What's this manual about?
This manual tells you about the two channel VWlog2 and how to use it to take readings.
Who does this apply to?
Installers, field engineers and technicians who need to install, commission and maintain a VWlog2 system.

Welcome!

Thank you for choosing VWlog2.

This manual has been written to help you utilise all of the functions of VWlog2. Please read this manual thoroughly before use to help avoid any problems and keep it handy when using VWlog2.

VWlog2

VWlog2 is a two-channel data logger, which reads and logs most commercially available Vibrating Wire (VW) sensors and optional thermistor temperature sensors. Data is stored as a CSV file onto the internal memory.

The VWlog2 contains 4MB of non-volatile internal memory which is sufficient for up to 50,000 readings per channel, equating to 5.7 years of data sampling at hourly intervals.

The internal memory in VWlog2 operates as a USB mass storage device, which is accessible through a mini USB interface, allowing data to be easily transferred from VWlog2 to a PC or mobile device via drag-and-drop, using the same action as a file on the PC's hard drive.

Easy to use configuration software enables the user to easily set up the VWlog2 parameters, such as date and time, sweep frequency range and excitation voltage.

VWlog2 is housed in a waterproof, rugged, die-cast aluminium enclosure, providing a rating of IP66 and all electronics are encased in an impervious sealing compound to avoid water damage.

With these features, VWlog2 is ideal for long-term and remote monitoring projects including those in harsh or damp environments.

Contents

OVERVIEW & INTRODUCTION

Important information

The following symbols are used throughout the manual

IMPORTANT INFORMATION QUESTION WARNING TIP

Product Changes

Important: Failure to adhere to the warnings in this manual may result in network disruption and possible data loss.

Failure to observe the warning may result in injury, product malfunction, unexpected readings or damage to the product that may invalidate its warranty.

Tips give additional information that may be helpful when using the VWlog2.

Soil Instruments has an ongoing policy of design review and reserves the right to amend the design of their product and this instruction manual without notice.

Warranty

Refer to our terms and conditions of sale for warranty information. The batteries are a consumable item and are excluded from the warranty.

Disposal

Products marked with the  symbol are subject to the following disposal rules in the UK and European countries:

- This product is designated for separate collection at an appropriate collection point
- Do not dispose of as household waste
- For more information, contact Soil Instruments or the local authority in charge of waste management.

System Description

Things You Need to Know

Features

- Reads two Vibrating Wire (VW) sensors and optional thermistor temperature sensors
- 4 MB internal memory; reads up to 50,000 readings per channel, equating to five years of data sampling at hourly intervals
- IP66 rated, rugged, die-cast aluminium enclosure
- Low power requirement; 2 x D Cell batteries last up to two years
- Easy configuration and firmware upgrade via mini-USB to USB cable
- True USB interface; data downloaded via drag-and-drop
- Reads using four user-selectable sweep ranges

Benefits

- Reads most types of commercially available Vibrating Wire (VW) sensors
- Optional 15V excitation ensures quality readings from sensors with long cables
- Ideal for long-term monitoring in harsh and damp environments
- Allows data collection immediately after sensor installation
- Fast setup and download time
- Versatile and economical
- All electronics sealed to protect from static and water damage

System Components

The VWlog2

The VWlog2 is a rugged two-channel Data Logger that will energise and read up to two Vibrating Wire (VW) sensors and optional thermistor temperature sensors and then store the readings internally for retrieval via a mini-USB to USB cable.
All settings are stored in a configuration file that is uploaded to VWlog2 via a mini-USB to USB cable. Once uploaded, these settings are saved internally and will be used until a new configuration file is uploaded.

Soil Instruments recommends carrying out a functionality test before going to site. After sending the configuration file to VWlog2, wire in a Vibrating Wire (VW) sensor and allow VWlog2 to take several readings. Download the data and check the readings and configurations are correct.

Quick Start Guide

Take care to insert the batteries with the correct polarity; make sure +/- on the batteries corresponds with +/- on the battery housing.

Before You Go to Site:

- Remove the top cover of VWlog2 using a Phillips head screwdriver.
- Insert 2 good quality, 1.5V Alkaline D Cell batteries into VWlog2 battery housing.
- Connect VWlog2 to your PC or laptop using the mini-USB to USB cable.
- Modify the configuration files on the VWlog2.
- Unplug the USB cable and replace the protective cap.
- Replace the top cover.

