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

SELECTOR GUIDE





TABLE OF CONTENTS

Comparison Tables
General Purpose Power Supplies
Special Purpose Power Supplies 5
Electronic Loads
Selection Charts
Single Output Programmable Power Supplies
Single Output Manual Power Supplies 8
PWS2000 Series Single-channel, Low-noise Power Supplies
PWS4000/Series 2200 Single-channel, Low-noise, Programmable Power Supplies 10 Designed for Benchtop and Automated Test Applications
Series 2220/2230 Two or Three Channels, Low Noise, Programmable Power Supplies 11 Designed for Benchtop Applications
2231A-30-3 Triple-Channel DC Power Supply
Series 2230G High Power, 3-Channel, Programmable Power Supplies
Series 2280S Precision Measurement, Programmable Power Supplies
Series 2260B Single-Channel, Wide Range, Programmable Power Supplies
2281S Precision DC Supply and Battery Simulator
Series 2300 Fast Transient Response and Battery Simulating Power Supplies
Series 2290 High Voltage Power Supplies
Series 2380 Programmable DC Electronic Loads



GENERAL PURPOSE POWER SUPPLIES

Model	Channel	Power	Output Voltage	Output Current	Programmable	Feature and Benefits	Applications	
PWS2185	1	90 W	18 V	5 A	N/A			
PWS2323	1	96 W	32 V	3 A	N/A	Affordable price	 Basic teaching labs 	
PWS2326	1	192 W	32 V	6 A	N/A	Wide output range from 90 W to 192 W	General bench use	
PWS2721	1	108 W	72 V	1.5 A	N/A			
PWS4205	1	100 W	20 V	5 A	USB			
PWS4305	1	150 W	30 V	5 A	USB			
PWS4323	1	96 W	32 V	3 A	USB			
PWS4602	1	150 W	60 V	2.5 A	USB	 Low ripple and noise 	Research and	
PWS4721	1	86 W	72 V	1.2 A	USB	• 0.1 mA measurement resolution	development labs	
2200-20-5	1	100 W	20 V	5 A	GPIB/USB	Remote sense to compensate for the voltage drop from	Automated	
2200-30-5	1	150 W	30 V	5 A	GPIB/USB	test leads	test systems	
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	0	45 W	30 V	1.5 A			Advanced teaching labs	
2220J-30-1	2	45 W	30 V	1.5 A	020			
0000 00 1		45 W	30 V	1.5 A		All channels are isolated and programmable	 Besearch and 	
2230-30-1	3	45 W	30 V	1.5 A	USB	High programming accuracy	development labs	
22303-30-1		30 W	6 V	5 A		Remote sense for all		
2220G-30-1	0	45 W	30 V	1.5 A	USB/GPIB	output channels	 Research and development labs Automated test systems 	
2220GJ-30-1	2	45 W	30 V	1.5 A		Fully supported in Tak Smorth ab M atudapt		
00000 00 1		45 W	30 V	1.5 A	USB/GPIB	lab software		
2230G-30-1	3	45 W	30 V	1.5 A				
220000 00 1		30 W	6 V	5 A				
		90 W	30 V	3 A		• All channels are isolated and		
22314-30-3	3	90 W	30 V	3 A	Optional USB	programmable	Basic teaching labs	
22017 00 0	0	15 W	5 V	3 A	Optional OOD	 Fully supported in TekSmartLab[™] student lab software 		
		90 W	30 V	3 A				
2230G-30-3	3	90 W	30 V	3 A				
		15 W	5 V	3 A		• All 3 channels are independent,	Automotive circuit testing	
		180 W	30 V	6A		programmable, and isolated	 High power analog 	
2230G-30-6	3	180 W	30 V	6A	USB/GPIB/ BS-232	Remote sense connections for all output channels	circuit testing	
		15 W	5 V	3 A	KS-232	Series, parallel, and tracking	 Power supply testing 	
		180 W	60 V	3 A		channel functions	Appliance circuit testing	
2230G-60-3	3	180 W	60 V	3 A			Sirour tosting	
		15 W	5 V	3 A				



GENERAL PURPOSE POWER SUPPLIES (continued)

