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FIRST
SMART
SPECTRORADIOMETER

Touch the technology

GL SPECTIS 1.0 Touch

GL SPECTIS 1.0 Touch + Flicker

The world's first smart spectroradiometer



SCAN THE QR CODE
AND GET MORE INFORMATION



MEASURING LABORATORY IN YOUR POCKET

Precise **GL SPECTIS 1.0 Touch** device, with a set of optional attachments was developed especially for measurements and evaluation of light sources, including LED. It has the advantages of highest class spectroradiometer in the form of a handy device with a touch screen.

GL SPECTIS 1.0 Touch + Flicker version additionally precisely measures Flicker parameters.

APPLICATION:

- for spectral evaluation of light sources during their operation
- to develop new designs of lighting fixtures
- for the daily quality control of LED production
- during maintenance of lighting installations
- when evaluating lamps integrated with light emitting diodes
- to measure Flicker parameters as required in **EU 2019/2020 ECODESIGN**

WHAT CAN BE MEASURED:

- **Lux** - illuminance
 - **Lumen** - total luminous flux
 - **CRI, TM-30-20** - colour rendering metrics compliant with the CIE
 - **CCT** - colour temperature in accordance with the CIE standard
 - **COLOUR** - colour coordinates according to CIE 1931 and CIE 1964
 - **Watt** - total radiant power
 - **PstLM** - Short Term Perceptibility for light modulation
 - **SVM** - Stroboscopic Visibility Measure
- ... and a lot more

EXPLORE THE WORLD OF SMART SPECTROMETERS

The **GL SPECTIS** line of measuring instruments uses the most modern and reliable technological solutions



GL OPTIC products are manufactured in Europe and sold and serviced at all continents.



Light quality control

First get to know us better.

At GL, we believe that the true quality innovation is about the best technology and not about gadget functionality. This is why we encourage all the potential customers to choose quality instruments for their lighting product quality control.

There are many light meters available on the market today. However, we know what matters for fast developing lighting manufacturers the most: engineering, precision, performance and, equally important, independence from external quality testing labs. For many manufacturers, the possibility of optimising product quality and faster prototyping are advantage factors helping them to win the market share.

Unlike mass produced devices, **GL instruments are individually calibrated** for the end user allowing accurate and dependable results in order to make the right product quality decisions.

GL Optic instruments feature **automatic dark current compensation combined with a temperature monitoring** system that allows everyone to use the system whenever and wherever they need dependable data.

The unique plug-and-measure concept by GL features the RFID codes helping to get the calibration files for each available accessory automatically and allow quick, easy and precise measurements of different lighting quantities. Changing from lux to lumen, and even luminance values, is as easy as changing the available accessories. Leave it to the system to take care of the rest.

“The ultimate light quality control systems available only for best lighting quality product manufacturers”

Who
trusted us:

BOE Display Technology
CHINA

B/S/H Hausgeräte GmbH
GERMANY

Sagecom
FRANCE

Samsung Electronics
KOREA

Nexus Industries Ltd
UNITED KINGDOM

LG Electronics
KOREA

Nvidia Corp.
USA

WHIRLPOOL Company
USA

Gruppo Antolin
FRANCE

LEAR Corporation GmbH
GERMANY

Guangzhou Antolin Lighting Co., Ltd
CHINA

British Standards Institution
UNITED KINGDOM

Varroc Lighting Systems, s.r.o.
CZECH REPUBLIC

MAGNA STEYR Fahrzeugtechnik
AUSTRIA

DELPHI Deutschland GmbH
GERMANY

10 YEARS
2009 – 2019

Origins

GL Optic was established in 2009 to bring innovative solutions. Since then we are continuously developing solutions for measuring optical radiation in a wide spectral range.

In addition to manufacturing measuring instruments and systems, we also offer measurement services and instrument calibration in our Calibration and Research Laboratory of Optical Radiation (CARLO), which is the only one in Central and Eastern Europe equipped with the Black Body Radiator.

