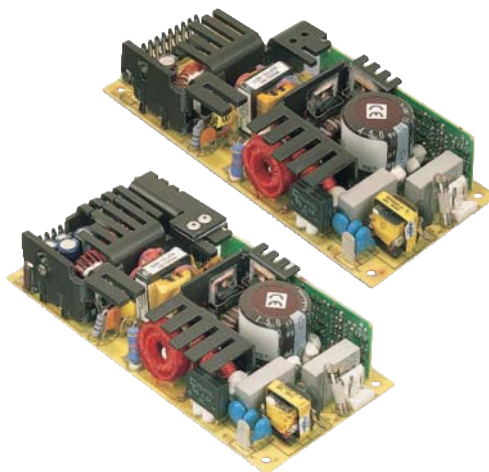


NLP110 Medical Series

Single and
triple output

Total Power: 80 - 110 W
Input Voltage: 90 - 264 Vac
of Outputs: Single, triple



Special Features

- Provides low voltage outputs
- Compliance to EN61000-3-2 (Power Factor = 0.98)
- Smallest industry standard package 6.5 x 3.0 x 1.26 inches
- 90 Vac to 264 Vac universal input range
- UL, cUL, and VDE safety approvals and CE-Marked to MDD
- Overvoltage and short circuit protection
- VDE0871-A, EN55022-A, EN55011-A conducted noise
- VDE0871-A, EN55022-A, EN55011-A radiated noise
- Meets all applicable and relevant immunity standards EN61000-4-2,4,5 and 6
- Available RoHS compliant
- 2 year warranty

Safety

VDE0805/EN60950/IEC950
File No. 10401-3336-1096

UL1950 File No. E136005

CSA C22.2 No. 950
File No. LR41062

Electrical Specifications

Input		
Input voltage range	Universal input, (See Note 6)	90-264 Vac
Input frequency range		47-63 Hz
Input current (cold start)	120 Vac 230 Vac	18 A max. 35 A max.
Safety ground leakage current	230 Vac, 50 Hz	<100 μ A
Input current	120 Vac @ 80 W 120 Vac @ 110 W 230 Vac @ 80 W 230 Vac @ 110 W	0.9 A rms 1.3 A rms .48 A rms 0.7 A rms
Input fuse	UL/IEC127	F3.15 A H, 250 Vac
Output		
Total regulation (line and load)	Main output Auxiliary outputs	\pm 2.0% \pm 5.0%
Rise time	At turn-on	1.0 s, max
Transient response	Main output 75% to 100% step at 0.1 A/ μ s	5.0% or 250 mV max. dev., 1ms max. recovery to 1%
Temperature coefficient		\pm 0.02%/ $^{\circ}$ C
Overvoltage protection	Main outputs	125%, \pm 10%
Short circuit protection	Cyclic operation	Continuous
Minimum output current	Single and multiple	See table



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

EMC Characteristics ⁽¹²⁾

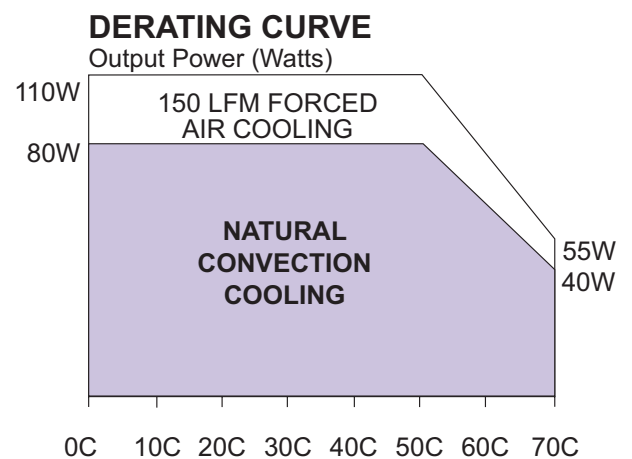
Conducted emissions	EN55022, FCC part 15	Level A
Radiated emissions	EN55022, FCC part 15	Level A
Harmonic current emission correction	EN61000-3-2	Compliant
ESD air	EN61000-4-2	Level 3
ESD contact	EN61000-4-2	Level 3
Surge	EN61000-4-5	Level 3
Fast transients	EN61000-4-4	Level 3
Radiated immunity	EN61000-4-3	Level 3
Conducted immunity	EN61000-4-6	Level 3

