

DODO SOIL

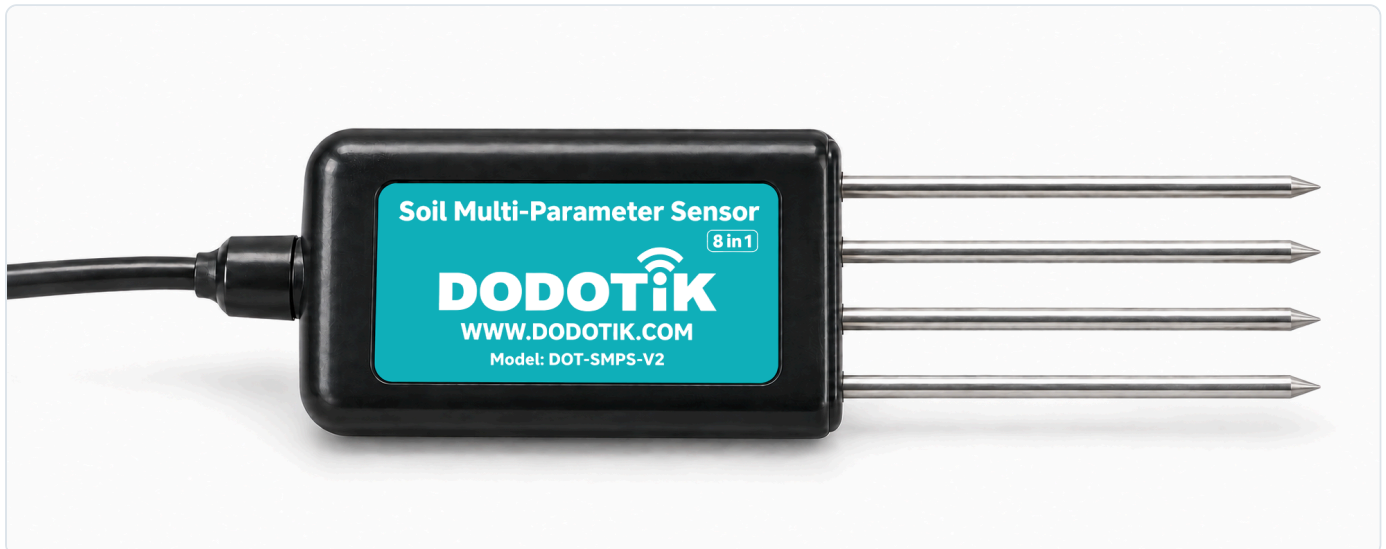
8-in-1 Soil Multi-Parameter Sensor

MOISTURE · TEMPERATURE · EC · PH · N · P · K · SALINITY

MODEL **DOT-SMPS-V2**

ORDER CODE **DS-8**

Works with **DODO LOGGER** · **DODOTiK Platform** · **DODOLINK mobile app** · any Modbus-RTU master



8 parameters, one probe	RS-485 Modbus-RTU	IP68, direct burial
DC 5–24 V	4 × $\varnothing$ 3 mm 316L needles	5 m cable, GX12 fitted

Datasheet Rev 2.1 · October 2026

1. Overview

DODO SOIL (DOT-SMPS-V2) is a single buried probe that reports **eight soil parameters** over one RS-485 Modbus-RTU connection: **volumetric moisture, temperature, electrical conductivity, pH, nitrogen, phosphorus, potassium, and salinity**.

One cable, one Modbus address, eight values — so a complete agronomic picture of a plot costs one sensor slot instead of eight. The head carries **four $\varnothing$ 3 mm needles on an 11 mm pitch**, machined from **316L stainless steel**, and the body is potted to **IP68**, so the unit can be buried and left in the ground season after season.

DODO SOIL is the companion soil sensor for the **DODO LOGGER**. It appears in the logger's no-code sensor library, so it is selected from the web interface and starts reporting with no firmware reflash and no wiring changes beyond plugging the connector in.

