Programmable DC Electronic Load

Introduction

PPL series are high performance programmable DC electronic load. Four basic functions and nine basic operation modes provides sufficient solutions wherever power sources need to be tested. Especially unique CPV and CPC modes greatly improved the functionality of constant power operation. The strong List Mode function, with Min. step 10ms and Max. step 99999s, allows users to set numbers of cycles at free and to link to other lists, facilitating complicated tests. Equipped with RS-232 interface for PC control, SCPI commands and Labview development platform, the PPL series are designed to provide high reliability, great performance and easy operation in research and production of aerospace, ship building, auto electronics, solar battery, fuel cell, etc.

Features

- ✓ 4 basic functions: CC, CV, CR, CP
- ✓ 9 basic operation modes: CCL, CCH, CVL, CVH, CRL, CRM, CRH, CPV, CPC
- ✓ 24-bit A/D converter and 16-bit D/A converter, 40kHz D/A conversion speed, high resolution & high speed
- ✓ Hardware circuit for CR function, faster transient response and higher CR accuracy
- ✓ High speed transient test function, max. test frequency 2kHz
- ✓ Over current, over voltage, over power, over temperature and reverse voltage protections
- ✓ 4.3-inch backlit Segment LCD display
- ✓ High speed rotary dial and keypad input
- ✓ Auto ON/OFF function
- ✓ List Mode function, step 10ms-99999s, free to set numbers of cycles and to be linked to other lists
- ✓ Auxiliary functions: short circuit test, battery discharge capacity test
- ✓ Save & recall function for frequently used setups, max 100 groups
- ✓ Intelligent cooling system, ensure high stability during long-time operation under full load
- ✓ Standard RS-232 interface, support SCPI commands, support Labview
- ✓ Optional RS-232 to USB cable

Product photo

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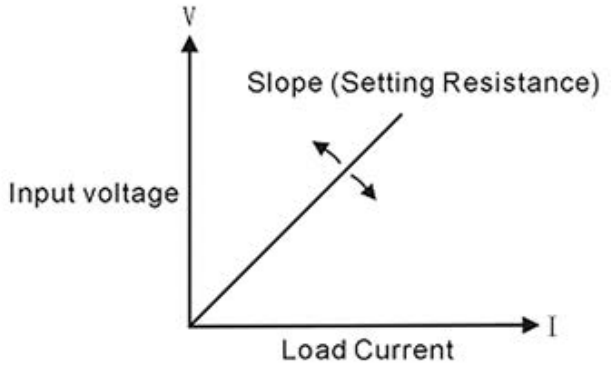
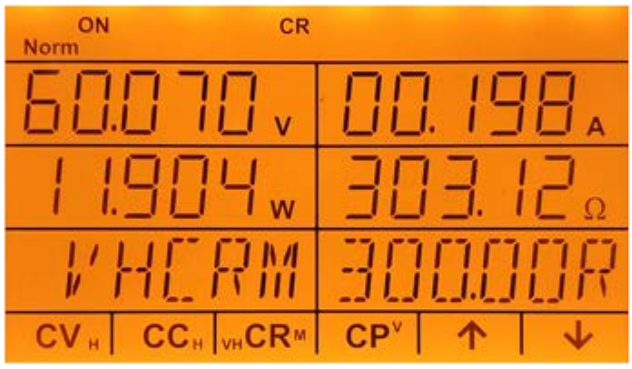
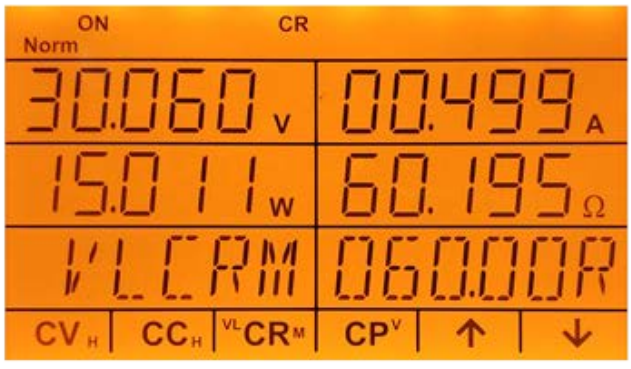
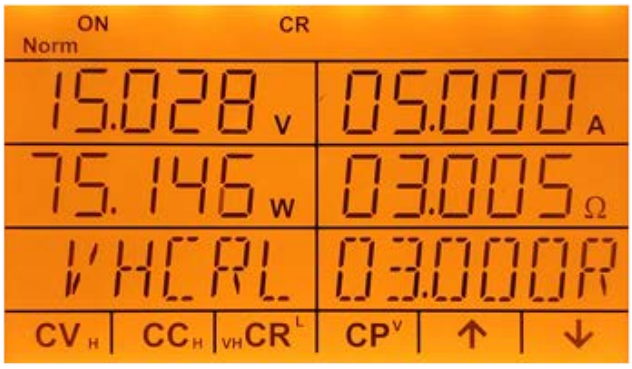
CR Test Mode

