TCP-485 WiFi Log Ver.02

SERIAL / WI-FI CONVERTER WITH DATALOGGER

Wi-Fi | Sitrad Supervisory system | Ethernet | RS 485 Serial Comunication | LOG Datalogger

⚠ Have this manual in the palm of yout hand through the **FG Finder** app.

TCP485WIFILOGV02-06T-17783-2510

⚠ BEFORE INSTALLING THE CONTROLLER, WE RECOMMEND THAT YOU READ THE INSTRUCTION MANUAL COMPLETELY IN ORDER TO AVOID POSSIBLE DAMAGE TO THE PRODUCT.

PRODUCT INSTALLATION PRECAUTION:
- Before performing any procedure on this instrument, disconnect it from the power supply;
- Ensure that the instrument has proper ventilation, avoiding installing it on panels that contain other devices that can cause it to operate outside the specified temperature limits;
- Install the product away from sources that may generate electromagnetic disturbances, such as: enginees, contactors, relays, solenoids, etc.

AUTHORIZED SERVICE:
- The installation and maintenance of the product must be performed only by qualified personnel;

ACCESSORIES:
- Use only original Full Gauge Controls accessories.
- If in doubt, contact technical support.

AS IT IS CONSTANTLY EVOLVING, FULL GAUGE CONTROLS RESERVES THE RIGHT TO CHANGE THE INFORMATION CONTAINED IN THE MANUAL AT ANY TIME, WITHOUT PRIOR NOTICE.

ANATEL

"This equipment is not entitled to protection against harmful interference and must not cause interference in duly authorized systems."
"This product is not suitable for use in a domestic environment, as it may cause electromagnetic interference that requires the user to take necessary measures to minimize these interference"

1. DESCRIPTION

The **TCP-485 WiFi Log** converter is an interface for communicating Full Gauge Controls controllers with the Sitrad[Pro] management software. The **TCP-485 WiFi Log** uses a Wi-Fi or Ethernet data network to communicate with the TCP/IP standard. Currently, many companies have wireless routers installed in their facilities, as well as wired infrastructures, making it possible to use these same networks for data traffic between controllers and Sitrad[Pro], using the **TCP-485 WiFi Log** converter.
This equipment has internal memory for data storage (datalogger), with the specific purpose of storing controller logs when communication with Sitrad[Pro] is unavailable.
Through the smartphone configuration app or Sitrad[Pro], it is possible to select which instruments will have their logs registered and what is their periodicity. The logs registered in the equipment can be requested by Sitrad[Pro] as soon as the communication is reestablished, allowing its insertion in the supervisory database.

2. APPLICATIONS

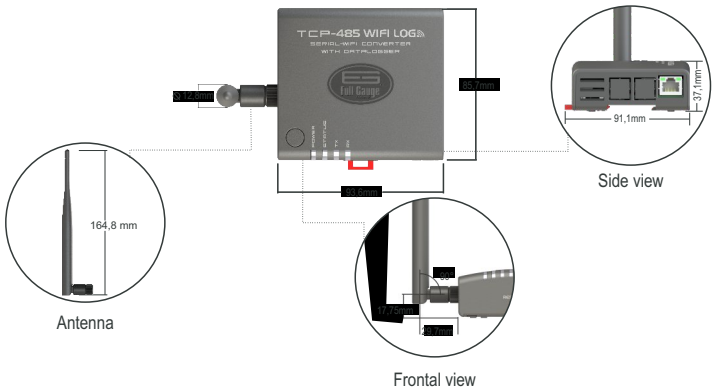
- Installations in which using the existing Wireless or Ethernet network is paramount;
- Installations that do not have conditions for passing new RS-485 data cabling and already have and Ethernet structure installed.

Note: The **TCP-485 WiFi Log** converter is designed to work with Full Gauge Controls instrument only.

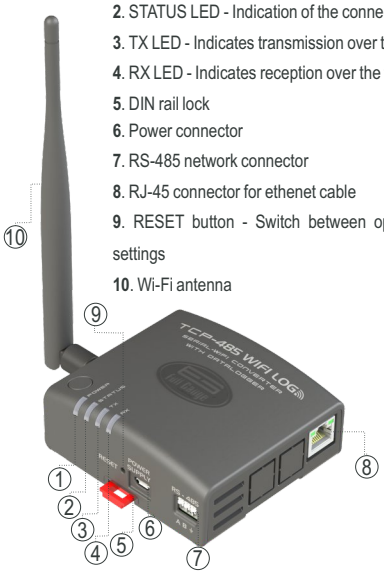
3. TECHNICAL SPECIFICATIONS

Converter power	External 5.1 Vdc / 2A source
Power supply included with the converter	Input - 100-240 Vac (50/60Hz) Output: 5.1Vdc / 2A
Operating Temperature	0 to 50°C / 32 to 122°F
Operating Humidity	10 to 90% UR (without condensation)
Number of instruments supported per converter on an RS-485 network	32 (without the need for termination)
Wi-Fi antenna	3,8dBi for stable, high-quality connection
Wi-Fi compatibility	IEEE 802.11 b/g/n up to 72,2 Mbps
Wi-Fi frequency	2,4GHz band, channels 1 to 11
Encryption type	WEP, WPA and WPA2
Ethernet (Lan Port)	10 / 100 Mbps
Internal memory	8MB
Product dimensions (without antenna)	93,6 x 37,1 x 91,1 mm (WxHxD)
Antenna dimensions	194,5 x 12,8mm (LxD)

4. DIMENSIONS



5. INDICATIONS AND KEYS



1. POWER LED - Indication of power and operating mode
2. STATUS LED - Indication of the connection status and signal strength
3. TX LED - Indicates transmission over the RS-485 network
4. RX LED - Indicates reception over the the RS-485 network
5. DIN rail lock
6. Power connector
7. RS-485 network connector
8. RJ-45 connector for ethenet cable
9. RESET button - Switch between operating modes, or restore to factory default settings
10. Wi-Fi antenna

6. INSTALLATION

The **TCP-485 WiFi Log** converter should be preferably installed in places away from noise and electromagnetic interference. It must be powered by the power supply provided with the device, if provided, or a compatible one.
If the operating mode is Wi-Fi Client, the signal quality of the wireless network must be ensured. If the signal is bad or very bad (see item 9), the communication may become unstable and there may be loss of information. For recommendations on how to position the device to avoid interference, see item 13.
The RS-485 network must be connected following the recommendations in item 12.

