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CLC/TS 61643-22

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English version

Low-voltage surge protective devices
Part 22: Surge protective devices connected to telecommunications and signalling networks - Selection and application principles
(IEC 61643-22:2004, modified)

Parafoudres basse tension
Partie 22: Parafoudres connectés aux réseaux de signaux et de télécommunications - Principes de choix et d'application
(CEI 61643-22:2004, modifiée)

Überspannungsschutzgeräte für Niederspannung
Teil 22: Überspannungsschutzgeräte für den Einsatz in Telekommunikations- und signalverarbeitenden Netzwerken - Auswahl- und Anwendungsprinzipien
(IEC 61643-22:2004, modifiziert)

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 61643-22:2004, prepared by SC 37A, Low-voltage surge protective devices, of IEC TC 37, Surge arresters, together with common modifications prepared by the Technical Committee CENELEC TC 37A, Low voltage surge protective devices, was submitted to the formal vote and was approved by CENELEC as CLC/TS 61643-22 on 2005-09-10.

The following date was fixed:

– latest date by which the existence of the CLC/TS has to be announced at national level (doa) 2006-07-01

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Contents

Introduction

This TS is a guide for the application of SPDs to telecommunications and signalling lines and those SPDs which have telecom or signalling SPDs in the same enclosure with power line SPDs. Definitions, requirements and test methods are given in EN 61643-21. The decision to use SPDs is based on an analysis of the risks that are seen by the network or system under consideration. Because telecommunications and signalling systems may depend on long lengths of wire, either buried or aerial, the exposure to overvoltages from lightning, power line faults and power line/load switching, can be significant. If these lines are unprotected, the resultant risk to information technology equipment (ITE) can also be significant. Other factors that may influence the decision to use SPDs are local regulators and insurance stipulations. This TS provides indications for evaluating the need for SPDs, the selection, installation and dimensioning of SPDs and for achieving coordination between SPDs and between SPDs and ITE installed on telecommunication and signal lines.

Coordination of SPDs assures that the interaction between them, as well as between an SPD and the ITE to be protected will be realized. Coordination requires that the voltage protection level, U_p, and let-through current, I_p, of the initial SPD does not exceed the resistibility of subsequent SPDs or the ITE.

In general, the SPD closest to the source of the impinging surge diverts most of the surge: a downstream SPD will divert the remaining or residual surge. The coordination of SPDs in a system is affected by the operation of the SPDs and the equipment to be protected as well as the characteristics of the system to which the SPDs are connected.

The following variables should be reviewed when attempting to attain proper coordination:

– waveshape of the impinging surge (impulse or AC);

– ability of the equipment to withstand an overvoltage/overcurrent without damage;

– installation, e.g. distance between SPDs and between SPDs and ITE;

– SPD voltage-limiting levels and response times.

The performance of an SPD and its coordination with other SPDs can be affected by exposure to previous transients. This is especially true for transients which approach the limit of the capacity of the SPD. If there is considerable doubt concerning the number and severity of the surges handled by the SPDs under consideration, it is suggested that SPDs with higher capabilities be used.

One of the direct effects of poor coordination may be bypassing of the SPD closest to the surge source, with the result that the following SPD will be forced to handle the entire surge. This can result in damage to that SPD.

Lack of proper coordination can also lead to equipment damage and, in severe cases, may lead to a fire hazard.

There are several technologies used in the design of the SPDs covered in this TS. These are explained in the main text and also in informative Annexes A and B.

1 Scope

This TS 61643-22 describes the principles for the selection, operation, location and coordination of SPDs connected to telecommunication and signalling networks with nominal system voltages up to 1 000 V r.m.s. a.c. and 1 500 V d.c.

This TS also addresses SPDs that incorporate protection for signalling lines and power lines in the same enclosure.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 61000-4-5:1995, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test* (IEC 61000-4-5:1995)

EN 61643-11:2002, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems - Requirements and tests* (IEC 61643-1:1998 + corr. Dec. 1998, mod.)

EN 61643-21:2001, *Low-voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signalling networks – Performance requirements and testing methods* (IEC 61643-21:2000 + corr. Mar. 2001)

IEC 61312-1:1995, *Protection against lightning electromagnetic impulse – Part 1: General principles*

IEC 61312-2:1999, *Protection against lightning electromagnetic impulse (LEMP) – Part 2: Shielding of structures, bonding inside structures and earthing*

ITU-T K.31:1993, *Bonding configurations and earthing of telecommunication installations inside a subscriber's building*

3 Terms and definitions

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

3.1
resistibility
ability of an SPD or information technology equipment (ITE) to withstand an overvoltage or overcurrent event without damage

NOTE This definition is derived from EN 61663-2 [1] [1)] and is modified for this application. The equipment can lose some function during the overvoltage/overcurrent, but works correctly after the application of the overvoltage/ overcurrent.

3.2
multiservice surge protective device
surge protective device providing protection for two or more services such as power, telecommunications and signalling in a single enclosure in which a reference bond is provided between services during surge conditions

1) Figures in square brackets refer to the bibliography.