

Delta-T Devices

WET150 Sensor

For Soils and Substrates

Moisture

Temperature

Electrical Conductivity

The product of 40 years' sensor development expertise, the WET150 is a new digital SDI-12 multi-parameter soil sensor with an exceptional price-performance ratio. It is ideal for horticulture and agriculture system integration.

- Accurate monitoring of growing conditions
- Measures moisture, temperature, and EC
- True research-grade quality at lower cost
- Rugged, buriable, and low power
- Detachable and extendable cable system
- Digital SDI-12 for easy system integration



SDI-12



The **WET150** – a game-changing sensor for system integration

Delta-T Devices has been at the forefront of soil and substrate sensor technology for over three decades, with a range that includes the WET 2 – used extensively in horticulture worldwide for many years.

With a strong heritage in developing instruments for scientific research, our sensors are built to high specifications and offer both excellent accuracy and premium build quality.

Through recent in-house design innovations the WET150 Sensor delivers this proven level of quality at a price point not previously thought possible. These technical breakthroughs mean that researchers, consultants and growers can now integrate a *true* research-grade multi parameter soil and substrate sensor into their systems at lower cost – making those systems even more effective, reliable and affordable.

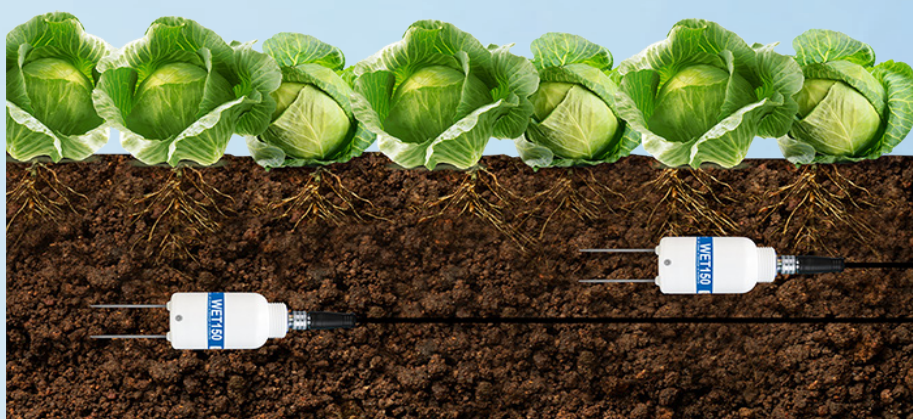
Measurement of three crucial variables

When buried in soil or substrate the WET150 Sensor simultaneously measures three crucial variables that influence plant growth: **moisture content**, **temperature**, and **electrical conductivity (EC)** – a strong indicator of the general nutrient level.

A key strength of the WET150 is its ability to accurately calculate pore water conductivity (ECp): the ion content of the water available to the plant. Patented sensor electronics produce research grade measurement accuracy with exceptional salinity and temperature stability – essential for critical control and irrigation decisions. When the WET150 is buried, temperature measurements (essential for compensating the EC measurements) are taken down in the root zone, ensuring highest accuracy.

When installed in grow bags, WET150s can provide the accurate data required to power sophisticated SDI-12 enabled automatic precision irrigation systems – cutting costs and waste whilst boosting produce yields and quality.

The rugged watertight build of the WET150 also makes it ideal for use in field agriculture – sensors can be left buried for years without loss of performance. WET150 sensors can also be buried at different depths to enable monitoring of soil moisture, temperature and EC profiles.



WET150 Kit for Portable use

The WET150 is available in Kit form with WET150 readout meter and carry case – providing users with a low cost, portable, and easy to use tool for obtaining instant moisture, temperature* and EC measurements.

*We recommend the WET150 is used as a portable sensor only in well-equilibrated environments where the air temperature doesn't differ significantly from the soil/substrate temperature.

Digital SDI-12 Interface



The WET150 is a digital SDI-12 sensor (fully compliant with version 1.3 standards). SDI-12 is a standardised interface for connecting digital sensors to a master device – typically an SDI-12 compatible data logger, wireless node, controller, or computer.

