

NFS110 Medical Series

Single and
quad output

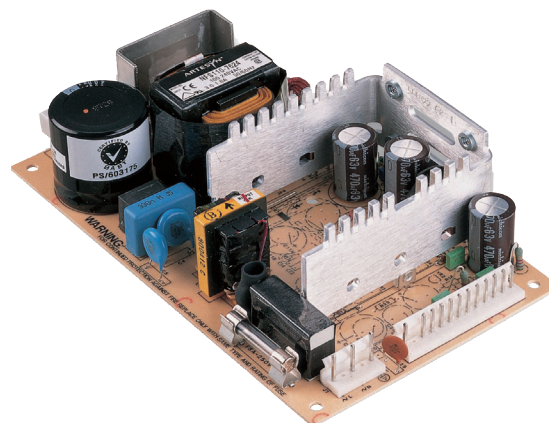
Total Power: 80 - 110 W
Input Voltage: 90 - 253 Vac
127 - 357 Vdc
of Outputs: Single, quad

Special Features

- 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



Rev. 12.29.08_139
NFS110-M Series
1 of 5



Electrical Specifications

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 °C unless otherwise stated



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

EMC Characteristics

Output Voltage	Output Currents			Ripple ⁽⁴⁾	Total Regulation ⁽⁵⁾	Model Numbers ^(13, 14, F)
	Max ⁽¹⁾	Peak ⁽²⁾	Fan ⁽³⁾			
+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 μ F capacitor.
- 5 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 $I_A / I_B \geq 5$. This output will maintain ±5.0% regulation if $I_A \geq 5$ A, where I_A = +5.1 V output current and I_B = +24 V output current.
- 6 Single output models have floating outputs which may be referenced as either 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

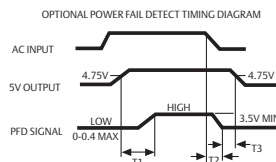
NFS110-7901PJ	+5.1 V (7.5-10 A)	150 mV peak, 1 ms recovery
	+12 V (2.5-5 A)	100 mV peak, 0.5 ms recovery
	-12 V (0.5-1 A)	100 mV peak, 0.5 ms recovery
	-5 V (0.5-1 A)	100 mV peak, 0.5 ms recovery
NFS110-7902PJ	+5.1 V (7.5-10 A)	150 mV peak, 1 ms recovery
	+12 V (2.5-5 A)	100 mV peak, 0.5 ms recovery
	-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

AC (J1) mating connector

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

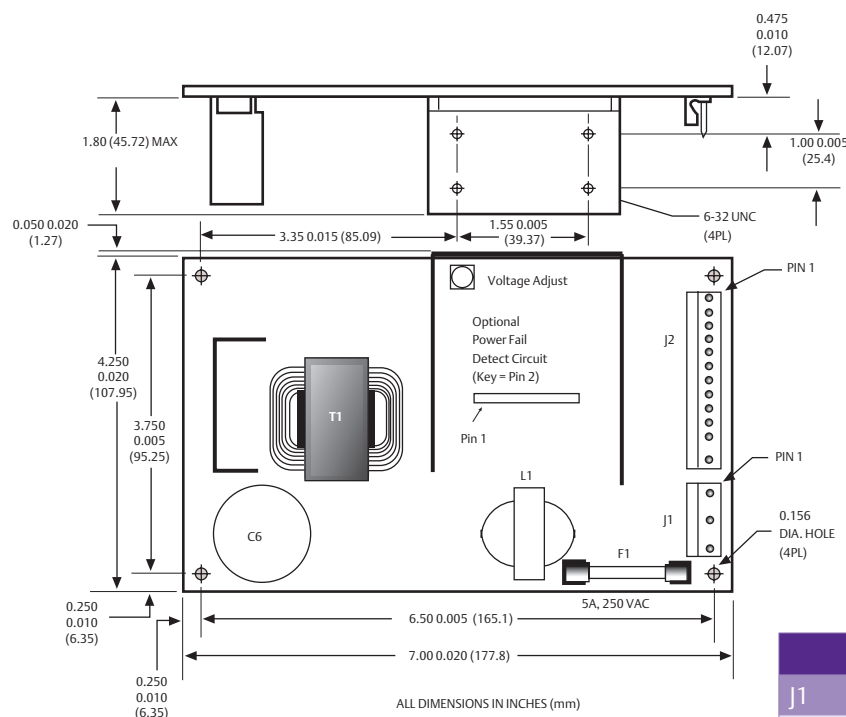
DC (J2) mating connector

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

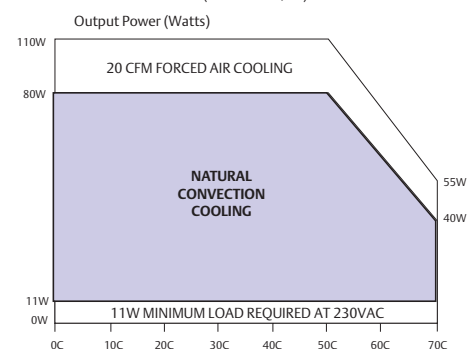


Power fail detect signal (Note 8)

50ms $\leq T1 \leq 200$ ms
T2 will vary with line and load
T3 ≥ 3 ms
Pout: 110W
PFD output is an open collector which will sink ≤ 40 mA in the low state.



DERATING CURVE (See Notes 9, 10)



Mechanical Notes

- Metallic or non-metallic stand-offs (maximum diameter 5.4mm) can be used in all four mounting holes without effecting safety approval.
- The ground pad of the mounting hole near J1, allows system grounding through a metal stand-off to the system chassis.
- The heat sink is grounded, and allows system grounding by mechanical connection to the system chassis.
- The supply must be mechanically supported using the PCB mounting holes and may be additionally supported by the heatsink mounting holes.
- 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.
- 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

N/C = no connection.

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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