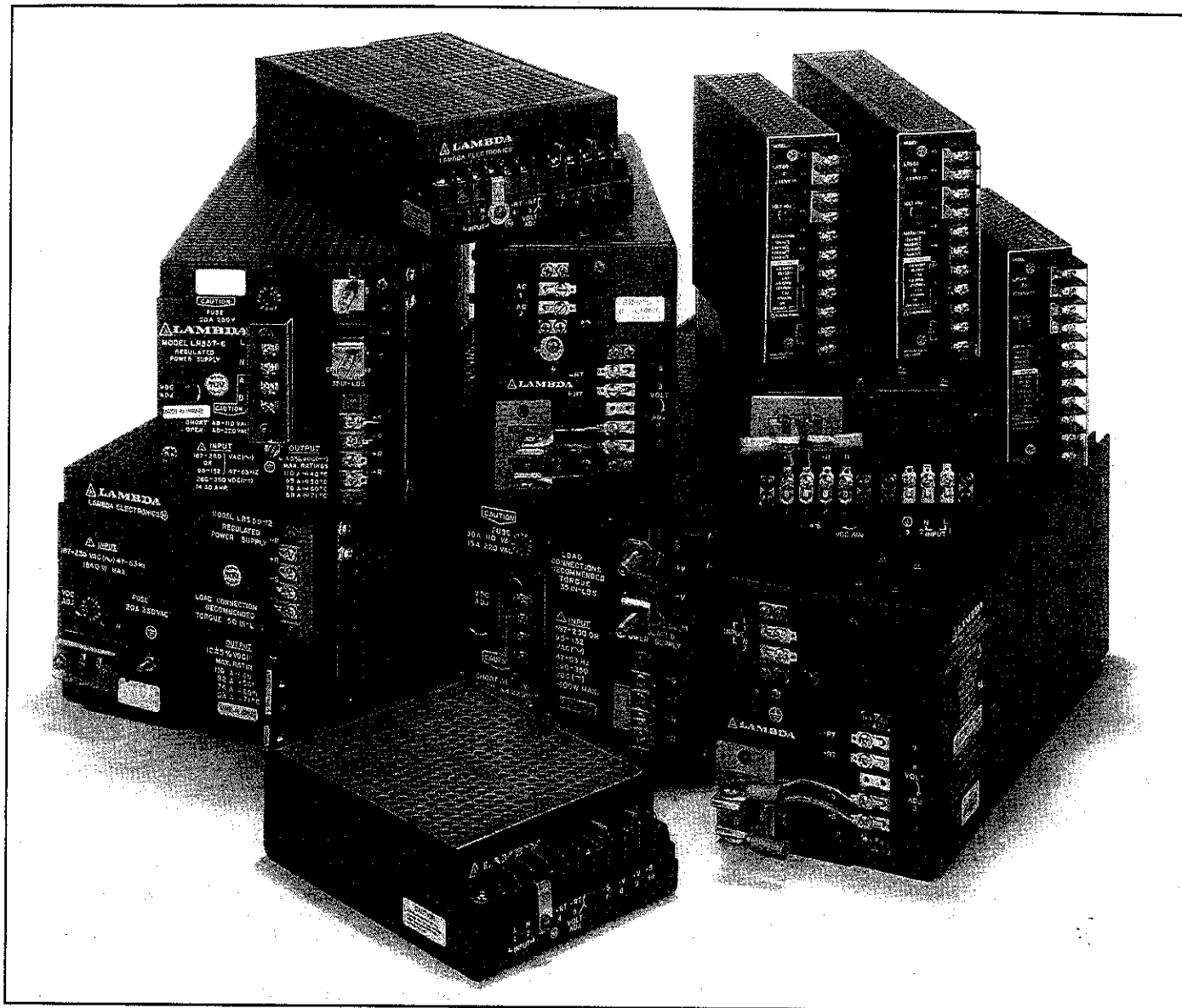


## PART 1A—AC-TO-DC SWITCHING POWER SUPPLIES

# LAMBDA'S MIL-ENVIRONMENT LR SERIES



## POWER SOLUTIONS FOR RUGGED, LOW NOISE ENVIRONMENTS

- Passed environmental tests in accordance with MIL-STD-810C.
  - Low Pressure — Method 500.1, Proc. I.
  - High Temperature — Method 501.1, Proc. I & II.
  - Low Temperature — Method 502.1, Proc. I.
  - Temperature Shock — Method 503.1, Proc. I.
  - Temperature Altitude — Method 504.1, Proc. I
  - Class 2 (–10°C operating).
  - Humidity — Method 507.1, Proc. I.
  - Fungus Proofing — Method 508.1, Proc. I.
  - Vibration — Method 514.2 Proc. X & XI.
  - Shock — Method 516.2, Proc. I & III.
  - Conducted Interference — MIL-STD-461A Notice 4 CE04.
- MIL-SPEC construction components, ratings and mounting methods rigidly specified by Lambda.
- 0.995 power factor and harmonic correction per IEC 555-2 when used in conjunction with Lambda's new PFHC-2600.
- Conducted EMI Conforms to FCC Docket 20780, Class A, MIL-STD-461A and VDE 0871 Class A.
- Up to 3.3W/in<sup>3</sup>.
- MRS Series DC output filter option reduces output ripple and noise to less than 4mV.
- Quality assurance procedure similar to MIL-I-45208, referenced to MIL-Q-9858A.
- Grade 1 design.

