GroPoint™
Growing innovation.

GroPoint Pro

TECHNICAL INFORMATION

The GroPoint™ Pro soil sensor is robust, reliable and highly accurate, providing cost-effective measurement of soil moisture, soil temperature, salinity (electrical conductivity or EC). This SDI-12 sensor also functions as a wetting front detector, providing a separate output for the wetting front measurement. The sleek, light-weight design installs quickly with minimal soil disruption. When installed vertically, the sensor averages volumetric moisture content over a soil layer of about 6” (15cm). When installed horizontally, the sensor can be used to measure moisture at a specific soil depth.

Wetting Front

By placing the tip of the sensor just above the bottom of your crop's root zone, the wetting front measurement will indicate when water has reached the bottom of the probe during irrigation, allowing you to have your irrigation stop at precisely the optimal time to ensure only the water needed is applied.

The GroPoint Pro calculates the first derivative (rate of change) of moisture to indicate how quickly the moisture level is increasing (it does not indicate in any way moisture decreases). Range is 0 (very low or negative rate of change) to 10 (high rate of change). A slow moisture increase generates low values, whereas a very rapid moisture increase generates higher readings (up to the maximum of 10). It is not related to absolute moisture level, rather how quickly the moisture level is changing. There is no time element in this measurement, it just compares previous readings to the current reading.

For example, assuming dry to saturated step change, wetting front readings will appear similar to this over time:

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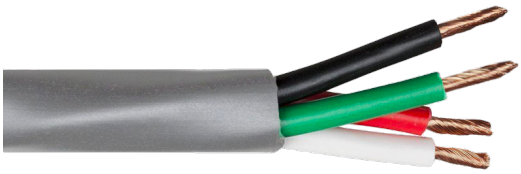
0	(no moisture change)
0	(no moisture change)
1	(minor increase in moisture level)
10	(sudden increase in moisture level)
7	(no moisture change (already at high level) or moisture drops)
4	(no moisture change (already at high level) or moisture drops)
1	(no moisture change (already at high level) or moisture drops)
0	(no moisture change (already at high level) or moisture drops)

Important note: The sensor must be continuously powered to provide useful wetting front measurement, as it maintains historical data values used in its calculations which are lost if power is turned off.

Wiring Legend

SDI-12



- Red: DC input voltage
- White: SDI-12 I/O
- Green: Ground/Common
- Black: no connection

Rugged Connector

Environmental sealing:
- Integral O-Ring gasket
- IP68 seal rating

Materials:
- Connector shell: thermoplastic

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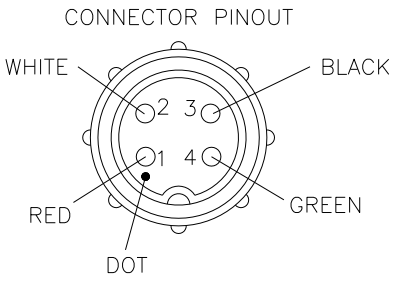
- Shell interior: Elastomeric
- Contacts: Copper alloy
- Contact plating: Gold over nickel

Mounting procedure:
Align connector, push on, rotate bayonet ring until tight.



SDI-12 Command Set

The GroPoint Lite (SDI-12 and RS-485 version) conforms to/implements all aspects of the SDI-12 V1.3 protocol specification. (a = sensor address).

Command	Meaning	Response
`a!`	Acknowledge	Device address (default address is '0')
`aI!`	Send identification	Identification string
`aAb!`	Change address	Change device address to ‘b’
`?!`	Address query	Device address
`aM!`	Start moisture measurement	Measurement time and count (e.g. “a0026”)
`aM1!`	Start temperature measurement	Measurement time and count (e.g. “a0023”)
`aC!`	Start concurrent measurement	Measurement time and count (e.g. “a00206”)
`aD0!`	Send data	Measurement results
`aD1!`	Send data	Additional data (if necessary)

All other commands received by the sensor will be acknowledged with the device address only.

Measurement Sequence and Output Format

Example measurement sequence with sensor address = 3 (SDI-12 logger-issued commands are in bold, followed by the sensor response):

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```
3M!30024
3
3D0!3+12.6+1.64+25.8+10.0
```

In response to the `3D0!` command, the sensor address is echoed back, followed by the volumetric water content in percent (+0.00% to +55.0%), the bulk conductivity in decisiemens per metre (+0.00 dS/m to +4.00 dS/m), the temperature in degrees Celsius (-30.0°C to +80.0°C), and finally the wetting front in relative units (+0.00 to +10.0). All data values are delimited by the + or – symbol.

Identification Output Format

```
3I!
313GROPOINTGPPRO113
```

In response to the `3I!` command, the sensor address is echoed back, followed by the SDI-12 protocol version (1.3 without the dot), the GroPoint identifier (GROPOINT), the product descriptor (GPPRO), and finally the firmware version (1.1.3 without the dots).

Sensor Start-up Time / Measurement Time

The time from application of power to the SDI-12 power bus until the sensor is ready to receive a command is approximately 75ms. The reported measurement time in response to the `aM!` measure command (where a is sensor address) is 3 seconds, measured from the end of `aM!` command response (`a003n<CR><LF>`) where n is the number of segments. Temperature measurements (`M1!`) always report 2 seconds for measurement time. Actual measurement times are less, and a service request is issued as soon as the measurement is completed. Current is at active level (15-20 mA) only during measurement time, otherwise current is less than 0.1 mA.

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