

LED Test Solution

www.chromaate.com



Chroma

Turnkey Test & Automation Solution Provider



Headquarters: Hwa-Ya Technology Park, Taiwan

Chroma, founded in 1984, is one of the world's leading suppliers of Automatic Testing Equipment (ATE) and provides test and measurement instrumentation and systems for various technology related industries. We specialize in turn-key test and automated solutions, which work in conjunction with manufacturing execution systems (MES).

Chroma's strength lies in test and measurements for: power electronics, passive component, electrical safety, video & color, LCD/LCM, automotive electronics, and semiconductor industries. More importantly, Chroma supports the clean energy initiative by providing solutions to test photovoltaics, LEDs, Li-batteries, power battery packs, electric vehicles and any ongoing new eco-driving industry developments.

In addition to having a large diverse group of R&D engineers, Chroma puts a large investment in research and development each year to ensure its continued technological leadership. Core technologies in power electronics and optics have fueled Chroma's drive forward into various new markets and success in providing innovative new test solutions with precision, reliability, and uniqueness.

Chroma Group & Global Operation Sites



CHROMA GROUP				
CHROMA ATE INC.				
Newworld H.K.	MAS Automation/Taiwan	Chroma Investment	Chroma New Material	Testar Electronics
Chroma/Beijing	MAS Automation/Nanjing	Chroma/USA		ADLINK Technology
Chroma/Shanghai	MAS Automation/Xiamen	Chroma/Netherlands		DynaScan Technology
Chroma/Suzhou		Chroma/Finland		EVT Technology
Chroma Xiamen		Chroma/Japan		
Chroma/Shenzhen				
Chroma/Dongguan				

LED Total Power Test System

Model 58173

The Chroma 58173, in automatic operation, comes with unique design and a whole new method for LED total power measurement. In bare wafer/chip LED test production, partial flux correction of total flux is the common measurement method in LED epitaxy industry. (See Figure 3 on flip page) However, conventional method causes some disadvantages, i.e., lower accuracy, low S/N ratio, and slow test time etc., and which are difficult to be applied on LED bar wafer/chip total power/flux test production.

Chroma has developed a high speed and high accuracy measurement method of LED total power/flux. (See Figure 1 on flip page) Applying this innovative test method enhances to gather more LED partial flux than using the conventional method. (See Figure 3 on flip page) It improves the accuracy dramatically and significantly.

Benefited Chroma's unique optical and mechanical design, LED total radiant flux will be collected by a wide photo detector. Other optical features like dominant wavelength, peak wavelength, CCT, etc. will be detected by Chroma's spectrometer. In addition, the 58173 offers a 6-inch wafer chuck and a packaged LED holder which users can collect variety of samples in one station. With a wide range of power source and meter, users can gather all of LED electrical data like forward voltage, leakage current, and reverse break voltage in one test step.

Key Features

- ✓ Chroma® Huge Photo Detector
- ✓ New method and unique design for LED total power measurement
- ✓ High speed automatic LED wafer/chip prober machine
- ✓ 6" wafer chuck on board
- ✓ Wide range of electrical test

Hardwares

- ✓ Automatic LED wafer/chips prober
- ✓ Leakage test module
- ✓ Source/measure module
- ✓ Optical test module
- ✓ Optional ESD test module



Optional Optical Modules

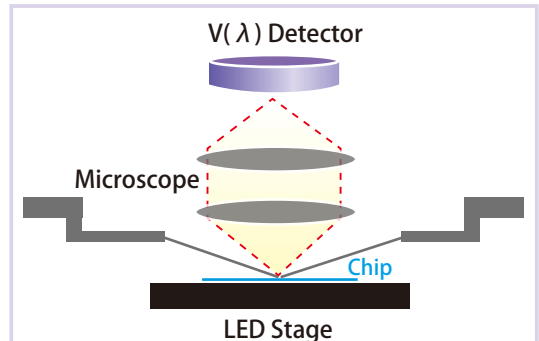


Figure 2 - Conventional Method of LED Wafer/chip Total Flux Measurement by Microscope Module

Standard Optical Module

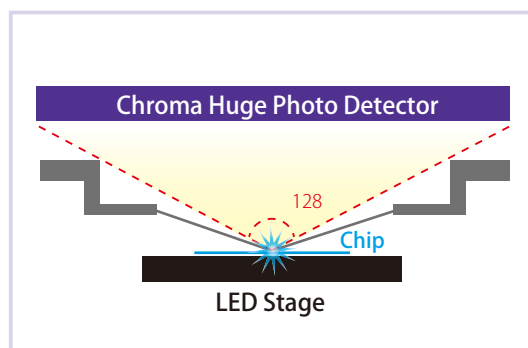


Figure 1 - Chroma's Innovative Method of LED Total Flux Measurement by Huge Photo Detector

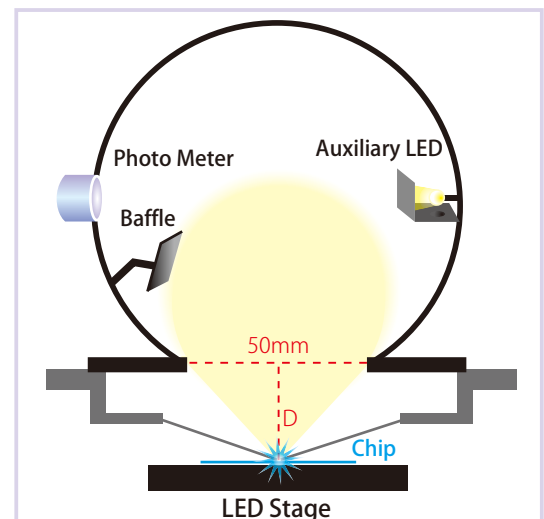
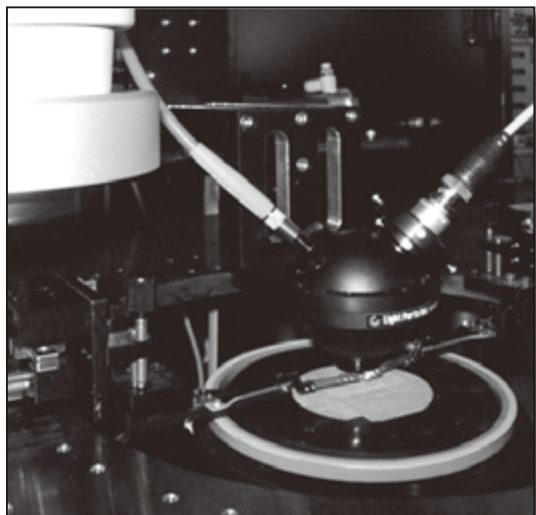
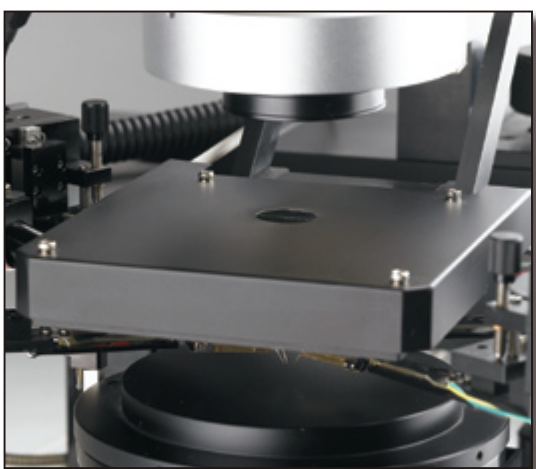


