

6010

Charger / Quick Charger / Adapter / LED Driver 自动测试系统



AUTOMATIC TEST EQUIPMENT (ATE)



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特 性

- 高性价比，全功能模组化设计之测试系统
- 适用于充电器，适配器 (adapter) 及 LED电源之多功能测试系统
- 可同时一次测试多个待测物，大幅提升生产线产能
- Windows 7 以上的作业环境
- 接受客制化订制
- 开放性架构软体平台
 - 支援相关硬体扩充
 - 测试项目编辑功能
 - 测试程式编辑功能
 - 统计分析报表编辑功能
 - 线上仪控功能
 - 使用者权限设定
 - 支援 Bar Code Reader

功 能 说 明

- 6010 Charger / Adapter / LED Driver 自动测试系统可满足多种类型之电源产品测试需求，可以同时一次测试多个待测物，大幅提升生产线产能。
具有多个模组组合，包含交流电源供应器独创的内含 Triac模拟输出功能的低杂讯类比式、4组精准的功率电表、2或4组涟波杂讯/时序测量模组、4组 OVP 直流电源、3310F系列&3332F/3336F电子负载模组及独创专为LED 电源输出测试所设计的专用电子负载3340G系列。
- 测试项目涵盖了5大类电源测试特性：
 1. 输出特性 (Output Performance) -- 检测待测物的一般性能
 2. 输入特性 (Input Characteristic) -- 检测待测物的输入电源参数
 3. 稳定度测试 (Regulation Tests) -- 检测待测物在输入电源和负载变化时的稳定性
 4. 时序和瞬态 (Timing & Transient) -- 测量开机、关机时的暂态状态及时序
 5. 保护测试 (Protection Tests) -- 触发及测试待测物的保护电路

LED Driver 测试项目

输出特性 Output Performances

- 直流输出电压
- 直流输出电流
- 涟波电流(RMS & Peak-to-Peak)
- 调光电流(PWM & Triac mode)
- 调光频率
- 调光周期
- 效率
- 测试中调整
- 过冲电压

输入特性 Input Characteristics

- 输入涌浪电流测试
- 输入有效值电流
- 输入峰值电流
- 输入功率
- 输入功率因素
- 输入电压缓升/降测试
- 输入频率缓升/降测试
- 输入断电测试
- 输入电源失真模拟

稳定度测试 Regulation Tests

- 负载稳定度
- 电压稳定度
- 综合稳定度

时序和瞬态 Timing & Transient

- 开机时序
- 关机时序
- 上升时间
- 下降时间

保护测试 Protection Tests

- 短路测试
- 过电压保护
- 过电流保护
- 过功率保护

特殊功能 Special Features

- TTL信号控制
- 继电器控制

Charger / Adapter 测试项目

输出特性 Output Performances

- 直流输出电压
- 直流输出电流
- 效率
- 测试中调整
- 过冲电压
- 过冲电流
- 杂讯(RMS & Peak-to-Peak)

输入特性 Input Characteristics

- 输入涌浪电流测试
- 输入有效值电流
- 输入峰值电流
- 输入功率
- 输入功率因素
- 输入电压缓升/降测试
- 输入频率缓升/降测试
- 输入断电测试
- 输入电源失真模拟

稳定度测试 Regulation Tests

- 负载稳定度
- 电压稳定度
- 综合稳定度
- 动态负载稳定度
- 同步动态负载稳定度

时序和瞬态 Timing & Transient

- 开机时序
- 关机时序
- 上升时间
- 下降时间

保护测试 Protection Tests

- 短路测试
- 过电压保护
- 过电流保护
- 过功率保护
- 温度模拟

特殊测试

- 平均效率测试

特殊功能

- TTL信号控制
- 继电器控制

规格

System Controller

MODEL	PC		
CPU	i5-3470(3.2GHz) or faster	Monitor	22"
SRAM	256KB	Keyboard	101 keys
DRAM	4GB or higher	I/O	Mouse / Print port
Hard driver	500GB or higher	System interface	RS-232
CD-ROM	40X or faster	System I/O	1:8 RS-232 Card

