GENERAL PURPOSE POWER SUPPLIES, SPECIAL PURPOSE POWER SUPPLIES, AND ELECTRONIC LOADS

SELECTOR GUIDE

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GENERAL PURPOSE POWER SUPPLIES

Model	Channel	Power	Output Voltage	Output Current	Programmable	Feature and Benefits	Applications
2200-20-5	1	100 W	20 V	5 A	GPIB/USB	• Low ripple and noise • 0.1 mA measurement resolution • Remote sense to compensate for the voltage drop from test leads • KickStart Software support	• Research and development labs • Automated test systems
2200-30-5	1	150 W	30 V	5 A	GPIB/USB		
2200-32-3	1	96 W	32 V	3 A	GPIB/USB		
2200-60-2	1	150 W	60 V	2.5 A	GPIB/USB		
2200-72-1	1	86 W	72 V	1.2 A	GPIB/USB		
2220-30-1	2	45 W	30 V	1.5 A	USB	• All channels are isolated and programmable • High programming accuracy • Remote sense for all output channels • Fully supported in TekSmartLab™ student lab software • KickStart Software support	• Advanced teaching labs • Research and development labs
2220J-30-1		45 W	30 V	1.5 A			
2230-30-1	3	45 W	30 V	1.5 A	USB		
		45 W	30 V	1.5 A			
		30 W	6 V	5 A			
2220G-30-1	2	45 W	30 V	1.5 A	USB/GPIB		• Research and development labs • Automated test systems
		45 W	30 V	1.5 A			
2230G-30-1	3	45 W	30 V	1.5 A	USB/GPIB		
		45 W	30 V	1.5 A			
		30 W	6 V	5 A			
2231A-30-3	3	90 W	30 V	3 A	Optional USB	• All channels are isolated and programmable • Fully supported in KickStart software • Cost-effective option • KickStart Software support	• Basic teaching labs • Research and development labs
		90 W	30 V	3 A			
		15 W	5 V	3 A			
2230-30-3	3	90 W	30 V	3 A	USB/RS-232	• All 3 channels are independent, programmable, and isolated • Remote sense connections for all output channels • Series, parallel, and tracking channel functions	• Automotive circuit testing • High power analog circuit testing • Power supply testing • Appliance circuit testing • Reliability device testing
		90 W	30 V	3 A			
		15 W	5 V	3 A			
2230-30-6	3	180 W	30 V	6A			
		180 W	30 V	6A			
		15 W	5 V	3 A			
2230-60-3	3	180 W	60 V	3 A			
		180 W	60 V	3 A			
		15 W	5 V	3 A			
2280S-32-6	1	192 W	32 V	6 A	GPIB/USB/LAN	• 10 nA to 3.2 A or 6 A high accuracy measurement • Capture dynamic load currents as short as 140 µs • Graphical user interface • Low noise, linear supply • KickStart Software support	• Research and development labs • Automated test systems • Battery-powered device power consumption test
2280S-60-3	1	192 W	60 V	3.2 A	GPIB/USB/LAN		
2260B-30-36	1	360 W	30 V	36 A	USB/LAN	• Compact size with large output range • Programmable rise and fall times • Battery simulation capability • Constant current priority setting • KickStart Software support	• Research and development labs • Automated test systems • Power LED testing • Laser diode constant current sourcing
2260B-80-13	1	360 W	80 V	13.5 A			
2260B-250-4	1	360 W	250 V	4.5 A			
2260B-800-1	1	360 W	800 V	1.44 A			
2260B-30-72	1	720 W	30 V	72 A			
2260B-80-27	1	720 W	80 V	27 A			
2260B-800-2	1	720 W	800 V	2.88 A			
2260B-30-108	1	1080 W	30 V	108 A			
2260B-80-40	1	1080 W	80 V	40.5 A			
2260B-250-13	1	1080 W	250 V	13.5 A			
2260B-800-4	1	1080 W	800 V	4.32 A			

SPECIAL PURPOSE POWER SUPPLIES

Model	Channel	Power	Output Voltage	Output Current	Programmable	Feature and Benefits	Applications
2281S-20-6	1	120 W	20 V	6 A	GPIB/USB/LAN	• Simulates batteries based on a dynamic battery model • Graphical display of battery State-of-Charge and battery voltage • Models include open circuit voltage and internal resistance as a function of State-of-Charge • Store up to 14 battery models • Precision power supply mode • KickStart Software support	• Research and development labs • Automated test systems • Battery-powered device power consumption test • Battery capacity test • Power management unit (PMIC) test
2302	1	45 W	15 V	5 A	GPIB	• Ultra-fast transient response output • Variable output resistance • Sinks up to 3 A current • 33 µs – 833 ms dynamic current measurement on 5 A range (2302) and 5 A and 500 mA range (2302-PJ) • 4 relay control ports • Built-in DVM	• Mobile phone testing • Portable, battery-operated device testing • Wireless device testing
2303	1	45 W	15 V	5 A	GPIB	• Ultra-fast transient response output • 33 µs – 833 ms dynamic current measurement on 5 A range (2303) and 5 A and 500 mA ranges (2303-PJ) • Sinks up to 2 A current • 1 relay control port • Built-in DVM	• Mobile phone testing • Portable, battery-operated device testing • Wireless device testing
2306 2306-PJ 2306-LAN	2	45 W	15 V	5 A	GPIB/LAN	• Ultra-fast transient response output • Variable output resistance on battery channel • 33 µs – 833 ms dynamic current measurement on 5 A range (2306), 5 A and 500 mA ranges (2306-PJ) • Battery channel pulse measurements on 5 A (2306) and 5 A and 500 mA ranges (2306-PJ) • Sinks up to 3 A current • 2nd channel for charger simulation • 4 relay control ports • Built-in DVM • LAN communication (2306-LAN only) • KickStart Software support (2306-LAN only)	• Mobile phone testing • Portable, battery-operated device testing • Wireless device testing

SPECIAL PURPOSE POWER SUPPLIES (continued)

