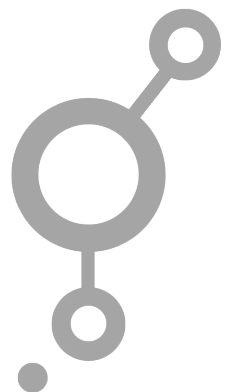




Connected **Detectify**

TECHNICAL GUIDE



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OVERVIEW

1.1 Version

Note: This user manual has been authored by Connected Inventions for the purpose of knowledge transfer to customers and/or partners. The document is not to be distributed by any other party than Connected Inventions.

REVISION HISTORY

DATE	VERSION	AUTHOR	CHANGES
12.08.2024	v1.1	Petri Mäkelä	

About Connected Inventions

Connected Inventions are prop-tech innovators. We provide cost and energy efficient IoT solutions enabling data-driven building operations. Our solutions allow owners and facility managers to reduce energy consumption, lower carbon emissions and transform buildings into more sustainable, healthy, cost-effective, and resilient assets. Our secure IoT solutions include devices, data management platforms, and connectivity services to simplify the deployment of maintenance-free solutions worldwide.

1.2 Device Description & Technical Specifications

Connected Inventions Detectify is an industrial-grade passive infrared (PIR) battery powered sensor designed for indoor motion detection. The device uses ultra-low-power, two-way radio communication, compatible with both Sigfox and LoRa network technologies (user-selectable).

The device can achieve a battery life of up to ten years, depending on environmental conditions and volume of messages.

There are two versions of the device available:

A 90-degree wide detection angle version (see image below), suitable for detecting motion in larger spaces such as rooms (ideal for larger spaces, for example monitoring people monitoring in a room)

A 30-degree narrow detection angle version (see image below), ideal for more confined areas like workstations or desks (ideal for smaller spaces, for example monitoring of the occupancy of a specific office desks)

The Detectify sensor has been designed to provide real-time motion alerts, and can be used to count and report motion events periodically or cumulatively.



TECHNICAL SPECIFICATIONS

Description:	Detectify is a wireless, battery powered movement detector based on a PIR sensor (passive infrared radiation)
Size:	98x30mm including the mounting bracket
Enclosure Material:	ABS plastic white (black available on order)
IP Rating:	IP20 (Indoor applications)
Batteries:	2x3.6V Lithium, 5,400 mAh
Battery Life:	Up to 10 years depending on use case
Working Conditions:	Temperature 0...50 C, Humidity 0...95%
Measuring Range:	Up to 5 meters
Beamwidth:	90+ degrees / 30 degree
Sensor:	Nysenba PIR sensor HM312
Connectivity:	Sigfox 868MHz, 902MHz, 920MHz. LoRaWAN 1.04: EU868, US915, AS923, AU915
Antenna:	Internal 3dBi Helical antenna
Certifications:	CE, FCC, Sigfox Class 0U, LoRa Alliance
Warranty:	1 year

1.3 Terms of Use

Before using your device, please read the entire manual and all safety instructions to ensure safe and proper use. Please retain this manual for future reference.

- The descriptions in this manual are based on the default settings of the device.
- Images in the manual may not perfectly reflect the actual, latest product version. Contact support for specific requirements.
- “The content of this manual may vary from the software provided by service providers or network carriers and is subject to change without notice. Some middleware or end applications may receive data differently, enabling or restricting certain payload features based on network carrier variations. For the latest updates, please visit the Connected Inventions website at www.connectedinventions.com.”
- Available features and additional services may vary depending on your connectivity service and/or software provider*.
- Applications on this device may operate differently compared with similar ones and may lack certain features, such as downlink messaging. For instance, setting downlink parameters requires specific downlink format options. If no access to either Sigfox or LoRaWAN backend is available, or their service does not support downlink messaging, these features—and other system messages—may not be available.”
- Connected Inventions are not liable for performance issues caused by third-party applications or improper installation.

1.4 Environmental Installation Conditions

Ensure that the sensor is installed in a suitable environment.

Conditions outside these parameters may impact connectivity an/or device performance

- Always protect the device from direct exposure to **moisture, water and dirt**.
- Avoid placing the device closer than 15 cm to metal or magnetic objects, electrical cables, electrical devices, or selective glass.
- Ensure the device is not installed near **metallic objects, electrical cables, or selective windows**.
- Be aware that **metal roofs, ceilings, steel-reinforced concrete, underground locations, and other obstacles** can significantly degrade the device's radio performance.

