

GEONET WIRELESS LORA[®] DATA ACQUISITION SYSTEM

GEOKON[®]

MODEL 8910 SERIES



The GeoNet Wireless LoRa Data Acquisition System: a typical network configuration of Loggers, a Cellular Gateway and Cloud integration with secure data access

APPLICATIONS

Typical applications include:

- Groundwater monitoring
- Tailings dams
- Mining/slope stability
- Structural monitoring of buildings, bridges, excavations, and tunnels
- Historical structures

INTRODUCTION

The system consists of a gateway and subordinate wireless loggers that transmit data collected from the connected sensors. The gateway controls the network and is the aggregator of all the data from the loggers in the system. The gateway transfers collected data to the GEOKON cloud data storage platform, where it is securely stored. Data can be viewed in GEOKON Agent Software or exported to a third-party software platform through the Open API. (Offline configurator also available.)

The system is compatible with most manufacturers' vibrating wire instruments and GEOKON addressable sensor strings (MEMS, VW, and thermistor). Sensor cables are connected through cable glands. For multi-sensor

instruments such as load cells and thermistor strings, a multichannel logger with a single cable gland entry is used.

Other available models include: A digital high power logger capable of reading up to 500 GEOKON MEMS sensors or any other sensor that utilizes RS-485 Modbus[®] communication protocol. A tilt logger that combines the functionality of a biaxial tiltmeter and a GeoNet logger.

Model 8960 Digital Vibrating Wire interfaces can be connected to GeoNet multi-channel and addressable 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 data sheet for more information.

COMMUNICATIONS

The Model 8910 GeoNet Wireless Data Acquisition utilizes LoRa radio technology. The system topology takes the form of a star network. All loggers communicate directly with the gateway. The loggers wake from sleep to collect and/or transmit data to the gateway and then return to sleep when finished to conserve battery life. Loggers that get separated from the network will continue to collect and store data autonomously until network connectivity

is re-established, at which time the data will be transmitted to the gateway. Up to 8 networks can exist within radio range of one another by setting each to a different operating channel.

The loggers can also operate using LoRaWAN[®] communication protocol for use with LoRaWAN third-party gateways.

Configuration of the network is accomplished by using the GEOKON API (api.geokon.com).

GENERAL SPECIFICATIONS

Power Supply	2 × D cell, lithium / 5-24V external GTW and DHP models: Internal sealed lead acid (SLA) battery pack, 4V, 10 Ah / 5-24V external
Operating Temperature	-40° C to +85° C (range varies by power source) (TLT model max of +65° C)
Temperature Accuracy	±0.5° C
Direct Connection Type	USB
Enclosure	Die-cast aluminum, IP 68 rated to 1.5 m
Dimensions	Refer to the product instruction manual

NETWORK SPECIFICATIONS

Topology	Star
Radio Technology	LoRa/LoRaWAN
Radio Frequency, ISM Band	868-928 MHz (user selectable masking by region)
Channels	8 (4 auto configurable)
Range ¹	Up to 20 km in rural open areas with line-of-sight Up to 5 km in urban areas

¹Outdoor, clear line-of-sight. Depends on operating frequency.

VIBRATING WIRE LOGGER SPECIFICATIONS

Trueness	0.082 Hz
Frequency Precision	±0.146 Hz (99% CI)
Frequency Resolution	±0.002 Hz
Enclosure VW Frequency Range	400 – 6500 Hz

TILT LOGGER SPECIFICATIONS

Range ¹	±90°
Resolution ²	0.00025° (0.004 mm/m)
Precision ³	±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) ±0.0016° across ±15° range (±0.026 mm/m) ±0.0026° across ±30° range (±0.042 mm/m)
Axis	2

¹Calibrated Range: ±30°

²99% confidence interval (i.e. 99 out of 100 individual readings fall within this tolerance).

³Includes random walk (changes in consecutive readings with no discernible cause) and seismic noise during testing.

DIGITAL LOGGER SPECIFICATIONS

MEMS Sensors Limits per Model	Non-rechargeable ADR: 32 sensors Rechargeable ADR: 64 sensors (90 sensors, with the sensor string powered via external 12 V power supply) DHP: 250 MEMS or 500 Model 6140 MEMS Sensors
Communication Protocol	RS-485 Modbus

AVAILABLE MODELS



Single-Channel
VW Logger



Eight-Channel
VW Logger



Addressable
Logger



Tilt
Logger



Digital High
Power Logger



Cellular Gateway

ORDERING INFORMATION

Example Part Number for a Logger: 8910-01C-CBL-R

LOGGER TYPE: ○
01C: Single-Channel VW
08C: Eight-Channel VW
ADR: Digital Addressable
DHP: Digital High Power
TLT: Tilt Logger

SENSOR CONNECTION: ○
CBL: Cable Gland
NAP: No Access Point

BATTERY TYPE: ○
R: Optional Rechargeable Battery

Example Part Number for a Gateway: 8910-GTW-LTM

GATEWAY TYPE: ○
LTE: Cellular for LTE networks
LTM: Cellular for LTE-M networks

ACCESSORIES

8900-SOL-10W-USB: GeoNet Series Solar Panel, 10W, unregulated.
KIT-GEONET-C: USB 2.0 A Male to C Male Cable, #3 Phillips Head Screwdriver, 3/32" Flat Head Screwdriver

BAT-202: Lithium D size battery, 17 Ah
COM-169: USB 2.0 A Male to C Male Cable

GEOKON

TRUSTED MEASUREMENTS.

GEOKON
48 Spencer Street
Lebanon, NH 03766 · USA

www.geokon.com
e: info@geokon.com
p: +1-603-448-1562

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