Specification

Supply voltage	24Vdc ±10% 2A
Consumption	208mA / 5W
CPU	528MHz ARM Cortex A7
Memory	512MB RAM
Storage	4GB Flash
Interfaces:	
Modem 3G/4G	
LoRaWAN 863 MHz to 928MHZ	
Ethernet	
Bus protection	ESD, Short circuit & over consumption
Heat dissipation	24W
Mounting	DIN-rail

Ambient:	
Temperature	0 to 45°C
RH	5 to 95% RH, non-condensing
Housing:	
Material	ABS
Dimensions	160 x 110 x 55mm
Weight	340g
Country of origin	France
Conformity	EMC, CE & UKCA Marked

WEEE Directive:

At the end of the products useful life please dispose as per the local regulations.
Do not dispose of with normal household waste.
Do not burn.

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Safety Rules

- Incorrect wiring of this product may damage it and cause other hazards.
- The product must be installed by a qualified professional.
- Make sure the product has been wired correctly before turning on the power.
- Before wiring, removing, or mounting the product, be sure to turn off the power. Failure to do so may result in electric shock.
- Do not touch electrically connected parts, such as power terminals. Doing so may result in electric shock.
- Do not disassemble the product. Doing so may result in electric shock or malfunction.
- Use the product within the operating ranges recommended in the specifications (temperature, humidity, voltage, shock, mounting direction, atmosphere, etc.) Failure to do so may result in fire or malfunction.
- Tighten the electrical wires on the connector. Insufficient tightening of the wires on the terminal may cause a fire.
- Disconnect the power supply before installation or maintenance to avoid electric shock or property damage.
- Use only copper conductors. Make all connections in accordance with local, state, and national electrical codes.
- To reduce the risk of fire or electric shock, install the equipment in a controlled environment relatively free of contaminants.
- This equipment is intended for use as a monitoring and control device only. To avoid loss of data or damage to the equipment, do not use it for any other purpose.
- The cover or front panel of the Bridge should not be removed. No configuration or maintenance action of the components (e.g. jumpers or battery) by the user requires the removal of the cover; all elements are accessible as connectors on the top, bottom, and side of the Bridge.
- The Bridge must be mounted on a DIN rail in a cabinet or in an electrical box.
- When the Bridge is mounted inside an enclosure, make sure the enclosure is designed to maintain the required operating temperature range (allowing for 24 watts of dissipation by the controller). This is especially important if the Box is mounted inside an enclosure with other heat-producing equipment.
- This product is intended for indoor use only.
- Do not install the Bridge in an area:
    - Where there is excessive moisture, corrosive fumes, or explosive vapours
    - Where vibration or shock is likely to occur,
    - Subject to electrical noise, e.g. near large electrical contractors, electrical machinery, welding equipment, etc.
- This equipment is not suitable for use in areas where children may be present.
- The Bridge is not compatible with a Power-Over-Ethernet (POE) network. Connecting the Bridge to a network segment carrying power may cause a failure. In this case, you must disconnect the Bridge from the POE network segment, turn it off and on again.
- To avoid any risk of injury caused by a fall, the Bridge should not be installed more than 2 meters from the ground.

EN 60730-1 Power supply considerations

- Electrical safety in building automation and control systems relies primarily on the use of extra-low voltage, strictly separated from the mains voltage.

This low voltage is either SELV or PELV, according to EN 60730-1.

- Protection against electric shocks is ensured by the following measures:
    - Voltage limitation (low voltage supply 24Vdc DC ±10%, SELV or PELV),
    - Protective separation of the SELV system from all circuits other than SELV and PELV,
    - Simple separation of the SELV system from other SELV systems, PELV systems and the ground.

- Field devices such as sensors, status contractors, or actuators connected to the low voltage inputs and outputs of the I/O modules must comply with SELV or PELV requirements. Interfaces to field devices and other systems must also comply with SELV or PELV requirements.

- When power for SELV or PELV circuits is obtained from higher voltage power systems, it shall be provided by a safety transformer or converter designed for continuous operation to power the SELV or PELV circuits.

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Markings

Disposal and recycling



Electrical and electronic equipment may not be disposed of with household waste. This also applies to products that do not carry this logo. Electrical and electronic equipment contain materials and substances that can harm the environment and human health. At the end of their life, electrical and electronic equipment must therefore be disposed of in an appropriate way. The European WEEE Directive 2012/19/EU applies throughout the European Union. The directives and laws that transpose it into national law may vary from country to country. Environmentally sound disposal is good for your health and protects the environment from harmful substances in electrical and electronic equipment.

- Observe national and local regulations regarding the disposal of electrical and electronic equipment.
- Erase all data stored on electrical and electronic equipment.
- Drop off or send your electrical and electronic equipment to your local specialized collection point.

This symbol is only valid in the European Union (EU). For disposal in countries out of the European Union please contact your local authorities or dealer and ask for the correct method of disposal.

CE & UKCA Marking



This product is manufactured in accordance with the technical specifications of the product and is in compliance in all respects with the relevant standards and regulations.

FCC-IC Compliance Statement
FCC ID : 2A2KQ-WSGW1



This equipment has been tested and found to comply 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 the instruction, 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 harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct 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.

WARNING : This product is only to be installed by qualified personnel.

Cellular RF

This device contains a cellular RF module with FCC ID : 2AJYU-8PYA004
This device contains a cellular RF module with IC : 23761-8PYA005

FCC Caution:

1. Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

2. Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

3. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

4. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

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The cellular antenna delivered by Sontay meets the FCC-IC regulations.

If the installer makes the choice to use another antenna, it must follow the specifications listed for the device used to comply with FCC/IC regulations limiting both maximum RF output power and human exposure to RF radiation. **Note:** See table at bottom of this page.

1. Whip antenna type
2. 50 Ohm typical impedance
3. Maximum antenna gain

LoRaWAN RF

This device contains a Lorawan RF module with FCC ID : 2AF6B-RAK2247
This device contains a Lorawan RF module with IC : 25908-RAK2247

FCC Warning: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions.

(1) This device may not cause harmful interference;
(2) This device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This module complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

The LoRaWAN antenna delivered by Sontay meets the FCC-IC regulations.
If the installer makes the choice to use another antenna, the maximum antenna gain allowed is 5.8 dBi to comply with FCC/IC regulations limiting both maximum RF output power and human exposure to RF radiation.

CAN ICES-003 Compliance

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

This radio transmitter (23761-8PYA005 and 25908-RAK2247) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada licence-exempt RSS(s). Operation is subject to the following two conditions:

1. this device may not cause interference, and
2. this device must accept any interference, including interference that may cause undesired operation of the device.

Cellular antenna characteristics

1. Whip antenna type
2. 50 Ohm typical impedance
3. Maximum antenna gain

LoRa antenna characteristics

Gain: 5.8dB

Frequency Band	Antenna Gain (dBi)	Frequency Band	Antenna Gain (dBi)
GSM850	-1	LTE Band5	7
GSM1900	6	LTE Band7	10
GPRS850 4TS	-1	LTE Band12	6
GPRS1900 4TS	6	LTE Band13	6
WCDMA band2	10	LTE Band25	10
WCDMA band4	9	LTE Band26	8
WCDMA band5	7	LTE Band41	9
LTE Band2	10	LTE Band66	9
LTE Band4	11		

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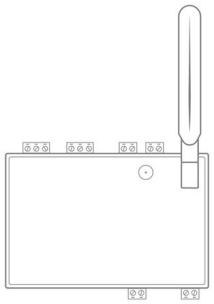
GSM Antenna

The Bridge is supplied with a standard GSM antenna.

For the United States, please use an antenna with a gain not exceeding that shown in the table:

Frequency Band	Antenna Gain (dBi)	Frequency Band	Antenna Gain (dBi)
GSM850	-1	LTE Band5	7
GSM1900	6	LTE Band7	10
GPRS850 4TS	-1	LTE Band12	6
GPRS1900 4TS	6	LTE Band13	6
WCDMA band2	10	LTE Band25	10
WCDMA band4	9	LTE Band26	8
WCDMA band5	7	LTE Band41	9
LTE Band2	10	LTE Band66	9
LTE Band4	11		

- If the quality of the GSM signal is good: keep the original antenna installed on the Bridge.



- If the signal quality is insufficient: move the original antenna out of the cabinet; use an RF extension cord with SMA connector, up to 2 meters.
- If the signal quality is still insufficient: use a high-gain antenna with a maximum of 10 meters of cable; this antenna can, for example, be moved to the outside or to the other floors to obtain a better signal quality. Please note that, beyond 15 meters of cable, the GSM signal is significantly weakened.

GSM Subscription

GSM is valid for 3 years from date of purchase, when expired the vendor will be contacted and asked if they wish to extend this for a further 3 years for a small charge. It will not stop the Hub/Bridge from working, the IP output will continue to function, just that you will no longer be able to connect via the User Console if you wanted to add extra sensors for example.

