



# lumenradio W-Modbus Module User Manual

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**lumenradio W-Modbus Module**



## APPLICATION AREA

The W-Modbus product transmits Modbus RTU frames wirelessly. It is designed to be used indoors as a Modbus RTU cable replacement.

## GENERAL

All relevant personnel must acquaint themselves with these instructions before installation. Warranty is subject to void if the product is not handled accordingly with the outlined instructions. Any damage to the product or parts due to improper handling will void the warranty. For additional W-Modbus documentation scan the QR-code or visit [www.lumenradio.com](http://www.lumenradio.com)

## WARRANTY

The warranty or service agreement will be deemed void if:

1. The product is repaired, modified, or changed, unless such repair, modification or change has been approved by Lumen Radio AB; or
2. The serial number on the product has been made ineligible or is missing.

## THE PACKAGING CONTAINS

- 1 x W-Modbus
- 1x W-Modbus PRO
- 1 x Instruction leaflet

## ELECTRICAL SAFETY

Only qualified electricians or service personnel trained by Lumen Radio may perform interventions in connection with electrical installation. Always follow local/national rules when performing this type of electrical installation. When connecting a 24 V isolation transformer, this must be done in accordance with IEC 61558-1.

## TECHNICAL DATA

- Power supply: 24 VAC  $\pm 15\%$  50-60 Hz, 24 VDC  $\pm 15\%$  2.5 W
- Max. power consumption: 2.5W
- 24 V output max. power: 10 W

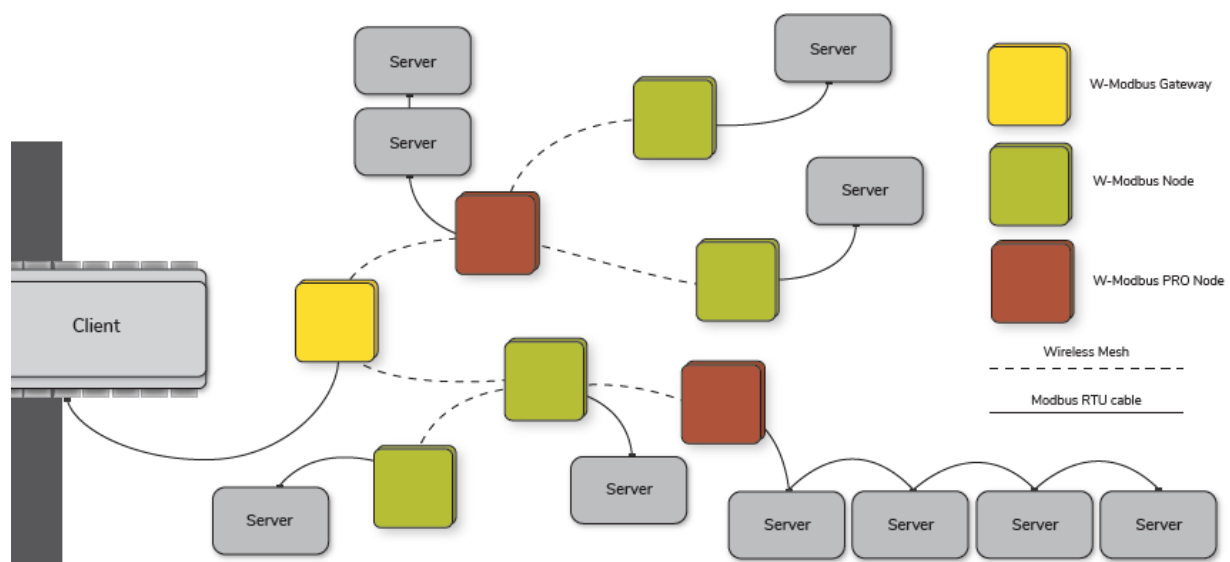
- Auto resettable fuse: Yes
- Cable rating, connector: solid / stranded 0.14 – 0.5 mm<sup>2</sup> / 0.2 – 0.5 mm<sup>2</sup>
- Conductor sizes (AWG): 24 – 20
- Frequency band: 2.45 GHz, ISM band (2400-2483 MHz)
- Baud rate: 9600, 19200, 38400, 76800 bps
- Number of Nodes: 100 Nodes in one wireless network
- Number of hops: Range per hop: Max 8 hops in the meshing network
- Output (ERP): 500 m line of sight (approximately 50-70 m indoors with walls) Max 20 dBm
- IP class: 40
- Material: ABS UL94-V0
- Colour: White, RAL 9003
- Ambient temperature: Storage: Operating: -20 to +55°C
- RH: -30 to +80°C
- Weight: Dimensions: W86.0 x H86.0 x D25.5 mm

