
GB ***OPERATING MANUAL***



DATA LOGGER THI/USB

BA-THI-01-GB

Table of contents

Foreword	A - 01
1. Please read before putting into operation	A - 01
2. Package contents	A - 02
3. What you will require	A - 02
3.1. Installation of the required software	A - 02
3.1.1. Installation of the USB controller driver	A - 02
3.1.2. Installation of the SmartGraph software	A - 03
4. Features	A - 03
5. Operation	A - 04
5.1. Operating modes	A - 04
5.2. Switching on and off	A - 04
5.3. Connecting external sensors	A - 04
5.4. Displaying the measured values	A - 04
5.5. Data recording options (logging)	A - 04
6. Notes on maintenance and operation	A - 05
7. Tips and tricks	A - 06
8. Technical data	A - 07

Foreword

In the **THI/USB**, you have chosen a measuring instrument that offers you a comprehensive range of possible uses.

The dual-channel data logger has two internal sensors to measure air temperature and humidity.

Please study all the documentation for this device thoroughly, so that you can exploit this measuring instrument's range of functions to the full in practice.

This operating manual describes the hardware functions.

A separate operating manual for the corresponding software for configuring the data logger, the **software handbook**, is included on the CD-ROM.


1. Please read before putting into operation

This measuring instrument has been constructed according to the current state of the art and fulfils the requirements of the applicable European and national guidelines. This conformity has been proven; the manufacturer is in possession of the relevant declarations and documents. You as a user must follow these operating instructions in order to maintain this condition and to ensure safe operation!

- Before using the device, this operating manual must be read carefully and followed in all points.
- Never make measurements on live electrical parts.
- Observe the measurement range of the measured value recorder (inappropriate use can lead to destruction).
- The determination of valid measuring results, conclusions and actions derived from them are exclusively the responsibility of the user! Any liability or guarantee for the correctness of the results obtained is excluded. Under no circumstances will any liability be accepted for damage resulting from the use of the measuring results that were obtained.



Appropriate use:

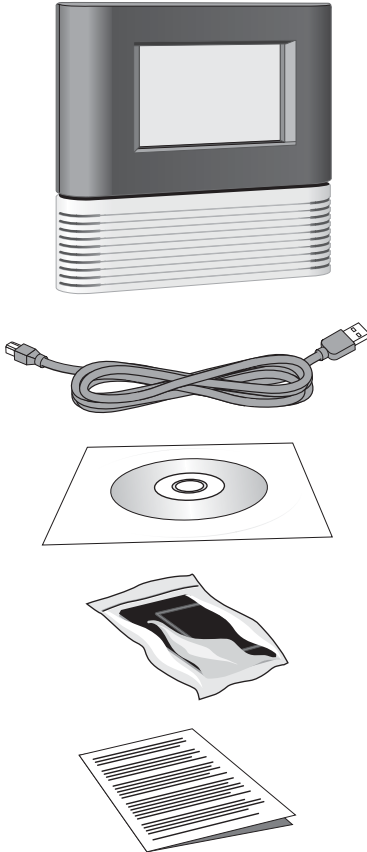
- The measuring device may only be operated within the specified technical parameters.
- The measuring device may only be used under the conditions and for the purposes for which it was designed.
- Operational safety can no longer be ensured if modifications or conversions have been made.
-  Electronic equipment may not be disposed of in the domestic waste, but must be correctly disposed of in accordance with the European Parliament and European Council Guideline 2002/96/EG of 27th January 2003 regarding used electrical and electronic equipment. Please dispose of this equipment in accordance with the applicable legal stipulations when its service life is ended.

