Document Information

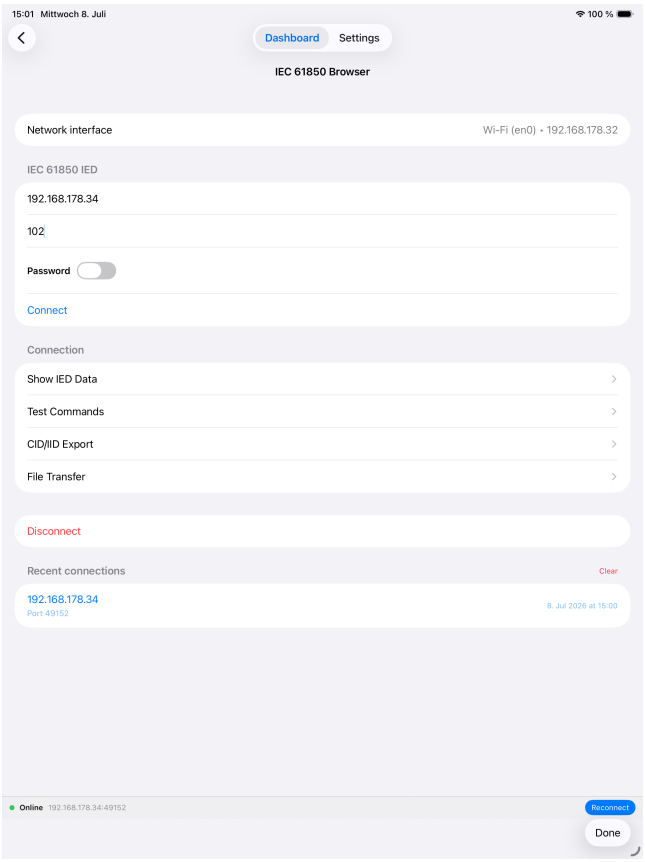
Item	Description
Document	IEC61850Browser User Manual
App Version	1.2.27
Document Version	1.0
Release Date	July 2026
Language	English (US)

IEC61850Browser

Mobile Engineering for IEC 61850®
Diagnostics • Signal Monitoring • Event Logging • Test Commands

CID/IID Export • File Transfer • Time Server

User Manual – Version 1.2.27



Home screen after a successful connection

Mobile diagnostics, signal monitoring, control command testing, and file access for IEC 61850 IEDs

Scope This user manual describes only the functions available in IEC61850Browser Version 1.2.27.

Table of Contents

This manual provides a step-by-step guide through all available features of the application.

1 About This Manual

IEC61850Browser is a native engineering application for iPhone and iPad specifically designed for mobile use in protection engineering and substation automation. The application provides direct access to IEC 61850 compliant Intelligent Electronic Devices (IEDs) and supports commissioning, maintenance, diagnostics, as well as authorized testing and control operations directly in the field.

This manual is intended for engineers, commissioning specialists, service personnel, maintenance technicians, and protection & automation professionals working with IEC 61850 based systems. A basic understanding of IEC 61850 communication is recommended.

The application is designed for practical use in substations, test environments, and industrial installations. After a successful connection has been established, the IED data model is automatically read and all available functions become accessible.

Available Features

Direct connection to an IED using its IP address and communication port.

Optional authentication for protected IEDs using either Password Only or Username and Password authentication.

Signal monitoring using either time-based polling or report-based monitoring.

Execution of authorized control commands including feedback returned by the IED.

Retrieval and export of files available on the connected IED.

Automatic recording of signal changes with export to TXT or CSV format.

Discovery of reachable IEC 61850 devices within the local IP network.

Integrated Time Server for testing and simulating time synchronization of IEC 61850 IEDs.

Management of Wi-Fi and USB-C Ethernet network interfaces, including scanner configuration.

📌 Note

Definition IED stands for Intelligent Electronic Device, such as a protection relay or bay controller. Terms including Logical Device (LD), Logical Node (LN), Quality, Select Before Operate (SBO), DataSet, Report Control Block (RCB), and Functional Constraint (FC) are used throughout this manual according to the IEC 61850 standard.

2 Safety Information and Requirements

IEC61850Browser is designed to support diagnostic, testing, commissioning, and maintenance activities in IEC 61850 environments. The application does not replace operational procedures, work permits, or safety measures and must only be used by qualified personnel.

For safe and reliable operation, always follow the applicable company procedures, substation safety regulations, protection and control concepts, and the documentation provided by the IED manufacturer.

Requirements

Compatible iPhone or iPad

- Network access to the target IED
- Wi-Fi or USB-C Ethernet network interface
- IP address and communication port of the target device
- Appropriate user credentials
- Authorization to perform control operations

> ⚠️ **Warning**
>
> **Important Safety Notice**Executing control commands may change the actual operating state of electrical equipment.Use Test Commands only if you are authorized to do so, in accordance with all applicable safety procedures and operating instructions, and only when any potential impact on equipment and personnel has been fully assessed.

Network Access

Ensure that the selected network interface is connected to the same network segment as the target IED and that communication is not blocked by firewalls, VLAN configurations, or routing rules.

> 📌 Note
>
> IEC61850Browser does not store passwords in the list of recently used connections.

3 Quick Start – First Connection in Eight Steps

The following steps describe the typical workflow for establishing an initial connection to an IED and starting signal monitoring.

1. Establish a network connection and, if required, select the desired network interface under Settings.
2. Open Go Online from the dashboard.
3. Enter the IP address and communication port of the IED.
4. If the IED is protected, enable authentication and select the appropriate login method.
5. Tap Connect and wait until the connection status changes to Online.
6. Open the required Logical Device and Logical Node under Show IED Data.
7. Select the signals to be monitored and open the monitoring view.
8. Configure the polling interval (if applicable) and start monitoring by tapping Start.

