USER GUIDE FOR WIRELESS SENSOR AC CURRENT INPUT WS433-AC

WS433-AC-MN-EN-01	APR-2020

This document is applied for the following products

SKU	WS433-AC	**HW Ver.**	2.5	**FW Ver.**	5.0
Item Code	WS433-AC-11	Wireless sensor 1-channel AC current input max 5A, IP67, battery AA 1.5VDC, cable 0.5m length with PG9 cable gland and wire crimpping connectors for SAFETY			

1. Functions Change Log

HW Ver.	FW Ver.	Release Date	Functions Change
2.5	5.0	DEC-2019	• Change RF data rate by button

2. Introduction

Wireless sensor with 1-channel AC current input 5A to measure the AC current load of your motors, machines...to count the energy consumption, OVER-load or NO-load detection, run hour counting…It is configured the operation parameters like data sending interval, health check cycle...remotely from Globiots platform or via ModbusRTU software. The wireless module can last up to 10 years with a single AA battery.



3. Specification

Measuring range	0..5A AC
Accuracy	1.0%
Resolution	10 bit
Temperature Drift	< 100 ppm
Electrical connection	cable 0.5m length with PG9 cable gland and wire crimpping connectors for SAFETY
Optional accessories	304SS Adapter PG9/male 1/2""NPT or PG13.5 or M20 to allow direct mounting on Process instruments or electrical panel
Data speed	Up to 50kbps
Tranmission distance, LOS	500m
Antenna	Internal Antenna, 3 dbi
Battery	01 x AA 1.5VDC, up to 10-year operation, depends on configuration
Frequency Band	ISM 433Mhz, Sub-GHz technology from Texas Instrument, USA
Receiving Sensitivity	-110dBm at 50kbps
International Compliance	ETSI EN 300 220, EN 303 204 (Europe) FCC CFR47 Part15 (US), ARIB STD-T108 (Japan)
Security Standard	AES-128
Operating temperature of PCB	-40oC..+60oC (with AA L91 Energizer)
Housing	Poly-carbonate, IP67
Installation method	L-type bracket SUS304 , by M4 screws or double-sided 3M tape (included)
Product dimensions	125x30x30mm
Net weight (without battery)	< 100g
Box dimension	190x50x50mm
Gross weight	140g

