

ecowitt®

4.9" Wi-Fi Weather Station Receiver with LCD Display

Model: WN1820 / WN1821(with Built-in CO₂ Sensor)



<https://s.ecowitt.com/YKMQNM>

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1. Introduction

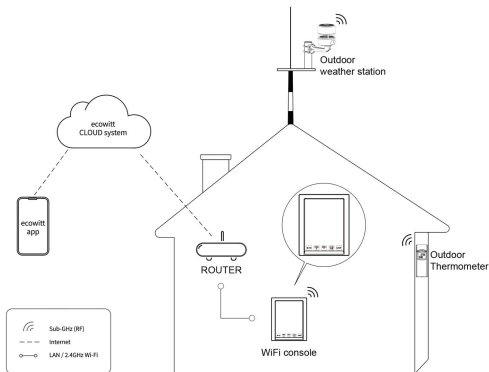


Figure 1 How Ecowitt system works

Thank you for your purchase of Ecowitt WN1820/WN1821 weather station receiver.

The WN1820/WN1821 is a Wi-Fi weather station receiver equipped with a 4.9" full-color LCD display. They support monitoring indoor and outdoor conditions, and have built-in temperature, humidity,

and barometric pressure sensors(WN1821 also comes with a **CO₂ sensor**), and can connect almost all Ecowitt transmitters with the same RF frequency to use together, to get accurate weather data including wind speed, wind direction, rainfall, UV, solar radiation, outdoor temperature, outdoor humidity and more.

Meanwhile, they support connecting IoT devices, such as WFC01、WFC02 and AC1100, to achieve smart control through Ecowitt App, which are powerful weather station receivers.

WN1820/WN1821 supports connecting to a 2.4 GHz Wi-Fi network for viewing data from anywhere on your phone, tablet, and computer browser, all for free.

Just so you know, the WN1820/WN1821 needs to be used with optional sensors to obtain outdoor weather data and is not a standalone product.

The following user guide provides step by step instructions for installation and operation. Use this manual to become familiar with your professional weather station and save it for future reference.

General Terms Used in the Manual:

Weather Station: Includes the console and sensors (or sensor array).

Receiver: Refers to the console.

Transmitter: Refers to the sensor or sensor array.

RF: Radio frequency. It refers to the ISM and SRD SubG (Industrial, Scientific and Medical and Short Range Devices frequency bands below 1 GHz) for communicating between the console and its sensors. This frequency is not the same as the 4G modem (LTE) or Wi-Fi working frequencies (2.4 GHz, 5 GHz.) ISM/SRD bands are kept separate from 4G frequencies by national regulations to avoid interferences. Typical ISM/SRD frequencies are 915MHz(Americas), 868MHz(Europe), 433MHz(worldwide), 920MHz (Japan, Korea).

2. Initial Setup and Usage

2.1 Part list

QTY	Item
1	WN1820/WN1821 Weather Station Receiver
1	DC to USB cable
1	User Manual
1	Quick Start Guide

Table 1

2.2 Multiple Views and Size

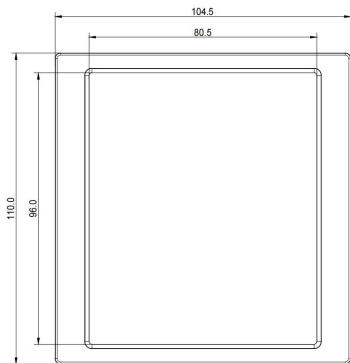


Figure 2 Main view

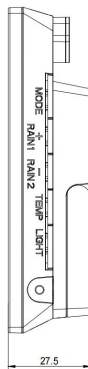


Figure 3 Side view

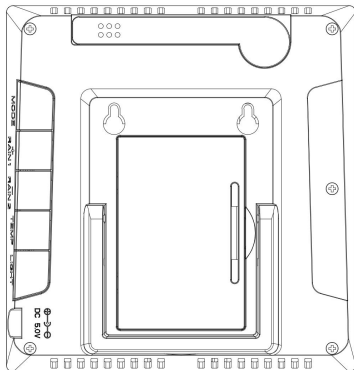


Figure 4 Rear view

2.3 Power up

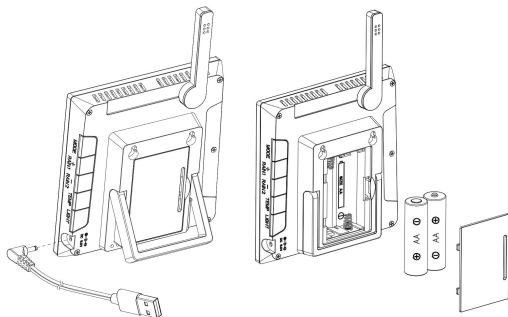


Figure 5 DC power or Battery power

2.3.1 Via DC power

Plug a 5V 1A power adapter into a wall outlet, connect the USB cable and then connect it to the Power socket on the back of the console. The device will power on and automatically enter the pairing mode.



Note:

- When powered by DC input, all features are enabled, including Wi-Fi connectivity, sensor

data reception, and server upload.

- When using DC power only (no batteries inserted), the device may still display a low battery icon. This is normal and does not affect functionality. You can safely ignore this icon when DC power is connected.
- In order to prevent the display console's own temperature rising from affecting the accurate reading of temperature and humidity, the temperature and humidity sensor is placed at the antenna end, away from the station body. Orient the console antenna straight up for accurate indoor temperature and humidity reading.

2.3.2 Via batteries (not included)

2.3.2.1 Battery usage warning:

- Ensure batteries are installed with correct polarity (+/-).
- Only use new batteries.

Insert 2 fresh AA batteries (not included) into the battery compartment to power the station on.



Note:

- It can run for about 14 days for the WN1820 and 8 days for the WN1821.
- Provide local display functionality only!
- Wi-Fi and other SOME functions are disabled.
- Data upload to the cloud platform function is disabled.

