RLE Technologies WIFI-CO2 Wireless WiFi Temperature and Humidity Sensor User Guide

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Contents

Installation Supplies

Included with the WIFI-CO2
WIFI-CO2 device – includes two 3.6V lithium batteries

Available from RLE, sold separately
USB-A to Micro B cable, used for configuration

Additional materials
Computer with a terminal interface (CLI)

Technical Support Note:
This sensor is compatible with RLE's WiNG-MGR. For the sensor and WiNG MGR to communicate correctly, the WiNG-MGR may require a firmware update:

Device	Minimum Required Firmware
WiNG-MGRv2	v1.2.1
WiNG-MGR	v3.6.1

Mount the Sensor

1. Remove the lid from the sensor enclosure. The lid has one large tab at the top and two small tabs at the bottom that secure it to the sensor base. Squeeze the top of the lid to release the large tab. Pivot the top of lid out from the base and gently separate the two bottom tabs from the base.
   NOTE: The serial number is printed on a white label on the outside of the sensor lid. The serial number on this label is unique to each sensor and you will need to refer to this number throughout the life span of the device.
2. Remove the circuit board from the base to expose the mounting holes. Before you take it apart examine how the board fits into the base. You'll have to put it back into the base so make sure you have a clear understanding of how it was assembled before you remove it.
3. To remove the board pull the circuit board clip out to relieve the tension that holds the board in place. Angle the board up and then pull it to the right to remove it from the base. Move the board slowly and gently to get it out

of the base without damaging any circuitry.

4. Do not mount the transmitter behind metal objects. Use the provided hardware to secure the base in the desired location.
5. Put the circuit board back into the enclosure. There are two “L” shaped brackets along the left side of the enclosure. Angle the board in under the lip of these L brackets and as far down as it will go against the plastic pegs at the bottom of the enclosure. Guide the board so it is parallel with the base. Pull the circuit board clip out and push the board down until the circuit board clip snaps into place and secures the board. The board is a very tight fit in the enclosure. Work slowly and gently so the board is secured by the enclosure and doesn’t get damaged in the process.

Activate the Sensor

Each sensor is equipped with two 3.6V lithium batteries which should be replaced as needed. Once the protective battery tab has been removed, the average battery life is up to 5 years at the default transmission interval. Battery life varies based on WiFi signal strength, transmission interval, and access point performance. Sensors will not operate with alkaline batteries – make sure the batteries are replaced with two 3.6V lithium cells. Safely dispose of old batteries.

The sensor is shipped with a battery pull tab in place which turns the device off. To activate the sensor, remove the protective tab to engage the batteries. Turn off the sensor by re-inserting the tab or removing the batteries. Any time the sensor is shipped, it should either be turned off or placed in a shielded container to prevent interference that might cause shipping problems.

Once the sensor is activated, put the lid back onto the sensor enclosure.

Configure the WIFI-CO2 to Communicate on Your Network

Each WIFI-CO2 sensor needs to be configured to communicate on your wireless network. Use a USB-A to Micro B cable and a computer with a terminal interface (CLI) to configure the sensors.

1. Use the USB-A to Micro B cable to plug the sensor into a computer.
2. Access the computer’s CLI: 115200 baud, 8 data bits, 1 stop bit, no parity.
3. Connect the sensor to a wireless network. There are two ways to do this:

   Option 1: Select a network from a list of available options

   a. Enter “C” at the prompt to configure a wireless network.

   b. Enter the number that corresponds with the desired network.

   c. If the network has security, enter the password when prompted.

   Option 2: Configure a network manually

   a. Enter “S” at the prompt to enter your network’s SSID.

   b. If the network has security, enter “P” to set the network password.

   c. Enter “A” to set a network security type.
4. Configure your network. There are several ways to do this:

   Option 1: Use a DHCP IPv4 network

   a. Enter “D” at the prompt and then enter “1” to enable DHCP.

   Option 2: Use a static IPv4 network

   a. Enter “D” at the prompt and then enter “0” to use a static network.

   b. Enter “I” at the prompt to set the IP address of the sensor.

c. Enter “N” to set the netmask.

d. Enter “G” to set the network gateway

Option 3: Use a static IPv6 network

a. Enter “M” at the prompt to edit the IP mode.

b. Enter “1” to select IPv6 – Static.

c. Enter “I” to set the global IPv6 address of the sensor, if applicable.

