DAVITEQ WSLRW LoRaWAN Sensor User Guide

Contents

DAVITEQ WSLRW LoRaWAN Sensor

Product Information

Specifications

- Sensor Input: I2C, SPI, UART
- Data rate: Variable
- Antenna: External
- Battery: 2 x AA-type battery
- RF Frequency and Tx Power: Configurable
- Protocol: LoRaWAN
- Data sending modes: OTAA or ABP
- Working temperature: Variable
- Dimensions: Variable
- Net-weight: Variable
- Housing: Not specified

Product Usage Instructions

STEP 1: Configure End Device (Using Modbus Configuration Cable)

1. Select the region (refer to register address 317)
2. End Device Operation:
    - Setting value (Example): AS923, IN865, EU868,..
    - Write AppEUI information from the Application Server to the Lorawan End Device

- Write AppKey (created by the user) information for Lorawan End Device and Application Server
- Write DevEUI information from the Application Server to the Lorawan end device
- Configure cycle to send data
- Configure sensor sampling_rate
- Write Network Session Key and App Session Key (created by the user) information to the Lorawan end device (and Application Server)
- Configure the parameters of the sensor

STEP 2: Configure the operation of LoRaWAN Gateway

1. Configure the information in the General tab
2. Configure the information in the Radio tab

STEP 3: Configure the operation of LoRaWAN Gateway on the Network Server

(Refer to Check data configuration table)

(Ex: URSALINK Gateway)

- Configure Server address and server port (For more information)
- Select the Region Region (Other parameters to default)
- (Ex: URSALINK Gateway with Thethingsnetwork)
    - Gateway ID registration
    - Frequency Plan parameters configuration
    - Router parameters configuration
    - Check the connection of the gateway to the The Gateway status LED lights up and displays the message Status: connected on the network server Thethingsnetwork

STEP 4: Configure the operation of the Application Server on the Network Server

1. App ID registration
2. Handler parameters configuration

STEP 5: Register Lorawan End Device on Application Server on Thethingsnetwork

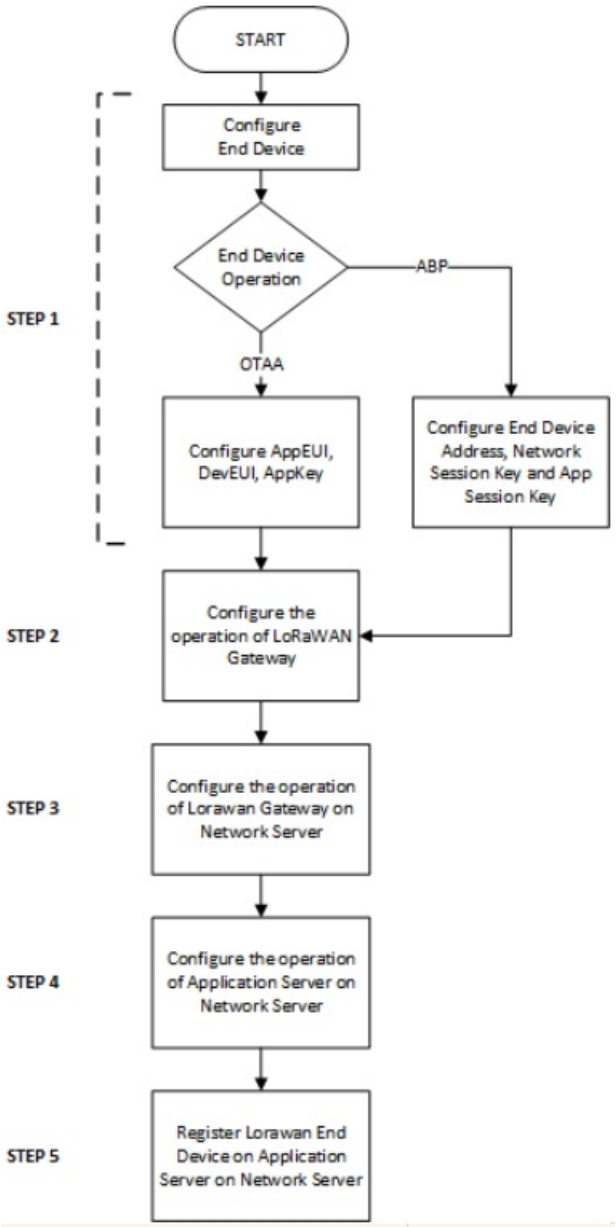
1. ID Registration
2. Select operation mode (OTAA or ABP)
3. Configure parameters DevEUI and AppKEY
4. Configure parameters Device Address, Network Session Key, App Session Key

Frequently Asked Questions (FAQ)