# PART IA—AC-TO-DC SWITCHING POWER SUPPLIES

## MIL-ENVIRONMENT SWITCHING SELECTOR GUIDE

### Fixed Voltage. Single Output.

| MAX CURRENT<br>AT OPERATING<br>TEMPERATURE OF |       |       |       | COMPLETE<br>ELEC.<br>SPEC.<br>PG. | COMPLETE<br>MECH.<br>SPEC.<br>PG. | DIMENSIONS<br>(inches)                                                                              | LAMBDA'S<br>CHOICE<br>(Δ)* | QTY.<br>1 | PRICE<br>QTY.<br>10 | QTY.<br>25 | MODEL     |
|-----------------------------------------------|-------|-------|-------|-----------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------|-----------|---------------------|------------|-----------|
| 40°C                                          | 50°C  | 60°C  | 71°C  |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 2V ±5% ADJ.                                   |       |       |       |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 4.0                                           | 3.2   | 2.4   | 2.0   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | \$ 182    | \$ 174              | \$ 166     | LRS-49-2  |
| 7.0                                           | 5.6   | 4.2   | 3.5   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-2  |
| 12.0                                          | 9.6   | 7.2   | 6.0   | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-2  |
| 15.0                                          | 13.7  | 11.1  | 5.9   | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 371       | 354                 | 340        | LRS-52-2  |
| 25.0                                          | 21.5  | 17.5  | 10.0  | 11                                | 150                               | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 506       | 482                 | 462        | LRS-53-2  |
| 40.0                                          | 34.0  | 27.5  | 19.5  | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 621       | 592                 | 568        | LRS-54-2  |
| 60.0                                          | 51.0  | 41.0  | 30.0  | 11                                | 151                               | 3¾ × 4 <sup>7</sup> / <sub>8</sub> × 10½                                                            | Δ                          | 788       | 752                 | 721        | LRS-55-2  |
| 90.0                                          | 77.0  | 61.0  | 45.0  | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 979       | 933                 | 895        | LRS-56-2  |
| 130.0                                         | 110.0 | 90.0  | 68.0  | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1283      | 1222                | 1173       | LRS-57-2  |
| 180.0                                         | 147.0 | 120.0 | 83.0  | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13⅞                                                            | Δ                          | 1552      | 1478                | 1419       | LRS-58-2  |
| 250.0                                         | 200.0 | 165.0 | 125.0 | 11                                | 151                               | 6⅝ × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>                               | Δ                          | 1890      | 1800                | 1728       | LRS-59-2  |
| 5V ±5% ADJ.                                   |       |       |       |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 4.0                                           | 3.2   | 2.4   | 2.0   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | 182       | 174                 | 166        | LRS-49-5  |
| 7.0                                           | 5.6   | 4.2   | 3.5   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-5  |
| 12.0                                          | 9.6   | 7.2   | 6.0   | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-5  |
| 15.0                                          | 13.7  | 11.1  | 5.9   | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 332       | 317                 | 303        | LRS-52-5  |
| 25.0                                          | 21.5  | 17.5  | 10.0  | 11                                | 150                               | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 452       | 431                 | 413        | LRS-53-5  |
| 40.0                                          | 34.0  | 27.5  | 19.5  | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 554       | 528                 | 506        | LRS-54-5  |
| 60.0                                          | 51.0  | 41.0  | 30.0  | 11                                | 151                               | 3¾ × 4 <sup>7</sup> / <sub>8</sub> × 10½                                                            | Δ                          | 706       | 672                 | 645        | LRS-55-5  |
| 90.0                                          | 77.0  | 61.0  | 45.0  | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 874       | 833                 | 800        | LRS-56-5  |
| 130.0                                         | 110.0 | 90.0  | 68.0  | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1145      | 1090                | 1047       | LRS-57-5  |
| 180.0                                         | 147.0 | 120.0 | 83.0  | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13⅞                                                            | Δ                          | 1386      | 1320                | 1267       | LRS-58-5  |
| 250.0                                         | 200.0 | 165.0 | 125.0 | 11                                | 151                               | 6⅝ × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>                               | Δ                          | 1686      | 1607                | 1542       | LRS-59-5  |
| 6V ±5% ADJ.                                   |       |       |       |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 3.3                                           | 2.6   | 2.0   | 1.7   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | 182       | 174                 | 166        | LRS-49-6  |
| 6.0                                           | 4.8   | 3.6   | 3.0   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-6  |
| 10.0                                          | 8.0   | 6.0   | 5.0   | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-6  |
| 13.5                                          | 12.2  | 9.9   | 5.2   | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 332       | 317                 | 303        | LRS-52-6  |
| 21.0                                          | 18.5  | 16.0  | 8.3   | 11                                | 150                               | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 452       | 431                 | 413        | LRS-53-6  |
| 35.0                                          | 31.0  | 24.0  | 17.0  | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 554       | 528                 | 506        | LRS-54-6  |
| 52.0                                          | 44.0  | 36.0  | 26.0  | 11                                | 151                               | 3¾ × 4 <sup>7</sup> / <sub>8</sub> × 10½                                                            | Δ                          | 706       | 672                 | 645        | LRS-55-6  |
| 80.0                                          | 69.0  | 54.0  | 39.0  | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 874       | 833                 | 800        | LRS-56-6  |
| 110.0                                         | 93.0  | 76.0  | 58.0  | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1145      | 1090                | 1047       | LRS-57-6  |
| 150.0                                         | 123.0 | 100.0 | 70.0  | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13⅞                                                            | Δ                          | 1386      | 1320                | 1267       | LRS-58-6  |
| 210.0                                         | 170.0 | 140.0 | 105.0 | 11                                | 151                               | 6⅝ × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>                               | Δ                          | 1686      | 1607                | 1542       | LRS-59-6  |
| 12V ±5% ADJ.                                  |       |       |       |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 1.7                                           | 1.4   | 1.0   | 0.9   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | 182       | 174                 | 166        | LRS-49-12 |
| 3.0                                           | 2.4   | 1.8   | 1.5   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-12 |
| 5.2                                           | 4.1   | 3.1   | 2.6   | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-12 |
| 7.8                                           | 6.8   | 4.9   | 2.3   | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 332       | 317                 | 303        | LRS-52-12 |
| 12.5                                          | 11.2  | 9.6   | 7.2   | 11                                | 150                               | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 452       | 431                 | 413        | LRS-53-12 |
| 22.0                                          | 18.5  | 15.0  | 10.0  | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 554       | 528                 | 506        | LRS-54-12 |
| 30.0                                          | 26.0  | 22.0  | 16.0  | 11                                | 151                               | 3¾ × 4 <sup>7</sup> / <sub>8</sub> × 10½                                                            | Δ                          | 706       | 672                 | 645        | LRS-55-12 |
| 47.0                                          | 41.0  | 34.0  | 21.9  | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 874       | 833                 | 800        | LRS-56-12 |
| 65.0                                          | 58.0  | 48.0  | 34.0  | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1145      | 1090                | 1047       | LRS-57-12 |
| 84.0                                          | 69.0  | 56.0  | 40.0  | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13⅞                                                            | Δ                          | 1386      | 1320                | 1267       | LRS-58-12 |
| 110.0                                         | 92.0  | 74.0  | 53.0  | 11                                | 151                               | 6⅝ × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>                               | Δ                          | 1686      | 1607                | 1542       | LRS-59-12 |
| 15V ±5% ADJ.                                  |       |       |       |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 1.4                                           | 1.1   | 0.8   | 0.7   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | 182       | 174                 | 166        | LRS-49-15 |
| 2.6                                           | 2.0   | 1.6   | 1.3   | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-15 |
| 4.2                                           | 3.3   | 2.5   | 2.1   | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-15 |
| 6.4                                           | 5.6   | 4.0   | 1.9   | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 332       | 317                 | 303        | LRS-52-15 |
| 10.0                                          | 9.0   | 7.7   | 5.8   | 11                                | 150                               | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 452       | 431                 | 413        | LRS-53-15 |
| 18.0                                          | 15.0  | 12.0  | 8.0   | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 554       | 528                 | 506        | LRS-54-15 |
| 25.0                                          | 22.0  | 19.0  | 13.0  | 11                                | 151                               | 3¾ × 4 <sup>7</sup> / <sub>8</sub> × 10½                                                            | Δ                          | 706       | 672                 | 645        | LRS-55-15 |
| 38.0                                          | 33.0  | 28.0  | 17.9  | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 874       | 833                 | 800        | LRS-56-15 |
| 52.0                                          | 46.0  | 38.0  | 27.0  | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1145      | 1090                | 1047       | LRS-57-15 |
| 68.0                                          | 56.0  | 45.5  | 32.0  | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13⅞                                                            | Δ                          | 1386      | 1320                | 1267       | LRS-58-15 |
| 90.0                                          | 75.0  | 60.0  | 43.0  | 11                                | 151                               | 6⅝ × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>                               | Δ                          | 1686      | 1607                | 1542       | LRS-59-15 |

