iMETOS®

iMETOS ECO D3
USER MANUAL
Version 1.0, 05-2018

Thank you for choosing an iMETOS for monitoring soil moisture data, agrometeorological variables and other environmental conditions. The iMETOS ECO D3 has been designed to work in harsh conditions and in all climate zones. It can monitor data with a wide variety of sensor sets. Like all products of the iMETOS family, it measures, logs and sends data to the FieldClimate cloud. Users have free access to data through web and mobile applications. Additional services (like plant disease models and hyper localized weather forecasts) are available upon license fee payment. Web API is available for interface with other custom applications.

iMETOS ECO D3 systems will be mainly used for:
- Soil moisture monitoring.
- Hydrology and flood warning applications.
- Frost warning via SMS.
- Meteorological monitoring.
- Weather forecast corrected with local measurements.
- Plant disease models (depending on the configuration of the equipment).
- Eco-physiological monitoring.
- Environmental monitoring.
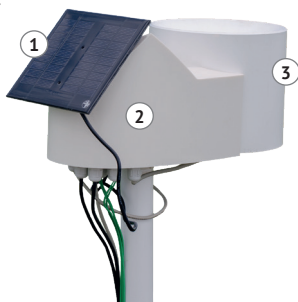
YOUR iMETOS ECO D3

The iMETOS ECO D3 BASE consists of a white plastic case containing the electronics, the battery and the internal or external antenna. It can be customized with a wide variety of sensors for soil moisture, water level, temperature, salinity and more. Taped to the solar panel you will find a sticker with a unique serial number and the keys that enable the access to the *FieldClimate* platform.

Other variations are described on the list below. Each of them is expandable with more sensors.

On picture:
iMETOS ECO D3

1. Solar panel; 2. Body containing a datalogger, a modem and a battery; 3. Rain gauge.

MAIN VARIATIONS

- iMETOS ECO D3 CLIMA: Air Temperature sensor and Rain Gauge. This basic configuration enables the use of the *imeteopro.com* platform.
- iMETOS ECO D3 FROST: Wet and Dry Bulb Temperature sensor.
- iMETOS ECO D3 SM-1/2/3/4/5: Air Temperature sensor, Rain Gauge (iMETOS ECO D3 SM-1/2) and soil moisture interfaces (Watermark, Decagon or Sentek). Please note that soil moisture sensors are not included in the package.
- iMETOS ECO D3 DISEASE MONITOR: Air Temperature and Humidity sensor, Rain Gauge and Leaf Wetness sensor.
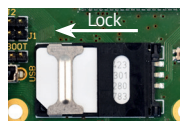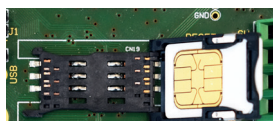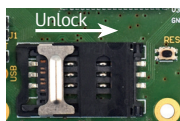- iMETOS ECO D3 TANK MONITOR: Water Level sensor.

START-UP THE iMETOS ECO D3

1. Open the housing by unscrewing the 6 screws on the bottom.

2. Loose the nut from the cable gland.

3. Pull out the case cover, letting the battery cable loop pass through the gland.

4. In GPRS, UTMS, LTE (i.e. G2, G3, G4) networks a SIM card from a provider is needed. To insert a SIM card:

4.1 Slide the metal part of the SIM card holder to unlock it.

4.2 Place the SIM card into the holder so the gold contacts on the SIM face down on the board.

4.3 Lock the holder by sliding the metal lock.

Note: Check that the PIN request for the SIM is disabled and that you have data transfer service enabled.

5. Plug the battery cable into the BAT connector on the PCB (red circle).

6. Close the cover to its final position.

Your device is now up and running. The three LEDs on the motherboard will turn on for an instant indication that the station has reset. After this, the connection with FieldClimate will start and the LEDs will give you information about the communication process (for more details see *Blinking code* section on *metos.at/home/imetos-eco-series/#blinking-code*). In case you need further support, please contact support@metos.at.

iMETOS ECO D3 is a durable and flexible datalogger for all climatic conditions, but if you want to store it (e.g. during the winter) in a warehouse, disconnect the battery to avoid discharge.

