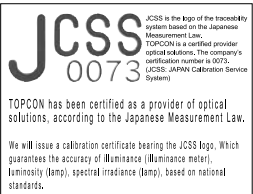


■Specification

		SR-UL2		SR-UL1R		SR-3AR		SR-NIR	
Optical system		Objective lens: f= 82 mm F2.5, Eyepiece lens: 5° view field, Diopter adjustment range: ±5diopter							
Dispersing element		Diffraction grating							
Photodetector		Electronically cooled linear CCD							
Measuring angle		2° / 1° / 0.2° / 0.1° Motor drive							
Measuring distance		350 mm to ∞ (distance from metallic tip of objective lens)							
Measuring diameter (mm ϕ)	Measuring angle	Measuring distance (mm) (distance from metallic tip of objective lens)							
	2°	350	400	500	600	800	1000	2000	5000
	1°	10.0	11.7	15.1	18.6	25.4	32.2	66.4	169
	0.2°	4.99	5.84	7.55	9.26	12.7	16.1	33.2	84.4
	0.1°	1.00	1.17	1.51	1.86	2.54	3.22	6.64	16.9
Wavelength range		380nm~780nm						600~1030nm	
Spectral accuracy		±0.3nm (on Hg emission line)						±0.5nm (on Hg emission line)	
Spectral band width		5~8nm (half width)							
Wavelength resolution		1nm							
Measurement mode		Auto/manual (integral time/frequency), external vertical sync signal input							
Measuring object		Spectral radiance (W, sr <sup>-1</sup> , m <sup>-2</sup> , nm <sup>-1</sup> )							
Calculation function		Radiance (Le: W, sr <sup>-1</sup> , m <sup>-2</sup> ), luminance (Lv: cd, m <sup>-2</sup> ),							
		CIE1931 chromaticity coordinates xy, CIE1976 chromaticity coordinates u'v', tristimulus value XYZ							
		Correlated color temperature (Tc: K) and deviation (duv), CIE standard observer 2°/10°							
Accuracy		Luminance : ±2% Chromaticity(x,y) : ±0.002 (for standard illuminant A)						with in ±7% (600nm-1030nm for Topcon Standard light)	
Repeatability	Luminance ※1	1.5%(0.0005~0.005cd/m²) 0.4%(0.005~0.1cd/m²) 0.3%(0.1cd/m² or more)		1.5%(0.001~0.005cd/m²) 0.4%(0.005~0.1cd/m²) 0.3%(0.1cd/m² or more)		0.3%(0.1cd/m² or more)		2% or less (600nm-1030nm for Topcon Standard light)	
	Chromaticity ※2	0.005(0.0005~0.005cd/m²) 0.0015(0.005~0.1cd/m²) 0.0005(0.1cd/m² or more)		0.005(0.001~0.005cd/m²) 0.0015(0.005~0.1cd/m²) 0.0005(0.1cd/m² or more)		0.0005(0.1cd/m² or more)			
Range of guaranteed luminance accuracy (cd/m2) (for standard illuminant A) ※3	Measuring angle	SR-UL2		SR-UL1R		SR-3AR		SR-NIR	
	2°	0.0005~3,000		0.001~3,000		0.1~3,000		0.5~3,000*4	
	1°	0.0015~9,000		0.003~9,000		0.3~9,000		1~9,000*4	
	0.2°	0.0375~70,000		0.075~70,000		7.5~70,000		20~70,000*4	
	0.1°	0.15~300,000		0.3~300,000		30~300,000		100~300,000*4	
Polarization error		Luminance 1% or less, Spectral radiance 2% or less (400nm to 780nm)						Spectral radiance 5% or less	
Measurement time		NORMAL SPEED MODE: About 1 to 248seconds. HIGH SPEED MODE: About 1 to 17seconds. (excludes communication time with computer)		NORMAL SPEED MODE: About 1 to 248seconds. HIGH SPEED MODE: About 1 to 17seconds. (excludes communication time with computer)		NORMAL SPEED MODE: About 1 to 31seconds. HIGH SPEED MODE: About 1 to 17seconds. (excludes communication time with computer)		About 1 to 31seconds. (excludes communication time with computer)	
Interface		RS-232C Baud rate: 4800/9600/19200/38400 bps, Parity: Odd/even/none, Data length: 7/8 bits, Stop bit: 1/2 bits USB:USB2.0							
Power supply		Provided AC adapter AC100V-240V, 50/60Hz, DC12V							
Power consumption		Approx.36W				Approx.34W		Approx.36W	
Operating conditions		Temperature: :5℃~30℃				Temperature: :5℃~35℃		Temperature: :5℃~35℃	
External dimensions		Humidity: 80%R.H. and below (No condensation) About 406 mm x 150 mm x 239 mm (L x W x D)							
Weight		About 5.5 kg (main unit only)							