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The Bridge - Technical Datasheet

The Bridge V1.3 is an electronic device

- Created to connect all equipment from all buildings: IoT sensors, meters, heating, air conditioning, air handling systems, building management systems (BMS).
- Easy and quick to install: accessible for all. If the building already has a BMS, the Bridge connects to the main bus as the third party. If there's no BMS, a BMS network is directly created by the Bridge.
- Telemetry and controls: collects data and controls equipment.
- Smart Converter: unifies the field communication protocols.
- Web-Connected: automatically connects to the cloud via 3G/4G.
- Powerful IoT device: combines the functionality of a gateway, a PLC, a modem, and an edge device.
- Edge computing: hosts user plug-ins for local automation.

Power Supply

- 24Vdc ±10%, 2A.
- Cable between the power supply and the Bridge: 2 wires, 22 AWG or 0.35mm².
- Overvoltage, undervoltage and overcurrent protection on the power supply, with LED indication (green LED when the power supply is compatible, red LED if it is not suitable).

Drivers

- BACnet IP
- LoRaWAN 1.0 Local private
- Modbus TCP/IP
- MQTT Client

Software

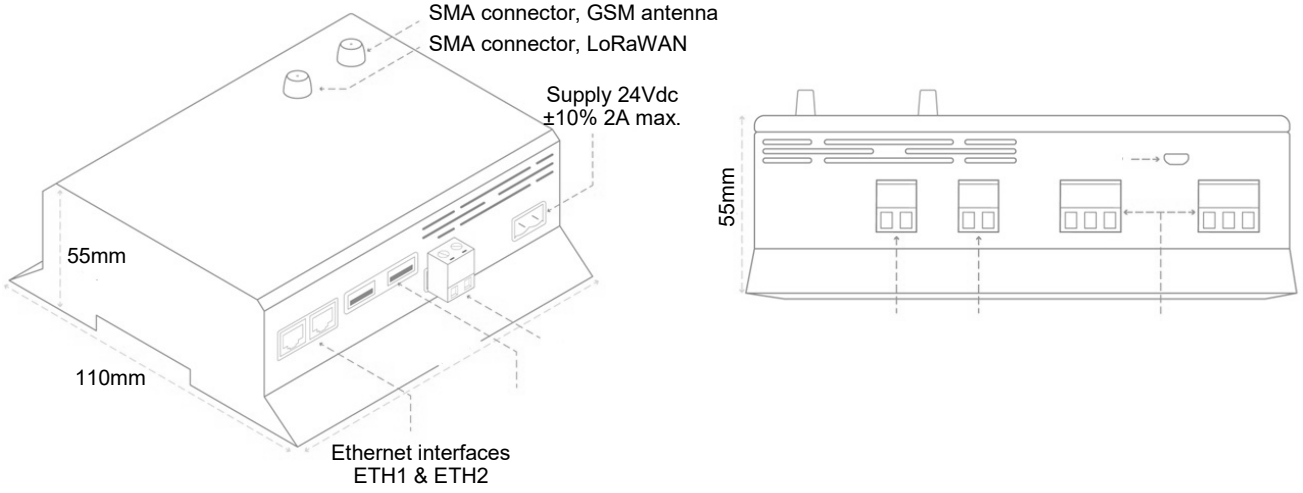
Secured Linux Yocto distribution.

- Built-in drivers for all buses, protocols, and building equipment.
- Automatic discovery of equipment on BACnet.
- Remote and automated configuration.
- Secure server communication via MQTT.
- Automatic and secure software updates.

Security

Enterprise-grade security based on SSL/TLS with the following properties:

- Two-way authentication between Bridge and server with x509 certificates.
- End-to-end encryption.
- Message integrity checks.



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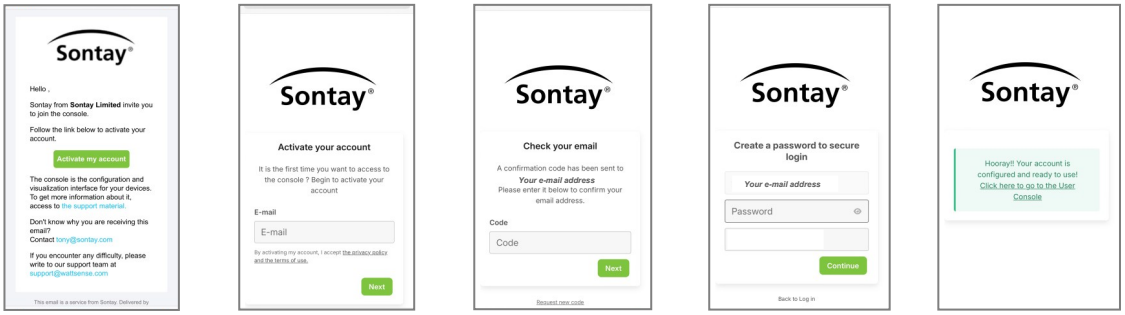
Installation Guide

Computer access to the console

Prior to the Bridge being dispatched you will receive an e-mail requesting that you to set up a user account for the Bridge.

This e-mail is sent to the primary user of the Bridge, additional users can be set up on the Bridge with varying levels of access. This ask you to active an account to use the Console to all configuration of the Bridge.

a. b. c. d. e.



a. The first e-mail as you to active your account. Click the 'Active my account' button and this will open a new Web browser window

b. Enter your e-mail address, click "Next"

c. Check your e-mail, copy/paste the verification code from your e-mail into the "Code" box, click "Next"

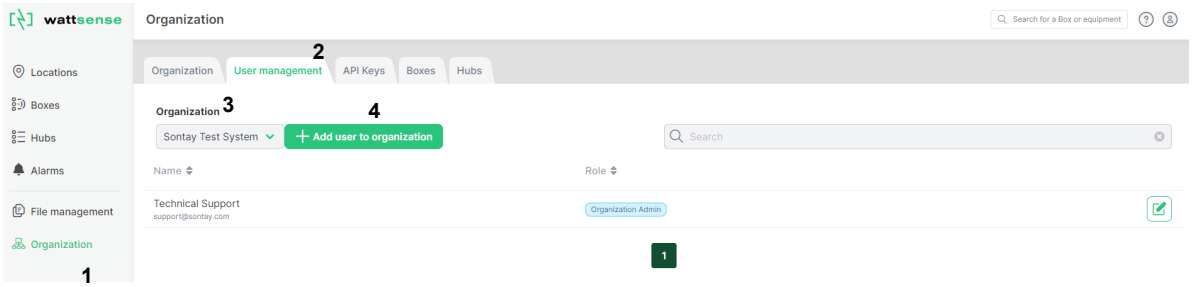
d. Enter a password, its not case sensitive or has a minimum number of characters required, click "Continue"

e. Click on "Click here to go to the User Console" enter your email and password you are then ready to start using the Bridge

Adding new users to the organization

You can add new/additional users that can access the Bridge. These instructions will show you how to add and define there access rights.

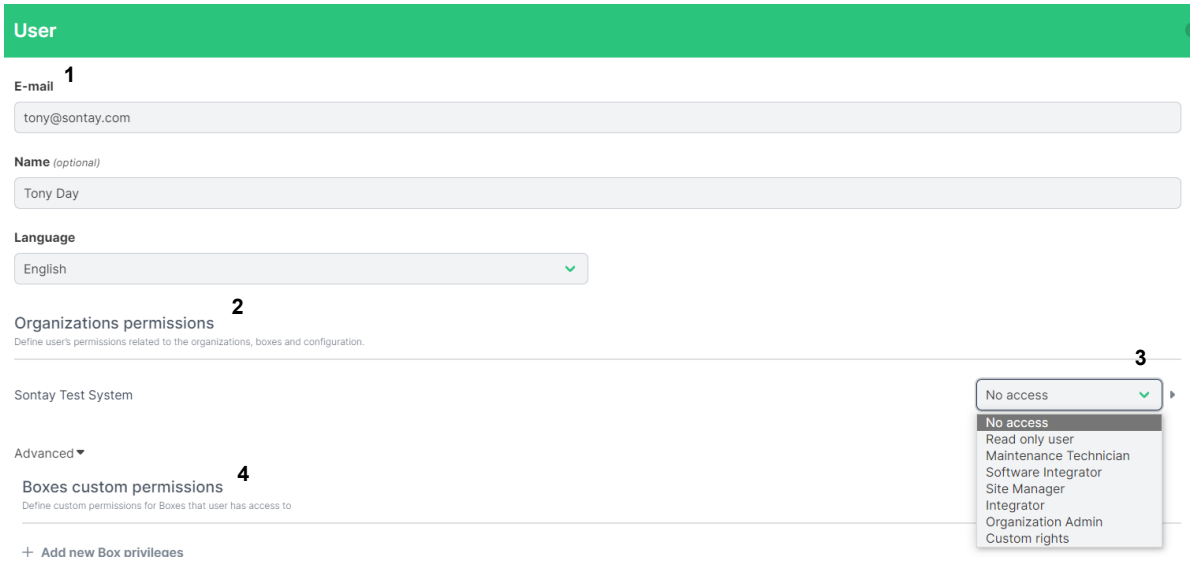
- Log into the User Console.
  1 Click on the organization section
  2 Click on User management
  3 Select the organization in which you want to create a user
  4 Click on the Add user to organization button



