Installation manual

Diagnose Controller Quick Installation Manual

Powering Business Worldwide

(en) Electric current! Danger to life!

Installation, commissioning and maintenance work must be carried out by qualified personnel only.

(de) Lebensgefahr durch elektrischen Strom!

Arbeiten bzw. Montage an diesem Produkt darf nur von Elektrofachkräften und elektrotechnisch unterwiesenen Personen ausgeführt werden.

(fr) Tension électrique dangereuse!

L'installation de l'appareil, ainsi que tous les travaux effectués sur celui-ci, doivent être réalisés par un électricien qualifié ou par un personnel spécialement formé.

(es) ¡Corriente eléctrica! ¡Peligro de muerte!

La instalación del dispositivo, así como todos los trabajos en él, deben ser realizados por un electricista calificado o por personal especialmente capacitado.

(it) Tensione elettrica: Pericolo di morte!

L'installazione e il lavoro sul dispositivo devono essere effettuati da un elettricista qualificato o da personale specializzato.

(zh) 触电危险！

設備的安裝，以及所有工作，
必須由合格的電工或經過專門培訓的人員完成。

(ru) Электрический ток! Опасно для жизни!

Установка и эксплуатация устройства должны выполняться квалифицированным электриком или специально обученным персоналом.

(nl) Levensgevaar door elektrische stroom!

Installatie van het apparaat en alle werkzaamheden eraan, mogen uitsluitend door een gekwalificeerd elektricien of speciaal opgeleid vakpersoneel worden uitgevoerd.

(da) Livsfare på grund af elektrisk strøm!

Arbejde i forbindelse med installation, opstart ogvedligehold må kun udføres af kvalificeret personale.

(el) Προσοχή, κίνδυνος ηλεκτροπληξίας!

Η εγκατάσταση, εκκίνηση και συντήρηση θα πρέπει να πραγματοποιείται μόνο από εξειδικευμένο προσωπικό.

(pt) Perigo de vida devido a corrente eléctrica!

A instalação do dispositivo, bem como todos os trabalhos devem ser realizados por um eletricista qualificado ou por pessoal especialmente formado.

(sv) Livsfara genom elektrisk ström!

Installation, idrifttagande och underhållsarbete får endast utföras av behörig personal.

(fi) Hengenvaarallinen jännite!

Laitteen asennus ja käyttö ainoastaan sähköasentajan tai siihen perehdytetyn henkilön toimesta.

(cs) Nebezpečí úrazu elektrickým proudem!

Instalace zařízení a veškeré práce na něm musí být provedeny kvalifikovaným elektrikářem nebo speciálně vyškoleným personálem.

(et) Eluohtlik! Elektrilöögioht!

Paigaldus-, kasutus- ja hooldustöid peab läbi viima ainult kvalifitseeritud personal.

(hu) Életveszély az elektromos áram révén!

Az eszköz felszerelését, valamint az ehhez kapcsolódó összes munkát szakképzett villanyszerelővel vagy szakképzett személyzetnek kell elvégeznie.

(lv) Elektriskā strāva apdraud dzīvību!

Uzstādīšana, nodošana ekspluatācijā un apkopes darbi jāveic tikai kvalificētam personālam.

(lt) Pavojus gyvybei dėl elektros srovės!

Įrengimo, paleidimo ir techninės priežiūros darbus turi atlikti tik kvalifikuotas personalas.

(pl) Porażenie prądem elektrycznym stanowi zagrożenie dla życia!

Instalacja urządzenia, jak również prace nad nim, muszą być wykonywane przez wykwalifikowanego elektryka lub specjalnie wyszkolony personel.

(sl) Življenjska nevarnost zaradi električnega toka!

Dela montaže, zagona in vzdrževanja morajo izvajati samo usposobljeno osebje.

(sk) Nebezpečenstvo ohrozenia života elektrickým prúdom!

Inštalácia prístroja, ako aj všetky práce na ňom musia byť vykonané kvalifikovaným elektrotechnikom alebo špeciálne vyškoleným personálom.

(bg) Опасност за живота от електрически ток!

Инсталирането на устройството, както и всяка работа по него, трябва да бъде извършвано от квалифициран електротехник или от специално обучен персонал.

(ro) Atenţie! Pericol electric!

Montajul și lucrul cu acest aparat trebuie făcute numai de un electrician calificat sau de personal tehnic specializat.

(hr) Opasnost po život uslijed električne struje!

Radove ugradnje, puštanja u pogon i održavanja mora vršiti samo kvalificirano osoblje.

(tr) Elektrik akımı! Hayati tehlike!

Bu ürünün çalıştırılması veya kurulumu sadece elektroteknik eğitimleri almış olan ehliyetli elektrikçiler ve kişiler tarafından yapılmalıdır.

(sr) Електрична струја! Опасност по живот!

Арбеитен бзв. Монтажа и диесем Продукт дарф од Електрофацхкрафтен унд електротецхницх унтервиесенен Персонен аусгефухрт верден.

(no) Elektrisk strøm! Livsfare!

Installasjon av enheten, samt arbeid på den, skal kun utføres av kvalifisert personell, eller av de som er spesielt opplært til dette arbeidet.

(uk) Електричний струм! Небезпечно для життя!

Встановлення пристрою, так само, як і робота з ним, повинні виконуватись кваліфікованим електриком або персоналом, що пройшов спеціальну підготовку.

(ar) تيـار الكهربـائي! خطـر مـوت!

التثبيـــت والتكليـــف و أعمـــال
الصـيانة يجـب أن تقـام فقـط مـن طـرف
المـــوظفين المـــؤهلين

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الطابق 1 – الدار البيضاء – المغرب
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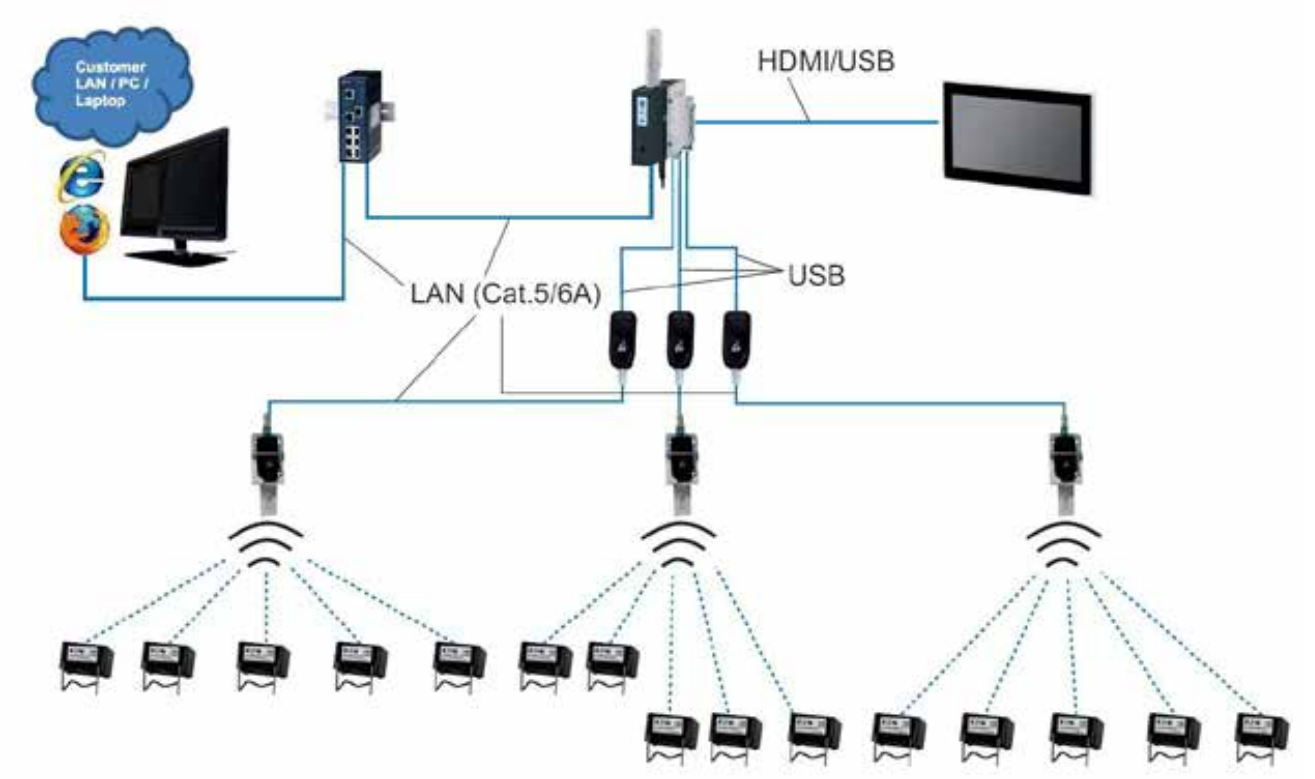
Table of contents

1. Abbreviations

xDC	Diagnose controller
RF	Radio frequency

2. Accessing your Diagnose controller from your PC

The Diagnose Controller can be directly accessed from your computer by using the web browser on your computer. In order to access the xDC, it is important that the PC and your xDC be placed in the same network.



2.1 Physical network setup

1. Connect your xDC to your computer network, by using an Ethernet network cable.
2. To obtain the IP address for accessing the xDC web server through your web browser, then use IP address assigned by your IT team or follow the instruction set 2.2 for using your own router.
3. In case of missing DHCP server (timeout for searching: 10min), a fix IP address (169.254.1.15) is available for the Diagnose controller.
4. When you have the IP address then move to Instruction set 2.3.

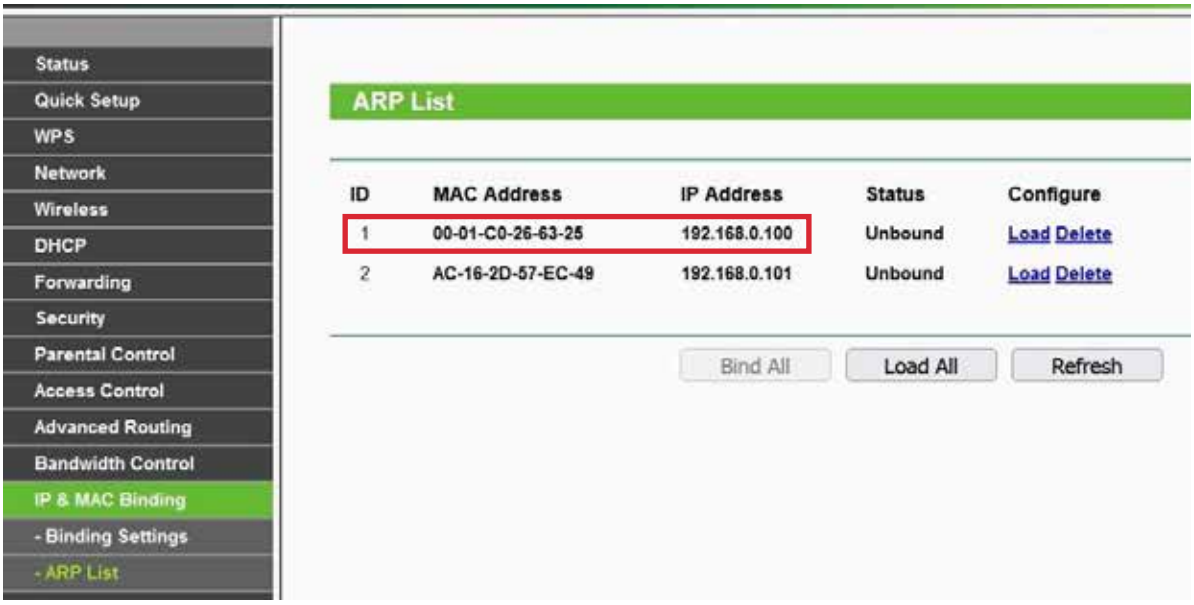
2.2 Obtaining your IP address via your router

1. Ensure that both your computer and xDC are connected to the same router.
2. Read the instruction manual of your router, or check the type label of the router in order to access the router directly.

To access the router directly you will need the following information:

- The Router IP address that you need to type directly into your web browser.
- The default username and password that you need to login into the Router.

3. Upon accessing the router web page, navigate to the DHCP clients list to find out the assigned IP address for the xDC.



