

# POWER SUPPLIES

Tektronix and Keithley power supplies offer a wide range of performance. Get single-channel models with superior accuracy and 10nA current measurement resolution. New high voltage power supplies combine high voltage with sensitive, low current measurement for high voltage device testing and characterization and high voltage research. For multiple source needs, select a dual-channel or triple-channel supply. All channels are isolated and fully programmable. For testing battery-operated devices, consider a battery simulator.



CATEGORY	DESCRIPTION	CHANNELS	MAX VOLTAGE/ MAX CURRENT	RESOLUTION	VOLTAGE ACCURACY	CURRENT ACCURACY	INTERFACE
Tektronix PWS2000 Series (4 models)	Manual	1	18V-72V/1.5A-6A	10mV, 10mA	± (0.05% + 15 mV)	± (0.1% + 15 mA)	Not applicable
Tektronix PWS4000 Series (5 models)	USB Programmable Single-Channel	1	20V-72V /1.2A-5A	1mV, 0.1mA	± (0.02% + 2.5 mV)	± (0.05% + 1 mA)	USB
Keithley 2200 Series (5 models)	USB and GPIB Programmable Single-Channel	1	20V-72V /1.2A-5A	1mV, 0.1mA	± (0.02% + 2.5 mV)	± (0.05% + 1 mA)	USB, GPIB
Keithley Model 2231A-30-3	Optional USB Triple-Channel	3	CH1/2: 30V/3A CH3: 5V/3A	10mV, 1mA	± (0.06% + 20mV)	± (0.2% + 10 mA)	Optional USB
Keithley 2220/2230 Series (8 models)	USB Multi-Channel; USB and GPIB Multi-Channel	2 (2220 Series) 3 (2230 Series)	CH1/2-30V / 1.5A (2220 Series) CH1/2-30V / 1.5A, CH3-6V / 5A (2230 Series)	1mV, 1mA	± (0.03% + 10 mV)	± (0.1% + 5 mA)	USB USB & GPIB (-G versions)
Keithley 2260B Series (12 models)	360W, 720W and 1080W Wide output range USB, LAN, and Optional GPIB	1	30V-800V / 1.44A-108A	1mV, 1mA	± (0.1% + 10 mV)	± (0.1% + 10 mA)	USB, LAN, analog, and optional GPIB
Keithley 2268 Series (6 models)	850W 1U high, half-rack wide, programmable, with 5V and 15V auxiliary outputs	1	20V-150V/ 5.6A-42A	2.4mV, 0.67mA	0.1% of Full Scale	0.2% of Full Scale	USB, GPIB, LAN, RS-232, RS-485, and analog
Keithley Models 2280S-32-6 2280S-60-3	Precision measurement 6½-digit measurement resolution	1	32V-60V/3.2A-6A	0.1mV, 10nA	± (0.02% + 2 mV)	± (0.05% + 10 µA)	USB, GPIB, and LAN
Keithley Models 2281S-20-6	Single-Channel, Precision DC Power Supply & Battery Simulator	1	20V/6A	0.1mV, 10nA	± (0.02% + 2 mV)	± (0.05% + 10 uA)	USB, GPIB, and LAN
Keithley Models 2290-5 2290-10	High Voltage	1	5kV / 5mA (2290-5) 10kV / 1mA (2290-10)	1V, 1µA	±0.01% (2290-5), ±6V (2290-10)	±0.01% (2290-5), ±5µA (2290-10)	GPIB (2290-5), GPIB, RS-232 (2290-10)
Keithley Models 2302, 2302-PJ, 2306, 2306-PJ, 2306-VS, 2308	Battery simulator	1 (2302) 2 (2306, 2308)	15V / 5A	1mV, 100nA	0.05% + 3mV	0.2% + 1µA	GPIB
Keithley Models 2303, 2303-PJ, 2304A	Fast Transient Response	1	15V / 5A (2303) 20V / 5A (2304A)	1mV, 100nA	0.05% + 3mV	0.2% + 1µA	GPIB



## PWS2000 Series Single-Channel Power Supply

More power. More features. More value. Support many different applications with wide output voltage and current ranges, and down to 10 mV/10 mA resolution. Save time with a numeric keypad for fast and accurate voltage/current selection. Strain less with a bright, large readout digital display. All backed by Tektronix reliability.

MODELS	OUTPUT VOLTAGE	OUTPUT CURRENT	PROGRAMMABLE
PWS2185	18V	5A	No
PWS2323	32V	3A	No
PWS2326	32V	6A	No
PWS2721	72V	1.5A	No

### RECOMMENDED ACCESSORIES

RMU2U	Rackmount Shelf Kit for 1 or 2 Units
386-7598-xx	Rackmount Cosmetic Filler Panel

### RECOMMENDED SERVICE

R5	5-year Extended Warranty
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DATA SHEET



360° VIEW

### PRODUCT HIGHLIGHTS

- Linear regulation
- 0.05% basic DC voltage accuracy
- 0.2% basic DC current accuracy
- Less than 3 mVp-p ripple and noise
- 20 user-defined setup memories



The numeric keypad makes it easy to specify a precise current limit before you start your test.



