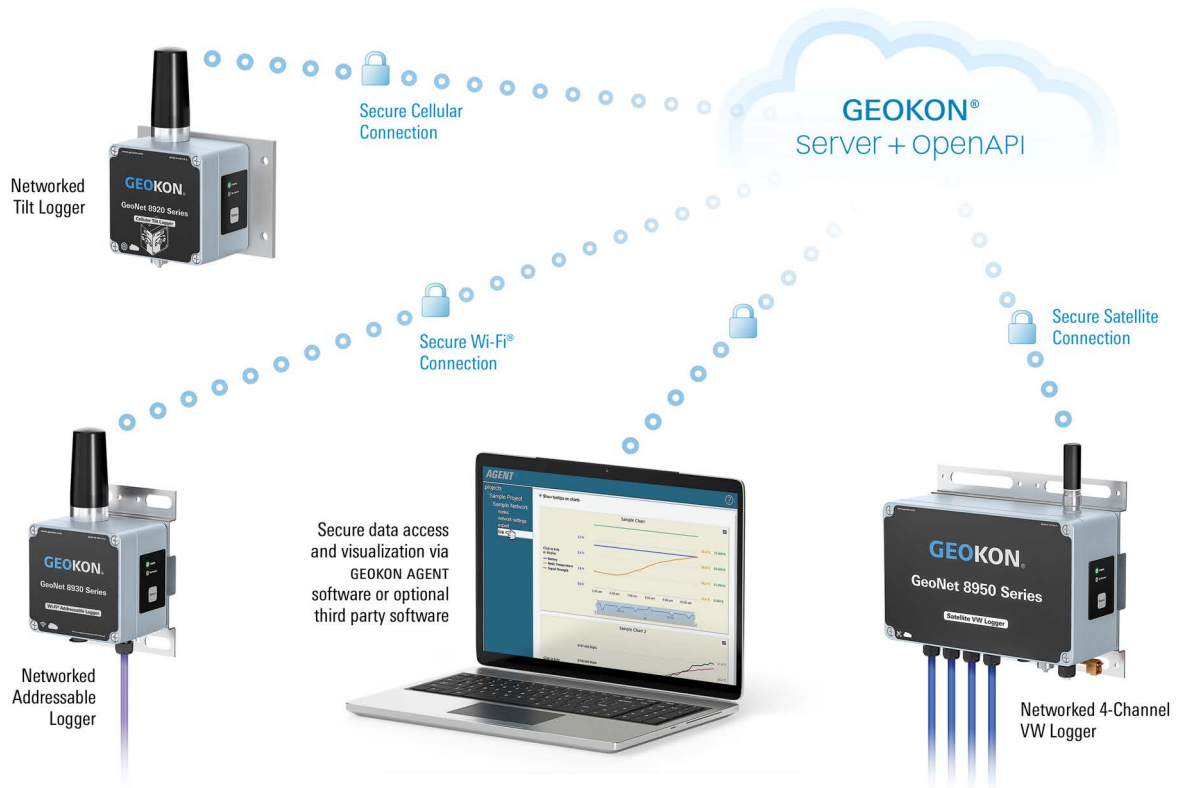




# Model Series 8920, 8930, 8950 GeoNet Network Loggers Instruction Manual





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# 1. INTRODUCTION

GEOKON Model 8920, 8930, and 8950 Series Loggers offer a high-value, networked data collection option for all GEOKON vibrating wire instruments and digital sensor (MEMS IPI and VW) strings. Each logger comes from the factory ready for deployment and may commence with data acquisition in minutes.

Tilt loggers are also available and combine the functionality of a biaxial tiltmeter and a Network Logger.

Sensor data is collected and transferred via a cellular, Wi-Fi, or satellite network to a secure cloud-based storage platform where it can be accessed through the GEOKON OpenAPI. Industry leading data visualization software, such as the free GEOKON Agent program can be used with the OpenAPI for data viewing and reporting. Commissioning, billing and configuration are accomplished via the easy-to-use GEOKON API Portal. The portal allows users to activate loggers, change settings, configure sensor channels, and view current logger status.

The API Portal can be found at [api.geokon.com](https://api.geokon.com) and the GEOKON Agent program can be downloaded at [geokon.com/Software](https://geokon.com/Software).

Model 8960 Digital Vibrating Wire interfaces can be connected to GeoNet Multi-Channel, Addressable, and Digital High Power Loggers to expand the capacity of the logger. See Section 3.7.

## FEATURES:

- Automated data connection to servers
- Automated calculation of engineering units via Web API integration with the GEOKON database
- Rugged, die-cast aluminum enclosure (DHP enclosures are IP 68 rated to 1.5 m, or 5 feet) with a pressure compensation vent to prevent condensation buildup in humid climates.
- USB connector for firmware updates, diagnostics, and more

## 1.1 8920 MODEL LIST

| Model Number     | Logger Type                   | Cellular Network | Sensor Cable Entry |
|------------------|-------------------------------|------------------|--------------------|
| 8920-LTM-01C-CBL | Single-Channel Vibrating Wire | LTE-M            | Cable Gland        |
| 8920-LTM-04C-CBL | Four-Channel Vibrating Wire   |                  |                    |
| 8920-LTM-08C-CBL | Eight-Channel Vibrating Wire  |                  |                    |
| 8920-LTM-ADR-CBL | Addressable, RS-485           |                  |                    |
| 8920-LTM-DHP-CBL | Digital High Power, RS-485    |                  |                    |
| 8920-LTM-TLT-NAP | Tilt                          |                  | Not Applicable     |
| 8920-03G-01C-CBL | Single-Channel Vibrating Wire | 3G               | Cable Gland        |
| 8920-03G-04C-CBL | Four-Channel Vibrating Wire   |                  |                    |
| 8920-03G-08C-CBL | Eight-Channel Vibrating Wire  |                  |                    |
| 8920-03G-ADR-CBL | Addressable                   |                  |                    |
| 8920-03G-TLT-NAP | Tilt                          |                  | Not Applicable     |

TABLE 1: List of Model 8920 Loggers



OpenAPI Portal



Software Resources

## 1.2 8930 MODEL LIST

| Model Number | Logger Type                   | Network | Sensor Cable Entry |
|--------------|-------------------------------|---------|--------------------|
| 8930-01C-CBL | Single-Channel Vibrating Wire | Wi-Fi   | Cable Gland        |
| 8930-04C-CBL | Four-Channel Vibrating Wire   |         |                    |
| 8930-08C-CBL | Eight-Channel Vibrating Wire  |         |                    |
| 8930-ADR-CBL | Addressable                   |         |                    |
| 8930-TLT-NAP | Tilt                          |         | Not Applicable     |

**TABLE 2:** List of Model 8930 Loggers

## 1.3 8950 MODEL LIST

| Model Number | Logger Type                   | Network   | Sensor Cable Entry |
|--------------|-------------------------------|-----------|--------------------|
| 8950-01C-CBL | Single-Channel Vibrating Wire | Satellite | Cable Gland        |
| 8950-04C-CBL | Four-Channel Vibrating Wire   |           |                    |
| 8950-08C-CBL | Eight-Channel Vibrating Wire  |           |                    |
| 8950-ADR-CBL | Addressable                   |           |                    |
| 8950-TLT-NAP | Tilt                          |           | Not Applicable     |

**TABLE 3:** List of Model 8950 Loggers

## 1.4 INCLUDED ACCESSORIES

| GeoNet Product Line             | Part Number                                       | Description  | Quantity |
|---------------------------------|---|--|----------|
| Digital High Power (DHP) Models | ELC-824   | Antenna  | 1        |
| All Other Models                | CHG-11  | GeoNet Charger Kit, including: AC-DC power supply with barrel jack and multi-country AC adapter kit. | 1        |
|                                 | COM-169   | USB 2.0 A Male to C Male Cable   | 1        |
|                                 | 8950 Models:<br>ELC-1026<br>ELC-1027<br>HRD-A1279 | Antenna  | 1        |
|                                 | All other Models: ELC-824                         |  |          |
|                                 | TLS-111   | #3 Phillips Head Screwdriver   | 1        |
|                                 | TLS-112   | 3/32" Flat Head Screwdriver  | 1        |

**TABLE 4:** List of Included Accessories by GeoNet Product Line

## 1.5 ADDITIONAL ACCESSORIES (NOT INCLUDED)

| Accessory Application      | Part Number  | Description  |
|----------------------------|--|--|
| 12 Volt Battery Conversion | 8020-7-1   | Solar Panel, 20-watt, regulated. For use with a 12V battery (customer supplied). Includes side-of-pole mounts, charge controller, and 4.5 m (15') interconnect cable with battery clips. |
|                            | 8800-7B or -7BV  | External 12V battery conversion cable, 3 m (10') length. Varied cable lengths are available (-7BV model).  |
| Other                      | 8900-SOL-10W-BRJ   | 10 Watt solar panel. For use with all models except digital high power (DHP).  |
|                            | 8900-SOL-10W-BRJ   | 10 Watt solar panel. For use with digital high power models (DHP).   |
|                            | <b>KIT-GEONET-C-T20, including:</b><br>COM-169<br>TLS-112<br>TLS-641                 | <b>Accessory Kit for Digital High Power (DHP) Models, including:</b><br>USB 2.0 A Male to C Male Cable<br>3/32" Flat Head Screwdriver<br>T20 Torx Key                                    |
|                            | <b>KIT-GEONET (For Legacy Products), including:</b><br>COM-166<br>TLS-111<br>TLS-112 | <b>Accessory Kit for Legacy Products, including:</b><br>Mini USB to STD A Cable<br>#3 Phillips Head Screwdriver<br>3/32" Flat Head Screwdriver   |

**TABLE 5:** Additional Accessories (Not Included)

## 2. MODELS

### 2.1 VIBRATING WIRE (VW) LOGGERS

The Vibrating Wire Logger series read the quantity of gauges outlined below. Sensor cables are connected through a cable gland or a 10-pin bulkhead connector, depending on model.

#### 2.1.1 SINGLE-CHANNEL VIBRATING WIRE LOGGER

Single-channel loggers will read one GEOKON vibrating wire gauge and integral thermistor.



**FIGURE 1:** Single-Channel Loggers: 8920 (Left), 8950 (Right), 8930 Not Shown

#### 2.1.2 FOUR-CHANNEL VIBRATING WIRE LOGGER

Four-channel loggers will read up to four GEOKON vibrating wire gauges and integral thermistors.



**FIGURE 2:** Four-Channel Loggers: 8920 (Left), 8950 (Right), 8930 Not Shown

A four-channel logger can be configured as follows:

| Maximum Number of Gauges | Maximum Number of Load Cells  |
|--------------------------|---|
| Four                     | One 3-gauge <b>or</b> one 4-gauge load cell<br><i>Refer to Appendix I for load cell wiring tables</i> |

**TABLE 6:** Four-Channel Logger Gauge/Load Limits

### 2.1.3 EIGHT-CHANNEL VIBRATING WIRE LOGGER

Eight-channel loggers will read up to eight GEOKON vibrating wire gauges and integral thermistors.



**FIGURE 3:** Eight-Channel Loggers: 8920 (Left), 8950 (Right), 8930 Not Shown

An eight-channel logger can be configured as follows:

| Maximum Number of Gauges | Maximum Number of Load Cells                    |
|--------------------------|---|
| Eight                    | One 3-gauge <b>and</b> one 4-gauge load cell    |
|                          | Two 3-gauge <b>or</b> two 4-gauge load cells    |
|                          | One 6-gauge load cell                           |
|                          | Refer to Appendix I for load cell wiring tables |

**TABLE 7:** Eight-Channel Logger Gauge/Load Limits

## 2.2 DIGITAL (RS-485) LOGGERS

Digital RS-485 loggers are compatible with GEOKON Digital Addressable MEMS products. Sensor cables are connected through a cable gland.

### 2.2.1 ADDRESSABLE LOGGER

Addressable loggers are compatible with GEOKON Digital Addressable MEMS products and are capable of reading up to 64 GEOKON MEMS sensors.



**FIGURE 4:** Addressable Loggers: 8920 (Left), 8950 (Right), 8930 Not Shown

## 2.2.2 DIGITAL HIGH POWER (DHP) LOGGER

Digital High Power (DHP) loggers are compatible with GEOKON Digital Addressable MEMS products. Loggers are capable of reading up to 250 GEOKON MEMS, or up to 500 GEOKON 6140 sensors. They are also capable of reading non-GEOKON sensors that utilize RS-485 MODBUS communication protocol. DHP loggers are equipped with a rechargeable battery and must be connected to a solar panel or other external power supply.



**FIGURE 5:** Digital High Power Logger

## 2.3 TILT LOGGER

Tilt loggers contain an integrated tiltmeter sensor. The two axes of the tiltmeter have a range of  $\pm 90^\circ$  (the calibrated range is  $\pm 30^\circ$ ), based on a starting position of  $0^\circ$  (antenna pointing up).

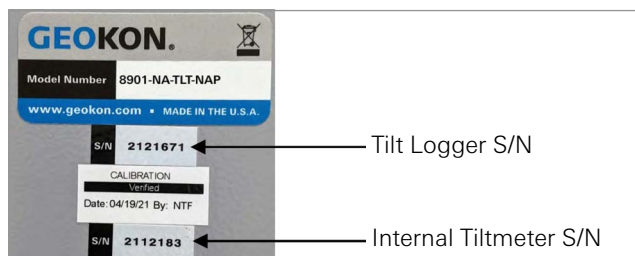
**Note:** Tilt loggers do not possess sensor-reading function; external sensors cannot be connected.



**FIGURE 6:** Tilt Loggers: 8920 (Left), 8950 (Right), 8930 Not Shown

Tilt loggers have two serial numbers, the tilt logger serial number is the upper number, and serial number for the internal tiltmeter is the lower number. See the figure below.

**Note:** Tilt logger serial numbers greater than 2047508 provide calibrated output and do not require post processing.



**FIGURE 7:** Tilt Loggers Serial Number Placement

## 3. INSTALLATION

---

### 3.1 INSTALLATION OVERVIEW

A general overview of the installation is shown in the steps below. Each step is described in detail in the sections that follow.

1. Mount the logger
2. Connect an earth ground
3. Install the antenna
4. Remove the cover
5. Connect the sensors
6. Expanding logger capacity (optional)
7. Power the logger
8. Verify network connectivity
9. Connect to a Wi-Fi network (8930 loggers only)
10. Seal the logger
11. Commission (activate) the logger

### 3.2 MOUNT THE LOGGER

GeoNet mounting bracket are designed to be used with U-bolts, hose clamps, screws, etc. Mount all devices vertically, with the antenna pointing up. GEOKON recommends a mounting height of at least two meters. Lower than two meters may compromise performance. As a rule, higher is usually better.

### 3.3 CONNECT AN EARTH GROUND

Properly grounding GeoNet devices will lessen the chance of them being damaged from nearby lightning strikes or other large transient voltages. Each vibrating wire (VW) channel is protected by a 230V gas discharge tube, followed by a high-speed surge protector and a transient voltage suppression diode. Each thermistor (TH) channel is protected by a 230V gas discharge tube, followed by an inductor (lower resistance than high-speed surge protectors) and a transient voltage suppression diode.

For these components to safely divert lightning energy to ground, a solid electrical connection to earth ground is required. All GeoNet devices can be grounded by connecting a suitable earth ground to the mounting bracket. Some GeoNet devices can also be grounded via the copper ground lug on the bottom of the enclosure.

A copper grounding rod at least six feet in length should be driven into the soil to a minimum depth of three feet, as close to the device as possible. Alternatively, any other suitable earth ground attachment may be used. Connect the grounding rod to the mounting bracket or the copper grounding lug on the exterior of the device with a 12 AWG or larger wire. This will provide a path from the device to earth ground in the event of a lightning strike.

### 3.4 INSTALL THE ANTENNA

Remove the rubber cap from the antenna mount and install the antenna by turning it clockwise.

**Important! Do not cross thread the antenna. The O-ring on the bottom of the antenna must be flush with the enclosure.**

### 3.5 REMOVE / OPEN THE COVER

#### 3.5.1 DIGITAL HIGH POWER LOGGER

Open the covers of all devices in the network by wedging open the latch on the right-hand side. (If needed, use a flathead screwdriver for leverage.) Unscrew the two Torx screws beneath the latch with the provided Torx key. Open the cover.

**Important! Ensure that no dirt, water, or other contaminants enter the enclosure.**



**FIGURE 9:** Open the Cover of a DHP Logger

#### 3.5.2 ALL OTHER LOGGERS (NOT DHP)

Unscrew the four cap screws on the enclosure. Remove the cover.