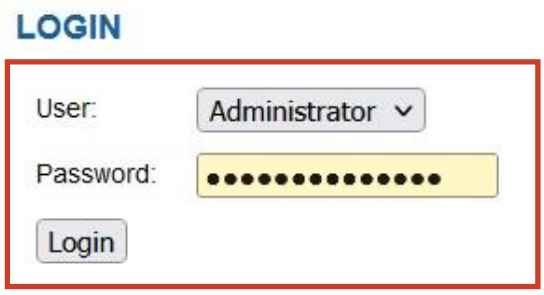
2.3 Accessing your Diagnose controller

2.3.1 Once you have the correct IP address for the xDC, type it into your web browser.

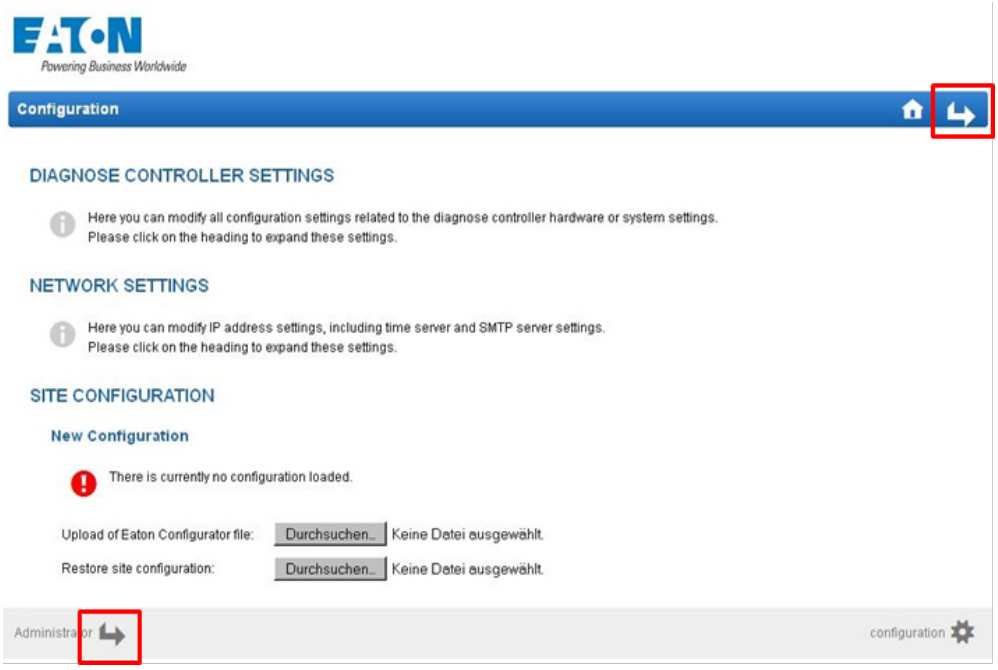
2.3.2 When you arrive to the Login screen, enter the following details for Login:

In case of first login choose Administrator as per default password: eaton_diagnose
Full access for uploading.
XML-file and doing configuration / sensor arrangement etc.

Viewer mode can be entered if configuration was successfully uploaded before / 2nd login after configuration limited access just for visualization the running application on an HMI.



2.3.3 Correct entry of login details will take to the Site Configuration page – click on the arrow bring you back to the login screen. Non-admins cannot access the settings page and cannot change any settings of the diagnose controller.



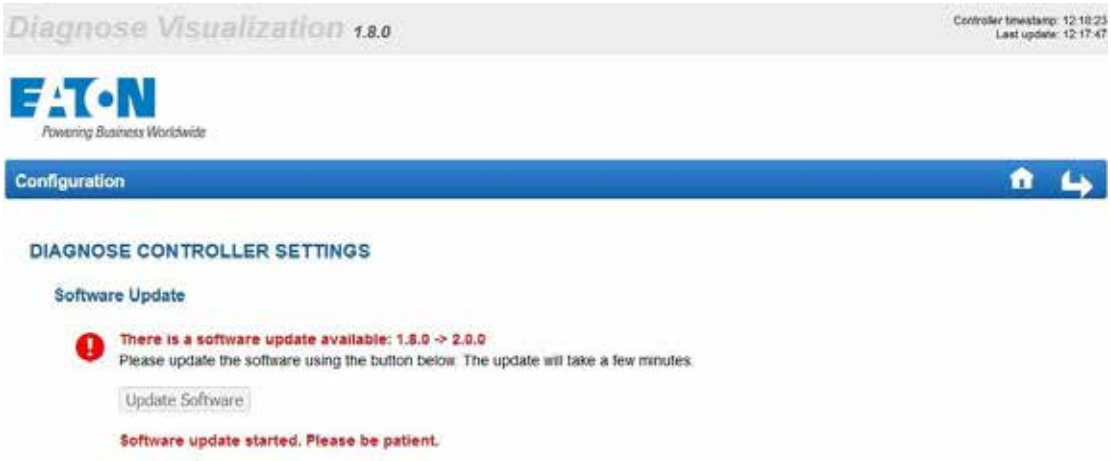
3. Updating your Diagnose controller to the latest firmware

3.1 You can update your xDC to the latest firmware version:

Download the latest firmware version from Eaton Download Center: **ftp://ftp.moeller.net/AUTOMATION/DOWNLOAD/XNT/XNT-CTRL-00_01.** Copy all file from diagnose_offline_update_x-y-z.zip on empty, formatted USB Stick. Insert USB stick in USB port of Diagnose Controller. The bottom configuration icon changes to red and is displayed with the red text "update available" next to it. Open Configuration page (or reload it, if already opened).

3.2 Press the "Update Software" button.

3.3 Upon direction to the Waiting for Software Update, please allow 15 minutes to pass while waiting for the device to reboot and automatically redirect back to the site configuration page.

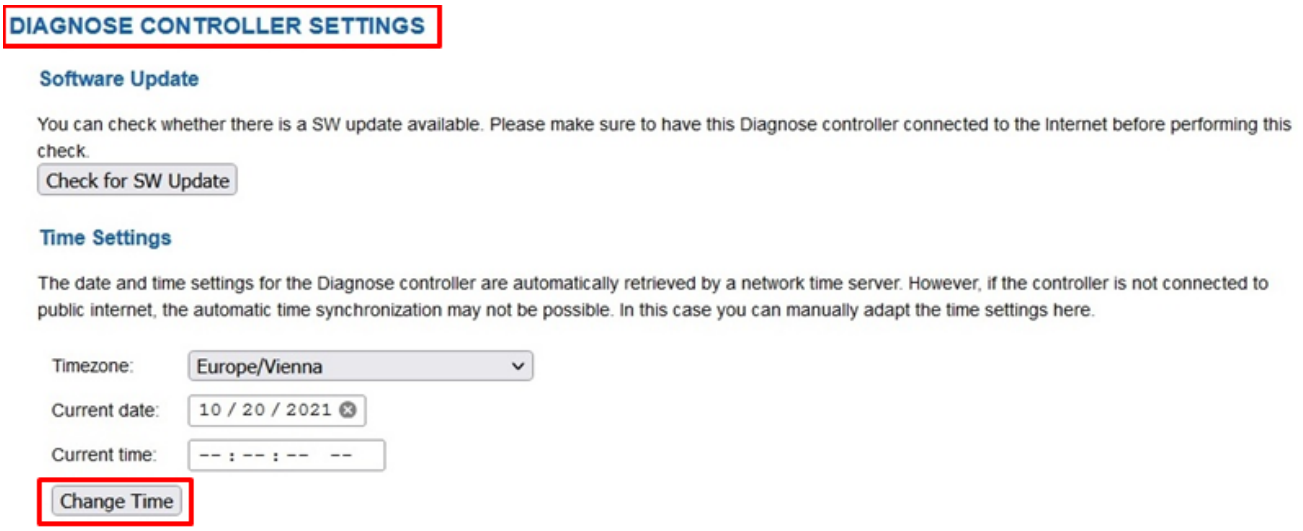


3.4 After about 15 minutes, you will be re-directed to the Site Configuration page and the Software Update section will no longer be displayed. This section will only be shown when another update is available.

4. Diagnose controller settings

4.1 Time settings

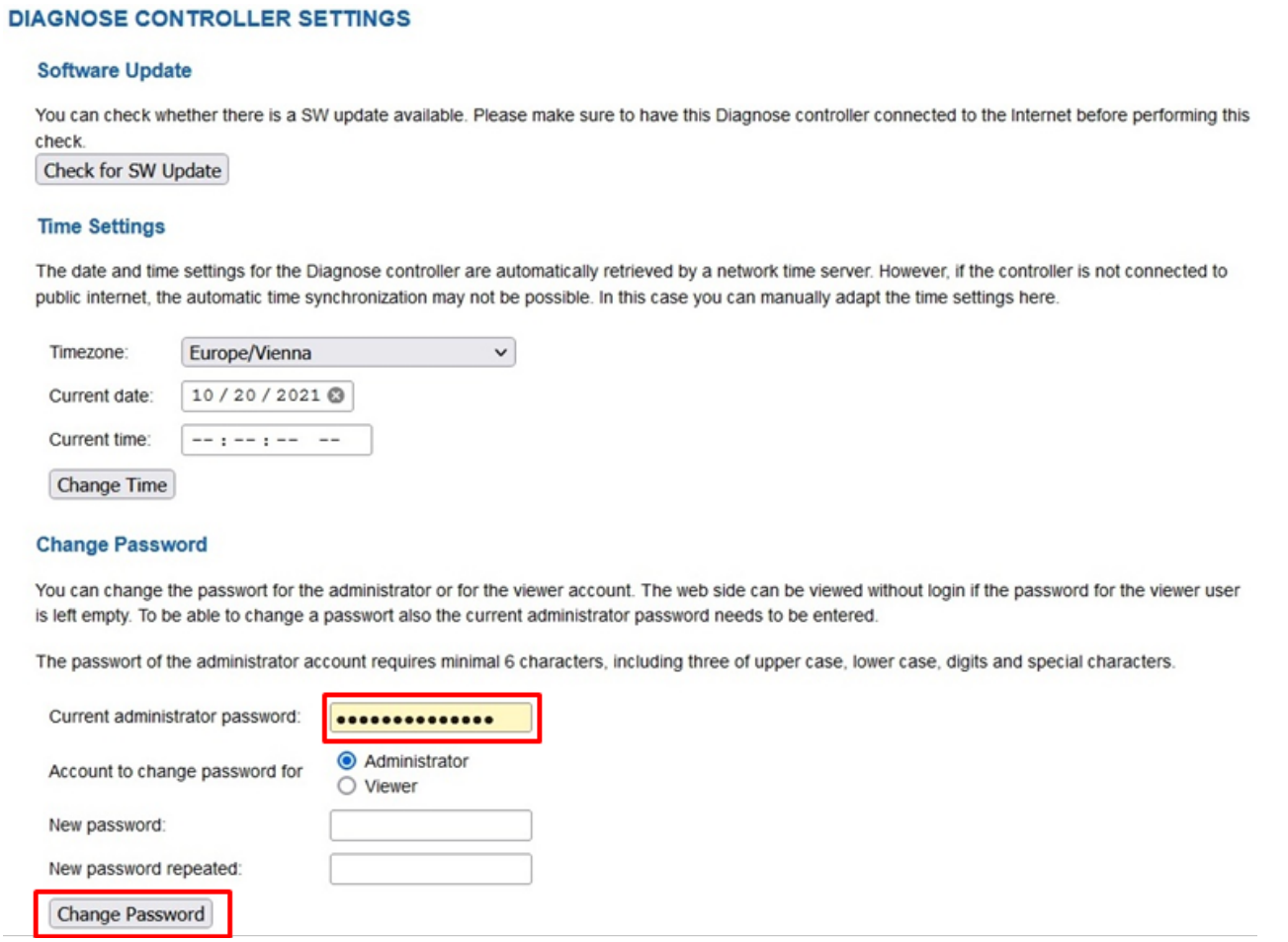
Click on “Diagnose controller settings”- Button, insert current date and time and click on “Change Time”- button.



4.2 Change password

Click on “Diagnose controller settings”- button.

For change the Login-Password fill in the current password, choose Administrator or Viewer, enter the new password and repeat it. Default for Viewer is no password (auto-login) Press “Change Password” button.



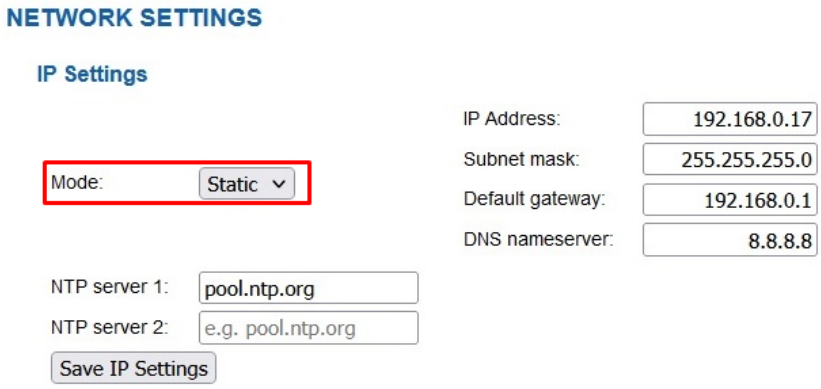
Password length should be minimum 6 characters and must meet at least 3 out of the following 4 complexity rules:

- at least 1 uppercase character (A-Z)
- at w character (a-z)
- at least 1 digit (0-9)
- at least 1 special character (punctuation)

4.3 IP settings

Click on “Network Settings”- button.

