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Find the *Delta-T Devices GP1* at our website: *Click HERE*

Delta-T Devices

GP1 Data Logger

- a compact, weatherproof, research grade data logger

- High accuracy 7 channel data logger
- 600,000 readings
- Compatible with DeltaLINK-Cloud online data viewing and sharing platform
- Smart relay control





Overview

The GP1 can record:

- **2 differential analogue voltages**
- **2 temperature channels**
- **2 pulse counters**
- **Plus 1 Delta-T WET Sensor**

When connected to 1 or 2 ThetaProbes or SM150T Soil Moisture Sensors, the GP1 Logger provides simple high accuracy recording of moisture content (as well as rainfall and temperature).

Applications

- **Monitoring soil moisture**
- **Environmental data logging**
- **Climate research and meteorology**



Ease of use

With its simple software, long battery life and large memory, the GP1 is very easy to set up and maintain. It is well suited to outdoor logging applications - the waterproof (IP67) case does not require a secondary enclosure.

The GP1's small size allows it to be installed in confined spaces, or to be hidden away if security is an issue.

The internal alkaline battery lasts for >1 year when taking hourly readings from 2 moisture sensors, 2 temperature sensors and a rain gauge.

GP1 Data Logger

Sensors

2 x Differential voltage channels



The GP1 provides 2 differential voltage channels that are ideal for connecting ML3 or SM150T soil moisture sensors. Each channel has an input range of -0.2 to +2.7 V and a resolution of 1 mV, enabling it to support a wide range of environmental sensors. Sensors can be powered by a configurable warm-up from either the switched battery power or from the +5 V reference.

2 x Counter channels



The GP1 includes one fast and one slow counter for connection to pulse output and contact closure sensors. The fast counter can record pulses up to 33 kHz. Either counter can record switch closures up to 50 Hz and so is suitable for connection to a rain gauge or flow meter.

2 x Temperature channels



The two temperature channels are optimised for 10k thermistor probes and provide accurate temperature readings over the range -20 to +60°C. Either channel can alternatively be used with an SM150T Sensor in order to log moisture readings from additional soil moisture sensors.

1 x WET Sensor channel



The GP1 can connect to a Delta-T WET Sensor to provide readings of water content, electrical conductivity and temperature. Specialist calibrations are available for a range of horticultural substrates including mineral wool, peat-based composts and coconut fibre (coir).

Bridge sensors, tensiometers

The optional GP-PBA-X50 precision bridge adapter board converts the input from a voltage channel into a precision bridge suitable for recording readings from compatible pressure transducer tensiometer. It is possible to fit 2 PBA adapters into each GP1. Other pressure transducers and bridge sensors can also be used with the PBA adapter.

1 x Relay channel output



The GP1 has a highly versatile relay channel which can be controlled by multiple sensor thresholds, allowing researchers to set alarm conditions or to control and adjust experimental conditions. Both simple and highly complex control is possible

Other Features

Communications: Data can be collected by a laptop via RS232, or via USB (USB to RS232 Adapter Cable type USB-RS232 required), or remotely using the cellular modem options. Up to 10 GP1s can be networked together in order to share power and communications.

Configuring the GP1 with DeltaLINK: The free DeltaLINK software supplied with the GP1 enables full configuration, sensor checking (including real-time graphing) and data collection from the logger. Collected data can be graphed directly in DeltaLINK or imported into Excel using the data import wizard. Specialist configuration programs are provided for irrigation control and for use with the BF5 Sunshine Sensor and SPN1 Sunshine Pyranometer.

Reading frequency: The GP1 can be configured to record readings at any frequency from 1 second to 24 hours. All sensors are recorded at the same rate.

Power: The GP1 is very power efficient and a single 9 V alkaline battery will typically last for a full year when taking hourly readings. Alternatively it can be powered from an 11 to 24 V DC external power source or from a solar panel.

Memory: The GP1 stores over 600,000 readings in non-volatile flash memory ensuring data security in the event of a flat battery.

Sealing: The small (140 x 105 x 45 mm) enclosure is fully sealed to IP67, doing away with the need for an expensive additional enclosure for simple field applications.

