

TECHNICAL REPORT

IEC TR 61010-3

Second edition
2003-04

Safety requirements for electrical equipment for measurement, control, and laboratory use –

Part 3: Protocol for the preparation of conformity verification reports for the IEC 61010 2nd edition series

*Règles de sécurité pour appareils électriques
de mesurage, de régulation et de laboratoire –*

*Partie 3:
Protocole pour l'élaboration des rapports
de vérification de la conformité de la série
de publications 61010 de deuxième édition*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT
FOR MEASUREMENT, CONTROL, AND LABORATORY USE –****Part 3: Protocol for the preparation of conformity verification
reports for the IEC 61010 2nd edition series**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 61010-3, which is a technical report, has been prepared by technical committee 66: Safety of measuring, control, and laboratory equipment.

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

Enquiry draft	Report on voting
66/275/DTR	66/302/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.

This report is a Technical Report and is of a purely informative nature and is therefore by itself not to be regarded as an International Standard.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

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- withdrawn;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

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

Part 3: Protocol for the preparation of conformity verification reports for the IEC 61010 2nd edition series

1 Scope

This part of IEC 61010 is a technical report, which provides a test protocol to assist with determining and recording verification of conformity of the equipment under test with the reference documents identified on the front cover of the appropriate report.

2 General

Conformity verification reports (CVRs) should only be used with the appropriate standards.

Individual report layouts reflecting the referenced documents are presented for each part of the IEC 61010 series in the form of a check list, together with the forms (where required) for reflecting the results of tests. Key words or phrases of the appropriate standard(s) are mainly used, but in order to understand the full details of the requirements to be met when using a CVR, it is essential that test personnel refer to the appropriate standard(s). Where any doubts arise, the requirements of standards take preference over the text of CVRs.

The part 2 standards indicate in their forewords which amendments (if any) are applicable to IEC 61010-1: 2001 2nd edition.

Care should be taken to ensure that any potentially destructive testing is performed last in the sequence of testing, as determined by the tester.

Clauses or subclauses which are not applicable need not be included in the prepared report, provided that these omissions are indicated in the contents list of the report. An example of a contents list based on IEC 61010-1: 2001 is given in Annex A for a report on a specific product.

3 Applicability of conformity verification reports

3.1 CVR for IEC 61010-1: 2001, 2nd edition

IEC 61010-3-1: 2003 for:

- a) IEC 61010-1: 2001
- or
- b) IEC 61010-1: 2001 + amendment 1: (in preparation)

3.2 CVRs for part 2 standards with cross-references to IEC 61010-1: 2001 - 2nd edition

- a) IEC 61010-3-010 for IEC 61010-2-010. (standard in preparation);
- b) IEC 61010-3-020 for IEC 61010-2-020. (standard in preparation);
- c) IEC 61010-3-051 for IEC 61010-2-051. (standard in preparation);
- d) IEC 61010-3-061 for IEC 61010-2-061. (standard in preparation);

- e) IEC 61010-3-081 for IEC 61010-2-081 (standard in preparation)
- f) IEC 61010-3-101 for IEC 61010-2-101 (standard in preparation)

3.3 CVRs for stand-alone standards in the IEC 61010 series

A stand-alone standard is one, which does not cross-refer to IEC 61010-1.

- a) IEC 61010-3-031 for IEC 61010-031: (standard in preparation)
- b) IEC 61010-3-040 for IEC 61010-040: (standard in preparation)

4 Documents

The documents a) to d), together with any others required by the standard, should be reviewed and listed in the report:

- a) general description of the equipment tested;
- b) OPERATOR instructions;
- c) installation instruction;
- d) service instructions.

