110 WATTS

REL-110 SERIES

NO MINIMUM ORDER REQUIRED

Features

- RoHS Compliant
- Universal 85-264 VAC Input
- Advanced SMT Design
- Compact 3.0" X 5.0" X 1.3" Size
- 2 Year Warranty
- Fits 1U Application
- One to Four Outputs
- EN 60950-1 ITE Certification
- EN 60601-1 Medical Certification
- Class B Emissions Per EN 55011/22
- Harmonic Current per EN 61000-3-2
- EMC to EN 61000-6-2 & EN 60601-1-2
- Optional Chassis & Cover
- High Efficiency

OPEN FRAME

CHASSIS/COVER

OUTPUT SPECIFICATIONS

Total Output Power at 50c	80W Convection Cooled 110W 300 LMF Forced Air
Output Voltage Centering	Output 1: +/-0.5% Output 2: +/-5.0% Output 3: +/-5.0% Output 4: +/-5.0% (All outputs at 50% load)
Source Regulation	Outputs 1-4: 0.5%
Load Regulation	Output 1:0.5% Output 2: 5.0% (4001-5) 8.0% (2001) 6.0% Output 3: 5.0% Output 4: 5.0% (10-100% load change)
Cross Regulation	Output 2-4: 5.0%
Output Voltage Adjust Range	Output 1: 95%-105%
Output Noise	Outputs 1-4: 1.0%
Turn On Overshoot	None
Transient Response Voltage Deviation Recovery Time Load Change	Outputs 1-4: 5.0% 500 ÂµS 50% To 100%
Output Overvoltage Protection	Output 1: 110% to 150%
Output Overpower Protection	110-160% rated Pout, cycle on/off, auto recovery
Hold Up Time	16 mS Min, Full Power 85 V Input
Start Up Time	4 Second, 120V Input

INPUT SPECIFICATIONS

Source Voltage	85-264 Voltage AC
Frequency Range	47-63 Hz
Peak Inrush Current	40A
Efficiency	.82% Typ., Full Power, 230V (Varies by model)
Power Factor	0.95(Full Power, 230V)

ENVIRONMENTAL SPECIFICATIONS

Ambient Operating Temperature Range	0°C to +70°C Derating: See Power Rating Chart
Ambient Storage Temp. Range	-40°C to +85°C
Temperature Coefficient	Outputs 1-4: 0.02%/°C

ELECTROMAGNETIC COMPATIBILITY

Electrostatic Discharge	EN 61000-4-2	+/-8kV Contact Discharge +/-8kV Air Discharge
Radiated Electro-magnetic Field	EN 61000-4-3	80MHz-2.5GHz, 10V/m, 80% AM
EFT/Bursts	EN 61000-4-4	+/-2kV
Surges	EN 61000-4-5	+/-1 kV Common Mode +/-2 kV Differential Mode
Conducted Immunity	EN 61000-4-6	.15-80MHz., 10V, 80% AM
Voltage Dips and Interruptions	EN 61000-4-11	30% Dip.500ms 95% Dip,10ms 60% Reduction,1s (Criteria B) 95% Reduction,5000ms
Radiated Emissions	EN55011/22Class B	
Conducted Emissions	EN55011/22Class B	
Harmonic Current Emissions	EN 61000-3-2	
Voltage Fluctuations and Flicker	EN 61000-3-3	

GENERAL SPECIFICATIONS

Dielectric Strength	
Reinforced Insulation	5656 VDC, Primary to Secondary, 1 Sec.
Basic Insulation	2121 VDC, Primary to Ground, 1 Sec.
Operational Insulation	500 VDC, Secondary to Ground, 1 Sec.
Leakage Current	<300 ÂµA Earth Leakage Current
Power Fail Signal	Logic low with input power failure 10mS minimum prior to output 1 dropping 1%
Remote Sense(singles only)	250mV compensation of output cable losses
Mean Time Between Failures	100,000 Hours min., MIL-HDBK-217F, 25°C, GB
Weight	0.80 Lbs. Open Frame 1.28 Lbs. Chassis and Cover