## SYSTEM OVERVIEW

A W-Modbus network consists of a single W-Modbus Gateway connected to the Modbus Client using an RS485 cable, and up to 100 W-Modbus Nodes, each of them connected to one Modbus Server over RS485. Every device can act as either a Gateway or a Node, selectable by the 3 pole switch – see Commissioning section. Each W-Modbus Node will scan to find the connected Modbus Servers' Modbus address. The scanning is done by querying each Modbus address, hence the process may take up to 2 minutes. If the W-Modbus Node cannot find the connected Modbus Servers address, it will not be reachable by the Modbus Client connected to the W-Modbus Gateway. If adding, removing or changing the Modbus address of the connected device, double press the push button to initiate a new scanning.

## W-MODBUS PRO

With the PRO version of W-Modbus, up to four Modbus Servers can be connected to one W-Modbus PRO Node – making it even easier to connect multiple devices located in close proximity to each other. W-Modbus and W-Modbus PRO are fully compatible and can be mixed in a system. All instructions below apply to both models. The label on the back of the product shows the product type: W-Modbus or W-Modbus PRO.



## INSTALLATION

Install the W-Modbus unit next to the device it should be connected to.

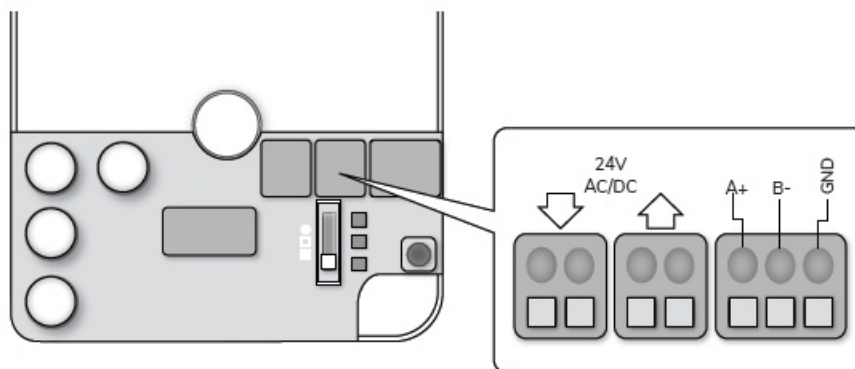
1. Confirm that the W-Modbus unit has no visible damage.
2. The W-Modbus enclosure is wall mounted and fits onto a junction box. Start with mounting the backplate of the enclosure.
3. Connect the power supply and the Modbus device to the W-Modbus unit, as shown to the right. Use the rear and/or top knockouts for cable entry.
4. All W-Modbus units are factory set for Node operation, without the need for additional configuration. If mixing serial configuration in the system, adjust the dip switches accordingly.
5. Secure the front plate to the mounted back plate.
6. Check that the W-Modbus unit and its wiring are securely mounted (if the unit is powered this will be indicated by the LEDs) The device is now ready for commissioning.

W-Modbus is an end device with internal termination resistor.

### POWER AND RS485 CONNECTION

The W-Modbus units have 24 VAC/VDC power in/out connection and connection for Modbus RTU communication via RS485.