General Specifications

Hold-up time	120 Vac, 60 Hz	16.7 ms @ 110 W
Efficiency	120 Vac, 80 W (-9905J)	75% min.
Isolation voltage	Input/output	4000 Vac
	Input/chassis	1500 Vac
Approvals and standards pending	EN60601-1, IEC60601-1, VDE0750, UL2601-1, C22.2 No. 601.1-M90	
Weight		283 g (10 oz)
MTBF demonstrated	MIL-HDBK-217F	220,000 hours min

Environmental Specifications

Thermal performance	Operating ambient, (See derating curve)	0 °C to +50 °C
	Non-operating	-40 °C to +85 °C
	50 °C to 70 °C ambient, convection cooled	Derate to 50% load
	0 °C to 50 °C, ambient, convection cooled	80 W
	0 °C to 50 °C ambient, 150 LFM forced air	110 W
	Peak (0 °C to +50 °C, 60 s)	(See Note 3)
Relative humidity	Non-condensing	5% to 95% RH
Altitude	Operating	10,000 feet max
	Non-operating	30,000 feet max
Vibration (see Note 5)	5-500 Hz	2.4 G rms peak
Shock	per MIL-STD-810E	516.4 Part IV

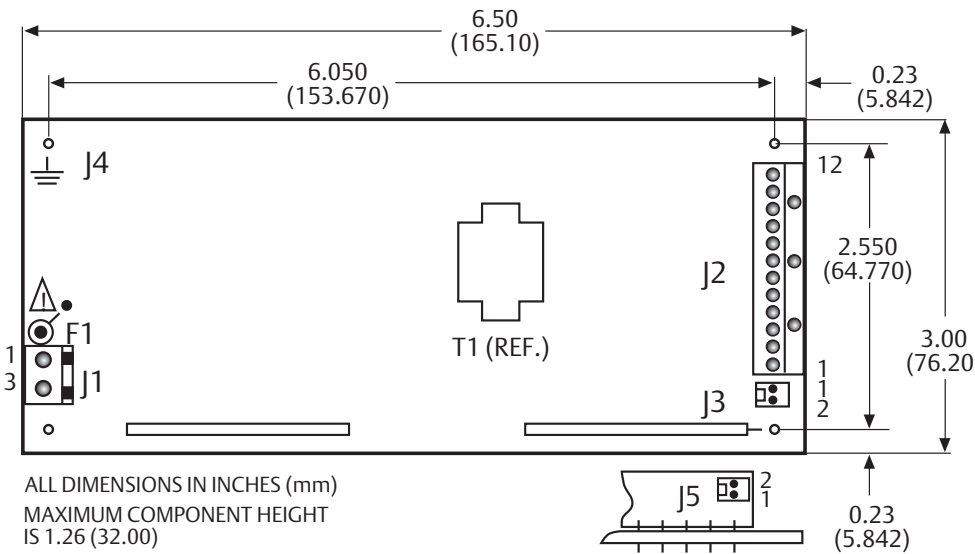


Ordering Information

Output Voltage	Min ⁽⁶⁾	Max ⁽¹⁾	150 LFM ⁽²⁾	300 LFM ⁽³⁾	Peak ⁽⁴⁾	Ripple ⁽⁵⁾	Total Regulation	Model Numbers ^(7, 14, 15)
+5 V	0.5 A	15 A	22 A	22 A	22 A	50 mV	± 2.0%	NLP110-9905J
+12 V	0.3 A	6.4 A	9.2 A	9.2 A	11.5 A	120 mV	± 2.0%	NLP110-9912J
+48 V	0 A	1.6 A	2.3 A	2.3 A	2.5 A	240 mV	± 2.0%	NLP110-9917J
+24 V	0.2 A	3.2 A	4.6 A	4.6 A	6.0 A	240 mV	± 2.0%	NLP110-9924J
+5 V (A)	0.5 A	13 A	16 A	18 A	18 A	50 mV	± 2.0%	NLP110-9993J
+3.3 V (B)	0.2 A	13 A	16 A	20 A	20 A	50 mV	± 2.0%	
+12 V	0 A	0.65 A	1 A	1 A	1 A	120 mV	± 5.0%	
+3.3 V (A)	0.5 A	13 A	16 A	20 A	22 A	50 mV	± 2.0%	NLP110-9994J
+2.5 V (B)	0.1 A	13 A	16 A	20 A	22 A	50 mV	± 2.0%	
+12 V	0 A	0.65 A	1 A	1 A	1 A	120 mV	± 5.0%	
+12 V (A)	0.2 A	6.5 A	8.5 A	8.5 A	10 A	1200 mV	± 2.0%	NLP110-9995J
+3.3 V (B)	0.5 A	13 A	16 A	20 A	22 A	50 mV	± 2.0%	
-12 V	0 A	0.65 A	1 A	1 A	1 A	120 mV	± 5.0%	
+12 V (A)	0.2 A	6.5 A	8.5 A	8.5 A	10 A	120 mV	± 2.0%	NLP110-9908J
+5 V (B)	0.2 A	13 A	16 A	18 A	22 A	50 mV	± 2.0%	
-12 V	0 A	0.65 A	1 A	1 A	1 A	120 mV	± 5.0%	

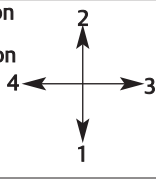
Notes

- Free air convection.
Multiple output units: maximum continuous output power not to exceed 80 W.
For -9993J; $I_{3.3V} = 13$ A max.; $I_{5.0V} = 13$ A max.; $I_{3.3V} + I_{5.0V} \leq 16$ A.
For -9994J; $I_{3.3V} = 13$ A max.; $I_{2.5V} = 13$ A max.; $I_{3.3V} + I_{2.5V} \leq 16$ A.
For -9995J; $I_{3.3V} = 13$ A max.; $I_{12V} = 6.5$ A max.; $I_{3.3V} + I_{12V} \leq 16$ A.
For -9908J; $I_{5.0V} = 13$ A max.; $I_{12V} = 6.5$ A max.; $I_{5.0V} + I_{12V} \leq 16$ A.
Single output units: maximum continuous output power not to exceed; 75 W on -9905J; 76.8 W on -9912J, -9924J, and -9917J.
- 150 LFM forced air cooling from L4 side.
Multiple output units: maximum continuous output power not to exceed 105 W.
For -9993J; $I_{3.3V} = 16$ A max.; $I_{5.0V} = 16$ A max.; $I_{3.3V} + I_{5.0V} \leq 20$ A.
For -9994J; $I_{3.3V} = 16$ A max.; $I_{2.5V} = 16$ A max.; $I_{3.3V} + I_{2.5V} \leq 20$ A.
For -9995J; $I_{3.3V} = 16$ A max.; $I_{12V} = 8.5$ A max.; $I_{3.3V} + I_{12V} \leq 20$ A.
For -9908J; $I_{5.0V} = 16$ A max.; $I_{12V} = 8.5$ A max.; $I_{5.0V} + I_{12V} \leq 20$ A.
Single output units: maximum continuous output power not to exceed 110 W for all models.
- 300 LFM forced air cooling from L4 side.