5. Enter “B” to set the IP address of the BMS system or WiNG-MGR.
6. Enter “X” to transmit a test packet.

Initial Sensor Calibration

Each WIFI-CO2 sensor must be configured for its environment during deployment. The sensor will not operate properly until all steps of this initial configuration procedure are completed:

1. Enter “F” at the main menu to configure CO2 settings.
2. Enter “A” and configure the altitude of the current location.
3. Enter “E” to enable or disable the auto-zero functionality of the sensor.
4. Enter “X” to return to the main menu.
5. Enter “X” or “K” to save the CO2 settings.
6. Remove both batteries and USB power from the sensor.
7. Expose the sensor to fresh air in an unoccupied space for five to ten minutes – outside air is best.
8. Reinsert the batteries. The sensor will zero immediately after it powers on.

Sensor LED

There are several alarm and alert patterns and colors programmed for the LED. The LED is almost always off during standard operation and is primarily active during sensor configuration and reset sequences.

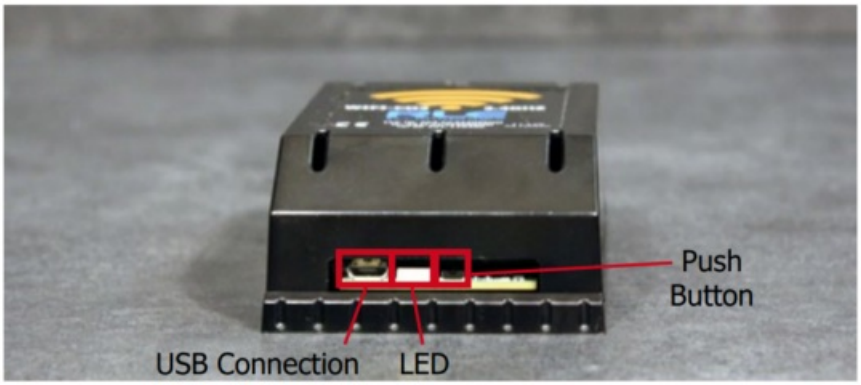
Color	Status Description
Blue Solid	Ready
Quick Blue/ Green Flash	Once every transmission interval. Sensor is successfully connected to wireless network
Quick Red/ Blue Flash	Failed wireless connection
Purple Blink	Factory reset in progress

Sensor Push Button

The sensor’s push button is located next to the LED and is used to reset the sensor to its original factory settings.

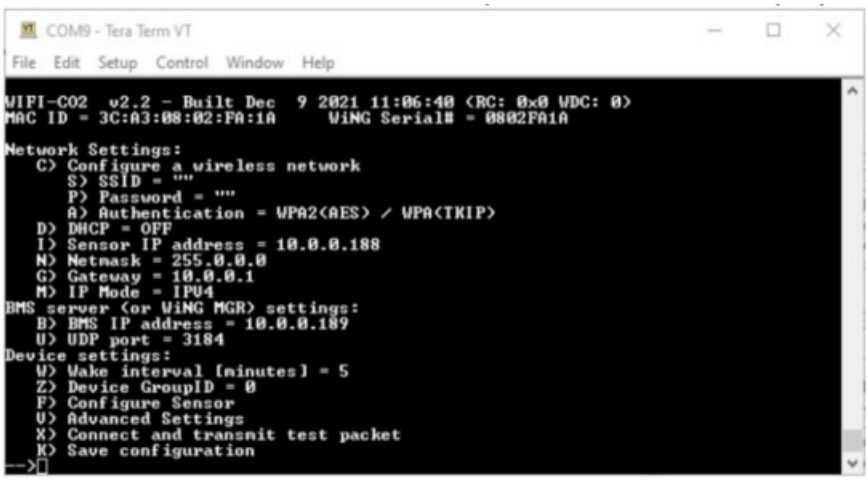
If you’d like to reset the sensor, it must be connected to a computer via the USB cable. Push and hold the button for 10 seconds. A countdown will be displayed in the terminal emulation software, and the LED will flash purple to indicate the sensor is being reset. Once the reset is complete, the sensor LED will glow blue.

You can also press the button once to send a single packet once the sensor is configured on your network and the USB cable is unplugged from the sensor.



