PowerLogic™ T300

Substation Controller

Quick Start Guide

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www.se.com

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Safety Information

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

FCC Part 15

This equipment is designed and tested with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with *PowerLogic™ T300 HU250 Installation Guide* (reference NHA77925) may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to prevent interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with FCC RF radiation exposure limits set forth for general population. This device must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

EU Directives

This equipment complies with the following Directives of the European Parliament and of the Council:

- EMC Directive 2014/30/EU
- LVD Directive 2014/35/EU
- RED Directive 2014/53/EU
- RoHS Directive 2015/863/EU

UKCA Directives

UK Regulation:

- The Electromagnetic Compatibility Regulations SI 2016 No. 1091
- The Electrical Equipment (Safety) Regulations SI 2016 No. 1101
- The Radio Equipment Regulations SI 2017 No. 1206
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 SI 2012 No. 3032

Introduction

This document gives initial instructions to start the unit. It is addressed to a person with profile of a project developer that has sufficient skills on the equipment and associated tools to do the following operations:

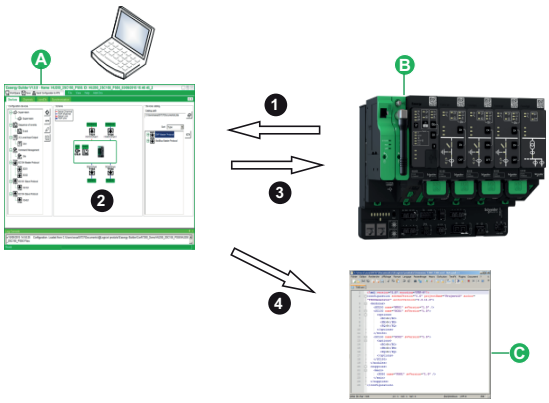
- Installation of Easergy Builder
- First connection to the RTU
- Brief presentation of Easergy Builder and PowerLogic™ T300 Web server
- Importing a default configuration to Easergy Builder
- Downloading the PowerLogic T300 configuration to Easergy Builder
- Creation of protocol mapping
- Creation of new event file and corresponding settings
- Setting the PowerLogic T300 RTU synchronization
- Sending the configuration to the unit

The PowerLogic T300 RTU can be received from Schneider Electric in various forms:

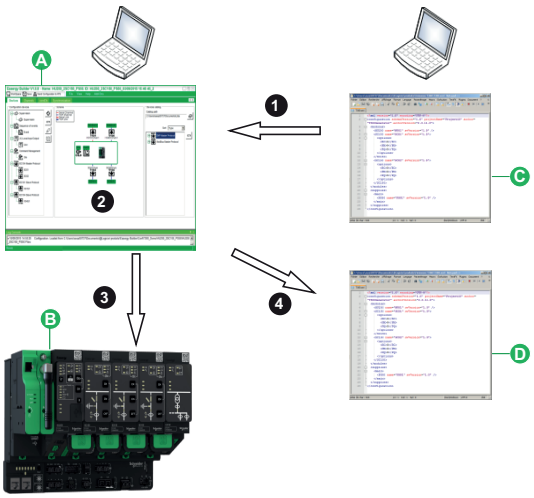
- If received as a **complete PowerLogic T300** cabinet, the unit is provided from the factory with a default configuration that corresponds to the options of the unit ordered. In this case, the aim is simply to make a first connection to the unit and to use the Easergy Builder configuration tool to download the existing PowerLogic T300 configuration, change the settings and personalize it to the customer application.
- If received as **separate modules** HU250, SC150/SC160, LV150, PS50, etc.), they will be assembled after the delivery in a panel or an enclosure. No configuration is included in the unit, because it depends on the customer application which is unknown to the factory at the time of supply. In this case, the product includes only an empty configuration. A default configuration must be generated by the **T300 Generator** configuration tool (creation of `*.tar.gz` file). This default configuration must then be imported to Easergy Builder and personalized according to the customer application.

In both cases, once completed, the configuration must be uploaded to the unit using Easergy Builder or saved externally as `*.tar.gz` file, to be uploaded later to other T300 units.

Complete PowerLogic T300



PowerLogic T300 received as separate modules



A. PowerLogic T300

B. Easergy Builder

1. Configuration imported into Easergy Builder
2. Configuration customization in Easergy Builder
3. Configuration uploaded to the unit
4. Configuration backup as external file *.tar.gz, for use as configuration file template for other PowerLogic T300

Easergy Builder

Presentation

Easergy Builder is the advanced configuration customization tool for the T300. This customization can be done offline or connected to the unit. The configuration established in Easergy Builder can be downloaded directly to the unit or imported later when connected to it. The goal of Easergy Builder is to prepare a reference configuration. This reference configuration can be used globally as a template for all T300s to be commissioned. Once this configuration is loaded into the unit, the user must configure the application parameters specific to each T300 (MV network parameters, communication parameters, etc.). This setting is done via the T300 web server. The configuration created in the Easergy Builder tool takes into account the possibilities and options of the unit, as well as the different T300 firmware versions. Each firmware version may include specific options or settings that do not exist in other versions. By creating the configuration, the user must define the version of the T300 firmware used, so that the configuration corresponds to this version. Thus, the compatibility of the generated configuration will be compliant to the version of the T300 firmware.

NOTE: When a configuration file is loaded into the unit, the PowerLogic T300 is able (through an update mechanism) to make compatible the loaded configuration that does not match the embedded firmware version. However, the missing or overwritten parameters in this configuration will be ignored, thus helping avoid any issue related to the operation of the system.

Installation of Easergy Builder

The installation instructions and the Easergy Builder software installation procedure are explained in the Easergy Builder User Manual (SE-S856-MSS). Consult this document for more information on these procedures.

First Local Connection to T300 RTU

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS-2011, CSA Z462, NFC 18–510 and UTE C18–510–1.
- This unit must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplies of this unit before working on or inside the unit.
- Always use a properly rated voltage sensing device to confirm that power is off.
- To open a live current transformer secondary circuit, turn off the primary side of the transformer and short-circuit the transformer secondary circuit.
- Set all devices, doors, and covers before turning on power to this unit.

Failure to follow these instructions will result in death or serious injury.

⚠WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Example: Emergency Stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of anticipated transmission delays or failures of the link.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

You can access the T300 RTU by the following means:

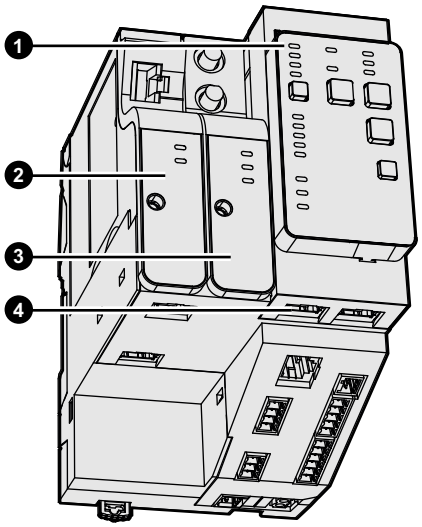
- via Ethernet
- via Wi-Fi

  NOTE: Wi-Fi and other wireless protocols are only available on the HU250 with part number EMS59000.

Initialization of Local Access via Ethernet

1. Power on the unit.

2. Wait until the HU250 operating LED is flashing. When the LED lights steadily, connect the Ethernet cable between the PC and the local LAN Ethernet port of the HU250.



1. HU250 operating LED
2. Modem slot #1
3. Modem slot #2
4. HU250 LAN Ethernet port (to connect a PC)

NOTE: For this connection, there is no need to change the IP setting of the PC, because the T300 RTU includes a DHCP server that automatically assigns an IP address to the computer once physically connected.

Activation of Local Wi-Fi Access

NOTE: Wi-Fi and other wireless protocols are only available on the HU250 with part number EMS59000.

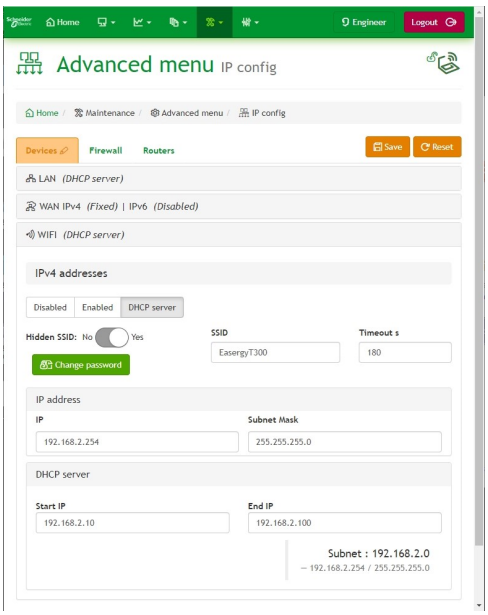
NOTE: Wi-Fi access is disabled by configuration on the T300 RTU when received from the factory.

To get a wireless connection with the unit, the first step is to activate Wi-Fi access via the T300 Web server.

To do this, an Ethernet connection to the unit is required.

1. Power on the unit.
2. Wait until the HU250 operating LED is flashing. When the LED lights steadily, connect the Ethernet cable between the PC and the local LAN Ethernet port of the HU250.
3. Once connected and logged in, go to the **Maintenance > IP configuration** page.

4. In the Wi-Fi section, configure the following settings to activate Wi-Fi access:



Setting	By default	To be configured	Description
Wi-Fi	Disabled	DHCP Server	**Enabled** means Wi-Fi activation
Hidden SSID	No	No	
SSID	PowerLogic T300	To customize	Enter a unique SSID for each T300.
IP	192.168.2.254	192.168.2.254	The default settings can be changed according to the properties of your LAN network if required.
Subnet mask	255.255.255.0	255.255.255.0	
DHCP Server	Enabled	Enabled	
Sart IP	192.168.2.10	192.168.2.10	
End IP	192.168.2.100	192.168.2.100	

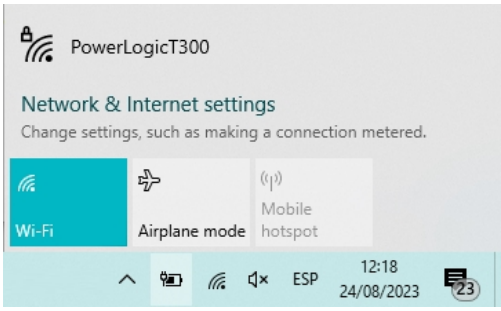
5. Click the **Save** button to apply the changes.
6. Click the **Change password** button. Define a new personal password.

   NOTE: For security reasons, it is important to change default passwords so they are unique on each T300 RTU.

7. Put the unit in **Local mode** using button on the front panel of the HU250.

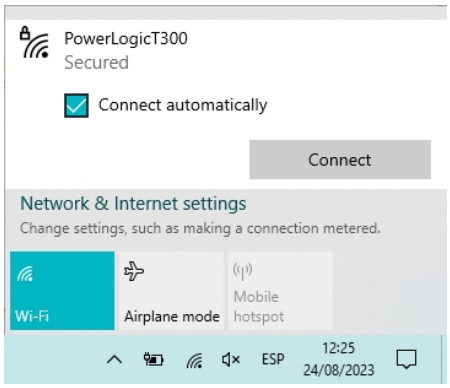
   NOTE: By default, Wi-Fi access is activated on the unit only in Local mode.

8. Click the Wireless icon on the Windows task bar of your computer desktop.

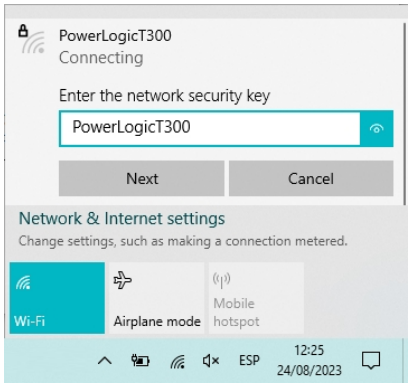


9. Check that the wireless connection (with SSID defined previously) appears in the Windows task bar and click it.

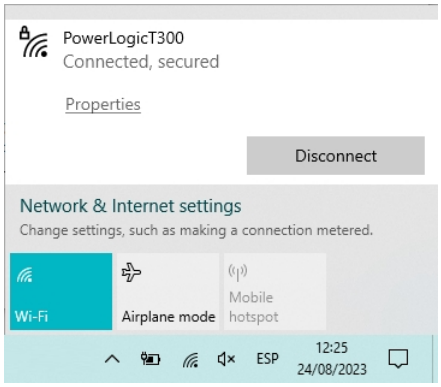
10. Click the **Connect** button.



11. Enter the Wi-Fi security key (password defined previously).



12. Windows automatically connects to this Wi-Fi network and the T300 SSID appears as connected in the task bar. You can now disconnect the Ethernet cable from the unit.



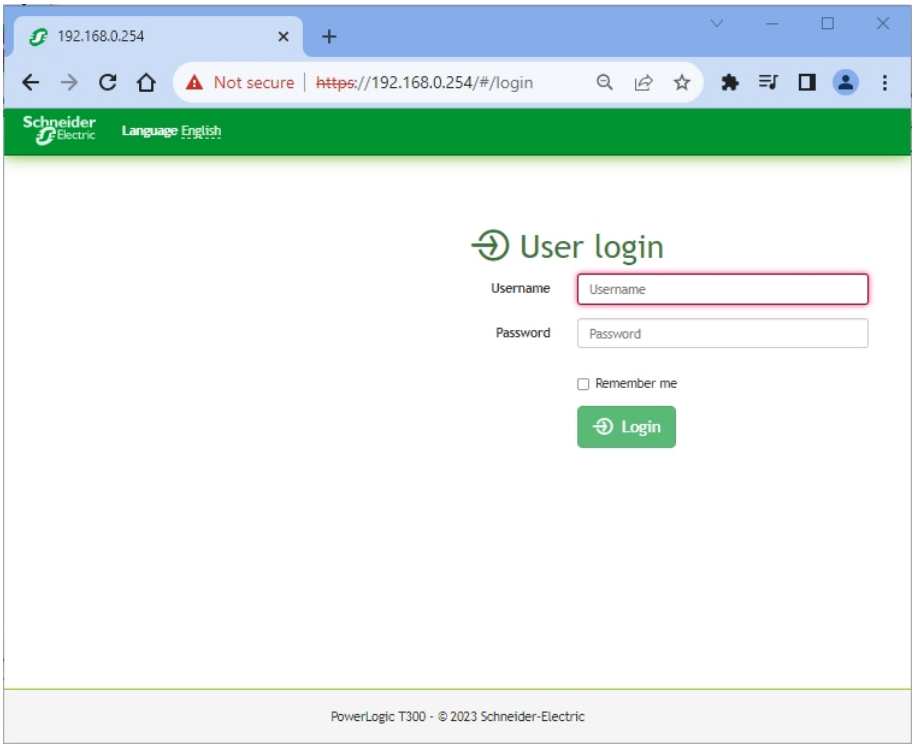
Connection to T300 Web Server

1. Start an Internet browser. Access to the HTML pages is activated according to the rights related to the user type. Refer to Access Rights for each Type of User, page 14.
2. In the **Address** field, enter the following IP address: **https://192.168.2.254**. Click **Ok**.

   A message appears regarding the Security Certificate.
3. Follow the instructions to override and continue to access the T300 Website.

   The startup page of the embedded server appears on screen.
4. Select the language to be used and click **Ok**.

5. Enter a **User name** and a **Password**. The following default users are defined on the unit:



USERS	Operator	Engineer	Installer	Viewer	SECADM
Login	Operator	Engineer	Installer	Viewer	SecurityAd-min
Password	Operator1!	Engineer1!	Installer1!	Viewer1!	Security1!

NOTE: for security requirements, all passwords must be changed during commissioning.

6. Access to the HTML pages is activated according to the rights relating to the user type.

Access Rights for Each Type of User

Rights Defined For Each Role/User			INSTALLER	ENGINEER	VIEWER	OPERATOR	SECADM	SECAUD	RBACMNT
Object	**Description**	**Action**							
CONF_DB	T300 application configuration (HU250, SC150/SC160)	CONFDB_READ	x	x	x	x			
		CONFDB_WRITE	x	x					
CONF_SYS	T300 system configuration (Ethernet, Wi-Fi, modem box, etc.)	CONFSYS_READ	x	x		x			
		CONFSYS_ WRITE	x	x					
FIRMWARE	HU250 firmware	FIRMWARE_ VIEW	x	x		x			
		FIRMWARE_ READ	x	x					
		FIRMWARE_ WRITE	x	x					
WEBSERVICE	T300 Web server	WEBSERVICES_ ACCESS	x	x	x	x	x		
SSH	Easergy Builder, console	SSH_ACCESS	x	x					

Rights Defined For Each Role/User			INSTALLER	ENGINEER	VIEWER	OPERATOR	SECADM	SECAUD	RBACMNT
Object	**Description**	**Action**							
OS_SHELL	Linux Shell, configuration import/ export service	OSSHELL_ ACCESS		x					
SYS_LOG	System and SOE log files	SYSLOG_READ	x	x		x			
		SYSLOG_WRITE	x	x					
RBAC	System security (users, passwords, access rights, certificate management)	RBAC_READ					x		CAE
		RBAC_WRITE					x		CAE
RBAC_LOG	Security log file	RBACLOG_READ					x	CAE	CAE
DATA	Device data (signals, measurements, controls, counters, PS50 settings, etc.)	DATA_READ	x	x	x	x			
		DATA_WRITE	x	x		x			
RESET	Device reset	RESET_ACCESS	x	x					

NOTE: "CAE" means that this user/role cannot access the Web server, but has the rights assigned via the CAE only.

NOTE: It is not possible to modify the rights assigned to a role via the T300 Web server. This can only be done via the CAE. Refer to the CAE manual for more information on how to administer the roles and associated rights in the RBAC model.

NOTE: To have full access to read and write a configuration in Easergy Builder, you need the services "SSH" and "OS_SHELL". So, only the access Engineer allows this possibility.

Configuration of SC150/SC160 and LV150 IP Addressees

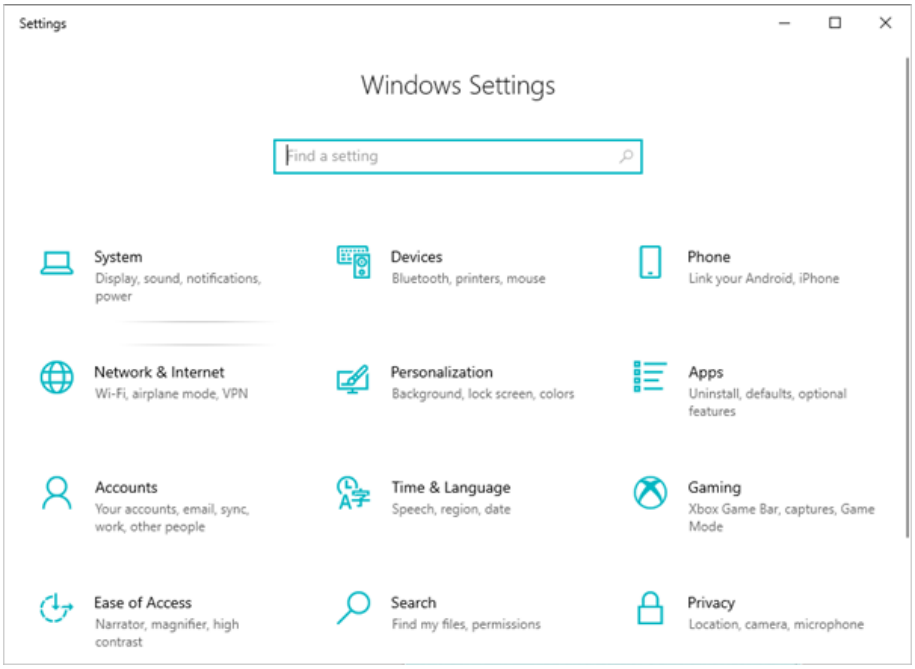
Introduction

If the SC150/SC160 or LV150 modules are received as separate modules and are therefore not part of a complete PowerLogic T300 enclosure, it is necessary to change the existing IP address. Each SC150/SC160 and LV150 delivered from the factory includes a default IP address (e.g. 192.168.10.10). If multiple SC150/SC160s and LV150s are used and connected to the same LAN Ethernet network as the PowerLogic T300 device, each SC150/SC160 and LV150 device must have a different IP address to help avoid IP address conflicts on the LAN network. The following explains how to change the SC150/SC160 or LV150 IP address. The IP address configured depends on the position of the module on the PowerLogic T300. If the SC150/SC160 and LV150 modules are received in a complete PowerLogic T300 enclosure, this operation was already performed at the factory. In this case, there is no need to follow this procedure.

