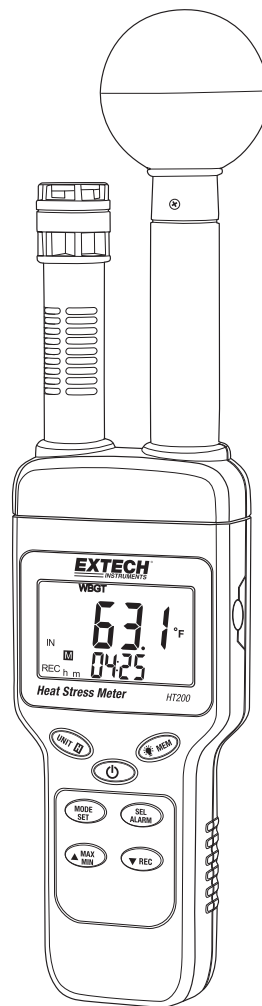




USER MANUAL

Heat Stress WBGT Meter


Model HT200



Introduction

Thank you for selecting the Extech Instruments Model HT200 Heat Stress WBGT Meter. The HT200 accurately determines the Heat Stress by factoring a combination of parameters: Humidity, Temperature, and Direct Solar Radiation. These factors affect how high body temperatures rise, as well as the ability to cool down. This device is shipped fully tested and calibrated and, with proper use, will provide years of reliable service. Please visit our website (www.extech.com) to check for the latest version of this User Guide, Product Updates, Product Registration, and Customer Support.

Features

- Fast responding capacitance sensor
- Accurate measurements for: Wet bulb globe temperature (WBGT), Black globe temperature (TG), Humidity (%RH), Air temperature (TA), Wet bulb (WET), and Dew point (DEW)
- Maximum, minimum, and data hold Recording
- Low battery indication 
- LCD display with LED backlighting
- Manual data recording (up to 50 reading sets)
- View data records
- Selectable temperature units C or F
- Brass black ball 50mm (2") diameter
- WBGT high and low audible and visual alarm functions
- Auto Power OFF with disable function

Safety



WARNING: Avoid electromagnetic interference (EMI) to avoid erratic meter readings.



WARNING: The measurements will be inaccurate if the black ball is touched during a test.



WARNING: If the black ball is damage or deformed in shape, inaccurate measurement values will result.



CAUTION: Please place the meter in a warm temperature and low humidity environment for 24 hours after the meter has been used in an overly humid environment.



CAUTION: Please have the meter calibrated yearly for the best results.

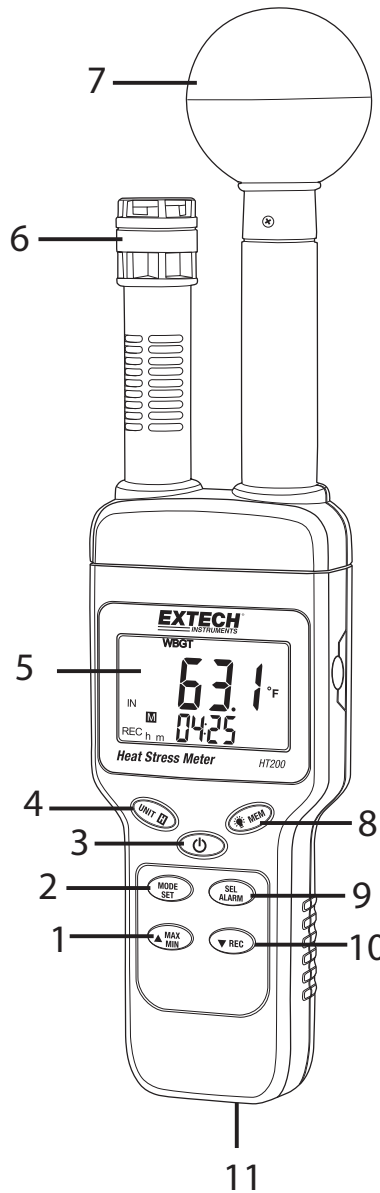


WARNING: Do not store this device in direct sunlight or in overly hot and/or damp areas.

