OPERATION MANUAL

Wearable WBGT / HI Checker

Model: ☐ 87783
☐ 87784

CE

INTRODUCTION

Thank you for purchasing this wearable WBGT/HI checker. This compact checker measures air temperature, globe temperature, and humidity to give heat stress index for using in control of physical activity in hot environment to limit the danger of heat-related injuries.

WBGT (wet-bulb globe temperature) was developed as a monitoring basis at US military training camps and became widespread for the use in workplaces and sports situations.
It is suggested in an international standard ISO 7243 and many governments such as OSHA (US Occupational Safety & Health Administration), SMA(Sports Medicine Australia)and Japan Society for Occupational Health in establishing the permissible heat exposure limits in occupational health, sports or other physical activities.
The applications of the heat index can be in construction, iron and steel foundries, bricks-firing plants, glass facilities, boiler rooms, mining sites, army training, marathon, beach activities and so on.

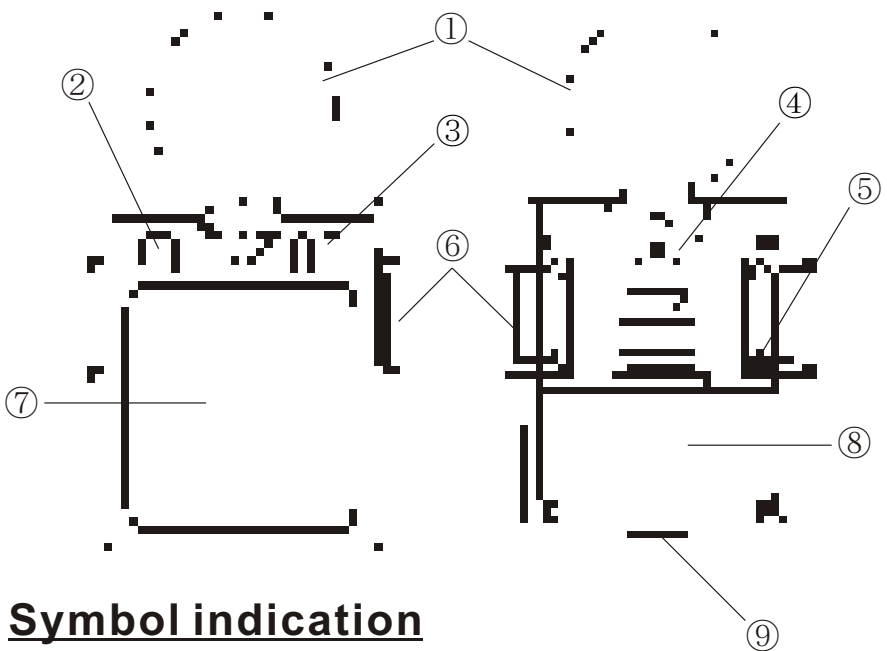
The **heat index** was developed by the US National Weather Service to help people avoid heat illness. Prolonged exposure and/or physical activity at a high heat index is likely to lead to sun stroke, heat cramps, heat exhaustion and even death. However, please be aware that heat index is not an exact science. The values reached are approximations. Ultimately, the final decision of whether or not to exercise or work belongs to the individual, athletic trainer or employer..

Features

- Simultaneously display WBGT, HI,Temperature & RH
- For outdoor & indoor heat stress measuring
- Programmable buzzur & red LED danger zone warning
- Audible alarm volume adjustable (75dB / 60dB / mute)
- 4 level dangerous level indicator on LCD
- Wearable design with strap included
- Display updates every 20 seconds
- Functions
  87784 : WBGT + HI 2 in 1
  87783 : WBGT only

METER HARDWARE

Front / Rear Appearance



Symbol indication

① ABS Black Ball
② Power Key［SET]
③ up/down adjust (2 Keys)
④ Hanger
⑤ Screw to change the strap holder
⑥ Strap holder
⑦ LCD Display
⑧ Battery Cover
⑨ Screw hold for tripod

Wearable Strap

You can using the strap to fixed the checker in your helmet.