SDI-12 defines both the digital communications and sensor power standards. A key strength of SDI-12 is that it supports the connection of multiple networked sensors to a single input on a master device.

How does SDI-12 enhance the WET150?

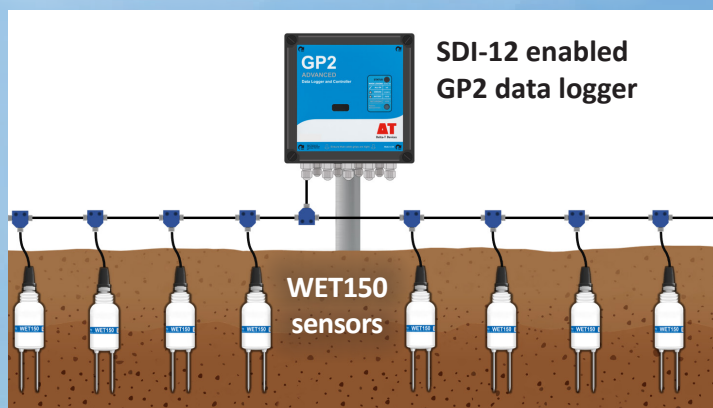
The WET150 (like all SDI-12 Sensors) is low power and features an integrated microprocessor that enables it to perform two way communication with an SDI-12 master device.

The WET150 outputs readings in a standard SDI-12 format which can be sent to, and recognised by, the master device. The inclusion of a microprocessor also gives the WET150 the ability to perform complex internal correction, compensation and averaging algorithms that enhance the quality of the data.

SDI-12 protocol is based on a master-slave configuration. When installed in an SDI-12 network, individually addressed WET150s (slaves) are sent data requests by the master device. These requests briefly wake all WET150s in the network – and result in a measurement and data sending response from the targeted WET150.

When not responding to a master request, all WET150s remain in a dormant energy saving state.

Typical WET150 Sensor configuration



Key SDI-12 Benefits

- Use many sensors with just a single master device, reducing complexity and costs.
- Low power systems that run off battery and are powered via the interface Bus.
- Many parameters can be transmitted over simplified wiring.
- No loss of accuracy over large cable runs.
- Ideal for wireless comms based applications

Easy Installation

The WET150's sharp and strong pins minimise soil and substrate disturbance, preserving the original structure around the measurement rods, and making the probe easy to insert and install.

For burial at depth the cylindrical shape facilitates installation in augured holes. Optional extension tubes assist with placement and removal (50 cm and 100 cm lengths, connectable).

Applications

Soil Science: The WET150 is easy to install and delivers research-grade accuracy and reliability for researchers monitoring soil and substrate conditions.

Horticulture and Agriculture: The WET150 Sensor is provided with substrate calibrations for coir, peat, and mineral wool, as well as soils – providing a simple, effective, rugged solution to checking the uniformity of growing conditions for many types of growing media.

Precision Irrigation: Accuracy and ease of use make the WET150 sensor ideally suited to precision irrigation applications. The WET150's compact size allows it to be easily installed in plant pots or grow bags. Its readings can be used to optimise irrigation scheduling, or the WET150 can be installed as part of an SDI-12 automated smart irrigation system.

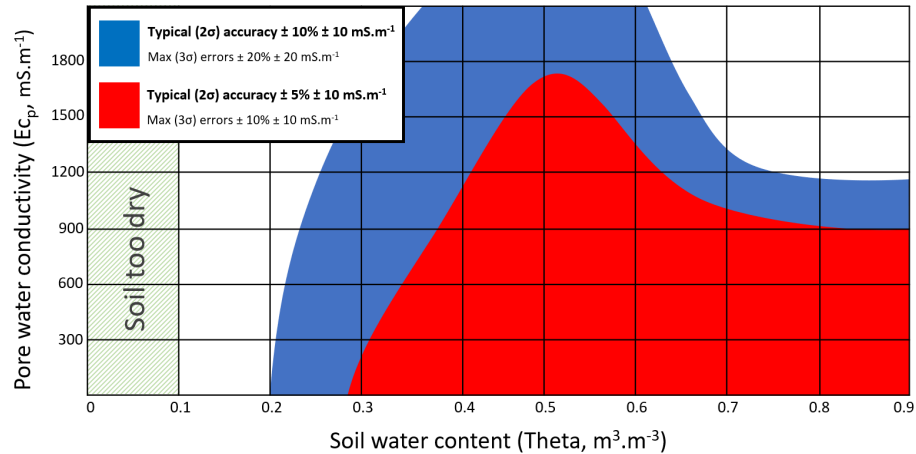
System Integration: The WET150's accurate and stable three parameter measurement, simple SDI-12 output and low power makes it the ideal sensor for system integrators. Industrial rated, UV resistant cable fitted with a waterproof IP68 connector allows the sensor to be buried indefinitely, whilst still permitting easy cable exchange or extension if necessary.

