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 µA at 115 VAC or 200 µA 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 ±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.

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 (50 Hz)
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			V1 & V2: ±3 V3 & V4: ±5 of nominal	%	PQ43 models
			V1: ±1 V2, V3 & V4: ±5 of nominal	%	All other models
Transient Response			4	%	Deviation with a 25% load change at 1 A/µs. Recovery within 1% in <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: foldbback current limit.				
Temperature Coefficient			0.02	%/˚C	

General Specifications

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Reliability and Service Life					
Mean Time Between Failure		385		kHrs	MIL-HDBK-217F @ 25 ºC
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 ºC, unless otherwise stated.

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-10		+70	ºC	See derating curves
Storage Temperature	-20		+85	ºC	
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	A	
Radiated Field	EN61000-4-3	10 V/m	A	
Surges	EN61000-4-5	3	A	
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 Flicker	EN61000-3-3			

Efficiency

Unit Type	Typical	Units	Notes & Conditions
RCL175PS24	89.0	%	230 VAC input, full load (see curves)
RCL175PQ43	83.0	%	230 VAC input, full load (see curves)

Safety Agency Approvals

Safety Agency	Safety Standard	Category
CB Report	Certificate # US/16253/UL IEC60950-1:2005 Ed 2	Information Technology
UL	UL File #E139109-A62-UL UL60950-1 (2007), CSA 22.2 No.60950-1-07 Ed 2	Information Technology
TUV	TUV Certificate # B06 11 57396 020, EN60950-1:2004	Information Technology
CE	LVD	

Safety Agency	Safety Standard	Category
CB Report	Certificate #US/18340/UL, IEC60601-1 Ed 3 Including Risk Management	Medical
UL	UL File # E146893, ANSI/AAMI ES 60601-1:2005 & CSA C22.2 No. 60601-1:08	Medical
TUV	TUV EN60601-1:2006	Medical

	Means of Protection	Category
Primary to Secondary	2 x MOPP Class I Operation, 1 x MOPP Class II Operation, contact sales for 2 x MOPP (Means of Patient Protection)	IEC60601-1 Ed 3
Secondary to Earth	1 x MOPP (Means of Patient Protection)	

Equipment Protection Class	Safety Standard	Notes & Conditions
Class I & Class II	IEC60950-1:2005 Ed 2 & IEC60601-1 Ed 3	See safety agency conditions of acceptability for details

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	
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	0.1 A	6.3 A	8.4 A	F 12 V	0.1 A	2.0 A				RCL175PT31[4,6]
175 W	200 W	110 W	5.0 V	1.5 A	15.0 A	-	15.0 V	0.1 A	4.6 A	6.6 A	F 15 V	0.1 A	2.0 A				RCL175PT32[4,6]
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	3.3 V	0.1 A	15.0 A	-	F 15 V	0.1 A	2.0 A	F 15 V	0.0 A	2.0 A	RCL175PQ43[5,6]
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	12.0 V	0.1 A	5.5 A	7.6 A	F 5 V	0.1 A	2.0 A	F 12 V	0.0 A	2.0 A	RCL175PQ44[6]
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	15.0 V	0.1 A	4.0 A	6.0 A	F 5 V	0.1 A	2.0 A	F 15 V	0.0 A	2.0 A	RCL175PQ45[4,6]
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	24.0 V	0.1 A	3.2 A	5.0 A	F 12 V	0.1 A	2.0 A	F 12 V	0.0 A	2.0 A	RCL175PQ46[4,6]
175 W	200 W	90 W	5.0 V	1.5 A	15.0 A	-	24.0 V	0.1 A	3.0 A	5.0 A	F 15 V	0.1 A	2.0 A	F 15 V	0.0 A	2.0 A	RCL175PQ47[4,6]

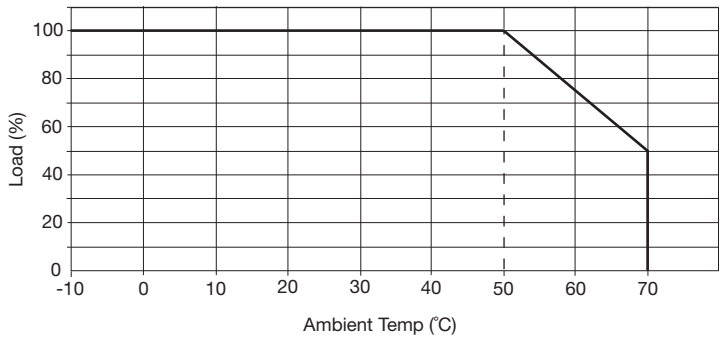
Notes:

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

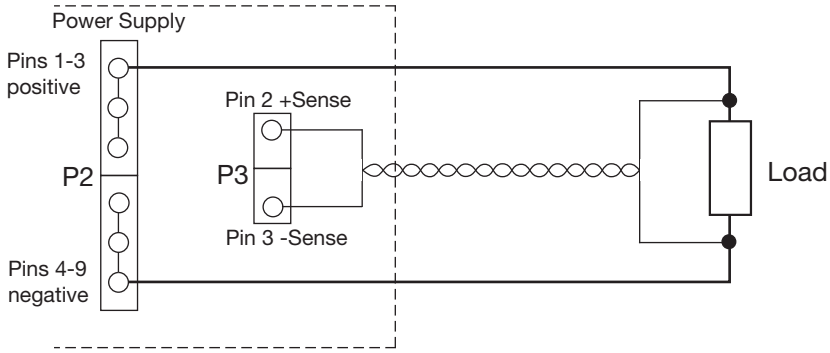
- For the U-channel version, add suffix '-U' to the model number.
- For the U-channel version with cover kit, add suffix '-C' to the model number.
- For the U-channel version with fan cover kit, add suffix '-F' to the model number.
- For screw terminals (output connector P2 only), contact sales.
- For versions with remote enable, contact sales.
- For foldback current limit on single output models, contact sales.
- For constant current limit (output 1 & 2) on multi output models, contact sales.

Thermal Derating Curve



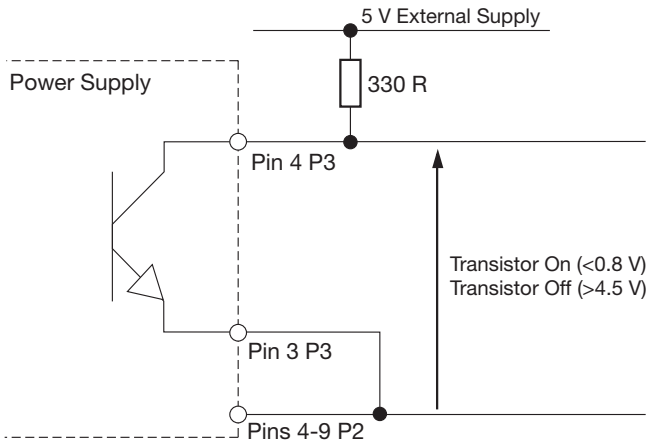
Remote Sense

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



Power Fail

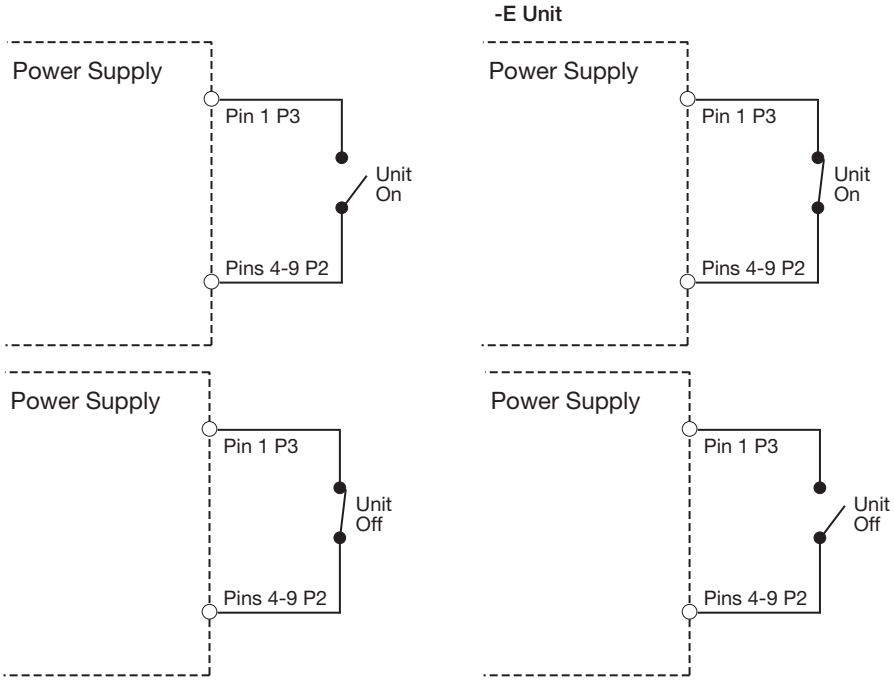
Open Collector output refers to 0V Sense. When using the Power Fail signal, -Sense must be connected to OP1 & 2 Return (0V).



