

# Sorensen DLM 600 Series

375–600 W

## Half Rack Programmable DC Power Supply

5–300 V

- High Power Density: 600 watts in 1U (1.75 inches) high, half rack (8.5 inches) wide; no top or bottom clearance spacing required.
- Near Linear Ripple & Noise Ripple as low as 2.5mV rms, noise as low as 15mV p-p.
- Remote Control
- LXI Compliant Ethernet LAN / RS-232C (16 bit)
- IEEE-488.2 / RS-232C (12 bit)
- Standard analog programming 0-5V, 0-10V, or 0-5kΩ.



2–75 A



110

220



The Sorensen DLM 600 series of programmable power supplies is designed to provide continuously variable output voltage and current for a broad range of applications in a compact 1U (1.75 inches) high, half-rack (8.5 inch) wide chassis.

With the use of Zero Voltage Switching (ZVS) technology, these supplies are able to achieve exceptionally low ripple and noise rivaling larger and more expensive linear power supplies. In addition, the high efficiency and fast load transient response assure that the DLM 600 is ideal for even the most demanding applications.

The DLM 600 models are ideal for high density multiple output rackmount requirements or low profile benchtop applications. Output voltages from 0-5VDC to 0-300VDC and currents from 0-2A to 0-75A are available.

The cooling air intake is at the front and sides with exhaust at the rear and sides. Variable speed fans are controlled as a function of ambient air temperature and load, thus reducing acoustic noise and increasing fan life. This allows supplies to be stacked one directly on top of another without space in between, yielding maximum rackmount packing density and a wide operating temperature of 0-50° C. An optional rackmount kit is available to easily mount one or two units side-by-side.

The front panel layout makes the DLM 600 series easy to use. Voltage and current can be set from individual 10-turn potentiometer knobs. Control push buttons include power on, output on, local/remote, voltage/current preview and overvoltage protection preview. Set-point or actual voltage/ current values can be viewed on two 3 ½digit LED displays.

Supplies can be connected in series or parallel. All models automatically accept any standard single phase input without manual set up.

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**AMETEK**<sup>®</sup>  
**PROGRAMMABLE POWER**

# DLM 600 Series : Product Specifications

| Common                  |   |
|-------------------------|---|
| 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 <1V on DLM5-75 and DLM8-75, <2V for all other DLM600 models |
| Remote Programming      | Voltage, current (0-100%) and OVP (5-110%) of full scale can be programmed by selectable 0-5VDC, 0-10VDC, or 0-5kΩ  |
| Remote Monitoring       | Voltage or current can be monitored with user selectable ranges, scaled to 0-5 VDC or 0-10 VDC  |
| Operational Features    | Master/slave parallel operation, up to 4 units of the same model can be connected in parallel, with active current sharing control. Series operation, multiple units of the same model can be connected in series, limited by 300Vpk between either output terminal and chassis.  |
| Software                | IVI-COM, LabVIEW® or LabWindow®/CVI driver for Ethernet and IEEE-488.2  |
| Regulatory Compliance   | CE Compliant: <ul style="list-style-type: none"> <li>• Low Voltage Directive (73/23/EEC) using EN 61010-1, and</li> <li>• EMC Directive (89/336/EEC) using EN 61326 Certified to UL 61010-1, CSA C22.2 No. 61010.1 and IEC/EN 61010-1</li> </ul>  |
| Input                   |   |
| Voltage and Frequency   | 90-132 VAC or 180-264 VAC max, auto ranging, 47-63 Hz, single phase, 2-wire plus ground   |
| Current                 | 11A maximum at 115VAC, 6A maximum at 230 VAC  |
| Connector               | IEC 320 with detachable line cord   |
| Power Factor            | 0.6, typical at full load; dependent on the impedance of the AC input.  |
| Output                  |   |
| Line Regulation         | Voltage: 0.005% of V max + 2 mV<br>Current: 0.01% of I max + 2 mA<br>See table for input voltage variation over the AC input voltage range, with constant rated load.   |
| Load Regulation         | Voltage: 0.005% of V max + 2 mV<br>Current: 0.02% of I max + 5 mA<br>See table For 0-100% load variation, with constant nominal line voltage  |
| Transient Response      | 500 μs to steady-state output voltage (within 0.1% of Vmax) for 50-100% or 100-50% load change  |
| Stability               | ±0.05% of maximum voltage or current over 8 hours after 30 minute warm-up time at fixed line, load and temperature  |
| Efficiency              | 84% typical at maximum output power; 82% typical for DLM 5-75 and DLM 8-75  |
| Temperature Coefficient | 0.02%/°C of maximum output voltage, 0.03%/°C of maximum output current. Change in output per °C change in ambient temperature, with constant line and load.   |
| Environmental           |   |
| Operating Temperature   | 0°C to 50°C (no derating)   |
| Storage Temperature     | -40°C to 65°C   |
| Cooling                 | Internal variable speed fans with over temperature protection. Air intake is from the front and sides with exhaust at rear and sides for maximum rackmount packing density.   |
| Physical                |   |
| Dimensions              | Width: 8.5" (216 mm)<br>Height: 1U or 1.75" (44 mm)<br>Depth: 17" (432 mm) Option M6 depth 20" (508 mm)   |
| Weight                  | 9.7 lbs. (4.4 kg)   |
| Shipping Weight         | 12.7 lbs. (5.8 kg)  |

