

PROTECTION STANDARDS APPLICABLE TO TERMINALS

C. Politano

1. INTRODUCTION

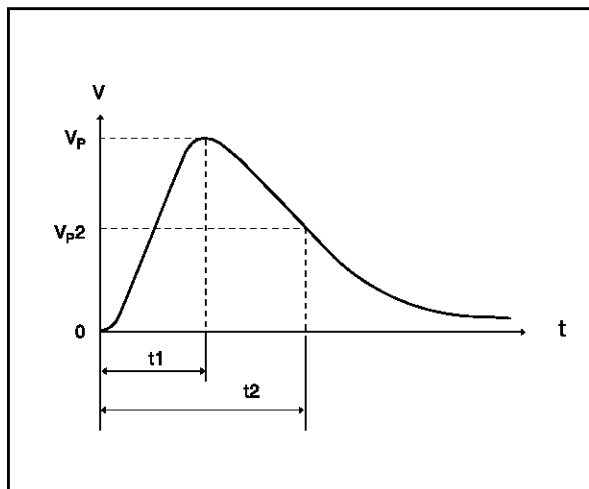
The purpose of this document is to summarize the main telecommunication standards with regard to the protection requirements against two types of overvoltage :

- lightning surges
- power crossing perturbations

2. LIGHTNING SURGES

The lightning overvoltage is simulated by a biexponential wave, which is defined by the rise time t_1 and the duration t_2 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 its standard, which can be summarized by the times t_1 and t_2 , the peak voltage of the wave and the surge generator diagram. Table 1 gives an exhaustive list of the standards :

| Table 1 : Lightning surges standards. | | | |
|---------------------------------------|------------------------------------|---------------------|--------|
| COUNTRY | AUTHORITY | WAVEFORM (μ s) | |
| ENGLAND | CCITT-417 BRITISH TELECOM | 10/700 | |
| | | 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.

