C E R T I F I C A T E

TÜV

of Conformity
Low Voltage Directive 73/23/EEC
as last amended by EEC Directive 93/68/EEC

Registration No.: AN 50017933 0001

Report No.: 14001596 001

Holder:
Precision Mastech Enterprises Co.
Room 1709, Hewlett Centre
52 Hoi Yuen Road
Kwun Tong, Kowloon
Hong Kong

Product:
Widerstandsmessgerät
(Earth Tester)

Identification:
MS5209
(refer to Report 14001596 001 for detailed list)

Serial no. : Engineering Sample
Tested acc. to : EN 61010-1:2001
EN 61010-2-31:2002

This certificate of conformity is based on an evaluation of a sample of the above mentioned product. Technical Report and documentation are at the Licence Holder's disposal.This is to certify that the tested sample is in conformity with all revision of Annex I of Council Directive 73/23/EEC, in its latest amended version, referred to as the Low Voltage Directive. This certificate does not imply assessment of the series-production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex III of the Directive.

TÜV Rheinland Product Safety GmbH TÜV Rheinland Zertifizierungsstelle

Certification Body

Cologne, 21.05.2003

Dipl.-Ing. F. Nispel

TÜV Rheinland Product Safety GmbH - Am Grauen Stein - D-51105 Köln

CE The CE marking may be used if all relevant and effective EC Directives are complied with. CE

Prüfbericht - Nr.: *Test Report No.:*	**14001596 001**		Seite 1 von 69 *Page 1 of 69*
Auftraggeber: *Client:*	**Precision Mastech Enterprises Co.** Room 1709, Hewlett Centre, 52 Hoi Yuen Road, Kwun Tong, Kowloon, Hong Kong.		
Gegenstand der Prüfung: *Test item:*	**Earth Tester**		
Bezeichnung: *Identification:*	**MS5209**	**Serien-Nr.:** *Serial No.:*	**Engineering Samples**
Wareneingangs-Nr.: *Receipt No.:*	**020801007-012**	**Eingangsdatum:** *Date of receipt:*	**01/08/2002**
Prüfort: *Testing location:*	**TÜV Rheinland Hong Kong Ltd.**		
Prüfgrundlage: *Test specification:*	**EN 61010-1: 2001** **EN 61010-2-31: 2002**		
Prüfergebnis: *Test Result:*	**Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage.** *The a. m. test item passed.*		

Prüflaboratorium/ *Testing Laboratory: As testing location*

zusammengestellt/ *compiled by:*			**kontrolliert**/ *checked by:*		
15/05/2003	Joseph Cheang		21 MAY 2003	Sven-Olaf Steinke	
Datum *Date*	**Name** *Name*	**Unterschrift** *Signature*	**Datum** *Date*	**Name** *Name*	**Unterschrift** *Signature*

Sonstiges/ Other Aspects:

- Enclosed 5 page of TÜV Rheinland Hong Kong Ltd equipment list
- The additional test requirements for EN 61010-2-31 has attached on the page 63-69 of this test report.

Abkürzungen:			*Abbreviations:*		
ok / P	=	*entspricht Prüfgrundlage*	*ok / P*	=	*passed*
fail / F	=	*entspricht nicht Prüfgrundlage*	*fail / F*	=	*failed*
n.a. / N	=	*nicht anwendbar*	*n.a. / N*	=	*not applicable*

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TEST REPORT

EN 61010-1 / EN 61010-2-31
Safety requirements for electrical equipment for measurement, control, and laboratory use
Part 1: General requirements

Part 2-31: Safety requirement for hand-help probe assemblies for electrical measurement and test (page 63-69)

Report Reference No. ..... :	**14001596 001**
Tested by (name and signature)..... :	See page 1 .....
Approved by (name and signature) ..:	See page 1 .....
Date of issue..... :	See page 1
Testing Laboratory ..... :	**TÜV Rheinland Hong Kong Ltd.**
Address..... :	Room 405, 4/F., Tech Centre, 72 Tat Chee Avenue, Kowloon, Hong Kong.
Testing location/procedure ..... :	CBTL [X] SMT [ ] TMP [ ]
Address..... :	Same as above
Applicant's name ..... :	See page 1
Address..... :	See page 1
Test specification:	
Standard ..... :	EN 61010-1: 2001 & EN 61010-2-31: 2002
Test procedure..... :	LVD Approval
Non-standard test method ..... :	N.A.
Test Report Form No. ..... :	EN61010_C
TRF Originator ..... :	VDE
Master TRF..... :	Dated 01-07-27

Test item description..... :	Earth Tester
Trademark..... :	MASTECH
Model and/or type reference..... :	MS5209
Manufacturer ..... :	Shenzhen Huayi Mastech Co., Ltd. Address: East Wing 8/F, Block 4, Saige Science and Technology Industrial Garden Hua Qiang Bei Road, Shenzhen.
Rating(s) ..... :	12V DC (8 pieces of 1,5V AA sizes batteries)

Test item particulars ..... :	
Type of item tested ..... :	Measuring equipment
Description of equipment function ..... :	Earth resistance measurement for building installation: range from 10/100/1000Ω Earth voltage measurement for building installation: 30V AC (5KΩ/V approx.)
Installation/over voltage category ..... :	Measurement Category I
Pollution degree ..... :	Protection degree 2
Environmental rating ..... :	Standard
Equipment mobility ..... :	Portable
Connection to mains supply ..... :	DC operated
Operating conditions ..... :	Short-time
Overall size of the equipment (L x W x H) ..... :	140mm(L) x 140mm(W) x 90mm(H)
Mass of the equipment (kg) ..... :	0,638Kg (include 8 pieces of 1,5V AA size batteries)
Marked degree of protection to IEC 60529 ..... :	Class II, ⧈ , IP20 (marked on tester surface)
Accessories and detachable parts included in the evaluation ..... :	Include 8 pieces 1.5V AA sizes batteries and 3 test lead wires (RED wire for C terminal 15meter, Yellow wire for P terminal 10 meter, Green wire for E terminal 5 meter)
Options ..... :	Measurement selection switches (OFF BATT. CHECK); (AC V); (MEAS.) & (SIMPLIFIED MEAS.) Range selection switches (x1Ω); (x10Ω) & (x100Ω)
Test case verdicts:	
Test case does not apply to the test object ..... :	N/A
Test object does meet the requirement ..... :	P(Pass)
Test object does not meet the requirement ..... :	F(Fail)
Testing ..... :	
Date of receipt of test item ..... :	01/08/2002
Date (s) of performance of tests ..... :	13-22/11/2002

General remarks:

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

The test results presented in this report relate only to the item(s) tested.

"(see remark #)" refers to a remark appended to the report.
"(see Annex #)" refers to an annex appended to the report.
"(see Form A.#)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

Copy of marking plate:

Manufacturer Trademark: MASTECH; model no: MS5209 [located on front part of enclosure]

Rating label is not in scale

Summary of test results (information/comments):

Refer to test report

	TABLE: 1 - Documents attached to this report	
Document No.	Document description	Page Numbers
Yes (5 pages of equipment list in the end of test report)		

See TÜV Rheinland Hong Kong Ltd Equipment List

	TABLE: 2 - Test equipment list				
Item	Type	Equipment	Calibration date		Comments
		No.	Last[1]	Due	
Attached with 5 pages of equipment list on last of test report.					

1) or interval between calibrations.

