Datasheet of
Intellia INT G01- Soil Moisture Sensor

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Introduction and principle

Intellia INT G01-Soil Moisture Sensor is a high accuracy, high sensitivity of soil moisture measuring instrument. It can be used permanently embedded in the soil, widely applied to the soil moisture monitoring, water saving irrigation, greenhouse control, smart agriculture, road monitoring, hydrology and meteorology, and other fields.

The product is on the principle of electromagnetic pulse (FDR:Frequency Domain Reflectometry) by inserting stainless steel probe into the soil surface or soil profile to quickly measure the soil moisture, which has the characteristics of high measurement precision, fast and accurate measurement, continuous fixed point measurement, no radioactivity and no soil disturbance.

Technical Specification

Monitoring principle：FDR

Structure：4-pin type

Measuring range：0~100%（（m3/m3））

Response time：＜1s

Accuracy：±2%（0～50%（m3/m3）,25℃）

Output Signal：

4-20mA	RS485modbus Communication protocol

Power Supply：DC12~24V

Working current：27mA typical,50mA maximum

Power Consumption：DC12V <=0.6W

Resolution：0.01℃，0.1%

Measuring area: 90% of the effect is in a cylinder 2.5 cm in diameter and 6 cm in length around the central probe

Sealing material: ABS (abrasive processing)

Size：133*40mm（needle：60mm）

Standard cable length: 2.5 M

Stabilization time: about 10 seconds after power on

The farthest lead: current 200 meters, RS485 100 meters

Ingress Protection：IP65

Wiring Method

Out cable line, 485 output sensor comes standard with a 2.5 m four-core cable. Users can customize the cable of appropriate length according to the needs. The cable specification is 0.2mm2 four-core shielded cable. The wiring color is defined as：
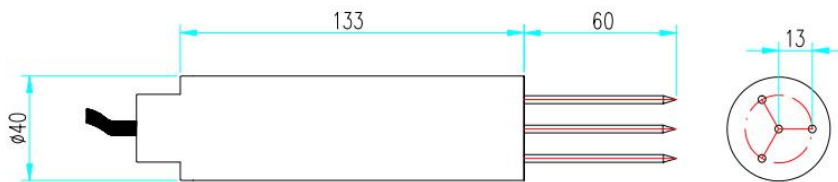
Output signal	
Red	VDD
Black	GND
Green	A
Blue	B

The current output sensor comes standard with a 2.5 m three-core cable. Users can customize the cable of the appropriate length according to the requirements. The cable size is 0.2mm2 three-core shielded cable. The wiring color is defined as：

Current Output	
Red	VDD
Black	GND
Yellow	Signal output

Dimensions:

Unit:mm

Installation Notes：

1.The steel needle of the sensor is completely inserted into the soil to be tested, and the sensor cannot be shaken when inserted to prevent the sensor probe from being affected；

2.The sensor can be used for multi-layer observation ,the soil moisture monitoring station is need to be established；

3.When you feel that there is a hard object in the soil, please select the measured point again to prevent damage to the sensor probe.

4.Do not insert the probe into the solid soil to avoid damaging the probe.When measuring, the measured soil density should be as even as possible；

5.When removing the sensor from the soil, do not pull the cable directly.After use, clean and dry the probe to keep it clean；

6. An unpredictable measurement error (>10% vol) may result if the measurement point is not selected properly.Rough installation, will lead to sensor stainless steel needle breakage, affect the accuracy of measurement.The following aspects must be noted in the installation:

（1）Unusual holes or pores. If there are holes or air holes in the sensing range of the sensor, measurement errors will occur, especially when the sensor is inserted and removed, it is necessary to avoid repeating the operation at the same position；

（2）Installation Angle.In different applications, sensors can be installed in different ways, usually in two types, horizontal and vertical.The distribution of moisture in soil medium is influenced by many factors, such as space and time.Sensors must be installed in a way that minimizes these effects.When mounted vertically, the sensor measures the average moisture content in an induction zone of approximately 6 cm；

（3）Sampling points. The choice of sampling points must be carefully considered. In addition to the two points mentioned above, there are many other factors that affect the measurement accuracy of the sensor. It can be listed as: changes in soil density and composition, crushed stone, plant roots, cockroach loosening effect,

soil drainage state, soil surface moisture Volatilization and so on.

7．Due to the different water sources, the water quality will change accordingly. The measured voltage output value of the sensor placed in the simple water sample will fluctuate within a range. This measurement value can only be used as a reference value and cannot be used to judge the measurement accuracy of the sensor itself.

Warranty and after-sales:

Warranty: The product has a warranty period of 12 months from the delivery date (except for problems caused by failure to comply with the corresponding technical requirements or other human actions). After-sales commitment: Users can consult technical questions by Email and get a clear solution.

Communication protocol

1. Communication specifications

9600, 8, 1, N, N

2. Uniform packet format

（XX： From equipment station number0X01-0XFF;CRClo CRChi：CRC check code low byte first, high byte last）

3. Write the station number command

➢Host sends command format：

Device address	Function code	Start register address	Number of registers	Data length	Data	CRC check
00	10	0001	0001	02	00xx	CRClo CRChi （ XX= 0X01- 0XFF）

➢Slave response command format：

Device address	Function code	Start register address	Number of registers	CRC check
00	10	0001	0001	CRCloCRChi

➢Eg：(Address changed to 33)
Command 00 10 00 01 00 01 02 00 33 EA 04
Reply   00 10 00 01 00 01 51 D8

4. Read station number command (fixed command)

➤ Host sends command format：

Device address	Function code	Start register address	Number of registers	CRC check
00	03	0001	0001	CRCloCRChi

➤ Slave response command format：

Device address	Function code	Data length	Data	CRC check
00	03	0001	0001	CRCloCRChi （XX=01-ff）

➤ Eg：（Address is FF）

Command 00 03 00 01 00 01 D4 1B

Reply   00 03 02 00 FF C5 C4

5. Read data command

➤ Host sends command format：

Device address	Function code	Start register address	Number of registers	CRC check
xx	03	0001	0001	CRCloCRChi

➤ Slave response command format：

Device address	Function code	Data length	Data	CRC check
XX	03	02	00yy	CRCloCRChi

➤ Eg：

➤ Command：FF 03 00 00 00 01 91 D4

➤ Reply ：FF 03 02 00 11 51 9C

   Soil Moisture = 00 11   = 17/10 = 1.7%