

Installing Model 8800/8900 Series GeoNet Wireless Mesh Data Acquisition Systems



Topics Covered in this Tutorial

- Important Terms
- Initial Setup
- Device Mounting
- Connecting Sensors
- Activating the Gateway

Important Terms

- **Mesh Network**

- ▶ A collection of GeoNet devices communicating via radio signals

- **Data Logger**

- ▶ Collects data from sensors
- ▶ Forwards the collected data to the gateway
- ▶ Relays data from/to other data loggers as necessary

- **Gateway**

- ▶ Controls the network
- ▶ Central collection point for all data

- **GEOKON Agent Software & Api Portal Website**

- ▶ Used for network configuration

Important Terms (Continued)

- **Deployment Mode**

- ▶ Must be used when making changes to a network (e.g., adding loggers, changing batteries, resetting a device, etc.)
- ▶ Active for 1 hour after the gateway is powered on, and each time a data logger is added to the network
- ▶ Reactivate in Agent or by pressing the status button on the gateway

- **Radio Channels**

- ▶ Radio channels are set at the factory
- ▶ Only change if multiple networks are within radio range of each other
- ▶ Refer to the product manual for more information

Initial Setup



Getting Started

To expedite the installation:

- Gather all components in one location
- Perform the installation in the designated order
- Power the gateway before powering the data loggers

Items Required for Installation

- **Provided with GeoNet Gateways/Data Loggers**
 - ▶ Antenna (All models)
 - ▶ Screwdrivers & USB Cable (All gateways)
 - ▶ USB to RS-232 adaptor (RS-232 gateways only)
 - ▶ D-cell batteries (All models except Cellular/Wi-Fi Gateways)
 - ▶ GeoNet charger kit (Cellular/Wi-Fi Gateways only)
- **Purchased separately (or customer sourced)**
 - ▶ Mounting hardware (screws, U-bolts, hose clamps, etc.)
 - ▶ Materials to create a suitable earth ground
(We recommended a 6 ft. copper rod and ≥ 12 AWG copper wire)

Attach the Antennas

For all devices in the network:

1. Remove the rubber cap from the antenna mount.
2. Install the antenna by rotating it clockwise until it is finger-tight.



 Be careful not to cross-thread the antenna. Cellular gateway antennas have an o-ring that must be tightened against the enclosure to keep water out.

Remove the Covers

For all devices in the network:

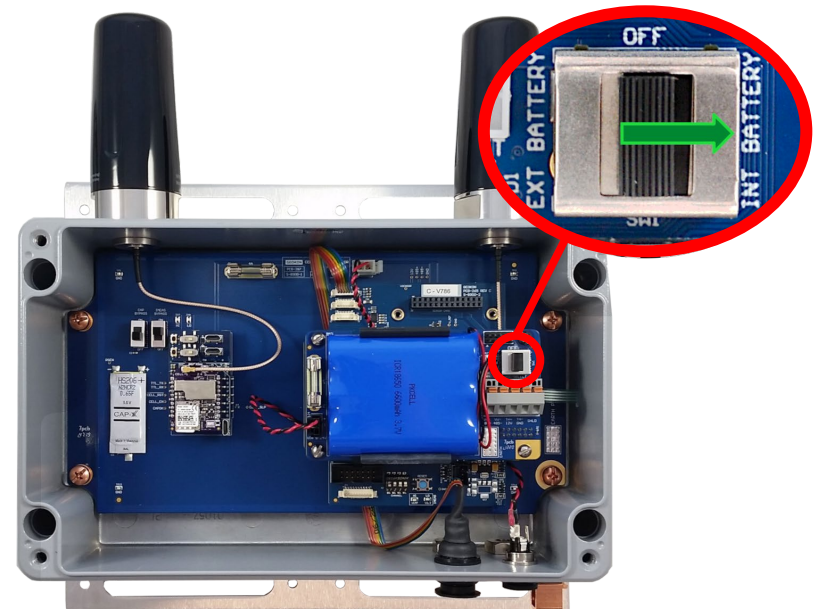
1. Loosen the screws of the cover by turning them counterclockwise.
2. Remove the cover.