PWS Series power supplies are designed to be stacked with other Tektronix bench instruments to save you valuable bench space.

### ANOTHER PRODUCT FOR CONSIDERATION

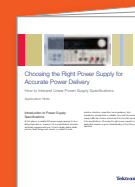
The PWS4000 Series offers greater accuracy, additional features and programmability.

### SHIPS WITH PRODUCT

- Calibration Certificate
- User Documentation
- Power Cord
- 3-year Warranty

### LEARN MORE

with the “Choosing the Right Power Supply for Accurate Power Delivery” Application Note.





DATA SHEET

360° VIEW

PRODUCT HIGHLIGHTS

- Linear regulation
- 0.03% basic DC voltage accuracy; 0.05% basic DC current accuracy
- USB interface for remote programming
- Less than 5 mVp-p ripple and noise
- Remote sense, list mode and 40 user-defined setup memories



The numeric keypad makes it easy to specify a precise current limit before you start your test.



PWS Series power supplies are designed to be stacked with other Tektronix bench instruments to save you valuable bench space.

## PWS4000 Series USB Programmable, Single-Channel Power Supply

Precision. Now available at the touch of a button. Generate the power you need with down to 1 mV/0.1 mA resolution and a basic voltage accuracy of 0.03%. Accelerate complex tests with list mode and a USB port for remote programming. Save time with a numeric keypad for fast and accurate voltage/current selection. Performance. Accuracy. Affordability. Meet your new power supply.

MODELS	OUTPUT VOLTAGE	OUTPUT CURRENT	PROGRAMMABLE
PWS4205	20 V	5 A	Yes
PWS4305	30 V	5 A	Yes
PWS4323	32 V	3 A	Yes
PWS4602	60 V	2.5 A	Yes
PWS4721	72 V	1.2 A	Yes

RECOMMENDED ACCESSORIES

- RMU2U Rackmount Shelf Kit for 1 or 2 Units
- 386-7598-xx Rackmount Cosmetic Filler Panel

RECOMMENDED SERVICE

- SILV100 5-year Extended Warranty

ANOTHER PRODUCT FOR CONSIDERATION

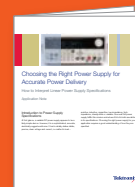
The DMM Series offers accurate voltage, current and resistance measurements for AC and DC signals.

SHIPS WITH PRODUCT

- Calibration Certificate
- User Documentation
- Power Cord
- 3-year Warranty

LEARN MORE

with the “Choosing the Right Power Supply for Accurate Power Delivery” Application Note.





DATA SHEET



## 2200 Programmable Single-Channel DC Power Supplies with Remote Sensing

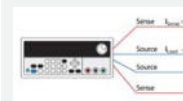
Keithley programmable single-channel DC power supplies offer an excellent combination of performance, versatility, and ease of use, including 0.03% basic accuracy, 0.1mA measurement resolution, and keypad data entry. Select from a variety of DC power supplies with voltages from 20V to 72V.

### PRODUCT HIGHLIGHTS

- Low noise, linear regulation
- 0.03% basic voltage output
- 0.05% basic current accuracy
- 1mV and 0.1mA output and measurement resolution
- Seven programmable output lists with up to 80 steps/list
- GPIB and USB interfaces



Series 2200 rear panel.



Remote sensing compensates for voltage drops in the test leads by extending the power supply feedback loop to the input of the load.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE AND NOISE
2200-20-5	20V	5A	100W	<1mV <sub>RMS</sub> , <3mVP-P
2200-30-5	30V	5A	150W	<1mV <sub>RMS</sub> , <4mVP-P
2200-32-3	32V	3A	96W	<1mV <sub>RMS</sub> , <4mVP-P
2200-60-2	60V	2.5A	150W	<1mV <sub>RMS</sub> , <5mVP-P
2200-72-1	72V	1.2A	86W	<1mV <sub>RMS</sub> , <3mVP-P

### RECOMMENDED ACCESSORIES

CS-1638-12	Rear Panel Mating Connector, Single Channel
USB-B-1	USB Cable
4299-7	Fixed Rack Mount Kit
KPCI-488LPA	IEEE-488 Interface Board for PCI Bus
7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)

### RECOMMENDED SERVICE

Model Number*-EW	1 additional year of factory warranty
C/Model Number*-3Y-STD	3 calibrations within 3 years of purchase
C/Model Number*-3Y-DATA	3 (ANSI-Z540-1 compliant) calibrations within 3 years of purchase
C/Model Number*-5Y-STD	5 calibrations within 5 years of purchase
C/Model Number*-5Y-DATA	5 (ANSI-Z540-1 compliant) calibrations within 5 years of purchase

\* Insert Model Number. Example: C/2200-20-5-3Y-DATA.

