CCR200 series

200W Fan cooled | **170W** Conduction cooled | **110W** Convection cooled

AC-DC power supplies

The CCR200 series of compact medical AC-DC power supplies are designed to operate in convection cooled, conduction cooled, and fan cooled applications with power ratings from 110W to 200W. CCR200 offers high efficiency and high power density in a low 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 CCR200 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

- 200W fan cooled, 170W conduction cooled
- Universal, single phase input: 85 to 264VAC
- 78.6 x 57.9mm footprint, 25.4mm profile
- High efficiency, up to 94%
- Low earth leakage <300µA
- Low patient leakage <75µA
- Medical versions Class I & Class II
- Medical (BF) & ITE safety approvals
- Class B conducted and radiated emissions
- 3 year warranty

Applications

Healthcare

Instrumentation

Process control

Robotics

Technology

Dimensions

78.6 x 57.9 x 25.4mm (3.09" x 2.28" 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]	
CCR200PS12	12.0V	9.17A	14.17A	16.67A	92%
CCR200PS15	15.0V	7.33A	11.33A	13.33A	93%
CCR200PS24	24.0V	4.58A	7.08A	8.33A	94%
CCR200PS28	28.0V	3.92A	6.07A	7.14A	93%
CCR200PS30	30.0V	3.67A	5.67A	6.66A	93%
CCR200PS36	36.0V	3.06A	4.72A	5.67A	94%
CCR200PS48	48.0V	2.29A	3.54A	4.16A	94%
CCR200PS54	54.0V	2.04A	3.15A	3.70A	94%

Notes:

1. Requires 24 m^3/h (14CFM)
2. Thermal resistance for conduction cooling ≤1.5°C/W.
3. Typical value at 230VAC input and 200W load.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage - operating	85[1]	115/230	264	VAC	Derate output linearly from 200W at 115VAC to 150W at 85VAC – fan cooled
					Derate output linearly from 170W at 115VAC to 130W at 85VAC – conduction cooled
					Derate output linearly from 110W at 115VAC to 90W at 85VAC – convection cooled
Input frequency	47	50/60	63	Hz	Agency approval, 47-63Hz
Power factor	0.96	>0.98			230VAC, 100% load
Input current - full load			2.5/1.2	A	115/230VAC
Inrush current			85	A	240 VAC cold start, 25°C
Earth leakage current			300	µA	264 VAC/60Hz
No load input power			0.3/0.32	W	115VAC/230VAC
Input protection	T3.15A/250V Internal fuse fitted in line and neutral.				

[1] Agency approval, 90-264VAC

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage - V1	12		54	VDC	See models and ratings table
Initial set accuracy			±1	%	50% load, 115/230VAC
Minimum load	No minimum load required				
Start up delay			1	s	115/230VAC full load
Hold up time	10			ms	115VAC full load at 25°C
Drift			±0.02	%	After 20 min warm up
Line regulation			±0.3	%	
Load regulation			±0.5	%	0-100% load
Transient response			4	%	Recovery within 1% in less than 500µs for a 50-75% and 75-50% load step
Output voltage adjustment		±5		%	
Ripple & noise			1/100	%/mV	Measured at 20MHz bandwidth and 10µF electrolytic capacitor in parallel with 0.1µF ceramic capacitor at 25°C (12V & 15V/other models)
Overvoltage protection	110		140	%	Vnom, recycle input to reset, 54V model OVP <63V
Overload protection	125		165	%	Inom
Short circuit protection	Trip & restart				
Temperature coefficient			0.02	%/°C	
Overtemperature protection	Measured internally, auto resetting				

CCR200 series

General

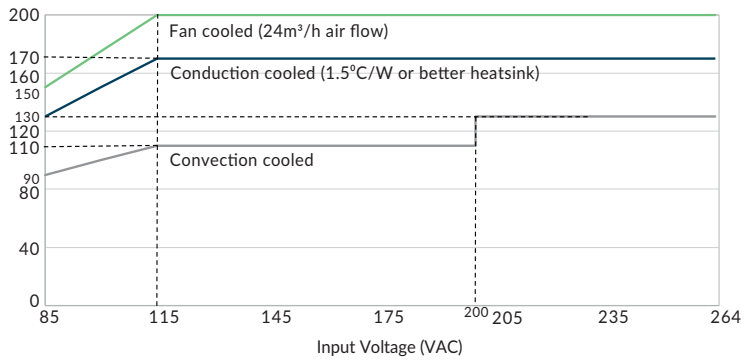
Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		94		%	See models and ratings table
Isolation: input to output	4000			VAC	2 x MOPP
input to ground	1800			VAC	1 x MOPP
output to ground	1500			VAC	1 x MOPP
Switching frequency		130/110		kHz	Main converter (varies with load, 15V model/others)
	70		140	kHz	PFC (varies with load)
Power density			1.7	W/cm³	Fan cooled
Patient leakage current			75	µA	
Mean time between failure	450			khrs	MIL-HDBK-217F, 25°C GB.
Weight		220 (0.485)		g (lb)	

