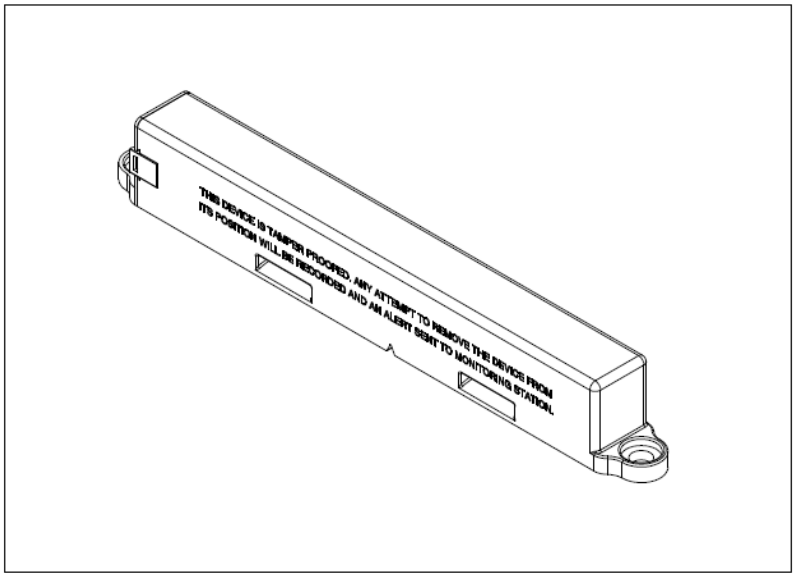
IET10RCx User Manual

Version 1.5



2024 – 02 -14

SJIT Co.,Ltd

Contents

1. Revision history

Date	Version	Name	Description
OCT. 30, 2018	1.0	KD Kim	First release product description
JAN. 07, 2020	1.1	KD Kim	Change title picture, change company name
Mar 19, 2021	1.2	KD Kim	Installation guide revision and supplementation
Jul. 1 2022	1.3	KD Kim	Change the company name and apply the designated font
Oct. 21 2022	1.4	KD Kim	Added use description
Feb. 14 2024	1.5	KD Kim	Change the company name Updated temperature specifications Added Precautions

2. Features

A device that tracks the location of installed assets by sending location information acquired through GPS and WIFI SCAN to Sigfox.

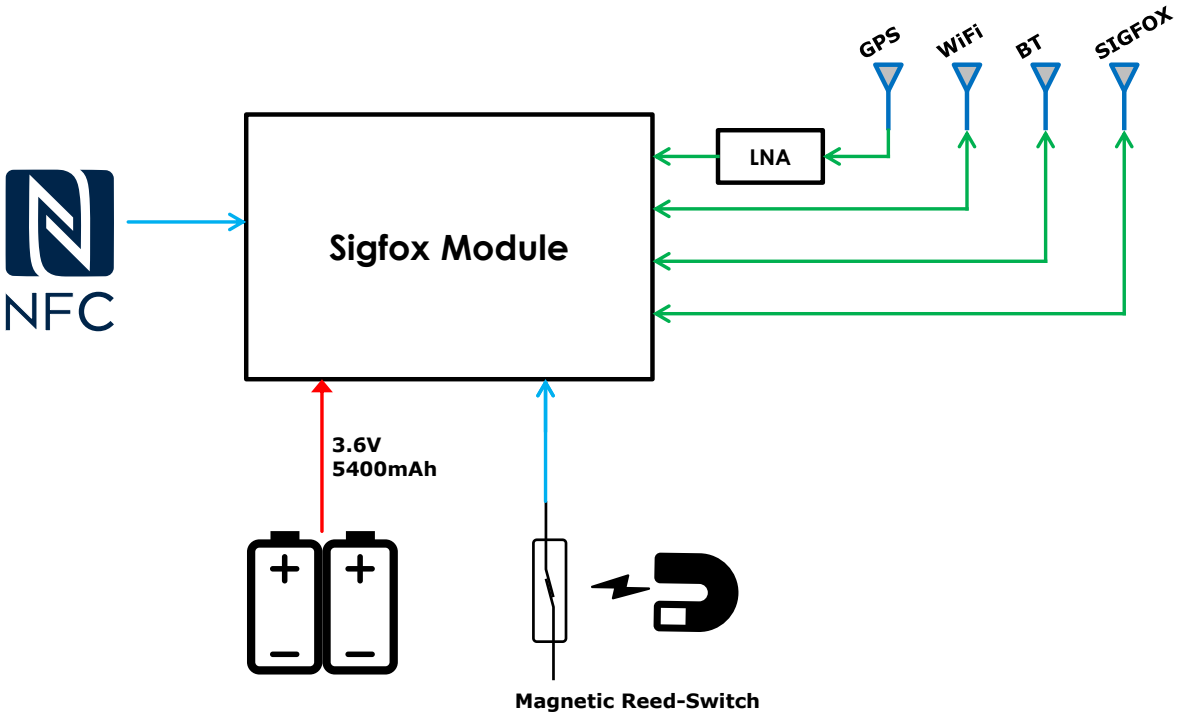
Items	Key features
Dimensions	197mm X 20mm X 27mm
Sigfox Ready™ Certificate	P_00E1_19E2_01(RC1) P_00E1_A901_01(RC3) P_00E1_20D3_01(RC4)
Device Uplink Radiation Class	0u[1)]
Sigfox Verified Certificate	M_0042_FDF8_01, M_000B_C8D5_02(RC1) M_0042_9D8D_01, M_000B_53D3_01(RC3) M_0042_6128_01, M_000B_1BE9_01(RC4)
Enclosure Material	Polycarbonate
Battery	Primary, Li-$SOCl_2$, 5400mAh, 3.6V
Operation Temperature	-20 ~ +60℃
Wafer proof	IP68
Shock proof	IK10
Wireless for location	GPS, WiFi, BLE, Sigfox
Device Management	Bluetooth 4.2 Support, BLE advertising, BLE FOTA
NFC	Tag-A Support, Easy Bluetooth pairing with NFC tagging
Sensors	3-axes accelerometer, Magnetic reed switch
Current consumption	Standby 18uA, sleep 3uA (depends on user scenario)
Life time	10 years (2 messages per a day) ※note: the real life time of battery is different as condition