Our team consists of experienced programmers, electronic and mechanical engineers, production technicians, sales and support engineers - all focused on delivering intelligent yet affordable solutions.



Light quality control

GL OPTIC IS A FULL-LINE MANUFACTURER OF COMPLETE INSTRUMENTATION FOR PROFESSIONAL SPECTRAL LIGHT MEASUREMENT

At GL, we design, manufacture and support light quality control systems that help modern lighting companies develop their products faster and better by using the knowledge, technology and expertise which are built in every light measurement instrument we provide. With the use of our instruments and software, lighting companies get control over quality from the moment of the components purchase through the research and development stage up to the final product testing.

GL OPTIC LEADERSHIP TEAM



Michael Gall

CEO of Just Normlicht


co-founder of GL Optic and an open-minded entrepreneur with many years of experience in lighting technology for visual colour assessment.



Miko Przybyla

COO of GL Optic

a partner, light quality enthusiast and head of GL business development and operations.

 Light quality blog



Jan Lalek

COO of GL Optic

co-founder of GL Optic – physicist and optical engineering expert, passionate about colorimetry, optics and modern technology.

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unique features of smart spectroradiometer

1 SMALL SIZE GREAT POWER

The optical system uses a miniature reflective lens and CMOS sensor, which creates a miniature low stray light system providing 1.7 nm data acquisition intervals.



2 ANDROID SYSTEM

Using the world's most powerful mobile platform provides constant support and access to the latest technological solutions.



3 TOUCHSCREEN DISPLAY

Intuitive touchscreen controls allow to carry out the entire test, without the need to connect to a computer. Essential data is instantly displayed on a color screen.



4 USB & WI FI CONNECTION

Thanks to the USB or Wi-Fi connection, it is easy to transfer measurement data to the computer. Additionally, a connection of **GL SPECTIS 1.0 Touch** with our optional software **GL SPECTROSOFT** will create a measuring set, tailor-made to Your needs.



5 MICRO SD MEMORY CARD

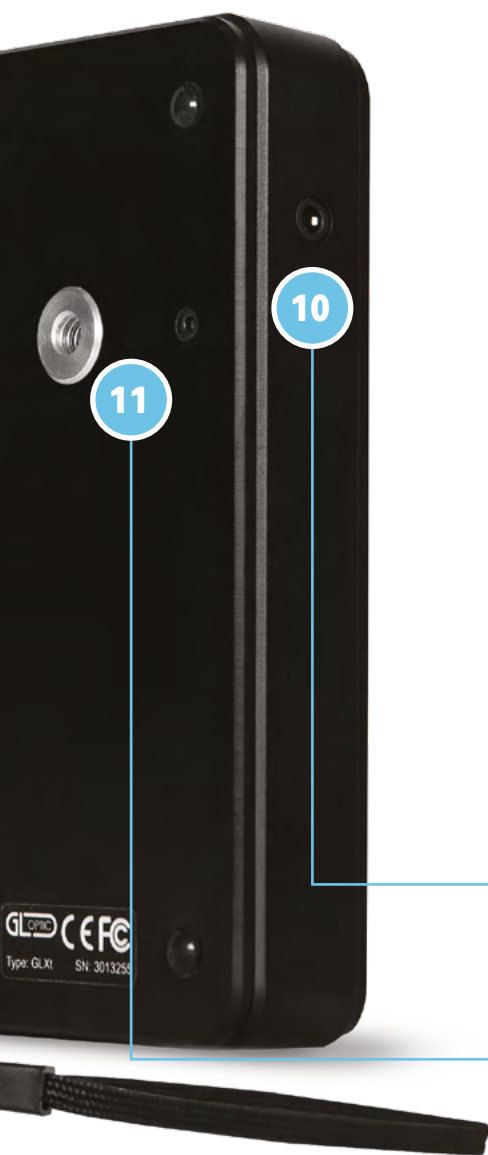
Measurements are automatically saved on a microSD card, with a capacity of 16 GB. The system creates a directory library with data. Transferring data to a computer is very simple.

