Installation & Commissioning Guide

DIRIS DigiBOX A-200

UL/CSA

Ed.1

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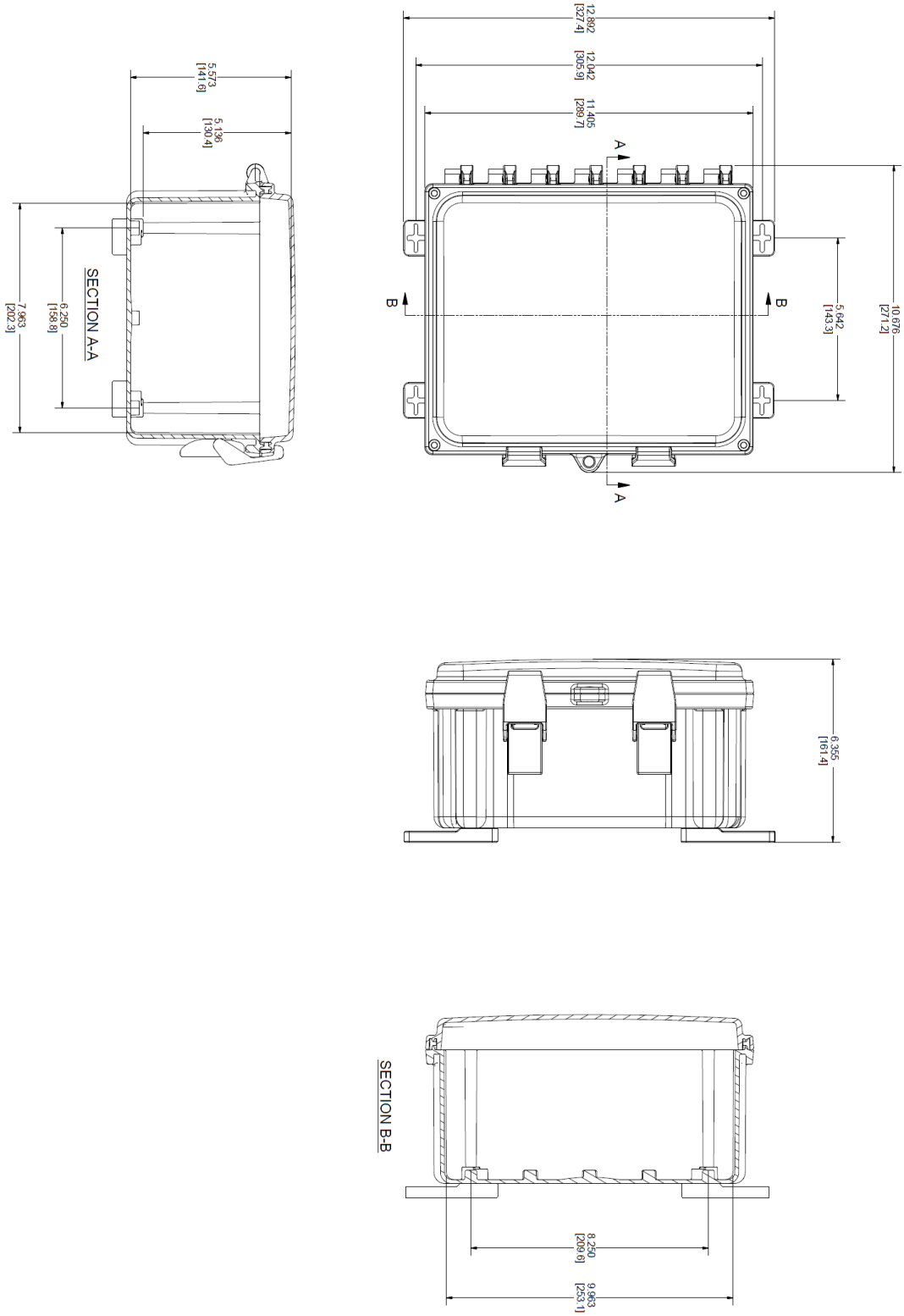
Introduction:

The purpose of this document is to explain the steps of installing and configuring the DIRIS DigiBOX A-200.

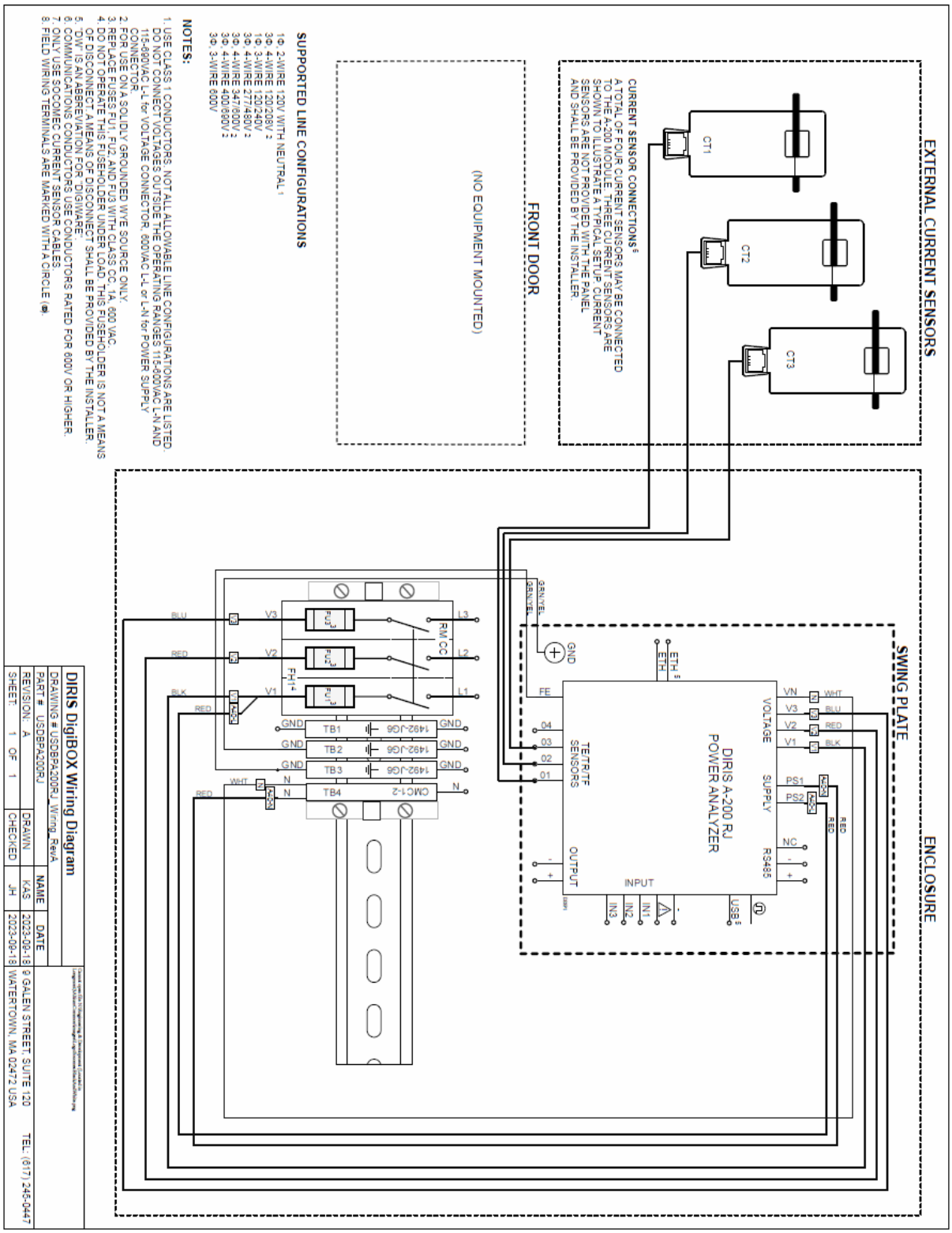
Part Number	Description	
USDBPA200RJ	DIRIS DigiBOX A-200 enclosed single-point power meter; 4 CT channels; Polycarbonate NEMA 4X enclosure; RS485 Modbus RTU and Ethernet Modbus TCP/IP + BACnet IP communication; internally pre-wired with fused voltage connections; 115 – 600 VAC power supply	

Dimensions in / [mm]:



Wiring diagrams:

> USDBPA200RJ



Technical characteristics:

Electrical characteristics

Auxiliary power supply	
Voltage	115-600 VAC
Frequency	50/60 Hz

Measurement characteristics

Power and energy measurement	
Accuracy active energy and active power	Class 0.2, DigiBOX A-200 alone Class 0.5 with TE, iTR, TF sensors Class 1 with TR sensors
Accuracy reactive energy	Class 1 with TE, iTR, TF sensors
Power factor measurement	
Accuracy	Class 0.5 with TE, iTR, TF sensors Class 1 with TR sensors
Voltage measurement	
Electrical network type	Single-phase (1P2W) / Two-phase (2P2W) / Two-phase with neutral (2P3W) / Three-phase (3P3W) Delta / Three-phase with neutral (3P4W) Wye / Three-phase (3P4W) Delta High Leg
Voltage measurement rating	50-600 VAC (Ph-N) / 90-690 VAC (Ph-Ph) – CAT III
Voltage accuracy	Class 0.1
Voltage input consumption	≤ 1 VA
Frequency range	45 – 65 Hz
Frequency accuracy	Class 0.02
Current measurement	
Number of current inputs	4
Associated current sensors	Solid-core TE, split-core TR/iTR, flexible Rogowski TF
Connection	Socomec RJ12 cables
Accuracy	Class 0.1 DigiBOX A-200 alone Class 0.5 with TE, iTR, TF sensors Class 1 with TR sensors

Mechanical characteristics

Application	Indoor or outdoor installations
Enclosure	Polycarbonate with UV inhibitors UL94-5VA flammability rating
Enclosure dimensions (in)	12 (H) x 10 (W) x 6 (D)
Protection rating	NEMA 4X / IP66
Operational temperature	-13 ... +158 °F / -25 °C ... +70 °C
Altitude	≤ 9840 ft / 3000 m

Communication characteristics

RS485	
Link	RS485
Connection type	2 to 3 half duplex wires
Protocol	Modbus RTU
Baudrate	9600 – 115200 baud
Ethernet	
Link	Dual Ethernet
Connection type	RJ45 10/100 Mbs
Protocol	Modbus TCP/IP, BACnet IP
USB	
Link	Micro USB Type b
Protocol	Modbus RTU
Use	Configuration via Easy Config System and firmware upgrade via Product Upgrade Tool

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1. Hazards and Warnings

The term "device" used in the paragraphs below refers to the DIRIS A-200. The assembly, use, servicing and maintenance of this product must only be carried out by trained, qualified professionals.