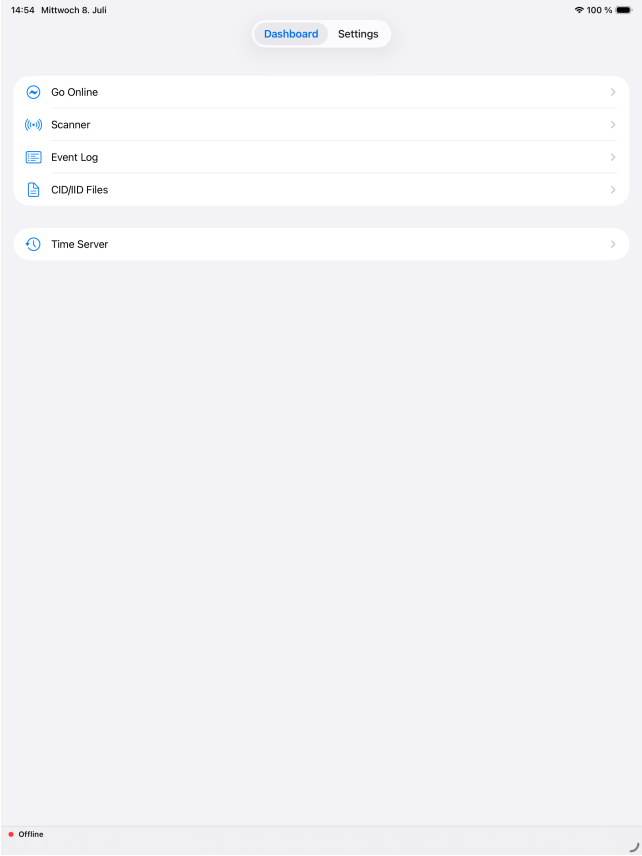


Figure 1 – Dashboard: Entry point for direct connections and the network scanner

4 Dashboard and Connection Status

The dashboard serves as the central entry point of IEC61850Browser. From here, connections can be established, locally stored files managed, and all available application functions accessed. Once a connection has been successfully established, all supported online features become available automatically.

Available dashboard functions include:

- Go Online – Establish a direct connection using an IP address and communication port.
- Scanner – Search the local network for reachable IEC 61850 devices.
- Event Log – View locally stored event logs and export them when required.
- CID/IID Files – Manage locally stored CID and IID files.
- Time Server – Configure and operate the integrated IEC 61850 time server.

After a successful connection, the application automatically reads the IED data model. The available online functions, including Show IED Data, Test Commands, CID/IID Export, and File Transfer, are then displayed.

The permanent status indicator at the bottom of the screen continuously shows whether the current connection is Online or Offline.

If the connection is interrupted, it can quickly be restored using the Reconnect section. Previously connected IEDs are listed as Recent Connections, allowing IP addresses and communication ports to be reused without manual re-entry.

For security reasons, passwords are never stored and must always be entered again when reconnecting.

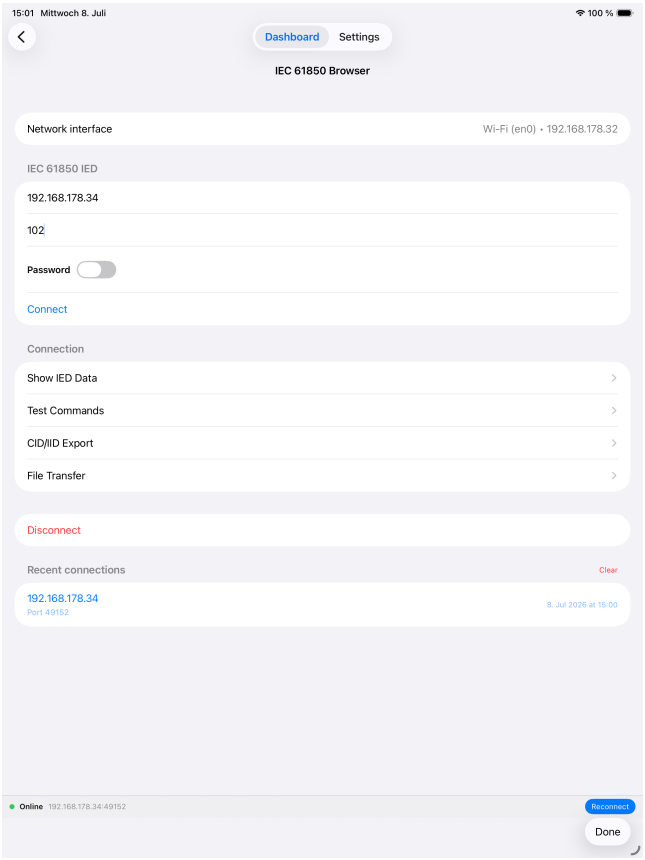


Figure 2 – Connected IED showing available application features and Recent Connections

5 Direct Connection to an IED

5.1 Entering the IP Address and Port

Use the Go Online page to establish a direct connection to an IEC 61850 IED. Enter the IP address, communication port, and—if required—the authentication credentials for the target device.

Enter the IP address of the IED. IEC 61850 uses MMS port 102 by default. If your IED is configured to use a different port, enter the appropriate value manually. Tap Connect to establish the connection.

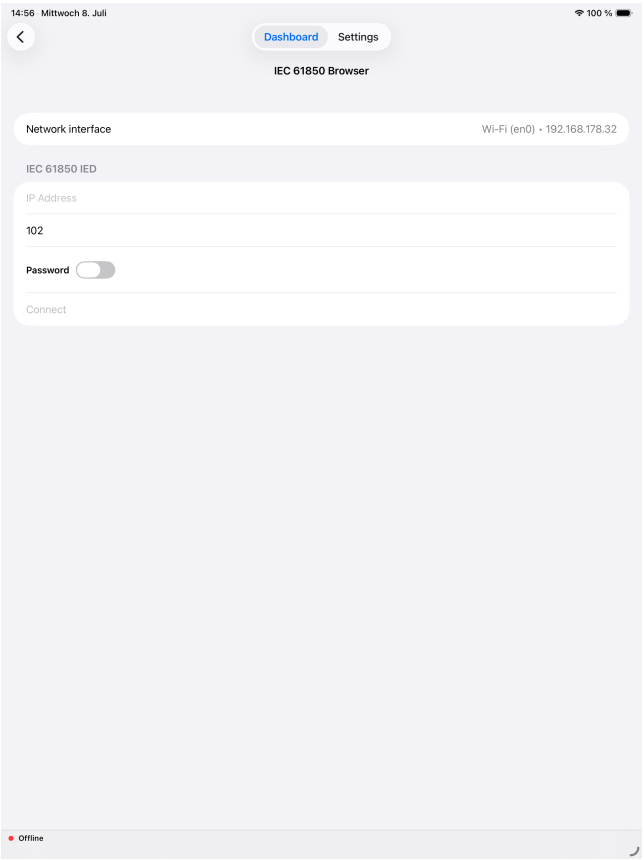


Figure 3 – Go Online: Entering the IP address and communication port

5.2 Authentication

IEC61850Browser supports the following authentication methods:

- Password Only
- Username and Password

If access control is enabled on the IED, enable authentication. Depending on the device configuration, either Password Only or Username and Password authentication may be required. Select the appropriate method, enter the credentials, and continue establishing the connection.

