TECHNICAL REPORT

IEC TR 61010-3-032

First edition
2000-01

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

Part 3-032: Conformity verification report for IEC 61010-2-032:1994, Particular requirements for hand-held current clamps for electrical measurement and test

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

Partie 3-032: Rapports de vérification de la conformité de la CEI 61010-2-032

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For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to publications IEC 60027: *Letter symbols to be used in electrical technology*, IEC 60417: *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets* and IEC 60617: *Graphical symbols for diagrams.*

* See web site address on title page.

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International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site http://www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3-032: Conformity verification report for IEC 61010-2-032:1994, Particular requirements for hand-held current clamps for electrical measurement and test

FOREWORD

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2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
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Technical reports do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful by the maintenance team.

IEC 61010-3-032, which is a technical report, 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:

Enquiry draft	Report on voting
66/192/CDV	66/216/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 3.

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. It is for use by testhouses and other users to assist them with determining and recording verification of conformity of the equipment under test with the requirements of

IEC 61010-2-032:1997,

and

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 61010-3:1997. 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.

Reference to IEC 61010-1 clauses and subclauses which have no applicability for IEC 61010-2-032 have been identified in the comments column of the report as 'Not applicable'. The Forms A.9, A.21, A.22, A.23, A.25, A.26, A.27 and A.28, which are normally associated with these clauses/subclauses, are also excluded from this report.

The IEC sells read-only PDF files as a general rule. In the present instance, and quite exceptionally, to enable the user to fill in the forms, a revisable file is included in a pocket affixed to the back cover of this publication.

This publication can be downloaded from the Web as a PDF file. There is, however, at the end of the document, a revisable file containing the forms. Please use the zip/unzip function.

Conformity Verification Report IEC 61010-2-032: Safety requirements for electrical equipment for measurement, control, and laboratory use Particular requirements for hand-held current clamps for electrical measurement and test	
Report reference No ..... :	
Compiled by (+ signature)..... :	
Approved by (+ signature)..... :	
Date of issue ..... :	
Testing organization..... :	
Address..... :	
Testing location..... :	
Applicant ..... :	
Address..... :	
Standard ..... :	IEC 61010-2-032:1994 and IEC 61010-1:1990 + Amendment 1:1992 or IEC 61010-1:1990 + Amendment 1:1992 + Amendment 2:1995
Copyright blank test report..... :	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
Trademark..... ..... :	
Model/type référence ..... :	
Manufacturer..... :	
Rating..... :	
Copy of rating plate:	

Description of equipment function:

INSTALLATION/OVERVOLTAGE CATEGORY:

POLLUTION DEGREE:

Environmental rating: ☐ Standard ☐ Other (specify):

Equipment mobility: ☐ Hand-held

Operating conditions: ☐ Continuous ☐ Short-time ☐ Intermittent

Overall size of the equipment (Length × Width × Height) cm:

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

Document No.	Document description	Number of pages

Table 2 – Test equipment list

Item	Type	Equipment No.	Calibration date		Comments
			Last[1)]	Due	

1) or interval between calibrations.

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

NOTE 1 List all manufacturers concerned.

NOTE 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		
	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		
5.1.101	**RATING**		
	– RATED circuit-to-earth voltage		
	– Nature of voltage		
	– Installation category		
	– Value and nature of maximum current		
5.1.2	**Identification**		
	Equipment is identified by		
	– name or trademark of manufacturer or supplier		
	– model number, name or other means		
	– clamp designated for use with specific equipment		
	– model indicated on clamp or – symbol 14 used and information in documentation		
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		

Clause Subclause	Requirement	Result	Comments
	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:		
	– 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		
5.1.6	**TERMINALS and operating devices**		
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators		
	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**		Not applicable

Clause Subclause	Requirement	Result	Comments
5.2	**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)		
	– warning for more than 2 s **(AM 1 only)**		
5.3	**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		
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		

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

Clause Subclause	Requirement	Result	Comments
	– 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		
5.4.4	**Equipment operation**		
	Instructions for use include		
	– identification of operating controls		
	– interconnection		
	– 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		
5.4.5	**Equipment maintenance**		
	Instructions include		
	– sufficient preventive maintenance and inspection information		
	– specific battery type		
	– any manufacturer specified parts		
	– RATING and characteristics of fuses		
6 **F**	**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		