### SHIPS WITH PRODUCT

- User Documentation
- Rear Panel Mating Connector
- Calibration Certificate
- Power Cord
- 3-year Warranty

### LEARN MORE

with the "Understanding Linear Power Supply Specifications" Application Note.





## 2231A-30-3 Triple-Channel DC Power Supply

The 2231A-30-3 Triple-Channel DC Power Supply can output a total of 195W of power, providing the power levels needed to energize a wide range of circuits and devices for benchtop work. Two channels can supply up to 30V at 3A each; the third channel can provide up to 5V at 3A. The Model 2231A-30-3 does not compromise on performance or convenience features, offering the versatility and ease of use you need, so it can be the only DC power supply on your bench.

### PRODUCT HIGHLIGHTS

- 195W with two 30V@3A outputs and one 5V@3A output
- All channels are isolated and programmable
- 0.06% basic voltage accuracy and 0.2% basic current accuracy
- Double output levels by connecting two channels in series or parallel
- Optional USB interface
- Fully supported by TekSmartLab™



Connect the two 30V channels in series or parallel to double the output voltage to 60V or the supplied current to 6A.



2231A-30-3 fully supported by TekSmartLab™.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE & NOISE
2231A-30-3	CH1:30V, CH2:30V, CH3:5V	CH1:3A, CH2:3A, CH3:3V	195W	<1mV <sub>RMS</sub> , <5mV <sub>p-p</sub>

### RECOMMENDED ACCESSORIES

2231A-001 USB Adaptor with USB Cable

### RECOMMENDED SERVICE

Model Number\*-EW 1-Year KeithleyCare® Gold Plan

Model Number\*-5Y-EW 5-Year KeithleyCare Gold Plan

C/Model Number\*-3Y-STD KeithleyCare 3-Yr Std Calibration Plan

C/Model Number\*-5Y-STD KeithleyCare 5-Yr Std Calibration Plan

\* Insert Model Number. Examples: 2231A-5Y-EW, C/2200-20-5-3Y-DATA

### SHIPS WITH PRODUCT

- User Documentation
- Calibration Certificate
- Power Cord
- 3-year Warranty



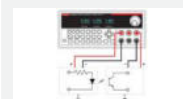
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## PRODUCT HIGHLIGHTS

- Dual- and triple-channel models
- Two 30V/1.5A channels
- One 6V/5A channel (on triple-channel model)
- All channels are isolated and programmable
- USB interface, USB and GPIB on G versions
- Fully supported by TekSmartLab™



Model 2230G-30-1 rear panel.



Power two isolated circuits with isolated output channels.

## 2220/2230 Programmable Multiple Channel DC Power Supplies with Remote Sensing

Keithley programmable multi-channel DC power supplies offer an excellent combination of performance, versatility, and ease of use including fully isolated channels, fully programmable channels, and all channel measurements displayed simultaneously. Choose either the dual-channel DC power supply or the triple-channel DC power supply.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE AND NOISE
2220-30-1 2220G-30-1* 2220J-30-1* 2220GJ-30-1*	Ch 1: 30V, Ch 2:30V	Ch1: 1.5A, Ch 2: 1.5A	45W/channel; 90W total	<1mVRMS, <3mV P-P
2230-30-1 2230G-30-1* 2230J-30-1* 2230GJ-30-1*	Ch1: 30V, Ch 2: 30V, Ch 3: 6V	Ch1: 1.5A, Ch 2: 1.5A, Ch 3: 5A	Ch 1 and Ch 2: 45W each Ch 3: 30W, 120W total	<1mVRMS, <3mV P-P

\*G versions include a GPIB interface; J versions for Japan.

### RECOMMENDED ACCESSORIES

CS-1655-15	Rear Panel Mating Connector, Multi-Channel
USB-B-1	USB Cable
4299-7	Fixed Rack Mount Kit

### RECOMMENDED SERVICE

Model Number*-EW	1 additional year of factory warranty
Model Number*-5Y-EW	2 additional years of factory warranty beyond the standard 3-year warranty
C/Model Number*-3Y-STD	3 calibrations within 3 years of purchase
C/Model Number*-3Y-DATA	3 (ANSI-Z540-1 compliant) calibrations within 3 years of purchase
C/Model Number*-5Y-STD	5 calibrations within 5 years of purchase
C/Model Number*-5Y-DATA	5 (ANSI-Z540-1 compliant) calibrations within 5 years of purchase

\* Insert Model Number. Examples: 2220-30-1-5Y-EW, C/2220-30-1-3Y-DATA

### RECOMMENDED ACCESSORIES

#### Additional Recommended Accessories for "G" Versions

KPCI-488LPA	IEEE-488 Interface Board for PCI Bus
7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)

### SHIPS WITH PRODUCT

- User Documentation
- Rear Panel Mating Connector
- Calibration Certificate
- Power Cord
- 3-year Warranty

### LEARN MORE

with the "Ensuring that Power Supply Performance Meets Your Requirements" Application Note.





