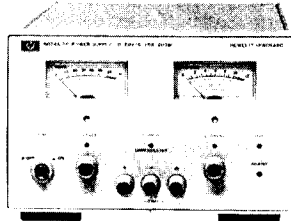


POWER SUPPLIES

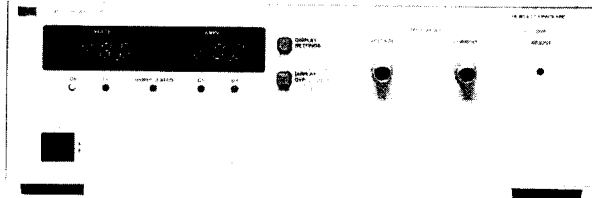
Autoranging Power Supplies

Models 6010A, 6011A, 6012B, 6023A, and 6024A

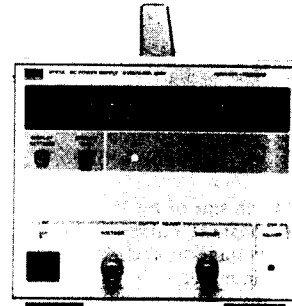
- Complete front panel control/display
- Constant voltage/constant current operation
- Remote programming and sensing
- Autoranging output
- High efficiency, compact, and light weight
- Ten-turn voltage and current controls



HP 6024A



HP 6010A, 6011A, 6012B



HP 6023A

Description

HP Models 6010A, 6011A, 6012B, and 6023A

This versatile family of dc power supplies provides laboratory grade performance along with many features to meet both laboratory and system needs.

Ten-turn front panel controls provide the means to precisely adjust the output voltage and current. The settings of these controls can be observed on the front panel meters by pressing the Display Settings button. This allows the current limit to be set when operating in the CV mode without shorting the output terminals and the voltage limit to be set when operating in the CC mode without opening the load leads.

Three and one-half digit front panel meters provide a convenient means for monitoring the output voltage and current. The accuracy of these meters allow them to replace external DVMs and monitor resistors in many applications that require monitoring of the power supply output.

The overvoltage protection (OVP) trip level can also be displayed on the front panel meters, allowing the trip level to be accurately adjusted without actually activating the OVP circuitry or disconnecting loads. In addition to the protection provided to the power supply and load by the OVP, these supplies also have protection against operating under excessive ac line or thermal conditions.

As autoranging power supplies, these units can operate at their maximum rated power over a wide and continuous range of voltage and current combinations. This often allows both present and future requirements to be satisfied with fewer supplies.

Special modifications are available to extend the output ratings even further. For example, the HP 6010A with Special Option V05 can provide up to 500 volts. See page 454 for more details.

Specifications

Ratings*		Autoranging Output*							HP Model	Regulation				10% Change Transient Recovery
Volts	Amperes	V ₁	P ₁	V ₂	P ₂	V ₃	P ₃	Load Effect		Source Effect		Time / Level		
								Voltage	Current	Voltage	Current			
0-20	0-30	20V	200W	14V	242W	6.7V	200W	6023A	0.01% +2mV	0.01% +9mA	0.01% +1mV	0.01% +6mA	1ms / 50mV	
0-20	0-120	20V	1000W	14V	1064W	7V	840W	6011A	0.01% +3mV	0.01% +15mA	0.01% +2mV	0.01% +25mA	2ms / 100mV	
0-60	0-10	60V	200W	40V	240W	20V	200W	6024A	0.01% +3mV	0.01% +3mA	0.01% +5mV	0.01% +5mA	1ms / 75mV	
0-60	0-50	60V	1000W	40V	1200W	20V	1000W	6012B	0.01% +5mV	0.01% +10mA	0.01% +3mV	0.01% +10mA	2ms / 100mV	
0-200**	0-17	200V	1000W	120V	1200W	60V	1020W	6010A	0.01% +5mV	0.01% +10mA	0.01% +5mV	0.01% +5mA	2ms / 150mV	

*See the generalized autoranging output characteristic curve.

**HP Model 6010A with Special Option V05 can provide up to 500 volts. See page 454 for more details.

HP Model 6023A is stable when operating in the CC mode into inductive loads up to one henry. HP Models 6010A, 6011A and 6012B are stable when operating in the CC mode into inductive loads up to 100 mH, and a special modification is available for these three models to assure stability with loads up to ten henries.

System Features

The output voltage and current of these supplies can be remotely controlled with either 0-5 volt or 0-4000 ohm analog programming signals. The actual output levels can be monitored without complicated external circuitry by connecting DVMs to the buffered 0-5 volt monitor outputs. All programming and monitoring signals are referenced to the same common and are accessed through the rear panel barrier strip.

Either terminal may be grounded, or floated up to ± 240 volts from chassis ground for the HP 6011A, 6012B and 6023A, and ± 550 volts for the HP 6010A.

If more output voltage or current is needed than a single unit can provide, auto-series or auto-parallel configurations can be used. Up to four 1000-watt units, or up to two 200-watt units can be connected in auto-parallel, and any combination can be used in auto-series providing up to 240 volts total (550 Vdc for HP 6010A) from chassis ground including output voltage. Remote sensing can be used to maintain the CV load effect specification at the load with up to 0.5 volt drop per load lead and sense wires that are less than 0.2 ohm per lead. Operation is possible with up to 2.0 volts per lead; however, load effect specification may be degraded. For more system control and monitoring capabilities, see Option 002.

HP Model 6024A

As an autoranging dc power supply, the HP 6024A can provide 200 watts over a wide and continuous range of voltage and current combinations, with maximums of 60 volts and 10 amperes. This provides greater flexibility than traditional power supplies that have only one maximum power point.

