KEYNES CONTROLS

VibWire-108-SDI12

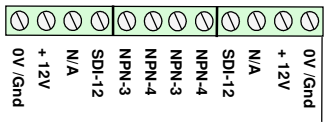
8 Channel Vibrating Wire Sensor Interface using SDI12 network

CE

Free Windows Configuration, Display and Recording Software

Download Q-LOG

Download a free copy of Q-LOG at
http://www.aquabat.net/QLOGFree/qlogv2.html



Contact Keynes Controls
Tel: 0044 118 327 6067

Model No. VibWire-108-SDI12

Overview

The VibWire-108-SDI12is a rugged, versatile, general purpose vibrating wire sensor interface for connection directly to data recorders and acquisition systems across a SDI-12 network. The VibWire-108 range of devices gives third party systems the ability to use vibrating wire sensors even if the original hardware is not designed to do so.

Sensor Excitation - Auto Resonance

All of the VibWire-108 range of interfaces utilises an auto-resonance sensor excitation and measurement technique for activating the vibrating wire sensors and taking a reading. This technique has the advantage over pluck systems in that no prior User knowledge of the vibrating wire sensor is required. Auto-resonance sensor excitation minimises the strain on the sensor coil as it always acts to maximise the output signal from the sensor, and does this without wasting energy on out of band excitation frequencies.

Terminal Port - Configuration

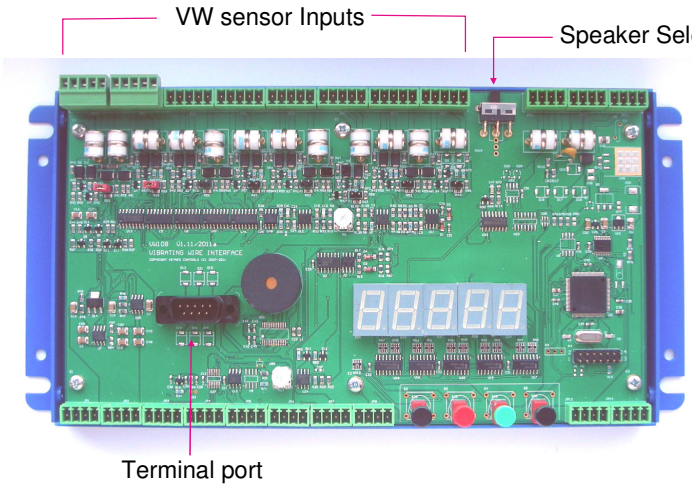
A terminal port menu system is be used to configure this device. The User can configure the instrument to send measurement values in Hz, Digits or SI units. No programming is required to configure this instrument.

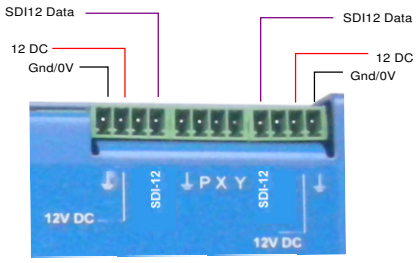
Features:

- 8 x 4-wire vibrating wire sensor inputs
- Resolves the VW signal to less than 0.001 Hz (industry standard 0.1 Hz)
- Gas discharge tube sensor protection
- Real-time frequency display: 5-digit
- Audible output
- Auto resonance VW excitation
- SDI-12 network support
- Firmware upgrade facility
- Automatic VW sensor configuration
- Digital communications to remove noise sources and errors.
- Simplified configuration and data logger support.
- Output - Frequency, Digits, SI Units, Temp deg C
- Steinhart-Hart thermistor linearisation support
- Integrated polynomial linearisation - quadratic Support direct from VW sensor calibration data sheet.