SOCOMEC shall not be held responsible for failure to comply with the instructions in this manual

1.1 Risk of electrocution, burns or explosion

	Caution: risk of electric shock	Ref. ISO 7000-0434B (2004-01)
	Caution: refer to the accompanying documentation each time this symbol is shown	Ref. ISO 7010-W001 (2011-05)

- Only duly authorized and qualified personnel may work or install/uninstall the device.
- The instructions are valid together with the specific instructions for the device.
- The device is designed only for its intended purpose as set out in the instructions.
- Only accessories authorized or recommended by SOCOMEC may be used in association with the device.
- Before proceeding with installation, maintenance, cleaning, disassembly, connection, or maintenance work, the device and system must be cut off from the mains to avoid electrocution

	Do NOT clamp or pull out NON-INSULATED conductors carrying DANGEROUS VOLTAGE which could cause an electric shock, burn or arc flash. Ref. IEC 61010-2-032

  and damaging the system and device.
- This device is not designed to be repaired by the user.
- For any questions related to the disposal of the device, please contact SOCOMEC.

Failure to comply with the instructions of the device and this safety information can cause bodily injury, electric shock, burns, death or damage to property.

1.2 Risk of Damaging the Device

	Caution: risk of electric shock	Ref. ISO 7000-0434B (2004-01)
	Caution: refer to the accompanying documentation each time this symbol is shown	Ref. ISO 7010-W001 (2011-05)

To ensure that the device operates correctly, make sure that:

- The device is correctly installed.
- There is a maximum voltage at the voltage measurement input terminals of 690 VAC phase-phase or 600 VAC phase-neutral.
- There is a maximum voltage at the auxiliary power supply input terminals of 600 V AC.
- The network frequency indicated on the device is observed: 50 or 60 Hz.
- Always connect the TE, TR/iTR or TF current sensors using Socomec RJ12 cables and observing the maximum prescribed currents.
- When the ambient temperature exceeds +50°C, the minimum temperature rating of the copper cable to be connected to terminal must be +85°C.

Failure to respect these precautions could cause damage to the device.

1.3 Responsibility

- Assembly, connection and use must be carried out in accordance with the installation standards currently in force.
- The device must be installed in accordance with the rules given in this manual.
- Failure to observe the rules for installing this unit may compromise the device's intrinsic protection.
- The device must be positioned within an installation which complies with the standards currently in force.
- Any cable which needs to be replaced may only be replaced with a cable having the correct rating.
- Despite constantly striving for quality in preparing this manual, errors or omissions are always a possibility and are not the responsibility of SOCOMEC

2. Conduit Hole

The DIRIS DigiBOX A-200 is shipped with no conduit holes; they can be cut on the left side, right side, and/or the top. See the below drawings for recommended conduit hole locations.

1. Open the enclosure door, unscrew the two right ride screws, and lift the metal plate.
2. Cut the conduit holes only in the locations where conduit fittings will be installed. Conduit hole templates can be found within the black bag that comes in the box.
3. To maintain the enclosure's environmental rating, the installer must use conduit hubs/fittings* with the same environmental rating as the enclosure.
4. Maintain spacing of at least ½ inch between conduit hubs/fittings and uninsulated live conductors.
5. Use "Grounding" conduit fittings* with built-in set screws. Run insulated copper conductors, 16awg or thicker, from fittings to spar ground terminal blocks.
6. Route incoming voltage conductors at least ¼ inch away from current sensor and signal conductors. Route current sensor conductors at least ¼ inch away from communication conductors.
7. Use cable ties to secure conductors to each other and to maintain spacing

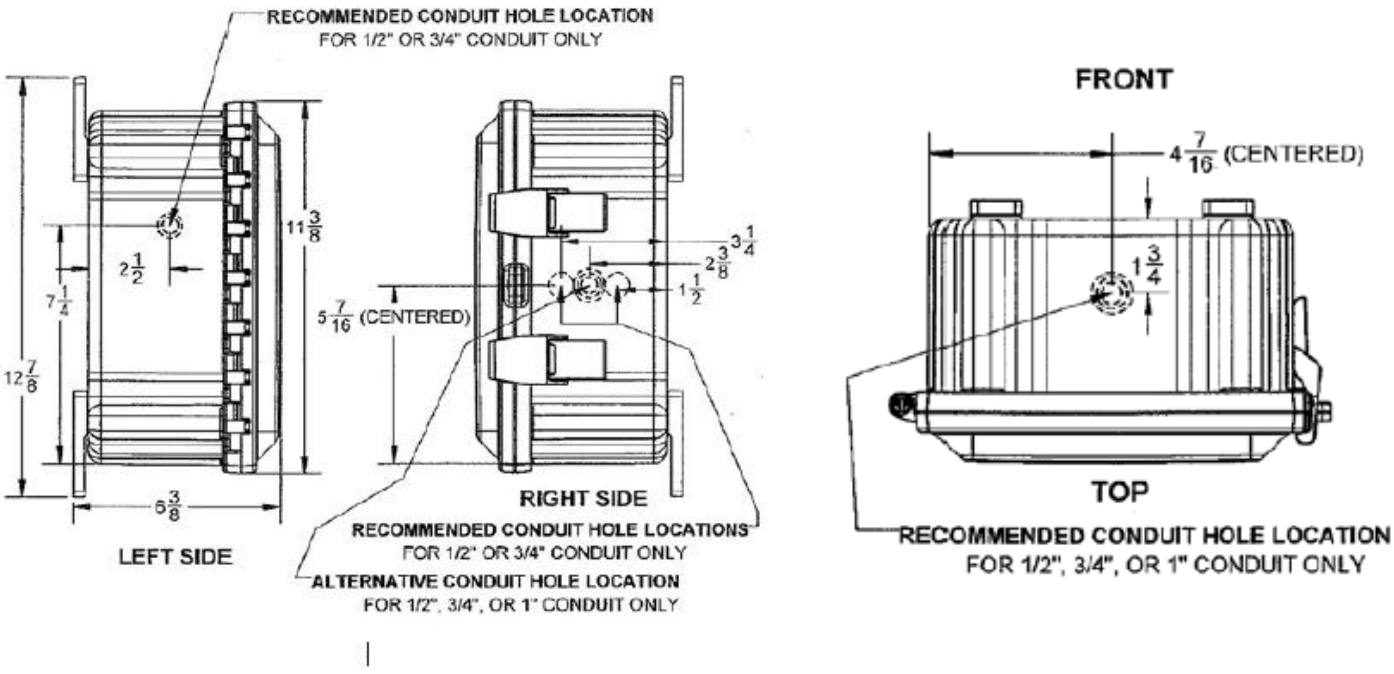


Figure 1: Recommended conduit hole locations

3. Install Mounting Feet to the Back of the Enclosure

1. A mounting feet and screw pack is provided with the DIRIS DigiBOX A-200.

Figure 2: Mounting feet and hardware provided with the DIRIS DigiBOX A-200.

2. Turn the enclosure upside down on a flat surface so the back side is visible. Then place the mounting feet over the octagon pieces either horizontally, diagonally, or vertically and fasten them with the ¼ inch -20 x 0.25 inch SS, countersunk Phillips drive screws (torque limit is 30 in. lbs.).

Figure 3: Three ways to place the mounting feet on the enclosure (vertical, horizontal, and diagonal).

3. The enclosure is now ready to be mounted vertically (i.e. on a wall) or horizontally (i.e. on a table top).

4. To mount the unit, use #10-32 ¾ inch pan head screws and screw directly in the center of the cross on the mounting feet.

Figure 4: Red dot indicates where to screw when mounting on surface.

4. Wiring of the system

Before wiring the system, make sure that the fuses are NOT installed. The fuses are to be installed AFTER all wiring is complete.

1. Behind the metal plate the prewired and the components that need to be wired can be seen.

2. Wire the voltage according to the designated fuse holder (L1, L2, L3, and N).

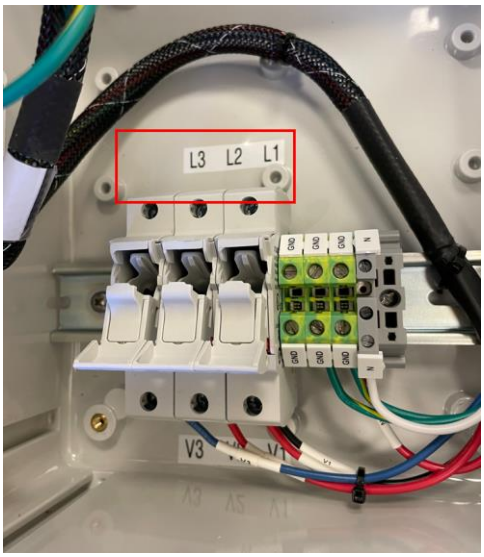


Figure 5: Wire the voltage based on the labeled fuse holders (note that the fuse holders are empty).

