

Apogee MQ-210

Apogee MQ-210 Underwater Quantum Light PAR Meter User Manual

Model: MQ-210

1. INTRODUCTION

The Apogee MQ-210 Quantum Light PAR Meter is designed for precise measurement of Photosynthetic Active Radiation (PAR) in underwater environments. This device features a waterproof quantum sensor connected to a handheld meter. The MQ-210 is specifically engineered to apply an immersion effect correction factor directly through its firmware, ensuring accurate readings in aquatic settings. It is suitable for various light sources, though specific post-measurement correction factors may be required for LED light sources to achieve optimal accuracy.

Important Note: While the sensor and its cable are fully waterproof, the handheld meter unit is NOT waterproof and must be kept dry.

2. SAFETY INFORMATION

- Always ensure the handheld meter remains dry. Exposure to water will damage the unit and void the warranty.
- Do not attempt to open or modify the handheld meter or the sensor. This can lead to damage and inaccurate readings.
- Handle the sensor cable with care to prevent kinks or damage, which could compromise its waterproof integrity.
- Keep the device away from extreme temperatures and direct sunlight when not in use.
- Use only specified batteries (if applicable, refer to product packaging or Apogee documentation).

3. PACKAGE CONTENTS

Upon unpacking, please verify that all the following components are present:

- Apogee MQ-210 Handheld Meter

- Waterproof Quantum Sensor (attached via cable)
- User Manual (this document)

4. PRODUCT OVERVIEW

The MQ-210 system comprises two main parts: the handheld display unit and the waterproof quantum sensor.



Figure 1: Apogee MQ-210 Underwater Quantum Light PAR Meter. This image displays the complete MQ-210 unit, featuring the handheld meter with its digital display and control buttons, connected by a cable to the compact, black waterproof quantum sensor. The sensor is designed for submersion, while the handheld unit is for dry use.

4.1 Handheld Meter

The handheld meter features a digital display for showing PAR readings in $\mu\text{mol m}^{-2} \text{s}^{-1}$. It includes control buttons for power, sampling, and mode selection. The meter processes the raw sensor data and applies the immersion effect correction factor.

4.2 Waterproof Quantum Sensor



Figure 2: Close-up view of the Apogee waterproof quantum sensor. This image highlights the robust, anodized aluminum body and the acrylic diffuser of the sensor head. The sensor contains a blue-enhanced silicon photodiode and custom optical filters, designed for accurate underwater PAR measurements.

The sensor incorporates a blue-enhanced silicon photodiode and custom optical filters housed within a rugged, anodized aluminum body with an acrylic diffuser. It is designed for full submersion in water, making it ideal for applications such as saltwater aquariums.

5. SETUP

1. **Unpack the Device:** Carefully remove the handheld meter and sensor from its packaging.

2. **Inspect for Damage:** Check the handheld meter, sensor, and cable for any visible signs of damage. If damage is found, do not proceed with setup and contact support.
3. **Battery Installation (if applicable):** If the meter requires user-installed batteries (not specified, but common for handheld devices), open the battery compartment (usually on the back) and insert the correct type and number of batteries, observing polarity.
4. **Sensor Connection:** The quantum sensor is permanently attached to the handheld meter via a waterproof cable. Ensure the cable connection point to the sensor is secure and undamaged.
5. **Initial Power On:** Press the power button on the handheld meter to turn it on. The display should illuminate and show a reading.

6. OPERATING INSTRUCTIONS

6.1 Powering On/Off

- To power on the meter, press the **Power** button (usually marked with a circle and vertical line symbol).
- To power off, press and hold the **Power** button until the display turns off.

6.2 Taking Measurements

1. **Position the Sensor:** Carefully submerge the waterproof quantum sensor into the water at the desired depth and location for measurement. Ensure the sensor's acrylic diffuser is clean and unobstructed.
2. **Observe Readings:** The handheld meter's display will show the real-time PAR reading in $\mu\text{mol m}^{-2} \text{s}^{-1}$. The MQ-210 automatically applies the immersion effect correction factor in its firmware for underwater measurements.
3. **Sampling (if applicable):** If the meter has a "sample" button, pressing it may log the current reading or provide a stable reading. Refer to the on-screen indicators for specific sampling functions.
4. **Mode Selection (if applicable):** Use the "mode" button to cycle through different display modes or settings if available.

6.3 LED Light Source Considerations

While the MQ-210 is excellent for most light sources, when measuring PAR from LED light sources, post-measurement correction factors may need to be applied for the most accurate results. Consult Apogee Instruments' official documentation or website for specific correction factors pertaining to various LED types.