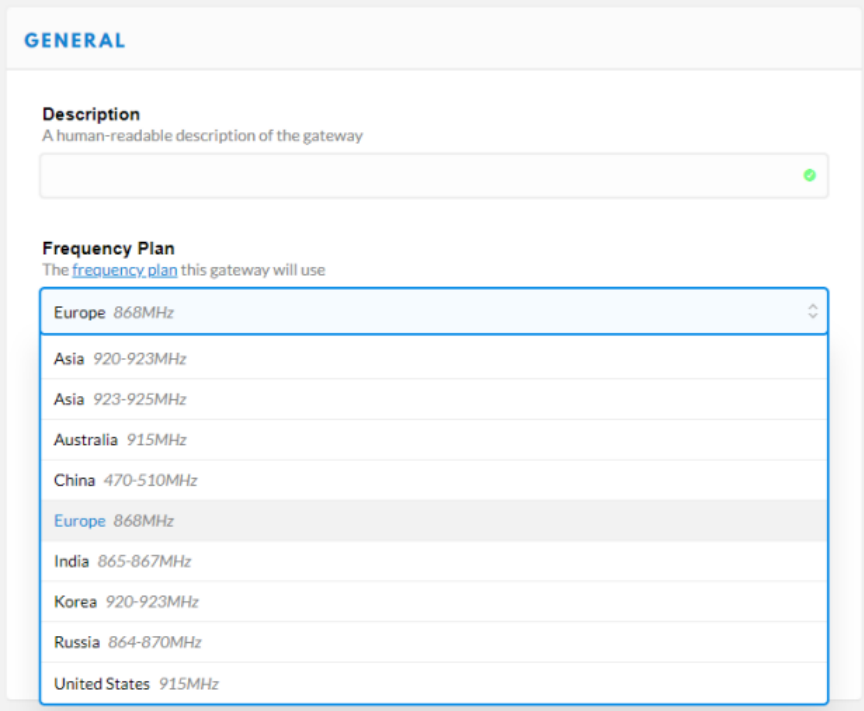
- **Q: How long does the sensor battery last?**

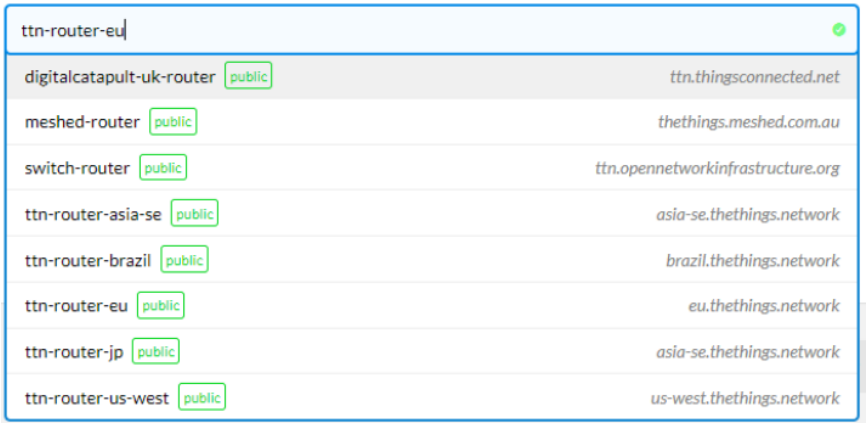
- A: The sensor can last up to 10 years with a 2 x AA-type battery (depending on configuration).
- **Q: What is the FCC Warning for this device?**
- A: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- **Q: What should be the minimum distance between the radiator and the body when operating this equipment?**
- A: This equipment should be installed and operated with a minimum distance of 20cm between the radiator and the body.

Configuration Check List



STEP 1: Configure End Device (Using Modbus Configuration Cable)	**Setting value (Example)**
1. Select region	AS923, IN865, EU868,.. (refer to register address **317**)
2. End Device Operation	OTAA or ABP
. o OTAA	1. Write AppEUI information from the Application Server to the Loraw an End Device; 2. Write AppKey (created by the user) information for the Lorawan En d Device and Application Server.
. o ABP	1. Write DevEUI information from the Application Server to the Lorawa n end device;
	2. write Network Session Key and App Session Key (created by the u ser) information to the Lorawan end device (and Application Server).
3. Configure “cycle send data”	900 sec (Default)
4. Configure “sensor sampling_rate”	120 sec (Default)
5. Configure the parameters of the s ensor	(Refer to Check data configuration table)
STEP 2: Configure the operation of L oRaWAN Gateway	(Ex: URSALINK Gateway)
1. Configure the information in the G eneral tab	Server address, Server port (For more information)
2. Configure the information in the R adio tab	Select the Region Region (Other parameters to default)
STEP 3: Configure the operation of L oRaWAN Gateway on the Network S erver	(Ex: URSALINK Gateway with Thethingsnetwork)

1. Gateway ID registration	Gateway ID is the GatewayEUI information on the Gateway
2. Frequency Plan parameters configuration	Asia 920-923MHz, Europe 868MHz,… 

3. Router parameters configuration	
4. Check the connection of the gate way to the network server	The Gateway status LED lights up and displays the message “Status: co nnected” on the Thethingsnetwork
STEP 4: Configure the operation o f the Application Server on the Net work Server	
1. App ID registration	
2. Handler parameters configuration	
STEP 5: Register Lorawan End De vice on Application Server on Thethingsnetwork	
1. ID Registration	
2. Select operation mode	OTAA or ABP

. o OTAA	Configure parameters DevEUI and AppKEY
. o ABP	Configure parameters Device Address, Network Session Key, App Sessi on Key

Introduction

WSLRW-SMT is a LoRaWAN Soil Moisture Sensor, which can be used to measure Soil Moisture, Fertilizer and Soil Erosion, too. It is powered by 02 x AA-type batteries and can last up to 10 years. The Moisture sensor utilises the Frequency Domain measuring technique to deliver high accuracy and stable measurement of Soil moisture. The Moisture value is not affected by fertilizer content and temperature like other simple Capacitance Moisture sensors on the market. The sensor will transmit data in kilometres distance to the LoRaWAN gateway, any brand on the market. The typical applications are Smart Farms, Smart Agriculture, Automatic Irrigation Systems, Soil Quality Measurement, and Soil Erosion Monitoring.

