KEYNES CONTROLS

VibWire-108-Analog

8 Channel Vibrating Wire Sensor Interface - 485 Network

Contact Keynes Controls
Tel: 0044 118 327 6067

CE

Pin-outs

Model No. VibWire-108-485

Terminal Port Cover

Overview

The VibWire-108-Amalog is a rugged, versatile, general purpose vibrating wire sensor interface for connection directly to SCADA applications and data recorders using standard analogue data acquisition systems. 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 or Digits. No programming is required to configure this instrument.

Analogue Output Signals

The analogue output signals are scaled proportional to the incoming sensor signals. User controls are used to optimised these setting to improve the resolution and accuracy of the measurements.

Features

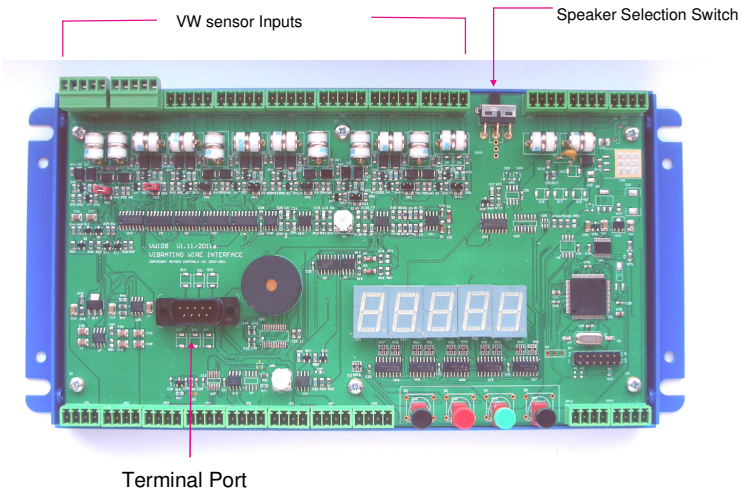
- 8 x 4 Wire Vibrating Wire Sensor Inputs (4 wire)
- 8 x Analog Output - Frequency Sensors 0-2.5 V DC
- 8 x Analog Output - Temperature Sensors 0-2.5 V DC
- Resolves the VW signal to less than 0.001 Hz (industry standard 0.1 Hz)
- Gas Discharge Tube Sensor Protection
- Real-time Frequency Display - 5 digit
- Audible Output
- Auto Resonance VW Excitation
- RS-485 Network Support
- Automatic VW sensor configuration
- Digital communications to remove noise sources and errors.
- Simplified configuration and data logger support
- Output - Frequency - Hz, Digits, Temp Deg C
- Steinhart-Hart Thermistor Linearisation
- Terminal Port for Sensor Set-up

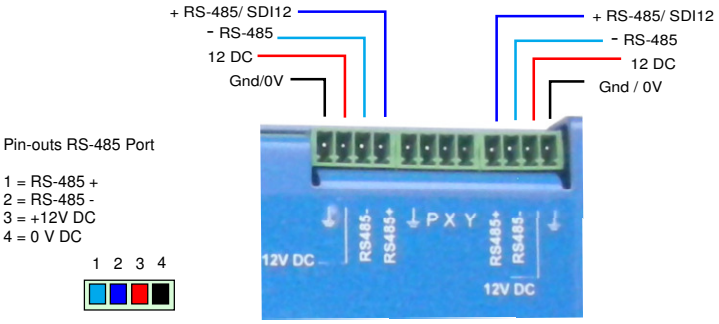
Specifications

Description		
Frequency Display	5 Segment display	Resolution 0.1 Hz
Vibrating Wire Inputs	8 x 4 Wire Inputs	
Scan Time	2 - 24 Sec's	1 to 8 channels depending on sensor operation.
Line Resistance	Up to 2 K ohms	
8 Analogue Inputs	0 - 2.5V DC 3.3K / 10 K Ω	0- 2.5V DC Thermistor
Lightning Protection	Gas Discharge Tube	
VW Excitation Range	400 - 6 K Hz	
VW Excitation Mode	Auto-resonance	
Operating Voltage	9 - 18V DC	
Ceramic Loudspeaker	VW sensor	Selector switch
Power Consumption		
Scanning mode	10 mA	Duration 24 Sec (3 Sec / Chan)
Display mode	40 mA	Continuous
RS-485 mode	2.2 mA	Continuous while waiting for commands
Software		
VW sensor linearisation	Quadratic	$Y = A + B.F + C.F^2$
Temperature sensor linearisation	Steinhart-Hart	User-selectable via terminal port

