ENSTO

IFS N° 2010059 / 72905_A
07/08/2020
1 (99)

e-RTU 2020-1A cabinet

Installation and operation guide

4PR-F14-D

Ensto Novexia SAS 210 rue Léon Jouhaux
BP 10446
69656 Villefranche-sur-Saône Cedex,
France

Tel. +33 (0)4 74 65 61 61
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Better life.
With electricity.

General

- Before unpacking
> Verify that the product in its packaging has not been damaged during transport.
> Verify that the product is suitable for the intended installation.

- Before installation
> Carefully read the operation guide before installing or using this product.
> Perform the installation carefully, ensuring that the equipment remains clean throughout the operation.

- After installation
> If you are installing this product for someone else, leave the guide for the end user.
> Clean the work area after installation.

Legal notices

- The product may only be installed by a competent person with adequate training in the installation practices and with adequate knowledge of proper safety and installation practices for electrical equipment. If local regulations have requirements relating to this training or adequate knowledge in terms of the installation of electrical equipment, the aforementioned requirements must be complied with by this person.

- Ensto Novexia declines all liability for any property damage or personal injury caused by poor installation, mishandling, or failure to comply with safety recommendations.

WARNING

For the operation of this system in complete safety, it is essential that the installers, users and technicians follow the procedures and precautions described in this guide. Non-compliance with these instructions may cause damage to the products and/or serious or even fatal injury.

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1 PRESENTATION

1.1. Product purpose

1.2. General characteristics

1.3. Mechanical specifications

1.4. List of equipment required for installation (not supplied by Ensto Novexia)

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1.1 PRODUCT PURPOSE

The cabinet houses all the functions required to control an AUGUSTE load break switch and to detect faults (Amperometric & Directional) in a compact unit. Combining the equipment with the switch makes the electrical network more reliable by reducing the number and duration of power outages.
A number of remote control modes for the control station are available to satisfy all requirements (RADIO, GSM/GPRS or external modem, etc.).

1.2 GENERAL CHARACTERISTICS

1.2.1 General

The equipment facilitates the instrumentation and control of the AUGUSTE load break switch. In addition, it is equipped with functions for remote communication, acquisition of analog values, fault detection and automation.

- ✓ **Remote communication with the control station:**

By default, the cabinet incorporates the standard protocols for communication with control stations (IEC 104/101, DNP3 IP/serial, MODBUS RTU/IP, etc.)
With its 3 Ethernet ports and 2 UARTs, the e-RTU 2020 enables all modern communication media (IP or serial) to be used with the control station – SCADA – (XG modem, ADSL or fibre optic routers, IP radio, digital radio, etc.)
It enables several media to be used simultaneously (communication redundancy)

- ✓ **Control of AUGUSTE MV load break switches:**

It is possible to control the AUGUSTE load break switch in remote or local mode. Switch commands can be controlled by ASF automation. The position of the switching device is accessible via the user (UI) and PC interfaces.

- ✓ **Acquisition of analog values:**

The cabinets measure the following MV network values:
- Measurement of instantaneous current
- Calculation of current averaged over X minutes (configurable value)
- Maximum instantaneous backup current
- Measurement of instantaneous MV voltage
- Calculation of MV voltage averaged over X minutes (configurable value)
- Cyclic measurement recording in a file (configurable measurements and frequencies)

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The product measures the following information in real time:

- LV supply voltageVoltage and current relating to the 12V internal and 12V radio power supply
- Voltage and current of the 48V voltage source
- Internal temperature of the cabinet
- External temperature (PT100) for external T° or transformer measurement
- Measurement originating from a 4-20mA or 0-10V external sensor for measuring the water level, SF6 pressure, etc.

✓ **Visualization of the cabinet status and information relating to the MV network:**

The following information is displayed on the front panel of the product or on the PC:

- Position of the MV switch
- Switch status (neutralised -manual mode- or unlocked)
- Number of switching operations
- Cabinet 12V, 48V voltage and supply voltage out of range
- Battery fault
- Equipment fault
- Local or remote modes
- Automation status (ASF)
- Date and time

✓ **Detection of MV faults:**

-Amperometric, directional
-Fault counters: Polyphase & Phase/Earth
-Fault signalling on the user interface.

✓ **Automation:**

Auto-Sectionalizing Function (ASF) equating to opening the MV switch in the event of a downstream fault during the source unit resetting cycles.

✓ **Dated Recording of Events (DRE):**

All the cabinet events (opening, fault detection, etc.) can be consulted or downloaded in .csv format using the PC interface (DRME).
The .csv files can be directly exported into excel

✓ **Power supplies:**

-AC voltage 230V±15% or 135±15% or 101V±15%.
-Sealed lead battery 12V 38Ah or 24Ah (autonomous supply).

Possible compatibility with other network voltages (on request)

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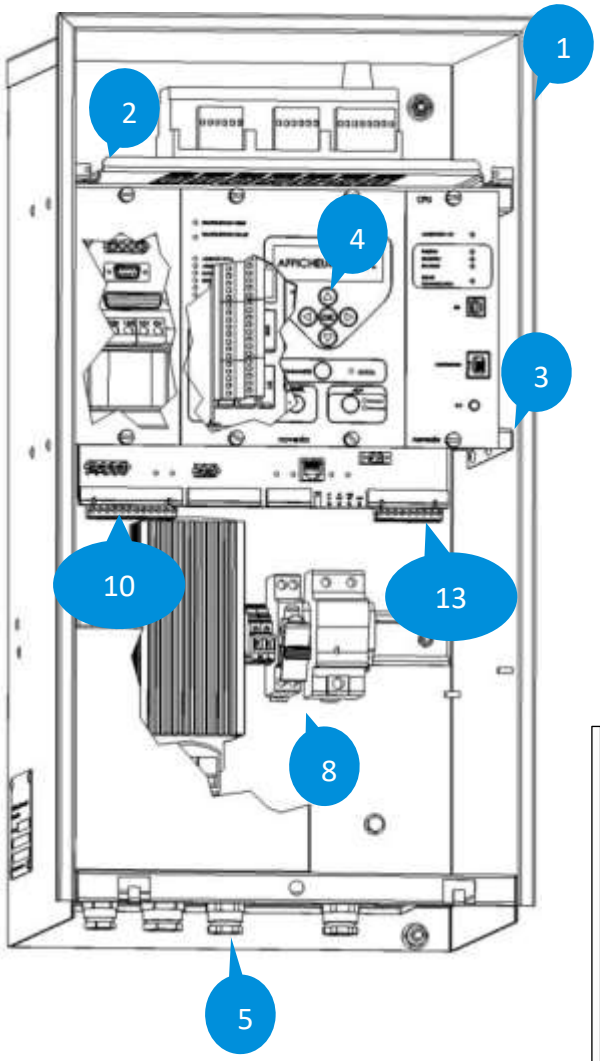
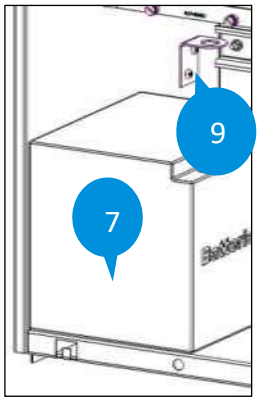
1.2.2 Overview of the product:

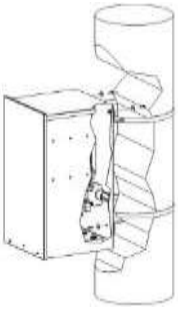
There are 2 available versions of the Auguste cabinet:
Small cabinet: Cabinet dimensions h x w x d, 625 x 335 x 345 mm
Large cabinet: Cabinet dimensions h x w x d, 782 x 362 x 300 mm
These cabinets are broken down into several sub-assemblies, which are accessible at different access levels.





Mounting by clamping with a UPN / square pole

12



Mounting by banding with a bracket / round pole

6

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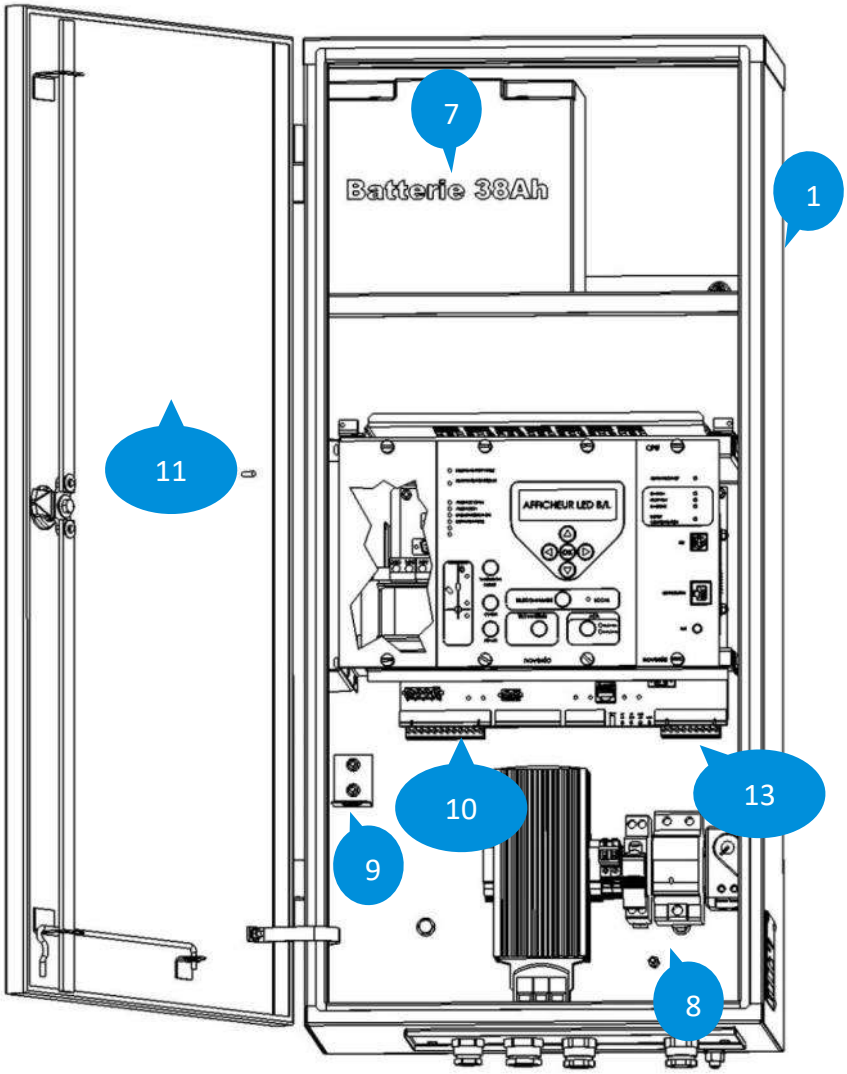

Mounting by banding with a bracket / round pole

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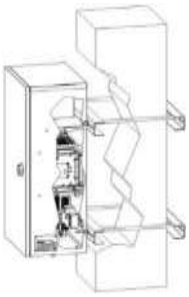

Mounting by clamping with a UPN / square pole

12

1- The cabinet's metal envelope
2- Metal drawer incorporating the communication system
3- Card rack comprising the power supplies, the CPU, the current & voltage acquisition modules and the switch's control interface
4- User interface (UI)
5- Grommets for external cable management (electrical control, sensors, etc.)
6- Bracket for mounting the cabinet on a round or square pole
7- Battery (autonomous supply)
8- 230V AC supply and voltage surge protection connection area
9- Radio interface: Radio antenna connection area
10- Electrical control connectors (male & female section)
11- Door
12- UPN for mounting the cabinet on a square pole
13 – Current and voltage sensor connectors

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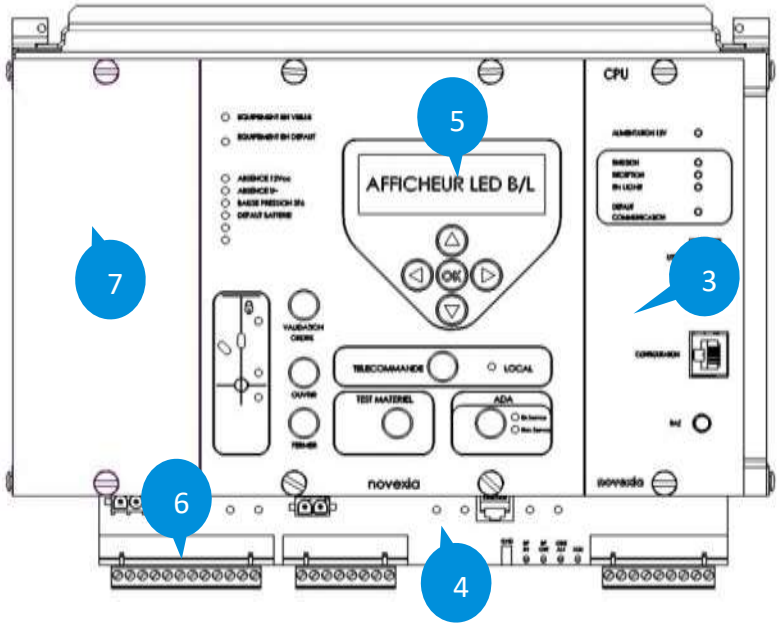
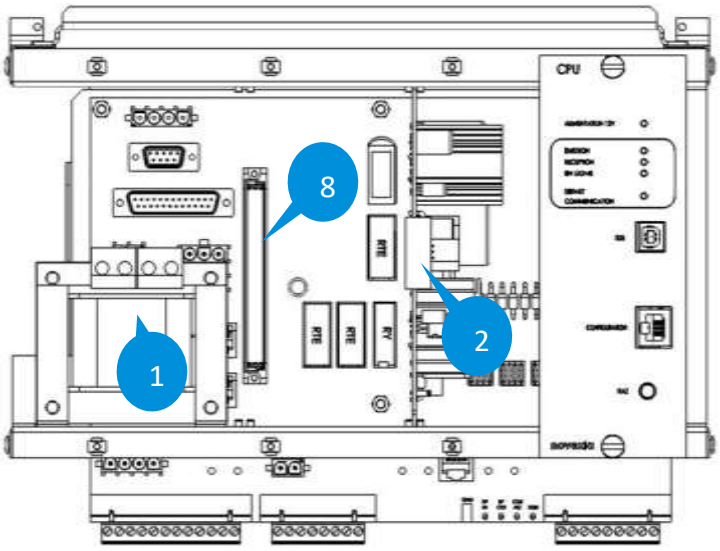
1.2.3 Description of the card rack:

The rack is made up of the 8 functional units highlighted in the diagram below:



Symbols explained on the following page



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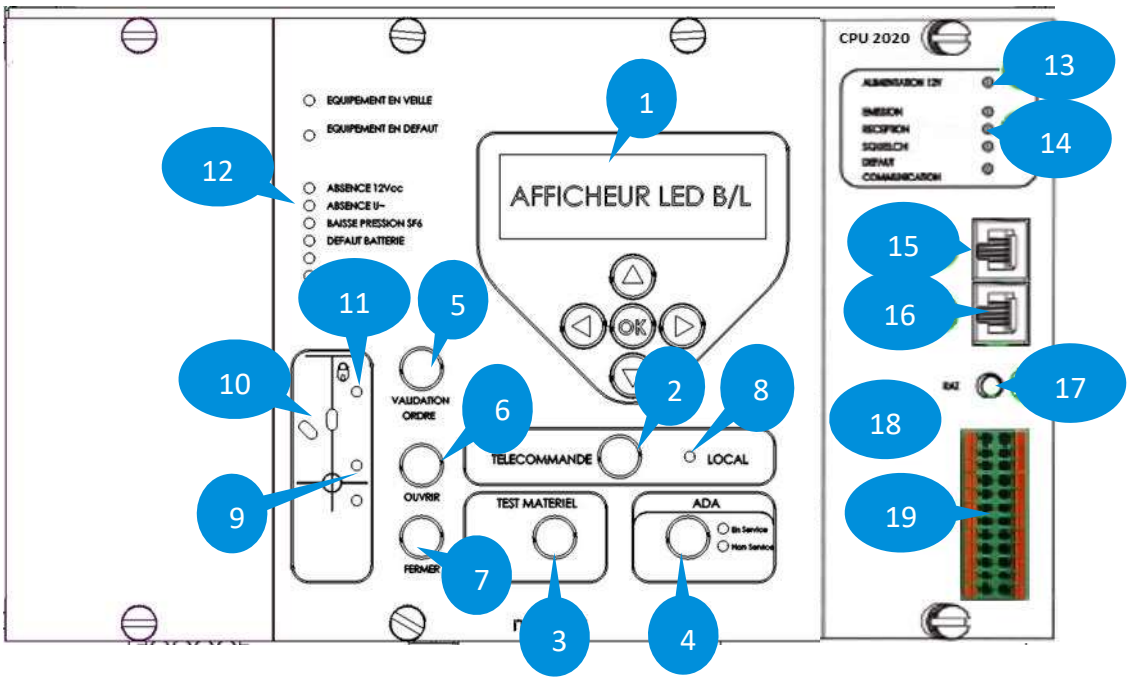
1- Product power supply transformer.
2- 12 V voltage module: Charges the battery and provides the cabinet's internal and external power supply. The module also has automatic protection for the battery and loads (internal and external).
3- CPU2020 module: Monitors all the equipment and houses the modules: current, voltage and the Measurement Board (optional)
4- Motherboard: Interface for the equipment's internal and external connections (cards, cables, sensors, etc.).
5- User interface: Enables the user to exchange information with the product (visualization of certain cabinet settings).
6- Female switch control connector
7- Panel housing Optional modules: 230V socket, door contact, lighting.
8- Location of the **additional input/output module**

1.2.4 Description of the user interface (UI):

The user interface allows the user to visualize certain equipment settings.



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1- **Display/navigation button module:** Visualization of product information
2- **Remote control button:** Selects local or remote mode.
3- **Equipment test button:** Lights up all the indicator lights to check they are working properly.
4- **ASF button:** Turns the automation (ASF) on/off. “ES” lit indicates that ASF automation is on. “HS” lit indicates that ASF is off.
5- **Command validation button:** To be used simultaneously with the open/close buttons
6- **Open button:** Open command
7- **Close button:** Close command
8- **Local indicator light:** Local mode is indicated by the red light being on. If the indicator light is off, you are in remote mode.
9- **Fault indicator lights**: Fault signalling image. In the case of an amperometric detector, the green light indicates a fault between Phase and Earth, the red light indicates a fault between Phases.
10- **Position indicator lights:** Switch position (open, closed)
11- **Locking indicator light:** Flashing indicates disengagement of the AUGUSTE’s motor and/or locking of the AUGUSTE by the manual operating lever.
12- **Cabinet status indicator lights:** If the “EQUIPEMENT EN DEFAUT” indicator light is on, you need to look at the cabinet status information lights or at the Ethernet “Maintenance” page to identify the cause of the fault.
13- **12V power supply indicator light:** Lit if the cabinet is supplied with power
14- **Communication indicator lights:** Indicates the traffic present on the communication device. The **“Emission”** light indicates that information is passing from the cabinet to the communication device. The **“reception”** light indicates that information is passing from the communication device to the cabinet. The **“Online”** light indicates the use of a line by the communication device with a remote communication apparatus. The **“Défaut communication”** light indicates a problem initialising the communication device or that the caller’s number is disabled (several unsuccessful call attempts).
15- **ETHERNET Configuration Port: Provides access to the PC interface.**
Address 192.168.10.1 (static)
16- **ETHERNET Extension Port:** Allows external equipment or a second IP communication medium to be connected. Address 220.220.0.1 (modifiable)
17- **Reset button:** Peripheral reset, SPI fault reset, charger fault reset
18- **ETHERNET Communication Port (on the back of the CPU):** Allows an IP communication medium to be connected. The Ethernet cable is offset towards the area reserved for communication media (see §1.2.2). Address 192.168.0.1 (modifiable)
19- **I/O connector:** Temperature measurement (PT100), 4-20mA/0-10V sensor, user inputs and outputs (dry contacts)

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Wiring:

PT100 (red)	2	1	PT100 (red)
PT100 (white) / 0V	4	3	4-20mA / 0-10V analog input
Common 0V	6	5	Digital input 1
Common 0V	8	7	Digital input 2
Common 0V	10	9	Digital input 3
Common 0V	12	11	Digital input 4
Common 0V	14	13	Digital input 5
Common 0V	16	15	+12V
NC (Isolation)	18	17	NC (Isolation)
RELAY1 (CONTACT1)	20	19	RELAY1 (CONTACT2)
RELAY2 (CONTACT1)	22	21	RELAY2 (CONTACT2)
RELAY3 (CONTACT1)	24	23	RELAY3 (CONTACT2)

The user Input and Output Labels are fully configurable by means of software

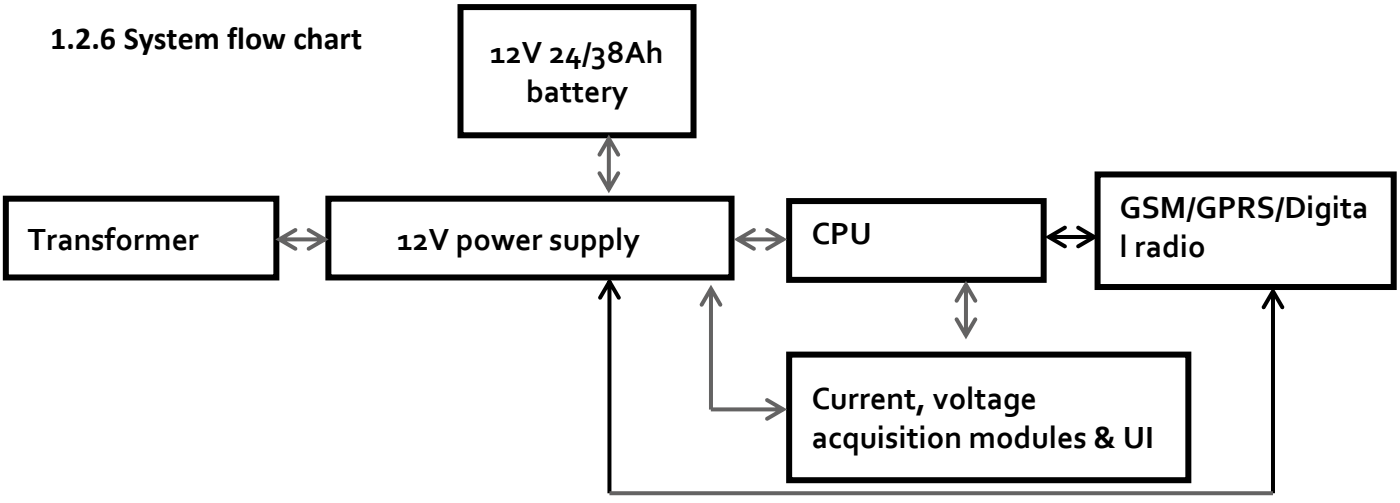
1.2.5 Bag of accessories

It contains the necessary items for installation and continued operation (maintenance) of the product.

Its contents are as follows:

- Spare fuses: 12V internal (Radio) & 12V or 48V drive motor
- User manual and operation guide
- Installation guide
- Fixing hardware for the suspension bracket
- Protocol notice

1.2.6 System flow chart



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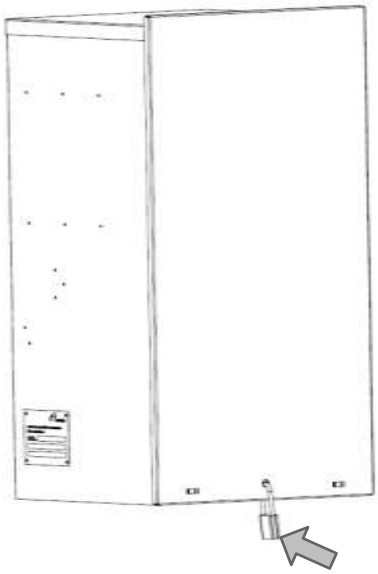
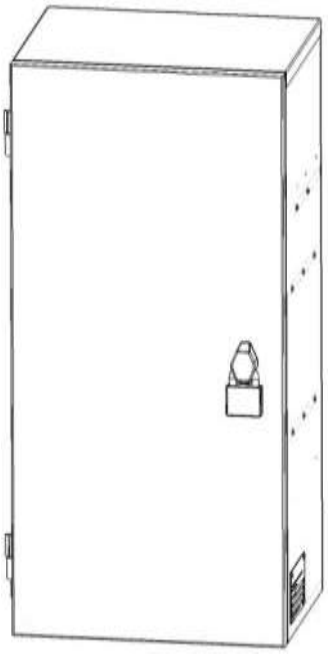
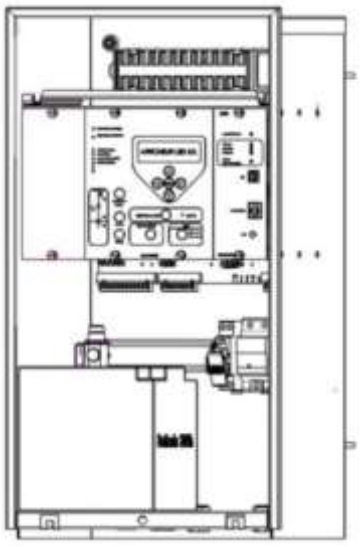
1.2.7 Access levels

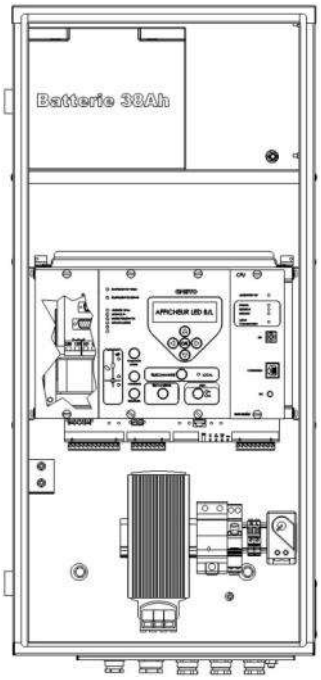
The cabinets have two access levels defined as follows:





Level 0 > in operation: All the cabinet's interfaces are inaccessible. The door is locked using a padlock (not supplied by Ensto Novexia).





Level 1 > **maintenance**: access for maintenance technicians (complete accessibility)

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1.3 MECHANICAL SPECIFICATIONS

1.3.1 Characteristics:

Small cabinet dimensions	H × W × D	625 mm × 335 mm × 345 mm
Large cabinet dimensions	H × W × D	782 mm × 362 mm × 300 mm
Mass *(with battery)*	Small cabinet / Large cabinet	30kg / 34kg
Envelope materials 1mm thick galvanised sheet		Stainless steel
Protection rating		IP55
Mechanical impacts		IK10
Mechanical vibration	In accordance with NF EN 60068-2-6	(10Hz to 500Hz 2g or 0.15mm peak-to-peak)
Resistance to saline mist	NF EN 60068-2-11	Exposure 698 h
Earthquake resistance	NF 60255-21-3	Class 2
Operating temperatures	Small cabinet Large cabinet	-25°C to +55°C -50°C to +55°C
Storage temperature		-25°C to +70°C

The cabinet has four mounting points. Centre distance of 260 mm between the 2 upper holes and 200 mm between the 2 lower holes × 495 mm enabling it to be mounted on the pole support bracket.

1.3.2 Rating plate:

An easy to read external plate allows the cabinet to be identified.

It contains the following details:

-The protocol
-The serial number
-The product's date of manufacture

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1.3.3 Identification of electronic circuit boards:

Each electronic circuit board is identified by a serial number and its type. The information for each board (serial number and type) appear on a plate inside the cabinet.
Example:

2009525 e-RTU 2020 CABINET No. 2000106 Date: 07/08/2020

Board Name	Novexia code	Serial no.	Board Name	Novexia code	Serial no.
CPU2020 board PR236 V1.0 PR241 V1.0	2009612-14	2000001	MOTHERBOARD	2006336-03	1300001
PR175 V1.1 CURRENT ACK BOARD	2006207-03	1400036	Charger card PR142 V1.2	2004993-08	1400005
CABINET BATCH No.	2005112-08	P	PR144 V1.2 DISPLAY BOARD	2006211-03	1300022
Ensto-Novexia after-sales service: +336 16 66 46 43					

1.4 LIST OF EQUIPMENT REQUIRED FOR INSTALLATION

When preparing an installation site, check that the following equipment is present

1.4.1 Battery:

<u>The batteries used meet the following criteria:</u>
- Stationary sealed lead-acid type, valve regulated type, in accordance with NF EN 60696-21 and 22
- Maximum dimensions: 195mm x 160mm x 170mm
- Initial capacity: 38 Ah or 24 Ah
- Connection via type M5 insulated threaded ring terminals

If there is no LV voltage, the battery enables power to be supplied to the cabinet. In addition, the battery provides the power required to drive the switch during a switching operation.

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✓ **Cabinet mounting element:**

Use metal bands to secure the bracket on the pole.

1.4.2 Current sensor and connecting cable:

The sensors take instantaneous measurements of the three MV line currents in order to detect faults and acquire the analog values.
The coils and the connecting cable are pre-installed on the AUGUSTE load break switch.
In the sensitive detection version, the sensors take instantaneous measurements of 2 line currents and the possible earth fault current.

