CCR550 series

550W Fan cooled | **450W** Conduction cooled | **230W** Convection cooled

AC-DC power supplies

The CCR550 series of compact medical AC-DC power supplies are designed to operate in convection, conduction, and fan cooled applications with power ratings from 230W to 550W. CCR550 offers high efficiency and high power density in a low 1" profile, baseplate cooled design that ensures effective thermal management and quiet operation for noise sensitive applications.

Featuring Class B conducted and radiated emissions, worldwide industrial and medical safety approvals, 2 x MOPP isolation and low leakage currents, the CCR550 is designed for easy integration into a wide range of BF rated medical applications including respiratory care, imaging, patient monitoring, patient treatment, and industrial applications such as process control, test & measurement, and industrial printing.

Features

- 550W fan cooled, 450W conduction cooled
- Universal, single phase input: 85 to 264VAC
- 129.4 x 83.5mm footprint, 25.4mm profile
- High efficiency, up to 94%
- Low earth leakage <300µA
- Low patient leakage <90µA
- Medical (BF) & ITE safety approvals
- Class B conducted and radiated emissions
- 3 year warranty

Applications

Healthcare | Instrumentation | Process control | Robotics | Technology

Dimensions

129.4 x 83.5 x 25.4mm (5.09" x 3.29" x 1.00")

Documentation

For further information click the link or scan the code

→ xppower.com

Models & ratings

Model number	Output voltage	Output current			Efficiency[3]
		Convection cooled	Conduction cooled[2]	Fan cooled[1]	
CCR550PS12	12.0V	19.16A	37.50A	45.83A	92%
CCR550PS15	15.0V	15.33A	30.00A	36.66A	93%
CCR550PS24	24.0V	9.58A	18.75A	22.91A	93%
CCR550PS28	28.0V	8.21A	16.07A	19.64A	93%
CCR550PS30	30.0V	7.67A	15.00A	18.33A	93%
CCR550PS36	36.0V	6.39A	12.50A	15.27A	94%
CCR550PS48	48.0V	4.79A	9.37A	11.45A	94%
CCR550PS54	54.0V	4.26A	8.34A	10.18A	94%

Notes:

1. Requires 37m³/h (22CFM)
2. Thermal resistance for conduction cooling ≤1.0°C/W.
3. Typical value at 230VAC input and 550W load.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage - operating	85[1]	115/230	264	VAC	Derate output linearly from 550W at 120VAC to 400W at 85VAC – fan cooled
					Derate output linearly from 450W at 110VAC to 350W at 85VAC – conduction cooled
					Derate output linearly from 230W at 110VAC to 200W at 85VAC – convection cooled
Input frequency	47	50/60	63	Hz	Agency approval, 47-63Hz
Power factor		0.98			230VAC, 100% load
Input current - full load			5.6/2.8	A	115/230VAC
Inrush current			45	A	240VAC cold start, +25°C
Earth leakage current			300	µA	264 VAC/60Hz
Input protection	T6.3A/250 V Internal fuse fitted in line and neutral.				

Notes:

1. Agency approval, 90-264VAC

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	12		54	VDC	See models and ratings table
Initial set accuracy			±1	%	Full load, 115/230VAC
Minimum load	No minimum load required				
Start up			2	s	115/230VAC full load
Hold up time	8	12		ms	115VAC full load at +25°C
Line regulation			±0.2	%	
Load regulation			±0.5	%	10-100% load
Transient response			4	%	Recovery within 1% in less than 500µs for a 75-100% and 100-75% load step
Output voltage adjustment		±5		%	28V model adjustment range is 0 to 5%
Ripple & noise			1/200	%/mV	12V & 15V / others, measured at 20MHz bandwidth and 10µF electrolytic capacitor in parallel with 0.1µF ceramic capacitor at +25°C
Remote sense	Compensates for 5% drop of nominal output voltage				
Overvoltage protection	110		150	%	Vnom, 48V & 54V model OVP <60V Recycle input to reset
Overload protection	120		160	%	Inom
Short circuit protection	Trip & restart				
Drift			±0.02	%	After 20 min warm up
Temperature coefficient			0.02	%/°C	
Overtemperature protection	Measured internally, auto resetting				

General

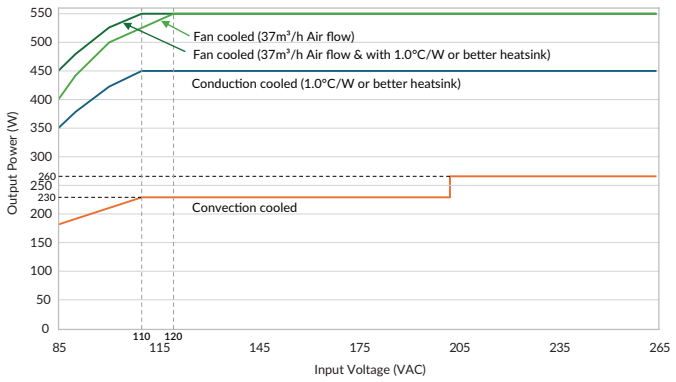
Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		94		%	See models and ratings table
Isolation: input to output	4000			VAC	2 x MOPP
input to ground	1800			VAC	1 x MOPP
output to ground	1500			VAC	1 x MOPP
Switching frequency		65		kHz	Main converter full load
		115		kHz	PFC full load
Power density			2.0	W/cm³	Fan cooled
Patient leakage current			90	µA	
Mean time between failure	400			khrs	MIL-HDBK-217F, +25°C GB.
Weight		535 (1.18)		g (lb)	

