GEOKON®

Model 8921 and 8951 Series

GeoNet Network Data Loggers & Data Acquisition System

Quick Start Guide

For those familiar with Geotechnical devices and their installation, the following guide may be used. For more detailed information than is provided in this Quick Start Guide, please refer to the Model 8921 Instruction Manual.

1. STATUS BUTTON & LED STATUS INDICATORS

All GeoNet devices have red and green LED indicators. When the status button is pressed on the data logger, the LEDs briefly display the network status and the data logger takes a reading and sends existing data immediately.

LED Indicators		Description
Green		Logging, good communications
Green	Red	Logging, no communications
	Red	Not logging, no communications

TABLE 1: *LED Indicator Meaning*

2. 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. Open the cover
2. Install the antenna
3. Power the data logger
4. Verify network connectivity
5. Register and configure the data logger
6. Expanding data logger capacity (optional)
7. Mount the devices
8. Connect an earth ground
9. Connect the sensors
10. Seal the data logger

2.1 OPEN THE COVERS

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

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

2.2 INSTALL THE ANTENNAS

Remove the rubber caps from the antenna mounts. Position the antennas on the mounts and then rotate the antenna in a clockwise direction until tightened.

Note: Do not cross thread the antenna. The O-ring on the bottom of the antennae must be flush with the enclosure to prevent water entry.

2.3 POWER THE DATA LOGGER

Connect the data logger to an external power source via a USB-C connector (purchased separately) (see the full instruction manual for solar panel installation).

Move the battery switch to the ON position. The green battery LED will flash twice, indicating the unit has power.

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

TABLE 2: *Battery Board LED Indicator Meaning*

2.4 VERIFY NETWORK CONNECTIVITY

Data loggers will set the network time automatically when they connect to the network.* Cellular data loggers will normally connect to the network within approximately five minutes. Satellite data loggers may take up to 20 minutes to connect.

Verify the network connection has been made by pressing the status button. The status LEDs should flash both green and red. If only the red LED flashes, wait several minutes and then check again.

Note: *GeoNet Cellular data loggers are compatible with all major LTE Cat 1 networks except Verizon.

2.5 REGISTER AND CONFIGURE THE DATA LOGGER

Register the data logger by entering the Serial Number in the GEOKON API portal: api.geokon.com. Select the option to activate network service.

Note: Data loggers may not identify correctly until the sensors are connected.

2.5.1 CONFIGURE THE DATA LOGGER VIA THE GEOKON DESKTOP APPLICATION (MANUAL CONNECTION)

Configuring the data logger is optional and only applicable to the Model 8921-ANA Analog Data Logger.

Connect the data logger to a laptop with a USB-C connector (purchased separately).

Download and launch a VCP driver, this will allow the data logger to be recognized through the USB port on a computer:

https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers?tab=downloads

Download and launch the GEOKON Desktop application:

https://apps.microsoft.com/detail/9P05ZLF7JTHJ

Select **Settings** and select the appropriate data logger settings from the dropdown menus. Select **Apply Settings**. Refer to the Model 8921 Instruction Manual for configuration settings and examples.

2.6 EXPANDING DATA LOGGER CAPACITY (OPTIONAL)

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

Refer to the Model 8960 Instruction Manual (geokon.com/8960-Series) for information on how to connect a data 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 data logger has been powered on.

2.7 MOUNT THE DEVICES

GeoNet mounting brackets 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. As a rule, higher is usually better.

Certain mounting configurations can hinder or even completely block wireless signal transmission or can introduce electrical noise to the signal. (Large structures, such as walls, buildings, hills, etc. can block and/or reflect RF signals.)

Note: A high Received Signal Strength Indicator (RSSI) level does not guarantee trouble-free communication

COMMON MOUNTING MISTAKES INCLUDE:

- Not enough clear space around the antenna
- Mounting too close to buildings, fences, or walls that can block the signal
- Mounting devices horizontally
- Placing the device inside an enclosure or on a metal plate
- Metallic objects nearby

2.8 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.

2.9 CONNECT THE SENSORS

Note: Data loggers will stop trying to read an empty channel after two attempts. The data logger will read all channels at the top of every hour and will resume sampling when it detects a sensor. (Reset the data logger to initiate an immediate retry.)

For ease of wiring, sensor cables should be inserted into the cable glands on multi-channel data 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 black 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 below.

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

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

TABLE 3: *Vibrating Wire Data Logger Wiring*

Addressable and DHP (RS-485) Data Logger		
Position	**Color**	**Description**
485+	WHITE	RS-485 Data+
485-	GREEN	RS-485 Data-
12V	RED	12 Volt Bus
GND	BLACK	Bus Ground
SHD	BARE	Analog Ground (Shield)

TABLE 4: *Addressable and DHP (RS-485) Data Logger Wiring*

Analog Data Logger		
Position	**Color**	**Description**
Vin+	No universal color code	Sensor Signal+
Vin-		Sensor Signal-
Exc+		Excitation Voltage+
Exc-		Excitation Voltage-
SHD	BARE	Analog Ground (Shield)

TABLE 5: *Analog Data Logger 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.
8. **Analog Data Loggers Only:** Confirm the selector switch (located under the terminal block, see Figure 1) is set to the appropriate channel for the sensor being read. See the Model 8921 Instruction Manual for examples on wiring and selector switch configuration.

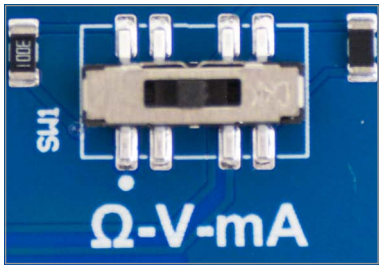

FIGURE 1: *Analog Mode Selector Switch*

2.10 SEAL THE DATA LOGGERS

1. Record the serial number of the data loggers and the attached sensors. For multiple-channel data 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.

GEOKON®

GEOKON
48 Spencer Street
Lebanon, New Hampshire
03766, USA

Phone: +1 (603) 448-1562
Email: teamsales@geokon.com
Website: www.geokon.com

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