

MAIN FEATURES

- 85 – 264 V_{AC} Universal input voltage range
- 200 W rated power
- 1.00" (25.4 mm) low profile package (28.4 W/in³)
- High efficiency (up to 94%)
- No-load low power consumption: <0.3 W for 12, 24, V_{DC}; <0.4W for 48 V_{DC} standard output variants.
- Low earth leakage current: <300 μ A
- Over temperature protection, auto recovery
- Output over voltage protection, latch off
- Overload and short circuit protections, auto recovering
- Metallic protecting cage on semi-potted PWA
- IEC safety installation Class I
- Certified to the latest IEC/EN/UL 62368-1 edition
- Medical safety approval to IEC 60601-1 3rd edition, 2xMoPP protection grade BF appliances compatible.
- IEC 60601-1-2 4th edition EMC compliant.
- Operating Altitude up to 5000 m (OVC II), up to 2000 m (OVC III)
- RoHS-3 compliant (EU directive 2015/863)
- 5 years warranty



DESCRIPTION

The LPM200 is a series of Medical grade power supplies designed to offer the high-power density and high efficiency that space constrained and power demanding systems need. Available in 12, 24, and 48 V_{DC} outputs, this series of high-performance AC-DC power supplies provides up to 200 W steady output power with moving air, or from 190 W upwards with convection cooling over the 110 – 240 V_{AC} nominal input voltage range, all in a compact 2.28 x 3.09 x 1.00" form factor package.

The semi-potted base-plate package allows thermal management through conduction cooling particularly needed in those installations where the heat can be dispelled solely through solid thermal path.

The series also includes 15, 28, 30, 36 and 54V versions whose availability will be assessed upon demand.

With 94% typical efficiency and extremely low (< 0.3 / 0.4 W) power consumption at no-load, the LPM200 facilitates thermal management and equipment design, including compatibility with the latest environmental legislations. The LPM200 series complies with the latest edition of the IEC60601-1 safety standard for medical equipment, offers 2x MoPP means of patient protection and is suitable for BF rated applied parts.

The LPM200 series meets the EN 55011 and EN 60601-1-2 EMC limits of Class B for conducted and radiated emissions as well as the IEC/EN61000-3, for harmonic and flicker, and IEC/EN 60601-1-2 4th edition for EMC immunity standards.

The series comes configured in the IEC protective Class I.

MARKET SEGMENTS AND APPLICATIONS

- Diagnostic equipment
- Imaging equipment
- Portable devices
- Therapy appliances
- Dental equipment
- Dermatology aesthetic medicine

MODEL CODING AND OUTPUT RATINGS

Model Number	Output Voltage V_{OUT} [V]	Voltage Accuracy ⁽¹⁾ [%]	I_{OUT} Current Forced Air ⁽²⁾ [A]	I_{OUT} Current Convection [A]	I_{OUT} Current Conduction ⁽³⁾ [A]	V_{OUT} Ripple ⁽⁴⁾ [mV]	Typical Efficiency ⁽⁵⁾ [%]
LPM200-12-SP	12	±1	16.67	9.17	14.17	150	92
LPM200-15-SP	15	±1	13.33	7.33	11.33	150	92
LPM200-24-SP	24	±1	8.33	4.58	7.08	200	94
LPM200-28-SP	28	±1	7.14	3.93	6.07	200	93
LPM200-30-SP	30	±1	6.66	3.67	5.67	200	93
LPM200-36-SP	36	±1	5.55	3.06	4.72	200	94
LPM200-48-SP	48	±1	4.16	2.29	3.54	200	94
LPM200-54-SP	54	±1	3.70	2.04	3.15	200	93

Notes:

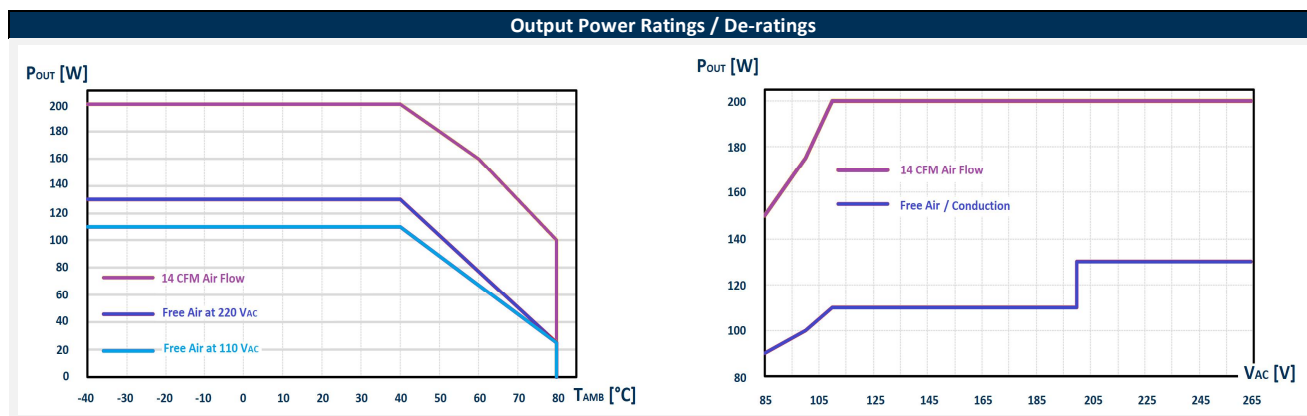
1. At full load
2. 14 CFM forced air cooling at >110 V_{AC}
3. Thermal contact with 177.8 x 177.8 x 2.0 mm (7.00 x 7.00 x 0.08 in) metallic plate
4. 0.1 µF ceramic capacitor and 10 µF electrolytic capacitor in parallel at load, 20 MHz BW
5. Typical values at 230 V_{AC}, full load, 25 °C ambient temperature

INPUT SPECIFICATIONS

Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
AC Input Voltage		85	100-240	264	V _{AC}
Input Frequency		47	50/60	63	Hz
Input Current	RMS at 100 V _{AC} , maximum load	-	-	3.15	A
Inrush Current (peak)	240 V _{AC} , 25 °C ambient, cold start	-	-	85	A
Fusing	Time Lag, 3.15 A, 250 V on both L and N	-	5	-	A
Efficiency	At 230 V _{AC} , 100 % rated load, 25 °C T _{AMB}				
	12, 15 V _{DC}	-	92	-	%
	24, 36, 48 V _{DC}	-	94	-	
	28, 30 V _{DC}	-	93	-	
No-load Power Consumption	At 115-230 V _{RMS} , no load, 12, 15, 24, 28, 30, 36 V	-	-	0.3	W
	48, 54 V variants	-	-	0.4	
Power Factor	At full rated load, 230 V _{AC} , 50 Hz input voltage	0.96	0.98	-	-
Harmonic Current	Complies with EN-61000-3-2, Classes A, D				
Fluctuations and Flicker	Complies with EN-61000-3-3 at nominal voltages and full load				
Earth Leakage Current	Normal conditions, 264 V _{AC} , 60 Hz	-	-	300	µA
Touch Leakage Current	Normal conditions, 264 V _{AC} , 60 Hz	-	-	100	µA

