

PHOTO RESEARCH®, Inc.

The PR®-680L / PR-680 SpectraDuo® Spectroradiometer and Photometer

Unique Design

The PR-680L SpectraDuo marks the beginning of a new era in light measurement. This unique, patent pending, battery powered portable instrument is the first and only fast-scanning 256 detector element spectroradiometer and ultra-sensitive low noise PMT based photometer on the market. The PR-680L has three available operating modes: 1) As a fast scanning spectroradiometer 2) As a highly sensitive photometer or 3) Auto Select Mode which automatically selects between detectors based on the available signal. *The PR-680 is similar to the PR-680L with some exceptions.*

The PR-680L/680 is supplied with 4 automated measuring apertures (1°, 1/2°, 1/4° and 1/8°) and an automated measure shutter. Other hardware features include AutoSync® for automatically synchronizing to the source refresh rate insuring the utmost accuracy, a Secure Digital (SD) port for measurement storage, and an external trigger port allowing remote measurement activation from either a push button or peripheral device, and a long lasting rechargeable Lithium-ion (Li-Ion) battery.



Easy to Use

The PR-680L/680 is controlled via the on-board, 2.25" x 3" high resolution, full color touch screen LCD display and 5-way navigation keypad for easy navigation. Following a measurement, the PR-680L/680 displays data and a color spectral graph on the system display. The PR-680L design provides stand alone operation - no PC required and can also be controlled via the world famous SpectraWin® software over USB, RS232 or Bluetooth interfaces.

Flexibility

The unique design of the PR-680L makes tasks such as spectrally based colorimetry and high speed, low level luminance - required for display metrology - possible with a single instrument by supplying a wide dynamic range - 0.00007 fL (photometer and 1° aperture) to 5,000,000 fL (spectroradiometer and 1/8° aperture) without using external neutral density filters. The PR-680 range is 0.001 to 5,000,000 fL. Since the Pritchard® viewing and measuring optics are shared by both the spectroradiometer and photometer, no realignment of the instrument to the target is required when switching between modes.

An optional analog output provides the capability of using the PMT as a high speed tool for characterizing display ON / OFF response (3 µsec response) or waveform analysis of flash sources. We've further enhanced the flexibility by adding two sensitivity modes (Standard & Extended) and 4 measurement speeds : Normal, Fast, 2X Fast, 4X Fast.

For applications other than luminance the PR-680L/680 can be supplied with optical accessories such as a cosine receptor for illuminance, LR-127 LED Analyzer for testing LED's to CIE 127, fiber probe for remote non-line-of-sight testing, and a series of magnification lens for small spot size analysis. The PR-680L/680 also provides the capability for interactive display white point calibration (RGB software).

Connectivity

It's easy for the PR-680L/680 to talk to the outside world - it comes equipped with USB and Bluetooth (optional) wireless interfaces. It is supplied with text based, Remote Mode syntax and a driver that emulates an RS232 interface (COM: port) making it a simple task to generate custom programming to perform specific tasks or for inclusion in an ATE environment. If needed, an RS232 interface can be added to complement the standard USB.

Features	Benefits
DUO Detector Design	Spectral and PMT photometer based measurements
Full Color Touch Screen Display	Easy-to-use menu based software
Wide Dynamic Range	Address almost any display measurement requirement
USB Interface	Connects to virtually any PC
Bluetooth ready (optional)	Wireless, remote data transfer
Analog Output (optional)	Optical Waveform Analysis
Long lasting rechargeable Li-Ion battery	Excellent for field use.
SD Card Storage	Save thousands of measurements
Internal automated ND-1 filter for the PMT	Increase PMT dynamic range by 10X

Applications

Display luminance and color	Medical / dental color testing
Contrast	Reflectance / transmittance
Screen brightness	Quality control
LED testing	Human factors
Paper, ink and textile testing	Dominant wavelength

