

Manual **Datalogger**

Revision V12 (05/2006)

Datalogger TSE

Datalogger THI

Datalogger TCE

Datalogger TPR

Datalogger THC

Datalogger TIC



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1 General

The datalogger family Txx is a new development, which stands out from the field due to its excellent price / performance ratio.

The compact design and modular technology enables the datalogger to be used for a lot of various and different applications. The large display allows the measurement values to be read from a distance of several metres.

Due to its extremely low energy consumption and large memory, the product is definitely appropriate for long term measurements in both mobile and stationary applications.

The new-comers into the datalogger family are :

Datalogger THI = temperature / humidity internal

Datalogger TSE = temperature / humidity external

Datalogger TCE = thermocouples

Datalogger TPR = temperature / air pressure

Datalogger THC = temperature / humidity compact (without display)

Datalogger TIC = temperature / compact (without Display)

The Datalogger THI is an electronic mini thermo-hygrograph with internal sensors.

The Datalogger TSE has two channels, to which either two temperature sensors or one combined temperature/humidity sensor can be connected.

The Datalogger TCE is a 2 channel datalogger for thermocouples(J,K,N,E,R,S,T).

The Datalogger TPR enables the measurement of the air pressure as well as of the temperature.

The Datalogger THC is a pricely affordable datalogger for temperature and humidity without display and the Datalogger TIC a single channel datalogger for temperature without display.

The SmartGraph 2 software, which is delivered along with the instrument, allows the user to visualize the data on the PC screen and to record them.

The professional version SmartGraph 2 enables the values for temperature and dew-point to be shown on the display optionally in °C or °F and the humidity in % (relative humidity) or in g/m³ (absolute humidity).

2 Display module

The datalogger usually consists of two modules: the main body or display module and the module including the sensor(s)

The memory, real time clock and the microprocessor controller are located in the display module.

