NFS110 Medical Series

Single and quad output

Total Power: 80 - 110 W **Input Voltage:** 90 - 253 Vac

127 - 357 Vdc

of Outputs: Single, quad



- 7.0 x 4.25 x 1.8 inch package
- Medical, dental and laboratory applications
- Overvoltage and short circuit protection
- 110 W with 20 CFM
- UL, VDE and CSA safety approvals
- EN60601-1 and UL2601 medical approvals
- Available RoHS compliant
- 2 year warranty

Safety

- VDE0805/EN60601-1/
- IEC601/IEC1010
- File No. 10401-3336-1049
- Licence No. 2874
- UL2601 File No. E147937
- CSA C22.2 No. 125
- File No. LR41062C



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Electrical Specifications

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Output					
Voltage adjustability:	+5.1 V o/p on multi's 5.1 V single output 12 V single output 15 V single output 24 V single output	±3.0% ±3.0% 12-14 V 15-18 V 24-30 V			
Line regulation:	LL to HL, FL All outputs on all units	± 0.1% max.			
Overshoot/undershoot:	At turn-on no lead	0%			
Temperature coefficient:	All outputs	±0.02% / °C			
Overvoltage protection:	Multi o/p 5.1 V only 5.1 V single 12 V single 15 V single 24 V single	6.25 V ± 0.75 V 6.25 V ± 0.75 V 15.75 V ± 1.0 V 22 V ± 1.5 V 33 V ± 2.5 V			
Output power limit:	Primary power limited	Pin max. 160 W Pout min. 110 W			
Short circuit protection:		Burst mode operation			
Input					
Input voltage range:		90-253 Vac 127-357 Vdc			
Input frequency range:		47-440 Hz			
Input surge current:	110 Vac. 50 Hz 230 Vac. 50 Hz	17 A 25 A			
Safety ground leakage current:	132 Vac 264 Vac	50 μA 100 μA			

All specifications are typical at nominal input, full load at 25 $^{\circ}\text{C}$ 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
ESD air:	EN61000-4-2, level 3	Perf. criteria 1
ESD contact:	EN61000-4-2, level 4	Perf. criteria 1
Surge:	EN61000-4-3, level 3	Perf. criteria 1
Fast transients:	EN61000-4-4, level 3	Perf. criteria 1
Radiated immunity:	EN61000-4-5, level 3	Perf. criteria 2
Conducted immunity:	EN61000-4-6, level 3	Perf. criteria 2
General Specifications		
Hold-up time:	110 Vac @ 80 W 110 Vac @ 110 W 230 Vac @ 80 W 230 Vac @ 110 W	35 ms 17 ms 140 ms 100 ms
Efficiency:	Multiple outputs +5.1 V single 12 V and 15 V singles 24 V single	70% typical 70% typical 72% typical 75% typical
Isolation voltage:	Input/output Input/chassis	4000 Vac 1500 Vac
Approvals and standards: (see note 12)		VDE0750, IEC60601, IEC1010, UL2601, CSA C22.2 No. 125
Weight:	Singles Multiple outputs	550 g (19.4 oz) 600 g (21.2 oz)
MTBF (@25 °C)	MIL-HDBK-217E	125,000 hours min.

Environmental Specifications

Thermal performance:	Operating, see curve	0° C to +70 °C
(See notes 9, 10)	Non-operating	-40 °C to +85 °C
	0 °C to 50 °C amb. convection cooled	80 W
	+50 °C to +70 °C, amb. convection cooled	Derate 2 W/°C
	0 °C to +50 °C, 20 CFM forced air	110 W
	+50 °C to +70 °C, 20CFM forced air	Derate 2.75 W/°C
	Peak, 0 °C to +50 °C, max. 60 seconds	110W
Relative humidity:	Non-condensing	5% to 95% RH
Altitude:	Operating	10,000 feet max.
	Non-operating	40,000 feet max.
Vibration (See Note 11):	5-500 Hz	2.4 G rms peak