Figure 3 - Conventional Method of LED Wafer/chip Total Flux Measurement by Integrating Sphere



Integrating Sphere



Chroma® Huge Photo Detector

SPECIFICATION-1

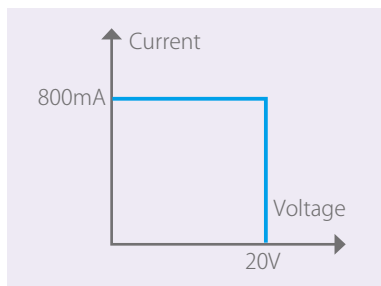
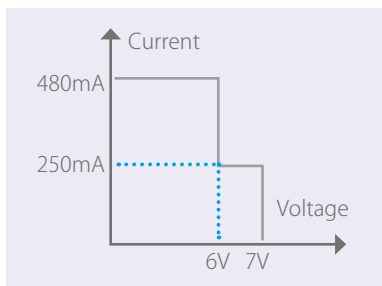
Model	58173		
Current-Voltage Testing			
Stimulus Current Ranges	10uA/2mA/20mA/480mA (800mA optional)		
Current Accuracy	See specification-2, 0.6% 500uA (800mA optional)		
Voltage Range			
Compliance Voltage Range	1~7V / 7~20V (optional)		
Compliance Voltage accuracy	See specification-2 / 3.5% 40mV		
Voltage Measurement	7V / 7~20V		
Voltage Accuracy	See specification-2 / 0.75% 40mV (7~20V optional)		
Voltage-Current Testing (Reverse Voltage)			
Stimulus Voltage Ranges	0~10V, 0~200V (Accuracy 0.3% 0.1% FS)		
Voltage Measurement Ranges	0~10V, 0~200V (Accuracy 0.3% 0.1% FS)		
Current Measurement Ranges	100 A/ 5mA 0.3%, 0.2% 0.1%FS 1 A*, 2% 0.1%FS		
Compliance Current Ranges	0~100 A, 0~5mA (Accuracy 5%, 0.1% FS)		
Wavelength / Colour measurements			
Detector Type	Chroma® Huge Photo Detector (standard)		
Spectrometer	Chroma® 52962		
Wavelength Range Visible	380~780nm		
Total Measurement LED Angle	128		
Wavelength Resolution (FWHM)	0.24nm		
Radiant Flux repeatability (mW) ²	5%		
Dominant Wavelength	1 nm		
Repeatability	1 nm		
CIEx,y Accuracy	0.004		
Mechanical Specifications			
Manual Prober	wafer chuck		
Chuck Size	6 inch		
Dimension	970 (L) x 970 (W) x 2250 (H)mm		
Weight	580kg		
Power Input	220V		
Air input	6 mm		
Air Flow Rate	7 L/min		
Software			
Operation System supported	Microsoft Windows 2000 or XP*		

* Note 1 : test condition > 30nA and under resistor load
 * Note 2 : depends on DUT quality and without thermal effect

SPECIFICATION-2

Voltage Accuracy								
Range	0~1V				1~7V			
Source Accuracy (% reading. + volts)	3%+2.5mV				0.6%+8mV			
Programming Voltage	0~1V				1~7V			
Measure Accuracy (% reading. + volts)	0.5%+1.5mV				0.5%+2mV			
Current Accuracy								
Range	10uA		2mA		20mA		480mA	
Programming Current	0~0.5uA	0.5~10uA	0~0.3mA	0.3mA~2mA	0~3mA	3mA~20mA	0~50mA	50mA~500mA
Source Accuracy (% reading. + amp)	0.5%+30nA	0.1%+30nA	0.45%+2uA	0.45%+2uA	0.66%+20uA	0.66%+20uA	0.3%+900uA	0.3%+900uA
Measure Accuracy (% reading. + amp)	0.5%+300nA	0.2%+20nA	0.6%+1uA	0.35%+600nA	0.7%+60uA	0.5%+60uA	0.6%+600uA	0.3%+600uA

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.



Optional Source Meter Unit

ESD Test System

Model 58154 Series

Chroma 58154 series ESD Test Systems are PXI/PCI controlled module to simulate electrostatic discharge pulse during electronic device testing. The 58154 series offer both ESD STM5.1-2001-Human Body Model and ESD STM5.2-1999-Machine Model. The user friendly software offers programmable and flexible features, such as sampling test on a wafer, ESD model, ESD pulse polarity, ESD pulse interval in a sequence, and automatic testing function.

The 58154 series includes a control module and a pulse output external box. High voltage power supply unit (PSU) and pulse shaping circuits provide the ESD STM standards compliant pulse waveform.

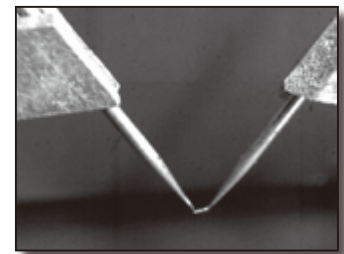
The 58154 series offer a flexible, widely and totally ESD test solution to customers. Furthermore, the ESD pulse is generally applied to the device under test before measuring device electric parameters and the 58154 series can be perfectly integrated with Chroma 58151 tester and Chroma 58153 probe, which is a total solution in production line.



