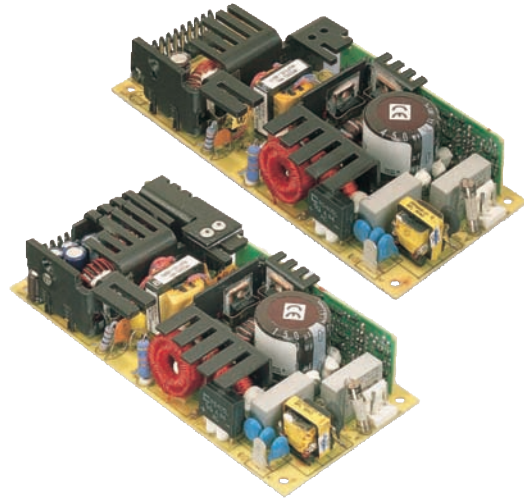


# NLP110 Medical Series

## 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)
- Package 6.5 x 3.0 x 1.26 inches
- 90 Vac to 264 Vac universal input range
- UL, cUL, and VDE safety approvals
- 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
- RoHS compliant
- 2 year warranty

### Safety

- VDE0750/EN60601-1/IEC601 IEC1010 File No. 10401-3336-1049. License No. 2874
- UL2601 File No. E147937
- CSA C22.2 No. 125 File No. LR41062C

## Electrical Specifications

Input		
Input range:	Universal input (See Note 6)	90-264 Vac
Frequency:		47-63 Hz
Input surge current: (cold start)	120 Vac 230 Vac	18 A max. 35 A max.
Safety ground leakage current:	230 Vac, 50 Hz	< 100 $\mu$ 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 0.48 A rms 0.7 A rms
Input fuse:	UL/IEC127	F3.15A 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 $\mu$ s	5.0% or 250 mV max. dev., 1 ms 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



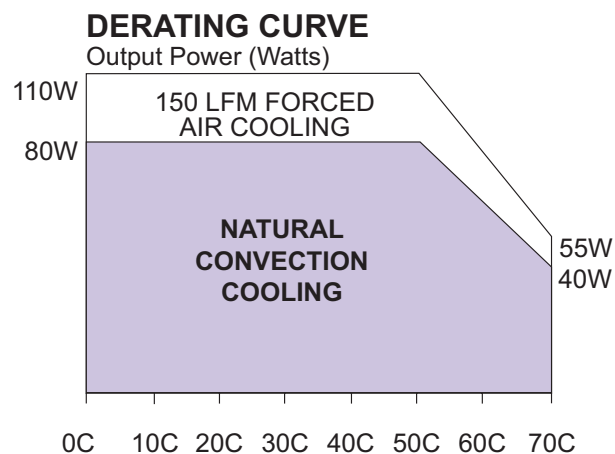
All specifications are typical at nominal input, full load at 25 °C unless otherwise stated.

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EMC Characteristics		
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 Input/chassis	4000 Vac 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