[1)]EIRP Test result

Table 3: Effective Isotropic Radiated Power

Nominal Frequency [MHz]	EUT / Antenna Orientation	Effective Isotropic Radiated Power [dBm]	Angle Theta [degrees]	Limit (Sigfox) [dBm]	Margin [dB]	Limit (Standard) [dBm]	Margin [dB]
868.13	X / Vertical	13.99	140	16	2.01	16.12	2.13

3. Block diagram



4. Electrical characteristic

4.1 Temperature characteristic

Symbol	Parameter	Rating	Unit
OT	Operating Temperature	-20 to +60	℃
ST	Storage Temperature(*)	+30 (Max.)	℃

※ When user is not used the device after shipment at the deep sleep condition.

4.2 DC characteristic

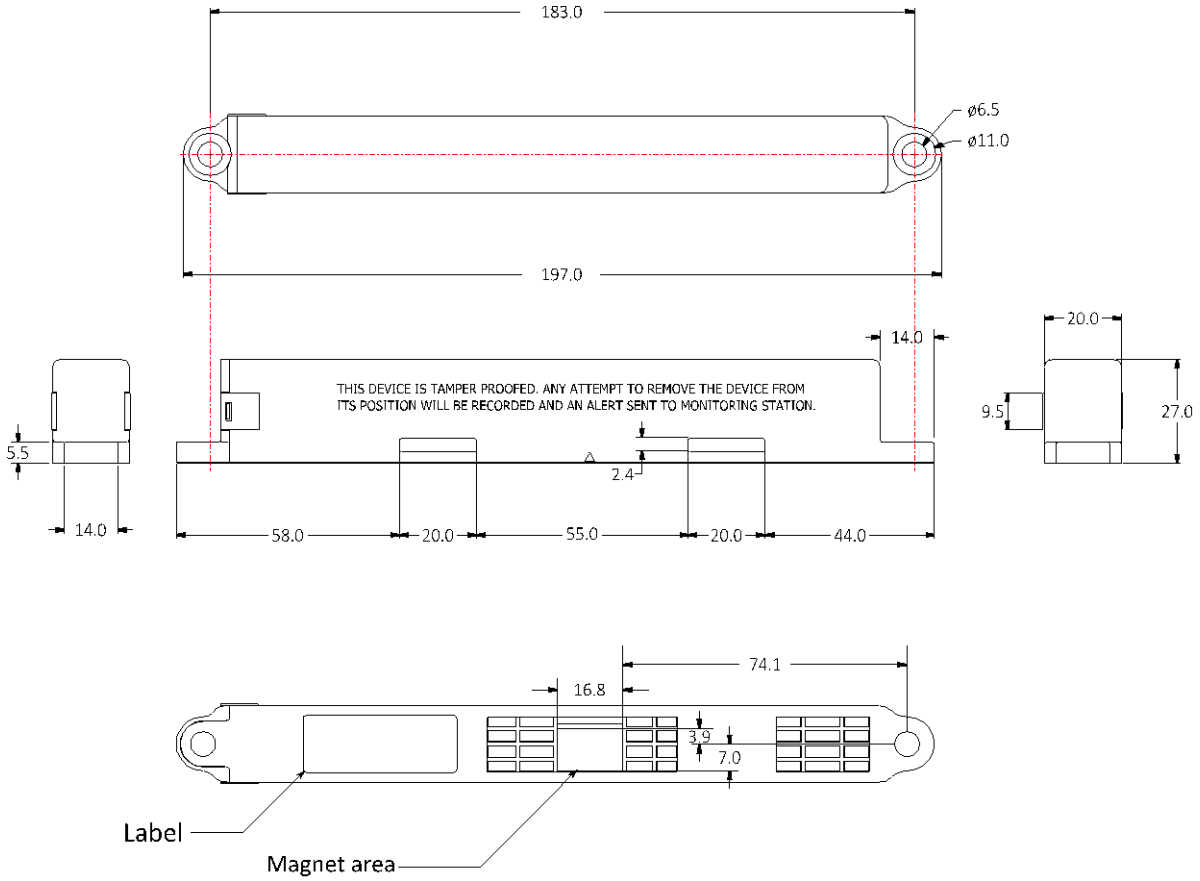
Symbol	Parameter	Min	Typ.	Max	Unit
VBAT	Battery pack voltage		3.6		V
CBAT	Battery capacity per 1pack		2700		mAh
Current	Deep sleep current		2		uA
	Sleep on any motion sensing(①)		10		uA
	BLE advertizing@2sec interval(②+①)		19		uA
	GPS backup on(optional)		34		uA
	WiFi scan mode(5.7s Average)		46.5		mA
	GPS scan mode		23		mA
	Sigfox Tx current@RC1/3(11.5s Average)		42.5		mA
	Sigfox Tx current@RC2/4(3.5s Average)		150		mA
	Sigfox Rx current@RC1/3(24.5s Average)		15.2		mA
	Sigfox Rx current@RC2/4(24.5s Average)		25		mA