Headline capabilities

- **Eight parameters, one probe** — moisture, temperature, EC, pH, N, P, K, salinity
- **One Modbus transaction** — all eight values read from eight consecutive registers
- **Fast** — stable 3 s after power-on, under 1 s response
- **Buried-rated** — IP68 potting, 316L stainless needles, direct soil contact
- **Wide supply** — DC 5–24 V, so it runs from the logger's sensor socket directly
- **Standard protocol** — RS-485 Modbus-RTU, 9600 8N1; no proprietary driver needed
- **Field-addressable** — slave address changed over the bus, including by broadcast

2. Product identification

Item	Value
Product name	DODO SOIL — 8-in-1 Soil Multi-Parameter Sensor
Model number	DOT-SMPS-V2
Order code	DS-8 (see section 12 for range and cable variants)
Brand	DODOTiK · www.dodotik.com
Sensor type	Buried multi-parameter soil probe, 4-needle head
Interface	RS-485, Modbus-RTU
Cable termination	GX12 4-pin female connector, fitted as standard

Marking on the unit. The teal label on the body face carries, in order: *Soil Multi-Parameter Sensor*, the **8 in 1** mark, the **DODOTiK** wordmark, *www.dodotik.com*, and *Model: DOT-SMPS-V2*. Quote **DOT-SMPS-V2** for technical support and **DS-8** (with its suffix) when ordering — the model number identifies the hardware platform, the order code identifies the configured variant.

Rev 2.0 correction. Rev 1.0 of this datasheet described a **five**-needle head, taken from a photograph of a different sensor body. The shipping DODO SOIL unit has **four** needles on an 11 mm pitch, as shown in the product photograph and the dimension drawing in section 6. No electrical, protocol or measurement specification changed; only the probe count, pitch and array span.

3. Measured parameters

#	Parameter	Unit	Range	Accuracy	Resolution
1	Soil moisture (volumetric)	% m ³ /m ³	0–100 %	±2 % m ³ /m ³ (over 0–50 %)	0.1 %
2	Soil temperature	°C	–30 ... +70 °C	±0.2 °C	0.1 °C
3	Electrical conductivity (EC)	µS/cm	0–20 000 µS/cm (default)	±2 %	1 µS/cm
4	Salinity	µS/cm	0–20 000 µS/cm (default)	±2 %	1 µS/cm
5	Nitrogen (N)	mg/kg	0–1999 mg/kg	±3 %	1 mg/kg
6	Phosphorus (P)	mg/kg	0–1999 mg/kg	±3 %	1 mg/kg
7	Potassium (K)	mg/kg	0–1999 mg/kg	±3 %	1 mg/kg
8	pH	pH	3–10 pH	±1 pH	0.01 pH

N, P and K are equivalently specified in **mg/L**; the device returns one integer per channel and the unit follows the convention used in your soil reporting.

EC and salinity range options. 0–20 000 µS/cm is the default. **0–10 000 µS/cm** and **0–2000 µS/cm** variants are available and must be specified at order — the range is set in the factory, not in the field. A narrower range does not improve the stated ±2 % accuracy, but it does suit low-conductivity soils better.

Read the pH figure carefully. Resolution is 0.01 pH but accuracy is **±1 pH**. The sensor is well suited to tracking *changes and trends* in soil pH across a plot or a season. It is not a substitute for a calibrated laboratory pH determination where an absolute value matters.

Temperature range vs. operating range. The temperature element is specified from **–30 °C to +70 °C**, but the sensor electronics are rated for a **0–50 °C working environment** (section 5.3). Buried installations normally sit well inside that window; surface and above-ground use in freezing or very hot conditions does not.

4. How it works

Moisture — frequency-domain reflectometry (FDR). The probe measures the dielectric constant of the surrounding soil using high-frequency electronics, which is then converted to volumetric water content. Because water dominates the dielectric response of soil, this reads the real moisture content across a wide range of soil types with little sensitivity to soil texture — the reason FDR is the most widely used soil moisture method in the field.

Temperature — Class A PT1000. Sensing uses a grade-A ST-1-PT1000 precision platinum resistance element from Heraeus (Germany). The front end adds a dedicated temperature compensation and data-processing stage that corrects the measurement error the platinum element introduces through its own characteristics, which is what delivers the $\pm 0.2\text{ }^{\circ}\text{C}$ figure over a wide environmental span.

EC and salinity — direct electrode measurement. The stainless-steel needles measure the conductivity of soluble salt ions in the soil solution once the probe is embedded, and the raw conductivity is converted to a calibrated digital value.

pH. The pH response is converted on-board to a digital value on the same register map, so no separate pH transmitter or buffer electronics are needed.

