

6050-2-X 3310F

USB PD Dual-Channel + AB Switch Test System



Basic version



Standard version



Value version



Complete version

Feature

- 2 sets of U.U.T can be tested at the same time to improve test efficiency and save test time and cost
- Select the required device configuration version (Basic / Standard / Added Value / Full version) according to product testing requirements
- In addition to supporting USB PD, also supports QC2.0 / QC3.0 / PE+ / PE+2.0
- Highly cost-effective, fully functional modular design test system
- Operating environment of Windows 7 or higher (included)
- Open architecture software platform
 1. Support related hardware expansion
 2. User editable test item
 3. User editable test program
 4. User editable report format & statistical report
 5. On-line control function
 6. User authority control
 7. Support Bar Code Reader

6050-2 (3310F) USB PD DUAL-CHANNEL+AB SWITCH TEST SYSTEM

USB PD Test items and equipment configuration table

Test items	Instrument Equipment								
	APS-7000 AC Source	9922-R QC Controller	99094 QC Controller	3310F DC Load	4031-PD Timing & Noise	4015A Power Meter	4013A Power Meter	PFR-100L D.C. Power Supply	5303 AVR
USB PD Performances									
USB PD Source / Sink Profile	✓	✓	✓	✓					
USB PD Power Data Object (PDO)	✓	✓	✓	✓					
Positive Voltage Transitions	✓	✓	✓	✓	✓				
Negative Voltage Transitions	✓	✓	✓	✓	✓				
Hard Reset	✓	✓	✓	✓	✓				
USB Type C Cable unplug	✓		✓	✓	✓				
Output Performances									
Output Voltage	✓	✓	✓	✓					
Output Current	✓	✓	✓	✓					
Dynamic Load (Vpeak +/-)	✓	✓	✓	✓	✓				
Average Efficiency	✓	✓	✓	✓					
Ripple Voltage	✓	✓	✓	✓	✓				
Input Characteristics									
Input RMS Current	✓	✓	✓	✓		✓	✓		
Input Frequency	✓	✓	✓	✓		✓	✓		
Input Power	✓	✓	✓	✓		✓	✓		
No Load Power Consumption	✓	✓	✓	✓		✓	✓		
Input Power Factor	✓	✓	✓	✓		✓	✓		
Input Voltage Sag	✓	✓	✓	✓	✓	✓	✓		
Current Harmonics	✓	✓	✓	✓		✓			
Input Inrush Current	✓	✓	✓	✓		✓	✓		✓
Regulation Tests									
Line Regulation	✓	✓	✓	✓					
Load Regulation	✓	✓	✓	✓					
Combine Regulation	✓	✓	✓	✓					
Timing & Transient									
Turn ON (Set-Up) Time	✓	✓	✓	✓	✓				
Turn OFF (Hold-Up) Time	✓	✓	✓	✓	✓				
Rise Time	✓	✓	✓	✓	✓				
Fall Time	✓	✓	✓	✓	✓				
Protection Tests									
Short Circuit	✓	✓	✓	✓					
OV Protection	✓	✓	✓	✓				✓	
OC Protection	✓	✓	✓	✓					
OP Protection	✓	✓	✓	✓					

USB PD Dual-channel + AB switch test system quick selection table

Test items	USB PD Dual-channel + AB switch test system quick selection table			
	6050-2-A-X Basic version	6050-2-B-X Standard version	6050-2-C-X Value Version	6050-2-D-X Complete version
USB PD Performances				
USB PD Source / Sink Profile	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
USB PD Power Data Object (PDO)	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Positive Voltage Transitions		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Negative Voltage Transitions		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Hard Reset		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
USB Type C Cable unplug		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Output Performances				
Output Voltage	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Output Current	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Dynamic Load (Vpeak +/-)		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Average Efficiency	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Ripple Voltage		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Input Characteristics				
Input RMS Current	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Input Frequency	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Input Power	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
No Load Power Consumption	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Input Power Factor	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Input Voltage Sag	<input checked="" type="checkbox"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Current Harmonics			<input checked="" type="radio"/>	<input checked="" type="radio"/>
Input Inrush Current				<input checked="" type="radio"/>
Regulation Tests				
Line Regulation	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Load Regulation	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Combine Regulation	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Timing & Transient				
Turn ON (Set-Up) Time		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Turn OFF (Hold-Up) Time		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Rise Time		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Fall Time		<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Protection Tests				
Short Circuit	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
OV Protection				<input checked="" type="radio"/>
OC Protection	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
OP Protection	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

△ Only provide Input Voltage Sag capability

6050-2-A-X Single Output USB PD basic version dual-channel + AB switch test system configuration is as shown in the table, just needs APS-7000 series AC Source, 3305F + 3310F series and 9922-R Quick Charge Controller and 4013A-2 Power Meter.

The basic version system configuration is shown below.