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

	TABLE: 3 - List of components and circuits relied on for safety				P
Unique component reference or location (including drawing reference if required)	Application/Function	Manufacturer (NOTE 1)	Part number	RATING (NOTE 2)	Evidence of acceptance (NOTE 3)
PCB	Support current carrying part	Various	Approved type	Double sided, V-0, 130°C	UL; tested in appliance
Housing & button	Protect the PCB and components inside.	TAITA CHEMICAL CO LTD	5000	ABS, V-1, 60°C	UL; tested in appliance
Test lead wires, plugs and connectors	Connection to earthing system and earth test point	Wonderful wire	UL 1803	PVC with V-0 flammability, AWG18, 2000V, 80°C	UL(E77981); tested in appliance

NOTE 1 - List all manufacturers concerned.
NOTE 2 - Electrical, mechanical, flammability, etc.
NOTE 3 - Licence number, file number or other documentary evidence of acceptance

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
5	MARKING AND DOCUMENTATION		P
5.1.1	General		P
	Required equipment markings are:		P
	visible:	Marking for Double insulation, caution and E, P & C are mark on Tester surface.	P
	From the exterior; or		P
	After removing a cover; or	After removing the cover, a battery compartment holder can be seen; a clear battery type, voltage and polarity direction was indicated.	P
	Opening a door		N
	After removal from a rack or panel		N
	Not put on parts which can be removed by an OPERATOR		P
	Letter symbols (IEC 60027) used	Symbol 2, 11, 14, used.	N
	Graphic symbols (IEC 61010-1: Table 1) used	Alternating current and caution (risk of danger) symbol is used. Refer to rating label	P
5.1.2	Identification		P
	Equipment is identified by:		P
5.1.2a)	Manufacturer's or supplier's name or trademark	Trademark: MASTECH	P
5.1.2b)	Model number, name or other means	MS5209 marked on surface of tester.	P
	Manufacturing location identified	Single manufacturing location, see user manual last page.	N
5.1.3	Mains supply	Not operated by AC mains	N
	Equipment is marked as follows:	Ditto	N
5.1.3a)	Nature of supply:	DC	N
	1) a.c. RATED mains frequency or range .....of frequencies .....:		N
	2) d.c. with symbol 1	8 pieces 1.5V AA sizes batteries is marked on user manual.	N
5.1.3b)	RATED supply voltage(s) or range.....:	Battery operated	N

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
5.1.3c)	Max. RATED power (W or VA)or input current .....:		N
	The measured value not more than 110 %	(see Form A.3)	N
	If more than one voltage range:	Single voltage	N
	Separate values marked; or		N
	Values differ by less than 20 %	(see Form A.3)	N
5.1.3d)	OPERATOR-set for different RATED supply voltages:	Single voltage	N
	Indicates the equipment set voltage		N
	PORTABLE EQUIPMENT indication is visible from the exterior		N
	Changing the setting changes the indication		N
5.1.3e)	Accessory mains socket-outlets accepting standard mains plugs are marked:	No socket outlet	N
	With the voltage if it is different from the mains supply voltage .....:		N
	For use only with specific equipment		N
	If not marked for specific equipment it is marked with:		N
	The maximum RATED current or power; or		N
	Symbol 14 with full details in the documentation		N
5.1.4	Fuses	No fuse incorporated	N
	OPERATOR replaceable fuse marking (see also 5.4.5) .....:		N
5.1.5	TERMINALS, connections and operating devices		P
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators marked	Terminal marked with E, P, C as well as symbol 14	P
	If insufficient space, symbol 14 used	Marked	P
5.1.5.1	TERMINALS	See § 5.1.5	P
	Mains supply TERMINALS identified		N
	Other TERMINAL marking .....:		P
5.1.5.1a)	FUNCTIONAL EARTH TERMINALS (symbol 5 used)		N
5.1.5.1b)	PROTECTIVE CONDUCTOR TERMINALS:		N
	Symbol 6 is placed close to or on the TERMINAL; OR		N
	Part of appliance inlet		N

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
5.1.5.1c)	TERMINALS of measuring and control circuits (symbol 7 used)		N
5.1.5.1d)	HAZARDOUS LIVE TERMINALS supplied from the interior	Due to the function of this earth resistance tester have 3 possibilities to generate hazard voltage: -When pressing the "SIMPLIFIED MEAS." Button, it will generate a possible maximum 130Vpeak AC (across E-P terminal) for testing the earth resistance. -When pressing the "MEAS." Button, it will generate a possible maximum 130Vpeak AC (across E-C terminal) for testing the earth resistance. -When pressing the "BATT.CHECK" Button, it will generate a possible maximum 130Vpeak AC (across P-C terminal) Mentioned in user manual.	P
	Standard MAINS socket outlet; or		N
	RATINGS marked; or		N
	Symbol 14 used	Marked on panel below the terminals	P
5.1.5.1e)	ACCESSIBLE FUNCTIONAL EARTH TERMINALS:		N
	Self-evident; or		N
	Indication (symbol 8 acceptable)		N
5.1.5.2	Measuring circuit TERMINALS		P
	For TERMINALS other than those permanently connected and not ACCESSIBLE:		N
	RATED voltage or current marked		N
	Unless clear indication that below limits:		N
	Maximum RATED voltage to earth is marked; or		N
	For specific connection to other equipment TERMINALS only, and means for identifying provided		N

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
	Appropriate measurement category marked (CAT II, CAT III or CAT IV); or		N
	No measurement category marked (CAT I)	CAT I marked on tester surface.	P
	Required markings are adjacent to TERMINALS; OR		N
	If insufficient space:		N
	On the RATING plate or scale plate; or		N
	TERMINAL is marked with symbol 14	Marked below the measuring terminals. Also, measuring terminal with specified colour to match with specified coloured test leads provided by manufacturer.	P
5.1.6	Switches and circuit breakers	Switches are not for such purpose.	N
	If disconnecting device, on or off position marked		N
5.1.7	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		P
	Protected throughout (symbol 11 used)	Marked on tester surface	P
	Only partially protected (symbol 11 not used)		N
5.1.8	Field-wiring TERMINAL boxes		N
	If TERMINAL or ENCLOSURE exceeds 60 °C:	(See Form A.21A)	N
	Cable temperature RATING marked		N
	Marking visible or beside TERMINAL		N
5.2	Warning markings		P
	Visible when ready for NORMAL USE	Batteries polarity marking and caution symbol are visible.	P
	Are near or on applicable parts	Inside the battery compartment & on surface of tester.	P
	Symbols and text correct dimensions and colour		P
	If necessary marked with symbol 14	Marked on surface of tester and have corresponding sentences inside user manual for warning.	P
	Statement to isolate or disconnect		N
5.3	Durability of markings		P

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
	The required markings remain clear and legible in NORMAL USE	(see Form A.4)	P
5.4	Documentation		P
5.4.1	General		P
	Equipment is accompanied by documentation which includes:		P
5.4.1a)	Intended use		P
5.4.1b)	Technical specification		P
5.4.1c)	Instructions for use		P
5.4.1d)	Name and address of manufacturer or supplier	Manufacturer name and address are marked on user manual	P
5.4.1e)	Information specified in 5.4.2 to 5.4.5		P
5.4.1f)	If marking of TERMINALS required, definition of measurement category		N
5.4.1g)	If CAT 1:		N
	Warning		N
	RATINGS		N
	Warning statements and a clear explanation of warning symbols:		N
	Provided in the documentation; or		N
	Information is marked on the equipment		N
5.4.2	Equipment RATINGS		P
	Documentation includes:		P
5.4.2a)	Supply voltage or voltage range		P
	Frequency or frequency range	DC	N
	Power or current RATING		N
5.4.2b)	Description of all input and output connections	Measuring probe terminal has colour and letter indication (E, C, P) for description	P
5.4.2c)	RATING of insulation of external circuits, when such circuits are nowhere ACCESSIBLE		N
5.4.2d)	Statement of the range of environmental conditions		P
5.4.2e)	Degree of protection (IEC 60529)		N
5.4.3	Equipment installation		P

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
	Documentation includes instructions for:		P
5.4.3a)	Assembly, location and mounting		P
5.4.3b)	Protective earthing		N
5.4.3c)	Connections to supply		N
5.4.3d)	PERMANENTLY CONNECTED EQUIPMENT:		N
	1) Supply wiring requirements		N
	2) If external switch or circuit-breaker, requirements and location recommendation		N
5.4.3e)	Ventilation requirements		N
5.4.3f)	Special services (e. g. air, cooling liquid)		N
5.4.3g)	Maximum sound power level		N
5.4.3h)	Instructions about sound pressure		N
5.4.3i)	Permanently connected measuring TERMINALS:		N
	Measurement category		N
	RATED MAXIMUM WORKING VOLTAGE or current		N
5.4.4	Equipment operation		P
	Instructions for use include:		P
5.4.4a)	Identification of operating controls		P
5.4.4b)	Positioning for disconnection		N
5.4.4c)	Interconnection		N
5.4.4d)	Specification of intermittent operation limits		N
5.4.4e)	Explanation of symbols used	Symbol 14 has explanation in user manual.	P
5.4.4f)	Replacement of consumable materials	Batteries	P
5.4.4g)	Cleaning and decontamination (see 11.2)		N
5.4.4h)	Listing of any poisonous or injurious gases and quantities		N
5.4.4i)	Risk-reduction procedures relating to flammable liquids		N
	A statement about protection impairment if used in a manner not specified by the manufacturer	Mentioned in user manual	P
5.4.5	Equipment maintenance		P
	Instructions include:		N

