## ARTESYN

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Patent No. 4912620
[ 2 YEAR ULARRANTY ] ( $\epsilon^{(L V D)}$

## NFS200 SERIES

Triple and quad output

- $5.0 \times 9.0 \times 2.5$ inch package
- Overvoltage and short circuit protection
- 200W with 30CFM
- Adjustable outputs
- Isolated outputs
- Power fail detect signals
- EN55022, EN55011 conducted emissions level A
- UL, VDE, CSA and BABT safety approvals

The NFS200 series is a 200W universal input AC/DC power supply in a $5 \times 9 \times$ 2.5 inch package. The NFS200 series has four multiple output models and has proven itself to be highly reliable and versatile product for a wide range of communication and industrial applications, with a very high peak capability on the auxiliary outputs for drive and motor applications. The NFS200 provides 200W of output power with 30CFM of air. Standard features include overvoltage and short circuit protection, adjustable outputs, isolated outputs and power fail detect. The series, with full international safety approval and the CE mark, meets conducted emissions EN55022 level A. The NFS200 series is designed for use in medium power data networking, computer, telecom and industrial applications such as servers, PABX's, printers and process automation.

SPECIFICATION
All specifications are typical at nominal input, full load at $25^{\circ} \mathrm{C}$ unless otherwise stated

| OUTPUT SPECIFICATIONS |  |  |
| :---: | :---: | :---: |
| Voltage adjustability | +5 V output | $\pm 5.0 \%$ |
| Line regulation | LL to HL, FL <br> Main output | $\pm 0.1 \%$ max. |
| Load regulation | Main output Auxiliary outputs | $\begin{aligned} & \pm 2.0 \% \text { max. } \\ & \pm 2.5 \% \text { max. } \end{aligned}$ |
| Overshoot/undershoot | At turn-on | 0\% |
| Transient response | $\stackrel{+5 \mathrm{~V}}{(20 \mathrm{~A} \text { to } 30 \mathrm{~A} \text { step) }}$ | $\pm 200 \mathrm{mV}$ max. dev. $500 \mu \mathrm{~s}$ recovery to 1.0\% |
| Temperature coefficient | All outputs | $\pm 0.02 \% /{ }^{\circ} \mathrm{C}$ |
| Overvoltage protection | +5 V output | $6.25 \mathrm{~V} \pm 0.5 \mathrm{~V}$ |
| Short circuit protection |  | with auto-recovery |
| Fan output current (See Note 8) | J 1: pins 3 and 4 | 12.1V @ 0.75A max. |
| INPUT SPECIFICATIONS |  |  |
| Input voltage range | Universal input | 90VAC to 264VAC 130VDC to 370VDC |
| Input frequency range |  | 47 Hz to 63 Hz |
| Input surge current | $110 \mathrm{VAC}, 60 \mathrm{~Hz}$ <br> $230 \mathrm{VAC}, 50 \mathrm{~Hz}$ | 40A max. 80A max. |
| Safety ground leakage current | 110VAC, 60 Hz <br> $230 \mathrm{VAC}, 50 \mathrm{~Hz}$ | 0.9 mA max. 1.6 mA max. |