INSTALLING YOUR iMETOS

The iMETOS has to be mounted on the pole: at the bottom of the unit there is a plastic ring with a metal clamp on it. Make sure that the pole is as vertical as possible. Check the bubble level on the rain gauge to ensure the right installation verticality of the pole.

Mount the solar panel on the main plastic case. In the northern hemisphere, it should face south while in the southern hemisphere it should point towards north.

Rain gauge is integrated in the plastic case, as depicted in the *iMETOS ECO D3* figure on the previous page.

iMETOS ECO D3 for soil moisture monitoring comes with a set of soil moisture sensors connected to the main unit or to an extension box on the serial bus connection. All soil moisture sensors need a specific interface and can be connected to the main control unit through the cable chain. The soil moisture and temperature sensors have to be properly installed in the ground. Depth of placement depends on the application and varies with the rooting depth of turf or plant material.

To install fork-like sensors, excavate a trench to the depth required and insert the entire sensing portion of the sensor horizontally into the undisturbed soil face. Let the cable go down first and then take it up to the top. This prevents water from following the cable in the ground and wetting the sensor.

Soak Watermark sensors in water before installation.

To install soil moisture profile probes, drill a hole with an auger and insert the probe carefully in the tapered soil opening, until the top of the probe is levelled with the soil surface. To ensure high quality of measurements, all soil moisture sensors should have a good contact with the soil around them.

In iMETOS ECO D3 FROST the Wet and Dry Bulb Temperature sensor should be mounted at 50 cm above the ground or at the height of the lowest flowers/fruits.
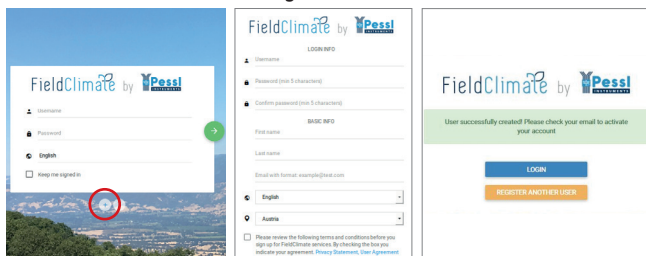
The leaf wetness sensor can be tied to a branch of the plant slightly inclined with the filter paper looking up. Mount it in a position that allows the sensor to pick up early rain and to stay wet in the shade.

Note: 6 sensors can be connected directly to the iMETOS board; there is also one PI bus chain input and 2 extension connectors on the top of the motherboard – the system can handle up to 400 sensors. The central extension can support up to two cable chains, 2 soil moisture profile probes or the SDI12 interface. The extension on the left side supports the I2C interface, which can be connected with barometric pressure and lightning sensors. For detailed info about the installation of sensors refer to *metos.at/home/imetos-eco-series*.

USE YOUR iMETOS

To start using services we provide, you need to register on the FieldClimate platform, which gives you the access to the data in graphs or tables. FieldClimate also provides a powerful decision support system for growing your crops (plant protection, irrigation, sowing, harvesting, fertilizing).

REGISTER AS A NEW USER ON ng.FieldClimate.com
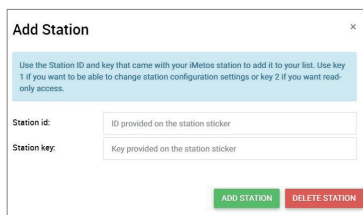

1. Go to *ng.fieldclimate.com/login* and click the button data & e-mail. "+".

2. Insert your personal data & e-mail.

3. Check your e-mail and click on the link to activate the user account you created.

ADD YOUR iMETOS DEVICE TO YOUR ACCOUNT

Now you can login to *ng.FieldClimate.com*. To add your iMETOS device, click on the icon in the top right corner **User Menu > Add/Remove station**. It will ask you for the Station Serial number (SN) and the station key. Now the silver sticker (in the figure) which came with your iMETOS has to be used.
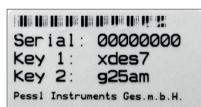
Key 1 gives you full (admin) access and enables you to change all the settings and set up the iMETOS (e.g. data transfer interval, SMS warning, etc.). With Key 2 the user is not allowed to change the station parameters, but can access all the data.