PRODUCT HIGHLIGHTS

- Wide output range with constant power
- Programmable voltage/current rise and fall times
- Constant current priority setting
- Programmable output resistance
- USB, LAN, Analog Control, optional GPIB



Precisely control voltage rise time with the variable slew rate control.



Rear panel of Model 2260B-30-36 or 2260B-80-13

## 2260B Series Programmable DC Power Supply (360W, 720W, 1080W)

Source a wide range of voltages and currents using the Series 2260B Programmable DC Power Supplies. All twelve instruments have constant power outputs to provide a wide range of voltage and output currents. The wide range of output voltages and currents and multiple interfaces in the 2260B power supplies enables their use in a broad array of applications including research and design, quality control, and production test. The 360W supplies can output as much as 30V, 80V, 250V and 800V or as much as 36A, 13.5A, 4.5A and 1.44A; the 720W supplies can output 72A, 27A, 9A and 2.88A; the 1080W supplies can output 108A, 40.5A, 13.5A and 4.32A, with the same maximum voltage outputs.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE & NOISE
2260B-30-36	30V	36A	360W	<7 mV <sub>RMS</sub> , <60 mV <sub>p-p</sub>
2260B-80-13	80V	13.5A	360W	<7 mV <sub>RMS</sub> , <60 mV <sub>p-p</sub>
2260B-250-4	250V	4.5A	360W	<15 mV <sub>RMS</sub> , <80 mV <sub>p-p</sub>
2260B-800-1	800V	1.44A	360W	<30 mV <sub>RMS</sub> , <150 mV <sub>p-p</sub>
2260B-30-72	30V	72A	720W	<11 mV <sub>RMS</sub> , <80 mV <sub>p-p</sub>
2260B-80-27	80V	27A	720W	<11 mV <sub>RMS</sub> , <80 mV <sub>p-p</sub>
2260B-250-9	250V	9A	720W	<15 mV <sub>RMS</sub> , <100 mV <sub>p-p</sub>
2260B-800-2	800V	2.88A	720W	<30 mV <sub>RMS</sub> , <200 mV <sub>p-p</sub>
2260B-30-108	30V	108A	1080W	<14 mV <sub>RMS</sub> , <100 mV <sub>p-p</sub>
2260B-80-40	80V	40.5A	1080W	<14 mV <sub>RMS</sub> , <100 mV <sub>p-p</sub>
2260B-250-13	250V	13A	1080W	<15 mV <sub>RMS</sub> , <120 mV <sub>p-p</sub>
2260B-800-4	800V	4.32A	1080W	<30 mV <sub>RMS</sub> , <200 mV <sub>p-p</sub>

### RECOMMENDED ACCESSORIES

2260-001	Accessory Kit
2260-002	Simple IDC Tool
2260-003	Contact Removal Tool
2260-004	Basic Accessories Kit
2260-005	Cable for 2 units in Series connection
2260-006	Cable for 2 units in Parallel connection
2260-007	Cable for 3 units in Parallel connection
2260-008	Test Lead Set with Lugs
2260-009	Test Leads (250V, 800V)
2260-010	Basic Accessories Kit (250V, 800V models)
2260-EXTERM-HV	Extended Terminal (250V, 800V models)
2260B-GPIB-USB	GPIB To USB Adapter
2260B-EXTERM	Extended Terminal
2260B-RMK-JIS	Rack Mount Kit (JIS)
2260B-RMK-EIA	Rack Mount Kit (EIA)

### RECOMMENDED SERVICE

Model Number*-EW	3-year factory warranty extended to 1 additional year from date of shipment
Model Number*-5Y-EW	3-year factory warranty extended to 5 years from date of shipment
C/Model Number*-3Y-STD	KeithleyCare 3-Year Standard Calibration Plan
C/Model Number*-3Y-DAT	KeithleyCare 3-Year Calibration with Data Plan
C/Model Number*-5Y-STD	KeithleyCare 5-Year Standard Calibration Plan
C/Model Number*-5Y-DAT	KeithleyCare 5-Year Calibration with Data Plan

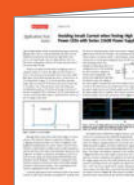
\* Insert Model Number. Examples: 2260B-30-36-5Y-EW, C/2260B-30-36-3Y-DATA.

### SHIPS WITH PRODUCT

- 2260B Basic Accessories Kit
- Test Leads
- USB Cable
- Quick Start Guide
- User Documentation
- Power Cord
- 3-year Warranty

### LEARN MORE

with the "Avoiding Inrush Current when Testing High Power LEDs with Series 2260B Power Supplies" Application Note.

