

RCL175 Series



- 175 W with 12 CFM cooling
- 200 W Peak Capability
- Up to 120 W Convection-cooled
- Low Leakage Current
- Industrial, IT & Medical Approvals
- Level B Conducted Emissions
- Class I & II Operation
- EN61000-3-2, -3 Compliant
- 4 Mechanical Options
- Flexible Design for Modified Standards
- Universal AC Input
- Single, Dual, Triple & Quad Outputs
- Mating Connector & Cable Harnesses Available

Approved for Class I and Class II applications, XP Power's RCL range of single and multiple output AC-DC, 175 W power supplies features the world's smallest footprint for units of these ratings. The open frame version measures just 5.5" long x 3.71" wide (140 mm x 94.1 mm) and 1.28" (34.6 mm) high. These high-density power supplies meet EN55022 Level B conducted emissions with maximum leakage currents of 120 μ A at 115 VAC or 200 μ A at 230 VAC. As a result, these switchers are equally suitable for industrial, IT and medical applications, with no price premium for meeting medical requirements.

The RCL175 series has single output versions from 3.3 V to 48 V DC, adjustable by $\pm 10\%$, and dual, triple and quad output versions covering combinations of 3.3 V, 5 V, 12 V, 15 V and 24 V. They are dual-fused for compliance with IEC60601-1 and efficiency is 80-90%, depending upon the model, so minimal excess heat is generated.

The power supplies deliver full power between -10 °C and +50 °C and will operate at up to +70 °C with derating and require only 12 CFM of cooling for full power operation, with up to 120 W possible when convection-cooled. Comprehensive overvoltage, overload and short circuit protection is built in. Covers, cable harnesses and connector kits are available.



T H E X P E R T S I N P O W E R

Input Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	90 ⁽¹⁾		264	VAC	120-370 VDC
Input Frequency	47	50/60	63	Hz	
Power Factor		0.9			230 VAC
Input Current - No Load		100		mA	230 VAC
Input Current - Full Load			2.1	A	115 VAC
Inrush Current			35	A	230 VAC
Earth Leakage Current			120/200	µA	115/230 VAC
Input Protection	T3.15 A/250 V internal fuse in both line and neutral				

Note:

1. Minimum input voltage is 85 VAC but output power must be derated to 95%.

Output Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage					See Models and Ratings table
Initial Set Accuracy			±2	%	
Output Voltage Adjustment	±10			%	V1 (via pot), outputs 2-4 track by same %
Minimum Load			1.5	A	V1 of multi-output models, 100 mA on auxiliaries
Start Up Delay			2	s	
Start Up Rise Time			100	ms	
Hold Up Time	20			ms	Nominal low line & maximum power
Drift			±0.2	%	
Line Regulation			±0.5	%	90-264 VAC
Load Regulation			1) V1 & V2: ±3 V3 & V4: ±5 of nominal 2) V1: ±1 V2, V3 & V4: ±5 of nominal	%	1) PQ41, 42, 43 2) All other models
Transient Response			4	%	Deviation with a 25% load change at 1 A/µs. Recovery within 1% in less than 500 µs
Ripple & Noise	50		200	mV	20 MHz bandwidth dependent on output voltage
Overvoltage Protection	115		140	%	
Short Circuit Protection	Single output models: constant current limit. Multi-output models: foldback current limit.				
Temperature Coefficient			0.02	%/°C	

General Specifications

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Reliability and Service Life					
Mean Time Between Failure		100		kHrs	MIL-HDBK-217F @ 25 °C
Isolation					
Input to Output Test Voltage	4000			VAC	Test duration: 1 min
Input to Ground Test Voltage	1500			VAC	Test duration: 1 min
Output to Ground Test Voltage	1500 500			VAC	Test duration: 1 min (Open Frame) ⁽¹⁾ Test duration: 1 min (U Channel & Covered)
Other Specifications					
Switching Frequency: PFC		75		kHz	
Switching Frequency: PWM		60		kHz	
Weight	1.1 (500)		2.0 (900)	lb (g)	Depending on mechanical configuration

Note:

1. Unit to be mounted on plastic spacers.

2. All specifications are at nominal input and full resistive load at 25 °C, unless otherwise stated.

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-10		+70	°C	See derating curves
Storage Temperature	-20		+85	°C	
Cooling			12	CFM	For 175 W of output power
Humidity			95	%RH	Non-condensing
Operating Altitude			3000	m	
Shock			30	G peak	Half sine 6 axes
Vibration			2	G	5 Hz to 500 Hz, 3 axes

Electromagnetic Compatibility - Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	3	A	
EFT	EN61000-4-4	3	B	
Radiated Field	EN61000-4-3	10 V/m	B	
Surges	EN61000-4-5	3	B	
Conducted	EN61000-4-6	10 V/m	A	
Dips and Interruptions	EN61000-4-11	70% Ut	A	For 10 ms
		40% Ut	B	For 100 ms

Electromagnetic Compatibility - Emissions

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Conducted	EN55022/11	Class B		
Radiated	EN55022/11	Class A		
Voltage Fluctuations	EN61000-3-3			
Flicker	EN55022/11	Class A		

Efficiency

Phenomenon	Typical	Units	Notes & Conditions
RCL175PS24	89.0	%	230 VAC input, full load (see curves)
RCL175PQ42	83.0	%	230 VAC input, full load (see curves)

Safety Agency Approvals

Standard	Category
EN60950	2000
UL/cUL 60950	3rd Edition
UL/cUL 60601-1	1st Edition (2003)
IEC 60950	IEC 60950 (2001) 1st Edition
IEC60601-1	IEC 60601-1 (1998) 2nd Edition, amd nos. 1&2