When You Are in the Field:

- Remove the top cover of VWlog2 using a Phillips head screwdriver.
- Connect up to two Vibrating Wire (VW) sensors (each can be with an optional built-in thermistor temperature sensor) to the wiring terminals in VWlog2 using a terminal screw driver.
- Insert 2 x D Cell batteries into VWlog2 battery housing
- Replace the top cover.
- Leave VWlog2 in a non-submerged and safe location.

When You Need to Collect Data:

- Connect VWlog2 to your PC or laptop using the mini-USB to USB cable
- Use drag-and-drop to transfer the data file to your PC or laptop
- View the data in a spreadsheet or text editor.

If using a text editor, Soil Instruments recommends 'NotePad++' because it will display the lines in a more organised fashion using a column format.

Please refer to '*Detailed VWlog2 User Guide*' in this manual for more details.

DETAILED VWLOG2 USER GUIDE

Operating VWlog2

Inserting the Batteries

The battery housing is accessed by unscrewing the four screws on the top cover of VWlog2 using a Phillips head screwdriver. Once the lid has been removed the batteries can be inserted into the battery housing.

Take care to insert the batteries with the correct polarity; make sure +/- on the batteries corresponds with +/- on the battery housing.

Preparing VWlog2 and VW Sensors

Loosen the cable glands by turning the outer connection in an anti-clockwise direction.

Strip the Vibrating Wire (VW) sensor cable, making sure an adequate length of the internal cables is exposed to wire into the VWlog2 sensor terminals.

Only a competent person trained in the use of VWlog2 and Vibrating Wire sensors should connect the sensors.

Connecting Sensors with Temperature

Push the Vibrating Wire (VW) sensor cable through the cable gland and connect the wires to the sensor terminals as shown in the table below.

SENSOR CONNECTIONS	SENSOR TERMINAL: CHANNEL 1	SENSOR TERMINAL: CHANNEL 2
VW Sensor +	VW1+	VW2+
VW Sensor -	VW1-	VW2-
VW Thermistor +	T1	T2
VW Thermistor -	T1	T2
Shield	Shield	Shield

VWlog2 is only compatible with 3 K ohm thermistor temperature sensors. It will not work with RTD-based temperature sensors used by some manufacturers.

Connecting Sensors without Temperature

Push the Vibrating Wire (VW) sensor cable through the cable gland and connect the wires to the sensor terminals as shown in the following table.

SENSOR CONNECTIONS	SENSOR TERMINAL: CHANNEL 1	SENSOR TERMINAL: CHANNEL 2
VW Sensor +	VW1+	VW2+
VW Sensor -	VW1-	VW2-
Not used	T1	T2
Not used	T1	T2
Shield	Shield	Shield

Once Vibrating Wire sensors have been connected to VWlog2, ensure the cable glands are thoroughly tightened to maintain a watertight seal.

LED Sequence

Once the VWlog2 has been installed and the batteries inserted, the following LED sequence will occur, informing you of the logger status.

LED SEQUENCE	DESCRIPTION	LOGGER STATUS LED
1	Batteries inserted, Logger functioning	'Heartbeat' – flashing every 7 seconds
2	Logger taking a reading	Solid red light (based on reading interval)
3	Logger connected to PC	Solid red light

Your Logger is now ready to use.

Please proceed to the '*Guide to Configuration & Data Files*' in this manual for details on how to configure the logger and retrieve data.

GUIDE TO CONFIGURATION & DATA FILES

VWlog2 Configuration Files

Overview

The VWlog2 configuration files hold information on how and when the Vibrating Wire (VW) sensors are read.

The configurable parameters within the VWlog2 configuration file are as follows.

- Reading interval
- Number of retries
- Sweep frequency range
- Excitation voltage.
- Date/Time

The sweep frequency range and excitation voltage can be individually modified for both channels.

The configuration files are opened directly from the VWlog2 and modified using the Soil Instruments configuration software.

Once the settings have been modified to suit your requirements, the new configuration files are saved to the VWlog2. VWlog2 will use the new settings on the next data cycle.

VWlog2 Datalogger Configuration File

The VWlog2 datalogger configuration file is a text file that holds information on how the Vibrating Wire (VW) sensors are read.