OUTPUT SPECIFICATIONS

Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
Output Voltage	±1 % set point accuracy for all voltage variants.	-	12	-	V
	At 100 % load, 25 °C T _{AMB} , 100-240 V _{AC}	-	15	-	
		-	24	-	
		-	28	-	
		-	30	-	
		-	36	-	
		-	48	-	
Output Voltage Adjustment		-	54	-	%
	P _{OUT} ≤ P _{RATED} , Through potentiometer	5	-	5	
	Rated Currents				
	≥ 110 V _{AC} , 14 CFM air flow				
	12 V _{DC}	-	-	16.67	
	15 V _{DC}	-	-	13.33	
	24 V _{DC}	-	-	8.33	
	28 V _{DC}	-	-	7.14	A
	30 V _{DC}	-	-	6.66	
	36 V _{DC}	-	-	5.55	
	48 V _{DC}	-	-	4.16	
	54 V _{DC}	-	-	3.70	
	See output power de-rating curves below				
	≥ 110 V _{AC} , free air				A
	12 V _{DC}	-	-	9.17	
	15 V _{DC}	-	-	7.33	
	24 V _{DC}	-	-	4.58	
	28 V _{DC}	-	-	3.93	
	30 V _{DC}	-	-	3.67	
	36 V _{DC}	-	-	3.06	
	48 V _{DC}	-	-	2.29	A
	54 V _{DC}	-	-	2.04	
	See output power de-rating curves below				
	≥ 110 V _{AC} , Conduction (18 x 18 x 2 mm plate)				A
	12 V _{DC}	-	-	14.17	
	15 V _{DC}	-	-	11.33	
	24 V _{DC}	-	-	7.08	
	28 V _{DC}	-	-	6.07	
	30 V _{DC}	-	-	5.67	
	36 V _{DC}	-	-	4.72	
	48 V _{DC}	-	-	3.54	A
	54 V _{DC}	-	-	3.15	
	See output power de-rating curves below				
Load Regulation	90 – 264 V _{AC}	-	-	±0.5	%V _{OUT}
	20 – 100 % full load				
Line Regulation	Full load	-	-	±0.2	%V _{OUT}
	V _{AC} : 90 – 264 V _{RMS}				
Transient Response	25% load changes at 1 A/μs				%V _{OUT}
	12 V _{DC} at 2200 μF Load / I _{OUT} > 0.5 A	-	-	±5	
	24 V _{DC} at 1000 μF Load / I _{OUT} > 0.5 A				
	48 V _{DC} at 560 μF Load / I _{OUT} > 0.5 A				
Ripple and Noise	12, 15 V _{DC}	-	-	150	mV
	24, 28, 30, 36, 48, 54 V _{DC}	-	-	200	
	Peak-to-peak, 20 MHz BW. 100 nF ceramic and 10 μF electrolytic caps at the load				
Turn-on Overshoot		-	-	TBV	%V _{OUT}
Hold-up Time	At 115 V _{IN} , full load, for all models	10	12	-	ms
Minimum Load	All models	0	-	-	A
Maximum Load Capacitance	At nominal V _{IN} , 25 °C ambient, max load				μF
	12 V _{DC}			6800	
	15 V _{DC}			5360	
	24 V _{DC}			3440	
	28 V _{DC}	-	-	3440	
	30 V _{DC}	-	-	3220	
	36 V _{DC}	-	-	2680	
	48 V _{DC}			2000	
	54 V _{DC}			1560	
Temperature Drift		-0.05	-	+0.05	%V/°C



PROTECTION FEATURES

Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
Input Fuse	Time Lag, 3.15 A, 250 V on L1 and L2	-	5	-	A
Over Current	At nominal input voltages Hiccup mode, auto-recovering	125	145	165	% I_{MAX}
Short Circuit	At nominal input voltages Hiccup mode, auto-recovering	-	-	-	
Over Voltage	12 V _{DC} 15 V _{DC} 24 V _{DC} 28 V _{DC} 30 V _{DC} 36 V _{DC} 48 V _{DC} 54 V _{DC} Unit shut down and latch off (AC recycle)	- - - - - - - -	16 20 32 35 35 45 55 63	- - - - - - - -	V
Over Temperature	Hiccup mode, auto-recovering	-	-	-	
Isolation Primary-to- Secondary	Reinforced	4250	-	-	V _{AC}
Isolation Input-to-PE	Basic	2000	-	-	V _{AC}
Isolation Output-to-PE	Basic	2000	-	-	V _{AC}

