

# Service Protection Module (T1/E1)

## Model SPM-T1-xx

### Features and Specifications

#### OVERVIEW

The Service Protection Module (SPM) connects to copper facilities to protect network equipment against lightning surges and AC power faults. Model SPM-T1-xx (Figure 1) plugs into an Engenuity SIPP chassis and provides RJ48C connectivity for T1 or E1 services.

- Fast-acting primary protection and current limiting for T1 or E1 copper services
- Choice of front-only or front and rear jack access
- Easy installation in an Engenuity SIPP chassis
- Tested to Telcordia GR-974, GR-3108, and NEBS
- Operating temperature range of -40°C to +70°C

#### APPLICATION

Each SPM-T1-xx module provides protection and connectivity for T1 or E1 services (dry loop) in central offices, CEVs, or outside plant cabinets.

Models are available with front-only or front and rear connectors, and optional monitor jacks. Each SPM occupies one or two slots in a SIPP chassis, depending on the chosen jack configuration. Modules can be installed in any combination or order within the chassis.

#### COORDINATED PROTECTION

Service Protection Modules combine current limiting, voltage limiting (gas discharge tube), and fusing to prevent lightning and AC surges from damaging network equipment. Figure 2 shows the placement of these protection elements within the SPM.

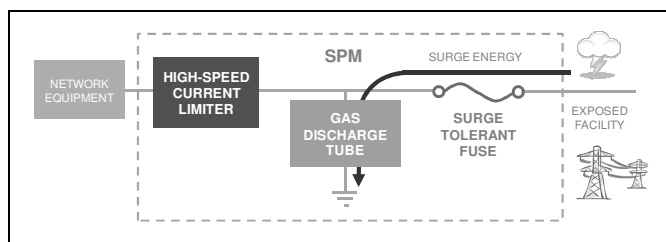


Figure 2. SPM block diagram

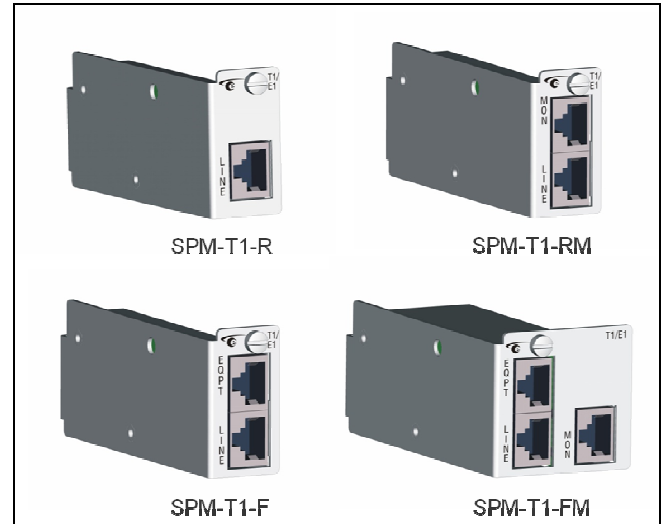


Figure 1. SPM-T1-xx Models

The fast-reacting current limiter blocks transients by switching to a high resistance state, at which point the gas tube diverts surge energy to ground. The combination of current and voltage limiting blocks more energy than can be achieved by voltage clamping alone. Within one microsecond, the current let through toward network equipment is reduced to less than 1 mA (0.1V into a 100Ω load). After the surge clears, the current limiter returns to a low series resistance and the gas tube returns to high bridging resistance.

#### FAIL SAFE OPERATION

Fusing within the SPM provides an alternative to installation of external fuse links. In the event of an extreme lightning surge or high AC exposure, SPM fuses opens to prevent hazardous damage to connectors or cabling. The fuses are surge tolerant and remain transparent to moderate strikes.

In addition, all SPM gas tubes include a fail-short mechanism that prevents thermal overload under AC conditions. The feature creates a mechanical short to ground and only operates if prolonged AC energy exists that could otherwise create a fire hazard.

Activation of a fuse or fail-short mechanism requires the SPM to be replaced.

## SPM-T1-xx SPECIFICATIONS

<b>Signal</b>	T1: AMI B8ZS Encoding, 1.544 MHz, E1: HDB3 Encoding, 2.048 MHz	
<b>Connector</b>	RJ48C; gel coated contacts	
<b>Protected Leads</b>	Pins 1, 2, 4, 5 (Pins 3, 6, 7, 8 grounded)	
<b>Standards</b>	Tested to Telcordia GR-974, GR-1089, GR-3108, and GR-63 requirements	
<b>Application</b>	Dry loop (No DC)	
<b>Impulse Life Characteristics</b>	±10 A, 10/1000 µs:	> 1500 operations
	±100 A, 10/1000 µs:	> 100 operations
<b>AC Life Characteristics</b>	1 A rms, 1 sec:	> 60 operations
	10 A rms, 1 sec:	Fuse opens for protection
<b>End of Life Characteristics</b>	±10 A, 10/1000 µs:	> 3000 operations
	±100 A, 10/1000 µs:	> 300 operations
<b>Current Limiting (toward equipment)</b>	Protection turn-on threshold:	180 mA min., 360 mA max.
	Time to trigger / Time to fully block	~ 10 nanoseconds / ~ 1 microsecond
	Maximum let-through (blocked state):	1 mA (0.1V @ 100 Ω)
<b>Insulation Resistance</b>	> 100 MΩ @ ±50 VDC	
<b>Insertion Loss</b>	< 1.0 dB	
<b>Series Resistance</b>	< 14 Ω	
<b>Capacitance</b>	< 20 pF	
<b>Operating Temperature</b>	-40° C to +70° C	

## SPM-T1-xx MODELS

MODEL NUMBER	EQUIPMENT CONNECTION	LINE CONNECTION	MONITOR CONNECTION	CHASSIS SLOTS	DIMENSIONS	WEIGHT
SPM-T1-R	REAR	FRONT	N/A	1	1.7" H x 0.9"W x 3.9"D	~ 3 ounces
SPM-T1-RM	REAR	FRONT	FRONT	1	1.7" H x 0.9"W x 3.9"D	~ 3 ounces
SPM-T1-F	FRONT	FRONT	N/A	1	1.7" H x 0.9"W x 3.9"D	~ 3 ounces
SPM-T1-FM	FRONT	FRONT	FRONT	2	1.7" H x 1.8"W x 3.9"D	~ 4 ounces

## REFERENCE DOCUMENTATION

DESCRIPTION	DOCUMENT NUMBER
SPM Installation & Maintenance Guide	001-02-000012
SIPP-600 Technical Practice	001-01-000053
SIPP-1800 Technical Practice	001-01-000036
SIPP-3600 Technical Practice	001-01-000048



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