USER GUIDE FOR LONG RANGE WIRELESS BRIDGES WS433-BL

WS433-BL-MN-EN-01	DEC-2020

This document is applied for the following products

SKU	WS433-BL	**HW Ver.**	2.4	**FW Ver.**	2.0
Item Code	WS433-BL-RS485-M2	Long Range Wireless Bridge, Master, RS485, Modbus RTU, external antenna 0 dbi, M12-Female connector, 4-pin, coding A			
	WS433-BL-RS485-S2	Long Range Wireless Bridge, Slave, RS485, Modbus RTU, external antenna 0 dbi, M12-Female connector, 4-pin, coding A			

1. Functions Change Log

HW Ver.	FW Ver.	Release Date	Functions Change
2.4	2.0	JUL-2019	

2. Introduction

WS433-BL is a range of Sub-Ghz wireless bridges to replace the RS485 cable or network. This wireless technology will save time, labor cost & cable cost as well. LOS Distance is up to 6000m at baud rate 38400. Optional integrated IoT gateway (iConnector) allows easily configure & diagnose remotely or monitoring / controls via any IoT Platform as welll. The deployment of these wireless devices can be done in just 15 minutes!

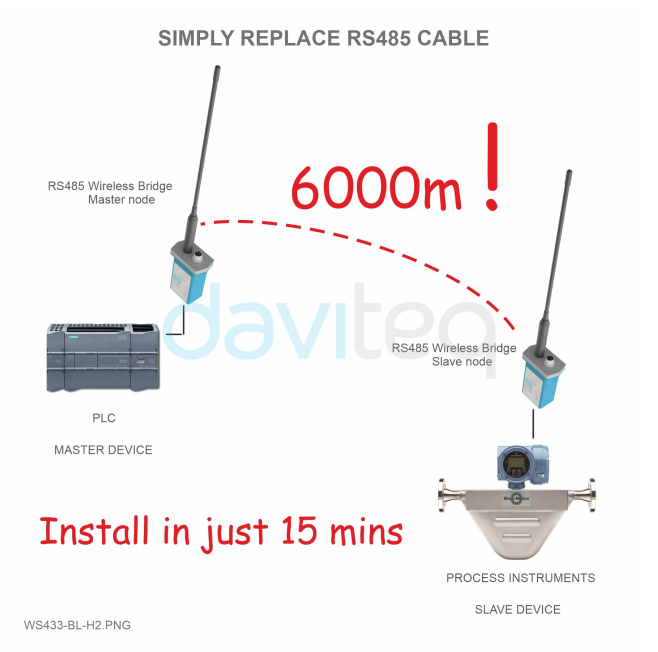


WS433-BL-H1.PNG

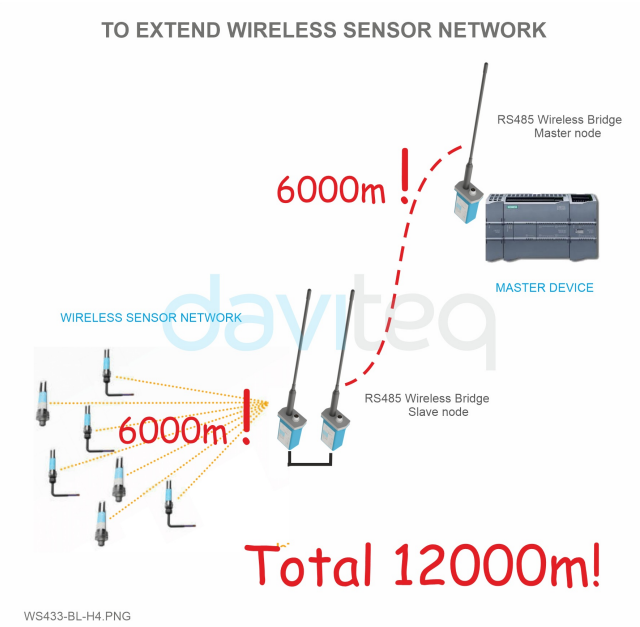
3. Specification

Communication	RS485 Modbus RTU, RS232 (optional)
Wireless data rate	50kbps (support baud rate 38400)
Transmission distance	LOS 6000m @ 50 kpbs (lowest Antenna height is 4m)
Antenna	Standard external antenna -1.1 dBi for slave node, 3.0 dbi for master node (option 6 & 9 dbi)
Power supply	7..48 Vdc @ 500mA max
Electrical connection	M12-female, 4-pin A-coding
RF frequency band	Free license ISM 433.92Mhz (for others 868, 915, 920Mhz, refer related datasheets)
Ready to comply	ETSI EN 300 220, EN 303 204 (Europe) FCC CFR47 Part15 (US), ARIB STD-T108 (Japan)**
Vietnam Type Approval Certification	QCVN 73:2013/BTTTT, QCVN 96:2015/BTTTT (DAVITEQ B00122019)
Data encryption	AES-128
Ambient working temperature	-40oC..+85oC
Housing	Aluminum + Polycarbonate, IP67
Mounting	Wall mounting holes
Product dimensions	H106xW73xD42 (excluded antenna)
Net weight	190 grams
Packaging dimension	W160 x D150 x H100 mm
Gross weight	< 300 grams

4. Applications







5. Operation Principle

5.1 Add RS485 Wireless Bridge Slave into RS485 Wireless Bridge Master

Step 1: Antenna settings for both master and slave

> ⚠ **NOTE: Use your hand to tighten the antenna on the sensor, not using tools.**

