SAUTER Internet of Things

Universal IoT Gateway

User manual

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SAUTER
Creating Sustainable Environments.

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For safety reasons and to ensure compliance with the documented system data, repairs to components must be carried out only by the manufacturer. When devices are used for applications with technical safety requirements, the corresponding instructions must be followed.

Failure to use Sauter Building Control Schweiz AG software or approved software with our hardware products may result in injury, damage or incorrect operating results.

Failure to follow this information may result in personal injury or property damage.

Information about reading the document

NOTE: Notes on operations related to the chapter

Relevant information highlighted

Important information, to be taken into account

Note

In this document, you will find references to the different standards mentioned. Since the publication of this document, it is possible that some elements or even functionalities of the protocols discussed have changed beyond our good will.

Contents

1. Introduction

This manual contains the main features of this universal gateway and instructions for the correct installation, configuration and operation of the device.

The contents of this manual should be made known to anyone installing, configuring or operating this gateway or any associated equipment.

Keep this manual for future reference during installation, configuration and operation.

Universal gateways support several protocols, however, only those listed below are described in detail:

- Modbus
- M-Bus
- BACnet
- *MQTT*
- *OPC UA*
- *Sauter Vision Center*
- *ExportCSV (data export driver, can be coupled with FTP for example)*

** Documented separately or at a later date*

It is also about describing some fundamental functionalities, such as:

- Basic features (settings, time, date, system and backups)
- Routing (Mapping between sources, with some example scripts)
- *API interface*
- *Language (Free programming according to IEC-61131 FBD and JavaScript)*
- *Remote Services (not described in this document)*

1.1. Overview of features

The "Universal IoT Gateway" product family is intended to be used as a universal gateway. They offer a user interface and a set of protocols. The universal gateway allows access to a defined set of data points, which are mapped from one control network technology to another control network technology. In particular, the BACnet gateway allows the implementation of mappings between a set of Modbus network variables and a set of standard BACnet server objects.

Data from the supported communication technologies are available as data points in the automatic server. These data points are freely configurable via the integrated web-based configuration interface, which offers a quick and easy way to configure the equipment using import/export functions among others.

Data points between different communication technologies can be connected to each other for data transfer between these communication technologies (gateway). The data points are also subject to the alarm, trend and scheduling functions of the automation server insofar as they are supported (the protocol technologies are different).

The use of mathematical objects allows basic calculations to be performed and the built-in e-mail client allows the gateway to send e-mails under certain conditions. The generated

alarms can be configured to send e-mails to predefined addresses (Gateway "SMTP (Simple Mail Transfer Protocol)").

Trend data collected by the device is available in CSV format and via the dedicated web service, however, auxiliary storage is recommended to use this feature.

The universal gateway contains a freely programmable controller that can operate on all data points contained and integrated in the gateway. The controller application is developed using the IEC-61131 compliant design tool directly available from the web interface.

The built-in web server makes it easy to configure the device using a standard web browser supporting HTML5 and the latest web technologies such as Chrome, Edge, Opera, Safari or Firefox. You can test your browser at: https://html5test.com, the minimum score is usually over 500 points for optimal use the web interface also provides statistical information for system setup and network troubleshooting. The various models are also equipped with SD memory card ports and one or more USB peripheral ports.

Some gateway models are also equipped with a 2-port Ethernet switch/hub. In switched mode, an Ethernet daisy chain can be constructed, reducing cabling efforts. The two Ethernet connectors can also be configured to function as two isolated IP interfaces. This can be used to securely connect a building LAN while keeping it isolated from WAN access, which exposes certain aspects using secure services. Using the external 3/4G USB adapter, the device also provides an interface that can connect to a third-party access point using mobile data.

The Universal Gateway is used for some of the following functions:

- Connect data points between all supported protocol sources (BACnet, KNX, Modbus, M-Bus, MQTT, OPC, ...) using the universal gateway function
- Browse data points from the web interface, network scanning features
- Exposure of data points to any other data source
- Basic automation functions on data points (alarms, trends, programming)
- Recording of alarms and measurements
- Sending emails about alarms, trend logs or scheduled events

Note:	Some features not described are available on the equipment. However, they are not specifically described in this document. Please refer to your support contact if you need help.

2. Models and applications

There are several hardware and software references for the Universal IoT Gateway. The physical devices have distinct properties in terms of functionality.

2.1. Comparison of versions and materials

Features	EY-GT103	EY-GT485	EY-GT110	EY-APU1D4*
Inputs/Outputs (I/O)	YES	NO	NO	NO
USB-A / OTG port	4x	3x	1x	2x
Type of mounting	DIN 43880	DIN 43880	DIN 43880	Table
Ethernet port RJ45	1x 10/100 Mps	1x 10/100 Mps	1x 1000 Mps (Eth1) 1x 10/100 Mps (Eth0)	3x 10/100 Mps
WLAN antenna	YES	NO	NO	NO
RS-485 serial ports	1x	2x	2x	1x
Bus termination	Inside	Inside	DIP Switch	NO
CPU - Processors	Quad-core 1.2 GHz ARM A7	Quad-core 1.2 GHz ARM A7	Quad-core 600Mhz ARM A53	AMD 1 GHz dual Bobcat core - G series T40E
RAM (random access memory)	1 GB DDR2	1 GB DDR2	1 GB DDR3	4 GB DDR3
Operating system	Linux intégré	Linux intégré	Linux intégré	Linux intégré
Memory	64 GB microSDHC	64 GB microSDHC	16 GB eMMC intégré	16 GB eMMC intégré
Power supply	9-30 VDC	8-35 VDC	9-30 VDC	12 VDC / PA

* Used only for SHS applications (Sauter Smart Home Solution)

The YZP487Fxxx references are intended for installation on a PC (software version for Windows).

Note: Please pay attention that the functionality of non-IP communication drivers such as Modbus RTU, BACnet MS/TP, KNX TP or M.BUS must work with a serial port. In some cases and when operating on virtual machines, this configuration must be checked beforehand.

It is also important to check the communication ports related to the protocol technology used. (For example, no BACnet/IP (UDP 47808) if another BACnet client is used on the same port, such as nPO or SVC)

2.2. Ordering information

The references are preceded by the prefix **P37-035** in the IFS ERP system (ONV - SBC).
The material

2.2.1. Material

Reference	Description
EY-GT103F001	S103 Hardware only
EY-GT103F002	S103 (Modbus, BACnet)
EY-GT103F099	S103 Full (all drivers & module logic)
EY-GT485F001	S485 Hardware only
EY-GT485F002	S485 (Modbus, BACnet)
EY-GT485F099	S485 Full (all drivers & module logic)
EY-GT110F001	G110 Hardware only
EY-GT110F002	G110 (Modbus, BACnet)
EY-GT110F099	G110 Full (all drivers & module logic)
EY-APU1DF004	APU1D4 Full (all drivers & module logic) - SHS use Only
Remote services	
YCS451F001	Remote Management connector, incl. OS, VPN
YCS451F002	Modem 3G/4G Huawei e3372 pre-configured. Option 4G for YCS451F001

Software and additional licenses

Reference	Description
YZP487F200	Version software for Windows (all drivers & module logic)
YZP487F280	Software version for Windows (Modbus RTU/TCP + SVC)
Licenses	
YZP488F100	Logic module (WBL-Language, PLC software)
YZP485F700	SHS module, Browser/iOS/Android (Sauter Home Solutions)
YZP485F600	Module redundancy (high availability redundancy, 2 devices needed)
YZP487F500	Remote access module (VPN, RDP, VNC, HTTP, HTTPS, SSH)
Driver pack	
YZP487F301	Pack 1 driver
YZP487F302	Pack 2 drivers
YZP487F303	Pack 3 drivers
Unitary drivers (identical references for all versions)	
EY-GT485F300	KNX driver (TP/USB/IP)
EY-GT485F301	Modbus TCP/RTU driver (Master/slave)
EY-GT485F302	BACnet/IP Driver - MS/TP (Client/Server)
EY-GT485F303	Driver SVC (Sauter Vision Center)
EY-GT485F304	Driver Sick Sensors
EY-GT485F305	Driver Uhoo (Cloud Air Quality)
EY-GT485F306	M-Bus driver
EY-GT485F307	MQTT Driver (Client/Broker)
EY-GT485F308	OPC UA driver (Client/Server)
EY-GT485F309	Driver FS (local Windows file system)

Reference	Description
EY-GT485F310	Luxmate driver (Zumtobel, IP, RS232)
EY-GT485F311	ESPA 4.4.4 driver (Master/Slave)
EY-GT485F312	Sonos Driver
EY-GT485F313	Philips HUE driver
EY-GT485F314	Amazon AWS Cloud IoT Driver
EY-GT485F315	SMPP driver
EY-GT485F316	Google Cloud IoT Driver
EY-GT485F317	Smart-me driver (Cloud Energy meters)
EY-GT485F318	SMTP Email Driver
EY-GT485F319	SMS Driver (local USB modem or SMS WBC Gateway)
EY-GT485F320	Zwave driver, need accessory 7010083003
EY-GT485F321	Driver ADS (Beckhoff)
EY-GT485F322	ICX Driver (Commend)
EY-GT485F323	Driver eAlarm (Swisscom alarming system)
EY-GT485F324	IOS/Android Notification Driver
EY-GT485F325	Driver Meteo (Weather Forecast CH, FR, BE)
EY-GT485F326	Azure Driver
EY-GT485F327	Driver Cron (schedule)
EY-GT485F328	DMX Driver
EY-GT485F329	HTTP Driver (Get/Put/Delete) WebServices
EY-GT485F330	Velux KLF200 driver
EY-GT485F7500W	SNMP driver
EY-GT485F331	FTP Export Driver
EY-GT485F332	Drivers Meteomatics (weather predictions)

2.2.2. Accessories

Reference	Description
7010083003	Zwave USB Connector
7010083005	RS485toMBus-4M (up to 4 meters)
7010083008	RS485toMBus-XL45 (up to 45 meters)
7010083006	RS485toMBus-XL80 (up to 80 meters)
7010083009	RS485toMBus-XL120 (up to 120 meters)
7010083007	RS485toMBus-XL190 (up to 190 meters)

3. Getting started and quick start

This chapter explains how to easily configure the socket of the device (all types).

The technical specifications are described separately, only the software part is discussed in this documentation. Please refer to the product sheet for more information.

3.1. Basic device configuration

When the equipment is powered on, you can connect with the default static IP address through your web browser:

- http://192.168.1.99 (DHCP for Eth1 port on EY-GT110F001 model)

The subnet mask is 24 (255.255.255.0), no gateway is configured.

Once the page is loaded, you will be able to enter the default credentials.

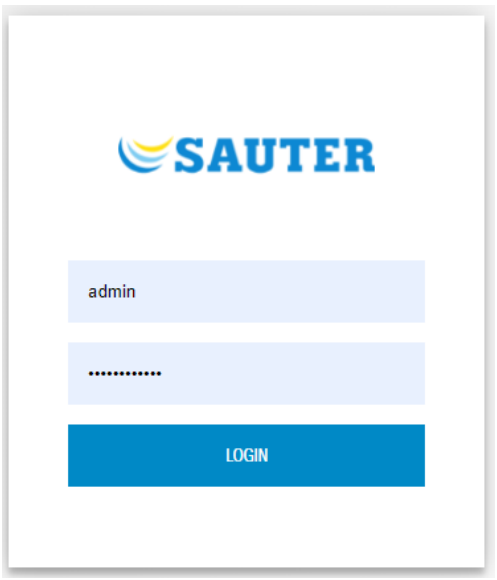


Figure 1 - Login page

Default credentials

User name : admin
Password : admin
(*to be replaced immediately after 1ère connection*)

In case of reset or loss of the IP address of the equipment, please use the discovery tool "SauterBoxFinder.exe".

This tool allows you to scan all the network cards available on your PC in order to perform a UDP multicast search.

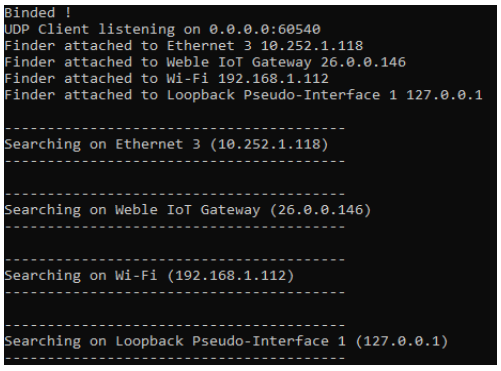


Figure 2 - Discovery tool

Once found, the address is indicated, you can then configure your network addressing in the same domain as the equipment you want to connect to.

You can download the discovery tool from the link available in the resources section

You must be locally connected (on the same LAN) for discovery to work properly.

3.1.1. Dashboard overview

The initial "Dashboard" interface presents the system information of the equipment described later in the document. After each connection, this page is activated by default.

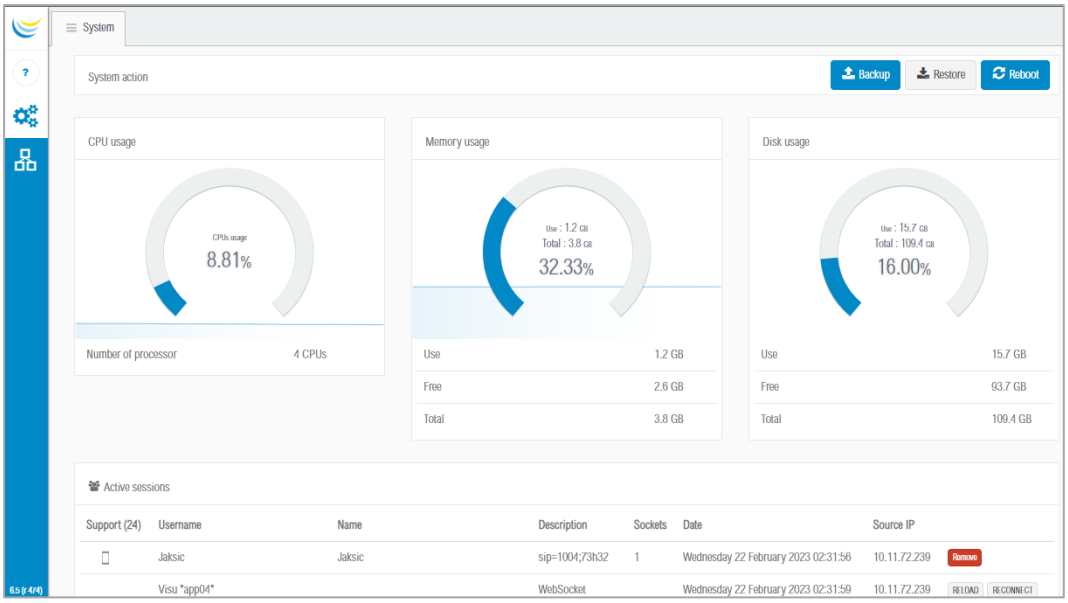


Figure 3 - Dashboard

From the portal, the backup, restore and restart actions are available by simply pressing the corresponding buttons.

