

Touch the technology

# GL SPECTIS 1.0 Touch

The world's first smart spectrometer

*lx, lm, fc, cd, cd/m<sup>2</sup>, mWATT  
CRI, CCT, Color, peak wavelength*



## IF YOU NEED TO MEASURE:

- illumination value - **Lux**
- luminous flux - **Lumen**
- color rendering index according to CIE - **CRI**
- correlated color temperature according to CIE standard - **CCT**
- color coordinates according to CIE 1931 and CIE 1964 - **COLOR**
- radiant power value - **mWatt**

and much more...

our highly portable and precise GL SPECTIS 1.0 Touch with optional accessories is the perfect solution.

## ENTER THE WORLD OF SMART SPECTROMETERS

GL Optic offers a complete line of measuring instruments using the latest smart technology solutions designed for top reliability and ease-of-use.



## LIGHT MEASUREMENT LAB IN THE PALM OF YOUR HAND

This intuitively-operated spectrometer uses an Android-based operating system and is specifically designed for the measurement and characterization of light sources - including LEDs - to provide accurate spectral information and color coordinate data conforming to CIE standards.

Scan this code to get more information.



GL Optic products are made in Europe, sold and serviced on all continents.

# GL SPECTIS 1.0 Touch series

A variety of applications and the user friendly interface make this instrument the world's first intelligent "smart" spectrometer.



## ANDROID SYSTEM

Our portable measurement instrument provides reliable results and lasting performance using the world's most powerful mobile platform. Today Android is the operating system that powers over 1 billion smartphones and tablets. This solution guarantees up-to-date technology solutions and on-going support to the benefit of the end user.

## WORLD-CLASS PHOTONIC SOLUTIONS

Do not be misled by the compact size of the instrument. It is a high performance device with unique features. The GL SPECTIS 1.0 Touch uses an optical system made up of a miniature collimating lens with a nano-imprint of diffraction lines and a high quality CMOS image sensor working in the range of 340 – 780 nm or 640 – 1050 nm. There is a miniature low stray light system providing 1.7 nm data acquisition intervals which is ideal for the measurement of LEDs and OLEDs and other light sources in the visual range.

## MEASUREMENT HEAD

GL Optic spectrometers are predominantly designed and preconfigured for luminance measurement. Therefore they always include a cosine corrected measurement head for illuminance/irradiance measurement.

The B class cosine corrected measurement head is a standard accessory allowing for the proper measurement of light from the 180° (2 pi) hemisphere above the sensor, according to Lambert's Cosine Law.

Measurement heads for different functions are available as accessories.

## TOUCH SCREEN DISPLAY

The instrument does not require a computer to take measurements and immediately shows critical data on the color touch screen. Navigation is very simple and the following parameters can be easily displayed:

- full spectral profile i.e. Spectral Power Distribution
- chromaticity charts according to CIE standards
- color coordinates
- all lighting parameters like CCT, CRI and the individual R1 – R15 indices
- peak wavelength values

## MICRO SD

Thousands of light measurements are automatically saved on the 4GB micro SD card included. The system creates a library of folders containing measurement data stored in separate files. The naming system can easily be changed to help the user gain easy access to the saved measurements. Moreover, the data can be transferred directly to a computer from the micro SD card.



GL Optic's GL SPECTIS 1.0 Touch is the first mobile spectrometer using an Android – based operating system providing the latest communication technologies. This unique device offers improved functionality and many new features. The GL SPECTIS 1.0 Touch integrates the performance of a high-end spectroradiometer into a handheld, intuitive, touch screen device.

The GL SPECTIS 1.0 Touch is perfectly suited for spectral assessment of light sources in operational, quality and development areas. Applications include precise measurement of complete lighting installations, such as exterior LED lights for street lighting and daily quality control of LED production. The spectrometer measures quickly and reliably – in the production facility, during the maintenance of lighting installations or for certification of light sources such as LED retrofits for incandescent lamps.



### USB

Communication features available in GL SPECTIS 1.0 Touch allow the user to perform a variety of measurement tasks. If you use our instrument as a stand-alone unit, you can easily transfer data to your PC. If you work with the optional GL SPECTROSOFT, you can choose the USB connection or with the software interface and create a measurement setup designed to your needs. GL Optic's GL SPECTIS 1.0 Touch is the first mobile spectrometer which uses an Android-based operating system and offers the latest communication technologies.