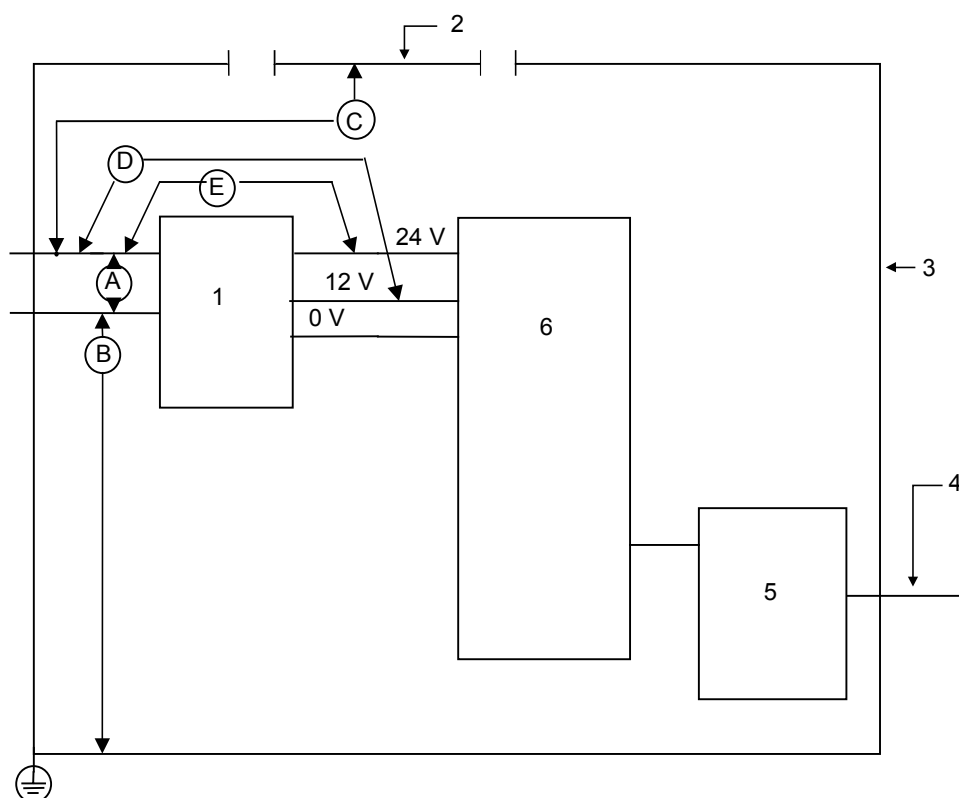
The documents e) to n), if applicable, should also be listed in the report:

- e) component data sheets and certification details;
- f) wire data sheets;
- g) flammability test results or data sheets;
- h) enclosure flammability test results and/or material data sheets;
- i) comparative tracking indices of printed wiring board materials;
- j) data sheets, test results or certification details for cathode-ray tubes;
- k) constructional drawings and specifications for transformers including winding and insulation details;
- l) test results for abnormal operation and fault conditions;
- m) layout of printed wiring boards with primary and secondary hazardous voltages showing all working voltages on the tracks;
- n) circuit diagrams, and assembly drawings of printed wiring boards.

5 Completion of the report

- a) If additional information is required for any part of the report, it should be included on a separate sheet.
- b) Clause 6 – *Protection against electric shock – Block diagram of a system.*

Where applicable, the table in Form A.5 should be completed and a block diagram included (where possible) to assist analysis of the product. See Figure 1 and Table 1 as examples of a block diagram and of a completed table. The letters A, B, etc., indicate points between which dielectric strength tests, or measurements of CREEPAGE DISTANCE or CLEARANCE, should be made.

**Key**

1 = Separation from mains

2 = Metal part not connected to protective earth

3 = ENCLOSURE connected to protective earth

4 = ACCESSIBLE TERMINALS

5 = ACCESSIBLE voltages below the limit of 6.3.1

6 = Internal voltages below the limits of 6.3.1

**Figure 1 – Example of a block diagram for Form A.5
based on circuits in IEC 61010-1:2001**

Location or description	Insulation type (note 1)	Maximum working voltage V	CREEPAGE DISTANCE				CLEARANCE mm	Test voltage (note 2) V	Comments (note 3)
			PWB mm	CTI	Other mm	CTI			
A	BI	230	1,5	100	3,0	100	1,5	1 900 d.c.	
B	BI	230	1,5	100	2,1	400	1,5	1 900 d.c.	
C	DI/RI	230	3,3	100	6,0	100	3,3	2 300 r.m.s.	
D	DI	230	3,3	100	6,0	100	3,3	2 300 r.m.s.	
E	DI	230	3,3	100	3,3	600	3,3	2 300 r.m.s.	

