

WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for period of **five (5) years** from the date of purchase and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted, if available. This warranty does not cover probes, batteries, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will void the warranty.

To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.
8281 E. Evans Rd, Suite #103
Scottsdale, AZ 85260

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at www.sperscientific.com, or return your warranty card within 10 days.



WBGT Heat Stress Meter

800036

Instruction Manual

SPER
SCIENTIFIC

Environmental Measurement Instruments

Revised 10/14/2013

WBGT Heat Stress Meter 800036

Copyright ©2009 by Sper Scientific

ALL RIGHTS RESERVED

Printed in the USA

The contents of this manual may not be reproduced or transmitted in any form or by any means electronic, mechanical, or other means that do not yet exist or may be developed, including photocopying, recording, or any information storage and retrieval system without the express permission from Sper Scientific.

HEAT STRESS REFERENCES

- National Institute for Occupational Safety and Health (www.cdc.gov/niosh).
- National Oceanic Atmospheric Administration (www.noaa.gov).
- Occupational Safety and Health Administration (www.osha.gov).
- World Health Organization (www.who.int).

CONTENTS

INTRODUCTION.....	4-5
FEATURES.....	6
UNIT DESCRIPTION	7
KEYPAD	8
LCD DISPLAY.....	9-10
MEASUREMENT PROCEDURES	11-18
Display Mode Selection	11
Heat Index Measurement	13
Non-Sleep Mode Selection.....	14
Alarm Threshold Selection	15
Data Analysis.....	17
BATTERY REPLACEMENT.....	19
TROUBLESHOOTING	20
ERROR CODES	21
SPECIFICATIONS	22-23
OPTIONAL ACCESSORIES	24
HEAT STRESS REFERENCES.....	25-26
WARRANTY.....	28

INTRODUCTION

The Sper Scientific WBGT (Wet Bulb Globe Temperature) Heat Stress Meter (Model 800036) is light-weight, portable, and provides the most accurate determination of the heat stress index based on the cumulative effect of air temperature, air movement, relative humidity, and radiant heat.

The WBGT Heat Stress Meter provides highly accurate readings with a typical response time of only 15 seconds. The WBGT Heat Stress Meter provides settings for both indoor and outdoor activities, and includes an audible alarm that is adjustable to your WBGT threshold.

You can use the WBGT Heat Stress Meter almost anywhere to determine appropriate exposure levels to high temperatures and avoid heat exhaustion during athletic events, military exercises, and industrial activities.

HEAT STRESS REFERENCES

Refer to any of the following organizations for current and reliable data regarding heat stress threshold recommendations and guidelines.

- American Conference of Governmental Industrial Hygienists (www-acgih.org).
- American Industrial Hygiene Association (www.aiha.org).
- Canadian Centre for Occupational Health & Safety (www.ccohs.ca).
- Environmental Protection Agency (www.epa.gov).
- International Organization for Standardization (www.iso.org).
- National Climatic Data Center (www.ncdc.noaa.gov).

OPTIONAL ACCESSORIES

- 840052 Data Acquisition Software
- 840054 USB Cable
- 840092 Bench-Top Tripod
- 840093 Field Tripod

INTRODUCTION

Recommended heat exposure limits for various activities have been set through government organizations such as the US Occupational Safety & Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH).

Current recommendations and guidelines are available through these organizations, as well as many others (refer to "Heat Stress References" for additional information).

FEATURES

- **Light-weight, Portable, and Accurate**—Provides accurate readings with a typical response time of only 15 seconds, and settings for both indoor/outdoor activities.
- **Threshold Alarm**—An audible alarm that is adjustable to your WBGT threshold.
- **Long-Life Battery Operation**—An expected battery life of more than 1000 hours (alkaline) and 250 hours (general purpose).
- **Tripod Mountable**—A tripod screw mount for hands-free monitoring.
- **Data Analysis**—USB port to connect with a PC for real-time data analysis.

SPECIFICATIONS

Unit Size: 10" (H) x 2" (W) x 1 1/4" (L)
255mm (H) x 50mm (W) x 30mm (L)

Unit Weight: 4oz. (126g)

Black Globe Diameter: 1.6" (40mm)

Battery Life: >1000 Hours Alkaline (250 Hours General Purpose)

