GroPoint™

Growing innovation.

Product Catalog

Soil sensors

Data loggers

Connectivity / wireless

Accessories

APRIL 2020

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Soil Sensors

		GroPoint Profile	GroPoint Lite	GroPoint Pro	GroPoint Classic
Product					
Summary		Measure soil moisture at multiple depths with a single probe and cable. Installs quickly and easily without excavating.	Analog or digital soil moisture and temperature. Exceptional accuracy (±2%) and fully-potted electronics for long-term durability.	SDI-12 sensor measures moisture, EC and temperature. Exceptional accuracy (±2%) and fully-potted electronics for long-term durability.	Legendary ruggedness and dependability. Exceptional accuracy and large sphere of influence.
Why choose this sensor?		When you want to measure soil mositure and temperature with extreme accuracy at multiple depths to analyze water penetration throught the soil.	When you need an extremely accurate and durable single-point soil sensor to measure moisture content and temperature.	When you need the accuracy and durability of GroPoint Lite, but also need to measure EC and would like a simple way to measure the wetting front.	When you need a 4-20mA analog solution and/or want a large area of influence surrounding the sensor.
Moisture		✓	✓	✓	✓
Temperature		temp sensors: surface & every 10 cm	🌡*	🌡	
Salinity/EC				✓	
Wetting front				✓	
Technology		TDT[5] Multiples of 15cm segments	TDT[5]	TDT[5]	TDT
Analog	**0-5mA**		✓		✓
	4-20mA		✓		✓
Digital	**SDI-12**	✓	✓	✓	
	RS-485 MODBUS	✓	✓		
Range	**Moisture**	0% to 100% of VMC			
	Temperature	-20°C to +70°C (-4°F to 158°F)	-20°C to +70°C (-4°F to 158°F)*	-20°C to +70°C (-4°F to 158°F)	n/a
	EC	n/a	n/a	0 to 4 dS/m	n/a
Accuracy	**Moisture**	±2.0% **	±2.0% **	±2.0% **	±2.0% **
	Temperature	±0.5°C	±0.5°C*	±0.5°C	n/a
	EC	n/a	n/a	±3%	n/a
Precision	**Moisture**	< 0.2%	< 0.2%	< 0.2%	< 0.2%
Current Consuption	**Quiescent**	<0.5mA	<0.1 mA *	<0.1 mA	n/a
	Active	15-20 mA (depending on number of segments) for 100 mS	0-5 mA: 18 mA nominal, 25mA max 4-20 mA: 30mA (nominal), 50 mA (max) SDI-12/RS-485: 15-35 mA	15-35 mA	0-5 mA: 15 mA nominal, 20mA max 4-20 mA: 30 mA nominal, 50 mA max

* digital only ** 8% to 42% VMC, in controlled laboratory conditions; factory calibrated for most agricultural soils. In field applications, accuracy may slightly decrease due to the inevitable heterogeneity of soil texture, soil compaction, moisture and fluctuation in soil temperature. The accuracy may also decrease in difficult soil conditions (higher clay and salinity content). In normal conditions, GroPoint sensors will maintain their accuracy from permanent wilting through field capacity in sandy loam through clay soils with less than 60% clay particles. Under moderately saline conditions. GroPoint sensors will maintain their accuracy up to 6 ds/m.