Model	Channel	Power	Output Voltage	Output Current	Programmable	Feature and Benefits	Applications
2280S-32-6	1	192 W	32 V	6 A	GPIB/USB/LAN	• 10 nA to 3.2 A or 6 A high	Research and
2280S-60-3	1	192 W	60 V	3.2 A	GPIB/USB/LAN	 accuracy measurement Capture dynamic load currents as short as 140 μs Graphical user interface Low noise, linear supply 	 development labs Automated test systems Battery-powered device power consumption test
2260B-30-36	1	360 W	30 V	36 A			
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		Compact size with large	Research and
2260B-30-72	1	720 W	30 V	72 A		output range	development labs
2260B-80-27	1	720 W	80 V	27 A		Programmable rise and	 Automated test systems
2260B-250-9	1	720 W	250 V	9 A	USD/LAN	fall times	Power LED testing
2260B-800-2	1	720 W	800 V	2.88 A		Battery simulation capability	Laser diode constant
2260B-30-108	1	1080 W	30 V	108 A		Constant current priority setting	current sourcing
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
						 Simulates batteries based on a dynamic battery model Graphical display of battery State of Charge and 	 Research and development labs Automated text systems
2281S-20-6	1	120 W	20 V	6 A	GPIB/USB/LAN	 Models include open circuit voltage and internal resistance as a function of State-of-Charge 	 Battery-powered device power consumption test Battery capacity test
						Store up to 14 battery modelsPrecision power supply mode	Power management unit (PMIC) test
						Ultra-fast transient response output	
						Variable output resistance	Mobile
2302						Sinks up to 3 A current	phone testing
2302-PJ	1	45 W	15 V	5 A	GPIB	 33 µs – 833 ms dynamic current measurement on 5 A range (2302) and 5 A and 500 mA range (2302-PJ) 	Portable, battery-operated device testing
						• 4 relay control ports	
						Built-in DVM	
						 Ultra-fast transient response output 	
2303 2303-PJ	1	45 W	15 V	5 A	GPIB	 33 µs – 833 ms dynamic current measurement on 5 A range (2303) and 5 A and 500 mA ranges (2303-PJ) 	 Mobile phone testing Portable, battery-operated
						Sinks up to 2 A current	device testing
						 1 relay control port 	
						Built-in DVM	
						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) 	Mobile phone testing
2306 2306-PJ	2	45 W	15 V	5 A	GPIB	Battery channel pulse measurements on 5 A (2306) and 5 A and 500 mA ranges (2306-PJ)	 Portable, battery-operated device testing
						Sinks up to 3 A current	
						 2nd channel for charger simulation 	
						 4 relay control ports 	
						Built-in DVM	



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
2290-5	1	25 W	5,000 V	5mA	GPIB	Safety interlock Analog voltage control	 High voltage breakdown testing
2290-10	1	10 W	10,000 V	1mA	GPIB/RS-232	Voltage and current monitoring outputs	 High voltage leakage current testing

ELECTRONIC LOADS

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



SINGLE OUTPUT PROGRAMMABLE POWER SUPPLIES

Selection Chart by Voltage and Current Outputs



Selection Chart by Voltage and Current Outputs-Exploded View





SINGLE OUTPUT MANUAL POWER SUPPLIES

Selection Chart by Voltage and Current Outputs







PWS2000 Series Single-channel, Low-noise Power Supplies Designed for Benchtop Applications

PWS2000 Features

- Linear power supply with low ripple and noise
- Power up to 192W
- 0.05% voltage programming accuracy
- 0.2% current programming accuracy
- 10 mV/10 mA programming resolution
- ≤3 mVp-p ripple and noise
- Store 20 sets of instrument setups
- Keypad data entry
- Three-year warranty

	PWS2185	PWS2323	PWS2326	PWS2721			
Output Voltage	0–18 V	0-32 V	0-32 V	0–72 V			
Output Current	0–5 A	0–3 A	0-6 A	0–1.5 A			
Output Power	90 W	96 W	192 W	108 W			
Ripple and Noise (20 Hz–7 MHz)						
СV р-р		≤ 3 n	۱V				
CV RMS		≤ 1 m	۱V				
CC RMS		≤ 5 m	۱A				
Programming Accuracy (25°C ±5°C)							
Voltage		±(0.05% +	10 mV)				
Current		±(0.2% +	10 mA)				
Readback Accura	cy (25°C ± 5 °C)						
Voltage	$\pm (0.05\% \pm 15 \text{ m})/)$	<20 V: ±(0.05% + 15 mV)					
voltage	±(0.0070 + 10111V)	≥20 \	≥20 V: ±(0.05% + 120 mV)				
Current	±(0.1% + 15 mA)						
Size	2U high, half rack width						
Other	Store up to 20 sets of user settings						

With their good ripple and noise performance, the PWS2000 Series are excellent supplies for education and lab R&D use.