7. OPERATION MODES

The **TCP-485 WiFi Log** converter has two network interfaces: Ethernet and Wi-Fi, and three modes of operation: Wi-Fi Access Point, Wi-Fi Client and Ethernet Client. Only one operation mode is enabled at a time that is, **it is not possible to use the Ethernet and Wi-Fi interfaces at the same time.**

7.1 Wi-Fi Access Point Mode:

In this mode, it operates as a Wi-Fi access point that accepts connection from only one client. This is the factory default operating mode, which basically serves to configure the converter on first use, although it can operate in this mode with a Sitrad[Pro] client connected to it. The factory default SSID is **TCP-485 WIFI Log W-XXXX E-YYYY**, with XXXX being the last 4 digits of the Wi-Fi MAC address and YYYY being the last 4 digits of the Ethernet MAC address.

Example: Wi-Fi: F8: F0: 05: AD: **75: 56** / Ethernet: F8: F0: 05: AD: **10: 54** } SSID **TCP-485 WiFi Log** W7556 - E1054

The MAC address of the product's network interfaces can be found on the label located on the front of the case.

The default password is **admin123**

7.2 Wi-Fi Client Mode:

In this mode, it operates as a Wi-Fi client and connects to the wireless network provided by the user. Supports dynamic (DHCP) or static IP configuration. It accepts the connection of a Sitrad[Pro] client and has an IP filter to restrict access within the network.

7.3 Ethernet Client Mode:

In this mode, it operates as an Ethernet client and connects to the wired network provided by the user. Supports dynamic (DHCP) or static IP configuration. It accepts the connection of a Sitrad[Pro] client and has an IP filter to restrict access within the network.

8. LED INDICATIONS

8.1 Wi-Fi Access Point Operation Mode

Power LED		Status LED		Event
Color	Status	Color	Status	
Lilac	On	Yellow	Blinking	Waiting for a client to connect to the Access Point.
			On	Client connected to the Access Point.
		Cyan		Client connected to the Access Point. Connected with Sitrad[Pro].
	Blinking		Blinking	Client connected to the Access Point. Receiving firmware update.

8.2 Wi-Fi Client Operation Mode

Power LED		Status LED		Event
Color	Status	Color	Status	
Blue	On	Blue	Blinking	Scanning for the configured Wi-Fi network. **Not connected** to Sitrad[Pro].
		Green		Connected to the Wi-Fi network. **Excellent** signal level. Waiting for Sitrad[Pro] client connection.
		Yellow		Connected to the Wi-Fi network. **Good** signal level. Waiting for Sitrad[Pro] client connection.
		Lilac		Connected to the Wi-Fi network. **Poor** signal level. Waiting for Sitrad[Pro] client connection.
		Red		Connected to the Wi-Fi network. **Very Poor** signal level. Waiting forSitrad[Pro] client connection.
		Green	On	Connected to the Wi-Fi network. **Excellent** signal level. **Connected** to Sitrad[Pro].
		Yellow		Connected to the Wi-Fi network. **Good** signal level. **Connected** to Sitrad[Pro].
		Lilac		Connected to the Wi-Fi network. **Poor** signal level. **Connected** to Sitrad[Pro].
		Red		Connected to the Wi-Fi network. **Very Poor** signal level. **Connected** to Sitrad[Pro].
	Blinking	Green	Blinking	Connected to the Wi-Fi network. **Excellent** signal level. Receiving firmware updtate.
		Yellow		Connected to the Wi-Fi network. **Good** signal level. Receiving firmware update.
		Lilac		Connected to the Wi-Fi network. **Poor** signal level. Receiving firmware update.
		Red		Connected to the Wi-Fi network. **Very Poor** signal level. Receiving firmware update.

8.3 Ethernet Client Mode

Power LED		Status LED		Event
Color	Status	Color	Status	
Green	On	Red	Blinking	Ethernet cable disconnected.
			On	Ethernet cable connected. Negotiating IP.
		Blue	Blinking	Connected to the ethernet network. Waiting for Sitrad[Pro]client connection.
			On	Connected to the ethernet network. Connected with Sitrad[Pro].
	Blinking		Blinking	Connected to the ethernet network. Receiving firmware update.

8.4 Errors

Power LED		Status LED		TX and RX LEDS	Error
Color	Status	Color	Status		
Red	On	Red	Blinking	Any	Not connected to the Wi-Fi network. Authentication failed. Check password, network security settings and signal strength.
		Blue			Not connected to the network (Wi-Fi or ethernet). Error obtaining IP (DHCP mode) or invalid IP (Static mode). Check network settings.
		Lilac			Not connected to the network. (Wi-Fi or ethernet). Invalid static IP configuration.
Yellow		Yellow	Any		Contact **Full Gauge Controls**
Any		Any	Blinking	On	Internal clock error. Datalogger disabled. Waiting for Sitrad[Pro]client connection.

8.5 Operations

Power LED		Status LED		TX and RX LEDS	Operation
Color	Status	Color	Status		
White	On	White	On	Off	Initialization in progress.
		Yellow			Initialization in progress. Finishing firmware update process.
		Red			Initialization failed. Corrupted memory. Contact **Full Gauge Controls**.
Cyan		Cyan			RESET button pressed. When released, starts changing the operating mode (see item 9.7).
Green		Green		On	RESET button pressed. Restoring the factory settings (see item 9.8).

