DENODL®
TECH FOR EASIER LIFE

3. DENODL APP USER GUIDE

INTRODUCTION

This document is a general user guide for DENODL App, the digital twin management platform from which all DENODL® systems are controlled and monitored.

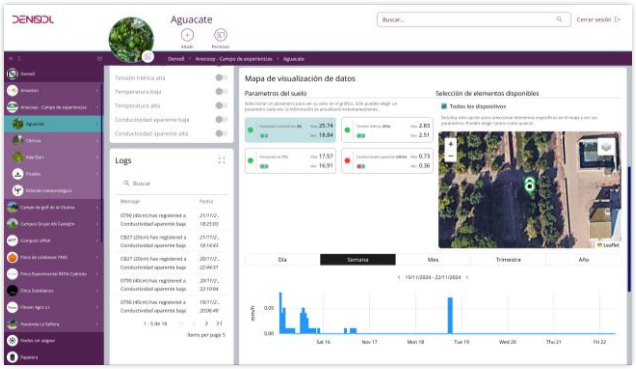
DENODL App can be accessed from any device with internet access, either through the web application on any browser or by installing the mobile app on iOS or Android (available in the App Store and Play Store).

This document covers the following points:

- The visual structure of DENODL App.
- Digital twin structure
- Adding new elements to the digital twins.
- Editing element fields
- Permission management system for elements.
- Transfer and deletion of elements-
- Monitoring of metrics derived from the sensors.

VISUAL STRUCTURE OF THE DENODL APP

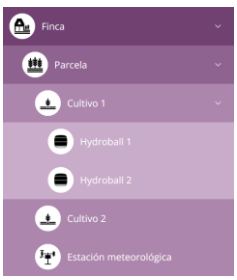
The DENODL App screens have three main parts:



- The header is where you find the image and the name of the element being viewed, various control buttons related to it, and the search bar.
- The side menu is located on the left and contains the structure of the digital twin, made up of its different elements. Clicking on any of them navigates directly to that element.
- The elements display area is the main part of the application, where all the data for each element is shown, as well as the metrics from the sensors.

DIGITAL TWINS STRUCTURE

DENODL® digital twins are based on a structure of “elements” organized hierarchically and nested within each other. This hierarchy is represented in the side menu, from which you can navigate to each element.



ADDING NEW ELEMENT(S)

To add new elements to the digital twin, such as new sensors or irrigation sectors, use the "Add" button in the header.

The elements can be created:

- They can be completely new, created from the user screen. For example, a new farm or operation.
- They can be subordinate to others, created from the screen of each element. For example, a new sensor within an existing irrigation sector, or an irrigation sector within a farm

When clicking the button the following window appears, where you define:

- The type of element you want to create.
- Name of the element.
- Its version (in applicable cases).
- Its ALT ID (in applicable cases).
- Its geometry: a polygon for surface elements (such as a crop, for example), and a point for elements without surface area (such as a sensor, for example)

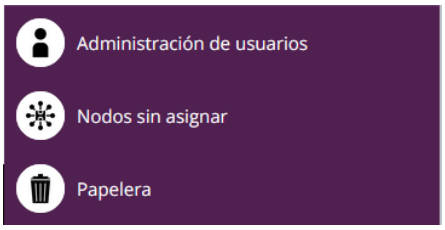
EDITING ELEMENT FIELDS

Each of the fields that define the elements is editable:

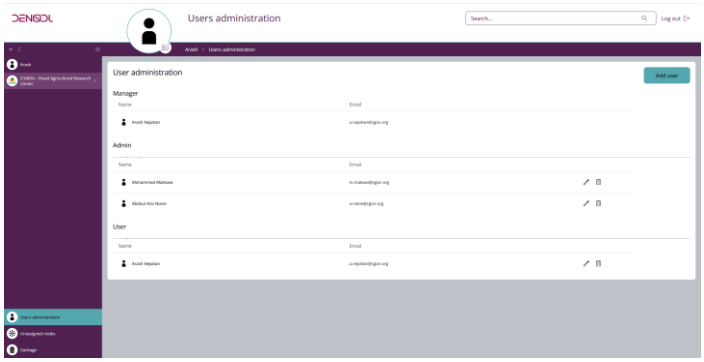
- In the element’s information section: by clicking the edit button, you can modify the Name, the Alt ID (available only for probes), and the notes.
- In the location map: both the position and geometry of the element can be modified.
- In the header: the image of the element can be modified.