Models and Ratings

Total Power			Output 1				Output 2 ⁽⁶⁾				Output 3 ^(6,8)			Output 4 ^(6,8)			Model Number
Max ⁽⁷⁾	Peak	Conv. ^(4,5)	V	Min	Max	Peak ⁽¹⁾	V	Min	Max	Peak ⁽¹⁾	V	Min	Max	V	Min	Max	
99 W	N/A	80 W	3.3 V	0.0 A	30.0 A	-											RCL175PS03
150 W	N/A	100 W	5.0 V	0.0 A	30.0 A	-											RCL175PS05
175 W	204 W	120 W	12.0 V	0.0 A	14.5 A	17.0 A											RCL175PS12
175 W	195 W	120 W	15.0 V	0.0 A	11.6 A	13.0 A											RCL175PS15
175 W	200 W	120 W	24.0 V	0.0 A	7.2 A	8.3 A											RCL175PS24
175 W	200 W	120 W	28.0 V	0.0 A	6.2 A	7.1 A											RCL175PS28
175 W	202 W	120 W	48.0 V	0.0 A	3.6 A	4.2 A											RCL175PS48
175 W	200 W	110 W	5.0 V	1.5 A	15.0 A	-	12.0 V	0 A	8.3 A	10.4 A							RCL175PD22 ⁽⁴⁾
175 W	200 W	110 W	5.0 V	1.5 A	15.0 A	-	24.0 V	0 A	4.2 A	5.2 A							RCL175PD23 ⁽⁴⁾
175 W	200 W	110 W	5.0 V	1.5 A	15.0 A	-	12.0 V	0 A	6.3 A	8.4 A				F 12 V	0 A	2 A	RCL175PT31 ⁽⁴⁾
175 W	200 W	110 W	5.0 V	1.5 A	15.0 A	-	15.0 V	0 A	4.6 A	6.6 A				F 15 V	0 A	2 A	RCL175PT32 ⁽⁴⁾
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	3.3 V	0 A	15.0 A	-	F 12 V	0 A	2 A	F 12 V	0 A	2 A	RCL175PQ42 ⁽⁵⁾
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	3.3 V	0 A	15.0 A	-	F 15 V	0 A	2 A	F 15 V	0 A	2 A	RCL175PQ43 ⁽⁵⁾
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	12.0 V	0 A	5.5 A	7.6 A	F 12 V	0 A	2 A	F 5 V	0 A	2 A	RCL175PQ44
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	15.0 V	0 A	4.0 A	6.0 A	F 15 V	0 A	2 A	F 5 V	0 A	2 A	RCL175PQ45 ⁽⁴⁾
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	24.0 V	0 A	3.2 A	5.0 A	F 12 V	0 A	2 A	F 12 V	0 A	2 A	RCL175PQ46 ⁽⁴⁾
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	24.0 V	0 A	3.0 A	5.0 A	F 15 V	0 A	2 A	F 15 V	0 A	2 A	RCL175PQ47 ⁽⁴⁾
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	12.0 V	0 A	6.3 A	8.4 A	F 12 V	0 A	2 A	F 12 V	0 A	2 A	RCL175PQ48

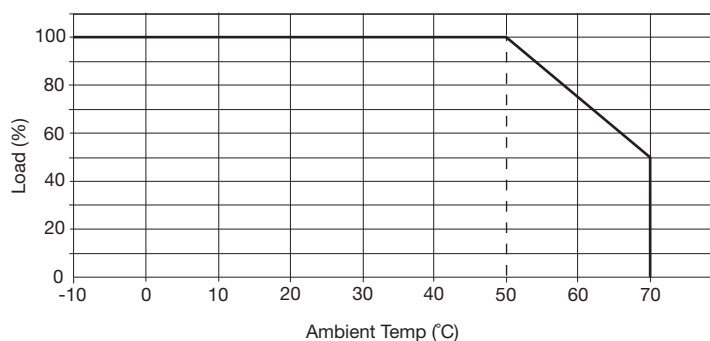
Note:

1. Peak rating can be taken for 5 seconds in every minute.
2. There is a user-accessible fan supply rated at 12 V at 350 mA (not available on fan-cooled units).
3. For operation at 85 VAC output power is derated to 95%.
4. OP1 10 A max convection-cooled.
5. 20 A max from output 1 and 2 combined convection-cooled.
6. A minimum load of 100 mA is required on output 2, 3 and 4 to maintain the regulation figures.
7. 12 CFM airflow required for maximum power.
8. Outputs 3 & 4 are floating. They can be connected externally for positive or negative output.

Options

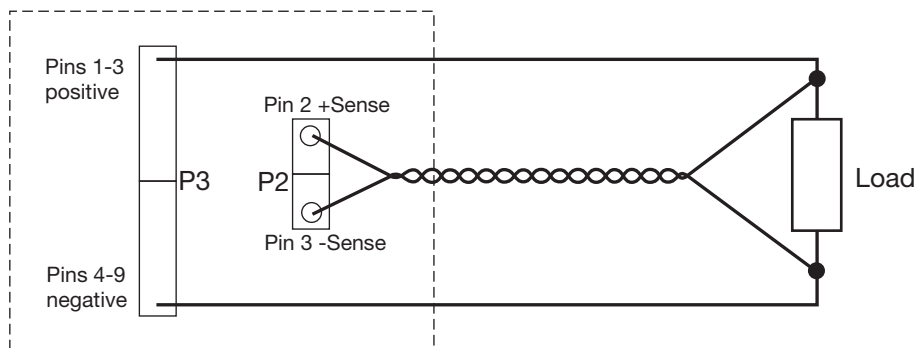
- For the U-channel version, add suffix '-U' to the model number.
- For the U-channel version with cover kit, add suffix '-C' to the model number.
- For the U-channel version with fan cover kit, add suffix '-F' to the model number.
- For screw terminals, add suffix '-S' to the model number.
- For conformally coated versions, add suffix '-T' to the model number.
- For versions with remote enable, add suffix '-E' to the model number.
- For foldback current limit on single output models, add suffix '-D' to the model number.
- For constant current limit (output 1 & 2) on multi output models, add suffix '-P' to the model number.

