IEC 61010-2-201

Edition 3.0 2024-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Safety requirements for electrical equipment for measurement, control, and laboratory use –
Part 2-201: Particular requirements for control equipment

Exigences de securité pour appareils électriques de mesurage, de régulation et de laboratoire –
Partie 2-201: Exigences particulières pour les équipements de commande

IEC 61010-2-201:2024-10(en-fr)

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SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

Part 2-201: Particular requirements for control equipment

FOREWORD

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IEC 61010-2-201 has been prepared by IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

This third edition cancels and replaces the second edition published in 2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) 1.1.1: the related equipment included in the Scope has been clarified;
b) 4.3.2.101: the optical fibre module has been deleted;
c) 5.4.3: equipment installation has been clarified;

d) 6.7.1.1: revision of the figure representing insulation between separate circuits has been included;

e) 6.7.101: the subclause relating to insulation for FIELD WIRING TERMINALS of OVERVOLTAGE CATEGORY II with a nominal voltage up to 1 000 V has been deleted;

f) 6.7.1.101: a new subclause relating to insulation for SELV/PELV CIRCUITS has been included;

g) 6.8.3: specification of voltage tester has been added;

h) 6.9.3: an additional exception relating to colour coding has been included;

i) 6.9.101: a new subclause relating to wiring for secondary circuits e.g. SELV/PELV has been included;

j) 8.2.2.101: additional requirements for glass displays have been included;

k) 8.3: the subclause relating to the drop test has been removed;

l) 9.3.2: additional requirements for material of connectors and insulating material have been included;

m) The particular requirements for non-metallic material have been clarified;

n) Clause 11: the particular requirements for protection against HAZARDS from fluid and solid foreign objects have been removed;

o) 12.4: an additional subclause relating to microwave radiation has been included;

p) 14.102: the description of switching devices has been clarified;

The text of this International Standard is based on the following documents:

Draft	Report on voting
65/1049/FDIS	65/1095/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 61010 series, published under the general title *Safety requirements for electrical equipment for measurement, control, and laboratory use*, can be found on the IEC website.

This document is to be used in conjunction with IEC 61010-1:2010, and IEC 61010-1:2010/AMD1:2016.

This document supplements or modifies the corresponding clauses in IEC 61010-1 so as to convert that publication into the IEC standard: *Particular requirements for control equipment.*

Where a particular subclause of IEC 61010-1 is not mentioned in this document, that subclause applies as far as is reasonable. Where this document states "addition", "modification", "replacement", or "deletion", the relevant requirement, test specification or note in IEC 61010-1 should be adapted accordingly.

In this document,

a) the following print types are used:
   – requirements and definitions: in roman type;
   – NOTES: in smaller roman type;
   – *conformity and tests: in italic type*;
   – terms used throughout this document which have been defined in Clause 3: SMALL ROMAN CAPITALS.
b) subclauses, figures, tables and notes which are additional to those in IEC 61010-1 are numbered starting from 101. Additional annexes are lettered starting from AA and additional list items are lettered from aa).

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC 61010-2-2xx documents are a series of standards on the safety of industrial-process measurement, control and automation equipment.

This document specifies the complete safety related requirements and related tests for control equipment (e.g. programmable controller (PLC), the components of distributed control systems (DCS), I/O devices, human machine interface (HMI)).

Safety terms of general use are defined in IEC 61010-1. More specific terms are defined in each relevant part of the IEC 61010 series.

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

Part 2-201: Particular requirements for control equipment

1 Scope and object

IEC 61010-1:2010, Clause 1 and IEC 61010-1:2010/AMD1:2016, Clause 1 apply, except as follows:

1.1.1 Equipment included in scope

Replacement:

Replace the existing text with the following:

This part of IEC 61010 specifies safety requirements and related verification tests for control equipment or their associated peripherals, or both.

Some equipment examples are:

- programmable logic controller (PLC);
- programmable automation controller (PAC);
- distributed control systems (DCS);
- industrial PC (computers) and panel PC;
- programming and debugging tools (PADTs);
- displays and human-machine interfaces (HMI);
- any product performing the function of control equipment or their associated peripherals, or both;
- positioners; and
- control equipment which have as their intended use the command and control of machines, automated manufacturing and industrial processes, for example discrete and continuous control.

