HEWLETT PACKARD hp HARRISON DIVISION

LABORATORY BENCH DC POWER SUPPLIES

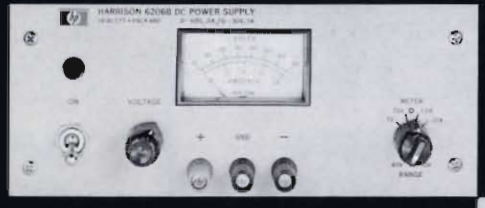
LAB SERIES

Models 6200B, 6201B, 6202B, 6203B, 6204B, 6205B, 6206B, 6207B, 6209B

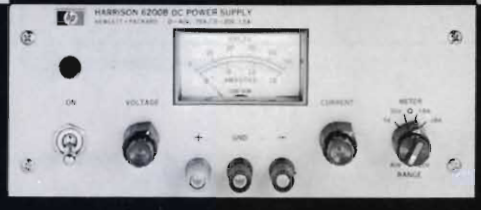
Technical Data 27 Dec '65

VOLTAGE OUTPUT	CURRENT OUTPUT	MODEL NUMBER
0-7.5	0-3A	6203B
0-20V or 0-40V	0-600MA 0-300MA	6204B
DUAL 0-20V or 0-40V	0-600MA 0-300MA	6205B
0-20V	0-1.5A	6201B
0-20V or 0-40V	0-1.5A 0-0.75A	6200B
0-40V	0-0.75A	6202B
0-30V or 0-60V	0-1A 0-0.5A	6206B
0-160V	0-200MA	6207B
0-320V	0-100MA	6209B

- ALL SILICON DESIGN
- MULTIPLE RANGE METER
- REMOTE PROGRAMMING AND SENSING
- HALF RACK WIDTH—EASILY RACK MOUNTED
- HIGH SPEED PROGRAMMING
- AUTO-SERIES, -PARALLEL, -TRACKING
- OVERVOLTAGE PROTECTION "CROWBAR" OPTION
- FRONT AND REAR OUTPUT TERMINALS



6204B, 6206B
DUAL RANGE



6200B, 6201B, 6202B, 6203B, 6207B, 6209B
CONSTANT VOLTAGE/CONSTANT CURRENT

6205B
TWO DUAL RANGE OUTPUTS

100 Locust Avenue, Berkeley Heights, New Jersey 07992, U. S. A. Tel. (201) 464-1234

Europe: 54 Route Des Acacias, Geneva, Switzerland. Cable: "HEWPACKSA" Tel. (022) 42.81.50

Printed in U.S.A.

SILICON "DIFF-AMPS" ASSU

LAB SERIES SPECIFICATIONS

		6200B	6201B	6202B	6203B
		CONSTANT VOLTAGE/CONSTANT CURRENT			
OUTPUT	DC Voltage	0-20V / 0-40V (DUAL RANGE)	0-20V	0-40V	0-7.5V
	DC Current	0-1.5A / 0-0.75A (DUAL RANGE)	0-1.5A	0-0.75A	0-3A
INPUT		105-125/210-250 VAC, 50-400 cps, 0.9 a, 70 w	105-125/210-250 VAC, 50-400 cps, 0.8 a, 66 w	105-125/210-250 VAC, 50-400 cps, 0.8 a, 66 w	105-125/210-250 VAC, 50-400 cps, 0.9 a, 70 w
LOAD REGULATION	Constant Voltage	0.01% plus 4 mv	0.01% plus 4 mv	0.01% plus 4 mv	5 mv
	Constant Current	0.03% plus 250 μa	0.03% plus 250 μa	0.03% plus 250 μa	0.03% plus 250 μa
LINE REGULATION	Constant Voltage	0.01% plus 4 mv	0.01% plus 4 mv	0.01% plus 4 mv	3 mv
	Constant Current	0.01% plus 250 μa	0.01% plus 250 μa	0.01% plus 250 μa	0.01% plus 250 μa
RIPPLE AND NOISE	Constant Voltage	200 μv rms	200 μv rms	200 μv rms	200 μv rms
	Constant Current	500 μa rms	500 μa rms	500 μa rms	500 μa rms
REMOTE PROGRAMMING	Constant Voltage*	200 ohms per volt	200 ohms per volt	200 ohms per volt	200 ohms per volt
	Constant Current†	500 ohms per amp / 1000 ohms per amp	1000 ohms per amp	1000 ohms per amp	500 ohms per amp
OVERLOAD PROTECTION		Constant voltage/constant current circuit provides complete protection for the power supply for any overload condition. In addition, continuously adjustable current limiting in constant voltage operation and continuously adjustable voltage limiting in constant current operation provides optimum protection for the load device.			
CONTROLS		Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Concentric Meter Range and Output Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.
METER RANGES		0-5V, 0-50V, 0-.18A, 0-1.8A	0-2.4V, 0-24V, 0-.18A, 0-1.8A	0-5V, 0-50V, 0-.09A, 0-.9A	0-.9V, 0-9V, 0-.4A, 0-4A
WEIGHT	(Net/Shipping)	14/19 pounds	14/19 pounds	14/19 pounds	14/19 pounds
PRICE	FOB Berkeley Heights, N. J.	$189.00 Model 6200B	$169.00 Model 6201B	$169.00 Model 6202B	$169.00 Model 6203B

