

Hand Held Sunphotometer for Measuring  
Aerosol Optical Thickness Easily and Accurately

Solar Light's innovative **Model 540 MICROTOPS II<sup>®</sup> Sunphotometer** is a 5 channel hand-held instrument for measuring aerosol optical thickness easily, accurately, and dependably. This multispectral instrument is designed to measure direct solar irradiance in five channels of selected wavelengths. It then uses this information to provide atmospheric properties, such as aerosol optical thickness and precipitable water vapor column. Standard wavelengths to choose from are 340nm, 380nm, 440nm, 500nm, 675nm, 870nm, 936nm, and 1020nm. If your research is focused in the longer wavelengths, then we recommend the 675nm, 870nm, 936nm or 1020nm filters. If your research requires water vapor column measurements, then we recommend either the 936nm and 1020nm pair or the 870nm and 936nm pair. Popular options include a rugged carrying case and Garmin GPS receiver to facilitate field operation. Research professionals worldwide rely on the Microtops II<sup>®</sup> for its unparalleled combination of accuracy, portability, and durability.



### Applications

- Weather Stations
- Scientific and Educational Studies
- Pollution Monitoring
- Photobiology
- Environmental Monitoring
- Vicarious Calibration
- Irradiance-Based Calibration of Imaging Sensors

### Features and Benefits

- High Accuracy
- Easy To Use
- Fully Portable
- Instantaneous Results
- Non-Volatile Memory
- Low Cost
- USB Interface
- Made in USA

### Carry Case Features

- Well padded, durable construction
- Adjustable shoulder strap
- Pouch for notepad, pencils, etc.
- Velcro strap to attach fellow GPS carrying case
- MICROTOPS II<sup>®</sup> is fully operable while inside case



# SOLAR<sup>®</sup> LIGHT

## Microtops II<sup>®</sup> Sunphotometer Model 540

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S/N	DATE	TIME	LAT.	LONG	ALT.	PRES.	SZA	S440	S675	S870	SIG936	SIG1020	AOT 440	AOT 675	AOT 870	AOT 936	AOT 1020	WATER
3103	x/xx/xx	15:06:00	40.01	-75.13	20	1018	65.4	1.82	27.9	55.01	58.95	132.36	0.200	0.180	0.120	0.110	0.100	1.04
3103	x/xx/xx	15:06:11	40.01	-75.13	20	1018	65.4	1.81	27.8	54.71	58.8	132.2	0.201	0.179	0.123	0.110	0.104	1.04
3103	x/xx/xx	15:06:23	40.01	-75.13	20	1018	65.4	1.8	27.91	54.77	58.82	131.32	0.197	0.181	0.119	0.111	0.098	1.03
3103	x/xx/xx	17:48:32	40.01	-75.13	20	1014	62.6	1.56	20.9	35.55	20.85	48.42	0.199	0.181	0.120	0.007	0.099	0.96
3103	x/xx/xx	17:48:43	40.01	-75.13	20	1014	62.6	1.39	19.13	34.96	18.49	43.01	0.200	0.177	0.121	0.114	0.100	0.94

OPTICAL CHANNELS	STRAY LIGHT
340 ± 0.3nm, 2nm FWHM	340nm: 1E-6 <650nm; 1E-5 <1.0µm
380 ± 0.4nm, 4nm FWHM	380nm: 1E-6 <650nm; 1E-5 <1.0µm
440 ± 1.5nm, 10nm FWHM	440nm: 1E-5 <1.0µm
500 ± 1.5nm, 10nm FWHM	500nm: 1E-6 <1.1µm; 1E-5 <1.2µm
675 ± 1.5nm, 10nm FWHM	675nm: 1E-6 <1.1µm; 1E-5 <1.2µm
870 ± 1.5nm, 10nm FWHM	870nm: 1E-6 <1.1µm; 1E-5 <1.2µm
936 ± 1.5nm, 10nm FWHM	936nm: 1E-6 <1.1µm; 1E-5 <1.2µm
1020 ± 1.5nm, 10nm FWHM	1020nm: 1E-6 <1.1nm; 1E-5 <1.2µm

SPECIFICATIONS	
<b>Resolution</b>	0.01W/cm <sup>2</sup> on 305nm Channel
<b>Dynamic Range</b>	>300,000
<b>Viewing Angle</b>	2.5°
<b>Precision</b>	1-2%
<b>Non-linearity</b>	max 0.002% FS
<b>Operating Environment</b>	0 to 50°C, No Precipitation
<b>Computer Interface</b>	RS232 / USB with Adapter
<b>Power Source</b>	4xAA Alkaline Batteries
<b>Weight</b>	21 oz. (600 grams)
<b>Size</b>	4"W x 8"H x 1.7"D (10x20x4.3 cm)

