UM02318

GN1S067 Livestock Tracker User Manual

V1.2

Document information

Info	Content
Keywords	*GN1S067, LoRaWAN, Livestock Tracker*
Abstract	*This document describes user manual of GN1S067.*

Content

1 Features

GN1S067 is an intelligent LoRaWAN tracker developed by RXHF for positioning and data monitoring of cattle and sheep in the livestock industry. It supports IP67 protection class, supports all-day weather environment work, and has the characteristics of high positioning accuracy, long communication distance and long battery life time.

It has the following features and functions:

1. Support reporting GPS position, temperature and humidity, number of steps, battery voltage and other information.

The tracker contains built-in GPS module, temperature and humidity sensor and Accelerometer sensor. The tracker will automatically report the data including sensor information periodically.

2. Supports flexible LoRaWAN report period configuration

Users can configure the report interval by themselves. It can be divided into maximum three duration (no overlap) for the whole day time. For each duration, the different report intervals can be set freely.

3. Support automatic time synchronization

After the device is turned on, it will automatically obtain the time through the NS of LoRaWAN as well as from the GPS module. The time will be re-obtained from NS every 24 hours, and the device time will also be updated after each GPS positioning to ensure that the time of the device is in an accurate state.

4. Support for custom time zone

Users can configure the time zone of their region through the APP or LoRaWAN. After configuring the time zone, other functions will work based on the configured time zone.

5. Support to configure the daily step count reset time

Based on need, User can decide and configure the time in a day when the daily step count will be reset back to zero.

6. Support to set the number of step for GPS positioning exemption, called “exemption steps”.

Support to set the number of step for GPS positioning exemption: if the step count between each uplink interval (for example one hour) is less than the exemption steps, then for the coming uplink time, GPS positioning is not performed, and will use the previous GPS position information for this uplink reporting, so as to reduce the power consumption and extend the service life of the product.

7. Supports all LoRaWAN frequency plans worldwide

It supports CN470, EU868, IN865, AS923, US915 and other frequency plans.

8. Support LoRaWAN uplink packet re-transmission if lost

After the device enables the re-transmission function, all LoRaWAN uplink data frames will be changed into Confirm frames. Once the device does not receive the downlink ACK after a confirm uplink, the device assumes that the communication has failed and saves the data in the local queue. When the next uplink successfully receives the ACK and the RSSI is greater than -100, the data in the local queue will be re-transmitted in order until the local queue is empty. If the re-transmission fails again, the previous process will be repeated and the retransmission will continue after waiting for a successful ACK reception.

9. Support relay function to forward the LoRaWAN class A message of slave node in ABP mode.

Tracker is a master device in relay function. This function can be enabled through APP or LoRaWAN, and support query, add, delete slave operations. When the function is enabled and the slave is added, the slave can send a wake-up frame to wake up the master, and the master forwards the uplink data of the slave to help the slave complete the communication.

10. Support remote configuration of related parameters through LoRaWAN network

Users can configure part of the parameters through the LoRaWAN network downlink.

11. Support mobile APP query and configuration parameters and firmware upgrade

You can configure more parameters and update the firmware through the APP.

12. Support multiple alerts

When the power is less than 10%, the low power alarm bit in the reported data will be set to 1. When the power is less than 5%, the device will shut down after the last packet of data is uploaded.

When the GPS positioning fails, the positioning failure alarm will be set to 1 in the reported data, and the next success will cancel the alarm.

When the re-transmission function is enabled, the alarm bit for re-transmission will be set to 1 in the reported data. Enable will increase power consumption, to alert the user.

When the relay function is enabled, the relay alarm bit will be set to 1 in the reported data. Enable will increase power consumption, to alert the user.

2 Local control and Indication Light

This product does not have a physical button, a Hall sensor is used instead. So a magnet is used to trigger the Hall sensor to locally control the device.
This device has two LEDs, the colors are green and blue. Different functions are triggered by the length of the trigger time of the Hall sensor, and different functions can be distinguished by the LED indication, and the user can trigger the corresponding action through the magnet, as shown in the following table.

Table 1 Hall sensor actions and status LED indication of device

Status	Hall sensor trigger time	LED indication	Function
Power-ON	1 - 5s	Two lights blink at the same time	A LoRaWAN report is triggered
	5 - 10s	Only green light blink	Open BLE broadcast
	10 - 15s	Only blue light blink	Power OFF
Power-OFF	1 - 5s	None	None
	5 - 10s	None	None
	10 - 15s	Only blue light blink	Power ON

Note: when the corresponding LED indication ON, remove the magnet to trigger the corresponding function. If the magnet is not removed for a long time, the two LEDs will be off after 15 seconds, and then remove the magnet will not trigger any function.