Nitrogen, phosphorus, potassium. The N, P and K channels report macronutrient content so soil fertility can be assessed systematically across a site — comparing plots, tracking depletion through a season, and targeting fertiliser where it is actually needed.

Application note. NPK, EC and pH readings from any in-situ probe are influenced by soil moisture, temperature and texture. For **relative** work — mapping variation across a field, watching a trend over time, triggering fertigation — the sensor is used directly. Where **absolute** agronomic numbers are required, take a soil sample alongside the probe at commissioning and use the laboratory result to establish a site offset.

5. Technical specifications

5.1 Measurement

Parameter	Value
Parameters measured	8 — moisture, temperature, EC, pH, N, P, K, salinity
Stabilisation time	3 seconds after power-on
Response time	< 1 second
Measurement method	FDR (moisture) · PT1000 (temperature) · electrode (EC, salinity)
Custom ranges	Temperature and moisture ranges customisable at order

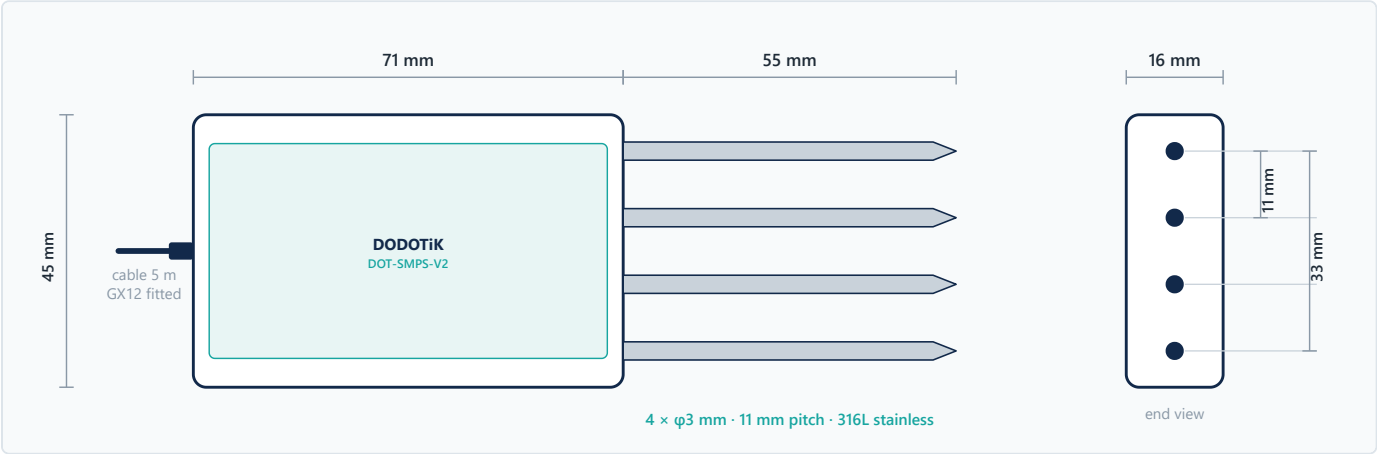
5.2 Electrical

Parameter	Value
Supply voltage	DC 5–24 V
Output	RS-485, Modbus-RTU
Baud rate	9600
Frame format	8 data bits, 1 stop bit, no parity (8N1)
Default slave address	0x01
Addressing	Field-changeable over the bus; broadcast address 0xFE supported
Cable	4-core, 5 m (standard), GX12 4-pin female connector fitted; other lengths on request

5.3 Mechanical and environmental

Parameter	Value
Probes	4 × $\varnothing$ 3 mm stainless steel needles, 55 mm long
Probe pitch	11 mm centre to centre · 33 mm across the outer pair
Probe material	316L stainless steel
Body dimensions (L × W × H)	71 × 45 × 16 mm
Housing material	ABS engineering plastic, epoxy-resin potted
Ingress protection	IP68 — suitable for direct burial
Installation	Surface or buried
Working environment	0 ... +50 °C
Corrosion resistance	Sealed against soil moisture and salts; no corrosion in direct burial

