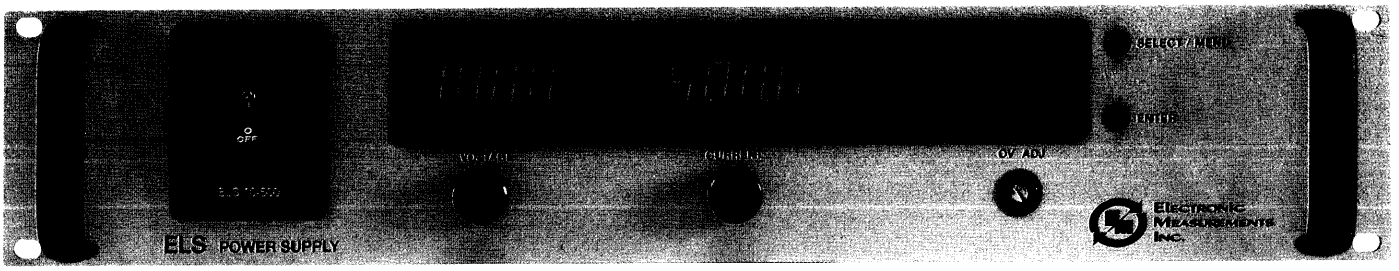
THE ELS SERIES



A NEW LEVEL OF PERFORMANCE

The ELS Series represents the culmination of 50 years of engineering expertise in the development of switchmode power supplies for scientific, medical, burn-in and process control applications. ELS achieves a new level of performance, efficiency, package density and ease of use opening a wide variety of applications.

A NEW STANDARD OF EXCELLENCE

ELS is ***the*** power supply to which others will be compared. Main features include:

- **HIGHEST POWER PER CUBIC INCH** — For wide range, rack mount, CV/CC power supplies — 50% improvement over prior models.

  5.0 kW - 4.71 watts per in^3 (0.287 watts per cm^3) - 1061 in^3 (0.017 m^3) - 2U package.

- **EASE OF USE** - In addition to standard voltage and current meters, the front panel features a ten character intelligent information display for system programming, diagnostics, monitor, testing and safety status.

- **HIGH EFFICIENCY AND POWER FACTOR CORRECTED** - Efficiency ranging from 84 to 92% depending on output voltage, with active power factor correction of up to 0.999. This means lower utility, installation and operating costs, reduced harmonic distortion and more reliable systems operation.

OUR CUSTOMERS TOLD US WHAT THEY WANTED MOST IN A POWER SUPPLY.

ELS IS THE RESULT

Customer satisfaction is the cornerstone of Electronic Measurements' quality policy. Meeting and exceeding customer expectations, continuous improvement and doing it right the first time are the means to that end. The design of the ELS began with the customer. The most extensive research we've ever conducted has resulted in a state-of-the-art power supply with the features you need most ..... **over 80 in all.** Ease of programming, power factor correction, high power density, low noise, flexible feature customization, reliability and ease of service are just the beginning. The ELS will improve your productivity, reduce energy costs and provide years of reliable service.

TECHNICAL INNOVATION

ELS utilizes the latest technologies (multiple patents applied for) to bring increased benefits to power supply users.

- Microprocessor Based Controller
  = Advanced Operator Control
- Higher 100 kHz Switching Frequency
  = Lower Noise, Smaller Size
- Soft Switching Technology
  = Lower Noise, Higher Efficiency
- New Transformer Magnetics
  = Smaller Size, Improved Reliability
- Fewer Internal Power Cables
  = Improved Reliability, Lower Noise

EMI'S TEAM APPROACH IMPROVES QUALITY

EMI's manufacturing team was actively involved since the beginning of the ELS design phase, lending a hand in the areas of standardization and modularity. The result is significantly improved manufacturability through the use of common modules, surface mount technology and built-in testing capability. EMI's team approach means increased reliability and serviceability.