\*LAMBDA'S RECOMMENDED CHOICE FOR NEW DESIGN REQUIREMENTS.

# PART IA — AC-TO-DC SWITCHING POWER SUPPLIES

## MIL-ENVIRONMENT SWITCHING SELECTOR GUIDE

### Fixed Voltage. Single Output.

| MAX CURRENT<br>AT OPERATING<br>TEMPERATURE OF |      |      |      | COMPLETE<br>ELEC.<br>SPEC.<br>PG. | COMPLETE<br>MECH.<br>SPEC.<br>PG. | DIMENSIONS<br>(inches)                                                                              | LAMBDA'S<br>CHOICE<br>(Δ)* | QTY.<br>1 | PRICE<br>QTY.<br>10 | QTY.<br>25 | MODEL     |
|-----------------------------------------------|------|------|------|-----------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------|-----------|---------------------|------------|-----------|
| 40°C                                          | 50°C | 60°C | 71°C |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 20V ± 5% ADJ.                                 |      |      |      |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 1.0                                           | 0.8  | 0.6  | 0.5  | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | \$ 182    | \$ 174              | \$ 166     | LRS-49-20 |
| 2.1                                           | 1.7  | 1.3  | 1.0  | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-20 |
| 3.5                                           | 2.8  | 2.1  | 1.7  | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-20 |
| 4.9                                           | 4.3  | 3.0  | 1.5  | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 332       | 317                 | 303        | LRS-52-20 |
| 7.7                                           | 6.9  | 5.9  | 4.5  | 11                                | 150                               | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 452       | 431                 | 413        | LRS-53-20 |
| 13.5                                          | 11.5 | 8.5  | 5.5  | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 554       | 528                 | 506        | LRS-54-20 |
| 19.0                                          | 16.5 | 14.0 | 10.0 | 11                                | 151                               | 3 <sup>3</sup> / <sub>4</sub> × 4 <sup>7</sup> / <sub>8</sub> × 10½                                 | Δ                          | 706       | 672                 | 645        | LRS-55-20 |
| 29.5                                          | 27.0 | 22.0 | 13.8 | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 874       | 833                 | 800        | LRS-56-20 |
| 40.0                                          | 36.0 | 30.0 | 21.0 | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1145      | 1090                | 1047       | LRS-57-20 |
| 52.0                                          | 43.0 | 35.0 | 24.5 | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13½                                                            | Δ                          | 1386      | 1320                | 1267       | LRS-58-20 |
| 70.0                                          | 58.0 | 46.0 | 33.0 | 11                                | 151                               | 6 <sup>5</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>    | Δ                          | 1686      | 1607                | 1542       | LRS-59-20 |
| 24V ± 5% ADJ.                                 |      |      |      |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 0.9                                           | 0.7  | 0.5  | 0.5  | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | 182       | 174                 | 166        | LRS-49-24 |
| 1.8                                           | 1.4  | 1.1  | 0.9  | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-24 |
| 3.0                                           | 2.4  | 1.8  | 1.5  | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-24 |
| 4.1                                           | 3.6  | 2.6  | 1.2  | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 332       | 317                 | 303        | LRS-52-24 |
| 6.5                                           | 5.8  | 5.0  | 3.8  | 11                                | 150                               | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 452       | 431                 | 413        | LRS-53-24 |
| 11.5                                          | 9.5  | 7.5  | 4.5  | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 554       | 528                 | 506        | LRS-54-24 |
| 16.0                                          | 14.0 | 12.0 | 8.0  | 11                                | 151                               | 3 <sup>3</sup> / <sub>4</sub> × 4 <sup>7</sup> / <sub>8</sub> × 10½                                 | Δ                          | 706       | 672                 | 645        | LRS-55-24 |
| 25.0                                          | 22.5 | 18.5 | 11.6 | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 874       | 833                 | 800        | LRS-56-24 |
| 33.5                                          | 29.0 | 24.0 | 17.0 | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1145      | 1090                | 1047       | LRS-57-24 |
| 44.0                                          | 36.0 | 29.5 | 20.5 | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13½                                                            | Δ                          | 1386      | 1320                | 1267       | LRS-58-24 |
| 60.0                                          | 50.0 | 40.0 | 28.0 | 11                                | 151                               | 6 <sup>5</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>    | Δ                          | 1686      | 1607                | 1542       | LRS-59-24 |
| 28V ± 5% ADJ.                                 |      |      |      |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 0.7                                           | 0.6  | 0.4  | 0.4  | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | 182       | 174                 | 166        | LRS-49-28 |
| 1.6                                           | 1.3  | 1.0  | 0.8  | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-28 |
| 2.5                                           | 2.0  | 1.5  | 1.2  | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-28 |