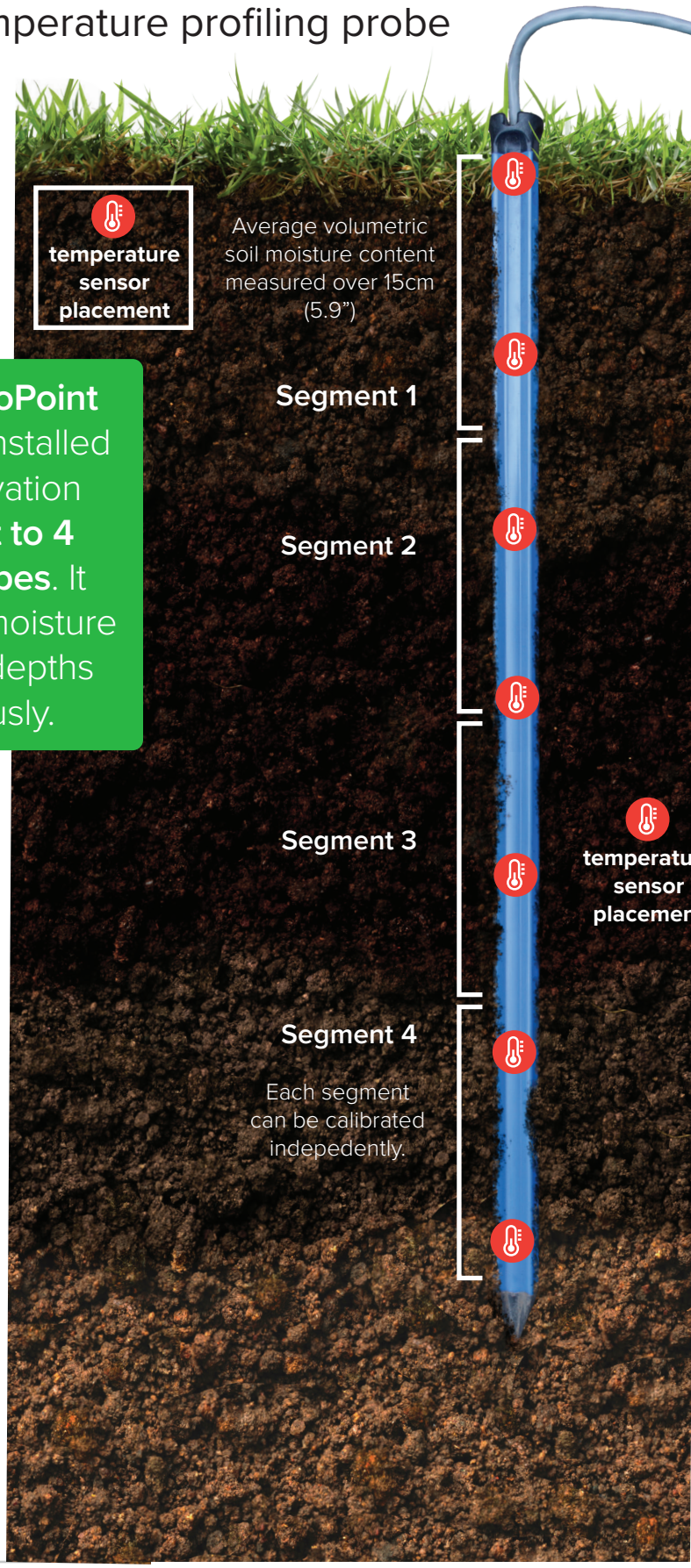
GroPoint Profile

Multi-segment soil moisture and temperature profiling probe

GroPoint™ Profile provides cost-effective measurement of volumetric water content over multiple depths using a single probe, eliminating the cumbersome excavation required for multiple sensors placed at different depths. It can be deployed in irrigation-sensitive zones to enable full control of precision irrigation needs, providing an understanding of water movement through the soil.

The sleek, lightweight design installs quickly with minimal soil disruption using a pilot rod and slide hammer tool. Designed for vertical installation, the sensor takes measurements over multiple soil layers, with each measurement zone (segment) providing the average volumetric soil moisture content over a 15 cm range (approximately 6 inches).

This **single GroPoint Profile probe** installed without excavation is **equivalent to 4 separate probes**. It measures soil moisture at 4 different depths simultaneously.



FEATURES

- ✓ Eliminates need for multiple sensors and cabling systems.
- ✓ Installs quickly and easily without excavating.
- ✓ One SDI-12 address is used to read all segments, providing for simplified installations. Optional RS-485 output, and modbus
- ✓ Moisture readings can be user-calibrated with 3rd-order polynomials to meet custom requirements.
- ✓ Low power requirements—suitable for remote, autonomous applications.
- ✓ Patented TDT^5 technology for scientific-grade accuracy and excellent long-term stability of measurements.
- ✓ Factory-calibrated for most agricultural soils, but can be custom calibrated before shipping.
- ✓ Each segment can be calibrated independently on site with 3rd order polynomials