1 Types of insulation to be stated:

BI = BASIC INSULATION
RI = REINFORCED INSULATION

DI = DOUBLE INSULATION
SI = SUPPLEMENTARY INSULATION

PI = PROTECTIVE IMPEDANCE

2 Types of voltage:

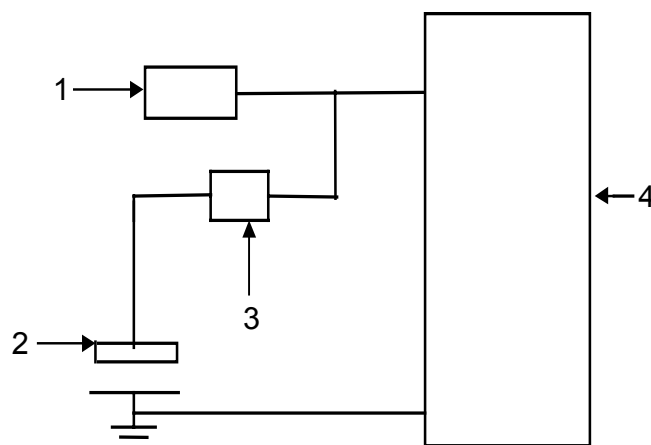
Peak impulse test voltage (pulse)
d.c.

r.m.s.

3 INSTALLATION (OVERVOLTAGE) CATEGORIES or POLLUTION DEGREES, which differ from these, should be shown under 'Comments'.

5.1 Batteries

Examples of block diagrams of battery load and charging circuits (see 13.2.2 and Form A.27)



Key

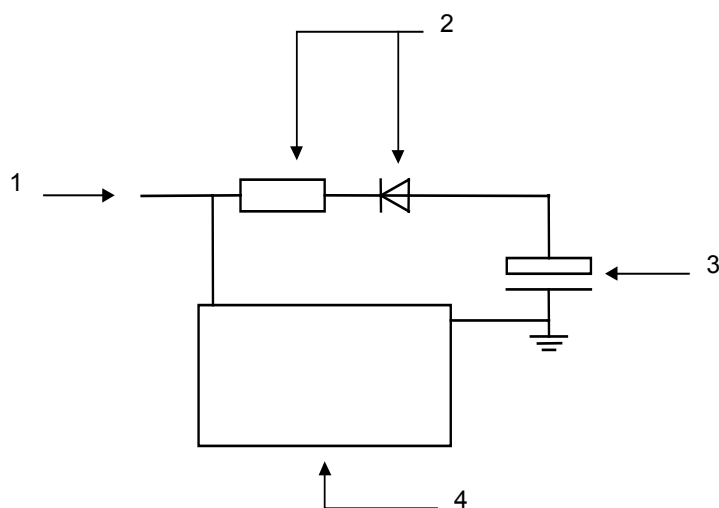
1 = From power supply: +5 V d.c.

3 = Fuse

2 = NiCd rechargeable battery. Charge and discharge current shall be limited to safe values

4 = Battery-powered RAM module

Figure 2 – Battery circuit using a rechargeable battery



Key

1 = From power supply: +5 V d.c.

3 = Lithium battery, not rechargeable

2 = Reverse-current protection devices

4 = Battery-powered RAM module

Figure 3 – Battery circuit with a battery that is not rechargeable

Annex A (Informative)

Example of a contents list based on IEC 61010-1: 2001 -2nd edition, for a report on a typical item of laboratory equipment.

NOTE Clauses and subclauses with a line through them are not applicable to the product concerned.

Summary of tests

- 4.4 Testing in SINGLE FAULT CONDITION
 - 4.4.2.1 PROTECTIVE IMPEDANCE
 - 4.4.2.2 Protective conductor
 - 4.4.2.3 Equipment or parts for short-term or intermittent operations
 - 4.4.2.4 Motors
 - 4.4.2.5 Capacitors
 - 4.4.2.6 MAINS transformers
 - 4.4.2.7 Outputs
 - 4.4.2.8 Equipment for more than one supply
 - 4.4.2.9 Cooling
 - 4.4.2.10 Heating devices
 - 4.4.2.11 Insulation between circuits and parts
 - 4.4.2.12 Interlocks
- 5 Marking and documentation
 - 5.1.1 General
 - 5.1.2 Identification
 - 5.1.3 Mains supply
 - 5.1.4 Fuses
 - 5.1.5 TERMINALS, connections and operating devices
 - 5.1.6 Switches and circuit-breakers
 - 5.1.7 Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION
 - 5.1.8 Field-wiring TERMINAL boxes
- 5.2 Warning markings
- 5.3 Durability of markings
- 5.4 Documentation
 - 5.4.1 General
 - 5.4.2 Equipment RATINGS
 - 5.4.3 Equipment installation
 - 5.4.4 Equipment operation
 - 5.4.5 Equipment maintenance
- 6 Protection against electric shock
 - 6.1 General
 - 6.1.1 Requirements
 - 6.1.2 Exceptions