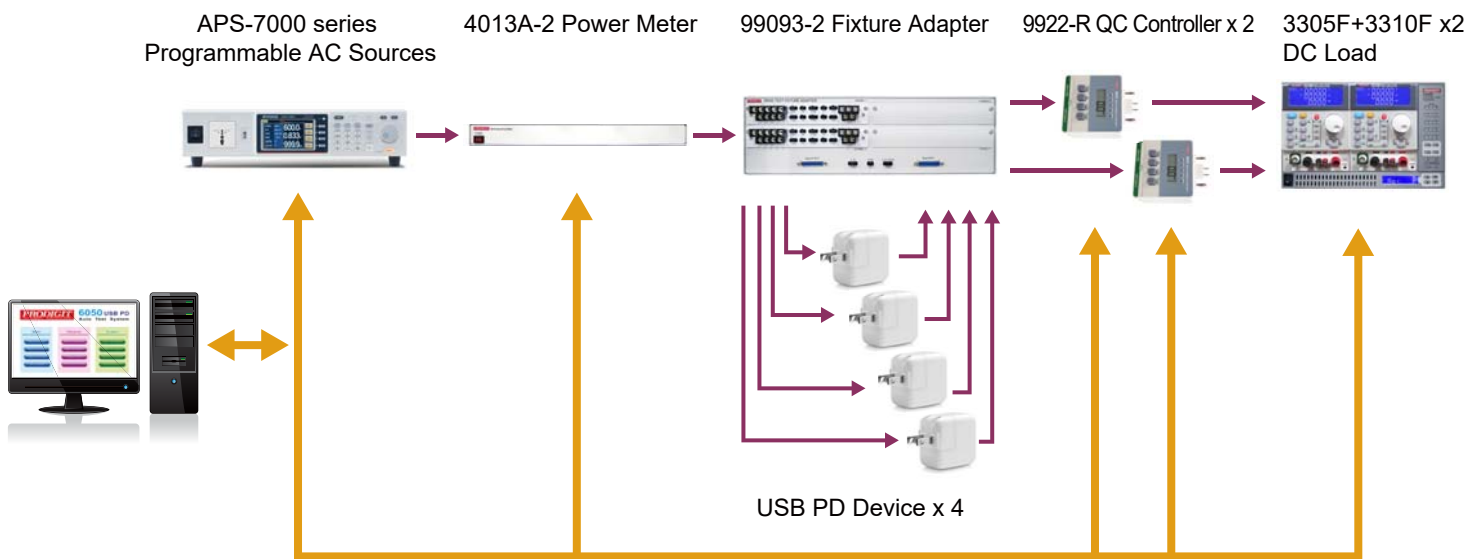
→ 3305F + 3310F x2 DC Load

→ 4013A-2 Power Meter

→ 99093-2 Fixture Adapter

→ APS-7000 series AC Sources

6050-2-A-X Basic version dual-channel + AB switch test system block diagram



6050-2-A-X Dual Channel with AB Switch Test System Configuration

6050-2-A-X Basic version dual-channel + AB switch test system test items are as follows

USB PD Performances
USB PD Source / Sink Profile
USB PD Power Data Object (PDO)

Output Performances
Output Voltage
Output Current
Average Efficiency

Regulation Tests
Line Regulation
Load Regulation
Combine Regulation

Input Characteristics
Input RMS Current
Input Frequency
Input Power
No Load Power Consumption
Input Power Factor

Protection Tests
Short Circuit
OC Protection
OP Protection

6050-2-A-X Basic version dual-channel + AB switch test system equipment configuration table

Model	Quantity
APS-7000 Series Programmable Linear AC Power Sources	1
3305F 2CH Mainframe	1
3310F 60V/30A/150W DC Load Module	2
9922-R Quick Charger Controller with RS-232	2
4013A-2 Power Meter (dual-channel)	1
99093-2 Fixture Adapter (dual-channel)	1
6050 system software	1
System Controller (PC)	1
CP-104EL-A 1:4 High Speed RS-232 Card	1
Uport 1410 USB to RS-232 4 Port For Note Book	0
System Specifications (PC or Note Book)	
CPU	i5-3470(3.2GHz) or faster
SRAM	256KB
DRAM	4GB or higher
Hard Driver	500GB or higher
CD-ROM	40X or faster
Monitor	22"
KeyBoard	101 Keys
I/O	Mouse/Print Port
System Interface	RS-232
System I/O	1:4 or 1:8 High Speed RS-232 Card
○ The system device should use this interface when using Note Book.	

OS : Windows 7.0 or latest version

6050-2-B-X Standard version dual-channel + AB switch test system is consisted of basic version by adding 4031-PD Timing & Noise Meter x 2 and 99094-2 two channels Quick Charger Controller can increase USB PD characteristics and timing and transient testing
 The standard version system configuration is shown below.



