

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

Part 3.1 Conformity verification report for IEC 61010-1

ICS 17.220.20

National foreword

This British Standard reproduces verbatim IEC 61010-3-1 : 1997 and implements it as the UK national standard.

The UK participation in its preparation was entrusted to Technical Committee EPL/66, Safety of measuring, control, and laboratory equipment, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, the IEC title page, pages 2 to 60, and inside back cover and a back cover.

Amendments issued since publication

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TECHNICAL REPORT – TYPE 3

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

Part 3-1: Conformity verification report for IEC 61010-1

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

*Partie 3-1:
Rapports de vérification de la conformité
de la CEI 61010-1*



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3-1: Conformity verification report for IEC 61010-1 (including amendment 1: 1992 or amendment 1: 1992 and 2: 1995)

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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- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

Technical reports of types 1 and 2 are subject to review within three years of publication to decide whether they can be transformed into International Standards. Technical reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

IEC 61010-3-1, which is a technical report of type 3, has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

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

Committee draft	Report on voting
66/145/CDV	66/165/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 report is a Technical Report of type 3 and is of a purely informative nature and is therefore by itself not to be regarded as an International Standard. It is for use by test houses and other users to assist them with determining and recording verification of conformity of the equipment under test with the requirements of:

IEC 61010-1: 1990 + amendment 1: 1992,

or

IEC 61010-1: 1990 + amendment 1: 1992 + amendment 2: 1995

The protocol for completion of this report is contained in publication IEC 61010-3: 1996.

Requirements which apply only to amendment 2 to IEC 61010-1 are indicated by “(AM 2)” in the first column. Requirements deleted by amendment 2 to IEC 61010-1 are indicated by “(AM 1 only)” in the second column.

A diskette containing the text of this standard is to be found in a pocket affixed to the back cover of this publication.

Conformity Verification Report IEC 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use	
Report reference No.....: Compiled by (+ signature).....: Approved by (+ signature).....: Date of issue.....:	
Testing organization.....: Address.....: Testing location	
Applicant.....: Address.....:	
Standard.....: Copyright blank test report....:	IEC 61010-1:1990 + A 1:1992 + A 2:1995 This report has been prepared by IEC TC 66, which retains responsibility for any changes or corrections required.
Test procedure.....: Procedure deviation.....: Non-standard test method.....:	
Type of item tested.....: ☐ Measurement ☐ Control ☐ Laboratory Trademark.....: Model/type reference.....: Manufacturer.....: Rating.....:	
Copy of rating plate:	

Description of equipment function.....:

INSTALLATION/OVERVOLTAGE CATEGORY:

POLLUTION DEGREE:

Environmental rating: ☐ Standard ☐ Other (specify):

Equipment mobility: ☐ Portable ☐ Hand-held ☐ Floorstanding ☐ Fixed
☐ Built in ☐ Benchmounted ☐ Other (specify):

Connection to mains supply: ☐ Permanent ☐ Detachable ☐ Non detachable ☐ None

Operating conditions: ☐ Continuous ☐ Short-time ☐ Intermittent

Overall size of the equipment (Length x Width x Height):

Mass of the equipment (kg):

Marked degree of protection to IEC 60529: IP___

Accessories and detachable parts included in the evaluation:

Options:

NOTE – "(see form A.X)" refers to a form appended to the report.

Table 1 – Documents attached to this report

[illegible]

Table 2 – Test equipment list

[illegible]

Table 3 – List of components relied on for safety

Unique component reference or location (including drawing reference if required)	Application/Function	Manufacturer and part number (note 1)	RATING (note 2)	Licence number, file number or other documentary evidence of acceptance
NOTES 1 List all manufacturers concerned. 2 Electrical, mechanical, flammability, etc.				

Clause Subclause	Requirement	Result	Comments
5	Marking and documentation		
5.1.1	General Required equipment markings are: a) visible: – from the exterior or – after removing a cover or – opening a door or – after removal from a rack or panel b) not put on parts which can be removed by an OPERATOR c) Letter symbols (IEC 60027) used d) Graphic symbols (IEC 61010-1:table 1) used		
5.1.2	Identification Equipment is identified by: – manufacturer's name or registered trade mark – model number, name or other means		
5.1.3	Mains supply Equipment is marked as follows: a) nature of supply: – a.c. RATED mains frequency or range of frequencies – d.c. with symbol 1 b) RATED supply voltage(s) or range c) – maximum RATED power (w or VA) or input current		
(AM 2)	If more than one voltage range: – separate values marked or – values differ by less than 20 % (see form A.3)		
F			