Specifications:

Description:		
Frequency display	5-segment display	Resolution 0.1 Hz
Vibrating wire inputs	8 x 4-wire inputs	
Scan time	2 - 24 Secs	1 to 8 channels depending on sensor operation.
Line resistance	Up to 2K ohms	
Frequency Input Measurement Accuracy	0.013 % of reading	
8 analogue inputs (Temperature)	0 - 2.5V DC 3.3K / 10K Ω	0- 2.5V DC Thermistor
Lightning protection	Gas discharge tube	
VW excitation range	400 - 6K Hz	
VW excitation mode	Auto-resonance	
Temp sensor	3.3 and 10K	Standard thermistor inputs
Operating voltage	9 - 18V DC	
Ceramic loudspeaker	VW sensor	Selector switch
Power Consumption:		
Scanning mode	8 mA	Duration 24 secs
Display mode	60 mA	Continuous with display
SDI-12 mode	1.2 mA	Continuous while waiting for commands
Software:		
VW sensor linearisation	Quadratic	$Y = A + BF + DF^2$
Temperature sensor linearisation	Steinhart-Hart	User-selectable via terminal port





SDI-12 Network Connection

The VibWire-108-SDI12 uses a very simple command structure to acquire and return data values:

Start Measurement Command:
aM! aC! where a = ID number concurrent measurement support

Get data values:

aD0!	--	Vibrating wire inputs	0 - 3	Hz, Digits (Hz^2), SI units
aD1!	--	Vibrating wire inputs	4 - 7	Hz, Digits (Hz^2), SI units
aD2!	--	Temp inputs channels	0 - 3	(mV or Deg C)
aD3!	--	Temp inputs channel	4 - 7	(mV or Deg C)

The VibWire-108 interface supports the full 4-wire gauge input and can use any inbuilt thermistor temperature sensor. All of the vibrating wire sensor interfaces and digital network ports are protected by gas discharge tube in order to prevent damage by local lightning strikes.

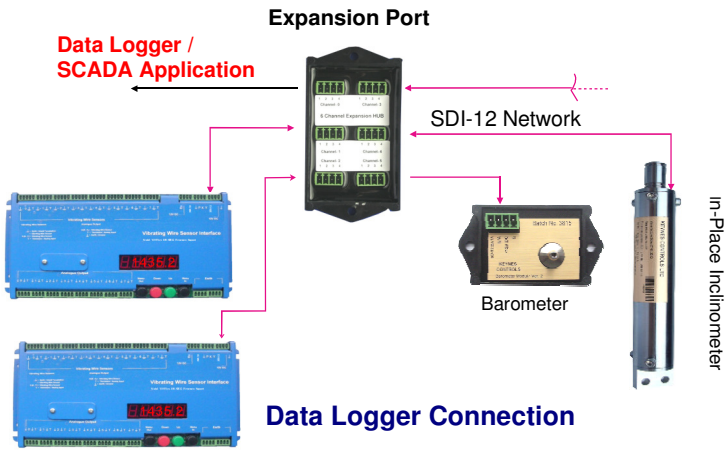
Part numbers:

VW-108-SDI12	**VibWire-108 with SDI-12 digital port**
USB-SDI12	**USB to SDI-12 media converter**

Measurement Data:	
Number of channels	8 x 4-wire VW inputs - User-selectable
VW sensor coil resistance	to 2 K Ohm (standard):- other ranges on request
Distance of VW sensor to interface	0 .. 10 Km depending on cabling.
Frequency range	400 - 6 KHz (standard) - other ranges on request
Frequency Resolution	32-bit resolution 0.001 Hz
Frequency Measurement Accuracy	0.012 % of reading (typically)
Long term stability	± 0.05 % FS max (per year)
Temperature range	- 50 to 70 deg C
Temperature resolution	0.1 °C +/- 0.2 deg thermistor 10K Ohm standard - 3.3K Ohm on request
Temperature accuracy	± 0.2 °C / 0.2 °F SDI-12
Thermistor measurement	A half-bridge ratio-metric measurement . Value returned in mV. Is used for temperature compensation on VW measurements.
Thermistor excitation	2.5 V DC 50 ppm / deg C
Input resistance	10 K Ohm 0.1 % completion resistor (standard) - 3.3 K Ohm on request
Units	Freq (Hz) Temperature (mV), Engineering Units after configuration.
Display only - Resolution	5 digit - 0.1 Hz
Electrical Data:	
Voltage supply	**SDI-12** 10.5 to 16V DC
Current compensation SDI-12 Option only	Typical values are @ 12V DC excitation
Idle mode: Active / measurement:	1.2 mA 8 mA data transmission 58 mA including frequency display These values may change slightly between sensors. Use figures as a guide only.
Measuring time warm up: response	 500 ms 3 seconds per channel depending on the VW sensor being used (typical)
Length of data lines SDI-12	 0 .. 100 m
SDI-12 Address mode	Supports enhanced addressing 0 .. 9 A .. Z
General Data:	
Dimensions (mm)	L =260 W = 127 D = 38
Material	Powder coated aluminium
SDI-12 Digital Port	SDI-12, 1200 Baud, 7-bit, N stop bit, even parity - other speeds on request
CE Conformity	CE conformity according to EN 61000-6
Weight	400 g
Terminal Port	9-way male - 9600 Baud 8 data, even parity, N stop