3.1.2. Menu icons

The main icons of the general menu are described below:

Icon	Meaning
	**Configuration** Gateway and device functionality settings
	**Logic module** (circuit)
	**Visualization** (only available in dev mode) - SHS v1 version, deprecated, use of SHS v2 with the "UI" gateway, please refer to the corresponding documentation!

Top banner

Icon	Meaning
	**Contextual online help** Displays details on hovering over the elements
	**Restart** Restart the equipment with prior confirmation
	**Disconnect** Disconnects the current session

3.1.3. Language of the interface and change of the initial password

You can set the display language by clicking on the available flag icons at the top left. The change takes effect immediately. By default, English is selected.

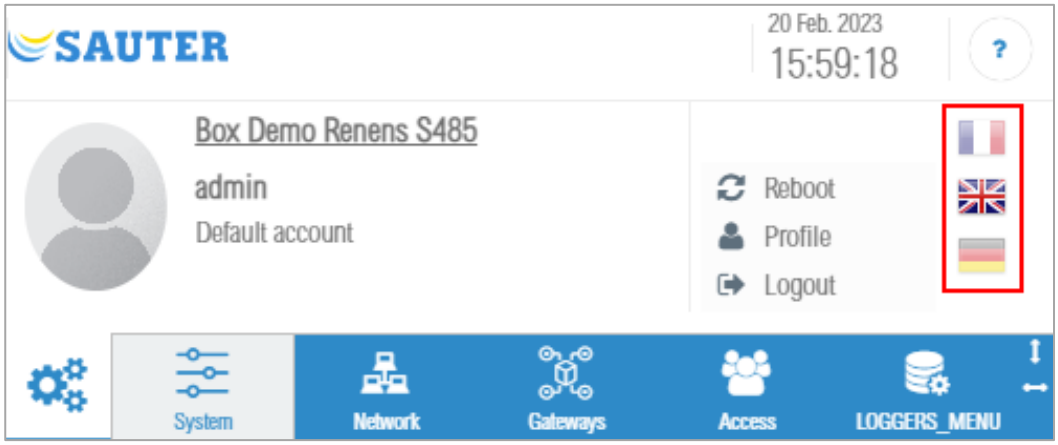


Figure 4 - Change of language

Note:	Please note that the features are constantly evolving with each update. By default, the development language is in English, so it is possible that some fields are not translated. Generally, the next update will correct these missing translations. You can also report them directly to the support through QMP ticketing.

Use this opportunity to change your password directly using the Profile button 

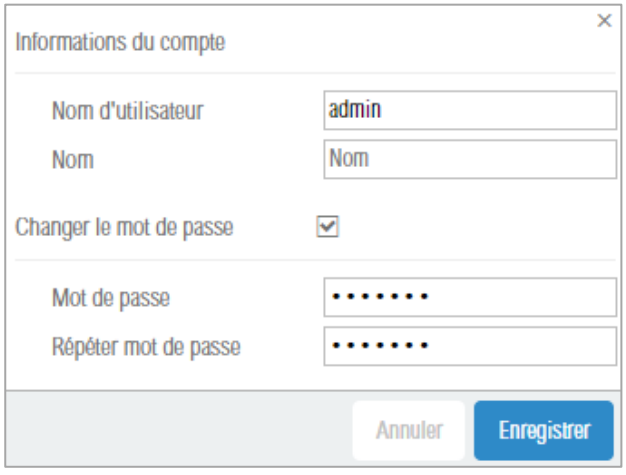


Figure 5 - Changing the password

Note:	You have the possibility to create several user profiles with different access rights. This part is detailed in the "User management" section.

4. Interface and parameterization features

This chapter describes some general functions such as the layout of navigation tabs (custom layout), menus and communication operations between data sources and gateways.

4.1. Sections

The main icons of the general menu are described below:

Icon	Meaning
	System *Time and system name, web settings, ...*
	Network *VPN Remote access, Wireless, DNS, GSM, Proxy, ...*
	Gateways *Data sources, list of routes, Monitoring*
	Access *User management, description, roles, sessions, ...*
	Logging *Configurable manual exports*

You can also enlarge or shrink the side menu with the slider.

4.1.1. Custom Layout

Each access menu and different data sources in the interface generates a tab. These can be displayed side by side or overlaid by simple drag and drop.

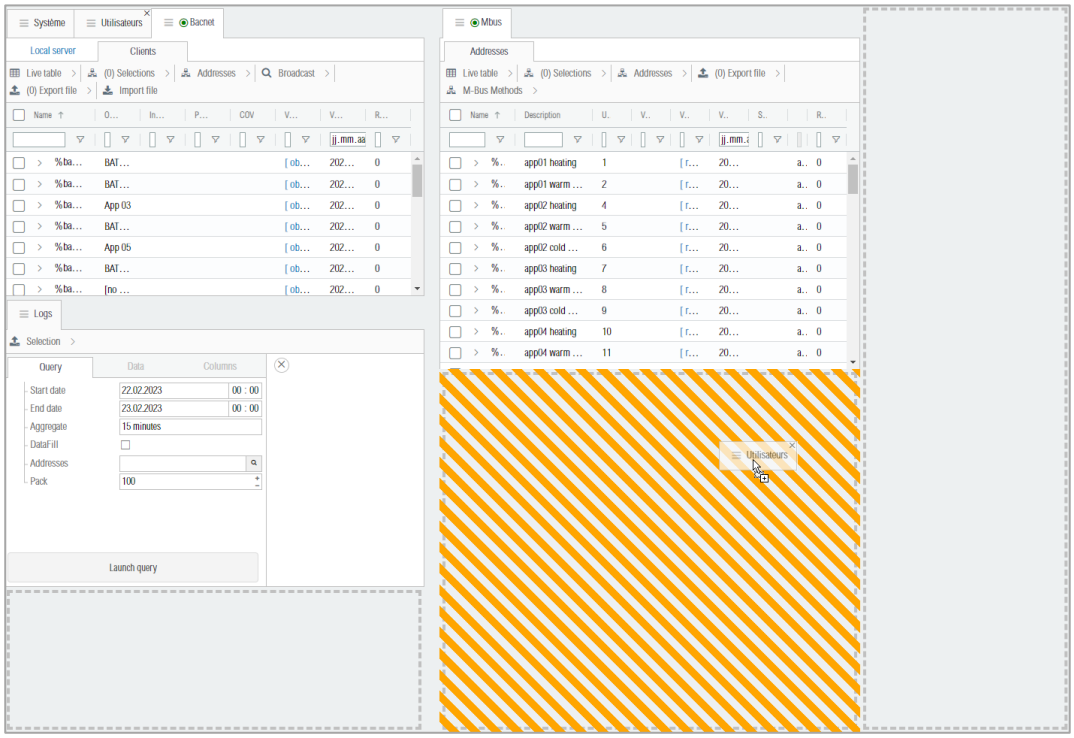


Figure 6 - Layout of the tabs

The possible movement zones are indicated by grey shaded boxes, when the tab is over a dropable zone, it appears in orange shading, then you can release the mouse and the layout will be as desired.

It is possible to move them at any time by dragging the tab to a new area. The tabs can be simply closed by clicking on the cross at the top right of the tab. The tabs are represented with the symbol .

This feature is very useful when you want to perform a route from one gateway to another by dragging one or more data points.

4.1.2. Gateway menus

Each protocol gateway contains menus that may vary depending on the functionality and availability of the supported protocol itself.

However, some of the available operations are common to almost all gateways. Below is a representation of a data point source.

	Display	Description of the submenus
	Live table	Default view with object hierarchy if available
	Columns	Allows you to show/hide the available columns
	Expend/close all rows	These two separate submenus allow you to expand or collapse the set of lines in accordance with their function
	Live table (flat view)	View of data points in unitary form
	Spreadsheet	Displays a spreadsheet view of the list of data points. The copy and paste functionality from Excel or others is similar to MS Excel or Open Office. **WARNING**, it is necessary to save in order for the modifications to be considered (asynchronous edition)
	Fullscreen	Allows to display the source in full screen to simplify the edition

	Selections	Description of the submenus
	Update addresses	Update address properties
	Remove addresses	Deletes the selected addresses
	Read value	Reading of the selected value(s)
	Write value	Writing of selected value(s)
	Select/Unselect all	Selects all addresses / removes address selection
	Select/Unselect all filtered	Selects all filtered addresses / removes the selection of filtered addresses

	Addresses	Description of the submenus
	Insert address	Insert an address
	Scanning	Allows to scan the network to obtain addresses automatically (available for compatible protocols supporting a discovery method only)

	Export file	Description of the submenus
	All addresses to CSV	Export all gateway addresses in CSV format
	Selection(x)	Export selected gateway addresses in CSV format
	All addresses to JSON	Export all gateway addresses in JSON format
	Selection(x)	Export selected gateway addresses in JSON format

Import file	Description of the submenus
	Import a file previously exported in CSV or JSON format

	Operations	Description du menu d'onglet
	Remove gateway	Deletes the selected gateway
	Stop gateway	Stops the selected gateway
	Restart gateway	Restarts the selected gateway
	Start gateway	Starts the selected gateway
	Import gateway	Import a previously saved gateway
	Export gateway	Exports the selected gateway
	Duplicate panel	Duplicates the tab of the selected gateway
	Close panel	Closes the tab of the selected gateway

4.1.3. Search fields and filtering options

All fields can be sorted upwards or downwards with the symbols ↑ and ↓ , the arrows appear as soon as you click on the column header.

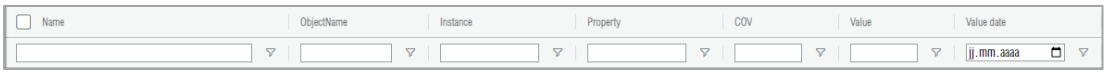
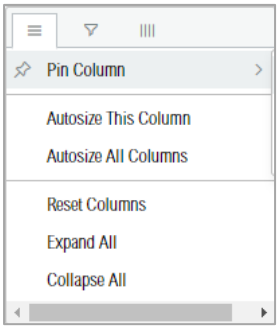


Figure 7 - Search fields

The box ☐ to the left of "**Name**" allows you to select all the addresses available on the gateway concerned.

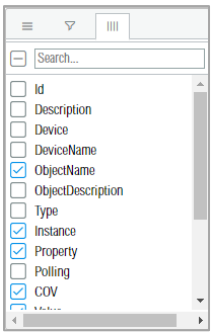
When hovering over the header field of each column, the ☰ menu appears. This allows you to perform advanced operations of additional display, filtering and selection of columns.



☰ Management of the display of the elements

▼ Filtering the selected field

||| Column display management



The default field filter allows you to specify a part of the name, property or value in each available field and visible from the gateway list ("contains" function). However, it is possible to filter specifically according to several available criteria.

Filtering mode	Description
Contains	**Contains**: The filter value is found somewhere in a field
Not contains	**Does not contain**: The value does not contain the same text or number as the filter value
Equals	**Equivalent:** The value corresponds exactly to the filter value
Not equal	**Different**: The value does not have an exact match of the filter value.
Starts with	**Starts with:** The value starts with the same characters as the filter value
Ends with	**Ends with:** The value ends with the same characters as the filter value

Regex	**Regular expressions**: Allows you to filter precisely a part of the character string contained in the field. The complete use of the Regex filtering mode is not specified here. You can consult the Wikipedia page: https://fr.wikipedia.org/wiki/regex to get the definition and the site https://regexr.com/ allows you to elaborate regular expressions in a simplified way.
	Below are some examples of Regex that can be used:
	
	`/^(?:50f561ee-ab53-40dc-b6eb-959646cc778e)/`
	ou
	`/^(\+FOY|\+FER|\+FAB|\+VIL|\+CUI)(.+):100$/`
	`analogValue.*/presentValue`
	
	The first and last "/" that surround the regular expression are optional, but can be used to specify a flag. For example if the regular expression ends with /i, as in /%m1.+/i, then it is not case sensitive.

4.1.4. Column layout

The columns can be moved in the desired order by simple drag and drop.

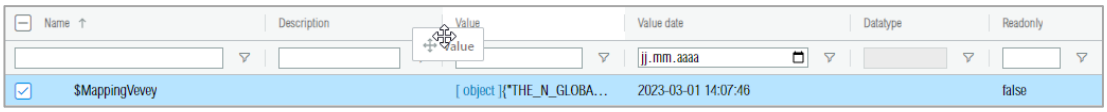


Figure 8 - Layout of the columns

Note: The header layout change remains effective as long as the gateway tab remains open.

4.1.5. Standard and common fields for gateways

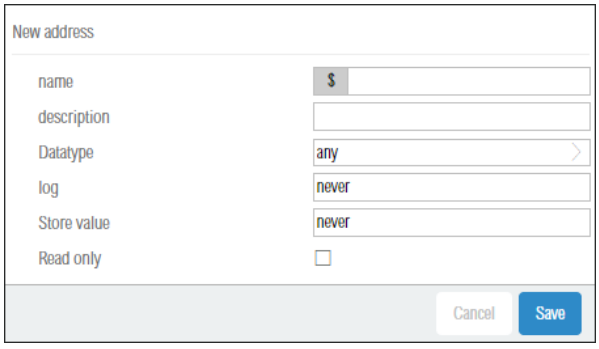


Figure 9 - Insert an address (internal)

The views of the fields can be selected in the display with the "Columns" menu.

