Instruction for connection of the CO₂ sensor to the Greenspec AFP, AFP63 or AFP light.

Manufaturor: Decagon, USA

Name of unit: MAS-1 4-20 mA soil moisture sensor.

Application: measurement of soil moisture in peat, substrate, rockwool. Knowing and regulating the correct soil moisture is an important factor for optimal plant growth. The measurement is not easy, the principle of the MAS is to measure the dielectric constant between the 2 poles. This value is much higher for water as for air or dry soil, giving a sensitive signal. The head of the sensor contains a microprocessor, to convert the measurement to a mA output signal.

Connecting to:

Electrical connection to AFP, see below.

For programming details see next page

Hardware Installation

It can be put in horizontal or vertical position without problems. The sensor is made of polymer: **do not use any force** but make a suitable hole to put it in the soil and fill that up. To remove, do **not** pull on the wire, but dig it out with care!

Maintenance:

None, but if you use it in very different media, adjusting the calibration factor will improve the results.

See the factors on the rear. Ask help at info@greenspec.nl to correct.

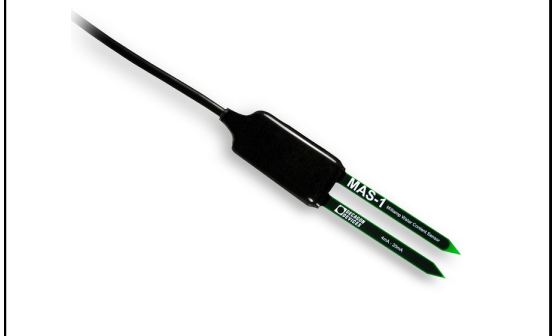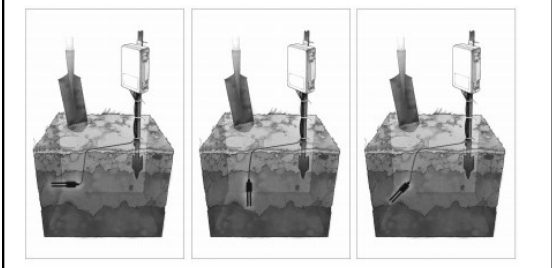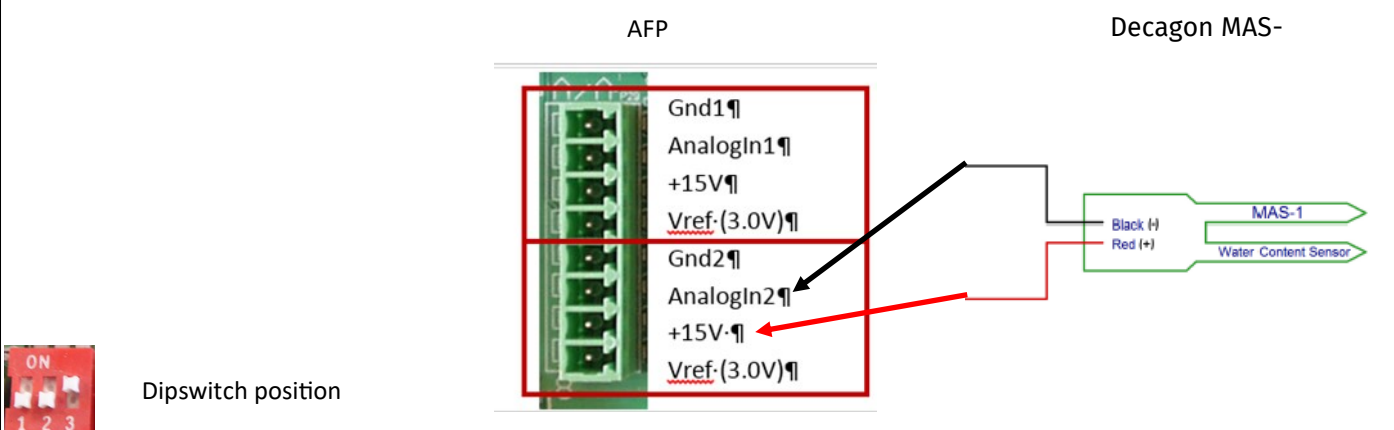Watch out: this needs second order function in software!

Foto 1: front view

Foto 2: sensor position options

Connection of the MAS-1:

Connect the red cable to the 15V supply and the black cable to the signal input.

Set the dip switch to the 4-20 mA range. Do not connect the unshielded wire.

AFP   Decagon MAS-

Dipswitch position

Program setting details:

Go to AFP config, set the correct hardware inpunt number, select analog, usage at default. Give a name.

Then click on the left top symbol and you reach the calibration secti-   on:

1: Go to the bottom section, set 4-20 equivalent to 0 to 100.

Click on calculate and you see the theoretical range.

2: Click on apply and you will see this also in the calibrate with 2 point section.

3: Set the name on soil moisture and click on Apply

4 After you close you will also read this range in the input settings setting (see left).

Then save the settings by clicking on the green confirm sign. After that close the window by clicking on

Nr Prog Inp	5
AFP	1:AFP456 Climate:
Hard Type	0:Ana
Nr In Hard	5
Usage Type	0:Default
Usage para	0:Default
Name	soil moist
Min	-25.0
Max	162.5
CODAGE	4095
In Calb	0.0000
Calc. Shift	0.0000
Meas. Meth	2:Average
Meas. Peric	00:01:00
....	
NrEvent Mi	0
NrEvent Ma	0

Technical specifications as according to the manufacturor data sheet

Soil moisture measure sensor	MAS-1 from Decagon.com
General data	Size lxbxh: 8.9 cm x 1.8 cm x 0.7 cm Weight 50 g
Mechanical construction	Electronic platine on a Cable: 5 m (standard), 3 wire (22 AWG tinned Red and Black wires, 24 AWG tinned bare wire)
Input parameters	4-20 mA corresponds to 0-100% soil humidity
Output parameters	Response time 4 s ±6% VWC with preset calibration for supported growing media up to 65% VWC Calibration factor for mineral soil: $VWC = 0.00328 \, xmA2 - 0.0244 \times mA - 0.00565$ Calibration factor for rock wool: $VWC = 0.00446 \times mA2 - 0.0359 \times mA + 0.0741$ Calibration factor for peat:
Electrical connection data	Supply 15V Consumption
Ambient conditions	Temperature–40 to 60 °C Application of Council Directive: 2004/208/EC and 2011/65/EU Standards to which conformity EN61326-1:2013 is declared: EN62321:2009