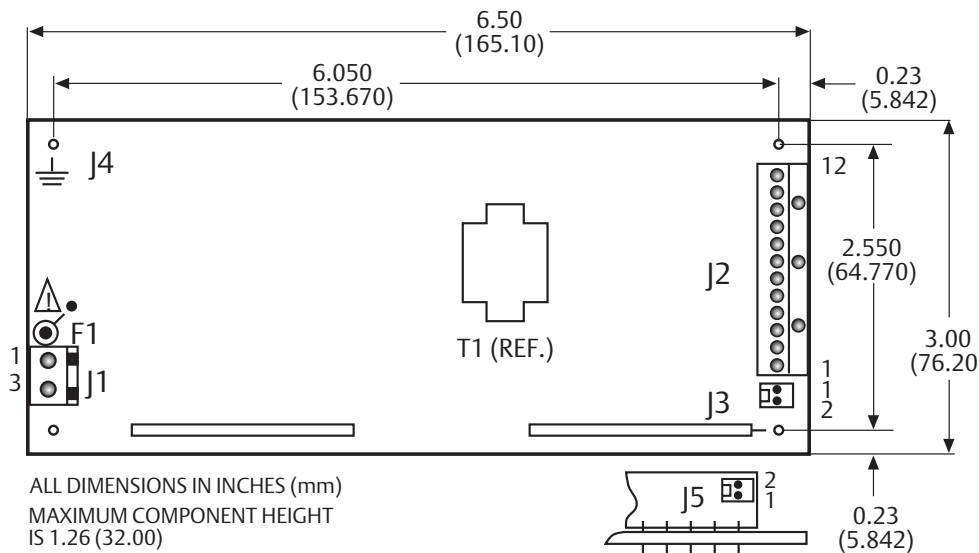


## Ordering Information

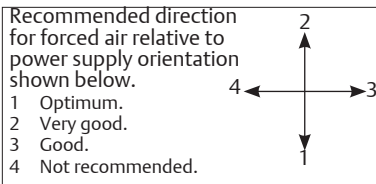
Output Voltage	Min <sup>(6)</sup>	Max <sup>(1)</sup>	150 LFM <sup>(2)</sup>	300 LFM <sup>(3)</sup>	Peak <sup>(4)</sup>	Ripple <sup>(5)</sup>	Total Regulation	Model Numbers <sup>(7, 14, 15)</sup>
+5 V	0.5 A	15 A	22 A	22 A	22 A	50 mV	± 2.0%	NLP110-9905J
+12 V	0.3 A	6.4 A	9.2 A	9.2 A	11.5 A	120 mV	± 2.0%	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;  $I_{3.3V} = 13 \text{ A max.}; I_{5.0V} = 13 \text{ A max.}; I_{3.3V} + I_{5.0V}^2 = 16 \text{ A}$ .  
For -9994J;  $I_{3.3V} = 13 \text{ A max.}; I_{2.5V} = 13 \text{ A max.}; I_{3.3V} + I_{2.5V}^2 = 16 \text{ A}$ .  
For -9995J;  $I_{3.3V} = 13 \text{ A max.}; I_{12V} = 6.5 \text{ A max.}; I_{3.3V} + I_{12V}^2 = 16 \text{ A}$ .  
For -9908J;  $I_{5.0V} = 13 \text{ A max.}; I_{12V} = 6.5 \text{ A max.}; I_{5.0V} + I_{12V}^2 = 16 \text{ A}$ .  
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;  $I_{3.3V} = 16 \text{ A max.}; I_{5.0V} = 16 \text{ A max.}; I_{3.3V} + I_{5.0V}^2 = 20 \text{ A}$ .  
For -9994J;  $I_{3.3V} = 16 \text{ A max.}; I_{2.5V} = 16 \text{ A max.}; I_{3.3V} + I_{2.5V}^2 = 20 \text{ A}$ .  
For -9995J;  $I_{3.3V} = 16 \text{ A max.}; I_{12V} = 8.5 \text{ A max.}; I_{3.3V} + I_{12V}^2 = 20 \text{ A}$ .  
For -9908J;  $I_{5.0V} = 16 \text{ A max.}; I_{12V} = 8.5 \text{ A max.}; I_{5.0V} + I_{12V}^2 = 20 \text{ A}$ .  
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;  $I_{3.3V} = 20 \text{ A max.}; I_{5.0V} = 18 \text{ A max.}; I_{3.3V} + I_{5.0V}^2 = 22 \text{ A}$ .  
For -9994J;  $I_{3.3V} = 20 \text{ A max.}; I_{2.5V} = 20 \text{ A max.}; I_{3.3V} + I_{2.5V}^2 = 22 \text{ A}$ .  
For -9995J;  $I_{3.3V} = 20 \text{ A max.}; I_{12V} = 8.5 \text{ A max.}; I_{3.3V} + I_{12V}^2 = 22 \text{ A}$ .  
For -9908J;  $I_{5.0V} = 20 \text{ A max.}; I_{12V} = 8.5 \text{ A max.}; I_{5.0V} + I_{12V}^2 = 22 \text{ A}$ .  
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  $\mu\text{F}$  electrolytic capacitor and a 0.1  $\mu\text{F}$  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 °C, and no semiconductor case temperature should exceed 120 °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>.



ALL DIMENSIONS IN INCHES (mm)  
MAXIMUM COMPONENT HEIGHT  
IS 1.26 (32.00)



Input Pin Connections	
<b>J1</b>	
Pin 1	AC Neutral
Pin 2	No Connection
Pin 3	AC Line
<b>J3</b>	
Pin 1	V (A) Sense +
Pin 2	V (A) Sense -
<b>J4</b>	
Pin 1	Safety Earth
<b>J5</b>	
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 <sup>(7)</sup>

### Input and output connectors

**AC (J1) connector type**  
Molex 26-60-4030 or equivalent.

**DC (J2) connector type**  
12 position Molex Spox type 26-48  
1125 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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