

# Ceres<sup>®</sup> Gateway3



**TENETICS, LLC**

Advanced Wireless Agriculture

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# Getting Started

Congratulations on selecting Ceres® for your precision agriculture. This manual will help you get your wireless Gateway installed and running in less than 5 minutes.

## Package Contents

Your Gateway package contains:

- Ceres® Gateway3
- Mounting Hardware
- Solar Panel with mounts
- Options:
  - external power supply and cable
  - external antenna and cable

## Overview



The wireless Gateway is a part of the Ceres® farm management system (FMS). If you haven't already done so, you should start by registering and setting up your farm here:

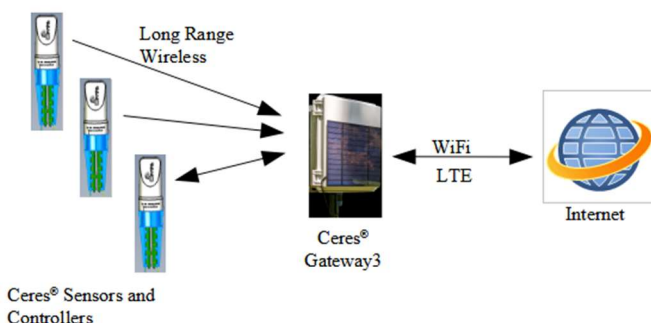
<https://ceresweb.tenetics.com>

The Gateway3 is an integral part of the FMS, connecting your long-range wireless sensors and controls with Ceres servers. Each Gateway3 supports up to 100 remote sensors and controllers. A farm can have multiple Gateway3s.

**Ceres® is a registered trademark of Tenetics, LLC**

The Gateway3 contains several radio transceivers:

- An LTE cellular transceiver connects to the internet
- A short-range 2.4GHz 802.11 (Wi-Fi) and Bluetooth transceiver connects to the internet or your phone.
- A long-range sub-GHz transceiver that communicates with your remote Ceres sensors and controllers.



Wi-Fi wireless range is typically 100-300 meters. Long-range wireless varies with terrain and intervening obstacles, however 1-2 miles (2-3km) is typical for flat un-obstructed farms.

Transmissions from remote wireless sensors and controllers are received by the gateway and stored in internal memory. The gateway can store more than 10000 readings allowing use in areas with limited or intermittent internet access.

The gateway periodically uses Wi-Fi or LTE to connect to the internet and forward received data to a secure database at a Tenetics data center. The database is automatically maintained and backed up so your data remains secure. The database makes your data available any time via your smart-phone or computer.

## Location/Mounting

The gateway can be mounted to a structure (wall) or pole using the provided mounting brackets. Use the included screws to mount the brackets to the back of the enclosure as shown below.

DO NOT OVERTIGHTEN SCREWS.



Pick a location as close to your fields as possible. If using WiFi for internet access, the gateway should be within 100-300m of your Wi-Fi Access Point/Router.

### Pro Tips:

- \* The gateway should be upright and as high as possible
- \* Don't mount the gateway against or near large metal objects
- \* Locate the gateway where it has an unobstructed view of your fields
- \* Make sure the solar panel faces south and gets full sun exposure

## Solar Power

The Gateway3 is powered by an internal sealed lead-acid (SLA) battery that is charged by a 3W solar panel mounted to the front cover.

The solar panel should be exposed to full sun and face south. The panel should be angled toward the sun using the supplied 35-degree angling adapters. The optimal angle depends on your latitude. For the continental United States, the proper angle is roughly the same as your latitude. For more information about the optimal solar angle, including how to get better results in winter see <https://www.solarpaneltilt.com/>.

The supplied solar panel has a typical service life of 2-4 years (about the same as the life of the SLA battery). The precise service life of the battery and panel are affected by many factors including temperature and sun exposure. When the panel and battery no longer power your Gateway3 reliably, they should be replaced. Low cost replacement panels are available from Tenetics or your Ceres® reseller.

To remove the solar panel, unscrew the circular connector at the bottom of the gateway and pull it straight down to disconnect the panel. Remove the solar panel and angle adapter from your gateway and install the replacement.

## External Power

If the supplied solar panel does not provide enough power in your location, a larger panel may be used. The panel should nominally nominal 12vdc. The maximum open-circuit panel voltage (Voc) **must** not exceed 24 volts or the Gateway3 may be damaged.

Where solar power is not available, the Gateway3 can be powered by a 12VDC power supply capable of providing at least 1A. Contact Tenetics or your Ceres® reseller for a suitable external DC power supply and/or DC power supply cable.

## Battery Replacement/Disposal

All sealed lead-acid (SLA) batteries have limited service life, typically 2-4 years. When your battery no longer keeps your Gateway3 operating reliably, it should be replaced.

To remove the battery, unplug the yellow connector from the Gateway3 main board, then push the battery retaining clip gently to the right and slide the battery out of the gateway. Remove the cable from the battery and save it for use with the new battery. When removing the cable from the battery, grasp the connectors and wiggle them off the battery rather than pulling on the wires.

The recommended replacement battery is a [Powersonic PS-640 F1](#).