FCC Warning
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.

Any changes or modifica;ons not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, under Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful

interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used following the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 2 0cm between the radiator and your body.

Specification

Sensor Input	I2C, SPI, UART, Digital Input 0-3.3V, Analog input 0-3V
Data rate	250bps .. 5470bps
Antenna	Internal Antenna 2.0 dbi
Battery	02 x AA size 1.5VDC, battery not included
RF Frequency and TX Po wer	US915, max +20 dBm Tx
Protocol	LoRaWAN, class A
Data sending modes	interval time, an alarm occurred and was manually triggered by a magnetic key
Working temperature	-40oC..+60oC
Dimensions	H106xW73xD42
Net-weight	190 grams
Housing	Aluminum + Polycarbonate plastic

Operation Principle

LoRaWAN protocol specifications

LoRaWAN Sensor Protocol Specifications

- LoRaWAN Protocol Version 1.0.3

- Application Server Version 1.3.0.0
- MAC Layer Version 4.4.2.0
- Radio Standards: LoRa Alliance Certified
- LoRaWAN Zone: LoRa Alliance AS923, KR920, AU915, US915, EU868, IN865, RU864
- Class A
- Join Active: OTAA / ABP
- Network Mode: Public Network / Private Network
- Tx Power: up to 20 dBm
- Frequency: 860 – 930Mhz
- Date rate: 250 bps – 5kbps
- Spreading factor: SF12 – SF7
- Bandwidth: 125 kHz
- Unconfirmed-data message
- LoRaWAN application port for certification: 224

Data rate of LoRaWAN Sensor

Data rate name	**Data rate (bps)**	**Spreading factor (SF)**	**Bandwidth (kHz)**	**Region**
DR0	980	SF10	125	US915
DR1	1760	SF9	125	
DR2	3125	SF8	125	
DR3	5470	SF7	125	

Tx power of LoRaWAN sensor

Max EIRP (dBm)	**Max Tx Power (dBm)**	**Region**
30	20	US915

The principle of operation of the LoRaWAN sensor

When starting the power supply, the LoRaWAN sensor has 60 seconds to allow configuration to operate via the Configuration Cable with the Modbus RTU protocol. After 60 seconds, the first packet will be sent, then the LoRaWAN sensor will send the next packets in the following cases:

- **Case 1:** When it reaches the frequency of taking data, the LoRaWAN sensor will wake up to measure and calculate.
- **Then**: If the measured value exceeds the High or Low setting thresholds, the packet will be sent to the Gateway and then asleep;

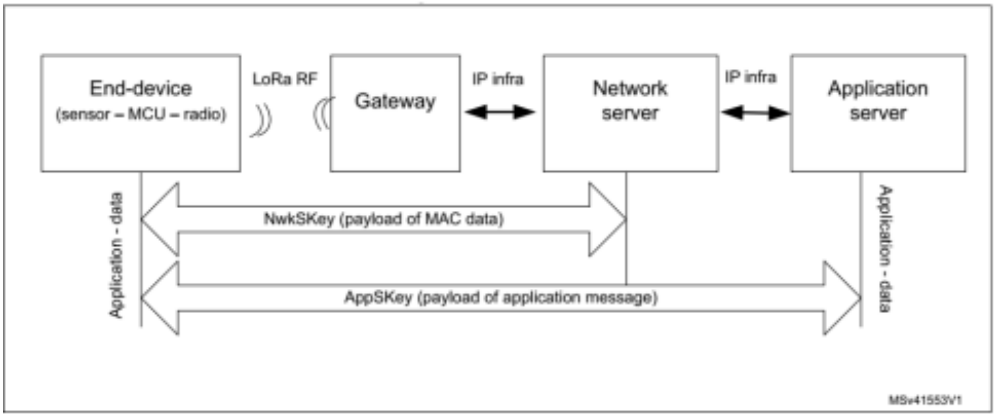
If NOT then sleep without sending data.

NOTE:
Once the data to Gateway by this alarm event, the timer of sending time interval will be reset;

- **Case 2:** When the sending time interval is reached, the LoRaWAN sensor wakes up to measure calculate and send data to Gateway immediately, regardless of value.
- **Case 3:** By using the magnet key, the LoRaWAN sensor can be triggered to send data to Gateway immediately.

