Sorensen DLM 3 & 4 kW Series

DC Power Supply

- High Power Density : 3 kW and 4 kW models, 2U (3½" high), (19" wide); no top or bottom clearance spacing required
- Preview Push-button : Overvoltage protection (OVP), voltage and current preview buttons
- Remote Voltage Sense : Sense leads are easily connected to a solderless connector
- Parallel or Series Operation Field configurable
- Power Factor Correction ≥0.98 1 Φ 3kW

The Sorensen DLM 3kW and 4kW Series programmable DC power supplies are designed to provide highly stable, continuously variable output voltage and current for a broad range of applications in a compact 2U (3½" high) chassis.

Both the 3 kW and 4 kW models have output voltages from 0-5 VDC to 0-600 VDC and a current range from 0-5A to 0-450A. The output rms noise is as low as 10 mV. The output will recover to 1% of its steady-state voltage within 1 ms for a step load change of 100% to 70% or 70% to 100%. The front panel layout makes the series extremely easy to use. Control switches include: power on, enable/ standby and local/ remote.

Displays and indicators show programmed set points and operational control status. The programmed voltage, current and overvoltage set points are displayed with two large 3½ digit LED displays. Operational Status LEDs indicate power on, shutdown, over temperature, overvoltage, constant current and voltage mode status. Control Status LEDs indicate front panel lockout, remote control and standby status. IEEE- 488.2 control LEDs indicate error, service request and remote address status.

The 3 kW Models will accept 200*/230 VAC single phase and 200*/208 VAC three phase input power.

The 4 kW Models will accept 200*/208 VAC, three phase or optional 400 or 480 VAC three phase input power.

*Operating temperature below 40°C

3–4 kW

5–600 V

5–450 A

~		208	230
≋	208	400	480

GPIB RS232

AMETEK
Programmable Power
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AMETEK®
PROGRAMMABLE POWER

DLM 3 & 4 kW Series : Product Specifications

Common		
Front Panel Controls	Knobs with 3½ digit digital displays to control output voltage and current settings. Power on/off switch, output enable/standby switch and local/remote switch. Voltage, current and overvoltage preview push buttons allow you to preview the programmed settings at any time; overvoltage limit is adjusted with a set screw accessible through the front panel.	
Displays and Indicators	Voltage and overvoltage setting 3½ digit LED display, current setting 3½ digit LED display. LED indicators for power on, shutdown, remote, overvoltage protection, over temperature and front panel lockout, constant voltage and constant current modes. IEEE-488.2 indicators include error, SRQ and address (M9E option).	
Overvoltage Protection	Output overvoltage (resets by cycling the enable/standby switch)	
Cooling	Internal fans with over temperature protection	
Remote Sense	The maximum load line drop is up to the full voltage rating of the supply. The drop in the load leads subtracts from the maximum voltage available for the load except as follows: maximum rated voltage is available at the load and voltage regulation specifications apply for line drops of <2V for models rated 5V to 16V, and <5V for all other models.	
Remote Sense Protection	Unit will not be damaged due to misconnection of the remote sense leads.	
Remote Programming	Voltage, current (0-100%) and OVP (5-110%) of full scale can be programmed by selectable 0-5 VDC, 0-10 VDC, or 0-5 kΩ.	
Remote Monitoring	Voltage or current can be monitored with user-selectable ranges, 0-5 VDC or 0-10 VDC	
Operational Features	Master/slave parallel operation, up to 2 units can be connected in parallel with active current sharing control to within 10% of each supply. Series operation, up to 3 units of the same model type can be connected in series (consult manual). Negative terminal rated at 150 Vmax above ground	
Software	LabVIEW® driver M9E/M85 programs can be downloaded at no cost at www.elgar.com	
Regulatory	CE Mark, 16-185 & 22-180 certified NRTL to EN 61010-1. Marked cCSAus	
Environmental		
Operating Temperature	0°C to 50°C, no derating (<200 VAC range limited to 40°C maximum)	
Storage Temperature	-40°C to 65°C	
Physical		
Dimensions	Width: 19″ (483 mm) Height: 3.5″ (88 mm) Depth: 18″ (508 mm)	
Weight	40 lbs. (18.2 kg)	
Shipping Weight	49 lbs. (22.3 kg)	
Input	**3 kW**	**4 kW**
Voltage Ranges	180-264 VAC, 47-63 Hz, (<200 VAC range limited to 40°C maximum)	180-264 VAC, 345-455 VAC, 432-528 VAC, 47-63 Hz (<200 VAC range limited to 40°C maximum)
Phases	single or three phase	three phase
Power Factor	0.95 typical with three phase input, 0.98 typical with single phase input	0.95 typical with three phase input
Current	single phase, 21A rms; three phase, 12A rms	180-264 VAC, 15A rms; 345-455 VAC, 8.5A rms; 432-528 VAC, 6.5A rms;
Output		
Stability	±0.05% of maximum voltage or current over 8 hours after 15 minute warm-up time at fixed line, load and temperature. Current accuracy for 5V, 8V, and 16V models is 1% typical.	
Line Regulation	For input voltage variation over the AC input voltage range, with constant rated load. Voltage: 0.05% of maximum rated output +2mV Current: 0.1% of maximum rated output	
Load Regulation	For 0-100% load variation, with constant nominal line voltage. Voltage: 0.05% of maximum rated output +2mV Current: 0.1% of maximum rated output	
Voltage Regulation	0.05% of maximum rated output +2mV	
Transient Response	Typically recovers in 1.5 ms to within 1% of steady-state output voltage (greater than 50% of Vmax) for 70-100% or 100-70% load change.	
Temperature Coefficient	0.02%/°C of rated output voltage; 0.03%/°C of rated output current. Change in output per °C change in ambient temperature, with constant line and load.	
Efficiency	5-8V Models: 82% typical 16-80V Models: 87% typical 150-600V Models: 85% typical (at maximum output power)	