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
	Sufficient preventive maintenance and inspection information		N
	Replacement of hoses, etc.		N
	Specific battery type	Battery type is mentioned in the user manual.	P
	Any manufacturer specified parts		N
	RATING and characteristics of fuses		N
6	PROTECTION AGAINST ELECTRIC SHOCK	(see Form A.5)	P
6.1	General		P
6.1.1	Requirements		P
	ACCESSIBLE parts not HAZADOUS LIVE in NORMAL CONDITION and SINGLE FAULT CONDITION	All accessible parts are below SELV, no hazard to user.	P
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.11	For test leads, see appended report in page xx	P
6.1.2	Exceptions		N
	Capacitance test	(see Forms A.6 and A.7)	N
	Parts not HAZARDOUS LIVE 10 s after interruption of supply	(see Forms A.6 and A.7)	N
6.2	Determination of ACCESSIBLE parts	(see Form A.6) For test leads probe tips, see appended report in page xx	P
6.2.1	General examination	(see Form A.6)	P
6.2.2	Openings above parts that are HAZARDOUS LIVE	Not parts are hazardous live, not test with terminal.	P
6.2.3	Openings for pre-set controls	Not present control	N
6.3	Permissible limits for ACCESSIBLE parts		N
6.3.1	Values in NORMAL CONDITION	Enclosure measured 0V, except probe tips.	P
6.3.2	Values in SINGLE FAULT CONDITION	Enclosure measured 0V, except probe tips.	P
6.4	Protection in NORMAL CONDITION (see 6.2, 6.3.1, 6.7, 6.8 and 8.1)	All circuit inside the voltage tester is enclosed by the enclosure by reinforced insulation. See § 6.8 and 8.1	P
6.5	Protection in SINGLE FAULT CONDITION	(see Form A.2)	P
	Additional protection is provided by:		N

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
	One or more of 6.5.1 to 6.5.3; or		N
	Automatic disconnection of the supply (6.5.4)		N
6.5.1	Protective BONDING		N
	ACCESSIBLE conductive parts:		N
	Separated by DOUBLE INSULATION or REINFORCED INSULATION; or		N
	Bonded to the PROTECTIVE CONDUCTOR TERMINAL; or		N
	Separated by screen or BARRIER bonded to PROTECTIVE CONDUCTOR TERMINAL from parts which are HAZARDOUS LIVE		N
6.5.1.1	Integrity of PROTECTIVE BONDING		N
6.5.1.1a)	PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		N
6.5.1.1b)	Soldered connections:	No subject to mechanical stress.	N
	Independently secured		N
	Not used for other purposes		N
	Screw connections are secured		N
6.5.1.1c)	PROTECTIVE BONDING not interrupted	Class II	N
6.5.1.1d)	Any moveable connection specifically designed, and meets 6.5.1.3		N
6.5.1.1e)	No external metal braid of cables used		N
6.5.1.1f)	If MAINS supply passes through:		N
	Means provided for passing protective conductor;		N
	Impedance meets 6.5.1.3.		N
6.5.1.1g)	Protective conductors bare or insulated, if insulated, green/yellow	Class II	N
	Exceptions:		N
	1) earthing braids;		N
	2) internal protective conductors etc.;		N
	Green/yellow not used for other purposes		N
6.5.1.1h)	TERMINAL suitable, and meets 6.5.1.2		N
6.5.1.2	PROTECTIVE CONDUCTOR TERMINAL		N

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
6.5.1.2a)	Contact surfaces are metal		N
6.5.1.2b)	Appliance inlet used		N
6.5.1.2c)	For rewireable cords and PERMANENTLY CONNECTED EQUIPMENT, PROTECTIVE CONDUCTOR TERMINAL is close to MAINS supply TERMINALS		N
6.5.1.2d)	If no MAINS supply is required, any PROTECTIVE CONDUCTOR TERMINAL:		N
	Is near TERMINALS of circuit for which protective earthing is necessary		N
	External if other TERMINALS external		N
6.5.1.2e)	Equivalent current-carrying capacity to MAINS supply TERMINALS	(see Form A.9)	N
6.5.1.2f)	If plug-in, makes first and breaks last		N
6.5.1.2g)	If also used for other bonding purposes, protective conductor:		N
	Applied first;		N
	Secured independently;		N
	Unlikely to be removed by servicing; or		N
	Warning marking requires replacement of protective conductor		N
6.5.1.2h)	Protective conductor of measuring circuit:		N
	1) Current RATING;		N
	2) PROTECTIVE BONDING:		N
	Not interrupted; or		N
	Indirect bonding used (see 6.5.1.5)		N
6.5.1.2i)	FUNCTIONAL EARTH TERMINALS allow independent connection		N
6.5.1.2j)	If a binding screw:	No such screw used.	N
	Suitable size for bond wire		N
	Not smaller than M 4 (No. 6)		N
	At least 3 turns of screw engaged		N
	Contact pressure not capable of reduction by deformation of materials		N
	Passes tightening torque test	(see Form A.9)	N

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
6.5.1.3	Impedance of PROTECTIVE BONDING of plug-connected equipment	(see Form A.10)	N
6.5.1.4	Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT	(see Form A.10)	N
6.5.1.5	Indirect bonding for measuring and test equipment	(see Form A.11)	N
6.5.2	DOUBLE INSULATION and REINFORCED INSULATION (see 6.7, 6.8 and 6.9.2)	Enclosure is reinforced insulation.	P
6.5.3	PROTECTIVE IMPEDANCE	(see Form A.12)	N
6.5.3a)	HIGH-INTEGRITY single component used (s. 14.6); or		N
6.5.3b)	A combination of components used; or		N
6.5.3c)	A combination of BASIC INSULATION and current- or voltage-limiting device used		N
	Components, wires and connections are RATED as required		N
6.5.4	Automatic disconnection of the supply	Battery operated, operation base on pressing the "MEAS." & "SIMPLIFIED MEAS." button one time and disconnection by pressing the "OFF" button.	N
	If used, it meets :		N
6.5.4a)	Supplied with the equipment; or		N
	Specified by installation instruction		N
6.5.4b)	RATED disconnecting time within limit specified		N
6.5.4c)	RATED for maximum RATED LOAD	Loading is depends on earthing circuit connected to tester.	N
6.6	Connections to external circuits		P
6.6.1	General		N
	Connections do not cause ACCESSIBLE parts of the following to become HAZARDOUS LIVE in NORMAL CONDITION or SINGLE FAULT CONDITION:		N
6.6.1a)	The external circuits		N
6.6.1b)	The equipment		N
	Separation of circuits provided; or		N
	Short circuit of separation does not cause a Hazard		N
	Instructions or markings include:		N

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EN 61010-1			
Clause	Requirement - Test	Result - Remark	Verdict
	1) RATED conditions for TERMINAL		N
	2) Required RATING of external circuit insulation		N
6.6.2	TERMINALS for external circuits		N
	TERMINALS which receive a charge from an internal capacitor are not HAZARDOUS LIVE	(see Form A.7)	N
	High voltage TERMINALS energized from the interior are:		N
	Not ACCESSIBLE if connected; or		N
	Unmated HAZARDOUS LIVE TERMINALS not ACCESSIBLE ; or		N
	marked with symbol 12		N
6.6.3	Circuits with TERMINALS which are HAZARDOUS LIVE		N
	These circuits are:		N
	Not connected to ACCESSIBLE conductive parts; or		N
	Connected to ACCESSIBLE conductive parts, but are not MAINS CIRCUITS and have one TERMINAL contact at earth potential		N
	No ACCESSIBLE conductive parts are HAZARDOUS LIVE		N
6.6.4	ACCESSIBLE TERMINALS for stranded conductors		N
6.6.4a)	No risk of accidental contact because:		N
	Located or shielded		N
	Self-evident or marked whether connected to ACCESSIBLE conductive parts		N
6.6.4b)	ACCESSIBLE TERMINALS will not work loose		N
6.7	CLEARANCES and CREEPAGE DISTANCES	(See Form A.5 and A.13)	P
6.8	Procedure for dielectric strength tests	(See Form A.5 and A.14)	P
6.9	Constructional requirements for protection against electric shock		P
6.9.1	General	Not possible	N
	If a failure could cause a HAZARD:	Not possible	N
6.9.1a)	Security of wiring connections	Not possible	N
6.9.1b)	Screws securing removable covers	Not possible	N
6.9.1c)	Accidental loosening	Not possible	N