NOTE:
The time between sending data for Class A is at least 3 seconds

Principle of operation LoRaWAN Network



The LoRaWAN Gateway function is Packet Forwarder so:

- **Between Gateway and End Device:** Gateway receives data packets from End Device via RF connection, so it is recommended to configure Radio parameters (**Note:** the packet that Gateway receives is encrypted)
- **Between Gateway and Network Server:** Gateway forwards data packets to the Network server via an IP connection, so it is recommended to configure Network parameters such as Server Address, Server Uplink Port, Server Downlink Port,…

LoRaWAN Network is secured as follows:

- Network section key (NwkSKey) to ensure the security of communications on the Network
- The application session key (AppSKey) to ensure data security between the End Device and the Application Server
- Special keys of the device such as DevEUI, AppEUI, Gateway EUI, and Device Address. *Therefore, the data packet that the Gateway receives is encrypted and decrypted on the Application server.*

To End Device connect to the Network server, you need to register in the following two ways:

Activation with OTAA (Over-the-Air activation):
Is the process of joining the Network automatically. Previously, both the End Device and Application Server installed the same DevEUI code, AppEUI, and AppKey. During activation, AppKey will generate 2 security keys for End Device and Network, which are:

- The network session key (NwkSKey): is the key to secure communication commands on the MAC layer between the End Device and the Network server.
- The application session key (AppSKey): is the key to secure data packets between the End Device and Application server.

ATTENTION:

- OTAA mode must be successfully activated for the End Device to send data packets to the Network through the Gateway;
- OTAA mode only needs to be activated once, if the device is reset or the battery is replaced, it will activate OTAA again;
- When the End Device is co*nnected to the Network server, whether the Gateway is reset or the power is*

restarted, it will not need to activate OTAA.

Activation by ABP (Activation by Personalization):
Is the process of joining the Network manually. Device Address, Network session key (NwkSKey), and Application session key (AppSKey) codes must be stored inside the End Device and Application server, so when the End Device sends data packets to the network server, it will also send the security codes to activate.

Configure the LoRaWAN Network

Configure End Device operation according to OTAA
Configuration parameters for the End Device to be activated by OTAA as the table below:

Parameter settings	Setting value (example)	Description
Join Mode	OTAA	Device activation type on Network Server
DevEUI	34 35 31 31 4B 37 75 12	Device ID's unique ID number => Set this ID number for the Application server
AppEUI	70 B3 D5 7E D0 02 D5 0B	Application server's unique ID number (random or user-generated) => Set this ID number for the End Device
AppKey	2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C	Key Number for generating 2 NwkSKey and AppSKey security keys created by the user (factory-created by default) => Used to install for both the Device and Application Server End

ATTENTION:

- The AppEUI number from the Application Server => is then installed for the End Device. AppEUI is randomly generated by the Application server or by the user;
- The number of AppKeys during OTAA activation will generate two security keys, Lora NwkSKey and AppSKey, which are used for both End Device and Network.

Configure End Device operation according to ABP
Configuration parameters for the End Device to be activated by ABP as the table below:

Parameter settings	Setting value (example)	Description
Join Mode	ABP	Device activation type on Network Server
Device Address	12 34 56 78	End Device Address created by the Application server => Set Device Address for End Device
NwkSKey (Network session key)	2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C	NwkSKey number created by the user to install and use for both the End Device and Application Server
AppSKey (Application session key)	2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C	AppSKey number generated by the user to install for both End Device and Application Server

LED meaning

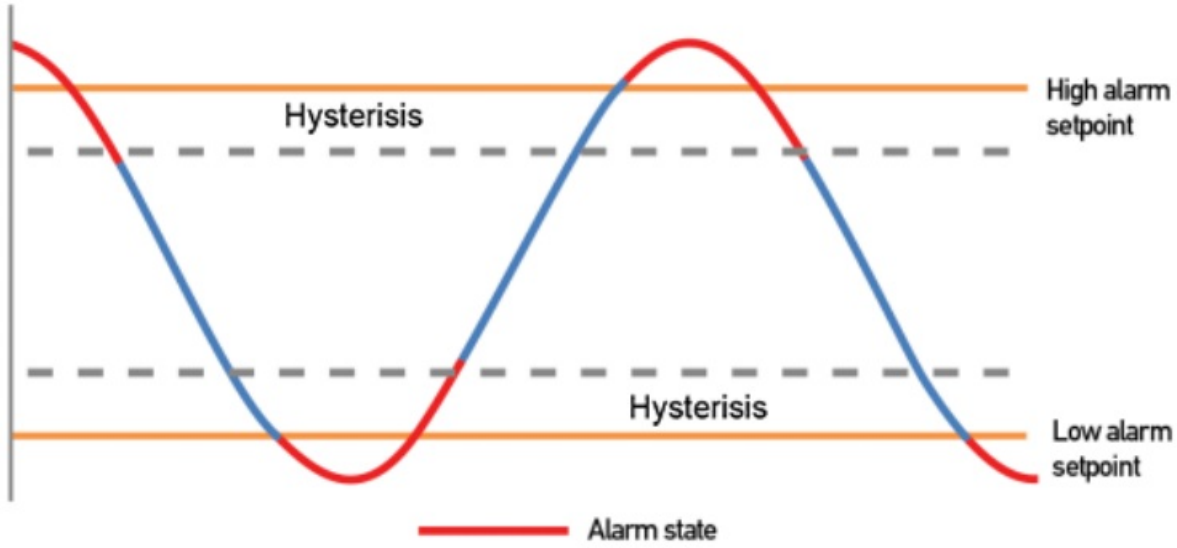
- **RED LED:**
  - **Fixed ON:** due to noise caused peripheral components (i2c, spi, uart, timer, etc, wet, …) do not initialize.
  - **Flashing 10ms ON** / **10s OFF:** Activation by OTAA on the Network server failed.
  - **Flashing 10ms ON** / **2s OFF:** Sending a data packet to Gateway failed.
- **GREEN LED**: Flashing 100ms ON / OFF when sending a data packet to Gateway.
- **BLUE LED:**
  - Flashing 1s ON / 1s OFF for the first 60 seconds when booting (insert batteries or connected external sources), after 60 seconds OFF.
  - ON during the LoRaWAN sensor receives data packets from the Network server and OFF when received.