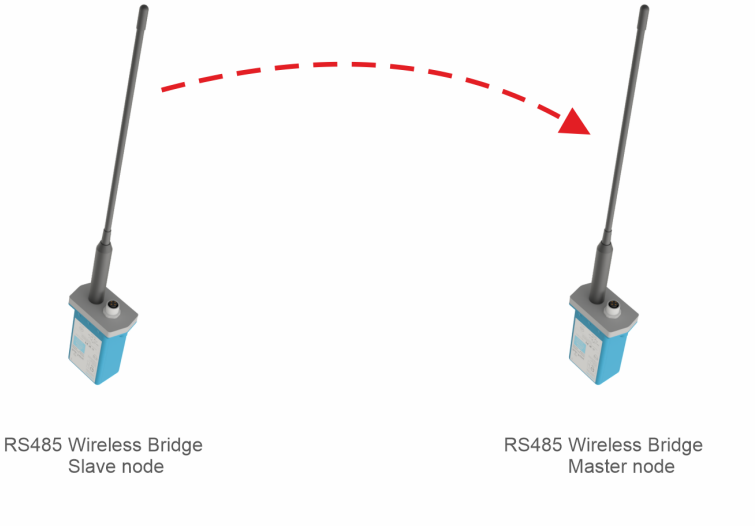


Step 2: 12-24VDC power supply for both slave and master via M12 connector

Step 3: Bring the antenna of Wireless bridge Slave closer to the antenna of Wireless bridge Master. If:

- Buzzer plays **1 peep** sound, LED blink 1 time, that means registering Slave on Master **successfully.**
- Buzzer plays **2 peep** sounds, LED blink 2 times, that this Wireless bridge Slave is **already registered.**

> ℹ **If you do not hear the "Peep" sound, please disconnect the power the Wireless bridge Slave, wait a few minute and try again.**



Step 4: When you hear **a beep** indicating the successful registration of Slave to Master, you are ready to use the product.

WS433-BL replaces the traditional RS485 transmission line and wireless data transmission together. So after adding, the connection will be normal as traditional RS485 connection.

- WS433-BL Slave connects to the ModbusRTU device below (power meter, level meter,...);

- WS433-BL Master connects to the control device (PLC, IoT Gateway,..).

5.2 Hall sensor and button function

The Wireless Bridges are pre-configured, only use this feature when you really want to change the data rate.

Hall buttons and sensors (using magnets for activation) have the same function and are only available for the first 5 minutes after power on

Press and **hold** the push button or bring the **magnet** near the Hall sensor:

- For **2s** => see the LED blink **once** or the buzzer will ring **1 Beep** => Release the push button or Take the magnet out to set RF data rate RF **50 kbps**
- For **5s** => see the LED blink **twice** or the buzzer beep **2 Beep** => release the push button or take the magnet out to set RF data rate RF **625 bps**
- For **10s** => see the LED blinking **3 times** or the buzzer buzzes **3 Beep** => release the push button or take the magnet to perform the **User factory reset** (User factory reset = reset frequency, RF transmit power, data rate, Slave ID, Modbus operating parameters, compare time for data status).
- If it takes more than **30 seconds**, the button will be **deactivated.**





Default configuration:

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

5.3 LED of WS433-BL

LED of WS433-BL will change state when RF data is received.