Thermal Derating Curve



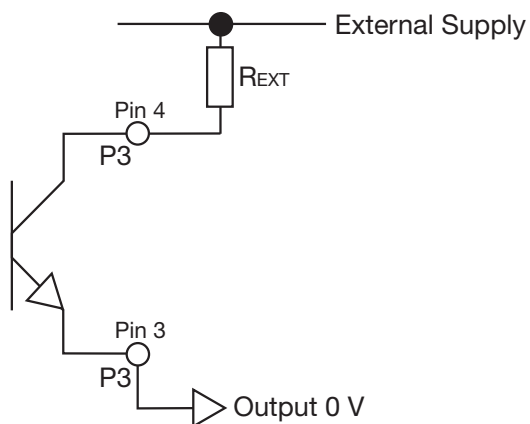
Remote Sense

V1 only, compensates for 0.5 VDC or 10%, whichever is lower.



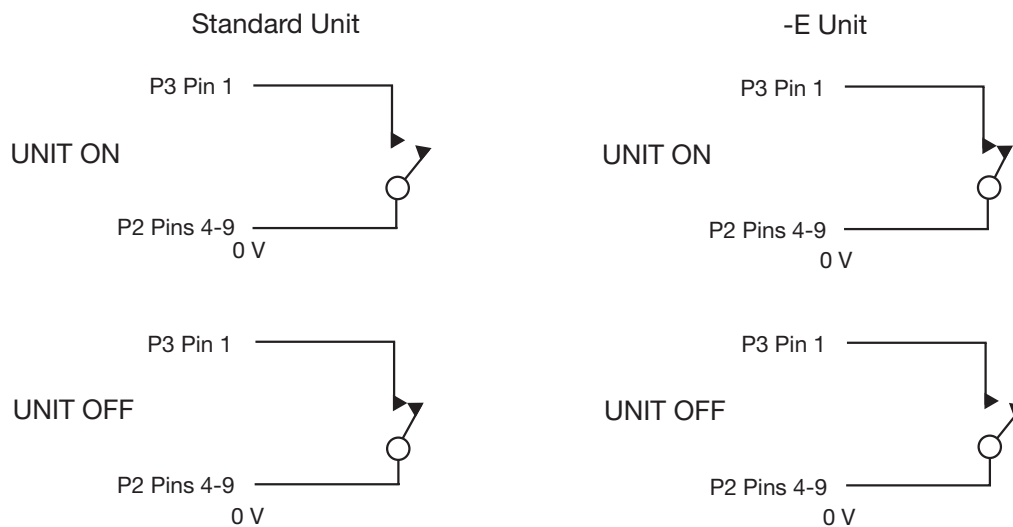
Power Fail

Open Collector output refers to 0V Sense. When using the Power Fail signal, -Sense must be connected to OP1 & 2 Return (0V).

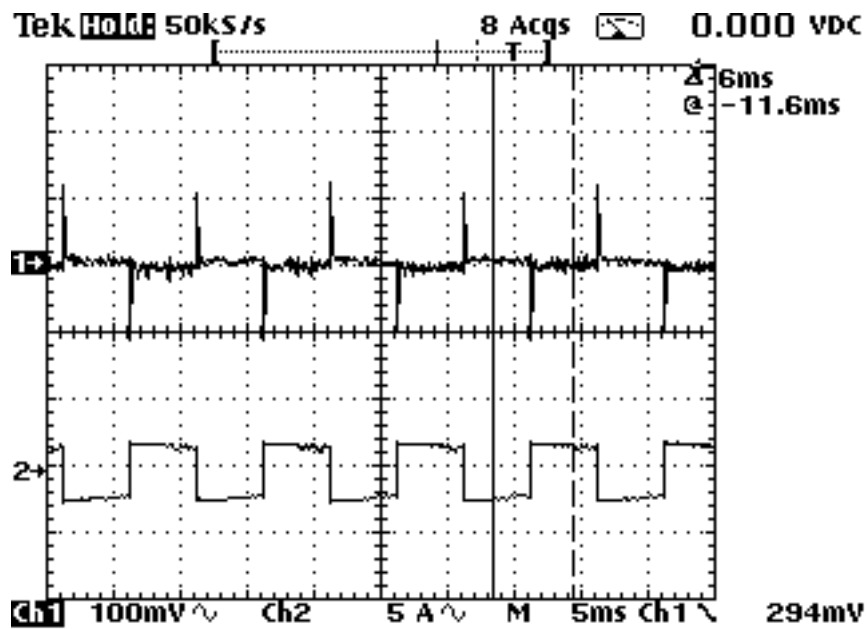


Remote On/Off

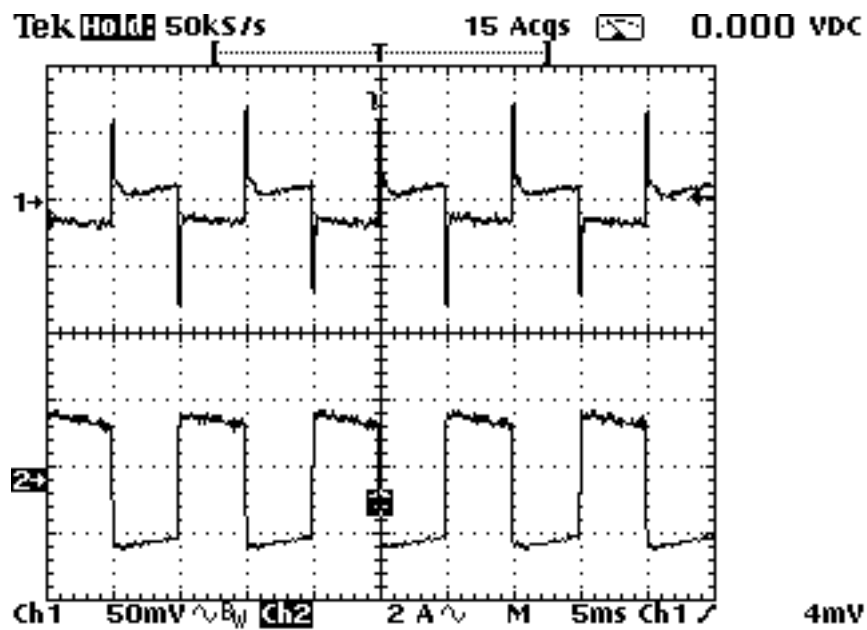
Connect Pin 1 (P3) to 0V to disable unit (optional enable, specify suffix '-E' with the model number).



