

CAS 140D

Технические характеристики

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CAS 140D High-end Array Spectrometer

Stray light corrected array spectrometer suitable as a reference instrument in laboratories and for production



Introduction

CAS 140D array spectrometer – highest degree of measurement accuracy at high and low light intensities, combined with compact design and a new “plug & play” principle

State-of-the-art optics and mechanics coupled with the most innovative evaluation applications make the CAS 140D unique. Due to the integration of a stray light correction matrix into the calibration process, this high-end spectrometer delivers measurement results of hitherto unrivalled precision. With a wavelength accuracy of less than ± 0.2 nm the CAS 140D is the first spectrometer to reliably comply with the limit defined in IEC 62471 for the determination of blue light hazard by white LEDs.

In conjunction with other light measurement instrumentation offered by Instrument Systems, such as ISP integrating spheres, the CAS 140D high-end spectrometer is ideal for the highly accurate measurement of correlated color temperature CCT and the color rendering index CRI. The traceable measurement uncertainties are only ± 0.0015 on the standard chromaticity coordinates of white LEDs, and are reliably estimated using state-of-the-art validated Monte Carlo calculations.

Main fields of application

Like its predecessor the CAS 140CT, the CAS 140D has an extremely wide range of applications – in LED measurement as well as the examination of displays of any technology (e.g. LCD, LED and OLED). Thanks to its robustness and short measuring times, the CAS 140D array spectrometer is also perfectly suitable for tough production environments. With back-illuminated CCD sensors, cooled to -10 °C, it satisfies the most exacting requirements in terms of sensitivity and stability, e.g. in LED in-process inspection.

As the technological successor to the proven CAS 140CT, it is also ideal as a reference instrument in national calibration labs.

Features

- Model variants from 200 to 1100 nm
- Cooled high-end array detector with innovative stray light correction
- Integral density filter wheel
- Shutter for dark current correction
- Short integration times as low as 4 ms
- USB, PCIe or Ethernet interface
- Automatic accessory recognition “plug & play”
- Software solutions for laboratory and production tasks

Fields of application

End-of-line testing in LED production

Thanks to its robustness and short measuring times, CAS 140D array spectroradiometers from Instrument Systems are ideally suited to 24/7 production. With back-illuminated CCD sensors cooled to -10 °C it fulfils the most demanding requirements in terms of sensitivity and stability, e.g. in LED production control. Due to its improved optical and mechanical design the CAS 140D is smaller, more functional and even easier to integrate into existing production lines. It has a particularly short integration time and a throughput-optimized spectrograph with minimum levels of stray light. With a wide selection of accessories, the array spectrometer has become a complete system for all spectroradiometric and photometric measurement tasks.

Display production testing

As a 3-in-1 system the LumiTop 2700 combines a RGB camera and flicker diode with a high-end spectroradiometer of the CAS series. It is used for the fast but at the same time highly accurate characterization of displays in production. Due to the constant reference check with the CAS 140D, its extremely high measurement accuracy applies across the entire field of view of the camera. The LumiTop 2700 enables various test applications to be conducted at a single test station. Thanks to the accompanying LumiSuite software with software development kit, the system can be easily integrated into production lines or used in the laboratory for a broad range of evaluation options.

Specifications

Principal Specifications of the CAS 140D

Model	UV/VIS	UV/VIS/NIR	VIS	VIS/NIR
Spectral range	200 - 830 nm	220 – 1020 / 300 – 1100 nm	360 – 830 nm	380 – 1040 nm
Detector	Back-thinned CCD			