5. Enclosure

① Dimension : 197mm X 20mm X 27mm

② Materials : PC (polycarbonate)

③ Color : Black



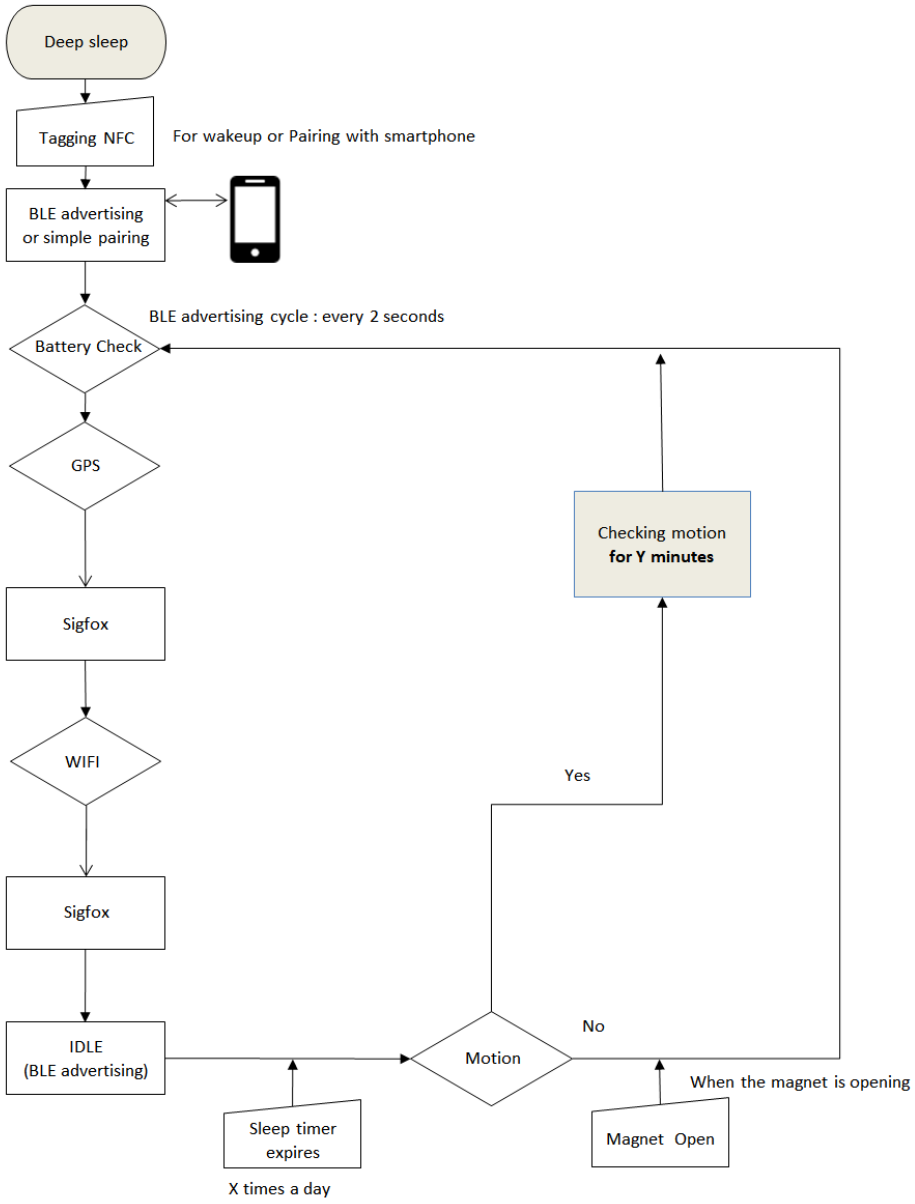
6. IET10RC's firmware lists

At first, please choose the types of firmware that you want and let us know.