4. Product Pictures

5A-AC CURRENT INPUT WIRELESS SENSOR WS433-AC



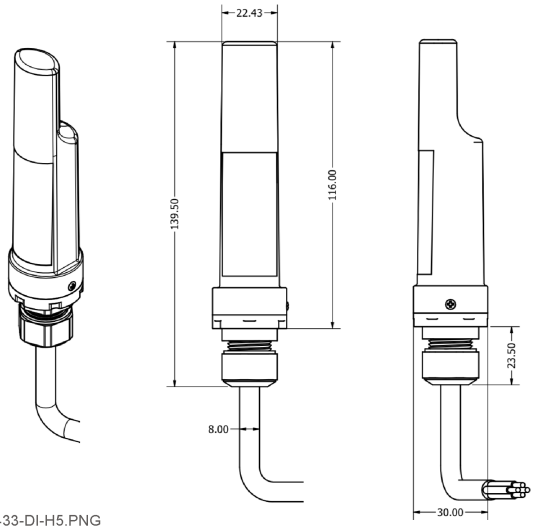
WS433-AC-H1.PNG

INSTALL BATTERY IN WS433



WS433-M12F-H3.PNG

DIMENSION DRAWINGS OF WS433 SENSOR WITH CABLE OUTPUT



WS433-DI-H5.PNG

CARTON BOX OF WIRELESS SENSOR



SIZE: DIA. 50MM X 180MM LENGTH

WS433-M12F-H6.PNG

PRODUCT PACKAGE INCLUDES



WS433-M12F-H7.PNG

RECOMMENDED BATTERIES for WIRELESS SENSOR WS433

E91 AA Alkaline battery



-18 .. + 60 oC working temperature

10-year shelf life

3000 mAH Capacity

Price: 1X

L91 AA Lithium battery



-40 .. + 60 oC working temperature

20-year shelf life

3500 mAH Capacity

Price: 3.5X

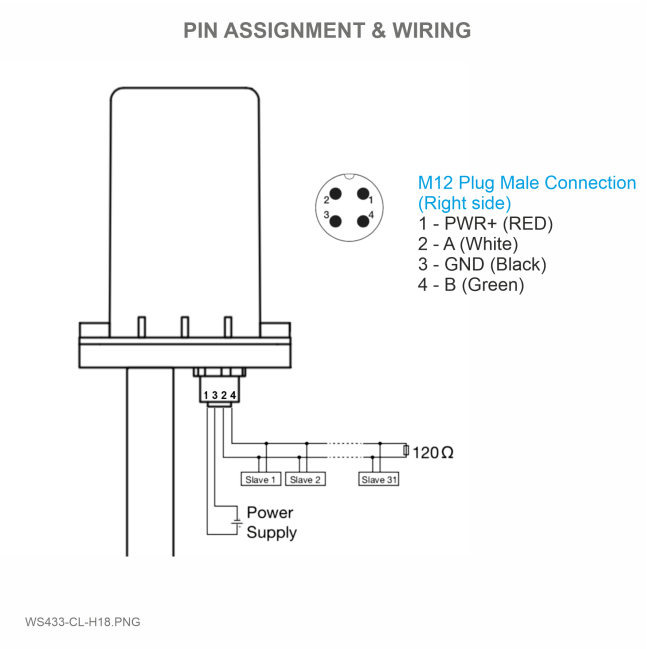
WS433-M12F-H8.PNG

5. Operation Principle

5.1 Add sensors node to Co-ordinator WS433-CL

5.1.1 Add Sensor Node ID automatically





Step 1: After supplying power the Co-ordinator via M12 connector, the Node ID must be registered within the first 5 minutes, up to 40 WS.

Step 2: Bring the wireless sensor closer to the Co-ordinator's antenna then take off the wireless sensor battery, wait for 5s then insert the battery again. If:

- Buzzer plays **1 peep** sound, LED blink 1 time, that means registering Node ID on Co-ordinator **successfully.**
- Buzzer plays **2 peep** sounds, LED blink 2 times, that this Node ID is **already registered.**

If you do not hear the "Peep" sound, please disconnect the power the co-ordinator, wait a few minute and try again.

Node id added in this way will be written to the **smallest node_id_n** address which is = **0.**

Set **Rssi_threshold** (see **RF MODE CONFIG** (in the **Modbus Memmap of WS433-CL**), default **-25**): The case if Co-ordinator is on high position and need to add node sensor. We set the sensor as close as possible and set the **Rssi_threshold** to **-80**, **-90** or **-100** to increase the sensitivity to allow WS433-CL-04 can add sensors at a longer distance. After that, perform 2 steps of adding sensors and then reset Rssi_threshold = -25.

Enb_auto_add_sensors configuration (see **RF MODE CONFIG** (in the **Modbus Memmap of WS433-CL**)): In case you do not want to turn off the power WS433-CL, you can set **Enb_auto_add_sensors = 1**, this way we have 5 minutes to add nodes (add up to 40 nodes) . After 5 minutes **Enb_auto_add_sensors** will automatically **= 0.**

Memmap resgisters

You can download Modbus Memmap of WS433-CL with the following link:

https://filerun.daviteq.com/wl/?id=BKEaUzdArkoc0Hc7nfpRShdPVToVrqQZ

5.1.2 Add sensor node into WS433-CL-04 (1) through intermediate WS433-CL-04 (2) and Modbus

In case the sensor need to be added to WS433-CL-04 (1) has been installed in a high position, the sensor cannot be brought close to WS433-CL-04 (1). For more details:

http://www.daviteq.com/en/manuals/books/long-range-wireless-co-ordinator-ws433-cl/page/user-guide-for-long-range-wireless-co-ordinator-ws433-cl

5.2 Button Function

Use the push button to set the data transfer speed for the first 30 seconds when the battery is first installed, after 30 seconds the push button function does not work.