| 3.5                                           | 3.1  | 2.2  | 1.1  | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 332       | 317                 | 303        | LRS-52-28 |
| 5.7                                           | 5.1  | 4.4  | 3.3  | 11                                | 150                               | 2 <sup>5</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 452       | 431                 | 413        | LRS-53-28 |
| 9.5                                           | 8.5  | 6.5  | 4.0  | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 554       | 528                 | 506        | LRS-54-28 |
| 14.0                                          | 12.0 | 10.0 | 7.0  | 11                                | 151                               | 3 <sup>3</sup> / <sub>4</sub> × 4 <sup>7</sup> / <sub>8</sub> × 10½                                 | Δ                          | 706       | 672                 | 645        | LRS-55-28 |
| 22.0                                          | 20.0 | 16.0 | 10.0 | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 874       | 833                 | 800        | LRS-56-28 |
| 29.0                                          | 25.5 | 21.0 | 15.0 | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1145      | 1090                | 1047       | LRS-57-28 |
| 38.0                                          | 31.0 | 25.5 | 17.5 | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13½                                                            | Δ                          | 1386      | 1320                | 1267       | LRS-58-28 |
| 52.0                                          | 43.0 | 34.0 | 24.0 | 11                                | 151                               | 6 <sup>5</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>    | Δ                          | 1686      | 1607                | 1542       | LRS-59-28 |
| 48V ± 5% ADJ.                                 |      |      |      |                                   |                                   |                                                                                                     |                            |           |                     |            |           |
| 0.4                                           | 0.3  | 0.2  | 0.2  | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>                              | Δ                          | 182       | 174                 | 166        | LRS-49-48 |
| 0.9                                           | 0.7  | 0.5  | 0.4  | 11                                | 149                               | 1½ × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>                              | Δ                          | 229       | 219                 | 209        | LRS-50-48 |
| 1.5                                           | 1.2  | 0.9  | 0.7  | 11                                | 149                               | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> | Δ                          | 290       | 276                 | 265        | LRS-51-48 |
| 2.0                                           | 1.7  | 1.2  | 0.6  | 11                                | 150                               | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6¼                                                              | Δ                          | 332       | 317                 | 303        | LRS-52-48 |
| 3.3                                           | 2.8  | 2.4  | 1.8  | 11                                | 150                               | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8½                                  | Δ                          | 452       | 431                 | 433        | LRS-53-48 |
| 5.8                                           | 5.1  | 3.6  | 2.3  | 11                                | 150                               | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              | Δ                          | 554       | 528                 | 506        | LRS-54-48 |
| 8.2                                           | 7.2  | 6.2  | 4.2  | 11                                | 151                               | 3 <sup>3</sup> / <sub>4</sub> × 4 <sup>7</sup> / <sub>8</sub> × 10½                                 | Δ                          | 706       | 672                 | 645        | LRS-55-48 |
| 13.0                                          | 12.0 | 9.5  | 6.0  | 11                                | 151                               | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11½                                | Δ                          | 874       | 833                 | 800        | LRS-56-48 |
| 17.5                                          | 15.5 | 12.5 | 9.0  | 11                                | 151                               | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              | Δ                          | 1145      | 1090                | 1047       | LRS-57-48 |
| 22.5                                          | 18.5 | 15.0 | 10.5 | 11                                | 151                               | 5½ × 4 <sup>7</sup> / <sub>8</sub> × 13½                                                            | Δ                          | 1386      | 1320                | 1267       | LRS-58-48 |
| 31.0                                          | 26.0 | 21.0 | 15.0 | 11                                | 151                               | 6 <sup>5</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>    | Δ                          | 1686      | 1607                | 1547       | LRS-59-48 |

\*LAMBDA'S RECOMMENDED CHOICE FOR NEW DESIGN REQUIREMENTS.

# PART IA—AC-TO-DC SWITCHING POWER SUPPLIES

## LAMBDA'S MIL-ENVIRONMENT LR SERIES

### DC OUTPUT

Voltage range shown in tables.

#### REGULATED VOLTAGE

regulation, line ..... 0.1% from 95 to 132VAC, 95 to 132VAC or 187 to 265VAC on LRS-49, 50, 51, 57, 58 and "M" option models. 187 to 265VAC on LRS-59 and "V" option models.

regulation, load ..... 0.1% from no load to full load.

ripple and noise  
(20MHz Bandwidth) ..... 10mV RMS, 35mV pk-pk for 2V models of LRS-49, 50, 51 and all 5V and 6V models. (25mV pk-pk for all other 2V models).  
15mV RMS, 100mV pk-pk for 12V through 28V models.  
35mV RMS, 150mV pk-pk for 48V models.

temperature  
coefficient ..... 0.03%/°C.

remote programming  
resistance ..... 1000Ω/volt.

remote programming  
voltage ..... volt per volt.