# DLM 600 Series : Product Specifications

# 375–600 W

| Model      | Output Ratings |               |               | Line Regulation                 |                                | Load Regulation                 |                                |
|------------|----------------|---------------|---------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|
|            | Voltage (VDC)  | Current (ADC) | Power (Watts) | Voltage (0.005% of Vmax + 2 mV) | Current (0.01% of Imax + 2 mA) | Voltage (0.005% of Vmax + 2 mV) | Current (0.02% of Imax + 5 mA) |
| DLM 5-75   | 0-5            | 0-75          | 375           | 2.4 mV                          | 9.5 mA                         | 2.4 mV                          | 20 mA                          |
| DLM 8-75   | 0-8            | 0-75          | 600           | 2.4 mV                          | 9.5 mA                         | 2.4 mV                          | 20 mA                          |
| DLM 10-60  | 0-10           | 0-60          | 600           | 2.5 mV                          | 8 mA                           | 2.5 mV                          | 17 mA                          |
| DLM 20-30  | 0-20           | 0-30          | 600           | 3 mV                            | 5 mA                           | 3 mV                            | 11 mA                          |
| DLM 40-15  | 0-40           | 0-15          | 600           | 4 mV                            | 3.5 mA                         | 4 mV                            | 8 mA                           |
| DLM 60-10  | 0-60           | 0-10          | 600           | 5 mV                            | 3 mA                           | 5 mV                            | 7 mA                           |
| DLM 80-7.5 | 0-80           | 0-7.5         | 600           | 6 mV                            | 2.8 mA                         | 6 mV                            | 6.5 mA                         |
| DLM 150-4  | 0-150          | 0-4           | 600           | 9.5 mV                          | 2.2 mA                         | 9.5 mV                          | 5.8 mA                         |
| DLM 300-2  | 0-300          | 0-2           | 600           | 17 mV                           | 2.1 mA                         | 17 mV                           | 5.4 mA                         |