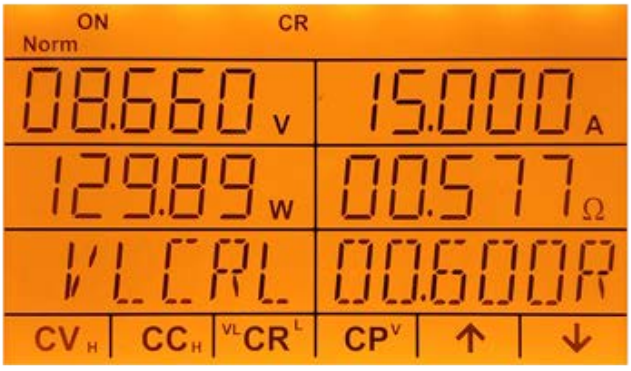
In CR mode, the load will sink a current linearly proportional to the input voltage in accordance with the programmed resistance to make I=U/R.IN CR mode, there are 6 test modes: low level (VL CRL), medium level (VL CRM), high level (VL CRH) of the low voltage range and low level (VH CRL), medium level (VH CRM), high level (VH CRH) of the high voltage range.





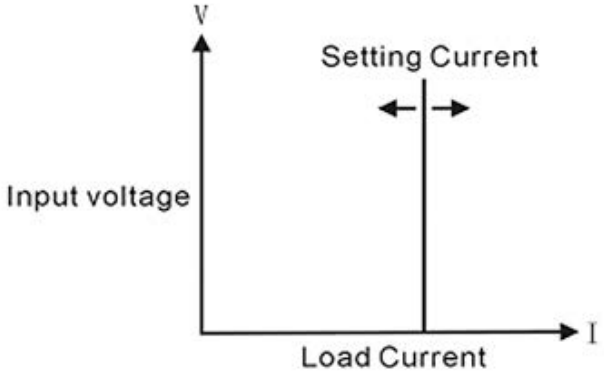


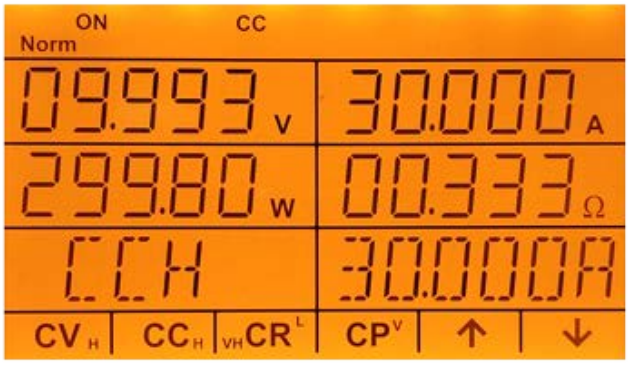




CC Test Mode

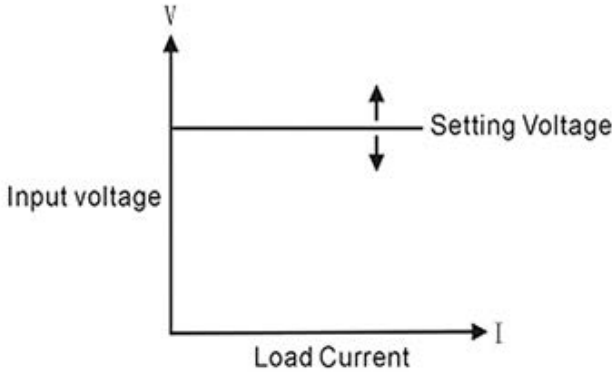
In CC mode, the load will sink a current in accordance with the programmed value regardless of the input voltage. Inn CC mode, there are high range(CCH) and low range(CCL). The high range provides wider test range. The low range provides better resolution at low current settings.

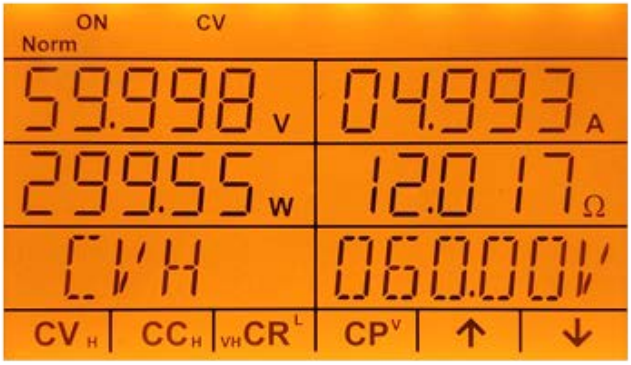


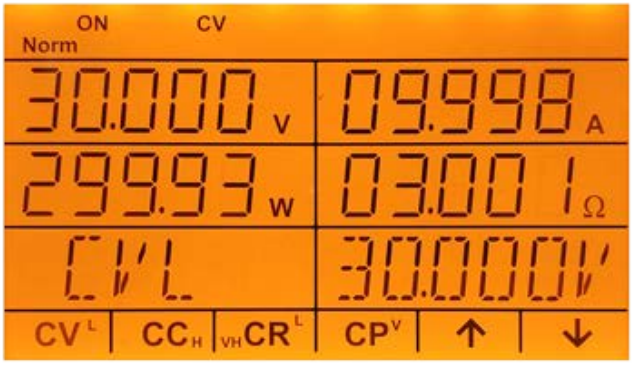


CV Test Mode

In CV mode, the load will attempt to sink enough current to control the source voltage to the programmed value regardless of the input current.