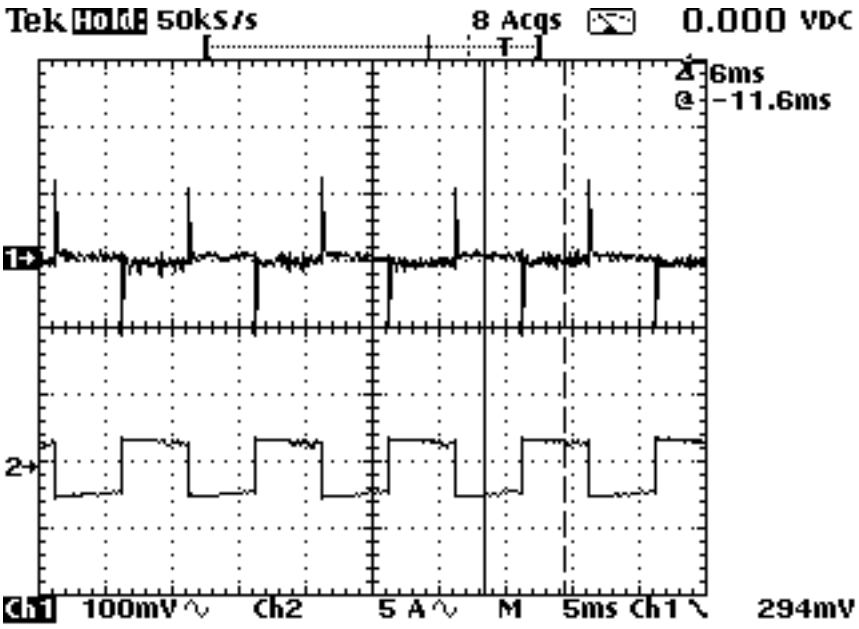
Remote On/Off

Connect Pin 1 (P3) to 0V to disable unit.