7. MAINTENANCE

7.1 Cleaning

- **Sensor:** After each use in water, rinse the sensor with fresh water to remove any salt, debris, or biological film. Gently wipe the acrylic diffuser with a soft, non-abrasive cloth. Avoid using harsh chemicals or abrasive materials that could scratch the diffuser.
- **Handheld Meter:** Clean the handheld meter with a dry, soft cloth. Do not use liquid cleaners or immerse the meter in water.

7.2 Storage

- Store the MQ-210 in a cool, dry place away from direct sunlight and extreme temperatures.

- If storing for extended periods, remove batteries from the handheld meter to prevent leakage (if applicable).
- Keep the sensor and cable free from kinks or sharp bends during storage.

8. TROUBLESHOOTING

Problem	Possible Cause	Solution
Meter does not power on.	Dead or incorrectly installed batteries.	Replace batteries with new ones, ensuring correct polarity.
Inaccurate or erratic readings.	<ul style="list-style-type: none"> • Dirty sensor diffuser. • Damaged sensor or cable. • Incorrect application of LED correction factor (for LED sources). 	<ul style="list-style-type: none"> • Clean the sensor diffuser gently. • Inspect sensor and cable for damage. If damaged, contact support. • Refer to Apogee documentation for LED correction factors.
Display shows "Error" or unusual characters.	Internal malfunction or sensor issue.	Try powering off and on again. If the error persists, contact Apogee Instruments support.
Buttons are unresponsive.	Internal button malfunction or software issue.	Power cycle the device. If buttons remain unresponsive, contact Apogee Instruments support.






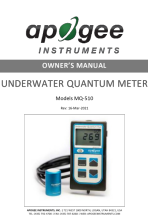
9. SPECIFICATIONS

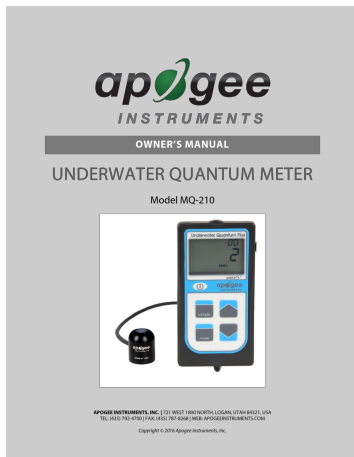
Feature	Detail
Model	MQ-210
Measurement Type	Underwater Photosynthetic Active Radiation (PAR)
Sensor Type	Blue-enhanced silicon photodiode with custom optical filters
Sensor Body Material	Rugged, anodized aluminum with acrylic diffuser
Immersion Effect Correction	Automatically applied via firmware
Handheld Meter Water Resistance	Not waterproof
Sensor Water Resistance	Fully waterproof
Manufacturer	Apogee Instruments

10. WARRANTY AND SUPPORT

For detailed warranty information, technical support, or service inquiries, please contact Apogee Instruments directly. Refer to their official website for the most current contact details and warranty policies. It is recommended to register your product with Apogee Instruments to ensure you receive updates and support.

Related Documents - MQ-210

	<p>Apogee Symphony I/O Troubleshooting: No Power On Issues</p> <p>A technical bulletin from Apogee Electronics providing troubleshooting steps for resolving 'no power on' issues with the Symphony I/O audio interface. Covers common symptoms and guides users through checking firmware, cables, power supply, and circuit boards.</p>
	<p>Apogee Clearmountain's Dance User's Guide: Delay Plugin Features and Setup</p> <p>Comprehensive user guide for Apogee's Clearmountain's Dance delay plugin. Learn about its analog tape emulation, ping pong delay, installation, signal routing, and troubleshooting.</p>
	<p>Apogee AFI-118 Subwoofer System: High-Performance 18-inch Professional Audio Subwoofer</p> <p>Detailed specifications and features of the Apogee AFI-118 Subwoofer System, an 18-inch (460mm) high-power subwoofer designed for professional audio applications, including live sound, clubs, and theaters. Learn about its driver, engineering data, and compatibility.</p>
	<p>Apogee Symphony Studio User's Guide: High-Resolution Audio Interface</p> <p>Comprehensive user guide for the Apogee Symphony Studio Series audio interface, covering setup, operation, software control, monitor workflows, and technical specifications for professional audio production.</p>
	<p>Apogee Symphony I/O MKII Price List Update</p> <p>A comprehensive price list for Apogee Symphony I/O MKII audio interfaces and accessories, detailing product codes, descriptions, and updated pricing effective December 21, 2020.</p>
	<p>Apogee Instruments MQ-510 Underwater Quantum Meter Owner's Manual</p> <p>Owner's Manual for the Apogee Instruments MQ-510 Underwater Quantum Meter, detailing its specifications, operation, maintenance, troubleshooting, and warranty information.</p>

