



Patent No. 5600546 and 5652700

[2 YEAR WARRANTY]



NLP150H SERIES

Single, dual, triple and quad output

- **6.5 x 3.0 x 3.06 package (2U applications)**
- **Smallest industry footprint**
- **EN61000-3-2 compliant**
- **Overvoltage and short circuit protection**
- **150W with 150LFM**
- **EN55022, EN55011 conducted emissions level B**
- **EN61000-4-2, -3, -4, -5, -6 immunity compliant**
- **UL, VDE and CSA safety approvals**

The NLP150H series is a 150W universal input AC/DC power supply in a 6.5 x 3.0 x 3.06 inch package for use in 2U applications. The series has the smallest standard 125 to 150W footprint in the industry, has input harmonic current emission correction as standard and has 3.3V models to support the semiconductor industry's transition from 5V to lower operating voltages. The NLP150H provides 150W of output power with 150LFM of air. Standard features include overvoltage and short circuit protection. The series has an enclosure with fan option that does not change the overall package size. The series, with full international safety approval and the CE mark, meets conducted emissions EN55022 level B and complies to EN61000-4-2, -3, -4, -5 and -6 immunity standards. The NLP150H series is designed for use in low power data networking, computer and telecom applications such as hubs, routers, file servers, graphic workstations, storage peripherals and PABX's.

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

OUTPUT SPECIFICATIONS		
Total regulation (Line and load)	Single outputs Multiple outputs (5V, 3.3V) Auxiliary outputs	±2.0% ±2.0% ±5.0%
Rise time	At turn-on	250ms, max.
Transient response	Main output 25% step at 0.1A/μs	5.0% or 250mV max. dev., 1ms max. recovery to 1%
Temperature coefficient		±0.02%/°C
Overvoltage protection	Single outputs and multi outputs 1 and 2	125% of nominal ±10% tolerance
Short circuit protection		Continuous
Minimum output current		Yes, see table
Remote sense	Outputs 1 and 2	0.5V max. drop
INPUT SPECIFICATIONS		
Input voltage range	Universal input	90 to 264VAC
Input frequency range		47Hz to 63Hz
Input surge current (cold start)	120VAC 230VAC	19A max. 38A max.
Safety ground leakage current	120VAC, 60Hz 230VAC, 50Hz	0.7mA 1.4mA
Input current	120VAC	2.4A max.
Input fuse	UL, IEC approved	250VAC 6.3A
EMC CHARACTERISTICS (7)		
Conducted emissions	EN55022, FCC part 15	Level B
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

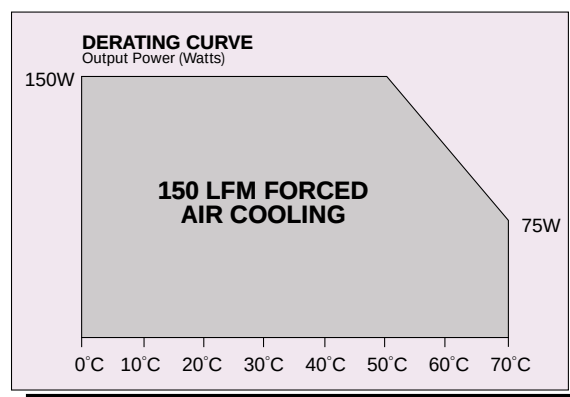
GENERAL SPECIFICATIONS		
Hold-up time	120VAC, 60Hz	16ms @ 150W
Efficiency		72% typical
Isolation voltage	Input/output Input/chassis	3000VAC 1500VAC
Switching frequency	Fixed	100kHz, ±10kHz
Approvals and standards (See Note 6)		VDE0805, EN60950 IEC950, UL1950 CSA C22.2 No. 950
Weight	Open-frame With cover and fan	680g (24 oz) 900g (31.77 oz)
Size	Open-frame With cover and fan	6.5 x 3.0 x 3.06 in. 7.5 x 3.0 x 3.10 in.
MTBF	MIL-HDBK-217F	> 200,000 hours
ENVIRONMENTAL SPECIFICATIONS		
Thermal performance	0°C to +50°C ambient, 150LFM forced air Non-operating +50°C to +70°C, 150LFM forced air Peak (0°C to +50°C, 60s) (See Note 2)	150W -40°C to +85°C Derate to 50% load
Relative humidity	Non-condensing	5% to 95% RH
Altitude	Operating Non-operating	10,000 feet max. 30,000 feet max.
Vibration (See Note 4)	5Hz to 500Hz	2.4G rms peak
Shock	per MIL-STD-810E	516.4 Part IV