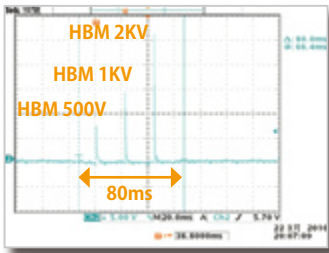
ESD Test System (PCI Board)

Key Features

- ✓ Two Model ESD Pulse Generation : Human body mode and Machine model
- ✓ Programmable Auto Test : Pulse delay, cycle and polarity are programmable
- ✓ Resolution (58154) :
 - 5V per-step for Machine model, 20V per-step for Human body mode
- ✓ Resolution (58154-A, 58154-B) :
 - 10V per-step for Machine model, 20V per-step for Machine mode, 30V per-step for Human body mode
- ✓ Resolution (58154-C) :
 - 10V per-step for Machine model, 30V per-step for Human body mode
- ✓ Diversity Control Interface : PCI DIO card or PXI DIO card
- ✓ Up to 8000V (58154-C)



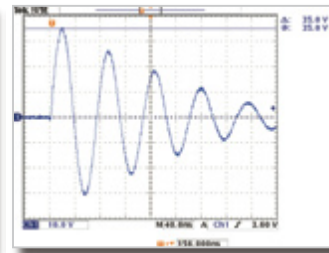
ESD Test on LED chip



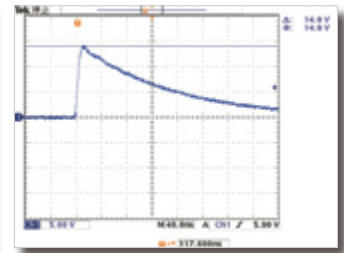
New Function and improvement - 3 HBM pulses within 80ms



Traditional way - 3 HBM pulses within 362ms



Machine Model waveform



Human Body Model waveform

SPECIFICATION				
Model	58154	58154-A	58154-B	58154-C
Parameter	Value			
ESD Mode	Machine Mode / Human body mode			
Pulse Voltage	Machine mode: 50V to 400V 5V Human body mode: 500V to 4KV 20V	Machine mode: 100V to 500V 10V Human body mode: 250V to 6KV 30V	Machine mode: 100V to 800V 10V Human body mode: 250V to 6KV 30V	Machine mode: 100V to 800V 10V Human body mode: 250V to 8KV 30V
ESD Specification *1	Machine model reference on STM5.2-1999 Human body model reference on STM5.1-2001			
Pulse Interval	20 ms to 1 s (User definable)			
Pulse Repetition	Single or multiple			
Pulse Polarity	Positive or negative (software control)			
AC Input	100 to 240V, 47 to 63 Hz			
Dimensions	434.6mm(W) x 97.7mm(H) x 306.8mm(D)			
Weight	11kg			

Pattern No: 95137265

Pattern Name: Discharge and remote feedback integrated testing system

Note*1 : The test condition is under output terminal of equipment



LED Electrical Test Module

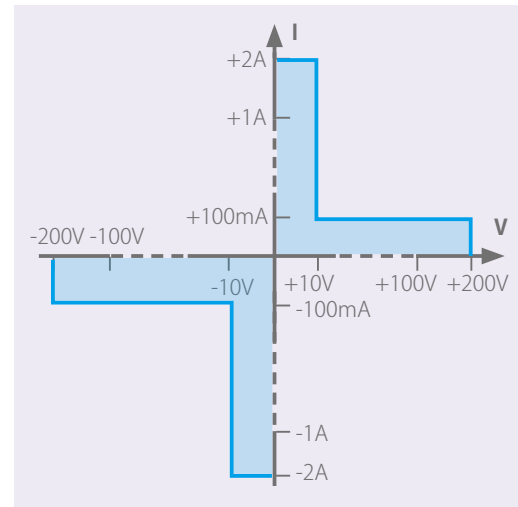
Model 58221-200-2

Chroma 58221-200-2 is a module specially designed to test the electrical features of LED in full range. It has all functions required for testing the LED electrical features. The 58221-200-2 supplies high accuracy current source up to 200V/ 100mA for High voltage (HV) and up to 10V/ 2A for High Power (HP). Besides the standalone operation the 58221-200-2 is featured in, the USB interface and other integrated design can also be applied for synchronous measurement.



Key Features

- ☑ Focused on High voltage (HV) and High Power (HP) LED application design
- ☑ Hardware sequencer/ program memory/data memory built inside
- ☑ Built-in timer for time delay in hardware
- ☑ SCR test function on board: Current slope tunable
- ☑ Synchronization with tester



SPECIFICATION				
Model	58221-200-2			
Current Source Accuracy				
Range	Programming Resolution	Source Accuracy (±% rdg.+Amps)	Default Measurement Resolution	Measurement Accuracy (±% rdg.+Amps)
10 A	1nA	0.08%+5nA	500pA	0.06%+3nA
500 A	50nA	0.08%+200nA	20nA	0.06%+100nA
100mA	10 A	0.08%+40 A	5 A	0.06%+20 A
1A	100 A	0.1%+5mA	50 A	0.2%+2.5mA
2A	200 A	0.1%+10mA	100 A	0.2%+5mA
Voltage Source Accuracy				
Range	Programming Resolution	Source Accuracy (±% rdg.+Amps)	Default Measurement Resolution	Measurement Accuracy (±% rdg.+Amps)
10V	1mV	0.08%+5mV	500 V	0.06%+3mV
100V	10mV	0.08%+10mV	5mV	0.06%+5mV
200V	20mV	0.08%+20mV	10mV	0.06%+10mV
General Specification				
Interface	USB/Stand alone			
Trigger	Available			
RAM	8M			
Operatoin Environment	23 5			
Power Consumption	150VA			
Dimensions (WxHxD)	430x90x430 mm			
Weight (kg)	10			

LED Die Inspection System

Model 7930

Chroma 7930 LED die inspection system is an automatic inspection system for textured and non-textured LED die wafer. The appearance feature of LED die and defects on it are clearly conspicuous by using advanced illumination technology. Illumination and camera shot mode can be adjusted for the different type of LED die.

Applied with high speed camera and inspection algorithms, Chroma 7930 can inspect a 2" wafer within 3.5 minutes and the number of die chips is around 12000 die chips (calculated base on size of 250um x 550um). Chroma 7930 also provides auto focus and tilts compensation function to overcome wafer/chunk leveling issue.

After the tape expansion process, the arrangement of dies on wafer may be formed an irregular alignment. Chroma 7930 offers a unique software alignment function to mapping the wafer file from LED tester. And add inspection results to generate a new wafer file for sorting process.

In addition, Chroma 7930 owns a friendly user interface to reduce user's learning time. All of inspection information are visualized for easy reading, like mapping map, Interactive edit window. In conclusion, Chroma 7930 is an ideal cost and performance selection for LED die process.