Note:

- *For a three-phase DELTA system, voltage is only wired to L1 L2, L3 inputs.*
- *For a single-phase system, voltage should be wired between L1 and N*

3. Plug in the RJ12 cables to the DIRIS A-200 and feed the RJ12 cables out of a conduit hole.

For a three-phase system:

- *Current sensor on phase A should be connected to I01 RJ12 port of DIRIS A-200,*
- *Current sensor on phase B should be connected to I02 RJ12 port of DIRIS A-200,*
- *Current sensor on phase C should be connected to I03 RJ12 port of DIRIS A-200,*
- *Optional current sensor on Neutral must be connected to I04 RJ12 port of DIRIS A-200.*

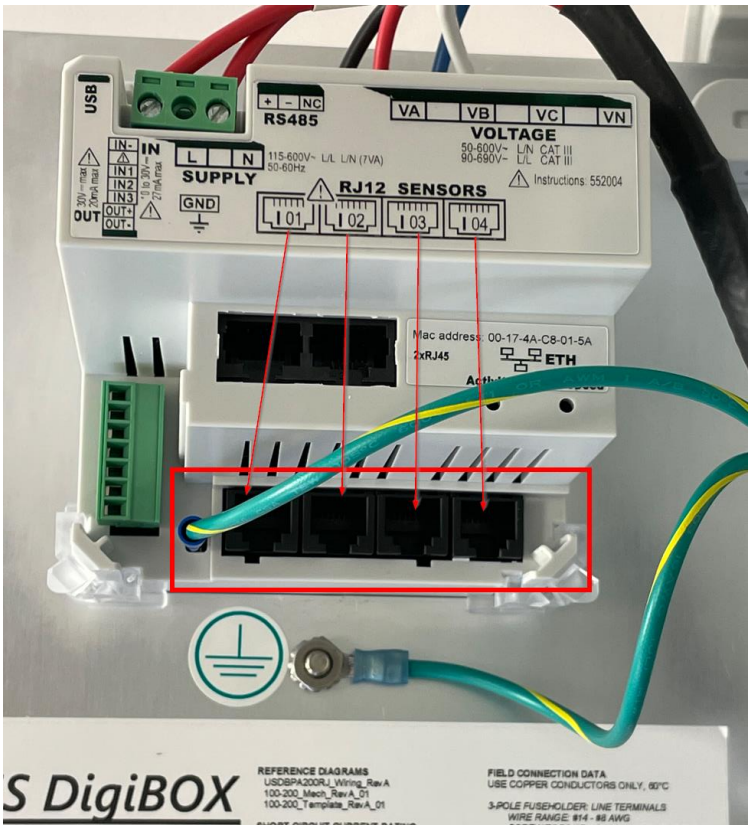


Figure 6: The boxed area is where the RJ12 cables are inserted on the DIRIS A-200.

In case of wiring errors (orientation of current sensor or phase association), software correction is possible without physically changing the wiring of current sensors (refer to 5.4, paragraph 5 to change current sensor settings).

4. Connect the current sensor to the load and plug the current sensor into the RJ12 cable connected to the DIRIS A-200

5. Plug in the Ethernet or RS485 bus depending on which communication protocol will be used, and feed the cable out of a conduit hole.

6. Maintain spacing of at least ½ inch between conduit hubs/fittings and uninsulated live conductors. Use cable ties to secure conductors to each other and to maintain spacing.

7. Put fuses provided in the black bag into the fuse holders

8. Close the metal plate and screw it back down. The DIRIS A-200 should now be on.

5. Configuring the DigiBOX A-200

5.1 Making sure firmware is up to date

1. Before commissioning your DIRIS DigiBOX A-200, make sure the DIRIS A-200 operates under the latest firmware version.
   The latest firmware versions are available on the Socomec website and firmware upgrade is done using the Product Upgrade Tool software, by connecting a laptop to the Micro USB port of the DIRIS A-200.

   Go to the website to download the Product Upgraded Tool:
   https://www.socomec.us/en-us/product-upgrade-tool

2. Product firmware is accessible from the Resource Center at the following link:
   https://www.socomec.us/en-us/resource-center/resource-type/firmware-266#main-wrapper
   Use the filter section on the left to find and download the DIRIS A-200 firmware.

   Please note that the firmware downloaded from the website is a zip file. DO NOT unzip the file, just directly upload the file into Product Upgrade Tool.

3. Plug in a micro USB cable to the back of the DIRIS A-200.

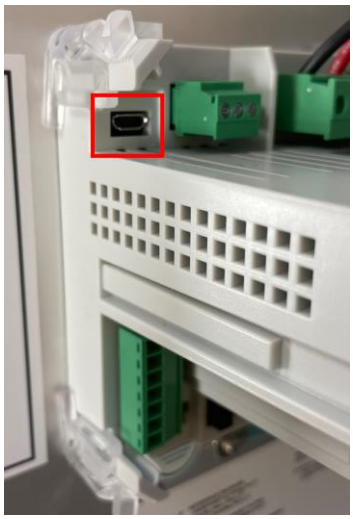


Figure 7: The micro USB port on the DIRIS A-200

DIRIS A-200 must be powered before connecting USB cable to laptop. In the event the USB cable has been plugged before powering the DIRIS A-200, disconnect both power supply and USB cable and repeat operation, powering the DIRIS A-200 first.

4. Open the Product Upgrade Tool software to get the below screen:

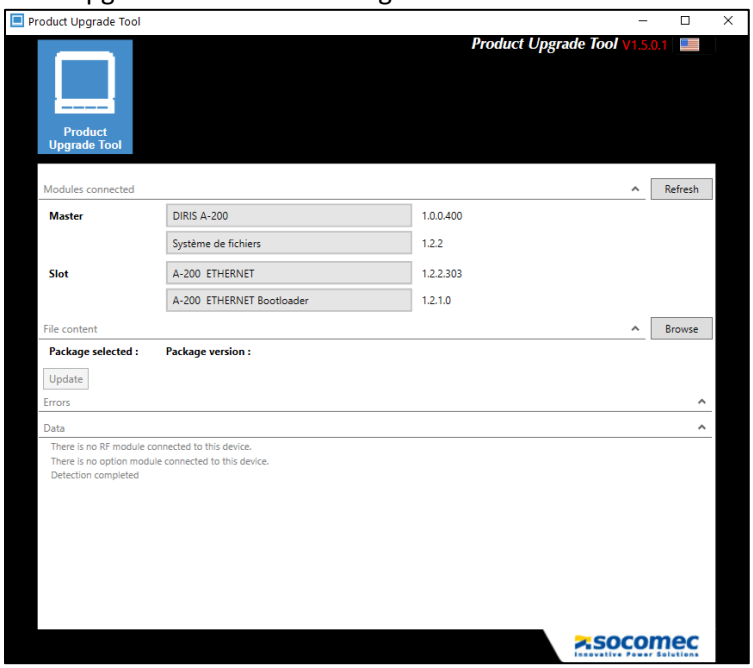


Figure 8: Product Upgrade tool home screen.

5. Click “Browse” and select the firmware folder that was downloaded.
   - An orange symbol means the firmware selected is the same as the one on the DIRIS A-200.
   - A green symbol means that the firmware selected is more recent than the one currently on the DIRIS A-200 and an upgrade is possible.
   - A red symbol means that the firmware selected is a lower version than the one currently on the DIRIS A-200.

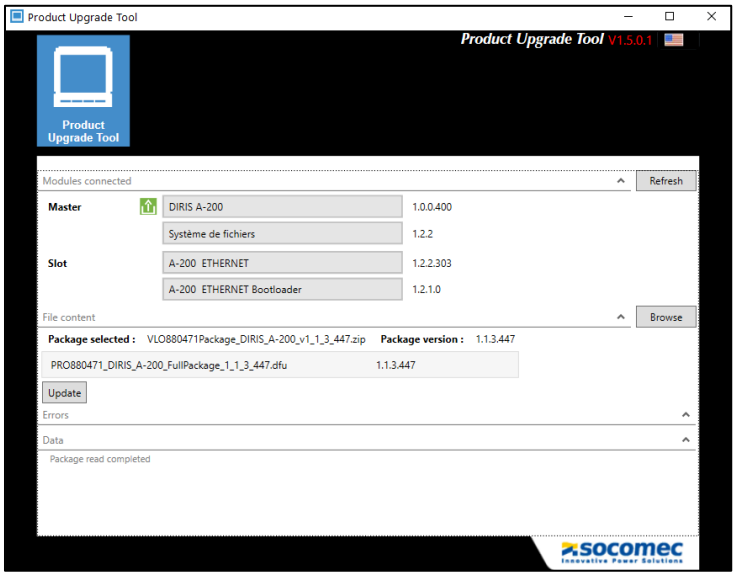


Figure 9: Product upgrade tool screen once the firmware is selected.