Output : Voltage and Current					
3 kW Model	Voltage	Current	4 kW Model	Voltage	Current
DLM 5-350E	0-5	0-350	DLM 5-450E	0-5	0-450
DLM 8-350E	0-8	0-350	DLM 8-450E	0-8	0-450
DLM 16-185E	0-16	0-185	DLM 16-250E	0-16	0-250
			DLM 22-180E *	0-22	0-180
DLM 32-95E	0-32	0-95	DLM 32-125E	0-32	0-125
DLM 40-75E	0-40	0-75	DLM 40-100E	0-40	0-100
DLM 60-50E	0-60	0-50	DLM 60-66E	0-60	0-66
DLM 80-37E	0-80	0-37	DLM 80-50E	0-80	0-50
DLM 150-20E	0-150	0-20	DLM 150-26E	0-150	0-26
DLM 300-10E	0-300	0-10	DLM 300-13E	0-300	0-13
DLM 600-5E	0-600	0-5	DLM 600-6.6E	0-600	0-6.6

Model	Output Ratings		Regulation Line and Load		Meter Accuracy	
	Voltage (VDC)	Current (ADC)	Voltage (0.05% of Vmax + 2 mV)	Current (0.1% of Imax)	Voltage (0.5% of Vmax + 1 count)	Current (0.75% of Imax + 1 count)
DLM 5-350E	0-5	0-350	5 mV	350 mA	0.04V	4A
DLM 5-450E	0-5	0-450	5 mV	450 mA	0.04V	5A
DLM 8-350E	0-8	0-350	6 mV	350 mA	0.05V	4A
DLM 8-450E	0-8	0-450	6 mV	450 mA	0.05V	5A
DLM 16-185E	0-16	0-185	10 mV	185 mA	0.09V	3A
DLM 16-250E	0-16	0-250	10 mV	250 mA	0.09V	3A
DLM 22-180E *	0-22	0-180	13 mV	180 mA	0.2V	3A
DLM 32-95E	0-32	0-95	18 mV	95 mA	0.3V	0.8A
DLM 32-125E	0-32	0-125	18 mV	125 mA	0.3V	1A
DLM 40-75E	0-40	0-75	22 mV	75 mA	0.3V	0.7A
DLM 40-100E	0-40	0-100	22 mV	100 mA	0.3V	0.9A
DLM 60-50E	0-60	0-50	32 mV	50 mA	0.4V	0.5A
DLM 60-66E	0-60	0-66	32 mV	66 mA	0.4V	0.6A
DLM 80-37E	0-80	0-37	42 mV	37 mA	0.5V	0.4A
DLM 80-50E	0-80	0-50	42 mV	50 mA	0.5V	0.5A
DLM 150-20E	0-150	0-20	77 mV	20 mA	0.9V	0.3A
DLM 150-26E	0-150	0-26	77 mV	26 mA	0.9V	0.3A
DLM 300-10E	0-300	0-10	152 mV	10 mA	3V	0.09A
DLM 300-13E	0-300	0-13	152 mV	13 mA	3V	0.11A
DLM 600-5E	0-600	0-5	302 mV	5 mA	4V	0.05A
DLM 600-6.6E	0-600	0-6.6	302 mV	7 mA	4V	0.06A