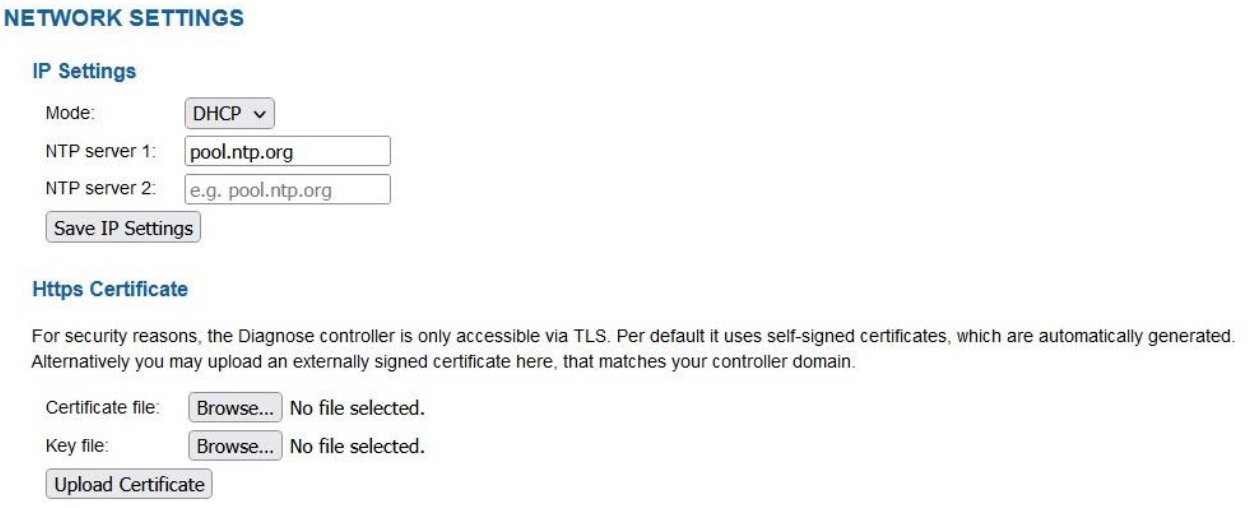
Standard mode is DHCP – IP-address will create from the Ethernet network If you want to set fix IP-address, change to mode “Static” and fill in the fields and save the IP settings.



Fill in NTP server if needed.

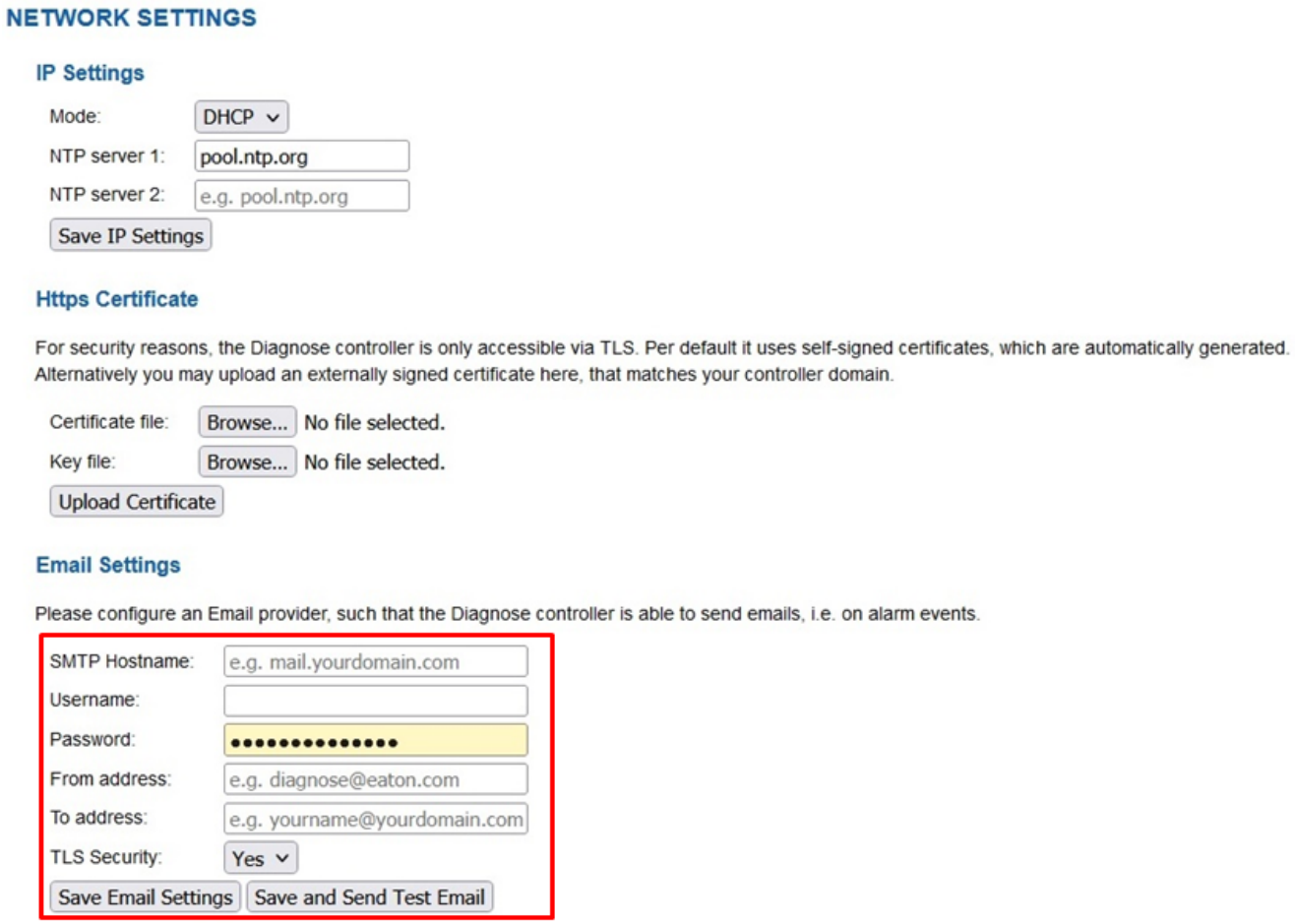
4.4 Https certificate

Click on “Network Settings”- button.
An externally signed certificate can be upload.



4.5 Email settings

Click on “Network Settings”- button.



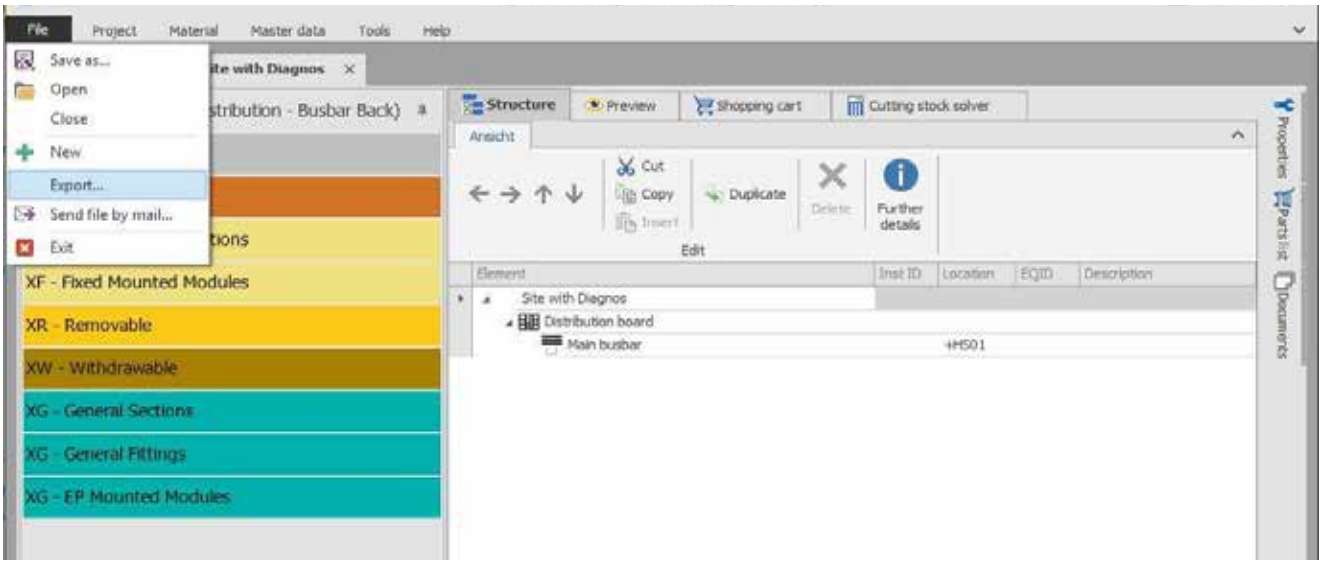
Fill in the settings for the e-mail. Test e-mail could be send.
Alarms are sent by e-mail to specified address(es). Language of e-mail is set when e-mail settings are saved: if preferred language of browser is set to german, e-mails are sent in german; otherwise e-mails are sent in English.

5. Configuring your Diagnose controller to visualize your low voltage site setup

The xDC requires an XML file export of your site configuration from the Eaton Configurator xEnergy tool. Follow the instruction set 5.1. to obtain the XML file from the Eaton Configurator xEnergy tool. When you have this XML file available on your PC then proceed to the next instruction set 5.2.

5.1 Exporting the XML file from Eaton configurator

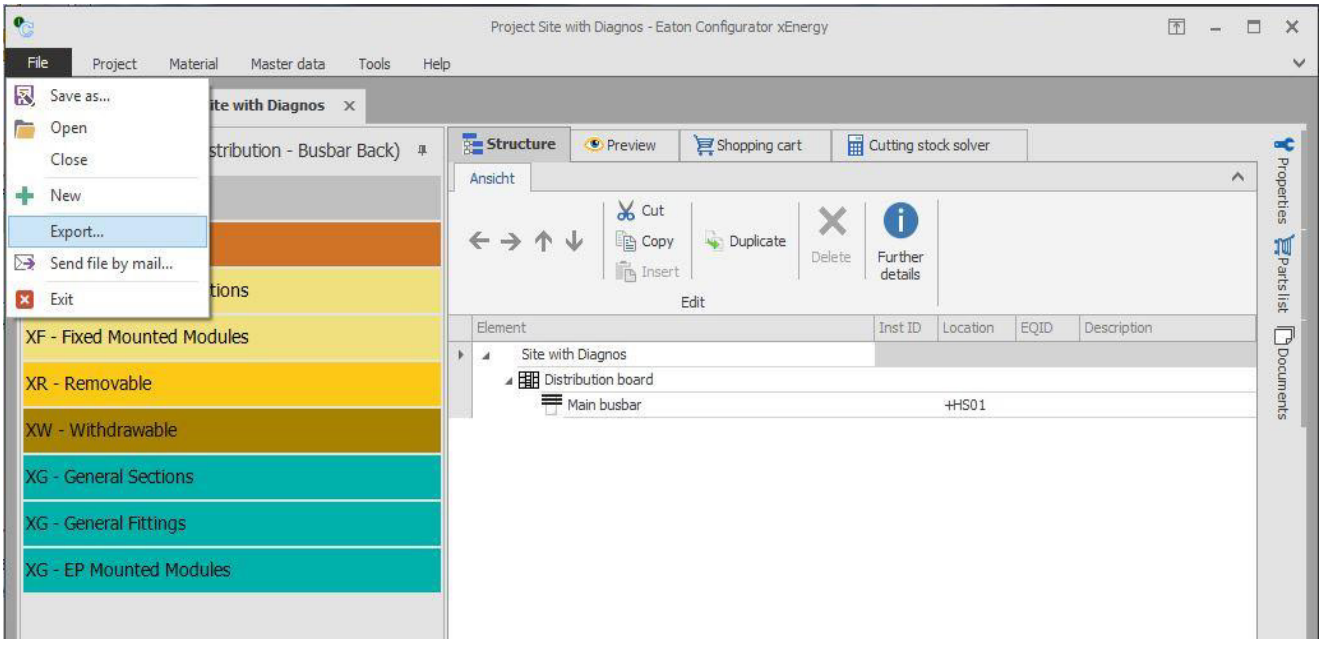
1. Once you have the completed configuration of your xEnergy Site, using the Eaton Configurator xEnergy tool, navigate to the menus: **File > Export.**



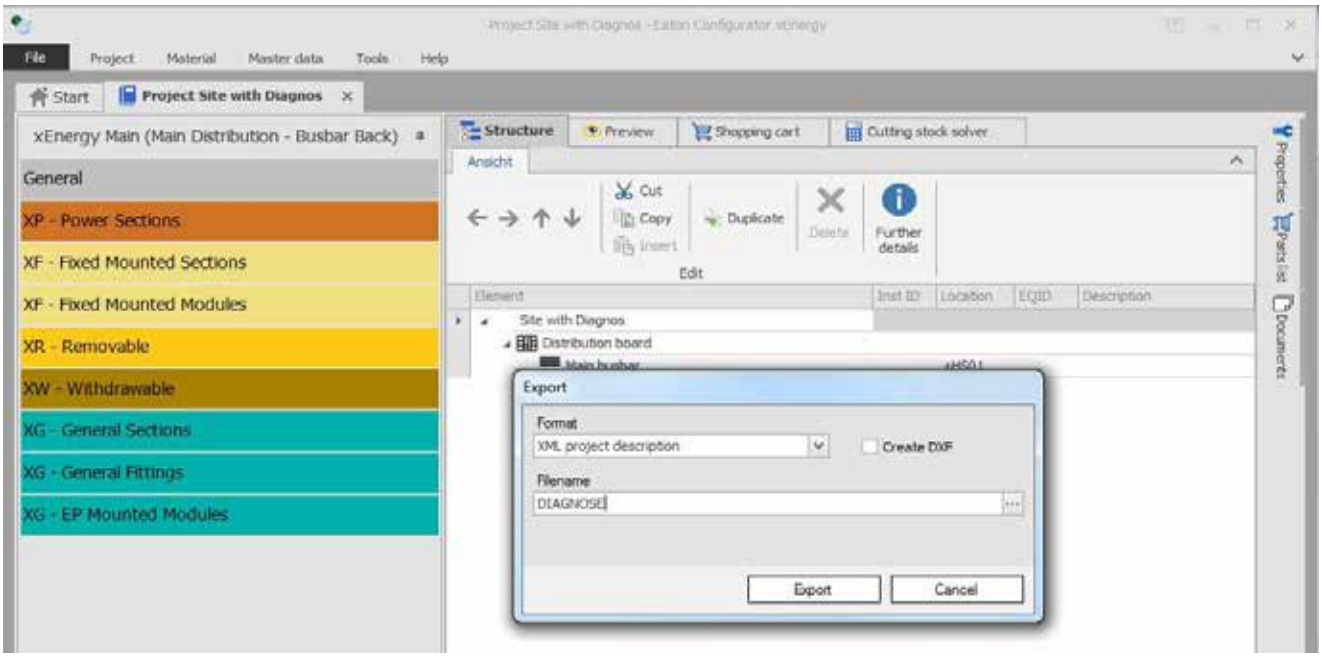
2. When the **Export** popup window comes up, ensure that the Format setting is *XML project description.*

   Under Filename, use th Button to select filepath, and to enter the name that would like the XML file to be saved under.