3 Quick start

3.1 Product registration

This product uses LoRaWAN mode for communication, so please register the device on LoRaWAN network server before use. Please seek help from your network server supplier for registration method on NS.
This product is in ABP mode. Please contact RisingHF sales for its ID and key information.

After registration, and user turns on the device using a magnet, the tracker will firstly report the version information of the device, followed by a GPS positioning and other data sensing work, the first GPS positioning takes about 60 seconds to execute. If there is no GPS signal in the room, it will time out after 60 seconds, the positioning will fail, and the device will report the packet without GPS data (Function code ID = 0x03). Otherwise, in the case of successful position, the device reports a packet with GPS data (Function code ID = 0x01).
The LoRaWAN message default PORT is 8.

3.2 Power-ON and Power-OFF

When you receive the device first time, it is in powered off mode by factory default.

In the power-off state, the magnet triggers the Hall sensor until the blue light flashes (trigger for about 10 seconds), and then remove the magnet to power on the device. After remove magnet the blue light stays on for about 3 seconds, indicating that the device is successfully powered on. At this time, the BLE broadcast will open and keep for 1 minute.

In the power-on state, the magnet trigger until the green light flashes. Remove the magnet, and the device will open BLE broadcast and keep for 1 minute for the APP to connect to the device.

In the power-on state, the magnet trigger until the blue light flashes. Remove the magnet, and the device will shut down at this time. The blue light will flash for about 3 seconds and enter power-off state.

3.3 Fast trigger uplink

In the power-on state, the magnet is used to trigger until the two lights flicker at the same time then remove the magnet, the device will trigger an uplink. This is called field testing mode, it is useful to evaluate the communication signal quality with the LoRaWAN gateway or want to check if device is working, don’t activate this mode if not needed. This process does not

perform GPS positioning, the last GPS positioning data is used. However, it will update the latest temperature and humidity, battery voltage and other data
At this time, the device will quickly uplink a data packet with the header of “Function ID”=0x01 or 0x03 (0x01: last GPS positioning success; 0x03: last positioning failure). In order to save time for fast uplink, the device will not perform GPS positioning at this time, but use the results of the previous positioning, and the data of other sensors will be updated to the latest, and then reported.

Please refer to “GN1S067-LoRaWan Application Protocol V1.3.pdf” for details of the reported data structure.

3.4 Normal uplink periodically

After Tracker is powered on, it will uplink message every hour by default, user can change the period interval by APP or LoRaWAN downlink command.

Uplink message including GPS position data, Humidity and temperature, step count and battery voltage, if GPS positioning success then uplink message will follow the format with function ID 0x01; If GPS positioning fails, then uplink message will be Heartbeat message which follows the format with function ID 0x03.

Any time if Alarm happens, device will trigger uplink alarm message, following the format with function ID 0x04.

For detail LoRaWAN application protocol, please refer to《GN1S067-LoRaWAN Application Protocol V1.3.pdf》

4 LoRaWAN Remote configure

The downlink configuration packets in this chapter are some examples, for the specific LoRaWAN format, refer to “GN1S067-LoRaWan Application Protocol V1.3.pdf".

4.1 Report period query and configure

Function code ID = 0xB0 for this command. The LoRaWAN reporting period used to set and query products can be flexibly configured with a maximum of three non-repeating time periods of reporting period.

4.1.1 Query

In LoRaWAN NS, the device downlink 0x 00B001B1.

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 B0 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 31	UU	SF7BW125	472.5	8.0	-82	7	8

According to the document parsing corresponding fields:
0x 80b0010000000000000000000000000000000000000000000031
The device is not configured with any cycles.

4.1.2 Configure

Give example if we want to configure the uplink period of the device to report once every 60 minutes from 8:10 to 12:30, once every 30 minutes from 12:31 to 20:00, and once every 120 minutes from 20:31 to 8:09.

In LoRaWAN NS, downlink message
0x 00B00101003C080A0C1E01001E0C1F1400010078141F080945.

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 B0 01 01 32	UU	SF7BW125	472.7	6.0	-83	9	8

According to the document parsing corresponding fields:
0x 80B0010132
Configure success.

Repeat the previous query to confirm the configuration:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
8C-F9-57-FF-FE-80-01-C3	80 B0 01 01 00 3C 08 0A 0C 1E 01 00 1E 0C 1F 14 00 01 00 78 14 1F 08 09 C5	UU	SF7BW125	472.5	9.2	-89	11	8

According to the document parsing corresponding fields:
0x 80B00101003C080A0C1E01001E0C1F1400010078141F0809C5
Is the correct result.

4.2 Positioning mode and resend function query and configure

Function code ID = 0xB1 for this command. Using this command, the device priority positioning mode and LoRaWAN resend function can be queried and configured.

