Specifications Release 3

Part Numbers: Barom-RS485 & Barom-SDI12

Model Part Number: Barom-RS485

Model Part Number: Barom-SDI12

Introduction

The digital barometer modules are low cost, low power intelligent sensors that have been designed to provide barometric values for data recording applications. The sensors are fully integrated into the Keynes Controls Q-LOG applications software that enables pressure values to be displayed on a PC and stored to a text based data file.

The barometers are ideally suited for use with intelligent water level sensors, regardless of the supplier, so long as the sensor being used supports the industry commands. The simple command set makes programming of the sensor a simple task.

Simple Installation

The Keynes Controls barometers are designed for simple installation and can be used with data loggers, large scale SCADA applications or directly connected to a Windows PC. The RS-485 version instrument can be connected to a WiFi network using an industry standard RS-485 to Ethernet converter.

The Keynes Controls USB media converters are simple to use, they automatically load a Microsoft approved device driver that is commonly supplied by default in the operating system at installation. The media converters can power the barometer directly from the PC USB port. Status indicators show when a reading is being made. The media converter with part number USB-SDI12-Pro is for the SDI-12 network, and USB-485-Pro for the RS-485 network.

The USB-SDI12-Pro version media converter will support up to 4 sensors without any requirement for an external power supply. The sensors are fully integrated into the free Q-LOG application software. Q-LOG can be used to display the water height and store measurements into a CSV format data file..

USB-485-Pro media converter
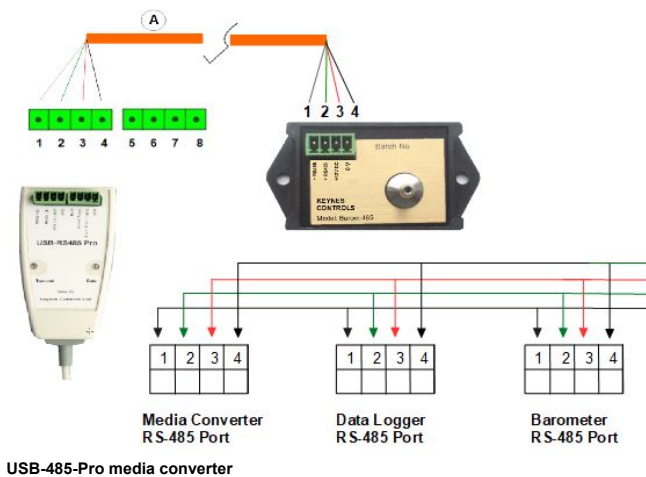
Barom-SDI12 Connections

The Image opposite demonstrates how to connect the Barom-485 to a USB to 485 media converter.

Pin Number
   1 = + RS-485
   2 = - RS-485
   3 = +12 V DC
    4 =   0 V/ Gnd

Simply connect Pin-1 on the media converter to Pin-1 on the barometer. Repeat for all other sensor inputs.

Communications Port Settings

Any media converter used to communicate with the sensor should be configured to use the following settings:

1200 Baud, 7 Bit, Even Parity, 1 Stop

Technical Specifications

The following table details the technical specifications for the barometer sensors.

Barometric Pressure		Min	Typical	Max	Units
Resolution			0.1		mbar
Range	750 - 1100				mbar
Absolute Pressure Accuracy	P = 750..1200 mbar at 25 ° C	-1.5		1.5	mbar
Pressure Long Term Stability	12 months				mbar
Temperature					
Resolution			0.1 Deg Software Limited		
Accuracy	25 ° C -40 to 85	-0.8		0.8	Deg C
Operating Range	-40 to 85				Deg C
Power Supply		10	12	18	Volts
Idle Mode			SDI-12 = 0.5 RS-485 = 1.1		mA
Active measurement			SDI-12 = 2.1 RS-485 =2.61		mA
Physical Dimensions (mm)	L = 50.80 W = 38.10 H = 19,5		All models		mm
Vent Tube Diameter	5 mm		All models		

Deployment

The main advantage of using the digital barometer is in there ease of use and simple installation.

The sensors are rugged in construction and can be deployed almost anywhere. The barometer can be fitted away from the water level sensor, into a more convenient or secure location. All of the cabling can be User installed.

A vent tube can be fitted onto the barometer and used move the atmospheric vent away for the sensor element. A moisture trap is often used when the vent tube is used inside a man hole or tunnel.

The Barom-SDI12 and Barom-485 models can be configured to supply data values in different engineering units.

SDI-12 Command		RS-485 Command		
aXR!		%aXR! Results		Results string list - Default "A C E"
				A = mbar B = mH2O C = Pascal D = mbar E = Temperature
aXI n!		%aXI n!		where n = integration period in milli-seconds 1000 mS = 1 second

A vent tube can be fitted onto the barometer and used to move the atmospheric vent away for the sensor element. A moisture trap is often used when the vent tube is used inside a man hole or tunnel.

Engineering Units

One advantage of using this device is that the results can be returned directly in different SI units

The main use of the product is to provide barometric corrections for ground water monitoring applications, or simply to provide local barometric readings for distributed applications. The sensor can be connected to WiFi using a RS-485 to Ethernet converter making readings available across a network.

Table of Commands

The following commands are used to take readings from the barometer sensors.

SDI-12 Command		Description		
aM!		Start measurement		
aD0!		Obtain data		a + Press-mbar, mH20 @ 4 ₀ °C +Temp (Deg C)
RS-485 Command				
%aM!		Start measurement		
%aD0!		Obtain data		a + Press-mbar, mH20 @ 4 ₀ °C +Temp (Deg C)

.**Barom-SDI12 Communications**

1200 Baud, 7 Data , No Parity, 1 Stop bit

Pin Number
- 1 =   SDI-12 Data
- 2 =   Not Used
- 3 =   +12 V DC
- 4 =   0 V/ Gnd

The image opposite shows how to connect the Barom-SDI12 sensor to a media converter and data logger.