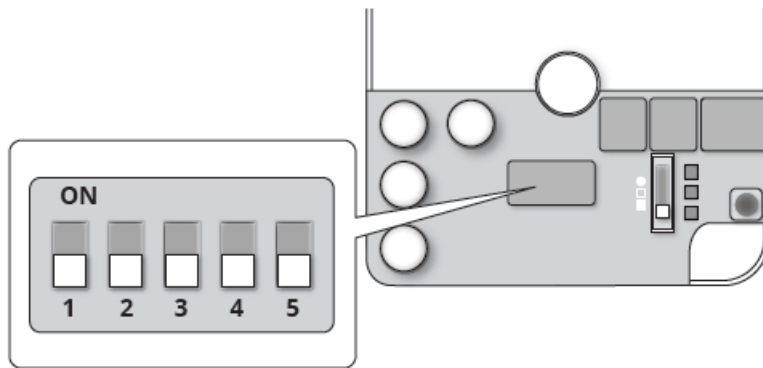
**WARNING:** When powering the W-Modbus device using 24 VAC, the power supply/transformer should not be shared with another Modbus de-vise also sharing a RS485 connection. This is to avoid ground loops caused by the use of different types of rectification in the devices. W-Modbus uses full wave rectification.



### BAUD RATE, PARITY AND STOP BIT

Set the baud rate, parity and stop bit configuration on the DIP switch to match the configuration of the connected Modbus device. The possible combinations can be found in the table to the right. The configuration on the W-Modbus Gateway is global and will be synced to all connected W-Modbus Nodes, meaning the W-Modbus Gateway is the only device that needs to be configured as long as the same configuration is used in the entire network.

If needed, different configuration can be used on the Nodes – effectively mixing configuration within the network. Use the 5th DIP switch to override the global con-figuration and use a local configuration set on the Node.



	1	2	3	4	5
9600 baud	OFF	OFF	–	–	–
19200 baud	OFF	ON	–	–	–
38400 baud	ON	OFF	–	–	–
76800 baud	ON	ON	–	–	–
No parity	–	–	OFF	–	–
Even parity	–	–	ON	–	–
1 stop bit	–	–	–	OFF	–
2 stop bit	–	–	–	ON	–
Use local serial configuration set on Node					ON
Use Gateway serial configuration on Node					OFF

## COMMISSIONING

The commissioning process is used to connect the W-Modbus devices to the same wireless network. All W-Modbus devices will come from factory commissioned in Node mode. If the same configuration is used in the entire system, the W-Modbus Gateway is the only device that needs to be configured, the nodes will automatically be configured when connecting to the gateway.

Mount and power up each device before starting with step 1 below.

