# Vibrating Wire Piezometers

## Applications

VW piezometers are used to monitor pore-water pressure. They can also be used to monitor water levels.
Typical applications include:

- Monitoring pore water pressures to determine safe rates of fill or excavation.
- Monitoring pore water pressures to determine slope stability.
- Monitoring the effects of dewatering systems used for excavations.
- Monitoring the effects of ground improvement systems such as vertical drains and sand drains.
- Monitoring pore pressures to check the performance of earth fill dams and embankments.
- Monitoring pore pressures to check containment systems at land fills and tailings dams.
- Monitoring water levels in stilling basins and weirs.

## Operation

The VW piezometer converts water pressure to a frequency signal via a diaphragm, a tensioned steel wire, and an electromagnetic coil.

The piezometer is designed so that a change in pressure on the diaphragm causes a change in tension of the wire. An electro-magnetic coil is used to excite the wire, which then vibrates at its natural frequency. The vibration of the wire in the proximity of the coil generates a frequency signal that is transmitted to the readout device.

The readout or data logger stores the reading in Hz. Calibration factors are then applied to the reading to arrive at a pressure in engineering units.


**VW Piezometers: Standard, Heavy Duty, and Push-In (bottom)**

## Types of VW Piezometers

**Standard:** The standard piezometer is suitable for most applications. It operates equally well in fully-grouted boreholes or sand-filter zones.

**Heavy-Duty:** The heavy-duty model has a strong, double-wall housing and is supplied with armored cable.

**Push-In:** The push-in piezometer can be pushed a short distance into soft soils using a EW drill rod.

**Multi-Level:** The multi-level piezometer system system provides an easy way to install multiple sensors in a borehole. See separate datasheet.

**Low-Pressure:** The low-pressure piezometer can monitor very small changes in pore-water pressure.

**Vented:** The vented piezometer is used to monitor water levels in open standpipes and wells.

**Corrosion Resistant:** A titanium body protects from corrosive environments.

## Advantages

**Groutable:** VW piezometers can be installed in fully-grouted boreholes and do not require sand filter zones. This greatly simplifies the installation of multiple sensors in the same borehole. It also makes it possible to install piezometers with inclinometer casing within the same borehole.

**High Resolution:** VW piezometers provide a resolution of 0.025% FS.

**High Accuracy:** Slope Indicator's automated, precision calibration system ensures that these sensors meet or exceed specifications.

**Rapid Response:** VW piezometers respond very quickly to changes in pore-water pressure.

**Reliable Signal Transmission:** With properly shielded cable, signals from the VW piezometer can be transmitted long distances.

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## STANDARD VW PIEZOMETERS

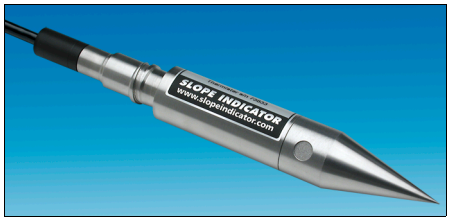
**3.5 bar (50 psi) Piezometer ..... 52611020**
**7 bar (100 psi) Piezometer..... 52611030**
**17 bar (250 psi) Piezometer ..... 52611040**
**35 bar (500 psi) Piezometer ..... 52611050**
**Signal Cable ..... 50613824**

The standard VW piezometer is suitable for most applications. The piezometer can be installed without a sand filter when the borehole is backfilled with bentonite-cement grout.

## VW PIEZOMETERS WITH CABLE

**Standard VW Piezometers, 3.5 bar (50 psi)**
**with 15 m (50') cable ..... 52611028**
**with 30 m (100') cable..... 52611024**
**with 45 m (150') cable..... 52611027**
**with 60 m (200') cable..... 52611026**

**Standard VW Piezometers, 7 bar (100 psi)**
**with 30 m (100') cable..... 52611033**
**with 45 m (150') cable..... 52611034**
**with 60 m (200') cable..... 52611035**
**with 90 m (300') cable..... 52611036**




## PUSH-IN VW PIEZOMETERS

**3.5 bar (50 psi) Piezometer ..... 52621020**
**7 bar (100 psi) Piezometer..... 52621030**
**17 bar (250 psi) Piezometer ..... 52621040**
**35 bar (500 psi) Piezometer ..... 52621050**
**Signal Cable ..... 50613824**
**Adapter for EW Drill Rod ..... 50718042**
**EW Coupling ..... 50718010**

The push-in piezometer has a special housing that allows it to be pushed a short distance into soft, cohesive soils.