APPLICATION NOTE

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

Figure 2 : 10/700 μ s wave generator

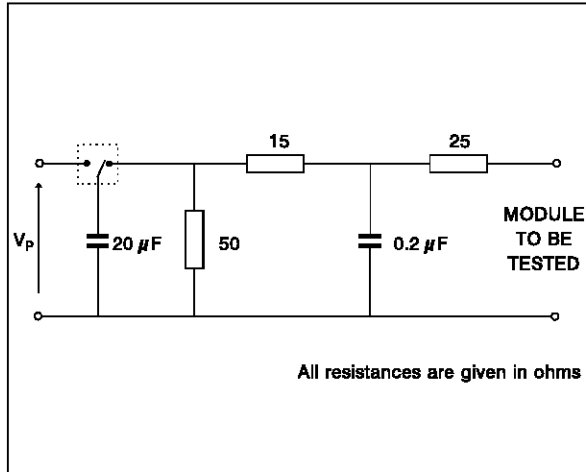


Figure 3 : 1.2/50 μ s wave generator

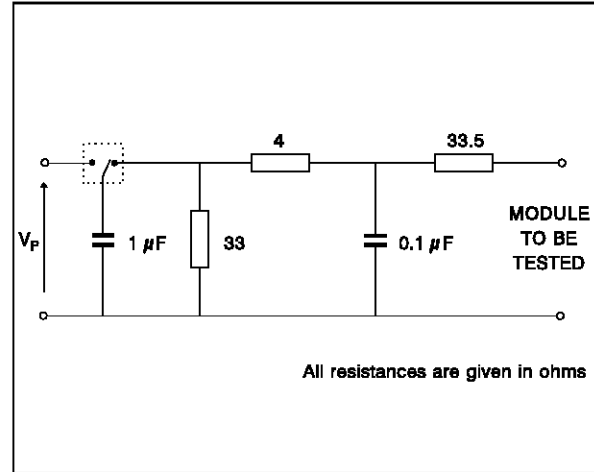


Figure 4 : 0.5/700 μ s wave generator

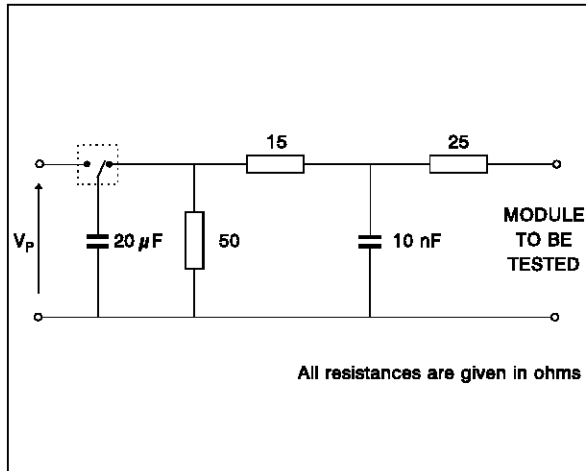


Figure 5 : 10/560 μ s wave generator

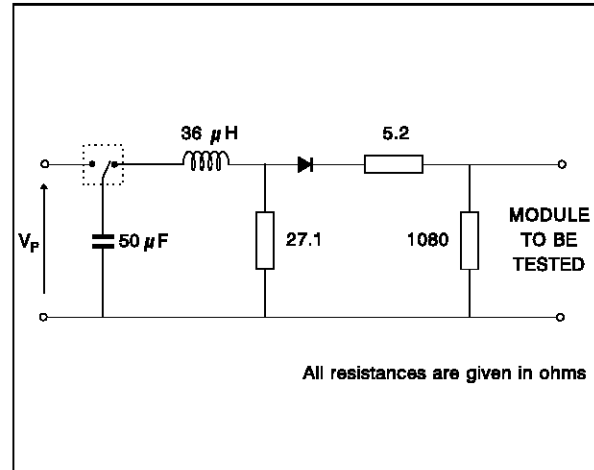


Figure 6 : 1/1000 μ s wave generator

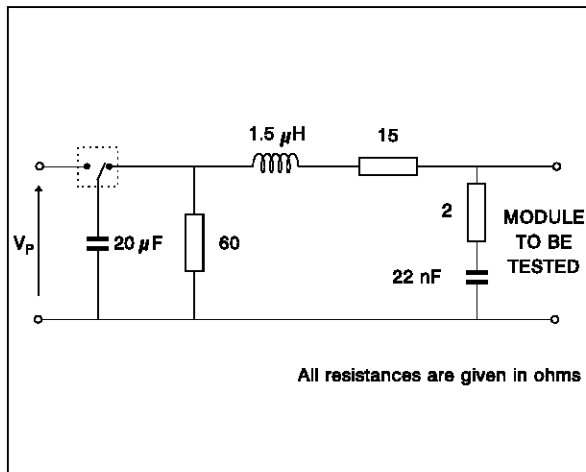


Figure 7 : 10/160 μ s wave generator

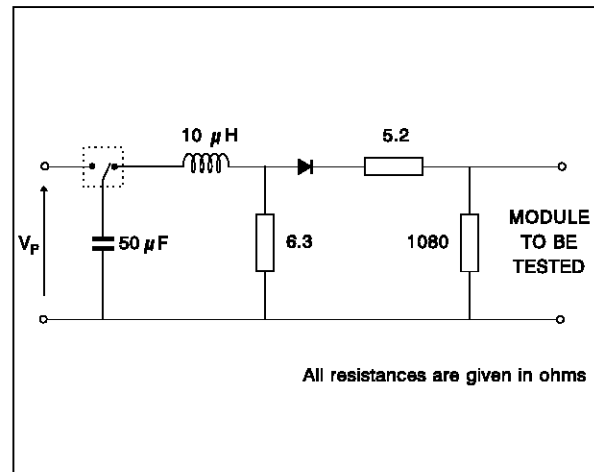
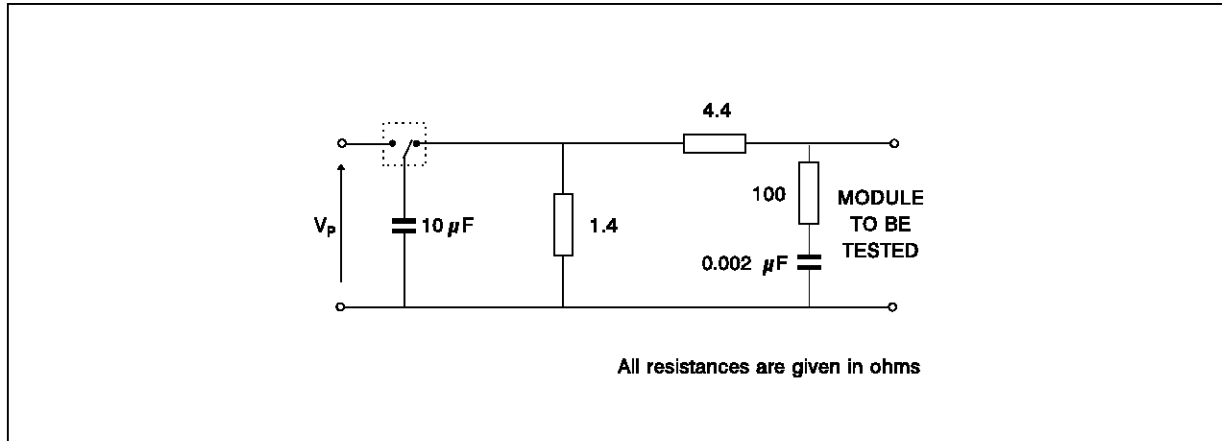
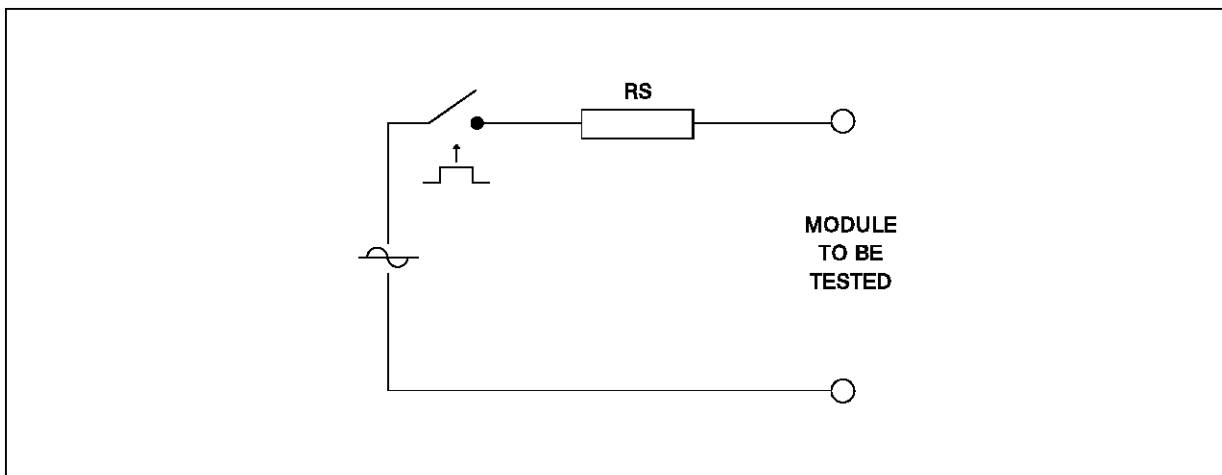


Figure 8 : 2/10 μ s wave generator

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.

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