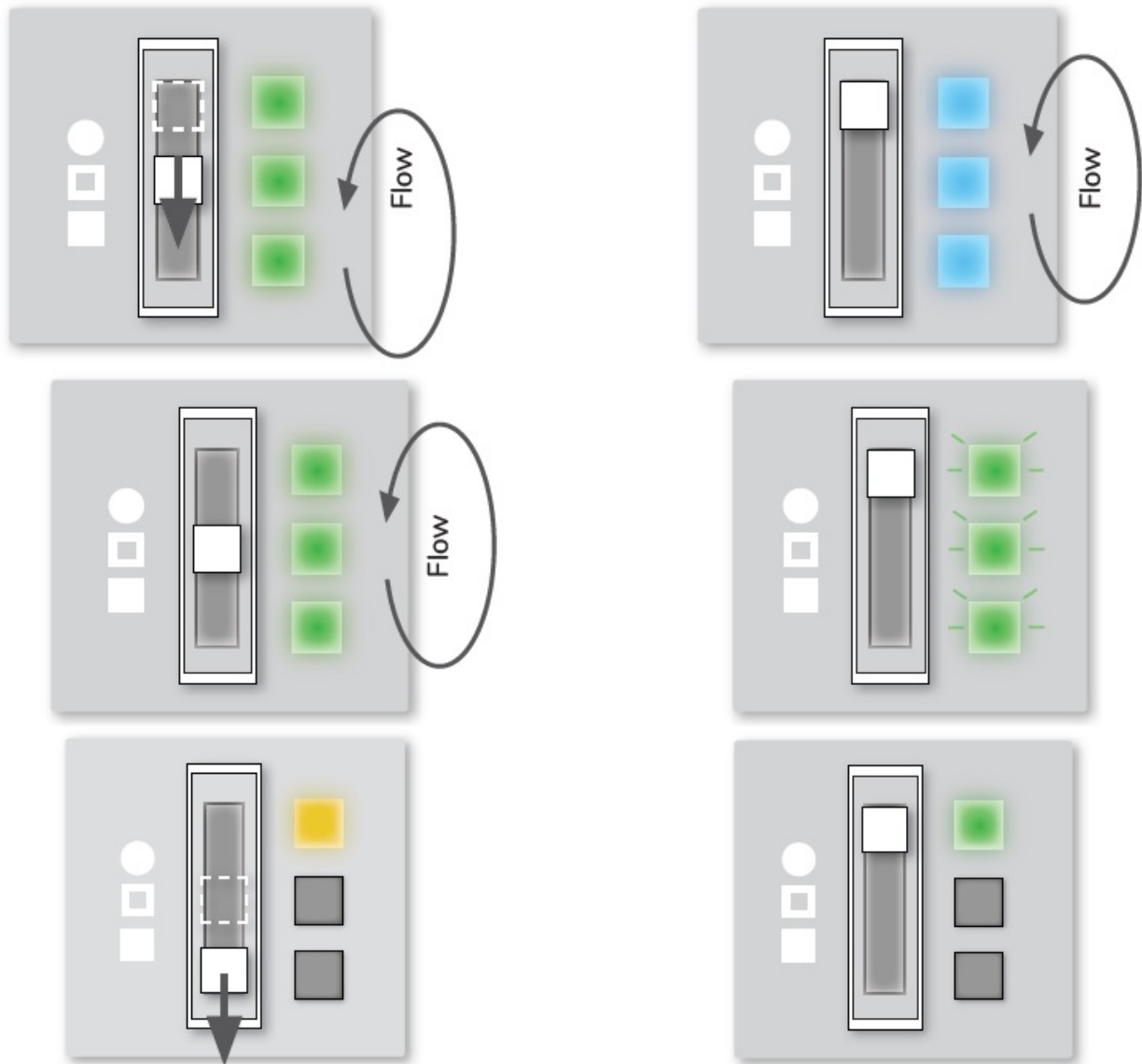
1. Start by selecting which device to use as the W-Modbus Gateway and position the 3 pole switch in the middle position. This unit will reboot into Gateway Commissioning Mode. The device will indicate the mode by a green flow of LEDs. In this step also adjust the dip switch to the correct baud rate, parity and stop bit(s)
2. All powered W-Modbus Nodes within range will now connect to the Gateway. This process takes a few minutes. Nodes further away will connect to a closer W-Modbus Node if the Gateway is out of reach. When a Node is connected it will be indicated by a synchronous green blink on all three LEDs.
3. Check that all Nodes installed are indicating connection, and then set the 3 pole switch to bottom position on the W-Modbus Gateway. Now the entire network will reboot into secure mode and be ready for operation. From

now on the LEDs will indicate status in accordance with the system status section.

**TIP:** It is possible to add a new node to an existing system. Just mount and power up the device as usual, then redo the commissioning starting from step 1.

**TIP:** To speed up the connection process, set the device intended to be Gateway in Commissioning mode before mounting the nodes. In that way they will connect as soon as they are powered, and the waiting time in step 2 above is reduced.