ENVIRONMENTAL SPECIFICATIONS

Specification	Test Conditions / Notes	Min	Nominal	Max	Units
Operating Temperature Range	Ambient temperature Case Temperature (T_c centre of base plate)	-40 -40	- -	80 90	°C
Storage Temperature Range		-40	-	85	°C
Humidity	RH, Non-condensing Operating Non-operating	- -	- -	93 95	%
Operating Altitude	OVC II OVC III	- -	- -	5000 3000	m
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-I 10 ms, each axis ($\pm X$, $\pm Y$, $\pm Z$), 3 times				
Vibration	Meet MIL-STD-810F Table 514.5C-VIII, 15÷2000 Hz, X-Y-Z axis, 1 hour each, total 3 hour				
MTBF	Full Load, 115 V _{AC} , 25 °C ambient GB, MIL-HDBK-217F	450	-	-	K hours
Useful Life	Low line range, 75% rated load, 40 °C ambient, natural convection, 100% duty cycle	26	-	-	K hours
Thermal Considerations	The output power derating curves relevant to forced and free air cooling are herein provided. These curves can be used as a guideline to assess the limit in performance of a power supply once installed in a system providing controlled air flow at a certain input voltage and ambient temperature. Conduction cooling installation thermal performance should be verified and assessed physically in any specific case.				

ELECTROMAGNETIC COMPATIBILITY (EMC) – EMISSIONS

Phenomenon	Conditions / Notes	Standard	Equipment Performance Class
Conducted	115 V _{RMS} , 230 V _{RMS} . Maximum load.	EN 55032 (ITE) 47 CFR FCC Part 15 EN 55011 (IMS)	B
Radiated		EN 55032 (ITE) 47 CFR FCC Part 15 EN 55011 (IMS)	B
Line Voltage Fluctuation and Flicker	At 2 0%, 50 % and 100 % maximum load. Nominal input voltages.	EN 61000-3-3	A
Harmonic Current Emission	At nominal input voltages	EN 61000-3-2	A, C, D

ELECTROMAGNETIC COMPATIBILITY EMC) – IMMUNITY

Phenomenon	Conditions / Notes	Standard	Test Level	Performance criteria
Reference standard for Medical equipment: EN 60601-1-2 Ed. 4.1				
ESD	15 kV air discharge, 8 kV contact, at any point of the system.	EN 61000-4-2	3	A
Radiated Field	10 V/m, 80-1000 MHz, 1 KHz 80% AM	EN 61000-4-3	3	A
Electric Fast Transient Surge	±2 kV on AC power port for 1 minute	EN 61000-4-4	3	A
	± 2 kV line to line; ± 4 kV line to earth; on AC power port	EN 61000-4-5	3	A
Conducted RF Immunity	10 V _{RMS} , 0,15-80 MHz, 1 KHz, 80 % AM	EN 61000-4-6	3	A
Dips and Interruptions	100 – 240 V _{AC} 30% Dip, 10 ms 60% Dip, 100 ms >95% Dip, 5000 5s Interrupts > 95 % for 5 s	EN61000-4-11 EN61000-4-11 EN61000-4-11 EN61000-4-11		A A A B

