Wireless Datalogger

Applications

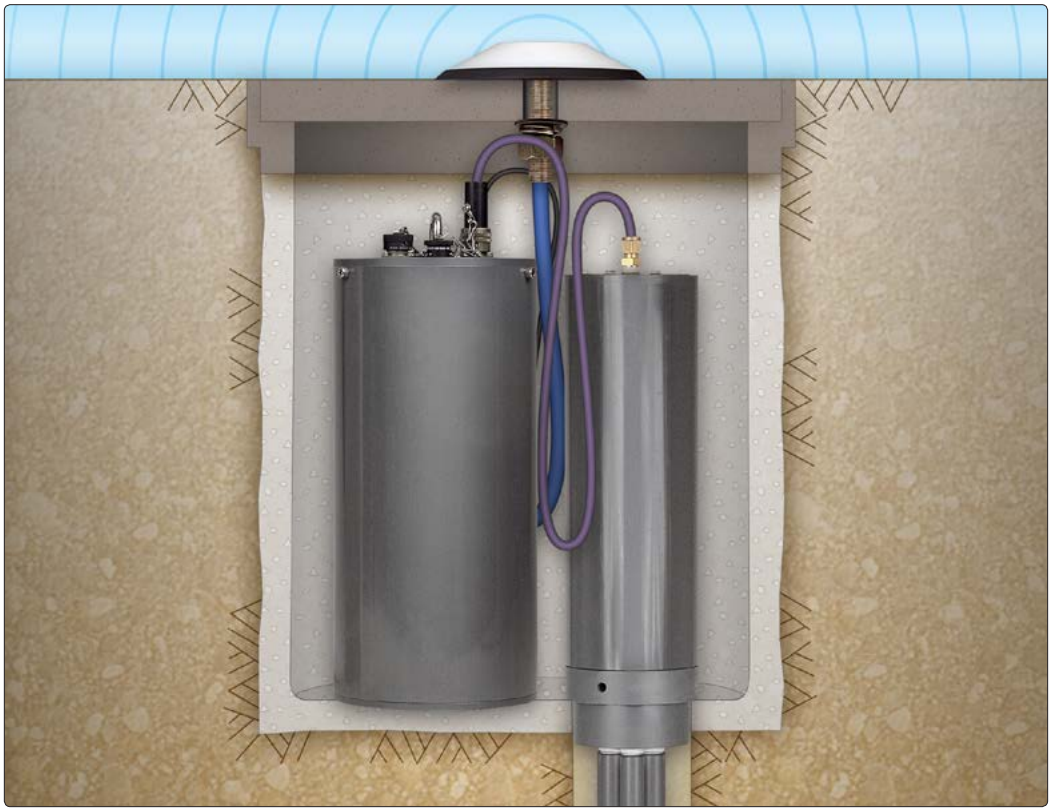
The Model 8600-3 is a wireless datalogger designed to transmit data from buried sensors installed in inaccessible locations.

Applications include…

- **Borehole Extensometers**
- **In-Place Inclinometers**
- **Multilevel Piezometers**

Model 8600-3 Datalogger and Model 1150 (A-3) Extensometer (shown on right).

Remote datalogger base station (or hub) with receiving and transmitting antennae.



Model 8600-3 Datalogger and Model 1150 (A-3) Extensometer in manhole, with manhole lid antenna.

Operating Principle

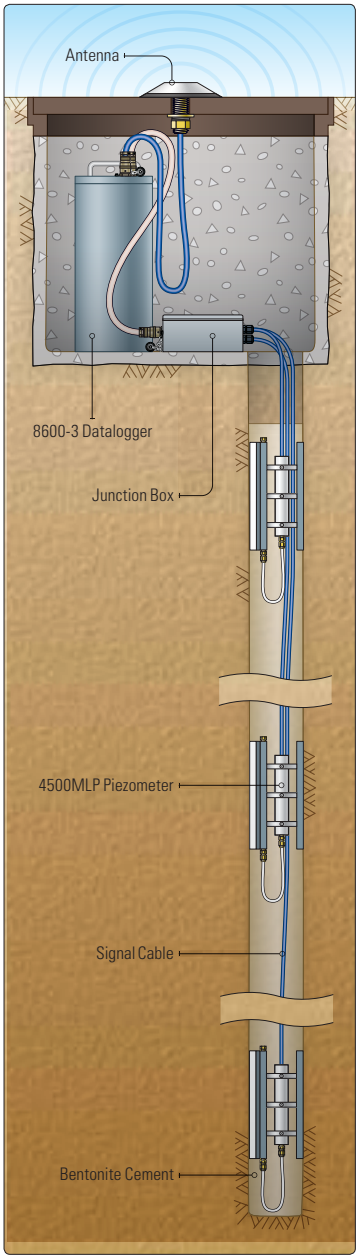
The 8600-3 is designed around the Campbell Scientific, Inc. Model CR800 datalogger, specifically to read the **GEOKON** line of Vibrating Wire sensors. The 8600-3 Datalogger is housed in a rugged, water-resistant enclosure (standard enclosure is PVC; optional stainless steel and waterproof enclosures available) together with a D-cell lithium battery pack (for unattended operation) and a RF modem (for wireless data transmission). It has low power consumption, wide temperature range and is moisture resistant. It's configured to read 6 sensors; either 6 VW or 3 VW plus 3 thermistors, or any combination thereof.