Components of the above named equipment and within the scope of this document are, for example:

- (auxiliary) stand-alone power supplies;
- peripherals such as digital and analogue I/O,
- remote-I/O;
- industrial network equipment, embedded or stand-alone (e.g. switches, routers, wireless base station).

Control equipment and their associated peripherals are intended to be used in an industrial environment. This document considers equipment designed as OPEN or ENCLOSED EQUIPMENT.

NOTE 1 Control equipment intended also for use in other environments or for other purposes (example: for use in building installations to control light or other electrical installations, or for use on cars, trains or ships) can have additional conformity requirements defined by the safety standard(s) for these applications. These requirements can involve for example: insulation, spacings and power restrictions.

NOTE 2 Computing devices and similar equipment within the scope of the IEC 60950 series or the IEC 62368 series and conforming to their requirements are considered to be suitable for use with control equipment within the scope of this document. However, some of the requirements of the IEC 60950 series for resistance to moisture and liquids are less stringent, IEC 61010-1:2010, 5.4.4, second paragraph takes this aspect into account.

Control equipment covered in this document is typically intended for use in OVERVOLTAGE CATEGORY II (IEC 60664-1) in low-voltage installations, where the RATED equipment supply voltage does not exceed 1 000 V a.c. RMS (50/60 Hz), or 1 000 V d.c..

Where control equipment is intended for installation to supply systems with OVERVOLTAGE CATEGORY III or IV, additional requirements are identified in Annex K.

The requirements of ISO/IEC Guide 51 and IEC Guide 104, as they relate to this part of IEC 61010, are incorporated herein.

1.1.2 Equipment excluded from scope

Replacement:

Replace the existing text with the following:

This document does not deal with aspects of the overall automated system, for example a complete assembly line. Control equipment (e.g. DCS and PLC), their application programme and their associated peripherals are considered as components (components in this context are items which perform no useful function by themselves) of an overall automated system.

Since control equipment (e.g. DCS and PLC) are component devices, safety considerations for the overall automated system including installation and application are beyond the scope of this document. Refer to the IEC 60364 series or applicable national and local regulations for electrical installation and guidelines.

1.2.1 Aspects included in scope

Replace the first sentence with the following:

The purpose of the requirements of this document is to ensure that all HAZARDs to the OPERATOR, SERVICE PERSONNEL and the surrounding area are reduced to a tolerable level.

NOTE By using the terms "OPERATOR" and "SERVICE PERSONNEL" this document considers the perception of HAZARDS depending on training and skills. Annex AA provides a general approach in this regard.

1.2.2 Aspects excluded from scope

Replacement:

Replace the existing text with the following:

This document does not cover:

a) reliability, functionality, performance, or other properties of the control equipment not related to safety;
b) mechanical or climatic requirements for operation, transport or storage;
c) EMC requirements (see e.g. the IEC 61326 series or IEC 61131-2);
d) protective measures for explosive atmospheres (see e.g. the IEC 60079 series);
e) functional safety (see e.g. the IEC 61508 series, IEC 61131-6).

2 Normative references

IEC 61010-1:2010, Clause 2 and IEC 61010-1:2010/AMD1:2016, Clause 2 apply, except as follows:

Addition:

Add the following new references:

IEC 60384-14, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end products (GWEPT)*

IEC 60695-11-3, *Fire hazard testing – Part 11-3: Test flames – 500 W flames – Apparatus and confirmational test methods*

IEC 60695-11-20, *Fire hazard testing – Part 11-20: Test flames – 500 W flame test method*

IEC 60947-4-1, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*

IEC 60947-4-2, *Low-voltage switchgear and controlgear – Part 4-2: Contactors and motor-starters – Semiconductor motor controllers, starters and soft-starters*

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-1:2010/AMD1:2016

IEC 61010-2-030, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for equipment having testing or measuring circuits*

IEC 61810-1:2015, *Electromechanical elementary relays – Part 1: General and safety requirements*

3 Terms and definitions

IEC 61010-1:2010, Clause 3 applies, except as follows:

3.1.3
PORTABLE EQUIPMENT

Modification:

Replace the definition with the following:

equipment intended to be carried by hand and not fixed during NORMAL USE

3.2.3
PROTECTIVE CONDUCTOR TERMINAL

Modification:

Replace the term "PROTECTIVE CONDUCTOR TERMINAL" *with* "PROTECTIVE EARTH TERMINAL" *and add the following Note to entry:*

Note 1 to entry: PROTECTIVE EARTH TERMINAL is most familiar to industrial users, manufacturers, etc. Therefore since this document is targeted towards industrial use, the most familiar term is utilized.