Show

Hide

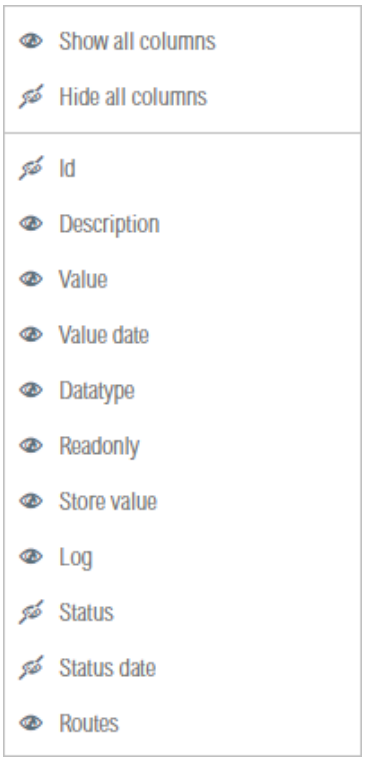


Figure 10 - Visibility option

New address:

- **Name** :

Name of the address

- **Description**:

Description of the data point

Datatype:

Allows you to define the supported format (depending on the gateway):

- **Any** (any type)
- **Number**
- **String** (string)

Log:

Defines the recording of traces:

- **15 minutes**
- **1 hour**
- **Never**
- **On change**
- **Always**

Store value:

Stores the value on the disk:

- **15 minutes**
- **1 hour**
- **Never**
- **On change**
- **Always**

Route:

Indicates whether one or more routes are linked to the address:

- By clicking on the number indicated, you can go directly to the route concerned

Value date:

- Time stamp of the last value read

4.2. System

4.2.1. General

The default display is the system home page, which shows the status of system information such as processor resource usage and memory, but also disk space.

The list of active sessions allows you to check the connections made on the system, but as an administrator, also to force a reconnection or the deletion of one or more of them.

4.2.1. Terminal

A command terminal (CLI) is also available, in addition to the advanced features (under control of a password "super admin", the latter is only available for Sauter support), allows to perform some useful commands, such as pinging a connected equipment.

The guest IDs (GUEST access, read) are shown directly on the console:

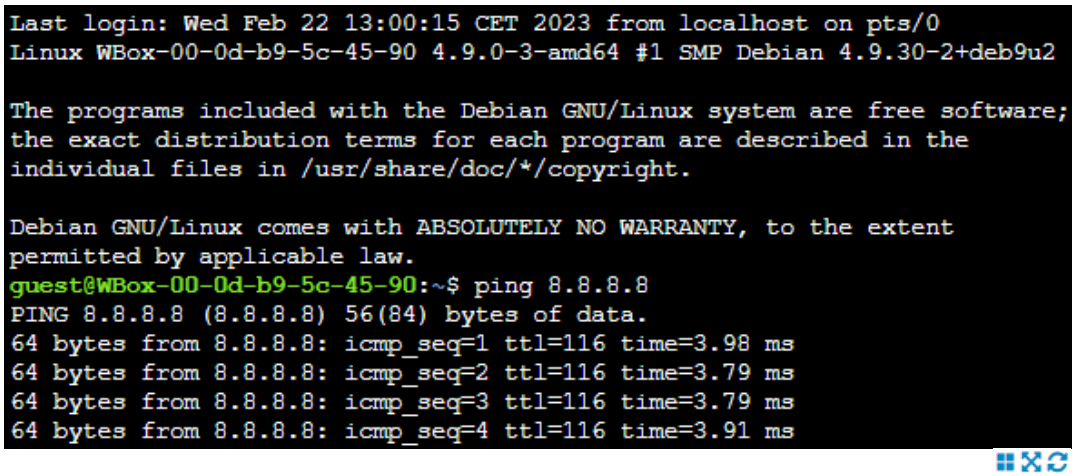


Figure 11 - Console interface

Various useful navigation commands (CLI)

Ordering	Description
ls	Lists all files and folders in the current folder
cd / cd ~	Navigate to HOME directory or particular directory (with path)
cd	Move up one level in the active directory
find	Search a document: ex. find /home/ -name sbc.txt
ping	Allows you to query a network device: e.g. ping 8.8.8.8
traceroute	Determines the route a packet takes to reach the host
netstat	Lists the local ports listening or connected to the device
clear	Clears the console and the previous commands displayed

For more information, please consult the official documentation: https://linux.org/

4.2.2. System menu

The following items can be found in the menu system:

System logs

Allows you to analyze all system information and perform filters on different messages and sources.

System files	Description
network	Information related to network communication
pm2	Service manager information: Start system applications
supervision	Information related to gateway processes
tincProcess	Information related to VPN and Remote Services processes
webserver	Web server information and application interface

License configuration

By default, the licenses are pre-installed when ordering the hardware corresponding to the commercial reference. If additional licenses are added later during commissioning, they can be activated from this menu by clicking on "**License manager**", then "**Insert license**" with the **+** symbol.

Please note that the **material ID** number must be transmitted in advance.

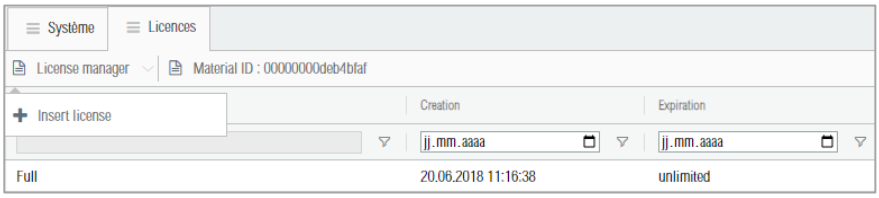


Figure 12 - License Manager

Then simply paste the license code you received into the field below:

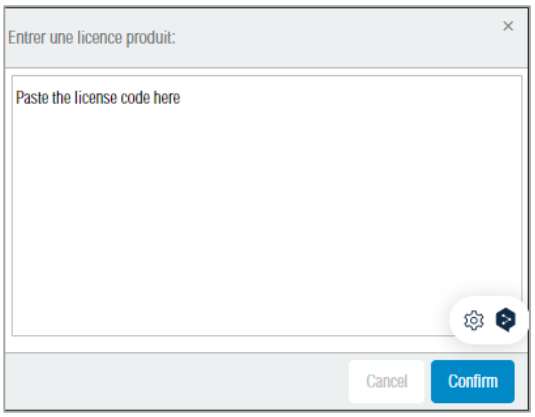


Figure 13 - Updating or adding a license

Note:	Avoid typing the license code manually, as it is very long and the risk of copying errors can be difficult to detect. Usually the code is delivered as text in an attachment or in an email back from the order.

Once the license code is activated, a new line appears with the activation date as a confirmation.

4.2.3. Cluster configuration

Clusters are used to group related processes from gateways together in order to optimize memory. From this interface, it is possible to perform grouped operations on them, such as restarting or stopping the cluster(s) concerned.

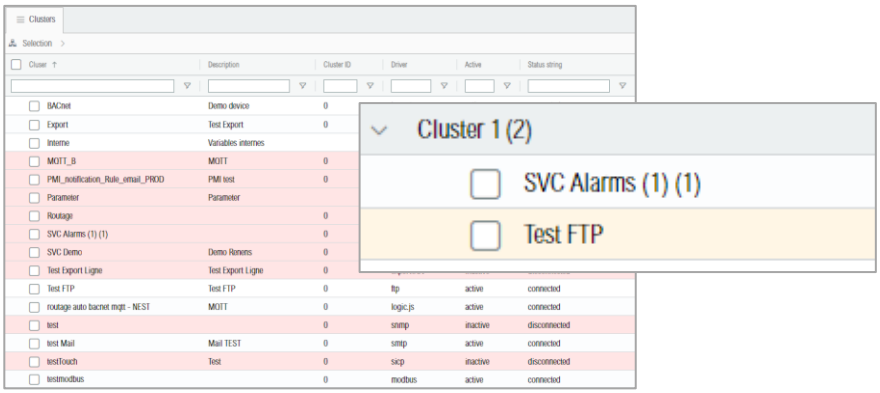


Figure 14 - Cluster display

Communication driver or process sources highlighted in red are those that are not currently active.

Note:	Be careful, if a cluster is stopped, all linked processes will be stopped too!

4.2.4. System update

By clicking on the update button, the following message appears:

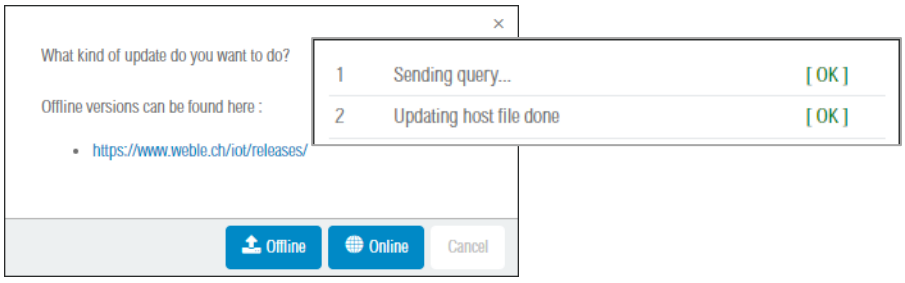


Figure 15 - Software update

The update packages can be imported offline with the "Offline" button, you can then select the previously downloaded file containing the ".wu" file extension. By clicking on the link, you will be automatically directed to the download directory which can be performed from any computer connected to the internet. This operation can only be performed if the device is not in DEV mode.

If the equipment is connected to the Internet, it is possible to click on the "Online" button, which allows you to update directly online.

4.2.5. System configuration

The global parameters of the equipment are shown in this section.

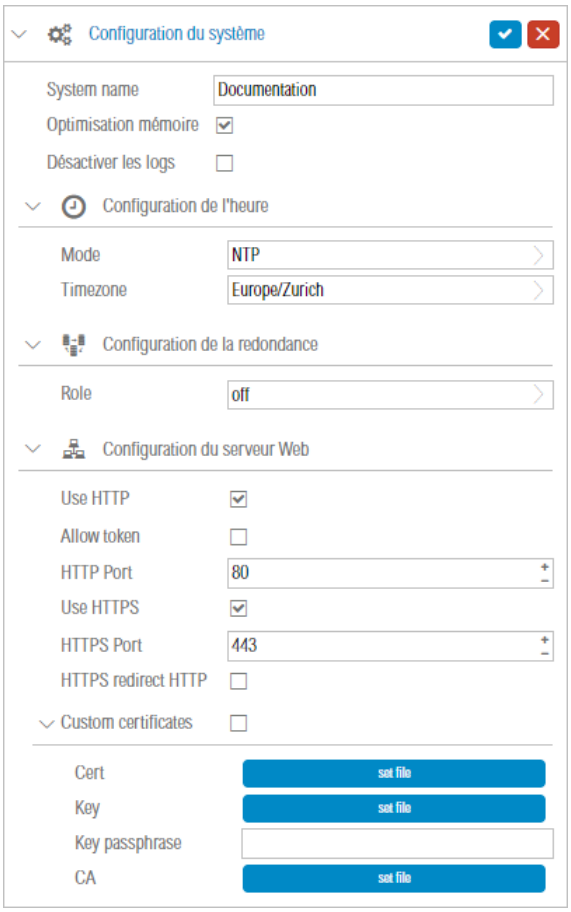


Figure 16 - System configuration

The symbols  They allow you to validate or cancel the parameters during the editing process

General :

- **System name** :

Name of the equipment

- **Memory Optimization**:

If enabled, optimizes the memory management of the device

- **Disable logs**

If enabled, removes the record from the event log

Time configuration :

- **Fashion**:

Allows you to select the type of clock from the following options:

  - **NTP** (default)
  - **Manually defined**
  - **Custom NTP**

- **Timezone**:

All standard regions are available for selection by drop-down menu

Configuring redundancy:

- **Role**:

Allows you to select the type of redundancy operation:

  - **OFF** (default)
  - **Master** (configurable port)
  - **Slave** (indicate Master)

Web server configuration :

All the options for port configuration or transport modes are available through this menu. The possibility to import third party certificates is also available.

Note: When the device is directly connected to the internet, it is recommended to redirect the http port (TCP80) to the secure https port (TCP443). If the secure port "https" is activated, the internet browser will indicate a certificate error if the certificates have not been generated by a recognized certification authority. However, if you have a wildcard certificate for your associated domain, you can import it in the "**Custom certificates**" section.

Backup/Restore

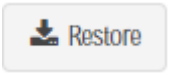
Backup and restore are essential functions, they allow to keep an engineering version and to restore it if a handling or configuration error occurs on the equipment.

It is recommended to make a backup at each configuration change, but at least when the installation/configuration is received by the customer and to store the backup archive on the network or in a safe place. The configurations are backward compatible, i.e. you can recover a whole backup even if the software version is not the same.

To perform a backup, simply click on the **Backup** button that appears on the system page portal.

The browser then automatically downloads the archive in ".ZIP" format to your download folder defined on your browser.

To restore a previous archive, click the nearby **Restore** button.



The system then offers you to select the option if you want to keep the network addressing of your backup (IP, GSM, WAN, LAN, WLAN and routes).

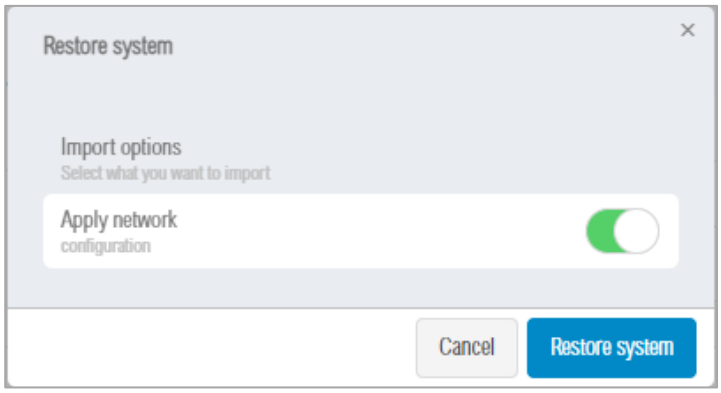


Figure 17 - System Restoration

Click on **Restore system** to import your backup. At this point, you can always cancel the operation by clicking on **Cancel**.

Network

4.2.6. General

The default display is the network home page, this portal displays the status of network information such as, Ethernet settings, modem usage, VPN access to Remote Services and access point.

The statuses are directly displayed, this allows to quickly check the different services, some features are directly accessible from this page.

