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Hati User Manual

Table of Contents

1. Overview of the functionality of the Hati device

Hati is an asset tracking device that enables the user to track the different locations of a moving asset, such as containers, carriers, trailers, trollies, heavy tools, etc . It's an industrial grade device that is maintenance-free and can reach a life-time up to 8 years, depending on the customer Use-Case (amount of messages/position updates, reception conditions, etc.). Based on a sophisticated motion algorithm, Hati is capable to send the relevant GPS location of the asset location or - as a fallback - Wifi BSSIDs address. The GPS / WiFi location message will be transmitted via NB-IoT network.

The core competence of the Hati is its motion algorithm, which allows sending messages only when motion event occurs. In other words, as long as the asset does not move, it will enter some kind of a power saving mode. Even if there is no motion detected, Hati can send a periodic position update once a day (configurable). Detecting motion happens when certain thresholds, such as speed and distance are exceeded (configurable). Once this occurs, the device waits until motion stops, then transmits the corresponding GPS data. Data transmission is done via NB-IoT network exclusively; no transmission through Wifi. Motion algorithm parameters and others can be configured through AlpsAlpine Connect platform, in an end-user friendly GUI.

2. Hati Components

The device consists of the following components:

- **MCU & Bluetooth Module v5.0 (Nordic Semiconductors: nRF52833-QIAA-B)**
- **GNSS Module (Sony: CXD5605AGF)**
- **NB-IoT Module (Quectel: BC660KGLAA)**
- **1 Lithium Thionyl Chloride Battery (HCB: ER18505M-3)**
- **NB-IoT Antenna (Antenova: SR4L002)**
- **GNSS Antenna (Quectel: YC0013AA)**
- **BLE Antenna (Quectel: YC0010AA)**

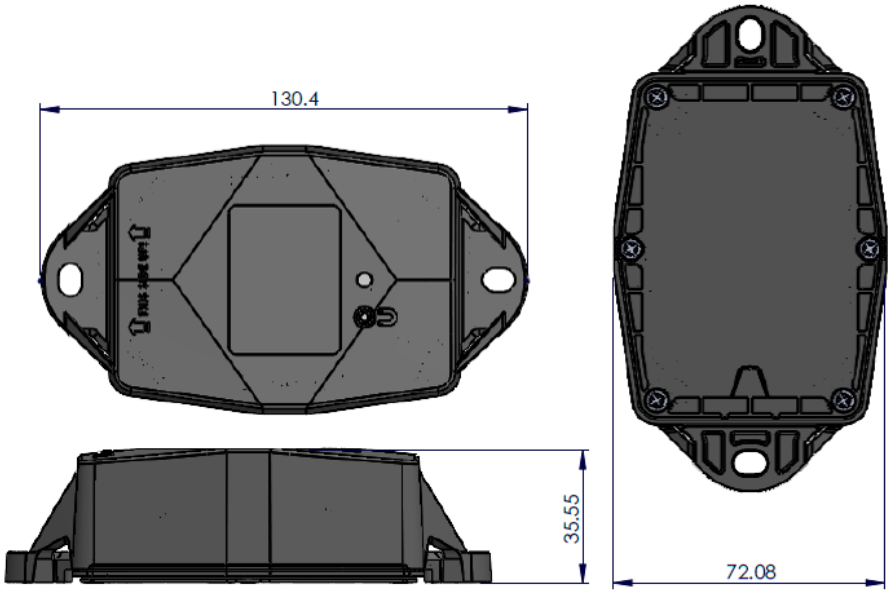
3. Basic Function

- GPS Positioning
- Wi-Fi positioning (Rx only)
- BLE positioning (i.e., Indoor)
- BLE communication with external sensors
- Data Integrity protection mechanism
- NB-IoT interface for global usage of cellular networks

OPTIONAL HW: Flight mode automatically detecting the cabin pressurisation, take-off, and landing.

4. Photos and Dimensions of Device

Hati will use same enclosure as Fenris device.



AlpsAlpine Design

Sensolus Design

5. OPERATION

Device Activation

There are two ways to activate the device: using a magnet or using the back-side button.

