SGS SWH Movement Sensor Device User Manual

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PRODUCT INTRODUCTION

Movement Sensor Device is a device designed to measure parameters that detect possible movement in the grain and generates an alarm. The device consists of a board with an accelerometer that transmits data via LoRaWAN technology. The main purpose of the device is to obtain these acceleration values when the device moves. The whole device is shown in following figure:

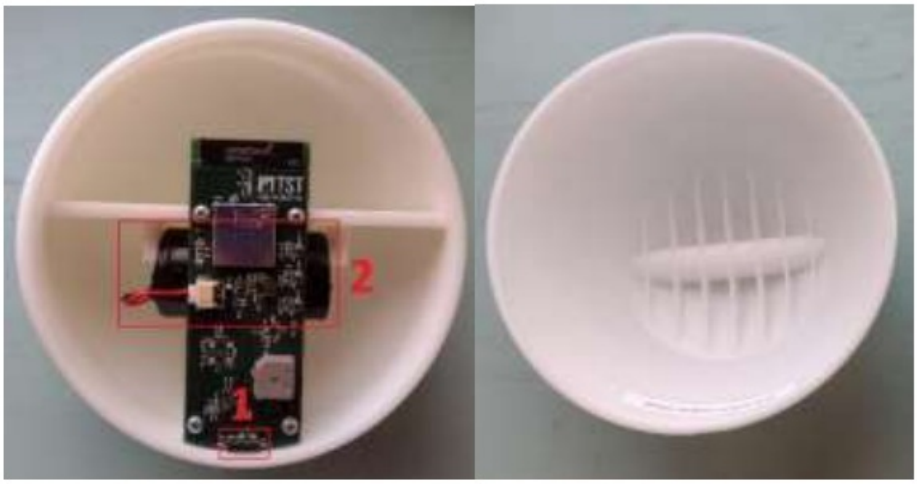
MAIN FEATURES

The Movement Sensor Device has the following features:

- Compliance with LoRaWAN technology
- Frequency band: EU 868 / US 915 / AS 923 / AU 915 / KR 920 / IN 865 / RU 864
- Replace AA batteries 1.5V/Lithium 3.0V/3.6V
- Environment resistance: IP65
- Case dimensions: TBD.

LORAWAN SENSOR
The following picture shows an overview of the movement sensor device.

1. Reed Sensor
2. Battery



QUICK START GUIDE

The main steps are listed for quick use. Please refer to the following sections for more details.

INSTALLATION
To carry out the installation of the device, perform the following steps.

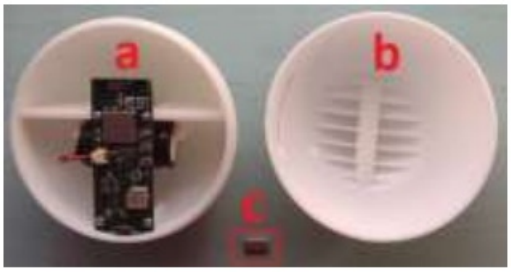
1. **Checklist**
   Unpack the package, check the part list to ensure nothing is missing.
2. **Activate the device**
   By default, the device is deactivated. To activate it, pass the magnet for 3 seconds in the reed area (one beep per second will be generated). When it is connected to the LoRa gateway, the device will emit a long beep and will send the first frame.
3. **Check the device is connected and sending data**
   You can check the status of the device by passing the magnet for one second, after that:
   - If it beeps 3 times, it will indicate that it is working and will send a frame.
   - If it beeps 5 times, it is deactivated.

CONFIGURATION
The device is already configured so it does not need it to carry out the configuration.

LORAWAN SENSOR INSTALLATION

In this section, the installation process of the device is explained. Before installing, please check the part list to ensure nothing is missing.

PACKING LIST



- Case 1
- Case 2
- Magnet

LORAWAN SENSOR CONFIGURATION

In this section, the configuration of the device is explained.

DEFAULT CONFIGURATION

By default, the device is deactivated. To activate it, pass the magnet for 3 seconds in the reed area (one beep per second will be generated). When it is connected to the LoRa gateway, the device will emit a long beep and will send the first frame.
From that moment on, the device will only send data in the following situations:

- If the time set to perform a keep-alive arrives, indicating that the device is still working.
- If the magnet is passed over the reed for 3 consecutive seconds.

  If the device moves and the accelerometer alarm is triggered, send a message when it starts to move and another one when it finishes moving within a 5-second window.

To deactivate the device, the magnet must be passed for 5 seconds, after this, the device will send a deactivation frame and will go to sleep.