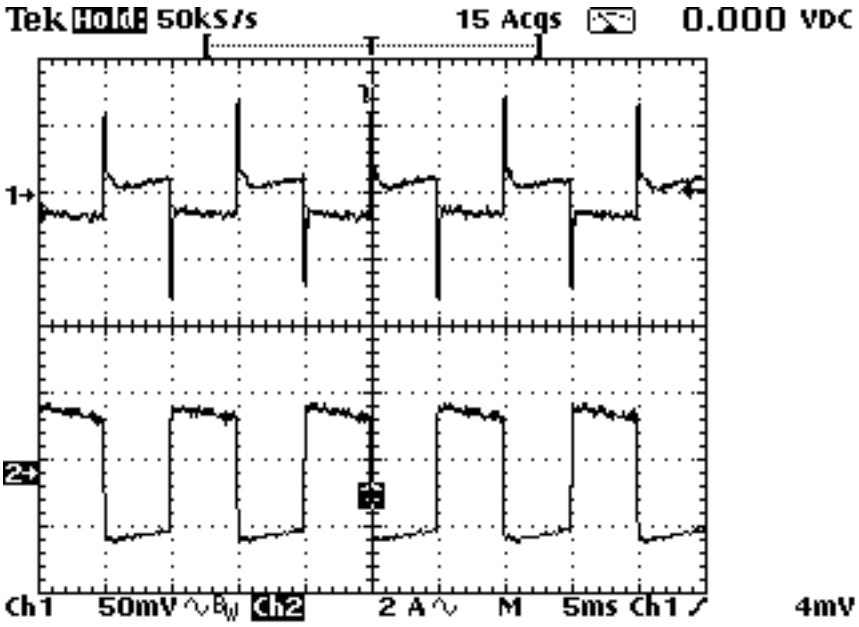
-E Unit



Transient Response

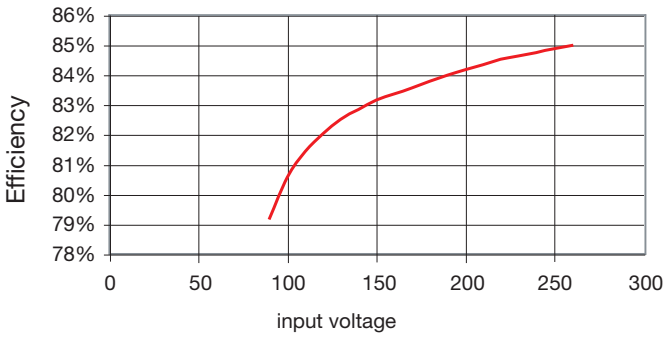


RCL175PS12 25% Load Change

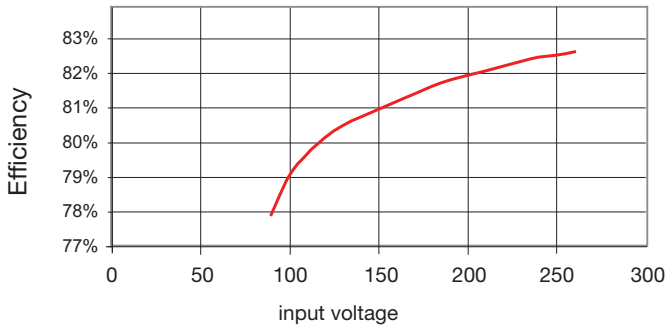


RCL175PQ43 O/P 1 25% Load Change

Efficiency Against Input Voltage

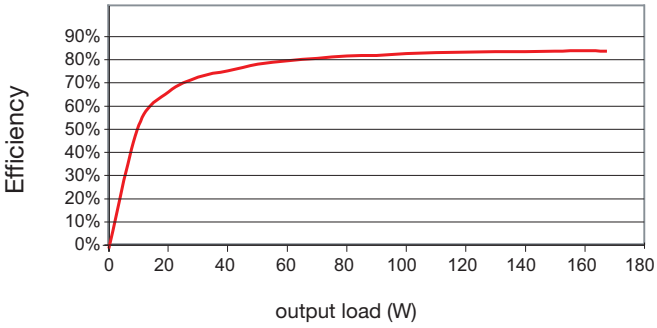


RCL175PS12 175 W Load

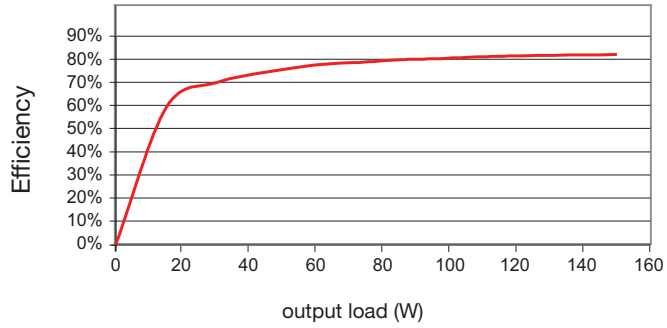


RCL175PQ42 175 W Load

Efficiency Against Output Load

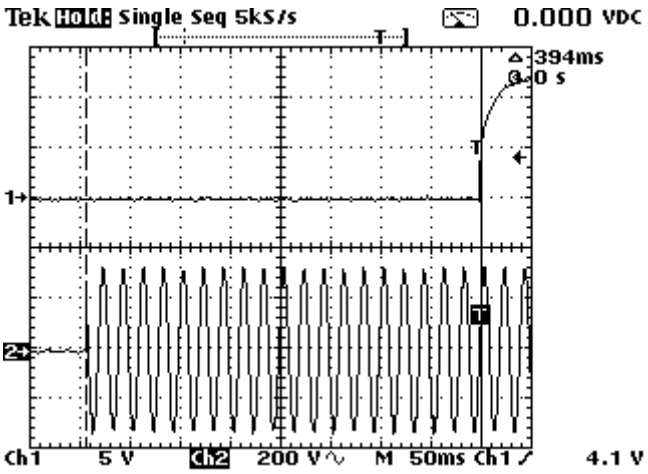


RCL175PS12 @ 230 VAC Input

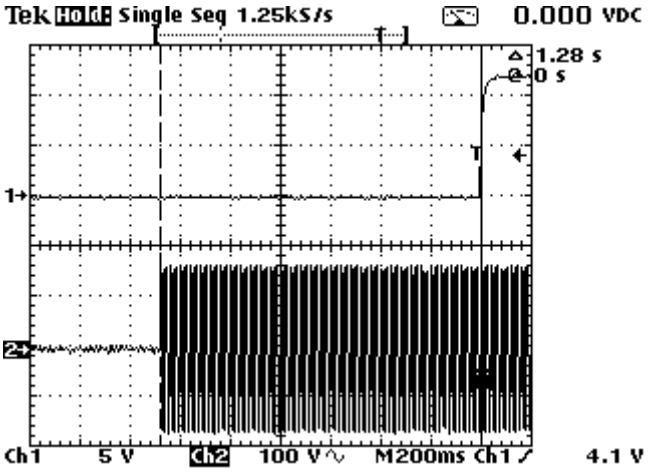