**Important! Ensure that no dirt, water, or other contaminants enter the enclosure.**

### 3.6 CONNECT THE SENSORS

**Note:** Multi-channel, Addressable, and Digital High Power loggers will stop trying to read an empty channel after two attempts. The logger will read all channels at the top of every hour and will resume sampling when it detects a sensor.

#### 3.6.1 CABLE GLAND CONNECTIONS

For ease of wiring, sensor cables should be inserted into the cable glands on Multi-channel loggers in order from left to right and wired into the VW terminal blocks in sequence, starting with channel one.

To connect a sensor:

1. Loosen the nut on the cable fitting and remove the plastic dowel.
2. Slide the sensor cable through the cable gland nut and fitting.
3. Connect the cable leads to the terminal block by holding down an orange tab, inserting the lead, and then releasing the tab. The wiring order is shown in the tables and figures below.

**Important! To prevent a short circuit, do not allow the cable leads to touch each other during or after wiring.**

4. Pull gently on each conductor to ensure it is secure.



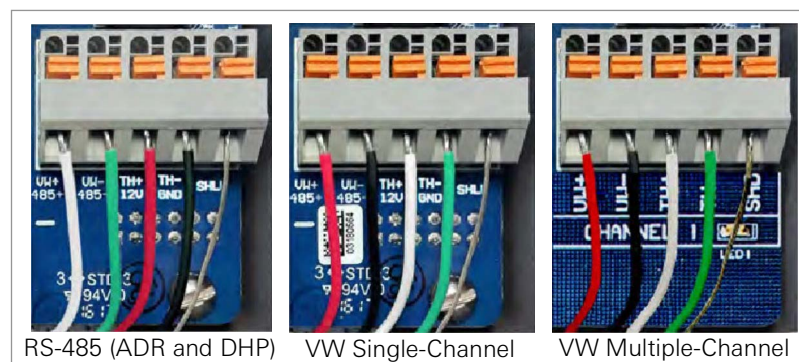
5. Tighten the cable gland nut until it firmly grips the outer jacket of the cable. The cable gland nut must be properly tightened to prevent water entry. Do not overtighten, as this might strip the plastic threads.
6. Pull gently on the gauge cable to ensure it is held in place by the cable gland.
7. Repeat these steps for each gauge cable to be connected.

| Single/Multiple.Channel Vibrating Wire Logger |       |                        |
|---|-------|------------------------|
| Position                                      | Color | Description            |
| VW+   | RED   | Vibrating Wire+        |
| VW-   | BLACK | Vibrating Wire-        |
| TH+   | WHITE | Thermistor+            |
| TH-   | GREEN | Thermistor-            |
| SHD   | BARE  | Analog Ground (Shield) |

**TABLE 8:** Vibrating Wire Logger Wiring

| Addressable and Digital High Power (RS-485) Loggers |       |                        |
|---|-------|------------------------|
| Position  | Color | Description            |
| 485+  | WHITE | RS-485 Data+           |
| 485-  | GREEN | RS-485 Data-           |
| 12V / VBUS  | RED   | 12 Volt Bus            |
| GND   | BLACK | Bus Ground             |
| SHD / EGND  | BARE  | Analog Ground (Shield) |

**TABLE 9:** Addressable and Digital High Power (RS-485) Logger Wiring



**FIGURE 10:** Terminal Connections

### 3.6.2 10-PIN CONNECTIONS

To connect a device using a 10-pin connection:

1. Remove the cover from the 10-pin connector.
2. Align the grooves on the sensor connector (male), with the connector on the logger (female).
3. Push the connector into place and then twist the outer ring of the male connector until it locks.

### 3.7 EXPANDING LOGGER CAPACITY (OPTIONAL)

Model 8960 Digital Vibrating Wire Interfaces can be connected to GeoNet Multi-Channel, Addressable, and Digital High Power Loggers to expand the capacity of the logger. Multiple VW interfaces can be daisy-chained together to bus the data to a single logger. The bus limit is 32 units or 64 Channels.

Refer to the [Model 8960 Instruction Manual](#) for information on how to connect a logger to an interface, how to address the interfaces, and other applicable steps. To get immediate software recognition the interfaces must be connected before the logger has been powered on.



Model 8960 Manual

### 3.8 POWER THE LOGGER

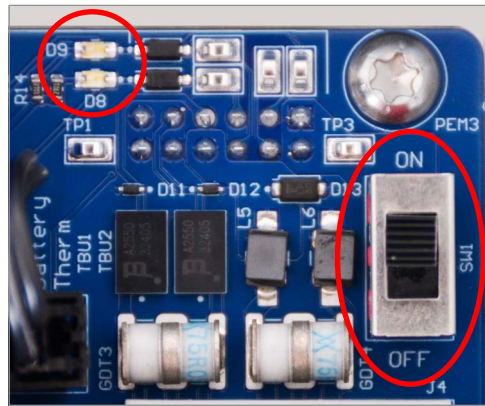
Connect the AC adaptor (USB-C for DHP loggers), solar panel, or other external power source. (Though equipped with an internal battery, loggers must have an external power source.)

Move the battery switch to the ON position for DHP loggers (Figure 11), or to the EXT BATTERY or INT BATTERY position for all other Loggers (Figure 12) according to Table 11. (The battery switch is located on the battery board inside the enclosure.) The green LED on the right side of the box will flash twice, indicating the unit has power.

**Note:** The LEDs are located on the battery board for DHP loggers. See Table 10 for the various LED indications.

| Green LED | Blue LED | Charge State          |
|-----------|----------|-----------------------|
| Off       | Off      | No Power              |
| On        | On       | Bulk                  |
| Off       | On       | Absorption            |
| On        | Off      | Float (Fully Charged) |

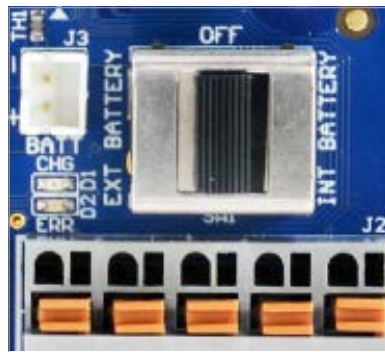
**TABLE 10:** Digital High Power Logger Battery Board LED Indicator Meaning



**FIGURE 11:** Digital High Power Logger Battery Switch

| Power Source                         | Geographic Zone |             |
|--------------------------------------|-----------------|-------------|
|                                      | Sub Polar       | Temperate   |
| Mains or solar with external battery | EXT BATTERY     | INT BATTERY |
| Solar without external battery       | N/A             |             |

**TABLE 11:** All Other Loggers (Not DHP) Battery Switch

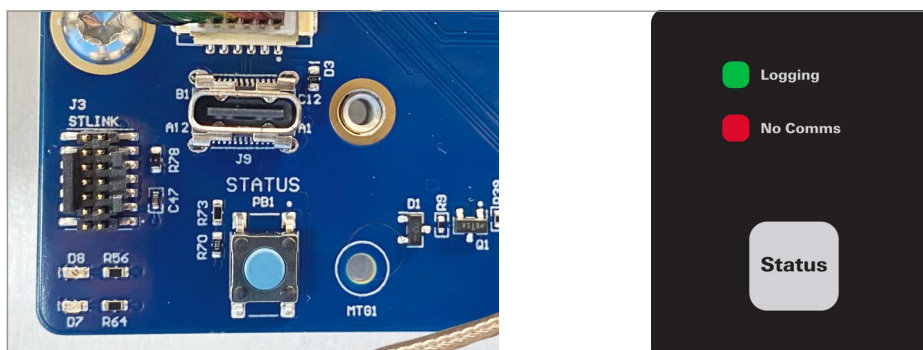


**FIGURE 12:** All Other Loggers (Not DHP) Battery Switch

### 3.9 VERIFY NETWORK CONNECTIVITY

The network status can be checked by pressing the status button on the side of the enclosure (for DHP loggers, this is a small blue button located inside the enclosure). When pressed, the status button triggers the appropriate LED indicators to briefly illuminate. The table below shows the meaning of the various LED indications.

Cellular loggers will normally connect to the network within approximately five minutes. (GeoNet Cellular loggers are compatible with all major networks except Verizon.) Satellite loggers may take up to 20 minutes to connect. For Wi-Fi loggers, follow the instructions in Section 13.



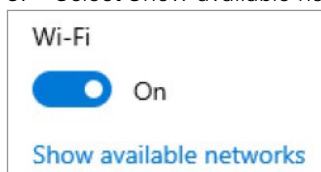
**TABLE 11:** Status Button and LED Location, DHP Logger (Left) and All Other Loggers (Right)

| Logging LED | Comms LED | Indication                     |
|-------------|-----------|--------------------------------|
| Green       |           | Logging, good communications   |
| Green       | Red       | Logging, no communications     |
|             | Red       | Not Logging, no communications |

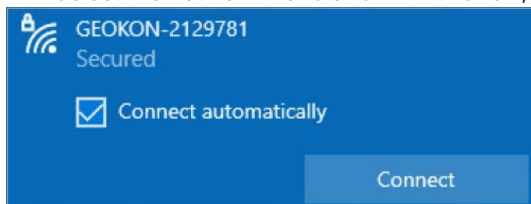
**TABLE 12:** LED Indicator Meaning

### 3.10 CONNECT TO A WI-FI NETWORK (8930 LOGGERS ONLY)

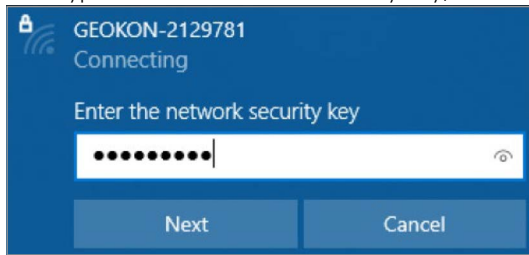
1. Turn on power to the 8930 GeoNet Wi-Fi logger.
2. Open Wi-Fi settings in Windows.
3. Select Show available networks.



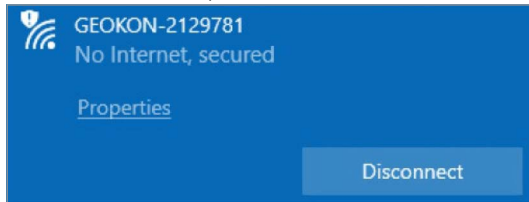
4. Select the network that starts with GEOKON, and then select the Connect button.



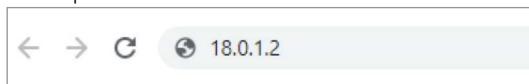
5. Type i<3GeoNet for the security key, and select the Next button.



6. The window updates to show that the connection was made.



7. Open a web browser and enter 18.0.1.2 in the window, and then press the Enter key.



8. Enter the name of your Wi-Fi network, and then click Submit.

Please select or enter a network name:

9. Enter your network password, and then click Submit.

Network:

Password:

10. A message is shown when the connection is complete.
11. If desired, a static IP address can be set in the GEOKON API portal after commissioning the gateway using the Wi-Fi Configuration.

### 3.11 SEAL THE LOGGER

#### 3.11.1 DIGITAL HIGH POWER LOGGER

1. Record the serial number of the loggers and the attached sensors. For multiple-channel loggers, also record the channel to which each sensor has been connected. (The serial numbers are used for identification purposes in the API portal and Agent software.)
2. Make sure the cover gasket and the mating ridge on the enclosure are clean.
3. Close the cover and tighten the two Torx screws.
4. Push the latch firmly closed onto the cover.

**Note:** Make sure any unused openings are plugged with the provided dowel and the cable gland nut is tightened.

#### 3.11.2 ALL OTHER LOGGERS (NOT DHP)

1. Record the serial number of the loggers and the attached sensors. For multiple-channel loggers, also record the channel to which each sensor has been connected. (The serial numbers are used for identification purposes in the API portal and Agent software.)
2. Make sure the cover gasket and the mating ridge on the enclosure are clean and that the gasket is properly seated inside the groove.

3. Place the cover on the unit, making sure the orientation is correct.
4. Tighten the cover screws a little at a time, working in a diagonal pattern.
5. Check that the cover has closed tightly and evenly.

**Note:** Make sure any unused openings are plugged with the provided dowel and the cable gland nut is tightened.



OpenAPI Portal

### **3.12 COMMISSION (ACTIVATE) THE LOGGER**

Network loggers are commissioned (activated) using the GEOKON API portal: [api.geokon.com](https://api.geokon.com).

## 4. MAINTENANCE

---

### 4.1 WEATHER PROOFING

GeoNet devices are designed to be splash proof and rain proof but **are not submersible**. The enclosures are sealed by a gasket. The gasket will only prevent water entry if the screws that hold the lid in place are properly tightened, and the gasket is properly aligned inside the lid.

Always mount the devices so that the cable entries are on the bottom. Ensure the cable gland fittings are securely tightened and that the white plastic dowels provided are used to plug cable entries which are not in use. For models that feature a 10-pin connector, the watertight cap must be installed when the connector is not in use.

Despite these precautions, the loggers may encounter leakage along the cable if the cable is cut, or if the unit is installed in an especially humid environment.



Technical Support

## APPENDIX A. TROUBLESHOOTING

---

Listed below are a few commonly experienced problems and remedial action. Visit [geokon.com/Technical-Support](https://geokon.com/Technical-Support) for additional troubleshooting help.

### ***SYMPTOM: UNIT WILL NOT RESPOND TO COMMUNICATIONS***

- ☐ Wrong connection type, or incorrect address specified in Agent software.
- ☐ The batteries may be improperly installed. Check their placement.
- ☐ The batteries inside the unit may be dead. Replace the batteries.

### ***SYMPTOM: DATA PRESENT (E.G., BATTERY/SIGNAL STRENGTH) BUT NO VW GAUGE DATA AVAILABLE***

- ☐ Verify that the gauge leads are wired correctly inside the logger. (See Section 3.6.1).
- ☐ Check the gauge for proper operation with an independent readout, such as a GK-404 or GK-406.

### ***SYMPTOM: VW GAUGE READING IS UNSTABLE***

- ☐ Move any sources of electrical noise away from the transducer cable, such as generators, motors, arc welding equipment, high voltage lines, etc.

### ***SYMPTOM: THERMISTOR DISPLAY SHOWS -273.15 DEGREES C***

- ☐ This indicates an open circuit to thermistor leads. Verify that the thermistor leads are properly connected inside the logger. (See Section 3.6.1).
- ☐ Check the thermistor for proper operation with an independent readout, such as a GK-404 or GK-406.

### ***SYMPTOM: NO LIGHTS WHEN PRESSED***

- ☐ Make sure that a power source is connected to the logger.
- ☐ Make sure the power switch is not in the center (OFF) position
- ☐ Device malfunction, contact GEOKON

### ***SYMPTOM: GREEN LIGHT FLASHING ONCE PER SECOND***

Bootloader is activated, complete the following:

1. Check whether any channel switches are in the ON position.
2. If channel switches were set to ON, set them to the OFF position and then press the blue reset button.
3. If the light is still flashing, a firmware update was interrupted. Update the firmware to the latest version. Firmware can be downloaded at [geokon.com/Software](https://geokon.com/Software) (Instructions are included with the download)

### ***SYMPTOM: GREEN AND RED LIGHT ALTERNATING***

- ☐ Device malfunction, contact GEOKON

### ***SYMPTOM RED LIGHT***

- ☐ Make sure the antenna is not obstructed
- ☐ Raise or otherwise elevate the mounting location
- ☐ Make sure the unit is activated in the API portal



Software Resources

## APPENDIX B. SOLAR PANEL KIT

---

The GEOKON Solar Panel Kit enables you to power a GeoNet Logger in an area that has no access to mains / domestic power.



**FIGURE 14:** Solar Panel for DHP Loggers (8900-SOL-10W-USB) and All Other Loggers (8900-SOL-10W-BRJ)

Inside the kit box are the following:

- One envelope containing technical documents and instructions
- One mounting bracket
- One solar panel complete with power regulation circuitry and power cable



**FIGURE 15:** Solar Panel Kit Box Contents

Install the solar panel by following the steps listed below. Each step is described in detail in the sections that follow.

1. Select a location for the solar panel.
2. Assemble and adjust the mounting bracket to the proper angle.
3. Install the mounting bracket onto the mounting surface or pole.
4. Secure the solar panel to the mounting bracket.
5. Turn on the logger and connect the power cable.