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Clause	Requirement - Test	Result - Remark	Verdict
	Easily damaged materials not used		N
	Non-impregnated hydroscopic materials not used		N
6.9.2	ENCLOSURES of equipment with DOUBLE INSULATION or REINFORCED INSULATION	Enclosure is reinforced insulation.	P
	ENCLOSURE surrounds all metal parts except for small metal parts which are separated	All electronics circuit is surround by enclosure.	P
	ENCLOSURES or parts made of insulating material	Enclosure is insulating material.	P
	Protection for metal ENCLOSURES or parts by:		N
6.9.2a)	An insulating coating or BARRIER on the inside; or		N
6.9.2b)	CLEARANCES and CREEPAGE DISTANCES cannot be reduced by loosening of parts or wires	Wires inside the tester are routed by cable tie to prevent loosen.	P
6.9.3	Over-range indication	Analoge Meter	P
	Unambiguous	Yes, for earth resistance	P
6.10	Connection to MAINS supply source and connections between parts of equipment	Not intended to connect to mains.	N
6.10.1	MAINS supply cords		N
6.10.1a)	RATED for maximum equipment current (see 5.1.3c)		N
	Cable complies with IEC 60227 or IEC 60245		N
6.10.1b)	Heat-resistant if likely to contact hot parts	No hot parts	N
6.10.1c)	Temperature RATING (cord and inlet)		N
6.10.1d)	Green/yellow used only for connection to PROTECTIVE CONDUCTOR TERMINALS	Class II	N
	Detachable cords with IEC 60320 MAINS connectors:		N
	Conform to IEC 60799; or		N
	Have the current RATING of the MAINS connector		N
6.10.2	Fitting of non-detachable MAINS supply cords		N
	Non-detachable cord protection:		N
6.10.2a)	Inlet or bushing smoothly rounded; or		N
6.10.2b)	Insulated cord guard protruding ≥5D		N
	The protective earth conductor is the last to take the strain		N
6.10.2	Cord anchorages:	No cord anchorage used.	N

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Clause	Requirement - Test	Result - Remark	Verdict
6.10.2a)	Cord is not clamped by direct pressure from a screw		N
6.10.2b)	Knots are not used		N
6.10.2c)	Cannot push the cord into the equipment to cause a hazard		N
6.10.2d)	No failure of cord insulation in anchorage with metal parts		N
6.10.2e)	Compression bushing:	No such bushing	N
	1) Clamps all types and sizes of MAINS cords; and		N
	2) Is suitable:		N
	For connection to TERMINALS provided; or		N
	It is designed for screened MAINS cord		N
6.10.2f)	Cord replacement does not cause a HAZARD and method of strain relief is clear		N
	Push-pull test	(see Form A.15)	N
6.10.3	Plugs and connectors	Tester is supply by DC (battery)	N
6.10.3a)	MAINS supply plugs, connectors etc., conform with relevant specifications		N
6.10.3b)	If equipment supplied at voltages below 6.3.2.a) or from a sole source:		N
	Plugs of supply cords do not fit MAINS sockets above RATED supply voltage		N
	MAINS-type plugs used only for connection to MAINS supply		N
6.10.3c)	Plug pins which receive a charge from an internal capacitor	(See Form A.7)	N
6.10.3d)	Accessory MAINS socket outlets:	No such things	N
	1) Marking if accepts a standard MAINS plug (see 5.1.3e)		N
	2) Input has a protective earth conductor if outlet has earth TERMINAL contact		N
6.11	Disconnection from supply source		P
6.11.1	General	See § 6.11.1.1	N
	Disconnects all current carrying conductors		N
6.11.1.1	Exceptions		P

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Clause	Requirement - Test	Result - Remark	Verdict
6.11.1.1a)	Equipment supplied by low energy source; or	Earth resistance tester is supply by 8 pieces 1.5V AA size batteries.	P
6.11.1.1b)	Equipment connected to impedance protected supply; or		N
6.11.1.1c)	Equipment constitutes an impedance protected load		N
6.11.2	Requirements according to type of equipment		N
6.11.2.1	PERMANENTLY CONNECTED EQUIPMENT and multi-phase equipment	Portable	N
	Employs switch or circuit-breaker		N
	If switch or circuit-breaker is not part of the equipment, documentation specifies:		N
6.11.2.1a)	Switch or circuit-breaker to be included in building installation		N
6.11.2.1b)	Location		N
6.11.2.1c)	Marking		N
6.11.2.2	Single-phase cord-connected equipment		N
	Equipment is provided with:		N
6.11.2.2a)	Switch or circuit-breaker; or		N
6.11.2.2b)	Appliance coupler (disconnectable without TOOL); or		N
6.11.2.2c)	Separable plug (without locking device)		N
6.11.2.3	HAZARDS arising from function		N
	Emergency switch		N
	Emergency switch ≤ 1 m from the moving part		N
6.11.3	Disconnecting devices		N
	Electrically close to the supply		N
6.11.3.1	Switches and circuit-breakers	See § 6.11.1.1	N
	When used as disconnection device:		N
	Meets IEC 60947-1 and IEC 60947-3		N
	Marked to indicate function		N
	Not incorporated in MAINS cord		N
	Does not interrupt protective earth conductor		N

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Clause	Requirement - Test	Result - Remark	Verdict
	If has other contacts meets separation requirements of 6.6 and 6.7		N
6.11.3.2	Appliance couplers and plugs		N
	Where an appliance coupler or separable plug is used as the disconnecting device (see 6.11.2.2):		N
	Readily identifiable and easily reached by the OPERATOR		N
	Single-phase PORTABLE EQUIPMENT cord length ≤ 3 m		N
	Protective earth conductor connected first and disconnected last		N
7	PROTECTION AGAINST MECHANICAL HAZARDS		P
7.1	General		P
	Conformity is checked by 7.2 to 7.6		P
7.2	Moving parts	No moving part	N
	Moving parts not able to crush, etc. (see also 6.11.2.3)		N
	If OPERATOR access permitted:		N
7.2a)	Access requires TOOL		N
7.2b)	Statement about training		N
7.2c)	Warning markings or symbol 14		N
7.3	Stability	Portable, checked	P
	Marking of non-automatic means		N
	Conformity tests:		N
7.3a)	10° tilt test		P
7.3b)	multi-directional force test		N
7.3c)	downward force test		N
7.4	Provisions for lifting and carrying	Intended to be carried by hand, without handles or grips	N
	Handles or grips withstand four times weight		N
	Equipment >18 kg:		N
	Has means for lifting or carrying; or		N
	Directions in documentation		N
7.5	Wall mounting		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Mounting brackets withstand four times weight		N
7.6	Expelled parts		N
	Equipment contains or limits the energy		N
	Protection not removable without the aid of a TOOL		N
8	MECHANICAL RESISTANCE TO SHOCK AND IMPACT		P
	After the tests of 8.1 to 8.2:		P
	Voltage tests	(see Form A.14)	N
	Inspections:		P
8a)	HAZARDOUS LIVE parts not accessible	No hazardous live parts accessible	P
8b)	ENCLOSURE shows no cracks (hazard)		P
8c)	CLEARANCES not less than their permitted values	(see Form A.13)	P
8d)	BARRIERS not damaged or loosened		P
8e)	No moving parts exposed, except permitted by 7.2	No moving part inside	N
8f)	No damage which could cause spread of fire		P
9	PROTECTION AGAINST THE SPREAD OF FIRE		P
	Conformity for each source of HAZARD or area of the equipment is checked by one of the following:	(See Form A.16)	N
9a)	Fault test of 4.4; or	(See Forms A.1 and A.2)	P
9b)	Application of 9.1 (eliminating or reducing the sources of ignition); or		P
9c)	Application of 9.2 (containment of fire within the equipment)		N
9.1	Eliminating or reducing the sources of ignition within the equipment		P
9.1a)	1) Limited-energy circuit (see 9.3); or		N
	2) Insulation meets the requirements for BASIC INSULATION; OR	(see Form A.5 and A.14)	N
	Bridging the insulation does not cause ignition	(see Form A.2)	N
9.1b)	Surface temperature of liquids and parts (see 9.4.a)	No flammable liquid inside.	N