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EMC Characteristics						
Output		Output Currents			Total	
Voltage	Max ⁽¹⁾	Peak (2)	Fan ⁽³⁾	Ripple (4)	Regulation (5)	Model Numbers (13, 14, F)
+5.1 V	8 A	20 A	10 A	50 mV	±2.0%	NFS110-7901PJ
+12 V	4.5 A	9 A	5 A	120 mV	±3.0%	
–12 V	0.5 A	1.5 A	1 A	120 mV	±3.0%	
–5 V	0.5 A	1.5 A	1 A	50 mV	±3.0%	
+5.1 V (I _A)	8 A	20 A	10 A	50 mV	±2.0%	NFS110-7902PJ
+24 V (I _B) ⁽⁶⁾	3.5 A	4.5 A	4.5 A	240 mV	+10/-5.0%	
+12 V	4.5 A	9 A	5 A	120 mV	±3.0%	
–12 V	0.5 A	1.5 A	1 A	120 mV	±3.0%	
12 V	7 A	9 A	9 A	120 mV	±2.0%	NFS110-7912J (7,8)
15 V	5 A	7.3 A	7.3 A	150 mV	±2.0%	NFS110-7915J (7,8)
24 V	3.5 A	4.5 A	4.5 A	240 mV	±2.0%	NFS110-7924J (7,8)

Notes

- 1 Convection cooled, 80 W maximum.
- 2 Peak outputs lasting less than 60 seconds with duty cycle less than 10%. Total peak power must not exceed 110 W.
- **3** Forced air, 20 CFM at 1 atmosphere, 110 W maximum.
- 4 Figure is peak-to-peak. Output ripple is measured across a 50 MHz bandwidth using a 12 inch twisted pair terminated with a 47 µF capacitor.
- Total regulation is defined at the static output regulation at 25 °C, including initial tolerance, line voltage within stated limits and output voltages adjusted to their factory settings. Also for NFS110-7902PJ, for 24 V output stated regulation I_A / I_B ² 5. This output will maintain ±5.0% regulation if I_A ² 5 A, where I_A = +5.1 V output current and I_B = +24 V output current.
 Single output models have floating outputs which may be referenced as either
- 6 Single output models have floating outputs which may be referenced as eithe positive or negative. Higher voltage supplies, may be adjusted over a wide output voltage range, as long as the total output power does not exceed 80 Watts (natural convection) or 110 Watts (forced air).
- 7 Power fail detect not available on single output models.
- 8 Derating curve is application specific for ambient temperatures > 50 °C, for optimum reliability no part of the heatsink should exceed 90 °C and no semiconductor case temperature should exceed 100 °C.
- 9 Caution: Allow a minimum of 1 second after disconnecting the power when making thermal measurements.
- 10 The user should read the PSU installation instructions in conjunction with the relevant national safety regulations in order to ensure compliance.
- 11 Three orthogonal axes, random vibration, 10 minute test for each axis.
- 12 This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.
- 13 The 'J' suffix indicates that these parts are Pb-free (RoHS 6/6) compliant. TSE RoHS 5/6 (non Pb-free) compliant versions may be available on special request, please contact your local sales representative for details.
- 14 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 to find a suitable alternative.

Transient Response					
NFS110-7901PJ	+5.1 V (7.5-10 A)	150 mV peak, 1 ms recovery			
	+12 V (2.5-5 A)	100 mV peak, 0.5 ms recovery			
	-12 V (0.5-1 A)	100 mV peak, 0.5 ms recovery			
	-5 V (0.5-1 A)	100 mV peak, 0.5 ms recovery			
NFS110-7902PJ	+5.1 V (7.5-10 A)	150 mV peak, 1 ms recovery			
	+12 V (2.5-5 A)	100 mV peak, 0.5 ms recovery			
	-12 V (0.5-1 A)	100 mV peak, 0.5 ms recovery			
	24 V (1.5-3 A)	300 mV peak,1 ms recovery			
NFS110-7905J	+5.1 V (10-20 A)	250 mV peak, 1 ms recovery			
NFS110-7912J	+12 V (4.5-9 A)	360 mV peak, 1 ms recovery			
NFS110-7915J	+15 V (3.65-7.3 A)	450 mV peak, 1 ms recovery			
NFS110-7924J	+24 V (2.25-4.5 A	720 mV peak, 1 ms recovery			