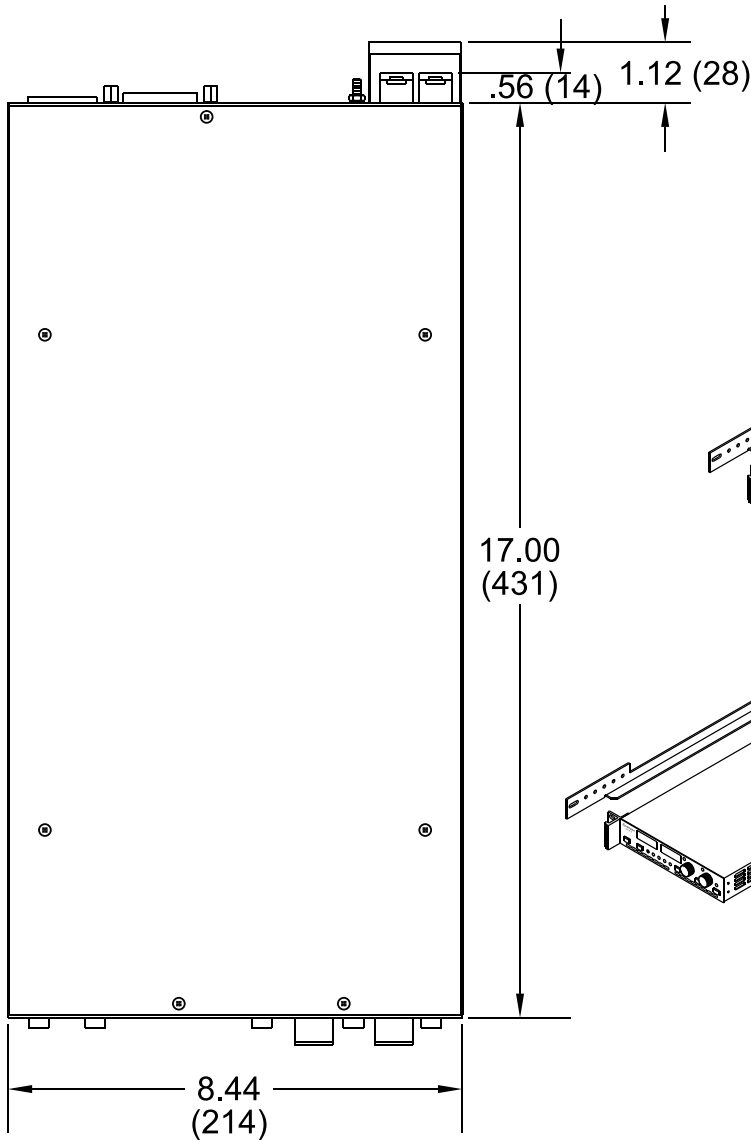
| Model      | Programming Accuracy <sup>‡</sup> |                         |                          |                        |                        |                          | Load Regulation                  |                                  |
|------------|-----------------------------------|-------------------------|--------------------------|------------------------|------------------------|--------------------------|----------------------------------|----------------------------------|
|            | Ethernet (M130/M131)              |                         |                          | GPIB (M9G/M85)         |                        |                          | Voltage (0.5% of Vmax + 1 count) | Current (1.0% of Imax + 1 count) |
|            | Voltage (0.1% of VMax)            | Current (0.25% of IMax) | OVP (0.5% of 1.1 x Vmax) | Voltage (0.2% of VMax) | Current (0.5% of IMax) | OVP (1.0% of 1.1 x Vmax) |                                  |                                  |
| DLM 5-75   | 8 mV                              | 188 mA                  | 44 mV                    | 16 mV                  | 375 mA                 | 55 mV                    | 35 mV                            | 850 mA                           |
| DLM 8-75   | 8 mV                              | 188 mA                  | 44 mV                    | 16 mV                  | 375 mA                 | 88 mV                    | 50 mV                            | 850 mA                           |
| DLM 10-60  | 10 mV                             | 150 mA                  | 55 mV                    | 20 mV                  | 300 mA                 | 110 mV                   | 60 mV                            | 700 mA                           |
| DLM 20-30  | 20 mV                             | 75 mA                   | 110 mV                   | 40 mV                  | 150 mA                 | 220 mV                   | 200 mV                           | 400 mA                           |
| DLM 40-15  | 40 mV                             | 38 mA                   | 220 mV                   | 80 mV                  | 75 mA                  | 440 mV                   | 300 mV                           | 160 mA                           |
| DLM 60-10  | 60 mV                             | 25 mA                   | 330 mV                   | 120 mV                 | 50 mA                  | 660 mV                   | 400 mV                           | 110 mA                           |
| DLM 80-7.5 | 80 mV                             | 19 mA                   | 440 mV                   | 160 mV                 | 38 mA                  | 880 mV                   | 500 mV                           | 85 mA                            |
| DLM 150-4  | 150 mV                            | 10 mA                   | 825 mV                   | 300 mV                 | 20 mA                  | 1.65 mV                  | 850 mV                           | 50 mA                            |
| DLM 300-2  | 300 mV                            | 5 mA                    | 1.65 V                   | 600 mV                 | 10 mA                  | 3.3 mV                   | 2.5 V                            | 30 mA                            |

<sup>‡</sup> Readback accuracy is the same as programming accuracy for all parameters except GPIB Voltage readback which is 0.25% of VMax

