

# Wireless Vibrating Wire Interface

## Applications

The Model 8040 is ideally suited for wireless data transmission with Micro-1000 and Micro-800 Data Acquisition Systems. Applications include...

- Excavations
- Pump Tests
- Landfills
- Dams
- Structural monitoring



● Model 8040T configured to read a Model 4500 Vibrating Wire Piezometer.



● Model 8040 2-Channel Wireless Vibrating Wire Interface Module.

## Operating Principle

The 8040 Series Wireless Vibrating Wire interface is designed to expand the data collection possibilities of the Micro-1000 and Micro-800 Series Dataloggers.

The wireless connectivity provided by the 8040 Series is particularly suitable where dataloggers are deployed over wide areas and where construction activity may render the use of conventional hard-wired systems impractical. The wireless connection also eliminates the need for running lengthy cables.

Available for 2, 4 or 16 sensors (VW plus thermistor), the 8040 Wireless Vibrating Wire Interface comprises Campbell Scientific's AVW206 (or AVW216) spectrum analyzer (with built-in 900 MHz or 2.4 GHz radio transmitter), power supply and antenna. It's housed in a rugged NEMA 4X enclosure designed for use in harsh environments with wide temperature tolerance, and resistance to moisture and humidity.

The 2 and 4 channel versions are also available in a rugged waterproof enclosure (Model 8040T). The standard enclosure is PVC (optional stainless steel also available). This design is particularly useful for installations below grade, in manholes containing the instrumentation to be monitored (see illustration left).

The AVW206 and AVW216 use an innovative spectral interpolation method for measuring the sensor's resonant frequency. With this spectral interpolation method, the module excites the vibrating wire sensor, measures the response, performs a Fourier transform on the response, and returns the result with a resolution better than 0.001 Hz. Because spectral analysis can distinguish signal from noise on the basis of frequency content, this method offers improved immunity to competing noise.

The power supply for the 8040 is generally provided by a 12 V lead acid battery, rechargeable by solar panels or AC mains. The 8040T is powered using four 19 Ah lithium D cells.

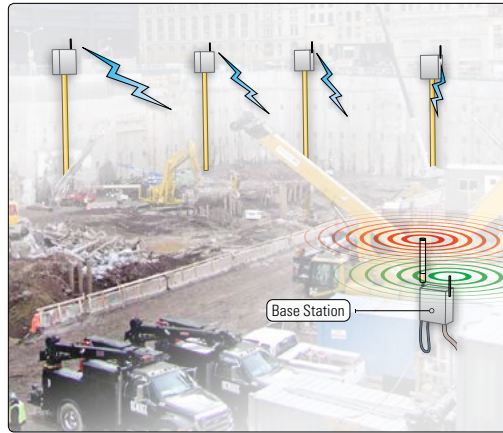
The Model 8040 commonly uses a whip antenna for data transmission, but high gain Yagi and Omnidirectional antennae are also available (please consult **GEOKON**® for selection of the appropriate antenna). The 8040T is typically supplied with a manhole lid antenna which allows for installations in roads, runways or other situations where a flush



- Model 8040 16-Channel Wireless Vibrating Wire Interface Module (external battery option, battery not shown).



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



- Illustration showing the Model 8040 Series Wireless Vibrating Wire Interface, monitoring in-place inclinometers.

mounted system is required. This antenna is of a rugged (tamper-proof) design allowing it to be mounted directly onto a manhole lid. It is waterproof and resistant to motor oils and gasoline.

Wireless data transmission, from the Model 8040 to the Micro-1000/Micro-800 Dataloggers is capable over distances up to several miles and relies on Line-Of-Sight (LOS). Where LOS is restricted, or where signals are required to go around corners (as may be found in urban environments), Repeater Stations can be incorporated into the monitoring system.

Several Model 8040s can be connected to Micro-1000 and/or Micro-800 Dataloggers, depending on the datalogger/multiplexer configuration (please contact **GEOKON** for details).

### 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

### Wireless Vibrating Wire Interfaces

<b>Input Range</b>	(vibrating wire) 100 to 6500 Hz (thermistor) ±2500 mV
<b>Resolution</b>	(vibrating wire) 0.001 Hz RMS (thermistor) 0.001 Ω RMS
<b>Accuracy</b>	(vibrating wire) ±0.013% of reading (thermistor) ±0.25% of reading
<b>Wireless Transmission Range</b>	up to 10 miles (when using a higher gain directional antenna, under ideal conditions)
<b>Battery</b>	12 V, 7 Ah Gel Cell
<b>Temperature Range</b>	-25°C to +50°C (-55°C to +80°C optional)
<b>L × W × H<sup>1</sup></b>	8040-2 (2-Channel): 305 × 254 × 152 mm 8040-4 (4-Channel): 356 × 305 × 203 mm 8040-16 (16-Channel): 356 × 305 × 203 mm
<b>Diameter × H</b>	8040T-2/4 (2/4-Channel): 168 × 380 mm

<sup>1</sup>Does not include mounting feet.

### CR800

<b>Range</b>	(analog) ±2.5 millivolts to ±5 volts (frequency) DC to 200 kHz
<b>Resolution</b>	(analog) 0.33 microvolts to 1333 microvolts (frequency) ±35 nS/no. cycles measured
<b>Accuracy</b>	(analog) ±0.1% of reading (frequency) ±0.01% of reading
<b>Excitation Output</b>	±2.5 V at 25 mA (max)
<b>Temperature Range</b>	-25°C to +50°C (-55°C to +80°C optional)
<b>Battery</b>	C-Cell Lithium 8.5 AH

### Radio Modem

<b>Operating Frequency</b>	RF401: 910 to 918 MHz RF411: 920 to 928 MHz RF416: 2.450 to 2.460 GHz
<b>Type</b>	Frequency Hopping Spread Spectrum (FHSS) Transceiver
<b>I/O Data Rate</b>	38.4 K, 19.2 K; 9600, 4800 or 1200 bps
<b>Transmitter Power Output</b>	RF401, RF411: 100 mW nominal RF416: 50 mW nominal
<b>Power</b>	9 to 16 VDC
<b>Average Current Drain</b>	Stand-by: < 1 mA (power-saving options used) Receiving: 24 mA (RF401, RF411), 36 mA (RF416) Transmitting: < 75 mA (RF401, RF411), 75 mA (RF416)
<b>Operating Temperature</b>	Standard: -25° to +50°C Extended <sup>1</sup> : -55°C to +85°C (RF401, RF411 only)

<sup>1</sup>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.