**MIMIZU.IO**
soil moisture

QUICK GUIDE –
SOIL MOISTURE SENSORS
AND GATEWAY LoRaWAN

1. GENERAL DESCRIPTION OF SENSORS

The capacitive moisture sensors provide you with real-time information about the humidity in your garden, so you can programme your watering more accurately and reduce water consumption to a minimum.

A. GENERAL DESCRIPTION GATEWAY

The gateway allows you to connect LoRaWAN humidity sensors to the internet to transmit soil moisture. This way, you can remotely monitor the overall soil moisture trend in your garden. Only one gateway is required, regardless of the number of sensors available.

Sensor 1

Sensor 2

LED
Setup-Taste

Reset-Taste
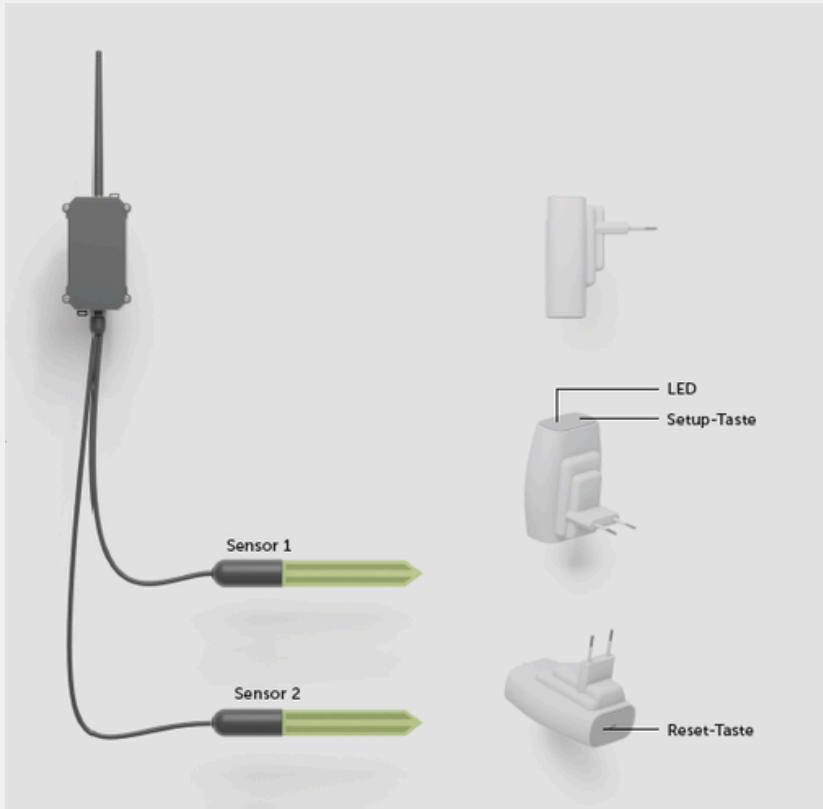
SOIL MOISTURE SENSORS

2. ASSEMBLY AND COMMISSIONING (Fig. 1)
2.01 INSTALLATION

- A hole 25 cm deep and 15 × 15 cm wide is dug in the ground. To insert the sensors, at least one wall should be vertical.
- The scale is used to ensure that the sensors are correctly positioned in the lawn: S1 = TOP; S2 = BOTTOM. The top of the scale (0) indicates the soil level.
- Position sensor 1 at 10 cm and sensor 2 at 20 cm depth in the soil. The sensor is pushed into the soil tip first. Loose soil must be compacted as much as possible.
- The cables should be laid so that the lowest part of the cable is below the level of the sensor.
- Fill the hole in layers and compact.
- The radio module should preferably be set up in a location where it is not directly exposed to the sun. Installation in a round shaft would be optimal.

WARNING
It is recommended that the cable be protected in a slotted corrugated pipe or buried so deep that it will not be damaged by work in the garden.

2.02 DEPTH OF FLOOR
The sensors should be placed deep enough in the soil so that the sensor (S1) is at the height of the centre of the root and the optional sensor (S2) is under the roots. This distance depends on the type of plant to be monitored. Examples:

Type	S1 and S2 (depth in cm)	
Lawn	10	20
Flower bed/ground cover	15	30
Hedge	30	60
Tree	45	90
Raised bed	10-15	20-30
Balcony boxes	10	Drainage
Vertical greening	Level 1	Level 2

2.03 POSITIONING
It is advisable to take the following recommendations into account:
- Position the sensors so that they are only hit by one irrigation circuit.
- Do not place the sensors at the edges of the garden.
- Place the sensors in a location that is representative, but not in the wettest or driest area.