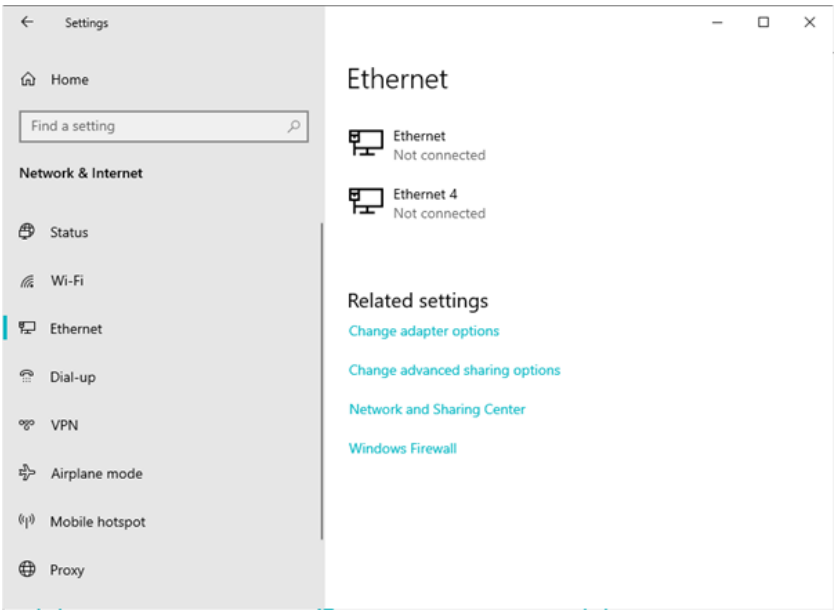
Changing the IP Address of the PC

To be able to change the IP address of an SC150/SC160 or LV150 module, the computer must be directly connected to the LAN Ethernet port of the module. Unlike the HU250, the SC150/SC160 and LV150 do not include a DHCP server. So, to adapt the computer to the SC150/SC160 or LV150 IP addresses, the IP address of the computer must be changed as explained below:

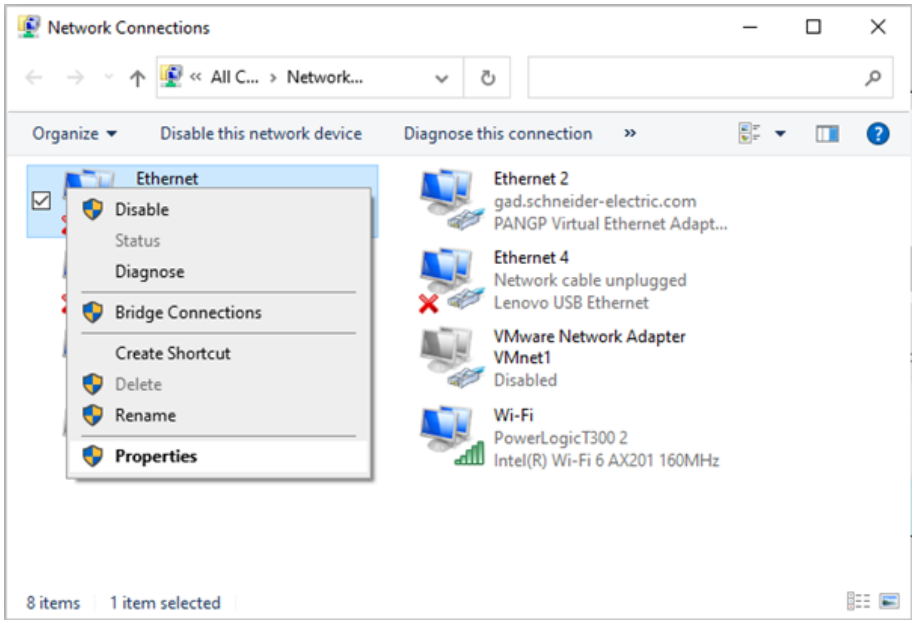
1. Click **Start** > **Settings** > **Network & Internet**.



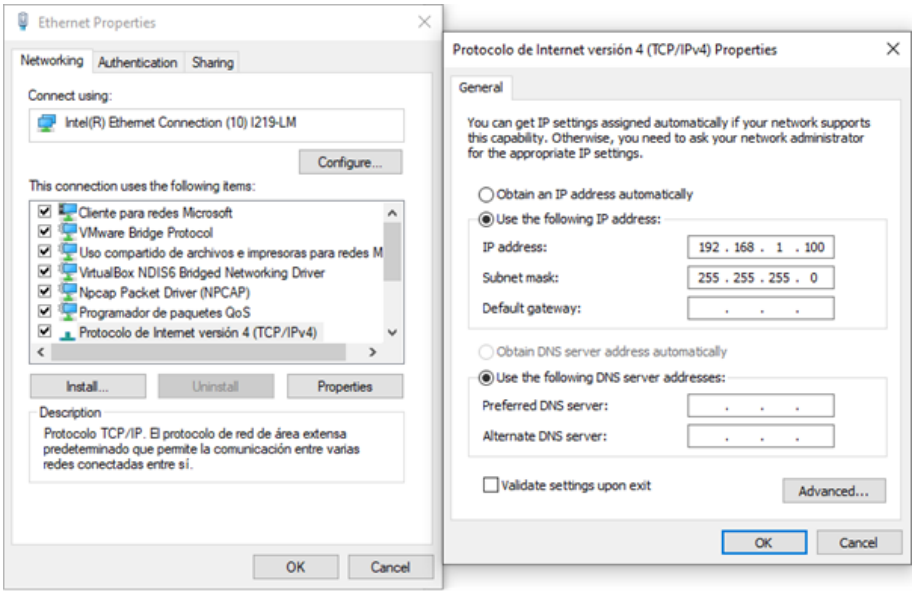
2. Select **Ethernet** and click on **Change adapter options**.



3. Right click on the desired network adapter and click on **Properties** on the pop-up window.



4. In the **Network** management tab, double-click **Internet Protocol Version 4 (TCP/IPv4)**.



5. In the new window that appears, in the **General tab**, click **Use the following IP address** option.
6. Enter 192.168.10.11 in the **IP address** field, then click OK twice to apply the new IP address.
7. The IP address of the computer has now been changed and is compatible with the IP address of SC150/SC160 or LV150 for the Ethernet connection.

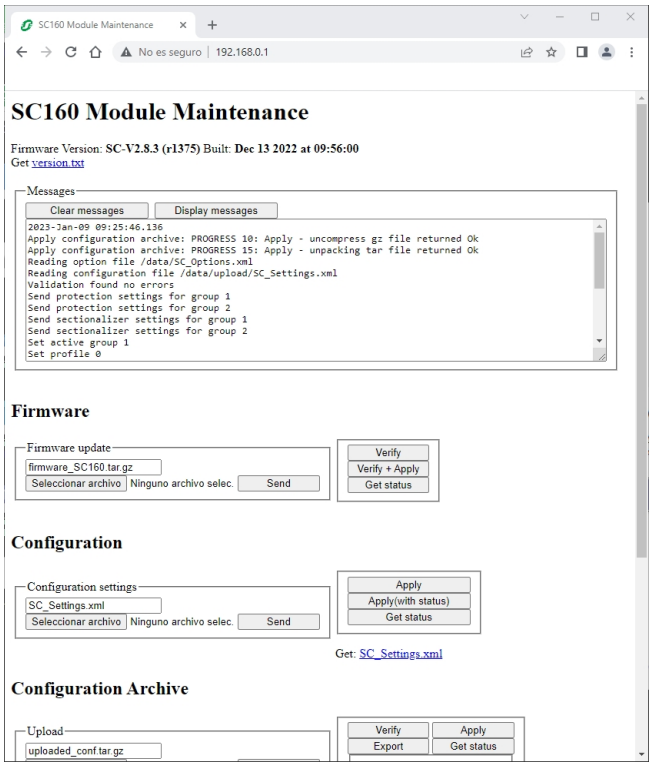
Changing the IP address of SC150/SC160 or LV150 Modules

The IP address of the computer has now been changed. The next step is to access the HTML pages of the SC150/SC160 or LV150 device in order to change the IP address. The procedure is the same for the two types of modules.

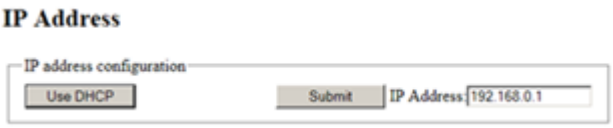
1. Connect the Ethernet cable between the PC and the local LAN Ethernet port of the module.
2. Start an internet browser.
3. Enter the IP address (http://192.168.10.10) in the **Address** field, then click **Ok**.

   NOTE: This access is not secure. So be careful, there is http and not https in the address field.

4. The HTML page of the SC150/SC160 or LV150 module is displayed.



5. Go down the page until you reach the **IP Address** option.
6. In the **IP address** field, enter the new IP address, depending on the type of module to configure, according to the following rules:



- SC150/SC160
  - 1st SC150/SC160: IP address=192.168.0.**1**
  - 2nd SC150/SC160: IP address=192.168.0.**2**
  - 3rd SC150/SC160: IP address=192.168.0.**3**
  - 4th SC150/SC160: IP address=192.168.0.**4**
  - Etc.
- LV150
  - 1st LV150: IP address=192.168.0.**31**
  - 2nd LV150: IP address=192.168.0.**32**
  - 3rd LV150: IP address=192.168.0.**33**

7. Click **Submit** to save the new IP address.
8. Switch off and switch on the power supply of the module to apply the new IP address (the IP address is only applied after restarting the unit).
9. The module is now ready to be installed on the HU250 LAN Ethernet network of the PowerLogic T300.
10. Repeat the same process for all the SC150/SC160 and LV150 modules.

NOTE: If the module is already configured and installed on the IP network of the HU250 with other LV150 and SC150/SC160 modules, it is necessary to disconnect the Ethernet jumpers connected to the adjacent modules and to restart the module before performing this operation of reconfiguring the IP address. Otherwise, the module may not respond to the request of connection to the IP address **http://192.168.10.10**.

Uploading Firmware to SC150/SC160 and LV150 Modules

Downloading of firmware to the T300 is normally done via the T300 Web server pages. However, it is also possible to download the firmware via direct access to HTML pages of the SC150/SC160 or LV150 modules. See below the method to perform this operation. This operation may be useful for maintenance or update of the SC150/SC160 or LV150 device without needing access to the Web server.

First, the IP address of the computer must be changed. Refer to the instructions described in chapter Changing the IP address of the PC.

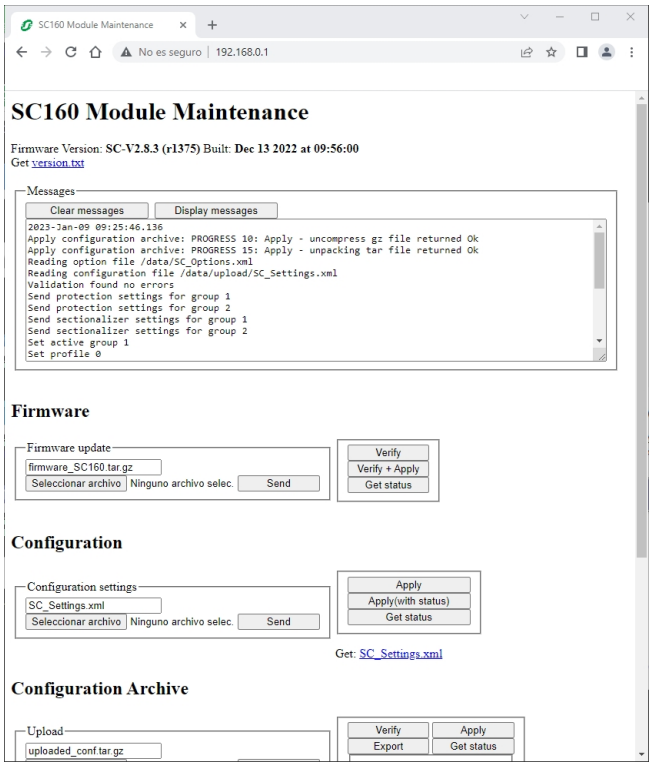
If it is not already done, refer to the previous chapter on Changing the IP address of SC150/SC160 and LV150, page 18 modules to configure the IP address of the modules you want to upgrade. If the SC150/SC160 and LV150 modules are received in a complete PowerLogic T300 enclosure, this operation has already been performed in the factory. In this case, there is no need to change the IP addresses of the modules.

The next step is to access the HTML pages of the SC150/SC160 or LV150 device to upload the new firmware:

1. With the Ethernet cable connected between the PC and the LAN Ethernet port of the module, start an Internet browser.
2. Define the IP address to be accessed, according to the position of the module in the PowerLogic T300 unit.
   - **SC150/SC160**
     - 1st SC150/SC160: IP address=192.168.0.1
     - 2nd SC150/SC160: IP address=192.168.0.2
     - 3rd SC150/SC160: IP address=192.168.0.3
     - 4th SC150/SC160: IP address=192.168.0.4
     - Etc.
   - **LV150**
     - 1st LV150: IP address=192.168.0.31
     - 2nd LV150: IP address=192.168.0.32
     - 3rd LV150: IP address=192.168.0.33
3. Enter the IP address in the **Address** field, then click **Ok**.

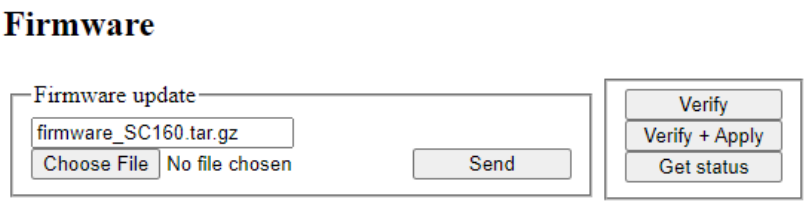
   NOTE: This access is not secure. So be careful, there is http and not https in the address field.

4. The HTML page of the module is displayed.



5. Go down the page until you reach the **Firmware** option.
6. In the **Firmware update** field, select the new firmware to be upgraded. The file to be uploaded has a tar.gz extension. You can select the file from its location on the hard disk.

   NOTE: To get the new version of the SC150/SC160 or LV150 firmware, please contact your local Schneider Electric engineering center.



7. Click **Send** to send the file to the device.
8. Click **Apply**, and the product will apply the file's content.
9. Wait for less than one minute until the device restarts. Once restarted, the status of the HU250 operating LED should be green. If this is not the case, refer to the Checking issues, page 65.
10. After the device has restarted, refresh the browser to check that the newly uploaded firmware version is indicated at the top of HTML pages.

11. The module is now updated.

    NOTE: The system is only temporarily busy during firmware uploading, and at the end of the process, the unit restarts.

    To avoid obtaining corrupted firmware on the unit, please respect the following instructions:

    - Make sure the firmware to upload corresponds to HU250.
    - Do not close the browser during the process until the restart of the unit.
    - Do not switch off the power supply until the device restarts.

      NOTE: If the firmware uploaded is detected as corrupted, the HU250 switches automatically to the previous one.

T300 Web Server Menu Overview

The T300 Web server is the local and remote user interface for consulting and monitoring T300 operating, maintenance, and application configuration data. Once the user name and password have been entered, all data in the HTML pages can be viewed simply by clicking on the links in the ribbon at the top of the screen.

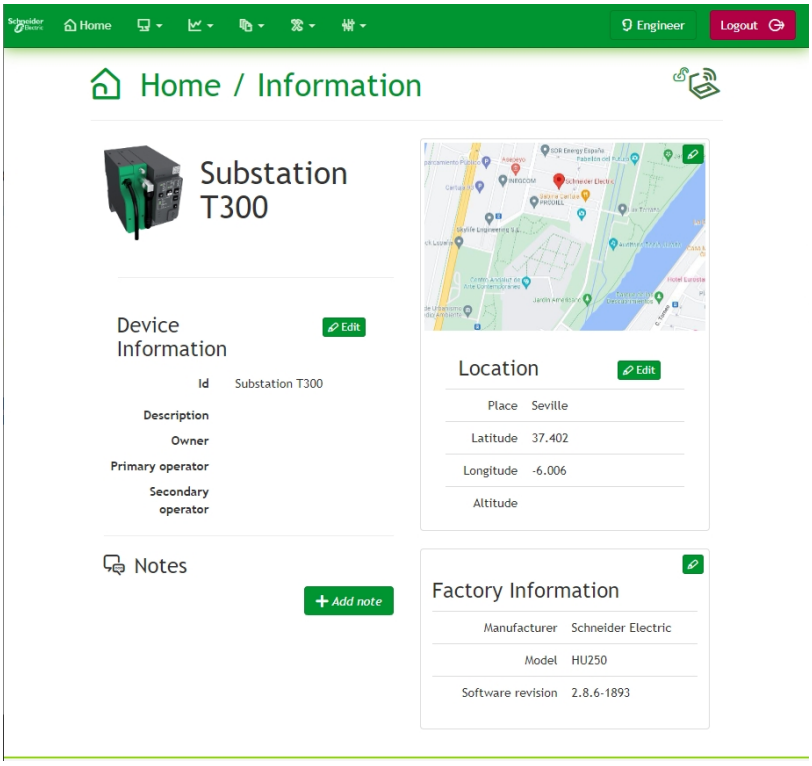
This ribbon contains five menus:

- Home
- Monitoring and Control
- MV/LV Measurements
- Diagnostics
- Maintenance

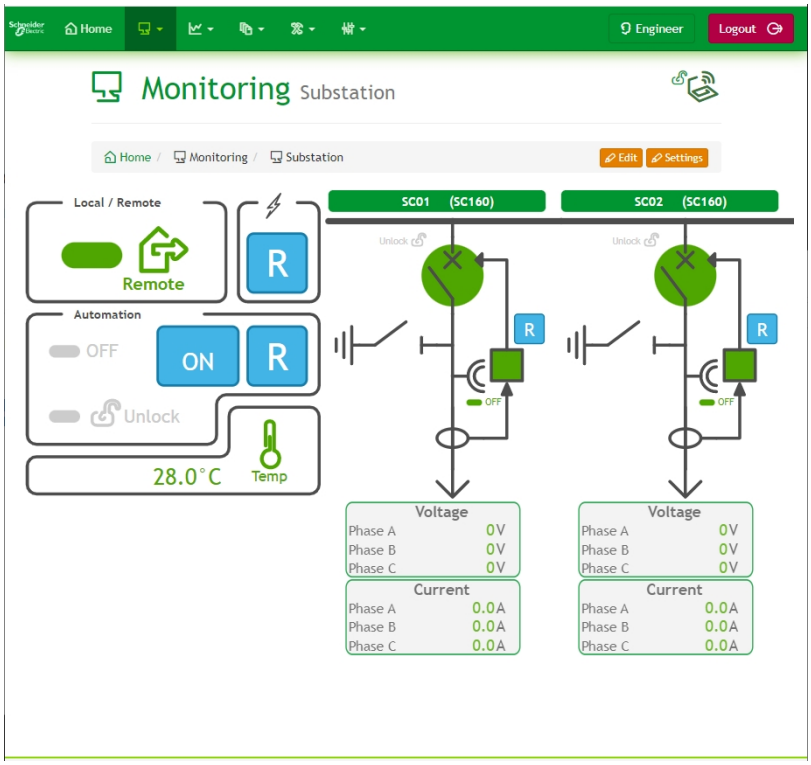
Home

The information on this page identifies the MV substation to which the user is connected.

