

WET150 Kit

Quick Start Guide

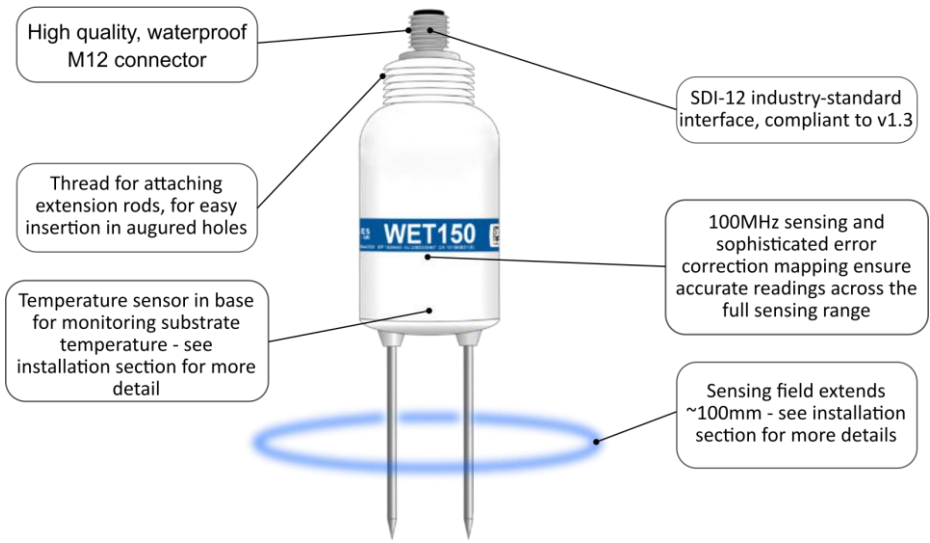


AT
Delta-T Devices

The WET150 Kit



The WET150



Getting Started

Thank you for purchasing the WET150 Kit, Delta-T's solution for portable monitoring of water content, electrical conductivity and temperature. Your WET150 Kit already has batteries fitted, so you can start working with it immediately. We recommend the following steps:

1. Check the soil type and configuration are suitable for your application (see 'Configuration', page 5)
2. See section "Taking Readings" (page 4) for advice on how to get the best out of the WET150 Kit.

Taking readings

1. Gently push the WET150 rods into the soil or substrate.
2. Press **READ** to take and display a reading.

The meter displays volumetric water content, temperature, and pore water conductivity (EC_p), unless the soil type is set to RAW – see the “RAW soil type” section

Getting the best out of your WET150 Kit

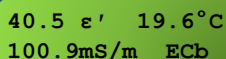
Insertion technique

Consistency is key to getting the best results from your WET150 Kit:

- Ensure the pins of the sensor are fully inserted into the soil/substrate
- Avoid using too much force. Pushing too hard can compress looser substrates like coir, which will change the readings. In soils, if you feel strong resistance it may be that you have hit a stone. Stop and re-insert at a new location to avoid damage to the sensor.

RAW soil type

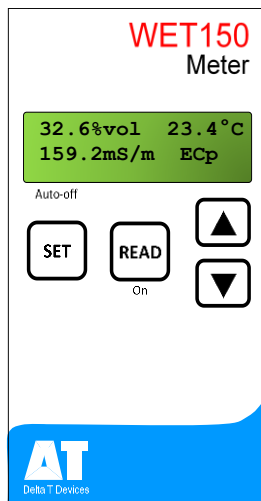
If the soil type is set to **RAW**, the meter will display the underlying readings of permittivity (ϵ'), temperature and bulk conductivity (EC_b) instead of water content and pore water conductivity (EC_p):



40.5 ϵ' 19.6 °C
100.9 mS/m EC_b

Temperature

Note: the temperature sensor in the WET150 is internal to the white body, so it takes over a minute to completely equilibrate. This can affect not just temperature accuracy but also the EC_p measurement accuracy, because the conductivity of typical plant nutrients changes by ~2% per °C. The Meter’s EC_p measurement is compensated to 25°C. 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.



Configuration

Press [SET] to configure the meter or sensor. Scroll up or down to the option that you want to configure, and press [SET] again to select. There are 5 menu options: Soil type, Soil setup, Units, Address, and Contrast.

The WET150 measures permittivity, bulk conductivity and temperature directly. From these measurements the Meter calculates pore water conductivity (EC_p) and water content. These calculations require user-configurable parameters which are stored on the Meter handheld unit. By default, the Meter comes with generic parameters that give comparable performance to the generic parameters in Delta-T's well-regarded WET2 sensor. **We strongly recommend you review these settings.** Best results will be obtained with customised parameters for your specific medium; Delta-T also supplies a list of generic parameters which give good performance for several common soils and substrates. See the [WET150 User Manual](#) (available online) for more details.

Soil type

Select the soil type that will be used when calculating water content and EC_p. Definitions can be found in the WET150 User Manual.

Soil Setup

The "Soil Setup" menu enables you to adjust the following parameters for each soil type (except RAW):

- **Moisture a0**
 - **Moisture a1**
 - **Soil Parameter** – this adjusts how the Meter calculates EC_p
 - **EC_p dry limit** – at low water contents, calculating EC_p from permittivity and EC_b becomes unreliable. This option defines the "too dry" permittivity level below which the Meter will not output EC_p due to declining accuracy.
- } These parameters adjust how the Meter calculates water content

The "Back" option will return you to the list of available soil types.

