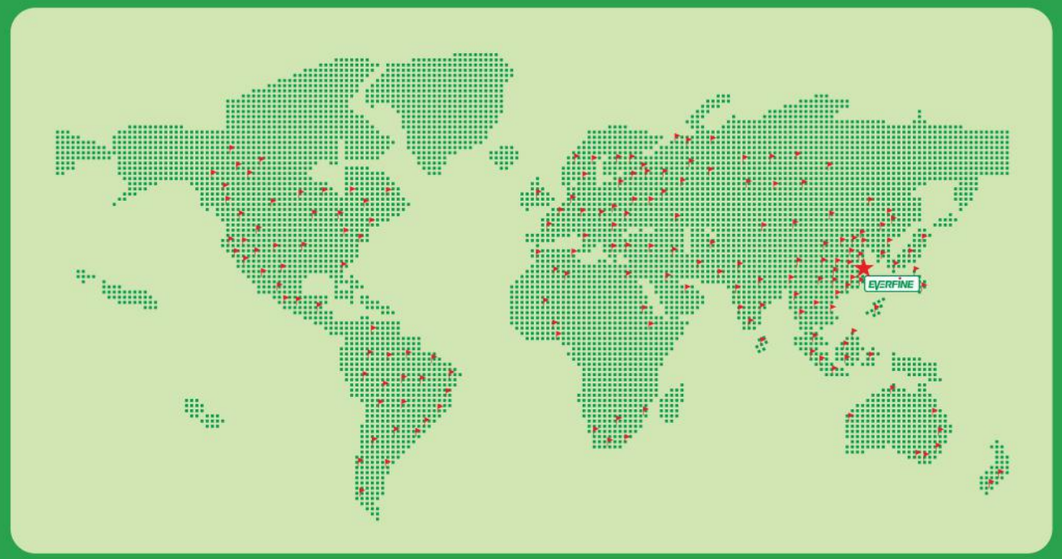

www.everfine.net

EVERFINE Corporation

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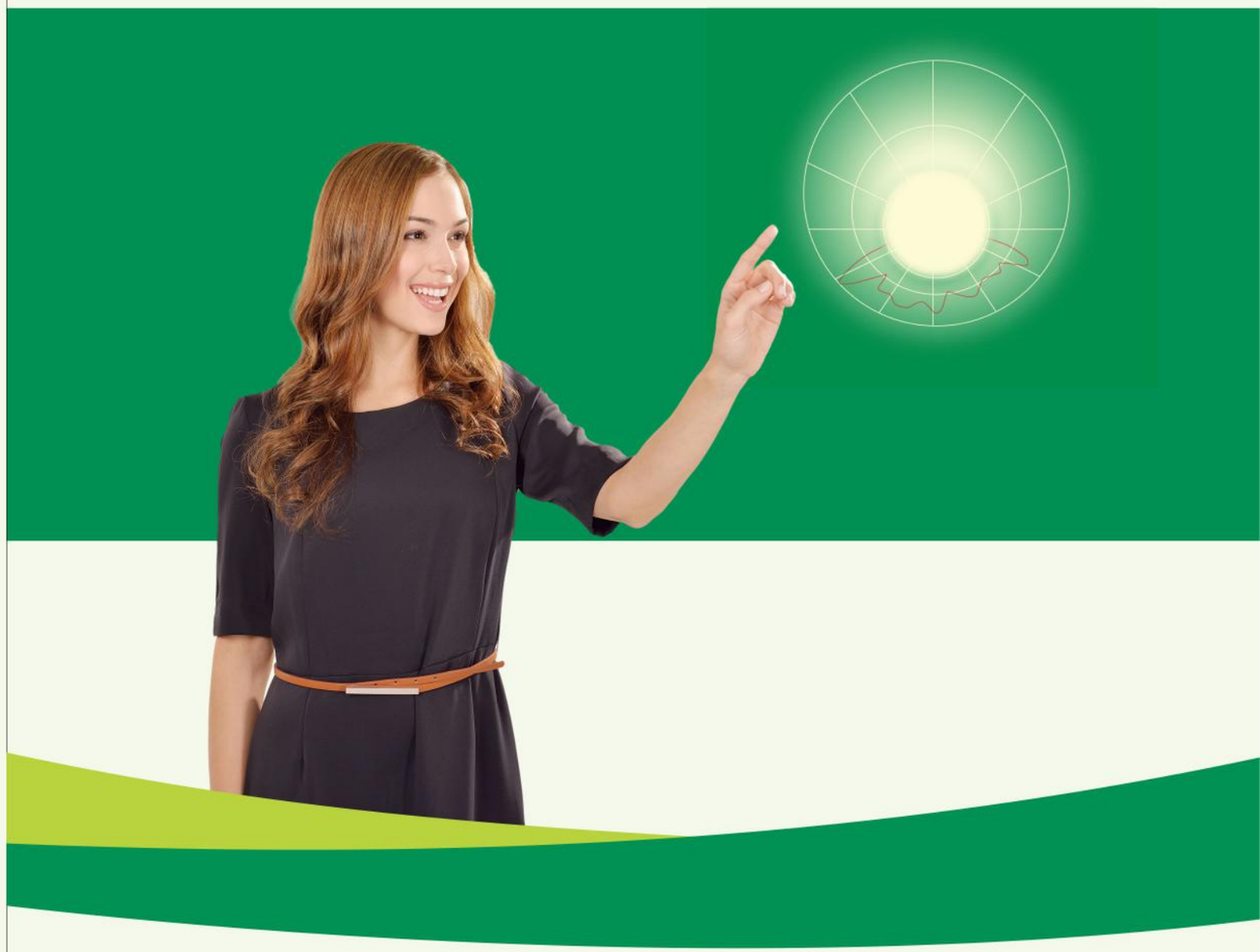
Asia	E-Mail: asia@everfine.net
India	E-Mail: india@everfine.net
China	E-Mail: china@everfine.cn

EVERFINE

Make every customer more satisfied

LED & Lighting Measurement Solutions



EVERFINE Corporation

(Stock code:300306)

EVERFINE PROFILE

EVERFINE Corporation (Stock Code: 300306) is a professional supplier of photoelectrical (optical, electrical, opto-electronical) measurement instrument and calibration service, and leading in the field of LED & lighting measurement instrument. She is located in Binjiang National Hi-Tech Zone, Hangzhou, China, the so called Heaven Silicon Valley. EVERFINE is a National Certificated High-tech Enterprise, Supportive Member of the CIE, ISO9001 Registered Firm, Government Certificated Software Enterprise & Software Product Enterprise, and owns a Province Level High-tech R&D Center, and NVLAP accredited Lab and CNAS accredited Lab. In 2013 and 2014, EVERFINE was judged by Forbes as China's Most Potential Listed Companies.

EVERFINE has undertaken projects of National 863 programs and local government Key Science &Technology Programs for many times. EVERFINE owns more than 100 patents, including Germany, US ones. Several products were awarded as "National Outstanding Innovation", "National Independent Innovation Products" or "National Key & New Products". Meanwhile, EVERFINE is active in the standardization societies, and chaired or participated in over 30 international and domestic standards.

EVERFINE has the largest customer base in LED & Lighting industry in the world, and lead both oversea and domestic high-end market share. The products have been exported to US, Europe, Japan and other developed countries and regions. The customers include high level institutes and laboratories like NIM, UNDP, NIST, ITRI, SGS, ITS, TUV, KEMA, CTI, and famous corporations like CREE, PHILIPS, GE, OSRAM, SAMSUNG and etc.

Headquarter of EVERFINE

EVERFINE Tower

NVLAP AND CNAS ACCREDITED LAB

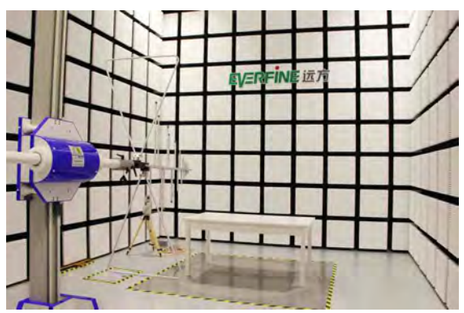
EVERFINE has several photoelectric laboratories that equip the most sophisticated instruments, including spectrometers, EMC testing systems, etc. Furthermore, EVERFINE possesses professional teams and post–doctoral station specialized in the R&D of measurement instruments for LED and lighting.

NVLAP certificate

CNAS certificate

PROVINCE R&D CENTER AND POST–DOCTORAL STATION

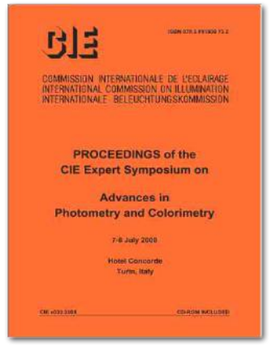
EVERFINE Test and Calibration Center has been accredited by NVLAP and CNAS, to be the first manufacturer of LED and lighting measurement instruments to receive the certificates in China.



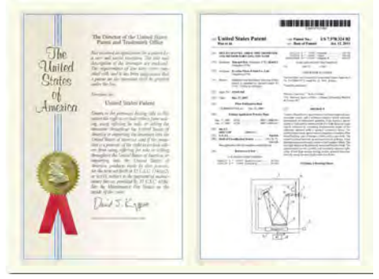
Advanced Photoelectric Laboratories

SCIENCE & TECHNOLOGY

- As of 2013, more than 60 papers have been published, most of them are published in international authoritative journals and important academic conferences.



- EVERFINE possesses more than 100 patents, including US and Germany patents.



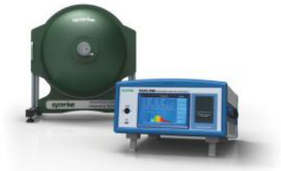
- EVERFINE has already led or participated in the drafting of more than 30 international and national standards.

CUSTOMERS

EVERFINE has won the largest share of the high end customers in lighting industry in the world.

Part of customers

MAIN PRODUCTS（1）



P01–P08

Spectroradiometer

The spectroradiometer is widely used to measure the spectral, photometric and colorimetric quantities of LEDs and other lighting sources.

P10–P23

Goniophotometer

The goniophotometer is widely applicable to acquire the luminous intensity distribution, luminous flux, spatial color distribution, and luminance distribution of lamps and luminaires.

P24–P34

LED (LEDs/Drivers/Lamps) Automatic Test Equipment

The equipments are widely used for the online quality control of LEDs/ drivers/LED lamps etc.,with automatic binning functions according to the testing result.

P36–P37

LED Thermal Resistance Structure Analyzer

The systems are used to measure the junction temperature, thermal resistance and thermal structure of LEDs.

P38–P40

Aging–Life Test System for LEDs & LED Luminaires

The systems are widely used for normal /accelerated aging, lumen maintenance measuring, lifetime evaluation and temperature function for LED products.

P41–P45

Optical Radiation Test System

The systems are designed especially for the measurement of optical radiation hazard exposures and the classification of optical radiation sources.

MAIN PRODUCTS （2）

P46–P46

Optical Measurement of Materials

Applied for white LED lamps yellow YAG phosphor, tri–band phosphor and other lighting material to measure the spectra, color, brightness, efficiency, thermal quenching characteristics, and etc.

P47–P55

Luminance Meter & Radiance Meter & Display Measurement System

EVERFINE offers a series of luminances meters, and test systems for the optical characteristics of FPD including luminance, chromaticity, uniformity, viewing angle,color gamut, contrast ration , etc.

P56–P62

Illuminance Meter & Irradiance Meter & Field Test Instrument

EVERFINE offers wide range of portable instruments for field measurement to measure illuminance, irradiance, luminance, spectra, chromaticity, color temperature, rendering index, flicker index, etc.

P63–P66

EMC tester

The instruments are designed to carry out the EMS(Electromagnetic Sensitivity) test, and IP （Ingress Protection） test for lamps and luminaires, electrical devices, materials, and etc.

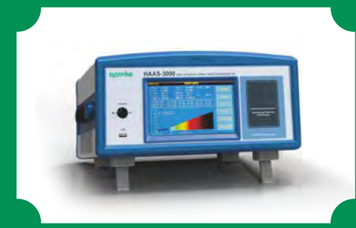
P67–P75

Digital Power Meter & Power Supply

The instruments are used to measure the input and output electrical performance and offer a stable power supply conditions for LED drivers, light sources, and other electrical appliance.

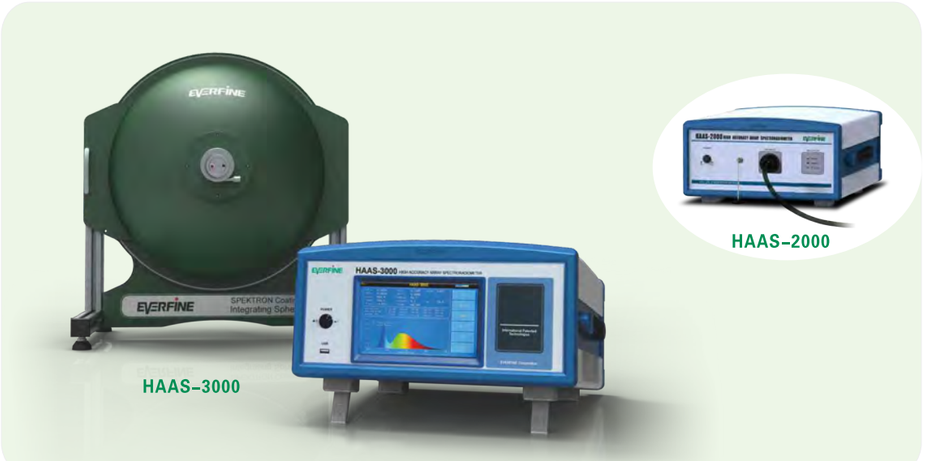
Chapter 1

SPECTRORADIOMETER



HAAS-2000/3000 HIGH ACCURACY ARRAY SPECTRORADIOMETER (Laboratory grade)

The Leading Speed Spectroradiometer



World Leading Specifications

- Can measure the spectra of flash light <1 μ s
- 0.3% photometry linearity
- Up to 0.01mcd sensitivity
- 0.0015 x, y accuracy
- 5.00E-05 stray light level
- 200nm~2550nm spectral range

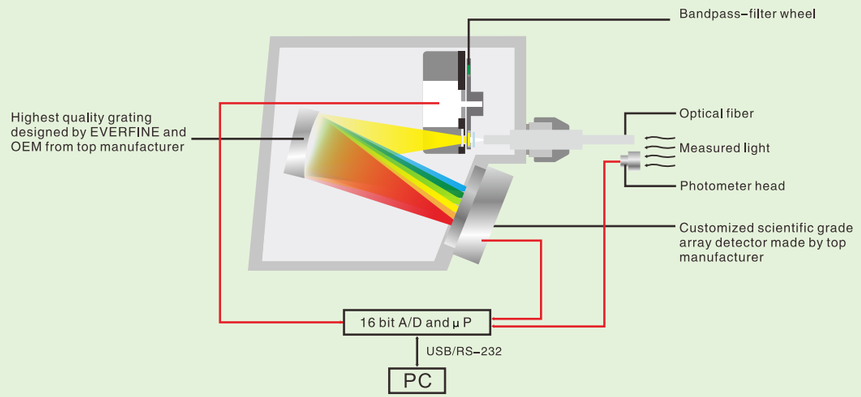
US patent granted

Awarded as "China Excellent Patent"

National Key & New Product

HAAS-2000/3000 HIGH ACCURACY ARRAY SPECTRORADIOMETER (Laboratory grade)

National High-tech Program(863 Program) Research Achievement ***US and China Patents Granted***



Principle sketch

Overview

Generally, the high-accuracy, high-sensitivity and high-speed spectroradiometers in the world employ high quality gratings and scientific-grade array detectors. And very few manufacturers in the world can supply these high-end commercial array detectors and gratings. However, even applying these top grade array detectors and gratings, there are still many problems in system optical matching.