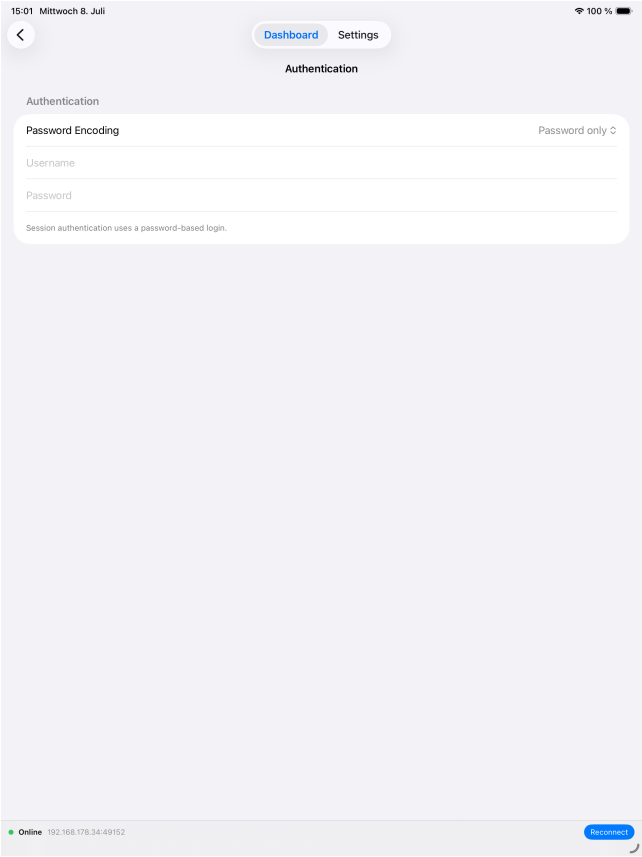


Figure 4 – Authentication: Selecting the authentication method

> 📌 Note
>
> Use only authorized credentials. IEC61850Browser never stores passwords in the list of recent connections.

6 Show IED Data and Signal Monitoring

The Show IED Data section allows signals from the connected IED data model to be selected and monitored. Two monitoring methods are available: time-based polling and event-driven Report Monitoring.

6.1 Monitoring Method

With time-based polling, signals are selected through the Logical Device and Logical Node hierarchy.

Alternatively, signals can be selected using Report Control Blocks (RCBs) and their associated DataSets. The application subscribes to the selected report and automatically imports all signals contained in the corresponding DataSet into the monitoring list.

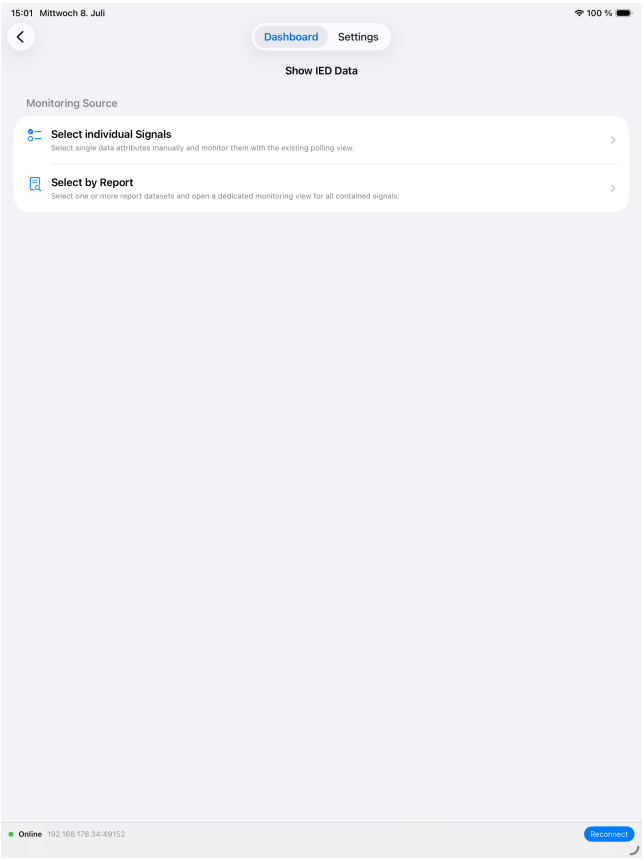


Figure 5 – Selecting the monitoring method: Time-Based or Report Monitoring

6.2 Selecting Signals Using Time-Based Monitoring

Open the required Logical Device and then the corresponding Logical Node. The available Data Objects and Data Attributes are displayed. Select the desired signals using the check boxes.