9. SET UP

The configuration of the TCP-485 WiFi Log converter is made through the **TCP-485 Config** smartphone (Android or iOS) app. The app can be found and dowloaded from the Play Store (Android) or App Store (iOS). The app's home screen is shown in Figure 01.

Figure 01

During configuration, it is advisable to be close to the converter to view the LED indications, as shown by the signal table (item 9). When energized, the **TCP-485 WiFi Log** converter will keep the POWER and STATUS LEDs on in **white** for approximately 7 (seven) seconds, indicating the device's initialization.
After initialization, the color of the POWER LED will indicate the TCP operating mode, and the STATUS LED, the status of its connection, as per item 9.

9.1 Setting up the converter for the first time:

The converter leaves the factory in the Wifi Access Point operating mode. After initialization, the POWER LED will be on in **lilac** and the STATUS LED will be flashing in **yellow**. At this moment, the TCP-485 WiFi Log awaits the connection of a client on its Wireless network created according to the standards specified in item 8.1. Using a smartphone with the **TCP-485 Config** app, choose the option **Connect on a TCP-485**. The screen in Figure 02 will appear. Choose the **OK** option, and the smartphone's Wi-Fi network selection interface will open (Figure 03). Connect to the network created by the converter (Figure 04) and ignore if the smartphone alerts that the closen network does not have access to the internet. Press the back button, and the smartphone will return to the **TCP-485 Config** app and display the **Converter Search** screen (Figure 05). Only the converter being configured will appear on this screen, since it is the access point itself. Select the converter and proceed to select the operating mode (items 10.2, 10.3 and 10.4).

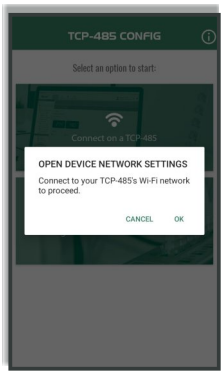


Figure 02

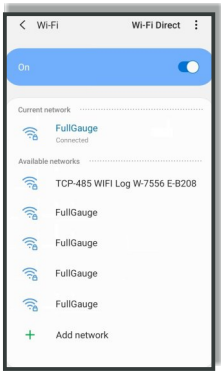


Figure 03

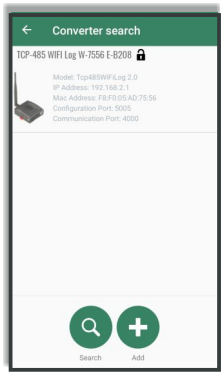


Figure 05

Figure 04

9.2 Operation Set Up in Wi-Fi Client mode:

Step 1: Select the converter you desire to configure on the **Converter Search** screen (Figure 05) and the **Basic Settings** screen (Figure 06) is displayed.
Configure the following fields:
- Converter name (up to 30 characters);
- Password (up to 8 characters): access password to change configuration parameters;
- Configuration Port (standard 5005);
- Communication Port (standard 4000);
- Network Interface: Wi-Fi or Ethernet.

In the **Network Interface** field, select the **Wi-Fi** option.

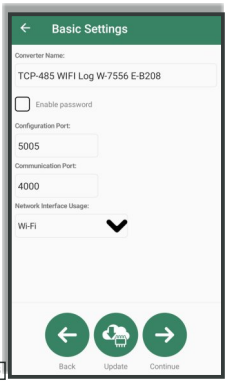


Figure 06

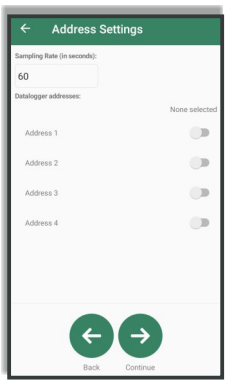


Figure 07

Step 2: **Address Settings** (Figure 07). It is used to configure the datalogger. This screen allows you to change the sampling interval of the datalogger between 15 and 60,000 seconds (default 60 seconds) and to choose the addresses of the instruments to be registered in the datalogger. Addresses 1 through 247 are enabled by selecting their respective checkbox. The maximum amount supported is 32 instruments. The figure shows only addresses 1 to 4. For others, scroll down.

Step 3: **Wi-Fi Network Mode** (Figure 08), it is where the operating mode will be chosen between Wi-Fi Client or Wi-Fi Access Point.
Select the option **Connect in a network**.

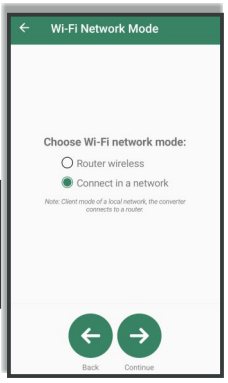


Figure 08

The connection of the **TCP-485 WiFi Log** via **iOS** does not perform WiFi network scanning due to operating system restrictions.
To connect, go to **Add Network** and manually enter the network name.

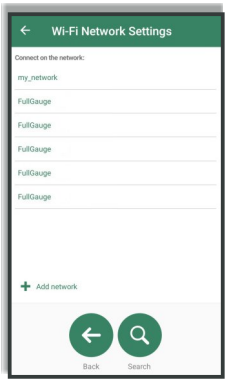


Figure 09

Step 4: **Wi-Fi Network Settings** (Figure 09). It is where the network to which the converter must connect is simply configured by touching its name in the list. If the desired network is a hidden network, select the **Add network** button to configure it manually.

Step 5: Configured the following parameters (Figure 10):
- Connect to the network (up to 32 characters): SSID of the network to connect. Fill only if the network is hidden;
- Connect on the network to connect;
- IP Mode: Dynamic (DHCP) or Static. In Static mode, you must configure IP Address, Netmask and Gateway;
- DNS server: Primary and Secondary;
- IP-Restricted Access: If it is desidred, only clients with IP within the configured range can connect to the converter.

