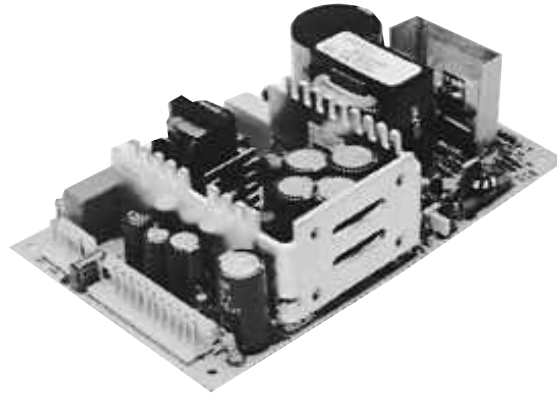


NFS110 MEDICAL SERIES

Single and quad output

Recommended for new design-ins

- 90VAC to 253VAC universal input
- 127VDC to 357VDC universal input
- 110W in 7.0" x 4.25" x 1.80"
- PFD signal as standard on multiple output units
- Short circuit protection with auto-restart
- UL, CSA and VDE approved
- Low leakage current
- High isolation voltage of 4000VAC



2 YEAR WARRANTY

CE (LVD)

Based on the robust NFS110 series, a range of IEC601 approved 110 Watt AC/DC power supplies have been designed for medical application. All models of the NFS110-79XX medical series have been designed to meet the safety ground leakage current requirements of IEC601. The basic mechanical and general specifications remain the same as those of the NFS110-76XX industrial series. Coupled with universal AC

input, high voltage DC input, and superior electrical performance, these medical approvals make the NFS110-79XX medical series ideal for medium power electronic based systems used in medical, dental and laboratory equipment.

SPECIFICATION

ALL SPECIFICATIONS ARE TYPICAL AT NOMINAL INPUT, FULL LOAD AND 25°C UNLESS OTHERWISE STATED

OUTPUT SPECIFICATIONS		
Voltage adjustability	+5.1V output on multi's 5.1V single 12V single 15V single 24V single	±3.0% ±3.0% 12V to 14V 15V to 18V 24V to 30V
Line regulation	LL to HL, FL All outputs on all units	±0.1% max
Total regulation		See table on facing page
Overshoot/undershoot	At turn-on no load	0%
Transient response		See table on facing page
Temperature coefficient	All outputs	±0.02%/°C
Overvoltage protection	Multi output 5.1V only 5.1V single 12V single 15V single 24V single	6.25V±0.75V 6.25V±0.75V 15.75V±1.0V 22V±1.5V 33V±2.5V
Output power limit		Pin max. 160W Pout min. 110W
Short circuit protection		Burst mode operation
INPUT SPECIFICATIONS		
Input voltage range		90 to 253VAC 127 to 357VDC
Input frequency range		47Hz to 440Hz
Input surge current	110VAC, 50Hz 230VAC, 50Hz	17A 35A
Safety ground leakage current	132VAC 264VAC	50µA 100µA

ELECTROMAGNETIC COMPATIBILITY SPECIFICATIONS		
Conducted noise	EN55022, EN55011, FCC/VDE Level A	
GENERAL SPECIFICATIONS		
Hold-up time	110VAC @ 80W 110VAC @ 110W 230VAC @ 80W 230VAC @ 110W	35ms 17ms 140ms 100ms
Efficiency	Multiple outputs +5.1V single 12V and 15V singles 24V single	70% typical 70% typical 72% typical 75% typical
Isolation voltage	Input/output Input/chassis	4000VAC 1500VAC
Switching frequency	At 100 Watts output At zero load	20 to 70kHz 100 to 250kHz
Approvals and standards	Safety	VDE0750, EN60601 IEC1010, UL544 CSA22.2 No. 125
Weight	Singles Multiple outputs	550g (19.4oz) 600g (21.2oz)
MTBF	MIL-HDBK-217E	125,000 hours
ENVIRONMENTAL SPECIFICATIONS		
Thermal performance	Operating, see curve Non-operating 0°C to +50°C, amb. convection cooled +50°C to +70°C, amb. convection cooled 0°C to +50°C, 20CFM forced air +50°C to +70°C, 20CFM forced air Peak, 0°C to +50°C, max. 60 seconds	0°C to +70°C -40°C to +85°C 80W Derate 2W/°C 110W Derate 2.75W/°C 110W
Relative humidity	Non-condensing	5% to 95% RH
Altitude	Operating Non-operating	10,000 feet max. 40,000 feet max.
Vibration (See Note 11)	5Hz to 500Hz	2.4G approx.