2.4 Display

After power-up, the display sequence is as follows:

1. The Initial Display appears for approximately 1 second.
2. The Full-Segment Display appears for approximately 3 seconds.
3. The device then enters the Normal Display.

2.4.1 Initial display

The Initial Display shows:

- Version Number
- Frequency

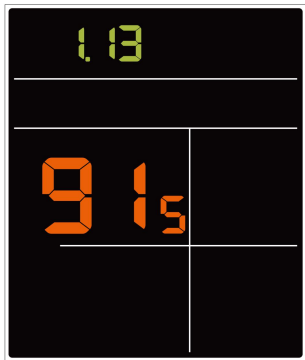


Figure 6

2.4.2 Full-Segment Display

All LCD segments are displayed for approximately 3 seconds to **confirm that the display is functioning properly.**

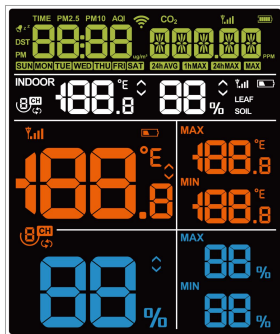


Figure 7

2.4.3 Normal display

After the Full-Segment Display, the device automatically enters the Normal Display mode.

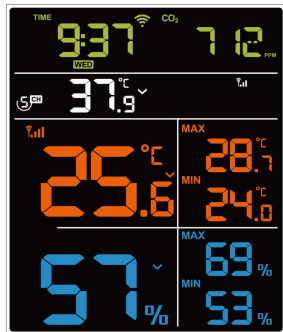


Figure 8

2.5 Button Functions

The console has five buttons for easy operation.

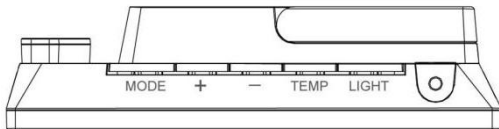


Figure 9

Icon	Description
【MODE】	1. Press to switch between Normal Mode, Alarm Clock Hour-Setting Mode, Alarm Clock Minute-Setting Mode, MAC Address Display Mode. 2. Hold for two seconds to enter the Set Mode.
【+】	1. While in Normal Mode, press this button to switch between date, CO₂, CO₂24hAVG, CO₂1hMAX, CO₂24hMAX and CO₂MAX. 2. While displaying the CO₂24hAVG/1hMAX/24hMAX/MAX, long press this button to reset max data.
【-】	Activate this function after turning on the indoor display area under the settings mode. 1. While in Normal Mode, press this button to switch between Indoor, WN34 CH1, WN34 CH2, WN34 CH3, WN34 CH4, WN34 CH5, WN34 CH6, WN34 CH7, WN34 CH8, WN35 CH1, WN35 CH2, WN35 CH3, WN35 CH4, WN35 CH5, WN35 CH6, WN35 CH7, WN35 CH8, WH51 CH1, WH51 CH2, WH51 CH3, WH51 CH4, WH51 CH5, WH51 CH6, WH51 CH7, WH51 CH8, ∅ , INDOOR. 2. While in single channel of the above

Icon	Description
	operation, long press this button 5 seconds to re-register the corresponding CH sensor. 3. While in ☺ mode, long press this button 5 seconds to re-register the WN34/WN35/WH51 CH1~8 sensors.
【TEMP】	1. While in Normal Mode, press this button to switch the WN31 display area between Outdoor Temperature (from WN32(P), WS90, WS80, WS69 or other compatible outdoor sensors) and WN31 Channels 1~8. The display cycles in the following sequence: Outdoor Temperature → WN31 CH1 → WN31 CH2 → WN31 CH3 → WN31 CH4 → WN31 CH5 → WN31 CH6 → WN31 CH7 → WN31 CH8 → Outdoor Temperature 2. While in single WN31 CH mode, hold this button 5 seconds to re-register the corresponding CH sensor. 3. While in ☺ mode, hold this button 5 seconds to re-register WN31 CH1~8 sensor.
【Light】	When powered by DC, press this button to switch between High, Middle, Low, Off.

Icon	Description
Combination Button	
MODE/Light	Hold these 2 buttons at the same time for 5 seconds to restore factory settings and reboot.
+/TEMP	Hold these 2 buttons at the same time over 2 seconds to trigger Soft-AP and the Wi-Fi icon will fast flash; you can use PC or phone to connect its hot spot.

Table 2

2.6 Wi-Fi Configuration

2.6.1 Download the Ecowitt App

Firstly please visit the Apple App Store or the Google Play Store or scan the QR code below to download the free Ecowitt App onto your mobile device.

Open the Ecowitt app and follow the on-screen instructions to add the device to the Device list of the Ecowitt app.



Figure 10 Download Ecowitt App

2.6.2 Console provisioning with the Ecowitt App

(1) Open Ecowitt App → "My devices" → "Add New Devices" → click WN1820/WN1821 icon → choose "WiFi Provisioning":

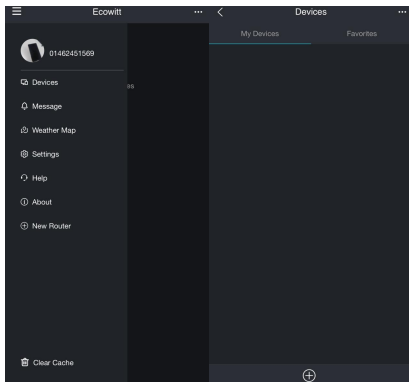


Figure 11

(2) Hold WN1820/WN1821's **TEMP** + **+** buttons for more than 2s in normal mode will turn on its hotspot, Wi-Fi icon will flash fast on the screen. Use mobile phone to connect to the hotspot "WN1820x-WIFIxxxx"/"WN1821x-WIFIxxxx" emitted by the receiver. Then tick "Operation Completed"→"Next".