EVERFINE has abundant experience in developing high-accuracy & high-speed spectroradiometer. She improves the design of the array detectors and gratings to make the optical matching more perfect, so that the system can obtain purer spectrum and better linearity.

Besides, with the special stray light controlling technology, dynamic range widening technology, precise electronic array detector driving technology and complex variable matrix software technology, and by adopting the patent Bandpass-filter Wheel Correcting Technique (BWCT), Spectrometer & Broadband-radiometer /photometer Combined Technique (SBCT), and modified NIST stray light correction technology, the spectroradiometer developed by EVERFINE can realize ultra low stray light of 5.00E-05 (under illuminant A) and super photometry linearity of 0.3% in overall dynamic range. Its key specifications are leading in the world.

HAAS-2000/3000 HIGH ACCURACY ARRAY SPECTRORADIOMETER (Laboratory grade)

Main specification

Model / Items	HAAS–2000 /3000						
	UV	VIS	VIR	UVIR	IR1	IR2	IR3
Optical bench							
Grating	Holographic grating with flat–field correction						
Slit width	100 μ m (standard)						
Optical input	Fiber optics						
Spectrograph							
Spectral range	200~400nm	380~780nm	350~1100nm	200~1200nm	780~1650nm	1600~2550nm	1050~2000nm
Spectral resolution	1nm	2.0nm	4nm	4nm	9nm	15nm	9nm
wavelength accuracy	±0.1nm	±0.3nm	±0.3nm	±0.3nm	±0.15nm	±3nm	±3nm
Colorimetry parameters							
Accuracy of chromaticy (x,y)	–	±0.0015	±0.002	±0.002	–	–	–
Chromaticy(x,y) reproducibility (blue LED)	–	±0.00015x ±0.0002y	±0.0002x ±0.0003y	±0.0002x ±0.0003y	–	–	–
Photometry / radiometry							
Linearity	±1%	±0.3% [2)]				±2%	±3%
Reproducibility	±0.3%	±0.2%				±0.7%	±1%
Accuracy	±3%	±1% [3)]				±7%	±10%

1) BCWT is applied 2) SBCT is applied 3) Excluding the uncertainty of standard Lamp

Measurable items

- Relative Spectral Power Distribution from 200nm–2550nm
- Chromaticity coordinate (x, y), (u',v')
- Peak Wavelength / FWHM/ Color Purity / Dominant Wavelength
- Color Temperature
- Color Rendering Index
- Red Ratio
- Luminous Flux/radiant flux (Equipped with integrating sphere)
- UV weighted radiometry quantities
- IR weighted radiometry quantities
- Photobiological safety analyzing

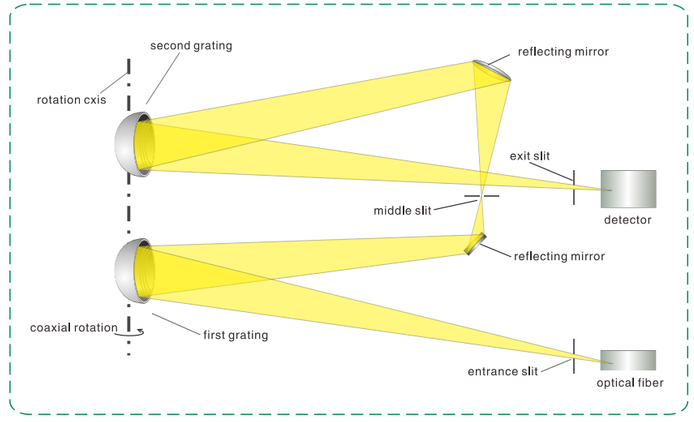
PMS-2000 DOUBLE-MONOCHROMATOR SPECTRORADIOMETER (Scientific grade)

The design of PMS–2000 adopts the coaxial symmetry double–monochromator technique, which leads to very high stray light control and wavelength accuracy. It is especially suitable for labs or research institutes with very high accuracy requirement.

Double- monochromator based Spectroradiometer with extremely high accuracy

The Coaxial & Symmetrical Double–monochromator Technique

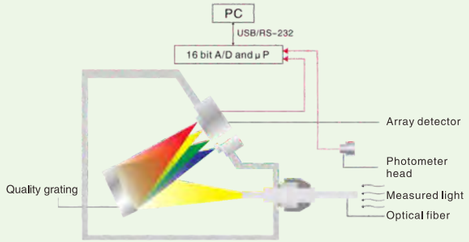
The tested light is dispersed by the first grating and the second grating in sequence. and then the monochromatic light afer two times dispersion goes into the detector. In this system, the two gratings are symmetrically set in one axis to realize coaxial rotation. It has super high wavelength accuracy because of no synchronous error.



HAAS-1200 ACCURATE ARRAY SPECTRORADIOMETER (Industry grade)

HAAS–1200 is an industrial product based on the technology of HAAS–2000/3000 high accuracy array spectroradiometer, and it belongs to the family of high accuracy, high speed spectroradiometers.

Ideal product to replace general mechanical scanning spectrometers

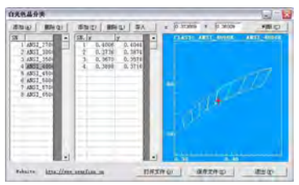


Main specifications

- Spectral range:350nm~1000nm (Special :UV–VIS–NIR)
- Wavelength accuracy: ± 0.3nm
- Color temperature range： 1000 K~100000 K
- Luminous flux range:0.01 lm~200,000 lm (Equipped with different integrating sphere)
- Spectral measurement linearity:1%
- Accuracy of chromaticity coordinate:0.003
- Integration time:1 ms~10 s
- A/D: 16 bit
- Communication:USB2.0

Partial software interface

Spectra & color measurement



Classification for white LEDs

BIN Function

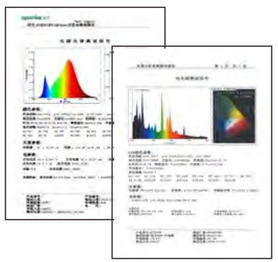
PCE SERIES OPTO-ELECTRONIC MEASUREMENT SYSTEM

Sigle LED/Module Opto–Electronic Measurement System

The measurable items are relative spectral power distribution, chromaticity coordinates, dominant wavelength, peak wavelength, purity, CCT, CRI, half–peak wavelength, luminous flux (equipped with integrating sphere), radiant power, red ratio, chromaticity deviation and etc.,it conforms to the requirements of CIE.

Opto–Electronic Measurement System

Measurable items of the module as LED backlight are relative spectral power distribution, chromaticity coordinates, dominant wavelength, peak wavelength, purity, CCT, CRI, half–peak wavelength, luminous flux (equipped with integrating sphere), radiant power, red ratio, chromaticity deviation and etc.,it conforms to the requirements of CIE.



PART 1

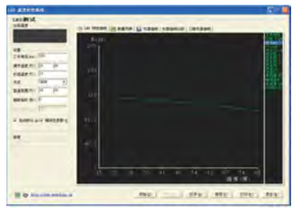
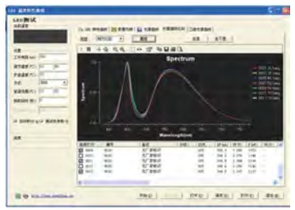
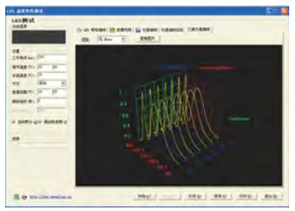
ATA-500/ATA-1000 AUTO-TEMPERATURED LED OPTO-ELECTRONIC ANALYZER

ATA–500/ATA–1000 is mainly used to measure the photometric & colorimetric & electric characteristics of LEDs, COB LEDs or LED modules at different case/junction temperature.

Main specifications

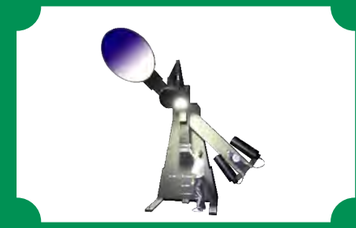
- Spectral range:380nm~780nm
- Wavelength accuracy: ± 0.3nm
- Half peak bandwidth： 2.0m
- Luminous flux range： 1lm ~ 20000lm
- (Equipped with proper integrating sphere)
- Power output range： AC or DC as required
- Equipped with a temperature controller
- The max. power of LED:100W
- The max. size of LED:100mm*100mm

Typical Testing Interface

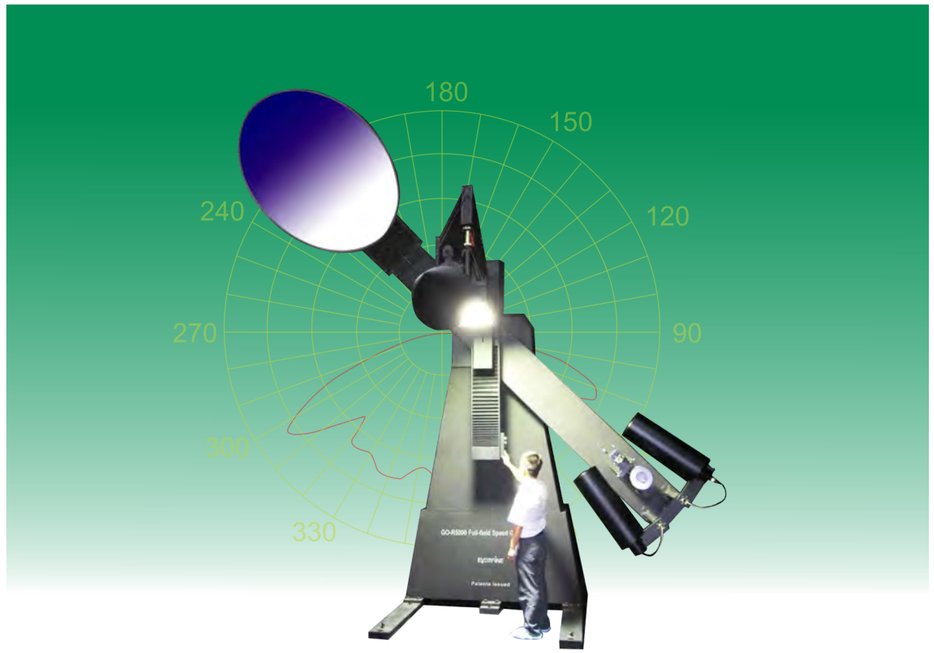
Chapter 2

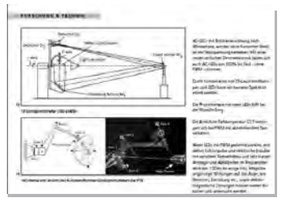
GONIOPHOTOMETER



GO-R5000 FULL-FIELD SPEED GONIOPHOTOMETER

Fully meets the standards of IESNA LM-79 and GB/T 24824





Germany periodical <LICHT> (11/12, 2009)

US and German patent granted

Awarded as "China Excellent Patent"

Measurable items

Luminous intensity data, luminous intensity distribution curve, efficient luminescence angle, spread angle, zonal luminous flux, luminaires efficiency, total luminous flux, luminance distribution, available average illuminance curve, coefficient of utilization, luminance limitation curves, glare, maximum ratio of distance to height, iso-Illuminance diagrams, curves of luminaires vs lighting area, Isocandela diagrams, spatial color distribution, spatial luminance distribution etc.

GO-R5000 FULL-FIELD SPEED GONIOPHOTOMETER

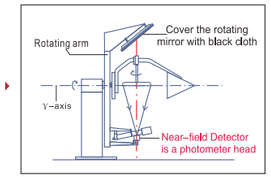
Multi Goniophotometers in 1 facility

Near-field measurement

Near-field detector directly receives light from the light source without passing through any mirror, the typical measurement distance is around 3m. Near-field detector can be a photometer head or spectroradiometer or imaging luminance meter.

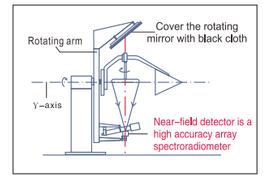
❶ Compact goniophotometer

- Near-field Detector is a photometer head
- The best way to measure total luminous flux of various size sources by illuminance integrating method, which is also the method for many developed countries to setup their national scale of luminous flux
- The best way to measure the luminous intensity of small or weak sources



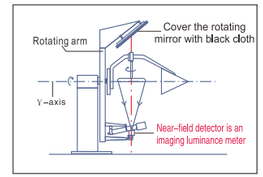
❷ Goniospectroradiometer

- Near-field detector is a high accuracy array spectroradiometer
- Measure the spatial spectral distribution, and obtain the averaged and non-uniformity of colorimetric quantities



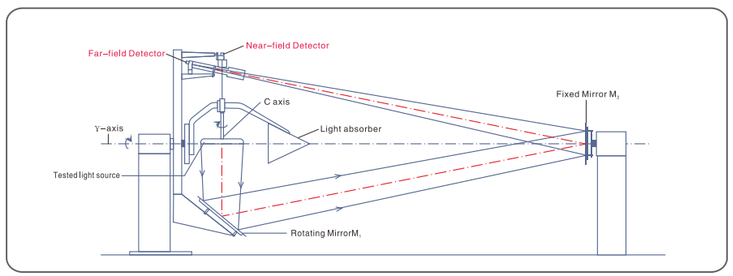
❸ Near-field goniophotometer

- Near-field detector is an imaging luminance meter
- Measure the spatial luminance distribution of light sources



Far-field measurement

Far-field Detector receives the light after twice reflection by Rotation Mirror M1 and Fixed Mirror M2, it realizes the far-field measurement, the typical distance is around 30m. And the dark room space is not enlarged accordingly. It can be applied for the intensity measurement of large size sources with narrow or wide beam angle sources, e.g. flood lights, indoor lights, road light, etc.