Magnet activation

Figure 1 – Hati Location of the indicator for magnet switch (detector)

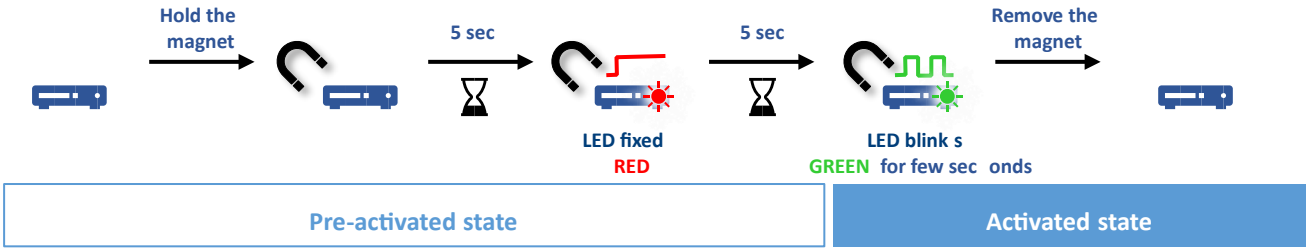


Figure 2 – Magnet activation, continuously hold magnet for 10sec

Device Deactivation

The device cannot be deactivated manually. The only way to deactivate is by Downlink command. However, once activated, SIM card providers will terminate the device contract if device is not sending a message for a couple of days (usually about 4 weeks). So, deactivating an NB-IoT device is not recommended. Instead, change configuration to non-frequent position updates.

Magnet capabilities

Magnet can be used for activation, ref. to previous chapters. Yet, it can also be used to perform following actions:

- Get device status
- Force a request for a new configuration

Regular small magnet is fine. No special one required.

Get device status

To get the device status, just hold the magnet for less than 5 seconds. The LED will indicate accordingly, indicating the current state of the device.

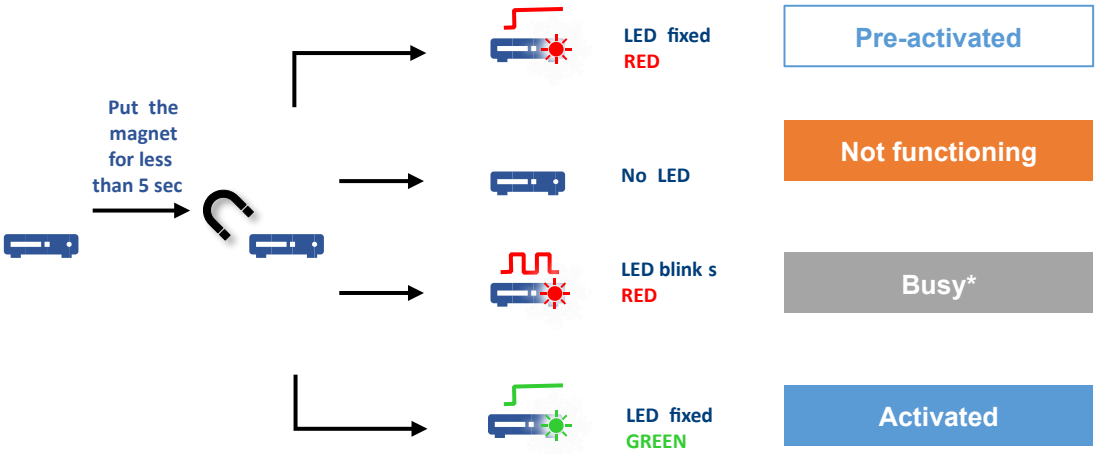


Figure 6 – Status determination of device

* Reasons for Busy state:

- Device is within first 60 seconds after (re-)boot

Note: On a reboot, it will blink green, for a short time (16 blinks, 4sec). Same for activation by Magnet.