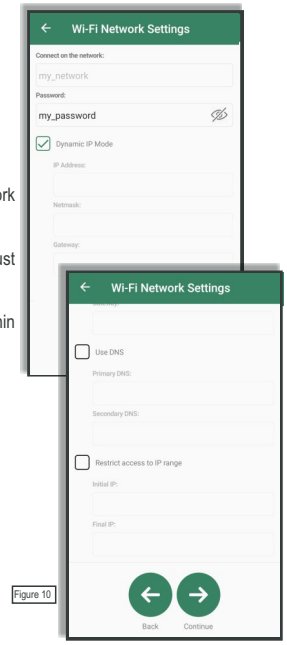


Figure 10

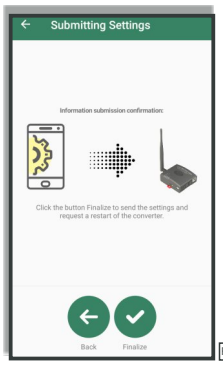


Figure 11

Figure 12

Step 3: **Submitting Settings** (Figure 11). Select the Finish button to have the app send the settings to the converter. If successful, the message in Figure 12 will be displayed. The converter will restart and start operating in the selected mode, trying to connect to the configured network.

9.3 Operation Set Up in Wi-Fi Access Point Mode:

Follow the same steps as in item 10.2, except for steps 3 to 5, which are described below.
Setp 3: On the **Wi-Fi Network Mode** screen, select the **Wireless Router** option (Figure 13).
Step 4: It is not displayed, go straight to step 5 "Wi-Fi Network Setup".

Figure 13

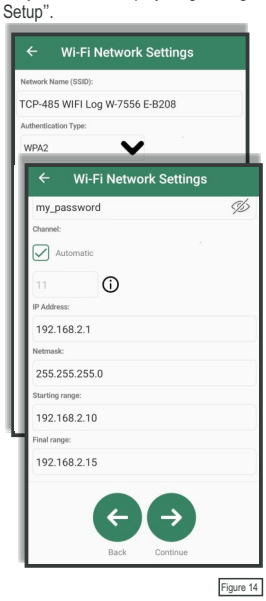


Figure 14

Step 5: In the **Wi-Fi Network Settings** screen (Figure 14), configure the Access Point parameters:
- Network name (up to 32 characters);
- Type of authentication: None or WPA2;
- Password (8 to 64 characters): If WPA2 is the selected Authentication type;
- Channel: Automatic or Manual (between 3 and 12);
- IP address: It is the address of the converter on the network itself;
- Net mask;
- Start and end range: Range of IPs to be assigned to clients connecting to the network.

9.4 Operation Set Up in Ethernet Client Mode

Select the converter according to item 10.1.
Step 1: On the **Basic Settings** screen, select the **Network Interface** field and the **Ethernet** option (Figure 15).

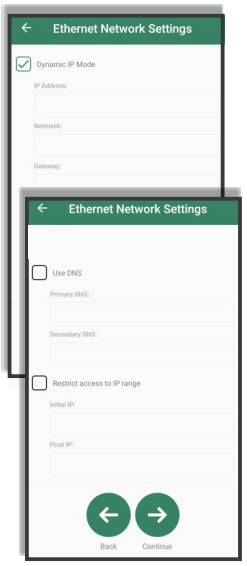


Figure 16

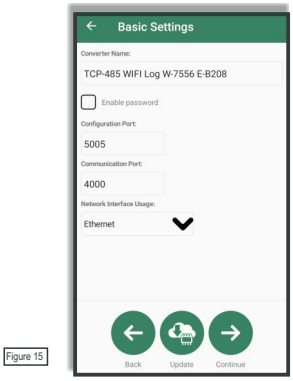


Figure 15

Step 2: In the **Ethernet Network Settings** screen (Figure 16), configure the parameters of the Ethernet network:
- IP Mode: Dynamic (DHCP) or Static. In Static mode, you must configure IP Address, Netmask and Gateway;
- DNS server: Primary and Secondary;
- IP-Restricted Access: If it is desidred, only clients with IP within the configured range can connect to the converter.

Step 3: **Submitting Settings** (Figure 17). Select the **Finish** button to have the app send the settings to the converter. If successful, the message in Figure 18 will be displayed. The converter will restart and start operating in the selected mode, trying to connect to the configured network.

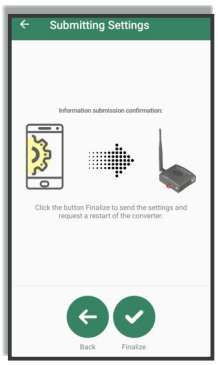


Figure 17

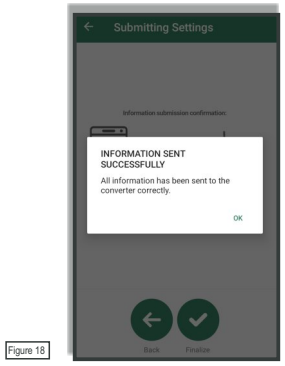


Figure 18

9.5 Reconfiguring the converter:

Using a smartphone with the **TCP-485 Config** app and **connected to the same network as the converter**, select the **Configure TCP-485 option on the current network**.

The **Converter Search** screen should display the converters connected to the network, It is possible to set more to have more than one converter on the same network (Figure 19). Select the desired converter and proceed to select the operating mode (items 10.2, 10.3 and 10.4).

Figure 19

Note: If the converter is not connected to the configured network, change the operation mode manually to Wi-Fi Access Point (as per item 10.7) or restore the factory settings (item 10.8).

9.6 Firmware Update:

The **TCP-485 WiFi Log** firmware update is made through the **TCP-485 Config** app. For this, the smartphone must have access to the internet, either through the Wi-Fi network to which it is connected, or through its cellular network.

Step 1: On the **Basic Settings** screen (Figure 20), select the **Update** button;

Step 2: On the **Firmware Update** screen (Figure 21), the current firmware version will be displayed. Touch the checkbox and choose the version you want to install (Figure 22). **Always try to install the latest version to ensure that your converter is always up to date**.