Environmental

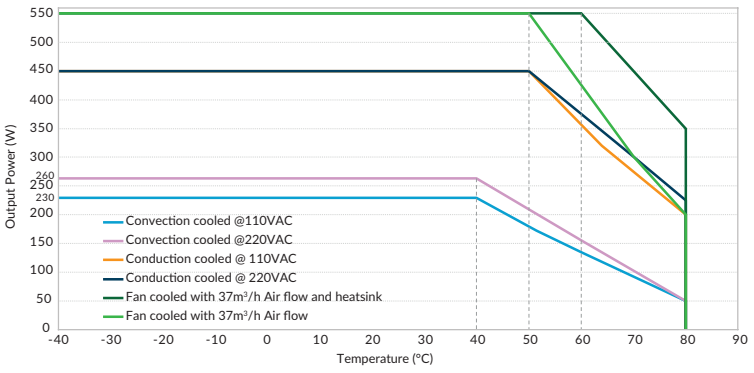
Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+80	°C	See derating curve, safety approved to +50°C
Storage temperature	-40		+85	°C	
Cooling	37 (22)			m³/h (CFM)	For fan cooled operation
Humidity	5		95	%RH	Non-condensing
Operating altitude			5000 / 2000	m	OVC II / OVC III
Vibration	Single axis 10-500Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6				
Shock	±3 x 30g shocks in each plane, total 18 shocks. 30g = 11ms (±0.5msecs), half sine. Conforms to EN60068-2-27				
Baseplate temperature			+95	°C	When using conduction cooling, max baseplate temperature (measured at the center) is +95°C but some components are not thermally connected to the baseplate. The temperatures of these components may not exceed temperatures shown in the thermal considerations section on page 5.

Derating curve

Input derating curve



Thermal derating curve



Emissions - EMC

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55032/EN55011	Class B	
Radiated	EN55032/EN55011	Class B	
Harmonic currents	EN61000-3-2	Class A & C	Class C ≥200W
Voltage flicker	EN61000-3-3		

Emissions - immunity

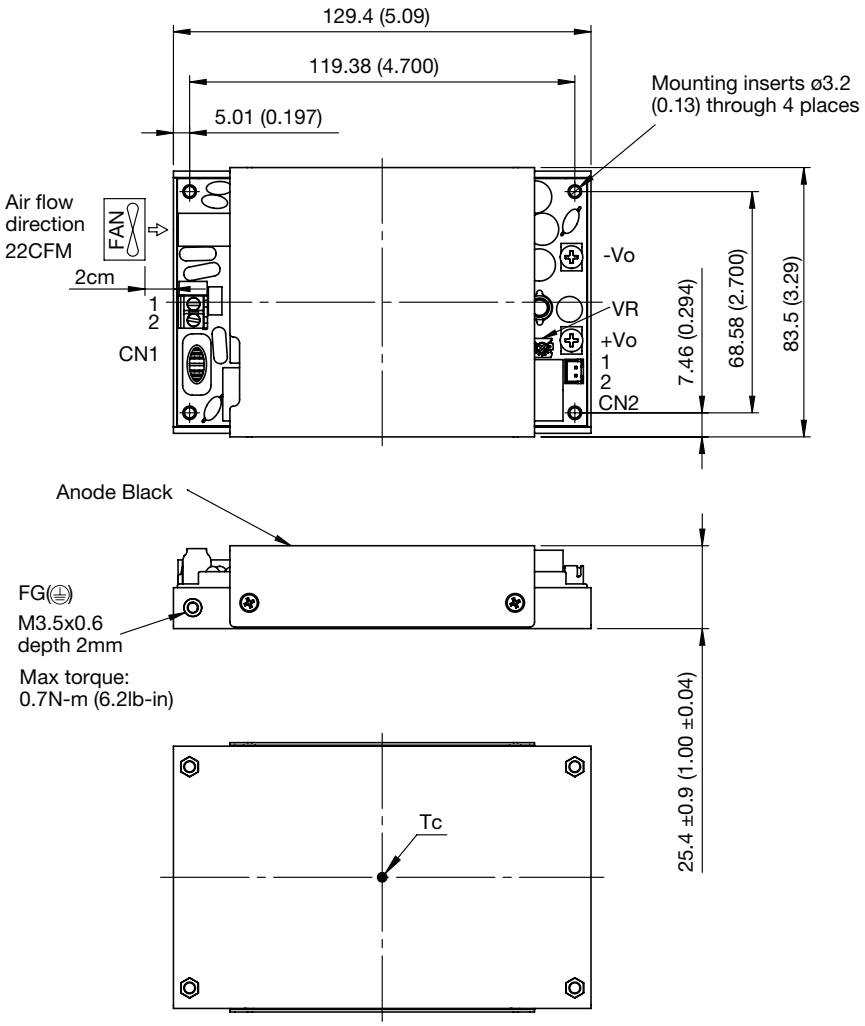
Phenomenon	Standard	Test level	Criteria	Notes & conditions
Medical device EMC	IEC60601-1-2	Ed.4.0 : 2014	as below	
Low voltage PSU EMC	EN55035		as below	
ESD immunity	EN61000-4-2	4	A	±15kV air, ±8kV contact
Radiated immunity	EN61000-4-3	10V/m	A	
EFT/burst	EN61000-4-4	±2kV	A	
Surge	EN61000-4-5	Installation class 4	A	±2kV line to line, ±4kV line to earth
Conducted	EN61000-4-6	6V	A	
Magnetic field	EN61000-4-8	30A/m	A	
Dips and interruptions	EN55035 (115VAC)	Dip 100% (0VAC), 10ms	A	
		Dip 100% (0VAC), 20ms	A	
		Dip 30% (80.5VAC), 500ms	B	
		Dip 60% (46VAC), 100ms	B	
		Dip 100% (0VAC), 5000ms	B	
	EN55035 (230VAC)	Dip 100% (0VAC), 10ms	A	
		Dip 100% (0VAC), 20ms	A	
		Dip 30% (181VAC), 500ms	A	
		Dip 60% (92VAC), 100ms	A	
		Dip 100% (0VAC), 5000ms	B	
	EN60601-1-2 (100VAC)	Dip 100% (0VAC), 10ms	A	
		Dip 100% (0VAC), 20ms	A	
		Dip 30% (70VAC), 500ms	B	
		Dip 100% (0VAC), 5000ms	B	
	EN60601-1-2 (240VAC)	Dip 100% (0VAC), 10ms	A	
		Dip 100% (0VAC), 20ms	A	
		Dip 30% (168VAC), 500ms	A	
		Dip 100% (0VAC), 5000ms	B	