A New Standard of Excellence

CE

Increased Reliability

With microprocessor control, both quality and customer testing are substantially enhanced. Internal diagnostics test power system conditions at turn-on and continue to monitor power supply and load parameters during operation. Trim pots, a potential source for drift and stability problems, have been eliminated. This reduces test time and assures stable performance.

A few of the many possible operations include:

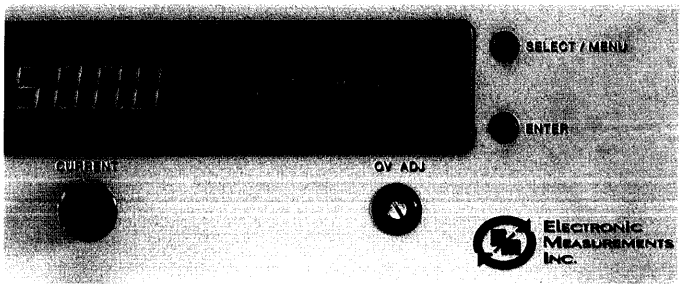
- Adjustable current limit without discharge of Output Caps
- Change to Remote Mode without hard-wired jumpers
- Set Overvoltage and Overcurrent limits
- Remotely inhibit output voltage without turning off power supply
- Reprogram limit ranges to prevent accidental reset from front panel
- EEPROM retains (if desired) many function settings when supply is powered down
- Fast Discharge Output for burn-in applications

Full Programmability

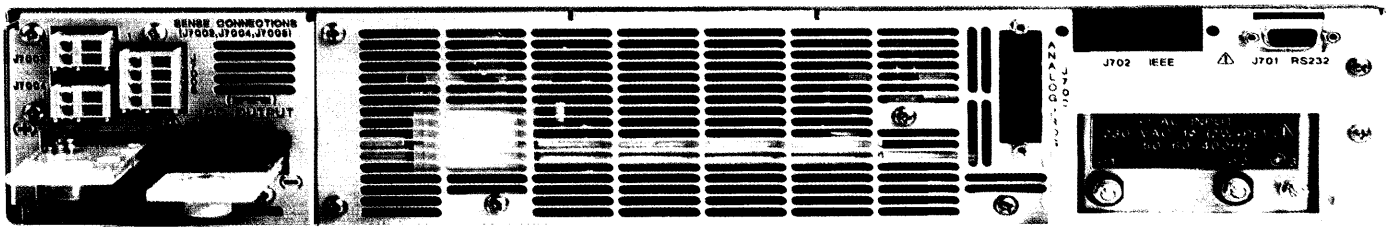
From the moment the unit is turned on, it is clear that this is a totally new concept in power conversion. The front panel display indicates the model, e.g., "ELS 10-500" while the supply conducts self test and indicates remote start-up. Once ready, "**LOCAL MODE**" is displayed showing that the supply is configured for local control. If another mode of operation was previously "Active" (prior to shutdown), the supply will return to and display that mode (e.g. "**REMOTE MODE**").

In the event of power failure, the ELS Power Supply can be programmed to return to the pre-set voltage or to stay at zero until manually reset. This protects test integrity and prevents product damage. Programming can also prevent tampering by locking out either local or remote control.

All these functions are addressed through the front panel or through standard RS232 communication programming interface via a DB9 connector on rear panel or optional IEEE 488.2 interface.



The microprocessor control and modular design coupled with EMI's 50 years of applications service make the ELS the central building block for an ever-growing range of new applications.