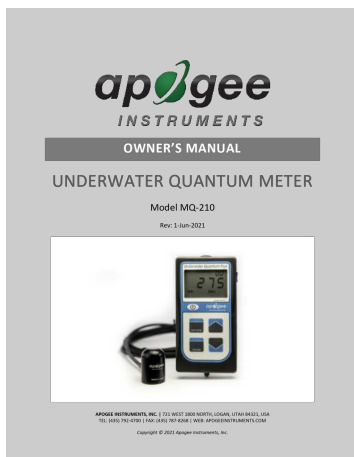


[\[pdf\]](#) User Manual Owner's Manual Instructions Specifications

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OWNER S MANUAL UNDERWATER QUANTUM METER Model **MQ-210** APOGEE INSTRUMENTS, INC. 721 WEST 1800 NORTH, LOGAN, UTAH 84321, USA TEL: 435 792-4700 FAX: 435 787-8268 WEB: APOGEEINSTRUMENTS.COM Copyright 2016 Apogee Instruments, Inc. 2 TABLE OF CONTENTS Owner s Manual

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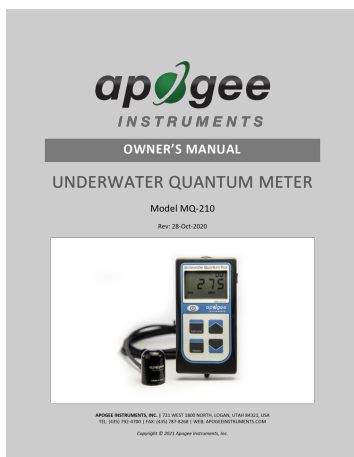


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Chris Madsen MQ 210 manual Apogee Instruments series quantum meters covered in this are self contained and come The bubble level the plate makes leveling simple accurate apogeeinstruments content

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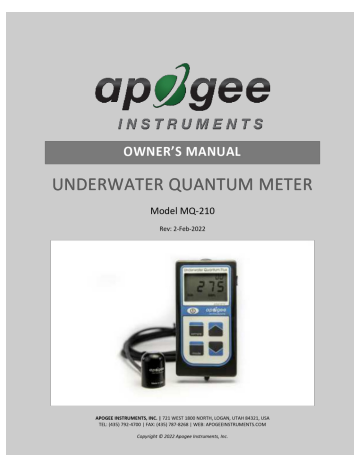


[\[pdf\]](#) User Manual Owner's Manual Specifications

Chris Madsen Underwater Quantum Meter UNDERWATER QUANTUM METER MQ 210 sensor attach to AL 100 leveling plate AM 320 Saltwater Submersible Sensor Wand DEPLOYMENT AND INSTALLATION Apogee series quantum meters are designed for spot check measurements and calculation of daily light Manual coralsands de mediafiles Sonstiges Downloaddateien apogee instruments |||

OWNER S MANUAL UNDERWATER QUANTUM METER Model **MQ-210** Rev: 28-Oct-2020 APOGEE INSTRUMENTS, INC. 721 WEST 1800 NORTH, LOGAN, UTAH 84321, USA TEL: 435 792-4700 FAX: 435 787-8268 WEB: APOGEEINSTRUMENTS.COM Copyright 2021 Apogee Instruments, Inc. TABLE OF CONTENTS Owner s Manual

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Chris Madsen MQ 210 manual Apogee Instruments UNDERWATER QUANTUM METER 3 feb 2022 — Please be advised that based on the information available to us from our raw material suppliers products manufactured by do not contain INTRODUCTION Radiation drives photosynthesis is called photosynthetically active radiation PAR and typically defined as total across a range of 400 700 nm e lss jp apogee content |||

OWNER S MANUAL UNDERWATER QUANTUM METER Model **MQ-210** Rev: 2-Feb-2022 APOGEE INSTRUMENTS, INC. 721 WEST 1800 NORTH, LOGAN, UTAH 84321, USA TEL: 435 792-4700 FAX: 435 787-8268 WEB: APOGEEINSTRUMENTS.COM Copyright 2022 Apogee Instruments, Inc. TABLE OF CONTENTS Owner s Manual

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UNDERWATER QUANTUM (PAR) METERS
MQ-510 & MQ-210

Research grade measurements of underwater photosynthetically active radiation

Mean spectral response measurements of six replicate Apogee MQ-210 and MQ-510 series quantum sensors.