Sensor Configuration Menu

These basic commands are available via a computer's Terminal Interface (CLI):



Command	**Description**
Blank	Print a list of all commands
C	Configure a wireless network
S	Set wireless SSID
P	Set wireless password **and** device password
A	Set wireless authentication type
D	Turn DHCP on and off

I	Set IP address (if DHCP is disabled)
N	Set netmask (if DHCP is disabled)
G	Set network gateway (if DHCP is disabled)
M	Set IP mode (IPv4 or static IPv6)
B	Set BMS or WiNG-MGR IP address to receive packet
U	Designate where UDP port packet will be sent
W	Set wake interval
Z	Set group ID (will be transmitted with packet)
F	Configure sensor-specific settings – see details in table below
V	Display advanced settings
X	Transmit a test packet
K	Save configuration

The following sensor settings are accessed through the F option on the main menu:

Sensor Settings Commands	Description
Blank	Print a list of all commands
A	Set altitude offset (Necessary for proper calibration)
E	Enable or disable bi-weekly auto-zero
T	Take sensor readings (CO2, temperature, humidity)
V	View sensor diagnostic and debugging information
X	Exit and return to main menu

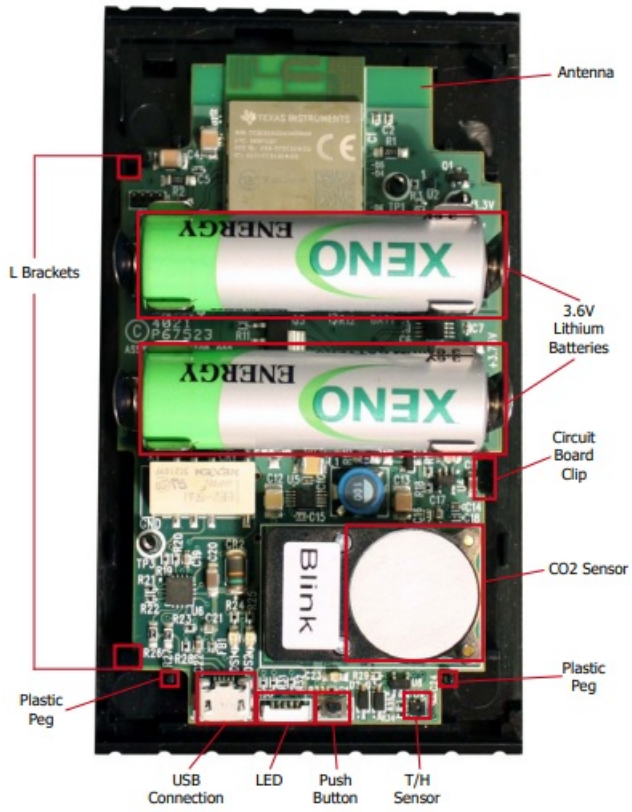
WIFI-CO2 Packet Structure

Bit Offset	**0-7**	**8-15**	**16-23**	**24-31**
0	Status Flag (U16)		Protocol Version (U8)	MAC Address (U8)
32	MAC Address (U8)			
64	MAC Address (U8)	Sensor Type (U8)	Packet Counter (U16)	

96	Group ID (U16)		Battery Voltage (U16) Unit: centivolts Divide unit value by 100 for combined total voltage of both batteries. Example: Data value = 635 635 ÷ 100 = 6.35 Total voltage of two batteries = 6.35V Battery life guidelines: > 6.0V = Good > 5.8V = OK – replace soon < 5.6V = Poor – replace immediately
128	Version Major (U8)	Version Minor (U8)	RSSI (U16)
160	Data 1 Data Type: UINT16 Description: CO2 Unit: PPM Example: Data 1 value = 818 CO2 Level = 818 PPM		Data 2 Data type: INT16 Description: Sensor temperature Unit: deci °C Divide unit value by 10 for temperature reading. Example: Data 2 value = 230 230 ÷ 10 = 23 Temperature = 23°C

192	Data 1 Data type: UINT16 Description: Sensor humidity Unit: deci % Divide unit value by 10 for humidity reading. Example: Data 1 value = 435 435 ÷ 10 = 43.5 Humidity = 43.5%	Reserved
224	Reserved	Reserved
256	Reserved	Reserved
288	Reserved	Reserved
320	Reserved	Packet CRC (U16)

WIFI-CO2 Internal Diagram



Disclaimer

Thank you for purchasing a WIFI-CO2 wireless Wi-Fi enabled carbon dioxide, temperature and humidity sensor. This guide details WIFI-CO2 installation and configuration.

Before you install a WIFI-CO2, check the RLE website – www.rletech.com – to ensure you are using the most recent version of our documentation.

If you need further assistance, please contact RLE Technologies at **support@rletech.com**.

Documents / Resources

	**RLE Technologies WIFI-CO2 Wireless WiFi Temperature and Humidity Sensor** [pdf] User Guide WIFI-CO2, Wireless WiFi Temperature and Humidity Sensor, WIFI-CO2 Wireless WiFi Temperature and Humidity Sensor

References

- **RLE Tech | Data Center Environment Monitoring & Leak Detection**
- **Leak Detection & Data Center Monitoring Equipment & Solutions // RLE**