

High Efficiency & High Precision & High Stability



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APM Technologies (Dongguan) Co., Ltd



# Contents

SP Series 20VDC	05 / 06
SP Series 32VDC	07 / 08
SP Series 40VDC	09 / 10
SP Series 60VDC	11 / 12
SP Series 75VDC	13 / 14
SP Series 80VDC/120VDC	15 / 16
SP Series 150VDC	17 / 18
SP Series 200VDC	19 / 20
LP Series 75VDC/100VDC	21 / 22
Front & Back Panel Introduction	23 / 24
Product Outline Dimension / Power Supply Monitoring Software	25 / 26
Application Case	27 / 28
Power Supply Selection	31 / 32

## Company Profile

APM Technologies (Dongguan) Co., Ltd. is a high-tech enterprise specialized in the research & development (R&D), production and distribution of marine smart system (MSS), PV solar inverter, programmable power supply, automated testing system and automated manufacturing equipment. Our company has complete systems in product planning, research & development, laboratory experiment, testing and quality control. In addition, we have passed the ISO 9001 standard certifications.

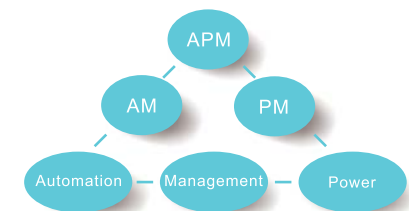
APM Technologies' R&D team consists of more than 100 personnel encompassing Ph.D. and master degree holders as well as senior experts in the related industries. By collaborating with a number of domestic and international research teams and maintaining a long term strategic cooperation with leading colleges and universities, our company can ensure products and services are leading the industry. Through applying our professional techniques and technologies to continually innovate and break through, so far APM Technologies has applied for a number of invention patents and already obtained a number of utility patents, design patents, software copyrights and other related patents. Our products have passed CE, CSA, UL, FCC.

APM Technologies as one of the prime leaders in programmable power supply, from the beginning to the present, and from the past to the future, has always upheld the company spirit of "Constant Pursuit of Excellence" so as to provide our customers with the "24 Hours a Day of Continuing Services".

## APM Implication

"APM" is the abbreviation of APM Technologies (Dongguan) Co., Ltd. It has two indications for APM.

One is the combination of Automation, Power and Machine/Management, which strengthen APM main products like automation and power supply as well as the importance of enterprise management. The other is that APM consists of AM and PM, which conveys APM Technologies' good service principle "24 Hours a Day of Continuing Services" to customers.



## Product Features

### Product Features of SP Series

High Efficiency--Up to 1.6kW/1U output power, 4kW/2U output power with up to 92% efficiency.

High Precision--Up to 0.05% voltage accuracy, up to 0.1% current accuracy and up to 100ms no load voltage drop time and 10ms full load voltage drop time.























High Stability--Continuable and stable working with temp. 0 to 40°C in full load voltage for a long time, and has passed CSA, UL, CE and FCC approval.

- Accurate voltage and current measurement capability
- Constant Power and wide range of voltage and current output
- Master/Slave parallel and series operation mode for up to 10 units
- Built-in standard automobile electrical test curve with 2U type products
- Support RS232/RS485/LAN/USB/GPIB ports
- OVP/OCP/OPP/OTP/SCP

### Product Features of LP Series

- Low ripple and low noise
- With 0.01% load regulation to ensure the stable power output when load changes
- High resolution and accuracy(1mV/0.05mA)
- Built-in high-accuracy 5 1/2 digit DC voltmeter(DVM)
- Built-in RS232 communication ports and use SCPI standart protocol communication
- OVP/OCP/OPP/OTP/SCP

## Product Icon Introduction

 Master/Slave operation mode for up to 4 units	 Optional GPIB interface	 UL certified
 Master/Slave operation mode for up to 10 units	 Over voltage protection	 FCC certified
 Function of editing List waveform	 Over current protection	 CSA certified
 Built-in automobile electronic standard test waveform	 Over power protection	 "STORE" can store 10 sets data (fast recall after store)
 Standard RS232 interface	 CC to CV protection	 Use SCPI commands, convenient for quick system integration
 Standard LAN interface	 CV to CC protection	 Function of editing waveform sequence
 Standard RS485 interface	 Support Short Mode, used for cable and circuit breaker test etc.	
 Standard USB interface	 CE certified	

## Product Quick Seletion List

### DC SP Series

Item	Output Voltage	1U					2U			
		600W	1000W	1200W	1500W	1600W	1000W	2000W	3000W	4000W
1	20VDC	60A	60A	60A	*	*	*	*	—	—
2	32VDC	50A	50A	50A	*	50A	*	*	120A	*
3	40VDC	40A	40A	40A	*	40A	120A	120A	120A	120A
4	60VDC	25A	25A	25A	25A	*	*	*	*	*
5	75VDC	20A	20A	20A	20A	*	50A	50A	50A	60A
6	80VDC	*	*	*	*	*	*	60A	60A	*
7	120VDC	*	*	*	*	*	40A	40A	40A	40A
8	150VDC	—	—	—	—	*	30A	30A	30A	30A
9	200VDC	8A	8A	8A	8A	*	24A	24A	24A	24A

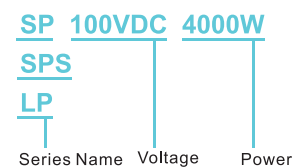
Remark: — Accept advance order

\* Not available

### DC LP Series

Item	Output Voltage	3U	
		150W	300W
1	75VDC	—	2A*2
2	100VDC	1.5A*1	1.5A*2

## Product Model Naming Method



※ Please refer to Product Quick Seletion List



**APM 24** Hours  
Continuing Services



## Product Application Field



### A. Automobile Sector

Used for automobile electronics product testing, and simulation of the voltage waveform of automobile under different conditions.



### B. Household Field C. Communication Sector D. LED Sector

- Used for household products test.
- Used for the tests of communication power supply and electronic devices.
- Used for burn-in test of LED driver and LED products.



### E. Automatic Testing Sector

Can be integrated in automatic testing system to test electricity parameters, and to supply power to the products under testing.



### F. Medical Field

Used for medical device testing or it being integrated in medical equipment.

### G. Aerospace Sector

Used for aviation electronic products testing and power supply.



### H. Scientific Research Sector

Used in scientific research units, colleges & universities, and certification institutions for laboratory testing and power supply.





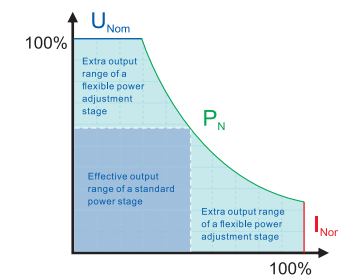
## 20VDC-1U

Model	SP20VDC600W	SP20VDC1000W	SP20VDC1200W
Input Voltage/ Frequency	90~265VAC, 47~63Hz		
Power Factor	>0.98		
Output Voltage Range	0~20V		
Output Current Range	0~60A		
Output Power	0~600W	0~1000W	0~1200W
Line Voltage Regulation	0.005%+1mV		
Line Current Regulation	4mA		
Voltage Load Regulation	10mV		
Current Load Regulation	60mA		
Voltage Display Resolution	0.1mV		
Current Display Resolution	0.2mA		
Voltage Setting/ Measurement Accuracy	0.05%+15mV		
Current Setting/ Measurement Accuracy	0.1%+60mA		
Voltage Ripple <sup>[1]</sup>	40mVp-p/6mVrms		
Current Ripple <sup>[1]</sup>	60mA(Full Range), 20mA(TYP Value)		
Voltage Temperature Coefficient <sup>[2]</sup>	100ppm/°C		
Current Temperature Coefficient <sup>[2]</sup>	150ppm/°C		
Remote Compensation	4V Max		
Load Transient Response Time	≤2ms		
Command Response Time	50ms		
Efficiency(Full Load)	82.5%	83%	84%
Weight	9.2kg		
Dimensions(W*H*D)	483,0*44,0*531,0 mm		

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

## Constant Power Diagrammatic Drawing and Brief Introduction

Wide range output power supply provides wider voltage and current range, one unit function can replace several traditional rectangular power units so as to save cost and space for user; meanwhile, this series power supply can realize diversified operation through front panel, monitoring software or external control to meet various application requirements of the user.