Product Specifications

	MQ-510	MQ-210
Calibration Uncertainty	± 5 %	± 5 %
Measurement Range	0 to 4000 $\mu\text{mol m}^{-2} \text{s}^{-1}$	0 to 4000 $\mu\text{mol m}^{-2} \text{s}^{-1}$
Measurement Reproducibility	Less than 0.5 %	Less than 0.5 %
Long term drift (Non-stabilized)	Less than 2 % per year	Less than 2 % per year
Non-linearity	Less than 1 % up to 4000 $\mu\text{mol m}^{-2} \text{s}^{-1}$	Less than 1 % up to 4000 $\mu\text{mol m}^{-2} \text{s}^{-1}$
Response Time	Less than 5 ms	Less than 5 ms
Field of View	180°	180°
Spectral Range	380 to 680 nm ± 5 nm bandwidths when response is greater than 10 % of maximum	430 to 650 nm bandwidths when response is greater than 10 % of maximum
Spectral Sensitivity	Less than 10 % from 420 to 440 nm ± 1 nm	Less than 10 % from 440 to 455 nm ± 1 nm
Operational Control Response	± 0.5 % at 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$	± 0.5 % at 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$
Temperature Response	± 0.5 % at 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$	± 0.5 % at 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$
Uncertainty in Daily Total	Less than 5 %	Less than 5 %
Detector	Blue enhanced silicon photodiode	Blue enhanced silicon photodiode
Housing	IP68	IP68
Operating Environment	0 to 30 °C; less than 90 % non-condensing relative humidity up to 30 °C; less than 70 % non-condensing relative humidity from 30 to 50 °C; upper ocean use is designed up to depth of 30 m	0 to 30 °C; less than 90 % non-condensing relative humidity up to 30 °C; less than 70 % non-condensing relative humidity from 30 to 50 °C; upper ocean use is designed up to depth of 30 m
Motor Dimensions	128 mm length, 70 mm width, 30 mm depth	128 mm length, 60 mm width, 30 mm depth
Sensor Dimensions	24 mm diameter, 37 mm height	24 mm diameter, 30 mm height
Mass	180 g	180 g
Cable	2 m of shielded, twisted pair wire; additional cable available; 170 jacket	2 m of shielded, twisted pair wire; additional cable available; 170 jacket
Warranty	4 years against defects in materials and workmanship	4 years against defects in materials and workmanship

Underwater Quantum Meter | MQ-210

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Underwater Accuracy of Apogee Quantum Sensors

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[pdf] Specifications Dimension Guide Warranty

apogeeinstruments content MQ 210 spec sheet 510 Full Spectrum Underwater LED PAR Meter Apogee Bulk Reef Supply the under reporting blue end of spectrum while slightly over reports Both units should perform well in a typical aquarium application For more information check out their Specification Sheets Instruments |||

UNDERWATER QUANTUM PAR METERS MQ-510 **MQ-210** Research-grade measurements of underwater photosynthetically active radiation Spectral Response Product Specifications Mean spectral response measurements of six replicate Apogee **MQ-210** and MQ-510 series quantum sensors. Calibration Uncertainty Me... lang:en score:26 filesize: 383.38 K page_count: 2 document date: 2020-10-28

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Underwater Quantum Meter **MQ-210** Ensure proper light levels for underwater photosynthesis. Ready for Underwater Use The **MQ-210** has the immersion effect correction factor preprogrammed in the meter firmware allowing you to make excellent underwater measurements right out of the box. Waterproof Sens... lang:en score:26 filesize: 1.51 M page_count: 2 document date: 2016-11-21

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UNDERWATER QUANTUM PAR METERS MQ-510 **MQ-210** Research-grade measurements of underwater photosynthetically active radiation Spectral Response Product Specifications Mean spectral response measurements of six replicate Apogee **MQ-210** and MQ-510 series quantum sensors. Calibration Uncertainty Me... lang:en score:21 filesize: 383.39 K page_count: 2 document date: 2020-10-28

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Mark Blonquist apogeeinstruments content Accuracy of Apogee Quantum Sensors Underwater Sensores de Radiación Fotosintéticamente Activa PAR SQ Coltein |||

Underwater Accuracy of Apogee Quantum Sensors Mark Blonquist and Matthew Isaac Apogee Instruments, I ... original quantum sensor model SQ-120, handheld meter version for underwater measurements is model **MQ-210** . Shortly after the new full spectrum sensor was released, immersion effect correction factor... lang:en score:21 filesize: 806.04 K page_count: 8 document date: 2018-05-24

Research-grade measurements of underwater photosynthetically active radiation

apogee
INSTRUMENTS

NEW Color for 2019!