2.04 CONFIGURATION IN THE USER INTERFACE (Fig. 2 and Fig. 3)
a. Choose a name for the sensor. Then note the serial number, which can be found on the label on the front of the sensor (EUI).

b. Define the type of soil and the type of plant you want to monitor with the sensor.

c. Define the limits of the soil type. These depend on the soil type in which the sensors are placed.

To start with, you can use the values recommended by the software. As you monitor how your watering preferences develop, you can adjust these settings.

Definition of the moisture limits of a soil type:
- **Maximum moisture:** This is the maximum moisture level beyond which the soil can no longer absorb any more water, and any additional water is lost by gravity and not retained by the soil. It is recommended that watering does not exceed this point too much, as from this point on, any excess water will be lost.
- **Minimum moisture level:** This is the minimum moisture level in the soil. If the level falls below this value, the plant will experience drought stress. This is when watering should start.
- **Wilting point:** This is a point at which the plant can suffer irreversible damage. It is recommended not to fall below this limit.

d. Depth of Sensors: Depth at which the sensors are installed. Please refer to Section 2.02 of this Quick Guide for more information.

2.05 TRANSMISSION OF MEASURED VALUES
The transmitter measures soil moisture every 10 minutes. If the reading is very close to the last value sent (a difference of 0.2% for values < 35% moisture or 1% for values >= 35% moisture), the value is not sent to save battery power. If the value remains unchanged after 10 moisture measurements, it sends the last measured values. This method can save up to 75% of the battery. To ensure that the transmitter has a correct communication with the server under all circumstances, an automatic reset is performed every 24 hours.

3. TECHNISCHE DATEN

Characteristic	Description
Temperature range	-20°C to 85°C
Supply Voltage	3,6 V
Battery	8500 mAh, Li/SOCl2 (not rechargeable)
Protection class	IP68
Battery life	Up to 2 years
LoRa frequency	LoRaWAN 1.0.3 Class A, 868 MHz (EU)
Dimension	Ø 145,4 mm; H 30,5 mm
Mass	200 g

4. LEGAL INFORMATION
4.01 WARRANTY (RADIO MODULE + BATTERY)
Both the LoRaWAN radio module and the battery have a 2-year warranty. To extend the life of the product, it is recommended to protect the radio module from direct sunlight.

4.02 DISPOSAL INSTRUCTIONS IN ACCORDANCE WITH THE ELECTRONIC EQUIPMENT DIRECTIVE AND THE WEEE DIRECTIVE 2012/19/EU

The radio module, battery and all individual parts must not be disposed of with household or industrial waste. You are obliged to dispose of the device at the end of its service life in accordance with the requirements of the Electrical and Electronic Equipment Act in order to protect the environment and reduce the amount of waste through recycling.
For more information and instructions on disposal, please contact a certified waste management company. The wireless modules contain a lithium battery that must be disposed of separately.

4.03 EU DECLARATION OF CONFORMITY

Distributor: DVS Beregnung GmbH
Ernst-Simon-Str. 8, 72072 Tübingen — Germany
Product type: Soil moisture sensor
Designation: LoRaWAN Soil Moisture Sensor

We hereby declare that the
radio equipment type 'LoRaWAN Soil Moisture Sensor'
is in compliance with Directive 2014/53/EU (Radio Equipment Directive) and
the Directive 2011/65/EU (RoHS Directive).

4.04 NOTE ON TRANSPORTING/DISPOSING OF THE BATTERY

The LoRaWAN radio module contains a lithium metal battery and is classified as UN 3091 (lithium metal batteries packed with equipment, including lithium alloy batteries)

## 5. MAINTENANCE
5.01 WINTER MAINTENANCE

No special precautions are required for the sensors in winter. They can be left outside.
If the temperature of the ground at the level of the sensors falls below 0 degrees Celsius, it is not possible to measure the moisture levels correctly because the water around the sensors will freeze.
When the temperature rises above 0 degrees Celsius again, the situation will normalise itself and the correct measurement values will be displayed again.

5.02 REPLACING THE BATTERY (Fig. 4)

a. Unscrew the 4 screws on the outer casing
b. Remove the casing cover
c. Disconnect the battery connector
d. Unscrew the 4 inner screws on the circuit board
e. Carefully pull the circuit board to the side to access the battery
f. Replace the battery
g. Perform the assembly in reverse order

WARNING

Use only original Mimizu replacement batteries, otherwise irreversible damage to the transmitter electronics may occur.