6 AUTOMATIC ADD-ON DETECTION

Unique optical probe detection mechanism and automatic adjustment of the calibration file, helps avoiding errors during the change of accessories. Calibration complies with the requirements of leading standardization institutes.



Light quality control



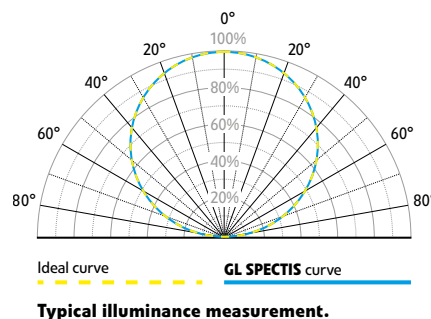
MEASURING HEAD STANDARD DIFFUSER

The set includes the cosine-corrected measuring head - a standard diffuser. It is used for measuring the intensity of light in the hemisphere above the sensor.

All spectrometers offered by GL Optic are calibrated and provide absolute values. The cosine corrected measurement head is designed for the precise measurement of illumination levels and conforms to the requirements of DIN 5032 Part 7 Class B.

According to Lambert's Cosine Law the radiant intensity observed at a "Lambertian" surface is directly proportional to the cosine of the angle between the incoming light and the normal to the surface.

Therefore it is absolutely necessary for the illuminance meter to include a cosine correcting head to eliminate measurement errors which may arise when the light source is not directly above the sensor, but at any angle within the hemisphere of measurement.



PHOTOMETRIC AND RADIOMETRIC CALIBRATION

Each spectroradiometer is individually calibrated before its delivery, which makes it possible to perform accurate measurements of various absolute values such as lux, candela or lumen, parallel to the radiometric values depending on the used measuring add-on.

DARK CURRENT COMPENSATION

The temperature sensor monitors its changes and automatically compensates for changes in the dark current level, guaranteeing excellent measurement stability..

TRIGGER SOCKET

The trigger in/out socket enables the synchronization of the spectroradiometer with external systems e.g. the signal from the socket can trigger the flash of a tested lamp during measurements.

UNIVERSAL MOUNT

Each unit is equipped with a mount featuring a standardized 1/4" size BSW thread. This allows for placing it on a tripod, optical bench, laboratory table or in a production setting. Thus, it can be used for field measurements or as an element of more complex measurement sets.

Plug and measure, expand the system

GL SPECTIS 1.0 Touch is a complete measuring instrument and works on the principle "plug and measure". But depending on your needs, it can expand by adding additional software or measuring add ons.

All **GL SPECTIS 1.0** spectroradiometers are delivered with a measuring head for illuminance/irradiance measurements and are properly calibrated. Additionally, **GL SPECTIS 1.0 Touch + Flicker** version is equipped with a photodiode to measure flicker, thus along with the illuminance measurement, it is possible to measure the light modulation related parameters at the same time.

ILLUMINANCE MEASUREMENT [lx]* IRRADIANCE MEASUREMENT [mW/m²]**

WHAT IS ILLUMINANCE?

It is the amount of radiant energy projected on given surface that is correlated to spectral sensitivity of human eye.

HOW IS IT MEASURED AND WHICH UNIT IS USED?

For the measurement use a spectrometer equipped with a measuring head, a so-called diffuser, with appropriate cosine correction. It is placed on the test surface and measures the illuminance level in lux [lx].

WHAT DOES THIS GIVE US?

It is a very practical method of determining the level of surface illumination, e.g. table, workplace, sidewalk surface, road or store shelf. Illuminance decreases with the square of the distance from the light source.

