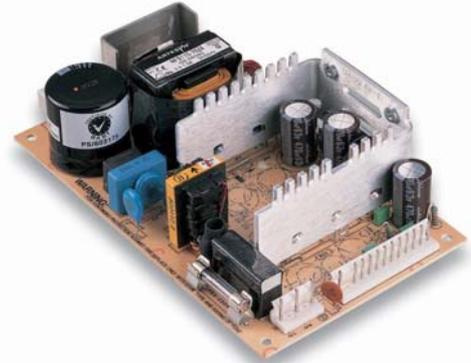


NFS110 Medical Series

Single and quad output

- 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



The NFS110 medical series is a 80 W to 110 W universal input ac-dc power supply on a 7 x 4.25 inch card with a maximum component height of 1.8 inches for use in medical applications. The NFS110 medical series has the same generic feature set as the standard NFS110 series but have been designed with lower safety ground leakage and higher isolation as required for medical safety approval. The NFS110 provides 80 W of output power with free air convection cooling which can be boosted to 110 W with 20 CFM of air. Standard features include overvoltage and short-circuit protection. The series, with full medical safety approval to EN60601 and UL2601, meets conducted emissions EN55022 level A. The NFS110 medical series is designed for use in low power medical, dental and laboratory applications such as dialysis machines, monitoring equipment, instrumentation and infusion pump controls.

CE (LVD)

2 YEAR WARRANTY

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

SPECIFICATIONS

OUTPUT SPECIFICATIONS

Voltage adjustability	+5.1 V output on multi's	±3.0%
	5.1 V single	±3.0%
	12 V single	12-14 V
	15 V single	15-18 V
	24 V single	24-30 V
Line regulation	LL to HL, FL All outputs on all units	±0.1% max.
Overshoot/undershoot	At turn-on no load	0%
Temperature coefficient	All outputs	±0.02%/°C
Overvoltage protection	Multi output 5.1 V only	6.25 V±0.75 V
	5.1 V single	6.25 V±0.75 V
	12 V single	15.75 V±1.0 V
	15 V single	22 V±1.5 V
	24 V single	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 SPECIFICATIONS

Input voltage range	90-253 Vac 127-357 Vdc	
Input frequency range	47-440 Hz	
Input surge current	110 Vac, 50 Hz	17 A
	230 Vac, 50 Hz	35 A
Safety ground leakage current	132 Vac	50 µA
	264 Vac	100 µA

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	EN61000-4-5, level 3	Perf. criteria 1
Fast transients	EN61000-4-4, level 3	Perf. criteria 1
Radiated immunity	EN61000-4-3, level 3	Perf. criteria 2
Conducted immunity	EN61000-4-6, level 3	Perf. criteria 2

GENERAL SPECIFICATIONS

Hold-up time	110 Vac @ 80 W	35 ms
	110 Vac @ 110 W	17 ms
	230 Vac @ 80 W	140 ms
	230 Vac @ 110 W	100 ms
Efficiency	Multiple outputs	70% typ.
	+5.1 V single	70% typ.
	12 V and 15 V singles	72% typ.
	24 V single	75% typ.
Isolation voltage	Input/output	4000 Vac
	Input/chassis	1500 Vac
Switching frequency	At 100 Watts output	20-70 kHz
	At zero load	100-250 kHz
Approvals and standards (See Note 12)	VDE0750, IEC60601 IEC1010, UL2601 CSA C22.2 No. 125	
Weight	Singles	550 g (19.4 oz)
	Multiple outputs	600 g (21.2 oz)
MTBF	MIL-HDBK-217E	125,000 hours

ENVIRONMENTAL SPECIFICATIONS

Thermal performance	Operating, see curve	0 °C to +70 °C
	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, 2 0CFM forced air	Derate 2.75 W/°C
Peak, 0 °C to +50 °C, max. 60 seconds	110 W	
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 approx.