UNDERWATER QUANTUM (PAR) METERS | MQ-510 & MQ-210

Features

Apogee Instruments PAR meters are the tool of choice for cost-effective, scientific-grade measurement of underwater PAR levels. Accurate tank PAR mapping, daily light integral measurements, and the adjusting of photosynthetic radiation levels to ensure success are all critical to specimen health. Apogee offers two different PAR meters for aquariums at two different price points. The basic MQ-210 features our original detector that is excellent for broadband light sources. The research-grade MQ-510 features an improved detector sensitive for all light sources, including LEDs, and maintains 1% CDR and 100% Raman PAR sensors in accuracy while costing much less.

Designed for Underwater Use

Custom housings are fully epoxy potting to be completely waterproof. Diffuser is cosine corrected for accurate 2π (Hemisphere) sensor readings are adjusted in firmware to correct for the immersion effect.

Accurate, Stable Measurements

Long-term testing with multiple replicate sensors and customer Q&A show measurement accuracy within 0.5% per year.

Datalogging Capabilities

The meter records up to 99 measurements in logging mode, making automatic measurements every 30 seconds and recording 30-minute averages. Data can be downloaded to calculate DLI.

NIST Traceable Calibration

Apogee Quantum sensors are calibrated by comparison to the mean of four transfer standard sensors under a reference setup. The reference sensors are recalibrated regularly to a larger lamp traceable to the National Institute of Standards and Technology. Calibration certificates are available upon request.