Step 3: Touch the **Update** button and the smartphone will download the firmware and start transmitting it to the converter. A progress bar (Figure 23) will indicate how many blocks were transmitted, and the total number or firmware blocks. The update can be canceled at any time by touching the **Cancel** button.

Step 4: At the end of the update, the message in Figure 24 will be displayed and the converter will restart immediately, turning on the POWER LED in **white**. The STATUS LED will turn **white** and then **yellow**, indicating that the firmware is being update.

Note: When updating firmware, **all equipment settings are maintained**.

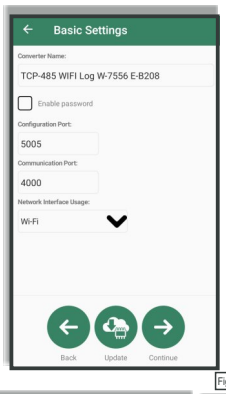


Figure 20

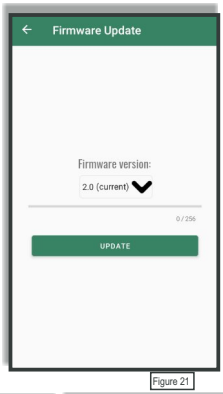


Figure 21

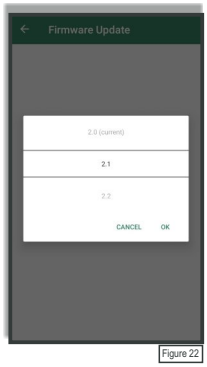


Figure 22

Figure 23

Figure 24

9.7 Changing the configuration mode:

The operating mode can be changed using the RESET button. Just press it for 3 (three) seconds until the POWER and STATUS LEDs are **cyan**. When you release the button, the device will restart and the operation mode will be changed from Client (Wi-Fi or Ethernet) to Access Point or from Access Point to Client (Wi-Fi or Etherne, the last one used).

This operation is useful if it is necessary to reconfigure the converter and it is not possible to access it on the network it is connected, or if it is unable to connect to the configured network.

9.8 Restoring factory settings:

If it is necessary to restore the factory setting of the **TCP-485 WiFi Log**, press the RESET button for 20 (twenty) seconds until all the LEDs are **green**. Upon restart, the converter will return to factory defaults and will operate in Wi-Fi Access Point mode, with default SSID and password.

Please Note: This operation will erase all settings previously made in the **TCP-485 WiFi Log**. converter. The datalogger data is not erased.

10. INTEGRATION WITH SITRAD[Pro]

The **TCP-485 WiFi Log** converter operates in conjunction with the Sitrad[Pro] supervisory software. The most update version is available at **https://www.sitrad.com.br**

10.1 Registering the converter in Sitrad[Pro]

Step 1: Figure 25 shows the Sitrad[Pro] Management screen. On the Device **List tab** on the left select the server where the converter will be installed. This server must be on the same network as the device. On the main **Server Information** tab, click the **Add Converter** button.

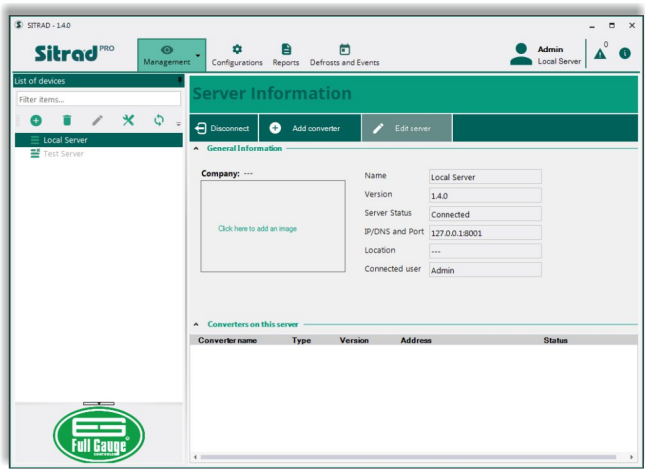


Figure 25

Step 2: In the **Select model** window (Figure 26), select to **Search automatically** and the software will search on the network for converters. If the converter is not available at the moment, you can add it manually by clicking on **Ethernet converter**.

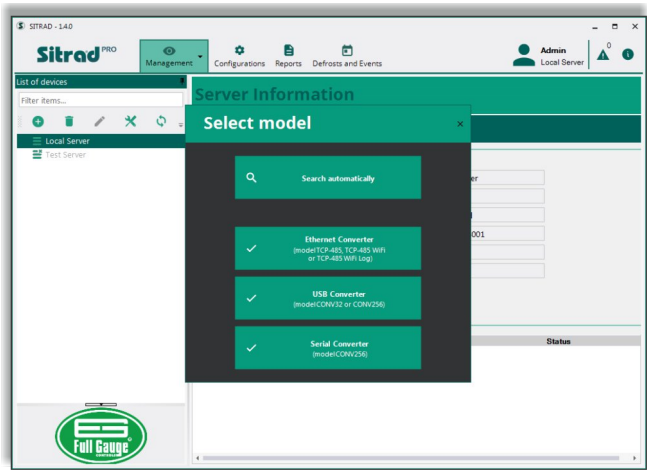


Figure 26

Step 3: Sitrad[Pro] should perform the search on the network, and the available converters should appear in the **Converter Search** tab (Figure 27). Select the desired converter and click **Add**.

