Operating Manual
Altimeter / Barometer / Thermometer

GTD 1100

CE

(V1.5 and higher)

Specification:

Measuring Ranges:	Temperature:	-25.0...+50.0°C,	resolution 0.1°C	/	-13.0 ... +122.0°F,	res. 0.1°F
	Abs. Pressure:	300.0 ... 1100.0mbar,	resolution 0.1mbar	/	225.0 ... 825.0mmHg,	res. 0.1mmHg
	Altitude:	-500 ... -200m,	resolution 1m	/	-1640 ...-655ft,	res. ~5ft
		-199.5...1999.5m,	resolution 0.5m	/	-654 ... 1999ft,	res. ~2ft
		2000...9000m,	resolution 1m	/	2000 ... 19999ft,	res. ~5ft
Max.Overpressure:	Abs. Pressure:	4000 mbar,		/	3000 mmHg	

Accuracy: (±1 Digit)
(at nominal temperature = 25°C)
Temperature: ±0.05% of measured value ±0.5% FS
Abs. Pressure: ±1.5mbar (750...1100mbar)
with calibration certificate: ±0.5mbar (750...1100mbar)

Offset and Scale: digital offset and scale correction for pressure measuring

Measuring Frequency: 1 measuring per second

Display: approx. 12 mm high, 4½-digit LCD

Operation Elements: 3 keys for ON/OFF, min-/max-value display, zero setting and editing the altitude.
Slide switch for the choice of the measuring range

Min-/Max-Value Memory: Min and max measured value are stored

Summing Functions: Only for altimeter: The covered altitude distance is calculated (ascent, descent, sum) resolution 2m

Tendency: Only for barometer: display of falling/rising pressure

Zero-Function: Difference measuring: the display value is set to zero (barometer, altimeter)

Ambient Conditions: -10 to 50°C; 0 to 80% RH. (not condensing)

Storage Temperature: -20 to 70°C

Power Supply: 9V-battery type JEC 6F22 (in scope of supply)

Power Consumption: approx. 50µA

Battery Life: standard zinc carbon battery more than 6000 hours!

Battery Change Indicator: automatically if battery is used up: "LO BAT"

Auto-Off-Function: when the Auto Off Function is activated, the device switches automatically off, if keypad is not attended for a longer time (selectable 1..120min).

Housing: impact-resistant ABS, transparent panel, front side IP65

Dimensions: approx. 106 x 67 x 30 mm (L x W x D)

Weight: approx. 135g 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 (89/336/EWG).
Additional fault: <1%

GREISINGER electronic GmbH
D - 93128 Regenstauf, Hans-Sachs-Straße 26
Phone: 0049 9402 / 9383-0, Fax: 0049 9402 / 9383-33, eMail: info@greisinger.de

⚠ 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 device, 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.
4. The battery has to be taken out, when storing device above 50°C.
   It is recommended to take the battery out, when storing device for a longer period of time.

Disposal Notice

- Dispense exhausted batteries at destined gathering places.
- Send the device directly to us, if it should be disposed. We will dispose the device appropriate and non-polluting.

Measurings And Functions

Measuring The Atmospheric Pressure (Slide Switch At “baro“)

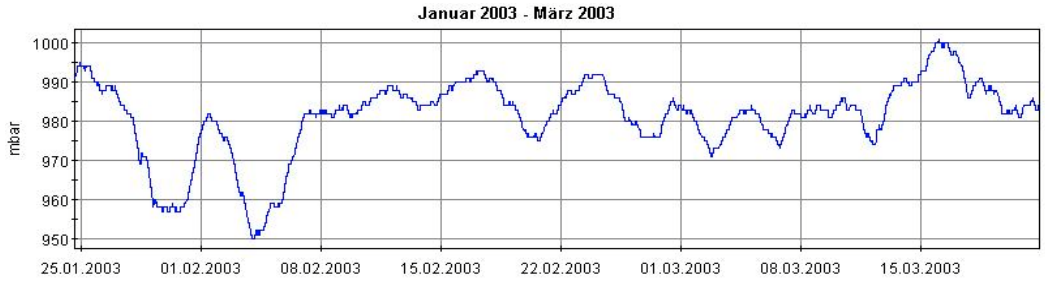
The device measures the absolute pressure of the ambient atmosphere. This value should not be confused with the values at sea level given by weather stations! Usually the sensor is placed above sea level. If the value at sea level is to be measured, the pressure decay caused by the elevation has to be considered! The device can correct the pressure. Therefore SEA.L (Sea Level correction) has to be activated in the configuration and the elevation above sea level (Alti = Altitude in [m]) has to be entered to get the correct value. An atmosphere of T0 = 15°C is assumed for the calculation. The tendency of the absolute pressure (falling or rising) can be used as an important indicator for weather forecasts. The display of the tendency can be activated via device configuration.