3.2.4
ENCLOSURE

Replacement:

Replace the definition and NOTE with the following:

housing affording the type and degree of protection suitable for the intended application

[SOURCE: IEC 60050-151:2001, 151-13-08]

Add the following new terms and definitions:

3.101
AMBIENT TEMPERATURE
temperature, determined under specified conditions, of the air surrounding the equipment

3.102
ENCLOSED EQUIPMENT
equipment which includes an ENCLOSURE, having safety capability, or a combination of an ENCLOSURE, having safety capability, and installation provisions enclosing on all sides, with the possible exception of its mounting surface, to prevent personnel from accidentally touching HAZARDOUS LIVE, hot or moving parts contained therein and meeting requirements of mechanical strength, flammability, and stability (where applicable)

EXAMPLE HAND-HELD EQUIPMENT.

Note 1 to entry: This definition is related to IEC 60050-441:1984, 441-12-02.

3.103
FIELD WIRING
wiring of the control equipment, which is not installed in the control equipment manufacturer's facility

EXAMPLE MAINS supply wiring.

3.104
INTERFACE
shared boundary between one control equipment and another control equipment, or between parts of a control equipment, through which information or electrical energy is conveyed

[SOURCE: IEC 61131-2:2017, 3.1.21]

3.105
MODULAR EQUIPMENT
equipment consisting of different modules such as a Rack, CPU, different I/O-modules, network modules

Note 1 to entry: MODULAR EQUIPMENT can:

a) be OPEN EQUIPMENT or ENCLOSED EQUIPMENT;

b) consist of modules that cannot operate alone or of a basic module that is operational alone and can be enhanced in function by additional modules;

c) vary in size and functionality depending on the combination and the number of modules;

d) be combined with operational equipment or enhanced in function by the addition of modules by the customer.

3.106
OPEN EQUIPMENT
equipment which does not protect personnel from accidentally touching HAZARDOUS LIVE or moving parts contained therein nor meet requirements of mechanical strength, flammability and stability (where applicable)

Note 1 to entry: See Annex AA.

3.107
PANEL MOUNTED EQUIPMENT
equipment where a portion of the equipment may form part of the ENCLOSURE

Note 1 to entry: See Figure 103.

3.108
PORT
access to a device or network where electromagnetic energy or signals may be supplied or received or where the device or network variables may be observed or measured

Note 1 to entry: PORT is most commonly used with respect to EMC.

3.109
PROTECTIVE EXTRA-LOW VOLTAGE CIRCUIT
PELV CIRCUIT
protective earth referenced electrical circuit in which the voltage cannot exceed the following:

NORMAL CONDITION and SINGLE FAULT CONDITION: The a.c. voltage levels are 30 V RMS, 42,4 V peak and the d.c. voltage level is 60 V. For equipment intended for use in WET LOCATIONS, the a.c. voltage levels are 16 V RMS, 22,6 V peak and the d.c. voltage level is 35 V

Note 1 to entry: Transients are not taken into consideration in PELV CIRCUITS.

[SOURCE: IEC 60050-195:2021, 195-06-29, modified – In the preferred term, "system" has been replaced with "circuit", a full description and clarifications have been added and the Note to entry has been replaced with a new Note to entry.]

3.110
SAFETY EXTRA-LOW VOLTAGE CIRCUIT
SELV CIRCUIT
non-protective earth referenced electrical circuit in which the voltage cannot exceed the following:

NORMAL CONDITION and SINGLE FAULT CONDITION: The a.c. voltage levels are 30 V RMS, 42,4 V peak and the d.c. voltage level is 60 V. For equipment intended for use in WET LOCATIONS, the a.c. voltage levels are 16 V RMS, 22,6 V peak and the d.c. voltage level is 35 V

Note 1 to entry: Transients are not taken into consideration in SELV CIRCUITS.