1.4.3 Capacitive voltage sensor and connecting cable:

The transducers measure the individual MV voltages to detect directional faults and the presence of voltage.
Where the option is required, the voltage sensors and the connecting cable are pre-installed on the AUGUSTE load break switch.

1.4.4 Radio antenna and holder:

Install a compliant communications antenna.

1.4.5 PC:

A PC is needed to commission the cabinet.
The PC used must have at least Windows 7, an Ethernet connection and a standard web browser (Microsoft Edge, Mozilla, FireFox, Google Chrome, etc.).

1.4.6 Ethernet Cable:

An RJ45 straight Ethernet cable (standard, commercially available cable) is required to connect the PC to the cabinet (not supplied with the cabinet).

1.4.7 Tools:

Standard tools only are needed to install the product (spanners, screwdriver, etc.), except for banding the bracket to the pole.

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2 INSTALLATION

2.1. Installation operations

2.2. External connections

2.3. Earthing instructions

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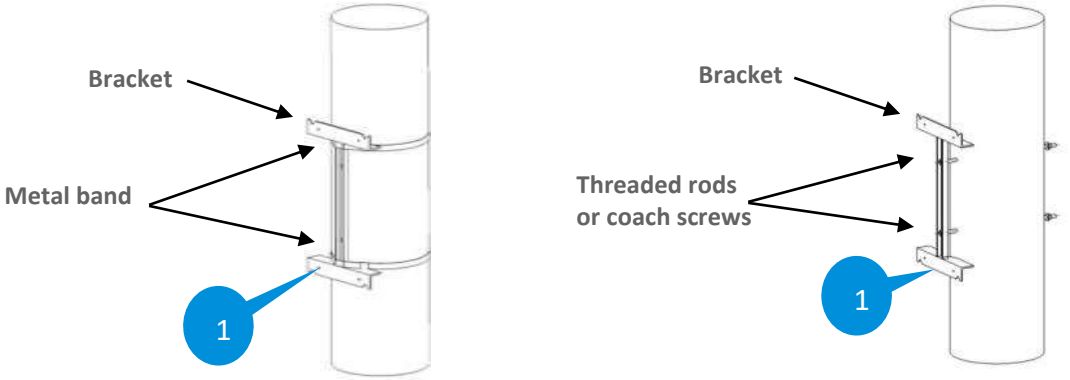
2.1 INSTALLATION OPERATIONS

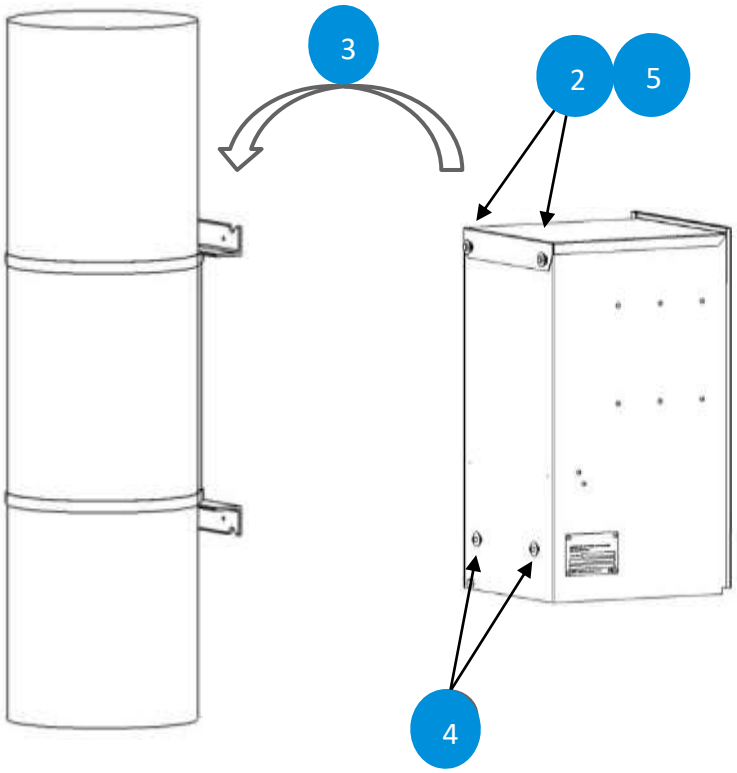
There are two kinds of mounting enabling a cabinet to be installed on a pole:

- With a suspension bracket

✓ **Step 1**: Attach the support bracket to the pole with the aid of metal bands, threaded rods or coach screws.



✓ **Step 2: On the outside** of the cabinet, screw the two upper screws in 10mm.
✓ **Step 3:** Hang the cabinet on the bracket.
✓ **Step 4: From the inside** of the cabinet, screw in and tighten the two lower screws.
✓ **Step 5:** Tighten the two upper screws.



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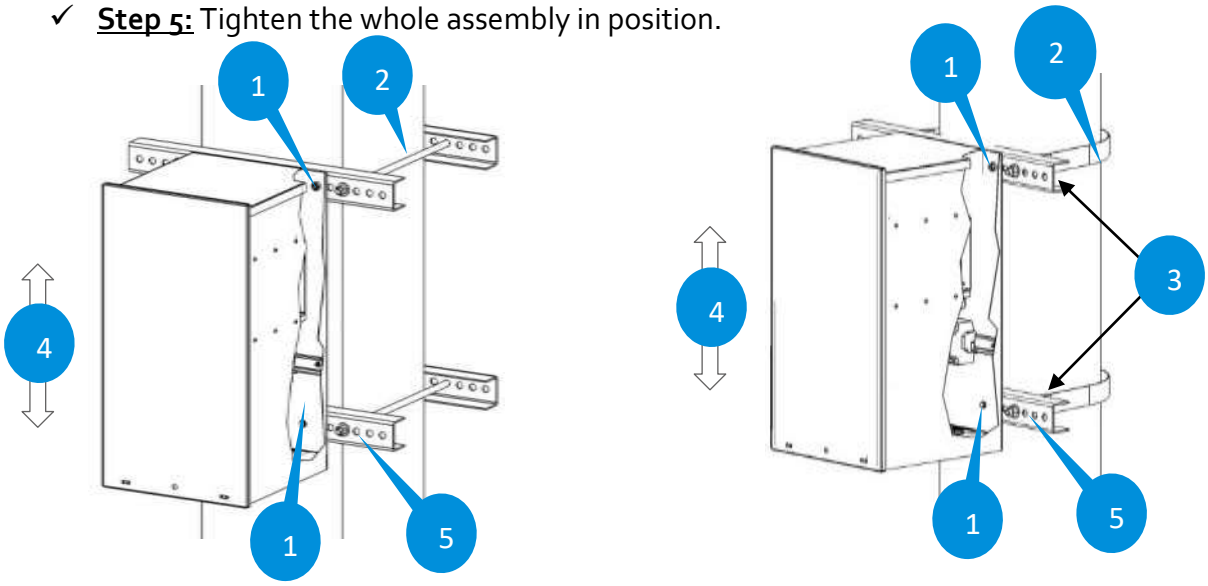
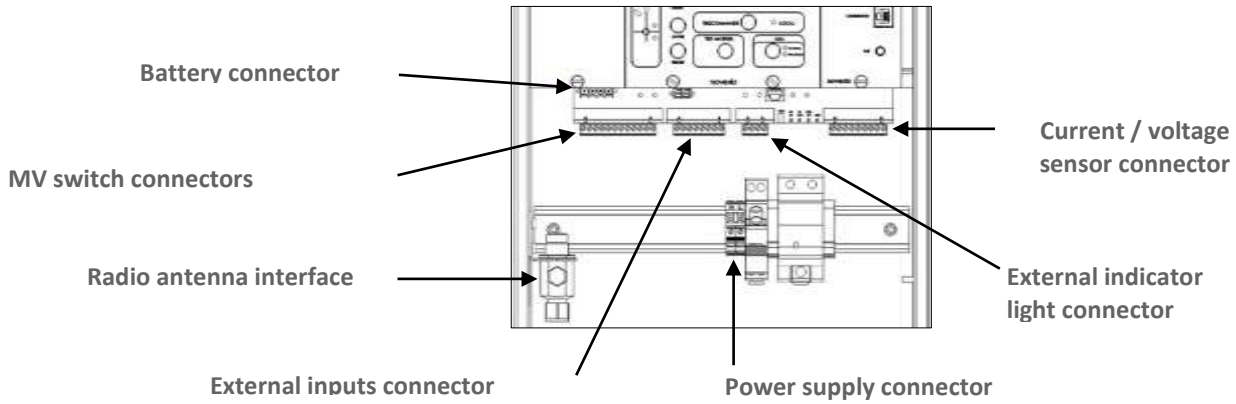
- By direct mounting
  - ✓ **Step 1**: Attach the two UPNs to the cabinet (hardware supplied by Novexia).
  - ✓ **Step 2:** Determine and cut two lengths of the banding supplied (mounting/banding) or determine and cut 4 x M12 threaded rods not supplied (mounting/clamping).
  - ✓ **Step 3:** Fit the ends of the 2 bands with their clamping fixtures provided.
  - ✓ **Step 4:** Equip the cabinet with its type of mounting, position it at the desired height.
  - ✓ **Step 5:** Tighten the whole assembly in position.



2.2 EXTERNAL CONNECTIONS

2.2.1 Identification of the various grommets and connectors:

The purpose of these assembly drawings is to facilitate connection of the external elements to the product (battery, current sensor, communications, etc.)



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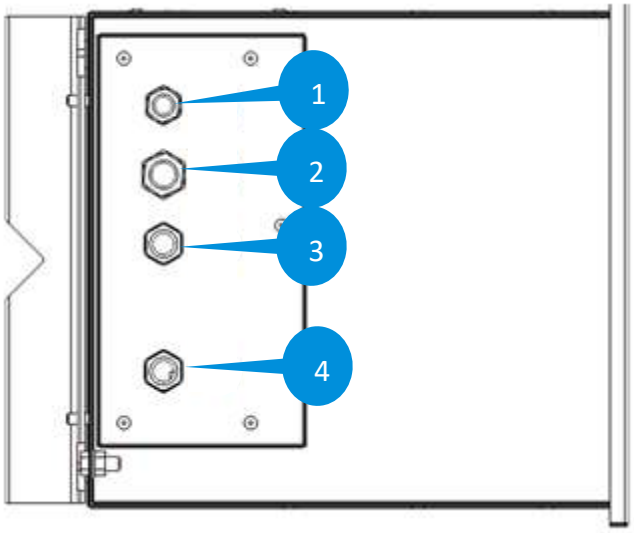
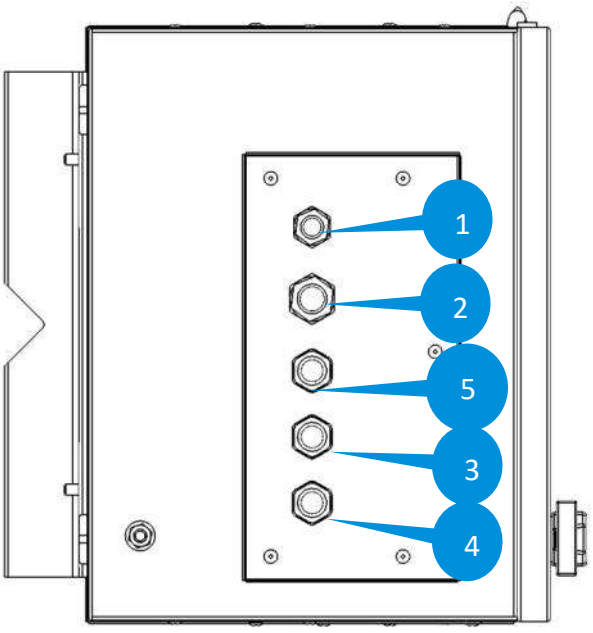


Small cabinet bottom view

1- Radio antenna cable grommet
2- AUGUSTE load break switch cable grommet
3- Cabinet power supply cable grommet
4- Current sensor cable grommet
5- Available grommet



Large cabinet bottom view

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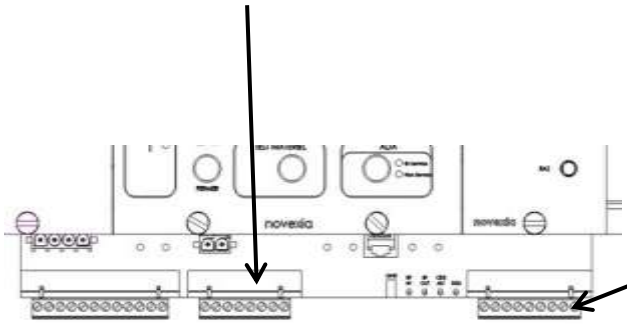
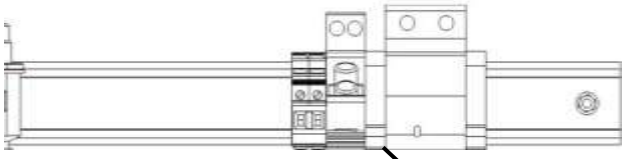
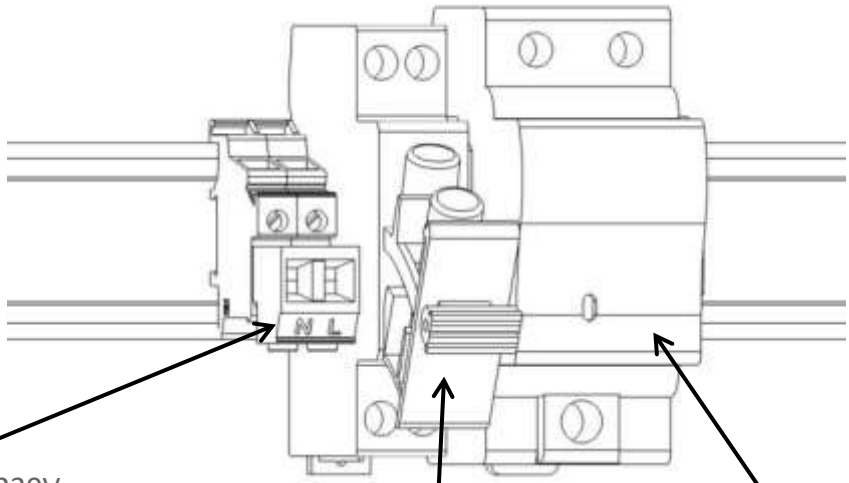
External connector including:
- External signalling
- Reserve inputs



Voltage & current sensor cable connector





101V/135V/230V
AC power supply

Lightning protection

- Fuse Holder *(Includes a spare fuse).*
or a
- Thermal magnetic circuit breaker

4PR-F14-D

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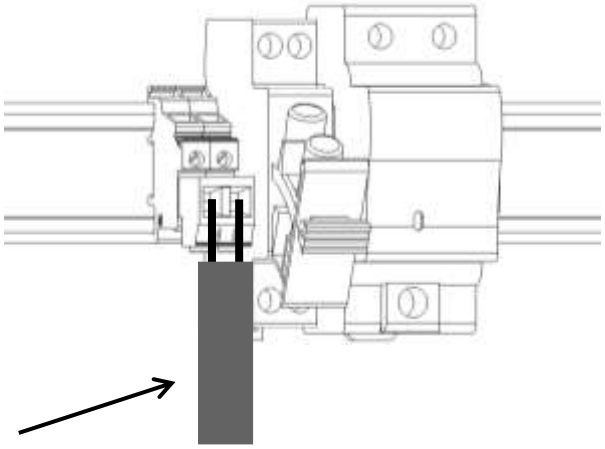
2.2.2 Connections:

To facilitate the connection of external elements, refer to § 2.3 "Identification of various grommets and connectors"

- Cabinet power supply:
Open the holder for the fuse protecting the AC power supply circuit and remove the power supply fuse. Then insert the **power supply connecting cable** into the grommet designed for this purpose.

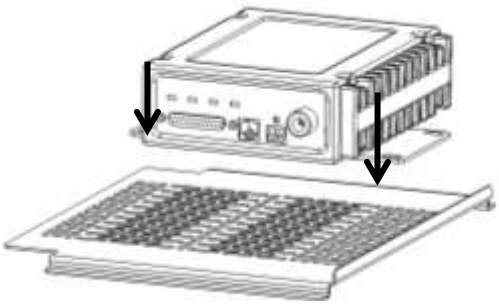
To complete this operation, connect the cable to the **power supply connector** (Neutral on the left & phase on the right).

Note: To perform this operation it is possible to disconnect the connector.



- Transmission via RADIO – GSM/GPRS – external RTU communication:
Note: Pre-connection of the data cable, as well as the radio power supply cable, is performed in the factory depending on the type of radio required.
1- Pull out the metal communication drawer.

2- Attach the communication system to the base.



3- Connect the equipment's **power supply** cable to the connector provided.

4- The **data** cable is already connected to the 25-pin connector on the motherboard. If this cable is not suitable for your communication equipment, you can modify it in line with the following diagram.

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>>>>>>> 9-pin **female** DATA cable or 9-pin **male** DATA cable depending on the circumstances.

25-pin connector no.		*9-pin connector no.*
1, 7, 11	0V	**5**
2	TX ----->>	**3**
3	RX -----<<	**2**
4	RTS --->>	
5	CTS ---<<	
6	DSR ---<<	
20	DTR --->>	
9	+12V / +5V	

5- Connect the radio or the GSM/GPRS to the antenna connector

6- Put the drawer back in place.

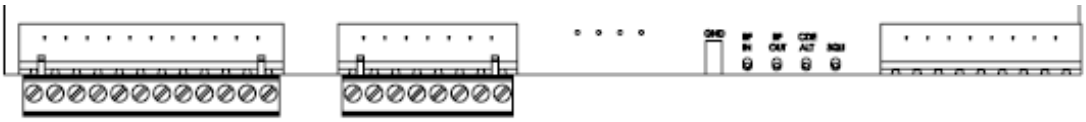
To complete mounting, connect the **radio antenna interface** to the communications antenna.

- Current sensors (coils):

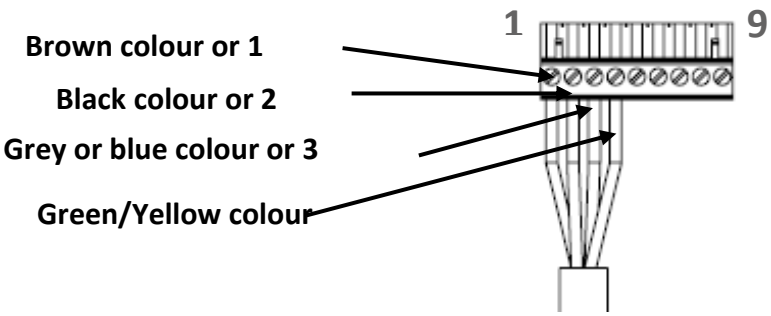
The current sensors and the connecting cable are pre-installed on the switching device (AUGUSTE load break switch).

Insert the **current sensor connecting** cable through the designated grommet.

Connect the current sensor connecting cable to the green 9-pin connector on the motherboard. **Adhere strictly to the location of wires on the connector.**



Brown or 1: Phase current 1
Black or 2: Phase current 2
Grey or blue or 3: Phase current 3
Green/Yellow or 4: Common current



To simplify connection, it is possible to disconnect the green 9-pin connector.

4PR-F14-D

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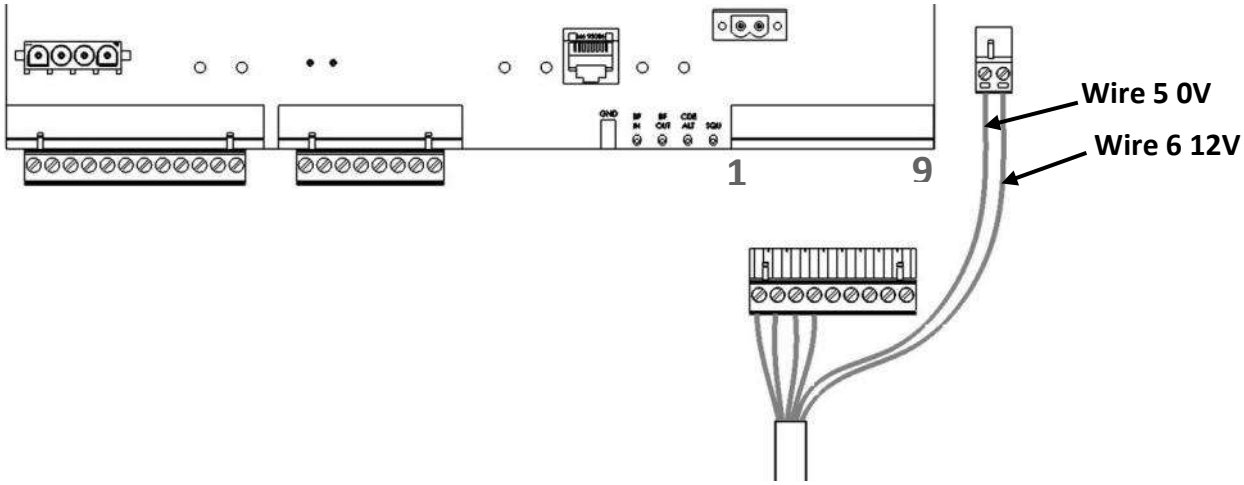
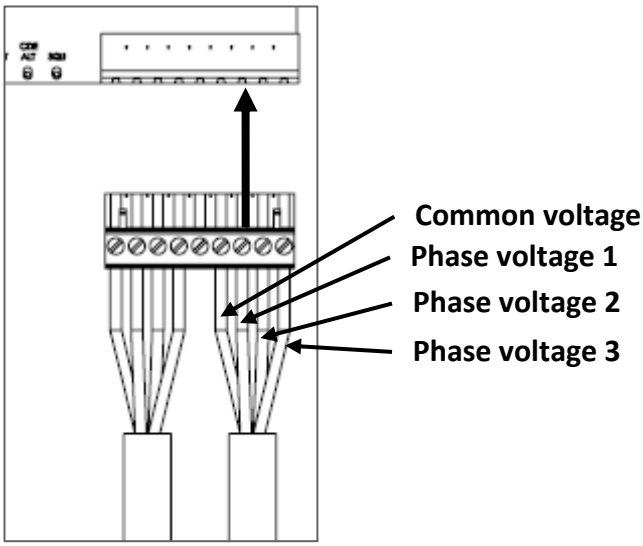
- Coil short-circuiter (optional)

This device is equipped with a relay in the switch mechanism, which short-circuits the coils when the two, 2-pin and 4-pin (or 9-pin), connectors are disconnected inside the cabinet, or when the latter is not live. This prevents all risk of voltage surges via the connector when the current transformer circuit is open.



- Voltage sensors (capacitive divider):

The voltage sensors and the connecting cable are pre-connected to the switching device (AUGUSTE load break switch).
Insert the **voltage sensor connecting** cable through the designated grommet.
Connect the voltage sensor connecting cable to the green 9-pin connector on the motherboard (shared with the current sensors).
Adhere strictly to the location of wires on the connector.



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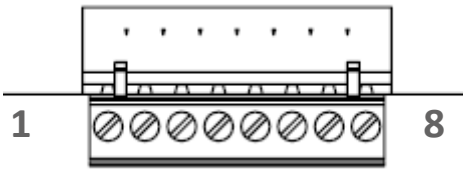
External signalling connector (on the motherboard):
This connector includes the external remote signalling (for example: Door contact) and the reserves.

Reserve Labels are fully personalizable by software.

Identification of the external connector pins:



Pin no.	Function
1	Reserve 1
2	Reserve 2
3	0V
4	Reserve 3
5	Reserve 4
6	Réserve 5
7	0V
8	0V

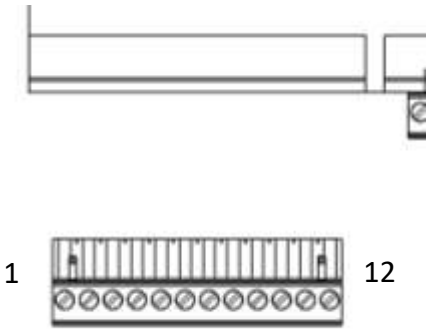
The dry contact inputs must be wired between the desired signal input (Ex: Door contact on Reserve 4) and a 0V input

Electrical control of the AUGUSTE load break switch:

The 12-pin connector must be connected to the AUGUSTE load break switch's connecting cable (on the motherboard).

Identification of control pins:

Pin no.	Connecting cable wire number	Function
1	1	SF6 pressure drop (optional)
2	2	0V
3	3	MV switch open
4	4	Motor -
5	5	MV switch closed
6	6	Motor +
7	7	Control disconnected
8	8	Motor -
9	9	Reserved
10	10	Motor +
11	11	Reserved
12	12	Reserved



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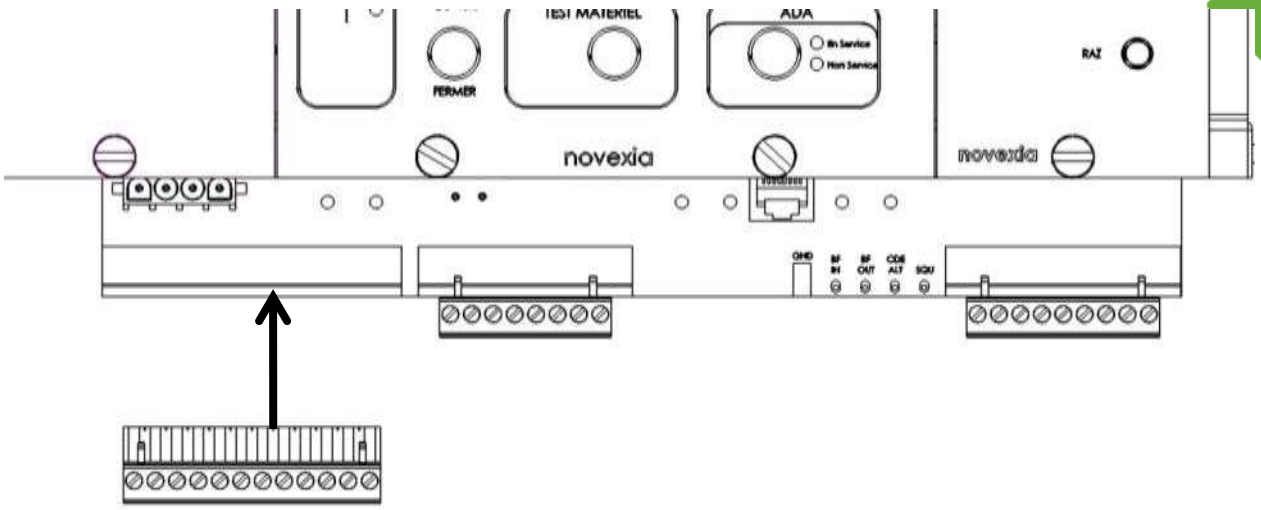


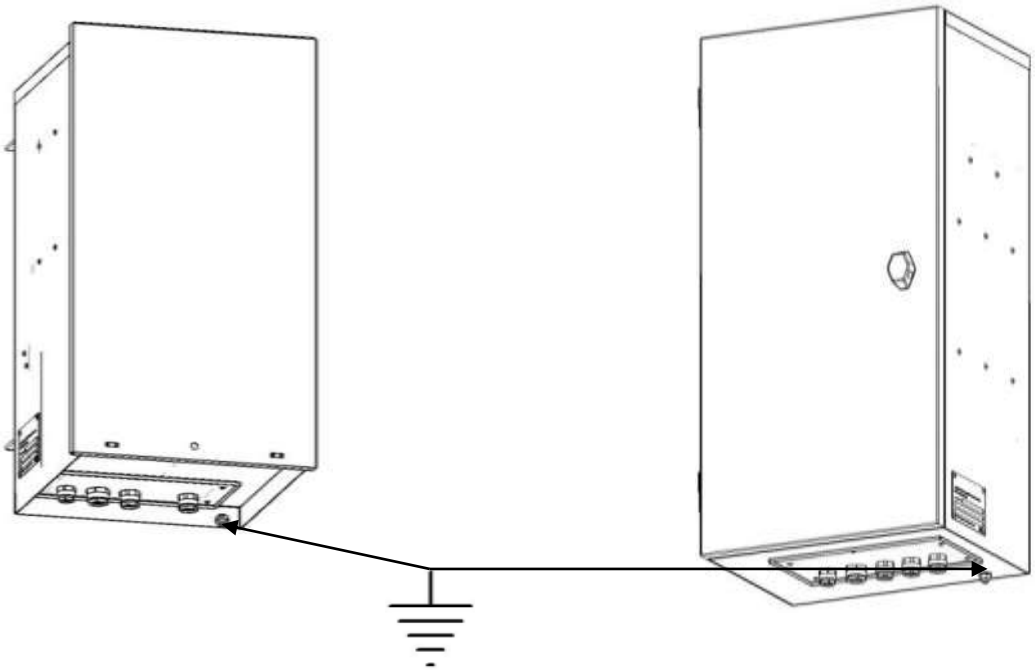
Now plug the connector into the female section.

