

09210 - LINEAR 8 Amp 13.8 Volt Supply. W/ Battery Management

Test Results

Introduction.

The power supply is designed to supply 13.8 volts nominal D.C. at 7.5 amps nominal from a 240 volt 50 hertz mains source. In addition, a 1.5 amp battery charger circuit is included, with a complete battery manager to monitor the battery voltage and disconnect it at 10.5 volts to stop deep discharge. It uses a thermostatically controlled fan to assist cooling. It is presented as a laser cut stainless steel case for desktop presentation. Other mounting methods and desktop cases can be supplied. (See Mechanical Spec.)



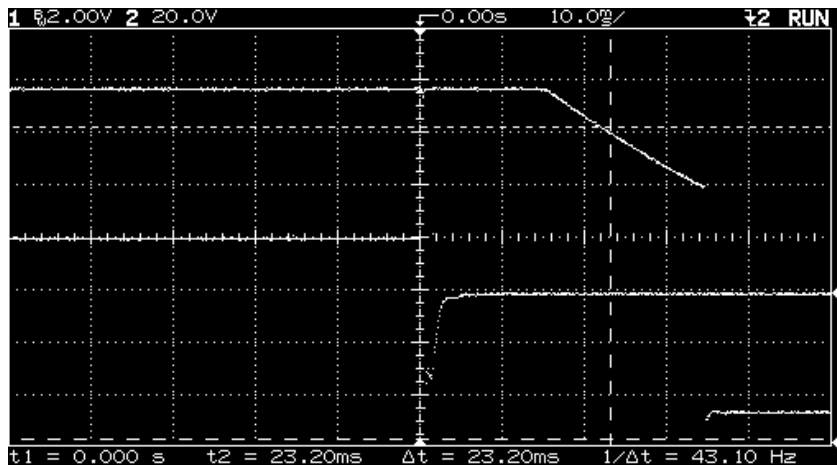
1.0 Input Voltage

The input voltage is 240 V AC at 50-Hertz nominal. No auto ranging occurs, and the output degrades gracefully below the minimum A.C. input voltage. The maximum voltage is an absolute, determined by the power transformer voltage rating.

Voltage range (load 7.5 amps)	215 V A.C. min (209 typical)	265 V A.C. max
Input Frequency ranges	50-60 Hertz.	
Indication	GREEN LED "ac on"	

1.1 Mains Hold Up (missing mains cycles)

The mains hold up at 240 Volts nominal and 50-Hertz and 7.5amps load is shown below.



12 V Output

Mains Input

This shows in excess of 20 ms hold up at full rated load.

1.2 Mains input

The mains input socket is an IEC fused and switched input, UL recognised and CSA certified. A spare fuse is included in the socket. The final unit will have a separate IEC socket / Fuse device and power switch.

1.3 Input Output Voltage Isolation

The input is isolated by a toroidal 50-hertz mains transformer certified to AS 3108.

2. Output Voltage and Current.



The voltage and current ratings and regulation are held over the full AC input range of 215V rms to 265 V rms.

A terminal block at the back of the supply will have separate terminals for Output Power "Load" and battery terminals.

We will be including output terminal lead with lugs to connect the Output power to the transceiver.

2.1 Factory Set Output Voltage

The output voltage is factory set by a 20 turn internal preset.

Output Voltage 13.80 volts at 1.0 amp

2.2 Output Regulation (over AC input and D.C. load)

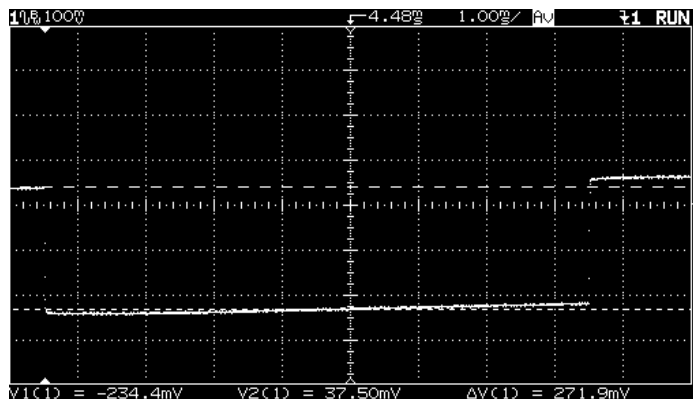
The output drops <300mV from 0 to 7.5 amps load, 215 AC. to 265 AC V input.

