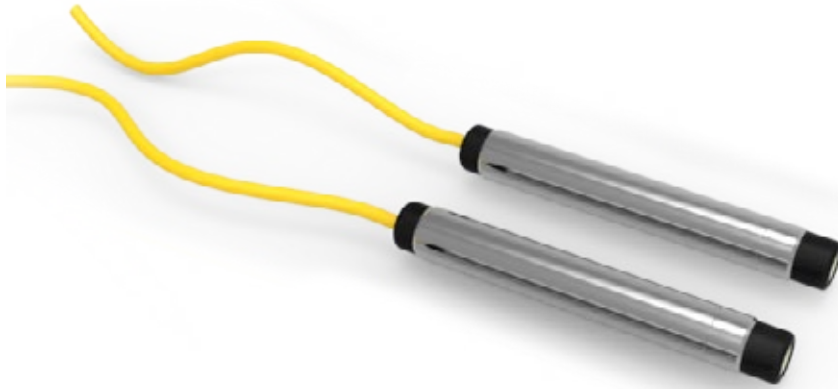


P235S

— PIEZO-RESISTIVE
PIEZOMETERS

PIEZOMETERS





PIEZO-RESISTIVE PIEZOMETERS

Piezo-resistive piezometers are very accurate pressure transducers suitable for high frequency readings and short term applications.

Their robust 4-20mA output signals are easy to read and automate and suitable for long-distance transmissions.

They can be connected to seismic dataloggers for monitoring rapid changes in pore-water pressure such as those produced by earthquakes.

APPLICATIONS

- Pore pressure in deep excavations
- Dynamic pore pressure monitoring
- Dewatering activities
- Hydraulic gradients in natural or cut slope

FEATURES

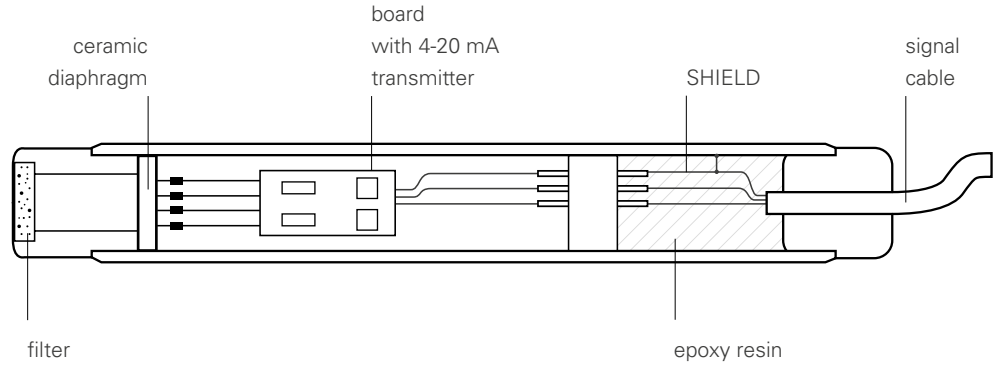
- High accuracy and stability
- Compatible with most readout/logger in the market
- Built-in thermistor (on request)
- Capable of reading negative pressures



Meet the essential requirements of the EMC Directive 2014/30/UE

WORKING PRINCIPLE

The piezo-resistive pressure sensor incorporates a chemically inert ceramic diaphragm. A precise 4-arm wheatstone bridge strain gauge is deposited on the dry side of the diaphragm. Water pressure applied to the wet side of the diaphragm causes the strain gauge to output a signal that is directly proportional to the applied stress. A circuit board converts the bridge signal into a robust 4-20mA signal that can be transmitted over long distances to remote readouts or data acquisition systems.



FILTER UNITS

Piezo-resistive piezometers have a filter tip that prevents small particles of soil from entering the chamber in front of the diaphragm. The pores in the filter allow entry of water, but not particles of soil. This kind of filter is standard with most piezometers and is known as an LAE filter, to distinguish it from an HAE filter. In some environments, the pressure of gas in the soil is higher than the pressure of water. This can adversely affect the accurate measurement of water pressure. In this case, filter with very small pores is required. When the filter is saturated, the surface tension at the pores effectively prevents entry of air, while still allowing entry of water. Air can enter only under very high pressure, thus the filter is known as HAE, High (pressure) Air Entry filter.

Both LAE and HAE filters must be saturated. In the case of the LAE filter, the issue is simply to ensure that there are no air bubbles in the chamber in front of the diaphragm. Such bubbles could slow the response time of the piezometer. In the case of the HAE filter, saturation is required to produce the surface tension effect, and a special saturation device is available for this purpose.