RCL175PQ43 @ 230 VAC Input

Start Up Time

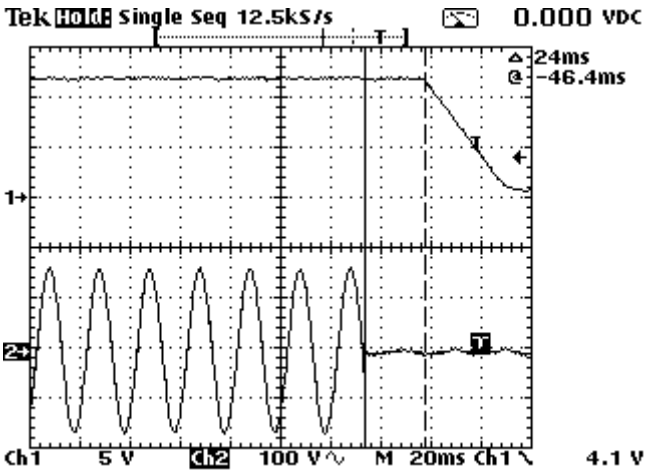


RCL175PS12 230 VAC 100% Load



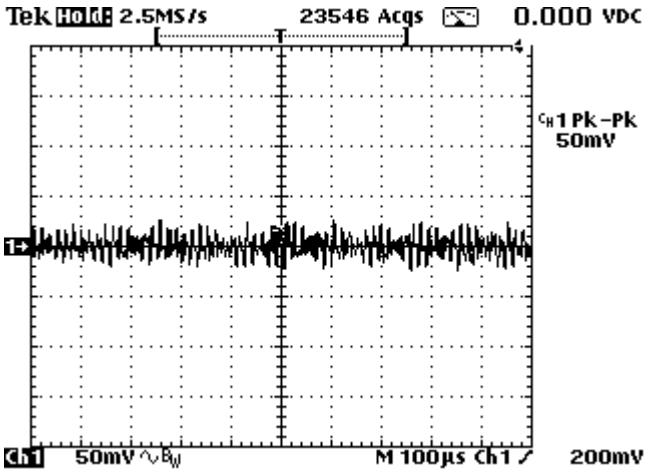
RCL175PQ43 115 VAC Full Load

Hold Up Time

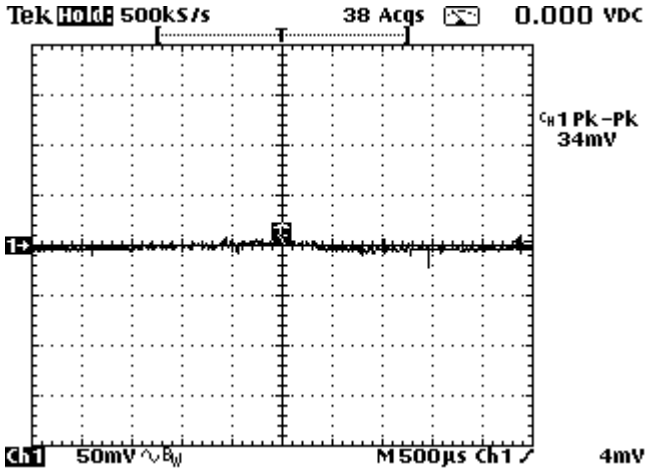


RCL175PS12 100% Load 115 VAC Input

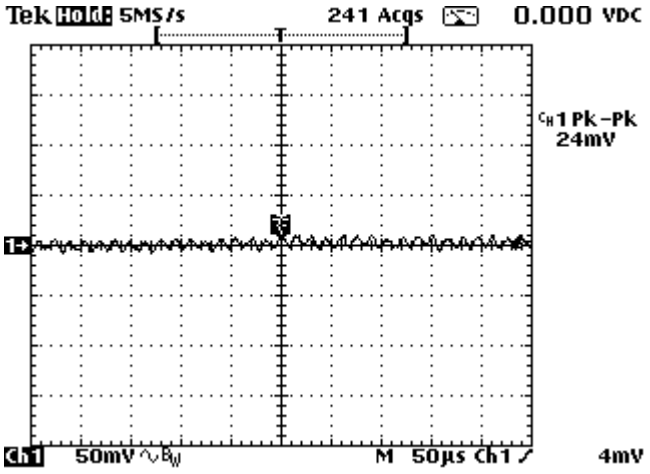
Output Noise & Ripple



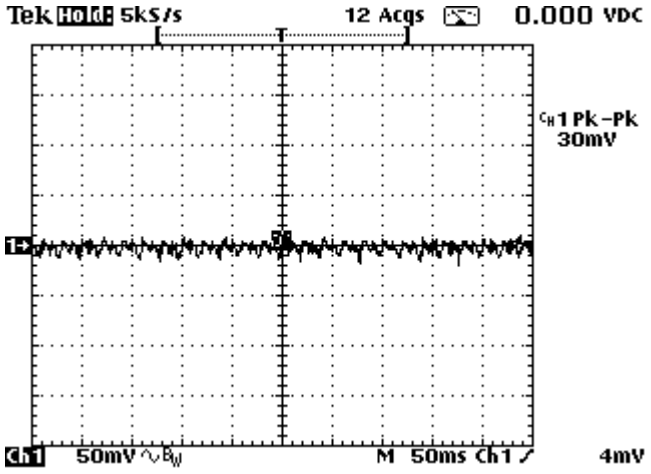
RCL175PS12 with 175 W load.
Noise measured is 50 mV pk-pk



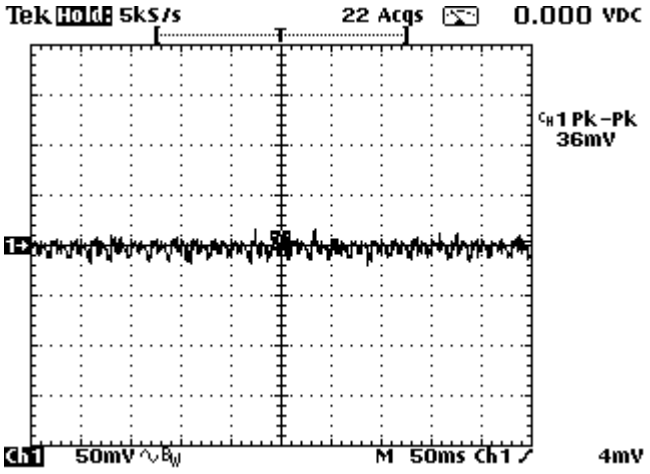
RCL175PQ43 O/P 1 with 75 W load.
Noise measured is 34 mV pk-pk