Movement transition

Normal scenario

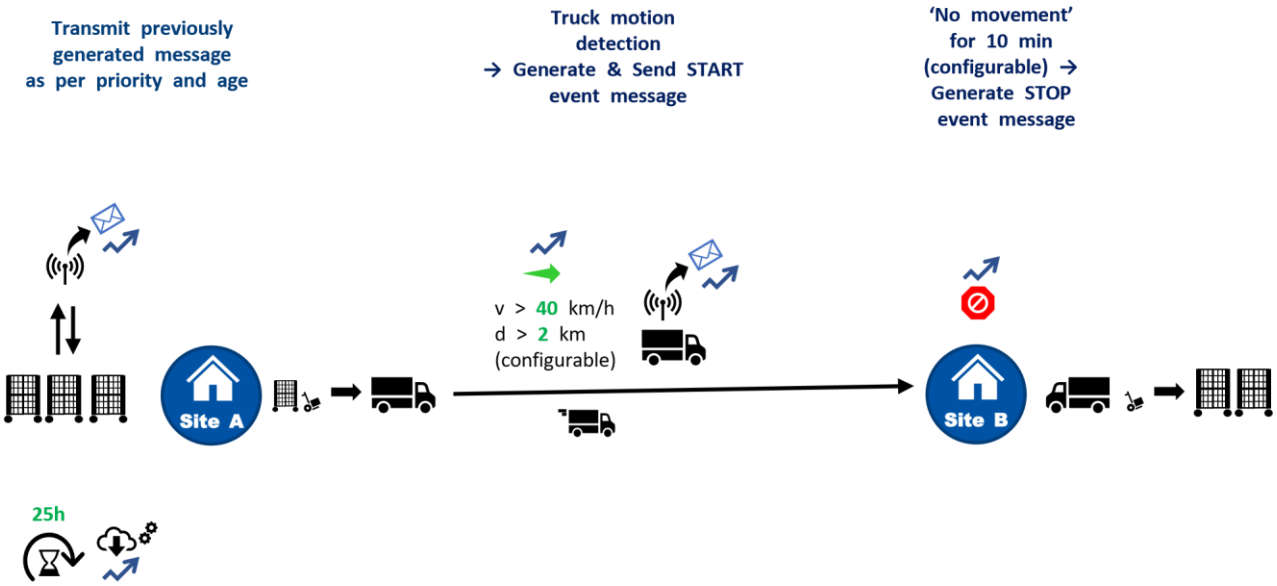


Figure 9 – Normal scenario of the movement transition

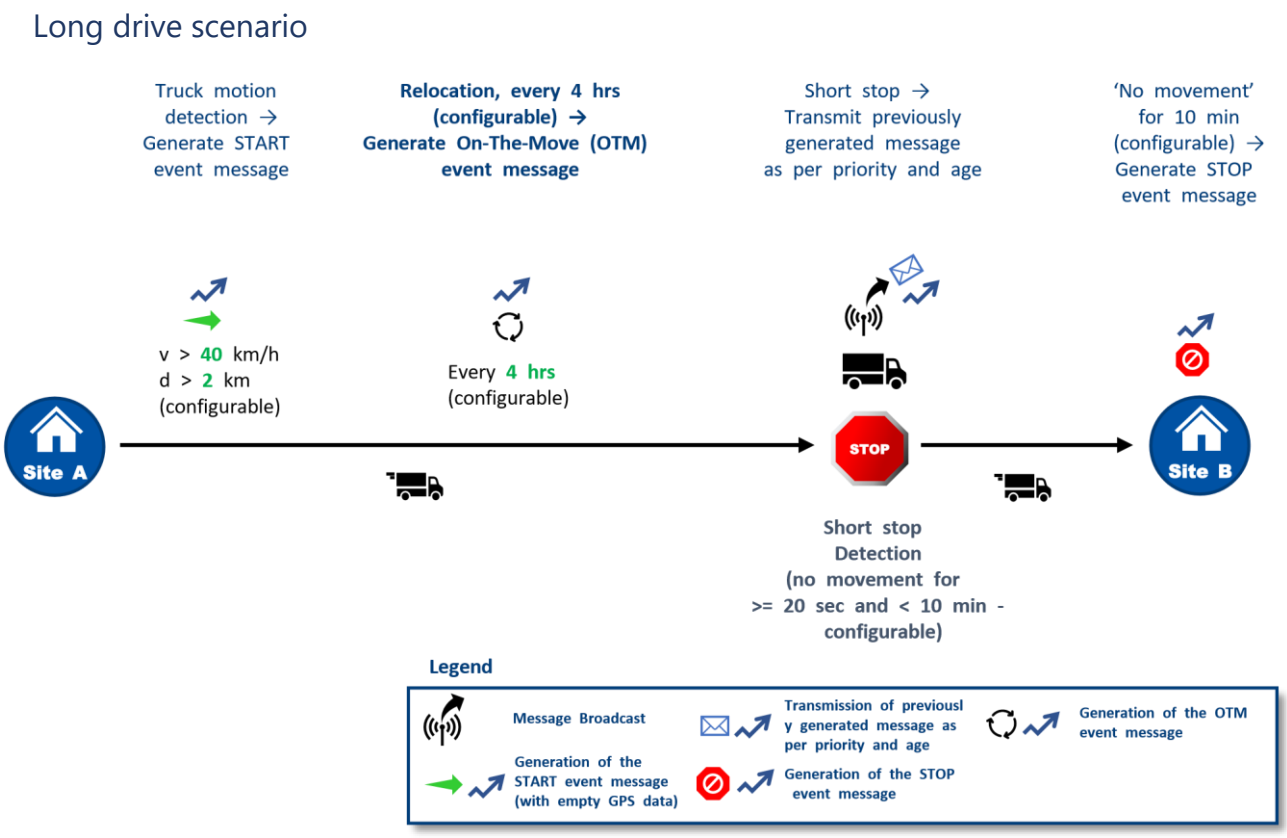


Figure 10 – Long Drive scenario of the movement transition

Note: OTM can be Enabled/Disabled through DL settings

Note: OTM interval can be configured from 30min – 17hrs

Note: Using short intervals of OTM will decrease battery lifetime.