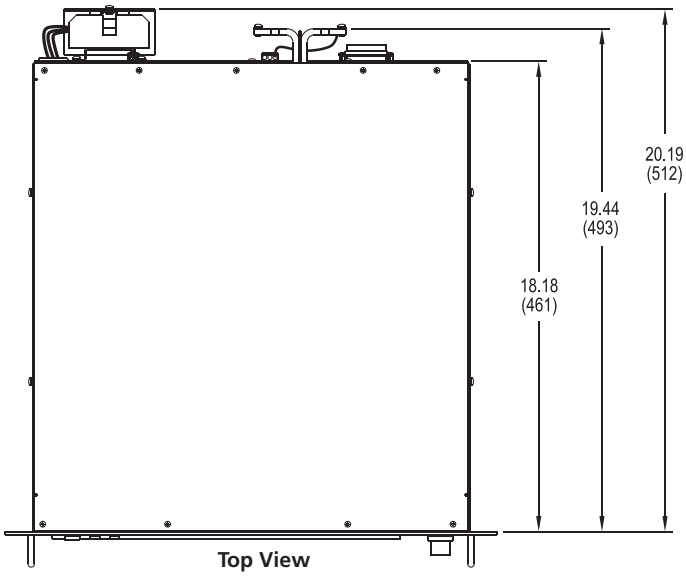
* 22V Model available as 4kW

DLM 3 & 4 kW Series : Product Specifications

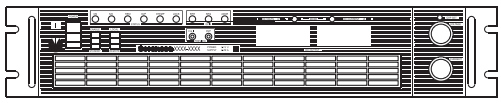
Model	Preview Accuracy		OVP Adjustment Range (6% to 110% Vmax)	Ripple & Noise		Stability		Temp Coefficient		Maximum Total Remote Sense Drop
	Voltage (05% of Vmax +1 count)	Current (1.0% of Imax +1 count)		Ripple (rms)*	Noise (p-p)	Voltage (0.05% of Vmax)	Current (0.05% of Imax)	Voltage (0.02% C of Vmax)	Current (0.03% C of Imax)	
DLM 5-350E	0.04V	5A	0.3-5.5V	12 mV	100 mV	3 mV	175 mA	1 mV	105 mA	2V
DLM 5-450E	0.04V	6A	0.3-5.5V	12 mV	100 mV	3 mV	225 mA	1 mV	135 mA	2V
DLM 8-350E	0.05V	5A	0.4-8.8V	12 mV	100 mV	4 mV	175 mA	1.6 mV	105 mA	2V
DLM 8-450E	0.05V	6A	0.4-8.8V	12 mV	100 mV	4 mV	225 mA	1.6 mV	135 mA	2V
DLM 16-185E	0.09V	3A	0.8-17.6V	10 mV	100 mV	8 mV	93 mA	3.2 mV	55 mA	2V
DLM 16-250E	0.09V	4A	0.8-17.6V	10 mV	100 mV	8 mV	125 mA	3.2 mV	75 mA	2V
DLM 22-180E *	0.2V	3A	1.1-24.2V	10 mV	100 mV	11 mV	90 mA	4.4 mA	54 mA	2V
DLM 32-95E	0.3V	1.1A	1.6-35V	10 mV	100 mV	16 mV	48 mA	6 mV	30 mA	5V
DLM 32-125E	0.3V	1.4A	1.6-35V	10 mV	100 mV	16 mV	63 mA	6 mV	38 mA	5V
DLM 40-75E	0.3V	0.9A	2-44V	10 mV	100 mV	20 mV	38 mA	8 mV	23 mA	5V
DLM 40-100E	0.3V	1.1A	2-44V	10 mV	100 mV	20 mV	50 mA	8 mV	30 mA	5V
DLM 60-50E	0.4V	0.6A	3-66V	15 mV	100 mV	30 mV	25 mA	12 mV	15 mA	5V
DLM 60-66E	0.4V	0.8A	3-66V	15 mV	100 mV	30 mV	33 mA	12 mV	19.8 mA	5V
DLM 80-37E	0.5V	0.5A	4-88V	15 mV	120 mV	40 mV	19 mA	16 mV	12 mA	5V
DLM 80-50E	0.5V	0.6A	4-88V	15 mV	120 mV	40 mV	25 mA	16 mV	15 mA	5V
DLM 150-20E	0.9V	0.3A	7.5-165V	30 mV	200 mV	75 mV	10 mA	30 mV	6 mA	5V
DLM 150-26E	0.9V	0.4A	7.5-165V	30 mV	200 mV	75 mV	13 mA	30 mV	7.8 mA	5V
DLM 300-10E	1.6V	0.11A	15-330V	60 mV	300 mV	150 mV	5 mA	60 mV	3 mA	5V
DLM 300-13E	1.6V	0.14A	15-330V	60 mV	300 mV	150 mV	6.5 mA	60 mV	3.9 mA	5V
DLM 600-5E	3.1V	0.06A	30-660V	100 mV	500 mV	300 mV	2.5 mA	120 mV	1.5 mA	5V
DLM 600-6.6E	3.1V	0.08A	30-660V	100 mV	500 mV	300 mV	3.3 mA	120 mV	2.0 mA	5V