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2. Package contents

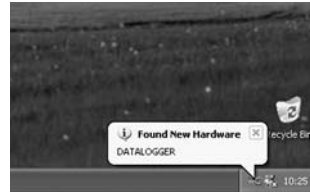
Your data logger is supplied with the following components:

- Data logger
- USB cable, length 1 m
- CD-ROM with software and operating manuals
- Fixing kit for wall mounting
- Works certificate



3.1.1. Installation of the USB controller driver

1. Place the CD-ROM in the CD-ROM drive of your PC.
2. Connect the data logger to your PC with the USB cable provided.



After communication is established, a message will be displayed on your PC, stating that new hardware has been found.



3. Hardware assistant

The hardware assistant will start automatically. Select "Install the software automatically" and confirm with "Next".



The driver will be searched for.



A warning message will appear, stating that the installed software has not passed the Windows logo test.

IMPORTANT!

Ignore this warning message and select "Continue Anyway".

3. What you will require

To configure your data logger and to read out the recorded measured values, you will require a PC with the following minimum performance:

- 450 MHZ Pentium-compatible CPU or better
- CD-ROM drive
- USB connection
- Operating system Windows 98/2000/ME/XP
- Minimum 128 MB RAM
- Adobe Acrobat Reader software
- Approx. 5 MB free hard disk space for installation of the software
- An additional 10 bytes of hard disk space for each measured value to be logged

3.1. Installation of the required software

Two prior steps are necessary in order to connect the data logger to the PC and to configure it using the software:

- Installation of the USB controller driver
- Installation of the SmartGraph software



The USB driver will be installed.



Select "Finish".

The first required USB controller is now available.

Note: Only the first required USB controller will be installed!



IMPORTANT : For the installation of the second required USB controller driver, it is necessary to repeat the entire procedure until the second required USB controller is available, otherwise the SmartGraph software cannot recognise the data logger!

3.1.2. Installation of the SmartGraph software

1. Place the CD-ROM in the CD-ROM drive of your PC

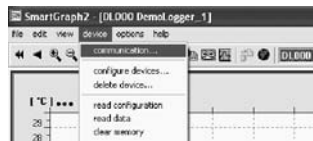
2. Install the software on your PC.

Follow the installation assistant's instructions.



3. After successful installation, start the software.

4. In the "device" menu, select the menu item "communication".

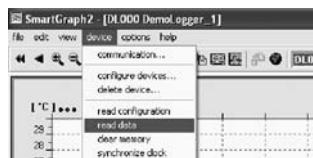


5. Select the interface for your data logger and confirm the selection.

6. Connect the data logger to your PC with the USB cable provided. Make sure that the USB driver has already been installed.



7. The data logger can now be called up via the software. To do this, select the relevant item in the "device" menu.



Further and more detailed information on the use of the software can be found in the **software handbook**, which is also included on the CD-ROM.

4. Features

Your data logger has the following features:



display for the indication of measured values, operating mode, date and time

concealed operating mode button USB B PC interface

- Two measurement channels for the recording of various measured variables:

Measurement channel 1:

Internal air temperature sensor

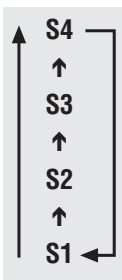
Measurement channel 2:

Internal capacitive air humidity sensor

- One memory for 60,000 single measured values per measurement channel
- A separate alarm function for each measurement channel

5. Operation

5.1. Operating modes



Four different operating modes can be selected for the data logger. The selected operating mode (selection) is indicated in the bottom left-hand corner of the display with S1, S2, S3 or S4. Switching between the various operating modes is effected via the operating mode button.

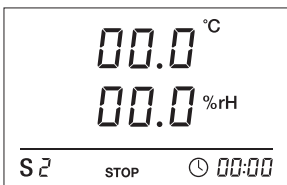
To select the desired operating mode, press and hold down the operating mode button with the aid of a blunt object, such as a ballpoint pen, until the desired operating mode (S1, S2, S3, S4) is indicated in the bottom left-hand corner of the display.



The four operating modes:

Operating mode 1 (S1)

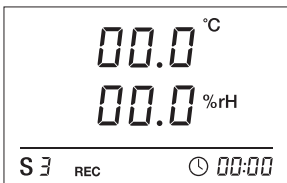
The data logger is switched off. OFF appears in the upper line.