- the substation GPS coordinates
- a location map created automatically and updated using the GPS data (if there is an Internet connection)
- the product ID with the option to add images
- notes added by the user.



Monitoring and Control



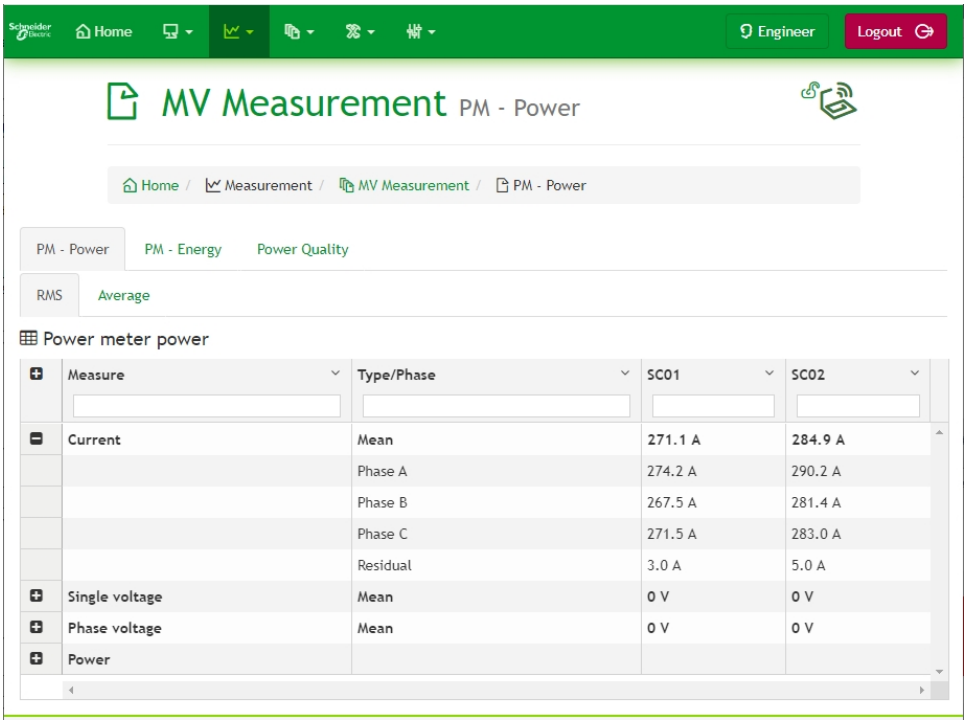
This menu is used to view the T300 status, monitor substation data, and control the breaking device:

- Graphical representation of the substation and switchgear with electrical symbols
- Display of T300 status in the form of a data point list with the values associated with each type (state, command data, analog data, setpoint values)
- Option to set command and setpoint data parameters manually from the Web server and to assign a specific preset value (for security purposes, each command must be confirmed by the user)
- Environmental and thermal connection condition monitoring in cubicles and substation (Alarm, Warning, Normal status management)

NOTE: The user can modify command data via the Web server:

- Via the Wi-Fi network only if the T300 is in local mode
- Via the LAN or WAN only if the T300 is in remote mode

MV/LV Measurements



This page is used to view the different measurements performed by the T300 (display of some measurements according to the options of the unit):

- Current measurements on each phase, residual current and mean current
- Average of the currents on each phase, the calculated or measured residual current and the average current
- Phase-to-neutral and phase-to-phase voltage measurements on each phase and indication of residual voltage and mean voltage measurements
- Average of the voltages on each phase, the calculated neutral voltage and the phase-to-neutral average voltage
- Active, reactive, and apparent power measurements on each phase
- Average of the active, reactive and apparent power on each phase and of the total power
- Power factor measurement on each phase
- Active, reactive, and apparent energy measurements on each phase
- Power quality measurement (statistics and counters for the voltage interruptions, sags, and swells on the MV network)
- Minimum and Maximum recorded for current averages, per day, week, month and year
- Harmonic distortions on each phase current and the average of the three phases
- Harmonic distortions on each phase voltage and the average of the three phases
- Harmonic magnitude 1 on each phase current
- Harmonic magnitude 1 on each phase voltage
- Harmonic 1 current and voltage on the average of the three phases
- Harmonic angle 1 on each phase current
- Harmonic angle 1 on each phase voltage

Diagnostics

This menu is used to view the data logs recorded in real time by the T300. Events are time-stamped with a 1 ms resolution.

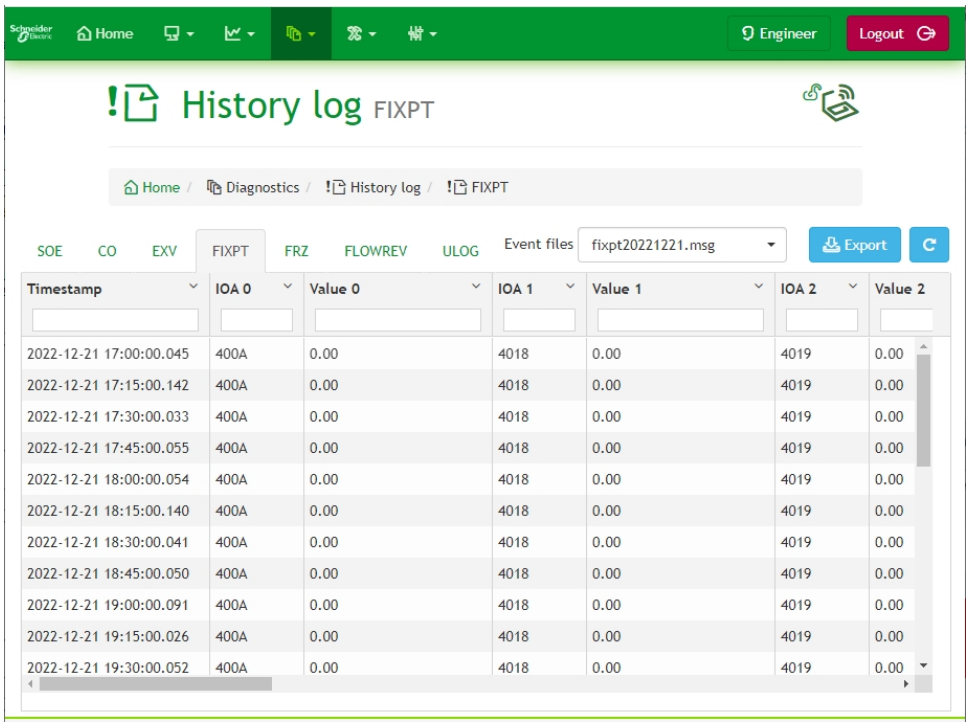
Recording of events: Data changes are recorded in log files according to the configuration.

The recording mode must be configured using the Easergy Builder configuration tool:

- It is possible to define up to 4 log files (Events).
- The size and name of each log file are configurable.
- Any data can be assigned to a log file.

NOTE: By default, Event, Measurement and Alarm logs are created, with a capacity of 2,000 events.

Log files can be downloaded locally or remotely. For all logs, when the storage capacity is reached, the most recent event erases the oldest event from the list.



Maintenance

This menu helps with maintenance of the T300 by supplying the relevant information or by allowing configuration of the standard RTU applications:

- **Users:** managing the roles and passwords associated with each user.
- **Clock:** Synchronization of the device date and time.
- **IP configuration:** Definition of the IP addresses of the LAN, WAN, and Wi-Fi networks or the T300 router function.
- **Physical port configuration:** Physical configuration of the Ethernet on HU250.
- **Modem configuration:** Configuration of the modem communication parameters, for the modems providing remote access, such as the 4G modem.
- **Firmware:** Information relating to the firmware for each module (version, date, and time) with the option to update it.

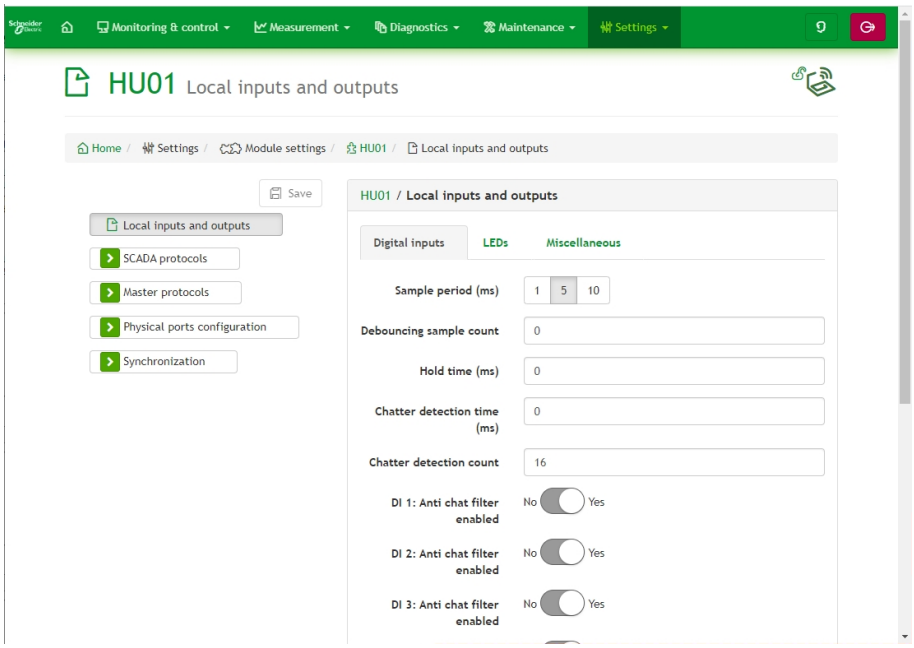
- **Configuration:** Information relating to the device configuration with the option to import/export the configuration in file format or saving/importing it into dedicated slot spaces in the device.
- **IEEE 802.15.4 network management:** (Option) Information relating to the IEEE 802.15.4 network that manages sensors to monitor the environmental and thermal conditions.

Settings

In the **Settings** window, you can access the pages dedicated to each T300 module and their configuration:

- HU250: Configuration of the HU250 module parameters

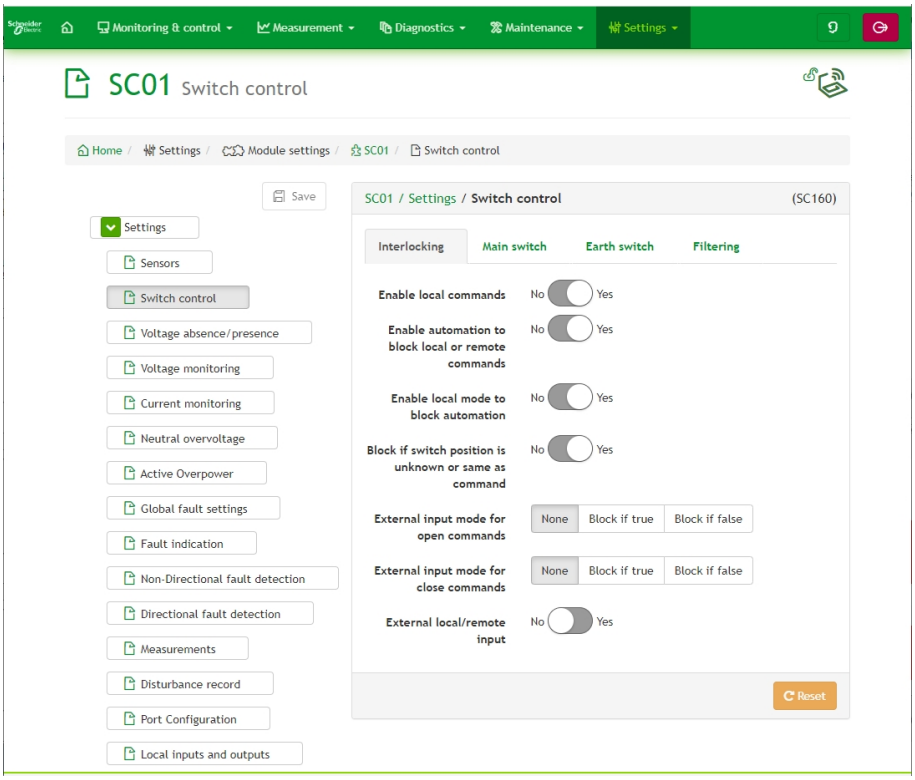
  Accessed via **HU01 Settings** page.



  - Local I/O
  - Automatic transfer switching (ATS)
  - Condition monitoring
  - Communication protocols
  - Communication ports and modems
  - Physical port configuration (for example, RS-485 for PS50 link, RS-232/485 modem box)
  - Time synchronization

- SC0x: Configuration of the parameters of each SC150 or SC160 module

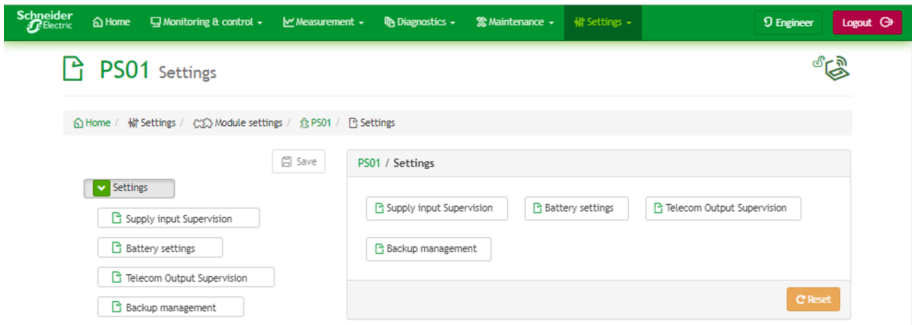
  Accessed via **SC01 Settings** page.



  - Current and voltage measurement sensors
  - Switch controls
  - Voltage presence/absence detection
  - Voltage monitoring
  - Active overpower
  - Fault current indication
  - Fault current detection
  - Tripping protection (on SC160 module only)
  - Cold Load Pick-up function (on SC160 module only)
  - Broken conductor detection
  - MV Measurements
  - MV Power quality
  - Disturbance record
  - Sectionalizer automation function
  - Port configuration
  - Local I/O: User LED customization

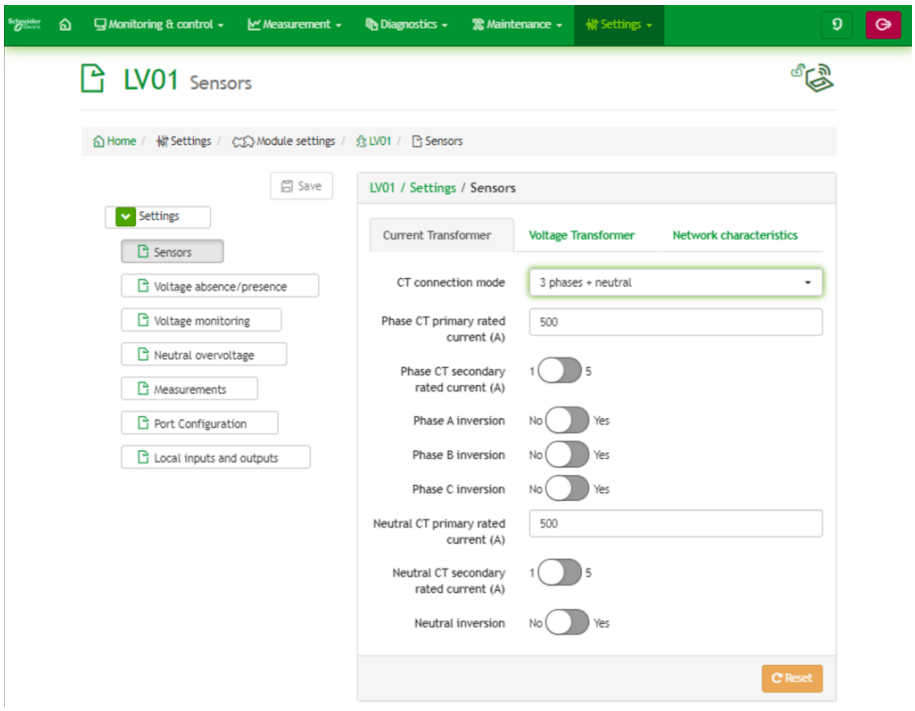
- PS50: Configuration of the parameters of each PS50 module:

  Accessed via **PS01 Settings** page.



  - Power supply input monitoring
  - Battery
  - Remote control order monitoring
  - Back-up power supply management
- LV0x: Configuration of the parameters of each LV150 module:

  Accessed via **LV01 Settings** page.



  - Current and voltage measurement sensors
  - LV Voltage monitoring
  - Broken conductor detection
  - LV Measurements
  - LV Power quality
  - Port configuration
  - Local I/O: User LED customization

Overview of Easergy Builder

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Example: Emergency Stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of anticipated transmission delays or failures of the link.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

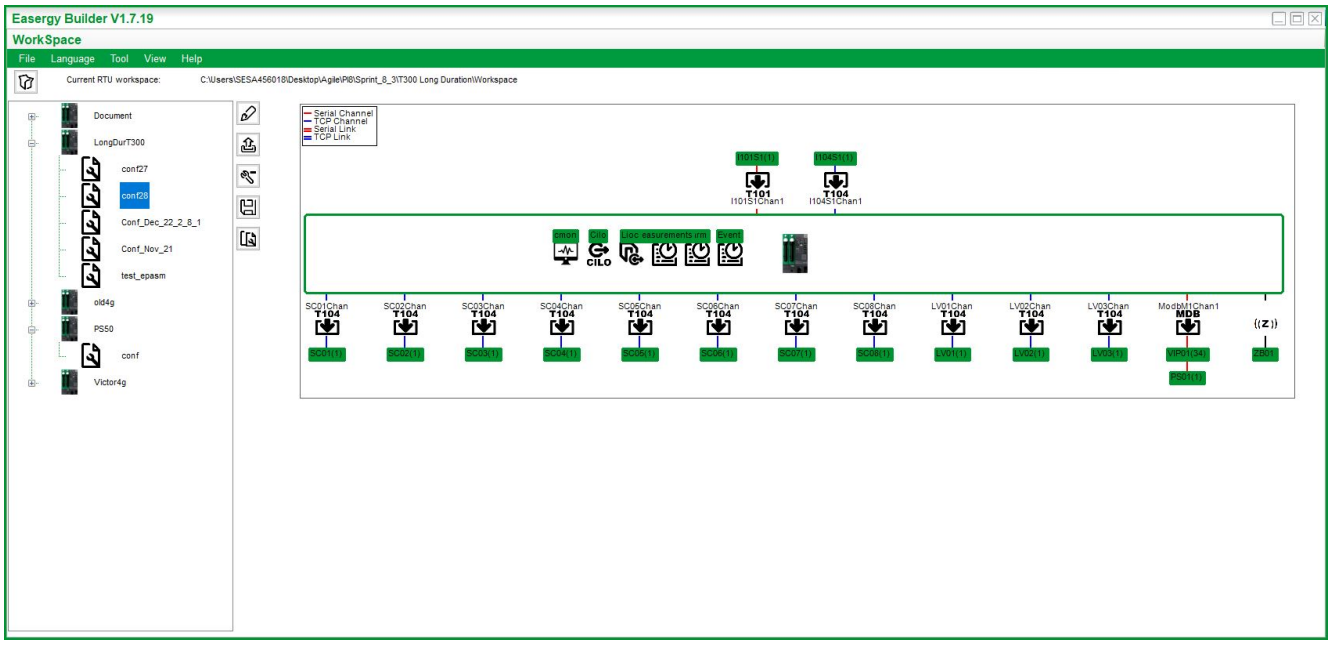
Easergy Builder is the dedicated PowerLogic T300 configuration tool for engineers to configure and customize advanced PowerLogic T300 functions that cannot be configured on the PowerLogic T300 Web server.