Power Meter

MODEL	4013A	4015A
No. of input Channel	4	
Vrms range	30V / 305V	15V / 30V 50V / 150V 300V / 500V
Irms range	20mA / 200mA 2000mA / 20A 200A peak	20mA / 50mA 200mA / 500mA 2A / 5A / 10A 20A / 200A peak
Low Pass Filter (V & A)	50KHz	
V/I harmonic number	1~50th (only 4015A)	
V/I THD range	0%~255% (only 4015A)	

Noise and Timing Analyzer Module

MODEL	4031	4032
Mainframe	60104	
No. of Input Channel	1	2
Noise measurement range	0~0.6V / 3Vp-p	
Low Pass Filter	up to 20MHZ	
Input Circuit	Differential input	
Timing range	1 Sec/2 Sec/4 Sec/8 Sec/16 Sec	
Voltage range	0~80V / 600V	
Current range	*(1/4F.S.) / (F.S.) A	
V-Ripple / I-Ripple measurement		
Band width	100KHZ	
Voltage range	0~80V / 600V	
Measurement range	0~3.2V / 20Vp-p	
Current range	*(1/4F.S.) / (F.S.) A	
Measurement range	*(1/8F.S.) / (1/2F.S.) Ap-p	
Sampling rate	100KHZ	
Update rate	50~1000mS	
V-Over / I-Over shoot		
Band width	100KHZ	
Voltage range	0~80V / 600V	
Current range	*(1/4F.S.) / (F.S.) A	
Sampling rate	100KHZ	
Update rate	50~1000mS	
Dimming Current measurement		
Band width	100KHZ	
Current range	*(1/8F.S.) / (1/2F.S.) A	
Frequency range	10HZ~35KHZ	
Duty range	3μS~90mS	
Sampling rate	100KHZ	
Update rate	50~1000mS	

DC Source (OVP testing)

MODEL	PFR-100L	PFR-100M
No. of output Channel	4	
Power Rating	100W	100W
Voltage range	50V	250V
Current range	10A	2A

DC Source

MODEL	PSU-60-25	PSU-150-10
Power Rating	Voltage range	Current range
1500W	60V / 25A	150V / 10A

AVR (Auto Voltage Regulator)

MODEL	5303
Power Rating	3KVA
Input Voltage Rating	230Vrms +/- 10%
Output Voltage Rating	230,264,277Vrms Selectable
Accuracy	±2.5Vrms
Interface	RS-232 remote control only

Noise and Timing Analyzer

MODEL	4034-1	4034-2	4034
No. of Input Channel	1	2	4
Noise measurement range	0~0.6V / 3Vp-p		
Low Pass Filter	up to 20MHZ		
Input Circuit	Differential input		
Timing range	1 Sec/2 Sec/4 Sec/8 Sec/16 Sec		
Voltage range	0~80V / 600V		
Current range	*(1/4F.S.) / (F.S.) A		
V-Ripple / I-Ripple measurement			
Band width	100KHz		
Voltage range	0~80V / 600V		
Measurement range	0~3.2V / 20Vp-p		
Current range	*(1/4F.S.) / (F.S.) A		
Measurement range	*(1/8F.S.) / (1/2F.S.) Ap-p		
Sampling rate	100KHz		
Update rate	50~1000mS		
V-Over / I-Over shoot			
Band width	100KHz		
Voltage range	0~80V / 600V		
Current range	*(1/4F.S.) / (F.S.) A		
Sampling rate	100KHz		
Update rate	50~1000mS		
Dimming Current measurement			
Band width	100KHz		
Current range	*(1/8F.S.) / (1/2F.S.) A		
Frequency range	10Hz~35KHz		
Duty range	3μS~90mS		
Sampling rate	100KHz		
Update rate	50~1000mS		

规格

Voltage Regulator

MODEL	5080
No. of Channel/Cell	4 x 4
Voltage range	0 ~ 5V
Accuracy	±0.2% of (Setting + Range)
Resolution	0.001V
Max Current	12mA (AC Input 90V)
Slew rate	0.166V/us
Interface	RS-232

Electronic Load Module

MODEL : 3310F , 3340G Series / 3332F / 3336F

Mainframe	60104
Load Mode	CC / CR / CV / CP / LED
Power rating	40-300W
Voltage range	0~500V
Current range	up to 60A
Slew rate	up to 2.5A/μS
Measurements	Power / Voltage / Current
Monitoring output	Current
Voltage Sense input	Yes