Operating mode 2 (S2)

The data logger is switched on; it determines the measured values of the individual measurement channels and displays them, as described in **chapter 5.4**. The logging mode is not activated in this operating mode; the displayed values are not stored in the memory. The display indicator for the storage of the measured values therefore displays STOP (no recording).

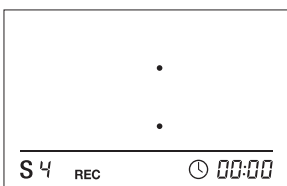
The data logger is switched on; it determines the measured values of the individual measurement channels and displays them, as described in **chapter 5.4**. The logging mode is not activated in this operating mode; the displayed values are not stored in the memory. The display indicator for the storage of the measured values therefore displays STOP (no recording).



Operating mode 3 (S3)

The data logger is switched on; it determines the measured values of the individual measurement channels and displays them, as described in **chapter 5.4**. The logging mode is activated in this operating mode; the displayed values are stored in the memory. The display indicator for the storage of the measured values therefore displays REC (recording of the measured values).

The data logger is switched on; it determines the measured values of the individual measurement channels and displays them, as described in **chapter 5.4**. The logging mode is activated in this operating mode; the displayed values are stored in the memory. The display indicator for the storage of the measured values therefore displays REC (recording of the measured values).



Operating mode 4 (S4)

The data logger is switched on; it determines the measured values of the individual measurement channels but does **not display them**. The logging mode is activated in this operating mode; the displayed values are stored in the memory. The display indicator for the storage of the measured values therefore displays REC (recording of the measured values).

The data logger is switched on; it determines the measured values of the individual measurement channels but does not display them. The logging mode is activated in this operating mode; the displayed values are stored in the memory. The display indicator for the storage of the measured values therefore displays REC (recording of the measured values).

5.2. Switching on and off

The data logger is switched on and off via the operating mode button (see **chapter 5.1**). The equipment is delivered as standard in operating mode S1 (switched off).

Switching on

Press and hold down the operating mode button of the switched-off data logger with the aid of a blunt object, such as a ballpoint pen, until the desired operating mode (S2, S3, S4) is displayed. The device is now operating.

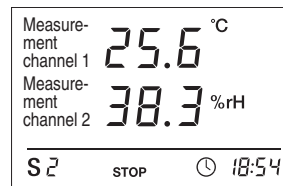
Switching off

Press and hold down the operating mode button of the switched-on data logger with the aid of a blunt object, such as a ballpoint pen, until operating mode S1 and OFF are displayed. The device is now switched off.

5.3. Connecting external sensors:

The connection of external sensors is not possible for this model.

5.4. Displaying the measured values



Two different measured values are displayed simultaneously.

5.5. Data recording options (logging)

When operating mode S3 or S4 is selected, the data logger is in logging mode and the measured values determined are stored in the device. The specifications for the type, duration and scope of the data recording in logging mode can be individually set via the software.

The following list of the various options serves only as a quick overview; more detailed information on this subject may be found in the software handbook.

Selection possibilities for the logging mode:

The measuring instrument records the measured data continuously. Two possibilities for the organisation of the memory are available for selection:

Start-stop mode

In start-stop mode, the measured data for each channel is recorded until the memory capacity of 60,000 values per channel is reached. Recording is then ended automatically.

Ring mode

Alternatively, ring recording mode may be selected in place of start-stop mode. In this case, the recording does not stop when the memory capacity has been reached, but continues indefinitely. To this end, the respective oldest values are continuously overwritten by the newest measured values.

Further adjustable parameters for the logging mode:

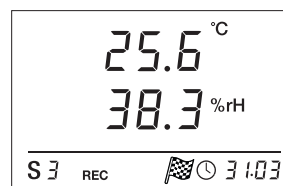
Sampling rates

The measured value to be stored during sampling can be selected via the software for each logging mode. The following measured values can be selected in any combination as desired: average value, minimum value and maximum value.