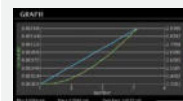




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## PRODUCT HIGHLIGHTS

- 10nA resolution to 6A with high accuracy, measure voltage and current with 6½-digit resolution
- Capture dynamic load currents as short as 140µs
- Output up to 192W of low noise, linear regulated power
- Programmable rise and fall times eliminate voltage overshoot and undershoot transients
- Built-in graphing simplifies analyzing trends or displaying voltage or current waveforms
- GPIB, USB, and LAN interfaces, built-in LXI web interface simplifies automated control/monitoring/data logging



Built-in graphing simplifies analyzing trends or displaying voltage or current waveforms.



Remote control or monitor the supply using its web browser over the LAN LXI interface.



KickStart software DC power supply main screen.

## 2280S Series Precision Measurement DC Power Supply

Series 2280S Precision Measurement, Low Noise, Programmable DC Power Supplies are much more than just sources of clean power; they are also precision measurement instruments. They can source stable, low noise voltages as well as monitor load currents over a wide dynamic range from amps to nanoamps. The Model 2280S-32-6 can output up to 32V at up to 6A; the Model 2280S-60-3 can output up to 60V at up to 3.2A.

MODEL	MAX OUTPUT VOLTAGE/ CURRENT	OUTPUT POWER	MAX CURRENT MEASUREMENT ACCURACY	TRANSIENT RESPONSE TIME
2280S-32-6	32V/6A	192W	±(0.05% + 10 µA)	<50µs
2280S-60-3	60V/3.2A	192W	±(0.05% + 10 µA)	<50µs

### RECOMMENDED ACCESSORIES

2280-001	Rear Panel Mating connector and Cover
2280-Test-Lead	Power Supply Test Lead Kit, 1000V, 20A Rating
CA-180-3A	LAN Crossover Cable (3 m)
USB-B-1	USB Cable Type A to B, 1m (3.3 ft)
2450-TLINK	Trigger Link cable to connect 2280S digital I/O to Trigger Link I/O on other Keithley instruments
4299-8	Single Fixed Rack-Mount Kit
4299-9	Dual Fixed Rack-Mount Kit
4299-10	Dual Fixed Rack-Mount Kit for one 2U Graphical Display Instrument and one Series 26xx Instrument
4299-11	Dual Fixed Rack-Mount Kit for one 2U Graphical Display Instrument and one Series 24xx, Series 2000, or 2U Agilent Instrument

### RECOMMENDED ACCESSORIES

7007-05	Double Shielded Premium IEEE-488 Interface Cables, 0.5m (1.6 ft)
7007-1	Double Shielded Premium IEEE-488 Interface Cables, 1m (3.2 ft)
7007-2	Double Shielded Premium IEEE-488 Interface Cables, 2m (6.5 ft)
7007-3	Double Shielded Premium IEEE-488 Interface Cables, 3m (10 ft)
7007-4	Double Shielded Premium IEEE-488 Interface Cables, 4m (13 ft)
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus

### SHIPS WITH PRODUCT

- KickStart Instrument Control Software (available at tek.com)
- 2280-001 output mating connector
- 174694600 LAN crossover cable (1.5 m)
- User Documentation
- QuickStart guide
- Calibrate Certificate
- Power Cord
- 3-year Warranty

### LEARN MORE

with the "Making Low Current Measurements with a Series 2280S Precision Measurement DC Power Supply" Application Note.







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PRODUCT HIGHLIGHTS

- One box integrates the functions of high-precision power supply, battery test, and battery simulation
- Sink current up to 1A and source current up to 6A
- Build a battery model based on charging a battery measurement. Use the model for battery simulation.
- Simulate real output during discharge with a battery model. Set the SOC/Voc, capacity, and resistance of a simulated battery according to test requirements
- Manually create, edit, import and export battery models

## 2281S Series Precision DC Power Supply with Battery Test and Battery Simulation Functions

The Series 2281S single-channel, precision DC supply and battery simulator innovatively integrates the functions of high-precision power supply, battery test, and battery simulation. It is able to analyze the DC consumption of a device under test, test a battery and generate a battery model based on the battery charging process, and simulate a battery based on the battery model. The 2281S-20-6 can output power up to 20V and 6A and sink current up to 1A.

The 2281S uses linear regulation to ensure low output noise and superior load current measurement sensitivity. A high resolution color thin film transistor (TFT) screen displays a wide range of information on measurements. Soft-key buttons and a navigation wheel combine with the TFT display to provide an easy-to-navigate user interface that speeds instrument setup and operation. In addition, built-in plotting functions allow monitoring trends such as drift. These features provide the flexibility required for both benchtop and automated test system applications. In addition, the 2281S provides a list mode, triggers, and other speed optimization functions to minimize test time in automated testing applications.



Log battery charge/discharge process and data (V, I, R and Amp-Hour information).



Offers both dynamic and static simulation modes to simulate battery output.