AC Source

MODEL	APS-7050
Power rating	500VA
Voltage range	0~150Vrms / 0~310Vrms
Current range	4.2A / 2.1A
Integration measurement	Power / Time
Output measurement	Yes

MODEL APS-7100

Power rating	1KVA
Voltage range	150 / 200V
Current range	8.4A / 4.2A
Output measurement	yes

NTC (Negative Temperature Coefficient) Emulator

NTC resister	10KΩ
Beta Range	2000K~5000K
Temp. Range	-40~120℃

注* : F.S. 为所选用电子负载的Current range

Noise & Timing Analyzer Module

MODEL	4031	4032
No. of Input Channel	1	2
Timing Measurement		Ripple Measurement
Set-up/Hold-up/Rise/Fall Time		Band Width
Voltage range		0~100 KHz
Current range		0~80 / 600 Vdc
Timing range		Measurement range
1Sec/2Sec/4Sec/8Sec/16Sec		0~3.2 / 20 Vp-p
Resolution		0.001 / 0.01V
Vth1/Vth2		Current range
Voltage range		*(1/4F.S.) / (F.S.) Adc
5%~95% of reading		Measurement range
Resolution		*(1/8F.S.) / (1/2F.S.) Ap-p
Accuracy		0.001 / 0.01A
Noise Measurement		Accuracy
Low Pass Filter		±5% of (Reading + Range)
Voltage range		Sampling Rate
up to 20 MHz		100KHz
Resolution		Update Rate
Accuracy		50~1000 mS
Over Shoot Measurement		Resolution
Band Width		1mS
Voltage range		Dimming Measurement
Measurement range		Band Width
0~80 / 600 Vdc		100KHz
Resolution		Current range
0.1 / 1Vdc		*(1/8F.S.) / (1/2F.S.) Adc
Current range		Resolution
*(1/4F.S.) / (F.S.) Adc		0.001 / 0.01A
Measurement range		Accuracy
*(1/4F.S.) / (F.S.) Adc		±5% of (Reading + Range)
Resolution		Sampling Rate
0.001 / 0.01A		100KHz
Accuracy		Update Rate
±5% OF (Reading + Range)		50~1000 mS
Sampling Rate		Resolution
100KHz		1mS
Update Rate		Frequency range
50~1000 mS		10Hz~35KHz
Resolution		Resolution
1mS		0.1Hz
		Accuracy
		±1% of (Reading + Range)
		Duty(Ton) Range
		3μS~90mS
		Resolution
		1μS
		Accuracy
		±1% of (Reading + Range)

注* : F.S. 为所选用电子负载的Current range

Noise & Timing Analyzer			
MODEL	4034-1	4034-2	4034
No. of Input Channel	1	2	4
Timing Measurement		Ripple Measurement	
Set-up/Hold-up/Rise/Fall Time		Band Width	0~100 KHz
Voltage range	0~80 / 600 Vdc	Voltage range	0~80 / 600 Vdc
Current range	*(1/4F.S.) / (F.S.) Adc	Measurement range	0~3.2 / 20 Vp-p
Timing range	1 Sec/2 Sec/4 Sec/8 Sec/16 Sec	Resolution	0.001 / 0.01V
Resolution	1μS/2μS/4μS/8μS/16μS	Current range	*(1/4F.S.) / (F.S.) Adc
Vth1/Vth2		Measurement range	*(1/8F.S.) / (1/2F.S.) Ap-p
Voltage range	5%~95% of reading	Resolution	0.001 / 0.01A
Resolution	0.1V / 1V , 0.001A/0.01A	Accuracy	±5% of (Reading + Range)
Accuracy	±2% of (Reading + Range)	Sampling Rate	100KHz
Noise Measurement		Update Rate	50~1000 mS
Low Pass Filter	up to 20 MHz	Resolution	1mS
Voltage range	0.6 / 3Vp-p	Dimming Measurement	
Resolution	1mV	Band Width	100KHz
Accuracy	±2% of Reading + 5mV	Current range	*(1/8F.S.) / (1/2F.S.) Adc
Over Shoot Measurement		Resolution	0.001 / 0.01A
Band Width	0~100 KHz	Accuracy	±5% of (Reading + Range)
Voltage range	0~80 / 600 Vdc	Sampling Rate	100KHz
Measurement range	0~80 / 600 Vdc	Update Rate	50~1000 mS
Resolution	0.1 / 1Vdc	Resolution	1mS
Current range	*(1/4F.S.) / (F.S.) Adc	Frequency range	10Hz~35KHz
Measurement range	*(1/4F.S.) / (F.S.) Adc	Resolution	0.1Hz
Resolution	0.001 / 0.01A	Accuracy	±1% of (Reading + Range)
Accuracy	±5% OF (Reading + Range)	Duty(Ton) Range	3μS~90mS
Sampling Rate	100KHz	Resolution	1μS
Update Rate	50~1000 mS	Accuracy	±1% of (Reading + Range)
Resolution	1mS		

