

Sorensen DLM 3 & 4 kW Series

3–4 kW

DC Power Supply

5–600 V

- 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



5–450 A

~

208

230

⚡

208

400

480

↔ GPIB RS232

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

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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) | |

DLM 3 & 4 kW Series : Product Specifications

3–4 kW

| 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

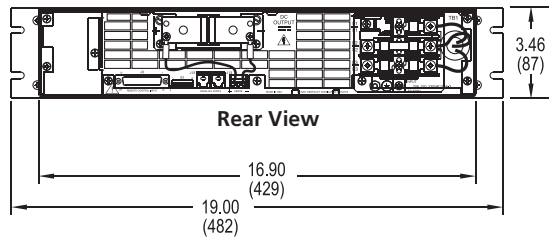
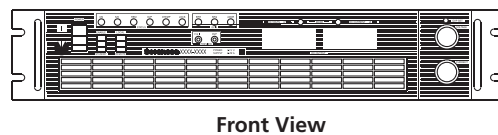
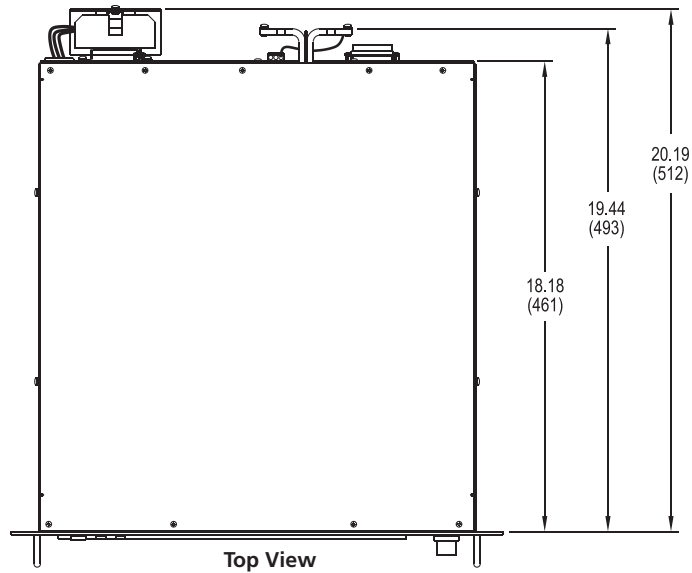
DLM 3 & 4 kW Series : Product Specifications

| Model | Preview Accuracy | | OVP Adjustment Range (6% to 110% Vmax) | Ripple & Noise | | Stability | | Temp Coefficient | | Maximum Total Remote Sense Drop |
|---------------|---------------------------------|---------------------------------|--|----------------|-------------|-------------------------|-------------------------|---------------------------|---------------------------|---------------------------------|
| | Voltage (0.5% 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



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)

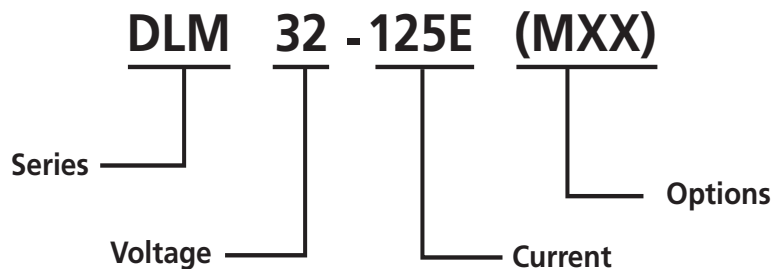
150V to 600V

Terminal block with #8-32 screws

Dimensions in inches (millimeters)

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 |