

# Vibrating Wire Readout

### Applications

The Model GK-405 Vibrating Wire Readout can be used with all **GEOKON**® Vibrating Wire sensors. The rugged and reliable, user-friendly GK-405 provides the following...

- Integrated FPC-2 Field PC
- Features **Bluetooth**® wireless technology communication between Field PC and Dock
- Real-time datalogging
- Two modes of data acquisition
- Data and configuration storage on internal 4 GB Solid State Drive
- Rechargeable Li-ion battery
- Cold weather operation



• Model GK-405 VV Readout Dock, shown with the FPC-2 Field PC removed.



• Model GK-405 VV Readout Dock, shown with a Model 4900 Vibrating Wire Load Cell and the FPC-1 Field PC.



• Close-up of Model GK-405 Vibrating Wire Readout and FPC-2 Field PC placed in dock.

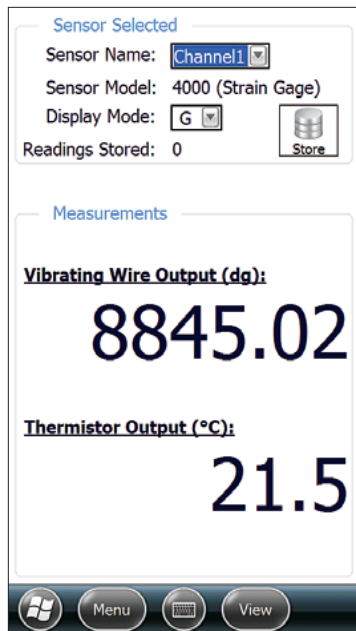
### Operating Principle

The Model GK-405 Vibrating Wire Readout is designed for use with all **GEOKON** Vibrating Wire sensors, in all kinds of weather conditions.

The Model GK-405 works on the “pluck and read” principle in which a swept wave frequency spectrum is transmitted to the electronic plucking coil in the sensor, which starts the wire vibrating at its resonant frequency. Milliseconds later, the plucking coil, in conjunction with a permanent magnet, becomes a sensing coil and transmits a sinusoidal output voltage, having the same frequency as the vibrating wire, back to the readout. Here the frequency is measured very accurately by means of a high precision digital quartz crystal oscillator. The measured frequency is squared

to linearize the output, and display is accomplished via **Bluetooth**® wireless transmission to the FPC-2 Field PC running the GK-405 application. The Model GK-405 can also read the thermistors included with most **GEOKON** Vibrating Wire sensors, and display the temperature directly in degrees Centigrade on the FPC-2 Field PC.

Storage of the readings is a simple one-button operation and each stored reading is identified by an array reference number, plus time, date and temperature. All readings can be exported to a number of different file formats. Syncing to a host computer is simple and straightforward, allowing project folders and data files to be easily saved.



• Live Readings screen shot, displaying vibrating wire strain gauge data.



• Model GK-405 VV Readout Dock, shown with the FPC-1 (top) and Archer Field PC (bottom), both of which are compatible.

## Advantages and Limitations

The Display Mode Control on the Live Reading Screen provides a variety of readout options: Period of vibration in micro seconds, Frequency squared  $\times 10^{-3}$  (digits) and Microstrain when used with strain gauges. When reading load cells, a built-in multiplexer automatically scans through all the vibrating wire sensors, averages the readings, applies the calibration factor and offset, and displays the load directly in engineering units. In addition, a Programmable Mode permits programming to display the sensor output in engineering units, via configurations created and edited in the Sensor Selection Screen. Thousands of sensors may be defined,

limited only by the storage remaining on the SSD. Data is logged and stored on a per-sensor basis.

*The GK-405 is available with or without the FPC-2 Field PC because the FPC-2, provided with the Model GK-604D Inclinator Readout, is compatible with both systems, as is the FPC-1 and Archer Field PC.*

## System Components

The Model GK-405 is supplied complete with a battery charger, 10-pin plug to flying leads patch cord and manual. Terminal Boxes are also available, which allow a multiplicity of vibrating wire sensors to be read quickly and conveniently, at one location.

## Technical Specifications

### GK-405 (Remote Module)

#### ▼ Vibrating Wire Readout

Excitation Range	450 Hz to 6000 Hz, 5 volt square wave
Resolution	0.001 Hz
Timebase Accuracy	$\pm 50$ ppm

#### ▼ Temperature Readout

Sensor Type	Thermistor, Dale #1C3001-B3 (YSI 44005)
Sensor Accuracy	$\pm 0.5$ °C
Range	-50 °C to +150 °C
Resolution	0.1 °C
Accuracy	0.5% to 1.0% F.S.

#### ▼ Communications

Wireless Protocol	Bluetooth® wireless technology: version 2.0 +EDR, Class 1, range 20 m
Bluetooth® Profile	Serial Port Profile (SPP)
Parameters	9600 baud, 8 data bits, 1 stop bit, no parity, full duplex, non-configurable
Transmission Format	ASCII

#### ▼ Physical

Temperature Range	-10 °C to +50 °C
Battery	7.4 Volt, 2600 mAh Li-ion
Operating Time	greater than 40 hours
Weight	2.45 kg
L×W×H	210×165×185 mm

### FPC-2 Field PC

#### ▼ Field PC

Processor	Texas Instruments 4470 dual-core @ 1.5 GHz
Memory/Disk	1 GB RAM/4 GB iNAND Flash
Operating System	Microsoft® Windows® Embedded Handheld 6.5.3
Screen	4.7" FWVGA (854 × 480); IPS; 600 nits, capacitive multi-touch Asahi Dragontrail chemically strengthened glass
Keypad	Numeric keypad with backlighting, on-screen QWERTY keyboard, 3 programmable function keys
Connections	USB A Host, USB micro (PC sync/charge), DB9 RS-232 serial, 3.5 mm headset
Communication	Audio: Built in: Receiver, loud-speaker; mic; Wireless LAN: 802.11 b/g/n; Bluetooth® wireless technology: version 2.0 in Windows Mobile OS, Class 2 (10 m)
Navigation	Integrated with stand-alone u-blox® GPS
Camera	Integrated 8-megapixel rear-facing camera with autofocus and LED illumination
Drop	MIL-STD-810G 516.6 Procedure IV
Battery	Li-ion, 3.7 V 5200 mAh (19.2 Wh) (warm-swappable) with smart gauge
Operating Temperature	-30 °C to 60 °C, MIL-STD-810G, 501.5/502.5 Procedure II and III
Weight	490 g, including battery and hand strap
L × W × H	191 × 80 × 35 mm

Please see the Model FPC-2 Field PC data sheet for additional specifications and full description.