H62.0.21.6C-04

EN

Operating manual
Precision Hygro-/Thermo-/Barometer with alarm function

as of version 2.1

GFTB 200

CE

☞ Please carefully read these instructions before use!

☞ Please consider the safety instructions!

☞ Please keep for future reference!

Made in Germany

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1 General Note

Read this document carefully and get used to the operation of the device before you use it. Keep this document within easy reach near the device for consulting in case of doubt.

The manufacturer will assume no liability or warranty in case of usage for other purpose than the intended one, ignoring this manual, operating by unqualified staff as well as unauthorized modifications to the device. The manufacturer is not liable for any costs or damages incurred at the user or third parties because of the usage or application of this device, in particular in case of improper use of the device, misuse or malfunction of the connection or of the device.

The manufacturer is not liable for misprints.

2 Safety

2.1 Intended use

The GFTB 200 measures the absolute air pressure, relative humidity, temperature and further derived units in ambient air. The air and temperature measurement is done by precision sensors in the probe tube that have to be protected from any dirt.
The additional units including ‘dew point temperature Td’, ‘wet bulb temperature Twb’, ‘absolute air humidity [g/m^3]’ and ‘specific humidity [g/kg]’ provide a precise and clear display of the current state of ambient air.
Due to the low power consumption, the device can be run permanently, for example as “weather station” or “humidity monitor with acoustic alarm”.

The safety requirements (see below) have to be observed.
The device must be used only according to its intended purpose and under suitable conditions.
Use the device carefully and according to its technical data (do not throw it, strike it, etc.)
Protect the device from dirt.

Possible application areas include server rooms museums, churches administrative and residential buildings, storage rooms, green houses, pools, production rooms, cooling and air-conditioning technology, construction/building physics/defect assessment and many more.

2.2 Safety signs and symbols

Warnings are labeled in this document with the followings signs:

Caution! This symbol warns of imminent danger, death, serious injuries and significant damage to property at non-observance.

Attention! This symbol warns of possible dangers or dangerous situations which can provoke damage to the device or environment at non-observance.

Note! This symbol point out processes which can indirectly influence operation or provoke unforeseen reactions at non-observance.

2.3 Safety guidelines

This device has been designed and tested in accordance with the safety regulations for electronic devices. However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

1. Trouble-free operation and reliability of the device can only be guaranteed if the device is not subjected to any other climatic conditions than those stated under “Specification”.
   If the device is transported from a cold to a warm environment condensation may cause in a failure of the function. In such a case make sure the device temperature has adjusted to the ambient temperature before trying a new start-up.
2. 

   If there is a risk whatsoever involved in running it, the device has to be switched off immediately and to be marked accordingly to avoid re-starting.
   Operator safety may be a risk if:
   - there is visible damage to the device
   - the device is not working as specified
   - the device has been stored under unsuitable conditions for a longer time.
   In case of doubt, please return device to manufacturer for repair or maintenance.
3. When connecting the device to other devices the connection has to be designed most thoroughly as internal connections in third-party devices (e.g. connection GND with protective earth) may lead to undesired voltage potentials that can lead to malfunctions or destroying of the GFTB 200 and the connected devices.

4. GEFAHR

Do not use these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury or material damage.
Failure to comply with these instructions could result in death or serious injury and material damage.

5. GEFAHR

This device must not be used at potentially explosive areas! The usage of this device at potentially explosive areas increases danger of deflagration, explosion or fire due to sparking.

2.4 Scope of supply

The scope of supply includes:

- Handheld measuring device GFTB 200
- 9V battery
- Operating manual

2.5 Operation and maintenance advice

a.) Battery operation:
If BAT is shown in the left part of the display the battery has been used up and needs to be replaced. However, the device will operate correctly for a certain time.

The battery has to be taken out, when storing device above 50°C. We recommend taking out battery if device is not used for a longer period of time.

b.) Treat device and sensor carefully. Use only in accordance with above specification. (do not throw, hit against etc.). Protect from soiling.

3 Handling

3.1 Display elements

1: Unit display	The unit for temperature, relative humidity and absolute pressure is displayed.
2: Main display	The selected measuring unit is displayed.
3: Additional display	The configuration and measuring value settings are displayed.
4: BAT	Display for low battery warning
5: HLD	The measuring value is ‘frozen’ (hold button).