#### AC INPUT

line ..... 95 to 132VAC, 47-440Hz.  
95 to 132VAC or 187 to 265VAC (user selectable), 47-440Hz on LRS-49, 50, 51, 57, 58.  
85 to 132/170 to 265 VAC, 47-440Hz on "M" option models.  
187 to 265VAC, 47-440Hz on LRS-59 only.

power ..... LRS-49: 30 watts maximum.  
LRS-50: 51.5 watts maximum.  
LRS-51: 96 watts maximum.  
LRS-52: 137 watts maximum.  
LRS-53: 225 watts maximum.  
LRS-54: 380 watts maximum.  
LRS-55: 515 watts maximum.  
LRS-56: 819 watts maximum.  
LRS-57: 1100 watts maximum.  
LRS-58: 1350 watts maximum.  
LRS-59: 1900 watts maximum.

#### DC INPUT

145VDC  $\pm$  10%. (260 to 370VDC for LRS-49, 50, 51, 57, 58, 59 and "M" and "V" option models.)

#### EFFICIENCY

50% min for 2V model of LRS-49. 55% min for all other 2V models. 65% min for 5V and 6V models of LRS-49. 67% min. for 5V and 6V models of LRS-52. 66% min for 12V and 15V models of LRS-49. 68% min for 5V and 6V models of LRS-50. 70% min for 5V through 15V models of LRS-53, 54; 12V and 15V models of LRS-50; 20V through 48V models of LRS-49. 73% min on 5V and 6V models of LRS-51; 20V through 48V models of LRS-50. 75% min for 5V and 6V models of LRS-55, 56; 5V through 15V models of LRS-57, 58, 59; 12V and 15V models of LRS-51; 12V through 20V models of LRS-52; 20V through 48V models of LRS-53, 54. 77% min for 12V through 20V models of LRS-55, 56. 78% min for 20V through 48V models of LRS-51; 24V through 48V models of LRS-52. 80% min for 20V through 48V models of LRS-57, 58, 59; 24V through 48V models of LRS-55, 56.

#### OVERSHOOT

No overshoot at turn-on, turn-off or power failure.

#### OPERATING TEMPERATURE RANGE

Continuous duty -10°C to +71°C with suitable derating above 40°C. Guaranteed turn-on at -20°C.

#### STORAGE TEMPERATURE RANGE

-55°C to +85°C.

#### OVERLOAD PROTECTION

##### ELECTRICAL

External overload protection, automatic electronic current limiting circuit limits the output current to a preset value, thereby providing protection for the load as well as the power supply.

##### THERMAL

Self-resetting thermostat.

##### FUSING

Line fuse removes the power supply from the line if a short occurs in the input circuitry.

#### OVERVOLTAGE PROTECTION

Overvoltage protection is standard on all models. If output voltage increases above a preset level, inverter drive is removed.

#### COOLING

All units are convection cooled. No fans or blowers are needed.

#### IN-RUSH LIMITING

The turn-on in-rush current will not exceed 40 amps peak from a cold start. (13 amps on LRS-49, 50. 19 amps on LRS-51. 50 amps on LRS-57, 58, 59.)

#### DC OUTPUT CONTROLS

Simple screwdriver adjustment over the entire voltage range.

### INPUT AND OUTPUT CONNECTIONS

All input, output, sensing, and remote on/off connections for LRS-49, 50, 51, 52 and LRS-53 are made through barrier strip terminals. All input, sensing and remote on/off connections for LRS-54, LRS-55, LRS-56, LRS-57, LRS-58 and LRS-59 are made through barrier strip terminals. DC output connection is made through heavy duty threaded bus bars.

#### MOUNTING

Two mounting surfaces and two mounting positions on LRS-52, 53, 54. One mounting surface and one mounting position on LRS-49, 50, 51, 55, 56, 57, 58, 59.

#### POWER FAILURE

2V, 5V and 6V models will remain within regulation limits for at least 16.7 msec. after loss of AC power when operating at full load,  $V_o$  max, and 105VAC input at 60Hz. (105 or 210VAC for LRS-49, 50, 51, 57, 58 and "M" option models. 210VAC at 60Hz for LRS-59.)

#### REMOTE SENSING

Provision is made for remote sensing to eliminate the effects of power output lead resistance on DC regulation.

#### REMOTE TURN-ON/TURN-OFF

Provision is made for digitally controlled remote turn-on, turn-off (TTL Compatible).

#### FUNGUS PROOFING

All units are inherently fungi inert.

#### MILITARY SPECIFICATIONS

The LR Series is built in Lambda factories to quality and inspection procedures which are similar to MIL-I-45208. The LRS-49, 50 and 51 are pending approval of environmental testing. The remainder of the series has passed environmental testing in accordance with MIL-STD-810C.

- 1) Low Pressure—Method 500.1, Procedure I.
- 2) High Temperature—Method 501.1, Procedures I and II.
- 3) Low Temperature—Method 502.1, Procedure I.
- 4) Temperature Shock—Method 503.1, Procedure I.
- 5) Temperature-Altitude—Method 504.1, Procedure I.  
Class 2 (-10°C Operating).
- 6) Humidity—Method 507.1, Procedure I.
- 7) Fungus—Method 508.1, Procedure I.
- 8) Vibration—Method 514.2, Procedures X and XI.
- 9) Shock—Method 516.2, Procedures I and III.

#### EMI

Conducted EMI conforms to FCC Docket 20780 Class A, and MIL-STD-461A Notice 4 CEO4 for power leads. LRS-57, LRS-58, LRS-59, and "M" and "V" option models also conform to VDE 0871 Class A.