About the Digital Soil Moisture Probe Technology

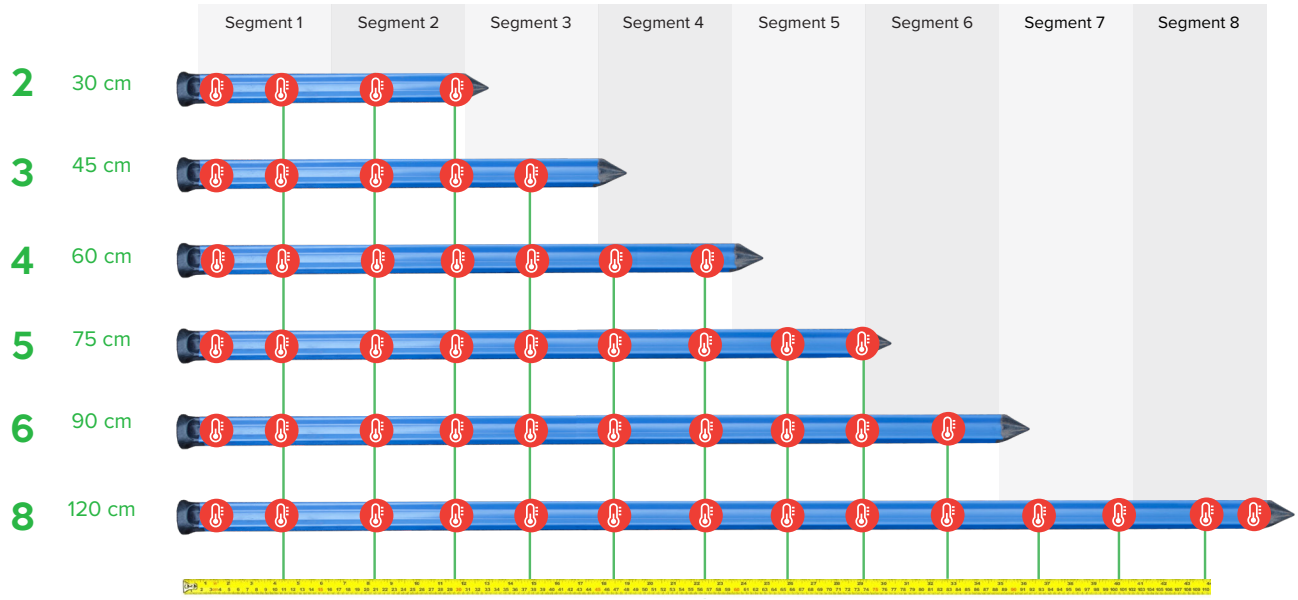
Patented TDT technology that provides accurate, repeatable soil moisture (and optionally soil temperature) measurements from the soil surface up to a depth of 120cm (4ft). The GroPoint™ Profile uses patented sensing antennas across each 15cm (6 in.) segment to provide a complete soil moisture profile. Each sensing element can be configured/calibrated individually to ensure accurate measurements across different soil types/horizons. Soil temperature sensors are located every 10cm.

Available with Modbus, SDI-12 and RS485 interfaces, in lengths of 30cm, 45cm, 60cm 75cm and 120cm; a single cable transmits all measurements. No access tubes or excavation are needed for installation in permanent and temporary installations.

Temperature Sensor Placement

Choose the number of 15cm segments that are right for your application.
The standard configuration places temperature sensors every 10 cm.

= temperature sensor placement



Ordering

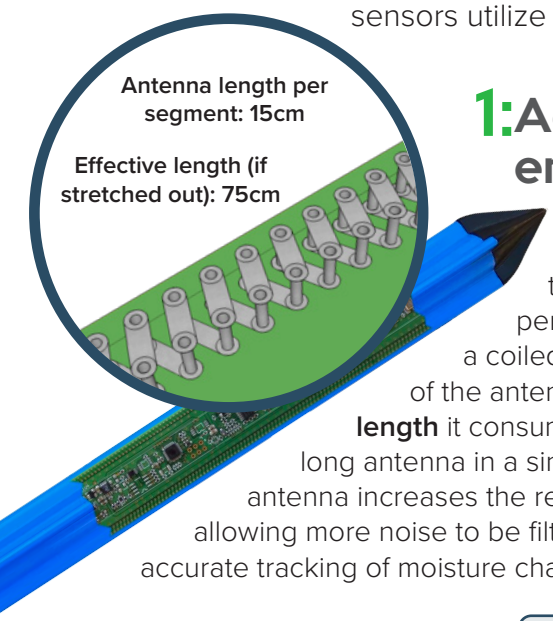
Specify cable and connection interface at order.
Cable Connection: Either flying lead or M12 Connector, **Interface:** SDI-12, modbus or RS485 + SDI-12

