We bring quality to light.

LGS 350
Goniophotometer

Instrument Systems
light measurement

LGS350-110 benchtop version

The features at a glance

- Type C goniophotometer with horizontal optical axis
- For samples up to max. 700 mm diameter and 8 kg weight
- Accurate determination of the luminous intensity distribution and luminous flux
- Angular-resolved analysis of spectral and colorimetric quantities
- Data export in IES and EULUMDAT format

Perfect for mid-sized SSL light sources and LED modules

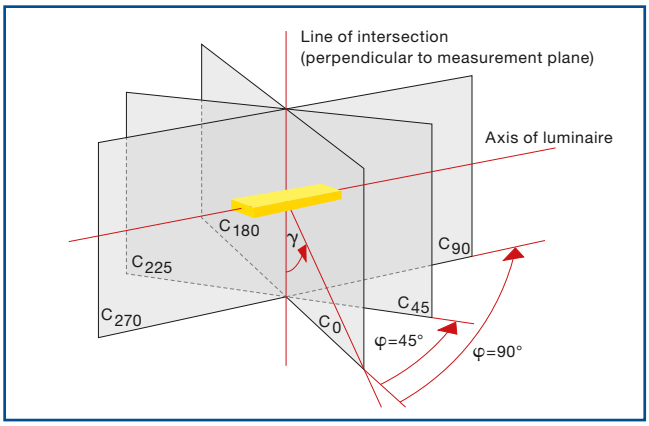
The LGS 350 Goniophotometer/Goniospectroradiometer was developed for the analysis of angle-dependent spatial radiation properties from small to medium-sized SSL luminaires and lamps, and LED modules. The test specimen is operated in a horizontal burning position and measurements can be taken at an angular range of ±160° in the gamma axis. The angular resolution of 0.01° means that very fine measuring grids can be recorded with a high level of accuracy and reproducibility. The LGS 350 is compliant with all the relevant specifications in conformity with CIE, DIN and IES standards.

Combined with a spectroradiometer from Instrument Systems, all spectral quantities such as color coordinates, color temperature and even color rendering index can be determined as a function of angle. C-plane measurements can also be carried out very quickly “on the fly” using the DSP 10 Photometer. This provides an overview of the spatial light distribution for the test specimen very quickly. The measured data can be displayed as different diagrams including the Isocandela diagram. The measurement results can also be exported in standard file formats.

The turnkey system

The LGS 350 comprises the actual goniometer with a sample plate for fixing the test specimen and the LGS Controller that drives the stepper motor and the angle display. If a photometer is used, the LGS Controller also displays the measured values in candela or lux. The LGS 350 is supplied in two versions:

- Goniometer with stable base and integrated LGS Controller
- Goniometer in benchtop version with separate 19” rack for the LGS Controller



Definition of the Type C coordinate system

The optical probe of the spectroradiometer or the photometer head for taking measurements is placed outside the photometric distance and attached to a stray light tube adjusted to the measuring distance and the sample size. The measuring distance should be 10 to 15 times the diameter of the light source being tested.

The goniometer unit

The LGS 350 Goniometer rotates the test specimen in the gamma and C axes. The horizontal alignment of the CIE 121-1996 coordinate system facilitates a particularly compact test setup. Both axes can be operated simultaneously and can be moved smoothly and with minimal vibration even when the test specimen is subject to maximum load. If a suitable sample mount is used, the system can also be deployed as a Type B goniometer. The design features a highly torsion-resistant frame with high-precision gearbox bearings. This guarantees a high level of reproducibility for sample positioning of ≤0.1° for a load even with maximum sample weight of 8 kg.

Sample plate and electrical connection

The sample plate measures 100 x 100 mm² and has 2 x 2 size 6 grooves and 2 x M6 x 12 tapped threads. This allows customer-specific specimen holders to be conveniently mounted on the plate with bolts. The sample plate is also provided with fitting bushes to ensure reproducible fixing.