#### PHYSICAL DATA

| Package Model | Lbs. Net                       | Lbs. Ship                     | Size Inches                                                                                         |
|---------------|--------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------|
| LRS-49        | 1 <sup>3</sup> / <sub>8</sub>  | 2 <sup>3</sup> / <sub>8</sub> | 1 <sup>1</sup> / <sub>2</sub> × 4 <sup>17</sup> / <sub>32</sub> × 4 <sup>23</sup> / <sub>32</sub>   |
| LRS-50        | 1 <sup>1</sup> / <sub>2</sub>  | 2 <sup>1</sup> / <sub>2</sub> | 1 <sup>1</sup> / <sub>2</sub> × 4 <sup>17</sup> / <sub>32</sub> × 5 <sup>15</sup> / <sub>32</sub>   |
| LRS-51        | 2                              | 3                             | 1 <sup>11</sup> / <sub>16</sub> × 4 <sup>17</sup> / <sub>32</sub> × 7 <sup>13</sup> / <sub>64</sub> |
| LRS-52        | 2 <sup>1</sup> / <sub>4</sub>  | 3 <sup>1</sup> / <sub>4</sub> | 2 × 4 <sup>7</sup> / <sub>8</sub> × 6 <sup>1</sup> / <sub>4</sub>                                   |
| LRS-53        | 3 <sup>1</sup> / <sub>4</sub>  | 4 <sup>1</sup> / <sub>4</sub> | 2 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 8 <sup>1</sup> / <sub>2</sub>       |
| LRS-54        | 6 <sup>1</sup> / <sub>2</sub>  | 7 <sup>1</sup> / <sub>2</sub> | 3 × 4 <sup>7</sup> / <sub>8</sub> × 11                                                              |
| LRS-55        | 7                              | 8 <sup>1</sup> / <sub>2</sub> | 3 <sup>3</sup> / <sub>4</sub> × 4 <sup>7</sup> / <sub>8</sub> × 10 <sup>1</sup> / <sub>2</sub>      |
| LRS-56        | 8 <sup>1</sup> / <sub>2</sub>  | 10                            | 4 <sup>7</sup> / <sub>16</sub> × 4 <sup>7</sup> / <sub>8</sub> × 11 <sup>1</sup> / <sub>2</sub>     |
| LRS-57        | 10 <sup>1</sup> / <sub>2</sub> | 12                            | 5 × 4 <sup>7</sup> / <sub>8</sub> × 12                                                              |
| LRS-58        | 12 <sup>1</sup> / <sub>2</sub> | 14                            | 5 <sup>1</sup> / <sub>2</sub> × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>1</sup> / <sub>8</sub>      |
| LRS-59        | 16 <sup>1</sup> / <sub>2</sub> | 19                            | 6 <sup>3</sup> / <sub>8</sub> × 4 <sup>7</sup> / <sub>8</sub> × 13 <sup>25</sup> / <sub>32</sub>    |

#### OPTIONS

##### AC INPUT

| Add Suffix <sup>1</sup>  | For Operation at:                                                      | Price |
|--------------------------|------------------------------------------------------------------------|-------|
| -V (LRS-55, 56 only)     | 185 to 265VAC<br>47-440Hz                                              | 12%   |
| -M (LRS-52, 53, 54 only) | 95 to 132VAC or<br>187 to 265VAC,<br>47-440Hz<br>(customer selectable) | 12%   |

<sup>1</sup> Add Suffix after package number, i.e.: LRS-55V-5, LRS-52M-5.

#### POWER FACTOR AND HARMONIC CORRECTION

0.995 power factor and harmonic correction per IEC 555-2 when used with the PFHC-2600. See pages 30-31.

#### ACCESSORIES

Rack Adapters and other accessories are available. See Part IV of this catalog.

#### FINISH

Gray, Fed. Std. 595, No. 26081.

#### GUARANTEED FOR 5 YEARS

Five year guarantee includes labor as well as parts. Guarantee applies to operation at full published specifications at end of 5 years.

