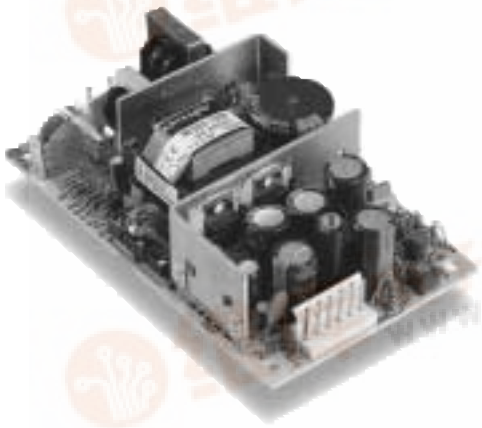
ARTESYN TECHNOLOGIES

NFS40 and NFN40 SERIES

Single and triple output



- **5.0 x 3.0 x 1.2 inch package (1U applications)**
- **Industry standard package**
- **Overvoltage and short circuit protection**
- **40W with free air convection**
- **Fixed frequency operation (NFN Series)**
- **NFS40: EN55022, EN55011 conducted emissions level A**
- **NFN40: EN55022, EN55011 conducted emissions level B**
- **UL, VDE and CSA safety approvals**

[2 YEAR WARRANTY]

CE (LVD)

The NFS40 and NFN40 are industry standard 40 Watt power supplies with the capability to supply 50W in a forced air ambient and to automatically operate from any voltage between 85VAC and 264VAC. Use of MOSFET based switching circuits allows for enhanced features such as output regulation down to zero load (NFN40). Universal input voltage eliminates the need to change jumpers or switch settings to cater for different or widely varying line voltages. In addition to the input voltage range, VDE, UL, CSA, EN60950 and IEC950 approvals make the NFS40 and NFN40 ideal for use in equipment installed throughout the world. The fixed frequency operation of the NFN40 further reduces emissions below VDE class B and significantly reduces leakage current. These low profile switchers with high power density are intended for use in small, digital systems.

SPECIFICATION

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

OUTPUT SPECIFICATIONS		
Output voltage adjustability	+5V output on triples Vout on singles	±5.0% ±5.0%
Line regulation LL to HL, FL	Main output Auxiliary outputs	±0.2% ±1.0%
Total regulation FL to NL	Main output Auxiliary outputs	±2.0% ±5.0%
Transient response	+5V (1.5A to 3A)	±120mV max. dev. 500µs recovery
Temperature coefficient	All outputs	±0.02%/°C
Overvoltage protection	+5V output	125% ±15% Vout
Output power limit	Primary power limited	90W input power limit
Short circuit protection	Single outputs Multiple outputs	Continuous Short term

INPUT SPECIFICATIONS		
Input voltage range	Universal input	85 to 264VAC 120 to 370VDC
Input frequency range		47 to 440Hz
Max. input surge current	132VAC, cold start 264VAC, cold start	12A max. 24A max.
Safety ground leakage current	NFS: 110VAC, 60Hz 230VAC, 50Hz NFN: 132VAC, 60Hz 240VAC, 50Hz	0.13mA max. 0.32mA max. 155µA max. 261µA max.

EMC CHARACTERISTICS		
Conducted emissions	EN55022 (NFS), FCC part 15	Level A
Conducted emissions	EN55022 (NFN), FCC part 15	Level B
Radiated emissions	EN55022 (NFS and NFN)	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	110VAC, 40 Watts 230VAC, 40 Watts	14ms 110ms
Efficiency		70% typical
Isolation voltage	Input/output Input/chassis	3000VAC 1500VAC
Switching frequency	NFS NFN	Variable Fixed, 45kHz ±5kHz
Approvals and standards (See Note 13)		VDE0805, EN60950 IEC950, IEC1010, UL1950 CSA C22.2 No. 950
Weight		280g (9.88oz)
MTBF (See Note 9)	MIL-HDBK-217E	170,000 hours

ENVIRONMENTAL SPECIFICATIONS		
Thermal performance (See Notes 8, 10)	Operating Non-operating 50°C ambient temp., Convection cooled Forced air cooling 50°C to 70°C ambient Peak (60 seconds)	0°C to +70°C –40°C to +85°C 40W 50W @ 20CFM Derate linearly to 50% load 60W
Relative humidity	Non-condensing	5% to 80% RH
Altitude	Operating Non-operating	10,000 feet max. 40,000 feet max.
Vibration (See Note 11)	5Hz to 500Hz,	2.4G rms peak

40 to 50 Watt
AC/DC universal input switch mode power supplies

OUTPUT VOLTAGE	OUTPUT CURRENTS			RIPPLE (4)	TOTAL REGULATION (5)	MODEL NUMBER (D)	
	MAX (1)	PEAK (2)	FAN (3)				
+5.1V (A)	3A	7A	5A	50mV	±2.0%	NFS40-7608 (5,6)	NFN40-7608 (5,6)
+12.0V (B)	2A	3A	2A	120mV	±5.0%		
–12.0V (C)	0.35A	1A	0.5A	120mV	±5.0%		
+5.1V (A)	4A	7A	5A	50mV	±2.0%	NFS40-7628 (12)	NFN40-7628 (12)
+12.0V (B)	0.35A	1A	0.5A	120mV	±5.0%		
–12.0V (C)	0.35A	1A	0.5A	120mV	±5.0%		
+5.1V (A)	3A	7A	5A	50mV	±2.0%	NFS40-7607 (5,6)	NFN40-7607 (5,6)
+12.0V (B)	2A	3A	2A	120mV	±5.0%		
–5.0V (C)	0.35A	1A	0.5A	50mV	±5.0%		
+5.1V (A)	3A	7A	5A	50mV	±2.0%	NFS40-7610 (5,6)	NFN40-7610 (5,6)
+15.0V (B)	2A	2.5A	2A	150mV	+10.0%/–3.0%		
–15.0V (C)	0.35A	1A	0.5A	150mV	±5.0%		
+5.1V	6A	12A	8A	100mV	±2.0%	NFS40-7605	NFN40-7605
+12.0V	3.3A	5A	4A	120mV	±2.0%	NFS40-7612	NFN40-7612
+15.0V	2.6A	4A	3.3A	150mV	±2.0%	NFS40-7615	NFN40-7615
+24.0V	1.6A	2.5A	2A	240mV	±2.0%	NFS40-7624	NFN40-7624