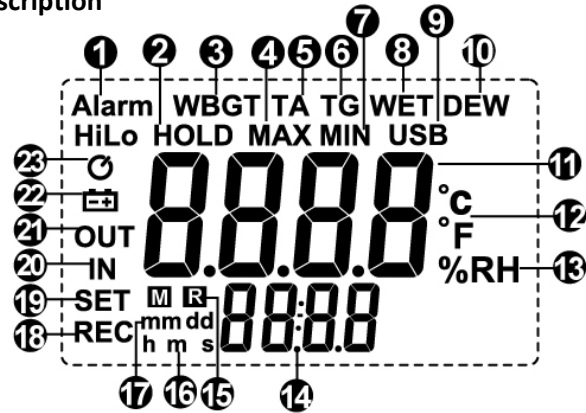
Meter Description

1. Up Arrow/MAX-MIN button
2. MODE/SET button
3. Power ON-OFF button
4. UNIT/DATA HOLD button
5. LCD Display
6. Temperature & Humidity sensor
7. Black Globe sensor
8. Backlight/MEM button
9. SEL/Alarm button
10. Down arrow/REC button
11. AC Adaptor power jack

Note: Battery compartment on back





LCD Display Description



1. Alarm symbol
2. DATA HOLD symbol
3. WBGT Mode
4. Max reading symbol
5. Air temperature mode
6. Black globe temperature mode
7. MIN (minimum) reading symbol
8. Wet bulb temperature mode
9. USB symbol (unused in HT200)
10. Dew point temperature mode
11. Primary display area
12. Temperature units
13. Relative humidity mode
14. Secondary display area
15. Stored reading 'R' alert & Memory Recall 'M' icon
16. Time symbol (unused in HT200)
17. Date symbol (unused in HT200)
18. Data Record mode symbol
19. Set Mode symbol
20. Indoor symbol (WBGT)
21. Outdoor symbol (WBGT)
22. Low battery symbol
23. Auto power off symbol

Operation



Powering the meter

Press the **Power**  button to power the meter ON or OFF. To show all of the display symbols at once: with the meter OFF, press and hold the **Power**  button. The firmware version will display for one second (after the button is released).

Auto Power Off


The HT200 automatically powers off after approximately 15 minutes of inactivity.

Enable-Disable Auto Power Off

With power ON, press and hold the **Power**  button for at least 2 seconds to disable or enable auto power-off. The clock  symbol appears on the LCD screen when the Auto Power OFF feature is enabled. The symbol disappears when the Auto Power OFF feature is disabled.


Note: The auto power-off will be disabled if the SET function or the alarm is enabled.

Alarm ON-OFF


Press and hold the **SEL/Alarm**  button for at least 2 seconds to turn the alarm function ON (armed) or OFF (disarmed). When armed the ALARM display icon will appear. When disarmed, the ALARM display icon disappears.

Note: The alarm function is disabled when the HOLD, SET, or VIEW DATA RECORDSD function is enabled.


Display Backlight

Press the **Backlight/Mem**  button to turn on the LCD backlight. The LCD backlight will automatically turn off after 15 seconds.

Selecting Temperature C/F units of measure

Press the **Unit/DH**  button to select the desired temperature unit of measure.

Mode Selection


Press the **Mode/Set**  button to change the mode. The available modes are WBGT, TA, %RH, TG, WET, DEW, and back to WBGT (see definitions below):

- Wet bulb globe temperature (WBGT)
- Air temperature (TA)
- Humidity (%RH)
- Black globe temperature (TG): monitors the effects of direct solar radiation
- Wet bulb temperature (WET)
- Dew point temperature (DEW)

In the WBGT mode, press the **Sel/Alarm**  button to toggle IN (indoor: without direct sun exposure) and OUT (outdoor: with direct sun exposure) modes.


Note: The mode function is unavailable in the HOLD function and SET function modes.

Data Hold

Press and hold the **Unit/DH**  button for 2 seconds to enable the Data Hold function. The HOLD display icon will appear the displayed reading will be frozen until the button is pressed and held again.


Note: The HOLD function is unavailable when the SET function is enabled.

Manual Data Recording


Press the **REC**  button to manually record (store) the current reading. The **REC** and **R** symbol will briefly appear on the LCD while the reading is stored.


Note: The Record Reading function is unavailable in the HOLD, SET, and VIEW DATA RECORDS modes.

View Data Records

Press and hold the **Backlight/Mem**  button to turn access (or exit) the View Data Records mode. When the View Data Records mode is accessed, the record number is shown on the bottom of the display, the associated reading is shown at the center of the LCD, and the 'M' memory and 'REC' icons will be visible.

Use the arrow buttons to scroll through the stored readings.


Press the **Mode/Set**  button to change the measurement type (i.e. WBGT, TA, %RH) for the currently selected record.