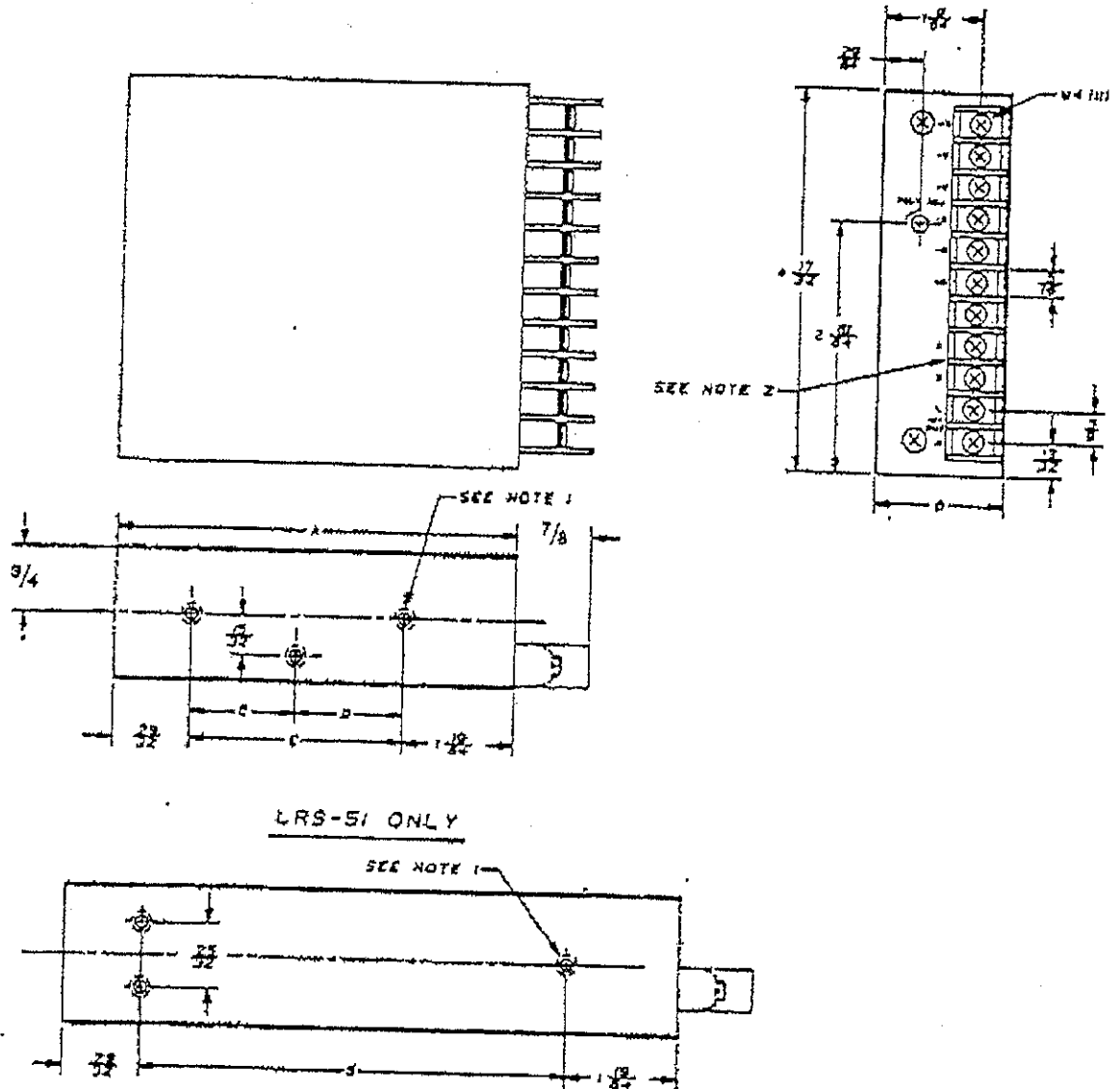
#### SAFETY AGENCY APPROVALS

UL recognized. CSA certified. The LRS-57, 58, 59 are under evaluation.

#### TUV LICENSED

110/220 and 220 input versions.

LRS-49  
LRS-50  
LRS-51



| DIM.<br>MODEL | A                               | B                               | E                               |
|---------------|---------------------------------|---------------------------------|---------------------------------|
| LRS-49        | 4 <sup>23</sup> / <sub>32</sub> | 1 <sup>1</sup> / <sub>2</sub>   | 2 <sup>33</sup> / <sub>64</sub> |
| LRS-50        | 5 <sup>15</sup> / <sub>32</sub> | 1 <sup>1</sup> / <sub>2</sub>   | 3 <sup>17</sup> / <sub>64</sub> |
| LRS-51        | 7 <sup>13</sup> / <sub>64</sub> | 1 <sup>11</sup> / <sub>16</sub> |                                 |

NOTE 1) NO. 6-32 TAPPED HOLES (3) FOR CUSTOMER CHASSIS MOUNTING. SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN <sup>16</sup>/<sub>64</sub> INCH.

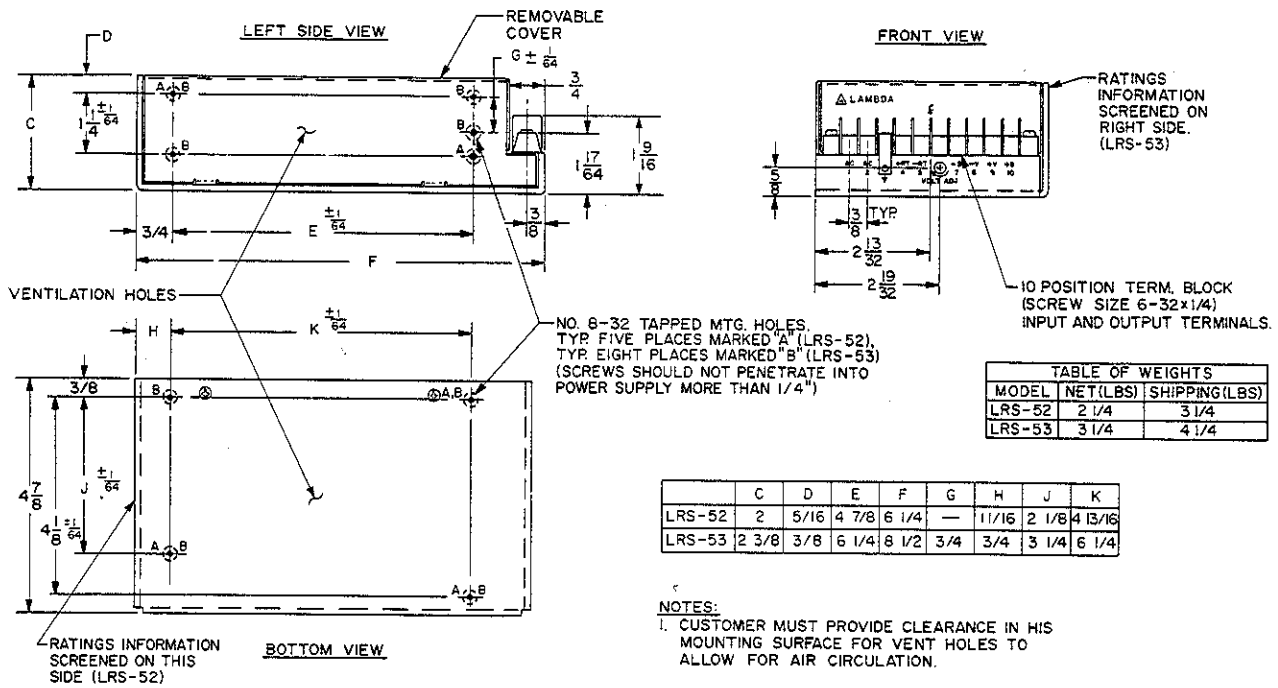
NOTE 2) 95 - 132 VAC INPUT, SHORT A TO B  
187 - 250 VAC INPUT, A TO B OPEN

| TABLE OF WEIGHTS |                               |                               |
|------------------|-------------------------------|-------------------------------|
| MODEL            | NET (LBS.)                    | SHIPPING (LBS.)               |
| LRS-49           | 1 <sup>3</sup> / <sub>8</sub> | 2 <sup>3</sup> / <sub>8</sub> |
| LRS-50           | 1 <sup>1</sup> / <sub>2</sub> | 2 <sup>1</sup> / <sub>8</sub> |
| LRS-51           | 2                             | 3                             |