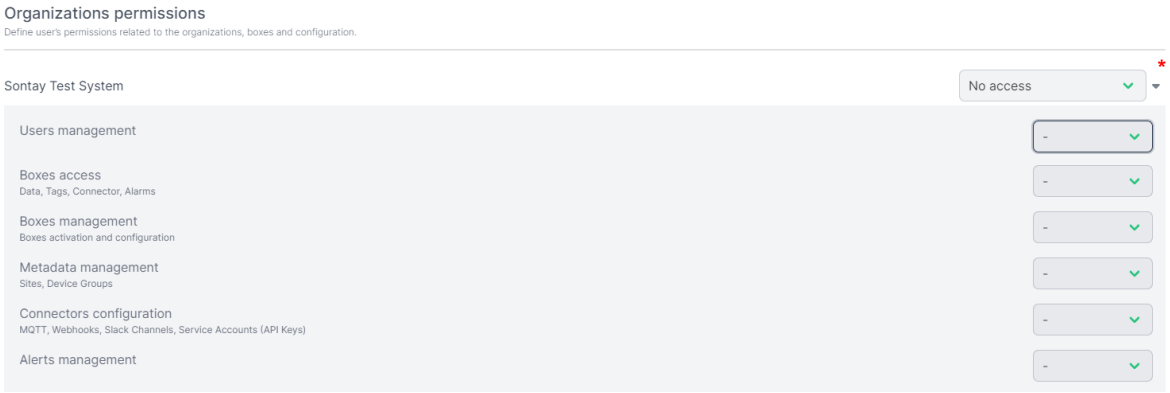
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- Once on the next view:

1 Fill in the email address of your new user (once saved, an onboarding email is send to this address)
2 Check the organizations (if you have more than 1, then you'll be able to define access for all organization)
3 Select your access right(*)
4 You can also allow right specifically to one (or a group) of Boxes, if nothing selected here, then the user will have access to all boxes.



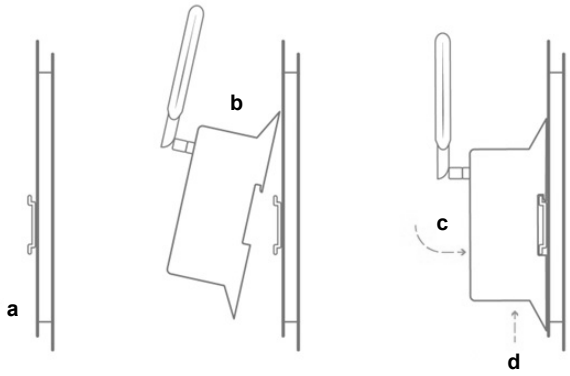
- Then click on "Save", your user is now ready to work.
- (*): You can find here the signification of the different rights, and made a custom one if needed.

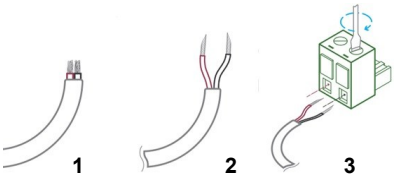


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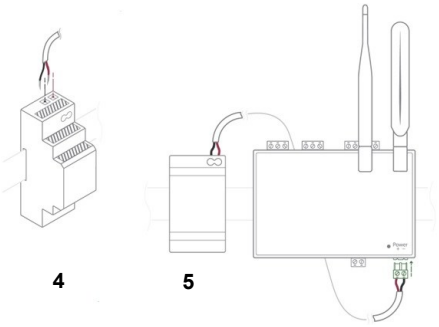
The power supply of the Bridge

- Ideally, place the Bridge in an electrical enclosure or cabinet.
- This type of equipment is not suitable for installation in places that can accommodate children.
- Mount the Bridge on a DIN rail.
- To avoid any risk of injury caused by a fall, the Bridge should not be installed more than 2 meters from the ground.
- Use a **DC** power supply of 24Vdc ±10%, 2A max.
- Screw the cable into the power connector of the Bridge.

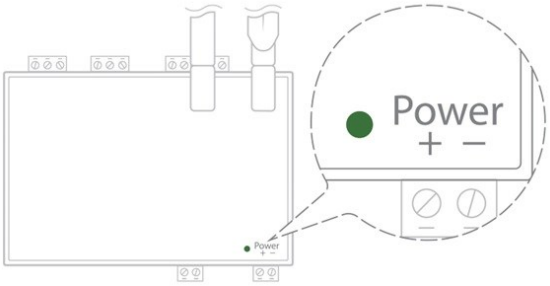




- Connect the cable to the power supply.



- Check that the "Power" LED is lit (steady green light).



The Bridge is protected against overvoltage, undervoltage, overcurrent from the power supply with indication by LED: green LED when the power supply is compatible, red LED if it is not suitable. Change the power supply to avoid damaging the Bridge.

- Wait about 10 seconds: the "Heartbeat" LED flashes (green light).



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LED Status

Type of interface	Quantity	Operating LED's	
Cellular modem	1	Yes	Not connected Every 1.2s Connected Every 0.4s Communicating
LoRaWAN module	1	No	
Ethernet RJ45	2	Yes	Communicating Not communicating
RS485 *	2	Yes	Communicating Not communicating
KNX *	1	Yes	Communicating Not communicating
M-Bus *	1	Yes	Communicating Not communicating
LPB/BSB (X-Bus) *	1	Yes	Communicating Not communicating
Power Supply	1	Yes	Power supply OK Power supply off
Heartbeat	1	Yes	Bridge working Bridge not working
USB **	2	No	
USB Micro **	1	No	

* Additional inputs to the Bridge, only available on Bridges ≥250 points
** Not used

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Adding LoRaWAN Sensors to the Bridge

- Install the Bridge in a central location to ensure the reception of all sensors.

- If the quality of the LoRa signal is good: keep the original antenna installed on the Bridge. You can check the quality of the LoRaWAN signal using the Sontay User Console. Once the Bridge and the LoRaWAN device are paired you can verify the quality of the signal. Use table in the LoRaWAN signal strength & quality section of this user manual.

- If the signal quality is insufficient: move the original antenna out of the cabinet; use an RF extension cord with a SMA connector up to 2 meters.

- If the signal quality is still insufficient: use a High-gain antenna with a maximum of 10 meters of cable; this antenna can for example be used outside or in other floors to obtain the best signal quality.

- For each sensor, follow these steps:
  1. Open the user console (available at https://console.sontay.com) in your Web browser.
  2. Enter your 'User name' & 'Password'
  3. Consult the RF-LW-x-Space or RF-LW-x-Plant datasheet on how to obtain the DevEUI, AppEUI & Application key data.
     - DevEUI — Unique 8-byte address, printed on label affixed to the sensor
     - AppEUI — 8-byte key, all zeros (16)
     - Application Key — 16-byte key, all zeros (32)
  4. Add the sensor to the user console you can name the device by naming it to be identifiable.
  5. When all sensors are added, save and send the configuration to the Box.
  6. Check on the user console that sensors are listed and you can view live data. This can take up to 15 / 30 minutes to pull data from the sensors.

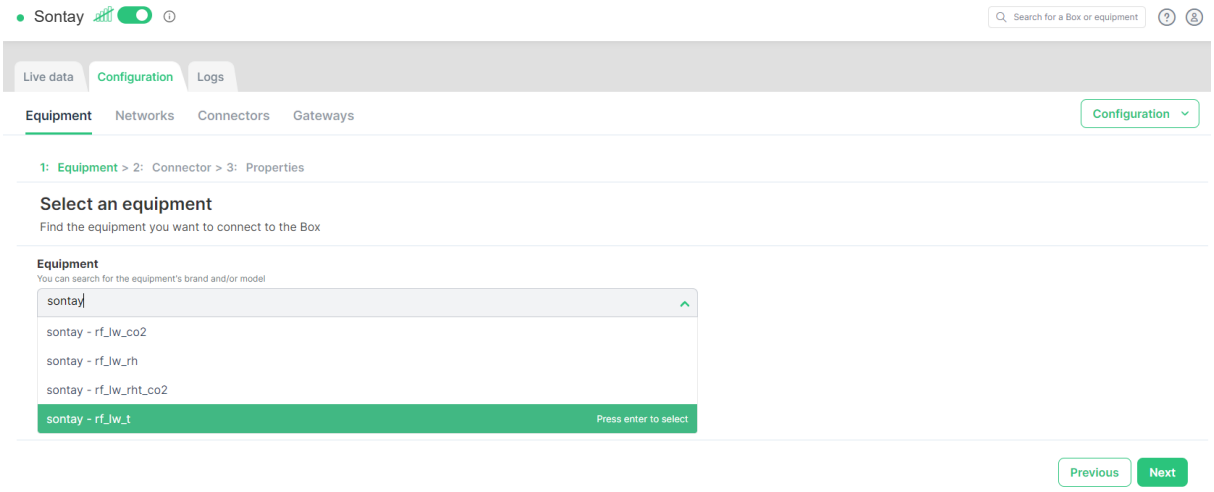
- In PC web browser via user console at https://console.sontay.com and log into your account
- Click on 'Bridges' on the left hand side of the page
- Enable reception property values, click on screen icon to enable:



- The Bridge has an installation configuration wizard, this has all the device payload information pre-installed.