Press the **Unit/DH**  button to switch the temperature unit.

Press and hold the **Backlight/Mem**  button to exit the viewing data records mode.

Note: The View Data Records mode is unavailable when the HOLD or SET function is enabled.




Maximum-Minimum (MAX-MIN) Reading Recording

Press and hold the **Max/Min**  button to enter the MAX-MIN recording mode. The LCD will show the **MAX** icon along with the maximum temperature measurement.

Use the **Max/Min**  button to toggle between Maximum (MAX) and Minimum (MIN) readings. Press and hold the **Max/Min**  button for more than 2 seconds to exit the maximum/minimum mode.






Note: The MAX-MIN mode is unavailable when the HOLD, SET, or VIEW DATA RECORDS function is enabled.

Setting Mode

Press and hold the  button to access the Setting mode where a series of parameters can be customized. The available parameters are explained individually below. To scroll through the parameters use the  button. Press the  button to start editing a particular parameter as explained below.






WBGT HIGH ALARM THRESHOLD (HI)



1. Step to the WBGT High Alarm Threshold screen using the  button.
2. At the High Alarm Threshold screen, press the  button to begin editing; the display will begin flashing.
3. Press the  button to select the desired temperature units.
4. Use the up and down arrow buttons to set the WBGT High Alarm Threshold value.
5. Use the  button to select the digit to edit.
6. Press the  button again to save the setting.
7. The meter will now aurally and visually alarm when the High Alarm Threshold has been exceeded. To arm/disarm the alarm function, refer to the 'ALARM ON-OFF' section.

WBGT LOW ALARM THRESHOLD (LO)






1. Step to the WBGT Low Alarm Threshold screen using the  button.
2. At the Low Alarm Threshold screen, press the  button to begin editing; the display will begin flashing.
3. Press the  button to select the desired temperature units.
4. Use the up and down arrow buttons to set the WBGT Low Alarm Threshold value.
5. Use the  button to select the digit to edit.
6. Press the  button again to save the setting.

The meter will now aurally and visually alarm when the Low Alarm Threshold is reached. To arm/disarm the alarm function, refer to the 'ALARM ON-OFF' section.





CLEAR STORED READINGS



1. Step to the 'Clear Stored Reading' screen (example shown above) using the  button. The number at the bottom of the display indicates the number of readings stored (50 maximum).
2. Press the  button and the display will begin flashing.
3. Use the up or down arrow button to select YES or NO. Select YES to erase all stored readings. Press NO to retain the readings in memory.
4. Press the  button to perform the selected action (YES or NO).




AIR TEMPERATURE OFFSET







1. Step to the Air Temperature Offset screen using the  button (example screen shown above).
2. Press the  button to begin editing; the display will begin flashing.
3. Use the up and down arrow buttons to set the offset value (from -9.9 to +9.9)
4. Press the  button to select the desired temperature units.
5. Press the  button again to save the setting.

RELATIVE HUMIDITY % OFFSET




1. Step to the RH% Offset screen using the  button (example screen shown above).
2. Press the  button to begin editing; the display will begin flashing.
3. Use the up and down arrow buttons to set the offset value (from -9.9 to +9.9).
4. Press the  button again to save the setting.

BLACK GLOBE TEMPERATURE OFFSET

1. Step to the Black Globe Temperature Offset screen using the  button (example screen shown above).
2. Press the  button to begin editing; the display will begin flashing.
3. Use the up and down arrow buttons to set the offset value (from -9.9 to +9.9).
4. Press the  button to select the desired temperature units.
5. Press the  button again to save the setting.

Battery Replacement

When the battery icon () appears on the LCD, the 9V battery must be replaced. Turn off the power and unplug all cables. Remove the battery from the rear battery compartment and replace it with a new 9V battery. Please observe correct battery polarity and do not switch the unit ON until the battery door is closed and secured.

When the meter is not in use, please remove the battery.



Never dispose of used batteries or rechargeable batteries in household waste.

As consumers, users are legally required to take used batteries to appropriate collection sites, the retail store where the batteries were purchased, or wherever batteries are sold.

Disposal: Do not dispose of this instrument in household waste. The user is obligated to take end-of-life devices to a designated collection point for the disposal of electrical and electronic equipment.

