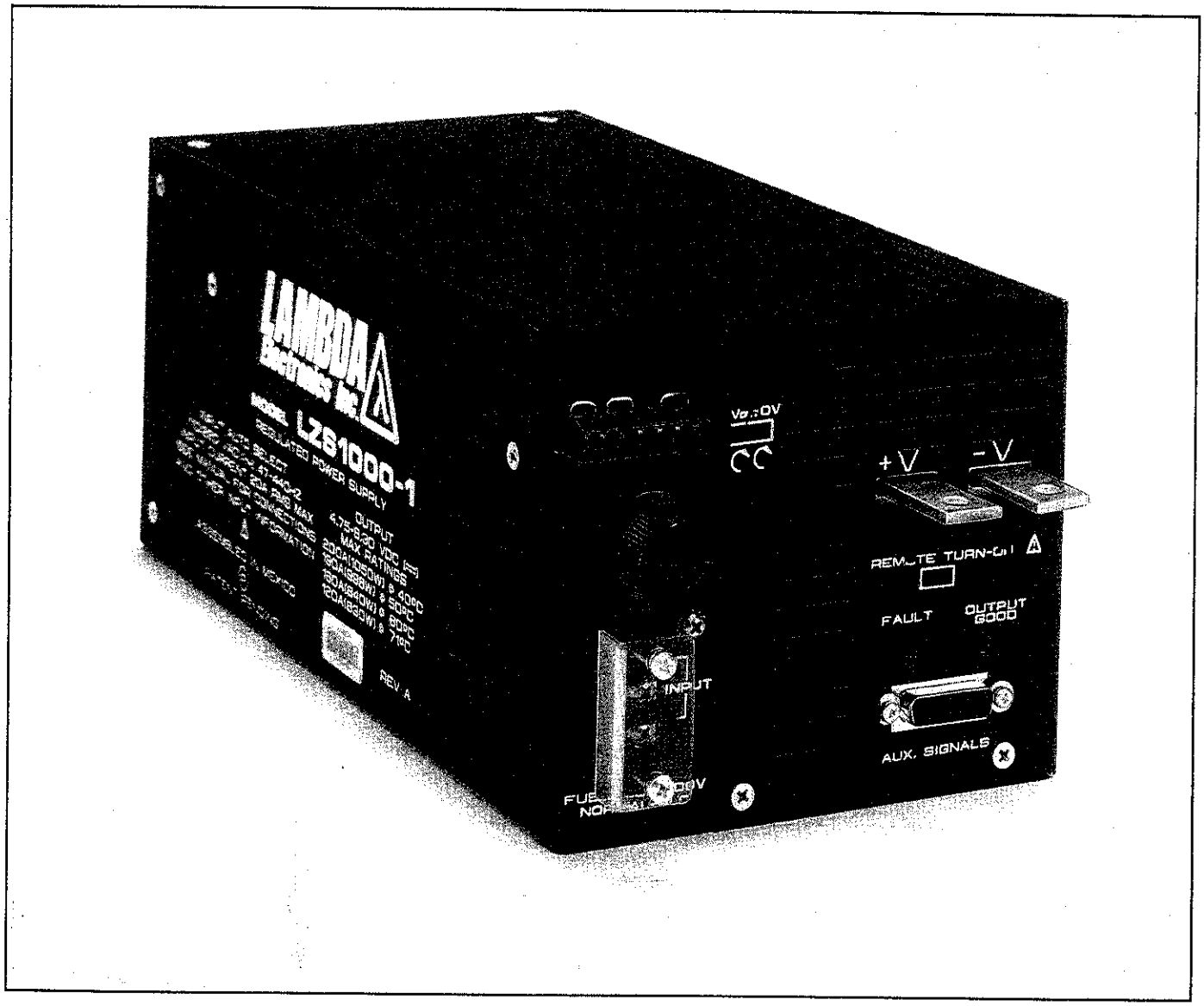
# PART IA—AC-TO-DC SWITCHING POWER SUPPLIES

# LAMBDA'S MIL-ENVIRONMENT LZS SERIES




## HIGH RELIABILITY IN RIGOROUS OPERATING CONDITIONS

Lambda introduces the new LZS Series ruggedized power supplies for harsh environmental conditions. Many of todays most demanding industrial applications are similar to military operating environments. Conditions such as elevated temperature, low temperature and shock and vibration can seriously compromise the long term reliability of most switching power supplies. With tested environmental capability per MIL-STD-810D, Lambda's LZS Series will provide reliable power in the most rigorous industrial applications.