Fig. 1

Fig. 2

Fig. 3

Fig. 4
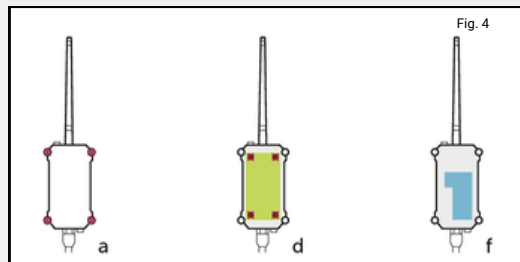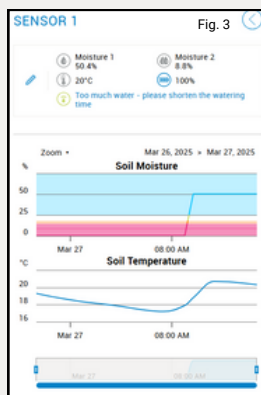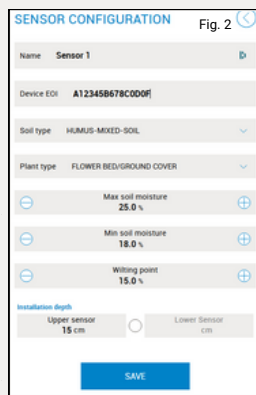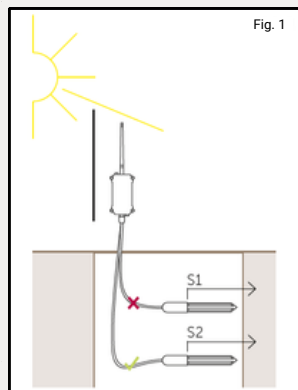
B. INSTALLATION AND COMMISSIONING
B.01 INSTALLING THE GATEWAY

The gateway is designed for indoor use and must therefore be installed in an area protected from the weather (spray water, direct sunlight, etc.).
It also requires access to a home WiFi network to function.

B.02 WIFI CONNECTION TO GATEWAY

- Press the 'Power indicator available' button on your smartphone or computer

    or   or

- Select the 'MiniHub-Pro-XXXXXX' device

- Enter the password for your device, which you can find on the label on the back (WiFi PW).

- To access the configuration menu of your device, enter the following IP address in the address bar of your browser (Firefox or Chrome is recommended): Web address: 192.168.4.1

- Select the SSID name of the WiFi network you want to connect to and enter your password:

- If the connection to the gateway is lost, the WiFi password is set correctly and you can close the browser. Web Service: Disconnected.

C. LED DISPLAY AND KEYS

Colour	Status	Description
Green	Off	Switch off
	On	Gateway is connected to the server.
	Flashing	Gateway connects to the server.
Orange	Off	N/A
	Flashing	Waiting for configuration (first start).
	Fast flashing	Gateway tries to connect via WLAN.

Port	Count	Description
Reset Button	1	Press and hold the button for 5 seconds to reset the gateway to factory settings.
Setup Button	1	Press and hold the button for 5 seconds to delete the Wi-Fi password and switch to configuration mode.

D. CHANGE WIFI PASSWORD

01 Press the **Setup** button for 5 seconds.
02 The gateway will be visible again.
03 The password record will be deleted...
04 ... and you can enter a new password.

E. RESET TO FACTORY SETTINGS

- Press the reset button for 5 seconds.
- Delete cookies from your browser.
- Enter the gateway configuration (see B.02: WiFi connection).
- Configure the gateway using the following steps:

Step 1:	–	activate OTA › OTA 'enable'
Step 2:	–	Mode › LoRa Packet Forwarder
	–	Server Adress: lora-upload01.mimizu.io
	–	Server Uplink Port › 31700
	–	Server Downlink Port › 31700
	–	disable LBT › LBT 'disable'
Step 3:	–	Enter the WiFi password (see point 3: B.02 WiFi connection)

F. TECHNICAL DATA

Characteristic	Description
Temperature range	-10°C to 60°C
Humidity	10 to ~ 85% (non-condensing)
Power supply	240 VAC, 50/60 Hz
WiFi	802.11 b/g/n 2.4 GHz
WiFi Security	WPA/WPA2
LoRa frequency	LoRaWAN 1.0.3, 862 to 870 MHz (EU)
Dimension	90 × 80 × 40 mm (L, W, H)
Mass	200 g

G. LEGAL INFORMATION
G.01 WARRANTY (GATEWAY + BATTERY)

The Gateway LoRaWAN Indoor has a 2-year warranty.

G.02 DISPOSAL INSTRUCTIONS IN ACCORDANCE WITH THE ELECTRONIC EQUIPMENT DIRECTIVE AND THE WEEE DIRECTIVE 2012/19/EU

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