At present, the device does not support Bluetooth indoor positioning, so this command can only be used to configure the resend function.

The resend function is described below:
After the device enables the resend function, all LoRaWAN uplink data frames will be changed into confirm frames. Once the device does not receive the downlink ACK after a uplink, the device assumes that the communication has failed and saves the data in the local queue. When the next uplink successfully receives the ACK and the RSSI is greater than -100, the data in the local queue will be reported in order until the local queue is empty. The local queue size is 10KBytes and a maximum of 365 frames can be cached based on the packet with Function ID=0x01.

4.2.1 Query

In LoRaWAN NS, the device downlink 0x 00B103B4.

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
8C-F9-57-FF-FE-80-01-C3	80 B1 03 01 35	UU	SF7BW125	472.5	9.0	-89	15	8

According to the document parsing corresponding fields:
0x 80B1030135
It can be seen that the positioning mode of the device is GPS priority, and the resend function is not opened.

4.2.2 Configure

Now you want to configure the location mode of your device to: GPS first, and turn on the resend function.

In LoRaWAN NS, the device downlink

0x 00B1018133 .

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
8C-F9-57-FF-FE-80-01-C3	80 04 20 01 5E 63 66	CU	SF7BW125	473.1	8.8	-91	18	8
8C-F9-57-FF-FE-80-01-C3	80 B1 01 01 33	CU	SF7BW125	471.9	8.5	-88	17	8

According to the document parsing corresponding fields:
0x 80B1010133 and 0x 800420015E6366
We can see that the configuration was successful, and the alarm command was triggered because the resend function was turned on.

Repeat the previous query to confirm the configuration:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 B1 01 81 B3	CU	SF7BW125	472.7	4.2	-83	20	8

According to the document parsing corresponding fields:
0x 80B10181B3
Is the correct result.

4.3 TimeZone query and configure

Function code ID = 0xC0 for this command. You can configure the time zone for your location.

4.3.1 Query

In LoRaWAN NS, the device downlink 0x 00C001C1 .
Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 C0 01 00 41	CU	SF7BW125	472.1	6.2	-85	22	8

According to the document parsing corresponding fields:
0x 80C0010041
The time zone of the device is 0.

4.3.2 Configure

Now you want to configure the time zone of the device to be: East 8.

In LoRaWAN NS, the device downlink
0x 00C00108C9 .

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 C0 01 01 42	CU	SF7BW125	473.3	5.2	-87	24	8

According to the document parsing corresponding fields:
0x 80C0010142
Config success.
Repeat the previous query to confirm the configuration:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 C0 01 08 49	CU	SF7BW125	472.9	6.5	-83	26	8
8C-F9-57-FF-FE-80-01-C3	80 01 5E 37 F4 B2 01 54 B5 C2 06 C4 D0 1B 00 00 EF 00 3F 00 00 01 5E 63 0A 9E 43 20 38	CU	SF7BW125	471.9	8.8	-85	25	8

According to the document parsing corresponding fields:
0x 80C0010849
Is the correct result.

4.4 Step count reset time query and configure

Function code ID = 0xC1 for this command. With this command, the user can change the time of the daily step count reset.

4.4.1 Query

In LoRaWAN NS, the device downlink 0x 00C101C2 .
Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
8C-F9-57-FF-FE-80-01-C3	80 C1 01 00 00 42	CU	SF7BW125	472.5	9.2	-87	28	8

According to the document parsing corresponding fields:
0x 80C101000042
It can be seen that the step count reset time of the device is 0 o’clock.

4.4.2 Configure

Now you want to configure the step count reset time of the device to 9:00.

In LoRaWAN NS, the device downlink
0x 00C1010900CB .

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
8C-F9-57-FF-FE-80-01-C3	80 C1 01 01 43	CU	SF7BW125	472.1	10.5	-85	30	8

According to the document parsing corresponding fields:
0x 80C1010143
Config success.

Repeat the previous query to confirm the configuration:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
8C-F9-57-FF-FE-80-01-C3	80 C1 01 09 00 4B	CU	SF7BW125	471.9	9.5	-83	32	8

According to the document parsing corresponding fields:
0x 80C10109004B
Is the correct result.

4.5 GPS positioning exemption query and configure

Function code ID = 0xC2 for this command. The user uses this command to remotely configure the number of location exemption steps.

4.5.1 Query

In LoRaWAN NS, the device downlink 0x 00C201C3 .
Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
8C-F9-57-FF-FE-80-01-C3	80 C2 01 00 00 43	CU	SF7BW125	473.1	8.5	-83	34	8

According to the document parsing corresponding fields:
0x 80C201000043
It can be seen that the number of positioning exemption step count of the device is 0, which means that GPS positioning will be performed every uplink.