- Press and hold the button for 2 seconds => LED blinks once => Release the button to set Data rate RF 50kbps.
- Press and hold the button for 5 seconds => LED blinks twice => Release the button to set Data rate RF 625bps.
- Press and hold the button for 10 seconds => LED blinks 3 times => Release the button to reset RF parameters (frequency, RF output power, data rate), if held for more than 30 seconds then the button function does not work.

Reset default WS433:

- **Frequency:** 433.92 MHz
- **RF transmit power:** 15 dBm
- **RF data rate:** 50 kbps

5.3 Configuration

5.3.1 Sensor configuration

The WS433-AC wireless sensor measures AC current via CT (Current Transformer).

We need to check what the **ratio** on the CT is printed on the sticker. **For example:** 50/5A = 10, 75/5A=15, 100/5A = 20, ...

First, you need to prepare



Computer



RS485
Configuration Cable



Power Adapter 12-24VDC

WS433-CL-H9.PNG

Then, use the RS485 configuration cable to communicate with the Co-ordinator WS433-CL-04 via Modbus software **(in the link below)**, then **write** the the ratio of the CT into "**Co-ordinator id**" and **sync** with the sensor node.

> **Daviteq Modbus Configuration Tool: https://filerun.daviteq.com/wl/?id=qK0PGNbY1g1fuxTqbFW9SXtEvCw7bpc6**
>
> **Template WS433-AC: https://filerun.daviteq.com/wl/?id=Nv5NoJleTianjd5LBNlWpDdMqKOlhOMq**