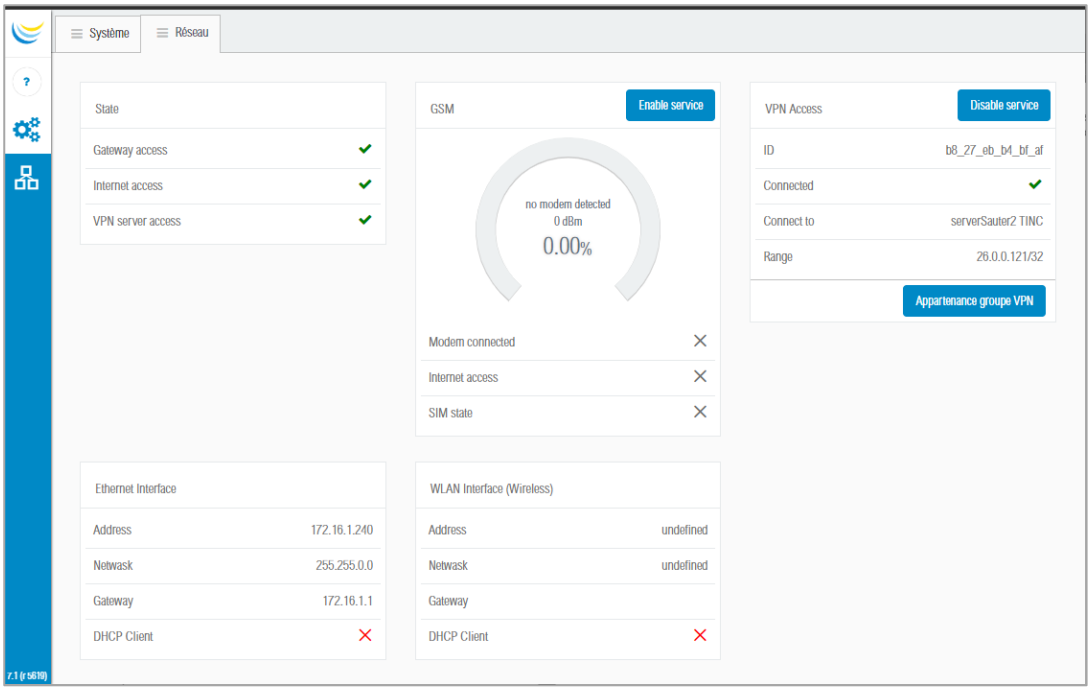


Figure 18 - Network portal

4.2.7. Port forwarding

The port forwarding menu simply allows you to manage direct access from the outside, a forwarding to a local network address on a specified TCP port.

NAT technology is applied to active inputs.

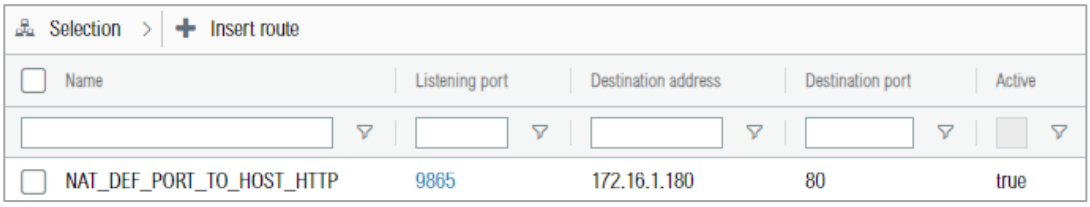


Figure 19 - Port forwarding

Note:	This feature should be applied for specific uses. It is preferable in terms of security, to use the Remote Services which ensures the encryption of data through the Sauter Cloud, the redirections are also available from the management interface. (please refer to the documentation).

4.2.8. Network configuration

The global parameters of the equipment are shown in this section.

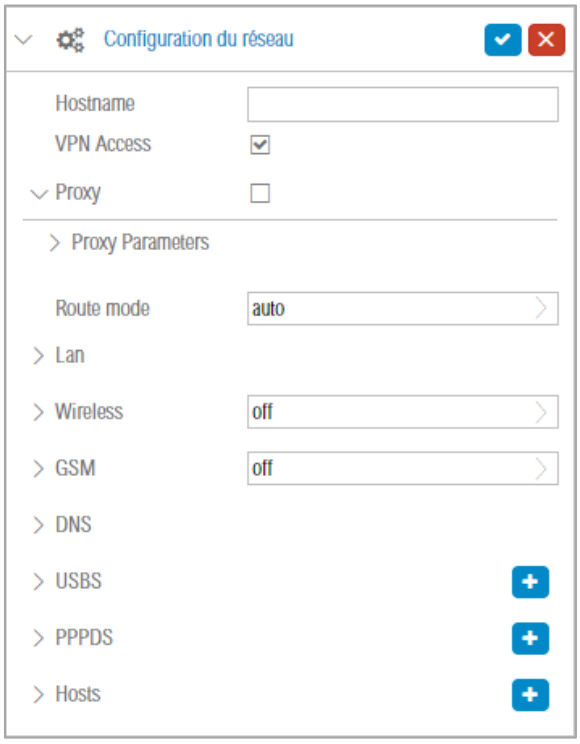


Figure 20 - Network configuration

General :

- **Hostname** :

Name of the equipment (network)

- **VPN Access** :

If enabled, allows registration to Sauter Cloud Remote Services (this service is licensed)

Proxy :

Allows you to define a network proxy address:

- Host / port
- User / password
- Custom route

LAN 1/2:

IP configuration of the equipment for the defined port:

- Mask and gateway
- DHCP Client
- Secondary address

WAN:

Equipment IP configuration for the WAN port (if available):

- Mask and gateway
- DHCP Client

Wireless:

Wi-Fi settings

- Customer
- Hotspot (access point)

By default, the GPRS gateway is the one of Swisscom: gprs.swisscom.ch

GSM :

3G/4G internet access or SMS sending (no internet)

- PIN / PUK
- GPRS Gateway
- Username / password

By default, Google DNS is enabled:

8.8.8.8 / 8.8.4.4

DNS:

Address of the name resolution server

- Primary
- Secondary

Advanced external communication settings (special uses)

USBS / PPPDS / HOSTS

Note: Network configurations may affect access to the equipment. Please take into consideration any changes that could make your access unavailable!

4.3. Gateways

4.3.1. General

The gateways are the core element of the Universal IoT Gateway. Each gateway can integrate different elements depending on the different communication protocols. The parameters are also related to the type of protocol.

The number of gateways is not specifically limited; however, it is advisable to check the resource usage. However, it is possible to create "**clusters**" in order to group certain gateway-related processes with one or more of them.

The operation of the gateways is licensed, the command references are separate except for the F099 version which contains all the protocols available for free use.

Routes and gateway monitoring are also available from this menu.

4.3.2. Gateways

A gateway must be started (green) to function. It is then possible to stop (red) or restart (orange) a gateway from the interface.

In order to facilitate the search, it is possible to type a part of the defined name of the gateway to make it available.

Figure 21 - List of gateways

General :

- **Import**:

Allows you to import a gateway

- **Configuration**:

Activate the configuration mode, add a new gateway according to the drop-down list

Status:

Apart from the color, the following statuses can be displayed

- CONNECTED
- CONNECTING
- DISCONNECTED

Names:

The defined names appear in the list

Operations:

The buttons allow the following operations:

- Configure
- Restart
- Stop
- Delete

4.3.3. Routes

Routes are used to perform mapping operations between the different gateways configured in the equipment.

Routing can be done in several ways.

1. From the routes interface
2. Drag and drop from one gateway to another directly on the points concerned

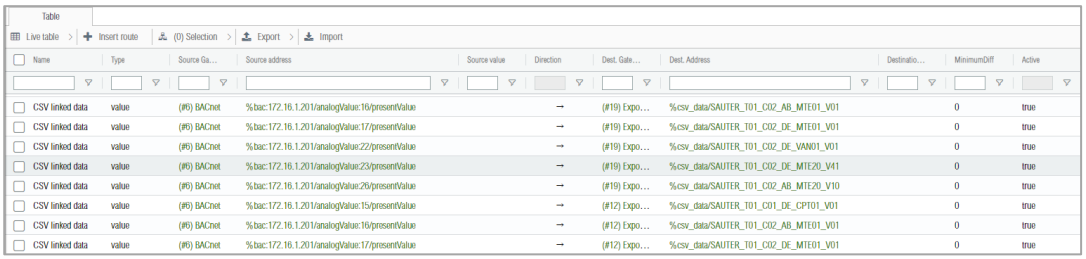


Figure 22 - New route

In this example, a new route is created using the **insert** + button

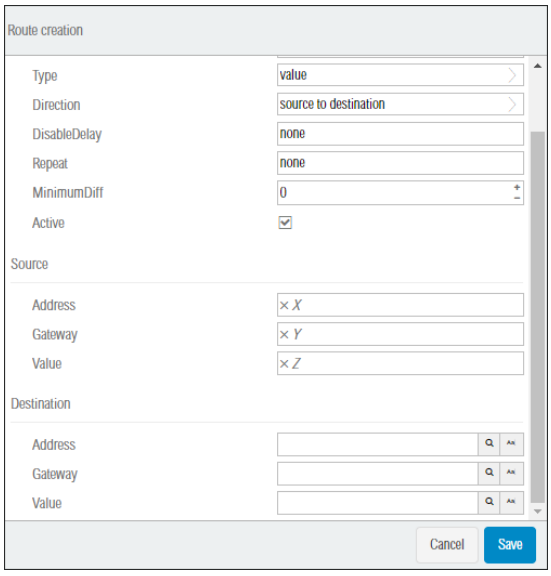


Figure 23 - New route

Route properties:

- **Name**:

Name of the Route

- **Type**:

Status, Value or Value/Status

- **Direction**:

Direction and ownership

  - Source to destination
  - Destination to source
  - Bidirectional
  - Bi (initialized by source)
  - Bi (initialized by destination)

- **DisableDelay**:

Deactivation delay

- **MinimumDiff**:

Change threshold value

- **Active**:

If activated, the route is effective

Source:

- **Address**:

Source data point

- **Gateway**:

Source data point

- **Value** :

Value of the source

Destination:

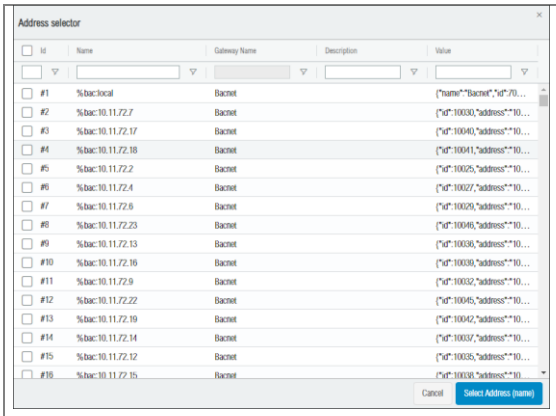


Figure 24 - Address selector

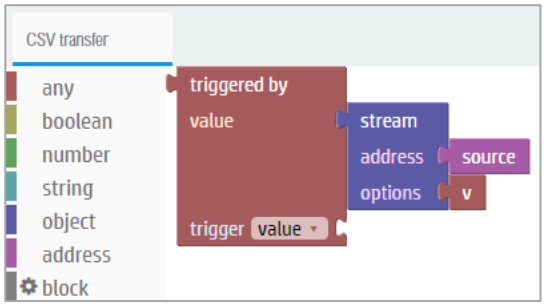


Figure 25 - Route editor

- **Address**:

Destination data point

- **Gateway**:

Destination data point

- **Value** :

Value of the destination

Operations:

Search function for addresses with the symbol

Displays the address selector

- Allows filtering on each field

Advanced routing functions with the symbol Aa

- Allows you to configure blocks
- Allows JavaScript editing

In the example on the left, the JavaScript equivalent is as follows:

```
triggered_by(stream(source,v),
"value")
```

Routes can be exported and imported in CSV or JSON format directly from the menu.

Note:	It is important to check the consistency of the routes (formats and value types). The system may disable one or more routes if they overload the system and the equipment. Routes whose addresses are no longer available remain displayed, but no longer have any function.

4.3.4. Gateway monitoring

Gateway monitoring allows you to check the communication and transmitted frames from a configured gateway and its associated addresses.

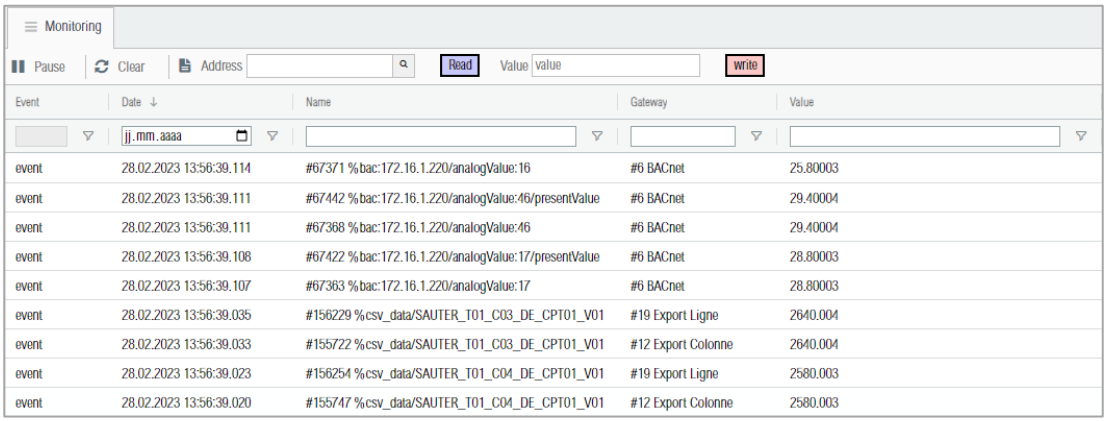


Figure 26 - Gateway monitoring

The traffic of information is often high, it is possible to pause

4.4. Access

The configuration of users is done from this interface

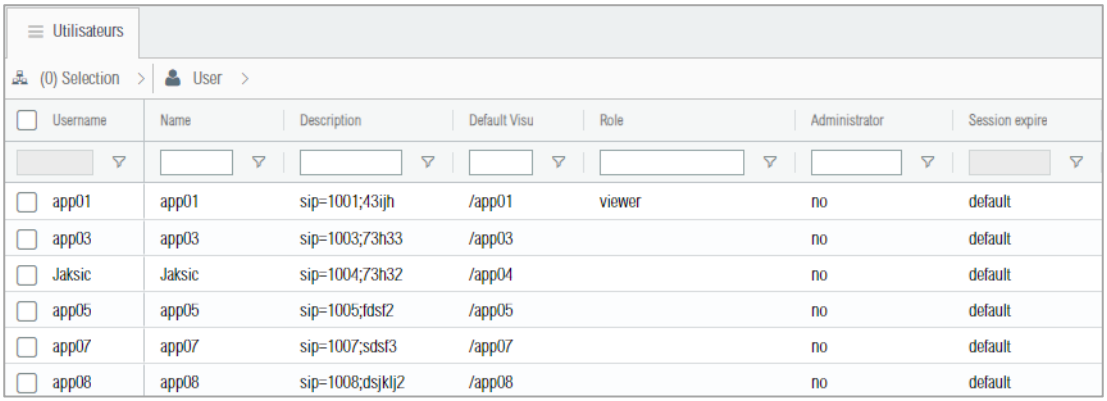


Figure 27 - Access management

To create a new user, simply click on the button **User >** "Insert User **+**".