Sample plate with sample connector

The electrical sample connector is a compact component mounted between the C axis gearbox and the sample plate. It therefore swivels with the sample plate and allows the lamp to be connected with short cables without any hazard of the cables becoming ruptured. The sample connector has two safety banana sockets and has been designed for a maximum voltage of 300 V.

The LGS Controller

LGS Controller for benchtop version

The LGS Controller drives the goniometer and is either integrated in the goniometer base (LGS350-100) or in a separate 19” rack (LGS350-110). Apart from accommodating the LSG Controller, both versions offer space for additional modules. A large 19” rack can also be supplied as an option with a height of 170 cm. This allows additional power supply units or measuring instruments to be integrated.

The LGS Controller includes the following functions:

- Display of the angle positions of both axes of rotation
- Input of any target angle on the numeric keypad
- Display of the photometric value if a DSP 10 Photometer is used
- Toggle between different measurement heads

User-friendly remote control

Would you like quick and easy manual positioning for both axes? The convenient RecoCAN remote control can be used for fine adjustment in increments of 0.01°. RecoCAN allows users to align the goniometer on the optical axis of the test specimen with ease.

RecoCAN remote control

The full spectrum of measuring options

The comprehensive accessories significantly expand the range of measuring options offered by the LGS 350. A universal sample holder for mid-size LED modules and lamps, and a lamp holder for standard fittings of the type E10, E27, E40, etc. are supplied.

Sample holder with LED-850 test adapter for single LEDs

Sample holders for TEC test adapters of the LED-850 and LED-870 series are available to plug and go. The test adapters facilitate the analyis of thermal properties of single LEDs, LED arrays and modules using minimum resources. The Peltier elements integrated in the test adapters permit adjustment over a wide temperature range from +5°C to +85°C.

Sample holder with LED-870 test adapter for LED arrays and modules

Photometric and colorimetric measurements

The LGS 350 is compatible with all spectroradiometers supplied by Instrument Systems. The CCD array spectrometers in the CAS series are ideal because they feature a very large dynamic measuring range and very short measuring times. The use of a spectroradiometer offers the unique advantage that photometric, radiometric and colorimetric quantities can be obtained from the measured spectral data. Specifically for SSL lamps and LED modules, measurement accuracy is superior to filter-based photometers and colorimeters.

However, the LGS 350 can also be combined with the very fast, integral photometers from Instrument Systems, which permit scanning of the entire intensity distribution

within a few minutes. Even pulse-width modulated LEDs with cycle frequencies of 80 Hz to 10 kHz can be measured precisely using the adaptive filtering and digital signal processing of the innovative DSP 10 Photometer.

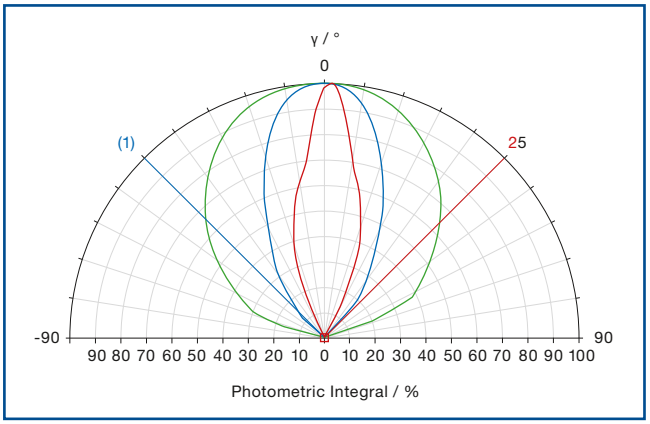
Measurement sequences in SpecWin Pro

SpecWin Pro software powers the outstanding productivity of the LGS 350. Two measurement modes are supported. Firstly, the sequence mode allows spatial radiation patterns of the test specimen to be recorded for gamma and C axes in defined angular increments. All measured data are available for subsequent evaluations. Secondly, the test series mode permits definition of arbitrary measurements with any definable sequence of angular positions.