NFS110 Medical Series

Single and quad output



LOW TO MEDIUM POWER AC/DC POWER SUPPLIES

80-110 W AC/DC Universal Input Switch Mode Power Supplies

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For the most current data and application support visit www.artesyn.com/powergroup/products.htm

OUTPUT VOLTAGE	OUTPUT CURRENTS			RIPPLE (4)	TOTAL REGULATION (5)	MODEL NUMBERS (13,14)
	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 (V _A)	8 A	20 A	10 A	50 mV	±2.0%	NFS110-7902PJ
+24 V (V _B)	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%	NFS110-7904PJ
+15 V	4 A	7.5 A	5 A	150 mV	±3.0%	
-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%	
+5.1 V (6)	16 A	22 A	20 A	50 mV	±2.0%	NFS110-7905J (6,7)
12 V (6)	7 A	9 A	9 A	120 mV	±2.0%	NFS110-7912J (6,7)
15 V (6)	5 A	7.3 A	7.3 A	150 mV	±2.0%	NFS110-7915J (6,7)
24 V (6)	3.5 A	4.5 A	4.5 A	240 mV	±2.0%	NFS110-7924J (6,7)

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 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 $I_A / I_B \leq 5$. This output will maintain ±5.0% regulation if $I_A \leq 5$ 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 Artesyn representative or use the on-line model number search tool at <http://www.artesyn.com/powergroup/products.htm> 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
NFS110-7902PJ	-5 V (0.5-1 A)	100 mV peak, 0.5 ms recovery
	+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
NFS110-7904PJ	24 V (1.5-3 A)	300 mV peak, 1 ms recovery
	+5.1 V (7.5-10 A)	150 mV peak, 1 ms recovery
	+15 V (2.5-5 A)	100 mV peak, 0.5 ms recovery
	-15 V (0.5-1 A)	100 mV peak, 0.5 ms recovery
NFS110-7905J	-5 V (0.5-1 A)	100 mV peak, 0.5 ms recovery
	+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

NFS110 Medical Series

Single and quad output



LOW TO MEDIUM POWER AC/DC POWER SUPPLIES

80-110 W AC/DC Universal Input Switch Mode Power Supplies

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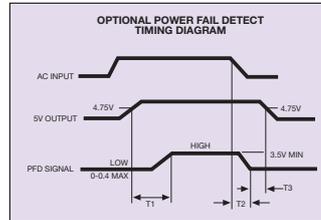
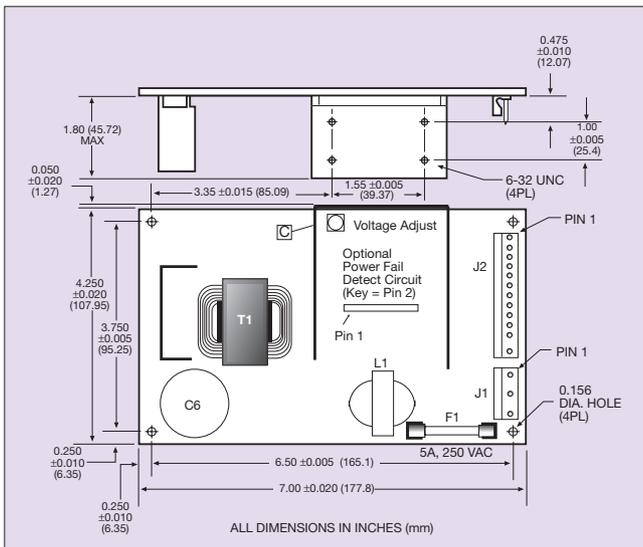
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AC (J1) mating connector

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

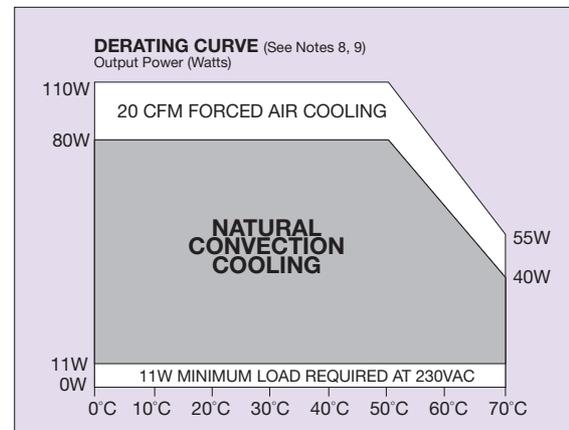
DC (J2) mating connector

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



Power fail detect signal (See Note 7)

50 ms \leq T1 \leq 200 ms
 T2 will vary with line and load
 T3 \geq 3 ms
 Pout: 110 W
 PFD output is an open collector which will sink \leq 40 mA 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 heatsink 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. Two different kits are available, order part number 'NFS110 COVER KIT' or 'NFS110C'.

International Safety Standard Approvals

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

UL2601 File No. E147937

CSA C22.2 No. 125 File No. LR41062C

PIN CONNECTIONS

J1	-7901PJ	-7902PJ	-7904PJ	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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