→ 60104+4031-PD+3310F+3310F+4031-PD

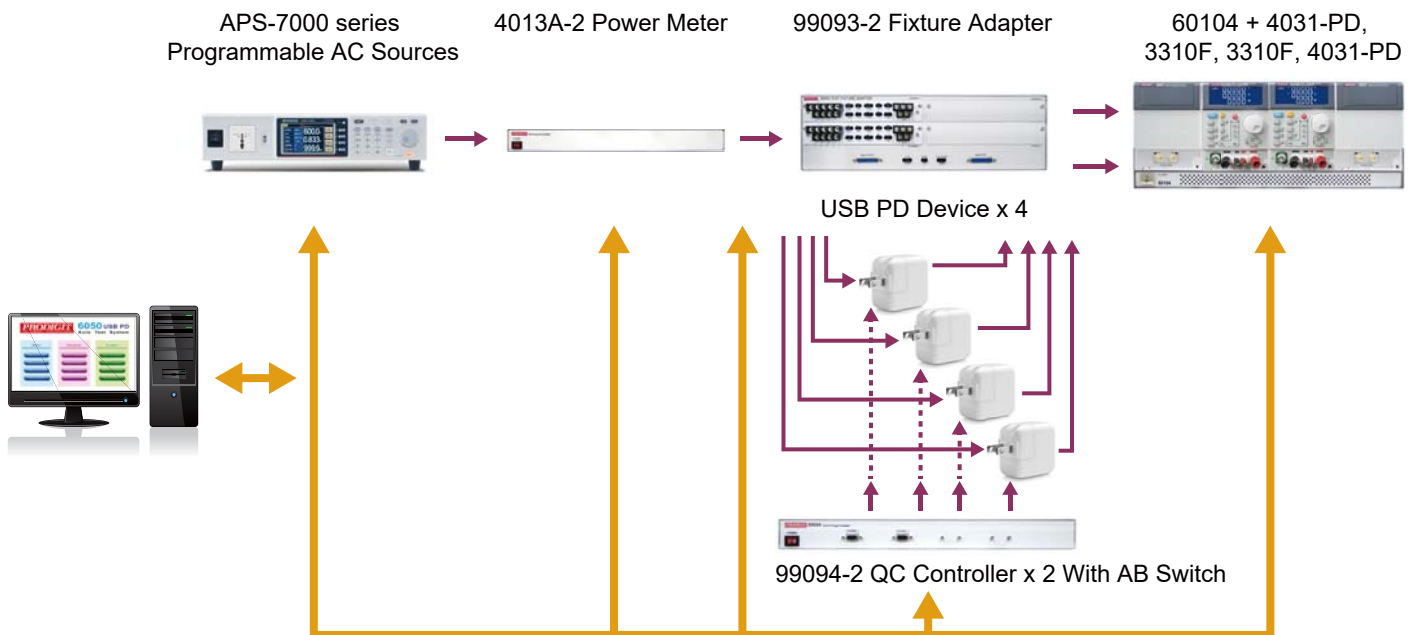
→ 99094-2 QC Controller

→ 4013A-2 Power Meter

→ 99093-2 Fixture Adapter

→ APS-7000 series AC Sources

6050-2-B-X standard version dual-channel + AB switch test system block diagram



6050-2-B-X Dual Channel with AB Switch Test System Configuration

6050-2-B-X Standard version dual-channel + AB switch by adding 4031-PDx2 and 99094-2 two channels Quick Charger Controller can increase the test items as shown in the block below.

USB PD Performances
Positive Voltage Transitions
Negative Voltage Transitions
Hard Reset
USB Type C Cable unplug

Timing & Transient
Turn ON (Set-Up) Time
Turn OFF (Hold-Up) Time
Rise Time
Fall Time

Output Performances
Dynamic Load (Vpeak +/-)
Ripple Voltage

Input Characteristics
Input Voltage Sag

6050-2-B-X Standard version dual-channel + AB switch equipment configuration table

Model	Quantity
APS-7000 Series Programmable Linear AC Power Sources	1
60104 4CH Mainframe; 4031-PD, 3310F, 3310F, 4031-PD	1
3310F 60V/30A/150W DC Load Module	2
4031-PD Timing & Noise Meter for PD	2
99094-2 Quick Charger Controller (dual-channel)	1
4013A-2 Power Meter (dual-channel)	1
6050 system software	1
System Controller (PC)	1
CP-104EL-A 1:4 High Speed RS-232 Card	1
Uport 1410 USB to RS-232 4 Port For Note Book	0
System Specifications (PC or Note Book)	
CPU	i5-3470(3.2GHz) or faster
SRAM	256KB
DRAM	4GB or higher
Hard Driver	500GB or higher
CD-ROM	40X or faster
Monitor	22"
KeyBoard	101 Keys
I/O	Mouse / Print Port
System Interface	RS-232
System I/O	1:4 or 1:8 High Speed RS-232 Card
○ The system device should use this interface when using Note Book.	

OS : Windows 7.0 or latest version

6050-2-C-X Value version (Standard version + Input current harmonic) dual-channel + AB switch test system : changing 4013A-2 to 4015A-2 power meter with Harmonic can increase the current harmonic Harmonics test.

The value version system configuration is shown below.