6. Click on “Update” if needed. Once the firmware is up to date you will see the following screen

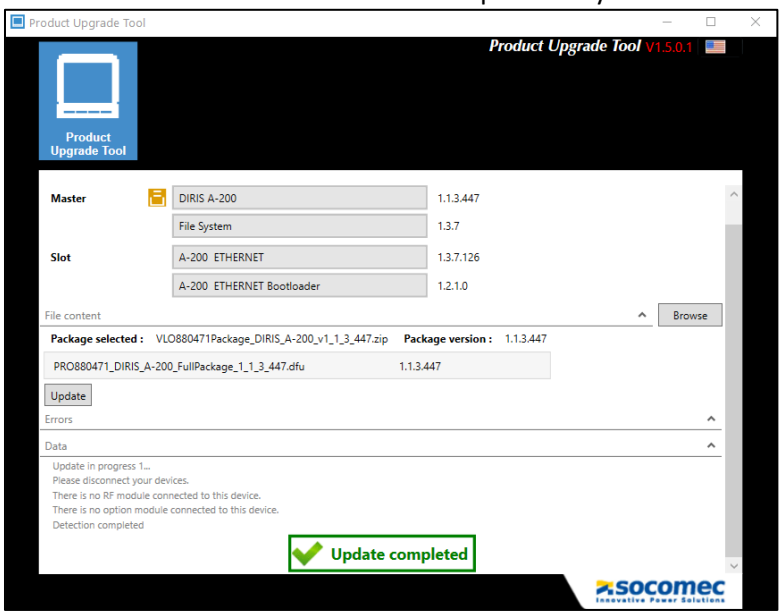


Figure 10: Product Upgrade Tool screen once update is complete.

5.2 Configuration Wizard

The DIRIS A-200 can be configured using the screen’s configuration “Wizard”. When using the Wizard the DIRIS A-200 provides step by step assistance from its screen. Follow the on screen instructions**.**

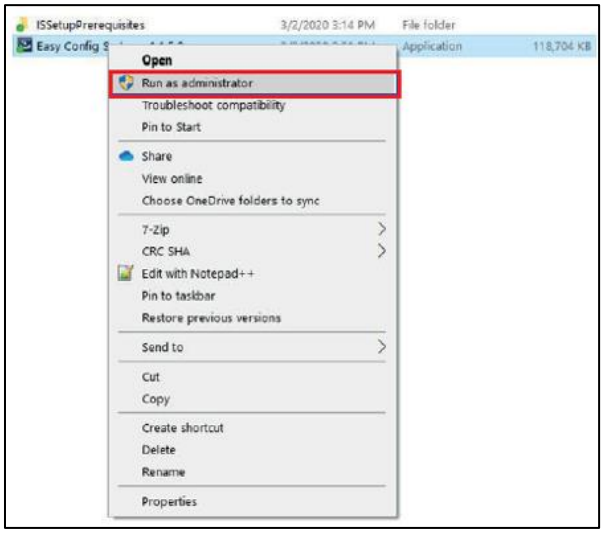
Complete configuration of the DIRIS DigiBOX A-200 can be performed from the Easy Config System software (versions 2.5 and above).

5.3 Installing Easy Config System

Easy Config System is a free software used for configuring Socomec Power metering devices from a computer.

1. Download Easy Config System from the following link:
   https://www.socomec.us/en-us/easy-config-system-software

2. Once the Easy Config System folder is saved on your computer, right click on the setup file and **Run as administrator**.



3. Plug the micro USB cable to the slot on the back of the A-200 power meter. Plug the USB end of the cable to the computer.

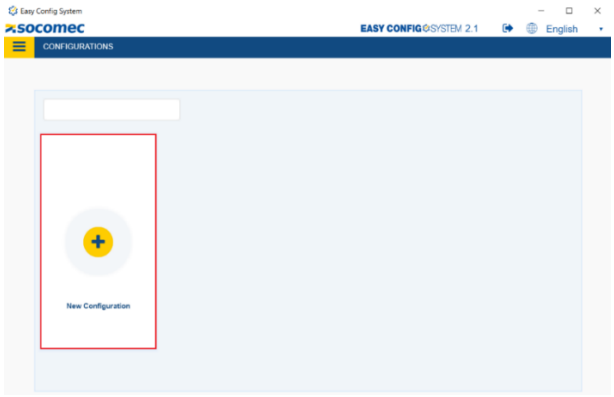
The DIRIS A-200 must be powered before connecting USB cable to laptop. In the event the USB cable has been plugged before powering the DIRIS A-200, disconnect both power supply and USB cable from DIRIS A-200 and repeat operation, powering the DIRIS A-200 first.

4. Open **Easy Config System** to configure the DIRIS A-200 power meter.

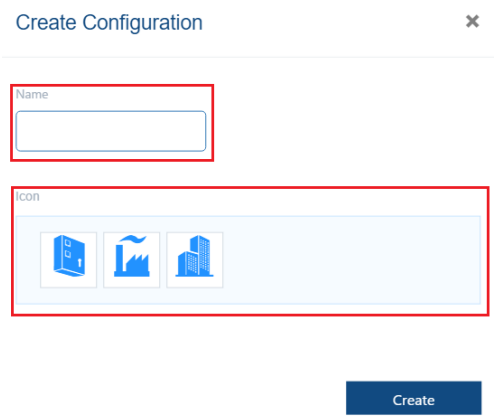
5. When logging in, choose the Admin profile and complete the verification using the information below. Each profile provides a different level of access.

Profile	Default Password	Capabilities
User	No Password	• Visualization • Basic Configuration
Admin	Admin	• Visualization • Full Configuration • Save System • Open System • Save Template • Upload Template • Template Management Password Modification

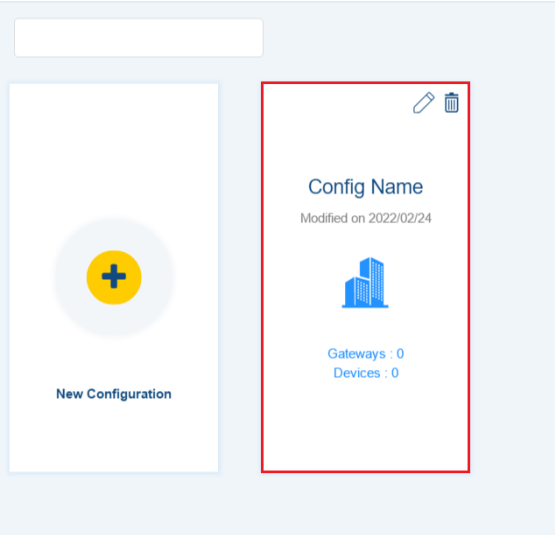
6. Create a new configuration by selecting **New Configuration.**



7. In the pop up window name your configuration and choose an icon.



8. Select the recently created configuration from the list.



9. Click on the **Device List** icon 

10. Navigate to and select **USB mode** on the top right corner to connect to the A-200 power meter and access configuration menus. 

The DIRIS DigiBOX A-200 will be automatically detected by **Easy Config System** (shown in the image below). If not, try disconnecting and reconnecting the cable and again clicking on **USB Mode**

5.4 Configuration of the DIRIS DigiBOX A-200 using Easy Config System

1. Once connected to the DIRIS A-200, navigate to and select **Device Configuration.**

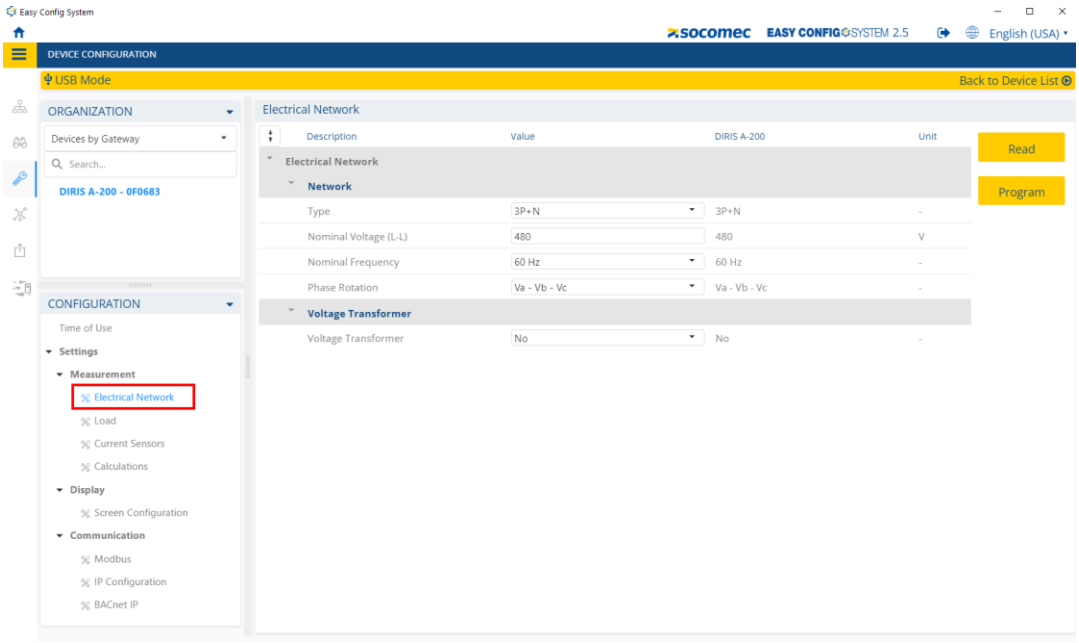
Time of Use

The DIRIS A-200 records Time of Use (ToU) energies on a perpetual calendar, managing up to 4 different seasons, up to 4 different rates, holidays and special days.