*VOLTAGE PROGRAMMING ACCURACY ±5% OR ±20 MV WHICHEVER IS GREATER †CURRE...

OTHER FEATURES OF THE LAB SERIES

SHORT CIRCUIT PROOF.

FRONT AND REAR OUTPUT TERMINALS.

HALF RACK WIDTH, 3½ INCHES HIGH — Units are designed for both bench and rack operation.

NO OVERSHOOT ON TURN-ON, TURN-OFF, or AC POWER REMOVAL.

FLOATING OUTPUT — Either positive or negative output terminal may be connected to ground through a separate terminal provided for that purpose, or the supply may be operated "floating" at up to 300 volts off ground.

AUTOMATIC SENSING — If the front output terminals are used, the DC output voltage is sensed at these front terminals; if the rear output terminals are used, the DC output voltage is sensed at the rear terminals — without any modification (no internal or external strapping changes). Thus the supply automatically achieves optimum regulation at the terminals to which the load is connected.

REMOTE SENSING — Remote error sensing terminals on the rear barrier strip make it possible to achieve optimum regulation of the supply at a pair of remote terminals in spite of the IR drop of the leads connecting the power supply output terminals to these remote load terminals.

SILICON "DIFF-AMP" FRONT END — The most sensitive and critical portions of any power supply feedback loop are the reference and that portion of the circuit which compares the output voltage with the reference. All LAB Series supplies employ a reference voltage derived from a temperature compensated zener diode; "diff-amps" (packaged silicon differential amplifiers consisting of two matched low level silicon transistors in a single case) compare the output voltage with this reference. In Constant Voltage/Constant Current supplies "diff-amps" are employed in the current comparison amplifier as well. Thus, both the excellent low level drift performance of the silicon transistor and the well-known balancing action of the differential amplifier circuit are combined to assure drift-free performance.

HIGH SPEED PROGRAMMING — Models 6200B, 6201B, 6202B, 6203B, 30V/MS when programming in either direction between 1V and maximum rated output, less than 2 MS between 0 and 1V. Contact factory for programming speed of other models.

MAXIMUM AMBIENT OPERATING TEMPERATURE — +50°C.

TEMPERATURE COEFFICIENT — Constant Voltage: Less than 0.02% plus 1 Mv/°C — Constant Current: Less than 0.02% plus 500 μa/°C.

STABILITY — Total drift for 8 hours (after 30 min. warm-up) at a Constant Ambient — Constant Voltage: Less than 0.1% plus 5 Mv. Constant Current: Less than 0.15% plus 2.5 Ma.

TRANSIENT RECOVERY TIME — Less than 50 μsec for output recovery to within 10 Mv following a full load current change in output.

INTERNAL IMPEDANCE — Less than 0.02 ohms from Dc to 1 Kc. Less than 0.5 ohms from 1 Kc. to 100 Kc. Less than 3.0 ohms from 100 Kc. to 1 Mc.

COOLING — Convection cooling is employed. No moving parts.

POWER CORD — 3-wire, 5-foot power cord.

SIZE — 3½" H x 12⅝" D x 8½" W—Half rack width.

FINISH — Light gray panel with dark gray case.

