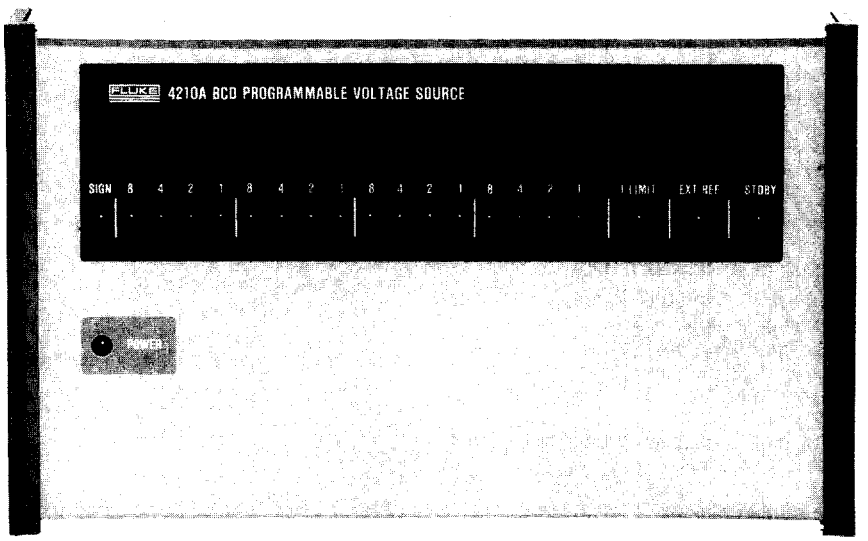
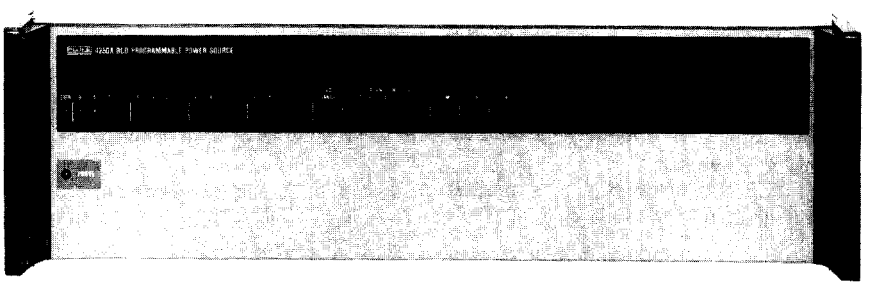
4200 Series

GPIB
IEEE-488



4210A



4250A

4200 Series Programmable Power Supplies

The 4200 Series Programmable Power Sources are more than just precision digital-to-analog converters. They incorporate features that are not available in typical programmable power supplies: speed, accuracy, low programming noise, true current limiting, isolated control logic, output proportional to an external reference voltage.

These power sources may be operated in series or parallel, just like batteries. They will operate with up to 1000 volts between chassis ground and guard (250 volts with GPIB/IEEE-488* interface). That allows you to use them as a programmable vernier for high voltage power supplies. Current sink capability, coupled with programmable current limits, allows four of the six models to be used as a dynamic load.

Isolated Control Logic Option (-01)

Isolated control logic is parallel BCD for the 4210A, 4250A, and 4270A and 14-bit or 16-bit parallel binary for the 4216A, 4265A, and 4275A and is available as Option -01. However, any of the six models may be ordered with multi-strobe logic (Option -09) or with an interface for compatibility with GPIB/IEEE Std 488-1978 (Option -05).

Multi-Strobe Logic Option (-09)

Allows programming directly from any 16-bit or 18-bit program source with addressing capabilities for up to eight 4200-Series Power Sources. The power sources may be in series as well as parallel. The control lines are electrically isolated from the output.

GPIB/IEEE-488 Interface Option (-05)

The GPIB/IEEE-488 interface allows the user to program the following functions using command character format: Voltage, current limit, external reference, range, polarity, SRQ response on errors, operate and standby. In addition to the normal command string format of programming, the GPIB/IEEE-488 interface offers a "Direct Ladder Access" mode of programming. This mode is a 4-byte transfer sequence with limited GPIB/IEEE-488 error and syntax checking, but with fast output results. The repertoire is SH1, AH1, T6, L4, SR1, DC1, and DT1.

External Reference Option (-03)

Output may be ac as well as dc. And, with Option -03, you have the ability to amplify or attenuate, by digital control, either an ac or dc voltage supplied by an external source. Output polarity matches input polarity. The 3 dB bandwidth is 100 kHz for the 4210A and 4216A, and 30 kHz for the other models.

**The terms GPIB and IEEE-488 may be used interchangeably throughout this catalog.*

Current Limit Option (-06)

To protect devices being powered, the output current can be automatically limited to any value between 10% and 110% of maximum output current in 10% steps and 1% steps to 11%. Current is automatically limited at 120% of rated output when Option -06 is not installed.