3.2 Pushbuttons

Key	on/off unit	**on/off unit:** press shortly: switch between measuring units press longer: switch off instrument
Key	mode	**mode:** press shortly: display of the MIN/MAX values Press longer: invoke the configuration menu (*see chapter 0*)
Key	hold	**hold:** press shortly: ‘Freeze’ the current measuring value (‘HLD’ displayed)

3.3 Switching on

The device is switched-on by shortly pushing the button on/off unit.

After segment test  the device shortly displays information on its configuration:

P_oF if auto-off function is activated (see chapter *0*). If this function is deactivated the device is in continuous operating mode.
After that the device is ready for measuring.

3.4 Running measurements

a) Please pay attention that no dirt gets into the vents. If this has already taken place, please do not try to remove it. Improper treatment can damage the sensors. Additionally the device should be proteced from mechanical agitation, because this can also damage the sensors (carrier material glass and ceramic)!

   Attention: In the sensor area the instrument is ESD-sensitive. Never touch or hold sensor head!

b) For accurate measurements it is required that the device has the same temperature as the measured room.
   If necessary you should wait therefore till the device can adept the ambient temperature.
   If this is not possible, the measurement should be done as described below:
   Hold device by the outstretched arm and sway back and forth to accelerate the air exchange and the temperature matching. As soon as the measured value is quite stable, it can be read off. This applies to humidity as well as temperature measurements. It may make sense to press the hold key to “freeze” all values and therefore read them off easily.

c) If the device is held in the hand during the measurement, both temperature and humidity are altered by the body heat. To minimize this influences the device should be held as far away from the sensor as possible and a direct contact with the exhaled air should be avoided. Most accurate measurements are achieved, if the device is set down and the measured value (as soon as it is stable) is read at adequate distance. Additionally you ought to consider that outdoor humidity measurements cannot have an accuracy of 0.1% due to outside influences like e.g. airflow or thermal fluctuation.

3.5 Choice of measuring unit

Press key on/off unit shortly to switch between the following measuring units:

- absolute air pressure [hPa]
- temperature [°C] or [°F]
- relative air humidity [%]
- dew point temperature Td [°C] or [°F]
- wet bulb temperature Twb [°C] or [°F]
- specific humidity [g/kg]
- absolute humidity [g/m^3]

If the cyclic displaying mode CYCL is activated (2 or 4 seconds) all measuring units will be displayed successively. A more detailed description of each measuring unit can be found in chapter 7.

Attention: The display of units can be suppressed by the configuration Hi dE, see also description in chapters “configuration of the device” and “Hiding unwanted display values”

3.6 Display of min-/max- value memory

For all measuring values the lowest and highest measured value since the switch-on of the device will be stored.

Display MIN value (Lo):	press mode shortly	display **switching** between **'Lo'** and **MIN value**
Display MAX value (Hi):	press mode again	display **switching** between **'Hi'** and **MAX value**
Return to current value:	press mode again	current measured value is displayed
Delete MIN/MAX value:	press mode for 2s	MIN and MAX values are deleted. **'CLr' (Clear)** is displayed shortly

After switching-off and turning-on again all min-/max- values will be deleted.

3.7 Hold – function

When the key hold key is pressed, the current measured values will be **'frozen'** (display symbol: HLD). As soon as the key hold is pressed again, the device measures again the normal way.

4 Description of measurement values

4.1 Absolute pressure

The device measures absolute pressure P_{abs}. The unit is **hPa** (hectopascal). hPa and mbar are identical.
The absolute pressure is mainly used for weather observation: the weather impacts the absolute pressure of the environment (e.g. low-pressure area: The current absolute pressure is lower than the normal one). It is also needed for the calculation of some other units.
Attention: The absolute pressure must not muddled up with "air pressure at sea level", given by the meteorological services. For this value the decrease of air pressure because of the elevation is compensated. The device can do this air pressure elevation compensation. Therefore the configuration SEAL (sea level adjustment) has to be activated (="on") and the current altitude above sea level ALti has to be entered to get a correct value. For the calculation an atmosphere of T0 = 15°C is assumed.

Air pressure – tendency indicator:
The tendency of the air pressure (falling or increasing, indicated by blinking arrows ⇕) can be used as an important sign to forecast the weather.
For the calculation of the tendency the device uses the air pressure of the last 4 hours:

"arrow up": air pressure has increased
"arrow down": air pressure has decreased
As long as the air pressure is constant (i.e. changing <0.2 mbar/h) no tendency arrow is displayed.