RCL175PQ43 O/P 2 with 50 W load.
Noise measured is 24 mV pk-pk

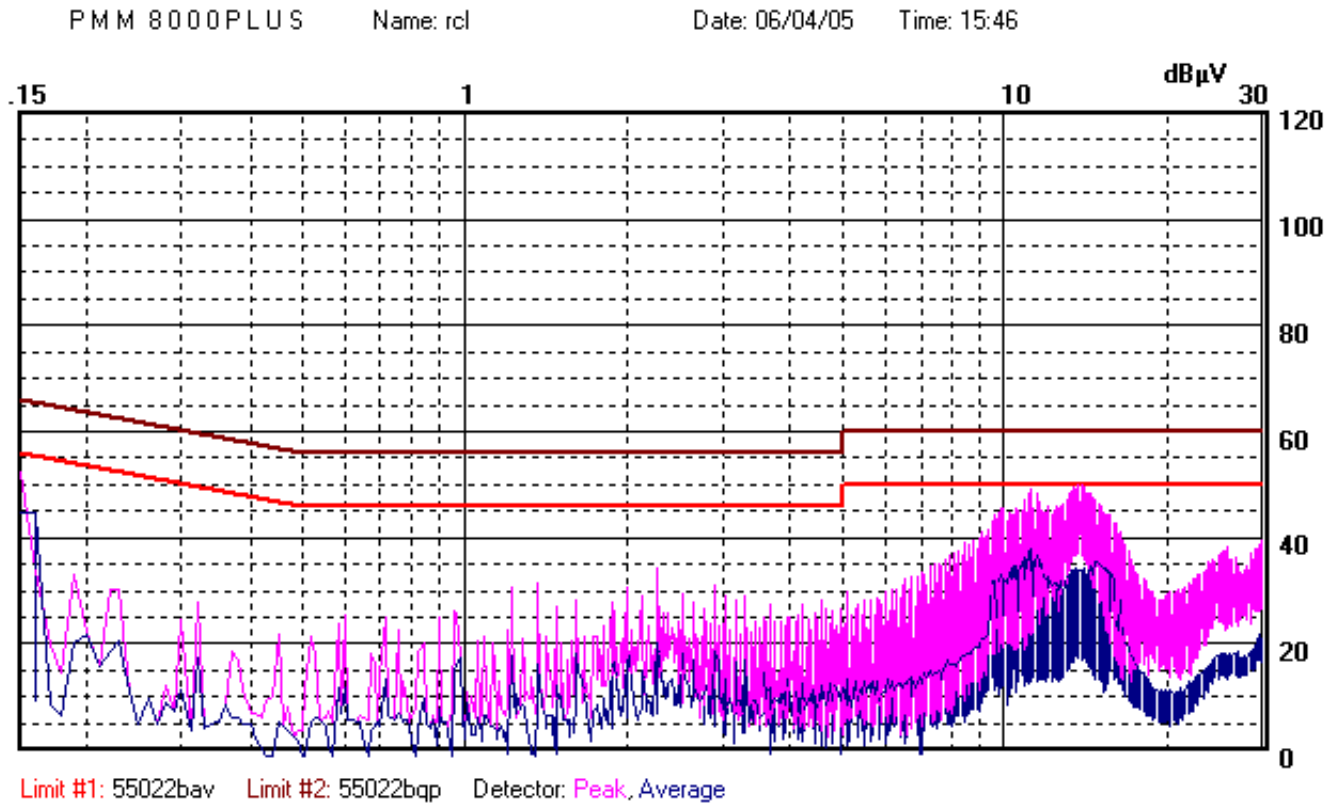


RCL175PQ43 O/P 3 with 24 W load.
Noise measured is 30 mV pk-pk



RCL175PQ43 O/P 4 with 24 W load.
Noise measured is 36 mV pk-pk

Conducted Noise

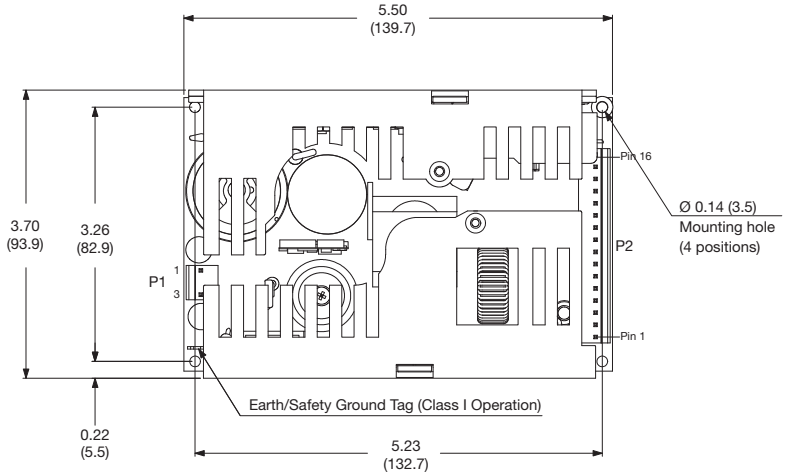


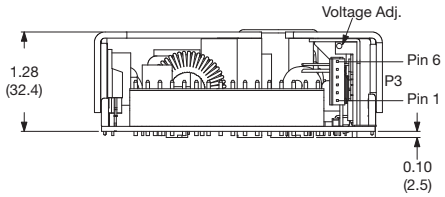
Mechanical Details

All dimensions are in inches (mm)
Tolerance ±0.02 (±0.5)

Open Frame

Weight: 1.10 lbs (500 g) approx.