Keep-Alive / BIDIR

Keep alive message (BIDIR messages) contains most of the diagnostics information (Temp, Uptime, Battery status, etc). It rotates the sent information. There is NO POSITION info included.

Keep Alive is usually send every 24hrs/25hrs. This interval is configurable (1hr – 48hr).

A BIDIR message equals a Keep-Alive message but including DL request.

Startup behaviour on Boot event (i.e. BLE Reset)

On Startup, the device will send a Boot message, followed by a BIDIR message (So, Keep-Alive including DL request). Startup requires approx. 60 seconds. On first startup of the device, the tracker will usually receive updated configuration from the Alps Alpine Platform. In certain cases, this will automatically trigger a reboot

after 10 min, to apply new settings. This is an autonomous process that doesn't require any manual interaction by user.

6. TECHNICAL SPECIFICATION

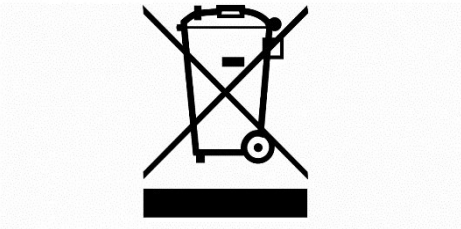
Dimension [mm] (L x W x H)		130.4 x 72 x 35.5
Weight:		225g
Housing Material		PBT/PC
Operating Temperature [°C]		-20 to +60
Localization technology (accuracy)	GPS	5-25m
	Wifi	25-100m
	Bluetooth	5-30m
Battery Lifetime		Up to 8 years, highly depending on Use-Case
Certifcation		CE, FCC,
International Protection Class		IP69
Maximum relative humidity:		95%
Battery		Non-replaceable 8400 mAh, 3.6V, nominal 25°C (Li-SoCl2, 3xER17505M parallel connected cells)
Mounting Method		Rivets, Screws, Zip-ties, Double side adhesive tape

7. MOUNTING POSITION

To mount the Hati to the asset, 2 rivets or screws have to be inserted through the two holes of the device on the sides. There are arrows on the device housing to indicate the best mounting orientation.

It is advised to place the Hati on the top part of the asset, in order to avoid any hits/impacts from a forklift or any other type of vehicles. Additionally, make sure Hati is not covered/surrounded by metal as this might cause bad reception of build-in antennas. In general, keep good sky view, for better GPS reception.

8. DISPOSAL



Make sure you apply to the rules of disposal, existing within your country.

GER: Hati device is registered at EAR (Elektro-Altgeräte Register) and has an WEEE number (Waste of Electrical and Electronic Equipment).

9. DISCLAIMER

We make every effort to ensure that the information and technical details in this handbook are accurate and complete. Nevertheless, this document is not a contractual agreement and cannot be used as a reference for any warranty claims. The network communication is highly dependent on NB-IoT coverage and many other environmental factors, therefore ALPS ALPINE is not liable to any monetary impacts due to lost messages.

Due to IP69 certification, warranty is lost if the device is opened.

10. REGULATIONS

Radiation Exposure Statement: The radiated output power of this device meets the limits of FCC/ISED Canada radio frequency exposure limits. This device should be operated with a minimum separation distance of 20 cm between the equipment and a person's body.
WARNING: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment
Radio Equipment Statement: Operation is subject to the following two conditions:
1.
The device may not cause harmful interference.
2.
The device must accept any interference received, including interference that may cause undesired operation of the device.
FCC ID: 2AT4V-HATI
IC: 26629-HATI
Contains FCC ID: XMR2021BC660KGL
Contains IC: 10224A-2021BC660GL
HVIN: 2AT2004A

FCC USA

FCC ID: 2AT4V-HATI, Contains FCC ID: XMR2021BC660KGL 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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RF Exposure

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

ISED Canada

IC: 26629- HATI, Contains IC: 10224A-2021BC660GL This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: 1. This device may not cause interference. 2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : 1. L'appareil ne doit pas produire de brouillage; 2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Exposure

This equipment complies with ISED Canada radiation exposure limits set forth for an uncontrolled environment. This device should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements d'ISDE Canada établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.