Soil NPK-S (RS485 type) sensor manual

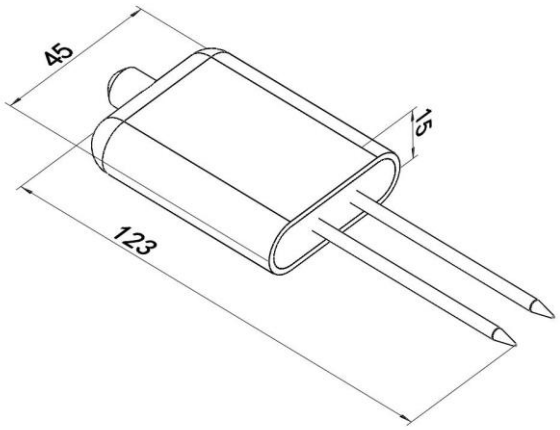
Soil parameters measuring

Nitrogen Phosphorus Potassium	• Measuring range: 1-1999 mg/kg(mg/L) • Resolution：1 mg/kg(mg/L) • Response time: ＜1S
Reminder The measurement of NPK adopts the general rapid detection method, so there are certain errors, Use with caution for planting reference. However, the sensor supports the function of writing NPK data. You can use standard instruments to measure NPK then write in to provide data for monitoring system.	

Specification

Power supply	DC4.5-30V
Max Power consumption	0.5W@24V DC
Protection class	IP68, long-term immersion in water use
Cable length	2M
Operating environment	-40℃-80℃
Overall dimensions	45 * 15 * 123mm