Length & Number of Segments	Part No. With Temperature	Part No. Without Temperature
2 Segment (30 cm)	2625-N-T-2	2625-N-2
3 Segment (45 cm)	2625-N-T-3	2625-N-3
4 Segment (60 cm)	2625-N-T-4	2625-N-4
5 Segment (75 cm)	2625-N-T-5	2625-N-5
6 Segment (90 cm)	2625-N-T-6	2625-N-6
8 Segment (120 cm)	2625-N-T-8	2625-N-8

5 GroPoint's patented technique for soil moisture measurement

Our proprietary TDT[5] technology delivers an **exceptional price:performance ratio**, with performance as good (in most cases better) as sensors costing much more.

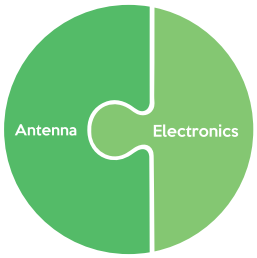
GroPoint™ sensors are based on the field-proven Time Domain Transmission (TDT) method of reliably measuring soil moisture, which is a refined version of Time Domain Reflectometry (TDR). TDT-based sensors do not need to be calibrated to each type of soil they will be buried in. Some of the best soil sensors utilize this method. **TDT[5] enhances TDT in 5 key ways:**



1: Accurate across entire length

Our patented design weaves the antenna through the circuit board 20 times per centimetre, and much like a coiled spring, the effective length of the antenna is **5 times the physical length** it consumes. It's like having a 75cm long antenna in a single 15cm sensor. A larger antenna increases the resolution of each sample, allowing more noise to be filtered out. This gives highly accurate tracking of moisture changes with no "dead spots".

2: Reduced manufacturing cost



Unlike other moisture probes, Gropoint sensors do not have separate components for electronics and bulky metal antennas. By integrating the antenna and all electronics into the same circuit board (possible thanks to the patented antenna design), manufacturing costs are dramatically reduced.

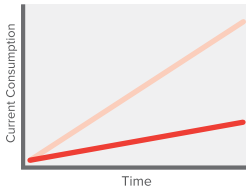
3: Repeatable accuracy

400,000 pulses filtered per measurement

Each time a measurement is taken, GroPoint sends 400,000 pulses through the sensing element to generate data for the measurement, then employs advanced filtering to eliminate outlying readings (noise) before averaging the data and sending the measurement as SDI-12 output. This ensures that the same extreme accuracy (±1%) is obtained each and every time moisture is measured.

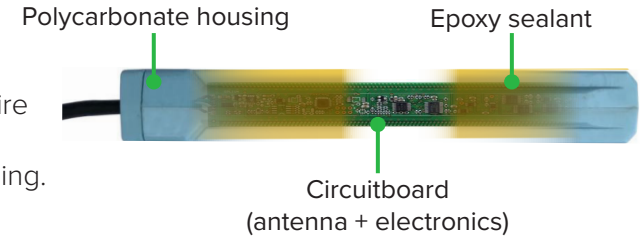
4: Low power consumption

Even with 400,000 pulses for each measurement, the total time to take the measurement is less than 100 ms. This means that power consumption is minimal, and that permits GroPoint sensors to be operated for many months with small 9V battery-powered data loggers.