Remember to re-tighten all the grommets.

2.2.3 Earthing instructions:

Loosen the earth M8 stud bolt nut.
Remove the washer (flat and locking).
Place the **ring terminal connected to the equipment's earth** on the bolt.
Place the two washers on the bolt and secure the entire assembly using the nut.

No earthing or incorrect earthing may result in your control cabinet malfunctioning.



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3 COMMISSIONING

3.1. Points to be checked before commissioning

3.2. List of commissioning operations

3.3. Operational tests

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3.1 POINTS TO BE CHECKED BEFORE COMMISSIONING

3.1.1 Visual inspection

Check the product by means of a simple visual inspection (cabinet and user interface with no impact). Check the battery charge status.

3.1.2 Setting up the configuration PC

The equipment is configured during this phase. To do this, it is necessary to use a computer with an Ethernet connection and a standard web browser (Microsoft Edge, Mozilla, FireFox, Google Chrome, etc.).

First, it is necessary to establish the connection between the equipment and the embedded software.
Note: The PC used must have at least Windows 7, an Ethernet connection and a standard web browser (Microsoft Edge, Mozilla FireFox, Google Chrome, etc.).

Changing an IP address on a PC
The connection to new e-RTU 2020 cabinets is established via an Ethernet port and uses the IP protocol.
Therefore, it is essential, in order for this to work, to provide the configuration PC with an IP address in line with that of the cabinet.
The cabinet configuration IP address is common to all of our products and is as follows:

- IP address: 192.168.10.1
- Subnet mask: 255.255.255.0

The configuration PC address must be:

- IP address: from **192.168.10.2** (or up to 192.168.10.254)
- Subnet mask: **255.255.255.0**

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This operation only needs to be performed once on the same PC to connect to all the cabinets.
Note: The CPU2020 board includes a DHCP server (disabled by default).
Refer to guide 72868 – System configuration guide for cabinet e-RTU 2020

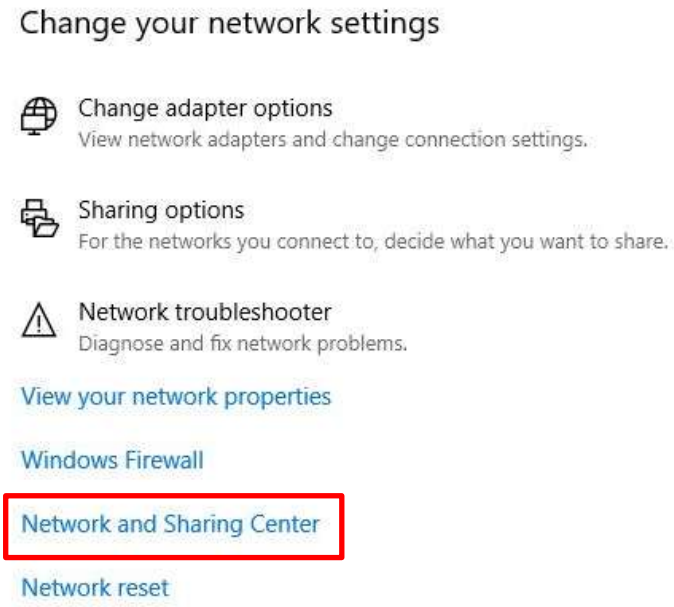
It is essential to have administrator rights in order to change the IP addresses of a PC.

Note: Following configuration, if this PC needs to be connected to one or more different networks, it is necessary to change its IP address in order to bring it into line with the network addressing principles (static IP, DHCP).

The method for changing the PC IP addresses in different PC operating environments is detailed below

- Windows 10

Right-click the network icon in the menu bar to the right.
Select “Open Network and Sharing centre”



Select “Network and sharing centre”

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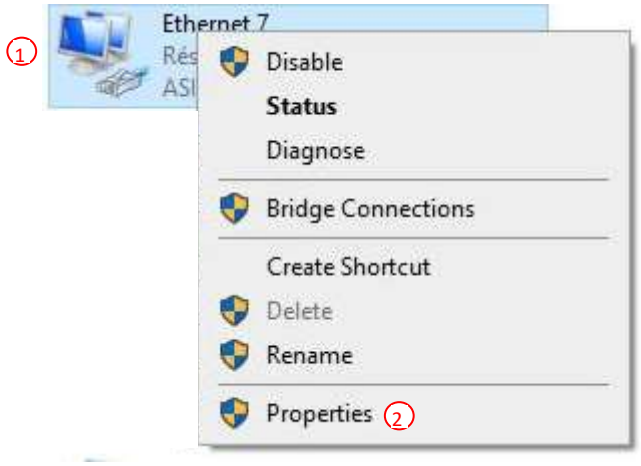
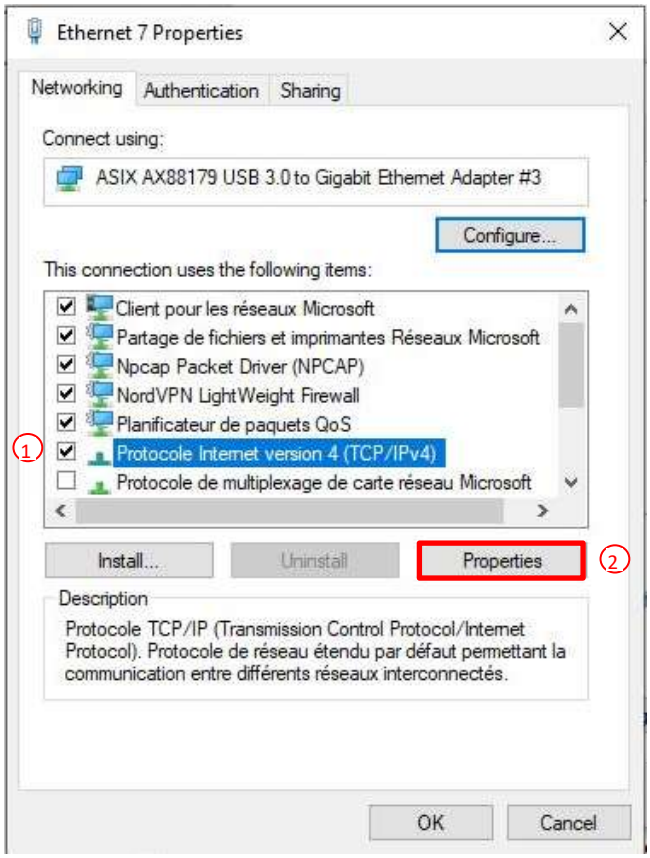
In the panel on the left-hand side, select “Change adapter settings”



① Select and right-click the icon to view the network connection pop-up menu that will be used.

② Select “Properties”



① Select “Internet Protocol (TCP/IP)” or “Internet Protocol version 4 (TCP/IPv4)” (without deselecting the tick box)

② Select “Properties”

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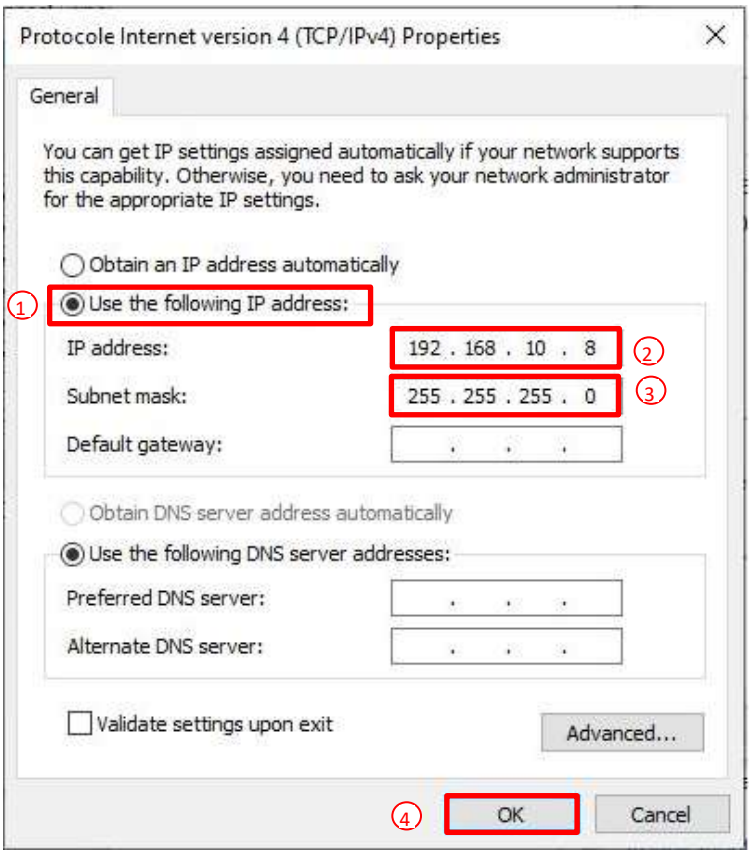
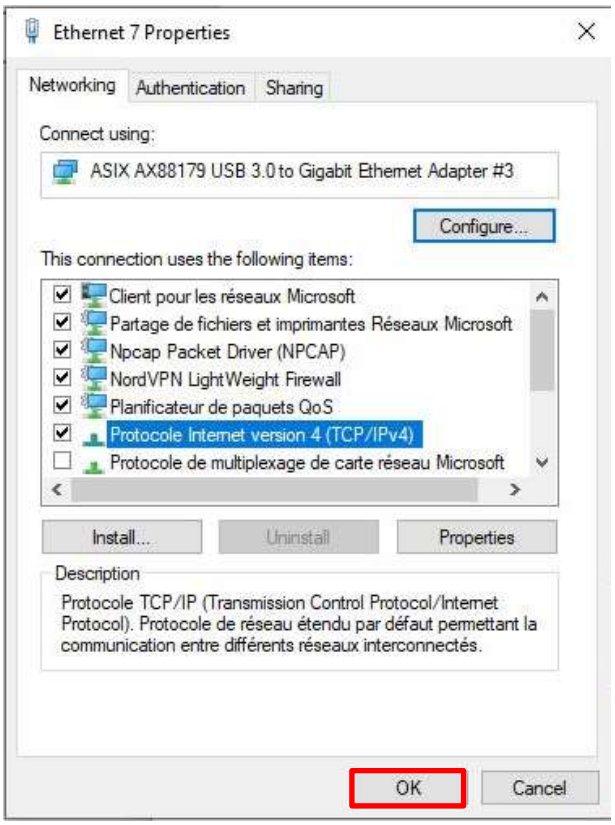


① Select “Use the following IP address”
Enter:
② the IP address
③ the subnet mask
④ Confirm with “Ok”



Select “Close”.
The change of IP address has now taken effect.

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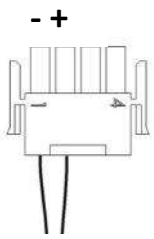
3.2 LIST OF COMMISSIONING OPERATIONS

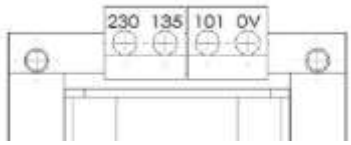
3.2.1 Product power supply

Pay attention to the polarity of the connector

Insert the battery into its housing and connect it to the equipment.



Measure the voltage originating from the VT incorporated into the Auguste and check its compatibility with the cabinet's transformer cabling.



Place the fuse back in its housing and close the fuse holder.

The equipment is now live

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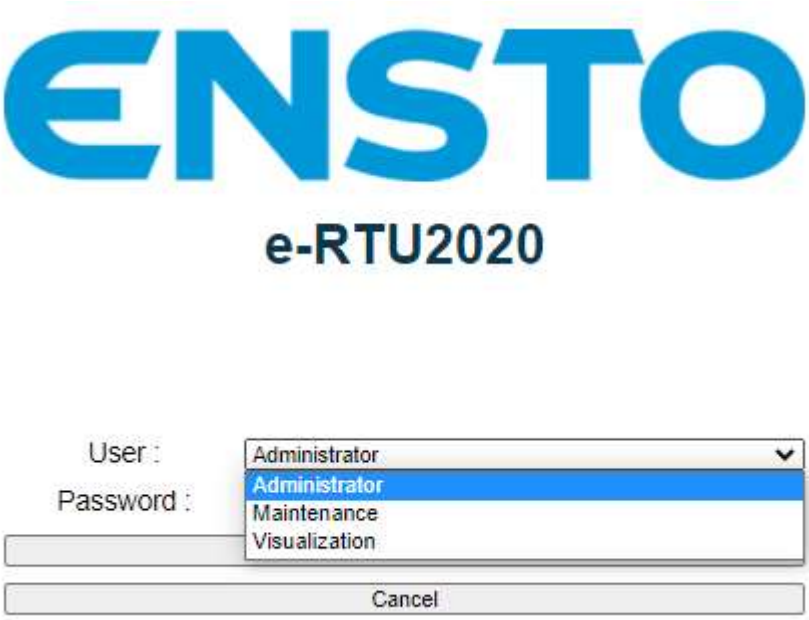
3.2.2 Configuration by PC

Now connect your PC to the cabinet's Ethernet Configuration port.
Open the Ethernet browser and enter https://192.168.10.1 in the address bar
As the certificate is self-signed, a warning message may appear. Agree to continue.

You are then taken to the home page for the embedded software.



3 user accounts are created by default:

- Administrator:
  Access to all tabs.
  Default password: root_ensto

- Maintenance:
  Access to all tabs associated with operation of the MV network
  Default password: maintenance_ensto

- Visualization
  Access limited to visualization, downloading and actions available on the local UI.
  Default password: ensto

The passwords for Administrator and Maintenance users must be changed when the user first logs in.
Additional accounts can be added
(*Refer to guide 72909 – System configuration guide for cabinet e-RTU 2020)*

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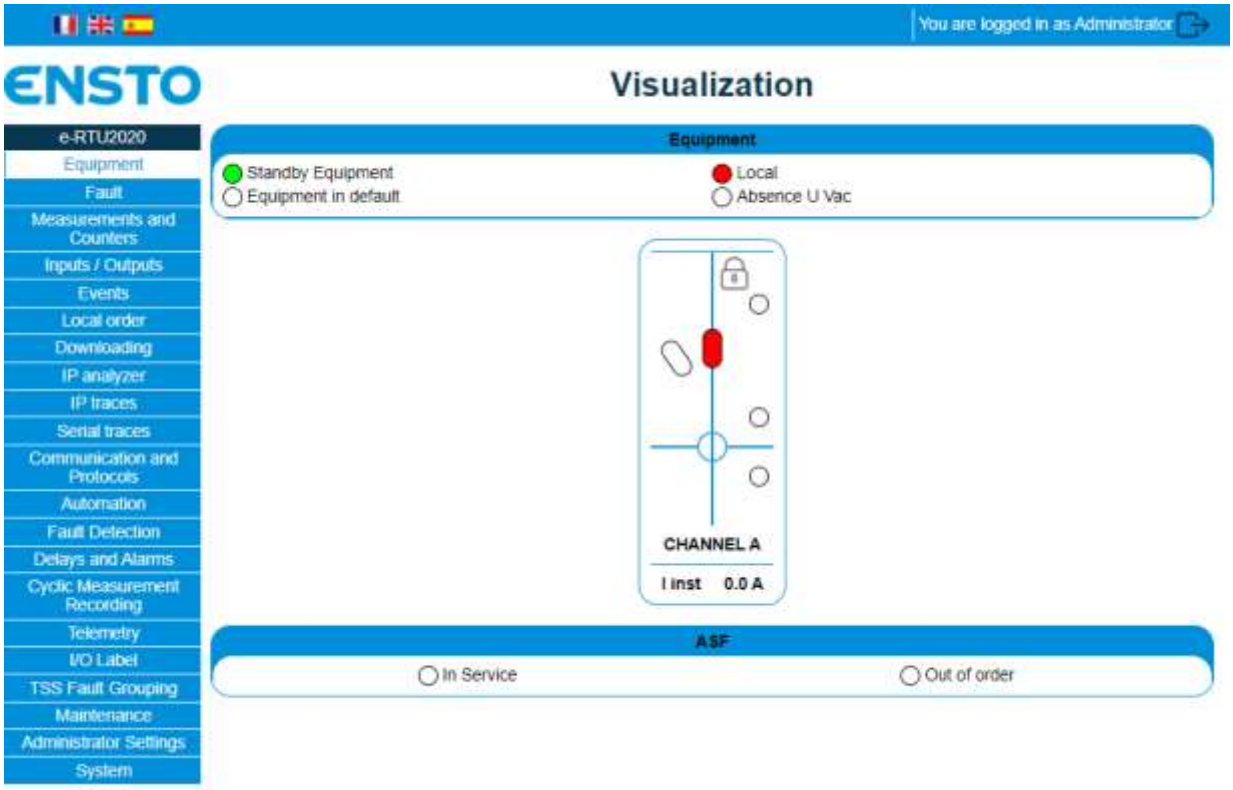
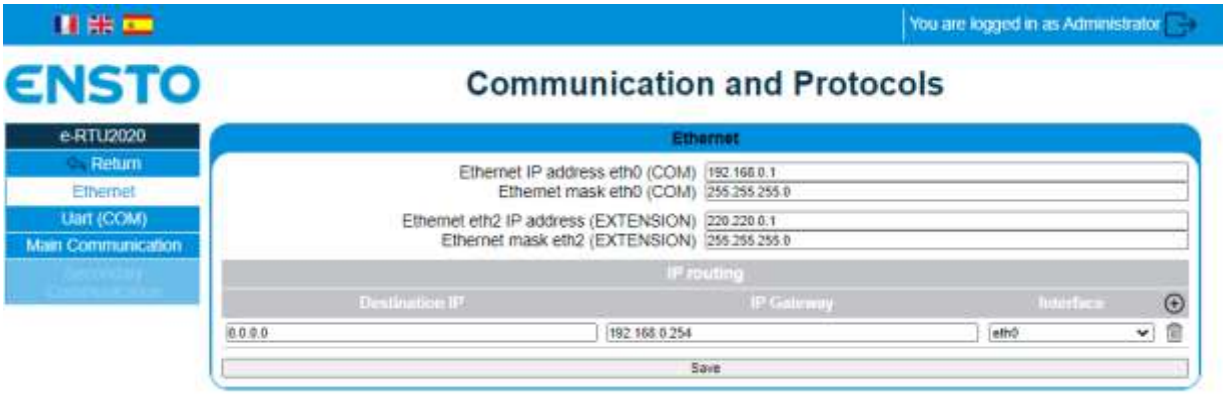
All of the configuration settings are detailed in § 4.2, but the following settings at least must be configured



- Communication and Protocols Menu
  - ➢ Configure the communication devices
    - IP:



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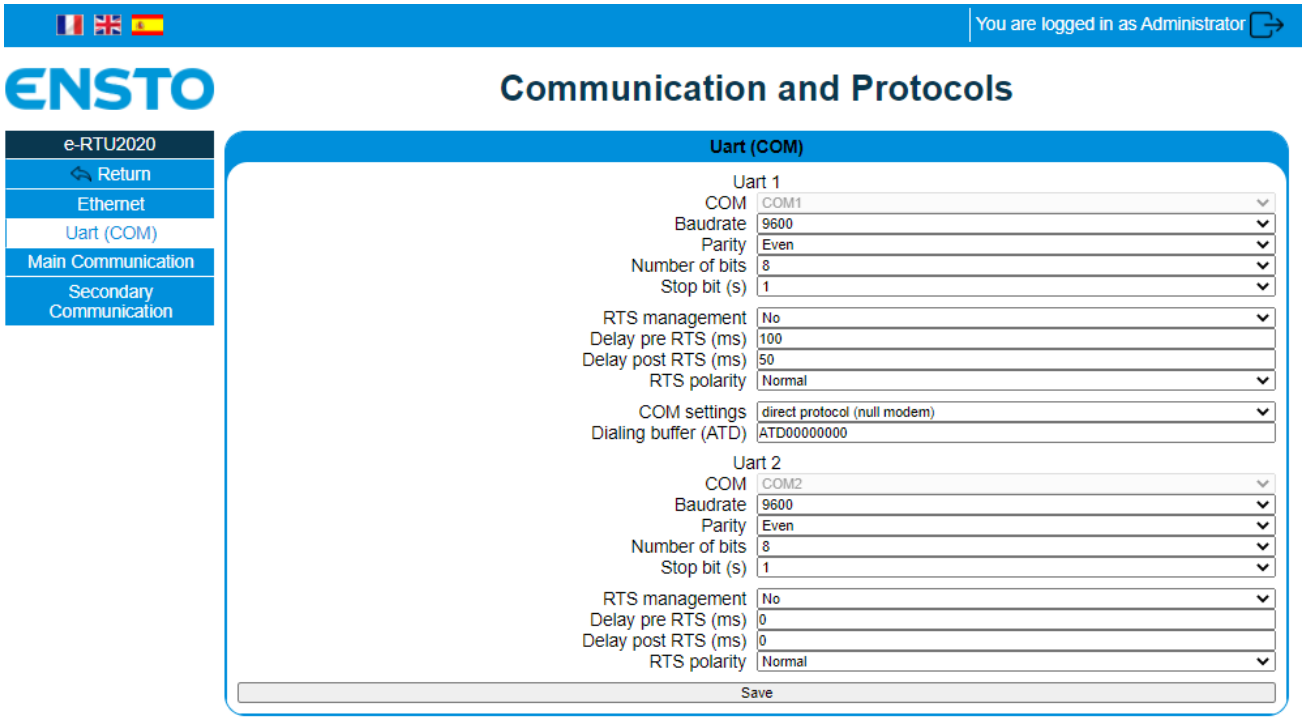
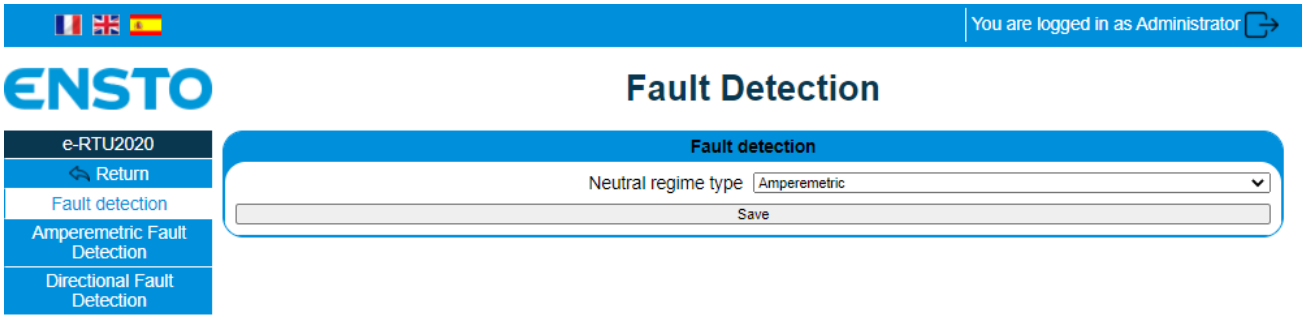
- Serial:



➢ Configure primary/secondary communication (see Protocol Notice)

- Fault detection menu

➢ Program the type of fault detection



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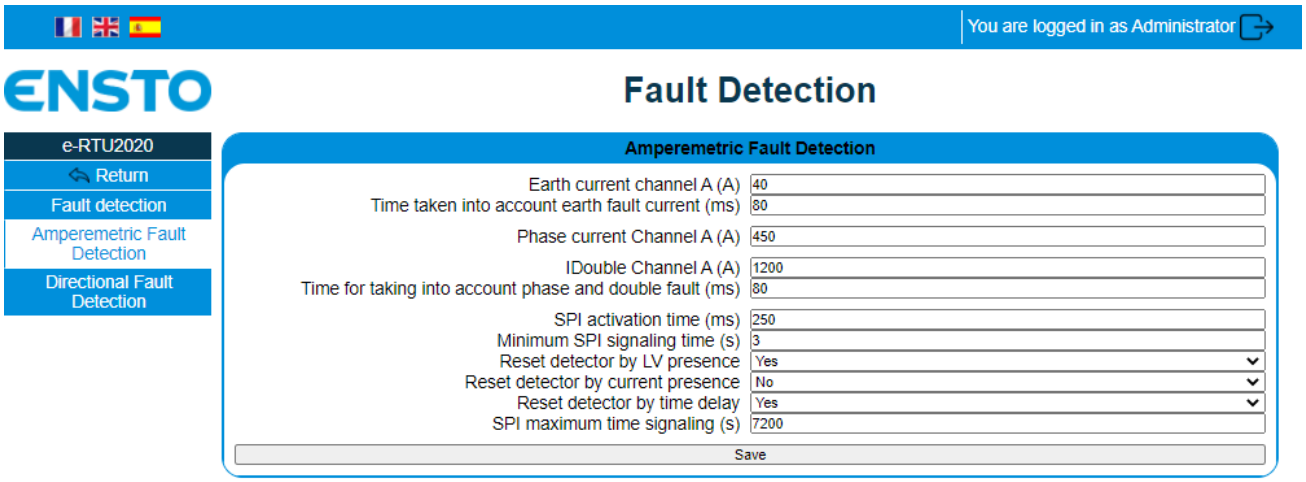
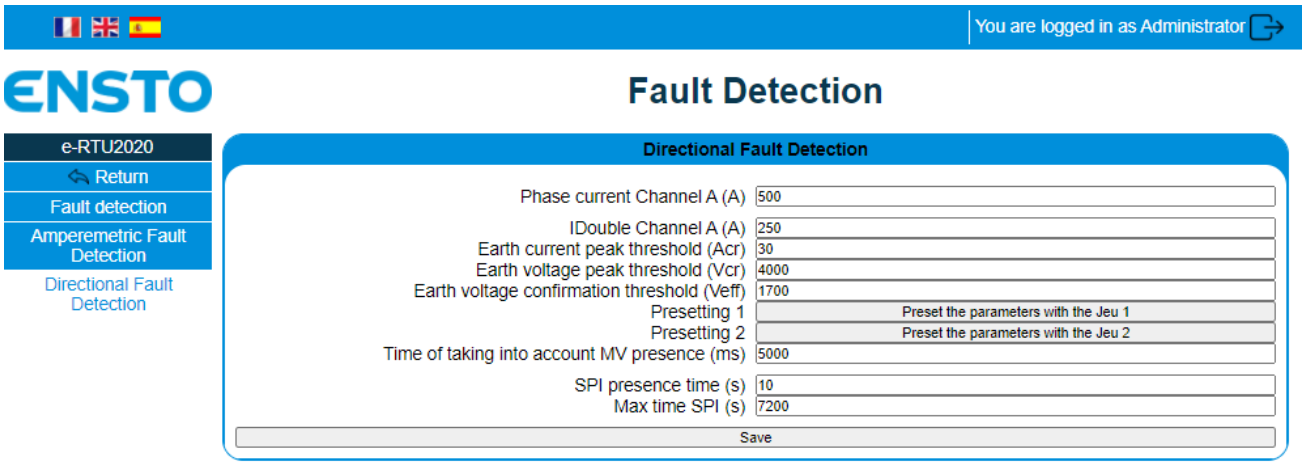
- Overcurrent (“Amperometric”):

➢ Program the current thresholds for single-phase and polyphase faults



- Directional

➢ Program the current thresholds for single-phase and polyphase faults



Standard homopolar sensitivity presets are available
(Press the Preset1 and Preset2 buttons)

