

## Penetrologger with GPS and soil moisture sensor

- **Robust design**
- **Precise and fast internal GPS**
- **Moisture percentage per measurement**
- **Display of Vehicle Cone Index**
- **Memory for 1500 measurements**
- **Definition of numerous different projects**
- **Velocity indicator stimulates correct pushing**
- **Field and office programmable / read-out**

## Penetrologger

The penetrometer measures the resistance to penetration of the soil and saves the measuring results to digitally process them on a computer. The penetrometer is ergonomically designed, lightweight and easy to use. It can be used to measure to a depth of 80 cm.

The penetrometer values are expressed in MegaPascals (MPa) and Newtons (N) as a function of depth. It also evaluates the Cone Index (CI).

## GPS

The penetrometer comprises an accurate internal GPS-system to determine the exact measuring point. The coordinates saved in the penetrometer can be linked to a place or map using software (or less accurately via Internet).

## Soil moisture sensor

Optionally, a soil moisture sensor (art. no. 061550) can be connected to make a one point measurement and record the soil moisture percentage at the measuring point (applying the Frequency Domain technique).

The soil moisture data are stored together with the coordinates and the measured resistance to penetration.

The soil moisture sensor can be easily pushed into the soil (or other material).

## Carrying capacity

The penetrometer measures the resistance of the soil or the shallow subsurface and is a suitable instrument for use in civil engineering, soil science, agriculture, sports field maintenance and park and public garden management.

Both in the case of civil engineering and agriculture it is very important to be aware of the degree of penetration resistance. For civil engineering purposes a high degree of resistance is generally desirable. This concerns the ability to determine the suitability for foundations for buildings and infrastructure projects.

Conversely, for agricultural purposes an excessively high resistance can present problems. A high degree of compaction (the carrying capacity of the soil) can impede root development and the oxygen supply to the roots. When the resistance is too low this can mean too little carrying capacity for cattle to walk round or for agricultural machinery to operate.

## USCS

The so-called Unified Soil Classification System (USCS) determines whether a vehicle carrying a load is able to drive across a certain piece of land. The classification is expressed in figures, one for the vehicle and one for the soil. The figure for the vehicle, the Vehicle Cone Index (VCI), has no dimension and is based on various factors, e.g. soil accessibility, soil pressure and the ratio between engine capacity and weight of the vehicle. The Cone Index (CI) represents the soil figure. This figure can be determined by means of a cone-penetrometer. A comparison of both indexes shows the suitability of the terrain for driving over.



### Technical specifications penetrometer

Operating temperature	0 - 50 °C
Operating humidity	IP 54 (splash water proof)
Penetrometer weight (excl. rod, incl. battery)	3.4 kg
Overall carrying weight	15.5 kg
Dimensions for transport	58 x 29 x 25 cm
Memory	1500 measurements
Maximum penetration force	1000 N
Force resolution	1 N
Depth registration	80 cm
Depth resolution	1 cm
GPS accuracy (Circular Error Probable)	< 2.5 m CEP



### Technical specifications soil moisture sensor

Measuring range	5-55%
Accuracy	5%
Resolution	1%
Output signal	0-1 Vdc
Measuring pens material	stainless steel
Length measuring pens (4)	60 mm
Diameter measuring pens	3.2 mm