→ 60104+4031-PD+3310F+3310F+4031-PD

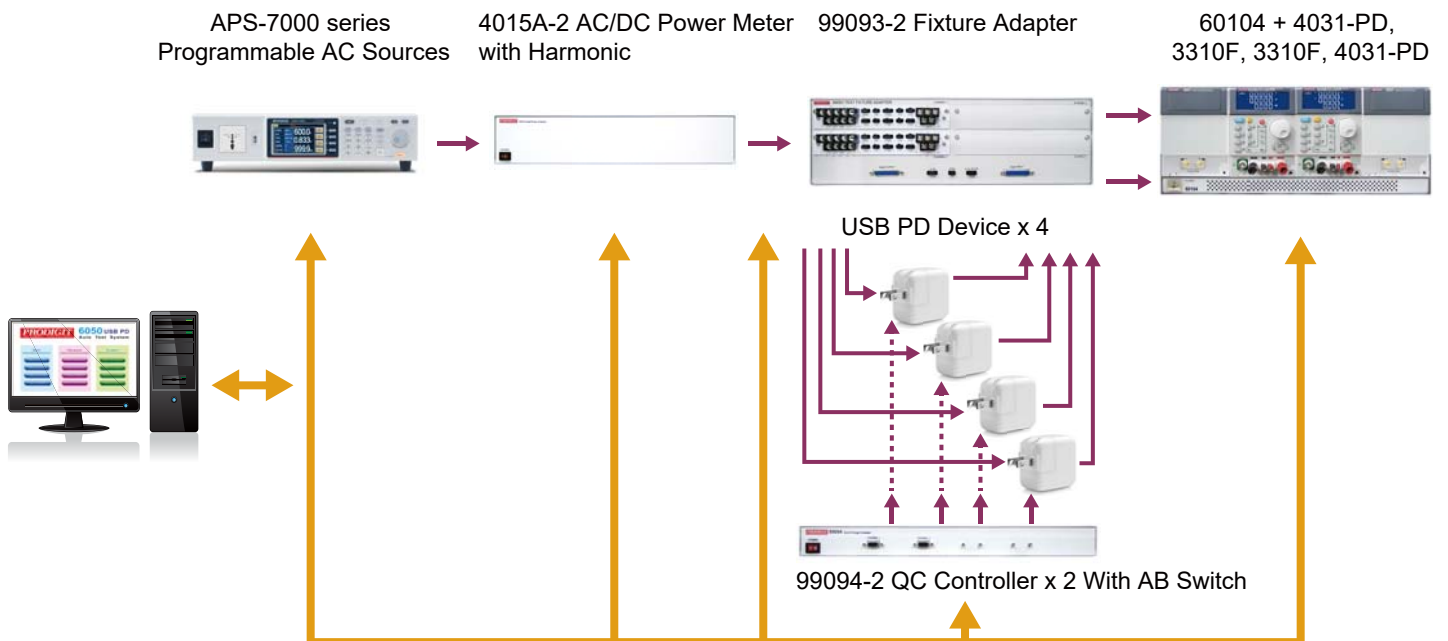
→ 99094-2 QC Controller

→ 4015A-2 Power Meter with Harmonic

→ 99093-2 Fixture Adapter

→ APS-7000 series AC Sources

6050-2-C-X Value version dual-channel + AB switch test system block diagram



6050-2-C-X Dual Channel with AB Switch Test System Configuration

6050-2-C-X Value version dual-channel + AB switch test system by adding 4015A-2 can increase the test items as shown in the following green block

Input Characteristics
Current Harmonics

6050-2-C-X Value version dual-channel + AB switch test system equipment configuration table

Model	Quantity
APS-7000 Series Programmable Linear AC Power Sources	1
60104 4CH Mainframe; 4031-PD, 3310F, 3310F, 4031-PD	1
3310F 60V/30A/150W DC Load Module	2
4031-PD Timing & Noise Meter for PD	2
4015A-2 Power Meter with Harmonic (dual-channel)	1
99094-2 Quick Charger Controller (dual-channel)	1
99093-2 Fixture Adapter (dual-channel)	1
6050 system software	1
System Controller (PC)	1
CP-104EL-A 1:4 High Speed RS-232 Card	1
Uport 1410 USB to RS-232 4 Port For Note Book	0
System Specifications (PC or Note Book)	
CPU	i5-3470(3.2GHz) or faster
SRAM	256KB
DRAM	4GB or higher
Hard Driver	500GB or higher
CD-ROM	40X or faster
Monitor	22"
KeyBoard	101 Keys
I/O	Mouse / Print Port
System Interface	RS-232
System I/O	1:4 or 1:8 High Speed RS-232 Card
○ The system device should use this interface when using Note Book.	