Multiple output units: maximum continuous output power not to exceed 110 W.
For -9993J; $I_{3.3V} = 20$ A max.; $I_{5.0V} = 18$ A max.; $I_{3.3V} + I_{5.0V} \leq 22$ A.
For -9994J; $I_{3.3V} = 20$ A max.; $I_{2.5V} = 20$ A max.; $I_{3.3V} + I_{2.5V} \leq 22$ A.
For -9995J; $I_{3.3V} = 20$ A max.; $I_{12V} = 8.5$ A max.; $I_{3.3V} + I_{12V} \leq 22$ A.
For -9908J; $I_{5.0V} = 20$ A max.; $I_{12V} = 8.5$ A max.; $I_{5.0V} + I_{12V} \leq 22$ A.
Single output units: maximum continuous output power not to exceed 110 W for all models.
- Peak output current lasting less than 30 seconds with duty cycle less than 5%. During peak loading, output voltage may exceed total regulation limits.
- Figure is peak-to-peak for convection power rating. Output noise measurements are made across a 20 MHz bandwidth using a 6' twisted pair, terminated with a 10 μ F electrolytic capacitor and a 0.1 μ F ceramic capacitor.
- Minimum load required for correct start-up and operation on single outputs and on main output of multiple versions. Failure to observe minimum load on main output will not allow the supply to start-up correctly. Some electronic test loads have a large delay time before they start drawing current even though the voltage from the supply is present. During this time delay, there is no load on the output and as a result, the supply cannot start-up properly and maintain its correct output voltage. In these instances, a dummy resistive load across the output may be necessary to load the output of the supply until the test load can function correctly and draw the intended minimum load. Minimum load required on auxiliary outputs to maintain regulation.
- For models NLP110-9908J and NLP110-9995J, the 12 V output is floating. For -12 V output, pin 11 on J2 has to be connected to Return making pin 12 the -12 V output.
- Three orthogonal axes, random vibration 10 minutes for each axes, 2.4 G rms 5 Hz to 500 Hz.
- For optimum reliability, no part of the heatsink should exceed 110 $\frac{1}{4}$ C, and no semiconductor case temperature should exceed 120 $\frac{1}{4}$ C.
- CAUTION: Allow a minimum of 1 second after disconnecting line power when making thermal measurements.
- This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.
- The EMI specifications reference measurements made with the power supply mounted on a grounded metal sheet extending 1 inch beyond each edge, using an unshielded cable. No external filtering required during conducted emissions testing but some applications may require additional filtering to achieve system compliance. A line choke, (ac input cords looped twice through an EMI suppression toroid) was used during radiated emissions testing. Considerable radiated testing in 1U six-sided boxes has shown that units can meet level B in typical systems. Application support is available from the factory to assist with EMI compliance.
- All models require a minimum mounting stand-off of 6.35 mm (0.25 inches) in the end use product.
- The 'J' suffix indicates that these parts are Pb-free (RoHS 6/6) compliant.
- NOTICE: Some models do not support all options. Please contact your local Emerson Network Power representative or use the on-line model number search tool at <http://www.powerconversion.com/products>.