MODEL	DESCRIPTION	MAXIMUM OUTPUT VOLTAGE/CURRENT	OUTPUT POWER	MAXIMUM CURRENT MEASUREMENT ACCURACY
2281S-20-6	Single-Channel, Precision DC Power Supply & Battery Simulator	20V/6A	120W	±(0.05% + 10 µA)

RECOMMENDED ACCESSORIES

2450-TLINK	Trigger Link Cable to connect 2281S Digital I/O to Trigger Link I/O on other Keithley instruments
4299-8	Single Fixed Rack-Mount Kit
4299-9	Dual Fixed Rack-Mount Kit
4299-10	Dual Fixed Rack-Mount Kit for one 2U Graphical Display Instrument and one Series 26xx Instrument
4299-11	Dual Fixed Rack-Mount Kit for one 2U Graphical Display Instrument and one Series 24xx, Series 2000, or 2U Agilent Instrument
CA-180-3A	LAN crossover cable (3 m)
7007-05	Double Shielded Premium IEEE-488 Interface Cables, 0.5m (1.6 ft)

RECOMMENDED ACCESSORIES

7007-1	Double Shielded Premium IEEE-488 Interface Cables, 1m (3.2 ft)
7007-2	Double Shielded Premium IEEE-488 Interface Cables, 2m (6.5 ft)
7007-3	Double Shielded Premium IEEE-488 Interface Cables, 3m (10 ft)
7007-4	Double Shielded Premium IEEE-488 Interface Cables, 4m (13 ft)
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus
KUSB-488B	IEEE-488.2 USB-GPIB Interface Adapter for USB Port with 2m (6.6 ft) cable
USB-B-1	Type A to B, 1 m (3.3 ft) USB Cable

SHIPS WITH PRODUCT

- Quick Start Guide
- KickStart Instrument Control Software (available at tek.com)
- User Documentation
- 174694600 LAN Crossover Cable (1.5 m)
- Power Cord
- Rear Panel Mating
- Connector with Cover

LEARN MORE

with the “How to Accelerate a Power Management Unit Test Using the Keithley 2281S Battery Simulator” Application Note.





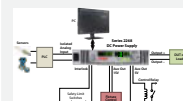
DATA SHEET

## PRODUCT HIGHLIGHTS

- Compact 1U high, half-rack wide
- 5V and 15V auxiliary outputs
- Isolated and non-isolated analog inputs and outputs
- Foldback mode with programmable delay
- Control up to 30 supplies through one interface
- LAN, USB, GPIB, RS-232, RS-485, and analog I/O are all standard



Series 2268 rear panel showing all the interfaces.



Control a 2268 supply with analog inputs and control external devices with the auxiliary outputs.

## 2268 Series 850W DC Power Supply

Series 2268 power supplies provide both analog and digital control options and a number of digital interface options and can operate in constant voltage (CV), constant current (CC), or constant power modes to address a broad array of applications. These high-efficiency, soft-starting power supplies provide reliable performance and long life. Packaged in low profile 1U high, half-rack-width enclosures, they offer the highest power density in the smallest package.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE	NOISE
2268-20-42	20V	42A	850W	50mV <sub>p-p</sub>	8mV <sub>RMS</sub>
2268-40-21	40V	21A	850W	50mV <sub>p-p</sub>	8mV <sub>RMS</sub>
2268-60-14	60V	14A	850W	50mV <sub>p-p</sub>	8mV <sub>RMS</sub>
2268-80-10	80V	10.5A	850W	80mV <sub>p-p</sub>	8mV <sub>RMS</sub>
2268-100-8	100V	8.5A	860W	80mV <sub>p-p</sub>	8mV <sub>RMS</sub>
2268-150-5	150V	5.6A	850W	100mV <sub>p-p</sub>	10mV <sub>RMS</sub>

### RECOMMENDED ACCESSORIES

2268-HDR	Hardware to Connect Test Lead Lugs to the 2268-20-42 or 2268-40-21
2268-RMK-1	Rack Mount Kit for One Series 2268 DC Power Supply
2268-RMK-2	Rack Mount Kit for Two Series 2268 DC Power Supplies
CA-180-3A	LAN Crossover Cable
USB-B-1	USB Cable Type A to B, 1m (3.3 ft)
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus
KUSB-488B	IEEE-488.2 USB-GPIB Interface Adapter for USB Port

### RECOMMENDED ACCESSORIES

7007-05	Double Shielded Premium IEEE-488 Interface Cables, 0.5m (1.6 ft)
7007-1	Double Shielded Premium IEEE-488 Interface Cables, 1m (3.2 ft)
7007-2	Double Shielded Premium IEEE-488 Interface Cables, 2m (6.5 ft)
7007-3	Double Shielded Premium IEEE-488 Interface Cables, 3m (10 ft)
7007-4	Double Shielded Premium IEEE-488 Interface Cables, 4m (13 ft)

### SHIPS WITH PRODUCT

- User Documentation
- Test Lead Connection Hardware (for 2268-20-42 and 2268-40-21 only)
- Power Cord

### RECOMMENDED SERVICE

Model*-EW	1 additional year of factory warranty
Model*-5Y-EW	2 additional years of factory warranty beyond the standard 3-year warranty
C/Model*-3Y-STD	3 calibrations within 3 years of purchase
3Y-DATA	3 (ANSI-Z540-1 compliant) calibrations within 3 years of purchase
C/Model*-5Y-STD	5 calibrations within 5 years of purchase
C/Model*-5Y-DATA	5 (ANSI-Z540-1 compliant) calibrations within 5 years of purchase

\* Insert Model Number. Example: 2268-40-21-5Y-EW, C/2268-40-21-3Y-DATA.