## Typical Application of This Power Supply

20V programmable DC power supply could be widely used for charging 12V battery system.

For lead-acid battery, charging current could be 20% of its battery capacity, for Li-ion battery, charging current could be 70% of its battery capacity. After charging current is confirmed, you can further choose and confirm the power supply model.

At present, battery widely adopts 3-stage charging algorithm, the power supply supports switch over between CC (Constant Current) mode and CV (Constant Voltage) mode, the mode could be set flexibly according to the display of power supply's voltage to choose to enter quick charge phase, equalized charge phase or floating charge phase.





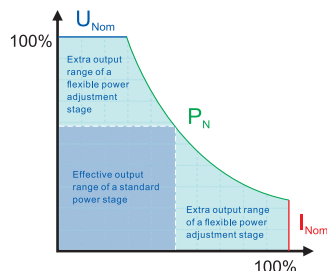
### 32VDC-1U

Model	SP32VDC600W	SP32VDC1000W	SP32VDC1200W	SP32VDC1600W
Input Voltage/ Frequency	90~265VAC,47~63Hz			
Power Factor	>0,98			
Output Voltage Range	0~32V			
Output Current Range	0~50A			
Output Power	0~600W	0~1000W	0~1200W	0~1600W
Line Voltage Regulation	0.005%+1mV			
Line Current Regulation	4mA			
Voltage Load Regulation	10mV			
Current Load Regulation	50mA			
Voltage Display Resolution	0.1mV			
Current Display Resolution	0.2mA			
Voltage Setting/ Measurement Accuracy	0.05%+15mV			
Current Setting/ Measurement Accuracy	0.1%+50mA			
Voltage Ripple <sup>[1]</sup>	40mVp-p/6mVrms			
Current Ripple <sup>[1]</sup>	50mA(Full Range),20mA(TYP Value)			
Voltage Temperature Coefficient <sup>[2]</sup>	100ppm/°C			
Current Temperature Coefficient <sup>[2]</sup>	150ppm/°C			
Remote Compensation	4V Max			
Load Transient Response Time	≤2ms			
Command Response Time	50ms			
Efficiency(Full Load)	86%	89%	89%	89%
Weight	9.2kg			
Dimensions(W*H*D)	483.0*44.0*531.0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

#### Constant Power Diagrammatic Drawing and Brief Introduction

Wide range output power supply provides wider voltage and current range, one unit function can replace several traditional rectangular power units so as to save cost and space for user; meanwhile, this series power supply can realize diversified operation through front panel, monitoring software or external control to meet various application requirements of the user.



### 32VDC-2U

Model	SP32VDC3000W
Input Voltage/ Frequency	190~265VAC,47~63Hz
Power Factor	>0,98
Output Voltage Range	0~32V
Output Current Range	0~120A
Output Power	0~3000W
Line Voltage Regulation	0.01%+8mV
Line Current Regulation	30mA
Voltage Load Regulation	15mV
Current Load Regulation	120mA
Voltage Display Resolution	0.1mV
Current Display Resolution	1mA
Voltage Setting/ Measurement Accuracy	0.05%+15mV
Current Setting/ Measurement Accuracy	0.1%+120mA
Voltage Ripple <sup>[1]</sup>	40mVp-p/6mVrms
Current Ripple <sup>[1]</sup>	150mA(Full Range),20mA(TYP Value)
Voltage Temperature Coefficient <sup>[2]</sup>	100ppm/°C
Current Temperature Coefficient <sup>[2]</sup>	150ppm/°C
Remote Compensation	4V Max
Load Transient Response Time	≤2ms
Command Response Time	50ms
Efficiency(Full Load)	86%
Weight	14.7kg
Dimensions(W*H*D)	483.0*87.0*626.0 mm

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

#### Typical Application of This Power Supply

32V programmable DC power supply is applicable to electrical equipment testing sector.

To choose this type of power supply, you may take below aspects into consideration:

1. High precision voltage output, up to 0.05% voltage accuracy, connect to remote compensation cable in realistic application, to make load voltage is the set voltage.
2. Wide range of current, in general, restarting inductive load need current that is much higher than to maintain it operate normally (approximately 3~7 times).
3. Convenient for power extension, considering user's sustainable requirement, the power supply could extend voltage, current and power flexibly, master-slave control and current-sharing function could realize above requirement perfectly.



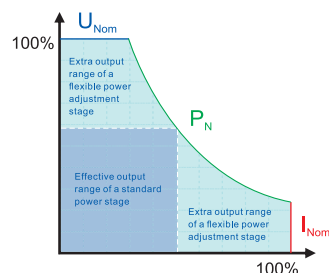
## 40VDC-1U

Model	SP40VDC600W	SP40VDC1000W	SP40VDC1200W	SP40VDC1600W
Input Voltage/ Frequency	90~265VAC,47~63Hz			
Power Factor	>0,98			
Output Voltage Range	0~40V			
Output Current Range	0~40A			
Output Power	0~600W	0~1000W	0~1200W	0~1600W
Line Voltage Regulation	0.005%+1mV			
Line Current Regulation	4mA			
Voltage Load Regulation	10mV			
Current Load Regulation	40mA			
Voltage Display Resolution	0.1mV			
Current Display Resolution	0.2mA			
Voltage Setting/ Measurement Accuracy	0.05%+15mV			
Current Setting/ Measurement Accuracy	0.1%+40mA			
Voltage Ripple <sup>[1]</sup>	40mVp-p/6mVrms			
Current Ripple <sup>[1]</sup>	40mA(Full Range),20mA(TYP Value)			
Voltage Temperature Coefficient <sup>[2]</sup>	100ppm/°C			
Current Temperature Coefficient <sup>[2]</sup>	150ppm/°C			
Remote Compensation	4V Max			
Load Transient Response Time	≤2ms			
Command Response Time	50ms			
Efficiency(Full Load)	87%	89%	89%	90%
Weight	9.2kg			
Dimensions(W*H*D)	483.0*44.0*531.0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

### Constant Power Diagrammatic Drawing and Brief Introduction

Wide range output power supply provides wider voltage and current range, one unit function can replace several traditional rectangular power units so as to save cost and space for user; meanwhile, this series power supply can realize diversified operation through front panel, monitoring software or external control to meet various application requirements of the user.



