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High-Density Configurable Power Supply For Industrial And Medical Applications

[Advanced Energy](#) has expanded its NeoPower (NP) family of ultra-high density configurable power supplies with new options that save space, reduce electrical noise, and simplify Ethernet connectivity. Well suited for advanced industrial, medical, and test and measurement applications, NeoPower offers a power density up to four times higher than conventional solutions, according to the vendor (see the figure). The company adds that the flexible and straightforward configuration allows engineers to expedite product development with optimized, application-specific power conversion without custom designs.

The latest additions to the NeoPower range include the NP05, which offers 2.4 kW in an industry-standard 2.5-inch form factor with five different single-slot, low-noise modules, and a PowerPro Ethernet adapter.

"Advanced Energy's NeoPower family extends our leadership in configurable and modular power supplies for demanding power conversion needs," said Joe Voyles, Advanced Energy's vice president, Industrial Power Conversion, System Power. "The new options enable customers to quickly configure designs to address applications requiring higher power densities that demand low ripple voltages with enhanced power supply monitoring and control."

Supporting up to five different power rails from a single ac input, the NP05 saves space, reduces noise and simplifies leakage current management (see leakage current and other specs in Table 1). The single-slot low-noise modules work well in applications where low common-mode and differential voltage ripple are critical (see Table 2).

NeoPower power supplies include connectivity as a feature, making them suitable for IoT applications that require cloud-based monitoring and control. The PowerPro Ethernet adapter adds more connectivity options and is appropriate for customers who need MODBUS TCP control and monitoring.

For more information, see the NeoPower NP05 Series [page](#).



Figure. Targeting advanced industrial, medical, and test and measurement applications, the NeoPower family of ac-dc power supplies offers a power density which is said to be up to four times higher than conventional solutions. The flexible and straightforward configuration allows engineers to expedite product development with optimized, application-specific power conversion without custom designs. An addition to this family, the NP05 offers 2.4 kW in an industry-standard 2.5-inch form factor with five different single-slot, low-noise modules, and a PowerPro Ethernet adapter.

Table 1. Electrical specifications for the five-slot NP05 ac-dc power supply.

Input		
Case Model	NP05W1A	NP08W1A
Orderable Part Number	83-105-0001W	83-108-0001W
Number of Slots	5	8
Max Power	Low line: 1200 W; High line: 2400 W	
Power Density	17.45 W/in ³	18.18 W/in ³
AC Input Range	Low line 1-phase: 90 to 132 VAC; High line 1-phase: 180 to 264 VAC	
AC Input Frequency	47 to 440 Hz	
Turn-on Voltage	87 VAC +/- 2%	
Turn-off Voltage	81 VAC +/- 2%	
Max Inrush Current ¹	80 A	
Max Input Current	27 A	
Crest Factor	1.1 to 1.5	
Power Factor	0.99 at full load and nominal line	
Harmonic Distortion	Meets EN 61000-3-2	
Line Interruption	Meets SEMI F47-0706, 53, 58, S14 at nominal input voltages and full load condition	
Input Leakage Current ² - Industrial	< 2.5 mA	
Input Leakage Current ² - Medical BF	Earth (normal condition) < 0.5 mA Earth (single fault condition) < 1.0 mA Touch/Patient (normal condition) < 0.1 mA Touch/Patient (single fault condition) < 0.5 mA	
Hold-up Time	20 ms minimum, additional holdover storage with optional HUP module ³	
Ride-through Time	20 ms minimum, additional holdover storage with optional HUP module ³	
Input Protection	Internal fuse on all input lines (not user serviceable)	
Input Over Voltage Protection	Up to 115% of nominal input without damage	
Isolation	Input to Output: 5000 VAC or 7000 VDC, 2 x MOPP Input to Earth: 1800 VAC or 2500 VDC, 1x MOPP	
Efficiency ⁴	90% typical (Contact support for efficiency curve for a configured model)	
Standby Output	5 V/2 A	

Note 1 - Any additional inrush current surges or spikes in the form of AC cycles or multiple AC cycles greater than 10 ms, and less than 150 ms, must not exceed 25 A peak
Short pulses (<300 µs) caused by X caps are not considered.

Note 2 - The specification is not applicable for 400 Hz (+/-10%) input frequency operation.

Note 3 - Consult with AE for the availability of the HUP module.

Note 4 - Tested with 1-phase NP08W1A case at 240 VAC input and populated with 8 x 48 V modules . 5 V standby at no load.

Table 2. Ripple and noise specifications for the NP05.

Output - Adjustable Voltage Source	via Digital Command	via Analog Signal
Programming Accuracy	+/- 1% of Vset or Vnom, whichever is greater	+/- 1.5% of Vset or Vnom, whichever is greater
Monitoring Accuracy	+/- (1% of Vset + 1% of Vnom)	+/- (1.5% of Vset + 1.5% of Vnom)
Line Regulation	+/-1% of Vnom	
Load Regulation	+/-1% of Vnom	
Ripple & Noise @ 20 MHz BW (Pk-to-Pk)	1% of Vset or Vnom, whichever is greater Measured with a 0.1 μ F ceramic capacitor in parallel with a 10 μ F tantalum or low ESR E-cap.	
Ripple & Noise @ 20 MHz BW (RMS)	0.1% of Vset or Vnom or 10 mV, whichever is greater Measured with a 0.1 μ F ceramic capacitor in parallel with a 10 μ F tantalum or low ESR E-cap.	
Common Mode Ripple/Noise (Pk-to-Pk) @ 10 Hz to 70 MHz BW ¹	0.1% of Vset or Vnom or 10 mV, whichever is greater Across a 100 Ohm resistor between both DC outputs, including ground, at the DC power connector and chassis ground. Use FET probe such as Tektronix model P6046 or equivalent.	
Transient Loading	Minimum dynamic load: 20% of rated output current Maximum dynamic loading step: 50% step load @ 1 A/ μ s Voltage deviation: +/- 7.5% of Vset or Vnom which is greater (for 5V output models); +/- 5% of Vset or Vnom (for other module variants)	
Turn-on Output Voltage Overshoot	+7.5% of Vset or Vnom, whichever is greater (5V output models) +5% of Vset or Vnom, whichever is greater (other output models)	
Turn-off Output Voltage Undershoot	-7.5% of Vset or Vnom, whichever is greater (5V output models) -5% of Vset or Vnom, whichever is greater (other output models)	
Adjustable Output Voltage Risetime	20 to 100 ms	

Note 1 - For Low Noise Module Variants only. Refer to Common Mode Ripple & Noise test setting and setup.

Output - Adjustable Current Source	via Digital Command	via Analog Signal
Programming Accuracy	+/- 1% of Iset or Irated, whichever is greater	+/- 2% of Iset or Irated, whichever is greater
Monitoring Accuracy	+/- (1% of Iset + 1% of Irated)	+/- (2% of Iset + 2% of Irated)
Line Regulation	+/- 2% of Irated	
Load Regulation	+/- 2% of Irated	
Ripple & Noise @ 20 MHz BW (RMS)	+/- (1% of Iset + 1% of Irated) Measured with a 0.1 μ F ceramic capacitor in parallel with a 10 μ F tantalum or low ESR E-cap.	
Turn-on Output Voltage Overshoot	+5% of Iset or Irated, whichever is greater	
Turn-off Output Voltage Undershoot	-5% of Iset or Irated, whichever is greater	
Adjustable Output Current Risetime	20 to 100 ms	