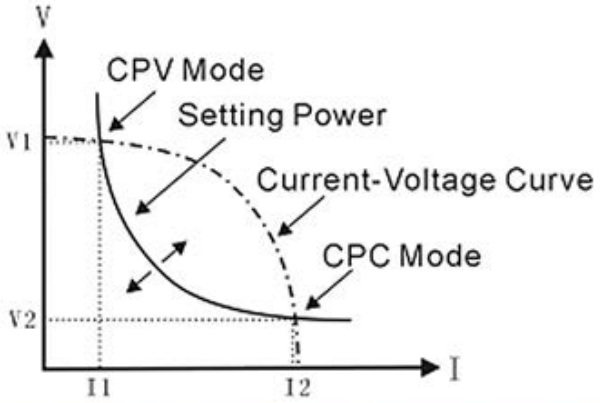


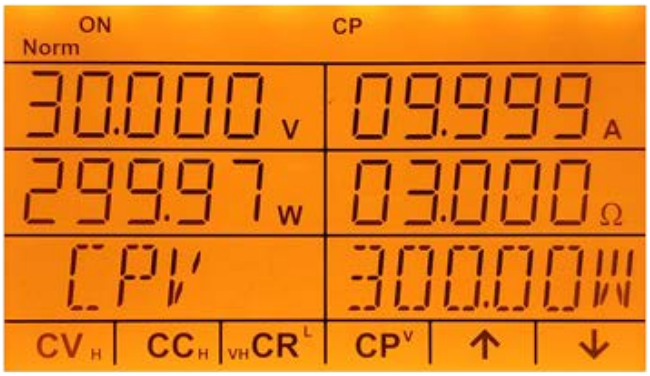


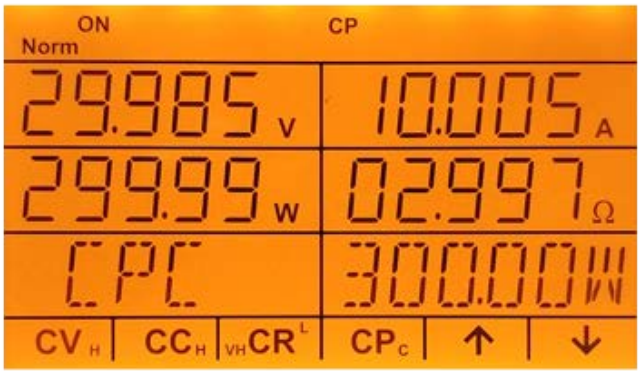


CP Test Mode

In CP mode, the load consumes the constant power in accordance with the programmed value regardless of the changes of external current and voltage. In CP mode, there are two test modes: Constant Power-Voltage Source mode (CPV) and Constant Power-Current Source mode (CPC). The CPV mode is applied to voltage source test, and the CPC mode is applied to current source test.

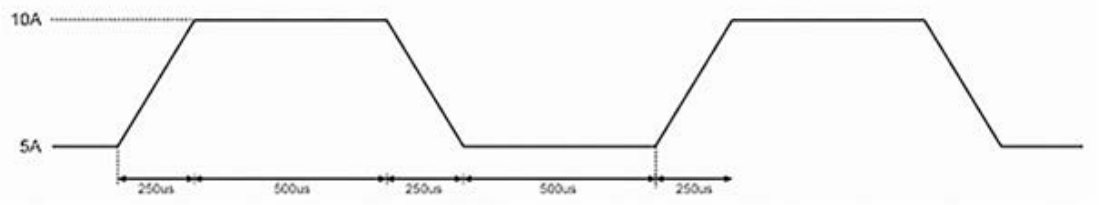




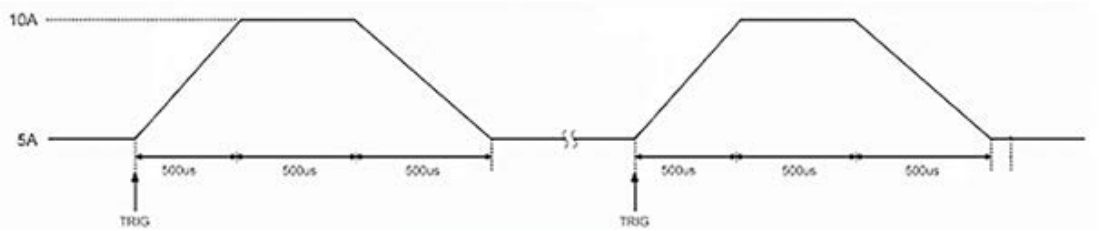


Transient Operation Mode

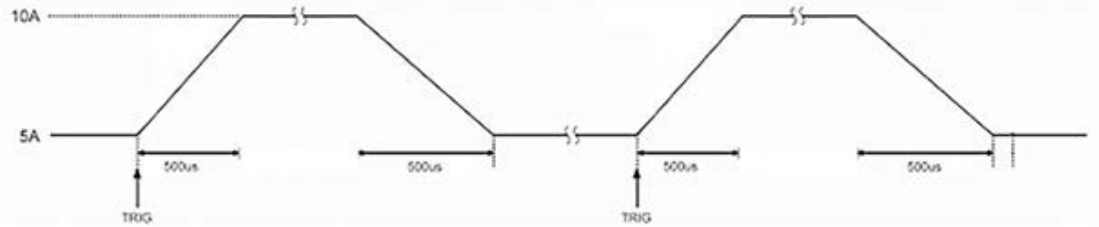
In transient operation mode, the load periodically switch between two levels (LevelH and LevelL), which can be applied to test the dynamic characteristics of the power supply. The transient operation can be executed in the CC, CV, CR modes, and has three operating statuses: Continuous, Pulsed, and Toggled.



