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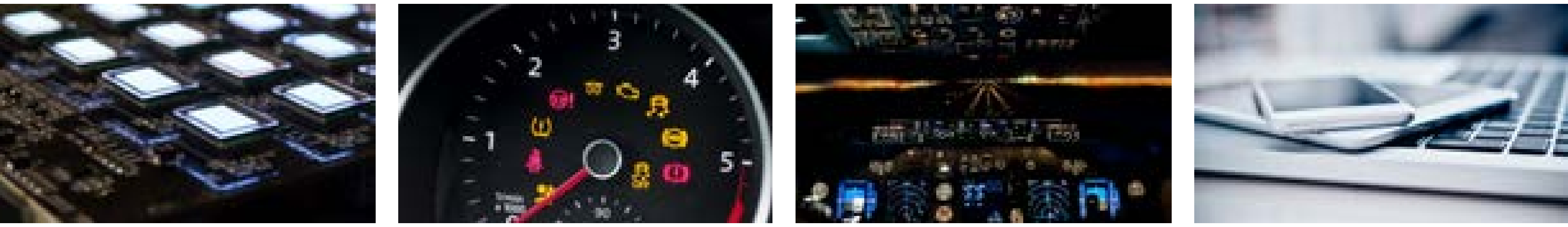
80 YEARS
OF INNOVATION
PHOTO RESEARCH

Photo Research SpectraScan® PR-7 Series Spectroradiometers



The Photo Research SpectraScan PR-7 Series, ideally suited for R&D as well as production settings, features superior sensitivity, high spectral resolution, and versatility for challenging light source measurements.

The PR-730, PR-740 and PR-788 all cover the visible spectrum, sampling from 380 to 780 nm, while the PR-735 and PR-745 measure from 380 to 1080 nm—ideal for near IR testing.

All PR-7 Series instruments:

- Exhibit virtually no polarization error or straylight
- Feature an automated aperture wheel accommodating up to 8 apertures
- Include optional variable bandwidths
- Communicate over USB and RS232 interfaces
- Will connect with an array of optional accessories

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The Novanta Photo Research SpectraScan® PR-7 Series Spectroradiometers

SpectraScan® PR-740/745 and PR-730/735

The PR-730 and PR-740 cover the visible spectrum, sampling from 380 to 780 nm, while the PR-735 and PR-745 measure from 380 to 1080 nm—ideal for near IR testing. The PR-740/745 features superior sensitivity and speed and is 20 times more sensitive and approximately 250 times faster than the PR-730/735. When ultra-low light capability is not necessary, the PR-730 measures up to 215 times higher than the PR-740 without additional ND filters. All devices can help speed the R&D and production process even in challenging light conditions.

SpectraScan® PR-788

The PR-788 is an Extended Dynamic Range Spectroradiometer based on the ultra-sensitive PR-74X series of spectral measuring systems currently being used in R&D, QC, QA and on the production floor. The industry leading 1,000,000:1 dynamic range of the PR-788 provides the solution for measuring the output of your device from black to full white without the necessity of adding external attenuation or changing the optical geometry (e.g. measuring field size)—all at the highest speeds available on the market. Typical applications for the PR-788 include backlight testing, OLED testing and laser projection calibration.

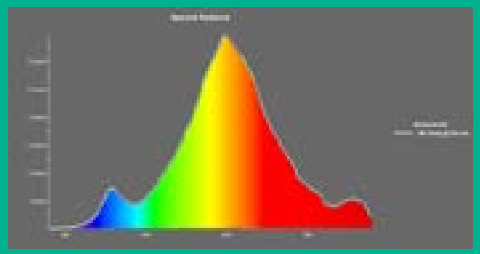
Features for all PR-7 Series devices:

- **Full-color touch screen display and SD card measurement storage**
- **Variable Spectral Bandwidth is available on select models**
- **AutoSync ensures accurate results regardless of refresh or backlight characteristics**
- **Using a lithium-ion battery, can be converted to a portable device lasting 8 hours**

Measurement Capabilities

- **Luminance—**Footlamberts (fL) and cd/m^2
- **Chromaticity—**CIE 1931 x,y—1960 uv 1976 u', v'
- **Correlated Color Temperature (CCT)** in Kelvins
- **Dominant Wavelength—**0.1 nm resolution
- **Spectral Power Distribution (SPD) graph**
- **Display White Point calibration**
- **L*a*b*, L*u*v* and ΔE***
- **Peak WL and Integrated Radiance**

SpectraScan devices can be used as a color GO / NO Gauge with the CIE Pass / Fail Region feature. You can define an ellipse (circle), rectangle (square) or polygon (up to 10 sides). Following a measurement if the measured color point falls within the specified region, PASS is displayed if not, FAIL. This is an ideal tool for repetitive production QC testing or device color uniformity.



