

## **SPECIFICATIONS FOR ISOLATING POWER SUPPLY FOR ATC/CAB SIGNAL SYSTEMS: Model 4510225B**

### **1.0 SCOPE**

This specification is for a DC to DC isolating power supply for the Automatic Train Control and Cab Signal systems. This power supply provides input to output isolation and converts an unregulated nominal +38 Vdc to a regulated +32 Vdc. The load circuit includes relays, electronics, other regulators and switching power supplies.



### **2.0 ELECTRICAL**

- 2.1 The power supply provides isolation between the input and output.
- 2.2 The input and output circuits of the power supply are electrically isolated from the case. The input and output circuits of the power supply are electrically isolated from each other. The isolation is greater than 500 megohms at 500 Vdc minimum.
- 2.3 The input circuitry of the power supply is designed with transient protection. The power supply is able to withstand a 5 KV peak amplitude pulse with a total energy of 200 joules.

#### **2.4 Input Circuit:**

- 2.4.1 Input voltage range: 18 to 45 Vdc.
- 2.4.2 The input voltage of the power supply is normally powered from a motor alternator operating from the third rail. The motor alternator output feeds a transformer and a three-phase full wave rectifier to produce the unfiltered nominal 38 Vdc that feeds this power supply. The input voltage to the power supply can also be from storage batteries when the motor alternator system is inoperative. The motor alternator operates at 60 hz  $\pm$  2 hertz.
- 2.4.3 Ripple voltage: 6 volts peak to peak maximum, 360 hz.
- 2.4.4 The input of the power supply shall be protected by a fuse that is accessible from outside the power supply enclosure.

#### **2.5 Output**

- 2.5.1 The power supply is capable of delivering full output over the entire unregulated DC input range.
- 2.5.2 The output voltage of the power supply is 32 volts direct current regulated to 1 percent.
- 2.5.3 The continuous output current rating of the power supply is 12 amps.

- 2.6 The power supply is equipped with circuitry to protect itself and the load circuit.
- 2.6.1 The power supply will automatically shut down should the output exceed 40 Vdc for one second or more and will only restart after a manual interruption of the input voltage.
  - 2.6.2 The power supply is designed to limit the output current during an overload condition. The power supply will automatically restart, after the overload condition stops. There is no fold back current limit preventing restart.
  - 2.6.3 The power supply shall be equipped with light emitting diode diagnostic indicators that are easily viewed. The diagnostic indicators shall have the following colors, are clearly labeled, and indicate the following:
    - 2.6.3.1 Output over voltage - red
    - 2.6.3.2 Operating in current limit - red
    - 2.6.3.3 Power supply output present - green
- 2.7 The input and output connections of the power supply are terminated at a terminal board that accommodates ring tongue terminals for #12 AWG cables.

### **3.0 MECHANICAL**

- 3.1 The power supply is normally mounted within a waterproof, air tight, metal box. The box is electrically connected to the rail car's ground system.
- 3.2 The box containing the power supply system may be bolted to the car body without resilient suspension.
- 3.3 All printed circuit boards have a moisture resistant conformal coating.
- 3.4 Shock: Five (5)g's each axis, minimum, without damage; pulse width 20ms, rectangular shape.
- 3.5 Vibration: Constant velocity of 5.0 inches inches/second, 0 to peak, from 0.5 hz to 12.27 hz and constant acceleration of 1g, 0 to peak, from 12.27 hz to 100 hz without damage; logarithmic sweep upward once, one minute duration.

### **3.6 Environmental Specifications:**

- 3.6.1 Temperature: (Operating and Storage) -10 to +135 F
- 3.6.2 Humidity: 95%, non-condensing
- 3.6.3 Dimensions: See Outline Drawing 240-013-000