2.3 Maximum Current

The maximum load current is 8 amps. The current limit is 9 amps. The supply can be shorted out. No minimum load current is required.

2.4 Output Step Response

The oscilloscope image shows the current step response (240 VAC nominal input) for a 1.0 to 7.5-amp step,



The step response shows only the step due to the regulation. No other artefacts can be seen.

2.5 Nature of the Output Impedance

The very low frequency output impedance is represented by the regulation of the supply. At audio frequency the step response above represents it. At 100-200 KHz, a Nippon Chemi-Con 105 C low ESR Capacitor controls the output impedance. At RF a multilayer monolithic ceramic capacitor is used at the output terminals.

2.6 Noises and Ripple

This is about the most difficult thing to measure with any power supply. This is because there are always short range circulating magnetic fields near such a supply, ready to inject noise into the high impedance CRO leads of the unwary.

The ripple and noise is < 7 mV rms in a bandwidth of 150 Mhz. with no discernable 50 or 100 Hz. Component.

2.7 Over Voltage Protection

The supply uses a completely independent voltage reference to monitor the output voltage. Should this exceed 16 volts, the outputs are shut down via independent power MOSFET switches. If the fault is an output-induced transient that clears itself, the supply starts up automatically.

2.8 Isolation to Ground

The supply is DC isolated from the case, but RF bypassed with 1UF ceramic capacitors to ground on both rails. These have a 50 V DC rating.

2.9 Battery Manager

2.91 Charge Current and Volts

The battery terminals are charged at a maximum current determined by an internal resistor and a PTC.

- Typical Charge current 1.4 amps at a battery voltage of 12 V
- The maximum battery voltage is limited to 13.8 volts at no load.

2.92 DC Output OK LED

When the mains are on, or a charged battery is connected, a green LED shows "dc ok".

2.93 Under Voltage Lockout

In battery backup mode, the battery is connected by a Shottky diode to the load. To prevent deep discharge, an internal MOSFET switch disconnects the battery negative rail at 10.5 volts. The battery is re-connected at 12.5 volts when the mains return. This hysteresis stops hunting.

Under voltage lockout 10.5 volts typical.

Hysteresis 2 volts.

2.94 Reverse Polarity LED

The load is protected against a reverse battery connection. A red LED indicates the problem.

2.95 Battery FUSE

A 10-amp blade fuse is on the back panel to protect the 09110B against battery short circuits.

3. Temperature Rating

Only well specified parts are used from quality suppliers. Only 1% metal oxide resistors are used. All semiconductors are sourced from Japan, Europe or America.

The fan assist operates on a nominal heatsink temperature of 40 C.. If the heatsink exceeds 40 C, the fan runs all the time. The worst-case rise is around 40 C, so the electrolytic are within rating, up to an ambient of 45C.

Free air circulation must be allowed, as the product is a linear mode power supply and gets warm.

4. Mechanical

The case will come in three variants.

- ❑ The sample supplied is in a Black Viersiclad case, aluminium base and feet for desktop use.
- ❑ Extruded aluminium case, stainless front and back and captive nuts for rack mounting.
- ❑ Extruded aluminium case, stainless front (labelled with your logo) and stainless back, with feet, suitable for desktop use.

4.1 Size and weights

The case is 182 mm wide, 180 mm deep and 70 mm high, or 80 mm high with feet. It weighs approximately 2 Kg.