Spectral Errors

	Apogee MQ-510	Apogee MQ-210	LI-190	LI-195	LI-198	LI-199	LI-200	LI-201	LI-202	LI-203	LI-204	LI-205	LI-206	LI-207	LI-208	LI-209	LI-210	LI-211	LI-212	LI-213	LI-214	LI-215	LI-216	LI-217	LI-218	LI-219	LI-220	LI-221	LI-222	LI-223	LI-224	LI-225	LI-226	LI-227	LI-228	LI-229	LI-230	LI-231	LI-232	LI-233	LI-234	LI-235	LI-236	LI-237	LI-238	LI-239	LI-240	LI-241	LI-242	LI-243	LI-244	LI-245	LI-246	LI-247	LI-248	LI-249	LI-250	LI-251	LI-252	LI-253	LI-254	LI-255	LI-256	LI-257	LI-258	LI-259	LI-260	LI-261	LI-262	LI-263	LI-264	LI-265	LI-266	LI-267	LI-268	LI-269	LI-270	LI-271	LI-272	LI-273	LI-274	LI-275	LI-276	LI-277	LI-278	LI-279	LI-280	LI-281	LI-282	LI-283	LI-284	LI-285	LI-286	LI-287	LI-288	LI-289	LI-290	LI-291	LI-292	LI-293	LI-294	LI-295	LI-296	LI-297	LI-298	LI-299	LI-300	LI-301	LI-302	LI-303	LI-304	LI-305	LI-306	LI-307	LI-308	LI-309	LI-310	LI-311	LI-312	LI-313	LI-314	LI-315	LI-316	LI-317	LI-318	LI-319	LI-320	LI-321	LI-322	LI-323	LI-324	LI-325	LI-326	LI-327	LI-328	LI-329	LI-330	LI-331	LI-332	LI-333	LI-334	LI-335	LI-336	LI-337	LI-338	LI-339	LI-340	LI-341	LI-342	LI-343	LI-344	LI-345	LI-346	LI-347	LI-348	LI-349	LI-350	LI-351	LI-352	LI-353	LI-354	LI-355	LI-356	LI-357	LI-358	LI-359	LI-360	LI-361	LI-362	LI-363	LI-364	LI-365	LI-366	LI-367	LI-368	LI-369	LI-370	LI-371	LI-372	LI-373	LI-374	LI-375	LI-376	LI-377	LI-378	LI-379	LI-380	LI-381	LI-382	LI-383	LI-384	LI-385	LI-386	LI-387	LI-388	LI-389	LI-390	LI-391	LI-392	LI-393	LI-394	LI-395	LI-396	LI-397	LI-398	LI-399	LI-400	LI-401	LI-402	LI-403	LI-404	LI-405	LI-406	LI-407	LI-408	LI-409	LI-410	LI-411	LI-412	LI-413	LI-414	LI-415	LI-416	LI-417	LI-418	LI-419	LI-420	LI-421	LI-422	LI-423	LI-424	LI-425	LI-426	LI-427	LI-428	LI-429	LI-430	LI-431	LI-432	LI-433	LI-434	LI-435	LI-436	LI-437	LI-438	LI-439	LI-440	LI-441	LI-442	LI-443	LI-444	LI-445	LI-446	LI-447	LI-448	LI-449	LI-450	LI-451	LI-452	LI-453	LI-454	LI-455	LI-456	LI-457	LI-458	LI-459	LI-460	LI-461	LI-462	LI-463	LI-464	LI-465	LI-466	LI-467	LI-468	LI-469	LI-470	LI-471	LI-472	LI-473	LI-474	LI-475	LI-476	LI-477	LI-478	LI-479	LI-480	LI-481	LI-482	LI-483	LI-484	LI-485	LI-486	LI-487	LI-488	LI-489	LI-490	LI-491	LI-492	LI-493	LI-494	LI-495	LI-496	LI-497	LI-498	LI-499	LI-500	LI-501	LI-502	LI-503	LI-504	LI-505	LI-506	LI-507	LI-508	LI-509	LI-510	LI-511	LI-512	LI-513	LI-514	LI-515	LI-516	LI-517	LI-518	LI-519	LI-520	LI-521	LI-522	LI-523	LI-524	LI-525	LI-526	LI-527	LI-528	LI-529	LI-530	LI-531	LI-532	LI-533	LI-534	LI-535	LI-536	LI-537	LI-538	LI-539	LI-540	LI-541	LI-542	LI-543	LI-544	LI-545	LI-546	LI-547	LI-548	LI-549	LI-550	LI-551	LI-552	LI-553	LI-554	LI-555	LI-556	LI-557	LI-558	LI-559	LI-560	LI-561	LI-562	LI-563	LI-564	LI-565	LI-566	LI-567	LI-568	LI-569	LI-570	LI-571	LI-572	LI-573	LI-574	LI-575	LI-576	LI-577	LI-578	LI-579	LI-580	LI-581	LI-582	LI-583	LI-584	LI-585	LI-586	LI-587	LI-588	LI-589	LI-590	LI-591	LI-592	LI-593	LI-594	LI-595	LI-596	LI-597	LI-598	LI-599	LI-600	LI-601	LI-602	LI-603	LI-604	LI-605	LI-606	LI-607	LI-608	LI-609	LI-610	LI-611	LI-612	LI-613	LI-614	LI-615	LI-616	LI-617	LI-618	LI-619	LI-620	LI-621	LI-622	LI-623	LI-624	LI-625	LI-626	LI-627	LI-628	LI-629	LI-630	LI-631	LI-632	LI-633	LI-634	LI-635	LI-636	LI-637	LI-638	LI-639	LI-640	LI-641	LI-642	LI-643	LI-644	LI-645	LI-646	LI-647	LI-648	LI-649	LI-650	LI-651	LI-652	LI-653	LI-654	LI-655	LI-656	LI-657	LI-658	LI-659	LI-660	LI-661	LI-662	LI-663	LI-664	LI-665	LI-666	LI-667	LI-668	LI-669	LI-670	LI-671	LI-672	LI-673	LI-674	LI-675	LI-676	LI-677	LI-678	LI-679	LI-680	LI-681	LI-682	LI-683	LI-684	LI-685	LI-686	LI-687	LI-688	LI-689	LI-690	LI-691	LI-692	LI-693	LI-694	LI-695	LI-696	LI-697	LI-698	LI-699	LI-700	LI-701	LI-702	LI-703	LI-704	LI-705	LI-706	LI-707	LI-708	LI-709	LI-710	LI-711	LI-712	LI-713	LI-714	LI-715	LI-716	LI-717	LI-718	LI-719	LI-720	LI-721	LI-722	LI-723	LI-724	LI-725	LI-726	LI-727	LI-728	LI-729	LI-730	LI-731	LI-732	LI-733	LI-734	LI-735	LI-736	LI-737	LI-738	LI-739	LI-740	LI-741	LI-742	LI-743	LI-744	LI-745	LI-746	LI-747	LI-748	LI-749	LI-750	LI-751	LI-752	LI-753	LI-754	LI-755	LI-756	LI-757	LI-758	LI-759	LI-760	LI-761	LI-762	LI-763	LI-764	LI-765	LI-766	LI-767	LI-768	LI-769	LI-770	LI-771	LI-772	LI-773	LI-774	LI-775	LI-776	LI-777	LI-778	LI-779	LI-780	LI-781	LI-782	LI-783	LI-784	LI-785	LI-786	LI-787	LI-788	LI-789	LI-790	LI-791	LI-792	LI-793	LI-794	LI-795	LI-796	LI-797	LI-798	LI-799	LI-800	LI-801	LI-802	LI-803	LI-804	LI-805	LI-806	LI-807	LI-808	LI-809	LI-810	LI-811	LI-812	LI-813	LI-814	LI-815	LI-816	LI-817	LI-818	LI-819	LI-820	LI-821	LI-822	LI-823	LI-824	LI-825	LI-826	LI-827	LI-828	LI-829	LI-830	LI-831	LI-832	LI-833	LI-834	LI-835	LI-836	LI-837	LI-838	LI-839	LI-840	LI-841	LI-842	LI-843	LI-844	LI-845	LI-846	LI-847	LI-848	LI-849	LI-850	LI-851	LI-852	LI-853	LI-854	LI-855	LI-856	LI-857	LI-858	LI-859	LI-860	LI-861	LI-862	LI-863	LI-864	LI-865	LI-866	LI-867	LI-868	LI-869	LI-870	LI-871	LI-872	LI-873	LI-874	LI-875	LI-876	LI-877	LI-878	LI-879	LI-880	LI-881	LI-882	LI-883	LI-884	LI-885	LI-886	LI-887	LI-888	LI-889	LI-890	LI-891	LI-892	LI-893	LI-894	LI-895	LI-896	LI-897	LI-898	LI-899	LI-900	LI-901	LI-902	LI-903	LI-904	LI-905	LI-906	LI-907	LI-908	LI-909	LI-910	LI-911	LI-912	LI-913	LI-914	LI-915	LI-916	LI-917	LI-918	LI-919	LI-920	LI-921	LI-922	LI-923	LI-924	LI-925	LI-926	LI-927	LI-928	LI-929	LI-930	LI-931	LI-932	LI-933	LI-934	LI-935	LI-936	LI-937	LI-938	LI-939	LI-940	LI-941	LI-942	LI-943	LI-944	LI-945	LI-946	LI-947	LI-948	LI-949	LI-950	LI-951	LI-952	LI-953	LI-954	LI-955	LI-956	LI-957	LI-958	LI-959	LI-960	LI-961	LI-962	LI-963	LI-964	LI-965	LI-966	LI-967	LI-968	LI-969	LI-970	LI-971	LI-972	LI-973	LI-974	LI-975	LI-976	LI-977	LI-978	LI-979	LI-980	LI-981	LI-982	LI-983	LI-984	LI-985	LI-986	LI-987	LI-988	LI-989	LI-990	LI-991	LI-992	LI-993	LI-994	LI-995	LI-996	LI-997	LI-998	LI-999	LI-1000
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Spectral Response