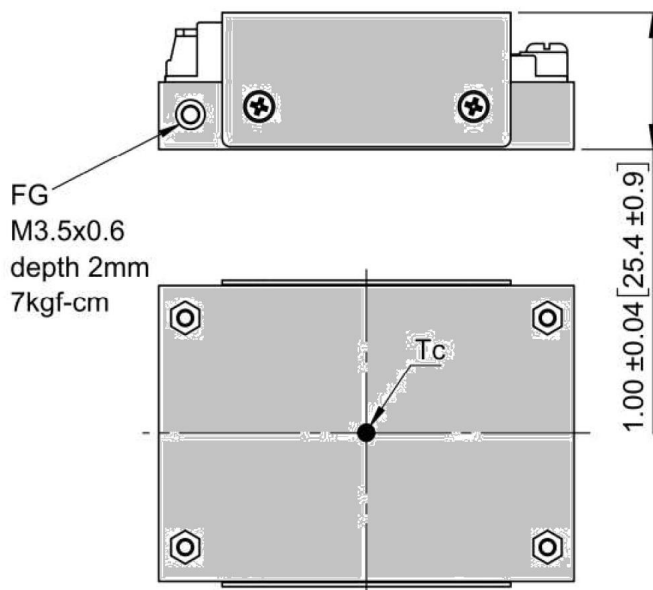
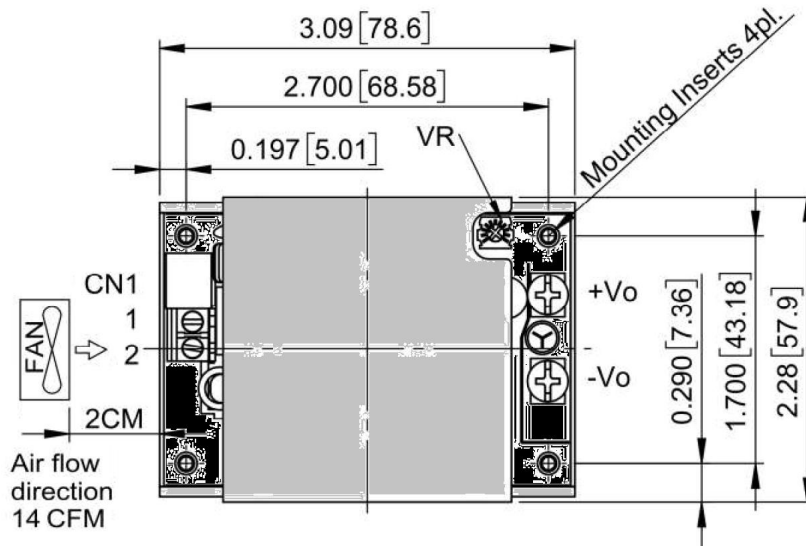
SAFETY AGENCIES APPROVALS

Certification Body	Safety Standards and file numbers	Category
ANSI/AAMI	ES 60601-1 Ed. 3 TH	Medical
IEC IECEE CB Certification	IEC/EN 60601-1 Ed. 3 TH	Medical
CE	Directive 2014/35/EU: Electrical Safety: Low Voltage electrical equipment (LVD) Directive 2014/30/EU: Electromagnetic Compatibility (EMC) Regulation 2017/745/EU: Medical device regulation (MDR) Directive EU 2015/863 (RoHS 3)	Medical

OUTLINE DRAWING AND CONNECTIONS

Overall dimensions: 57.9 x 78.6 x 25.4 mm (2.28 x 3.09 x 1.00 in)

Weight: 195 g (0.43 lb)



Dimensions: in [mm]

Tolerance in: x.xx=±0.03, x.xxx=±0.020

mm: x.x=±0.7, x.xx=±0.50

AC Input Connector(CN1):ECE ETB22

Pin	Function	Mating Wire Range
1	ACL	14~18 AWG
2	ACN	

DC Output Connector:KANG YANG PCB-58M4

Function	The screw locked torque
+Vo	M4 7kgf-cm
-Vo	

Mounting Inserts

Option
Ø3.2 Through depth 10.5mm
M3x0.5 Threaded depth 10.5mm

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REVISION HISTORY

Rev.	Date	Originator	Comments
0	July 23 rd , 2024	D. Azzeruoli	First release
1	Oct 24 th , 2024	D. Azzeruoli	- Head description change - Input minimum voltage updated to 85 V - Main Feature and Description chapters updated - V_{OUT} adjustment range amended to ±5%