1.5 Device Safety

When troubleshooting:

- Do not open the casing cover
- Do not tamper with any components or battery pack in any way
- Do not remove casing

Return the device:

- Ship the device to your supplier in case of malfunction
- Advise your shipping agent and declare that the device contains a battery with lithium

Disposal:

- Dispose the device responsibly at the appropriate waste collection location
- Ensure that the disposal site caters for electronic waste and batteries

1.6 Get Help

For further assistance, contact your supplier or service provider according to your support agreements.

You can contact Connected Inventions support@connectedinventions.com

OPERATION

2.1 Device Principles of Work

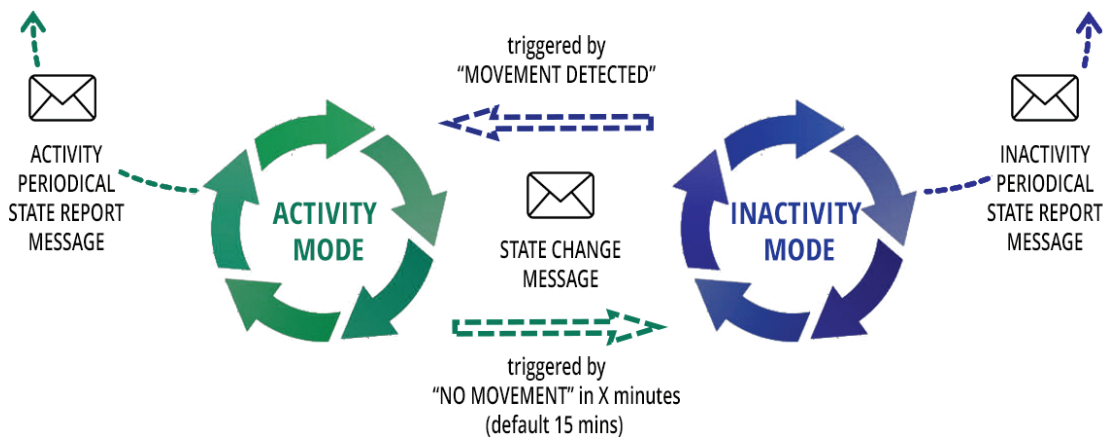
The Detectify operates in two modes: Activity Mode (AM) and Inactivity Mode (IM).

In Inactivity Mode, the device monitors for movement. When movement is detected, it switches to Activity Mode. Once in Activity Mode it increments both the Activity Counter and Cumulative Activity Counter, and sends a message immediately.

In Activity Mode, the device tracks movement in 3-second intervals, incrementing the counters accordingly. After the Activity Reporting Period (ARP) is reached, a message containing the updated counters is sent, and a new ARP begins.

If no movement is detected during the Inactivity Detection Period (IDP) while still in Activity Mode, the final movement data is sent, and the device reverts to Inactivity Mode.