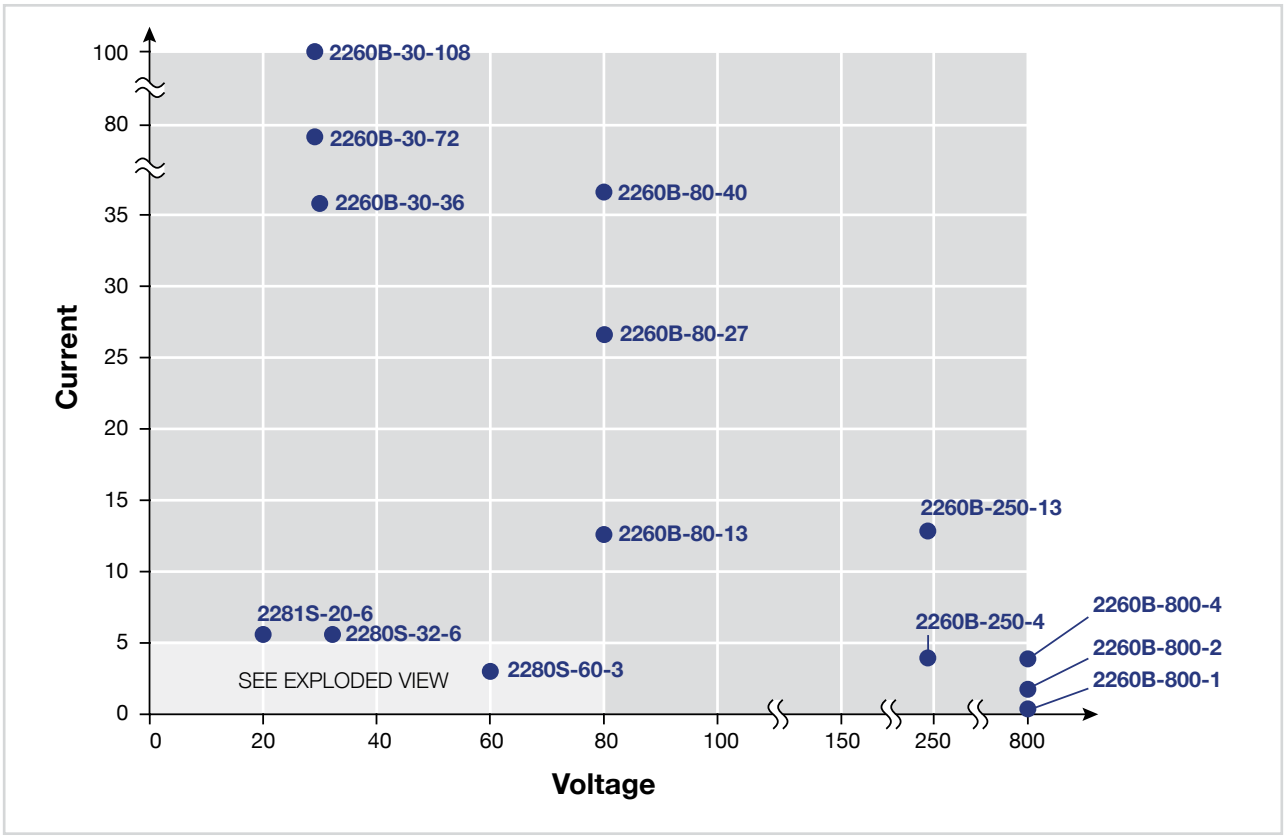
Model	Channel	Power	Output Voltage	Output Current	Programmable	Feature and Benefits	Applications
2308	2	45 W	15 V	5 A	GPIB	• Ultra-fast transient response output • Variable output resistance on battery channel • 33 µs–833 ms dynamic current measurements on four current ranges • Battery channel pulse measurements on 5A, 500 mA, 50 mA, and 5 mA ranges • Sinks up to 3 A current • 2nd Channel for charger simulation • 4 relay control ports • Built-in DVM	• Mobile phone testing • Portable, battery-operated device testing • Wireless device testing
2290-5	1	25 W	5,000 V	5mA	GPIB	• Safety interlock • Analog voltage control • Voltage and current monitoring outputs	• High voltage breakdown testing • High voltage leakage current testing
2290-10	1	10 W	10,000 V	1mA	GPIB/RS-232		

ELECTRONIC LOADS

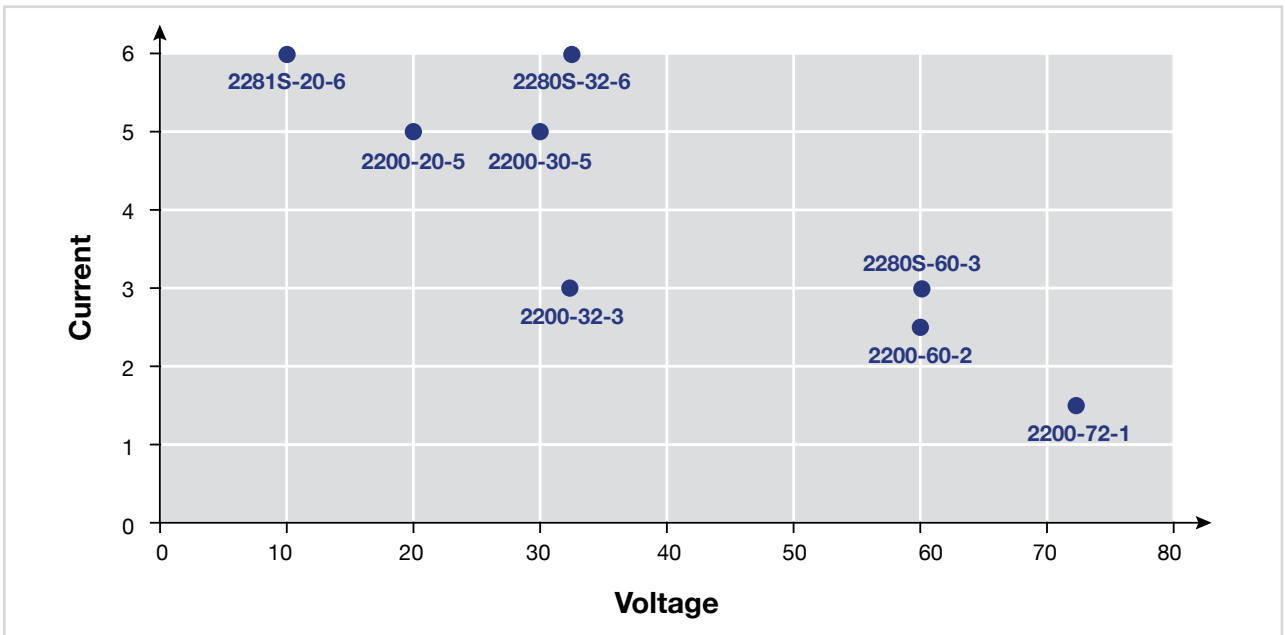
Model	Number of Channels	Maximum Power	Maximum Voltage	Maximum Sink Current	PC Interface	Features	Applications
2380-500-15	1	200 W	500 V	15 A	USB/GPIB/ RS-232	• Constant Current (CC), Constant Voltage (CV), Constant Resistance (CR), and Constant Power (CP) operating functions • LED simulated load test function • Battery test function • Dynamic mode with cycle rate up to 25 kHz	• Efficiency, environmental, stress, and accelerated life testing of AC/DC power supplies and DC/DC modules • LED driver testing • Automotive electronics testing • Battery discharge testing
2380-120-60	1	250 W	120 V	60 A			
2380-500-30	1	750 W	500 V	30 A			