Additionally, the sampling rate for the sensor and the storage rate for recording the measured values can also be set. Both rates can be set from 1 to 1440 minutes.

Preset operating mode

Besides the possibility of starting the recording of measured values immediately, the data logger can also be used in the so-called preset operating mode. The starting date and time for the measurement period are set and the recording of the measured values starts at this time.



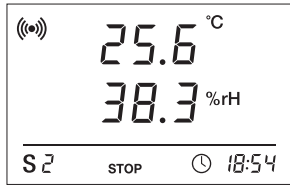
If preset operating mode has been selected, the starting flag symbol is displayed in the lower display line and the starting date and time for data recording will be displayed alternately in the date/time display.

When the preset starting time is reached, the starting flag display disappears, the real time clock is displayed, the data logger switches automatically from the previous operating mode (S1, S2, S3) to the logging mode of operating mode S4 and data recording begins. **It is therefore not necessary to switch on the logger in preset operating mode.**

Even if the data logger had already been previously switched on, in preset operating mode it records exclusively the measured data for the defined period, but not the measured data from the time of switching on.

Alarm function

A separate alarm function for each measurement channel can be configured via the measuring instrument administration. A value corridor is specified, the so-called 'good' range, outside of which an alarm is triggered, via the definition of an upper and lower alarm limit value.

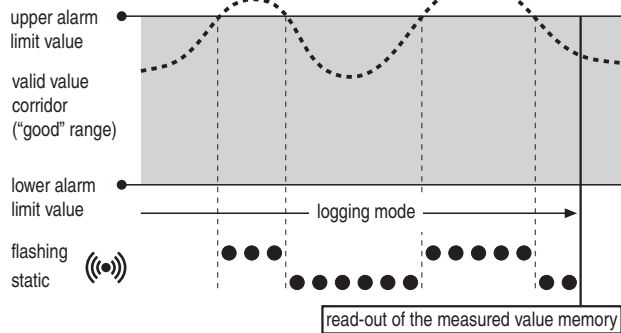


If an alarm is triggered on one of the available measurement channels, a continuously flashing alarm symbol appears alongside the measured value for this channel for as long as the measured value lies outside the 'good' range.

If the measured values re-enters the defined value corridor, i.e. the 'good' range, the alarm no longer flashes, but is displayed statically. This is intended to indicate that an alarm event has taken place. If the measured value once again moves outside the 'good' range, the alarm symbol flashes again.

The alarm display is extinguished by reading out the measured value memory.

Alarm display



Additionally, a hysteresis can be set, by which value the measured value must re-enter the valid range in order to switch off the alarm.

Further information on alarm hysteresis and its practical use can be found in the chapter "Tips and tricks".

Note: The visual illustration of the alarm function on the display is only available in operating modes S2 and S3! The storage of alarm events in logging mode is, however, independent of the selected type of display of the measured values, i.e. the alarm events are recorded even in operating mode S4 with the display deactivated.

6. Notes on maintenance and operation

Positioning for mobile use

The data logger can be positioned as required for the mobile recording of measured values. **Please observe the permitted ambient conditions for operation** (see technical details) Due to its compact dimensions, the data logger can also be placed out of sight for inconspicuous use.

Wall mounting

The data logger can also be mounted on a wall for the stationary recording of data. A fixing kit for wall mounting is included in the package. Only the holding plate need be mounted on the wall to install the data logger. The data logger can then be slid onto the holding plate by means of the guide rail at the rear.