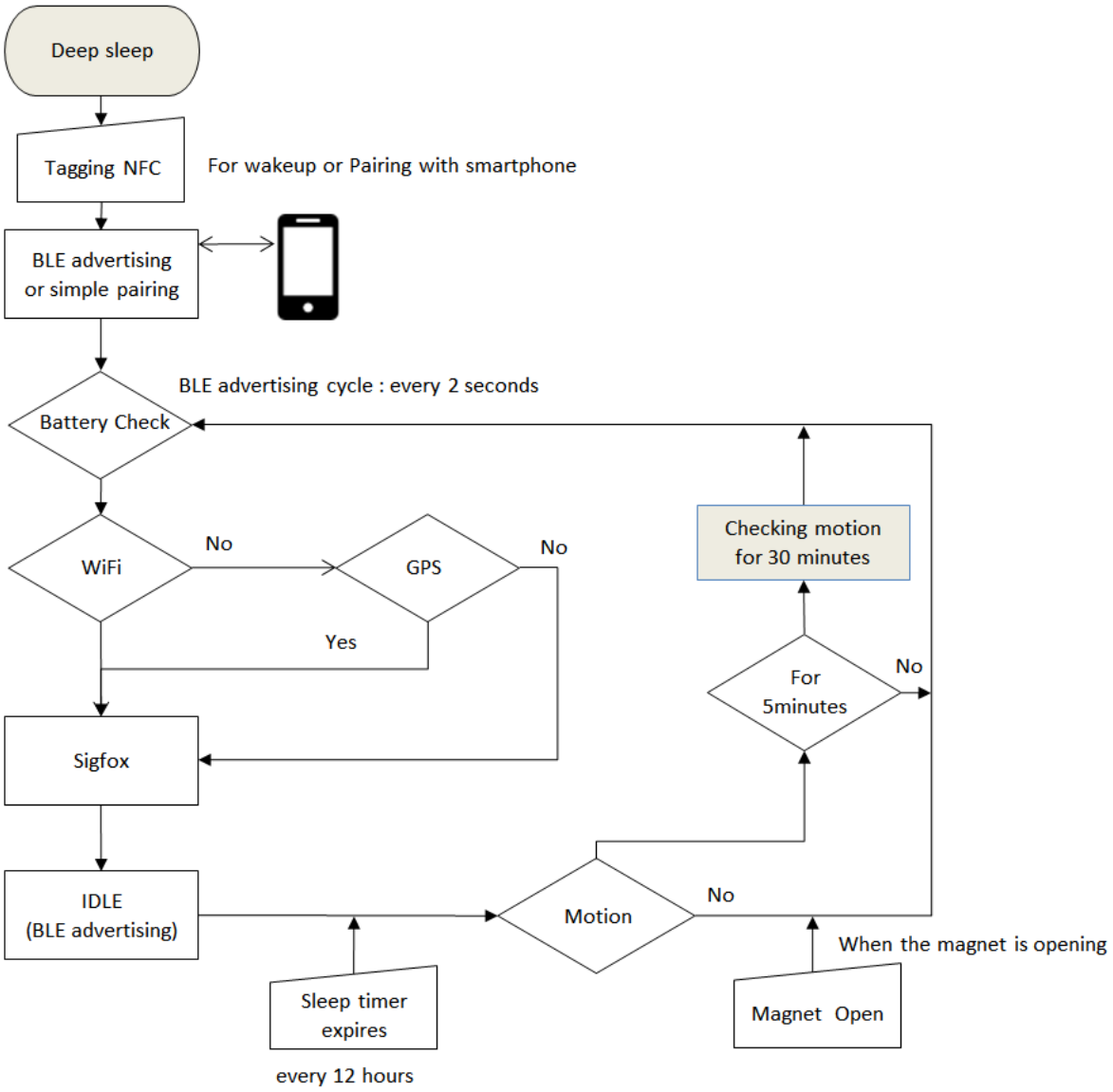
Software Type	Use cases	Details
S01	POV version from Sigfox IoT agency	GPS->Sigfox->WIFI->Sigfox, every 1 hour
S10	Commercial version	WIFI -> GPS->Sigfox, every 12 hours, magnet event
Customize	User requirement	Please let us know your scenario and we will support you.

7. Software flowchart

7.1 S01 flowchart



7.2 S10 flowchart



8. RF specifications

8.1 Sigfox; Specifications

- RC1

Conditions: VCC=3.3V, Temp=25℃

Parameter		Min.	Typ.	Max.	Unit
RF Frequency	Tx		868.130		MHz
	Rx		869.525		MHz
Tx output power			13.7		dBm
Frequency Error Tolerance(+25℃)		-2.5	-	+2.5	ppm
Rx Sensitivity(@600bps, GFSK)		-	-127	-	dBm

- RC2

Conditions: VCC=3.3V, Temp=25℃

Parameter		Min.	Typ.	Max.	Unit
RF Frequency	Tx		902.2		MHz
	Rx		905.2		MHz
Tx output power			22.5		dBm
Frequency Error Tolerance(+25℃)		-2.5	-	+2.5	ppm
Rx Sensitivity(@600bps, GFSK)		-	-129	-	dBm

- RC3

Conditions: VCC=3.3V, Temp=25℃

Parameter		Min.	Typ.	Max.	Unit
RF Frequency	Tx		923.2		MHz
	Rx		922.2		MHz
Tx output power			13.7		dBm
Frequency Error Tolerance(+25℃)		-2.5	-	+2.5	ppm
Rx Sensitivity(@600bps, GFSK)		-	-127	-	dBm

