

WE BRING QUALITY TO LIGHT.

# LED Station

MAS 40 Turn-key System for LED Testing



- Complete configuration for LED measurements (measures luminous intensity [cd], luminous flux [lm], color values and radiation patterns)
- Cost-effective and robust CCD spectrometer technology
- Option of connecting to all INSTRUMENT SYSTEMS measurement adapters
- Optimized for quality assurance
- SpecWin Light Software, DLLs and LabView drivers available
- Constant current source optimized for LEDs

## LED Station: the complete solution for testing LEDs

At last there is a cost-effective spectrometer system for fast, easy measurements of all the key optical parameters of an LED:

- Luminous intensity [cd]
- Luminous flux [lm]
- Dominant, centroid and peak wavelength [nm]
- Color coordinates, color temperature and color rendering index
- Spatial radiation pattern

The LED station is based on the MAS 40 Mini-Array Spectrometer used to measure the emitted light of LEDs. A variety of adapters can be mounted to the stable input port of the MAS 40. Each adapter is used to define a specific measurement geometry necessary to achieve the desired photometric unit (luminous intensity or luminous flux).

Despite the attractive price, there are no compromises on measurement accuracy. All the components of the LED Station have been manufactured to the exacting quality standards of INSTRUMENT SYSTEMS. In addition, the measurement accessories are calibrated with the spectrometer prior to shipment using standards directly traceable to PTB or NIST.

## USB Interface: plug and go

Install the software, connect the USB cable, attach the adapter, and start taking measurements. That's how quick it is to get up and running – whether using a desktop PC or a notebook. The benefit: you can start working productively straight away.

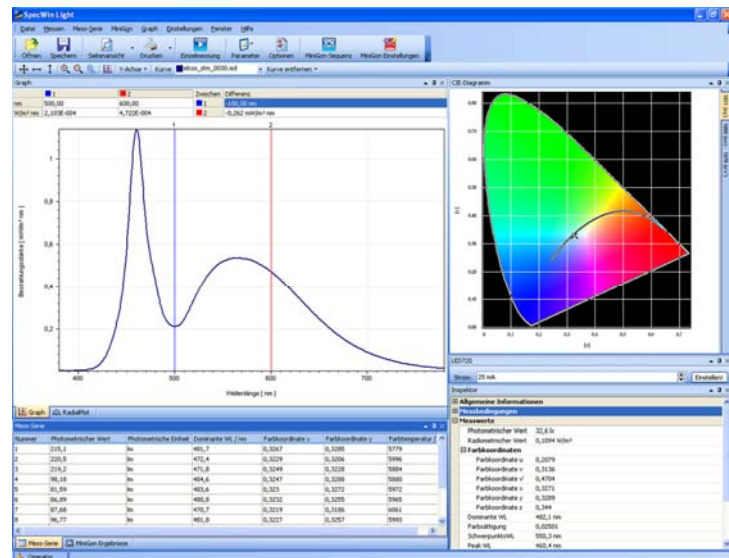
## LED Station: upgradeable

The LED Station was specifically designed to meet the challenges of optical metrology. In addition, INSTRUMENT SYSTEMS is your long term partner providing the right experience, technical support, and a broad product range.

You can use the optional optical fiber port to connect any of the measurement adapters from INSTRUMENT SYSTEMS to the LED Station. This capability allows users to access the full range of applications in display metrology as well as general spectroradiometry, spectrophotometry and color analysis. Your investment is secure when it comes to planning future applications.

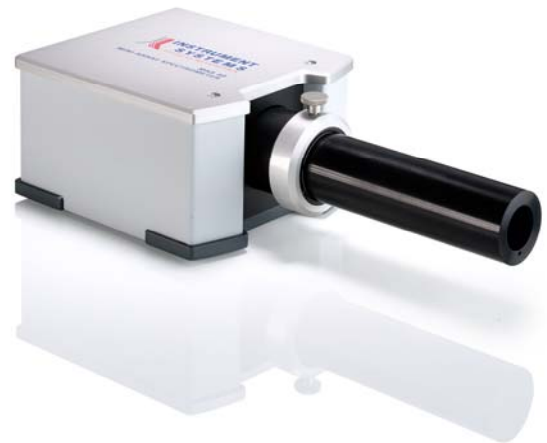
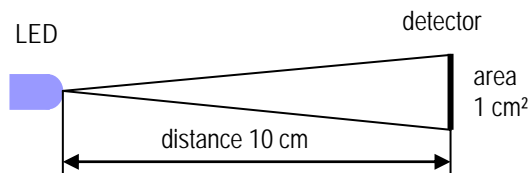
## SpecWin Light Software: simple and user-friendly

SpecWin Light helps to make the LED Station easy to use by focusing on the basic functions of measurement, analysis and documentation. This means that SpecWin Light can also be operated by semi-skilled personnel, e.g. in quality assurance.



