

T8-2005

Pressure Transducer Tensiometer

- ■ ■ Microcontroller-integrated
- ■ ■ Configurable analog signals
- ■ ■ Integrated soil temperature sensor
- ■ ■ External refilling
- ■ ■ New designed filling status indicator
- ■ ■ Serial RS485 tensioLink interface
- ■ ■ Serial SDI12 interface

The T8 version 2005 now incorporates a digital signal processing which offers highest flexibility for integrating the sensor in measuring systems, different output signal ranges for data logger applications or possibility for direct PC-readout or networking.

Integrated configurable amplifier

- ✗ Offers linear, single-ended output signals in a selectable range of **0 to 1 V**, **0 to 2 V** or **0 to 5 V** for water tension and soil temperature. Thus, the T8 is compatible to nearly any data logger or data recording device.
- ✗ No special or even stabilised power supply is needed - connect the T8 directly to a battery, mains power unit, ...
- ✗ Extension cables up to 100 m can be connected, the electromagnetic sensitivity (EMC) is minimised.

Serial interfaces

- ✗ tensioLink RS485 interface for configuration - and for cost-effective sensor interconnection in extensive bus networks.
- ✗ Simple laboratory use with direct sensor connection to a PC's USB-port. Requires software and USB-adaptor.
- ✗ SDI12 interface for according measuring systems.

Internal logging function

- ✗ Readings can be stored in a programmable interval in a non-volatile memory. They are downloaded with a PC/notebook and the tensioView software. A continuous power supply must be ensured for correct time data.

External refilling

- ✗ Through two capillary tubes the T8 can be refilled respectively deaerated without removing it from the soil.

Improved heat-pulse fill level indicator

- ✗ The filling status of a T8 in a downwardly installation can be checked without removing the Tensiometer from the soil. Instead of the previously used IR-photo-sensor air bubbles are now detected with the heat-pulse method which operates much more reliable. The status is indicated by a digital switch.

Soil temperature measurement

- ✗ The tip of the highly accurate Pt1000 temperature sensor dips directly into the Tensiometer cup's water resulting in the best possible thermal contact to the soil.



Why Tensiometers?

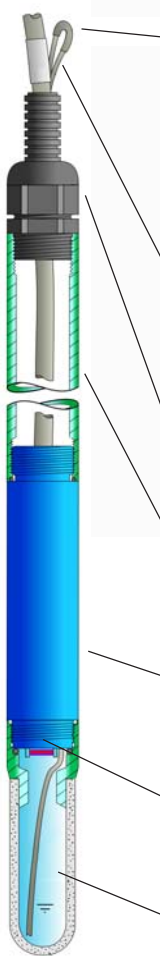
All water movements in the soil are directly depending on the soil water tension, as water will always move from the lower to the higher potential.

Compared to other methods, only with Tensiometers ...

- the sum of the water holding forces is measured,
- no knowledge of the soil's pF-characteristic and no soil calibration is necessary,
- installation disturbances are inhibited as the measured volume is much higher, ...

A few of many applications:

- ■ ■ Studies on drain water, ascending or lateral water and infiltration processes
- ■ ■ Agricultural and forest research on plant water availability and plant physiology
- ■ ■ Water balance and transport studies
- ■ ■ Layer impermeability in landfill and dumpsites
- ■ ■ Regulation of irrigation systems
- ■ ■ Control sensor for soil water extraction systems
- ■ ■ Monitoring studies with data-logger or fieldbus
- ■ ■ Lysimeter sites
- ■ ■ Ecological conservation of evidence



External refilling
Installed Tensiometers, if still saturated, are refilled or deaerated through two stainless steel capillary tubes. The tubes can be extended. Using the supplied refilling syringe a measuring range of approx. 800 hPa can be achieved. With the optional refilling tools, the full range can be refurbished.

Reference pressure
The reference atmospheric pressure is conducted through a watertight membrane on the cable and the cable interior. The membrane must always have contact to atmosphere.

Cable gland
The T8 can be buried completely. Special cable glands can be fixed for a watertight connection of optionally available protective tubes.

Acrylic glass shaft
One-piece shafts can have any length from 10 to 200 cm. Over 200 cm, the shafts are dividable. More or less "unlimited" shaft extension is possible.

Sensor body with amplifier
No stabilised power supply is required! Connect the T8 directly to a rechargeable battery, mains power unit, etc.

Sensor area
Position of the pressure transducer inlet, IR-indicator, temperature probe and first refilling tube opening.

High-grade ceramic cup
Water filled, with second end of refilling tube.

Technical Specifications

Soil water tension

Measuring range +100 (pressure) ... -85 kPa (tension)
Accuracy ± 0.5 kPa

Temperature sensor Pt 1000

Measuring range -30 ... +70°C
Accuracy ±0,2 K (-10°C ... +10°C)
±0,4 K (-30°C ... +30°C)

Analog signal for pressure and temperature

Selectable 0 ... 1 V, 0 ... 2 V or 0 .. 5 V
Single-ended
Resolution 16 bit

Filling status

Digital switch 0 V for filling status "OK" or selected voltage for "insufficient"

Power supply	6 ... 20 V _{DC}
Current consumption	3 mA
Ceramic cup	Ø24 mm; length 60 mm
Shaft	Ø25 mm; PMMA
Plug	male, 8-pin, M12/IP67

Cable length on sensor body:

for shafts up to 120 cm: 1,5 m from sensor body
for shafts over 121 cm: 30 cm from end of shaft
Effective cable length is cable length minus shaft length
The reference air membrane is fixed close to the plug



Accessories

Connecting cables CC-8 or EC-8

Please order connecting cables (female plug and free wire ends) or extension cables (one each male, female plug) separately

External refilling kit BKTex

To reach a measuring range of 900 hPa or for refilling tubes over 5 m (!), the BKTex refilling kit for in-the-field use is available. Incl. manual vacuum pump, vacuum bottle, syringe.



Laboratory refilling kit BKT468

For degassing ceramic cup and pressure sensor and refilling in the laboratory. Requires a vacuum pump (not incl., min. 8 mbar).



INFIELD7 handheld unit

Handheld read-out device for spot readings of the soil water tension (in hPa or kPa), soil temperature and filling status. Internal memory. In combination with the laboratory refill kit, T8 can be re-calibrated with the INFIELD7.

The INFIELD7 reads out all UMS Tensiometers, but also certain types of gypsum blocks, temperature and FD-probes (volumetric water content).



Gouge auger set TB-25

The gouge auger has a specially shaped tapered blade tip for an accurate fitting of the cup in the borehole - the slurring of the cup becomes unnecessary.

Ordering information accessories

Art. no.

Connecting cable, 5 m (plug to wire ends)	CC-8/5
Connecting cable, 10 m	CC-8/10
Connecting cable, 20 m	CC-8/20
Extension cable, 5 m (plug to plug)	EC-8/5
Extension cable, 10 m	EC-8/10
Extension cable, 20 m	EC-8/20
Handheld measuring device	INFIELD7
Refill kit with manual vacuum pump	BKTex
Laboratory refill kit (without pump)	BKT456
Gouge auger set	TB-25

Ordering information

Art. no.

Pressure Transducer Tensiometer	T8-...*
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On an order please note the required shaft length (total length = shaft length + 16 cm)
Order connecting cables separately and note the required length.

Contents of supply: T8 (filled), user manual, shaft water retaining disc, calibration certificate, one refilling syringe per order

