

GLÖTZL Baumeßtechnik

PORE WATER PRESSURE, WATER and PRESSURE CELL ... Vibrating Wire Technique

Type PVM 3 ..

PVM 4 ..

Art. No.: 69.04...

The electric pressure cell with vibrating wire technique is used for measurement of pore water pressures and water pressure up to max. 600 bars.

These cells are used in dams or embankments, also to measure water level in boreholes and for the direct measurement of liquid pressure in boreholes and wells.

As housing we have different models. The sensor consists of a pressure sensitive diaphragm and a wire. This diaphragm is loaded by pressure and consequently the diaphragm is deflected. This results in a discharge of the strenghtened wire and is leading to a change of frequency. This frequency signal is transmitted by a cable to a portable readout unit or an automatic data logger system.



Figure: Porewater pressure cell with front filter stone

Advantages of vibrating wire technique

- Long-term measurement under difficult conditions
- Long-term stability with high resolution
- No influencing by longer cable lengths
- Practical and very robust measuring system
- Proved and successfully applied system
- Closed system

Available models

A series of modified cells can be supplied. The shown standard sensor is a very small-sized one and can so be used in stand-pipes and also in boreholes and embankments. Further models are cells for push-in in the underground, combined pore water pressure and earth pressure cells as well as cells for direct measurement of earth pressures only.

Configuration of the cells

The sensor installed in the cell corresponds to the state-of-art in the field of vibrating wire technique. All parts are machined of stainless steel, classification 1.4571. The inner part of the sensor has vacuum condition and is closed by welding. A special patented welding technique connects both ends of the wire with the housing. Therefore, a very good stability of the wire tensioning is reached.

Electromagnetic coils are placed close to the wire and are stimulating the wire. By this stimulation the wire is vibrating and the frequency of this wiring vibration is changed into an electric output signal. By changing the pressure deflection of the diaphragm also the frequency of the wire is influenced and altered proportionally to the pressure which is to be measured.

Measuring Cable

Standard cable is a 4-wire shielded one with PE-coating. Two wires are used for the sensor itself and two wires for an optional available temperature sensor.

For special request under rough conditions, cables are available with double coating as also for high temperature.

Important is that resistance changes in the measuring cable by temperature, contact resistance values at the interfaces as also water or humidity in the cable are not influencing the output signal frequency of the sensor.

This fact as well as an excellent zero point and long-term stability enable a better application of vibrating wire sensors - compared with the usual electrical sensors - in case of long-term measurements as well as measurements under rough conditions



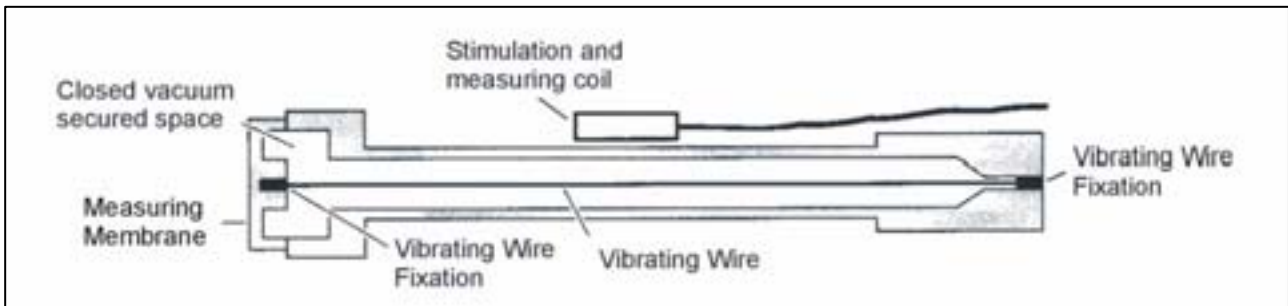
Pressure ranges

-0.5 up to +0.4, +0.7, +2.0, +3.5, +5.0, +7.0, +10, +20, +35, +70, +100, +200, +350 and +500 bars, Negative pressures standard up to -0.5 bar

Filter stones or special connections

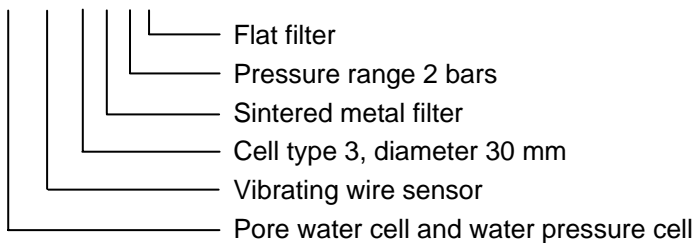
- Sintered metal filter of stainless steel, standard
- Ceramic filter stone with high air entry values
- Special connections according to customers' request or also standard screws; dia. 6 mm