4.5.2 Configure

Now we want to set the exemption step count of the device to 45678.

In LoRaWAN NS, the device downlink
0x 00C201B26EE3.

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 C2 01 01 44	CU	SF7BW125	472.5	6.8	-82	36	8

According to the document parsing corresponding fields:
0x 80C2010144
Config success.

Repeat the previous query to confirm the configuration:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 C2 01 B2 6E 63	CU	SF7BW125	472.3	5.5	-80	38	8

According to the document parsing corresponding fields:
0x 80C201B26E63
Is the correct result(0xB26E = 45678).

4.6 Downlink time calibration device

Function code ID = 0x00 for this command.
Note: It is generally not used when the GPS signal and LoRa signal are good, the time error is too large.

In LoRaWAN NS, the device downlink
0x 00000107E705120A291D0056.

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 00 01 01 82	CU	SF7BW125	473.3	7.8	-81	40	8

According to the document parsing corresponding fields:
0x 8000010182
The time configuration was successful and the time zone changed to 0.

4.7 Trigger GPS positioning and report

Function code ID = 0x01 for this command. When the user uses this command, the device will ignore the limit of the GPS location exemption step count, force a GPS location and then report the data.

In LoRaWAN NS, the device downlink
0x 000101.

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 01 64 65 91 09 01 54 B6 2B 06 C4 D0 A9 00 00 39 00 49 00 00 01 5E 63 0A B5 43 20 C3	CU	SF7BW125	473.1	8.0	-81	43	8
8C-F9-57-FF-FE-80-01-C3	80 01 64 65 91 02 01 54 B6 2B 06 C4 D0 A9 00 00 39 00 49 00 00 01 5E 63 0A B8 43 20 BF	CU	SF7BW125	473.1	8.5	-76	42	8

At this point, there will be two reporting, one is triggered by the magnet, and one is triggered by the command.

4.8 Factory reset

Function code ID = 0xB5 for this command.
Note: The parameters of LoRaWAN are not reset.

In LoRaWAN NS, the device downlink
0x 00B501B6.

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)	帧计数器	节点端口
F0-4C-D5-FF-FE-04-49-0C	80 B5 01 01 37	UU	SF7BW125	472.9	7.8	-83	45	8

According to the document parsing corresponding fields:
0x 80B5010137
At this point, the previously set parameters have been reverted to their default values.

4.9 Relay management

Function code ID = 0xC3 for this command. Contains the relay related add and delete functions.
It is also described in the LoRaWAN protocol documentation how to remove the switch instruction format for all slaves as well as separately control the relay function.

4.9.1 Query

In LoRaWAN NS, the device downlink 0x 00C301C4 .
Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:
The master will return several reply data frames if it binds several slaves, for example, if it currently binds two slaves.

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)
8C-F9-57-FF-FE-80-0F-79	80 C3 01 00 21 11 22 33 44 0F	CU	SF7BW125	471.9	8.5	-15
8C-F9-57-FF-FE-80-0F-79	80 C3 01 00 20 00 6A D8 2C D2	CU	SF7BW125	472.7	9.8	-16

According to the document parsing corresponding fields:
The master binds two salve Devaddrs, 006AD82C and 11223344.

4.9.2 Add

For the specific slave add command format, please check the LoRaWAN protocol documentation.
For example, if you want to add a slave with Devaddr 35344554 to the master and enable the relay feature:
In LoRaWAN NS, the device downlink
0x 00C3010335344554C9 .

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm)
8C-F9-57-FF-FE-80-0F-79	80 04 60 01 68 5B A8	CU	SF7BW125	472.5	9.5	-21
8C-F9-57-FF-FE-80-0F-79	80 C3 01 03 47	CU	SF7BW125	473.3	9.8	-21

According to the document parsing corresponding fields:
0x 80C3010347 : It indicates that the device has successfully add the slave and successfully opened the relay master function.
0x 80046001685BA8 : This is the alarm data frame to inform the user that the relay master function has been turned on and the power consumption will increase.
The device is add to a maximum of 10 slaves, and will not be add after more than 10.

4.9.3 Del

For the specific slave del command format, please check the LoRaWAN protocol documentation.
For example, delete the slave with Devaddr 35344554 added in the previous section, and turn on the relay functionality:
In LoRaWAN NS, the device downlink
0x 00C3010235344554C8 .

Use the magnet to trigger the device to quickly uplink, and wait for the device to answer:

网关 ID	上行数据	消息类型	速率	频率 (MHz)	信噪比 (dB)	信号强度 (dBm
8C-F9-57-FF-FE-80-0F-79	80 C3 01 03 47	CU	SF7BW125	472.7	9.2	-20

According to the document parsing corresponding fields:
Delete the slave successfully, open the relay master successfully.