RE STABLE OUTPUT CONTROL

	6204B	6205B	6206B	6207B	6209B
CONSTANT VOLTAGE/CURRENT LIMITING				**CV/CC**	
	0V DUAL RANGE 0-40V .6A 0-0.3A	0-20V TWO DUAL RANGE OUTPUTS 0-40V 0-0.6A 0-0.3A	0-30V DUAL RANGE 0-60V 0-1A 0-0.5A	0-160V 0-0.2A	0-320V 0-0.1A
	105-125/210-250 VAC, 50-400 cps, 0.4 a, 24 w	105-125/210-250 VAC, 50-440 cps, 0.5 a, 50 w	105-125/210-250 VAC, 50-400 cps, 1.0 a, 66 w	105-125/210-250 VAC, 48-63 cps, 1.0 a, 60 w	105-125/210-250 VAC, 48-63 cps, 1.0 a, 60 w
	0.01% plus 4 mv	0.01% plus 4 mv	0.01% plus 4 mv	0.02% plus 2 mv	0.02% plus 2 mv
	———	———	———	200 μa	200 μa
	0.01% plus 4 mv	0.01% plus 4 mv	0.01% plus 4 mv	0.02% plus 2 mv	0.02% plus 2 mv
	———	———	———	200 μa	200 μa
	200 μv rms	200 μv rms	200 μv rms	500 μv rms	1 mv rms
	———	———	———	200 μa rms	200 μa rms
	200 ohms per volt	200 ohms per volt	300 ohms per volt	300 ohms per volt	300 ohms per volt
	———	———	———	3750 ohms per amp	10,000 ohms per amp
	Fixed current limit provides complete protection for any overload condition. This limit is set at approximately 700 ma for the 20 volt range and 350 ma for the 40 volt range.	Fixed current limit provides complete protection for any overload condition. This limit is set at approximately 700 ma for the 20 volt range and 350 ma for the 40 volt range.	Fixed current limit provides complete protection for any overload condition. This limit is set for approximately 1.2 A for the 30 volt range and 600 ma for the 60 volt range.	Same as 6200B	
	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Meter Range and Output Range Switch.	Combined Pilot Light and On-Off Button, Two Concentric Coarse and Fine Voltage Controls, Two Concentric Meter Range and Output Range Switches.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Meter Range and Output Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.
	5V, 0-50V, 0-.075A, 0-.75A	0-5V, 0-50V, 0-.075A, 0-.75A	0-7V, 0-70V, 0-.12A, 0-1.2A	0-20V, 0-200V, 0-24 Ma, 0-240 Ma	0-40V, 0-400V, 0-10 Ma, 0-100 Ma
	10/13 pounds	10/13 pounds	12/17 pounds	13/18 pounds	13/18 pounds
	$144.00 Model 6204B	STANDARD **$235.00** OPTION 15 NO 5V & .75A METER RANGES **$195.00** Model 6205B	**$169.00** Model 6206B	**$194.00** Model 6207B	**$194.00** Model 6209B

PROGRAMMING ACCURACY ±10% OR 0.002X, WHICHEVER IS GREATER, WHERE X IS CURRENT RATING OF SUPPLY

Auto-Series, Auto-Parallel, and Auto-Tracking Operation

All LAB Series power supplies have been designed so that they can readily be used in conjunction with other units of their kind for increased voltage and current requirements as well as for applications requiring the coordinated or proportional control of several supply outputs — all with no internal wiring changes.

AUTO-SERIES

Any number of supplies of mixed model numbers can be "stacked" in series up to 300 volts off ground. Thus it is possible to obtain output voltages higher than those available from one supply alone or to obtain a "chain" of regulated voltages all referenced to ground and all equally or proportionally controlled with one knob.

AUTO-PARALLEL

Any number of supplies of the same model number may be connected in parallel, thus resulting in a power source of greater current capability than would be possible using one supply alone. Such combinations also feature one-knob master control. The current contribution from each supply automatically is held equal to that of the master supply.

AUTO-TRACKING

In this configuration two or more supplies having a common output bus are controlled from the one supply designated as the "master" supply by means of the strapping configuration. Auto-tracking has as its purpose not the increasing of the current or voltage capability but rather the attaining of a proportional control of several power supplies in a system from one knob. In this fashion it is possible to establish the reference of the master supply as the only reference in the power supply system. No internal wiring changes are required for any of the many possible combinations of supplies in automatic series, parallel, or tracking operation, since all connections are made using rear panel terminals. Furthermore, the use of these supplies in any of these coordinated modes of operation does not preclude the simultaneous use of other features such as Constant Voltage/Constant Current operation, remote sensing, remote programming, etc. Thus it is possible to treat individual supplies in the LAB Series as highly regulated building blocks which can be compounded for higher power requirements or used individually at separate locations. If it becomes necessary at a later date to increase the voltage or current rating of the power supply for a system, this "add-on" feature permits such power increases at minimum cost, since the previously purchased power supplies need not be discarded.