MODEL LISTING

Model	Output 1	Output 2	Output 3	Output 4
REL-110-4001	+3.3V/10A(1)	+5V/6A	+12V/2A	-12V/2A
REL-110-4002	+5V/10A(1)	+3.3V/6A	+12V/2A	-12V/2A
REL-110-4003	+5V/10A(1)	+3.3V/6A	+15V/2A	-15V/2A
REL-110-4004	+5V/10A(1)	-5V/6A	+12V/2A	-12V/2A
REL-110-4005	+5V/10A(1)	-5V/6A	+15V/2A	-15V/2A
REL-110-4006	+5V/10A(1)	+24V/2A	+12V/2A	-12V/2A
REL-110-4007	+5V/10A(1)	+24V/2A	+15V/2A	-15V/2A
REL-110-4009	+5V/10A(1)	+24V/2A	+7V/2.5A	-7V/2.5A
REL-110-3001	+5V/10A(1)	+12V/3A		-12V/3A
REL-110-3002	+5V/10A(1)	+15V/2A		-15V/2A
REL-110-3003	+8V/6A(1)	-8V/1A		+30V/1A
REL-110-3004	+9V/3A(1)	+24V/3A	+13V/2A	
REL-110-2001	+3.3V/10A(1)	+5V/6A		
REL-110-2002	+5V/10A(1)	+12V/5A		
REL-110-2003	+5V/10A(1)	+24V/3A		
REL-110-2004	+12V/5A	-12V/4A		
REL-110-2005	+15V/4A	-15V/3A		
REL-110-2006	+18V/4A	-18V/3A		
REL-110-1001	2.5V/22A(2)			
REL-110-1002	3.3V/22A(1)			
REL-110-1003	5V/22A(1)			
REL-110-1004	12V/9.2A			
REL-110-1005	15V/7.3A			
REL-110-1006	24V/4.6A			
REL-110-1007	28V/3.9A			
REL-110-1008	48V/2.3A			

Notes

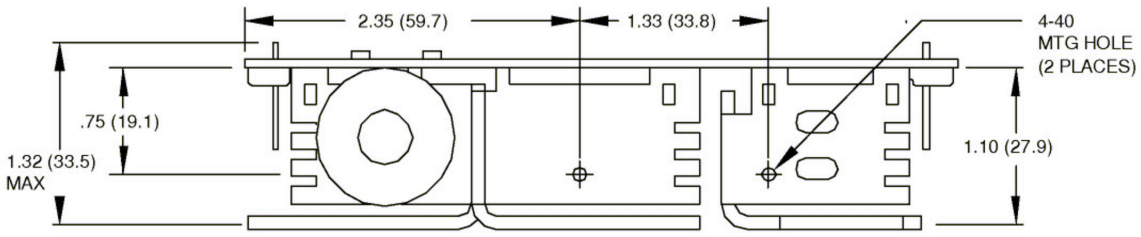
Consult factory for alternate output configuration.
Consult factory for positive, negative or floating outputs.
Refer to Application Information for complete output power ratings.
All specifications are maximum at 25°C unless otherwise stated and are subjected to change without notice.
Specify optional chassis and cover when ordering.