THE ELS SERIES

OVER 80 CUSTOMER DEMANDED FEATURES

PROGRAMMING/CONTROL/CONFIGURATION

PROGRAMMING

1. Output Voltage Internal (Front Panel Potentiometer)
2. Output Voltage External (Host Computer)
3. Output Voltage Rear Panel (Analog Programming)
4. Output Current Internal (Front Panel Potentiometer)
5. Output Current External (Host Computer)
6. Output Current Rear Panel (Analog Programming)
7. Output Voltage Limit
8. Output Current Limit
9. Output Overvoltage Limit
10. Output Power Limit
11. Overvoltage (Front Panel Potentiometer)
12. Overvoltage (Host Computer)

CONTROL

13. Local Turn On/Off
14. Remote Turn On/Off
15. Overcurrent Protection, Latched/Unlatched
16. Overcurrent Protection, Disable/Enable
17. Fast Output Discharge (Crowbar), Enable/Disable
18. OVP Reset, Latch/Unlatch
19. OVP Reset, Enable/Disable
20. Loss Of Power (Local/Local)
21. Loss Of Power (Remote/Remote - V=Ø, I=Ø)
22. Loss Of Power (A_Remote/A_Remote - Initial)

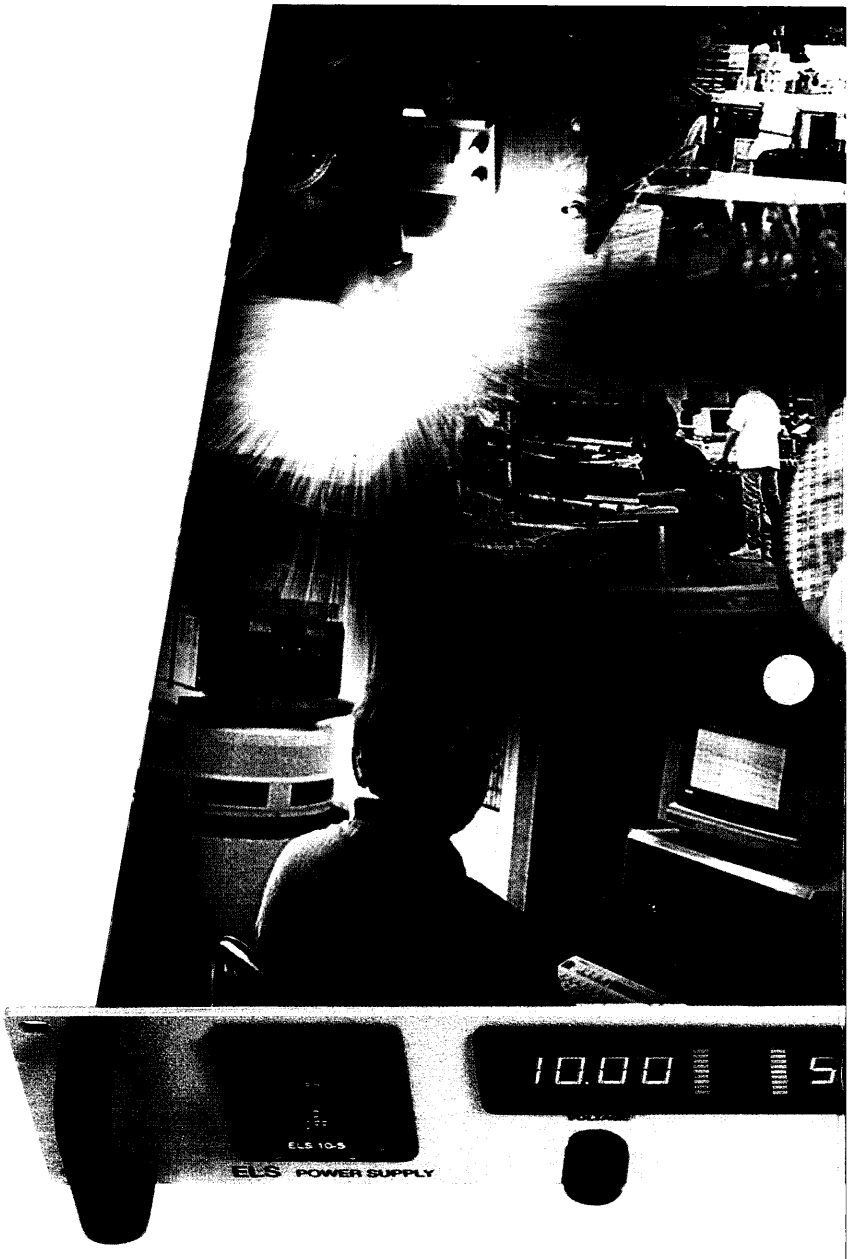
CONFIGURATION

23. Local Mode (Voltage)
24. Local Mode (Current)
25. Remote Mode (Voltage)
26. Remote Mode (Current)
27. Auto Remote Mode (Voltage)
28. Auto Remote Mode (Current)
29. Rear Panel (Ext. Analog Voltage Programming)
30. Rear Panel (Ext. Analog Current Programming)
31. Master/Slave Operation

MEASURE/MONITOR

MEASURE

32. Output Voltage (Local)
33. Output Voltage (Remote)
34. Output Current (Local)
35. Output Current (Remote)
36. Overvoltage (Local)
