Umweltanalytische Produkte GmbH

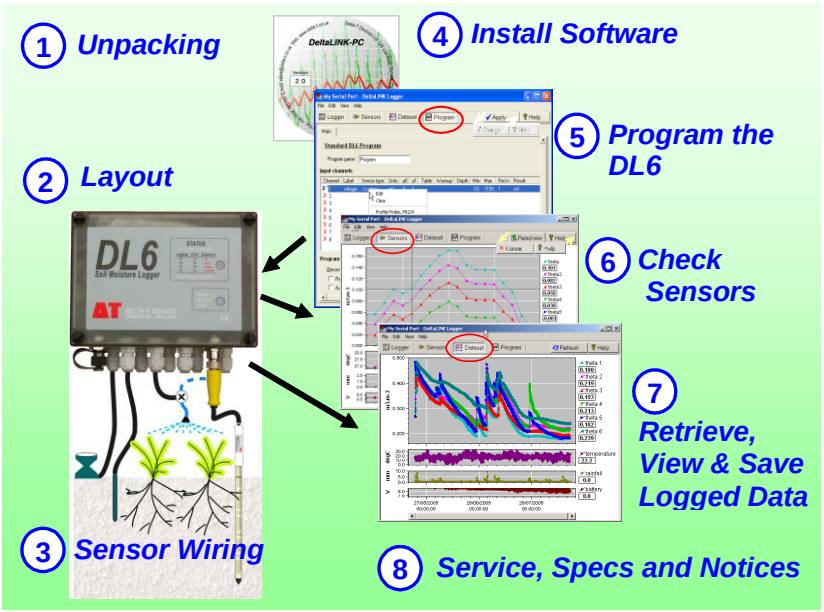
DL6 Data Logger

Soil Moisture Logger with 6 Soil Moisture Channels, Temperature and Rain Gauge Channels and Versatile Relay Channel

Quick Start Guide *Version 1.2*

Delta-T Devices Ltd

Weitere Infos unter vertrieb@upgmbh.com / support@upgmbh.com



1 Unpacking

The DL6 package includes the following:

- DL6 Logger with alkaline batteries and DL6 to PC serial cable (DL6-RS232)
- CD with DeltaLINK-PC software

Optional accessories:

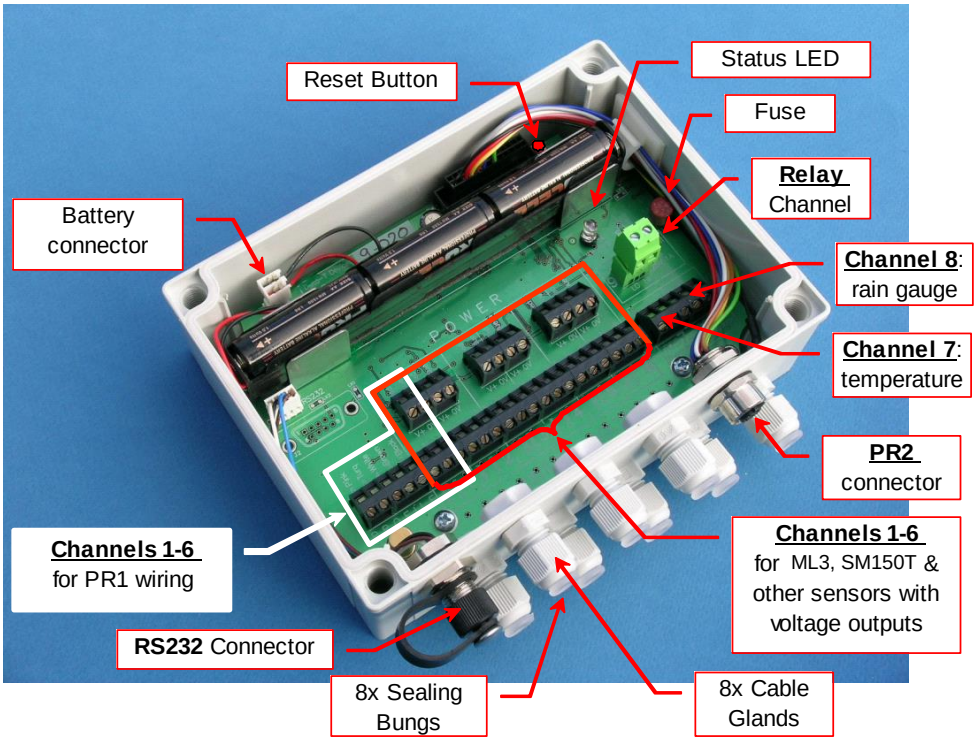
- Mounting Kit (DL6-MKT1) – *1 m stainless steel post, mounting plate with fittings.*
- Spares Kit (DL6-SP) – *fuse, desiccant, battery holder, cable glands, bungs & O-rings.*
- Spare Alkaline batteries (DL6-BAT)
- Spare Lithium batteries (DL6-ELB)