- RC4

Conditions: VCC=3.3V, Temp=25℃

Parameter		Min.	Typ.	Max.	Unit
RF Frequency	Tx		920.8		MHz
	Rx		922.3		MHz

Tx output power		22.5		dBm
Frequency Error Tolerance(+25℃)	-2.5	-	+2.5	ppm
Rx Sensitivity(@600bps, GFSK)	-	-129	-	dBm

8.2 WIFI Specifications

[Receiver Specification]

Conditions: VCC=3.3V, Temp=25℃

Parameter	Conditions	Min.	Typ.	Max.	Unit
Minimum Receiver Sensitivity in 802.11b mode					
11Mbps		-	-84	-76	dBm
Minimum Receiver Sensitivity in 802.11g mode					
54Mbps		-	-72	-65	dBm
Minimum Receiver Sensitivity in 802.11n mode					
HT20, MCS7	PER<10%	-	-70	-64	dBm

[Transmitter Specification]

Conditions: VCC=3.3V, Temp=25℃

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Power in 802.11b mode, CCK					
1~11Mbps	As specified in IEEE802.11	10	12.5	15	dBm
Output Power in 802.11g mode, OFDM					
6M~54Mbps	As specified in IEEE802.11	10	12.5	15	dBm
Output Power in 802.11n mode, HT20, OFDM					
MCS0~7	As specified in IEEE802.11	10	12.5	15	dBm
Frequency Tolerance					
802.11b/g/n	Operating Temp.	-25	0	25	ppm

8.3 BLE Specifications

Conditions: VCC=3.3V, Temp=25℃

Parameter	Min.	Typ.	Max.	Unit
RF Characteristics				
RF Frequency Range	2.402	-	2.480	GHz
Output Power [TRM-LE/CA/01/C]	-0.5	3.5	7.5	dBm
Receiver Sensitivity [PER<30.8%, 1500packets]	-	-93.5	-70	dBm

8.4 GPS Specifications

Conditions: VCC=3.3V, Temp=25℃

Parameter	Min.	Typ.	Max.	Unit
Frequency		1575.42		MHz
GPS Sensitivity				
Tracking		-160		dBm
Navigation		-159		dBm
Acquisition (Cold start)		-145		dBm
C/N0		-39		
Time To First Fix				
Cold Start		30		sec
Hot Start(When GPS Backup is on)		3		sec

8.5 NFC Specifications

Parameter	Min.	Typ.	Max.	Unit
RF Input Frequency		13.56		MHz
ISO-14443A				
Carrier modulation index	95			%
Data Rate		106		Kbps
Modulation sub carrier frequency		13.56 /16		MHz

9. Getting started

① When user get the product first, it might be shipment mode and kept deep sleep mode.

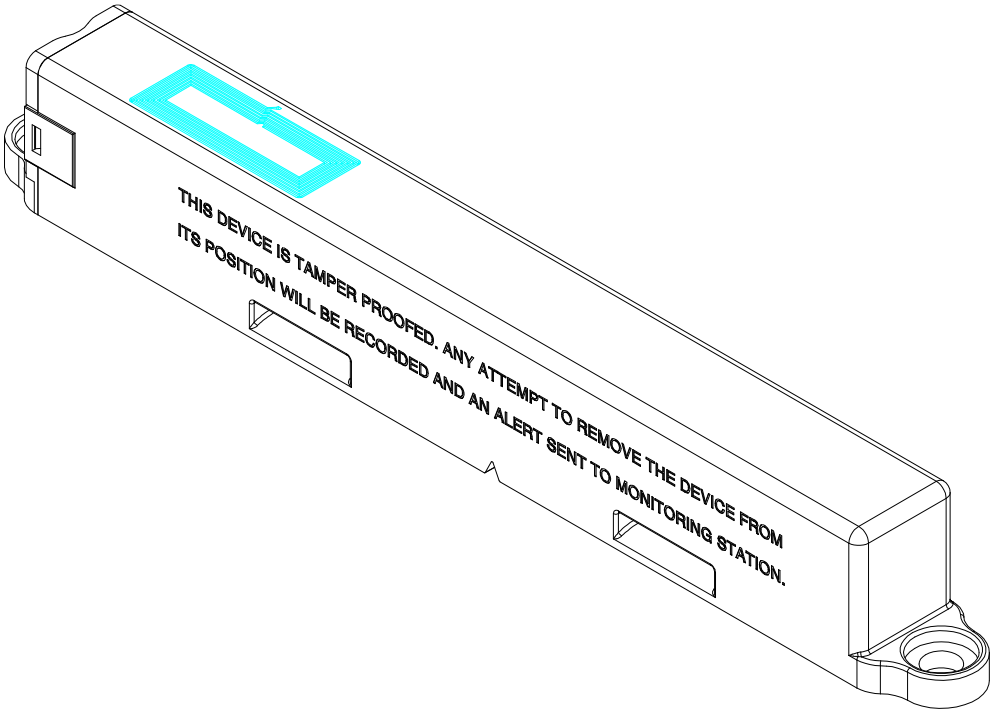
② The product will wake up when the RFID reader or smartphone is placed in the light blue area as shown below.

③ It takes about 5 to 10 seconds for the product to activate.