Note:

1. The Wi-Fi function does not turn on when the device is running solely on battery power.
2. WN1820x-WIFIxxxx, the first x represents the frequency, A=868MHz, B=915MHz, C=433MHz, xxxx represents the last 4 digits of the product MAC address

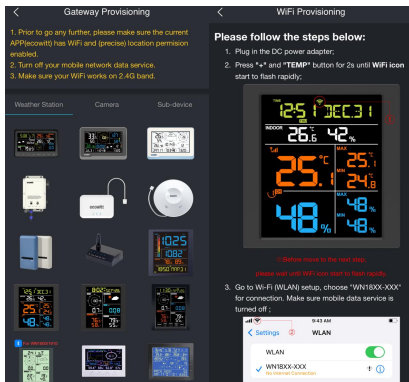


Figure 12

- (3) Allow location access, recommend selecting "While Using the App". Then return to the Ecovitt

App.

(4) Fill in the Wi-Fi SSID and password, then click "Submit".

The image displays two side-by-side screenshots of a mobile application interface titled "Gateway Provisioning".

Left Screenshot:

- Setting Gateway:**
 - Update Interval: 1 minute (dropdown menu)
 - Publicity: ☒
- Add WN1821B-WIFI9AF8 to your router :**
 - Network Name (SSID): [Empty dropdown menu] Scan
 - Password: [Empty text field]
- Instructions:**
 - ① Please do not select/enter a 5G router;
 - ② If your router does not require a password, leave the password blank;
- Submit** (button)

Right Screenshot:

- Setting Gateway:**
 - Update Interval: 1 minute (dropdown menu)
 - Publicity: ☒
- Add WN1821B-WIFI9AF8 to your router :**
 - Network Name (SSID): TP-LINK_D18E (dropdown menu) Scan
 - Password: [Field filled with asterisks]
- Instructions:**
 - ① Please do not select/enter a 5G router;
 - ② If your router does not require a password, leave the password blank;
- Submit** (button)

Figure 13

(5) Now the gateway setup is successful. Switch the network of phone to the same Wi-Fi WN1820/WN1821 is connected to. The receiver has

been successfully added to the App, then the data can be viewed online.

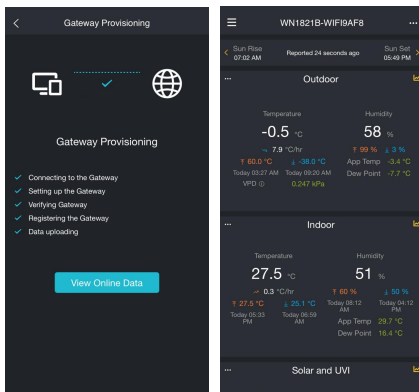


Figure 14

Note: If you are unable to connect the WN1820/WN1821 to Wi-Fi using the Ecowitt App, we recommend using the setup via Embedded Web Page 192.168.4.1 on the next page.

2.6.3 Web Page 192.168.4.1

(1) Hold **TEMP** +  to turn on WN1820/WN1821's hotspot and connect to this hotspot with your mobile device. Use mobile browser to search the URL: 192.168.4.1. No password is set by default. Click login.

(2) Click Local Network. Input the name and password of the router.

(3) Now the WN1820/WN1821 is successfully connected to the Wi-Fi router. Copy the MAC address for the following steps.

(4) Switch the network of phone to the same Wi-Fi WN1820/WN1821 is connected to. Open Ecowitt App → "My Devices" → "Add New Devices" → click WN1820/WN1821 icon → choose Manually Adding.

(5) Edit the Device Name and paste the MAC address copied in step (3) into the box, and click "Save", then the data can be viewed online.

2.6.4 Replacing Wi-Fi Router

If you want to change your router, follow **Section 2.6.2 or 2.6.3** again after restoring the gateway to its

factory settings (Hold **MODE/Light** for 5 seconds for a factory reset).

2.7 Connect the console with the sensors

Note 1: This connection does not require Wi-Fi.

Note 2: Make sure that the RF frequency of sensor and console matches (the frequency is different for various countries because of regulations).

To pair the optional sensors (refer to Section 7 Optional Sensors for more optional sensors) with the WN1821/1820, please do as follows:

- 1.Power the sensor on and place it next to the console.
- 2.Wait for 1~2 minutes, check whether the console will pick up the sensor data automatically and display it on the screen or App.
- 3.If data is not received from a registered sensor, the RF icon will decrease the signal by one frame; if data is received, the RF icon will increase the signal by one frame.
- 4.If data is not received, try the following: after making sure the phone and WN1821/1820 are connected to the same Wi-Fi network, open the

Ecowitt App → Sensor ID → enter the Sensor Management page.

5. In the Sensor Management page, find the sensor you want to pair, select the ID number box and register it.

6. Once successful, you may return to the main interface to check the data.

If you know exactly the sensor ID, and want the WN1821/1820 to pair that sensor only, you may enter the sensor ID, and save the change to make it effective.

3. User Interface

3.1 Main screen

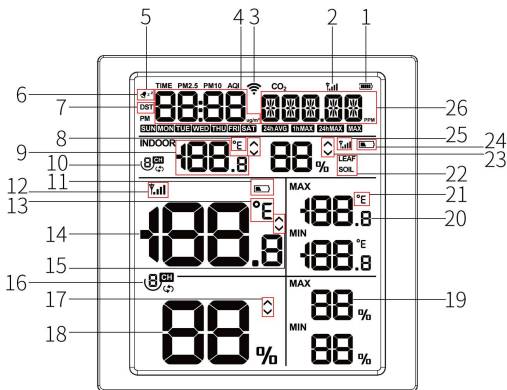


Figure 15

- 1) Battery Status of WN1820/WN1821
- 2) WN1820/WN1821 Signal Icon

- 3) CO₂ Concentration (ppm) / Date
- 4) Wi-Fi Status Icon
- 5) Time Display
- 6) Alarm Indicator
- 7) Daylight Saving Time (DST) Indicator
- 8) Trend Indicator*
- 9) Temperature Unit (° C / ° F)
- 10) Display Area for Indoor Temperature / WH51 & WH52 Soil Moisture / WN34 Soil or Liquid Temperature / WN35 Leaf Wetness
- 11) Channel Number of the Currently Displayed Sensor
- 12) Battery Status of the Currently Displayed Sensor
- 13) Signal Icon of the Currently Displayed Sensor
- 14) Temperature Unit (° C / ° F)
- 15) Outdoor Temperature and WN31 Temperature Data for Channels 1 – 8
- 16) Trend Indicator*
- 17) Channel Number of the Currently Displayed Channel