Compatible sensors:

- One Profile Probe type PR2/4, PR2/6, PR1/4 or PR1/6 (see note*[1])
- or up to six SM series Soil Moisture Sensors (SM150, SM150T, SM200 or SM300)
- or up to six ThetaProbe Soil Moisture Sensors (ML2 or ML3)
- and one temperature sensor – e.g. 2K thermistor (ST1, SM150T, SM300 or ML3)
- and one rain gauge (RG1 or RG2)

Note*[1]: Two soil moisture sensors can also be used along with a PR2/4 or PR1/4 Profile Probe
Note*[2]: Only one of the six SM150T or SM300 temperature sensors can be used

2 Layout



The DL6 is a nine channel logger with: 6 differential analogue channels suitable for soil moisture sensors, one resistance channel suitable for a 2K thermistor, one event counter channel suitable for a rain gauge, and one versatile relay channel.
Up to 16000 readings can be stored.

3 Sensor Wiring

Profile Probes

Profile Probe PR2/4 and PR2/6: use the PR2 to DL6 cable (PRC/M12-05) or choice of extension cables (no wiring–up required).
Do not connect any other sensors to channels 1-4 or 1-6 respectively.

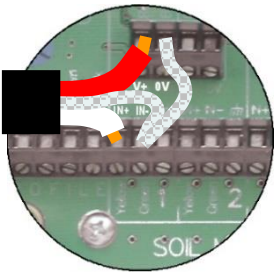
Profile Probe PR1/4 and PR1/6: Wire according to the colours printed beside the terminals. Do not connect any other sensors to channels 1-4 or 1-6 respectively.

See the online **PR1 Wiring Instructions Guide** in the **DeltaLINK Document Library** folder.

Single-ended voltage sensor (e.g. SM200)

The picture shows an SM200 single-ended sensor connected and powered from Channel 1.

Function	Colour (SM200)	DL6 terminal
Power to sensor	Red	**V+**
Signal	White	**IN+**
Ground	Shield	**IN-**and **0V**

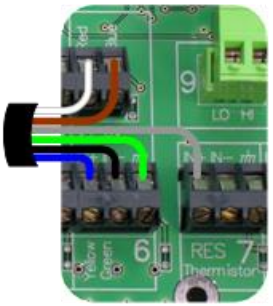


Note: Ensure a wire link is fitted between IN- and 0V.

Differential voltage sensor (e.g. ML3)

The picture shows an ML3 soil moisture sensor connected and powered from Channel 1 and its temperature sensor connected to the resistance channel.

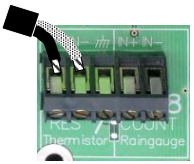
Function	Colour (ML3)	DL6 terminal
Power to sensor	White	**V+**
Power return	Brown	**0V**
Signal +ve	Blue	**IN+**
Signal -ve	Black	**IN-**
Temperature +	Grey	**RES IN+**
Cable screen	Green	⏚



Temperature / Resistance channel 7 (e.g. ST1)

The picture shows a 2K thermistor temperature sensor connected to channel 7. Connect between **IN+** and **IN-**.