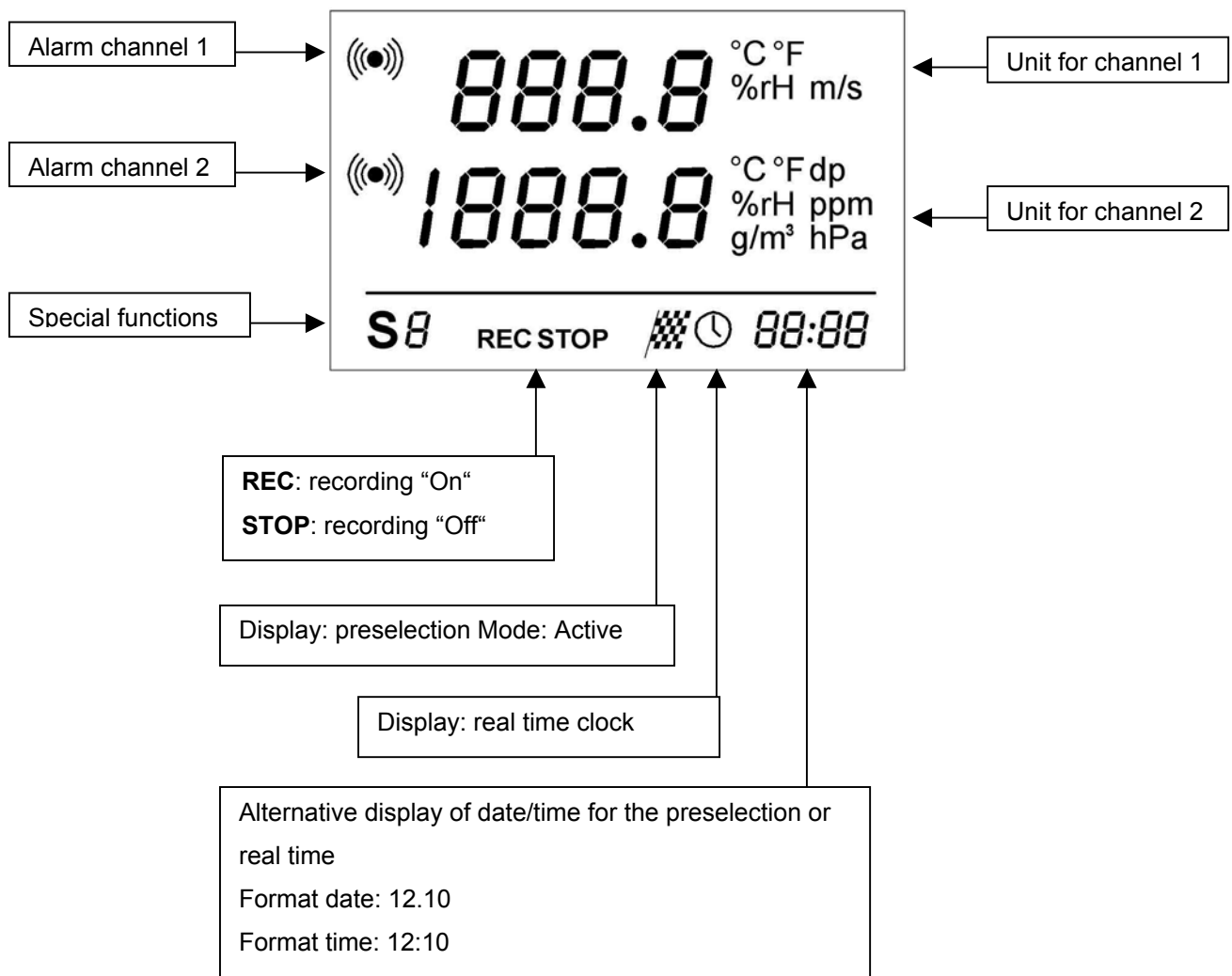


Figure: Datalogger Display Elements

Explanations concerning the display operation:

When a pre-set limit has been exceeded the alarm symbol of the corresponding channel flashes. Once an alarm has been recognized, the alarm symbol remains visible on screen in static form even if the limit is no longer exceeded. The alarm message can only be eliminated by selecting "Memory Readout" on the PC.

If the Pre-selection mode (start flag) was selected, the start-date and start-time for data recording are shown on the Date/Time display. Once the pre-set date/time has been reached the start flag is eliminated, the real time clock display becomes active and data recording begins.

3 Module with internal sensors

The sensors for temperature and relative humidity, the corresponding sensor adapters, and the serial interface (RS232) are located on this module.



Figure: Module with internal sensors

Necessary calibration intervals depend on the environmental conditions and the requirements of the permissible tolerance deviations.

A single point calibration of the internal sensors can be carried out using a comparison standard. The captured offset values can be entered in the SmartGraph software under: *Instrument / Configuration Of Instruments / Sensors / Settings*.

Two point calibrations can only be carried out in the factory.

4 Datalogger TSE with external sensors

The connectors for the external sensors, the corresponding sensor adapters and the serial interface (RS232) are located on this module.



Figure: module with external sensors

Either one or two temperature sensors or one to two combined temperature/humidity sensors can be connected. (Two sensors are only to be used in combination with the Professional version SmartGraph 2). If only one external sensor is used, it will be connected to the left hand sensor socket.

Important: the datalogger is a mere two channel datalogger. By connecting a combined temp./hum. sensor both channels are occupied and further sensors will be ignored.

In order that the instrument may correctly recognise to which channels the sensors are connected, both sensor socket positions must first be free. If a sensor is connected to one of the two sockets, the indication **UPLG** (Unplug) appears in the corresponding line (Line 1= left hand socket, Line 2= right hand socket).

If both socket positions are free, the indication **SENS** appears in the upper line, and the first sensor can be connected to the left hand socket position.

10 seconds are left yet (countdown on the display) to connect an optional second sensor to the right hand socket position.

Important: As long as SENS is shown on the display, the datalogger will not respond on the serial interface. It is therefore not possible to read out data or change the configuration.

The extension cable can be used with both external sensors.

Important: a maximum of 3 extensions can be connected to one temperature/humidity sensor and a maximum of 4 extensions to one temperature sensor.

Extensions can affect the accuracy!