Continuous Transient Operation



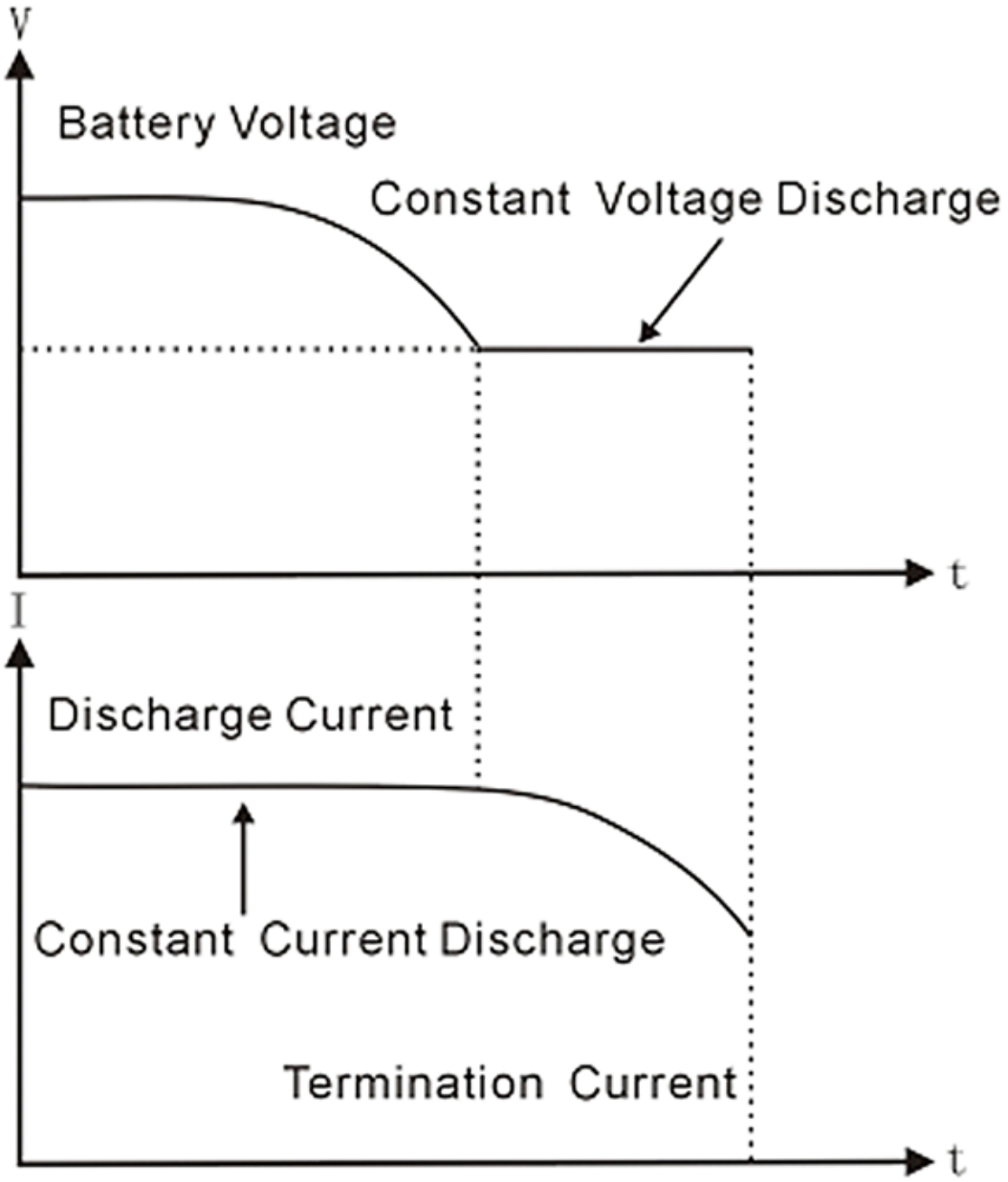
Pulsed Transient Operation



Toggled Transient Operation

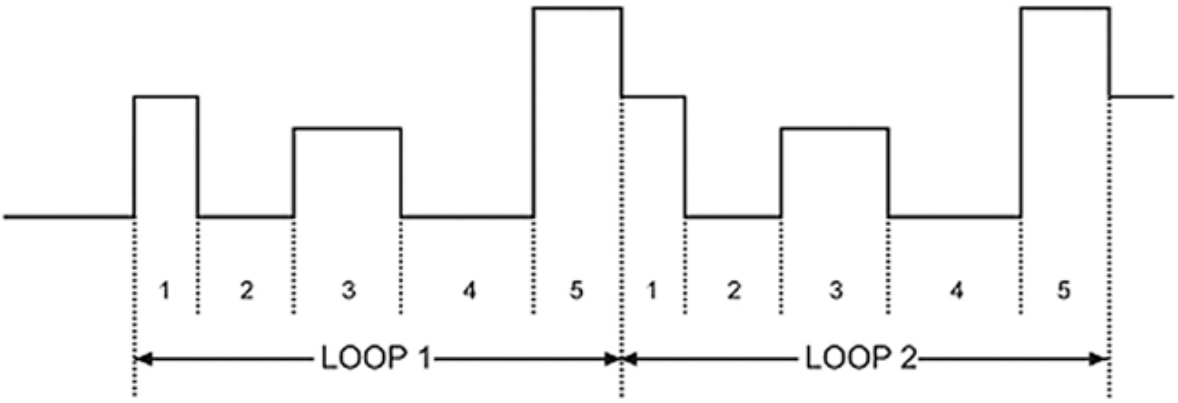
Battery Discharge Mode

The electronic load adopts constant current discharge to test battery capacity. The discharge current, termination voltage, and termination current can be self-defined.Real-time values of battery voltage, discharge current, discharge time, and discharge capacity during the test are displayed on LCD screen.



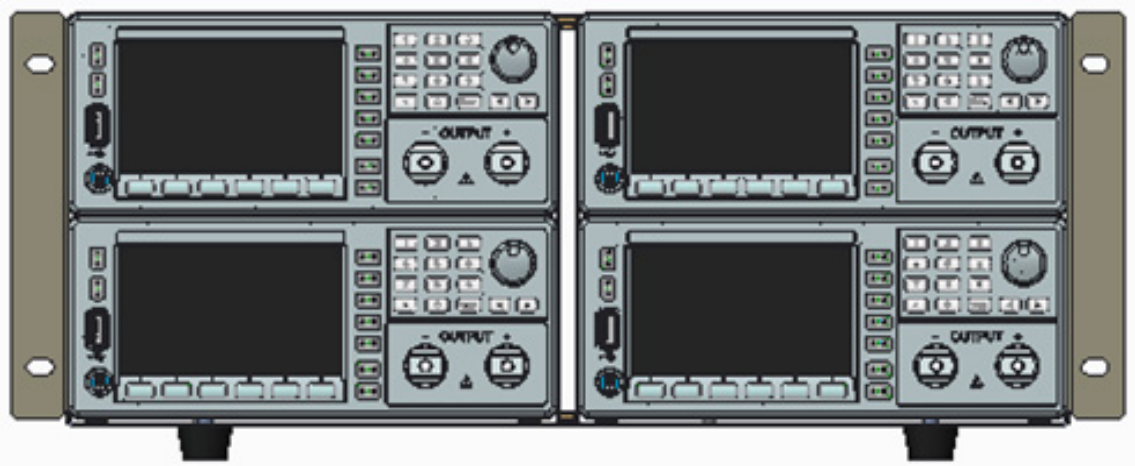
List Mode

In List mode, use can program a series of sequence steps. In each step, operation mode, load values, duration time can be set up. The sequence operation can be executed in the CC, CV, and CR modes.



Rack Mount Compatible

The electronic load units can be locked onto 19-inch cabinet, providing 3U rack panel or 4U rack panel.



Specifications

Model		8611C2	8612C2	8612C3
Rated input (0℃~40℃)				
Voltage		0~150V	0~150V	0~150V
Current		1mA~30A	1mA~30A	1mA~60A
Power *1		150W	300W	300W
MOV@FS current		1.5V	0.82V	1.2V
Constant voltage mode (CV)				
Low range		0.1~30V	0.1~30V	0.1~30V
Resolution		1mV	1mV	1mV
Accuracy		±(0.05%+0.02%FS)	±(0.05%+0.02%FS)	±(0.05%+0.02%FS)
High range		0.10~150V	0.10~150V	0.10~150V
Resolution		10mV	10mV	10mV
Accuracy		±(0.05%+0.025%FS)	±(0.05%+0.025%FS)	±(0.05%+0.025%FS)
Constant current mode (CC)				