THE iMETOS DASHBOARD, STATION DATA AND SETTINGS

In the new **Dashboard** with a widgeted structure, the user can manage quick access to the services of the highest interest. On the top right corner, **Station List** allows you to choose among all the iMETOS devices and select a single one.
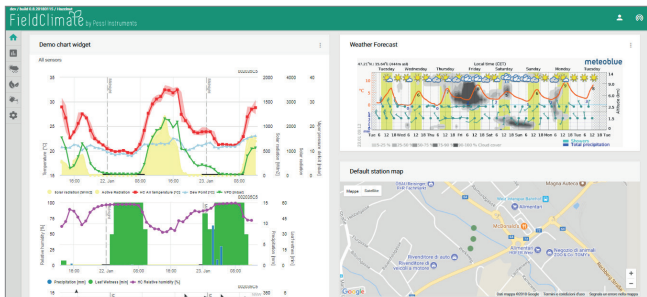
On the left side, **Station data** page displays the data measured by your iMETOS. Data can be viewed in detailed graphs and tables. You can access the structured menu, which allows you to define time series-resolution and export data in a chart/table.

In the **Soil Moisture** page you will find all your sensors connected to your iMETOS displayed in charts and tables. You can set the budget lines in the chart indicating different moisture conditions (see figure below).

With the activation of licenses for highly precise localized **weather forecast** and plant **disease models**, ou can access all data of these additional services. If you have active yearly weather forecast license, you will also be able to use the iMETEO PRO package (*dashboard.imeteopro.com/login*), by logging in with your Fieldclimate username and password. To activate the licences please contact your local distributor or license@metos.at.

On **Station settings** page you can configure your iMETOS.

Station settings > Configuration: Under Time zone and location, you need to provide precise information, as weather forecast and other services depend on it. Under Logging and transfer settings, you can define how your iMETOS

device logs and sends data. Please note that the iMETOS is delivered with the default factory settings (as in the figure on the previous page). More options are available by clicking the "Advanced options" button.

Station settings > Sensors and nodes: You can define a custom name for your station and nodes connected to it. For convenient viewing of data, you can also rename each sensor and customize its color in the graph.

Station settings > Warnings: You can add phone numbers and set thresholds for each sensor, at which the warning SMS should be sent.

For further inquiries visit *docs.metos.at/FieldClimate*.

MAINTAINING THE iMETOS

The weather station should be checked periodically to ensure that sensors are in optimal condition. Regular maintenance is necessary for flawless operation and durability.

At the beginning of the new season, check that the station is working correctly; data must be transmitted at the set interval to FieldClimate. Keep the solar panel and sensors clean and ensure correct rainfall measurements by making sure the rain gauge is levelled (check the bubble indicator), and not obstructed by leaves, insects or debris. Check if leaf wetness sensor has the appropriate filter paper intact and positioned correctly (it should be replaced once, preferably twice a year).

Frost risk: Make sure that the water bottle of wet bulb temperature sensor is at least 80% full.

When the solar panel of the iMETOS is exposed to the sun and gets enough sunlight it should constantly recharge the battery of the system. The lifespan of the battery is expected to be 5 to 6 years with sufficient recharging from the solar panel. Deep discharge shortens its lifetime. The iMETOS will prevent this from happening and protect the battery by limiting the data transfer to the safe level of charge. In doing so, data is not lost and battery recovers faster.

UPDATING YOUR iMETOS

Every time the iMETOS ECO D3 connects to FieldClimate, it checks for the latest firmware version. If it finds a newer version, it automatically downloads it and updates itself. iMETOS ECO D3 can also be updated manually via the USB connection.

For full user manual please visit:
metos.at/home/imetos-eco-series

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