Adaptor for EW drill rod extends the length of the piezometer by 0.6m and provides a left-hand threadad for easy disconnect of the drill rod. Order one adapter per piezometer.

Coupling (pin) threads into the drill rod and has a left-hand thread for easy disconnect from the adaptor. Coupling can be reused, so only one is needed.


## HEAVY-DUTY VW PIEZOMETERS

**3.5 bar (50 psi) Piezometer.....52610520**
**7 bar (100 psi) Piezometer .....52610530**
**17 bar (250 psi) Piezometer .....52610540**
**35 bar (500 psi) Piezometer .....52610550**
**Signal Cable, Armored.....50613886**

This piezometer features a strong double wall housing and is normally supplied with armored signal cable.


## LOW-PRESSURE VW PIEZOMETERS

**0.7 bar (10 psi) Piezometer.....52611610**
**1.8 bar (25 psi) Piezometer.....52611625**
**Signal Cable .....50613824**

The low-pressure piezometer is designed to monitor very small changes in pore-water pressure. It can also be used to monitor water levels.

## CORROSION-RESISTANT VW


## PIEZO

**7 bar (100 psi) Piezometer .....52621230**
**17 bar (250 psi) Piezometer .....52621240**
**PVC Signal Cable .....50613824**

The body of the corrosion-resistant VW piezometer is manufactured of titanium while the filter and diaphragm are protected by a heat-bonded PTFE coating and a PVC housing. PVC signal cable has four 22-gauge conductors. Consult factory if other configurations are required.

## VW PIEZOMETER SPECIFICATIONS

**Sensor Type:** Pluck-type vibrating wire sensor with built-in thermistor or RTD.

**Range:** Standard ranges are listed at left. Custom calibration ranges are available.

**Resolution:** 0.025%FS.

**Accuracy:** ±0.1% FS for 0.7 - 7 bar sensors, ±0.3% FS for 17 and 35 bar sensors.

**Maximum Pressure:** 1.5 x rated range.

**Filter:** 50-micron, sintered stainless steel. Add y part 92611065 for 1-bar high-air-entry filter.

**Temperature Coefficient:** < 0.04% FS per °C).

**Materials:** Stainless steel.

**Size:** Standard: 19 x 155 mm (0.75 x 6.10")
Low-Pressure: 29 x 191 mm (1.125 x 7.5"). Heavy-Duty: 29 x 191 mm (1.125 x 7.5").
Push-In: 35 x 270 mm (1.385 x 10.5").
Corrosion-Resistant: 29x191mm (1.125 x 7.5").

**Weight:** Standard: 0.16 kg (0.3 lb).
Low-pressure: 0.45 kg (1 lb).
Heavy-Duty: 0.8 kg (1.75 lb).
Push-in: 1.2 kg (2.75 lb).

## SIGNAL CABLE SPECIFICATIONS

**Standard Signal Cable ..... 50613824**

Shielded cable with four 22-gauge tinned-copper conductors and polyvinyl chloride jacket.

**Armored Signal Cable..... 50613886**

Shield cable with four 22-gauge tinned-copper conductors, inner polyurethane jacket, steel braid armor, and outer high-density, polyethylene jacket. For heavy duty piezometer only.

## READOUT & TERMINAL BOXES

**VW Data Recorder ..... 52613500**
**Jumper Cable for Terminal Box..... 52613557**
**Terminal Box for 6 sensors..... 57711606**
**Terminal Box for 12 Sensors ..... 57711600**
**Terminal Box for 24 Sensors ..... 97711624**

See separate datasheet for VW Data Recorder. Terminal boxes provide terminals for 6, 12, or 24 sensors. Sensors are selected by rotary switch. 6-sensor box is 240 x 190 x 120 mm (9.5 x 7.5 x 4.75"). 12 and 24-sensor boxes are 290 x 345 x 135 mm (11.5 x 13.5 x 5.25").

## DATA LOGGERS

VW piezometers connect directly to DGSI GTecLink VW Data Loggers and the V-Logger as well as the Campbell Scientific CR6 Data Logger. The Campbell Scientific CR800 and CR1000X require an AVW200 vibrating wire adaptor.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