This adjustable elastic arm strap can fixed the checker when you are in outdoor activity. (Fig 1)

Fig 1

Tripod Mounting

You may use tripod to hold the checker vertically for long term use.(Fig 2)
A built-in thread is on the bottom side of the meter(See Fig 3)

Fig 3

Fig 2

Battery Installation

The checker powered by 2 pcs AAA batteries. To check the battery when :

1. First time using the checker
2. The battery symbol appear on LCD
3. The checker can not power on

To install the batteries

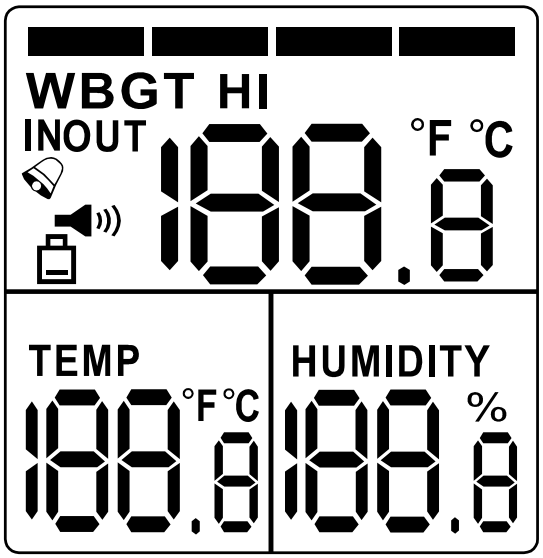
1. Turn off the checker
2. Put out the battery cover
3. Replace the old batteries with two new battery.
4. Make sure the batteries are in the place and the polarity is correct.
5. Put back the battery cover.

When to do battery replacement?

appears on the LCD when battery voltage gets low. Please replace battery by opening the compartment on the rear of the meter.

CONTROLS AND INDICATORS

LCD display



WBGT	Wet Bulb Globe Temperature
TEMP	Air Temperature
RH%	Relative Humidity
°C/°F	Celsius/Fahrenheit
IN	Indoor (no sun)
OUT	Outdoor (full sun)
	Alarm indicator
	Battery Indicator
	Sound Level
HI	Heat Index (87784 only)

Function Keys

SET -Press power key to turn on the checker.
-Press and hold power key for 2 seconds to turn off the checker.
-In measurement mode, press [SET]key , [▲]and [▼] key simultaneously for 3 seconds till entering setting mode.
-In power off status, press [SET] key, [▲] and [▼] simultaneously for 5 seconds till entering RESET mode.

▼ ▲ -In normal mode, press [▲]or [▼] key to adjust the sound level.
-In setting mode, press [▲]or [▼] button to adjust the value of thresholds or ON / OFF the alarm.

OPERATING INSTRUCTIONS

1. POWER

Press SET to turn on(press1 second) and turn off (press 2 seconds) the meter. All indicators are shown on the LCD when power on(Fig.4), and then enter measuring mode. You will see the firmware version on the LCD for 1 second while power on.(Fig.5)

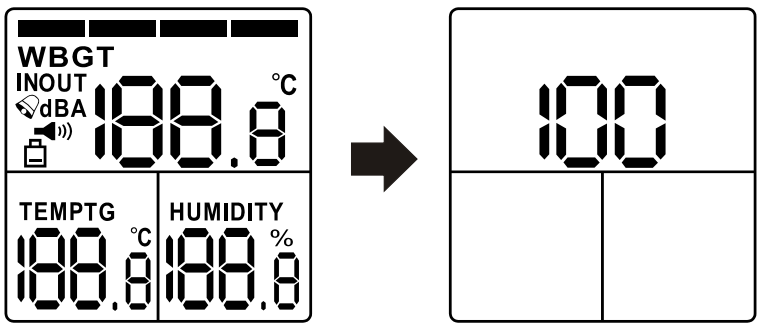


Fig.4 Fig.5

2. MEASUREMENT

When into to measurement mode, the WBGT value, temperature and humidity display on the screen. (See Fig 6)

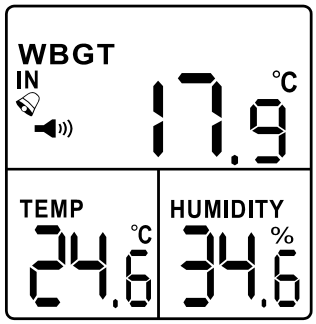


Fig.6

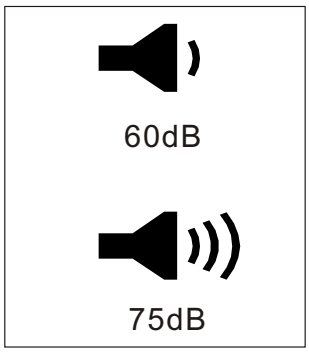


Fig.7

3. SOUND LEVEL

User can press the [▲]or [▼] key to adjust the volume of the alarm. In measuring mode, press [▲]or [▼] key to adjust the volume in 0dB > 60dB >75dB respectively. The symbol will show as Fig 7.