 Do not allow any water, dirt, or contaminants to enter the enclosure.



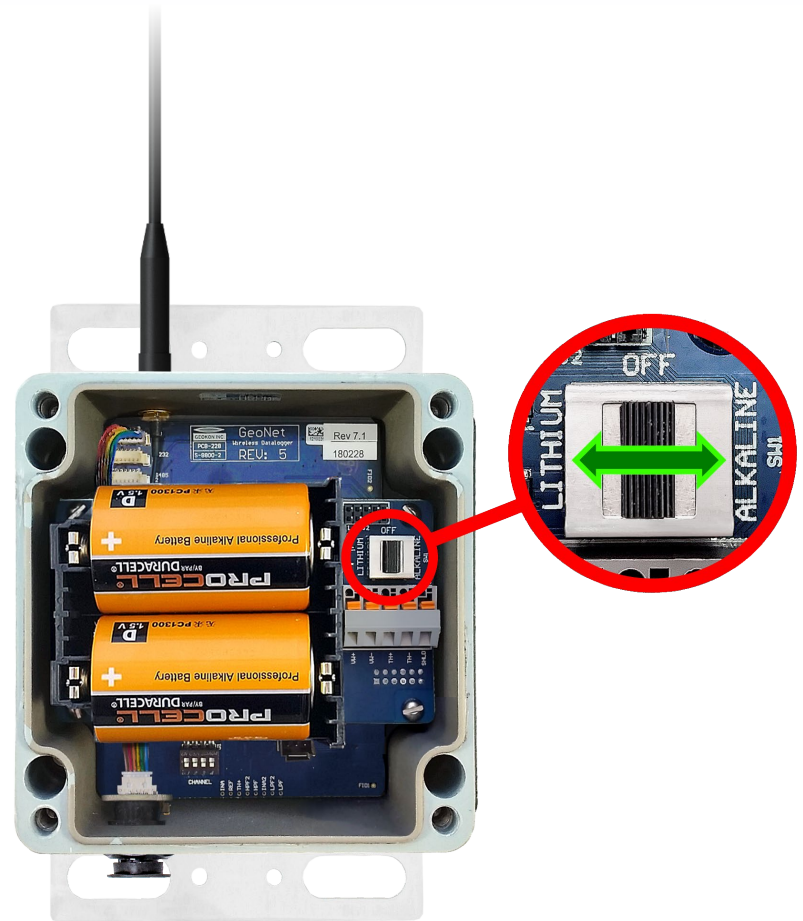
Powering a Cellular/Wi-Fi Gateway

1. Connect the AC adaptor or other power source.
(Can function on battery power, but battery will deplete quickly.)
2. Move the power switch to INT BATTERY.
(EXT BATTERY is used with external 12-volt batteries.)
3. The green LED will flash twice.
(LEDs won't flash again until a data logger joins the network or the status button is pressed.)



Powering a Local Gateway

1. Insert the batteries with the positive and negative sides aligned according to the marks inside the holder.
2. Move the power switch to "ALKALINE" or "LITHIUM" depending on the type of batteries installed.
2. The green LED will flash twice. (LEDs won't flash again until a data logger joins the network or the status button is pressed.)