As defined in the previous chapter, Easergy Builder software must be installed on a computer. It is mainly an off-line tool that can be used without connection to the product, except for uploading existing PowerLogic T300 configuration or uploading a new configuration to the unit. Connection to the PowerLogic T300 RTU is required to upload a configuration to the unit. Connection to the unit can be established via WI-FI or wired connection or remotely via the WAN with secure connection (follow the instructions in the chapter 3 to initialize the Wi-Fi, page 11 or Ethernet, page 13 connection to the unit before using Easergy Builder).

NOTE: A project produced with Easergy Builder is saved to a computer hard disk so that it can be modified off-line (i.e. without another connection to the product). Easergy Builder includes two separate interfaces:

- **WorkSpace:**

  The WorkSpace is the main configuration page for the user. It displays a tree of all existing PowerLogic T300 RTU configurations and offers as a diagram the architecture of each RTU application (i.e. the architecture of the different functional or communication blocks (called devices) which are included in the configuration).



The default folder where the Workspace is saved is as follows: `C:\Users\myname\Documents\Workspace1`. To download an existing Workspace, use the **File**> **Load WorkSpace** menu option.

Each RTU configuration of the **WorkSpace:** includes the following general settings:

- IP parameters for LAN, WAN and Wi-Fi access (IP address, time delays, etc.). These IP addresses are used to transfer configuration files to the unit.
- Slot (modem) to be used for communication (RS232/485, 3G or 4G).

- **RTU configuration:**

  By clicking on the RTU configuration name on the left-hand panel of the **WorkSpace**, the window changes to display details about the RTU configuration.

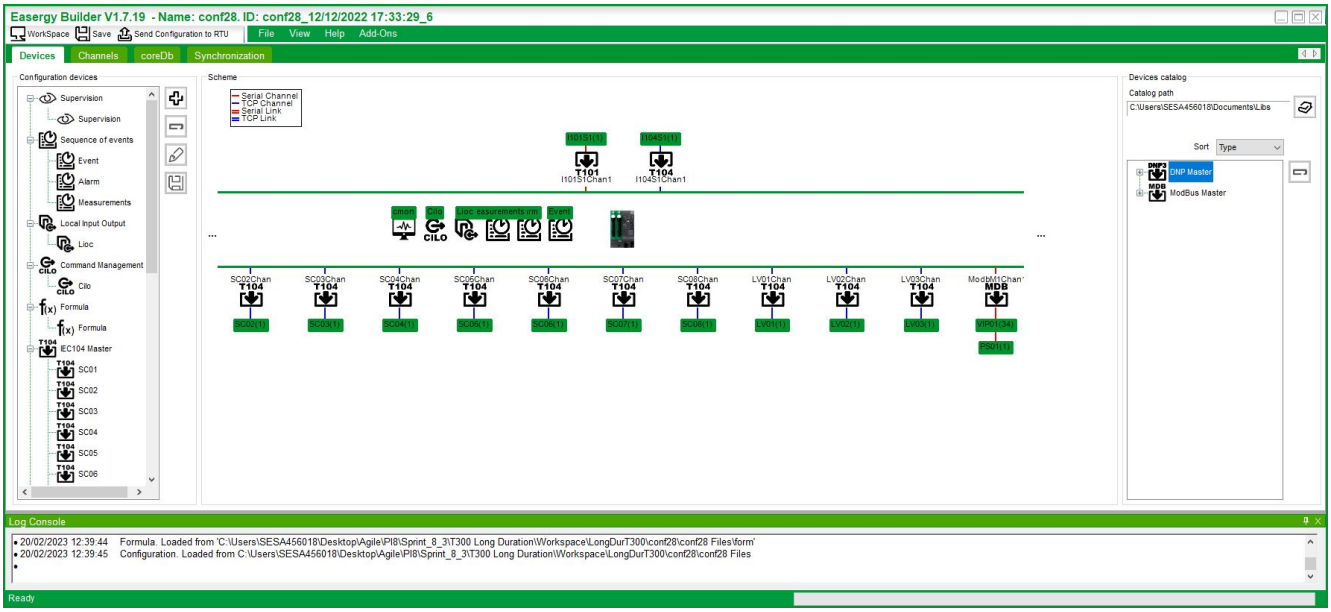
  Each of the following types of functional blocks (named devices or bin controllers) can be included in a PowerLogic T300 RTU configuration:

  - Supervision
  - SOE (Sequence of Evenets)
  - Local acquisition (input/output)
  - Command Management (Cilo)
  - Formula
  - Client/Server Protocol (IEC60870-5-104, IEC60870-5-101, DNP3)
  - Modbus Client protocol
  - IsaGRAF project interface

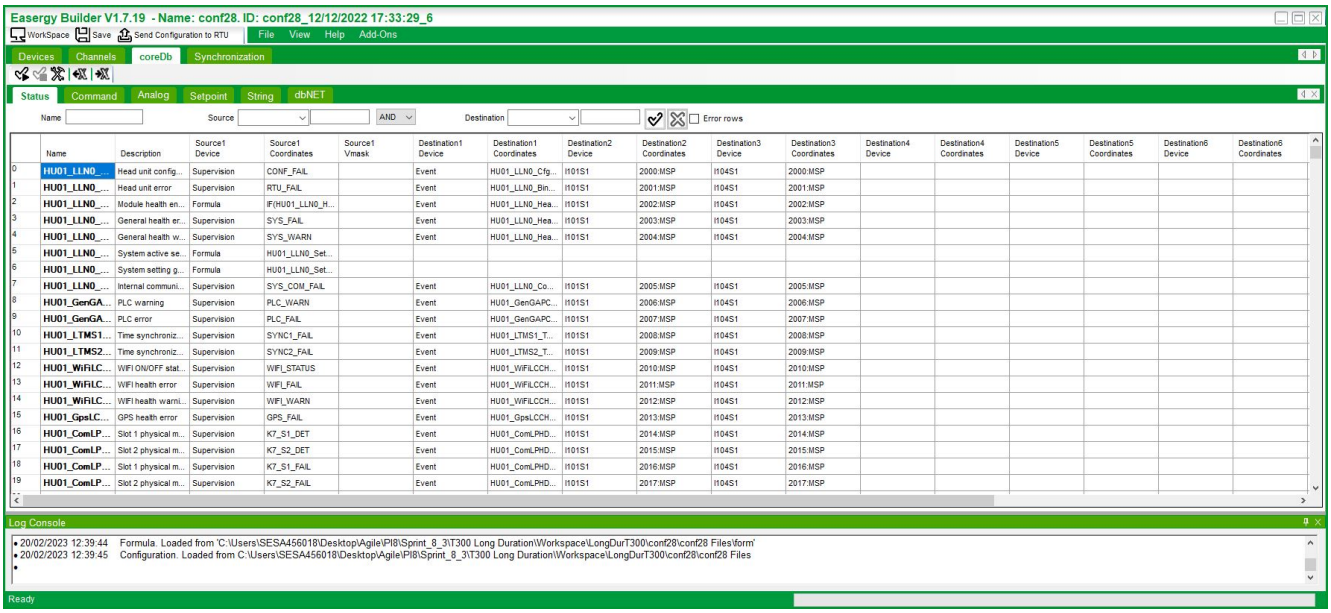
Clicking on a device name gives access to the device configuration details.

To personalize the application, this RTU configuration interface provides 4 pages of settings:

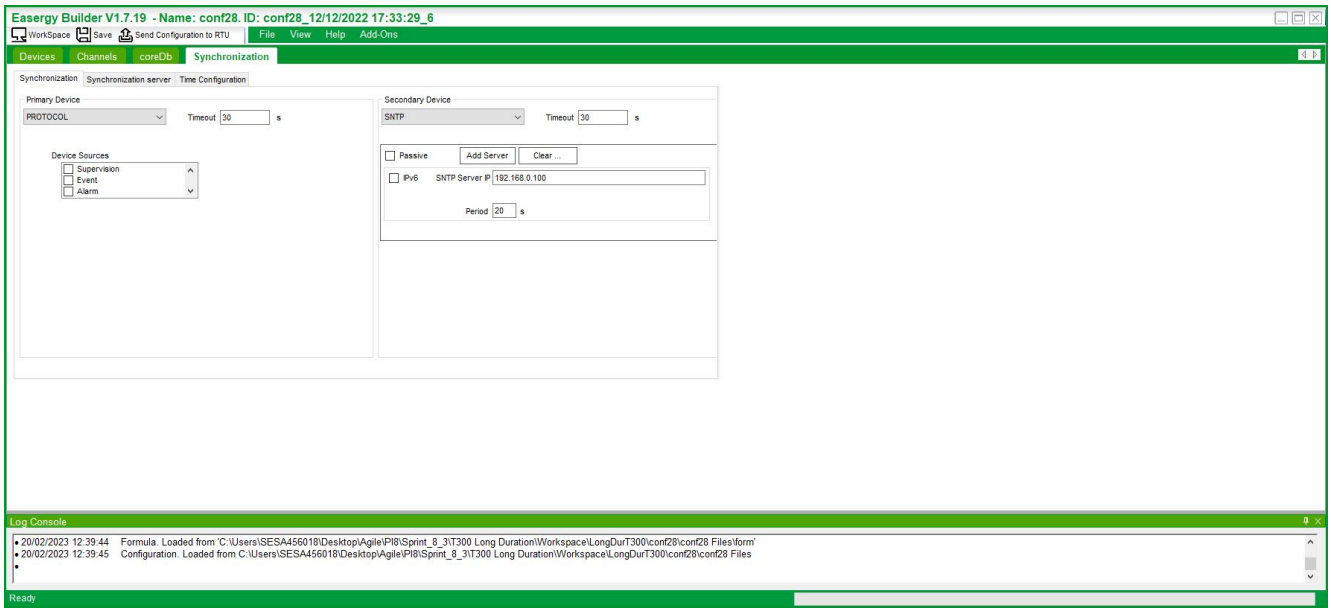
- **Devices** page: Used to define and adjust settings with one device for each functional or communication block. These settings can also be viewed or changed using thePowerLogic T300 Web pages.



- **Channels**: One communication channel for each internal or external communication link. A channel is attached to a protocol device. These settings can also be viewed or changed using the PowerLogic T300 Web pages.
- **CoreDb**: Real-time database including, for each data object, labels and mapping, sources and destinations. These definitions are used to build the Monitoring and Control Web pages for the RTU but note that related settings can only be changed in Easergy Builder.



- **Synchronization**: Time synchronization settings.



Working with Easergy Builder

⚠WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Example: Emergency Stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of anticipated transmission delays or failures of the link.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: This operation should be performed only by an engineer or an expert who has sufficient product skills and knowledge of the Easergy Builder configuration tool.

Once the unit has been started and the connection established, the PowerLogic T300 configuration must be customized to make it correspond to the project requirements. To do this, the configuration must first be uploaded to the Easergy Builder tool.

There are two possibilities for importing a T300 configuration into Easergy Builder.

The first option is to download the existing configuration from the PowerLogic T300 unit when connected to it.

The second option is by importing a `*.tar.gz` configuration file.

How to Import a Configuration from a PowerLogic T300 Connected to Easergy Builder

In Easergy Builder, importing the configuration from the PowerLogic T300 RTU is made up of two different steps:

- Creating a new RTU device
- Importing the RTU parameters (PowerLogic T300 configuration).

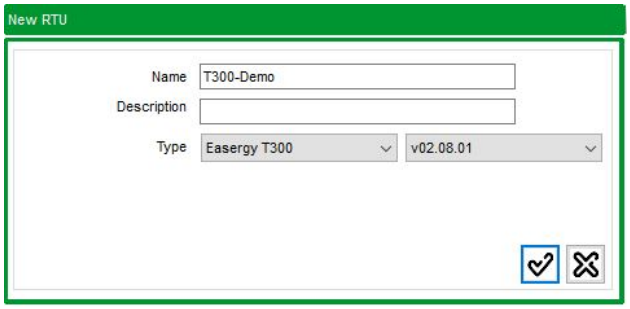
These two processes are described in detail in the following instructions:

Creating a new RTU Device

1. Start Easergy Builder.

2. You must create a new RTU device in the **WorkSpace** before uploading a configuration. In the **WorkSpace**, click the **+** button **Add RTU**.

3. A **New RTU** window appears. Enter the following settings and then click **Ok**:



- **Name** of PowerLogic T300 unit (e.g.: T300_Demo)
- **Type** of device: PowerLogic T300
- Version of T300 firmware: The parameters displayed and configured in Easergy Builder for customizing the configuration will correspond to the T300 firmware version defined in this field and also to the corresponding functions and possibilities of the product:
  - v1.0: Configure if the HU250 firmware version is less than 1.2.
  - v1.2: Configure if the HU250 firmware version is greater than or equal to 1.2.

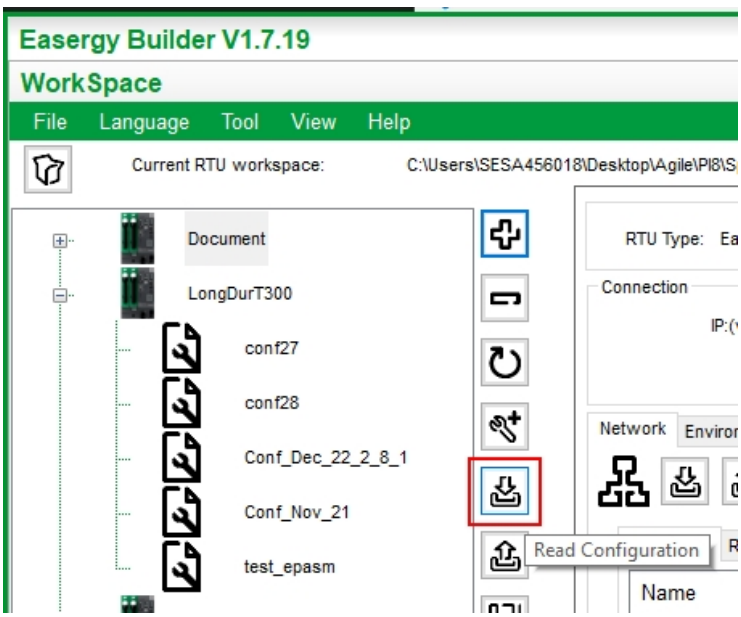
4. The new settings are displayed in the HU250 **WorkSpace**. In the **Connection** section, enter the IP address of the PowerLogic T300 unit according to the type of connection:

- Wi-Fi: IP = 192.168.2.254
- Ethernet port (LAN): IP = 192.168.0.254.

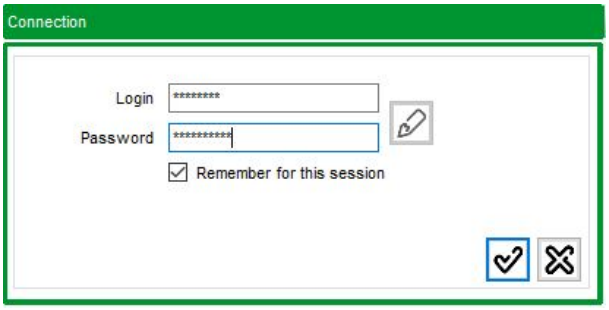
Importing RTU Parameters

1. If not already done, initialize the connection to the PowerLogic T300 RTU via Wi-Fi or Ethernet access (refer to First Local Connection to T300 RTU, page 10).

2. Click the **Read Configuration** button to start importing the PowerLogic T300 configuration to Easergy Builder.



3. Enter the login and the password in the connection window and click **OK**.

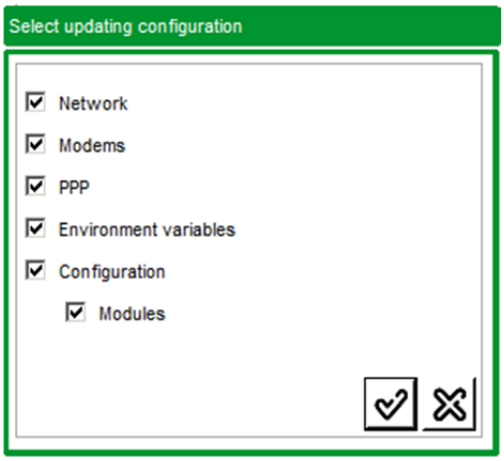


NOTE: The default users are the same as those used for Web Server access: only Engineers have sufficient rights to download the T300 configuration to Easergy Builder.

USERS	ENGINEER
Login	Engineer
Password	Engineer1!

NOTE: For security requirements, all the passwords thave to be changed during commissioning.

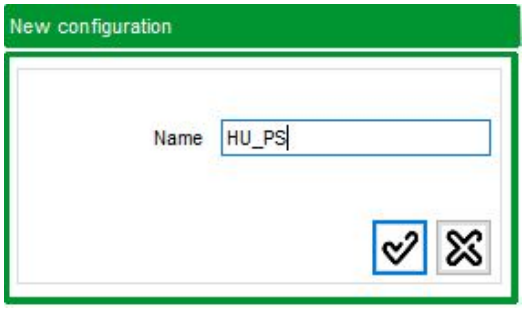
4. Select the parameters to be included in the configuration to be imported from the unit:



- Network parameters by checking the **Network** option
- Modems parameters by checking the **Modems** option
- Remote PPP connections parameters (2G, 3G, 4G) by checking the **PPP** option
- Environment variables parameters by checking the **Environment Variables** option
- General configuration parameters by checking the **Configuration** option
- Module parameters (option checked systematically).

