TENMARS TM-213

TENMARS TM-213 UVAB Light Meter User Manual

Model: TM-213

1. Introduction

The TENMARS TM-213 is a compact, professional UVAB light meter designed for accurate measurement of ultraviolet radiation. This device is suitable for a variety of applications, including industrial monitoring, UV sterilization, graphic arts, photochemical matching, UV EPROM erasure, photoresist exposure, and curing of inks, adhesives, and coatings. It is also useful for laboratory studies such as weathering degradation, virology, microbial genetics, DNA research, and biological hoods.
This manual provides detailed instructions for the safe and effective use of your TM-213 UVAB Light Meter. Please read it thoroughly before operation and retain it for future reference.

2. Safety Information

To ensure safe operation and to prevent damage to the meter, please observe the following safety precautions:

- Do not operate the meter if it appears damaged or if the casing is open.
- Avoid exposing the meter to extreme temperatures, humidity, or direct sunlight for prolonged periods.
- Do not attempt to repair or modify the meter. Refer all servicing to qualified personnel.
- Remove batteries if the meter is not to be used for an extended period to prevent battery leakage.
- Keep the sensor clean and free from obstructions for accurate readings.
- This device measures UV radiation. Prolonged exposure to high levels of UV radiation can be harmful. Use appropriate personal protective equipment when working in environments with high UV levels.

3. Package Contents

Verify that all items listed below are present and in good condition upon unpacking:

- TENMARS TM-213 UVAB Light Meter
- User Manual
- Carrying Case
- Calibration Certificate (if included)

Image 3.1: The TENMARS TM-213 UVAB Light Meter package contents, showing the meter, its protective carrying case, the user manual, and a calibration certificate.

Image 3.2: The TENMARS TM-213 UVAB Light Meter, its carrying case, and the retail packaging.

4. Device Overview

Familiarize yourself with the components and controls of your TM-213 UVAB Light Meter.

Image 4.1: Front view of the TM-213 meter. Key features include the LCD display, UV sensor with protective cap, and control buttons for power, zero, unit, and hold functions.

Image 4.2: Angled view of the TM-213 meter, providing a better perspective of its compact design and button placement.

Image 4.3: Close-up of the UV sensor with its protective cap removed, ready for measurement.

Image 4.4: Back view of the TM-213 meter, displaying the product label with specifications and the battery compartment cover.

4.1 Controls and Display

- **LCD Display:** Shows measurement readings, units, and other indicators.
- **Power Button (●):** Turns the meter ON or OFF.
- **ZERO Button:** Used to zero the reading before measurement.
- **UNIT Button:** Toggles between measurement units (uW/cm² and mW/cm²).
- **HOLD Button:** Freezes the current reading on the display.
- **UV Sensor:** Detects UVAB radiation. Ensure it is clean and unobstructed.

5. Setup

5.1 Battery Installation

The TM-213 requires two 1.5V AAA batteries for operation. Batteries are not included with the device.

1. Locate the battery compartment cover on the back of the meter.
2. Use a small screwdriver to loosen the screw securing the battery cover.
3. Remove the battery cover.
4. Insert two 1.5V AAA batteries, observing the correct polarity (+/-) as indicated inside the compartment.
5. Replace the battery cover and tighten the screw securely.

Image 5.1: The battery compartment of the TM-213 meter with the cover removed, illustrating the correct placement for two AAA batteries.

5.2 Powering On/Off

- To turn the meter ON, press the green Power button ().
- To turn the meter OFF, press the green Power button () again.
- The meter features an automatic shutdown function after approximately 15 minutes of inactivity to conserve battery life.

6. Operating Instructions

6.1 Taking a Measurement

1. Ensure batteries are installed and the meter is powered ON.
2. Remove the protective cap from the UV sensor.
3. **Zeroing the Meter:** In an area with no UV light (e.g., in a dark room or with the sensor completely covered), press the **ZERO** button. The display should show "0" or a value very close to zero. This step ensures accuracy.
4. Position the UV sensor towards the UV source or area you wish to measure.

5. Read the UV radiation value displayed on the LCD screen. The measurement updates approximately every 3 seconds.

6.2 Changing Measurement Units

The TM-213 can display readings in microwatts per square centimeter (uW/cm²) or milliwatts per square centimeter (mW/cm²).

- Press the **UNIT** button to toggle between uW/cm² and mW/cm².
- Note that 1000 uW/cm² is equivalent to 1 mW/cm².

6.3 Data Hold Function

To freeze the current reading on the display:

- Press the **HOLD** button during a measurement. The reading will be frozen.
- Press the **HOLD** button again to release the reading and resume live measurement.

7. Maintenance

7.1 Cleaning

- Wipe the meter's casing with a soft, damp cloth. Do not use abrasive cleaners or solvents.
- Keep the UV sensor clean and free of dust or debris. Use a soft, lint-free cloth to gently clean the sensor surface.

7.2 Storage

- When not in use, always place the protective cap over the UV sensor.
- Store the meter in its carrying case to protect it from dust, moisture, and physical damage.
- If storing for an extended period, remove the batteries to prevent leakage.
- Store in a cool, dry place away from direct sunlight and extreme temperatures.

Image 7.1: The TM-213 meter stored in its protective plastic bag and carrying case, demonstrating proper storage for longevity.

8. Troubleshooting

If you encounter issues with your TM-213 meter, refer to the table below for common problems and solutions.

Problem	Possible Cause	Solution
Meter does not power on.	Dead or incorrectly installed batteries.	Check battery polarity. Replace with fresh 1.5V AAA batteries.
Display shows "OL".	Overload condition; UV radiation exceeds the meter's range.	Move the meter further from the UV source or use in a lower intensity environment.
Inaccurate or fluctuating readings.	Dirty sensor, improper zeroing, or external interference.	Clean the UV sensor. Perform a zero calibration in a dark environment. Ensure no strong electromagnetic fields are nearby.

Problem	Possible Cause	Solution
Meter shuts off unexpectedly.	Automatic shutdown activated or low battery.	This is normal after 15 minutes of inactivity. If it happens during use, replace batteries.

9. Specifications

Technical specifications for the TENMARS TM-213 UVAB Light Meter:

Parameter	Detail
Display	3¾ digit LCD with a maximum reading of 4000
Measurement Range	3999 uW/cm² to 39.99 mW/cm² (1000 uW/cm² = 1 mW/cm²)
UV Sensor Spectrum	Bandpass from 290 nm to 390 nm
Accuracy	±4% FS + 2 digits (FS: full scale 15% for UV sunlight)
Maximum Sensitivity Wavelength	365 nm
Sampling Time	Approximately 3 seconds
Over-range Indication	"OL" displayed on screen
Power Supply	2 x 1.5V AAA batteries
Automatic Shutdown	After approximately 15 minutes of inactivity
Dimensions (Main Instrument)	133 x 48 x 27 mm (5.24 x 1.89 x 1.06 inches)
Weight (Main Instrument)	Approximately 90 g (0.2 lbs)
EMC Compliance	Complies with EN61326 (1997) + A1 (1998) + A2 (2001)
Material	Plastic

10. Warranty and Support

TENMARS products are designed for reliability and performance. For specific warranty information, please refer to the warranty card included with your product or contact your local TENMARS distributor or customer service.
For technical support, troubleshooting assistance beyond this manual, or service inquiries, please contact TENMARS customer support through their official website or the contact information provided in your product documentation.
Note: The provided JSON includes a "Certificate of Calibration" image, indicating that the product is calibrated and tested according to international standards. This supports the quality and reliability of the device.