



MOTOROLA

POWER SUPPLY MODULE

MODEL CLN1221

(250 W, 50/60 Hz, 85 to 264 Vac Input)

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DESCRIPTION

The CLN1221 Power Supply Module is described in this section. This Power Supply is used on low power (i.e., 30/40 W) stations. A general description, identification of inputs and outputs, a functional block diagram, and functional theory of operation are provided. The information provided is sufficient to give service personnel a functional understanding of the module, allowing maintenance and troubleshooting to the module level. (Refer also to the Maintenance and Troubleshooting section of this manual for detailed troubleshooting procedures for all modules in the station.)

General Description

The CLN1221 Power Supply Module accepts an ac input (85 to 264 Vac, 50/60 Hz) and generates two output dc voltages to power the station modules: +5.1 Vdc and +14.2 Vdc. The power supply is a high-frequency switched mode design, utilizing Pulse Width Modulation (PWM) control, all contained in a metal heatsink, mounted on the left-hand side of the station. The design provides for over-voltage/over-current protection.

The ac input connection is made at the rear of the station via an IEC-type connector keyed to accept only high temperature type mating connectors. Also provided is a Battery Backup connection. Power supply cooling is provided by natural convection via the heatsink which is coplanar with the power supply circuit board assembly.



An external battery charger system is required to support the battery backup feature.

2 PERFORMANCE SPECIFICATIONS

Table 1 shows the electrical performance specifications for the Model CLN1221 Power Supply Module.

Table 1. CLN1221 Power Supply Module Performance Specifications

Parameter		Specification
Operating Temperature		-30° to +60° C (-22° to +140° F)
Input Voltage Range		85 to 264 Vac
Input Frequency Range		47 to 63 Hz
Steady State Output Voltage		14.2 V @ 16.5 A, 5.1 V @ 2 A
Output Power (Rated)		250 W
Load Transient		14.2 Vdc output $\leq \pm 2.5\%$ of steady state value
Output Ripple	+14.2 Vdc +5.1 Vdc	50 mV p-p, @ 25° C (77° F) 100 mV p-p, @ 25° C (77° F)
Efficiency		Greater than 75% (full load)

3**IDENTIFICATION OF INPUTS/OUTPUTS**

Figure 1 shows the model CLN1221 Power Supply Module input and output external connections.