125 to 150 Watt AC/DC universal input switch mode power supplies

OUTPUT VOLTAGE	OUTPUT CURRENT			RIPPLE (3)	TOTAL REGULATION	MODEL NUMBERS (8,9)
	MIN	MAX (1)	PEAK (2)			
5V	3A	30A	36A	50mV	±2.0%	NLP150H-9605
12V	1.25A	12.5A	15A	120mV	±2.0%	NLP150H-9612
13.8V	1.1A	11A	13A	120mV	±2.0%	NLP150H-9614
24V	0.63A	6.3A	7.5A	240mV	±2.0%	NLP150H-9624
48V	0.32A	3.2A	3.75A	480mV	±2.0%	NLP150H-9617
5V (V _A)	1.5A	15A	18A	50mV	±2.0%	NLP150H-9690
3.3V (V _B)	1.5A	15A	18A	50mV	±2.0%	
5V (V _A)	1.5A	15A	18A	50mV	±2.0%	NLP150H-9608
12V (V _B)	0.63A	6.3A	7.5A	120mV	±2.0%	
-12V (V _C)	0A	0.8A	1.0A	120mV	±5.0%	
5V (V _A)	1.5A	15A	18A	50mV	±2.0%	NLP150H-9610
15V (V _B)	0.5A	5A	6A	150mV	±2.0%	
-15V (V _C)	0A	0.8A	1.0A	150mV	±5.0%	
5V (V _A)	1.5A	15A	18A	50mV	±2.0%	NLP150H-9691
3.3V (V _B)	1.2A	12A	15A	50mV	±2.0%	
12V (V _C)	0A	1.25A	1.25A	120mV	±5.0%	
-12V (V _D)	0A	0.8A	1.0A	120mV	±5.0%	
5V (V _A)	1.5A	15A	18A	50mV	±2.0%	NLP150H-9602
12V (V _B)	0.63A	6.3A	7.5A	120mV	±2.0%	
24V (V _C)	0A	0.8A	1.0A	240mV	±5.0%	
-12V (V _D)	0A	0.8A	1.0A	120mV	±5.0%	

Notes

- 150LFM forced air cooling (150W max.).
- Peak output current lasting less than 60 seconds with duty cycle less than 5%. During peak loading, output voltage may exceed total regulation limits.
- Figure is peak-to-peak. Output noise measurements are made across a 20MHz bandwidth using a 12 inch twisted pair, terminated with a 47µF capacitor.
- Three orthogonal axes, random vibration 10 minutes for each axes, 2.4G rms 5Hz to 500Hz.
- CAUTION: Allow a minimum of 1 second after disconnecting line power when making thermal measurements.
- This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.
- For system EMI compliance, a ground choke may be required before connecting the ground wire to the chassis.
- To order the NLP150H with an enclosure, add the suffix 'E' to the model number e.g. NLP150H-96XHE. See page 61 for details.
- For single output models, J2 and J3 must be connected in parallel for proper operation. To maintain specified regulation on enclosed single output models and on V_A and V_B of enclosed multiple output models, the remote sense pins should be used.
- For optimum reliability no part of the heatsink should exceed 120°C and no semi-conductor case temperature should exceed 135°C.