SpectraWin™ Software

SpectraWin® Software is a full featured, menu driven, Windows 32- or 64-bit PC-based control program designed to provide a powerful and easy-to-use interface to control and manipulate data from your SpectraScan device. In addition to the standard features of measurement and display of spectral power distribution, luminance, and CIE colorimetry, SpectraWin has additional features for viewing, analyzing and calculating measured data.

SpectraWin Pro includes a powerful macro scripting tool to help you automate your measurement tasks and the optional RGB DisplayCal package turns your SpectraScan device into a Windows- based display calibration tool enabling you to interactively set the white point of the display from a learned stimulus (golden display) or by entering target values.

Accessories

A full range of optical accessories are available to extend the measurement capabilities beyond radiance and luminance and to enhance the dynamic range of the instruments.

Radiance and Luminance

The majority of radiance (w/sr/m^2) and luminance (fL or cd/m^2) measurements are performed using the wide range of objective lens including the standard MS-75, a 75 mm lens focusable from 14″ to infinity, a 7.5 mm wide angle lens, a series of close- up lenses with a 0.5X to a 5X magnification factor, a 2, 4 or 10 foot fiber probe (FP-730) with a 0.125″ measuring diameter and a direct contact luminance adaptor (LA-730) that includes an ambient light shield.

Irradiance and Illuminance

For irradiance (w/m^2) or illuminance (fc or lux) incidence measurements, the CR-730 and or the ICC-730 can be added to the suite of accessories. The CR-730 is a true cosine corrected diffuser that rotates 360o about the optical axis, for example, to test overhead luminaires with the instrument resting on a bench top.

Reflectance

If you need to conduct reflectance tests, or as another means of measuring light incident on a plane (irradiance / illuminance), the RS-3 and SRS-3 reflectance standards are available.

Filters

To extend the dynamic range of the SpectraScan, a wide range of neutral density filters (10X—10,000X attenuation) are available.

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Photo Research SpectraScan® Spectroradiometers

PR-730 / 735, PR-740 / PR-745 and PR-788 Product Specifications

PR-730 Luminance Range (in fL)*

	APERTURES				
ACCESSORY	2°	1°	1/2°	1/4°	1/10°
MS-75	$1.00E^{-4}$ – $1.40E^{4}$	$4.00E^{-4}$ – $5.60E^{4}$	$1.60E^{-3}$ – $2.24E^{5}$	$6.40E^{-3}$ – $8.96E^{5}$	$4.00E^{-2}$ – $5.60E^{6}$
SL-0.5X	$1.00E^{-4}$ – $1.40E^{4}$	$4.00E^{-4}$ – $5.60E^{4}$	$1.60E^{-3}$ – $2.24E^{5}$	$6.40E^{-3}$ – $8.96E^{5}$	$4.00E^{-2}$ – $5.60E^{6}$
SL-1X	$1.00E^{-4}$ – $1.40E^{4}$	$4.00E^{-4}$ – $5.60E^{4}$	$1.60E^{-3}$ – $2.24E^{5}$	$6.40E^{-3}$ – $8.96E^{5}$	$4.00E^{-2}$ – $5.60E^{6}$
MS-7.5X	$1.00E^{-4}$ – $1.40E^{4}$	$4.00E^{-4}$ – $5.60E^{4}$	$1.60E^{-3}$ – $2.24E^{5}$	$6.40E^{-3}$ – $8.96E^{5}$	$4.00E^{-2}$ – $5.60E^{6}$
LA-730	$1.00E^{-4}$ – $1.40E^{4}$	$4.00E^{-4}$ – $5.60E^{4}$	$1.60E^{-3}$ – $2.24E^{5}$	$6.40E^{-3}$ – $8.96E^{5}$	$4.00E^{-2}$ – $5.60E^{7}$
FP-730	$2.50E^{-4}$ – $3.50E^{4}$	$1.00E^{-4}$ – $1.40E^{5}$	$4.00E^{-3}$ – $5.6E^{5}$	$1.60E^{-2}$ – $2.24E^{6}$	$1.00E^{-1}$ – $1.40E^{6}$
CR-730 (fc)	$2.00E^{-4}$ – $2.80E^{4}$	$8.00E^{-4}$ – $1.12E^{5}$	$3.20E^{-3}$ – $4.48E^{5}$	$1.28E^{-1}$ – $1.79E^{6}$	$8.00E^{-2}$ – $1.12E^{6}$

