

# NLP65 Medical Series

Single, dual and triple output



LOW POWER AC/DC POWER SUPPLIES

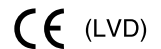
65W AC/DC Universal Input Switch Mode Power Supplies

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- 85VAC to 264VAC universal input range
- Harmonic current correction as standard
- Maximum component height 1.26 inches
- UL, CSA and VDE safety approvals
- Overvoltage and short circuit protection
- 5 x 3 x 1.26 inch (127.0 x 76.2 x 32mm) footprint



The NLP65 Medical series is a 65W universal input AC/DC power supply with input harmonic current correction as standard. This compact design, packed in a 5 x 3 inch card with a maximum component height of 1.26 inches, is ideal for use in a variety of medical, laboratory and dental applications such as centrifuges, incubators and infusion pumps. The NLP65 Medical series comprises of eight models in single, dual and triple output configurations. Providing 65 Watts of continuous output power with free air convection, the NLP65 Medical series will deliver 75 Watts output power with 20CFM of air. The series, with full medical safety approval to EN60601 and UL2601, is CE marked, greatly accelerating design-in time and reducing system compliance costs.



2 YEAR WARRANTY

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

## SPECIFICATIONS

### OUTPUT SPECIFICATIONS

|                          |                     |                      |
|--------------------------|---------------------|----------------------|
| Output power             | Natural convection  | 65W max.             |
| Total regulation         |                     | See table            |
| Rise time                | At turn-on          | 1.0s, max.           |
| Transient response       | Main output         | 5.0% max. dev.,      |
|                          | 25% step at 0.1A/μs | 1ms recovery to 1.0% |
| Temperature coefficient  |                     | ±0.02%/°C            |
| Overvoltage protection   | Main outputs        | 125%, ±10%           |
| Short circuit protection | Cyclic operation    | Yes                  |

### INPUT SPECIFICATIONS

|                                  |                 |                |
|----------------------------------|-----------------|----------------|
| Input voltage range (See Note 2) | Universal input | 85 to 264VAC   |
| Input frequency range            |                 | 47Hz to 63Hz   |
| Input surge current (cold start) | 120VAC          | 17A max.       |
|                                  | 230VAC          | 32A max.       |
| Safety ground leakage current    | 264VAC, 60Hz    | 95μA           |
| Input current                    | 120VAC          | 1.05A rms      |
|                                  | 230VAC          | 0.51A rms      |
| Input fuse                       |                 | 250VAC F 3.15A |

### 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            | 120VAC, 60Hz  | 16ms @ 65W                          |
| Efficiency              | 120VAC, 65W   | 72% typ.                            |
| Isolation voltage       | Input/output  | 4000VAC                             |
|                         | Input/chassis | 1500VAC                             |
| Switching frequency     | Fixed         | 100kHz, ±5kHz                       |
| Approvals and standards |               | EN60601, UL2601<br>CSA 22.2 No. 125 |
| Weight                  |               | 283g (10 oz)                        |
| MTBF                    | MIL-HDBK-217F | 150,000 hours                       |

### ENVIRONMENTAL SPECIFICATIONS

|                        |   |                    |
|------------------------|---|--------------------|
| Thermal performance    | Operating ambient, (See derating curve) | 0°C to +70°C       |
|                        | Non-operating                           | -40°C to +85°C     |
|                        | 0°C to 50°C ambient, convection cooled  | 65W                |
|                        | 50°C to 70°C ambient, convection cooled | Derate to 50% load |
| Relative humidity      | Non-condensing                          | 5% to 95% RH       |
| Altitude               | Operating                               | 10,000 feet max.   |
|                        | Non-operating                           | 30,000 feet max.   |
| Vibration (See Note 5) | 5Hz to 500Hz                            | 2.43G rms approx.  |
| Shock                  | per MIL-STD-810E                        | 516.4 Part IV      |

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| OUTPUT VOLTAGE | OUTPUT CURRENT     |       |                     | RIPPLE <sup>(4)</sup> | TOTAL REGULATION <sup>(6)</sup> | MODEL NUMBER |
|----------------|--------------------|-------|---------------------|-----------------------|---------------------------------|--------------|
|                | MAX <sup>(1)</sup> | PEAK  | FAN <sup>(10)</sup> |                       |                                 |              |
| +5V            | 7.0A               | 9.1A  | 8.0A                | 50mV                  | ±2.0%                           | NLP65-9908   |
| +12V           | 2.5A               | 3.3A  | 3.0A                | 150mV                 | ±5.0%                           |              |
| -12V           | 0.5A               | 0.81A | 1.0A                | 120mV                 | ±5.0%                           |              |
| +5V            | 7.0A               | 9.1A  | 8.0A                | 50mV                  | ±2.0%                           | NLP65-9910   |
| +15V           | 2.2A               | 2.9A  | 2.5A                | 150mV                 | ±5.0%                           |              |
| -15V           | 0.65A              | 0.85A | 0.8A                | 150mV                 | ±5.0%                           |              |
| +5V            | 7.0A               | 9.1A  | 8.0A                | 50mV                  | ±2.0%                           | NLP65-9920   |
| +24V           | 2.0A               | 2.6A  | 2.0A                | 240mV                 | ±5.0%                           |              |
| +5V            | 7.0A               | 9.1A  | 8.0A                | 50mV                  | ±2.0%                           | NLP65-9929   |
| +12V           | 2.5A               | 3.3A  | 3.0A                | 150mV                 | ±5.0%                           |              |
| +5V            | 10.0A              | 13.0A | 12.0A               | 50mV                  | ±2.0%                           | NLP65-9905   |
| +12V           | 5.4A               | 7.0A  | 6.5A                | 120mV                 | ±2.0%                           | NLP65-9912   |
| +15V           | 4.4A               | 5.7A  | 5.3A                | 150mV                 | ±2.0%                           | NLP65-9915   |
| +24V           | 2.7A               | 3.5A  | 3.5A                | 240mV                 | ±2.0%                           | NLP65-9924   |