Configuration of the Vibrating Wire Sensor



Ordering Example

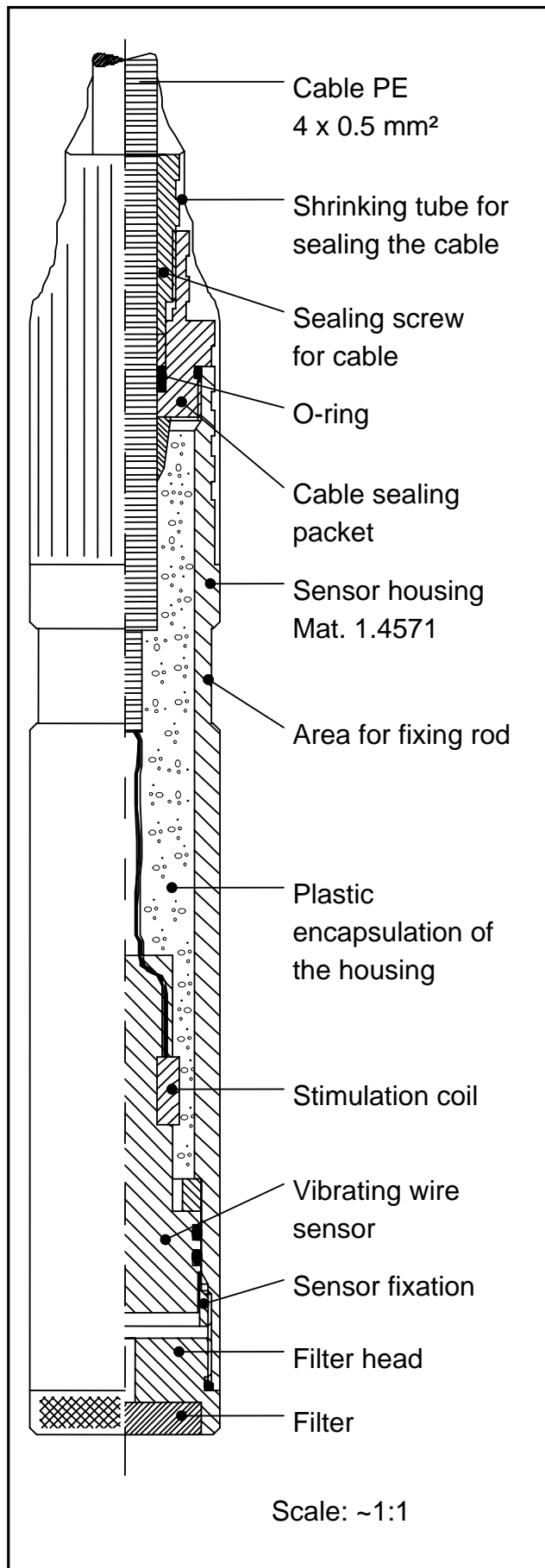
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Measuring Units

- Connection boxes and manual switches
- Battery-operated readout units
- Automatic measuring and registration units with memory and remote control

Sensor Housing



Technical Data

Technical Data	Standard
Overload security	50 %
Linearity including hysteresis f.s.	± 0.5 %
Optional	± 0.1 %
Resolution f.s.	± 0.02 %
Thermal drift	< 0.03 %/°C
Sensor Specifications	typical
Coil resistance Ohm/20 °C	480
Thermistor resistance Ohm/25 °C	3000
Inductivity mH	42
Capacity nF	135
Cable resistance Ohm	150
Temperature range °C	0 – +70
Current supply mA _{ss} /12V	25
Supply, pulse control V _{ss}	12
Measuring frequency	0.7 kHz – 1 kHz

Wiring:	Vibrating Wire Sensor	Thermistor
Cable 4 x 0.5 mm ²	red/blue	yellow/black

Readout Units



Hand operated distribution unit for 6 points with additional air pressure sensor
Housing of polyester for wall or rod installation IP 66
Type AKVW 6/LS

Portable readout unit without memory
Type SMC 2.02



Multiple function readout unit with memory,
type VMG 14.1
For further information see relevant leaflet



Automatic measuring and registration unit, type
MFA 6 E, in standard or ex-protection version

Subject to technical alternations