WS-GP1 Weather Station



The GP1 provides the logging engine for this compact and robust weather station, which records wind speed, wind direction, rainfall, solar radiation, relative humidity and air temperature – see separate data sheet.



3G-DLC-BX1/SP and 3G-BX1/SP Modem Box

Remote communications

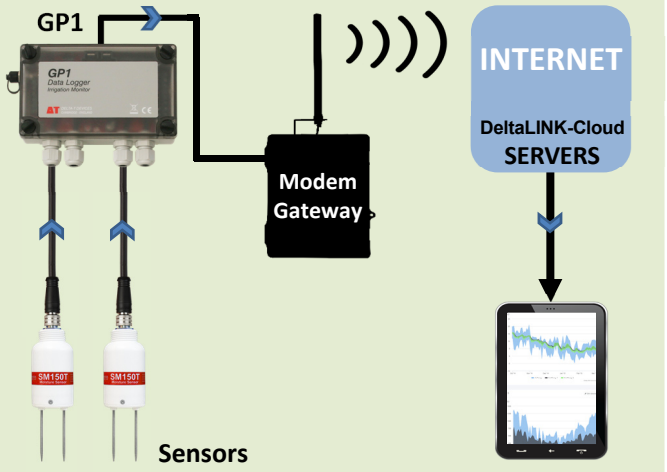
DeltaLINK-Cloud Modem Gateway options

To connect Delta-T Loggers to DeltaLINK-Cloud, customers need to purchase a modem gateway and a data package.

The 3G-DLC-BX1/SP and 3G-DLC-BX1/B are “plug and play” modem gateway systems that can upload your logger’s status and data automatically to DeltaLINK-Cloud.

Both systems include an enclosure, battery, quad band modem, smart SIM, battery, cables, antenna and mounting kit for fixing to masts. In addition, the 3G-DLC-BX1/SP version includes a 30 W solar panel.

Please note that the logger (ordered separately) has to be mounted outside the modem box. A Data Package is also required to complete the system. To ensure the system meets your needs, please request a quotation before ordering.



Data Packages

To connect to local network services, customers need to purchase a Data Package. Delta-T modem gateways are supplied with a Smart SIM that can connect to multiple network providers, maximising the chance of a stable connection being established. For almost all locations with network coverage, the Smart SIM will be able to make a connection. (Data Packages enable the Smart SIM to connect to specific networks; they do not relate to geographical zones).

Data Packages are supplied in blocks of 120MB; each Package is valid for use for up to 3 years from the date of purchase and line rental is included in the Package cost. To ensure the Data Package is able to access the appropriate networks, please request a quotation, stating the precise location required.

DeltaLINK-Cloud
www.deltalink-cloud.com

DeltaLINK-Cloud is a sophisticated and secure online data viewing, management and sharing platform for Delta-T Devices data loggers.

- **Remote data monitoring on mobile devices**
- **Animated live data dashboard graphics**
- **Easy data sharing for collaborative projects**
- **Powerful charting and reporting features**
- **Smart SIM card provided - for easy set-up**
- **Secure and encrypted**
- **Remote management of multiple sites**
- **Multi-language (Fr, De, Es, 中文)**

DeltaLINK-Cloud is an advanced, yet easy to use, online solution that enables remote viewing, management and sharing of sensor data.

The platform allows users to monitor the status of the logger, graph and export the uploaded data and to share access to data with project collaborators/stakeholders.

The remote logger control feature and DeltaLINK software enables users to remotely control the program, start or stop logging, modify program settings, set the logger’s clock, or delete a dataset - minimising the need for time consuming site visits.

Data generated by the data logger can be charted alone or aggregated and charted for multiple loggers. Charting is customisable and can be saved as reports for future use and then shared via a URL link.

DeltaLINK-Cloud Dashboards

DeltaLINK-Cloud can display data using simple graphical devices known as widgets. Dashboards enable users to control the type, colour and position of widgets, ensuring that critical data is displayed clearly and with maximum impact.

These high quality animated data visualisations transform the ability of teams to identify and respond to trends or incidents, such as a threshold being exceeded. Dashboards are quickly linked to relevant data sources and can be viewed remotely on smart devices, enabling users to view and share real-time sensor data on-screen.