  - Click 'Configuration' tab
  - Click 'Equipment' tab
  - Click 'Add Equipment'

  - Click 'Pick a decoded equipment'
  - Click 'Select Equipment'
  - Click on the Equipment field and start to type 'Sontay or the part number of the sensor'

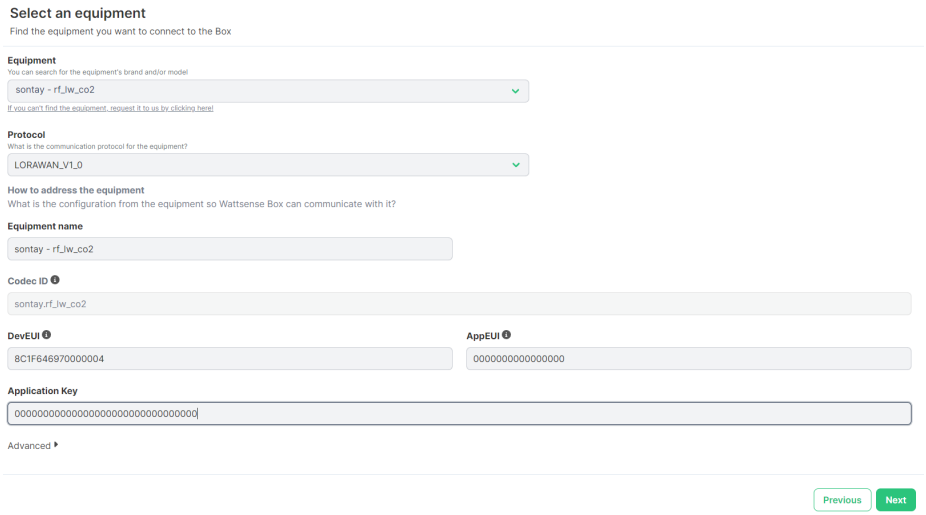


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- Select your sensor that you want to add to the Bridge.

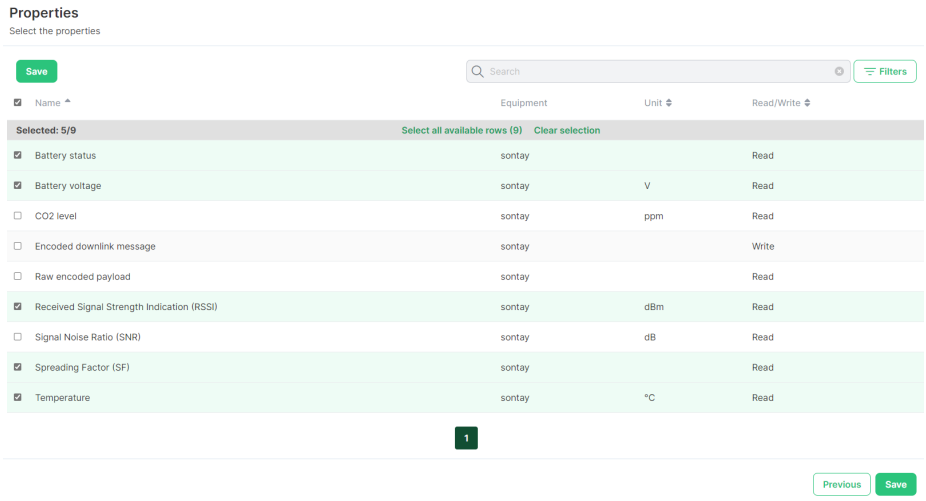
- From earlier instructions obtained from the sensor:
  - Add ‘DevEUI’ code into field (16 digit, please ignore the : between the letter/numbers)
  - Add ‘AppEUI’ code into field (16 digit, please ignore the : between the numbers)
  - Add ‘Application Key’ into field (32 digit, please ignore the : between the numbers)
  - Click ‘Next’

- The DevEUI code is also printed on a label which is located on the sensor. In the absence of a mobile device to read the sensor the sensor can still be added to the console just no changes can be made to its default settings.

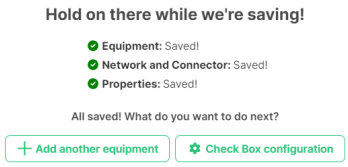


- A new window will open, next is to select which properties from the sensor that you want to send to the Bridge.

- To select what data you want add a tick to the boxes on the left hand side

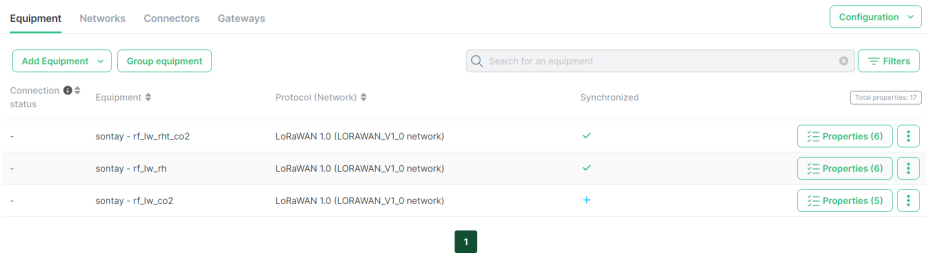


- Once you have made your selections, click ‘Save’
- Pop up box will appear, you can either ‘add another equipment’ or go ‘Check Box configuration’

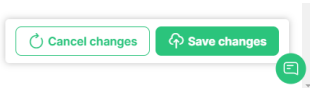


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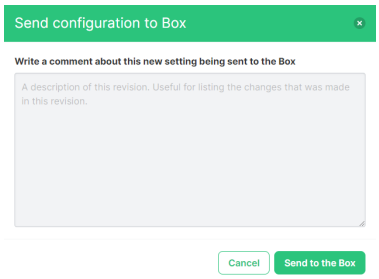
- If 'add another equipment' is selected repeat above process.
- If 'check box configuration' is selected your device(s) will be in the Equipment list.



- Next step is to add this to your box. Click on the 'Save changes' icon at the bottom of the web page.



- Pop up box will appear, click 'Send to the Box'



- The sensor is now added to the Bridge, you can view the data from the points you have selected by clicking on the 'Live Data' tab and expanding the sensor added.

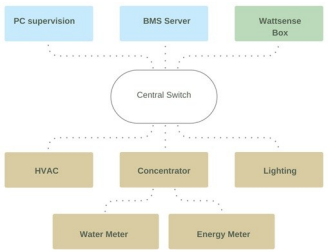
  For best results, first add the sensors to the Console, save and synchronised, then switch the sensors on.

  - During the pairing period the 'Error' & 'Status' LED's will blink together every 10 seconds.
  - When paired just the 'Status' LED will blink every 30 seconds.

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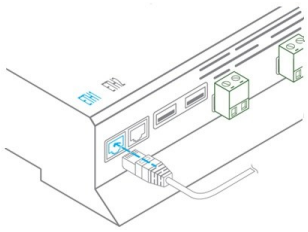
To Connect the Bridge to the BMS

- Determine the type(s) of network(s) associated with the BMS (communication protocols between the BMS server and the technical equipment).
- Obtain, if possible, the schematic of the communication network(s) of the BMS.
- Identify where and how the BMS server connects to the building's network.

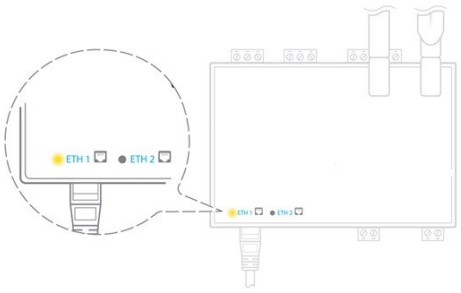


IP Network Connections

- Make sure to have an Ethernet cable
- Connect the cable to the Ethernet port of the Box ETH1 or ETH2.