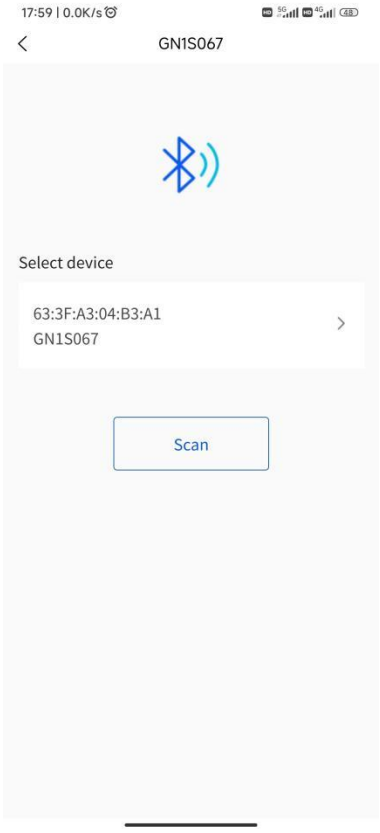
5 APP Instructions

The device has a corresponding mobile APP to cooperate with it. Currently, the APP only has an Android version.

The APP establishes a connection with the device via Bluetooth. The APP will disconnect the Bluetooth connection from the device when:
Case 1: more than five minutes without any active action with the device will trigger the disconnection of the Bluetooth connection and return to the home page.
Case 2: The mobile phone actively turns off Bluetooth, which will trigger the disconnection of Bluetooth and return to the home page.
Case 3: When clicking the back button in the upper left corner or the mobile phone operation returns to the upper level, the Bluetooth connection will be disconnected and the home page will be returned.

5.1 BLE Connect

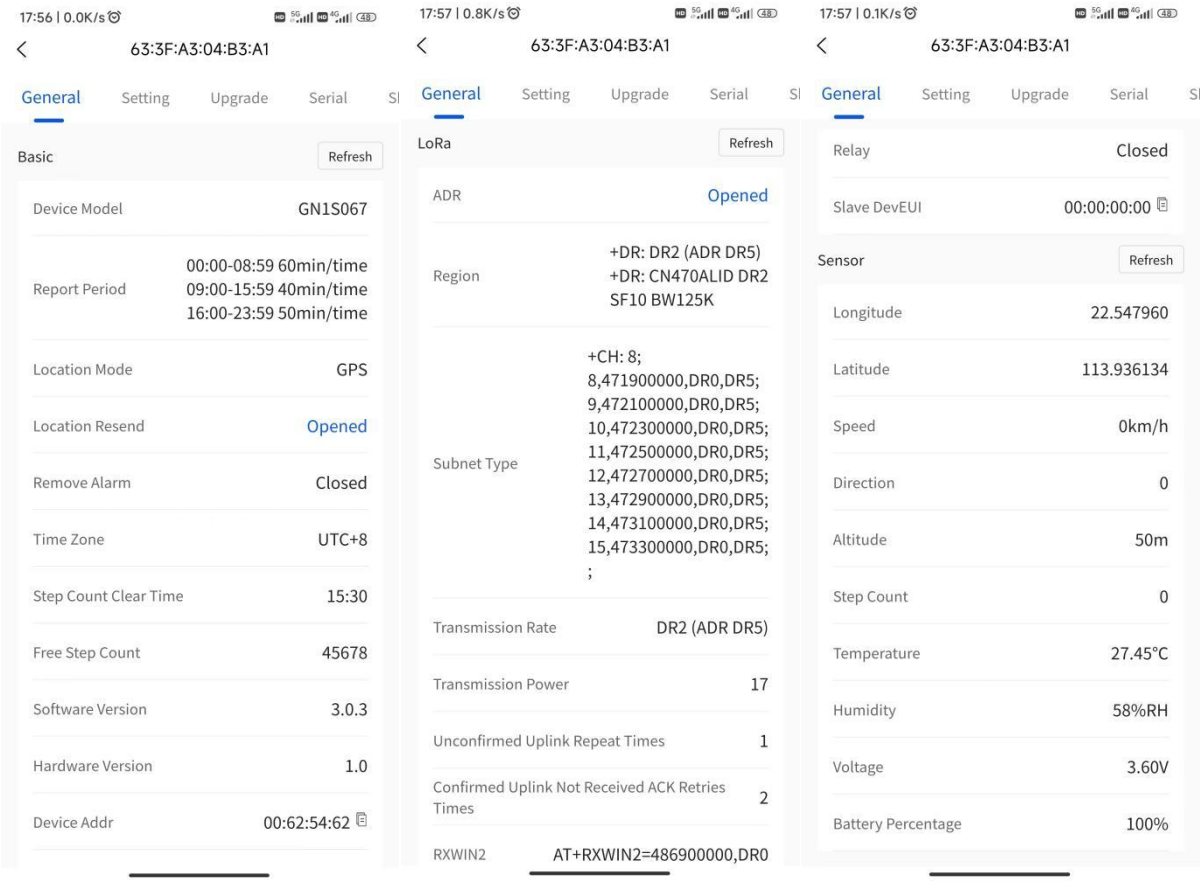
First, log in to the APP and click the device icon of GN1S067 to scan the device. Use a magnet to power on the device, or turn on the device's BLE broadcast (refer to Table 1 Hall sensor actions and status LED indication of device), so that the APP can scan the device and connect.