- 6.2 Determination of ACCESSIBLE parts
 - 6.2.1 Examination
 - 6.2.2 Openings above parts that are HAZARDOUS LIVE
 - 6.2.3 Openings for pre-set controls
- 6.3 Permissible limits for ACCESSIBLE parts
 - 6.3.1 Values in NORMAL CONDITION
 - 6.2.3 Values in SINGLE FAULT CONDITION
- 6.4 Protection in NORMAL CONDITION
- 6.5 Protection in SINGLE FAULT CONDITION
 - 6.5.1 PROTECTIVE BONDING
 - 6.5.1.1 Integrity of protective bonding
 - 6.5.1.2 PROTECTIVE CONDUCTOR TERMINAL
 - 6.5.1.3 Impedance of PROTECTIVE BONDING of plug-connected equipment
 - ~~6.5.1.4 Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT~~
 - ~~6.5.1.5 Indirect bonding for test and measurement equipment~~
 - 6.5.2 DOUBLE INSULATION and REINFORCED INSULATION
 - ~~6.5.3 PROTECTIVE IMPEDANCE~~
 - ~~6.5.4 Automatic disconnection of the supply~~
- ~~6.6 Connection to external circuits~~
 - ~~6.6.1 General~~
 - ~~6.6.2 TERMINALS for external circuits~~
 - ~~6.6.3 Circuits with TERMINALS which are HAZARDOUS LIVE~~
 - ~~6.6.4 ACCESSIBLE TERMINALS for stranded conductors~~
- 6.7 CLEARANCES and CREEPAGE DISTANCES
- 6.8 Procedure for dielectric strength tests
 - 6.8.1 Reference test earth
 - 6.8.2 Humidity preconditioning
 - 6.8.3 Conduct of tests
 - 6.8.4 Voltage tests
- 6.9 Constructional requirements for protection against electric shock
 - 6.9.1 General
 - ~~6.9.2 ENCLOSURES of equipment with DOUBLE INSULATION or REINFORCED INSULATION~~
 - 6.9.3 Equipment using PROTECTIVE BONDING
 - ~~6.9.4 Over-range indication~~
- 6.10 Connection to MAINS supply source and connections between parts of equipment
 - 6.10.1 MAINS supply cords
 - ~~6.10.2 Fitting of non-detachable MAINS supply cords~~
 - 6.10.3 Plugs and connectors
- 6.11 Disconnection from supply source
 - ~~6.11.1 General~~
 - 6.11.1.1 Exceptions
 - 6.11.2 Requirements according to type of equipment
 - ~~6.11.2.1 PERMANENTLY CONNECTED EQUIPMENT and multi-phase equipment~~
 - 6.11.2.2 Single-phase cord-connected equipment
 - 6.11.2.3 Hazards arising from function
 - 6.11.3 Disconnecting devices
 - 6.11.3.1 Switches and circuit-breakers
 - 6.11.3.2 Appliance couplers and plugs
- 7 Protection against mechanical HAZARDS
 - 7.1 General
 - ~~7.2 Moving parts~~
 - 7.3 Stability