Clause Subclause	Requirement	Result	Comments
6.1.1	**Exceptions**		
	Conductive hazardous live parts within a jaw opening accessible:		
	– CLEARANCES and CREEPAGE DISTANCES are met		
	– see 13.101		
F	Capacitance test (see Forms A.6 and A.7)		
6.2	**Determination of ACCESSIBLE parts**		
F	(see Form A.6)		
6.3	**Permissible limits for ACCESSIBLE parts**		
6.3.1	**Values in NORMAL CONDITION**		
F	(see Form A.7)		
6.3.2	**Values in SINGLE FAULT CONDITION**		
F	(see Form A.8)		
6.4	**Protection in NORMAL CONDITION** (see 6.8 and 8.1)		
6.4.101	**Hand-held or hand-manipulated parts**		
	DOUBLE INSULATION or REINFORCED INSULATION		
6.5	**Protection in SINGLE FAULT CONDITION**		
	Additional protection is provided by		
	– one or more of 6.5.1 to 6.5.3		
6.5.1	**Protective earthing**		
	ACCESSIBLE conductive parts:		
	– bonded to the protective conductor terminal or – separated by screen or BARRIER from parts which are HAZARDOUS LIVE		
6.5.1.1	**PROTECTIVE BONDING**		Not applicable
6.5.1.2	Bonding impedance of plug-connected equipment (see Form A.9)		Not applicable and Form A.9 not used
6.5.1.3	Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT (see Form A.9)		Not applicable and Form A.9 not used
6.5.1.4	Indirect bonding for measuring and test equipment (see Form A.9)		Not applicable and Form A.9 not used
6.5.2	**DOUBLE INSULATION and REINFORCED INSULATION** (see 6.7, 6.8 and 6.9.2)		

Clause Subclause	Requirement	Result	Comments
6.5.3	**PROTECTIVE IMPEDANCE**		
F	(see Form A.10)		
	Components wires and connections are RATED as required		
6.5.4	**Built-in equipment (AM 1 only)**		Not applicable
	or		
	Built-in panel meters (AM 2)		Not applicable
6.6	**External circuits**		
6.6.1	**Separation of internal circuits**		
F	(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		
F	TERMINALS which receive a charge from an internal capacitor (see Form A.7)		
	High-voltage TERMINALS energized from the interior are		
	– not ACCESSIBLE		
	or		
(AM 2)	– marked		

Clause Subclause	Requirement	Result	Comments
6.6.3	**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	**CLEARANCES and CREEPAGE DISTANCES**		
F	(see annex D of IEC 61010-1 and Form A.11)		
6.7.101	**Barrier or tactile indicator**		
	– BARRIER or indicator warns OPERATOR of the limit of safe access		
	– CLEARANCES and CREEPAGE DISTANCES comply between BARRIER or indicator and hazardous live parts		
6.8	**Dielectric strength tests**		
F	(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		
	Protection for metal ENCLOSURES or parts by		
	– PROTECTIVE IMPEDANCE		
	or		
	– an insulating coating or BARRIER on the inside		
	or		
	– CLEARANCES and CREEPAGE DISTANCES cannot be reduced by loosening of parts or wires		

Clause Subclause	Requirement	Result	Comments
6.9.3	**Equipment using PROTECTIVE BONDING**		Not applicable
6.9.4 (AM 2)	**Over-range indication**		
	Unambiguous		
6.10	**Connection to mains supply source (AM 2 only)** or		Not applicable
(AM 2)	**Connection to mains supply source and connections between parts of equipment**		
6.10.1	**Mains supply cords**		Not applicable
6.10.3	**Plugs and connectors**		Not applicable
6.11	**TERMINALS**		
6.11.1	**ACCESSIBLE TERMINALS**		
	a) No risk of accidental contact (see also 5.1.6c))		
	b) Will not work loose		
6.11.2	**PROTECTIVE CONDUCTOR TERMINAL**		
	c) If no mains supply is required, any PROTECTIVE CONDUCTOR TERMINAL is		
	– near TERMINALS of circuit for which protective earthing is necessary		
	– external if other TERMINALS external		
	e) Soldered connections:		
	– independently secured		
	– not used for other purposes		
	– screw connections are secured		
	f) Contact surfaces are metal		
6.11.3	**FUNCTIONAL EARTH TERMINALS**		
	Independent connection		
6.12	**Disconnection from supply source**		Not applicable
7	**Protection against mechanical hazards**		
7.1	**General**		
	Conformity is checked by 7.2 to 7.5		