※1 2σ from 10 times continuous measurement at measuring angle 2° in normal speed mode  
※2 Max value - Min value from 10 times continuous measurement at measuring angle 2° in normal speed mode  
※3 Measurable range in Normal and High speed mode.  
※4 SR-NIR can not measure quantity of luminance. The value is for reference, when measuring standard illuminant A.  
\*The measuring distance is the distance from the metallic tip of the objective lens.  
\*The values in this table are design reference values and may differ somewhat from the actual diameter.



※Some screens are simulated.  
※The specifications and external appearances of product in this catalogue may be changed without prior notice due to improvements.  
※The catalogue includes products that are sold separately.  
※The actual color of products may differ slightly from the catalogue due to lighting and printing conditions.

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**Note** Make sure to carefully read the "User's Manual" to ensure that you use the product properly and safely.

<http://www.topcon-techno.co.jp>



# SPECTRORADIOMETER

*SR-UL2 / SR-UL1R / SR-3AR / SR-NIR*

Spectroradiometer series



Measuring more deep black with high speed!!

# Topcon SR series are suited for measuring high-contrast, high-reproducibility and high-quality display with high accuracy

As the quality of the flat Panel Display (FPD) and the light source have been increasing, there has been a growing demand for more accurate measuring instrument. Additionally, the demand for measurement with high contrast from low and high luminance has been increasing, and not only luminance and chromaticity data but also spectral power distribution data with high accuracy have been increasing. Spectroradiometer SR-3A,SR-UL1R, SR-UL2 are designed to meet that demand and achieve high usability and stable measurement. Spectroradiometer for Near-infrared SR-NIR is suited for measuring very faint near-infrared light emitted from LCD/PDP and measuring near-infrared light emitted from LED with spectroradiometry.

Spectroradiometer

## SR-3AR

- The SR-3A can measure as low as 0.1cd/m<sup>2</sup>
- Measuring CCFL and Back light unit
- Measuring Light source Lamp



Spectroradiometer for ultra-low luminance

## SR-UL1R

- The SR-UL1R can measure as low as 0.001cd/m<sup>2</sup>
- Measuring high contrast display
- Measuring instrument panel



Spectroradiometer for ultra-low luminance

## SR-UL2

- The SR-UL2 can measure as low as 0.0005cd/m<sup>2</sup>
- Measuring Mega contrast display
- Measuring instrument panel



Near Infrared Spectroradiometer

## SR-NIR

- Measuring Near-infrared light emitted from FPD
- Measuring Hg bright line emitted from CCFL lamp at 1013nm
- Measuring bright line of Ne, Ar



# Topcon SR series is equipped with the ability of high accuracy and multifunctional calculation with spectroradiometry.

## Reference for Topcon measuring instruments.

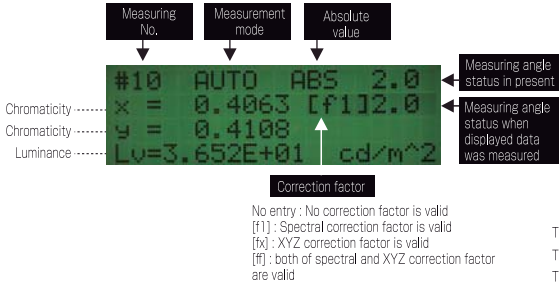
You can use measured data by using SR-3AR, SR-UL1R and SR-UL2 as standard, and you can correct other instruments based on the data.