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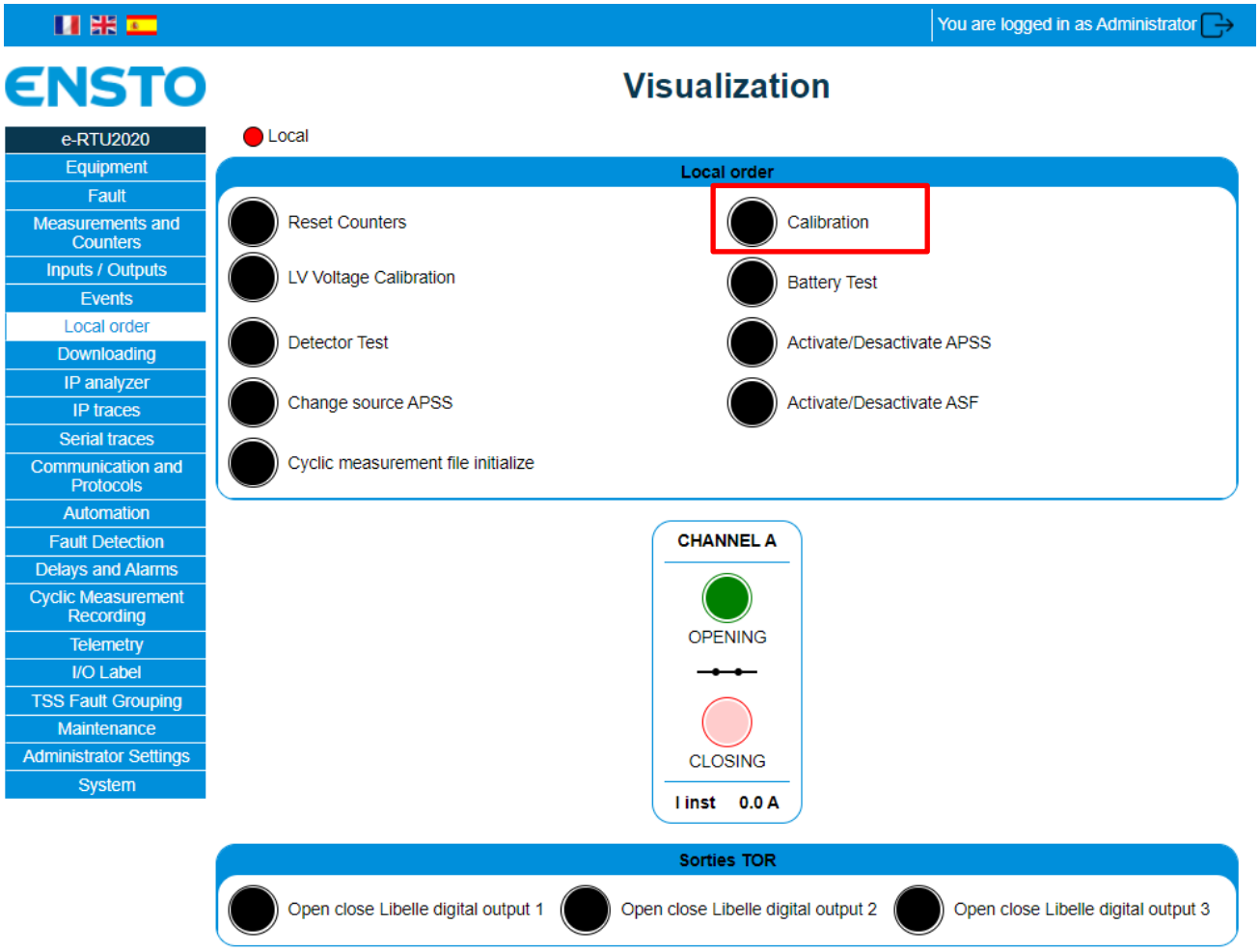
➢ Calibrate the PPACSs (to do this, there must be MV) in the local control tab



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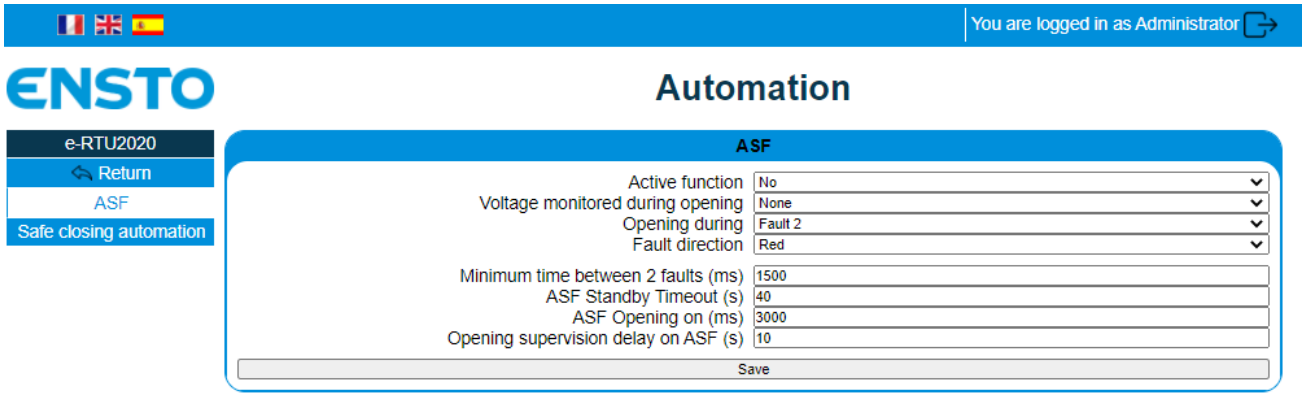
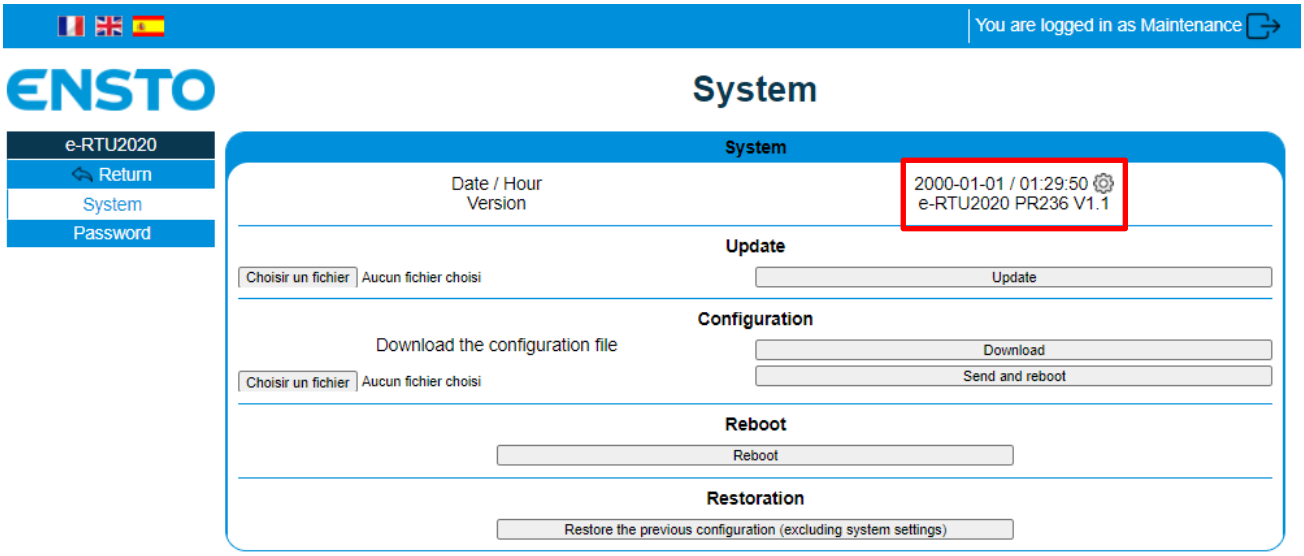
- Automation menu (if necessary)
  - ASF



➢ Turn the use of ASF automation on or off (Function active/inactive)

In order to function, automation must be turned on either locally via the local panel or remotely.

- System menu



➢ Set the ITI cabinet's time either manually or using the time on your PC (click on the cogwheel alongside the time)

On completion of configuration, there should no longer be any faults and the green equipment standby LED on the local panel should flash.

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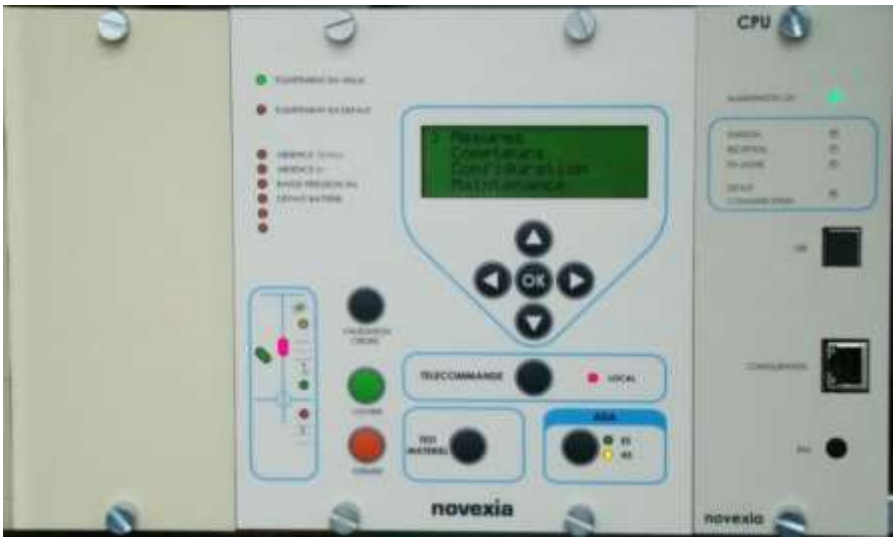
3.3 OPERATIONAL TESTS

A description of the user interface is available in § 1.2.

Via the local panel, check that the following information is displayed:

12V POWER SUPPLY indicator light	STEADY ON
EQUIPMENT IN STANDBY indicator light	FLASHING
LOCAL indicator light	STEADY ON
POSITION indicator light	STEADY ON GREEN OR RED (if a switch or simulator is connected)
LOCKING indicator light	OFF OR FLASHING (depends on the manual control status)
TEXT display	**> Measurements** **Counters** **Configuration** **Maintenance**



✓ Press the **EQUIPMENT TEST** button and check that all the indicator lights come on and that the display is off.

For the following commissioning operations, it is necessary to use the display/navigation button module. A memo relating to use of the local panel is available in § 4.2.

✓ *Test*:

There are internal test routines. In addition, advanced functions including fault detection and ASF automation can be controlled by devices sold by Ensto Novexia.

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- Battery test:
The equipment includes a battery test for verifying the good condition of the latter.
Maintenance → Battery test → Press the "OK" button

20 seconds later, the screen displays the message: **Battery test OK" or "Battery test failed"**. If the procedure has failed, refer to §5.2 (corrective maintenance) to identify the cause of the problem.

- Fault detector test:
To run this test, use the display/navigation button module:

Maintenance → Detector tests → Press the "OK" button

The flashing of fault indicators implies that the detector is working properly. If the procedure has failed, refer to §5.2 (corrective maintenance) to identify the cause of the problem.

✓ *Calibration procedure: (if voltage sensors are present)*

As the switch is connected to the live network, initiating the calibration of voltage sensors can be performed via the display/navigation button module.
Maintenance → Cal Voltage Sensor → Press the "OK" button
After 10s, the display shows the calibration status (OK or Failed). If the procedure has failed, refer to §5.2 (corrective maintenance) to identify the cause of the problem.

✓ Perform communication tests with the control station and check the proper return of information to the remote control centre.

The "Reception", "Transmission", and "Online" LEDs must flicker during communication (serial protocols).

✓ Check the correct operation of the electrical control of the MV switch on the simulator or in reality. To do this, perform an open/close cycle (via the local panel, by pressing the command validation and the open or close buttons at the same time) and check the correspondence between the position of the switch and the position indicator lights on the UI.

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4 OPERATION

4.1. Functions

4.2. Commands, tests, configurations

4.3. Method for using the PC interface

4.4. Upgrades with new functions

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4.1 FUNCTIONS

The cabinet houses all the functions required to remotely control an AUGUSTE load break switch in a compact unit. In addition, it enables line faults to be detected, for example, where a branch has fallen on the line.

Several variants are available to meet all communication needs.

Viewing and configuration are possible by PC by means of the HTML pages embedded in the equipment.

Certain settings can be viewed on the local panel.

4.1.1 Power supply unit function

The power supply unit comprises:

Current surge protection: fuse holder or 2A or 4A thermal magnetic circuit breaker
Voltage surge protection:
Rated voltage: 230V, discharge capacity: 15kA (Soulé type PM15BI)
100 VA primary isolation transformer with a protective screen
0V – 101V – 135V – 230V (U±15%) (for connection in accordance with the LV voltage)
secondary: 0V – 27V = 3A

dielectric strength: primary/screen: 4kV 50Hz – 1mm, 5kV with 1.2/50µs shock wave
secondary/screen: 4kV 50Hz – 1mm, 5kV with 1.2/50µs shock wave
primary/secondary: 4kV 50Hz – 1mm, 5kV with 1.2/50µs shock wave

earth/primary, secondary and screen: 4kV 50Hz – 1mm, 5kV with 1.2/50µs shock wave

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Battery charger

- charging the 12V battery. The charger is voltage-regulated and temperature-compensated with a current limit of 3.5 A. The charge curve is specific to each type of battery, batteries must be replaced with batteries of the same type and the same make. The power supply unit can provide 15A for 50ms and 6A for 7s for controlling the motor.

- Management of the 12V power supply required by the cabinet. A 6.3A F1 fuse protects the charger. A 6.3A F2 fuse protects the motor power supply. In standby or during operating cycles, the voltage is 12V +30%, -10% depending on consumption and the ambient temperature.

- residual ripple less than 1% from 50Hz to 3kHz

- 0V connected to the protective earth

- battery protection against deep discharge

- following a lack of AC voltage for 16 hours (configurable), the loads powered by the battery are cut off (the cabinet is no longer live).
The power supply is restored by:
  * returning the AC voltage
  * pressing the reset button, which restarts a 16-hour charging cycle

- In the event of excessive power consumption by your communication equipment (Current>2A for more than 3min) the 12V power supply circuit is disconnected. Restore the power supply by pressing the reset button, which initialises the cabinet.

- Monitoring the AC voltage. The loss of AC voltage (U<30%) is indicated by:
  * Remote signalling: “No AC voltage”
  * a red indicator light appears on the front panel of the local panel module

- periodic battery test: perform the periodic test of 12V batteries. A battery testing system is incorporated into the battery charger. The battery capacity is systematically tested every 24 hours.

A current of 6A is provided in a resistive load for a period of 2s. The battery voltage is measured before, during and after testing. This enables the voltage drop at these terminals to be calculated. Exceeding the voltage drop threshold indicates that the battery’s characteristics are no longer able to guarantee normal operation of the control cabinet (battery at the end of its life or insufficient charge). This information is signalled by the red indicator lights (battery fault and EQUIPMENT FAILURE) on the front panel and via remote signalling.

The battery voltage varies according to the ambient temperature; the permissible voltage drop threshold is offset by the temperature measurement.

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It should be noted that the test can also be initiated manually via the display menu. This test takes about 2s. If a battery fault is detected, the battery fault remote signal is activated. The battery fault and the red equipment failure indicator lights come on and remain lit until the complete removal of power supplies.

Batteries

Values measured:
- battery voltage: 12V ±2%±0.1V 48V ±2%±0.4V (depending on the model)
Lead batteries: 12V/24Ah or 12V/38Ah (depending on the type of RTU and PSTN or radio communication mode). Plan to replace the battery every 4 to 5 years with a battery that is identical to the original one.

NB.:
In the case of prolonged storage, the battery must be recharged every 6 months.

Charging voltage 12V	Temperature
13.9V	15°
13.8V	20°
13.7V	25°

Note that you can recharge the battery with the aid of the control cabinet by connecting it to mains power

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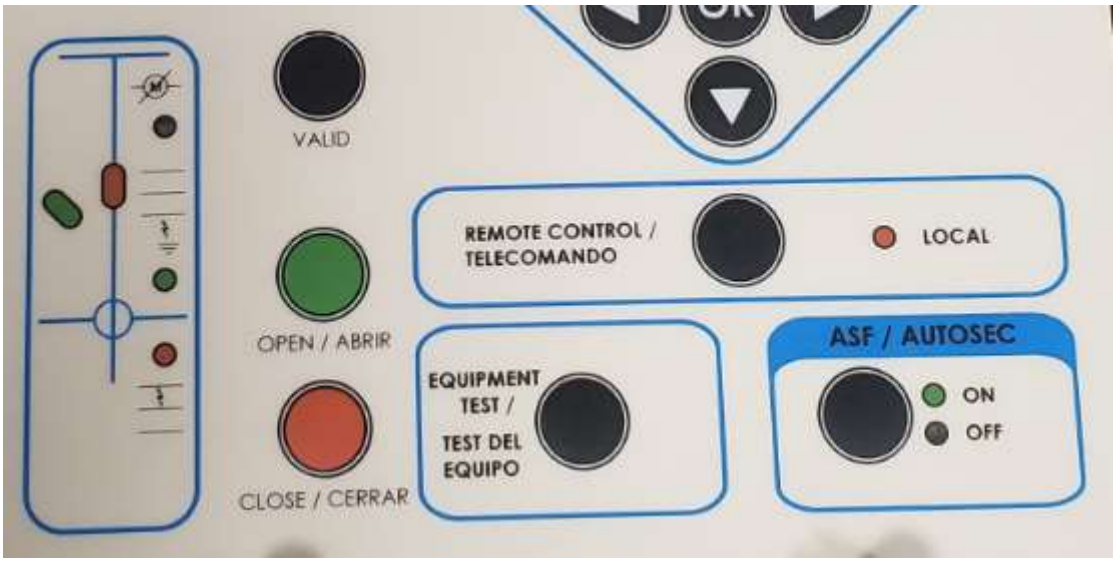
4.1.2 Switch control function

The switch can be operated remotely or locally via the cabinet's UI.



For local switching operations, ensure that the cabinet is in local operation ("Local" indicator light on) otherwise press the "TELECOMMANDE/LOCAL" button

To implement a close command, press the "CLOSE" and "COMMAND VALIDATION" buttons at the same time. After closing, the red position indicator light comes on

To implement an open command, press the "OPEN" and "COMMAND VALIDATION" buttons at the same time. After opening, the green position indicator light comes on

Note: If the switch is neutralised by the neutralisation switch or in manual mode for the switch, the corresponding indicator light flashes yellow and all local or remotely controlled switching operations are prevented.

4.1.3 Fault detection function

The device comprises:

- 3 current measuring coils installed on the phases with a ratio of 500A/1A (300A/1A as an option) and 3kV insulation between the windings and the earth or 2 current measuring coils installed on phases 1 and 2 and a homopolar coil, with a ratio of 500A/1A and 3kV insulation between the windings and the earth for detection of low value phase_earth faults (>4A).

- 3 isolation transformers with 2kV coils, which protect our electronic system from voltage surges.

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An electronic assembly, which comprises the modules for:

- phase current measurement
- detection of exceeded thresholds
- monitoring AC voltage (optional)
- visualisation des défauts
- remote fault signalling

The fault current detector is designed to detect polyphase faults and faults (between phase and earth) on medium voltage three-phase networks with a resistive neutral or earth.

Any exceeding of the phase current or phase-earth current threshold for a period longer T1, which is programmable from 30ms to 990ms (±10ms), is indicated by:

- visualization of a red or green indicator light on the front panel of the cabinet
- remote “fault occurrence” signalling

Deletion of logs is performed by the return of AC voltage or after 2 hours signalling. However, the information is retained for at least 3s after the fault has disappeared.

Characteristics

The different fault and time delay thresholds can be changed using the PC

- fault signalling by a red or green light on the front
- the measurement signal is isolated by means of a 2kV isolation transformer
- detection of the lack of MV voltage at U < 30% of the power supply

4.1.4 ASF function

Automation analyses and stores the occurrence of permanent faults detected by the fault detector and controls the automatic opening of the switch if the threshold for the number of faults is reached. A fault is considered permanent when, in the power supply substation (or source substation), the upstream circuit breaker performs an ineffective slow recloser cycle.

The AUTOMATION considers a fault downstream of the switch to be permanent when N number of network faults (N programmable from 1 to 7) are detected. The faults taken into consideration are Phase-Earth or Phase-Phase faults > T1. Faults < T1 are not considered.

E.g.:
The circuit breaker cycle takes place as shown in the diagram. The command to open the switch is only transmitted 3s (T3) after the second occurrence of a current fault if the line is not live.

If the voltage has not disappeared, the opening command is not transmitted.

If no second fault is detected by a time T2 after the occurrence of the first fault, the automation returns to the initial mode (T2 programmable from 15s to 80s).

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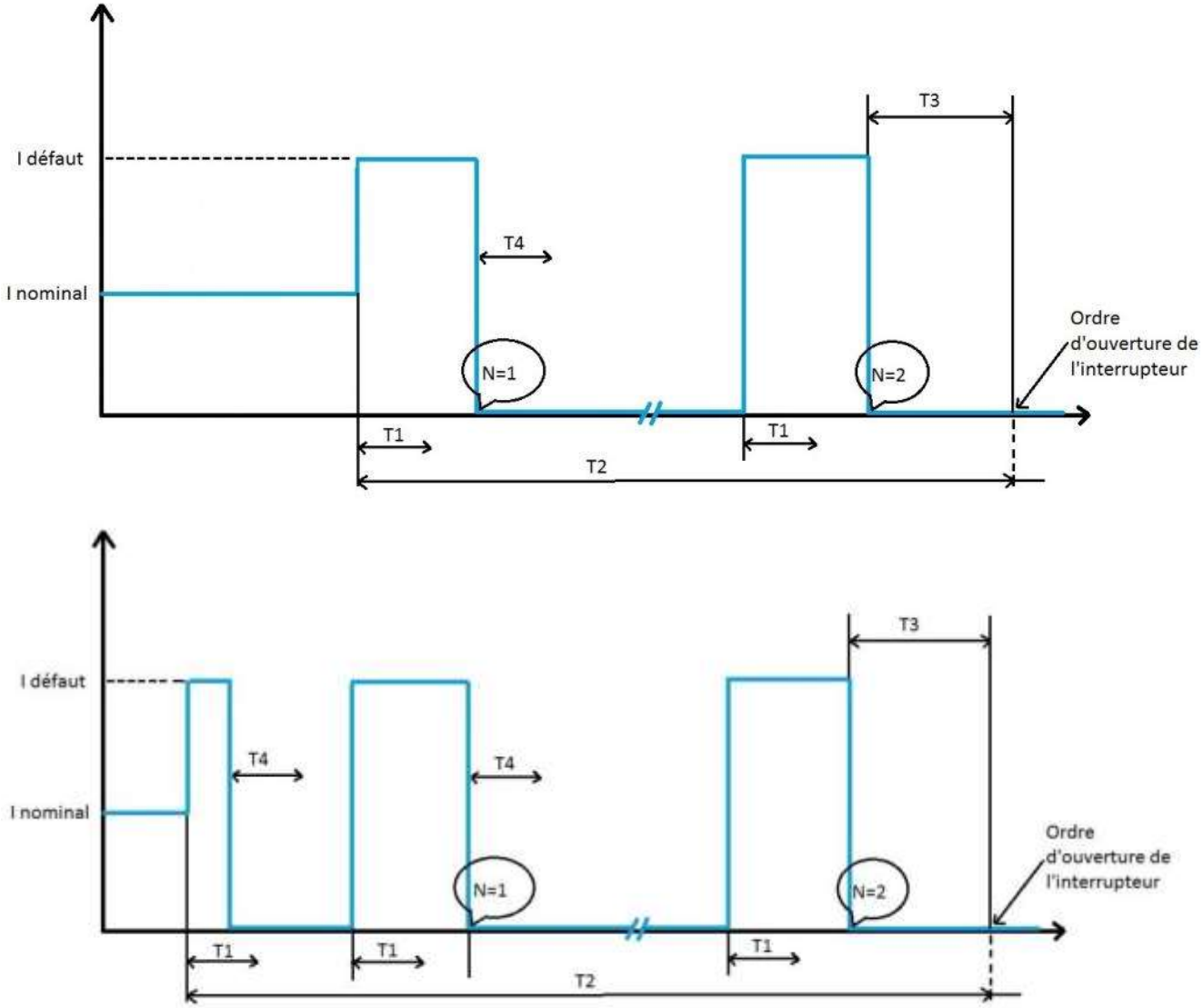

T1: Time to trigger fault detection (page “fault detector setting programming”)
T2: Timeout to return to the initial state
T3: Time delay before opening command
T4: Minimum time between two faults
N: Number of faults before opening

Automation activation / deactivation (ASF) can be carried out either by remote control or locally on the local HMI of the box

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To activate or deactivate the ASF function, press the "ASF" button. After commissioning, the green "ASF in service" indicator light comes on and After deactivation the yellow "ASF out of service" indicator lights up. The activation / deactivation action by the "ASF" BP can be secured by simultaneously pressing the "ORDER VALIDATION" BP (see § 4.3.20 Administrator parameters)

4.2 COMMANDS, TESTS, CONFIGURATIONS

The product has UI and PC interfaces for configuring it and visualizing information on the cabinet and the network. This paragraph informs the technician of the method for using the product interfaces.

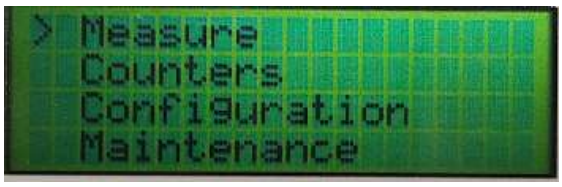
- Method for using the user interface (UI):

The user interface has buttons, indicator lights and a display.
The use of buttons and the visualization of LEDs is intuitive. The memo (below) is available for taking charge of the ***display/navigation button*** module.

Memo for using the display/navigation button module

In the initial state in local mode, the screen displays the following tabs:

> Measurements
> Counters
> Configuration
> Maintenance



Position the arrow opposite a tab and press the OK button to access it. To leave the tab, press the LEFT button. The arrow is moved using the UP and DOWN buttons.

It is possible to scroll through the information contained in the tabs using the UP and DOWN buttons.

The “Configuration” and “Maintenance” menus allow certain cabinet settings to be visualized.

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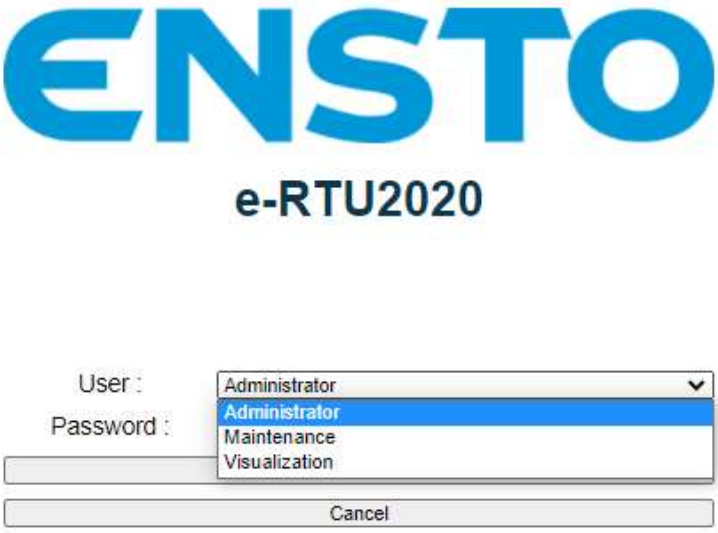
4.3 METHOD FOR USING THE PC INTERFACE



3 user accounts are created by default:

- Administrator:
  Access to all tabs.
  Default password: root_ensto

- Maintenance:
  Access to all tabs associated with operation of the MV network
  Default password: maintenance_ensto

- Visualization
  Access limited to visualization, downloading and actions available on the local UI.
  Default password: ensto

The passwords for Administrator and Maintenance users must be changed when the user first logs in.
Additional accounts can be added
(*Refer to guide 72909 – System configuration guide for cabinet e-RTU 2020)*

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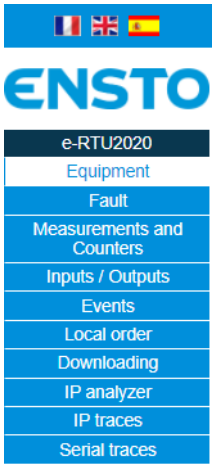
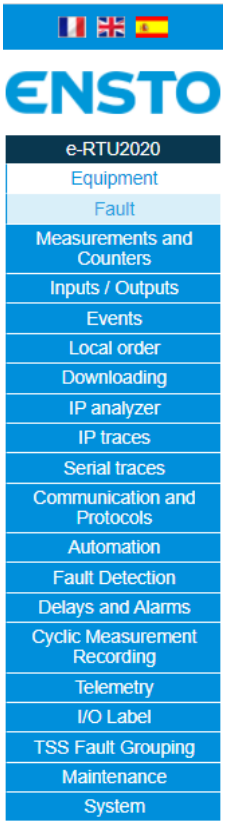
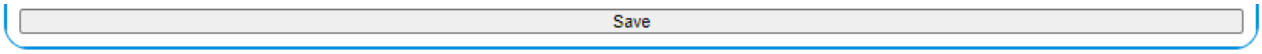
4.3.1 Available tabs depending on the user level

User Level	Visualization	Maintenance	Administrator
Accessible tabs			

The Maintenance and Administrator user levels allow settings to be changed, by entering the value via the computer keyboard or via the drop-down menu.
Data is incorporated by the equipment when the **save button** is pressed on the corresponding page.