Lambda's LZS Series includes many features to simplify system integration including current sharing capability—thereby lowering development time and costs.

- 1000W.
- MIL-STD-810D compliance.
- 110/220VAC auto-selectable input.
- Low noise outputs, to 10mV RMS, 35mV pk-pk.
- Wide range adjustable outputs.
- Operation from −30°C to +71°C ambient.
- 0.995 power factor and harmonic correction per IEC 555-2 when used in conjunction with Lambda's new PFHC-2600.
- Current sharing capability.
- Supervisory module available for AC and DC monitoring.
- Grade 1 design.

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## DC OUTPUT
Voltage range shown in tables.

## REGULATED VOLTAGE
regulation, line ..... 0.1% for line variations from 85 to 132VAC or 187 to 265VAC.
regulation, load ..... 0.1% for load variations from no load to full load and full load to no load.
ripple and noise (20MHz Bandwidth) ..... 10mV RMS, 35mV pk-pk for -1 models. 10mV RMS, 50mV pk-pk for -2 models. 15mV RMS, 100mV pk-pk for -3 models.
temperature coefficient .... 0.025%/°C.
remote programming resistance ..... 1000 Ω/v nominal.
remote programming voltage ..... volt per volt.

## AC INPUT
line ..... 85-132/187-265VAC, auto selectable.

## INPUT POWER
1428W maximum at 85VAC input.
1400W typical at 115VAC input.

## DC INPUT
220 to 375 VDC.

## EFFICIENCY
73.5% minimum at 85 VAC input for -1 models.
75.0% typical at 115 VAC input.

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

## OPERATING TEMPERATURE
Continuous duty from −30°C to +71°C with suitable derating above 40°C.

## STORAGE TEMPERATURE
−55°C to +85°C.

## OVERLOAD PROTECTION
### ELECTRICAL
Fixed current limit on each output limits the output current to a safe value to protect the load as well as the power supply.

### THERMAL
All models include a thermostat. In the event of a thermal shutdown the AC input must be recycled to reset the thermal protection circuitry.

## FUSING
Externally accessible line fuse removes the supply from the input line in the event of a short in the input circuitry.

## OVERVOLTAGE PROTECTION
All outputs are provided with overvoltage protection. Trigger level is set via externally accessible potentiometer.

## COOLING
All units are fan cooled via an integral DC ball bearing fan.

## IN-RUSH LIMITING

| | 110VAC | 220VAC |
|---|---|---|
| LZS-1000 | 40A peak | 78A peak |

## DC OUTPUT CONTROLS
A multi-turn potentiometer is provided for output voltage adjustment over the entire allowable range.

## INPUT, OUTPUT AND SIGNAL CONNECTIONS
AC input ..... PCB mounted heavy duty barrier strip.
DC output ..... Heavy duty buss bars.
Chassis ground ..... Tapped hole in chassis.
Sensing, remote on/off and P.O. ..... PCB mounted lugless connector.

## MOUNTING
One mounting surface, multiple mounting positions.

## OUTPUT GOOD/FAULT INDICATION
A green LED indicates when the output is within allowable range. A red LED indicates when an overvoltage or overtemperature shutdown has occurred.

## PARALLEL OPERATION
Each unit is capable of operating in current sharing parallel with a like unit via the P.O. terminal connection.

## POWER FAILURE
The DC output on the -1 model will remain within regulation specs for 16.7mSec at 100VAC, 50 Hz input, when the output is 5.25V or less at full load output current.

## REMOTE SENSING
Provision is made for remote sensing on all outputs 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 via the externally accessible "D" connector.