High Resolution Option (-07)

To be able to program output voltage with 10 times better resolution than normal, Option -07 may be ordered for models 4210A, 4250A, and 4270A. Option -06 cannot be installed at the same time, however.

A4200 Manual Control Unit

For bench operation and calibration the A4200 is available as an accessory. It allows the operator to manually select each control line as well as monitor flag lines available from a power source. To view such characteristics as programming noise, settling time, rise time etc., an automatic mode is provided. When all the bits in any 8-4-2-1 decade are set, the power source will generate a staircase at the analog output which may be examined on an oscilloscope. The A4200 is not compatible with Option -09 or the IEEE-488 Interface Option (-05).

Specifications

Technical Specifications

Characteristics	1/2 Rack		Full Rack Width			
	4210A	**4216A**	**4250A**	**4265A**	**4270A**	**4275A**
Display	BCD	Binary	BCD	Binary	1BCD	Binary
Current Range	±100 mA	±100 mA	±1A	±1A	±0.5A	±0.5A
Option -06 Limit*	–	–	10% steps*	10% steps*	10% steps*	10% steps*
Regulation [1]	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%
Settling Time						
Within 0.1% of step	18 µs	18 µs	70 µs	70 µs	80 µs	85 µs
Within 0.01% of step	30 µs	30 µs	100 µs	100 µs	110 µs	110 µs
Low Voltage Range						
Voltage Range	±9.999	±16.383	±9.999V	±16.383V	±9.999V	±32.7675V
Resolution	1 mV	1 mV	1 mV	1 mV	1 mV	0.5 mV
W/Option -07	100 µV	–	100 µV	–	100 µV	–
90-Day Accuracy [2] ±0.01% of Output	±100 µV	±100 µV	±100 µV	±100 µV	±100 µV	±160 µV
90-Day Stability [3] ±0.003% of Output	±60 µV	±60 µV	±70 µV	±70 µV	±70 µV	±105 µV
Ripple and Noise [4]	300 µV rms	300 µV rms	500 µV rms	500 µV rms	500 µV rms	500 µV rms
Programming Noise	130 mV p-p	130 mV p-p	130 mV p-p	130 mV p-p	130 mV p-p	130 mV p-p
High Voltage Range						
Voltage Range	–	–	±65.00V	±65.53V	±99.99V	±110V
Resolution	–	–	10 mV	4 mV	10 mV	2 mV
W/Option -07	–	–	1 mV	–	1 mV	–
90- Day Accuracy [2] ±0.01% of Output	–	–	±700 µV	±300 µV	±700 µV	±530 µV
90-Day Stability [3] ±0.003% of Output	–	–	±490 µV	±210 µV	±490 µV	±370 µV
Ripple and Noise [4]	–	–	1 mV rms	1 mV rms	1.2 mV rms	1.2 mV rms
Programming Noise	–	–	260 mV p-p	260 mV p-p	260 mV p-p	260 mV p-p

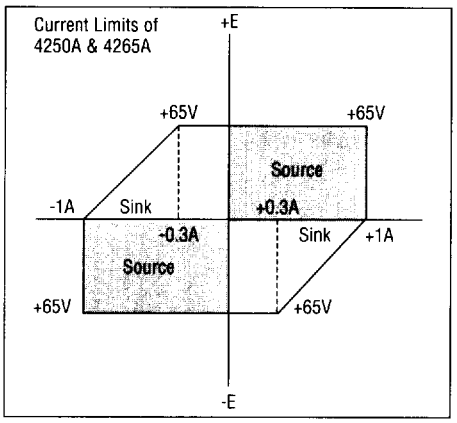
** Also 1% steps to 11%. Limit at 120% of range without Option -06*
[1] Percent of output, no load to full load, ±10% line change
[2] 15°C to 35°C
[3] At constant line, load, and temperature
[4] 10 Hz to 10 MHz bandwidth

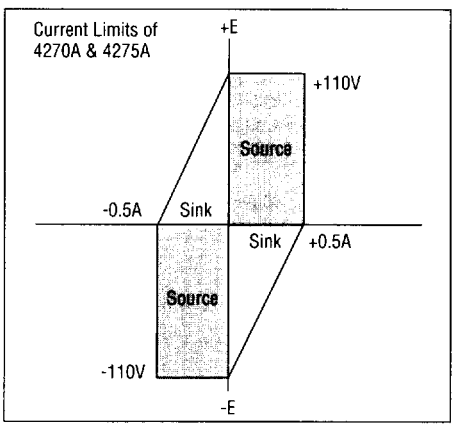
General Specifications

Shock: 120G, 11 millisecond half-sinewave
Vibration: 14.5G, 10 Hz to 55 Hz
Altitude: ≤10,000 feet, operating; ≤50,000 non-operating
Temperature: 0°C to 50°C operating; -40°C to <75°C non-operating
Power: 115V or 230V ac ±10%, 48 Hz to 62 Hz. 4210A and 4216A 15W; 4250A and 4265A 100W; 4270A and 4275A 200W