For example: when we read WS433-BL Slave data from WS433-BL Master, the LED on the Slave will change.





5.4 Checking connection with Modbus Tool

> **Default offline address:**
>
> The Wireless Bridge Master address is **200;**
>
> The Wireless Bridge Slave address is **201**;
>
> Other Modbus RTU devices have the address provided by the manufacturer.

First, you need to prepare



Computer



RS485
Configuration Cable



Power Adapter 12-24VDC

WS433-CL-H9.PNG

Step 1: Connect Antenna, RS485 - configuration cable and power supply the wireless bridge;





SUPPLY POWER 12-24VDC



WS433-CL-H11.PNG

CONNECT RS485 - CONFIGURATION
TO COMPUTER via USB



WS433-CL-H13.PNG

Step 2: Open Modbus tool on PC

- You can download Daviteq Modbus Configuration Tool with the following link:

https://filerun.daviteq.com/wl/?id=BaX6RFlaEySKSYHX2j5nYHKBgeWckrox

Template File of WS433-BL Master: https://filerun.daviteq.com/wl/?id=cOS9c22bsg7PpRxNa1LAZZEVaZCuM3eq

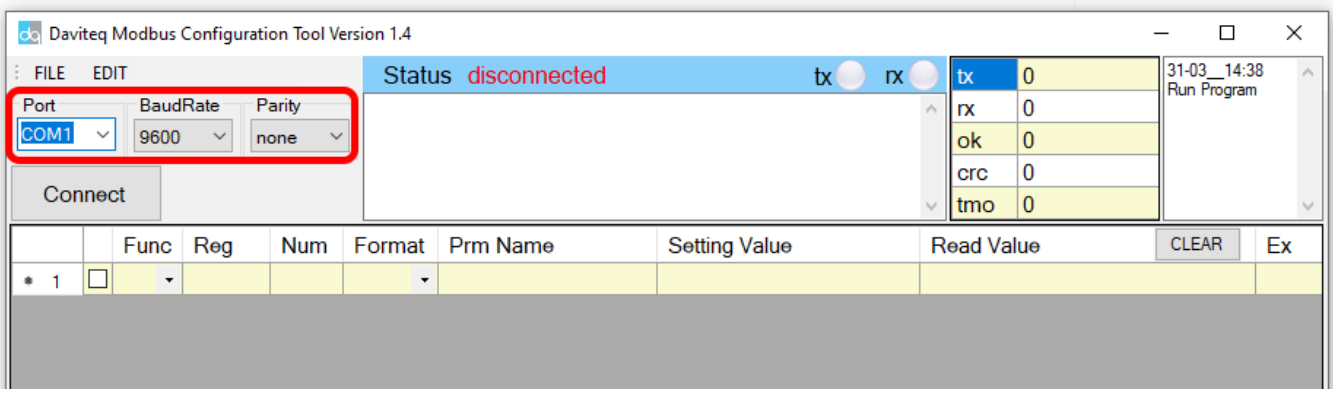
Template File of WS433-BL Slave: https://filerun.daviteq.com/wl/?id=qBnH0kCshk4cRhawWGOauDAMDqHRhT4g

How to use the Modbus configuration software

- Unzip file and run file application "**mb_master 1.1**"