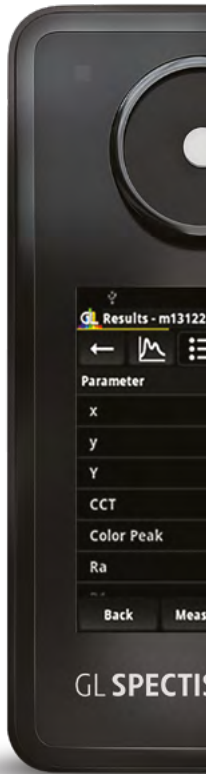
+ LOW LEVEL ILLUMINANCE MEASUREMENT (range from 0,01 to 100 000 lux)

GL SALLI diffuser for low levels illuminance measurements.

In special applications, e.g. for evacuation lighting or road lighting measurements. The **GL SALLI** diffuser enables the use of two measuring systems.

It provides angular correction for the spectroradiometer and a photodiode what enables a simultaneous measurement with both sensors..

 Install it in place of the standard measuring head.





LUMINOUS FLUX MEASUREMENT [lm]* RADIANT FLUX MEASUREMENT [mW]**



Integrating sphere **GL OPTI SPHERE 48** for single LED measurements

The GL SPECTIS 1.0 Touch spectroradiometer, together with the integrating sphere, with a diameter of 48 mm, creates a portable measuring set for measuring the luminous flux of single LEDs. Take it with you for a meeting with suppliers or customers to verify the quality of the LEDs.

WHAT IS LUMINOUS FLUX?

It is the total measurement of the perceived power of light in relation to the spectral sensitivity of the human eye.

HOW IT IS MEASURED?

Luminous flux is measured with a spectrometer connected to an integrating sphere. This method allows to determine the total amount of energy emitted by an examined source in all directions. The SI unit of luminous flux is lumen [lm].

WHAT DOES IT GIVE US?

It allows us to determine the total amount of light emitted by a source in every direction, taking into account the sensitivity of the human eye. Such measurement provides a basis for calculating other parameters and can be used for comparing different light sources.

 Install it in place of the standard measuring head.



LUMINANCE MEASUREMENT [cd/m^2]* RADIANCE MEASUREMENT [$\text{mW}/\text{sr}/\text{nm}$]**

GL OPTI PROBE 1.0.10 LUMINANCE for display measurements.

It is designed to be used with **GL SPECTIS 1.0 Touch** for luminance measurements of flat displays, LCD and LED panels, plasma FPDs displays as well as for testing projection displays and OLED light sources. The measurement provides accurate readings of luminance and color coordinates comply to CIE standards.

WHAT IS LUMINANCE?

Luminance is a photometric measure of luminous intensity of light that is emitted or reflected and diffused by a particular area.

HOW IT IS MEASURED?

It is measured with a lens directed towards the examined surface. The SI unit is candela per square meter [cd/m^2].

WHAT IT GIVES US?

It allows to assess the brightness of a particular surface and is especially useful when measuring the brightness of screens and displays, as well as airport runways, roads surface lit with street lamps, etc..

 Connect the probe to the device with a fiber optic cable.



LUMINANCE MEASUREMENT [cd/m^2]* ENERGETIC LUMINANCE MEASUREMENT [$\text{mW}/\text{sr}/\text{nm}$]**

GL OPTI PROBE 1.0.11 LUMINANCE for spot luminance and color testing

For measuring small illuminated elements and individual LEDs. In the shape of a pen, with point only 1 mm in diameter.

 Connect the probe to the device with a fiber optic cable.



* photometric unit ** radiometric unit

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Touch the Flicker

GL SPECTIS 1.0 Touch + Flicker – the latest innovation from GL Optic, integrates the accurate measurement of light flicker with all the measurement quantities of the **GL Spectis 1.0 Touch**. Flicker quantification is accomplished with a combination of photodiodes, high speed analog circuits, and high sample rate analog to digital (A/D) converters.

SPECTROMETER AND PHOTODIODE MEASUREMENT

GL Optic spectrometers are predominantly designed and preconfigured for light measurement. The B class cosine corrected measurement head is a standard accessory allowing for the proper measurement of light.