Once all the settings have been changed, they are applied by the cabinet when the **Apply change**s button is pressed:

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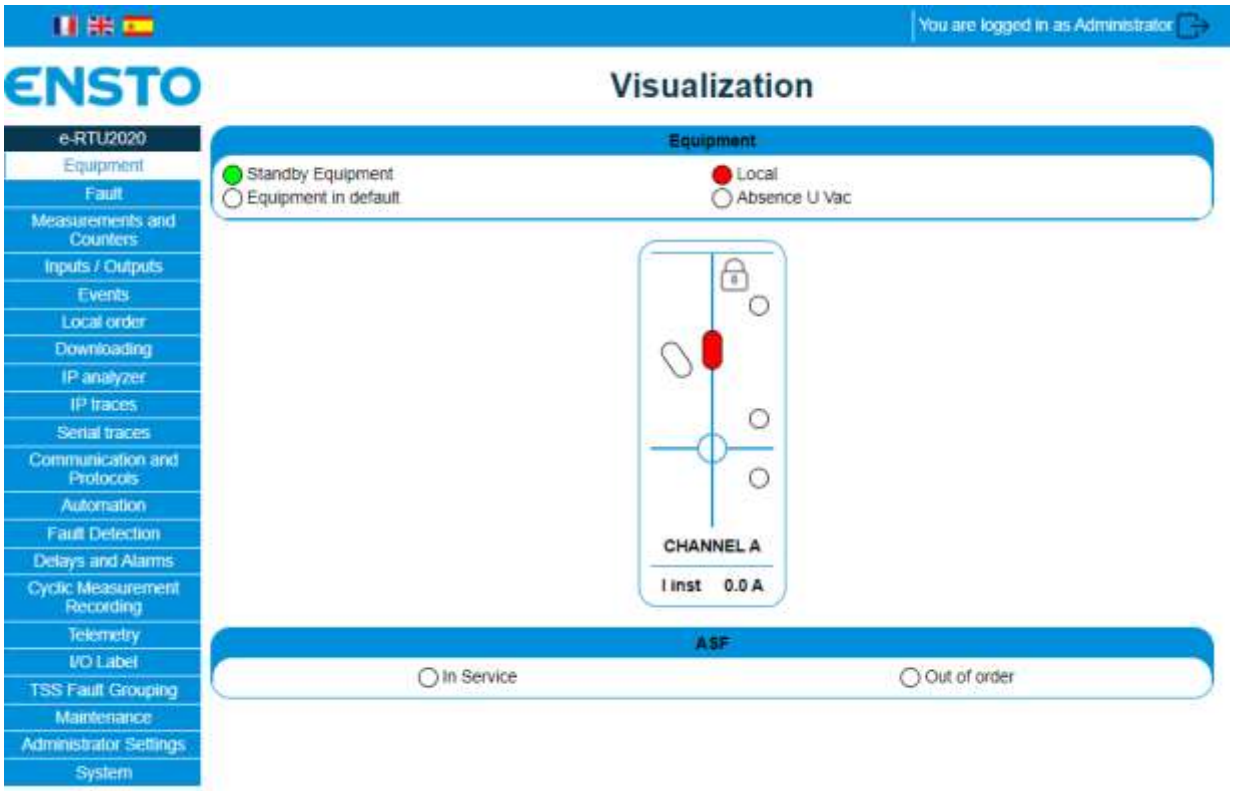
4.3.2 Visualization Tab



Settings	Possibilities	Definitions
Equipment fault	Lit up red Off	Fault affecting one of the cabinet's elements. An explanation of the fault will be provided in the Fault tab
Equipment in standby	Lit up green Off	Equipment operating normally. Additional information on the equipment fault
No LV supply voltage	Lit up red Off	No power supply if the voltage is below 170V (for a 230V power supply)
Local	Lit up red Off	Product operating mode visualization (Local / Remote)
Switch position	Lit up green Lit up red Off Lit up red+green	Switch open Switch closed Switch not present Switch fault
Instantaneous current (by channel)	0 to 999	Instantaneous value of three averaged line currents
Fault detection (by channel)	Lit up red Lit up green Lit up green+red Off	Line fault detection depending on the type of detection selected (§X.X.X Fault detection tab) and the type of visualization selected (§X.X.X Administrator Settings tab)
Channel lockout information – padlock – (by channel)	Lit up yellow Off	Status of the lockout switch for the MV cell
Automation status (ASF)	Lit up green Lit up yellow Off	On ("In service") Off ("Out of order") Disabled

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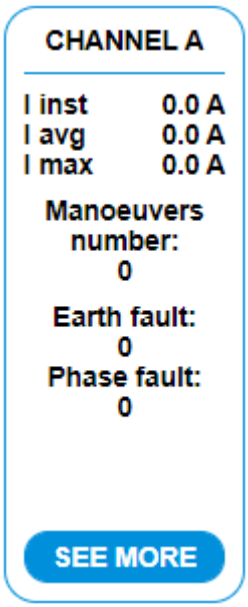
By moving the mouse over the channel, the channel's details appear:



Instantaneous current	0 to 999	Instantaneous value of three averaged line currents
Average current	0 to 999	Averaged instantaneous current
Maximum current	0 to 999	Maximum instantaneous current
Switching operation counters	0 to 9999	Number of switching operations switching operations
Phase/earth fault (in amperometric detection mode only)	0 to 9999	Number of faults between phase and earth
Fault between phases	0 to 9999	Number of faults between phases
Red fault (in directional detection mode only)	0 to 9999	Number of red faults
Green fault (in directional detection mode only)	0 to 9999	Number of green faults

The button SEE MORE opens the *Measurements and Counters* tab (see §4.2.4)

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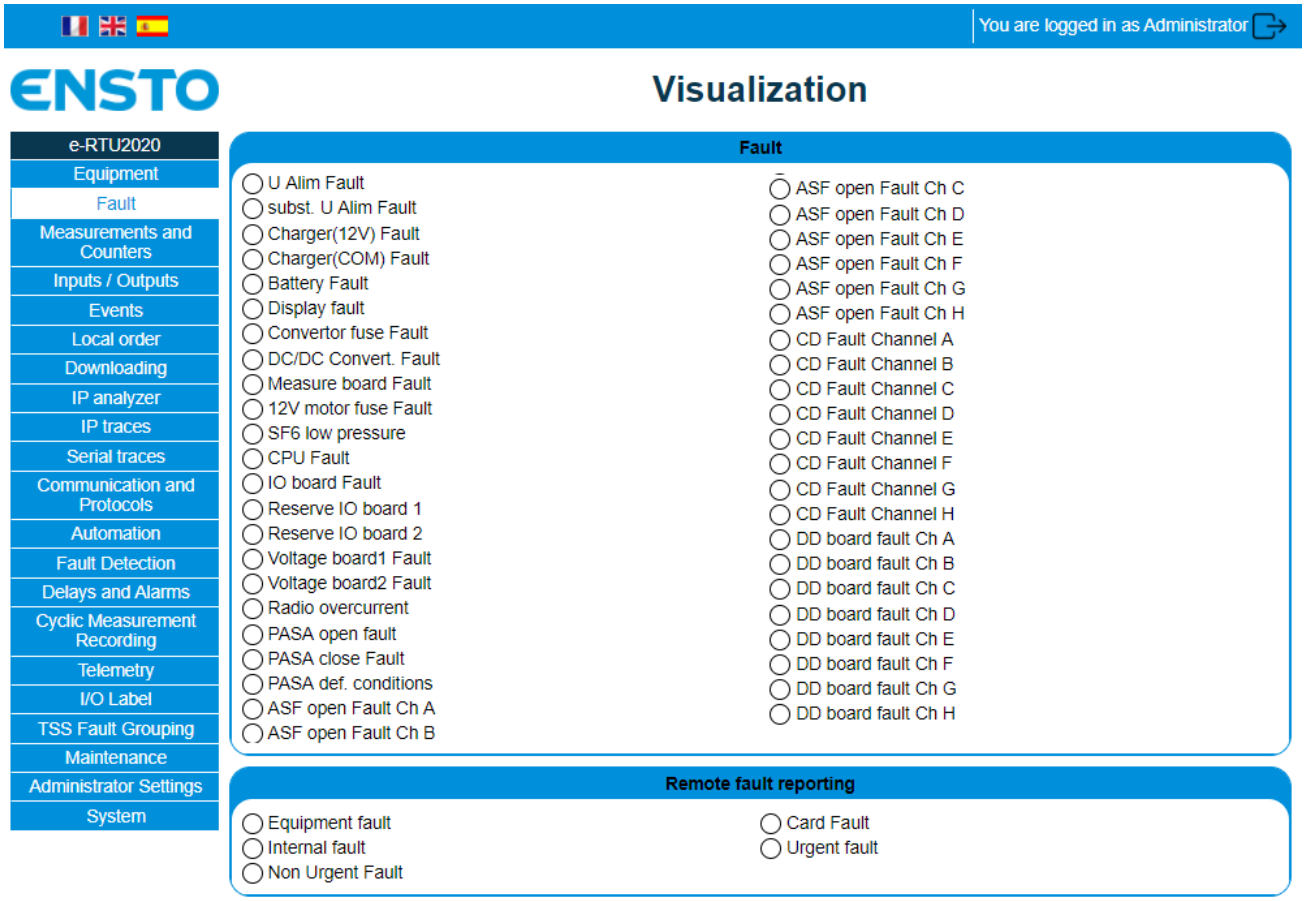
4.3.3 Fault Tab



Settings	Possibilities	Definitions
Prolonged lack of LV supply voltage (AC voltage)	Lit up red Off	No power supply for 16 h (configurable value)
Charger Fault (12V voltage)	Lit up red Off	12V voltage fault or no 12V voltage
Charger fault (COM)	Lit up red Off	Charger card communication fault
Battery fault	Lit up red Off	Battery anomaly if the voltage at its terminals is less than 10.5V or its capacity is zero or the battery test has failed
Display fault	Lit up red Off	Display board communication fault
Converter fuse fault	Lit up red Off	48V fuse fault as the result of 48 V over-consumption
Converter fault	Lit up red Off	Output voltage fault or no output voltage from the DC/DC converter
Measurement board fault (overhead only)	Lit up red Off	Measurement board communication fault
Motor fuse fault (overhead only)	Lit up red Off	Motor fuse fault as the result of 12 V motor over-consumption
SF6 pressure drop fault (overhead only)	Lit up red Off	Information originating from the SF6 pressure sensor contact (Auguste)
CPU fault	Lit up red Off	CPU board electronic fault

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IO board fault	Lit up red Off	IO 16 board communication fault
Reserves card 1 fault	Lit up red Off	Reserves information originating from the fault detector card wire 1 communication fault
Reserves card 2 fault (underground only)	Lit up red Off	Reserves information originating from the fault detector card wire 2 communication fault
VT 1 fault (PPACS) (directional only)	Lit up red Off	Communication fault or fault affecting initialisation of the voltage acquisition electronics originating from the PPACS fault detector card wire 1
VT 2 fault (PPACS) (underground only) (directional only)	Lit up red Off	Communication fault or fault affecting initialisation of the voltage acquisition electronics originating from the PPACS fault detector card wire 2
Prolonged max. radio current	Lit up red Off	Over-consumption of external 12V current (by default >2A for 3mn – Adjustable)
APSS active source opening fault (underground only)	Lit up red Off	Fault affecting opening of the active source during APSS switching
APSS backup source closing fault (underground only)	Lit up red Off	Fault affecting closing of the backup source during APSS switching
APSS conditions fault (underground only)	Lit up red Off	Automation locked as the result of a lack of switching conditions
ASF opening fault (by channel)	Lit up red Off	Channel opening fault as the result of ASF automation
DC fault (by channel)	Lit up red Off	Switch O/C management system communication fault
Fault detection (by channel)	Lit up red Off	Fault detection card communication fault or internal fault

Faults can also be viewed directly on the display.
Maintenance/Equipment fault menu

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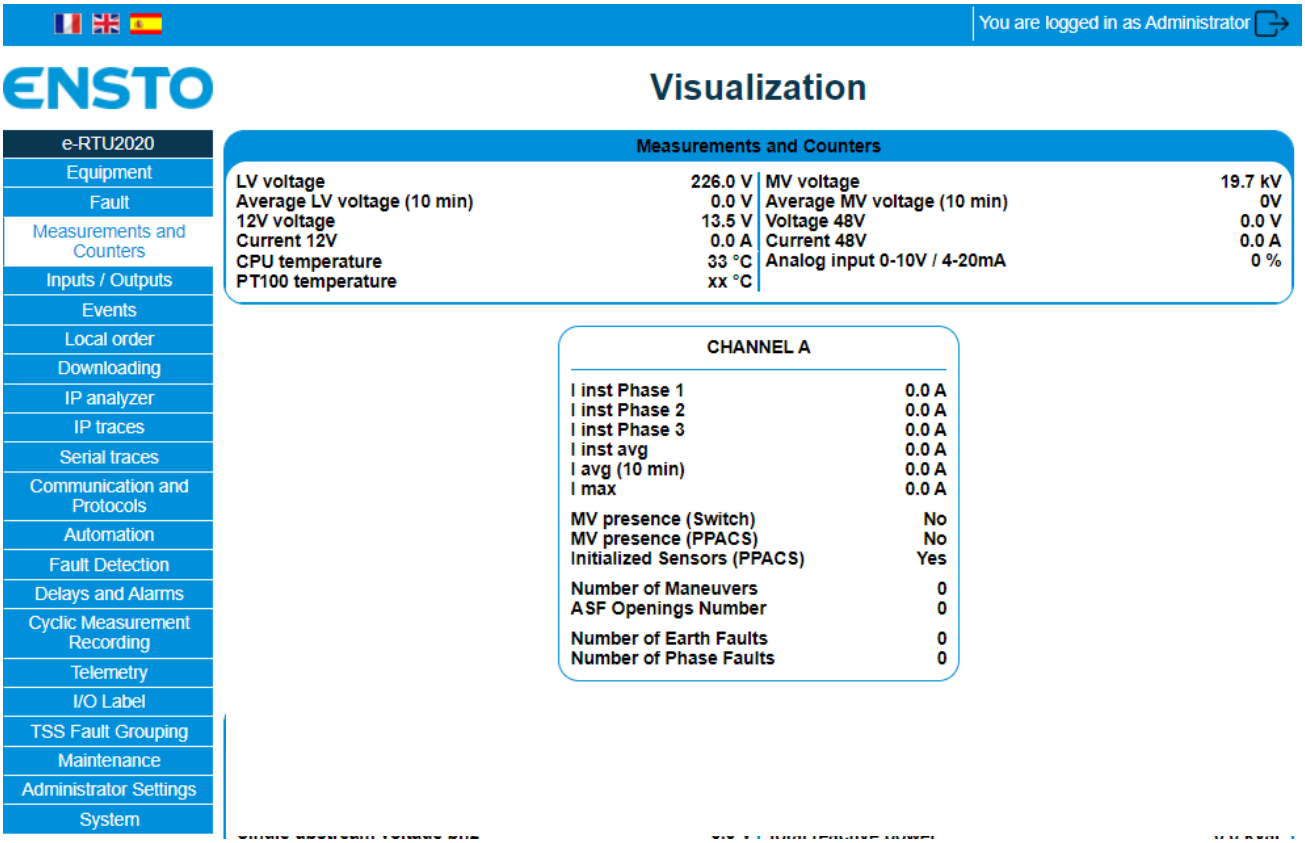
4.3.4 Measurements and Counters Tab



Settings	Possibilities	Definitions
LV voltage	0 to 999.9	LV voltage value in V
Average LV voltage	0 to 999.9	Averaged LV voltage value in V
MV voltage	0 to 99.9	Value of the MV voltage in kV originating from the LV
Average MV voltage	0 to 99.9	Averaged MV voltage value in V
12V voltage	0 to 99.9	Instantaneous value of the internal 12V voltage in V
12V current	0 to 9.9	Instantaneous current supplied to external elements (radio, etc.) in A
48V voltage	0 to 99.9	Instantaneous value of the 48V source in V
48V current	0 to 9.9	Instantaneous current supplied to the switch
CPU temperature	± 99.9°	Internal temperature of the cabinet in degrees
PT100 temperature	± 999.9°	Temperature originating from the PT100 temperature sensor in degrees (see §1.2.4)
Analog input 0-10V / 4-20mA	0 to 100%	Measurement as a % originating from the analog sensor (see §1.2.4)
Instantaneous current Phase 1 (by channel)	0 to 999	Instantaneous line current value for phase 1
Instantaneous current Phase 2 (by channel)	0 to 999	Instantaneous line current value for phase 2
Instantaneous current Phase 3 (by channel)	0 to 999	Instantaneous line current value for phase 3

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Average instantaneous current (by channel)	0 to 999	Instantaneous value of three averaged line currents
Average current (10mn) (by channel)	0 to 999	Averaged instantaneous current
Maximum current (by channel)	0 to 999	Maximum instantaneous current
MV available (DC) (by channel)	Yes No	MV availability information originating from the switch connector (see §2.3.2.f)
MV available (PPACS) (by channel)	Yes No	MV availability information originating from the PPACS separable connector (see §2.3.2.d)
Initialized sensor (PPACS) (by channel)	Yes No	PPACS sensor initialised (see §4.2.2. Fault detection menu – directional)
Switching operation counters (by channel)	0 to 9999	Number of switching operations (1 switching operation = 1 opening + 1 closing)
ASF opening counters (by channel)	0 to 9999	Number of openings triggered by ASF automation
Phase/earth fault (by channel) (in amperometric detection mode only)	0 to 9999	Number of faults between phase and earth
Fault between phases (by channel) (in amperometric detection mode only)	0 to 9999	Number of faults between phases
Red fault(by channel) (in directional detection mode only)	0 to 9999	Number of red faults
Green fault(by channel) (in directional detection mode only)	0 to 9999	Number of green faults
Poly fault (by channel) (in directional detection mode only)	0 to 9999	Number of faults between phases (polyphase)

Measurements can also be viewed directly on the display.
Measurements and **Counters** menus

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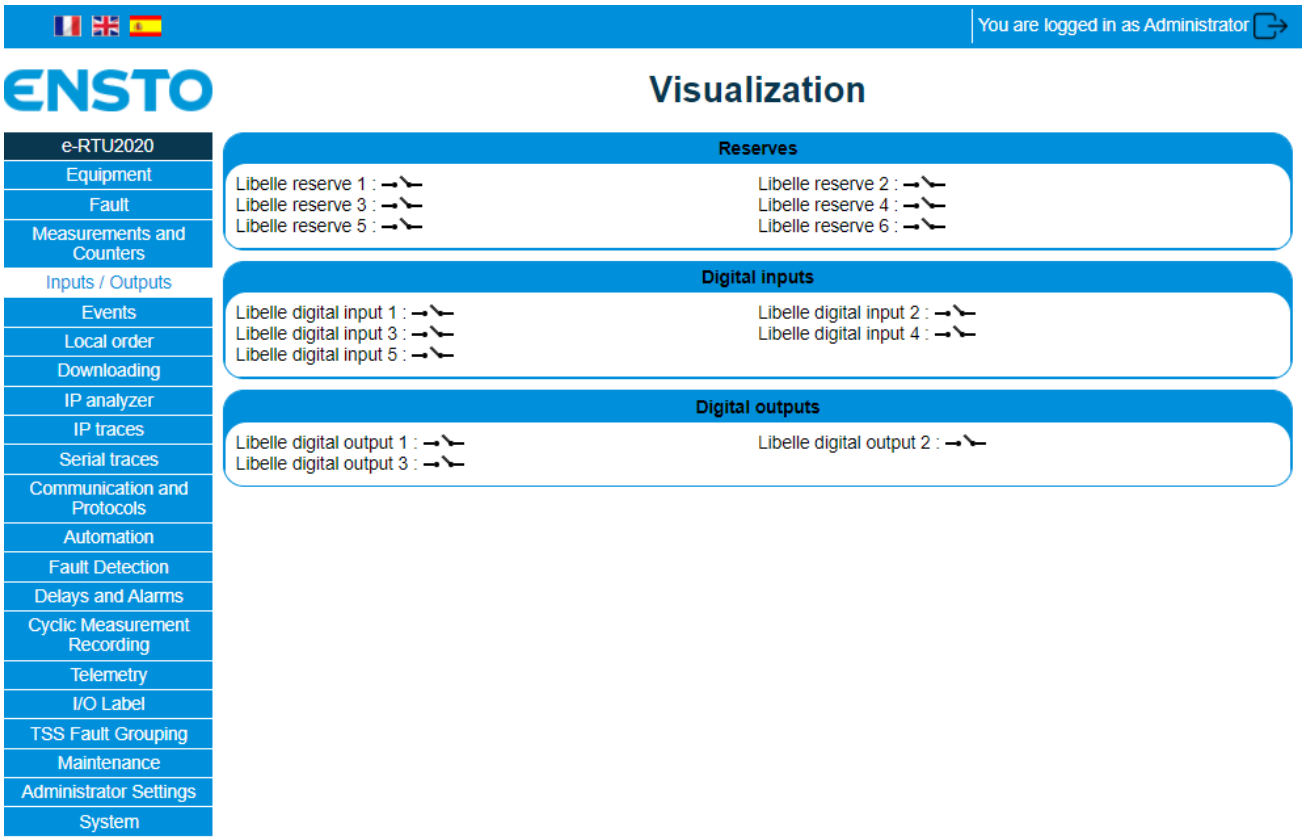
4.3.5 Inputs / Outputs Tab



Settings	Possibilities	Definitions
Reserves 1 to 6	Contact open or closed	Status of the reserves contact (see §2.3.2.e)
Digital inputs 1 to 5	Contact open or closed	Status of the dry contact at digital inputs (see §1.2.4)
Digital outputs 1 to 5	Contact open or closed	Status of the dry contact at digital output relays (see §1.2.4)

The Labels are fully customisable (see §4.3.17 I/O label)

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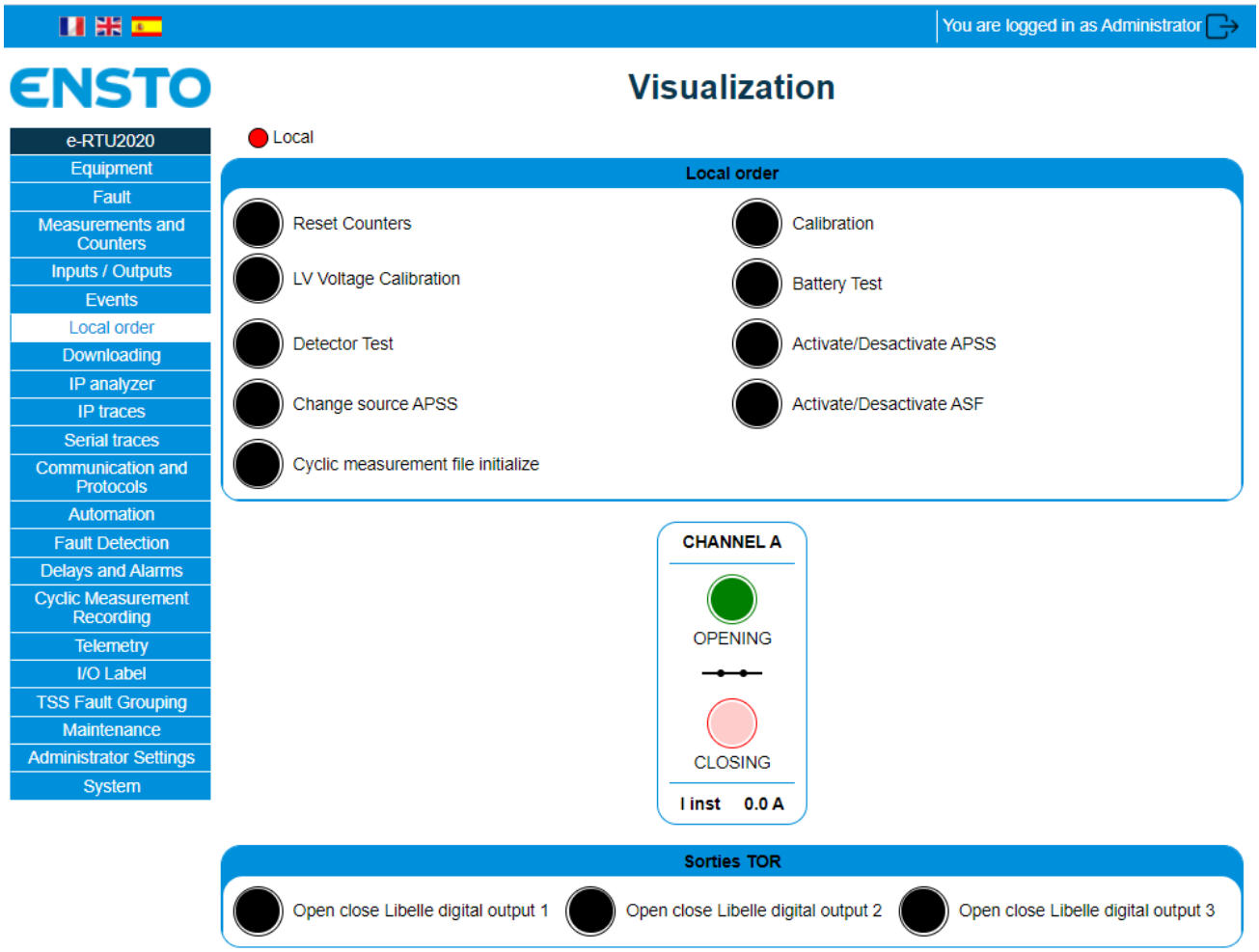
4.3.6 Events Tab

See §5.1.3

4.3.7 Local Command Tab



This tab enables the actions that can be performed with the local UI to be performed locally.

This offers the option of performing opening and closing commands for a switch, following a maintenance operation on the latter, in complete safety.

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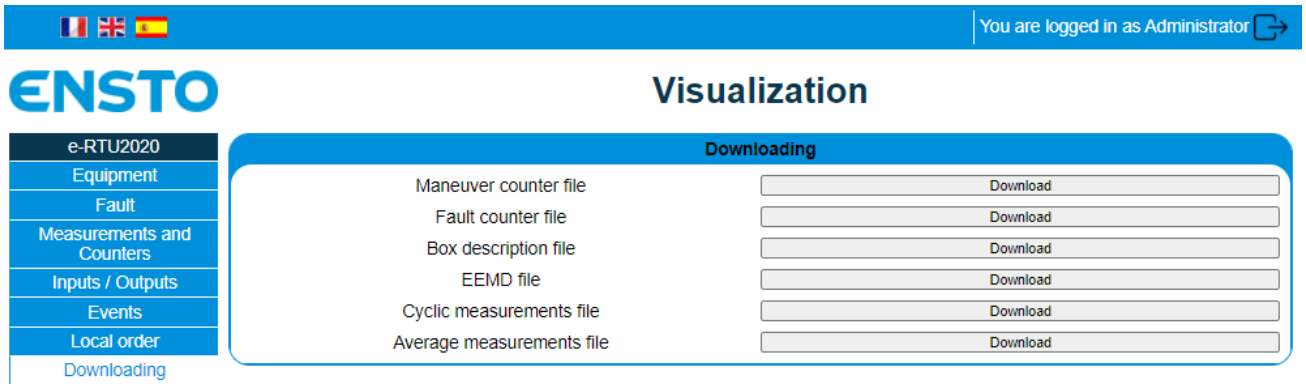
Buttons	Actions	Local UI
Reset counters	Resets the switching operation counters	Configuration/Reset Counters
LV Voltage Calibration	Calibration of the LV voltage (correction of the LV/ELV transformer ratio, if necessary)	
Detector test	Runs a test of the detectors present (The fault LEDs flash)	Maintenance / Detector Test
Change source APSS (underground only)	Changing the permitted switching direction	SOURCE button
Cyclic measurement file initialize	to initiation of cyclic measurement recording (see §4.2.16)	
Calibration (directional only)	Calibration of PPACSs (see §3.2.2. Directional)	
Battery Test	Initiation of the battery test procedure Result in the Fault tab (see §4.2.3)	Maintenance / Battery test
Activate/Deactivate APSS (underground only)	Turns the APSS function off	APSS button (on/off)
Activate/Deactivate ASF	Turns the ASF function off	ASF button (on/off)
Opening / Closing (by channel)	Switch opening or closing command (instantaneous current recalled for increased safety)	Switch Control Buttons CHANNEL / COMMAND VALIDATION / OPENING / CLOSING
Open/close digital outputs	Digital output command relayed. Position in the Inputs / Outputs tab (see §4.2.5)	

4.3.8 Downloading Tab



This tab allows files generated by the cabinet to be downloaded in .csv format, for direct export into excel type spreadsheets

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4.3.9 IP Analyzer Tab

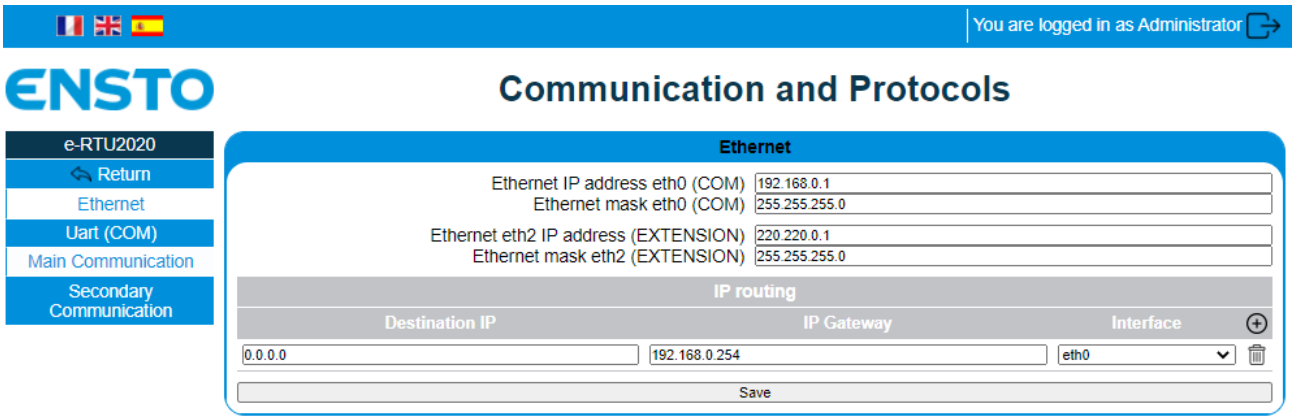
See §5.1.1

4.3.10 IP Traces Tab

See §5.1.2

4.3.11 Communication and Protocols Tab

4.3.11.1 Ethernet Tab



This tab allows the IP addressing (V4) for 2 Eth0 (COM) communication ports located on the back of the CPU2020 board (remote Ethernet connection in the communication area) and Eth2 (EXTENSION) on the front of the CPU2020 board to be defined.
Remember: the address of the Eth1 (CONFIGURATION) port is static (192.168.10.1)