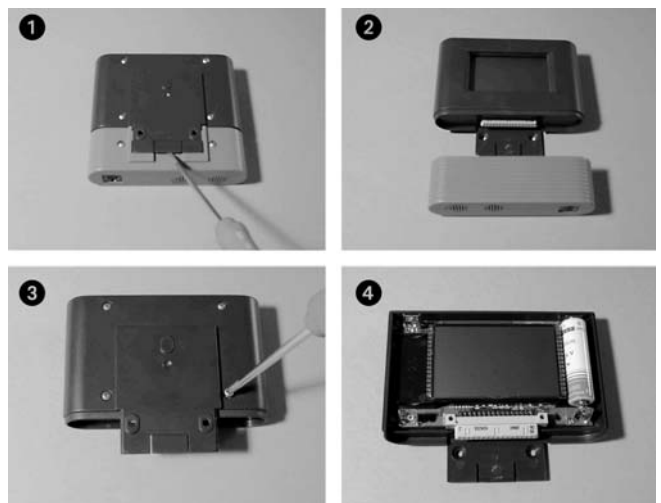
Change of location

In particular when moving from a cold to a warm environment, for example, when bringing the device into a warm room after overnight storage in a car, water may condense on the circuit board, depending on the relative humidity of the air in the room.

This physical effect, which cannot be prevented by structural means for any measuring instrument, leads to false measurement values. In such cases, please wait about 5 minutes until the measuring instrument has 'acclimatised' itself before commencing with measurements.

Battery replacement

If BATT appears in the upper line of the display, the battery must be replaced.



In order to replace the battery, first separate the display module from the sensor module. Carefully lift the connecting tab at the rear of the data logger with the aid of a suitable tool, such as a screwdriver.

The sensor module can now be detached from the display module.

Loosen the four screws at the rear of the display module with a suitable screwdriver. Place the display module on a flat surface with the display facing upwards and carefully lift up the upper part of the plastic cover.

Please be sure to observe the correct polarity when inserting the battery and read the safety instructions on the battery. Only use batteries which comply with the technical data.

Other types of battery are not permitted and can cause faulty operation. Do not use rechargeable batteries!

Finally, screw the upper and lower parts of the casing together again, fit the sensor module onto the guide rail of the display module and carefully push the two modules together until they latch.

The battery should be replaced once per year. Frequent transfer of data to the PC reduces the battery lifetime.

Do not throw the batteries into the domestic waste, into a fire or water, but dispose of them correctly in accordance with applicable legal regulations.

“Set Clock” display

So that the clock setting is retained when changing the battery, it is recommended to set the device to operating mode S1 (see 5.1, Operating modes). The power consumption is very low in this operating mode and the clock setting will be retained if the battery is replaced quickly.



If the time setting is deleted (e.g. in case of a longer power interruption) “SEt CLOC” appears in the display (note: due to the 4-digit seven-segment display, the word “clock” cannot be fully displayed).

This indicates that the date and time should be set, otherwise the clock will start with the default value (e.g. 1/12/2005). The “Set clock” display remains visible until the time has been synchronised via the SmartGraph software. No measured values will be displayed until the clock has been set.

Care

Clean the device if necessary with a moist, soft, lint-free cloth. Take care that no moisture enters the casing. Do not use sprays, solvents, cleaning agents containing alcohol or scouring agents; use only clean water to moisten the cloth.

7. Tips and tricks

Use of alarm hysteresis

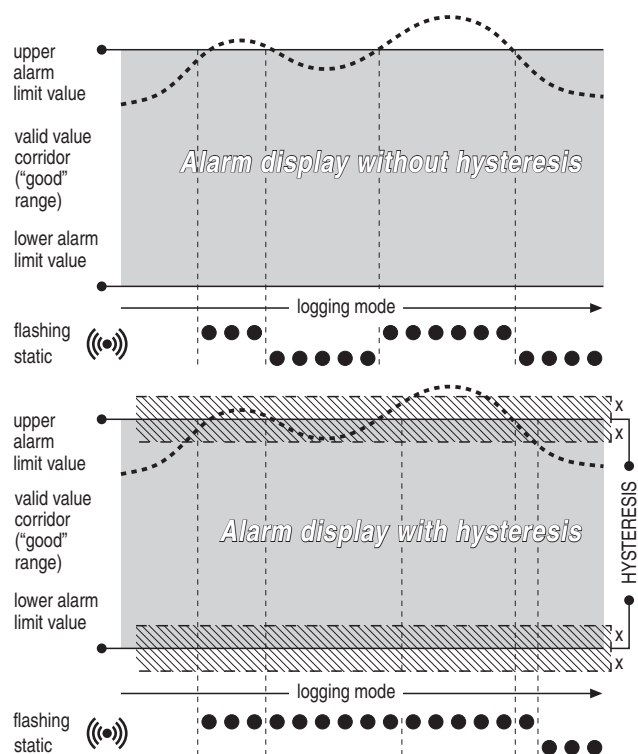
If the alarm function without hysteresis is used, an alarm will be triggered and recorded each time the specified limit value is exceeded.