A dedicated dashboard allows to customize the tariff schedule based on the utility requirements. A tutorial video is available at the following link to help you configure your Time of Use calendar: https://www.youtube.com/watch?v=z__03s5lBDM

Measurement

2. **Electrical Network:** select the Network Type being measured based on where the voltage is measured by the DigiBOX A-200 as well as the L-L nominal voltage and nominal frequency (60 Hz in North America)



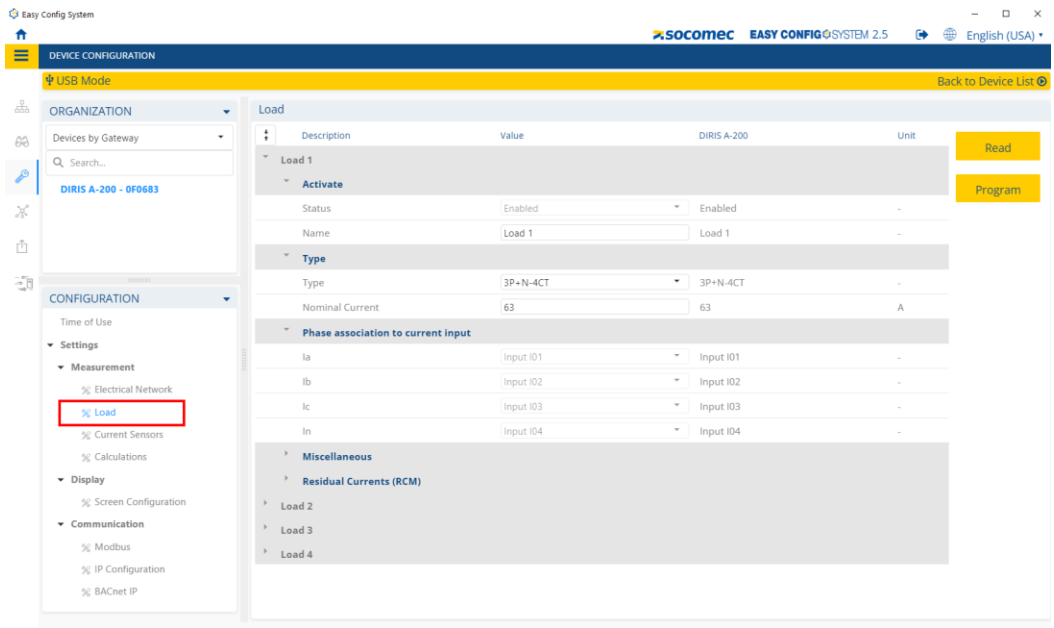
For a three-phase Wye system, make sure the Electrical Network is configured as 3P+N. If configured as 3P only (Delta system), some electrical values (Va, Vb, Vc) will not be available.

3. Once you have entered your parameters, click on **Program** at the top right side of the screen and this will immediately flash the DigiBOX A-200. Clicking on **Program**, only flashes the parameters of the tab that you are currently working on to the DigiBOX A-200.

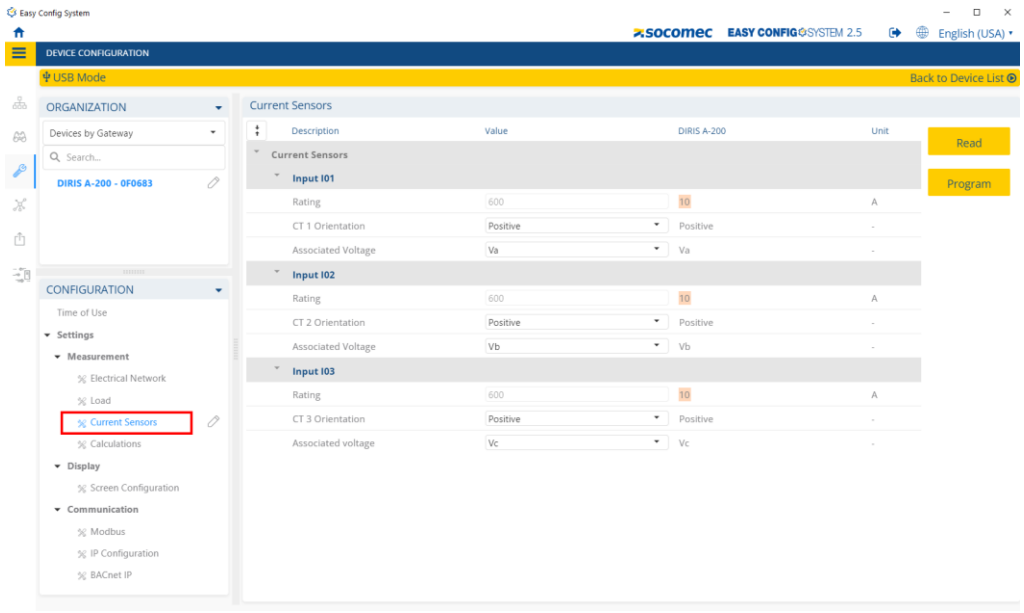
4. **Load:** Define the Load Type being measured and provide the Nominal Current. You can also name the Load and define the energy usage.

Note: *Supported load types : 1P+N – 1CT, 2P – 1CT, 2P+N - 2CT, 3P – 3CT / 3P – 2CT / 3P – 1CT, 3P+N – 3CT / 3P+N – 1CT*

For a three-phase load with neutral (Wye), make sure the Load type is configured as 3P+N – 3CT or 3P+N – 4CT. If configured as 3P (Delta), some electrical values for individual phases will not be available (P1, P2, P3).



5. The **Current Sensors** menu allows you to configure the current sensors connected to the DigiBOX A-200.
   The rating of current sensors is automatically detected thanks to the RJ12 technology.
   For each current sensor, you can change:
   - Its orientation: Positive = P1 → P2 on TE/TR/iTR current sensors and in the same direction as arrow for TF current sensors
   - Its phase voltage association. This is particularly useful if a wiring mistake has been made during installation

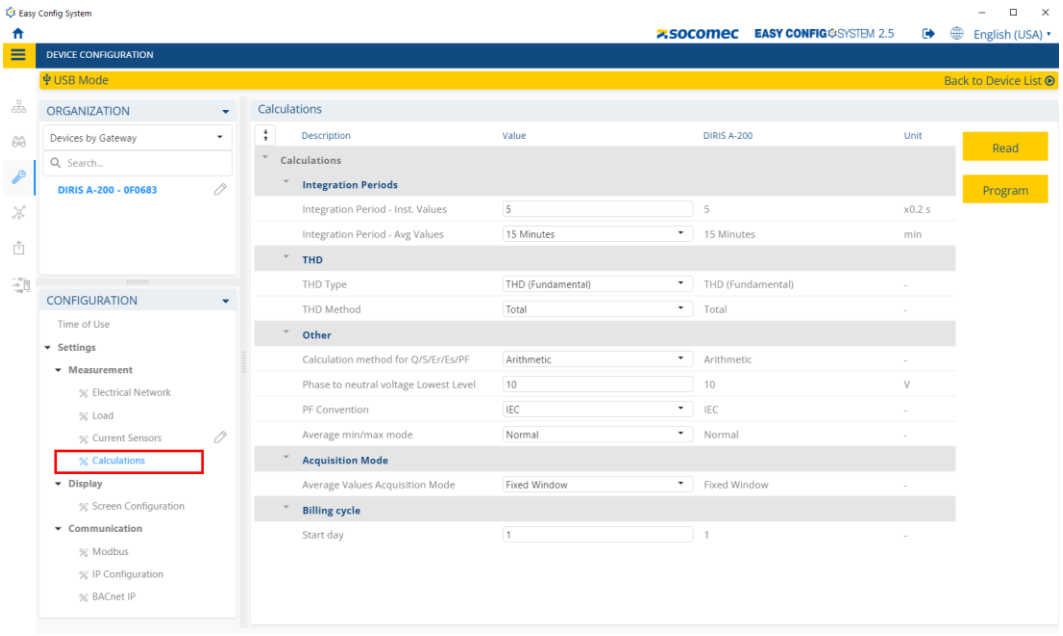


6. **Calculations:** Set the integration period for instantaneous and average values of the different electrical parameters.

Notes:

*The integration period of average values determines the reading interval of **Trends** displayed on WEBVIEW-S, the webserver embedded in the DigiBOX A-200.*

Refer to step 11 to choose the electrical parameters you wish to record for Trends curves on WEBVIEW-M.