- 18) Trend Indicator*
- 19) Outdoor Humidity and WN31 Humidity Data for Channels 1 – 8
- 20) MAX/MIN Humidity of the Currently Displayed Channel
- 21) MAX/MIN Temperature of the Currently Displayed Channel
- 22) Temperature Unit (° C / ° F)
- 23) Leaf Wetness or Soil Moisture
- 24) Trend Indicator*
- 25) Battery Status of the Currently Displayed Sensor
- 26) Signal Icon of the Currently Displayed Sensor

***——Trend Indicator Function**

Refer to section 4.4

3.2 Date & Time

The date and time will be automatically updated when the Wi-Fi configuration is finished, and the automatic time zone is set.

CO₂

3.3 Power Status Icon

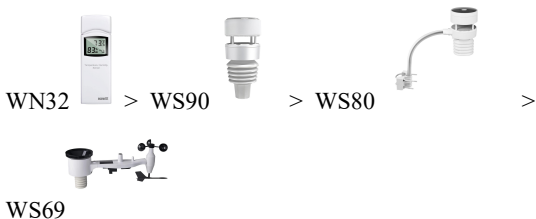
1. The display will show the low voltage icon if no batteries are presented on console.
2. When the battery voltage of the device is less than or equal to 2.5V, the low voltage icon will be displayed.
3. If the device's battery is higher than 2.5V, the low voltage icon will not be displayed (when recovering from low voltage, it needs to be above 2.6V before the low voltage icon will not be displayed).
4. The battery is purely for backup purpose, and with battery power, the device can work for 24hours.

3.4 Indoor Temperature, Humidity

WN1821/WN1820 has a built-in temperature & humidity sensor, and a barometric pressure sensor. The WN32P can be used to replace the built-in sensor data.

3.5 Outdoor Temperature and Humidity

Temperature and humidity display priority:



3.6 Multi-channel Temp&Humi data

While in Normal Mode, press the [-] button. This module will display data by switching between Indoor, WN34 (CH1-CH8), WN35 (CH1-CH8), and WH51 (CH1-CH8), ↻, and Indoor.

3.7 Wi-Fi Icon

Wi-Fi Icon	State
Fast Flash	Soft-AP switched on after power up or key activation
Solid OFF	Device lost connection with the router
Slow Flash	Device successfully connects with the router
Solid ON	Data has been uploaded to the server. The Wi-Fi icons indicate signal strength

	and are divided into 5 levels, corresponding to the icons 0 frame, 1 frame, 2 frame, 3 frame and 4 frame. 0 frame: no wifi connection 1 frame: RSSI < -85 2 frames: -85 <= RSSI < -75 3 frames: -75 <= RSSI < -65 4 frames: -65 <= RSSI < 10
--	---

Table 3

3.8 CO₂ PPM Level/Date

In Normal Mode, press the + button to switch between the date and CO₂ data, including the current value, 24-hour average value, 1-hour maximum value, 24-hour maximum value, and historical maximum value.

- **Note1:** WN1820 can be used with Ecowitt WH45 and WH46D sensors to obtain CO₂ data.
- **Note2:** When the WN1821 is used together with the WH45 or WH46D, the sensor data will override and replace the console's built-in data display.

4. Basic Setup Guide

4.1 Backlight

- * When powered by batteries, the backlight will turn off after the product is powered on 15s.
- * When powered by batteries, the backlight will turn on by pressing any button, and the backlight will turn off automatically after 15s of no button operation.
- * When powered by DC power supply, the backlight will be automatically adjusted to medium.
- * After disconnecting with DC power supply, the brightness will maintain for 15s and then automatically turn off.
- * **When powered by DC power supply, press LIGHT to adjust the backlight: High -> Medium -> Low -> Off.**

4.2 Alarm Clock Function

After the alarm is triggered, the alarm will continue to ring for 2 mins without any button operation, and the alarm will ring more and more rapidly during the 2 mins.

4.3 Snooze Function

* When you set the alarm and it is triggered, short press LIGHT to enter snooze mode and the icon will be displayed at the alarm. 10 minutes later the alarm will sound again.

* Press and hold any button for 2 seconds after entering snooze mode to exit snooze mode.

4.4 Trend Arrow Function

* Only indoor temperature and humidity, WN31 WN34 temperature and humidity have the trend arrow function.

* The algorithm is as follows :

3 hrs comparison which changes on every ½ hour

Eg.: At 3:00 - compare to 12:00 data; at 3:30 -compare to 12:30 etc

Tendency indicators	Humidity	Temperature
	Rising > 3%	Rising >= 1C/2F
	Falling > 3%	Falling >= 1C/2F

Table 4

4.5 Storage Function

* Once powered on, the device will save the changed settings after 3 mins, and the product will restore the previous setting items when re-powered.

* If you change the setting parameters via its embedded web page, it will save them immediately and the settings will not be lost when powered off.

*** The following settings can be saved:**

1. Turn on/off the alarm clock, set the hour and minute of the alarm clock.
2. BEEP on/off status.
3. RST daily maximum/minimum on/off.
4. 12/24H hour format.
5. Temperature unit setting.

* After the device completes upgrade it will save the built-in CO₂ , WN31 1~8 maximum and minimum value data, including:

1. MAX, 1H MAX, 24H MAX, 24H AVG for CO₂ .
2. WN31 1~8 MAX/MIN temperature and humidity.

* After finishing CO₂ calibration, the CO₂ calibration value will be saved in the NVS, and the next power-up

will read the latest CO₂ calibration value after a successful calibration.