Transient Response

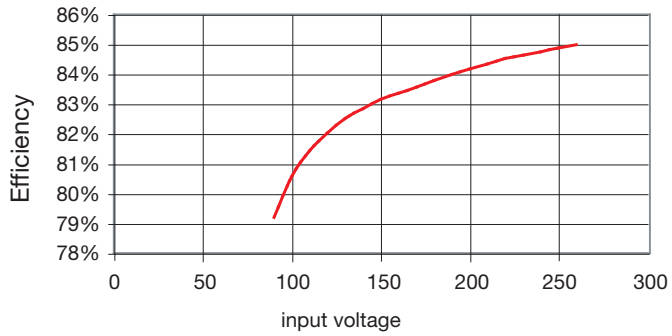


RCL175PS12 25% Load Change

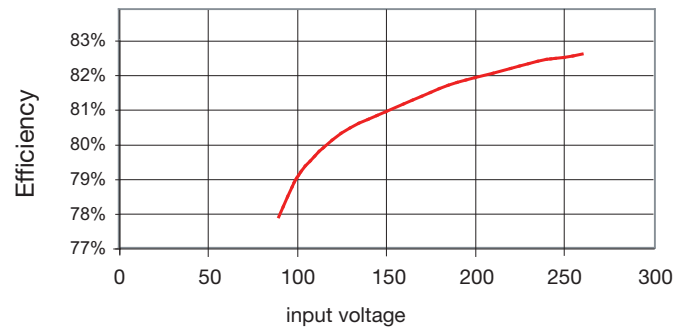


RCL175PQ42 O/P 1 25% Load Change

Efficiency Against Input Voltage

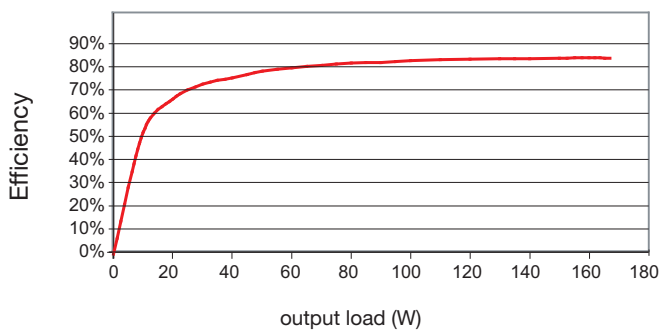


RCL175PS12 175 W Load

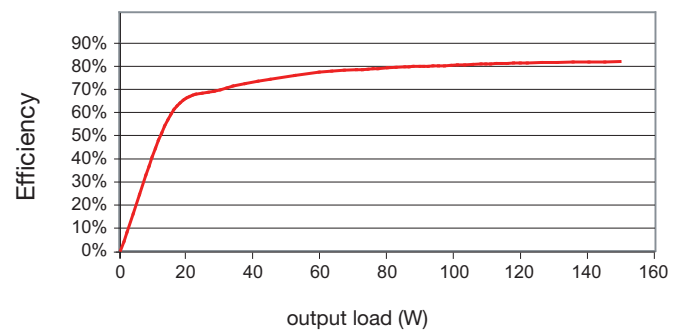


RCL175PQ42 175 W Load

Efficiency Against Output Load

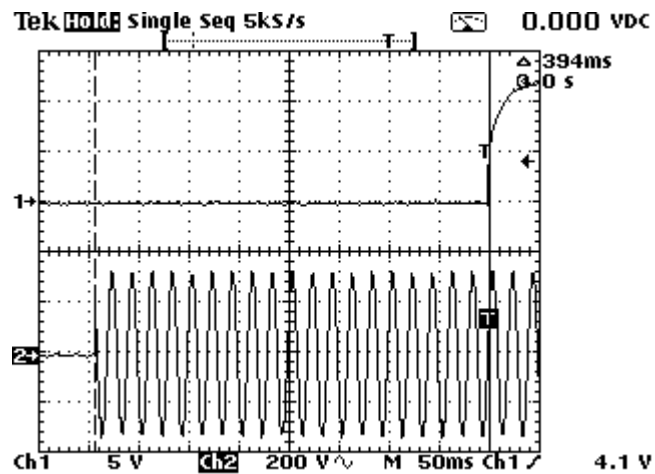


RCL175PS12 @ 230 VAC Input

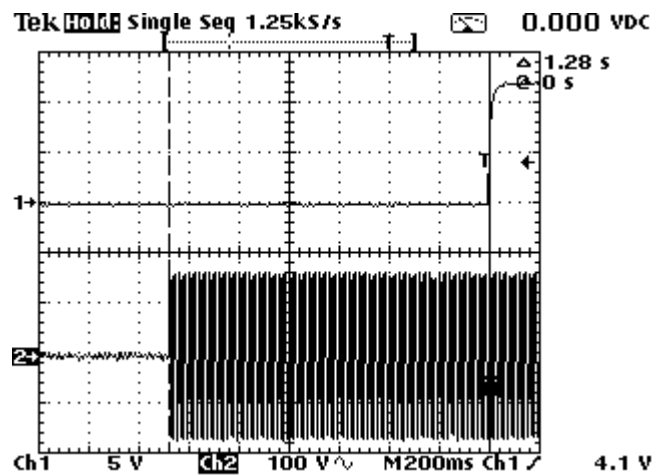