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Clause	Requirement - Test	Result - Remark	Verdict
9.1c)	No ignition in circuits designed to produce heat	Heat generated inside different part of appliance are very low (<10°C) when short-circuit the test (measuring) terminal, see Form A.20A and (see Form A.2)	P
9.2	Containment of the fire within the equipment, should it occur		N
9.2a)	Energizing of the equipment is controlled by an OPERATOR held switch		N
9.2b)	Enclosure is conform with constructional requirements of 9.2.1; and		N
	Requirements of 9.4b) or c) are met		N
9.2.1	Constructional requirements		N
9.2.1a)	Insulated wires have flammability classification FV1 or better	(see Table 3 or Form A.17)	N
	Connectors and insulating material have flammability classification FV2 or better	(see Table 3 or Form A.17)	N
9.2.1b)	The enclosure is constructed as follows :		N
	1) Bottom constructed with:		N
	No openings; or		N
	Extent as specified in figure 7; or		N
	Baffles as specified in figure 6; or		N
	Perforated as specified in Table 12; or		N
	Metal screen with a mesh		N
	2) Sides have no openings as specified in figure 7		N
	3) Material of ENCLOSURE and any baffle or flame barrier is made of:		N
	Metal (except magnesium); or		N
	Non metallic materials have flammability classification FV1 or better	(see Table 3 or Form A.17)	N
	4) ENCLOSURE and any baffle or flame barrier have adequate rigidity		N
9.3	Limited-energy circuit		N
9.3a)	Potential not more than 30 r.m.s. and 42.4 V peak, or 60 V dc		N
9.3b)	Current limited by one of following means:		N

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Clause	Requirement - Test	Result - Remark	Verdict
	1) Inherently or by impedance; or		N
	2) Overcurrent protective device; or		N
	3) A regulating network limits also in SINGLE FAULT CONDITION		N
9.3c)	Is separated by at least BASIC INSULATION		N
	If overcurrent protective device used:		N
	Fuse or a non adjustable electromechanical device		N
9.4	Requirements for equipment containing or using flammable liquids	No flammable liquid inside.	N
	Flammable liquids contained in or specified for use with equipment do not cause spread of fire		N
	Risk is reduced to a tolerable level:	(see Form A.19)	N
9.4a)	The temperature of surface or parts in contact with flammable liquids is 25 °C below fire point		N
9.4b)	The quantity of liquid is limited		N
9.4c)	Flames are contained within the equipment		N
	Detailed instructions for risk-reduction provided		N
9.5	Overcurrent protection	Voltage tester not energized by mains.	N
	Devices not in the protective conductor		N
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase)		N
9.5.1	PERMANENTLY CONNECTED EQUIPMENT		N
	Overcurrent device:		N
	Fitted within the equipment; or		N
	Specified in manufacturer's instructions		N
9.5.2	Other equipment		N
	Protection within the equipment		N
10	EQUIPMENT TEMPERATURE LIMITS AND RESISTANCE TO HEAT		P
10.1	Surface temperature limits for protection against burns		P
	Easily touched surfaces within the limits	(see Form A.20A)	P
	Heated surfaces necessary for functional reasons exceeding specified values:		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Are recognizable as such by appearance or function; or		P
	Are marked with symbol 13		N
	Guards are not removable without TOOL	No guards	N
10.2	Temperatures of windings	Input and output winding was measured during normal operation (see Form A.20B)	P
	Limits not exceeded in:		P
	NORMAL CONDITION		P
	SINGLE FAULT CONDITION		P
10.3	Other temperature measurements	(see Form A.20A)	P
	Following measurements conducted if applicable:		P
10.3a)	Value of 60 °C of field-wiring TERMINAL box not exceeded		N
10.3b)	Surface of flammable liquids and parts in contact with this liquids		N
10.3c)	Surface of non-metallic ENCLOSURES		P
10.3d)	Parts made of insulating material supporting parts connected to MAINS supply		N
10.3e)	TERMINALS carrying a current more than 0.5 A		N
10.4	Conduct of temperature test	Equipment not intended to produce heat for functional purpose. (see Form A20)	N
10.5	Resistance to heat		P
10.5.1	Integrity of CLEARANCE and CREEPAGE DISTANCES	(See Form A.13)	N
10.5.2	Non-metallic ENCLOSURES	Checked by non-operative treatment: 7hours at temperature of 70°C. (See Forms A.21)	P
	After treatment:	The equipment is no hazard and pass the test of 8.1.1 and 8.1.2	P
	No HAZARDOUS LIVE parts ACCESSIBLE;	No hazardous live part accessible, except test terminal (refer to clause 6.1.2)	P

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Clause	Requirement - Test	Result - Remark	Verdict
	Tests of 8.1 and 8.2	(See Form A.13)	P
	In case of doubt, tests of 6.8 (without humidity preconditioning)	(See Form A.14)	N
10.5.3	Insulating material	Plastic for enclosure, no Insulating materials are support or connected to mains supply For test leads, see appended reports in page xx	P
10.5.3a)	Parts supporting parts connected to MAINS supply		N
10.5.3b)	TERMINALS carrying a current more than 0.5 A		N
	Examination of material data; or		N
	in case of doubt::	See 10.5.3 remarks	N
	1) Ball pressure test; or		N
	2) Vicat softening testof ISO 306		N
11	PROTECTION AGAINST HAZARDS FROM FLUIDS	No fluids inside the appliance	N
11.1	General		N
11.2	Cleaning	(See Form A.23)	N
11.3	Spillage	(See Form A.23)	N
11.4	Overflow	(See Form A.23)	N
11.5	Battery electrolyte	Batteries are hold inside a battery compartment, also there are cover to protect the batteries inside the tester, leakage of electrolyte would not impair to safety.	P
	Battery electrolyte leakage presents no hazard	Ditto	P
11.6	Specially protected equipment	No specially protected equipment. (See Form A.23)	N
11.7	Fluid pressure and leakage	No fluids inside the appliance	N
11.7.1	Maximum pressure		N
	Maximum pressure of any part does not exceed P_{RATED}		N
11.7.2	Leakage and rupture at high pressure	No fluids inside the appliance. (See Form A.24)	N
	Test to IEC 60335 (refrigeration only)		N

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Clause	Requirement - Test	Result - Remark	Verdict
11.7.3	Leakage from low-pressure parts	(See Form A.24)	N
11.7.4	Overpressure safety device		N
	Does not operate in NORMAL USE		N
	Meets ISO 4126-1; and		N
	It is conform with:		N
11.7.4a)	Connected as close as possible to parts intended to be protected		N
11.7.4b)	Easy access for inspection, maintenance and repair		N
11.7.4c)	Adjustment only with TOOL		N
11.7.4d)	No discharge towards person		N
11.7.4e)	No HAZARD from deposit of discharged material		N
11.7.4f)	Adequate discharge capacity		N
11.7.4g)	No shut-off valve between overpressure safety device and protected parts		N
12	PROTECTION AGAINST RADIATION, INCLUDING LASER SOURCES, AND AGAINST SONIC AND ULTRASONIC PRESSURE	No any radiation will emit from appliance.	N
12.1	General		N
	Equipment provides protection		N
12.2	Equipment producing ionizing radiation		N
12.2.1	Ionizing radiation	(See Form A.25)	N
12.2.2	Accelerated electrons		N
12.3	Ultra-violet (UV) radiation	(Conformity test under consideration)	N
	No unintentional and HAZARDOUS escape of UV radiation		N
12.4	Micro-wave radiation		N
	Power density does not exceed 10 W/m^2 .....:		N
12.5	Sonic and ultrasonic pressure		N
12.5.1	Sound level	(See Form A.26)	N
12.5.2	Ultrasonic pressure	(See Form A.26)	N
12.6	Laser sources (IEC 60825-1)		N
13	PROTECTION AGAINST LIBERATED GASES, EXPLOSION AND IMPLOSION		N

