

INTERNATIONAL STANDARD



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

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CONTENTS

FOREWORD.....	5
INTRODUCTION.....	8
1 Scope and object.....	9
2 Normative references	11
3 Terms and definitions	12
4 Tests	14
5 Marking and documentation.....	16
6 Protection against electric shock	17
7 Protection against mechanical HAZARDS.....	33
8 Resistance to mechanical stresses	34
9 Protection against the spread of fire	36
10 Equipment temperature limits and resistance to heat.....	37
11 Protection against HAZARDS from fluids	45
12 Protection against radiation, including laser sources, and against sonic and ultrasonic pressure	45
13 Protection against liberated gases and substances, explosion and implosion	46
14 Components and subassemblies	46
15 Protection by interlocks	47
16 HAZARDS resulting from application	47
17 RISK assessment.....	47
Annexes	49
Annex E (informative) Guideline for reduction of POLLUTION DEGREES	50
Annex F (normative) ROUTINE TESTS	52
Annex L (informative) Index of defined terms	54
Annex AA (informative) General approach to safety for control equipment	55
Annex BB (informative) System drawing of isolation boundaries	58
Annex CC (informative) Historical techniques for secondary circuits	69
Annex DD (informative) Cross references between IEC 61010-2-201 and IEC 61010-1:2010 or IEC 61131-2:2007
Annex DD (normative) Flammability test for magnesium alloy fire ENCLOSURES or flame barriers (see 9.3.2).....	74
Annex EE (informative) Information/documentation and correlation to its uses	75
Annex FF (informative) Measurement of CLEARANCES and CREEPAGE DISTANCES.....	77
Bibliography.....	79
Figure 101 – Typical interface/port diagram of control equipment.....	19
Figure 102 – Requirements for insulation between separate circuits and between circuits and ACCESSIBLE conductive parts	25
Figure 103 – Mechanical HAZARDS requirements for , with regard to PANEL MOUNTED EQUIPMENT	34
Figure 104 – Safety enclosure with HMI installed through a wall Spread of fire HAZARDS, with regard to PANEL MOUNTED EQUIPMENT.....	37
Figure 105 – General temperature test environment	40

Figure 105 – Panel mounted HMI device extending through the wall of a cabinet	
Figure 106 – Vented equipment	41
Figure 107 – Non-vented equipment	42
Figure 108 – Panel mounted device extending through the wall of a cabinet	43
Figure AA.1 – Control equipment access and safety concerns	55
Figure BB.1 – Typical system ENCLOSURE layout	59
Figure BB.2 – Simplified system schematic	60
Figure BB.3 – HAZARD situation of the control equipment	61
Figure BB.4 – Application of the standard to the control equipment safety drawing	62
Figure BB.5 – Application of 6.7.1.5 items a) and b) to the control equipment safety drawing	62
Figure BB.6 – Application of 6.7.1.5 items a), b), c) and d) to the control equipment safety drawing	63
Figure BB.7 – REINFORCED INSULATION	64
Figure BB.8 – BASIC INSULATION	65
Figure BB.9 – REINFORCED INSULATION, BASIC INSULATION and limiting PROTECTIVE IMPEDANCE	66
Figure BB.10 – REINFORCED INSULATION from external power supplies	67
Figure BB.11 – BASIC INSULATION from external power supplies	68
Figure EE.1 – Information/documentation for component products	75
Figure EE.2 – Information/documentation accumulation and segregation tree for an example installation	76
Figure FF.1 – The path a component mounted to a PWB (side view)	78
Figure FF.2 – The path a component mounted to a PWB (side view)	78
<u>IEC 61010-2-201:2017</u>	
Table 101 – Overload test circuit values	13
Table 102 – Endurance test circuit values	14
Table 103 – OPERATOR accessibility ACCESSIBLE ports for open and ENCLOSED EQUIPMENT	18
Table 4 – CLEARANCE and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V	25
Table 5 – Test voltages for solid insulation between MAINS and between MAINS and secondary circuits OVERVOLTAGE CATEGORY II up to 300 V ^d	26
Table 6 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V	27
Table 104 – Minimum CREEPAGE _s and CLEARANCE _s in air of OVERVOLTAGE CATEGORY II up to 1 000 V at FIELD-WIRING TERMINALS ^{d,e}	28
Table 105 – Drop tests	
Table 19 – Surface temperature limits, under NORMAL CONDITION _s	34
Table E.1 – Environmental situations	44
Table E.2 – Reduction of POLLUTION DEGREES (PD)	45
Table CC.1 – Limits of output current and output power for inherently limited power sources	64
Table CC.2 – Limits of output current, output power and RATINGS for over-current protective devices for non-inherently limited power sources	65
Table DD.1 – Cross references between IEC 61010-2-201 and IEC 61010-1 or IEC 61131-2	