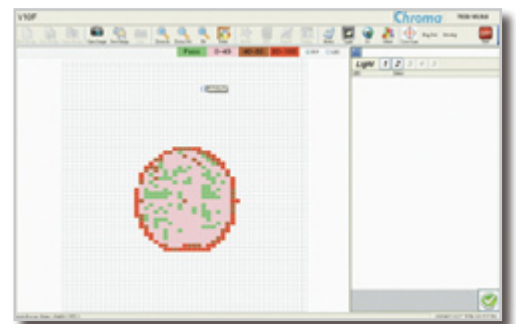


Key Features

- ✓ High speed inspection for LED wafer
- ✓ Auto Compensation for wafer Z-axis leveling
- ✓ Fast auto focus are using for clearly acquisition images
- ✓ Software edge finding technology can be applied to different shape of wafer
- ✓ Advance and flexible illumination modules are suitable for surface-textured and non-textured LED die
- ✓ Inspection mapping file can be output for down-stream sorter
- ✓ Adjustable inspection criteria can be set for different type LED die



CIE127 Condition B measurement Module



Softpanel

SPECIFICATION	
Suitable Wafer and LED Die	
Die Size	150μm x 150μm~1300μmx1300μm
Die Height	60μm~200μm (Max. Tolerance 15μm)
Chunk Size	6 in, (8 in option)
Wafer Size	2~4 in wafer
Inspector Spec	
Camera	5.0M pixel Color Camera (2450Hx2045V)
Resolution	0.8um~3.45um (standard 1.7um)
Field of View	4.165mmX3.476mm for 1.7um resolution
Throughput	0.018sec/pcs (base on 1.7um resolution and die size 250umX550um, real time)
Focus	Software auto focus with Z axis motor
Tilt Compensation	Software auto focus with Z axis motor
Stages	X, Y, axis motorized stages
Accessory	Barcode reader
Facility Requirement	
Power Input	220V, 1ø, 50/60Hz
General Spec	
Dimension (WxDxH)	1000mm(W)x1000mm(D)x1500mm(H)
Weight	300kg

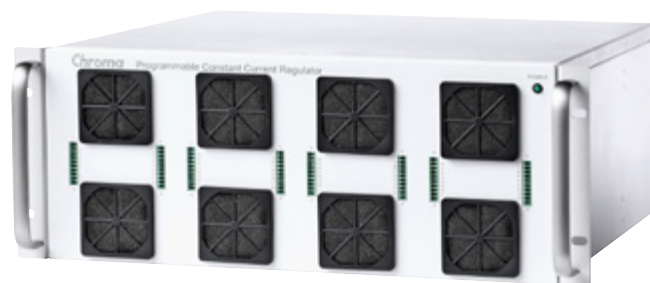
Inspection Items

Pad Contamination	Pad Residue	Pad Shift	Pad Scratch	SiO2 Peeling
ITO Pinholes	ITO Pad Residue	Mesa Abnormal	Die Chipping	Chip Residue

Multi-channel Constant Current Regulator

Model 58222-64

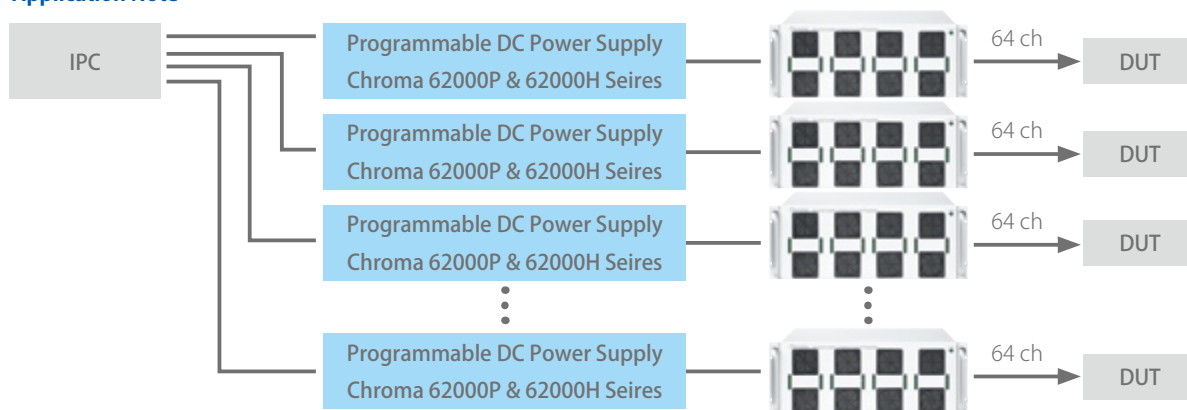
Chroma 58222-64 is a 64-channel current regulator that each channel not only can regulate the constant current up to 500mA but also has 0~400V voltage measurement function. For product application, various programmable power supplies can be applied for multi-channel constant current output and voltage measurement. The user can integrate several 58222-64 with power supplies based on the demands of channels and current for multi-channel test.



Key Features

- ☑ Each channel supports up to 500mA/400V
- ☑ Programmable constant current output
- ☑ Fast rising time <1ms
- ☑ Voltage measurement function on board
- ☑ Wide range and programmable current source output: 1uA~500mA

Application Note



SPECIFICATION

Model	58222-64			
Electrical Specification				
Channels	64			
Force Current Range	1uA~ 10uA	10uA~ 100uA	100uA~ 100mA	100mA~ 500mA
Force Current Accuracy	(0.3%+10nA)	(0.3%+25nA)	(0.3%+25uA)	(0.3%+500uA)
Measure Voltage Range	0.1V~40V		40V~400V	
Measure Voltage Accuracy (2wires)	(0.5%+5mV)		(0.5%+10mV)	
Input Voltage limit ^{*1}	V input – V read<5V			
General Specification				
Interface	USB			
Operatoin Environment	Temperature: 0~55 /Humidity:10~90%RH			
Dimensions (WxHxD)	482x180x450 mm			
Temperature Coe cient	0~18 & 28~55 (0.3 x accuracy specification)/			
Weight (kg)	20			
Warm-up Duration	30 mins			

Note *1: The difference of DC output voltage and DUT read voltage is suggested to less 5V

LED Light Bar Test System

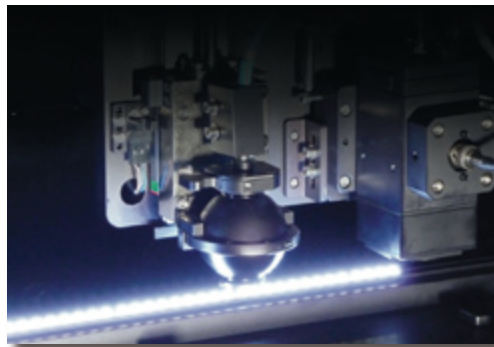
Model 58182

Chroma 58182 LED Light Bar Test System is a fully automatic test system able to measure the top-view/side-view light bar uniformity composed of white light or RGB LED. With image recognition function, it can accurately capture the location of LED and identify the center of LED under the measurement. With automatic mechanical and optical measurement function, the 58182 can perform extremely accurate optical and electrical measurement.