6. Dimensions

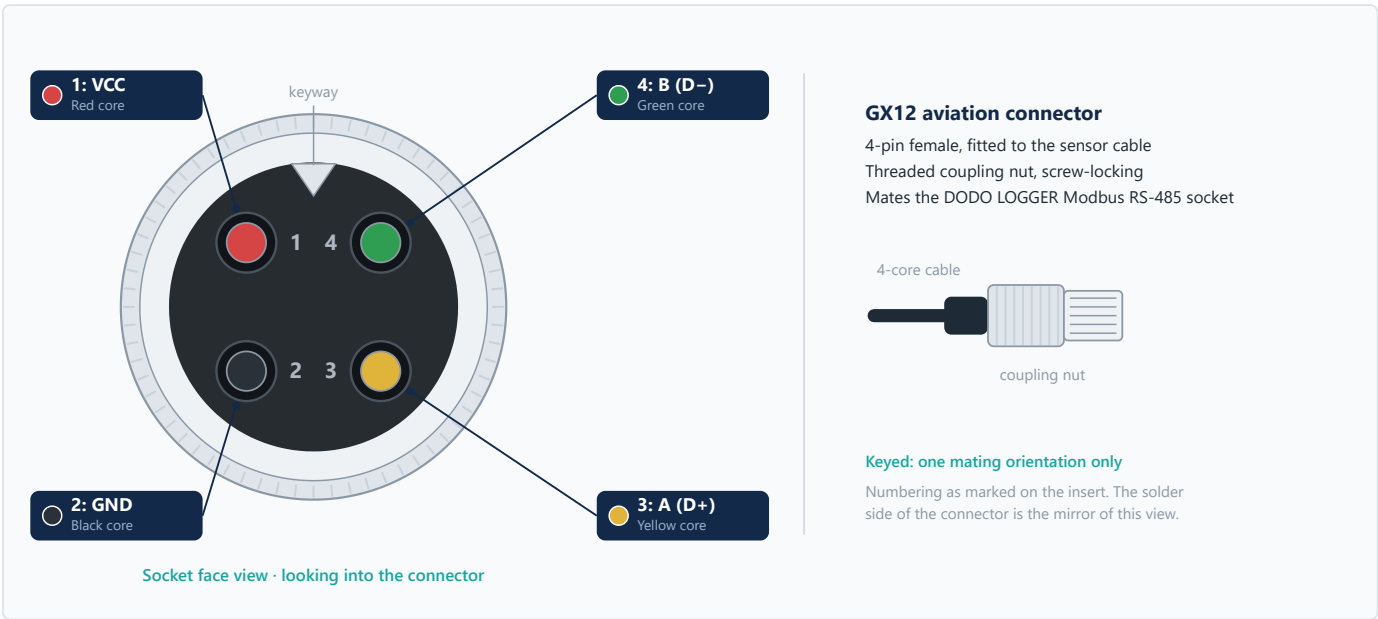


Dimension	Value
Body length	71 mm
Body width	45 mm
Body thickness	16 mm
Probe length	55 mm
Probe diameter	$\varnothing$ 3 mm
Probe count	4
Probe pitch	11 mm
Probe array span	33 mm
Cable length	5 m (standard)

7. Wiring and installation

7.1 Connector

The 5 m cable is terminated in a **GX12 4-pin female aviation connector**, fitted as standard. It screws directly onto the **DODO LOGGER** Modbus RS-485 sensor socket — no stripping, no terminal block, no tools.



Pin	Signal	Wire colour	Function
1	VCC	Red	Power + (DC 5–24 V)
2	GND	Black	Ground
3	A (D+)	Yellow	RS-485 A
4	B (D–)	Green	RS-485 B

Connector	Value
Type	GX12 aviation connector, 4-pin
Gender on sensor cable	Female (socket contacts)
Coupling	Threaded nut, screw-locking
Keying	Moulded keyway — one mating orientation only
Mates with	DODO LOGGER Modbus RS-485 sensor socket (GX12, 4-pin)

The logger passes its own input voltage through to VCC, so a 12 V or 24 V logger supply is within the sensor's 5–24 V window with no separate PSU.

Pin numbering. The numbers above are read from the **socket face** — looking into the connector, as drawn. The solder side is the mirror of that view. Check the numbers marked on the insert before re-terminating a cut cable, and see section 7.3 on why cutting the cable at the gland costs the IP68 rating.