RCL175PQ42 @ 230 VAC Input

Start Up Time

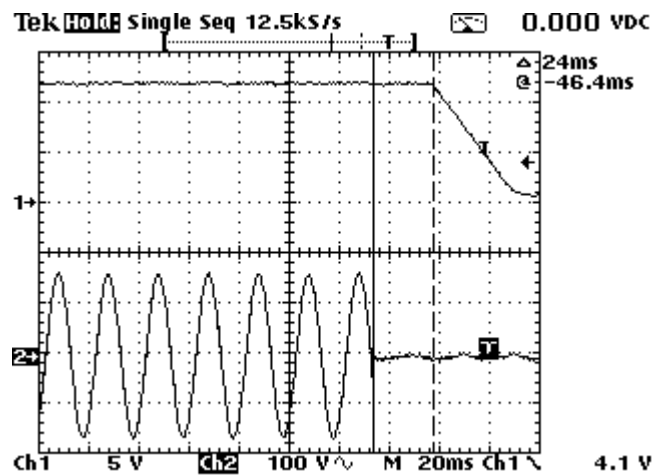


RCL175PS12 230 VAC 100% Load



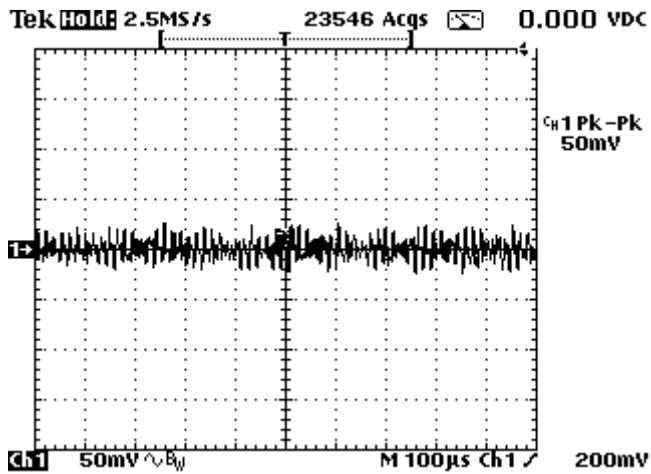
RCL175PQ42 115 VAC FULL Load

Hold Up Time

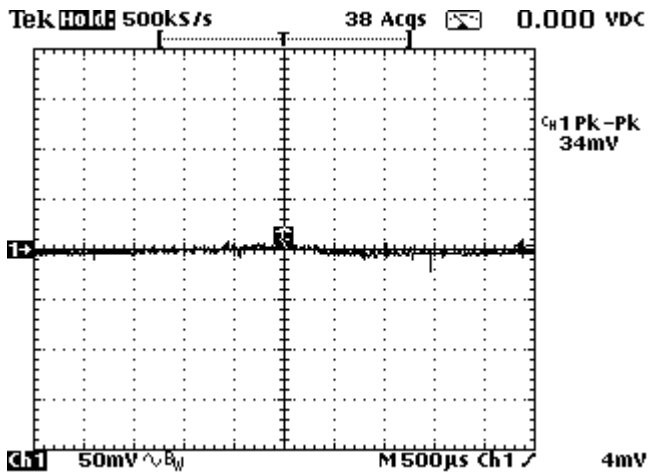


RCL175PS12 100% Load 115 VAC Input

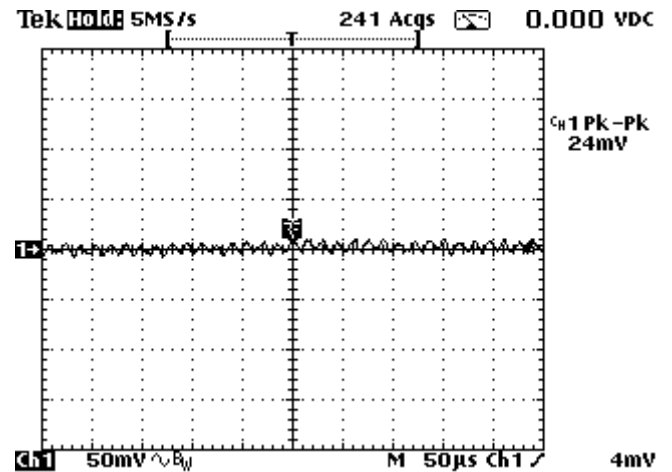
Output Noise & Ripple



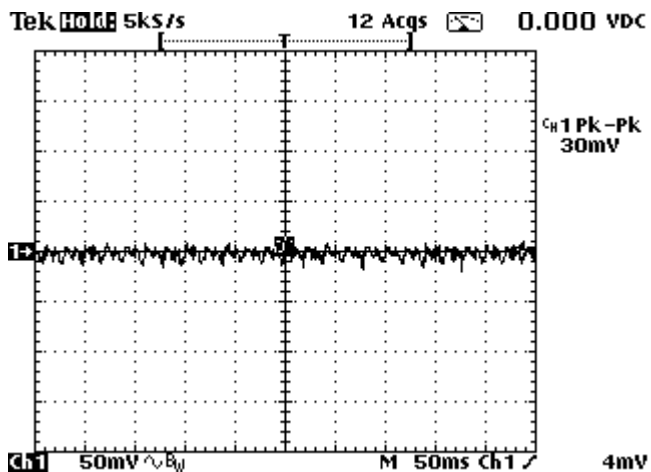
RCL175PS12 with 175 W load.
Noise measured is 50 mV pk-pk