④ After activation, you can connect to the product through the provided APP.

⑤ When connected to the product, you can get Sigfox ID, PAC, BT MAC, and scenario operation is possible.

The NFC antenna is built into the part marked light blue in the figure below.



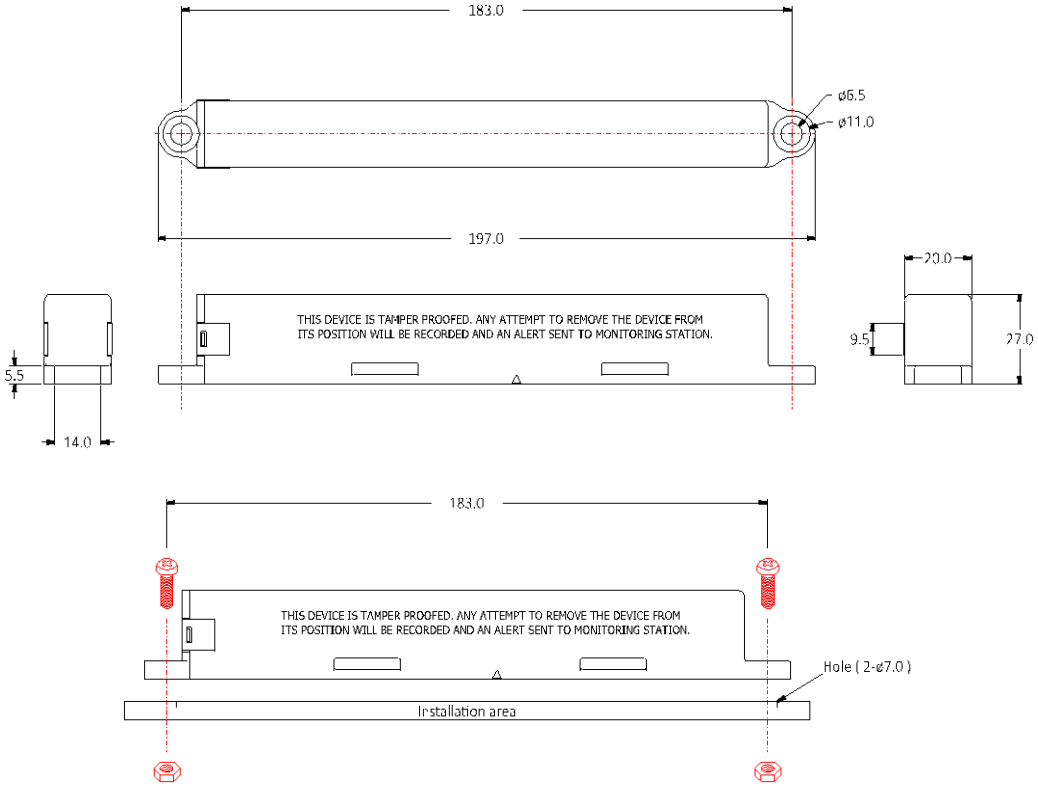
10. How to install

*** Depending on the installation location and installation method, wireless performance may be affected and the device may be damaged. We do not guarantee any problems that may arise if you do not follow the recommended installation method described below. Therefore, it is advisable to inquire in advance about the installation method.**

10.1 Using the device's fixing hole

- Install the product on a flat and clean place.
- Be sure to observe the dimensions between the two fixing holes.
- Do not install the product so that it is bent or deformed.
- Screws or bolts must be tightened vertically.
- Tightening screws or bolts with too strong force may damage the device.

  ∇ Recommended torque: up to 35kgf·cm (Base on nut or machine thread tapping hole)



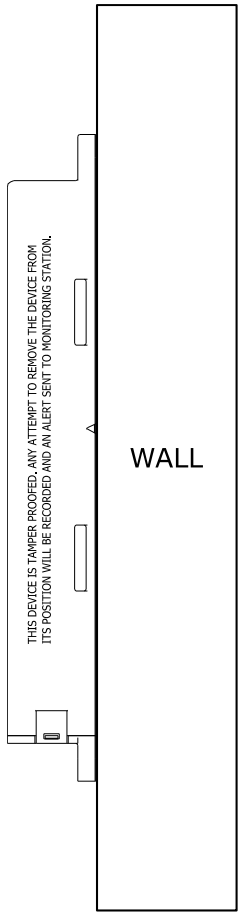
If you are installing on a hard surface such as a steel plate or wall, see additional instructions below.