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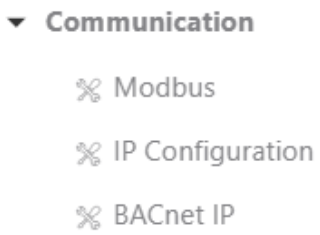
Display

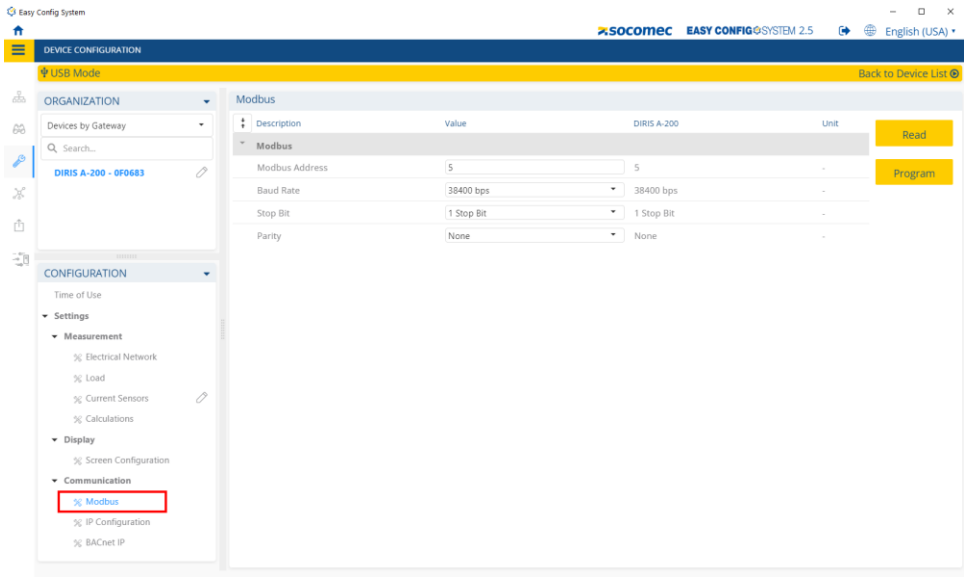
7. The **Display** section allows to customize the A-200 screen settings for optimal user experience (language, backlight settings etc.).

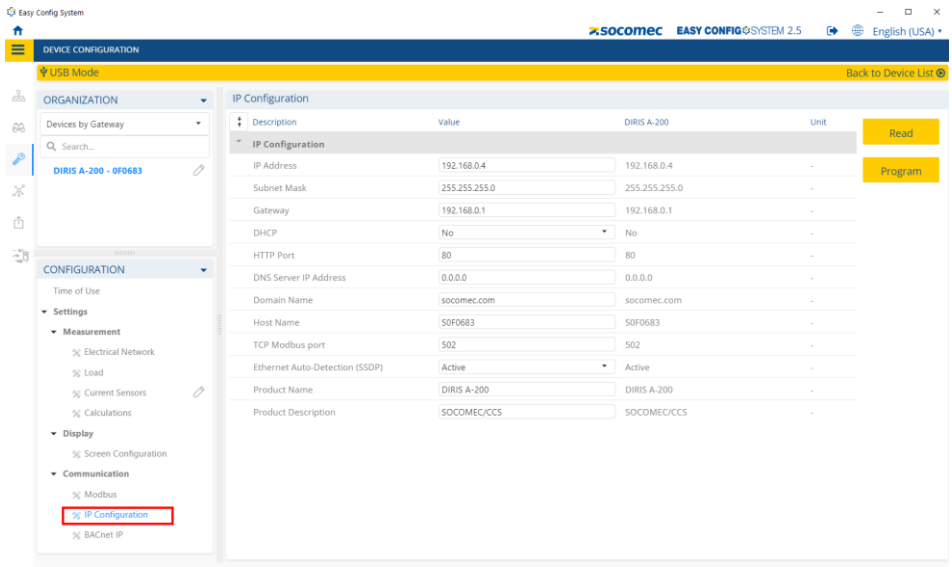
Communication

8. The **Communication** section will show the different communication protocols and their parameters (IP Address, MODBUS Address, Baud rate, etc.).



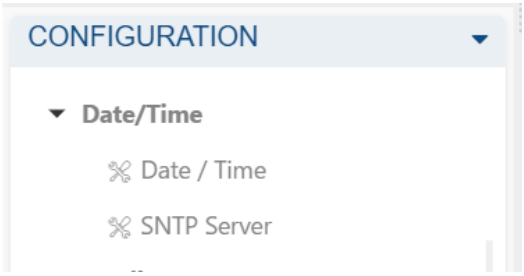
The Modbus address and IP address will give you the capability to connect and communicate with the product. Enter all desired IP settings.





Date/Time

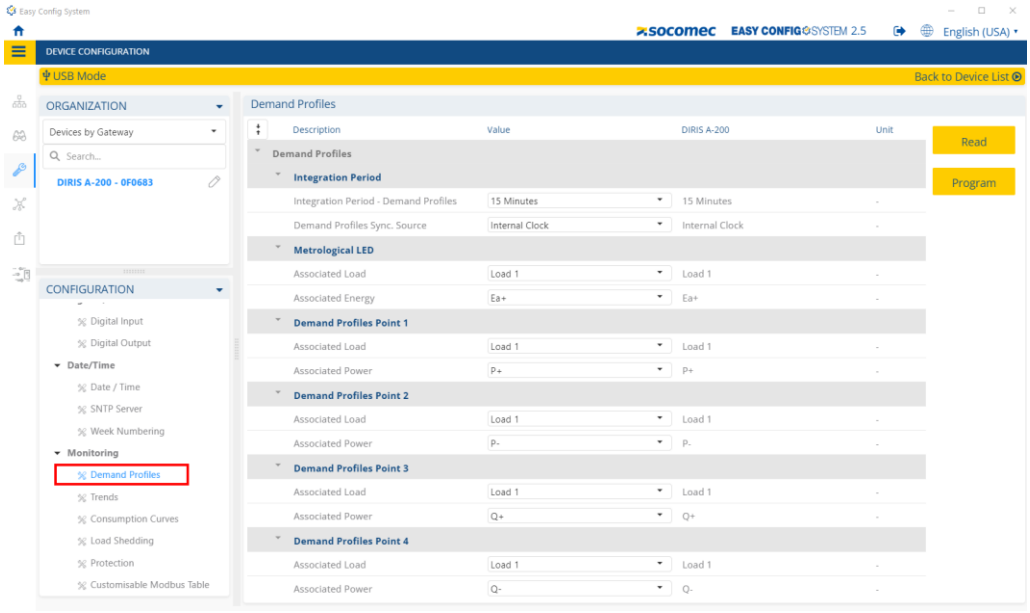
9. Next, click on the **Date/Time** tab. You can synchronize the date/time of the DigiBOX A-200 to the Date/time of your computer manually, or set up an SNTP server for an automatic time synchronization to an SNTP server. Ask your IT department for SNTP server credentials.



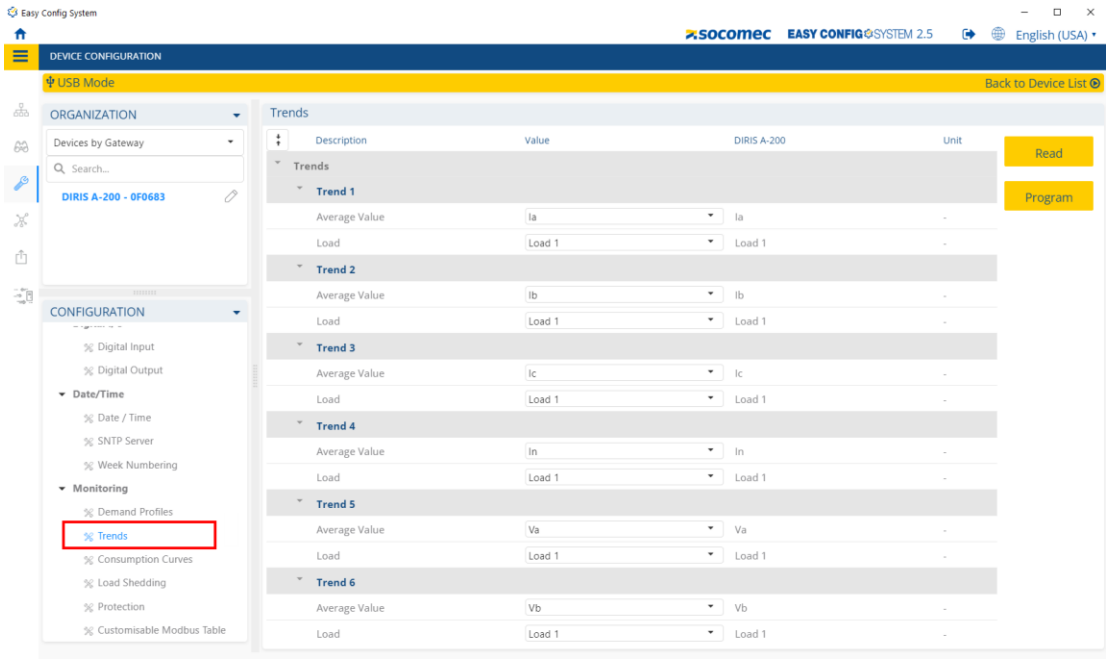
Monitoring

10. **Demand profiles:** Set the integration period of Demand profiles, then select which power values you wish to log and their associated load. Demand profiles can be visualized on the embedded webserver WEBVIEW-S.

***Note:** It is recommended to set the integration period of Demand profiles at 15 min (default value), so it matches most utility meter reading intervals.*



11. Trends: Choose and select the different parameters you want to record and be able to visualize trends (historical view) on WEBVIEW.



