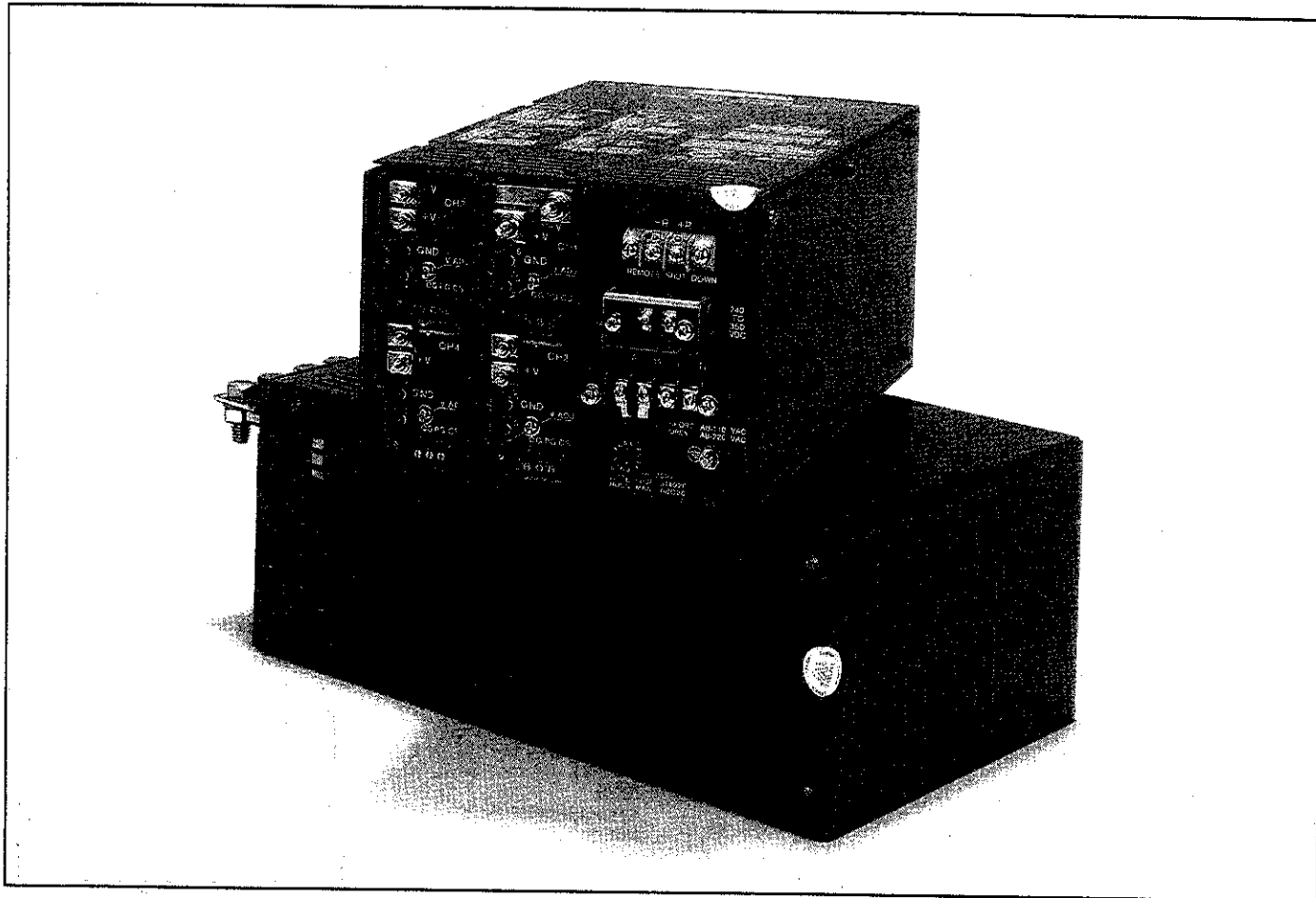


PART 1A—AC-TO-DC SWITCHING POWER SUPPLIES

LAMBDA'S MIL-ENVIRONMENT LRQ SERIES



RUGGED QUADS FOR HIGH GRADE INDUSTRIAL APPLICATIONS

Lambda's LRQ Series meets the most rigorous high grade industrial requirements, as well as the stringent specifications called out in MIL-STD-810D. And with a standard product design, power supply selection can be completed more quickly, at less cost, and with utmost confidence.

Shock, vibration, humidity (100%), high temperature (71°C), low temperature (-40°C) and high altitudes can seriously degrade the dependability of a power supply in electronic equipment. Lambda's LRQ Series is designed, manufactured and tested specifically to operate in these environments. To reach the highest level of system reliability, the LRQ Series includes current sharing parallel capability with a single connection per parallel output pair. This allows outputs with the same voltages within each unit, or in separate units to be paralleled. True N + 1 redundant operation is achieved using external diodes. To ensure each output is within tolerance, there are (4) independent visual and TTL compatible power good signals for maximum uptime and proper fault monitoring in the most critical power applications.