International Safety Standard Approvals

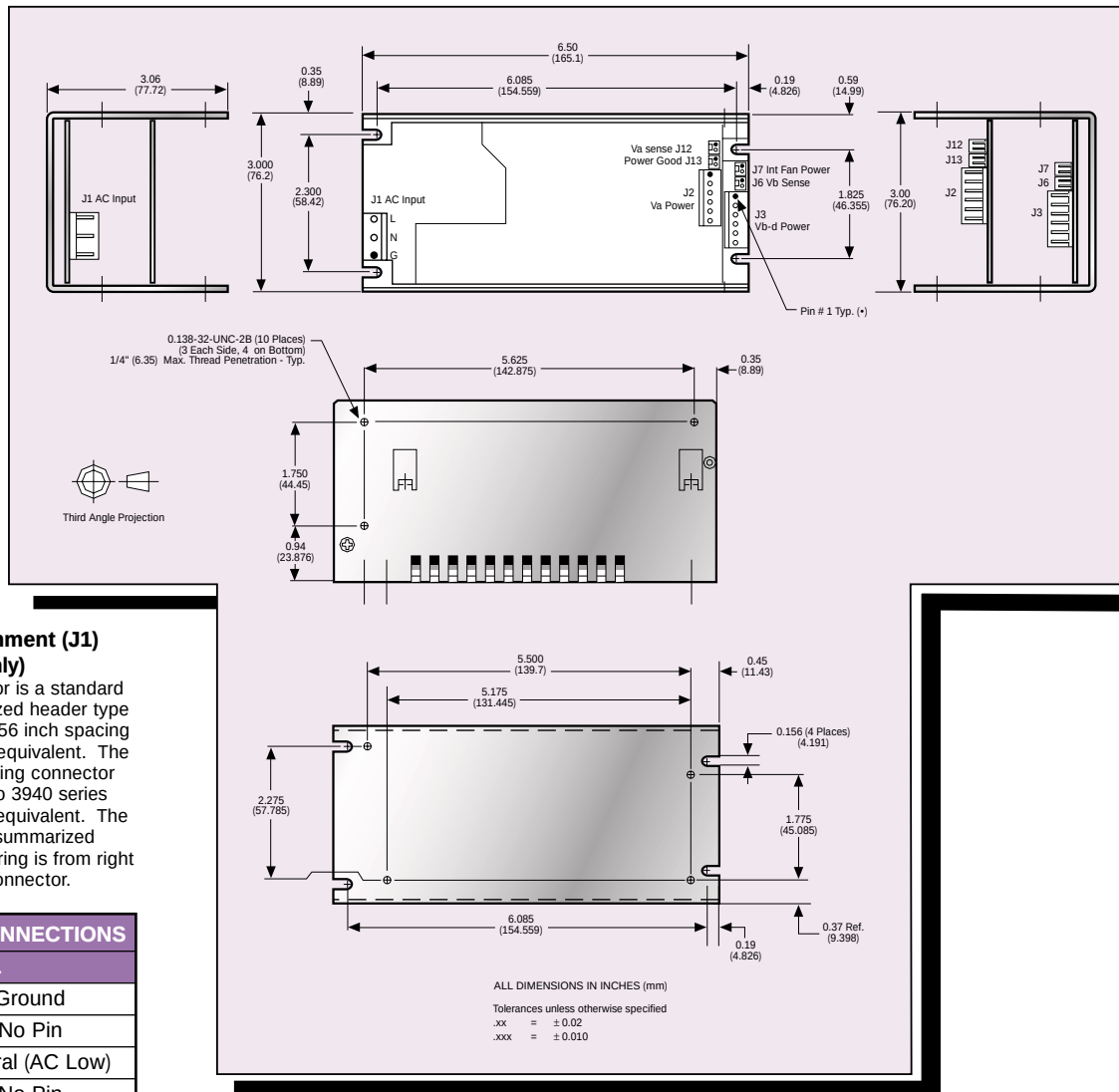
VDE0805/EN60950/IEC950 File No. 10401-3336-0108
Licence No. 98724