### AUTOMATIC ACCESSORY DETECTION

GL SPECTIS 1.0 Touch possesses a unique mechanism to detect which optical probe has been attached and automatically uses the correct calibration file for that accessory. This enables the user to confidently avoid measuring errors when changing accessory interfaces. The calibration meets the requirements of leading standards institutes and is confirmed with a manufacturer's certification.

### DARK CURRENT COMPENSATION

Despite the fact that this is not a cooled detector instrument, the GL SPECTIS 1.0 Touch is ready to provide very accurate measurements in different conditions. A temperature sensor installed on the electronic board monitors changes in temperature and automatically compensates for any change of noise level, providing excellent measurement stability.

### PHOTOMETRIC AND RADIOMETRIC CALIBRATION

An absolute spectral calibration is provided for each spectrometer before delivery thereby enabling the accurate measurement of various absolute values such as Lux, Candela and Lumen together with radiometric values depending on the measurement accessory installed.

### TRIGGER SOCKET

For advanced applications, you can use the trigger in/out socket which enables synchronization of the unit with external systems. For example, the signal from the socket can trigger the flash of a tested lamp during measurements.

### UNIVERSAL MOUNT

The GL SPECTIS 1.0 Touch works as a field application instrument but you can also easily use it for more complex measurement setups. Each unit is equipped with a universal mount featuring a standardized 1/4" BSW thread size used for camera mounts. This mount enables you to place your instrument on a tripod or a laboratory optical bench, as well as in a production setting.



# GL SPECTIS 1.0 Touch

## + optional GL SPECTROSOFT + ACCESSORIES

Complete measurement instrumentation with unlimited possibilities.

With the universal concept and design of our instrument you can easily expand your measurement system by adding optional software interfaces and accessories.

## ILLUMINATION MEASUREMENT [Ix]

Irradiance measurement [mW/m<sup>2</sup>]

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.

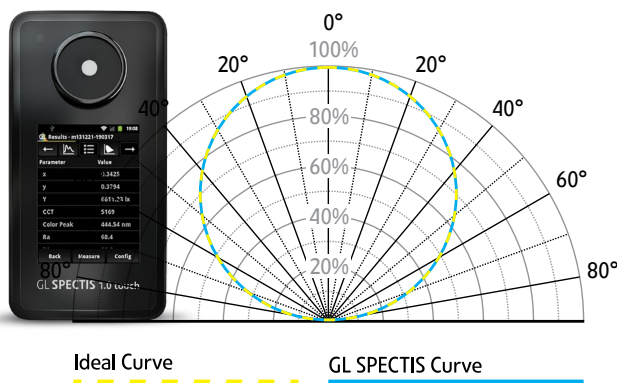


Fig. An example of the response of an illuminance.

### What is illuminance?

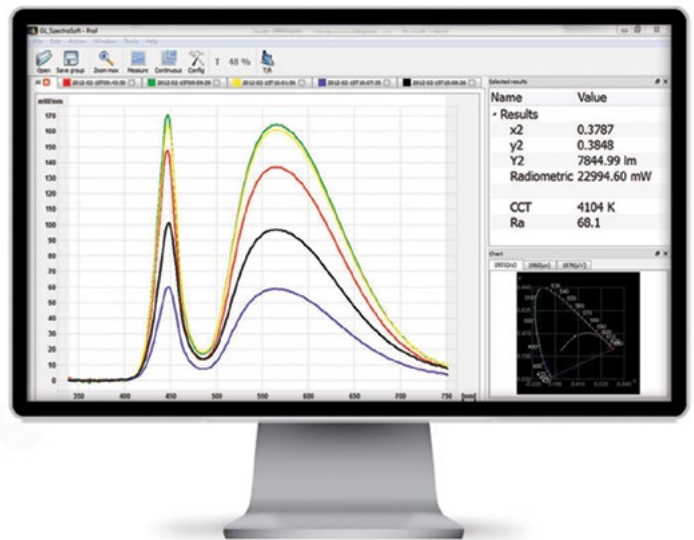
It is the total luminous flux incident on a surface, correlated with the human brightness perception.

### How is it measured and which unit is used?

It is measured using a spectrometer with a cosine-corrected measurement probe called a diffuser. It is placed on an examined surface and measures the luminous emittance in lux [lx].

### What does it give us?

It is a very practical method of determining the level of light on surfaces like work tables, pavements, roads or shelves. Illuminance is inversely proportional to the square of the distance from the source.



## USB 2.0

Use USB to connect your device to GL SPECTROSOFT to transfer data or trigger measurements from your PC.

