

6010

Charger / Quick Charger / Adapter / LED Driver 自動測試系統



AUTOMATIC TEST EQUIPMENT (ATE)



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特 性

- 高性價比，全功能模組化設計之測試系統
- 適用於充電器，適配器(adapter)及LED電源之多功能測試系統
- 可同時一次測試多個待測物，大幅提升生產線產能
- Windows 7 以上的作業環境
- 接受客製化訂製
- 開放性架構軟體平台
 - 支援相關硬體擴充
 - 測試項目編輯功能
 - 測試程式編輯功能
 - 統計分析報表編輯功能
 - 線上儀控功能
 - 使用者權限設定
 - 支援 Bar Code Reader

功 能 說 明

- 6010 Charger / Adapter / LED Driver 自動測試系統可滿足多種類型之電源產品測試需求，可以同時一次測試多個待測物，大幅提升生產線產能。具有多個模組組合，包含交流電源供應器獨創的內含 Triac 模擬輸出功能的低雜訊類比式、4組精準的功率電表、2或4組漣波雜訊/時序測量模組、4組 OVP 直流電源、3310F 系列 & 3332F/3336F 電子負載模組及獨創專為 LED 電源輸出測試所設計的專用電子負載 3340G 系列。
- 測試項目涵蓋了5大類電源測試特性：
 1. 輸出特性 (Output Performance) -- 檢測待測物的一般性能
 2. 輸入特性 (Input Characteristic) -- 檢測待測物的輸入電源參數
 3. 穩定度測試 (Regulation Tests) -- 檢測待測物在輸入電源和負載變化時的穩定性
 4. 時序和瞬態 (Timing & Transient) -- 測量開機、關機時的暫態狀態及時序
 5. 保護測試 (Protection Tests) -- 觸發及測試待測物的保護電路

LED Driver 測試項目

輸出特性 Output Performances

- 直流輸出電壓
- 直流輸出電流
- 漣波電流(RMS & Peak-to-Peak)
- 調光電流(PWM & Triac mode)
- 調光頻率
- 調光週期
- 效率
- 測試中調整
- 過衝電壓

輸入特性 Input Characteristics

- 輸入湧浪電流測試
- 輸入有效值電流
- 輸入峰值電流
- 輸入功率
- 輸入功率因素
- 輸入電壓緩升/降測試
- 輸入頻率緩升/降測試
- 輸入斷電測試
- 輸入電源失真模擬

穩定度測試 Regulation Tests

- 負載穩定度
- 電壓穩定度
- 綜合穩定度

時序和瞬態 Timing & Transient

- 開機時序
- 關機時序
- 上升時間
- 下降時間

保護測試 Protection Tests

- 短路測試
- 過電壓保護
- 過電流保護
- 過功率保護

特殊功能 Special Features

- TTL信號控制
- 繼電器控制

Charger / Adapter 測試項目

輸出特性 Output Performances

- 直流輸出電壓
- 直流輸出電流
- 效率
- 測試中調整
- 過衝電壓
- 過衝電流
- 雜訊(RMS & Peak-to-Peak)

輸入特性 Input Characteristics

- 輸入湧浪電流測試
- 輸入有效值電流
- 輸入峰值電流
- 輸入功率
- 輸入功率因素
- 輸入電壓緩升/降測試
- 輸入頻率緩升/降測試
- 輸入斷電測試
- 輸入電源失真模擬

穩定度測試 Regulation Tests

- 負載穩定度
- 電壓穩定度
- 綜合穩定度
- 動態負載穩定度
- 同步動態負載穩定度

時序和瞬態 Timing & Transient

- 開機時序
- 關機時序
- 上升時間
- 下降時間

保護測試 Protection Tests

- 短路測試
- 過電壓保護
- 過電流保護
- 過功率保護
- 溫度模擬

特殊測試

- 平均效率測試

特殊功能

- TTL信號控制
- 繼電器控制

規 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		

規 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℃

註* : F.S. 為所選用電子負載的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	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	1Sec/2Sec/4Sec/8Sec/16Sec	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		