The filename is "xxxx.cfg", where; "xxxx" is the VWlog2 ID
(four character serial number found on the silver label).

More details on the content and format of "xxxx.cfg" are shown in the following table.

On power up, VWlog2 reads the information in "xxxx.cfg" and uses this information to read the sensors and save the data to its memory.

SECTION	AVAILABLE PROPERTIES	VALID VALUE	DESCRIPTION	Recommended VALUE
[Schedule]	Reading_Interval	30 to 3600	Time (in seconds) between the readings	3600
[Schedule]	Num_Retry	0 to 5	Number of times to re-take the reading if the reading frequency is beyond the range between Hz_min & Hz max	3
[Channel1]	Hz_min	From four available ranges		
	Hz_max			
	Excitation_Voltage	5 to 15	Excitation voltage in V	5
[Channel2]	Hz_min	From four available ranges		
	Hz_max			
	Excitation_Voltage	5 to 15	Excitation voltage in V	5

Configuration Software

Instal the software onto a Windows PC or laptop, the software is available from the following locations:

https://soilinstruments.helpdocs.com/software/vwlog2-configuration-software

SCAN ME

Or from the USB stick supplied with the VWLog2

Once installed connect the VWlog2 to the computer using a mini USB lead.

Once connected, VWlog2 appears as a removable storage device on your PC or laptop as shown below.

Open the configuration software from the VWLog2 Icon on the desktop, the software will automatically connect to the VWLog2 and its configuration file will be loaded into the software screen.

The configuration can be modified as required and then saved back to the VWLog2

When performing a Save As you will be required to enter the file name, The filename is "xxxx.cfg", where; "xxxx" is the VWlog2 ID
(four character serial number found on the silver label).

You can use Save As to create configuration files for additional VWLog2's

New creates a new config file from a default template

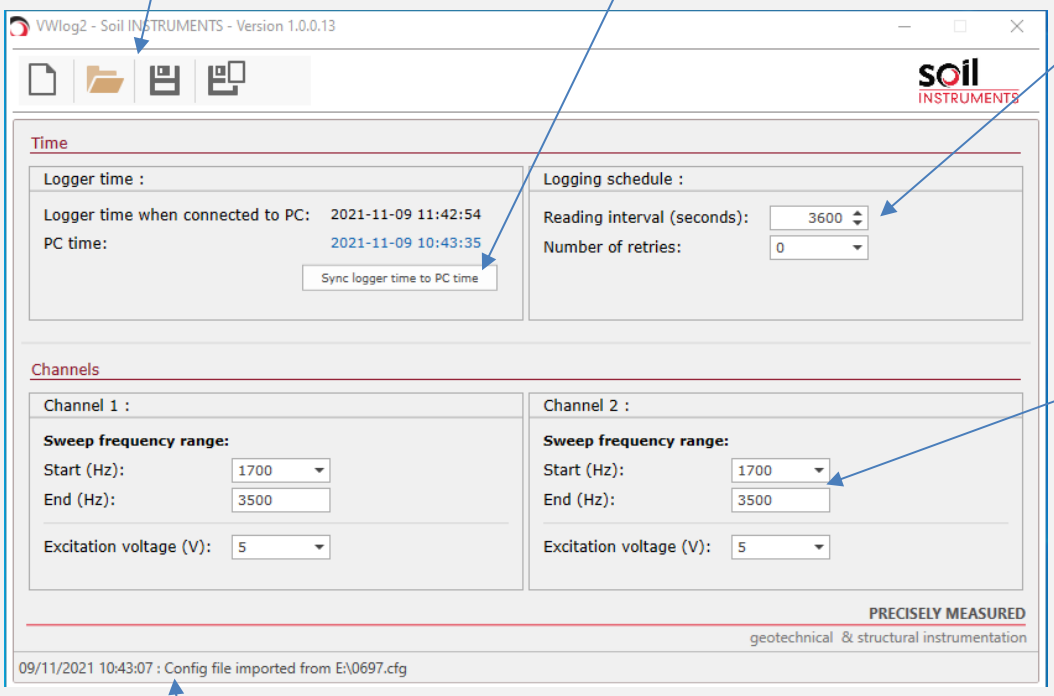
Open allows for navigation to an existing config file

Save stores the config file to the connected VWLog2

Save As allows for saving to a location on the computer

Syncs the VWLog2 date and time to the Computer date and time

Select the required reading interval and number of retries



Each channel is individually configurable

Select the required start frequency from the four selectable ranges and the excitation voltage

Notification line updated following completed actions

Consult the manufacturers' manual for the recommended sweep frequency range for the VW sensor being used. See the FAQ for Soil Instruments VW sensors.