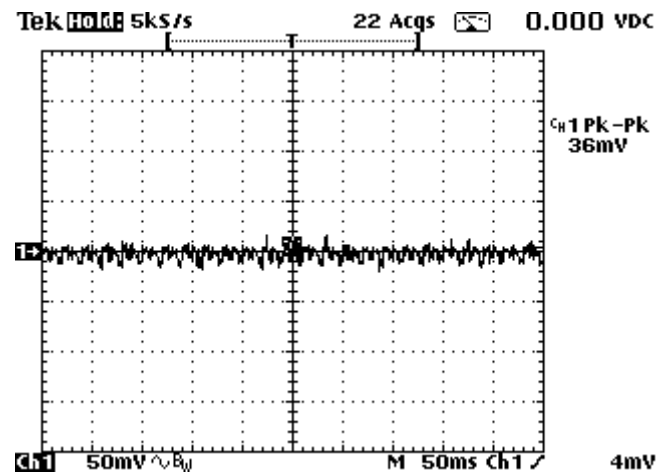
RCL175PQ42 O/P 1 with 75 W load.
Noise measured is 34 mV pk-pk



RCL175PQ42 O/P 2 with 50 W load.
Noise measured is 24 mV pk-pk



RCL175PQ42 O/P 3 with 24 W load.
Noise measured is 30 mV pk-pk



RCL175PQ42 O/P 4 with 24 W load.
Noise measured is 36 mV pk-pk

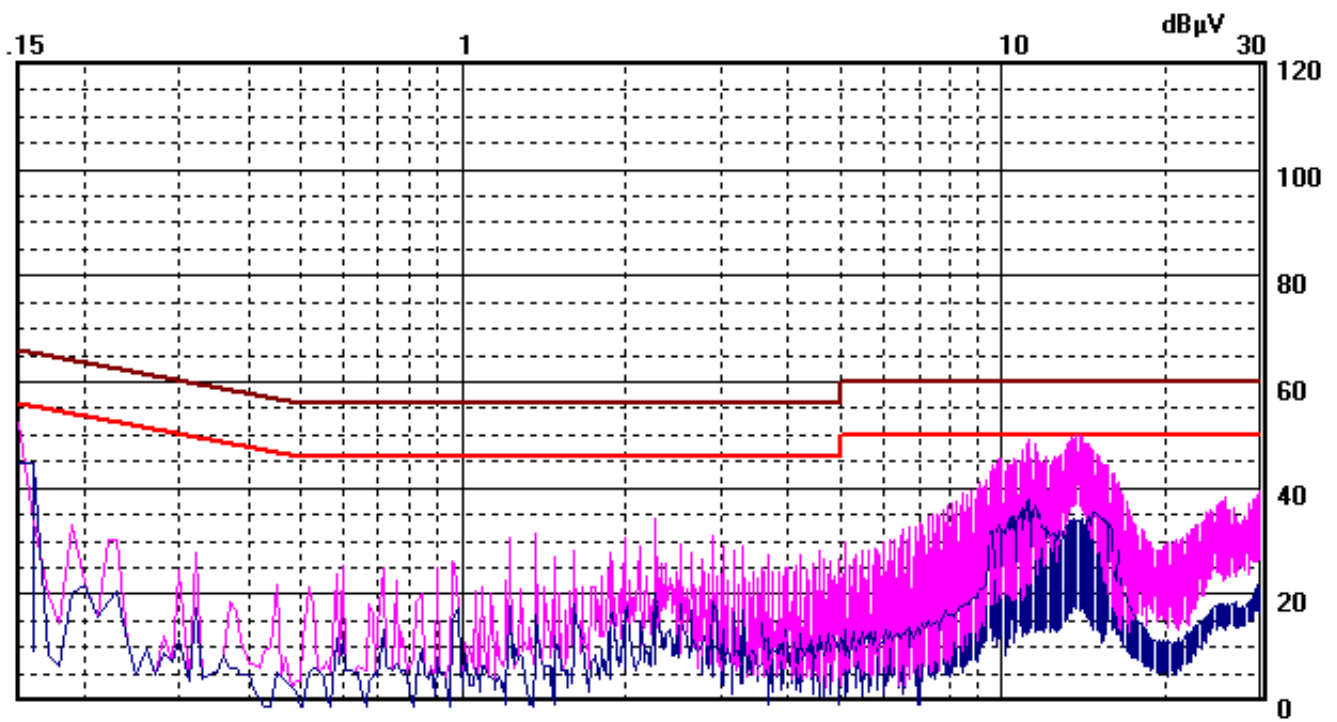
Conducted Noise

PMM 8000PLUS

Name: rcl

Date: 06/04/05

Time: 15:46



Limit #1: 55022bav Limit #2: 55022bqp Detector: Peak, Average

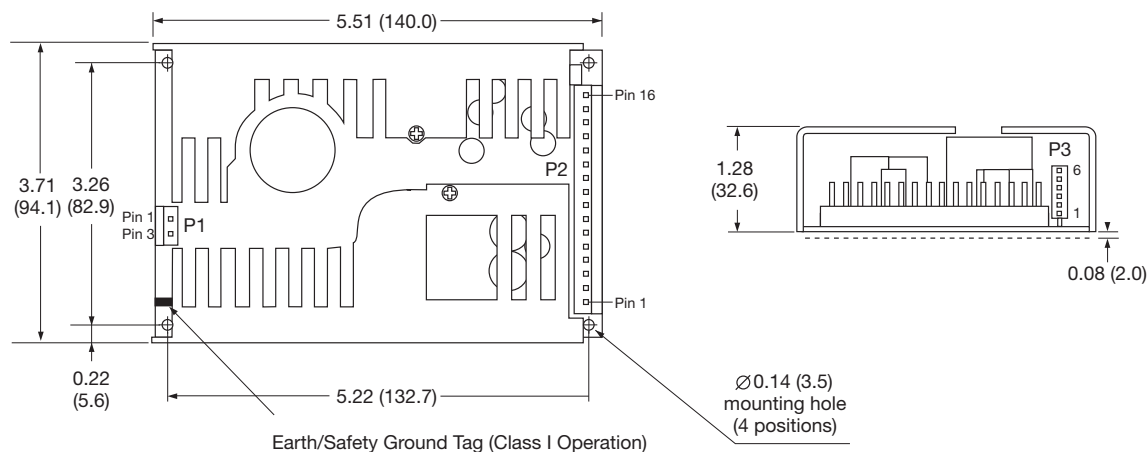
rcl half load 1r5

Mechanical Details

All dimensions are in inches (mm)

Open Frame

Weight: 1.10 lbs (500 g) approx.