The 58182 integrates image recognition function, automatic mechanical and optical measurement. It can not only improve the yield rate by sifting out the defect products, but also reduce the product verification time and development cost. In addition, the 58182 has a flexible measurement platform to adapt different type of top-view / side-view LED light bar measurement, and friendly user interface to reduce user's learning time. Consequently, the 58182 is the best choice for testing top-view/side-view light bar.

Key Features

- ✓ Measure the top-view/side-view light bar uniformity composed of white light or RGB LED
- ✓ Equipped with image recognition function to capture the LED location accurately
- ✓ Excellent optical performance
- ✓ ESD damaged sorting function
- ✓ FPC/PCB light bar adaptability



CIE127 Partial Flux Measurement Module



CIE127 Condition B measurement Module

SPECIFICATION				
Model		58182		
Optical Module		CIE 127 condition B optical tube		
Average Intensive (mcd)	Range	100~10000mcd		
	Accuracy	5%		
	Repeatability	2%		
Lumen (lm) Measurement Specification		Option		
CIE x, y	Accuracy	0.004		
	Repeatability	0.002		
Spectrometer	Wavelength Range	380~780nm		
	Optical resolution	2nm		
	A/D	16 bits		
Light Bar length		600mm		
Other Channels		20 X 12 Ch		
Power Supply	Voltage	0~200V	0~60V	0~300V
	Current	10uA~5mA	1mA~2A	40mA~2A
	Voltage accuracy	0.3%+0.1%F.S	0.01%+10mV	0.05%+0.05%F.S
	Current accuracy	0.3%+0.1%F.S	0.01%+1mA	0.03%+40mA
Data output	Format	Excel (*.csv)		
	Output items	mcd, CIEx, CIEy		
XY moving range		600x250mm		
Dimension		1300 (D)	2360 (W)	1815 (H)mm

2D CCD LED Light Bar Test System

Model 58187

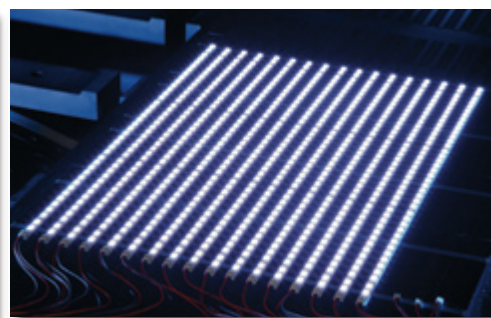
Chroma 58187 is an LED light bar auto test system with the features of fast and accurate. It is capable of testing up to 36,000 pcs LED light bars a day to save massive manpower. For optical measurement, Chroma 58187 is not sampling test the Light bars but tests the light intensity and color of each LED on the Light bar. For electrical test, Chroma 58187 that equipped with a 64 channels current source can provide 1uA~500mA current output and 0~400V forward voltage for measurement. Furthermore, the 58187 can apply to various white light LED tests such as packaged LED, LED module, LED array, LED luminaries for light intensity and color measurement. It gives the production line a fast test platform for mass production.

Key Features

- ✓ High throughput: 36K light bars per day
- ✓ Fully test every LED on the light bar
- ✓ 1uA~500mA and multi-channel (64ch) constant current source
- ✓ Fully automatic design
- ✓ Broad test applications:
Packaged LED, LED modules,
LED array, LED light bar, LED luminaries



Loading Tray



Testing

SPECIFICATION		58187-Auto	58187-Manual
Model		58187-Auto	58187-Manual
Measurement Channels		64	64
Device Under Test (DUT)		Top view White LED Light bar	
Optical Module		CIE 127 condition B optical tube	
Average Intensive	Range	20cd	
	Accuracy *1	5%	
	Repeatability *2	2%	
Chromaticity (CIE x, y)	Accuracy *1	0.005	
	Repeatability *2	0.002	
Each Channel Output Power	Max. Voltage Measurement Range	300V	
	Max. Current Output Range	400mA	
	Output Current Accuracy	See Appendix Table	
	Voltage Measurement Accuracy	See Appendix Table	
Test board Specification	Max Light Bar Q'ty	20 pcs	30 pcs
	Available Range	700 x 300 mm	650 x 480 mm
	Measurement Range	650 x 300 mm	650 x 480 mm
	Light bar fixture	Mechanical	
General Specification	Light Bar Turn-on fixture	Pobing pin	Wire
	Equipment size (W*D*H)	2300x1800x2115	1600x1300x2060
	AC Input	220V Single phase/50-60Hz	
	Current	<10Arms@ full load	
	Compressed Air	>0.5Mpa	
	Test Boards in Magazine	Max 10pcs	No magazine

Appendix table				
Channel	64			
Voltage Accuracy (23°C ±5°C)				
Range	0~4V	0~40V	0~400V	
Measurement Resolution	1mV	10mV	100mV	
Measure Accuracy *1 (%rdg. + o set)	0.2%+5mV	0.2%+50mV	0.3%+500mV	
Current Accuracy (23°C ±5°C)				
Range	10 A	100 A	100mA	500mA
Programming Resolution	5nA	50nA	50 A	200 A
Source Accuracy (%rdg. + o set)	0.1%+20nA	0.1%+200nA	0.1%+200 A	0.2%+1mA
Temperature Coe cient	0~18 & 28~55 (0.3 accuracy specification)/			
Max.Output Power	2.5W/Ch.			
Dissipation *2	[i.e Input Voltage Limit * 500mA]			
Input Voltage Limit	DCin (V) - Read(V) < 5V			
Load Regulation	CCM:0.08% of selected range.			
Overshoot	<0.2% typical(500mA step,RL=20).			
Output Settling Time	Time required to reach its final value after command is processed. 150 s typical.Resistive load.500mA range.			
Operation Environment	Temperature: 0~55 /Humidity:10~90%RH			
Storage Environment	Temperature:-20~70 /Humidity:5~95%RH			
Warm-up Duration	30 minutes			

Note *1 : Benchmark: Correction equipment Measure type : White LED Wavelength range: 380~780nm , 2 Sigma error

Note *2 : White LED Wavelength range: 380~780nm , 2 Sigma error

AC/DC LED Test System

Model 58158

Chroma 58158 AC/DC LED Integrated Test System, compliances the AC LED Device National Standard, has integrated Chroma's Power Electronics Test Equipment - Programmable AC Power Source and Digital Power Meter to offer users a real AC environment for measuring AC LED.

