

# Operating Manual For Hygro-/Thermometer

## GFTH 200



### Application range:

Quick-response measurement of atmospheric humidity, temperature and dew point temperature (resp. wet bulb temperature) in EDP rooms, museums, churches, administrative and residential buildings, storage rooms, green houses, pools, production rooms, for cooling technology and air conditioning as well as for building engineers and for the evaluation of damage to buildings etc.

### Specification:

<b>Measuring range:</b>	temperature: -25,0°C ... +70,0°C resp. -13,0 ... +158,0°F humidity: 0,0 ... 100,0 %RH (recommended range or application: 11 to 90 %RH) dew point temperature: -40,0 ... +70,0 °C resp. -40,0 ... +158,0°F (GFTH200 – standard) wet bulb temperature: -27,0 ... +70,0 °C resp. -16,6 ... +158,0°F (only for option: GFTH200 / FK)
<b>Resolution:</b>	temperature: 0,1°C or 0,1°F (selectable) humidity: 0,1 %RH dew point temperature: 0,1°C or 0,1°F wet bulb temperature: 0,1°C or 0,1°F
<b>Accuracy:</b> (±1 digit) (at nominal temperature = 25°C)	temperature (internal): ± 0,5% of m. v. ± 0,1°C (same as Pt1000 1/3 DIN) temperature (external): ± 0,1°C (device) ± probe accuracy humidity: ± 1,5% linearity, ± 1,5% hystereses (range: 11 to 90 %RH)
<b>Measuring probe:</b>	temperature: Pt1000 humidity: capacitive polymer humidity sensor
<b>Response time:</b>	T90 = 10 sec.
<b>Terminal for external probe:</b>	for connection on any Pt1000 probe with 3.5 mm mono plug. (measuring range: -25.0 ... +70.0°C)
<b>Offset- and scale:</b>	digital offset and scale adjustment
<b>Display:</b>	approx. 13 mm high, 3½-digit LCD-display
<b>Operation elements:</b>	3 keys for ON/OFF, min-/max-value display, hold Slide switch for selection of measuring range
<b>Nominal temperature:</b>	25°C
<b>Operating conditions:</b>	electronics: -25 to 70°C; 0 to 80 %RH (non-condensing) sensors: -25 to 70°C; 0 to 100 %RH.
<b>Power supply:</b>	9V battery type JEC 6F22 (in scope of supply)
<b>Power consumption:</b> (for standard type)	approx. 100µA at 1 measurings / s (mode FAST) approx. 55µA at 1 measurings/2s approx. 20µA at 1 measurings/10s approx. 9µA at 1 measuring/60s
<b>Low battery warning:</b>	"BAT" automatically displayed if battery is low
<b>Auto off function:</b>	when the Auto Off Function is activated, the device switches automatically off, if keypad is not attended for a longer time (selectable 1..120min).
<b>Min-/Max-value memory:</b>	Min and max measured values are stored for all 3 measuring ranges.
<b>Hold key:</b>	the current measuring will be „frozen“ (for all 3 ranges).
<b>Housing:</b>	impact resistant ABS-housing: approx. 106 x 67 x 30 mm (HxWxD), in addition, sensor head protruding vertically, length 35 mm, diameter 14 mm, overall length 141 mm.
<b>Weight:</b>	approx. 135g incl. battery
<b>EMC:</b>	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 (89/336/EWG). Additional fault: <1%



 **Safety instructions:**

This device has been designed and tested in accordance to 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 it.

1. Trouble-free operation and reliability of the device can only be guaranteed if it 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 result 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
 In case of doubt, please return device to manufacturer for repair or maintenance.
3. **Warning:** Do not use these product 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.

**Notes for device functions:**

**Choice Of Measuring Unit:**

The measuring unit can be chosen by means of the slide switch at the right side of the instrument.

