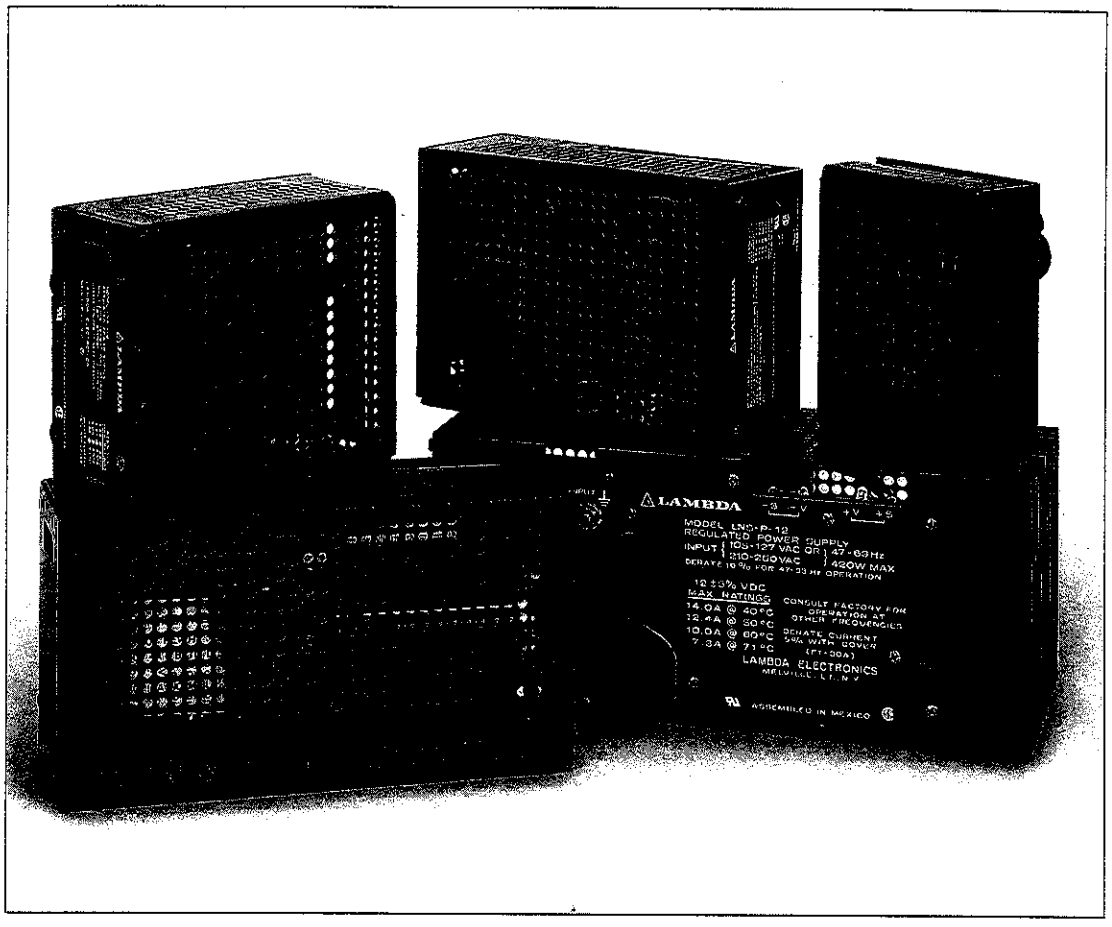
Part I – AC-to-DC Power Supplies

LAMBDA'S LD and SERIES



High Reliability Linear Solutions for Low Noise Applications

Lambda's LD and LN Series linear power supplies are designed to meet the ever increasing requirements of high reliability and ease of use in today's modern equipment. They feature extremely low output ripple and noise – ideal for medical and industrial applications, and test equipment employing sensitive analog circuits.

Lambda's LD and LN Series are manufactured using only the highest-grade components. And our stringent in-house component derating ensures that the LD and LN Series provide the highest reliability for any low-noise, high-stability requirement.

