

POWERSOLVE ELECTRONICS LTD
PSL400-XX series Conduction Cooled Power Supply
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1. SCOPE

This specification describes an AC input power supply with single output voltage switching power supply designed to be conduction cooled via a base-plate. Based on the existing Powersolve PSL400-28. The design uses discrete components rather than proprietary DC modules.

2. ELECTRICAL SPECIFICATION

2.1. AC INPUT REQUIREMENTS

2.1.1. INPUT VOLTAGE

The operating range of the power adapter is 90 to 264Vac.

2.1.2. INPUT FREQUENCY

The input frequency range is 47 to 63 Hz.

2.1.3. EFFICIENCY

The power supply efficiency is 80% min. At full load and with 115Vac input.

2.1.4. INRUSH CURRENT

No Damage (Cold Start).

2.1.5. MAX. INPUT AC CURRENT

4.06A @115Vac, 2.10A @230Vac.

2.1.6. POWER FACTOR

Typically 0.97 – 0.99 depending on O/P load. Compliant with EN61000-3-2

2.2. DC OUTPUT REQUIREMENTS

2.2.1. OUTPUT VOLTAGE

The output voltage under all conditions of rated input voltages and frequencies, of output loads from minimum to maximum and of environmental requirements shall remain within the following limit:

Normal Voltage	Adjust
+12.0V	+/-1.2V
+15.0V	+/- 1.5V
+24.0V	+/-2.4V

The output voltage is measured at the psu connector.

2.2.2. OUTPUT CURRENT

The minimum and maximum continuous output currents are listed in this section.

Output Voltage	Minimum (A)	Maximum (A)
+12.0V	0.0	33A
+15.0V	0.0	26.6A
+24V	0.0	16.6A

2.2.3. OVER CURRENT CONTROL

Over current protection will prevent damages to power supply when output is short-circuited continuously with 100 milliohms or less. The output current shall be internally limited to 150% Max or less at load condition. In the mean time, the temperature rise shall not exceed the limit specified in 4.5 Damage to the power supply must not occur if operated in short circuit.

2.2.4. OUTPUT RIPPLE / NOISE

Ripple is defined as a composite of a power line frequency component plus a high frequency component due to the power oscillator. Common mode noise, which may be observed due to oscilloscope connections, will be ignored. The output voltage ripple and noise limits under all conditions of rated input voltages and frequencies, of output loads from minimum to maximum, and to add 0.1uf and 10uf capacitors at output connector terminal for ripple and noise test.

The spec as follow table.

Normal Voltage	Ripple & Noise
+12.0V	120mV
+15.0V	150mV
+24.0V	240mV

2.2.5. OUTPUT POWER AND TURN-ON DELAY

The turn-on delay from application of AC input power to the establishment of rated DC power voltage should not exceed 3 seconds@115Vac under any conditions at CC mode test.

2.2.6. OUTPUT OVER VOLTAGE PROTECTION

The output shall be protected from over voltage fault at all conditions including open- loop by breakdown that is set to trip at 15Vdc maximum.

2.2.7. VOLTAGE HOLD-UP TIME

When the power supply is operated at 100% of maximum continuous output load, the minimum output holdup time after loss of input power shall be **8mS** for AC input voltage (115Vac, 60Hz) and at 60-degrees cut angle.

2.2.8. LINE AND LOAD REGULATION

Line regulation for max deviation of I/P voltage: 1%

Load regulation for max deviation of O/P load: 5%

2.2.9. CURRENT SHARE

Two power supplies can be connected in parallel sharing within 10%. Oring diodes Fitted as standard

3. MECHANICAL REQUIREMENTS

3.1. PHYSICAL DIMENSIONS

The overall dimension of this power supply is as follows

300 mm (L) x 127 mm (W) x 60 mm (H) Max.

The power supply will consist of an extruded aluminum U channel chassis with a base-plate with mounting holes running the length of each side.

4. ENVIRONMENTAL REQUIREMENTS

4.1. TEMPERATURE AND HUMIDITY

Operating Temperature Range -20 °C to +70°C (no de-rating)

Non-operating Temperature Range -40°C to +85°C

Operating Humidity 10 to 90% relative humidity (non-condensing)

Non-operating Humidity 5 to 95% relative humidity (non-condensing)

Cooling via base-plate to a cold wall or chassis or integral fan.

Conformal coating is to be applied to the PCB as standard.

4.2. SHOCK AND VIBRATION

2 G 10 min/1 cycle 10 Hz – 500Khz, 60 minutes on each axis.

5. RELIABILITY

5.1. MEAN TIME BETWEEN FAILURES (MTBF)

The MTBF for the power supply shall equal or exceed 200,000 hours when operated at full rated load in an ambient of 25°C by MIL-HDBK-217F.

6. EMC AND SAFETY

The power supply shall meet the following standards:

- **Emissions** EN55022 level B conducted
- **Harmonic Distortion** EN61000-3-2
- **ESD Immunity** EN61000-4-2 level 3
- **Radiated immunity** EN61000-4-3
- **EFT Burst** EN61000-4-4 level 3
- **Surge** EN61000-4-5 level 3
- **Conducted immunity** EN61000-4-6 level 3
- **Dips and interruptions** EN61000-4-11
- **Safety approvals** EN60950 CE marked to low voltage directive

Cross section of proposed extruded aluminium chassis showing mounting flanges for conduction cooling to baseplate