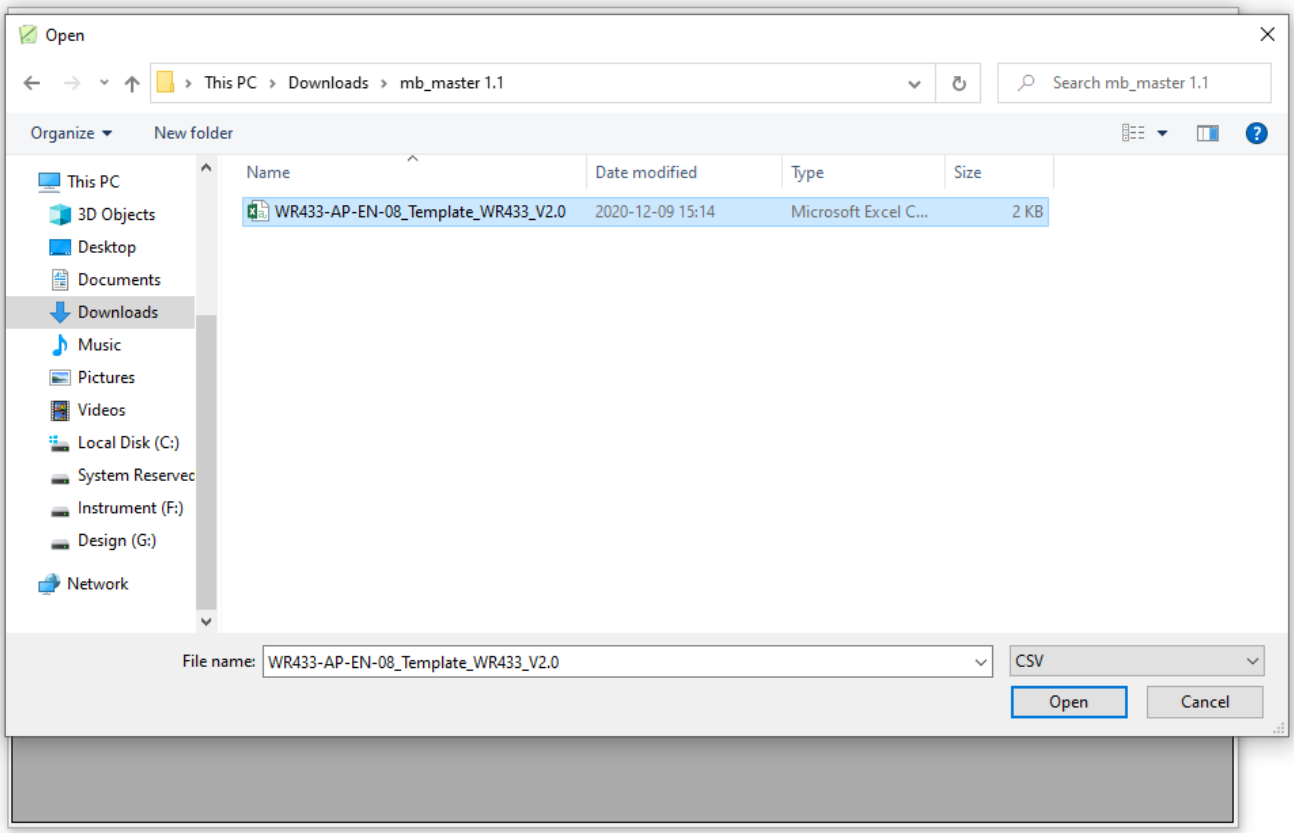
Name	Date modified	Type	Size
common_lib.dll	2019-03-08 17:08	Application exten...	20 KB
master_lib.dll	2019-03-14 10:27	Application exten...	9 KB
mb_lib.dll	2019-03-08 17:08	Application exten...	232 KB
mb_master 1.1	2019-07-01 10:58	Application	8 KB