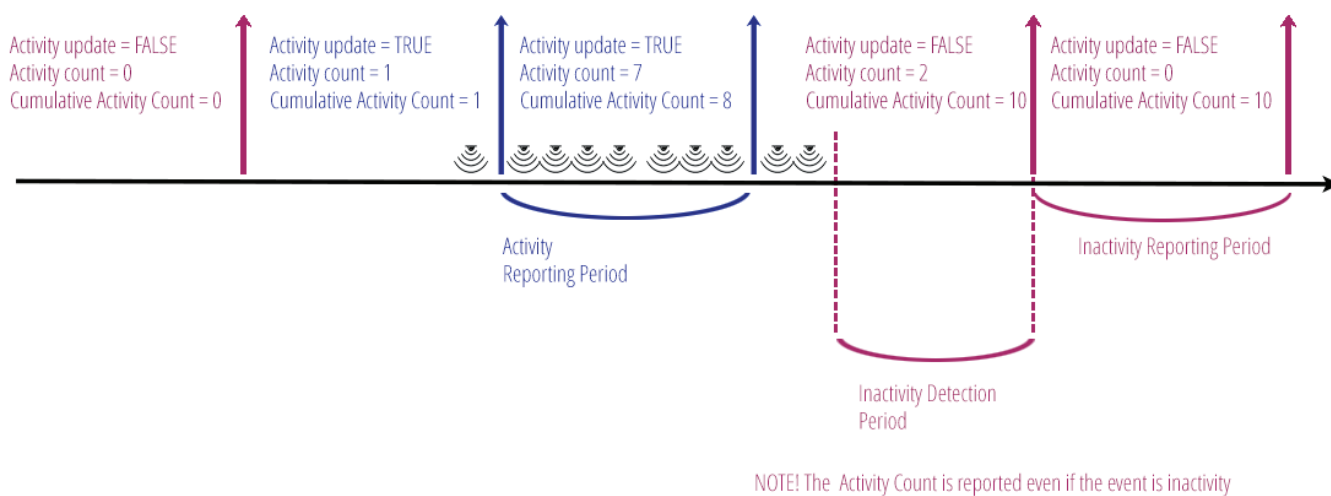
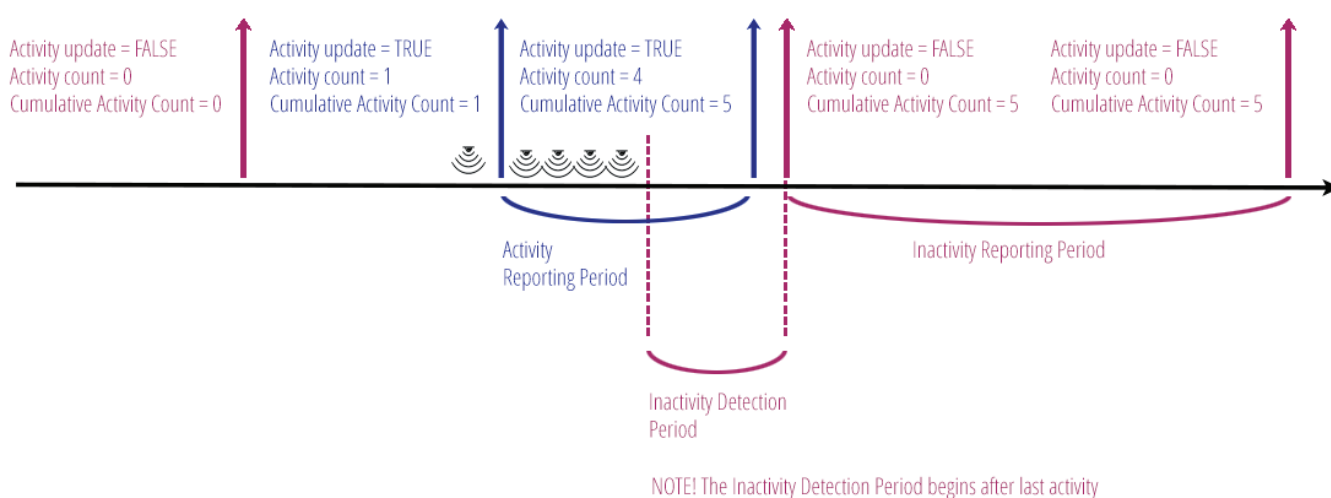
Once in Inactivity Mode, if the Inactivity Reporting Period (IRP) passes without detecting any movement, the device sends a periodic inactivity message.



2.2 Measurements & Results

The graphs below describe the status of Activity and Inactivity Mode over time.

- Movements are monitored continuously.
- Once triggered, movements are monitored continuously and counted in 3 second intervals.
- The number of movements are recorded over time.
- Once there is no movement over a configurable period of time, the device sends a message that no movement has been recorded.



2.3 Configuration

2.3.1 TX Power

This feature enables adaptive power reduction to extend battery life and minimise radio network noise. There are four modes for this feature:

- 0: Full power is always used.
- 1: The device transmits at -1 dB.
- 2: The device transmits at -3 dB; if the uplink message is not received, the power reverts to -1 dB.
- 3: The device transmits at -6 dB; if the uplink message is not received, the power reverts to -1 dB.

The default setting for this feature is 1.

Note: This feature is only supported in the RC1/EU868 region when the device operates in Sigfox mode. It is not compatible with other regions or modes.

2.3.2 Fast Start Activity Reporting

By default, the device collects movement data according to the time specified by the Activity Reporting Period. If it is necessary to report movement immediately upon first detection, this feature can be enabled, allowing the period to be defined by the Inactivity Detection Time instead.

The default setting for this feature is 0 (no override of Inactivity Detection Time).

