AC-DC Medical & Industrial

70-180 Watts **RLM Series**



Specification Input

Input Voltage

Input Frequency Inrush Current Power Factor Leakage Current

Output

Output Voltage

Output Voltage Adiustment Minimum Load

Start Up Delay Hold Up Time Initial Set Accuracy Line Regulation Load Regulation

Ripple & Noise Overvoltage Protection Overload Protection Remote Sense

Remote ON/OFF (Optional)

- 85-264 VAC (See Application Note 18 for 24 & 48 VDC input versions) 47-63 Hz
- 40 A pk
- Compliant with EN61000-3-2 <300 uA earth leakage.
 - <100 µA secondary leakage
- See tables (for isolated outputs add suffix '-I')
- ±5.0% V1 only
- 10% required on V1 of multi-output units to maintain stated regulation
- 5 secs max
- 16 ms at 100% load & 85 VAC
- V1 ±1.0%, all other outputs ±5.0%
- 0.5%, 85-264 VAC
- V1 0.5%, V2 6.0%, V3 & V4 5.0%, 10-100% load change
- 1% pk-pk 20 MHz bandwidth
- V1, 110-150%
- 110-160% of nominal load. Outputs cycle on/off auto recovery
 - Single output models only Compensates for 250 mV (See Application Note 12)
- Contact closure shuts off all outputs available only for the RLM150 & RLM185, add suffix -'R'

THE XPERTS IN POWER



Power Fail Standard

Non-standard Outputs

Optional Cover

(67/67 kHz RLM70)

Logic low with input power failure

For screw terminal input/output

connectors add suffix '-T'

100 kHrs at +25 °C GB

to MIL-HDBK-217

10 ms min prior to V1 dropping 1%

(NB: signals connector remain molex)

General

Efficiency 82% typical at 230 VAC, full load Isolation 5656 VDC Input to Output 2121 VDC Input to Ground 707 VDC Output to Ground Switching Frequency 67 kHz PFC, 134 kHz PWM ٠

Power Fail Signal

Screw Terminals (Optional)

MTBF

Environmental

Operating	•	0 ℃ to +70 ℃ - See Derating Curves
Temperature		for -40 °C operation add suffix '-W'
Storage Temperature	•	-40 ℃ to +85 ℃
Shock	•	Transit drop per MIL-STD-810E Method 516.4 Procedure iV
Vibration	•	MIL-STD-810E Method 514.4-1

Vibration

EMC & Safety

- Emissions ESD Susceptibilty Radiated Susceptibility EFT/Burst
- Surge Safety Approvals
- EN55022 Level B conducted EN55022 Level B radiated
- EN61000-4-2 Level 2 contact. Level 3 air
- EN61000-4-3 Level 3
 - EN61000-4-4 Level 3
 - EN61000-4-5 Level 3
 - UL2601-1, UL60950, EN60601-1, EN60950, CSA22.2 No.601-1-M90, CSA22.2 No.60 950-00