## LEARN MORE

download the Application Note: "Efficiency Power Supply Control to Minimize Test Time and Costs in Automated Test Systems using Multiple Power Supplies."



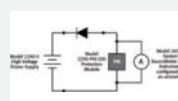


PRODUCT HIGHLIGHTS

- Source voltages up to 5kV and 10kV
- 1µA current measurement resolution
- Low noise for precision sourcing and sensitive measurements; selectable filters reduce noise to less than 3mVRMS on the 5kV supply
- Safety interlock controls high voltage output
- GPIB programmable
- Protection module prevents damage to low voltage instrumentation



The Model 2290-PM-200 Protection Module protects low voltage measurement equipment from voltages greater than 200V.



Reverse breakdown testing of a high voltage diode using a Keithley SourceMeter® SMU instrument to measure leakage currents down to picoamp levels. The Model 2290-PM-200 SMU Protection Module protects the SourceMeter SMU instrument from high voltage when the diode breaks down.

## 2290 High Voltage Power Supply

Series 2290 High Voltage Power Supplies facilitate high voltage device and material testing, as well as high energy physics experimentation. The Model 2290-5 5kV Power Supply provides voltage outputs up to 5000V, and the Model 2290-10 10kV Power Supply offers up to 10,000V. These supplies measure both output voltage with 1V resolution and output current with 1µA resolution.

MODEL	MAX OUTPUT VOLTAGE	MAX OUTPUT CURRENT	POWER	RIPPLE
2290-5	5kV	5mA	25W	3mVRMS maximum with filter
2290-10	10kV	1mA	10W	1VRMS

### RECOMMENDED ACCESSORIES

**For 2290-5:**

2290-5-SHV	5kV SHV Female–SHV Female Cable, 3m (10 ft)
2290-5-MHV	5kV SHV Female–MHV Male Cable, 3m (10 ft)
2290-5-SHVBH	5kV SHV Male Bulkhead Connector
2290-5-RMK-1	Single Fixed Rack Mount Kit for 5kV Power Supply
2290-5-RMK-2	Dual Fixed Rack Mount Kit for 5kV Power Supply

**For 2290-10:**

2290-10-SHVUC	10kV SHV Male to Underterminated Cable, 3m (10ft)
2290-10-SHV	10kV SHV Male–SHV Male Cable, 3m (10 ft)
2290-10-SHVBH	10kV SHV Female Bulkhead Connector
2290-10-RMK-1	Single Fixed Rack Mount Kit for 10kV Power Supply
2290-10-RMK-2	Dual Fixed Rack Mount Kit for 10kV Power Supply

### RECOMMENDED ACCESSORIES

**For both:**

2290-PM-200	10kV Protection Module
2290-INT-CABLE	3-Pin Connector to Underterminated Interlock Cable
4299-7	Fixed Shelf Rack Mount Kit
KPCI-488LPA	IEEE-488.2 Interface Board for the PCI Bus
KUSB-488B	IEEE-488.2 USB-GPIB Interface Adapter for USB port with built-in 2m (6.6 ft) cable
7007-05	Double Shielded Premium IEEE-488 Interface Cable, 0.5m (1.6 ft)
7007-1	Double Shielded Premium IEEE-488 Interface Cable, 1m (3.2 ft)
7007-2	Double Shielded Premium IEEE-488 Interface Cable, 2m (6.5 ft)
7007-3	Double Shielded Premium IEEE-488 Interface Cable, 3m (10 ft)
7007-4	Double Shielded Premium IEEE-488 Interface Cable, 4m (13 ft)

### SHIPS WITH PRODUCT

- User Documentation
- Power Cord

### RECOMMENDED SERVICE

Model*-3Y-EW	1-Year Factory Warranty extended to 3 years from date of shipment
Model*-5Y-EW	1-Year Factory Warranty extended to 5 years from date of shipment
C/Model*-3Y-STD	KeithleyCare 3-Year Standard Calibration Plan

\* Insert Model Number. Examples: 2290-5-3Y-EW, C/2290E-10-3Y-STD.

## LEARN MORE

with the “Breakdown and Leakage Current Measurements on High Voltage Semiconductor Devices Using Keithley Series 2290 High Voltage Power Supplies and Series 2600B System SourceMeter Source Measure Unit (SMU) Instruments” Application Note.