Clause Subclause	Requirement	Result	Comments
7.2	**Moving parts**		
	Moving parts not able to crush, etc. (see also 6.12.2.3)		
(AM 2)	If OPERATOR access permitted:		
	a) access requires TOOL		
	b) statement about training		
	c) warning markings or symbol 14		
7.3	**Stability**		
	Marking of non-automatic means		
	Conformity tests:		
	– 10° tilt test		
	– multi-directional force test		
	– downward force test		
7.4	**Provisions for lifting and carrying**		
	Handles or grips withstand four times mass		
	Equipment ≥18 kg:		
	– has means for lifting or carrying or – directions in documentation		
7.5	**Expelled parts**		
	Equipment contains or limits the energy		
	Protection not removable without the aid of a TOOL		
8	**Mechanical resistance to shock, vibration and impact (AM 1 only)** or		
(AM 2)	**Mechanical resistance to shock and impact**		
F	After the tests of 8.1 to 8.4 (see Form A.11):		
F	– voltage tests (see Form A.12)		
	– inspection, equipment meets the following requirements:		
	a) HAZARDOUS LIVE parts not ACCESSIBLE		
	b) ENCLOSURE shows no cracks (hazard)		
F	c) CLEARANCES not less than their permitted values (see Form A.11)		

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

Clause Subclause		Requirement	Result	Comments
		– BARRIERS not damaged or loosened		
		– no moving parts exposed, except as permitted by 7.2		
		– no damage which could cause spread of fire		
9		**Equipment temperature limits and protection against the spread of fire**		
9.1		**General**		
		Conformity is checked by		
	F	– 9.2 and fault tests of 4.4 (see Forms A.1, A.2 and A.18)		
		or		
	F	– measurement of CREEPAGE DISTANCE and CLEARANCE and the voltage tests of annex G (see Form A.14)		
		or		
	F	– method of annex F (see Forms A.15, A.16 and A.17)		
9.2		**Temperature tests**		
9.3		**Guards**		
	F	Surfaces liable to exceed 100 °C (see Form A.18):		
		– protected by guards		
		or		
		– marked		
		or		
		– intended to be hot (see 9.1)		
		Guards not removable without TOOL		
9.4		**Field-wiring TERMINAL boxes**		Not applicable
9.5		**Overtemperature protection devices**		
	F	– fitted, to operate in SINGLE FAULT CONDITION (see Form A.1)		
		– meets 14.3		
		– does not operate in NORMAL USE (see 3.5.6)		
		– if self-resetting, can only be set to operate in SINGLE FAULT CONDITION		
9.6		**Overcurrent protection**		Not applicable
10		**Resistance to heat**		
10.1	**F**	**Integrity of CLEARANCE and CREEPAGE DISTANCES** (see Form A.11)		

Clause Subclause	Requirement	Result	Comments
10.2 **F**	**Resistance to heat of non-metallic ENCLOSURES** (see Form A.19)		
10.3	**Resistance to heat of insulation material**		
	Parts supporting		
	– parts connected to mains supply		
	– TERMINALS carrying >0,5 A		
11	**Resistance to moisture and liquids (AM 1 only)**		
or **(AM 2)**	**Protection against hazards from fluids**		
11.1	**General**		
11.2 **F**	**Cleaning** (see Form A.20)		
11.3 **F**	**Spillage** (see Form A.20)		
11.4 **F**	**Overflow** (see Form A.20)		
11.5	**Liquid leakage (AM 1 only)**		
11.5.1 **F**	**Equipment containing liquid (AM 1 only)** (see Form A.20)		
11.5.2	**Battery electrolyte (AM 1 only)**		Not applicable
or **11.5 (AM 2)**	**Battery electrolyte**		Not applicable
11.6 **F**	**Specially protected equipment** (see Form A.20)		
11.7 (AM 2)	**Fluid pressure and leakage**		Not applicable and Form A.21 not used
12	**Protection against radiation, including laser sources, and against sonic and ultrasonic pressure**		Not applicable and Forms A.22 and A.23 not used
13	**Protection against liberated gases, explosion and implosion**		
13.1	**Poisonous and injurious gases**		Not applicable
13.2	**Explosion and implosion**		
13.2.1	**Components**		Not applicable