IP routing can be adapted to all the routing options for IP networks.
The default address is recorded as 0.0.0.0

Settings	Possibilities	Definitions
Ethernet IP address etho (COM)	Xxx.Xxx.Xxx.Xxx	IP address(V4) that is assigned to the COM port of the e-RTU 2020 cabinet
Ethernet mask etho (COM)	Xxx.Xxx.Xxx.Xxx	Subnet mask that is assigned to the COM port of the e-RTU 2020 cabinet
Ethernet IP address etho (COM)	Xxx.Xxx.Xxx.Xxx	IP address (V4) that is assigned to the EXTENSION port of the e-RTU 2020 cabinet
Ethernet mask etho (COM)	Xxx.Xxx.Xxx.Xxx	Subnet mask that is assigned to the EXTENSION port of the e-RTU 2020 cabinet
IP routing – Destination IP	Xxx.Xxx.Xxx.Xxx	Destination address using the "IP Gateway" gateway on the "Interface" Ethernet port
IP routing- Gateway IP	Xxx.Xxx.Xxx.Xxx	IP address of the gateway used by the routing
IP routing- Interface	Etho or Eth2	Ethernet port used by the routing (etho COM or eth1 EXTENSION)

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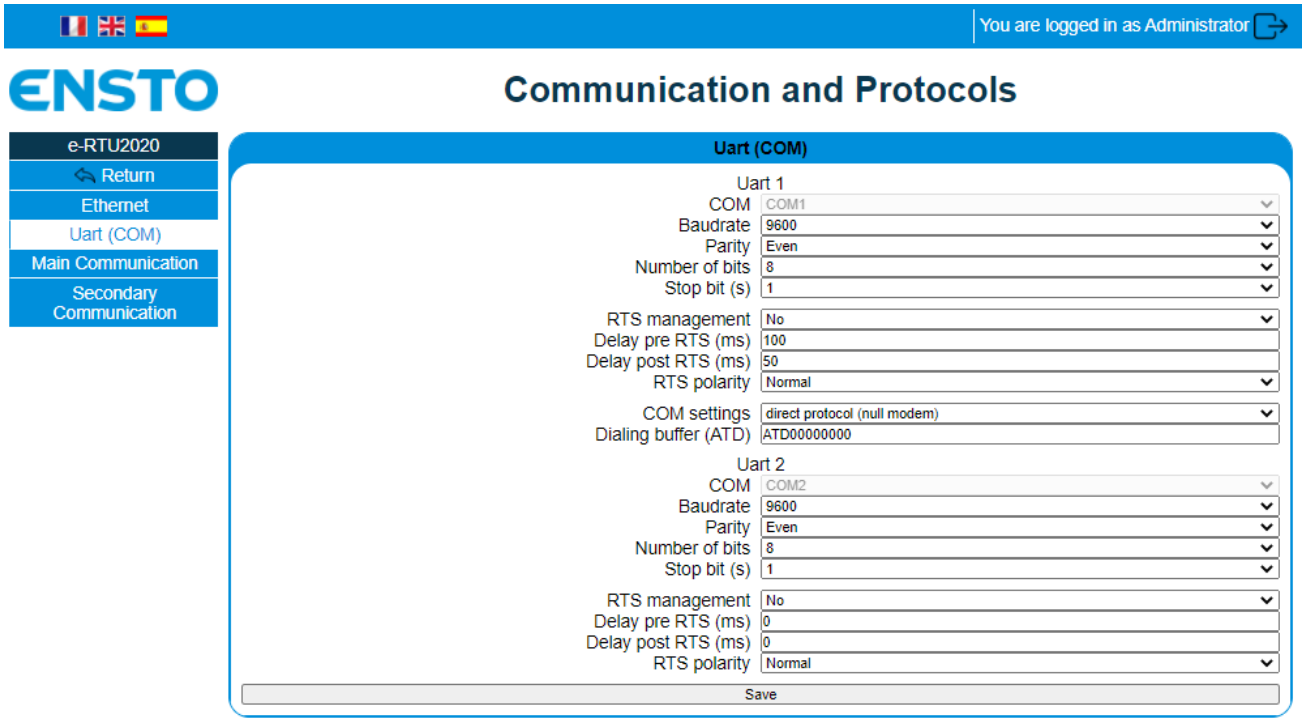
4.3.11.2 UART(COM) Tab



This tab allows the 2 serial communication ports UART 1 (COM1) and UART 2 (COM2) to be configured Management of the RTS signal with pre-activation and post-activation delays provides a means to interface with the transparent digital radios

Settings (UART 1 and UART 2)	**Possibilities**	**Definitions**
Baud rate	110 to 3686400 baud	
Parity	Even Odd None	
Data bits	7 or 8	
Stop bit	1 or 2	
RTS management	Yes No	
Delay pre RTS	0 to 500ms	
Delay post RTS	0 to 500ms	
RTS polarity	Normal Inverted	
COM settings (UART 1 only)	Direct protocol (null modem) AT command modem	Null modem or digital radio Modem using AT commands (GSM type). DTR used for command / line mode
Dialling buffer (ATD) (UART 1 and AT command modem only)	ATD<telephone number>	

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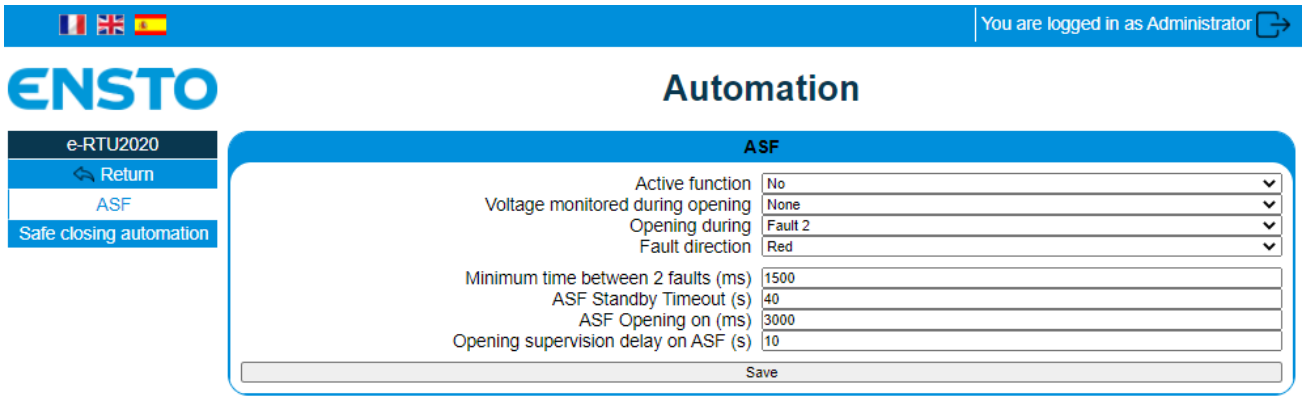
4.3.11.3 UART(COM) Tab

See specific protocol notices

4.3.12 Automation Tab

4.3.12.1 ASF Tab

How the ASF function works is described in §4.1.4



Settings	Possibilities	Definitions
Function enabled	Yes No	Activation or deactivation of the ASF function
Voltage monitored during opening	None Cabinet power supply (LV) MV (DC) MV (PPACS)	This setting involves opening only if the voltage selected is not present Voltage sensors see §2.3.2
ASF configuration (by channel)	Valid Invalid	Invalid disables the function on the specified channel
Opening during (by channel)	Slow 1 to 7	Opening of the switch after the 1st and 7th fault
Fault configuration (by channel) (in directional only)	Red Green	Defines the type of fault triggering opening
Minimum time between 2 faults	100 to 5000ms	Time between 2 faults in order for the fault to be counted
ASF Standby Timeout	15 to 240s	Return to the initial automation state after the timeout
ASF opening time delay	0 to 5000ms	Opening time delay in relation to the time when the ASF conditions are met
Opening supervision delay on ASF	1 to 50s	Opening delay as the result of ASF automation. The expiry of this period without a return to the "open" position, creates an "ASF opening on" fault

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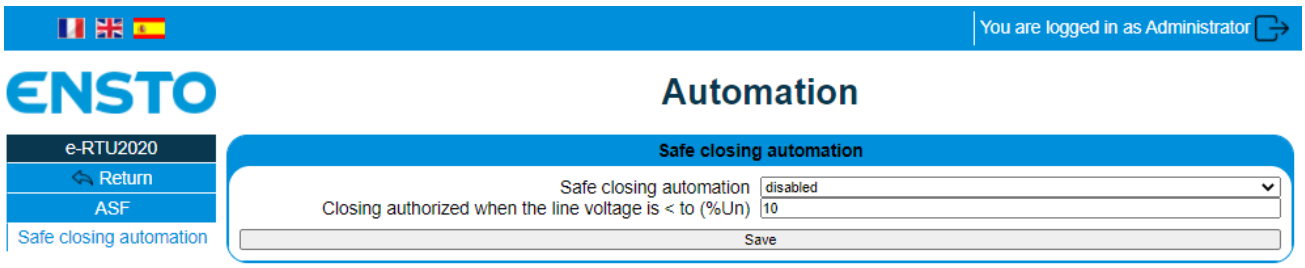
4.3.12.2 Safe closing automation tab

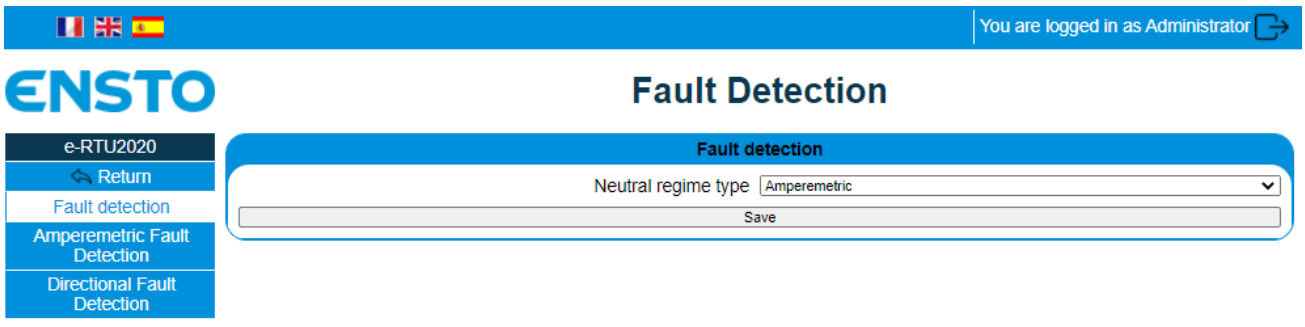


This automation can only be used when the measurement board is present and the switch is equipped with voltage sensors.
When automation is enabled and the network voltage upstream and downstream of the switch is greater than the network voltage percentage, closing the switch is prevented to protect the electrical network and the protective devices located therein.

Settings	Possibilities	Definitions
Safe closing automation function	Enabled Disabled	Enabling or disabling of the function
Network voltage percentage	10 to 50	Network voltage percentage, which prevents closing operations

4.3.13 Fault Detection Tab

The list of types of fault detections managed by the electronics installed in the equipment is available in the “Fault Detection” tab.
It relates directly to the type of neutral point treatment used.



Contact Ensto novexia for more information.

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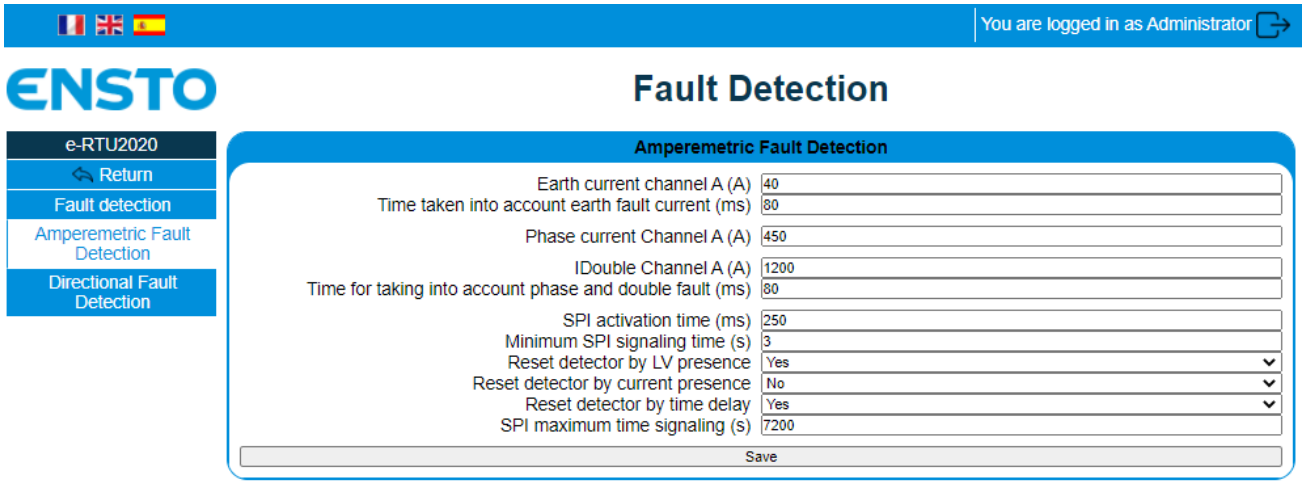
4.3.13.1 Overcurrent Fault Detection Tab

In the case of "France" type amperometric fault detection:



Settings	Possibilities	Definitions
Homopolar current (by channel)	20A to 240A	Detection of an earth fault if the residual current is above the threshold for an interval longer than the time for triggering detection of the homopolar current
Homopolar fault trigger time	30 to 30,000 ms	Minimum earth fault time
Phase current (by channel)	250A to 1600A	Detection of a phase fault if at least one of the two line currents is above the configured threshold
Double current (by channel)	250A to 1200A	Detection of a phase fault if the residual current is above the threshold for an interval longer than the time for triggering detection of the phase fault
Phase and double fault trigger time	30 to 3,000 ms	Minimum phase fault time
SPI activation time	30 to 10,000ms	Minimum fault time for validating the related SPI
Minimum SPI signalling time	0 to 60s	Minimum time for maintaining the fault SPI
Reset detector if LV available	No Yes	Allows the fault detector to be reset if LV voltage is available
Reset detector if line current available	No Yes	Allows the fault detector to be reset if line current is available (>5A)
Reset detector by time delay	No Yes	Allows the fault detector to be reset at the end of the "Maximum SPI signalling time" timeout
Maximum SPI signalling time	1s to 10,800s (3 h)	

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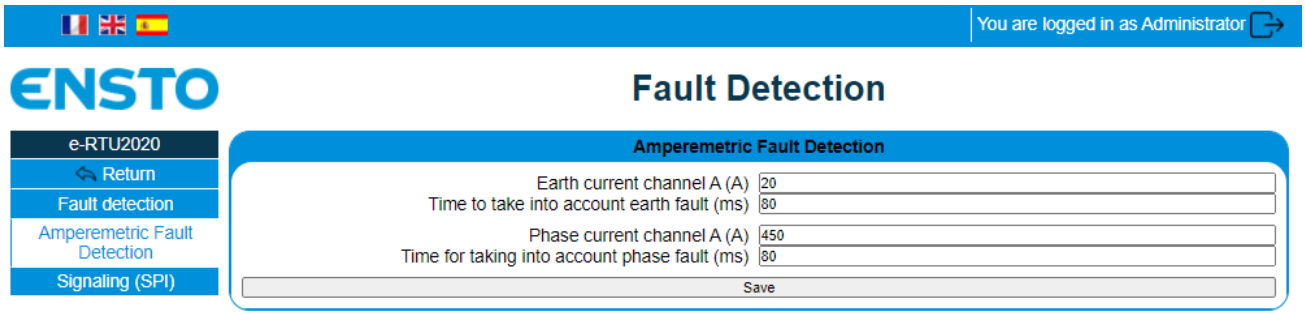
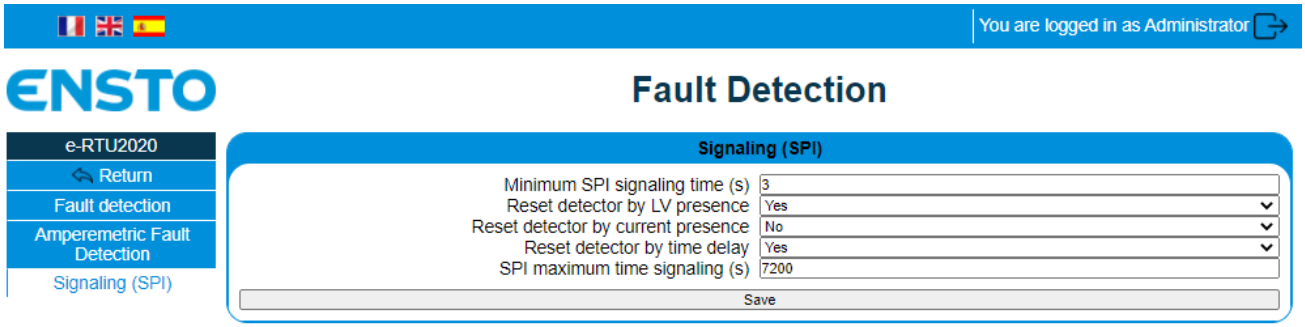
In the case of "Export" type amperometric fault detection:



Settings	Possibilities	Definitions
Earth current (by channel)	4A to 100A	Detection of an earth fault if the residual current is above the threshold for an interval longer than the time for triggering detection of the fault
Earth fault trigger time	30 to 30,000 ms	Minimum earth fault time
Phase current (by channel)	10A to 615A	Detection of a phase fault if at least one of the two line currents is above the configured threshold
Phase fault trigger time	30 to 3,000 ms	Minimum phase fault time



Settings	Possibilities	Definitions
Minimum SPI signalling time	0 to 60s	Minimum time for maintaining the fault SPI
Reset detector if LV available	No Yes	Allows the fault detector to be reset if LV voltage is available
Reset detector if line current available	No Yes	Allows the fault detector to be reset if line current is available (>5A)
Reset detector by time delay	No Yes	Allows the fault detector to be reset at the end of the "Maximum SPI signalling time" timeout
Maximum SPI signalling time	1s to 10,800s (3 h)	

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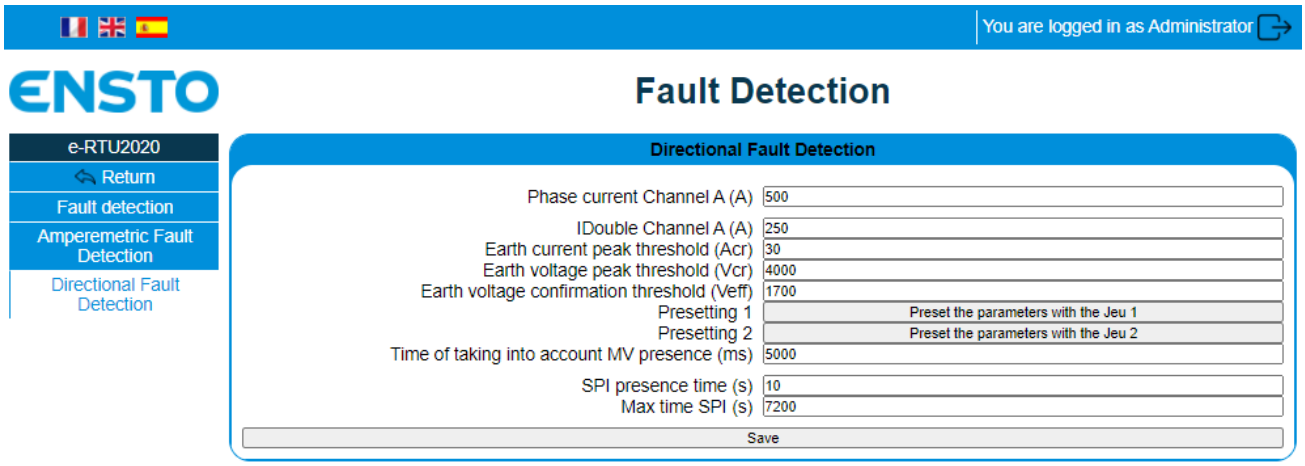
4.3.13.2 Directional Fault Detection Tab

Directional detection in accordance with HN 45 S 51 (EDF)



Settings	Possibilities	Definitions
Phase current (by channel)	100A to 1000A	Detection of a phase fault if at least one of the two line currents is above the configured threshold.
Double current (by channel)	250A to 1000A	Detection of a double fault if the residual current is above the configured threshold
Homopolar peak threshold (APK)	10 to 100 APK	green or red fault Refer to specification HN 54-S51 for the operating principle
Homopolar voltage peak threshold (VPK)	2,000 to 10,000 VPK	green or red fault Refer to specification HN 54-S51 for the operating principle
Homopolar voltage confirmation threshold (Vrms)	1,000 to 6,000 Vrms	green or red fault Refer to specification HN 54-S51 for the operating principle
Homopolar detection sensitivity pre-selection	Preset 1 Preset 2	Green or red fault Refer to specification HN 54-S51 for the operating principle
MV availability trigger time	100 to 10,000ms	Refer to specification HN 54-S51 for the operating principle
SPI availability trigger time	0 to 70s	Delay before SPI activation
Max SPI time	1s to 10,800s (3 h)	Remote signalling duration if no MV

4.3.14 Delays and Alarms Tab

4.3.14.1 TS Delay Tab

This tab allows a delay to be defined between the physical appearance of a status and the positioning of the related TS (information recorded by protocol)

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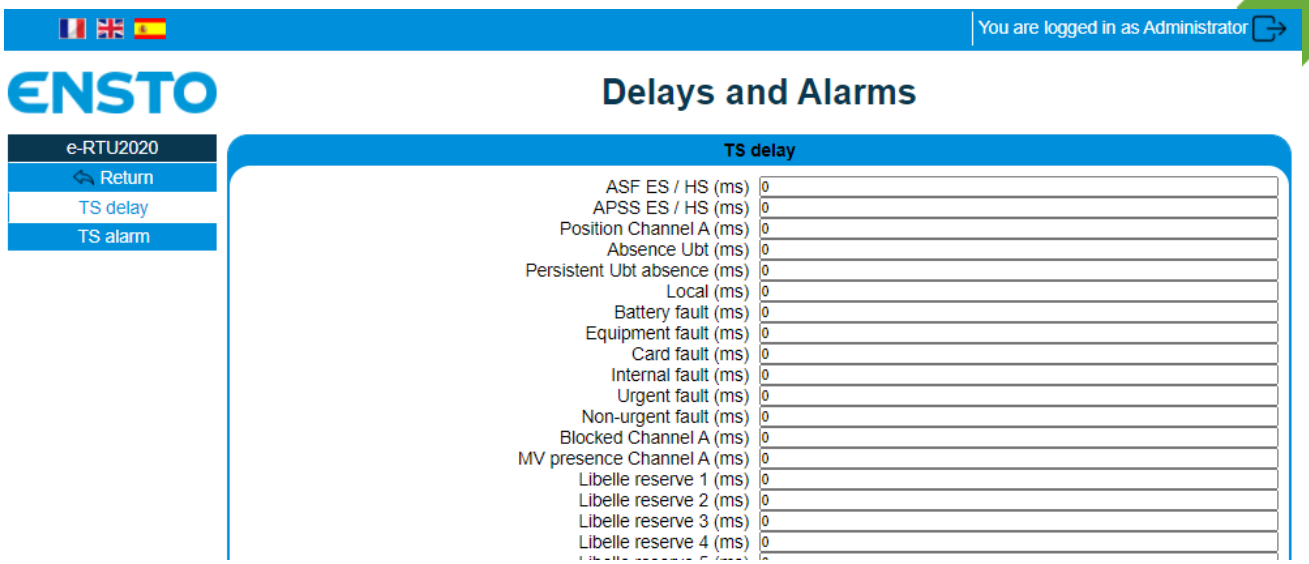
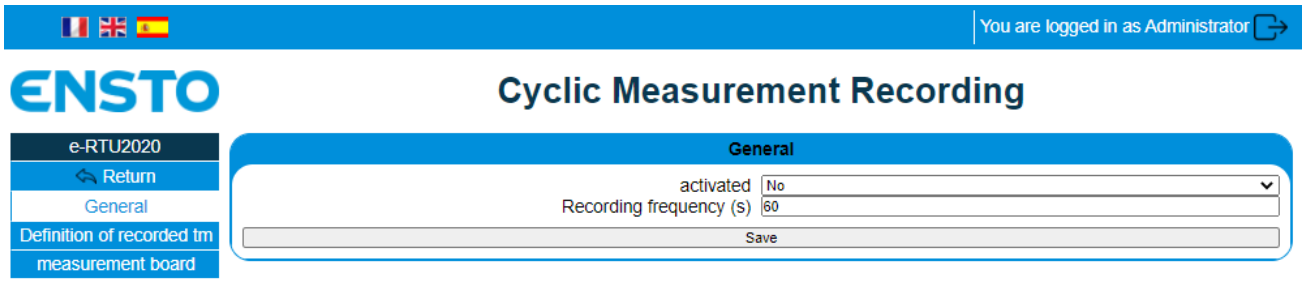


4.3.14.2 TS Alarm Tab

This tab allows the TSs generating a call (use of a line) to be configured.
This configuration is only used when a modem is used with a non-permanent connection (GSM type – AT command see §4.2.11.2)

4.3.15 Cyclic measurement recording tab

This tab allows cyclic measurement recording in a .csv format file, for direct export into an Excel type spreadsheet, to be configured.
The file size is 100k, enabling more than 10,000 measurements to be recorded
Should the capacity be exceeded, the file is saved by after-sales service and a new one is created.



Settings	Possibilities	Definitions
Enabled	No Yes	Activation of cyclic measurement recording
Recording frequency	1 to 100s	

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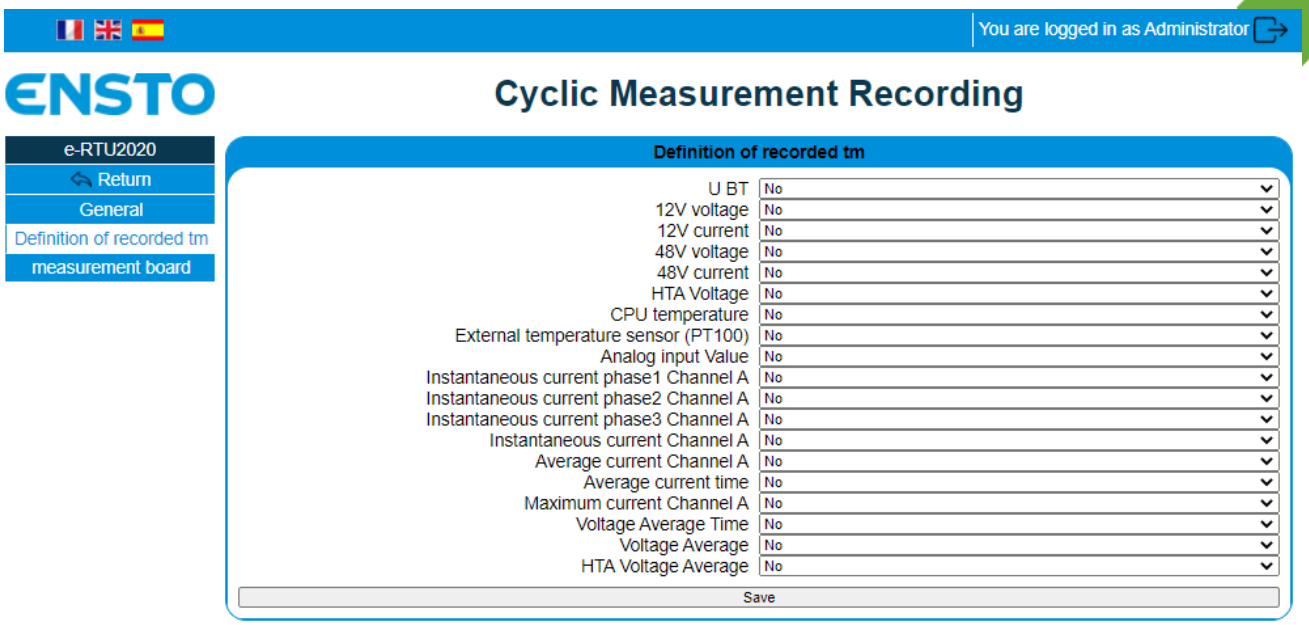
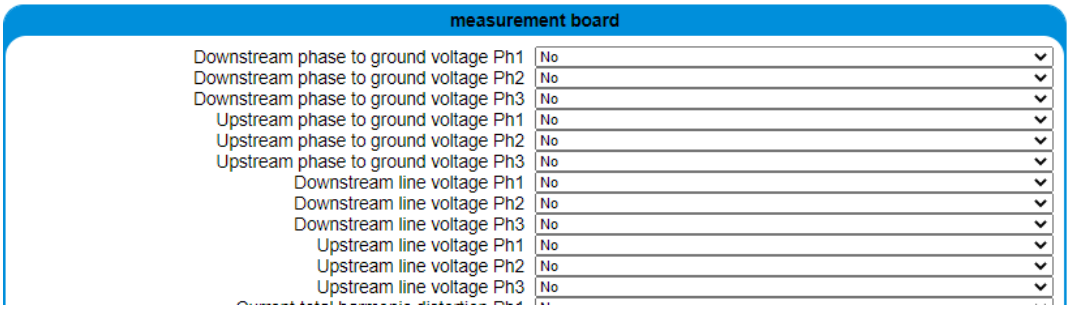


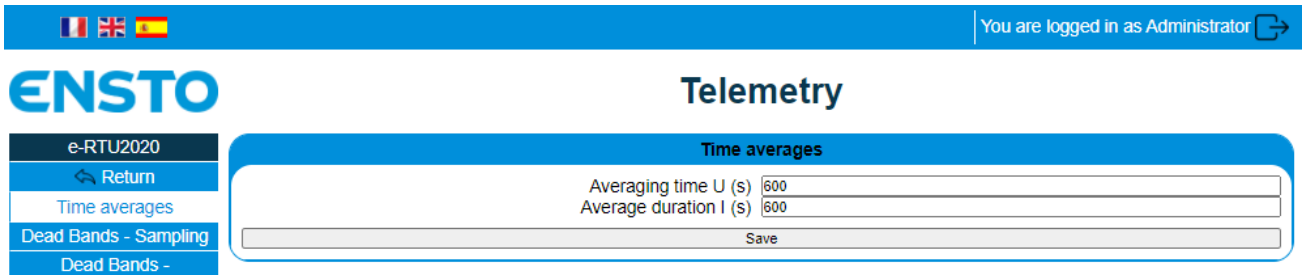
Additional measurement are available if measurement board is present



4.3.16 Analog Input Tab

4.3.16.1 Time averages tab

This tab allows the voltage (LV and MV) and average current information to be defined by channel
The time averages are synchronised at a fixed time taking account of the averaging duration.
For example: for a programmed 10-min period, an average value is calculated at Xh10mn, Xh20mn, Xh30mn, etc.