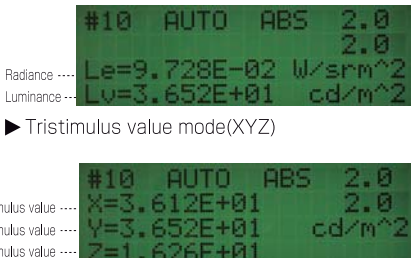
## Computing (common with SR-UL2, SR-UL1R and SR-3AR)

Not only spectral distribution but also chromaticity, Tristimulus value, luminance and correlated color temperature can be determined by calculation immediately. Tristimulus value X,Y,Z, at 10 degree observers can be determined also.

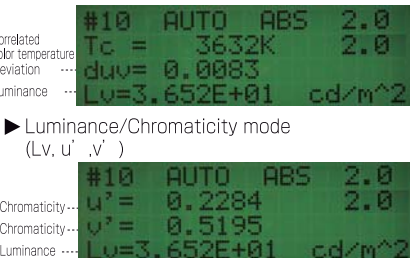
### Luminance /chromaticity mode (Lv, x,y)



### Radiance/Luminance mode (Le, Lv)



### Correlated color temperature/ Deviation mode (Tc, duv, Lv)

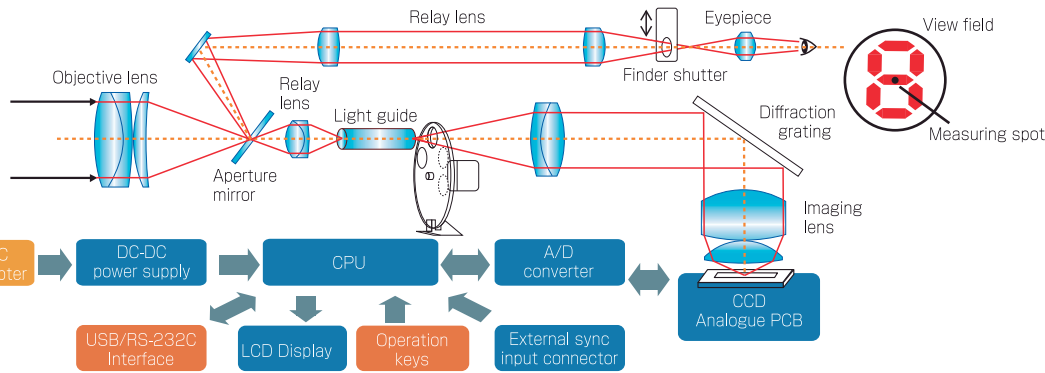


### Luminance/Chromaticity mode (Lv, u', v')



## Block diagram (SR-3AR / SR-UL1R / SR-UL2 / SR-NIR in common)

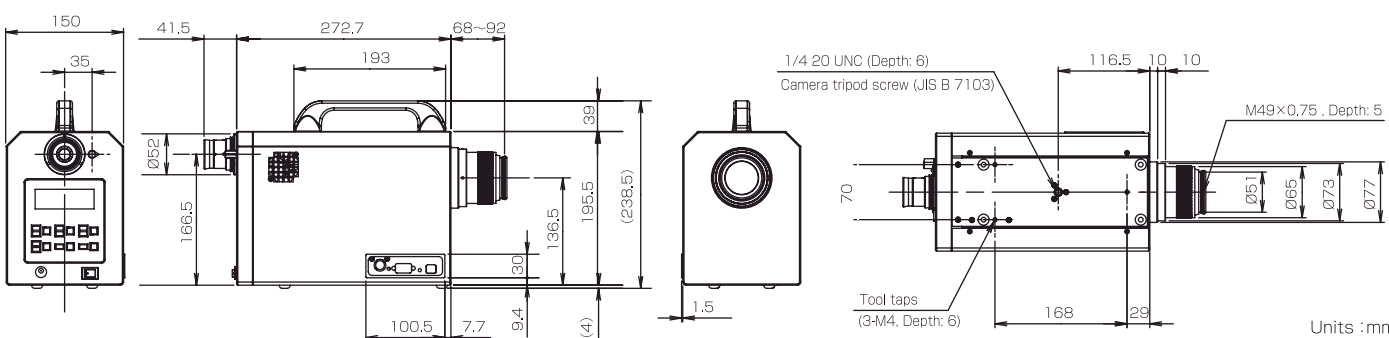
Telescopic system makes it possible to measure the absolute value of the spectral radiance of light sources or objects without coming in contact with them. This optics also make it possible to verify the object to measure through a finder.