Note : There is no buzzer icon displays on the LCD while the sound is 0dB.

4. DANGER ZONE INDICATOR

There have 4 level heat stress danger zone indicator on the top of the LCD. This works on both WBGT & HI The symbol will show as Fig 8.

Fig.8

Hazardous	WBGT	HI
Caution	26.7~29.4C (80~84.9F)	27~31.9C (80.6~89.4F)
Extreme caution	29.4~31C (85~87.9F)	32~40.9C (89~105.6F)
Danger	31~32.2 (88~89.9F)	41~53.9 (105.7~129F)
Extreme danger	>32.2C (>90F)	>54C (>129F)

5. ALARM

While the measured heat stress value is over alarm threshold, red LED, buzzer and measured value will all blink every second as reminder. After 30 seconds, it beeps 1 time per minute. User can terminate the beep sound at any time when pressing [▼] key. The alarm threshold value can be re-programmed. Check “SETUP” section in page 7 for the details.

SETUP

This function allow users to customize their own checker.
Press SET key+ [▲]+ [▼] key simultaneously for 3 seconds to enter setting mode.The Checker will return to normal display while keys are inactived for 30 sec in setup mode.
For 87783, it is only related WBGT.
For 87784, WBGT & HI (Heat Index) is switchable by user.

IN/OUT SWITCH (ONLY for WBGT mode)

This function is to calculate WBGT without [IN] or with [OUT] direct sun exposure.
Under IN/OUT modes, press [▲] or [▼] to switch [IN / OUT] then press SET key to confirm. (see Fig. 9 & 10)

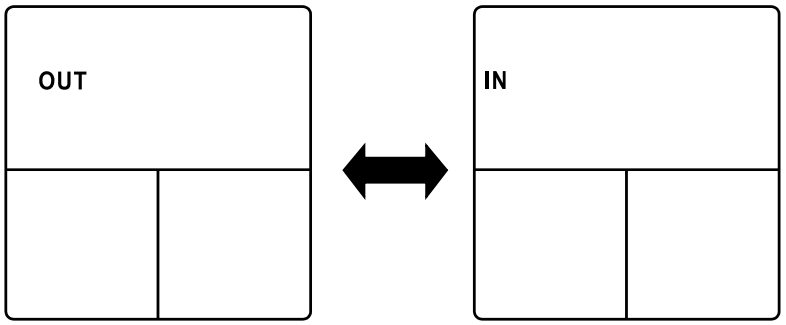


Fig.9 Fig.10

ALARM THRESHOLD SETTING

This function allows users to customize alarm threshold or stay at factory default alarm threshold.
While choosing to stay at factory default alarm threshold, please select [OFF].
[OFF] means to turn off customization function.
The default alarm-threshold is defined in below and each range has different buzzer frequence to distinguish.

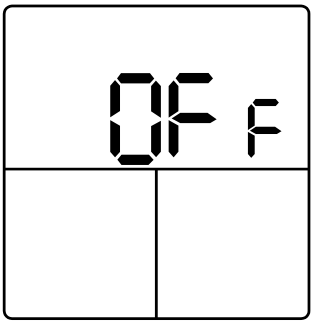


Fig.11

If user decide to customize their own alarm threshold, select [ON], [ON] means the alarm threshold setting is turned ON by user.(see Fig 12 & 13)

The adjustment range is listed below.

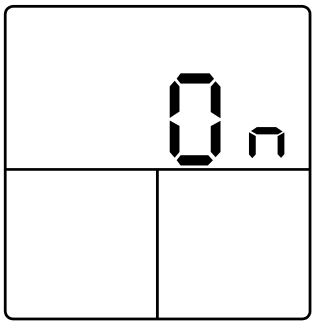


Fig 12

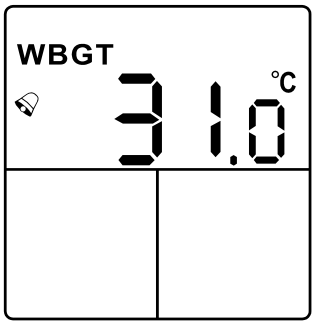


Fig 13

Hazardous	WBGT	HI	Alarm Customize OFF	Alarm Customize ON
Caution	26.7~29.4C (80~84.9F)	27~31.9C (80.6~89.4F)	Silent	Urgent beep upon the measured reading is over the threshold
Extreme caution	29.4~31C (85~87.9F)	32~40.9C (89~105.6F)	Beep	
Danger	31~32.2 (88~89.9F)	41~53.9 (105.7~129F)	Urgent Beep	
Extreme danger	>32.2C (>90F)	>54C (>129F)	Urgent Beep	

Press [▲] or [▼] key to adjust alarm value. Press SET key to save the value.The adjustment is 0.1per step. The adjustment range is 20~50C for WBGT and 20~60C for HI.

