USER GUIDE FOR WIRELESS RELAYS WS433-RL

WS433-RL-MN-EN-01	DEC-2020

This document is applied for the following products

SKU	WS433-RL	**HW Ver.**	2.5	**FW Ver.**	5.0
Item Code	WS433-RL-14	Wireless relay module with 04 x SPST relay, contact rating 0.5A@125VAC/1.0A@30VDC, IP67, power supply 7-60VDC, cable 05m length with PG9 cable gland			
	WS433-RL-12	Wireless relay module with 02 x SPDT relay, contact rating 5.0A@250VAC, IP67, power supply 7-60VDC, cable 05m length with PG9 cable gland			

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 Relay output module, select SPDT or SPST contacts, select 2 or 4 channels, to control your motor, pump, valve, door, alarm, lighting, machines...It is configured the operation parameters like data sending interval, health check cycle...remotely from Globiots platform or via ModbusRTU software.



WS433-RL-H1.PNG

3. Specification

Outputs	02 x SPDT relay or 04 x SPST relay
SPST contacts	0.3A@125VAC/1.0A@24VDC
SPDT contacts	5.0A@250VAC
Functions	ON/OFF
Electrical connection	cable 0.5m length with PG9 cable gland
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
Power	7-60VDC, max 200mA
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. Typical Applications



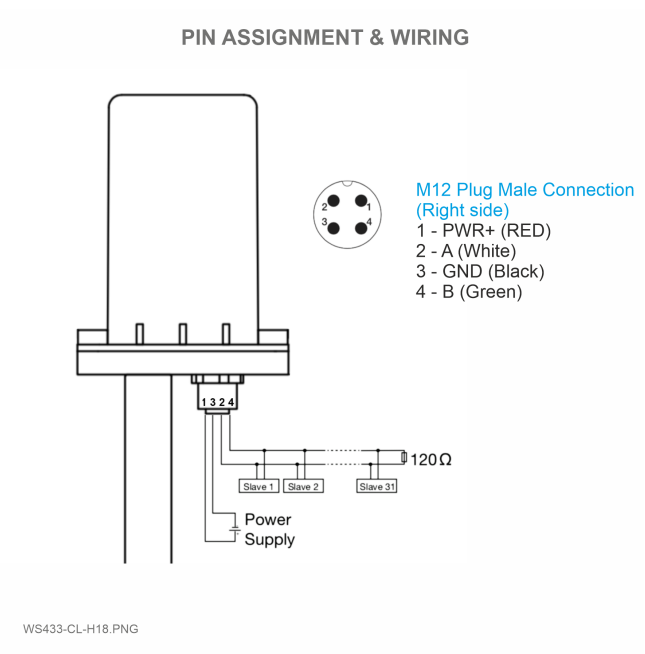
WS433-RL-H4.PNG

5. Operation of wireless sensor

5.1 Add sensors node to Co-ordinator WS433-CL

5.2.1 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.

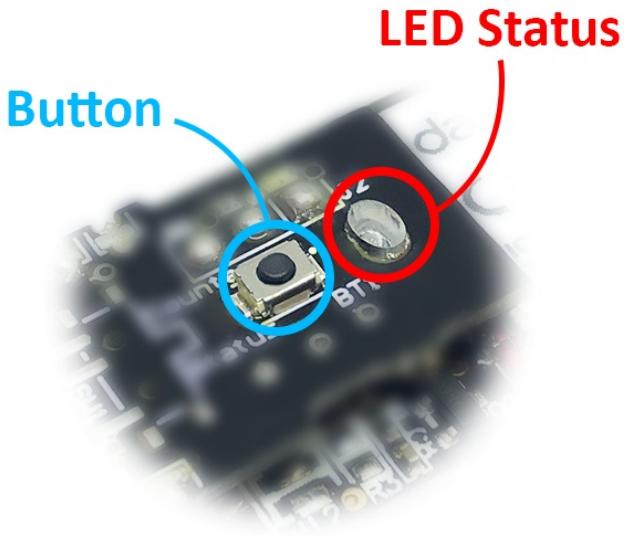
Enb_auto_add_sensors configuration (see **RF MODE CONFIG** (in the **Modbus Memmap of WS433-CL**)): In case you do not want to turn off the power WS433-CL, you can set **Enb_auto_add_sensors = 1**, this way we have 5 minutes to add nodes (add up to 40 nodes) . After 5 minutes **Enb_auto_add_sensors**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

> **Memmap resgisters**
>
> You can download Modbus Memmap of WS433-CL with the following link:
>
> **https://filerun.daviteq.com/wl/?id=WBbGm89AToHWyvIyMOc780N1KmjfUr3Y**

5.2.2 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:**

5.2 Button Function



Open the cover of sensor then 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

Memmap resgisters

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

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

In the memmap file, refer to the **Memmap of WS433-RL** sheet to configure the sensor's operating parameters accordingly.