## 40VDC-2U

Model	SPS40VDC1000W	SP40VDC2000W	SP40VDC3000W	SP40VDC4000W
Input Voltage/ Frequency	90~265VAC,47~63Hz		190~265VAC,47~63Hz	
Power Factor	>0.98			>0.99
Output Voltage Range	0~40V			
Output Current Range	0~120A			
Output Power	0~1000W	0~2000W	0~3000W	0~4000W
Line Voltage Regulation	0.02%+8mV	0.01%+8mV		
Line Current Regulation	30mA			
Voltage Load Regulation	15mV			
Current Load Regulation	120mA			
Voltage Display Resolution	0.1mV			
Current Display Resolution	1mA			
Voltage Setting/ Measurement Accuracy	0.05%+15mV			
Current Setting/ Measurement Accuracy	0.1%+120mA			
Voltage Ripple <sub>0.1</sub>	40mVp-p/6mVrms			
Current Ripple <sub>0.1</sub>	150mA(Full Range),20mA(TYP Value)			
Voltage Temperature Coefficient <sub>0.2</sub>	100ppm/°C			
Current Temperature Coefficient <sub>0.2</sub>	150ppm/°C			
Remote Compensation	4V Max			
Load Transient Response Time	≤2ms			
Command Response Time	50ms			
Efficiency(Full Load)	87%	88%	88%	91%
Weight	14.7kg			
Dimensions(W×H×D)	483.0×87.0×626.0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

### Typical Application of This Power Supply

40V programmable DC power supply is applicable to electrical equipment testing sector.

To protect user's devices and the power supply itself, protection functions of OVP, OCP, OPP etc. could be started according to the requirement, SCP function defaults to OFF.

Testing the current-carrying capability of cable or circuit breaker, to some degree, means to set power supply to short circuit mode, if power supply send out alarm constantly, normal test will not be realized, therefore, SHORT MODE is added in the menu for this application, set the SHORT MODE to OFF when testing cable or circuit breaker, then the test could be proceeded smoothly.





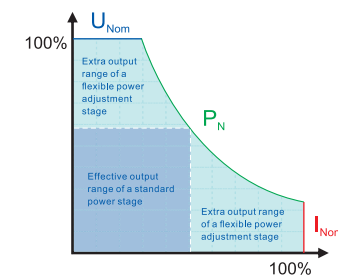
## 60VDC-1U

Model	SP60VDC600W	SP60VDC1000W	SP60VDC1200W	SP60VDC1500W
Input Voltage/ Frequency	90~265VAC,47~63Hz			
Power Factor	>0,98			
Output Voltage Range	0~60V			
Output Current Range	0~25A			
Output Power	0~600W	0~1000W	0~1200W	0~1500W
Line Voltage Regulation	0.005%+1mV			
Line Current Regulation	4mA			
Voltage Load Regulation	10mV			
Current Load Regulation	25mA			
Voltage Display Resolution	0.1mV			
Current Display Resolution	0.2mA			
Voltage Setting/ Measurement Accuracy	0.05%+15mV			
Current Setting/ Measurement Accuracy	0.1%+25mA			
Voltage Ripple <sup>[1]</sup>	40mVp-p/6mVrms			
Current Ripple <sup>[1]</sup>	25mA(Full Range),10mA(TYP Value)			
Voltage Temperature Coefficient <sup>[2]</sup>	100ppm/°C			
Current Temperature Coefficient <sup>[2]</sup>	150ppm/°C			
Remote Compensation	4V Max			
Load Transient Response Time	≤2ms			
Command Response Time	50ms			
Efficiency(Full Load)	88%	89%	90%	91%
Weight	8.9kg			
Dimensions(W*H*D)	483.0*44.0*531.0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

## Constant Power Diagrammatic Drawing and Brief Introduction

Wide range output power supply provides wider voltage and current range, one unit function can replace several traditional rectangular power units so as to save cost and space for user; meanwhile, this series power supply can realize diversified operation through front panel, monitoring software or external control to meet various application requirements of the user.



## Typical Application of This Power Supply

60V programmable DC power supply could be widely used for charging 48V battery system.

For lead-acid battery, charging current could be 20% of its battery capacity, for Li-ion battery, charging current could be 70% of its battery capacity. After charging current is confirmed, you can further choose and confirm the power supply model.

At present, battery widely adopts 3-stage charging algorithm, the power supply supports switch over between CC (Constant Current) mode and CV (Constant Voltage) mode, the mode could be set flexibly according to the display of power supply's voltage to choose to enter quick charge phase, equalized charge phase or floating charge phase.



• High Efficiency • High Precision • High Stability





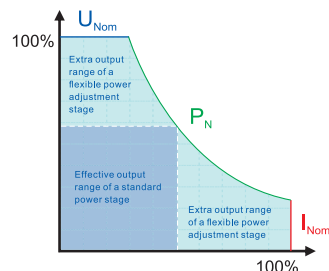
## 75VDC-1U

Model	SP75VDC600W	SP75VDC1000W	SP75VDC1200W	SP75VDC1500W
Input Voltage/ Frequency	90~265VAC,47~63Hz			
Power Factor	>0,98			
Output Voltage Range	0~75V			
Output Current Range	0~20A			
Output Power	0~600W	0~1000W	0~1200W	0~1500W
Line Voltage Regulation	0.005%+1mV			
Line Current Regulation	4mA			
Voltage Load Regulation	10mV			
Current Load Regulation	20mA			
Voltage Display Resolution	0.1mV			
Current Display Resolution	0.2mA			
Voltage Setting/ Measurement Accuracy	0.05%+15mV			
Current Setting/ Measurement Accuracy	0.1%+20mA			
Voltage Ripple <sup>[1]</sup>	40mVp-p/6mVrms			
Current Ripple <sup>[1]</sup>	20mA(Full Range),10mA(TYP Value)			
Voltage Temperature Coefficient <sup>[2]</sup>	100ppm/°C			
Current Temperature Coefficient <sup>[2]</sup>	150ppm/°C			
Remote Compensation	4V Max			
Load Transient Response Time	≤2ms			
Command Response Time	50ms			
Efficiency(Full Load)	88%	89%	90%	91%
Weight	8.9kg			
Dimensions(W*H*D)	483.0*44.0*531.0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

### Constant Power Diagrammatic Drawing and Brief Introduction

Wide range output power supply provides wider voltage and current range, one unit function can replace several traditional rectangular power units so as to save cost and space for user; meanwhile, this series power supply can realize diversified operation through front panel, monitoring software or external control to meet various application requirements of the user.



## 75VDC-2U

Model	SPS75VDC1000W		SP75VDC2000W	SP75VDC3000W	SP75VDC4000W
Input Voltage/ Frequency	90~265VAC,47~63Hz		190~265VAC,47~63Hz		
Power Factor	>0.98				>0.99
Output Voltage Range	0~75V				
Output Current Range	0~50A				0~60A
Output Power	0~1000W	0~2000W	0~3000W		0~4000W
Line Voltage Regulation	0.02%+8mV	0.01%+8mV			
Line Current Regulation	30mA				
Voltage Load Regulation	15mV				
Current Load Regulation	50mA	50mA	50mA	60mA	
Voltage Display Resolution	0.1mV				
Current Display Resolution	0.1mA				
Voltage Setting/ Measurement Accuracy	0.05%+15mV				
Current Setting/ Measurement Accuracy	0.1%+50mA	0.1%+50mA	0.1%+50mA		0.1%+60mA
Voltage Ripple <sub>[1]</sub>	40mVp-p/6mVrms				40mVp-p/8mVrms
Current Ripple <sub>[1]</sub>	50mA(Full Range),10mA(TYP Value)		50mA(Full Range) 20mA(TYP Value)		60mA(Full Range) 10mA(TYP Value)
Voltage Temperature Coefficient <sub>[2]</sub>	100ppm/°C				
Current Temperature Coefficient <sub>[2]</sub>	150ppm/°C				
Remote Compensation	5V Max	4V Max	4V Max		5V Max
Load Transient Response Time	≤2ms				
Command Response Time	50ms				
Efficiency(Full Load)	88%	88%	91%	91%	
Weight	13.2kg				
Dimensions(W*H*D)	483,0*87,0*581,0 mm				

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

### Typical Application of This Power Supply

75V programmable DC power supply is applicable to activation of some electronic devices in military field.  
The application requires the power supply take time as standard, under CC (constant current) mode, adjust power setting of current-limiting to activate these electronic devices.  
When using this function, List function is applicable to edit parameters that is needed for test, if power supply is integrated in the system, SCPI instruct can be used to control it remotely. Both operations could content client very well.