With the addition of a separate, dedicated photodiode and real-time data processing, they measure flicker as well.

SIMPLE PERIODIC WAVEFORM PROPERTIES AND FLICKER METRICS

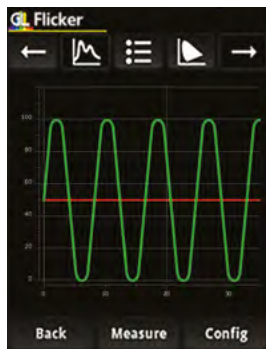
TRIANGLE WAVEFORM SHAPE

- Flicker Percent = 100%
- Flicker Index = 0.250
- Flicker Frequency 100 Hz



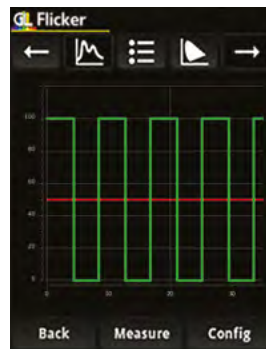
SINE WAVEFORM SHAPE

- Flicker Percent = 100%
- Flicker Index = 0.318
- Flicker Frequency 100 Hz



SQUARE WAVEFORM SHAPE

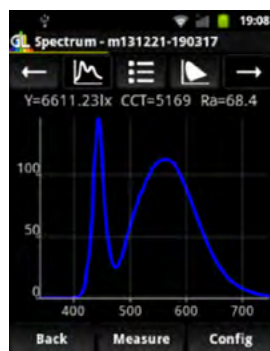
- Flicker Percent = 100%
- Flicker Index = 0.500
- Flicker Frequency 100 Hz



INTEGRATED FLICKER AND ILLUMINANCE SPECTRORADIOMETRIC MEASUREMENT INSTRUMENT

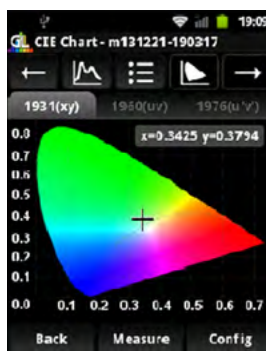
SPECTRUM

The calibrated spectroradiometer provides Spectral Power Distribution curves that are the basis for all the photometric and colorimetric calculations.



COLOR

Various CIE Chromaticity Charts and calculated color coordinates help the user to check the light color output.