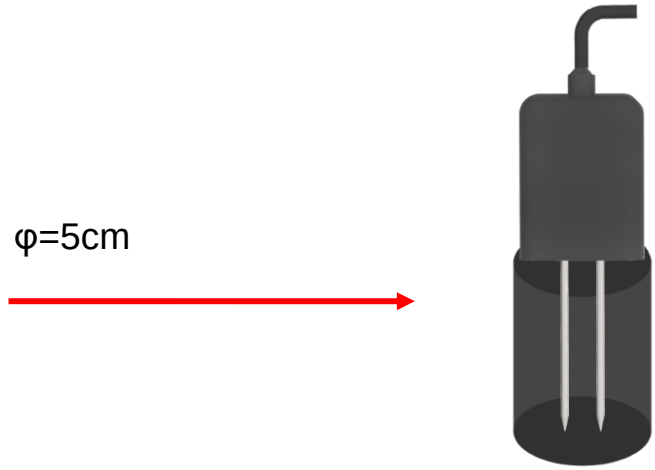
Size



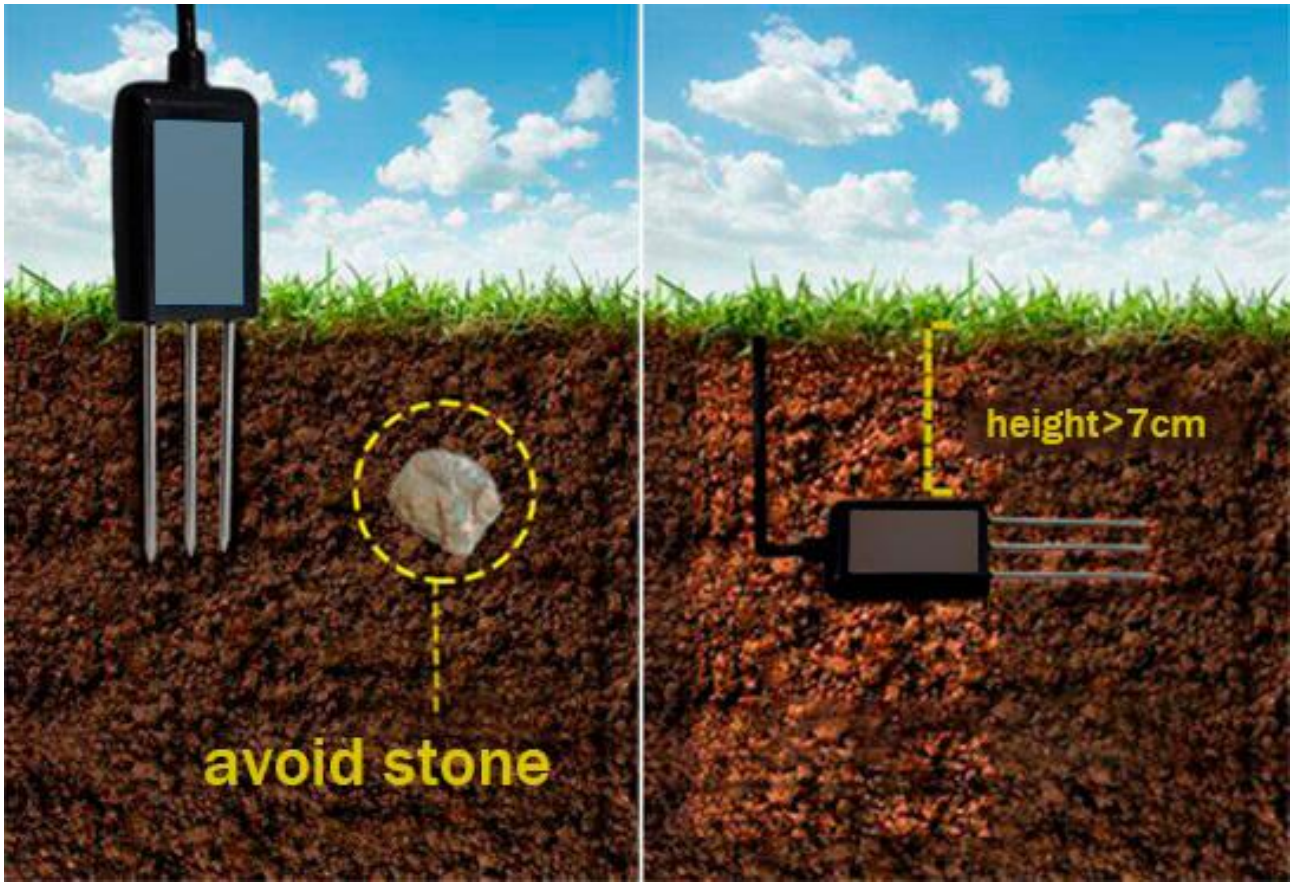
Wiring

Cable color	description
Brown	Power + (DC5-30V)
black	Power -
yellow	RS485 A+
blue	RS485 B-

Measuring range



Installation



RS485 communication

Default parameters: 4800,n,8,1

Default device address is 1

Modbus RTU protocol

Read status registers, read function code: 0x30					
Register address (Hex)	PLC Address (decimal)	meaning	Number of bytes	content	remark
001E	40031	Nitrogen content	2	real value	read/write
001F	40032	Phosphorus content	2	real value	read/write
0020	40033	Potassium content	2	real value	read/write
03E8	41001	Nitrogen content coefficient High byte	2	real value (float)	read / write
03E9	41002	Nitrogen content coefficient Low byte	2		
03EA	41003	Nitrogen content calibration value	2		read / write
03F2	41011	Phosphorus content coefficient High byte	2	real value (float)	read / write
03F3	41012	Phosphorus content coefficient Low byte	2		
03F4	41013	Phosphorus content calibration value			read / write
03FC	41021	Potassium content coefficient High byte	2	real value (float)	read / write
03FD	41022	Potassium content coefficient Low byte	2		
03FE	41023	Potassium content calibration value	2		read / write
Parameters registers, read function code: 0x30 (0x40), write function code: 0x10					
07D0	42001	Slave ID	2		1-254
07D1	42002	baud rate	2		0: 2400 1: 4800 2: 9600 Default 4800

coefficient and calibration like the formula

Y=AX+B

Y is reading value

X is original value

A is coefficient

B is calibration

E.g., read Nitrogen, Phosphorus, Potassium together:
Master sends

Address	Function Code	Start Address (Hi)	Start Address (Lo)	Number of Points (Hi)	Number of Points (Lo)	Error Check (Lo)	Error Check (Hi)
0x01	0x03	0x00	0x1E	0x00	0x03	0x65	0xCD

Sensor responds:

Address	Function Code	Number of byte	Nitrogen value	Phosphorus value	Potassium value	Error Check (Lo)	Error Check (Hi)
0x01	0x03	0x06	0x00 0x20	0x00 0x25	0x00 0x30	0xB1	0x6D

Potassium: 0x20 H= 32 mg/kg
Phosphorus: 0x25 H= 37 mg/kg
Potassium: 0x30 H= 48 mg/kg