Typical Response Time: 15 seconds

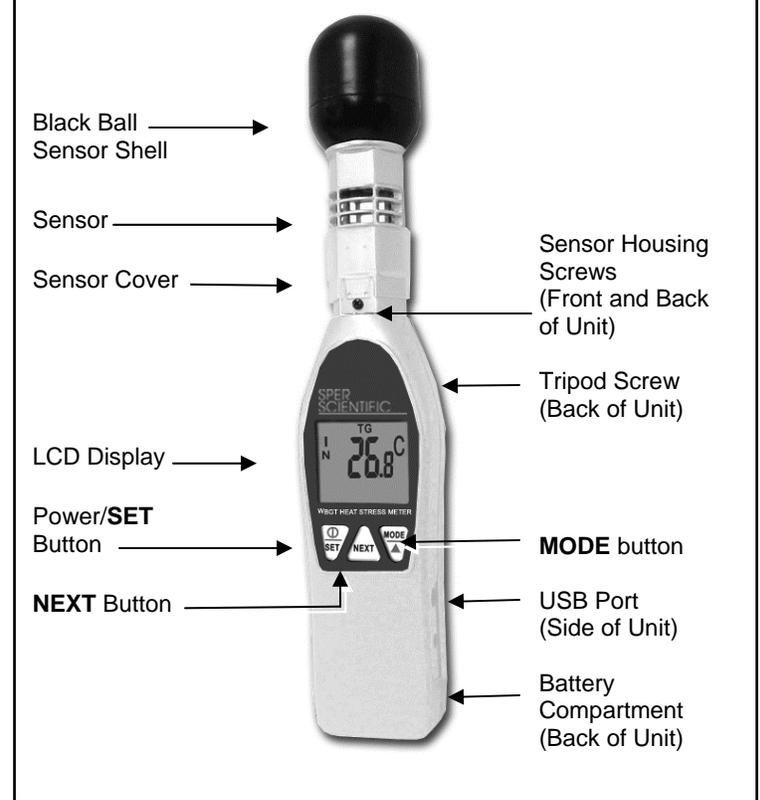
USB Port Protocol: 9600 bps, 8 data bits, no parity

SPECIFICATIONS

	Range	Resolution	Accuracy
WBGT	0°-50°C 32°- 122°F	0.1° C/F	±2°C Indoor 3°C Outdoor (-15°-40°C)
Air Temp (TA)			Otherwise ±2.5 Indoor 3.5°C Outdoor
Globe Temp (TG)	0°-80°C 32°- 176°F		±0.6°C
Relative Humidity (RH)	0-100% RH	0.1% RH	±2°C (15°-35 °C)
			±3% RH (10°-90% RH) Otherwise ±5% RH

- 22 -

UNIT DESCRIPTION



- 7 -

KEYPAD

	Press the SET button to turn on/off the unit and to enter the alarm setting mode.
	Press the NEXT button to select a digit in the alarm setting mode and to exit the setting mode when complete.
	Press the MODE button to change the display mode, to select the environment mode (IN/OUT), and to change the values when setting the alarm mode.
	Press the SET and MODE button simultaneously to select Non-Sleep mode and prevent the unit from turning off automatically.
	Press the NEXT and MODE button simultaneously to select between Celsius and Fahrenheit temperature scales.

ERROR CODES

Error	Description
	Low battery indicator.
OUT	Out-of-range indicator displayed during alarm threshold setting.
E02	The value is below the measuring range or the sensor is installed incorrectly.
E03	The value is above the measuring range.
E04	The original data is in error—value error or the sensor is installed incorrectly.
E011	RH calibration error.
E033	Fatal circuit error. Return the meter to the vendor for repair or replacement.

Send in unit for calibration.

TROUBLESHOOTING

No Display:

1. Ensure that you have pressed the **SET** button for longer than 100mS.
2. Ensure that the batteries are in good condition, have proper contact, and are in correct polarity. When in doubt, replace the batteries. (Refer to "Battery Replacement.")

Display Disappeared:

1. If the low battery indicator displayed before the display disappeared, replace the batteries. (Refer to "Battery Replacement.")



2. Disable the Automatic Power-Off function and place the unit in Non-Sleep mode. (Refer to "Non-Sleep Mode Selection.")

LCD DISPLAY



WBGT	Wet Bulb Globe Temperature
A composite temperature used to estimate the effect of temperature, humidity, wind chill, and solar radiation on humans.	
TG	Black Globe Temperature
Temperature as measured by a black globe thermometer, which monitors the effects of direct solar radiation on an exposed surface. This temperature is analogous to what you feel when standing in the sun.	
TA	Air Temperature (Ta)
The standard temperature as normally referenced in weather observations and forecasts.	

LCD DISPLAY

%	Relative Humidity
The percentage of water vapor in the air.	
IN/OUT	Indoor/Outdoor
Environment with or without direct sun exposure using the following equations: Indoor/Outdoor (No Sun): $WBGT=0.7 WB + 0.3 TG$ Outdoor (Full Sun): $WBGT=0.7 WB + 0.2 TG + 0.1 TA$	
C/F	Celsius/Fahrenheit
Ambient temperature in either Celsius or Fahrenheit .	
	Low Battery Indicator
The low battery icon indicates that you must replace the batteries.	
DP/REC/888	Unused
These indicators are reserved for use in future models. Please disregard.	

BATTERY REPLACEMENT

1. When the meter displays the low battery icon, press the **SET** button to turn the unit **off**. 
2. Open the battery compartment on the back of the unit.
3. Remove the old batteries and replace them with 2 new AAA batteries. Replace the compartment cover.

Battery life is greater than 1000 hours when using alkaline batteries (250 hours when using general purpose batteries).

MEASUREMENT PROCEDURES

The software interface protocol is 9600 bps, 8 data bits, with no parity. The communication format transmits ASCII code every second while the WBGT Heat Stress Meter is turned **on**.