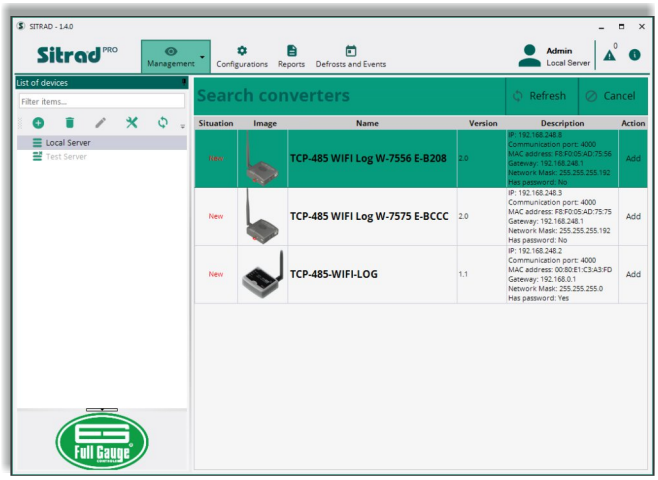


Figure 27

Step 4: Figure 28 shows the **Converter Registration** tab. Check the device data and edit if necessary. Sitrad[Pro] identifies the **TCP-485 WiFi Log** as **TCP-485 WiFi Log** with **Version 2**.The **''Connect via''** field defines wheter Sitrad[Pro] will recognize the converter on the network by IP or MAC address. If the converter is configured in Client mode with dynamic IP, it is advisable to select the MAC Address option, as the device's IP may vary within the network. After configuring the desired parameters, click on the **Save** button to register the converter on the server.

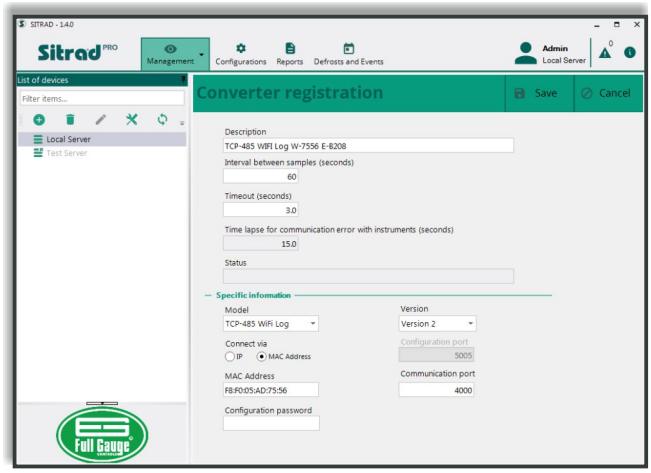


Figure 28

Step 5: Once registered, the converter will appear linked to the chosen server on the **Device List** tab. When selected, the **Converter Information** tab is displayed (Figure 29). To register the instruments that are in the RS-485 network of this new converter, click on the **Search Instruments** button.

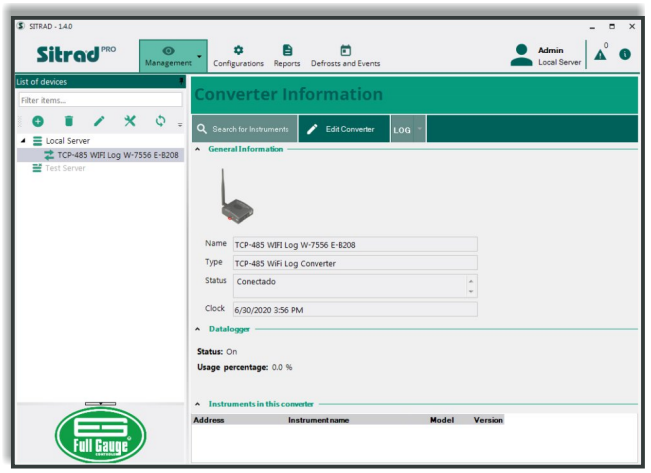


Figure 29

Step 6: The **Instrument Search** tab allows you to register instruments by address. There are two options: Search in address range, in which various instruments with addresses within the selected range are searched. After choosing the option, just click on **Search** and Sitrad[Pro] automatically registers the instruments (Figure 30). If you choose to search the full range of addresses, the process may take a few minutes. The registered instruments will now appear on the **Device List** tab, linked to the converter.

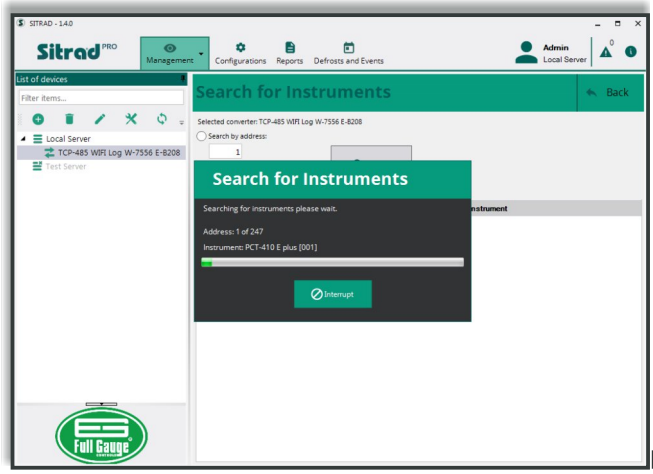


Figure 30

10.2 Managing the Datalogger

10.2.1. Set up

Step 1: With the converter selected, select the LOG ⏭Configure Datalogger menu on the **Converter Information** tab (Figure 31).

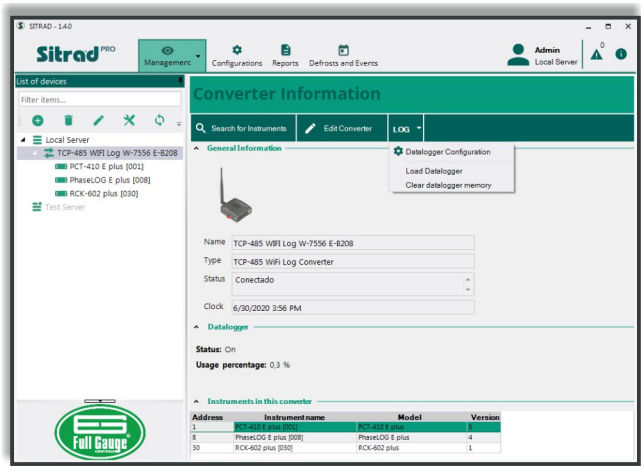


Figure 31

Step 2: The **Datalogger Configuration** screen is displayed (Figure 32). Set the interval between samples and select the instruments you want to be registered in the datalogger. Only registered instruments are displayed in the list. To insert instruments per address that have not been installed yet, uncheck the ''Show only registered'' box, and all addresses will be available to choose from. The screen also displays the estimated total history time of the datalogger. Click Save to keep your changes.