Measuring The Altitude / Elevation (Slide Switch at “alti“)

The meter calculates the current altitude from the absolute pressure: Pressure falls with rising altitude.
It has to be considered that not only changes in altitude but also changes in the weather has influence to the altitude display. To correct the weather influence the displayed altitude can be corrected by the keys. To do so press the keys “up“ and “down“ simultaneously, ‘Corr‘ will flash in the display. By means of the keys “up“ and “down“ the displayed value in m or ft (dep. on the configuration) can be corrected. The input will be finished by pressing the left “enter“ key or after 20 seconds without changes.
If the display was corrected at a known altitude of a landmark (e.g. contour lines in maps, marks at railway stations, buildings or other landmarks) and the weather is stable, the display is very precise (e.g. deviation within a view meters per day). At instable weather conditions with changing pressure measuring faults of 10 meters per hour are possible! Thunderstorms can cause even larger errors. But keep in mind: This error source is equal to any barometric altimeter, absolutely independent from the meters precision!

Weather-Example:
Absolute pressure at 340 meters above zero.
Changes up to 1mbar/h!

1mbar change is equal to about 8.5m.



If used in alpine terrain the weather phenomenon ‚Inversion‘ as a potential source of error has to be also considered. The altitude calculation is temperature dependent. Usually an average atmospheric temperature of 15°C is assumed for the calculation A actual temperature of 25°C causes an error of 40m when measuring a distance of 1000m. To compensate this effect the reference temperature can be entered in the devices configuration.

Hint: ***At begin of an observation of the altitude e.g. at the start of a tour, don’t forget to reset the min/max and sum memories, see below!***
If the exact altitude was entered at the beginning of a tour and in the following there are measuring errors of more than 5m per hour a change in the weather is probable! E.g. measuring is to high -> the weather probably gets worse.

MIN/MAX Value Memory, Additional Summing Functions Of Altimeter

watch MIN value (Lo):	press key ‘Mode‘ shortly once	display changes between ‘Lo‘ and MIN value
watch MAX value (Hi):	press ‘Mode‘ shortly once again	display changes between ‘Hi‘ and MAX value
*)sum of ascents (ASC):	press ‘Mode‘ shortly once again	display changes between ‘ASC‘ and sum of ascents
*)sum of descents (DESC):	press ‘Mode‘ shortly once again	display changes between ‚DESC‘ and sum of descents
*)sum ‘all‘ (ALL=asc-desc):	press ‘Mode‘ shortly once again	display changes between ‚ALL‘ and sum
restore current value:	press ‘Mode‘ shortly once again	current value is displayed
clear MIN/MAX/Sums:	press ‘Mode‘ for 2 seconds	MIN, MAX and sums are cleared. ‘CLr‘ appears shortly.

*) Summing functions only with slide switch at “alti“: During the instrument is switched on this functions of the altimeter are summing up the travelled altitude distances since the last clearing:

- Sum Ascent: The sum over all ascents.
- Sum Descent: The sum over all descents.
- Sum All: The travelled altitude distance (ASC-DESC).

The summing functions are not cleared by switching Off and On again! Whereas min and max are cleared.

Note: ***When using the summing functions the auto power off function should be deactivated. Please refer to „Configuration Of The Device – I.) Auto Power Off Time“***

Zero Function (Slide Switch At “alti“ Or “baro“)

By means of the zero-function relative measurings can be made: press “zero“-key for 2 seconds – “nuLL“ will be displayed shortly, the display will be set to 0, pressing “zero“ for 2 sec’s again: Absolute value will be displayed again.

Please note: ***The setting an resetting of the zero function is also clearing the min and max value memories and the summing functions of the altimeter.***

Tendency Display (Slide Switch At “baro“, Not During Min- Or Max-Value Display)

The tendency during the last 4 hours will be displayed alternating to the currently measured value, if the display is activated:
„riSE“: abs. pressure has been rising
„FALL“: abs. pressure has been falling

As long as the pressure keeps constant (e.g. change <0.2mbar/h), no tendency will be displayed.

Note: ***The tendency display is supposed to be used during stationary operation. The operation during changing altitude is nonsense, because the instrument can not distinguish between variation in pressure because of changing weather or because of changing altitude.***

Note: ***When using the tendency display the auto power off function should be deactivated. Please refer to „Configuration Of The Device – I.) Auto Power Off Time“***

Configuration Of The Device

To configure the instrument proceed like follows:

1. Switch off the instrument.
2. **Keep the ‘up‘ key pressed** while pressing **’on/off’-key shortly**.
   Keep on pressing the ‘up‘ key until ‘P_oF‘ appears (after about 3 seconds).

I.) Auto Power Off Time „P_oF“

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.