Network Connection & Expansion

The image below shows how the VibWire-108-SDI12 units can be used to create a distributed solution across a SDI-12 digital network. Additional interfaces can be connected to the network by simply connecting the next unit onto the expansion port.

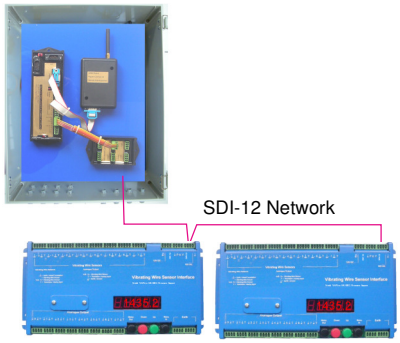


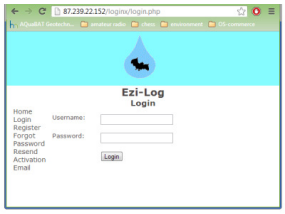
Data Logger Connection

When using the SDI-12 network a 3-core cable is required to connect all the instruments together. The expansion port is used only to simplify the installation.

Remote Data Access - Mobile Phone Network

The data from the VibWire-108 units can be accessed from remote sites automatically by using the EZ-LOG data loggers and Web page interface. Data is sent out across the mobile phone GPRS network and stored into a database.





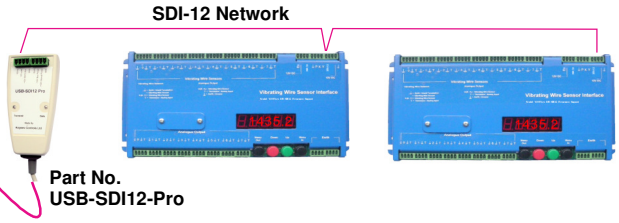
EZ-LOG Web Interface

The EZ-LOG Web interface enables the User to control the remote download times and to set the E-mail alarm system directly onto the secure database.

PC Data Acquisition

USB PC Interface

The VibWire-108-SDI12 can be connected to a laptop / PC computer system by using the USB-SDI12-Pro media converter. The USB-SDI12-Pro media converter can power up to 2 x VibWire-108 units directly from the laptop USB port.



USB-SDI12-Pro Media Converter connected to a laptop.

Keynes Controls reserved the right to make changes without notice.
The specifications are correct at the time of printing.
Please contact us the latest details.