Model	UV/VIS	UV/VIS/NIR	VIS	VIS/NIR
Number of pixels	1024 x 128			
Spectral resolution ¹⁾	3.0 nm	3.7 nm	2.2 nm	3.0 nm
Data point interval	0.65 nm	0.8 nm	0.5 nm	0.65 nm
Wavelength accuracy	± 0.2 nm			
Integration time	4 ms – 65 s			
Shortest duration SOT to EOT ²⁾	6 ms			
Sensor dynamic range ³⁾	37,000:1			
Linearity	± 0.5 %			
Cooling	-10 °C			
Stray light				
Broadband for illuminant A ⁴⁾	5·10-4			
For LED ⁵⁾	1·10-4			
With laser ⁵⁾	5·10-5			
Sensitivity				
Irradiance ⁶⁾ [W/m² nm]	1·10-8 – 100	6·10-9 – 60	7·10-9 – 70	6·10-9 – 60
Spectrophotometry				
Baseline noise ⁷⁾	± 0.4 %			
Transmission measuring accuracy ⁸⁾	± 0.5 % T			
Baseline drift ⁹⁾	0.15 %/h			
Spectrograph				
Focal length, grating	Approx. 120 mm f/3.5 / plane ruled grating			

Slit	50 µm, 100 µm or 250 µm
Filter wheel / Shutter	Max. 7 slots for density filters OD 0.5 to OD 4; UV/VIS and UV/VIS/NIR with UV density filters; position monitoring with encoder
Electrical data	
AD converter	24 bit resolution, Chip 16 bit
PC interface	USB 2.0, PCIe, Ethernet
Triggering	1 TTL input with ascending slope; 2 software-controlled TTL outputs; 1 TTL output with flash pulse
Other	
Dimensions (H, W, D)	144 x 341 x 359 mm ³
Power supply	Wide-range input 100 – 240 VAC 50/60 Hz
Power consumption	Max. 70 VA
Ambient temperature	15 – 35 °C; relative humidity 0 – 70 % max., non-condensing
Weight	Approx. 9 kg
Valid standards	In conformity with EN 60721-4-7 Class 7M2, EN 60721-4-7 Class 2M2, EN 61326:2004-05 and EN 61010-2002-08

Measure- ment uncertainty ¹⁰⁾	Lumi- nance / radiance	Lum. intensity/ flux	Irradiance / illumi- nance	Color coordinates (x,y) ¹¹⁾	Dominant wave- length
Instrument precision	± 0.1 %			0.0001	0.02 nm
Accuracy	± 3 %	± 4 %	± 3.5 %	0.0015	0.5 nm

1) Applies to a 100 µm slit.

2) With USB interface.

3) For a single acquisition with 4 ms integration time.

4) Measured with edge filter OG455 at 400 nm, relative to peak intensity of unweighted spectral data.

5) Measured 150 nm to left of the peak wavelength, relative to peak intensity of unweighted spectral data.

6) Measured with optical probe EOP-120 and OFG-414 fiber bundle at 600 nm and signal/noise ratio of 10:1, without averaging.

7) With shortest integration time, without averaging and with 50 % modulation. This value improves with appropriate averaging (e.g. 9x averaging results in a 3x reduction of noise).

8) Applies to optimum spectral range; with 10 % transmission and immediately after recording an averaged baseline.

9) Typical value. Applies with LS100-130 light source after 2 hour warm-up.

10) Minimum achievable, extended relative measuring uncertainty applied to a twofold standard deviation. Only applies to the measuring and ambient conditions used for calibration (e.g. without density filter, optimum spectral range, sufficient signal level, etc.).

11) For white LEDs.

Accessories

In combination with the correct accessories / all spectral measurement tasks.

CAS 140D accessories for LED measurement

- LEDGON goniophotometer
- LED 4xx adapter for luminous intensity
- LED 25 averaged LED intensity adapter
- LED test socket (standard + high-brightness)
- LED-81x/-850 test adapter for high-power LEDs
- ACS LED calibration standard

CAS 140CT accessories for display measurement

- TOP 200 telescope optical probe

Additional CAS 140D accessories

- Integrating spheres from 50 mm to 2000 mm, also UV-compatible
- Optical probes EOP series

Software solutions

- SpecWin Pro and SpecWind Light
- Software development kit

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