Specifications

	Volumetric water content	Pore water conductivity (ECp)	Permittivity	Bulk conductivity (ECb)	Temperature
Accuracy	± 0.03 m³.m ⁻³ (3%)	See graph below this table	± (3% of reading + 0.8 ε') 1 → 40	± (10mS.m ⁻¹ + 6%)	± 0.5°C (0°C to +40°C range)
			± 5% of reading 40 → 80		± 0.7°C (-20°C to +60°C range)
Range	Full range: 0 to 1.0 m³.m ⁻³	See graph below this table	for ECp ≤ 800 mS.m ⁻¹ 1 → 40	from 0 to 1200 mS.m ⁻¹	Full range: -20°C to +60°C
	Accurate range: 0.05 to 1.0 m³.m ⁻³ ECb 0 to 500 mS.m ⁻¹		for ECp ≤ 500 mS.m ⁻¹ 40 → 80		Accurate range: 0°C to +40°C
Output	SDI-12 protocol 1.3 (www.sdi-12.org) <i>Providing water content, pore water conductivity, and temperature - together with base readings of permittivity and bulk conductivity.</i> <i>Outputs are exceptionally configurable.</i>				
Power requirement	Operating voltage: 6 to 20 Volts Current consumption (typical values when powered from 12 Volts): Active sensing: 22 mA average over 12 ms (average includes short peaks at 45 mA) Active results computation: 2 mA over 188 ms Idle: <0.5mA				
Environmental	IP68, -20 to +60°C				
Sample volume	~55 x 70 mm diameter				
	Sample volume is weighted towards soil immediately surrounding the rods				
Dimensions	Overall: 143 x 40 mm dia Rods: 51 mm x 2.5 mm dia				
Weight	Weight 77g (excl. cable)				
Sensor calibrations	Individual sensors are interchangeable. Recalibration advised every 5 years (depending on use)				
Soil calibrations	The WET150 Sensor comes complete with calibrations for mineral and organic soils plus coir, peat, and mineral wool substrates				



Pore water conductivity accuracy



Notes:

- [1] The WET150 has been carefully optimised to provide accurate readings in soils and substrates - readings taken in water or air may not meet the full specification.
- [2] The EC_p contour map is based on measurements from 30 sensors at 20°C in NPL* traceable media. Calculated EC_p readings are derived from the Hilhorst equation, using the generalised "mineral" soil calibration and the default soil parameter = 4.1
- * NPL is the UK's National Metrology Institute, developing and maintaining the national primary measurement standards.

Ordering information

WET150	Soil moisture, temperature and EC Sensor. NB cable must be ordered separately
WET150 KIT	Portable kit including WET150 Sensor, WET150 Meter, and carrying case
WET150 CABLES and accessories for burial at depth	
SMSC/lw-05	5 m cable terminating in bare wires for connection to SDI-12 loggers and controllers
EXT/5W-01 EXT/5W-05 EXT/5W-10 EXT/5W-25	1 m, 5m, 10 m and 25 m extension cables, M12 connectors
NTP1/STP1	Network T-Pieces for connection to M12 cabling network
ML/EX50	0.5 m extension tube
ML/EX100	1 m extension tube
SM-AUG-100	Spiral auger, 45 mm dia. Installs WET150 Sensor at depth, length 1.2 m

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WET150 Data Sheet v.1.4