Recommended direction
for forced air relative to
power supply orientation
shown below.

- 1 Optimum.
- 2 Very good.
- 3 Good.
- 4 Not recommended.



Input Pin Connections

J1	Pin 1	AC Neutral
	Pin 2	No Connection
	Pin 3	AC Line
J3	Pin 1	V (A) Sense +
	Pin 2	V (A) Sense -
J4	Pin 1	Safety Earth
J5	Pin 1	V (B) Sense +
	Pin 2	V (B) Sense -

Output Pin Connections

J2	Single	Triple
Pin 1	No Connection	V (B)
Pin 2	No Connection	V (B)
Pin 3	No Connection	V (B)
Pin 4	Return	Return
Pin 5	Return	Return
Pin 6	Return	Return
Pin 7	Return	Return
Pin 8	V (A)	V (A)
Pin 9	V (A)	V (A)
Pin 10	V (A)	V (A)
Pin 11	No Connection	V (C)
Pin 12	No Connection	V (C) Return (7)

Input and output connectors

AC (J1) connector type

Molex 26-60-4030 or equivalent.

DC (J2) connector type

12 position Molex Spox type 26-481125 or equivalent.

Sense (J3) connector type

Molex 22-23-2021 or equivalent.

Earth (J4) connector type

Male 0.250 quick disconnect.

Sense (J5) connector type

Leoco 2421P02H000.

Mating connectors

AC (J1) mating connector type

Molex 09-50-3031 or equivalent with Molex 08-50-0105 or equivalent crimp terminals.

DC (J2) mating connector type

Molex Spox type 26-03-3121 and contact 08-52-0113.

Sense (J3) mating connector type

Molex 22-01-3027 and contact 08-50-0113.

Earth (J4) mating connector type

Molex 90028.

Sense (J5) mating connector type

Leoco 2420S020000 and contact 2453TPB00V1.

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