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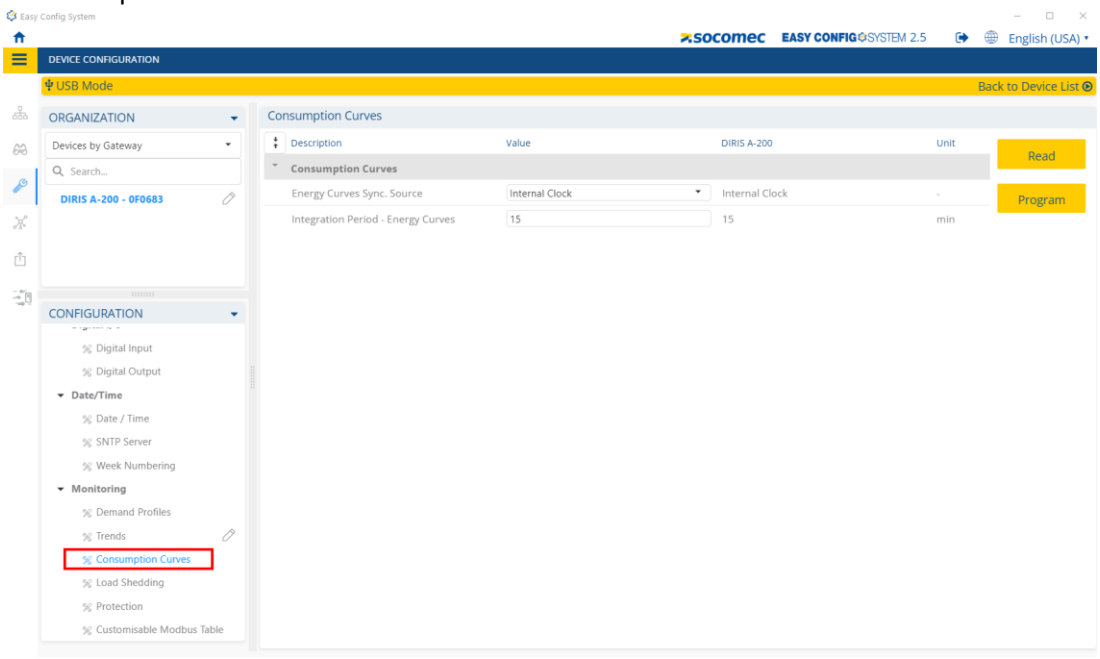
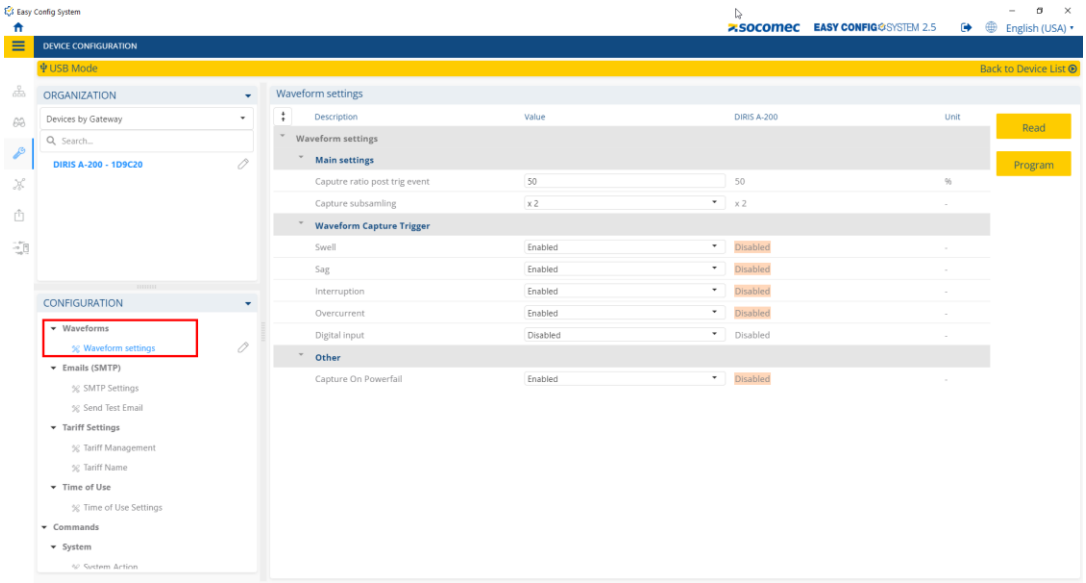
12. **Consumption Curves:** Set the desired integration period for consumption curves (kWh). Consumption curves can be visualized on the embeded webserver WEBVIEW-S.



Waveforms

13. By default, waveform captures are disabled for voltage sags, interruptions, swells and overcurrents. Change each setting to “Enabled” to activate automatic waveform capture upon detection of a power quality event.
14. To trigger a waveform capture upon a loss of power supply, enable “Capture on Powerfail”.



Make sure nominal voltage (L-L value) is correctly configured in "Electrical Network" menu.

Notes: *By default, a sag will be detected if voltage drops below 90% of nominal voltage, a swell if voltage goes above 110% of nominal voltage, and an interruption if voltage drops below 5% of nominal voltage. If necessary, go to the Alarms section - EN50160 events to change the power quality event thresholds.*

15. You can also change the Pre/Post trigger ration (50% by default, meaning that half of the capture is before the event and the other half is after the event).

16. You can also change the capture subsampling from x1 to x8 (x2 by default). A subsampling x2 will provide 80 samples per cycle, while a subsampling x1 will provide 160 samples per cycle.

17. Continue to navigate through the remaining settings menus (*Digital I/O, Alarms and Emails (SMTP)*) and set all parameters per your application.

Please note that additional assistance from your IT department may be required when it comes to configuring communication protocols, services and ports.

18. Once the configuration is done in Easy Config System, follow the steps in chapter 6 to set up WEBVIEW-S to be able to visualize measurements from a web browser.

6. WEBVIEW-S

WEBVIEW-S is a free webserver, embedded in the DigiBOX A-200 and provides visualization of real-time measurements and monitoring of energy consumption and demand profiles. It is intended for use by those who wish to have a complete and user-friendly tool to quickly analyze malfunctions within their electrical installation to guarantee energy-related performance.

6.1 WEBVIEW-S configuration

1. Open the internet browser and type in the IP address of the DIRIS DigiBOX A-200.

The default IP address for the DIRIS DigiBOX A-200 is: 192.168.0.4

2. Log in as Administrator with the default password “Admin”.
For cyber security reasons the application ask you to change the default password. Your password must be changed at least once a year to access the setup menu of the webserver.

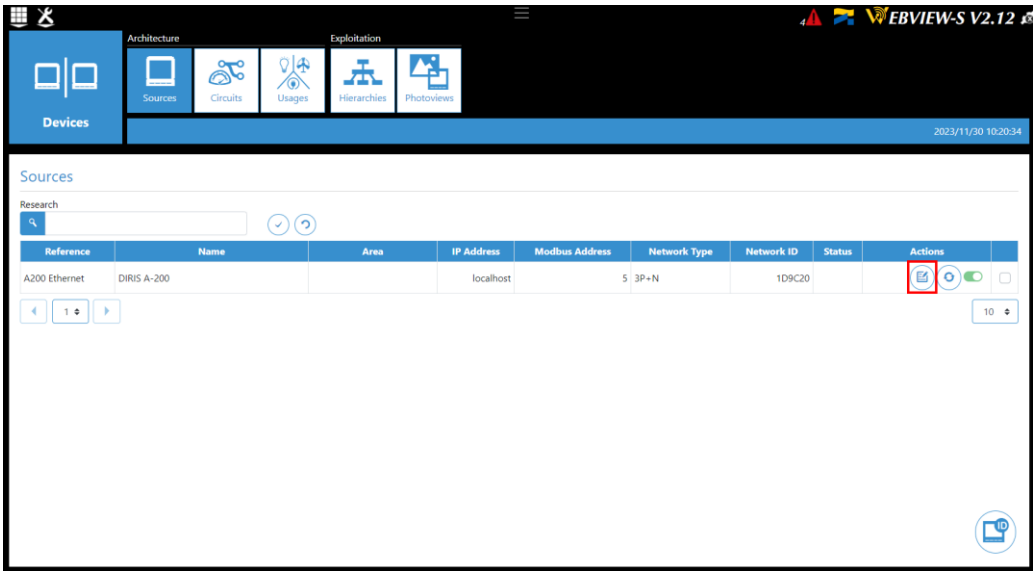
It is also recommended to change default passwords of Cyber Security and Advanced User profiles in addition to the Admin profile. Until default passwords for all 3 profiles have been changed, the Password Alert alarm will remain active and ***the ALARM LED on the DIRIS A-200 will be flashing.***

The Password Alert alarm can also be disabled from Easy Config System.

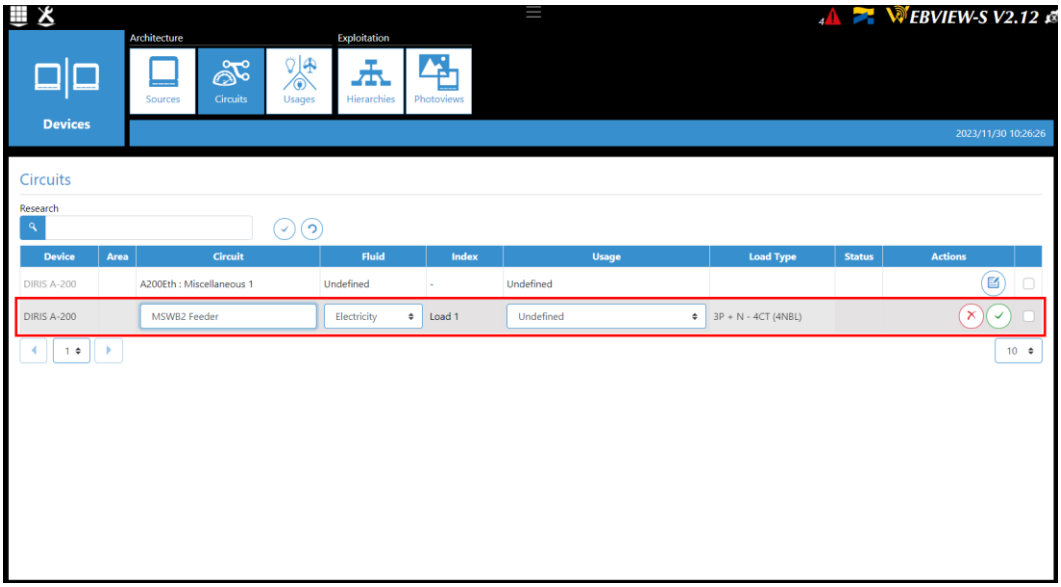
3. Once connected as Admin, click on the toolbox icon in the top left corner of the screen.