Table FF.1 – Dimensions of X 69

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-201: Particular requirements for control equipment

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

The text of this standard is based on the following documents:

FDIS	Report on voting
65/652/FDIS	65/657/RVD

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

This second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

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

- a) clarify, change, delete definitions which were causing confusion,
- b) change and clarify the temperature testing methodology,
- c) change documentation methodologies allowed,
- d) change some TERMINAL markings,
- e) add clarity to some of the informative annexes,
- f) add Annex E with changes,
- g) add Annexes AA – FF.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This Part 2-201 is intended to be used in conjunction with IEC 61010-1. It was established on the basis of the third edition (2010) of that standard. Consideration may be given to future editions of, or amendments to, IEC 61010-1.

This Part 2-201 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 Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. Where this part states “addition”, “modification”, “replacement”, or “deletion”, the relevant requirement, test specification or NOTE in Part 1 should be adapted accordingly.

In this standard, 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 standard which have been defined in Clause 3: SMALL ROMAN CAPITALS.

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.

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

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INTRODUCTION

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

This part 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 part of **IEC 61010**.

~~This part incorporates the safety related requirements of Programmable Controllers.~~

~~Annex DD provides a cross reference between clauses of this standard and those of IEC 61010-1 or IEC 61131-2:2007.~~

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

Part 2-201: Particular requirements for control equipment

1 Scope and object

This clause of Part 1 is applicable, except as follows.

1.1.1 Equipment included in scope

Replacement:

- This part of IEC 61010 specifies safety requirements and related verification tests for **any product performing the function of control equipment** ~~of the following types which and/or their associated peripherals.~~ In addition, these products have as their intended use the command and control of machines, automated manufacturing and industrial processes, e.g. discrete and continuous control. **Some equipment examples are: programmable logic controller (PLC);**
- programmable **automation** controller (~~PLC and~~ **PAC**);
- ~~the components of~~ distributed control systems (DCS);
- ~~the components of~~ remote I/O ~~systems;~~
- 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 and/or their associated peripherals;~~
- **positioners.**

Components of the above named equipment and in the scope of this standard are:

- (auxiliary) stand-alone power supplies;
- peripherals such as digital and analogue I/O, remote-I/O;
- industrial network equipment.

Control equipment and their associated peripherals are intended to be used in an industrial environment and may be provided 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 as example: insulation, spacings and power restrictions.

NOTE 2 Computing devices and similar equipment within the scope of IEC 60950 (planned to be replaced by IEC 62368) and conforming to its requirements are considered to be suitable for use with control equipment within the scope of this standard. However, some of the requirements of IEC 60950 for resistance to moisture and liquids are less stringent than those in IEC 61010-1:2010, 5.4.4 second paragraph.

Control equipment covered in this standard is intended for use in **OVERVOLTAGE CATEGORY II, III and IV** (IEC 60664-1) in low-voltage installations, where the **RATED** equipment supply voltage does not exceed AC. 1 000 V r.m.s. (50/60 Hz), or DC ~~1 500~~ **1 000** V.

~~NOTE 3—If equipment in the scope of this part is applied to overvoltage category III and IV installations, then the requirements of Annex K of Part 1 apply.~~

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:

This standard does not deal with aspects of the overall automated system, e.g. a complete assembly line. Control equipment (e.g. DCS and PLC), their application program 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 standard. Refer to IEC 60364 series of standards or applicable national/local regulations for electrical installation and guidelines.