Third-party loggers and bare-lead installations. Where the sensor is wired to equipment other than a DODO LOGGER, cut the connector off at the plug end — not at the sensor's gland — and land the four cores by colour using the table above.

The connector is not the buried part. The **IP68** rating covers the sensor body, its potting and its moulded cable gland — the parts that go into the ground. The GX12 mating pair is a screw-locking dry-side connector: keep it above grade, inside the logger enclosure, or in a sealed junction box. A connector sitting in standing water or in a flooded trench will eventually track between contacts, and the symptom is an intermittent Modbus timeout rather than an obvious failure.

7.2 Installation

Buried (continuous monitoring). Dig to the target root depth, insert the needles fully into undisturbed soil on the side wall of the hole, then backfill and compact so no air gaps remain around them. Air pockets read as dry soil and are the single most common cause of low moisture readings.

Surface (spot measurement). Push the needles fully into the soil until the body face sits flush. Allow the 3 s stabilisation before reading.

Bus wiring. Standard RS-485 rules apply: daisy-chain the A/B pair, keep stubs short, and give each sensor on the same bus a unique slave address (section 8.3).

7.3 Handling and maintenance

- Push the probe in by the **body**, never by levering on the needles; they are 3 mm and will bend against stones. In compacted or stony ground, pilot the holes first.
- Do not strike the head with a hammer or mallet.
- Clean the needles with water and a soft cloth after lifting. Do not abrade them — the 316L surface is the measuring electrode for EC and salinity.
- The cable gland is part of the IP68 seal. Do not cut, re-terminate or extend the cable at the gland; extend it at a sealed junction further down the run instead.
- Tighten the GX12 coupling nut by hand until it seats. It is a fine thread on a 12 mm shell; a tool will strip it.
- Keep the connector out of standing water (section 7.1), and cap or tape the shell whenever the sensor is stored or transported unmated.
- There are no user-serviceable parts and no field calibration adjustment inside the potted body.

8. Modbus RTU interface

8.1 Link settings

Setting	Value
Protocol	Modbus-RTU
Slave address	0x01 (default)
Baud rate	9600
Data bits	8
Stop bits	1
Parity	None

8.2 Register map

All eight values are **holding registers starting at 0x0000**, read with function code **0x03** in a single transaction.

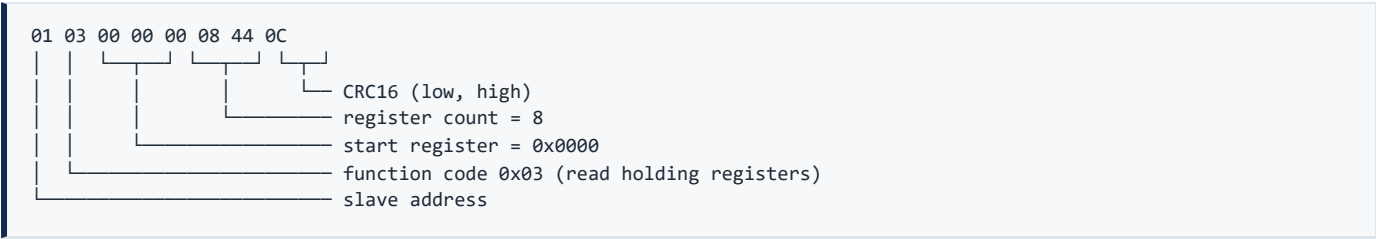
Register	Value	Scaling	Unit	Notes
0x0000	Soil temperature	÷ 10	°C	Signed (two's complement)
0x0001	Soil moisture	÷ 10	%	
0x0002	Electrical conductivity	× 1	µS/cm	
0x0003	Salinity	× 1	µS/cm	
0x0004	Nitrogen (N)	× 1	mg/kg	
0x0005	Phosphorus (P)	× 1	mg/kg	
0x0006	Potassium (K)	× 1	mg/kg	

Register	Value	Scaling	Unit	Notes
0x0007	pH	÷ 100	pH	

Register order. Salinity is at **0x0003** and pH at **0x0007** — the order is temperature, moisture, EC, **salinity**, N, P, K, **pH**. Some documentation for this sensor class lists pH fourth in prose. The map above is the one the device actually returns; it has been verified byte-for-byte against live units on the DODOTiK bench.