   Finally click the Export button to carry out the export.



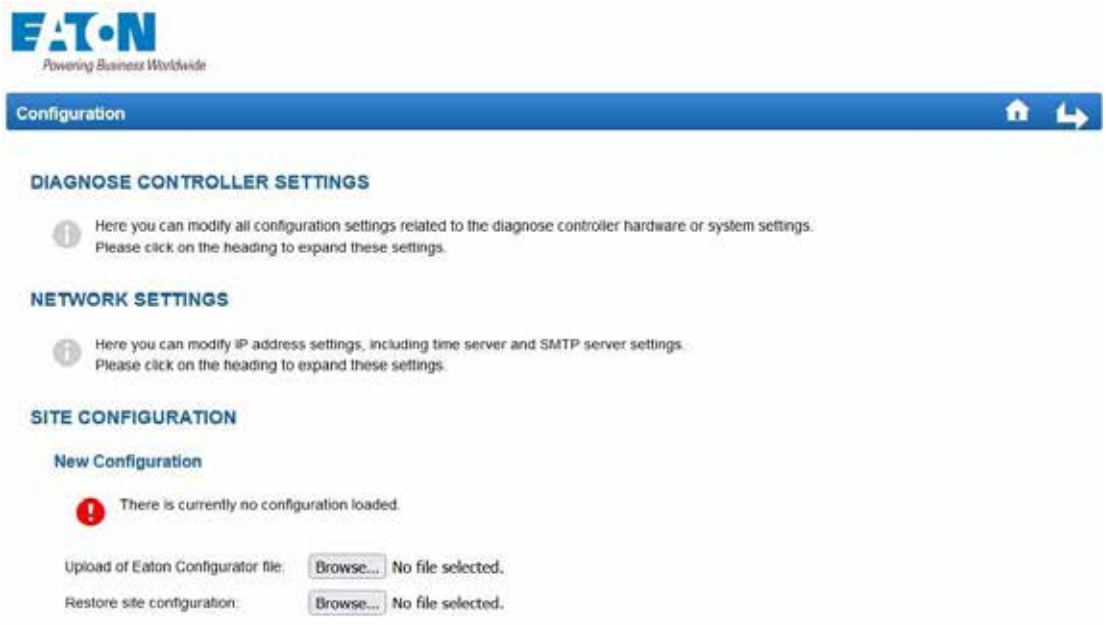
3. Once the export is complete and successful, the **Transfer project** popup window should come up with the information that "The project has been exported successfully". Continue to instruction set 4.2 to continue configuring the visualization your xDC.



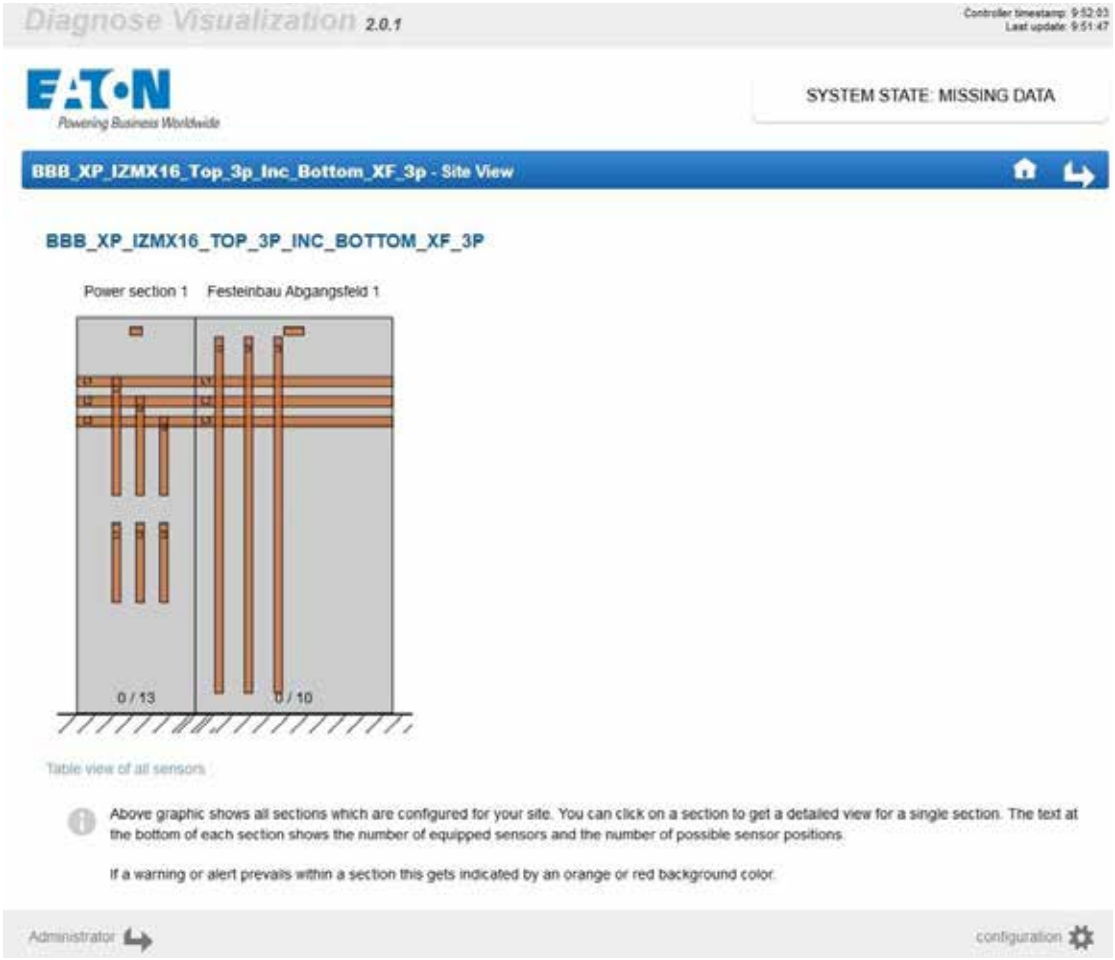
5.2 Uploading the Eaton Configurator file and place sensors

5.2.1 Click on "Site Configuration" button.

5.2.2 Click the Browse button to find the Eaton Configurator XML file export to upload. Selected the file and it will be upload.

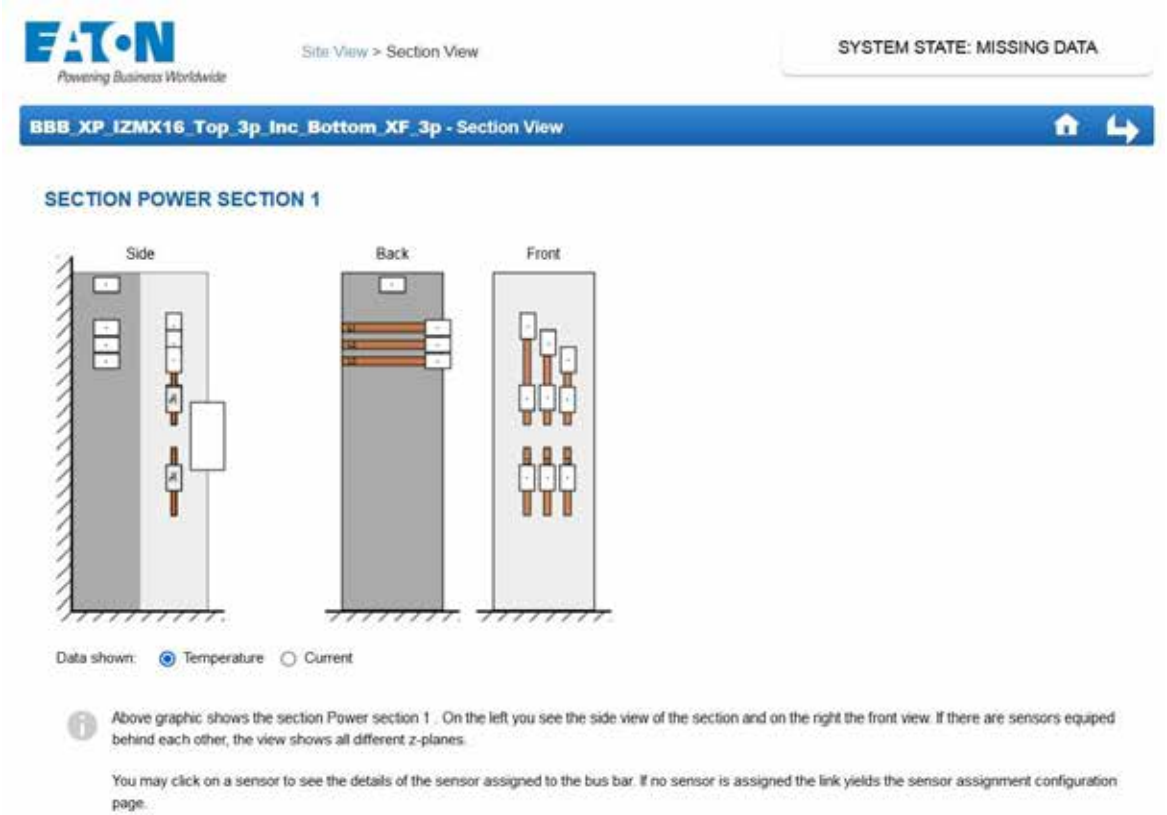


5.2.3 Once the xDC has completed the upload process, you will be re-directed to the Distribution Board Site Overview Page. On this page you can see all the sections visualized.

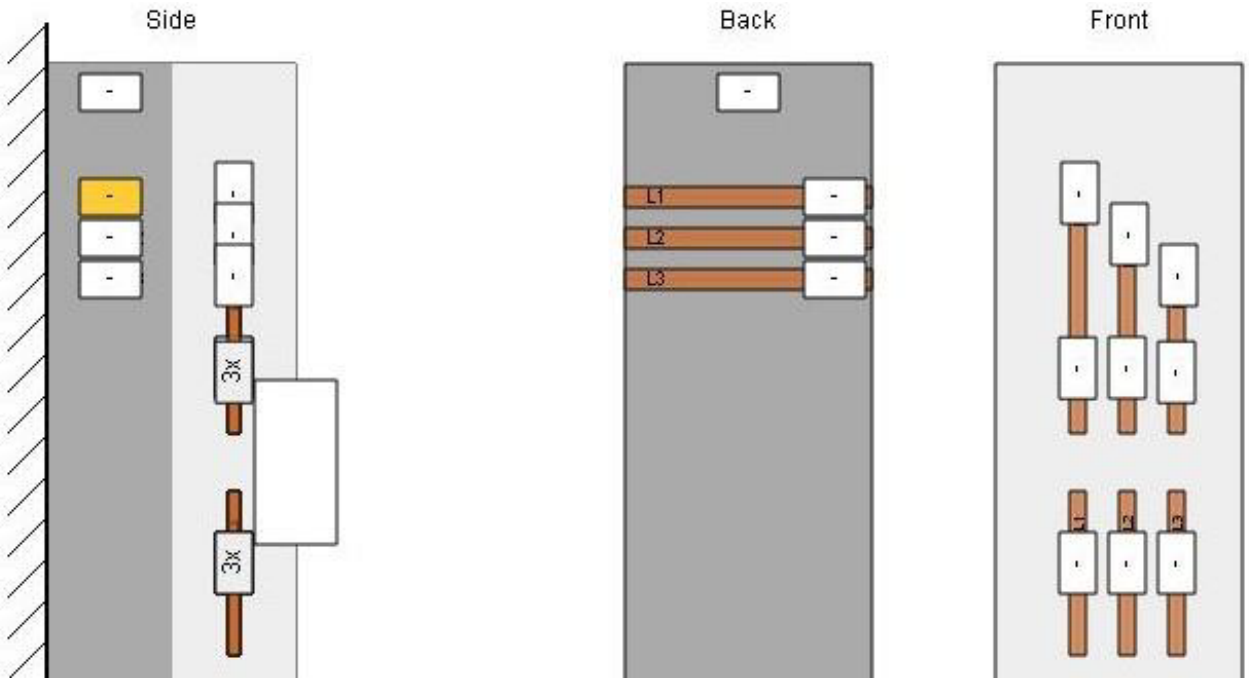


5.2.4 Hovering over a section with your mouse highlights the section for selection. Clicking on section will direct to the Section View.