Furthermore, the 58158 also integrates Chroma DC Power Supplies with the flexible optical test platform which equips with integrating sphere, photo detector, and etc.. Users can measure optical and electrical parameters of AC/DC LED through a friendly software interface.

Key Features

- ✓ Simulate the real AC test condition and environment
- ✓ Integrate AC, DC, and optical features test to one platform
- ✓ Support DC test for AC LED
- ✓ Support dual-optical test module in one platform (Integrating sphere or average intensity) (optional)
- ✓ Support AC /DC LIV Analysis
- ✓ Offer standard light source for calibration

SPECIFICATION		
Model	58158	
Measurement Items		
Optical Measurement Items	Lumens (lm), mW, Wp, Wd, FWHM, CIE(x,y), CIE(u',v'), CCT, CRI	
Electrical Measurement Items	Vdc, Idc, Vrms, Vpeak+, Vpeak-, Irms, Irms+, Irms-, Inrush current, Frequency, Real power P, reactive power VAR, apparent power VA, power factor PF, energy, THD (current and voltage), Vf, If	
Optical Measurement		
Photo Detector	Wavelength Range	380~780nm
	Lumens Range *1	1~70 lm (>70lm optional)
Spectrometer	Detector Type	2048 Pixels Linear CCD array
	Wavelength Range	380~780nm
	Slit	100um
	Resolution(FWHM)	3.8nm
	Integration Time	1.2ms~10sec
	Dynamic Range (Single scan)	2x10 ⁸
Fiber Optic Connector	SMA 905	
Electrical AC Source		
Output Rating-AC		500VA~36KVA
Voltage	Range/Phase	150V/300V/Auto
	Accuracy	0.2%+0.2%F.S.
	Resolution	0.1V
	Distortion	0.3%@50/60Hz 1%, 15~1KHz (Typical)
	Line Regulation	0.10%
Max.Current / Phase	r.m.s	32A/20A (150V/300V)
	peak	192A/96A (150V/300V)
Frequency	Range/Phase	DC, 15~1KHz
	Accuracy	0.15%
Harmonic-Inter Harmonic Stimulaton	Bandwidth	2400Hz

Electrical AC Meter		
AC Voltage	Range	150/300/500Vrms (CF=1.6)
	Accuracy	0.1%+0.05%*KHz of rdg + 0.08% of rng
	Input Resistance	1M
AC Current	Range	SHUNT H : 0.2/2/8/20Arms (CF=2 @ 0.2/2/8A, CF=4 @ 20A) SHUNT L : 0.01/0.1/0.4/2Arms (CF=4)
	Accuracy *2	SHUNT H : (0.1%+0.05%*KHz) of rdg + 0.12%rdg SHUNT L & 20A : (0.1%+0.05%*KHz) of rdg + 0.25% rng
	Range(W)	1.5W~10KW, 24 ranges
Power	Accuracy *3	SHUNT H : [0.2% + 0.1%*KHz + (0.3/PF)%*KHz] of rdg + 0.2% of rdg SHUNT L & 20A : [0.2% + 0.1%*KHz + (0.3/PF)%*KHz] of rdg + 0.33% of rdg 300V x 0.01A Range : 0.2%of rdg + 7mW
	Power Factor accuracy *4	0.006 + (0.003 / PF) KHz
Harmonic	Range	2~50 order



Optional Integrating Spheres

DC Measurement		
DC Power Supply	Output Voltage	0~64V (> 64V optional)
	Output Current	0~3A (> 3A Optional)
	Ripple and Noise	1400 uVrms & 14 mVp-p / < 1mA
	Line Regulation	0.01% + 4mV / 0.01% + 300 A
	Load Regulation	< 6mV / 0.01% + 300 A
	Program Accuracy	0.02% + 10mV / 0.01%+1mA
Read back Accuracy	0.02% + 10mV / 0.01%+1mA	
	Others	
Dimension (H x W x D)		1081 x 532 x 700 mm
Weight		100k g
Power Consumption		300 W
Operating		100~240V VAC 50/60HZ
Software Support DC Source		
Chroma 11200 (650V), Chroma 11200 (800V), Chroma 52958, Chroma 6200P-300-8, Keithley 24XX Series, Motech PPS3210		

LED AC/DC Burn-in Test System

Model 58266

Chroma 58266 LED Burn-in Test System is a multi-channel AC and DC burn-in test system. In AC test, it uses an AC source and a meter with the unique circuit design of Chroma to achieve multi-channel tests that reduce the test and burn-in cost greatly. For DC test, it works with multi-channel DC current sources with various kinds of powers to attain multi-channel AC/DC dual tests burn-in system. In addition, Chroma 58266 has a temperature control oven that the user can perform monitoring and measurement in long hour under the test environment of different temperature.

Key Features

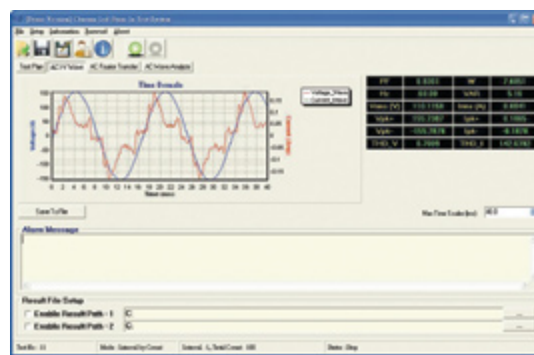
- ✓ Multi-channel AC test function : 48ch, 100ch, 200ch or more
- ✓ Programmable AC source
- ✓ AC parameter real time monitor
- ✓ Optional DC and optical test functions are available