Specifications

		Typical at +20 °C	Max -20 °C to +60 °C	Notes
Differential Voltage Channels	Voltage accuracy	± (0.3 mV + 0.01% reading)	± (1.6 mV + 0.05% reading)	over full -0.2 V to +2.7 V voltage range
	Soil moisture accuracy	±0.06%θ (±0.0006 $m^3.m^{-3}$)	±0.3%volθ (±0.003 $m^3.m^{-3}$)	with ML3 or SM150T (0 to 60% θ) *[1]*
	Resolution / input noise	±0.1 mV		effective resolution of readings (typical)
	Input voltage range	-0.2 V to +2.7 V		
	Input voltage limits	-2.8 V to +3.6 V *[2]*		each input signal relative to logger GND
Temperature Channels	Temperature accuracy	±0.07 °C	±0.1 °C (with GP1 below 30 °C if reading -20 to 0 °C)	using 10K thermistor -20 to +60 °C *[1]*
	Resistance accuracy	±0.2% of 2 to 100KΩ reading (±0.3% max)	±0.5% of 2 to 20KΩ reading	
Event Counters	Event counter (Event6)	< 50 Hz, contact closure or pulse/logic inputs		logic low input < 1 V, logic high input > 1.9 V, maximum ±14 V on Event inputs 5 and 6
	High speed counter (Event5)	< 33k Hz, pulse/logic. <100 Hz, contact closure		
Power	Internal battery life	1 year typical (alkaline)		9V PP3 battery *[3]*
	External power	11 to 24 V DC		power via external M8 connector
	Switched sensor power	up to 120 mA: > 10 V if external power > 13.8 V		switched battery or external power
	+5 V reference	5 V ±0.6%	5 V ±1.6%	switched voltage reference, up to 50 mA
Relay Channel	1 x relay	SPST, < 30 V DC or < 24 V AC, 1 A resettable fuse		separate ON / OFF conditions adjustable ON duty cycle
Data Recording	Logging frequency	1 second to 24 hour		user configurable logging frequency
	Sensor warm-up	multiples of 1 second		user configurable sensor warm-up times
	Internal flash memory	> 600k readings, typical		non-volatile flash memory
	Communications	RS232 (115 kbaud) / USB [4]		comms via external M8 connector or USB [4]
Physical	Environmental	water resistant to IP67		4 cable glands, connector & case
	Size and weight	140 x 105 x 45 mm, 280 g		including battery
	Temperature	-20 to +60 °C		

[1] GP1 accuracy, not including sensor errors
[2] Common Mode Rejection (CMRR) > 66 dB (78 dB typical)
[3] 2 x ML3 ThetaProbes with 1 second warm-up, 2 x 10k thermistors, and rain gauge, logging once per hour continuous
[4] With USB to RS232 Adapter Cable type USB-RS232

Ordering Information

Data Logger type GP1 including DeltaLINK software and RS232 cable.

USB-RS232 Adapter Cable connects to PC's USB port.

Optional accessories:

Mounting Plate type DL-MKT suitable for GP1, GP2 and DL6. Comprises 320 x 190 mm stainless steel plate and fittings for mounting onto 51 mm tube or flat surfaces.

External Power Cable type GP1-EPC1 for external powering from an 11 to 24 V DC source.

Precision Bridge Adapter Board type GP-PBA-X50 converts an input voltage channel to read precision bridge sensors; 1 or 2 may be fitted to a GP1.

GP1 M8 Cabling and Network Accessories - please enquire.

Cellular Modem Options - please enquire.

Other Loggers and Systems

All Delta-T loggers can be supplied with a range of **modem**, **solar power** and networking options.

The **GP2** is an advanced 12 channel logger and controller. It is versatile, easy to use, rugged and SDI-12 compatible.

The **DL6** provides 6 analogue inputs and is ideal for logging a PR2/4 or PR2/6 Profile Probe.

The **WS-GP1** Weather Station is a compact and portable package featuring the GP1 and 6 standard weather sensors.

The **WS-GP2** Weather Station is a powerful, rugged and flexible system. Ideal for demanding research and monitoring projects.

For information on these or other products, please visit the Delta-T Devices web site: **www.delta-t.co.uk**

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