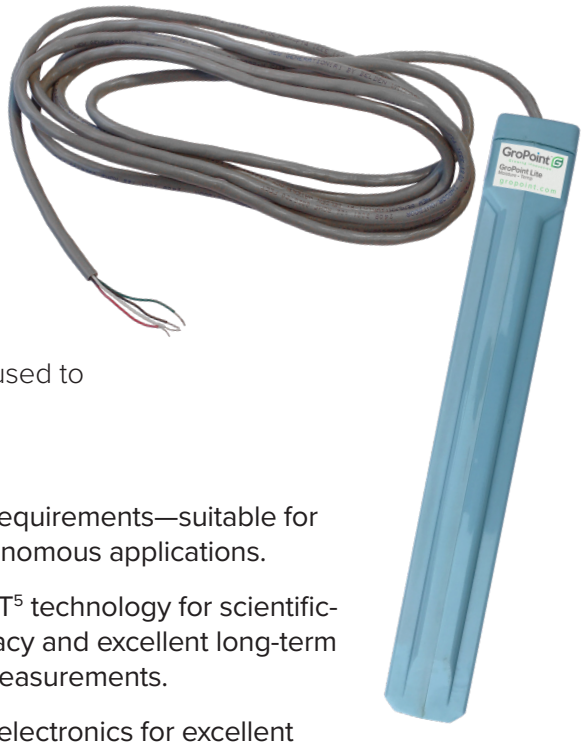


5: Maximum durability

Unlike typical sensors, the antenna is not exposed to the soil, so there's nothing to bend or break. The entire sensor circuit board (including antenna) is sealed in epoxy, then encased in a sealed polycarbonate housing.



GroPoint Lite (Part 2575 Part 2577 Part 2585)



Accurate and reliable analog or digital soil moisture probe

The GroPoint™ Lite soil sensor is robust, reliable and highly accurate, providing cost effective soil moisture and temperature measurements. The sleek, lightweight 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.

FEATURES

- ✓ Soil moisture (and temperature with digital versions) sensor
- ✓ Flexible interface options (SDI-12, RS-485 MODBUS, 0-5mA and 4-20ma) simplify integration into a broad range of applications, ancillary equipment and data loggers.
- ✓ Moisture readings can be user-calibrated with 3rd-order polynomials to meet custom requirements.
- ✓ Low power requirements—suitable for remote, autonomous applications.
- ✓ Patented TDT[5] technology for scientific-grade accuracy and excellent long-term stability of measurements.
- ✓ Fully potted electronics for excellent durability.

GroPoint Pro (Part 2595)

Moisture, salinity, temperature and wetting front in a single SDI-12 sensor

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. 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.

FEATURES

- ✓ Provides SDI-12 output of moisture, temperature and salinity (electrical conductivity).
- ✓ Detects when wetting front has reached bottom of probe.
- ✓ Moisture readings can be user-calibrated with 3rd-order polynomials to meet custom requirements.
- ✓ Low power requirements—suitable for remote, autonomous applications.
- ✓ Patented TDT5 technology for scientific-grade accuracy and excellent long-term stability of measurements.
- ✓ Fully potted electronics for excellent durability.

GroPoint Classic (Part 1626 - 1630)

The original analog GroPoint moisture sensor, with legendary ruggedness and accuracy.

GroPoint™ Classic is our original analog soil sensor, with a rugged design that has been proven over decades of use. The sensing element is manufactured from a solid 6.4mm (0.25”) stainless steel rod, and all electronics are sealed in water-proof epoxy.

The 4-20mA output integrates easily with common irrigation control and management systems, and it’s also available with 0-5mA output. The standard 5m cable can be extended to up to 150m (500’) and terminates in a rugged IP66/68 environmental connector or bare wires.

The sensor can be calibrated specifically for sandy soil, moderate loamy soils or high salinity and clay soils—specify when ordering. It also features a larger area of influence than our other sensors—about 10cm (4”) surrounding the sensing element.

The GroPoint Classic responds immediately and accurately to changes in soil moisture. It’s extremely rugged, easy to install and requires virtually no maintenance. It will provide years of reliable service.

FEATURES

- ✓ Fully potted electronics for excellent durability and consistency of operations.
- ✓ Stainless steel sensing element provides years of maintenance free, reliable sensing.
- ✓ 4-20 mA interface options provide easy and simple integration into common irrigation management and control systems.
- ✓ Low power consumption—suitable for remote applications.
- ✓ Large area of influence.

Data Loggers

GP-DLBT Bluetooth SDI-12 Datalogger (Part 2992)

Simple, effective and reliable automatic recording of sensor data.

The Bluetooth SDI-12 Datalogger is both a data logger and a wireless access point to retrieve data through your smartphone. It can be left in the field connected to your sensors, allowing you to access the data when convenient.

The Bluetooth SDI-12 Datalogger connects to up to 10 SDI-12 GroPoint sensors (with the 4-Port SDI-12 Expansion Bar). Sensors must terminate in an M12 connector.