- Connect the Box to the switch (IP network) on which the supervision PC/BMS server is connected.
- Check that the ETH1 or ETH2 LED lights up.



<u>Configuration</u>

- If there is no DHCP server on the network, attribute a static IP address, its mask and the gateway if necessary to the Box (Discuss with the building's IT manager).
- If there is a DHCP server on the network, the address is automatically assigned.

Information to retrieve in preparation for the configuration:

- For each device that communicates in Modbus IP
  - From the BMS software, perform an extract of the available properties: list the data types provided by the different devices to which the BMS has access.
  - If it is impossible to retrieve this information, get the IP address and TCP port (and if needed, for some devices, the slave address (Slave ID), the brand, and model of the equipment, and extra identifying information. This information is necessary for the installation configuration and to retrieve data.

- In the case of a BACnet IP network
  - Write down the BACnet port of the network. This information will be necessary for the installation configuration and to retrieve data.

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Setting up a BACnet IP Network on the Bridge

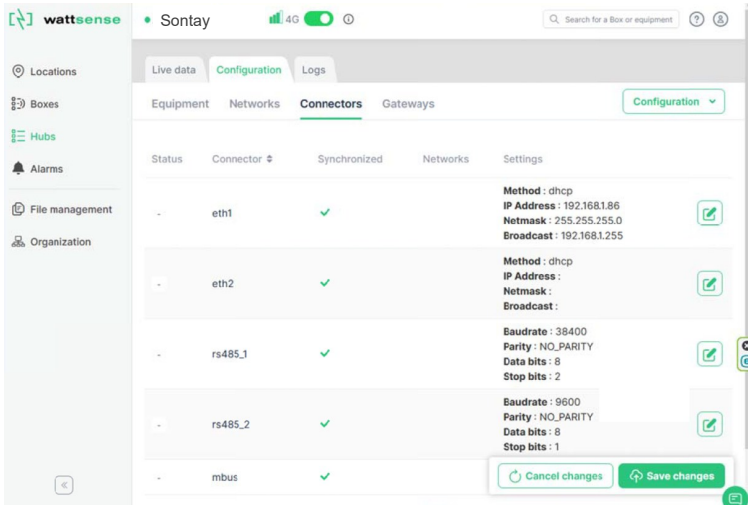
NB - These instructions assume that the LoRa sensors/devices have already been added to the Bridge.

Setting up an Ethernet port on the Bridge

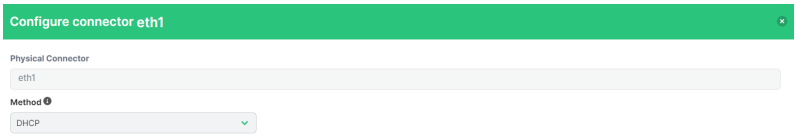
There are 2 Ethernet ports on the Bridge, ETH1 and ETH2. It doesn't matter which you use, but if one is already used it's probably best to have the other configured for a different domain, for example:

- If ETH1 is configured for 192.168.1.xxx, then enter 192.168.0.xxx or 10.0.20.xxx for ETH2 for example.

Click on the Bridge 'Configuration' tab on the Sontay User Console, then click on the 'Connectors' tab. A list of available connections should be visible, including ETH1 and ETH2 at the top of the list.



Click on the edit icon to the right of the Ethernet port you want to use. Here, you can set up the Ethernet port configuration.



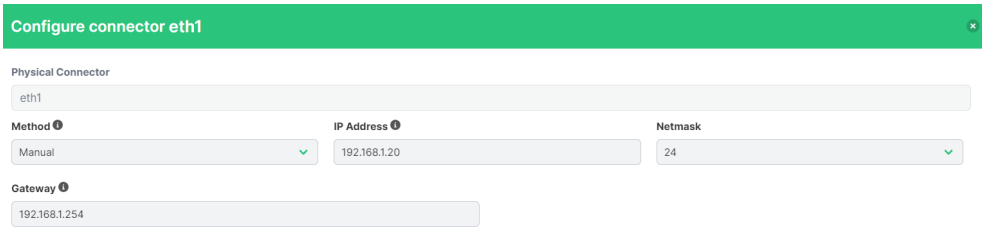
By clicking on the 'Method' drop-down box, the initial options are either;

- Manual – the allows you to define the IP address and subnet mask, or
- DHCP (Dynamic Host Configuration Protocol), which will allow the Bridge to be automatically assigned an IP address from the DHCP server on your network (if installed and enabled).

NB – If you choose DHCP, you may not immediately be able to tell what IP address has been assigned.

If DHCP is selected, all that needs to be done to finish the connector configuration is to click the 'Save' button at the bottom right of the screen. If you elect to use manual settings, you will need to fill in the 'IP Address', 'Netmask' and 'Gateway' fields (see next page).

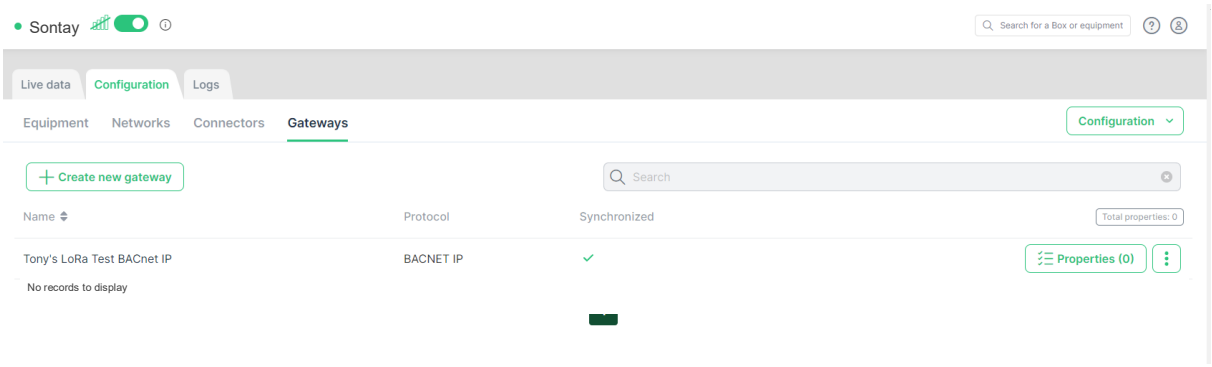
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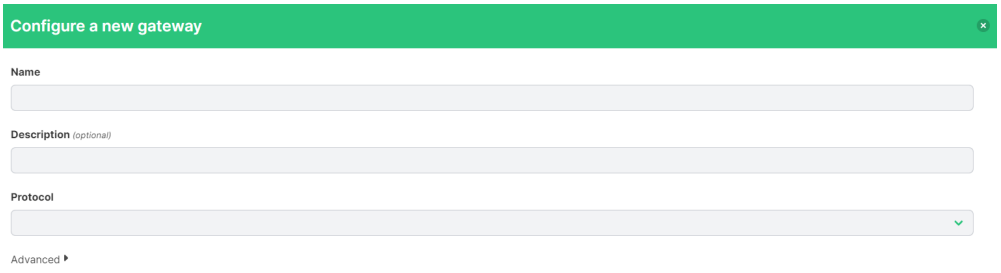
- Make sure you don't use an IP address that's already taken on the same domain and network – if you do, you'll lose comms to both devices.
- Leave 'Netmask' at the default setting of 24 (unless you have reason to change it)
- Adding a Gateway IP address is optional, but if you know the IP address of your network gate, it's always useful to use it.
- When you've filled in the settings, don't forget to click the 'Save' button at the bottom right of the screen.

Setting up a BACnet IP Gateway

Click on the 'Bridge Configuration' tab of the Sontay User Console, then click on the 'Gateways' tab.

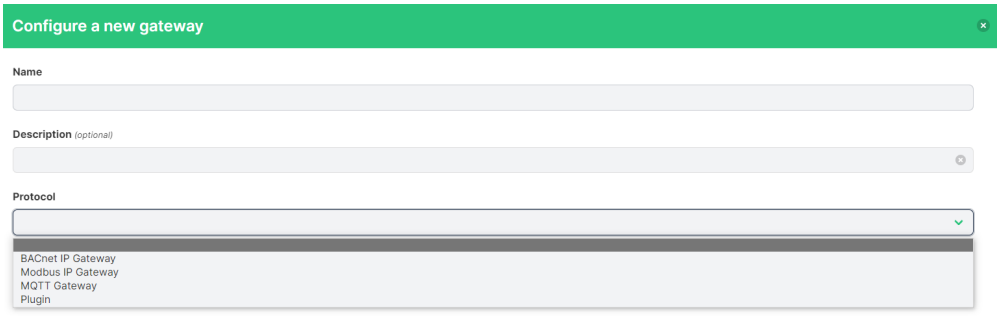


Click on the 'Create new gateway' button.



Fill in all the required fields.