PART 2

GO-R5000 FULL-FIELD SPEED GONIOPHOTOMETER

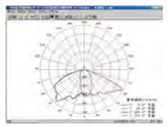
Full-field goniophotometry

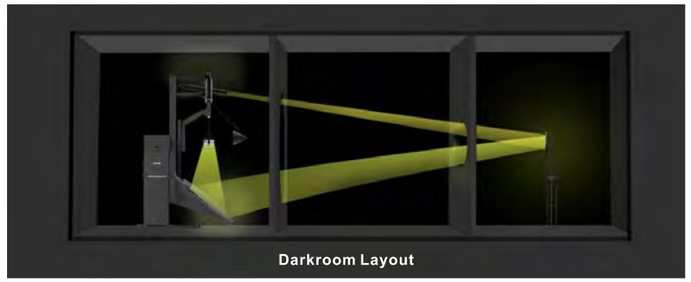
As there are multi detectors configured in the system, by the special software, it can realize mutual corrections between detectors to further increase the accuracy.

Date File Format

The output file can directly match international Universal Lighting Design Software, such as Dialux/AGI32/Lumen-Micro

*.GOS *.CIE *.CEN *.IES *.Tm14
*.CIB *.LDT





Darkroom Layout

Main specifications

Photometry					
Accuracy of photometer head		CLASS L, f_1' <1.5%			
Linearity of photometry		0.2%			
Reproducibility of photometry		0.1% (for stable lamps)			
The detecting ability of photometer		$1\times10^{-5}/1\times10^{-4}/1\times10^{-3}$ lx/0.01lx (On request)			
Measuring Range of illuminance		$1\times10^{-5}/1\times10^{-4}$/0.001lx~20klx/200klx (On request)			
Measuring Range of the luminous Intensity		$4.0\times10^{-5}/4.0\times10^{-4}/4.0\times10^{-3}$ cd/4.0×10^{-2} cd~1.8×10^{7} cd/1.8×10^{8} cd (On request, widest in the world)			
Angle					
C angle	Rotation range	0° ~ 360°			
	Angle accuracy	0.1° /0.05° (The highest accuracy in the world)			
γ angle	Rotation range	−180° ~ +180°			
	Angle accuracy	0.1° /0.05° (The highest accuracy in the world)			
Measurement speed		Up to 3rpm and adjustable			
Max. characteristics of lamps or luminaires					
Items \ Model		GO-R5000 -XXX-STD	GO-R5000 -XXX-LRG	GO-R5000 -XXX-SML	GO-R5000 -XXX-CST
Size		1600mm	2000 mm	800 mm	On request
Weight		50kg	80kg	30kg	On request
Power		3000W/10A AC/DC			

GO-2000 GONIOPHOTOMETER

GO-2000 is a goniophotometer with facility for turning the light source in CIE B-β or C-γ coordinate system. Besides the measurement of luminous intensity distribution and luminous flux, GO-2000 can also measure spatial color distribution of lamps and luminaries..

CIE C-γ solution

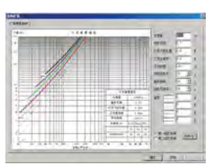
CIE B-β solution

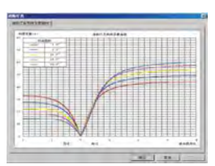
Main specifications

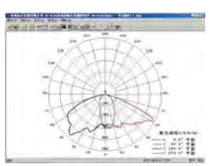
- Auto rotation range of light source around horizontal and vertical axis: ± 180°
- Accuracy of angle: up to 0.05°
- Pre-amplified and constant-temperatured photometer head, CLASS L (f_1'<1.5%) or CLASS A (f_1'<3.0%)
- Measuring range of illuminance: 0.0001lx-200klx
- Max. characteristics of test luminaire: dia. 2000mm, weight 60kg, power 3000W/10A, AC/DC
- EVERFINE patent (ZL200720184017.2) in luminaire rotation base design to let the installation of the luminaire more convenient, and let the light source blocks the tested light beam as little as possible
- CAN communication mode to suit long-distance transmission with high reliability

Darkroom Layout

Test Reports







PART 2

GO-SPEX100 GONIOSPECTRARADIOMETER

By the special darkroom–integrated design, the system can accurately measure the spatial charateristics of LED package including spatial light distribution, spatial color distribution, and luminous flux. Meet the requirements of CIE–127 and TC2–74.

Perfect Solution for Spatial Distribution Measurement of LED package

Main specifications

- Measuring distance:100mm, 316mm,1000mm
- LED Rotation range: ± 90° （γ axis), ± 180° (C axis)
- 100mm² receiving–aperture integrating sphere, meet the requirements of CIE–127 and TC2–74
- Equipped with constant–temperature LED adapter
- Measuring spectrum range: 350nm~1000nm
- CIE/ISO standard international high accuracy photometer detector, strictly V(λ)corrected;
- Measuring data can be represented in IES file and other international standard files, and can be used for secondary optical design
- Electrical performance measurement and curves functions

Test Reports

GO-SPEX500 COMPACT GONIOSPECTRARADIOMETER

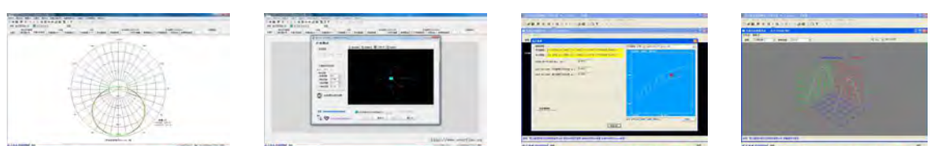
By the special darkroom–integrated design, the system can accurately measure the spatial characteristics of the lamps and luminaires without establishing a dark room, including spatial light distribution, spatial color distribution, and luminous flux.

Goniophotometer with darkroom integrated

Main specifications

- Auto rotation range of luminaires: 0° ~ 360° (C axis)； –180° ~ +180° (γ axis)
- Accuracy of angle: ± 0.1°
- Measuring distance: 3.0~10.0m (on request)
- Maximum characteristics of test luminaire: weight 50kg, diameter Φ1000mm
- Can measure the luminous intensity distribution by fine V(λ)corrected photometer head
- Can measure the spatial color distribution, average color, and spatial color non–uniformity by high accuracy array spectroradiometer

Test Reports



PART 2

GO-I300 INTERGRATED GONIOPHOTOMETER

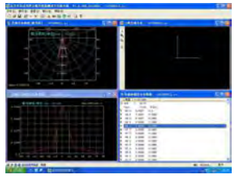
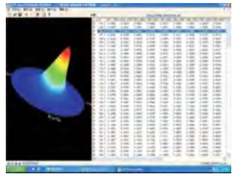
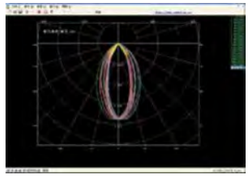
By the special darkroom-integrated design, the system can accurately measure the spatial luminous intensity distribution and luminous flux of small size lamps and luminaires without establishing a darkroom.

Goniophotometer with darkroom integrated

Main specifications

- Auto rotation range of luminaire: 0 ° –360° (C axis), –90° –+90° (γ axis)
- Measuring distance: 3m
- Fine V(λ) corrected photometer head
- Wide linear dynamic range

Test Reports

GO-HD5 GONIOPHOTOMETER FOR AUTOMOTIVE AND SINGAL LIGHTS

Automatic test system for the measurement of light distribution and luminous intensity as well as illuminance measurement for traffic signal lights and all kinds of vehicle luminaires.

CIE A-α Goniophotometer with high accuracy
0.01° Angle Accuracy
National Key & New Product

Meet the international and domestic standard requirements:

- SAE J584 J131 J593 J1383
- ECE R1 R5 R6 R7 R8
- Code of Federal Regulation (CFR), FMVSS108
- GB14887-2003, GB17510-2008, GB25991-2010 etc

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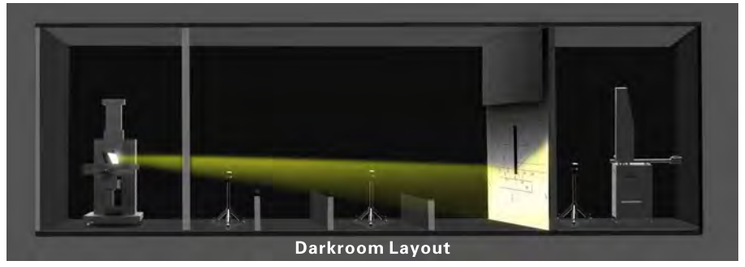
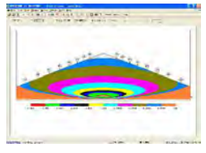


Darkroom Layout

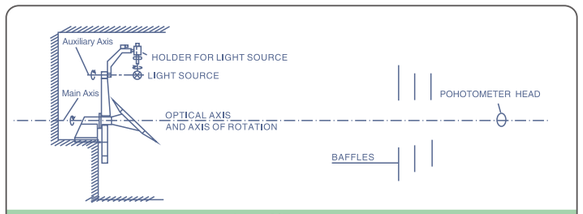
Typical Testing Interface


GO-CS CENTRIC ROTATING MIRROR GONIOPHOTOMTER

GO-CS is a traditional goniophotometer with rotating mirror(mirror on optics axis).

The goniophotometer rotates the luminaire in the prescribed burning position around the vertical axis and a reflecting mirror rotates around the horizontal axis (Main axis), meanwhile auxiliary axis rotates toward the opposite direction simultaneously. The combined motion of the luminaire and mirror permit luminous measurement at the direction of any horizontal or vertical angle without tilting the luminare during measurement.



refer to CIE 70 –1987, page 25

Technical characteristics

The test light source remains its prescribed burning attitude, but the instability of the test source due to its movement, the synchronization problem between the main and auxiliary axis will affect the measuring accuracy. The application of this kind of goniophotometer is reduced because more advanced goniophotometry technologies appear.

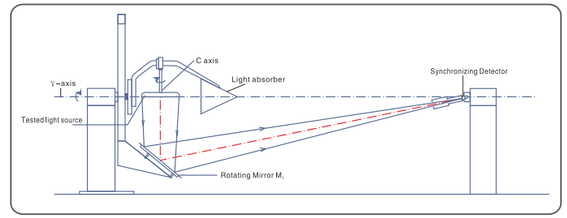
Main specifications

Photometry				
Accuracy of photometer head		Class L, f_1'<1.5% / Class A, f_1'<3.0%		
Linearity of photometry		0.2%		
The detecting ability of photometer		$1\times10^{-6}/1\times10^{-4}/1\times10^{-3}$ lx/0.01lx (On request)		
Measuring Range of illuminance		$1\times10^{-6}/1\times10^{-4}$/0.001lx~20klx/200klx (On request)		
Angle				
C angle	Rotation range	0° ~ 360°		
	Angle accuracy	±0.1°		
γ angle	Rotation range	–180° ~ +180°		
	Angle accuracy	±0.1°		
Max. characteristics of lamps or luminaires				
Items \ Model	GO-CS1600（STD）	GO-CS2000（LRG）	GO-CS800（SML）	GO-CS-CST（CST）
Size	1600mm	2000mm	800mm	On request
Weight	50kg	80kg	30kg	On request
Power	3000W/10A,AC/DC			

GO-R100 CIRCUS MOVING MIRROR GONIOPHOTOMETER

GO-R100 is a traditional goniophotometer with rotating mirror(lamp on optics axis).

During the measurement, the test light source does not move, and the mirror rotates around the light source. The light emitted from the light source is reflected by the mirror and then received by the synchronizing detector which follows the reflecting mirror always. Because the synchronizing detector is employed, the measured light incidence to detector at angle of 0° .



Technical characteristics

High stability is realized because the test light source remains its prescribed burning attitude and does not move. But the synchronization problem between the detector and reflecting mirror axis will affect the measuring accuracy. The application of this kind of goniophotometer is reduced because more advanced goniophotometry technologies appear.

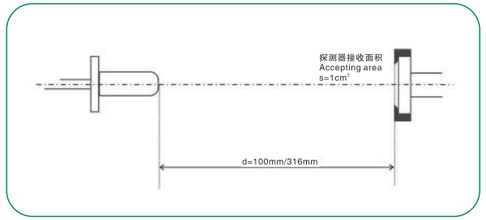
Main specifications

Photometry		
Accuracy of photometer head		Class L, f_1'<1.5% / Class A, f_1'<3.0%
Linearity of photometry		0.2%
The detecting ability of photometer		$1\times10^{-5}/1\times10^{-4}/1\times10^{-3}$ lx/0.01lx (On request)
Measuring Range of illuminance		$1\times10^{-5}/1\times10^{-4}$/0.001lx~20klx/200klx (On request)
Angle		
C angle	Rotation range	0° ~ 360°
	Angle accuracy	±0.1°
γ angle	Rotation range	–180° ~ +180°
	Angle accuracy	±0.1°
Max. characteristics of lamps or luminaires		
Size		1600mm
Weight		50kg
Power		3000W/10A,AC/DC

PART 2

LED626/LED620 GONIOPHOTOMETER FOR LEDs

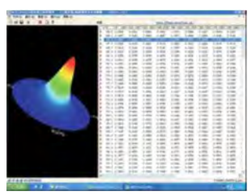
Designed according to the requirements of CIE pub. No.127, and especially used to measure the luminous intensity distribution, luminous intensity, beam angle, and electrical characteristics of LEDs.