## Measurement of Luminous Intensity: the $I_{LEDB}$ adapter:

The  $I_{LEDB}$  adapter provides CIE-compatible measurements of luminous intensity and all spectral parameters (e.g. dominant wavelength). Precision engineering maintains the specified measurement distance of precisely 10 cm from a detector with an area of 1 cm<sup>2</sup>. The  $I_{LEDB}$  adapter can accommodate all LED test fixtures (supporting different package types including SMD) from INSTRUMENT SYSTEMS.



## Measurement of Luminous Flux: the integrating sphere adapter

The ISP75 integrating sphere adapter is available for measuring luminous flux and radiant power.

The LED test fixture is used to push the LED into the opening of the sphere in such a way that all the light radiation is launched into the integrating sphere. The interior of the integrating sphere has a highly reflective and diffusing white coating for this purpose.

All LED test fixtures from Instrument Systems can also be used with the integrating sphere.



# LED Station

## The Mini-Goniophotometer:

The Mini-Goniophotometer was developed to characterize the spatial radiation pattern of LEDs. The high angular resolution of  $0.06^\circ$  means that precise measurements can also be taken of modern, narrow-angled LEDs. The integrated stepper motor control offers an angular range of  $\pm 90^\circ$  to the mechanical axis of the LED. The orientation of the LED in the phi axis can be manually adjusted for two orientations ( $0^\circ$  and  $90^\circ$ ).

The standard measurement geometry corresponds to the  $I_{LED\Phi}$  configuration, i.e. the distance between the LED and the detector is 10 cm with a detector area of  $1 \text{ cm}^2$ . The detector diameter can be limited to 0.6 mm when measuring narrow-angled LEDs.

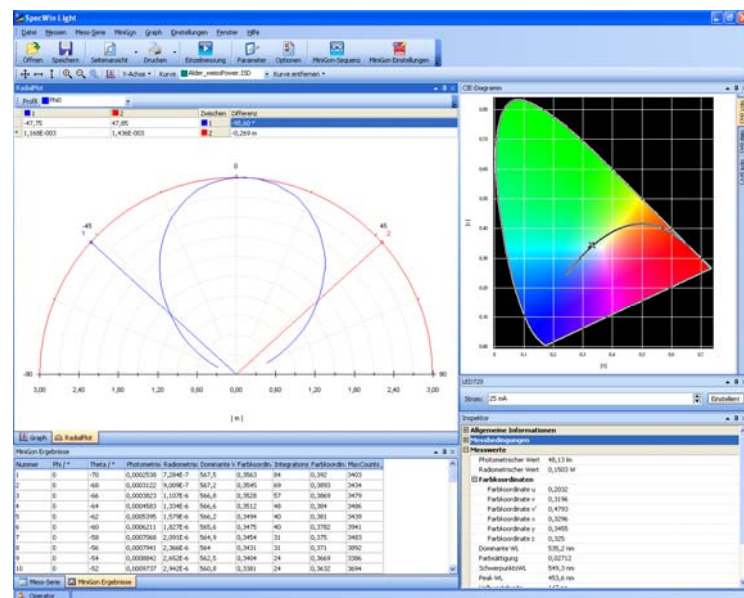
The Mini-Goniophotometer is controlled by the software via an USB interface.



A special measurement mode of the SpecWin Light software features the dialog for setting angular parameters.

The radiation pattern is displayed in either polar or Cartesian (xy) coordinates.

The test data obtained are stored in ASCII-text files and can be easily imported into MS Excel™.



# LED Station

## Setup:

The MAS 40 Mini-Array Spectrometer forms the core of the LED Station. The MAS 40 is mounted on a stable base plate and the I<sub>LEDB</sub> luminous intensity adapter or the ISP75 integrating sphere is attached directly to the MAS 40 input port. The Mini-Goniophotometer has

its own base plate and the MAS 40 is mounted on this plate when measuring the spatial radiation pattern.