1.2.1 Aspects included in scope

Replacement:

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

NOTE 1 By using the terms "OPERATOR" and "SERVICE PERSONNEL" this standard considers the perception of HAZARDS depending on training and skills. Annex AA gives a general approach in this regard.

Requirements for protection against particular types of HAZARD are given in Clauses 6 to 17, as follows:

- a) electric shock or burn (see Clause 6);
- b) mechanical HAZARDS (see Clauses 7 and 8);
- c) spread of fire from the control equipment (see Clause 9);
- d) excessive temperature (see Clause 10);
- e) effects of fluids and fluid pressure (see Clause 11);
- f) effects of radiation, including lasers sources, and sonic and ultrasonic pressure (see Clause 12);
- g) liberated gases, explosion and implosion (see Clause 13);

~~Requirements for protection against hazards~~

- h) arising from REASONABLY FORESEEABLE MISUSE and ergonomic factors ~~are specified in~~ (see Clause 16);
- i) RISK assessment for HAZARDS or environments not fully covered above ~~is specified in~~ (see Clause 17).

NOTE 2 Attention is drawn to the existence of additional requirements regarding the health and safety of labour forces.

1.2.2 Aspects excluded from scope

Replacement:

This standard 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. IEC 61326 or IEC 61131-2);

- d) protective measures for explosive atmospheres (see e.g. IEC 60079 series);
- e) functional safety (see e.g. IEC 61508, IEC 61131-6).

2 Normative references

This clause of Part 1 is applicable, except as follows.

Addition:

~~IEC 60068-2-31:2008, Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens~~

IEC 60384-14:~~2005~~, Fixed capacitors for use in electronic equipment – Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains

IEC 60664-1:~~2007~~, Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests

IEC 60695-2-11:~~2000~~, 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 60947-5-1:~~2003~~, Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices

~~IEC 60947-7-1:2009, Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors~~

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

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

IEC 61051-2:~~1994~~, Varistors for use in electronic equipment – Part 2: Sectional specification for surge suppression varistors

IEC 61643-21, Low voltage surge protective devices – Part 21: Surge protective devices connected to telecommunications and signalling networks – Performance requirements and testing methods

IEC 61643-311, Components for low-voltage surge protective devices – Part 311: Performance requirements and test circuits for gas discharge tubes (GDT)

IEC 61643-321, Components for low-voltage surge protective devices – Part 321: Specifications for avalanche breakdown diode (ABD)

IEC 61643-331, Components for low-voltage surge protective devices – Part 331: Specification for metal oxide varistors (MOV)

3 Terms and definitions

This clause of Part 1 is applicable, except as follows.

3.2.3

PROTECTIVE CONDUCTOR TERMINAL

Modification:

In this part “PROTECTIVE CONDUCTOR TERMINAL” is replaced by “PROTECTIVE EARTH TERMINAL”.

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

3.5.11

OPERATOR

Addition:

Note 1 to entry: See definition in Part 1 and Annex AA.

Add the following terms and definitions:

3.101

AMBIENT TEMPERATURE

temperature, determined under prescribed conditions, of the air surrounding the equipment

3.102

ENCLOSED EQUIPMENT

equipment which includes an ENCLOSURE, having safety capability, or 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)

Note 1 to entry: Examples are portable and HAND-HELD EQUIPMENT.

Note 2 to entry: This definition is related to IEC 60050-441:1990 2000, 441-12-02.

3.103

ENCLOSURE

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

Note 1 to entry: An ENCLOSURE, in general, may or may not have any safety capabilities, which depend on its application ~~purpose~~ and construction.

Note 2 to entry: In this standard an ENCLOSURE is assumed to have safety capability, unless specifically stated otherwise.

[SOURCE: IEC 60050-195:1998, 195-02-35, modified – the notes to entry have been added]

3.104

EXTERNAL CIRCUIT

circuit connected by FIELD WIRING of the control equipment

3.105

FIELD WIRING

wiring of the control equipment, which is not installed ~~by the user~~ in the control equipment manufacturer's facility

Note 1 to entry: Examples of FIELD WIRING are power supply, digital and analogue input and output wiring.