80 to 110 Watt AC/DC universal input switch mode power supplies

OUTPUT VOLTAGE	OUTPUT CURRENTS			RIPPLE (4)	TOTAL REGULATION (5)	MODEL NUMBERS (F)
	MAX (1)	PEAK (2)	FAN (3)			
+5.1V	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7901P
+12.0V	4.5A	9.0A	5.0A	120mV	±3.0%	
-12.0V	0.5A	1.5A	1.0A	120mV	±3.0%	
-5.0V	0.5A	1.5A	1.0A	50mV	±3.0%	
+5.1V(A)	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7902P
+24.0V(B)	3.5A	4.5A	4.5A	240mV	+10/-5.0%	
+12.0V	4.5A	9.0A	5.0A	120mV	±3.0%	
-12V	0.5A	1.5A	1.0A	120mV	±3.0%	
+5.1V	8.0A	20.0A	10.0A	50mV	±2.0%	NFS110-7904P
+15.0V	4.0A	7.5A	5.0A	150mV	±3.0%	
-15V	0.5A	1.5A	1.0A	150mV	±3.0%	
-5V	0.5A	1.5A	1.0A	50mV	±3.0%	
5.1V (6)	16.0A	22.0A	20.0A	50mV	±2.0%	NFS110-7905
12V (6)	7.0A	9.0A	9.0A	120mV	±2.0%	NFS110-7912
15V (6)	5.0A	7.3A	7.3A	150mV	±2.0%	NFS110-7915
24V (6)	3.5A	4.5A	4.5A	240mV	±2.0%	NFS110-7924


Notes

- 1 Convection cooled, 80W maximum.
- 2 Peak outputs lasting less than 60 seconds with duty cycle less than 10%. Total peak power must not exceed 110W.
- 3 Forced air, 20CFM at 1 atmosphere, 110W maximum.
- 4 Figure is peak-to-peak. Output ripple is measured across a 50MHz bandwidth using a 12" twisted pair terminated with a 47µF 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 NFS110-7902P, for 24V output stated regulation $I(A)/I(B) \leq 5$. This output will maintain ±5% regulation if $I(A) \leq 5A$, where $I(A) = +5.1V$ output current and $I(B) = +24V$ 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.

TRANSIENT RESPONSE

NFS110-7901P	+5.1V (7.5A to 10A)	150mV peak, 1ms recovery
	+12V (2.5A to 5A)	100mV peak, 0.5ms recovery
	-12V (0.5A to 1A)	100mV peak, 0.5ms recovery
	-5V (0.5A to 1A)	100mV peak, 0.5ms recovery
NFS110-7902P	+5.1V (7.5A to 10A)	150mV peak, 1ms recovery
	+12V (2.5A to 5A)	100mV peak, 0.5ms recovery
	-12V (0.5A to 1A)	100mV peak, 0.5ms recovery
	24V (1.5A to 3A)	300mV peak, 1ms recovery
NFS110-7904P	+5.1V (7.5A to 10A)	150mV peak, 1ms recovery
	+15V (2.5A to 5A)	100mV peak, 0.5ms recovery
	-15V (0.5A to 1A)	100mV peak, 0.5ms recovery
	-5V (0.5A to 1A)	100mV peak, 0.5ms recovery
NFS110-7905	+5.1V (10A to 20A)	250mV peak, 1ms recovery
NFS110-7912	+12V (4.5A to 9A)	360mV peak, 1ms recovery
NFS110-7915	+15V (3.65A to 7.3A)	450mV peak, 1ms recovery
NFS110-7924	+24V (2.25A to 4.5A)	720mV peak, 1ms recovery