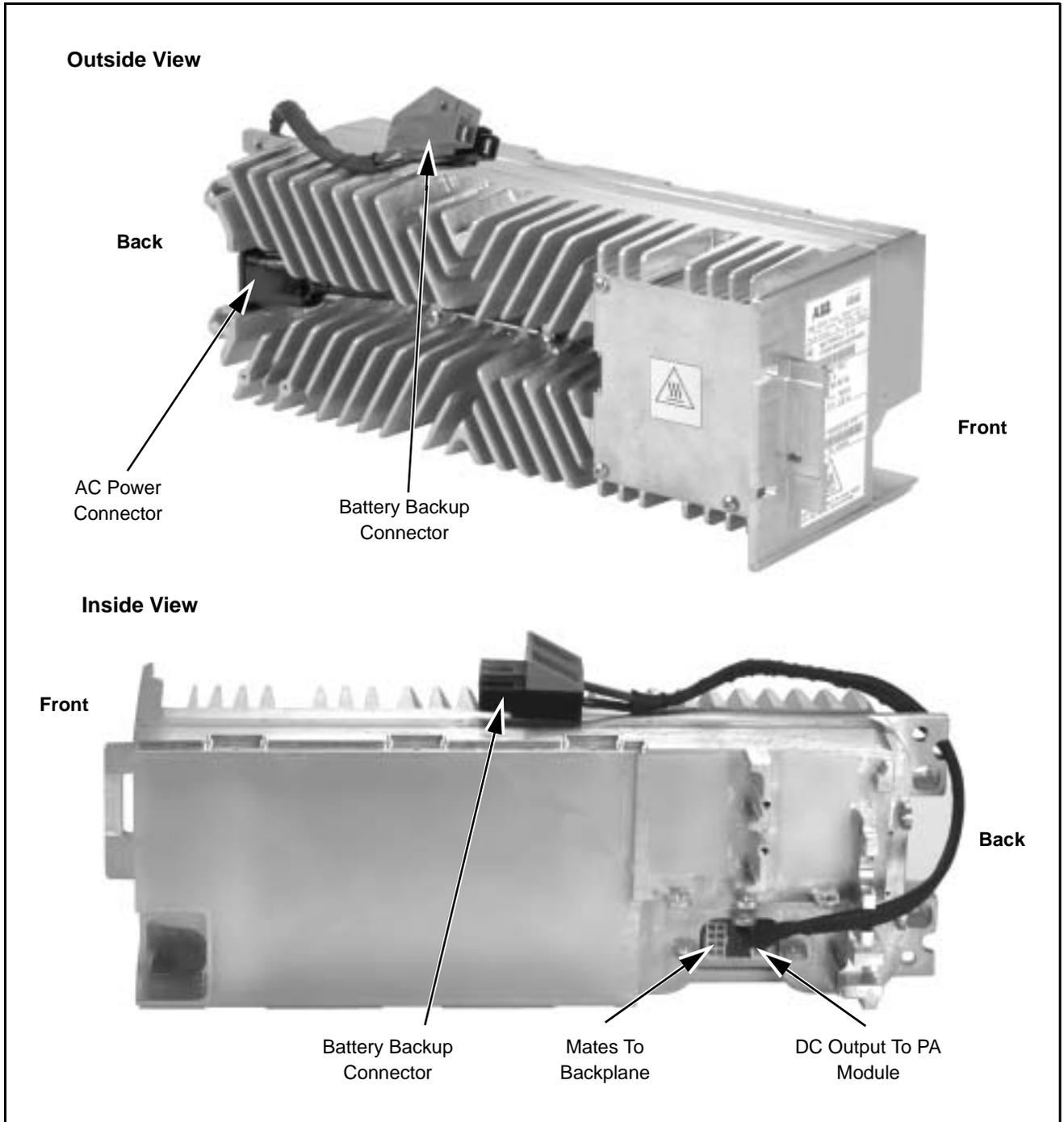


Figure 1. Model CLN1221 Power Supply Module Input/Output Connections

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FUNCTIONAL THEORY OF OPERATION

The following theory of operation describes the operation of the power supply circuitry at a functional level. The information is presented to give the service technician a basic understanding of the functions performed by the module in order to facilitate maintenance and troubleshooting to the module level. Refer to Figure 2 for a block diagram of the power supply module.

Supply Circuitry



Output Over-Current Protection

An over-current condition on the 14.2 Vdc output causes the total supply to shutdown and try to restart. If the over-current continues to exist, the power supply will 'hiccup' until the overload condition is removed, and will not be damaged by the overload. The 14.2 Vdc output goes into the hiccup mode when its output current is greater than 18 A. The trip point for the 5.1 Vdc output is greater than 115% of the maximum current specified for the output. The power supply recovers automatically after the removal of the overload condition.

Over-Voltage Detection and Shutdown

The 14.2 Vdc output is protected from continuous over-voltages by detection circuits that cause the supply to shutdown and then try to restart itself. If the over-voltage condition continues to occur, the supply goes into a 'hiccup' mode of shutting down and trying to restart. If the over-voltage condition is removed, the supply automatically recovers. In addition, the 5.1 Vdc output is protected by an over-voltage detect circuit that shuts down both series regulators at the same time. The trip point of the over-voltage detection circuit is less than 16.8 Vdc for 14.2 Vdc, and less than 6.0 Vdc for 5.1 Vdc.

AC Fail Detect

An AC Fail detect signal is provided to indicate (when used with battery backup option) that the power supply is operating from an external dc source rather than the ac mains. This signal is an open collector output capable of sinking 1mA, and is routed to the Station Control Module. The active low state indicates ac operation. For the nominal 120 V ac operation, the signal is active-high impedance (indicating an ac mains failure) when the ac voltage is less than 85 Vrms, but more than the minimum voltage that guarantees that all outputs will be in regulation at full load. For the nominal 240 Vac operation, the detect point is less than 170 Vrms but more than the minimum ac input voltage that guarantees that all outputs be in regulation at full load.