UL1950 File No. E136005

CSA C22.2 No. 950 File No. LR41062C

125 to 150 Watt AC/DC universal input switch mode power supplies

Open-frame mechanical drawing



Input pin assignment (J1) (Open-frame only)

The input connector is a standard Leoco 5-pin polarized header type connector with 0.156 inch spacing (3940P05V000) or equivalent. The recommended mating connector socket is the Leoco 3940 series (3940S050000) or equivalent. The pin assignment is summarized below. Pin numbering is from right to left facing the connector.

INPUT PIN CONNECTIONS

J1

Pin	Assignment
Pin 1	Ground
Pin 2	No Pin
Pin 3	Neutral (AC Low)
Pin 4	No Pin
Pin 5	Line (AC High)

Output pin assignment (J2, J3)

The output power connectors are two standard Leoco 6-pin polarized header type connectors with 0.156 inch spacing (3940P06V000) or equivalent. The recommended mating connector sockets are the Leoco 3940 series (3940S060000) or equivalents. The pin assignment is summarized below. Pin numbering is from right to left facing the connector. For single output models, J2 and J3 must be connected in parallel for proper operation.

PIN CONNECTIONS

J2 (ALL MODELS)

Pin	Assignment
Pin 1	V _A
Pin 2	V _A
Pin 3	V _A
Pin 4	Return
Pin 5	Return
Pin 6	Return

OUTPUT PIN CONNECTIONS

J3 SINGLE (9) DUAL TRIPLE QUAD

Pin	SINGLE (9)	DUAL	TRIPLE	QUAD
Pin 1	V _A	V _B	V _C	V _D
Pin 2	V _A	V _B	V _B	V _B
Pin 3	V _A	V _B	V _B	V _B
Pin 4	Return	Return	Return	Return
Pin 5	Return	Return	Return	Return
Pin 6	Return	Return	No Pin	V _C

Signal pin assignment (J6, J12, J13)

Three two-pin Molex 6373 type connectors (P/N: 22-23-2021) with 0.100 inch spacing or equivalent are used for remote sensing and power good signal. The pin assignment is summarized in the following tables. Pin numbering is from right to left facing the connector.

PIN CONNECTIONS

J13 (ALL MODELS)

Pin	Assignment
Pin 1	V _A Return
Pin 2	Power Good

PIN CONNECTIONS

J12 (ALL MODELS)