PR-740 Luminance Range (in fL)*

	APERTURES				
ACCESSORY	2°	1°	1/2°	1/4°	1/10°
MS-75	$5.00E^{-6}$ – $5.00E^{1}$	$2.00E^{-5}$ – $2.00E^{2}$	$8.00E^{-5}$ – $8.00E^{2}$	$3.20E^{-4}$ – $3.20E^{3}$	$2.00E^{-3}$ – $2.00E^{4}$
SL-0.5X	$5.00E^{-6}$ – $5.00E^{1}$	$2.00E^{-5}$ – $2.00E^{2}$	$8.00E^{-5}$ – $8.00E^{2}$	$3.20E^{-4}$ – $3.20E^{3}$	$2.00E^{-3}$ – $2.00E^{4}$
SL-1X	$5.00E^{-6}$ – $5.00E^{1}$	$2.00E^{-5}$ – $2.00E^{2}$	$8.00E^{-5}$ – $8.00E^{2}$	$3.20E^{-4}$ – $3.20E^{3}$	$2.00E^{-3}$ – $2.00E^{4}$
MS-7.5X	$5.00E^{-6}$ – $5.00E^{1}$	$2.00E^{-5}$ – $2.00E^{2}$	$8.00E^{-5}$ – $8.00E^{2}$	$3.20E^{-4}$ – $3.20E^{3}$	$2.00E^{-3}$ – $2.00E^{4}$
LA-730	$5.00E^{-6}$ – $5.00E^{1}$	$2.00E^{-5}$ – $2.00E^{2}$	$8.00E^{-5}$ – $8.00E^{2}$	$3.20E^{-4}$ – $3.20E^{3}$	$2.00E^{-3}$ – $2.00E^{4}$
FP-730	$1.25E^{-5}$ – $1.25E^{2}$	$5.00E^{-5}$ – $5.00E^{2}$	$2.00E^{-4}$ – $2.00E^{3}$	$8.00E^{-4}$ – $8.00E^{3}$	$5.00E^{-3}$ – $5.00E^{4}$
CR-730 (fc)	$1.00E^{-5}$ – $1.00E^{2}$	$4.00E^{-5}$ – $4.00E^{2}$	$1.60E^{-4}$ – $1.60E^{3}$	$6.40E^{-4}$ – $6.40E^{3}$	$4.00E^{-3}$ – $4.00E^{4}$