Constant Voltage/Constant Current Operation

As indicated above, six of the LAB Series supplies can be operated as either constant voltage or constant current supplies. No external power resistors are required for constant current operation. When the load resistance changes through the "critical" or "crossover" value equal to E (the front panel voltage control setting) divided by I (the front panel current control setting), the supply will automatically transfer from constant voltage to constant current operation (or vice versa depending upon whether the load resistance R_L is decreasing or increasing). For example, if the supply is initially in constant voltage operation and the load resistance R_L is allowed to decrease, the supply will continue to deliver increasing current at constant voltage until the output current reaches a value equal to the current control setting. For further decreases in R_L, this current will remain constant and the output voltage will decrease. Conversely, if the supply is initially in constant current operation and R_L is allowed to increase, the current will remain constant until the output voltage reaches the value set by the front panel voltage control. At this point the supply will revert to constant voltage operation. Further increases in R_L will be accompanied by a decreasing output current and a constant output voltage.

IMPROVED LAB SERIES SUPPLIES HAVE ADDED FEATURES, OPTIONS

LAB Series supplies, already regarded as the industry standard for comparison because of their reliability, versatility, and performance specifications, have now been updated. The glass epoxy printed wiring board now mounts all circuit components via plated-through holes; a new package design achieves greater rack-mounting rigidity and ease in assembly. These production techniques result in improved reliability and lowered production cost, permitting Hewlett-Packard to manufacture laboratory power supplies using highest quality components at a competitive price.

All "B" version LAB Series supplies employ all-silicon circuitry. In addition, on models 6200B, 6201B, 6202B, and 6203B, special circuitry has been included to increase the down-programming speed, thus making it commensurate with the up-programming capability.

To further increase bench utility, multiple range meters have been included as standard on all models. Switching the meter range switch to the "wrong" position will result in no damage to the meter or degradation of power supply performance.

An unusually flexible power supply, Model 6205, has been added to the LAB Series. This supply has two independent outputs, each of which can be set for operation at either 0-20V at 0-0.6A, or 0-40V at 0-0.3A. Both outputs are floated and can be used independently as positive or negative sources, or combined in series or parallel, thus providing output capability of up to 80V and up to 1.2A. In all, nine output combinations are obtainable from the 6205B:

0-20V @ 0-600 MA
0-40V @ 0-300 MA
Two 0-20V @ 0-600 MA
Two 0-40V @ 0-300 MA
0-20V @ 0-600 MA plus 0-40V @ 0-300 MA
0-40V @ 0-600 MA (Two 20's in Auto-Series)
0-80V @ 0-300 MA (Two 40's in Auto-Series)
0-20V @ 0-1.2 A (Two 20's in Auto-Parallel)
0-40V @ 0-600 MA (Two 40's in Auto-Parallel)

BUILT-IN PROTECTION CIRCUITS

A Current Limit Circuit

Continuously adjustable current limit protection is provided by the front panel current control on Constant Voltage/Constant Current models. Other models include a fixed current limit circuit. In either case, the supply is fully protected for all overloads, including a direct short across the output terminals.

B Meter Protection Circuit

No damage can result from any meter overload, regardless of duration or meter range employed.

C Output Terminal Protection Diode

A reverse polarity diode is connected across the output terminals. This protects other supply components from the effects of any reverse voltage accidentally applied across the output terminals, such as might result from the series connection of another power supply.

D Series Regulator Protection Diode

A reverse polarity diode is connected in parallel with the series regulator transistors. This protects the series transistors from any reverse voltage, such as might result from the parallel connection of another power supply.

E Control Amplifier Input Clamp Diodes

Low level input stages for both the Constant Voltage and Constant Current amplifiers are protected with two diodes, limiting the maximum instantaneous input voltage to less than one volt; these diodes thus protect input stages from damage due to large signals associated with the rapid manipulation of output controls, rapid changes in remote programming input, etc.

OPTIONS

Specify by Option Number

06—OVERVOLTAGE PROTECTION "CROWBAR": Protects delicate loads against power supply failure or operator error. Compact, inexpensive, can be factory installed (only) at rear of power supplies. Virtual short circuit (crowbar) placed across load within 10 microseconds after overvoltage margin is exceeded.