2.3.3 Fast Start Inactivity Reporting

By default, the device records inactivity based on the time specified by the Inactivity Reporting Period. If early inactivity reporting is needed upon first detection, this feature can be enabled, using the Inactivity Detection Time to define the period.

The default setting for this feature is 0 (no override of Inactivity Detection Time).

2.3.4 Send Cumulative Activity Counts

When enabled, this feature allows the device to send the cumulative number of movements recorded since activation. The device records approximately three-second intervals as one movement, with a maximum of 20 movements per minute.

Note: Even if this feature is disabled, the device will still record movements. Once enabled, the device will transmit all recorded movements from the start and continue to do so with every subsequent message until the feature is disabled.

The default setting for this feature is 0 (disabled).

2.3.5 Activity Reporting Period

When the device is in Activity Mode, it reports activity at intervals specified by the Activity Reporting Period.

The default setting is 2, which indicates that there must be continuous movement within a 20-minute period.

2.3.6 Inactivity Reporting Period

When in Inactivity Mode, the device sends messages at intervals defined by this setting.

The default setting is 94, meaning there must be no detected movement for 480 continuous minutes.

2.3.7 Inactivity Detection Time

If the Fast Start Activity or Fast Start Inactivity parameter is set to 1, this feature specifies the time used to override the reporting period on first occurrence.

The default setting for this feature is 2, which corresponds to 15 minutes.

INSTALLATION & MAINTENANCE

3.1 Network & Mode Selection

Before powering on the device: ensure it is provisioned into the network management system.

In LoRaWAN mode: If the device is powered on before provisioning, it may take up to 24 hours for it to re-join the network

To select the desired network mode, use a small screwdriver to slide the mode switch:

- “SF” for Sigfox
- “LR” for LoRa

Once the network mode is selected, use the screwdriver to slide the power switch to the “I” position. The switch should move smoothly without requiring excessive force.

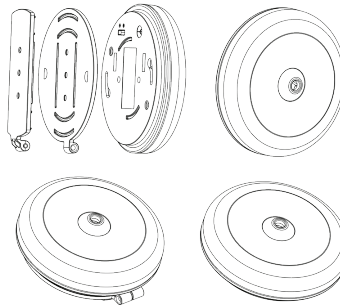
Caution: Do not apply unnecessary force when sliding the switch.



3.2 Mounting Instructions

Record the device's identifier and key for future reference.

The **Sigfox identifier**, **LoRa DevEUI**, and **PAC key** can be found on the label located at the bottom of the device. Alternatively, you can scan the QR code to retrieve the identifier and PAC key. An example of the label is shown below.



Install the device in a suitable position for motion detection. The maximum detection range is approximately five meters, with a detection angle of either 30 degrees or 90 degrees, depending on the device version.

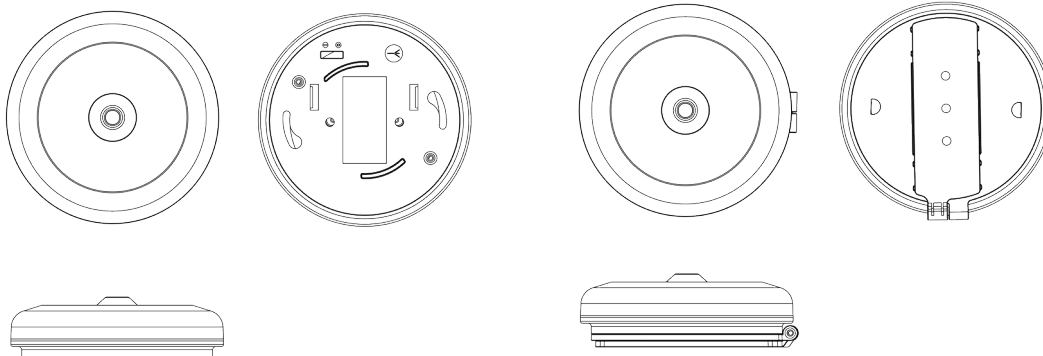
To mount the device, you can use either the **direct screw plate** or the **angle joint support**, both of which are included.

Important: Avoid placing the device closer than 15 cm to metal or magnetic objects, electrical cables, electrical devices, or selective glass. Doing so may significantly reduce both radio performance and battery life.

