

User Manual R1.1
Santacary Technology Co. Ltd.
MHK-U15 Reptile UV Index Meter



INTRODUCTION

Congratulations on your purchase of this Santacary MHK-U15 Reptile UV Index Meter. MHK-U15 is a precise meter that measures 240-400 nm ultraviolet radiation. It measures UV irradiance in the wavelengths that enable Vitamin D3 Synthesis in reptiles.

FEATURES

- ✧ Gallium Nitride Based Material Photovoltaic Mode
- ✧ High-precision detection, rapid response and operation
- ✧ Sensor's spectral response covers Vitamin-D3 Action Spectrum in Reptiles
- ✧ Display UVI, and UVB radiation intensity simultaneously
- ✧ Trend chart display showing the past readings for UVI
- ✧ Simultaneously displaying ambient temperature and humidity

APPLICATION

- ✧ Measures UV irradiance in the wavelengths that enable Vitamin D3 Synthesis in reptiles
- ✧ Monitors instantaneous UV Index (UVI)

DEVICE



1. UV sensor
2. TFT display
3. Power button
4. Select button
5. Enter button
6. Battery compartment cover

OPERATION

1. Proper usage of meter

- Wear eye protection and gloves when checking UV lamps
- Allow lamps to warm up at least 15 minutes prior to taking readings

2. Power Button

2.1 Turn On/Turn Off Meter

1) When the meter is turned off, press Power button  to turn on the unit.

2) When the meter is turned on, press Power button  for 2 seconds to turn off the unit.

When the unit is first turned on, it performs 1 second countdown for meter warm up, then enters normal display with current UVI, and UVB radiation intensity readings displayed. The meter starts taking measurements when power on and updates readings every 2 seconds. The UVB radiation Units are $\mu\text{W} / \text{cm}^2$.

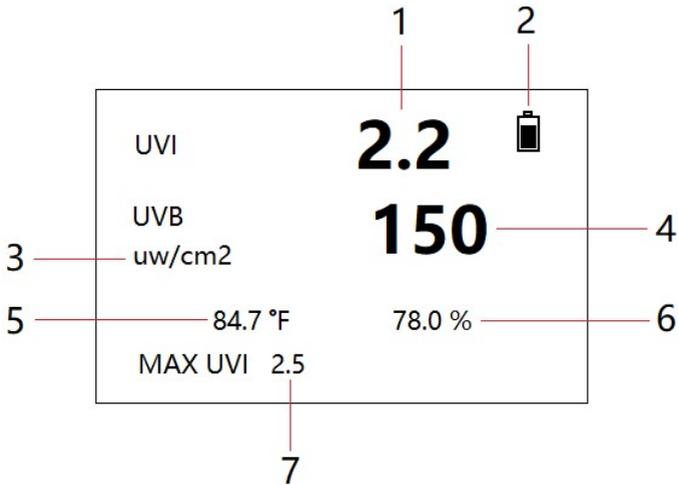
2.2 Hold function

Hold function keeps a reading on the display. In normal measurement state, press the Power button  shortly to select Hold function. The meter then stops all further measurements and the display will display “Hold” on screen down-right side. Press the Power button  shortly to exit Hold function. It will resume normal operation. The maximum value of UVI before data Hold operation is reset and cleared.

3. Select button **SELECT**

Press Select button **SELECT** shortly to switch Normal Display, Trend Chart Display and Log Display.

3.1 Normal Display

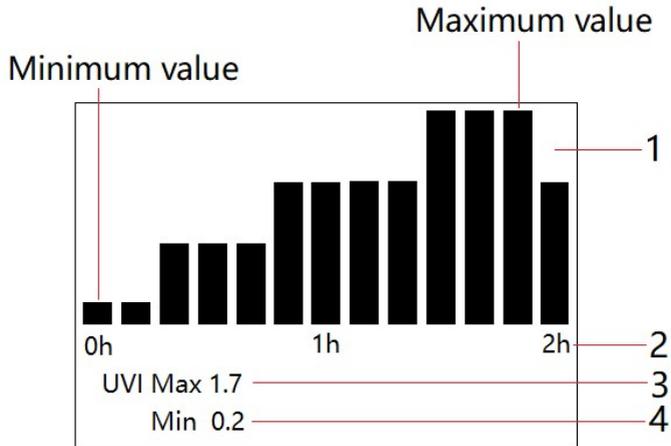


1. UVI (Ultraviolet Index for reptile)
2. Battery gauge
3. UVB radiation intensity unit
4. UVB radiation intensity
5. Air temperature
6. % relative humidity
7. Maximum UVI

3.2 Trend Chart Display

MHK-U15 has a data log function that provides up to 12 hours history of UVI.