Note: The tendency indicator is designated for a static use at one point.
The mobile use e.g. during a hike does not make sense, because it cannot be distinguished between real variations of the air pressure and changes of the air pressure because of altitude differences. If the tendency indicator is used, the auto-off-function should be deactivated. (see chapter 8 "configuration of the device").

4.2 Temperature

The device measures the ambient air temperature T. The selectable units are **°C or °F**.
The temperature sensor is arranged in the protecting probe tube. In order to measure the ambient air temperature as fast as possible the probe tube has big cut-outs. The temperature measurement can be accelerated by swaying the instrument.

4.3 Relative humidity

The device measures the relative humidity F of the air. The unit is **% RH**
This unit shows how much water the air contains relatively. 100% corresponds with that amount of water the air can maximally contain at the current temperature. More water than 100% is disposed as fog, dew or rime. Warm air can contain a lot more water than cold air. So the relative humidity falls, if the air is warmed.
The relative humidity in addition to the temperature of the room is often used for evaluating a healthful indoor climate.
A relative humidity between minimal 30 to maximal 55 % is normally seen as 'healthful'.

Dryer air increases the risk of acute respiratory disease (also advantages the generation of ozone), more humid air advantages the growth of noxious bacteria and fungi.

The relative humidity is also important if the energy input is concerned: You need a lot more energy to heat humid air than for dry air.

4.4 Dew point temperature

The device calculates the dew point temperature Td. The selectable units are: **°C or °F**.
This temperature states at which temperature the measured air would dispose fog, dew or rime.
This cooling down under this temperature can also take place for example on cold surfaces.
Example: You take a cold bottle from the fridge – the ambient air steams up at the cold bottle surface, because its temperature is lower than the dew point temperature.

4.5 Wet bulb temperature

The device calculates the wet bulb temperature Twb. The selectable units are: **°C or °F**.
The wet bulb temperature states, how cold a wet surface gets at the measured ambient air.
Because of evaporation wet surfaces are cooled down to the wet bulb temperature. The dryer the ambient air is, the more a wet surface is cooled down. If the relative humidity of the ambient air is 100%, the surface is not cooled down, the temperature just gets the same than that one of the ambient air. In former times the humidity of the air was measured with psychrometers by means of this effect.
Because of this cool-down effect snow can be formed even at temperatures above 0°C, for this reason the wet bulb temperature is a important value e.g. for snow cannons.

4.6 Specific humidity

The device calculates the specific humidity x of the air. The unit is **g/kg**.
The specific humidity states, how many grams water are contained in one kilogram air: $x = m_{water[g]}/m_{dry\ air[kg]}$
This unit is sometimes also called mixture ratio.

4.7 Absolute humidity

The device calculates the absolute humidity d of the air. The unit is: **g/m³.**
The absolute humidity states, how many grams water are contained in one cubic meter of the measured air.
By means of this value the influences on the indoor climate can be pointed out concretely.
Following factors adding water to the ambient (among e.g. structural conditions):

Bath	approx. 700 g water per hour
Shower	approx. 2500 g per hour
Indoor plant	approx. 100...500 g per day
Breathing	approx. 100 g per hour
Sleep period	approx. 1000 g per person
Drying of clothes	approx. 1000...1500 g per 4.5 kg clothes

For comparison: 1 cubic meter air at 20 °C can maximally contain ca. 17 gram water.
This unit shows very clearly the importance of the right airing for a good living comfort.
If a room is not aired, the ambient air can get too humid very fast. The surplus water is disposed of on cool objects (windows, walls) or badly aired places (room corners). Thus a.o. noxious mildew can grow.

5 Additional Functions and Information

5.1 Hiding unwanted display values

By means of the configuration of the HidE value a binary coded mask for hiding any of the display values can be entered. (e.g. pressure display = 1, temperature = 2, see table).
If the numbers of all values to be hidden are summed up and entered as “HidE” value, only the remaining values will be visible. This enables customizing the instrument and the operation may be significantly simplified for several applications.

