



PM-WCS-3-I2C I2C Capacitive soil moisture, temperature, EC sensor

FEATURES

- Arduino and Raspberry Pi client software libraries.
- Dust and waterproof
- Calibration functions for EC and Dielectric permittivity
- Low cost and easy to use.
- Fairly accurate readings





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ELECTRICAL PROPERTIES

	Min/Sleep	Typical	Max
Supply voltage (VCC), V	2.5	3.3	3.5
Working current (VCC=3.6V) , mA	-	12	14
Operating Temperature Range, Celsius	-20	25	70

In case your application needs to power up sensor before measurement, time to wait before taking measurement is 100ms (1.7s for old version before v1.1).

MEASUREMENT PROPERTIES

	Resolution /avg Tolerance	Range
Dielectric permittivity (ϵ) (Temperature corrected)	0.1 ϵ /5%	1 (air) to 80 (water)
Volumetric water content - VWC calculation from Dielectric permittivity ϵ . $VWC = 0.002974 * \text{pow}(\epsilon, 2) + 0.07424 * \epsilon - 1.295$;		
Electrical Conductivity (mS/m)	0.01 mS/m /20%	0...300 mS/m
Temperature (°C)	0.1°C /1%	-20 to 70°C
Degree of water saturation in the soil	0.1% /5%	0 - 100%

PHYSICAL PROPERTIES

Sensor dimensions 114 x 24 x11
Cable length 1.5m



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RASPBERRY PI

wiring to Raspberry Pi connector:

Raspberry Pi pin #1 - sensor **red** (3.3v)
Raspberry Pi pin #3 - sensor **green** (SDA)
Raspberry Pi pin #5 - sensor **white** (SCL)
Raspberry Pi pin #9 - sensor **black** (GND)
Raspberry Pi pin #9 - sensor shield(GND)

Enable i2c interface in Raspberry Pi

see [this manual](#)

Get software

This sample software demonstrates how to make command line interface for the sensor. Sensor default I2C address is 0x63.

To get software execute following on Raspberry Pi:

```
git clone https://github.com/tinovi/i2cRaspberry
```

```
cd i2cRaspberry
```

```
chmod 777 *.sh to add permissions for execute
```

```
./mk.sh to make demo executable
```

```
./read.sh to read data from sensor
```

```
./svcs 0x63 addr 0x65 ( optional) to change default address 0x63 to new I2C address: 0x65
```

CALIBRATION RASPBERRY

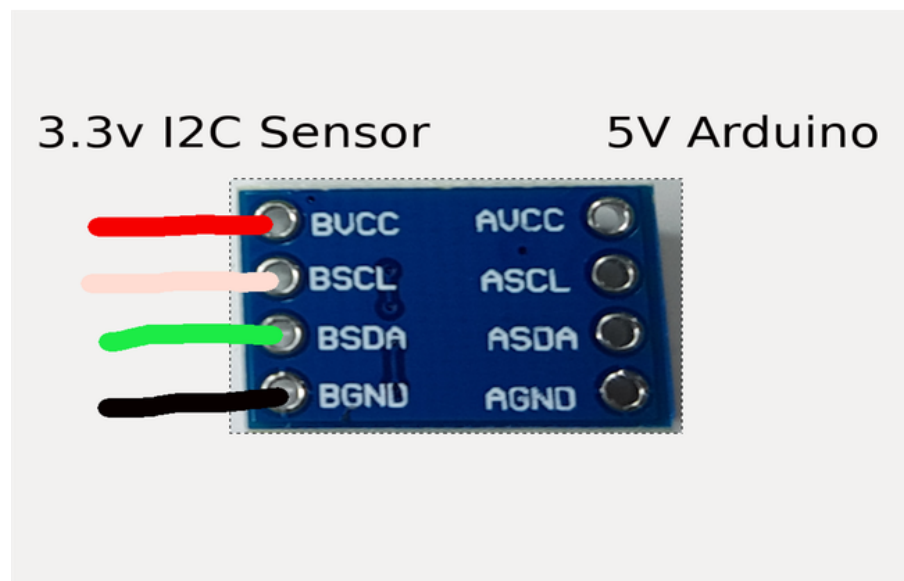
- 1) Download and install raspberry pi software described in previous section
- 2) **cd i2cRaspberry** - cd to software directory
- 3) **./read.sh** - read data
- 4) **./cal_air.sh** - hold sensor in the air, and execute this command to calibrate sensor in the air
- 5) **./cal_water.sh** - submerge sensor in the water or soil with the water, and execute this command to calibrate water.
- 6) **./cal_ec.sh <ec uS/m>** - put sensor to the soil or calibration fluid with known uS/m and write correct uS/m
- 7) **./read.sh** - read data



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ARDUINO

WARNING!!! for SDA and SCL lines use sensor VCC (VCC max 3.6v) voltage levels only. Please use voltage level converter module, connect sensor to B side, 5v arduino to A side (see picture)



wiring to Arduino:

Arduiono pin #3V3 - sensor **red** (3.3v)
Arduiono pin #A4 - sensor **green** (SDA)
Arduiono pin #A5 - sensor **white** (SCL)
Arduiono pin #GND - sensor **black** (GND)
Arduiono pin #GND - sensor shield (GND)

Get software

This sample software demonstrates how to read data from sensor.
Sensor default I2C address is 0x63.
Download Arduino library from [there](#).