注* : F.S. 为所选用电子负载的Current range

DC OVP Source		
MODEL	PFR-100L	PFR-100M
No. of output Channel	4	
Power Rating	100W	100W
Voltage range	50V	250V
Resolution	2mV	10mV
Accuracy	±1% of setting	
Current range	10A	2A
Resolution	1mA	0.1mA
Accuracy	±1% of setting	

DC Source			
MODEL	PSU 60-25 / PSU 150-10		
Output	Measurements		
Power Rating	1500W	DCV meter	60V / 120V
Voltage range	60V / 150V	Resolution	0.01V(0~99) / 0.1V (100~120)
Accuracy	±1% of (Setting + Range)	Accuracy	±1% of (Reading + Range)
Resolution	2mV / 5.2mV	DCA meter	25A / 12.5A
Load Regulation	±1%	Resolution	0.01A
Line Regulation	±1%	Accuracy	±2% of (Reading + Range)
Current rangs	25A / 10A	Interface	RS-232
Accuracy	±1% of (Setting + Range)		
Resolution	0.8mA / 0.5mA		
Protection	OVP, OTP, OPP		

Power Meter

MODEL : 4013A							
No. of Input Channel		4			DCW meter		800mW / 8W / 80W / 800W / 8000W
ACV meter(Vrms)		30V / 305V			Resolution		32-bit
Resolution		16-bit			Accuracy		±0.5% of (Reading + Range)
Accuracy		±0.5% of (Reading + Range)			PF meter		±0.01~1.00
ACA meter(Arms)		20mA / 200mA / 2A / 20A / 200A (for Inrush)			Resolution		0.01
Resolution		16-bit			Accuracy		Corresponds to V and A, 1% of (Reading + Range)
Accuracy		±0.5% of (Reading + Range) / ±2% of (Reading + Range) (for Inrush)					
ACW meter		0.6W / 6W / 60W / 600W / 6000W			Frequency meter		40~70 Hz
Resolution		32-bit			Resolution		0.1 Hz
Accuracy		±0.5% of (Reading + Range)			Accuracy		± 0.1 Hz
DCV meter		40V / 400V			Inrush Delay/Period		0~99.9mS / 0.1~99.9S
Resolution		0.001V / 0.01V			Meter Meas. Rate Interval time		100mS / 200mS / 500mS / 1S / 5S / 10S
Accuracy		±0.5% of (Reading + Range)			Low Pass Filter(V & A)		50KHz
DCA meter		20mA / 200mA / 2A / 20A / 200A (for Inrush)			Interface		RS-232
Resolution		0.001mA/0.01mA/0.1mA/1mA/10mA(for Inrush)					
Accuracy		±0.5% of (Reading + Range) / ±2% of (Reading + Range) (for Inrush)					
MODEL : 4015A							
No. of Input Channel		4					
ACV meter (Vrms)	Range	15V/0.001V 30V/0.001V 50V/0.01V 150V/0.01V 300V/0.01V 500V/0.1V			DCV	Range	Same as ACV
	Accuracy	±0.1% of (Reading + Range)				Accuracy	Same as ACV
ACA meter (Arms)	Range	20mA/0.001mA 500mA/0.01mA 10A/1mA 50mA/0.001mA 2A/0.1mA 20A/1mA 200mA/0.01mA 5A/0.1mA 200A peak/0.01A			DCA	Range	Same as ACA
						Accuracy	Same as ACA
	Accuracy	±0.1% of (Reading + Range)			DCW	Range	Same as ACW
		±2% of (Reading + Range, for Inrush)				Accuracy	Same as ACW
ACW meter	Range	0.3W / 0.01mW 0.6W / 0.01mW 1W / 0.1mW 0.75W / 0.1mW 1.5W / 0.1mW 2.5W / 0.1mW 3W / 0.1mW 6W / 0.1mW 10W / 1mW 7.5W / 1mW 15W / 1mW 25W / 1mW 30W / 1mW 60W / 1mW 100W / 10mW 75W / 1mW 150W / 10mW 250W / 10mW 150W / 10mW 300W / 10mW 500W / 10mW 300W / 10mW 600W / 10mW 1000W / 0.1W			PF meter	Range	±0.001~1.000 / 0.001
						Accuracy	1% of (Reading + Range, Corresponds to V and A)
					Frequency meter	Range	40~70 / 0.1Hz
						Accuracy	± 0.1 Hz
					V/A	Number	1~50 th / Same as ACV, ACA meter
						Accuracy	±0.5% of (Reading + Range)
					V/A THD	Range	0%~255% / 0.001%
						Accuracy	±0.5% of (Reading + Range)
					Inrush Delay/Period		0~100ms
					Low Pass Filter(V&A)		50KHz
					Interface		RS-232
	Accuracy		±0.1% of (Reading + Range)				