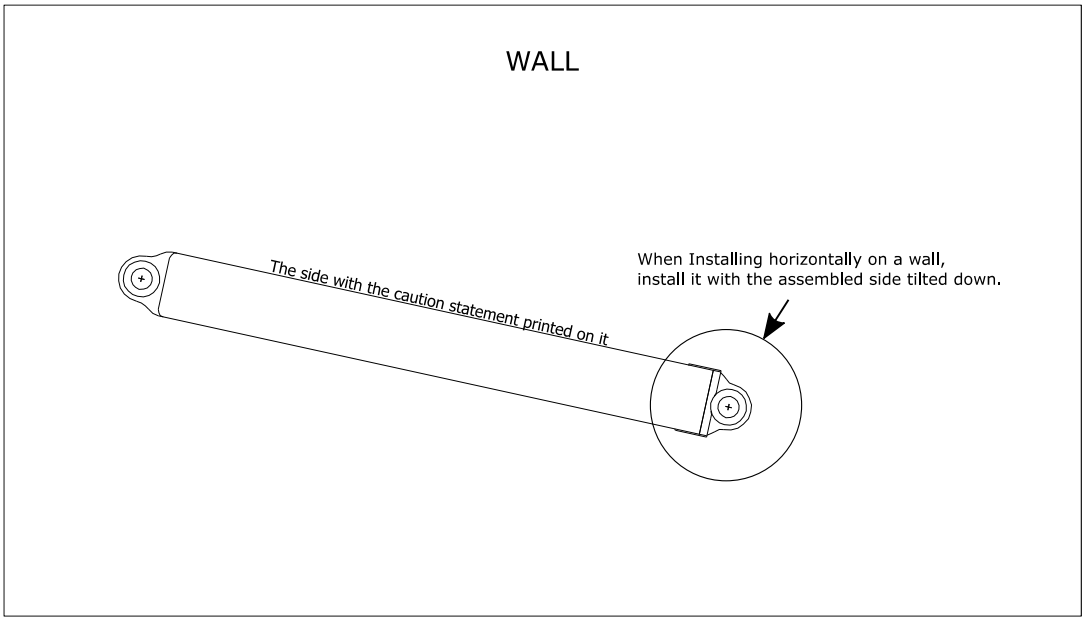
- When using screws, use Bind-Head M6.0 X 12.0 and install after machining M6.0 machine thread taps.
- If it is difficult to accurately adhere to the 183.0mm dimensions, drill M4, M5 machine holes.
- Do not drill and install at the same time. (Strong torque and sludge will destroy the product.)

- If you can't machine threaded taps, use bolts and nuts.
- If bolts and nuts are used, drill 7 pie holes 183.0mm apart in the installation area.
- There is also a way to use a bracket.

■ Installation Environment Guide

- When installing vertically on a wall, install with the assembled side facing down.
- Avoid installing it on an metal plate or in a place surrounded by metal.
- Wireless performance may be degraded if installed on metal.
- Consider a bracket for installation, as distance from metal can ensure wireless performance.

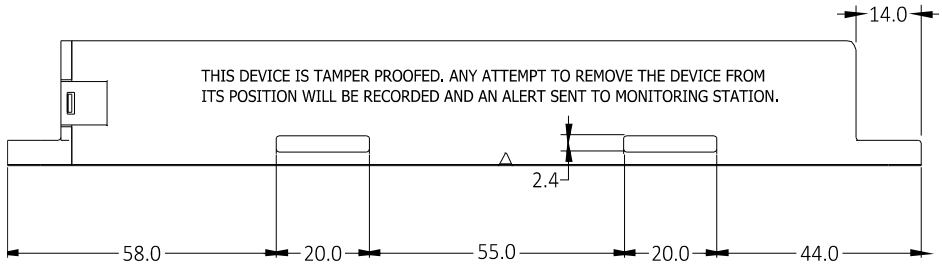


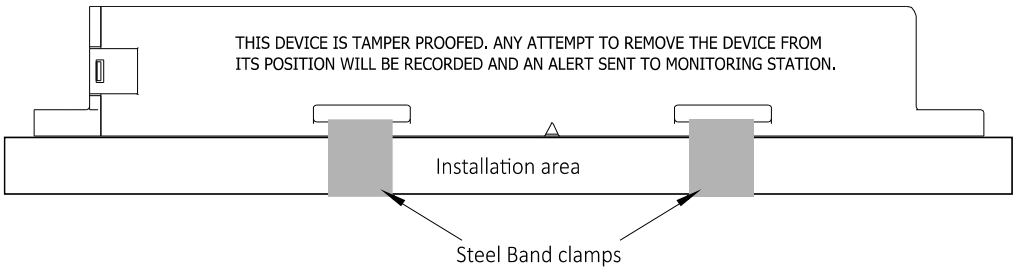


- When installing horizontally on a wall, install it with the assembled side tilted down.

10.2 Using the device's slots

- Install the product on a flat and clean place.
- Fix it to the slot of the product with band clamps or cable ties.
- Please refer to the slot sizes below when choosing a band clamp or cable tie.
- Fix the product firmly so that it does not move.
- If installing additional screws after fastening, work only on soft materials. Further work on hard objects such as steel destroys the product due to torque and sludge.