DSP 10 Photometer with stray light tube on stand

Other add-ons of SpecWin Pro software and appropriate instrumentation also permit current, voltage and temperature to be included in the goniometric analysis as control and measured parameters. For example, Keithley 2400 and Keithley 2600 series sourcemeters, and other DC and AC voltage sources can easily be installed as an add-on.

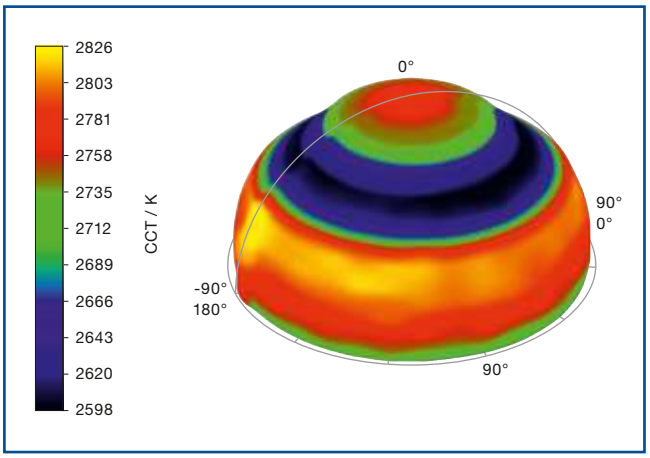
SpecWin Pro also supports high-precision determination of radiant power or luminous flux by angular integration of radiant intensity and luminous intensity. If a spectroradiometer is used as a measurement device, the individual spectra of all angular positions are also aggregated. This ensures genuine integration of the entire spectral radiant power and hence precise calculation of the colorimetric quantities. This is an advantage not offered by competing products.



Luminous intensity distribution of various LED modules

Display options and output formats

The graphics window is the central element of the user interface of SpecWin Pro. This window displays all measurements. Five different display options are available for the spatial radiation pattern: radial display (luminous intensity distribution curve), semi-radial and cartesian view, and a two-dimensional spherical display with Isocandela lines and a 3D view. All displays accept photometric, radiometric, colorimetric and spectral measured data for evaluation. The measured data obtained can also be exported in IES and EULUMDAT format for use in simulation programs.



3D display and CCT distribution of a SSL lamp

Technical specifications

Model	LGS350-100	LGS350-110
Equipment setup	Stable base with integrated LGS Controller	Benchtop version with LGS Controller in a separate 19” rack
19” module slots	14 U in height; 10 U occupied, 4 U free	9 U in height, fully occupied, optionally more
Height	1432 mm	740 mm
Width	500 mm	500 mm
Depth	650 mm	650 mm
Weight	approx. 95 kg	approx. 60 kg
Height of the optical axis	1372 mm ±5 mm (adjustable)	680 mm ±5 mm (adjustable)
Goniometer		
CIE goniometer type	Type C with horizontal optical axis	
Driver	Stepper motors	
Angular range C axis	±160° with end switches, -10° – 190° used for measurements	
Angular range γ axis	±160° with end switches	
Resolution of the angle encoder	0.01°	
Reproducibility C axis	≤0.1° (at max. sample load)	
Reproducibility γ axis	≤0.05° (at max. sample load)	
Angular speed C axis	16 speeds selectable from 2.5°/s to 36°/s	
Angular speed γ axis	16 speeds selectable from 1°/s to 18°/s	
Clear width C axis – swivel arm	370 mm	
Alignment laser	Integrated in the center of rotation of the C axis, 1 mW, laser class 2	
Machine safety	Emergency stop switch on the goniometer and the LGS Controller, safety strips on the swivel arm	
Sample table		
Mounting plate	100 x 100 mm² with 2 x 2 grooves size 6 (inside dimension 50 mm) for slot nuts size 6 – M5 or T-bolts M6; also 2 tapped threads M6 x 12 (inside dimension 80 mm)	
Maximum sample size	700 x 140 mm² or 640 x 230 mm² or 500 x 500 mm² (in each case for symmetrical mounting)	
Maximum sample mass	8 kg	
Electrical sample connection	2 safety banana sockets for specimen power supply; 2 safety banana sockets for probe cable; 1 protective conductor; max. 300 V, 10 A	
LGS Controller		
Functions	Driving the stepper motors for the goniometer; display of the angle positions; optional display of measured values for the Optronik Line DSP 10 photometer	
Interfaces	RS-232-C for connecting a PC; CAN Bus for DSP 10 photometer and RecoCAN remote control	
Power supply	230 VAC (optional 115 VAC)	
Power rating	120 W	
LGS Motion Driver		
Functions	Power electronic for the goniometer, main switch for goniometer power supply, start button to unlock gears, emergency stop switch, Laser on/off switch, connection of RecoCAN remote control	
Interfaces	Circular connector for stepper motors, CAN Bus for LGS Controller, Sub-D for control signal of goniometer, power socket for power supply of LGS Controller	
Power supply	230 VAC (optional 115 VAC)	
Power rating	720 W	