How to use the Modbus configuration software

CONNECT CO-ORDINATOR TO RS485 - CONFIGURATION CABLE via M12 CONNECTOR



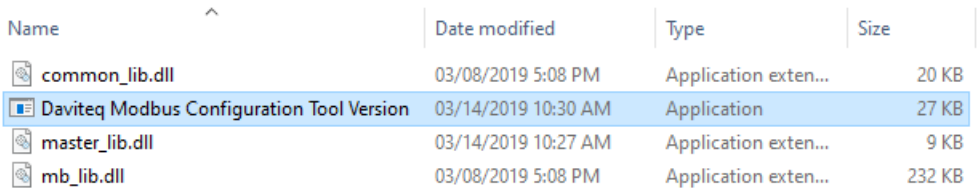
WS433-CL-H12.PNG

CONNECT RS485 - CONFIGURATION TO COMPUTER via USB

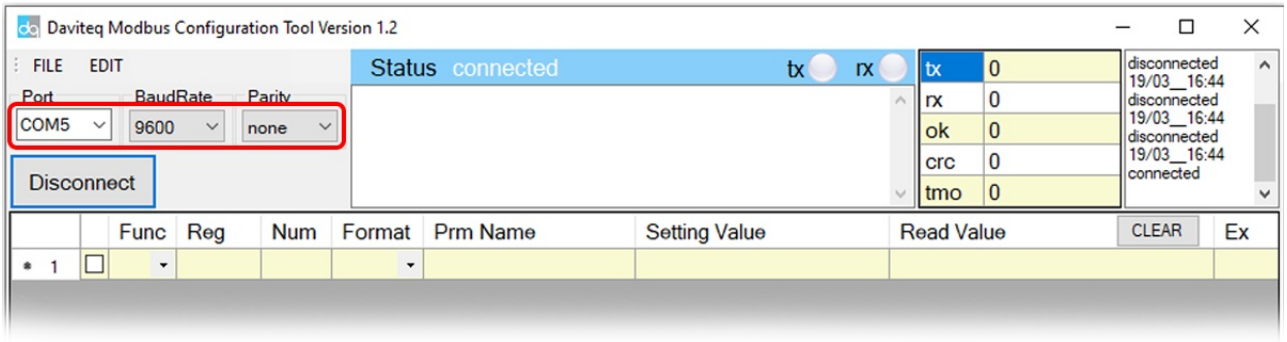


WS433-CL-H13.PNG

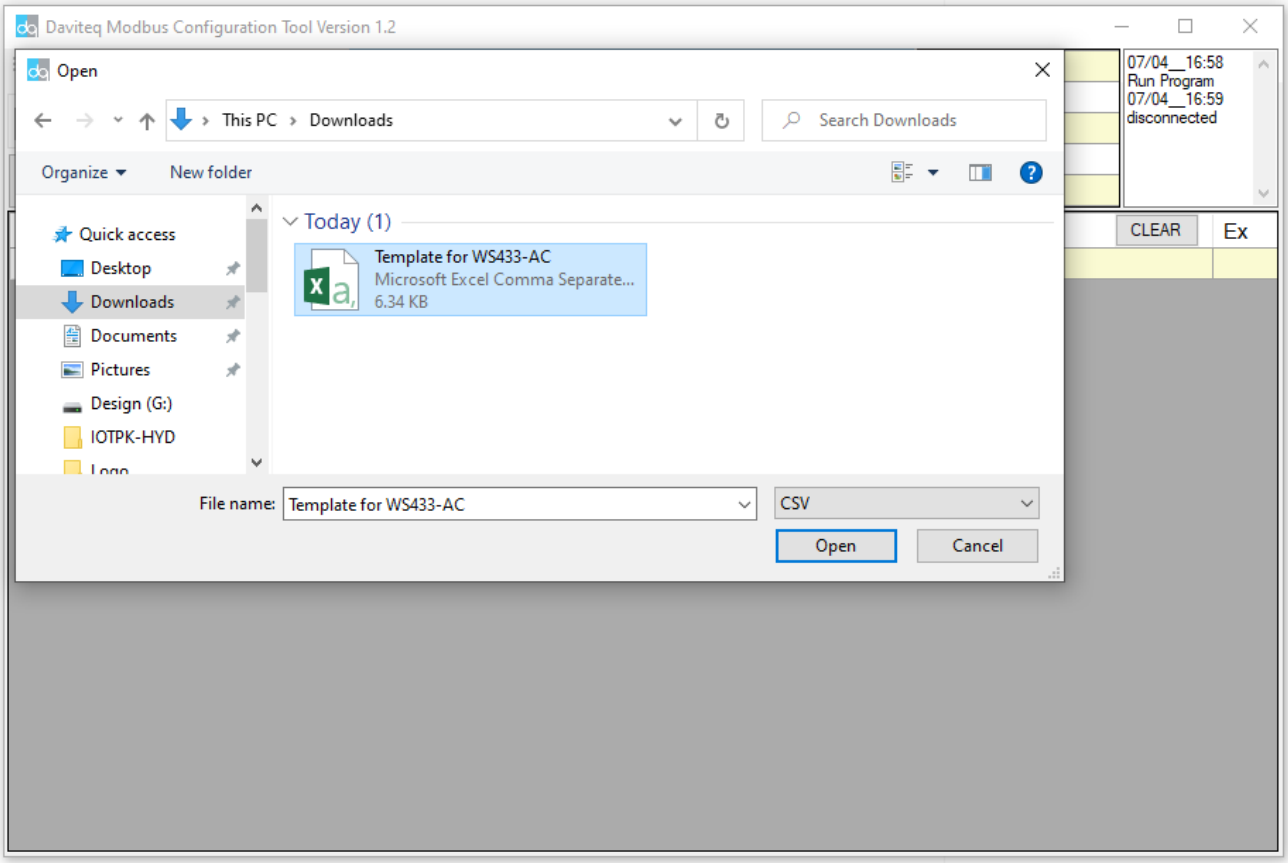
- Unzip **file** and run file application **Daviteq Modbus Configuration Tool Version**