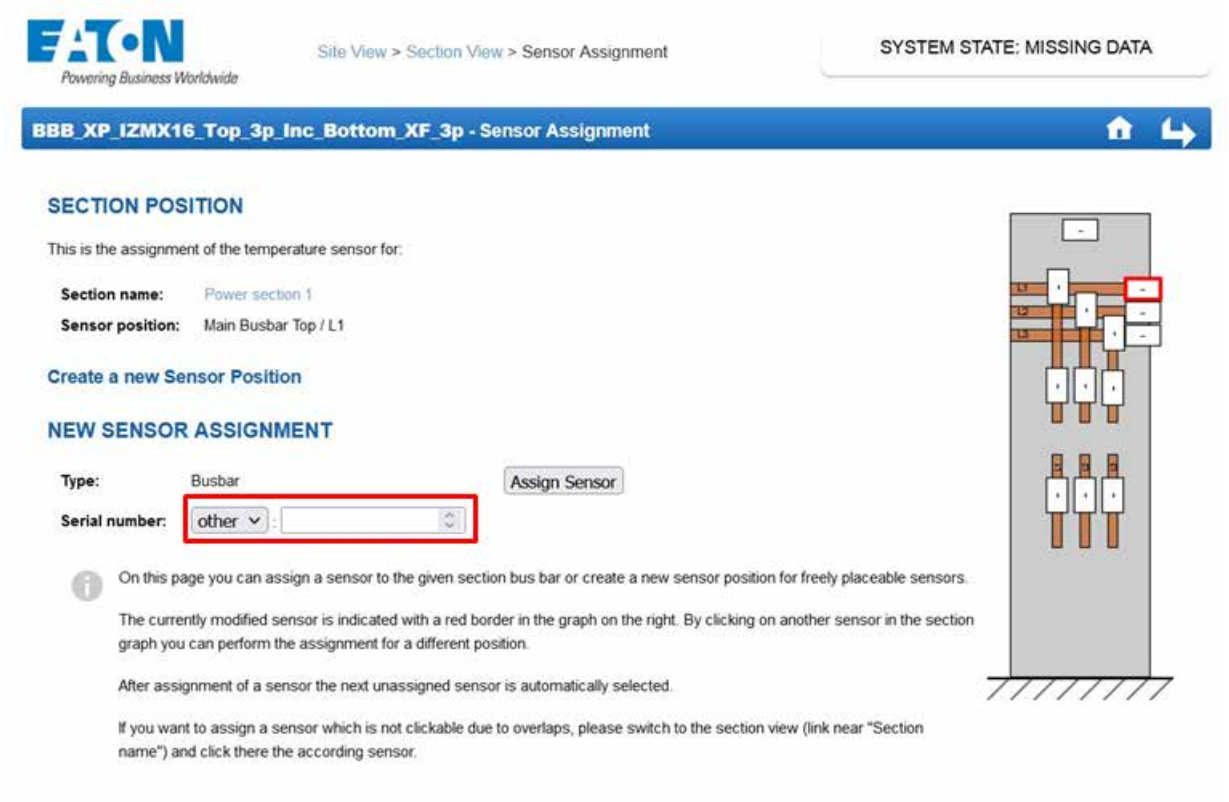
5.2.5 The Section View allows you to view all the recommended sensor positions for that particular section.



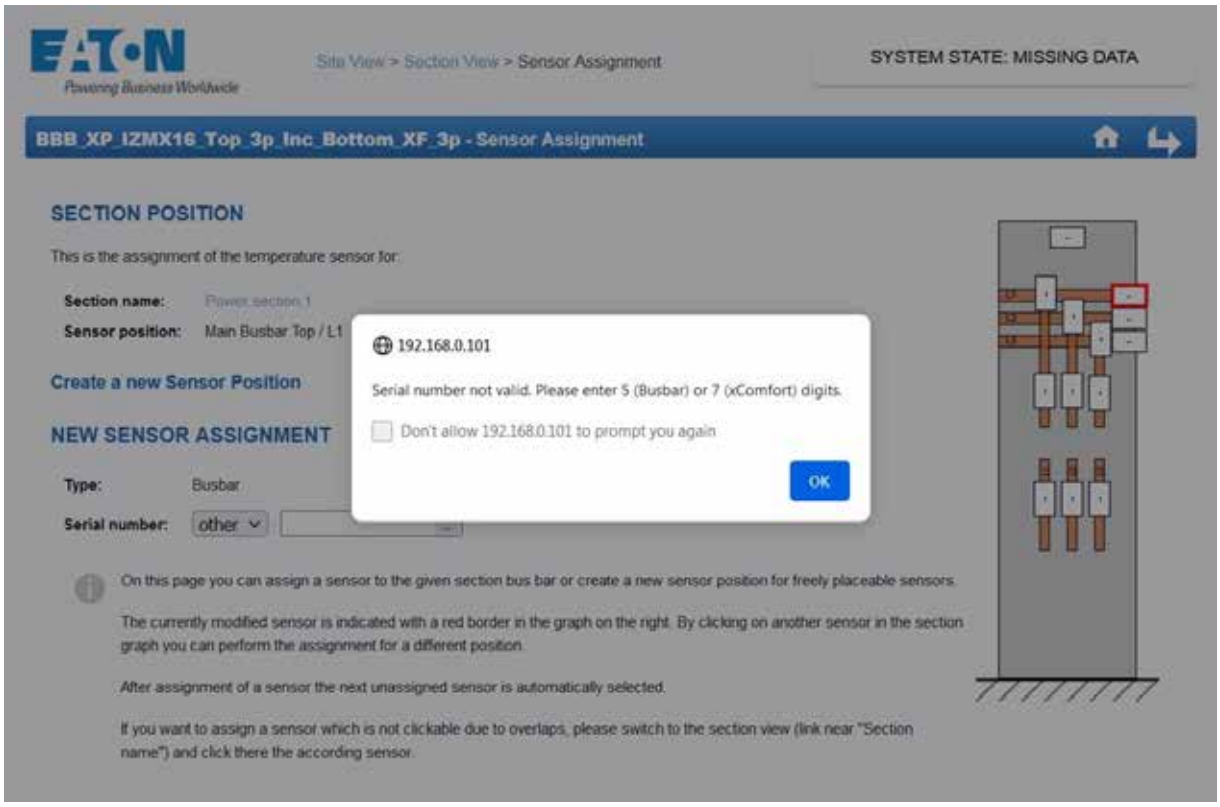
5.2.6 Hovering over a sensor area highlights the selected sensor. Clicking on the sensor will direct you to the Sensor page for that particular sensor location.



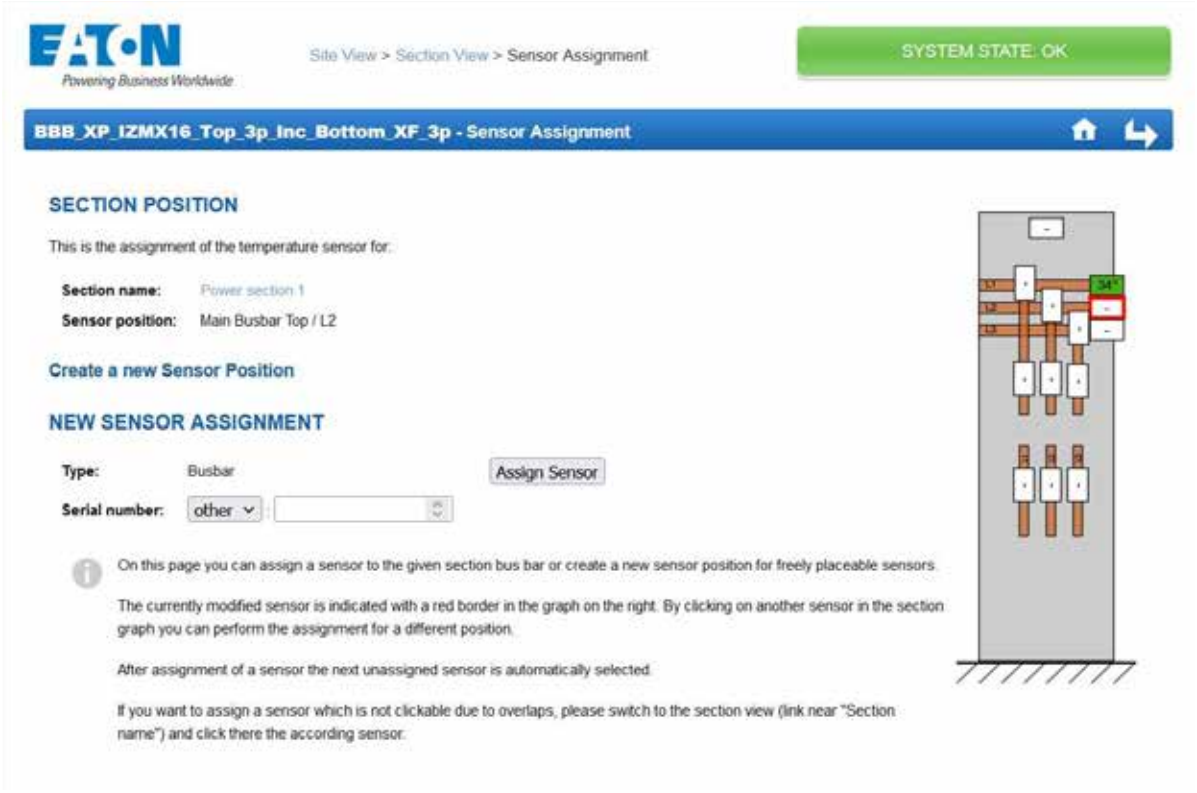
5.2.7 To assign a sensor, select it from the dropdown menu if already detected by the system. Otherwise manually enter the sensor number in the Serial Number entry box. You can add any comments regarding the sensor in the comment box. Upon completion selected the “Assign Sensor” button in order to assign the sensor to that position.



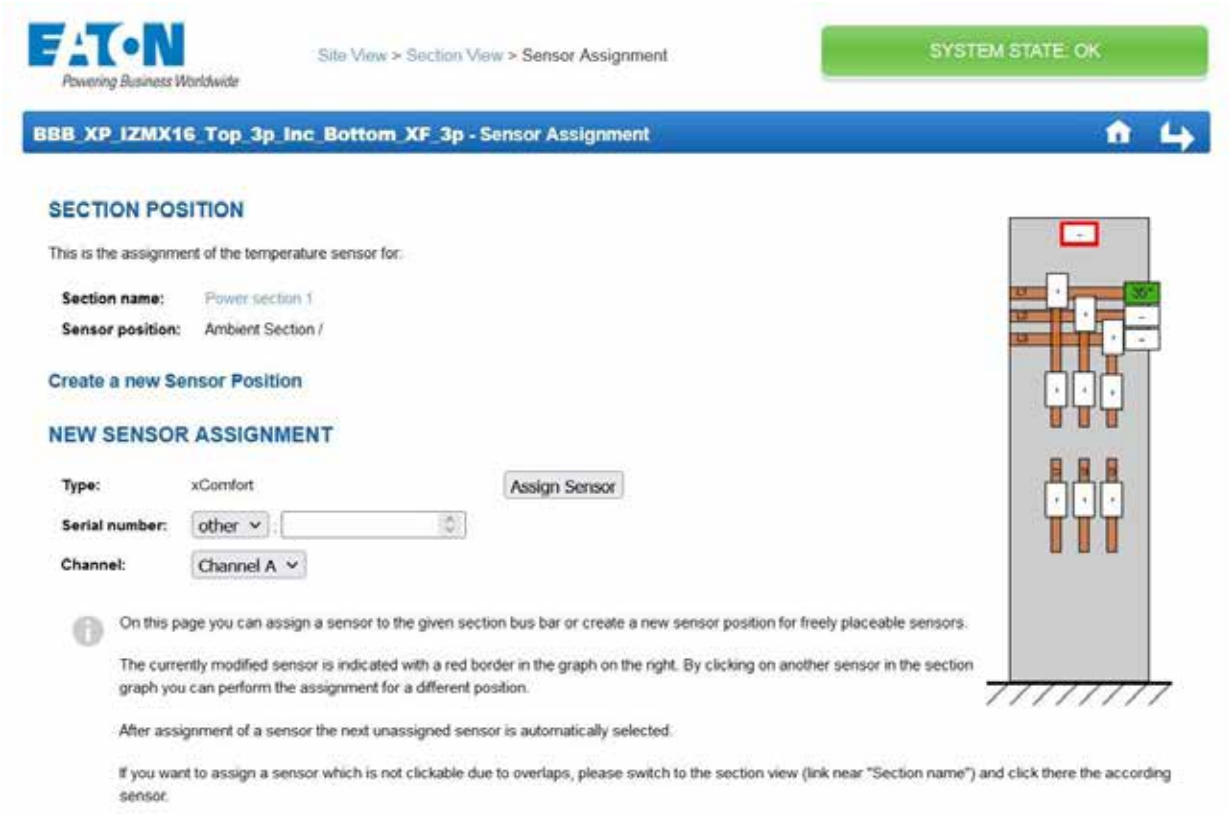
5.2.8 Fill in correct number of digits for serials of sensors – otherwise warning field informs you:
Busbar: 5 digits
Ambient: 7 digits