International Safety Standard Approvals

 VDE0750/EN60601-1/IEC601/IEC1010 File No. 10401-3336-1049 license No. 2874

 UL544 File No. E147937

 CSA22.2 No. 125 File No. LR41062C/LR50913

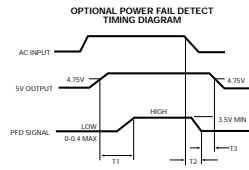
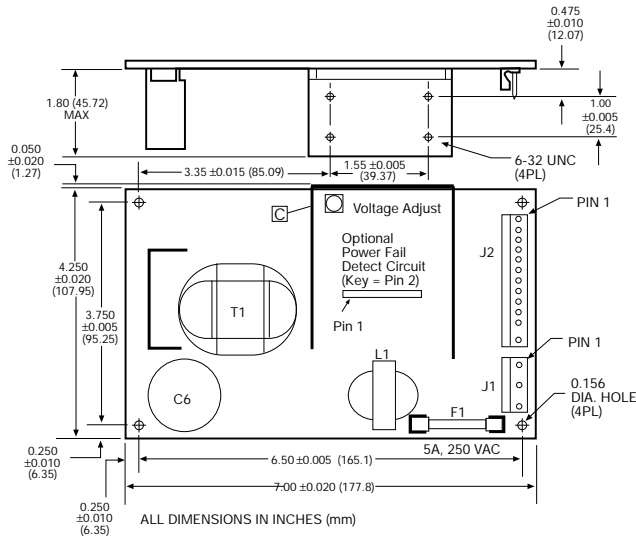
80 to 110 Watt AC/DC universal input switch mode power supplies

AC (J1) mating connector

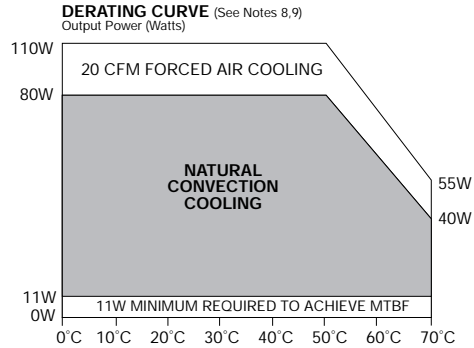
Molex 09-50-3051 or equivalent with the second and fourth pins removed and the mating connector is Molex 09-91-0500 or equivalent.

DC (J2) mating connector

Molex 09-91-1300 or equivalent with 08-50-0164 or equivalent crimp terminals.



Power fail detect signal, See Note 7
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.



Mechanical notes

- A Metallic or non-metallic stand-offs (maximum diameter 5.4mm) can be used in all four mounting holes without affecting 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 heatsink 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. Details are on page 59. Order part number NFS110C.

PIN CONNECTIONS				
J1	-7901P	-7902P	-7904P	SINGLES
Pin 1	AC Ground	AC Ground	AC Ground	AC Ground
Pin 2	AC Neutral	AC Neutral	AC Neutral	AC Neutral
Pin 3	AC Live	AC Live	AC Live	AC Live
J2				
Pin 1	+5.1V	+5.1V	+5.1V	V _{out}
Pin 2	+5.1V	+5.1V	+5.1V	V _{out}
Pin 3	+5.1V	+5.1V	+5.1V	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	+12V	+12V	+15V	V _{out}
Pin 9	+12V	+12V	+15V	V _{out}
Pin 10	PFD	PFD	PFD	N/C
Pin 11	-12V	-12V	-15V	N/C
Pin 12	Removed for Key			
Pin 13	-5V	+24V	-5V	N/C

N/C = no connection.