Size
4210A and 4216A: One half 19-inch rack width, 13.3 cm H x 21.6 cm W x 40.9 cm D (5.25 in x 8.5 in x 16.13 in)
Others: Full 19-inch rack width, 13.3 cm H x 43.2 cm W x 49.7 cm D (5.25 in x 17 in x 19.56 in)
Weight
4210A and 4216A: 5.5 kg (12 lb)
Others: 15.9 kg (35 lb)

Included with Instrument: Instruction manual, power cord, mating digital input cable connector, screw terminal outputs. Order Y8021, Y8022, or Y8023 cable separately for Option -05





Options (for above Models)*

-01 Isolated Control Logic	$ 670
-03 External Reference	465
-05 IEEE-488 Interface	740
-06 Programmable Current Limit	450
-07 1100 µV Resolution (4250A only)	650
-09 (BCD/Binary) Multi-strobe Logic	1090

** See chart below for compatibility*

Accessories (Also see Section 17)

Rack Mount Kit for 4210A and 4216A	
M05-200-603 5¼", Dual	$115
M05-203-601 5¼", Offset	130
M05-203-602 5¼", Centered	130
Rack Mount Kit for 4250A, 4265A, 4270A, 4275A	
M05-205-600 5¼",single	95
Rack Slides for M05-200-603 or M05-205-600	
M00-260-610 18"	130
M00-270-610 20"	130
M00-280-610 24"	130
A4200 Manual Control Unit w/Cable	995
4210A-4014 PCB Extender Board	100
4270A-4303 PCB Extender Cable	215
Y8021 IEEE-488Cable, 1m	130
Y8022 IEEE-488Cable, 2m	145
Y8023 IEEE-488Cable, 4m	155

Customer Support Services

Warranty

One-year product warranty. See Section 16 for further information on warranty terms and conditions.

Extended Warranty

A 10% discount is available when you order the following at the time of the instrument purchase or when ordered within the factory warranty period.

SC1-4210A Repair	$ 176
SC2-4210A Calibration	324
SC3-4210A Full Service	476
SC4-4210A Performance Verification-Plus	194
SC1-4216A Repair	176
SC2-4216A Calibration	324
SC3-4216A Full Service	476
SC4-4216A Performance Verification-Plus	194
SC1-4250A Repair	498
SC2-4250A Calibration	324
SC3-4250A Full Service	766
SC4-4250A Performance Verification-Plus	194
SC1-4265A Repair	498
SC2-4265A Calibration	324
SC3-4265A Full Service	766
SC4-4265A Performance Verification-Plus	194
SC1-4270A Repair	514
SC2-4270A Calibration	324
SC3-4270A Full Service	780
SC4-4270A Performance Verification-Plus	194
SC1-4275A Repair	529
SC2-4275A Calibration	324
SC3-4275A Full Service	794
SC4-4275A Performance Verification-Plus	194

Note: Incoming and/or outgoing calibration readings are available as an option.

Ordering Information

Models

January 1990 prices

4210A Programmable Power Source, 100 mA	$3600
4216A Programmable Power Source, 100 mA	3600
4250A Programmable Power Source, 1A	5150
4265A Programmable Power Source, 1A	5150
4270A Programmable Power Source, 500 mA	5550
4275A Programmable Power Source, 500 mA	5550

Interface Option -01, -05, or -09 is also required

4200 Series Option Compatibility

Option	Description	4210A	4216A	4250A	4265A	4270A	4275A
42**A-01	Isolated Control Logic	1	1	1	1	1	1
42**A-03	External Reference	•	•	•	•	•	•
42**A-05	Interface for IEEE-488 Bus	1	1	1	1	1	1
42**A-06	Programmable Current Limit	–	–	2	•	2	•
42**A-07	100 Microvolt Resolution	•	–	2	–	2	–
42**A-09	Multistrobe Logic (BCD/Binary)	1	1	1	1	1	1
Other Items							
M05-205-600	Rack Adapter	–	–	•	•	•	•
M05-203-601	Rack Adapter, left or right side	•	•	–	–	–	–
M05-203-602	Rack Adapter, centered	•	•	–	–	–	–
M05-200-603	Rack Adapter, dual, left & right	•	•	–	–	–	–
M00-260-610	18-Inch Rack Slides	3	3	3	3	3	3
M00-270-610	20-Inch Rack Slides	3	3	3	3	3	3
M00-280-610	24-Inch Rack Slides	3	3	3	3	3	3

Notes: All options are customer-installable. However, add the suffix letter K if option is not to be installed at the factory. Order -07K and/or -09K through the parts department.

•Compatible option

1. -01, -05, or -09 is required. Only one may be installed in one instrument

2. Option -06 and -07 cannot be installed in the same instrument

3. Used with Rack Adapter -600 or -603

*42**A Use appropriate model number as prefix for option number*