Close the Gateway

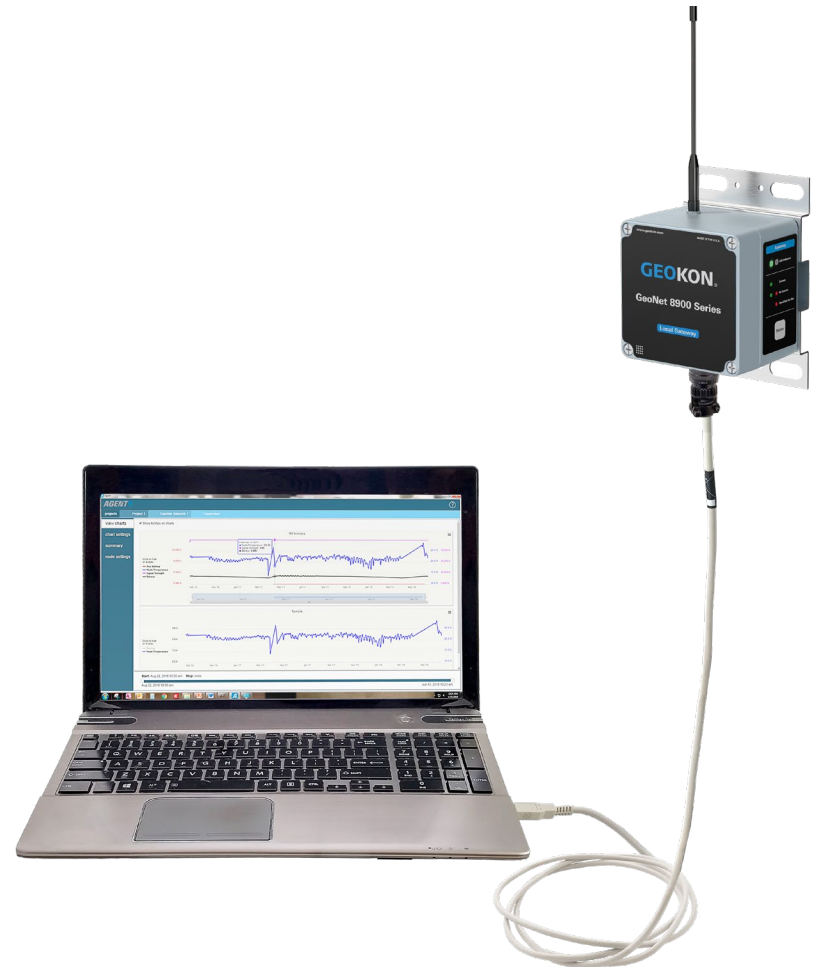
1. Make sure the cover gasket and the mating ridge on the enclosure are clean, and that the gasket is properly seated inside the groove.
2. Place the cover on the unit.
(Make sure it is oriented correctly.)
3. Tighten the cover screws a little at a time, working in a diagonal pattern.
4. Check that the cover has closed tightly and evenly.



Setting the Time on Local Gateways

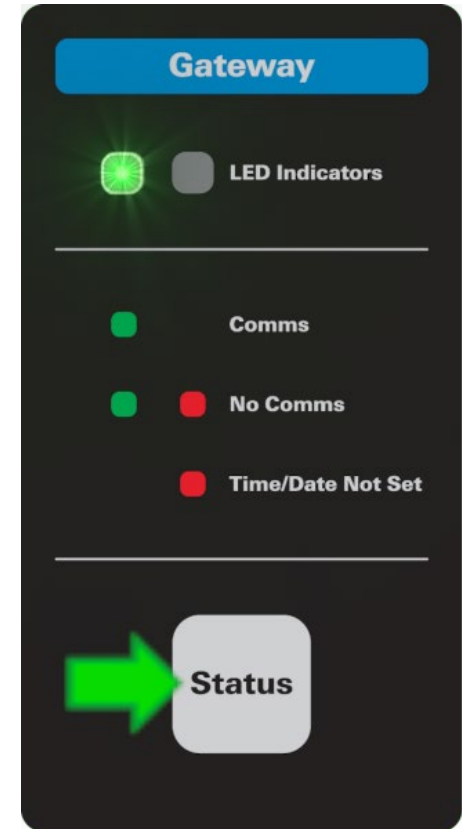
1. Connect the Gateway to a computer using the factory-supplied cable.
2. Use Agent software to set the correct time zone.
(Refer to the Agent software manual for more information.)

 Data will not be collected until the network time has been set.