Overvoltage Margin: 1 to 4 volts, screwdriver adjustable.

Power Requirement: 15 ma continuous drain from power supply being protected.

Size: Adds 5 inches to depth dimension of power supplies.

Weight: Adds 1½ lbs. to net, 5 lbs. to shipping.

Price: $95

07—VOLTAGE 10-TURN POT: Single control that replaces both coarse and fine voltage controls and improves output settability.

Price: $25

08—CURRENT 10-TURN POT: Single control that replaces both coarse and fine current controls and improves output settability.

Price: $25

09—VOLTAGE AND CURRENT 10-TURN POT: Consists of options 07 and 08.

Price: $45

13—THREE DIGIT GRADUATED DECADIAL VOLTAGE CONTROL: Includes 10-turn control replacing coarse and fine voltage control.

Price: $60

14—THREE DIGIT GRADUATED DECADIAL CURRENT CONTROL: Includes 10-turn control replacing coarse and fine current control.

Price: $60

RACK MOUNTING KITS

Part Number	Description	Price
14513A	Rack Kit for mounting one supply	$20.00
14523A	Rack Kit for mounting two supplies	$10.00

SILICON "DIFF-AMPS" ASSURE STABLE OUTPUT CONTROL

LAB SERIES SPECIFICATIONS		6200B	6201B	6202B	6203B	6204B	6205B	6206B	6207B	6209B
		CONSTANT VOLTAGE/CONSTANT CURRENT				CONSTANT VOLTAGE/CURRENT LIMITING			CV/CC	
OUTPUT	DC Voltage	0-20V / 0-40V (DUAL RANGE)	0-20V	0-40V	0-7.5V	0-20V / 0-40V (DUAL RANGE)	0-20V / 0-40V (TWO DUAL RANGE OUTPUTS)	0-30V / 0-60V (DUAL RANGE)	0-160V	0-320V
	DC Current	0-1.5A / 0-0.75A	0-1.5A	0-0.75A	0-3A	0-0.6A / 0-0.3A	0-0.6A / 0-0.3A	0-1A / 0-0.5A	0-0.2A	0-0.1A
INPUT		105-125/210-250 VAC, 50-400 cps, 0.9 a, 70 w	105-125/210-250 VAC, 50-400 cps, 0.8 a, 66 w	105-125/210-250 VAC, 50-400 cps, 0.8 a, 66 w	105-125/210-250 VAC, 50-400 cps, 0.9 a, 70 w	105-125/210-250 VAC, 50-400 cps, 0.4 a, 24 w	105-125/210-250 VAC, 50-440 cps, 0.5 a, 50 w	105-125/210-250 VAC, 50-400 cps, 1.0 a, 66 w	105-125/210-250 VAC, 48-63 cps, 1.0 a, 60 w	105-125/210-250 VAC, 48-63 cps, 1.0 a, 60 w
LOAD REGULATION	Constant Voltage	0.01% plus 4 mv	0.01% plus 4 mv	0.01% plus 4 mv	5 mv	0.01% plus 4 mv	0.01% plus 4 mv	0.01% plus 4 mv	0.02% plus 2 mv	0.02% plus 2 mv
	Constant Current	0.03% plus 250 μa	0.03% plus 250 μa	0.03% plus 250 μa	0.03% plus 250 μa	———	———	———	200 μa	200 μa
LINE REGULATION	Constant Voltage	0.01% plus 4 mv	0.01% plus 4 mv	0.01% plus 4 mv	3 mv	0.01% plus 4 mv	0.01% plus 4 mv	0.01% plus 4 mv	0.02% plus 2 mv	0.02% plus 2 mv
	Constant Current	0.01% plus 250 μa	0.01% plus 250 μa	0.01% plus 250 μa	0.01% plus 250 μa	———	———	———	200 μa	200 μa
RIPPLE AND NOISE	Constant Voltage	200 μv rms	200 μv rms	200 μv rms	200 μv rms	200 μv rms	200 μv rms	200 μv rms	500 μv rms	1 mv rms
	Constant Current	500 μa rms	500 μa rms	500 μa rms	500 μa rms	———	———	———	200 μa rms	200 μa rms
REMOTE PROGRAMMING	Constant Voltage*	200 ohms per volt	200 ohms per volt	200 ohms per volt	200 ohms per volt	200 ohms per volt	200 ohms per volt	300 ohms per volt	300 ohms per volt	300 ohms per volt
	Constant Current†	500 ohms per amp / 1000 ohms per amp	1000 ohms per amp	1000 ohms per amp	500 ohms per amp	———	———	———	3750 ohms per amp	10,000 ohms per amp
OVERLOAD PROTECTION		Constant voltage/constant current circuit provides complete protection for the power supply for any overload condition. In addition, continuously adjustable current limiting in constant voltage operation and continuously adjustable voltage limiting in constant current operation provides optimum protection for the load device.				Fixed current limit provides complete protection for any overload condition. This limit is set at approximately 700 ma for the 20 volt range and 350 ma for the 40 volt range.	Fixed current limit provides complete protection for any overload condition. This limit is set at approximately 700 ma for the 20 volt range and 350 ma for the 40 volt range.	Fixed current limit provides complete protection for any overload condition. This limit is set for approximately 1.2 A for the 30 volt range and 600 ma for the 60 volt range.	Same as 6200B	
CONTROLS		Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Concentric Meter Range and Output Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Meter Range and Output Range Switch.	Combined Pilot Light and On-Off Button, Two Concentric Coarse and Fine Voltage Controls, Two Concentric Meter Range and Output Range Switches.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Meter Range and Output Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.	Off-On Switch, Pilot Light, Concentric Coarse and Fine Voltage Control, Concentric Coarse and Fine Current Control, Meter Range Switch.
METER RANGES		0-5V, 0-50V, 0-.18A, 0-1.8A	0-2.4V, 0-24V, 0-.18A, 0-1.8A	0-5V, 0-50V, 0-.09A, 0-.9A	0-.9V, 0-9V, 0-.4A, 0-4A	0-5V, 0-50V, 0-.075A, 0-.75A	0-5V, 0-50V, 0-.075A, 0-.75A	0-7V, 0-70V, 0-.12A, 0-1.2A	0-20V, 0-200V, 0-24 Ma, 0-240 Ma	0-40V, 0-400V, 0-10 Ma, 0-100 Ma
WEIGHT	(Net/Shipping)	14/19 pounds	14/19 pounds	14/19 pounds	14/19 pounds	10/13 pounds	10/13 pounds	12/17 pounds	13/18 pounds	13/18 pounds
PRICE	FOB Berkeley Heights, N. J.	$189.00 Model 6200B	$169.00 Model 6201B	$169.00 Model 6202B	$169.00 Model 6203B	$144.00 Model 6204B	STANDARD $235.00 / OPTION 15 NO 5V & .75A METER RANGES $195.00 Model 6205B	$169.00 Model 6206B	$194.00 Model 6207B	$194.00 Model 6209B