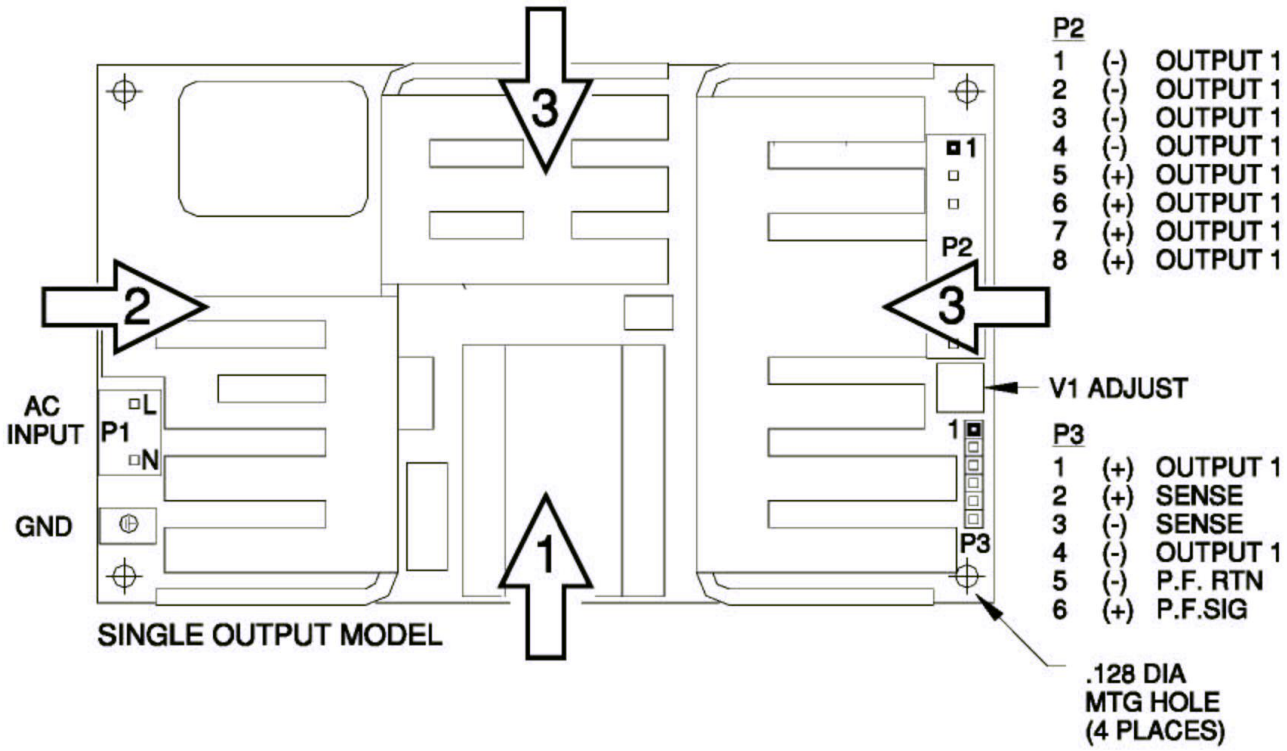
SAFETY SPECIFICATIONS

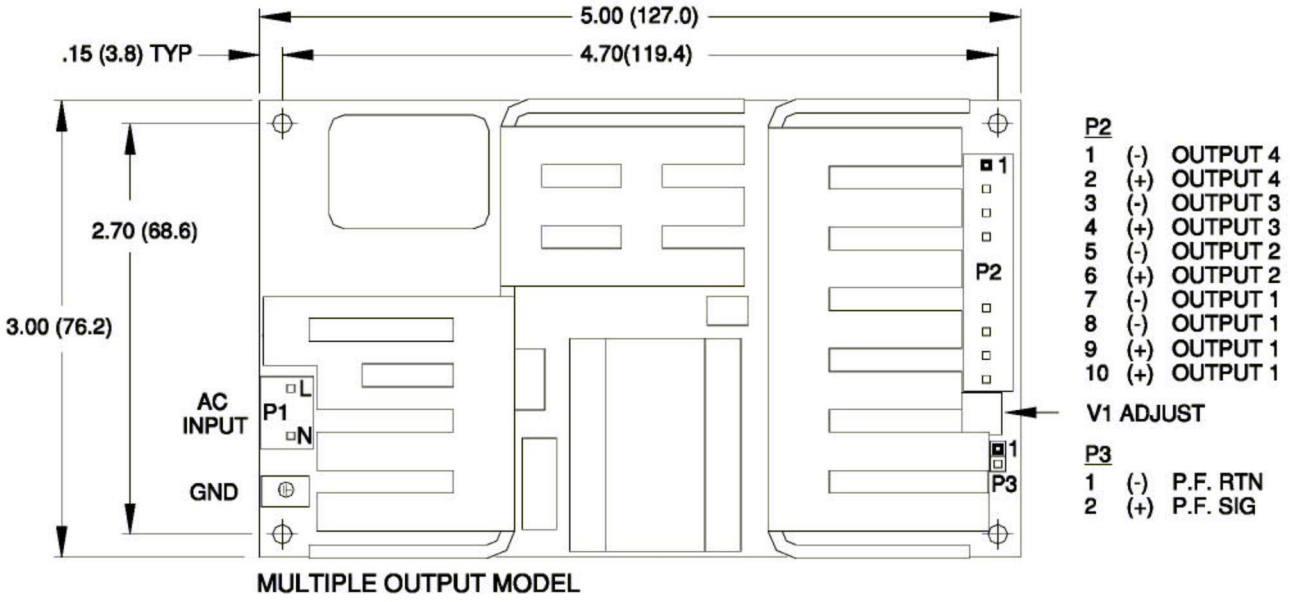
General		Protection Class:	I
		Overvoltage Category:	II
		Pollution Degree:	2
c UL us	Underwriters Laboratories File E137708/E140259	UL 60950-1 First Edition UL 60601-1 First Edition	
IECEE CB SCHEME		CB Report Per IEC 60950-1(2001) First Edition Deviations CB Report Per IEC 60601-1(1988) First Edition, A1, A2	All National
c UL us	UL Recognition Mark for Canada File E137708/E140259	CAN/CSA-C22.2 No. 60950-1-03 601-1-M90	CAN/CSA-C22.2 No. with updates 1 and 2
TUV	TUV	EN 60950-1:2001 EN 60601-1/A2: 1995	
CE		Low Voltage Directive	