## Component Names (SR-3AR / SR-UL1R / SR-UL2 / SR-NIR in common)



## Dimension (SR-3AR / SR-UL1R / SR-UL2 / SR-NIR in common)



For measuring of Spectral distribution, Luminance, Chromaticity and Correlated color temperature of the light emitted from display device and lamp, SR series Spectroradiometer is suited.

- Measuring High definition FPD  
Optical system in the SR-series matches Spectroradiometry measurement, and ISO,VESA, JEITA standard with high repeatability.
- High contrast measurement  
High S/N, high sensitive sensor, and Dark noise manipulation technology are adopted.
- Contrast ratio, Gamma characteristics measurement  
High accuracy (lineality, repeatability).



■Feature (SR-3AR , SR-UL1R and SR-UL2)

●Ultra-low luminance measurement

	SR-3AR	SR-UL1R	SR-UL2
2°	0.1 - 3,000cd/m²	0.001 - 3,000cd/m²	0.0005 - 3,000cd/m²
1°	0.3 - 9,000cd/m²	0.003 - 9,000cd/m²	0.0015 - 9,000cd/m²
0.2°	7.5 - 70,000cd/m²	0.075 - 70,000cd/m²	0.0375 - 70,000cd/m²
0.1°	30 - 300,000cd/m²	0.3 - 300,000cd/m²	0.15 - 300,000cd/m²

\*The SR-UL1R and SR-UL2 is suited for the measuring of very low level luminance and very small area such as Interior panel in automobile, Audio monitor and high-contrast display.

●High accuracy

The SR-UL2/SR-UL1R/SR-3AR achieves high accuracy in luminance of ±2%, chromaticity of ΔxΔy±0.002

(SR-UL2 : 0.0005cd/m² or more at measuring angle 2° for standard Illuminant A)  
(SR-UL1R : 0.001cd/m² or more at measuring angle 2° for standard Illuminant A)  
(SR-3AR : 0.1cd/m² or more at measuring angle 2° for standard Illuminant A)  
\*Normal Speed mode.

●Measuring flicker light with high accuracy

Synchronous measurement / Integral time delay  
For periodic light measurement, SR-UL2 / SR-UL1R / SR-3AR automatically detects and measures the frequency of light once you enter a sync signal. You can obtain stable measured data for measuring the display which is insert black signal between lighting.

●High speed mode

New added High speed mode provide high speed measurement even at low level luminance.  
Measuring time : About 1 – 17 sec.  
Measurable luminance range in High speed mode  
SR-3AR : 0.1 - 3,000cd/m²  
Luminance : ±5%(0.1 - 0.5cd/m²), ±2%(0.5 - cd/m²)  
Chromaticity: xy±0.005(0.1 - 0.5cd/m²), xy±0.002(0.5 - cd/m²)  
SR-UL1R : 0.01 - 3,000cd/m²  
Luminance : ±2%(0.01 - 3,000cd/m²)  
Chromaticity: xy±0.003(0.01~0.05cd/m²), xy±0.002(0.05~cd/m²)  
SR-UL2 : 0.005 - 3,000cd/m²  
Luminance : ±2%(0.005 - 3,000cd/m²)  
Chromaticity: xy±0.003(0.005~0.05cd/m²), xy±0.002(0.05~cd/m²)