## 80VDC-2U

## 120VDC-2U

Model	SP80VDC2000W	SP80VDC3000W
Input Voltage/ Frequency	190~265VAC,47~63Hz	
Power Factor	>0,98	
Output Voltage Range	0~80V	
Output Current Range	0~60A	
Output Power	0~2000W	0~3000W
Line Voltage Regulation	0.01%+8mV	
Line Current Regulation	30mA	
Voltage Load Regulation	15mV	
Current Load Regulation	60mA	
Voltage Display Resolution	0.1mV	
Current Display Resolution	0.1mA	
Voltage Setting/ Measurement Accuracy	0.05%+15mV	
Current Setting/ Measurement Accuracy	0.1%+60mA	
Voltage Ripple <sub>(1)</sub>	40mVp-p/6mVrms	
Current Ripple <sub>(1)</sub>	50mA(Full Range),10mA(TYP Value)	
Voltage Temperature Coefficient <sub>(2)</sub>	100ppm/°C	
Current Temperature Coefficient <sub>(2)</sub>	150ppm/°C	
Remote Compensation	4V Max	
Load Transient Response Time	≤3ms	≤2ms
Command Response Time	50ms	
Efficiency(Full Load)	89%	91%
Weight	13.2kg	
Dimensions(W*H*D)	483,0*87,0*581,0 mm	

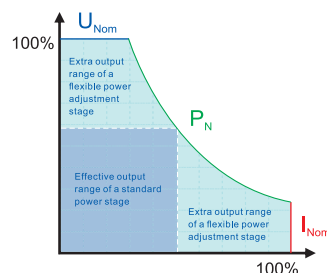
Model	SPS120VDC1000W	SP120VDC2000W	SP120VDC3000W	SP120VDC4000W
Input Voltage/ Frequency	90~265VAC,47~63Hz			
Power Factor	>0,98			
Output Voltage Range	0~120V			
Output Current Range	0~40A			
Output Power	0~1000W	0~2000W	0~3000W	0~4000W
Line Voltage Regulation	0.02%+8mV			
Line Current Regulation	40mA	30mA		
Voltage Load Regulation	15mV			
Current Load Regulation	40mA			
Voltage Display Resolution	1mV			
Current Display Resolution	0.1mA			
Voltage Setting/ Measurement Accuracy	0.1%+15mV			
Current Setting/ Measurement Accuracy	0.1%+40mA			
Voltage Ripple <sub>(1)</sub>	80mVp-p/15mVrms			
Current Ripple <sub>(1)</sub>	60mA(Full Range),10mA(TYP Value)			
Voltage Temperature Coefficient <sub>(2)</sub>	100ppm/°C			
Current Temperature Coefficient <sub>(2)</sub>	150ppm/°C			
Remote Compensation	5V Max			
Load Transient Response Time	≤2ms	≤3ms	≤2ms	≤2ms
Command Response Time	50ms			
Efficiency(Full Load)	88%	89%	91%	92%
Weight	13.2kg			
Dimensions(W*H*D)	483,0*87,0*581,0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.  
[2] Test Condition: Ambient temperature is among 0~40°C.

### Constant Power Diagrammatic Drawing and Brief Introduction

Wide range output power supply provides wider voltage and current range, one unit function can replace several traditional rectangular power units so as to save cost and space for user; meanwhile, this series power supply can realize diversified operation through front panel, monitoring software or external control to meet various application requirements of the user.



### Typical Application of This Power Supply

80V programmable DC power supply is applicable to automobile electronics product testing sector.  
Built-in 12V DIN40839 automobile starting voltage waveform, be able to simulate automobile engine electronic performance test; Meanwhile, built-in 12V ISO-16750-2 engine start test waveform enable simulation of voltage drop test waveform and restoration function test waveform of automobile electronic. This function save the tedious editing process before test, test engineer could adjust the set parameter of waveform so as to realize the output of waveform under different test level.

120V programmable DC power supply is widely used in automatic testing sector.  
The average conversion efficiency of 120VDC programmable power supply is 90%, its load regulation is low, which ensure stable output when the load is changing constantly; Standard RS232/RS485/USB/LAN interface and GPIB is optional, which not only provide more flexibility but also have your test system adapt future requirement; Meanwhile, the power supply supports standard SCPI communication interface, which is convenient for user's secondary development.



## 150VDC-2U

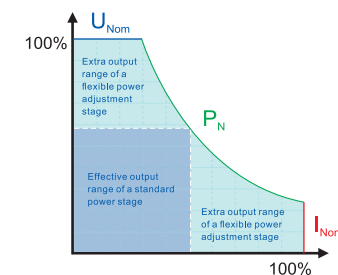
Model	SPS150VDC1000W	SP150VDC2000W	SP150VDC3000W	SP150VDC4000W
Input Voltage/ Frequency	90~265VAC,47~63Hz	190~265VAC,47~63Hz		
Power Factor	>0.98			
Output Voltage Range	0~150V			
Output Current Range	0~30A			
Output Power	0~1000W	0~2000W	0~3000W	0~4000W
Line Voltage Regulation	0.02%+8mV			
Line Current Regulation	30mA			
Voltage Load Regulation	15mV			
Current Load Regulation	30mA			
Voltage Display Resolution	1mV			
Current Display Resolution	0.1mA			
Voltage Setting/ Measurement Accuracy	0.1%+15mV			
Current Setting/ Measurement Accuracy	0.1%+30mA			
Voltage Ripple <sub>(1)</sub>	80mVp-p/15mVrms			
Current Ripple <sub>(1)</sub>	60mA(Full Range),10mA(TYP Value)			
Voltage Temperature Coefficient <sub>(2)</sub>	100ppm/°C			
Current Temperature Coefficient <sub>(2)</sub>	150ppm/°C			
Remote Compensation	5V Max			
Load Transient Response Time	≤2ms	≤3ms	≤2.5ms	≤2.5ms
Command Response Time	50ms			
Efficiency(Full Load)	88%	90%	92%	93%
Weight	13.2kg			
Dimensions(W*H*D)	483,0*87,0*581,0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.

[2] Test Condition: Ambient temperature is among 0~40°C.

## Constant Power Diagrammatic Drawing and Brief Introduction

Wide range output power supply provides wider voltage and current range, one unit function can replace several traditional rectangular power units so as to save cost and space for user; meanwhile, this series power supply can realize diversified operation through front panel, monitoring software or external control to meet various application requirements of the user.



## Typical Application of This Power Supply

150V programmable DC power supply is widely used in automatic testing sector.

The average conversion efficiency of 150VDC programmable power supply is 90%, its load regulation is low, which ensure stable output when the load is changing constantly; Standard RS232/RS485/USB/LAN interface and GPIB is optional, which not only provide more flexibility but also have your test system adapt future requirement; Meanwhile, the power supply support standard SCPI communication interface, which is convenient for user's secondary development.