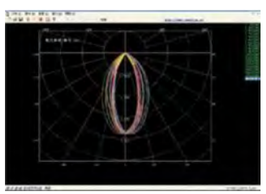


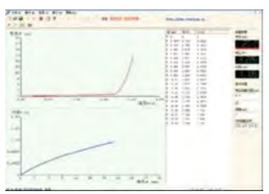
Main specifications

- Measuring distance: 100mm，316mm
- Rotation range of LEDs: ±90°（γ axis）, 0° ~360°（C axis）
- Accuracy of angle: up to 0.05°
- CIE/ISO standard photometer head, fine V(λ) corrected
- Measuring data can be represented in IES file
- Precise LED orientation and axis alignment design
- Electrical performance measurement and curves functions

Test Reports

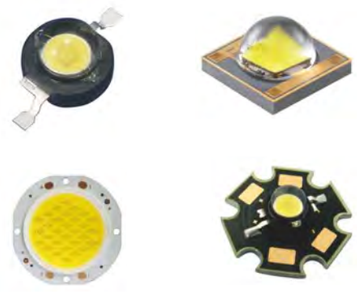




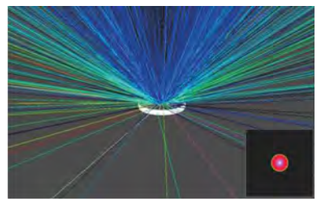


GO-NR1000 NEAR-FIELD GONIOPHOTOMETER

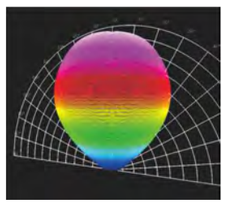
GO-NR1000 near-field goniophotometer is applicable for near-field photometric measurement of sources of small size, and can obtain the luminance distribution. The total luminous flux, illuminance distribution of every planes, and far-field luminous intensity distribution can be acquired by establishing the ray model of light via algorithm. The combination of output ray model and optical software, such as Tracepro, make it more convenient and accurate to do the secondary optical design and development.



LED package



Ray Distribution & Luminance Image of a single LED



Luminous Intensity Distribution of LED Computed by Software

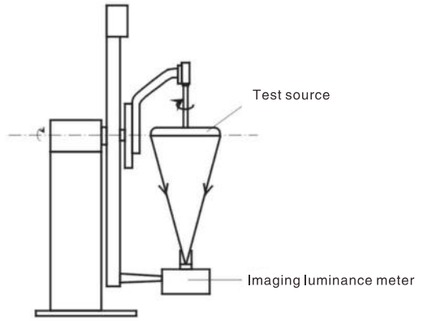
Main specifications

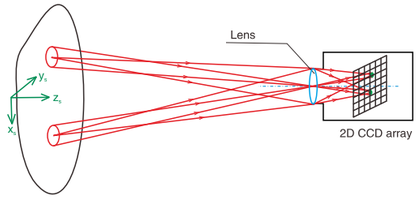
- Rotating range of horizontal axis（γ axis）: -140° ~+140°
- Rotating range of vertical axis（C axis）: 0° ~360°
- Angle accuracy of rotation: ±0.1°
- Measurement distance: ⩾80mm
- Size of emitting area of test source: 0.5mm~100mm
- Pixel of imaging luminance meter: no less than 1 million
- Measurement range of luminance: 1mcd/m²~20000kcd/m²

NEAR-FIELD PHOTOMETRIC MEASUREMENT

What is near-field goniophotometer?

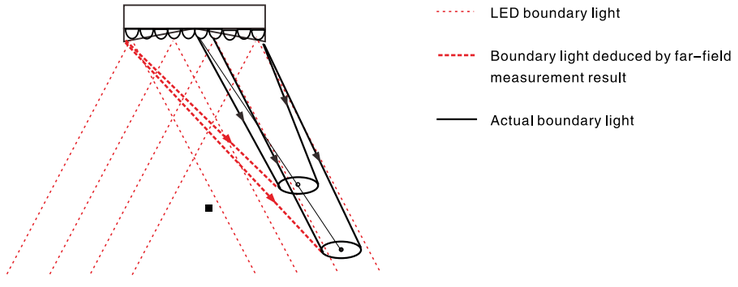
The near-field goniophotometer adopts a two-dimensional CCD imaging luminance meter. As the figure shown, imaging luminance meter rotates around the test source (e.g., LED), measuring the luminance distribution of every angle, i.e., the luminous flux of every direction of each light-emitting point . The actual ray model can be deduced, which can be input into optical design software for better luminaire and field design.





Advantages & Limitations of Near-field Goniophotometer

The traditional goniophotometer acquires the light distribution at long distance, however, when the illuminated surface is near the light source, the distribution differs great from that in long distance. As the figure shown, the distributions of light ray in every distance of LED luminaires which includes multiply LEDs with certain beam angle differ great.



Light ray in every distance of emitted surface by LED luminaires

Near-field goniophotometer can establish the actual light ray model of tested sample, providing more detailed data for optical design.
However, the accuracy of near-field goniophotometer is much lower than the traditional ones, so it can not be used for quality verification & certification.

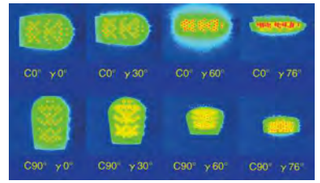
NEAR-FIELD PHOTOMETRIC MEASUREMENT

Type of Near-field Goniophotometer of EVERFINE

Near-field goniophotometer is suitable for both small sources like LED packages and large luminaires.
Many types of EVERFINE goniophotometer can integrate the near-field goniophotometer function, including: GO-R5000、GO-2000、GO-HD5、GO-SPEX500 and etc..

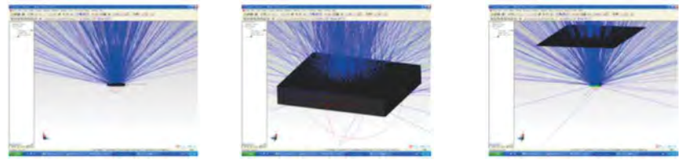
Measurable items

- Spatial luminance distribution

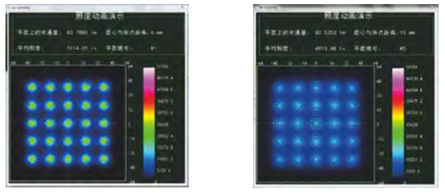


Luminance distribution of street lights

- Ray model of light source

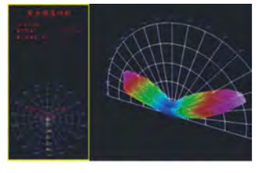


- Illuminance distribution in every plane

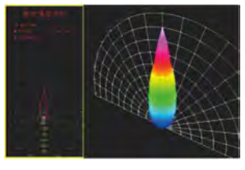


Near-field (6mm， 10mm), result via computing

- Luminous intensity distribution in far-field



Luminous intensity distribution deduced by near-field ray model of LED street lights



Luminous intensity of projector

Chapter 3

LED (LEDs/DRIVERS/LAMPS) AUTOMATIC TEST EQUIPMENT

LAT-3000 LED LAMP AUTOMATIC AGING-TEST PRODUCTION LINE

- *High efficient aging saves time cost*
- *Integrates LED lamp aging and online performances tests*
- *Completes 100% test for all LED lamps and all their performances*
- *Features in fast speed, high accuracy and cost-saving*

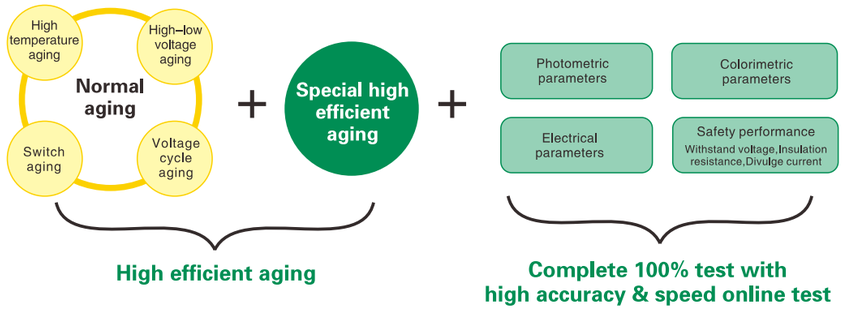
Applications

LAT–3000 is a production solution for the quality control of indoor and outdoor lamps/luminaires. It integrates the high efficient aging and photometric, colorimetric & electrical measurements for 100% online test. Its smart software will make products classification and indicate the early failure products automatically.

LAT-3000 LED LAMP AUTOMATIC AGING-TEST PRODUCTION LINE

Main functions

- High efficient aging（identify the early failure products)
- High accuracy & speed online test



- 1800 lamps per hour (vary with auto/manual mounting)
- Automatic binning function
- Personal Identification And Date Tracing Back

Main specifications

- The system size: can be adjusted according to the actual situation
- Measurement speed: 1200 lamps per hour(manual) ;1800 lamps per hour(auto)
- Applicable lamps: LED bulb lamps, PAR lamps, reflector lamps, candle lamps, fluorescent lamps, flatbed lamps, tube lamps, streetlamps, downlights etc
- Lamp holder interface: The system is compatible to E27, E26, E24, E17, E14, E12, MR16, GU10, G5, G13 etc.
- Aging functions: High-low voltage aging, ambient temperature aging, high temperature aging, switch aging, voltage cycle aging, special high efficiency aging.
- Measurement functions: Photometric, colorimetric and electrical quantities; safety performance.
- Output power range: 2V ~ 300V
- Stability of power supply: ≤0.2%
- Wavelength range: 380nm ~ 780nm
- Luminous flux: 0.1lm~200000lm

Note: The system will be configured differently according to the LED products under test

LAT-2000 LED LAMP AUTOMATIC AGING-TEST PRODUCTION LINE

- *Integrates LED lamp aging and online performances tests*
- *Completes 100% test for all LED lamps and all their performances*
- *Features in fast speed, high accuracy and cost-saving*

LAT-2000 integrates LED lamp aging procedure to identify the early failure products as soon as possible. And the high accuracy & speed 100% on-line test will perform the color, photometric and electrical binning for all LED lamps.

Main specifications

- Size: can be adjusted according to the actual situation
- Measurement speed: 1200 lamps per hour(manual) ;1800 lamps per hour(auto)
- Applicable lamps: LED bulb lamps, PAR lamps, reflector lamps, candle lamps, fluorescent lamps, flatbed lamps, tube lamps, streetlamps, downlights etc
- Lamp holder interface: The system is compatible to E27, E26, E24, E17, E14, E12, MR16, GU10, G5, G13 etc
- Aging functions: High-low voltage aging, ambient temperature aging, high temperature aging ,switch aging, voltage cycle aging, etc
- Measurement functions: Photometric, colorimetric and electrical quantities; safety performance.
- Output power range: 2V ~ 300V
- Stability of power supply: ≤0.2%
- Wavelength range: 380nm ~ 780nm
- Luminous flux: 0.1lm~200000lm

Note: The system will be configured differently according to the LED products under test

LAT-1000 LED LAMP AUTOMATIC TEST PRODUCTION LINE

- *Completes 100% test for all LED lamps and all their performances*
- *Features in fast speed, high accuracy*

LAT–1000 LED lamp automatic test production provides photometric, colorimetric and electrical online tests for various LED lamps with high accuracy and high speed. Then the system will reject the unqualified products and perform high efficient binning for products packaging.

Main specifications

- Size: About 4~6 meter
- Measurement speed: 1200 lamps per hour(manual) ;1800 lamps per hour(auto)
- Applicable lamps: LED bulb lamps, PAR lamps, lamps, candle lamps, fluorescent lamps, flatbed lamps, tube lamps, streetlamps etc
- Lamp holder interface: The system is suitable for E27,E26,E24,E17,E14,E12,MR16,GU10,G5,G13 etc.
- Measurement functions: Photometric, colorimetric and electrical quantities; safety performance.
- Output power range: 2V ~ 300V
- Stability of power supply: ≤0.2%
- Wavelength range: 380nm ~ 780nm
- Luminous flux: 0.1lm~200000lm

Note: The system will be configured differently according to the LED products under test

HATS-5000 HIGH ACCURACY AUTOMATIC LAMP TEST SYSTEM

More intelligent and fast laboratory-scale testing system

Application

Preheating and high accuracy photometric & electrical measurement can be conducted automatically, additionally, every lamp or luminaire can identified, so that their performance and quality can be managed and traceable. The applicable products include: LED bulb, PAR light, spotlight, fluorescent lamp, panel light, tube light and road light, etc.

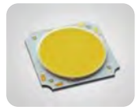
Main characteristics

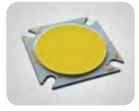
- **High accuracy**
  All test equipment meet requirements of laboratory test, which can achieve parameter measurement of spectral, colorimetric and photometric quantities with high accuracy.
- **High efficiency**
  With programmed control, the test speed can be up to 20 lamps per hour.
- **High reliability**
  One–to–one correspondence can be established between test data and each lamp to reduce the manual error.
- **Low Equipment cost**
  The cost can be reduced greatly through this alternative system to the scheme of multiple testing equipments.
- **Low labor cost**
  and only one person is needed to mount and remove the lamp which can save labor cost greatly.

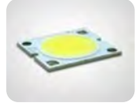
LED 950 COB AUTOMATIC SPEED TEST SYSTEM

This system is mainly used for the measurements of spectrum, chromaticity, photometric and electrical quantifies of LEDs (COB), as well as binning. It features high accuracy, fast speed and versatile functions, and is compatible with various COBs, which makes it suit for on–line test and quality control.

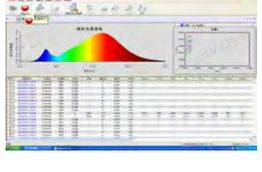
- ***High speed: Up to 2.5k/h***
- ***High accuracy: Adopt the high accuracy array spectroradiometer technology***
- ***Intelligence: Intelligent binning function***







Test Reports



ATP-200t COB自动包装系统 COB AUTOMATIC PACKAGE SYSTEM

As the extension module of LED950, the COB automatic speed test system, the COB automatic packing system of ATP–200t can fulfill packaging and BIN collecting of COB LEDs from outled pipes. Based on the test results of LED950, which is mainly used to measure the spectral, colorimetric, photometric electric quantities of COB LEDs, the ATP–200t will finish automatically sorting, packaging and even filling pipe and pipe plug with high efficiency and no downtime.