OS : Windows 7.0 or latest version

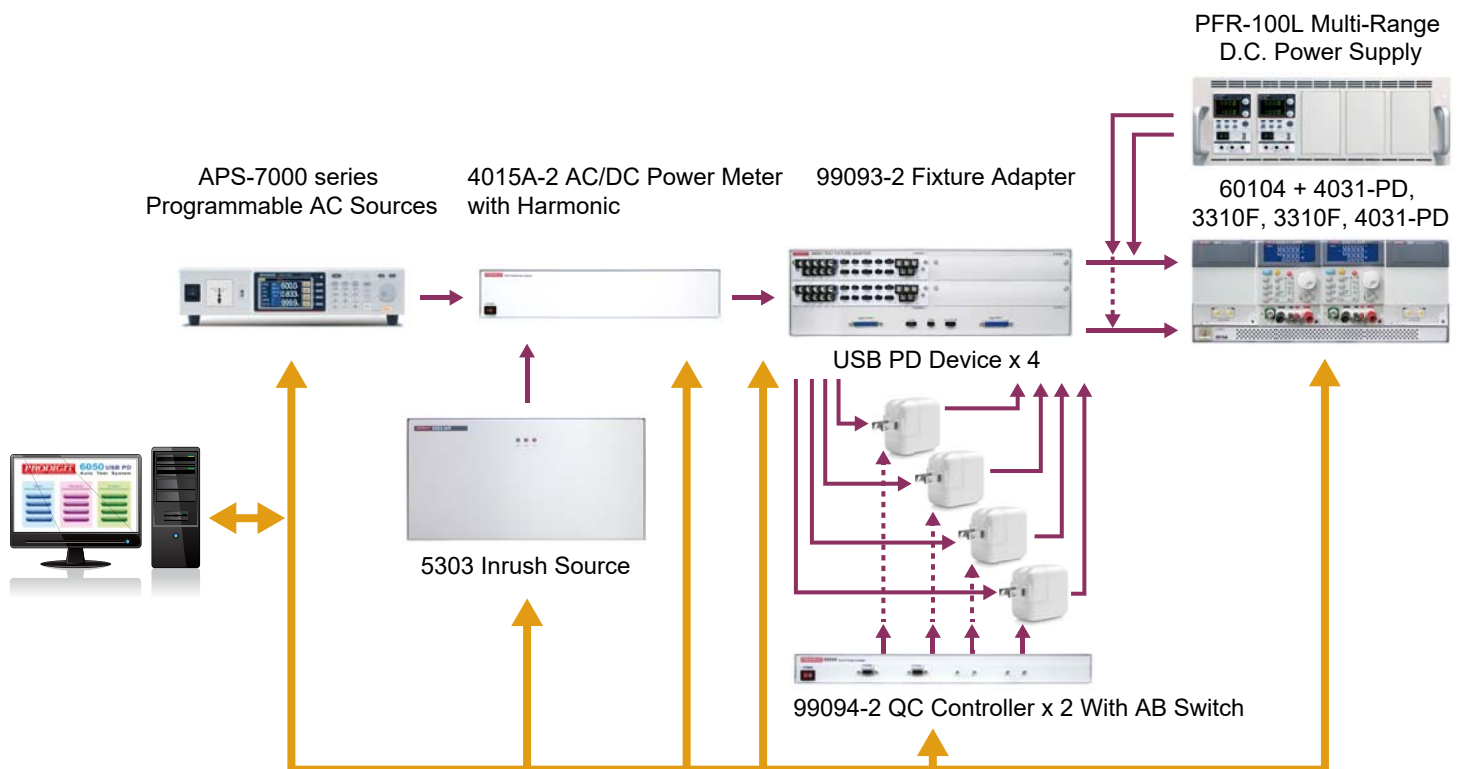
6050-2-D-X Complete version (Standard version + Input Current Harmonics + Input Inrush Current) dual-channel + AB switch test system : adds 5303 AVR and PFR-100L-2 D.C. Power Supply to increase Input Inrush Current and over voltage protection tests.

The Complete version system configuration is shown below.



- 60104+4031-PD+3310F+3310F+4031-PD
- 99094-2 QC Controller
- PFR-100L Multi-Range D.C. Power Supply
- 4015A-2 Power Meter with Harmonic
- 5303 AVR for Inrush Current
- 99093-2 Fixture Adapter
- APS-7000 series AC Sources

6050-2-D-X Complete version dual-channel + AB switch test system block diagram



6050-2-D-X Dual Channel with AB Switch Test System Configuration

6050-2-D-X Complete version dual-channel + AB switch test system by adding 5303 and PFR-100L , the following items can be added to the test item

Input Characteristics
Input Inrush Current

Protection Tests
OV Protection

6050-2-D Complete version dual-channel + AB switch equipment configuration table

Model	Quantity
APS-7000 Series Programmable Linear AC Power Sources	1
60104 4CH Mainframe; 4031-PD, 3310F, 3310F, 4031-PD	1
3310F 60V/30A/150W DC Load Module	2
4031-PD Timing & Noise Meter for PD	2
4015A-2 Power Meter with Harmonic (dual-channel)	1
PFR-100L Multi-Range D.C. Power Supply	2
5303 3KVA AVR	1
99094-2 Quick Charger Controller (dual-channel)	1
99093-2 Fixture Adapter (dual-channel)	1
6050 system software	1
System Controller (PC)	1
CP-104EL-A 1:4 High Speed RS-232 Card	1
Uport 1410 USB to RS-232 4 Port For Note Book	0
System Specifications (PC or Note Book)	
CPU	i5-3470(3.2GHz) or faster
SRAM	256KB
DRAM	4GB or higher
Hard Driver	500GB or higher
CD-ROM	40X or faster
Monitor	22"
KeyBoard	101 Keys
I/O	Mouse / Print Port
System Interface	RS-232
System I/O	1:4 or 1:8 High Speed RS-232 Card
○ The system device should use this interface when using Note Book.	