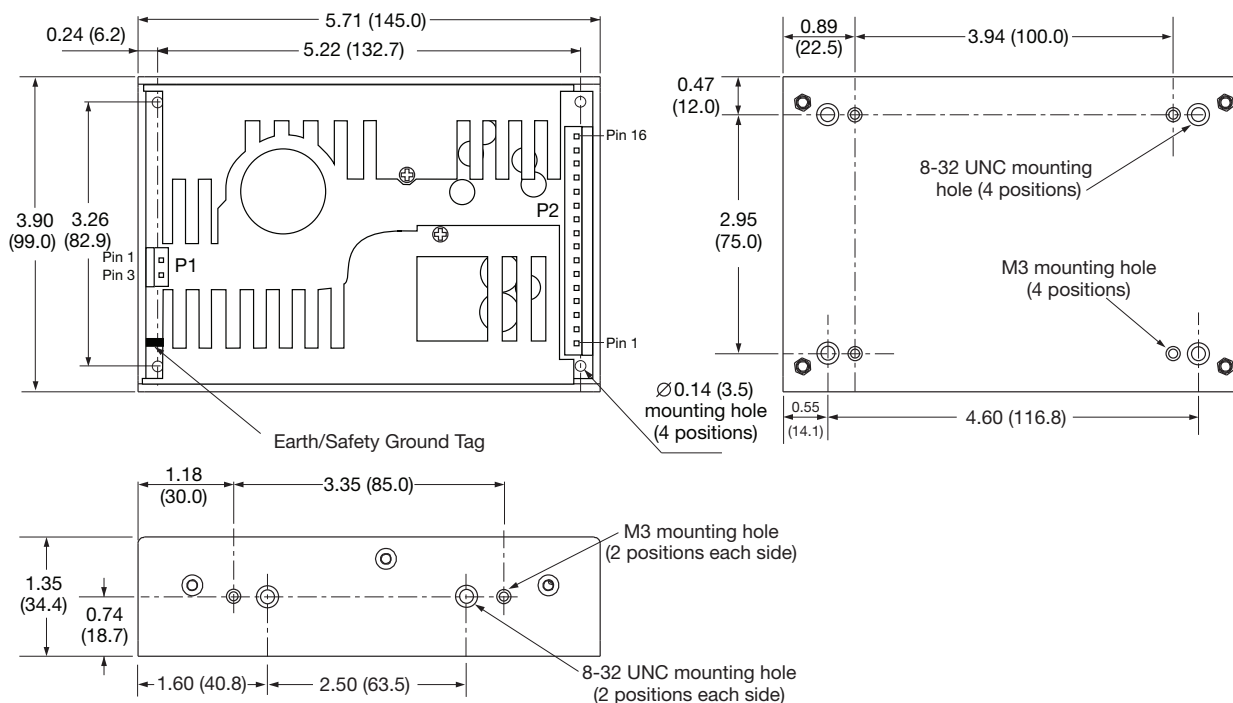


Note:

1. Suitable for class I and class II operation, for class II applications contact sales.
2. Overall height: 1.36 (34.6)

U-channel

Weight: 1.54 lbs (700 g) approx.



Note:

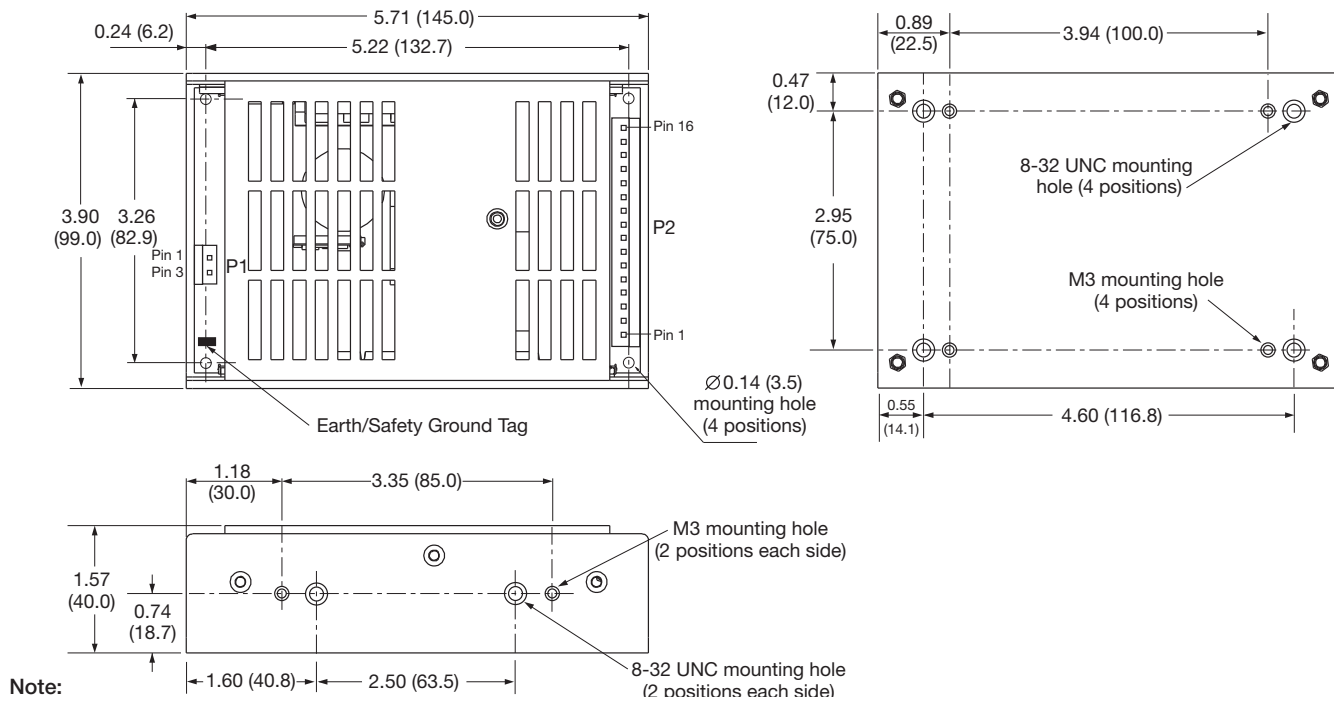
1. Suitable for class I operation only.