### B.1 SELECT A LOCATION

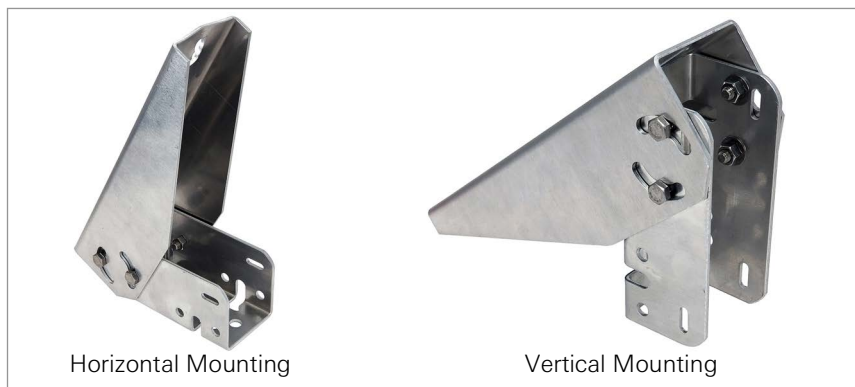
Choose a location for the solar panel that is clear of obstructions and anything that might cast a shadow on the panel.



## B.2 ASSEMBLE THE MOUNTING BRACKET

When assembling the two sections of the mounting bracket, be sure to set the sections to the desired angle before tightening the nuts. The angle of the mounting bracket will dictate the angle of the solar panel.

- Ensure the angle is at least 10 degrees, to aid in water control.
- In general, choose the best angle for the latitude of your location.
- Mounting on a horizontal surface will require a reverse configuration of the two sections compared to mounting vertically, as shown below.



**FIGURE 16:** *Mounting Options*

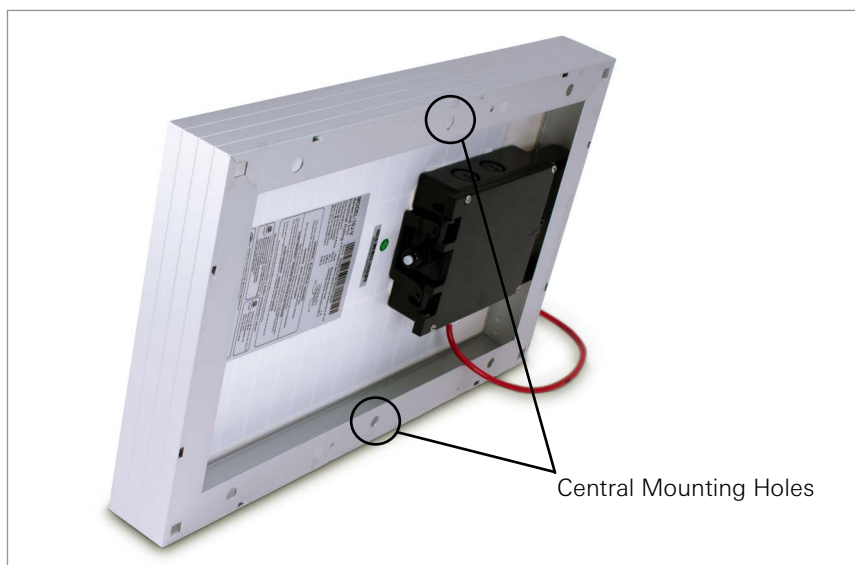
## B.3 INSTALL THE MOUNTING BRACKET

Mount the bracket on a flat surface (roof, wall, etc.) using locally supplied bolts or lag screws. If mounting to a pole, use locally supplied U-bolts and retaining clamps.

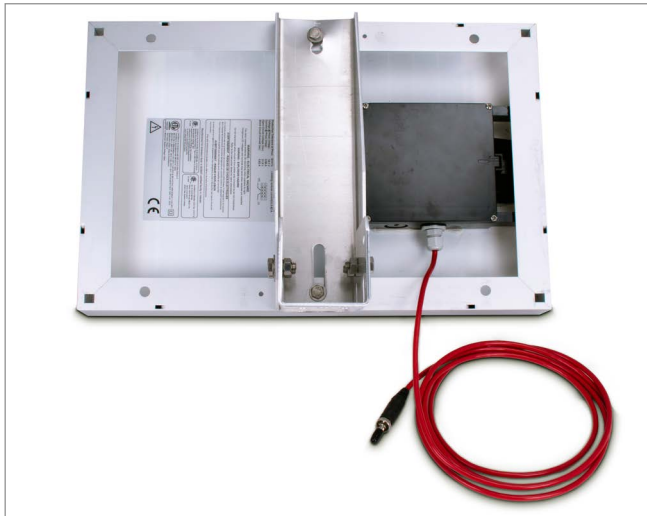
## B.4 SECURE THE SOLAR PANEL TO THE MOUNTING BRACKET

Use the included nuts and screws to secure the solar panel to the mounting bracket. Use the centrally located holes provided for this purpose on the back of the solar panel.

**Note:** Be sure to mount the solar panel with the cable coming out the bottom of the panel, as shown below.



**FIGURE 17:** *Centrally Located Mounting Holes*



**FIGURE 18:** Mounting Brackets Fastened Centrally

## B.5 CONNECT THE POWER CABLE

### B.5.1 BATTERY SWITCH

Before connecting the power cable, be sure you have set the battery switch in the ON position for DHP loggers, or as indicated in Table 13 for all other loggers.

| Power Source                         | Geographic Zone |             |
|--------------------------------------|-----------------|-------------|
|                                      | Sub Polar       | Temperate   |
| Mains or solar with external battery | EXT BATTERY     | INT BATTERY |
| Solar without external battery       | N/A             |             |

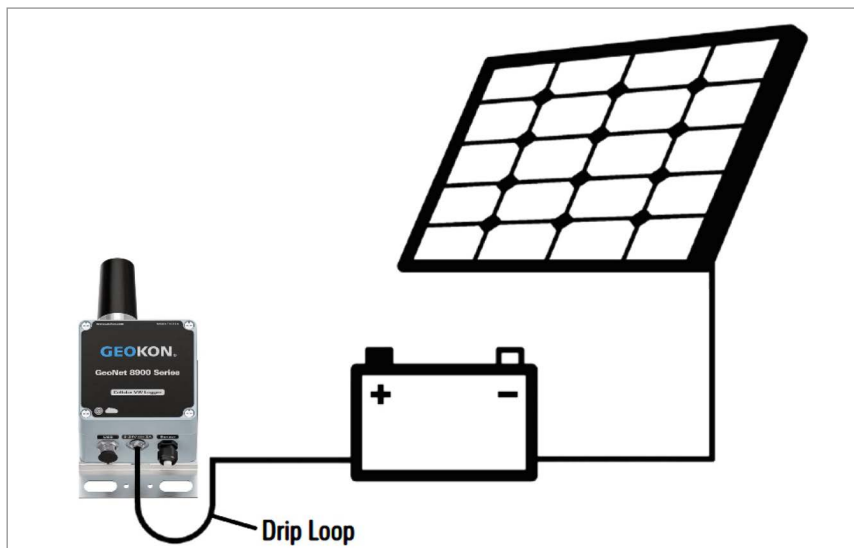
**TABLE 13:** All Other Loggers (Not DHP) Battery Switch

### B.5.2 MAKING THE CONNECTION

Remove the plastic cap from the cable connector, then attach it to the EXT BATTERY plug on the logger (USB-C plug for DHP loggers). Tighten the retaining ring on the plug, for strain relief.

**Note:** All GeoNet Loggers have a USB port. However, only the DHP loggers can be charged via USB.

**Note:** Be sure to implement a drip loop, as indicated in the previous figure, to prevent water ingress through the power connector.



**FIGURE 19:** Solar Panel with External Battery

## APPENDIX C. SPECIFICATIONS

### C.1 VIBRATING WIRE LOGGER SPECIFICATIONS

|                            |  |
|----------------------------|--|
| Trueness                   | 0.082 Hz   |
| Frequency Precision        | ±0.146 Hz (99% CI)                               |
| Frequency Resolution       | ±0.002 Hz  |
| Thermistor Accuracy        | 1% (0.5° C thermistor point match)               |
| Thermistor Resolution      | 0.032 °C   |
| Scan Interval              | 10-1440 Minutes                                  |
| Data Transmission Interval | 8920, 8930: 10-1440 minutes<br>8950: 120 minutes |
| Power Supply               | Mains power or solar                             |
| Operating Temperature      | -40 °C to +85 °C (range varies by power source)  |
| VW Frequency Range         | 400-6,500 Hz                                     |
| Enclosure Material         | Die-cast aluminum                                |
| Enclosure Dimensions       | See Appendix E                                   |

**TABLE 14:** *Vibrating Wire Logger Specifications*

### C.2 DIGITAL LOGGER (ADDRESSABLE AND DIGITAL HIGH POWER) SPECIFICATIONS

|                            |   |
|----------------------------|---|
| Data Memory                | 32 MB   |
| Storage Capacity           | Varies by sensor sting connected  |
| MEMS Sensor Limits         | ADR: 64 Sensors (90 sensors, with the sensor string powered via external 12 V power supply)<br>DHP: 250 MEMS or 500 Model 6140 MEMS Sensors |
| Communication Protocol     | RS-485 Modbus   |
| Thermistor Accuracy        | 1% (0.5° C thermistor point match)  |
| Thermistor Resolution      | 0.032 °C  |
| Scan Interval              | Min: 10 minutes; Max: 24 hours  |
| Data Transmission Interval | 8920, 8930: Min: 10 minutes; Max: 24 hours<br>8950: Min: 2 hours; Max: 24 hours   |
| Power Supply               | Mains power or solar  |
| Operating Temperature      | -40 °C to +85 °C (range varies by power source)   |
| Enclosure Material         | ADR: Die-cast aluminum<br>DHP: Die-cast aluminum, IP 68 rated to 1.5 m (5 feet)   |
| Enclosure Dimensions       | See Appendix E  |

**TABLE 15:** *Digital Logger (Addressable and Digital High Power) Specifications*

### C.3 TILT LOGGER SPECIFICATIONS

|                                   |  |
|-----------------------------------|--|
| Range <sup>1</sup>                | ±90°   |
| Resolution <sup>2</sup>           | 0.00025° (0.004 mm/m)  |
| Precision <sup>3</sup>            | ±0.0075° (±0.13 mm/m)  |
| Nonlinearity                      | ±0.005° across ±30° range (±0.09 mm/m)   |
| Temperature Dependent Uncertainty | ±0.001° across ±5° range (±0.016 mm/m)<br>±0.0016° across ±15° range (±0.026 mm/m)<br>±0.0026° across ±30° range (±0.042 mm/m) |
| Axis                              | 2  |
| Data Memory                       | 32 MB  |
| Storage Capacity                  | 500,000 readings   |
| Thermistor Accuracy               | 1% (0.5 °C thermistor point match)   |
| Thermistor Resolution             | 0.032 °C   |
| Scan Interval                     | Min: 10 minutes; Max: 1 day  |
| Power Supply                      | Mains power or solar   |
| Operating Temperature             | -40 °C to +65 °C (range varies by power source)  |
| Enclosure Material                | Die-cast aluminum  |
| Enclosure Dimensions              | See Appendix E   |

**TABLE 16:** Tilt Logger Specifications

**Note:**

<sup>1</sup> Calibrated Range: ±30°

<sup>2</sup> 99% confidence interval (i.e., 99 out of 100 individual readings fall within this tolerance).

<sup>3</sup> Includes random walk (changes between consecutive readings that have no discernible cause) and seismic noise during testing.

### C.4 SUPPORTED CELLULAR FREQUENCIES

|     | Band | Frequency (MHZ) | Uplink (MHZ) | Downlink (MHZ) |
|-----|------|-----------------|--------------|----------------|
| 03G | 5    | 850             | 824-849      | 869-894        |
|     | 2    | 1900            | 1850-1910    | 1930-1990      |
| LTM | 2    | 1900            | 1850-1910    | 1930-1990      |
|     | 4    | 1700            | 1710-1755    | 2110-2155      |
|     | 8    | 900             | 880-915      | 925-960        |
|     | 28   | 700             | 703-748      | 758-803        |

**TABLE 17:** Supported Cellular Frequencies Specifications

GeoNet Cellular Loggers are compatible with all major networks except Verizon

### C.5 WI-FI SPECIFICATIONS

|              |   |
|--------------|---|
| Protocol     | IEEE 802.11 b/g/n<br>IEEE 802.11 d  |
| Band Support | Station Mode: 2.4 GHz, Channel 1–13<br>Access Point Mode: 2.4 GHz, Channel 1–11 |

**TABLE 18:** Wi-fi Specifications

## APPENDIX D. CONNECTOR PINOUTS

### D.1 VW LOGGERS WITH CABLE GLAND CONNECTION

| Terminal Strip Position | Description            | Cable Wire Color |
|-------------------------|------------------------|------------------|
| VW+                     | Vibrating Wire+        | RED              |
| VW-                     | Vibrating Wire-        | BLACK            |
| TH+                     | Thermistor+            | WHITE            |
| TH-                     | Thermistor-            | GREEN            |
| S                       | Analog Ground (Shield) | BARE WIRE        |

TABLE 19: VW Logger, Cable Gland Connection

### D.2 VW LOGGERS WITH 10-PIN BULKHEAD CONNECTION

| 10-Pin Bulkhead | Internal Wire Color | Description            | Cable Wire Color |
|-----------------|---------------------|------------------------|------------------|
| A               | Brown               | Vibrating Wire+        | RED              |
| B               | Red                 | Vibrating Wire-        | BLACK            |
| C               | Orange              | Thermistor+            | WHITE            |
| D               | Yellow              | Thermistor-            | GREEN            |
| E               | Green               | Analog Ground (Shield) | BARE WIRE        |
| F               | Blue                | +VCC Supply            | N/A              |
| G               | Violet              | Digital Ground         | N/A              |
| H               | Grey                | Mux Reset              | N/A              |
| J               | White               | Mux Clock              | N/A              |
| K               | Black               | Digital Ground         | N/A              |

TABLE 20: VW Logger, 10-Pin Bulkhead Connections

### D.3 ADDRESSABLE AND DIGITAL HIGH POWER (RS-485) LOGGERS

| Terminal Strip Position | Description            | Cable Wire Color |
|-------------------------|------------------------|------------------|
| 485+                    | RS-485 Data+           | WHITE            |
| 485-                    | RS-485 Data-           | GREEN            |
| 12V                     | 12 Volt Bus            | RED              |
| GND                     | Bus Ground             | BLACK            |
| S                       | Analog Ground (Shield) | BARE WIRE        |

TABLE 21: Addressable Logger, Cable Gland Connections

**APPENDIX E. UNIT DIMENSIONS**

**E.1 8920 AND 8930 SERIES LOGGERS**

**E.1.1 SINGLE-CHANNEL (01C) AND ADDRESSABLE (ADR) MODELS**



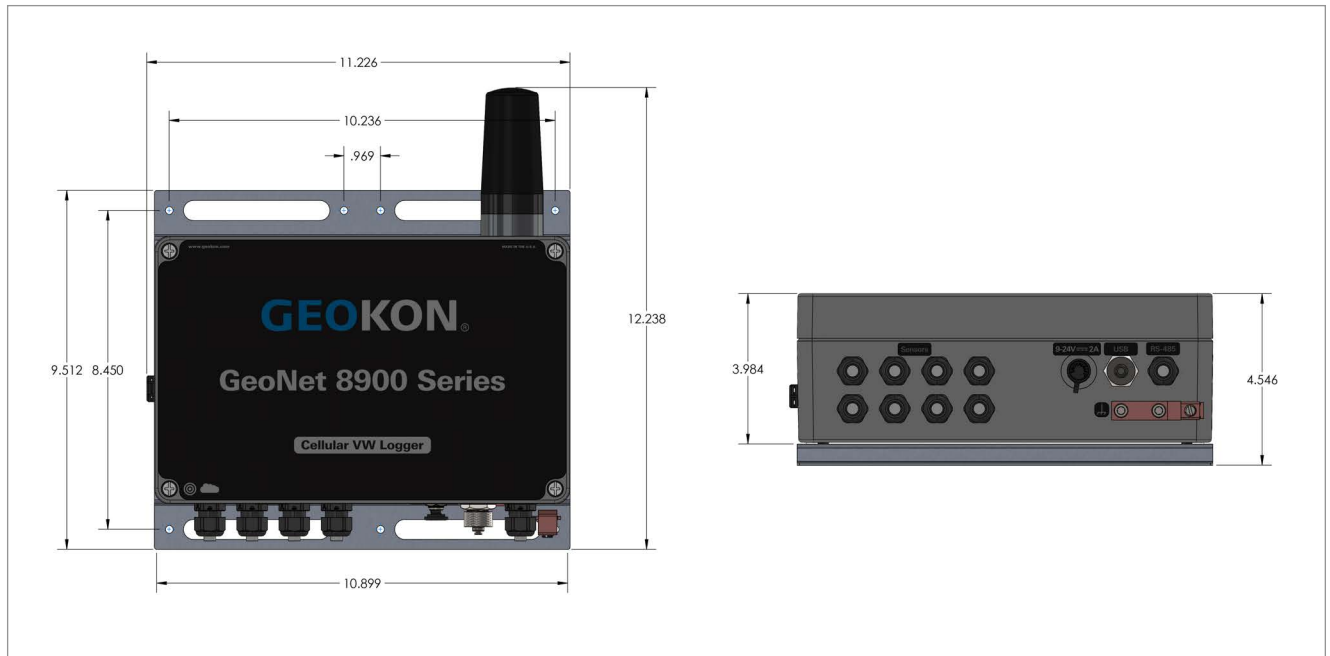
**FIGURE 20:** Single-Channel (01C) and Addressable (ADR) Models