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Clause	Requirement - Test	Result - Remark	Verdict
13.1	Poisonous and injurious gases		N
	Attached data/test reports demonstrate conformity		N
13.2	Explosion and implosion	No such components have such hazard.	N
13.2.1	Components		N
	Components liable to explode:		N
	Pressure release device provided; or		N
	Apparatus incorporates OPERATOR protection (see also 7.6)		N
	Pressure release device:		N
	Discharge without danger		N
	Cannot be obstructed		N
13.2.2	Batteries and battery charging	Use non-rechargeable battery	P
	If explosion or fire hazard could occur:	No such hazard.	N
	Protection incorporated in the equipment; or	Inside the battery compartment, clear correct batteries polarity symbol is engraved on each slot.	P
	Instructions specify batteries with built-in protection	No need, see above	N
	In case of wrong type of battery used:	No hazard, the tester would not work.	P
	No HAZARD; or		P
	Warning by marking and within instructions		N
	Equipment with means to charge rechargeable batteries:	Non-rechargeable batteries are use, except user will dispose the batteries after their lifetime is over.	N
	Warning against the charging of non-rechargeable batteries; and		N
	Type of rechargeable battery indicated; or		N
	Symbol 14 used		N
	Battery compartment design	Inside the battery compartment, correct batteries polarity symbol is engraved. (See Form A.27)	P
	Single component failure		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Polarity reversal test	(See Form A.27)	P
13.2.3	Implosion of cathode ray tubes	No such item in appliance	N
	If maximum face dimensions > 160 mm .....:		N
	Intrinsically protected and correctly mounted; or		N
	ENCLOSURE provides protection:		N
	If non-intrinsically protected:		N
	Screen not removable without TOOL		N
	If glass screen, not in contact with surface of tube		N
13.2.4	Equipment RATED for high pressure (See 11.7)		N
14	COMPONENTS	No danger is render because 12V DC batteries supply all the components inside the PCB. Also, the PCB and housing of tester are UL approved with flammability class 94V-0 and 94HB respectively.	P
14.1	General		N
	Where safety is involved, components meet relevant requirements	(see Table 3)	N
14.2	Motors	No motor	N
14.2.1	Motor temperatures		N
	Does not present a HAZARD when stopped or prevented form starting; or	(See Form A.20)	N
	Protected by overtemperature or thermal protection device conform with 14.3		N
14.2.2	Series excitation motors		N
	Connected direct to device, if overspeeding causes a HAZARD		N
14.3	Overtemperature protection devices	No such device in appliance	N
	Devices operating in a SINGLE FAULT CONDITION	(See Form A.28)	N
14.3a)	Reliable function is ensured		N
14.3b)	RATED to interrupt maximum current and voltage		N
14.3c)	Does not operate in NORMAL USE		N
14.4	Fuse holders		N
	No access to HAZARDOUS LIVE parts		N

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Clause	Requirement - Test	Result - Remark	Verdict
14.5	Mains voltage selecting devices		N
	Accidental change not possible		N
14.6	HIGH INTEGRITY components	No such component	N
	Used in applicable positions (see Table 3)		N
	Conforms with IEC publications		N
	Single electronic device not used		N
14.7	Mains transformers tested outside equipment	See Forms A.29 and A.30	N
14.8	Printed circuit boards		P
	Data shows conformity with FV-1 of IEC 60707 or better; or	PCB is UL 94V-0 recognized material	P
	Test shows conformity with FV-1 of IEC 60707 or better; or	See Form A.17	N
	Thin film flexible PCB with limited-energy circuit used		N
14.9	Circuits or components used as transient overvoltage limiting devices	No such device	N
	After test, no sign of overload or degradation		N
15	PROTECTION BY INTERLOCKS	No interlock	N
15.1	General		N
	Interlocks are designed to remove a hazard before OPERATOR exposed		N
15.2	Prevention of reactivation		N
15.3	Reliability		N
	Single fault unlikely to occur; or		N
	Cannot cause a HAZARD		N
16	TEST AND MEASUREMENT EQUIPMENT	Not for current measuring	N
16.1	Current measuring circuits	(see Form A.31)	N
16.2	Multifunction meters and similar equipment	(see Form A.32)	N
	No HAZARD from:		N
	RATED input voltage combinations		N
	Settings of functions		N
	Settings of range controls		N
ANNEX F	ROUTINE TESTS	Not connected to main supply	N

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Clause	Requirement - Test	Result - Remark	Verdict
	Manufacturer's declaration		N

4.4.2	TABLE: Summary of SINGLE FAULT CONDITIONS	Form A.1	P

Subclause	Title	Does not apply	Carried out	Comments
4.4.2.1	PROTECTIVE IMPEDANCE	X		
4.4.2.2	Protective conductor	X		
4.4.2.3	Equipment or parts for short-term or intermittent operation	X		
4.4.2.4	Motors	X		
4.4.2.5	Capacitors		X	See Form A.2
4.4.2.6	Mains transformers Attach drawing of MAINS Txs showing all protective devices (see Forms A.29 and A.30)	X		Transformer inside the tester is not connected to mains.
4.4.2.7	Outputs		X	Output test terminal (E-C) are short-circuited (refer to clause 10.1"temperature measurement result), no hazard.
4.4.2.8	Equipment for more than one supply	X		
4.4.2.9	Cooling – air holes closed – fans stopped – coolant stopped	X X X X		
4.4.2.10	Heating devices – timer overridden – temperature controller overridden – loss of cooling liquid – overfilled or empty or both	X X X X X		
4.4.2.11	Insulation between circuits and parts		X	Reinforced insulation between circuits to parts (enclosure).
4.4.2.12	Interlocks	X		

List below all SINGLE FAULT CONDITIONS not covered by 4.4.2.1 to 4.4.2.12:

Clause 4.4.4.3, after 4.4.2.7 (Same as clause 10.1 "temperature measurement", Form A.20A, refer to it), criteria required by standard meet. Pass

Supplementary information:

(See Form A.2 for details of tests)

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Clause	Requirement - Test	Result – Remark	Verdict

4.4	TABLE: Testing in single FAULT CONDITION – Results			Form A.2	P
Test subclause	Fault No.	Fault description	Td 4.4.3 (NOTE)	How was test terminated Comments	Meets 4.4.4
4.4.2.7	1	Short circuit tester output terminal (E-C) continuously until steady by pressing the "MEAS." button. (Same as clause 10.1 "temperature measurement", Form A.20A, refer to it) Remarks: due to terminal E is the common of P and C, so test result will be the same if terminal E-P shorted.	Measured 2,04mA short-circuit current. Refer to clause 10.1 result.	Until steady Comment: no charring, glowing or flaming of the tissue paper or cheesecloth. No melting of insulation material.	Yes
	2	Short-circuit E-P terminal when pressing "MEAS." Button	Measured 2,04mA short-circuit current.	As above	Yes
	3	Short-circuit C-P terminal when pressing "MEAS." Button	Measured 0mA short-circuit current.	As above	Yes
	4	Short-circuit resistor R23 (10K ohm)	30 minutes	No insulation breakdown, safety keep, test stop	Yes
	5	Short-circuit resistor R32 (3K ohm)	30 minutes	No insulation breakdown, safety keep, test stop	Yes
	6	Short-circuit resistor R7 (3K ohm)	30 minutes	No insulation breakdown, safety keep, test stop	Yes
	7	Short-circuit capacitor C8 (1000pF)	30 minutes	No insulation breakdown, safety keep, test stop	Yes
	8	Short-circuit transformer secondary winding (T-white to T-yellow)	30 minutes	No insulation breakdown, safety keep, test stop	Yes
	9	Short-circuit transformer secondary winding (T-black to T-yellow)	30 minutes	No insulation breakdown, safety keep, test stop	Yes
	10	Short-circuit transformer secondary winding (T-white to T-black)	30 minutes	No insulation breakdown, safety keep, test stop	Yes

NOTE Td = Test duration in h:min:s
Record dielectric strength test on Form A.14 and temperature tests on Form A.20.
Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

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Clause	Requirement - Test	Result - Remark	Verdict

5.1.3c)	**TABLE: Mains supply**		Form A.3	N
	Marked rating ..... :	V		—
	Phase ..... :			—
	Frequency ..... :	Hz		—
	Current ..... :	A		—
	Power ..... :	W		—
	Power ..... :	VA		—

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

Note: Measurements are only required for marked ratings.