• High Efficiency • High Precision • High Stability





## 200VDC-1U

Model	SP200VDC600W	SP200VDC1000W	SP200VDC1200W	SP200VDC1500W
Input Voltage/ Frequency	90~265VAC,47~63Hz			
Power Factor	>0,98			
Output Voltage Range	0~200V			
Output Current Range	0~8A			
Output Power	0~600W	0~1000W	0~1200W	0~1500W
Line Voltage Regulation	0.02%+8mV			
Line Current Regulation	30mA			
Voltage Load Regulation	15mV			
Current Load Regulation	8mA			
Voltage Display Resolution	1mV			
Current Display Resolution	0.1mA			
Voltage Setting/ Measurement Accuracy	0.1%+15mV			
Current Setting/ Measurement Accuracy	0.1%+8mA			
Voltage Ripple <sup>[1]</sup>	120mVp-p/40mVrms			
Current Ripple <sup>[1]</sup>	40mA(Full Range),10mA(TYP Value)			
Voltage Temperature Coefficient <sup>[2]</sup>	100ppm/°C			
Current Temperature Coefficient <sup>[2]</sup>	150ppm/°C			
Remote Compensation	4V Max			
Load Transient Response Time	≤3ms			
Command Response Time	50ms			
Efficiency(Full Load)	88%	89%	90%	91%
Weight	9.5kg			
Dimensions(W*H*D)	483.0*44.0*531.0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.

[2] Test Condition: Ambient temperature is among 0~40°C.



## 200VDC-2U

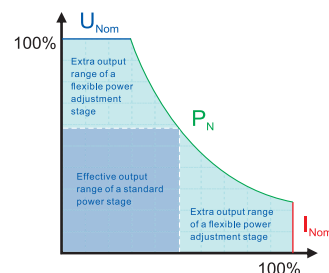
Model	SPS200VDC1000W	SP200VDC2000W	SP200VDC3000W	SP200VDC4000W
Input Voltage/ Frequency	90~265VAC,47~63Hz	190~265VAC,47~63Hz		
Power Factor	>0,98			
Output Voltage Range	0~200V			
Output Current Range	0~24A			
Output Power	0~1000W	0~2000W	0~3000W	0~4000W
Line Voltage Regulation	0.02%+8mV			
Line Current Regulation	30mA			
Voltage Load Regulation	15mV			25mV
Current Load Regulation	24mA			
Voltage Display Resolution	1mV			
Current Display Resolution	0.1mA			
Voltage Setting/ Measurement Accuracy	0.1%+15mV			
Current Setting/ Measurement Accuracy	0.1%+24mA			
Voltage Ripple <sub>(1)</sub>	150mVp-p/30mVrms			
Current Ripple <sub>(1)</sub>	50mA(Full Range),20mA(TYP Value)			
Voltage Temperature Coefficient <sub>(2)</sub>	100ppm/°C			
Current Temperature Coefficient <sub>(2)</sub>	150ppm/°C			
Remote Compensation	5V Max			
Load Transient Response Time	≤2ms	≤3ms	≤3ms	≤3ms
Command Response Time	50ms			
Efficiency(Full Load)	88%	90%	91%	92%
Weight	13.2kg			
Dimensions(W*H*D)	483,0*87,0*581,0 mm			

[1] Test Condition: Voltage ripple, CV (Constant Voltage) mode-rated output voltage (Vp-p @ 20MHz, Vrms@1,25MHz); Current ripple: CC (Constant Current) mode (Arms @1,25MHz) Current ripple typical value standard: test under full load of rated voltage, at the same time, for full load of the full range voltage, the effective value of the current ripple is among the full range voltage standard.

[2] Test Condition: Ambient temperature is among 0~40°C.

### Constant Power Diagrammatic Drawing and Brief Introduction

Wide range output power supply provides wider voltage and current range, one unit function can replace several traditional rectangular power units so as to save cost and space for user; meanwhile, this series power supply can realize diversified operation through front panel, monitoring software or external control to meet various application requirements of the user.



### Typical Application of This Power Supply

200V programmable DC power supply is widely used in automatic testing sector.

The average conversion efficiency of 200VDC programmable power supply is 90%, its load regulation is low, which ensure stable output when the load is changing constantly; Standard RS232/RS485/USB/LAN interface and GPIB is optional, which not only provide more flexibility but also have your test system adapt future requirement; Meanwhile, the power supply support standard SCPI communication interface, which is convenient for user's secondary development.



LP75VDC

RS232

CE

SCPI

Model	LP75VDC300W
Input Voltage Range	220VAC $\pm 10\%$ /110VAC $\pm 10\%$
Input Frequency Range	47~63Hz
Output Channels	2
Rated Input Power	Approx.550VA
Rated Output Voltage	0~75V
Rated Output Current	0~2A
Voltage Load Regulation	$<0.02\%+10\text{mV}$
Current Load Regulation	$<0.02\%+4\text{mA}$
Voltage Setting Resolution	1mV
Current Setting Resolution	0.05mA
Voltage Readback Resolution	0.1mV
Current Readback Resolution	0.01mA
Voltage Setting Accuracy	0.01%+12mV
Current Setting Accuracy	0.05%+2mA
Voltage Readback Accuracy	0.02%+12mV
Current Readback Accuracy	0.05%+5mA
Voltmeter Accuracy	0~75V Accuracy:0.02%+10mV
Voltage Ripple & Noise	70mVp-p/5mVrms
Current Ripple & Noise	1mA
Temperature Coefficient	300ppm/°C
Storage Temperature	-20~70°C
Working Condition	0~50°C 0~95%RH
Cooling Mode	Forced air cooling
Weight	19.2kg
Dimensions (W*H*D)	482.0*133.0*477.0 mm

Product Features

- \* Low ripple and noise
- \* High resolution and accuracy (1mV/0.01mA)
- \* Built-in high-accuracy 5 1/2 digit DC voltmeter
- \* Support for high-accuracy & dynamic programming output
- \* High brightness vacuum fluorescent display (VFD), four rows of 8—channel simultaneous data output
- \* Dual—channel output can be connected in series or parallel to achieve single channel output (External wiring is required)
- \* Operating temperature is up to 50°C
- \* Smart cooling system: the fan will automatically turned on/off according to temperature
- \* Support for externally triggered input and output (Optional)
- \* Start Up self diagnosis, and standard equipment rack design
- \* Use SCPI standard communication protocol
- \* Built-in RS232 communication interface (port)



LP100VDC

RS232

CE

SCPI

Model	LP100VDC150W	LP100VDC300W
Input Voltage Range	220VAC $\pm 10\%$ /110VAC $\pm 10\%$	
Input Frequency Range	47~63Hz	
Output Channels	1	2
Rated Input Power	Approx.270VA	Approx.550VA
Rated Output Voltage	0~100V	
Rated Output Current	0~1.5A	
Voltage Load Regulation	$<0.02\%+10\text{mV}$	
Current Load Regulation	$<0.02\%+4\text{mA}$	
Voltage Setting Resolution	1mV	
Current Setting Resolution	0.05mA	
Voltage Readback Resolution	0.1mV	
Current Readback Resolution	0.01mA	
Voltage Setting Accuracy	0.01%+12mV	
Current Setting Accuracy	0.05%+2mA	
Voltage Readback Accuracy	0.02%+12mV	
Current Readback Accuracy	0.05%+5mA	
Voltmeter Accuracy	0~100V Accuracy:0.02%+10mV	
Voltage Ripple & Noise	70mVp-p/5mVrms	
Current Ripple & Noise	1mA	
Temperature Coefficient	300ppm/°C	
Storage Temperature	-20~70°C	
Working Condition	0~50°C 0~95%RH	
Cooling Mode	Forced air cooling	
Weight	12.2kg	19.2kg
Dimensions (W*H*D)	482.0*133.0*477.0 mm	



## SP Series Front Panel Introduction



1U Power supply Front Panel



2U Power supply Front Panel

Key	Introduction
	Numeric Key
	Decimal Point
	Escape
	UP, used for choose menu or increase set value in menu operation
	DOWN, used for choose menu or decrease set value in menu operation
	Enter
	Set power supply's output voltage value
	Set power supply's output current-limiting value
	Press it to back to the main interface quickly
	Control ON/OFF of power supply
	Menu
	Work with functional keys to realize multifunction
LOCAL	Panel operation
RECALL	Recall stored setting value of power supply from internal storage
STORE	Store current settings of power supply to storage location
DVM/POWER	Display DVM value and power value

## LP Series Front Panel Introduction



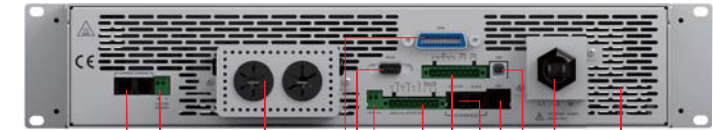
The left part of the panel is vacuum fluorescent display (VFD) and the right part is power switch. VFD can display the current operation status of the power supply.