* Minimum sensitivities at 10:1 signal-to-noise against Illuminant A source

Product Specifications

FEATURE	PR-730	PR-740	PR-735	PR-745	PR-788
Wavelength Range	380 – 780 nm	380 – 780 nm	380 – 1080 nm	380– 1080 nm	380 – 780 nm
Detector Elements	512 Cooled Detectors	512 Cooled Detectors	512 Cooled Detectors	512 Cooled Detectors	512 Cooled Detectors
Spectral Bandwidth	2, 4 or 8 nm or Automatically Switchable 2, 4 and 8 nm	2, 4 or 8 nm or Automatically Switchable 2, 4 and 8 nm	4, 8 or 14 nm or Automatically Switchable 4, 8 and 14 nm	4, 8 or 14 nm or Automatically Switchable 4, 8 and 14 nm	2, 4, 8 or 14 nm or Automatically Switchable 4, 8 and 14 nm
Exposure Time Range	12 ms – 5 min	7 ms – 2 min	12 ms – 5 min	7 ms – 2 min	7 ms – 2 min.
Measurement Time @ 3.42cd/m2 with 2° aperture	75,000 ms	300 ms	37,500 ms	150 ms	300 ms
Wavelength Accuracy	< 0.4 nm	< 0.4 nm	< 0.8 nm	< 0.8 nm	< 0.4 nm
Spectral Resolution	1 nm	1 nm	2 nm	2 nm	1 nm
Digital Resolution	16 bits	16 bits	16 bits	16 bits	16 bits
Available Apertures	2°, 1°, 1/2°, 1/4°, 1/5°, 1/8°, 1/10°, 1/10° x 1° (Hor . Slit), 1/10° x 2° (Ver. Slit), 1/2° x 1-1/2° (Hor. Slit)	2°, 1°, 1/2°, 1/4°, 1/5°, 1/8°, 1/10°, 1/10° x 1° (Hor . Slit), 1/10° x 2° (Ver. Slit), 1/2° x 1-1/2° (Hor. Slit)	2°, 1°, 1/2°, 1/4°, 1/5°, 1/8°, 1/10°, 1/10° x 1° (Hor . Slit), 1/10° x 2° (Ver. Slit), 1/2° x 1-1/2° (Hor. Slit)	2°, 1°, 1/2°, 1/4°, 1/5°, 1/8°, 1/10°, 1/10° x 1° (Hor . Slit), 1/10° x 2° (Ver. Slit), 1/2° x 1-1/2° (Hor. Slit)	2°, 1°, 1/2°, 1/4°, 1/5°, 1/8°, 1/10°, 1/10° x 1° (Ver. Slit), 1/2° x 1-1/2° (Hor. Slit)
Standard Lens	MS-75 – 75 mm	MS-75 – 75 mm	MS-75 – 75 mm	MS-75 – 75 mm	MS-75 – 75 mm
Luminance Sensitivity for Illum. A (2856K)* +	1.00E–4 fL (3.43E-3 cd/m^2) with 2° aperture	5.00E–6 (1.71E-5 cd/m^2) with 2° aperture	5.00E–5 fL (1.71E-4 cd/m^2) with 2° aperture	2.50E–6 (8.55-7 cd/m^2) with 2° aperture	1.00E–6 fL (3.42E-5 cd/m2) with 2° aperture
Luminance Accuracy*	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 3.00E–3 fL (1.03E–2 cd/m^2) with 2° aperture	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 1.50E–4 fL (5.14E–4 cd/m^2) with 2° aperture	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 1.50E–3 fL (5.15E–3 cd/m^2) with 2° aperture	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 7.50E–5 fL (2.57E–4 cd/m^2) with 2° aperture	±2% against NIST traceable Illum. A (2856K) Lum. Std. at 1.50E–4 fL (5.14E–4 cd/m2) with 2° aperture
Luminance Repeatability*	≤1% at 3.00E–3 fL (1.03E–2 cd/m^2) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)	≤1% at 1.50E–4 fL (5.14E–4 cd/m^2) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)	≤1% at 1.50E–3 fL (5.15E–3 cd/m^2) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)	≤1% at 7.5E–5 fL (2.57E–4 cd/m^2) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)	≤1% at 1.50E–4 fL (5.14E–4 cd/m2) with 2° aperture against NIST traceable Lum. Std. @ 2856K (Illum. A)
Color Accuracy+	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 3.00E–3 fL (1.03E-2 cd/m^2) with 2° aperture	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 1.50E–4 fL (5.14E-4 cd/m^2) with 2° aperture	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 1.50E–3 fL (5.15E-3 cd/m^2) with 2° aperture	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 7.5E–5 fL (2.57E-4 cd/m^2) with 2° aperture	±0.0015 for CIE 1931 x, y for Illum. A (2856K) at 1.50E–4 fL (5.14E-4 cd/m2) with 2° aperture
Color Repeatability+	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 3.00E–3 fL (1.03E–2 cd/m^2) with 2° aperture	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 1.50E–4 fL (5.14E–4 cd/m^2) with 2° aperture	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 1.50E–3 fL (5.15E–3 cd/m^2) with 2° aperture	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 7.5E–5 fL (2.57E–4 cd/m^2) with 2° aperture	0.0005 for CIE 1931 x, y for Illum. A (2856K) at 1.50E–4 fL (5.14E–4 cd/m2) with 2° aperture
Polarization Error	< 0.2%	< 0.2%	<0.2%	<0.2%	<0.2%
Stray Light	< 0.06%	< 0.06%	< 0.06%	< 0.06%	< 0.06%
Storage	Secure Digital (SD) Card	Secure Digital (SD) Card	Secure Digital (SD) Card	Secure Digital (SD) Card	Secure Digital (SD) Card
AutoSync Range	20 to 2000 Hz	20 to 2000 Hz	20 to 2000 Hz	20 to 2000 Hz	20 to 2000 Hz
Interfaces	USB, RS232	USB, RS232	USB, RS232	USB, RS232	USB, RS232
Power	Rechargeable Li-ion battery or AC Adapter (90—240 VAC)	Rechargeable Li-ion battery or AC Adapter (90—240 VAC)	Rechargeable Li-ion battery or AC Adapter (90—240 VAC)	Rechargeable Li-ion battery or AC Adapter (90—240 VAC)	Rechargeable Li-ion battery or AC Adapter (90—240 VAC)
Battery Life	> 8 hours	> 8 hours	> 8 hours	> 8 hours	> 8 hours
Weight	13.25 lbs. (6.01 kg)	13.25 lbs. (6.01 kg)	13.25 lbs. (6.01 kg)	13.25 lbs. (6.01 kg)	13.25 lbs. (6.01 kg)
Dimensions	.03 in. x 6.69 in. x 8.0 in. (28.0 cm x 17.0 cm x 20.3 cm)	.03 in. x 6.69 in. x 8.0 in. (28.0 cm x 17.0 cm x 20.3 cm)	.03 in. x 6.69 in. x 8.0 in. (28.0 cm x 17.0 cm x 20.3 cm)	.03 in. x 6.69 in. x 8.0 in. (28.0 cm x 17.0 cm x 20.3 cm)	.03 in. x 6.69 in. x 8.0 in. 28.0 x 17.0 x 20.3 cm
Operating Temperature/ Humidity	34° to 95° F (1° to 35° C) / 0–90% non-condensing	34° to 95° F (1° to 35° C) / 0–90% non-condensing	34° to 95° F (1° to 35° C) / 0–90% non-condensing	34° to 95° F (1° to 35° C) / 0–90% non-condensing	1° to 35° C / 0 - 90% RH non-condensing

