IEC 61010-2-201

Edition 3.0 2024-10
EXTENDED VERSION

INTERNATIONAL STANDARD

colour inside

This full version of IEC 61010-2-201:2024 includes the content of the references made to IEC 61010-1:2010+AMD1:2016 CSV

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 17.020, 19.020, 25.040.40

ISBN 978-2-8322-9966-1

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TC 66/Publication 61010-1 (2010), Third edition/I-SH 01

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

Part 1: General requirements

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

The text of this interpretation sheet is based on the following documents:

ISH	Report on voting
66/497A/ISH	66/505/RVD

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

———————

IEC 61010-1:2010 contains a requirement in 6.8.3.1 pertaining to voltage testers for type tests as follows:

“The generator shall be able to supply a power of at least 500 VA.”

This has given rise to the following questions:

How does one interpret the requirement for voltage testers in 6.8.3.1 of IEC 61010-1:2010? Specifically, this subclause requires that “The generator shall be able to supply a power of at least 500 VA.” Does this requirement apply throughout the rated output range of the voltage tester? What is meant by the word “generator”? Is the “generator” the power supply within the voltage tester, or the voltage tester output, or something else?

Interpretation:

“A voltage tester used for type tests must be able to deliver at least 500 VA at its full-rated output voltage. It does not necessarily need to deliver 500 VA if set for lower voltages.

For example, a voltage tester that can deliver 100 mA at any test output voltage up to 5 000 V (and a current corresponding to 500 VA above 5 000 V) would meet the requirement.

The requirements for voltage testers used for routine (production line) tests are included in Annex F. The requirements of 6.8.3.1 do not apply to these voltage testers.”

February 2013 **ICS 19.080, 71.040.10**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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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This extended version (EXV) of the official IEC Standard provides the user with the full content of the Standard.

IEC 61010-2-201:2024 EXV includes the content of IEC 61010-2-201:2024, and the references made to IEC 61010-1:2010+AMD1:2016 CSV.

The specific content of IEC 61010-2-201:2024 is displayed on a blue background.

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 to IEC 61010-1:2010

This Interational Standard specifies the safety requirements that are generally applicable to all equipment within its scope. For certain types of equipment, these requirements will be supplemented or modified by the special requirements of one, or more than one, particular part 2 of the standard which must be read in conjunction with the part 1 requirements.

INTRODUCTION IEC 61010-2-201:2024

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

1.1 Scope

1.1.1 Equipment included in scope

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

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.

1.1.3 Computing equipment

This standard applies only to computers, processors, etc. which form part of equipment within the scope of this standard or are designed for use exclusively with the equipment.

NOTE Computing devices and similar equipment within the scope of IEC 60950 and conforming to its requirements are considered to be suitable for use with 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 this standard (see 5.4.4 second paragraph)).

1.2 Object

1.2.1 Aspects included in scope

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.

Requirements for protection against particular types of HAZARD are given in Clauses 6 to 13, as follows:

a) electric shock or burn (see Clause 6);
b) mechanical HAZARDS (see Clauses 7 and 8);
c) spread of fire from the 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 arising from REASONABLY FORESEEABLE MISUSE and ergonomic factors are specified in Clause 16.

RISK assessment for HAZARDS or environments not fully covered above is specified in Clause 17.

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

1.2.2 Aspects excluded from scope

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).

1.3 Verification

This standard also specifies methods of verifying that the equipment meets the requirements of this standard, through inspection, TYPE TESTS, ROUTINE TESTS, and RISK assessment.

1.4 Environmental conditions

1.4.1 Normal environmental conditions

This standard applies to equipment designed to be safe at least under the following conditions:

a) indoor use;

b) altitude up to 2 000 m;

c) temperature 5 °C to 40 °C;

d) maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;

e) MAINS supply voltage fluctuations up to ±10 % of the nominal voltage;

f) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY II;

NOTE 1 These levels of transient overvoltage are typical for equipment supplied from the building wiring.

g) TEMPORARY OVERVOLTAGES occurring on the MAINS supply.

h) applicable POLLUTION DEGREE of the intended environment (POLLUTION DEGREE 2 in most cases).

NOTE 2 Manufacturers may specify more restricted environmental conditions for operation; nevertheless the equipment must be safe within these normal environmental conditions.

1.4.2 Extended environmental conditions

This standard applies to equipment designed to be safe not only in the environmental conditions specified in 1.4.1, but also in any of the following conditions as RATED by the manufacturer of the equipment:

a) outdoor use;

b) altitude above 2 000 m;

c) ambient temperatures below 5 °C or above 40 °C;

d) relative humidity above the levels specified in 1.4.1;

e) MAINS supply voltage fluctuations exceeding ±10 % of the nominal voltage;

f) WET LOCATION;

g) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY III or IV (see Annex K).