Web Address: http://www. Aquabat.net

info@Aquabat.net





RS-485 Network Connection

Pin-outs RS-485 Port

1 = RS-485 +
2 = RS-485 -
3 = +12V DC
4 = 0 V DC

1 2 3 4

The VibWire-108-RS485 uses a very simple command structure to acquire and return data values.

Start Measurement Command: aM! aC! where a = ID Number
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 interfaces supports the full 4 wire gauge input and can use any in-built thermistor temperature sensor. All of the vibrating wire sensor interfaces and digital network port are protected by gas discharge tube in order to prevent damage by local lightning strikes.

Part Numbers:

VW-108-RS485	VibWire-108 with RS485 Digital Port
USB-485	USB to RS-485 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
VW sensor units Temperature sensor	Hz, Digits (Hz^2), SI Units $y = A + B.F + C.F^2 + D.F^3$ Deg C, mV
Frequency Resolution Accuracy	32 bit resolution 0.001 Hz
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 10 K Ohm standard 3.3 K Ohm on request
Temperature accuracy	± 0.2 °C / 0.2 °F RS-485
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
Display only - Resolution	5 digit - 0.1 Hz
Electrical Data	
Voltage supply	**RS-485** 10.5 to 16V DC
Current compensation RS-485 Option only	Typical values are @ 12 V DC Excitation
Idle mode Active / measurement	2.2 mA 10 mA data transmission 60 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 RS-485	 0 .. 1000 m
RS-485 Address mode	Supports enhanced addressing 0 .. 9 A .. Z
General Data:	
Dimensions (mm)	L =260 W = 128.5 D = 38
Material	Powder coated aluminium
Digital Port	RS-485, 1200 Baud, 7 bit, N stop bit, Even Parity - other speeds on request
CE Conformity	CE conformity according to EN 61000-6
Terminal Port	9 Way Male - 9600 Baud 8 data, Even Parity, N stop , DTE
Weight	400 g

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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:	%?!	a\r\n
identifies instrument address and commonly used on single instrument operations only.	Used to make command set SDI-12 compatible	Where a = number 0 - 9 or a - z
Change Address:	%aAb!	b\r\n
used to change instrument address from default to new one for network operations	**a** = initial address **b** = new address %0A3! changes ID = 0 to ID = 3	**a : b** = number 0 - 9 or a - z
Start Measurement:	%aM!	a0308\r\n
instruct an instrument to make measurement	**a** = address of instrument	instrument with address a returns 8 x VW & 8 x temp after 30 seconds
Concurrent measurement:	%aC!	a03016\r\n
Used for polling multiple instruments on a network to start to make readings. This command frees RS-485 bus for other devices	start measurement instrument address **a**	initial response only after receipt of instruct and no response when data ready to be sent.
Send Data:	%aD0! aD1! aD2! or aD3!	+xxxx.x+xxxx.x+xxxx.x+xxxx.x\r\n
Data returned aND! = Vib + Vib + Therm + Therm and has same format for each command	'%**aD0!** -- Vibrating Wire Chans 0 - 3 Hz, Hz^2, SI Units '%**aD1!**'-- Vibrating Wire Chans 4 - 7 Hz, Hz^2, SI Units %**aD2!**'-- Temp inputs Chans 0 - 3 Deg C, mV '%**aD3!**' -- Temp inputs Chans 4 - 7 Deg C, mV	

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Connection of Multiple Devices to a RS-485 Network

Node ID=0

Node ID = 0

3rd Part Logger

or

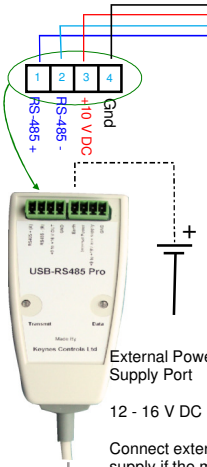
USB-RS485-Pro

RS-485 Port

Part No. USB-RS485-Pro

Isolated USB - RS485 media converter.