LD and SERIES FEATURES

MIL-STD-810 C Specifications	The LD and LN Series have passed tests in accordance with the stringent specifications of MIL-STD-810 C. This ensures that your design can meet the requirements of even the most rigorous environments.
Lowest Output Ripple and Noise	Featuring output ripple as low as 150μV RMS, the LD and LN Series are ideal for sensitive communication and high-gain, wide bandwidth applications.
High Line and Load Stability	With line and load regulation as precise as 0.005% + 5mV, the LD and LN Series are well suited for applications where unstable line voltages are prevalent and stable output voltages are required.
High Temperature Operation	The LN Series is capable of operation in ambient temperatures as high as 71°C.
Five Year Guarantee	Lambda's LD and LN Series are guaranteed to operate at published specifications for five years.
AC Inputs	The LD and LN Series can be configured for 220VAC operation via a transformer tap change providing low noise solutions for worldwide applications.
Cooling	All models are convection cooled. No fans are required to operate at rated output. Additional power can be obtained by removing the cover. Contact the factory for further information.
Remote Sensing	Load leads can significantly degrade the performance of a power supply by picking up emissions which increase output ripple. Load current can cause resistive voltage drops which alter the effective voltage at the load. The remote sensing capability of the LD and LN Series compensates for these effects ensuring a low noise exact voltage at your load.

Part I – AC-to-DC Power Supplies

LD and SERIES SPECIFICATIONS

AC Input
line .....105 to 127VAC, 210 to 254VAC (by transformer tap change), 47-440Hz. Consult factory for operation at frequencies other than 57-63Hz.

DC Output
Voltage range shown in tables.

Regulated Voltage

	LD SERIES	LN SERIES
regulation, line	0.005% +5mV	0.1% (0.15% for LNS-Z)
regulation, line	0.005% +5mV	0.1%, (0.15% for LNS-Z)
ripple and noise	150μV RMS, 1mV pk-pk, 250μVRMS for 100V, 120V & 150V units	1.5mV RMS, 5mV pk-pk 5mV RMS, 15mV pk-pk for LNS-P-48
temperature coefficient	(0.01% +10μV)/°C (0.005% +10μV)/°C on wide range models with external programming resistors	0.03%/°C
remote programming resistance	1000 ohms/volt Programming to less than 1 volt on wide range models must be done in two steps; first to 1 volt and then to desired value	200 ohms/volt (not on LND)
remote programming voltage	volt per volt	volt per volt (not on LND)

Tracking Accuracy (Dual Tracking Models Only)
3% absolute voltage difference, 0.2% change for all conditions of line, load and temperature.

Electrical Overload Protection
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 Overload Protection
Thermostat – automatically reset when overtemperature condition is eliminated.

Overvoltage Protection
Overvoltage protection module crowbars output when trip level is exceeded – standard on all 5V models.

Isolation Rating
Minimum, 10 Megohm isolation from DC to ground at 750VDC.

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

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

Cooling
All units are convection cooled. No external heat sinking or forced air is required.

Operating Temperature Range
Continuous operation from 0° to +71°C on LN Series and 0° to +60°C on LD Series with suitable derating above +40°C. Consult the factory for derating below 0°C.

Storage Temperature Range
−55°C to +85°C.

Input and Output Connections
Heavy-duty screw terminals on printed circuit board.

Mounting
LN/LDS-Y, X, W – three mounting surfaces, three mounting positions (Two mounting surfaces on wide range and 48V models when used with optional LH OV).
LN/LDS-P – one mounting surface, one mounting position.

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

Transformer
MIL-T-27C, Grade 6; Electrostatic shield; 4000VAC input/output isolation.

Fungus Proofing
No fungi nutrient material used.

Military Specifications
The LD and LN Series have passed the following tests in accordance with MIL-STD-810C.
1) Low Pressure – Method 500.1, Procedure I.
2) High Temperature – Method 501.1, Procedures I & 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 (0°C operating)
6) Humidity – Method 507.1, Procedures I & II.
7) Fungus – Method 508.1, Procedure I.
8) Vibration – Method 514.2, Procedures X & XI.
9) Shock – Method 516.2, Procedures I & III.
MIL-I-6181D – Conducted and radiated EMI with one output terminal grounded.

Accessories
For rack adapters and other accessories, see Part IV of this catalog.

Power Supply Series	OV Series
LNS-Z, LNS-Y, LDS-Y-12V through 28V models	L-6A-OV
LNS-X, LND, LDS-X-12V through 28V models	L-12A-OV
LNS-W, LDS-W-12V through 28V models	Consult Factory
LNS-P, LDS-P-12V through 28V models	Consult Factory
LD All 01, 02, 03 and 48V models	LHOV (Adjustable)