Low range		0~3A	0~3A	0~6A
Resolution		1mA	1mA	1mA
Accuracy		±(0.1%+0.1%FS)	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
High range		0~30A	0~30A	0~60A
Resolution		10mA	10mA	10mA
Accuracy		±(0.1%+0.15%FS)	±(0.1%+0.15%FS)	±(0.1%+0.15%FS)
Constant resistance mode (CR) (Input voltage /current≥10%FS)				
Low range (VH CRL)		≈0.06 ~ 6Ω	≈0.04 ~ 6Ω	≈0.025 ~ 3Ω
Resolution		100uΩ	100uΩ	50uΩ
Accuracy (Impedance)		±(0.5%+0.5%FS)	±(0.5%+0.5%FS)	±(0.5%+0.5%FS)
Middle range (VH CRM)		≈6 ~ 600Ω	≈6 ~ 600Ω	≈3 ~ 300Ω
Resolution		2.7us	2.7us	5.4us
Accuracy (Conductance)		±(1%+1%FS)	±(1%+1%FS)	±(1%+1%FS)
High range (VH CRH)		≈60 ~ 4000Ω	≈60 ~ 4000Ω	≈30 ~ 4000Ω
Resolution *2		0.30us	0.30us	0.20us
Accuracy (Conductance)		±(1.5%+1.5%FS)	±(1.5%+1.5%FS)	±(1.5%+1.5%FS)
Low range (VL CRL)		≈0.06 ~ 1.12Ω	≈0.04 ~ 1.12Ω	≈0.025 ~ 0.6Ω
Resolution		18uΩ	18uΩ	9.6uΩ
Accuracy (Impedance)		±(0.5%+0.5%FS)	±(0.5%+0.5%FS)	±(0.5%+0.5%FS)
Medium range (VL CRM)		≈1.12 ~ 112Ω	≈1.12 ~ 112Ω	≈0.6 ~ 60Ω
Resolution		15us	15us	27us
Accuracy (Conductance)		±(1%+1%FS)	±(1%+1%FS)	±(1%+1%FS)
High range (VL CRH)		≈11.2 ~ 2000Ω	≈11.2 ~ 2000Ω	≈6.0 ~ 2000Ω
Resolution		1.6us	1.6us	3.0us
Accuracy (Conductance)		±(1.5%+1.5%FS)	±(1.5%+1.5%FS)	±(1.5%+1.5%FS)
Constant power mode (CP) (Input voltage /current≥10%FS)				
Range		0~150W	0~300W	0~300W
Resolution	P<100W	1mW	1mW	1mW
	P≥100W	10mW	10mW	10mW
Accuracy		±(1%+0.1%FS)	±(1%+0.1%FS)	±(1%+0.1%FS)