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



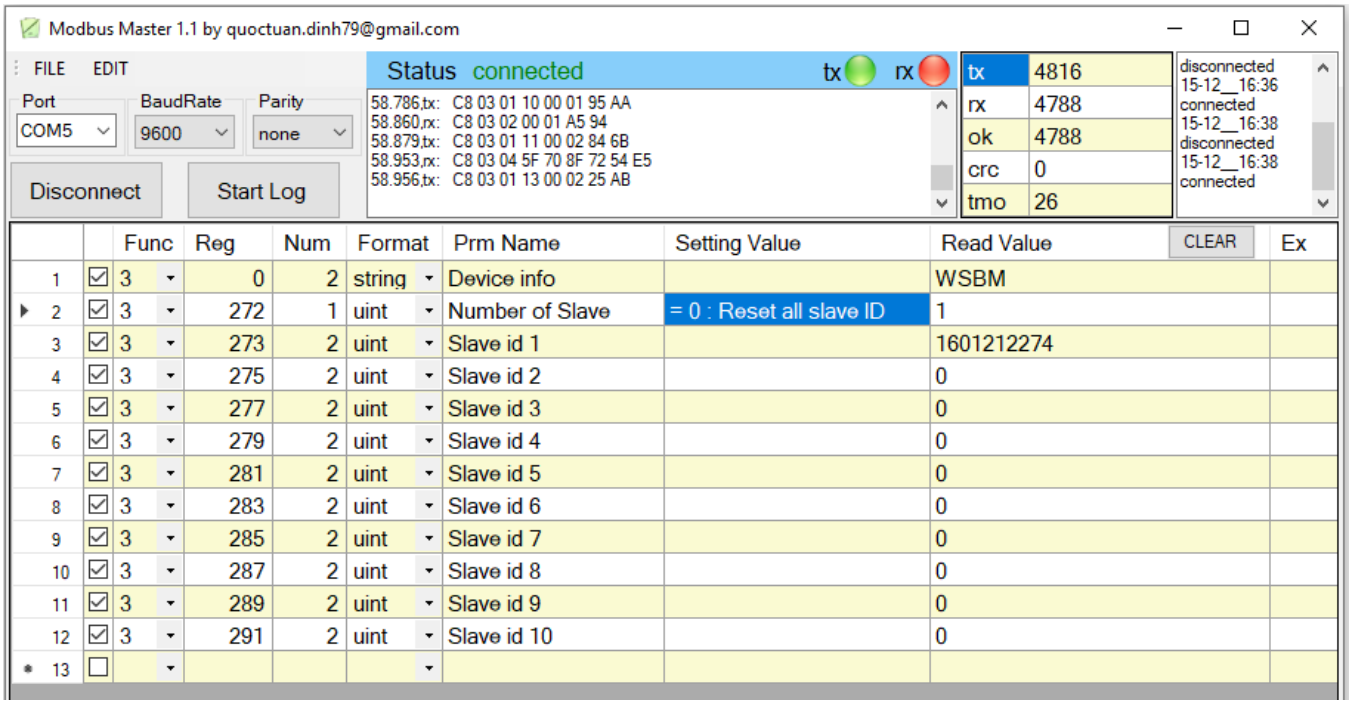
- Click " **Connect** " untill the Status displays "**disconnected**" to "**connected**". It means the WS433-BL is being connected with computer;
- Next, we need to import the configuration file for WS433-BL by importing the csv file: Go to MENU**FILE / Import New / =>** select the **template file**.

Please select the correct template to import into the tool

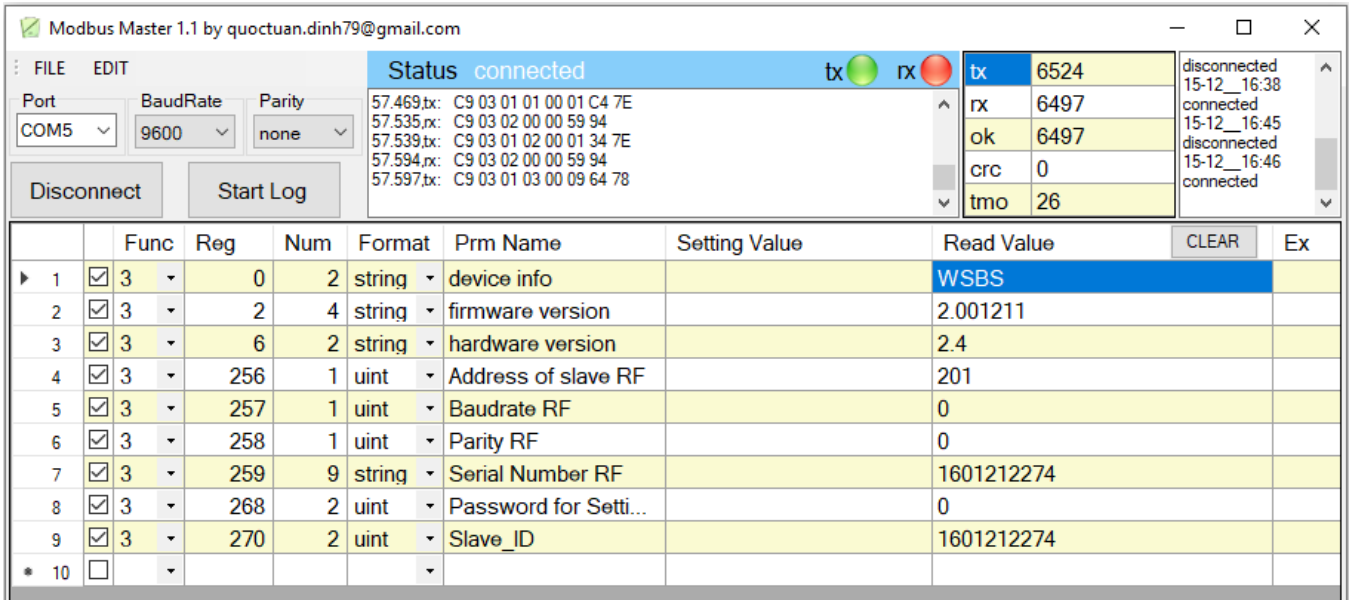


Step 3: We change the modbus address in column Slave (write in command 16 and read the value with command 3)