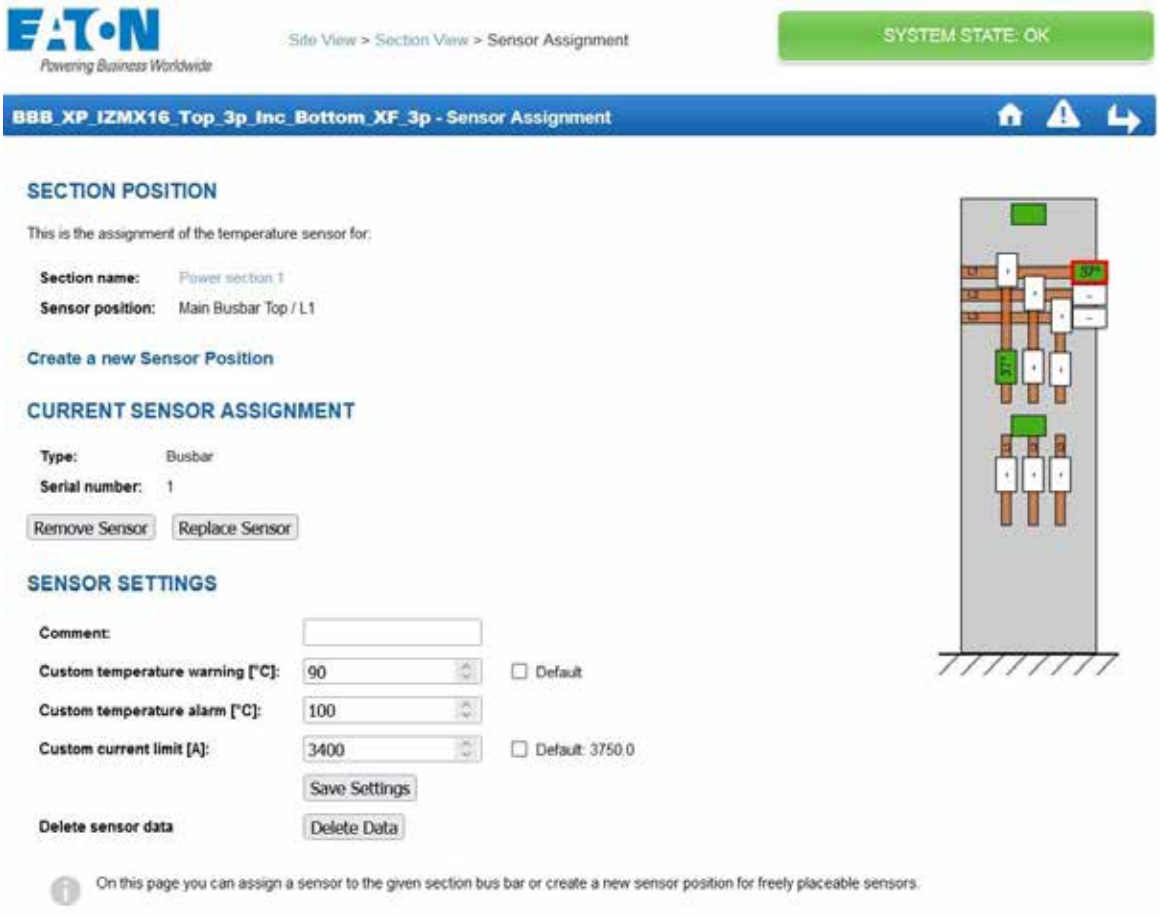
5.2.9 Assignment of the sensor takes the user to the assignment of the next unassigned sensor of the current section. After all sensors of current section are assigned, it brings you back to the Section View. If the sensor has not yet sent a signal to the xDC then a question mark will be displayed in the box, otherwise the sensor temperature reading will be displayed in the box. The sensor assignment can be continued in the same fashion for all sensors.



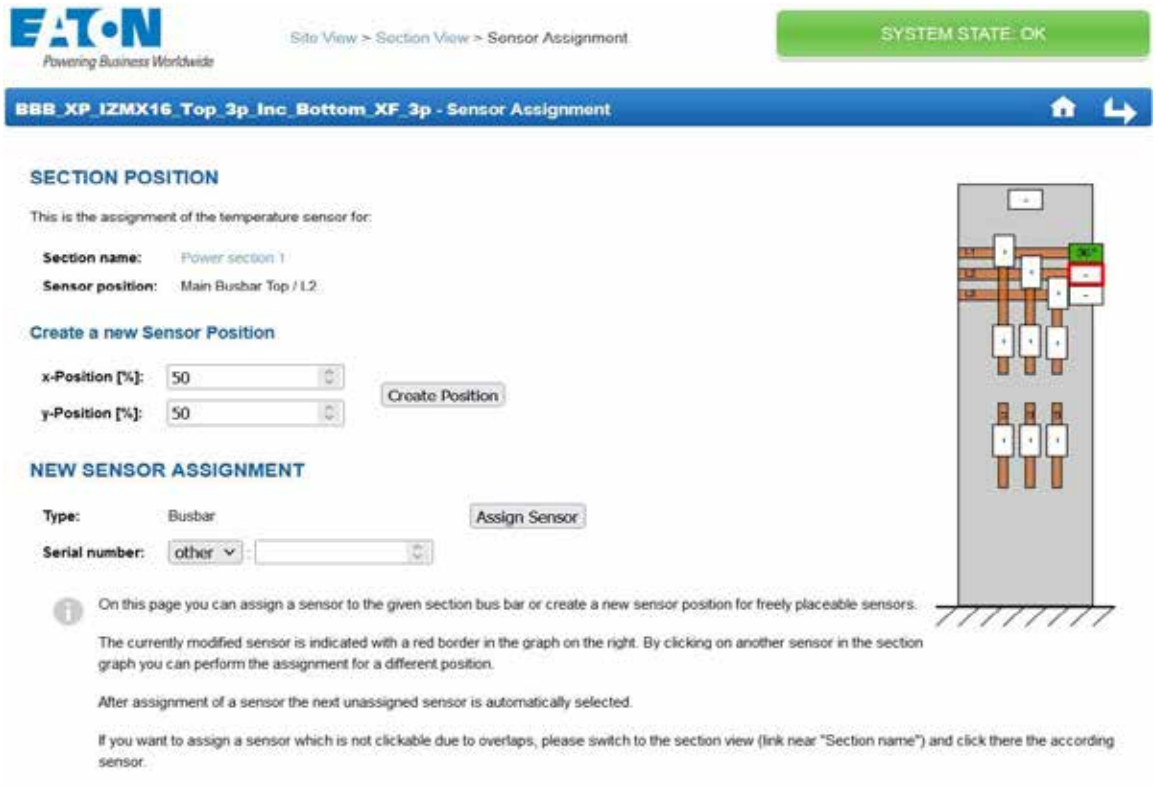
5.2.10 To assign an ambient sensor, click on the sensor on the top of section view. Manually enter the sensor number in the serial number entry box and select channel. You can add any comments regarding the sensor in the comment box. Upon completion selected the "Assign Sensor" button in order to assign the sensor to that position.



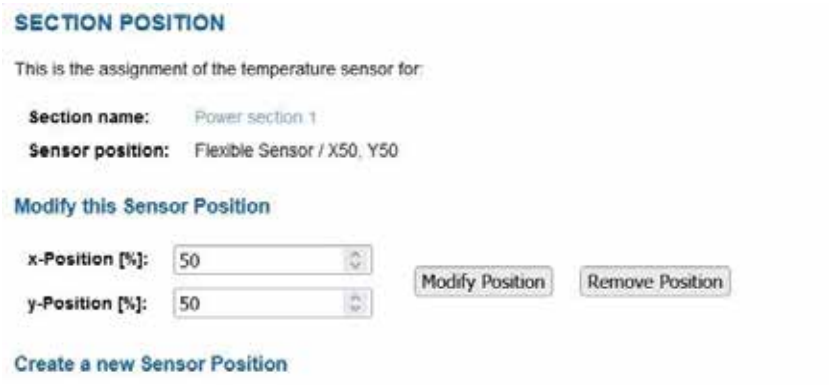
5.2.11 It is the ability to set own thresholds for warning and alarms. Click off the "Default" checkbox and enter the values.



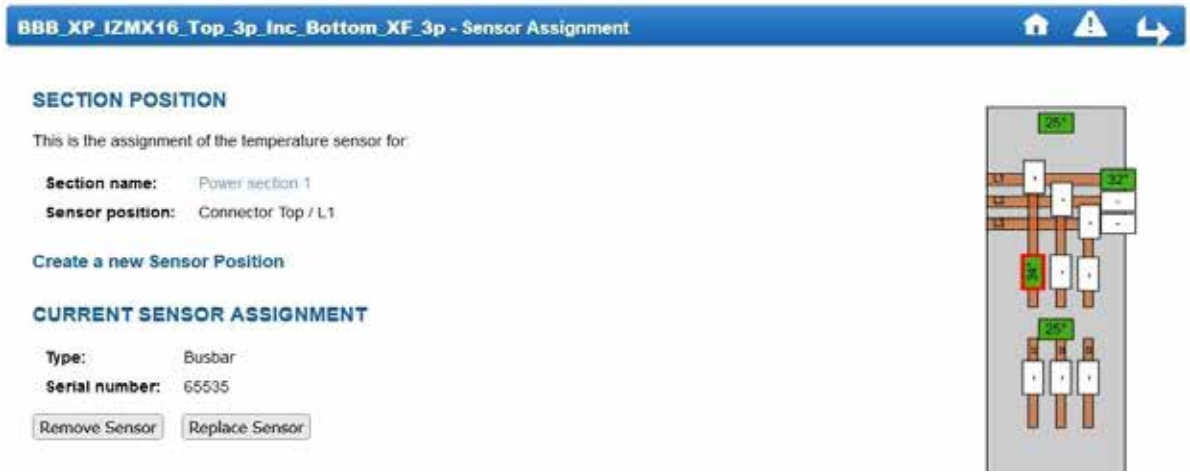
5.2.12 To create a new sensor position choose any sensor position. After that click on "Create a new Sensor Position" and select the x and y-Position in % - press "Create Position".



You can modify or remove the new position.