Format:

Wxxx.xC(F):Txxx.xC(F):Txxx.xC(F):Hxx.x%LRCCRLF

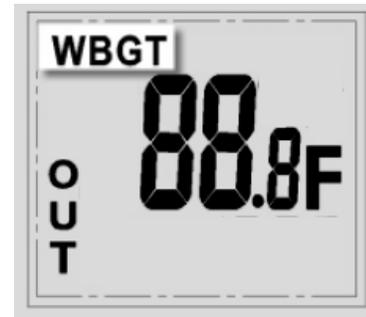
The first value represents the WBGT; the second value represents TA; the third value represents TG; and the fourth represents the RH.

For convenient long-term monitoring, you can mount the WBGT Stress Meter on an optional Bench-Top Tripod (840092) or Field Tripod (840093) using the built-in tripod mount at the back of the unit.

MEASUREMENT PROCEDURES

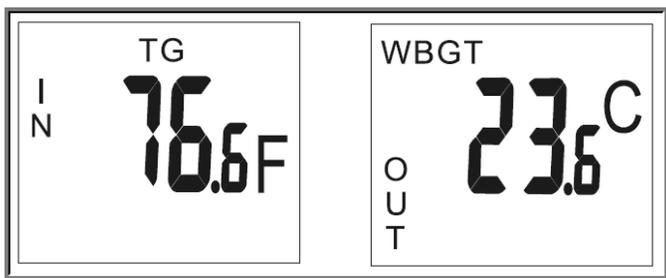
Display Mode Selection

1. Turn **on** the meter by pressing the **SET** button. The LCD display turns **on** and the meter enters measuring mode.
2. Press the **MODE** button to cycle through the RH percent, WBGT, TA, and TG modes, respectively.



MEASUREMENT PROCEDURES

3. Press and hold the **MODE** button to select the environment mode. Each time you press and hold the **MODE** button, the LCD display switches between IN (for indoor measurements) and OUT (for outdoor measurements).
4. When reading temperature, press the **MODE** and **NEXT** buttons simultaneously to select between a Celsius (C°) and Fahrenheit (F°) temperature reading.



- 12 -

MEASUREMENT PROCEDURES

Note...

If you have selected a setting that is out of range (lower than the current temperature), the LCD will display **OUT** under the temperature setting.



Data Analysis

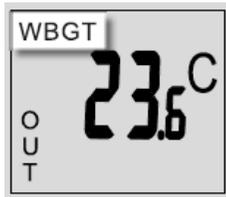
WBGT Heat Stress Meter includes a USB port to connect your meter to a PC to store, analyze, and print data.

USB Cable (840054) and the Data Acquisition Software (840052) are available as optional accessories.

- 17 -

MEASUREMENT PROCEDURES

2. To change the value of the first flashing digit, press the **MODE** button repeatedly.
3. When you have selected the first value, press the **NEXT** button to select the second digit.
4. Press the **MODE** button repeatedly to change the value and repeat this step for the third digit.
5. When you have selected the desired WBGT alarm value, press and hold the **NEXT** button for 2 seconds to set the alarm value and enter measuring mode.

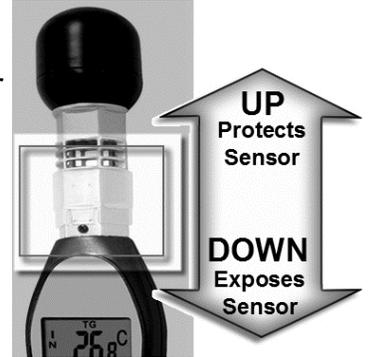


Be sure to set the unit to WBGT display mode.

MEASUREMENT PROCEDURES

Heat Index Measurement

1. Turn **on** the meter by pressing the **SET** button. The LCD display turns **on** and enters measuring mode.
2. Slide down the sensor protective cover. The LCD displays the value for the selected display mode within 15 seconds.
3. When you have completed your readings, slide the cover back up to its protective position and press the **SET** button to turn **off** the unit.



MEASUREMENT PROCEDURES

Non-Sleep Mode Selection

To save battery life, the WBGT Heat Stress Meter turns **off** automatically after 20 minutes of inactivity. To monitor the environment continuously for longer periods, you may override this feature:

1. With the meter turned **off**, press and hold the **SET** and **MODE** buttons simultaneously for 2 seconds. The meter displays **■** and enters Non-Sleep measurement mode.
2. When you have completed your readings, slide the cover back up to its protective position and press the **SET** button to turn **off** the unit. Non-Sleep mode is cancelled and the unit is reset to turn **off** automatically after 20 minutes.

MEASUREMENT PROCEDURES

Alarm Threshold Selection

The WBGT Heat Stress Meter features an audible alarm. You can adjust the alarm values as required within the range of 68.0°F-99.0°F (20.0°C-37.2°C).

If the meter reaches the set alarm value, the unit emits an audible alarm (continuous beep at about 70dB) to let you know that your threshold has been exceeded.

The alarm stops when the reading falls below the set threshold or when you turn **off** the meter. To set your alarm:

1. With the meter turned **off**, press and hold the **SET** button for 2 seconds. The LCD displays a temperature setting with the first digit flashing.