PWS4000/Series 2200 Single-channel, Low-noise, Programmable Power Supplies Designed for Benchtop and Automated Test Applications



	PWS4205 2200-20-5	PWS4305 2200-30-5	PWS4323 2200-32-3	PWS4602 2200-60-2	PWS4721 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	$\pm (0.03\% + 3 \text{ mV})$	±(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	PWS series with USB interface, 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.						

PWS4000/2200 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
- PWS Series supplied with a USB interface; 2200 Series supplied with USB and GPIB interfaces
- Three-year warranty

The PWS4000 and 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





	2 22	230-30-1, 2230J-30-1 30G-30-1, 2230GJ-30	2220-30-1, 2 2220G-30-1, 2	2220J-30-1*, 2220GJ-30-1*			
Output Channel		3		2	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 Accura	acy (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 a to a DUT commor	re isolated and permit k n reference; displays tot	both a positive voltage tal voltage and current	output and a negative volution output when in series a	oltage output relative		

* 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

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

		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	Ripple and Noise (20 Hz–20 MHz)					
CV p-p	≤5 mV					
CV RMS	≤1 mV					
CC RMS	≤6 mA					
Programming Accur	acy (25°C ±5	°C)				
Voltage	±((0.06% + 20 m	۱V)			
Current	±((0.2% + 10 m	A)			
Readback Accuracy	$(25^{\circ}C \pm 5^{\circ}C)$)				
Voltage	±((0.06% + 20 m	۱V)			
Current	±(0.2% + 10 mA)					
Size	2U high, half rack width					
Other	Store up to	30 sets of us	ser 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 2230G

High Power, 3-Channel, Programmable Power Supplies For **Design and Test of high power components and circuits**

Series 2230G 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 (2230G-30-6)
- Voltage and current outputs of three channels are displayed simultaneously for immediate observation of each output state
- USB, GPIB, and RS-232 interfaces and rear panel connections for automated test convenience





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 2230G High Power 3-Channel Power Supplies

	2230G-30-3		2230G	2230G-30-6		2230G-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 H	z to 20 MHz, 23°C	± 5°C)					
Voltage (V _{peak-peak})	<3 mV	peak-peak	$< 4 \text{ mV}_{\text{peak-peak}}$	$<3 \text{ mV}_{\text{peak-peak}}$	<4 mV _{pe}	ak-peak	
Voltage (VRMS)	<1 m	V _{rms}	$<1 \text{ mV}_{\text{RMS}}$	$<1 \text{ mV}_{\text{RMS}}$	<1 mV _{RMS}		
Current (IRMS)	<4 m	A _{RMS}	<5 mA _{RMS}	<4 mA _{RMS}	<4 mA _{RMS}		
Setting and Readback	Accuracy (using r	emote 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 r	nV	1 m	۱V	1 m'	V	
Current	1 mA		1 m	۱A	1 mA		
Communication	USB, GPIB, RS-232						
Size			2U high, half rack width				
Other	All output channe	ls are isolated, inc	dependent, and pro	ogrammable. Seri	es, parallel, and tra	cking 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 H	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 Accurac	су			
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	±(0.05% + 10 μA)	±(0.05% + 10 μA)		
1 A/10 A Range	±(0.05% + 250 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	r 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, ha	lf 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





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



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

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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 142mm wide 720 W units or two 214mm wide 1080 W units fit in a standard rack width

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.





CC RMS	72 mA	27 mA	10 mA	5 mA	144 mA	54 mA	20 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% + 200 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% + 10 mA	0.1% + 4 mA	0.1% + 100 mA	0.1% + 40 mA	0.1% + 15 mA	0.1% + 6 mA
Readback Accur	racy ±(%	of readin	g + offset	t)								
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% + 200 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% + 10 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	100 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	150 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	1200 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	2 ms	1 ms	1 ms	2 ms	2 ms
Communication	USB/LAN, GPIB Optional (2260-GPIB-USB adapter)											
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 H	z–20 MHz)		
CV p-p (mV):	<6 mV		
CV RMS (mV):	<1 mV		
CC RMS (mA):	<3 mA		
Programming Accuracy	y		
Voltage	±(0.02% + 3 mV)		
Current	±(0.05% + 5 mA)		
Readback Accuracy			
Voltage	±(0.02% + 2 mV)		
Current	±(0.04% + 10 μA)		
1 A/10 A Range	±(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



94.62%

0.0946 Ah

0.2710 Ω

2281S-20-6 startup screen.