Notes

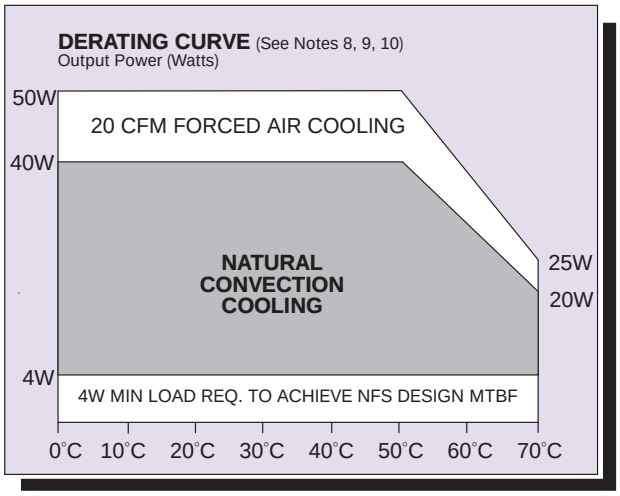
1 Natural convection cooled, 40W maximum.
2 Peak output current lasting less than 30 seconds with duty cycle less than 10%. During peak loading, outputs may go outside of total regulation limits. Peak total power must not exceed 60W.
3 Forced air, 20 CFM at 1 atmosphere, 50W maximum.
4 Figure is peak-to-peak. Output noise is measured across a 50MHz bandwidth using a 12 inch twisted pair, terminated with a 47µF capacitor.
5 Total regulation is defined as the static output regulation at 25°C, including initial tolerance, line voltage within stated limits, load currents within stated limits, and output voltages adjusted to their factory settings. Also, 0.25<I(A)/I(B)<5.0 to maintain stated regulation. This does not apply to NFS40-7628 and NFN40-7628 power supplies as both have regulated auxiliary outputs.
6 A minimum load of 0.5A is required on the +5V output to obtain full current from the negative output.
7 The NFS40 offers the possibility of power sharing between outputs. Consult factory for details.
8 Derating curve is application specific for ambient temperatures >50°C, for optimum reliability no part of the heatsink should exceed 110°C and no semiconductor case temperature should exceed 115°C.
9 A 4W minimum load is required to achieve the NFS design MTBF. This restriction does not apply to the NFN series.
10 Caution: Allow a minimum of 1 second after disconnecting the power when making thermal measurements.
11 Three orthogonal axes, sweep at 1 octave/minute, 5 minute dwell at four major resonances.
12 The NFS40-7628 and NFN40-7628 have separately linear regulated +12V and -12V outputs. The loading conditions in note 5 and note 6 do not apply.
13 This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.

International Safety Standard Approvals

NFS40: VDE0805/EN60950/IEC950/IEC1010 File No. 10401-3336-1044
Licence No. 4389, 2559, 1651 and 1044
NFN40: VDE0805/EN60950/IEC950/IEC1010 File No. 10401-3336-1067
Licence No. 4389, 2559, 1651 and 1044

UL1950 File No. E136005

CSA C22.2 No. 950 File No. LR41062C



40 to 50 Watt
AC/DC universal input switch mode power supplies

Mechanical notes

A NFS40 models only: In order to meet safety requirements, a non-metallic stand-off is mandatory for one hole as specified in the mechanical drawing.

B The ground pad of the mounting hole near P1 allows system grounding through a metal stand-off.

C To improve conducted noise, the ground pad of the mounting hole near the output connector should be connected with the ground pad of the mounting hole near P1 (P1 for NFS40 models and J3 on NFN40 models). Use metal stand-offs attached to a common metal chassis. This connection also significantly attenuates common mode noise.

D A standard L-bracket and cover is available for mounting which contains all screws, connectors and necessary mounting hardware. Details are on page 72. Order part number 'NFS40 COVER KIT'.

AC mating connector

Molex 09-50-3031 or equivalent with Molex 08-50-0164 or equivalent crimp terminals.

DC mating connector

Molex 09-50-3061 or equivalent with Molex 08-50-0164 or equivalent crimp terminals.

NFS40 AND NFN40 PIN CONNECTIONS				
J1	**-7608, -7628**	**-7607**	**-7610**	**SINGLES**
Pin 1	AC Line	AC Line	AC Line	AC Line
Pin 2	AC Neutral	AC Neutral	AC Neutral	AC Neutral
J2				
Pin 1	+12V	+12V	+15V	+Vout
Pin 2	+5.1V	+5.1V	+5.1V	+Vout
Pin 3	+5.1V	+5.1V	+5.1V	+Vout
Pin 4	Return	Return	Return	Return
Pin 5	Return	Return	Return	Return
Pin 6	–12V	–5V	–15V	Return
P1/J3 (C)				
Pin 1	Safety Ground