SINGLE OUTPUT PROGRAMMABLE POWER SUPPLIES

Selection Chart by Voltage and Current Outputs



Selection Chart by Voltage and Current Outputs–Exploded View



Series 2200

Single-channel, Low-noise, Programmable Power Supplies

Designed for **Benchtop and Automated Test Applications**

	2200-20-5	2200-30-5	2200-32-3	2200-60-2	2200-72-1
Output Voltage	0–20 V	0–30 V	0–32 V	0–60 V	0–72 V
Output Current	0–5 A	0–5 A	0–3 A	0–2.5 A	0–1.2 A
Output Power	100 W	150 W	96 W	150 W	86 W
Ripple and Noise (20 Hz–7 MHz)					
CV p-p	<3 mV	<4 mV	<4 mV	<5 mV	<3 mV
CV RMS	<1 mV	<1 mV	<1 mV	<1 mV	<1 mV
CC RMS	<3 mA	<4 mA	<3 mA	<3 mA	<3 mA
Programming Accuracy (25°C ± 5°C)					
Voltage	±(0.03% + 3 mV)	±(0.03% + 3 mV)	±(0.03% + 3 mV)	±(0.03% + 6 mV)	±(0.03% + 6 mV)
Current	±(0.05% + 2 mA)	±(0.05% + 2.5 mA)	±(0.05% + 2 mA)	±(0.05% + 1.5 mA)	±(0.05% + 1 mA)
Readback Accuracy (25°C ± 5°C)					
Voltage	±(0.02% + 3 mV)	±(0.02% + 2.5 mV)	±(0.02% + 3 mV)	±(0.02% + 6 mV)	±(0.02% + 5 mV)
Current	±(0.05% + 2 mA)	±(0.05% + 2.5 mA)	±(0.05% + 2 mA)	±(0.05% + 1.5 mA)	±(0.05% + 1 mA)
Programming	2200 Series with USB and GPIB interfaces				
Size	2U high, half rack width				
Other	List mode supports up to 7 seven customized test sequences; each sequence can hold 80 voltage and current steps.				

2200 Features

- Linear power supply with low ripple and noise
- Power up to 150 W
- 0.03% voltage programming accuracy
- 0.05% current programming accuracy
- 1 mV / 0.1 mA programming resolution, high precision power supply for testing low power components
- Remote sense function maximizes output voltage accuracy at the DUT
- List mode supports up to 80 steps to improve ATE test efficiency
- 2200 Series supplied with USB and GPIB interfaces
- Three-year warranty
- KickStart Software support

The 2200 Series programmable power supplies have excellent accuracy for R&D and manufacturing testing of a wide range of components, sub-assemblies, and end products.

Series 2220/2230

Two or Three Channels, Low Noise, Programmable Power Supplies

Designed for **Benchtop Applications**

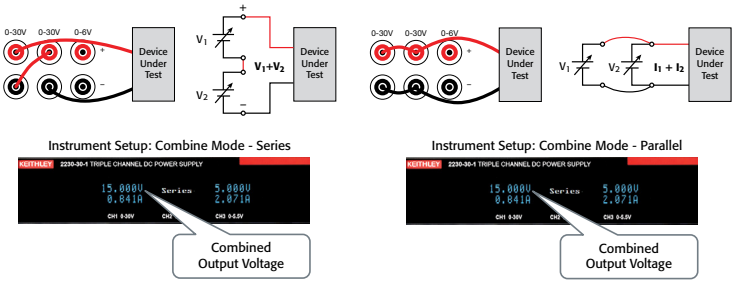
	2230-30-1, 2230G-30-1, 2230GJ-30-1*			2220-30-1, 2220G-30-1	
Output Channel	3			2	
Voltage	0–30 V	0–30 V	0–6 V	0–30 V	0–30 V
Current	0–1.5 A	0–1.5 A	0–5 A	0–1.5 A	0–1.5 A
Power	120 W			90 W	
Ripple and Noise					
CV p-p 7 mHz	< 3 mV	< 3 mV	< 3 mV	< 3 mV	< 3 mV
CV RMS 7 mHz	< 1 mV	< 1 mV	< 1 mV	< 1 mV	< 1 mV
CC RMS 20 mHz	< 5 mA	< 5 mA	< 6 mA	< 5 mA	< 5 mA
Programming Accuracy (25°C ± 5°C)					
Voltage	±(0.03% + 10 mV)	±(0.03% + 10 mV)	±(0.03% + 10 mV)	±(0.03% + 10 mV)	±(0.03% + 10 mV)
Current	±(0.1% + 5 mA)	±(0.1% + 5 mA)	±(0.1% + 5 mA)	±(0.1% + 5 mA)	±(0.1% + 5 mA)
Readback Accuracy (25 °C ± 5 °C)					
Voltage	±(0.03% + 10 mV)	±(0.03% + 10 mV)	±(0.03% + 10 mV)	±(0.03% + 10 mV)	±(0.03% + 10 mV)
Current	±(0.1% + 5 mA)	±(0.1% + 5 mA)	±(0.1% + 5 mA)	±(0.1% + 5 mA)	±(0.1% + 5 mA)
Communication	Standard with USB interface; 22XXG/GJ with GPIB interface				
Size	2U high, half rack width				
Other	All output channels are isolated and permit both a positive voltage output and a negative voltage output relative to a DUT common reference; displays total voltage and current output when in series and parallel modes				

* J-versions are designed for 100 VAC nominal input AC line voltage.

Series 2220/2230 Features

- Two or three outputs
- Linear power supply with low ripple and noise
- All channels are isolated and can be controlled independently to maximize flexibility
- All channels have remote sensing to ensure maximum voltage accuracy at the DUT
- Two 30 V channels can be connected in series or parallel and the display shows total output voltage and current
- 0.03% voltage programming accuracy and 0.1% current programming accuracy
- Three-year warranty
- KickStart Software support

Series 2220/2230 Multi-Channel Power Supplies are excellent for use in student labs, R&D, and test labs. They provide 2 or 3 channels of isolated, high quality power to one or multiple DUTs.



Use the series and parallel modes to double voltage or current output. The supply ensures that both channels share the load equally; and, the supply displays the total voltage output, the current output, and the control mode being used.