You can select the 15 V DC excitation option if the sensor has a long cable. As a guide, a cable is considered long if it is over 200m (600 ft), however, Soil Instruments advise that you consult the manufacturers' manual for the recommended excitation voltage for the VW sensor being used.

Data File

Overview

The data file is transferred from VWlog2 to your PC or laptop via drag-and-drop and can be viewed via a spreadsheet or in a text editor on your PC.

If there is an unrecognised section name, the entire section (with all its properties) will be skipped. Within a known section, all unrecognised properties will be skipped.

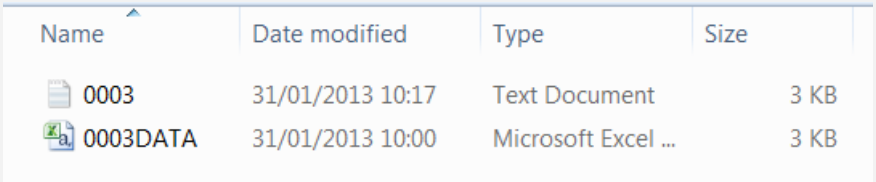
If a section is skipped or is not included in the Logger Configuration File, the default values of all the properties in the section will be assumed.

If using a text editor, we recommend 'NotePad++' because it will display the lines in a more organised fashion using a column format.

Once connected, VWlog2 appears as a removable storage device on your PC or laptop as shown below.

When you open VWlog2, two data files are displayed; a text document and a CSV file. The files may be transferred to your PC or laptop by dragging and dropping.

The CSV file can be opened in 'Excel'



Name	Date modified	Type	Size
0003	31/01/2013 10:17	Text Document	3 KB
0003DATA	31/01/2013 10:00	Microsoft Excel ...	3 KB

Example of a data file

Date/Time	Serial Number	Vbatt(V)	Board Temp(°C)	CH1 freq(Hz)	CH1 temp(°C)	CH2 freq(Hz)	CH2 temp(°C)	Flags
29/01/2013 17:00	0x0003	2.7	23	2843.354	20.2	2006.615	23.3	0
29/01/2013 18:00	0x0003	2.7	23	2843.354	20.2	2006.605	23.4	0
29/01/2013 19:00	0x0003	2.7	22.9	2843.512	20.2	2006.487	23.2	0
29/01/2013 20:00	0x0003	2.7	23	2843.559	20.2	2006.628	23.4	0
29/01/2013 21:00	0x0003	2.7	22.9	2843.459	20.2	2006.447	23.1	0
29/01/2013 22:00	0x0003	2.7	22.7	2843.422	20.2	2006.382	22.9	0
29/01/2013 23:00	0x0003	2.7	22.5	2843.454	20.2	2006.426	22.7	0

Format of the Data File

COLUMN	DESCRIPTION	EXAMPLE
Date/Time	Date and time of reading (yyyy-mm-dd hh:mm:ss)	2013-02-13 17:30:00
Serial Number	Sensor serial number. The sensor serial number is displayed as a decimal number	0x0245
Vbatt(V)	Battery voltage at time of reading	3.0
Board Temp(°C)	Logger temperature at time of readings in °C	22.8
CH1 freq(Hz)	Sensor reading from channel 1 in Hz. The value will be “NAN” if no sensor or the reading is still outside the sweeping range after retries	3059.669
CH1 temp(°C)	Thermistor temperature sensor reading from channel 1 in °C. The value will be “NAN” if no sensor or the reading is beyond the normal range	21.1
CH2 freq(Hz)	Sensor reading from channel 2 in Hz. The value will be “NAN” if the reading is still outside the sweeping range after retries	3088.827
CH2 temp(°C)	Thermistor temperature sensor reading from channel 2 in °C. The value will be “NAN” if no sensor or the reading is beyond the normal range	21.4
Flags	Reserved for future use	N/A

There is another file on the VWlog2, “xxxx.LOG” (where “xxxx” is the VWlog2 ID four character serial number found on the silver label). This file must not be moved or deleted and should be ignored by the user.