2 Normative references

The following referenced documents, where applicable, 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 60027 (all parts), *Letter symbols to be used in electrical technology*

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

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60073, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60309 (all parts), *Plugs, socket-outlets and couplers for industrial purposes*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60332-2-2, *Tests on electric and optical fibre cables under fire conditions – Part 2-2: Test for vertical flame propagation for a single small insulated wire or cable – Procedure for diffustion flame*

IEC 60335-2-24, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers.*

IEC 60335-2-89, *Household and similar electrical appliances – Safety – Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor*

IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*
IEC 60364-4-44:2007/AMD1:2015

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 60417, *Graphical symbols for use on equipment*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

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 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

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

IEC 60799, *Electrical accessories – Cord sets and interconnection cord sets*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

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 61010-031, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test*

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 61180 (all parts), *High-voltage test techniques for low-voltage equipment*

IEC 61180-1, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedure requirements*

IEC 61180-2, *High-voltage test techniques for low-voltage equipment – Part 2: Test equipment*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

IEC 61672-2, *Electroacoustics – Sound level meters – Part 2: Pattern evaluation tests*

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

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external impacts (IK code)*

IEC 62471, *Photobiological safety of lamps and lamp systems*

IEC TR 62471-2*, Photobiological safety of lamps and lamp systems – Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety*

IEC 62598, *Nuclear instrumentation – Constructional requirements and classification of radiometric gauges*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

ISO 306:2013, *Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST)*

ISO 361, *Basic ionizing radiation symbol*

ISO 3746, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane*

ISO 7000, *Graphical symbols for use on equipment*

ISO 9614-1, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points*

ISO 13857, *Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs*

EN 378-2, *Refrigerating systems and heat pumps – Safety and environmental requirements. Design, construction, testing, marking and documentation*

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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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-201: Particular requirements for control equipment

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

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*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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EXIGENCES DE SÉCURITÉ POUR APPAREILS ÉLECTRIQUES DE MESURAGE, DE RÉGULATION ET DE LABORATOIRE –

Partie 2-201: Exigences particulières pour les équipements de commande

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L'IEC 61010-2-201 a été établie par le comité d'études 65 de l'IEC: Mesure, commande et automation dans les processus industriels. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2017. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) 1.1.1: clarification concernant les équipements inclus dans le domaine d'application;
b) 4.3.2.101: suppression du module à fibre optique;
c) 5.4.3: clarification de l'installation de l'équipement;
d) 6.7.1.1: révision de la figure représentant l'isolation entre des circuits séparés;
e) 6.7.101: suppression du paragraphe concernant l'isolation des BORNES A CABLER SUR PLACE de CATEGORIE DE SURTENSION II avec une tension nominale maximale de 1 000 V;
f) 6.7.1.101: ajout d'un nouveau paragraphe concernant l'isolation des CIRCUITS TBTS/TBTP;
g) 6.8.3: ajout d'une spécification pour le contrôleur de tension;
h) 6.9.3: ajout d'une exception supplémentaire pour le codage des couleurs;
i) 6.9.101: ajout d'un nouveau paragraphe concernant le câblage des circuits secondaires, par exemple TBTS/TBTP;
j) 8.2.2.101: ajout d'exigences supplémentaires pour les écrans en verre;
k) 8.3: suppression du paragraphe concernant l'essai de chute;
l) 9.3.2: ajout d'exigences supplémentaires pour les matériaux des connecteurs et les matériaux isolants;
m) clarification des exigences particulières relatives aux matériaux non métalliques;
n) Article 11: suppression des exigences particulières concernant la protection contre les DANGERS des fluides et des corps solides étrangers;
o) 12.4: ajout d'un paragraphe supplémentaire concernant le rayonnement hyperfréquence;
p) 14.102: clarification concernant la description des appareils de commutation.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
65/1049/FDIS	65/1095/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

La version française de la norme n’a pas été soumise au vote.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Une liste de toutes les parties de la série IEC 61010, publiées sous le titre général *Exigences de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire*, se trouve sur le site web de l'IEC.

Le présent document doit être utilisé conjointement avec l'IEC 61010-1:2010 et l'IEC 61010-1:2010/AMD1:2016.

Le présent document complète ou modifie les articles correspondants de l'IEC 61010-1, de façon à transformer cette publication en norme IEC: *Exigences particulières pour les équipements de commande.*

Lorsqu'un paragraphe particulier de l'IEC 61010-1 n'est pas mentionné dans le présent document, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque le présent document mentionne "addition", "modification", "remplacement" ou "suppression", il convient d'adapter l'exigence, la spécification d'essai ou la note correspondante de l'IEC 61010-1 en conséquence.