Special Note:
If user prefer to monitor the heat stress in a completely silent way, following procedure can block the alarm function so LED, buzzer and alarm related icons are all off.
While adjusting alarm threshold value, pressing [▲]and [▼] key simultaneously. The alarm threshold will show [--.-]on the LCD (see Fig 14). Press [▲]and [▼] again to revert the status.

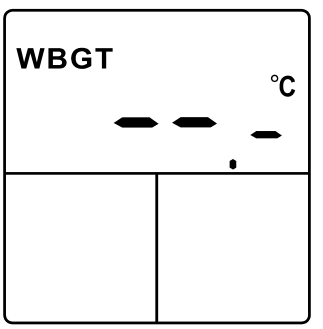


Fig 14

TEMPERATURE UNIT °C /°F

Press [▲] and [▼] key to switch °C (degrees Celcius) or ° F (degrees Farhenheit). Press SET key to save the selection. (See Fig 15 & Fig 16)

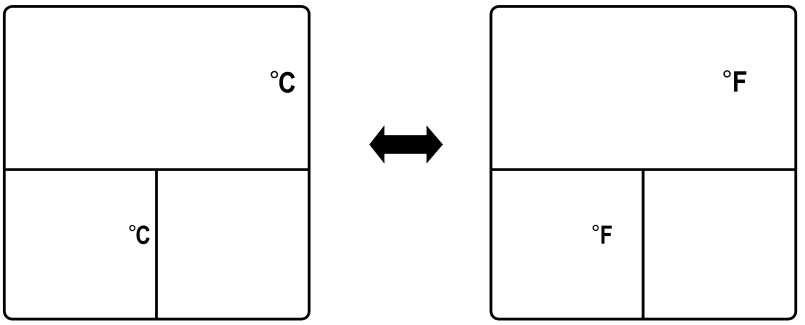


Fig 15 Fig 16

WBGT / HI SWITCHING (87784 ONLY)

In 87784, the main displayed heat stress index can be WBGT or HI. While the temp unit setting completed, pressing [▲]or [▼] key to switch WBGT/HI and then press SET key to confirm.(See Fig 17 & 18)
Then, the checker will return to measurement mode after upon all setting are completed.

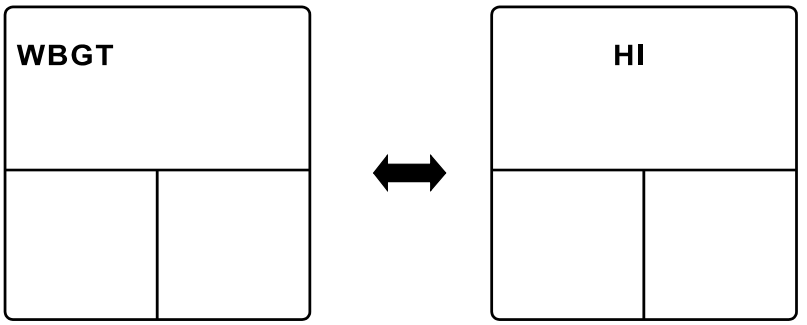


Fig 17 Fig 18

RESET FUNCTION

This allows user RESET the checker to default setting. In **POWER OFF** status, press [SET], [▲]and [▼] key simultaneously for 5 seconds till [rSt] symbol show on the LCD in 5 seconds. Then full display will be turned on and go to measurement mode automatically.(See Fig 19)

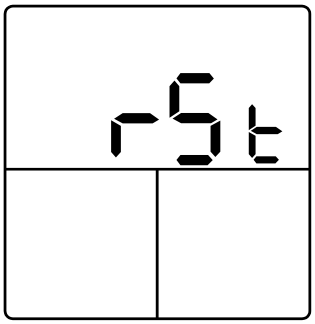


Fig 19

The default status of each setup parameter is:

Description	Default Value
IN/OUT	OUT
ALARM THRESHOLD SETTING	OFF
°C / °F	°C
WBGT/HI(87784 ONLY)	WBGT
SOUND LEVEL	

MATERIALS SUPPLIED

This package contains :