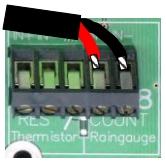
Connect any braid or screen to the ⏚ terminal if required.



Rain gauge / Count channel 8 (e.g. RG1)

Use this channel to monitor slow events such as a rain gauge. A rain gauge is shown connected to **IN+** and **IN-** terminals. This channel can be used to initiate dual-rate logging. Refer to online Help for detailed information.

Note: the polarity of cable connection is not important when using thermistors or rain gauges.

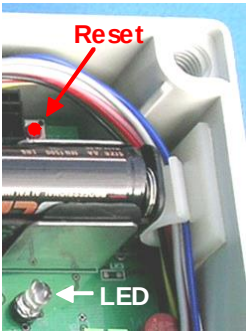


Relay (alarm) channel

The **relay** channel is an open/close switch (default condition open). The channel is protected with a resetting poly-fuse and can switch up to 1A.

Reset Switch

In the unlikely event of the logger locking up, press the **Reset** button briefly.



After pressing **Reset,** four **LED** flashes indicate that the DL6 is performing a warm reset. Program and data are preserved and logging will resume.

Holding **Reset** for more than 5 seconds will initiate a cold reset, with the status **LED** flashing an additional four times. A cold reset restores the factory-set default program and deletes all data.

Status LED

Tap the logger - the LED should flash as follows:
If it does not flash, check the battery.

Pattern	Logging?	Error?
★	No	No
★★	Yes	No
★★★	No	Yes
★★★★	Yes	Yes

Analogue Channel Considerations

The differential analogue channels accept signals of nominally 0 to 1V, with a full signal range of –0.01 to +1.15 V. Each channel has **V+ and 0V** connections to allow the switched powering of sensors. Sensors can be powered up with an adjustable warm-up time prior to taking sensor readings. Warm-up times of multiples of 1 second are permitted. The supply voltage is unregulated. Ensure analogue signals are kept within the permitted input voltage range (-0.2 to +3 V relative to logger ground ⏚). If sensors are used that are not powered by the DL6 then the input signal may need a 10K resistor between IN- and ground.

4 Install Software

To operate the DeltaLINK software for the DL6 logger you need:

- A PC running Windows XP, Vista, 7,8,10 or a later version.
- Microsoft Excel 97 or later for the Dataset Import Wizard.
- One free RS232 serial port or USB-RS232 adapter.
- DVD or internet connection for installing DeltaLINK.
- A minimum of 50MB of available hard disk space.
- DL6 to PC RS232 cable (supplied with DL6).
- DeltaLINK-PC version 3.6 or later, from DVD or www.delta-t.co.uk.
- Acrobat Reader for reading documentation (free download from www.adobe.com)

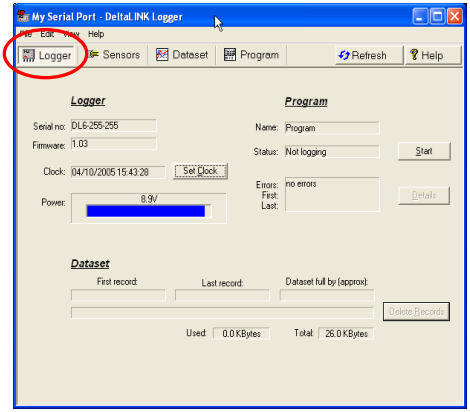
To install DeltaLINK-PC:

1. Insert the DVD, browse to loggers, DeltaLINK and select Install DeltaLINK, or download and install it from http://www.delta-t.co.uk/software/
2. Setup creates a desktop shortcut to DeltaLINK-PC, and a DeltaLINK-PC program group.
3. Check **Release Notes.pdf** in the **Document Library** folder for latest information.

Start DeltaLINK-PC

1. Connect the DL6 to the PC's serial port (preferably COM1) using the supplied DL6 to PC serial cable[1]
2. Double click on the **DeltaLINK-PC** icon on the desktop.

3. DeltaLINK attempts to connect to a logger. If successful, DeltaLINK shows information about the DL6 in the **Logger** window.
4. If you have a fresh installation, DeltaLINK attempts to use COM1. If the connection fails because the DL6 is connected to the wrong serial port select **File, Properties**. Click **New...** to create a connection which uses the correct port.