	St	atus: 📕		\triangle
V:	+12.9	9997	V	OFF
I:	+0.09	99999	А	
A-H:	+1.99	9998	mAh	
V-Set 0.0	00 V I-Lir	nit: 0.1000 A		
A-H/Watt	V-Set	I-Limit	End	
V-Set	0.000 V	0.1000 A	0.0100 A	Next 🔿

Battery test function.

Battery simulation function.



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500

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Voc: _____ 4.2362 V

1.0500 A

Vt: _____ 3.9497 V

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, 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





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



Lithium Ion Battery with

²³⁰⁸ with Output Resistance Programmed to 130 m $\!\Omega$



Time 100 µs/div.

The 2303, 2306, 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.



Time 100 µs/div.

Series 2300 Specialized DC Power Supplies

Mode	l	2302	2302-PJ	2303	2303-PJ	2306	2306-PJ	2308		
No. of Channels		1		2						
Power Ou	wer Output 45				45 W					
Voltage Ou	utput				0–15 V					
Maximu Continuc Current Ou	Maximum Continuous 5 A @ 4 V Current Output		5 A @ 9 V		5 A @ 4 V					
Variable Resi Outpu	iable Resistance 0–1 Ω Output 10 mΩ resolution 10 mΩ		$0-1 \ \Omega$ 2 resolution (channel 1)							
Current S Capacit	Sink ty	3	A	2 A		3 A				
DC Current Measurement Sensitivity		100 nA	10 µA	100 nA	10 µA	100 nA	10 µA (Ch. 1) 100 nA (Ch. 2)	100 nA		
Dynamic Current Measurement		5 A range: 33 µs–833 ms integration times	500 mA and 5 A ranges: 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 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		
A	V	0.05%								
Accuracy	I				0.2%					
Communication		GPIB								
Size		2U high, half rack width								
Other		DVM, relay control port, open sense lead detection (excluding 2303 and 2303-PJ), 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	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 μΑ	±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		2380-500-15/2380J-500-15*	2380-120-60/2380J-120-60*	2380-500-30/2380J-500-3*		
	Input Voltage	0–500 V	0–120 V	0–500 V		
Rated Value (0°–40°C)	Input Current	0–15 A	0-60 A	0–30 A		
	Input Power	200 W	250 W	750 W		
	Range	0.1– 500 V	0–120 V	0–500 V		
Constant Voltage Mode	Resolution	10 mV	10 mV	10 mV		
voltage mode	Accuracy	±(0.05% + 0.025% FS)	±(0.05% + 0.025% FS)	±(0.025% + 0.05% FS)		
	Range	0–15 A 0–60 A		0–30 A		
Constant	Resolution	1 mA	1 mA	1 mA		
Current Mode	Accuracy	±(0.05% + 0.05% FS)	±(0.05% + 0.1% FS)	±(0.05% + 0.05% FS)		
Constant	Range	10 Ω–7.5 kΩ	10 Ω–7.5 kΩ	10 Ω–7.5 kΩ		
Resistance	Resolution	0.1 Ω	0.1 Ω	0.1Ω		
Mode	Accuracy	±(0.01% + 0.0008 S)	±(0.01% + 0.0008 S)	±(0.01% + 0.0008 S)		
	Range	200 W	250 W	750 W		
Constant Power Mode	Resolution	10 mW	10 mW	10 mW		
	Accuracy	±(0.1% + 0.1% FS)	±(0.2% + 0.2% FS)	±(0.2% + 0.2% FS)		
Dynamic Mod	e					
	T1 & T2	20 µs–3600 s; Res: 1 µs	20 µs–3600 s; Res: 1 µs	20 µs–3600 s; Res: 1 µs		
CC Mode	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 Ra	nge					
	Range	0–500 V	0–120 V	0–500 V		
Readback Voltage	Resolution	10 mV	1 mV	10 mV		
	Accuracy	±(0.025% + 0.025% FS)	±(0.025% + 0.025% FS)	±(0.025% + 0.025% FS)		
	Range	0–15 A	0–60 A	0–30 A		
Readback Current	Resolution	0.1 mA	1 mA	1 mA		
	Accuracy	±(0.05% + 0.05% FS)	±(0.05% + 0.1% FS)	±(0.05% + 0.05% FS)		
	Range	200 W	250 W	750 W		
Readback Power	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				

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



Contact Information

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