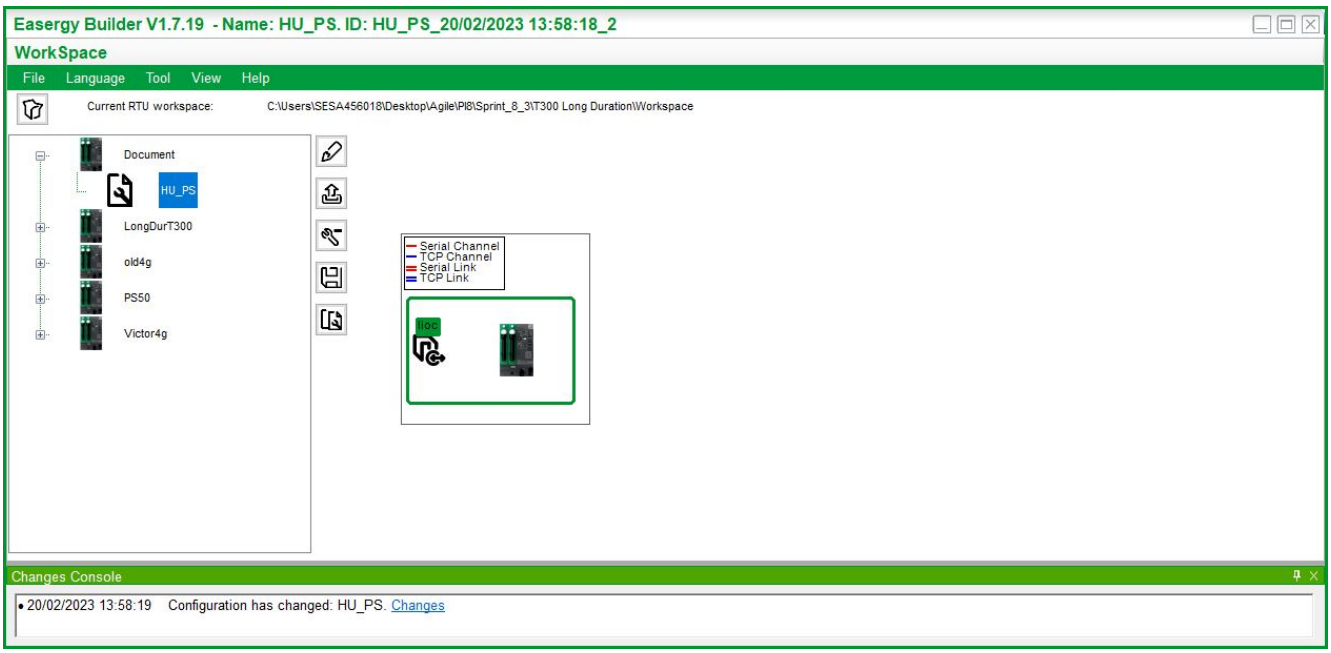
NOTE: For initial creation of configuration, it is recommended to check all available default options.

5. Give a name to the new configuration that will be created after the download.



6. The exchange between Easergy Builder and the PowerLogic T300 RTU starts. After a few seconds, the downloading process is complete and the **WorkSpace** displays a diagram with all the items of this RTU configuration.

7. The PowerLogic T300 configuration is now imported into Easergy Builder.

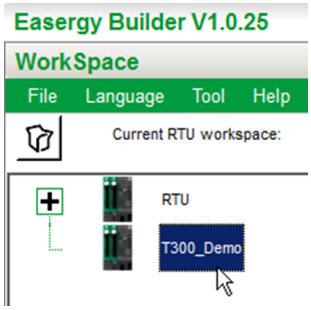


This configuration can be customized, page 41.

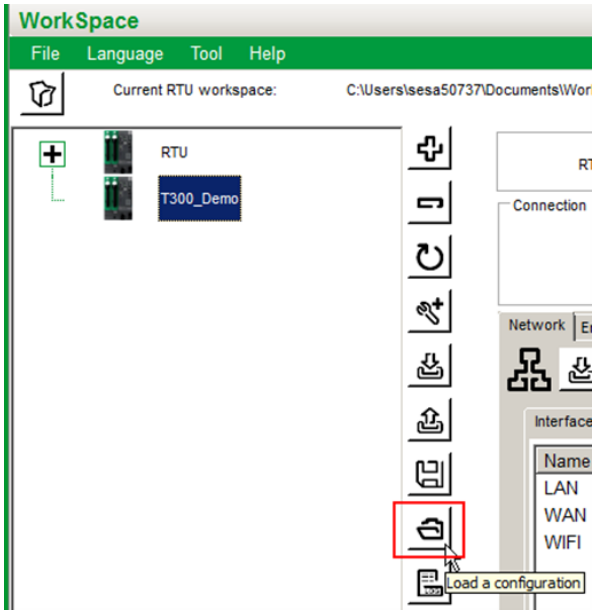
How to Import a Saved Configuration into Easergy Builder

Follow these instructions to import a `*.tar.gz` configuration file into Easergy Builder:

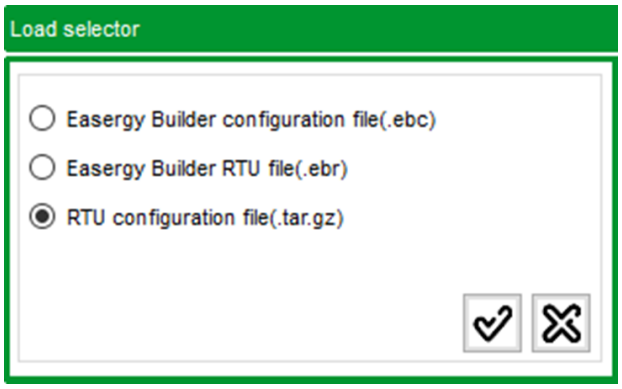
1. Start Easergy Builder.
2. In the **Workspace** interface, click the RTU name for which you want to download the configuration.



3. Click the **Load a configuration** button.

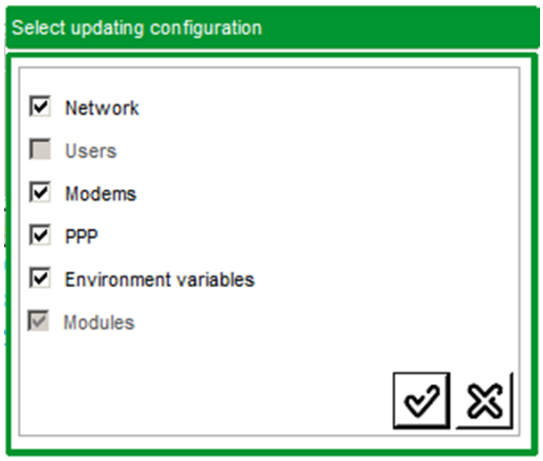


4. A window **Load selector** appears for choosing the type of format for the file to be imported. Click on the choice **RTU configuration file (tar.gz)**.



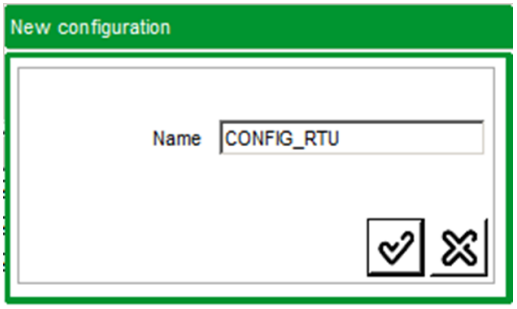
5. When prompted on screen, select the location of the configuration file (`*.tar.gz`) on your PC, to import into Easergy Builder.

6. A window appears asking to choose what to import in the configuration. Select the options you want and confirm:
   - **Network**: Network parameters (LAN, WAN, Wi-Fi)
   - **Modems**: Modem parameters
   - **PPP**: PPP parameters (IP addresses)
   - **Environment variables**: HTTPS, SSH ports



NOTE: These settings are saved in the RTU configuration. By choosing to import them, the existing settings of the RTU configuration will be overwritten by the new settings imported.

7. A window appears asking to define a name of the configuration to download. Define the name and confirm. The configuration is then created in the **Workspace** interface.



8. By clicking the name of the created configuration, a diagram is displayed in the right part of the **Workspace** interface showing all the devices of the newly imported configuration.
9. The RTU configuration is now imported in Easergy Builder. The next step is to modify and customize this T300 configuration, page 41.

Customizing a PowerLogic T300 Configuration in Easergy Builder

NOTE: The operation described below should only be performed by an engineer or an expert who has sufficient product skills and knowledge of the Easergy Builder configuration tool.

Before customizing a PowerLogic T300 configuration, it must be downloaded to the Easergy Builder tool (for more details, refer to How to Import a Configuration from a PowerLogic T300 Connected to Easergy Builder, page 34).

From a default PowerLogic T300 configuration, customize the following settings to correspond to the customer's needs and application:

- Sequence Of Events (SOE)
- Protocol mapping
- Free LEDs on HU250 front panel (HMI)
- External lamps

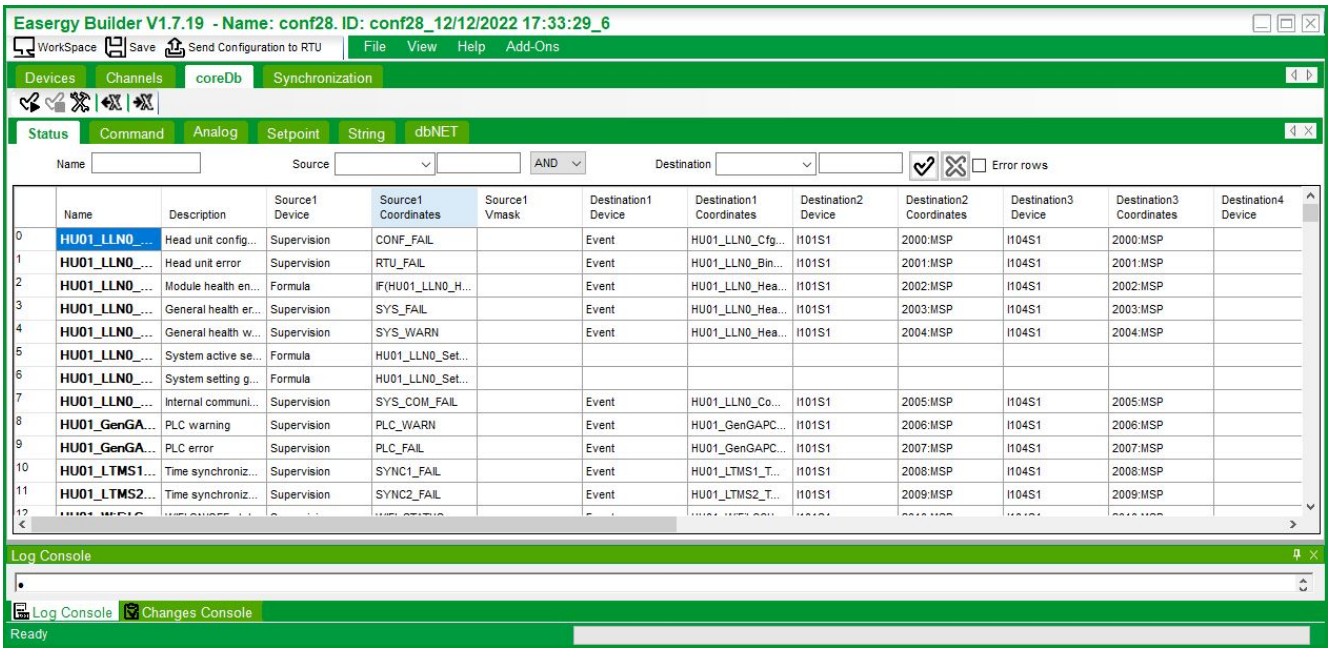
Other settings that correspond to the application can be directly changed on the PowerLogic T300 Web Server.

How to Create Communication Protocol Mapping

This chapter details how to create mapping for data points depending on the type of protocol used.

1. From the RTU configuration interface on Easergy Builder, click the **CoreDb** tab to enter the PowerLogic T300 database view. Five spreadsheet views are displayed. The first four tabs are related to types of data points included in the database.

Name	Description
Status	Integer type data points that can be sent to SCADA or an event log. Typically 1 or 2 bit status, or 32-bit counters.
Command	Integer commands typically received from SCADA or Web pages.
Analog	Floating data points that can be sent to SCADA either as integers or floating-point numbers.
Setpoint	Analog commands typically received from SCADA or Web pages.
dbNET	**dbNET** enables multiple PowerLogic T300 RTUs to share their databases within an IP network.



Basic columns for types of data points in the first four spreadsheets:

Field	Description
Name	Unique name used as database key . Do not change.
Description	Character string that appears on the monitoring and control Web pages.
Source1 Device	Name of the physical or logical device that the data comes from.
Source1 Coordinates	Text string that identifies the point type and number within the source device.
Source1 Vmask	Bit mask to select required value from the source.
Destination N Device	Name of a physical or logical device that data is sent to.
Destination N Coordinates	Text string that identifies the point type and number within the destination device.

NOTICE

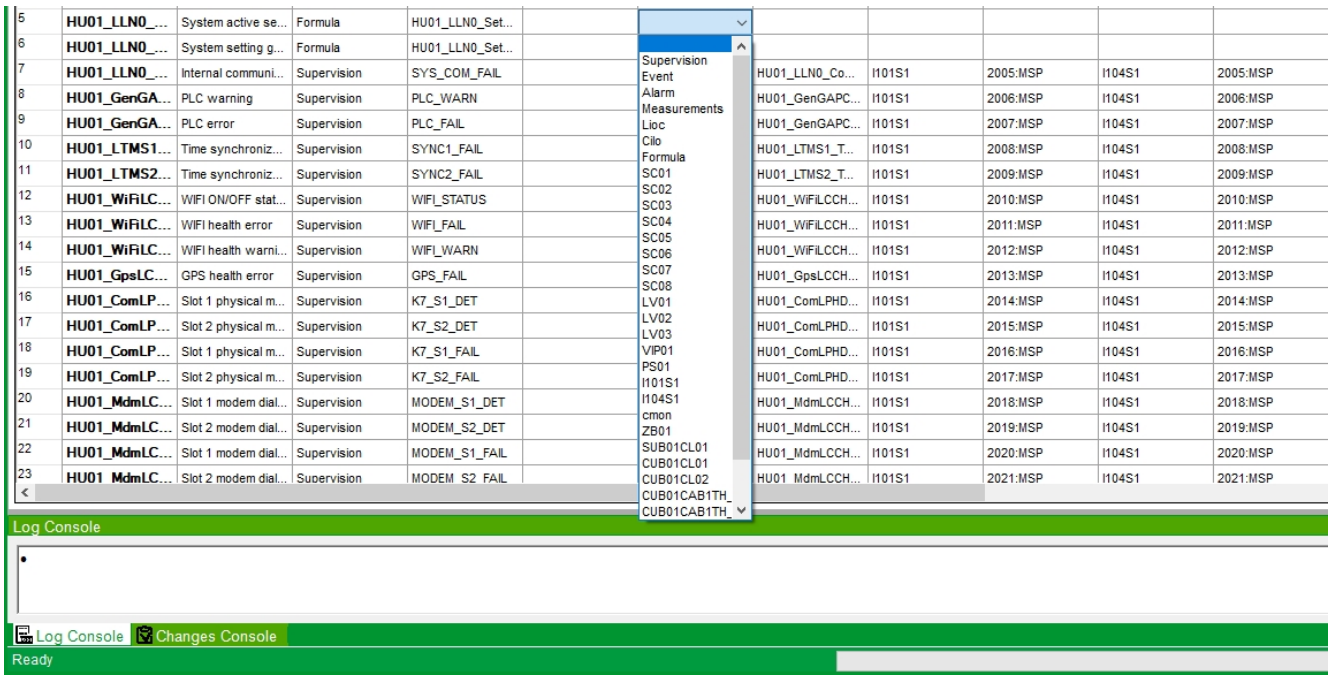
HAZARD OF UNINTENDED EQUIPMENT OPERATION

Do not change existing parameters set in the **CoreDb** tab. Only the **Description** field can be changed.

Failure to follow these instructions can result in equipment damage.

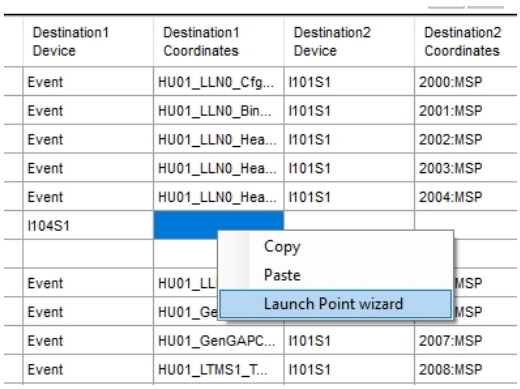
Other columns can be used to set initial values for analog scaling factors, for example.

2. In the **CoreDb** page, click the tab that corresponds to the type of point you want to configure (**Status**, **Command**, **Analog** or **Setpoint**).
3. Each point in the spreadsheet has zero or one source and zero or more destinations. Do not change the existing sources and destinations which are already defined.
4. **Command** or **Setpoint**: click the cell of the first empty **Source n device** available.
5. **Status** or **Analog**: click the cell of the first empty **Destination n device** available. For **Status**,**n** can be set from 1 to 4.
6. Select the **Device** in the proposed list corresponding to the protocol server instance which is to be used for the transmission of this point status to SCADA. For example:
   - **I101S1**: IEC60870-5-101
   - **I104S1**: IEC60870-5-104
   - Etc.

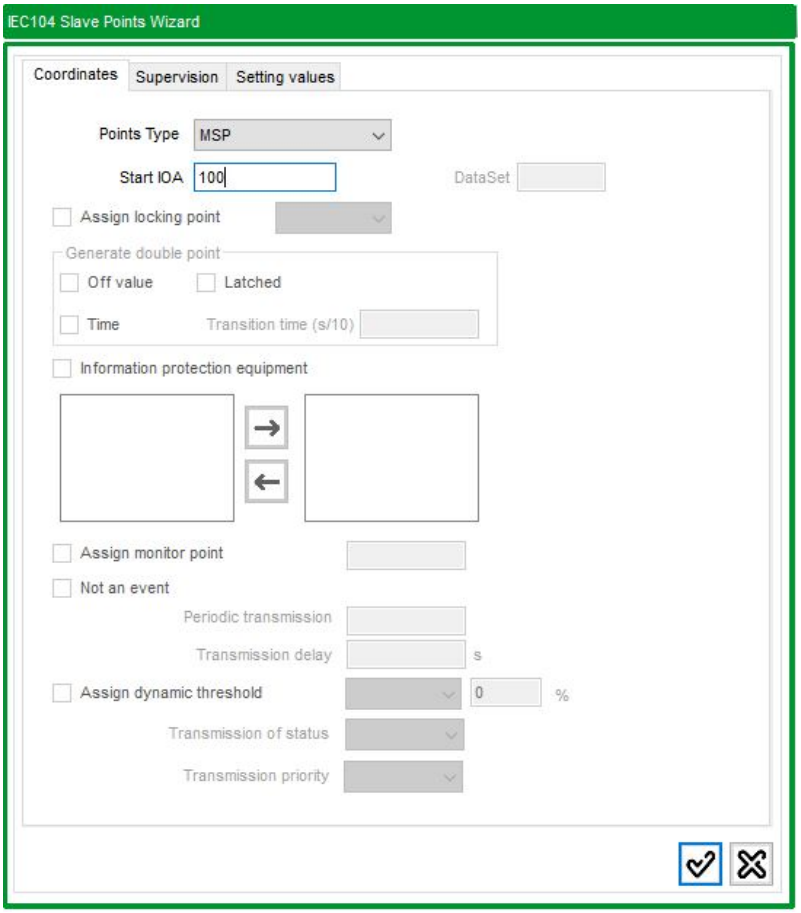


NOTE: The list of proposed devices depends on the communication protocols and channels already defined in the RTU configuration.

7. Right-click **Destination n coordinates** or **Source n coordinates** (where **n** is equal to the same number as the **Destination** or **Source device**).
8. Select **Launch Point Wizard**.