MAINTENANCE GUIDE

Maintaining the VWlog2 System

Routine Maintenance

VWlog2 is manufactured with multilayer circuit boards containing surface mounted components. For this reason, there are no parts that require routine maintenance other than the replacement of the batteries and recalibration of VWlog2.

Ensure the protective cap of the USB port and cable glands are securely tightened so that VWlog2 remains watertight.

Battery Maintenance

VWlog2 is powered by 2 x D Cell batteries. VWlog2 battery status can be logged at regular intervals to monitor the battery levels, avoiding loss of power and therefore loss of data by making sure you replace the batteries promptly.

When replacing the batteries, make sure you run all the start-up tests to confirm that VWlog2 is fully functioning.

Take care to insert the batteries with the correct polarity; make sure +/- on the batteries corresponds with +/- on the battery housing.

Battery life is dependent on the following factors:

- Battery type/quality
- Sensor reading frequency
- Ambient temperature

Soil Instruments advise that with both channels active, two new D Cell alkaline batteries will keep VWlog2 in operation for two years while reading two Vibrating Wire (VW) sensors and two temperature sensors every hour.

The minimum voltage of VWlog2 is 2V, but please be aware that this is for VWlog2 only and not for any sensors attached to it. Please refer to the manufacturers' manual for your sensors for further information.

APPENDICES

Appendix A - Firmware Update

You can update VWlog2 firmware locally. The firmware will be supplied by Soil Instruments as a binary file with a "hex" extension. The typical filename is "xxxx.hex".

To perform a firmware update:

STEP	ACTION
1	Rename the latest firmware file such as "xxxx.hex" to "image.hex"
2	Connect VWlog2 to the PC using a mini-USB to USB cable
3	Copy "image.hex" to VWlog2 memory which appears as a removable drive
4	Disconnect VWlog2 from the PC
5	VWlog2 will now be updated to the new firmware
6	VWlog2 will then delete "image.hex" from its memory

Appendix B – Frequently Asked Questions

Why is VWlog2 not showing as a removable drive on my PC or laptop?

Firstly, make sure the mini-USB is correctly inserted into VWlog2. When VWlog2 is connected to your PC, a solid red light should be displayed to the right of the USB port. If the mini-USB to USB cable is correctly inserted but there is still no red light, you may have a faulty USB port on your PC. Check this by plugging into a different USB port if one is available, alternatively try a different PC. If after these checks VWlog2 is still not connecting, you may have a faulty mini-USB to USB cable, in which case you can try a different cable.

If the problem persists please contact our support team.

Why is VWlog2 not working after I have replaced the batteries?

Check that the batteries are new and have been inserted with the correct polarity. The problem may be caused by cable damage or a bad connection from the battery housing to the wiring terminal. You can check this by using a Multimeter to test the battery power. If the batteries have full voltage but VWlog2 is still not functioning, please contact our support team.

What sweep frequency range should I use for my Vibrating Wire (VW) sensors?

You should select a sweeping range that covers the defined range for the type of sensor connected. Below is a table showing the sweep frequency ranges for various VW sensors manufactured by Soil Instruments. This table is a reference for Soil Instruments VW sensors only, for non-Soil Instruments sensors please refer to the manufacturers' recommended sweep frequency range.

Sweep Frequency Ranges for Soil Instruments Vibrating Wire Sensors

INSTRUMENT	CATALOGUE CODE	SIGNAL RANGE
VW Piezometer	W4, W9	1700 - 3400 Hz
VW Pressure Cell	P6, P9, P10	1700 - 3400 Hz
VW Settlement Cell	S8	1700 - 3400 Hz
VW Load Cell	L2	2000 - 3000 Hz
VW Temperature Sensor	T3	2000 - 3500 Hz
VW Weir Sensor	W10	2000 - 3500 Hz

I have data in the second channel even though I only have channel one sensor connected

This can sometimes occure when the open second channel picks up residual frequencies from the first channel.

SUPPORT

Contact Soil Instruments support team using the details below:

https://soilinstruments.helpdocs.com

email: support@soilinstruments.com

Scan Me For Support