37. Overvoltage (Remote)
38. Overcurrent Protection
39. Voltage Potentiometer
40. Current Potentiometer
41. Overvoltage Potentiometer



Inside Every ELS Power S
to Quality, Innova

DESIGNED WITH THE USER IN MIND

pply is EMI's Dedication
ion & Teamwork

MONITOR

42. Line Brown Out Voltage
43. Line Phase
44. Temperature
45. Boost/Pre Boost
46. Local Mode
47. Remote Mode
48. Auto Remote Mode
49. RS232 Interface
50. Ext. Analog Voltage Programming
51. Ext. Analog Current Programming
52. Master/Slave Condition
53. Voltage/Current Mode
54. Inverter Temperature
55. Power Factor Temperature
56. Output Rectifier Temperature

DISPLAY/STATUS FEATURES

DISPLAY

57. Output Voltage (Local)
58. Output Voltage (Remote)
59. Output Current (Local)
60. Overvoltage (Local)
61. Output Current (Remote)
62. Overvoltage (Remote)
63. Overcurrent Protection
64. Voltage Potentiometer
65. Current Potentiometer
66. Overvoltage Potentiometer
67. Output Voltage Limits
68. Output Current Limits
69. Output Overvoltage Limits

STATUS FEATURES

70. Voltage Mode
71. Current Mode
72. Overvoltage
73. Overcurrent
74. Slave Mode
75. Input Power Line Failure
76. Mode, Local, Remote, Auto Remote
77. Mode, External Voltage Programming
78. Mode, External Current Programming
79. Over Temperature
80. Inverter Failure
81. PS Ready
82. DC Output OK
83. Power-On Output for External Use
84. Alarm for Unit Failure
85. Remote Off Activated

OPERATIONAL RATINGS @ 50° C, 50/60/400 Hz

OUTPUT RATINGS[1]