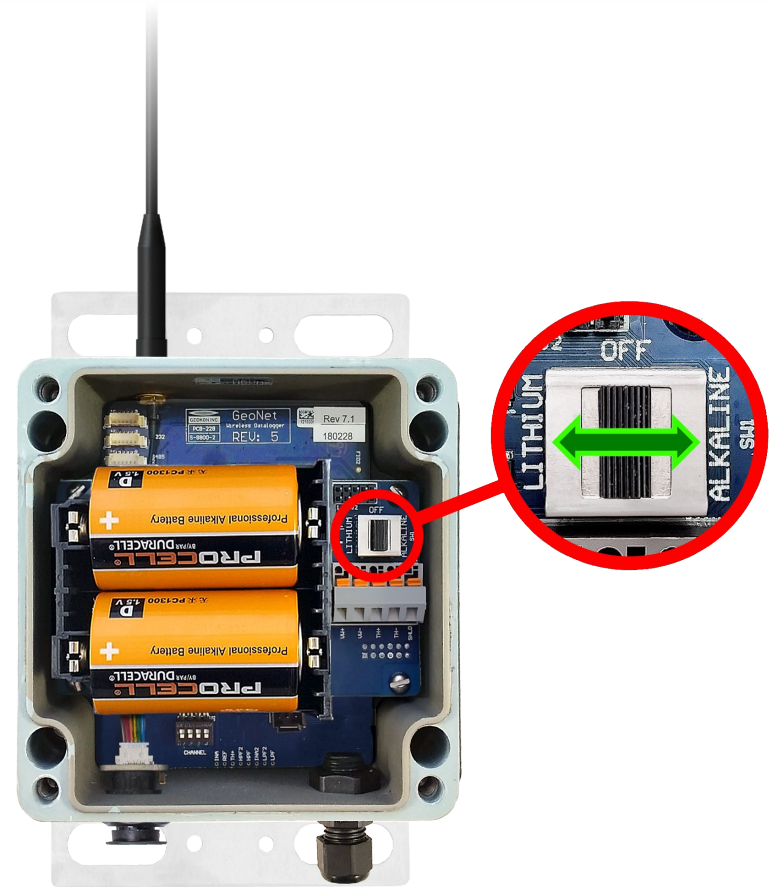
Gateway, Final Steps

1. Press the status button.
2. Verify the green (or green and red) LED flashes.
3. If only the red LED flashes:
 - ▶ Cellular/Wi-Fi Gateways: Wait a few minutes, then try again.
 - ▶ Local Gateways:
Set the time in Agent software.
4. Record the serial number of the Gateway.



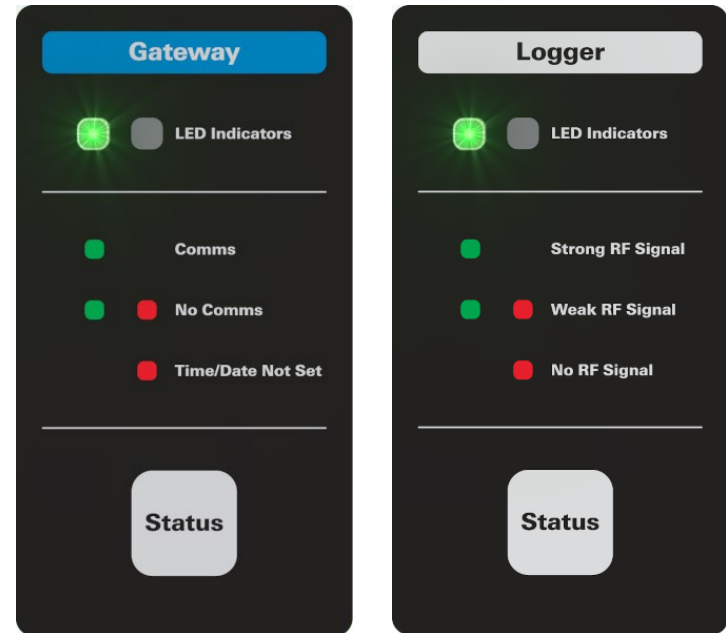
Powering the Data Loggers

- Data loggers should be close to the gateway when powered on.
1. Insert the batteries as shown.
 2. Move the power switch to "ALKALINE" or "LITHIUM" depending on the type of batteries installed.
 3. The green LED will flash twice. (This may take several seconds to occur.)