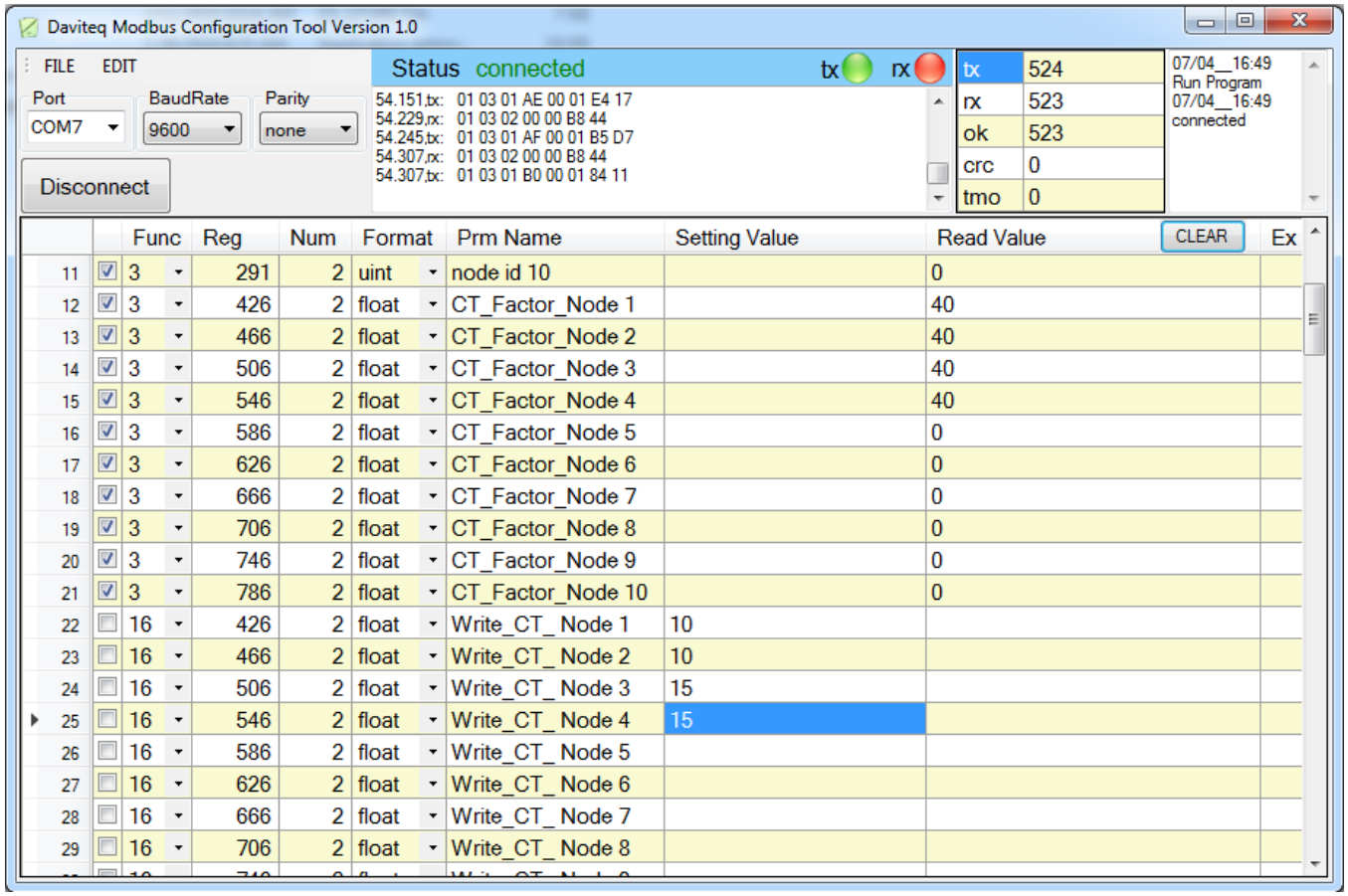
- Choose **COM Port** (the Port which is USB cable plugged in)
- Set the **BaudRate: 9600**, **Parity: none**