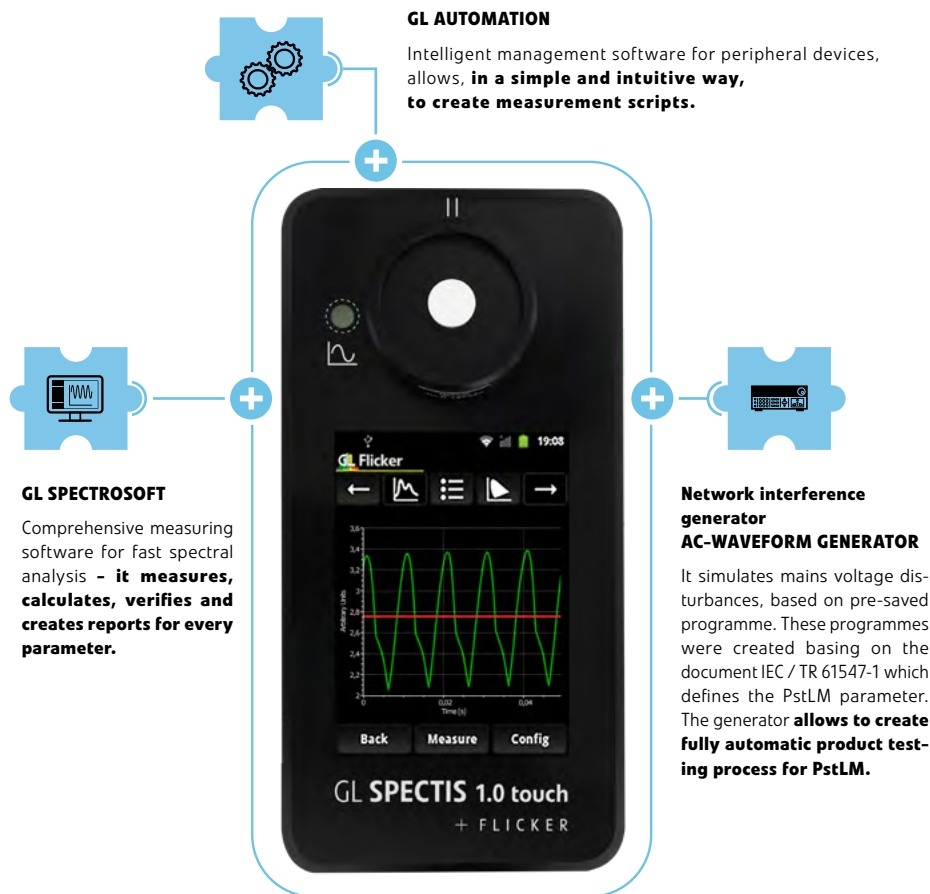
VALUE

It displays high accuracy illuminance measurements and includes all the key photometric and colorimetric values directly on the screen such as:
lx, fc, x,y, color coordinates,
CCT, CRI and radiometric scaling.





SYSTEM CONFIGURATION AS REQUIRED BY EU ECODSIGN DIRECTIVE



GL SPECTIS 1.0 Touch + Flicker

KEY FEATURES:

- Compact, portable, solidly built
- Intuitive, color LCD touch screen user interface
- Laboratory grade accuracy and repeatability
- Dark current and temperature compensation
- Automatic accessory detection and calibration loading
- Use standalone, or in conjunction with system accessories

INCLUDES:

- Certificate of calibration to reference standard
- Cosine-corrected standard diffuser head (illuminance)
- Versatile interfaces: USB, SD card
- Remote trigger socket
- Universal mount for tripod or optical bench use
- Rugged case, charger, cable

EU ECODSIGN DIRECTIVE

The revised regulation of the European Commission on Ecodesign for light sources introduces new requirements for light flicker indicators – PstLM and SVM.

PstLM stands for Short Term Perceptibility for light modulation, which determines the resistance of the light source power supply system to network disturbances. PstLM = 1 means 50% chance that the Observer will detect Flicker. **Ecodesign Directive require PstLM ≤ 1.**

SVM stands for Stroboscopic Visibility Measure – new parameter, determining the occurrence probability of the strobe effect. The strobe effect visibility threshold is $SVM \geq 1$. With $SVM \leq 1$ the strobe effect will not be visible to the Observer.

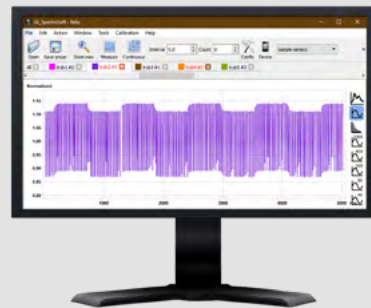
Ecodesign Directive requires to obtain SVM value of ≤ 0.9 . before 01/09/2024 and after this date, an SVM threshold of $SVM \leq 0.4$ applies.



To perform a Flicker measurement according to Ecodesign requirements the meter with an appropriate measuring range is not enough. It is essential to create appropriate power conditions.

PstLM determines the resistance to network interference and, therefore, appropriate simulation of such disturbances must be created under laboratory conditions. For this purpose, it is necessary to use programmable AC-WAVEFORM GENERATOR, which generates the signals with appropriate resolution and speed.

To make such measurement even faster, GL AUTOMATION software will easily and quickly allow to create a script that will carry out the entire measurement.