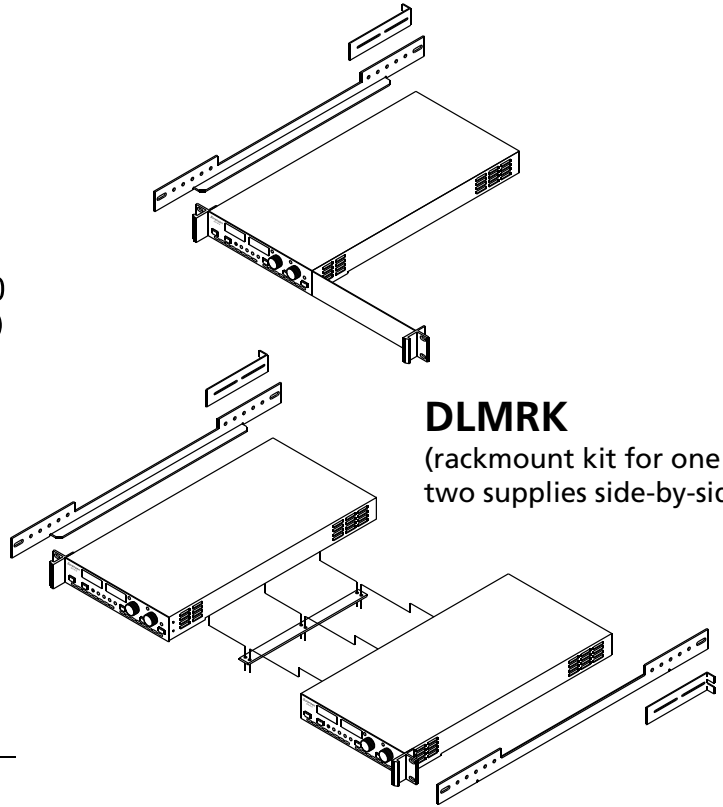
| Model      | Ripple and Noise, Voltage Mode |              | OVP Adjustment Range (5% - 110% of Vmax) | Stability               |                         | Temperature Coefficient    |                            | Maximum Total Remote Sense Drop |
|------------|--------------------------------|--------------|--|-------------------------|-------------------------|----------------------------|----------------------------|---------------------------------|
|            | 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 5-75   | 5 mV                           | 30 mV        | 0.25-5.5 V                               | 2.5 mV                  | 37.5 mA                 | 1 mV/°C                    | 22.5 mA/°C                 | 1 V                             |
| DLM 8-75   | 5 mV                           | 30 mV        | 0.4-8.8 V                                | 4 mV                    | 37.5 mA                 | 1.6 mV/°C                  | 22.5 mA/°C                 | 1 V                             |
| DLM 10-60  | 5 mV                           | 30 mV        | 0.5-11 V                                 | 5 mV                    | 30 mA                   | 2 mV/°C                    | 18 mA/°C                   | 2 V                             |
| DLM 20-30  | 2.5 mV                         | 15 mV        | 1-22 V                                   | 10 mV                   | 15 mA                   | 4 mV/°C                    | 9 mA/°C                    | 2 V                             |
| DLM 40-15  | 2.5 mV                         | 15 mV        | 2-44 V                                   | 20 mV                   | 7.5 mA                  | 8 mV/°C                    | 4.5 mA/°C                  | 2 V                             |
| DLM 60-10  | 2.5 mV                         | 20 mV        | 3-66 V                                   | 30 mV                   | 5 mA                    | 12 mV/°C                   | 3 mA/°C                    | 2 V                             |
| DLM 80-7.5 | 4 mV                           | 20 mV        | 4-88 V                                   | 40 mV                   | 3.8 mA                  | 16 mV/°C                   | 2.25 mA/°C                 | 2 V                             |
| DLM 150-4  | 7 mV                           | 40 mV        | 7.5-165 V                                | 75 mV                   | 2 mA                    | 30 mV/°C                   | 1.2 mA/°C                  | 2 V                             |
| DLM 300-2  | 10 mV                          | 60 mV        | 15-330 V                                 | 150 mV                  | 1 mA                    | 60 mV/°C                   | 0.6 mA/°C                  | 2 V                             |