Process of measurement
When the LoRa sensor wakes up, it will supply power to the internal or external sensor so that the sensor can start measuring. After measuring successfully it will turn off the power to the sensor for energy saving. The measured value is the raw value of the sensor. The measured value can be scaled according to the following formula:

Y = aX + b

- **X:** the raw value from the sensor
- **Y:** the calculated value will be sent to LoRaWAN Gateway in the payload data.
- **a:** constant (default value is 1)
- **b:** constant (default value is 0)

So, if there is no user setting for a and b ==> Y = X
The Y value will be compared with the Lo and Hi threshold. Please refer below to the graph of alarm processing.



Payload Data
The following is the format of payload data that will be sent to the LoRaWAN Gateway.

Sensor type (1 byte)	Status1 (1 byte)	Status2 (1 byte)	1st – Parameter (Int16)	2nd – Parameter (Int16)	3rd – Parameter (Int16)

Meaning of Data in the Payload

Data	**Size (byte)**	**Bit**	**Format**	**Meaning**
Sensor type	1	all	Uint8	Sensor type = 0x0D means LoRaWAN Tilt Sensor. Sensor type = 0xFF means no sensor
Status1: battery level	1	Bit 7 and 6	Uint8	Battery capacity in 04 levels 11: battery level 4 (99 %) 10: battery level 3 (60%) 01: battery level 2 (30%) 00: battery level 1 (10%)
Status1: error		Bit 5 and 4		Node status 01: error 00: no error

Status1: alarm 1		Bit 3 and 2		Alarm status of 1st – Parameter (X Tilt value) 11: Hi alarm 01: Lo alarm 00: No alarm
Status1: alarm 2		Bit 1 and 0		Alarm status of 2nd – Parameter (Y Tilt value) 11: Hi alarm 01: Lo alarm 00: No alarm
	1	Bit 7 and 2	Uint8	Not Applicable
Status2: alarm 3		Bit 1 and 0		Alarm status of 3rd – Parameter (Z Tilt value) 11: Hi alarm 01: Lo alarm 00: No alarm
1st – Parameter	2	all	Int16	Measured value 1
2nd – Parameter	2	all	Int16	Measured value 2
3rd – Parameter	2	all	Int16	Measured value 3

Configuration
Using the configuration cable to connect to the sensor as below picture.

Serial port configuration on the computer:

- COMPort, Baudrate: 9600,
- Parity: None,
- Stop bit: 1,
- Data bit: 8
- Modbus RTU: Reading data by Function 3 / Writing data by Function 16.

Step to configure

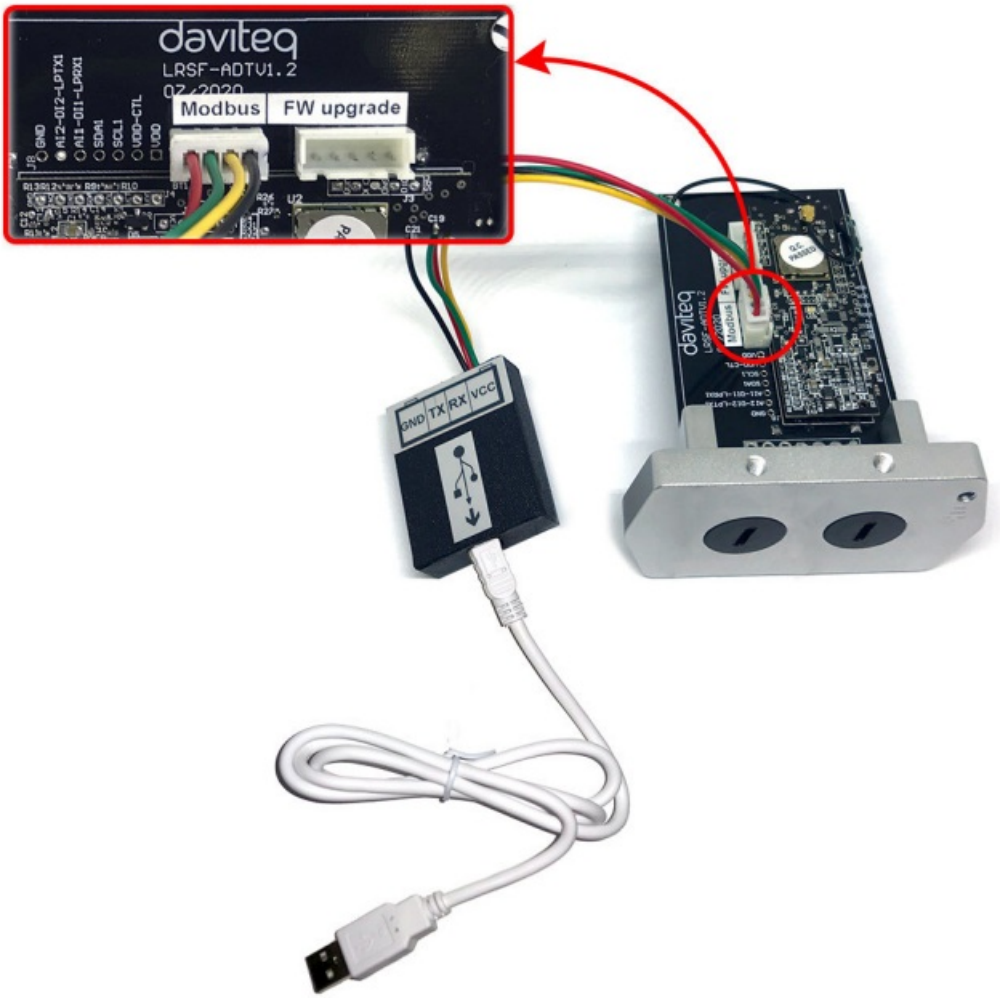
NOTE:
The Modbus configuration can only be performed in the first 60s after powering up the LoRaWAN sensor. After 60, if the user can not finish the configuration process, the user needs to reset the power of the LoRaWAN sensor again, by removing the battery in at least 15.