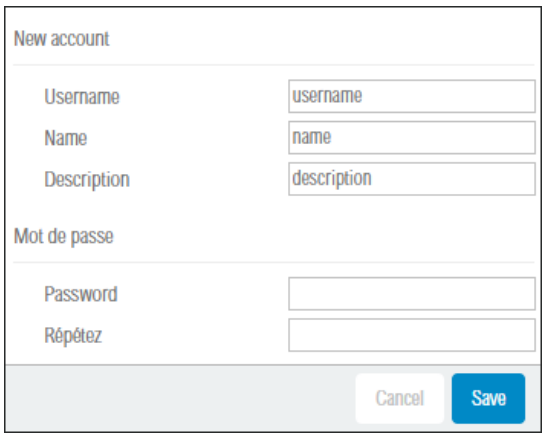


Figure 28 - New user

Once created, you can define the access rights and various parameters listed below:

Field	Description
Username	User name (login)
Name	Name displayed (e.g. last name, first name)
Description	User description (optional)
Default visu	User default view
Role	User Role: ■ Administrator (read/write rights) ■ Viewer (reading right) ■ None (no rights)
Administrator	YES / NO (if activated, gives access to configuration)
Session expires	Expiration time (configurable or never), default, global setting

4.5. Data log

4.5.1. General

This section allows you to display and export historical data.

It is necessary to have an external storage device of USB type to be able to carry out a retention of the data. The aggregations are natural and calculated in the background to obtain a fast display during queries.

4.5.2. Queries

The "**Query"** tab allows you to define the period (start and end), the aggregation mode and the addresses selected for the display of the data, just click on the symbol 🔍

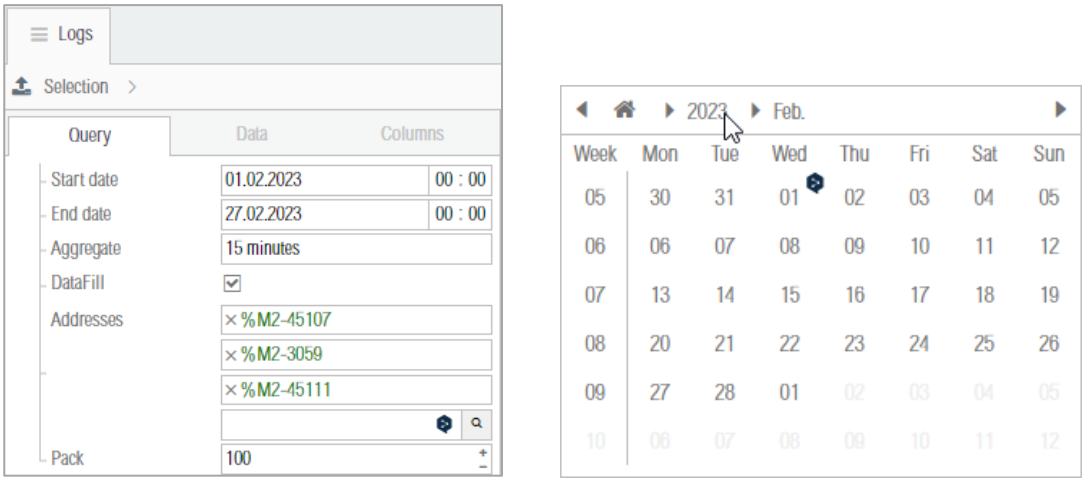


Figure 29 - Data query

Once the addresses are defined, click on the **Launch query** button

4.5.3. Data

The "**Data"** tab allows you to define the data display style and add specific conditions for each selected address.

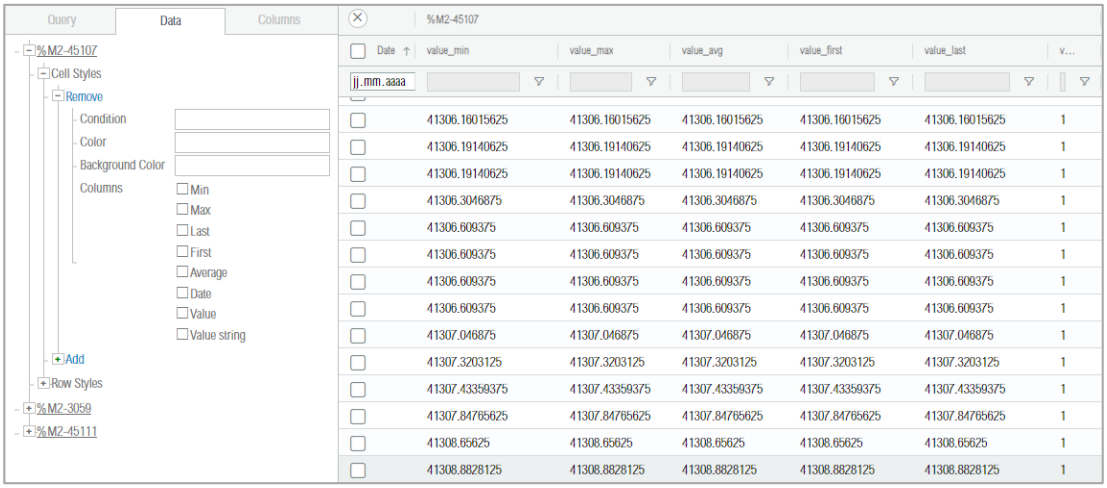


Figure 30 - Data configuration

4.5.4. Columns

The "**Columns**" tab allows you to define the columns to be displayed according to the choices available below:

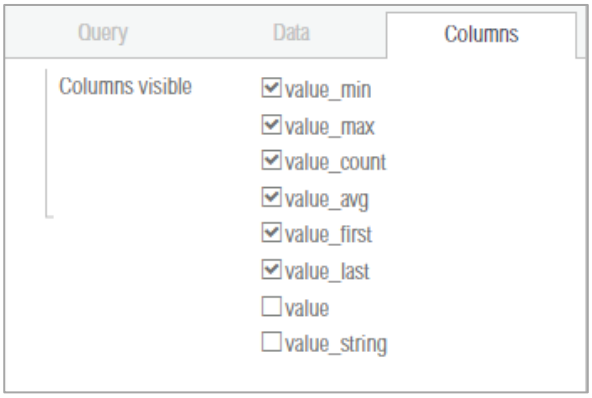
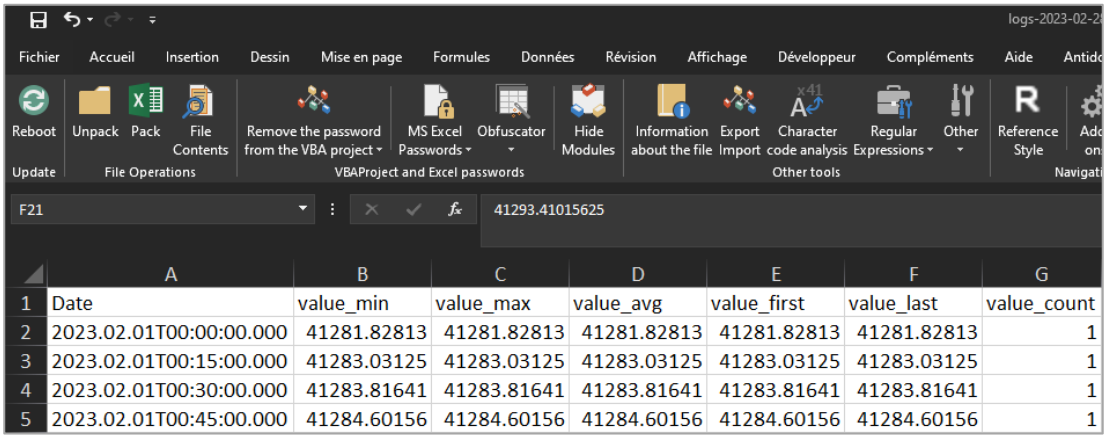


Figure 31 - Column configuration

4.5.5. Data export

By clicking on the menu " **Selection** ", you have the possibility to export the data in several standard formats (active selection or all entries).

- CSV
- JSON
- MS Excel
- XML



	A	B	C	D	E	F	G
1	Date	value_min	value_max	value_avg	value_first	value_last	value_count
2	2023.02.01T00:00:00.000	41281.82813	41281.82813	41281.82813	41281.82813	41281.82813	1
3	2023.02.01T00:15:00.000	41283.03125	41283.03125	41283.03125	41283.03125	41283.03125	1
4	2023.02.01T00:30:00.000	41283.81641	41283.81641	41283.81641	41283.81641	41283.81641	1
5	2023.02.01T00:45:00.000	41284.60156	41284.60156	41284.60156	41284.60156	41284.60156	1

Figure 32 - Export to Excel

Note:	Please make sure you have external persistent storage to use the logging features **The storage interface is not available directly from the interface. Please contact support for such an implementation.**

5. Modbus

The MODBUS protocol is a communication protocol based on Master/Slave or Client/Server architecture. The protocol is primarily intended to enable simple, reliable and fast communication between automation and field devices.

5.1. Principle of the Modbus protocol

The MODBUS protocol has been established for a long time and has now become a de facto standard. It is based on the MODBUS protocol, which has been known since 1979 for programmable controllers. The particular advantage for the user is that MODBUS is a simple protocol and therefore ensures very fast data transmission over ETHERNET. Due to the vendor-neutral data structure, communication between devices from different manufacturers is not a problem if the table is known and documented (different formats and data types).

For data transmission, a distinction is made between the following different communication modes:

- Modbus TCP: TCP/IP ETHERNET communication based on the client/server model (Master/Slave)
- Modbus RTU: asynchronous serial transmission via RS-232 or RS-485
- Modbus ASCII: similar to RTU protocol, only a different data format, rather rare use

5.2. Modbus TCP

Modbus TCP creates a client/server communication. For this, the participants only need to be in the same IP address range or be routed in a computerized way, the default port is TCP502, it is initiated by the client.

An additional setting is made via the device address, which is not manually adjustable for all manufacturers. With this device address, you can, for example, via a Modbus TCP/Modbus RTU gateway by addressing the IP address of the gateway, reach the underlying Modbus RTU participants using the device addresses. Modbus TCP has been specified in the IEC 61158 standard since 2007 and is referenced as CPF 15/1 in the IEC 61784-2 standard.

5.3. Modbus RTU

Modbus RTU provides master/slave serial communication via RS-232 or RS-485. In order to address Modbus RTU, the serial communication parameters must first be known or set. These include baud rate, parity and stop bits. In addition, the slave address(es) to be addressed by the master is/are added. The cable length for RS-232 is limited to 15 m and for RS-485 to 1200 m.

5.4. Modbus data source

Before integrating data points in Modbus format, it is necessary to know the exchange tables containing the register addresses, formats and types of data points.

There are several types of data models that the Gateway is able to handle natively:

5.4.1. Type of data

Type of data	Format	Rights	Description
Discrete	Bit	Read-Only	This type of data comes from an I/O system
Coils	Bit	Read-Write	This type of data can be modified.
Input Registers	16-bit	Read-Only	This type of data comes from an I/O system
Holding Registers	16-bit	Read-Write	This type of data can be modified.

For more information, please visit: https://modbus.org/

5.4.2. Format types and modes

The different formats supported by the gateway are the following:

- Int8, int16, int32, Uint8, Uint16, Uint32, BCD8, BCD16 and BCD32
- Bit, Hex and ASCII
- Floating, Double and MOD1000 (specific to Schneider Electric)
- Multiple register reading (up to 4 registers simultaneously)
- Big Endian and Little Endian (BE, LE)
- Swapping mode (SW / SB) according to IEEE-751

These are not detailed in this document, but you can refer to the official Modbus documentation at: https://modbus.org/

Note: The Modbus communication protocol works only by scanning. It is therefore not possible to scan a device to discover its available addresses and formats.

You must therefore have the Modbus exchange table from the equipment supplier (in case of Modbus client)

5.5. Modbus Gateway

5.5.1. Modbus gateway parameter

The Modbus gateway can be inserted or imported from the "Gateways" menu.

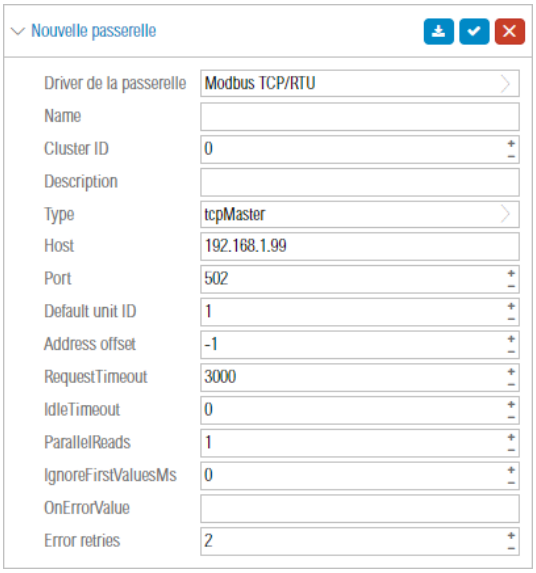


Figure 33 - Modbus Gateway

Validate the parameters, then start the gateway with the button 

When the gateway is started correctly, it will be displayed in green in the gateway list. Click on it to get the configuration on the side panel

Gateway Properties:

Example with TCP Master. The fields adapt themselves according to the available properties.