To attach the device using the screw plate:

- Attach the screw plate to the desired surface.
- Align the pins on the device with the twist-holes on the bottom of the plate.
- Twist the device clockwise until it locks into place.

For **work desk installations**, ensure the hinge of the screw plate is aligned with any metal support structures. Attach the device so that the antenna points away from the metal structure, and gently twist clockwise until it locks into place.



[without plate]

[with plate]

3.3 Maintenance & Battery Replacement

To identify the need for battery change, see the troubleshooting section

Only use batteries provided by your supplier or Connected Inventions.

Please contact your supplier or Connected Inventions support for assistance with battery replacements.

Battery replacement instructions for the Detectify device:

- 1. Switch the device off.**
2. Unscrew back cover screws and remove the back cover
3. Carefully unplug the connector, avoiding contact with the PCB.
4. Gently lift the battery pack from the casing, do not pull from the cable . Dual-sided tape may require some force, but do this slowly and carefully.
5. Remove the tape protector from the new battery pack and place it in the device.
6. Plug in the connector making sure the polarity
7. Attach the back cover
- 8. Switch the device on.**

Note: There are no other user repairable/replaceable device parts.

COMMUNICATION

4.1 Sigfox Provisioning

If you are using **FoxxerIoT** as your data platform, **DO NOT** provision devices directly to the Sigfox backend. Instead, follow the steps in **Section 4.3**.

The **Sigfox ID** and **PAC** are printed on the label located on the back cover of each device.

Ensure you obtain a **Device Admin** role or higher privileges in the Sigfox backend from your connectivity service provider before proceeding with the following steps:

1. Create a group for your organisation and associate it with a contract (if this hasn't been done already).
2. Create a device type under the newly created group (if not already done).
3. Prepare a **.csv file** containing the IDs and PACs of the devices you wish to provision. The format should be semicolon-separated, with each device on a new line as follows:
ID;PAC
4. Navigate to the "Devices" section and select "New Series".
5. Choose the organisation created earlier.
6. Provide a batch name, prefix, etc.
7. Select the contract previously made.
8. Browse the **.csv file** with the IDs and PACs.

Make sure to use the correct certificate for Connected Detectify based on your region:

- P_010_A_54AB_01 (RC1)
- P_010_A_E932_01 (RC2)
- P_010_A_1E77_01 (RC4)

Note: The provisioning process on the Sigfox backend may take up to 30 minutes to complete.

Once the devices are successfully provisioned (first message sent and received) you can switch them on, and messages should begin appearing in the Sigfox backend shortly.

For more information about Sigfox please visit <https://build.sigfox.com>

4.2 LoRaWAN Provisioning

LoRaWAN provisioning should be performed using the procedures provided by the provider of your supported backend system. Please refer to the provisioning manual from your backend supplier. For example, consult the documentation at [Loriot Provisioning Guide](#).

Once the device is powered on, it will automatically begin the join procedure. If the initial join attempt fails, the device will reattempt according to the following schedule:

1. First reattempt immediately after the initial failed join
2. Second reattempt after 60 seconds
3. Third reattempt after 5 minutes
4. Fourth reattempt after 30 minutes
5. Fifth reattempt after 4 hours
6. Sixth and subsequent attempts every 24 hours

4.2.1 LoRaWAN Parameters

- **LoRaWAN Protocol Version:** 1.0.4
- **Regional Parameters:** EU868, AS923, or US915 (depending on your region and product purchased)
- **Profile:** Class A
- **Join Type:** OTAA (Over-The-Air Activation)
- **AppEUI:** 0x0101010101010101
- **DevEUI:** Unique identifier for each device (found on the back cover label)
- **AppKey:** Unique security key for each device (provided upon product delivery)
- **Application Port (Uplink/Downlink):** 7
- **ADR (Adaptive Data Rate):** Yes

4.3 FoverIoT Provisioning Sigfox

FoverIoT is an IoT Platform provided by Connected Inventions, enabling our customers and partners to integrate with device data and analytics in an extremely efficient, fast and easy way.

If you are a Fover IoT user do not manually register devices.

FoverIoT will automatically provision devices to the Sigfox backend when registering devices into its database. **Do not manually register devices to the Sigfox backend.** If the devices are already registered in the Sigfox backend and you wish to use FoverIoT as your data platform, please contact Connected Inventions Support at: support@connectedinventions.com.