When turn on the power supply, VFD displays double channels, there are four lines data which display value of two output channel (channel 1 & channel 2). The first line displays the actual output voltage, current (Iout) and power status (CC/CV). The second line displays voltage value (Vmeas) tested by voltmeter and voltage output set value. The third line displays actual output voltage, current (Iout) and power status (CC/CV) of Channel 2. The forth line displays voltage value (Vmeas) tested by voltmeter and voltage output set value.

## SP Series Back Panel Introduction



1U Power supply Back Panel



2U Power supply Back Panel

- 1 AVG1/AVG2 Connector, used for connecting between units to enable current sharing.
- 2 Voltage Remote Supporting Connector (VOLTAGE SENSING): Used to support wire voltage drops.
- 3 DC output terminal: Left (-), Right (+).
- 4 GPIB Communication connector.
- 5 RS-232 Communication connector.
- 6 DVM Connector.
- 7 ANALOG INTERFACE signal connection terminal.
- 8 RS-485 Communication connector.
- 9 SYSTEM BUS control, used for transmission of master and slaves.
- 10 LAN Communication Interface.
- 11 USB Communication Interface.
- 12 AC Power Connection terminal.
- 13 The fan duct outlet.

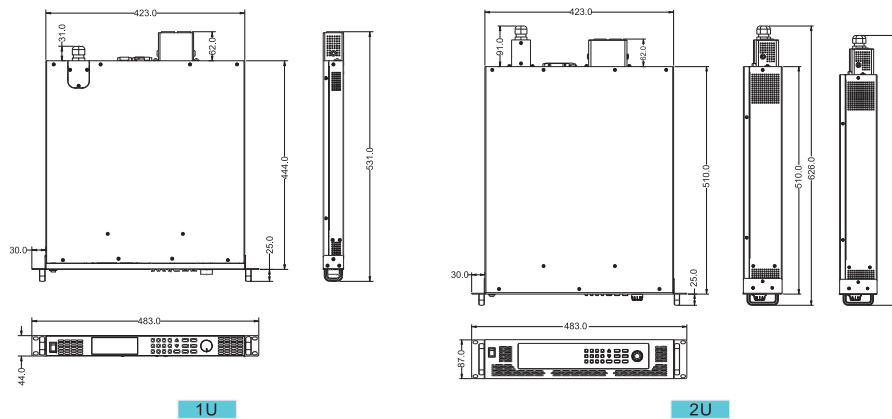
## LP Series Back Panel Introduction



- 1 AC Socket (with a built-in fuse)
- 2 Input Switch (AC 110V, 60Hz/ AC 220V, 50Hz)
- 3 Output Terminal
- 4 The fan duct outlet
- 5 RS-232 Communication Port
- 6 Measuring Port & Remote Trigger Port (Optional)

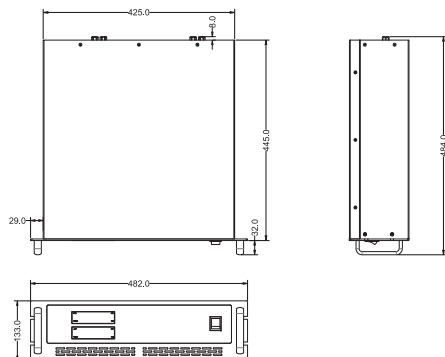


## SP Series Outline Dimension Drawing (unit: mm)



Remark: Dimension of 20VDC, 30VDC, 40VDC 2U products: 483.0\*87.0\*626.0 mm  
Dimension of 75VDC, 80VDC, 120VDC, 150VDC, 200VDC 2U products: 483.0\*87.0\*626.0 mm

## LP Series Outline Dimension Drawing (unit: mm)



## Power Supply Monitoring Software

### ▶ Power River Controller/ DC Power Control Panel (SP Series)

Power River Controller/ DC Power Control Panel are self-developed supervisory software on programmable DC power from APM Technologies that are applicable for 1U/2U SP series power. This monitoring software nearly covers all the functions of front panel operation, thus enable the user to remotely monitor the device on a PC in an efficient & convenient way. Base on the PC's external power connection condition, switchover to the Single Mode interface, Master/Slave interface, and Multi Mode interface can be performed easily.

APM Technologies' programmable DC power supply is equipped with a variety of common communication interface such as the USB/LAN/RS485/RS232 in order to provide more options based on customer actual requirements.



### ▶ LPRPE (LP Series)



1. Monitoring can be achieved through system setting of the corresponding COM interface.
2. Voltage and current values can be configured through the soft keyboard and rotary knob.
3. User customizable common voltage and current values.
4. Power supply voltage can be scanned.
5. Self-inspection on the output accuracy of voltage and current values.

## Application Case

### Automobile Electronic Products Impulse Testing

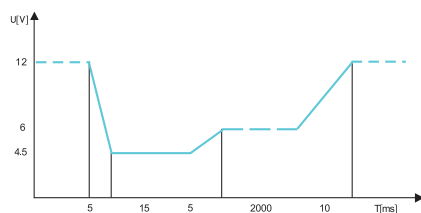
One of the leading automotive electronics product manufactures has used APM Technologies' SP series programmable DC power supply to perform impulse testing on their electronics products to verify the reliability and stability.

Our products can meet clients' requirement and complete products' function test solution very well.

Programmable power supply developed by APM Technologies contains frequently used test waveform which complies with standards of Automobile Electronic Field. This function save the tedious editing process before test, test engineer could adjust the set parameter of waveform so as to output waveforms under different test level.

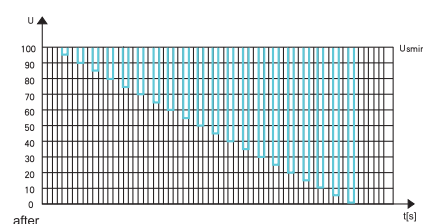


This test waveform is strict in voltage increasing and decreasing of Power, APM Technologies can totally meet the requirement since they got the related item patents.



Standard: DIN40839

Test Item: Automobile Electronic Engine Start Test



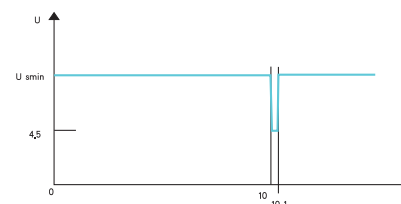
Standard: ISO16750-2

Test Item: Automobile Electronic Restoration Function Test

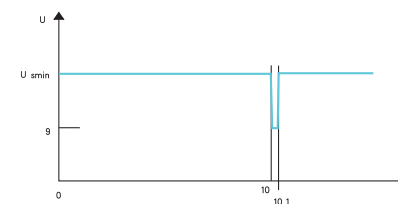
This test waveform is used for simulating the impact of Electronics when the fuses of Automobile circuit break, the voltages of other circuits drop instantaneously.