Physical Data

Package Model	Lbs. Net	Lbs. Ship	Size Inches
LN-Z	3	3¼	4⅞ × 4 × 1¾ (w/cover)
			4⅞ × 4 × 1⅝ (w/o cover)
LN-Y, LDS-Y	5	5½	5⅝ × 4⅞ × 2⅝ (w/cover)
			5⅝ × 4⅞ × 2½ (w/o cover)
LN-X, LDS-X	7¾	8¼	7 × 4⅞ × 2⅞ (w/cover)
			7 × 4⅞ × 2¾ (w/o cover)
LN-W, LDS-W	9	9½	9 × 4⅞ × 2⅞ (w/cover)
			9 × 4⅞ × 2¾ (w/o cover)
LNS-P, LDS-P	14	15½	11 × 4⅞ × 4 13/32 (w & w/o cover)
LND-P	15½	17	11 × 4⅞ × 4 13/32 (w & w/o cover)

Guaranteed For 5 Years
5-year guarantee includes labor as well as parts. Guarantee applies to operation at full published specifications at the end of 5 years.

UL/CSA
UL Recognized. CSA Certified.

Rugged Environment Ratings Table—Single Output

LZS SERIES
- Worldwide AC Input
- EMI Meets VDE, FCC Curve B
- Wide Range Outputs

LR SERIES
- Convection Cooled
- EMI Meets VDE, FCC Curve A
- MRS Output Ripple Filters Available

LD/LN SERIES
- Linear Power Supplies
- Low Output Ripple
- Low Leakage Current

MAX CURRENT AMPS (MAX POWER WATTS)[1] AT AMBIENT TEMPERATURE OF 40°C	50°C	60°C	71°C	Vout ADJ. RANGE	COMPLETE ELEC. SPEC. PG.	UNIT PRICE PER DELIVERED QUANTITY 1	10	25	MODEL
5V OUTPUT									
5.00	4.00	3.00	–	4.75-5.25	16	347	331	–	LDS-Y-5-OV[2]
8.50	7.30	6.00	–	4.75-5.25	16	429	408	–	LDS-X-5-OV[2]
11.90	9.90	7.70	–	4.75-5.25	16	522	498	–	LDS-W-5-OV[2]
20.90	18.00	14.80	–	4.75-5.25	16	651	620	–	LDS-P-5-OV[2]
12V OUTPUT									
3.40	2.55	1.75	–	11.40-12.60	16	333	318	–	LDS-Y-12[2]
5.50	4.70	3.80	–	11.40-12.60	16	412	394	–	LDS-X-12[2]
7.20	6.00	4.50	–	11.40-12.60	16	503	479	–	LDS-W-12[2]
13.30	11.80	9.50	–	11.40-12.60	16	635	606	–	LDS-P-12[2]

Notes: [1]Max output power cannot exceed rating in parenthesis within specified output voltage range.
[2]Currents are 10-15% higher when used without a cover. Consult the factory.

Rugged Environment Ratings Table—Single Output

LZS SERIES
- Worldwide AC Input
- EMI Meets VDE, FCC Curve B
- Wide Range Outputs

LR SERIES
- Convection Cooled
- EMI Meets VDE, FCC Curve A
- MRS Output Ripple Filters Available

LD/LN SERIES
- Linear Power Supplies
- Low Output Ripple
- Low Leakage Current

MAX CURRENT AMPS (MAX POWER WATTS)[1] AT AMBIENT TEMPERATURE OF 40°C	50°C	60°C	71°C	Vout ADJ. RANGE	COMPLETE ELEC. SPEC. PG.	UNIT PRICE PER DELIVERED QUANTITY 1	10	25	MODEL
15V OUTPUT									
3.00	2.25	1.55	–	14.25-15.75	16	333	318	–	LDS-Y-15[2]
4.70	3.90	3.10	–	14.25-15.75	16	412	394	–	LDS-X-15[2]
6.55	5.30	4.00	–	14.25-15.75	16	503	479	–	LDS-W-15[2]
11.40	10.00	8.10	–	14.25-15.75	16	635	606	–	LDS-P-15[2]
24V OUTPUT									
1.90	1.55	1.15	–	22.80-25.20	16	333	318	–	LDS-Y-24[2]
3.20	2.70	2.00	–	22.80-25.20	16	412	394	–	LDS-X-24[2]
4.60	3.70	2.80	–	22.80-25.20	16	503	479	–	LDS-W-24[2]
8.50	7.60	5.70	–	22.80-25.20	16	635	606	–	LDS-P-24[2]

Notes: [1]Max output power cannot exceed rating in parenthesis within specified output voltage range.
[2]Currents are 10-15% higher when used without a cover. Consult the factory.