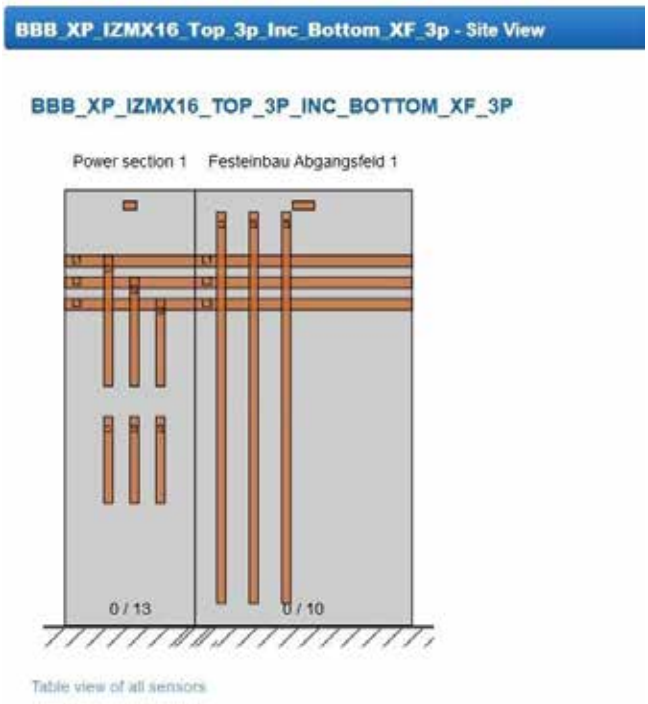


5.2.13 You can remove the sensor or replace it with other sensor.



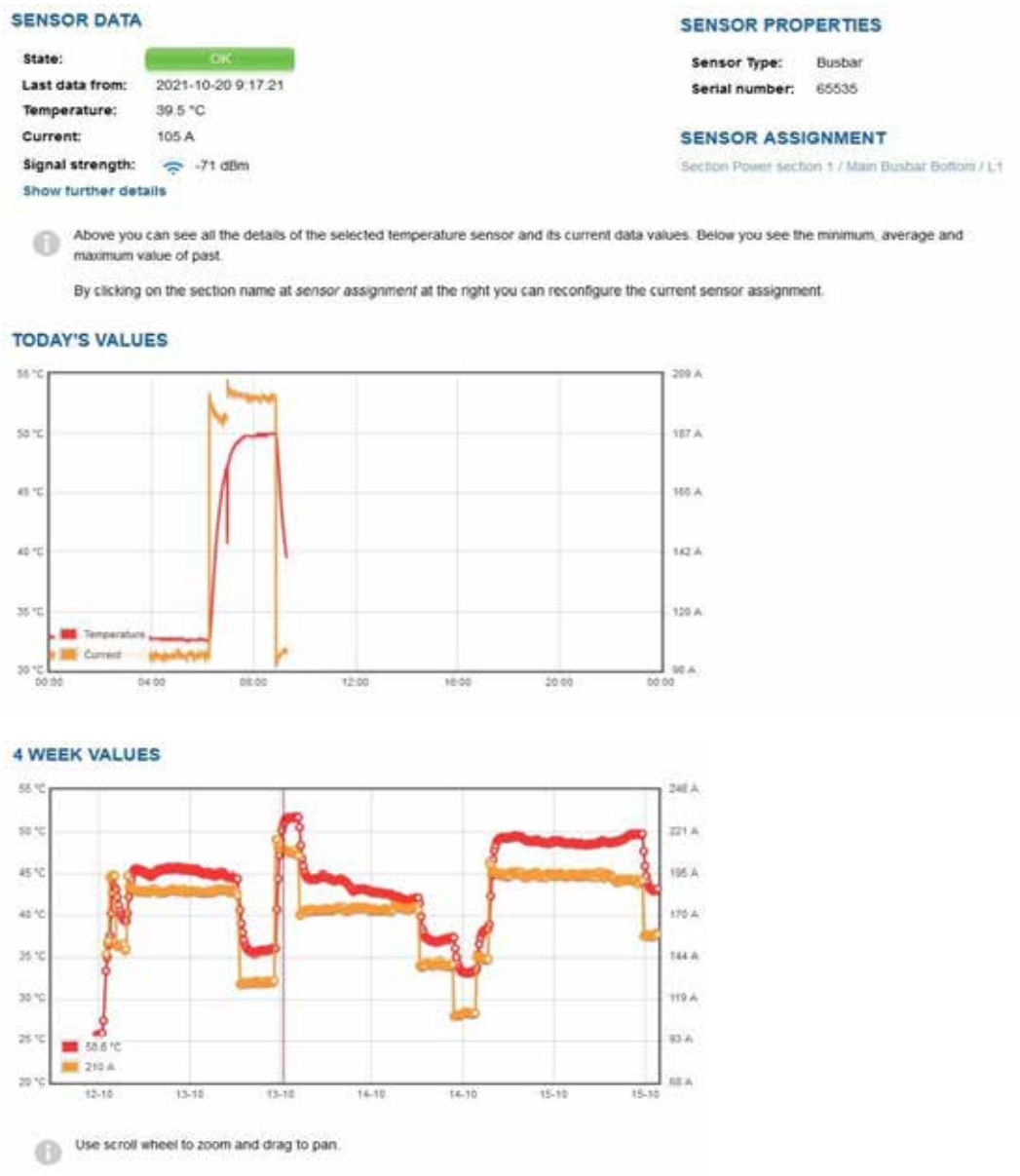
5.2.14 Table view of all sensors

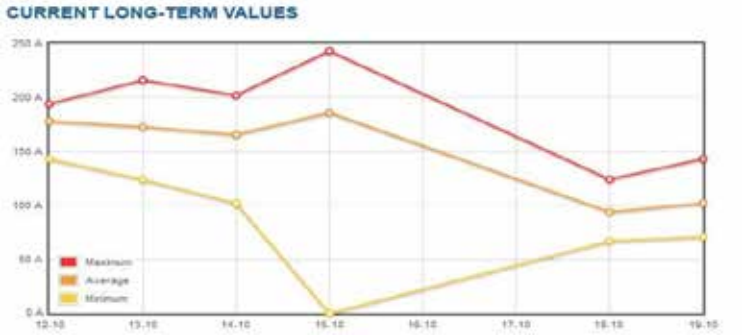
On the "Site View" by clicking on the link will bring you to the list of all sensors.



By clicking on the head of the table, you can sort the values. Clicking on the Field will bring you the Section View; Clicking on the Serial number will bring you to the Sensor View.

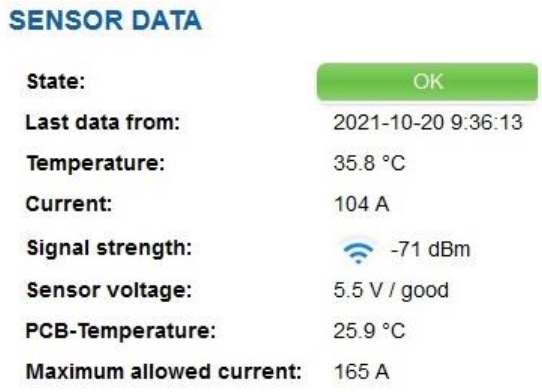
5.2.15 Clicking on an assigned sensor location from the Section View page will direct you to the Sensor View. On this page you can view the sensor specific data, including the all the current day values, a 4 weeks graph (1 temperature value all 10min) and trend values for the past 180 days.





The sensor data shows the last time, when the sensor send a date; the temperature of the copper; the sensor signal strength.

On further details you see: the battery voltage of the ambient sensor or the generated voltage depends on the current; the PCB-Temperature; the maximum allow current (if it is a current sensor).

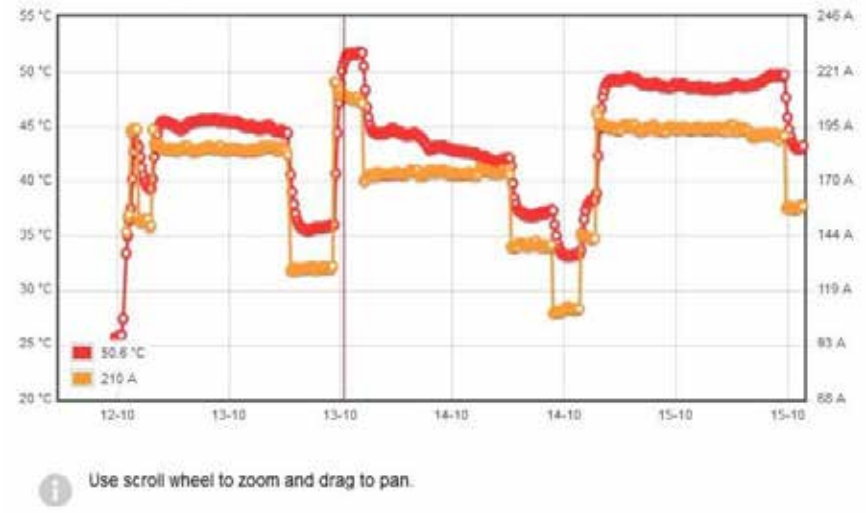


The Day graph shows the values of today and will reset at 0 o'clock. With the cursor you can move over the graph and it shows the values at this time.

Both values for temperature and current will shown in the graph.

In the 4 weeks graph use scroll wheel to zoom and drag to pan – on external display use double-touch to zoom in and use "Reset Zoom" button to zoom back.

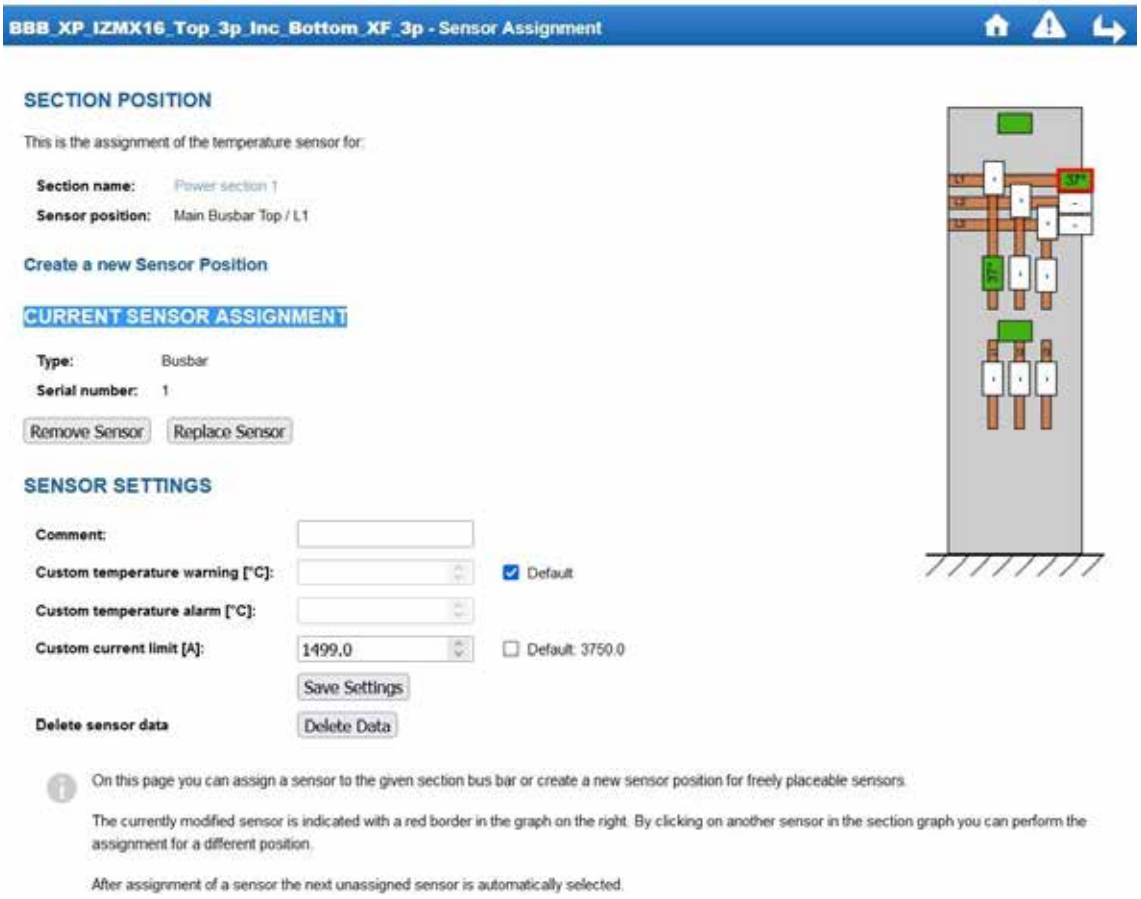
4 WEEKS VALUE



The Trend value graph shows minimum, maximum and average values of the last 180 days.

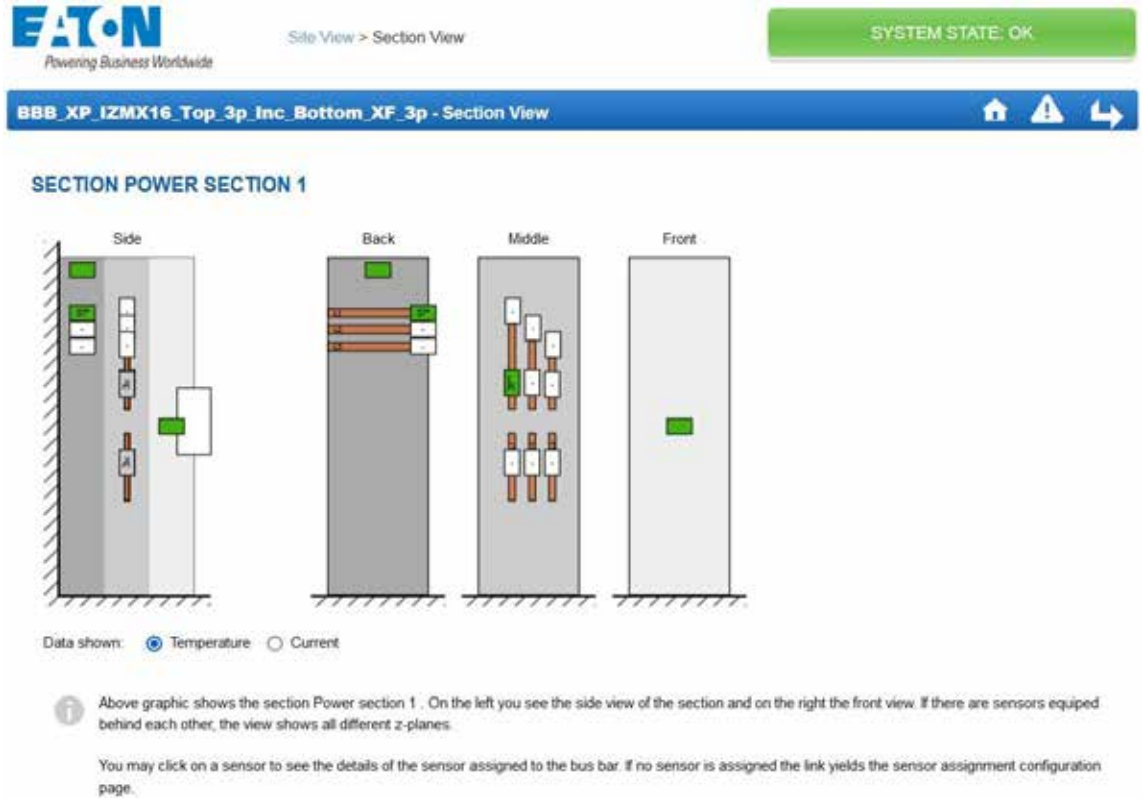
5.2.16 Delete Date

You can delete the saved date of each sensor in the Sensor Assignment – the Sensor Setting will be stay.