| 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 1 |
| Conducted immunity | EN61000-4-6, level 3 | Perf. criteria 1 |
| GENERAL SPECIFIC ATIONS |  |  |
| Hold-up time | 110VAC | 15 ms |
|  | After PFD flag @ 200W | 5 ms |
| Efficiency | 110/230VAC @ 200W | 70\% typ. |
| Isolation voltage | Input/output Input/chassis | $\begin{aligned} & 3000 \mathrm{VAC} \\ & 1500 \mathrm{VAC} \end{aligned}$ |
| Switching frequency | Variable | 80 to 100 kHz |
| Standards and approvals (See Note 9) | VDE0805, EN60950, IEC950 IEC1010, UL1950, BABT CSA C22.2 No. 950 |  |
| Weight | 1.34 kg (47.30oz) |  |
| MTBF (See Note 1) | MIL-HDBK-217E | 84,000 hours |
| ENVIRONMENTAL SPECIFICATIONS |  |  |
| Thermal performance (See Notes 3, 10) | Operating $0^{\circ} \mathrm{C}$ to $+70^{\circ} \mathrm{C}$ <br> Non-operating $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ <br> $0^{\circ} \mathrm{C}$ to $50^{\circ} \mathrm{C}$ ambient,  <br> 300 W  <br> $50^{\circ} \mathrm{CM}$ forced air $70^{\circ} \mathrm{C}$ ambient, Derate linearly <br> 30 CFM forced air to 100 W at $70^{\circ} \mathrm{C}$ |  |
| Relative humidity | Non-condensing | 5\% to 95\% RH |
| Altitude | Operating 10 <br> Non-operating 40 | 0,000 feet max. 0,000 feet max. |
| Vibration | Three orthogonal axes, random vibration 10 minute test for each axis | $\begin{array}{r} 2.4 \mathrm{Gms} \\ 5 \text { to } 500 \mathrm{~Hz} \end{array}$ |

# 200 Watt AC/DC universal input switch mode power supplies 

| OUTPUT <br> VOLTAGE | OUTPUT CURRENTS |  |  | RIPPLE (4) | TOTAL <br> REGULATION (5) | MODEL NUMBER ${ }^{(A)}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | MIN (1) | PEAK (2) | MAX (3) |  |  | OPEN FRAME | CASED |
| +5.1V | 5.0A | 30A | 30.0 A | 50 mV | $\pm 2 \%$ | NFS200-7601 ${ }^{(6)}$ | NFS200-7601CF ${ }^{(6)}$ |
| +12.1V | OA | 12A | 8.0A | 120 mV | $\pm 2.5 \%$ |  |  |
| -12.1V | OA | 5.0A | 4.0A | 120 mV | $\pm 2.5 \%$ |  |  |
| -5.2V (6) | OA | 6.0A | 6.0A | 50 mV | $\pm 2.5 \%$ |  |  |
| +5.1V | 5.0A | 30A | 30.0A | 50 mV | $\pm 2 \%$ | NFS200-7602 (7) | NFS200-7602CF ${ }^{(7)}$ |
| +12.1V | OA | 12A | 8.0A | 120 mV | $\pm 2.5 \%$ |  |  |
| -12.1V | OA | 5.0A | 4.0A | 120 mV | $\pm 2.5 \%$ |  |  |
| 24.0 V (7) | OA | 3.0A | 3.0A | 240 mV | $\pm 2.5 \%$ |  |  |
| +5.1V | 5.0A | 30A | 30.0A | 50 mV | $\pm 2 \%$ | NFS200-7603 ${ }^{(7)}$ | NFS200-7603CF ${ }^{(7)}$ |
| +12.1V | OA | 12A | 8.0A | 120 mV | $\pm 2.5 \%$ |  |  |
| -12.1V | OA | 5.0A | 4.0A | 120 mV | $\pm 2.5 \%$ |  |  |
| $12.0 \mathrm{~V}{ }^{(7)}$ | OA | 4.0A | 4.0A | 120 mV | $\pm 2.5 \%$ |  |  |
| +5.1V | 5.0A | 30A | 30A | 50 mV | $\pm 2.5 \%$ | NFS200-7608 | NFS200-7608CF |
| +12.1V | OA | 12.0A | 8.0A | 120 mV | $\pm 2.5 \%$ |  |  |
| -12.1V | OA | 5.0A | 4.0A | 120 mV | $\pm 2.5 \%$ |  |  |