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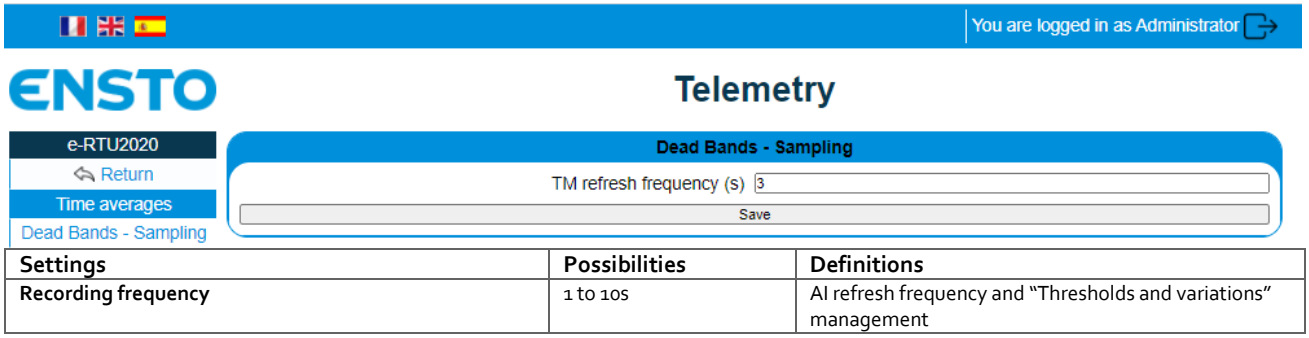
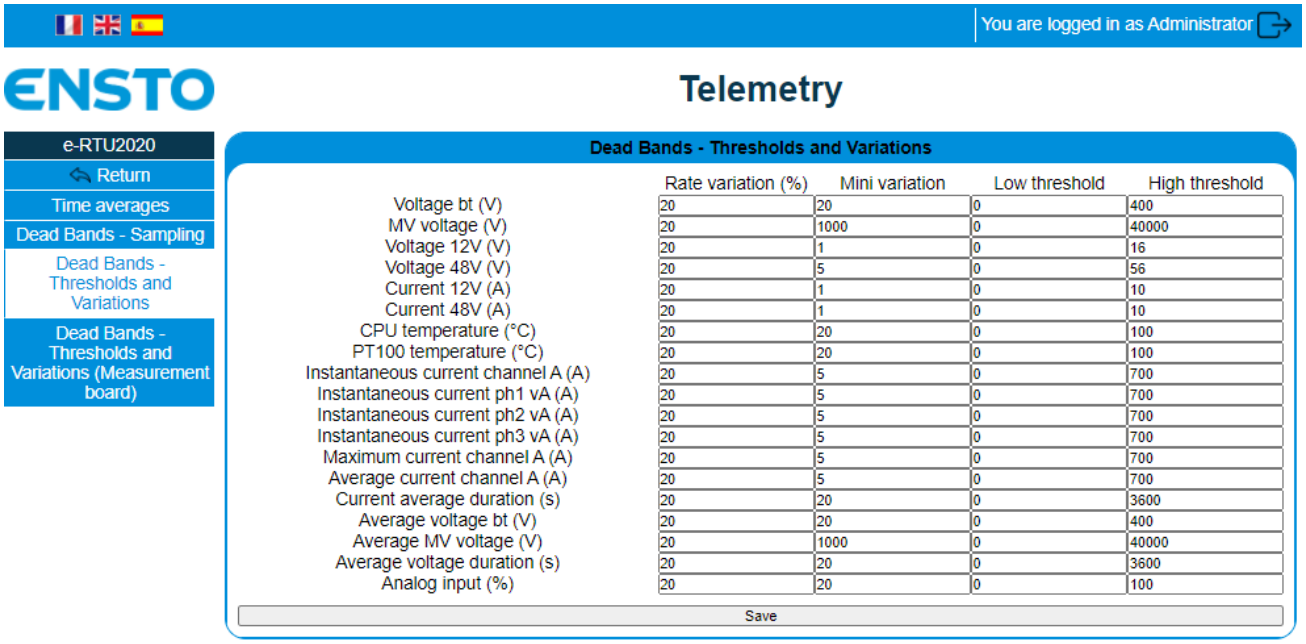
4.3.16.2 Dead Bands Tab (Sampling / Threshold and variation)

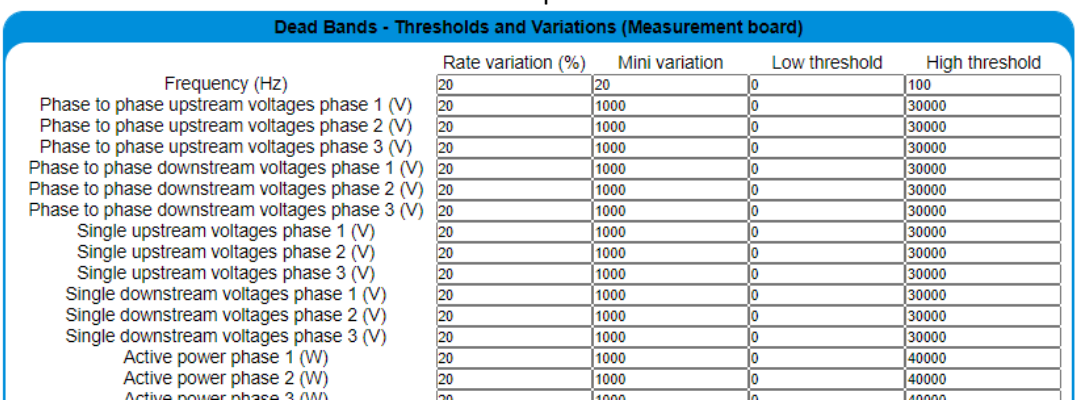
These tabs allow the conditions for updating AIs available for communication (see protocol notices) to be defined



Settings	Possibilities	Definitions
Recording frequency	1 to 10s	AI refresh frequency and "Thresholds and variations" management



Additional measurement are available if measurement board is present



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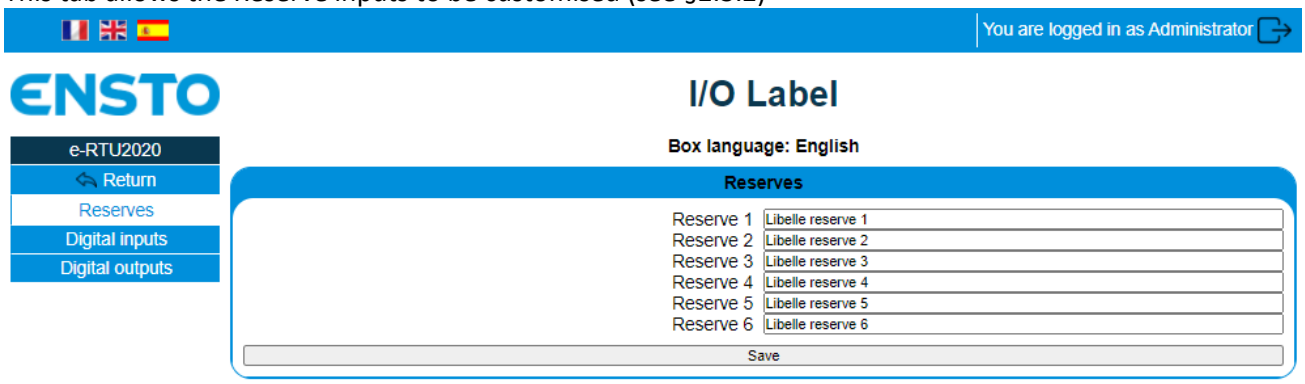
Settings	Possibilities	Definitions
Variation rate (for each item)	0 to 100%	Variation rate of a measurement for spontaneous transmission of a AI
Mini variation (for each item)	Measurement range and unit	Minimum variation of the measurement for transmission.
Low threshold (for each item)	Measurement range and unit	Minimum and Maximum permitted measurements (AI invalid outside these ranges)
High threshold (for each item)	Measurement range and unit	

4.3.17 I/O Label Tab

4.3.17.1 Reserves Tab

This tab allows the Reserve inputs to be customised (see §2.3.2)



Example: Reserve 5: “Locking switching” if the APSS function is used
Reserve 3: “Water level”

4.3.17.2 Digital Inputs and Digital Output Tab

This tab allows the digital inputs and outputs to be customised (see §1.2.4)

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4.3.18 SPI Fault Grouping Tab

The SPI fault groupings are SPIs allowing an SPI to be linked to various pieces of equipment fault information.
The e-RTU 2020 cabinet offers 3 manufacturer SPI groupings (fixed) and 2 user SPI groupings (configurable)
Manufacturer SPI

- Equipment fault
  This fault is created for all equipment faults.
  Information relating to the equipment fault indicator light on the front.

- Board fault
  Fault relating to the electronics.

- Internal fault
  Equivalent to a board fault + faults relating to automation
  Information relating to the internal fault indicator light on the front
  (Display type = Type 1 – see §4.2.20).

User SPI:

- Urgent fault
- Non-urgent fault

4.3.18.1 Manufacturer SPI

Board fault	Internal fault	Equipment fault
CPU board fault	**Board fault**	**Internal fault**
Display board fault	ASF opening fault (by channel)	Battery fault
Charger card fault (COM)	APSS active source opening fault	No AC voltage
DC electronic fault (by channel)	APSS backup source closing fault	Prolonged lack of AC voltage
Reserves electronic fault (board 1 and 2)	APSS condition not met fault	Charger fault (12V)
Fault detector board fault (by channel)		Converter fuse fault
Converter board fault		Prolonged over-consumption of external 12V (max. radio current)
Measurement board fault (overhead only)		SF6 pressure drop (Overhead only)
16 I/O board fault		
PPACS (VT) voltage electronic fault (Underground: board 1 and 2, Overhead: voltage board)		
Motor control fuse fault (overhead only)		

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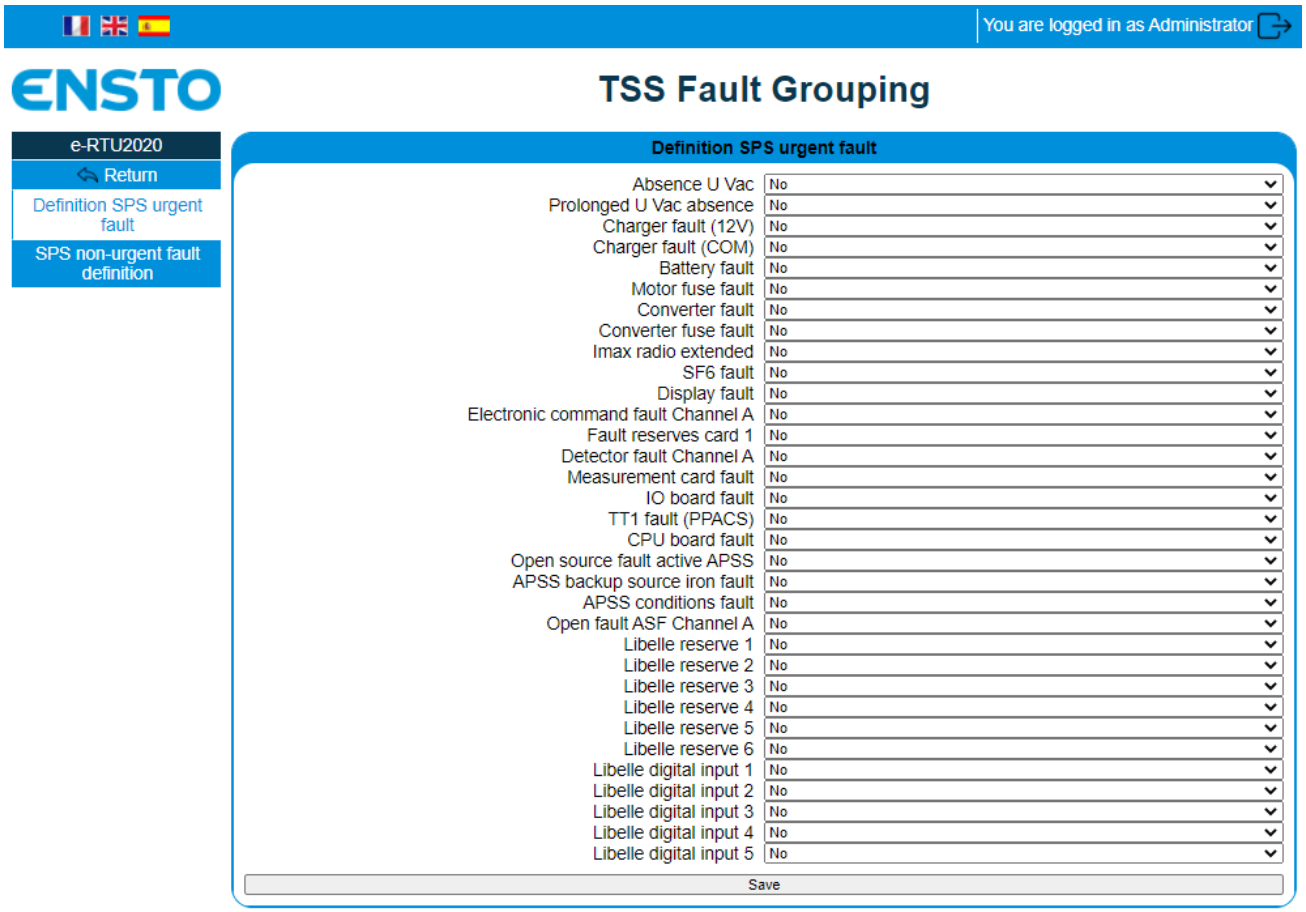
4.3.18.2 User SPI



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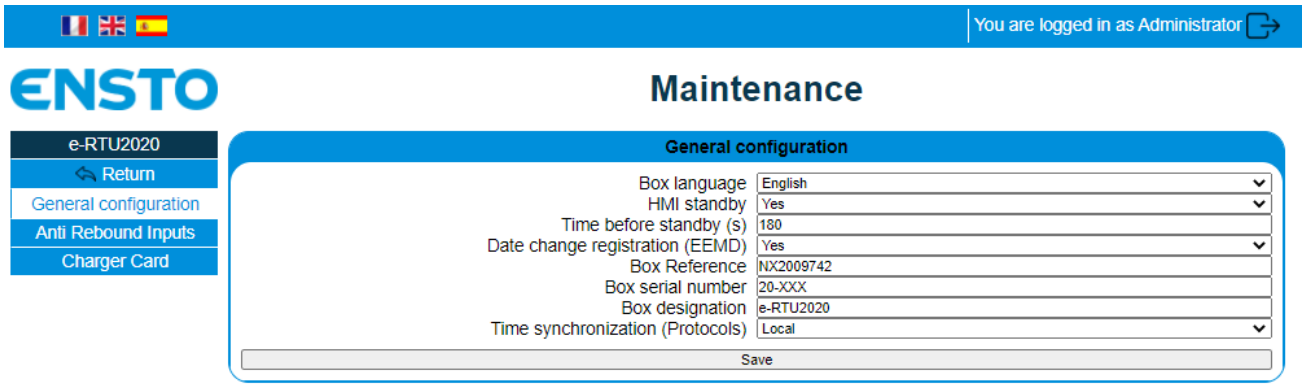
4.3.19 Maintenance Tab

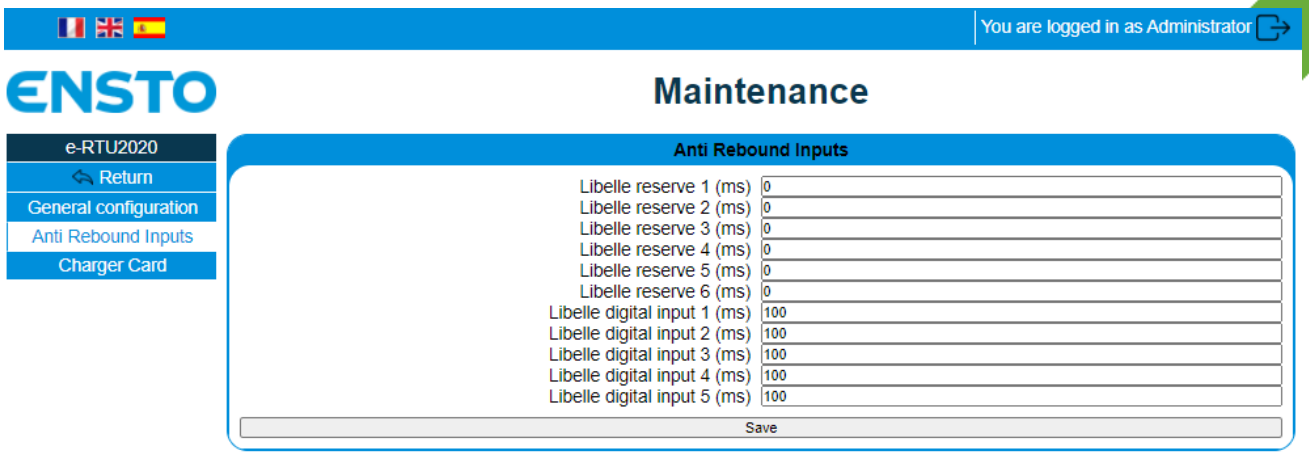
4.3.19.1 General Configuration Tab



Settings	Possibilities	Definitions
Cabinet language	English English Spanish	
UI standby	No Yes	Local UI indicator lights off in remote mode at the end of "Time before standby". Only the "Equipment in standby" or "equipment fault" indicator lights are on.
Time before standby	10 to 600s	
Date recorded maintenance events (DRME)	No Yes	Registration of a date event when the day is changed
Cabinet Reference		ensto cabinet code
Cabinet serial number		To be entered for after-sales service contacts
Cabinet description		Free field for cabinet name Default name: e-RTU 2020
Time synchronisation (Protocols)	Local UTC-12 to UTC+14	Time adjustment by protocol if required by SCADA

4.3.19.2 Anti Rebound Tab

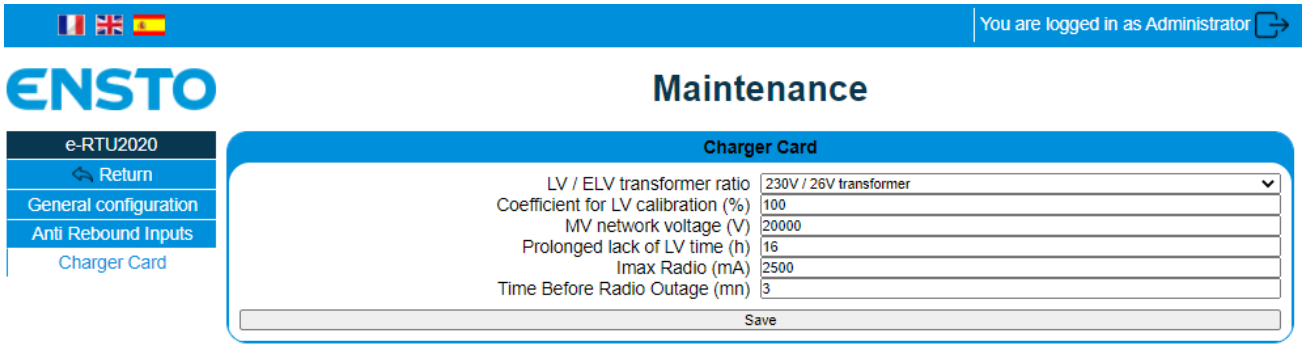
This tab allows the anti rebound for Reserve inputs (see §2.2.2) and digital inputs (see §1.2.4) to be configured
These inputs can be connected to various sensors by the user, it is sometimes necessary to adjust the input's sensitivity.
Example: anti rebound of 1s for a door contact in order to prevent unintentional status changes when opening and closing the door.



Settings	Possibilities	Definitions
Anti rebound (for each item)	0 to 1000ms	

4.3.19.3 Charger card tab

This tab allows the settings relating to the power supply (Charger card) to be configured

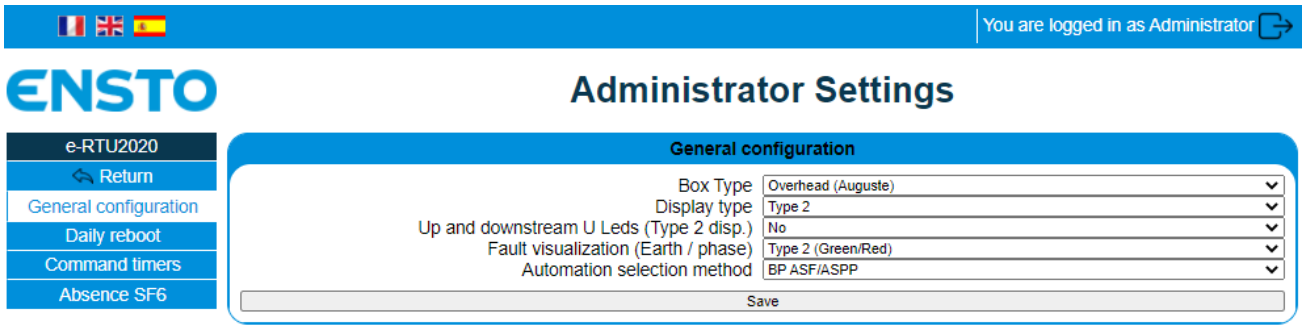


Settings	Possibilities	Definitions
LV / ELV transformer ratio	230V / 26V transformer 58V / 26V transformer 135V / 26V transformer 101V / 26V transformer 270V / 26V transformer	Definition of the transformation ratio value for the cabinet's LV/ELV transformer
Coefficient for LV calibration	1 to 200%	Correction of the LV measurement error. The coefficient is calculated automatically by a simple measurement of the voltage at the cabinet's input. See §4.2.7
MV network voltage	5,000 to 30,000V	MV network voltage for calculating the MV voltage analog input with the LV measurement
Prolonged lack of LV time	1 to 48 h	Time before outage
Imax Radio	200 to 4000 mA	Defines the maximum current consumed by the communication device (radio) when transmitting. In the event that this threshold is exceeded during the "Time Before Radio outage", the device power supply is cut off
Time Before Radio Outage	1 to 1000 mn	

4.3.20 Administrator Settings Tab (Administrator user only)

4.3.20.1 General Configuration Tab

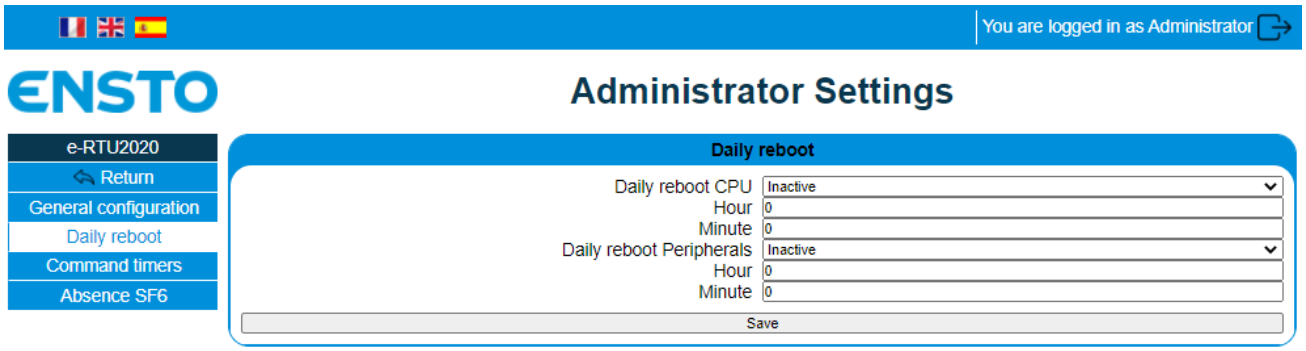
This tab defines and allows the cabinet's specific features and options to be configured
These settings are factory-set on the basis of the cabinet's configuration and the customer's requirements



Settings	Possibilities	Definitions
Cabinet type	Underground Overhead (Auguste) Overhead (Other)	Determines the type of cabinet based on its operation
Display type	Type 1 (internal fault) Type 2	Definition of the Display board installed in the cabinet. Type 2 display for overhead only
Upstream and downstream voltage LEDs (Type 2 disp.)	Yes No	Upstream voltage/downstream voltage availability LED management options with Type 2 display only
Fault Visualization (Earth/phase)	Type 1 (Red/Red+Green) Type 2 (Green/Red)	Red light for an Earth fault (homopolar) Red+green lights for a Phase fault (polyphase) Green light for an Earth fault (homopolar) Red light for a Phase fault (polyphase)
Automation selection method	ASF/APSS button ASF/APSS + COMMAND VALIDATION button	Automation enabled by pressing the button Automation enabled by pressing the button and the COMMAND VALIDATION button at the same time

4.3.20.2 Daily Reboot Tab

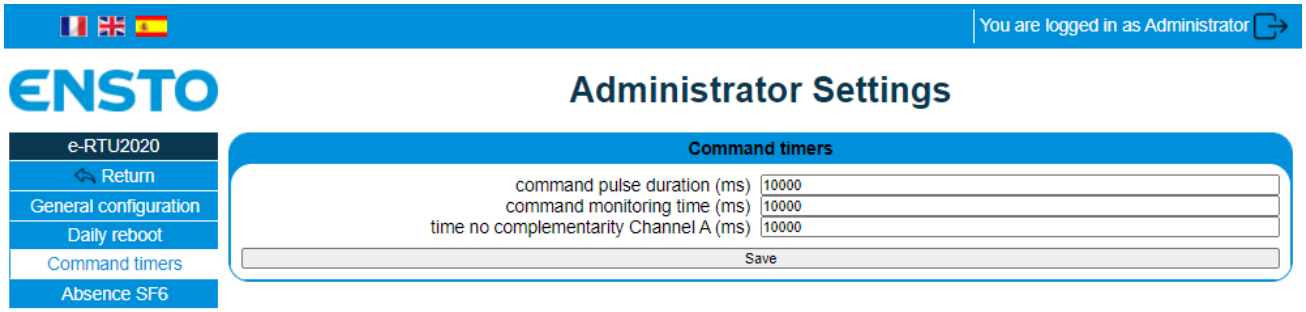
This tab allows daily Reboots (restarts) of the cabinet to be enabled and configured.



Settings	Possibilities	Definitions
Daily reboot CPU	Inactive active	Daily reboot of the CPU Equivalent to a reboot command (see System configuration guide)
Daily reboot Peripherals	Inactive active	Daily reboot of peripherals (display boards, charger, fault detection, communication device, etc.)