9. A window containing configuration information for the **Destination** or **Source Coordinates** is displayed. The type of configuration information depends on the type of protocol used.

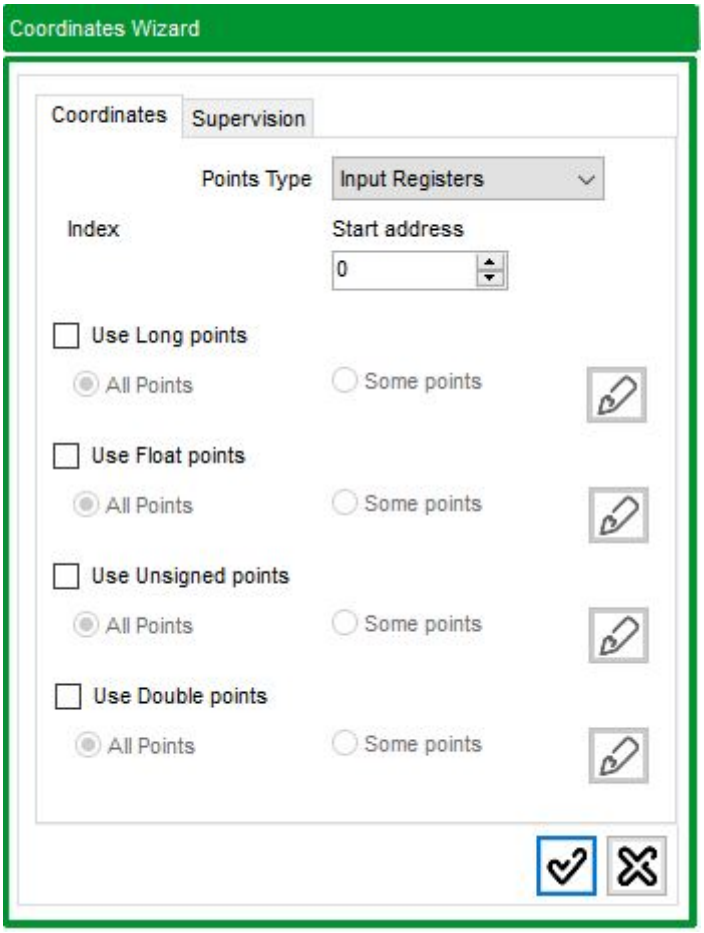


Use the following table to define settings:

DNP3 setting		
Setting	**Description**	**Comment**
Index	Index associated with the point. Select a value between 0 and 65535.	Unique value for each point index in decimal value (e.g. 1)
Type	Object type of the point	**OB01:** digital inputs **OB03:** double digital inputs **OB10:** digital output status **OB12:** digital outputs/commands **OB20:** counters **OB21:** frozen counters **OB30:** analog inputs **OB40:** analog output status **OB41:** analog outputs/commands.
Class Mask	Class number	**Class 0:** For static data (does not generate events). **Class 1 to 3**: for dynamic data (changing events).

IEC60870-5-101/IEC60870-5-104 setting		
Setting	**Description**	**Comment**
Point type	Point type identifier	• **For Input information:** **MSP**: Single-Point information **MDP**: Double-Point Information **MST**: Step position information **MBO**: Bit string of 32 bits **MMEA**: Measured value, normalized value **MMEB**: Measured value, scaled value **MMEC**: Measured value, short floating-point number **MIT**: Integrated totals. • **For Commands** **CSC**: Single command **CDC**: Double command **CRC**: Regulating step command **CSEA**: Set-point command, normalized value **CSEB**: Set-point command, scaled value **CSEC**: Set-point command, short floating-point number **CBO**: Bit string of 32 bits.
Start IOA	Point address (select a value from 1 to 65535)	IOA = Information Object Address. Unique value for each point index in decimal value (for example,. 1).

MODBUS setting		
Setting	**Description**	**Comment**
Points type	Function code to be used	**Coil status:** n output bits reading (function code: 01). **Input status:** n input bits reading (function code: 02). **Input Registers:** n input words reading (function code: 04). **Holding registers:** n output words reading (function code: 03).
Start address	Register start address	Initial register from which data is to be read.
Use Long points	Use of Long points type	Options to define the data format to be used, for all the points or partially by defining the concerned points. **NOTE:** These options are available only for Registers functions (function codes: 03 and 04)
Use Float points	Use of Float points type	
Use Unsigned points	Use of Unsigned points type	
Use Double points	Use of Double points type	



For more information about how to configure protocols, consult the user manual available for each protocol.

Refer to the following table for correspondence between coordinate types to be configured and the type of object defined on SCADA:

Point type correspondence					
SCADA object type	**CoreDb Type**	**IEC60870-5-101/ 104**	**Modbus type**	**Modbus format**	**DNP3**
Digital input	Status	MSP	IS		OB01
Double digital input	Status	MDP	IS		OB03
Counter	Status	MIT	IR	:U	OB20
Digital output	Command	CSC	CS		OB12
Double digital output	Command	CDC	CS		OB12
Integer command	Command	CSEC	HR		OB41
Counter preset	Command	CSEC	HR	:L	OB41
Analog input	Analog	MMEC	IR		OB30
Analog output	Set-point	CSEC	HR	:F	OB41
Boolean setting	Set-point	CSC	CS		OB12
Integer setting	Set-point	CSEC	HR	:L	OB41
Float setting	Set-point	CSEC	HR	:F	OB41

NOTE: Coordinates are dependent on the protocol being used.

As shown in the previous tables, IEC and DNP3 have their own specific coordinate formats. Once defined in the **CoreDb**, formats are as follows:

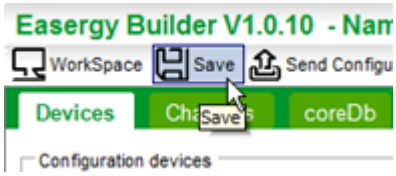
- DNP3: `<point index>:<object type>:<class number>` (for example, **`1:OB01:0`**

- IEC60870-5-101/IEC60870-5-104: `<Start IOA>:<point type>` (for example, **`00001:MSP`**)

For a complete list of all data points included in the **CoreDb** and their correspondence with SCADA object types, consult the *T300 User Manual (NT00378)*. For additional information, consult user manuals dedicated to each protocol.

Destination1 Device	Destination1 Coordinates
Dnp3S1	1:OB01:0
I104S1	00001:MSP

10. Repeat for all data points of the **CoreDb**. You must include the protocol address.
11. Save all changes by clicking on the **Save** button at the top of the RTU configuration page.



Communication protocol mapping is now completed.

How to Create a Sequence of Events (SOE)

An **Event** device is automatically created during device configuration in default PowerLogic T300 configurations. This **Event** device corresponds to default use. It includes some of thePowerLogic T300 data points that to integrate the application.

In the event of a signal change, data points are configured to record related changes in an **Event** file containing specific predefined labels for each state or measurement unit.

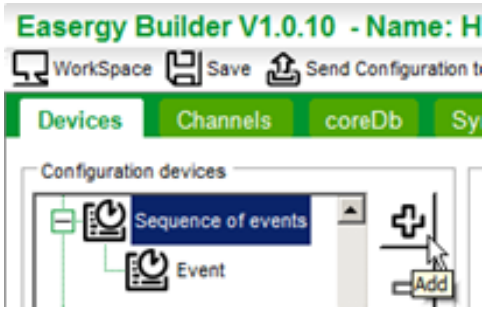
All corresponding settings are made to parameters of the SOE device and to the CoreDb spreadsheet.

The next sections in this chapter describe how to:

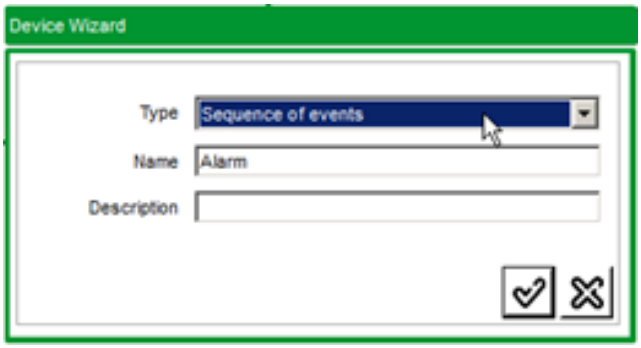
- Create new SOE devices
- Change default settings
- Add or delete data points

Creating a New SOE Device

1. In the RTU configuration interface, select the **Sequence of events** device in the left-hand panel and then click the **+** button.



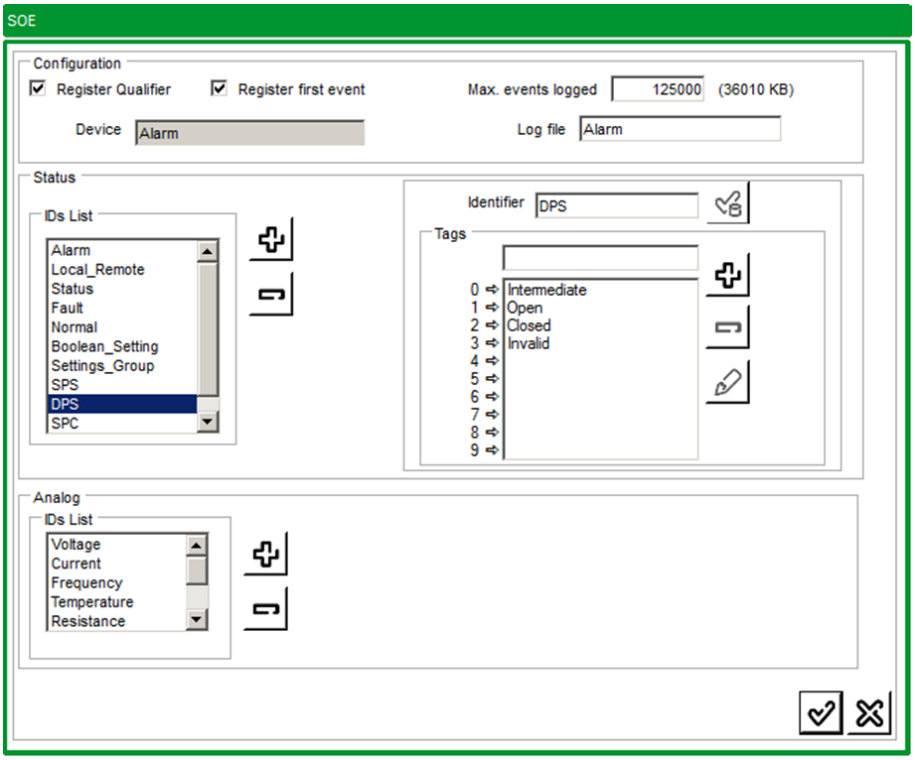
2. In the **Device Wizard** window, select the **Sequence of events** type and name the **Event** file you want to create (for example, **Alarm**). Click **Ok**.



A new **Alarm** file is created in the **SOE** device.

3. To enter SOE file settings, double-click the **Alarm** device.

4. A new **SOE** file screen is displayed. If required, change default settings such as **Log file** name and **Max. events logged** in the **Configuration** pane.



5. Two ID lists are defined by default in the **Status** and **Analog** panes, Each ID corresponds to an identifier for a list of strings used to format information related to logged output.

   ID lists differ between **Status** and **Analog** panes:

   - **Status**: used to set up values associated with logical points to make them more descriptive, with customized labels for each status. These labels are displayed in the log file and **Web server** page. By selecting an item in the ID list, tags display with specific label values of a logical point. Change existing labels using the **Modify** button and create new IDs and associated labels by clicking on the **+** button.
   - **Analog**: used to set up the unit which is transmitted. It is associated with an analog value and displayed in the log file and **Web server** page. By selecting an item in the ID list, tags appear on screen with specific labels corresponding to the unit of the analog point. Change existing labels if necessary and create new IDs and associated labels by clicking on the **+** button.

6. Once IDs and associated tags are modified or created, click the **Ok** button to take changes in the **SOE** file into account.

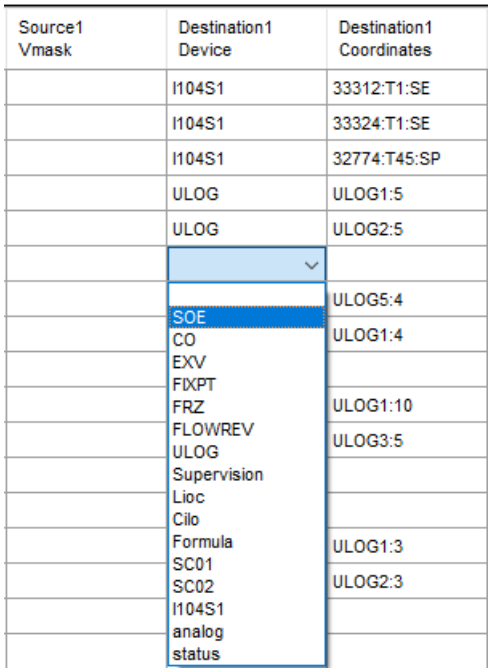
Activating an Event in the CoreDB

This chapter describes in detail how to configure the use of events for a point in CoreDb spreadsheet.

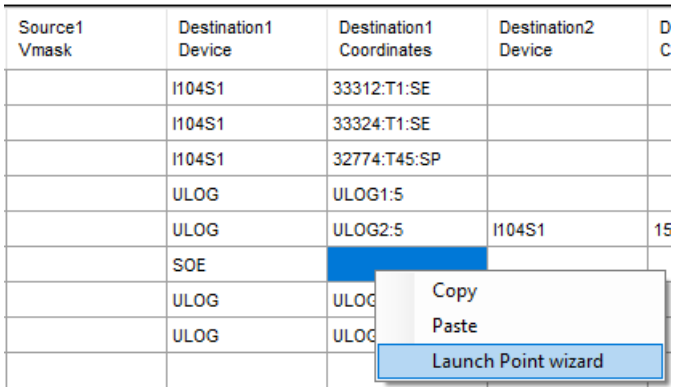
1. On the CoreDb page, click the tab corresponding to the type of point, **Status**, **Command**, **Analog** or **Set-point** you want to configure.
2. Each point in the spreadsheet has zero or one source, and zero or more destinations. Do not change the destinations that have already been defined. Click the cell of the first empty **Destination n device** available (For **Status**, set n to a value between 1 and 4).
3. Select the **Device** in the proposed list that corresponds to the name of the **Event** file you want to associate with this point. For instance, **Event** or the name of the new **Event** file you have created in the previous procedure.

   NOTE: The filename determines the labels that will be associated with an event. Also note that changes in given data may be tracked in several SOE devices if several destinations are defined.

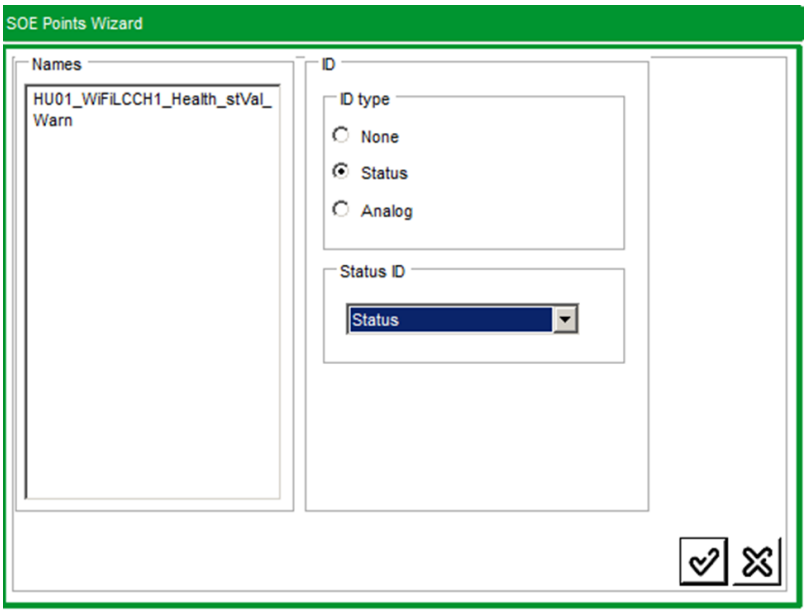
4. Right-click **Destination n coordinates** (where n is identical to the value defined in the **Destination device**).



5. Select **Launch Point Wizard**.



6. An **SOE Points Wizard** window displays with information to be configured for coordinates:



SOE Points Wizard		
Setting	**Description**	**Comment**
Names	Label used as event name for the point value change. This label is indicated in the Event file and displayed in the **Web server**.	By default, the point name is automatically proposed as the event name. Change this name to use another label. **NOTE:** The point description (significant for the application) is also indicated in the Event file and in the **Web server**.
ID	ID type that must be used.	Select one of three for the ID: • **None**: No ID used. For example, default labels (0,1) are used for a logical point. • **Status**: Use of a status ID list. If used, the status ID list must be defined (see next setting) • **Analog**: Use of analog ID list. If used, the analog ID list must be defined (see next setting)
Status ID	• if **Status ID** is selected: Set of strings that replaces the signal value of the log files : ◦ 0 is replaced by the first introduced string ◦ 1 is replaced by the second introduced string ... and so on. If an event is registered with a value that has not an associated tag, this value is shown directly. • if **Analog ID** is selected: Set of strings that goes with the point value.	The proposed list corresponds to the existing ID lists defined in the Event file used.

It is important to know the correspondence between the ID type to be configured (and the associated ID list), and the type of object defined on SCADA.

The following table shows this correspondence.

Consult the table in the T300 database manual for a complete list of all data points included in the CoreDb, as well as correspondence with SCADA object types.

Point type correspondence	
SCADA Object Type	**ID List**
Digital input	All (excluding DPS,DPC and Settings_Group)
Double digital input	DPS
Digital output	SPC
Double digital output	DPC
Analog input	Analog

For each default ID list, the following table shows the various tags (labels) that are listed in the **Event** file and **Web server** pages for each logical point status (0, 1, 2, 3):

Status				
ID List	**Tags**			
	0	**1**	**2**	**3**
Alarm	No	Yes	-	-
Local_Remote	Remote	Local	-	-
Status	OFF	ON	-	-
Fault	Normal	Fault	-	-
Normal	Fault	Normal	-	-
Boolean_ Setting	Disabled	Enabled	-	-
Settings_Group	Invalid	1	2	-
SPS	Inactive	Active	-	-
DPS	Intermediate	Open	Closed	Invalid
SPC	OFF	ON	-	-
DPC	Intermediate	Open	Closed	Invalid

The following table shows the tags (units) that are associated with analog values for display in the **Web server** or for the log file. The units displayed are dependent on the ID list selected:

Analog	
IDs List	**Tags**
Voltage	V
Current	A
Frequency	Hz
Temperature	°C
Resistance	Ohm
P	W
Q	VAR
S	VA
Percent	%

7. Once the setting is defined, the coordinate in CoreDb has the following format:

   `NAME:ID` (For example, `_Prs_general:SPS`)

Destination1 Device	Destination1 Coordinates
Event	SC01_MvSVPI1_Prs_general:SPS

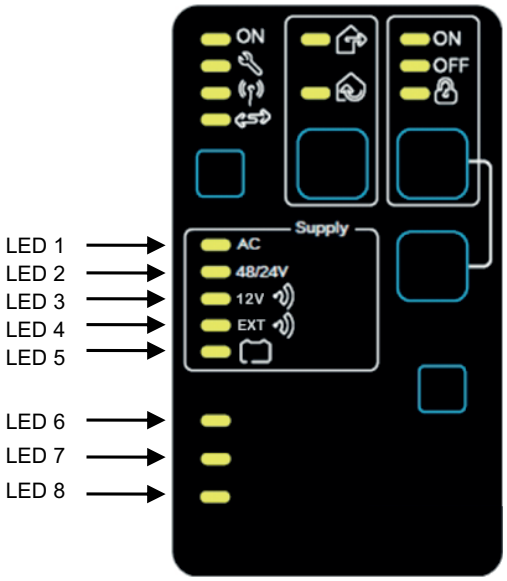
8. Repeat the procedure to set all data points of the CoreDb that include events.
9. Save all changes by clicking the **Save** button at the top of the RTU configuration page.