2231A-30-3
Triple-Channel DC Power Supply
Designed for **Benchtop Applications**

2231A-30-3 Features

- Three independent and adjustable outputs in one instrument
- Power up to 195 W
- 0.06% voltage programming accuracy
- 0.2% current programming accuracy
- DC power with less than 5 mVp-p noise
- Simultaneous display of all three outputs
- Double output levels by connecting the two 30 V channels in series or parallel
- Store 30 setups
- Turn off any output with a programmable timer
- Control from a PC with optional USB interface
- Three-year warranty
- KickStart Software support

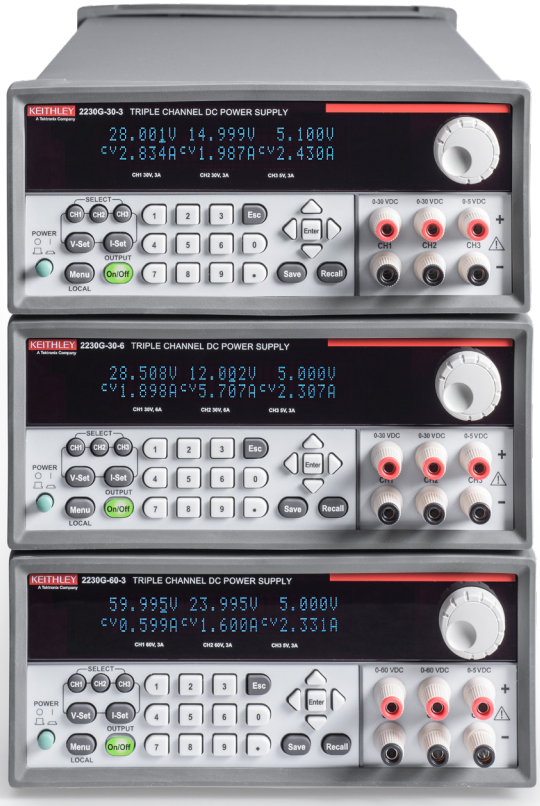
	2231A-30-3		
Channel	1	2	3
Output Voltage	0–30 V	0–30 V	0–5 V
Output Current	0–3 A	0–3 A	0–3 A
Output Power	195 W		
Ripple and Noise (20 Hz–20 MHz)			
CV p-p	≤5 mV		
CV RMS	≤1 mV		
CC RMS	≤6 mA		
Programming Accuracy (25°C ±5°C)			
Voltage	±(0.06% + 20 mV)		
Current	±(0.2% + 10 mA)		
Readback Accuracy (25°C ± 5°C)			
Voltage	±(0.06% + 20 mV)		
Current	±(0.2% + 10 mA)		
Size	2U high, half rack width		
Other	Store up to 30 sets of user settings		

The 2231A-30-3 is a highly cost-effective power supply with 195 W of power for student laboratories and laboratory R&D use.

Series 2230

High Power, 3-Channel, Programmable Power Supplies

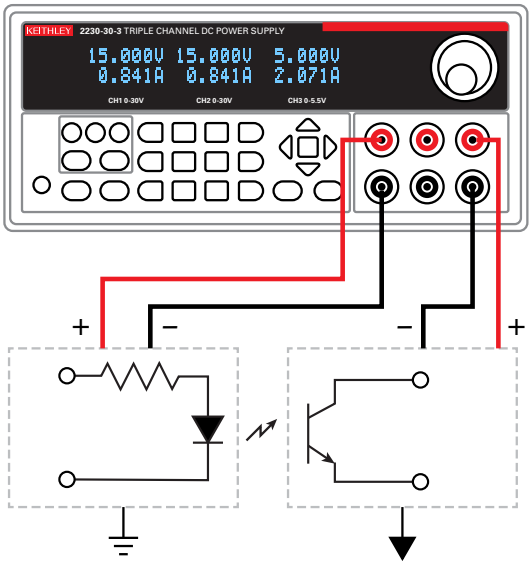
For **Design and Test of high power components and circuits**

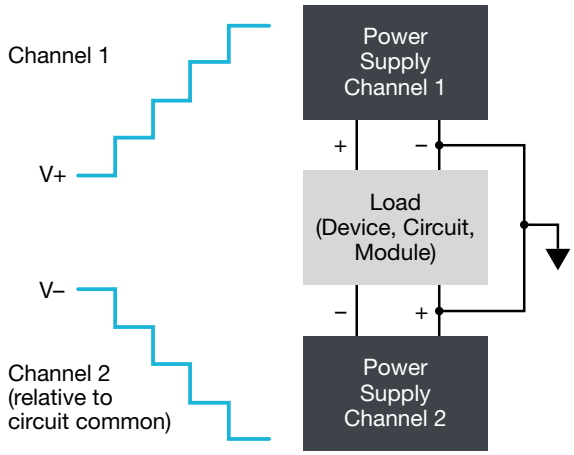


Series 2230 Features

- One 195 W model and two 375 W models
- 195 W model has two 30 V, 3 A channels and one 5 V, 3 A channel
- 375 W models have two 30 V, 6A channels or two 60 V, 3 A channels and one 5 V, 3 A channel
- All channels are independently controlled and are isolated to power a wide range of test setups
- All channels have remote sensing so that the programmed voltage is accurately applied to the load
- Set and monitor output voltages with 0.03% basic accuracy and 1 mV resolution
- Monitor load current with 0.1% basic accuracy and 1 mA resolution
- Low noise, linear regulation with <1 mVrms ripple and noise
- Combine channels in series to output as high as 60 V and in parallel with two or three channels to create capacity as high as 15 A (2230-30-6)
- Voltage and current outputs of three channels are displayed simultaneously for immediate observation of each output state
- USB and RS-232 interfaces and rear panel connections for automated test convenience
- KickStart Software support

Power two isolated circuits with isolated output channels.





Easily test a bipolar circuit over its operating voltage range using the tracking function so both the +voltage and the – voltage change together.