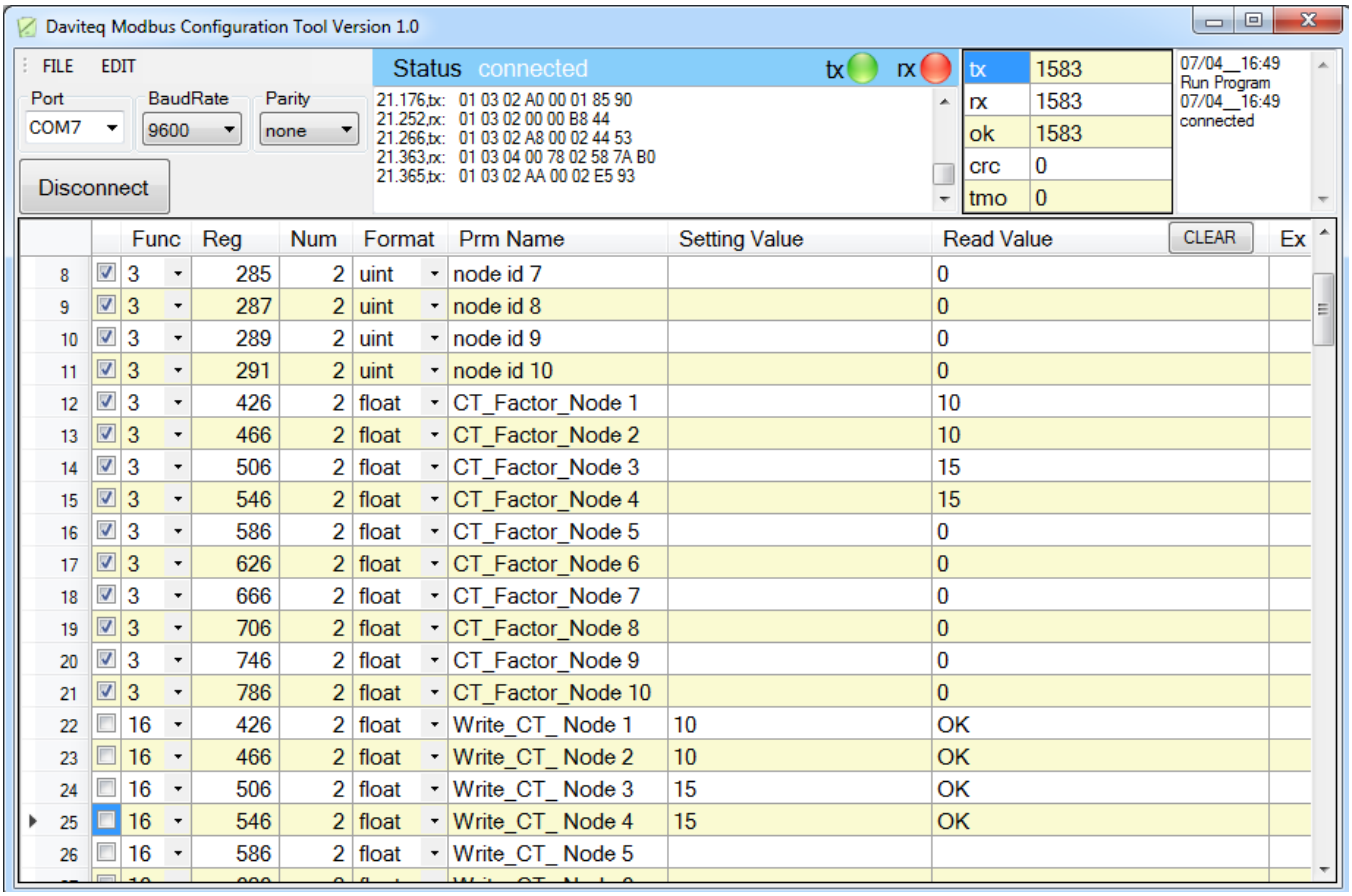


- Click " **Connect** " untill the Status displays "**disconnected**" to "**connected**". It means the WS433-CL-04 is being connected with computer.
- Next, we need to import the configuration file for WS433-CL-04 by importing the csv file: Go to MENU **FILE / Import New / =>** select the file with name **Template for WS433-AC.csv** (after unzip the file).