## Notes

- Natural convection cooling. Models NLP65-9929, NLP65-9908, NLP65-9910 must not exceed 62.5 Watts continuous output power with natural convection. Model NLP65-9920 not to exceed 65 Watts continuous output power with natural convection.
- When the input voltage is less than 90VAC the operating temperature range is 0°C to +40°C. The ripple and regulation specifications may not be met.
- 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 for convection power rating. Output noise measurements are made across a 20MHz bandwidth using a 6 inch twisted pair, terminated with a 10µF electrolytic capacitor and a 0.1µF ceramic capacitor.
- Three orthogonal axes, random vibration 10 minutes for each axes, 2.4G rms 5Hz to 500Hz.
- To maintain stated regulation then:  
for single output units  
 $I \geq 0.2A$  I max.  
for multiple output units  
 $0.25 \leq I(A)/I(B) \leq 5$ , for  $I(A) \geq 0.2A$  I(A) max.
- For optimum reliability, no part of the heatsink should exceed 120°C, and no semiconductor case temperature should exceed 130°C.
- 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.
- Maximum continuous output power for all multiple output models must not exceed 75 Watts with 20CFM forced air cooling at 50°C.

## International Safety Standard Approvals



VDE0705/EN60601-1/IEC1010 File No. 10401-3336-0156/31HM3  
Licence No. 121949



UL1950 File No. E147937



CSA C22.2 No. 950 File No. LR41062C

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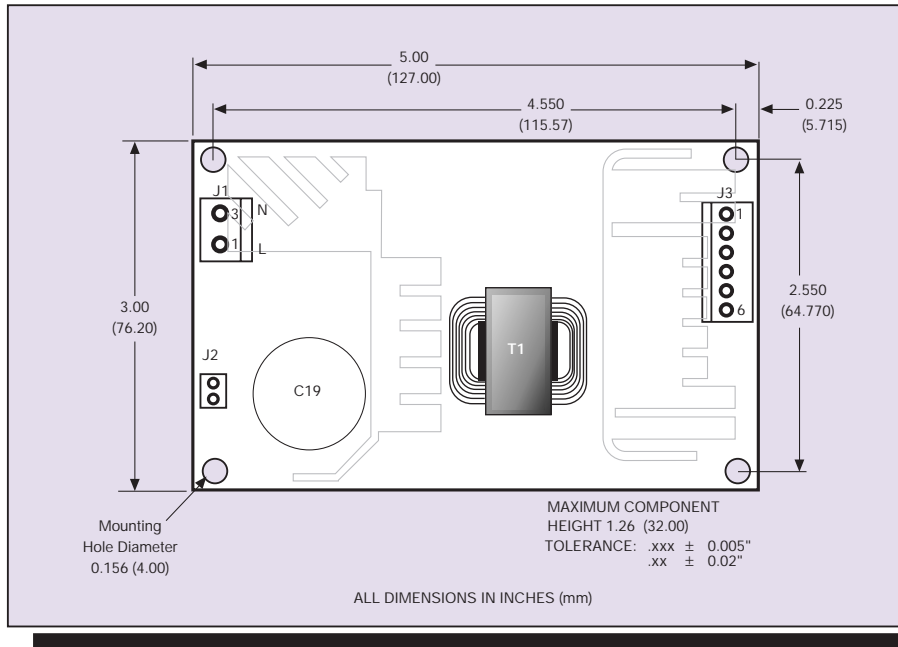
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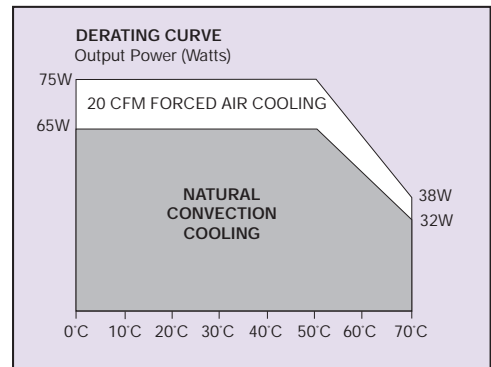
## Mechanical Notes

A All dimensions are in inches (mm).



| INPUT PIN CONNECTIONS |               |
|-----------------------|---------------|
| J1                    |               |
| Pin 1                 | AC Line       |
| Pin 2                 | No Pin        |
| Pin 3                 | AC Neutral    |
| J2                    |               |
| Pin 1                 | Safety Ground |

| J3    | OUTPUT PIN CONNECTIONS |        |        |
|-------|------------------------|--------|--------|
|       | SINGLE                 | DUAL   | TRIPLE |
| Pin 1 | No Connection          | V (B)  | V (B)  |
| Pin 2 | V (A)                  | V (A)  | V (A)  |
| Pin 3 | V (A)                  | V (A)  | V (A)  |
| Pin 4 | Return                 | Return | Return |
| Pin 5 | Return                 | Return | Return |
| Pin 6 | No Connection          | No Pin | V (C)  |



### Input and output connectors

**AC (J1) connector type**  
Molex 26-60-4030 type.

**DC (J3) connector type**  
Molex 26-60-4060 type.

### Mating connectors

**AC (J1) mating connector type**  
Molex 09-50-3031 or equivalent with Molex 08-50-0105 or equivalent crimp terminals.

**DC (J3) mating connector type**  
Molex 09-50-3061 with Molex 2478 phosphor bronze crimp terminals or equivalent.