The reference memmap addresses are based on the order of the sensors added in the Memmap file above

Below are examples of some typical sensor parameters:

Function Code (Read)	Function Code (Write)	# of register	Byte Size	Description	Value Range	Default	Format	Property	Explanation
3	16	1	2	Control Relay 1 of sensor Node	0-1	0	uint16	Read/Write	0: turn off relay 1 1: turn on relay 1

3	16	1	2	Control Relay 2 of sensor Node	0-1	0	uint16	Read/Write	0: turn off relay 2 1: turn on relay 2
3	16	1	2	Control Relay 3 of sensor Node	0-1	0	uint16	Read/Write	0: turn off relay 3 1: turn on relay 3
3	16	1	2	Control Relay 4 of sensor Node	0-1	0	uint16	Read/Write	0: turn off relay 4 1: turn on relay 4
4		1	2	%Battery of sensor Node	10,30,60,99		uint16	Read	Battery level, only 04 levels: 10%, 30%, 60% and 99% (full). When 10% ==> Need to replace the battery
4		2	4	Analog value 1 of sensor Node (parameter 1)			float	Read	Value from Analog input sensor. This value is parameter 1 of a wireless sensor node
4		2	4	Value of parameter 2 of sensor Node			float	Read	Same value as parameter 1
3		1	2	Data status of Node	0-9, 99		byte	Read	0-9: Interval updated data 99: Disconnected
3		1	2	RF Signal strength of Node	0-4		byte	Read	From 0 to 4 with 0 is being lost connection RF and 4 is the strongest RF
3	16	1	2	Cycle_wakeup	1-3600(s)	120	uint16	Read/Write	Every time interval of Cycle_wakeup sensor node would ONLY send data to co-ordinator if the new measured value was changed more than the Delta value of the last measured value. Default Cycle_wakeup is 120 seconds
3	16	1	2	Cycle_healths	60-7200(s)	600	uint16	Read/Write	Every time interval of Cycle_healths sensor node will absolutely send data to co-ordinator regardless any condition

3	16	2	4	Radio frequency	433.05-434.79, 433 Mhz	433.92	float	Read/Write	Configure the operating frequency of wireless sensor by Co-ordinator, should be configured from 433.05-434.79 MHz, only for advanced users

6. Installation

6.1 Installation location

Wireless sensor utilize the ultra-low power 433Mhz RF signal to transmit/receive data with Wireless co-ordinator.

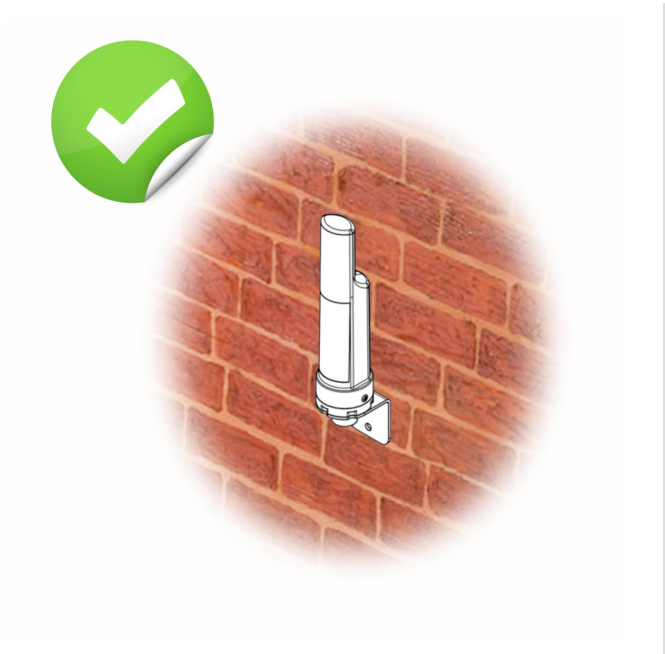
To maximize the distance of transmission, the ideal condition is Line-of-sight (LOS) between the Wireless sensor and Gateway. In real life, there may be no LOS condition. However, the two modules still communicate each other, but the distance will be reduced significantly.