Ordering information

Order no.	Description
Goniometer	
LGS350-100	LGS 350 Goniometer with stable base; 2-axis goniometer in type C configuration with horizontal optical axis; integrated 19” rack for LGS Controller (includes stepper-motor control and space for another 2 modules); without photometer or spectroradiometer
LGS350-110	LGS 350 Goniometer in benchtop version; 2-axis goniometer in type C configuration with horizontal optical axis; separate 19” rack for LGS Controller (includes stepper-motor control and space for one further module); without photometer or spectroradiometer
Options	
LGS350-300	Optional 115 VAC power supply unit for LGS 350
LGS350-310	Optional 19” freestanding rack for LGS350-110; 33 U high (170 cm) for accommodating additional units
LGS350-320	RecoCAN remote control for manual angle positioning
LGS350-510	Sample holder for LED-850 TEC adapter for LEDs
LGS350-520	Sample holder for LED-870 TEC adapter for small LED modules
LGS350-530	Sample holder for LED-880 TEC adapter for mid-size LED modules
LGS350-550	Universal sample holder for mid-size LED modules and lamps
LGS350-570	Standard lamp holder for E27
Accessories	
LGS-410	Stand with mount for a stray light tube; height of the optical axis approx. 1200 – 1400 mm (variable)
LGS-440	Stray light tube with ±4.5° field of view; for measuring luminous intensity distribution in the far field; for optical probe EOP-120 or photometer head
LGS-450	Stray light tube with ±45° field of view; for measuring luminous flux in the near field; for optical probe EOP-120 or photometer head
LGS-470	Mobile cart for spectroradiometer
Photometer	
LGS-610	DSP 10 photometer comprising - PMH-100 photometer head (10 x 10 mm² detector aperture), class L in conformity with DIN5032-7, EN-DIN13032-1, CIE69 - Measuring amplifier with digital signal processor for connecting to LGS Controller - Factory calibration certificate and certificate of V-Lamba correction of the detector; incl. mounting plate for stand
Spectroradiometer with optical probe	
CAS140CT-151	CAS 140CT Compact Array Spectrometer; Model VIS; 360 – 830 nm; 1024 x 128 pixel back-illuminated CCD detector; 2.2 nm spectral resolution (100 µm slit); 0.5 nm/pixel data point interval
EOP-120	Optical probe for irradiance; medium light throughput and cosine correction from 190 – 1700 nm; adapter for fiber bundle
OFG-414	Fiber bundle with ferrule; 1.5 mm diam., 2 m long; 380 – 1600 nm
PLG-410	Fiber bundle adapter; 300 – 2200 nm, optimized for VIS
CAL-100	Calibration of irradiance; wavelength range UV, VIS or IR
Software	
SW-130	SpecWin Pro spectral software for Windows XP / Vista / 7; support of all spectrometers, goniometers and positioning systems.

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