The 8600-3 is typically installed in a recessed manhole, containing the instrumentation to be monitored, as shown in the illustration above (please consult **GEOKON** if other configurations are anticipated; in which case, other dataloggers may be suggested).

Typically, the 8600-3 Datalogger is installed together with a Spread Spectrum Radio Modem and Antenna.

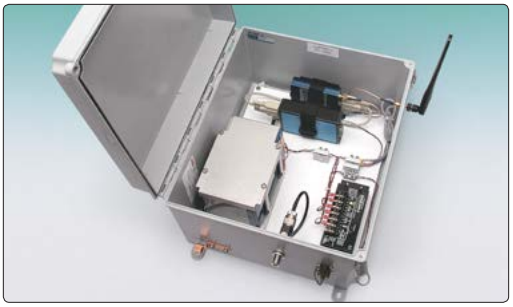
The integral RF Radio Modem is used for wireless data communication to a local base station (or hub) where a transceiver routes the data to a PC or to a modem for onward transmission to a remote PC (or PC's).

Spread Spectrum Radios spread the normally narrow band information signal over a relatively wide band of frequencies. This allows the communications to be more immune to noise and interference from RF sources such as pagers and cellular phones. They also reduce susceptibility to RF interference from the other spread spectrum devices by providing user-selectable frequency hopping patterns.



● *Model 8600-3 Datalogger shown with Model 4500MLP Multilevel Piezometers.*

● *The 8600-3 Datalogger.*



● *Remote datalogger base station (or hub) internal details.*

For most applications the 8600-3 is generally used with a manhole type lid antenna which allows for installations in roads, runways or other situations where a flush-mounted system is required. (Where flush mounting is not required, a conventional Omni or Yagi antenna can be used.)

The antenna is of rugged (tamper proof) design allowing it to be mounted directly onto a manhole lid. The antenna is waterproof and its construction is resistant to motor oils, gasoline, acetone and methyl ethyl ketone.

Software

Windows® based **LoggerNet®** software provides the user with complete control over the datalogger, by allowing the user to create the program which is executed by the datalogger. **Windows** based MultiLogger software allows for an efficient means of deploying the datalogger by providing easy to use menus and selections to build the datalogger program, monitoring the current activity, and collecting the data. Vista Data Vision (VDV) software provides a complete data management package for the previously collected data. VDV also provides the means for browsing, reporting and publishing data to the Internet.

Technical Specifications (CR800)

Range	*(analog)* ±2.5 millivolts to ±5 volts *(frequency)* DC to 200 kHz
Resolution	*(analog)* 0.33 microvolts to 1333 microvolts *(frequency)* ±35 nS/no. cycles measured
Accuracy	*(analog)* ±0.12% of reading + offset *(frequency)* ±0.01% of reading + resolution
Excitation Output	±2.5 V at 25 mA (max)
Temperature Range	–25 °C to +50 °C (–55 °C to +80 °C optional)
Battery	4 × D-cell Lithium 8.5 Ah
Diameter × Height	168 × 381 mm

(Manhole Lid Antenna)

VSWR at Resonant Point		2:1 max
Connector	User Selectable	
Nominal Impedance	50 Ohms	
Gain	3 dB	
Polarization	vertical	
Maximum Power Input	125 watts	
Height × Diameter	32 × 178 mm	*Specifications subject to change without notice*

(Radio Modem)

Operating Frequency	*RF401:* 910 to 918 MHz *RF411:* 920 to 928 MHz *RF416:* 2.450 to 2.460 GHz
Type	Frequency Hopping Spread Spectrum (FHSS) Transceiver
I/O Data Rate	38.4 K, 19.2 K; 9600, 4800 or 1200 bps
Receiver Sensitivity	*RF401, RF411:* –110 dBm at 10^{-4} bit error rate[1] *RF416:* –104 dBm at 10^{-4} bit error rate[1]
Interference Rejection	70 dB at pager/cellular phone frequencies
Transmitter Power Output	*RF401, RF411:* 100 mW nominal *RF416:* 50 mW nominal
Antenna Connector	Reverse polarity SMA
Power	9 to 16 VDC
Average Current Drain	*Stand-by:* < 1 mA (power-saving options used) *Receiving:* 24 mA (RF401, RF411), 36 mA (RF416) *Transmitting:* < 75 mA (RF401), RF411), 75 mA (RF416)
Operating Temperature	*Standard:* –25 °C to +50 °C *Extended:* –55 °C to +85 °C (RF401, RF411 only)[2]
LEDs	Power on, TX, RX, diagnostics
L × W × H	121 × 70 × 33 mm

[1] *Campbell Scientific protocols will issue retries whenever a bit error occurs.*
[2] *The push button that allows customers to check/edit programmable settings while the radio is connected to a computer may not operate at temperatures colder than –25 °C.*

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