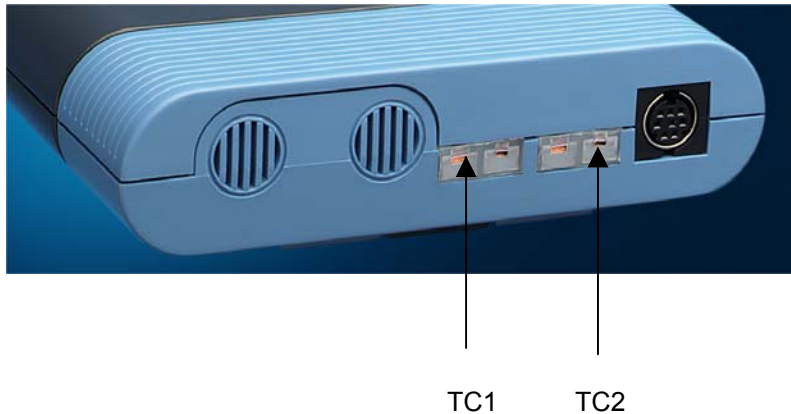
Necessary calibration intervals are dependent on the environmental conditions and the requirements of the permissible tolerance deviations.

A single point calibration of the sensors can be carried out using a comparison standard. The captured Offset values can be entered in the SmartGraph software under: *Instrument / Configuration Of Instruments / Sensors / Settings*.

Two point calibrations can only be carried out in the factory.

5 Datalogger TCE with thermocouples

The datalogger TCE supports the following thermocouple types (TC) : K, N, J, E, R, S and T at both outputs TC1 and TC2.



Important: the same TC type has to be used for both outputs (TC1 and TC2) ; make sure that the rotary switch is set in the position corresponding to the TC type (see table below).

The TC is set up via a rotary switch on the plug-in side of the sensor module. The set up value appears on the left side at the bottom of the display (switch position: S0...S9).



Rotary switch to set up TC

The sensor module should be removed to set up the TC (see § Changing the module).

A maximum of 7 TC (**type: K, J, N, E, R, S, T**) can be selected via the rotary switch.

A selection via the software is not possible.

Table: correspondance rotary switch position and thermocouple type

POSITION ROTARY SWITCH	THERMOCOUPLE TYPE
0	logger off
1	K
2	J
3	N
4	E
5	R
6	S
7	T
8	logger off
9	logger off

The channel which remains free (no connection with a TC) will show the cold junction temperature.

The TC are connected via SMP connectors.

Important: make sure to only use connectors with a blade ; stamped connectors are not allowed since they can irreversibly damage the TC connection plug.

Overview thermocouples

Datalogger-TC

Type-Code and ANSI colors	Switch position	Thermo- couple type	Material of the connecting plug		Measuring range °C
			+	-	
K	1	chromel/alumel	chromel	alumel	-200 ... +1200
T	7	copper-constantan	copper	constantan	-270 ... +400
J	2	iron-constantan	iron	constantan	-200 ... +1200
E	4	chromel-constantan	chromel	constantan	-270 ... +1000
R	5	Pt/13%platinum-rhodium	copper	alloy	-50 ... +1770
S	6	Pt/10%platinum-rdodium	copper	alloy	-50 ... +1770
N	3	nicrosil-nisil	nicrosil	nisil	-200 ... +1200

Important: check on the polarity when connecting a TC.

6 Datalogger TPR with temperature and air pressure

There is no special instruction to follow concerning this model.

The altitude of the place you are staying in can be set in the software SmartGraph2 which is delivered along with the datalogger. You will then obtain an air pressure value based on the sea level (1013,25 hPa).

