



# FinappSM

## CRNS SM probe Soil Moisture

A CRNS probe for measuring Soil Moisture contactless, in real time, over a radius of 125m (5ha), from 0-50cm depth.

### Overview

The FinappSM is a soil water content sensor measuring with CRNS technology.

This soil moisture sensor was developed for environmental monitoring, hydrogeological risks and smart agriculture. The FinappSM is the ideal equipment for proximity measurements as it performs non-contact measurement and is able to cover medium to large areas, considering interesting depths for these applications, making continuous measurement available.

Cosmic rays come from space and in contact with the Earth's atmosphere generate a cascade of particles, including fast neutrons. The latter have the peculiarity of interacting mainly with water molecules.

When they come into contact with water in the ground or snow, part of the fast neutrons is absorbed and part is reflected back into the air, losing part of the initial energy: thus slow neutrons are born.

A large difference between the number of fast and slow neutrons implies a large amount of water and vice versa. Since fast neutrons have enough energy to penetrate inside the ground for many cm (meters in snow), the given figure is representative in depth.

Since slow neutrons are distributed over large distances, it is possible to monitor the water content over vast areas, about 5 hectares at sea level.

The non-contact sensor technology of Soil Moisture Finapp superbly overcomes the limitations of point sensors and satellite measurements.

### Benefit & features

- Real time measurement
- Contactless
- Non-invasive
- Spatial scale 5-10 ha
- Insensitivity to soil salinity, bulk density, texture and surface roughness
- Depth 0-50cm
- Remote IoT telemetry options
- Passive sensor
- Instant installation;
- No consumable or moving parts
- Very low power consumption
- Overcoming the limits of point sensors and satellite measurements
- Ten-year maintenance cycle

### Application

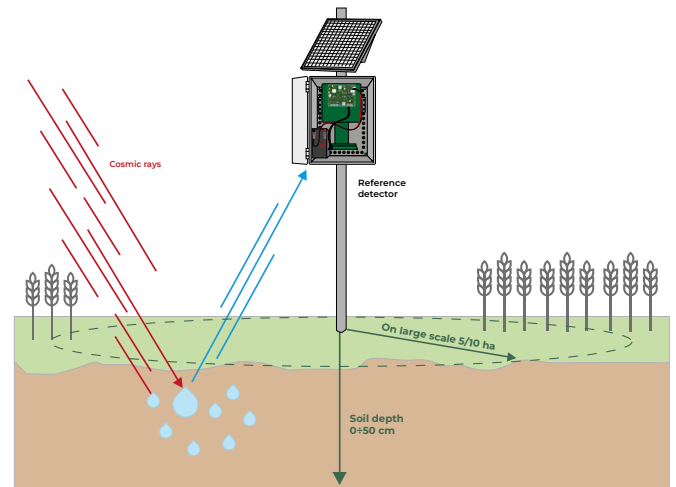
- Smart Irrigation
- Smart Agriculture
- Landslides Monitoring
- Flooding
- Wildfire Risk
- Hydrological Hazards
- Environmental monitoring

## Specification

<b>Main output</b>	Soil Moisture / Soil Water Content
<b>Range</b>	0% - 100%
<b>Measuring units</b>	1. percentual % 2. gravimetrics (Kg/Kg), 3. volumetrics (m <sup>3</sup> /m <sup>3</sup> ; introducing soil texture value)
<b>Footprint</b>	5ha (120-140m radius)
<b>Neutrons counting</b>	900 neutrons/h*
<b>Muons counting for real time on site validation</b>	4'000 muons/h*
<b>Barometrics pressure</b>	900- 1100 mBar; included
<b>Electrical consumption</b>	0,5Wh (40mA @ 12V) agg. peak 1,22A @ 12V
<b>Case</b>	ABS Plastic, IP67, 40x30x17cm
<b>Power supply</b>	Autonomous: Battery & Solar Panel 17,1-30V / max 35W External: 11,5-15V External: 9,6-15V by SDI12 interface USBC: 5V
<b>Temperature of use</b>	-40°C / +65°C
<b>Web interface</b>	2G/3G/4G (SIM included)
<b>Data access</b>	1. Web Interface 2. API 3. MicroSD 4. USB / RS232 5. SDI12
<b>Location identification</b>	GPS (on demand)
<b>Optional interfaces**</b>	RS-232; RS-485; SDI-12
<b>Optional parameters</b>	Rain Gauge; External Temperature & Humidity;

\* at sea level under standard conditions soil moisture ~5% at 5Gev cut-off Rigidity

\*\* to choose between two available slots



## Optional accessories

Model	Features
FR010	Pole
FR011	Tripod
FR003	40W solar Panel
FR012	18 Ah battery
FM007	Sdi-12 Output

## Ordering Information

Model	Features
-	Brackets for anchoring to 40-50mm pole (default 48mm)
-	Cable with connector for connection to external power supply
FR002	20W Solar Panel
FR015	7 Ah Battery included
-	Instruction Manual