GL SPECTROSOFT

GL SPECTROSOFT is a comprehensive optional measurement software package for fast analysis. It measures, converts, verifies and reports on all parameters.

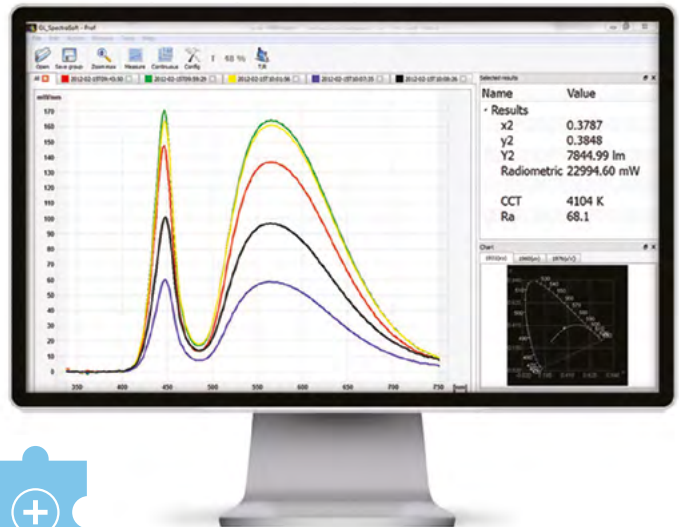
Thanks to connecting **GL SPECTIS 1.0 Touch** with **GL SPECTROSOFT** via wi-fi every measurement performed with the instrument can be further analyzed on the computer. Data can be exported in CSV or TXT formats to other programs, e.g. to Microsoft Excel.

THE PROGRAM CALCULATES THE VALUES:

- colour coordinates according to CIE standards
- correlated colour temperature CCT
- chromaticity error
- colour peak
- colour dominant
- colour rendering index CRI (CIE 13.3)
- scotopic and photopic values
- PAR and PPFD
- MacAdam and Duv +/- ellipses

SELECTED FUNCTIONS:

- PASS / FAIL for production applications
- personalized report generator using templates, prepared in any text editor
- management of peripheral devices such as power sources, TEC controllers, power supplies
- command line for LabVIEW™ and other systems
- LED measurement according to CIE 127: 2007 and IESNA LM-79-08
- absolute or relative measurements
- flexible data interpretation
- useful tools for easy analysis and interpretation of the measured spectra
- calculating the metamerism index (MI Index) (CIE 51.2)
- measurement procedure compliant with ISO 3664: 2009
- comparison window: presentation of a comparative measurement table
- selected results window: presentation of selected results
- sorting tool: selection of brightness and colour groups for LEDs
- measurement of transmission and reflection
- measurements to determine compliance with the EU 2019/2020 ECODESIGN requirements



WITH ADDITIONAL OPTICAL PROBES THE FOLLOWING MEASUREMENTS CAN BE TAKEN:

- Illuminance (lux)
- Spectral distribution of radiation ($\mu\text{W}/\text{m}^2/\text{nm}$)
- Luminous flux (lumen)
- Radiant power (W/nm)
- Light (candela)
- Luminance, 2D and spot (cd/m^2)

GL OPTIC MEASUREMENT SYSTEM

COMPLETE MEASURING LABORATORY IN A CASE

All **GL SPECTIS 1.0** spectroradiometers are delivered with the measuring head for illuminance measurements and are properly calibrated. Additionally, the **GL SPECTIS 1.0 Touch + Flicker** is equipped with a photo diode for the Flicker measurement, thanks to this, together with the measurement of the illuminance intensity, it is possible to measure flicker characteristics.

To extend the measurement capabilities of these devices it is necessary to use additional attachments and probes. Accessories are included in a secure suitcase.

Find out more on page 3-4.