Click the scanned device to initiate a Bluetooth connection. If the connection is successful, you proceed to the next page, and the device's green light will flash to indicate a successful connection.

5.2 Get device info

After successfully connecting the Bluetooth of the device in the previous step, the detail page is entered, which contains all the information of the device, including three categories: basic information, LoRaWAN related information, and sensor information. Users can scroll down to view various types of information, and can click the refresh button to refresh the corresponding information.



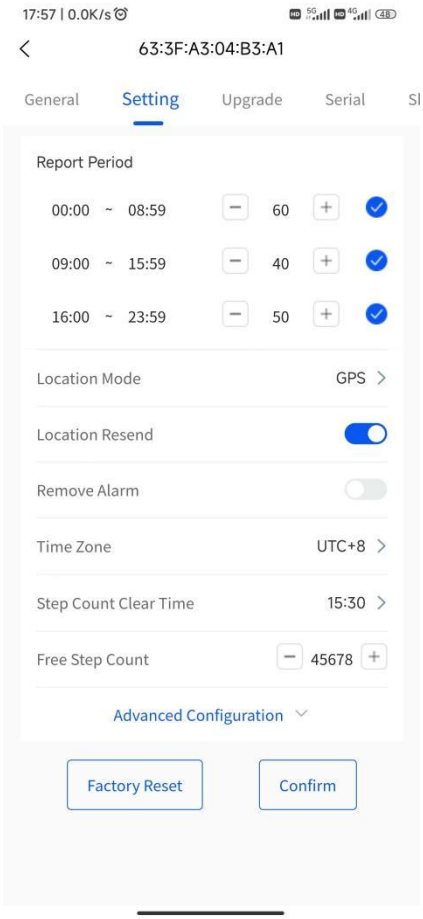
Note: When acquiring sensor data, GPS positioning takes a long time, so it is slow, taking up to 1 minute.

5.3 Parameter configure

After the user makes a parameter change, he needs to click the Confirm button for the change to take effect. It is recommended to return to the detail page after the modification to refresh the parameters and confirm whether the modification was successful.

- Base configure

Click the setting interface to enter the following page:



In this page, users can configure the report period, location resend function, time zone, step count clear time, and free step count (also known as GPS positioning exemption above). The location mode and the remove alarm need not be set and are reserved for future use.

Here are some basic configurable parameters:

1. Report period: When configuring this parameter, the report period cannot be repeated, otherwise the configuration fails. For example, if user wants to configure the whole day period, it needs to be configured from 00:00-23:59. If it is configured from 00:00-00:00, the configuration will fail. The check box after the report period needs to be checked for the configuration for that time period to take effect.

2. Location Resend: When this function is not turned on, all LoRaWAN uplink use unconfirmed frames; When the function is enabled, the device will send an alarm frame with Function ID 0x04 to notify the NS or AS device to enable the location resend function. All uplink will use confirm frame, and if no ACK is received, the data will be cached in the local buffer area. The next uplink and ACK is received, and the RSSI is greater than -100, the cached historical data will be uplink to NS again.

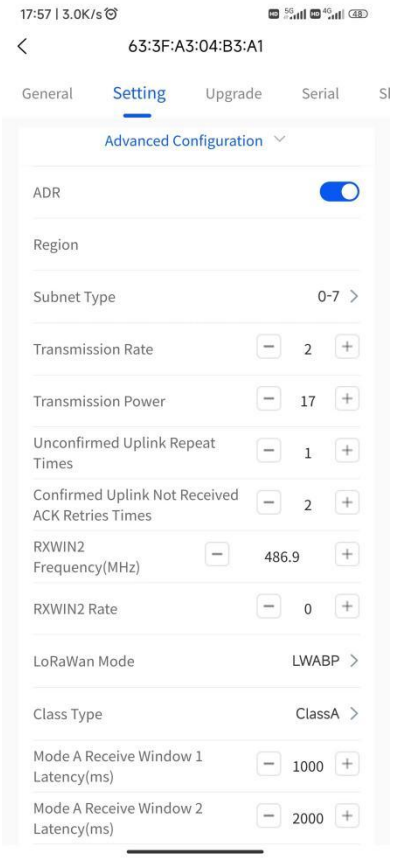
3. Time zone: users can flexibly adjust the time zone according to the location, and the report period time and the step clearing time will automatically match the time zone.