Data is stored in non-volatile memory and is retained even if the battery fails. The memory can hold up to 200,000 measurements. Works with ANY V1.3 SDI-12 Sensor.

Specifications

Wireless protocol	Bluetooth 4.0 LE
Maximum number of sensors	10 (via multiple 4-Port SDI-12 Expansion Bars) Depending on measurement interval and type of sensor, additional sensors may be configured. Up to 20 sensors can be configured depending on cable length and sensor power requirements
Storage	4 MB This is the equivalent of: > 200K GroPoint Lite measurements > 80K moisture and temperature measurements from a GroPoint Profile 4-segment sensor
Measurement interval	Configurable by user Range: 1 minute to 12 hours
Power	Operates on a Primary C-Cell 8 Ah battery (3.6V) - (battery not included) or 2x AA alkaline batteries
Battery life	Up to several years, depending on measurement interval and battery selection

FEATURES

- ✓ Retrieve sensor data wirelessly to your smartphone with a quick visit to the site.
- ✓ Stay connected up to 60m (200 ft) away.
- ✓ Operates with a Primary C-Cell battery (3.6V or 21.5 V alkaline)
- ✓ Battery life of several years is typical.
- ✓ Water-resistant, IP65-rated enclosure.
- ✓ Data is retained even with no battery.
- ✓ Free GP Reader app available for Andriod devices.

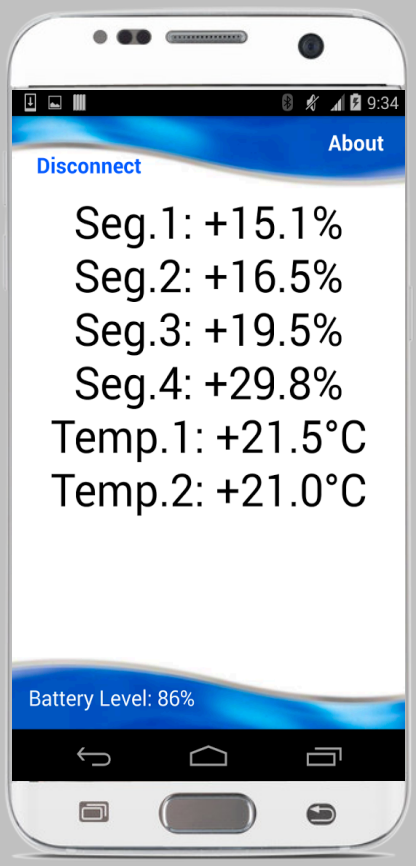
Free GP Reader APP

What Products Can Use The App?

All of our dataloggers, including GP-DLBT Bluetooth SDI-12 Datalogger and the GP-DLBT Bluetooth SDI-12 Datalogger Kit can be connected to the app. The GP Reader App allows you to view and download the data collected by your dataloggers.

How It Works

With the app open on your smartphone, simply push the button on the Bluetooth SDI-12 Datalogger to wake it up and automatically establish a wireless connection. Tap the Download button in the app to download all logged data.



APP FEATURES

- ✓ Check current conditions
- ✓ Download the logged data
- ✓ Check the current battery level of the Datalogger
- ✓ Set up the sensor sampling interval (from one minute to 12 hours
- ✓ Transfer the data from universal CSV format, to your favorite graphing software

GP-DLBT Bluetooth SDI-12 Datalogger Kit (Part 2992-KIT)

Connect up to 10 SDI-12 Sensors

The Bluetooth SDI-12 Datalogger Kit includes the Bluetooth SDI-12 Datalogger (Part 2992), along with a 4-Port SDI-12 Expansion Bar, M12 Male to Female Cable and 3.6V C-Cell Battery.

With two expansion bars, the Bluetooth Sensor Pod can connect up to 8 SDI-12 GropPoint Sensors. When using the GroPoint expansion bar, sensors require M12 connectors.

This product uses the free GP-Reader Andriod App.

This kit will allow you to connect **four** SDI-12 Sensors. To connect **eight** sensors, you will need an additional M12 Male to Female Cable and 4-Port Expansion Bar, as well as a **2-Port Expansion Bar** (see Accessories Page 13).