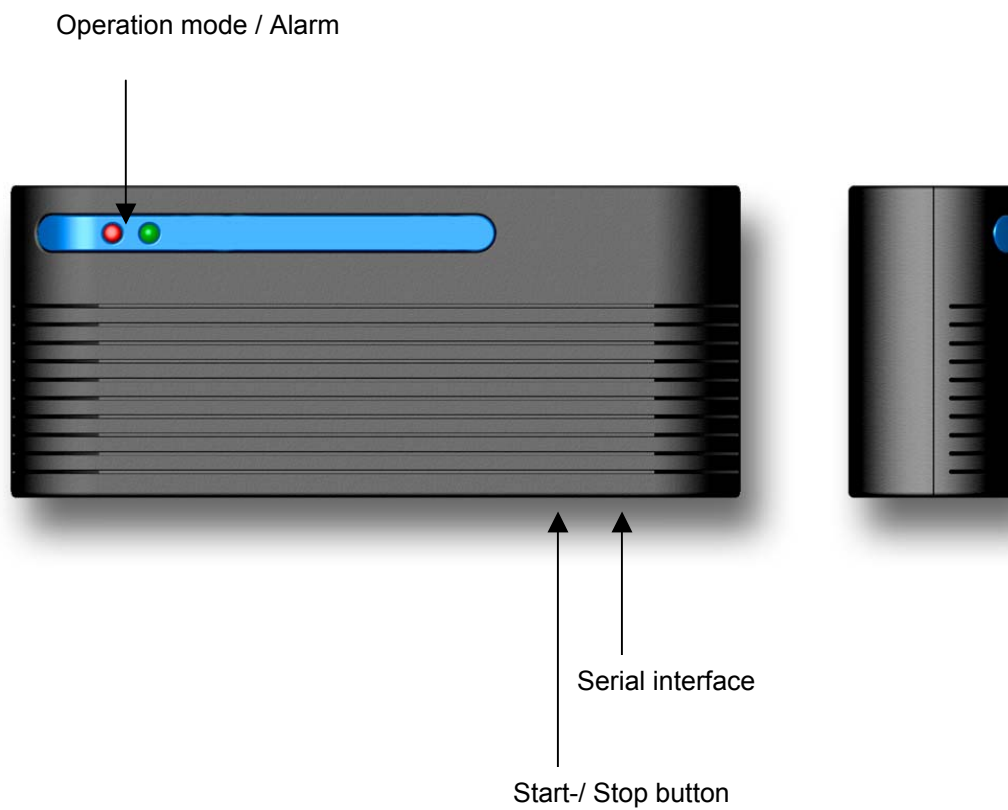
Table: referenced atmosphere

Altitude/m	Average air pressure/hPa
0	1013,25
100	1001,3
200	989,5
300	977,7
400	966,1
500	954,6
600	943,2
700	931,9
800	920,8
900	909,7
1000	898,8
1100	887,9
1200	877,2

7 Datalogger TCI / THC (T°, T°/H without display)

General: the hardware of the datalogger compact is almost identical to the hardware of the datalogger with display. Two LEDs (a red and a green one) are used as a substitute for the display to indicate the operation mode and the alarm.

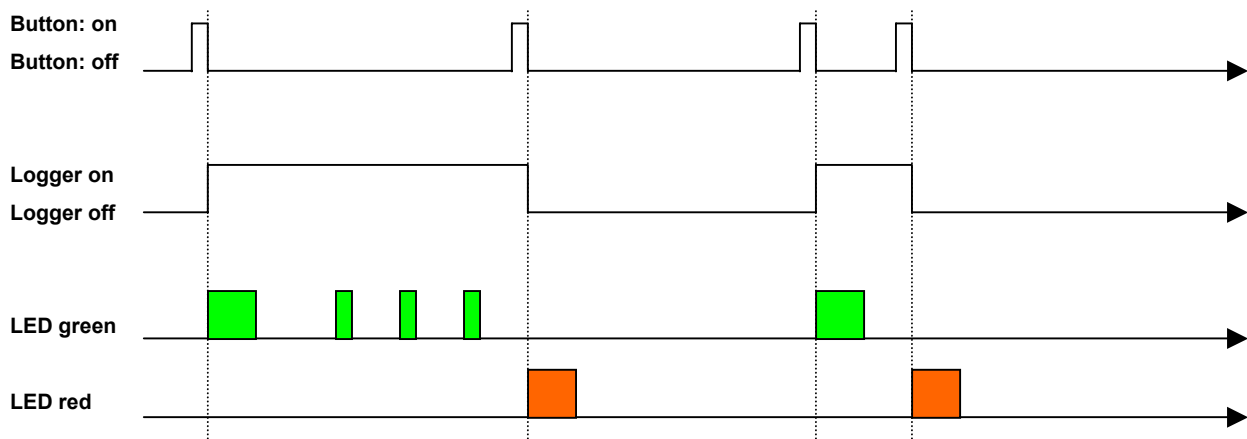
In addition, you will find close to the serial interface a start / stop button to switch on / off the datalogger.