   SOE configuration is now completed.

How to Customize the LEDs (HU250)

LEDs (1 to 8) used on the front panel of HU250 module and the external indicators (lights) can be customized to define the data points (and thus the corresponding functionality) required to switch on / light up these LEDs.

The configuration described in this procedure can be made only via Easergy Builder.



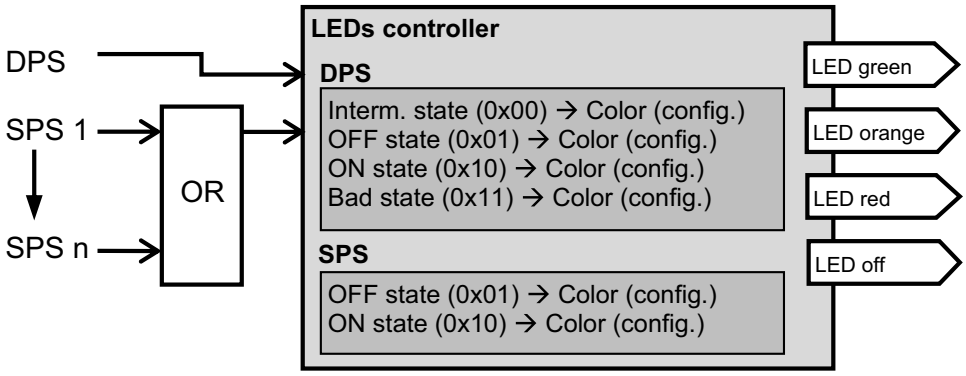
The display color of these LEDs can also be customized. This can be done via Easergy Builder or via the T300 Web server. For more details regarding these settings, consult the T300 user manual (NT00378).

Assigning Customizable LEDs on Front Panel of HU250 Module

The 8 LEDS (LEDs 1 to 8) on front panel of HU250 (see illustration above) can be customized.

However, if PS50 power supply module is used, LEDs 1 to 5 are already assigned to T300 predefined functions. The final 3 LEDs (LED 6-8) can be freely allocated.

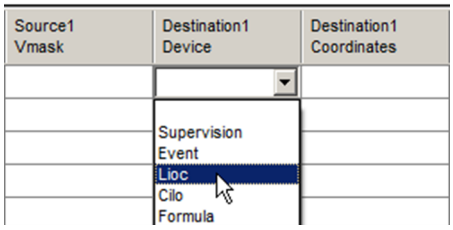
If the PS50 power supply module is not used, you can reallocate their assignment, but this is not recommended due to loss of the standard T300 functionality.



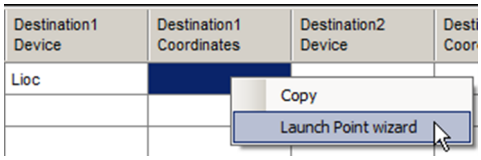
Functional diagram of LEDs Bin controller.

The following procedure explains how to assign a **CoreDb** data point to an available LED (e.g. to activate a LED when a digital input becomes active):

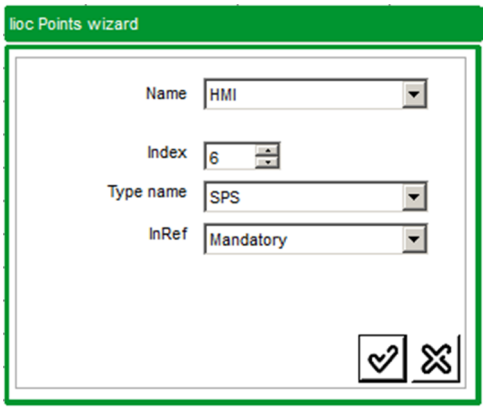
1. In the **CoreDb** page, click the **Status** tab.
2. Determine the name of the data point on which to assign the LED (e.g, **Digital input** 1). The **Description** column in **CoreDb** can help to find the correspondence of the data.
3. Each point in the spreadsheet has zero or one source and zero or more destinations. Do not change the existing sources and destinations already defined.
4. For the data point to configure, click the cell of the first empty **Destination n device** available (n can be 1 to 4).
5. Select the Device in the proposed list that corresponds to **Lioc**.



6. Right-click the corresponding **Destination n coordinates** cell (where n is the same number as the Destination device previously selected).
7. Select **Launch Point Wizard**.



8. A **Lioc point wizard**window appears with configuration information for the Destination Coordinates. Use the following table to define the type of setting to apply:



Setting	Description	Value to set
Name	Choice for assigning the function.	Choose **HMI** to assign to a front panel LED.
Index	Index number of the LED to assign to the data point.	Choose a number from 1 to 8: Assigned LEDs: 1 to 5 Free LEDs : 6 to 8.
Type name	Type of input data point; single **(SPS)** or double **(DPS)**.	A **(SPS)** data manages 2 states (ON, OFF) and therefore 2 LED colors. A **(DPS)** data manages 4 states (ON, OFF, Intermediate, Bad) and therefore 4 LED colors. Several **SPS** inputs can be configured on the same LED. **(DPS)** + **(SPS)** combination is not allowed.
InRef	Choice of quality management type for the data.	Consult the three following tables describing the quality management type. Configurable as **Mandatory**, **Important** or **Nice to have**.

Quality management for a data: type assigned to the data based on the .

Data sate			
Data quality	**invalid**	**Overflow**	**Not topical**
Good			
Questionable			X
Invalid	X	X	

The following table determines how the resulting quality of the erroneous state of the data is interpreted, depending on the choice InRef defined:

InRef			
Resulting quality			
Data quality	**Mandatory**	**Overflow**	**Not topical**
Good	Good	Good	Good
Questionable	Questionable	Good	Good
Invalid	Invalid	Questionable	Good

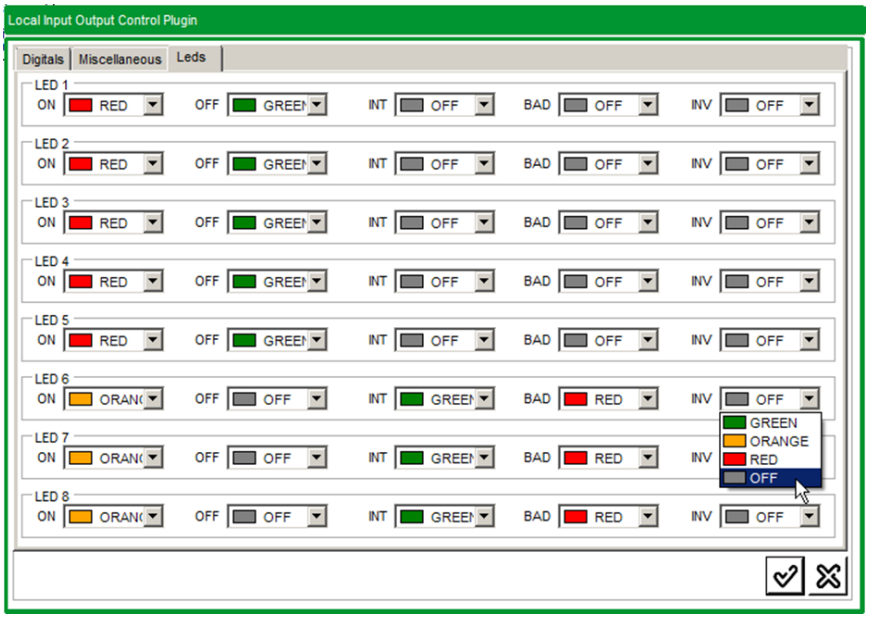
The following table shows the default display color for each LED, depending on the state of the associated data type and its resulting quality:

Colors displayed by default				
Resulting quality				
Data state	Quality Good		Quality Questionable	Quality Invalid
	LED 1 to 5	LED 6 to 8		
DPS ON	RED (*)	ORANGE (*)		
DPS OFF	GREEN (*)	OFF (*)		
DPS INT	OFF (*)	GREEN (*)		
DPS BAD	OFF (*)	RED (*)		
DPS INV			OFF	OFF (*)
(*) = Configurable as ORANGE, OFF, GREEN or RED (the default color is shown in the table).				

NOTE: for SPS data type, only the colors corresponding to the ON, OFF and INV states are displayed.

A display "OFF" corresponds to LED unlit.

Lioc window in Easergy Builder allows the color configuration for each LED, depending on the state of the data and the resulting quality associated:



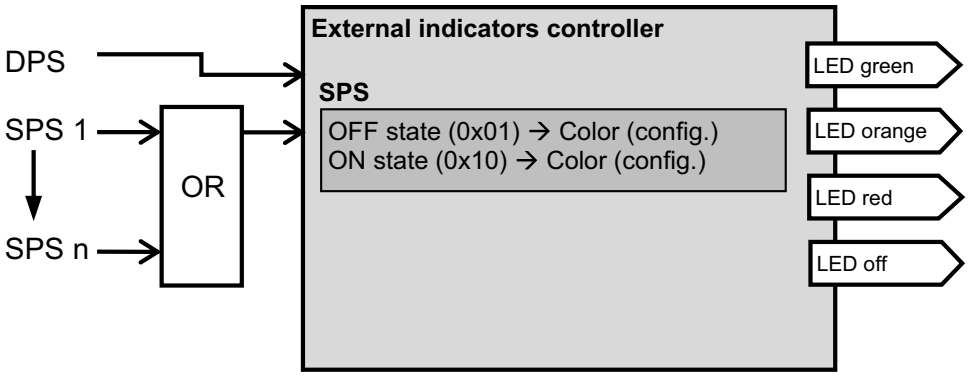
The setup is complete.

Refer to chapter "How to send a configuration to the RTU, page 61" to load the modified RTU configuration in the T300 and to activate the new setting defined for the LEDs.

NOTE: some of the LEDs of SC1xx and LV150 modules can also be customized (linked to a variable, within a predefined list). This is not done using Easergy Builder, but directly in the Webserver. Refer to T300 User manual (NT00378) for details.

Assigning HU250 External Indicators

HU250 module includes external indicators (LEDs 6, 7 and 8, page 52). These indicators can be customized. By default, there is no assignment for these indicators.



Functional diagram of external indicators Bin controller.

Examples of Assignment for External Indicators

The operation depends only on the data point to which the indicator is assigned.

- **Directional fault current detection**: the standard functionality involves the use of the first indicator (green) indicating the presence of a fault current towards the busbar and the second indicator (red) for indicating the presence of a fault current in the direction of the network. The data set in this case is as follows:

Data point to configure	Description	Assignement
SC01_GenSFPI1_FltInd_dirGen_Fwd	Fault current direction - forward	Ext. indicator 1
SC01_GenSFPI1_FltInd_dirGen_Bwd	Fault current direction - backward	Ext. indicator 2

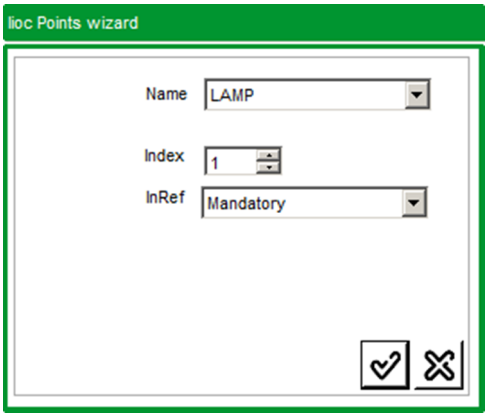
- **Ammetric fault current detection**: the standard functionality involves the first indicator (red) for indicating the presence of any type of fault current. The data set in this case is as follows:

Data point to configure	Description	Assignement
SC01_GenSFPI1_FltInd_general	General fault current indication	Ext. indicator 1

	Name	Description
69	SC01_GenSFPI1_FltInd_dirGen_Bwd	Fault direction - backward
70	SC01_GenSFPI1_FltInd_dirGen_Fwd	Fault direction - forward
71	SC01_GenSFPI1_FltInd_general	General fault indication

Procedure to Assign External Indicators

The procedure is the same as described previously for front panel LEDs of HU250 module. Refer to the previous section for detailed instructions on assignment of external indicators. Note: the only exception is the choices of the window **Lioc Point wizard** shown in the table below, which are different.



Lioc point wizard		
Setting	**Description**	**Value to set**
Name	Choice for assigning the function.	Choose **LAMP** to assign to an external indicator.
Index	Index number of the lamp to assign to the data point	Choose a number from 1 to 2: First indicator: 1 Second indicator: 2.
InRef	Choice of quality management type for the data	Configuration identical to the front panel LEDs. Consult the three tables on the previous page for the significance of quality management type. Configurable as **Mandatory**, **Important** or **Nice to have**.

The setup is complete.

Refer to chapter How to send a configuration to the RTU, page 61 to load the modified RTU configuration in the T300 and to activate the new setting defined for the external indicators.

How to Synchronize the RTU

One of the RTU project customization consists of defining the way to synchronize the unit automatically.

There are three possibilities for synchronizing the RTU:

- Automatically by the communication protocol (via the SCADA).
- Through an SNTP server, if the RTU is connected to an IP network.
- By GPS satellites, if the **HU250** module includes a 4G modem with GPS.

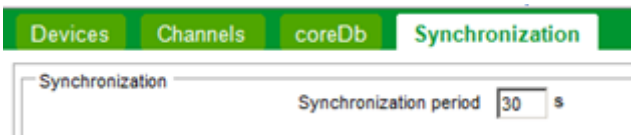
  NOTE: Synchronization by GPS is only possible if RTU Type is set to v1.3 or a higher version in Easergy Builder for the RTU. Consult the Easergy Builder User Manual (SE-S856-MSS) for more information .

You can define two channels of synchronization, the primary device and the secondary device.

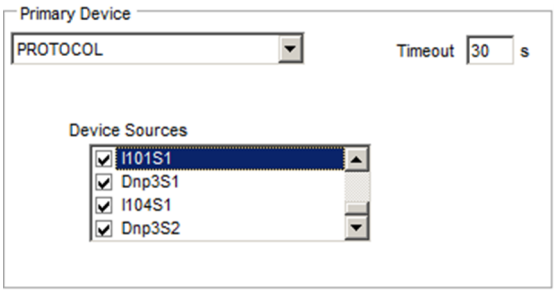
The secondary device is used if the primary device is unavailable.

To configure the synchronization settings, perform the following instructions:

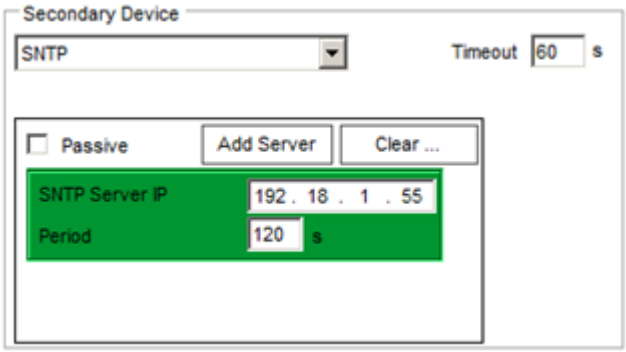
1. In the RTU configuration interface of Easergy Builder, access the **Synchronization** page.



2. In the **Synchronization** tab, define the following settings:
   a. Define the primary device and the secondary device: it can be a **PROTOCOL**, a **GPS** channel or an **SNTP** server. Specify one option for each device. The two devices must have different settings.
      - **PROTOCOL** device: in the proposed list, select the protocol device sources from which the unit receives the synchronization date and time via communication with SCADA. You can select more than one protocol (for example I101S1, Dnp3S1, I104S1).



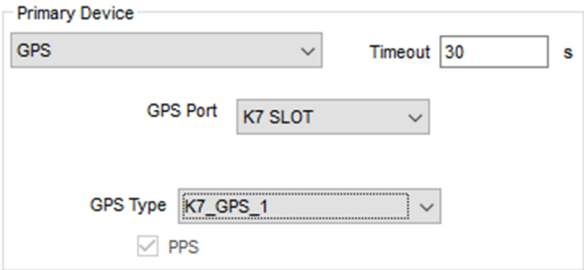
      - **SNTP** server: if you define the server as active (**Passive** option not checked), enter the period that corresponds to the time delay before asking the server for a new synchronization. Also enter the IP address of this **SNTP** server. This period is not used in passive mode because in that mode the **HU250** merely waits to be synchronized by the server.



      - **GPS**: synchronization is done through the 4G modem box. In the **GPS Type**, select the slot used for the 4G modem:

        - **K7_GPS_1**: modem slot number 1.

        - **K7_GPS_2**: modem slot number 2.



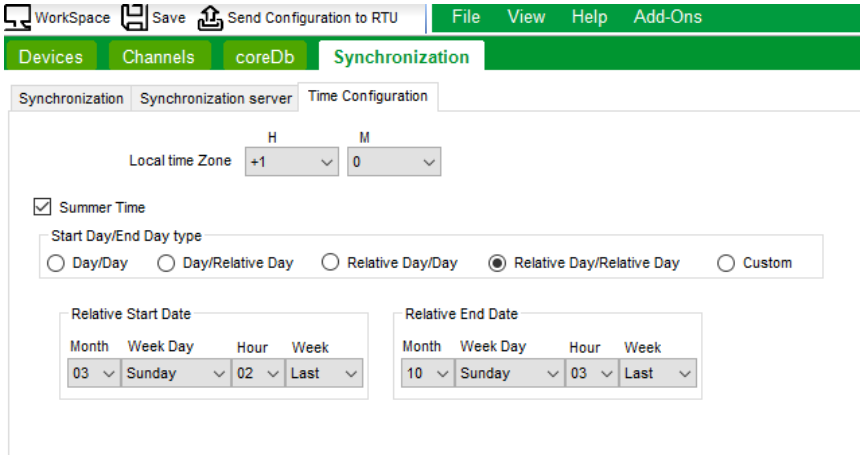
        NOTE: Refer to the *HU250 Installation Guide* (reference NHA77925) for details of channel 1 and channel 2 modem locations.

   b. Define a timeout for the primary and secondary devices. This timeout is the time delay before declaring the active device non-responsive and switching to the other device.

      NOTE: There is no need to define the Synchronization period. This parameter is not used by HU250.

   c. If your region zone uses summer time settings (depending on your country) you can activate in the **Synchronization**, server the **Summer time** settings and the **Start date** and **End date** to be applied for summer time. Various methods are available for defining the start and end dates.

Choose the one that best corresponds to the method used by your country.



d. Define the **Local time zone** that corresponds to the time difference between your local zone and GMT time.

NOTICE

HAZARD OF UNINTENDED EQUIPMENT OPERATION

Do not change the default setting of the **Synchronization** server .This setting is reserved for internal communication and synchronization between the HU250 and the SC150/SC160 or LV150 modules.

Failure to follow these instructions can result in equipment damage.

