HUB'O:

GETTING STARTED

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Embedded software is based on Nke Watteco proprietary drivers and applicative code and operates on the Contiki kernel from the SICS (Swedish Institute of Computer Science).

http://www.nke-watteco.com/

DOCUMENT HISTORY

Date	Revision	Modification Description
April 2018	1.0	Creation
November 2018	1.1	Add some more details in the Hardware Set-up
February 2019	2.0	Modification to use the tool Make-cfg (new version)

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1 INTRODUCTION

Hub'O is the first private LoRaWAN network gateway designed by nke Watteco. Hub'O works in partnership with a distant server hosted or communicating with the applicative back-end of our client.

Now that you have received your gateway, you will be able to create your own LoRaWAN network and start working with it. This document is here to help you in the installation and the first configuration of Hub'O.

A last paragraph will describe how to correctly install on site a Hub'O gateway and LoRaWAN end-devices paired to it. It will be seen that thanks to its LCD screen, the installer can double check that the LoRaWAN end-devices are correctly paired to Hub'O and correctly communicates with it.

FIGURE 1 - HUB'O GATEWAY

2 HARDWARE SET-UP

When the LoRaWAN gateway is shipped, a power supply cable is mounted. However, the LoRaWAN antenna is not, in order to not be damaged during the journey.

Thus, the first thing to do is to mount the LoRaWAN antenna on the SMA connector (located at the Hub'O right side). Once the antenna correctly mounted, it can be feld to the top to get what can be seen on Figure 1.