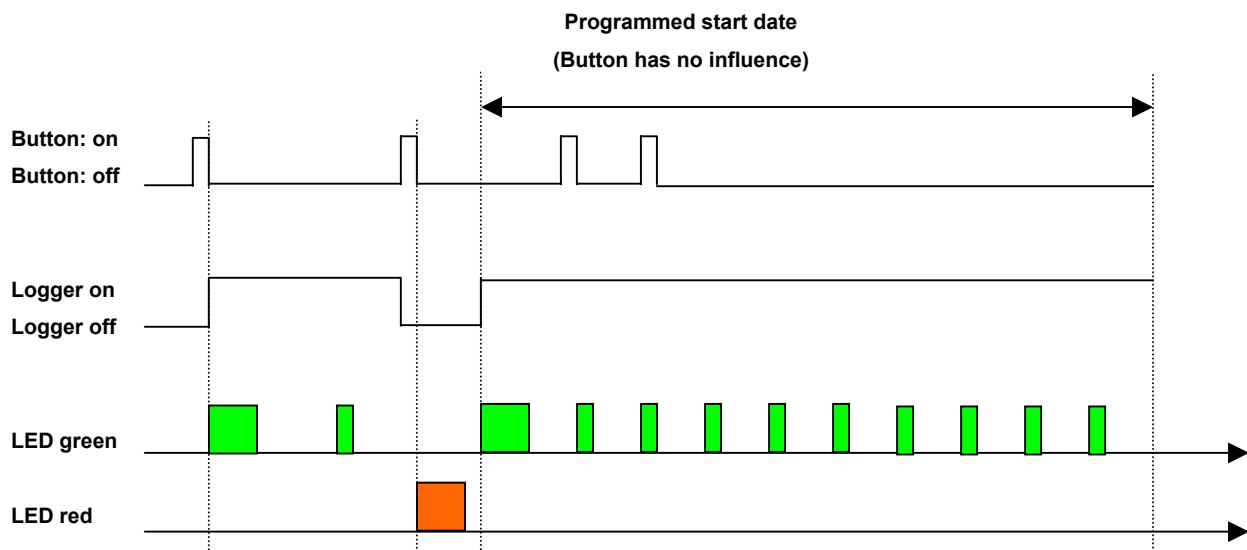
Start/Stop function: the off / on button enables the datalogger to start and stop recording. The manual activation / deactivation of the datalogger and the configuration in start/stop or in ring mode are independent.. By pressing the off / on button, the datalogger will start recording ; by pressing it again, the datalogger will stop etc..

Important: In the start / stop mode, the datalogger will start recording from the start date on (provided that this date is set in the datalogger) no matter if the start / stop button is being pressed during this time.

Before the datalogger starts recording, it can be activated or deactivated too via the on / off button (s. timing diagram).



Timing diagram: Datalogger THC/TIC in ring mode



Timing diagram: Datalogger THC/TIC in start/stop-mode

The button should be kept pressed for approx. 1 sec. to start / stop the datalogger.

When activating the datalogger, the green LED remains on during 3 sec. The red LED remains on during 3 sec. when deactivating the datalogger.