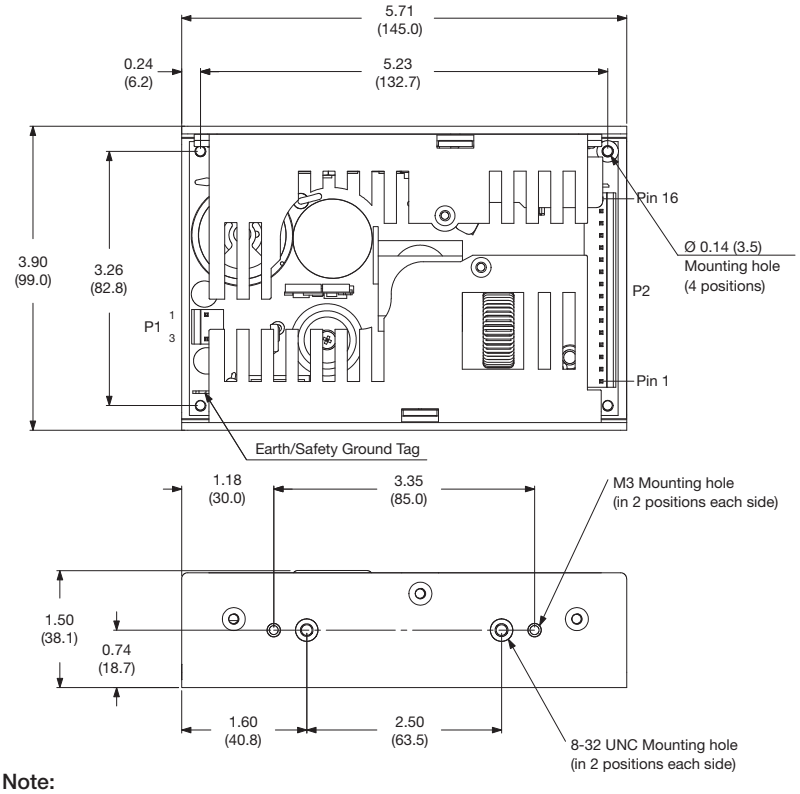


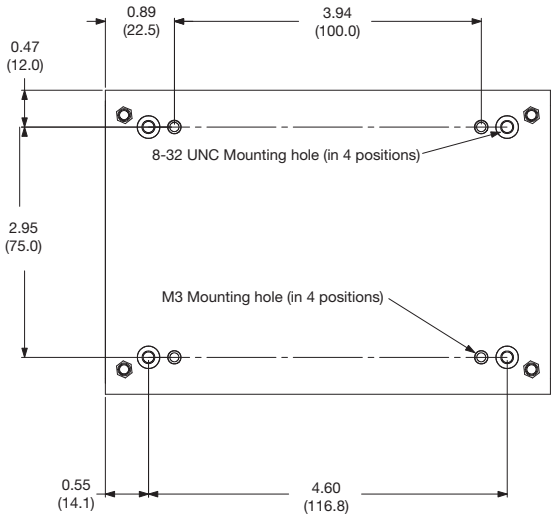


Note:
1. Suitable for class I and class II operation, for class II applications contact sales.
2. Overall height: 1.36 (34.6)

U-channel

Weight: 1.54 lbs (700 g) approx.





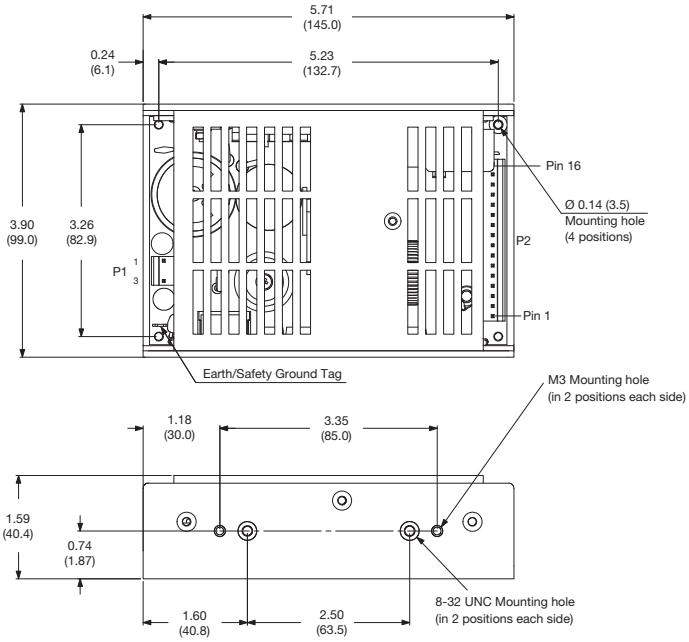
Note:
1. Suitable for class I operation only.
2. Mounting screws must not penetrate by more than 0.12” (3.0 mm) max

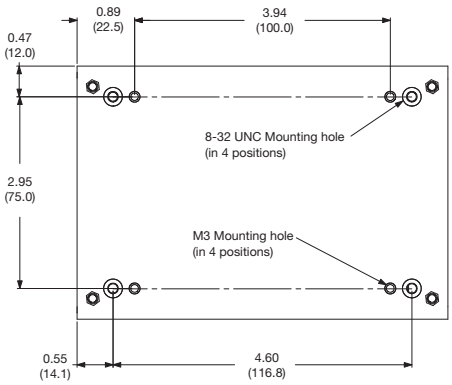
Mechanical Details

All dimensions are in inches (mm)

U-channel & Cover

Weight: 1.76 lbs (800 g) approx.