Supported Commands

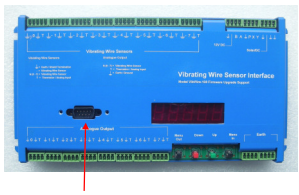
Description	Command	VW108 Response
Acknowledge active	a!	a\r\n
Send ID: provided to complement SDI-12 protocol	I!	a13KEYNESCOVW1080001\r\n Part description assigned by Keynes
Address query: identifies instrument address and commonly used on single instrument operations only.	?! Used to make command set SDI-12 compatible	a\r\n Where a = number 0 - 9 or a - z
Change address: used to change instrument address from default to new one for network operations	aAb! **a** = initial address **b** = new address 0A3! changes ID = 0 to ID = 3	b\r\n **a : b** = number 0 - 9 or a - z
Start measurement: instruct an instrument to make measurement	%aM! **a** = address of instrument	a0308\r\n instrument with address a returns 8 x VW & 8 x temp after 30 seconds
Concurrent measurement: Used for polling multiple instruments on a network to start to make readings. This command frees SDI-12 bus for other devices	aC! start measurement instrument address **a**	a03016\r\n initial response only after receipt of instruction and no response when data ready to be sent.
Send data: Data returned aND! = Vib + Vib + Therm + Therm and has same format for each command	%aD0! aD1! aD2! or aD3! '**aD0!** – Vibrating wire Chans 0 - 3 Hz, Hz², SI Units '**aD1!**'– Vibrating wire Chans 4 - 7 Hz, Hz², SI Units **aD2!**'– Temp inputs Chans 0 - 3 deg C, mV '**aD3!**'-- Temp inputs Chans 4 - 7 deg C, mV	+xxxx.x+xxxx.x+xxxx.x+xxxx.x\r\n

Tel: 0044 118 327 6067

Engineering Data Values

The VibWire-108 can be used to acquire raw sensor and temperature values for post-process analysis, or can provide data directly into engineering units. The instrument is fully-configurable using the inbuilt terminal port and menu system and has the ability to use most different manufacturers' sensors. The VW108 family all use the standard quadratic equation for VW sensor linearisation and the Steinhart-Hart thermistor linearisation for the temperature sensor inputs.

USB-RS232 Converter



Terminal Port

Configuration Made Easy

All of the VibWire-108 family of products can be configured using the inbuilt terminal port and menu system. All that is required is a Terminal Emulator package such as the Microsoft HyperTerminal or any other similar package.

The in-built menu system is straightforward and allows VW sensor configuration parameters to be stored directly into the VibWire-108 without any prior knowledge of programming.

Free Windows Q-LOG Application

The VW-108 range of interfaces are all fully integrated into the Q-LOG Data Recording & Display software. Q-LOG is the Keynes Controls PC-based application that uses a Windows environment to configure, record, and display values from the VibWire-108 range of interfaces.

Terminal Port Menu System

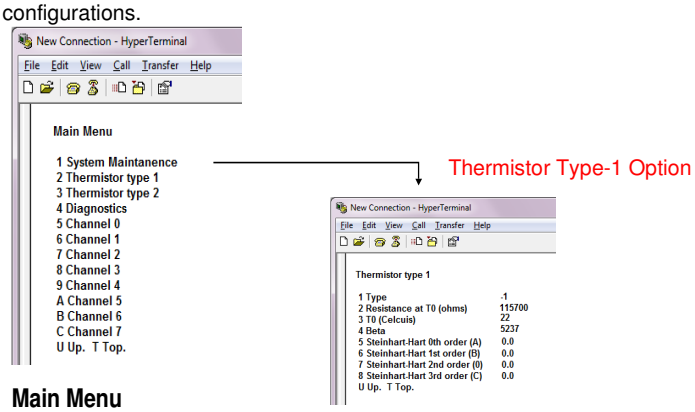
The images below show part of the menu system built into the VibWire-108.

On powering up the instrument the Main menu shown below will appear.

Use the terminal emulator software to type the sensor calibration parameters and store them into instrument. Data values from the VibWire-108 can be supplied in raw or SI (Engineering) value format.

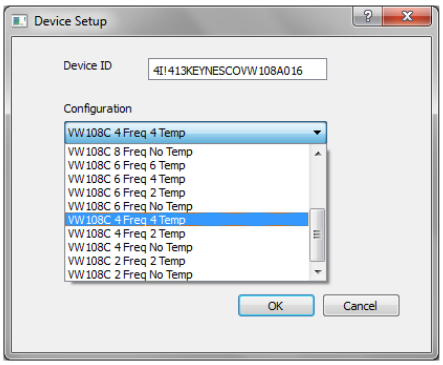
Each VW sensor input channel can be individually configured.