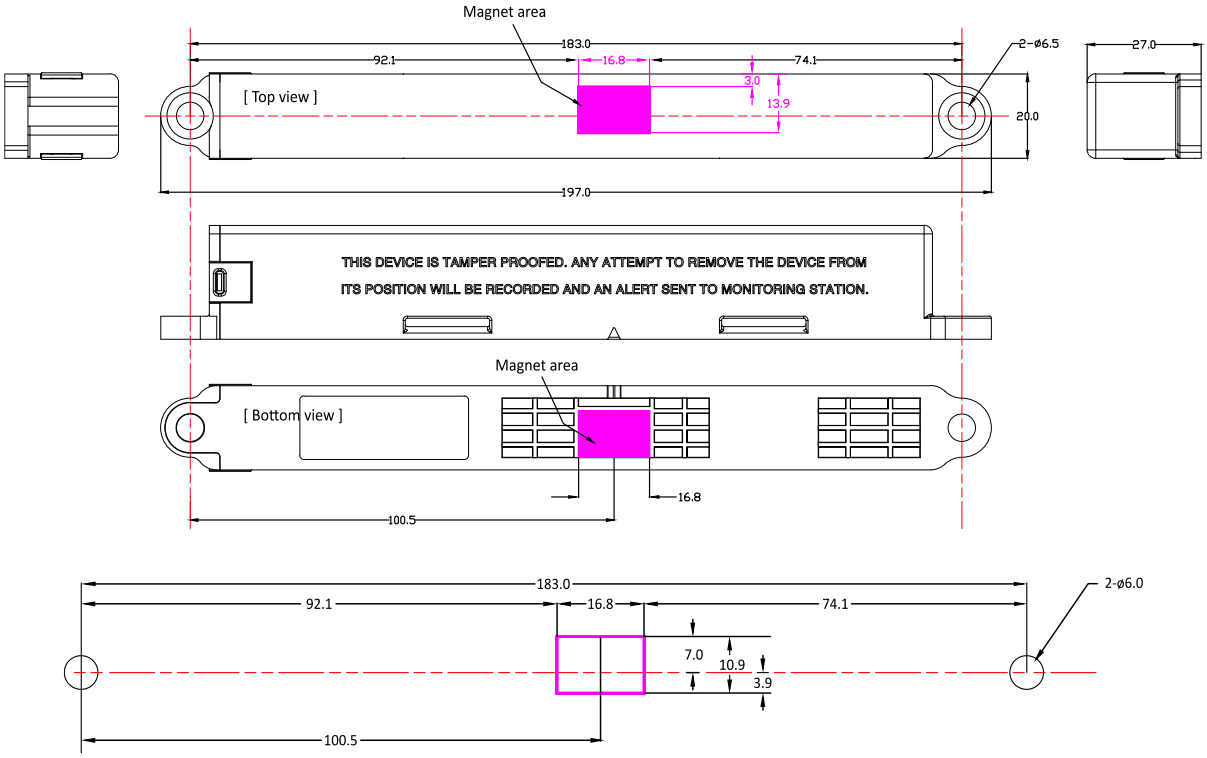


■ Other precautions related to installation

- Some users fix the product with too much force and the product is damaged.
- Use an electric screwdriver with adjustable torque rather than your hand.
- It is waterproof and resistant to shocks and drops, but you never know what will happen in the real situation. It's good to do everything you can.

10.3 Magnet installation

- When using the magnet detection function, please refer to the figure below to attach the magnet.
- Dimension of magnet(WxDxH): 15mm x 10mm x 4mm
- Magnet attachment Space: 16.8mm x 10.9mm x 4.5mm



* If the provided neodymium magnet is exposed to moisture for a long period of time, its magnetic power may be reduced due to corrosion, and if exposed to an environment above 60~80℃ for a long period of time, its magnetic power may be reduced. This reduction in magnetism can be permanent and make normal functioning difficult.

If you have any difficulties with installation conditions, please contact us.

11. Precautions

- This product is waterproof, but may not be waterproof due to damage, random disassembly or reassembly of the product.
- This product may cause radio interference depending on the wireless environment of the installation and operating environment.
- There may be shadow zone for wireless communication.
- Depending on each location service, error of location information may occur.
- Do not disassemble, repair or modify.
- If you need repair or something is wrong, please contact our C/S.
- The life of the product may vary depending on the user's request scenario.
- In general, you can use the longest at 20 degrees, and the lower the temperature, the lower the capacity of the battery.
- At high temperatures above 40 degrees, the battery's natural discharge rate starts to increase, so the lifespan may be shorter than expected.
- Silicone oil used to improve the sealing properties of the product may leak from the assembly.
- Check the safety data sheet for silicone oil. (You can receive it from our C/S team.)
- Do not eat or inhale spilled oil.
- Avoid contact with leaked oil, wear gloves and wipe with alcohol.

- FCC Certification Notice

FCC ID : 2BEK7IET10RC4

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.

12. Warranty

- This product was produced through strict quality control and technical verification.
- The warranty period for the product is one year from the date of purchase.
- We are not responsible for product loss caused by customer's carelessness.
- In case of breakdown due to customer's carelessness, repair fee may be charged.
- This product is a wireless communication product but does not guarantee communication distance.
- Problems arising from failure to follow the installation method described in this user manual are not covered by the warranty.

Support	Iot.sigfox@seongji.co.kr
Warranty Term[1)]	1 year from date of purchase
Manufacturer	SJIT Co., Ltd.
Country of manufacture	Republic of Korea

[1)]This is not the meaning of life time to able use this device.
The life time of device is different depending on messages per day.
Especially when the message is sent to Sigfox network every one hour,
the life time can be shorter than one year.

*** The contents of this document may be changed at the manufacturer's discretion, and notification of changes is not obligatory. Get up-to-date documentation with our support team.*

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