MDF Modules/Primary Protection Modules
Application Overview

Problem/Solution
Main distribution frame (MDF) modules and primary protection modules are of critical importance in providing protection for the sensitive components in the central office and on customer premise. These modules protect against AC power cross, power induction, and lightning faults on the telecommunication lines. If not protected against, such hazards can potentially travel into the central office and severely damage sensitive switching and transmission equipment or into the customer premise jeopardizing the safety of residents and their homes. To minimize the effects of such occurrences, PolySwitch resettable devices can be used as overcurrent protection in primary protection applications, such as MDF modules and Network Interface Devices (NID).

Typical Protection Requirements
The requirements for MDF modules and NID protection vary depending on the local telephone company requirements. Protection specifications are based on collaboration between the local telephone company, the module manufacturer, and the company providing the protection components.

In North America, Telcordia GR-974 is the dominant standard for MDF protection. In the rest of the world, many standards use the ITU-T K.20 specification as a guideline. Most specifications include lightning and power cross surges intended to mimic the worst case electrical faults that can be expected. Typical power cross surges range from 100V to 300V, with current levels from 0.250A to 3A. Lightning surges with open-circuit voltages of 1000V to 2500V and short-circuit currents of 10 to 100A peak are common.

Device Selection for Agency Approval Requirements
For Telcordia GR-974 applications, the PolySwitch TRF250-180 device is an appropriate overcurrent protection choice.
20Ω and 4Ω heat coils have been used extensively in the past for overcurrent protection. PolySwitch devices will trip faster than 4Ω heat coils, thereby providing a higher level of protection against low level “sneak currents” which can cause significant damage. 20Ω heat coils trip faster and at lower currents than 4Ω heat coils; however, their relatively higher resistance may be a problem for today’s DSL services where maximizing loop lengths and minimizing signal attenuation are desirable.

In many parts of the world outside North America, the ITU-T K.20 requirements are used as the basis for primary protection module specifications. The 250V rated PolySwitch devices are commonly used to meet these requirements. To accommodate the variety of protection module form factors, several PolySwitch device form factors have been designed, including radial-leaded (TR250-120), surface-mount (TS250-130), vertical surface-mount (TSV250-130), and chip (e.g., TCF250-120T) devices.

Custom devices may be available to meet country-specific requirements. Please contact Raychem Circuit Protection for details.

Figure 1. Typical Schematic