USER ADMINISTRATION

It is possible to manage users from accounts that have been registered as "User Administrators." In such cases, a "User Management" button will appear at the bottom of the side menu, which provides access to the user management screen



From this screen, you can view the existing users, edit them, delete them, and register new ones.

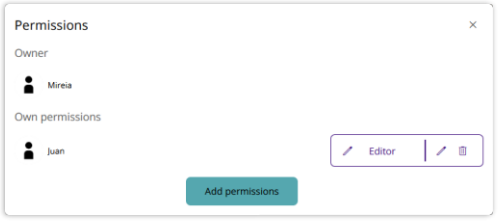


To register a new user, click the “ADD user” button located in the upper right corner.

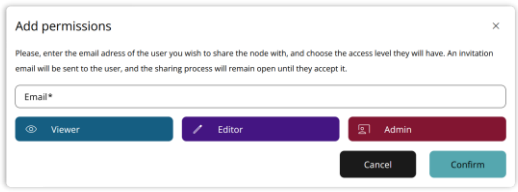
The following window will appear. In it, you can fill in the user’s details and choose whether or not they will be a user administrator (in which case, the user will be able to register other users).

PERMISSIONS MANAGEMENT SYSTEM

DENODL App includes an integrated permissions management system that allows access to elements of the digital twin to be granted to other users. Additionally, it is possible to limit the level of control each user has over a given element. This way, each user can perform different actions depending on the permissions granted for each element. To assign permissions for an element, navigate to the element and click the permissions button in the header. This will open a window displaying current permissions:



From this window, existing permissions can be edited or removed, and permissions for new users can be added using the “Add permissions” button



There are four levels of permissions for a single element:

- **Owner:** The user to whom the element belongs, either because they created it or because another user permanently transferred it to them. This role cannot be changed from the permissions window.
- **Administrator**: can perform the same actions on the element as the "Owner."
- **Editor**: can edit the editable fields of the element but cannot delete it, transfer it, or grant permissions over it.
- **Viewer**: can access the element and view its information, but cannot delete it, transfer it, grant permissions over it, or edit any fields.

The element for which permissions have been granted will appear in the account of the user receiving them, under the “Unassigned Nodes” section at the bottom of the side menu. From there, the user can accept or reject the permissions for that element.

TRANSFER AND DELETION OF ELEMENTS

Any element can be transferred to another user or deleted by users who have sufficient permission levels over it. The transfer and delete buttons for

The buttons for transferring and deleting elements are located in the header.

To transfer the element, you must enter the email address of the other user in the pop-up window. When an element is transferred, it will appear in the other user’s “Unassigned Elements” section* until they accept or reject the transfer. Once the transfer is accepted, that user becomes the new owner of the element.

When an element is deleted, it will be moved to the trash, from where it can be permanently deleted.

*”The unassigned elements” section is located at the bottom of the side menu.

CONFIGURATION OF THE HYDROBALL

Some elements, such as the HYDROBALL®, can be configured directly from DENODL App. To do this, click the “Options” button on the HYDROBALL® element, and the configuration window will open:

The configurable settings are:

- Calibration by soil texture, which allows you to calibrate the HYDROBALL® according to the soil texture where it is buried.
- Manual calibration, which lets you manually calibrate each HYDROBALL® measurement using factors or by entering the desired reference measurement.

MONITORIZATION OF METRICS

DENODL® digital twins are capable of obtaining data both from sensors and from third-party APIs. The purpose of this data is to monitor the current status of crops and sensors, as well as to calculate new values such as soil textures or daily accumulated degrees.

The elements that collect measurements:

- **HYDROBALL®**: The latest measurement taken by the HYDROBALL® sensor is displayed on the cards, and the history of all measurements can be viewed in graphs. Additionally, you can select specific time range to display the measurements and switch the graph to view all types of measurements from the sensor.
- **Weather stations**: The information is updated every hour through a meteorological API. You can view the data from the last hour, the forecast for the upcoming days, and the historical data displayed in graphs.

And the elements that interpret the previous measurements are the “Irrigation Sectors,” which display the following information:

- Compared measurements from the sensors: the “Data Visualization Map” shows the number of sensors that in their last reading detected a high, optimal, or low level for each measurement, along with the maximum and minimum measurement at that moment. Additionally, on the map, sensors can be selected or deselected to show or hide their measurements in the cards and the graph.
- Combined graphs: display all measurements from the different HYDROBALL® sensors.