Example 1: We read the address of Wireless Bridge Master;



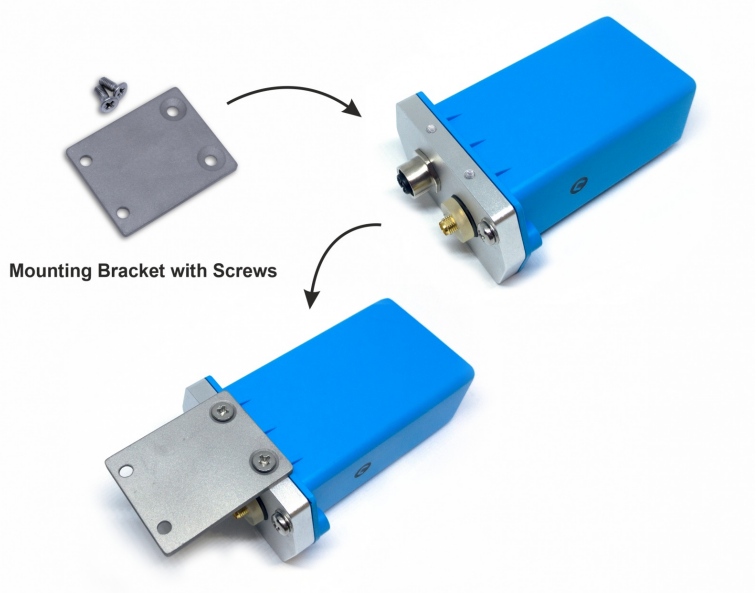
Example 2: We read the address of Wireless Bridge Slave;



6. Installation

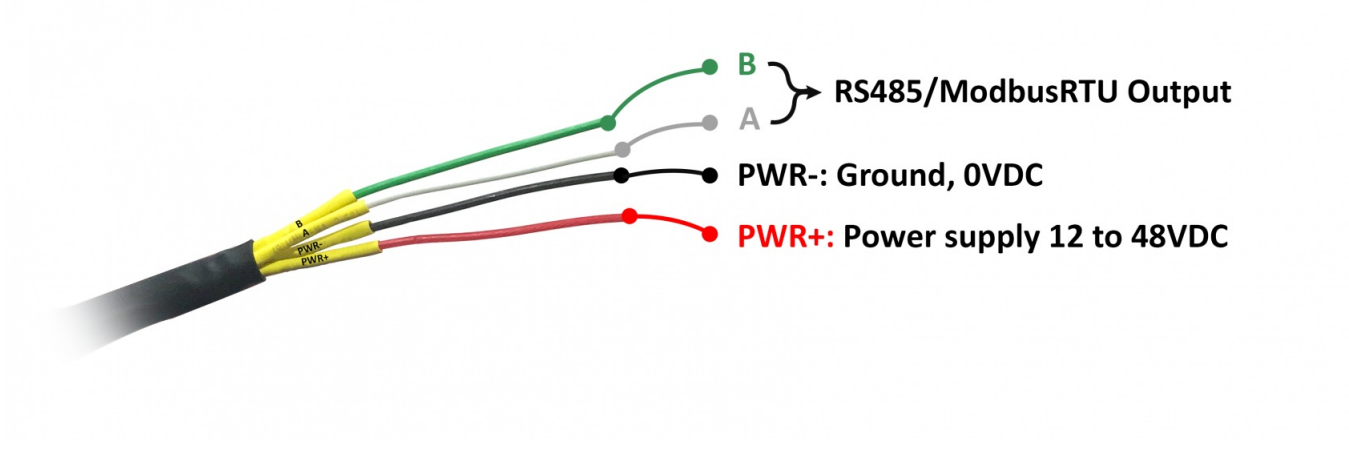
6.1 Mounting bracket installation

The mounting bracket is made from hard metallic material. Following to these steps as the below picture



6.2 IO Wiring

Please wiring as shown below:



Each cable includes wires which are marked labels according to types of connection. (user should not cut these labels before installation to avoid confusing)

- **Red:** PWR+(12...48VDC)
- **Black:** PWR-(OVDC)
- **Green:** B
- **White:** A

Recommend to use **24VDC** power.