OS : Windows 7.0 or latest version

All Equipment Functions and Specifications List

APS-7000 Series Programmable Linear AC Power Sources Suitable test item & Specifications

Model	APS-7000 Series Programmable Linear AC Power Sources			
Suitable Test Item				
1. Input RMS Current 2. Input Frequency 3. Input Power 4. No Load Power Consumption 5. Input Power Factor 6. Input Voltage Sag 7. Line Regulation 8. A voltage ON/OFF angle (0 ~ 360°) Can be programmed				
Specifications	APS-7050	APS-7100	APS-7200	APS-7300
Power Rating	500VA	1000VA	2000VA	3000VA
Voltage Rating	0 ~ 155Vrms, 0 ~ 310Vrms			
Current Rating	0~155Vrms	4.2A	8.4A	16.8A
	0~310Vrms	2.1A	4.2A	8.4A
Frequency	45 ~ 500 Hz			
Angle (ON/OFF)	0 ~ 359°			
PQT<IEC 61000-4-11>	DIP, Interrupt, Variation			
MEASUREMENT				
ACV meter (Vrms)	0 ~ 155Vrms, 0 ~ 310Vrms, Auto			
Voltage (RMS)	Range	0.20~38.75Vrms;38.76~77.50Vrms;77.51~155.0Vrms;155.1~310.0Vrms		
	Resolution	0.01V at 0.00 ~ 99.99Vrms; 0.1V at 100.0 ~ 310.0Vrms		
	Accuracy *4	±(0.5% of reading + 2 counts)		
Frequency	Range	45 ~ 500Hz		
	Resolution	0.01Hz at 45Hz~99.99Hz ; 0.1Hz at 100Hz~500.0Hz		
	Accuracy	±0.1Hz		
Current (RMS)	Range	2.00 ~ 70.00mA ; 60.0 ~ 350.0mA ; 0.300 ~ 3.500A ; 3.00 ~ 17.5A	0.200 ~ 3.500A ; 3.00 ~ 35.00A	
	Resolution	0.01mA, 0.1mA, 0.001A, 0.01A	0.001A ; 0.01A	
	Accuracy	± (0.6% of reading+5 counts), 2.00~350.0mA ; ± (0.5% of reading+5 counts), 0.300~3.500A ; ± (0.5% of reading+3 counts),3.000~17.50A	± (0.5% of reading + 5 counts) , 0.200 ~ 3.500A ± (0.5% of reading + 3 counts) , 3.00 ~ 35.00A	
Current (Peak)	Range	0.0 ~ 70.0A	0.0 ~ 140.0A	
	Resolution	0.1A		
	Accuracy	± (1% of reading + 1 count)		
Power (W)	Resolution	0.01W, 0.1W, 1W	0.1W, 1W	
	Accuracy	± (0.6% of reading+5 counts), 0.20~99.99W ; ± (0.6% of reading+5 counts), 100.0~999.9W ; ± (0.6% of reading+2 counts), 1000~9999W	± (0.6% of reading + 5counts) , 0.2 ~ 999.9W ± (0.6% of reading + 2counts) , 1000 ~ 9999W	
Apparent (VA)	Resolution	0.01VA, 0.1VA, 1VA	0.1VA, 1VA	
	Accuracy	±(1% of reading+7 counts), 0.20~99.99VA ; ±(1% of reading+7 counts), 100.0~999.9V A ; ±(1% of reading+5 counts), 1000~9999VA	± (1% of reading + 7 counts) , 0.2 ~ 999.9VA ; ± (1% of reading + 5 counts) , 1000 ~ 9999VA	
Power Factor	Resolution	0.001		
	Accuracy	± (2% of reading + 2 counts)		
Frequency meter	45 ~ 500Hz			
Interface	RS-232			

Table 1 - Preferred test level and durations for voltage dips

Class ^a	Test level and durations for voltage dips(ts) (50 Hz/60 Hz)				
Class 1	Case-by-case according to the equipment requirements				
Class 2	0 % during 1/2 cycle	0 % during 1 cycle	70 % during 25/30 ^c cycles		
Class 3	0 % during 1/2 cycle	0 % during 1 cycle	40 % during 10/12 ^c cycles	70 % during 25/30 ^c cycles	80 % during 250/300 ^c cycles
Class X ^b	X	X	X	X	X

a Classes as per IEC 61000-2-4; see Annex B.
 b To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.
 c "25/30 cycles" means "25 cycles for 50 Hz test" and "30 cycles for 60 Hz test"

Table 2 - Preferred test level and durations for short interruptions

Class ^a	Class ^a Test level and durations for short interruptions (ts) (50 Hz/60 Hz)
Class 1	Case-by-case according to the equipment requirements
Class 2	0 % during 250/300 ^c cycles
Class 3	0 % during 250/300 ^c cycles
Class X ^b	X

a Classes as per IEC 61000-2-4 ; see Annex B.
 b To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.
 c "250/300 cycles" means "250 cycles for 50 Hz test" and "300 cycles for 60 Hz test"

Table 3 - Timing of short-term supply voltage variations

Voltage test level	Time for decreasing voltage (td)	Time at reduced voltage (ts)	Time for increasing voltage (ti) (50 Hz/60 Hz)
70%	Abrupt	1 cycle	25/30 ^b cycles
X ^a	X ^a	X ^a	X ^a

a To be defined by product committee.
 b "25/30 cycles" means "25 cycles for 50 Hz test" and "30 cycles for 60 Hz test".

