



PIEZO-RM™ Digital Level Sensor

FEATURES

- Custom Level Ranges up to 200m / 600 ft H₂O
- Unsurpassed Accuracy of $\pm 0.05\%$ Total Error Band
- SDI-12 / RS485 Digital Communication - 1 to 36 sensors.
- 316 SS / Marine Bronze Construction
- Engineering Results - Digital Data Transfer
- Gas Discharge Lightning Protection as Standard
- Option for User Installed Cables
- IP68 Sealed Device - Glass sealed network connection
- Compatible any 3rd party SDI-12 logger/ RS485 Interface
- In-built statistics processing - Max / Min levels

APPLICATIONS

- Level Monitoring
- Surface Water Monitoring
- Down Hole
- Ground Water Monitoring
- Well Monitoring
- Tank Level
- De-watering
- Reservoirs
- Oceanographic Research



SDI-12 Version Sensor

PIEZO-1-SDI12	10 m range
PIEZO-2-SDI12	20 m range
PIEZO-5-SDI12	50 m range
PIEZO-10-SDI12	100 m range

RS-485 Version Sensor

PIEZO-1-485	10 m range
PIEZO-2-485	20 m range
PIEZO-5-485	50 m range
PIEZO-10-485	100 m range
PIEZO-20-485	200 m range

The PIEZO-RM submersible hydrostatic transducer represents the leading edge of level sensing technology available today. The device uses a highly stable ceramic based sealed silicon-isolated sensor for the pressure measurements.

The PIEZO-RM series of sensors features the SDI-12 / RS485 digital interface for communications. The SDI-12 interface is an industry standard network for digital communications with data recorders and other intelligent sensors, especially in the environmental field monitoring applications. The transducer meets the demanding requirements of the UK Environment Agency Office for accuracy specification for stage monitoring.

The PIEZO-RM sensors are intended for applications with requirements that include battery-powered operations. The sensors uses advanced power with minimal current drain, low system cost, and use of a single recorder with multiple sensors "daisy-chained" on to a single network cable. The PIEZO-RM SDI-12 network supports the enhanced specification supporting up to 36 sensors and cable lengths to 300 ft / 100 m.

The PIEZO-RM range of sensors are totally sealed units with an IP 68 rating. A three pin connector and securing cable gland enable custom length cables to be attached. The sensors can be supplied with cable fitted at the time of order or as stand-alone device for completion by the User. Any 3 core Polyurethane backed cable is all that required to complete the communications between the PIEZO-RM sensor and a data logger.

To provide the optimum in measurement accuracy and reliability the PIEZO-RM does not use vented signal cabling and is a complete hermetically sealed device. This removes any chance of failure due to accidental cable breaks, barometric errors due to cable elongation and the ingress of moisture due to condensation from high humidity levels and damage to the electronics. .

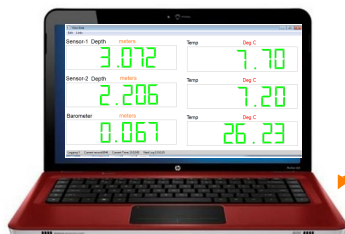
Barometric correction for the PIEZO-RM sensor data requires a separate barometer level to enable the liquid level to be corrected to the true level. The Keynes Controls **Barom-SDI12** barometer module is an ideal device to use as it uses the same SDI-12 digital communications as the PIEZO-RM and gives results in the same engineering units. A simple subtraction calculation corrects the liquid level values to the true height.

The additional cost of the barometer module is easily compensated for due to the lower cost, greater installation flexibility, easier deployment of the sensor cabling and the higher reliability of non vented systems. A barometer module is only fitted when required and is not required for all applications.

PC Based Data Record Solution

The image opposite shows a simple PC based water level recording system using the PIEZO-RM and barometer module.

There is no limit on the amount of data to be recorded.