The trend chart displays the past readings for UVI. The time per division (indicates the chart's time per unit division) is 60 min / div. Trend chart contains a maximum of 13 recorded data at one time. The time span is 12 hours. After the chart is full the data is FIFO (first-in, first-out). Below is the example of Trend Chart Display.



1. Vertical bar of UVI (The higher the bar, the greater the value)
2. Time scale (farther to the right, longer time in the past)
3. Maximum value on the chart of UVI
4. Minimum value on the chart of UVI

At the bottom of the chart, there are two numerical indicators: Max and Min. The Max and Min values will reflect the maximum and minimum values on the chart of UVI.

3.3 Log Display

This display lists the 13 recorded data in the trend chart with time stamps.

UVI			
0m	0.2	70m	1.2
10m	0.2	80m	1.2
20m	0.7	90m	1.7
30m	0.7	100m	1.7
40m	0.7	110m	1.7
50m	1.2	2h	1.2
1h	1.2		

1
2

1. Time stamps in past (m--minute, h--hour)
2. UVI records

4. Enter Button **ENTER**

4.1 Menu operations

By pressing the Enter button **ENTER** shortly, the meter enters into Menu operation. There are three menu items by pressing the enter button **ENTER** shortly to loop. The menu items are described in table 1.

Table 1 Menu Operations

Menu Items	Description and Operation
Temperature Unit	1) Pressing Select button SELECT shortly to switch two temperature units: °F and °C. <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="border: 1px solid black; padding: 10px; text-align: center;"> Temperature Unit: °F </div> <div style="text-align: center;"> ⇕ ⇕ </div> <div style="border: 1px solid black; padding: 10px; text-align: center;"> Temperature Unit: °C </div> </div>

	2) Pressing the Enter button ENTER shortly to confirm and enter next menu item.
Zero the sensor offset	1) Keep the sensor completely dark (such as covering the sensor with a black opaque object) 2) Pressing Select button SELECT shortly to reset the sensor offset and exits the MENU operation. Return to the normal measurement state.
EXIT	1) User presses Select button SELECT to exit the MENU operation and return to the normal measurement state. 2) Or pressing the Enter button ENTER shortly to loop back to the first menu item: Temperature Unit.

FERGUSON ZONES AND SUGGESTED UVI

In 2012, the British and Irish Association of Zoos and Aquariums (BIAZA) built on Professor Gary Ferguson (Texas Christian University) 's research to produce a document allocating Ferguson Zones to 254 species of reptiles and amphibians (table 2).

Table 2 Ferguson Zones

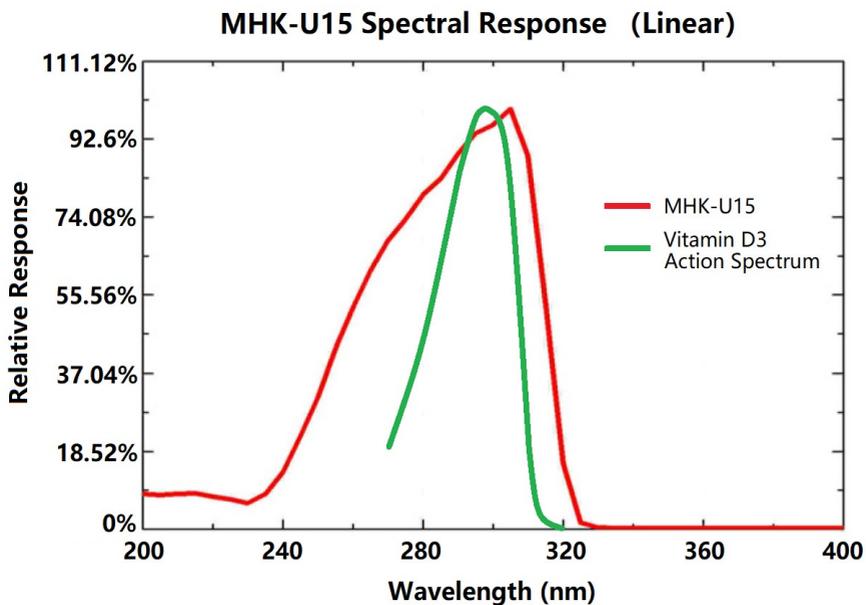
FERGUSON ZONE	SPECIES INCLUDE	SUGGESTED UVI
Zone 1: Crepuscular or Shade Dweller, Thermal Conformer	Crested Gecko Leopard Gecko Tokay Gecko Burmese Python Green Tree Python Milk Snake Reticulated Python	Shade Method: Gradient UVI 0~0.7

