

Manual

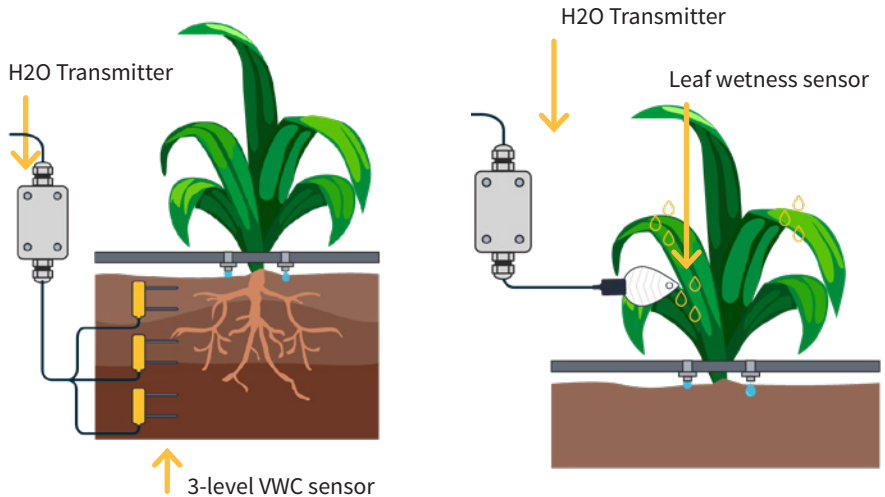
H2O Transmitter

CODE 2 SENSORS 06750001 | 3 SENSORS 06750002

Transmitter for reading soil water content sensors (VWC: Volumetric Water Content) or wet leaves (LWS: Leaf Wetness Sensor).

It offers the following benefits:

- Reading of up to three sensors of this type:
 - Decagon 10HS (VWC)
 - Decagon EC5 (VWC)
 - Meter Group TEROS-10 (VWC)
- Reading such a sensor:
 - Meter Group PHYTOS-31
- The transmitter adapts the signals coming from the sensors and generates an output in standard 4-20mA current values.



From the transmitter itself, the number and type of sensors and the soil variety can be configured by using a Module Reader.

The transmitter supplies each sensor with the necessary supply voltage depending on the type of sensor configured internally.

All sensors connected to the same transmitter must always be of the same type.

Technical characteristics

Power supply

Power supply	12 Vdc to 20 Vdc	
Energy consumption	3 sensors: less than 0'9 W	
Surge fuse	Input	Thermal (PTC) 0'4 A at 25 °C self-resetting
Reverse Current Protection:	Yes	

Outputs

Output sign	4 – 20 mA	1, 2 o 3 outputs
Sensor power supply	3 Vdc to 12 Vdc	1, 2 o 3 outputs

Inputs

Number	1, 2 or 3
Type	Analogue (12 bits)

Response time

Minimum transmitter power supply time before receiving reading:

1 sensor: 250 ms	2 sensors: 400 ms	3 sensors: 500 ms
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Maximum distance

Transmitter power (12 Vdc, with 2x1.5mm² cable):

1 sensor: 225 metres	2 sensors: 150 metres	3 sensors: 100 metres
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From sensor to transmitter: 30 metres

4-20 mA current output: 1000 metres

Environment

Temperature	-10 °C to +60 °C
Degree of protection	IP65
Moisture	< 95 %
Height	2000 m
Pollution	Grade II

Transmitter box dimensions

Height	99 mm
Width	65 mm
Depth	39 mm
Weight (approx.)	0,4 Kg



This symbol indicates that electrical and electronic equipment should not be disposed of along with household waste at the end of its useful life. The product must be taken to the corresponding collection point for recycling and proper treatment of electrical and electronic equipment in accordance with national legislation.

Installation

- The transmitter should be positioned horizontally, so that moisture does not accumulate at the ends.
- The transmitter should be placed in a location that is not directly exposed to the sun.
- It is absolutely necessary to keep the box water-tight.
- Feed the hose cable through the stuffing box and tighten it as well as you can.
- Do not place the transmitter cables next to power lines.



