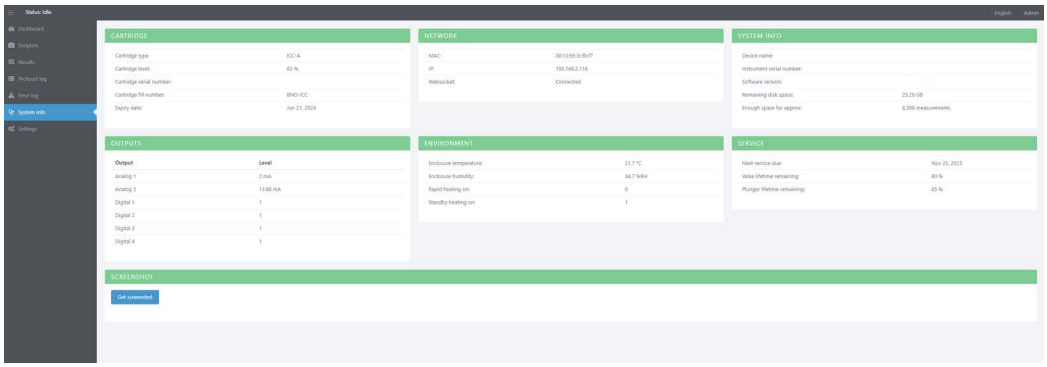
Results	Shows a plot of measurements over time and provides download options. Below the plot download areas are located for auto mode, manual mode and instrument validation. Additionally, the results of auto mode & manual mode are listed at the bottom of the page. In this overview you can see the results in table format, download cumulative ZIP files and the IMG and FCS files from each measurement. For BactoSense Multi, only the Manual Mode is displayed and no plot of the measurements over time will be shown.



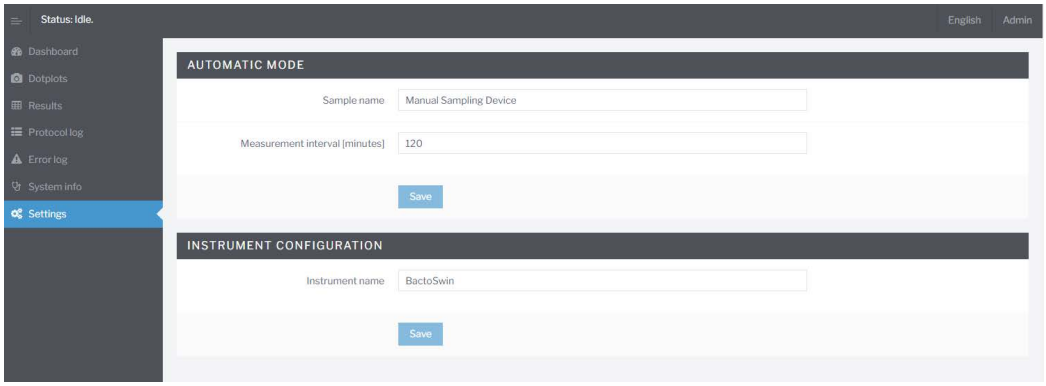
Protocol Log	Offers an overview of run protocols and error messages. A CSV file containing the respective data can be downloaded.



Error Log	Lists all errors and warnings, which can be downloaded as XLSX, CSV or PDF.



System Info	Provides general system information and allows taking screenshots.



Settings	Allows changing sample names, measurement intervals, and the instrument name. Not available for BactoSense Multi.

3.2 Graphical User Interface Relay (GUI relay)

The remote desktop of the GUI relay allows you to access the device as if you were physically present.

Figure 3-1 Exemplary picture of the remote desktop of the GUI relay

CAUTION!

Be aware that your actions on the screen are visible to others, either standing in front of the instrument or remotely connected. Confidential information might be shared.

4 Troubleshooting

If BactoSense (Multi) was turned off during installation, BactoLink should work immediately. If issues persist:

1. BactoLink must be fully powered on before BactoSense is powered on to establish the connection from BactoSense to BactoLink. Allow at least 3 minutes for the instrument to establish a network connection.
2. Check mobile network connectivity at your location using your cell phone.
3. If no connection can be made, disconnect and reconnect the antenna from the PoE injector to power cycle the antenna.
4. Inspect all connections on the PoE injector and connected instruments.
5. If issues persist, power cycle BactoSense.

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