3310F DC E-Load List of Specification and applicable features

Model	3310F DC E-Load	
Applicable test function		
1. Output Voltage 2. Output Current 3. Dynamic Load 4. Efficiency	5. Average Efficiency 6. Short Circuit 7. OC Protection 8. OP Protection	
Specifications		
Power	150W	
Current	30A	
Voltage	60V	
Constant Current Mode		
Range	0 ~ 3A	0 ~ 30A
Constant Resistance Mode		
Range	2 ~120K Ω	0.02 Ω ~ 2 Ω
Constant Voltage Mode		
Range	0 ~ 6V	0 ~ 60V
Constant Power Mode		
Range	0 ~ 15W	0 ~ 150W
Dynamic Mode		
Timing		
Thigh & Tlow	0.050~9.999 / 99.99 / 999.9 / 9999mS	
Resolution	0.001 / 0.01 / 0.1 / 1mS	
Slew rate	2.0 ~ 125mA/uS	20 ~ 1250mA/uS
Accuracy	\pm (5% of Setting) \pm 10uS	
Measurement		
Voltage Read Back		
Range (5 Digital)	6V	60V
Current Read Back		
Range (5 Digital)	3A	30A
Resolution	0.0001A	0.001A
Current Monitor	FULL SCALE 10V	
Current Programming Input	FULL SCALE 10V	
Programmable Short	BUILT-IN	
Load ON Voltage	0.1 ~ 25V	
Accuracy	1% of (Setting + Range)	
Load OFF Voltage	0 ~ 25V	
Accuracy	0.025% of (Setting + Range)	
Typical Short Resistance	0.02 Ω	
Maximum Short Current	30 A	
Operating range		
Temperature	0~+40 $^{\circ}$ C	
Humidity	20~85%rh	

4015A-2 List of Specification and applicable features

Model	4015A-2 Power Meter With Harmonic			
No. of Input Channel	2			
Applicable test function				
1. Input RMS Current		4. No Load Power Consumption		
2. Input Frequency		5. Input Power Factor		
3. Input Power		6. Current Harmonic		
Specifications				
ACV meter (Vrms)	Range	15V / 0.001V, 30V / 0.001V, 50V / 0.01V 150V / 0.01V, 300V / 0.01V, 500V / 0.1V		
	Accuracy	±0.1% of (Reading + Range)		
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		
	Accuracy	±0.1% of (Reading + Range)		
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
		3W / 0.1mW	6W / 0.1mW	10W / 1mW
		7.5W / 1mW	15W / 1mW	25W / 1mW
		30W / 1mW	60W/1mW	100W / 10mW
		75W / 10mW	150W / 10mW	250W / 10mW
		300W / 10mW	600W / 10mW	1000W / 0.1W
750W / 10mW	1500W / 0.1W	2500W / 0.1W		
1500W / 0.1W	3000W / 0.1W	5000W / 0.1W		
3000W / 0.1W	6000W / 0.1W	10000W / 1W		
Accuracy	±0.1% of (Reading + Range)			
DCV	Range	Same as AC		
	Accuracy	Same as AC		
DCA	Range	Same as AC		
	Accuracy	Same as AC		
DCW	Range	Same as AC		
	Accuracy	Same as AC		
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		
Harmonic	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		

4013A-2 List of Specification and applicable features

Model	4013A Power Meter
No. of Input Channel	2
Applicable test function	
1. Input RMS Current 2. Input Frequency 3. Input Power	4. No Load Power Consumption 5. Input Power Factor
Specifications	
ACV meter(Vrms)	30V / 300V
Resolution	16-bit
Accuracy	±0.5% of (Reading + Range)
ACA meter(Arms)	20mA / 200mA / 2A / 20A / 200A(for Inrush)
Resolution	16-bit
Accuracy	±0.5% of (Reading + Range) / ±2% of (Reading + Range) (for Inrush)
ACW meter	0.6W / 6W / 60W / 600W / 6000W
Resolution	32-bit
Accuracy	±0.5% of (Reading + Range)
DCV meter	40V / 400V
Resolution	0.001V / 0.01V
Accuracy	±0.5% of (Reading + Range)
DCA meter	20mA / 200mA / 2A / 20A / 200A(for Inrush)
Resolution	0.001mA / 0.01mA / 0.1mA / 1mA / 10mA(for Inrush)
Accuracy	±0.5% of (Reading + Range) / ±2% of (Reading + Range) (for Inrush)
DCW meter	800mW / 8W / 80W / 800W / 8000W
Resolution	32-bit
Accuracy	±0.5% of (Reading + Range)
PF meter	±0.01~1.00
Resolution	0.01
Accuracy	Corresponds to V and A, 1% of (Reading + Range)
Frequency meter	40~70 Hz
Resolution	0.1 Hz
Accuracy	± 0.1 Hz
Inrush Delay/Period	0~99.9mS/0.1~99.9S
Meter Meas. Rate Interval time	100mS / 200mS / 500mS / 1S / 5S / 10S
Low Pass Filter(V & A)	50KHz
Interface	RS-232