Connecting

The transmitter is provided with two 1.5m cable hoses that allow you to make different connections more easily without the need to access the interior.



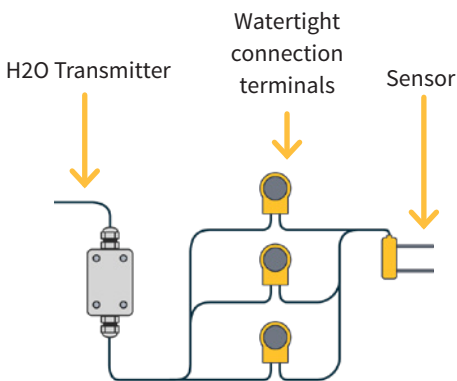
Sensor connection hose, 6-wire (2 sensors) or 9-wire (3 sensors):

<i>Sensor connection</i>						
Wire colour	ID	Function	1 sensor	2 sensors	3 sensors	
White	A1	Analogue sensor input 1	x	x	x	
Brown	0V	Common sensor power supply	x	x	x	
Green	VA1	Sensor 1 power supply	x	x	x	
Yellow	A2	Analogue sensor input 2		x	x	
Grey	0V	Common sensor power supply		x	x	
Pink	VA2	Sensor 2 power supply		x	x	
Blue	A3	Analogue sensor input 3			x	
Red	0V	Common sensor power supply			x	
Black	VA3	Sensor 3 power supply			x	

6-wire power supply and current output connection hose:

<i>Power supply and current output</i>						
Wire colour	ID	Function	1 sensor	2 sensors	3 sensors	
White	0V	- (negative) of power supply	x	x	x	
Brown	12V	+ (positive) of power supply	x	x	x	
Green	S1	Output 1: 4 - 20 mA	x	x	x	
Yellow	S2	Output 2: 4 - 20 mA		x	x	
Grey	S3	Output 3: 4 - 20 mA			x	

Consult the manual of each sensor for detailed information about its installation and connection.



To guarantee the water-tightness of the connections of the wires in the module hose, using watertight terminals is recommended. The connection through these terminals must be made without stripping the cable wires.

The 3M Scotchlok series (www.3m.com); ES Caps from TYCO Electronics (www.tycoelectronics.com); or Cellpack resin splice and derivation kits (www.cellpackiberica.com) can be used as connection elements.






NOTE

It is recommended that loose cables also be connected with an excess of 3M of connector to avoid possible short circuits or from them getting wet.

Configuration



The transmitters are generally configured at the factory. However, it is possible to make consultations or configurations through the use of a “Module Reader,” consisting of a screen and four keys that are connected to the transmitter through the only interior visible connector.

Press the  key to enter the main menu. With the  and  keys, you can change the options within the menu. With the  key, you can enter the selected menu option. With the  key, you can return to the menu option of the previous hierarchy.

Within the main menu, you can see the following options:

- Consultation
- Configuration

CONSULTATION MENU

Transmitter’s general consultation menu, where you can view:

- Controller firmware version No.
- Transmitter type (depending on the sensor used).
- Consultation of the value, in mV, that the sensors deliver, (from input 1 (A1) to input 3 (A3)).
- Consultation of the 4-20 mA current value being delivered (output of 1 to 3).

CONFIGURATION MENU

Configuration menu of the different transmitters according to the type of sensor.

For each sensor, you can configure the number of sensors that are read and the type of soil.