PR-680L Specifications

Detectors	256 sensors and PMT
Inter-detector alignment error	0%
Spectroradiometer Wavelength Range	380 to 780 nm
Optics	Pritchard viewing and measuring system.
Digital Resolution	16 bits
Filters	Trimmed Photopic Automated ND-1 (0.1 transmission) for PMT
Spectral Resolution	1.56 nm per pixel
Spectral bandwidth	8 nm (5 nm optional)
Spectral Accuracy	± 1 nm
Luminance Range (fL)	0.00007 - 5,000,000
Luminance accuracy (Against NIST luminance standard - Illuminant A)	± 2%*
Luminance precision	≤ 1%*
Color Accuracy (for Illuminant A)	± 0.0015* in CIE 1931 x,y
Measurement Capabilities	Luminance, Illuminance, luminous intensity, chromaticity, correlated color temperature.
AutoSync Range	20 to 400 Hz
Analog Output Responses Time	3 µsec
Measurement Time	6 ms to 30 secs.
Battery	Lithium-ion (≥ 12 hours operation).
Weight	4 lbs (1.8 kg)
Operating Temperature	34° to 95° F (1° to 35° C)

* Luminance level of 0.3 fL for the Array, and 0.002 fL for the PMT with the 1° aperture against an Illuminant A based NIST traceable luminance standard.

† Sensitivities are for 10:1 signal to RMS noise against an Illuminant A based NIST traceable luminance standard.

◇ For the PR-680, multiply PR-680L PMT luminance values by 14.29.

All specifications subject to change without notice.

PR-680L Measurement Spot Size

Accessory	Working Distance	Aperture			
		1°	1/2°	1/4°	1/8°
MS-75 (355 mm to infinity)	355 mm	5.25 mm	2.63 mm	1.315 mm	0.658 mm
	305 m	5.32 m	2.66 m	1.33 m	665 mm
SL-0.5X	94.1 mm to 137 mm	1.5 mm to 2.54 mm	0.75 mm to 1.27 mm	0.375 mm to 0.635 mm	0.188 mm to 0.318 mm
	SL-1X	46 mm to 66 mm	0.890 mm to 1.32 mm	0.445 mm to 0.660 mm	0.226 mm to 0.330 mm
MS-2.5X	46 mm	0.51 mm	0.225 mm	0.128 mm	0.064 mm
MS-5X	28 mm	0.289 mm	0.145 mm	0.072 mm	0.036 mm
MS-7.5	100 mm	24.8 mm	12.4 mm	6.20 mm	3.10 mm
	30.5 m	5.32 m	2.66 m	1.33 cm	665 mm
LA-680	Contact	13.2 mm	13.2 mm	13.2 mm	13.2 mm
FP-680	Contact	3.17 mm	N/A	N/A	N/A

PR-680L Minimum Measureable Luminance (fL) †

Access.	Detector	Aperture			
		1°	1/2°	1/4°	1/8°
MS-75	Array PMT ◇	0.02	0.08	0.32	1.28
		0.00007	0.00028	0.0011	0.0044
SL-0.5X	Array PMT	0.02	0.08	0.32	1.28
		0.00007	0.00028	0.0011	0.0044
SL-1X	Array PMT	0.02	0.08	0.32	1.28
		0.00007	0.00028	0.0011	0.0044
MS-2.5X	Array PMT	0.05	0.2	0.8	3.20
		0.00018	0.0007	0.0028	0.011
MS-5X	Array PMT	0.08	0.32	1.28	5.12
		0.00028	0.0011	0.0045	0.018
MS-7.5	Array PMT	0.02	0.08	0.32	1.28
		0.00007	0.00028	0.0011	0.0044
LA-680	Array PMT	0.02	0.08	0.32	1.28
		0.00007	0.00028	0.0011	0.0044
FP-680	Array PMT	0.05	N/A	N/A	N/A
		0.00018			
CR-680	Array PMT	0.04 fc	N/A	N/A	N/A
		0.00014 fc			



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