REFERENCES
Atmosphere Poster (363K) Presented at Quadrennial Ozone Symposium Charlottesville, Virginia, USA June 4-13 1992 Daniel Berger, Marian Morys
Ultraviolet radiation as applied to photoclimate therapy at the Dead Sea (114K) A.I. Kudish, PhD, D. Abels, MD, and M. Harari, MD - International Journal of Dermatology 2003, 42, 359-365
A Comparison of the New Filter Ozonometer MICROTOPS II <sup>®</sup> with Dobson and Brewer Spectrometers at Hohenpeissenberg (108K) U. Kohler - Reprint from Geophysical Research Letters
Absolute Measurement and Modelization of 305.5 nm Direct Spectral Solar Radiation in Rosario, Argentina(43K) Work published in Spanish in "Avances en Energias Renovables y Medio Ambiente", Vol. 2, 11.53-11.56 (1998).
A Comparison of Spectroradiometers to Radiometers for UV Radiation Measurements (43K) Daniel Berger
Ship-Based Sun Photometer Measurements Using Microtops Sun Photometers Porter et al, Journal of Atmospheric and Oceanographic Technology, Vol. 18, 765-774, 2001.

### Highlights

- **High Accuracy** - Highest grade filters are embedded in solid cast aluminum housing to ensure accurate, stable optical alignment. Low noise electronics allow high linearity, resolution and dynamic range.
- **Ease of Use** - No computer knowledge is necessary to make measurements. Just aim the meter at the sun, align the image of the sun with the cross-hairs and push the button. In few seconds the measurement will be completed and the result stored in memory.
- **Portability** - A small hand-held device is all you need to perform measurements. No additional computer is necessary.
- **Instantaneous Results** - The Aerosol optical thickness calculation algorithms are programmed in the MICROTOPS II and the final results of all stored scans can be conveniently viewed on the LCD. The raw data is also stored to allow retrospective adjustments of algorithms.
- **Non-Volatile Memory** - The raw data collected by the MICROTOPS II, as well as calculated results are stored in non-volatile memory. Each data point is annotated with date, time, site coordinates, solar angle, altitude, pressure and temperature.
- **Low Cost** - By implementing the latest technology, instrument cost has been brought well below that of comparable sunphotometers, without sacrificing accuracy or features.
- **Computer Interface** - Connection to a PC through a USB interface enables transfer of collected data. MICROTOPS Organizer, a Windows-based software automates data retrieval and archiving.

Part Number: 210058

Revision Level: C

Specifications subject to change without notice.

Since 1967, Solar Light Company, Inc. has been recognized worldwide as America's premier manufacturer of Precision Solar Simulators and Light Sources, Light Measurement Instrumentation, UV Transmittance Analyzers, Meteorological Instrumentation, and Digital and Analog Sensors. Our advanced line of UV, visible, and IR radiometers and light meters measure laboratory, industrial, environmental, and health related light levels with NIST traceable accuracy. Column ozone, aerosol, and water vapor thickness measurements, in addition to long-term global ultraviolet radiation studies all over the world are performed using our atmospheric line of instrumentation. Solar Light also provides NIST traceable spectroradiometric analyses, calibrations for light meters and light sources, accelerated ultraviolet radiation degradation testing of materials, and OEM instrumentation and monitors. Please visit our website for more details, specifications, and pictures!



**State Of The Art Solar Simulators** available in 150-1000+ watt UV or AM variations for a variety of applications including PV Cell Testing, Materials Testing, Pre-Irradiation for In Vitro Broad Spectrum Sunscreen Testing, SPF Testing, and much more.



**Multi-Functional Professional Grade Radiometers** available with and without data logging, and compatible with over 130 Solar Light PMA-Series Sensors to measure UV, Visible and IR wavelengths. Specialty Meters also available to measure UV Radiation, SUV/UVA, Scotopic/Photopic Spectra, and much more.



**Advanced NIST-Traceable Sensors** for accurate measurement of UVA, UVB, UVA+B, UVC, Visible, IR, Photostability, Temperature, and Custom Wavelength – well over 130 models in both digital and analog configurations, all compatible with our Radiometers.



**Ultraviolet Transmittance Analyzers** available as complete integrated turnkey systems to meet the latest ISO24443 requirements.



**Handheld Ozonometers and Sunphotometers** for fast and dependable Column Ozone, Aerosol, and Water Vapor Thickness measurements, in addition to long-term global ultraviolet radiation studies.