## 2300 Series Portable Device Battery/Charger Simulator

Keithley's battery-simulating power supplies can simulate a battery's output characteristics and its discharged state. These supplies can measure low, sleep mode load current and pulsed output load current. Dual-channel models facilitate testing portable device, charge control circuitry with a battery channel and a charger simulator channel.

DATA SHEET  
2302-2306

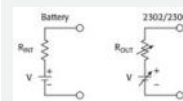
DATA SHEET  
2308

### PRODUCT HIGHLIGHTS

- Optimized for battery-powered device testing
- 100nA current measurement sensitivity
- Load pulse current measurement: 33 $\mu$ s - 833 $\mu$ s
- Variable output resistance: 0 - 1 $\Omega$  with 10m $\Omega$  resolution
- Measure sleep, currents, standby currents, and full load currents to determine power consumption
- Sink current to simulate a discharged battery



Model 2306 Rear Panel.



Simplified schematic of a battery and the 2302/2306.

MODEL	CHANNELS	MAX OUTPUT VOLTAGE / CURRENT	POWER	TRANSIENT RESPONSE TO A 10X LOAD CURRENT CHANGE	CURRENT SINK CAPACITY
2302, 2302-PJ	1	15V/5A	42W	<40 $\mu$ s recovery time and <75mV voltage drop	3A
2306, 2306-PJ	2	15V/5A	45W	<40 $\mu$ s recovery time and <75 mV voltage drop	3A
2308	2	15V/5A	45W	<35 $\mu$ s recovery time and <90 mV voltage drop	3A

### RECOMMENDED ACCESSORIES

2306-DISP	Remote Display (2302, 2306, 2308)
CS-846	Mating Output Connector
SC-182	Low Inductance Coaxial Cable
4288-1	Single Fixed Rack Mount Kit
4288-2	Dual Fixed Rack Mount Kit
KPCI-488LPA	IEEE-488 Interface Board for PCI Bus
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter

### RECOMMENDED ACCESSORIES

7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)

### RECOMMENDED SERVICE

Model*-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
Model*-PJ-3Y-EW	1-year factory warranty extended to 3 years from date of shipment

\* Insert Model Number. Example: 2302-3Y-EW.

### SHIPS WITH PRODUCT

- User Documentation
- Rear Panel Mating Connector
- Calibration Certificate
- Power Cord
- 1-year Warranty

### LEARN MORE

with the "Simulating Battery Impedance with the Models 2302 and 2306 Battery Simulators/Chargers" Application Note.





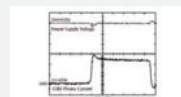
DATA SHEET

PRODUCT HIGHLIGHTS

- Ultra-fast response times to load changes
- Optimized for battery-powered device testing
- 100nA current measurement sensitivity
- Load pulse current measurement: 33µs - 833µs
- Measure sleep, standby currents, and full load currents to determine power consumption
- Sink current to simulate a discharged battery



Model 2303 rear panel.



Keithley's high speed power supply maintain a stable voltage during large load changes.

## 2303 High Speed Power Supply

The Model 2303 Power Supply provides both voltage control and power consumption monitoring for automated testing of portable, battery-operated devices. It is optimized for testing battery-operated, wireless communication devices such as cellular phones that undergo substantial load changes for very short time intervals.

MODEL	CHANNELS	MAX OUTPUT VOLTAGE / CURRENT	POWER	TRANSIENT RESPONSE TO A 10X LOAD CURRENT CHANGE	CURRENT SINK CAPACITY
2303	Single Output	15V/3A or 9V/5A	45W	<40µs recovery time and <100mV voltage drop	2A

### RECOMMENDED ACCESSORIES

CS-846	Mating Output Connector
SC-182	Low Inductance Coaxial Cable
4288-1	Single Fixed Rack Mount Kit
4288-2	Dual Fixed Rack Mount Kit
KPCI-488LPA	IEEE-488 Interface Board for PCI Bus
KUSB-488B	IEEE-488 USB-to-GPIB Interface Adapter

### RECOMMENDED ACCESSORIES

7007-05	Double Shielded IEEE-488 Cable, 0.5m (1.6ft)
7007-1	Double Shielded IEEE-488 Cable, 1m (3.2 ft)
7007-2	Double Shielded IEEE-488 Cable, 2m (6.5 ft)
7007-3	Double Shielded IEEE-488 Cable, 3m (10 ft)
7007-4	Double Shielded IEEE-488 Cable, 4m (13 ft)

### RECOMMENDED SERVICE

Model*-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
C/Model-3Y-ISO	3 (ISO-17025 accredited) calibrations within 3 years of purchase for Models 2303, 2303-PJ*

\* Insert Model Number. Examples: 2303-3Y-EW, C/2303-3Y-ISO.

### SHIPS WITH PRODUCT

- User Documentation
- Rear Panel Mating Connector
- Calibration Certificate
- Power Cord
- 1-year Warranty

### LEARN MORE

with the "Stabilizing Fast Transient Response Power Supply/Load Circuits" Application Note.



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