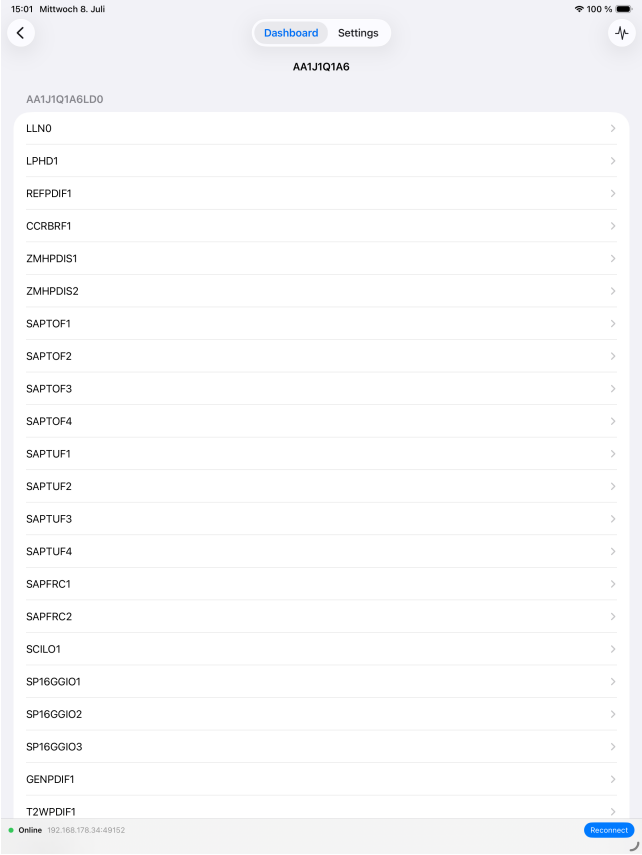


Figure 6 – Selecting Logical Devices

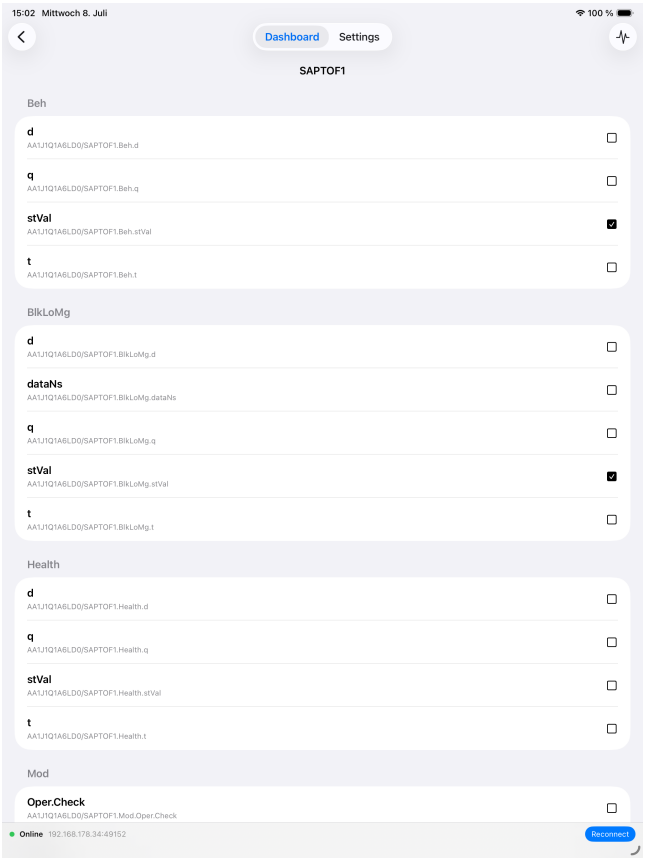


Figure 7 – Selecting individual signals within a Logical Node

6.3 Selecting Signals Using Report Monitoring

With Report Monitoring, signal changes are transmitted by the IED whenever an event occurs. Compared to cyclic polling, this significantly reduces network traffic. This feature requires the IED to support Report Control Blocks (RCBs) and DataSets.

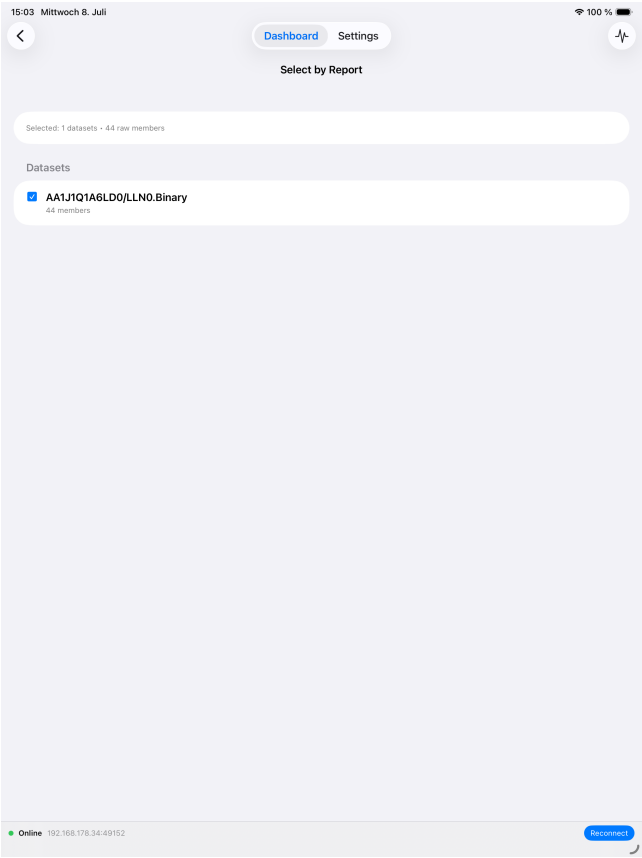


Figure 8 – Selecting Reports

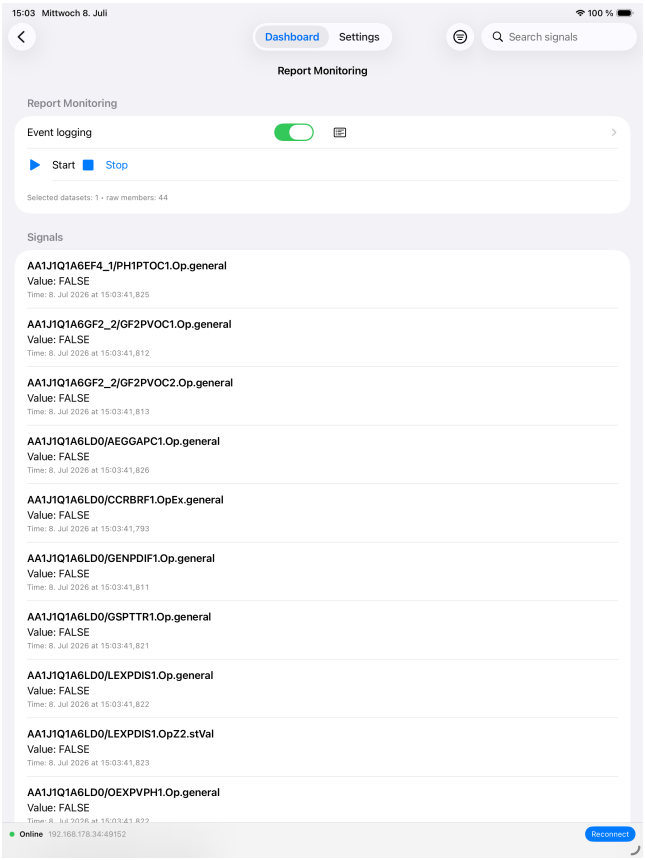


Figure 9 – Signals are automatically imported from the selected DataSet

6.4 Starting and Stopping Monitoring / Event Logs

After selecting the required signals, open the monitoring view using the icon in the upper-right corner. All selected signals, including those imported from DataSets, are displayed with their current value, timestamp, and quality information.If Time-Based Monitoring is used, configure the desired polling interval. Start or stop monitoring using the Start and Stop buttons.

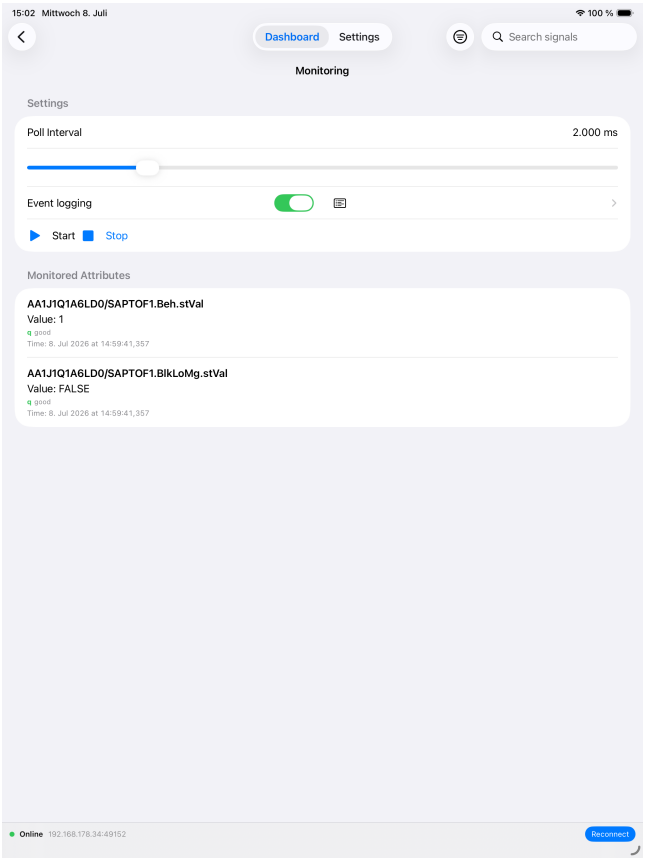


Figure 10 – Monitoring view with polling interval, Start/Stop controls, and Event Log

