PROTECTION STANDARDS APPLICABLE TO TERMINALS

C. Politano

1. INTRODUCTION

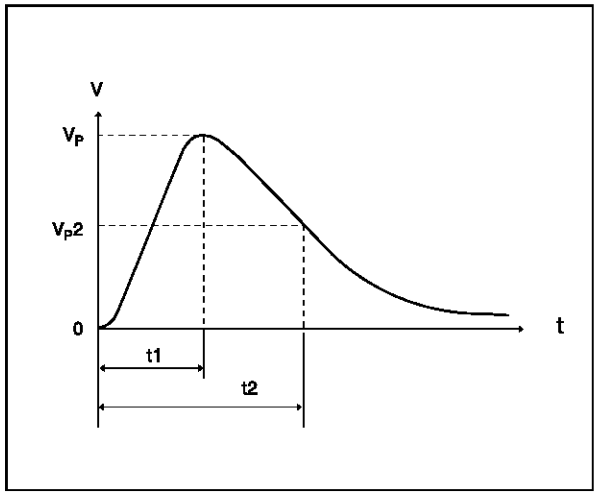
The purpose of this document is to summarize the main telecommunication standards with regard to the protection requirements against two types of overvoltage :

- lightning surges
- power crossing perturbations

2. LIGHTNING SURGES

The lightning overvoltage is simulated by a biexponentional wave, which is defined by the rise time t1 and the duration t2 between the start and the time at which the falling edge crosses half the peak value (fig.1)

Figure 1 : Standard wave



Each country publishes it standard, which can be summarized by the times t1 and t2, the peak voltage of the wave and the surge generator diagram. Table 1 gives on inexhaustive list of the standards :

Table 1 : Lightning surges standards.

COUNTRY	AUTHORITY	WAVEFORM (µs)
ENGLAND	CCITT-417	10/700
	BRITISH TELECOM	10/700
FRANCE	PTT	0.5/700
GERMANY	BUNDESPOST	10/700
ITALY	SIP	10/700
		1/1000
SPAIN	COMPANY TELEFONICA DE ESPANA	1/1000
SWEDEN	TELEVERKET	10/700
SWITZERLAND	PTT - BETRIEBE	10/700
		1.2/50
USA	BELL	10/1000
		10/360
		2/10
	FCC	10/560
		10/160
		2/10

The peak voltage value varies from 1 kV to 2 kV according to the country.

The following figures give the schematics of the surge generators mainly used :