- ***High accuracy test Intelligent binning & packaging***
- ***Unmanned operation during the whole process***
- ***High speed & accuracy High efficiency***

Main specifications

- Packaging speed: up to 150 pipes/hr
- Auto filling and packaging COB, covering lid and stacking COB LEDs in a designated zone
- Specifications:COB LEDs with quadrilateral or circular trimming

PART 3

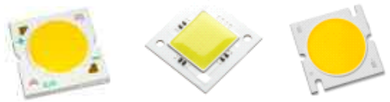
LED 930 COB SEMI-AUTOMATIC SPEED TEST SYSTEM

The system can be applied for the spectral, colorimetric, photometric and electrical measurements of COB LEDs. After completing all the measurements, it will conduct performance binning for tested COB LEDs automatically. LED 930 features in high accuracy, fast speed and versatile functions etc., and is compatible to various COB LEDs, which makes it suit best for on–line test and quality control.

High accuracy

Fast speed

Intelligent binning function



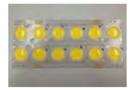
Main characteristics

- **Compatible to square or trimming circular COBs, which could be conveniently installed without any auxiliary device.**
- **High accuracy and high speed**
  It adopts high accuracy & speed spectroradiometry technology, which makes it complete all the measurements within milliseconds, so as to improve the efficiency of the on–line test.
- **Accurate evaluation of the consistency of color quality**
  Measure the general color rendering index (Ra) and the special color rendering index (Ri), e.g. SDCM could be evaluated according to the CIE R2–66, ANSI C78.377 and Energy Star products specification etc..
- **Intelligent binning function**
  The performance of single product and the average performance of batch products could be analyzed to make intelligent binning for manufacturers, which will helpful for the quality control and classification..

LED850 LED ARRAY SPEED TEST SYSTEM (For LED packaging)

LED850 LED Array Speed Test System is mainly used to measure the spectra, color, photometric, and electric quantities for LED packages, COB LEDs, LED Arrays and modules, etc. It is especially suitable for the on–line testing and BIN classification with fast speed and high accuracy.

High accuracy & Speed On-line test system
for LED array and COB LEDs



Technical characteristics

- **High integration and aesthetic appearance**
  The system consists of high accuracy array spectroradiometer, integrating sphere, DC power supply for LEDs , electric test system, standard calibration system, and software. The operation interfaces with LCD touch screen make the measurement more convenient.
- **High accuracy and high speed**
  The high accuracy array spectroradiometry technology make the measurement time for one test can be up to ms grade.
- **Versatile function**
  The system can measure the spectral, colorimetric, photometric, and electric characteristics of LEDs.

Main specifications

- Spectral range:350nm~1000nm
- Wavelength accuracy: ± 0.3nm
- Color temperature range： 1000 K~100000 K
- Luminous flux range:0.1lm~10000lm
- Photometry accuracy: Class 1
- Max. output of DC power supply: 50V/4A or on request
- Accuracy of voltage and current: ± (0.1%F.S.+0.1%R.D.+1Dig.)

DAT-2000 LED DRIVER ACCELERATED AGING&AUTOMATIC TEST LINE

DAT-2000 is designed to perform specific aging for LED drivers, and integrates its performances test function, which can identify the early failure products automatically. All the measurement results can be tracked to each driver by the smart software, which suits best for the on-line quality management for switch power supply or LED driver manufacturer.

- ***Integrates driver aging and high efficiency on-line test for driver performances***
- ***Test all the performances to completely evaluate the drivers***




Main specifications

- Measurement speed: 500 drivers per hour (depending on the LED drivers)
- Applicable drivers: LED drivers, switch power supply etc.
- Measurement power range: Output power ≤300W
- Aging functions: High voltage aging, low voltage aging, room temperature aging, high temperature aging, switch aging, etc. accelerated aging.
- Measurement functions: Electrical test: input characteristics, output characteristic, modulation, and protection function, safety performance (option),EMC(option)

Note: The system will be configured differently according to the LED products under test.

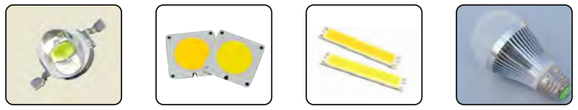
PART 3

Chapter 4

THERMAL ANALYSIS SYSTEM & AGING-LIFE TEST SYSTEM FOR LEDs

TRA-200/300 LED THERMAL RESISTANCE STRUCTURE ANALYZER

- *Patents technologies*
- *Capable of analyzing thermal structure*

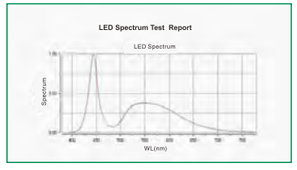


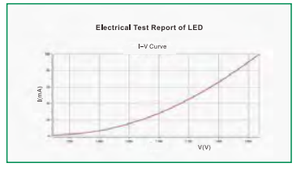
Main reference standards

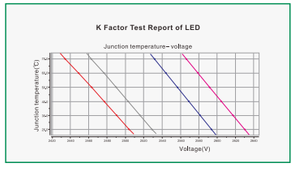
- EIA/JESD 51 Methodology for the Thermal Measurement of Component Packages
- MIL-STD-750D Thermal Impedance (Response) Testing of Diodes

Measuring functions

TRA-200 can measure the following quantities and curves: K factor, junction temperature, LED electrical parameters, I-V curve, junction temperature-time curve and spectra etc.





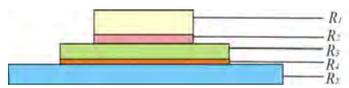


TRA-200/300 LED THERMAL RESISTANCE STRUCTURE ANALYZER

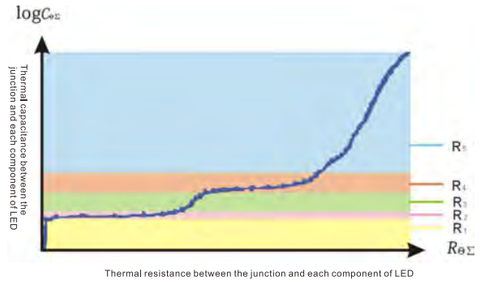
Thermal Measurement and Thermal Structure Analysis

- The collected transient junction temperature variation data will be analyzed to obtain the thermal structure function by the professional software.
- Thermal resistance is the index to evaluate the thermal characteristics of the whole LED device. While the thermal structure function represents the distribution of the thermal capacitance and resistance of the components along the heat flow path of LEDs, which is used for the thermal contact analysis.

LED thermal resistance



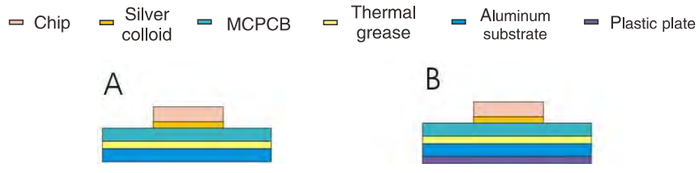
LED thermal structure

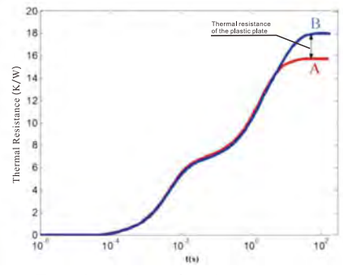


Thermal structure function of an LED

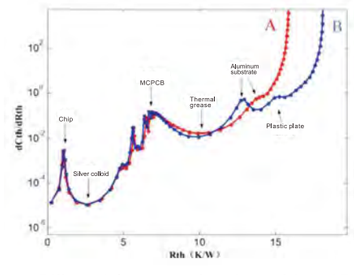
Typical Test

A and B are two LED packages. The material and structure of A and B are the same, except that a plastic plate has been added under the aluminum substrate of B. The characteristic peak of the plastic plate of B is obvious in the structure function of B.





Transient thermal resistance curves

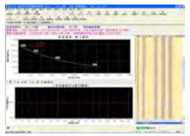


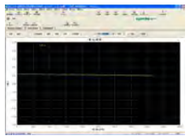
Differential structure functions of A and B

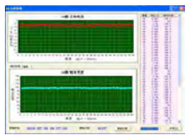
LT–200A AGING–LIFE TEST SYSTEM FOR LEDs

The system is widely used for normal /accelerated aging, lumen maintenance measuring, chromaticity shift measuring, lifetime evaluation and temperature characteristic testing for LED packages, arrays, modules. The extrapolation of lifetime by programmable models is also available to estimate the lifetime of LEDs.

Applied in NVLAP accredited Lab







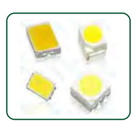
Main reference standard

- IES LM–80–08 Approved method for measuring lumen maintenance of LED light sources
- IEC/PAS 62717 Performance requirement of LED modules for general lighting
- ENERGY STAR Program Requirement Product Specification Eligibility Criteria
- IES TM–21–11 Projecting Long Term Lumen Maintenance of LED Light Sources
- GB/T 24824–09 Measurement methods of LED modules for general lighting
- QB/T 4057–10 LEDs for general lighting–Performance requirements

Main specifications

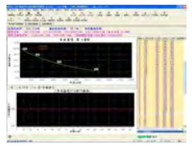
- Three chambers and multiple sampling channels (as order) design, higher efficiency.
- Temperature range: –20℃~+100℃ (as order)
- Temperature accuracy: ±1℃, Precision: 0.1℃
- Photometry repeatability： 0.3%
- Wavelength range: 380nm~780nm
- Chromaticity reproducibility: ±0.0002x, ±0.0002y

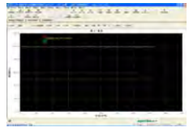
Typical Application

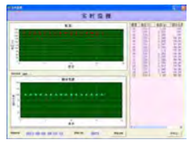


LT–300A AGING–LIFE TEST SYSTEM FOR LED LUMINAIRES

The system is widely used for normal /accelerated aging, lumen maintenance measuring, chromaticity shift measuring, lifetime evaluation and temperature characteristic testing for LED luminaires, arrays, and modules. The extrapolation of lifetime by programmable models is also available to estimate the lifetime of LED luminaires.







Applied in NVLAP accredited Lab

Main reference standard

- IESNA LM–80 Approved method for measuring lumen maintenance of LED light sources
- IESNA LM–82 Characerization of LED Light Engines and LED Lamps for Electrical and Photometric Properties as a Function of Temperature
- ENERGY STAR Program Requirements Product Specification for Lamps Version 1.0 (Test Method)
- ENERGY STAR Program Requirements Product Specification for Lamps (Light Bulbs) Eligibility Criteria Version 1.0
- IEC/PAS 62717 LED modules for general lighting – Performance requirements
- IEC/PAS 62722–2–1 Luminaire performance – Part 2–1: Particular requirements for LED luminaires
- GB/T 24824–09 Measurement methods of LED modules for general lighting

Main specifications

- Single/multiple chamber and multiple sample channels (as order) design, higher efficiency.
- Temperature range：–20℃~+100℃ (as order)
- Temperature accuracy： ±1℃， Precision：0.1
- Photometry repeatability： 0.3%
- Wavelength range：380nm~780nm
- Chromaticity reproducibility: ±0.0002x，y
- The voltage, current and clamps for test LEDs can all be customized as actual needs.
- Voltage Stability：better than 0.2%

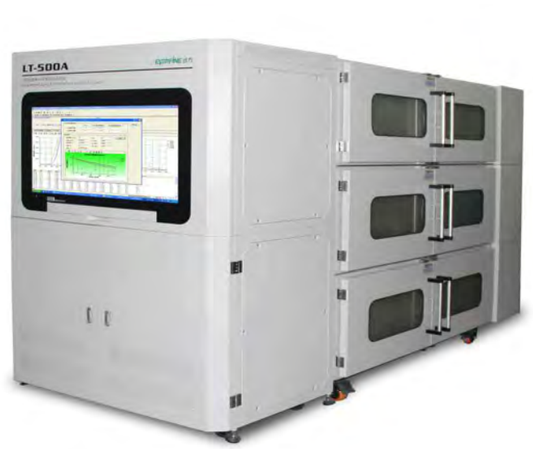
Typical Application

PART 4

LT–500A AGING–LIFE TEST SYSTEM FOR LED LUMINAIRES

Six chambers, used for normal /accelerated aging, lumen maintenance measuring, chromaticity shift measuring, lifetime evaluation and temperature characteristic testing for LED lamps and luminaires under different temperatures. The extrapolation of lifetime by programmable models is also available to estimate the lifetime of LED luminaires.

Applied in NVLAP accredited Lab



- **Six chambers, different temperature test at the same time, greatly shorten the test time**
- **Completely real–time online monitor , operation is simple, accurate and reliable**
- **Base down and base up**

Main reference standard

- IESNA LM–80 Approved method for measuring lumen maintenance of LED light sources
- IESNA LM–82 Characerization of LED Light Engines and LED Lamps for Electrical and Photometric Properties as a Function of Temperature
- ENERGY STAR Program Requirements Product Specification for Lamps Version 1.0 (Test Method)
- ENERGY STAR Program Requirements Product Specification for Lamps (Light Bulbs) Eligibility Criteria Version 1.0
- IEC/PAS 62717 LED modules for general lighting – Performance requirements
- IEC/PAS 62722–2–1 Luminaire performance – Part 2–1: Particular requirements for LED luminaires
- GB/T 24824–09 Measurement methods of LED modules for general lighting

Typical Application

PART 4

Chapter 5

Optical Radiation Test System

Chapter 6

Optical Measurement of Materials

OST-500 OPTICAL RADIATION TEST SYSTEM

OST-500 fully meets the requirements of standard IEC/EN 62471/CIE S009, IEC/TR 62778, GB/T 20145, IEC/EN 60598 Annex P., IEC/EN 60432, IEC/EN 60335, GB/T30117 , GB 7000.1, 2009/125/EC directives etc. This system equipped with a precise&automatic double-axis goniometer, can search for the direction which has the max luminous intensity automatically, and measure the effective radiation hazard exposure, and photometric & colorimetric parameters of lamps and lamp systems in this direction.