OUTPUT VOLTAG	E & CURRENT RA	TINGS - 70 WATT I	MODELS	RLM
Output	Output	Output	Output	Model
1 ⁽¹¹⁾	2	3	4	Number
+3.3 V/6.0 A	+5.0 V/5.0 A	+12.0 V/2.0 A ⁽⁶⁾	-12.0 V/2.0 A ⁽⁶⁾	RLM70PQ41
+5.0 V/6.0 A	+3.3 V/5.0 A	+12.0 V/2.0 A ⁽⁶⁾	-12.0 V/2.0 A ⁽⁶⁾	RLM70PQ42
+5.0 V/6.0 A	+3.3 V/5.0 A	+15.0 V/2.0 A ⁽⁶⁾	-15.0 V/2.0 A ⁽⁶⁾	RLM70PQ43
+5.0 V/6.0 A	-5.0 V/5.0 A	+12.0 V/2.0 A ⁽⁶⁾	-12.0 V/2.0 A ⁽⁶⁾	RLM70PQ44
+5.0 V/6.0 A	-5.0 V/5.0 A	+15.0 V/2.0 A ⁽⁶⁾	-15.0 V/2.0 A ⁽⁶⁾	RLM70PQ45
+5.0 V/6.0 A	+24.0 V/2.0 A	+12.0 V/2.0 A ⁽⁶⁾	-12.0 V/2.0 A ⁽⁶⁾	RLM70PQ46
+5.0 V/6.0 A	+24.0 V/2.0 A	+15.0 V/2.0 A ⁽⁶⁾	-15.0 V/2.0 A ⁽⁶⁾	RLM70PQ47
+5.0 V/6.0 A	+12.0 V/2.0 A		-12.0 V/3.0 A	RLM70PT31
+5.0 V/6.0 A	+15.0 V/2.0 A		-15.0 V/3.0 A	RLM70PT32
+3.3 V/6.0 A	+5.0 V/5.0 A			RLM70PD21
+5.0 V/6.0 A	+12.0 V/4.0 A			RLM70PD22
+5.0 V/6.0 A	+24.0 V/2.0 A			RLM70PD23
+12.0 V/3.0 A	-12.0 V/3.0 A			RLM70PD24
+15.0 V/3.0 A	-15.0 V/2.0 A			RLM70PD25
+5.0 V/6.0 A	-5.0 V/5.0 A			RLM70PD26
2.5 V/14.0 A ⁽¹⁾				RLM70PS2V5
3.3 V/14.0 A				RLM70PS3V3
5.0 V/14.0 A				RLM70PS05
12.0 V/5.8 A				RLM70PS12
15.0 V/4.7 A				RLM70PS15
24.0 V/2.9 A				RLM70PS24
28.0 V/2.5 A				RLM70PS28
48.0 V/1.5 A				RLM70PS48

See Application Notes.

Mechanical Details





equivalent crimp terminal housing with Molex 2478 or equivalent crimp terminal.

DC Output Mating Connector P2

0.156 inch friction lock header mates with Molex 09-50-3081 or equivalent crimp terminal housing with Molex 2478 or equivalent crimp terminal.

Ground Mating Connector

0.187 inch quick disconnect terminal.

P.F./Sense Connector P3

0.100 breakaway header mates with Molex 22-55-2061/50-57-9002 Single/Multi or equivalent crimp terminal housing with Molex type 71851 or equivalent crimp terminal.



OUTPUT VOLTAG	E & CURRENT RA	TINGS - 110 WATT	MODELS	RLM
Output	Output	Output	Output	Model
1 ⁽¹¹⁾ ⁽⁵⁾	2 ⁽⁵⁾	3(4)	4 ⁽⁴⁾	Number
+3.3 V/10.0 A ⁽¹⁾	+5.0 V/6.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM110PQ41
+5.0 V/10.0 A ⁽¹⁾	+3.3 V/6.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM110PQ42
+5.0 V/10.0 A ⁽¹⁾	+3.3 V/6.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM110PQ43
+5.0 V/10.0 A ⁽¹⁾	-5.0 V/6.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM110PQ44
+5.0 V/10.0 A ⁽¹⁾	-5.0 V/6.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM110PQ45
+5.0 V/10.0 A ⁽¹⁾	+24.0 V/2.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM110PQ46
+5.0 V/10.0 A ⁽¹⁾	+24.0 V/2.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM110PQ47
+5.0 V/10.0 A ⁽¹⁾	+12.0 V/3.0 A		-12.0 V/2.0 A	RLM110PT31
+5.0 V/10.0 A ⁽¹⁾	+15.0 V/2.0 A		-15.0 V/2.0 A	RLM110PT32
+3.3 V/10.0 A ⁽¹⁾	+5.0 V/6.0 A			RLM110PD21
+5.0 V/10.0 A ⁽¹⁾	+12.0 V/5.0 A			RLM110PD22
+5.0 V/10.0 A ⁽¹⁾	+24.0 V/3.0 A			RLM110PD23
+12.0 V/5.0 A	-12.0 V/4.0 A			RLM110PD24
+15.0 V/4.0 A	-15.0 V/3.0 A			RLM110PD25
+18.0 V/4.0 A	-18.0 V/3.0 A			RLM110PD26
2.5 V/22.0 A ⁽²⁾				RLM110PS2V5
3.3 V/22.0 A ⁽²⁾				RLM110PS3V3
5.0 V/22.0 A ⁽²⁾				RLM110PS05
12.0 V/9.2 A				RLM110PS12
15.0 V/7.3 A				RLM110PS15
24.0 V/4.6 A				RLM110PS24
28.0 V/3.9 A				RLM110PS28
48.0 V/2.3 A				RLM110PS48
				•