- In the row **Write_CT_Node** , we write the the ratio of the CT of sensor node to co-ordinator id WS433-CL-04 by **write** the the ratio of the CT in column**Setting Value** then check the box **Func** to write the value => the value in the **Read Value** column show **OK**, that means the configuration is complete.



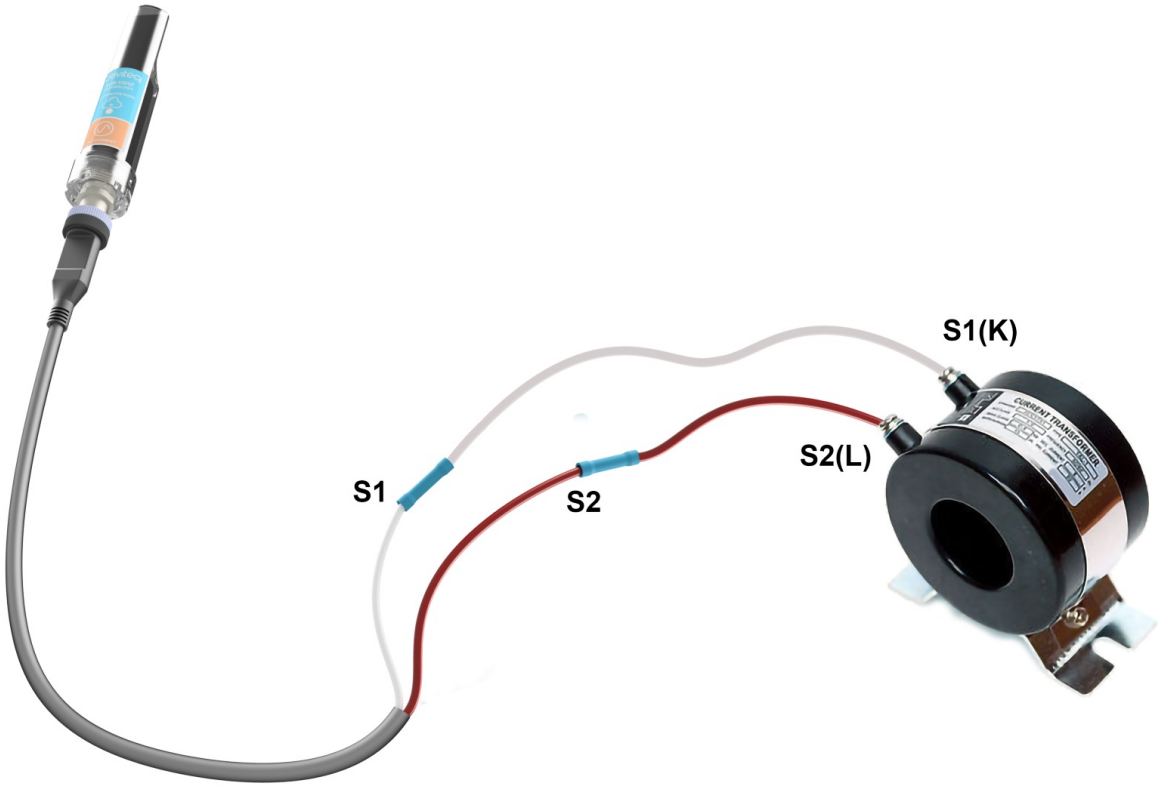


		Func	Reg	Num	Format	Prm Name	Setting Value	Read Value	Ex
8	☑	3	285	2	uint	node id 7		0	
9	☑	3	287	2	uint	node id 8		0	
10	☑	3	289	2	uint	node id 9		0	
11	☑	3	291	2	uint	node id 10		0	
12	☑	3	426	2	float	CT_Factor_Node 1		10	
13	☑	3	466	2	float	CT_Factor_Node 2		10	
14	☑	3	506	2	float	CT_Factor_Node 3		15	
15	☑	3	546	2	float	CT_Factor_Node 4		15	
16	☑	3	586	2	float	CT_Factor_Node 5		0	
17	☑	3	626	2	float	CT_Factor_Node 6		0	
18	☑	3	666	2	float	CT_Factor_Node 7		0	
19	☑	3	706	2	float	CT_Factor_Node 8		0	
20	☑	3	746	2	float	CT_Factor_Node 9		0	
21	☑	3	786	2	float	CT_Factor_Node 10		0	
22	☐	16	426	2	float	Write_CT_ Node 1	10	OK	
23	☐	16	466	2	float	Write_CT_ Node 2	10	OK	
24	☐	16	506	2	float	Write_CT_ Node 3	15	OK	
25	☐	16	546	2	float	Write_CT_ Node 4	15	OK	
26	☐	16	586	2	float	Write_CT_ Node 5			

- You can now connect the **Co-ordinator WS433-CL-04** using an **RS485 connection** to read data from the wireless sensor.

5.3.2 IO Wiring

On WS433-AC there are 2 wires marked S1 and S2, we connect the sensor to the current transformer according to S1 with S1 (K) and S2 with S2 (L) as shown below.



6. Installation

6.1 Installation location

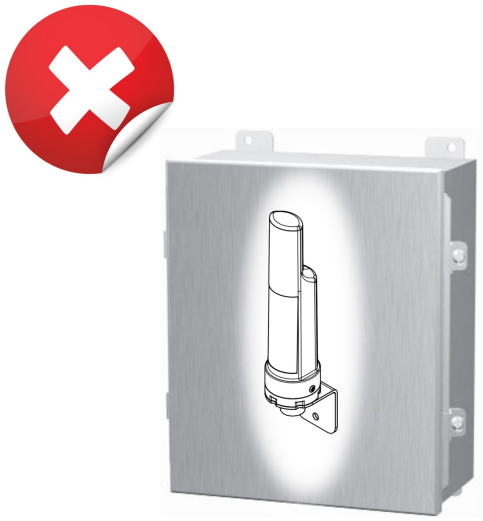
The bracket will be fixed on the wall or material with a flat surface with double-sided 3M tape (included in the accessory bag in a carton box) or 2 x M4 screws (supplied by the customer);