*VOLTAGE PROGRAMMING ACCURACY ±5% OR ±20 MV WHICHEVER IS GREATER †CURRENT PROGRAMMING ACCURACY ±10% OR 0.002X, WHICHEVER IS GREATER, WHERE X IS CURRENT RATING OF SUPPLY

OTHER FEATURES OF THE LAB SERIES

SHORT CIRCUIT PROOF.

FRONT AND REAR OUTPUT TERMINALS.

HALF RACK WIDTH, 3½ INCHES HIGH — Units are designed for both bench and rack operation.

NO OVERSHOOT ON TURN-ON, TURN-OFF, or AC POWER REMOVAL.

FLOATING OUTPUT — Either positive or negative output terminal may be connected to ground through a separate terminal provided for that purpose, or the supply may be operated "floating" at up to 300 volts off ground.

AUTOMATIC SENSING — If the front output terminals are used, the DC output voltage is sensed at these front terminals; if the rear output terminals are used, the DC output voltage is sensed at the rear terminals — without any modification (no internal or external strapping changes). Thus the supply automatically achieves optimum regulation at the terminals to which the load is connected.

REMOTE SENSING — Remote error sensing terminals on the rear barrier strip make it possible to achieve optimum regulation of the supply at a pair of remote terminals in spite of the IR drop of the leads connecting the power supply output terminals to these remote load terminals.

SILICON "DIFF-AMP" FRONT END — The most sensitive and critical portions of any power supply feedback loop are the reference and that portion of the circuit which compares the output voltage with the reference. All LAB Series supplies employ a reference voltage derived from a temperature compensated zener diode; "diff-amps" (packaged silicon differential amplifiers consisting of two matched low level silicon transistors in a single case) compare the output voltage with this reference. In Constant Voltage/Constant Current supplies "diff-amps" are employed in the current comparison amplifier as well. Thus, both the excellent low level drift performance of the silicon transistor and the well-known balancing action of the differential amplifier circuit are combined to assure drift-free performance.