8.3 Reading all eight values

Request — read 8 registers from 0x0000 on slave 0x01:



Response — 16 data bytes:

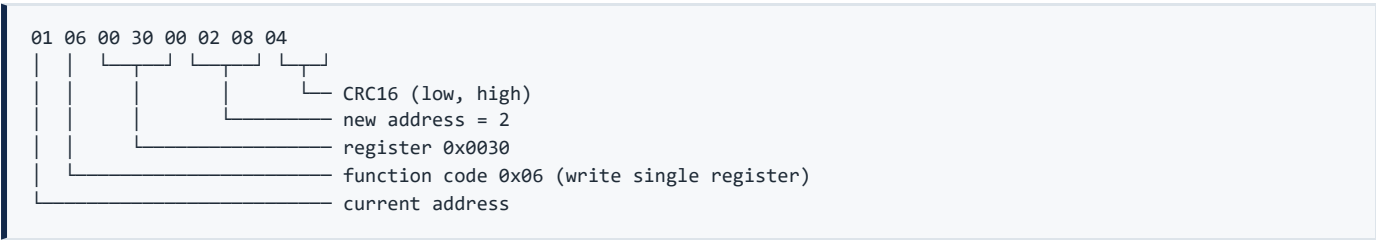
01 03 10 FF DD 01 64 04 D2 05 4C 00 87 00 8A 00 8E 02 AE DF 12

Bytes	Raw	Decodes to
FF DD	0xFFDD	Soil temperature −3.5 °C
01 64	0x0164	Soil moisture 35.6 %
04 D2	0x04D2	EC 1234 μS/cm
05 4C	0x054C	Salinity 1356 μS/cm
00 87	0x0087	Nitrogen 135 mg/kg
00 8A	0x008A	Phosphorus 138 mg/kg
00 8E	0x008E	Potassium 142 mg/kg
02 AE	0x02AE	pH 6.86

Note the temperature decode: 0xFFDD is **−35** as a signed 16-bit value, which divided by 10 gives −3.5 °C. Treating it as unsigned yields 6553.3 °C.

8.4 Changing the slave address

Write the new address to register **0x0030** with function code **0x06**. Changing a sensor from address 1 to address 2:



The sensor echoes the frame back on success.

Lost the address? Use broadcast address **0xFE** in place of the slave address. The reply still carries the sensor's *real* address, so 0xFE doubles as an address query. Only one sensor may be on the bus when using 0xFE.

9. DODO LOGGER, DODOTiK Platform and the DODOLINK app

DODO SOIL is a complete monitoring point on its own: plug it into a **DODO LOGGER** and all eight parameters are recorded locally, sent to the cloud, and visible on a phone — with no firmware work and no integration project.



DODO LOGGER — the companion data logger. The sensor's fitted GX12 connector screws straight onto its Modbus RS-485 socket; up to four sensors per logger, uplink over Wi-Fi, LoRaWAN or 4G LTE.

9.1 Reading the sensor with DODO LOGGER

DODO SOIL is in the logger's **no-code sensor library**. An installer selects it in the logger's web interface, assigns it to one of the four universal sensor slots, and all eight parameters begin logging to SD and publishing to the cloud — no firmware reflash and no backend change, because the logger self-describes its schema to the platform.

Item	Behaviour
Slot type	Modbus RS-485 (GX12 4-pin socket)
Connection	Plug-in — the sensor's fitted GX12 connector mates directly; no wiring
Power	Supplied by the logger; pass-through of the logger's 12–24 V input
Sensors per logger	Up to 4 slots; multiple DODO SOIL units on one bus need unique addresses
Logging	Every reading to microSD, always on, offline included
Cloud	MQTT/TLS to the DODOTiK Platform, or POST to your own HTTPS endpoint

9.2 DODOTiK Platform and the DODOLINK mobile app

Readings published by the logger arrive at the **DODOTiK Platform** (`platform.dodotik.com`) over MQTT/TLS, and at the **DODOLINK** mobile app for iOS and Android. Because the logger publishes its own schema, a new sensor appears in both with no backend deployment and no app update.