Environmental

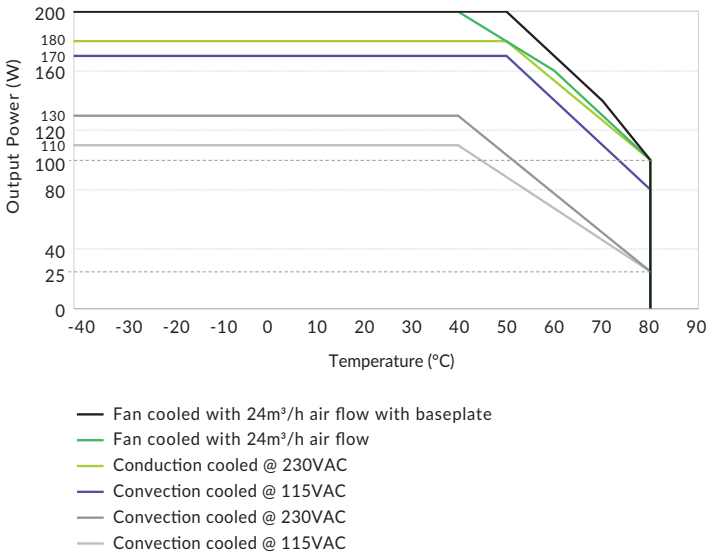
Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+80	°C	See derating curve, safety approved to 50°C.
Storage temperature	-40		+85	°C	
Cooling	24 (14.0)			m³/h (CFM)	For fan cooled operation
Humidity	5		95	%RH	Non-condensing
Operating altitude			4000 / 5000 (2000)	m	Medical/ITE 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 & D	Class C ≥80W
Voltage flicker	EN61000-3-3		

Emissions - immunity

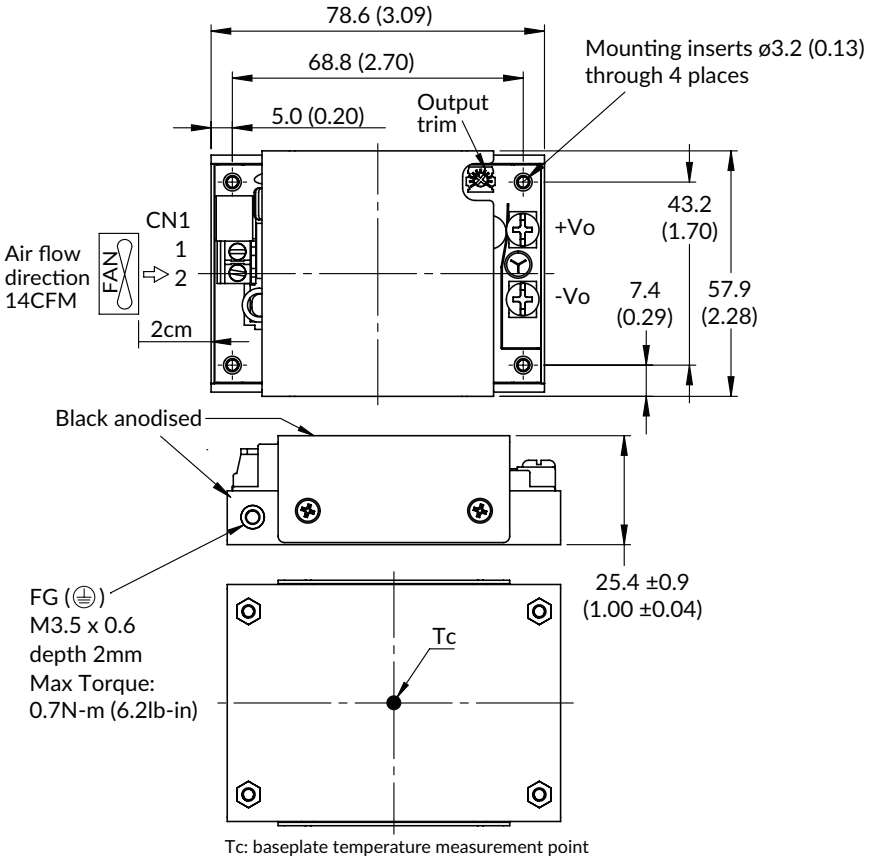
Phenomenon	Standard	Test level	Criteria	Notes & conditions
Medical device EMC	IEC60601-1-2	Ed.4.0 : 2014	as below	
Low voltage PSU EMC	EN55035		as below	
ESD immunity	EN61000-4-2	4	A	±15kV air, ±8kV contact
Radiated immunity	EN61000-4-3	10V/m	A	
EFT/burst	EN61000-4-4	±2kV	A	
Surge	EN61000-4-5	Installation 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 for ITE Class I & II for 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 measurement point

AC input connector (CN1): ECE ETB22

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

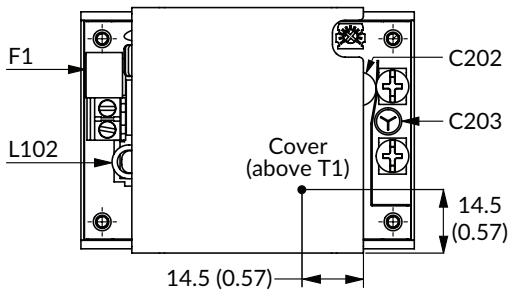
Max torque: 0.4N-m (3.5lb-in)

Notes:

1. All dimensions shown in mm (inches). Tolerance: ±0.5 (0.02).
2. Weight: Standard versions: 220g (0.485lb) approx.
3. DC output terminal screws are M4. Max Torque: 0.7N-m (6.2 lb-in)

Thermal considerations

Temperature measurements (at maximum ambient)	
Component	**Max temperature °C**
L102	130°C
Cover (above T1)	95°C
F1	125°C
C202	125°C
C203	105°C
Baseplate	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).