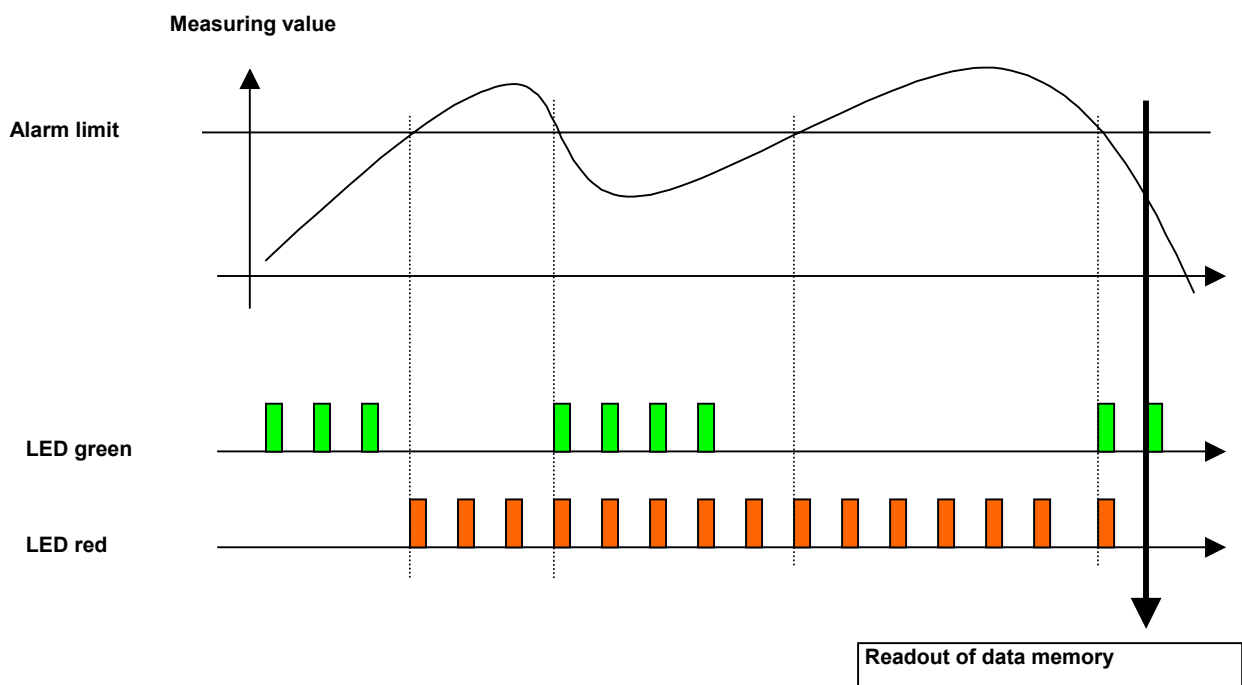
While recording, both LEDs on the datalogger or just one of them will flash at 10 sec interval. This time interval is completely independent of the recording and storage intervals set by the user in the datalogger.

Alarm function: the datalogger is equipped with an alarm function on both channels (temperature and humidity) which enables the user to set minimum as well as maximum limit values.

The red LED will flash in case of an alarm.

If an alarm occurs while the datalogger is recording, the green LED will switch off and the red LED will start flashing.

As soon as the measured values have become normal again, both LEDs will flash to signal that an alarm came up. This can be reset by reading out the memory.



Timing diagram: Datalogger THC/TIC alarm

8 Changing the sensor module

To change the sensor module, carefully remove the datalogger back-plate with a screwdriver. The sensor module can now be separated from the main body.

Place the new sensor module on the guide rail of the main body and assemble the two modules by pushing them together until they embed.

Important: The module must be connected only when the instrument displays "FAIL".

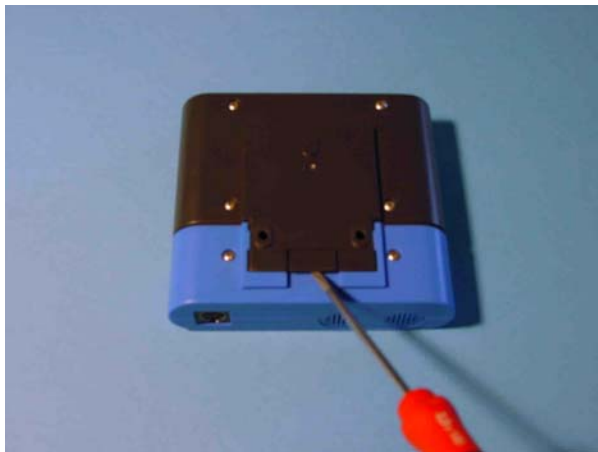


Figure: removing the back plate



Figure: assembly of the modules

9 Changing the battery

If the temperature value in the upper display line is displaced by the word bAtt, the battery has to be changed.

In order to do this, first remove the sensor module (see above “changing the sensor module”).

Then remove the four screws on the rear of the display module with a suitable screwdriver.