The monitoring view displays the current value, the timestamp of the most recent update, and the associated quality information. Choose a polling interval that matches the number of monitored signals and the performance of the target network. During active monitoring, signal changes can be recorded automatically in the **Event Log**. Each entry contains the timestamp, signal name, and recorded value. Recording stops automatically when monitoring is stopped. Event logs are stored locally and can be reopened or exported as TXT or CSV files at any time. Use the integrated **search and filter** functions to quickly locate or display specific signals.

> 💡 Best Practice
>
> When troubleshooting, start with a small number of clearly identifiable signals. This makes it easier to evaluate value changes, timestamps, and quality information.
>
> For large monitoring applications, Report Monitoring is recommended whenever the IED provides suitable reports.

7 Test Commands

The Test Commands section lists only those data points that have been identified by the connected IED as controllable. Select a data point to open the corresponding command view.

7.1 Selecting a Controllable Data Point

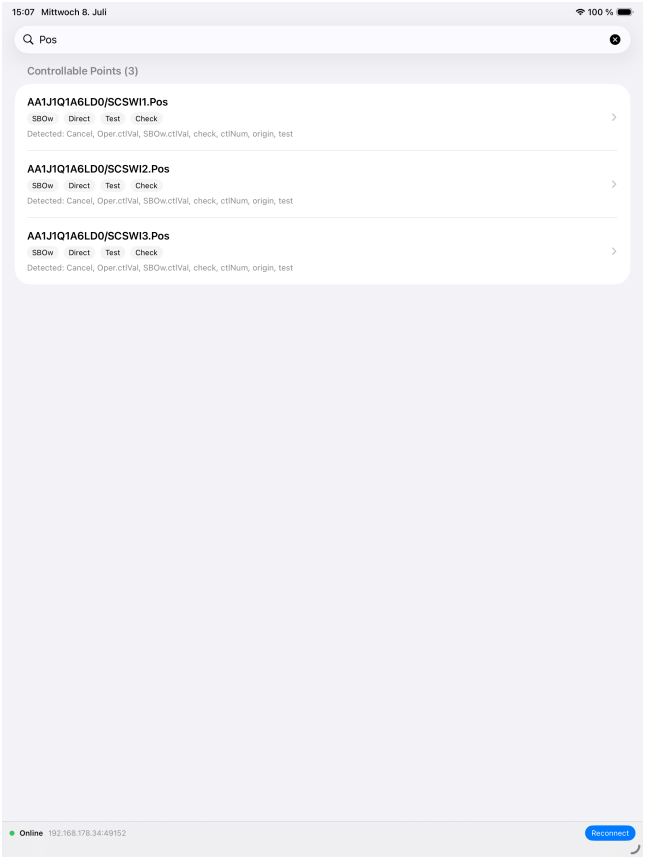


Figure 11 – Selecting a controllable data point

7.2 Configuring a Command

The command interface automatically adapts to the selected data type. Only parameters relevant to the selected control point are displayed. Depending on the data point, options such as switching state, command type, service, or control permissions may be available.

The application also considers the control model defined in the IEC 61850 data model, such as Direct Operate or Select Before Operate (SBO). Parameters including Interlock Check, Test, and Synchrocheck can be enabled whenever supported by the IED and appropriate for the intended operation.

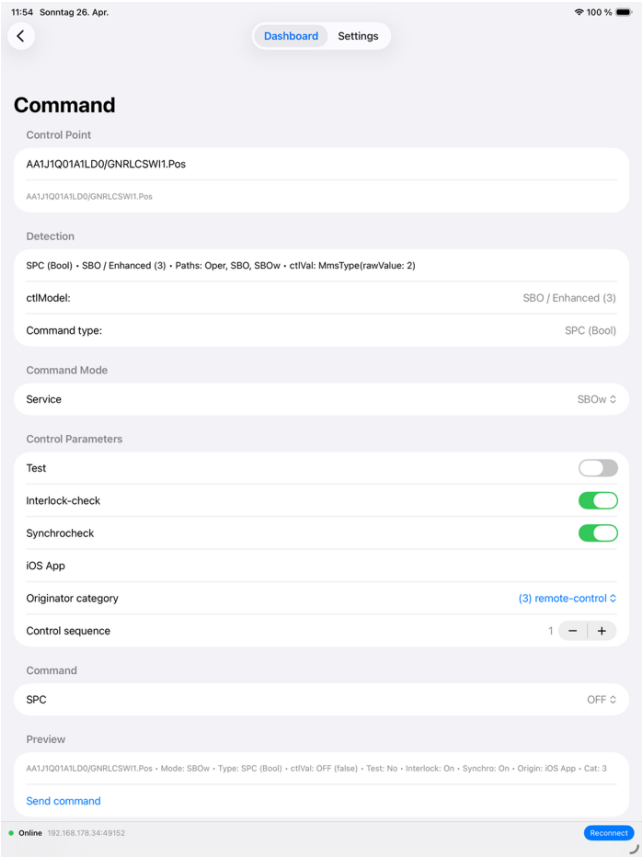


Figure 12 – Command view with control-point-specific options

7.3 Sending a Command and Evaluating the Response

Before sending a command, carefully verify the selected data point and all configured options. Tap Send Command to transmit the command to the IED. The feedback window indicates whether the command was accepted or rejected. If rejected, the response returned by the IED is displayed and can be used for further analysis.

⚠ Warning

Before executing switching operations, ensure that the correct data point has been selected, the required operational authorization has been granted, and any interlocks, test switches, or synchronization conditions have been considered.

8 CID/IID Export

The integrated CID/IID Export function automatically generates an SCL file in either CID or IID format using the information retrieved from the connected IEC 61850 IED.

During the export process, the application reads all available information from the connected IED and creates a complete snapshot of its current configuration. Optionally, the current values of individual data objects can also be included in the exported file.

The export supports all commonly used IEC 61850 editions: Edition 1, Edition 2, Edition 2.1

After the export has been completed, the generated file is automatically validated before it becomes available for export. A copy is also stored within the application's local file storage for future use.