**E.1.2 FOUR-CHANNEL (04C) MODELS**



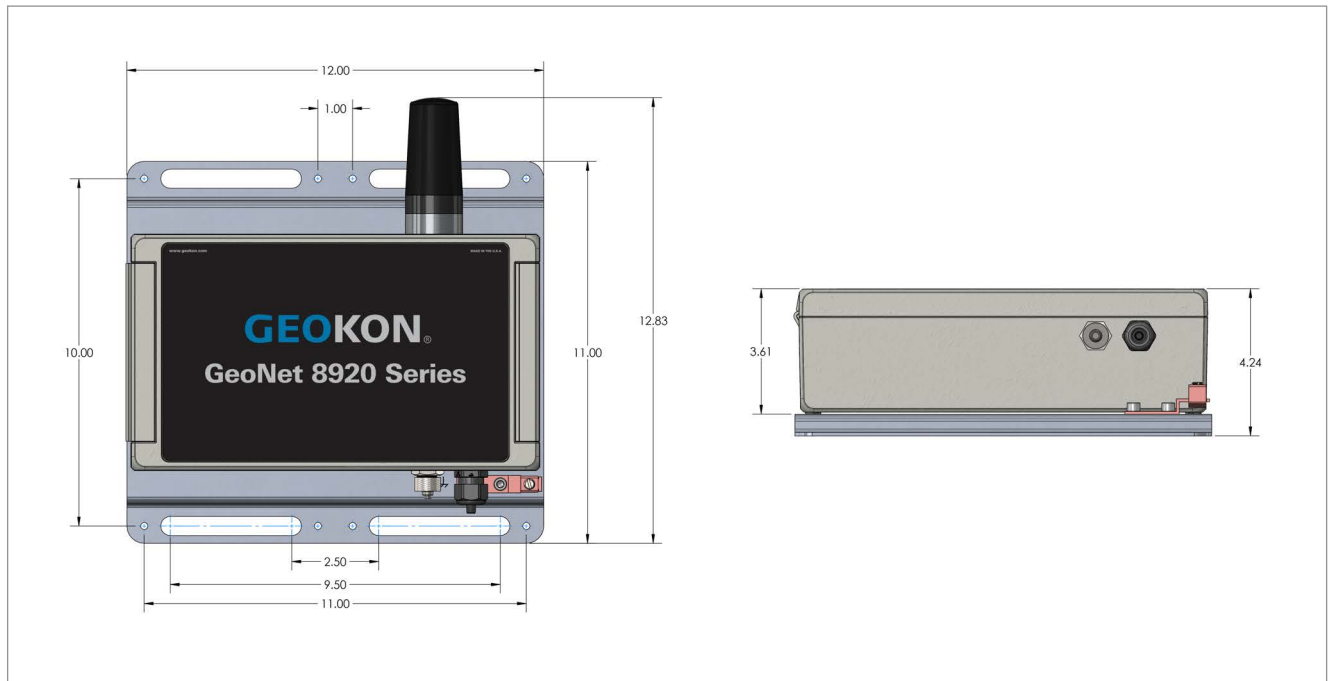
**FIGURE 21:** Four-Channel (04C) Models

### E.1.3 EIGHT-CHANNEL (08C) MODELS



**FIGURE 22:** Eight-Channel (08C) Models

### E.1.4 DIGITAL HIGH POWER (DHP) MODELS



**FIGURE 23:** Digital High Power (DHP) Models (Antenna Not Pictured)

E.1.5 TILT (TLT) MODELS

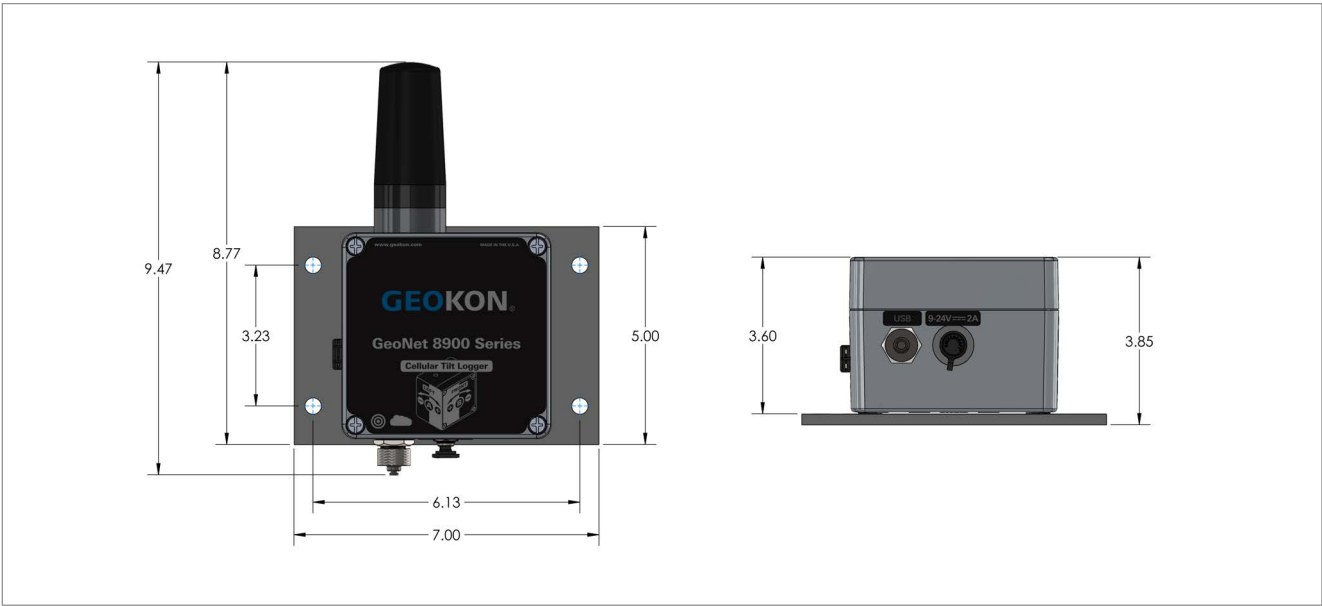


FIGURE 24: Tilt (TLT) Models

E.2 8950 SERIES LOGGERS

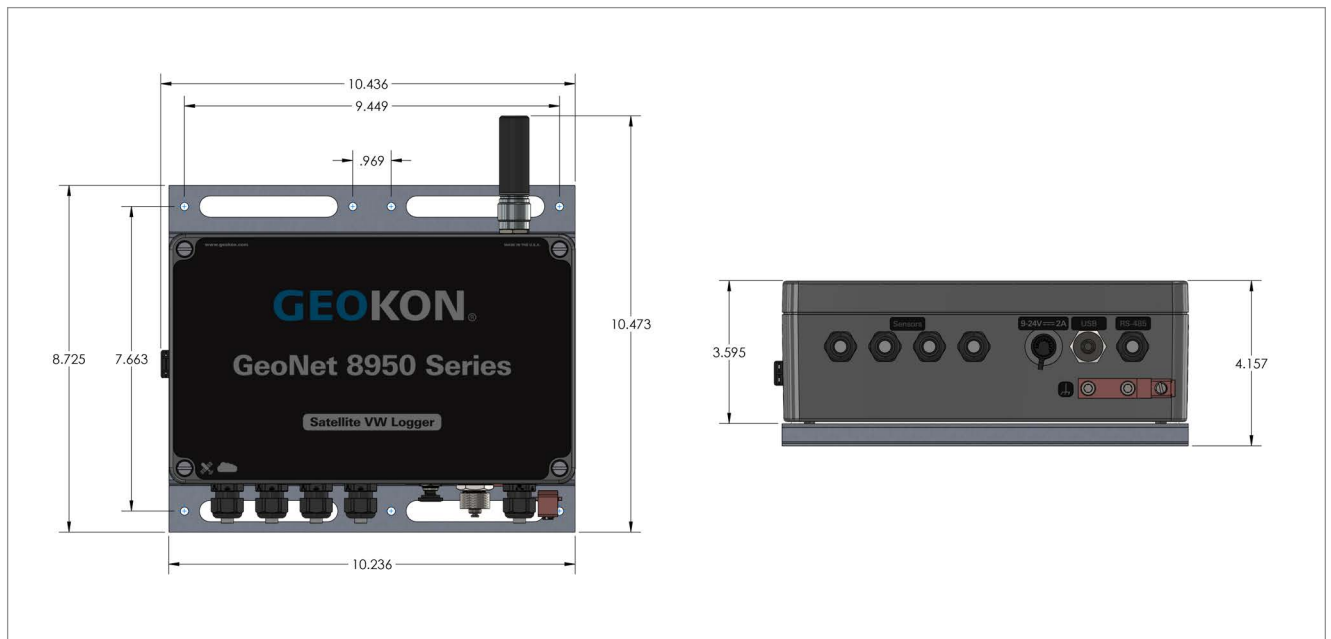
E.2.1 SINGLE-CHANNEL (01C) AND ADDRESSABLE (ADR) MODELS



FIGURE 25: Single-Channel (01C) and Addressable (ADR) Models



## E.2.2 FOUR-CHANNEL (04C) MODELS



**FIGURE 26:** Four-Channel (04C) Models

## E.2.3 EIGHT-CHANNEL (08C) MODELS



**FIGURE 27:** Eight-Channel (08C) Models

E.2.4 TILT (TLT) MODELS

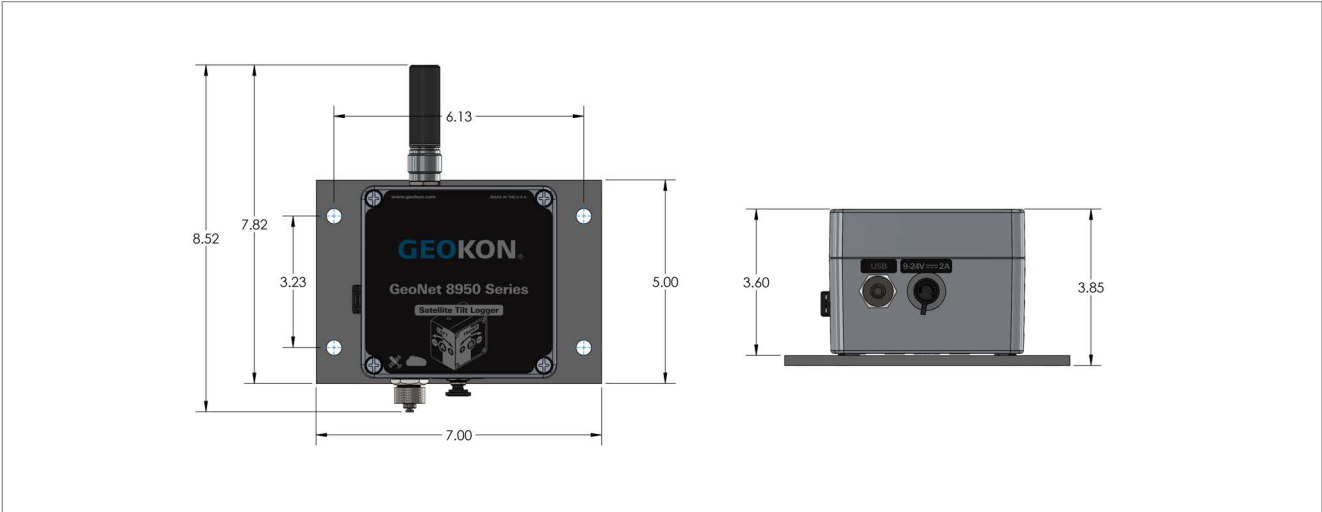
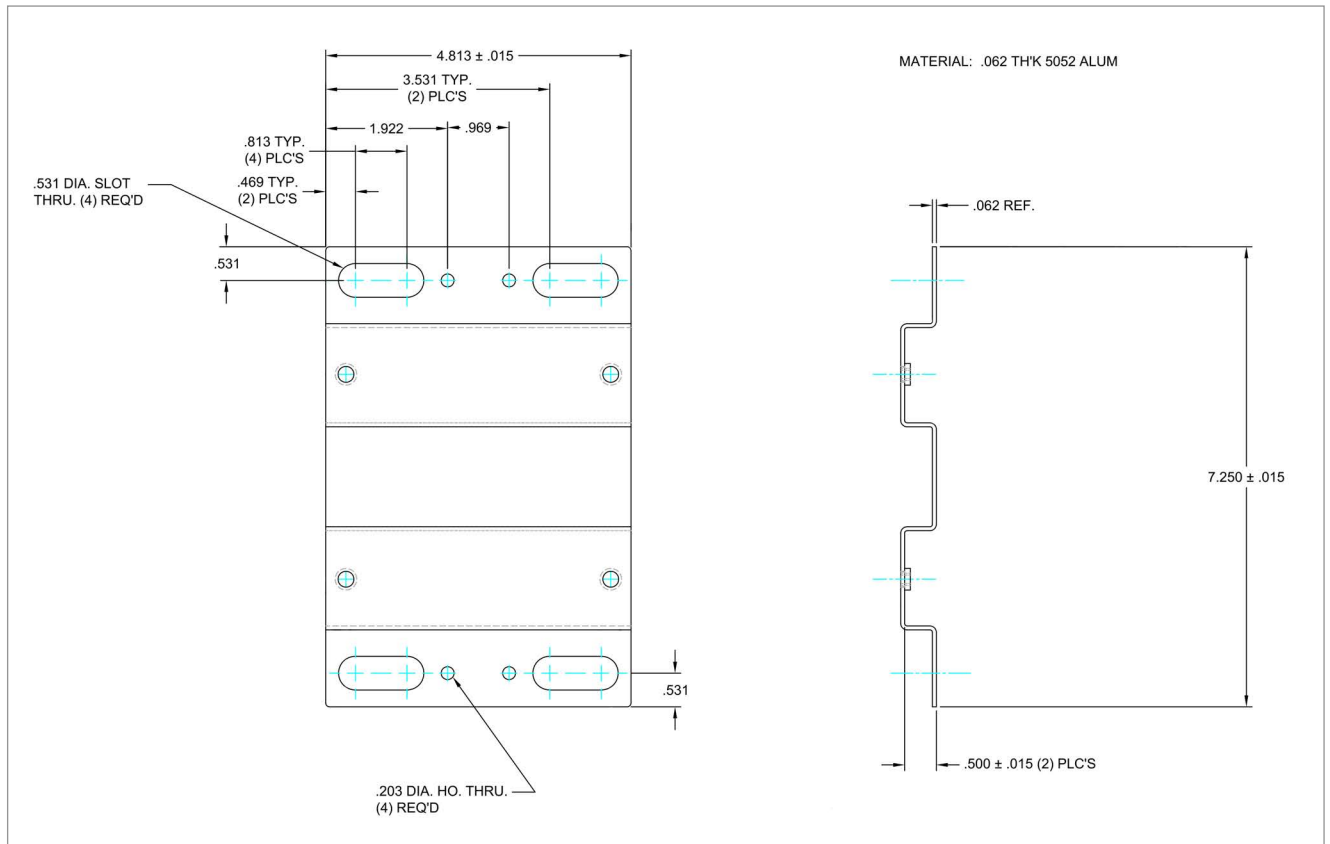