The **Sigfox ID** and **PAC** are located on the label on the back cover of each device.

Provisioning with FoverIoT

1. Ensure you have a **Partner Admin** role or higher privileges in FoverIoT. You do not need a Sigfox backend account.
2. Create the **Customer organization** and send invitations to users (if not done previously).
3. Create a **parser** for the customer (if not done previously):
 - Navigate to "Devices" > "Device Parsers" > "New Built-in".
 - Search for **Connected Inventions Detectify**.
 - Select **version 5.4** and click **Create**.
4. Select the customer created earlier and choose the correct contract.
5. Prepare a **.csv file** with the device IDs and PACs, formatted as follows (semicolon-separated, one device per line):
ID;PAC
6. Go to **Devices > Import Devices > Sigfox**.
7. Upload the **.csv file** prepared earlier.
8. Enter the appropriate certification ID based on your region:
 - **P_010_A_54AB_01 (RC1)**
 - **P_010_A_E932_01 (RC2)**
 - **P_010_A_1E77_01 (RC4)**
9. Select the parser you created earlier (Tip: use the search tool for easier access).
10. Optionally, you can assign **tags** to devices for easier searching later (e.g., Detectify, Motion Sensor).
11. Click **Import** to begin the process.

Note: The import process can take up to 30 minutes to register the devices on the Sigfox backend.

Once the devices have been successfully provisioned, you can switch them on, and messages should soon begin appearing on the Sigfox backend and will be forwarded to FoverIoT.

4.4 FoxerloT Provisioning LoRa-Mode

FoxerloT will automatically provision devices to the **NetMore LoRa backend** when registering devices into its database. **Do not manually register devices to the NetMore backend.** If your devices are already registered in any other LoRa backend and you wish to use FoxerloT as your data platform, please contact Connected Inventions Support at: support@connectedinventions.com.

The **LoRa EUI** is found on the label on the back cover of each device. You should have also received a list containing the **EUI** and **AppKey** for each device.

Provisioning with FoxerloT

1. Ensure you have a **Partner Admin** role or higher privileges in FoxerloT.
2. Create the **Customer organization** and send invitations to users (if not done previously).
3. Create a **parser** for the customer (if not done previously):
 - Navigate to **Devices > Device Parsers > New Built-in**.
 - Search for **Connected Inventions Detectify**.
 - Select version **5.4 LoRa** and click **Create**.
4. Select the customer created earlier.
5. Prepare (or use the one provided upon delivery) a **.csv file** containing the EUI and AppKey for each device. The format should be semicolon-separated, with each device on a new line as follows:
EUI;AppKey
6. Go to **Devices > Import Devices > LoRa**.
7. Upload the **.csv file** with the EUIs and AppKeys.
8. Select the parser created earlier (Tip: use the search tool for quicker access).
9. Optionally, assign **tags** to the devices for easier searching later (e.g., Detectify, Motion Sensor).
10. Click **Import** to begin the process.

Note: The import process can take up to 30 minutes to register the devices on the NetMore backend.

Once the devices are successfully provisioned, you can switch them on, and messages should begin to appear on the NetMore backend within 24 hours and will be forwarded to FoxerloT.

DATA FORMATS

5.0 Message Types

Uplink Message Types

The device will send four types of messages:

- 1. Measurement Message without Counters**
Contains sensor data without activity or inactivity counters.
- 2. Measurement Message with Counters**
Contains sensor data along with activity or inactivity counters.
- 3. Initial System Message**
Sent only once, immediately after the device has been powered on.
- 4. Periodical System Message**
Sent after every downlink request, providing periodic system updates.

Indexing Information

- Bytes are indexed in **big-endian** order.
- Bits are ordered as **76543210** in standard **little-endian** format.