See Application Notes.

Mechanical Details





Option/Sense Connector P3

0.100 breakaway header mates with Molex 50-57-9002/50-57-9006 Single/Multi or equivalent crimp terminal housing with Molex type 71851 or equivalent crimp terminal.



OUTPUT VOLTAG	E & CURRENT RA	TINGS - 150 WATT	MODELS	RLM
Output	Output	Output	Output	Model
1 ⁽¹¹⁾ ⁽⁵⁾	2 ⁽⁵⁾	3 ⁽⁴⁾	4 ⁽⁴⁾	Number
+3.3 V/15.0 A ⁽¹⁾	+5.0 V/8.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM150PQ41
+5.0 V/15.0 A (1)	+3.3 V/8.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM150PQ42
+5.0 V/15.0 A (1)	+3.3 V/8.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM150PQ43
+5.0 V/15.0 A (1)	-5.0 V/8.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM150PQ44
+5.0 V/15.0 A (1)	-5.0 V/8.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM150PQ45
+5.0 V/15.0 A (1)	+24.0 V/3.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM150PQ46
+5.0 V/15.0 A (1)	+24.0 V/3.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM150PQ47
+5.0 V/15.0 A (1)	+12.0 V/5.0 A	+24.0 V/1.0 A	-24.0 V/1.0 A	RLM150PQ10
+5.0 V/15.0 A (1)	+12.0 V/4.0 A		-12.0 V/2.0 A	RLM150PT31
+5.0 V/15.0 A (1)	+15.0 V/3.0 A		-15.0 V/2.0 A	RLM150PT32
+5.0 V/6.0 A	+12.0 V/7.0 A		-12.0 V/3.0 A	RLM150PT34
+3.3 V/15.0 A ⁽¹⁾	+5.0 V/8.0 A			RLM150PD21
+5.0 V/15.0 A (1)	+12.0 V/5.0 A			RLM150PD22
+5.0 V/15.0 A (1)	+24.0 V/3.0 A			RLM150PD23
+12.0 V/7.5 A	-12.0 V/5.0 A			RLM150PD24
+15.0 V/5.0 A				RLM150PD25
2.5 V/30.0 A (2)				RLM150PS2V5
3.3 V/30.0 A (2)				RLM150PS3V3
5.0 V/30.0 A (2)				RLM150PS05
20.0 - 31.0 V/5.4 A				RLM150PS10
12.0 V/12.5 A				RLM150PS12
15.0 V/10.0 A				RLM150PS15
24.0 V/6.3 A				RLM150PS24
28.0 V/5.4 A				RLM150PS28
36.0 V/4.2 A				RLM150PS36
48.0 V/3.1 A				RLM150PS48

See Application Notes.

