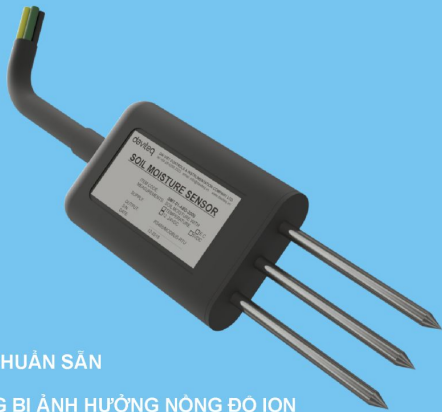


# SOIL MOISTURE SENSOR



SKU: SMT

## SOIL MOISTURE SENSOR SMT CẢM BIẾN ĐỘ ẨM ĐẤT



HIỆU CHUẨN SẴN

KHÔNG BỊ ẢNH HƯỞNG NỒNG ĐỘ ION  
TRONG PHÂN

CÓ THỂ CHÔN SÂU DƯỚI ĐẤT



SMT-H1.PNG

SMT is a soil moisture, soil temperature and soil EC. Utilize advanced technology, Frequency Domain Reflectometry to deliver high accuracy and stable measurement of Soil Moisture, not affected by Fertilizer contents and Temperature like the simple Capacitance Moisture Sensor on the market. Sensor output is RS485 / modbusRTU easily connected to any control and monitoring system. Typical applications are: intelligent irrigation systems, greenhouses, soil condition check ...



### PRE-CALIBRATED

Sensors are pre-calibrated at factory to deliver high accuracy and quick installation



### HIGH ACCURACY

Utilize advanced technology, Frequency Domain Reflectometry to deliver high accuracy and stable measurement of Soil Moisture, not affected by Fertilizer contents and Temperature like the simple Capacitance Moisture Sensor on the market



### RS485/MODBUSRTU

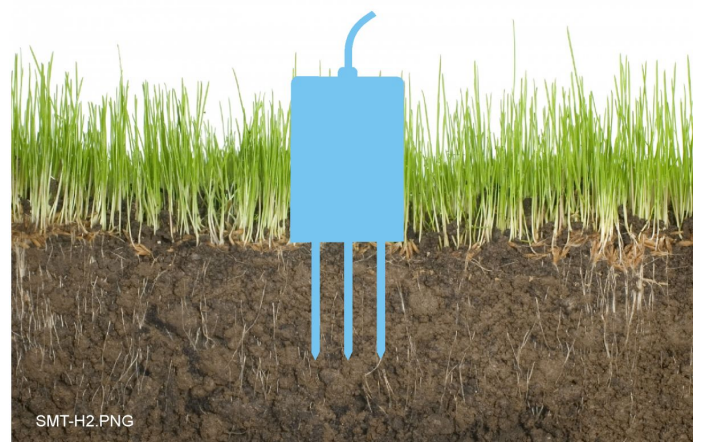
Easy to connect to any system



### IP68

Ingress Protection IP68 allow sensor can be buried in the soil in long time

## INSTALLATION FOR SURFACE MEASUREMENT ĐO LỚP ĐẤT MẶT



SMT-H2.PNG

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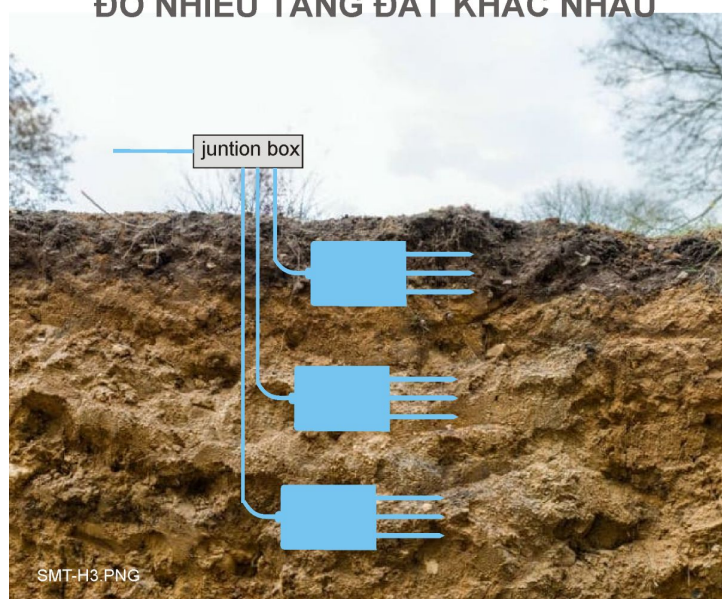
JUN-2020 | Doc No: SMT-DS-EN-10

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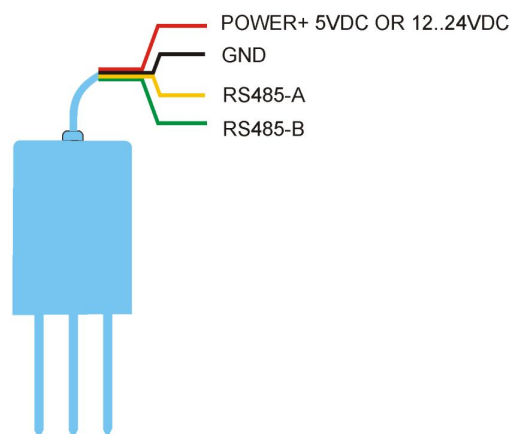
## SPECIFICATION