Series 2230 High Power 3-Channel Power Supplies

	2230-30-3		2230-30-6		2230-60-3	
	CH 1 and CH 2	CH 3	CH 1 and CH 2	CH 3	CH 1 and CH 2	CH 3
DC Output Rating						
Voltage	0 V to 30 V	0 V to 5 V	0 V to 30 V	0 V to 5 V	0 V to 60 V	0 V to 5 V
Maximum Voltage	30.1 V	5.1 V	30.1 V	5.1 V	60.1 V	5.1 V
Current	0 A to 3 A	0 A to 3 A	0 A to 6 A	0 A to 3 A	0 A to 3 A	0 A to 3 A
Maximum Power	195 W		375 W		375 W	
Ripple and Noise (20 Hz to 20 MHz, 23°C ± 5°C)						
Voltage ($V_{peak-peak}$)	<3 $mV_{peak-peak}$		<4 $mV_{peak-peak}$	<3 $mV_{peak-peak}$	<4 $mV_{peak-peak}$	
Voltage (VRMS)	<1 mV_{RMS}		<1 mV_{RMS}	<1 mV_{RMS}	<1 mV_{RMS}	
Current (IRMS)	<4 mA_{RMS}		<5 mA_{RMS}	<4 mA_{RMS}	<4 mA_{RMS}	
Setting and Readback Accuracy (using remote sense, 23°C ± 5°C)						
Voltage	±(0.03% + 10 mV)		±(0.03% + 10 mV)		±(0.03% + 10 mV)	
Current	±(0.1% + 5 mA)		±(0.1% + 8 mA)	±(0.1% + 5 mA)	±(0.1% + 5 mA)	
Setting and Readback Resolution						
Voltage	1 mV		1 mV		1 mV	
Current	1 mA		1 mA		1 mA	
Communication	USB, RS-232					
Size	2U high, half rack width					
Other	All output channels are isolated, independent, and programmable. Series, parallel, and tracking functions.					

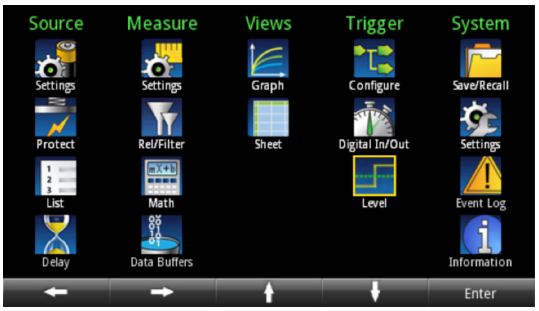
Series 2280S
Precision Measurement, Programmable Power Supplies
Designed for Current Drain Analysis

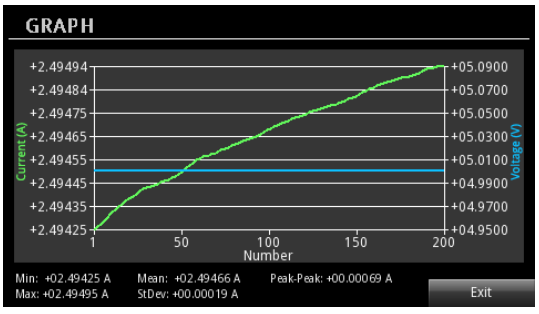
	2280S-32-6	2280S-60-3
Output Voltage	0–32 V	0–60 V
Output Current	0–6 A	0–3.2 A
Output Power	192 W	192 W
Ripple and Noise (20 Hz–20 MHz)		
CV p-p (mV):	<5 mV	<7 mV
CV RMS (mV):	<1 mV	<2 mV
CC RMS (mA):	<3 mA	<3 mA
Programming Accuracy		
Voltage	±(0.02% + 3 mV)	±(0.02% + 6 mV)
Current	±(0.05% + 5 mA)	±(0.05% + 5 mA)
Readback Accuracy		
Voltage	±(0.02% + 2 mV)	±(0.02% + 4 mV)
Current 10 mA/100 mA Range 1 A/10 A Range	±(0.05% + 10 µA) ±(0.05% + 250 µA)	±(0.05% + 10 µA) ±(0.05% + 250 µA)
Readback Resolution (under 6.5 digit setting)		
Voltage	100 µV	100 µV
Current	10 nA	10 nA
Minimum Measurement Time	0.002 Power Line Cycles	
Response Time		
Voltage Rising Slew Rate	10 V/s–100 V/s	10 V/s–100 V/s
Voltage Falling Slew Rate	10 V/s–100 V/s	10 V/s–100 V/s
Load Transient Response Time	<50 µs	
Programming	GPIB/USB/LAN (LXI-C)	
Size	2U high, half rack width	
Other	Precision measurement power supply with 6½-digit DMM measurement capability, GUI, LXI web interface, output list function and programmable output slew rate	

The Series 2280S Precision Measurement Power Supply helps R&D and test engineers easily perform current drain analysis on low power products.

Series 2280S Features

- 6½-digit DMM measurement capability to observe load currents from 100 nA to 6 A
- High speed sampling capability, for capturing load current pulses as narrow as 140 µs
- 192 W linear power supply with low ripple and noise and <50 µs, fast transient response
- Output list function
- Programmable voltage slew rate simulates supply rise time conditions
- GUI with waveform display of output current and voltage
- GPIB, USB, and LAN (LXI) interfaces
- Three-year warranty
- KickStart Software support





Series 2280S main menu screen (top) and graph screen (bottom)

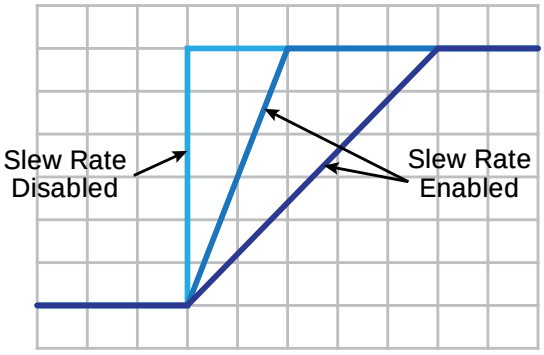
Series 2260B
Single-Channel Wide Range, Programmable Power Supplies

Designed for **Automated Test** and **Benchtop Applications**

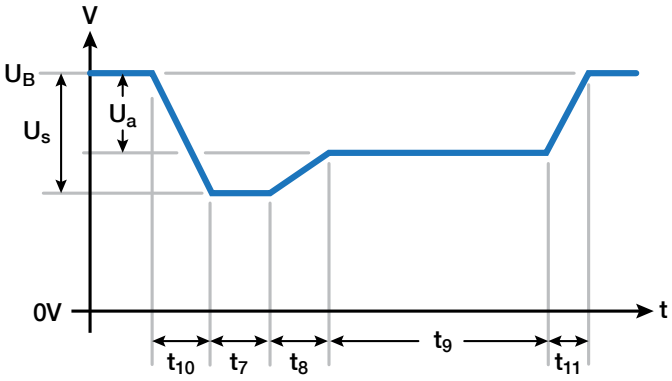
Series 2260B Features

- Single output, high power density, system power supply
- 360 W, 720 W and 1080 W versions with voltage up to 800 V and current up to 108 A
- Programmable voltage or current rise and fall times preventing damage from inrush current to low impedance loads
- Constant current priority setting reduces voltage and current overshoot when powering LEDs
- Simulate a battery's output with a programmable output resistance
- Choose from analog control, USB, LAN, or an optional GPIB interface for automated control
- Save bench and test system space: six 71mm wide 360 W units or three 142 mm wide 720 W units or two 214 mm wide 1080 W units fit in a standard rack width
- Ability to combine two of same model in series or three in parallel to increase voltage / current
- Three-year warranty
- KickStart Software support

The Series 2260B Programmable DC Power Supplies provide plenty of power for automated environmental test systems, life testing systems, and production test systems. The programmable slew rates minimize inrush current to protect DUTs, especially for LED product test and switch-mode power supply test.