Intermediate between Zones 1 and 2	Fiji Branded Iguana Corn Snake Carpet Python	Shade Method: Gradient UVI 0~0.7
Zone 2: Partial Sun / Occasional Basker, Thermoregulator	Australian Water Dragon Emerald Tree Monitor Green Anole Monkey-Tailed Skink Pygmy Chameleon Ornate Box Turtle Red Foot Tortoise Boa Constrictor Red-Tailed Ratsnake Garter Snake Western Hognose Snake	Shade Method: Gradient UVI 0~1.0 or Sunbeam Method: UVI Maximum 1.1~3.0 in Basking Zone
Intermediate between Zones 2 and 3	Blue-Tongued Skink Chinese Water Dragon Panther Chameleon Common Musk Turtle	Sunbeam Method: UVI Maximum 1.1~3.0 in Basking Zone
Zone 3: Open or Partial Sun Basker, Thermoregulator	Black-and-White Tegu Frimled Lizard Standing's Day Gecko Yemen Chameleon Indian Star Tortoise Leopard Tortoise Spotted Turtle Diamond Python	Sunbeam Method: UVI Maximum 2.9~7.4 in Basking Zone
Intermediate between Zones 3 and 4	Bearded Dragon Bosc or Savannah Monitor Green Iguana Painted Turtle	Sunbeam Method: UVI Maximum 2.9~7.4 in Basking Zone

	Red Eared Slider Sulcata or African Spurred Tortoise	
Zone 4: Mid-Day Sun Basker, Thermoregulator	Chuckwalla Uromastyx Rhinoceros Iguana Texas Horned Lizard	Sunbeam Method: UVI Maximum 4.5~8.0 in Basking Zone

SPECTRAL RESPONSE

The MHK-U15 UV sensor’s spectral response (linear) is closely covers reptiles Vitamin D3 Action Spectrum as shown in below.



The strongest promoting effect on the synthesis of vitamin D3 in reptiles is at 290~305nm.

SPECIFICATIONS

UV Specification

UVI Measurement Range	0 to 160
Resolution of UVI	0.1
UVB Intensity Range	0 to 3,500 $\mu\text{W}/\text{cm}^2$
Resolution of UVB Intensity	1.0 $\mu\text{W}/\text{cm}^2$
Spectral Detection Range	240 to 400 nm
Peak point of Spectrum	305 nm
Measurement accuracy	$\pm 5\%$
Temperature Range	-10 to 50°C (14 to 122°F)
Humidity Range	0 to 90%RH

Temperature Specification

Temperature Range	-10.0~60.0°C (14~140°F) display
Display Resolution	0.1°C (0.1°F)
Display Options	°C/°F switchable
Accuracy	$\pm 0.5^\circ\text{C}$ ($\pm 0.9^\circ\text{F}$)
Response Time	5~30 seconds

RH Specification

Measurement Range	0.0~99.9%RH
Display Resolution	1%RH
Accuracy	$\pm 4.5\%$ RH
Response Time	<8 seconds for 63% of step change

General

Display	2.2" TFT LCD
Operating	-10°C to 50°C (14°F to 122°F), 0~90% RH non-condensing

Storage	-10°C to 60°C (14°F to 140°F), <99% RH non-condensing
Power Supply	Three AA Alkaline Batteries
Dimensions	74x148x26.5mm (2.91x5.83x1.04")
Weight	119 grams (4.2 oz.) without batteries

BATTERIES REPLACEMENT

1. When the batteries power is low, the low voltage symbol  appears on the display. It indicates that the batteries need to be replaced. If they are not replaced in time, the accuracy of measurement will be affected.
2. Open the battery compartment cover and take out the batteries.
3. Install 3 new AA batteries correctly according to the diagram of positive and negative poles in the battery compartment.
4. If the meter is not used for a long time, please take out the batteries to prevent the batteries from leaking and damaging the meter.

MATERIALS SUPPLIED

- ✧ Santacary MHK-U15 Reptile UV Index Meter
- ✧ Carry case
- ✧ English User Manual

CLEANING AND STORAGE

The front panel and case can be cleaned carefully with a soft wet cloth. Allow drying completely before using. Do not use aromatic hydrocarbons or chlorinated solvents for cleaning. Keep sensor free of oil, dirt, etc.

WARRANTY

The MHK-U15 is warranted to be free from defects in material and workmanship for a period of two year from the date of purchase. This warranty covers normal operation and does not cover misuse, abuse, alteration, neglect, improper maintenance.

CONTACT US

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