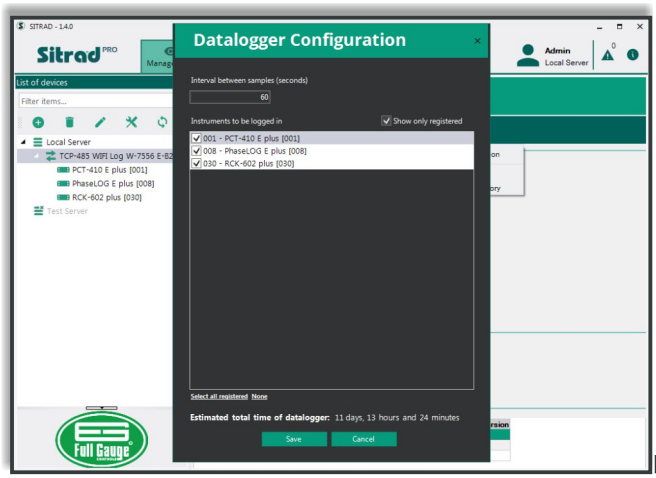


Figure 32

10.2.2. Loading

To load the converter Datalogger, select the LOG ⏭Load Datalogger menu on the Converter Information tab (Figure 31). In the Datalogger section, a progress bar indicates the process and the percentage elapsed in loading the datalogger (see Figure 33).

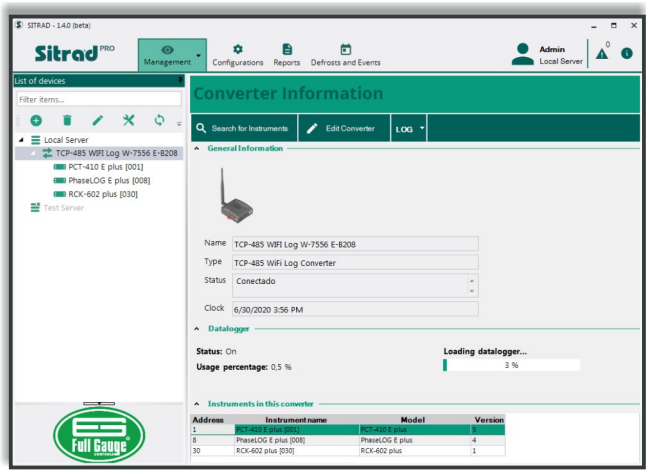


Figure 33

10.2.3. Delete

To delete the Datalogger data from the converter, select the LOG ⏩Clear Datalogger memory menu on the Converter Information tab (Figure 31). A window will be displayed confirming the operation (Figure 34). Select Yes and all logs will be deleted from the converter's memory.

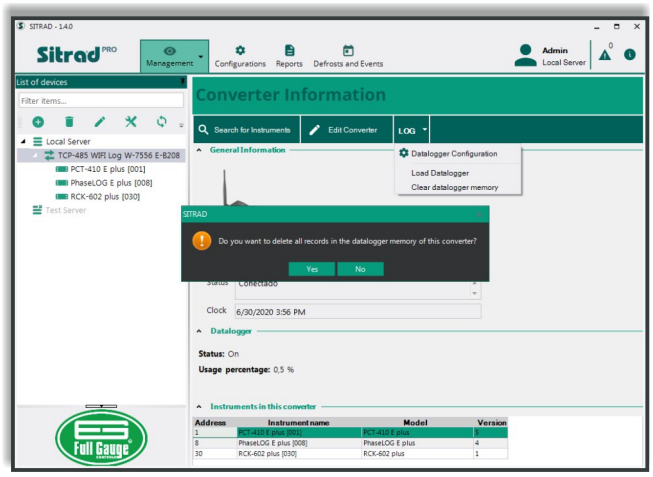


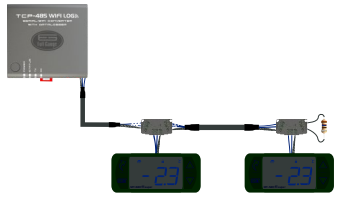
Figure 34

11. USAGE RECOMMENDATIONS

When the **TCP-485 Wi-Fi Log** uses wireless communication, some recommendations must ve taken into account when installing it, in order to guarantee its best performance. Here are some of them.
1) Check that the Wi-Fi devices are compliant with the IEEE 802.11 b/g/n standard;
2) Install the Wi-Fi router preferably at the highest point of the room, so that your signal is better broadcast, with a minimum or interference from obstacles;
3) Observe in the router's technical specifications how many simultaneous connections it supports;
4) Avoid sources of interference, such as:
- Microwave ovens;
- Direct Satellite Services (DSS);
- Power sources (power transmission lines, electric railway tracks and power stations);
- 2.4 GHz or 5 GHz phones;
- Wireless radio frequency video;
- Wireless speakers;
- LCD screens and external monitors;
- Unprotected cables;
- Other wireless devices.
5) At the installation site, avoid physical barriers that attenuate the signal, below we have a table with the level of attenuation of each material:

Barrier types	Interference potential
Wood	Low
Synthetic materials	Low
Glass	Low
Water	Medium
Brick	Medium
Marble	Medium
Plaster	High
Concrete	High
Armored glass	High
Metal	Very high

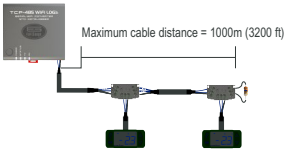
12. CONNECTING CONTROLLERS, RS-485 SERIAL INTERFACE AND COMPUTER



12.1 FOR A ROBUST ELECTRICAL INSTALLATION, TRY TO FOLLOW THE RECOMMENDATIONS BELOW:

- Use 2-way cable, with a minimum of 24AWG;
- Use preferably shielded cables in order to protect the communication line from external interference;
- If necessary, please use a connection block;
- Use the connection blocks to make the connections to the controllers. In addition to facilitating the connection, they have a protection purpose;
- Avoid connections greater than 2 meters (6.5 ft) between the connection block and the controller;
- Use a maximum number of **32 devices** connected to each Interface.