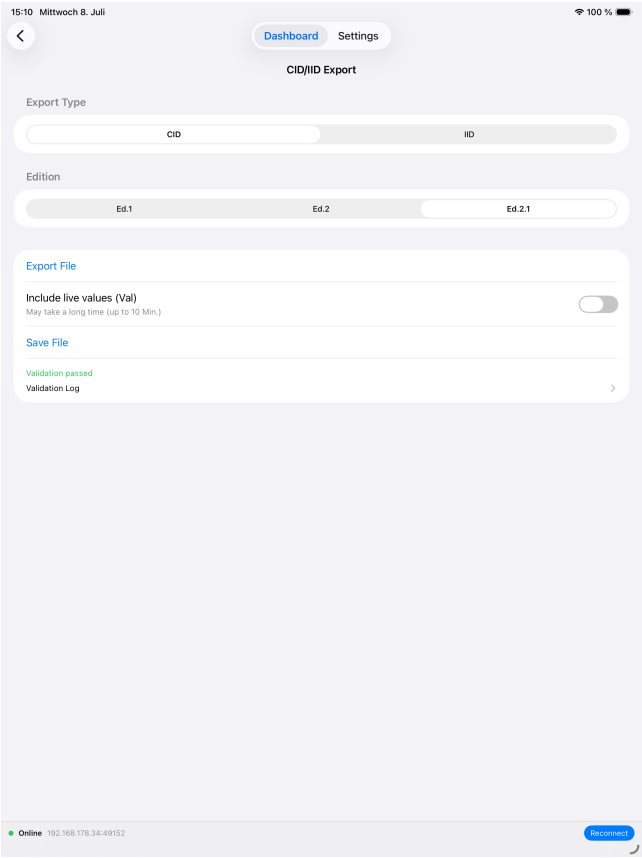


Figure 13 – CID/IID Export

After a successful export, the file can be saved or shared using the standard iOS Share function. Always follow your organization's policies regarding the handling of engineering and configuration data.

> 📌 Note
>
> Every exported file is automatically validated immediately after creation. This helps identify incomplete or invalid SCL files before they are distributed.

9 File Transfer

The File Transfer section provides access to files made available by the connected IED. Depending on the manufacturer and device type, these may include COMTRADE recordings, event logs, configuration files, or other diagnostic data.

Open the File Transfer section. The application reads the current file directory from the IED and displays all available files. Tap Download to transfer the selected file to your mobile device.

After downloading, the file is stored locally and can be opened immediately, saved, or shared with other applications using the iOS Share function.

Always comply with your organization's policies regarding the handling of configuration files, disturbance records, and event data.

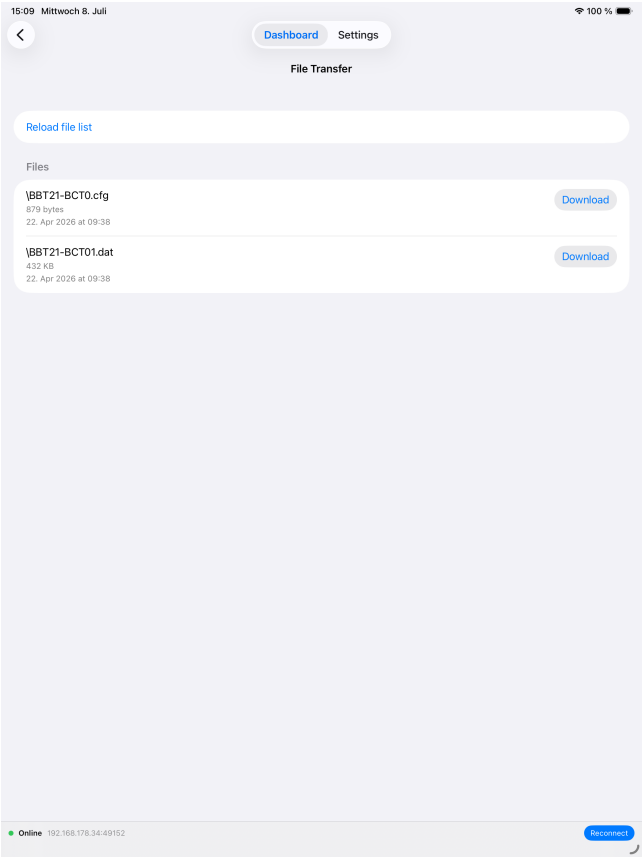


Figure 14 – File Transfer with file list and download buttons

> 💡 Best Practice
>
> Large COMTRADE recordings or event files may require additional download time depending on the file size and network performance.

10 Scanner

The integrated Scanner searches the IP address range of the currently selected network interface for reachable IEC 61850 devices. This allows IEDs to be discovered even when their IP addresses are unknown.Depending on the scanner configuration, either the last octet or the last two octets of the local IP subnet are scanned. The scanner checks whether a device is reachable and whether the configured communication ports are open.The results list displays the discovered devices together with their IP address, detected communication ports, and the technical IEC 61850 device name reported by the IED.

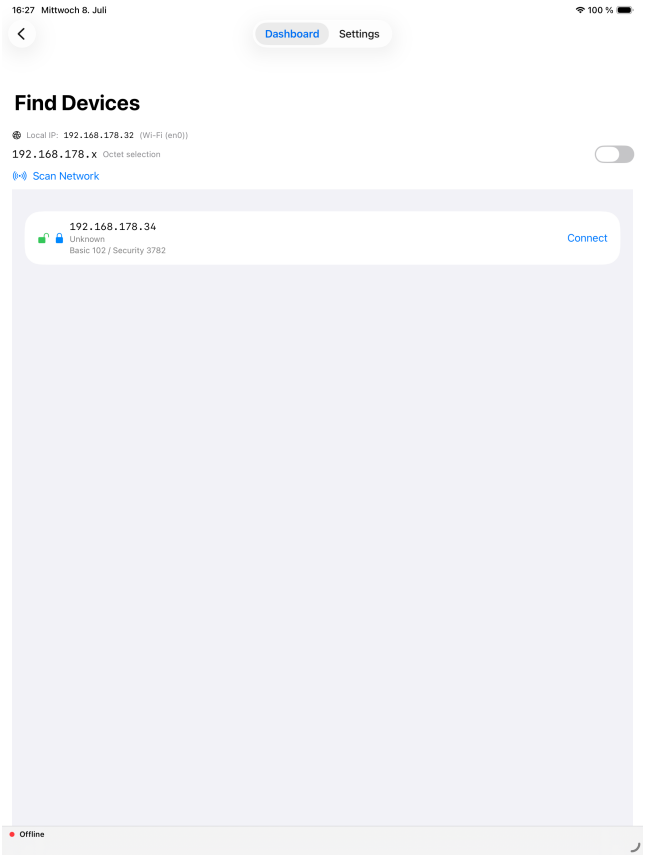


Figure 15 – Scanner showing discovered device and Connect option

Selecting Connect opens the connection view. The detected IP address and communication port are transferred automatically, allowing the connection to be established without entering them again.