Rugged Environment Ratings Table—Single Output

LZS SERIES
- Worldwide AC Input
- EMI Meets VDE, FCC Curve B
- Wide Range Outputs

LR SERIES
- Convection Cooled
- EMI Meets VDE, FCC Curve A
- MRS Output Ripple Filters Available

LD/LN SERIES
- Linear Power Supplies
- Low Output Ripple
- Low Leakage Current

MAX CURRENT AMPS (MAX POWER WATTS)[1] AT AMBIENT TEMPERATURE OF				Vout	COMPLETE ELEC. SPEC.	UNIT PRICE PER DELIVERED QUANTITY			
40°C	50°C	60°C	71°C	ADJ. RANGE	PG.	1	10	25	MODEL
28V OUTPUT									
1.65	1.35	1.00	—	26.60-29.40	16	333	318	—	LDS-Y-28[2]
2.90	2.50	1.90	—	26.60-29.40	16	419	394	—	LDS-X-28[2]
4.00	3.40	2.60	—	26.60-29.40	16	503	479	—	LDS-W-28[2]
7.60	6.70	4.90	—	26.60-29.40	16	635	606	—	LDS-P-28[2]
48V OUTPUT									
1.20	0.95	0.70	—	45.60-50.40	16	347	331	—	LDS-Y-48[2]
1.90	1.60	1.20	—	45.60-50.40	16	429	408	—	LDS-X-48[2]
2.60	2.20	1.70	—	45.60-50.40	16	522	498	—	LDS-W-48[2]

Notes: [1]Max output power cannot exceed rating in parenthesis within specified output voltage range.
[2]Currents are 10-15% higher when used without a cover. Consult the factory.

Rugged Environment Ratings Table

LZS SERIES
- Worldwide AC Input
- EMI Meets VDE, FCC Curve B
- Wide Range Outputs

LR SERIES
- Convection Cooled
- EMI Meets VDE, FCC Curve A
- MRS Output Ripple Filters Available

LD/LN SERIES
- Linear Power Supplies
- Low Output Ripple
- Low Leakage Current

MAX CURRENT AT OPERATING TEMPERATURE OF 40°C	50°C	60°C	71°C	COMPLETE ELEC. SPEC. PG.	UNIT PRICE PER DELIVERED QUANTITY 1	10	MODEL
SINGLE OUTPUT. WIDE RANGE OUTPUT.							
0-7 VOLTS ADJ.							
~~3.40~~	2.85	1.80	—	16	$347	$331	LDS-Y-01[2]
4.10	3.40	2.60	—	16	429	408	LDS-X-01[2]
5.60	4.80	3.80	—	16	522	498	LDS-W-01[2]
9.00	8.00	7.10	—	16	651	620	LDS-P-01[2]
0-18 VOLTS ADJ.							
~~1.80~~	1.60	0.90	—	16	347	331	LDS-Y-02[2]
1.95	1.60	1.30	—	16	429	408	LDS-X-02[2]
2.70	2.40	1.90	—	16	522	498	LDS-W-02[2]
4.30	3.80	3.10	—	16	651	620	LDS-P-02[2]
0-32 VOLTS ADJ.							
1.10	0.95	0.60	—	16	347	331	LDS-Y-03[2]
1.25	1.10	0.95	—	16	429	408	LDS-X-03[2]
1.80	1.50	1.20	—	16	522	498	LDS-W-03[2]
2.50	2.40	2.20	—	16	651	620	LDS-P-03[2]

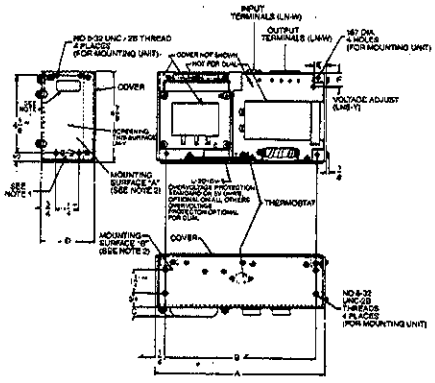
VOLT Vo	MAX CURRENT (AMPS) AT AMBIENT TEMPERATURE OF 40°C	50°C	60°C	71°C	COMPLETE ELEC. SPEC. PG.	UNIT PRICE PER DELIVERED QUANTITY 1	10	MODEL

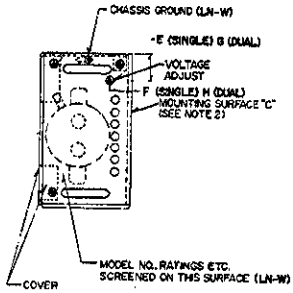
*Contact factory for 48VDC filters.