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Model		8611C2	8612C2	8612C3
Voltage measurement				
Low range		0~30V	0~30V	0~30V
Resolution		1mV	1mV	1mV
Accuracy		±(0.05%+0.02%FS)	±(0.05%+0.02%FS)	±(0.05%+0.02%FS)
High range		0~150V	0~150V	0~150V
Resolution		10mV	10mV	10mV
Accuracy		±(0.05%+0.025%FS)	±(0.05%+0.025%FS)	±(0.05%+0.025%FS)
Current measurement				
Low range		0~3A	0~3A	0~6A
Resolution		1mA	1mA	1mA
Accuracy		±(0.1%+0.1%FS)	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
High range		0~30A	0~30A	0~60A
Resolution		1mA	1mA	1mA
Accuracy		±(0.1%+0.15%FS)	±(0.1%+0.15%FS)	±(0.1%+0.15%FS)
Power measurement (Input voltage /current≥10%FS)				
Range		0~150W	0~300W	0~300W
Resolution	P<100W	1mW	1mW	1mW
	P≥100W	10mW	10mW	10mW
Accuracy		1%+0.1%FS	1%+0.1%FS	1%+0.1%FS
Current slew rate				
Range	CCH (/us)	0.1mA ~1.5A	0.1mA ~1.5A	0.1mA ~3A
	CCL (/us) *3	0.1mA ~0.15A	0.1mA ~0.15A	0.1mA ~0.33A
Resolution		0.1mA/us	0.1mA/us	0.1mA/us
Accuracy *4		3%+10us	3%+10us	3%+10us
Battery discharge				
Discharge time		1s~100h	1s~100h	1s~100h
Resolution		1s	1s	1s
Accuracy		0.2%+1s	0.2%+1s	0.2%+1s
Battery capacity		3000Ah	3000Ah	6000Ah
Resolution		1mAh	1mAh	1mAh
Accuracy		0.3%+0.01Ah	0.3%+0.01Ah	0.3%+0.01Ah
Discharge voltage range		0.1V~150V	0.1V~150V	0.1V~150V
Discharge current resolution		10mA	10mA	10mA
Short circuit				
CCL		3.6A	3.6A	7.2A
CCH		33A	33A	66A
CV		0V	0V	0V
VH CRL		0.044Ω	0.027Ω	0.022Ω
VH CRM		5.6Ω	5.6Ω	2.8Ω
VH CRH		58Ω	58Ω	29Ω
VL CRL		0.044Ω	0.027Ω	0.022Ω
VL CRM		1.1Ω	1.1Ω	0.53Ω
VL CRH		10Ω	10Ω	5.3Ω
CPV		165W	315W	315W
CPC		0W	0W	0W