2260B output slew rate control.



Example waveform using the output list function.

2260B-30-36
2260B-80-13
2260B-250-4
2260B-800-1

2260B-30-72
2260B-80-27
2260B-250-9
2260B-800-2

2260B-30-108
2260B-80-40
2260B-250-13
2260B-800-4

	2260B-										
	30-36	80-13	250-4	800-1	30-72	80-27	800-2	30-108	80-40	250-13	800-4
Output Voltage	0–30 V	0–80 V	0–250 V	0–800 V	0–30 V	0–80 V	0–800 V	0–30 V	0–80 V	0–250 V	0–800 V
Output Current	0–36 A	0–13.5 A	0–4.5 A	0–1.44A	0–72 A	0–27 A	0–2.88A	0–108A	0–40.5 A	0–13.5 A	0–4.32 A
Output Power	360 W	360 W	360 W	360 W	720 W	720 W	720 W	1080 W	1080 W	1080 W	1080 W
Ripple and Noise (noise bandwidth 20 MHz, ripple bandwidth 1 MHz)											
CV p-p	60 mV	60 mV	80 mV	150 mV	80 mV	80 mV	200 mV	100 mV	100 mV	120 mV	200 mV
CV RMS	7 mV	7 mV	15 mV	30 mV	11 mV	11 mV	30 mV	14 mV	14 mV	15 mV	30 mV
CC RMS	72 mA	27 mA	10 mA	5 mA	144 mA	54 mA	10 mA	216 mA	81 mA	30 mA	15 mA
Programming Accuracy ±(% of reading + offset)											
Voltage	0.1% + 10 mV	0.1% + 10 mV	0.1% + 200 mV	0.1% + 400 mV	0.1% + 10 mV	0.1% + 10 mV	0.1% + 400 mV	0.1% + 10 mV	0.1% + 10 mV	0.1% + 200 mV	0.1% + 400 mV
Current	0.1% + 30 mA	0.1% + 10 mA	0.1% + 5 mA	0.1% + 2 mA	0.1% + 60 mA	0.1% + 30 mA	0.1% + 4 mA	0.1% + 100 mA	0.1% + 40 mA	0.1% + 15 mA	0.1% + 6 mA
Readback Accuracy ±(% of reading + offset)											
Voltage	0.1% + 10 mV	0.1% + 10 mV	0.1% + 200 mV	0.1% + 400 mV	0.1% + 10 mV	0.1% + 10 mV	0.1% + 400 mV	0.1% + 10 mV	0.1% + 10 mV	0.1% + 200 mV	0.1% + 400 mV
Current	0.1% + 30 mA	0.1% + 10 mA	0.1% + 5 mA	0.1% + 2 mA	0.1% + 60 mA	0.1% + 30 mA	0.1% + 4 mA	0.1% + 100 mA	0.1% + 40 mA	0.1% + 15 mA	0.1% + 6 mA
Response Time											
Rise Time	50 ms	50 ms	100 ms	150 ms	50 ms	50 ms	150 ms	50 ms	50 ms	100 ms	150 ms
Fall Time (Full Load)	50 ms	50 ms	150 ms	300 ms	50 ms	50 ms	200 ms	50 ms	50 ms	150 ms	300 ms
Fall Time (No Load)	500 ms	500 ms	1200 ms	2000 ms	500 ms	500 ms	2000 ms	500 ms	500 ms	1200 ms	2000 ms
Load Transient Recovery Time	1 ms	1 ms	2 ms	2 ms	1 ms	1 ms	2 ms	1 ms	1 ms	2 ms	2 ms
Communication	USB/LAN										
Dimension	3U high; 1/6 rack width (360 W models); 1/3 rack width (720 W models); 1/2 rack width (1080 W models).										
Others	Adjustable output voltage and current slew rate, programming output resistance, serial and parallel connections, CC priority mode										

2281S

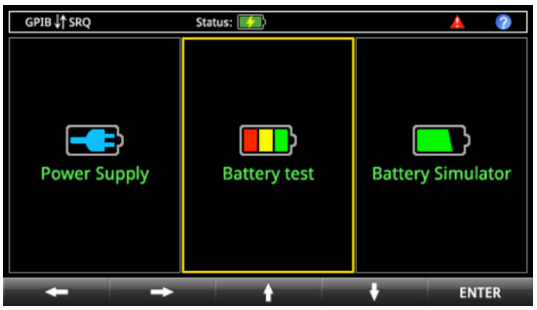
Precision DC Supply and Battery Simulator

Dynamic **battery simulation** using a battery model

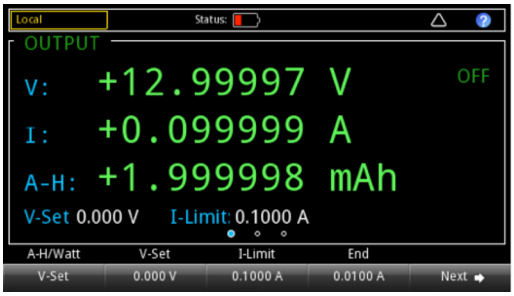
	2281S-20-6
Output Voltage	0–20 V
Output Current	–1 to +6 A
Output Power	120 W
Ripple and Noise (20 Hz–20 MHz)	
CV p-p (mV):	<6 mV
CV RMS (mV):	<1 mV
CC RMS (mA):	<3 mA
Programming Accuracy	
Voltage	±(0.02% + 3 mV)
Current	±(0.05% + 5 mA)
Readback Accuracy	
Voltage	±(0.02% + 2 mV)
Current 10 mA/100 mA Range 1 A/10 A Range	±(0.04% + 10 µA) ±(0.05% + 250 µA)
Readback Resolution (under 6.5 digit setting)	
Voltage	100 µV
Current	10 nA
Minimum Measurement Time	0.002 Power Line Cycles
Response Time	
Voltage Rising Slew Rate	10 V/s–100 V/s
Voltage Falling Slew Rate	10 V/s–100 V/s
Load Transient Response Time	<50 µs
Programming	GPIB/USB/LAN (LXI-C)
Size	2U high, half rack width
Other	Precision measurement power supply with 6½-digit DMM measurement capability, GUI, LXI web interface, output list function and programmable output slew rate