| PIN CONNECTIONS |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| TB1 | NFS200-7601 | NFS200-7602 | NFS200-7603 | NFS200-7608 |
| Term 1 | AC Line | AC Line | AC Line | AC Line |
| Term 2 | AC Neutral | AC Neutral | AC Neutral | AC Neutral |
| Term 3 | Safety Ground | Safety Ground | Safety Ground | Safety Ground |
| TB2 |  |  |  |  |
| Term 1 | +5.1V | +5.1V | +5.1V | +5.1V |
| Term 2 | +5.1V | +5.1V | +5.1V | +5.1V |
| Term 3 | Return | Return | Return | Return |
| Term 4 | Return | Return | Return | Return |
| Term 5 | Return | Return | Return | Return |
| Term 6 | +12.1V | +12.1V | +12.1V | +12.1V |
| Term 7 | -12.1V | -12.1V | -12.1V | -12.1V |
| Term 8 | $-5.2 \mathrm{~V}{ }^{(6)}$ | 24V Return ${ }^{(7)}$ | 12 V Return ${ }^{(7)}$ |  |
| Term 9 | -5.2V Return ${ }^{(6)}$ | $+24 \mathrm{~V}^{(7)}$ | $+12 V^{(7)}$ |  |
| Term 10 |  |  |  |  |
| J 1 |  |  |  |  |
| Pin 1 | PFD | PFD | PFD | PFD |
| Pin 2 | PFD Return | PFD Return | PFD Return | PFD Return |
| Pin 3 | Fan Return | Fan Return | Fan Return | Fan Return |
| Pin $4{ }^{(8)}$ | Fan | Fan | Fan | Fan |

## Notes

1 25W minimum total output load required for reliable operation. Also, $\pm 12 \mathrm{~V}$ output peak current capability requires a +5.1 V @ 5 A minimum load.
2 Peak output current lasting less than 30 seconds with duty cycle less than $10 \%$. During peak loading, outputs may drift outside total regulation limits.
3 Requires forced air, 30CFM minimum, or 350LFM.
4 Figure is peak-to-peak. Output noise is measured across a 50 MHz bandwidth using a 12 inch twisted pair, terminated with a $47 \mu \mathrm{~F}$ capacitor.
5 Total regulation is defined as the static output regulation at $25^{\circ} \mathrm{C}$, including initial tolerance, line voltage within stated limits, load currents within stated limits, and output voltages adjusted to their factory settings.
6 Although the -5.2 V return is electrically connected to the 'main' return (terminals 3, 4 and 5, which are all connected together), Artesyn
Technologies recommends that system cabling allow -5.2 V return current flow to terminal 9.
7 The auxiliary output is floating, and can be referenced as either positive or negative. The return is the negative terminal of the pair.
8 Any fan current must be subtracted from the total available $+12.1 V$ current. Supplied fans draw 0.14A
9 This product is only for installation by professional installers within other equipment and must not be operated as a stand alone product.
10 Derating curve is application specific for ambient temperatures $>50^{\circ} \mathrm{C}$, for optimum reliability no part of the heat sink should exceed $90^{\circ} \mathrm{C}$ and no semi-conductor temperature should exceed $100^{\circ} \mathrm{C}$.

## International Safety Standard Approvals

VDE0805/EN60950/IEC950/IEC1010
File No. 10401-3336-1058 Licence No. 3613
-1 UL1950 File No. E136005
(S) CSA C22.2 No. 950 File No. LR41062C
(2) Certificate No. PS/603176

## 200 Watt <br> AC/DC universal input switch mode power supplies

## Mechanical notes

A A standard cover and fan assembly can be added during manufacturing. Details are on page 84. To order, add suffix "CF" to the model number e.g. NFS200-7601CF.

AC (TB 1) connector
Kulka P/N 4597A-6/32-03 or equivalent

## DC (TB2) connector

Kulka P/N 4597A-6/32-09 or equivalent
J 1 mating connector
Molex 22-01-1043 or equivalent with 4809 series or equivalent crimp terminal


POWER FAIL DETECT SIGNAL
$50 \mathrm{~ms} \leq \mathrm{T} 1 \leq 200 \mathrm{~ms}$
T2 will vary with line and load
T3 25 ms
Pout: 200W
PFD output is an open collector which will sink $\leq 40 \mathrm{~mA}$ in the low state