5.2.17 Section View

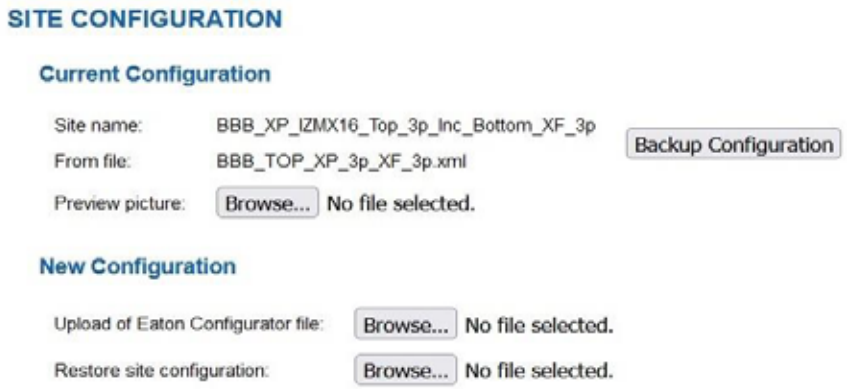
Select type of shown data with buttons.



5.3 Backup and restore configuration

5.3.1 In the "Site configuration" page it is possible to back up your complete configuration (section and Sensors). Press "Backup Configuration" button and save the file.

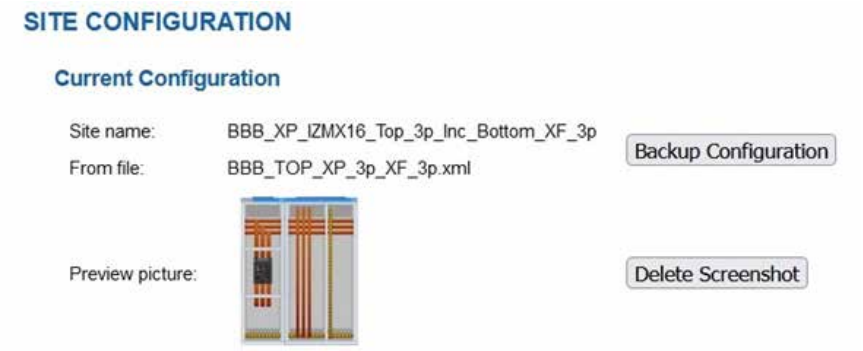
5.3.2 To restore the site configuration click the "Browse" button to find the file. On clicking on the file will restore the site configuration.



5.4 Eaton configuration preview picture

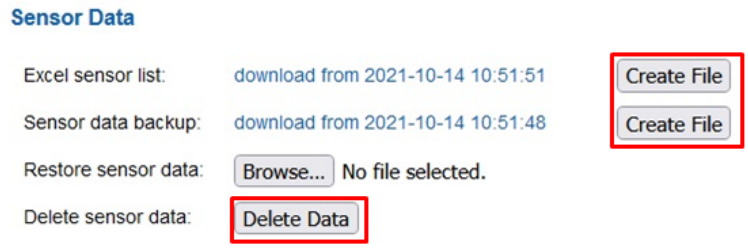
Click the "Browse" button to find the picture (jpg), by clicking on the file will upload screenshot

You see the preview picture; use the "Delete" button to remove the picture



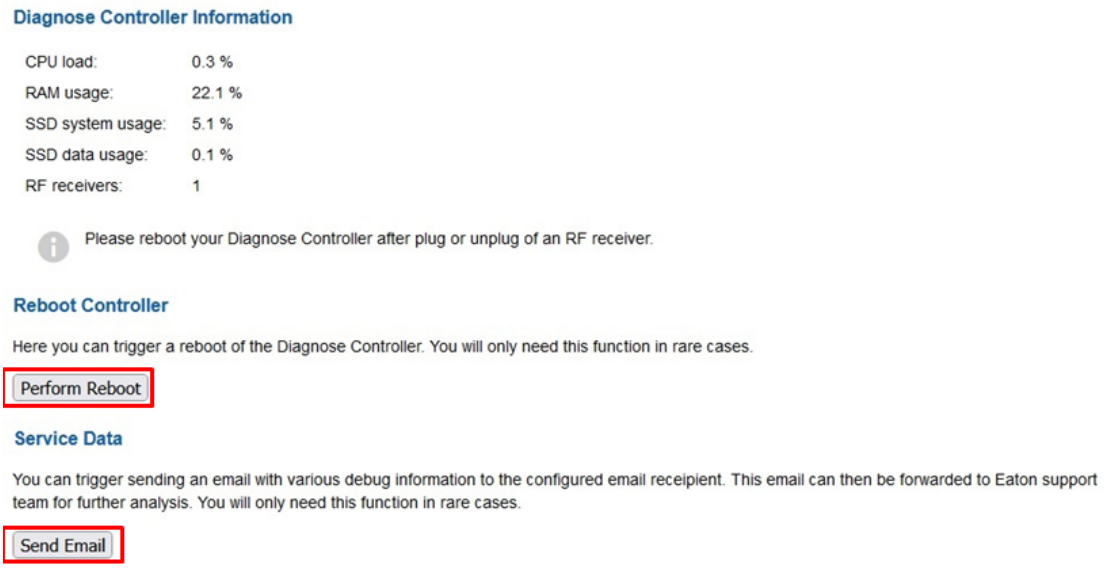
5.5 Senor list, date backup and restore, delete sensor data

Press the **Create File** button to create an Excel sensor list. Press on Download to save the data. Do it in the same way with sensor date. Restore the sensor date is similar to the configuration file.
Delete data for all sensors with **Delete Data.**



5.6 Controller information, reboot, service

On Diagnose controller setting are information about the xDC, reboot the controller and send service data.



5.7 Device reset

5.7.1 Reset Diagnose controller to factory defaults available by inserting an USB stick with a special file in root directory named EatonDiagnoseCommands.txt with the content DoFactoryReset.

- Reset all IP settings (i.e. setting it to DHCP)
- Delete database
- Reset password
- Reset xComfort USB interface CKOZ-00/14

5.7.2 Reset IP settings to DHCP

Available by inserting an USB stick with a special file in root directory named EatonDiagnoseCommands.txt with the content ResetIpSettings.

- Reset all IP settings (i.e. setting it to DHCP)

6 Status box - definitions

The status box is displayed on the Site, Section and Sensor view pages in the top page areas.
The status box should be interpreted as following:

Status Box Color	Interpretation
Green	
	Overall System health according to mounted sensors is fine. (at least one sensor has to be active to get “green” system state)
No Data	
	In preliminary state when no sensors are placed.
Yellow	
	In case of missing data at least from one allocated sensor. - potential reasons: Sensor signal strength is too low, no signal since 5 min, Voltage drops under 3,0 Volts; Info: required current rating at the busbar to reach 3,0 Volts: Cross section 40x10mm / 50x10mm: 60 Amps Cross section 60x10mm: 70 Amps Cross section 80x10mm: 100 Amps Cross section 120x10mm: 120 Amps
Orange	
	**Warning:** System health is close to exceeding the limits of acceptable operation. Recommended action is detailed on the right hand side of the status box in the Site View and section View pages. Hovering your mouse over the Status box provides the cause of state change.
Red	
	**Critical:** System health has exceeded the limits of acceptable operation. Recommended action is detailed on the right hand side of the status box in the Site View and section View pages. Hovering your mouse over the Status box provides the cause of state change.

6.1 Using the alarm list to locate compromised areas for red and amber

To quickly determine the sensor location causing the state change that you click the Alarm icon to view the cause of the state change, text description of the sensor location and the suggested remedy. All areas causing a state change requiring attention will be highlighted in this list. For the Section view click the alarm text in the Section column for further details. Active alarms are represented in Red. Previous alarms not requiring any action will be represented in green.

The Alarm list provides the user with text description of the compromised location. To visually identify the location and see the specific sensor details.

1. Clicking the text in the "Section" column will navigate you to the "Section View"
2. Select a highlighted sensor location for more details
3. Carry out recommended actions

Or

1. Clicking the text in the "Position" column will navigate you to the relevant sensor

Acknowledged alarms are be visible in the history view - select button.

7 Modbus – definitions

7.1 Modbus-TCP register explanation

7.1.1. Modbus slave

The measured values and certain alarms are made available via a virtual Modbus slave (Server) over Modbus / TCP (IEC 61158). A maximum of 3 parallel Modbus connections is possible. Port-number is 502 (as in the standard). function/register type is 03 (read holding registers). Only 1 register can be read by one read command!
If device address scheme is used, register 0 is found at address 400001. Please be aware that 5-digits addressing (register 0 at 40001) would not be sufficient as there are more than 9999 registers in use.

Data retrieval is done via the Modbus register address by a Modbus master (client), where the 12 MSBs are determining the sensor-ID (which is not the serial number, written on the sensor!) and the 4 LSBs the measurand.

With the serial number (which can be read out via Modbus with the sensor-ID) the sensor can be identified in the web interface. Sensor-ID 0 is reserved for special queries (alarms). To find out all assignments of sensor-IDs to serial numbers, just read out all available serial numbers. If there are 100 sensors, read out following Modbus registers: 0x001B/0x001C, 0x002B/0x002C, ..., 0x064B/0x064C.

The measurand is defined as follows:

```
0x0 ... Temperature
0x1 ... Temperature PCB (only busbar sensors)
0x2 ... value of electrical current ([A], as 16 Bit integer value)
0x3 ... Pending alarms for this sensor, each Bit used as a flag (see 7.1.2)
0x6 ... Section number of sensor
0x7 ... Sensor position and phase (see 7.1.3)
0x8 ... RSSI
0x9 ... Supply/Battery voltage x 10.0
0xA ... Sensor Type (0..busbar, 1..xComfort)
0xB ... Serial (MSBs)
0xC ... Serial (LSBs)
0xD ... Datapoint (12 LSBs) / Channel No (4 MSBs) (only xComfort sensors)
0xE ... Timestamp UTC of last transmission (MSBs)
0xF ... Timestamp UTC of last transmission (LSBs)
```

Example: Modbus register address 0x00A0 holds the 2-Byte value of the current temperature of sensor with ID 10. 0x00AE and 0x00AF holds the 4-Byte value of its last data timestamp.

Alarms: Register-Address **0x0000**

```
 4 MSBs      ...Alarm-Code (see 7.1.2)
             ... lowest code if multiple alarms are pending
             ... 0 if no alarm is pending
12 LSBs      ...Sensor-ID, if only one Alarm on one sensor is pending
             ... 0 if more alarms are pending or more sensors are affected
```

Register-Address **0x0000 + Alarm-Code** (e.g. 0x0001 for Temperature-alarm or 0x000C for Voltage-alarm)

```
 4 MSBs      ... Number of sensors affected
12 LSBs      ... Sensor-ID of affected sensor (lowest ID if more Sensors are
             affected)
```

7.1.2. Alarm codes

In case of bit-coded alarms (pending alarms for one sensor), the LSB is Bit 0, and the MSB is Bit 15.

Example: The bit-coded alarm 0x0602 [Bit pattern 0000 0110 0000 0010] has Bit 1, Bit 9 and Bit 10 set. According the following list, this means that this sensor has triggered a temperature alarm (Bit 1, code 0x0002), a current warning (Bit 9, code 0x0200) and a low signal strength information (Bit 10, code 0x0400).

Alarms

- Bit 0 (0x0001): LSB, Not defined
- Bit 1 (0x0002): Temperature maximum reached:
    - o Main busbar back: T > T_max
    - o Main busbar top: T > T_max
    - o ACB/MCCB connection: T > T_max
    - o Dropper busbar: T > T_max
- Bit 2 (0x0004): High internal sensor temperature: T_pcb > T_maxpcb
- Bit 3 (0x0008): High ambient Temperature: T_amb > T_maxamb
- Bit 4 (0x0010): Abnormal temperature raising, not implemented
- Bit 5 (0x0020): Current higher than threshold

Warnings

- Bit 6 (0x0040): Temperature threshold prewarning: T > (T_max - 10K)
- Bit 9 (0x0200): Current higher than 95% of threshold current

Infos

- Bit 10 (0x0400): Low sensor signal strength: RSSI value < -90dBm
- Bit 11 (0x0800): Signal not received: no signal since 5min (xComfort: 12h)
- Bit 12 (0x1000): Battery/Voltage too low: voltage < 3.0V

7.1.3 Sensor position

The sensor position is coded as follow:

Bit 0-7: Position

1: Main busbar top

2: Main busbar top double

3: Main busbar bottom

4: Main busbar bottom double

5: Main busbar roof

6: Vertical dropper busbar top

7: Vertical dropper busbar bottom

8: Horizontal dropper busbar

...

...

Bit 8-9: Phase

0:N

1:L1

2:L2

3:L3

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