- **Step 1:** Install the Modbus Configurator Software in the link below: **https://filerun.daviteq.com/wl/?id=qK0PGNbY1g1fuxTqbFW9SXtEvCw7bpc6**

How to use the Modbus configuration software

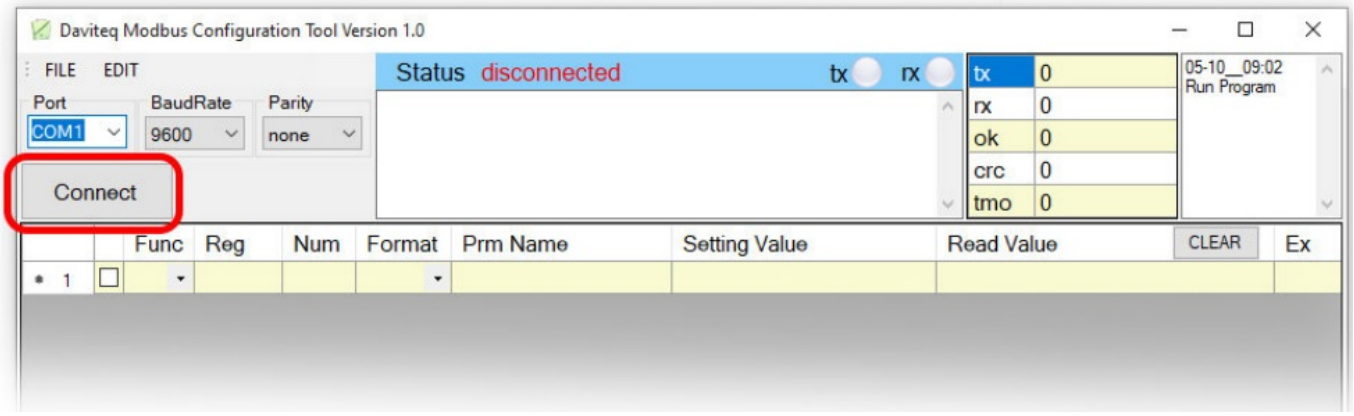
- **Step 2:** Plug the configuration cable into the computer via the USB port and install the driver;
- **Step 3:** Open the plastic housing with the L hex key to unscrew the M4 screws at the side of the housing

- **Step 4:** Plug the connector into the configuration port;



- **Step 5:** Import the configuration file by importing the CSV file: Go to MENU: FILE / Import New / => select the file with the name CONFIGURATION TEMPLATE FILE FOR LORAWAN SENSOR FW1.0.csv (in the link below). Then click Connect;

CONFIGURATION TEMPLATE FILE FOR LORAWAN SENSOR FW1.0



To write a new value to the device:
First, you need to write the password in “password for setting”, after reading the value to check ok, you can write the new value AppEUI, AppKey,You only have 60 seconds after plugging the configuration cable or the power supply into the device for configuration.

Register table
Here is the table of Data that will be read by the Modbus tool

Modbus Register (Decimal)	**Modbus Register (Hex)**	**Function n n Code**	**# of Registers**	**Description**	**Range**	**Default**	**Format**	**Property**	**Comment**
0	0	3	5	device info		WSLRW-I2C	string	Read	Wireless Sensor LoRaWAN – I2C
5	5	3	4	firmware version		1.00ddmm	string	Read	dd mm = day/month
9	9	3	2	hardware version		1.10	string	Read	
11	B	3	4	lorawan protocol version		01.00.03	string	Read	lorawan v1.0.3

15	F	3	6	application version		01.03.00.00	string	Read	application server v1.3.0.0
21	15	3	6	mac layer version		04.04.02.00	string	Read	mac layer v4.4.2.0
27	1B	3	4	device			hex	Read	End Device's EUI number, used to register the product on the Network Server by OTAA
31	1F	3	4	Lora appear			hex	Read	The application server's EUI number is used to register the product on the Network Server by OTAA
35	23	3	8	Lora apply			hex	Read	The number of keys used to create two security keys of the End Device, used to register the product on the Network Server by OTAA