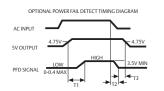
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AC (|1) mating connector

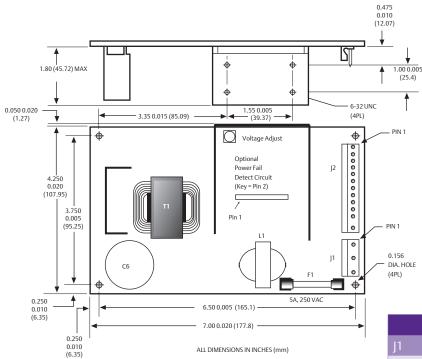
Molex 09-50-3051 or Molex 09-91-0500 mating connector with 2478 or equivalent crimp terminals.

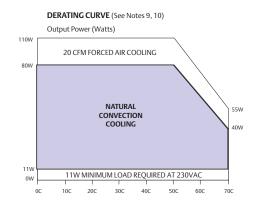
DC (J2) mating connector

Molex 09-50-3131 or Molex 09-91-1300 mating connector with 2478 or equivalent crimp terminals.



Power fail detect signal (Note 8) $50ms \le T1 \le 200ms$ T2 will vary with line and load $T3 \ge 3ms$ Pout: 110W PFD output is an open collector which will $sink \le 40mA$ in the low state.





Mechanical Notes

- A Metallic or non-metallic stand-offs (maximum diameter 5.4mm) can be
- used in all four mounting holes without effecting safety approval.

 B The ground pad of the mounting hole near J1, allows system grounding through a metal stand-off to the system chassis.
- C The heat sink is grounded, and allows system grounding by mechanical connection to the system chassis.
- **D** The supply must be mechanically supported using the PCB mounting holes and may be additionally supported by the heatsink mounting holes.
- E It is always advisable to attach the power supply heat sink to another thermal dissipator (such as a chassis or finned heatsink etc). The resulting decrease in heat sink mounted component temperatures will improve power supply lifetime.
- F A standard L-bracket and cover is available for mounting which contains all screws, connectors and necessary mounting hardware. The kit is available, order part number "NFS110CJ".

Pin Connections					
J1	-7901PJ	-7902PJ	SINGLES		
Pin 1	AC Ground	AC Ground	AC Ground		
Pin 2	AC Neutral	AC Neutral	AC Neutral		
Pin 3	AC Line	AC Line	AC Line		
J2					
Pin 1	+5.1 V	+5.1 V	V _{out}		
Pin 2	+5.1 V	+5.1 V	V _{out}		
Pin 3	+5.1 V	+5.1 V	V _{out}		
Pin 4	Return	Return	Return		
Pin 5	Return	Return	Return		
Pin 6	Return	Return	Return		
Pin 7	Return	Return	Return		
Pin 8	+12 V	+12 V	V _{out}		
Pin 9	+12 V	+12 V	V _{out}		
Pin 10	PFD	PFD	N/C		
Pin 11	-12 V	-12 V	N/C		
Pin 12	Removed for Key				
Pin 13	-5 V	+24 V	N/C		

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Americas

5810 Van Allen Way Carlsbad, CA 92008 USA

Telephone: +1 760 930 4600 Facsimile: +1 760 930 0698

Europe (UK)

Waterfront Business Park Merry Hill, Dudley West Midlands, DY5 1LX United Kingdom

Telephone: +44 (0) 1384 842 211 Facsimile: +44 (0) 1384 843 355

Asia (HK)

14/F, Lu Plaza 2 Wing Yip Street Kwun Tong, Kowloon Hong Kong

Telephone: +852 2176 3333 Facsimile: +852 2176 3888

For global contact, visit:

www.powerconversion.com techsupport.embeddedpower @emerson.com

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