Multi-Level VW Piezometer

**Application**
The multi-level VW piezometer is used to monitor pore-water pressure at multiple zones in a borehole.

**Operation**
The VW piezometers are standard units. Each is attached to a short length of plastic pipe, as shown in the photo above.

 Longer lengths of pipe, measured to place each piezometer at its intended depth, are assembled as the system is installed. Signal cable from each piezometer run through the pipe up to the surface.

 In addition to providing a way to place the piezometers, the pipe also protects signal cable as drill casing or augers are removed, serves as a grout delivery pipe, and prevents channeling of water along the length of the cables.

 When the components of the system are in place, bentonite-cement grout is pumped through the pipe to backfill the entire borehole, including the area surrounding each piezometer.

 When the grout cures, each piezometer is isolated from the zones above and below it, but is highly responsive to changes in pore-water pressures at its own elevation.

**Advantages**

**Simple Installation:** The grout-in technique is simple and quick. It eliminates the need for sand intake zones and bentonite seals.

**Precise Placement:** The depth of each piezometer is controlled by the plastic pipe.

**Protected Cables:** Signal cables are enclosed in pipe and protected when the drill casing or auger is removed. This eliminates twisted or pulled out cables.

**Superior Isolation:** Since cables are sealed inside a pipe, the pipe is grouted, and the borehole is grouted, water cannot flow between the zones intersected by the borehole.

**Easy to Automate:** To automate readings, simply connect signal cables to a data logger.
### ORDERING INFORMATION
Three components must be ordered: a multi-level housing, a VW piezometer, and signal cable. The three are assembled into one unit at the factory.

### MULTI-LEVEL HOUSING
- **Multi-Level Housing**: 52611100
- **Length**: 305 mm (12”)
- **Diameter**: 71 mm (2.8”)
- **Couplings**: 1.25” schedule 40 slip coupling
- **Pipe Requirements**: 1.25 inch, schedule 40 PVC pipe can accommodate signal cables for a maximum of six piezometers and offers convenient handling to depths of 45 m (150’)
- **Weight**: 0.64 kg (1.4 lb)

### VW PIEZOMETER FOR HOUSING
- **3.5 bar (50 psi) piezometer**: 52611020
- **7 bar (100 psi) piezometer**: 52611030
- **Sensor Type**: Pluck-type vibrating wire sensor with built-in thermistor or RTD
- **Range**: 3.5 or 7 bar (50 or 100 psi)
- **Resolution**: 0.025%FS
- **Accuracy**: ±0.1% FS
- **Maximum Pressure**: 1.5 x rated range
- **Filter**: 50-micron sintered stainless steel
- **Temperature Coefficient**: < 0.04% FS per °C
- **Materials**: Stainless steel

### SIGNAL CABLE
- **Signal Cable, PU**: 50613324
  - Small diameter shielded cable with two twisted pairs of 24-gauge wire and polyurethane jacket.
- **Signal Cable, PVC**: 50613824
  - Shielded cable with four 22-gauge, tinned copper conductors and polyvinyl chloride (PVC) jacket.

### PVC PIPE
- **1.25” schedule 40 PVC pipe, slip couplings, and PVC cement and can be purchased economically at local plumbing or hardware stores.

### GROUT FITTING
- **Grout Fitting**: 52611150
  - Optional grout fitting provides a convenient way to keep cables out of the way while grouting the borehole. Fits 1.25” schedule 40 PVC pipe.

### TERMINAL BOXES
- **Terminal Box for 6 sensors**: 57711606
- **Terminal Box for 12 Sensors**: 57711600
- **Terminal Box for 24 Sensors**: 97711624

### ABOUT GROUT-IN INSTALLATION
The references below discuss the theory and practice of grout-in installation of piezometers.

- Tofani, G.D. (2000), "Grout In-Place Installation of Slope Inclinometers and Piezometers," in Seminar on Geotechnical Field Instrumentation held at the University of Washington by the ASCE Seattle Section, Geotechnical Group.

### READOUTS
- VW Data Recorder: 52613500
  - This easy to use readout displays and records VW sensor data in Hz or Hz², and thermistor or RTD data in degrees C. See separate data sheet for details.

### DATA LOGGERS
- **8-Channel V-Logger**: 52615180
- **4-Channel V-Logger**: 52615140
- **Campbell Scientific Data Loggers**
  - The Campbell Scientific data logger with a VW interface and the AM16/32 multiplexer can accommodate 16 piezometers with temperature readings or 32 piezometers without temperature readings. See separate datasheet.