- Give the Gateway a name (for example, Test BACnet IP).
- The description, though optional, should be filled in, as a reminder for later.
- From the drop-down list of Protocols, select BACnet IP Gateway.



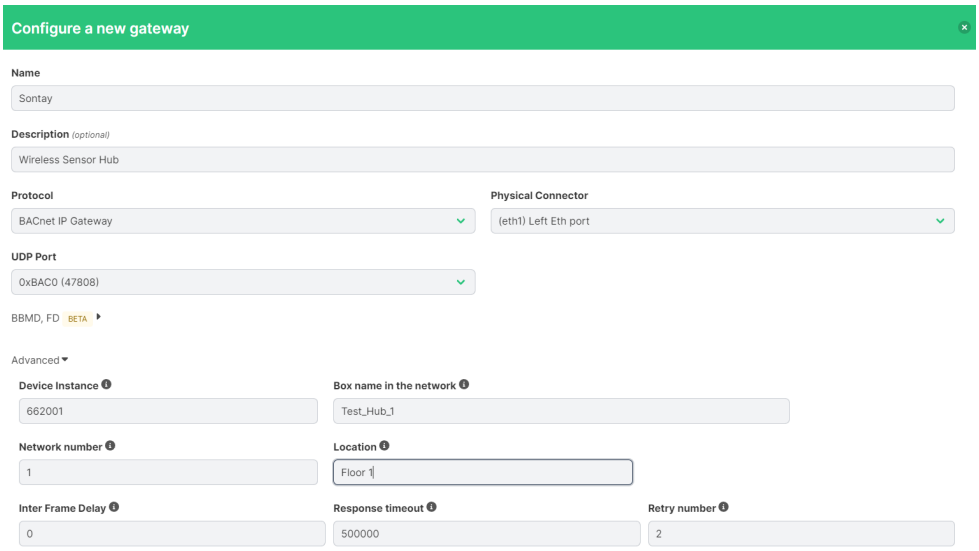
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Fill in all the required fields.

- Give the Gateway a name (for example, Test BACnet IP).
- The description, though optional, should be filled in, as a reminder for later.
- From the drop-down list of Protocols, select BACnet IP Gateway.



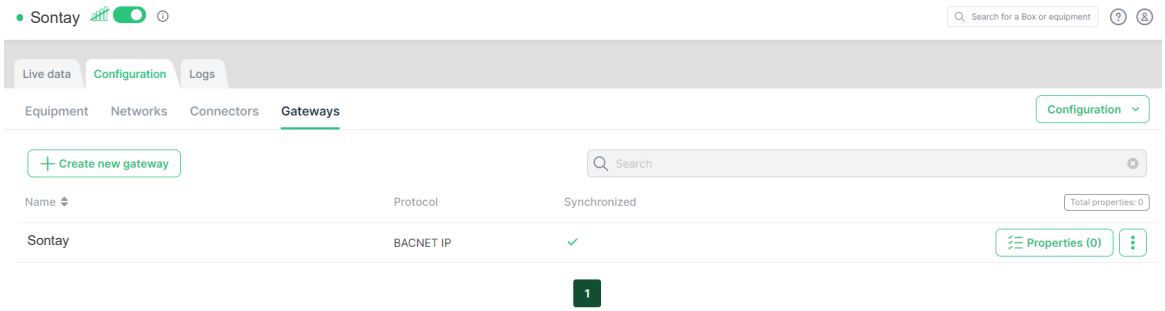
- Now, you'll see extra fields to complete.
  - From the 'Physical Connector' drop-down, select the Ethernet port you set up during "Setting up an Ethernet port on the Bridge" (ETH1 or ETH2)
  - Leave the 'UDP Port' settings as they are.
  - If required, you can change the 'Device Instance' and 'Network number'. For example set the 'Network number' to 1 and ' Device Instance' to 662001
  - Here you can also give the Bridge a name and location.



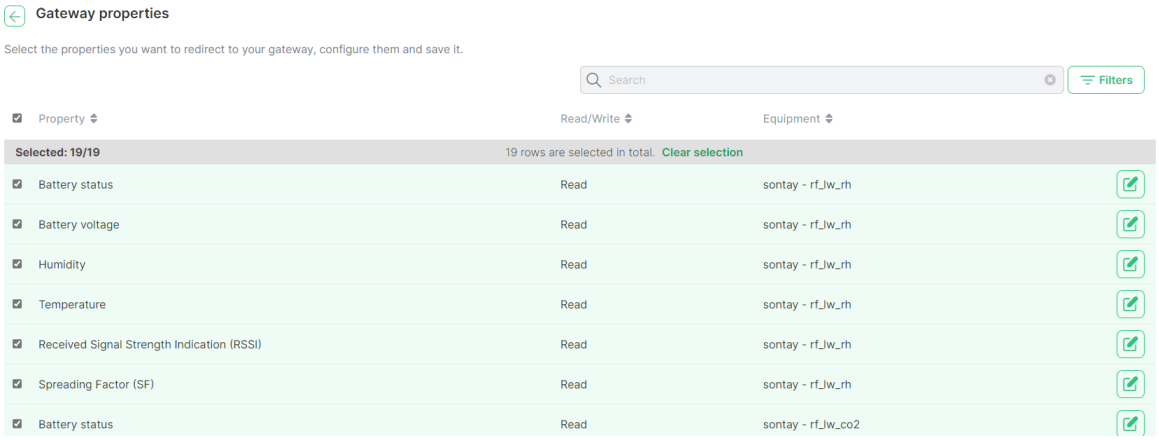
NB - Click 'Save' at the bottom of the screen when complete.

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Adding LoRaWAN device points to the BACnet IP gateway



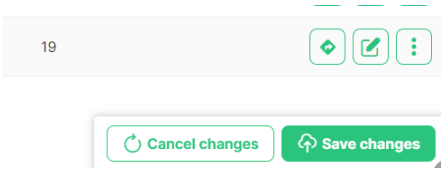
Click on the 'Properties' button to the right of the BACnet IP gateway, then click on the '+ Add Property button'. A list of LoRa device properties are then shown. Tick the properties you want to see as BACnet objects.



When you've clicked on all the points you want, click the 'Save' button at the bottom right of the screen.

Next you need to send the configuration to the box.

Click the 'Save Changes' button at the bottom of the screen.



Then 'Send to the Box'

All BACnet points that were selected will then be available to view.

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BACnet PICS

Normative for the BACnet protocol implementation conformance statement

A B-GW is a BACnet gateway. It is intended for connecting one or more non-BACnet networks into a BACnet internetwork. There are two types of B-GW devices, those that represent non-BACnet devices as a network of virtual BACnet devices, and those that represent non-BACnet devices as BACnet objects. Our B-GW implementation falls on the latest category.

Our B-GW enables specification of the following:

- **Data Sharing**
  - – Ability to provide the values of any of its BACnet objects
  - – Ability to allow modification of some or all of its BACnet objects by another device
- **Alarm and Event Management**
  - – No requirement
- **Scheduling**
  - – No requirement
- **Trending**
  - – No requirement
- **Device and Network Management**
  - – Ability to respond to queries about its status
  - – Ability to respond to requests for information about any of its objects
  - – Ability to respond to communication control messages
  - – Ability to respond to network layer messages

The rest of this section follows the ANSI/ASHRAE Standard 135-2016 Annex A “PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT” (BPICS) structure. Therefore, a certain degree of BACnet’s nomenclatures is required.

Protocol implementation conformance statement

This is our BACnet Implementation Conformance statement. See the ANSI/ASHRAE Standard 135-2016 Annex A for more information.

- BACnet Protocol Revision: 12
- Product description:

A BACnet Gateway (B-GW) mapping Wsgateway data input, outputs and values into BACnet objects from a single BACnet device. The Sontay data are referred as all the properties that a Sontay Bridge is able to read or write from different HVAC protocols, such as ModBus, Mbus, LON. Therefore, our B-GW lets the Sontay Bridge to pass said data into BACnet networks.

- BACnet Standardized Device Profiles Supported (Annex L):
  - – [X] BACnet Gateway (B-GW)
- BACnet Interoperability Building Blocks Supported (Annex K):
  - – [X] Data Sharing-ReadProperty-B (DS-RP-B),
  - – [X] Data Sharing-WriteProperty-B (DS-WP-B),
  - – [X] Device Management-Dynamic Device Binding-B (DM-DDB-B),
  - – [X] Device Management-Dynamic Object Binding-B (DM-DOB-B),
  - – [X] Gateway-Embedded Objects-B (GW-EO-B)
- Standard Object Types Supported:

A deep list of BACnet objects supported is located after this sub-section. However, all the objects are, in terms of BACnet, statically created. Therefore, the CreateObject and DeleteObject services are not supported.

See Standard BACnet objects types supported for more information.