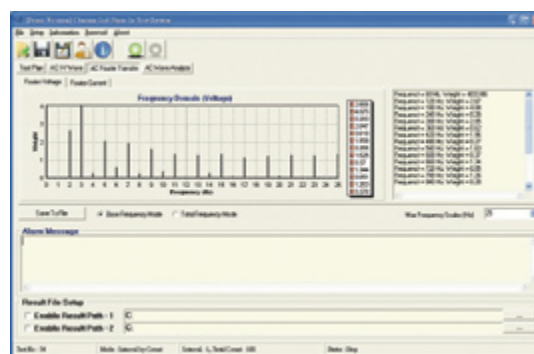
SPECIFICATION			
Model	58266		
AC Driving Source *1			
AC output	50~300V AC		
Frequency	20~1KHz		
Voltage accuracy	0.2% + 0.2%F.S		
AC Electrical Measurement (Standard)			
Channels	48 (>48ch option)		
Test Items	V _{rm} , I _{rms} , W , PF, THD, I _{peak} , V _{peak}		
Current accuracy	0.3% + (0.05%*KHZ)		
Voltage accuracy	0.3% + (0.05%*KHZ)		
PF accuracy	0.01		
Power accuracy	0.3% 10mW		
Power Range	0.5W ~ 10W/1channel		
DC Electrical Measurement (Option) *			
Channels	64		
Test Items	V _f		
Force Current Range	1uA~500mA		
Force current accuracy (%rdg. o set)	0.5% 2mA		
Voltage Measurement Range	40V	100V	400V
Voltage Measurement accuracy (%rdg. o set)	0.5% 10mV		
Optical Measurement (Option)			
Optical power Range	10W / 1channel (>10W option)		
Test Items	Recode optical power decay, real time monitor power decay, Flicker		
Optical power Edge % accuracy	0.1% *2		
Measure speed	100ms~200ms/1 channel		
Temperature Measure (Option)			
Temperature edge Range	40~90		
Simulator accuracy	0.3		
Measure accuracy	0.3		
General Specification			
Temperature simulator Dimension (WxHxD)	90x160x80cm	180x160x100 cm	360x200x120 cm
Tester Dimension	60cm(W)/160cm(H)/90cm(D)		
Temperature simulator AC input	AC 220V, 1 , 10A, 50~60Hz		
Tester	AC 120V, 1 , 10A, 50~60Hz		
Weight	250 kg	350kg	450kg
Operation temperature	10~ 40		



Testing



I-V Waveform



Voltage & Current THD

LED AC/DC Life Time Test System

Model 58267

Chroma 58267 is a LED life time test system that uses the 2D CCD optical measurement technology. When working with multi-channel AC or DC current source, it can meet the multi-channel LED optical and electrical test requirements. Through the CCD optical measurement technology, it can measure and monitor multiple LEDs or optical characteristics of light at the same time. For electrical test, besides working with Chroma's multi-channel current source to do multi-channel measurement, it can also work with the unique Chroma multi-channel AC measurement technology to achieve multi-channel AC/DC LED light tests.

Key Features

- ✓ Multi-channel DC test function: 64ch or more
- ✓ Multi-channel optical test function: Over 100 PCS of packaged LED, LED bulb 63PCS, LED T5/T8 Bar 10PCS
- ✓ Optional multi-channel AC test function: 64ch or more
- ✓ Real time monitoring all test results
- ✓ Less DUT dimension limits (Packaged LED, LED array, LED bulb, LED Bar, LED luminaries available)
- ✓ Support inline production line integration

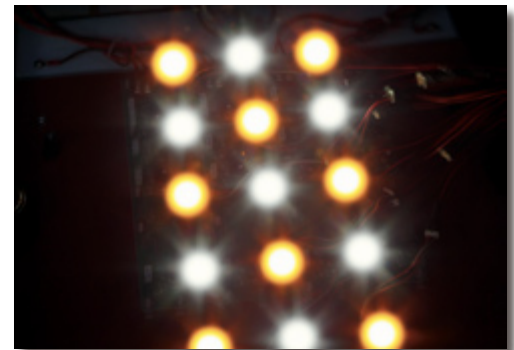
SPECIFICATION	
Model	58267
Optical Specification	
FOV area	580x490mm
FOV uniformity *1	3%
Z axis uniformity (7.5cm) *1	2%
Repeatability	2%
Optical Power range (cd)	<20 (>20cd option)
DUT limitation *1	Edge to edge 5mm
DC Electrical Measurement (FIMV) *2	
Channels	64
Test Items	Vf *4
Force Current Range	max. current 500mA
Force current accuracy (%rdg. + o set)	0.5% + 2mA
Voltage Measurement Range	35V (>35V option)
Voltage Measurement accuracy (%rdg. + o set)	0.5% + 10mV
AC Electrical Specification (Option)	
Channels	64
Test Items	V _{rm} , I _{rms} ,W , PF, THD, I _{paak} ,V _{peak}
Current accuracy	0.3% + (0.05%*KHZ)
Voltage accuracy	0.3% + (0.05%*KHZ)
PF accuracy	0.01
Power accuracy	0.3% 10mW
Power Range	0.5W ~ 10W/1 channel
General	
Power Requirement	220V AC/50Hz,1
Power Consumption	Max. 2300VA
Weight	600kg
Air input	Ø10mm
Air flow rate	5L/min
Dimensions	950mm(W) x 900mm(D) x 2250mm(L)
System Controller	
Model	Industry PC
CPU	E7400 Core 2 Du 2.8G
SRAM	DDR2 667 240P 2GB
Monitor	19"

Note*1: Test condition is under SMD 3020 LED @ 20mA

Note*2: Regulator is a common anode design

Note*3: Voltage measurements are sequence test

Note*4: Vf measurement is at 2 wires test condition



LED Bulb Life-time Testing



Real-time VF & Optical Power Monitor

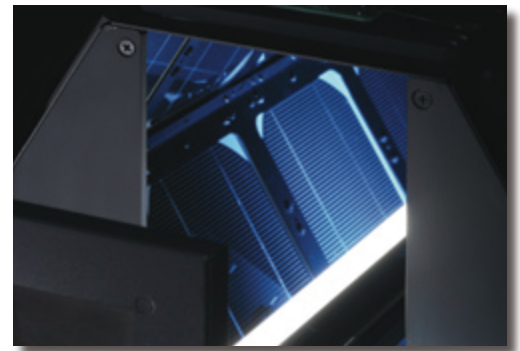
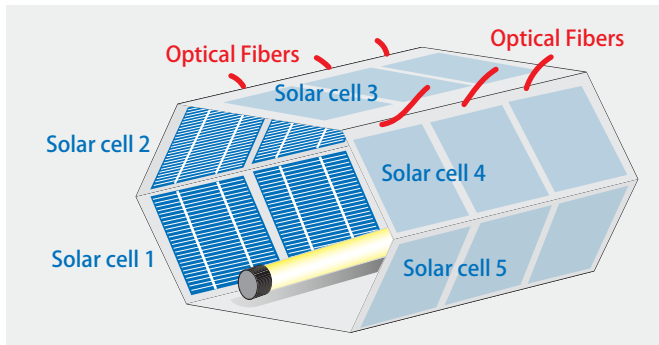


LED Luminaires In-line Test System

The design concept of Chroma LED high speed measurement module is to combine several large size detectors and add up the luminous flux obtained by each detector to calculate the total flux of LED light. This design not only overcomes the shortcoming of previous inconvenient measurement for total flux, it also implements the inline test on production line. Chroma is able to provide the customer a fully automatic production line that covers both quality and productivity.

