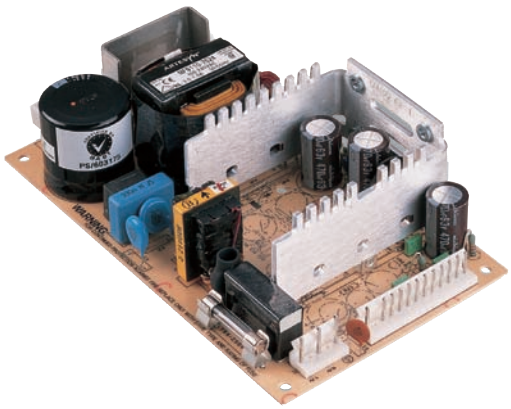
NFS110 Series

Single & Quad output



Total Power: 80 - 110 W
Input Voltage: 85 - 264 Vac
120 - 370 Vdc
# of Outputs: Single, quad

RoHS 2002/95/EC

Special Features

- 7.0 x 4.25 x 1.8 inch package
- Overvoltage and short circuit protection
- 110 W with 20 CFM
- Adjustable outputs
- EN55022, EN55011 conducted emissions level B
- UL, VDE and CSA safety approvals
- CE mark
- Available RoHS compliant
- 2 year warranty

Safety

- VDE0805/EN60950/
- IEC950/IEC1010
  File No. 10401-3336-0213
- Licence No. 4001467 7
- UL1950 File No. E132002
- CSA C22.2 No. 950
  File No. LR41062C

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	0%
Temperature coefficient:	All outputs	±0.02%/°C
Overvoltage protection:	Multi o/p 5.1 V only 5.1 V single output 12 V single output 15 V single output 24 V single output	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
Minimum output current:	(See Note 13)	0 A
Short circuit protection:	Burst mode operation	
Input		
Input voltage range:		85 - 264 Vac 120 - 370 Vdc
Input frequency range:		47 - 440 Hz
Input surge current:	230 Vac	35 A
Safety ground leakage current:	110 Vac, 50 Hz 230 Vac, 50 Hz	0.2 mA, max. 0.4 mA, max.

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

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EMERSON Network Power

EMC Characteristics		
Conducted emissions:	EN55022, FCC part 15	Level B
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 1
General Specifications		
Hold-up time:	110 Vac @ 80 W 110 Vac @ 110 W 230 Vac @ 80 W 230 Vac @ 100 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	3000 Vac 1500 Vac
Approvals and standards: (see note 12)	VDE0805, EN60950, IEC950, IEC1010, UL1950, CSA C22.2 No. 950	
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 ambient	0° C to +70 °C
(See notes 9, 10)	Non-operating	-40 °C to +85 °C
	0 °C to 50 °C convection cooled	80 W
	+50 °C to +70 °C, 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

Ordering Information

Output Voltage	Output Currents			Ripple [4]	Total Regulation [5]	Model Numbers [13, 15, F]
	Max [1]	Peak [2]	Fan [3]			
+5.1 V	8 A	20 A	10 A	50 mV	± 2.0%	NFS110-7601PJ [14]
+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%	NFS110-7602PJ [6, 14]
+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%	
+5.1 V	8 A	20 A	10 A	50 mV	± 2.0%	NFS110-7604PJ [14]
15 V	4 A	7.5 A	5 A	150 mV	± 4.0%	
-15 V	0.5 A	1.5 A	1 A	150 mV	± 3.0%	
-5 V	0.5 A	1.5 A	1 A	50 mV	± 3.0%	
12 V	7 A	9 A	9 A	120 mV	± 2.0%	NFS110-7612J [7,8]
15 V	5 A	7.3 A	7.3 A	150 mV	± 2.0%	NFS110-7615J [7,8]
24 V	3.5 A	4.5 A	4.5 A	240 mV	± 2.0%	NFS110-7624J [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.
5 Total regulation is defined as the static output regulation at 25 °C, including initial tolerance, line voltage within stated limits and output voltages adjusted to their factory settings.
6 To achieve stated regulation on the 24 V output on the NFS110-7602PJ, the following load condition must be true: $I_A / I_B \leq 5$, where:
I_A = +5.1 V output current, and
I_B = +24 V output current
The +24 V output will maintain ±5.0% regulation under the following additional condition: $I_A \leq 5$ A.
7 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).
8 Power fail detect not available on single output models.
9 Derating curve is application specific for ambient temperatures >50 °C, for optimum reliability no part of the heatsink should exceed 90 ºC and no semiconductor case temperature should exceed 100 ºC.
10 Caution: Allow a minimum of 1 second after disconnecting the power when making thermal measurements.
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 Recommend a minimum load of 11 W to achieve the design MTBF. See the derating curve on page 4.
14 Power failure detec is optional by including the suffix “P” to the model number.
15 The ‘J’ suffix indicates that these parts are Pb-free (RoHS 6/6) compliant.
16 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