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Model	8611C2	8612C2	8612C3
Max. slew rate			
Current	1.5A /us	1.5A /us	3A /us
Voltage	0.2V /us	0.2V /us	0.2V /us
Open circuit	≥20kΩ	≥20kΩ	≥20kΩ
Max. input level			
Current	33A	33A	66A
Voltage	175V	175V	175V
Ripple & Noise			
Current (rms/p-p)	3mA/30mA	3mA/30mA	6mA/60mA
Voltage (rms)	5mV	5mV	5mV
Transient operation			
Transient mode	Continuous, Pulse, Toggled		
Frequency range *5	0.01Hz~2kHz		
High/Low time	0~99999ms		
Resolution	250us		
Accuracy	0.2%+10us		
Rising/Falling time	250us~99999ms		
Resolution	250us		
Accuracy	0.2%+10us		
List Mode			
Step time	10ms~99999s		
Resolution	10ms		
Accuracy	0.2%+10us		
No. of steps	1~50		
No. of cycles	0~65535		
Storage	8 Lists		
Expanded function	Chain		
Trigger input			
Trigger level	TTL falling edge		
Trigger pulse width	≥20us		
General			
Protection	Over current, over voltage, over power, over temperature and reverse voltage protections		
Interface	RS-232 interface, support SCPI commands, support Labview		
	Optional RS-232 to USB cable		
Operating environment	0℃~40℃, ≤85%RH		
Storage environment	-10℃~70℃, ≤70%RH		
Power source	AC110V/220V±10% selectable, 50/60Hz		
Accessories	Power cord x1, Operation manual x1, RS-232 cable x1		
Dimension (WxHxD)	215x89x412mm		
Weight	5.2kg	6.7kg	

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Model		8612B1	8613C3	8613C4	8613B2
Rated input (0℃~40℃)					
Voltage		0~500V	0~150V	0~150V	0~500V
Current		1mA~15A	1mA~60A	1mA~120A	1mA~30A
Power *1		300W	600W	600W	600W
MOV@FS current		3.8V	0.9V	1.6V	4.2V
Constant voltage mode (CV)					
Low range		0.1~30V	0.1~30V	0.1~30V	0.1~30V
Resolution		1mV	1mV	1mV	1mV
Accuracy		±(0.05%+0.02%FS)	±(0.05%+0.02%FS)	±(0.05%+0.02%FS)	±(0.05%+0.02%FS)
High range		0.10~500V	0.10~150V	0.10~150V	0.10~500V
Resolution		10mV	10mV	10mV	10mV
Accuracy		±(0.05%+0.025%FS)	±(0.05%+0.025%FS)	±(0.05%+0.025%FS)	±(0.05%+0.025%FS)
Constant current mode (CC)					
Low range		0~1.5A	0~6A	0~12A	0~3A
Resolution		1mA	1mA	1mA	1mA
Accuracy		±(0.1%+0.1%FS)	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
High range		0~15A	0~60A	0~120A	0~30A
Resolution		10mA	10mA	10mA	10mA
Accuracy		±(0.1%+0.15%FS)	±(0.1%+0.15%FS)	±(0.1%+0.15%FS)	±(0.1%+0.15%FS)
Constant resistance mode (CR) (Input voltage /current≥10%FS)					
Low range (VH CRL)		≈0.3 ~ 36Ω	≈0.02~3Ω	≈0.15~15Ω	≈0.15~18Ω
Resolution		600uΩ	50uΩ	25uΩ	300uΩ
Accuracy (Impedance)		±(0.5%+0.5%FS)	±(0.5%+0.5%FS)	±(0.5%+0.5%FS)	±(0.5%+0.5%FS)
Middle range (VH CRM)		≈36 ~ 3600Ω	≈3~300Ω	≈1.5~150Ω	≈18~1800Ω
Resolution		0.45us	5.4us	10us	0.90us
Accuracy (Conductance)		±(1%+1%FS)	±(1%+1%FS)	±(1%+1%FS)	±(1%+1%FS)
High range (VH CRH)		≈360 ~ 4000Ω	≈30~4000Ω	≈150~4000Ω	≈180~4000Ω
Resolution *2		0.051us	0.20us	1.2us	0.10us
Accuracy (Conductance)		±(1.5%+1.5%FS)	±(1.5%+1.5%FS)	±(1.5%+1.5%FS)	±(1.5%+1.5%FS)
Low range (VL CRL)		≈0.3 ~ 2.4Ω	≈0.02~0.6Ω	≈0.015~0.3Ω	≈0.15~1.2Ω
Resolution		38uΩ	9.6uΩ	4.8uΩ	19uΩ
Accuracy (Impedance)		±(0.5%+0.5%FS)	±(0.5%+0.5%FS)	±(0.5%+0.5%FS)	±(0.5%+0.5%FS)
Medium range (VL CRM)		≈2.4 ~ 240Ω	≈0.6~60Ω	≈0.3~30Ω	≈1.2~120Ω
Resolution		6.8us	27us	54us	14us
Accuracy (Conductance)		±(1%+1%FS)	±(1%+1%FS)	±(1%+1%FS)	±(1%+1%FS)
High range (VL CRH)		≈24 ~ 2000Ω	≈6.0~2000Ω	≈3.0~2000Ω	≈12~2000Ω
Resolution		0.78us	3.0us	6.1us	1.5us
Accuracy (Conductance)		±(1.5%+1.5%FS)	±(1.5%+1.5%FS)	±(1.5%+1.5%FS)	±(1.5%+1.5%FS)
Constant power mode (CP) (Input voltage /current≥10%FS)					
Range		0~300W	0~600W	0~600W	0~600W
Resolution	P<100W	1mW	1mW	1mW	1mW
	P≥100W	10mW	10mW	10mW	10mW
Accuracy		±(1%+0.1%FS)	±(1%+0.1%FS)	±(1%+0.1%FS)	±(1%+0.1%FS)

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Programmable DC Electronic Load