- Four quad output models from 580W to 930W.
- No pre-load required.
- N + 1 current sharing parallel capability on each output.
- Visual (LED) and digital (TTL compatible) DC power good signals for each output.
- MIL-STD-810D environmental capability.
- Integral EMI filtering to FCC, VDE & MIL-STD-461 specifications.
- 85–132/170–265 VAC selectable input.
- Turn-on at -40°C , operation to $+71^{\circ}\text{C}$.
- Low noise outputs.
- Worldwide safety agency approvals: UL, CSA, TUV/IEC.
- Backed by Lambda's 5 year guarantee.
- Grade 1 design.

PART IA—AC-TO-DC SWITCHING POWER SUPPLIES

LAMBDA'S MIL-ENVIRONMENT LRQ SERIES

DC OUTPUT

Voltage range shown in tables.

REGULATED VOLTAGE

regulation, line	0.1% for line changes from 85 to 132VAC, or 170 to 265VAC, or 240 to 370VDC.
regulation, load	0.1% for load variations from no load to full load
cross regulation	0.1% on any output.
ripple and noise	10mV RMS, 35mV pk-pk on CH1 5V output. 15mV RMS, 100mV pk-pk on auxiliary outputs.
temperature coefficient	.025%/°C
remote programming resistance	1000 Ω /V nominal on all outputs.
remote programming voltage	volt per volt nominal on all outputs.

AC INPUT

line	85 to 132VAC or 170 to 265VAC, user selectable via external jumper. Regulation and ripple specifications may be exceeded on the main output when operating above 5.5VDC and on inputs below 95VAC (185VAC).
power	LRQ-57: 805 Watts maximum. LRQ-58: 1293 Watts maximum. Ratings are at full load and maximum voltage on each output.

DC INPUT

240 to 370VDC when jumper is in 220V position.

EFFICIENCY

72% minimum at full output power.

OVERSHOOT

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

OPERATING TEMPERATURE

Continuous duty from -20°C to +71°C with suitable derating above 50°C. At -20°C ripple specifications are doubled. Units will turn on at -40°C.

STORAGE TEMPERATURE

-55°C to +85°C.

OVERLOAD PROTECTION ELECTRICAL

Fixed current limit on each output limits output current to a safe value, thereby providing protection for the load as well as the power supply. CH4 has a two second current limit delay during which it can deliver 150% of the rated output current.

THERMAL

All models include a thermostat. The inverter drive is removed if the fan rotation is blocked. The AC input must be recycled to reset the thermal protection circuitry.

FUSING

Externally accessible line fuse removes the power supply from the input line in the event of a short in the input circuitry. The units also contain an internal fuse.

OVERVOLTAGE PROTECTION

All outputs are provided with overvoltage protection. The mechanism on the main 5V channel will shut the unit down. The mechanism on the auxiliaries will reduce the specific output voltage to a safe low value. The overvoltage protection is reset by cycling the input line.

COOLING

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

IN-RUSH LIMITING

The turn-on in-rush current will not exceed 25 Amps from a cold start on the LRQ-57 (40 Amps on the LRQ-58).

DC OUTPUT CONTROLS

A 10-turn potentiometer is provided for adjustment of each output independently over the entire allowable range.

POWER GOOD INDICATION

Every output includes an independent dual color LED which is green for output good and red for overvoltage, overtemperature or current limit. A TTL power good signal is also provided for each output. A logic "1" indicates DC output power good; logic "0" indicates DC output power not good.

PARALLEL OPERATION

Each output is capable of operating in current sharing parallel with another output of the same voltage with a maximum 10% current imbalance. A single connection per output is required.

INPUT, OUTPUT AND SIGNAL CONNECTIONS

DC output connections are via buss bars. AC input and signal connections are via barrier strips.

MOUNTING

One mounting surface, multiple mounting positions. Metric and standard mounting holes are provided.

HOLD-UP TIME

The DC outputs will remain within regulation specifications in the event of AC failure for 20mSec at 105 or 210VAC at full load.

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. A TTL compatible logic 1 or open circuit turns the unit on and a logic 0 or short turns the unit off. Remote terminals are floating and SELV isolated from the input.

FUNGUS PROOFING

All units are inherently fungus inert.

ISOLATION

Input to output: 3750VAC

Input to ground: 1500VAC

Output to output: 100VAC

All outputs are SELV isolated from each other as well as the input.

MILITARY SPECIFICATIONS

The LRQ Series is designed to meet the following MIL-STD-810D specifications.