When using 3M double sided tape, please install the sensor at a height of 2 meters or less.

ATTENTION:

DO NOT install the Wireless 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.





6.2 Power Supply & Battery installation

Steps for battery installation:

- Using Philips screw driver to unscrew M2 screw at the side of housing



- Carefully pull out the top plastic housing in the vertical direction

> ⚠ **NOTE:** Because of O-ring, it requires to have much pulling force at the beginning, therefore please do it carefully to avoid the damage of circuit board which is very thin (1.00mm);



- Insert the AA battery

> **Please take note the poles of battery**



- Insert the top plastic housing and locking by M2 screw



7. Troubleshooting

No.	Phenomena	Reason	Solutions
1	The status LED of wireless sensor doesn't light up	• No power supply. • Configuration function of the LED is not correct.	• Check that the battery is empty or not installed correctly. • Reconfigure the led light function exactly as instructed.

2	Wireless sensor not connected to co-ordinator	• No power supply. • The configuration function of the RF data rate is incorrect.	• Check that the battery is empty or not installed correctly. • Reconfigure the RF data rate with the button according to the instructions.

8. Support contacts

Manufacturer

Daviteq Technologies Inc
No.11 Street 2G, Nam Hung Vuong Res., An Lac Ward, Binh Tan Dist., Ho Chi Minh City, Vietnam.
Tel: +84-28-6268.2523/4 (ext.122)
Email: info@daviteq.com | www.daviteq.com

Distributor in **Australia** and **New Zealand**

Templogger Pty Ltd
Tel: 1800 LOGGER
Email: contact@templogger.net

Revision #11
Created Mon, Apr 6, 2020 7:13 PM by Kiệt Anh Nguyễn
Updated Mon, Aug 30, 2021 2:31 AM by Kiệt Anh Nguyễn