## FUNGUS PROOFING
All units are inherently fungus inert.

## ISOLATION
Input to output: 3000 Volts RMS
Input to ground: 1500 Volts RMS
Output to output: 500 Volts RMS

## MILITARY SPECIFICATIONS
The LZS Series is undergoing tests for the following MIL-STD-810D specifications.
1) Low Pressure—Method 500.2 Procedure I for air transport (non operating) and Procedure II for high altitude ground operation.
2) High Temp—Method 502.2 Procedure I (storage) and Procedure II (operating) for Category "Hot", Table 501.2-I.
3) Low Temp.—Method 501.2 Procedures I and II for "basic cold" (CI).
4) Temp. Shock—Method 503.2 for Paragraph 3.10, specified storage conditions.
5) Temp./Altitude—Method 504.1 Procedure I per MIL-STD-810C, Class 2 (−20°C operating).
6) Humidity—Method 507.2 Procedures I and II for Cycle 1 and Cycle 4.
7) Fungus—Method 508.2 Procedure I.
8) Vibration—Method 514.3 Category 1 basic transportation, Figures 514.3-1. Common carrier, two hours per axis.
9) Shock—Method 516.3 Procedure VI.

In addition the LZS Series conforms to the following MIL specifications.
1) Vibration—MIL-STD-167 (Vibration Type I).
2) Transient—MIL-STD-1399 (Voltage transient—Type III power).

## EMI
Conducted EMI conforms to FCC Docket 20780 Class A, VDE 0871 Curve B, MIL-461A, notice 4, CE04.

## PHYSICAL DATA

| PACKAGE | LBS. NET | LBS. SHIP | DIMENSIONS |
|---|---|---|---|
| LZS-1000 | 15 | 17.5 | 4.75 × 4.75 × 10.5 |

## POWER FACTOR/HARMONIC CORRECTION
0.995 power factor and harmonic correction per IEC 555-2 when used with Lambda's PFHC-2600. See pages 30–31 for details.

## OUTPUT SIGNALS
Signals for AC good/fail, OV alarm, UV alarm and inverter good are available at the external signal connector.

## FINISH
All metal parts are coated. Chassis is painted black.

## GUARANTEED FOR 5 YEARS
Five year guarantee includes labor as well as parts. Guarantee applies to operation at full published specifications at the end of five years.

## SAFETY AGENCY APPROVALS
The LZS Series is presently under evaluation for UL, CSA and TUV/IEC.

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

# MIL-ENVIRONMENT SWITCHING SELECTOR GUIDE

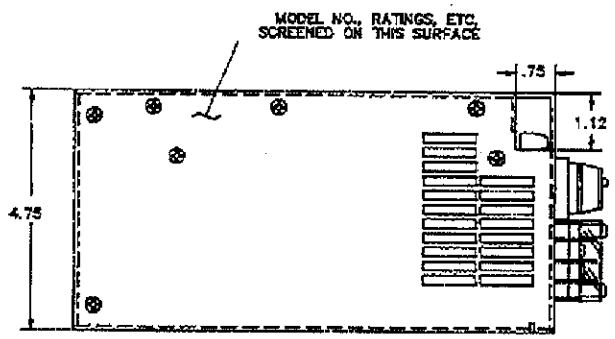
## LZS Series. Wide Range. Single Output.

| MAXIMUM OUTPUT CURRENT AT AMBIENT OF (A) 40°C | 50°C | 60°C | 71°C | MAXIMUM OUTPUT POWER AT AMBIENT OF (W) 40°C | 50°C | 60°C | 71°C | COMPLETE ELEC. SPEC. PG. | COMPLETE MECH. SPEC. PG. | DIMENSIONS (inches) | PRICE QTY. 1 | QTY. 10 | QTY. 25 | MODEL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4.75 to 6.3V ADJ.** | | | | | | | | | | | | | | |
| 200 | 190 | 160 | 120 | 1050 | 998 | 840 | 630 | 9 | 148 | 5.63 × 4.75 × 10.5 | **$1130** | **$1075** | **$1025** | **LZS-1000-1** |
| **11.4 to 15.75V ADJ.** | | | | | | | | | | | | | | |
| 83 | 80 | 66.7 | 50 | 1050 | 998 | 840 | 630 | 9 | 148 | 5.63 × 4.75 × 10.5 | **1130** | **1075** | **1025** | **LZS-1000-2** |
| **19 to 29.4V ADJ.** | | | | | | | | | | | | | | |
| 50 | 47.5 | 40 | 30 | 1050 | 998 | 840 | 630 | 9 | 148 | 5.63 × 4.75 × 10.5 | **1130** | **1075** | **1025** | **LZS-1000-3** |

