

Medical Electronics

Application Overview

Problem/Solution

An electromedical device can experience overcurrent conditions in the secondary side of its internal power transformer, in one of its communication ports (modem, SCSI, ethernet, mouse/keyboard), and through its probe and voltage/current input terminals. A portable unit can also experience overcurrent conditions in its battery packs.

Typical Protection Requirements

The modem circuit typically requires overcurrent and overvoltage requirements. For overcurrent protection, 600V or 250V with low current is needed. For the power supply, communication ports, and probes, voltage is typically less than 30V, with currents less than 3A.

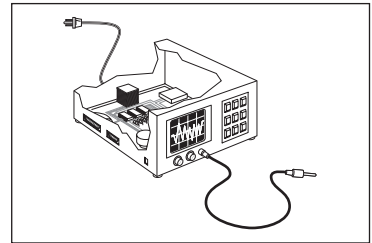
Typical Agency Approval Requirements

Power supplies generally fall under UL1012 and/or UL1310, depending on their classification. These standards describe the

overcurrent limiting required by the power supply—8A in 60 seconds and 8A in 5 seconds respectively. UL1950 and FCC Part 68 in North America, and ITUK.21 elsewhere, specifically apply to telecommunication customer premise equipment; these also specify overcurrent and overvoltage safety standards applicable to telecommunication equipment.

Technology Comparison

Bimetallic thermostatic switches, fuses, and ceramic positive temperature coefficient (CPTC) devices have been used to protect motors. The limitations of bimetallic switches include cycling and the potential for contacts to weld shut. The CPTC has a relatively high resistance and power dissipation, which may be of concern in a portable system. In addition, CPTCs are relatively large and can exhibit thermal behavior where undesirable high temperatures can be reached. Moreover, being a ceramic material, they may



be vulnerable to cracking as a result of shock or vibration. CPTCs also have a relatively slower time-to-trip compared to Polymeric PTC devices. Fuses can fatigue as well, but most significant is that they are one-use devices that must be replaced after a fault has occurred. PolySwitch devices latch into a high-resistance state when a fault occurs. Once the fault and power to the circuit are removed, the device automatically resets and is ready for normal operation.

Device Selection

For telecommunication applications, the TR600, TRF600, TS600, or TVB series devices are typically used. The TR250 and TS250 series devices are typically used for telecommunication applications elsewhere. For power supply, port, and probe protection, products from radial-leaded and surface-mount families are typically used.

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Figure 1. Base Unit Circuit