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement		Comments
	d) OPERATOR –set for different RATED supply voltages: – indicates the equipment set voltage – PORTABLE EQUIPMENT indication is visible from the exterior – changing the setting changes the indication e) Accessory mains socket-outlets accepting standard mains plugs are marked: – with the voltage if it is different from the mains supply voltage – for use only with specific equipment If not marked for specific equipment it is marked with: – the maximum RATED current or power, and maximum permitted leakage current or – symbol 14 with full details in the documentation		
	F The measured value not more than 110 % (see form A.3)		
5.1.4	Fuses OPERATOR replaceable fuse marking (see also 5.4.5)		
5.1.5	Measuring circuit TERMINALS		
(AM 2)	RATED maximum working voltage or current marked Unless clear indication that below limits: – maximum RATED voltage to earth is marked or – for specific connection only, and means for identifying provided – is adjacent to TERMINALS or – if insufficient space:		

Clause Subclause	Requirement	Result	Comments
5.1.6	- on the RATING plate or scale plate or - if the TERMINAL is marked with symbol 14		
	(AM 2) INSTALLATION CATEGORY marked		
	(AM 2) TERMINALS permanently connected and not ACCESSIBLE		
	TERMINALS and operating devices		
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators		
	(AM 2) Mains supply TERMINALS identified		
	(AM 2) Power supply switch on or off position marked if used as disconnecting device		
	TERMINAL marking:		
	a) FUNCTIONAL EARTH TERMINALS		
	b) PROTECTIVE CONDUCTOR TERMINALS:		
	symbol 6 is placed close to or on the TERMINAL		
	or		
	part of appliance inlet		
	c) TERMINALS of measuring and control circuits		
	d) TERMINALS supplied from the interior		
	e) ACCESSIBLE FUNCTIONAL EARTH TERMINALS		
	f) Position on or off of power supply switch (AM 1 only)		
5.1.7	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		
	Protected throughout (symbol 11 used)		
	Only partially protected (symbol 11 not used)		
5.1.8	Battery charging		
	Equipment with means to charge re-chargeable batteries is marked:		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
5.2	– to warn against the charging of non-rechargeable batteries		
	– to indicate the type of rechargeable battery used		
	Warning markings		
	– visible when ready for NORMAL USE		
	– if necessary marked with symbol 14		
	– are near or on applicable parts		
	(AM 2) – statement to isolate or disconnect		
	– advice how to avoid contact with ACCESSIBLE HAZARDOUS LIVE parts		
	– TERMINAL voltage exceeding 1 kV (symbol 12)		
	– easily touched high temperature parts (symbol 13)		
5.3	– warning for more than 2 s (AM 1 only)		
	Durability of markings		
F	The required markings remain clear and legible in NORMAL USE (see form A.4)		
5.4	Documentation		
5.4.1	General		
	Equipment is accompanied by documentation which includes:		
	– technical specification		
	– instructions for use		
	– name and address of manufacturer or supplier		
	(AM 2) Definition of INSTALLATION CATEGORY		
	Warning statements and a clear explanation of warning symbols:		
	– provided in the documentation		
	or		
	– information is marked on the equipment		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
5.4.2	Equipment RATINGS Documentation includes: – supply voltage or voltage range – frequency or frequency range – power or current RATING – a description of all input and output connections – RATING of insulation of external circuits, when such circuits are nowhere ACCESSIBLE – statement of the range of environmental conditions		
5.4.3	Equipment installation Documentation includes instructions for: – assembly, location and mounting – protective earthing – connections to supply – ventilation requirements – special services		
(AM 2)	– maximum sound power level		
(AM 2)	– instructions about sound pressure		
	Additional for permanently connected equipment: – supply wiring – any external switch or circuit-breaker (including location) – any external overcurrent protection		
5.4.4	Equipment operation Instructions for use include: – identification of operating controls		
(AM 2)	– positioning for disconnection		
	– interconnection		