4. Step count clear time: The step number of the device will clear every day. The user can specify the time point of step clear through this parameter.

5. Free step count: When the next report comes and the step difference is not greater than the value, GPS positioning is not performed, and the last GPS information is used for reporting, so as to reduce the power consumption and extend the service life of the product.

- Advanced configure

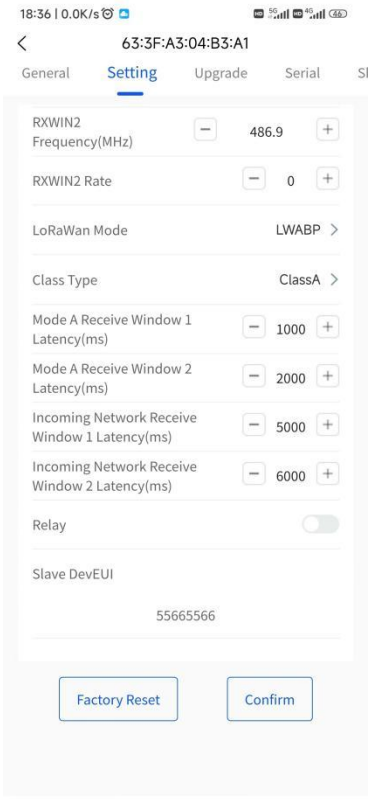
Click the Advanced configuration button to open the drop-down box to see the parameters related to LoRaWAN:



The parameters in the above figure are the parameters related to LoRaWAN network. Users who are not familiar with LoRaWAN should modify it carefully, as it may cause the device to lose contact.

5.4 Relay configure

In the drop-down box of the advanced configuration page, there is a button to configure the relay function:



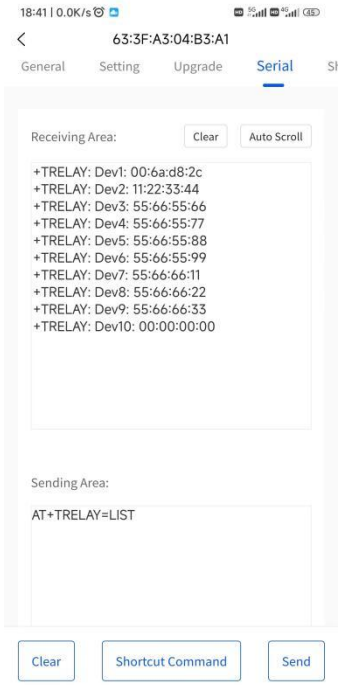
In the figure above, only one relay slave can be added at a time; in the figure, the slave with Devaddr 55665566 is added. You need to click Confirm for the changes to take effect. A maximum of 10 slaves can be added, and when more than 10, the addition failure will be prompted.

Note: At least one slave Devaddr must be added to enable the relay function successfully.

The current APP has no interface for deletion and query. If you need to query or delete, you need to switch to the serial port tool page and use the AT command to complete it.

- Query: AT+TRELAY=LIST

The result is shown in the following figure. All added slave devices will be displayed in the interface. 00:00:00:00 means that the position is empty, and a new slave can be add.

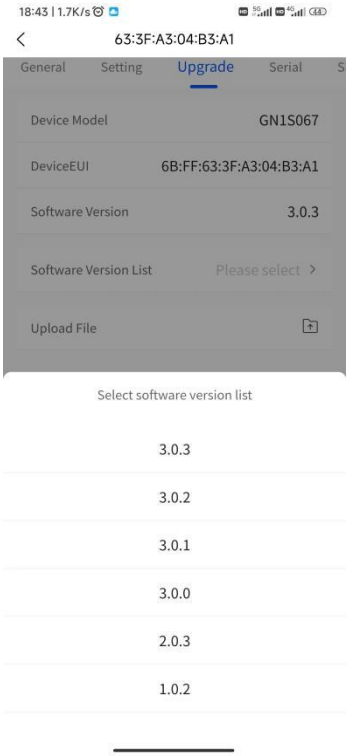


- Delete: AT+TRELAY=DEL, 55665566

After using the command, the slave 55665566 will be deleted, and the reply +TRELAY: OK indicates that the deletion is successful.

5.5 Firmware upgrade

In the upgrade page, user can check the current software version number, and the APP will prompt user if there is a new firmware that can be updated.



When you need to upgrade, select the corresponding software version number and confirm the upgrade. This process takes about 1 minute.