2281S Features

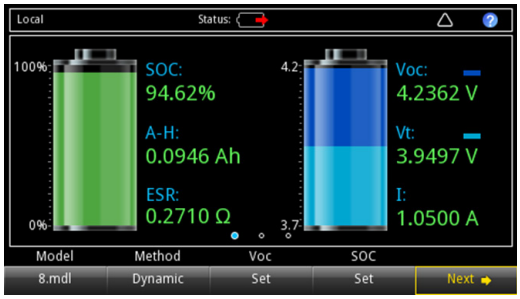
- Battery simulator
  - Simulate a battery based on a dynamic battery model
  - Dynamic and static simulation modes to simulate battery output
  - Graphical display of capacity and battery voltage
- Battery test instrument
  - Create a battery model based on a rechargeable battery's charge cycle
  - Test battery capacity
  - Monitor V, I, R and Amp-Hour data
- Precision power supply
  - 6½-digit DMM measurement capability to observe load currents from 100nA to 6A
  - High speed sampling capability, for capturing load current pulses as narrow as 140µs
- GPIB, USB, and LAN/LXI interfaces
- Three-year warranty
- KickStart Software support



2281S-20-6 startup screen.



Battery test function.

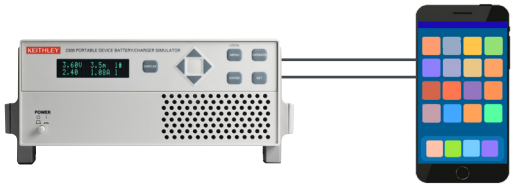


Battery simulation function.

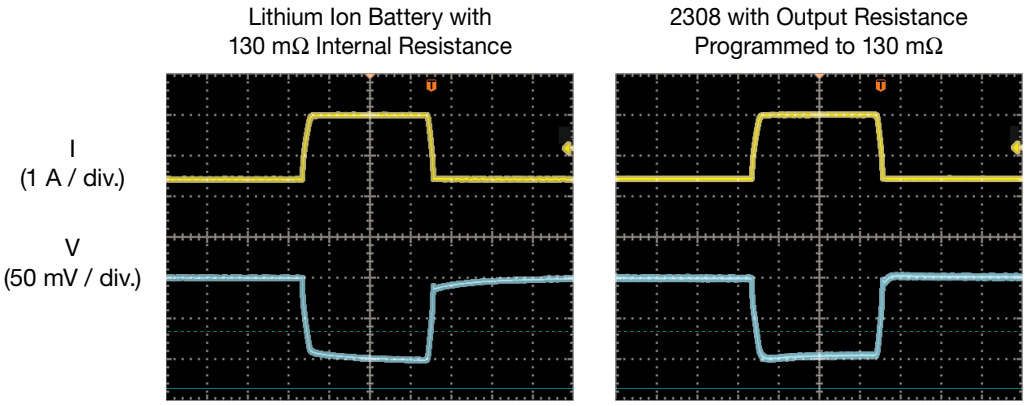
Series 2300
Fast Transient Response and Battery Simulating Power Supplies
Designed for **Production testing of portable, battery-operated products**

Series 2300 Features

- Variable output resistance for simulating a battery's output response (2302, 2306-LAN, and 2308)
- Ultra-fast response to large load current changes such as transmit currents
- Sinks current to simulate a discharged rechargeable battery
- 100 nA current measurement sensitivity
- Single- and dual-channel models, second channel simulates a battery charger
- Built-in digital voltmeter
- GPIB programmable
- LAN communication (2306-LAN only)
- KickStart Software support (2306-LAN only)



Use a Series 2300 power supply to simulate a battery and to power a battery-powered device such as a smartphone.



The 2303, 2306-LAN, and 2308 have a programmable output resistance, which allows them to simulate the output of a real battery, a capability that conventional power supplies do not have. The voltage output response of a lithium ion battery to a load current burst is shown in the figure on the left. The figure on the right shows the voltage output of the 2308 with its output resistance programmed to be equivalent to the internal resistance of the Lithium Ion battery. The 2308's output is nearly identical to the battery's output.

Series 2300 Specialized DC Power Supplies

Model		2302	2303	2306	2306-PJ	2308
No. of Channels		1		2		
Power Output		45 W				
Voltage Output		0–15 V				
Maximum Continuous Current Output		5 A @ 4 V	5 A @ 9 V	5 A @ 4 V		
Variable Resistance Output		0–1 Ω 10 mΩ resolution		0–1 Ω 10 mΩ resolution (channel 1)		
Current Sink Capacity		3 A	2 A	3 A		
DC Current Measurement Sensitivity		100 nA	100 nA	100 nA	10 µA (Ch. 1) 100 nA (Ch. 2)	100 nA
Dynamic Current Measurement		5 A range: 33 µs–833 ms integration times	5 A range: 33 µs–833 ms integration times	5 A range: 33 µs–833 ms integration times	500 mA and 5 A ranges: 33 µs–833 ms integration times	5 A, 500 mA, 50 mA and 5 mA ranges: 33 µs–833 ms integration times
Accuracy	V	0.05%				
	I	0.2%				
Communication		GPIB and LAN (2306-LAN only)				
Size		2U high, half rack width				
Other		DVM, relay control port, open sense lead detection (excluding 2303), and analog output (2308 only)				

Series 2290

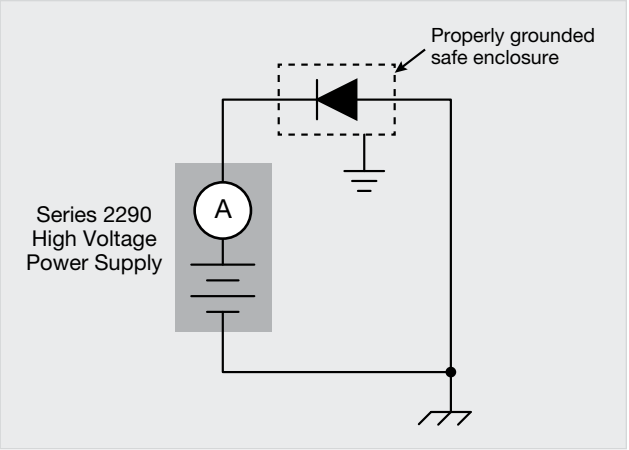
High Voltage Power Supplies

Designed for **High voltage breakdown testing and leakage current testing on high power devices**