Supplementary information:

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Clause	Requirement - Test	Result - Remark	Verdict

5.3	**TABLE: Durability of markings**	Form A.4	P
Marking method (see NOTE)		Agent	
1) Printed on surface		A Isopropyl alcohol	
NOTE – Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.			

Marking location	Marking method (see above)
Identification (5.1.2)	See above
Mains supply (5.1.3)	N
Fuses (5.1.4)	N
TERMINALS and operating devices (5.1.5.1)	N
Measuring circuit TERMINALS (5.1.5.2)	N
Switches and cricuit breakers (5.1.6)	N
DOUBLE/REINFORCED equipment (5.1.7)	See above
Field wiring TERMINAL boxes (5.1.8)	N
Warning marking (5.2)	N
Battery charging (13.2.2)	N

Method	Test agent	Remains legible	Label loose	Curled edges	Comments
		Verdict	Verdict	Verdict	
See above	See above	Yes	No	No	Pass

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Clause	Requirement - Test	Result - Remark	Verdict

6	TABLE: Protection against electric shock - Block diagram of system Form A.5								P
Pollution degree .....:		2	Installation category (overvoltage category).....:						N
Location or	Insulation type	Maximum working	CREEPAGE DISTANCE (NOTE 3)				CLEARANCE (NOTE 3)	Test voltage	Comments
Description	(NOTE 1)	Voltage (NOTE 2)	PWB mm	CTI	Other mm	CTI	mm	(NOTE 2) V	
From test terminal (E, P, C) to housing	RI	AC 130V (declared by client, refer to user manual)	See form A.13	175 (IIIb)	See form A.13	175 (IIIb)	See form A.13	620x1,5 = 992V peak a.c. and d.c.	P
Between test terminal E-P & E-C.	BI	AC 130V (declared by client, refer to user manual)	See form A.13	175 (IIIb)	See form A.13	175 (IIIb)	See form A.13	620V peak a.c. and d.c.	P

NOTE 1 – Type of insulation:	NOTE 2 - Types of voltage	NOTE 3 - INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES)
BI = BASIC INSULATION DI = DOUBLE INSULATION PI = PROTECTIVE IMPEDANCE RI = Reinforced INSULATION SI = Supplementary INSULATION	Peak impulse test voltage (pulse) r.m.s. d.c. peak	or POLLUTION DEGREES which differ from these should be shown under "Comments".

Supplementary Information:

Hand-help probe: -

- **Test lead require RI**
- **Plug of test lead require BI**

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

6.2	**TABLE: List of ACCESSIBLE parts**		**Form A.6**	**P**
6.1.2	Exceptions		Yes	—
6.2	Determination of accessible parts		See below	—
Item	Description	Determination method (NOTE 5)	Exception under 6.1.2 (NOTE 4)	
Housing of tester	---	By test finger	---	
Measuring terminals	E, P, C	By test finger	---	
Test leads	Measuring tools	By test finger	---	
Test lead probe tips	Direct contact to measuring point	---	Except under 6.1.1 of EN 61010-2-31	

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.

Supplementary information

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

6	TABLE: Values in NORMAL CONDITION													Form A.7	P
6.1.1	Exceptions													11.2 Cleaning and decontamination	—
6.3.1	Values in NORMAL CONDITION (see NOTE 1)													11.3 Spillage	—
6.6.2	Terminals for external circuit													11.4 Overflow	—
6.10.3	Plugs and connections														—
Item (see Form A.6)	Voltage			Current				Capacitance		10 s test (NOTE 2)			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			
Housing of tester	0V	-	-	-	-	-	-	-	-	-	-	-	Pass		
Measuring terminals	0V	-	-	-	-	-	-	-	-	-	-	-	Pass		
Test leads	0V	-	-	-	-	-	-	-	-	-	-	-	Pass		

NOTE 1 – The requirements of 6.3.1 include drying out (if specified). For permanently connected equipment, the current values are 1,5 times the specified values.
NOTE 2 – A 5 s test is specified in 6.10.3c).

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

6.3.2	TABLE: Values in SINGLE FAULT CONDITION											Form A.8	P
Item (See Form A.6)	Subclause and fault No. (see FormA.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.			
Housing of tester	4.4, 4.4.2.7	0V	-	-	-	-	-	-	-	-	-	Pass	
Measuring terminals	4.4, 4.4.2.7	0V	-	-	-	-	-	-	-	-	-	Pass	
Test leads	4.4, 4.4.2.7	0V	-	-	-	-	-	-	-	-	-	Pass	

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.

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

6.5.1.1	TABLE: Cross-sectional area of bonding conductors	Form A.9	N
Conductor location		Cross-sectional area mm^2	Verdict

6.5.1.2	TABLE: Tighting torque test			N
Conductor location		Size of Screw	Tighting torque Nm	Verdict

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

6.5.1.3	TABLE: Bonding impedance of plug connected equipment			Form A.10	N
ACCESSIBLE part under test		Test current A	Voltage attained after 1 min V	Calculated resistance (maximum allowed 0,1 Ω) Ω	Verdict

Supplementary information:

6.5.1.4	TABLE: Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT			N
ACCESSIBLE part under test		Test current A	Voltage attained after 1 min (maximum 10 V) V	Verdict

Supplementary information:

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

6.5.1.5	TABLE: Indirect bonding for measuring and test equipment	Form A.11	N
ACCESSIBLE part under test	Voltage attained s	Time for voltage to drop to allowable levels s	Verdict
a) Voltage limiting device	—	—	—

Supplementary Information:

ACCESSIBLE part under test	Voltage applied V	Time for device to trip s	Verdict
b) Voltage-sensitive tripping device			

Supplementary Information:

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Clause	Requirement - Test	Result – Remark	Verdict

6.5.3	TABLE: PROTECTIVE IMPEDANCE	Form A.12	N

A high INTEGRITY single component

Component	Location	Comments

A combination of components

Component	Location	Comments

A combination of BASIC INSULATION and a current or voltage limiting device

Component	Location	Comments

Supplementary information:

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

6.7	TABLE: CLEARANCES and CREEPAGE DISTANCES	Form A.13	P
8	Mechanical resistance to shock and impact		
10.5.1	Integrity of CLEARANCES AND CREEPAGE DISTANCES		

Location (see Form A.5)	Measured (initial – 6.7)		Verdict	Mechanical tests (note)					Test at max. RATED ambient (10.5.1)	Measured after test (if required)		Verdict	Comments
	CREEPAGE DISTANCE mm	CLEARANCE mm		Applied force (6.7) N	Rigidity (8.1) Static	Rigidity (8.1) Dynamic	Drop (8.2) Normal	Drop (8.2) Hand-held/ Plug-in		CREEPAGE DISTANCE mm	CLEARANCE mm		
From test terminal (E, P, C) to housing (accessible part)	9mm	9mm	Pass	30N	Tested, pass	---	---	Tested, pass	40°C	9mm	9mm	Pass	Measurement from measuring terminal to accessible part of enclosure: cr=cl= 9mm For working voltage 130Va.c. -Limit for pollution degree 2, material group IIIb on printed wring board: ≥ 0,34mm (creepage). -Limit for measurement category I: ≥ 0,2mm for clearance, 3,2mm for creepage. Internal to external enclosure in moulding: 5,1mm Enclosure thickness: 3,1mm **Comment: Pass** Remarks: F=1, D1=D2=0,01mm

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

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Clause	Requirement - Test	Result – Remark	Verdict