Key Features

- ☑ Mass production application: LED lamp, LED bulb, LED bar, LED streetlight, and other luminaires
- ☑ Less error comparing to integrating sphere measurement
- ☑ High speed test and flicker measurement
- ☑ AC/DC LIV analysis software on board
- ☑ Provide standard light source for calibration which is international standard traceable
- ☑ Thermal control fixture adaptable (option)



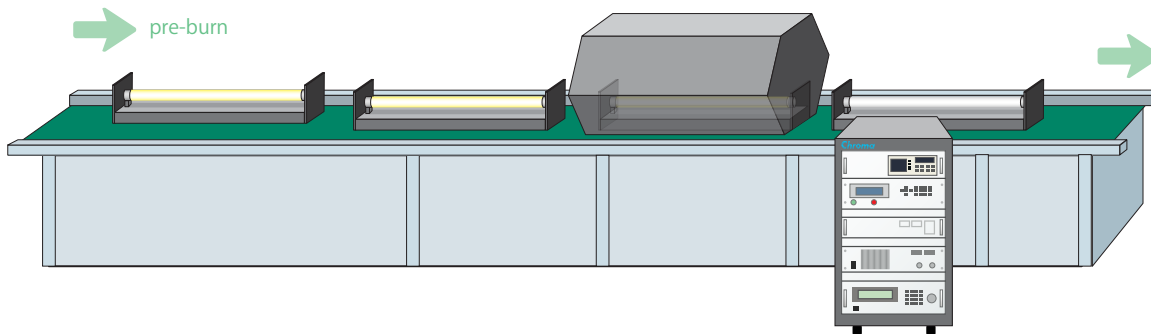
Solar Cell Box

In-line Production Test Applications

LED In-line Bulb Measurement



T8/T5 In-line Light Bar Measurement



SPECIFICATION		
Measurement Items		
Optical Measurement Items		Lumens (lm), mW, Wp, Wd, FWHM, CIE(x,y), CIE(u',v'), CCT, CRI
Electrical Measurement Items		Vdc, Idc, Vrms, Vpeak+, Vpeak-, Irms, Irms+, Irms-, Inrush current, Frequency, Real power P, reactive power VAR, apparent power VA, power factor PF, energy, THD (current and voltage), Vf, If
Optical Measurement		
Photo Detector	Wavelength Range	380~780nm
	Lumens Range *1	1~70 lm (>70lm optional)
Spectrometer	Detector Type	2048 Pixels Linear CCD array
	Wavelength Range	380~780nm
	Slit	100um
	Resolution(FWHM)	3.8nm
	Integration Time	1.2ms~ 10sec
	Dynamic Range (Single scan)	2x10 ⁸
Fiber Optic Connector		SMA 905
Electrical AC Source		
Output Rating-AC		500VA~36KVA
Voltage	Range/Phase	150V/300V/Auto
	Accuracy	0.2%+0.2%F.S.
	Resolution	0.1V
	Distortion	0.3%@50/60Hz 1%, 15~1KHz (Typical)
	Line Regulation	0.10%
	Load Regulation	0.20%
Max.Current /Phase	r.m.s	32A/20A (150V/300V)
	peak	192A/96A (150V/300V)
Frequency	Range/Phase	DC, 15~1KHz
	Accuracy	0.15%
Harmonic-Inter Harmonic Stimulaton	Bandwidth	2400Hz
	Dimension(HxWxD)	1081x532x700 mm
Others	Weight	100kg
	Power Consumption	300W
	Operating	100~240V VAC 50/60HZ
	Software Support DC Sources	Chroma 52958, Chroma 6200P-300-8, Chroma 11200(650V), Chroma 11200(800V), Keithley 24XX Series

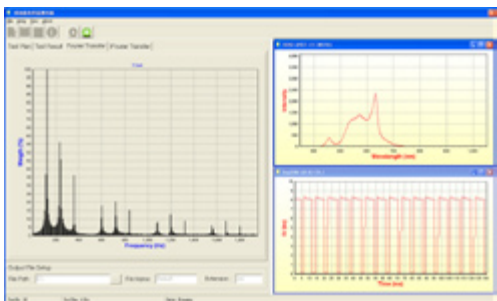
Electrical AC Meter		
AC Voltage	Range	150/300/500Vrms (CF=1.6)
	Accuracy	0.1%+0.05%*KHZ of rdg + 0.08% of rng
	Input Resistance	1M
AC Current	Range	SHUNT H : 0.2/2/8/20Arms (CF=2 @ 0.2/2/8A, CF=4 @ 20A) SHUNT L : 0.01/0.1/0.4/2Arms (CF=4)
	Accuracy *2	SHUNT H : (0.1%+0.05%*KHz) of rdg + 0.12%rdg SHUNT L & 20A : (0.1%+0.05%*KHz) of rdg + 0.25% rng
Power	Range(W)	1.5W~10KW, 24 ranges
	Accuracy *3	SHUNT H : [0.2% + 0.1%*KHz + (0.3/PF)%*KHz] of rdg + 0.2% of rdg SHUNT L & 20A : [0.2% + 0.1%*KHz + (0.3/PF)%*KHz] of rdg + 0.33% of rdg 300V x 0.01A Range : 0.2%of rdg + 7mW
	Power Factor accuracy *4	0.006 + (0.003 / PF) KHz
Harmonic	Range	2~50 order

Notes *1: Base on 60cm T8/T5 light bar test fixture. Total power test fixtures will be different by luminaires

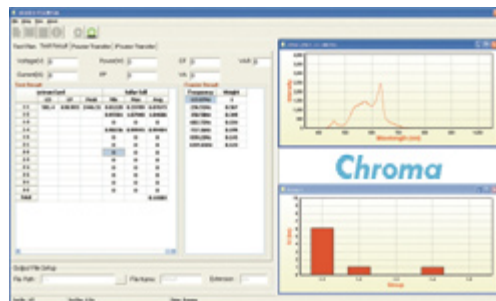
Notes *2: The current accuracy applies temperature range 23 ± 1 for 0.01A&0.2A(CF=2). For all the other current range, the spec. applied under 23 ± 5

Notes *3: The 300Vx0.01A range is usually used to test No-load condition of UUT

Notes *4: The PF spec. applies only when the signals are higher then 50% of the selected voltage and current ranges.



THD, Flicker & Wavelength Measurement



Luminaires Optical Power Distribution Analysis





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