DOWNLINK COMMANDS TO CHANGE THE CONFIGURATION

It is possible to change the configuration of the device through the LoRa gateway via downlink frames. You can check if the downlink has been correctly sent because the led will light up blue. The following are the different payloads for the GCM v3 device:
Time Update (Little Endian)
To change the date and time of the device send a 4 byte frame with desired value in UNIX Timestamp on Port 4.
Example:

- Fri Oct 15 2021 06:45:14 GMT+0000
- 1634280314
- 6169237A

  7A 23 69 61

Change transmission windows (Little endian)
To change the times at which the device sends data send a 2 byte frame with desired value in minutes (UTC Time) on Port 5.
Example:

- Sending at 00:00 / 12:00

- 0 / 720 (Minutes)
- 0 / 2D0 (Big Endian)
- 00 00 / D0 02 (Little Endian)

Change region
To change the region in which the device must operate, send 1 byte on Port 6.

- REGION_AS923 → 00
- REGION_AU915 → 01
- REGION_EU868 → 05
- REGION_KR920 → 06
- REGION_IN865 → 07
- REGION_US915 → 08
- REGION_RU864 → 09

Change keys
To modify ABP or OTAA keys send 1 byte with activation mode 01 or 02 respectively and then 16+16 bytes according to the table on Port 7.

TRAMA DE KEYS	LONGITUD	EJEMPLO	DESCRIPCIÓN
Activación	1B	01	Cambio de la Key de ABP.
AppKey	16B	2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F FF	Nueva AppKey.
NwKey	16B	2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F FF	Nueva NwKey.

Change JoinEUI
To modify JoinEUI send 8 bytes with the new value on Port 8.

Change ACK
To disable or enable the ACK send by the gateway screen you have to send 1 byte (00 / 01) respectively on Port 9.
Test
To show the downlink message via UART send the ‘x’ bytes on Port 10.
Accelerometer configuration
To configure the accelerometer you have to send 4 bytes (according to the table) on Port 11.

TRAMA DE CONFIG. ACELERÓMETRO	LONGITUD	EJEMPLO	DESCRIPCIÓN
ODR	1B	20	Output Data Rate (Hz)
Duración	1B	01	Tiempo entre medidas de aceleración.
Threshold	1B	1A	Umbral interno: por debajo se pone en bajo consumo.
Movement Threshold	1B	0A	Umbral que comprueba la diferencia entre 2 instantes.

Accelerometer RAW configuration
To configure the registers of the accelerometer you have to send blocks of 2 bytes (according to the table) on Port 12.
Example:

- Default configuration: 20 27 21 01 22 40 23 00 24 08 25 00 30 7F 32 1A 33 01
- ODR to 5276 Hz: 20 97 21 01 22 40 23 00 24 08 25 00 30 7F 32 1A 33 01

TRAMA DE CONFIG. ACELERÓMETRO	LONGITUD	EJEMPLO	DESCRIPCIÓN
#Registro1	1B	20	Número de registro 1
Valor1	1B	27	Valor del registro 1
#Registro2	1B	21	Número de registro 2
Valor2	1B	01	Valor del registro 2
#Registro3	1B	22	Número de registro 3
Valor3	1B	40	Valor del registro 3
#Registro4	1B	23	Número de registro 4
Valor4	1B	00	Valor del registro 4
#Registro5	1B	24	Número de registro 5
Valor5	1B	08	Valor del registro 5
#Registro6	1B	25	Número de registro 6
Valor6	1B	00	Valor del registro 6
#Registro7	1B	30	Número de registro 7
Valor7	1B	7F	Valor del registro 7
#Registro8	1B	32	Número de registro 8
Valor8	1B	1A	Valor del registro 8
#Registro9	1B	33	Número de registro 9
Valor9	1B	01	Valor del registro 9
...	...	...	...
#RegistroN	1B	xx	Número de registro
ValorN	1B	xx	Valor del registro

SAFETY PRECAUTIONS

Follow the next safety instructions:

- Never submerge the device in any liquid.
- Keep the device in a dry place and away from any liquids that might spill.
- Do not let the electronic parts come into contact with any steel elements, to avoid injuries and burns.
- The gateway must not be modeled in any way.
- Do not place the gateway where the temperature is below/above the operating range.
- Do not place the gateway close to objects with naked flames, heat source (oven or sunlight), cold source, liquid, and extreme temperature changes.
- Do not power on the gateway or connect it to another electrical device when installing.
  Check lighting and water protection when used outdoors.
- Do not connect or power the equipment using cables that have been damaged.
- Do not clean the gateway with detergents or solvents such as benzene or alcohol. To clean the device, wipe with a soft moistened cloth. Use another soft, dry cloth to wipe dry.

FCC Information:
Please take attention that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment This device complies with Part 15 of the FCC

Rules. Its 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.

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Documents / Resources

	SGS SWH Movement Sensor Device [pdf] User Manual MSDTST, 2A229MSDTST, SWH, Movement Sensor Device, SWH Movement Sensor Device