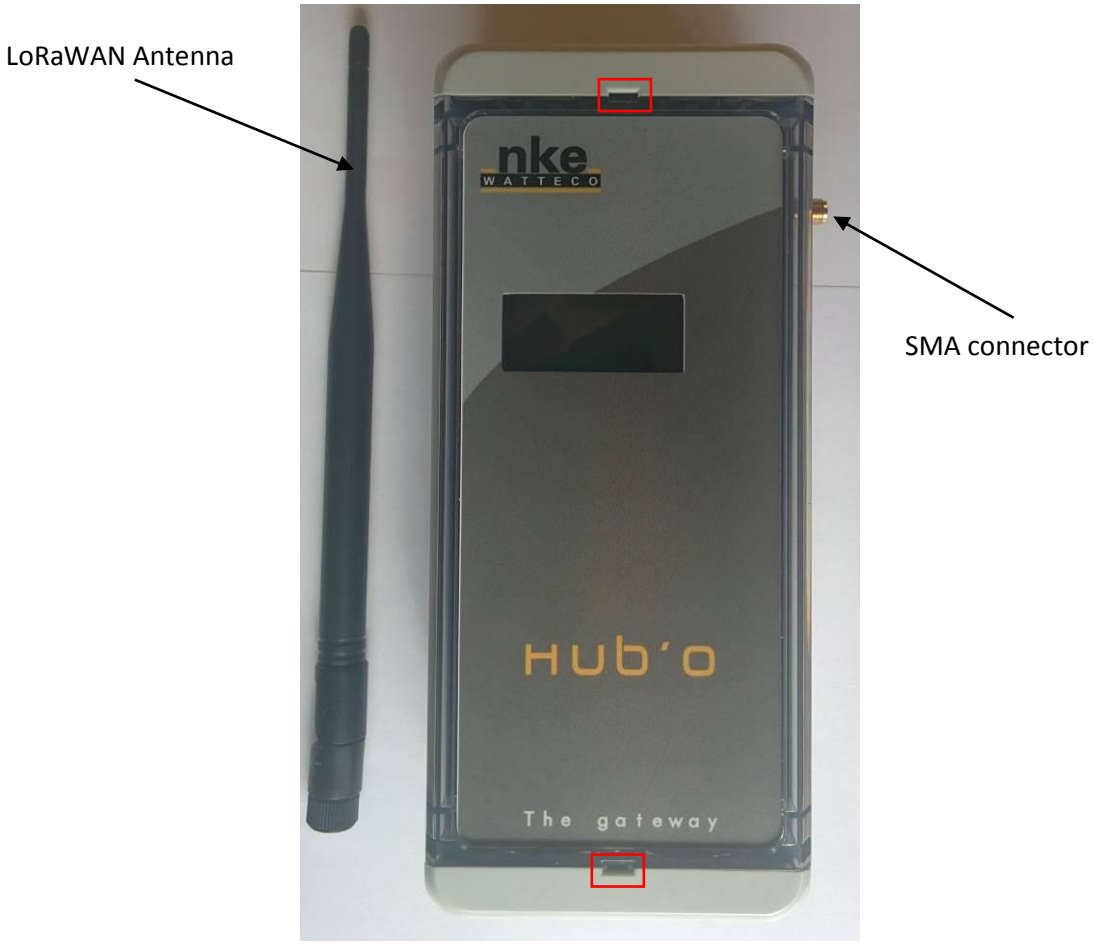

FIGURE 2 - LORAWAN GATEWAY AT RECEPTION

When shipped, Hub'O already contains a 9V disposable battery. This battery is used to correctly shutdown the gateway in case of pwer cut.

To open casing, it is recommended to use a flathead screwdriver to "do lever" on one of the red squared area on Figure 2.

On the Figure 3 can be seen the space provided for the 9V disposable battery, please be careful to respect the polarity.