**IMPORTANT:** SLA batteries contain lead which is a toxic and material that must be recycled by law. Do NOT dispose of SLA batteries in residential waste. Used batteries should be taken to a recycling center or household hazardous waste center. Lead-acid batteries are the most recycled consumer product and most recycling facilities accept and recycle them. Please dispose of used SLA batteries responsibly.



**NOTE:** when replacing the SLA battery in your Gateway3, remove the battery cable from the battery and save it for use with your new battery. If you accidentally dispose of or damage your battery cable, contact Tenetics or your Ceres reseller for a replacement cable.

**Pro Tip:** cover one of the terminals of a used battery with a piece of electrical tape to prevent accidental short circuits.

## Storage and Shipping

If will not be using your Gateway3 for an extended period or if you are shipping the Gateway3, unplug the SLA battery. Note that SLA batteries should be charged at least every 6 months while in storage.

## Restoring Factory Defaults

To restore a gateway to its factory default settings:

1. Disconnect the battery (turn the gateway off)
2. Press and hold the SETUP button
3. Connect the battery (turns the gateway on)
4. Continue holding the SETUP button for 10 seconds
5. Release the SETUP button

**NOTE: all configuration and settings will be erased including stored configuration and readings; the password will revert to the original factory password.**

## External Antenna (option)

For most farms, the internal Gateway3 antenna provides excellent field coverage. If additional range is needed, the Gateway3 can be ordered with one of two external antenna options.

The 3dBi external antenna option can be mounted directly to the RP-SMA connector on the top left of the Gateway3. The antenna should be screwed on securely but DO NOT OVERTIGHTEN.

The 5dBi external antenna option provides maximum range and should be professionally mounted to a pole or structure and connected to the Gateway3 using low-loss N-to-RP-SMA coaxial cable such as [Times Microwave LMR-400](#). Be sure to use outdoor-rated cable/connectors and a lightning arrestor.

NOTE: use ONLY external antennas supplied by Tenetics; others may void your warranty and violate government regulations.

## Remote Locations

The Gateway3 is self-contained, weatherproof, and in most cases can be solar powered. It can be used anywhere LTE cellular or WiFi networking are available. If the LTE or WiFi signal is weak, raise the gateway to a higher location or re-orient the gateway.

## Connecting to a WiFi Network

If WiFi networking is available at your gateway's location, using it can save cost relative to LTE cellular connectivity. Configure your Gateway3 for WiFi internet access can be done several ways including:

- ESPTouch – install from Apple/Google app store
- ESPBluFi – install from Apple/Google app store
- USB command-line interface
  - Connect PC via USB A-B cable (printer cable)
  - Run a terminal program such as TeraTerm
  - Configure 115200bps, 8 data bits, no parity, 1 stop bit
  - Press Enter to get the login prompt: "Password">  
Enter the password shown inside your gateway.
  - Enter the SSID and password for your AP:  
**GW> config ap mySSID myPSK**
  - Reset the gateway:  
**GW> reset**

Note: if a WiFi network is configured and available, the Gateway3 will automatically use it instead of LTE cellular for internet access.

## Disconnecting from a WiFi Network

To disconnect from a Wi-Fi network and forget the configured SSID/PSK: press and hold the SETUP button for 10 seconds. When you release the button, the gateway will disconnect from your access point and erase the stored SSID/PSK. You can then repeat the Wi-Fi connection or configuration steps to connect to a new Access Point.

# Specifications

## Power

- Typical power consumption less than 1/10 Watt
- Internal: 6V 4.5Ah AGM sealed lead-acid battery
- External: solar panel or 12VDC power supply

## Physical

- 9"x 7"x 4.41"
- -40 to +85C operating temperature range
- IP65 Waterproof
- Mounting: pole or structure
- 12V Solar Panel: 145mm x 145mm

## Wireless

- LTE Global Cellular
- Wi-Fi: 802.11 b/g/n compliant
- Bluetooth and BLE
- GPS Receiver
- FCC certified Ceres Long-Range Wireless:
  - Long range sub-GHz frequency band
  - Secure frequency hopping spread spectrum (FHSS)
  - Internal antenna OR
  - Optional external RP-SMA antenna

## FCC Notice

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

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. Changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The distance between user and products should be no less than 20cm.

FCC ID: 2AA6Q-GW3

Contains FCC ID: 2AC7Z-ESPWROOM32

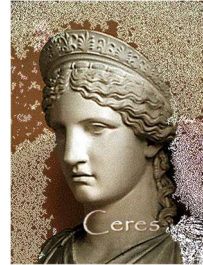
Contains FCC ID: 2AJYU-SIM7000G

## Who we are

Tenetics is committed to bringing precision agriculture technology to small and medium-sized farms. Our Ceres wireless products help you monitor and manage your farm from your computer or smart-phone.

Ceres is designed for agriculture:

- Easy installation
- Solar power
- Long wireless range
- Wide operating temperature
- Rugged outdoor reliability



Ceres (Demeter) was the Greek and Roman goddess of agriculture. “Cereal” comes from her name.

## Contact Us

Tenetics is located in suburban Maryland. For more information about Ceres products, please contact us or visit our website.

Phone: 301-970-9700

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Web: <https://www.tenetics.com>