Sensor	Using advanced technology, Domain Domain Reflectometry, has been calibrated in the factory
Soil moisture measurement range	0 .. 100%
Soil moisture precision	+/- 3.0%
Moisture resolution	0.01%
Temperature measurement range	-30 .. + 70 oC
Temperature accuracy	+/- 0.3 oC
Temperature resolution	0.1 oC
Range of conductivity	0 .. 20 mS / cm
Conductivity accuracy	+/- 2.0% of range
Conductivity resolution	0.1 mS / cm
Response time	< 1s
Measuring volume	diameter 70mm and height 70mm
Output	RS485 / modbusRTU
Power supply	5VDC or 12..24VDC
Current consumption	Maximum 35mA
Ambient humidity	100% RH
Working temperature	-40oC .. + 80oC
Protection level	IP68 (buried underground)
Sensor materials	316L SS & Engineering plastic
Electrical connectors	1.5 m signal conductor
Standard	CE-Marking
Dimensions	71x45x16mm with 55 mm electrode

### INSTALLATION FOR MULTI-LAYER MEASUREMENT ĐO NHIỀU TẦNG ĐẤT KHÁC NHAU



### WIRING FOR SOIL MOISTURE SENSOR ĐẦU DÂY



SMT-H4.PNG

## MODBUS COMMANDS FOR SMT-01

**Protocol:** MODBUS-RTU, 9600bps, Data bits:8, Stop bit:1, Check bit: no

**Slave address:** the factory default is 01H (set according to the need, 00H to FFH)

### Using 03H Function to read Temperature & Humidity values

Master command (slave address: 0x01) 01 03 00 00 00 02 C40B

Slave Response 01 03 04 01 23 01 64 0A7E

**Temperature:** (0123)H < 0x8000, (0123)H = (291)D,  $291/10 = 29.1(^{\circ}\text{C})$

If the data  $\geq$  0x8000, for example: 0xFF05, according to the following method to calculate:  $0xFF05 - 0xFFFF - 0x01 = (65285)D - (65535)D - (1)D = (-251)D$ ,  $-251/10 = -25.1(^{\circ}\text{C})$

**Humidity:** (0164)H = (356)D,  $356/10 = 35.6(\%)$

**Using 06H Function to change slave address** (ensure that no other devices on the bus at this time)

Master command (Changed the 01H to 02H) 01 06 00 00 00 02 080B

Slave Response 01 06 02 00 02 3949

If you forget the original address, you should use the broadcast address (FEH) (ensure that no other devices on the bus at this time).

#### Note:

1. All underlined is fixed bit;
2. The last two bytes is CRC check command.

SMT-H5.PNG

## MODBUS COMMANDS FOR SMT-02

**Protocol:** MODBUS-RTU, 9600bps, Data bits:8, Stop bit:1, Check bit: no

**Slave address:** the factory default is FEH (set according to the need, 01H to FFH)

### Using 03H Function to read Temperature, Humidity & EC values (Setting terminal (White) connected to GND)

Master command (slave address: 0xFE) FE 03 00 00 00 03 11C4

Slave Response FE 03 06 0E 93 08 90 02 4E 62AB

**Moisture:** (0E93)H = (3731)D,  $3731/100 = 37.31\%$

**Temperature:** (0890)H < 0x8000, (0890)H = (2192)D,  $2192/100 = 21.92(^{\circ}\text{C})$

If the data  $\geq$  0x8000, for example: 0xFF05, according to the following method to calculate:  $0xFF05 - 0xFFFF - 0x01 = (65285)D - (65535)D - (1)D = (-251)D$ ,  $-251/100 = -2.51(^{\circ}\text{C})$

**EC:** (024E)H = (590)D =  $590/1000 = 0.59\text{mS/cm}$

**Using 06H Function to change slave address** (sensor must be reset to take the change affect)

Master command (Changed to 01H) FF 06 02 00 00 01 5C6C

Slave Response FF 06 02 00 00 01 5C6C

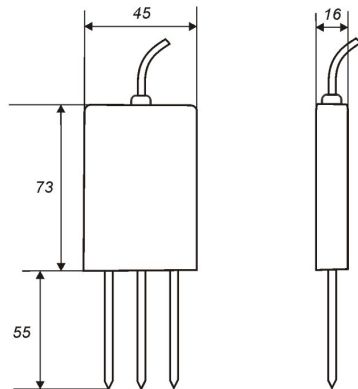
If you forget the address, you can use the set mode to change address. On set mode (Setting terminal (White) connected to POWER+), the sensor address is FFH. (ensure that no other devices on the bus at this time, after that sensor must be reset to take change affect).

#### Note:

1. All underlined is fixed bit;
2. The last two bytes is CRC check command.

SMT-H6.PNG

## DIMENSION DRAWINGS BẢN VẼ KÍCH THƯỚC



SMT-H7.PNG

## ORDERING INFORMATION

ITEM CODES	DESCRIPTIONS
<b>** SOIL MOISTURE &amp; TEMPERATURE SENSORS **</b>	
SMT-01-ABD-2000	Soil moisture and temperature sensor, 12..24VDC power supply, RS485/ModbusRTU output, IP67 / IP68, 2m sensor cable
SMT-01-AAD-2000	Soil moisture and temperature sensor, 5VDC power supply, RS485/ModbusRTU output, IP67 / IP68, 2m sensor cable
<b>** SOIL MOISTURE &amp; SOIL EC SENSORS **</b>	
SMT-02-BB-2000	Soil moisture and soil EC sensor, 12..24VDC power supply, RS485/ModbusRTU output, IP67 / IP68, 2m sensor cable
SMT-02-AB-2000	Soil moisture and soil EC sensor, 5VDC power supply, RS485/ModbusRTU output, IP67 / IP68, 2m sensor cable