Digital Barometer Modules

Water Services

Specifications Release 2

Part Numbers: Barom-RS485 & Barom-SDI12 model

Model Part No: Barom-RS485

Model Part No: 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 PIEZO-RM range of intelligent sensors and provide barometric pressure values directly in the same engineering units as to the water level sensors.

Encapsulated Design

All of the barometer models are fully encapsulated and safe for operation in harsh environments. When used with the PIEZO-RM range of level sensor offers a completely sealed measuring solution. The cabling is easy to use fit and deploy often at a much lower cost than systems using vented sensor. The high reliability of a sealed system offers the highest reliability for long term operation.

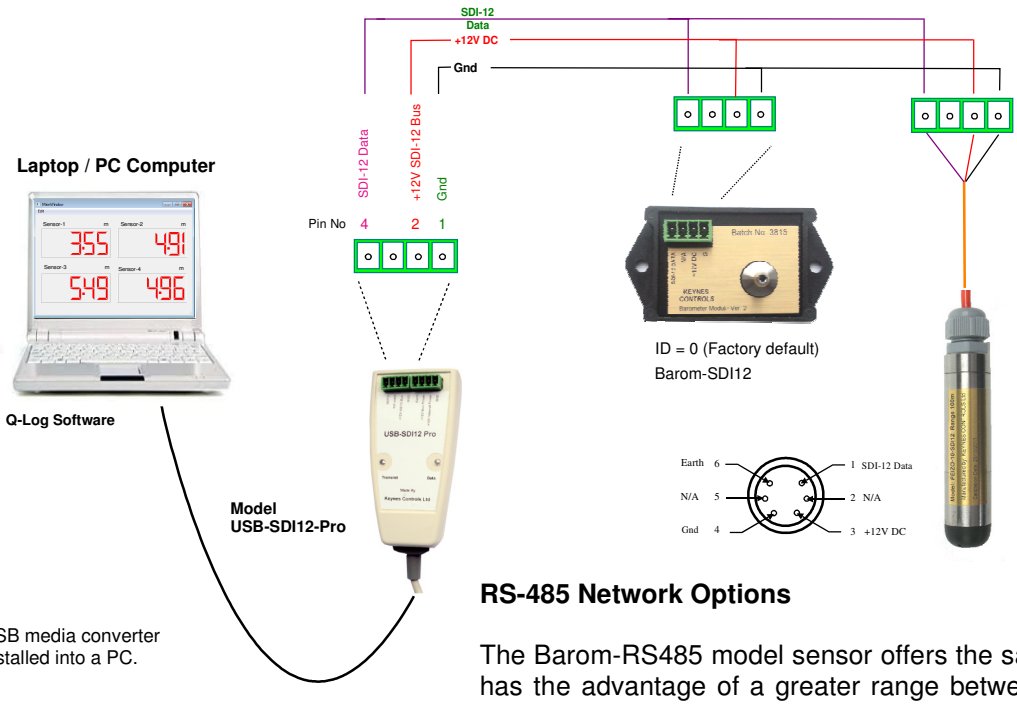
Complete Water Level Recording Solution

The image below shows a complete water level recording system with barometric correction.

The system is shown using the USB-SDI120-Pro version media interface, a barometer and PIEZO-RM type water level sensor. This is the minimum specification solution to give a complete water height measurement. The USB-SDI12-Pro version media converter not only converts the data signals from the network into a format the computer can understand, it also powers the sensors directly from the USB port of the computer.

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 data into a CSV format data file.



System Supply

Keynes Controls can supply the system shown opposite as a full kit of parts including the PC or as individual items.

The Q-Log applications software is can be configured to plot the water height data as a trend chart, and uses a panel meter to show the real time level measurements.

The basic system can be expanded to have up to 10 individual water level sensors or other intelligent sensors.

RS-485 Network Options

The Barom-RS485 model sensor offers the same features as the SDI-12 model but has the advantage of a greater range between the sensor and the logger than is possible using SDI-12.

Technical Specifications

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

Maximum error of pressure reading over the pressure range.

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		1		mbar
Temperature					
Resolution			0.1 Deg software limited		
Accuracy	20 °C -40 to 85	-0.8 -2		0.8 2	Deg C Deg C
Operating Range	-40 to 85				Deg C
Power Supply Idle mode Active / measurement		10	12 SDI-12 = 0.5 RS-485 = 1.1 SDI-12 = 2.1 RS-485 = 2.6	18	Volts mA mA
Physical Dimensions	L = 50.80 W = 38.10 H = 19.05		All models		mm
Vent Tube diameter	5 mm		All models		

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

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.

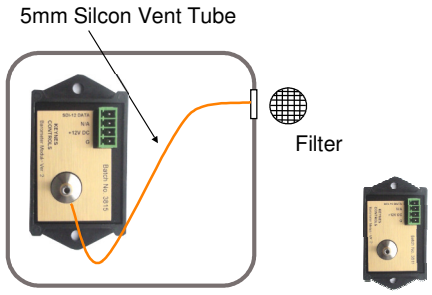
Re-Calibration

It is recommended the both of the barometer models are returned for re-calibration by Keynes Controls each year.

Drift in the sensor calibration will cause a small error in the measured results.

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 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



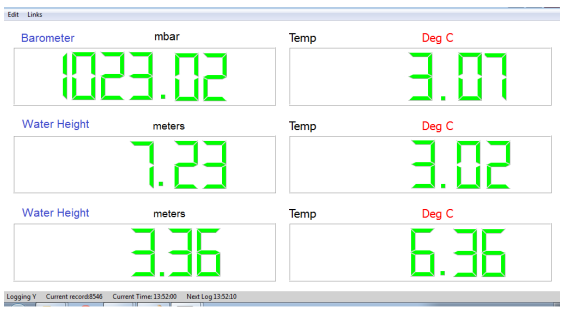
Water Level Barometric Correction

Both the Barom-SDI12 and Barom-RS485 sensors are intelligent devices and can supply barometric pressure in a range of different engineering units.

To obtain the true water height the atmospheric conditions have to be taken into consideration.

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

make sure both the level sensor and the barometer are using the same engineering units.



Use the Q-LOG formulae to apply barometric corrections to the water height data values.

Part Number	**Description**	**Further Details**
Barom-SDI12	Digital barometer SDI-12 network	http://www.aquabat.net/Barometer/barometer-digital.html
Barom-485	Digital barometer RS485 network	Same as above
PIEZO-RM	Digital water level sensor	http://www.aquabat.net/PIEZOSummary/piezo-sensorsv1.html
USB-SDI12-Pro	Isolated USB Sensor Excitation media converter	http://www.aquabat.net/USB/USBSDI12Pro.html
USBS12v1	USB-SDI12 digital network media converter	http://www.aquabat.net/USBSDI/usbs12mediav1.html
USB-485v1	USB-RS485 digital network media converter	http://www.aquabat.net/USB485/USB-RS485mediav1.html
Q-LOG	Data Recording and Display Software for SDI-12 and RS-485 intelligent sensors	http://www.aquabat.net/QLOGFree/qlogv2.html