Specifications are subject to change without notice.

* Measuring Illum. A Lum. Std. @ 1.03E-3 cd/m^2 with 2° aperture +

+ For CIE 1931 x,y measuring Illum. A Lum. Std. @ 1.03E-3 cd/m with 2° aperture

PR-788 Luminance Range Chart (cd/m²)

	APERTURES (fl)				
ACCESSORY	**2°**	**1°**	**1/2°**	**1/4°**	**1/10°**
MS-75	3.42E -05 to 1.71E+04	1.37E -04 to 6.85E+04	5.48E -04 to 2.74E+05	2.20E -03 to 1.10E+06	1.37E -02 to 6.85E+06
SL-0.5X	3.42E -05 to 1.71E+04	1.37E -04 to 6.85E+04	5.48E -04 to 2.74E+05	2.20E -03 to 1.10E+06	1.37E -02 to 6.85E+06
SL-1X	3.42E -05 to 1.71E+04	1.37E -04 to 6.85E+04	5.48E -04 to 2.74E+05	2.20E -03 to 1.10E+06	1.37E -02 to 6.85E+06
MS-7.5X	3.42E -05 to 1.71E+04	1.37E -04 to 6.85E+04	5.48E -04 to 2.74E+05	2.20E -03 to 1.10E+06	1.37E -02 to 6.85E+06
LA-730	3.42E -05 to 1.71E+04	1.37E -04 to 6.85E+04	5.48E -04 to 2.74E+05	2.20E -03 to 1.10E+06	1.37E -02 to 6.85E+06
FP-730	2.14E -04 to 1.07E+05	8.56E -04 to 4.28E+05	3.42E -03 to 1.71E+06	1.37E -02 to 6.85E+06	8.56E -02 to 4.28E+07
CR-730 (lux)	6.86E -05 to 3.43E+04	2.74E -04 to 1.37E+05	1.09E -03 to 5.48E+05	4.38E -03 to 2.19E+06	2.74E -02 to 1.37E+07

* Measuring Illum. A Lum. Std. @ 1.03E-3 cd/m² with 2° aperture +

+ For CIE 1931 x,y measuring Illum. A Lum. Std. @ 1.03E-3 cd/m with 2° aperture

PR-788 Aperture vs. Measurement Spot Size

		APERTURES				
ACCESSORY	**WORKING DISTANCE**	**2°**	**1°**	**1/2°**	**1/4°**	**1/10°**
MS-75 (355 mm to infinity)	355 mm to 305 m	10.5 mm to 10.64 mm	5.25 mm to 5.23 m	2.63 mm to 2.66 m	1.315 mm to 1.33 m	0.525 mm to 532 mm
SL-0.5X	94.1 mm to 137 mm	3.0 mm to 5.08 mm	1.5 mm to 2.54 mm	0.75 mm to 1.27 mm	0.375 mm to 0.635 mm	0.15 to 0.132 mm
SL-1X	46 mm to 66 mm	1.78 mm to 2.64 mm	0.890 mm to 1.32 mm	0.445 mm to 0.660 mm	0.226 mm to 0.330 mm	0.089 mm to 0.132 mm
MS-7.5X	100 mm to 30.5 mm	35.0 mm to 10.64 mm	17.5 mm to 5.32 m	8.75 mm to 2.66 mm	4.38c mm to 1.33 m	1.75 mm to 5.32 mm
LA-730	Contact	13.2 mm	13.2 mm	13.2 mm	13.2 mm	13.2 mm
FP-730	Contact	3.17 mm	3.17 mm	3.17 mm	3.17 mm	3.17 mm

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