Symbol	Meaning
🟢 Open Lock	Standard MMS port detected
🔵 Closed Lock	Secure MMS port detected

📌 Note

Run network scans only on networks for which you have authorization. Limit the scan range to the required subnet in order to minimize unnecessary network traffic and avoid misinterpretation of the results.

11 Time Server

The integrated Time Server provides a time source for IEC 61850 IEDs. It can be used to verify proper time synchronization and to validate the processing of timestamps by connected devices.

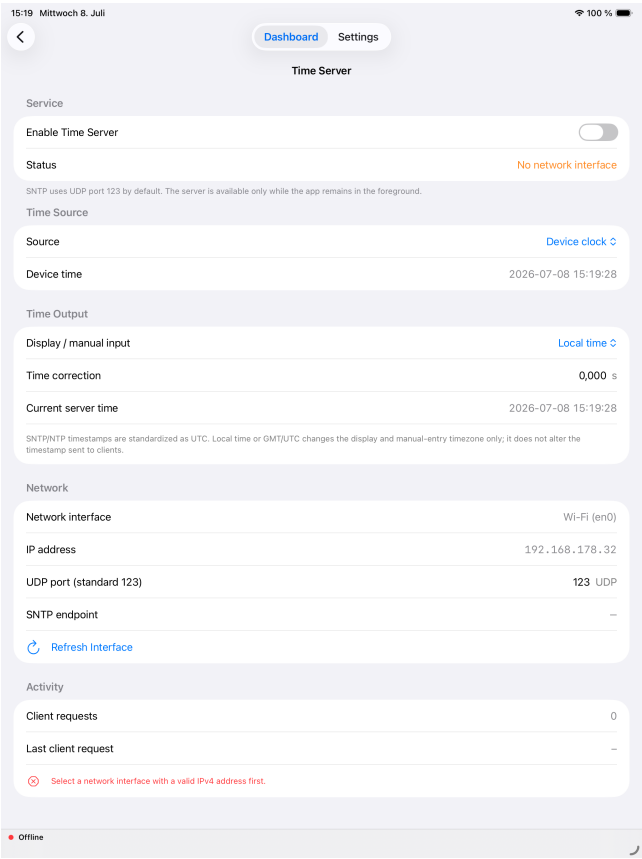


Figure 16 – Time Server with time source selection and server status

Available time sources:

- Device System Time
- Manual Time Entry
- Online Time Server

The Network section displays the currently selected network interface together with its IP address. The Activity section records incoming time synchronization requests received from connected IEDs.

> 📌 Note
>
> The Time Server is active only while the application remains in the foreground. For extended testing sessions, enable Keep Display On.

12 Settings

The Settings section contains the general configuration options of IEC61850Browser, including network interface selection, scanner configuration, and additional application settings.

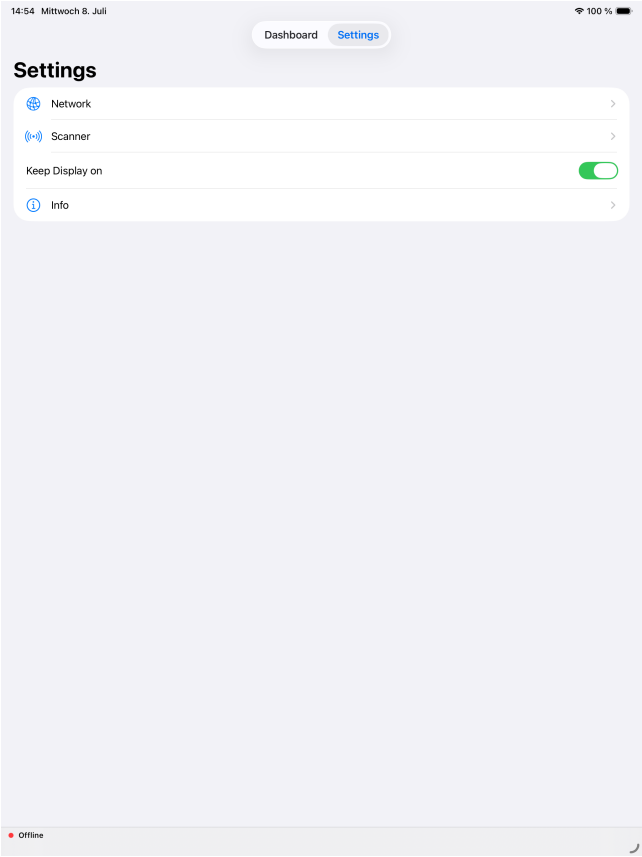


Figure 17 – Settings: Network, Scanner, and Keep Display On

12.1 Keep Display On

Enable Keep Display On whenever the application is used for extended monitoring or scanning sessions. This prevents the display from turning off automatically and reduces the likelihood of interruptions caused by the application moving to the background.

This feature is especially recommended for long-running monitoring sessions and when using the integrated Time Server.

12.2 Network

Use the Network section to select the desired network interface. In addition to Wi-Fi, USB-C Ethernet adapters are also supported. The application displays the IP address of the selected interface and provides direct access to the operating system's network settings.

After changing the network interface, all subsequent connections are established using the selected interface.

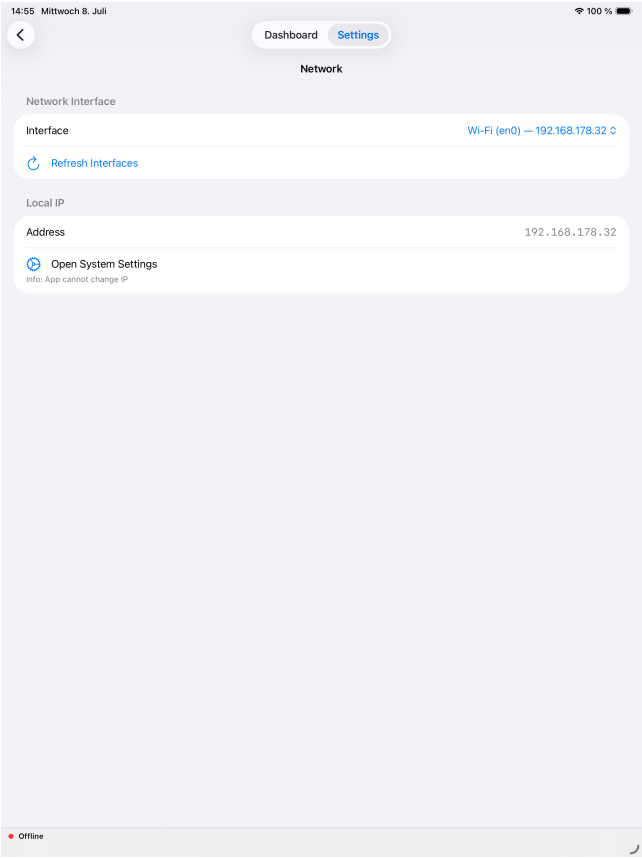


Figure 18 – Network: Network interface selection and status

When the application starts, the previously used network interface is selected automatically whenever available. If it is no longer available, the application falls back to the available Wi-Fi interface.