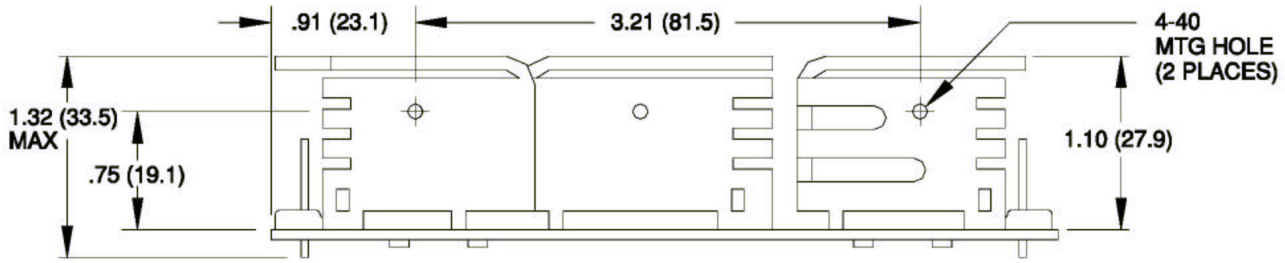
REL-110 SERIES MECHANICAL SPECIFICATIONS

OPEN FRAME

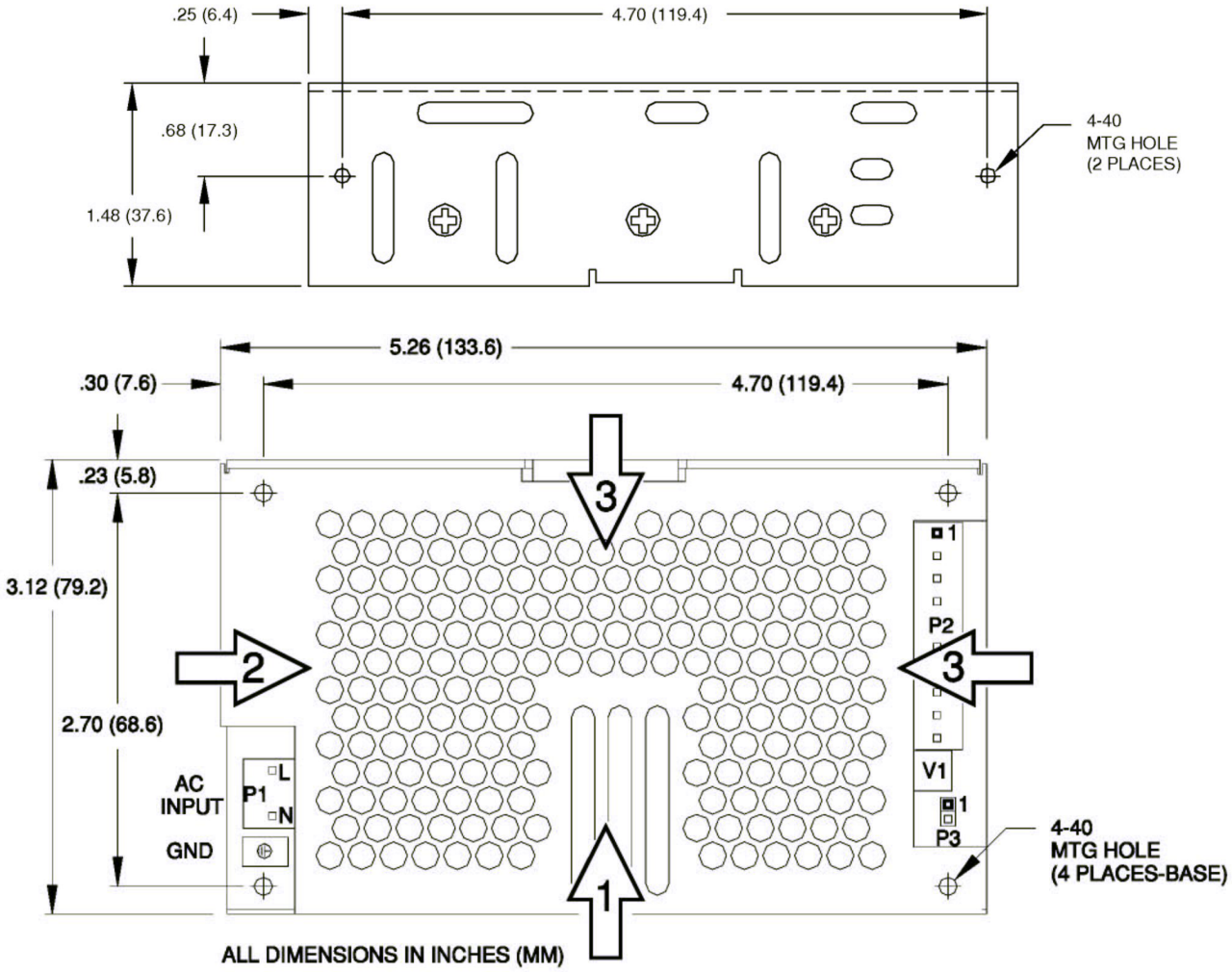



P2
1 (-) OUTPUT 1
2 (-) OUTPUT 1
3 (-) OUTPUT 1
4 (-) OUTPUT 1
5 (+) OUTPUT 1
6 (+) OUTPUT 1
7 (+) OUTPUT 1
8 (+) OUTPUT 1
V1 ADJUST
P3
1 (+) OUTPUT 1
2 (+) SENSE
3 (-) SENSE
4 (-) OUTPUT 1
5 (-) P.F. RTN
6 (+) P.F.SIG
AC INPUT
P1
L
N
GND
P2
P3
1
2
3
SINGLE OUTPUT MODEL
.128 DIA
MTG HOLE
(4 PLACES)


5.00 (127.0)
.15 (3.8) TYP
4.70(119.4)
2.70 (68.6)
3.00 (76.2)
P2
1 (-) OUTPUT 4
2 (+) OUTPUT 4
3 (-) OUTPUT 3
4 (+) OUTPUT 3
5 (-) OUTPUT 2
6 (+) OUTPUT 2
7 (-) OUTPUT 1
8 (-) OUTPUT 1
9 (+) OUTPUT 1
10 (+) OUTPUT 1
V1 ADJUST
P3
1 (-) P.F. RTN
2 (+) P.F. SIG
AC INPUT
P1
L
N
GND
MULTIPLE OUTPUT MODEL


.91 (23.1)
3.21 (81.5)
4-40
MTG HOLE
(2 PLACES)
1.32 (33.5)
MAX
.75 (19.1)
1.10 (27.9)