The TCP/IP Protocol allows you to communicate with the device using a customized PC-based interface, as well as LabVIEW or other software environments.

There are a wide range of accessories available for the device, including different optical probes and integrating spheres (Ulbricht spheres). For the measurement of luminous flux, GL Optic offers a 48 mm integrating sphere, the GL OPTI SPHERE 48, which mounts directly onto the spectrometer, thus maintaining portability. Other sizes of integrating spheres are also available for laboratory measurements. GL OPTI PROBE 1.0.10 LUMINANCE can be connected to the device through a fiber-optic guide to measure luminance of displays and LED modules, flat panel luminaires and reflecting surfaces.

GL SPECTROSOFT is an analytical PC-based software designed for laboratory applications, field work in production quality control and for general light assessment purposes. Key features include: Intuitive and easy to use interface, Absolute or relative measurements, flexible data presentation and other helpful tools for easy analysis and interpretation of measured spectra. The following measurements can be performed with the use of additional

optical probes:

- Illuminance (lux)
- Spectral irradiance ( $\mu\text{W}/\text{m}^2/\text{nm}$ )
- Luminous flux (lumens)
- Spectral radiant flux ( $\text{W}/\text{nm}$ )
- Luminous intensity (candelas)
- Luminance, 2D & spot (candelas per sq. meter)

## **+** LUMINOUS FLUX MEASUREMENT [lm] Radiant power measurement [mW]



### **GL OPTI SPHERE 48 for single LEDs**

GL Optic offers a unique solution for luminous flux measurements of single LEDs. GL OPTI SPHERE 48 is an accessory that can be combined with our spectrometers to create a portable measurement set.

Did you know that electric current, electronic drivers and even heat may negatively affect the lighting properties of LEDs? These are some of the reasons why you would need an integrating sphere to measure the performance of single LEDs once they are installed on the PCB. This compact and portable set can be carried in a case, so you can bring it to meetings with your suppliers or customers.

#### **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 do we measure it?**

Luminous flux is measured with a spectrometer connected to an integrating sphere. This method allows us 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 a measurement provides a basis for calculating other parameters and can be used for comparing different light sources.

## **+** LUMINANCE MEASUREMENT [ $\text{cd}/\text{m}^2$ ]

### **GL OPTI PROBE 1.0.10 LUMINANCE for display measurements**

GL OPTI PROBE 1.0.10 LUMINANCE is an accessory which is designed to be used with our GL SPECTIS 1.0 Touch for luminance measurements of flat displays, LCD and LED panels, as well as plasma FPDs.

It is also the perfect solution for testing projection displays as well as OLED light sources.

The measurement provides accurate readings of luminance [ $\text{cd}/\text{m}^2$ ] and color coordinates (x, y, Y) conforming to CIE standards.

#### **What is luminance?**

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

#### **How is it measured and what unit is used?**

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

#### **What does it give us?**

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



# TECHNICAL DATA



|                                                        |                                      |
|--------------------------------------------------------|--------------------------------------|
| <b>Illuminance</b>                                     | <b>1 – 200,000 lx</b>                |
| <b>Irradiance</b>                                      | <b>20 – 200,000 mW/m<sup>2</sup></b> |
| <b>Luminous flux</b> (with GL OPTI SPHERE 48)          | <b>0.03 – 150 lm</b>                 |
| <b>Radiant power</b> (with GL OPTI SPHERE 48)          | <b>0.03 – 500 mW</b>                 |
| <b>Luminance</b> (with GL OPTI PROBE 1.0.10 LUMINANCE) | <b>3 – 80,000 cd/m<sup>2</sup></b>   |
| <b>PC interface</b>                                    | <b>USB 2.0 standard</b>              |