Clause Subclause	Requirement	Result	Comments
13.2.2	**Batteries**		
F	(see Form A.24)		
	Explosion or fire hazard:		
	– protection incorporated in the equipment		
	or		
	– instructions specify batteries		
	and		
	– single component cannot cause hazard (short circuit and open circuit)		
F	(see Form A.24, including circuit diagram)		
	– warning marking or symbol 14		
	Battery compartment design		
	Polarity reversal test		
13.3	**Implosion of high-vacuum devices**		Not applicable
13.101	**Protection against short circuits**		
	Protection between wires or busbars during clamping or measurement at least BASIC INSULATION		
14	**Components**		
14.1	**General**		
	Where safety is involved, components meet relevant requirements (see Table 3 of this report and Figure 5 of IEC 61010-1/A2)		
14.2	**Motors**		Not applicable and Form A.25 not used
14.3	**Overtemperature protection devices**		Not applicable and Form A.26 not used
14.4	**Fuse holders**		
	No access to HAZARDOUS LIVE parts		
14.5	**Mains voltage selecting devices**		Not applicable
14.6	**HIGH INTEGRITY components**		
	Used in applicable positions (see Table 3)		
	Complies with IEC publications		
	Not a single electronic device		
14.7	**Mains transformers**		Not applicable and Forms A.27 and A.28 not used
14.8 (AM 2)	**Overpressure safety devices**		Not applicable

Clause Subclause	Requirement	Result	Comments
14.101	**Input and output signal measuring leads**		
	Fixed or detachable signal or measuring leads meet IEC 61010-2-031		
15	**Protection by interlocks**		Not applicable
16 (AM 2)	**Measuring circuits**		
16.1 (AM 2)	**Current measuring circuits**		
F	(see Form A.29)		

Form A.1

Summary of SINGLE FAULT CONDITIONS applied (4.4.2)

(see Form A.2 for details of tests)

Sub-clause	Title	Does not apply	Carried out	Comments
4.4.2.1	PROTECTIVE IMPEDANCE			
4.4.2.2	Protective conductor			
4.4.2.3	Equipment or parts for short-term or intermittent operation			
4.4.2.7	Outputs open-circuited or short-circuited			
4.4.2.11	Insulation between circuits and parts			
List below all SINGLE FAULT CONDITIONS not covered by 4.4.2.1 to 4.4.2.12				

4.4 Testing in SINGLE FAULT CONDITION – Results

Test subclause	Fault No.	Fault description	T_d 4.4.3 (note 1)	How was test terminated Comments	Meets 4.4.4

1) T_d = Test duration in h:min:s
Record dielectric strength test on Form A.12 and temperature tests on Form A.18.
Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.3

5.1.3c) Mains supply

Marked RATING _____ _____Phase _____Hz _____A _____W _____VA	NOTE Measurements are required only for marked RATINGS

Test No.	Voltage V	Frequency Hz	Current I	Power in W	Power in VA	Comments

General comments:

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.4

5.3 Durability of markings

Table A.4.1 – Marking method (note)
NOTE Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

Table A.4.2 – Agent
A (specify agent)
B (specify agent)
C Water
D Isopropyl alcohol

Marking location	Marking method (see Table A.4.1)
Identification (5.1.2)	
Fuses (5.1.4)	
Measuring circuit TERMINALS (5.1.5)	
TERMINALS and operating devices (5.1.6)	
Double/reinforced equipment (5.1.7)	
Warning markings (5.2)	

Method (Table A.4.1)	Test agent (Table A.4.2)	Remains legible Pass/Fail	Label loose Pass/Fail	Curled edges Pass/Fail	Comments

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.5

Clause 6 – Protection against electric shock – Block diagram of system

POLLUTION DEGREE: _____ **INSTALLATION CATEGORY (OVERVOLTAGE CATEGORY):**_____

Location or description	Insulation type (note 1)	Maximum working voltage (note 2) V	CREEPAGE DISTANCE (note 3)				CLEARANCE (note 3) mm	Test voltage (note 2) V	Comments
			PWB mm	CTI	Other mm	CTI			

NOTE 1 Type of insulation:

BI = BASIC INSULATION
DI = DOUBLE INSULATION
PI = PROTECTIVE IMPEDANCE
RI = REINFORCED INSULATION
SI = SUPPLEMENTARY INSULATION

NOTE 2 Types of voltage

Peak impulse test voltage (pulse)
r.m.s.
d.c.
peak

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

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.6

6.1.1 Exceptions
6.2 Determination of ACCESSIBLE parts

List of ACCESSIBLE parts

Item	Description	Determination method (note 5)	Exception under 6.1.1 (note 4)

NOTE 1 Test fingers and pins are to be applied without force unless a force is specified (see 6.2.1).