4. Then Click on the **"Devices"** tab on the top left hand of the screen.

5. The DIRIS A-200 will be listed, and you can click on the “Edit” button under the “Actions” column to customize the device name and choose an Area where the A-200 is located.



6. From the **“Circuits”** tab, you can rename the Load name (normally already configured in Easy Config System), and select an energy usage (heating, lighting etc.) associated to each load. Selecting energy usages is useful when creating Hierarchies to understand which usage consumes the most energy.



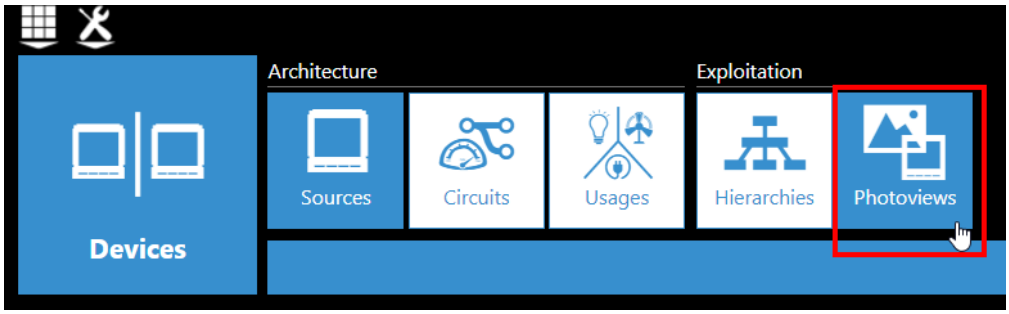
WEBVIEW-S is now set up. You can go back to home screen menu by clicking on 

The “Monitor” menu allows you to visualize real time measurements, the “Trends” menu allows you to visualize historical measurements, and “Consumption” menu shows consumption curves.

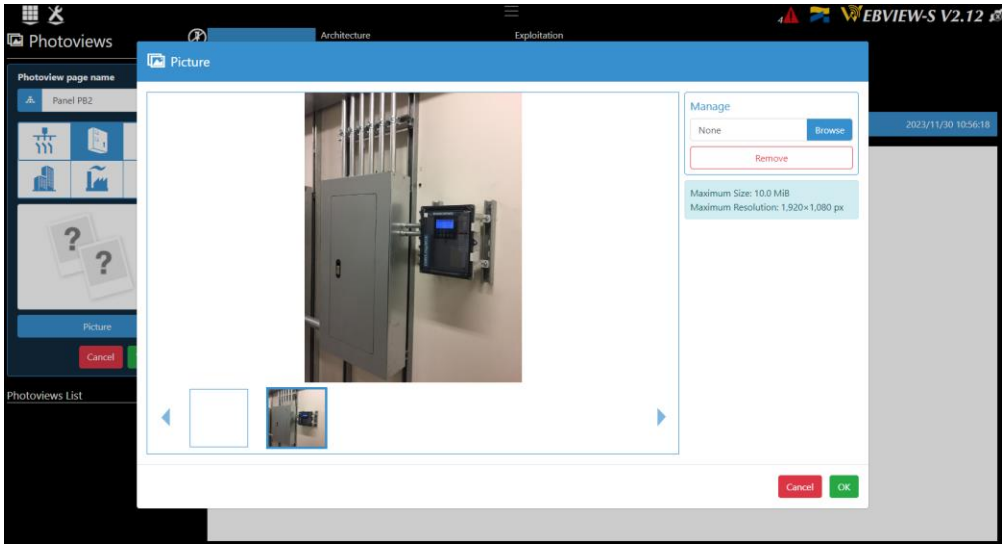
6.2 Configuring Photoview

Photoview allows you to display electrical measurements directly on a chosen background picture. The picture can be a map, a panel, an electrical diagram, etc. It shows an overview of all your metering points and their electrical measurements.

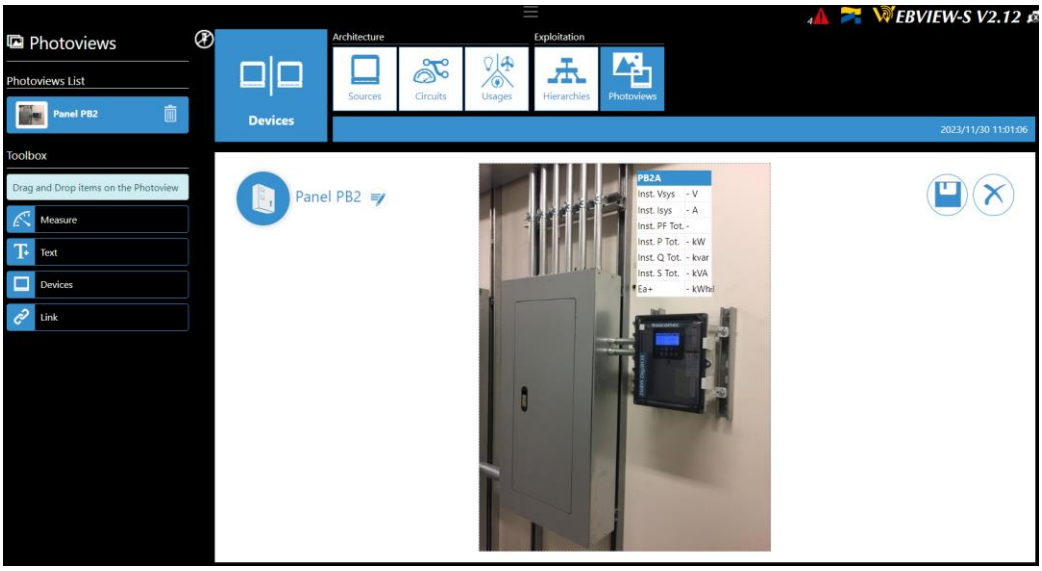
1. Click on the **"Photoviews"** tab:



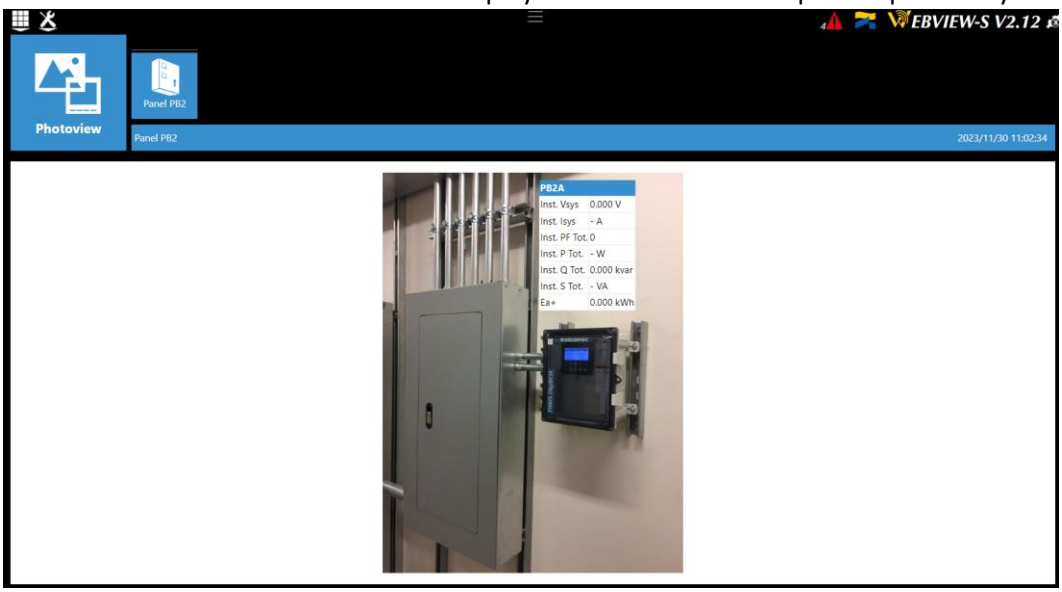
2. Next click on "Add a new Photoview".
3. Give it a name and choose an icon. Then select the picture you would like to use. Select the checkmark to validate.



4. The picture will now appear on the screen. On the picture, you can drag and drop devices, text and measurements. You can also add a link to create a connection to another Photoview.
5. For example, click and hold on "Measure" and drag it onto the picture. A selection window will open with the list of available devices, loads associated to the devices and data available for each load.
6. Select a device and select the different measurements you want displayed on your Photoview.
7. Once the measurements have been selected, they will be directly displayed on the picture. They can be moved anywhere on the picture.



8. Double click on the measurement table to go back to the list of devices, loads and measurements.
9. Once your Photoview is fully configured, click on the save icon on the right side of the screen.
10. Go back to WEBVIEW-S's homepage; a **"Photoview"** menu is now available.
11. Click on **"Photoview".** The values are displayed in real time on the picture previously chosen.



Congratulations! Your configuration is now complete.

If you need any assistance, please email our support team at tech.us@socomec.com.
For all other inquiries, contact info.us@socomec.com.

For more information on our other products and solutions, visit our website at www.socomec.us

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