Standard: ISO16750-2

Test Item: Instantaneous Interrupt Test

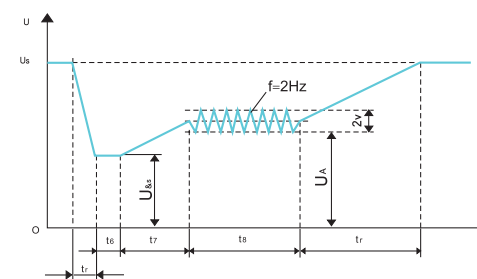


12V System



24V System

This test waveform is similar to that of DIN40839 Standard, the mid-part add waveform component test, which more truly simulates the Engine Start Test.



Standard: ISO16750-2

Test Item: Automobile Electronic Engine Start Test

## Test Systems

- Audio amplifier test system
- Cash register main panel test system
- LED driving power function system
- Ballast and LED driving power burn-in test system
- Transducer control panel and driver board test system
- Electronic welding machine control board and power strip function test system

### 1. UPS Power Supply Test System



### 2. Power Supply Test System

- Adapter
- Charger
- LED Power Supply
- PC Power Supply
- Power Inverter
- Communication Power Supply



SP60VDC1000W type is used for DC-DC charger/ module test system, the whole system needs DC power supply, electronic load, dynamometer, and oscilloscope etc., connect to IPC (Industrial Personal Computer) through communication interfaces, apply monitoring software to realize automatic testing; In the system, programmable power supply developed by APM Technologies provides DC power to DC-DC charger and module under testing, various data could be tested only after power is supplied, meanwhile, the input & output voltage and current of DC-DC charger/ module could be tested precisely; At the same time, transient voltage, rise & fall waveform, current measurement under rated voltage mode etc. could be tested.

SP75VDC1500W type is used for adapter test system, the whole system needs DC power supply, electronic load, dynamometer, and oscilloscope etc., connect to IPC (Industrial Personal Computer) through communication interfaces, apply monitoring software to realize automatic testing; In the system, programmable power supply developed by APM Technologies could test the output voltage and current of adapter precisely; At the same time, transient voltage, rise & fall waveform, current measurement under rated voltage mode etc. could be tested.

### 3. PCBA Test

Use SP75VDC1500W type to test electrical parameter between each point in the PCB-board through test fixture and coordinate with software operation. Clients use this type for production line test, six sets output: 5V / 0.5A, 10.7V / 0.5A, 28V / 6A, 30V / 0.5A, 36V / 6A, 48V / 15A are needed and rapid switchover of required voltage & current is requested to improve the production line efficiency and facilitate operator's usage. For this, programmable power supply developed by APM Technologies provides fast call function, which enable operator to output a set of required voltage & current with one key.



### 4. DC Fan Test System

Use SP32VDC1000W type for DC fan test system; Programmable power supply developed by APM Technologies provides power to DC fan under testing.



### 5. Multimedia Test System





# Power Supply Selection

Testing any components, circuit board, module or device, one or more power supplies are needed to supply power to the test object and test excitation source.

Not only supply power to the device under test, these power supplies sometimes also provide test excitation by simulating working environment of this device. Such as wide range charger is able to charge 12VDC or 24VDC battery pack, its max charging voltage is around 28.8VDC; For electronic products, its conventional test item contains OVP (over voltage protection) test, OVP test normally needs voltage that is 10% even 20% higher than rated working voltage; For automobile circuit that adopts rated 12VDC voltage, the max input voltage still possibly reaches 27VDC, therefore, some automobile standard request 27VDC voltage to conduct limit test to device that normally working under 12VDC voltage. This kind of basic factor decide people's requirement to the power supply.

Before purchasing DC power supply, you can choose linear power supply or switching power supply according to your requirement. The linear power supply is featured by low ripple & low noise and fast transient response, while its efficiency is low, large heat release and it is big and heavy, it is normally applied when low ripple & low noise and fast transient response are required.

Even in the application that low ripple & low noise is requested, switching power supply is able to handle it very well. As the latest development of power electronic technology has improved the ripple and noise parameters significantly.

Switching power supply will take the place of linear power supply in more and more applications, the reasons are: there are significant improvement in switching power supply's ripple and noise, and it is featured with small size, high power density, high efficiency and easy to control (such as: master-slave control, series-parallel connection control and RS485 Bus etc.)

Linear power supply may be the best choice for below application fields:

Item	Application type	Main Factors to be considered
1	Radio Mobile Phone Radar	Common features of these device are: they have very sensitive frequency discrimination or demodulator circuit, and not suitable to work under high noise environment. To test the real performance of these devices, it is needed to make sure that DC power supply will not bring any parasitic noise to the test.
2	Low Power Consumption electronic products	Low-power (normally under 200W) linear power supply has little price variance, and the linear power supply has more advantages.
3	Few channels is needed by system	For this kind of application, the size and weight of linear power supply should be taken into consideration, small influence will be occurred as the small channel quantity; Meanwhile, linear power supply could content the requirement when there are few channels and there is no requirement on series-parallel connection control, master-slave control or overall control.

When we choose a suitable switching DC power supply, what are the aspects or main factors that need to consider? To choose a suitable one, you can take below aspects into consideration:

- |   |                           |                                 |
|---|---------------------------|---------------------------------|
| 1.Required Range of Voltage, Current and Power              | 6.Accuracy                | 11. Ability for Load-supporting |
| 2.Confirmation of Parallel and Series Operation Requirement | 7.Temperature Coefficient | 12.Remote Compensation          |
| 3.Communication and Control Requirement                     | 8.Load Regulation         | 13.CC (constant current) Mode   |
| 4.Transient Response  | 9.Line Regulation         | 14.Stability and Reliability    |
| 5.Ripple  | 10.Slope                  | 15.Budget                       |

## 1.Requirement Range of Voltage, Current and Power

- Different voltage is needed when test objects (components and parts, circuit board, module and finished device). For example:(1) The working voltage of different parts of the circuit board may be different, the test need to simulate working environment and provide different voltage; (2) Different voltage is also needed when conduct under voltage test, normal voltage test and over voltage test; (3) A company always develops and manufactures diversified products, considering the device investigation, a power supply that meets as many application requirement as possible is expected.
- Different current is needed when test objects (components and parts, circuit board, module and finished device). For example : (1) Different current is needed when conduct no-load test, 25% load test, half load test, full load test and over load test. (2) A company always develops and manufactures diversified products, for example, research or manufacture company of charger, the voltage and power of its products are different.
- Even the company who produce simplex products would need to conduct OVP, OCP and OPP test to their products.

From all above, we can get the requirement to voltage, current, power range of power supply, after overall consideration of budget and ROI (return on investigation), we can easily pick up one or several power supplies to meet our test requirements; We always choose power supply combination to lower our investigation and meet our requirement, such as: low voltage @ high current + high voltage @ low current + mid voltage @ high power.

## 2. Confirmation of Series and Parallel Operation

- If we need output voltage that is higher than a single power supply, we can realize it by parallel several power supplies, conduct master-slave control through Bus to make sure the whole performance is comply with the parameter specification of only one power supply contained in the system, Power Supplies developed by APM Technologies could achieve up to 10 units parallel under Master/Slave mode;
- Adopt same model type when parallel power supplies; All controls are proceed by master unit, the total current is the sum of output current of each power supply.If need voltage that is higher than a single power supply can provide, we can operate the DC power supply in series; (To connect one power supply's positive terminal to another one's negative terminal, thus to connect several power supplies in series, then connect the remaining positive terminal and negative terminal to the load; )
- Programmable power supply developed by APM Technologies could be controlled under master-slave mode when run in series; under master-slave mode, all controls are conducted by master unit.
- Under this mode, the voltage will distribute equally to all the power supplies under master-slave control; For example: when 5 power supplies run in series, under master-slave control mode, if the required output voltage is 50Vdc, the output voltage of each power supply is 10Vdc; All controls are conducted through master unit, and the total voltage could not exceed 1000Vdc.