FIGURE 28: Tilt (TLT) Models

## APPENDIX F. MOUNTING BRACKET DIMENSIONS

### F.1 SINGLE CHANNEL (01C) AND ADDRESSABLE (ADR) MODELS



**FIGURE 29:** Single-Channel (01C) and Addressable (ADR) Models

F.2 FOUR-CHANNEL (04C) MODELS

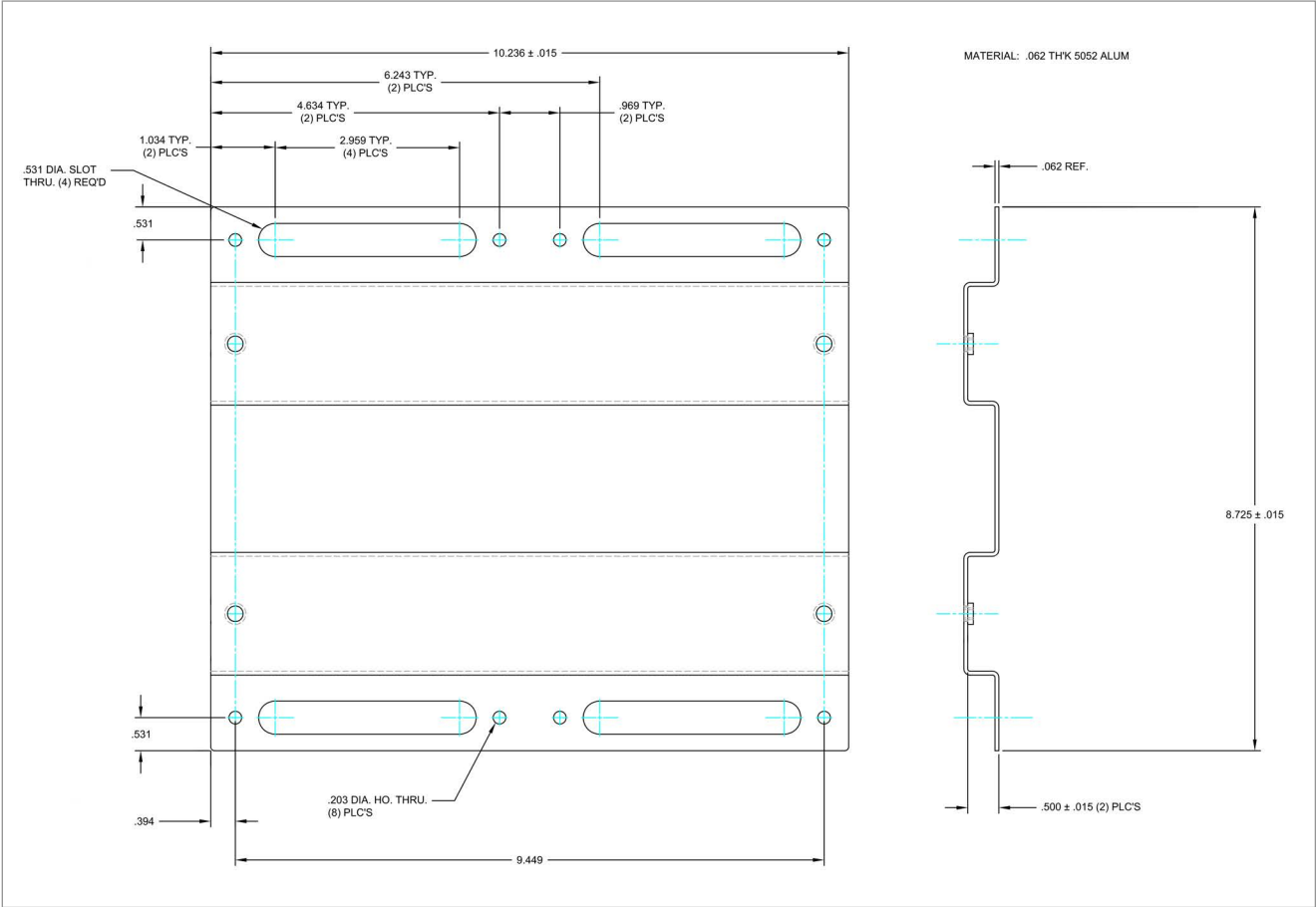
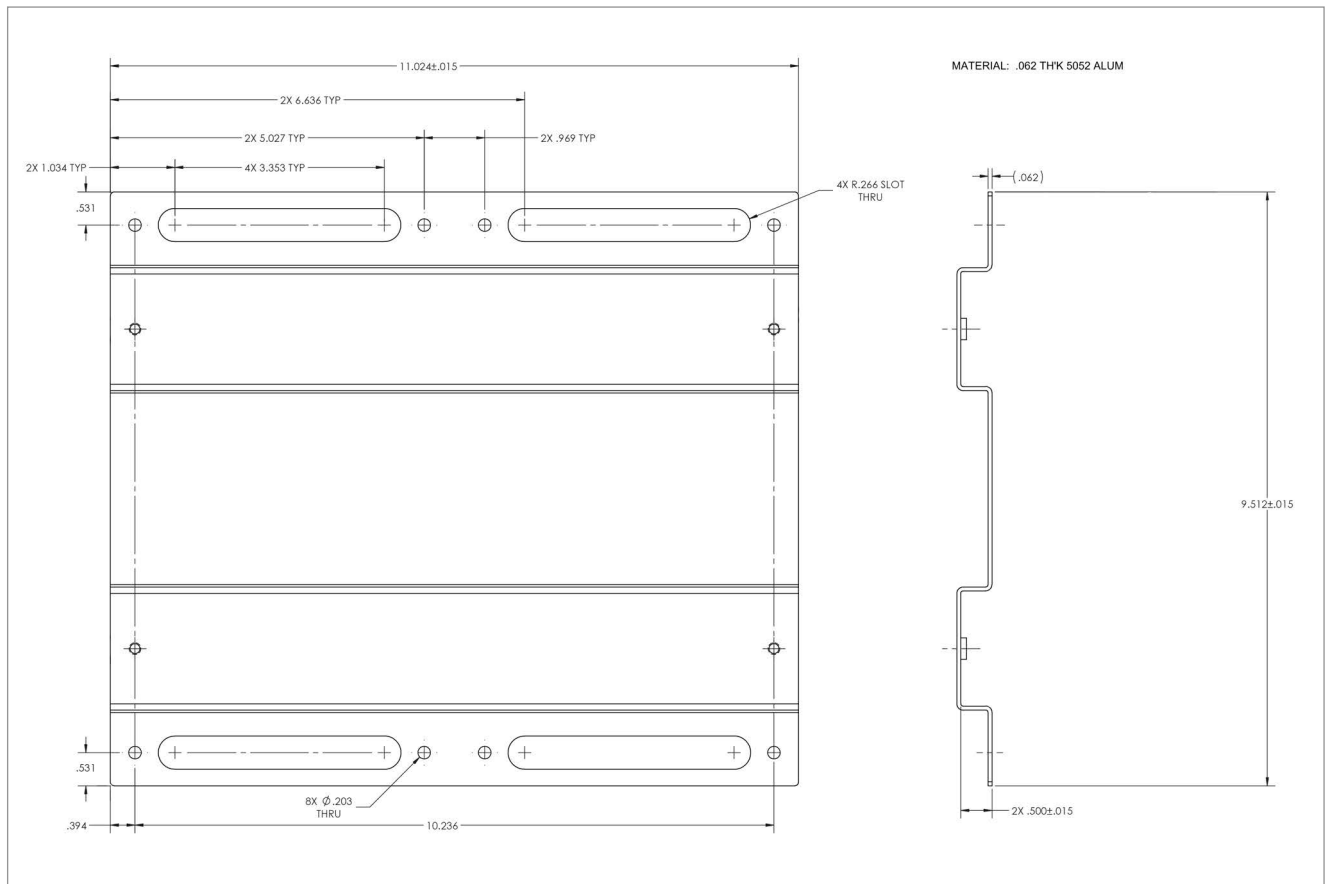


FIGURE 30: Four-Channel (04C) Models

### F.3 EIGHT-CHANNEL (08C) MODELS



**FIGURE 31:** Eight-Channel (08C) Models

F.4 DIGITAL HIGH POWER (DHP) MODELS

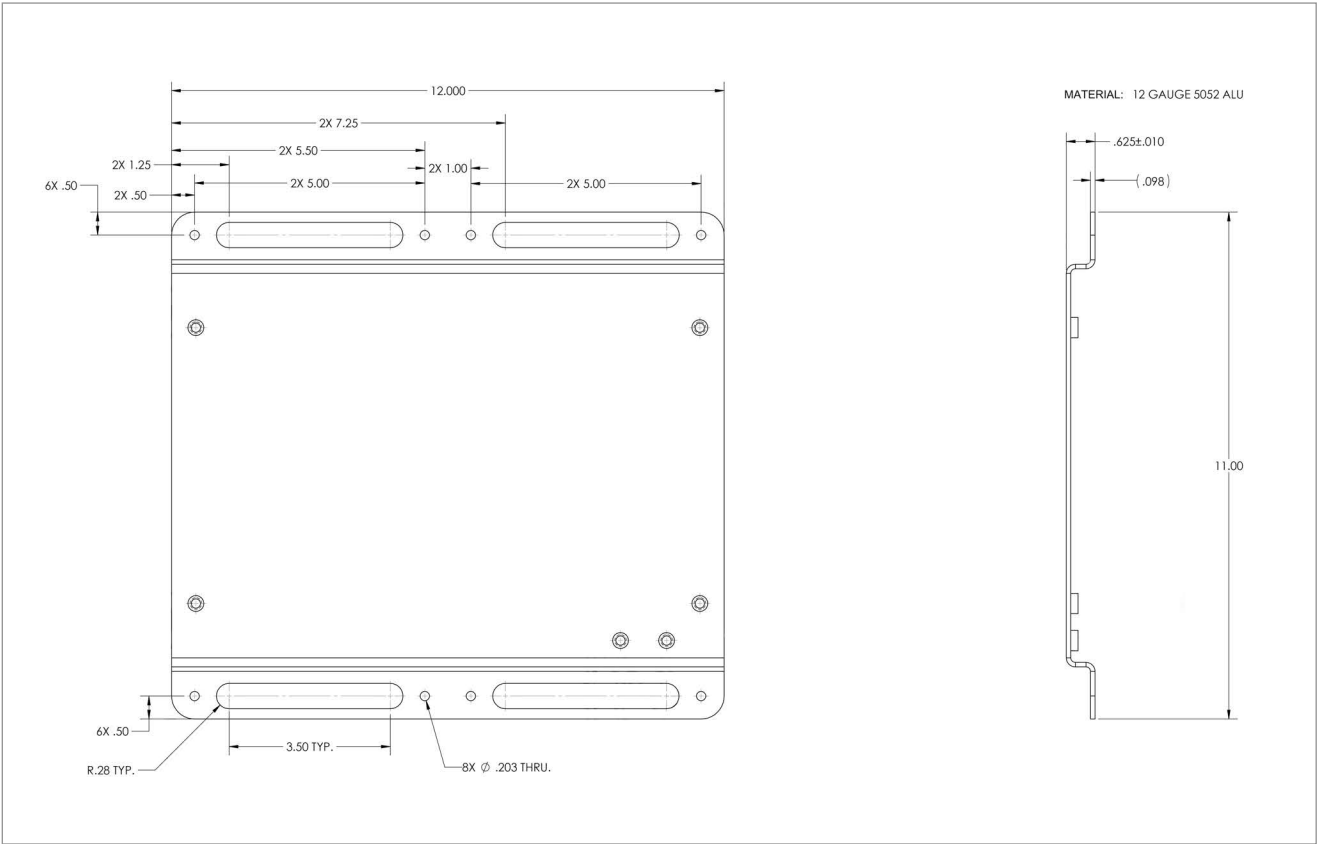


FIGURE 32: Digital High Power (DHP) Models

F.5 TILT (TLT) MODELS

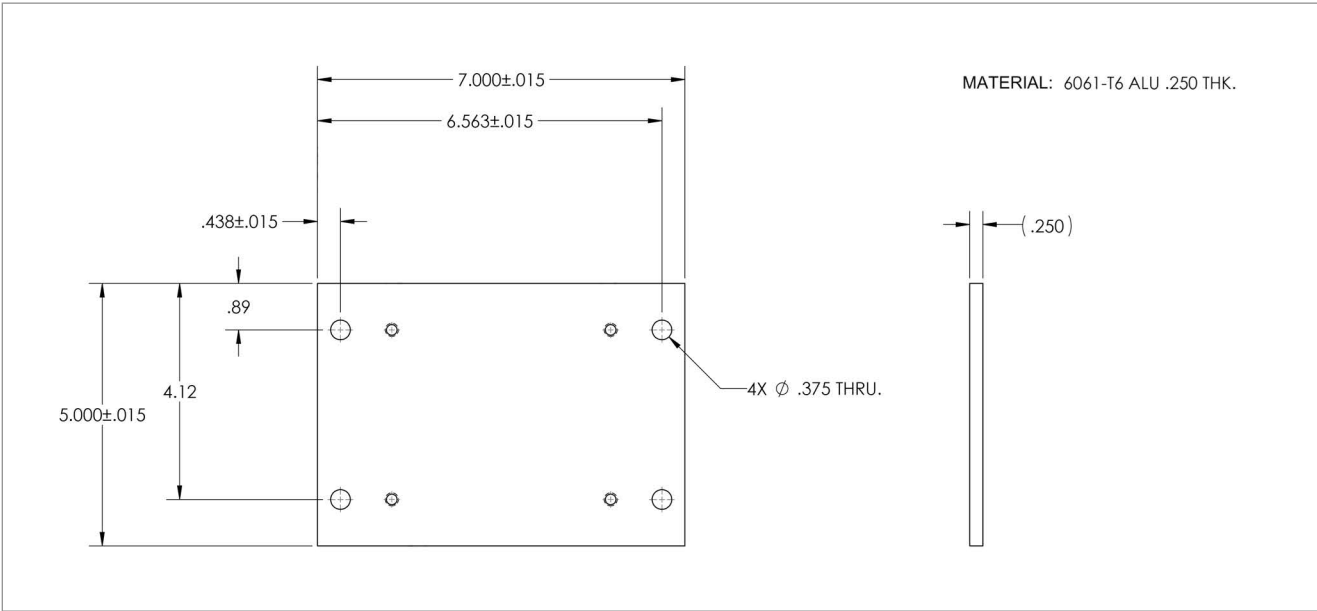
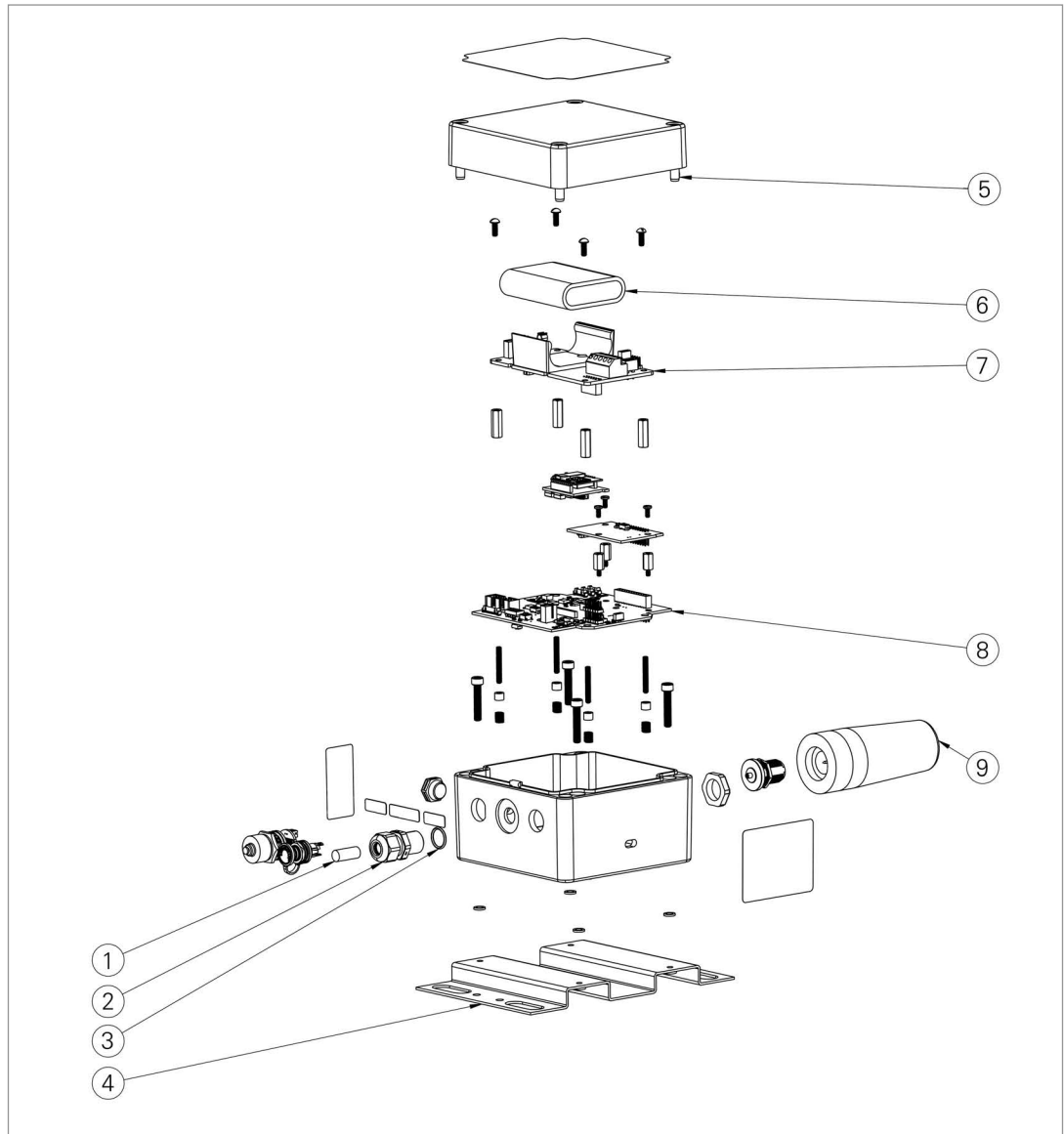