43	2B	3	8	Lora whiskey			hex	Read	key number encrypts the communication command of the MAC layer of the End Device, which is used to register the product on the Network Server by ABP
51	33	3	8	Lora apps key			hex	Read	End Device data encryption key number, used to register the product on the Network Server by ABP
59	3B	3	2	device address		0	uint32	Read	End Device address created by the Application server used to register the product on the Network server by ABP

61	3D	3	2	network ID		0	uint32	Read	Network server ID number used to register the product on the Network server by ABP
63	3F	3	2	join mode		OTAA	string	Read	OTAA: Over-the-Air activation, ABP: Activation by Personalization n
65	41	3	4	network mode		PUBLIC	string	Read	PUBLIC, PRIVATE
76	4C	3	3	bandwidth		BW125	string	Read	BW125
79	4F	3	2	spread factor		SF10	string	Read	SF10, SF9, SF8, SF7
81	51	3	4	activation of ADR		ADR OFF	string	Read	ADR ON, ADR OFF
85	55	3	1	class		A	string	Read	
103	67	3	1	sensor type	1-255		uint16	Read	1-254: sensor type, 255: no sensor

104	68	3	1	battery level	0-3		uint16	Read	4 levels of battery capacity status

105	69	3	1	error status	0-1		uint16	Read	Error code of sensor, 0: no error, 1: error
106	6A	3	1	prm1 alarm status	0-2		uint16	Read	Alarm status of parameters 1, 0: none, 1: Low, 2: High
107	6B	3	1	prm2 alarm status	0-2		uint16	Read	Alarm status of parameter 2
108	6C	3	2	prm1 value			float	Read	Value of parameter 1
110	6E	3	2	prm2 value			float	Read	Value of parameter 2
112	70	3	1	battery %	10%, 30%, 60%, 99%		uint16	Read	% Value of battery capacity
113	71	3	2	battery voltage	0-3.67 VDC		float	Read	Value of battery voltage

115	73	3	2	mcu temperature	oC		float	Read	Temperature value of RF module
117	75	3	1	mcu ref	0-3.67 VDC		uint16	Read	Vref value of RF module
118	76	3	1	button1 status	0-1		uint16	Read	Button state, 0: No button pressed, 1: Button pressed
119	77	3	1	button2 status	0-1		uint16	Read	Button status, 0: No magnetic sensor detected, 1: Magnetic sensor detected
126	78	3	2	prm3 value			float	Read	Value of parameter 3
128	7A	3	1	prm3 alarm status	0-2		uint16	Read	Report the alarm status of parameter 3

Here is the table for Configuration:

Modbus Register (Decimal)	Modbus's Register (Hex)	Function n Code	# of Registers	Description	Range	Default t	Format	Property	Comment
256	100	3 / 16	1	modbus address	1-247	1	uint16	R/W	Modbus address of the device
257	101	3 / 16	1	modbus baudrate	0-1	0	uint16	R/W	0: 9600, 1: 19200
258	102	3 / 16	1	modbus parity	0-2	0	uint16	R/W	0: none, 1: odd, 2: even
259	103	3 / 16	9	serial number			string	R/W (Password)	

268	10C	3 / 16	2	password for setting			uint32	R/W (Password)	password 190577
270	10E	3 / 16	4	Lora appear			hex	R/W (Password)	The application server's EUI number, used to register the product on the Network Server by OTAA

274	112	3 / 16	8	Lora apply			hex	R/W (Password)	The number of keys used to create two security keys of the End Device, used to register the product on the Network server by OTAA
282	11A	3 / 16	8	Lora whiskey			hex	R/W (Password)	key number encrypts the communication command of the MAC layer of the End Device, which is used to register the product on the Network Server by ABP
290	122	3 / 16	8	Lora apps key			hex	R/W (Password)	End Device data encryption key number, used to register the product on the Network Server by ABP

298	12A	3 / 16	2	device address			uint32	R/W (Password)	End Device address created by the Application server used to register the product on the Network server by ABP
300	12C	3 / 16	2	network ID			uint32	R/W (Password)	Network server ID number used to register the product on the Network server by ABP
302	12E	3 / 16	1	activation mode	0-1	1	uint16	R/W (Password)	1: OTAA (Over-the-Air Activation), 0: ABP (Activation by Personalization)
304	130	3 / 16	1	application port	1-255	1	uint16	R/W (Password)	Port 224 is reserved for certification
319	13F	3 / 16	1	tx power	2-20	16	uint16	R/W (Password)	tx power: 2,4,6,8,10,12,14,16,18, 20

320	140	3 / 16	1	adaptative data rate	0-1	0	uint16	R/W (Password)	Automatically adjust data rate, 0: disable, 1: enable
334	14E	3 / 16	2	cycle send data		900	uint32	R/W	sec (data sending cycle)
338	152	3 / 16	1	alarm limit		44	uint16	R/W	limit the number of events/day
340	154	3 / 16	2	sensor1: sampling_rate		120	uint32	R/W	sec (frequency of data taken from sensor 1)
348	15C	3 / 16	2	prm1: a		1	float	R/W	Scale parameter “a” of Measured value 1
350	15E	3 / 16	2	prm1: b		0	float	R/W	Scale parameter “b” of Measured value 1
354	162	3 / 16	2	prm1: High Threshold		100000	float	R/W	A high threshold value of Measured value 1
356	164	3 / 16	2	prm1: High Hysteresis		10000	float	R/W	High hysteresis value of Measured value 1