5.1 System Messages

<SYSTEM MESSAGE HEADER BYTE>

BYTE	BIT	TYPE	NAME	SHORT	DESC
0	0-2	UINT3	message function	function	0=initial message, 1=config ack message
0	3	UINT1	message type	isSysMsg	always 1 for system message
0	4-7	UINT4	firmware version	ver	0=special 1-15=production

INITIAL SYSTEM MESSAGE (Only after booting)

BYTE	BIT	TYPE	NAME	SHORT	DESC
0	0-7	UINT8	<SYSTEM HEADER>		
1	0-3	UINT4	reserved		
1	4-7	UINT4	radio_zone	radioZone	
2	0-7	UINT8	hardware release	hwRelease	
3	0-7	UINT8	device type	deviceType	
4-7	0-32	UINT32	firmware build number	build	

PERIODICAL SYSTEM MESSAGE (After every downlink request once in 24h)

BYTE	BIT	TYPE	NAME	SHORT	DESC
0	0-7	UINT8	<SYSTEM HEADER>		
1	0-7	UINT8	message count x1000	ms-gCount1000	how many messages the device has been sending in thousands
2	0-7	UINT8	last TX voltage	txVoltage	N / 50 volts
3-10	0-63	UINT64	downlink config	lastConfiguration	the configuration in use (if DL fails this will be the previous configuration)

INITIAL SYSTEM MESSAGE EXAMPLE (Only after booting)

Uplink payload	ver	is-SysMsg	function	radio Zone	hw Release	device-Type	build
481004097d5aeebb	4	1	0	1	4	9	B2103111355
482004097d5aeebb	4	1	0	2	4	9	B2103111355
483004097d5aeebb	4	1	0	3	4	9	B2103111355
484005097d5aeebb	4	1	0	4	5	9	B2103111355
48600A097d5aeebb	4	1	0	6	10	9	B2103111355
4870FF097d5aeebb	4	1	0	7	255	9	B2103111355
48F0FF097d5a0000	4	1	0	15	255	9	B2103050240

PERIODICAL SYSTEM MESSAGE EXAMPLE (After every downlink request once in 24h)

Uplink payload	ver	is-SysMsg	function	msg Count 1000	txVoltage [V]	lastConfiguration
4900ad00025f020000000000	4	1	1	0	3.46	00025f020000000000
4901a100000000000000000000	4	1	1	1	3.22	00000000000000000000
4910830006a0100000000000	4	1	1	16	2.62	0006a0100000000000
49FF00FFFFFFFFFFFFFFFFFFFF	4	1	1	255	0	FFFFFFFFFFFFFFFFFFFF

5.2 Uplink and Measurements

<MEASUREMENT MESSAGE HEADER BYTE>

BYTE	BIT	TYPE	NAME	SHORT	DESC
0	0	UINT1	LOW/HIGH TXP	TXP	0=Low Tx power used, 1=High Tx power used (SIGFOX RC1 ONLY)
0	1	UINT1	state changed	stChange	0=no, 1=yes
0	2	UINT1	state	stActive	0=inactive, 1=active
0	3	UINT1	message type	isSysMsg	always 0 for measurement message
0	4-7	UINT4	firmware version	ver	0=special 1-15=production

MEASUREMENT MESSAGE WITHOUT COUNTERS

BYTE	BIT	TYPE	NAME	DESC
0	0-7	UINT8	<MEASUREMENT HEADER>	in measurement message without counters only the header exist

MEASUREMENT MESSAGE WITH COUNTERS

BYTE	BIT	TYPE	NAME	DESC
0	0-7	UINT8	<MEASUREMENT HEADER>	
1-2	0-15	UINT16	period activity	how many activities were recorded during the activity period
3-6	0-31	UINT32	cumulative activity	how many activities were recorded since boot

MEASUREMENT MESSAGE WITHOUT COUNTERS EXAMPLES

Uplink payload	ver	isSysMsg	stActive	stChange	TXP
46	4	0	1	1	0
44	4	0	1	0	0
40	4	0	0	0	0
41	4	0	0	0	1
42	4	0	0	1	0
43	4	0	0	1	1
47	4	0	1	1	1
45	4	0	1	0	1
44	4	0	1	0	0
46	4	0	1	1	0

MEASUREMENT MESSAGE WITH COUNTERS EXAMPLES

Uplink payload	ver	isSysMsg	stActive	stChange	Period Count	Cumulative Count	TXP
4.60001E+13	4	0	1	1	1	1	0
44001B0000007C	4	0	1	0	27	124	0
400002000012F3	4	0	0	0	2	4851	0
4200FFFFFFFFFFFF	4	0	0	1	255	4294967295	0
4.70001E+13	4	0	1	1	1	1	1
45001B0000007C	4	0	1	0	27	124	1
410002000012F3	4	0	0	0	2	4851	1
4300FFFFFFFFFFFF	4	0	0	1	255	4294967295	1

5.3 Downlink Configurations

Following variables are user configurable via Downlink messages:

BYTE	BIT	TYPE	NAME	SHORT	DESC
0	0-1	UINT3	TX power mode	TXP	SIGFOX RC1 ONLY [0=full, 1=optimized, 2=auto-3db, 3=auto-6db]
0	2-4	UINT2	reserved0	res0	not in use, set to zero
0	5	UINT1	fast-start activity reporting	Re-Act	if 0 send first periodical activity after activity reporting period, else (1) after inactivity detection time
0	6	UINT1	fast-start inactivity reporting	RE-Inac	if 0 send first periodical inactivity after inactivity reporting period, else (1) after inactivity detection time
0	7	UINT1	send activity counts	counts	0=send only the normal message header (default), 1=send the header and the activity count
1	0-7	UINT8	activity reporting period	ARP	if N=0 then 11min else (N+2)*5min
2	0-7	UINT8	inactivity reporting period	IRP	if N=0 then 11min else (N+2)*5min
3	0-7	UINT8	inactivity detection period	IDP	(N+1)*5min
4-7	0-32	UINT32	reserved1	res1	not in use, set to zero

DEFAULT SETTINGS DOWNLINK PAYLOAD

Default DL payload	TXP	Re-Act	Re-Inac	res0	counts	ARP	IRP	IDP	res1
01025f0200000000	1	0	0	0	0	20	480	15	0

DOWNLINK PAYLOAD EXAMPLES

DL payload	TXP	Re-Act	Re-Inac	res0	counts	ARP	IRP	IDP	res1
00000000000000000000	0	0	0	0	0	10	10	5	0
40000000000000000000	1	0	0	0	0	10	10	5	0
80000000000000000000	3	0	0	0	0	10	10	5	0
c0000000000000000000	6	0	0	0	0	10	10	5	0
81000000000000000000	3	0	0	0	1	10	10	5	0
c2000000000000000000	6	1	0	0	0	10	10	5	0
43000000000000000000	1	1	0	0	1	10	10	5	0
84000000000000000000	3	0	1	0	0	10	10	5	0
c5000000000000000000	6	0	1	0	1	10	10	5	0
46000000000000000000	1	1	1	0	0	10	10	5	0
72000000000000000000	3	1	1	0	0	10	10	5	0
87010000000000000000	6	0	0	0	1	10	10	5	0
e2000100000000000000	3	1	1	0	1	10	15	5	0
e1000000000000000000	1	1	1	0	1	10	10	5	0
e10a0202000000000000	1	1	1	0	1	60	20	15	0

TROUBLESHOOTING

6.1 Frequently Asked Questions

No messages are being received by the backend:

- Ensure the power switch is turned on.
- Verify the network mode switch is in the correct position:
- SF for Sigfox
- LR for LoRaWAN
- Check if there is network coverage available at the installation site.
- For LoRaWAN, confirm that the gateway is operational and functioning correctly.
- Ensure the provisioning to the backend was completed properly and that there are no error messages related to the device or device group/type.

Messages are received intermittently or very rarely:

- Check the downlink configuration.
- Ensure the device is not installed near metallic objects, electrical cables, or selective windows.
- Be aware that metal roofs, ceilings, steel-reinforced concrete, underground locations, and other obstacles can significantly degrade the device's radio performance.

Messages are being received by the backend but no data is shown in the data platform:

- Confirm that the callback address to your data platform is correctly configured in the backend.
- Verify that the authorisation token/keys are properly set up in the backend for the callback.

How to Trace Battery End of Life

1. Daily Battery Voltage Monitoring

The device sends daily battery voltage readings under load (BatVLoad) via the System1 message.

2. No Messages from the Device

If the device has stopped sending messages and the last received System1 message shows a voltage below 2.5V, the battery may have reached the end of its life and should be replaced.

3. Device Still Sending, but Voltage is Between 2.0-2.5V

There is no exact voltage threshold at which the device will stop functioning, as each battery has unique characteristics. However, if the battery voltage is consistently between 2.0V and 2.5V, it is generally recommended to replace the battery to avoid sudden power loss.

6.2 Contact Information for Support

Email	support@connectedinventions.com
Phone	+358103115800
Address	Connected Inventions Oy, Tietäjäsentie 2, 02130 Espoo, FINLAND
Website	www.connectedinventions.com
Support Hours	8:00am - 4:00pm CET, Mon to Fri