- 7.4 Provisions for lifting and carrying
- 7.5 Wall mounting
- ~~7.6 Expelled parts~~
- 8 Mechanical resistance to shock and impact
- 8.1 ENCLOSURE rigidity test
- 8.2 Drop test
- 8.2.1 Equipment other than HAND-HELD EQUIPMENT and direct plug-in equipment
- 8.2.2 HAND-HELD EQUIPMENT and direct plug-in equipment
- 9 Protection against the spread of fire
- 9.1 Eliminating or reducing the sources of ignition within the equipment
- 9.2 Containment of fire within the equipment, should it occur
- ~~9.2.1 Constructional requirements~~
- ~~9.3 Limited energy circuit~~
- ~~9.4 Requirements for equipment containing or using flammable liquids~~
- 9.5 Overcurrent protection
- ~~9.5.1 PERMANENTLY CONNECTED EQUIPMENT~~
- 9.5.2 Other equipment
- 10 Equipment temperature limits and resistance to heat
- 10.1 Surface temperature limits for protection against burns
- 10.2 Temperatures of windings
- 10.3 Other temperature measurements
- 10.4 Conduct of temperature tests
- 10.5 Resistance to heat
- 10.5.1 Integrity of CLEARANCES and CREEPAGE DISTANCES
- 10.5.2 Non-metallic ENCLOSURES
- 10.5.3 Insulating material
- 11 Protection against HAZARDS from fluids
- 11.1 General
- 11.2 Cleaning
- ~~11.3 Spillage~~
- ~~11.4 Overflow~~
- ~~11.5 Battery electrolyte~~
- ~~11.6 Specially protected equipment~~
- ~~11.7 Fluid pressure and leakage~~
- ~~11.7.1 Maximum pressure~~
- ~~11.7.2 Leakage and rupture at high pressure~~
- ~~11.7.3 Leakage from low pressure parts~~
- ~~11.7.4 Overpressure safety device~~
- 12 Protection against radiation, including laser sources, and against sonic and ultrasonic pressure
- ~~12.1 General~~
- ~~12.2 Equipment producing ionizing radiation~~
- ~~12.2.1 Ionizing radiation~~
- ~~12.2.2 Accelerated electrons~~

- ~~12.3 — Ultra violet (UV) radiation~~
- ~~12.4 — Microwave radiation~~
- 12.5 Sonic and ultrasonic pressure
- 12.5.1 Sound level
- ~~12.5.2 — Ultrasonic pressure~~
- ~~12.6 — Laser sources~~
- ~~13 — Protection against liberated gases, explosion and implosion~~
- ~~13.1 — Poisonous and injurious gases~~
- ~~13.2 — Explosion and implosion~~
- ~~13.2.1 — Components~~
- ~~13.2.2 — Batteries and battery charging~~
- ~~13.2.3 — Implosion of cathode ray tubes~~
- ~~13.2.4 — Equipment RATED for high pressures~~
- 14 Components
- 14.1 General
- 14.2 Motors
- 14.2.1 Motor temperatures
- ~~14.2.2 — Series excitation motors~~
- 14.3 Overtemperature protection devices
- 14.4 Fuse holders
- ~~14.5 — Mains voltage selecting devices~~
- 14.6 HIGH INTEGRITY components
- 14.7 Mains transformers tested outside equipment
- 14.8 Printed circuit boards
- 14.9 Circuits or components used as transient overvoltage limiting devices
- ~~15 — Protection by interlocks~~
- ~~15.1 — General~~
- ~~15.2 — Prevention of reactivation~~
- ~~15.3 — Reliability~~
- ~~16 Test and measurement equipment~~
- ~~16.1 — Current measuring circuits~~
- ~~16.2 — Multifunction meters and similar equipment~~

Annexes

F Routine tests



Standards Survey

The IEC would like to offer you the best quality standards possible. To make sure that we continue to meet your needs, your feedback is essential. Would you please take a minute to answer the questions overleaf and fax them to us at +41 22 919 03 00 or mail them to the address below. Thank you!

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 librarian ☐
 researcher ☐
 design engineer ☐
 safety engineer ☐
 testing engineer ☐
 marketing specialist ☐
 other.....

Q3 I work for/in/as a:
(tick all that apply)

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 consultant ☐
 government ☐
 test/certification facility ☐
 public utility ☐
 education ☐
 military ☐
 other.....

Q4 This standard will be used for:
(tick all that apply)

- general reference ☐
 product research ☐
 product design/development ☐
 specifications ☐
 tenders ☐
 quality assessment ☐
 certification ☐
 technical documentation ☐
 thesis ☐
 manufacturing ☐
 other.....

Q5 This standard meets my needs:
(tick one)

- not at all ☐
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 fairly well ☐
 exactly ☐

Q6 If you ticked NOT AT ALL in Question 5 the reason is: (tick all that apply)

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 standard is incomplete ☐
 standard is too academic ☐
 standard is too superficial ☐
 title is misleading ☐
 I made the wrong choice ☐
 other

Q7 Please assess the standard in the following categories, using the numbers:

- (1) unacceptable,
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 (3) average,
 (4) above average,
 (5) exceptional,
 (6) not applicable

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 technical contents.....
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 tables, charts, graphs, figures.....
 other

Q8 I read/use the: (tick one)

- French text only ☐
 English text only ☐
 both English and French texts ☐

Q9 Please share any comment on any aspect of the IEC that you would like us to know:

.....



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