Powering the Data Loggers (Continued)

4. The data logger will join the network in about 30 seconds when in deployment mode. (Data logger and gateway LEDs will flash in unison.)
5. Power the other loggers and wait for them to join the network.
6. Verify all LEDs are flashing green only. (May take several minutes if the network is not in deployment mode.)



Device Mounting



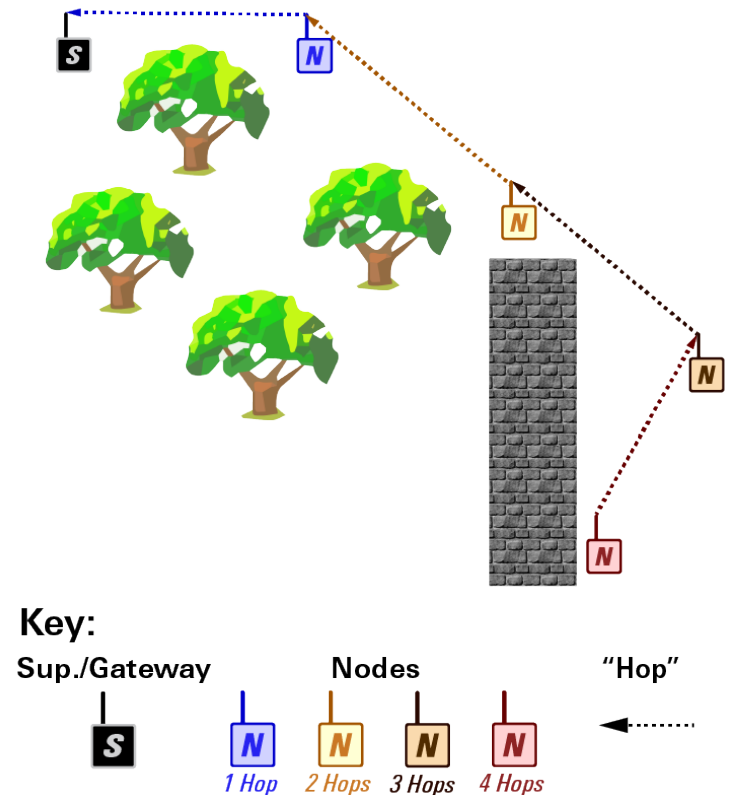
Device Mounting

- GeoNet Devices can be mounted using bolts, screws, hose clamps, U-bolts, etc. (Mounting hardware is not included.)
- Devices must be oriented vertically (antenna pointing up).
- A minimum mounting height of two meters is recommended.
- Place the Gateway in the center of the network wherever possible.
- Start by mounting the data loggers closest to the gateway and work outward.



Device Mounting (Continued)

- Additional data loggers can be used to work around obstacles.
- Each transmission from one GeoNet device to another is known as a "hop."
- A maximum of four hops can be made between a data logger and the gateway.
- The optimum data path (fewest hops) is automatically chosen by the network.



Device Mounting (Continued)

- Device range can be affected by obstructions and other factors that impede radio communications.
- Mount the devices within line of sight of each other whenever possible.
- Common mounting mistakes include:
 - ▶ Not enough clear space around the antenna.
 - ▶ Mounting devices horizontally.
 - ▶ Metallic objects nearby or in the radio path.



Device Mounting (Continued)

- GeoNet devices should be properly grounded to protect against lightning and other large transient voltages.
- All GeoNet devices can be grounded by connecting a suitable earth ground to the mounting bracket (**A**).
- Cellular Gateways and Multi-Channel Loggers can also be grounded via the copper ground lug on the bottom of the enclosure (**B**).