4.3.20.3 Command Timers Tab

This tab allows the commands to be set



Settings	Possibilities	Definitions
Command pulse duration	10 to 10,000ms	Period during which the control voltage is applied at the opening and closing command output
Command monitoring time	10 to 10,000ms	Period during which the return of the position for signalling transmission to SCADA is expected (at the end of the period, the position is transmitted)
No complementarity time (By channel)	10 to 10,000ms	Time during which no complementarity information is permitted (This corresponds to the max. time for physically executing the switching operation)

4.3.21 System Tab

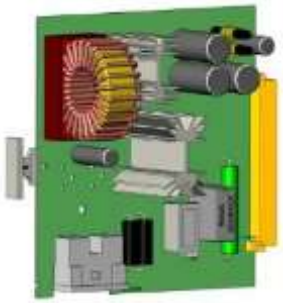
This tab allows the firmware to be updated, the configuration to be loaded (PC -> cabinet) or downloaded (Cabinet ->PC), the time to be set for the cabinet and the entire system to be configured (Users, Firewall, VPN tunnel, etc.)

See System configuration guide

4.4 UPGRADES WITH NEW FUNCTIONS

On request, this cabinet can be customised with the following modules.

12V/48V converter board



For use only if a drive equipped with a 48V motor is present

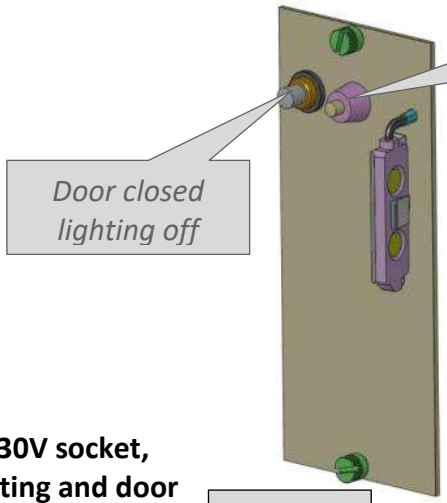
Door contact module

Indicates to the control station whether the cabinet door is open or closed

100W heating

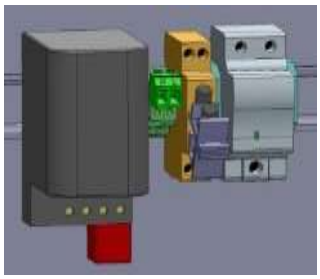
Maintains a sufficient temperature inside an insulated cabinet allowing it to be used down to -50°C

Lighting and door contact module



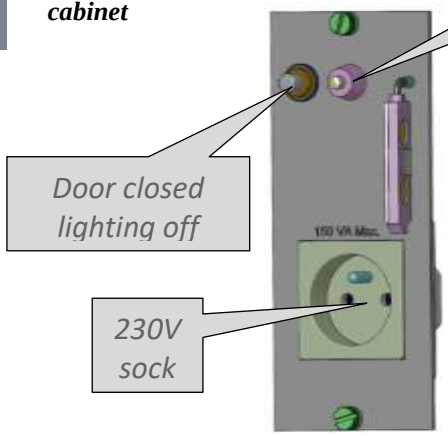
ng UI in low light conditions while indicating to the control station whether the cabinet door is open or closed

50W anti-condensation heater



Reduces the phenomenon of condensation caused by temperature differences inside the cabinet

230V socket, lighting and door contact module



Identical to the lighting and door contact module.
. Also allows a 230V device to be connected.
NB.: this module must be used with a specific optional power transformer

5 MAINTENANCE

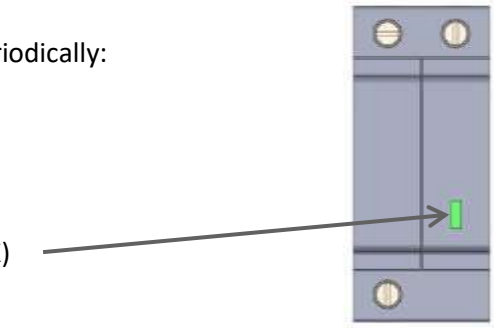
5.1. Preventive

5.2. Corrective

5.1 PREVENTIVE

The cabinet does not require any preventive maintenance, however,
Ensto Novexia recommends that the following checks are carried out periodically:

- Visual condition of the outside of the cabinet
- Earthing of the cabinet
- Tightening of grommets on the cable
- Internal condition of the cabinet (sand, insects, etc.)
- Condition of the voltage surge protection (Red failed, Green OK)



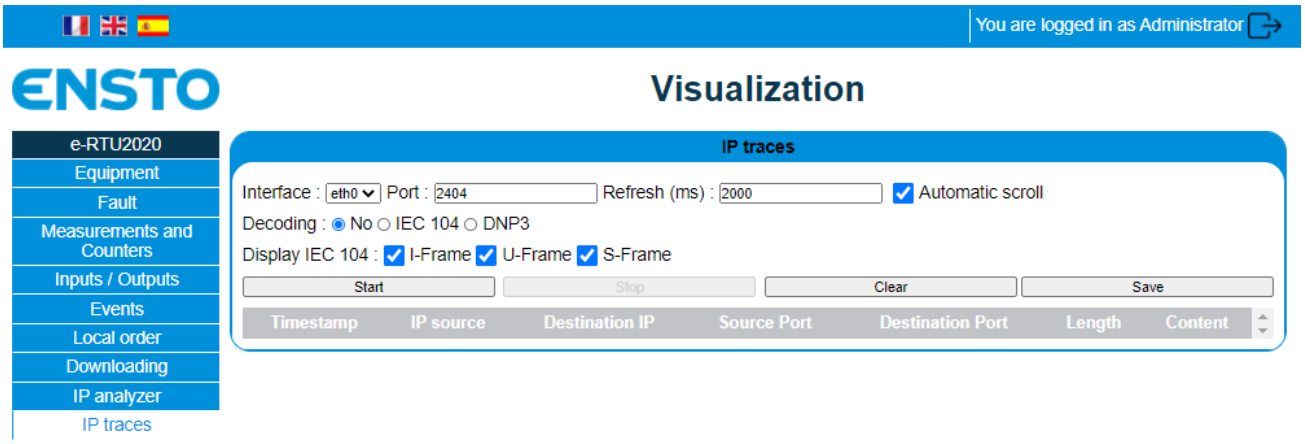
The e-RTU 2020 cabinet allows the connections and data transmitted via IP communication devices to be analysed by means of the configuration PC.

5.1.1 IP analyser

The “IP Analyzer” tab allows the connections to the 3 IP ports of the e-RTU 2020 cabinet to be identified and quantified.

5.1.2 IP traces

The “IP traces” tab allows the protocol frames of IP-based protocols (IEC 104, DNP3 IP) to be displayed.
Filters provide assistance for decoding frames on the basis of protocols.
Exchanges logged may be saved in a .txt file for analysis.

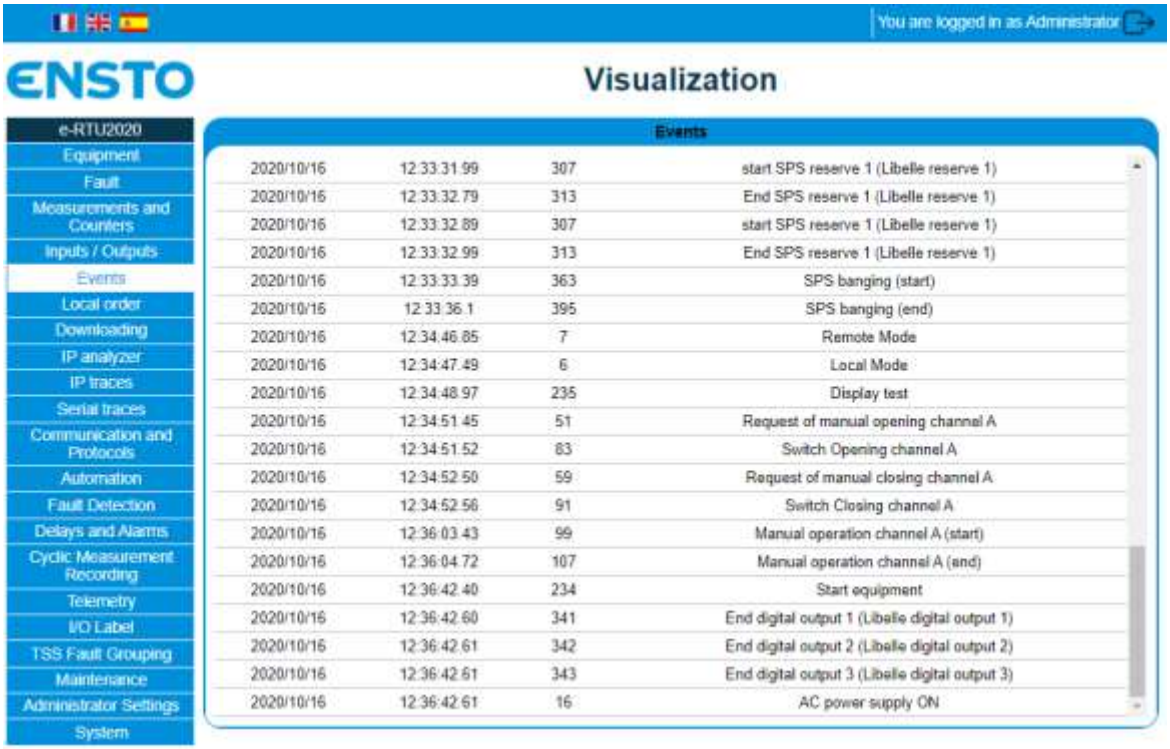


See protocol notices for more information on decoding.

5.1.3 Visualization of Dated Recorded Maintenance Events (DRME):

The cabinet stores a stack of a minimum of 10,000 dated events (1MB file), which can be viewed via the "Dated Recorded Maintenance Event (DRME)” HTML page.
Should the capacity be exceeded, the file is saved by after-sales service and a new one is created.

It is impossible to delete an event.



The DRMEs are events relating to the operation of the network and the cabinet
It is possible to save the events file (.csv) with the aid of the **“Download”** button.

A list of DRMEs and their numbers appears below.

code	Label
1	No voltage >2h
2	Charger card fault
3	Prolonged lack of voltage
4	Blacklisted number
5	drme stack full
6	Local
7	Remote
8	12V fault (start)
9	12V fault (end)
10	DC voltage fault (start)
11	DC voltage fault (end)
12	Battery fault (start)
13	Battery fault (end)
14	Autonomous supply backup (start)
15	Autonomous supply backup (end)
16	LV available
17	No LV
18	Red fault channel A
19	Red fault channel B
20	Red fault channel C
21	Red fault channel D
22	Red fault channel E
23	Red fault channel F
24	Red fault channel G
25	Red fault channel H
26	Green fault channel A
27	Green fault channel B
28	Green fault channel C
29	Green fault channel D
30	Green fault channel E
31	Green fault channel F
32	Green fault channel G
33	Green fault channel H
418	Earth fault channel A

419	Earth fault channel B
420	Earth fault channel C
421	Earth fault channel D
422	Earth fault channel E
423	Earth fault channel F
424	Earth fault channel G
425	Earth fault channel H
34	Phase fault channel A
35	Phase fault channel B
36	Phase fault channel C
37	Phase fault channel D
38	Phase fault channel E
39	Phase fault channel F
40	Phase fault channel G
41	Phase fault channel H
42	Permanent transmission
43	Selection of channel A for operation
44	Selection of channel B for operation
45	Selection of channel C for operation
46	Selection of channel D for operation
47	Selection of channel E for operation
48	Selection of channel F for operation
49	Selection of channel G for operation
50	Selection of channel H for operation
51	Manual opening request channel A
52	Manual opening request channel B
53	Manual opening request channel C
54	Manual opening request channel D
55	Manual opening request channel E
56	Manual opening request channel F
57	Manual opening request channel G
58	Manual opening request channel H
59	Manual closing request channel A
60	Manual closing request channel B
61	Manual closing request channel C
62	Manual closing request channel D
63	Manual closing request channel E
64	Manual closing request channel F
65	Manual closing request channel G
66	Manual closing request channel H

67	Remote controlled opening request channel A
68	Remote controlled opening request channel B
69	Remote controlled opening request channel C
70	Remote controlled opening request channel D
71	Remote controlled opening request channel E
72	Remote controlled opening request channel F
73	Remote controlled opening request channel G
74	Remote controlled opening request channel H
75	Remote controlled closing request channel A
76	Remote controlled closing request channel B
77	Remote controlled closing request channel C
78	Remote controlled closing request channel D
79	Remote controlled closing request channel E
80	Remote controlled closing request channel F
81	Remote controlled closing request channel G
82	Remote controlled closing request channel H
83	Channel A opening
84	Channel B opening
85	Channel C opening
86	Channel D opening
87	Channel E opening
88	Channel F opening
89	Channel G opening
90	Channel H opening
91	Channel A closing
92	Channel B closing
93	Channel C closing
94	Channel D closing
95	Channel E closing
96	Channel F closing
97	Channel G closing
98	Channel H closing
99	Blocked channel A (start)
100	Blocked channel B (start)
101	Blocked channel C (start)
102	Blocked channel D (start)
103	Blocked channel E (start)
104	Blocked channel F (start)
105	Blocked channel G (start)
106	Blocked channel H (start)

107	Blocked channel A (end)
108	Blocked channel B (end)
109	Blocked channel C (end)
110	Blocked channel D (end)
111	Blocked channel E (end)
112	Blocked channel F (end)
113	Blocked channel G (end)
114	Blocked channel H (end)
115	Start signalling closing heartbeat channel A
116	Start signalling closing heartbeat channel B
117	Start signalling closing heartbeat channel C
118	Start signalling closing heartbeat channel D
119	Start signalling closing heartbeat channel E
120	Start signalling closing heartbeat channel F
121	Start signalling closing heartbeat channel G
122	Start signalling closing heartbeat channel H
123	Start signalling opening heartbeat channel A
124	Start signalling opening heartbeat channel B
125	Start signalling opening heartbeat channel C
126	Start signalling opening heartbeat channel D
127	Start signalling opening heartbeat channel E
128	Start signalling opening heartbeat channel F
129	Start signalling opening heartbeat channel G
130	Start signalling opening heartbeat channel H
131	End signalling closing heartbeat channel A
132	End signalling closing heartbeat channel B
133	End signalling closing heartbeat channel C
134	End signalling closing heartbeat channel D
135	End signalling closing heartbeat channel E
136	End signalling closing heartbeat channel F
137	End signalling closing heartbeat channel G
138	End signalling closing heartbeat channel H
139	End signalling opening heartbeat channel A
140	End signalling opening heartbeat channel B
141	End signalling opening heartbeat channel C
142	End signalling opening heartbeat channel D
143	End signalling opening heartbeat channel E
144	End signalling opening heartbeat channel F
145	End signalling opening heartbeat channel G
146	End signalling opening heartbeat channel H

147	ASF configuration channel A
148	ASF configuration channel B
149	ASF configuration channel C
150	ASF configuration channel D
151	ASF configuration channel E
152	ASF configuration channel F
153	ASF configuration channel G
154	ASF configuration channel H
155	ASF configuration channel A green fault
156	ASF configuration channel B green fault
157	ASF configuration channel C green fault
158	ASF configuration channel D green fault
159	ASF configuration channel E green fault
160	ASF configuration channel F green fault
161	ASF configuration channel G green fault
162	ASF configuration channel H green fault
163	ASF configuration channel A red fault
164	ASF configuration channel B red fault
165	ASF configuration channel C red fault
166	ASF configuration channel D red fault
167	ASF configuration channel E red fault
168	ASF configuration channel F red fault
169	ASF configuration channel G red fault
170	ASF configuration channel H red fault
171	ASF function activation
172	ASF function deactivation
173	ASF turned on locally
174	ASF turned off locally
175	ASF turned on by remote control
176	ASF turned off by remote control
177	ASF opening request channel A
178	ASF opening request channel B
179	ASF opening request channel C
180	ASF opening request channel D
181	ASF opening request channel E
182	ASF opening request channel F
183	ASF opening request channel G
184	ASF opening request channel H
185	ASF opening fault channel A
186	ASF opening fault channel B

187	ASF opening fault channel C
188	ASF opening fault channel D
189	ASF opening fault channel E
190	ASF opening fault channel F
191	ASF opening fault channel G
192	ASF opening fault channel H
193	Simplified APSS configuration
194	Complete APSS configuration
195	Change to APSS source 1
196	Change to APSS source 2
197	APSS direction: Src1 -> Src2
198	APSS direction: Src1 <-> Src2
199	APSS direction: Src2 -> Src1
200	APSS function activation
201	APSS function deactivation
202	APSS turned on locally
203	APSS turned off locally
204	APSS turned on by remote control
205	APSS turned off by remote control
206	No voltage APSS source 1
207	Voltage available APSS source 1
208	No voltage APSS source 2
209	Voltage available APSS source 2
210	APSS switching (start)
211	APSS switching (end)
212	Locking APSS switching (start)
213	Locking APSS switching (end)
214	APSS switching cancelled
215	APSS opening request channel A
216	APSS opening request channel B
217	APSS opening request channel C
218	APSS opening request channel D
219	APSS opening request channel E
220	APSS opening request channel F
221	APSS opening request channel G
222	APSS opening request channel H
223	APSS closing request channel A
224	APSS closing request channel B
225	APSS closing request channel C
226	APSS closing request channel D

227	APSS closing request channel E
228	APSS closing request channel F
229	APSS closing request channel G
230	APSS closing request channel H
231	APSS active source opening fault
232	APSS backup source closing fault
233	Equipment reset
234	Equipment start-up
235	Display test
236	Urgent external fault (start)
237	Urgent external fault (end)
238	Non-urgent external fault (start)
239	Non-urgent external fault (end)
240	MV available (functional unit info) channel A
241	MV available (functional unit info) channel B
242	MV available (functional unit info) channel C
243	MV available (functional unit info) channel D
244	MV available (functional unit info) channel E
245	MV available (functional unit info) channel F
246	MV available (functional unit info) channel G
247	MV available (functional unit info) channel H
248	No MV (functional unit info) channel A
249	No MV (functional unit info) channel B
250	No MV (functional unit info) channel C
251	No MV (functional unit info) channel D
252	No MV (functional unit info) channel E
253	No MV (functional unit info) channel F
254	No MV (functional unit info) channel G
255	No MV (functional unit info) channel H
256	MV available (voltage sensor info) channel A
257	MV available (voltage sensor info) channel B
258	MV available (voltage sensor info) channel C
259	MV available (voltage sensor info) channel D
260	MV available (voltage sensor info) channel E
261	MV available (voltage sensor info) channel F
262	MV available (voltage sensor info) channel G
263	MV available (voltage sensor info) channel H
264	No MV (voltage sensor info) channel A
265	No MV (voltage sensor info) channel B
266	No MV (voltage sensor info) channel C

267	No MV (voltage sensor info) channel D
268	No MV (voltage sensor info) channel E
269	No MV (voltage sensor info) channel F
270	No MV (voltage sensor info) channel G
271	No MV (voltage sensor info) channel H
272	DC electronic fault channel A
273	DC electronic fault channel B
274	DC electronic fault channel C
275	DC electronic fault channel D
276	DC electronic fault channel E
277	DC electronic fault channel F
278	DC electronic fault channel G
279	DC electronic fault channel H
280	Electronic wiring board fault 1
281	Electronic wiring board fault 2
282	Detector board fault channel A
283	Detector board fault channel B
284	Detector board fault channel C
285	Detector board fault channel D
286	Detector board fault channel E
287	Detector board fault channel F
288	Detector board fault channel G
289	Detector board fault channel H
290	16 IO module fault
300	48V fuse fault
301	Detector voltage fault
302	Detector voltage fault
303	Display board fault
304	Converter board fault
305	Measurement board fault
306	CPU board fault
307	SPI start reserve 1
308	SPI start reserve 2
309	SPI start reserve 3
310	SPI start reserve 4
311	SPI start reserve 5
312	SPI start reserve 6
313	SPI end reserve 1
314	SPI end reserve 2
315	SPI end reserve 3

316	SPI end reserve 4
317	SPI end reserve 5
318	SPI end reserve 6
319	Detector voltage initialisation
320	Detector voltage initialisation failure
321	2 detectors voltage initialisation
322	2 detectors voltage initialisation failure
323	Restart Runtime
324	Date and time programming
325	Date event
326	SCA function activation
327	SCA function deactivation
328	Digital input 1 start
329	Digital input 2 start
330	Digital input 3 start
331	Digital input 4 start
332	Digital input 5 start
333	Digital input 1 end
334	Digital input 2 end
335	Digital input 3 end
336	Digital input 4 end
337	Digital input 5 end
338	Digital output 1 start
339	Digital output 2 start
340	Digital output 3 start
341	Digital output 1 end
342	Digital output 2 end
343	Digital output 3 end
344	SF6 drop start
345	SF6 drop end
346	Equipment fault
347	SPI 1 heartbeat (start)
348	SPI 2 heartbeat (start)
349	SPI 3 heartbeat (start)
350	SPI 4 heartbeat (start)
351	SPI 5 heartbeat (start)
352	SPI 6 heartbeat (start)
353	SPI 7 heartbeat (start)
354	SPI 8 heartbeat (start)
355	SPI 9 heartbeat (start)

356	SPI 10 heartbeat (start)
357	SPI 11 heartbeat (start)
358	SPI 12 heartbeat (start)
359	SPI 13 heartbeat (start)
360	SPI 14 heartbeat (start)
361	SPI 15 heartbeat (start)
362	SPI 16 heartbeat (start)
363	SPI 17 heartbeat (start)
364	SPI 18 heartbeat (start)
365	SPI 19 heartbeat (start)
366	SPI 20 heartbeat (start)
367	SPI 21 heartbeat (start)
368	SPI 22 heartbeat (start)
369	SPI 23 heartbeat (start)
370	SPI 24 heartbeat (start)
371	SPI 25 heartbeat (start)
372	SPI 26 heartbeat (start)
373	SPI 27 heartbeat (start)
374	SPI 28 heartbeat (start)
375	SPI 29 heartbeat (start)
376	SPI 30 heartbeat (start)
377	SPI 31 heartbeat (start)
378	SPI 32 heartbeat (start)
379	SPI 1 heartbeat (end)
380	SPI 2 heartbeat (end)
381	SPI 3 heartbeat (end)
382	SPI 4 heartbeat (end)
383	SPI 5 heartbeat (end)
384	SPI 6 heartbeat (end)
385	SPI 7 heartbeat (end)
386	SPI 8 heartbeat (end)
387	SPI 9 heartbeat (end)
388	SPI 10 heartbeat (end)
389	SPI 11 heartbeat (end)
390	SPI 12 heartbeat (end)
391	SPI 13 heartbeat (end)
392	SPI 14 heartbeat (end)
393	SPI 15 heartbeat (end)
394	SPI 16 heartbeat (end)
395	SPI 17 heartbeat (end)

396	SPI 18 heartbeat (end)
397	SPI 19 heartbeat (end)
398	SPI 20 heartbeat (end)
399	SPI 21 heartbeat (end)
400	SPI 22 heartbeat (end)
401	SPI 23 heartbeat (end)
402	SPI 24 heartbeat (end)
403	SPI 25 heartbeat (end)
404	SPI 26 heartbeat (end)
405	SPI 27 heartbeat (end)
406	SPI 28 heartbeat (end)
407	SPI 29 heartbeat (end)
408	SPI 30 heartbeat (end)
409	SPI 31 heartbeat (end)
410	SPI 32 heartbeat (end)
411	Initialisation of measurement recording file
412	DC closing Digital output 1
413	DC closing Digital output 2
414	DC closing Digital output 3
415	DC opening Digital output 1
416	DC opening Digital output 2
417	DC opening Digital output 3
418	Local closing command Digital output 1
419	Local closing command Digital output 2
420	Local closing command Digital output 3
421	Local opening command Digital output 1
422	Local opening command Digital output 2
423	Local opening command Digital output 3
424	Max. no. of login attempts admin mode
425	Reset bus
426	XML file initialisation fault
427	Motor fuse fault

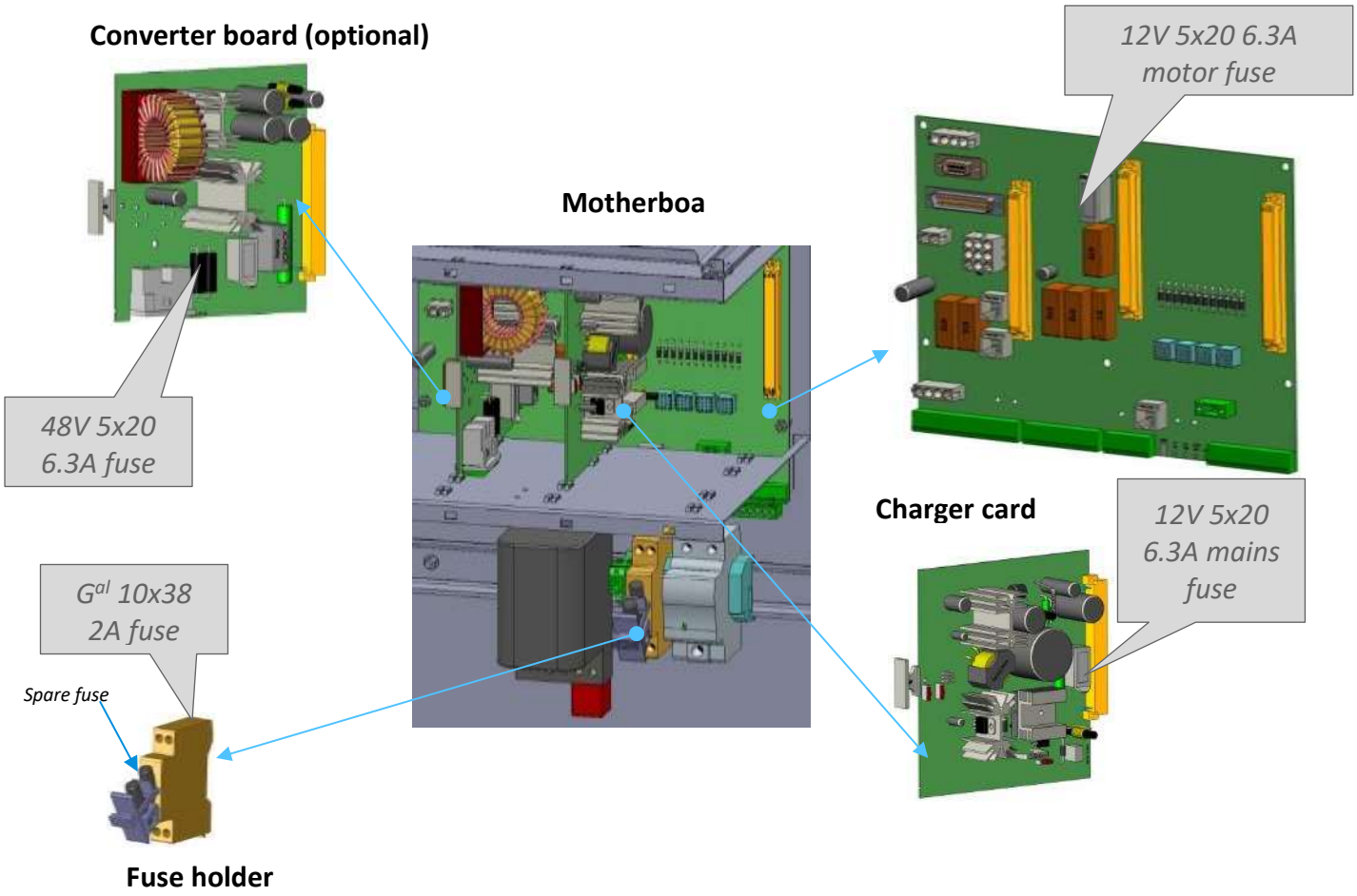
5.1.4 CPU2020 firmware update

Enables the new version of the CPU program to be downloaded

See System configuration guide

5.2 CORRECTIVE

Location of protective fuses



6 TECHNICAL SUPPORT

Should you encounter any problems or have any questions, please contact our Technical Support team:

After-Sales Service
33 av. du Général Leclerc – BP 323
FR - 65203 Bagnères-de-Bigorre
Tel.: +33 (0)5 62 91 45 36
Fax: +33 (0)5 62 91 45 30

You can also contact us by e-mail at infos.novexia@ensto.com

Ensto Novexia is also able to provide customised training.
Our Technical Support team and our sales team will be able to advise you.

7 END OF PRODUCT LIFE

For any questions relating to the end of the product's life, contact the after-sales service with the technical details of the sub-assemblies and/or products to be recycled.

Note

Equipment return tracking form

After-Sales Service
Parc d'Activités de la Haute-Bigorre
Boulevard de l'Adour
65200 Bagnères de Bigorre
Cedex
Landline: +33(0)5 62 91 45 36
Mobile: +33 (0)6 16 66 46 43

After-Sales Service
210, rue Léon Jouhaux – BP 10446
FR – 69656 Villefranche-sur-Saône
Cedex
Landline: +33 (0)4 74 65 61 60
Mobile: +33 (0)6 08 93 26 31