How to Send a Configuration to the RTU

Once the configuration has been customized in Easergy Builder, the next step is to provide this configuration to the Easergy T300 RTU.

This can be done by one of the following procedures:

- Uploading the configuration to the T300 RTU
- Saving the configuration as *.tar.gz file, for a later upload to the unit.

Once connected to it, the configuration is ready to be transferred, follow one of the procedure described below.

Uploading the Configuration to the RTU

There are two possibilities for uploading the configuration to the T300 RTU

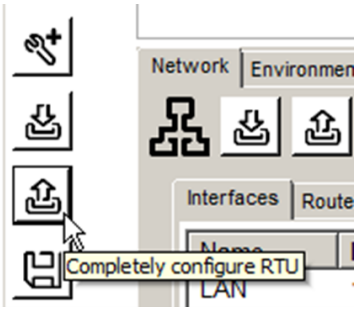
- **From the Workspace:** the upload can be complete or partial depending on the options checked in the list. The user chooses what to include in the setup.
- **Uploading from the RTU configuration interface:** only the RTU configuration is uploaded in this mode. Use this mode if you want to duplicate the same configuration on multiple RTU units without overwriting system parameters (ppp settings, Network, modems, etc.). In this case, the RTU configuration includes HU250, SC150/SC160 and LV150 modules settings.

Uploading from the Workspace

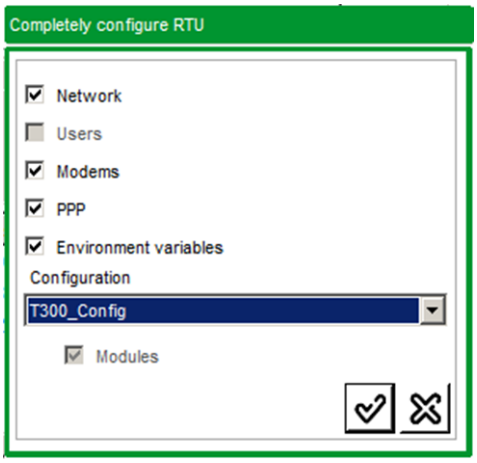
In this mode, the user can choose the configuration part to upload to the T300 RTU (options can be selected):

- **Network:** Network parameters (LAN, WAN, WI-FI)
- **Modems:** Modem paramters (2G, 3G dial-up settings)
- **ppp:** PPP parameters (IP addresses)
- **Environment variables:** ports parameters HTTPS, SSH, etc.
- **Configuration RTU:** selected RTU project configuration (all the device settings).

1. If this has not already been done, initialize the connection to the Easergy T300 RTU via Wi-Fi or Ethernet access . Refer to Local access via Ethernet.
2. From the WorkSpace, click the **Completely configure RTU** button.



3. Select the options depending on the WorkSpace parameters you want to upload to the T300 RTU. If the **Configuration** field stays empty, the RTU configuration will not be uploaded.



4. Validate the choice and follow the instructions in the Connection and transfer to the unit, page 62 section.

Uploading from the RTU Configuration Interface

In this mode, only the RTU configuration is uploaded to the T300 RTU. Other settings (Network, Modems, PPP, Environment variables) are not uploaded.

1. If this has not already been done, initialize the connection to the T300 RTU via Wi-Fi or Ethernet access. Refer to Local access via Ethernet.
2. From the RTU configuration interface, click the **Send Configuration to RTU** button.

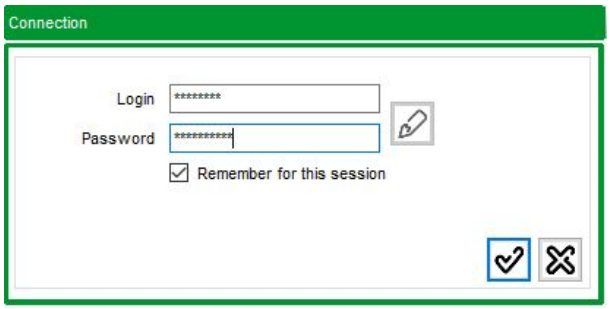
3. Follow the instructions in the Connection and transfer to the unit, page 62 section.

NOTE: The **Send configuration to RTU** button is also available in the quick access toolbar of the Workspace after selecting an RTU configuration.

Connection and Transfer to the Unit

The **Connection** window appears,

1. Enter the login and password and click **Validate** (use tick symbol).



NOTE: The default users are the same as those used for Web server access. But only the **Engineer** role has sufficient rights to upload the configuration to the RTU.

USERS	Engineer
Login	Engineer
Password	Engineer1!

NOTE: For security requirements, all the passwords must be changed during commissioning.

⚠ WARNING

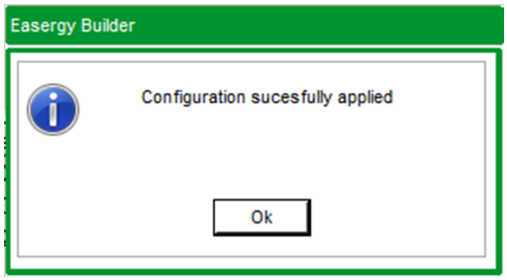
POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

Change all passwords during commissioning to help prevent unauthorized access to device settings, controls, and information.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The configuration is then uploaded into the unit.

2. A window appears stating that the configuration has been taken into account by the unit.



Once the RTU has restarted, in less than one minute, the status of the HU250 operating LED should be green. If this is not the case, refer to Checking issues, page 65.

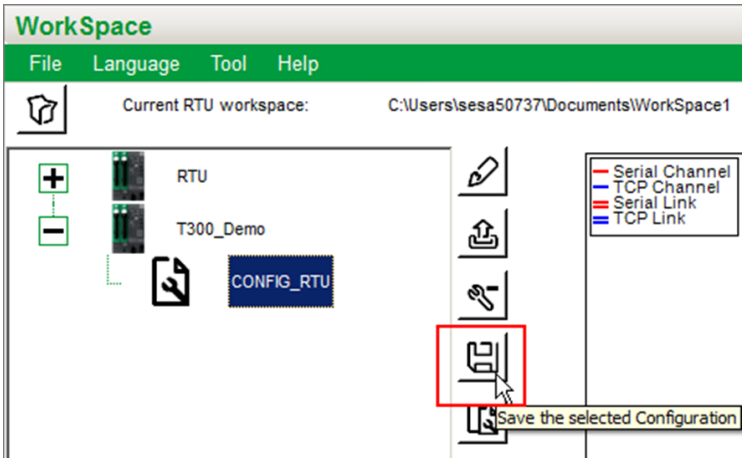
Saving the Configuration in tar.gz File

The `*.tar.gz` saved file can be subsequently loaded into a T300 via the Web server (without requiring Easergy Builder) or be imported back into Easergy Builder for possible changes to the RTU configuration.

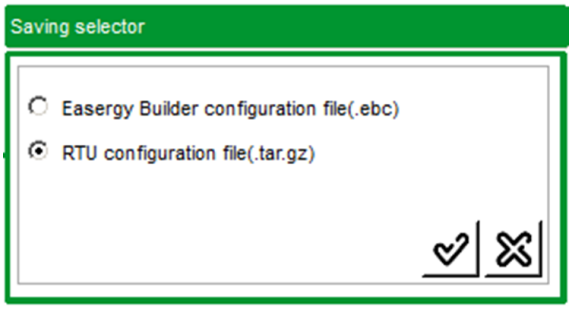
The `*.tar.gz` file is compatible with all tools available for the setup / backup / download.

The tar.gz backup is performed without connection to the equipment.

1. From the WorkSpace, select the RTU configuration to be saved and click the **Save the selected configuration** button.



2. In the **Saving selector** window, select the option **RTU configuration file (tar.gz)** and validate.



3. Select the location on your computer where to save the configuration file, then click the **Save** button.
4. The backup is complete.

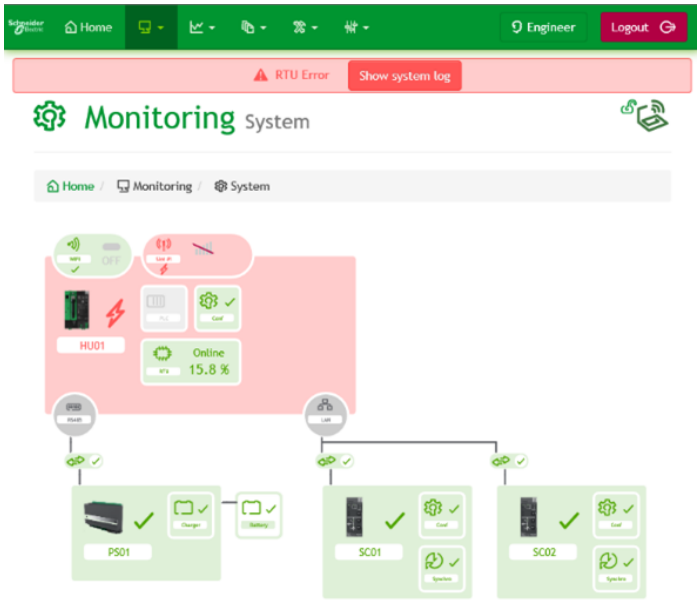
Checking Issues

After the configuration has been loaded to the unit and after the RTU has restarted, check that the status LED on the front panel of the HU250 is green. If a potential issue occurs, the LED displays a different color:

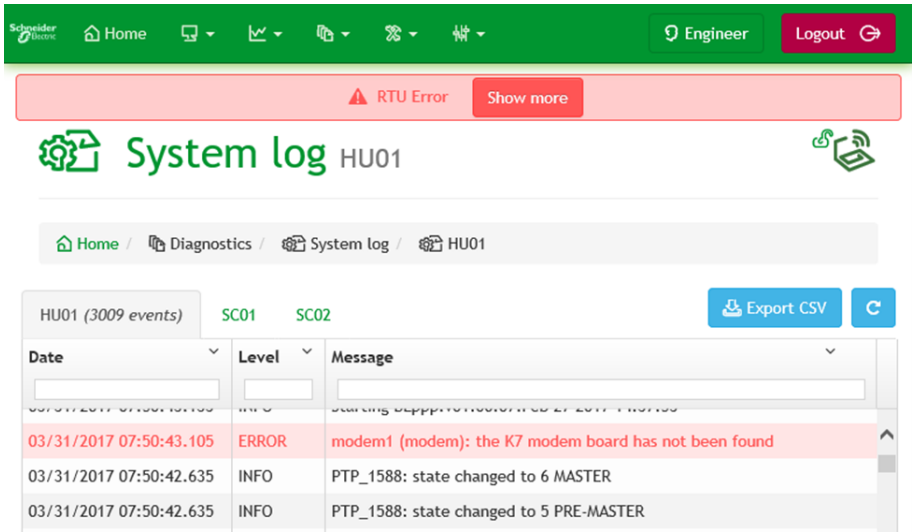
- Orange: internal communication potential issue (for example, with SC150/SC160 or LV150 module).
- Red: potential configuration issue, potential RTU issue or one of the SC150/SC160 or LV150 in potential issue.

In the event of a potential issue, there are different ways to identify it. Consult the following pages of the T300 Web server:

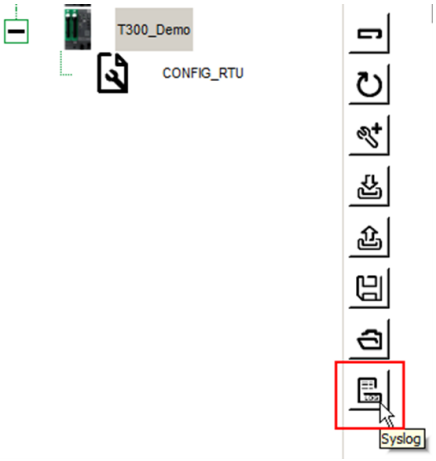
- **Monitoring & Control/System** page: after being logged into the Web Server, select the **System** menu (in the menu bar). The **Monitoring System** page helps you to find the element in potential issue. It can be a potential configuration issue or a potential issue on the T300. The description of the issue is indicated. If it is a potential configuration issue, the root cause is also indicated in the **Diagnostic / System** page. In this case, consult the **System log** (see below).



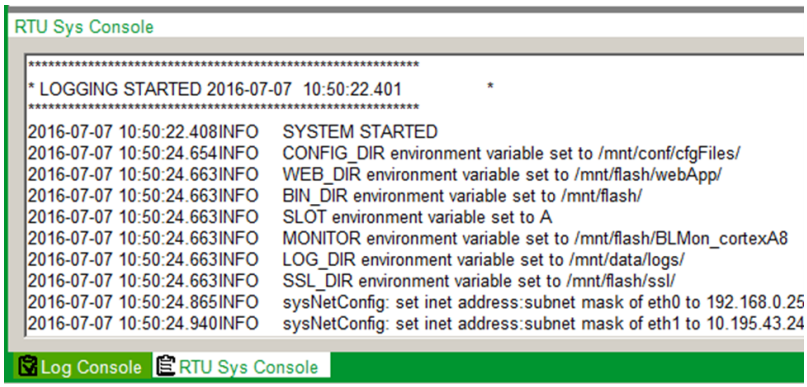
- **Diagnostic/System/HU01** view: after being logged to the Web Server, select the **Diagnostic** and display the **System/Log HU01** page making possible to identify the potential issue.



You can also consult the **Syslog** page from the Workspace in Easergy Builder. Select the RTU corresponding to the T300 to be checked and then click on the **Syslog** button.



After being logged into the unit, the **Syslog** file is downloaded automatically. The content of the Log file is displayed in the **RTU Sys Console** at the lower part of the Workspace. A potential issue can be displayed in the console content, if any.



NOTE: The content of the tab **HU01** of the **System log** page in the Web server and the content of the **RTU sys console** of Easergy Builder are similar regarding the content but with a different display format.

Glossary

A

A: Ampere.

AC: Alternate Current.

AI: : Analog Input

ANSI: American National Standards Institute. Private and non-profit organization headquartered in Washington that oversees the development of standards for products, services, processes, systems, and personnel in the United States.

AO: Analog Output

AT: AT is the abbreviation for ATtention. These 2 characters are used to start and send a command line in the form of text (ASCII codes) to a modem. The modem responds with OK or gives the response to the request.

ATS: Automatic Transfer Switching.

B

BIN controller: This relates to the different system data acquisition and processing application software that has access to the CoreDB database. Each BIN controller acts as a producer and/or consumer of data managed by CoreDB.

BIN: This is a set of Input/Output (I/O) signals with a common source. They may relate, for example, to the representation of an IED that communicates with the T300 RTU, or the representation of a SCADA system that receives or generates information acquired or generated on the platform.

BIMon: Base Line Monitoring tool is a shell dedicated to monitoring the various application program components of the firmware. The various communication channels can be monitored, for example, for diagnostic purposes.

C

CAE: Cybersecurity Administrator Expert. The CAE is a tool for organizing the T300 security policy and defining system access restrictions and user rights.

CH: Channels

CILO: Command InterLOcking. This is the system BIN controller that controls the switch output commands.

CM: Common Mode

CO: Coordinate.

CoreDB: CoreDB is a real-time RTU database that helps ensure the RTU signals are managed in real time.

CPU: Central Processing Unit

CT: Current Transformer

D

Db: DbNET

DHCP: Dynamic Host Configuration Protocol. A network protocol for ensuring that station IP parameters are automatically configured via automatic IP address allocation.

DI: Digital Input

DM: Differential Mode

DO: Digital Output

DT: Definite time. Designation for definite time fault current detection curves.

E

Easergy Builder: Easergy Builder is the official configuration tool for T300 equipment. This tool can be used to configure all the advanced RTU functions (for example, database, protocol addressing, events) and to carry out maintenance tasks on the equipment.

F

FPI: Fault Passage Indicator. Designation of the fault current detection function.

G

GMT: Greenwich Mean Time. Mean solar time at the Royal Observatory in Greenwich, London, England, used as the universal time standard.

H

HMI: Human Machine Interface

HTTP: Hyper Text Transfer Protocol. Client-server communication protocol developed for the World Wide Web. HTTPS (where S = Secure) is the secure variant of HTTP using SSL or TLS protocols.

HU250: Head Unit 250. Control and communication module for the T300.

Hysteresis: Delay of the effect on the cause in the behavior of a signal subjected to an increasing and then decreasing action (see diagram below). Hysteresis creates a zone of uncertainty signal detection in which the state is not clearly identified. Outside this area, the state is known.

I

IDMT: Inverse Definite Minimum Time. Designation for inverse definite minimum time fault current detection curves.

IEC: International Electrotechnical Commission. The international standards organization for the fields of electricity, electronics, electromagnetic compatibility, nanotechnology, and related technologies. It complements the International Organization for Standardization (ISO), which is responsible for other fields.

IED: Intelligent Electronic Device

IEEE: Institute of Electrical and Electronics Engineers. The IEEE is a professional association comprising members from the fields of electrical engineering, information technology, telecommunications, etc. The organization's mission is to advance knowledge in the field of electrical engineering and publish associated standards and other texts written by its members.

IP: Internet Protocol

Is: Maximum fault current threshold

K

K7: Another name for a mode box installed in the modem slots on the HU250.

L

LAN: Local Area Network

LED: Light Emitting Diode

Linux: Operating system running in realtime on the software platform. This is the element in charge of extracting the various software components from the hardware.

LIOC: Local Input Output Controller. This is the system BIN controller that manages the HMI and the digital I/O.

LV150: Low Voltage 150. Low Voltage measurement management module for T300 equipment.

LV: Low Voltage

M

Module: Hardware device comprising a functional component of the T300 (for example, SC150, HU250, and PS50 are modules on the T300).

MV: Medium Voltage

O

OS: Operating System

P

PC: Personal computer

PLC: Programmable Logic Controller

PPP: Point to Point Protocol. Internet transmission protocol for establishing a link-type connection between 2 hosts on a point-to-point link.

PS50: Power Supply 50. Standard power supply module for the T300 equipment.

PTOC: Protection Time OverCurrent

PTOV: Protection Time OverVoltage

PTUC: Protection Time UnderCurrent

PTUV: Protection Time UnderVoltage

R

RMS: Root Mean Square

RS: Serial link

RTU: Remote Terminal Unit

S

S/D: Source and Destination

SC150: Switch Control 150. Switch control and MV measurement management module for the T300.

SCADA: Supervisory Control And Data Acquisition

SEC: Sectionalizer automation function

SFTP: Secure File Transfer Protocol

SHELL: The shell is a command interpreter. It is the interface between the user and the operating system. The shell uses command lines entered by the user to act as the intermediary between the operating system and the user. The role of the shell is to read the command line, interpret its meaning, run the command, then return the result to the outputs.

SLOT: Slot reserved in the HU250 for a K7 modem.

SNTP: Simple Network Time Protocol

SOE: Sequence Of Events. This relates to saving and storing events and signal changes in the RTU that manages the data in real time.

SSH: Secure SHell. SSH is both a program and a secure communication protocol. It is the equivalent of the Telnet program and is used in the same way to run certain operations remotely (mainly server administration or file transfer operations). SSH is more secure than Telnet protocol.

SSID: Service Set IDentifier. Name used to identify a Wi-Fi network according to standard IEEE 802.11.

T

TCP or (TCP/IP): Transmission Control Protocol. Set of protocols used to transfer data on the Internet.

Ts: Fault current acknowledge time

U

UDP: User Datagram Protocol. Connectionless transport layer communication protocol for the TCP/IP model.

V

VAC: AC voltage

VDC: DC voltage

W

WAN: Wide Area Network

Wi-Fi: Wireless network

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