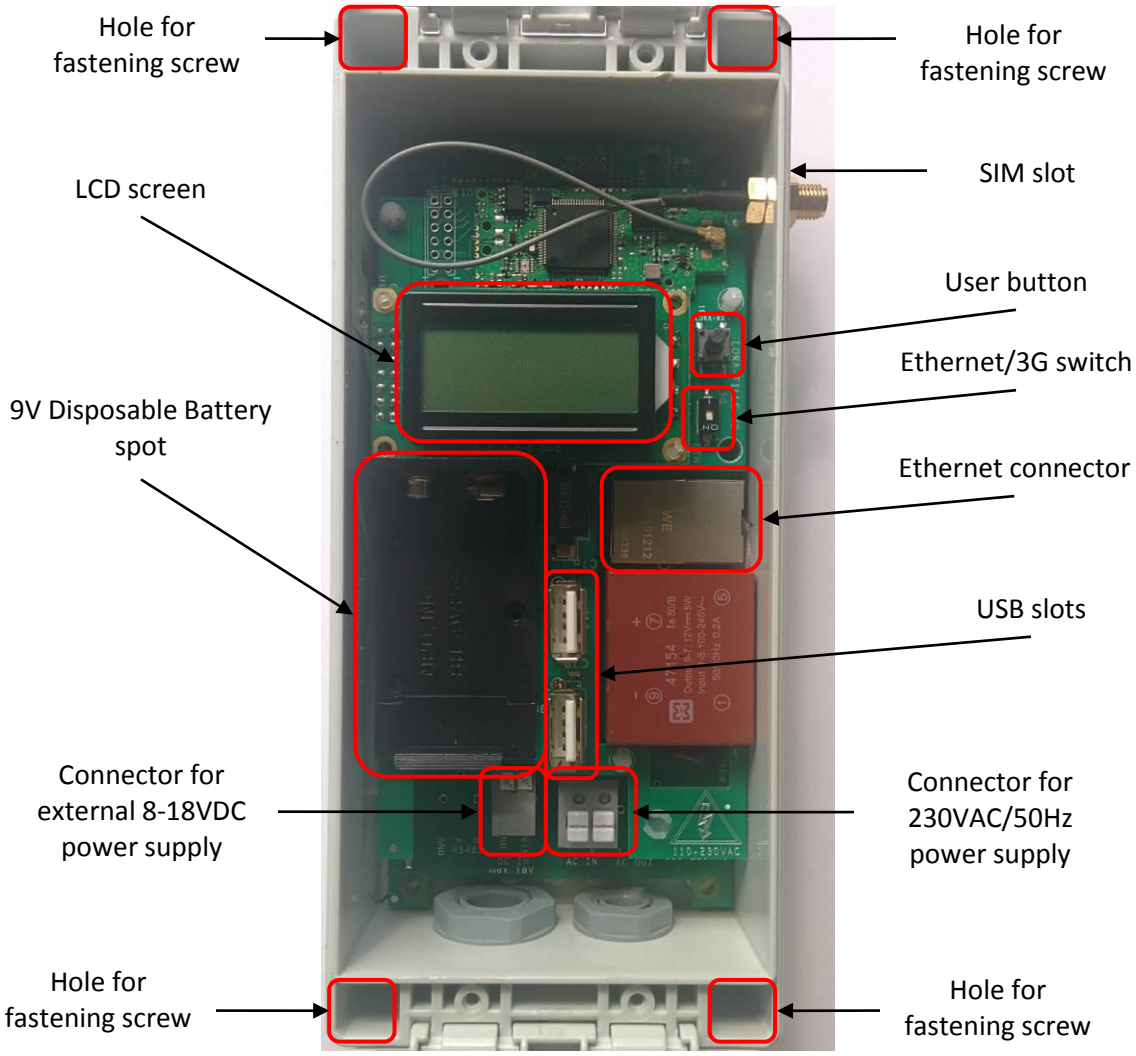

FIGURE 3 - INSIDE THE HUB'O GATEWAY

Now, your Hub'O is ready to be switched "ON".

The gateway is delivered with a power supply cable that can be connected directly to a **230 VAC/50Hz power supply**. The mounted cable do not have a plug on it, thus the phase wire and the neutral wire can be directly cable to a **230 VAC/50Hz power supply,** in an electrical board for example. If Hub'O needs to be connected to a socket, a plug needs to be added at the end of the mounted cable.

CAUTION: If the device is connected to the mains power source, harmful voltage will be present on all wires during operation.

Connect or unconnect the device after **MAKING SURE TO HAVE SWITCHED OFF MAINS POWER FROM ALL WIRES** (disconnecting a single wire e.g. from a manual switch is NOT sufficient).

An external VDC power supply can be used if a 230 VAC power source is not available. This power source needs to be between **8 and 18 VDC**. No cable is mounted on the VDC connector, to be used a cable needs to be added.

If an Ethernet network is used, Hub'O needs to be cabled to the network with a classic **RJ45 ethernet cable**.

Hub'O can be fixed against a wall or on any surface thanks to the holes for fastening scews inside the casing (cf. Figure 3). For a maximum radio range, Hub'O needs to be fixed with the positioning that can be seen on Figure 1 or 4.

Here below, can be seen the dimensions of the Hub'O product.

