

## Vibrating Wire Piezometer

### Features



- Sensor with unique integral magnet design
- Accurate, highly sensitive and reliable
- In-built thermistor and gas discharge tube
- Extremely stable for long term operations
- Frequency output for transmission over long distances
- Suitable for remote reading, scanning and data logging
- Stainless steel construction
- Waterproof

### Applications

ES&S's piezometers are used to measure groundwater elevations and pore-water pressures in boreholes, embankments, concrete structures, pipe lines, wells, stand pipes, compacted fills, etc.

The piezometer is designed to be embedded in soil, earth/rock, fills and concrete. It can be inserted in boreholes and small diameter pipes. Special models have the filter replaced with a threaded adapter to permit it to be coupled directly to hydraulic pressure lines. A typical application is uplift pressure measurement in dams.

Piezometers are capable of measuring pore water

and other fluid pressures in fully or partially saturated soils.

Pore pressure data is important when monitoring dams, embankments, compacted fills, footings, foundations, retaining walls, tunnels, underground works, slopes and open excavations.

Piezometers measure fluid pressure head meaning they can also be adopted in dewatering projects.

Pore water and pore pressure play a significant role in ground uplift, leave or settlement.



# Technical Specifications

Standard Range	3, 7, 10, 20, 35, 50 kg/cm sq (Higher Ranges on request)	
Over Range	1.5 x Range	
Sensitivity	0.01% of Full Scale	
Accuracy	0.5% of Full Scale or better	
Thermal Zero Shift	±0.1% Full Scale / °C	
Material	Stainless Steel	
Operating Temperature	-20°C to 60°C (Higher temperature version available)	
Coil Resistance	120-140 ohm nominal	
Thermistor 3k ohm	Included	
Electrical Surge Protection	Included	
Filter	High air or low air entry (Ceramic or stainless steel)	
Dimensions	20 mm dia x 145 mm length (standard)	
Electrical Cable	4-conductor, shielded	
Wiring Code	V/W sensor Thermistor	Red & Black White & Green

Note: Products and Specifications are subject to change without notice.

## Operating Principle

Any change in the pressure acting on the diaphragm of piezometer is communicated to the vibrating wire sensor and changes the tension of the wire. The wire is plucked by energising the miniature coil magnet so that it vibrates at its natural resonant frequency. The resonant frequency is proportional to the square root of the tension of the wire. A conventional readout unit can accurately measure the frequency of the wire. A microprocessor based readout unit can display the frequency as well as the value of the measured pressure directly in engineering units.

The piezometer is suitable for connection to data loggers for recording data in engineering units automatically at pre-determined intervals. By the use of appropriate software, the data logger can present recorded data in desired formats, predict trends of variations and even generate alarms at pre-determined set points.

The thermistor mounted in the piezometer enables simultaneous measurement of temperature. This allows any corrections to be made in the observed readings due to temperature changes. Piezometers with lightning protection are available on request.

Our vibrating wire piezometers incorporate vibrating wire sensor with unique integrated magnet design. A miniature magnet coil assembly is located inside the small stainless enclosure of the sensor at a very close proximity to the vibrating wire.

The design contributes to the outstanding features and performances over conventional vibrating wire piezometers.

The piezometer consists of a rigid cylindrical housing having the vibrating wire sensor inside it. One end of the housing has a high-air or low-air entry filter. The opposite end contains the sealed cable entry. With the filter in place, the main diaphragm of the piezometer is isolated from the solid particles and senses only the fluid pressure to be measured. The filter is easily removable for calibration and saturation.

The vibrating wire sensor is secured inside the rigid cylindrical housing of the piezometer. It comprises of a small stainless steel enclosure having a high tensile strength, heat treated and tempered steel wire. The wire is anchored at one end to the enclosure and to a small diaphragm at the other. A miniature magnet coiled assembly is precisely located at the center of the wire inside the same enclosure. This greatly enhances the response characteristics of the vibrating wire. The vibrating wire sensor is self-compensated against temperature variations.

The 'O' ring seal provides complete waterproofing and a high degree of protection from humid and corrosive environment conditions. The vibrating wire sensor is completely isolated from the total stresses acting on the body of the piezometer.

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