WATTS[3]	VOLTS (DC)	AMPS	REGULATION LINE	REGULATION LOAD	RIPPLE (mV)[2] p-p PARD[4]	RIPPLE (mV)[2] RMS	MODEL NUMBERS
1500	5	300	0.1%	0.1%	35	5	ELS 5-300
2250	7.5	300	0.1%	0.1%	35	5	ELS 7.5-300
3000	10	300	0.1%	0.1%	35	5	ELS 10-300
3000	15	200	0.1%	0.1%	35	5	ELS 15-200
3000	20	150	0.1%	0.1%	35	5	ELS 20-150
3000	30	100	0.1%	0.1%	35	5	ELS 30-100
3000	40	75	0.1%	0.1%	35	5	ELS 40-75
3000	50	60	0.1%	0.1%	50	10	ELS 50-60
3000	60	50	0.1%	0.1%	50	10	ELS 60-50
3000	100	30	0.1%	0.1%	100	20	ELS 100-30
3000	120	25	0.1%	0.1%	100	20	ELS 120-25
3000	150	20	0.1%	0.1%	120	20	ELS 150-20
3000	200	15	0.1%	0.1%	150	20	ELS 200-15
3000	250	12	0.1%	0.1%	150	20	ELS 250-12
3000	300	10	0.1%	0.1%	150	20	ELS 300-10
3000	400	7.5	0.1%	0.1%	150	20	ELS 400-7.5
3000	500	6	0.1%	0.1%	150	20	ELS 500-6
3000	600	5	0.1%	0.1%	250	20	ELS 600-5
1875	5	375	0.1%	0.1%	35	5	ELS 5-375
2812	7.5	375	0.1%	0.1%	35	5	ELS 7.5-375
3750	10	375	0.1%	0.1%	35	5	ELS 10-375
3750	15	250	0.1%	0.1%	35	5	ELS 15-250
3750	20	187	0.1%	0.1%	35	5	ELS 20-187
3750	30	125	0.1%	0.1%	35	5	ELS 30-125
3750	40	93	0.1%	0.1%	35	5	ELS 40-93
3750	50	75	0.1%	0.1%	50	10	ELS 50-75
3750	60	62.5	0.1%	0.1%	50	10	ELS 60-62.5
3750	100	37.5	0.1%	0.1%	100	20	ELS 100-37.5
3750	120	31	0.1%	0.1%	100	20	ELS 120-31
3750	150	25	0.1%	0.1%	120	20	ELS 150-25
3750	200	18.7	0.1%	0.1%	150	20	ELS 200-18.7
3750	250	15	0.1%	0.1%	150	20	ELS 250-15
3750	300	12.5	0.1%	0.1%	150	20	ELS 300-12.5
3750	400	9.3	0.1%	0.1%	150	20	ELS 400-9.3
3750	500	7.5	0.1%	0.1%	150	20	ELS 500-7.5
2500	5	500	0.1%	0.1%	35	5	ELS 5-500
5000	7.5	500	0.1%	0.1%	35	5	ELS 7.5-500
5000	10	500	0.1%	0.1%	35	5	ELS 10-500
5000	20	250	0.1%	0.1%	35	5	ELS 20-250
5000	30	165	0.1%	0.1%	35	5	ELS 30-165
5000	40	125	0.1%	0.1%	35	5	ELS 40-125
5000	60	80	0.1%	0.1%	50	10	ELS 60-80
5000	80	60	0.1%	0.1%	50	10	ELS 80-60
5000	100	50	0.1%	0.1%	100	20	ELS 100-50
5000	150	33	0.1%	0.1%	120	20	ELS 150-33
5000	250	20	0.1%	0.1%	150	20	ELS 250-20
5000	300	16	0.1%	0.1%	150	20	ELS 300-16
5000	600	8	0.1%	0.1%	250	20	ELS 600-8

(1) For non-standard output voltage or current or alternate input voltages, consult factory.

(2) RIPPLE at 25°C ambient, nominal line and full load; tip and sleeve method, 10x probe.

(3) Package scale limits maximum current available. This limits power available at low voltages.

(4) PARD - Periodic and Random Deviation - the sum of all ripple and noise components.

SPECIFICATIONS

Duty Cycle: Continuous Operation

Operating Temperature: 0 to 70°C. Above 50°C, consult Factory for Derating Curve

Switching Frequency: 100 kHz

Storage Temperature: -55 to +85°C

Efficiency: 84 - 92 % (depending on Output Voltage)

Frequency: 50 - 440 Hz (Except Single Phase PFC 50-60 Hz)

Power Factor: Single Phase Active PFC (optional)
0.999 nominal at Full Load
Three Phase Passive (std.) 0.90 (Full Load)

Maximum Neutral Current: (3 Phase) < 1 amp

Input Voltage Range (Typical): ±10% of nominal

	Voltage	Current
Programming Resolution (% Full Scale)	0.1%	0.1%
Load Regulation (30% Step Load Change)	0.1%	0.1%
Line Regulation (Low Line to High Line)	0.1%	0.1%
Temperature Coefficient per °C	0.02%	0.03%