NOTE 2 Special consideration should be given to inadequate insulation and high-voltage parts (see 6.2).

NOTE 3 Parts are considered to be ACCESSIBLE if they could be touched in the absence of any covering which is not considered to provide suitable insulation (see note to paragraph 1 of 6.4).

NOTE 4 Capacitor test may be required (see Form A.7).

NOTE 5 The determination methods are: visual; rigid test finger; jointed test finger; pin 3 mm diameter; pin 4 mm diameter.

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A. 7

6.1.1 Exceptions
6.3.1 Values in NORMAL CONDITION
6.6.2 TERMINALS for external circuit
6.10.3 Plugs and connections

11.2 Cleaning
11.3 Spillage

Item (see Form A.6)	Voltage			Current				Capacitance		10 s test (note)			Comments
	V r.m.s	V peak	V d.c.	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.	µC	mJ	V	µC	mJ	

NOTE A 5 s test is specified in 6.10.3c).

Tested by:_____Date:_____Test equipment No. (Table 2)_____

6.3.2 Values in SINGLE FAULT CONDITION

Item (see Form A.6)	Subclause and fault No. (see Form A.2)	Voltage			Transient (see note)		Current				Capacitance µF (note)	Comments
		V r.m.s.	V peak	V d.c.	V	s	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.		
NOTE Transient voltages must be below the limits given from Figure 1 and the capacitance below the limits from Figure 2 of IEC 61010-1.												

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.10

6.5.3 PROTECTIVE IMPEDANCE

A HIGH INTEGRITY single component		
Component	**Location**	**Comments**

Tested by:_____Date:_____Test equipment No. (Table 2)_____

A combination of components		
Component	**Location**	**Comments**

Tested by:_____Date:_____Test equipment No. (Table 2)_____

A combination of BASIC INSULATION and a current or voltage limiting device		
Component	**Location**	**Comments**

Tested by:_____Date:_____Test equipment No. (Table 2)_____

6.7 CLEARANCES and CREEPAGE DISTANCES
8 Mechanical resistance to shock and impact
10.1 Integrity of CLEARANCES and CREEPAGE DISTANCES

Location (see Form A.5)	Measured (initial - 6.7)		Result Pass/ Fail	Mechanical tests (note)					Measured after test (if required)		Result Pass/ Fail	Comments
	CREEPAGE DISTANCE mm	CLEARANCE mm		Applied force (6.7) N	Rigidity (8.1)	Impact hammer (8.2)	Drop (8.4.2)	Ambient test 40 °C (10.1)	CREEPAGE DISTANCE mm	CLEARANCE mm		

NOTE Refer to Form A.12 for dielectric strength tests following the above tests.

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.12

6.8 Dielectric strength tests

Location (see Form A.5 and/or fault Form A.2)	Working voltage V	Test voltage r.m.s./peak/d.c.	Result Pass/Fail	Comments (note)

NOTE Describe conditions prior to testing:

A = Humidity preconditioning (6.8.2 and 6.8.3)
B = ENCLOSURE tests (clause 8)
C = Resistance to heat of non-metallic ENCLOSURES (10.2)
D = After single faults (4.4)

Tested by:_____Date:_____Test equipment No. (Table 2)_____

9.1 General

Annex G – Test details

Between parts and circuits		CREEPAGE DISTANCE mm	CLEARANCE mm	Working voltage V	Test voltage r.m.s./peak/d.c. V	Result Pass/Fail	Comments

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.15

9.1 General

Annex F – Test details
F.2.1 Limited circuits

Circuit/ Location	Open circuit voltage r.m.s./d.c. V	Energy limitation					Comments
		Maximum current A	Maximum available power VA	Overload protection	Limited circuit Yes/No	Test to 4.4.3	

General comments:

Tested by:_____Date:_____Test equipment No. (Table 2)_____

F.2.2 Unlimited circuit

Location/ Circuit	Operator controlled switch	Overcurrent protection	Over-temperature protection	Comments

General comments:

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.16

9.1 General

Annex F – Test details (continued)
F.4.2 Constructional details
F.4.3 Enclosures

Clause	Requirement	Result Pass/Fail	Comments
F.4.2.1	Connectors comply with IEC standards		
F.4.2.2	Printing wiring boards are flame RATED FV 0 or FV 1		
F.4.2.3	ENCLOSURE surrounds unlimited circuits		
F.4.2.4	Wires comply with IEC standards		
F.4.3.1	High-current devices: – door or – cover and – means to hold door or cover closed or – gap less than limits		
F.4.3.2	Bottom of ENCLOSURES: – no opening or – with Table F.1 and Figure F.1 or – placement of components complies with Figure F.2		
F.4.3.3	Baffle or flame BARRIER: – ENCLOSURE made of metal or – ENCLOSURE made of non-metallic material (FV 0 or FV 1)		

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.17

9.1 General

Annex F – Test details (continued)
F.4.3 ENCLOSURES (F.4.3.3 test to IEC 60707)

Material tested:_____ Generic name: _____ Material manufacturer: _____ _____ Type:_____ Colour: _____ Conditioning details:_____ _____ _____	Overall result Pass/Fail

		Sample 1	Sample 2	Sample 3
Thickness of specimen	mm			
Duration of flaming after first application	s			
Duration after flaming plus glowing after second application	s			
Specimen burns to holding clamp	Yes/No			
Cotton ignited	Yes/No			
Sample result	Pass/Fail			

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.18

9.2 Temperature tests

Operating conditions:

Frequency: _____ Hz; _____Duration: _____ h _____ min

Voltage: _____ V Test room ambient: _____ °C

Part	t_m °C	t_c °C	t_a °C	Result Pass/ Fail	Comments

NOTE 1 See also 14.1 with reference to component operating conditions.

NOTE 2 t_m = measured temperature
t_c = corrected maximum temperature (t_m °C + 40 °C - test room ambient)
t_a = maximum permitted temperature

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.19

10.2 Resistance to heat of non-metallic enclosures

Test method used: Non-operative treatment [ ]
Empty ENCLOSURE [ ]
Operative treatment [ ]

Temperature during test:_____ °C

ENCLOSURE samples tested were:

Description	Material	Result Pass/Fail	Comments

Dielectric strength test (6.8.4): _____ V _____r.m.s./peak/d.c.

Comments:

Tested by:_____Date:_____Test equipment No. (Table 2)_____

8 Mechanical resistance to shock, vibration and impact (AM 1 only)
8 Mechanical resistance to shock and impact (AM 2 only)
11 Resistance to moisture and liquids (AM 1 only)
11 Protection against hazards from fluids (AM 2 only)

Voltage tests can be carried out once after performing the tests of clause 8 and clause 11. However, if voltage tests are carried out separately after each set of tests, two forms can be used.

Location (see Form A.5)	Clause 8 tests		Clause 11 tests			Working voltage V	Test voltage V	Result Pass/ Fail	Comments
	Rigidity (8.1)	Impact hammer (8.2)	Cleaning (11.2)	Spillage (11.3)	IEC 60529 (11.6)				
NOTE Use r.m.s., d.c. or peak to indicate the test voltage used.									

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.24

13.2.2 Batteries

Battery load and charging circuit diagram:

Battery type: _____

Battery manufacturer/model/catalogue No.: _____

Battery ratings: _____

Reverse polarity instalment test – Result (Pass/Fail): _____

Single components failures	**Result Pass/Fail**	
Component	**Open circuit**	**Short circuit**

Comments:

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.29

16.1 Current measuring circuits (AM 2 only)

The test is performed with all types and models of current transformers without internal protection, and which are specified by the manufacturer for use with the equipment.

a) Current transformers

Type/Model	RATED current A	Test current A	Interrupt Yes/No	Result Pass/Fail	Comments

Tested by:_____Date:_____Test equipment No. (Table 2)_____

b) Range changing switches

Type/Model	Maximum RATED current of switch	Cycling test Pass/Fail	Comments

Tested by:_____Date:_____Test equipment No. (Table 2)_____

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nearly ❑
fairly well ❑
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