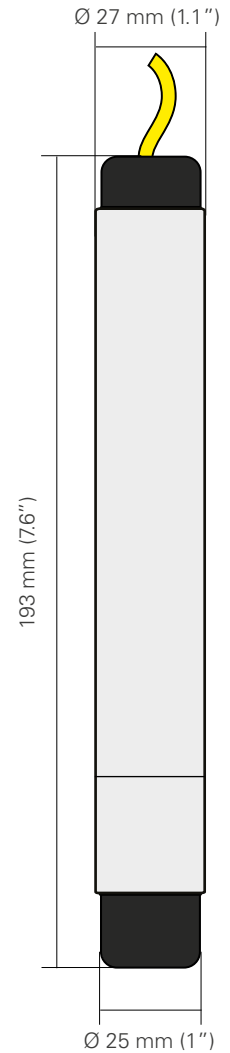
In general, LAE (standard) filters are suitable for most applications. HAE filter should be considered for unstaturated soil where gas pressure might affect the pore-water pressure reading.



Saturation of HAE filter with saturation device

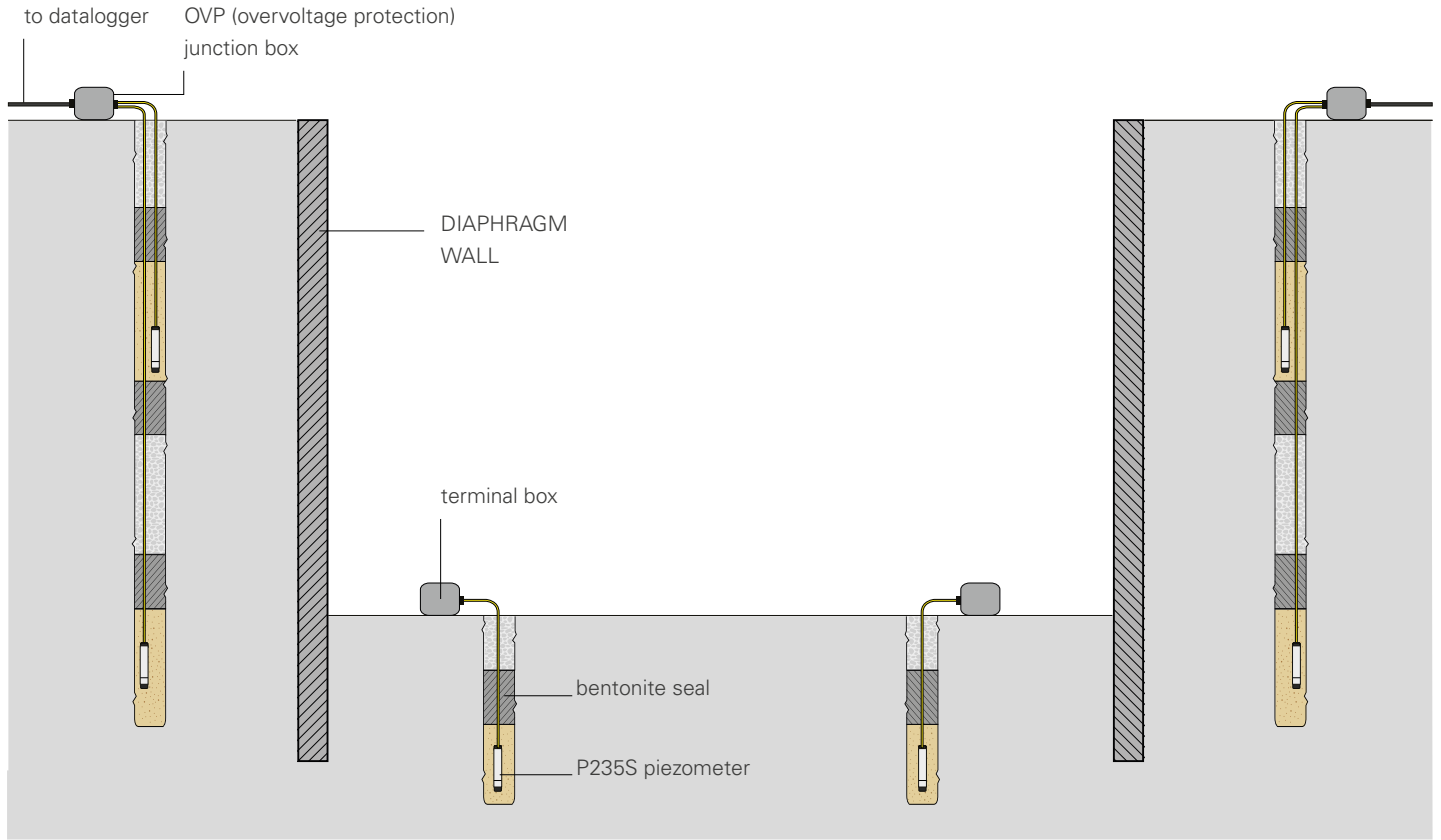
TECHNICAL SPECIFICATIONS

MODEL	OP235S4	OP235S1
Description	piezo-resistive piezometer with LAE filter	piezo-resistive piezometer with HAE filter
Available full scales (FS)	200 kPa, 500 kPa, 1.0 MPa, 2.0 MPa, 5.0 MPa (29 psi, 72.5 psi, 145 psi, 290 psi, 725 psi)	
Overload	1.3 x FS (200 kPa range) 2 xFS (for all other ranges)	
Sensitivity	0.01 % FS	
Total Accuracy ⁽¹⁾	< ±0.25% FS	
Lin. MPE	< ±0.20% FS (for 100 and 200 kPa FS)	
Pol. MPE	< ±0.15% FS (all other FS)	
Signal output	4 - 20 mA current loop (as option mV/V up to 1 MPa)	
Electric supply	12 -40 V DC	
Thermic zero shift	0.00025 % FS /°C	
Electric insulation	4 KV	
Temp. operating range	-20 to +80 °C	
Temperature sensor	built-in thermistor, added on request	
Material	stainless steel	
Dimensions	Ø 27 mm (1.1"), length 193 mm (7.6")	
Weight	0.5 kg (1.1 lbs)	
FILTER UNIT		
Type	LAE filter	HAE filter
Material	stainless steel or vjon	ceramic
Pore size	40-50 µm	0.25 µm
SIGNAL CABLES		
OWE102KEOZH	standard 2-wire cable with LSZH jacket and Kevlar stress member (For 4-20mA output)	
OWE104K00ZH	4-wire cable with LSZH jacket, used if thermistor is added (For mV/V output)	
OWE104K00PV	4-wire cable with PVC jacket, used if thermistor is added (For mV/V output)	
Max cable length to logger ⁽²⁾	1000 m with 4-20mA output 40 m with mV/V output (for more information see FAQ#77)	