J3 Connector			
1	Remote Output Enable	14	Remote Shutdown Input (+). Positive or negative true logic selection with S1
2	Remote Shutdown Return (-)	15	+5 VDC Auxiliary Output
3	Remote OVP Programming Input	16	1 mA Current Source for OVP Programming
4	Remote Programming Indicator	17	OVP Status Indicator
5	Operating Mode Indicator	18	Over temperature Shutdown Indicator
6	Status Indicator Return (-)	19	DC Voltage Monitor Output
7	Current Monitor Output	20	Remote /Local Voltage Control Select
8	Not Used	21	1 mA Current Source for Voltage Programming
9	Voltage Programming Input	22	1 mA Current Source for Current Programming
10	Current Programming Input	23	Remote/Local Current Control Select
11	Not Used	24	Not Used
12	Programming/Monitor Return (-)	25	Not Used
13	Not Used		

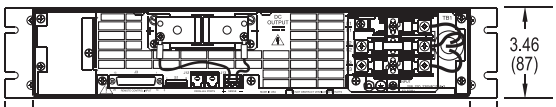
* 22V Model available as 4kW



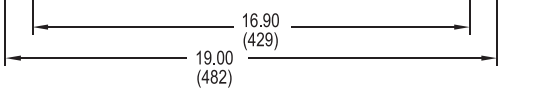
Top View



Front View



Rear View



Dimensions in inches (millimeters)

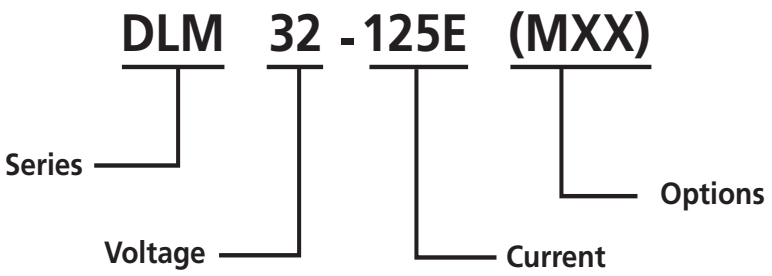
Input Connections
Compression lug terminals
#6 AWG max wire size

Chassis Ground Connection
#10-32 threaded stud

Output Connections
5V to 80V
Copper bus bars, nickel plated
Holes in bus bar 0.312 (7.92)
150V to 600V
Terminal block with #8-32 screws

DLM 3 & 4 kW Series

Model Number Description



Options and Accessories

M1	345-455 VAC, 47-63 Hz, three phase, 3 wire plus ground, Delta or WYE may be used (4 kW only)
M2	432-528 VAC, 47-63 Hz, three phase, 3 wire plus ground, Delta or WYE may be used (4 kW only)
M9E	SCPI compatible IEEE-488.2 and RS-232 interfaces (May not be combined with M51A or M85)
M13	Locking shafts (front panel potentiometers)
M51A	Isolated analog programming (May not be combined with M9C or M85). This isolation allows users to control power supplies not connected to a common ground. In addition, in systems with high ambient noise or with large ground loop currents the control ground can be isolated from the power ground eliminating problems.
M85	12-bit slave interface (May not be combined with M9E or M51A)
5361969-01	Paralleling Cable; one cable per slave unit
105-300-26	Rack slide kit