FIGURE 33: Tilt (TLT) Models

## APPENDIX G. COMPONENTS (TYPICAL REPLACEMENT PARTS)

### G.1 8920 AND 8930 SERIES LOGGERS

#### G.1.1 SINGLE-CHANNEL (01C) AND ADDRESSABLE (ADR) MODELS

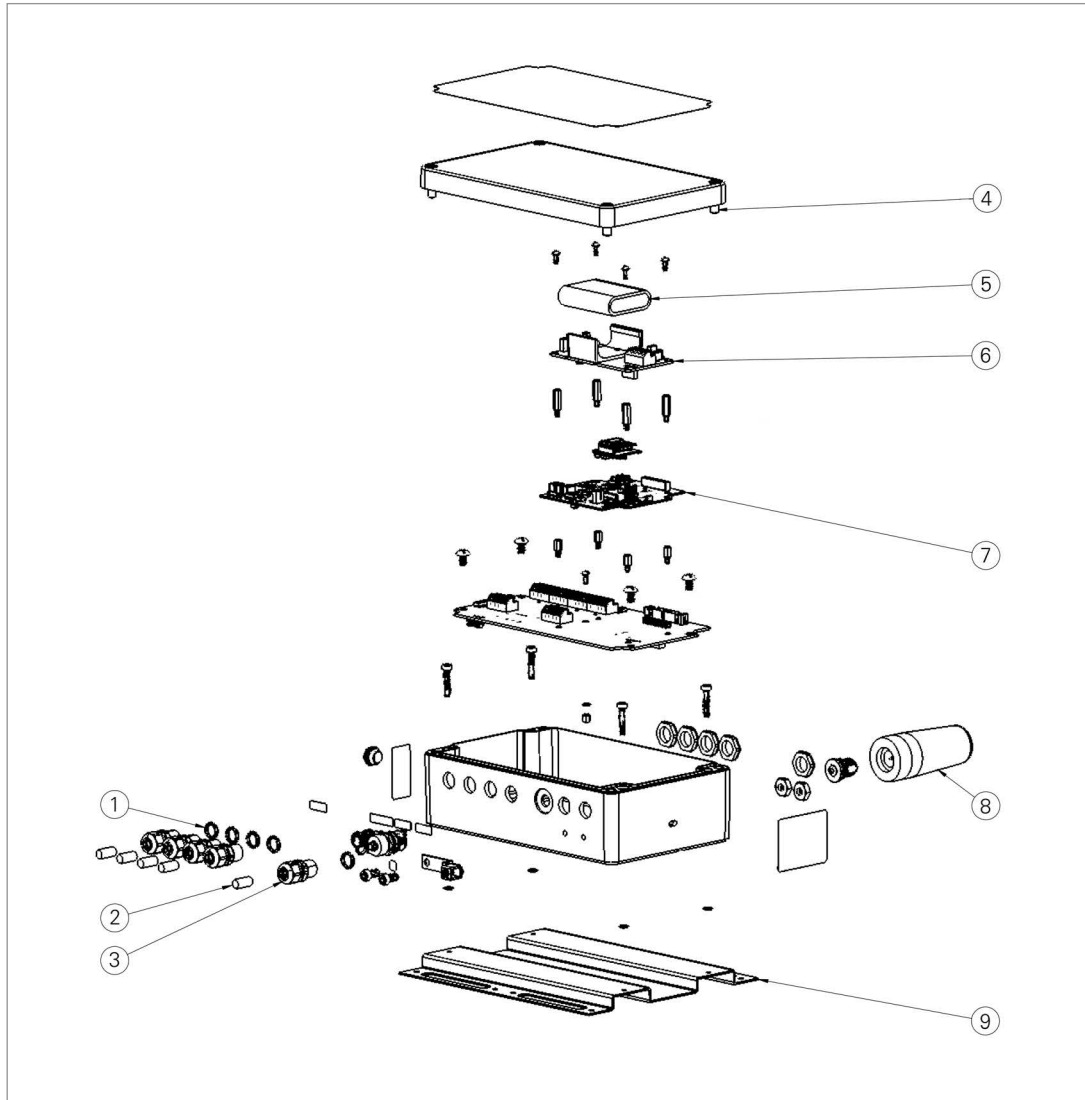


**FIGURE 34:** Single-Channel (01C) and Addressable (ADR) Models

| Item No. | Part Number | Description   |
|----------|-------------|---|
| 1        | CON-A342    | Dowel Pin   |
| 2        | CON-A331    | Cable Fitting   |
| 3        | SEAL-09     | Seal Ring for CON-A331  |
| 4        | C8800-1     | Mounting Bracket  |
| 5        | HRD-A2009   | M6 x 35 mm Allen Head Screw. When any replacements are required from the original screws, GEOKON recommends that all 4 screws are replaced. |
| 6        | BAT-207     | Battery Pack  |
| 7        | S-PCB-0292  | Battery Holder PCBA   |
| 8        | S-8900-NET  | GeoNet PCBA   |
| 9        | ELC-824     | Antenna   |

**TABLE 22:** Single-Channel (01C) and Addressable (ADR) Models Components Parts List

### G.1.2 FOUR-CHANNEL (04C) MODELS



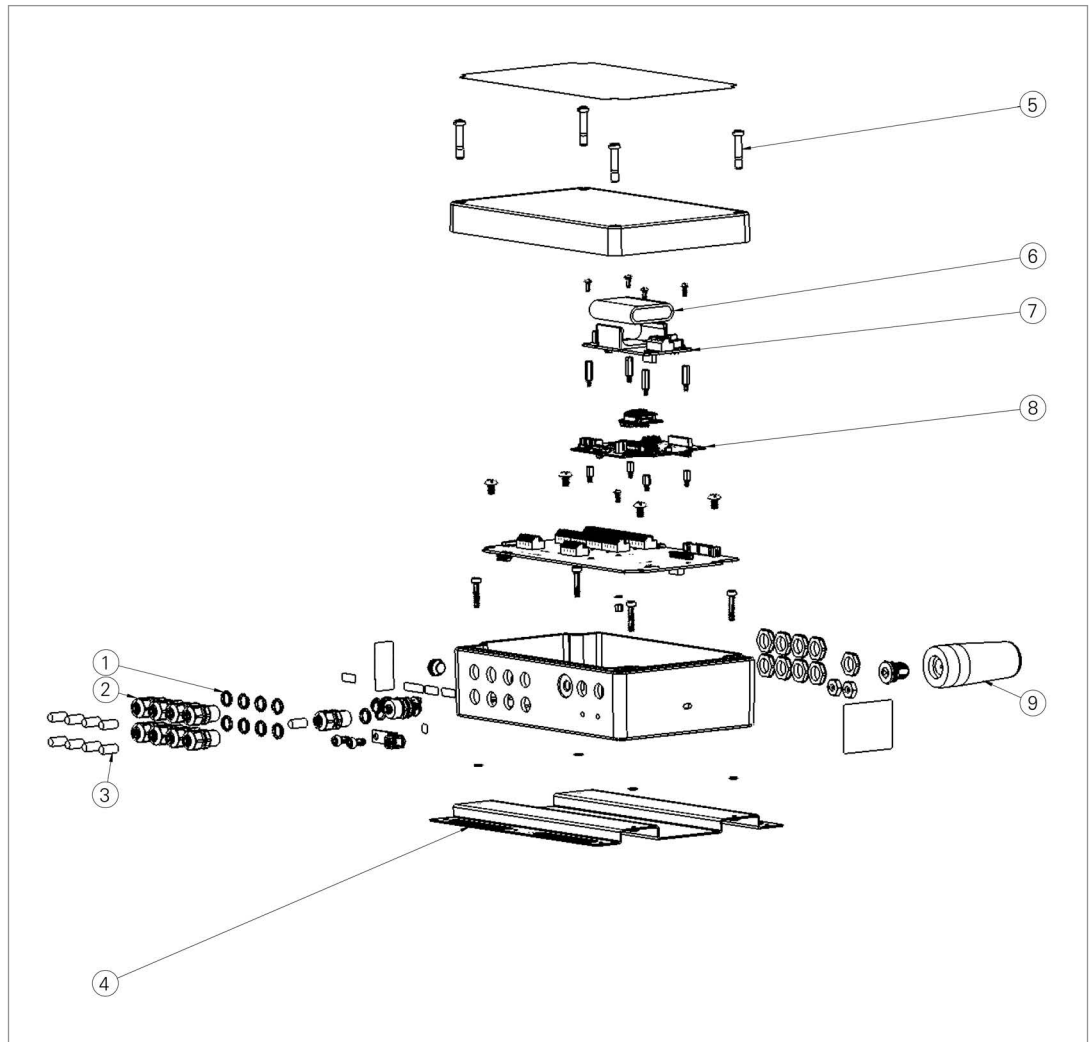
**FIGURE 35:** Four-Channel (04C) Models

| Item No. | Part Number | Description   |
|----------|-------------|---|
| 1        | SEAL-09     | Seal Ring for CON-A331  |
| 2        | CON-A342    | Dowel Pin   |
| 3        | CON-A331    | Cable Fitting   |
| 4        | HRD-A2006   | M6 x 25 mm Allen Head Screw. When any replacements are required from the original screws, GEOKON recommends that all 4 screws are replaced. |
| 5        | BAT-207     | Battery Pack  |
| 6        | S-PCB-0292  | Battery Holder PCBA   |
| 7        | S-8900-NET  | GeoNet PCBA   |
| 8        | ELC-824     | Antenna   |
| 9        | C8800-6     | Mounting Bracket  |

**TABLE 23:** Four-Channel (04C) Models Components Parts List



### G.1.3 EIGHT-CHANNEL (08C) MODELS

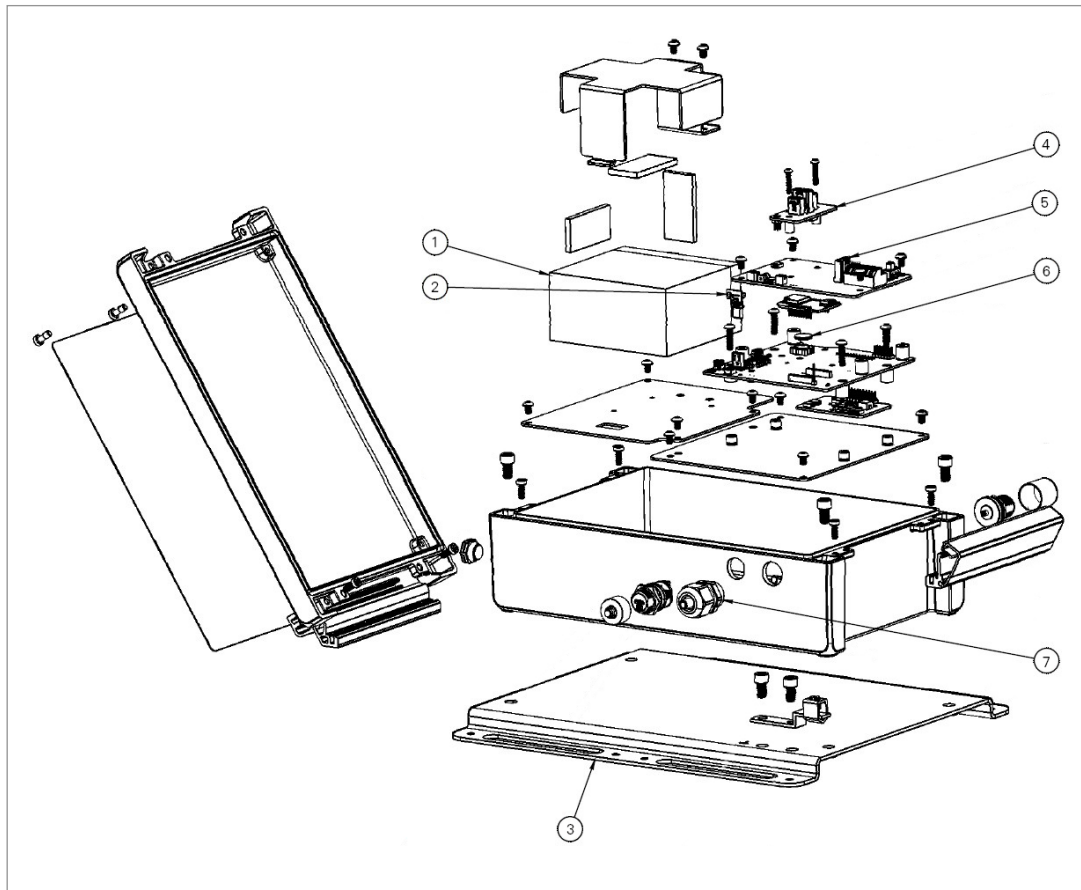


**FIGURE 36:** Eight-Channel (08C) Models

| Item No. | Part Number | Description   |
|----------|-------------|---|
| 1        | SEAL-09     | Seal Ring for CON-A331  |
| 2        | CON-A331    | Cable Fitting   |
| 3        | CON-A342    | Dowel Pin   |
| 4        | C8900-1     | Mounting Bracket  |
| 5        | HRD-A2009   | M6 x 35 mm Allen Head Screw. When any replacements are required from the original screws, GEOKON recommends that all 4 screws are replaced. |
| 6        | BAT-207     | Battery Pack  |
| 7        | S-PCB-0292  | Battery Holder PCBA   |
| 8        | S-8900-NET  | GeoNet PCBA   |
| 9        | ELC-824     | Antenna   |