- Data Link-Layer Options:
  - – [X] BACnet IP, (Annex J)
- Device Address Binding: NO
- Networking Options: Not applicable
- Character Sets Supported:
  - – [X] ISO 10646 (UTF-8)
- Gateway Options:

The non-BACnet devices data are supported by the Wsgateway’s box on the form of properties. Each one of those properties will be represented by a BACnet object.

- Network Security options:
  - – [X] Non-secure Device - is capable of operating without BACnet Network Security

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Supported BACnet services

Application Service	Initiates Request	Executes Request
I-Am	Yes	~
I-Have	Yes	~
ReadProperty	~	Yes
Who-Has	~	Yes
Who-Is	~	Yes
WriteProperty	~	Yes

Standard BACnet objects types supported

All the objects are available since the startup. However, those that are not output types (Analog Input, Binary Value, etc.) are marked as not connected and out of service. Once a successful reading from the non-BACnet device linked to the object is received the corresponding object will be update it as online.

The number of objects is determined by the client of the Sontay Bridge. This is done by means of local mechanism outside of this scope. The Sontay Bridge doesn't support BACnet services such as CreateObject and/or DestroyObject.

How often the non-BACnet devices feed the new data or attends the WriteProperty service is left outside this scope.

The rest of this section display the BACnet objects supported by the Sontay Bridge as well theirs BACnet properties.
Each property includes the property identifier, the datatype of the property, and one of the following: O, R, W. A conformance code of O indicates that the property is optional; R indicates that the property is required to be present and readable using BACnet services; W indicates that the property is required to be present, readable, and writable using BACnet services.

BACnet Device Object

Bridge:

Property identifier	Property data-type	Conformance code
Object_Identifier	BACnetObjectIdentifier	R
Object_Name	CharacterString	R
Object_Type	BACnetObjectType	R
System_Status	BACnetDeviceStatus	R
Vendor_Name	CharacterString	R
Vendor_Identifier	Unsigned	R
Model_Name	CharacterString	R
Firmware_Revision	CharacterString	R
Application_Software_Version	CharacterString	R
Location	CharacterString	O
Description	CharacterString	R
Protocol_Version	Unsigned	R
Protocol_Revision	Unsigned	R
Protocol_Services_Supported	~	R
Protocol_Object_Types_Supported	~	R
Object_List	~	R
Max_APDU_Length_Accepted	Unsigned	R
Segmentation_Supported	Boolean	R
Max_Segments_Accepted	Unsigned	R
APDU_Segment_Timeout	Unsigned	R
APDU_Timeout	Unsigned	R
Number_Of_APDU_Retries	Unsigned	R
Device_Address_Binding	BACnetList	R
Database_Revision	Unsigned	R
Property_List	~	R

The Property Location is marked as optional as is expected to be given at startup time by the client. If this is not given the property will not be added to the object.

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Analog Input Object Type:

Property Identifier	Writable	Required	Property Data
Object_Identifier	No	x	ANALOG INPUT #
Object_Name	No	x	“Battery status”
Object_Type	No	x	Object Characterstring (40)
Out_Of_Service	No	x	FALSE
Present_Value	No	x	**Good / OK / Poor**
Status_Flags	No	x	{FALSE, FALSE, FALSE, FALSE}

Property Identifier	Writable	Required	Property Data
Object_Identifier	No	x	ANALOG INPUT #
Object_Name	No	x	“Battery voltage”
Object_Type	No	x	Analog Input (0)
Out_Of_Service	No	x	FALSE
Present_Value	No	x	Voltage
Status_Flags	No	x	{FALSE, FALSE, FALSE, FALSE}
Units	No	x	Vdc

Property Identifier	Writable	Required	Property Data
Object_Identifier	No	x	ANALOG INPUT #
Object_Name	No	x	“CO2 level”
Object_Type	No	x	Analog Input (0)
Out_Of_Service	No	x	FALSE
Present_Value	No	x	CO2 in Parts Per Million
Status_Flags	No	x	{FALSE, FALSE, FALSE, FALSE}
Units	No	x	Parts Per Million

Property Identifier	Writable	Required	Property Data
Object_Identifier	No	x	ANALOG INPUT #
Object_Name	No	x	“Humidity”
Object_Type	No	x	Analog Input (0)
Out_Of_Service	No	x	FALSE
Present_Value	No	x	Relative Humidity in Percent
Status_Flags	No	x	{FALSE, FALSE, FALSE, FALSE}
Units	No	x	Percent Relative Humidity

Property Identifier	Writable	Required	Property Data
Object_Identifier	No	x	ANALOG INPUT #
Object_Name	No	x	“Temperature”
Object_Type	No	x	Analog Input (0)
Out_Of_Service	No	x	FALSE
Present_Value	No	x	Temperature in Degrees Celsius
Status_Flags	No	x	{FALSE, FALSE, FALSE, FALSE}
Units	No	x	Degrees Celsius

Property Identifier	Writable	Required	Property Data
Object_Identifier	No	x	ANALOG INPUT #
Object_Name	No	x	“Received Signal Strength Indication (RSSI)”
Object_Type	No	x	Analog Input (0)
Out_Of_Service	No	x	FALSE
Present_Value	No	x	RSSI in Decibels Per Milliwatt
Status_Flags	No	x	{FALSE, FALSE, FALSE, FALSE}
Units	No	x	Decibels Per Milliwatt

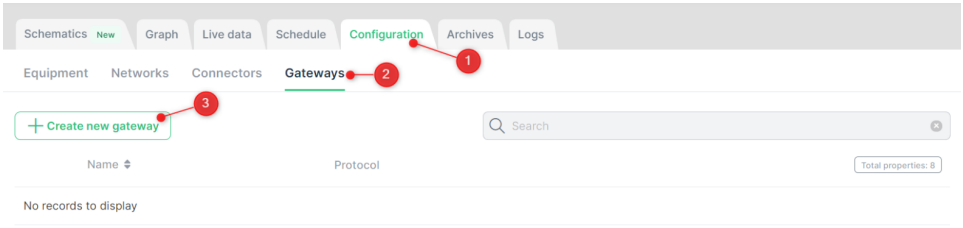
Property Identifier	Writable	Required	Property Data
Object_Identifier	No	x	ANALOG INPUT #
Object_Name	No	x	“Spreading Factor (SF)”
Object_Type	No	x	Analog Input (0)
Out_Of_Service	No	x	FALSE
Present_Value	No	x	Signal Noise Ratio in Decibels
Status_Flags	No	x	{FALSE, FALSE, FALSE, FALSE}
Units	No	x	Decibels

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Setting up a Modbus IP Network on the Bridge

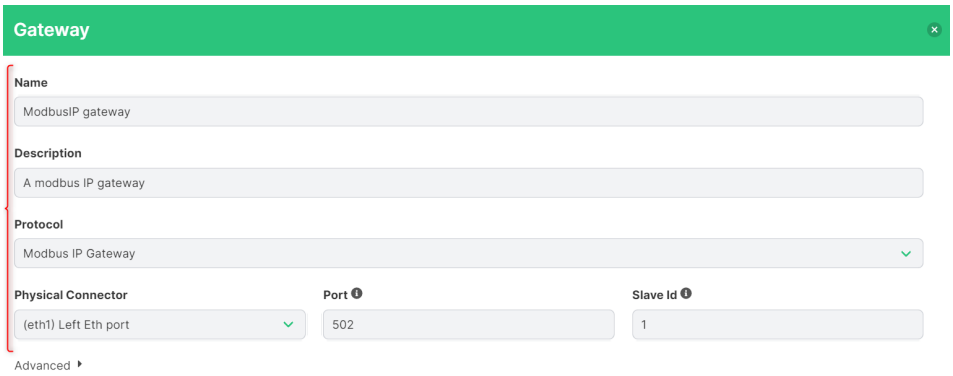
NB - These instructions assume that the LoRaWAN sensors/devices have already been added to the Bridge.

