AT

Delta-T Devices

GP1 Data Logger

GP1 Data Logger
- a compact, weatherproof, research grade data logger

- **High accuracy 7 channel data logger**

- **600,000 readings**

- **Free use of DeltaLINK-Cloud data viewing and sharing service**

- **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**
- ► **Controlling irrigation**

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 and is suitable for most digital anemometers. 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 (see the Irrigation panel below).

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 GPRS 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.

Irrigation Control

The GP1 Data Logger can use soil moisture to control irrigation directly (and/or rainfall and/or temperature), or act as a sophisticated interface between these sensors and many type of programmable timer.

NB: Our GP2 Data Logger and Controller offers even more advanced irrigation control capabilities.

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.

GPRS remote communications

There are two options for providing GPRS modem communications with the GP1 Logger

DeltaLINK-Cloud GPRS options

The GPRS-DLC-BX1/SP and GPRS-DLC-BX1/B systems provide a GPRS Modem gateway which upload your logger's status and data automatically to DeltaLINK-Cloud (a free online data viewing and sharing service). It also provides a connection between DeltaLINK and your logger - adding the following capabilities: program, start/stop logging, modify program settings, set the logger's clock or delete a dataset.

The GPRS-DLC-BX1/SP and GPRS-DLC-BX1/B systems include an enclosure, quad band modem, smart SIM, 10Ah battery, cables, antenna and mounting kit for fixing to masts or poles (42-51 mm dia.) if required. In addition, the GPRS-DLC-BX1/SP version includes a 30W solar panel with brackets for mast/pole fixing. Please note that the logger has to be mounted outside the modem box. A line rental and data package are also required to complete the system and must be ordered separately. To ensure your modem system exactly meets your needs, please request a quotation.
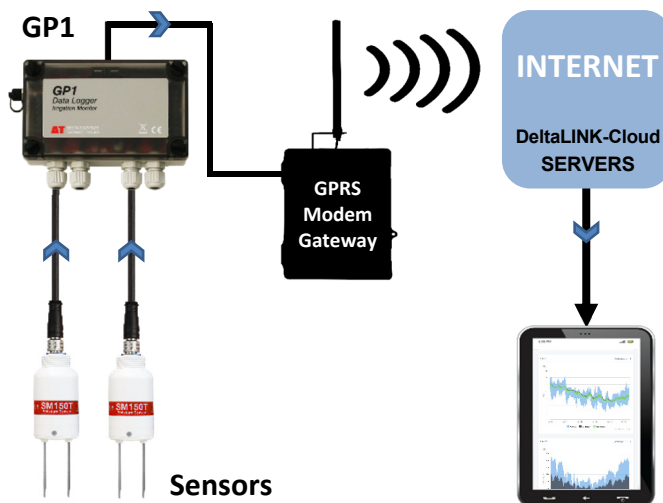
GPRS-DLC-BX1/SP and GPRS-BX1/SP Modem Box

GPRS options without DeltaLINK-Cloud access

For customers who would prefer not to use the free DeltaLINK-Cloud service, or whose local GPRS service cannot be accessed by the Delta-T Smart SIM, we can supply the GPRS-BX1/B and GPRS-BX1/SP modem systems. They only provide access via DeltaLINK PC software and not DeltaLINK-Cloud. All DeltaLINK functionality is available as detailed above (for the GPRS-DLC-BX1/SP and GPRS-DLC-BX1/B systems).

These systems are supplied without a SIM and come with modems that require a fixed IP address. In all other respects the hardware is identical to the GPRS-DLC-BX1/SP and GPRS-DLC-BX1/B systems. Please note that to activate the system customers need to obtain their own SIM card and to make arrangements with a network provider. (The SIM must have fixed IP address and be GPRS enabled).

GP1

INTERNET

DeltaLINK-Cloud SERVERS

GPRS Modem Gateway

Sensors

DeltaLINK-Cloud
www.deltalink-cloud.com

DeltaLINK-Cloud is a **free*** online data viewing and sharing service for Delta-T data loggers and weather stations. Collect, view and share your sensor data with ease. Anywhere. Anytime.

DeltaLINK-Cloud is a secure cloud based connectivity, data management and data retrieval solution.

The website allows a user to monitor the status of their devices, to graph and export data and to share the data with others. All website functionality comes for free and is accessible from most internet capable devices (phones, tablets and computers).

FREE Service

- **Remote data monitoring**
- **Share data and collaborate**
- **Automatic upload**
- **Flexible charting and reporting**
- **Smart SIM card provided**
- **Secure and encrypted**
- **Multi-language (Fr, De, Es, 中文)**

Visit the DeltaLINK-Cloud Information page at:
www.delta-t.co.uk/deltalink-cloud.asp

*Requires GPRS Modem Gateway and Data Package.

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.

Optional accessories:

Mounting Kit type GP1-MP1 stainless steel mounting plate with fittings for up to 51mm diameter tube or post.

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

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

GP1 M8 Cabling and Network Accessories - please enquire.
GPRS 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 **DL2e** can take readings from up to 62 input channels for larger logging applications.

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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