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.

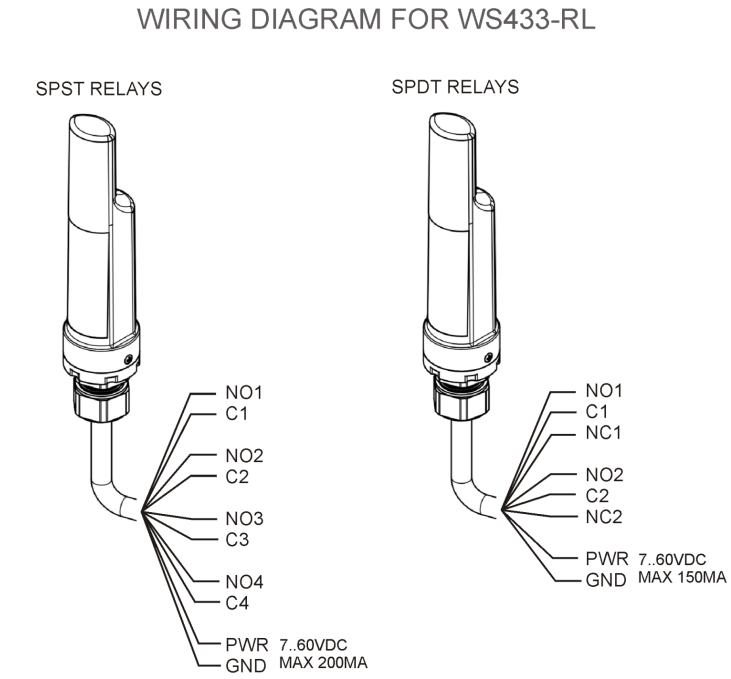
ATTENTION:

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.



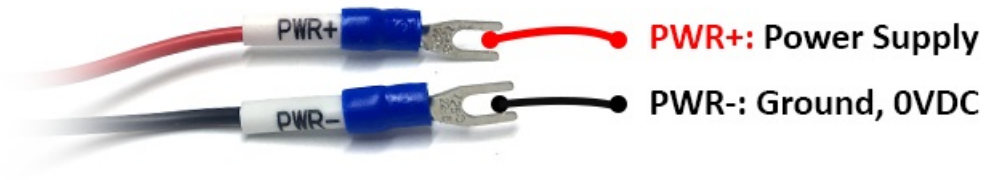


6.3 Wiring



WS433-RL-H3.PNG

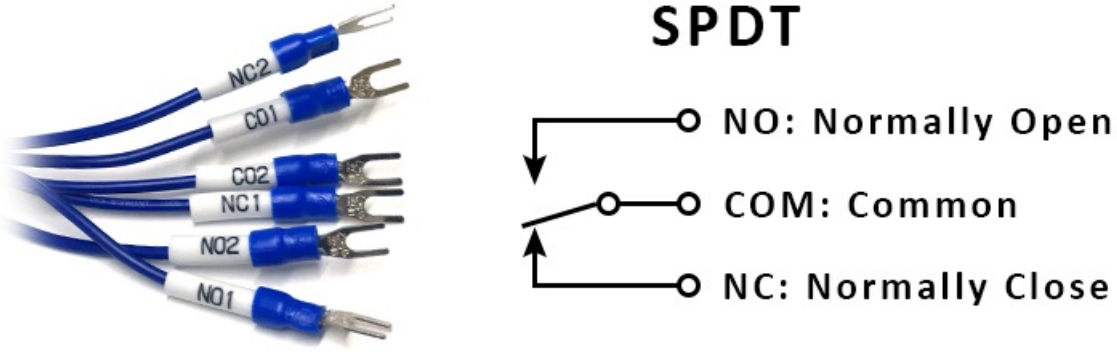
6.3.1 Power supply connection



- **Red:** Power Supply
- **Black:** Ground (GND)

> Recommend to use **24VDC** power.
>
> The signal cable from the wireless relay should be protected by corrugated hose or the plastic tube, keep the cable avoid high temperature areas.

6.3.2 IO wiring



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 #3
Created Sun, Dec 20, 2020 8:04 PM by Kiệt Anh Nguyễn
Updated Mon, Aug 30, 2021 3:23 AM by Kiệt Anh Nguyễn