Clause Subclause	Requirement	Result	Comments
5.4.5	– specification of intermittent operation limits		
	– explanation of symbols used		
	– replacement of consumable materials		
	– cleaning and decontamination (see 11.2)		
	A warning against use in a manner not specified by the manufacturer		
	Equipment maintenance		
	Instructions include:		
	– sufficient preventive maintenance and inspection information		
	(AM 2) – replacement of hoses, etc.		
	– specific battery type		
6	– any manufacturer specified parts		
	– RATING and characteristics of fuses		
6	Protection against electric shock (see form A.5)		
6.1	General		
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.12		
6.1.1	Exceptions		
	F Capacitance test (see forms A.6 and A.7)		
6.2	Determination of ACCESSIBLE parts (see form A.6)		
6.3	Permissible limits for ACCESSIBLE parts		
6.3.1	Values in NORMAL CONDITION (see form A.7)		
6.3.2	Values in SINGLE FAULT CONDITION (see form A.8)		
6.4	Protection in NORMAL CONDITION (see 6.8 and 8.1)		
6.5	Protection in SINGLE FAULT CONDITION		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
6.5.1	Additional protection is provided by:		
	– one or more of 6.5.1 to 6.5.3		
	or		
	– automatic disconnection of the supply		
	Protective earthing		
	ACCESSIBLE conductive parts:		
	– bonded to the protective conductor terminal		
	or		
	– separated by screen or BARRIER from parts which are HAZARDOUS LIVE		
	(For indirect bonding of measurement and test equipment see 6.5.1.4)		
6.5.1.1	PROTECTIVE BONDING		
	PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		
6.5.1.2	Bonding impedance of plug-connected equipment (see form A.9)		
6.5.1.3	Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT (see form A.9)		
6.5.1.4	Indirect bonding for measuring and test equipment (see form A.9)		
6.5.2	DOUBLE INSULATION and REINFORCED INSULATION (see 6.7, 6.8 and 6.9.2)		
6.5.3	PROTECTIVE IMPEDANCE (see form A.10)		
	Components wires and connections are RATED as required		
6.5.4	Built-in equipment (AM 1 only)		
or	Built-in panel meters		
(AM 2)	If after building-in the requirements of 6.5.1 to 6.5.3 are not met:		
	– equipment (AM 1 only):		
	or		

Clause Subclause	Requirement	Result	Comments
(AM 2)	– panel meter: – has no ACCESSIBLE conductive parts – has basic insulation of accessible surfaces – has DOUBLE/REINFORCED INSULATION of ACCESSIBLE surface of parts intended to be grasped		
6.6	External circuits		
6.6.1	F Separation of internal circuits (see list in forms A.1 and A.5) If the other internal circuit exceeds the values of 6.3.2 in NORMAL CONDITION and only BASIC INSULATION: a) short-circuit could not make external circuit HAZARDOUS LIVE b) manufacturer's instructions include: – a statement that the TERMINAL for external circuits is for use only with equipment which has no live parts which are ACCESSIBLE – the RATING of the insulation required for external circuits – the connection to be used at the remote end of external circuits – the type of equipment which may be connected to the TERMINAL		
6.6.2	TERMINALS for external circuits ACCESSIBLE TERMINALS are not HAZARDOUS LIVE except as permitted by 6.1.1 The following terminals are not hazardous live: – PROTECTIVE CONDUCTOR TERMINALS – FUNCTIONAL EARTH TERMINALS – headphone TERMINALS F TERMINALS which receive a charge from an internal capacitor (see form A.7)		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
6.6.3 (AM 2)	High-voltage TERMINALS energised from the interior are:		
	– not accessible		
	or		
	– marked		
	Circuits with TERMINALS which are HAZARDOUS LIVE		
	These circuits:		
	– are not connected to ACCESSIBLE conductive parts		
	or		
	– are connected to ACCESSIBLE conductive parts, but are not mains circuits and have one TERMINAL contact at earth potential		
	No ACCESSIBLE conductive parts are HAZARDOUS LIVE		
6.7 F	CLEARANCES and CREEPAGE DISTANCES (See annex D of IEC 61010-1 and form A.11)		
6.8 F	Dielectric strength tests (see annex E of IEC 61010-1 and form A.12)		
	(protection against the spread of fire see 9.1)		
6.9	Constructional requirements for protection against electric shock		
6.9.1	General		
	In circuits exceeding the values of 6.3.2:		
	– security of wiring connections		
	– screws securing removable covers		
	– accidental loosening		
6.9.2	ENCLOSURES of equipment with DOUBLE INSULATION or REINFORCED INSULATION		
	ENCLOSURE surrounds all metal parts except for small metal parts which are separated		
	ENCLOSURES or parts made of insulating material		

Result: P = Pass F = Fail NA = Not Applicable