- **Name** :

Name of the gateway

- **Cluster ID**:

Cluster number if defined

- **Description**:

Description of the gateway

- **Type**:

Type and mode of communication

  - rtuMaster
  - rtuSlave
  - tcpMaster
  - tcpSlave

- **Host**:

IP address or host name

- **Port**:

Communication TCP port (default 502 for Modbus IP)

- **Default unit ID** :

Modbus unit number

- **Address offset** :

Modbus offset (default -1)

- **RequestTimeout**:

Time limit for requests

- **IdleTimeout**:

Inactivity time

- **ParallelReads**:

Simultaneous readings

- **IgnoreFirstIValuesMs**:

Delay of not considering the first reader values (ms)

- **OnErrorValue**:

Default value in case of reading error

- **Error retries** :

Number of tries before considering the reading as a communication error

5.5.2. Creating a Modbus address

To create a Modbus address, simply click

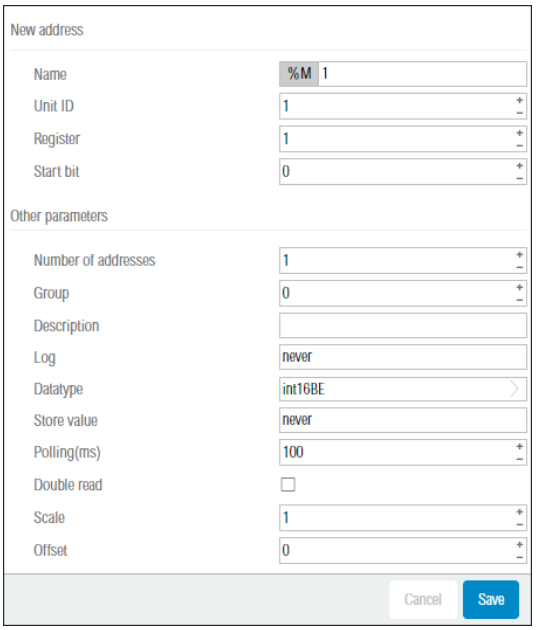


Figure 34 - New Modbus address

Once you have configured the address. Click on **Save**

Remark:

The different data types work in the same way. The prefixes of the addresses change and are available in their respective tab.

Be careful, each value will be saved with this parameter, check the scanning frequency before enabling this option.

New address:

Example with a Holding Register and TCP client format. The fields adapt themselves according to the available properties.

- **Name** :

Data point name (automatic)

- **Unit ID**:

Equipment number

- **Register**:

Modbus register number

- **Start bit**:

Read bit number

Other parameters:

- **Number of addresses** :

Number of addresses to create

- **Group**:

Group number (default 0)

- **Description**:

Description of the point(s)

- **Log**:

Logging parameters

- **Datatype**:

Modbus data type

Some examples below, details available in reference

  - Int16BE
  - Double
  - Float
  - Mod1000
  - ...

- **Store value**:

Storage of the value on the disk

- **Polling**:

Scanning delay (in ms)

- **Double read**:

If enabled, takes two readings

- **Scale**:

Reading scale, factor on value

- **Offset** :

Register offset (default 0)

5.5.3. View of a Modbus gateway (Holding Registers)

The data points are available in table form with the usual filtering operations, field headers and data import and export possibilities.

Name	Description	Value	Value date	Datatype	Pollin…	Scale
			jj.mm.aaaa			
%M1-1000	TP1 - Masterpact TP - Reseau Normal - Tension A-B [V]	[read] 413	2023-02-22 11:12:53	int16BE	300000	1
%M1-1001	TP1 - Masterpact TP - Reseau Normal - Tension B-C [V]	[read] 415	2023-02-22 11:13:12	int16BE	300000	1
%M1-1002	TP1 - Masterpact TP - Reseau Normal - Tension C-A [V]	[read] 414	2023-02-22 10:59:14	int16BE	300000	1
%M1-1016	TP1 - Masterpact TP - Reseau Normal - Courant Phase A [A]	[read] 126	2023-02-22 10:45:37	int16BE	300000	1
%M1-1017	TP1 - Masterpact TP - Reseau Normal - Courant Phase B [A]	[read] 123	2023-02-22 11:14:26	int16BE	300000	1
%M1-1018	TP1 - Masterpact TP - Reseau Normal - Courant Phase C [A]	[read] 116	2023-02-22 11:14:45	int16BE	300000	1
%M1-1037	TP1 - Masterpact TP - Reseau Normal - Puissance active [kW] (a / p…	[read] 87	2023-02-22 11:11:19	int16BE	300000	1
%M1-1041	TP1 - Masterpact TP - Reseau Normal - Puissance reactive [kVar] (a …	[read] 15	2023-02-22 11:11:38	int16BE	300000	1
%M1-1045	TP1 - Masterpact TP - Reseau Normal - Puissance apparante [kW] (a…	[read] 87	2023-02-22 10:57:41	int16BE	300000	1
%M1-1046	TP1 - Masterpact TP - Reseau Normal - Facteur de puissance Phase …	[read] -32768	2022-10-25 14:01:23	int16BE	300000	1
%M1-1047	TP1 - Masterpact TP - Reseau Normal - Facteur de puissance Phase …	[read] -32768	2022-10-25 14:01:24	int16BE	300000	1
%M1-1048	TP1 - Masterpact TP - Reseau Normal - Facteur de puissance Phase …	[read] -32768	2022-10-25 14:01:24	int16BE	300000	1
%M1-1054	TP1 - Masterpact TP - Reseau Normal - Frequence [Hz] (a / par 10)	[read] 500	2023-02-22 00:18:15	int16BE	300000	1
%M1-2000	TP1 - Masterpact TP - Reseau Normal - Energie active [kWh]	[read] 5220203	2023-02-22 11:12:16	mod10000_4_BE	300000	1
%M1-2004	TP1 - Masterpact TP - Reseau Normal - Energie reactive [kVarh]	[read] 438439	2023-02-22 11:11:00	mod10000_4_BE	300000	1
%M1-2024	TP1 - Masterpact TP - Reseau Normal - Energie apparante [kWh]	[read] 5245105	2023-02-22 11:12:34	mod10000_4_BE	300000	1

Figure 35 - Modbus Gateway in Holding Registers

5.5.4. View of a Modbus gateway (Input Registers)

The data points are available in table form with the usual filtering operations, field headers and data import and export possibilities.

Holding registers | Input registers | Coils | Discrete inputs

Live table | (0) Selections | Addresses | (0) Export file | Import file

Name	Description	Value	Value date	Datatype	Pollin…	Scale
			jj.mm.aaaa			
%Q0	Temp BE / 10	[read] 9.60000000000…	2023-02-25 11:23:01	int16BE	5000	0.1
%Q1-0	AVEC SLAVE SPECIFIE	[read] 96	2023-02-25 11:23:01	int16BE	100	1
%Q2	klux sud	[read] 23000	2023-02-25 11:21:31	int16BE	5000	1000
%Q4	klux ouest	[read] 14000	2023-02-25 11:21:31	int16BE	5000	1000
%Q6	klux est	[read] 47000	2023-02-25 11:22:39	int16BE	5000	1000
%Q8	Eclairage	[read] 999	2023-02-25 07:39:51	int16BE	5000	1
%Q10	Vent / 10 m/s	[read] 7.56	2023-02-25 11:23:10	int16BE	5000	0.36
%Q12	GPS	[read] 1	2023-02-23 12:47:41	uint8	5000	1
%Q13	Pluie	[read] 0	2023-02-25 03:03:07	uint8	100	1
%Q14	Jour du mois	[read] 25	2023-02-25 01:00:04	int16BE	5000	1
%Q16	Mois	[read] 2	2023-02-01 01:00:05	int16BE	5000	1
%Q18	Année	[read] 2023	2023-01-01 01:00:05	int16BE	5000	1
%Q20	Heure GMT 0	[read] 10	2023-02-25 11:00:03	int16BE	5000	1
%Q22	Minutes	[read] 23	2023-02-25 11:23:05	int16BE	5000	1
%Q24	Secondes	[read] 6	2023-02-25 11:23:10	int16BE	5000	1
%Q26	Azimut / 10 , 0 - 360 deg	[read] 156.600000000…	2023-02-25 11:23:05	int16BE	5000	0.1
%Q28	Elévation / 10 , 0 -90 deg	[read] 31.700000000…	2023-02-25 11:22:05	int16BE	5000	0.1
%Q30	Longitude / 100	[read] 7.52000000000…	2023-02-11 15:52:29	int16BE	5000	0.01
%Q32	Latitude / 100	[read] 46.31	2023-02-23 00:38:20	int16BE	5000	0.01

Figure 36 - Modbus Gateway in Input Registers

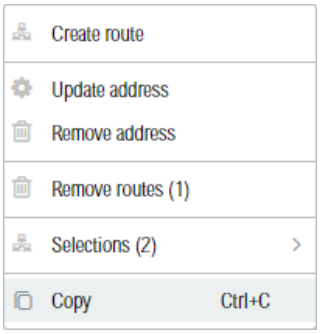
5.5.5. Data generation and integration

The data points are available in table form with the usual filtering operations, field headers.

Ideally, the registers to be integrated are often the same for the Modbus equipment (e.g. electrical circuit breakers). It is then convenient to generate some addresses and export the data by working them on Excel for example. Then import the file again with all the address generation.

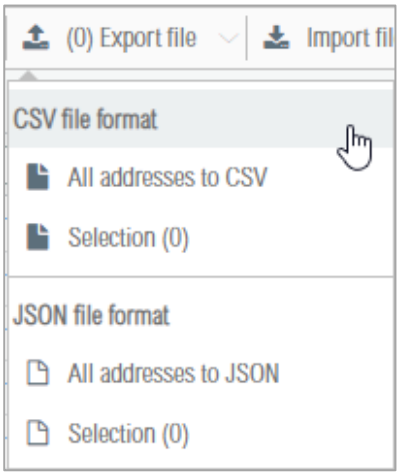
The "**Spreadsheet**" mode is also suitable for this type of operation.

A contextual menu is also available for various operations, directly on the selected address:



5.5.5.1. Export

In order to export the data contained in the gateway, you must click on the "**Export file**" button, then select the desired format from the following:



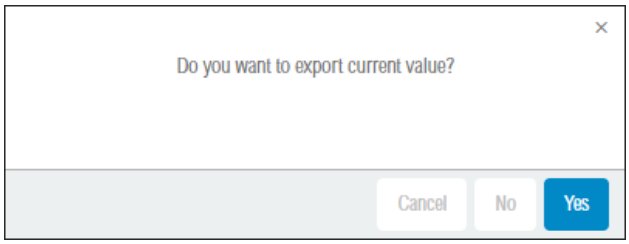
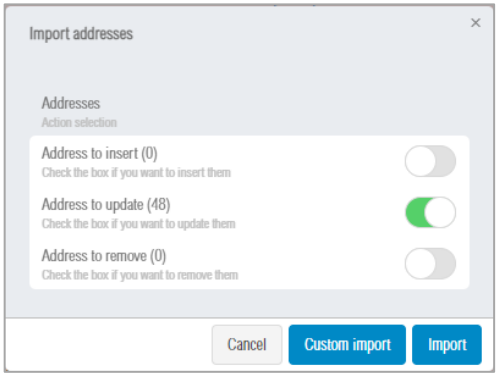


Figure 37 - Exporting addresses from a Modbus gateway

The CSV format is suitable for mass processing in an external spreadsheet. It is a comma-delimited plain text format.

When exporting, the interface prompts you to export the values as well. Generally, this feature is useful for volatile parameters or internal sources.



Once your file is worked on your table, save it in CSV format, then import it using the "**Import file**" button.

You then have the option to allow the insertion, update and deletion of data based on what is read in the import file.

Note that the system does not distinguish the delimiter (, or ;).

6. M-Bus

The M-Bus system based on a master-slave procedure can adopt line, star and tree topologies. The master supplies the serial bus with power and processes the data from the M-Bus slaves (measuring devices). It is widely used for the communication of heat and electricity meters. It is not linked to any manufacturer.

6.1. Principle of the M-Bus protocol

The M-Bus (Meter-Bus) is an economical fieldbus for the feedback of energy consumption. A central master communicates via a twisted pair with the participants (up to 250 per segment), such as heat meters, water meters, electricity meters, gas meters, etc., as well as with sensors and actuators of all types.

The M-Bus is used to read energy consumption data from electricity meters, heat meters, gas meters, water meters and various sensors and actuators from different manufacturers. As an efficient measuring system for the acquisition of consumption data, the Meter-bus is often used in the field of building management technology.

For more information, please visit https://m-bus.com/

Note:	It is necessary to use an external power supply to the gateway to communicate with M-Bus compatible equipment (serial standard). The external power supply must be sized according to the number of meters on the line. Please refer to the commercial references

6.2. M-Bus Gateway

The M-Bus Gateway can operate with three communication modes. The gateway supports device discovery methods.

6.2.1. M-Bus gateway parameters

The M-Bus gateway can be inserted or imported from the "Gateways" menu.

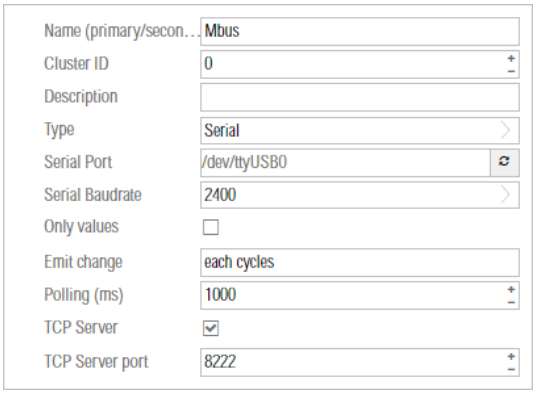


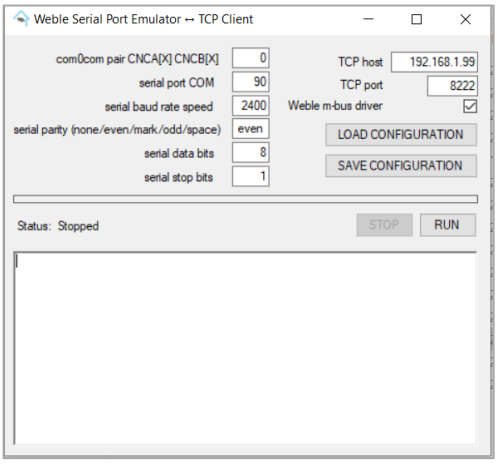
Figure 38 - M-Bus Gateway

Validate the parameters, then start the gateway with the button 

When the gateway is started correctly, it will be displayed in green in the gateway list. Click on it to get the configuration on the side panel.