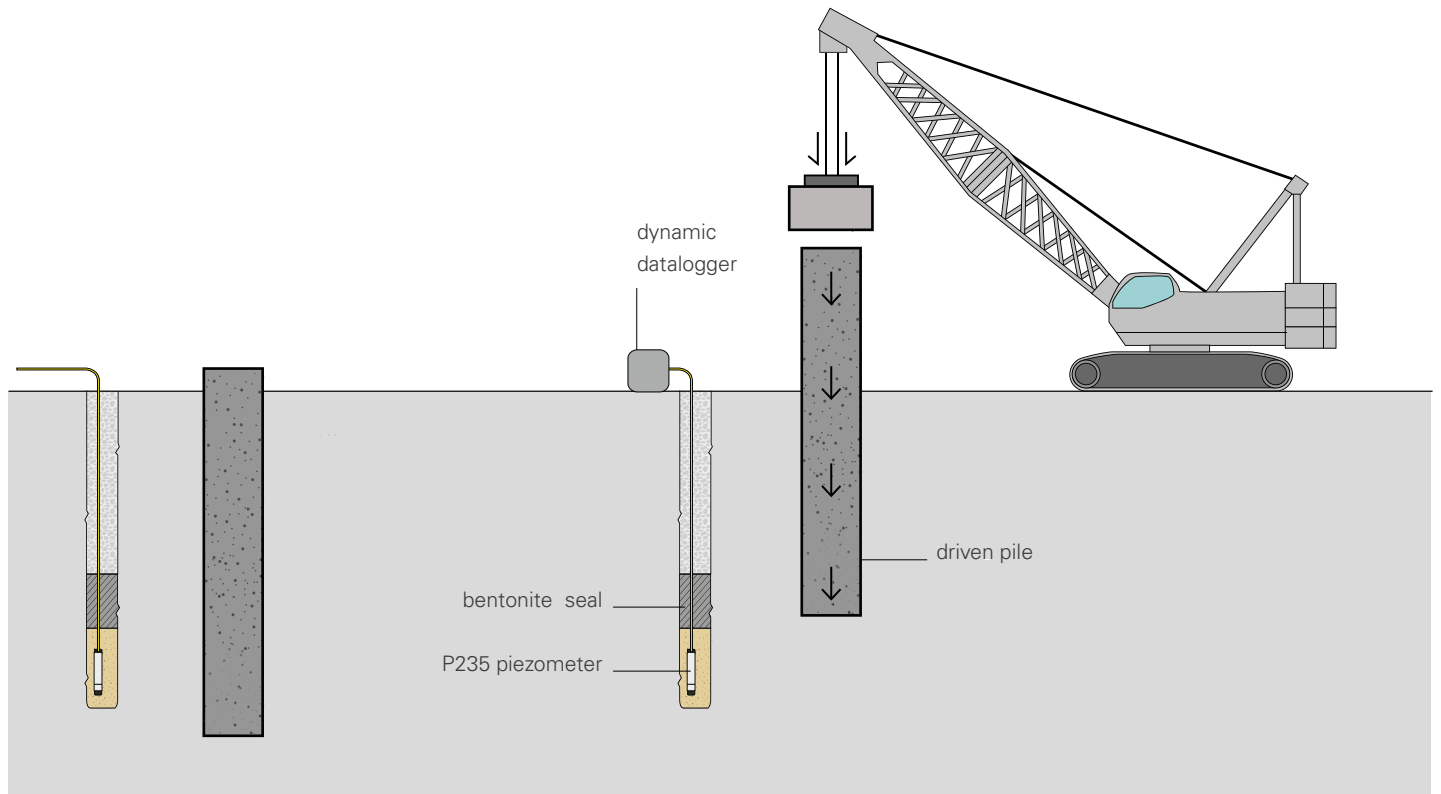


(1)MPE is the Maximum Permitted Error on the measuring range (FSR). In the Calibration Report, the accuracies of the gauge are calculated using both linear regression (≤ Lin. MPE) and polynomial correction (≤ Pol. MPE) (2) refer to FAQ section of Sisgeo website: www.sisgeo.com/faq

APPLICATION IN DEEP EXCAVATION



DYNAMIC APPLICATION WITH DRIVEN PILES



ACCESSORIES AND SPARE PARTS

PROTECTIVE PIEZOMETER CAP OP100CH1000

Protective cap for piezometers with data plate and survey pin.



FILTER SATURATION DEVICE OPF01SAT000

Stainless steel pump for saturating HAE ceramic filters. Includes pump, 10 bar pressure gauge, and a threaded connection for the filters.



LAE STEEL FILTER OPF40D20000

Spare LAE sintered steel filter for P2354S4 piezometers, pore size 40/50µm

LAE VYON FILTER OPF40D2000P

Spare LAE Vyon (polyetylene) filter for P235S4 piezometers, pore size 40/50µm.

CABLE SPLICING KIT OEGSMOK0000

Splice kit for lengthening or repairing cable.

P235 HAE CERAMIC FILTER OPF01D16000

Spare HAE ceramic filter for P235S1 piezometers, pore size 0.25µm.

BENTONITE PELLETS 1000BE20025K

10 mm bentonite pellets supplied in 25 kg bag.

SINGLE INSTRUMENT OVP JB OEPDP002W00

IP67 plastic box with 3-level OVP Over Voltage Protection board for the connection of a 2-wire instrument. Note that OVP requires connection to an adequate earth ground.

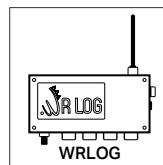
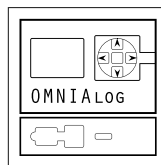
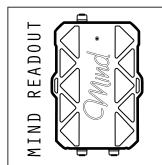
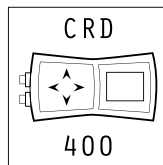
OVP JUNCTION BOX OEPDP000W00

IP67 plastic box with 3-level OVP Over Voltage Protection boards for the connection of up to 15 instruments. Note that OVP requires connection to an adequate earth ground.

TERMINAL BOX OEPM0000000

Terminal boxes provide termination and connectors for 1, 2, or 3 instruments. Used with portable readout. Includes IP67 plastic box, cable glands, and 7-pin military connectors.

READABLE BY



For further information refer to their own datasheets

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TECHNICAL ASSISTANCE

SISGEO offers customers e-mail and phone assistance to ensure proper use of instruments and readout and to maximize performance of the system.

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