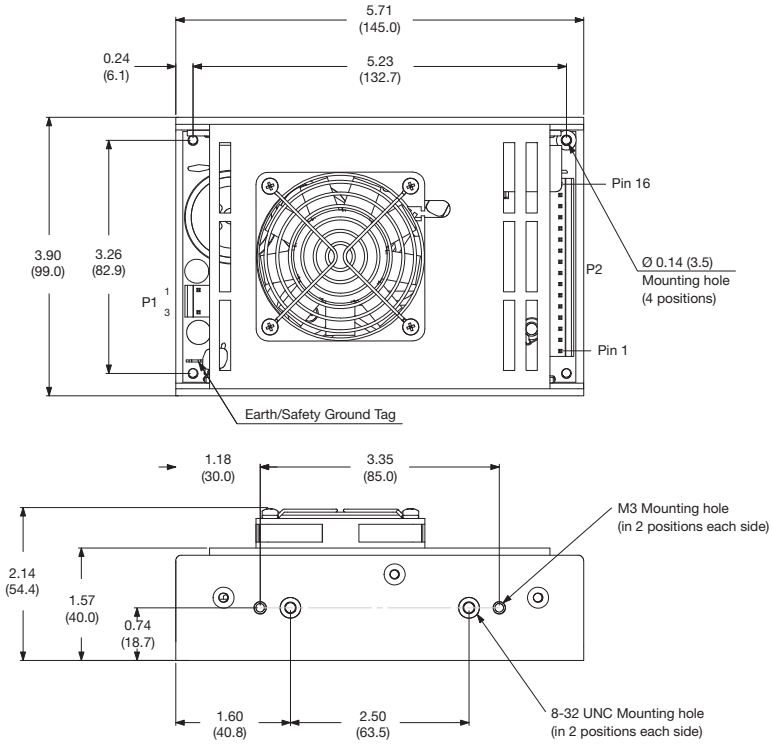


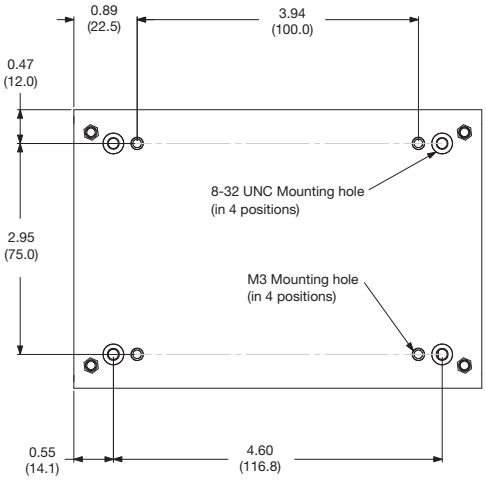


Note:
1. Suitable for class I operation only.
2. Mounting screws must not penetrate by more than 0.12” (3.0 mm) max

U-channel & Fan Cover

Weight: 1.98 lbs (900 g) approx.





Note:
1. Suitable for class I operation only.
2. Mounting screws must not penetrate by more than 0.12” (3.0 mm) max

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

P3 is a 6-way 0.1" pitch square pin header
Molex housing 22-01-2065 pins 08-50-0032 (30-22 AWG)
For mating connectors, use pinouts as details in this datasheet.
May not match manufacturers mold marks as connector.

Connector Info

For all formats, output connector P2 as follows:

Single Output Models:
6-way 0.156" pitch square pin header
Molex housing 09-91-0600 or equivalent
Pins 08-50-0106 (24-18 AWG) 08-50-0108 (28-22 AWG)

Dual Output Models:
12-way 0.156" pitch square pin header (except model PD22 which has a 14-way connector)
Molex housing 09-91-1200 or equivalent
Pins 08-50-0106 (24-18 AWG) 08-50-0108 (28-22 AWG)

Triple Output Models:
14-way 0.156" pitch square pin header
Molex housing 09-91-1400 or equivalent
Pins 08-50-0106 (24-18 AWG) 08-50-0108 (28-22 AWG)

Quad Output Models:
16-way 0.156" pitch square pin header
Molex housing 09-91-1600 or equivalent
Pins 08-50-0106 (24-18 AWG) 08-50-0108 (28-22 AWG)

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 (Double/Reinforced Insulation) only when mounted above chassis (accessible metal parts) on insulating posts and provide minimum of 8mm creepage and 5 mm clearance distance. Class II units have no reliance upon protective earthing. In all other cases the units will be considered Class I.