Display value	unit	Code		example 1	example 2	
Absolute pressure	[hPa]	1			1	
Temperature	[°C] or [°F]	2				
Relative humidity	[%]	4				
Dew point temperature Td	[°C] or [°F]	8		8	8	
Wet bulb temperature Twb	[°C] or [°F]	16		16		
specific humidity	[g/kg]	32		32	32	
Absolute humidity	[g/m3]	64		64	64	
			HidE value = sum:	**120**	**105**	

Example 1: Only absolute air pressure, temperature and relative humidity are shown
Example 2: Only temperature, relative humidity and wet bulb temperature Twb are shown
At least on value is always visible.
Setting ex works: no (= code 0): all values are visible.

5.2 Measuring rate rAtE

The measuring rate is configurable (see ‘Configuration of the instrument’). Selectable values are:
FASt: Standard measuring 1 per second. Application for quick response on site measurements
SLo Low Power measuring: 1 per minute. E.g. for permanent operation as weather station (auto power off deactivated: P_oF = oFF)
When using the slow rate the battery life is more than doubled. Assuming the standard zinc carbon batteries the device already runs more than a year. With better batteries (e.g. Lithium) the operation time can even be extended much more.

6 System messages

Er. 1	measuring range has been exceeded, measuring value too high
Er. 2	meas. value has fallen below permissible range, measuring value too low
Er. 3	display range has been exceeded (>19999)
Er. 4	meas. value has fallen below displayable range (< -19999)
Er. 7	system error - the device has detected a system fault (defective or far outside allowable ambient temperature range)
Er.11	Value could not be calculated (sensor not within measuring range, etc.)
BAT 984.6 hPa	If **“BAT”** is displayed at the left side of display, the battery is weak, measuring can be continued for a short period.
bAt	The battery is used up and needs to be replaced. Measuring is no more possible.

7 Configuration of the device

To configure the device functions proceed as follows:

- Switch off the device.
- Press mode and keep button pressed. Switch on device (press on/off unit shortly).
  Release mode not before the first parameter "P_oF" is displayed.
- Adjust current parameter with "up" mode or "down" hold.
- Switch to the next parameter with button on/off unit.

Parameter (on/off unit)	Value (mode / hold)	Description
P_oF	**Auto power-off delay** *ex works: 20 min.*	
	1 … 120	**Auto power-off delay** in minutes. Device will be automatically switched off as soon as this time has elapsed if no key is pressed. (possible values: 1..120 min)
	oFF	The auto power off function is deactivated (continuous operation).
Unit	**Temperature unit** *ex works: °C*	
	° C / °F	Temperature in °C / in °F
SEA.L	**Sea-level correction SEA.L** *ex works: oFF*	
	oFF / on	SEA.L deactivated / SEA.L activated
ALti	**Altitude above sea level (Altitude) – only for SEA.L = ON** *ex works: 340*	
	-500… 9000	Current altitude in meter
CYCL	**Cyclic alternating of the displayed unit** *ex works: oFF*	
	2, 4	Display cycle: 2 or 4 seconds
	oFF	CYCL deactivated
HidE	**Hiding unwanted display values** *ex works: no*	
	no	All values visible
	1 … 126	Binary coded value to hide any combination of values
rAtE	**Measuring rate** *ex works: FASt*	
	FASt / SLo	Standard: 1 per second / Energy saving: 1 per minute
AL	**Alarm function** *ex works:: oFF*	
	oFF / on	Alarm deaktiviert / Alarm activated
AL.In	**Alarm input**	
	PAbS	Ambient pressure
	t	Temperature
	rEL.h	Relative humidity
	td	Dew point temperature
	t.WB	Wet bulb temperature
	Ab5.h	Absolute humidity (g/m³)
	SPc.h	specific humidity (g/kg)
AL.Lo	**Alarm low: lower alarm rail**	
	0 … end of range	Display <= alarm low: alarm will be activated
AL.Hi	**Alarm high: upper alarm rail**	
	0 … end of range	Display >= alarm high: alarm will be activated
AL.dE	**Alarm delay** *ex works:: 0*	
	0… 1000	Delay in minutes
Adr.	**Base address (interface)** *ex works: 1*	
	01, 11 21, …, 91	Selection of base address
Init	**Restore factory defaults**	
	no / YES	Abort / restore factory defaults

Pressing on/off unit after adjusting the last parameter will save the settings and restart the device (segment test).