Mean spectral response measurements of six replicate Apogee MQ-510 and MQ-210 sensors, spectral response. Spectral response measurements were made at 10 nm intervals across a wavelength range of 380 to 700 nm. A monochromator with an attached electric light source. Measured spectral data from each quantum sensor were normalized by the measured spectral response of the monochromator to light calibration, which was measured with a spectroradiometer.

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mq 510 spec sheet MQ Full Spectrum Underwater Quantum Meter Envco envcoglobal files docs |||

Research-grade measurements of underwater photosynthetically active radiation

NEW Color for 2019 UNDERWATER QUANTUM PAR METERS MQ-510 **MQ-210**

Features Apogee Instruments PAR meters are the tool of choice for cost-effective, scientific-grade measurement of underwater PAR levels. Accurate tank...

lang:en score:16 filesize: 470.8 K page_count: 2 document date: 2019-08-21



[pdf] Catalog

Apogee overzichtlij quantum licht meter met 10 sensoren CaTeCApogee overzicht 3687catec nl 3687 |||

www.catec.nl M E E T I N S T R U M E N T A T I E 2021 Catalog Product Line 3 As we release this 20 ... ectric SQ-422 Modbus Sun/Electric MQ-100 Meter, attached sensor MQ-200 Meter, separate sensor **MQ-210** Meter, underwater calibration Line Quantum Models 0 to 800 mV SQ-313 3 Sensor Sun Calibrat...

lang:en score:16 filesize: 7.02 M page_count: 34 document date: 2021-02-03

TIVOLI GARDENS
MQ-510 and MQ-210 Underwater Quantum Meters

Aquarist technicians at Tivoli Gardens in Copenhagen, Denmark are currently using Apogee underwater quantum meters to optimize the illumination of their extensive aquarium exhibits. Achieving the perfect balance and arrangement of their LEDs, and other lighting sources requires great care every time they must be recalibrated.

First, the lighting must be arranged in a way that places the public viewing the corals. Second, giving the specimens the proper spectral irradiance and intensity is critical to helping the flora and fauna thrive. Next, access light must be managed to reduce algae growth and minimize maintenance. And finally, the power use of the exhibit must be optimized for electricity and conservation.

With 4.6 million visitors in 2017, Tivoli Gardens is the second most popular seasonal amusement park in the world and beyond Europe Park.

Application Summary

Summary
Used for underwater quantum meters to optimize the illumination of their extensive aquarium exhibits.