Model		8612B1	8613C3	8613C4	8613B2
Voltage measurement					
Low range		0~30V	0~30V	0~30V	0~30V
Resolution		1mV	1mV	1mV	1mV
Accuracy		±(0.05%+0.02%FS)	±(0.05%+0.02%FS)	±(0.05%+0.02%FS)	±(0.05%+0.02%FS)
High range		0~500V	0~150V	0~150V	0~500V
Resolution		10mV	10mV	10mV	10mV
Accuracy		±(0.05%+0.025%FS)	±(0.05%+0.025%FS)	±(0.05%+0.025%FS)	±(0.05%+0.025%FS)
Current measurement					
Low range		0~1.5A	0~6A	0~12A	0~3A
Resolution		1mA	1mA	1mA	1mA
Accuracy		±(0.1%+0.1%FS)	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
High range		0~15A	0~60A	0~120A	0~30A
Resolution		1mA	1mA	1mA	1mA
Accuracy		±(0.1%+0.15%FS)	±(0.1%+0.15%FS)	±(0.1%+0.15%FS)	±(0.1%+0.15%FS)
Power measurement (Input voltage /current≥10%FS)					
Range		0~300W	0~600W	0~600W	0~600W
Resolution	P<100W	1mW	1mW	1mW	1mW
	P≥100W	10mW	100mW	100mW	100mW
Accuracy		1%+0.1%FS	1%+0.1%FS	1%+0.1%FS	1%+0.1%FS
Current slew rate					
Range	CCH (/us)	0.1mA ~0.75A	0.1mA ~3A	0.1mA ~6A	0.1mA ~1.5A
	CCL (/us) *3	0.1mA ~0.075A	0.1mA ~0.33A	0.1mA ~0.6A	0.1mA ~0.15A
Resolution		0.1mA/us	0.1mA/us	0.1mA/us	0.1mA/us
Accuracy *4		3%+10us	3%+10us	3%+10us	3%+10us
Battery discharge					
Discharge time		1s~100h	1s~100h	1s~100h	1s~100h
Resolution		1s	1s	1s	1s
Accuracy		0.2%+1s	0.2%+1s	0.2%+1s	0.2%+1s
Battery capacity		1500Ah	6000Ah	12000Ah	3000Ah
Resolution		1mAh	1mAh	1mAh	1mAh
Accuracy		0.3%+0.01Ah	0.3%+0.01Ah	0.3%+0.01Ah	0.3%+0.01Ah
Discharge voltage range		0.1V~150V	0.1V~150V	0.1V~150V	0.1V~150V
Discharge current resolution		10mA	10mA	10mA	10mA
Short circuit					
CCL		1.8A	7.2A	14.6A	3.6A
CCH		16.5A	66A	132A	33A
CV		0V	0V	0V	0V
VH CRL		0.24Ω	0.015Ω	0.013Ω	0.13Ω
VH CRM		31Ω	2.8Ω	1.4Ω	16Ω
VH CRH		310Ω	29Ω	15Ω	160Ω
VL CRL		0.24Ω	0.015Ω	0.013Ω	0.13Ω
VL CRM		2Ω	0.53Ω	0.26Ω	1.0Ω
VL CRH		20Ω	5.3Ω	2.4Ω	10Ω
CPV		315W	630W	630W	630W
CPC		0W	0W	0W	0W

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Programmable DC Electronic Load

Model	8612B1	8613C3	8613C4	8613B2
Max. slew rate				
Current	0.75A /us	3A /us	6A /us	1.5A /us
Voltage	0.02V /us	0.2V /us	0.2V /us	0.02V /us
Open circuit	≥20kΩ	≥20kΩ	≥20kΩ	≥20kΩ
Max. input level				
Current	16.5A	66A	132A	33A
Voltage	550V	175V	175V	550V
Ripple & Noise				
Current (rms/p-p)	5mA/50mA	6mA/60mA	12mA/120mA	5mA/50mA
Voltage (rms)	5mV	5mV	5mV	5mV
Transient operation				
Transient mode	Continuous, Pulse, Toggled			
Frequency range *5	0.01Hz~2kHz			
High/Low time	0~99999ms			
Resolution	250us			
Accuracy	0.2%+10us			
Rising/Falling time	250us~99999ms			
Resolution	250us			
Accuracy	0.2%+10us			
List Mode				
Step time	10ms~99999s			
Resolution	10ms			
Accuracy	0.2%+10us			
No. of steps	1~50			
No. of cycles	0~65535			
Storage	8 Lists			
Expanded function	Chain			
Trigger input				
Trigger level	TTL falling edge			
Trigger pulse width	≥20us			
General				
Protection	Over current, over voltage, over power, over temperature and reverse voltage protections			
Interface	RS-232 interface, support SCPI commands, support Labview			
	Optional RS-232 to USB cable			
Operating environment	0℃~40℃, ≤85%RH			
Storage environment	-10℃~70℃, ≤70%RH			
Power source	AC110V/220V±10% selectable, 50/60Hz			
Accessories	Power cord x1, Operation manual x1, RS-232 cable x1			
Dimension (WxHxD)	215x89x412mm	215x89x507mm		
Weight	6.7kg	9kg		

Specifications are subject to change without prior notice.

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