Series 2290 Features

- 5000 V and 10,000 V models
- µA current sensitivity
- Low noise, <1 Vrms for the 10 kV model and <3 mVrms for the 5 kV supply
- Safety interlock controls the high voltage output
- GPIB programmable

Model	2290-5	2290-10
Output Voltage	50 V – 5000 V	100 V – 10,000 V
Output Current	5 mA	1 mA
Output Power	25 W	10 W
Output Ripple	≤3 mV RMS with filter	0.01% of full scale, VRMS
Programming Accuracy		
Voltage	±(0.01% of setting + 2.5 V)	±0.06% of full scale
Current	±(0.01% of setting + 2.5 µA)	±0.5% of full scale
Readback Accuracy		
Voltage	±2 V	±2 V
Current	±2 µA	±2 µA
Readback Resolution		
Voltage	1 V	1 V
Current	1 µA	1 µA
PC Interface	GPIB	GPIB, RS-232
Size	2U High, Half-rack wide	
Other	Safety interlock for protection of user, analog voltage input for control system applications	

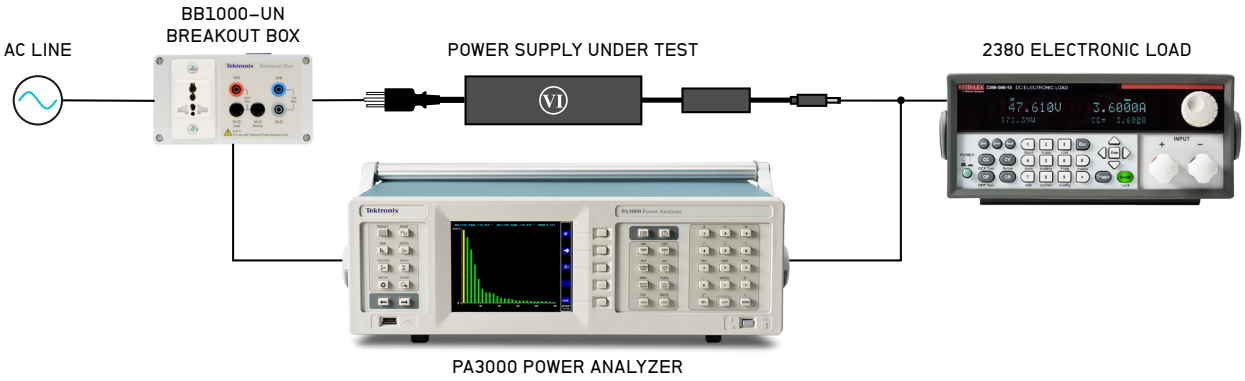


Breakdown voltage test on a high voltage diode using the Series 2290 High Voltage Power Supply as a kV voltage source and as a low current ammeter.

Series 2380
Programmable DC Electronic Loads
Designed for **Benchtop and Automated Test of Power Conversion Devices**

Series 2380 Features

- 200 W, 250 W, and 750 W models
- Supports up to 500 V or 60 A
- Constant current (CC), constant voltage (CV), constant resistance (CR),and constant power (CP) operating modes
- LED simulated load test mode for testing LED drivers
- Battery discharge mode for battery characterization
- Dynamic mode with the cycle rate up to 25 kHz
- Readback voltage and current resolution down to 0.1 mV and 0.01 mA
- Voltage rise time and fall time measurement
- Current monitor function
- List mode
- GPIB, USB, and RS-232 interfaces



Test power supplies to ensure they conform to the latest efficiency standards with the Series 2380 Electronic Loads and the PA3000 Power Analyzer. Use the Series 2380 Electronic Loads to test the power supplies over a wide range of loads.

Series 2380 Programmable DC Electronic Loads

Model		2380-500-15	2380-120-60	2380-500-30
Rated Value (0°–40°C)	Input Voltage	0–500 V	0–120 V	0–500 V
	Input Current	0–15 A	0–60 A	0–30 A
	Input Power	200 W	250 W	750 W
Constant Voltage Mode	Range	0.1– 500 V	0–120 V	0–500 V
	Resolution	10 mV	10 mV	10 mV
	Accuracy	±(0.05% + 0.025% FS)	±(0.05% + 0.025% FS)	±(0.025% + 0.05% FS)
Constant Current Mode	Range	0–15 A	0–60 A	0–30 A
	Resolution	1 mA	1 mA	1 mA
	Accuracy	±(0.05% + 0.05% FS)	±(0.05% + 0.1% FS)	±(0.05% + 0.05% FS)
Constant Resistance Mode	Range	10 Ω–7.5 kΩ	10 Ω–7.5 kΩ	10 Ω–7.5 kΩ
	Resolution	0.1 Ω	0.1 Ω	0.1Ω
	Accuracy	±(0.01% + 0.0008 S)	±(0.01% + 0.0008 S)	±(0.01% + 0.0008 S)
Constant Power Mode	Range	200 W	250 W	750 W
	Resolution	10 mW	10 mW	10 mW
	Accuracy	±(0.1% + 0.1% FS)	±(0.2% + 0.2% FS)	±(0.2% + 0.2% FS)
Dynamic Mode				
CC Mode	T1 & T2	20 µs–3600 s; Res: 1 µs	20 µs–3600 s; Res: 1 µs	20 µs–3600 s; Res: 1 µs
	Ascending/ Descending Slope	0.001–1 A/µs	0.001–2.5 A/µs	0.001–1 A/µs
	Minimum Rise Time	~10 µs	~20 µs	~20 µs
Measuring Range				
Readback Voltage	Range	0–500 V	0–120 V	0–500 V
	Resolution	10 mV	1 mV	10 mV
	Accuracy	±(0.025% + 0.025% FS)	±(0.025% + 0.025% FS)	±(0.025% + 0.025% FS)
Readback Current	Range	0–15 A	0–60 A	0–30 A
	Resolution	0.1 mA	1 mA	1 mA
	Accuracy	±(0.05% + 0.05% FS)	±(0.05% + 0.1% FS)	±(0.05% + 0.05% FS)
Readback Power	Range	200 W	250 W	750 W
	Resolution	10 mW	10m W	10 mW
	Accuracy	±(0.1% + 0.1% FS)	±(0.2% + 0.2% FS)	±(0.2% + 0.2% FS)
Communication		USB, GPIB, RS-232 interfaces		
Size		2U, half-rack width (2380-150-15 and 2380-120-60) 3U, full-rack width (2380-500-30)		
Other		List mode, battery test mode, LED simulated load test mode, current monitor, short circuit test function		

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