INPUT CURRENT

INPUT CONFIGURATION				OUTPUT POWER		
Nom (Vac)	Low Line (Vac)	Phase	Power Factor Type	3 KW	3.75 KW	5 KW
				AC INPUT CURRENT		
208	190	3	Passive	12 amps	15 amps	20 amps
230	190	1	Active	19 amps	-	-
230	190	1	Passive	23 amps (limited to 2.5 kW or 300A Output max.)	-	-

NOTES 1) All input currents provided above are max. RMS values based on low line voltage.
2) Consult factory for input current for other input voltages.

Stability: 0.05% maximum voltage or current change over eight hours, under constant line, load and temperature.

Adjustment Range: Programmable from 5% to 100% of Output Voltage and Current

Response Time (Voltage): A 30% step load change is less than 500 microseconds for units up to 20 V output. Units above 20 V output, transient response is increased by a factor of Vmax/20.

User Input (Programming): RS232 (standard) through DB9 Connector on rear panel.

IEEE 488.2 (optional) interface on rear panel

Constant Voltage Mode - Full Scale = 0 - 5 VDC

Constant Current Mode - Full Scale = 0 - 5 VDC

0-10 VDC Programming optional

Front Panel: Output Voltage (Digital Meter)
Output Current (Digital Meter)
Multifunction VFD (10 Character)
Buttons to select Menu and Program functions
OV Potentiometer Adjustment
Voltage and Current Control (ten-turn)
Bargraph displays for Voltage and Current
Circuit Breaker Input Switch
Voltage or Current Mode Indicators

Protection: Input Overcurrent Protection - Circuit Breaker on front panel
Input transient protection
Output protection - Voltage and/or Current limited to % maximum output
Thermal Protection - Microprocessor controlled

Monitor Diagnostics: Voltage & Current Output 0-5 Volt for 0 to Full Scale (0-10 Volt optional)
Power Supply Ready
V or I mode
Output to indicate loss of control and Unit Shutdown

Display/Indicate: 4 digit display for Voltage and Current
V or I mode LED's
Multifunction VFD display indicates mode of operation, failure and programmed values/limits
Power On indicators

Controls: Standard ELS units are provided with UL approved circuit protection which combines primary circuit protection with on/off control. Output Voltage and Current are adjusted by the 10 turn, front panel mounted controls, or through RS232 interface.

Programming: ELS power supplies respond either to the setting of the front panel controls or to external control signals. Zero to 10 volt programming is optional.

The RS232 interface allows the user to program and measure the output voltage and current of an ELS Supply via a computer. The local and remote programming signals are software selectable over the interface, along with a wide variety of monitor, protection and diagnostic functions.

UL & CE Safety Marks Available: Consult factory for more information

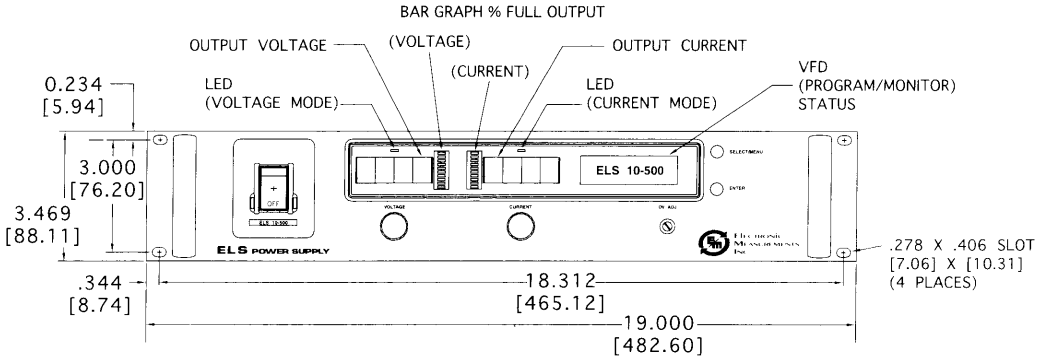
Cooling Air: Driven by DC fans, air enters at top, bottom and sides of the case and exits at rear. Holes in top cover assist cooling.