**TABLE 24:** Eight-Channel (08C) Models Components Parts List

#### G.1.4 DIGITAL HIGH POWER (DHP) MODELS

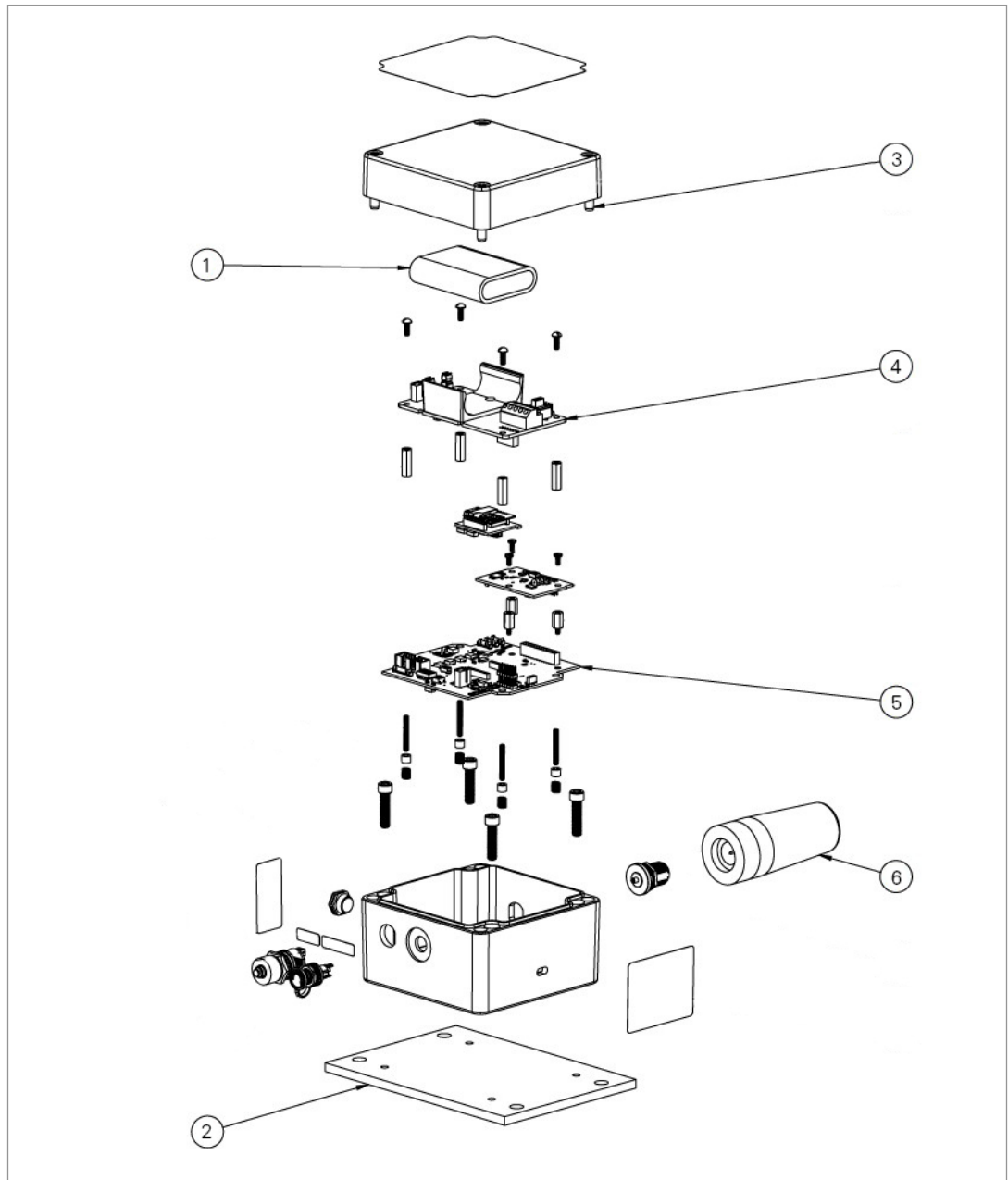


**FIGURE 37:** Digital High Power (DHP) Models (Antenna Not Pictured)

| Item No.            | Part Number  | Description   |
|---------------------|--|---|
| 1                   | BAT-209  | Sealed Lead Acid Battery  |
| 2                   | S-8910-13  | PicoBlade to USB-C Plug OVP   |
| 3                   | BOX-501-BRACKET  | Mounting Bracket  |
| 4                   | S-8910-3-1   | LoRa SLA OVP  |
| 5                   | N/A  | Fuse, contact GEOKON for more information.  |
| 6                   | BAT-122  | Lithium Coin Cell Battery   |
| 7                   | <b>CON-A443, including:</b><br>CON-A342<br>CON-A331<br>SEAL-09 | <b>Assembled Cable Gland, including:</b><br>Dowel Pin<br>Cable Fitting<br>Seal Ring |
| 8<br>(Not Pictured) | ELC-824  | Antenna   |

**TABLE 25:** Digital High Power (DHP) Models Components Parts List

### G.1.5 TILT (TLT) MODELS



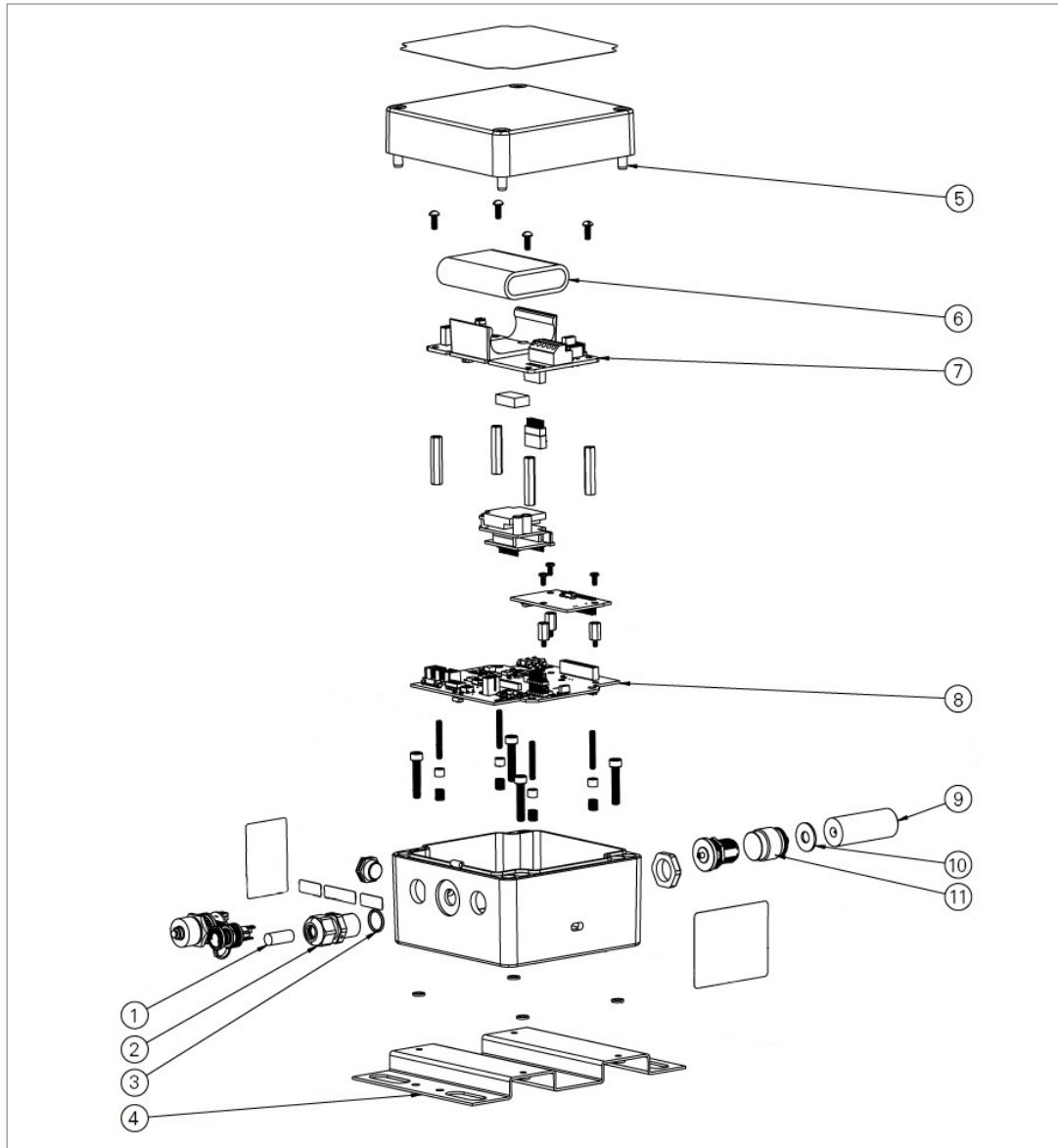
**FIGURE 38:** Tilt (TLT) Models

| Item No. | Part Number | Description   |
|----------|-------------|---|
| 1        | BAT-207     | Battery Pack  |
| 2        | A8101-3     | Mounting Bracket  |
| 3        | HRD-A2009   | M6 x 35 mm Allen Head Screw. When any replacements are required from the original screws, GEOKON recommends that all 4 screws are replaced. |
| 4        | S-PCB-0292  | Battery Holder PCBA   |
| 5        | S-8900-NET  | GeoNet PCBA   |
| 6        | ELC-824     | Antenna   |

**TABLE 26:** Tilt (TLT) Models Components Parts List

## G.2 8950 SERIES LOGGERS

### G.2.1 SINGLE-CHANNEL (01C) AND ADDRESSABLE (ADR) MODELS

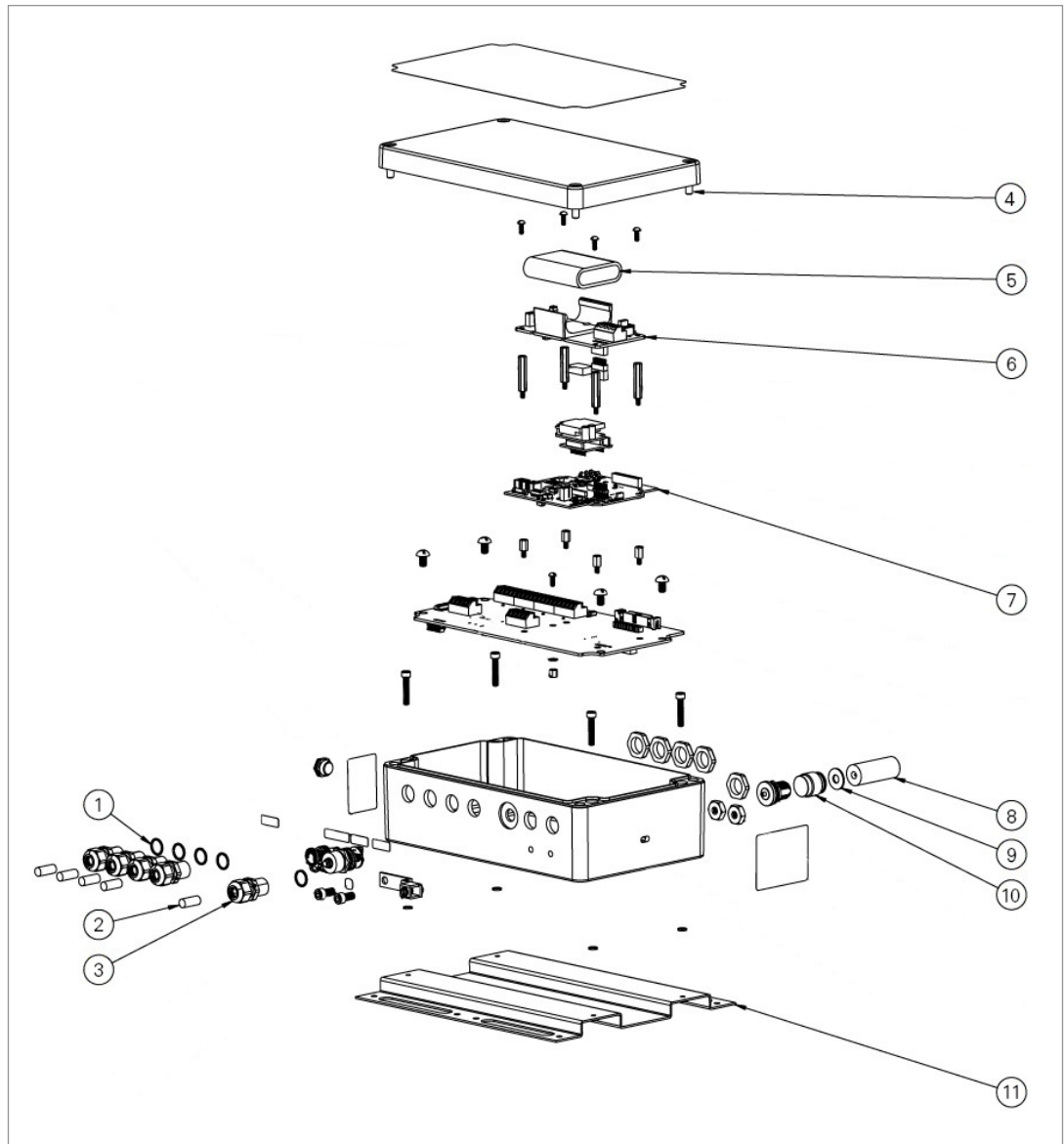


**FIGURE 39:** Single-Channel (01C) and Addressable (ADR) Models

| Item No. | Part Number | Description   |
|----------|-------------|---|
| 1        | CON-A342    | Dowel Pin   |
| 2        | CON-A331    | Cable Fitting   |
| 3        | SEAL-09     | Seal Ring for CON-A331  |
| 4        | C8800-1     | Mounting Bracket  |
| 5        | HRD-A2009   | M6 x 35 mm Allen Head Screw. When any replacements are required from the original screws, GEOKON recommends that all 4 screws are replaced. |
| 6        | BAT-207     | Battery Pack  |
| 7        | S-PCB-0292  | Battery Holder PCBA   |
| 8        | S-8900-NET  | GeoNet PCBA   |
| 9        | ELC-1026    | Antenna   |
| 10       | HRD-A1279   | Rubber Washer   |
| 11       | ELC-1027    | Antenna Adapter   |

**TABLE 27:** Single-Channel (01C) and Addressable (ADR) Models Components Parts List

## G.2.2 FOUR-CHANNEL (04C) MODELS

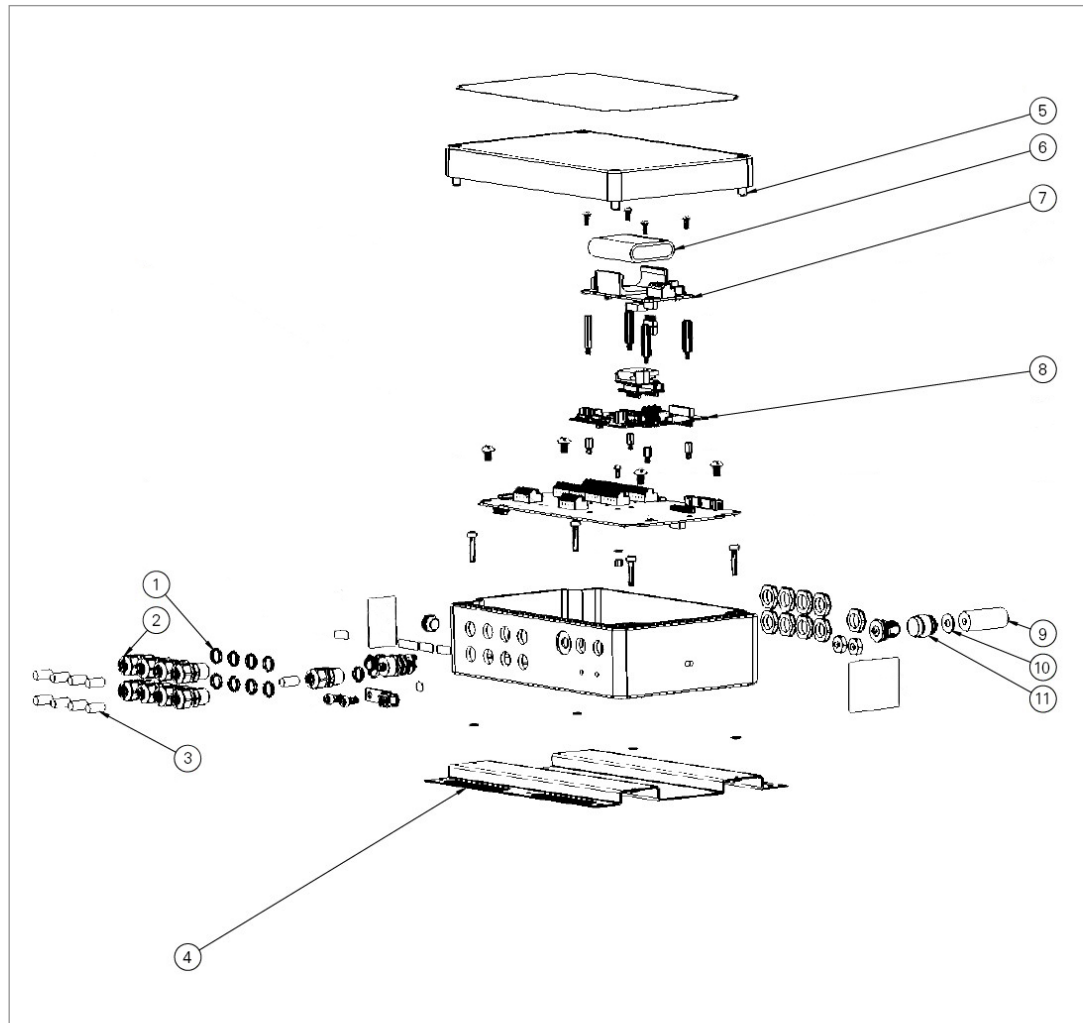


**FIGURE 40:** Four-Channel (04C) Models

| Item No. | Part Number | Description   |
|----------|-------------|---|
| 1        | SEAL-09     | Seal Ring for CON-A331  |
| 2        | CON-A342    | Dowel Pin   |
| 3        | CON-A331    | Cable Fitting   |
| 4        | HRD-A2006   | M6 x 25 mm Allen Head Screw. When any replacements are required from the original screws, GEOKON recommends that all 4 screws are replaced. |
| 5        | BAT-207     | Battery Pack  |
| 6        | S-PCB-0292  | Battery Holder PCBA   |
| 7        | S-8900-NET  | GeoNet PCBA   |
| 8        | ELC-1026    | Antenna   |
| 9        | HRD-A1279   | Rubber Washer   |
| 10       | ELC-1027    | Antenna Adapter   |
| 11       | C8800-6     | Mounting Bracket  |