Device Mounting (Continued)

- Tilt data loggers:
 - ▶ The direction of tilt for the A and B axes is shown on the cover of the unit.
 - ▶ The two axes of the tiltmeter have a calibrated range of $\pm 30^\circ$, based on a starting position of 0° (antenna pointing up).



Connecting Sensors



Please Note

⚠ Multi-channel & addressable data loggers stop reading empty sensor channels after 2 attempts.

- ▶ Retries occur at the top of each hour.
- ▶ Reset the data logger for an immediate retry.



10-Pin Connectors

1. Align the internal grooves of the connectors and then push them together.
2. Twist the outer ring clockwise until the connector locks into place.



Bare Leads

1. Loosen the cable gland nut and insert the cable into the logger.
2. Connect each lead by holding down an orange tab, inserting a lead, and then releasing the tab.

Vibrating Wire

RED = VW+

BLACK = VW-

WHITE = TH+

GREEN = TH-

BARE = SHLD

Addressable (RS-485)

WHITE = 485+

GREEN = 485-

RED = 12V

BLACK = GND

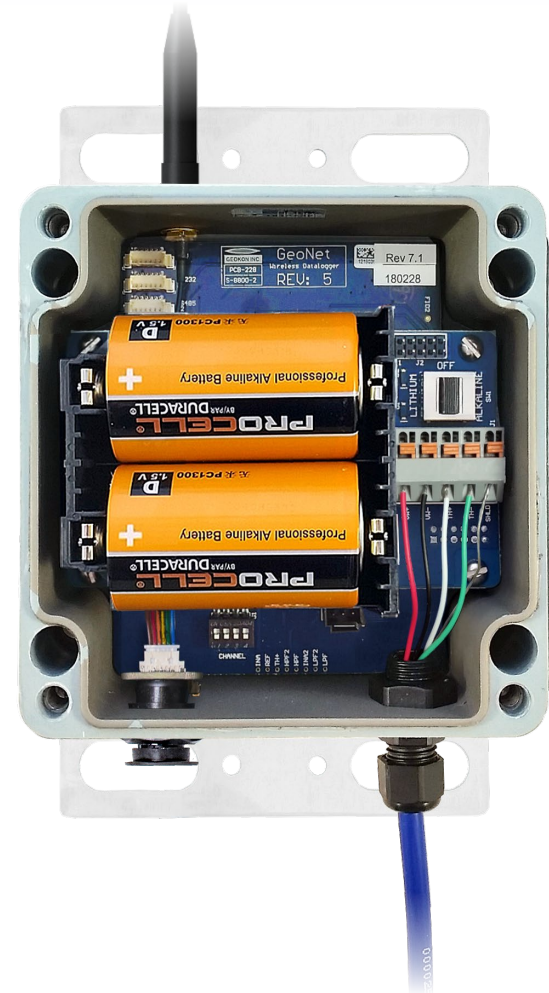
BARE = SHLD

 To prevent short circuits, do not allow bare leads to touch. Trim leads if necessary.



Bare Leads (Continued)

3. Gently pull on each conductor to make sure it is secure.
4. Tighten the cable gland nut until the gland firmly grips the cable. (Do not over-tighten).
5. Gently pull on the cable to make sure it is held by the cable gland.
(Proper tightening prevents water entry.)



Close the Data Logger & Record Serial Numbers

1. Install the covers on the data loggers.
2. Record the serial number of the data logger and the attached sensor. For multi-channel data loggers, note the channel each sensor has been wired into.



Activating Cellular/Wi-Fi Gateways

- Make sure all data loggers have joined the network *before* commissioning (activating) the gateway.
- Each time a device is added to the network, it must be recommissioned.)
- Cellular gateways:
 - ▶ Commission (activated) the gateway using the GEOKON API portal: <https://api.geokon.com>.
- Wi-Fi gateways:
 - ▶ Please refer to the instruction manual.

For more information...

- Consult the GeoNet and Agent software instruction manuals: www.GEOKON.com/Manuals.
- Visit www.GEOKON.com/Tutorials for more tutorials, including a GeoNet Troubleshooting tutorial.