4.6 Beep On or Off setting

Press and hold the **MODE** button for 2 seconds, then press the  or  button to turn the beep on or off.

5. More settings in different modes

There are 5 modes : Normal Mode, Setting Mode, Alarm Clock Hour-Setting Mode, Alarm Clock Minute-Setting Mode, MAC Address Display Mode.

5.1 Normal Mode

While normally powered on, the device enter into the normal mode in default. While in other modes, the device will automatically enter into the normal mode after 30 seconds no operation or press the button LIGHT (Not hold) to enter into normal mode.

5.2 Alarm Clock Hour-Setting Mode

1. While in Alarm Clock Hour-Setting Mode, Adjust

the hour by pressing the button + and - .

2. **Power on/off** the alarm clock by pressing the button **TEMP** .

5.3 Alarm Clock Minute-Setting Mode

1. While in Alarm Clock Minute-Setting Mode, Adjust the minute by pressing the button + and - .

2. **Power on/off** the alarm clock by pressing the button **TEMP** .

5.4 MAC Address Display Mode

Press the button **MODE** to enter the MAC Address Display Mode to check the mac address.

5.5 Setting Mode

Press and hold the **MODE** button for two seconds to enter the Setting Mode. To proceed to the next setting, press (do not hold) the **MODE** button.

To exit the SET mode at any time, press the **LIGHT**

button.

Summarizes the set mode sequence and commands.

Command	Mode	Settings
[MODE] + 2 seconds	Enter Setting Mode, Beep On or Off	Press [+] or [-] to switch OFF and ON. This will prevent the beep from sounding when pressing any button.
[MODE]	Clear Max/Min	Press [+] or [-] to switch OFF and ON. When set to ON, the minimum and maximum values reset every day at midnight (00:00). When set to OFF, the minimum and maximum values must be reset manually.
[MODE]	Indoor display area	Press [+] or [-] to adjust on or off.
[MODE]	12 hour / 24 hour Format	Press [+] or [-] to switch hour format between 12 hour and 24-hour format.
[MODE]	Hour	Press [+] or [-] to adjust hour up or down.

[MODE]	Minute	Press [+] or [-] to adjust minute up or down.
[MODE]	Year	Press [+] or [-] to adjust year up or down.
[MODE]	Month	Press [+] or [-] to adjust month up or down.
[MODE]	Day	Press [+] or [-] to adjust day up or down.
[MODE]	Temperature Units of Measure	Press [+] or [-] to change temperature units of measure between °F and °C.
[MODE]	CO ₂ Calibration	Press [TEMP] to switch OFF and ON.

Table 5

6. WN1821 CO₂ parameter

6.1 CO₂ Concentration

1. If device detects the built-in CO₂ concentration sensor, it will automatically switch to display the real-time CO₂ concentration value when the product is powered up and detect the CO₂ concentration.
2. While in Normal Mode, press  button to switch between date, CO₂ live data, CO₂ 24hAVG, CO₂

1hMAX, CO₂ 24hMAX and CO₂ MAX.

6.2 CO₂ Calibration(ONLY for data from WN1821)

- In **Normal Mode**, hold the **button Mode 2** seconds to enter into the **Setting Mode**, and press the button **Mode** until CO₂ calibration mode is presented. Put the console in outdoor air location, or at least with normal fresh outdoor air submerged.
- Display real-time CO₂ concentration data, updates once every 5 seconds.
- When **"ON"** flashes to indicate that CO₂ calibration is currently in progress; when **"OFF"** flashes to indicate that CO₂ calibration is not currently in progress. **Default value 420PPM** will be displayed. Adjust this value if you have other reliable reference reading available.
- Before calibration is completed, the calibration value can be adjusted by pressing the button.
- After calibration, **"OK"** flashes to indicate successful CO₂ calibration; when **"NG"** flashes

to indicate failure of CO₂ calibration.

- In the CO₂ calibration page, it will not return to the main page automatically.

7. Optional Weather Servers

Note: This function must be performed while the console is connected to the Wi-Fi network.

Your console is capable of sending your sensor data to selected internet-based weather services. The supported services are shown in the **Table** below:

Services	Description
Wunderground	Site: Wunderground.com Provides local & long-range weather forecasts, weather reports, maps & tropical weather conditions for locations worldwide.
WOW	Site: wow.metoffice.gov.uk A UK based weather observation website.
Weathercloud	Site: Weathercloud.net A large network of weather stations

Services	Description
	reporting data in real time from all over the world.
Ecowitt	Site: ecowitt.net Ecowitt's new weather server that can host a bunch of sensors that other services don't support at this time.

Table 6 Supported weather services

Note: If you are testing the setup with the outdoor sensor package nearby and indoor, you may want to consider connecting to Wi-Fi, but not yet configuring any of the weather services. The reason is that while indoor the temperatures and humidity recorded by the outdoor sensor, and as reported to the weather service(s) will reflect indoor conditions, and not outdoor conditions. Therefore, they will be incorrect. Furthermore, the rainfall bucket may be tripped during handling, causing rain to register while it may not actually have been raining. One way to prevent this is to follow all instructions, except to use an incorrect password on purpose! Then, after final outdoor installation, come back and change the password after

clearing console history. That will start uploading to the services with a clean slate.

7.1 Registering with and using wunderground.com

Perform the following steps to get the Station ID and Password on wunderground.com:

Visit Wunderground.com and select the "Log in" at the upper right corner of the home page and sign up (if you don't have an account ,please register first.)

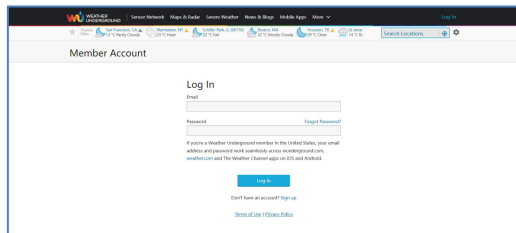


Figure 16

- 1) Click "My Profile" and select "My Devices" to register your station.