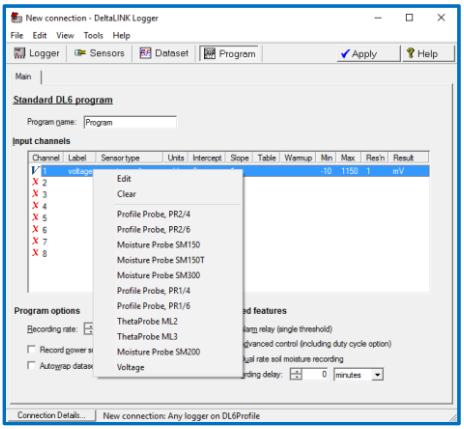


Online Help

DeltaLINK provides extensive online **Help**. Click **Help** from any DeltaLINK window (or press F1) for detailed information about DeltaLINK operation and functionality. Select **Help, Document Library** to open a folder of application notes and technical documentation.

5 Program the DL6

1. Select the **Program** window. For a new logger, this will show the DL6's factory-set 'Default' program. Click **Change** to enter your own program settings.
2. Right-click the **Input Channels** list to select a sensor type from a pop-up menu, or select **Edit Channel** from the popup menu to customize a sensor's properties.
3. Click the **Advanced Features** options to add or remove **Alarm**, **Control and Dual Rate** tabs, and enter details in these tabs, as required.
4. Click **Apply** to install a modified logging program into the DL6 logger.



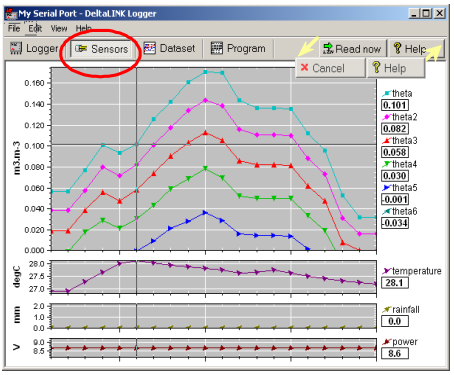
Custom Sensor Support

DeltaLINK supports the use of custom sensor linearisation tables for using custom sensor types. Refer to the **Document Library** folder for detailed instructions.

[1] You can also communicate with the DL6 via a modem (see Document Library folder for modem application notes).

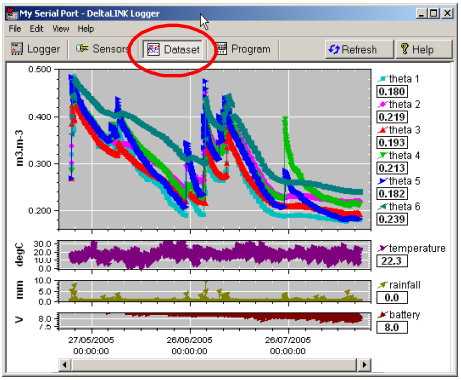
6 Check Sensors and Start Logging

1. Select the **Sensors** window and click the **Read now** button. The sensor readings will continually refresh on a scrolling time graph.
2. Observe the sensor reading display in the scrolling charts and value panels while adjusting sensor wiring and/or installation conditions.
3. Click the **Cancel** button when finished.
4. Once sensors are setup select the **Logger** window and click **Start** to commence logging.



7 Retrieve, View and Save Logged Data

1. Select the **Dataset** window. All stored data in the logger will be retrieved and displayed on the screen (it may take a few seconds to upload the data). Click **Refresh** if required.
2. Select **File, Save** to save the data to a dataset file.
3. Select **File, Open** to open and view a previously saved dataset file.
4. To save a dataset file as a ASCII file for importing into other programs, open the file in DeltaLINK, and select **File, Save As…** selecting the appropriate file type to save.



Dataset Import Wizard

Dataset Import Wizard helps you seamlessly import data into MS Excel spreadsheets. Multiple dataset files may be imported and the data interleaved.