Ten-turn potentiometers provide precise control of the output voltage and current. The output levels can be observed on the separate front panel voltage and current meters. Terminals are available on both the front and rear panel for load connections.

The built-in OVP is adjustable from the front panel. Other protection features include over-temperature and high ac line detection.

The HP 6024A has many system oriented features. It can be remotely programmed with 0-5 volt or 0-2500 ohm analog signals. The output current can be easily monitored without an external shunt with the proportional 0-5 volt buffered monitor output. Remote sensing can be used to eliminate the effects of voltage drops in the load leads, and either terminal may be floated up to ± 240 volts from chassis ground. Several units can be combined in auto-series, auto-parallel, and auto-tracking configurations, further increasing the HP 6024A's flexibility.

For more system features, see Option 002.

General Specifications

Dimensions

HP 6010A, 6011A and 6012B: 132.6 mm H x 425.5 mm W x 516.4 mm D (5.2" x 16.75" x 20.33").

HP 6023A: 177.0 mm H x 212.3 mm W x 443.6 mm D (6.97" x 8.36" x 17.872").

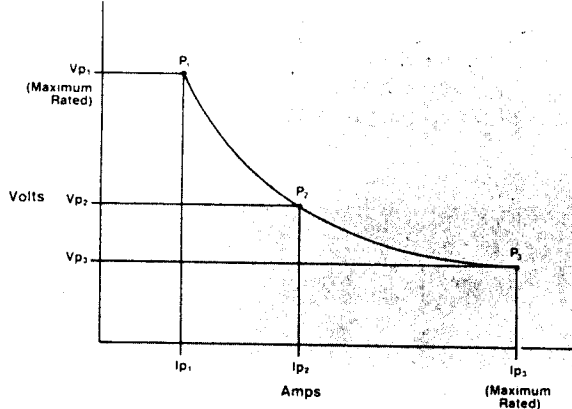
HP 6024A: 133.4 mm H x 212.3 mm W x 415.33 D (5.25" x 8.36" x 16.35").

Ordering Information

Option Descriptions

002: provides extra programming and monitoring capabilities for system use. A card inserted into the power supply is accessible through a 37-pin connector on the rear panel. It provides easy access to the control and monitor signals available on standard units, as well as these additional features:

- OVP trip and reset
- power supply inhibit
- status bits indicating CV mode, CC mode, unregulated output, OVP tripped, overtemperature condition, and ac line drop-out
- remote programming via a 0-2 mA current sink
- bias supplies for your circuitry: +5 volts at 100 mA, +15 volts at 75 mA, and -15 volts at 75 mA.
- buffered 0-5 volt outputs representing both the output voltage and output current. (HP 6010A, 6011A, 6012B, and 6023A provide this feature standard, but HP 6024A only provides a scaled 0-5 volt output to represent the output current, not the output voltage.)
- programmable remote/local for use when programming with a current sink.



Generalized autoranging output characteristic curve

These features can all be taken advantage of with an HP 6940B or 6942A Multiprogrammer instrument sub-system configured with an HP 69520A or 69709A Power Supply Programming Card. The Multiprogrammer provides a cost-effective solution for controlling a group of power supplies, and also can provide many other digital and analog monitoring and control functions, all on the HP-IB. The voltage and current programming resolution available with either card is 1/1000th of full scale.

The features available with Option 002 can also be interfaced to your own external circuitry rather than an HP Multiprogrammer.

100: 87-106 Vac, 48-63 Hz. HP 6024A Only! This option is for use in Japan only. The power supply output power is 75% of the output power available with the other line voltage options. For HP 6024A only.

220: 191 to 233 Vac, 48-63 Hz.

240: 208 to 250 Vac, 48-63 Hz.

800: Rack-mount kit for two units side by side. This applies to HP 6023A and 6024A only.

HP 6023A
HP 6024A

908: Rack-mount kit for a single unit. A blank filler panel is supplied when ordered for half rack width units.

HP 6010A, 6011A, 6012B
HP 6023A
HP 6024A

909: Rack-mount kit with handles for HP Models 6010A, 6011A, and 6012B

910: One extra operating and service manual shipped with each power supply.

HP 6024A
HP 6010A, 6011A, 6012B, 6023A

PARD (rms/p-p) 20Hz-20MHz		Programming Response Time							General*					
		UP			DOWN				AC Input Current				Weight kg (lbs)	
		Voltage	Current	Settling Band	Full Load	No Load	Full Load	Light Load		100 Vac	120 Vac	220 Vac	240 Vac	Net
Time	Load													
3 mV 30 mV	15 mA —	5 mV	100 ms	100 ms	200 ms	500 ms	50 Ω	—	6.5 A	3.8 A	3.6 A	8.6 (19)	10.5 (23)	
8 mV 50 mV	120 mA —	30 mV	300 ms	300 ms	500 ms	1.5 sec	50 Ω	—	24 A	15 A	14 A	16.8 (37)	22.2 (49)	
3 mV 30 mV	5 mA —	60 mV	200 ms	200 ms	300 ms	600 ms	Open	5.3 A	5.3 A	2.9 A	2.7 A	5.4 (12)	7.3 (16)	
8 mV 40 mV	25 mA —	90 mV	300 ms	300 ms	2.0 sec	3.0 sec	100 Ω	—	24 A	15 A	14 A	15.9 (35)	21.3 (47)	
22mV 50mV	15mA —	300mV	300ms	300ms	600ms	3.5 sec	Open	—	24 A	15 A	14 A	16.3 (36)	21.7 (48)	

* An ac input option must be specified when ordering.