Where	What you get
DODO LOGGER — on the device	Browser dashboard served by the logger itself, on the local network or its own access point. Live readings, slot configuration, and CSV download straight off the microSD card. No app, no internet.
DODOTiK Platform — web	Live dashboards, full history, alert thresholds and device management across every logger on the account.

Where	What you get
DODOLINK — iOS and Android	The same live readings and alerts on a phone, for an agronomist who is out in the field rather than at a desk.
Your own system — instead of, or alongside	The logger can POST self-describing JSON to your HTTPS endpoint, or the sensor can be read directly by any Modbus-RTU master — PLC, DCS, SCADA or a paperless recorder.

Nothing here is a lock-in. DODO SOIL is a standard Modbus-RTU device on a standard RS-485 bus. The DODO LOGGER, the platform and the app are the fastest route from probe to dashboard, not the only one — the register map in section 8 is everything a third-party integrator needs.

10. Quality and warranty

- **IP68** sealed — rated for direct burial
- **316L stainless steel** needles — no corrosion in soil contact
- **Warranty: 1 year**

11. Applications

- **Water-saving irrigation** — moisture-triggered and fertigation control
- **Greenhouses** — flowers, vegetables, substrate and bed monitoring
- **Precision agriculture** — NPK mapping, variable-rate fertiliser planning
- **Grassland and pasture management** — fertility and salinity tracking
- **Environmental and meteorological monitoring** — soil stations, research networks
- **Plant cultivation and scientific trials** — replicated plots, rapid soil testing

12. Ordering information

Order code	Description
DS-8	DODO SOIL 8-in-1 sensor (DOT-SMPS-V2), RS-485 Modbus-RTU, EC/salinity 0–20 000 µS/cm, 5 m cable with GX12 connector
DS-8-EC10K	As DS-8, EC/salinity range 0–10 000 µS/cm
DS-8-EC2K	As DS-8, EC/salinity range 0–2000 µS/cm
DS-8-L2	As DS-8, 2 m cable
DS-8-L10	As DS-8, 10 m cable

EC/salinity range and cable length are **factory-set**. Specify both at order; neither can be changed in the field. Custom cable lengths and custom temperature or moisture ranges are available on request.

What's in the box:

- DODO SOIL DOT-SMPS-V2 sensor with 5 m 4-core cable, GX12 4-pin female connector fitted



DS-8 as shipped: four-needle head, the standard 5 m cable, and the GX12 4-pin female connector already fitted.

Not included: power supply, RS-485 interface or logger.

13. Support & contact

Company	DODOTiK — industrial IoT hardware, designed and built in Türkiye
Address	Aykosan Sanayi Sitesi, Çarşı Blok No: 416, Başakşehir, İstanbul, Türkiye
Phone	+90 538 282 6257
WhatsApp	+90 538 282 6257
Email	info@dodotik.com
Website	www.dodotik.com
Cloud platform	https://platform.dodotik.com
Technical support	info@dodotik.com — quote the model number from the unit label
Sales & distribution	info@dodotik.com — export pricing, volume tiers and partner terms on request

Quote the model number **DOT-SMPS-V2** from the label on the sensor body when you contact support, and the order code with its suffix (**DS-8**, **DS-8-EC10K**, ...) when you reorder — the EC range and cable length are factory-set and cannot be read off the unit.

Wiring diagrams, DODO LOGGER integration notes, and the no-code sensor-library workflow are available in the product documentation. The companion **DODO LOGGER** data logger has its own datasheet.

14. Revision history

Rev	Date	Change
1.0	September 2026	First release
2.0	October 2026	Probe count corrected to 4 × $\varnothing$3 mm on an 11 mm pitch (33 mm span) and the dimension drawing redrawn to match; model number DOT-SMPS-V2 added throughout with a new product-identification section; production product photograph; handling and maintenance guidance added. Standard cable length changed from 2 m to 5 m and the GX12 4-pin female connector documented as fitted standard, with a socket-face pinout figure and an as-shipped photograph; order code DS-8-L5 withdrawn and DS-8-L2 added. No measurement, electrical or protocol specification changed.

Rev	Date	Change
2.1	October 2026	Section 9 expanded to cover the DODOTiK Platform and the DODOLINK mobile app alongside the DODO LOGGER, with a photograph of the logger and a cover line naming what the sensor plugs into. No measurement, electrical, mechanical or protocol specification changed.