\*measuring angle 2°

●No need of warm-up

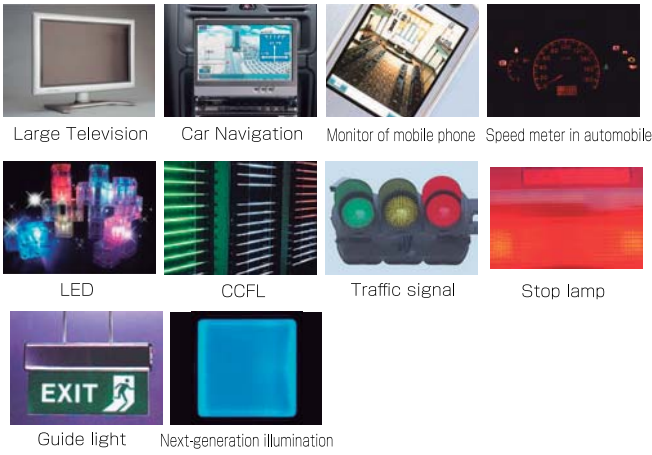
●Spectral observation

SR series conduct spectral radiance measurement and so that spectral distribution and spectral radiance can be observed.

●Useful software CS-900

Colorimetry software CS-900 for Windows is standard accessory.  
The CS-900 can control the SR-UL2/ SR-UL1R/ SR-3AR, and collect measured data and plot the spectral distribution graphs and chromaticity diagram

■Usage(SR-3AR , SR-UL1R and SR-UL2)



Optical characteristic evaluation of Flat Panel Display, Fluorescent material, Large Television, Mobile phone, Plasma Display Panel, Automobile (Component, Interior panel and various type of lamp), Indicator (Large Panel LED, Traffic light, mobile phone), Parts for display (LCD module, Cold cathode fluorescence light, LED and Optical filter), Material (Back light, Fluorescent material, Optical filter, Organic EL and LED).

The SR-NIR achieves high accuracy measurement of very faint Near infrared.

■Feature (SR-NIR)

- The SR-NIR can measure spectral distribution in near infrared range(600-1030nm)with high accuracy. Combine with SR series
- Very slight near-infrared light emitted from LCD and PDP can be measured. Near-infrared light from Mercury-free Cold cathode fluorescent lamp and transmittance of near-infrared absorption filter can be measured.

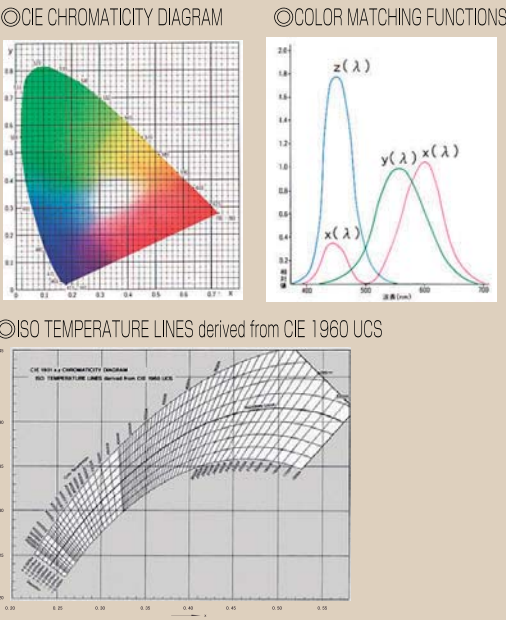
- Combine with SR series, Spectral distribution can be measured from visible tonear infrared range(380-1030nm).