AC Power Source with Power/Energy Analyzer

MODEL	APS-7050			
Power Rating	500VA	ACA meter(Arms)		2~70mA / 60~350mA / 0.3~3.5A / 3~17.5A
Type	Linear	Resolution		0.01mA / 0.1mA / 0.001A / 0.01A
Voltage Rating	0~155Vrms / 0~310Vrms	Accuracy		± (0.6% of reading+5 counts) ± (0.5% of reading +5 counts) ± (0.5% of reading+3 counts)
Accuracy	± 0.5% of setting + 2 counts	ACW meter		1.5W / 3W / 6W / 30W / 60W / 300W / 600W
Resolution	0.01V / 0.1V	Resolution		0.01W / 0.1W / 1W
Distortion	THD≤0.5% (R load)	Accuracy		± (0.6% of reading+5 counts) ± (0.6% of reading +5 counts) ± (0.6% of reading+2 counts)
Load Regulation	±0.5%±0.5V	PF meter		0.000~1.000
Line Regulation	0.1%	Resolution		0.001
Current Rating	4.2A / 2.1A	Accuracy		± (2% of reading + 2 counts)
Frequency	45~500Hz	Frequency meter		45 ~ 500Hz
Resolution	0.01Hz / 0.1Hz	Resolution		0.01Hz / 0.1Hz
Protection	OCP, OTP, OPP	Accuracy		±0.1Hz
Measurements		Interface		
ACV meter (Vrms)	0 ~ 99Vrms / 100~310Vrms	Interface	Standard	USB / LAN
Resolution	0.01 / 0.1V		Optional	GPIB / RS232
Accuracy	±0.5% of (Reading + 2 counts)			

AC Source					
MODEL : APS-7100 / APS-7200 / APS-7300					
Output Specification			Meter Specification		
Power	Range	1KVA / 2KVA / 3KVA	Voltage	Range	500V
	Type	Linear Amp		Resolution	0.1V
Voltage	Range	0~155 Vrms / 0~310 Vrms	Current	Accuracy	± 0.5% OF (Reading + Range)
	Resolution	0.1V		Range	7A
Current	Accuracy	0.2%±0.2%F.S.	Watt	Resolution	0.001A
	Range	8.4A / 4.2A		Accuracy	± 0.5% OF (Reading + Range)
Distortion		THD ≤ 0.5% (R load)	Frequency	Range	1000W
Load Regulation		±0.5% ± 0.5V		Resolution	0.001W
Frequency	Range	45 ~ 500Hz	PF	Accuracy	± 0.5% OF (Reading + Range)
	Resolution	0.1Hz : 0.1Hz		Range	40~70Hz
Angle (ON/OFF)	Response Time	100uS	AC input Specification	Resolution	0.1Hz
	Range	0~359°		Accuracy	+/-0.4Hz
PQT <IEC61000-4-11>	Resolution	1°	Voltage range	Range	+/-0.01~1.00
		Dip 、Interrupt 、Variation		Resolution	0.01
Protection		OCF, OTP, Short		Accuracy	Corresponds to V and A,1% of (Reading+Range)
			AC input Specification		
			Voltage range		115Vac±10% 230 Vac ±10%
			Frequency range		47-63Hz
			Circuit Breaker		125/250Vac 20A