Water Level Barometric Correction

Both the Barom-SDI12 and Barom-RS485 sensors can supply barometric pressure measurements in a range of different SI units. Many different data loggers can support the simple calculation.

True Water Height = Absolute Height (mmH_2O) - Barometer (mmH_2O)

when used with an intelligent water level sensor.
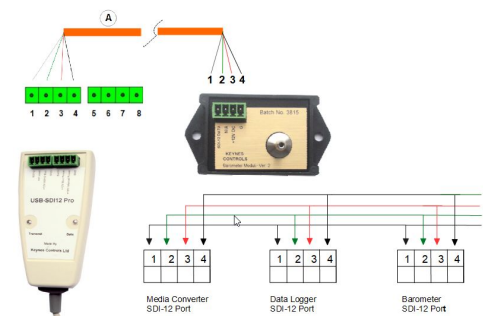
Q-LOG Data Acquisition, Configuration and Display Software

Q-LOG is the Keynes Controls Data Recording and Display software and has been designed solely for use with intelligent sensors and interfaces. The software operates as a stand-alone package and requires the use of an SDI-12, or RS-485 media converter. Q-LOG enables PC based systems to be created and tested. The software is free issued with the Keynes Controls instrumentation.

Common Keynes Controls device identifier strings.

| Product	ID string
VibWire-201-Pro	13KEYNESVWRDOA001
VibWire-101 VW sensor interface	13KEYNESCOVW101A011
VibWire-108 VW sensor interface	13KEYNESCOVW108A016
PIEZO-RM water level sensor	13KEYNESCOPRESR001
Barom-SDI-12 barometer	13KEYNESCOBAROMR003
I-P-I	13KEYNESCOIPINCL005
AquaDAT sensor interface	13KEYNESCOAQUDAT008
Single channel strain gage	13KEYNESCOSTRAIN027

Q-LOG Devices List Window.
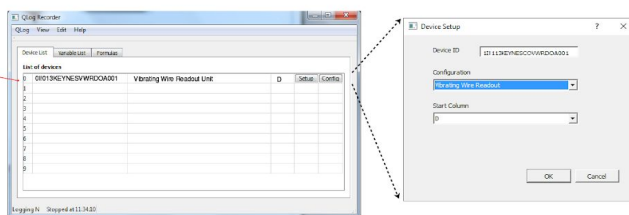
Image opposite demonstrates how the VibWire-301 is identified in Q-LOG. All the devices that are detected on a network are shown here.

Fig-16

Windows PC based Data Acquisition Systems

The simplest Windows PC based vibrating wire sensor solution is shown below. A Windows PC running Q-LOG and an isolated USB media converter..
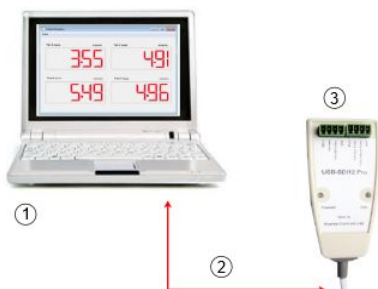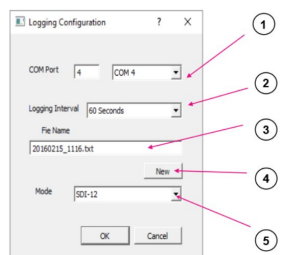
1. Windows PC running Q-LOG
2. USB Data Link
3. Optional Media Converter

Part Number: USB-SDI12-Pro (SDI12 Network)
               USB-485-Pro   (RS485 Network)

The Keynes Controls media converters can power the VibWire-301 directly from a laptop / Desktop USB Port without the use of an external power supply.

Q-LOG Data Display

The Q-LOG software can be used to:

1. Display Results in - Hz / Digits / Engineering Units
2. Real-time Charts.
3. User Defined Panel meters

Q-LOG Panel Meter Selection Window

No programming experience is required. The sensor calibration factors can be written directly into the device. There panel meters

Configuration

The measurements are recorded into unique time stamped text files that can be read by a spreadsheet. Information is easy to understand and process.

Q-LOG Network Configuration Window

Q-LOG Software Download

The Q-LOG software can be downloaded at:
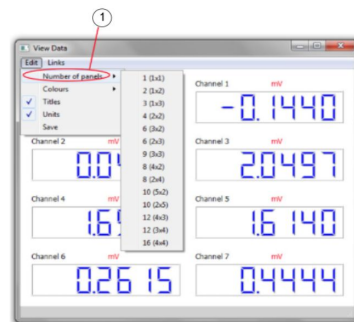**http://keynes-controls.com/Download/QLogSetup50_21may2020.zip**

Data Acquisition and Testing

The Q-LOG software is an ideal tool for testing measurement systems in the workshop before installation on site, Sensors can be configured, test measurements made, results displayed for easy analysis.

Confidence can be made in the measurements before any installation onto data recorders or site wide monitoring systems.

Configuration Settings

1. Enter Comm Port identified for USB media converter
2. Data Recording Sample Rates
     - (**1, 5, 10 Secs, 1 to 10 minutes, 1 and 6 Hours)**
3. Time stamp Log FIlename
4. New Button
     - Automatically create a new time stamped log file.
5. Network Type Selection - SDI-12 / RS-485.

Barometer in Operation
The Youtube video demonstrates configuration of a media convert and measurements in Q-LOG.
https://youtu.be/JWRhFoXQndg