- No. Inputs: 1, 2, or 3
- Soil: Mineral or Potting Soil

<i>Soil selection table according to sensor</i>		
Sensor	Mineral soil	Potting soil
10HS Decagon	x	x
PHYTOS-31 Meter Group	x	
EC-5 Decagon	x	x
TEROS-10 Meter Group	x	x

H2O ANALOGUE SENSOR FORMAT

The possibility of selecting one soil type or another is determined by the manufacturer of each of the sensors. Being able to make this selection allows the H2O transmitter to carry out one process or another with the sensor readings, as recommended by the manufacturer itself:

- 10HS Decagon** The sensor gives you a voltage $x[mV]$ that the H2O transmitter converts into VWC [%] (Volumetric Water Content) using the following equation:
 $VWC [\%] = fx5+ex4+dx3+cx2+bx+a$, and depending on the type of soil:

Mineral soil:

- $a = -1.92$
- $b = +6.69E-3$
- $c = -7.37E-6$
- $d = +2.97E-9$
- $e = 0$
- $f = 0$

– Potting soil:

- $a = -0.03$
- $b = -1.23E-4$
- $c = +7.05E-7$
- $d = 0$
- $e = 0$
- $f = 0$

<i>Sensor format 10HS</i>	
Parameter	Default value
No. of integers	2
No. of decimals	1
Sign	no
Units	%
Calibration point 1	
Real value	800 mV
Logical value	00.0 %
Calibration point 2	
Real value	4000 mV
Logical value	50.0 %

The value in [%] is converted, by the transmitter itself, to standard 4-20 mA current (800-4000 mV in Agrónic format), so that, in the controller in question, it is necessary to select the Ideal data format according to the type of sensor and type of soil selected. It is the responsibility of the user to change the data that characterizes said format.

- PHYTOS-31 Meter Group** This sensor is for the measurement of moisture on the leaf's surface (LWS: Leaf Wetness Sensor) and delivers a value between 10% and 50% of its supply voltage. The H2O transmitter delivers a supply voltage of 5V, so the value that this sensor will deliver will range between 500 mV (0%) and 2500 mV (100%). This value, in %, is converted by the transmitter to 4-20 mA current (800mV - 4000mV in Agrónic format).

<i>Sensor format PHYTOS-31</i>	
Parameter	Default value
No. of integers	3
No. of decimals	0
Sign	no
Units	%
Calibration point 1	
Real value	800 mV
Logical value	000 %
Calibration point 2	
Real value	4000 mV
Logical value	100 %

- **EC-5 Decagon** Decagon The sensor delivers a voltage x [mV] that the H2O transmitter transforms into VWC [%] (Volumetric Water Content or Soil Water Content) using the following expression: $VWC [\%] = bx+a$, and according to soil type:

- Mineral soil:
 - $a = -0.48$
 - $b = +11.605E-4$
- Potting soil:
 - $a = -0.696$
 - $b = +17.749E-4$

The value, in [%], is converted, by the transmitter itself, to standard 4-20 mA current (800-4000 mV in Agrónic format), so that the controller in question must select the Ideal data format according to the type of sensor and type of soil selected. It is the responsibility of the user to change the data that characterizes said format.

<i>Sensor format EC-5</i>	
Parameter	Default value
No. of integers	3
No. of decimals	1
Sign	no
Units	%
Calibration point 1	
Real value	800 mV
Logical value	00.0 %
Calibration point 2	
Real value	4000 mV
Logical value	100.0 %

- **TEROS-10 Meter Group** The sensor delivers a voltage x [mV] that the H2O transmitter transforms into VWC [%] (Volumetric Water Content or Soil Water Content) using the following expression: $VWC [\%] = dx3+cx2+bx+a$, and according to the soil type:

- Mineral soil:
 - $a = -2.154$
 - $b = +3.898E-3$
 - $c = -2.278E-6$
 - $d = +4.824E-10$
- Potting soil:
 - $a = -2.683$
 - $b = +4.868E-3$
 - $c = -2.731E-6$
 - $d = +5.439E-10$

<i>Sensor format TEROS-10</i>	
Parameter	Default value
No. of integers	2
No. of decimals	1
Sign	no
Units	%
Calibration point 1	
Real value	800 mV
Logical value	00.0 %
Calibration point 2	
Real value	4000 mV
Logical value	70.0 %

The value in [%] is converted, by the transmitter itself, to standard 4-20 mA current (800-4000 mV in Agrónic format), so that, in the controller in question, it is necessary to select the Ideal data format according to the type of sensor and type of soil selected. It is the responsibility of the user to change the data that characterizes said format.

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