Part No. USBS12v1



Media Converter



Barom-SDI

Barometer



Basic Data Logger Solution

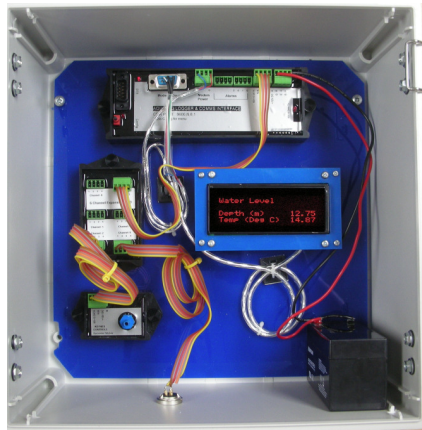
The image opposite demonstrates the basic data logger configuration for using the AquaLOG sensor and optional barometer module for atmospheric corrections.

A simple 3-wire SDI-12 network is used to pass data digitally between the sensors and the data logger. Water level values can be shown on the display unit or passed onto a web based application for remote access.

SDI-12 data transmission is used to communicate pressure values to the logger. The analogue conversion is carried out inside the sensor and so there are no errors in the measurements due to cable losses and calibration errors in a separate data acquisition system.

Third Party Data Loggers

The PIEZO-RM range of sensors will operate with any third party logger supporting SDI-12 digital communications.



SPECIFICATIONS

Specifications can change without notice

Total Error - includes the combined errors due to non-linearity, hysteresis, non-repeatability, and thermal effects over the compensated temperature range

Description	
Physical Parameters	Length: 100 mm Diameter: 22 mm Weight: 600 g without cable
Communications	Version 1.3 SDI-12 protocol - Enhanced spec on request Optional on request
SDI-12	
RS-485	
Ranges	1, 2, 5, 10 bar (10, 20, 50 100 m) Intermediate ranges on request Absolute gage
Proof Pressure	1.5 x F.S. (F.S = Full scale range)
Burst Pressure	2.0 x F.S.
Materials	316 Stainless Steel (standard) Marine Bronze / Titanium upon request
Protection rating	IP 68
Level	
Measurement Accuracy	± 0.05 % F.S. Typical.
Temperature	
Measurement Accuracy	± 0.5 Deg C Typical.
Resolution	
1 Bar (10m)	0.015 mm
2 Bar (20 m)	0.030 mm
5 Bar (50m)	0.075 mm
10 Bar (100 m)	0.15 mm
Engineering Units	mm H ₂ O, cm H ₂ O, m H ₂ O, inch H ₂ O, ft H ₂ O, PSI, bar
Temperature	Deg C or Deg F
User assigned level correction factors	Local Gravity Density
Operating Temperature	-20 to 60 Deg C Polyurethane cable/ 0 to 50 Deg C ETFE cable
Calibrated Range	5 to 30 Deg C (Standard) other ranges by request.
Excitation	10 - 18V DC
Current	8 mA Average during acquisition < 1 mA Quiescent state
Sampling Period	1 ms to 10 Secs - User defined 100 ms standard pre-set measurement period

Warranty Information

The information in this document is subject to change without notice. Keynes Controls Ltd. has made a reasonable effort to be sure that the information contained herein is current and accurate as of the date of publication. Keynes Controls Ltd. makes no warranty of any kind with regard to this material, including, but not limited to, its fitness for a particular application. Keynes Controls Ltd. will not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

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Glass Pressure Seals

Long-term stability of the compression glass seals used on the PIEZO-RM range of sensors are also very stable over long periods of time. Since glass is an inorganic material, it is not affected by long-term exposure to elevated temperatures or to the chemical components of the liquids under investigation. In other words, it does not lose the mechanical properties which can affect the seal, as do organic materials such as molded epoxies, potting compounds, and all engineering grade thermoplastics and thermosets. This is critical in applications where pressure integrity over a long life (over 10 years) is an advantage.

The electronics inside the PIEZO-RM sensors are inside a dry chamber safe from the ingress of any moisture including that caused by changes of humidity along vented cables.

In-built Statistics

The following parameters are available directly from the sensor.

Maximum Pressure, Minimum Pressure
Maximum Temperature, Minimum Temperature

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PIEZO-10-SDI12	100 m range	PIEZO-10-485	100 m range
		PIEZO-20-485	200 m range

RS-485 Version Sensor