When the progress bar reaches 100%, the device will disconnect from the Bluetooth connection. After about 10 seconds, the device will complete the firmware update, and the blue light will stay on for 3 seconds. At this time, the APP can search the device again and initiate the connection.

If the upgrade fails, please repeat the procedure above to upgrade firmware until succeed.

6 Installation guide

List of items:

GN1S067 tracker:	1PCS
Weave strap:	1PCS
Plastic buckle:	2PCS

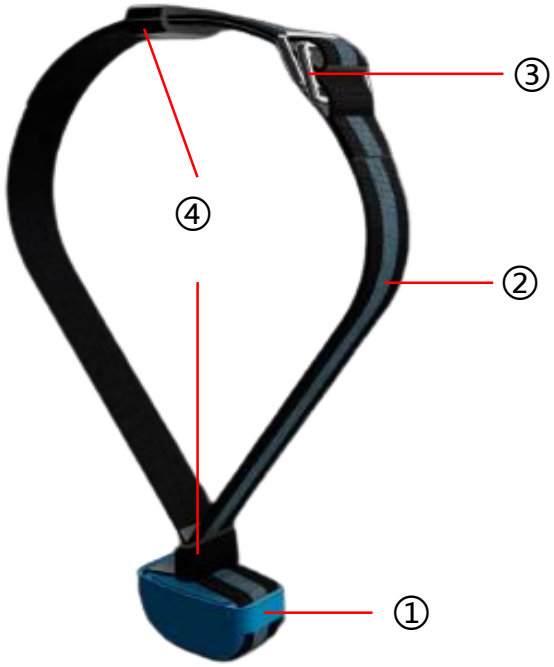


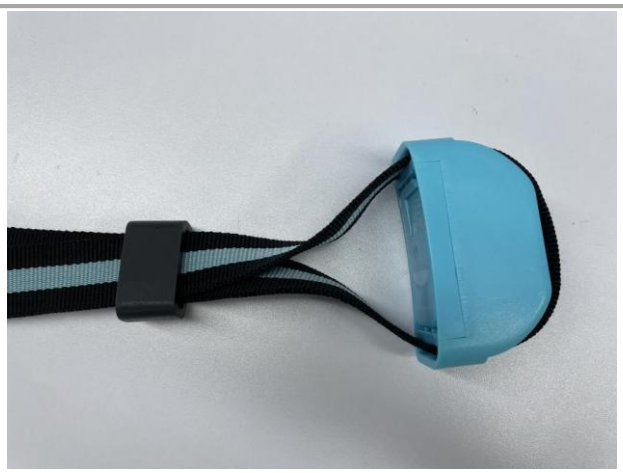
Table 2 GN1S067 assembly parts

Item	Part name	Description	Quantity
①	GN1S067 tracker	Tracker device	1
②	Weave strap	Strap to tie to livestock	1
③	Metal buckle	Adjust and Lock the strap	2
④	Plastic buckle	Adjust the device proximity away to livestock	2

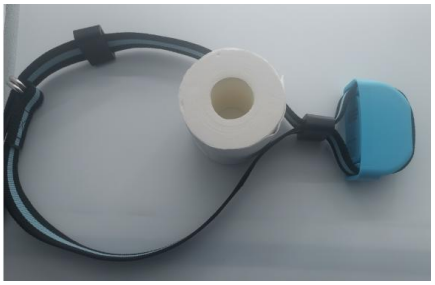
Please follow the steps below to install tracker to livestock:

1) The end of strap passes through the first plastic buckle and GN1S067 lug, as shown in the figure

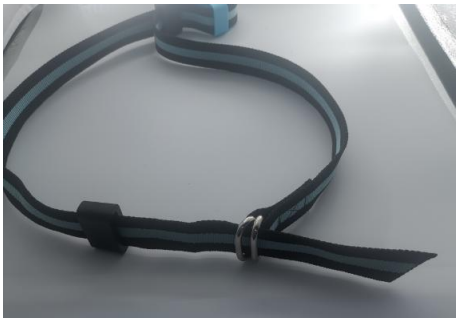
2) The end of strap passes through the other lug of device, adjust the length of strap needed, and passes through the first plastic buckle again.



3) Hang the strap on the neck of cattle or sheep, take out the second plastic buckle, and pass the end of strap through the second plastic buckle. The space between the two plastic buckle is for livestock.



4) Then the end of strap passes through the two metal buckles at the head of the strap, and turn back from one of two metal buckles, tense the strap to lock.
Pass the end of the strap through the second plastic buckle again, the purpose is to fix the strap so it will not swing.



5) After adjust the length and position of the strap, stick the Velcro. As shown in the following figure

6) Finish installation

Revision

-V1.2 2023-08-30
-add Installation Guide

-V1.1 2023-08-21
Modify the description that is unclear

-V1.0 2023-08-17
Create

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