The "Serial Port Emulator - TCP Client" tool allows to remotely connect in TCP to the M-Bus network and emulate a serial COM port on Windows.

This facilitates remote configuration of the M-Bus network (through a VPN) using specialized M-Bus Windows software that works only in serial mode such as "NG-MScan2" which we recommend.



Gateway Properties:

- **Name** :

Name of the gateway

- **Cluster ID**:

Cluster number if defined

- **Description**:

Description of the gateway

- **Type**:

Type of communication

  - Serial
  - TCP
  - Wireless

- **Serial Port or TCP** :

Serial port or IP address

- **Serial Baudrate or Port** :

Communication speed or TCP port

- **Only values** :

Enable retrieval of values only (without properties)

- **Emit change**:

Data transmission cycle (default: each cycle). This parameter can be set to :

  - Each cyl.
  - 15 minutes
  - 1 hour
  - Only changes

- **Polling**:

Scanning delay (in ms)

- **TCP Server**:

Activation of the TCP server

- **TCP Server Port** :

TCP server port number

6.2.2. Creating an M-Bus address

In order to create an address, just click on "**Addresses**" > "**Insert object**".

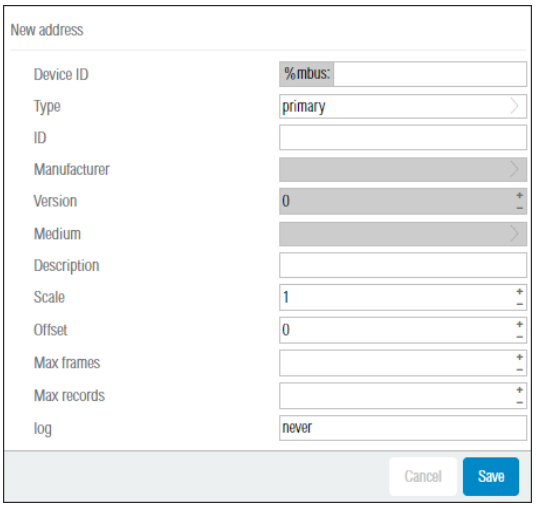


Figure 39 - New BACnet address

Once you have configured the address. Click on **Save**

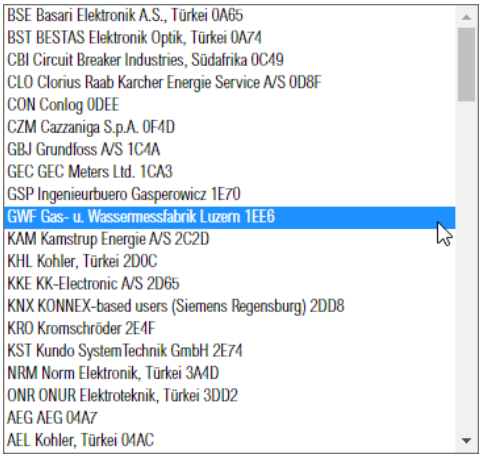


Figure 40 - List of M-Bus manufacturers

The types of counter (**Medium**)

- Other, Oil, Electricity, Gas, Heat, Steam, Hot Water, Water, H.C.A., Reserved

New address:

- **Device ID**:

Name of the data point (automatic)

- **Type**:

Type of address

- Primary
- Secondary

- **Manufacturer** :

Manufacturer (to be specified only if type "**Secondary**" has been selected)

- **Version**:

Version number (to be specified only if type "**Secondary**" has been selected)

- **Medium**:

Counter type (to be specified only if type "**Secondary**" has been selected)

- See drop-down list

- **Description**:

Description of the data point

- **Scale**:

Point Value Scale

- **Offset** :

Point value shift

- **Max frames**:

Maximum number of frames

- **Max records**:

Maximum number of records

- **Log**:

Logging parameters

7. BACnet

BACnet "Building Automation and Control Networks" is a data transfer protocol for building automation and control. BACnet facilitates communication between products from different manufacturers in building automation.

7.1. Principle of the BACnet protocol

BACnet was developed by the American Society of Heating, Refrigeration and Air Conditioning Engineers Inc. Published as an American standard in 1995, BACnet has been an ISO 16484-5 standard since 2003. BACnet provides open, interoperable building automation. As a result, extensions and modifications in the building can be implemented independently of the manufacturer and from one system to another. This is sometimes possible through the use of common data points and coordinated functions.

There are many protocols for the realization of projects in the building services sector; for large projects, the various trades often develop independently of each other. BACnet serves as a link between the various systems and products and thus ensures the exchange of data between the individual devices in a uniform overall system.

Numerous network technologies and topologies are supported, including IP protocol. Thus, both in the management and in the automation, an integration in all buildings is possible: HVAC, lighting control, security and fire alarm technology.

This protocol offers a high degree of flexibility and lower maintenance and installation costs in building automation and control. As a worldwide communication standard, BACnet is monitored by independent testing laboratories and is under constant development.

It is technology and manufacturer independent and has compatibility with different network technologies, e.g. ETHERNET, ARCNET LAN, MS/TP or PTP.

Tested by independent testing laboratories, it can be BTL certified.

Continuous maintenance and development of standards, currently BACnet/SC (Secure Connect) is available from most major automation manufacturers such as Sauter.

You can find more information at https://bacnet.org/

7.2. BACnet implementation (PICS)

This section contains the BACnet compatibility information for the Universal IoT Gateway. The standardized profile (as per Appendix L) is "BACnet Application Specific Controller" (B-ASC).

7.2.1. BACnet compatibility blocks (Annex K) - BIBBs

The following interoperability blocks are supported by the equipment

Data Sharing	Alarm & Event Management	Scheduling	Trending	Device & Network Management
DS-RP-A, -B DS-WP-A, -B DS-COV-A, -B DS-COVP-A	AE-N-A, -B AE-ACK-A, -B		T-VMT-I-A, -B T-VMT-E-A, -B	DM-DDB-A, -B DM-DOB A, -B DM-DCC-B DM-TS-A, -B DM-UTC-A, -B DM-BR-B DM-RD-B

7.2.2. Segmentation

The transmitted and sent messages can be segmented from 0 to 16 bits

7.2.3. Supported objects

Type of object	Abbreviation	Definition	Description
Device	DEV (8)	Purpose of the equipment	(Device-specific information and gateway properties such as manufacturer, firmware version, etc.)
Analog Input	AI (0)	Analog input	Read only - Data point from an analog input, for example, an actual temperature value.
Analog Output	AO (1)	Analog output	Read/write - For example, a control valve.
Analog Value	AV (2)	Analog value	Read/Write - For example, a temperature set point.
Binary Input	BI (3)	Binary input	Read only - Data point of a binary input, for example, a switching state of a fault detection.
Binary Output	BO (4)	Binary output	Read/write - For example, an actuator relay such as a pump release.
Binary Value	BV (5)	Binary value	Read/write - For example, a virtual point.
Multistate Input	MI (13)	Multi-state input	Read-only - Multiple input data point, for example, pump status information (on, off or unavailable).
Multistate Output	MO (14)	Multi-state output	Read/write - For example, multi-state engine (PV, MV, GV)

Type of object	Abbreviation	Definition	Description
Multistate Value	MV (19)	Multi-state value	Read/write - For example, a specification of the operating mode (Normal, Comfort, Eco, etc.)
Notification Class	NC (15)	Notification class for alarms	BACnet notification class (support for all 16 alarm classes), with associated status flags. Bit String Format - In Alarm, Fault, Overridden, Out of Service
Trend Log	TL (20)	Object of historical data	Subscriber packets of recording data from one station. Support also Trend-Log Multiple

7.2.4. Device (DEV=8)

Standardised support

Standard Property	CC	R	W	Range Restriction
Object-Identifier	W	☑	☑	(from config. interface)
Object-Name	W	☑	☑	(from config. interface)
Object-Type	R	☑		
System-Status	R	☑		
Vendor-Name	R	☑		
Vendor-Identifier	R	☑		
Model-Name	R	☑		
Firmware-Revision	R	☑		
Application-Software-Version	R	☑		
Description	O	☑	☑	(from config. interface)
Protocol-Version	R	☑		
Protocol-Revision	R	☑		
APDU-Segment-Timeout	O1	☑	☑	(from config. interface)
APDU-Timeout	R	☑		
Number-Of-APDU-Retries	R	☑		
Max-ADPDU-Length-Accepted	R	☑		(up to 1024)
Device-Address-Binding	R	☑		
Active-COV-Subscriptions	O9	☑	☐	

Properties of the Device object

Designation	Type of property	Description
Instance No.	required	Instance number (the gateway can be uniquely identified in a BACnet/IP network from the instance number).
Rental	optional	Place of installation of the gateway.
Description	optional	Description
Model Name	required	Model number of the gateway controller.
Object Name	required	Name of the gateway object
Local Date	optional	Local date
Local Time	optional	Local time
System Status	required	• System status of the device object. The system status according to the BACnet standard can have the following values: • Operational • Read Only • Download Required • Download in Progress

Designation	Type of property	Description
		• Non-Operational / Idle • Backup Required

7.2.5. Analog Input (AI=0)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑	□*	* (from config. interface)
Object-Name	R	☑	□*	* (from config. interface)
Object-Type	R	☑	□*	* (from config. interface)
Present-Value	R	☑		
Description	O	☑	□*	* (from config. interface)
Units	R	☑	□*	* (from config. interface)
COV-Increment	O2	☑	□*	* (from config. interface)

7.2.6. Analog Output (AO=1)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Present-Value	R1	☑		
Description	O	☑	☑	
Units	R	☑	☑	
COV-Increment	O2	☑	☑	

7.2.7. Analog Value (AV=2)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Present-Value	R1	☑		
Description	O	☑	☑	
Units	R	☑	☑	
COV-Increment	O2	☑	☑	

7.2.8. Binary Input (BI=3)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Present-Value	R1	☑		
Description	O	☑	☑	

7.2.9. Binary Output (BO=4)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Present-Value	R1	☑		
Description	O	☑	☑	

7.2.10. Binary Value (BV=5)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Present-Value	R1	☑		
Description	O	☑	☑	
COV-Increment	O2	☑	☑	

7.2.11. Multi-State Input (MI=13)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Present-Value	R1	☑		
Description	O	☑	☑	
COV-Increment	O2	☑	☑	
State-Text	O	☑	☐	

7.2.12. Multi-State Output (MO=14)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Present-Value	R1	☑		
Description	O	☑	☑	
COV-Increment	O2	☑	☑	
State-Text	O	☑	☐	

7.2.13. Multi-State Value (MV=15)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Present-Value	R1	☑		
Description	O	☑	☑	
COV-Increment	O2	☑	☑	
State-Text	O	☑	☐	

7.2.14. Notification Class (NC=15)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Notification-Class	R	☑		
Description	O	☑	☑	
Priority	R	☑	☑	
Ack-Required	R	☑	☑	

7.2.15. Trend Log (TL=20)

Standard Property	CC	R	W	Range Restriction
Object-Identifier	R	☑		
Object-Name	R	☑		
Object-Type	R	☑		
Enable	W	☑		
Description	O	☑	☑	
Buffer-Size	R	☑		
Log-Buffer	R	☑		

7.3. Communication layer options

The Universal IoT Gateway supports the following media:

- BACnet/IP (Appendix J), Foreign Device
- BACnet MS/TP (Clause 9), Master/Slave up to 115'200 baud

7.4. Network options

The Universal IoT Gateway supports the following features:

- BACnet/IP Broadcast Management Device (BBMD)
    - BBMD supports registrations by Foreign Devices, BDT/FDT: 32 max
- BACnet Router (Clause 6), MS/TP Option

7.5. Character sets

The Universal IoT Gateway supports the character sets :

- ISO 8859-1
- ISO 10646 (UTF-8)

7.6. BACnet Gateway

The BACnet gateway has a client and a server available through the two tabs.

7.6.1. BACnet gateway parameters

The BACnet gateway can be inserted or imported from the "Gateways" menu.

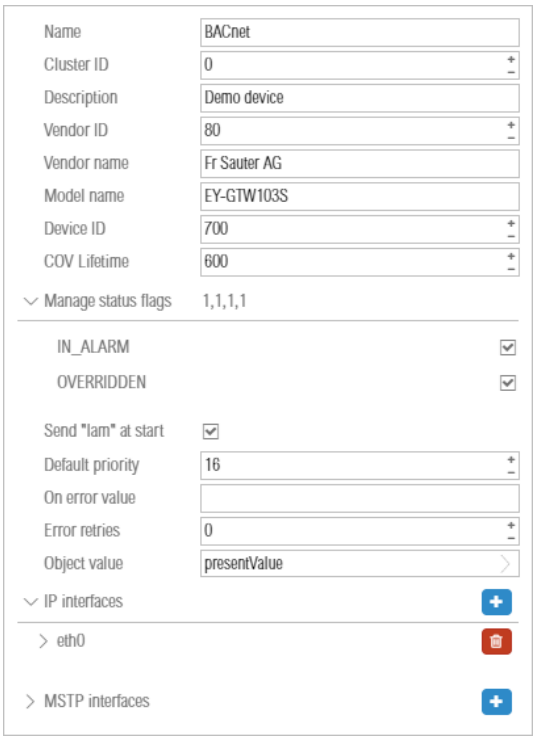


Figure 41 - BACnet Gateway

Validate the parameters, then start the gateway with the button 

When the gateway is started correctly, it will be displayed in green in the gateway list. Click on it to get the configuration on the side panel

Gateway Properties:

- **Name** :

Name of the gateway

- **Cluster ID**:

Cluster number if defined

- **Description**:

Description of the gateway

- **Vendor ID**:

BACnet manufacturer number (default 80, corresponds to Sauter)

- **Vendor Name**:

Manufacturer's name BACnet

- **Model Name** :

Equipment model

- **Device ID**:

Unique network identification number (DOI), (default 700)

- **COV Lifetime**:

COV subscription duration

Alarm properties :

- **IN_ALARM**:

Activation of the status flag "In alarm".