358	166	3 / 16	2	prm1: Low Threshold		0	float	R/W	A low threshold valu e of Measured value 1
360	168	3 / 16	2	prm1: Low Hysteresis		10000	float	R/W	Low hysteresis valu e of Measured value 1
362	16A	3 / 16	2	prm1: High Cut		10000 0	float	R/W	The upper limit valu e of Measured value 1
364	16C	3 / 16	2	prm1: Low Cut		0	float	R/W	The lower limit value of Measured v alue 1

Installation

Installation location
To maximize the distance of transmission, the ideal condition is Line-of-sight (LOS) between the LoRaWAN sensor and Gateway. In real life, there may be no LOS condition. However, the LoRaWAN sensor still communicates with Gateway, but the distance will be reduced significantly.

ATTENTION:
DO NOT install the LoRaWAN sensor or its antenna inside a completed metallic box or housing, because the RF signal can not pass through the metallic wall. The housing is made from Non-metallic materials like plastic, glass, wood, leather, concrete, cement…is acceptable.

Battery installation

WSLRW-AG-H7.PNG

Steps for battery installation:

- **Step 1:** Using the L hex key to unscrew the M4 screws at the side of the housing and carefully pull out the top plastic housing in the vertical direction

- **Step 2:** Insert 02 x AA 1.5VDC battery, please take note of the poles of the battery

ATTENTION:
REVERSED POLARITY OF BATTERIES IN 10 SECONDS CAN DAMAGE THE SENSOR CIRCUIT!!!

- **Step 3:** Insert the top plastic housing and locking by the L hex key

ATTENTION:
When reinstalling the cover, pay attention to putting the PCB edge into the middle slot of the box inside as shown below)

Troubleshooting

320	140	3 / 16	1	adaptative data rate	0-1	0	uint16	R/W (Password)	Automatically adjust data rate, 0: disable, 1: enable
334	14E	3 / 16	2	cycle send data		900	uint32	R/W	sec (data sending cycle)
338	152	3 / 16	1	alarm limit		44	uint16	R/W	limit the number of events/day

340	154	3 / 16	2	sensor1: sampling_rate		120	uint32	R/W	sec (frequency of data taken from sensor 1)
348	15C	3 / 16	2	prm1: a		1	float	R/W	Scale parameter “a” of Measured value 1
350	15E	3 / 16	2	prm1: b		0	float	R/W	Scale parameter “b” of Measured value 1
354	162	3 / 16	2	prm1: High Threshold		100000	float	R/W	A high threshold value of Measured value 1
356	164	3 / 16	2	prm1: High Hysteresis		10000	float	R/W	High hysteresis value of Measured value 1
358	166	3 / 16	2	prm1: Low Threshold		0	float	R/W	A low threshold value of Measured value 1
360	168	3 / 16	2	prm1: Low Hysteresis		10000	float	R/W	Low hysteresis value of Measured value 1
362	16A	3 / 16	2	prm1: High Cut		100000	float	R/W	The upper limit value of Measured value 1

364	16C	3 / 16	2	prm1: Low Cut		0	float	R/W	The lower limit value of Measured value 1

10	The node does not send RF to Gateway according to the alarm, LED does not blink	· The alarm configuration is incorrect · Running out of the number of alarms set for the day	· Check alarm configuration · Check the configuration for the maximum number of alarms per day
11	The node does not send RF to Gateway when activated by the magnetic key, LED does not blink	The magnetic sensor has malfunctioned	Read the status of the magnetic sensor via Modbus (when powering or attaching the battery) to see if the magnetic sensor is working.
12	Node has blinked LED GREEN when sending RF but the Gateway or Application server cannot receive	· LoRa module on the Gateway is faulty · The IP connection (4G / WiFi / …) on the Gateway is faulty	· Check Gateway's LoRa status lights on Gateway · Check 4G / WiFi status lights on the Gateway
13	The value of the sensor is 0 and sensor_type = 0xFF	Lost connection with the sensor	· Check sensor connection · Replace the module sensor
14	RSSI is weak and often loses data	· The distance between Node and Gateway is far or there are many obstructions · Connection to Antenna problem · Install metal nodes or in metal cabinets	· Configure Data rate = DR0 / SF12 · Check Antenna position · Install Node in a well-ventilated location

Support contacts

Manufacturer
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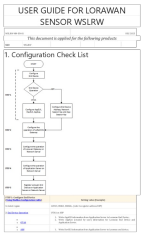
Documents / Resources

	DAVITEQ WSLRW LoRaWAN Sensor [pdf] User Guide WSLRW LoRaWAN Sensor, WSLRW, LoRaWAN Sensor, Sensor

References

- Daviteq – Nhà sản xuất cảm biến đo lường và hệ thống IoT
- filerun.daviteq.com/wl/?id=qK0PGNbY1g1fuxTqbFW9SXtEvCw7bpc6
- User Manual