Step 1:
First of all, you'll need to create a new gateway

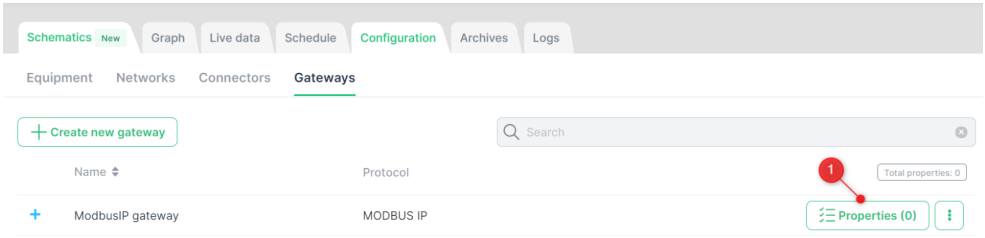


Step 2:
Then set up the gateway information,

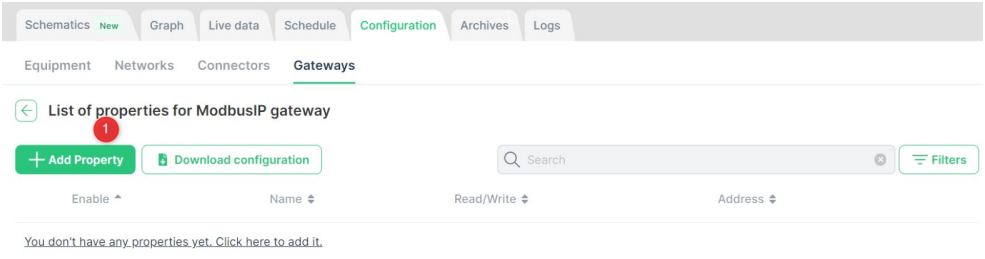
Important information: SlaveID needs to be unique in order to avoid conflict



Step 3:
To add properties in your gateway, select the "Properties" button

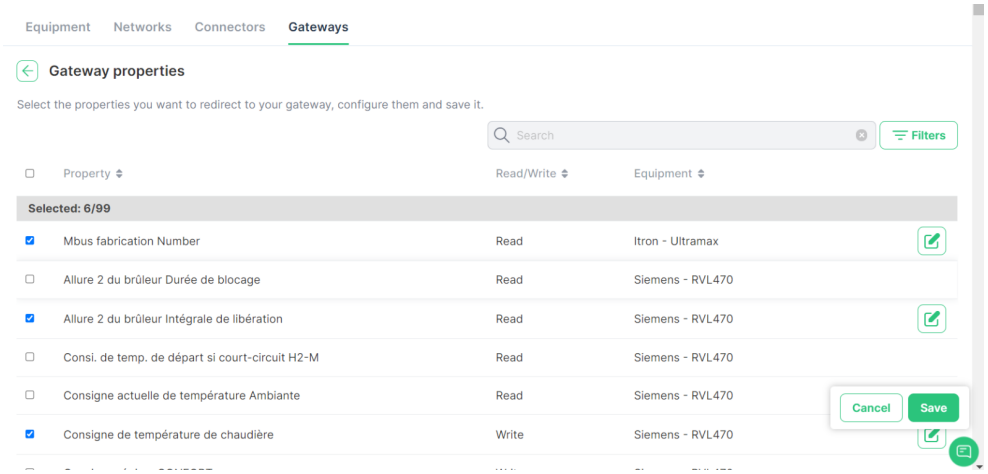


Click on the "Add Property" button.

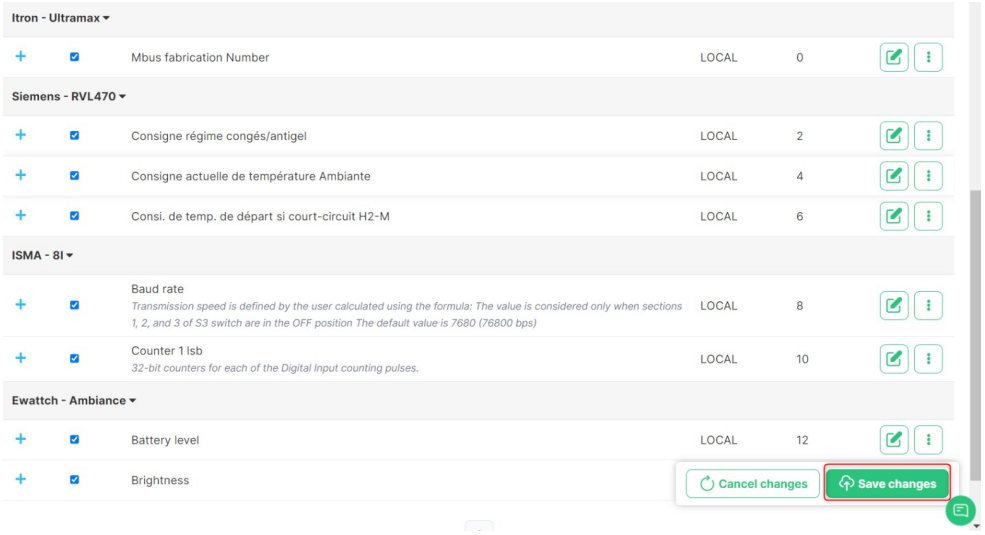


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Once in the view, you will be able to select the properties you want to redirect, then click on Save.

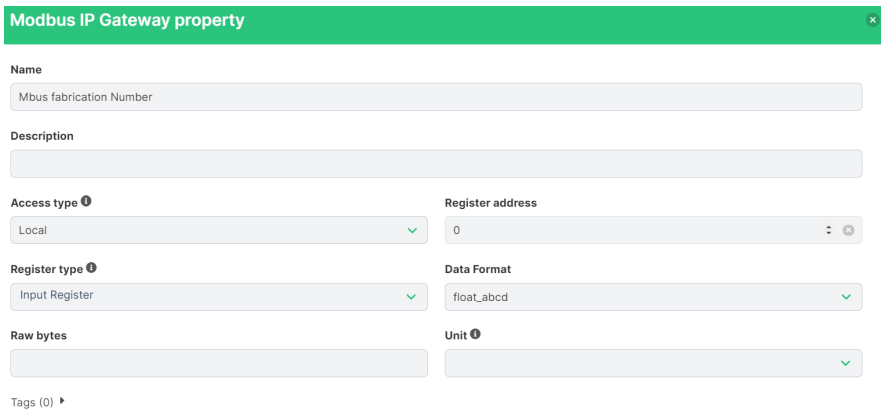


Step 4:
Here is the view of the gateway Modbus table



Property configuration:
By clicking on the button, you will be able to have the details of your gateway property.

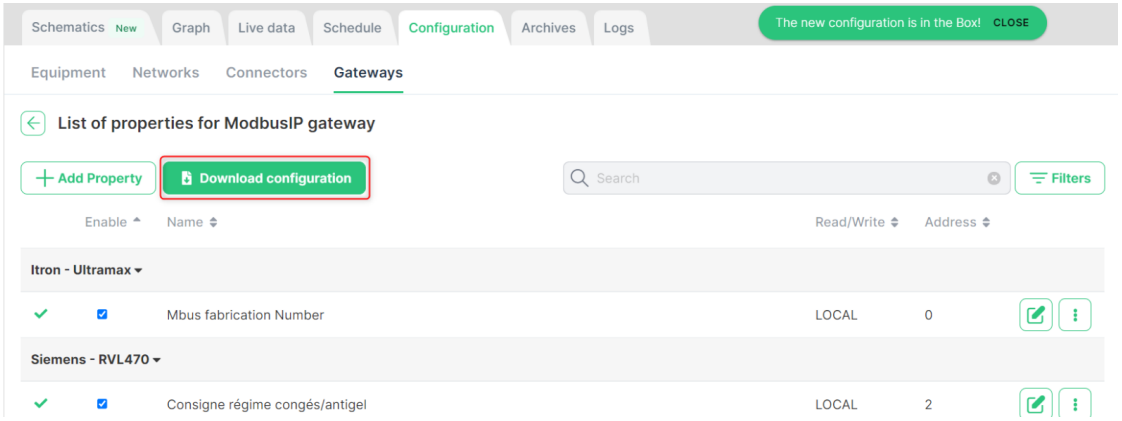
Be sure that your Modbus IP client configuration is matching these parameters.



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Step 5:
You can also download the Modbus table.

NOTE
The Modbus table is mandatory in order for you to configure your Modbus IP client, with this table, you'll know how to access the data made available by the Bridge.



LoRaWAN Signal Strength & Quality

	Signal Indicator	LoRaWAN					
		SF7	SF8	SF9	SF10	SF11	SF12
RSSI Received Signal Strength Indication	Bad	< -117 dBm	< -120 dBm	< -123 dBm	< -127 dBm	< 129 dBm	< -130 dBm
	Average	< 107 dBm	< -110 dBm	< -113 dBm	< -117 dBm	< -119 dBm	< -120 dBm
	Good	> -107 dBm	> -110 dBm	> -113 dBm	> -117 dBm	> -119 dBm	> -120 dBm
SNR Signal Noise Ratio	Bad	< 0 dB	< -5 dB	< -8 dB	< -10 dB	< -12 dB	< -15 dB
	Average	< 10 dB	< 5 dB	< 2 dB	< 0 dB	< -2 dB	< -5 dB
	Good	> 10 dB	> 5 dB	> 2 dB	> 0 dB	> -2 dB	> -5 dB

Support

The website support.wattsense.com/portal contains useful information for the Bridge (Tutorials, Knowledge base, etc..)

Here are some useful articles and tutorials:

https://support.wattsense.com/portal/en/kb

To alert the support team about any issues you are experiencing, please send an email to support@wattsense.com or create a ticket in the support platform.

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