## TECHNICAL DATA SHEET

|                                                    |                                                          |
|----------------------------------------------------|----------------------------------------------------------|
| Spectral range                                     | 340 – 780 nm or 640 – 1050 nm                            |
| Detector                                           | CMOS image sensor                                        |
| Number of pixels                                   | 256                                                      |
| Physical resolution                                | ~ 1.7 nm                                                 |
| Measurement range                                  | 1 – 200,000 lx                                           |
| Wavelength reproducibility                         | 0.5 nm                                                   |
| Integration time                                   | 10 ms – 10 s in automatic mode<br>(100 s in manual mode) |
| A/D conversion                                     | 16 bits                                                  |
| Signal to noise ratio                              | 1000:1                                                   |
| Cosine correction                                  | Class B according to DIN 5032 Part 7                     |
| Stray light                                        | 2*10E-3                                                  |
| Spectroradiometric accuracy                        | 4%                                                       |
| Measurement uncertainty of color coordinates (x,y) | 0.0015                                                   |
| Display full color                                 | 240x320 px                                               |
| Micro SD card                                      | 4GB                                                      |
| Power                                              | lithium-ion battery 1400 mAh                             |
| Power consumption                                  | ~ 640 mA                                                 |
| Power supply                                       | Input: AC 100-240V 50/60 Hz 0.15 A<br>Output: 5 V-1 A    |
| Ambient temperature                                | 5-35°C                                                   |
| Dimensions                                         | 74 mm x 146 mm x 24 mm                                   |
| Weight                                             | 315 g (< 1 pound)                                        |

## CALIBRATION, MAINTENANCE AND A 5-YEAR EXTENDED WARRANTY SYSTEM



By selecting a GL Optic Light Measurement System, you are choosing one of the most accurate, reliable, precise and intuitively operated spectrometers and light measuring technology available in the market today. All GL Optic equipment and SPECTROSOFT software is fully guaranteed, however, as with all precision light measurement instruments, they require regular expert maintenance, re-calibration and software updates to maintain optimum performance within the manufacturer's specifications and tolerances.

GL Optic offers their customers fast and professional service for equipment support, maintenance and repairs. We offer the industry's most extended maintenance program to help keep your instruments running like new. An extended 5-year warranty system is available for customers who wish to opt for regular calibration of their instruments at the GL Optic laboratory.

# GL SPECTROSOFT

GL SPECTROSOFT is an optional software package. It is a helpful tool for laboratory applications, as well as for field work in production quality control and for general light assessment purposes. The software interface gives the user quick access to useful information and functions. The program calculates color coordinate values according to CIE standards. Other calculations include correlated color temperature CCT, chromaticity error, peak wavelength, dominant wavelength, color rendering index CRI (CIE 13.3). Additionally it can calculate scotopic and photopic values, PAR and PPFD, MacAdam's ellipses and much more...



## GL SPECTROSOFT v. 3.0

### NEW FEATURES

- MacAdam ellipses and Duv +/-
- PASS/FAIL function for production applications
- Personalized report generator using templates prepared with any text editor
- Peripheral devices management such as current sources, power supplies, TEC controllers
- Command line for LabVIEW™ and other systems

### OTHER FEATURES

- Lighting Audit, a tool which uses plans from the CAD system and verifies lux levels
- Spectrum Mixer for the measuring of various spectra and simulating the photometric performance of color and spectrum mixing
- TM-30-15
- Measurement of LEDs compliant with CIE 127:2007 and IESNA LM-79-08
- Absolute or relative measurements
- Flexible data interpretation
- Helpful tools for easy analysis and interpretation of measured spectra
- Calculation of metamerism index MI Index (CIE 51.2)
- Measurement procedure conforming to the ISO 3664:2009
- Comparison window: presentation of the collective measurements chart
- Selected Results window: presentation of selected results
- Binning Tool: brightness and color groups selection for LEDs
- Transmission and Reflection measurement

## RELIABLE CALIBRATED INSTRUMENT

– a complete light measurement lab available in one case

Depending on the application customers can choose which accessories and software options are required. GL Optic delivers the instruments in a safe transportation case which is practical and can be used to carry or store the units.

The GL SPECTIS 1.0 Touch is an Android-based, hand-held spectrometer for light assessment in the UV VIS range. On the display you can monitor the SPD, color coordinates according to CIE standards, lux value, CCT and CRI indices. The units include spectral calibration and we offer additional accessories for luminous flux and luminance measurements. You can use this as a stand-alone unit and check these values on the display.

Additionally GL SPECTROSOFT is available for detailed analysis, reporting and data export from a Windows PC. If you connect the GL SPECTIS 1.0 Touch to your PC it will run as a standard USB spectrometer. You can transfer data from the unit to your computer and use the full functionality of the GL SPECTROSOFT.

Each measurement made on the device can be further analyzed on a PC. The data can be stored and reports can be created. Additionally you can export the data in CSV or TXT format to other programs such as Microsoft Excel.

The photo on the right illustrates the full measurement set including:

- **GL SPECTIS 1.0 Touch** - illuminance spectrometer
- **GL OPTI SPHERE 48** - integrating sphere for flux measurement
- **GL OPTI PROBE 1.0.10 LUMINANCE** - luminance measurement accessory