Test Fixture Adapter			
MODEL : 99093			
No. of Test Channel		4	
Terminal for Input		Terminal for Output	
Source	AC / DC	Source	AC / DC
Source Sense	AC / DC	Source Sense	AC / DC
Load	DC	Load	DC
Load Sense	DC	Load Sense	DC
DIM	DC	DIM	DC
NTC Emulator (Optional)		NTC	Resister
NTC resister	10KΩ	State	Test/Pass/Fail
Resister Range	10~500KΩ	Load Short	Yes(Relay)
Beta Range	2000K~5000K	Terminal for Key	A/B/STOP
Temp. Range	-40~120℃	State	A/B
		Digital I/O	16 bits

Quick Charger Emulator	
MODEL : 99094	
No. of Test Channel	4+4
Support Quick Charge	QC2.0, QC3.0, PE+, PE+2.0, USB PD
Terminal of Charger	D-sub 15Pin for ChxA, ChxB

Color & Fan flow sensor		
MODEL : 99095		
ITEM		SPECIFICATION
LED	Color distinguish	3 types
	Fading Detcet Time	100 ~ 65535 ms
	Wind distinguish	1000 ~ 65535 ms
FAN	Detcet Time	3 ranges(Range:±200 SCCM)
		100 ms (Minimum)

BMS Board Test Fixture			
MODEL : 99096			
No. of Test Channel	1 ~ 4	Discharge (P+ 、 P-)	20V/30A
Terminal of Input		Charge (CH+ 、 CH-)	20V/30A
Source (PS+ 、 PS-)	DC 20V/30A	Control I/O	Signal Output
MULTIMETER (M+ 、 M- 、 I+)	DCV 、 DCI 、 R	STATE	Pass/Fail/Test LED & Stop Key
DC Load+ 、 Load-	20V/30A	NTC Emulator	
DC Load Sense+ 、 Sense-	Signal Input	NTC Resistor	10KΩ
5080 (VB0\VB1\VB2\VB3\VB4)	DCV	Resistor Range	10 ~ 500KΩ
Terminal of Output		Beta Range	2000K ~ 5000KΩ
BAT (B+ 、 B-)	20V/30A	Temperature Range	-40 ~ 120℃

订 购 方 式

- 6010 : Charger / Adapter / LED Driver 自动测试系统
 - 60104 : 杂讯/时序分析仪
 - 4031 / 4032 : 杂讯/时序分析模组 (1CH/2CH)
 - 4034-1 / 4034-2 / 4034 : 杂讯/时序分析仪 (1CH/2CH/4CH)
 - 4013A / 4015A : 数位功率表
 - 5080 : 电压调整器 (应用于BMS板电池模拟)
 - 5303 : 稳压器 (for Inrush Test)
 - PFR-100M/100L : 无风扇多量程直流电源
 - PSU-60-25 / PSU-150-10 : 可编程交换式直流电源供应器
 - APS-7000 Series : 可编程线性交流电源供应器
- NTC模拟器 (应用于温度模拟)
 - 直流电子负载模组 : 3310F / 3340G系列 / 3332F 、 3336F
 - 99093 : ATE 测试连接转接器
 - 99094 : 快充模拟器
 - 99095 : LED灯号颜色及风扇风量侦测模组
 - 99096 : BMS板测试连接转接器
 - 6010系统软件
 - 6010系统19吋 (20U) 标准系统机箱
 - 6010系统19吋 (30U) 标准系统机箱
 - 商用电脑