OPTIONAL CHASSIS/COVER



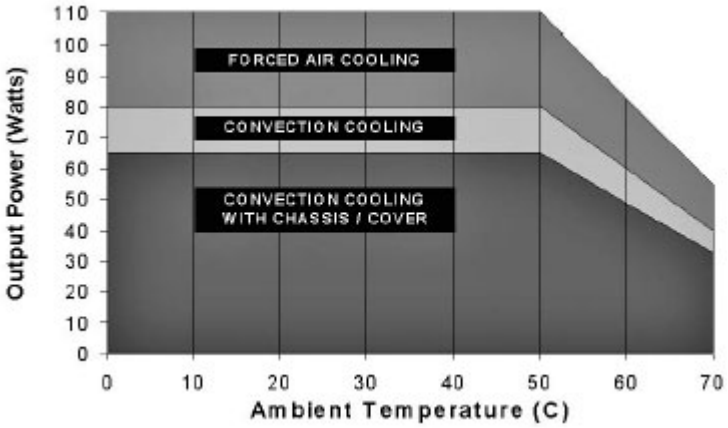
APPLICATIONS INFORMATION

1. Rated 8A maximum with convection cooling.
2. Rated 16A maximum with convection cooling.
3. Total power must not exceed 80 watts with convection cooling on open frame models except where noted.
4. Total power must not exceed 110 watts with 300LFM forced air cooling on open frame models.
5. Total power must not exceed 65 watts with convection cooling and chassis/cover option.
6. Total power must not exceed 110 watts with 300LFM forced air cooling and chassis/cover option.
7. Total current from Outputs 3 & 4 must not exceed 3 amps with convection cooling.
8. Total current from Outputs 1 & 2 must not exceed 12 amps with convection cooling.
9. Semiconductor case temperature must not exceed 110^{o} C.
10. Each output can deliver its rated current but total output power must not exceed maximum power as determined by the cooling method state above.
11. Sufficient area must be provided around convection cooled power supplies to allow natural movement of air to develop.
12. 300 linear feet per minute of airflow must be maintained one inch above any point of the heatsink in the direction shown when forced air cooling is required.
13. This product is intended for use as a professionally installed component within information technology and medical equipment.
14. A minimum load of 10% is requured on output one to ensure proper regulation of remaining outputs.
15. Remote sense terminals may be used to compensate for cable losses up to 250mV (single output

models only). The use of a twisted pair is recommended as well as a decoupling capacitor (0.1-10uF) and a capacitor of 100uF/amp connected across the load side.

16. 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.
17. This product was type tested and safety certificated using the the dielectric strength test voltages listed in Table V of UL 60601-1. In consideration of clause 20.4g, care must be taken to insure the voltage applied to a reinforced insulation does not over stress basic insulation. Secondary to ground capacitors may need to be removed prior to performing a dielectric strength type test on the end product. It is highly recommended that the DC test voltages listed in DVB.1. Annex DVB are not exceeded during a production-line dielectric strength test of the assembled end product. Please consult factory for further information.
18. This power supply has been safety approved and final tested using a DC dielectric strength test. Please consult factory before performing AC dielectric strength test.
19. Maximum screw penetration into bottom chassis mounting holes is .100 inches.
20. Maximum screw penetration into side chassis mounting holes is .188 inches.
21. To meet emissions specifications, all four mounting hole ground pads must be electrically connected to a common metal chassis. Chassis/cover option recommended.
22. This product is use only one fuse in the input circuit. In consideration of clause 57.6 of UL 60601-1, a second fuse may be required in the end product.

Maximum Output Power vs. Ambient Temperature



CONNECTOR SPECIFICATIONS

P1	AC Input	.156 friction lock header mates with Molex 09-50-3031 or equivalent crimp terminal housing with Molex 2478 or equivalent crimp terminal.
P2	DC Output (Single)	.156 friction lock header mates with Molex 09-50-3081 or equivalent crimp terminal housing with Molex 2478 or equivalent crimp terminal.
P2	DC Output (Multiple)	.156 friction lock header mates with Molex 09-50-3101 or equivalent crimp terminal housing with Molex 2478 or equivalent crimp terminal.
G	Ground	.187 quick disconnect terminal.
P3	P.F./Sense (Single)	.100 breakaway header mates with Molex 50-57-9006 or equivalent crimp terminal housing with Molex type 71851 or equivalent crimp terminal.
P3	P.F. (Multiple)	.100 breakaway header mates with Molex 50-57-9002 or equivalent crimp terminal housing with Molex type 71851 or equivalent crimp terminal.

RECOMMENDED AIR FLOW DIRECTION

1.Optimum 2.Good 3.Fair