Dans le présent document,

a) les caractères d'imprimerie suivants sont utilisés:
   - exigences et définitions: caractères romains;
   - NOTES: petits caractères romains;
   - *conformité et essais: caractères italiques*;
   - termes utilisés dans l'ensemble du présent document qui ont été définis à l'Article 3: PETITES MAJUSCULES EN CARACTERES ROMAINS.

b) les paragraphes, figures, tableaux et notes qui s'ajoutent à ceux de l'IEC 61010-1 sont numérotés à partir de 101. Les annexes qui sont ajoutées sont désignées AA et les éléments de liste supplémentaires sont désignés aa).

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

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INTRODUCTION

Les documents IEC 61010-2-2xx composent une série de normes relatives à la sécurité des appareils de mesure, de régulation et d'automatisation des processus industriels.

Le présent document spécifie l'ensemble des exigences et essais de sécurité relatifs aux équipements de commande (par exemple, automates programmables [PLC]), aux composants des systèmes à commande répartie (DCS), aux appareils d'E/S et à l'interface homme/machine (IHM).

Les termes de sécurité génériques sont définis dans l'IEC 61010-1. Les termes plus spécifiques sont définis dans chaque partie pertinente de la série IEC 61010.

EXIGENCES DE SÉCURITÉ POUR APPAREILS ÉLECTRIQUES DE MESURAGE, DE RÉGULATION ET DE LABORATOIRE –

Partie 2-201: Exigences particulières pour les équipements de commande

1 Domaine d'application et objet

L'Article 1 de l'IEC 61010-1:2010 et l'Article 1 de l'IEC 61010-1:2010/AMD1:2016 s'appliquent, avec les exceptions suivantes:

1.1.1 Appareils inclus dans le domaine d'application

Remplacement:

Remplacer le texte existant par ce qui suit:

La présente partie de l'IEC 61010 spécifie les exigences de sécurité et les essais de vérification associés pour les équipements de commande ou leurs périphériques associés, ou les deux.

Les équipements suivants en sont des exemples:

- les automates programmables (PLC, *Programmable Logic Controller*);
- les contrôleurs d'automatisation programmables (PAC, *Programmable Automation Controller*);
- les systèmes à commande répartie (DCS, *Distributed Control Systems*);
- les ordinateurs (PC) industriels et combinés PC-écran;
- les outils de programmation et de débogage (PADT, *Programming and Debugging Tools*);
- les affichages et les interfaces homme/machine (IHM);
- tout produit remplissant la fonction d'équipement de commande ou ses périphériques associés, ou les deux;
- les positionneurs; et
- les équipements de commande dont l'utilisation prévue consiste à contrôler et commander les machines, les processus industriels et de fabrication automatisés, par exemple par le biais d'un contrôle discret et continu.

Les composants des équipements susmentionnés et inclus dans le domaine d'application du présent document sont, par exemple:

- les alimentations autonomes (auxiliaires);
- les périphériques tels que les E/S numériques et analogiques;
- les E/S à distance;
- les équipements de réseau industriels, intégrés ou autonomes (par exemple, commutateurs, routeurs, stations de base sans fil).

Les équipements de commande et leurs périphériques associés sont conçus pour être utilisés dans un environnement industriel. Le présent document concerne les équipements conçus comme des EQUIPEMENTS OUVERTS ou des EQUIPEMENTS SOUS ENVELOPPE.

NOTE 1 Les équipements de commande également conçus pour être utilisés dans d'autres environnements ou à d'autres fins (par exemple, au sein de bâtiments pour commander l'éclairage ou d'autres installations électriques ou à bord de voitures, trains ou bateaux) peuvent faire l'objet d'exigences de conformité supplémentaires définies par la ou les normes de sécurité applicables à ces applications. Ces exigences peuvent concerner, par exemple, l'isolation, les espacements et les restrictions de puissance.

NOTE 2 Les calculateurs et équipements analogues inclus dans le domaine d'application de la série IEC 60950 ou de la série IEC 62368 et conformes à leurs exigences sont réputés être adaptés à une utilisation avec les équipements de commande inclus dans le domaine d'application du présent document. Cependant, certaines des exigences de la série IEC 60950 relative à la tenue à l'humidité et aux liquides sont moins strictes, le deuxième alinéa du 5.4.4 de l'IEC 61010-1:2010 tient compte de cet aspect.