1. Select , **All apps**, **DeltaLINK**, **Install Dataset Import Wizard**.
2. If prompted by Excel, select Enable Macros. Note that Excel's security settings must allow macros to run: refer to Excel Help.
3. Dataset Import Wizard will report that it has installed successfully, and will add **Import Dataset(s)** to the Add-in menu (or File menu in earlier Windows versions).

To Start Dataset Import Wizard: Start Excel, select Add-ins, Import Dataset(s) and follow the instructions (or File, Import Datasets in earlier versions of Windows.

DeltaLINK Cloud

For our free Cloud service see
http://www.delta-t.co.uk/deltalink-cloud/

DeltaLINK-Cloud
www.deltalink-cloud.com

8 Specifications, Service and Notices

Inputs/outputs	#	Range	DL6 Accuracy logger -10 to +50°C	Notes
Analogue channels (soil moisture)	6	0.0 - 0.1 $m^3.m^{-3}$	±0.001 $m^3.m^{-3}$	Applicable to : ML3, SM300 and PR2 (with up to 100m cable) PR1 (up to 25m cable) Mineral & organic soil calibrations
	6	0.1 - 0.6 $m^3.m^{-3}$	±1% of reading	
Analogue channels (DC voltage)	6	-10 to 1150 mV Common mode range -0.2 to 3V	±(0.3mV + 0.2% of reading) + common mode error: 0.25mV/V	Logger can read either volumetric water content or voltage (not both)
Temperature channels	1	sensor -20 to +60°C	±0.4°C	Using ST1 or ST2 or other 2K thermistor
Event counter channel	1	<50Hz, contact closure or pulse logic inputs		Max 1mm/second if using RG2 rain gauge (0.2mm/tip)
Sensor excitation	6	5 - 9V at 120mA		Uses internal battery voltage supply
Alarm out	1	1A, 25V DC/AC		Isolated relay switching 2A max[1]

Note 1: Alarm relay rated 2A but the fuse is 1A. Alarm out should support brief 2A

Feature	Full scale	Notes
Logging frequency	1s to 24hr	User selectable with accelerated logging option
Accelerated logging	1s to 24hr	User selected - rain gauge or event triggered
Reading capacity	16k readings	Auto-wrap or stop logging - user selectable
PC connection	1	Via RS232 connection (USB to RS232 converters are available)
Battery lifetime	1yr	6 alkaline AA cells last for up to one year (depends on logging frequency)
Environmental	IP67	-20 to +60°C Operating -10 to +50°C Full accuracy

Product Care and Maintenance

The **battery** can be removed for 10 hours without losing program settings or data, but no additional data will be logged while the battery is removed. Change the battery when the **Power** indicated in the **Logger** window of **DeltaLINK** is under 6.6V.

If the battery goes completely flat the LED will not flash. Put in new batteries. You may need to press the **Reset** button inside the logger then update the clock in DeltaLINK **Logger** window.

Use Lithium batteries for extended battery life and the full temperature range of the logger.
A lithium battery will typically last 3 to 5 times longer than a good quality alkaline.
Use of rechargeable or zinc-chloride batteries is not recommended for performance.

Desiccant: If indicator paper in the lid turns pink change or regenerate the white desiccant bag. Regenerate desiccant at 120ºC for 4 hours. Seal desiccant in a plastic bag when logger is open.

Legal Notices

This product uses software code. It should not be used in safety-critical applications or where consequential loss may occur. It is the responsibility of the user to ensure appropriate safeguards are in place for regularly monitoring and checking the equipment.

In no event shall Delta-T's liability exceed the selling price of the product. Delta-T is not liable for indirect, incidental or consequential damages in connection with the use of equipment, including but not limited to: data loss, vegetation loss, loss of energy or water, cost of substitute equipment or services, property damage, or personal injury that results from installer's negligence. The customer agrees to the limitations and exclusions of liability by purchase or use of this product.
See also **Product Usage.pdf** in the online **Document Library** folder.

The DL6 product is CE compliant, conforming to EN61326 (1997).

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