Notes: 2 currents are 10-15% higher when used without a cover. Consult the factory.

LD AND SERIES MECHANICAL DRAWINGS

LDS-W, LDS-Y,



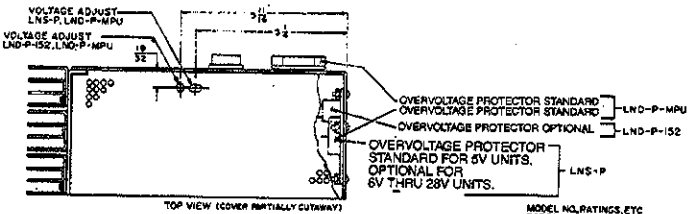


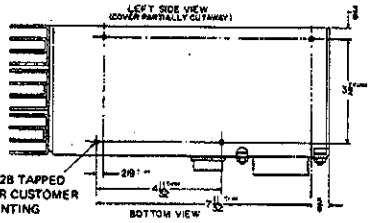
NOTES:
1. CUSTOMER MUST PROVIDE CLEARANCE IN HIS MOUNTING SURFACE FOR VENT HOLES TO ALLOW FOR AIR CIRCULATION.
2. WHEN USING SURFACE "C" AS MOUNTING SURFACE, COVER MUST BE ASSEMBLED TO UNIT AFTER UNIT IS BOLTED DOWN. FOR SURFACES "A" & "B", COVER MAY BE PRE-ASSEMBLED TO UNIT.
3. COVER SCREWS ARE INDICATED BY ●, AND THEY MUST BE REMOVED BEFORE REMOVING COVER

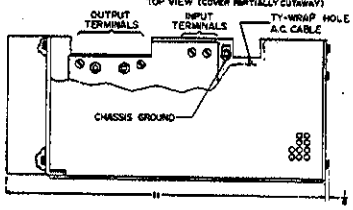
MODEL \ DIM.	A	B	C	D	E	F	G	H
LDS-W, LNS-W, LND-W	9	8	1/2	2 9/32	9/16	1/16	3/8	1 11/16
LDS-Y, LNS-Y, LND-Y	5 3/8	4 1/8	3/4	2 1/16	1 11/16	1/8	–	–

LDS-P,

NOTES:
1. CUSTOMER MOUNTING SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 1/4"
2. COVER SCREWS ARE INDICATED BY ● & ○ AND MUST BE REMOVED BEFORE COVER IS REMOVED (6 PLACES)
3. SIDE VIEWS DO NOT SHOW TRANSFORMER COIL PROTRUSION.







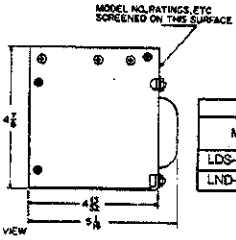
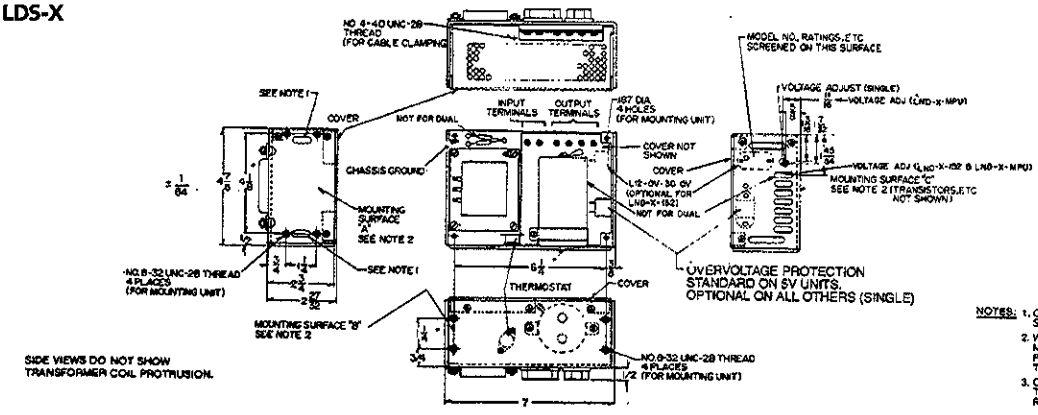


TABLE OF WEIGHTS		
MODEL	NET WT. (LBS)	SHIPPING WT. (LBS)
LDS-P, LNS-P	14	15½
LND-P	15½	17

LDS-X



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3. COVER SCREWS ARE INDICATED BY ● & ○ AND THEY MUST BE REMOVED BEFORE REMOVING COVER. (7 PLACES)