■Usage(SR-NIR)

- Measuring of near-infrared emitted from FPD such as LCD and PDP
- Measuring of energy of blight line of Hg (1013nm) in CCFL
- Measuring of energy of blight line of Ne. Ar
- Evaluation for near-infrared absorption filter
- Measuring of near-infrared from various type of light

Examples of the use of Spectroradiometer

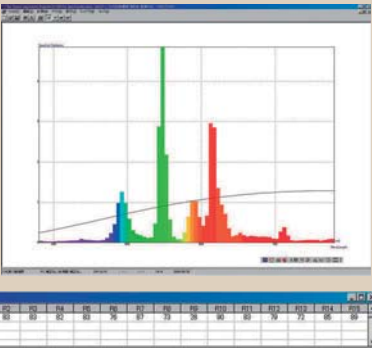
		SR-3AR / SR-UL1R / SR-UL2		
LCD	LCD Module	・ Luminance/Chromaticity ・ Uniformity ・ Build-up characteristic ・ Spectral power distribution	・ γ characteristics ・ Viewing angle characteristics ・ Temperature characteristics	・ Contrast ratio ・ Reflectivity ・ NTSC ratio
	Backlight Unit	・ Luminance/Chromaticity ・ Temperature characteristics	・ Uniformity ・ Spectral power distribution	・ Build-up characteristic
	CCFL	・ Luminance/Chromaticity ・ Spectral power distribution	・ Luminance/Chromaticity Mura	・ Build-up characteristic
	LED	・ Luminance/Chromaticity ・ Spectral power distribution	・ Build-up characteristic	・ Spectral power distribution
	Film	・ Luminance/Chromaticity ・ Spectral power distribution	・ Spectral reflectivity	・ Spectral transmission ratio
	Diffusing plate	・ Luminance/Chromaticity ・ Spectral power distribution	・ Spectral reflectivity	・ Spectral transmission ratio
PDP	PDP module	・ Luminance/Chromaticity ・ Uniformity ・ Build-up characteristic ・ Spectral power distribution	・ γ characteristics ・ Viewing angle characteristics ・ Temperature characteristics	・ Contrast ratio ・ Reflectivity ・ NTSC ratio
	Filter	・ Luminance/Chromaticity ・ Spectral power distribution	・ Spectral reflectivity	・ Spectral transmission ratio
OLED		・ Luminance/Chromaticity ・ Uniformity ・ Build-up characteristic ・ Spectral power distribution	・ γ characteristics ・ Viewing angle characteristics ・ Temperature characteristics	・ Contrast ratio ・ Reflectivity ・ NTSC ratio
Automotive	Instrument panel	・ Luminance/Chromaticity	・ Luminance/Chromaticity Mura	
	Meter	・ Luminance/Chromaticity	・ Luminance/Chromaticity Mura	



Color Rendering evaluation

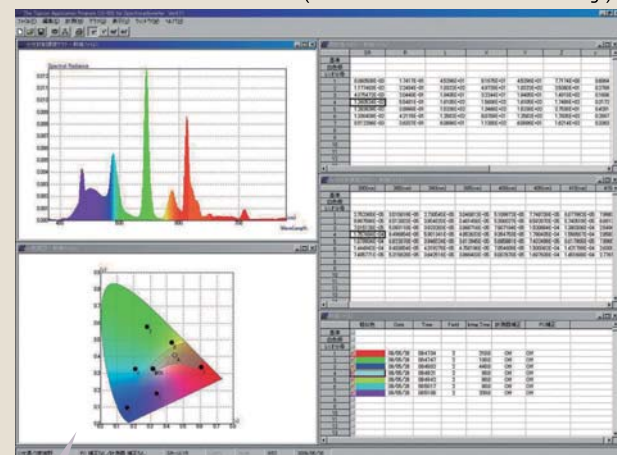
Spectral distribution data obtained by SR-UL1R / SR-3AR and Colorimetry software CS-900 allow you to evaluate color rending.

Color rendering is defines how well colors are rendered by different illumination.