The signal cable from sensor should be protected by corrugated hose or the Φ16 plastic tube, keep the cable avoid high temperature areas.

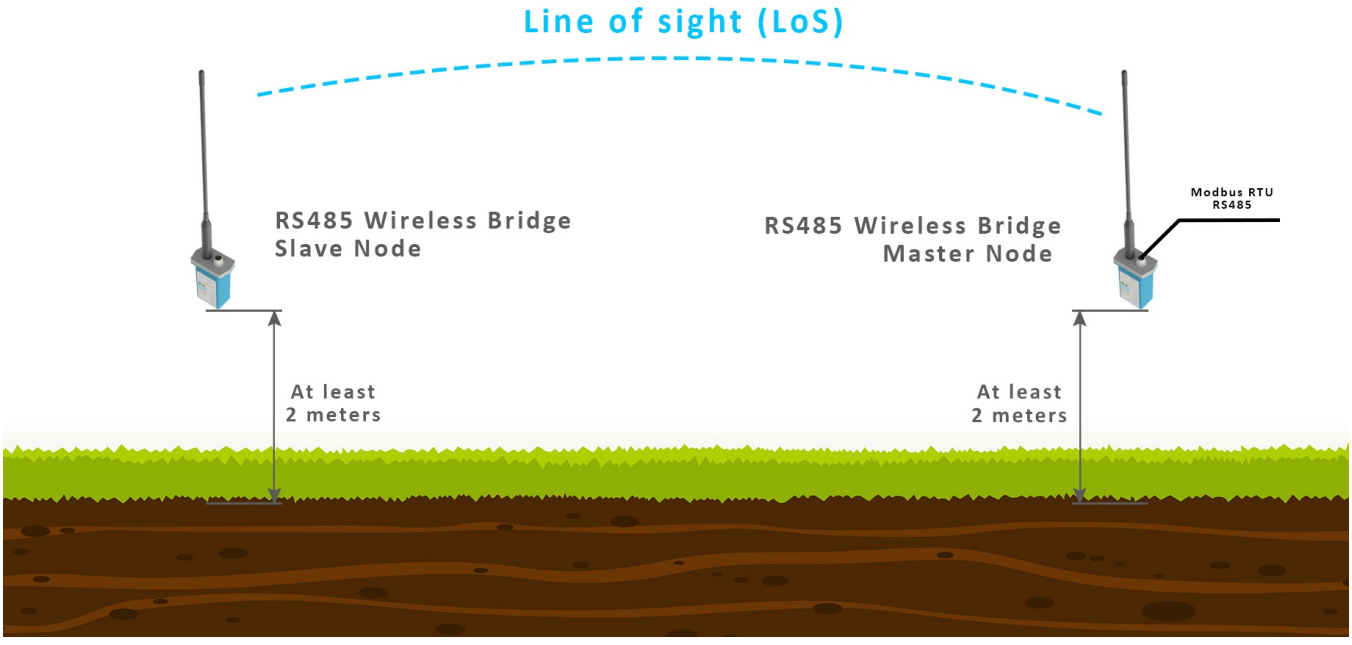
6.3 Installation location

The bracket will be fixed on the wall or material with a flat surface with 02 x M4 screws (supplied by the customer);

Please install the device at a height of 2 meters or less.

ATTENTION:

DO NOT install the Wireless bridge 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.



7. Troubleshooting

No.	Phenomena	Reason	Solutions
1	Cannot read modbus	• No power supply, the power cord is incorrectly connected; • Modbus connection pin A, B is loose or wrong; • Configuration slave address, baudrate, parity is not correct; • Reading the wrong command, wrong address register.	• Check the power connection; • Check the connection modbus A, B; • Check the configuration of slave address, baudrate, parity; • The product only supports modbus 3, 4, and 16. Check if the value of modbus status returned by 2 or 3 is an incorrect address reading.
2	Cannot add slave into master	• No power supply, the power cord is incorrectly connected; • The antenna is not fastened or connected; • Slave registered with another Master.	• Reset Slave with push button or magnet; • Check the power connection; • Disconnect the power source and reattach, then proceed to add automatically.

8. Support contacts

Manufacturer

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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)
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