TECHNICAL DATASHEET

GL SPECTIS 1.0 Touch

GL SPECTIS 1.0 Touch + Flicker

SPECTRAL PARAMETERS

Spectral range**	340 – 780 nm (UVa – VIS)	SPECTIS 1.0 Touch UVa–VIS
	640 – 1050 nm (VIS–NIR)	SPECTIS 1.0 Touch VIS–NIR
	340 – 750 nm (UVa – VIS)	SPECTIS 1.0 Touch LS
Illuminance (lux)*	10 – 100 000 lx	for white LED
	–	
Luminous flux [lm]	Available with optional GL OPTI SPHERE	
Luminance [cd/m²]	Available with optional GL OPTI PROBE	
Luminous intensity [cd]	Calculated in GL SPECTROSOFT	
Physical resolution / datapoint interval	~ 1.7 nm	
Wavelength reproducibility	0.5 nm	

340 – 780 nm (UVa – VIS)	GL SPECTIS 1.0 Touch + Flicker UVa – VIS
10 – 100 000 lx	for white LED
0,01 – 100 000 lx	Available with optional GL SALLI Diffusor
Available with optional GL OPTI SPHERE	
Available with optional GL OPTI PROBE	
Calculated in GL SPECTROSOFT	
~ 1.7 nm	
0.5 nm	

TECHNICAL DATA

Sensor	CMOS image sensor
Sensor (tętnienie światła)	–
Number of pixels	256
Integration time	10 ms – 10 s
A/D converter	16 bits
Signal-to-noise ratio	1000:1
Illuminance class	Class B – DIN 5032-7 Class AA – JIS C 1609-1:2006
Stray light	2*10 E-3
Tolerance – cosine response (f2')	< 3% (1.9%)
Uncertainty of color coordinates***	0.0015
Display	3.5" color LCD (240 x 320px)
USB	USB 2.0
WiFi	✓
SD Card slot	microSD 16 GB
Battery / Power pack	lithium-polymer battery 3500 mAh
Power supply via USB connector	< 640 mA
External power supply	USB mini socket: 5V, 1A
Operating temperature	5 – 35°C
Dimensions [H x W x D]	74.5 mm x 145.5 mm x 36.6 (with standard diffusor)
Weight	349 g

CMOS image sensor
high-speed photodiode, V(λ) correction class B
256
10 ms – 10 s
16 bits
1000:1
Class B – DIN 5032-7 Class AA – JIS C 1609-1:2006
2*10E-3
< 3% (1.9%)
0.0015
3.5" color LCD (240 x 320px)
USB 2.0
✓
microSD 16 GB
lithium-polymer battery 3500 mAh
< 640 mA
USB mini socket: 5V, 1A
5 – 35°C
74,5 mm x 145,5 mm x 36,6 mm (with standard diffusor)
349 g

FLICKER MEASUREMENT

Frequency range
Sampling rate
Maximum sampling rate
Calculated parameters

0.1 Hz – 12.5 kHz
125 kHz
0.1 – 15 000 lx
<ul style="list-style-type: none"> ▪ Flicker frequency ▪ Flicker Index ▪ Flicker percentage ▪ SVM (Stroboscopic Visibility Measure) ▪ PstLM (Short Term Perceptibility for light modulation) <ul style="list-style-type: none"> – available only with the GL Spectrosoft PRO/LAB ▪ SAM (Stroboscopic Acceptability Metric) ▪ Mp (also referred to LRC Flicker Perception) ▪ VESA (Video Electronics Standards Association) ▪ JEITA (Japan Electronics and Information Technology Industries Association) ▪ Flicker and FFT chart are available

CALIBRATION, MAINTENANCE and 5 YEAR EXTENDED WARRANTY



GL Optic devices and software are covered by a 12-month warranty.

Remember! Optimum operation in accordance with the specifications and within the given tolerances is possible while adhering to regular maintenance, recalibration and updating. Regular calibration of the instruments in our Laboratory allows for warranty extension to 5 years.

Thanks to the use of our comprehensive technical support program and professional service, maintenance and repairs, the devices we deliver will always function like new.



Light quality control



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● Resellers

● Clients

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