4031-PD List of Specification and applicable features

Model	4031-PD Noise & Timing Analyzer Module		
Applicable test function			
1. Positive Voltage Transitions 2. Negative Voltage Transitions 3. Hard Reset 4. USB Type C Cable Unplug 5. Ripple Voltage 6. Dynamic Load Vpeak +/- Measure		7. Input Voltage Sag 8. Turn ON(Set-Up) Time 9. Turn OFF(Hold-Up) Time 10. Rise Time 11. Fall Time	
Specifications			
No. of input channel		1	
Timing Measurement		Ripple Measurement	
Set-up / Hold-up / Rise / Fall Time		Band Width	0 ~ 100 KHz
Voltage range	0 ~ 10 / 30 Vdc	Voltage range	0 ~ 10/30 Vdc
Current range	*(1/4F.S.) / (F.S.) Adc	Measurement range	0 ~ 0.4/1 Vp-p
Timing range	1 Sec/2 Sec/4 Sec/8 Sec/16 Sec	Resolution	0.001/0.01V
Resolution	1 uS/2uS/4uS/8uS/16uS	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	0.01 V/0.01V, 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 ~ 10 / 30 Vdc	Sampling Rate	100KHz
Measurement range	0 ~ 10 / 30 Vdc	Update Rate	50~1000 mS
Resolution	0.01 Vdc	Resolution	1mS
Current range	*(1/4F.S.) / (F.S.) Adc	Frequency range	10Hz~35KHz
Measurement range	*(1/4F.S.) / (F.S.) Adc	Resolution	1Hz
Resolution	0.001 / 0.01A	Accuracy	±1% of (Reading + Range)
Accuracy	±1% of (Reading + Range)	Duty(Ton) Range	3uS~90mS
Sampling Rate	100KHz	Resolution	1uS
Update Rate	50~1000 mS	Accuracy	±1% of (Reading + Range)
Resolution	1mS		
Vpeak Measurement		USB PD Timing Measurement	
Vpeak+/Vpeak-		PVT/NVP/Hard Reset/Output Voltage Falling Time	
Band Width	0 ~ 100 KHz	Va/Vb/Vc/Vd	
Voltage range	0 ~ 10/30 Vdc	Voltage range	0 ~ 10/30 Vdc
Measurement range	0 ~ 10/30 Vdc	Resolution	0.01 V
Resolution	0.01Vdc	Accuracy	1% of (Reading + Range)
Accuracy	±1% of (Reading + Range)	Timing range	3 Sec
Sampling Rate	100KHz	Resolution	10 uS
Update Rate	50~1000 mS		
Resolution	1mS		

5303 AVR Suitable test item & Specifications

Model	5303 AVR	
Suitable Test Item		
1. Input Inrush Current		
Specifications		
Power Rating	3KVA	
Maximum Capacity	CF > 7	
Input Voltage Rating	230Vrms +/- 10%	
Output Voltage Rating	230,264,277Vrms Selectable	
Accuracy	±2.5Vrms	
Interface	RS-232 remote control only	

PFR-100L/100M Suitable test item & Specifications

Model	Fanless Multi-Range D.C. Power Supply		
Suitable Test Item			
1. Over Voltage Protection			
Specifications		PFR-100L	PFR-100M
Power Rating	100W		
Voltage range	0 ~ 50V	0 ~ 250V	
Resolution	40mV	200mV	
Current range	0 ~ 10A	0 ~ 2A	
Resolution	1mA	0.1mA	
Slew rate	Rise Time	50ms	100ms
	Fall Time	100ms	200ms
Protection	OCP , OTP		

99094-2 List of Specification and applicable features

Model	99094-2 Quick Charge Controller
Applicable test function	
1. USB PD Source / Sink Profile 2. USB PD Power Data Object (PDO) 3. USB PD Output Voltage Change 4. USB Type C Cable Unplug	
Specifications	
No. of Test Channel	2
Support Quick Charge	QC2.0, QC3.0, PE+, PE+2.0, USB PD
Terminal of Charger	D-sub 15Pin for ChxA, ChxB

9922-R List of Specification and applicable features

Model	9922-R Quick Charge Controller
Applicable test function	
1. USB PD Source / Sink Profile 2. USB PD Power Data Object (PDO) 3. USB PD Output Voltage Change	
Specifications	
Support Quick Charge	QC2.0, QC3.0, PE+, PE+2.0, USB PD 2.0
Terminal of Charger	micro USB, USB Type C
Input Power	5V, 150mA

Order Information



Basic version

6050-2-A-X (3310F) USB PD
Dual-Channel+AB Switch Test System



Standard version

6050-2-B-X (3310F) USB PD
Dual-Channel+AB Switch Test System



Value version

6050-2-C-X (3310F) USB PD
Dual-Channel+AB Switch Test System



Complete version

6050-2-D-X (3310F) USB PD
Dual-Channel+AB Switch Test System