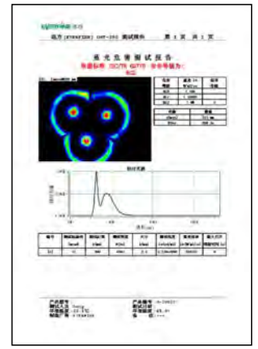
- *Precisely measure the radiation in wavelength range from 200nm–3000nm*
- *Automatically identify and position the maximum accessible optical emission*
- *Adopting patent technologies, it featurese high accuracy, high reliability and full automatization*
- *Fully meet the requirements of international photobiological safety standards, including Standard CIE, IEC, EN, ECE,GB and etc..*

Typical Application

OST-500 OPTICAL RADIATION TEST SYSTEM

Technical Specifications

- Extremely low stray light: UV–VIS range $\leqslant 1\times10^{-8}$
- UV Detecting Ability (especially for UVC) up to 0.001 mW/klm
- Radiance and apparent source measurement geometry: comform to CIE/IEC Standards
- Scanning angle range: ± 180° (C axis), ± 180° (γ axis)
- Meeting the requirements of encapsulating LED, light sources and luminariesAutomatically and quickly switching measurements of illuminance, irradiance and radiance, one-click operationfor all the measurements
- NIST (USA) and NIM (China) tracable, and provide CANS (China) and NVLAP certificates (option)



Hazard classification

Risk	Action spectrum	Symbol	Emission limits			Units
			Exempt	Low risk	Mod risk	
Actinic UV	$S_{UV}(\lambda)$	E_s	0.001	0.003	0.03	$W\cdot m^{-2}$
Near UV		E_{UVA}	10	33	100	$W\cdot m^{-2}$
Blue light	$B(\lambda)$	L_B	100	10000	4000000	$W\cdot m^{-2}\cdot sr^{-1}$
Blue light smal l source	$B(\lambda)$	E_B	1.0*	1.0	400	$W\cdot m^{-2}$
Retinal thermal	$R(\lambda)$	L_R	28000/α	28000/α	71000/α	$W\cdot m^{-2}\cdot sr^{-1}$
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	6000/α	6000/α	6000/α	$W\cdot m^{-2}\cdot sr^{-1}$
IR radiation,eye		E_{IR}	100	570	3200	$W\cdot m^{-2}$

* Small source defined as one with α < 0.011 radian. Averaging field of view at $10_{000\ s}$ is 0.1 radian.
** Involves evaluation of non-GLS source

Other Optional Functions

Optical Radiation Safety measurement for pulse lamps, laser lights and flash lights etc.

OST-300 OPTICAL RADIATION TEST SYSTEM

EVERFINE Optical Radiation Safety Test System, adopting many core patent technologies and integrating the intellectualized software, can measure the radiation hazard, exposure time and hazard distance of light and light system (200nm–3000nm) with high accuracy, flexible configuration and convenient operation. The system fully meets the requirements of international photobiological safety standards, including Standard CIE, IEC, EN, ECE , GB and etc.

Wide Application, professional and targeted solutions

Since the standards for different types of lamps and lamp systems are different, OST series provide targeted solutions for different customers accordingly, making the measurement cost saved largely.

Main specifications

- Wavelength range: 200nm~3000nm
- 5 dimension mechanically adjustable system for the convenient alignment
- The software determines the max. weighted radiance in certain filed of views (FOVs) automatically
- The software classifies the test samples into the RG groups as per IEC62471 and IEC/TR62778
- The luminance or radiance in any FOV is available, specially for 100mrd, 11mrd and 1.7mrd.
- Quantities are traceable to NIST (USA) or NIM (China)

ERP-200 EFFECTIVE UV RADIATION TEST SYSTEM

The system is mainly designed for the UVA+UVB, UVC radiation measurement for CFL and similar lighting products required by 2009/125/EC directive.

With the 0.001mW/klm detecting ability

The system adopts double–monochromator based spectroradiometer, and has extremely high spectral resolution over a wide wavelength, and has excellent stray light control. These makes the system especially suitable for the application of high requirement like photobiological safety analysis.

Measurable items

- Effective UV radiation (UVA+UVB、UVC) of CFL lighting products
- Effective UV radiation of halogen lamps,HID lamps and luminaires （UV–Radiation ）
- UV Irradiance and effective UV irradiance(UVA, UVB, UVC) of household applications with UV radiation
- Photometric and Colorimetric parameters of light sources and luminaires

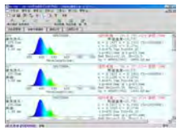
Main specifications

- Spectral range:200nm~800nm
- Wavelength accuracy: ±0.2nm
- Wavelength reproducibility: ±0.1nm
- Minimum spectral interval: 0.1nm, 1nm, 5nm
- Stray light:$\leqslant 10^{-8}$
- Dynamic:10^{8}
- Detecting ability: 0.001mW/klm in UVC range

EX-1000 EXCITING SPECTRA AND THERMAL QUENCHING ANALYZER FOR PHOSPHOR

EX–1000 can realize the measurement of excitation and emitting spectrum property of phosphor, this property is benefit for the choosing of exciting source or improving the phosphor itself to achieve high conversion efficiency, and it can also measure the luminescent property of phosphor in their real work state (high temperature environment).

The measurement method of this system is recommended by the National Standard



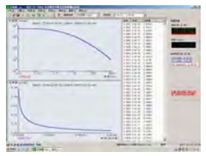
Emission Spectra Characteristics

Main specifications

- Excitation spectra range: 200~800nm
- Excitation spectra bandwidth: 1~10nm adjustable
- Emission spectra range:380 ~ 780nm
- Emission wavelength accuracy: ±0.3nm
- Temperature control: room temperature ~200℃
- CIE 0/45 illumination/ detection condition
- 3D diagram of excitation–emission spectra , 2D diagram of emission and excitation spectra, temperature–luminance diagram, and color analysis

CY-1000 LONG AFTERGLOW PHOSPHOR OPTICAL TEST SYSTEM

The measurement method of this system is recommended by the National Standard



CY–1000 Long Afterglow Phosphor Optical Test System is applied to measure and analyze the luminous brightness, chromaticity properties, and their variations of afterglow phosphor.

Main specifications

- Luminous brightness range:0.01 mcd/m^2-100cd/m^2
- Luminous brightness linearity: 0.2% (over full dynamic range, 1~2 magnitudes superior to PMT)
- Luminous brightness repeatability: 0.1%(over full dynamic range, 1~2 magnitudes superior to PMT)
- Spectral range: 380nm~780nm
- Wavelength accuracy: ±0.3nm
- Excitation source: 6500K fluorescent lamp
- CIE 45/0 excitation/observation condition
- Max long afterglow measurement time: 100 Hours
- Min sampling interval: 1 Sec

Chapter 7

Luminance Meter & Radiance Meter & Display Measurement System

SIRC-2000 SPECTRAL IMAGE RADIANCE COLORIMETER

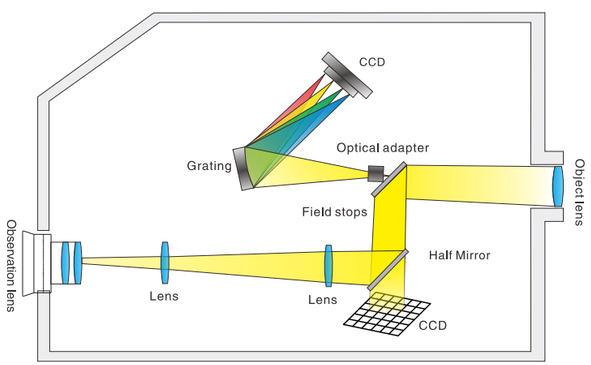
SIRC–2000 is a new generation of luminance meter, it adopts patent technologies to overcome the drawbacks of former ones, that it can not only precisely analysis the luminance image but also acquire the spectral and colorimetric information of an aiming point. It is an ideal instrument to appraise street lighting, landscape lighting, instrument panel, flat/curved panel display, projection screen and etc..

Patent double CCD design,
integrating the luminance image & spectrum analysis

Abundant measurement function

- Luminance
- Irradiance
- Luminance uniformity
- Spectral power distribution
- Chromaticity Lv x y、Lv u' v'、Lv Δuv、XYZ
- CCT
- CRI

Principle scheme



- Patent double CCD design: measuringthe luminance of every point in the field and the spectral & colorimetric quantities of the aiming point.
- Patent:
  ZL200910215557.6
  ZL200920353426.X

SIRC-2000 SPECTRAL IMAGE RADIANCE COLORIMETER

Revolution of luminance measurement :
more functions & higher accuracy

Conquer drawbacks of traditional luminance measurement

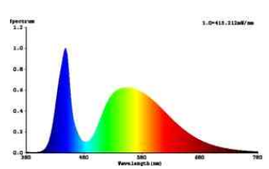
The imaging luminance meter is convenient for uniformity analysis, but the accuracy is limited.

Spot luminance meter need mechnical scanning point by point for the uniformity test.

SIRC–2000 overcomes the above disadvantages by providing abundant and precise quantities, that the 2 dimension luminance can be corrected via spectral quantities.

Characterietics

- **Wide measurement range**
  luminance: 0.1~1000000cd/m^2; CCT: 1000K~100,000K
- **High measurement accuracy**
  Alignment through digital image which realize good reproducibility.
  There is no spectral mismatch error for the aiming point and the high accurate data can be used to correct the quantitites of other points.

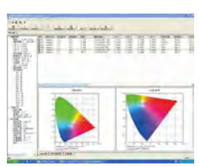
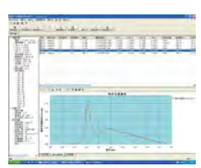
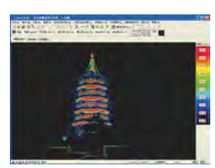
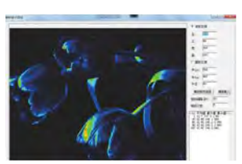


spectrum

correct
alignmeng

luminanc e image

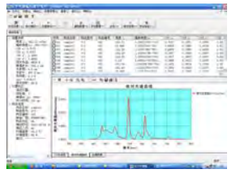
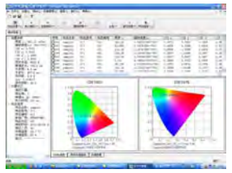
- **Super wide measurement wavelength range**
  wide measurement wavelength range:350nm–1000nm
- **TFT assists it suitable for both laboratory and field measurement.**
- **Comprehensive software**

PART 7

SRC-600/SRC-200 SPECTRAL RADIANCE METER

Accurate measurement for spectral radiance, luminance and colorimetric quantities


Choose the suitable measuring angle according to the targets

2° measuring field

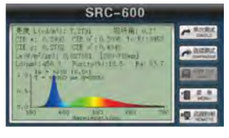
sources, such as outdoor display screen, landscape lighting, etc.


1° measuring field

Suitable for medium size sources, such as LCD, PDP, mobile screen, etc.

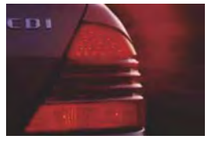

0.2° measuring field

Suitable for small size sources, such as digital tube, car panel, etc.

0.1° measuring field

Suitable for extremely small size sources, such as pixel point of PDP or LCD, cold cathode tube, etc.

SRC-600/SRC-200 SPECTRAL RADIANCE METER

Excellent performance, meet the high measurement requirements

- **Accurate measurement for spectral radiance, luminance and colorimetric quantities**
  Measurable items: spectral radiance, luminance, relative spectral power distribution, chromaticity coordinates, correlated color temperature, color rendering index, etc.

- **Ultra high sensitivity**
  The limit of SRC-600MX can be as low as 0.0001cd/m^2.

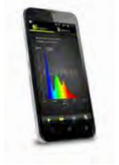
- **Super wide measurement range**
  Realize the measurement range of 10E9 without density filter.

- **High accuracy**
  No V(λ) mismatch error, it is suitable for correction of color filter.

- **High resolution**
  Equips with high quality TE-cooled CCD & excellent performance grating ,moreover, the well matching can obtain the resolution up to 0.6nm/pixel

- **Low polarization error**
  The unique design makes the depolarization level less than 0.2% and ensures the measurement accuracy.

- **Smart HMI**
  TFT and remote control via WIFI make it suitable for both laboratory and field measurement.



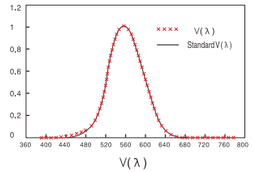
- **Key function of software**
  Sporting two working mode: local & remote control
  Sporting spectrum auto calibration
  Sporting verification of wavelength accuracy
  Storing 200 sets of measurement data

CX-2 IMAGE LUMINANCE METER

Accurate measurement for spectral radiance, luminance and colorimetric quantities

Main characteristics

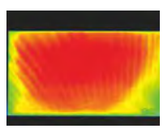
- **High Accuracy**
  The spectral matching of the optical system to the V(λ) function can reach Class A or Class B (DIN 5032–7)level.



- **High Dynamic Range**
  High dynamic ranging technology, realizes accurate measurement of objects with great luminance diversity.Up to super wide luminance measurement range of 0.000001cd/m^2 to 20, 000, 000cd/m^2(Measurement ranges vary with the model).
- **Good stability**
  Part models adopt advanced TE–cooling technology to realize excellent stability and repeatability.
- **Excellent image quality**
  Equipping with high–end objective lens of large aperture to measure object from short to very long distance.

Practical Measurement of instrument panel

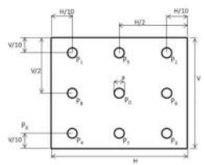
Measurement via labeling point method (digital image)



Automatically analysis iso–luminance color diagram

Practical Measurement of street and landscape lighting

Timing measurement



Auto uniformity measurement via nine–point

LM–3 SPOT LUMINANCE METER

Based on the telescope optic system and imaging technology, LM-3 Luminance Meter could test luminance without touching the light source.

Characterietics

- **LM–3 has super high sensitivity and accuracy, it is specially applicable for laboratories or calibration usage.**
  - **High quality photoelectrical detector**
    Use the photoelectrical detector elements, whose spectral response is strictly comply with CIE V(λ), to guarantee the high accuracy.
  - **Multiple field angle of measurement**
    Multiple field of measurement: 2° 、1° 、0.2° 、0.1° . Suitable for both small light source , such as indictor lamps and instrument panel, and big size light source, such as large outdoor LED display.
  - **Wide luminance measurement range**
    Wide luminance measurement range from 0.001cd/m^2 to 4,000,000cd/m^2.
  - **0.4m ~ infinite measuring distance**
    Feasible to measure object from small to very large distance equipped with high–end objective lens with large aperture.
- **LM–2 is basic with a viewing field, it can meet the Class 1 according to JJG–211.**

Typical Application

DMS-3200/7000 OPTICAL PROPERTY TEST SYSTEM FOR DISPLAYS

DMS is mainly used to test the optical properties of the optical properties of flat panel TV / LCD TV / plasma display panel TV / backlight units(BLU) / OLED and other types of flat panel displays measurements. It consists of high-precision spectral radiance meter with precision five-dimensional rotating platform, signal generators, electrical parameter testing and supply systems, special control software and other components.

