



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

K.36

(05/96)

PROTECTION AGAINST INTERFERENCE

SELECTION OF PROTECTIVE DEVICES

ITU-T Recommendation K.36

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation K.36 was prepared by ITU-T Study Group 5 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 8th of May 1996.

NOTES

1. In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.
2. The status of annexes and appendices attached to the Series K Recommendations should be interpreted as follows:
 - an *annex* to a Recommendation forms an integral part of the Recommendation;
 - an *appendix* to a Recommendation does not form part of the Recommendation and only provides some complementary explanation or information specific to that Recommendation.

© ITU 1996

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

CONTENTS

	<i>Page</i>
1 Introduction	1
2 Scope	1
3 Definitions	1
4 Characteristics of protective components	1
5 Origin of overvoltages and overcurrents	3
6 Strategies for protection of telecommunication systems	3
7 Desirable electrical characteristics	4
7.1 Normal operation of the system	4
7.2 SPD operating conditions	4
7.3 Current-limiting devices	6
7.4 Isolating devices	7
8 Failure modes	7
8.1 Clamping devices	7
8.2 Current-limiting device	8
9 Location and mounting of SPDs	8
10 Safety aspects	8
11 General aspects on costs for installation and maintenance	9

Page blank

o.ii

Recommendation K.36

SELECTION OF PROTECTIVE DEVICES

(Geneva, 1996)

1 Introduction

The increasing need for protection of telecommunication equipment against overcurrents and overvoltages has resulted in the development of a number of new protective components and elements. Recommendations K.28 for Solid State Arrestors (SSA) and K.30 for self-restoring, current-limiting devices specify the electromagnetic characteristics and test methods for such components. Recommendation K.12 deals with characteristics of Gas Discharge Tubes (GDTs).

The purpose of this Recommendation is to provide information about the application of new devices in the different parts of a telecommunication network. It is intended to guide protection engineers and manufacturers of equipment to select appropriate protection devices for a telecommunication system.

It should be noted that the implementation of protective devices in a communication system is only one of several methods to mitigate transient overvoltages. By using an efficient shielding and bonding technique the need of protective components may be significantly reduced.

2 Scope

This Recommendation gives guidance on the selection of protective components and assemblies in a telecommunication network. It deals with the protection of telecommunication equipment, subscriber's installations and cable plants exposed to overvoltages and overcurrents due to lightning discharges or power faults. Interferences from discharges of static electricity (ESD) and Electrical Fast Transients (EFT) are also considered as far as it may cause permanent damages to equipment.

3 Definitions

For the purposes of this Recommendation, the following definitions apply.

3.1 surge protective device (SPD): A device that is intended to mitigate surge overvoltages and overcurrents of limited durations. It may consist of a single component or have a more complex design, where several functions are integrated. It contains at least one non-linear component.

3.2 primary (or extrinsic) SPD: An SPD capable of diverting or arresting a considerable portion of the surge energy away from the system it is protecting. They are generally installed at the cable entrance to a building, on the MDF or at the equipment/cable interface.

3.3 secondary (or intrinsic) SPD: An SPD capable of handling lower energy surges than a primary SPD, that may be used without a primary SPD in less vulnerable situations, but acts in such a way as to remove residual surge energy that the primary let through. In the majority of cases they are part of the equipment being protected (intrinsic), but can be incorporated as part of a protection module (secondary).

For further definitions about SPD characteristics, see Recommendations K.12, K.28 and K.30.

4 Characteristics of protective components

Protective devices are usually divided into overvoltage and overcurrent elements. They may consist of single components or more complex devices, where several functions are integrated.

There are basically two types of overvoltage components: voltage switching and voltage limiting devices.