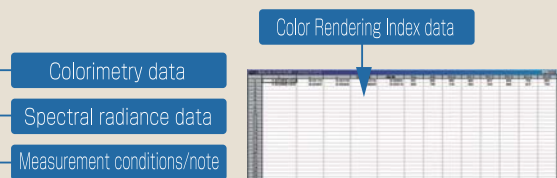


# Standard accessories software supports control of instrument and data collection

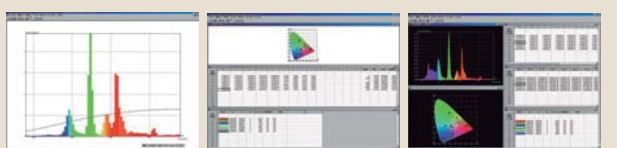
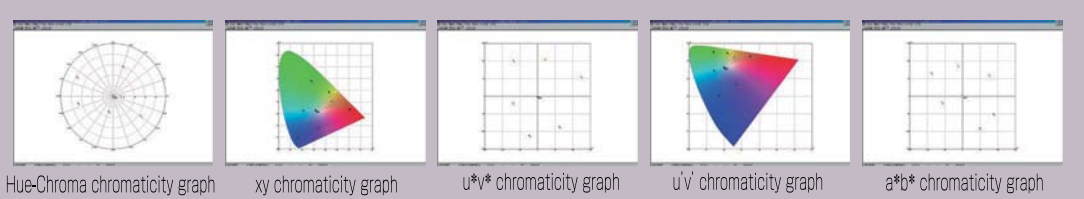
SR-3AR / SR-UL1R / SR-UL2 colorimetry software CS-900 (standard accessory)



Application software CS-900 for Windows supports Spectroradiometer SR-3AR / SR-UL1R / SR-UL2. You can control SR-3AR / SR-UL1R / SR-UL2 using by the CS-900, and collect, save, plot on a graph and calculate of the measured data and, use them for many purpose. On the Colorimetry mode, it can shorten the communication time between the instrument and PC due to omitting spectral data transmission.



○Chromaticity graph



Spectral radiance graph (Color Rendering Index/Standard light)

Colorimetry mode

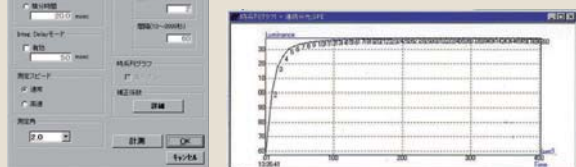
\*Black or white background color can be selected

Display:  
Color space mode:  
Calculation:  
Mode selection:  
Selects the measurement mode:  
Data evaluation:

Spectral graph, chromaticity diagram L, xy, XYZ, u'v', u\*v\*, L\*a\*b\*, Correlated color temperature, Deviation, Dominant wavelength  
Four basic arithmetic operations and function processing of spectral data  
spectral radiance mode/colorimetry mode  
Auto mode/Frequency (FREQ Mode)/External Sync. mode/Integral Time mode (MANU Mode), Measuring Speed, Measuring Field, Meas. Times, Single/Interval/Continue  
field/Illumination light sources, color rendering property

■Time-Luminance diagram

Displays graph of Time-series data in luminance measurement for continuous measurement (CONTINUE) or interval measurement (INTERVAL).

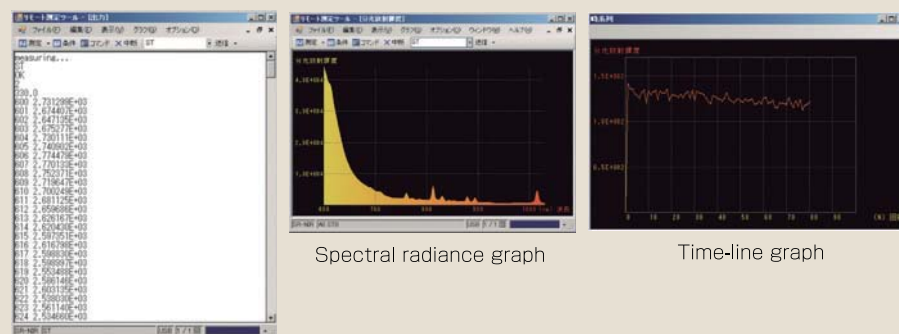


○System required (recommended)

- OS : Windows 2000/XP
- CPU : Pentium III 600MHz or more
- Memory : 128MB or more
- HDD : 60MB or more
- Ports : USB2.0(One port)
- RS-232C serial port (One port)

\*The RS-232C cable (interlink cable for DOS/V PC) must be purchased separately.

