

TECHNICAL REPORT

IEC TR 62102

First edition
2001-03

**Electrical safety –
Classification of interfaces for equipment
to be connected to information and
communications technology networks**

**Sécurité électrique –
Classification des interfaces pour les matériels
destinés à être connectés à des réseaux de
traitement de l'information et de communication**

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International Electrotechnical Commission
Telefax: +41 22 919 0300

3, rue de Varembé Geneva, Switzerland
e-mail: inmail@iec.ch

IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL SAFETY –
CLASSIFICATION OF INTERFACES FOR EQUIPMENT
TO BE CONNECTED TO INFORMATION
AND COMMUNICATIONS TECHNOLOGY NETWORKS**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 62102 which is a technical report, has been prepared by technical committee 74: Safety and energy efficiency of IT equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
74/568/CDV	74/580/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The committee has decided that the contents of this publication will remain unchanged until 2002-11. At this date, the publication will be:

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

This document, which is purely informative, is not to be regarded as an International Standard.

A bilingual version of this technical report may be issued at a later date.

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INTRODUCTION

This technical report is a guide to the determination of the interface requirements for equipment in terms of safety. It lists a number of interfaces and indicates the safety category of each listed interface. This technical report does not contain sufficient detail for conformance testing purposes, except when used in conjunction with product standards such as IEC 60950.

The equipment safety standard IEC 60950 specifies the requirements for categories of circuits as **SELV circuits**, **TNV circuits** and **hazardous voltage circuits** (among others). For stand-alone equipment it is a relatively simple matter to determine the different categories of circuits. However, an equipment which has data port interfaces is intended to be connected to other equipment, either locally or via a network. In this case, the safety categories of the interfaces which will be connected together have to be compatible with each other. Furthermore, the category of the interface of the remote equipment may be unknown. This is the case in systems where telecommunication equipment and data processing equipment are connected together via different types of interfaces and networks.

To overcome this situation it is necessary to classify the interfaces of equipment in such configurations according to the application and to select the safety category for the interfaces of the equipment and for the type of the network. Similarly, the interfaces have to be classified for protection against damage of the equipment and of the network. Aspects of protection are dealt with in the ITU-T K series of Recommendations.

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WITHDRAWN

ELECTRICAL SAFETY – CLASSIFICATION OF INTERFACES FOR EQUIPMENT TO BE CONNECTED TO INFORMATION AND COMMUNICATIONS TECHNOLOGY NETWORKS

1 Scope

This technical report applies to equipment interfaces. These interfaces within the equipment may be connected to **telecommunication networks**, they may form part of the **telecommunication network** infrastructure or they may provide localized transfer of data. This technical report provides guidance on the classification of interfaces in accordance with the circuit types defined in IEC 60950 following an analysis of the **telecommunication network** characteristics.

This technical report only covers equipment appropriately interconnected. Furthermore, it does not address damage caused by one equipment to another equipment to which it is connected. Exceptionally, interfaces may be designed for higher or lower levels for special applications. In such cases it should be ensured that only interfaces having the same safety category and protection level are connected together. This is based on the available specifications of the equipment manufacturers and network providers, and on information regarding the installation category of the mains interface.

This technical report is intended to be used by equipment designers, network operators, network regulators/authorities, standards writers and network installers. It is applicable to various interfaces of equipment. Network presentations are not equipment and so are not covered by IEC 60950; hence they are also not covered by this technical report. However, it is necessary to consider the characteristics, installation and presentation of **telecommunication networks** when determining what equipment interface requirements apply (e.g. **SELV circuit, TNV-1 circuit, TNV-2 circuit, TNV-3 circuit** etc.).

If a standard other than IEC 60950 is used for designing the equipment and its interface (e.g. IEC 62151 in conjunction with other product safety standards), then the corresponding requirements of these other standards are to be preferred.

If there is a conflict between this technical report and a more detailed specification, the latter prevails.

This technical report applies regardless of ownership or responsibility for installation and maintenance of the equipment or network.

NOTE Terminal equipment is often connected to customer premises cabling when used in a business environment, and there are standards covering such cabling.

2 Reference documents

IEC Guide 112, *Guide on the safety of multimedia equipment*

IEC 60065, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60364 (all parts), *Electrical installation of buildings*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60950, *Safety of information technology equipment*

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

IEC 62151, *Safety of equipment electrically connected to a telecommunication network*

ISO/IEC 8802-3, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications*

ITU-T Recommendation K.20, *Resistibility of telecommunication equipment installed in a telecommunications centre to overvoltages and overcurrents*

ITU-T Recommendation K.21, *Resistibility of telecommunication equipment installed in customer's premises to overvoltages and overcurrents*

ITU-T Recommendation K.27, *Bonding configurations and earthing inside a telecommunication building*

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

3 Terms and definitions

For the purposes of this technical report, the specified terms and definitions from IEC 60950 as well as the following additional definitions apply.

3.1 Definitions from IEC 60950

3.1.1

a.c. mains supply

the external a.c. power distribution system supplying power to the equipment. These power sources include public or private utilities and, unless otherwise specified, equivalent sources such as motor-driven generators and uninterruptible power supplies

3.1.2

hazardous voltage

a voltage exceeding 42,4 V peak, or 60 V d.c., existing in a circuit which does not meet the requirements for either a **limited current circuit** or a **TNV circuit**

3.1.3

limited current circuit

a circuit which is so designed and protected that, under both normal operating conditions and single-fault conditions, the current which can be drawn is not hazardous

3.1.4

primary circuit

a circuit which is directly connected to the **a.c. mains supply**. It includes, for example, the means for connection to the **a.c. mains supply**, the primary windings of transformers, motors and other loading devices

3.1.5**secondary circuit**

a circuit which has no direct connection to a **primary circuit** and derives its power from a transformer, converter or equivalent isolation device, or from a battery

3.1.6**SELV circuit**

a **secondary circuit** which is so designed and protected that under normal operating conditions and single-fault conditions, its voltages do not exceed a safe value

3.1.7**TNV circuit (including TNV-1 circuit, TNV-2 circuit, TNV-3 circuit)**

a circuit which is in the equipment and to which the accessible area of contact is limited and that is so designed and protected that, under normal operating conditions and single-fault conditions, the voltages do not exceed specified limit values

3.1.8**telecommunication network**

a metallically terminated transmission medium intended for communication between equipments that may be located in separate buildings, excluding:

- the mains system for supply, transmission and distribution of electrical power, if used as a telecommunication transmission medium;
- television distribution systems using cable;
- **SELV circuits** connecting units of data processing equipment

NOTE 1 The term **telecommunication network** is defined in terms of its functionality, not its electrical characteristics. A **telecommunication network** is not itself defined as being either a **SELV circuit** or a **TNV circuit**. Only the circuits in the equipment are so classified.

NOTE 2 A **telecommunication network** may be:

- publicly or privately owned;
- subject to transient overvoltages due to atmospheric discharges and faults in power distribution systems;
- subject to longitudinal (common mode) voltages induced from nearby power lines or electric traction lines.

NOTE 3 Examples of **telecommunication networks** are:

- a public switched telephone network;
- a public data network;
- an Integrated Services Digital Network (ISDN);
- a private network with electrical interface characteristics similar to the above.

3.1.9**service personnel**

persons having appropriate technical training and experience necessary to be aware of hazards to which they may be exposed in performing a task and of measures to minimize the risks for themselves or other persons

3.1.10**user**

any person, other than **service personnel**

3.2 Additional definitions for this document**3.2.1****antenna interface**

a port for connection of a radio frequency antenna to equipment