If your limit values are very tightly selected, this leads to a very frequent occurrence of alarm situations.

For example, if a room temperature of 24 °C is entered as the upper alarm limit value and a room temperature of 10 °C is entered as the lower alarm limit value and the room temperature settles permanently in the range between 23.5 and 25 °C during the measurement period, the result will be that numerous individual alarm signals will be generated and recorded during the entire measurement period.

In order to avoid this, an alarm hysteresis can be defined. With this setting, you can define a value by which the measurement value must re-enter the valid value corridor in order to switch off the alarm.

With a set value for the alarm hysteresis of 1 °C, the alarm in the above example would only be triggered once when 24 °C was exceeded and would only be switched off again when the value fell below 23 °C.



Battery replacement and lifetime

So that your measuring instrument is always ready for use, the battery should be replaced once per year. Frequent reading out of the measured data reduces the battery lifetime.

Measurement intervals and recording duration

The type of measured values to be recorded and the respective storage rates should be adapted to the purpose of use.

If you are intending to create particularly detailed documentation and wish to use all the software evaluation options, you can simultaneously record the average, minimum and maximum values for each measurement channel.

Given a specified storage rate of 10 minutes, a maximum recording duration of around 183 days would be possible in this case. For recording at shorter intervals, the storage rate can be reduced to a value of one minute. However, this also reduces the maximum recording duration.

If the main object of your measurement is long-term documentation, you can just record one value, for example, the average value. At a storage rate of 10 minutes, the memory capacity for this configuration allows a recording duration of 416 days!

8. Technical data

Data Logger		THI/USB
Function and alarm indication		Display
Measurement channels		2
Measured value memory (60,000 per channel)		120,000 measured values
Start/stop button		yes
Operating mode button		yes
Sensor elements	Measurement channel 1	Internal sensor for air temperature; NTC
	Measurement channel 2	Internal sensor for relative humidity; capacitive, HC series
PC interface		USB B
Storage conditions	Permissible ambient temperature	-30 °C to +60 °C
	Permissible relative humidity	< 95 % R.H., non-condensing
Operating conditions	Permissible operating temperature	-20 °C to +50 °C
	Permissible relative humidity	< 95 % R.H. or < 20 g/m ³ (the smaller value applies), non-condensing
Temperature (internal sensors)	Measurement range	-20 °C to +50 °C
	Resolution	0.1 °C for T: 0 to 40 °C, otherwise 0.2 °C
	Accuracy	0.3 °C for T: 0 to 40 °C, otherwise 0.5 °C
Relative humidity (internal sensors)	Measurement range R.H.	0 to 95 % R.H. or < 30 g/m ³ (the smaller value applies), non-condensing
	Resolution R.H.	0.5 % R.H.
	Accuracy R.H.	3.0 % R.H.
Electrical data	Power supply / battery	3.0 to 3.7 V / LS14500C (Saft)
	Battery lifetime	Approx. 1 year at a query interval ≥ 1 min.
Features	Standard package contents	Measuring instrument, USB cable 1 m, CD with software and manuals, fixing kit for wall mounting, works certificate.