Please note: *If no key is pressed for more than 2 minutes the configuration will be aborted. All changes will be discarded!*

8 Offset- (Zero point) and Slope Adjustment

The pressure, temperature and humidity measuring values can be readjusted by the following settings. However, please consider that the integrated sensors are very precise and readjustment is very rarely needed. Erroneous settings of the parameters will probably cause by far higher errors than e.g. caused by sensor drift in the course of time.
If you do not have access to suitable measuring references you may consider the notes on our calibration service in chapter 11.
The offset and slope adjustment corrects deviations of the integrated temperature, humidity and pressure sensors. The corresponding display value is calculated via the following formula:

Unit = °C, hPa, %: *displayed value = (meas. value – offset) * (1 + slope adjustment/100)*

Unit = °F: *displayed value = (meas. value – 32°F – offset) * (1 + slope adjustment /100) + 32°F*

To configure the offset and slope adjustment proceed as follows:

- Switch off the device.
- Press hold and keep button pressed. Switch on device (press on/off unit shortly).
  Release hold not before the first parameter **'OFS.P'** is displayed.
- Adjust current parameter with "up" mode or "down" hold.
- Switch to the next parameter with button on/off unit.

Parameter (on/off unit)	Value (mode / hold)	Description
OFS.P	**Offset of pressure measurement [P]** *ex works: oFF*	
	-5.0…+ 5.0	Set in 0.1 mbar steps
	oFF	Value is 0.0 mbar
SCL.P	**Slope of pressure measurement [P]** *ex works: oFF*	
	-5.00…+5.00	Set in 0.01% steps
	oFF	Value is 0.00%
	Example: *Value is set to 1.00 => slope is increased by 1.00% => slope = 101%. If 100.0 (without adjustment) is measured the device displays now 101.0.*	
OFS.t	**Offset of temperature measurement [T]** *ex works: oFF*	
	-5.0…+5.0°C -9.0…+9.0°F	Set in 0.1 steps
	oFF	Value is 0.0
SCL.t	**Slope of temperature measurement [T]** *ex works: oFF*	
	-5.00…+5.00	Set in 0.01% steps
	oFF	Value is 0.00%
OFS.F	**Offset of humidity measurement [F]** *ex works: oFF*	
	-5.0…+5.0	Set in 0.1% steps
	oFF	Value is 0.0%
SCL.F	**Slope of humidity measurement [F]** *ex works: oFF*	
	-5.00…+5.00	Set in 0.01% steps
	oFF	Value is 0.00%

Pressing on/off unit after adjusting the last parameter will save the settings and restart the device (segment test).

Please note: *If no key is pressed for more than 2 minutes the configuration will be aborted. All changes will be discarded!*

9 Interface

9.1 Selection of base address Adr.

Up to 10 measuring devices can be operated via one interface. All devices must have different base addresses 01, 11, 21 ...91. Select base address: se chapter 7.

9.2 Connection to PC, Software

The device can be connected to a USB interface of a PC by the electrically isolated interface converter USB 3100 (accessory). The data is transmitted binary-coded and protected against transmission errors by complex safety mechanism (CRC).
The following standard software packages are available:

- **GSOFT3050**: Operating and evaluation software for the integrated logger function
- **EBS20M / -60M**: 20-/60-channel software for measuring value display
- **EASYControl net**: Universal multi-channel software for real-time recording and displaying of measuring data; with real database

In case you want to develop your own software we offer a **GMH3000-development package** including:

- a universally applicable Windows functions library ('GMH3x32e.DLL') with documentation, can be used by all 'established' programming languages, suitable for:
  Windows 2000™, Windows XP™, Windows Vista™, Windows 7™
- Programming examples VBA, Visual Basic, Labview, Delphi 1.0™, Testpoint™ uvm.

10 Alarm

The alarm settings are done in the configuration menu (see chapter 0)
There are 2 possible settings:
off (AL.oFF) and on with buzzer (AL.on).
One measuring channel can be set as alarm input.
In many cases an alarm delay is reasonable, e.g. breathing on the sensor should not cause an alarm while monitoring the room humidity.
The following cases trigger an alarm if the alarm function is active:

- Measuring value fallen below lower alarm boundary (AL. Lo)
- Measuring value exceeds upper alarm boundary (AL. Hi)
- Sensor error , weak battery (bAt)
- Err.7: system error (triggers always acoustic alarm)

In alarm case the 'PRIO' flag is set in the device's response in case of interface operation.