3. Press ‘Mode‘ or ‘Zero‘ key, the currently selected power off time will be displayed (off, 1..120min)
4. Enter the desired time by pressing ‘Mode‘ or ‘Zero‘ key.
   Possible input: off: The auto power off function is deactivated (permanent operation)
   1...120: auto power off time in minutes.
5. Confirm the value by pressing ‘On/Off‘ key, ‘Unit‘ appears in the display

II.) Display Unit „Unit“: (Dependent Of The Slide Switch Position!):

6. Press ‘Mode‘ or ‘Zero‘ key, the currently selected unit will be displayed, depending on the slide switch position:
   “alti“: altitude unit meter (‘n‘) or feet (‘Ft‘)
   “temp“ temperature unit °C or °F
   “baro“ pressure unit mbar = hPascal (‘hPA‘) or mmHg (‘nnHG‘)
7. Enter the desired unit by pressing ‘Mode‘ or ‘Zero‘ key.
8. Confirm the value by pressing ‘On/Off‘ key, ‘SEA.L‘ appears at “baro“ (point 12), „trEF“ at „alti“, others: point 21

III.) Reference temperature for altitude measuring „trEF“ (standard 15°C, *only for slide switch at „alti“*)

9. Press ‘Mode‘ or ‘Zero‘ key, the currently selected reference temperature will be displayed

10. Enter the desired reference temperature by pressing ‘Mode‘ or ‘Zero‘ key.
    selectable values are: -25.0... 50.0°C or -13.0 ... 122.0°F
11. Confirm with ‘On/Off‘-key : continue with point 21

IV.) Sea Level Correction “SEA.L“ (Sea Level) Of Barometer Display: (*only for slide switch at „baro“*)

The sea level correction corrects the measured pressure to the pressure value above sea level (zero altitude)

12. Press ‘Mode‘ or ‘Zero‘ key, the currently selected state of the sea level correction will be displayed
13. Enter the desired state by pressing ‘Mode‘ or ‘Zero‘ key.
    selectable values are: on / off : sea level correction activated / deactivated
14. Confirm with ‘On/Off‘-key: ‘Alti‘ (if SEA.L = on) or ‘tEnd‘ appears in the display (if SEA.L = off)

V.) Entering the Altitude For The Sea Level Correction „Alt“: (*only for slide switch at „baro“*)

Here the current elevation above sea level has to be entered.

15. Press ‘Mode‘ or ‘Zero‘ key, the currently selected elevation for the sea level correction will be displayed.
16. Enter the desired state by pressing ‘Mode‘ or ‘Zero‘ key.
    selectable values are: -500... 9000m or –1640 ... 19999ft
17. Confirm the value by pressing ‘On/Off‘ key: ‘tEnd‘ appears in the display.

VI.) Tendency Display For Barometer (*only for slide switch at „baro“*)

18. Press ‘Mode‘ or ‘Zero‘ key, the currently selected state of the tendency display will be displayed.
19. Enter the desired state by pressing ‘Mode‘ or ‘Zero‘ key.
    selectable values are: on / off: tendency display activated / deactivated
20. Confirm the value by pressing ‘On/Off‘ key.
21. The values will be stored, the instrument will restart (segment test).

Please note: If during the configuration no key is pressed within 60 seconds, the configuration will be aborted. Eventually made changes won’t be stored!

Offset and Scale Adjustment (for “temp“ and “baro“)

The offset and scale adjustment is intended to be used to compensate errors of the internal pressure and temperature sensors. The display value is given by following formulas:

Unit = °C, mbar, mmHg: ***Display = (measured value - offset) * (1 + scale adjustment/100)***

Unit = °F: ***Display = (measured value –32°F - offset) * (1 + scale adjustment/100)+32°F***

To adjust a measuring offset and scale proceed like follows:

1. Switch off the instrument. Set Slide Switch to „baro“ or „temp“, whichever to be corrected.
2. **Keep the ‘down‘ key pressed** while pressing **’on/off’-key shortly**.
   Keep on pressing the ‘**down**‘ key until ‘OFFS‘ appears (after about 3 seconds).
3. Press ‘Mode‘ or ‘Zero‘ key, the currently selected offset adjustment appears.
4. Choose the desired value by pressing ‘Mode‘ or ‘Zero‘ key. (max. input range: ±5mbar or ±5.0°C resp. ±9.0°F)
5. Enter by pressing On/Off-key: SCAL appears in the display
6. Press ‘Mode‘ or ‘Zero‘ key, the currently selected scale adjustment appears
7. Choose the desired value by pressing ‘Mode‘ or ‘Zero‘ key. (max. input range: ±5.00%) The input is displayed in %.
   example: scale adjustment is 1.00 => scale is increased by 1.00% => Scale = 101%
   At a measured value of 1000.0 (without offset correction) the instrument would show 1010.0
8. Store the values by pressing ‘On/Off‘ key. The instrument will restart (segment test).

Please note: If during the changing of the offset adjust no key is pressed within 60 seconds, the input will be aborted. Eventually made changes won’t be stored!

System Messages

Er. 1 = measuring range has been exceeded
Er. 2 = meas. value has fallen below perm. range
Er. 3 = display range has been exceeded (>9999)
Er. 4 = meas. value has fallen below displayable range (<-1999)
Er. 7 = System fault - the device has detected a system fault (defective or far outside allowable ambient temperature range)
Err.11 = Sensor error or value could not be calculated

If the symbol **"LO BAT“** is displayed at the left side of display, the battery is weak, measuring can be continued for a certain time.

If “bAt“ is displayed in the main display the battery is used up and needs to be replaced. Measuring is no more possible.