Warranty: 5 Years

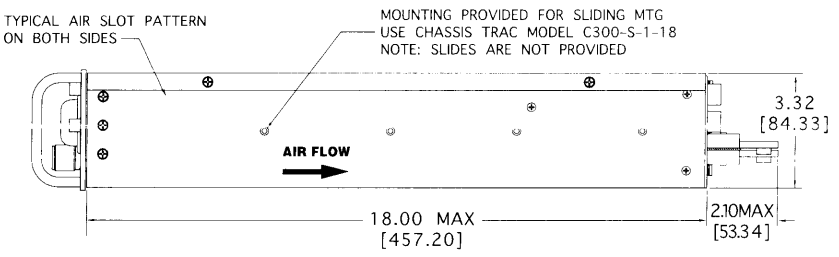
Weight: 45-50 pounds (20-23 kg) depending on power and options

MECHANICAL

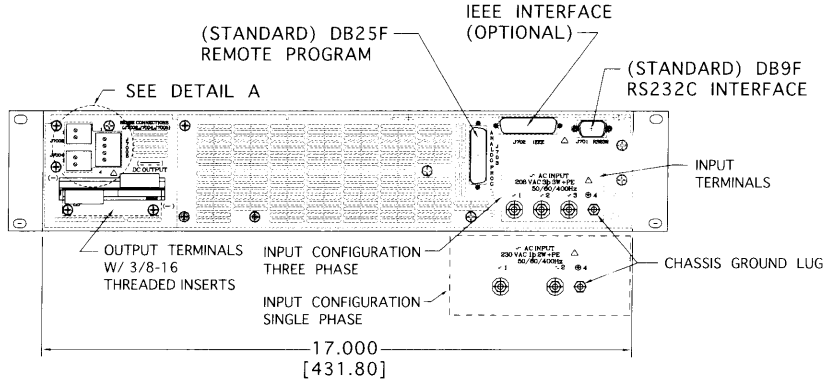
FRONT VIEW

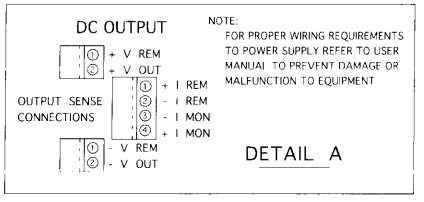


SIDE VIEW



BACK VIEW





Dimensions are for reference only. Please contact factory for detailed specifications.

HOW TO ORDER

ELS XXX X D XXXX

- **ELS XXX** — DC CURRENT RANGE
- **X** — AC INPUT

For This Input	Power Factor Correction	Use This Suffix
230 VAC 1 PHASE	ACTIVE	-1
208 VAC 3 PHASE	PASSIVE	-2
400 VAC 3 PHASE	PASSIVE	-3
480 VAC 3 PHASE	PASSIVE	-4
230 VAC 1 PHASE	PASSIVE	-5*

- **D** — DIGITAL PANEL METER STANDARD
- **XXXX** — OPTIONAL FEATURES

Consult factory for other voltage and current options

PRODUCT CHANGES: Product information published in this brochure was current at time of printing. However, Electronic Measurements, Inc. reserves the right to change specifications, designs and models without prior notice.

* May need to derate to limit input current. Consult factory for details.

C97/5U/1E

ELECTRONIC MEASUREMENTS INC.

a.l.e. systems

405 Essex Road, Neptune, NJ 07753 Phone: (908) 922-9300** Fax: (908) 922-9334**
Internet: www.emipower.com **As of June 1, 1997 area code will change to (732)