11 Accuracy Check / Adjustment Service

You can send the device to the manufacturer for adjustment and inspection.
Calibration certificate - DKD certificate - official certifications:
If the measuring instrument is supposed to receive a calibration certificate, it has to be sent to the manufacturer (declare test points, e.g. -20; 0°C; 70°C).
The basic settings can be only checked and – if necessary – corrected by the manufacturer.
A calibration protocol is enclosed to the device ex works. This documents the precision reached by the production process.

12 Reshipment and Disposal

12.1 Reshipment

All devices returned to the manufacturer have to be free of any residual of measuring media and/or other hazardous substances. Measuring residuals at housing or sensor may be a risk for persons or environment

Use an adequate transport package for reshipment, especially for fully functional devices. Please make sure that the device is protected in the package by enough packing materials.

12.2 Disposal instructions

Batteries must not be disposed in the regular domestic waste but at the designated collecting points. The device must not be disposed in the unsorted municipal waste! Send the device directly to us (sufficiently stamped), if it should be disposed. We will dispose the device appropriate and environmentally sound.

13 Specification

Measuring ranges	Temperature	-25.0°C – 70°C or -13.0 – 158.0°F
	Rel. humidity	0.0 – 100.0 % r.F. (recommended range: 11 – 90 % RH)
	Air pressure	10.0 – 1100.0 mbar
Calculated values	Dew point temperature Td	-40.0 – 70.0°C or -40.0 – 158.0°F
	Wet bulb temperature Twb	-27.0 – 70.0°C or -16.6 – 158.0°F
	specific humidity x	0.0 – 280.0 g/kg
	Absolute humidity d	0.0 – 200.0 g/m3
Resolution	Temperature	0.1°C or 0.1°F
	Rel. humidity	0.1 % RH
	Air pressure	0.1 mbar
Response time		T90 = 10 sec.
Accuracy: (±1 digit) (at nominal temperature)	Temperature	± 0.5% of meas. value ±0.1°C (PT1000 1/3 DIN B)
	Rel. humidity	± 2.5% (at range 11…90% r.F.)
	Air pressure	±1.5mbar (750...1100mbar) with calibration certificate WPD: ±0.5mbar (750...1100mbar)
Display		approx. 11 mm high, 4½-digit LCD-display with additional segments for displaying units, etc.
Operation elements		3 keys for ON/OFF, min-/max-value display, hold
Operating conditions		electronics: -25 to 70°C; 0 to 80% RH (non condensing) sensors: -25 to 70°C; 0 to 100% RH; max. 4000 mbar abs.
Alarm		buzzer/visual/interface: monitoring of a selected unit
Interface		serial interface (3.5 mm jack socket), via electrically isolated interface converter GRS3100, GRS3105 or USB3100 (accessory) directly connectable to RS232- or USB-interface of a PC
Additional functions		min/max/hold
Configurable display		The device can be configured by the user: display all measuring values alternating (2 or 4 sec. Cycle) or manual switching. Not required values can be suppressed.
Sea level adjustme		The displayed value of the barometer can be converted to air pressure at sea level (therefore the altitude above sea level has to be entered)
Tendency indicator		For barometer: air pressure falling/increasing
Power supply Current consumption (depending on mode, selectable)		9V battery type IEC 6F22 (included in delivery) approx. 90 µA at 1 measurement / s (Modus FAST) approx. 20 µA at 1 measurement / min: (SLo) i.e. service life > 1 year with standard batteries
Change battery indicator		Automatically if battery exhausted “bAt”
Auto-off function		Device will be automatically switched off if no key is pressed/no interface communication takes place for the time of the power-off delay. The power-off delay can be set to values between 1and 120 min.; it can be completely deactivated.
Offset and scale		digital offset and slope adjustment of all measurements
Housing		break-proof ABS-housing: approx. 106 x 67 x 30 mm (H x W x D), sensor head protruding vertically, length 35 mm, ø 14 mm, overall length 141 mm
Weight		approx. 130g incl. battery
EMC		The device corresponds to the essential protection ratings established in the Regulations of the Council for the Approximation of Legislation for the member countries regarding electromagnetic compatibility (2004/108/EG). Additional fault: <1%