- |                                     |  |
|-------------------------------------|--|
| Temp => slide switch up:            | The instrument shows the current temperature or referring min/max/hold values  |
| % RH => slide switch in the middle: | The instrument shows the current humidity or referring min/max/hold values     |
| Td => slide switch down:            | The instrument shows the dewpoint temperature or referring min/max/hold values |

For option GFTH200 / FK the unit wetbulb temperature ( Wb) instead of dewpoint temperature ( Td) is integrated:

- |                          |   |
|--------------------------|---|
| Wb => slide switch down: | The instrument shows the wetbulb temperature or referring min/max/hold values |
|--------------------------|---|

**MIN-MAX Value Memory:**

- |                               |                                     |  |
|-------------------------------|-------------------------------------|--|
| watch MIN value (Lo):         | press key 'Mode' shortly once       | display changes between 'Lo' and MIN value of the chosen unit            |
| watch MAX value (Hi):         | press key 'Mode' shortly once again | display changes between 'Hi' and MAX value of the chosen unit            |
| restore current value:        | press key 'Mode' shortly once again | current value of the chosen unit is displayed                            |
| clear MIN-/MAX- value memory: | press key 'Mode' for 2 seconds      | MIN and MAX values will be cleared.<br>The display shows shortly: 'CLr'. |

Please consider: If not the measuring mode 'fast' is chosen, the instruments changes automatically from MIN/MAX display to the current value display after 20 seconds.

**Hold – Function:**

By shortly pressing the 'Hold' key the currently measured values are 'frozen' for all three units, The display changes between 'Hld' and the 'frozen' value. The other two 'frozen' values can be displayed by setting of the slide switch..

Pressing the key 'Hold' shortly once again resets the display to the current value.

Please note: Measuring keeps on running in the background, the MIN/MAX values are updated continuously.

Please consider: If not the measuring mode 'fast' is chosen, the instruments changes automatically from Hold display to the current value display after 20 seconds.

**External Temperature Probe:**

The instrument can be connected to an external temperature probe with a 3.5mm audio plug.

If a probe is connected the temperature of the probe is displayed automatically instead of the internally integrated sensor. For the calculation of of the dewpoint (or wetbulb) temperature is still the internal sensor used.

The allowable temperature range of the external probe is 25.0 to 70.0°C.

## **Offset and Scale Adjustment:**

The offset and scale adjustment is mainly intended to be used to compensate errors of the external temperature probes. The internal temperature and humidity measuring can be adjusted, too.

The display value is given by following formula:

unit = °C or %r.F.: **Display = (measured value - offset) \* (1 + scale adjustment [%])**

unit = °F: **Display = (measured value - 32°F - offset) \* (1 + scale adjustment [%]) + 32°F**

The offset and scale adjustments can be entered for following units and are stored independently from each other:

- external temperature: offset unit = temperature, the external probe has to be plugged in before calling the adjustment menu.

- internal temperature: offset unit = temperature, **no** external probe has to be plugged in before calling the adjustment menu.

- humidity: offset unit = %RH

The scale adjustment unit is % of the measured value

At dewpoint and wetbulb temperature displaying instruments the referring offset and scale adjustment is not possible!

### **To adjust a measuring offset and scale proceed like follows:**

1. Switch off the instrument.
2. Choose the desired measuring unit  
(dewpoint temperature, "Td" or wetbulb temperature, "Wb" cannot be adjusted!)
3. Press the 'Hold' key while switching on the instrument.  
Keep 'Hold' key pressed until 'OFS' appears in the display (about 3 seconds).
4. Press 'Mode' or 'Hold' key, the currently selected offset adjustment of the chosen unit appears.
5. Choose the desired value by pressing 'Mode' or 'Hold' key. (max. input range: ±5.0°C or ±15.0 % RH)
6. Enter by pressing On/Off-key.
7. SCL appears in the display
8. Press 'Mode' or 'Hold' key, the currently selected scale adjustment of the chosen unit appears
9. Choose the desired value by pressing 'Mode' or 'Hold' key. (max. input range: ±5.00%)  
The input is displayed in %.  
example : scale adjustment is 4.00 => scale is increased by 4.00% => Scale = 104%  
At a measured value of 100.0 (without offset correction) the instrument would show 104.0
10. Store the values by pressing 'On/Off' key.

Please note: If during the changing of the offset adjust no key is pressed within 20 seconds, the input will be aborted.  
Eventually made changes won't be stored!

## **Configuration Of The Instrument:**

To configure the instrument proceed like follows:

1. Switch off the instrument.
2. Press the 'Mode' key while switching on the instrument.  
Keep 'Mode' key pressed until 'rAt' (=rate) appears in the display (about 3 seconds).

### **I.) Measuring Rate:**

The measuring rate determines how often the display of the measured values is actualized. Fast measuring rates ensure a fast response of the display to changing measuring values, but have higher power consumptions than slow rates. (see also: Specification)

3. The display shows 'rAt' (=measuring rate)
4. Press 'Mode' or 'Hold' key, the currently selected rate will be displayed.
5. Enter the desired rate by pressing 'Mode' or 'Hold' key.