\* rms noise typical from 20 Hz to 20 MHz  
Specifications subject to change

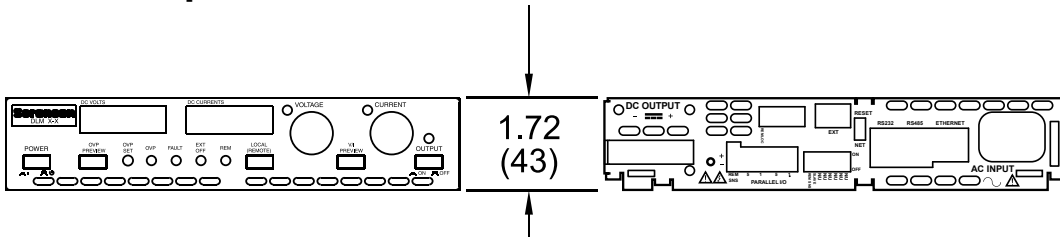
# DLM 600 Series : Product Diagram



**Top View**



**DLMRK**  
(rackmount kit for one or two supplies side-by-side)



**Front View**

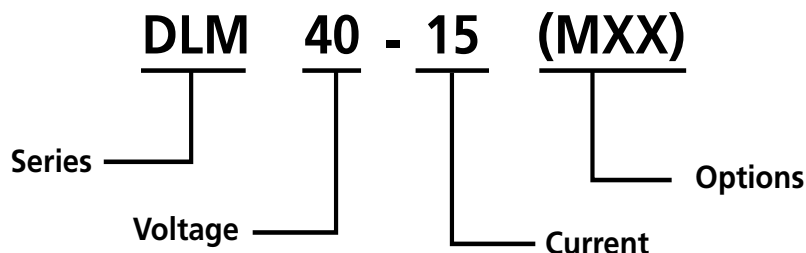
**Rear View**

Dimensions in inches (millimeters)

\*80V, 150V and 300V models have two position terminal blocks for the output

\*\*M6 Options 20" (508 MM).

## Model Number Description



## Voltage and Current Ranges

| Model      | Voltage | Current |
|------------|---------|---------|
| DLM 5-75   | 0-5 V   | 0-75 A  |
| DLM 8-75   | 0-8 V   | 0-75 A  |
| DLM 10-60  | 0-10 V  | 0-60 A  |
| DLM 20-30  | 0-20 V  | 0-30 A  |
| DLM 40-15  | 0-40 V  | 0-15 A  |
| DLM 60-10  | 0-60 V  | 0-10 A  |
| DLM 80-7.5 | 0-80 V  | 0-7.5 A |
| DLM 150-4  | 0-150 V | 0-4 A   |
| DLM 300-2  | 0-300 V | 0-2 A   |

## Options and Accessories

|       |   |
|-------|---|
| M130  | Ethernet/LAN Option (16 bit) <ul style="list-style-type: none"> <li>• LXI Class C Compliant</li> <li>• 10/100 base-T</li> <li>• TCP/IP Protocol</li> <li>• ICMP (Ping Server)</li> <li>• Web Server: Direct control of power supply via standard web browser.</li> </ul> RS-232C Interface                      |
| M6    | Disconnect & Polarity reversal relays (10V to 300V models only. This option requires one of the following options: M9G, M85, M130 or M131) Output disconnect and polarity reversal relays controlled via SCPI commands. An SPST relay is in line with each output lead.   |
| M9G   | IEEE-488.2 and RS-232C Interfaces   |
| M13   | Locking shafts (front panel potentiometers)   |
| M51A  | Optically Isolated Analog Programming and Monitoring. 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   | Multichannel Slave Interface  |
| M131  | Multichannel Slave Interface (16 bit) (M130 Master ONLY)  |
| DLMP1 | Paralleling Cable; one cable per slave unit   |
| DLMRK | Rackmount Kit for single DLM with filler panel and for two units mounted side-by-side   |

# DLM 600 Series

## J1 Connector

|    |                                |    |                                       |
|----|--------------------------------|----|---------------------------------------|
| 1  | ANALOG-CONTROL Input           | 14 | EXTERNAL-OFF Input (+)                |
| 2  | EXTERNAL-OFF Return            | 15 | Auxiliary 5 VDC Output (+)            |
| 3  | OVP Programming Input          | 16 | OVP Resistance Programming Output     |
| 4  | REMOTE-CONTROL Status Output   | 17 | OVP Resistance Programming Return     |
| 5  | VOLTAGE-MODE Status Output     | 18 | FAULT Status Output                   |
| 6  | Auxiliary 5 VDC Return         | 19 | Voltage Monitor Output                |
| 7  | Current Monitor Output         | 20 | Voltage Resistance Programming Return |
| 8  | Voltage/Current Monitor Return | 21 | Voltage Resistance Programming Output |
| 9  | Voltage Programming Input      | 22 | Current Resistance Programming Output |
| 10 | Current Programming Input      | 23 | Current Resistance Programming Return |
| 11 | Not Used                       | 24 | LOCAL-LOCKOUT Input                   |
| 12 | V//OVP Programming Return      | 25 | OVP Status Output                     |
| 13 | Not Used                       |    |                                       |

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