HIGH SPEED PROGRAMMING — Models 6200B, 6201B, 6202B, 6203B, 30V/MS when programming in either direction between 1V and maximum rated output, less than 2 MS between 0 and 1V. Contact factory for programming speed of other models.

MAXIMUM AMBIENT OPERATING TEMPERATURE — +50°C.

TEMPERATURE COEFFICIENT — Constant Voltage: Less than 0.02% plus 1 Mv/°C — Constant Current: Less than 0.02% plus 500 μa/°C.

STABILITY — Total drift for 8 hours (after 30 min. warm-up) at a Constant Ambient — Constant Voltage: Less than 0.1% plus 5 Mv. Constant Current: Less than 0.15% plus 2.5 Ma.

TRANSIENT RECOVERY TIME — Less than 50 μsec for output recovery to within 10 Mv following a full load current change in output.

INTERNAL IMPEDANCE — Less than 0.02 ohms from Dc to 1 Kc. Less than 0.5 ohms from 1 Kc. to 100 Kc. Less than 3.0 ohms from 100 Kc. to 1 Mc.

COOLING — Convection cooling is employed. No moving parts.

POWER CORD — 3-wire, 5-foot power cord.

SIZE — 3½" H x 12⅝" D x 8½" W—Half rack width.

FINISH — Light gray panel with dark gray case.

Auto-Series, Auto-Parallel, and Auto-Tracking Operation

All LAB Series power supplies have been designed so that they can readily be used in conjunction with other units of their kind for increased voltage and current requirements as well as for applications requiring the coordinated or proportional control of several supply outputs — all with no internal wiring changes.

AUTO-SERIES
Any number of supplies of mixed model numbers can be "stacked" in series up to 300 volts off ground. Thus it is possible to obtain output voltages higher than those available from one supply alone or to obtain a "chain" of regulated voltages all referenced to ground and all equally or proportionally controlled with one knob.

AUTO-PARALLEL
Any number of supplies of the same model number may be connected in parallel, thus resulting in a power source of greater current capability than would be possible using one supply alone. Such combinations also feature one-knob master control. The current contribution from each supply automatically is held equal to that of the master supply.

AUTO-TRACKING
In this configuration two or more supplies having a common output bus are controlled from the one supply designated as the "master" supply by means of the strapping configuration. Auto-tracking has as its purpose not the increasing of the current or voltage capability but rather the attaining of a proportional control of several power supplies in a system from one knob. In this fashion it is possible to establish the reference of the master supply as the only reference in the power supply system. No internal wiring changes are required for any of the many possible combinations of supplies in automatic series, parallel, or tracking operation, since all connections are made using rear panel terminals. Furthermore, the use of these supplies in any of these coordinated modes of operation does not preclude the simultaneous use of other features such as Constant Voltage/Constant Current operation, remote sensing, remote programming, etc. Thus it is possible to treat individual supplies in the LAB Series as highly regulated building blocks which can be compounded for higher power requirements or used individually at separate locations. If it becomes necessary at a later date to increase the voltage or current rating of the power supply for a system, this "add-on" feature permits such power increases at minimum cost, since the previously purchased power supplies need not be discarded.

Constant Voltage/Constant Current Operation

As indicated above, six of the LAB Series supplies can be operated as either constant voltage or constant current supplies. No external power resistors are required for constant current operation. When the load resistance changes through the "critical" or "crossover" value equal to E (the front panel voltage control setting) divided by I (the front panel current control setting), the supply will automatically transfer from constant voltage to constant current operation (or vice versa depending upon whether the load resistance R_L is decreasing or increasing). For example, if the supply is initially in constant voltage operation and the load resistance R_L is allowed to decrease, the supply will continue to deliver increasing current at constant voltage until the output current reaches a value equal to the current control setting. For further decreases in R_L, this current will remain constant and the output voltage will decrease. Conversely, if the supply is initially in constant current operation and R_L is allowed to increase, the current will remain constant until the output voltage reaches the value set by the front panel voltage control. At this point the supply will revert to constant voltage operation. Further increases in R_L will be accompanied by a decreasing output current and a constant output voltage.