Possible input:

FSt: fast - one measuring per second  
2...60: one measuring each 2..60 seconds

6. Confirm the value by pressing 'On/Off' key.

### **II.) Auto Power Off Time**

The auto power off time is entered in minutes. If no key is pressed during a measuring, the instrument switches itself off automatically after the entered period of time.

7. The display shows 'P.oF' (=Power Off)
8. Press 'Mode' or 'Hold' key, the currently selected power off time will be displayed (off, 1..120min)
9. Enter the desired time by pressing 'Mode' or 'Hold' key.

Possible input:

off: The auto power off function is deactivated (permanent operation)  
1...120: auto power off time in minutes.

10. Confirm the value by pressing 'On/Off' key.

**III.) Display Unit:**

*Choice of the temperature display unit: °C or °F – valid for all temperature displays.*

11. The display shows 'Uni' (=Unit)
12. Press 'Mode' or 'Hold' key, the currently selected unit will be displayed (°C or °F)
13. Enter the desired unit by pressing 'Mode' or 'Hold' key.
14. Confirm the value by pressing 'On/Off' key.

**IV.) Altitude:** (only for wetbulb temperature displaying instruments GFTH200 / FK)

*Choice of the altitude (above sea level). The input unit is kilometers above sea level.*

15. The display shows 'ALt'
16. Press 'Mode' or 'Hold' key, the currently selected altitude will be displayed.
17. Enter the desired altitude by pressing 'Mode' or 'Hold' key.  
Possible input: -1.00 ... 9.00 km
18. Confirm the value by pressing 'On/Off' key.
19. The values will be stored, the instrument will restart (segment test).

Please note: If during the configuration no key is pressed within 20 seconds, the configuration will be aborted. Eventually made changes won't be stored!

**System Messages:**

In case of measuring range overruns, etc. according error messages are displayed:

- Er. 1 = measuring range has been exceeded
- Er. 2 = meas. values have fallen below perm. range
- Er. 3 = display range overrun
- Er. 4 = display range underrun
- Er. 7 = System fault - the device has detected a system fault
- = value could not be calculated: at least one of the referring values of the calculation has an error

**Other Operational Functions:**

- a) If 'BAT' appears in the left hand corner of the display, the battery is used up and needs to be replaced. However, the instrument can still be operated for a short period of time.  
If „bAt“ is displayed in large letters the battery is finally used up and has to be replaced. Measuring is no more possible.
- b) The humidity and temperature sensor are located in the protruding sensor head. Make sure that the openings are not soiled. In case of soiling do not try to remove the dirt. Improper use may damage the sensors. Prevent any mechanical impact on the device as this may also lead to a destruction of the sensors (supporting material glass or ceramics)!  
**Please note: In the sensor area there is ESD-sensitive. Never touch or hold sensor head!**
- c) In order to guarantee accurate measurements the device has to be adjusted to ambient temperature.  
If necessary wait for the temperature of the device to adjust to the ambient temperature.  
If this is not possible, please proceed as follows:  
Move device around while holding it at an arm's length (fanning), to speed up the exchange of air and the temperature adjustment process. As soon as the display value is steady, readings can be made. This procedure shall be used for temperature and for humidity measurements. When the value is steady, You can press 'Hold' and stop the moving around for easy read out of measuring value.
- d) If you hold the device during measurements your body heat as well as your breath will change the temperature and the humidity. In order to minimise these factors, hold the device at as great a distance from the sensor as possible. Also try to prevent your breath coming into contact with the sensor. For optimum measuring results put down device and read display from a certain distance as soon as a constant measuring value is displayed.  
Always take into account that any humidity measurements in an open space cannot be made to an accuracy of more than 0.1% due to factors such as movement in the air, temperature changes etc.
- e) A user-calibration at the users site is not possible. To ensure highest accuracies it should be returned to the manufacturer every 12 months (when used in clean air) for checking or, if necessary: recalibration.  
If desired a calibration certificate can be made (acc. ISO 9000 ff). Price upon request.
- f) Probe tube and case are not 100% proof. If there are pressure differences between probe tube and case, there may be made wrong measurements.  
For measurements in channels with over/under pressure or strong air flow we recommend our GMH3330 or GMH3350 with humidity probe TFS0100 or TFS0100E.