Figure 2 : 10/700 µs wave generator

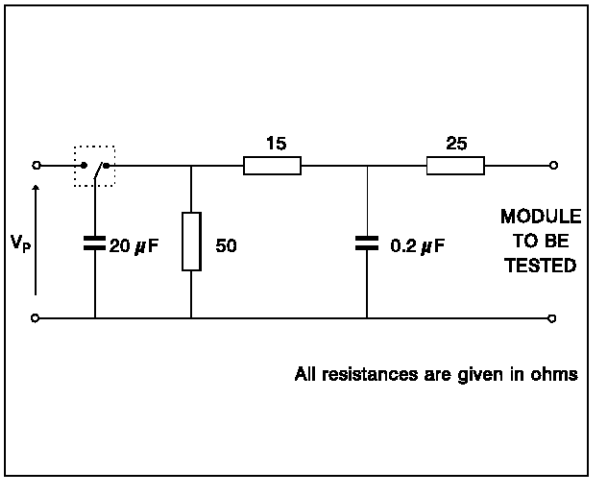


Figure 3 : 1.2/50 µs wave generator

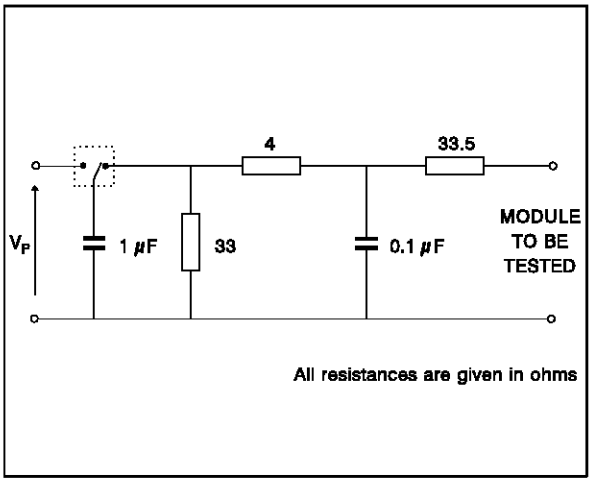


Figure 4 : 0.5/700 µs wave generator

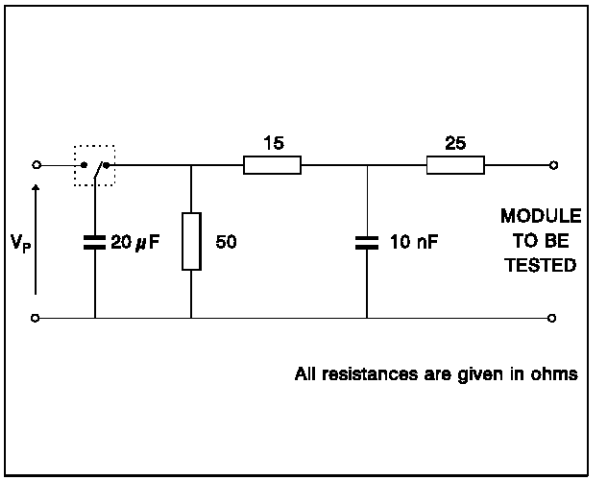


Figure 5 : 10/560 µs wave generator

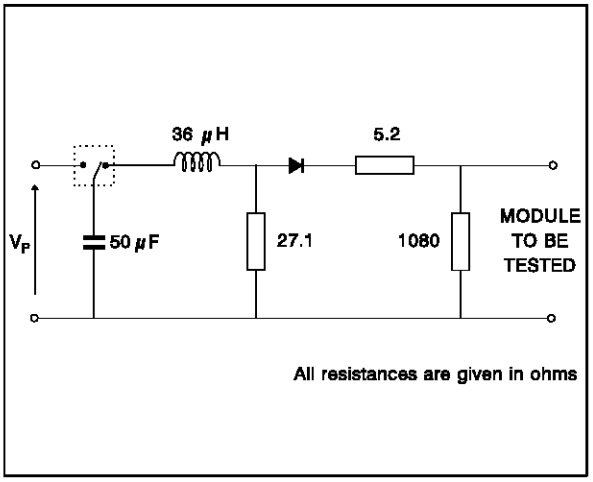


Figure 6 : 1/1000 µs wave generator

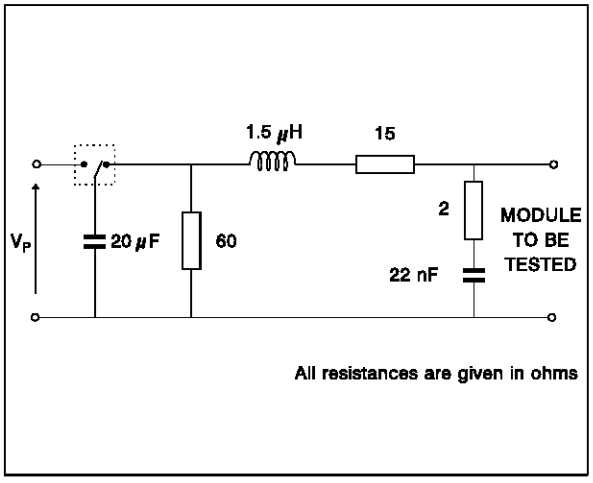


Figure 7 : 10/160 µs wave generator

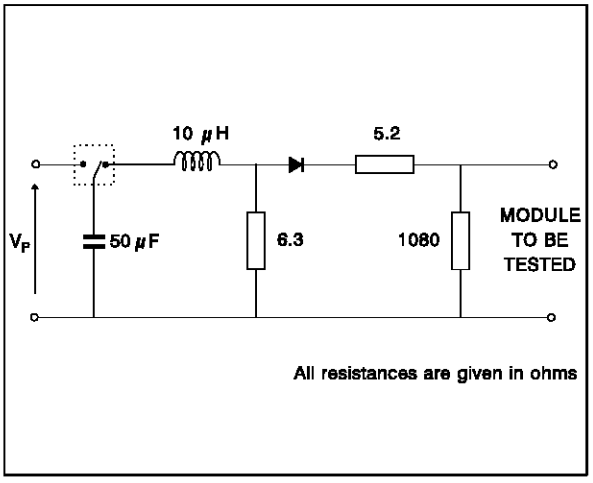
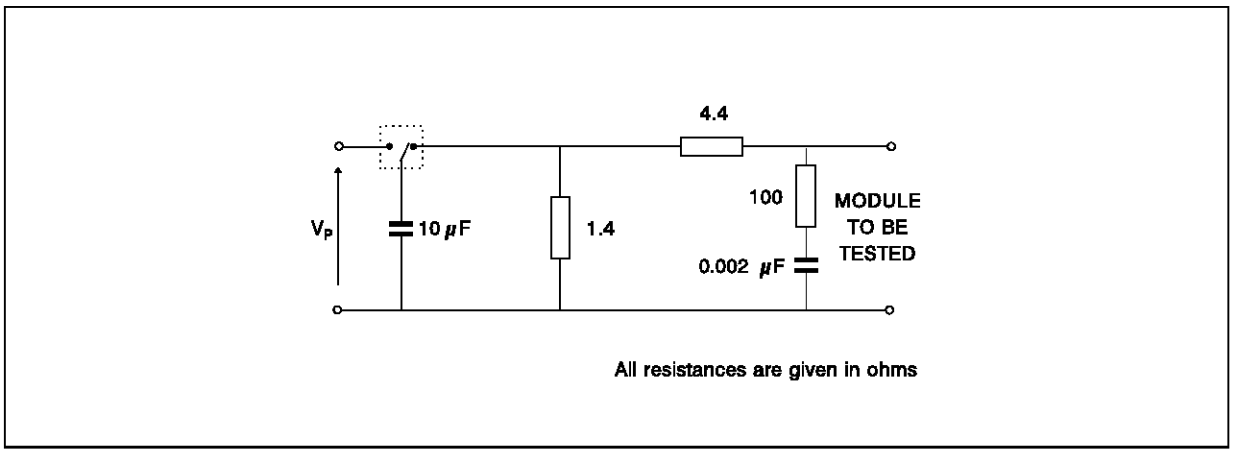


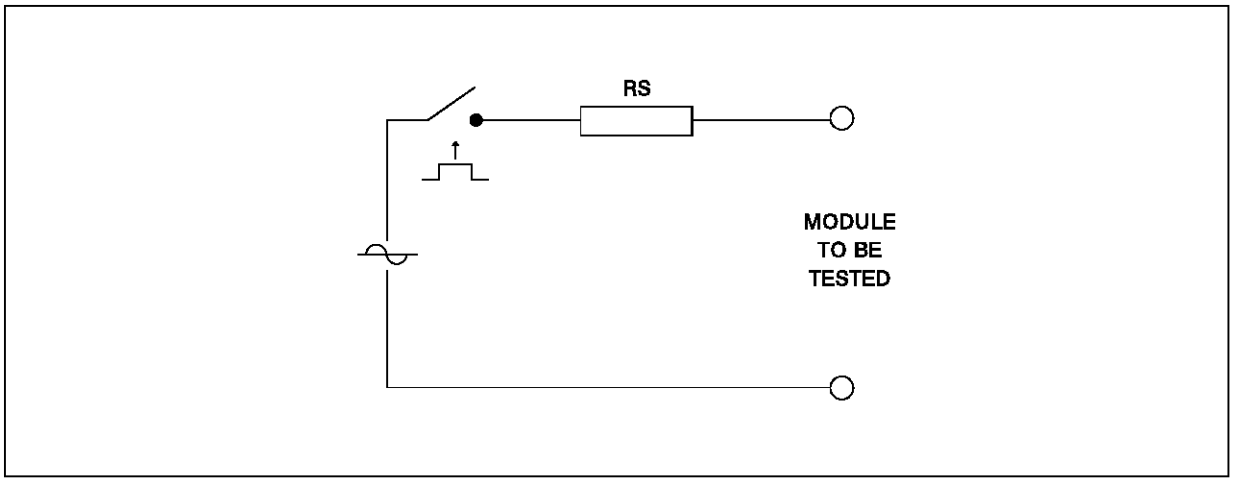
Figure 8 : 2/10 µs wave generator



3. CROSSING OR PROXIMITY WITH MAINS AC LINES :

Crossing or proximity is simulated by a sine wave generator (50 or 60 Hz) connected through a series resistor for a defined time (fig.9)

Figure 9 : Crossing simulation generator



For terminal applications this power crossing test is not widely required because only a few countries impose this standard.

The typical protection arrangement consists of a crowbar device plus a PTC.

4. CONCLUSION

Many different telecommunications protection standards are currently in use around the world. The SGS-THOMSON range of protection devices enables all of these to be covered.