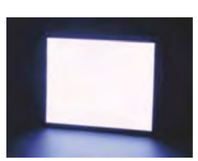
Flat display measurement solution

High accuracy ,fast speed, abundant quantities, convenient to use

Measurable Items

- Max.luminance, ave.luminance, effective ave.luminance, luminance non-uniformity
- Chromaticity coordinates, CCT, relative spectral power distribution, color uniformity
- Color gamut area, color gamut coverage
- Viewing angle
- Contrast
- Black and white response time
- Gray-grade Gamma
- Flicker
- Cross-talk
- Preheating property
- Luminance/luminous power ,luminous efficiency ,power consumption
- Total luminous flux (optional)

Typical Application



DMS-1500 OPTICAL PROPERTY TEST SYSTEM FOR DISPLAYS

High Degree of Automation, one key to complete all operations

Integrated design contributes the measurement of flat displays high accuracy

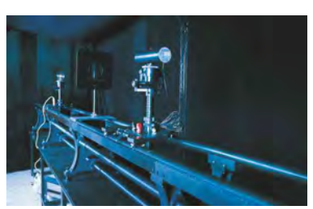
This system is applied to accurate measurement of luminance, luminance uniformity(Max luminance, average luminance and etc..), chromaticity coordinates, correlated color temperature, color space mode（Lv x y, Lv u' v', Δuv, XYZ）,color uniformity,luminance contrast, viewing angle, power consumption and other parameters.

PHOTOMETRY CALIBRATION SYSTEM

SLS-5000/SLG-1000 Standard Luminance Generator

SLG-5000/SLG-1000 is a standard luminance source, which can generate uniform and stable luminance. It is usually used in the calibration and verification for luminance meter , telescope, image sensor, photometer, radiometer, and other imaging device, etc.

CAL-1000 Photometry Calibration System



Applied in CNAS accredited Lab

The system is used to calibrate illuminance meters, luminance meters, radiometers, and other typical photometric test instruments.

PART 7

Chapter 8

Illuminance Meter & Irradiance Meter& Field Test Instrument

SPIC–200 SPECTRAL IRRADIANCE COLORIMETER

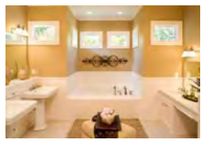
Measurement items

- The relative spectral power distribution (Pλ)
- Illuminance (E)
- S/P ratio
- Color rendering index (CRI)
- Correlated color temperature (CCT)
- Chromaticity in CIE 1931, 1960 and 1976
- Standard Deviation of Color Matching (SDCM)
- IES EVE illuminance
- Spectral irradiance

The minimum measurable illuminance up to 0.01 lx, $f_1' \approx 0$, the highest accuracy worldwide for portable measurement

Application examples


Road and tunnel lighting


Residential lighting


Retail lighting


Stadium lighting


OLED lighting


Uniform lighting for plants growing


LED/OLED displays


LED lamps and luminaires

PART 8

SPIC-200 SPECTRAL IRRADIANCE COLORIMETER

- **No V(λ) mismatch error that the accuracy is super high**
- **Up to milliseconds for spectral acquisition and real time analysis and display**
- **Detachable detector for flexible applications**
- **Mobile storage and speed communication with computer**

Ra:72; R9>0

Ra:82; R9:-90

Further analyze the color rendering of light sources

R9 is an important index for LEDs. The objects are perceived more colorful with the increase of R9.

Technical Specifications

Model	SPIC-200 A	SPIC-200 B
Spectral range(nm)	380~760	380~780
SBCT	No	Yes
Cosine Recipt Area(mm)	Φ8	Φ8+Φ3.5
Optical sensor	CCD (256 pixels)	CCD (256 pixels) & Si
Wavelength accuracy	±0.5nm	
Stray light	< 0.3%	
Integration time	5 ms - 60000 ms	
Illuminance range	10 lux～200 klux	0.1 lux～200 klux
CCT range	1000 K~100000 K	
Accuracy of chromaticity coordinates	± 0.001 (Relative to the standard light source whose stability is better than ±0.0001 and NIM traceable calibrated value)	
CRI	Ra; Ri (i=1~15) (Calculate R15 particularly)	
Battery	Rechargeable Li-ion Battery, 4 hours continuing operation	
Data Storing	4G SD Card	
Weight (With battery)	200 g	

Z-10 ILLUMINANCE METER

Z-10 offers accurate and easy measurement of level illuminance(vertical illuminance and horizontal illuminance)、illuminance difference、illuminance proportion、integrating illuminance and average illuminance measurement. Because of the good performance such as small size, multi function, easy operation, high accuracy, wide measuring range, and lower power consumption, it is especially widely used in field measurement.

Integrated measurement of easy operation

separate measurement for long distance

Multi-point illuminance measurement system

The detector and cable can be waterproofed designed for the underwater measurement

General illuminance measurement in industrial, commercial, residential, office lighting, and roadlights field.

ILLUMINANCE METER & IRRADIANCE METER & FIELD TEST INSTRUMENT

PHOTO–2000EZ Average Full–cylindrical illuminance meter

PHOTO–2000EZ average full–cylindrical illuminance meter offers accurate and easy measurement of full–cylindrical illuminance. it is widely used for field measurement in gymnasium, square, road lights, and station hall, etc.

PHOTO–2000EZ Average half–cylindrical illuminance meter

PHOTO–2000EZ average half–cylindrical illuminance meter offers accurate and easy measurement of half–cylindrical illuminance. it is widely used for field measurement in gymnasium, square, road lights and station hall, etc.

PHOTO–2000AH Automatic level illuminance meter

PHOTO–2000AH Automatic Level Illuminance Meter offers accurate and easy measurement of horizontal illuminance of angled surface. It is widely used for field testing.

PHOTO–2000INT Integrating Photometer

PHOTO–2000INT is mainly used for total exposure energy (cd.s or lx.s) and average exposure energy measurement.

EZ–3000 Portable spectroradiometric analyzing system

EZ–3000 is portable and high speed system for spectral, colorimetric and photometric measurement .It is used for relative spectral power distribution, chromaticity coordinate, dominant wavelength, peak wavelength, Color purity, CCT, color rendering index, Spectral Bandwidth, red ratio, SDCM, illuminance, luminance, transmittance, and reflectance measurement.

ILLUMINANCE METER & IRRADIANCE METER & FIELD TEST INSTRUMENT

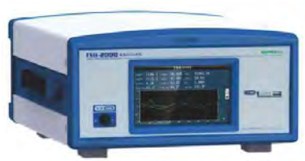
START–1000 Source Start up Time Test System

START-1000 is designed to test the starting time and run-up time of LED lamps and luminaires, CFL, etc., meeting requirements of European Unit instruction 1194/2012, 2009/125/EC and international standard IEC60969 “Self-ballasted Lamps for General Lighting Services-Performance Requirement”.

LFA – 2000 Light Flicker Analyzer

The photometric measurement system has high speed sampling rate that is up to 10kS/s. The special flicker test software can be used to measure rapid variable luminosity curve, strobe, fluctuate index(flicker index) and percent flicker of light sources and illuminate field. It's convenient to examine test data and waveform from LCD of instrument. The test result can be saved and printed, or export to computer.

FSH – 2000 Flash Light Analyzer



It can realize high speed photometric measurement of transient light sources such as the flashlight, and can measure the flickering width, integral intensity, effective intensity, peak intensity, average intensity of light sources.

ILLUMINANCE METER & IRRADIANCE METER & FIELD TEST INSTRUMENT

MS–20 Micro Spectrometer(Spectral irradiance Meter)

MS–20 micro spectrometer is used for relative spectral power distribution, chromaticity coordinate, dominant wavelength, peak wavelength, CCT, color rendering index, Spectral Bandwidth, Color purity, red ratio, SDCM, irradiance, illuminance measurement. It is especially ideal for the field measurement and outdoor measurement.

SP–10/SP–20 Spectral Phytometer

It can realize the measurement of the spectral power distribution, phytometric irradiation in phytometry system, photons at unit area in quantum system, irradiation in radiometry system, illuminance and chromatic parameters in photometry system. It is widely used in plant growth field.

PHOTO–2000m m–LUX Meter

PHOTO–2000m m–lux meter is specially designed for the measurement of weak lights whose illuminance is above 10^{-3}lx (namely m–lux). The instrument is usually applied in measurement for darkroom, photoprint room and any other weak light environment.

PHOTO–2000 μ μ –LUX Meter

PHOTO–2000 μ is professional designed for the measurement of micro lights (10^{-6}lx above).

U–10/U–20 Pocket UV Radiometer

UV–2000 pocket UV radiometer offers accurate and easy measurement of ultraviolet irradiance. Users can choose different detectors with certain waveband in accordance to specific requests.

PART 8

Chapter 9

EMC TESTER

EMS Test System

EMC Standard Laboratory

EMS TEST SYSTEM

EMS61000-2A ESD Generator

ESD generator is used for evaluating the electrostatic immunity performance of electrical and electronic equipments by simulating the real electrostatic discharges. It fully meets the requirements of IEC61000-4-2、GB/T17626.2.

ESD-1000 LED Electrostatic Analyzing System

ESD-1000 is specially designed according to the requirements and characteristics of ESD classification of LEDs. The system can not only generate ESD to LEDs, but also measure the forward voltage and reverse leakage current, so as to realize the speed classification of ESD sensitivity of LEDs.

EMS61000-3A Radiated Susceptibility Test System

EMS61000-3A is dedicated to the radiation immunity test for the lamps or luminaires, and meets the standards：EN 61547, IEC 61547, GB/T 18595,IEC61000-4-3, GB/T17626.3 etc.

EMS61000-6A Conducted Susceptibility Test System

EMS61000-6A is used for the conducted immunity test for the lamps or luminaires, and meets the standards: EN 61547, IEC 61547, GB/T 18595, IEC61000-4-6, GB/T17626.6 etc.

EMS TEST SYSTEM

EMS61000-4A Intelligent Electrical Fast Transient Generator

EMS61000-4A is used to test the immunity of electrical and electronic equipments to the electrical fast transient disturbances in circuitry or induction. It fully meets the requirements of IEC61000-4-4、GB/T17626.4.

EMS61000-5A Intelligent Surge Generator

Lightning strike or transient switch would cause the phenomena of over voltage and over current. EMS61000-5A Surge Generator can provide an accurate and ideal basis for evaluating the surge immunity of the power cable, I/O cable and communication cable of electrical and electronic equipment.It fully meets the requirements of IEC 61000-4-5、GB/T17626.5.

EMS61000-8K Power Frequency Magnetic Field Generator

EMS61000-8K can simulate the power frequency magnetic fields in household, commercial and industrial areas. It fully meets the requirement of IEC 61000-4-8、GB/T17626.8etc.

EMS61000-11k Voltage Dips and Interruptions Generator

EMS61000-11K is designed according to the characteristics and requirements of voltage dips, short interruptions and voltage variation immunity test. It fully meets the requirements of IEC 61000-4-11、GB/T17626.11.

PART 9

EMC STANDARD LABORATORY

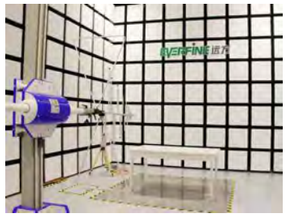
EMS61000–12C Ring Wave Generator

EMS61000–12C Ring Wave Generator is applied to evaluate the ring wave immunity of lamps and luminaires, and meets the standards: Energy star lamps v1.0 ,IEC61000–4–12 etc.

EMS7637A Automobile Electronics Immunity Test System

EMS7637A Immunity Test System simulates the typical electromagnetic disturbances for automobile electronics (including automobile lamps), and meets the standards: ISO7637 etc.

EMC Anechoic Chamber



All the surfaces of the EMC semi–anechoic chamber are installed with absorbing material except for the metal reflector on the ground surface. The lab can be used to simulate the open area test conditions. EMC anechoic chamber is protected from weather conditions and limitations of the background noise compared with open area. EMC anechoic chamber can meet the standards of 足CISPR16–1–4, IEC61000–4–3, GB/T17626.3, GB4824, GB4343, GB17743, GB9254 etc.

EMC shielded room

EMC shielded room realizes effective separation of the electromagnetic environment inside and outside. It can prevent influences of external electromagnetic interference on the test equipment being tested, while at the same time it can reduce the affections of electromagnetic leakage. Shielding room fully meets the standards of EN50147–1, GB12190–90 etc.

PART 9

Chapter 10

Digital Power Meter & Power Supply

LT-101A/LT-101E LED DRIVER TESTER

LT–101A LED driver tester is specially designed for input and output electrical performance of LED driver with high stability, economy and multifunction. It can test LED input and output electrical property simultaneously and can preset upper&lower limit for automatical judgment, and alarm when exceeding limit. It is very suitable for site–test like production line, quality inspection and R&D etc.

Specially designed for LED driver

Input & output characteristics test

Multifunctional & high accuracy

LT–101A

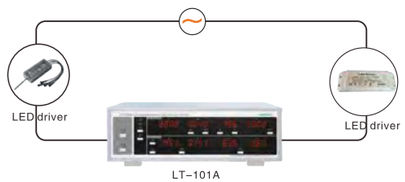
LT–101E

Specifications

- Measuremrnt Function: Measure voltage RMS, current RMS, active power, power factor, frequency, voltage & current total harmonic distortion, true RMS and relative value of 0~50th harmonics .
- Harmonic analysis function: THD and 2nd~50th harmonic value
- Measurement range of input and output voltage：3V ~ 300V
- Measurement range of input and output current：0.010A ~ 5.000A
- Measurement range of input and output frequency：DC, 20Hz ~ 65Hz
- Bandwidth：narrowband 20Hz~5kHz， wideband 20Hz~1MHz
- Measurement Accuracy：± (0.1% F.S.+0.1% R.D.)
- Output steady–state characteristics of the test:Measure voltage RMS, oscillation frequency, current RMS ,active power, power factor, and driver efficiency.
- Output start characteristics of test: Measure voltage peak, current peak and time to current peak within 0~3s from startup.
- The hold, alarm and PC communication functions are also avaliable.

Application examples

LT-101A LED driver tester is a compre-hensive instrument which fully meets the requirements of IEC62384, IEC61000–3–2, GB/T24825 and other related international & national standards.