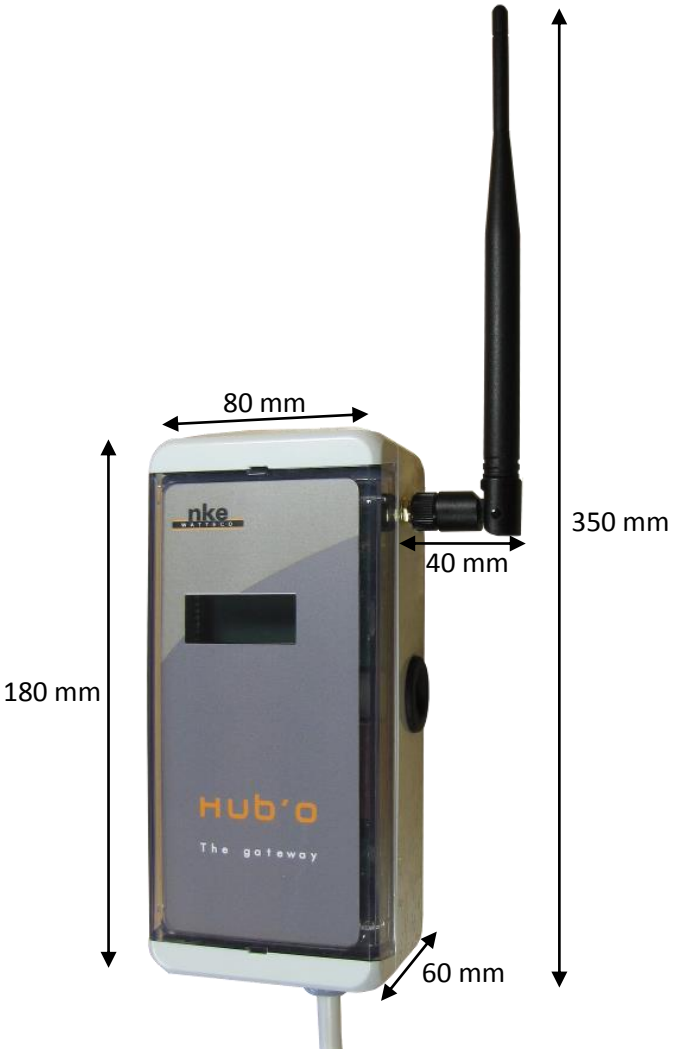

FIGURE 4 - HUB'O DIMENSIONS

3 FIRST CONFIGURATION

The next step in the Hub'O installation is to correctly configure it. In order to do that, a configuration file can be filled with the right parameters and can be uploaded on the Hub'O Gateway thanks to one of its USB slot (cf. Figure 3).

Here below, can be seen the steps to correctly create a configuration file and upload it to the Hub'O gateway.

3.1 CONFIGURATION FILE CREATION

Hub'O configuration file is a .json file, interpreted by the gateway to set its differents parameters.

In this configuration file, the gateway can be configured to use DHCP or a fixed IP address, the 2G/3G parameters can be set if needed, the SNTP server address can be set, and, of course, all the parameters used by the application: the distant server address, the data directory to upload file, the configuration directory to get the files, the data upload period, etc.

In order to have an exhaustive description of this file and how to complete it, please see the document named *"Hub'O_Server_Exchanges_Description_X_X.pdf"*, on paragraph **§5.2 Hub'O Configuration file**.

Once your creation file created, you can rename it as follow: **c_010_0000.json**.

3.2 SIGNATURE FILE CREATION

For security reasons, to upload a new configuration file on Hub'O gateway, it is necessary to generate a signature file first. Indeed, Hub'O will check for this signature file before taking into account the configuration file.

To generate this signature, please use the "**make-manifest**" tools in command line. This tool is available in the repertory "**exe_win32**" inside the make-cfg zip file.

The command line to use is the following:

```
make-manifest.exe --type CFG --file c_010_0000.json
```

FIGURE 5 - CREATING THE SIGNATURE FILE

If everything went well, a new file named "c_010.manifest" should appears in the same directory as make-manifest.exe and c_010_0000.json.

3.3 UPLOAD ON HUB'O

To upload the new configuration on the gateway, copy the configuration file "c_010_0000.json" and its signature "c_010.manifest" on the root of a USB stick.

Then plug the USB stick on one of the Hub'O USB slots. Wait approximately 15 seconds and then take back the USB stick, Hub'O is now configured as you wanted.

3.4 OTHER FILES USB UPLOAD

From the firmware version 02.00, it is possible to upload through USB two other kind of files: the ModBus configuration file and the allowed end-devices list. In order to have an exhaustive description of these files and how to complete it, please see the document named *"Hub'O_Server_Exchanges_Description_X_X.pdf".*

3.4.1 MODBUS CONFIGURATION FILE

Filename to give to the ModBus configuration file before creating the signature file: **c_modbus_010_0000.json**.

Command line to use to create the signature file:

```
make-manifest.exe --type MODBUS --file c_modbus_010_0000.json
```

FIGURE 6 - CREATING THE SIGNATURE FILE FOR THE MODBUS CONFIGURATION

Afterwards, both of the files (c_modbus_010_0000.json and c_modbus_010.manifest) needs to be copied at the root of the USB stick.

3.4.2 ALLOWED END-DEVICES LIST

Filename to give to the allowed end-devices list file before creating the signature file: **p_010_0000.json**.

Command line to use to create the signature file:

```
make-manifest.exe --type PROV --file p_010_0000.json
```

FIGURE 7 - CREATING THE SIGNATURE FILE FOR THE MODBUS CONFIGURATION

Afterwards, both of the files (c_modbus_010_0000.json and c_modbus_010.manifest) needs to be copied at the root of the USB stick.

4 CONNECTION TO THE NETWORK

Once Hub'O correctly configured, it can be connected physically to the Ethernet or 2G/3G network. Thus, you can connect an Ethernet cable to the gateway or you can insert the SIM card on the available slot, if it is not already done.

Check that the Ethernet/3G switch is at the right position for what you need. This switch can be seen on the Figure 3, at the right of the LCD screen and under the user button.