12.3 Scanner

The Scanner settings allow you to define which communication ports are checked during a network scan. Tap Apply to save your changes. The selected configuration is stored and used for all future scans.

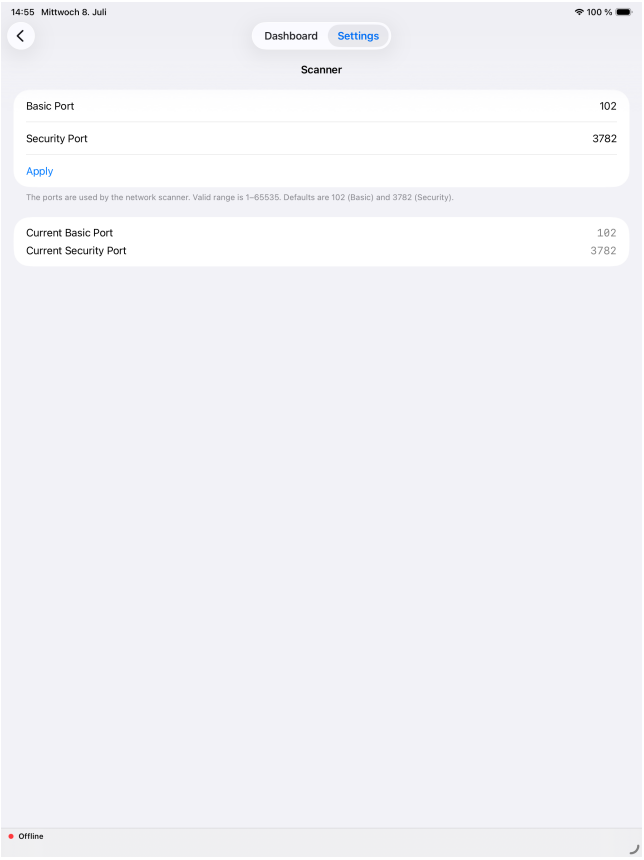


Figure 19 – Scanner settings for communication ports

13 Information, Subscription and Legal Information

The Information section provides general details about the application, the current version, subscription status, contact information, and legal notices.

The active subscription status and application version are displayed for reference. Links to the Privacy Policy, Terms of Use, and Legal Notices are available directly from this page.

For technical questions, feature requests, or support, please use the contact information provided within the application or visit the RelayGuard website.

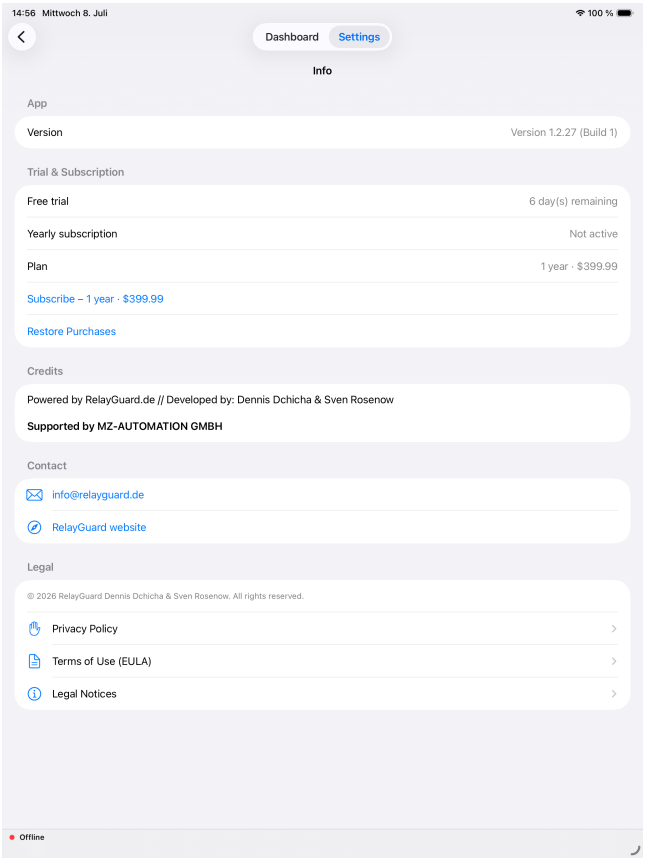


Figure 20 – Information page

- Under **Trial & Subscription**, the current trial status and subscription information are displayed.
- The **Plan** section displays the current purchase or subscription status.
- The **Contact** section provides direct access to the support email address and the RelayGuard website. Use the listed email address for technical questions, bug reports, or feature requests.
- The **Legal** section provides direct access to the **Privacy Policy**, **Terms of Use / EULA**, and **Legal Notices**.

14 Troubleshooting

The following recommendations can help resolve the most common connection and communication issues.

Observation	Recommended Checks
Connection cannot be established	Verify the IP address, communication port, network interface, and physical network connection.
Scanner does not detect any devices	Verify the configured scan range and communication ports. Ensure the mobile device is connected to the correct network segment.
Authentication failed	Verify the selected authentication method and user credentials.
Monitoring does not update	Verify the polling interval or confirm that the selected Report Control Block and DataSet are correctly configured.
Report Monitoring receives no data	Verify that the IED supports Report Control Blocks and DataSets, and ensure that the selected report is enabled.
Command rejected	Review the response returned by the IED. Verify control authorization, the selected data point, command type, interlocking conditions, test mode, and process conditions.
File transfer unavailable	Verify that the connected IED supports MMS File Services and that the required permissions are available.
Time Server not responding	Verify that the application is running in the foreground and that the correct network interface has been selected.

Support and Feedback For product information, documentation, and support, please visit:
info@relayguard.de

RelayGuard develops mobile engineering software for protection systems, substation automation, and the electric power industry. Our goal is to provide powerful tools that simplify commissioning, maintenance, diagnostics, and troubleshooting directly in the field.

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15 Abbreviations

Abbreviation	Description
IED	Intelligent Electronic Device
LD	Logical Device
LN	Logical Node
DO	Data Object
DA	Data Attribute
FC	Functional Constraint
RCB	Report Control Block
SCL	Substation Configuration Language
CID	Configured IED Description
IID	Instantiated IED Description
MMS	Manufacturing Message Specification

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End of User Manual