Figure 17

2) Select "Add New Device".

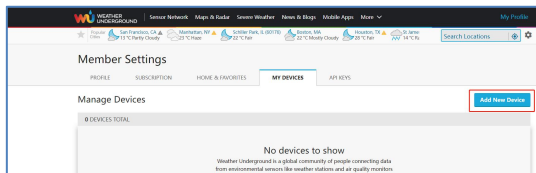


Figure 18

3) Find the "TYPE", select "other" ,then click "Next."



Figure 19

- 4) Select "Address" or "Manual" option, and find your local position. Touch "Next".

Add a New PWS

TYPE LOCATION DETAILS DONE

Set Device Name & Location

50%

Device Location:

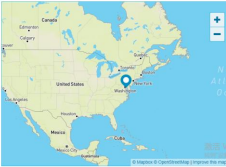
☐ Address ☒ Manual

38.695, -76.740

Your location has been verified and added!

Elevation: 12 m.
Lat, Lon: 38.695, -76.740
Neighborhood: Hudson
Time Zone: America/New_York

Back Next



The map shows the United States and parts of Canada and Mexico. A blue location pin is placed in New York City. Major cities like Washington, D.C., New York, Boston, and Los Angeles are labeled. The map includes a scale bar and a copyright notice for Mapbox.

Figure 20

- 5) This time you will be asked the details about your weather station. Go ahead and fill out the form.

Add a New PWS

TYPELOCATIONDETAILSDONE

Tell Us More About Your Device

75%

Name:(Required)

Give Your Device a Name

Elevation:(Required)

44

Device Hardware:(Required)

other

Surface Type:

Height Above Ground:

Ft. Above Ground

You Make Our Forecasts More Accurate, We Respect Your Privacy

Contribute to the Weather Underground community by sharing some information about yourself and your sensor. We use this information to manage your account and to improve the experience from the Weather Underground community. We may also share certain data for commercial purposes, such as your sensor location.

Learn more about how we take your privacy seriously

(Required)

☐ I Accept ☐ I Deny

Email Preferences:

☐ I would like to receive PWS notifications

Back

Next

Figure 21

- 6) After completing the weather station, you will see Station ID and Station Key.

Add a New PWS

TYPE LOCATION DETAILS **DONE**

Registration Complete!

100%

Congratulations! Your personal weather station is now registered with Weather Underground.

Enter the information below to your weather station software.

Your PWS

Station ID: [redacted]

Station Key: [redacted]

Copy credentials

View Devices

Configure Your Software

激活 WII 设备

Figure 22

- 7) Take note of the station ID and Key, then enter it in the Weather Server.
- 8) Refresh the page, you may have to wait about a few minutes until the status becomes "Online". Then you can click device name to view data.

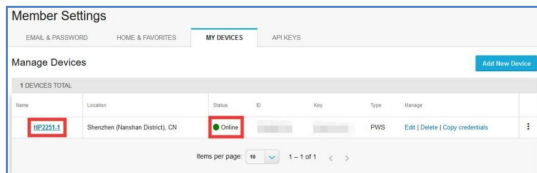


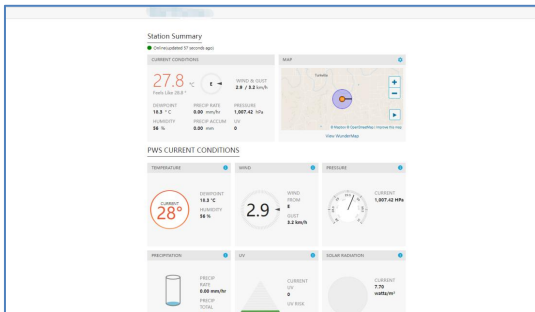
Figure 23

7.2 Viewing data on wunderground.com

The most basic way to observe your weather station's data is by using the wunderground.com web site. You will use a URL like this one, enter your Station ID in the section "STATIONID":

[http://www.wunderground.com/personal-weather-station / dashboard ? ID=STATIONID](http://www.wunderground.com/personal-weather-station/dashboard?ID=STATIONID)

It will show a page such this, where you can look at today's data and historical data as well:



7.3 Customized server setup

For highly experienced users, it offers the option to send data to the user's own server.

The website should be able to process the same protocol (data content and format) which is posted to Wunderground or to Ecowitt. Input all the information needed.

8. Specifications

Model:WN1821

Name	Weather Station (receiver)
Dimensions	110×104.5×27.5 (mm)
Screen Size	80.5×96 (mm)
Weight	160 (g)
Material of Plastic Casing	ABS
Material of Screen	VA-LCD
Temperature Metering Range	-9.9°C to 60°C (14°F to 140°F)
Temperature Metering Accuracy	±0.2°C (±0.4°F)
Temperature Metering Resolution	0.1°C (0.2°F)
Humidity Metering Range	1%RH to 99%RH
Humidity Metering Accuracy	±2%RH
Humidity Metering Resolution	1%RH
Barometric Pressure Metering range	300 to 1100 hPa (8.85 to 32.5 inHg)
Barometric Pressure Metering accuracy	±1.5hpa (absolute pressure); ±2hpa (relative pressure)
Barometric Pressure Metering resolution	0.1 hPa (0.01 inHg)
Photoacoustic NDIR CO ₂ Metering range	0 to 40000ppm
Photoacoustic NDIR CO ₂ Metering accuracy	±(50ppm + 5% of reading) when 400 to 2000 ppm
Photoacoustic NDIR CO ₂ Metering resolution	1ppm
Photoacoustic NDIR CO ₂ Accuracy drift per year	± (5ppm + 5% of reading)
Reading Update Interval	About 1 minute

Name	Weather Station (receiver)
RF Connection Frequency	920/915/868/433MHz (depending on local regulations)
RF Wireless Range	Over 100 meters (in open areas)
WLAN	802.11 b/g/n 2.4 GHz (802.11n, Max 150 Mbps)
WLAN Range	Over 30 meters (in open areas)
Console Operating Temperature	-10°C to 50°C (14°F to 122°F)
Power Supply	5V DC or 2×1.5V AA Battery (not included)
Battery Life	8 days