What's Included

Part Name and Quantity	Part No.
1 x GP-DLBT Bluetooth SDI-12 Datalogger	Part 2992
1 x M12 Male to Female Cable	Part 2999
1 x 4-Port Expansion Bar	Part 2998
1 x Li-SOCi2 C-Cell Battery	Part 6230

Connectivity/Wireless

GP-DU Handheld Sensor Reader

Instant readings of current conditions measured by your in-situ sensors.

(Part 2628 SDI-12 Part 1619 ANALOG)

The GP-DU handheld reader gives immediate readings of current measurement conditions from GroPoint sensors. It also allows testing of individual sensors to troubleshoot when the sensors are part of a larger system. It features a large display window in a robust weather resistant casing with a 3 pin EN3 or M12 connector.

The GP-DU reads data from analog sensors and displays the volumetric moisture content as a percentage.

The GP-DU SDI-12 is capable of reading all GroPoint SDI-12 sensors. The GP-DU SDI-12 is capable of reading any SDI-12 V1.3 or higher sensor.

SDI-12 version

FEATURES

- ✓ Battery operated
- ✓ Push button command
- ✓ Instant display
- ✓ Compact
- ✓ Self-calibrated
- ✓ Reads SDI-12 sensing devices
- ✓ Requires a 9V battery

CloudConnect

Soil Sensor Cellular Transport + Cloud Interface

GroPoint™ CloudConnect is a power-efficient, 2-way cellular (GSM or CDMA) modem that eliminates the need for a data logger by automatically capturing data from connected SDI-12 sensors and uploading it to a cloud-based data repository.

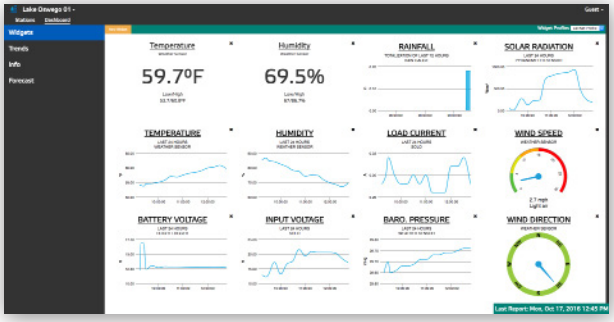
Data can be downloaded to work with it locally, or use our web-based GroPoint CloudInsight software to analyze and visualize your data, set up alerts, forward data to another destination, or configure your remote CloudConnect devices and SDI-12 sensors.

Sensor interface module. Connect SDI-12 sensors via bare wires.

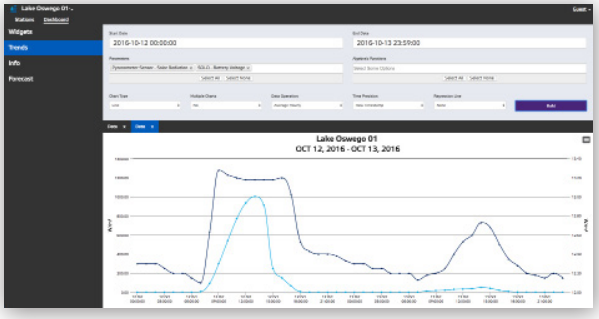
SD card slot for local backup storage.

FEATURES

- ✓ No data logger required. All data uploaded directly to the cloud.
- ✓ All data is also backuped up locally on removable SD card.
- ✓ Approximately 20X typical improvement in power consumption vs. typical cellular telemetry.
- ✓ Intelligent data management, data buffering, and network verification to ensure successful transmission of critical data.



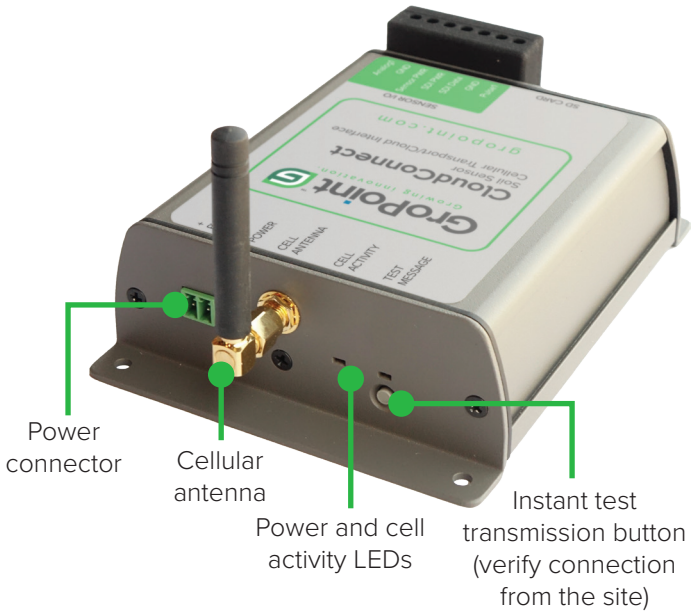
Customize your dashboard display with drag-and-drop data widgets