Mechanical Details





OUTPUT VOLTAG	E & CURRENT RA	TINGS - 185 WATT	MODELS	RLM
Output	Output	Output	Output	Model
1 ^{(11) (5)}	2 ⁽⁵⁾	3(4)	4 ⁽⁴⁾	Number
+3.3 V/20.0 A ⁽¹⁾	+5.0 V/10.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM185PQ41
+5.0 V/20.0 A ⁽¹⁾	+3.3 V/10.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM185PQ42
+5.0 V/20.0 A (1)	+3.3 V/10.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM185PQ43
+5.0 V/20.0 A (1)	-5.0 V/10.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM185PQ44
+5.0 V/20.0 A (1)	-5.0 V/10.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM185PQ45
+5.0 V/20.0 A (1)	+24.0 V/3.0 A	+12.0 V/2.0 A	-12.0 V/2.0 A	RLM185PQ46
+5.0 V/20.0 A (1)	+24.0 V/3.0 A	+15.0 V/2.0 A	-15.0 V/2.0 A	RLM185PQ47
+5.0 V/20.0 A (1)	+12.0 V/5.0 A		-12.0 V/3.0 A	RLM185PT31
+5.0 V/20.0 A (1)	+15.0 V/4.0 A		-15.0 V/3.0 A	RLM185PT32
+3.3 V/20.0 A (1)	+5.0 V/10.0 A			RLM185PD21
+5.0 V/20.0 A (1)	+12.0 V/8.0 A			RLM185PD22
+5.0 V/20.0 A (1)	+24.0 V/4.0 A			RLM185PD23
+12.0 V/10.0 A	-12.0 V/6.0 A			RLM185PD24
+15.0 V/6.0 A	-15.0 V/5.0 A			RLM185PD25
+15.0 V/8.0 A	-24.0 V/4.0 A			RLM185PD26
2.5 V/37.0 A ⁽²⁾				RLM185PS2V5
3.3 V/37.0 A ⁽²⁾				RLM185PS3V3
5.0 V/37.0 A ⁽²⁾				RLM185PS05
12.0 V/15.4 A				RLM185PS12
15.0 V/12.3 A				RLM185PS15
24.0 V/7.7 A				RLM185PS24
28.0 V/6.6 A				RLM185PS28
48.0 V/3.8 A				RLM185PS48

See Application Notes.

Mechanical Details





Derating Graphs



Application Notes

- 1. Rated 10 A (RLM70PS2V5), 8 A (RLM110), 12 A (RLM150), 15 A (RLM185) maximum with convection cooling.
- 2. Rated 16 A (RLM110), 20 A (RLM150), 27 A (RLM185) maximum with convection cooling.
- 3. Total power must not exceed 70 W (RLM70), 110 W (RLM110), 150 W (RLM150), 185 W (RLM185) with 300 LFM forced air cooling and chassis/cover option.
- 4. Total current from outputs 3 & 4 must not exceed 3 A with convection cooling.
- 5. Total current from outputs 1 & 2 must not exceed 12 A (RLM110), 15 A (RLM150), 20 A (RLM185) with convection cooling.
- 6. Rated 1.5 A with convection cooling.
- 7. Semiconductor case temperatures must not exceed +110 °C.
- 8. Each output can deliver its rated current but total output power must not exceed maximum power as determined by the cooling method stated above.
- 9. Sufficient area must be provided around convection cooled power supplies to allow natural movement of air to develop.
- 10. 300 LFM of airflow must be maintained 1 inches above any point of the heatsink in in the direction shown when forced air cooling is required.
- 11. A minimum load of 10% is required on output 1 to ensure proper regulation of remaining outputs. Not required on single output models.
- 12. Remote sense terminals may be used to compensate for cable losses up to 250 mV (RLM70 & 110 single output models only, RLM150 & 185 single output models and V1 of multi output models). The use of a twisted pair is recommended as well as a decoupling capacitor (0.1-10.0 μF) and a capacitor of 100 μF/A connected across the load side.
- 13. Peak to peak output ripple and noise is measured directly at the output terminals of the power supply, without the use of the probe ground lead or retractable tip, 20 MHz bandwidth.
- 14. This power supply has been safety approved and final tested using a DC dielectric strength test.
- 15. Maximum screw penetration into bottom chassis mounting holes is 0.10 inches (2.54 mm).
- 16. Maximum screw penetration into side chassis moutning holes is 0.25 inches (6.35 mm).
- 17. To meet emissions specifications, all four mounting hole ground pads must be electrically connected to a common metal chassis.
- For 18-36 VDC input replace P in part number with 24 eg RLM7024S12.
 For 36-72 VDC input replace P in part number with 48 eg RLM7048S12.