This device can power up to 10 single channel devices from the USB-RS485-Pro media converter directly from the PC USB port.



External Power Supply Port

12 - 16 V DC

Connect external power supply if the maximum current for the number of devices on the RS485 network exceeds 85 mA

Pin-outs RS-485 Port

1 = RS-485 +
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1 2 3 4

Q-Log Application

Part No. USB-RS485-Pro
Isolated RS-485 to USB media converter

Part No. **VibWire-108-485**

8 channel Vibrating Wire Sensor Interface with RS-485 digital network.

View looking into port

Node ID = 0

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

Pin-outs RS-485 Port

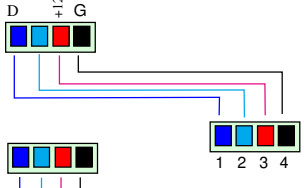
1 = RS-485 +
2 = RS-485 -
3 = +12V DC
4 = 0 V DC

View looking into port

1 2 3 4

Node ID = 1

VW108 RS-485 Port



VW108 RS-485 Port

Chan-0

1 2 3 4

VW108 RS-485 Port

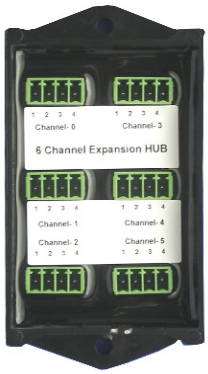
Chan-1

1 2 3 4

VW108 RS-485 Port

Chan-2

1 2 3 4



Hub

VW108 RS-485 Port

1 2 3 4

Connection to VibWire-101 MUX control port

1 2 3 4

External Power Supply Port

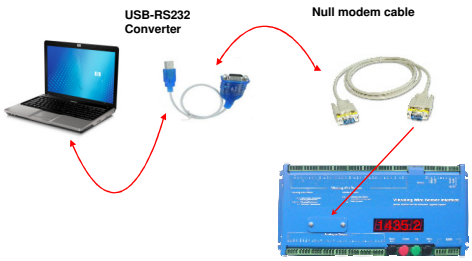
12 - 16 V DC

Connect external power supply if the maximum current for the number of devices on the RS485 network exceeds 85 mA

The image opposite shows how to connect multiple VibWire-108-485 units together using a 6 Port expansion hub.

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 in engineering units. The instrument is fully configurable using the in-built terminal port and menu system to accept most manufactures 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.



Configuration Made Easy

All of the VibWire-108 family of products can be configured using the in-built terminal port and menu system. All that is required is a Terminal Emulator package such as the Microsoft Hyper-terminal or any other similar package to talk to the instrument. The in-built menu system is straight forward and allows VW sensor configuration parameters to be stored directly into the VibWire-108 without any prior knowledge of programming.

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 intelligent sensors.

Terminal Port Menu System

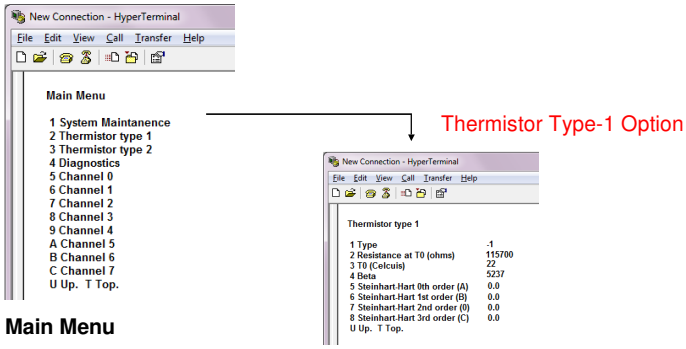
The images below show part of the menu system built into the VibWire-108.