Easily chart trends of any parameter

Technology behind CloudConnect

- **Cloud-based management**: Sensor configuration, data storage, custom algebraic equations, custom data formats and forwarding, control, analysis, alarm notifications (email, SMS), reporting and actions all done in the cloud.
- **Easy configuration**: Configure with any device connected to the Internet via the web-based GroPoint CloudInsight. No custom programming or scripts required.
- **Automated updates:** Updates to firmware and cloud-based application are automatic.
- **Reliable connection**: CloudConnect verifies connection with cell network and server connection before data is sent. If no connection is available or if data reception is not confirmed, data is saved and sent at the next scheduled transmission.



Specifications

SENSOR INPUT

Analog input	4 analog channels, single-ended Input type: 2 wire, 0 – 2.5 V or 4 - 20 mA current loop Sensor power: 24 VDC switched (under firmware control) Analog to digital (0-2.5 VDC): 21-bit resolution
Pulse input	4 pulse channels Continuity or TTL: 0 V to 2.2 V - 5 V Maximum rate: 10 pulses per second
SDI-12 input	Number of sensors: up to 62 sensors (up to 9 parameters per sensor) Sensor power: 12 VDC switched, during measurement

CURRENT CONSUMPTION

Listen/trigger mode/idle	<2 mA
Logging	35 mA
Data receive/store/prepare for transmission	150 mA
Data transmit	250 mA

Accessories

4-Port Expansion Bar with M12 Cable
Part 2998 & Part 2999

Connects to any open channel of a GroPoint data logger and provides connectors for up to four more sensors. Adds 3 additional ports (you lose 1, you gain 4).

M12 Male to Female Cable
Part 2999

2 Meter Cable with 1 male and 1 female connector. Connectors are 5 Pin M12 waterproof rated.

Additional GroPoint Sensor Cable
Part CE (Cable Extension)

Add to your sensor order (which includes a standard 5m cable) for a custom cable length.

2-Port Expansion Bar Part
Part 2998-2

3 port M12 waterproof connector with 2 female and one male M12 connectors. Connects to GroPoint dataloggers through cable. Used to expand SDI-12 connections or divide cables to extend cables in different directions.

Male or Female M12 Connector
Part: Male = 3053, Female = 3070

Field installable M12 connector, for connecting flying lead cables to datalogger. Ideal for third party sensors.

SDI-12 Alligator Clip Adaptor
Part 3080 M12 OR Part 3059 ENC3

Lets you use your GP-DU Handheld SDI-12 Sensor Reader withany bare-wire SDI-12 sensor.

Slide Hammer for GroPoint Profile
Part SH

Makes installing the GroPoint Profile quick and easy without excavating.

Pilot Rod for GroPoint Profile
Part PR-Length

Attaches to slide hammer, makes a hole the exact size of the GroPoint Profile probe being installed.

Li-SOCl2 C-Cell Battery
Part 6230

5.8 Ah -3.6 V Primary, high power, C-size spiral cell. Discharge temp range: -55C to +85C. Up to 2000 mA pulse current.

About

GroPoint™

Growing innovation.

GroPoint Products are manufactured in Canada by RioT Technology Corp.

In 2016, RioT Technology Corp. acquired the GroPoint™ brand.

We also hired several longstanding employees of ESI who had manufactured and designed the original MoisturePoint and GroPoint products. As such, we have the historical expertise for all GroPoint products in-house and available to assist former clients of ESI, and new clients interested in leveraging over 25 years of soil monitoring expertise.

RioT TECHNOLOGY CORP.

WINNER OF INNOVATION EXCELLENCE

VIATEC AWARDS 2019 RECIPIENT!

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