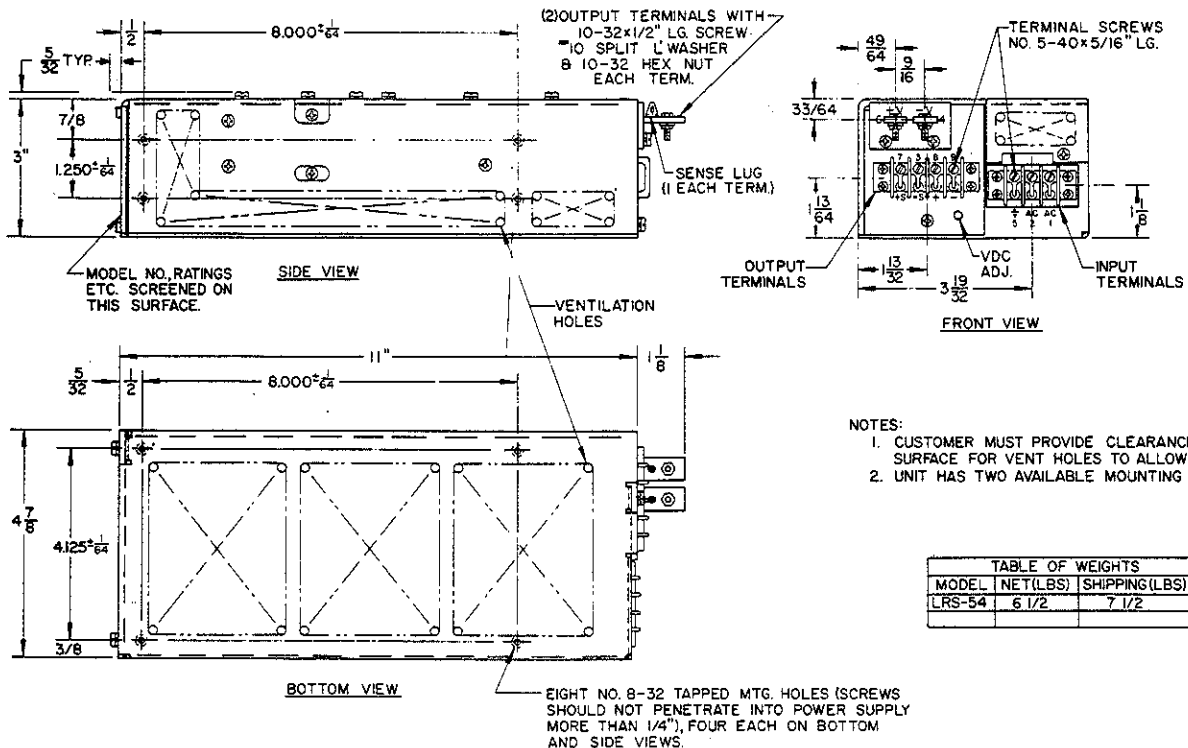
# PART V—MECHANICAL DRAWINGS

## LRS-52, LRS-53 AND LRS-54

LRS-52  
LRS-53



LRS-54



## LRS-55, LRS-56, LRS-57, LRS-58 AND LRS-59

[illegible]

**FRONT VIEW**

AC INPUT TERMINALS  
SCREWS # 6

LRS 57

7/8

2 3/8

2 3/4

1 3/8

3/8

2 3/8

1 1/2

3/8

3/16

7/8

1 1/2

2 3/8

GROUND TERM. SCREW # 8

MODEL, RATINGS, ETC.  
SCREENED ON THIS SURFACE

[illegible]

Technical drawing of a cabinet showing three views: front, bottom, and left.

- Front View:** Shows the cabinet's height (G) and width (F). It includes a top section with vertical slats and a base with casters. Dimensions J and H are indicated at the base.
- Bottom View:** Shows the cabinet's width (A) and depth (D). It includes a top section with vertical slats and a base with casters. Dimensions B and C are indicated on the right side.
- Left View:** Shows the cabinet's height (G) and width (F). It includes a top section with vertical slats and a base with casters. Dimensions J and H are indicated at the base.

Dimensions are labeled as follows:

- A: Width of the cabinet body.
- B: Height of the cabinet body.
- C: Height of the base.
- D: Depth of the cabinet body.
- E: Distance from the front edge to the base.
- F: Width of the cabinet including the top section.
- G: Total height of the cabinet.
- H: Height of the base.
- J: Height of the casters.

Notes:

- NO. 8-32 UNC-2B THD
- 4 PLACES FOR MTG UNIT

NOTES: 1. CUSTOMER TO PROVIDE CLEARANCE IN HIS MOUNTING SURFACE FOR VENT HOLES TO ALLOW FOR AIR CIRCULATION.  
2. CUSTOMER MOUNTING SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 5/16 INCH FOR LRS 57 & NOT MORE THAN 3/8 FOR LRS 58.

| DESCRIPTION | A   | B     | C   | D     | E   | F   | G    | H   | J   |
|-------------|-----|-------|-----|-------|-----|-----|------|-----|-----|
| LRS 57      | 5   | 5.891 | 2.8 | 4.082 | 3.1 | 4.8 | 12.3 | 1.8 | -   |
| LRS 58      | 5.2 | 5.891 | 2.7 | 4.062 | 3.5 | 4.8 | 13.3 | -   | 1.7 |
| LRS 59      | 6.2 | 8.000 | 2.5 | 4.125 | 1.8 | 4.8 | 13.3 | -   | 1.4 |