Pin	Assignment
Pin 1	- Sense V _A
Pin 2	+ Sense V _A

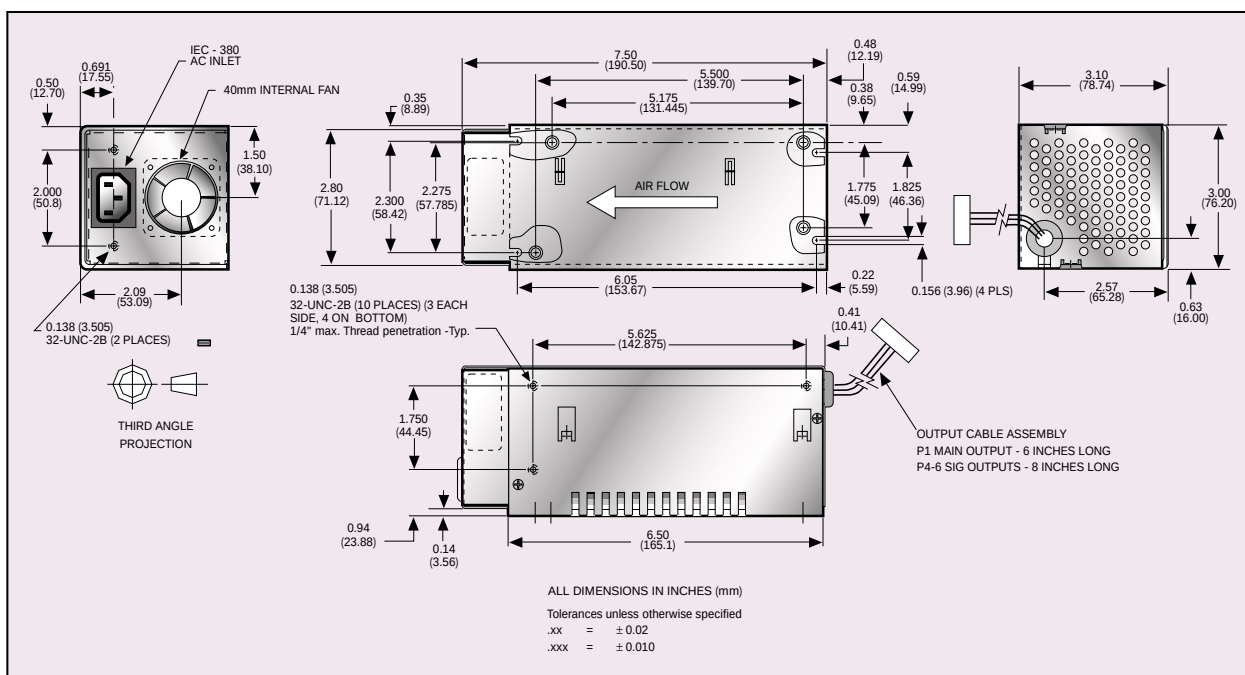
PIN CONNECTIONS

J6 (ALL MODELS)

Pin	Assignment
Pin 1	- Sense V _B
Pin 2	+ Sense V _B

125 to 150 Watt AC/DC universal input switch mode power supplies

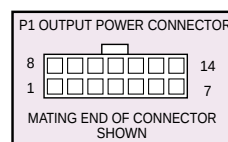
Enclosed mechanical drawing



OUTPUT PIN CONNECTIONS				
P1	SINGLE	DUAL	TRIPLE	QUAD
Pin 1	Return	Return	Return	Return
Pin 2	Return	Return	Return	Return
Pin 3	Return	Return	Return	Return
Pin 4	V _A	V _B	V _B	V _B
Pin 5	V _A	V _B	V _B	V _B
Pin 6	V _A	V _B	V _B	V _B
Pin 7	V _A	V _B	V _C	V _D
Pin 8	Return	Return	No Connect.	V _C
Pin 9	Return	Return	Return	Return
Pin 10	Return	Return	Return	Return
Pin 11	Return	Return	Return	Return
Pin 12	V _A	V _A	V _A	V _A
Pin 13	V _A	V _A	V _A	V _A
Pin 14	V _A	V _A	V _A	V _A

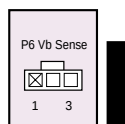
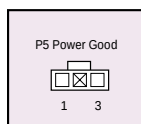
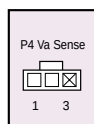
Output pin assignment (P1)

Molex mini-fit connector (P/N: 39-01-2145) or equivalent with Molex crimp terminals (P/N: 39-00-0059) or equivalent. The pin assignment is summarized below.



Signal pin assignment (P4, P5, P6)

Three two-pin Molex mini-fit connectors (P/N: 39-01-4031) with 0.165 inch spacing or equivalent with Molex crimp terminals (P/N: 39-00-0039) or equivalent. The pin assignment is summarized in the following tables. Pin numbering is from right to left facing the connector.



PIN CONNECTIONS P4 (ALL MODELS)	
Pin 1	- Sense V _A
Pin 2	+ Sense V _A
Pin 3	No Connection

PIN CONNECTIONS P5 (ALL MODELS)	
Pin 1	V _A Return
Pin 2	No Connection
Pin 3	Power Good

PIN CONNECTIONS P6 (ALL MODELS)	
Pin 1	No Connection
Pin 2	- Sense V _B
Pin 3	+ Sense V _B