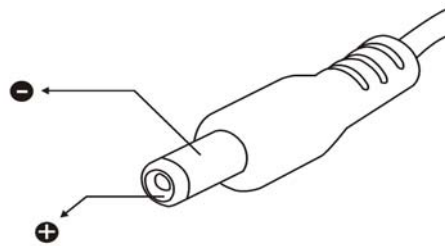
AC Adaptor Power

The AC power adaptor jack is located on the bottom of the meter. See specifications below:

External AC to DC adapter: Voltage 9 V_{DC} (8~14 V_{DC} Max) / 500mW.

Socket: Pin positive, Ground casing negative.

External diameter 5.5mm internal diameter 2.1mm



Specifications

Wet bulb globe temperature (WBGT)

Unit		Range	Resolution	Accuracy (calculated) @15~40 °C
Indoor & Outdoor Without sunlight	°C	0~59.0	0.1	WBGT = (0.7×WET)+(0.3×TG)
	°F	32.0~ 138.0	0.1	WBGT = (0.7×WET)+(0.3×TG)
Outdoor With sunlight	°C	0~56.0	0.1	WBGT=(0.7×WET)+ (0.2×TG)+(0.1×TA)
	°F	32.0~ 132.0	0.1	WBGT=(0.7×WET)+ (0.2×TG)+(0.1×TA)

Air Temperature (TA)

Unit	Range	Resolution	Accuracy @15~40 °C
°C	0~50.0	0.1	±0.8
°F	32.0~122.0	0.1	±1.5

Black globe temperature (TG)

Unit	Range	Resolution	Accuracy @15~40 °C
°C	0~80.0	0.1	±0.6
°F	32.0~176.0	0.1	±1.1

Relative Humidity (%RH)

Measurement Range	1%~99%
Accuracy	±3.0%RH (20~80%) ±5.0%RH (<20% or >80%)
Resolution	0.1%

Dew point temperature (DEW)

Unit	Range	Resolution
°C	-35.3~48.9	0.1
°F	-31.5~120.1	0.1
The value is calculated from the RH and Air temperature		

Wet bulb temperature (WET)

Unit	Range	Resolution
°C	-21.6~50.0	0.1
°F	-6.9~122.0	0.1
The value is calculated from the RH and air temperature		

Meter Dimensions 300 x 70 x 50mm (11.81 x 2.76 x 1.97in.) [L x W x H]

LCD 52 mm (W) x 36mm (L) [2.05 in (W) x 1.42 in (L)]

Ball Dimensions 50mm diameter, 19mm height (2" diameter and 0.75" height)

Weight 220g (7.76oz.) without batteries

Operating Altitude 2000m (6562ft) max.

Sampling Rate One per second (1 Hz)

Operating Temperature & Humidity 0°C to +50°C (32°F to 122°F), <95%RH. (Non-condensing)

Storage Temperature & Humidity -10°C to +50°C (14°F to 122°F), <70% RH. (Non-condensing)

Power supply 9V battery or AC Adaptor 100~240V DC 9V/ 0.5A (9mm)

Battery life 200 hours

Accessories 9V battery, Carrying Case, and AC100~240V to DC 9V/0.5A (9mm) Adaptor

Thermal Hazard Prevention Standards

Screening Criteria for Heat Stress Exposure (WGBT values in °C); for reference purposes only.

	Acclimatized				Not acclimatized			
Work (%)	100%	75%	50%	25%	100%	75%	50%	25%
Rest (%)	0%	25%	50%	75%	0%	25%	50%	75%
Light	29.5	30.5	31.5	32.5	27.5	29.0	30.0	31.0
Moderate	27.5	28.0	29.5	31.0	25.0	26.5	28.0	29.0
Heavy	26.0	27.5	28.5	30.0	22.5	24.5	26.5	28.0
Very Heavy	-	-	27.5	29.5	-	-	25.0	26.5

Example of Activities within Metabolic Rate Categories*

Categories	Examples/Activities
Resting	Sitting quietly
	Sitting with moderate arm movements
Light	Sitting with moderate arm and leg movements
	Standing with light work at machine or bench while using mostly arms
	Using a table saw
	Standing with light or moderate work at a machine or bench and some walking about
Moderate	Scrubbing in a standing position
	Walking about with moderate lifting or pushing
	Walking level at 3.7 mph (6Km/hr) while carrying 6.6 lbs. (3 Kg) weight
Heavy	Carpenter sawing by hand
	Shoveling dry sand
	Heavy assembly work on a non-continuous basis
	Intermittent heavy lifting with pushing/pulling (pick-and-shovel work)
Very heavy	Shoveling wet sand

*According to the American Conference of Governmental Industrial Hygienists [ACGIH] (2005)