Low Pressure	Method 500.2 Procedures I and II for air transport and high altitude ground operation.
High Temp	Method 502.2 Procedures I and II for category hot table 501.2-1.
Low Temp	Method 501.2 Procedures I and II for "basic cold" CI°.
Temp Shock	Method 503.2 for paragraph 3.10, specified storage conditions.
Temp Altitude	Method 504.1 Procedure I per MIL-STD-810C, class 2 (-20°C operating).
Humidity	Method 507.2 Procedures I and II for cycle 1 and cycle 4.
Fungus	Method 508.2 Procedure I.
Vibration	Method 514.3 Category 1 basic transportation, Figures 514.3-1. Common carrier, two hours per axis.
Shock	Method 516.3 Procedure 6.

EMI

Conducted EMI conforms to FCC Docket 20780 Class A, VDE 0871 Curve B and MIL-STD 461A CEO4.

PHYSICAL DATA

Package Model	Lbs. Net	Lbs. Ship	Size Inches
LRQ-57	13.6	14.8	4.875 × 6.5 × 10.25
LRQ-58	17	19	4.875 × 7.25 × 12.75

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.

FINISH

External metal parts are painted gray Fed. Std. 505 No. 2508.

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 LRQ Series is presently under evaluation for UL, CSA and TUV/IEC.

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

MIL-ENVIRONMENT SWITCHING SELECTOR GUIDE

LRQ Series. Quad Output.

MODEL	OUTPUT NUMBER	OUTPUT VOLTAGE RANGE (V) ADJ.	MAXIMUM OUTPUT CURRENT AT AMBIENT OF (A)				MAXIMUM OUTPUT POWER AT V _o MAXIMUM AT AMBIENT OF (W)				COMPLETE ELEC. SPEC. PG.	COMPLETE MECH. SPEC. PG.	DIMENSIONS (Inches)	QTY. 1	PRICE QTY. 10	QTY. 25
LRQ-57	1	3.5-6.0	56.0	56.0	54.0	46.0	580.0	580.0	550.8	436.3	13	148	6.5 × 4.875 × 10.25	\$1220	\$1170	\$1110
	2	10.0-16.0	6.2	6.2	6.0	5.6										
	3	10.0-16.0	3.8	3.8	3.3	3.3										
	4	20.0-30.0	2.8	2.8	2.6	2.6										
LRQ-57-2	1	3.5-6.0	56.0	56.0	54.0	46.0	580.8	580.8	551.2	437.0	13	148	6.5 × 4.875 × 10.25	1220	1170	1110
	2	10.0-16.0	6.2	6.2	6.0	5.6										
	3	10.0-16.0	3.8	3.8	3.3	3.3										
	4	10.0-16.0	5.3	5.3	4.9	4.9										
LRQ-58	1	3.5-6.0	91.0	91.0	88.0	74.0	930.8	930.8	900.3	662.2	13	148	7.25 × 4.875 × 12.75	1510	1450	1370
	2	10.0-16.0	10.3	10.3	10.0	8.3										
	3	10.0-16.0	5.5	5.5	5.3	4.55										
	4	20.0-30.0	4.4	4.4	4.25	3.55										
LRQ-58-2	1	3.5-6.0	91.0	91.0	88.0	74.0	931.6	931.6	901.6	663.3	13	148	7.25 × 4.875 × 12.75	1510	1450	1370
	2	10.0-16.0	10.3	10.3	10.0	8.3										
	3	10.0-16.0	5.5	5.5	5.3	4.55										
	4	10.0-16.0	8.3	8.3	8.05	6.7										

CAMBRIDGE SERIES IN PURE AND APPLIED MATHEMATICS

NOTES:

- CUSTOMER MOUNTING HOLES:
HOLE A: TAPPED # 10-32 4 PLCS.
HOLE B: TAPPED # M4 PITCH 0.7 4 PLCS.
- SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 1/8 INCH.
- CUSTOMER MUST PROVIDE ADEQUATE CLEARANCE FOR MAXIMUM AIR CIRCULATION.

BOTTOM VIEW

1/8" MAX.

7.500

1 1/4"

8.000

1 3/4"

VENTILATION SLOTS

RIGHT SIDE VIEW

4 7/8"

10 1/4"

1 1/4"

REAR VIEW

FAN INLET

8 1/8"

TOP VIEW

1/8" MAX. TYP.

INPUT/OUTPUT CONNECTION POINTS SCREENED ON THIS SURFACE

MODEL NO., PART NOS., ETC. SCREENED ON THIS SURFACE

VENTILATION SLOTS

FRONT VIEW

OUTPUT BUS BAR SCREWS # 10-32 2 PLCS.

OUTPUT BUS BAR SCREWS # 6-32 9 PLCS.

SIGNAL CONNECTORS

POWER GOOD/FAULT INDICATOR 4 PLCS.

INPUT CONNECTIONS SCREENED ON THIS SURFACE

TERMINAL SCREWS # 6

SAFETY GROUND TERMINAL SCREW # 6

FUSE BOX 250 VAC

[illegible]