Apogee Sensors Used
MQ-510

Organization
Tivoli Gardens

Location
Copenhagen, Denmark

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TIVOLI GARDENS MQ-510 and **MQ-210** Underwater Quantum Meters Aquarist technicians at Tivoli Gardens in Copenhagen, Denmark are currently using Apogee underwater quantum meters to optimize the illumination of their extensive aquarium exhibits. Achieving the perfect balance and arrangement of their LEDs...

lang:en score:16 filesize: 226.45 K page_count: 1 document date: 2020-12-31

Full Spectrum Underwater Quantum Meter | MQ-510

Ensure proper light levels for underwater photosynthesis.

Ready for Submarine Use
The MQ-510 is the first underwater quantum meter to be completely waterproof. The meter is fully submersible and can be used in any aquatic environment.

Nonlinear Sensor
The MQ-510 is the first underwater quantum meter to be completely waterproof. The meter is fully submersible and can be used in any aquatic environment.

Advanced Spectral Response
The MQ-510 is the first underwater quantum meter to be completely waterproof. The meter is fully submersible and can be used in any aquatic environment.

Accurate, Stable Measurements
The MQ-510 is the first underwater quantum meter to be completely waterproof. The meter is fully submersible and can be used in any aquatic environment.

Datalogging Capabilities
The MQ-510 is the first underwater quantum meter to be completely waterproof. The meter is fully submersible and can be used in any aquatic environment.

CaTeC

[pdf] User Manual

Full Spectrum Underwater Quantum Meter v1 catec nl MQ 510 2331 |||

Full Spectrum Underwater Quantum Meter MQ-510 Ensure proper light levels for underwater photosynth ... te of Standards and Technology NIST . Dimensions Mini USB Port 19.0 mm Spectral Response MQ-510 **MQ-210** Spectral Errors of Commercial Quantum Sensors Radiation Source Apogee Apogee MQ-510 **MQ-210**...

lang:en score:16 filesize: 4.8 M page_count: 2 document date: 2016-11-28

Misure di Luce



Dalla Ricerca al Mercato

La casa di Logan Utah, nata nel 1996 su iniziativa del Dr. Bugbee allo scopo di produrre su misura i dati strumenti non reperibili commercialmente, e aderenti alle esigenze della ricerca, si è affermata nel corso degli anni nella produzione di una vasta gamma di sensori di radiazione.

Parametri al Silicio SP-Joe-55

Parametri con cella al silicio (ISO Classe C, già classe 2 WMO), gamma d'onda da 300 a 1120 nm. Vengono offerti in una versione di cui una analizzabilità ed una standard. Le celle possono essere in oro, o in argento, o in rame. Le celle sono costruite in un filtro acrilico, forato, cerato di condizionamento del segnale, il tutto in un corpo in alluminio anodizzato, nero e a forma di cuglio. La particolare forma minimizza il rischio di bruciare o prosciugare e contribuisce a mantenere pulito il sensore. I parametri possono essere fissati con l'apposita batteria di testamento.



Parametri a Termopila SP-500 e SP-600

I parametri a Termopila, Classe C ISO, misurano una gamma d'onda più estesa, da 300 a 2100 nm (210-2160 la versione SP-600-50, per applicazioni molto verso il basso). Essendo sensibili a gran parte dello spettro solare, i parametri a termopila a corpo nero eliminano gli errori di spettro associati con i parametri al silicio. La serie SP-600, rivolta verso il basso, è destinata a misurare la radiazione diffusa dalla superficie terrestre e combina una flessibilità di quanto al ricevitore a corpo nero.



Parametro Integrato MP-100

L'MP-100 è un misuratore palmare integrato da sensore parametrico in grado di leggere in tempo reale e memorizzare misure espresse in W m⁻². L'MP-100 può memorizzare fino a 99 misure in tempo reale, in modalità acquisizione, si accende e c'è sempre 30 secondi. Ogni 30 minuti effettua la media delle ventiquattro misure effettuate, e la memorizza. Con le 48 medie che formano il periodo di 24 ore, viene calcolato il totale giornaliero espresso in MJ m⁻² d⁻¹.



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Vincenzo LuceA1 2 ecosearch info sites default files prodotti documentazione |||

Misure di Luce Dalla Ricerca al Mercato La casa di Logan Utah , nata nel 1996 su iniziativa del Dr. ... evanza Fotobiologica Misure di PAR per Acquari Tutti i misuratori e sensori subacquei della Apogee **MQ-210** e 510, SQ-420 e 520 rispettivamente correggono automaticamente l'effetto immersione, o sono ...

lang:it score:14 filesize: 811.5 K page_count: 4 document date: 2021-09-22