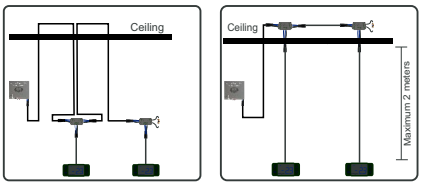
- Dimension networks with a maximum length of **1000m** (3200 ft) between the Interface and the last controller.



- Connect a 120 ohm terminating resistor between terminals **A** and **B** of the connection block at the end of the line when using a cable length greater than **100m** (320 ft).

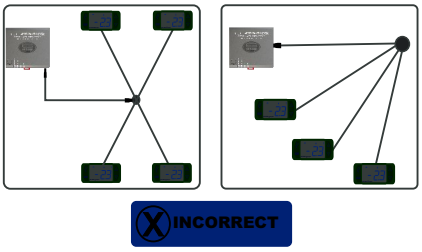
12.2 RECOMMEND TOPOLOGIES:

- Use one of the following settings to create a well-defined path.



12.3 NON-RECOMMENDED TOPOLOGIES

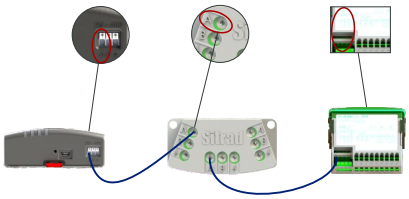
- Avoid creating long network branches.



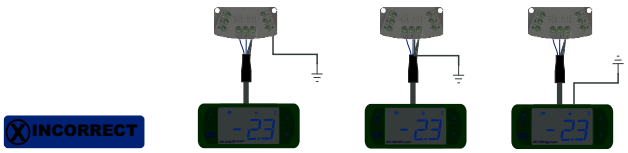
12.4 CONNECTION BLOCK FOR SERIAL COMMUNICATION

**Sold separately*

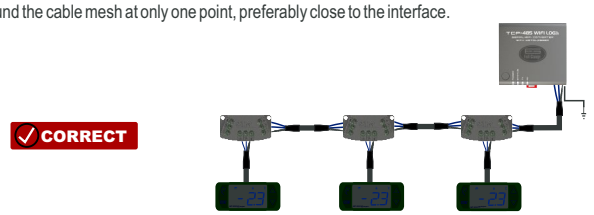
It is used to connect more than one controller to the interface. Wire connections should be made as follows: Terminal **A** of the controller connects to terminal **A** of the connection block, which in turn must be connected to terminal **A** of the Interface. Repeat the procedure for terminals **B** and ⏚ with ⏚ being the cable mesh. The ⏚ terminal of the connection block must be connected to the respective ⏚ terminals of each controller.



- Do not ground the controllers independently.

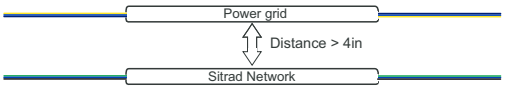


- Ground the cable mesh at only one point, preferably close to the interface.



12.5 IMPORTANT

According to NBR 5410 standard chapters:
1. Install surge protectors in the supply.
2. Sensor and serial communication cables can be together, but not in the same conduit through which electrical power and load activation pass.



ENVIRONMENTAL INFORMATION

Packaging:

The materials used in the packaging of Full Gauge products are 100% recyclable. Try to perform disposal through specialized recyclers.

Product:

The components used in Full Gauge controllers can be recycled and reused if disassembled by specialized companies.

Disposal:

Do not incinerate or dispose the controllers that have reached the end of their service as household garbage. Observe the laws in your area regarding disposal of electronic waste. If in doubt, please contact Full Gauge Controls.

WARRANTY - FULL GAUGE CONTROLS

The products manufactured by Full Gauge Controls after May 2005, have a warranty period of 10 (ten) years directly with the factory and 01 (one) year with accredited resellers, counted from the date of sale included on the invoice. After this year with resellers, the guarantee will continue to be valid if the instrument is sent directly to Full Gauge Controls. This period is valid for the Brazilian market. Other countries have a 2 (two) year warranty. The products are guaranteed in case of manufacturing failure that makes them unsuitable or improper for the applications for which they are intended. The warranty is limited to the maintenance of instruments manufactured by Full Gauge Controls, disregarding other types of expenses, such as indemnity due to damage caused to other equipment.

EXCEPTIONS TO WARRANTY

The Warranty does not cover expenses incurred for freight and/or insurance when sending products with signs of defect or faulty functioning to an authorized provider of technical support services. The following events are not covered either: natural wear and tear of parts; external damage caused by falls or inadequate packaging of products.

LOSS OF WARRANTY

Products will automatically lose its warranty in the following cases:

- The instructions for assembly and use found in the technical description and installation procedures in Standard IEC60364 are not obeyed;
- The product is submitted to conditions beyond the limits specified in its technical description;
- The product is violated or repaired by any person not a member of the technical team of Full Gauge Controls;
- Damage has been caused by a fall, blow and/or impact, infiltration of water, overload and/or atmospheric discharge.

USE OF WARRANTY

To make use of the warranty, customers must send the properly packaged product to Full Gauge Controls together with the invoice or receipt for the corresponding purchase. As much information as possible in relation to the issue detected must be sent to facilitate analysis, testing and execution of the service.

These procedures and any maintenance of the product may only be provided by Full Gauge Controls Technical Support services in the company's headquarters at Rua Júlio de Castilhos, 250 - CEP 92120-030 - Canoas - Rio Grande do Sul – Brasil

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