**TABLE 28:** Four-Channel (04C) Models Components Parts List

### G.2.3 EIGHT-CHANNEL (08C) MODELS

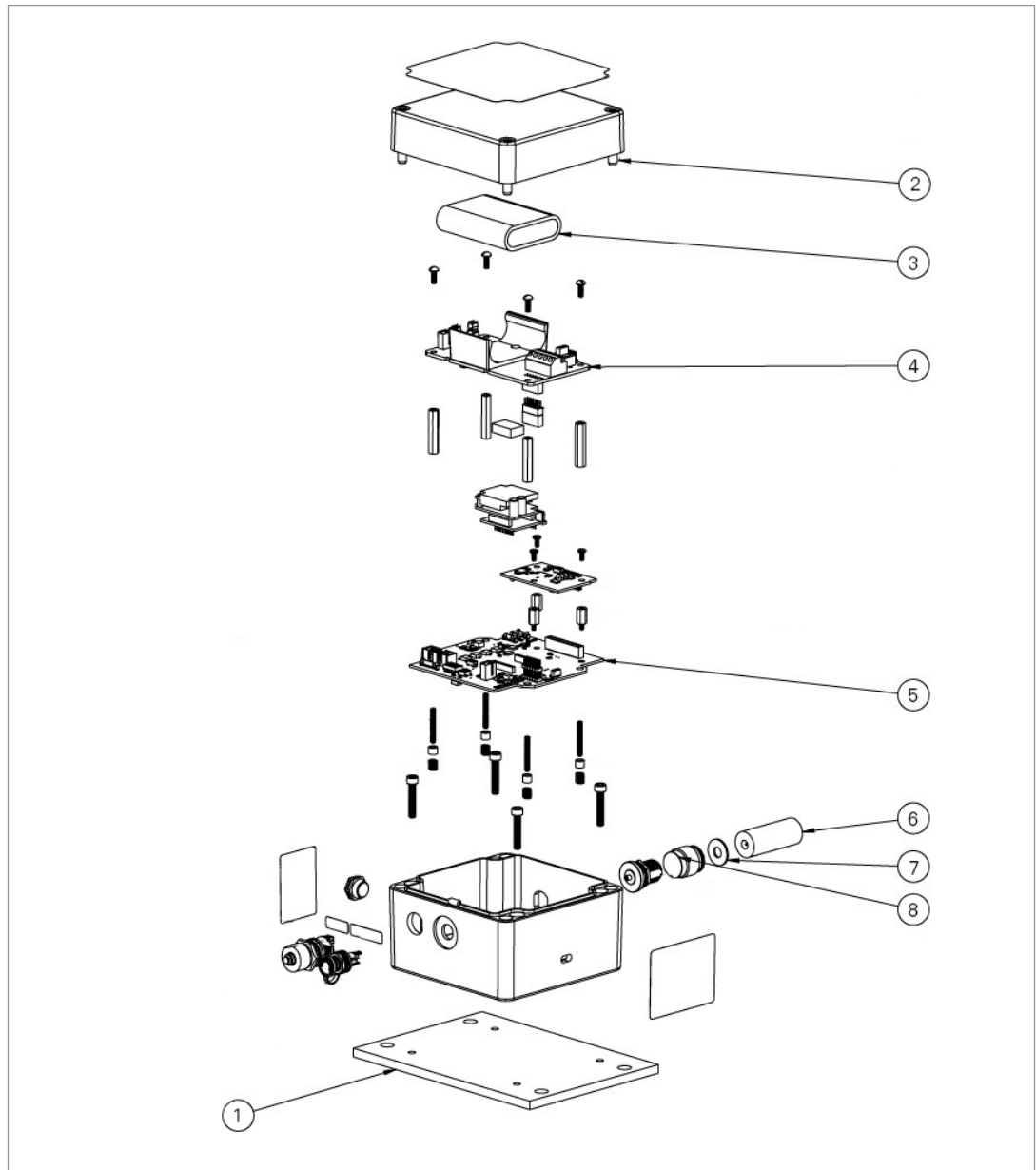


**FIGURE 41:** *Eight-Channel (08C) Models*

| Item No. | Part Number | Description   |
|----------|-------------|---|
| 1        | SEAL-09     | Seal Ring for CON-A331  |
| 2        | CON-A331    | Cable Fitting   |
| 3        | CON-A342    | Dowel Pin   |
| 4        | C8900-1     | Mounting Bracket  |
| 5        | HRD-A2009   | M6 x 35 mm Allen Head Screw. When any replacements are required from the original screws, GEOKON recommends that all 4 screws are replaced. |
| 6        | BAT-207     | Battery Pack  |
| 7        | S-PCB-0292  | Battery Holder PCBA   |
| 8        | S-8900-NET  | GeoNet PCBA   |
| 9        | ELC-1026    | Antenna   |
| 10       | HRD-A1279   | Rubber Washer   |
| 11       | ELC-1027    | Antenna Adapter   |

**TABLE 29:** *Eight-Channel (08C) Models Components Parts List*

## G.2.4 TILT (TLT) MODELS



**FIGURE 42:** Tilt (TLT) Models

| Item No. | Part Number | Description   |
|----------|-------------|---|
| 1        | A8101-3     | Mounting Bracket  |
| 2        | HRD-A2009   | M6 x 35 mm Allen Head Screw. When any replacements are required from the original screws, GEOKON recommends that all 4 screws are replaced. |
| 3        | BAT-207     | Battery Pack  |
| 4        | S-PCB-0292  | Battery Holder PCBA   |
| 5        | S-8900-NET  | GeoNet PCBA   |
| 6        | ELC-1026    | Antenna   |
| 7        | HRD-A1279   | Rubber Washer   |
| 8        | ELC-1027    | Antenna Adapter   |

**TABLE 30:** Tilt (TLT) Models Components Parts List

## APPENDIX H. FIRMWARE UPGRADE



OpenAPI Portal

**Warning!** Performing a firmware update on a logger will reset the logger memory. **Retrieve all data from the logger prior to performing a firmware update.**

**Note:** GeoNet Digital High Power Loggers allow for over-the-air (OTA) firmware upgrades.

Network logger firmware upgrades are performed remotely through the GEOKON Gateway using the GEOKON API portal at [api.geokon.com](http://api.geokon.com).

Alternatively, firmware upgrades can be performed on-site, using the instructions below:

1. Connect the COM-169 (USB 2.0 A Male to C Male Cable) to the USB-C connector on the bottom of enclosure and the USB port on the computer.

**Note:** Older Models may use a COM-166 (Mini USB to STD A Cable).

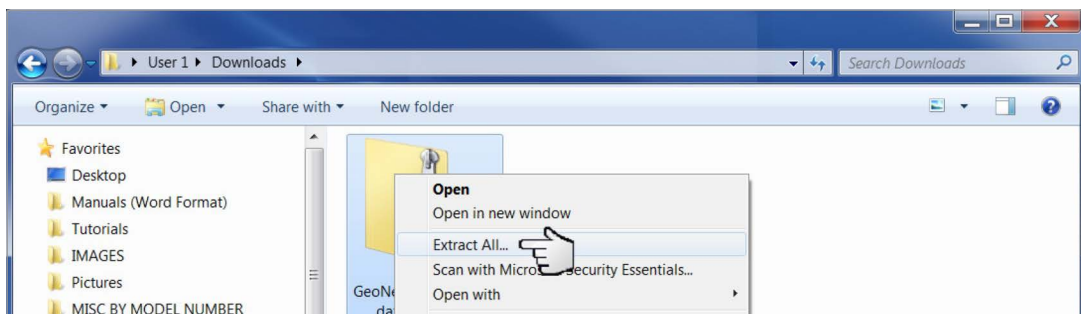


**FIGURE 43:** USB Cable Connection (COM-166 Pictured)



Software Resources

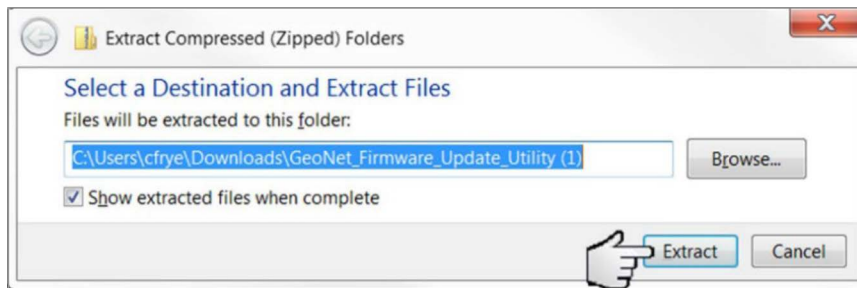
2. Download the “GeoNet Firmware Update Package” from [geokon.com/Software](http://geokon.com/Software).
3. Right click on the download file and choose “Extract All...”.



**FIGURE 44:** Extract File

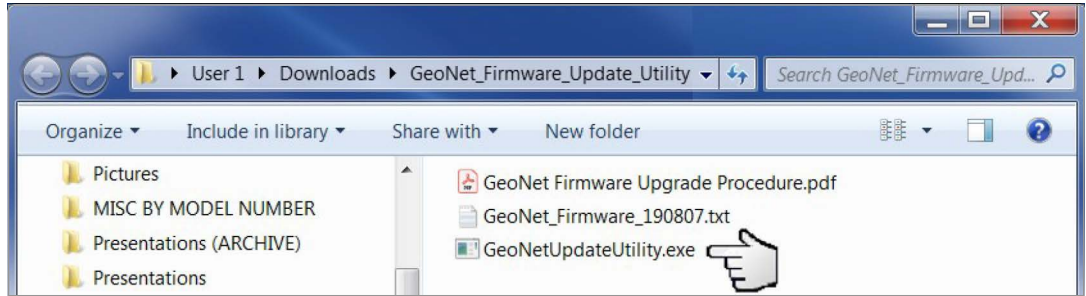
4. When prompted click “Extract All”.
5. Select a destination for the files and then click “Extract”.





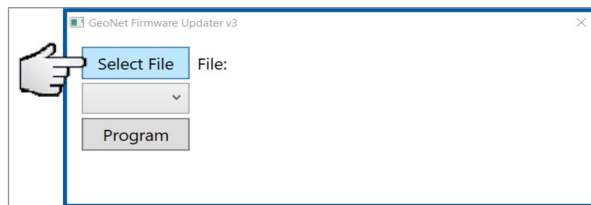
**FIGURE 45:** Select Destination, then Click Extract

6. Open "GeoNetUpdateUtility.exe" file. (If a security warning appears, click "Run").



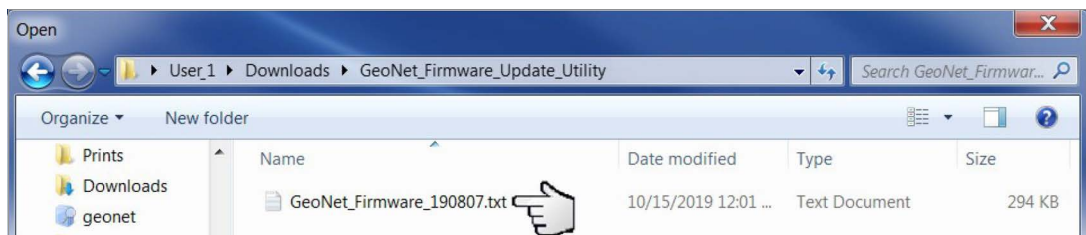
**FIGURE 46:** Open the GeoNet Update Utility Application

7. Click "Select File".



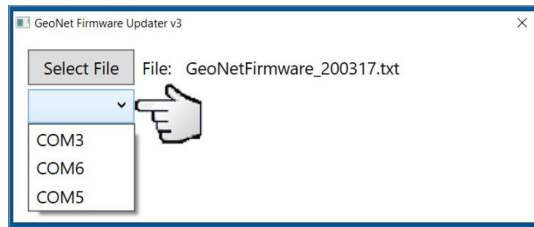
**FIGURE 47:** Click on "Select File"

8. Double click on the .txt firmware file. (Firmware files are named in the following format: "GeoNet\_Firmware\_YYMMDD.txt", where YY is the last two digits of the year, MM is the month, and DD is the day of the month.)



**FIGURE 48:** Double Click on Firmware Text File

9. Using the drop-down box below the "Select File" button, select the correct serial port for the COM-169 cable. To identify which serial port the unit is connected to, complete the following:
  - a. Unplug the COM-169 cable from the PC.
  - b. Go to the "Control Panel" then open "Device Manager".
  - c. Click on the triangle to the left of "Ports (COM & LPT)" to expand the list.
  - d. Plug the cable back into the computer and the port will appear in the list.



**FIGURE 49:** Select COM Port

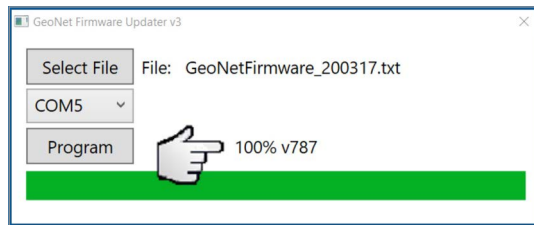
10. Click "Program".



**FIGURE 50:** Click on Program

11. A progress bar will appear. The update process will normally take one to two minutes.

12. Once the update has finished, operation will return to normal.



**FIGURE 51:** Update Finished

13. Repeat the above process with all the loggers in the Network.

The firmware update is now complete.

## APPENDIX I. VIBRATING WIRE LOAD CELL WIRING

### I.1 WIRING SINGLE LOAD CELL

| 8CH Interface <sup>1</sup> | Function   | 3-Gauge Load Cell<br>Violet Cable | 4-Gauge Load Cell<br>Violet Cable | 6 Gauge Load Cell<br>Orange Cable |
|----------------------------|------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Channel 1 VW+              | Gauge #1   | Red                               | Red                               | Red                               |
| Channel 2 VW+              | Gauge #2   | Red's Black                       | Red's Black                       | Red's Black                       |
| Channel 3 VW+              | Gauge #3   | White                             | White                             | White                             |
| Channel 4 VW+              | Gauge #4   | NC                                | White's Black                     | White's Black                     |
| Channel 5 VW+              | Gauge #5   | NC                                | NC                                | Green                             |
| Channel 6 VW+              | Gauge #6   | NC                                | NC                                | Green's Black                     |
| Channel 1 SHD              | Shield     | All Shields                       | All Shields                       | All Shields                       |
| VW- Channels <sup>2</sup>  | Common     | White's Black <sup>3</sup>        | Green                             | Blue                              |
| Channel 1 TH +             | Thermistor | Green <sup>3</sup>                | Blue                              | Yellow                            |
| Channel 1 TH -             | Thermistor | Green's Black                     | Blue's Black                      | Yellow's Black                    |

**TABLE 31:** Single Load Cell Wiring

**Note:**

<sup>1</sup> Where second Load Cell is being included, retain relative channel position count up from channel 5.

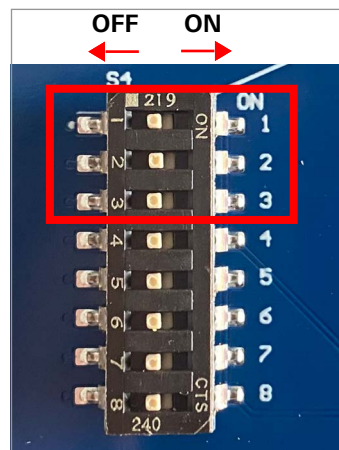
<sup>2</sup> Common "VW-" between all channels associated with each VW Load Cell

<sup>3</sup> White's black and Green wires are switched on GEOKON three-gauge VW load cells prior to serial number 3313.

### I.2 LOAD CELL CONFIGURATION SWITCH SETTINGS

| POS 1 | POS 2 | POS 3 | Configuration   |
|-------|-------|-------|---|
| OFF   | OFF   | OFF   | Std. No Load Cell   |
| ON    | OFF   | OFF   | One 3-Gauge Load Cell   |
| OFF   | ON    | OFF   | One 4-Gauge Load Cell   |
| ON    | ON    | OFF   | Two 3-Gauge Load Cells, second starting at channel 5                |
| OFF   | OFF   | ON    | Two 4-Gauge Load Cells, second starting at channel 5                |
| ON    | OFF   | ON    | One 3-Gauge Load Cell & One 4-Gauge Load Cell starting at channel 5 |
| OFF   | ON    | ON    | One 4-Gauge Load Cell & One 3-Gauge Load Cell starting at channel 5 |
| ON    | ON    | ON    | One 6-Gauge Load Cell   |

**TABLE 32:** Load Cell Configuration Switch Settings



**FIGURE 52:** Load Cell Configuration Switch



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