NFS110-7601PJ	+5.1 V (7.5 A to 10 A) +12 V (2.5 A to 5 A) -12 V (0.5 A to 1 A) -5 V (0.5 A to 1 A)	150 mV peak, 1 ms recovery 100 mV peak, 0.5 ms recovery 100 mV peak, 0.5 ms recovery 100 mV peak, 0.5 ms recovery
NFS110-7602PJ	+5.1 V (7.5 A to 10 A) +24 V (1.5 A to 3 A) +12 V (2.5 A to 5 A) -12 V (0.5 A to 1 A)	150 mV peak, 1 ms recovery 300 mV peak, 1 ms recovery 100 mV peak, 0.5 ms recovery 100 mV peak, 0.5 ms recovery
NFS110-7604PJ	+5.1 V (7.5 A to 10 A) +15 V (2.5 A to 5 A) -15 V (0.5 A to 1 A) -5 V (0.5 A to 1 A)	150 mV peak, 1 ms recovery 100 mV peak, 0.5 ms recovery 100 mV peak, 0.5 ms recovery 100 mV peak, 0.5 ms recovery
NFS110-7605J	+5.1 V (10 A to 20 A)	250 mV peak, 1 ms recovery
NFS110-7612J:	+12 V (4.5 A to 9 A)	360 mV peak, 1 ms recovery
NFS110-7615J	+15 V (3.65 A to 7.3 A)	450 mV peak, 1 ms recovery
NFS110-7624J	+24 V (2.25 A to 4.5 A)	720 mV peak, 1 ms recovery

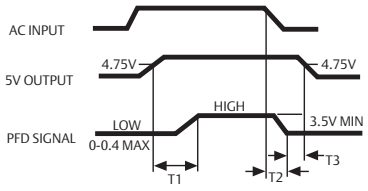
AC (J1) mating connector

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

DC (J2) mating connector

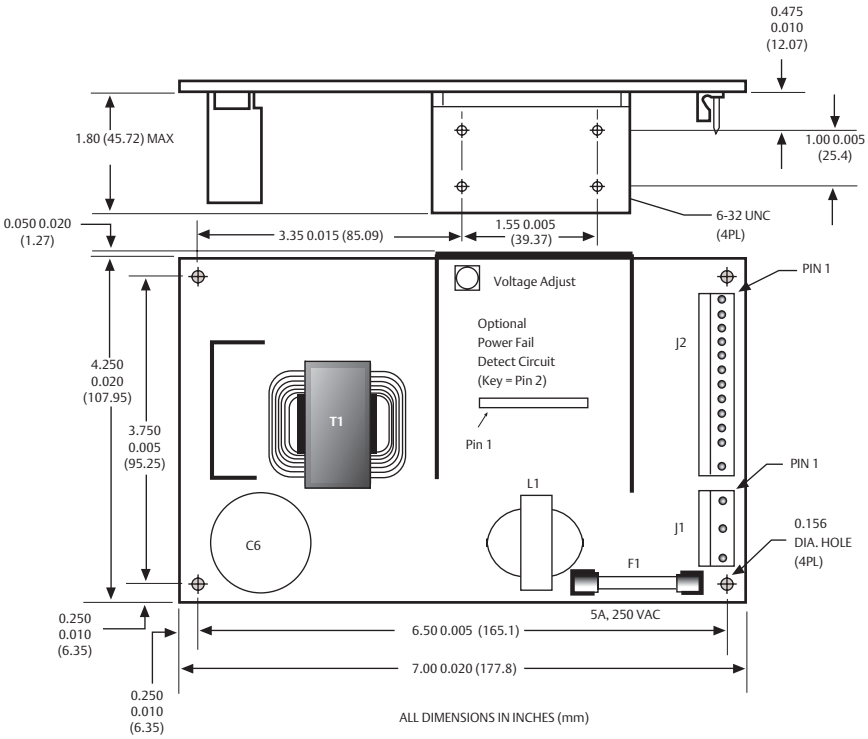
Molex 09-50-3131 or Molex 09-91-1300 mating connector with 2478 or equivalent crimp terminals.

OPTIONAL POWER FAIL DETECT TIMING DIAGRAM

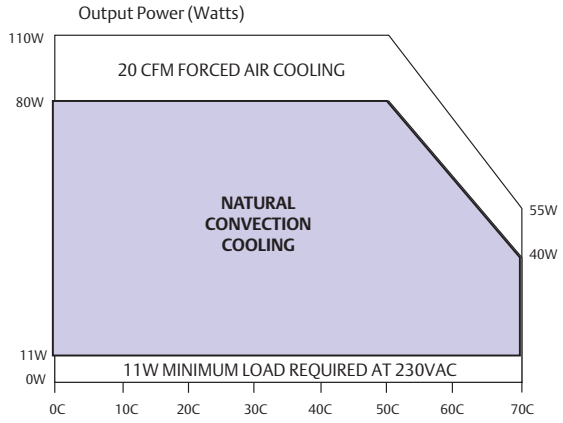


Power fail detect signal (Note 8)

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



DERATING CURVE (See Notes 9, 10)



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	**-7601PJ**	**-7602 P**	**-7604PJ**	**Singles**
Pin 1	AC Ground	AC Ground	AC Ground	AC Ground
Pin 2	AC Neutral	AC Neutral	AC Neutral	AC Neutral
Pin 3	AC Line	AC Line	AC Line	AC Line
J2				
Pin 1	+5.1 V	+5.1 V	+5.1 V	V_{out}
Pin 2	+5.1 V	+5.1 V	+5.1 V	V_{out}
Pin 3	+5.1 V	+5.1 V	+5.1 V	V_{out}
Pin 4	Return	Return	Return	Return
Pin 5	Return	Return	Return	Return
Pin 6	Return	Return	Return	Return
Pin 7	Return	Return	Return	Return
Pin 8	+12 V	+12 V	+15 V	V_{out}
Pin 9	+12 V	+12 V	+15 V	V_{out}
Pin 10	PFD	PFD	PFD	N/C
Pin 11	-12 V	-12 V	-15 V	N/C
Pin 12	Removed for Key			
Pin 13	-5 V	+24 V	-5 V	N/C

N/C = no connection

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