註* : F.S. 為所選用電子負載的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		

註* : F.S. 為所選用電子負載的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 ranges	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)			Frequency meter		40~70 Hz		
ACW meter		0.6W / 6W / 60W / 600W / 6000W			Resolution		0.1 Hz		
Resolution		32-bit			Accuracy		± 0.1 Hz		
Accuracy		±0.5% of (Reading + Range)			Inrush Delay/Period		0~99.9mS / 0.1~99.9S		
DCV meter		40V / 400V			Meter Meas. Rate		100mS / 200mS / 500mS / 1S / 5S / 10S		
Resolution		0.001V / 0.01V			Interval time				
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		DCV	Range	Same as ACV			
	Accuracy	150V/0.01V 300V/0.01V 500V/0.1V			Accuracy	Same as ACV			
ACA meter (Arms)	Range	±0.1% of (Reading + Range)		DCA	Range	Same as ACA			
					Accuracy	Same as ACA			
	Accuracy	20mA/0.001mA 50mA/0.001mA 200mA/0.01mA		DCW	Range	Same as ACW			
		50mA/0.001mA 2A/0.1mA 20A/1mA			Accuracy	Same as ACW			
ACW meter	Range	±0.1% of (Reading + Range)		PF meter	Range	±0.001~1.000 / 0.001			
		±2% of (Reading + Range, for Inrush)			Accuracy	1% of (Reading + Range, Corresponds to V and A)			
		0.3W / 0.01mW 0.6W / 0.01mW 1W / 0.1mW		Frequency meter	Range	40~70 / 0.1Hz			
		0.75W / 0.1mW 1.5W / 0.1mW 2.5W / 0.1mW			Accuracy	± 0.1 Hz			
		3W / 0.1mW 6W / 0.1mW 10W / 1mW		V/A	Number	1~50 th / Same as ACV, ACA meter			
		7.5W / 1mW 15W / 1mW 25W / 1mW			Harmonic	Accuracy	±0.5% of (Reading + Range)		
		30W / 1mW 60W / 1mW 100W / 10mW		V/A THD		Range	0%~255% / 0.001%		
		75W / 1mW 150W / 10mW 250W / 10mW			Accuracy	±0.5% of (Reading + Range)			
		150W / 10mW 300W / 10mW 1000W / 0.1W		Inrush Delay/Period	0~100ms				
		300W / 10mW 600W / 10mW 1000W / 0.1W			Low Pass Filter(V&A)	50KHz			
	Accuracy	±0.1% of (Reading + Range)		Interface		RS-232			

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)
			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°C	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°C

訂購方式

- **6010** : Charger / Adapter / LED Driver 自動測試系統
- **60104** : 雜訊/時序分析儀
- **4031 / 4032** : 雜訊/時序分析模組 (1CH/2CH)
- **4034-1 / 4034-2 / 4034** : 雜訊/時序分析儀 (1CH/2CH/4CH)
- **4013A / 4015A** : 數位功率表
- **5080** : 電壓調整器 (應用於BMS板電池模擬)
- **5303** : 穩壓器 (for Inrush Test)
- **PFR-100M/100L** : 無風扇多量程直流電源
- **PSU-60-25 / PSU-150-10** : 可編程交換式直流電源供應器
- **APS-7000 Series** : 可編程線性交流電源供應器
- **NTC模擬器** (應用於溫度模擬)
- 直流電子負載模組 : 3310F / 3340G系列 / 3332F、3336F
- **99093** : ATE 測試連接轉接器
- **99094** : 快充模擬器
- **99095** : LED燈號顏色及風扇風量偵測模組
- **99096** : BMS板測試連接轉接器
- **6010系統軟體**
- **6010系統19吋 (20U)** 標準系統機箱
- **6010系統19吋 (30U)** 標準系統機箱
- 商用電腦