- Meter x 1 pc
- AAA Size Batteries x 2 pcs
- Operation manual x 1 pc
- Fixing Strap x 1 pc
- Buckles x 2 pcs

SPECIFICATION

Model	87783	87784
Temp. range	0~50°C	
Temp. resolution	0.1°C/°F	
Temp. accuracy	+/-0.6°C	
Humidity. range	0.1%~99.9%RH	
Humidity resolution	0.1%RH	
Humidity accuracy	10.0%~90.0% @ 25°C:Typical 5%. Others 7%	
Globe Temp.(inside black ball)	0~70°C	
WBGT temp. range	0~50°C	0~50°C
HI temp. range		0~60°C
WBGT Alarm Range	20~50°C	20~50°C
HI Alarm Range		20~60°C
Black ball size(mm)	Dia. 40	
Stabilization time	15 ~25 minutes typical	
Battery life	~300hour	
LCD size (mm)	40(H)x39(W)	
Operation temp.	0~50°C	
Operation RH%	Humidity < 80%	
Storage temp.	-20~50°C	
Storage RH%	Humidity < 90%	
Dimension(mm)	70(H)x60(W)x22(T)	
Weight	~90g	
Standard Package	AAA x2pcs	
Battery	Meter/Battery/Manual/Paper box	

TROUBLE SHOOTING

Problem	Cause	Solution and Remark
Power on but no display	1) Pressing the "**On/Off**" key is too short	1) Make sure the time of pressing "**On/Off**" key is more than 2S
	2) The battery is not good connect	2) Check the battery is in place and make sure good contact and correct polarity.
	3) Battery is deplenished	3) Replace a new battery and try again.
Display disappear	1) Low battery	1) Check whether the low battery indicator is displayed on before Display disappear, if yes replace a new battery.

Error Code	Problem	Solution
TA/TG		
E02	The Value is under range	Put the meter in room temperature at least 30 minutes. If the error message still appears, please return to original for repair.
E03	The Value is over range	Put the meter in room temperature at least 30 minutes. If the error message still appears, please return to original for repair.
RH/ HEAT INDEX (HI) / WBGT		
E04	The Value is in error because of original data	Please refer TA/TG Error. (E02 / E03)
WBGT		
E04	The Value is in error because of original data	Please refer TA/TG Error. (E02 / E03)
Other		
	Can't adjust value from meter	Replace a new battery. If the error still appears, please return to original for repair.
	inexplicable error at Meter	Please [RESET] the meter. If the error still appears, please return to original for repair.

WARRANTY

The meter is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover misuse, abuse, alteration, neglect, improper maintenance, or damage resulting from leaking batteries. Proof of purchase is required for warranty repairs. Warranty is void if the meter has been opened.

RETURN AUTHORIZATION

Authorization must be obtained from the supplier before returning items for any reason. When requiring a RA (Return Authorization), please include data regarding the defective reason, the meters are to be returned along with good packing to prevent any damage in delivery and insured against possible damage or loss.

APPENDIX

WBGT &Physical exercise

WBGT	Flag	Activity Intensity
< 80°F < 26.7°C	White	Normal activity. Caution should be taken.
80-84.9°°F 26.7-29.4°C	Green	Discretion is required in planning intense physical activity.
85-87.9°F 29.4-31°C	Yellow	Intense activity for new and acclimatized persons should be curtailed.
88-89.9°F 31-32.2°C	Red	Intense exercise must b e curtailed for those with less than 12 weeks training in hot weather. Be on high alert
> 90°F > 32.2°C	Black	Cancel all outdoor exercise.

Source: Manual of Naval Preventive Medicine (NAVMED P-5010)

Heat Index Chart

Category	Heat Index	Possible heat disorders for people in high risk groups Extreme
Danger	54°C or higher	Heat stroke or sunstroke likely
Danger	41-54°C	Sunstroke,muscle cramps,and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity.
Extreme	32-41°C	Sunstroke,muscle cramps,and/or heat exhaustion possible with prolonged exposure and/or physical activity
Caution	27-32°C	Fatigue possible with prolonged exposure and/or physical activity.

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Hygrometer/Psychrometer
Thermometer
Anemometer
Sound Level Meter
Air Flow meter
Infrared Thermometer
K type Thermometer
K.J.T. type Thermometer
K.J.T.R.S.E. type Thermometer
pH Meter
Conductivity Meter
T.D.S. Meter
D.O. Meter
Saccharimeter
Manometer
Tacho Meter
Lux / Light Meter
Moisture Meter
Data logger
Temp./RH transmitter
Wireless Transmitter .....

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