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.

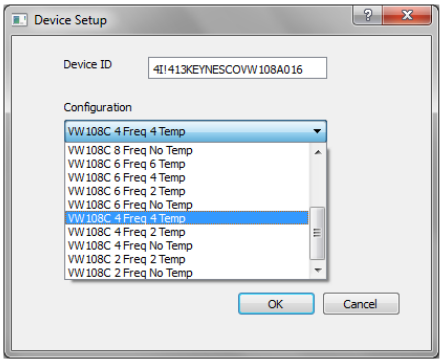
Each VW sensor input channel can be individually configured.

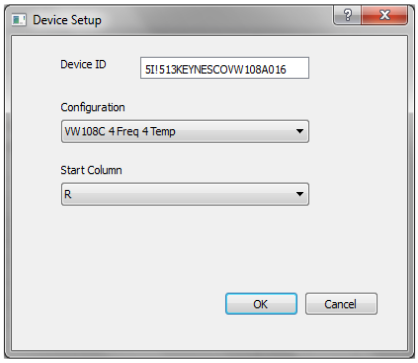
The menu system currently supports 2 different thermistor type configurations.

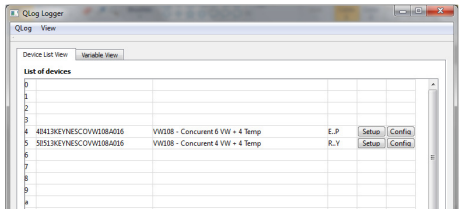


Main Menu

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



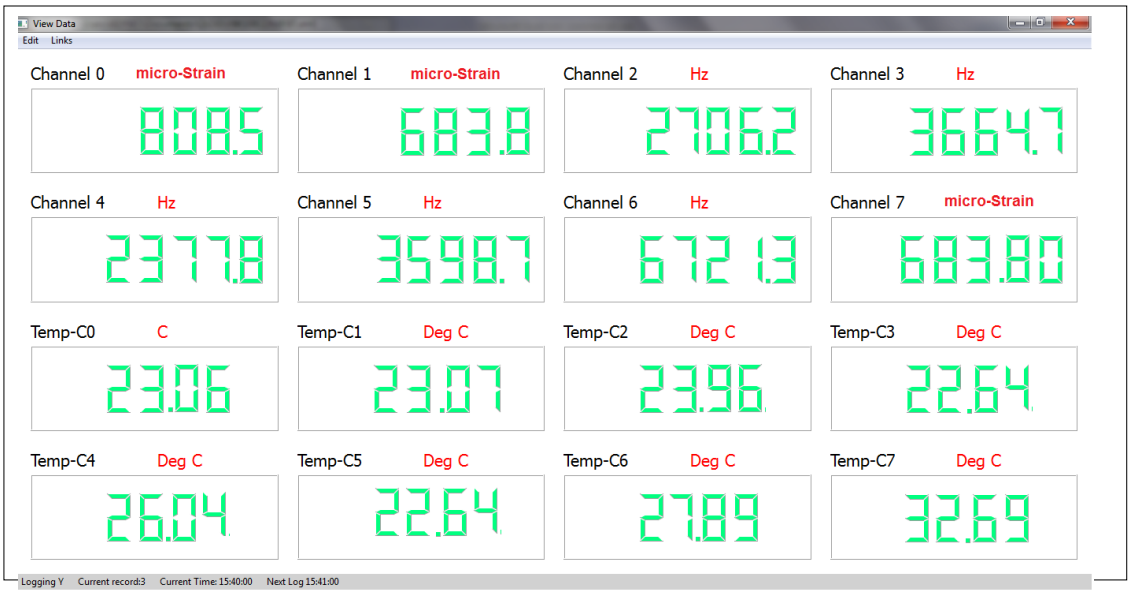




Q-LOG communicates to the sensors and instruments via the USB media converter attached to the PC. See image opposite.

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 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.

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.