Mechanical Details

All dimensions are in inches (mm)

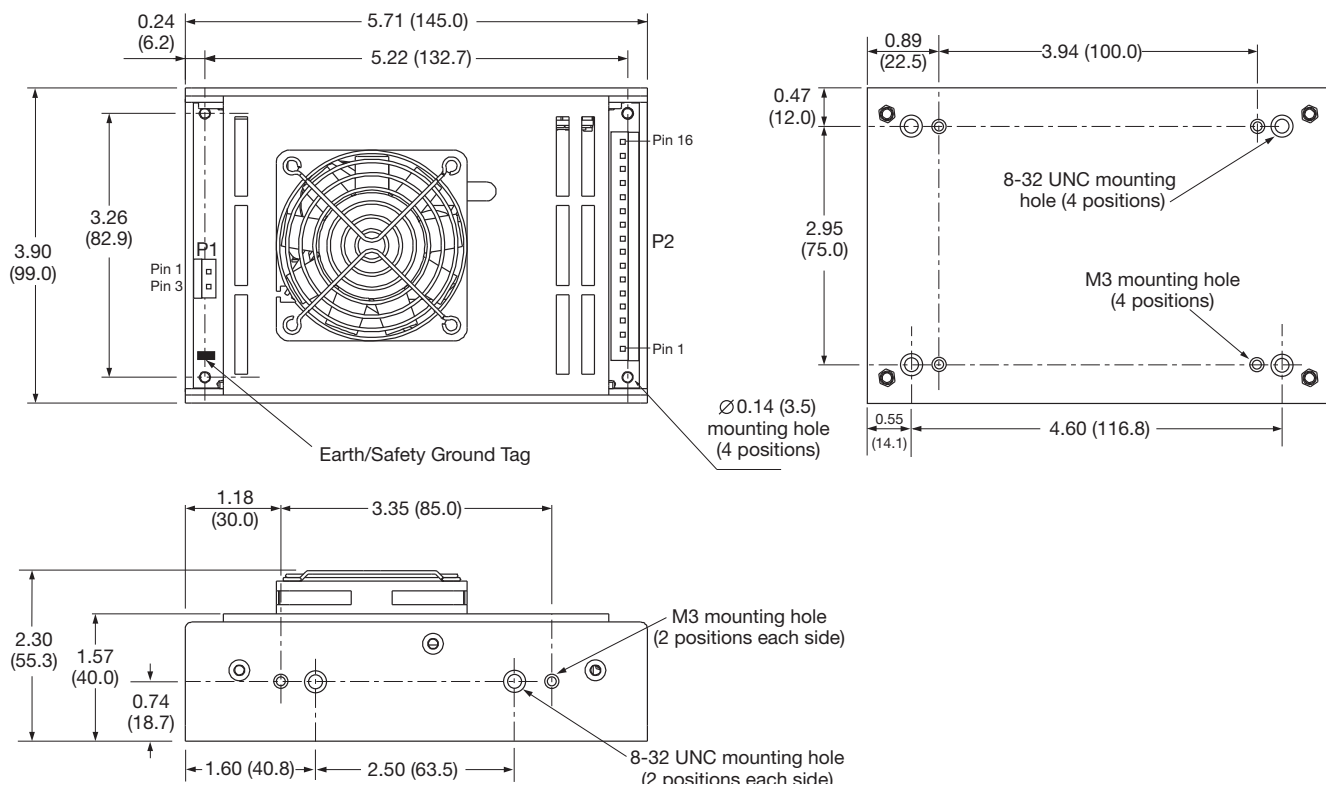
U-channel & Cover

Weight: 1.76 lbs (800 g) approx.



U-channel & Fan Cover

Weight: 1.98 lbs (900 g) approx.



Pin Connectors

INPUT CONNECTOR - P1	
Pin	Function
1	Live
2	N/C
3	Neutral

OUTPUT CONNECTOR - P2	
Pin	Function
1	+Output 1
2	+Output 1
3	+Output 1
4	0 V
5	0 V
6	0 V
7	0 V
8	0 V
9	0 V
10	+Output 2
11	+Output 2
12	+Output 2
13	-Output 3
14	+Output 3
15	-Output 4
16	+Output 4

SIGNALS CONNECTOR - P3	
Pin	Function
1	Remote On/Off
2	+Sense
3	-Sense
4	PF signal
5	0 V fan supply
6	+12 V fan supply

Installation Instructions for Class II Operation

The open frame power supply components are for building-in Class I or Class II.

They will be considered Class II when protection against electric shock does not rely on basic insulation only, unit provides additional safety precautions such as double/reinforced insulation and provides a minimum of 5 mm creepage and 4 mm clearance distance (mounted above chassis/accessible metal parts on insulating posts). Class II units have no reliance upon protective earthing. In all other cases, the units will be considered Class I.



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T H E X P E R T S I N P O W E R