## Remote measurement tool for SR-NIR (standard accessory)



Spectral radiance data

Spectral radiance graph

Time-line graph

Remote measuring tool is the software for supporting Spectroradiometer SR-NIR. The PC installed Remote measuring tool can control the SR-NIR and collect and save measured data.

○System required (recommended)

- OS : Windows 2000/XP
- CPU : Pentium III 600MHz or more
- Memory : 128MB or more
- HDD : 60MB or more
- Port : USB 2.0 (one port)
- RS-232C serial port (one port)

\*The RS-232C cable (interlink cable for DOS/V PC) must be purchased separately.

## System Diagram (SR-3AR/SR-UL1R/SR-UL2/SR-NIR in common)



These lenses make focal length shorten and make measurement area shrink.

## Optional accessories

- Attachment lens 3 sets AL-6/AL-11/AL-12
- These lenses make focal length shorten and make measurement area shrink.

(Specifications for Measuring Small Objects)

Measurement area (Diameter mmφ)	Measurement angle	AL-6 Measurement distance 51.72 to 68.53mm	AL-11 Measurement distance 19.56 to 24.80mm	AL-12 Measurement distance 165 to 197mm
	2°	2.00 to 2.88	1.18 to 1.53	3.23 to 4.00
	1°	1.00 to 1.44	0.59 to 0.76	1.62 to 2.00
	0.2°	0.20 to 0.29	0.15 to 0.19	0.32 to 0.40
	0.1°	0.10 to 0.14	0.06 to 0.08	0.16 to 0.20

\*Measurement distance may differ slightly depending on aperture mirror machining accuracy.  
\*Measurement distance is from metal tip of attachment lens to the object.

●Fiber probe FP-3P

Light guide used for remote detection of light from measurement object.

- Effective measurement angle: 2°
- Measurement diameter: 3-10 mmφ
- Measurement distance: 31.0-84.9 mm
- Fiber length: Approx. 1m

●Tripod 5N

Simplifies collimation of measurement object.

- Max height : 1835mm
- Min height : 585mm
- Folder length : 810mm
- Leg sections : 3
- Weight : 4.81Kg including Tripod stand

●Fine Adjustment Stand S-4

Simplifies vertical and lateral collimation.

- Elevation angle : 40°
- Depression angle : 80°
- Rotation : 360°
- Weight : Approx. 1.7Kg

●Tripod Tripod-SR

Simplifies collimation with smooth movement.

- Max height : 1614mm
- Min height : 234mm
- Folder length : 694mm
- Leg sections : 3
- Weight : 3.0Kg including Tripod stand

●Reference White Board WS-3

Used for measurement of object color or light source with directionality.

- Luminance factor : 90% or above (for measurement parameters of 0° incidence and 45° observation)
- Material: Barium sulfate (BaSO4)
- Dimensions: 78 mm , t = 12.5 mm
- Effective white surface: 40 mm (at center)

●CCD Adapter IA-2

Adapter for connecting instrument to the CCD camera.(C mount, 1/2 size)

●ND filter (10x/100x set)

Neutral density filter for measuring higher luminance than the measuring range of instrument.

## SR-3AR/SR-UL1R/SR-UL2 Standard package

- SR-3AR/SR-UL1R/SR-UL2(main body) ..... 1 pce
- AC adapter (ZV-18) ..... 1 pce
- Carrying case ..... 1 pce
- CD-ROM (Colorimetry software CS-900/CS-900 CF Tool/Instruction manual) ..... 1 pce
- Quick manual ..... 1 pce
- USB cable ..... 1 pce
- Objective lens cap ..... 1 pce

## SR-NIR Standard package

- SR-NIR(main body) ..... 1 pce
- AC adapter (ZV-18) ..... 1 pce
- Carrying case ..... 1 pce
- CD-ROM(SR-NIR Remote measurement tool/ Instruction manual) ..... 1 pce
- Quick manual ..... 1 pce
- USB cable ..... 1 pce
- Objective lens cap ..... 1 pce