

TECHNICAL REPORT

IEC TR 62102

Second edition
2005-05

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

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CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	7
3.1 Definitions from IEC 60950-1	7
3.2 Definitions from IEC 60950-21	9
3.3 Additional definitions for this document	9
3.4 Abbreviations.....	10
4 Reference configuration.....	10
5 Safety categories of interfaces provided for connection to an information and communications technology network	13
5.1 SELV circuits.....	13
5.2 TNV circuits.....	13
5.3 User information	13
5.4 RFT circuits.....	13
6 Phenomena affecting the safety of interface ports	13
6.1 Network Environment 0.....	14
6.2 Network Environment 1.....	14
7 Determination of circuit type.....	15
IEC TR 62102-2005.....	15
https://standards.iteh.ai/catalog/standards/sist/504dbcae-ab34-46a5-aaad-5e869c446d3a/iec-tr-62102-2005	
Annex A (informative) Consideration of interface phenomenon	16
Annex B (informative) Worked examples of certain network interfaces.....	19
Annex C (informative) Conditions for Network Environment 0.....	22
Annex D (informative) Voltage ranges of SELV circuits and TNV circuits.....	23
Bibliography.....	24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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IEC 62102, which is a technical report, was prepared by IEC technical committee 108: Safety of electronic equipment within the field of audio/video, information technology and communication technology, previously organized as IEC technical committee 74: Safety and energy efficiency of IT equipment.

This second edition cancels and replaces the first edition published in 2001. This edition constitutes a technical revision. The principal changes in this edition as compared with the first edition of IEC 62102 are as follows (small changes are not listed):

- this 2nd edition was updated to accord with IEC 60950-1:2001;
- RFT (remote feeding telecommunication) circuits from IEC 60950-21 have been added;

- in Annex B more interfaces have been added;
- in Annex B the category of xDSL interfaces have replaced ADSL interfaces.

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

Enquiry draft	Report on voting
108/128/DTR	108/130/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 2.

Terms printed in **bold** in the text are defined in Clause 3.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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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 60950-1 and IEC 60950-21.

The equipment safety standards IEC 60950-1 and IEC 60950-21 specify the requirements for categories of circuits as **SELV circuits**, **TNV circuits**, **RFT 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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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**, may form part of the **telecommunication network** infrastructure or 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 60950-1 and IEC 60950-21 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 60950-1 and IEC 60950-21; 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 (for example, **SELV circuit**, **TNV-1 circuit**, **TNV-2 circuit**, **TNV-3 circuit** etc.).

If a standard other than IEC 60950-1 or IEC 60950-21 is used for designing the equipment and its interface (for example, 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 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.

IEC 60950-1:2001, *Information technology equipment – Safety – Part 1: General requirements*

IEC 60950-21:2002, *Information technology equipment – Safety – Part 21: Remote power feeding*

3 Terms and definitions

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

3.1 Definitions from IEC 60950-1

3.1.1

a.c. mains supply

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

[IEC 60950-1, definition 1.2.8.1]

3.1.2

hazardous voltage

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**

[IEC 60950-1, definition 1.2.8.5]

3.1.3

limited current circuit

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

[IEC 60950-1, definition 1.2.8.8]

3.1.4

primary circuit

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

[IEC 60950-1, definition 1.2.8.3]

3.1.5

secondary circuit

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

[IEC 60950-1, definition 1.2.8.4]

3.1.6

SELV circuit

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

[IEC 60950-1, definition 1.2.8.7]

3.1.7

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

circuit that 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

[IEC 60950-1, definition 1.2.8.10]

3.1.8**telecommunication network**

metallically terminated transmission medium intended for communication between equipment 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;
- **cable distribution systems**;
- **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 an **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.

[IEC 60950-1, definition 1.2.13.8]

3.1.9**cable distribution system**

metallically terminated transmission medium using coaxial cable, mainly intended for transmission of video and/or audio signals between separate buildings or between outdoor antennas and buildings, excluding:

- the mains system for supply, transmission and distribution of electric power, if used as a communication transmission medium;
- **telecommunication networks**;
- **SELV** circuits connecting units of information technology equipment

NOTE 1 Examples of **cable distribution systems** are:

- local area cable networks, community antenna television systems and master antenna television systems providing video and audio signal distribution;
- outdoor antennas including satellite dishes, receiving antennas, and other similar devices.

NOTE 2 **Cable distribution systems** may be subjected to greater transients than **telecommunication networks**.

[IEC 60950-1, definition 1.2.13.14]

3.1.10**service person**

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

[IEC 60950-1, definition 1.2.13.5]

3.1.11**user**

any person, other than a **service person**

[IEC 60950-1, definition 1.2.13.6]

3.2 Definitions from IEC 60950-21

3.2.1

RFT circuit

remote feeding telecommunication circuit

a **secondary circuit** within the equipment, intended to supply or receive d.c. power via a **telecommunication network** at voltages equal to or exceeding the limits for **TNV circuits**, and on which overvoltages from **telecommunication networks** are possible

[IEC 60950-1, definition 3.1]

3.2.2

RFT-C circuit

an **RFT circuit** which is so designed and protected that under normal operating conditions and single fault conditions, the currents in the circuit do not exceed defined values

[IEC 60950-1, definition 3.2]

3.2.3

RFT-V circuit

an **RFT circuit** which is so designed and protected that under normal operating conditions and single fault conditions the voltages are limited and the accessible area of contact is limited

[IEC 60950-1, definition 3.3]

3.3 Additional definitions for this document

3.3.1

antenna interface

a port for connection of a radio frequency antenna to equipment

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3.3.2

coaxial cable interface

a port for connection of a coaxial cable providing for asymmetrical transmission to equipment

NOTE In this technical report the use of both indoor and outdoor coaxial cables is considered separately.

3.3.3

network termination point

the physical point at the boundary of a network intended to accept the connection of a terminal equipment or to be interconnected to another network

3.3.4

paired conductor interface

a port for connection of a cable providing for symmetrical transmission (for example, twisted pair) to equipment

NOTE In this technical report the use of both indoor and outdoor twisted pair cables is considered separately.

3.3.5

terminal connection point

the physical point of the terminal equipment intended to be connected to a network