Safety approvals

Certification	Standard	Notes & conditions
CB report	IEC62368-1	Audio/video, information and communication technology equipment
	IEC60601-1	Medical
UL	UL62368-1	Audio/video, information and communication technology equipment
	ANSI/AAMI ES60601-1 & CSA C22.2 No.60601-1	Medical
EN	EN62368-1	Audio/video, information and communication technology equipment
	EN60601-1	Medical
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Isolation	Standard	Notes & conditions
Primary to Secondary	2 x MOPP (Means of Patient Protection)	Class I & Class II for both ITE & Medical
Primary to Earth	1 x MOPP (Means of Patient Protection)	
Secondary to Earth	1 x MOPP (Means of Patient Protection)	

Mechanical details



Tc: baseplate temperature measurment point

AC input connector (CN1): ECE ETB22

Pin connections		
Pin	**Function**	**Mating wire range**
1	ACL	14-18AWG
2	ACN	

Max torque: 0.4 N-m (3.5 lb-in)

Remote sense (CN2): TKP 8822-02-NHB or equivalent

Pin connections			
Pin	**Function**	**Mating housing**	**Terminal**
1	S+	JST XHP-2 or equivalent	JST SXH-001T-P0.6N or equivalent
2	S-		

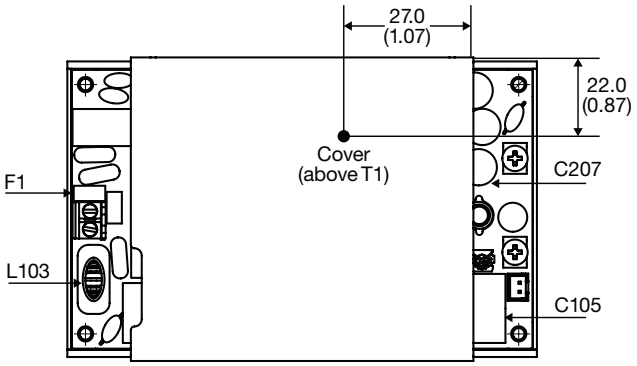
DC output terminal screws are M4.
Washer size (ID): 4.3mm (0.17") nom, (OD): 7.3mm (0.29") max
Max torque: 0.7N-m (6.2lb-in)

Notes:

1. All dimensions shown in mm (inches). Tolerance: ±0.5 (0.02).
2. Weight: Standard versions: 535g (1.18lbs) approx.

Thermal considerations

Temperature measurements (at maximum ambient)	
Component	**Max temperature °C**
L103	+130°C
F1	+125°C
C105	+105°C
C207	+125°C
Cover (above T1)	+100°C
Baseplate (Tc)	+95°C



In order to ensure safe operation of the PSU in the end-use equipment, the temperature of the components listed in the table must not be exceeded.
Temperature should be monitored using K type thermocouples placed on the hottest part of the component (out of direct air flow).