Table 7

Model:WN1820

Name	Weather Station (receiver)
Dimensions	110×104.5×27.5 (mm)
Screen Size	80.5×96 (mm)
Weight	158.3 (g)
Material of Plastic Casing	ABS
Material of Screen	VA-LCD
Temperature Metering Range	-9.9°C to 60°C (14°F to 140°F)
Temperature Metering Accuracy	±0.2°C (±0.4°F)
Temperature Metering Resolution	0.1°C (0.2°F)
Humidity Metering Range	1%RH to 99%RH
Humidity Metering Accuracy	±2%RH
Humidity Metering Resolution	1%RH
Barometric Pressure Metering range	300 to 1100 hPa (8.85 to 32.5 inHg)
Barometric Pressure	±1.5hpa (absolute pressure); ±2hpa

Name	Weather Station (receiver)
Metering accuracy	(relative pressure)
Barometric Pressure Metering resolution	0.1 hPa (0.01 inHg)
Reading Update Interval	About 1 minute
RF Connection Frequency	920/915/868/433MHz (depending on local regulations)
RF Wireless Range	Over 100 meters (in open areas)
WLAN	802.11 b/g/n 2.4 GHz (802.11n, Max 150 Mbps)
WLAN Range	Over 30 meters (in open areas)
Console Operating Temperature	-10°C to 50°C (14°F to 122°F)
Power Supply	5V DC or 2×1.5V AA Battery (not included)
Battery Life	14 days

Table 8

9. Features

1. The WN1821 has a built-in Photoacoustic NDIR CO₂ sensor for detecting CO₂ concentration, while the WN1820 can work with the WH45 Transmissive NDIR CO₂ sensor or the WH46D Photoacoustic NDIR CO₂ sensor to enable the CO₂ function. Both models have built-in temperature, humidity, and air pressure sensors.
2. Supports displaying indoor temperature, humidity, and their changing trends; supports displaying outdoor multi-channel transmitter temperature, humidity, and their changing trends.
3. Supports receiving and displaying multi-channel temperature and humidity sensors/transmitters, such as WN31, WN34, WN35, and WH51.
4. Can be used as a Wi-Fi gateway to receive data from additional sensors, which can be viewed via the web.
5. Supports maximum and minimum data logging.
6. Supports Wi-Fi configuration via the web page, including viewing more sensor data, setting the server, adjusting calibration parameters, and configuring

Sensor IDs.

7. With Wi-Fi functionality, supports uploading data to the weather station server.
8. Supports automatic time zone detection and automatic network time synchronization.
9. Supports DC power supply and adjustable backlight brightness.

10. Trouble shooting

10.1 What types of NDIR sensors exist and how do they work?

An introduction to the principles behind transmissive and photoacoustic NDIR sensing.

Characteristics of NDIR Sensors:

NDIR sensing has become the prevalent technique for measuring CO₂ concentration. The technology exploits the characteristic property of CO₂ molecules to strongly absorb infra-red (IR) light with wavelengths around 4.2 μm . When shining light of this wavelength

through a gas sample, the CO₂ concentration can thus be calculated from the proportion of light that is absorbed.

It is important to note that NDIR sensors do not require a dispersive element, such as a prism or a diffraction grating, to discriminate for the targeted wavelength. Instead, the light produced by the emitter is shown through a non-dispersive band-pass filter, allowing only

the infrared wavelengths of interest to pass. These characteristics give the sensors their classification: Non-dispersive Infra-red.

Transmissive NDIR:

These NDIR sensors typically feature an IR emitter and an optical detector, such as a photodiode, at opposite ends of a specially designed optical cavity. The optical detector measures the amount of IR light energy that is not absorbed by (i.e., transmitted through) the gas sample.

As the CO₂ concentration in the optical cavity increases, the amount of light detected decreases. Hence, this principle determines the amount of light energy CO₂ molecules have absorbed by calculating

the difference between the measurement and a reference intensity at a known CO₂ concentration.

NDIR CO₂ sensors leverage infra-red absorption at 4.2 μm wavelength without the use of dispersive optical elements.

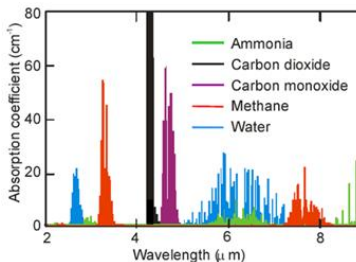


Figure 25

Absorption spectra of common trace gases
(HITRAN2016 molecular spectroscopic database)

Note that this reference value heavily depends on

precise positioning of IR emitter and photodetector, as well as the emission properties of the IR source and the optical cavity. Mechanical and thermal stresses acting on the measurement chamber can thus significantly falsify CO₂ readings.

Furthermore, transmissive NDIR sensors generally require a minimal optical path length in the centimeter scale for enough IR absorption to occur to accurately measure lower CO₂ concentrations.

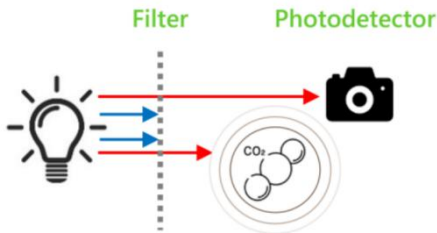


Illustration of a Transmissive NDIR setup

Figure 26

Photoacoustic NDIR:

In contrast to transmissive NDIR sensors, photoacoustic NDIR sensors detect the amount of energy that is absorbed by CO₂ molecules. When pulsing the infra-red emitter, CO₂ molecules absorb infra-red light periodically. This causes additional molecular vibration resulting in a pressure wave inside the measurement chamber. The higher the CO₂ concentration, the more light is absorbed, and thus the greater the amplitude of this acoustic wave becomes. A microphone inside the gas chamber measures this, from which the CO₂ concentration can then be calculated.