The "Restore defaults" option will reset the **selected** soil type to its factory settings.

IMPORTANT: The configuration menu only adjusts the settings within the Meter handheld unit. The only setting stored **on the sensor** which can be adjusted via the Meter handheld unit is the SDI-12 address.

Units

This menu enables you to select which units are used to display EC and temperature measurements.

Address

Each SDI-12 sensor has an “address”, a 1-character code that it uses to recognise when to respond to commands sent over a network of sensors.

The WET150 Meter can be used to set sensor addresses prior to their installation in a network.

Contrast

LCD contrast can be adjusted up or down using the scroll buttons.

The available options for the configuration menus are as follows:

| Soil Type | Conductivity | Temperature | SDI-12 Address | Soil Setup (select soil type) |
|---|-----------------------------------|--------------|--|---|
| - Mineral - Organic - Peat mix - Coir - Mineral wool - Custom - RAW | - mS/m - mS/cm - μ S/cm | - °C - °F | - a to z - 0 to 9 - A to Z (62 total available) | - Moisture a0 - Moisture a1 - Soil Parameter - ECp dry limit |

Troubleshooting sensor networks

SDI-12 sensor networks can include up to 62 sensors of various types and from different manufacturers. A single malfunctioning sensor may prevent the whole network from operating. The WET150 Meter can conveniently help locate faults.

The WET150 Meter can only take and display readings from WET150 sensors, however it can display the address of most attached SDI-12 sensors with a compatible power requirement*. Displaying the address checks that the attached sensor powers up correctly and responds to an SDI-12 command. This can prove a useful diagnostic aid when troubleshooting networks of SDI-12 sensors:

- Divide the network up into groups of 5 to 10 sensors and attempt to take readings from each group using your data logger / wireless module.
- When a group is identified which does not respond, separate the individual sensors and connect each in turn to the WET150 Meter (note non-WET150 sensors will display “sensor fault”).
- For each sensor, press [SET], scroll down to Address and press [SET] again to display the current SDI-12 address.
- Remove any sensor that fails to correctly display its address.

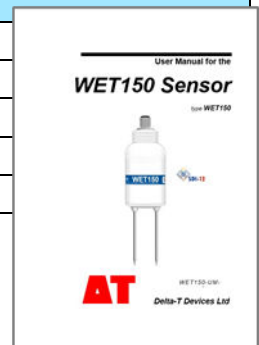
* The WET150 Meter supplies 6 volts to attached sensors. Most SDI-12 sensors will work fine with this, but please check the sensor specifications.

Outline specifications

| | | |
|---|--|------------------------------|
| Volumetric Water Content (%vol) | | |
| Accuracy | ± 3%vol (with a calibration matching the soil / substrate) | |
| Range | Accurate range: 5 to 100%vol , EC _b 0 to 500mS.m ⁻¹ Full range: 0 to 100%vol [1] | |
| Permittivity (ε') | | |
| Accuracy | ± (3% of reading + 0.8 ε') 1 → 40 for EC _p ≤ 800mS.m ⁻¹ ± 5% of reading 40 → 80 for EC _p ≤ 500mS.m ⁻¹ | |
| Range | Accurate range: 1 to 80 , full range: 1 to 90 | |
| Bulk soil conductivity (EC _b) | | |
| Accuracy | ± (6% of reading + 10mS.m ⁻¹) | |
| Range | Accurate range: 0 to 1200mS.m⁻¹ Full range: 0 to 2000mS.m ⁻¹ | |
| Temperature | | |
| <i>(the WET150 must be fully equilibrated with the soil to accurately measure soil temperature)</i> | | |
| Accuracy | ± 0.5 °C | ± 0.7 °C |
| Range | Accurate range: 0 to +40 °C | Full range: -20 to +60 °C |
| WET150 | | |
| Interface | SDI-12 v1.3 | |
| Sealing | IP68 | |
| Sample volume | 55 x 70 mm diameter (~1 litre needed for full accuracy) | |
| Dimensions | 143 x 40 mm diameter | |
| Weight | 77g | |
| Warranty | 5 years | |
| Meter | | |
| Power requirement | 2x AA alkaline batteries | |
| Battery life | ~2,400 readings | |
| Dimensions | 130 x 66 x 25 mm | |
| Weight | 160g | |
| Warranty | 2 years | |

Note [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.

Please refer to the [WET150 User Manual](#) for further details and important notes.



Changing the batteries

You will need a small cross-head screwdriver to access the batteries.

- Unscrew the 2 screws holding the battery cover in place, taking care not to displace the fitted o-rings.
- Remove and replace the 2 AA batteries, making sure to retain the correct polarity.
- Replace the 2 screws.

Note: All configuration settings will be retained.

Care and maintenance

- Do not touch the WET150 rods or expose them to other sources of static damage, particularly when powered up.
- Ensure that the connector is clean, undamaged and properly aligned before pushing the parts together. Screw together firmly for a water-tight seal.
- If inserting the sensor into soil and you feel strong resistance, it is likely you have encountered a stone. Stop pushing and re-insert at a new location.
- Do not pull the sensor out of soil by its cable.
- Protect the meter from heavy rain or submersion.



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