When you place your order you have the option of specifying a 10-fold sensitivity enhancement or alternatively a density filter to decrease the sensitivity. This tunes the sensitivity range to the desired application.

## Specifications:

Spectrometer Model	VIS	UV	VIS-NIR
Spectral range	320 to 800 nm	200 to 600 nm	380 to 950 nm
Spectral resolution *1	2.5 nm	2.5 nm	2.5 nm
Wavelength accuracy	± 0.5 nm	± 0.5 nm	± 0.5 nm
Stray light (broadband with standard illuminant A)	1 · 10E-3 at 400 nm	1 · 10E-3 at 285 nm	1 · 10E-3 at 400 nm
Stray light (for LEDs)	6 · 10E-4	6 · 10E-4	6 · 10E-4
<b>Luminous intensity (ILEDB)</b>			
Sensitivity range *2	0.4 mcd to 4 cd		
Measurement accuracy *3	± 7 %		
<b>Luminous flux (ISP75 integrating sphere)</b>			
Sensitivity range *2	20 mlm to 200 lm		
Measurement accuracy *3	± 7 %		
<b>Spectral measurements</b>			
Measurement accuracy for dominant wavelength *4	± 1 nm		
Measurement accuracy for chromaticity (x,y,z) *4	± 0.005		
<b>Miscellaneous (MAS 40 spectrometer)</b>			
Interface	USB		
Dimensions (H,W,D)	145 mm x 90 mm x 185 mm (spectrometer only)		
Power consumption	approx. 650 mW (via USB interface)		
Ambient conditions	10 to 35°C; relative humidity 70%		
Weight	approx. 2.1 kg (spectrometer only)		
<b>Mini-Goniophotometer</b>		<b>(preliminary specifications)</b>	
Angular range in theta axis	± 90°		
Angular resolution	0.056°		
Angular accuracy	± 5 %		
Interface	USB		
<b>LED-720 constant current source</b>		<b>(preliminary specifications)</b>	
Current range	0 to 50 mA		
Interface	USB		

\*1 Approximate values for standard 50 µm slit; other values are obtained with optional 25 µm and 100 µm slits

\*2 Measured at 500 nm wavelength, a signal-to-noise ratio of 10:1, and without averaging;

remark: option MAS40-210 delivers a ten-fold improvement in sensitivity

\*3 Directly after calibration relative to the calibration standard

\*4 Assuming sufficient signal dynamic range and valid calibration. The specified errors apply a twofold standard deviation.

# LED Station

## Ordering information

Order No	Description		
<b>Spectrometer (includes SpecWin-Light software)</b>			
Model	Spectral range	Spectral resolution	Data point interval
LED40-100	320 to 800 nm	2.5 nm	0.33 nm
LED40-110	200 to 600 nm	2.5 nm	0.33 nm
LED40-120	380 to 950 nm	2.5 nm	0.33 nm
<b>Measurement adapters</b>			
LED40-200	PLG input port VIS-NIR		
LED40-201	PLG input port UV-VIS		
LED40-310	I <sub>LED<sub>B</sub></sub> Luminous intensity adapter; spectral range 320 to 950 nm		
LED40-311	I <sub>LED<sub>B</sub></sub> Luminous intensity adapter; spectral range 200 to 950 nm		
LED40-320	ISP 75 Integrating sphere		
LED40-400	Mini-Goniophotometer		
LED40-410	Fiber-bundle connector for Mini-Goniophotometer; spectral range 320 to 1650 nm		
LED40-411	Fiber-bundle connector for Mini-Goniophotometer; spectral range 200 to 1700 nm		
LED40-415	Extension tube for I <sub>LED<sub>A</sub></sub> configuration of the Mini-Goniophotometer		
<b>Accessory</b>			
LED-720	Constant current source for LEDs		
<b>Options for the spectrometer</b>			
MAS40-210	10-fold sensitivity improvement		
MAS40-221	Density 1 filter (reduces signal level nominally by a factor of 10)		
MAS40-222	Density 2 filter (reduces signal level nominally by a factor of 100)		
MAS40-231	UV Density 1 filter (reduces signal level nominally by a factor of 10)		
<b>Software</b>			
SW-105	SpecWin high-end spectral software for Windows 2000/XP		
SW-120	SpecWin Light spectral software for Windows 2000/XP		
SW-251	Windows DLL for custom software development		
SW-253	LabView driver (requires SW-251 DLL)		





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