Photoacoustic NDIR sensing allows for much greater miniaturization of the measurement chamber. Furthermore, as sound waves are omnidirectional, relative positioning of emitter and microphone is unconstrained. Thus, photoacoustic NDIR sensors are usually more mechanically and thermally robust.

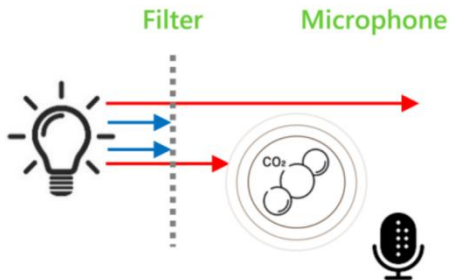


Illustration of a Photoacoustic NDIR setup

Figure 27

11. Optional Sensors

11.1 Sensors

The WN1820/1821 supports all existing Ecowitt sensors, including IoT (Internet of Things) devices. The data from all connected sensors can be viewed:

- On the ecowitt.net dashboard in the Ecowitt Weather Cloud with 1-minute resolution
- In the Ecowitt App with 1-minute resolution
- In the built-in web browser interface (WebUI) in real time
- In the WS View Plus App in real time

The following sensors can be purchased separately. For more information, please visit our website: <http://www.ecowitt.com>. Select the model of the units with the same RF frequency as your gateway or display (the frequency is different for various countries because of regulations).

Notes:

(1) The max QTY in the following table indicates the maximum number of the same sensor model or type that can be connected to the WN1820/WN1821.

(2) Theoretically all the different sensor arrays (WS68, 69, 80, 85, 90) could be connected to one gateway at the same time, but due to the sensor hierarchy (see above) this would only make sense in a few special cases (e.g. WS85 + WS68 (get solar data from WS68). WS85 or WS90 + WS69 (get traditional rain data from

the WS69).

(3) For WH51 / WH51L / WH52 soil moisture sensors, the console can display data from up to 8 channels, but it supports uploading data from up to 16 channels, which can be viewed in the Ecowitt App.

Note: After a power outage, the original 8-channel display order will remain unchanged; however, after a reset, the channel order may change.

The RF reception function will always be turned on to receive data from multiple sensors at any time.

11.1.1 Sensor Data which can be displayed on the console screen

Sensor Model	Max QTY	Picture	Functions
WS90	1		Outdoor temperature&humidity
WS80	1		Outdoor temperature&humidity
WS69	1		Outdoor temperature&humidity
WN32P	1		Indoor temperature, humidity

Sensor Model	Max QTY	Picture	Functions
WN32	1		Outdoor temperature and humidity
WN32_EP	1		Temperature and Humidity
WN31	8*		Temperature and humidity
WN31_EP			Temperature and Humidity
WN30			Temperature
WN36			Pool temperature
WH57	1		Lightning detection
WH51	16*		Soil moisture

Sensor Model	Max QTY	Picture	Functions
WH51L			Soil moisture
WH52			Soil Moisture
WN34L/S/D	8		Temperature
WN35	8		Leaf wetness
WH45/WH46	1*		CO ₂
WH46D			CO ₂ (Carbon Dioxide)

Table 9

11.1.2 Sensor Data which can only be uploaded to the Ecowitt Weather Cloud

Sensor Model	Max QTY	Picture	Functions
WS85	1		Wind speed/direction, rainfall
WS68	1		Light, UV, wind speed/direction
WH40	1		Rainfall
WN20	1		Rainfall
WN64	1		Wind speed / Rainfall

WH57	1		Lightning detection
WH41/W H43	4		PM2.5
WH55	4		Water leak detection
LDS01	4		Laser distance sensor

Table 10

Note: *—

Refers to the maximum number of sensors in this group. Any combination that sums up to the number mentioned is possible.

11.2 IoT Devices(Upload only)

Sensor Model	Max QTY	Picture	Functions
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WFC01	16*		Smart water timer
AC1100			Smart plug
WFC02			Smart water timer

Table 11 IoT device

Note: *—See Above

11.3 Sensor Data Reception Priority

Please note that when more than one sensor array or a rainfall sensor is registered in the gateway for outdoor temperature, wind, rain, and solar data, data processing will be prioritized according to the sensor hierarchy and uploaded to the platform.

Sensor Array Priority:

WS85>WS90>WS80>WS68>WS69.

Piezo rainfall priority: WS85>WS90

Traditional rainfall Priority: WH40> WN20>WS69.

12. Warranty Information

We disclaim responsibility for any technical error or printing error or the consequences thereof.

All trademarks and patents are recognized.

We provide a 2 years limited warranty on this product against manufacturing defects or defects in materials and workmanship.

This limited warranty begins on the original date of purchase, is valid only on products purchased, and only to the original purchaser of this product. To receive warranty service, the purchaser must contact us for problem determination and service procedures.

This limited warranty covers only actual defects within the product itself and does not cover the cost of installation or removal from a fixed installation, normal set-up or adjustments, or claims based on misrepresentation by the seller, or performance variations resulting from installation-related circumstances.

Manufacture: Shenzhen Fine Offset Electronics Co.,
Ltd. Address: 4/F, Block C, JiuJiu Industrial City,
Shajing Town, Baoan District, Shenzhen City, China

13. FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to

comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception,

which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

IC Caution:

English:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

French:

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de

licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

14. Contact Us

14.1 After-sales Service

Order Issues:

If you encounter any missing or incorrect shipments of Ecowitt products purchased, please reach out to the respective platform's customer service from the store where you bought the product for assistance.

Usage Inquiries:

Our product is continuously changing and improving, particularly online services and associated applications. To download the latest manual, and additional help, and for any issues related to product usage feel free to contact our customer support team at support@ecowitt.com. We are committed to providing

assistance and resolving any concerns you may have.

14.2 Stay in Touch

Ask questions, watch setup videos, and provide feedback on our social media outlets. Follow Ecowitt on Discord, Facebook, YouTube and Twitter.



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