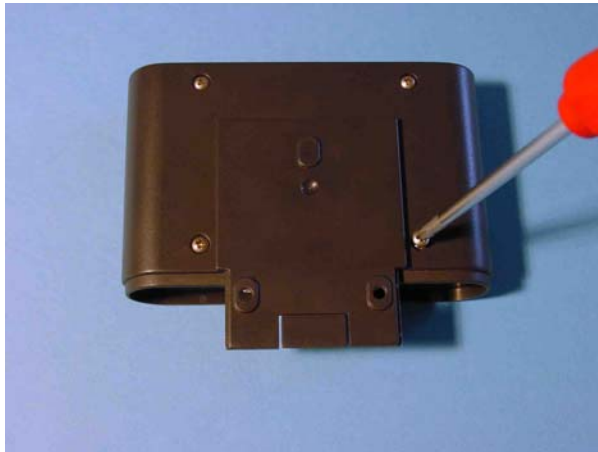


Figure: Opening the datalogger to change the battery

Lay the display module on a flat surface, with the display facing upwards, and carefully remove the upper part of the plastic cover.

Now remove the old battery and insert the new battery (Type: LS14500/Saft, 3.6V) into the holder.

Important: Use battery type LS14500/Saft exclusively. Batteries other than this type are not permitted and can disturb the correct functioning of the instrument. Observe the correct polarity of the battery and read the safety tips on the battery. Please do not touch the battery contacts (grease on your skin may cause oxidation!).

The **BAT** indication now disappears and the measurement values are shown again on the display.

Please check the time and adjust these if necessary again.

The battery should be changed annually. Frequent data transfer with the PC reduces battery lifespan.



Figure: changing the battery

10 Mounting the Datalogger

The datalogger can be used either as mobile or stationary data acquisition system. For stationary applications the datalogger may only be mounted on a flat surface. In order to do this, first remove the sensor module (see above “changing the sensor module”).

Two holes for wall mounting are provided in the guide rail of the main body. Use these to mount the main body. Then carefully join the two modules together until they embed.



Figure: mounting the datalogger

An anti-theft device made from aluminium is now available alternatively to the mounting system. This device additionally enables datalogger to be dismantled and the data to be downloaded much easier.

From 2003 on all datalogger will be delivered with an additional wall mounting bracket which can be used optionally. For mounting it on an datalogger with display unscrew the lower screws from the housing and fix the mounting bracket with the additional longer screws (see fig.)

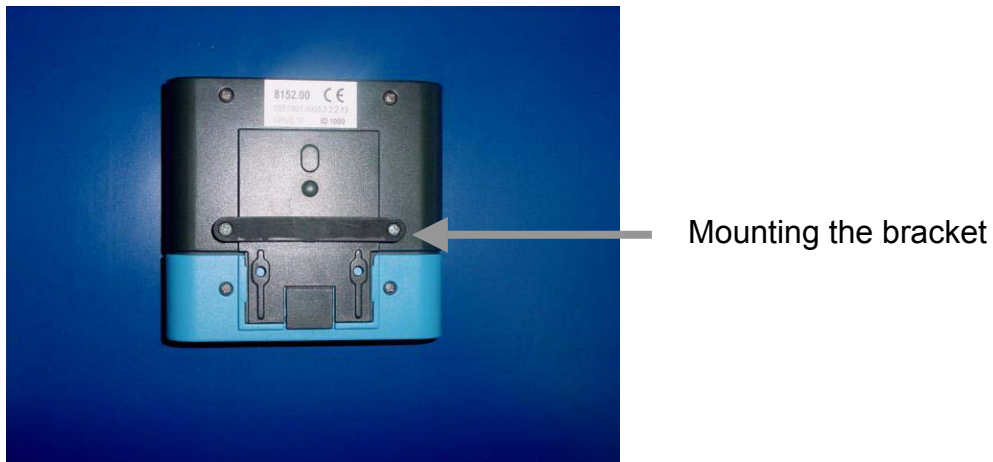


Fig.: Mounting the bracket

Now fix the angle to the wall and push the datalogger over it with the bracket.



Fig.: Hanging in the datalogger on the angle

For the datalogger without display only the angle has to be fixed to the wall and the datalogger be pushed over it.



Fig.: Mounting of a datalogger without display

Tips and Tricks

- The battery should be changed annually (Type: LS14500/Saft, 3.6V).
- Frequent communication with the PC reduces battery lifespan.
- For the data transfer to the PC, only use the cable supplied.
- Please avoid condensation on the datalogger and its sensors.
- Recommendations for measuring interval: 1 minute; storage interval 10 minutes

Measuring rates < 1 minute will cause higher energy consumption and thus reduce battery life considerably.