APA-200 POWER ADAPTER PERFORMANCE ANALYSIS AND MEASUREMENT SYSTEM

APA–200 power adapter performance analysis measurement system can conduct comprehensive test of steady state characteristics of the input and output, and power efficiency for charger, power adapter, switching power supply, power supply, and other similar loads. It is widely used in the quality judgement and specification screening of the products. According to the requirements of EU CE approval, it can also be used to test level 5 energy consumption of the charger (standby power consumption ≤ 0.3W).

Specifications

- AC input and DC output signal test of the power adapter
- Built–in DC electronic load, including CV, CC and CR mode, and external load interface
- Limit value setting of output voltage, output current and efficiency, and quality judgement function
- Measurement range of input and output voltage: 3V ~ 300V
- Measurement range of input and output current: 0.5mA ~ 5A
- Input frequency range: AC 45Hz ~ 65Hz, Output frequency range: DC, AC 45Hz ~ 65Hz
- Measurement Accuracy: ± (0.1% reading +0.1% range +1 digit)
- The functions of PC testing software can be optional. The functions include ripple test, harmonic analysis, starting–up characteristics analysis, qualified limits judgement, regulation test and stability test function, start–up and steady–state test of the input and output with voltage–current curve plotting .

DIGITAL POWER METER

PF9800/PF9901 Digital Power Meter(Compact Model)

PF9901 is compact–aspect designed, and suitable for massive purchase due to their competitive price and promising performance. They cover functions including voltage, current, power, power factor, etc.

PF9802 Digital Power Meter (AC & DC Model)

PF9802 is applicable for measuring AC, DC, AC & DC signals. It covers functions including voltage, current, power, PF, frequency, etc. User can preset upper & lower limit for judgment, and alarm with light and sound when limit is exceeded.

PF9808B Digital Power Meter (DSP & Integration Model)

PF9808B introduces the DSP real–time sampling technology leading in the world and can test all kinds of waveforms with high accuracy. It is especially suitable for measuring the power, current–hour and watt–hour value of variable discontinuous signals .

PF9811 Digital Power Meter (Harmonic Model)

Besides the fundamental measuring function, PF9811 can calculate THD (Total Harmonic Distortion) and 2–50th harmonics of voltage and current that meet the requirements of IEC610000–3–2.The actual waveform and date can be observed on computer through professional software.

PF310/330 Digital Power Meter (Multifunction, Wideband, High accuracy)

PF310/330 is a multifunction, wideband, high accuracy digital power meter. It covers functions including harmonic analysis, integration, scaling, averaging and data/reviewing, communication, etc. The instrument is suitable for measuring DC, and 0.5Hz~100kHz signal. The accuracy can reach 0.15%.

ELECTRONIC BALLAST ANALYZER

PF2010 Digital Power Meter (Multifunction, Wideband, High accuracy)

PF2010 has various measuring functions as PF210/PF210A, and the very wide frequency range of 10Hz~500kHz, and is capable of DC measurement as well. The measuring accuracy at the frequency range of 45Hz~65Hz is up to 0.06%. It's still leading in the market after more than 10 years field application and continuous improvement.

PF4000 Power Analyzer (Superior High–frequency Accuracy)

Besides the various measuring function, PF4000 can realize the test of wide frequency range of 10Hz~500kHz, and is capable of DC measurement as well. It has superior accuracy in high frequency. It is especially suitable for high–frequency and high accuracy test.

HB–6B Electronic Ballast Analyzer (For Fluorescent Lamp)

HB–6B is professionally designed to analyze the electrical characteristics of electronic ballast of Fluorescent Lamp.

HB–4A Electronic Ballast Analyzer (For Fluorescent Lamp)

HB–4A is professionally designed to analyze the electrical characteristics of electronic ballast of Fluorescent Lamp.

HB–4B Electronic Ballast Tester(For HID Lamp)

HB–4B is professionally designed to analyze the electrical characteristics of electronic ballast of HID Lamp.

PF9822 Automotive HID EB Tester

PF9822 is developed to test the output electrical performance of automotive Xe–lamp ballast.

PART 10

DPS SERIES AC POWER SUPPLY

DPS series AC Power Supplies offer stable and pure power conditions for the test load to ensure high accuracy, high reproducibility, and high stability of the test result, with the advantages of high load adaptability, good output waveform quality , low harmonic distortion, easy to operation, etc.

Output capacity: 500VA, 1kVA, 2kVA, 3kVA, 6kVA, 10kVA, 15kVA.

Main specifications					
Model	DPS1005	DPS1010	DPS1020	DPS1030	DPS1060
Output capacity	500VA	1KVA	2KVA	3KVA	6KVA
Output Voltage	0 ~ 150V 0 ~ 300V				
Voltage Stability	⩽0.2%				
Maximum output current	110V/4.6A 220V/2.3A	110V/9.2A 220V/4.6A	110V:18.4A 220V:9.2A	110V:27A 220V:13.5A	110V:54A 220V:27A
Output frequency	40.0Hz ~ 65.0Hz 40.0Hz ~ 450Hz (option)			45.0Hz ~ 65.0Hz 45.0Hz ~ 400Hz (option)	
Frequency stability	⩽0.03%reading+1digit			⩽0.03%	
Total Harmonic Distortion	⩽0.5%(40.0Hz ~ 65.0Hz)			⩽1%	
Efficiency	⩾75%	⩾80%	⩾80%	⩾85%	
Load effect	⩽0.2%			0.2%V0+0.1V (V0:half-load output voltage)	
Source voltage effect	⩽0.1%				
Self-protection function	Protection for short-circuit, over-current, over-load, over-heated.				

PPS SERIES PROGRAMMABLE AC POWER SOURCE METER

PPS series programmable AC power source meters integrate pure AC power supply, digital power meter, and intelligent control function together. The power source also has the self-protection function against short circuit, over current, overvoltage, over power and over-heating so that it can run reliably.

Main specifications				
Model		PPS1005	PPS1010	PPS1020
Output voltage		1V~150V/2V~300V		
Max.output power		500VA	1kVA	2kVA
Max.current (r.m.s)	0~150V	4.6A	9.2A	18.4A
	0~300V	2.3A	4.6A	9.2A
Output frequency	Range	40.0Hz~500.0Hz		
	Frequency stability	⩽0.03% of reading +1 count		
Total harmonic distortion		⩽0.5%(40.0Hz~100.0Hz); ⩽1%(100.1Hz~500.0Hz) Resistive load		
Stability of voltage		⩽0.2%		
Load effect		⩽0.2%		
Line regulation		⩽0.1%		
Transient response		<400μs		
Efficiency		⩾80%		
Measuremrnt Function		V_{rms}, V_p, V_{cf}, A_{rms}, A_p, A_{cf}, inrush current, power, power factor, frequency, and harmonics, etc.		
Basic accuracy of voltage, current		± (0.4% reading +0.1 %range + 1 digit)		

PART 10

WY SERIES DIGITAL CONSTANT CURRENT & CONSTANT VOLTAGE DC POWER SUPPLY

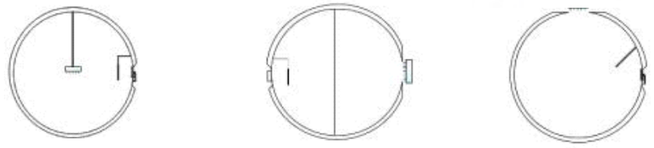
WY Series Digital Constant Current & Constant Voltage DC Power Supply combines the functions of constant voltage power supply, constant current power supply, precise voltmeter, precise ammeter and precise power meter together, and has many advantages such as high intelligence, high stability, high accuracy, continuously adjustable output current/voltage, etc. It is ideal to supply for standard lamps and other DC powered loads such as LED products.

Output capacity:WY305(30V/5A), WY3010(30V/10A), WY3020(30V/20A),
WY605(60V/5A),WY12010(120V/10A),
WY3002(300V/2A),WY3101(3*10V/1A)

Main specifications							
Model	WY305	WY3010	WY3020	WY605	WY12010	WY3002	WY3101
Output	Single channel						Three channels
Maximum output power	150VA	300VA	600VA	300VA	1000VA		3*10VA
Maximum output voltage & current	0~30V 0~5A	0~30V 0~10A	0~30V 0~20A	0~60V 0~5A	0~120V 0~10A	0~300V 0~2A	0~10V 0~1A
Output voltage drift of full scale	±0.01%reading					0.04% reading+ 10mV	±0.01% reading
Output current drift of full scale	±0.01%reading					0.05% reading+ 1mA	±0.01% reading
Voltmeter resolution	0.0001V (0.0000V ~ 9.9999V) 0.001V (10.000V ~ 300.00V)						
Ammeter resolution	0.0001A (0.0000A ~ 10.000A)						
Basic accuracy of Voltmeter and Ammeter	±(0.03%reading+0.02%range+1digit)				±(0.02% reading+ 0.01% range+1 digit)	±(0.03% reading+ 0.02% range+1 digit)	±(0.02% reading+0.01 % range+2 digit)

INTEGRATING SPHERE

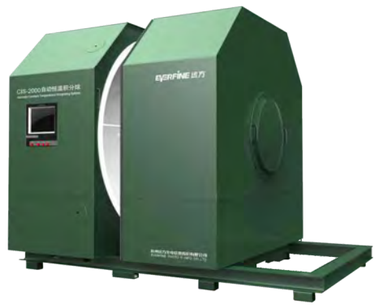
- Size: Φ0.3m, Φ0.5m, Φ1.0m, Φ1.5m, Φ1.75m, Φ2.0m, Φ2.5m, Φ3.0m, customized size
- Thermostatic methods: ambient, automatic constant–temperatured
- Coating property: SpektronTM coating, Diffuse reflectance, and appears nearly lambertian (perfectly diffuse) properties, non–toxic, durable and optically stable over time.
- Coating Reflectivity: coating R98, coating R80, UV coating
- Geometry: 4π (lamp mounted in the center)
  2π (lamp mounted on the side, top or bottom).



4π geometry　　2 geometry　　2 geometry

Geometries suggested by GB/T 24824 <Measurement methods of LED Modules for general lighting>

CIS–2000 Thermostatic Sphere



The thermostatic sphere which can realize accurately temperature control about high quality light source and SSL, is used to measure photometric, colorimetric and electric parameters at constant temperature.

Rotatable Integrating Sphere

The test lamp can be accurately measured at different angle for 2π or 4π geometry in the rotatable sphere, which can be rotated to any angle of the rotating range(±90°).

Chapter 11

CALIBRATION SERVICE

INTRODUCTION TO EVERFINE TEST AND CALIBRATION CENTER

EVERFINE Test and Calibration Center

EVERFINE Test and Calibration Center has established high-quality photometric and radiometric calibration and lighting test laboratories using all the equipment designed and produced by EVERFINE Corporation. Its calibration and test capacity has been so well recognized abroad that it has been granted by CNAS and NVLAP certificates,and also recognized bu EPA and Lighting Facts.

The center has gained NVLAP calibration accreditation on photometric and radiometric calibration, which means the center is the only organization with both NVLAP and CNAS accreditations on photometric and radiometric calibration in China.

The center aims to provide services of calibration, comparison test and accreditation demonstration, to improve the test and calibration ability of customers.

CNAS Accreditation Certificate

NVLAP Accreditation Certificate

CALIBRATION SERVICE

The center can provide both CNAS and NVLAP accredited calibration services on photometric, chromaticity and radiant calibration, which cover photometric and radiant measurement equipment. To meet customers' requirements, the center can also provide high–quality on–site calibration services.

Main services provided

Calibration category	Calibration parameter
Spectroradiometer	Wavelength accuracy, chromaticity
Illuminance meter	Illuminance
Luminance meter	Luminance, chromaticity
Standard lamp	Total luminous flux, luminous intensity,color temperature, total spectral radiant flux, spectral irradiance
AC and DC power supply	Current, voltage, stability
Power meter	Current, voltage, power factor, etc.

TEST SERVICE

The center has rich experience in comparison test between laboratories. It has been invited every year to participate in MIN and NIST comparison tests, and comparison results were highly matched with NIM and NIST. In order to improve test and calibration ability of our customers, the center can provide high–accuracy comparison test service between laboratories and accreditation demonstration service.

Test Category	Test parameter
Electromagnetic compatibility (EMC) TEST	Conducted/Radiated Emission Conducted/Radiated Disturbances Immunity Electrostatic Discharge Immunity, Electrical Fast Transient/Burst Immunity, Surge Immunity, Voltage Dips Immunity
Photometric, chromaticity, electrical test	Photometric, chromaticity, electrical parameters, luminaire life, temperature properties
Radiation photobiological safety test	Ultraviolet cataract, Ultraviolet erythema, Retinal thermal injury, Photoretinitis, Photokeratitis, Infrared cataract

ACCREDITATION CONSULTANCY SERVICE

EVERFINE Test and Calibration Center achieves satisfied result in American NVLAP Laboratory Comparison

Report of American NVLAP

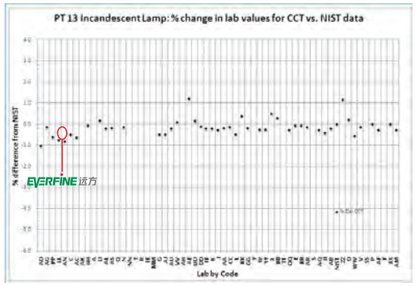


Diagram of Results of Attended Laboratories

EVERFINE Test and Calibration Center achieves the Best Comparison Satisfaction in CNAS Calibration Proficiency Testing

Notification of China National Accreditation Service for Conformity Assessment

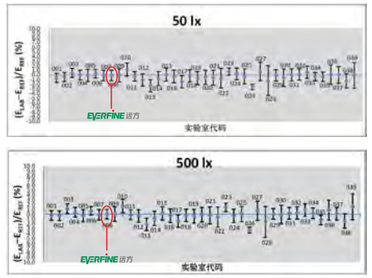


Diagram of Results of Attended Laboratories

The Center has the only lab in China with both CNAS and NVLAP accreditation in photometric and radiometric calibration, and also a lab with NVLAP accreditation in lighting test. The Center has plentiful experience in gaining accreditation. The Center has particular accreditation consultancy team to serve customers during their application for CNAS or NVLAP accreditation. With the guidance and help from our professional accreditation consultancy team, our customers will obtain accreditation more quickly and easily.

Contact EVERFINE Test and Calibration:
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– Email: calibration@everfine.cn lab@everfine.net
– Website: http://www.everfine.cn/calib.php
– Address: #669 Binkang Road, National High–tech Park, Hangzhou, China
– Zip code: 310053