Afterwards, Hub'O is correctly configured and can starts its exchanges with the distant server.

5 EXCHANGES WITH THE DISTANT SERVER

In order to have a complete understanding on how Hub'O exchanges with the distant server and what these exchanges are for, please read the document named:

- "*Hub'O_Server_Exchanges_Description_X_X.pdf*"

6 INSTALLING HUB'O WITH END-DEVICES ON SITE

Once all the steps listed before completed, the distant server can send the list of allowed end-devices to Hub'O (for more information about this exchange, please read the pdf document explaining that: "*Hub'O_Server_Exchanges_Description_X_X.pdf").*

6.1 INSTALLATION

When the end-devices list is received by Hub'O, the corresponding end-devices can be installed on site and can be turned on.

Depending on which end-device is used, either a led will flashes or a "bip" will be emitted from the sensor. The association process will be run between the end-device, Hub'O and the distant server (for more details, please see "*Hub'O_Server_Exchanges_Description_X_X.pdf").*

To have more details about nke Watteco end-devices association status, please see our support website: http://support.nke-watteco.com/

Once all the end-devices installed on site, a control can be done on Hub'O, thanks to the user menu. Indeed, Hub'O is able to display the list of all paired end-devices, together with a rating about the RF link.

To access this list, please press the user button (next to the LCD screen), until the Figure 5 screen appears.

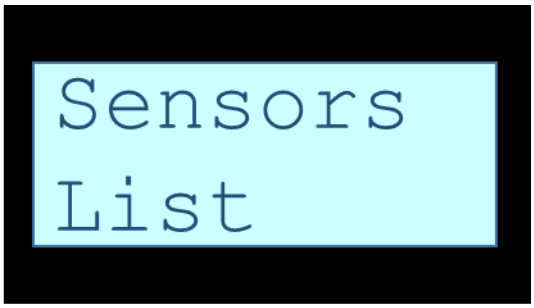

FIGURE 7 - END-DEVICE LIST SUBMENU

When this message appears on the screen, press again the user button for more than 1 second. Then, you will access to the list, starting with the first sensor (an example is given on the figure 6 here below).

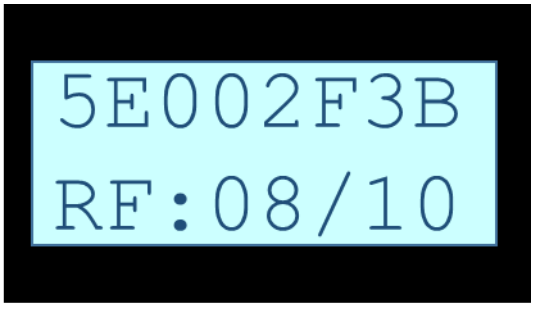

FIGURE 8 - EXAMPLE OF AN END-DEVICE DISPLAY

For each end-device, on the first line can be seen the last 4 bytes of the end-device devEUI. On the second line, can be seen the last RSSI level, converted to a rating on 10.

To go to the next end-device, please press shortly the user button. Each time a press is detected, the next end-device is displayed. When the last end-device is displayed, on the next press, Hub'O will loop back to the first one. To get out of the list, please wait for 30 seconds without pressing the button.

To have more informations about Hub'O IHM, please refers to the IHM description document:

- *"Description_IHM_Hub_O_VX_X.pdf"*

6.2 FIRST END-DEVICE CONFIGURATION

By default, nke Watteco devices are configure to send "unconfirmed" frames to the LoRaWAN network, in order to be compatible with all the private/public existing networks.

However, inside a LoraWAN network managed by Hub'O, it is strongly adviced to set this configuration to "confirmed" frames.

In order to do that, the distant server should send an end-device configuration file to Hub'O after each new association on the network. To configure the end-device to send "confirmed" frames, the following frame needs to be sent on FPort **125: 1105800400000801**.

For more details about end-devices configurations with Hub'O, please see:

- "*Hub'O_Server_Exchanges_Description_X_X.pdf*"

For more details about the frame allowing to configure the type of message send by the nke Watteco end-devices, please refers to: http://support.nke-watteco.com/lorawan-cluster/#Messagetype