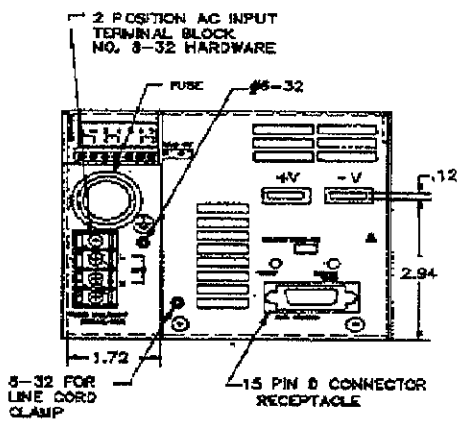
# PART V—MECHANICAL DRAWINGS

## LAMBDA LZS SERIES AND LRS SERIES

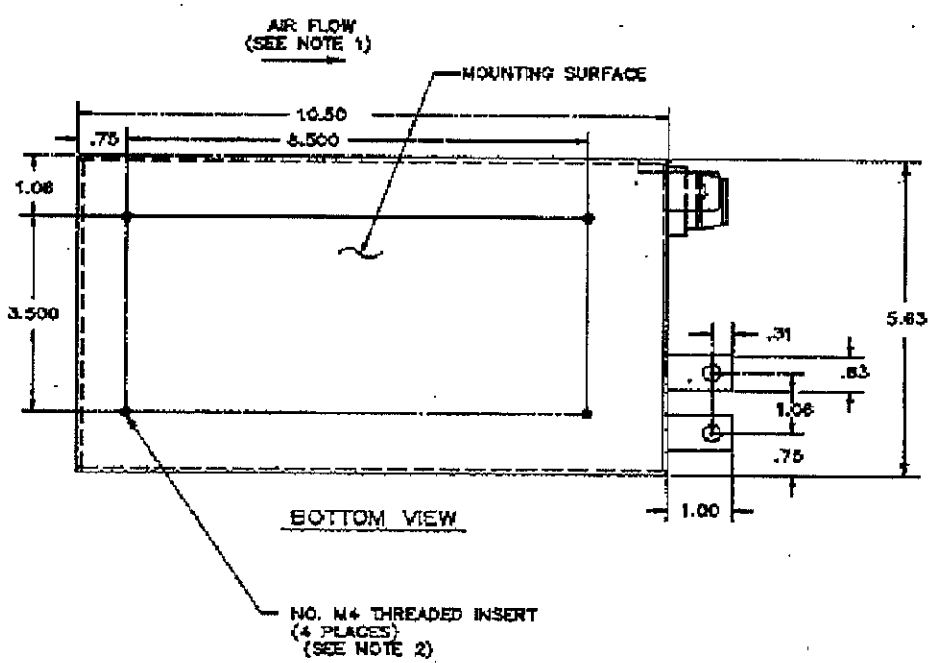
LZS-1000




SIDE VIEW




REAR VIEW




BOTTOM VIEW

| TABLE OF WEIGHTS | | |
|---|---|---|
| MODEL | NET (LBS.) | SHIPPING (LBS.) |
| LZS1000 SERIES | 15.5 LBS. | 19.5 LBS. |

NOTE:
1. CUSTOMER MUST PROVIDE ADEQUATE CLEARANCE AT FRONT, SIDES AND TOP SURFACES FOR AIR FLOW.
2. CUSTOMER MOUNTING SCREWS (NO. M4) MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THEN 1/8 INCH.
3. UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCE IS AS FOLLOWS: .XXX ±.005, .XX ±.02.