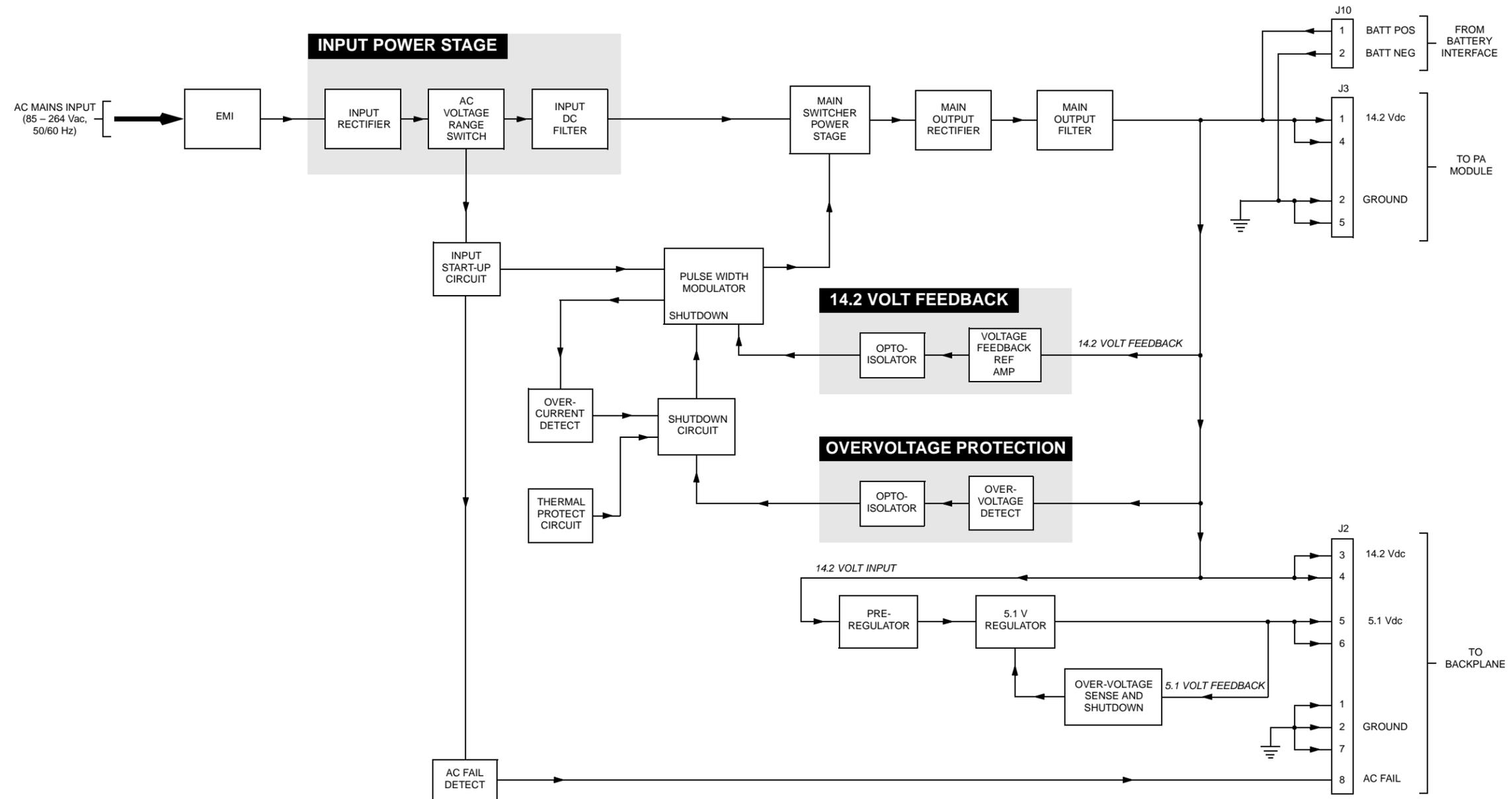


Figure 2. CLN1221 – 250 W Power Supply Functional Block Diagram