## 3. Communication and Control Requirements

- In application, the power supply always need to integrate into system and controlled by IPC (Industrial Personal Computer), so we need to communication with IPC; Therefore, you will need power supply with communication interface; In a system, other devices also need communication, normally, the communication interface of IPC is diversified, which requires the various communication interfaces chosen from the devices that integrated in the system to achieve a better operation result and lower equipment investment. (There are four standard communication interfaces included in the programmable DC power supply developed by APM Technologies: RS232, RS485, LAN and USB, GPIB is optional for 2U type)
- In some applications, it is needed to use analog quantity to control, then, analog control interface is needed. Through this interface, DC output voltage and current etc. could be set and controlled through low voltage, and resistance signal.

## 4. Transient Response

- Transient response is a standard that measure the ability of power supply to deal with the current requirement change or follow load impedance change. This is a very important specification parameter for many applications. When output current requirement increases or decreases sharply within a short time, output voltage may also increase or decrease sharply within a short time. The voltage control loop will strive to control the output voltage in the set value, while this response is not proceed instantaneously;
- To improve the transient response speed, it is unavoidably to sustain greater ripple and noise, in the programmable power supply, inner voltage control loop and output filter restrict each other; High output filter restricts ripple and noise, while it can lower the power supply's respond speed towards rapidly changed load. The fast inter voltage control loop can shorter the transient response time, while it may overshoot and undershoot to destroy the test object;
- Electric toll test is the typical application case of transient response, which use DC power supply simulate inner battery of electric tool; When start the electric tool, its current will increase rapidly;
- When testing the relay and fuse used in the automobile, the situation is totally differently. Programmable DC power supply must supply high current under voltage up to 30VDC, normally need power up to 5kW to 10kW. During the test, over high DC output voltage overshoot may destroy the relay and fuse. To avoid this, the power supply need be able to control DC output current change transiently from zero to the max value, or from the max value to zero.

## 5. Ripple

- When choose DC power supply, ripple is an important parameter need to be considered, ripple is the alternating current component in the direct current, the smaller the ripple is, the smoother the output is, the lower the noise is, and the better the output quality of the power supply is. Ripple is divided into voltage ripple and current ripple, there are two identify methods of voltage ripple: peak to peak value (mVp-p) and RMS (mVrms).

## 6.Accuracy

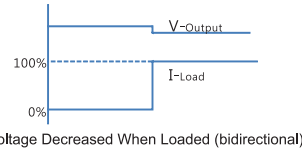
- Accuracy means the output voltage and current accuracy that the power supply could reach, it means the deviation between actual output voltage & current and the set value, it is the other parameter need to be considered when choose DC power supply. The accuracy is always expressed as percentage plus a fixed value, for example: 0.05%+15mV. The accuracy is related to the actual set value of voltage and current. The lower the set value of voltage and current is, the smaller the deviation of real voltage and current is, otherwise, the bigger.

## 7. Temperature Coefficient

- Temperature coefficient is determined by the components and materials chose by the power supply, when the power supply is running, especially when it runs for a long time, the inner temperature will increase, which may cause change to ripple, accuracy and response time of the power supply, impact its performance. The unit of temperature coefficient is ppm/°C (millionth), the smaller the value is, the smaller the change caused by temperature is, and the stable the output is. In the burn-in test and the production line test, as the ambient temperature is high, the power supply need to operate for a long time, the requirement of temperature coefficient is higher for these applications.

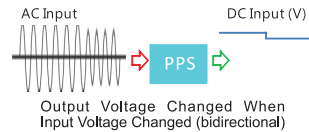
## 8. Load Regulation

- The other very important parameter of programmable power supply is load regulation; it is the deviation percentage of set value of output voltage caused by the changed current requirement of the test object; normally, the impact is small.



## 9. Line Regulation

- Line regulation means variation percentage caused of DC output voltage or current caused by the voltage variation of AC input circuit; this parameter is very important when the voltage of input circuit is not stable.



## 10. Slope

- Normally, output voltage slope (rise time and fall time) is also a very important parameter need to be considered; In order to improve the ripple and noise coefficient parameter, programmable DC power supply's output filter use large capacitance to store large sum of power: its charge/discharge time, the test object's current requirement determines the voltage slope to a great degree;
- DC output fall time not only relies on the inner LRC filter network output by programmable DC power supply, but also relies on the test requirement of the test object; It may take few seconds to release all the stored energy of output capacitor through the current consuming of the test object especially when the current of the test object is relatively lower than the power supply or when conduct no-load test: programmable DC power supply developed by APM Technologies got patent in this aspect, they make use of special circuit to consume energy, increase the slope parameter and decrease test time.
- Besides, one of the methods to improve the slope is to choose a programmable power supply with higher DC output range; if test a electric tool, and a 20Vdc power supply could meet all test application requirement, a 40Vdc power is suggested, while the output voltage limits to max 20Vdc; This because a 40Vdc requires a much smaller output capacitance than a 20Vdc programmable power supply, which cause the increase time from 0V to 20Vdc or 40Vdc of these two power supply is the same; Which means, a 40Vdc power supply's increase speed is twice as fast as a 20Vdc power supply.

## 11. Ability for Load-supporting

- In some applications, ability for load-supporting is also a main factor need to be considered, such as the test to sensitive or capacitive object, the input current is very high in the electric moment (such as the operation moment of air conditioner compressor and electrical machine or the electrical machine locked); Under this condition, current ( power ) need to be set according to the character of the test object.

## 12. Remote Compensation

- This function is applicable to compensating wire voltage drop; In all applications, line voltage drop exists between DC power supply output terminal and cable, meanwhile, line voltage drop also exists between DC power supply output circuit and interface to the outside; Under this situation, connect the power supply voltage remote compensation wires to the load will compensate the line voltage drop and improve the test accuracy and precision.

## 13. CC (Constant Current) Mode

- Even though most power supplies are woke work under CV (constant voltage) mode, there are still many applications need to use DC power supply under CC mode. When operate under CC mode, current control accuracy is very important, there is no need to pay attention to the set value accuracy and resolution of output voltage, the output voltage ripple and noise is not as important as output current ripple and noise.

## 14. Stability and Reliability

- Stability is indicator to measure the power supply's output voltage and current long term drift.
- In the LED power supply's burn-in test, programmable power supply is always in operation status, in this test, it is needed that the power supply could work stably for long period, the stability is always show in parts per million or ppm.

## 15. Budget

- When choose a power supply, budget is a very important factor must be considered, you can consider to decrease the investment by using the combination of power supplies with different parameter requirement; Meanwhile, it could be considered to the output capability of power supply by series or parallel connection.

# Customer Service Network

APM Technologies' global marketing service network covering not only the major cities of China domestic market, but also the most active economy areas of overseas market, such as in Australia, Europe, America, Asia, Middle East, etc. We offer our valuable customers excellent pre-sales, in-sales and after-sales services.



# Service Team



- Set customer service line to provide customers with the 24 hours a day of continuing hotline services.
- Conduct comprehensive system analysis according to customer's requirement and the product's practical application.
- Provide customer with highest cost performance device layout and technical solutions.
- Fast responsive after-sale support and assign after-sale personnel to provide professional service.
- Provide thorough product training service to customer.
- Product provides limited warranty and lifelong track service.
- Provide upgrade and update services to system application software for free.
- Regularly customer satisfactory survey, supervise after-sale service quality.