### W-MODBUS GATEWAY : W-MODBUS NODE



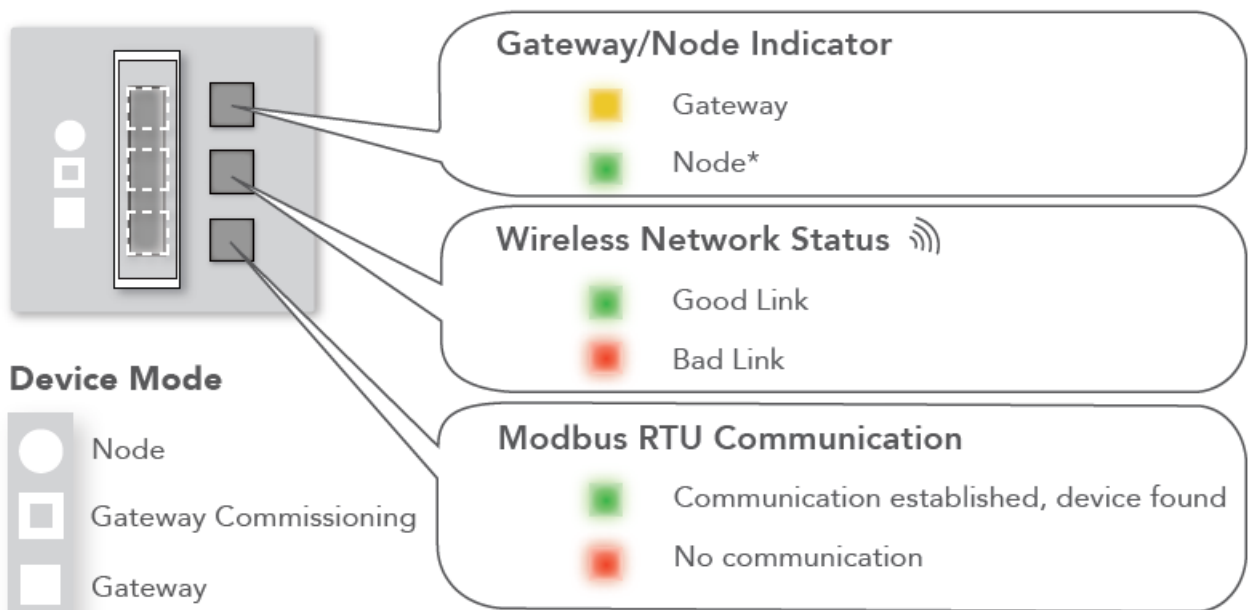
### TROUBLESHOOTING

- The LEDs suddenly go out. The LEDs turn off after 30 minutes, press the button once to turn on for another 30 minutes.
- Does the unit have power?
- Press the push button, if the LEDs are not switched on, check the power connection.
- Is the unit connected to the network?
- Check the Wireless Network status LED. A Node with a flowing blue light is not connected to the network. Reference the commission section to ensure the unit indicates connection before switching the Gateway into secure mode. If the flowing blue light persists the unit is out of range from the network. Try installing an extra W-

Modbus unit in between for better wireless coverage.

- Is the network within the limits of the maximum (100) Nodes allowed? Make sure no more than 100 Nodes are connected to one W-Modbus Gateway. If more than 100 Nodes are needed, another W-Modbus gateway are required. Set it up in the same way as before.
- If the Wireless Network Status indicates bad wireless network (red LED) make sure the distance between W-Modbus units are within the requirements or add an extra W-Modbus in between to get better wireless coverage
- If the Communication LED indicates no communication (red LED) check if the RS485 cable is correctly installed and make sure the Baud rate, Stop bit and Parity settings are correct.
- All Nodes are connected during commissioning (all LEDs flashes green) but not all Nodes rebooted to the secure network when the Gateway was set to secure network. Make sure only one unit is set to Gateway mode during commissioning. It is only possible to install one network at a time.

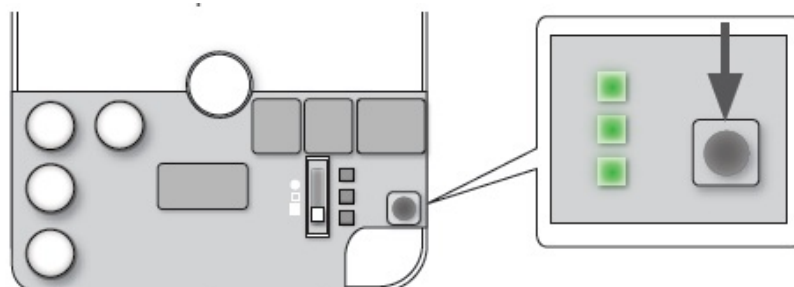
## SYSTEM MODE AND STATUS



Flashes green when connecting to the network

## PUSH BUTTON

The push button enables the LEDs, trigger Modbus Server rescanning, uncommissioning and firmware updates




PUSH BUTTON		
Push	Turn ON LEDs	All LEDS turn on (turns OFF after 30 min)
Double push	Rescan for connected Mod- bus Server (Only Node)	
Hold 10 s	Uncommissioning	mid LED indicates blue
Hold 20 s	Firmware update mode*	mid LED indicates red

Scan the QR code on the front page to find FW update instructions

For more information, FAQ and the latest version of the W-Modbus Manual visit [www.lumenradio.com](http://www.lumenradio.com) or scan the QR code.



Documents / Resources

	<a href="#">lumenradio W-Modbus Module</a> [pdf] User Manual W-Modbus, W-Modbus PRO, Module, W-Modbus Module
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References

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