

Soil Water Potential Sensor

metergroup.com/environment/products/teros-21



To say it's easy and affordable would be highly accurate

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TEROS 21

Introducing TEROS 21 Gen 2

The new Gen 2 version of our TEROS 21 is the world's first full-range (-5 to $-100,000$ kPa) water potential sensor with legendary high accuracy, low maintenance, and low cost.

See what's different

Do not settle for less

When it comes to measuring water potential (or soil suction), it's difficult to find a device that will meet your every need. You're either forced to deal with lowered accuracy or high-maintenance hassles (not to mention getting soaked on cost). You wouldn't think taking such a simple reading would be so challenging.

A true full-range sensor that's low maintenance and low cost

The TEROS 21 water potential sensor is incredibly easy to use. It requires no maintenance, and it's accurate enough for most applications. In fact, the TEROS 21 provides an even more accurate soil moisture picture than measuring water content alone.

A water content sensor only shows the percentage of water in the soil, but add a TEROS 21, and you'll know if that water is available to plants and where it will move. Plus, unlike water content, matric potential isn't dependent on soil type, so you can compare moisture between different sites. Not only that, the TEROS 21 is surprisingly affordable, and the new Gen 2 version boasts an improved circuit, a more robust microprocessor, and an improved measurement range. It now measures all the way from near saturation to air dry (-5 to -100,000 kPa) making it the world's first true full range water potential sensor.

Broad soil applications. Dependable accuracy.

To say TEROS 21 is more accurate than competitor sensors doesn't do it justice. That's because unlike competitor models, we calibrate each and every sensor for you. To do this, we use a chamber system that allows the TEROS 21 matric potential sensor to come to a fixed water potential. We put sensors in silica flour, and by controlling the water potential, we're able to set calibration points from -10 kPa to -80 kPa. The result: a long-term monitoring solution you can finally trust.

The only worry-free soil water potential sensor

Ease of use isn't something you normally associate with water potential measurement devices. Until now. That's because TEROS 21 is plug and play in a number of ways. First, once it's in the ground, the durable epoxy coating ensures long-lasting usage. Second, no maintenance is involved. That means no refilling. And no worrying about frozen conditions. Lastly, the TEROS 21 water potential sensor is also easy to integrate into systems (SDI-12 compatible) so it can be used with third-party loggers. All this adds up to saving you time and a lot of unnecessary labor.

Coverage—Get the maximum for the minimum

This is where you may expect to see a high price point for all of the extra value we engineered into TEROS 21. Instead, we offer them at a low cost so you don't have to spend more money to get the measurement coverage you need. Not only do more sensors for the money make more sense, but because they use less energy and include a temperature sensor, you'll also be getting more value for your money. And it's all backed by 15 years of research.

Soil water measuring that's immeasurable in value

Accurate. Easy to use. Affordable. The TEROS 21 water potential sensor outperforms in every aspect because we specifically designed it to save you time, hassle and money.

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Features

- Easy to use
- Improved accuracy comes from the six-point factory calibration

- Tough, long-lasting body
- No recalibration
- Low salt sensitivity
- Affordability
- Excellent range (sensitivity from -5 kPa all the way to air dry [-100,000 kPa])
- Onboard temperature measurement
- Plug and play capability
- Use with the [ZL6](#) for remote access to data on the cloud
- SDI-12 compatible

Specifications

MEASUREMENT SPECIFICATIONS

Water potential	<p>Range: -5 to -100,000 kPa (1.70 to 6.00 pF)</p> <p>Resolution: 0.1 kPa</p> <p>Accuracy: ±(10% of reading + 2 kPa) from -100 to -5 kPa</p>
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NOTE: TEROS 21 Gen 2 can read up to 0 kPa when on a wetting path. The air entry of the soil limits the performance of the sensor to -5 kPa on the drying curve.

NOTE: TEROS 21 is not well calibrated beyond -100 kPa. For more information on using the TEROS 21 beyond this range, see Section 3.3.3 in the user manual

Dielectric measurement frequency	70 MHz
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Temperature	<p>Range: -40 to +60 °C</p> <p>Resolution: 0.1 °C</p> <p>Accuracy: ±1 °C</p>
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COMMUNICATION SPECIFICATIONS

Output	RS-232 (TTL) with 3.6-V or SDI-12 communication protocol
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Data logger compatibility	METER ZL6, EM60, and Em50 data loggers or any data acquisition system capable of 3.6- to 15-VDC power and serial or SDI-12 communication
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PHYSICAL SPECIFICATIONS

Dimensions	Length: 9.6 cm (3.8 in) Width: 3.5 cm (1.4 in) Height: 1.5 cm (0.6 in)
Sensor diameter	3.2 cm (1.3 in)
Operating temperature range	Minimum: -40 °C Maximum: +60 °C NOTE: Sensors may be used at higher temperatures under certain conditions; contact Customer Support for assistance.
Cable length	5 m (standard) 75 m (maximum custom cable length) NOTE: Contact Customer Support if a nonstandard cable length is needed.
Connector types	3.5-mm stereo plug connector or stripped and tinned wires
ELECTRICAL AND TIMING SPECIFICATIONS	
Supply voltage (VCC to GND)	Minimum: 3.6 VDC Maximum: 15.0 VDC
Digital input voltage (logic high)	Minimum: 2.8 V Typical: 3.6 V Maximum: 5.0 V
Digital input voltage (logic low)	Minimum: -0.3 V Typical: 0.0 V Maximum: 0.8 V
Power line slew rate	Minimum: 1.0 V/ms
Current drain (during measurement)	Minimum: 3.0 mA Typical: 5.0 mA Maximum: 16.0 mA
Current drain (while asleep)	Typical: 0.03 mA

Power-up time (DDI serial)	Maximum: 50 ms
Power-up time (SDI-12)	Typical: 175 ms
Measurement duration	Typical: 175 ms

COMPLIANCE	Manufactured under ISO 9001:2015 EM ISO/IEC 17050:2010 (CE Mark)
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California requires the following notice:

WARNING: This product may contain chemicals including ethylene glycol, lead, nickel, styrene and cadmium, which are known to the State of California to cause cancer, birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov

LEARN MORE WITH ARTICLES, CASE STUDIES, DEMOS, WEBINARS

- [ZENTRA Cloud request a demo](#)
- [Cited publications TEROS 21](#)
- [The researcher's complete guide to water potential](#)
- [Video: Intensive vs. extensive variables](#)
- [Webinar: Water potential 101: Making use of an important tool](#)
- [Webinar: Soil moisture 202: Choose the right water potential instrument](#)
- [Case study: Soil sensors help turf growers find water/nutrient balance](#)
- [Case study: Screening for drought tolerance](#)
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Support

Have a question? Our team is ready to help!

We manufacture, test, calibrate, and repair every instrument in-house. Our scientists and technicians use the instruments every day in our product testing lab. No matter what your question is, we have someone who can help you answer it.

Email US: sales.environment@metergroup.com

Email Europe: sales.europe@metergroup.com

Phone US: +1 509-332-5600

Phone Europe: +49 89 12 66 52 0

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