Les équipements de commande couverts par le présent document sont généralement destinés à être utilisés dans des installations à basse tension de CATEGORIE DE SURTENSION II (IEC 60664-1), où la tension d'alimentation ASSIGNEE des équipements ne dépasse pas 1 000 V (valeur efficace) en courant alternatif (50/60 Hz) ou 1 000 V en courant continu.

Pour les équipements de commande destinés à être installés pour alimenter des systèmes de CATEGORIE DE SURTENSION III ou IV, des exigences supplémentaires sont indiquées à l'Annexe K.

Les exigences du Guide ISO/IEC 51 et du Guide IEC 104, en rapport avec la présente partie de l'IEC 61010, sont intégrées au présent document.

1.1.2 Appareils exclus du domaine d'application

Remplacement:

Remplacer le texte existant par ce qui suit:

Le présent document ne traite pas des aspects du système automatisé global, par exemple une chaîne de montage complète. Les équipements de commande (par exemple, DCS et PLC), leurs programmes d'application et leurs périphériques associés sont considérés comme des composants (les composants dans ce contexte sont des éléments qui n'accomplissent aucune fonction utile) d'un système automatisé global.

Étant donné que les équipements de commande (par exemple, DCS et PLC) sont des appareils de type composants, les considérations relatives à la sécurité du système automatisé global qui portent sur l'installation et l'application ne relèvent pas du domaine d'application du présent document. Se reporter à la série IEC 60364 ou aux réglementations nationales et locales applicables pour l'installation électrique et les lignes directrices.

1.2.1 Aspects inclus dans le domaine d'application

Remplacer la première phrase par ce qui suit:

L'objet des exigences du présent document est de s'assurer que tous les DANGERS pour l'OPERATEUR, le PERSONNEL D'ENTRETIEN et la zone environnante sont réduits à un niveau acceptable.

NOTE En utilisant les termes "OPERATEUR" et "PERSONNEL D'ENTRETIEN", le présent document prend en compte la perception des DANGERS en fonction de la formation et des compétences. Le Annexe AA fournit une approche générale à cet égard.

1.2.2 Aspects exclus du domaine d'application

Remplacement:

Remplacer le texte existant par ce qui suit:

Le présent document ne couvre pas:

a) la fiabilité, les fonctionnalités, les performances, ni les autres propriétés de l'équipement de commande qui ne sont pas liées à la sécurité;
b) les exigences mécaniques ou climatiques relatives à l'exploitation, au transport ou à l'entreposage;
c) les exigences relatives à la CEM (par exemple, la série IEC 61326 ou l'IEC 61131-2);
d) les mesures de protection relatives aux atmosphères explosives (par exemple, la série IEC 60079);
e) la sécurité fonctionnelle (par exemple, la série IEC 61508 ou l'IEC 61131-6).

2 Références normatives

L'Article 2 de l'IEC 61010-1:2010 et l'Article 2 de l'IEC 61010-1:2010/AMD1:2016 s'appliquent, avec les exceptions suivantes:

Addition:

Ajouter les nouvelles références suivantes:

IEC 60384-14, *Condensateurs fixes utilisés dans les équipements électroniques – Partie 14: Spécification intermédiaire – Condensateurs fixes pour la suppression des interférences électromagnétiques et la connexion au réseau d'alimentation*

IEC 60695-2-11, *Essais relatifs aux risques du feu – Partie 2-11: Essais au fil incandescent/chauffant – Méthode d'essai d'inflammabilité pour produits finis (GWEPT)*

IEC 60695-11-3, *Essais relatifs aux risques du feu – Partie 11-3: Flammes d'essai – Flamme de 500 W – Appareillage et méthodes d'essai de vérification*

IEC 60695-11-20, *Essais relatifs aux risques du feu – Partie 11-20: Flammes d'essai – Méthode d'essai à la flamme de 500 W*

IEC 60947-4-1, *Appareillage à basse tension – Partie 4-1: Contacteurs et démarreurs de moteurs – Contacteurs et démarreurs électromécaniques*

IEC 60947-4-2, *Appareillage à basse tension – Partie 4-2: Contacteurs et démarreurs de moteurs – Gradateurs, démarreurs et démarreurs progressifs à semiconducteurs de moteurs*

IEC 60947-5-1:2016, *Appareillage à basse tension – Partie 5-1: Appareils et éléments de commutation pour circuits de commande – Appareils électromécaniques pour circuits de commande*

IEC 61010-1:2010, *Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire – Partie 1: Exigences générales*
IEC 61010-1:2010/AMD1:2016

IEC 61010-2-030, *Exigences de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire – Partie 2-030: Exigences particulières pour les appareils équipés de circuits d'essai ou de mesure*

IEC 61810-1:2015, *Relais électromécaniques élémentaires – Partie 1: Exigences générales et de sécurité*