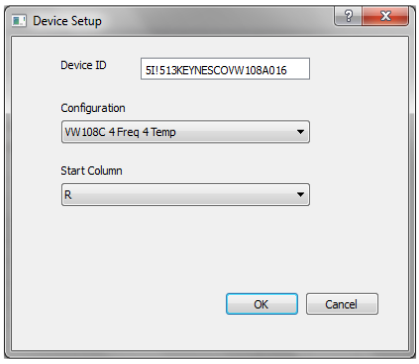
The menu system currently supports 2 different thermistor type configurations.

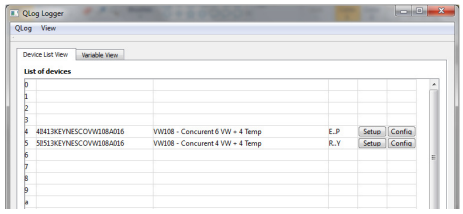


Main Menu

The images below show some of the configuration Window options available with Q-LOG for the VibWire-108:



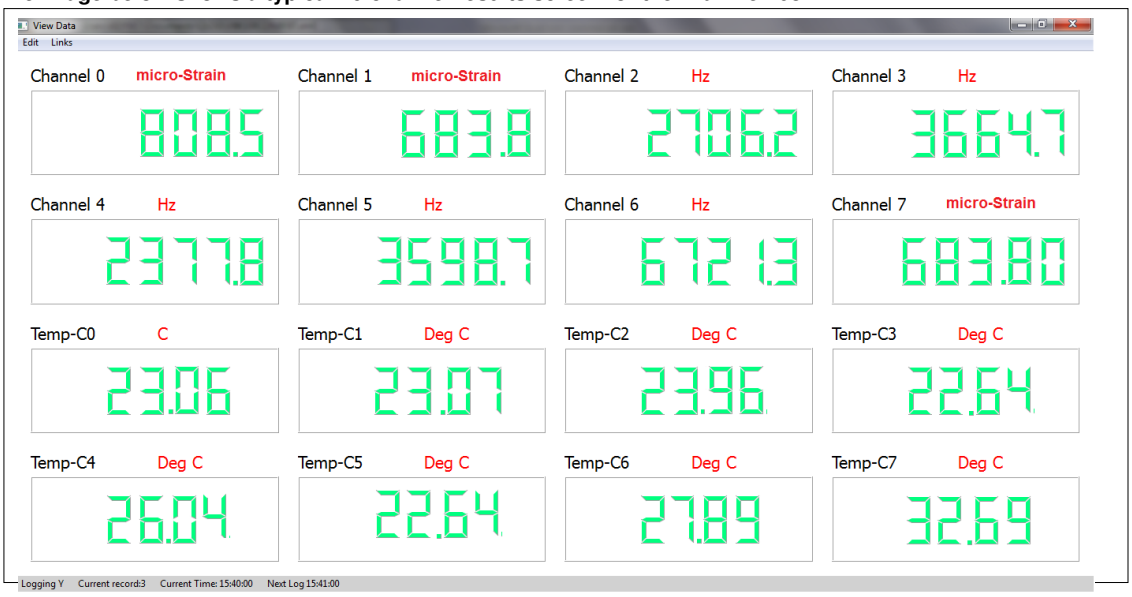




Q-LOG communicates to the sensors and instruments via the USB media converter attached to the PC. See image opposite.

The basic package supports up to 160 inputs and this can be expanded onto additional network inputs by simply installing additional media converters to the USB ports.

The image below shows a typical 16-channel results screen for the VibWire-108



The simple pull-down menu configuration system means large systems can be deployed and updated without any prior knowledge of programming applications.

The image opposite shows the LCD panel meter display for a single VibWire-108 instrument in Q-Log.

The screen can be configured

Dimensions of the VibWire-108 Back Mounting Panel

The image below shows the dimensions of the back mounting panel for the VibWire-108 range of vibrating wire sensor interfaces.