- **OVERRIDEN**:

Activation of the status flag "Overriden

General properties:

- **Send "Iam" at start** :

Sends an "I am" command when the gateway starts

- **Default priority**:

Default write priority (0 to 16, default is 16)

- **On error value** :

Value in case of error

- **Error retries** :

Number of tries before considering the reading as a communication error

- **Object value**:

Objects to import by default

  - prensentValue
  - all properties

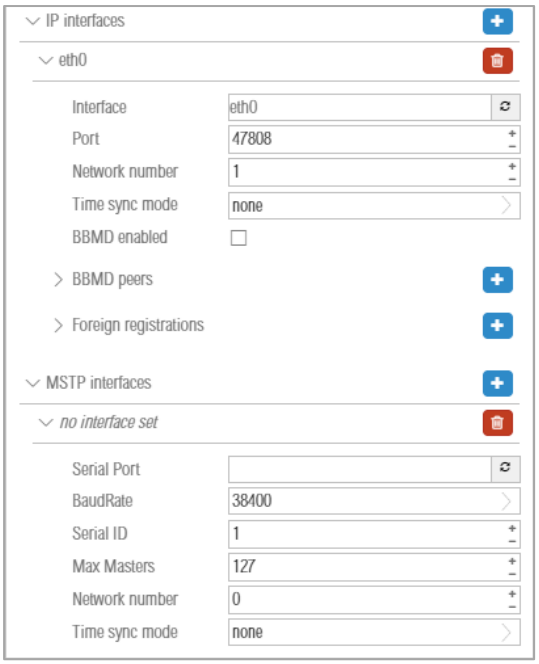


Figure 42 - BACnet Gateway

IP interface properties :

- **Interface**:

Network card selected

- **Port**:

BACnet UDP port (default 47808)

- **Network** number:

Network number (default 1)

- **Time sync mode** :

Time synchronization mode

  - none
  - customer
  - server

- **BBMD enabled**:

Activation of the BBMD mode

- **BBMD peers**:

Remote BBMD equipment (BDT)

- **Foreign registrations** :

Remote FD equipment (FDT)

MS/TP interface properties :

- **Serial Port**:

RS485 communication port

- **BaudRate**:

Communication speed in kBps

- **Serial ID**:

Serial interface number

- **Max Masters**:

Maximum number of devices (maximum 127 per network)

- **Network number** :

Network number

- **Time sync mode** :

Time synchronization mode

  - none
  - customer
  - server

7.6.2. Creating a BACnet address (Server)

In order to create an address, just click on "**Addresses**" > "**Insert object**".

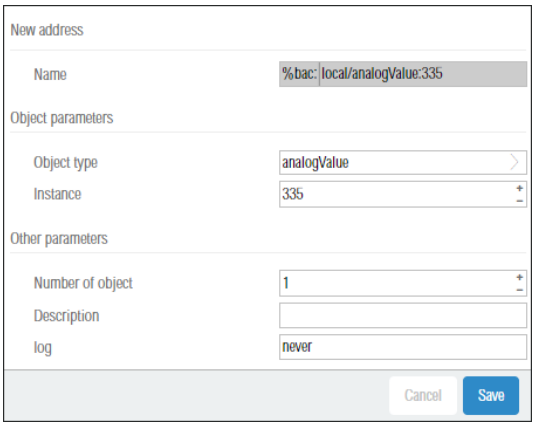


Figure 43 - New BACnet (S) address

Once you have configured the address. Click on **Save**

New address:

Example with a local BACnet server address

- **Name** :

Name of the data point (automatic, instance after instance)

- **Object type**:

Type of object according to available list

- **Instance**:

Case number

Other parameters:

- **Number of addresses** :

Number of addresses to create

- **Description**:

Description of the point(s)

- **Log**:

Logging parameters

7.6.3. Creating a BACnet device (Client)

In order to create an address, just click on "**Addresses**" > "**Insert device**".

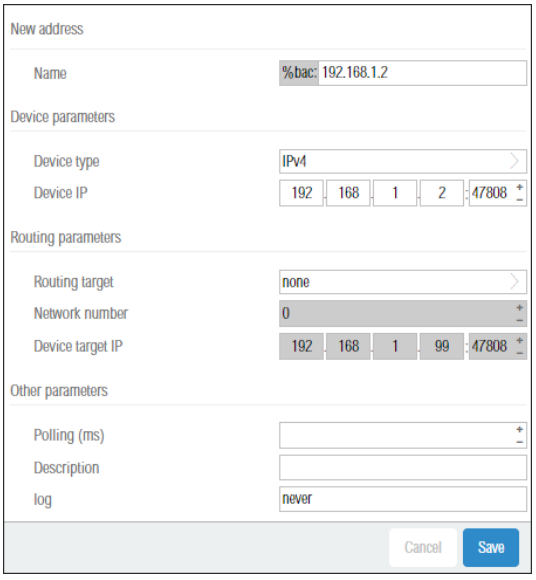


Figure 44 - New BACnet address (C)

Once you have configured the address. Click on **Save**

New equipment address:

Example with a BACnet client address

- **Name** :

Point name of the equipment (automatic, IP address)

Equipment parameters :

- **Device type**:

Type of equipment (IP or MS/TP)

- **Device IP or ID**:

IP address or ID number

Routing parameter:

- **Routing target** :

Routing destination

  - none
  - HEX
  - IPv4
  - MSTP

	Other parameters: • **Number of addresses** : Number of addresses to create • **Description**: Description of the point(s) • **Log**: Logging parameters

7.6.4. Creating a BACnet address (Client)

In order to create an address, just click on "**Addresses**" > "**Insert object**".

Figure 45 - New BACnet equipment

Once you have configured the address. Click on **Save**

New address:

Example with a BACnet client address

- **Name** :

Name of the data point

Equipment parameters :

- **Device type**:

Type of equipment (IP or MS/TP)

- **Device IP or ID**:

IP address or ID number

Routing parameter:

- **Routing target** :

Routing destination

  - none
  - HEX
  - IPv4
  - MSTP

Object parameter:

- **Object type**:

Type of object according to available list

- **Instance**:

Case number

Other parameters:

- **Number of addresses** :

Number of addresses to create

- **Polling**:

Scrutiny in ms

- **Object COV** :

COV activation

- **Description**:

Description of the point(s)

- **Log**:

	Logging parameters

You can then edit all object property values directly in the address list. You can perform operations directly with the context menu, such as importing data on an equipment, exporting EDE or adding an object.

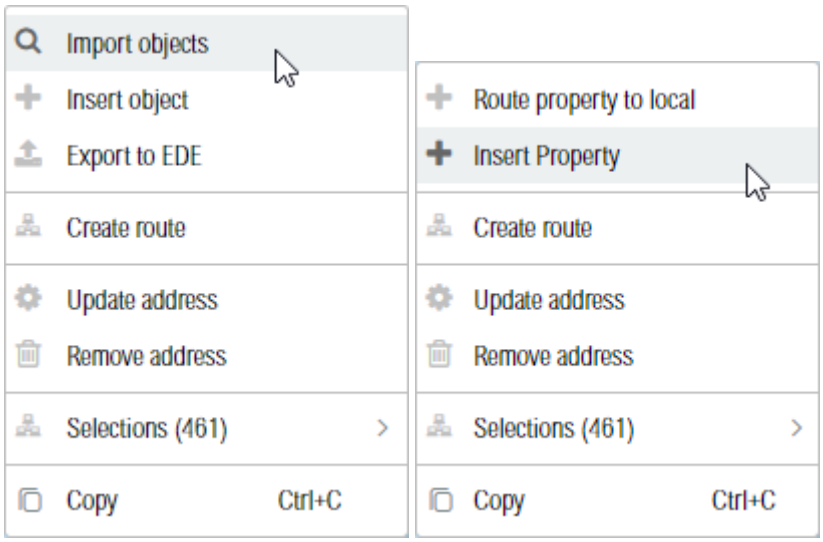


Figure 46 - BACnet context menu (equipment and objects)

By clicking on one or more previously created objects, it is possible to insert additional supported properties or update parameters.

7.6.5. Scanning BACnet devices (Broadcast client)

To save engineering time, BACnet allows scanning of BACnet devices on the local or remote network (BBMD or FD required).

Just click on the "Broadcast" button > "**Send command "Who is"**

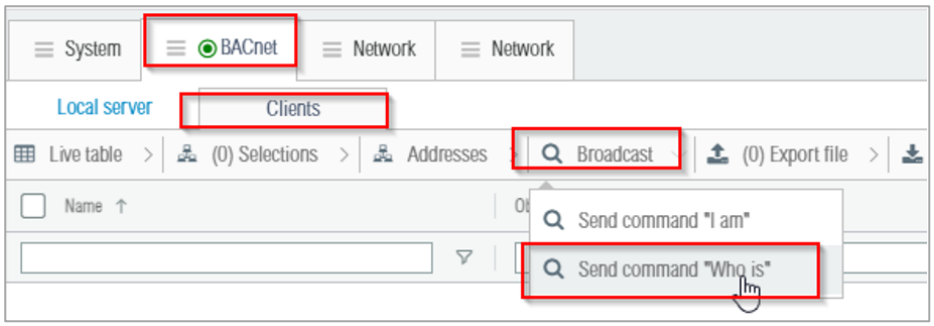


Figure 47 - BACnet device scan

7.6.6. Scanning BACnet objects on a device

To retrieve the list of objects, click on the desired equipment and bring up the contextual menu with the right mouse click, then "**Import objects**".

The BACnet objects are then displayed automatically, this may take a moment depending on the number of objects to be imported.

In order not to overload the system unnecessarily, only a selection of properties are natively imported into the gateway for each object.

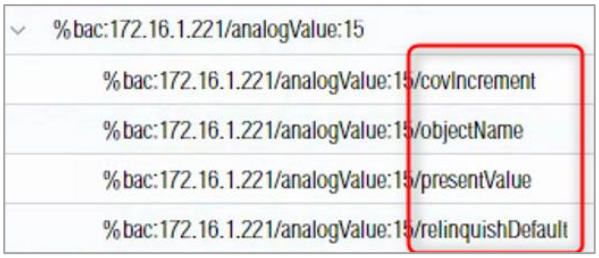


Figure 48 - Imported BACnet properties

In order to add other properties, click on the desired object(s) and bring up the contextual menu with the right click of the mouse, then "**Import Property**". Then add the desired available properties. Then activate the COV for the objects you want to subscribe to. This can be done in a generalized way thanks to the multiple selection, then in the menu "**(x) Selections**" > "**Update addresses**".

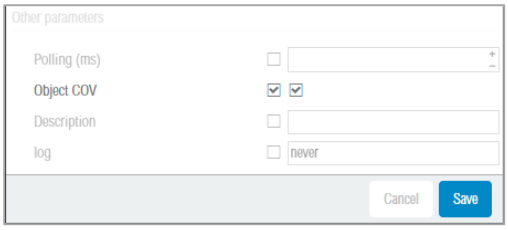


Figure 49 - Activation of the COV

Note :	Once an object import has been done on equipment, it is necessary to specify the COV subscription if you want to use the values without polling. By default, the COV polling is not activated in order to avoid any unnecessary communication overload.

7.6.7. Export EDE

Scanned equipment can be exported in EDE format (BACnet standard format)

Click on the desired equipment and bring up the contextual menu with the right mouse click, then "**Export to EDE**".

A compressed file in ".zip" format is then downloaded by your browser. This archive contains four CSV files that you can edit or import into a supervision system in order to perform offline engineering.

The CSV format is suitable for mass processing in an external spreadsheet. It is a comma-delimited plain text format.

Files	Description
EDE.csv	Main file containing the essentials (name, object, description), version 2.1
Object-types.csv	Object types containing equivalent codes (optional)
State-Texts.csv	Status texts associated with objects
Unit-text.csv	Types of units containing equivalent codes (optional)

8. Resources

8.1. Related documents or links (under development)

Document	Language	Link
Quick start EY-GT103	EN/FR/DE	X
EY-GT103 Product Sheet	EN	X
Product sheet EY-GT103	EN	X
Product sheet EY-GT103	DE	X
Quick start EY-GT485	EN/FR/DE	X
EY-GT485 Product Sheet	EN	X
EY-GT485 Product Sheet	EN	X
Product sheet EY-GT485	DE	X
Quick start EY-GT110	EN/FR/DE	X
EY-GT110 Product Sheet	EN	X
Product sheet EY-GT110	EN	X
Product sheet EY-GT110	DE	X
Remote Services Guide	EN	X
Remote Services Guide	EN	X
Remote Services Guide	DE	X
WBL Programming Guide	FR	X
WBL Programming Guide	EN	X
Advanced Routing Guide	EN	X
Advanced Routing Guide	FR	X
Tips & Tricks ,specific scripts	EN	X
Tips & Tricks ,specific scripts	FR	X

8.1. API Documentation

You can view the full REST API documentation for Universal IoT Gateway features and Remote Services online at :

https://wbc.weble.ch/api/docs

Note:	The online documentation is only accessible for those authenticated on the Sauter Cloud service.

8.2. Download links

Designation	Type	Download link
Universal IoT Gateway Software	EXE	iot-sauter.exe
VPN Remote Services client	EXE	Jump-Remote-Management.exe
Discovery tool	EXE	SkipBoxFinder.exe

8.3. Contact

In case of problems, please contact support who will open an incident. Please consult the general terms of sale available via the link below:

⇨ https://www.sauter-building-control.ch/CGV

Prepare your request by e-mail or telephone in advance with the following information:

- **Exact product reference**
- **Serial number**
- **MAC address**
- **Firmware version**
- **System backup**

The above information is essential for a qualitative support and traceability. We thank you for your understanding.

THANK YOU FOR USING SAUTER PRODUCTS AND SYSTEMS!

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9. Table of illustrations

10. Versions

Version	Date	Writing	Designation
1.0 / R1	01.03.2023	C. Villar	Initial version
1.0 / R2	03.03.2020	C. Villar	Spelling corrections
1.1 / R1	03.03.2020	C. Villar	Addition of BACnet and M-Bus sections

End of document

NOTES

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