6.8	**TABLE: Dielectric strength tests** **Form A.14**	**P**
4.4.4.1 b)	Conformity after application of fault conditions[1]	P
6.4	Protection in NORMAL CONDITION	P
6.5.2	DOUBLE INSULATION and REINFORCED INSULATION	P
6.6.1	Connections to external circuits	N
6.7.3.1 c)	CLEARANCE values – General: reduced CLEARANCES for homogeneous construction	N
6.10.2.5	Fitting of non-detachable MAINS SUPPLY cords[1]	N
8	Mechanical resistance to shock and impact	N
9.1 a) 2)	Eliminating or reducing the sources of ignition within the equipment	N
9.3 c)	Limited-energy circuit	N
11.2	Cleaning[1]	N
11.3	Spillage[1]	N
11.4	Overflow[1]	N
11.6	Specially protected equipment[1]	N
[1] Record the fault, test or treatment applied before the dielectric strength test		
	Test site altitude ..... : Normal	—
	Test voltage correction factor (see Table 10) ... : Nil	—

Location or references from Forms A.2 and A.3	Clause or sub-clause	Humidity Yes/No	Working voltage V	Test voltage r.m.s/peak/d.c V	Comments	Verdict
From test terminal to housing	After § 6.8.2	Yes	130Va.c.	992V peak a.c. and d.c.	No insulation breakdown	P
Between test terminal E and P	After § 6.8.2	Yes	130Va.c.	620V peak a.c. and d.c.	No insulation breakdown	P

Supplementary information:

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Clause	Requirement - Test	Result – Remark	Verdict

6.10.2	TABLE: Cord anchorage					Form A.15	N
Location		Mass kg	Pull N	Verdict	Torque Nm	Verdict	Comment
Supplementary information:							

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

9	TABLE: Protection against the spread of fire			Form A.16	N
Item	Source of HAZARD or area of the equipment considered (circuit, component, liquid etc.)	Protection Method (9a, 9b or 9c)	Protection details		Verdict
Supplementary information:					

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Clause	Requirement - Test	Result – Remark	Verdict

9.2.1	**TABLE: Constructional requirements**	**Form A.17**	**N**
14.8	Printed circuit boards		
Material tested ..... :			—
Generic name ..... :			—
Material manufacturer ..... :			—
Type ..... :			—
Colour ..... :			—
Conditioning details ..... :			—

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

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

9.3	TABLE: Limited-energy circuit					Form A.18	N
Item	9.3 a)	9.3 b) Current and power limitation			9.3 c)	Decision	
or Location (see Form A.16)	Maximum potential in circuit voltage r.m.s./d.c. V	Maximum available current A	Maximum available power VA	Overload protection after 120 s A	Circuit separation	Yes/No	Comments
Supplementary information:							

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

9.4	TABLE: Requirements for equipment containing or using flammable liquids		Form A.19	N
Type of liquid	9.4 Flammable liquids			Verdict
	b) quantity	c) Containment		
Supplementary information:				

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

10.	**TABLE: Temperature Measurements**	**Form A.20A**	**P**
10.1	Surface temperature limits - NORMAL CONDITION and / ~~OF SIGNLE FAULT CONDITION~~		P
10.2	Temperature of windings- NORMAL CONDITION and / ~~OF SIGNLE FAULT CONDITION~~		P
10.3	Other temperature measurements		---

Operating conditions:	Under 40°C ambient, pressing the "SIMPLIFIED MEAS." Button and short-circuit the E-P terminal, run until steady. Remarks: according to appliance construction, C and P terminal will automatically short-circuit together when "SIMPLIFIED MEAS." Button was pressed.

Frequency.....:	--- Hz	Test room ambient temperature (t_a) .... :	40,0°C
Voltage .....:	12V DC	Test duration..... :	104 minutes until steady

Part / Location	t_m °C	t_c °C	t_{max} °C	Verdict	Comments
External enclosure (hottest point)	41,6	---	80	P	Uncertainty of temperature ± 1,5°C
Push button	41,7	---	70	P	Uncertainty of temperature ± 1,5°C
Batteries body	45,7	---	80	P	Uncertainty of temperature ± 1,5°C
PCB (hottest point)	48,0	---	105	P	Uncertainty of temperature ± 1,5°C
Ambient:	40,0	---	---	---	

NOTE 1 - t_m = measured temperature
t_c = t_m corrected (t_m–t_a+ 40 °C or max. RATED ambient)
t_{max} = maximum permitted temperature
NOTE 2 - See also 14.1 with reference to component operating conditions
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary
NOTE 4 - See Form A.20B for details of winding temperature measurements

Supplementary information:

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Clause	Requirement - Test	Result – Remark	Verdict

10.2	**TABLE: Temperature of windings Resistance method Temperature Measurements**	**Form A.20B**	P
4.4.2.6	MAINS Transformers		P
14.2.1	~~Motor temperatures~~		N

Operating conditions:	Same as 10.1		
Frequency.....:	--- Hz	Test room ambient temperature (t_{a1}/t_{a2}) .. :	40, / 40, °C (initial / final) 0 0
Voltage .....:	12 V V DC	Test duration..... :	h 104 min

Part / Designation	R_{cold} Ω	R_{warm} Ω	Current A	t_r K	t_c °C	t_{max} °C	Verdict	Comments
Primary winding of Transformer	---	---	---	---	45,9	105 (Class A)	P	---
Secondary winding of Transformer	---	---	---	---	46,4	108 (Class A)	P	---

NOTE 1- R_{cold} = initial resistance; R_{warm} = final resistance
t_r = temperature rise; t_c = t_r corrected ($t_c = t_r - \{t_{a2} - t_{a1}\} + [40\ °C$ or max RATED ambient$]$)
t_{max} = maximum permitted temperature
NOTE 2 - Indicate insulation class (IEC 85) under comments (optional)
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary

Supplementary information:

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Clause	Requirement - Test	Result – Remark	Verdict

10.5.2	**TABLE: Resistance to heat of non-metallic enclosures** **Form A.21**		P
	Test method used:	Checked by non-operative treatment: 7hours at temperature of 70°C.	—
	Non operative treatment ..... :	[ ]	---
	Empty ENCLOSURE ..... :	[X]	---
	Operative treatment ..... :	[ ]	---
	Temperature during tests ..... :	See above	—
	ENCLOSURE samples tested were ..... :	Comply with standard	—

Description	Material	Comments	Verdict
7hours at temperature of 70°C.	ABS, 94HB, 60°C, UL file no.: E50263 (S)	Enclosure has shown no cracks/deform that impair to safety and and pass the test of 8.1.1 and 8.1.2	P

	Dielectric strength test (6.8) ..... :		V	r.m.s./peak/d.c.	

Supplementary information:

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Clause	Requirement - Test	Result – Remark	Verdict

10.5.3	**TABLE: Insulating Materials**		**Form A.22**	N
10.5.3a)	Ballpressure test			
	Max. allowed impression diameter ..... :	2 mm		—

Part	Test temperature °C	Impression Diameter (mm)	Verdict

Supplementary information:

10.5.3b)	Vicat softening test (ISO 306)		N
Part	Vicat softening temperature °C	Thickness of sample (mm)	Verdict

Supplementary information:

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

8	**TABLE: Mechanical resistance to shock and impact**	**Form A.23**	**P**
11	**Protection against hazards from fluids**		

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.

	Clause 8 tests				Clause 11 tests							
Location (see form A.5)	Static	Dynamic	Normal	Handheld Plug-in	Cleaning (11.2)	Spillage (11.3)	Overflow (11.4)	IEC 60529 (11.6)	Working voltage V	Test voltage V	Verdict	Comments
From test terminal to housing	-	-	-	Tested	-	-	-	-	130Va.c.	992V peak a.c. and d.c.	Pass	---
Between test terminal E & P	-	-	-	Tested	-	-	-	-	130Va.c.	620V peak a.c. and d.c.	Pass	---
Test leads	-	-	-	Tested	-	-	-	-	130Va.c.	992V peak a.c. and d.c.	Pass	---

NOTE – Use r.m.s., d.c. or peak to indicate the used test voltage.

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Clause	Requirement - Test	Result – Remark	Verdict

11.7.2	TABLE: Leakage and rupture at high pressure	Form A.24	N

Part	Maximum permissible working pressure MPa	Test pressure MPa	Leakage YES / NO	Burst YES / NO	Comments

Supplementary information:

11.7.3	Leakage from low-pressure parts	N

Part	Test pressure MPa	Leakage YES / NO	Comments

Supplementary information:

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EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

12.2.1	TABLE: Ionizing radiation		Form A 25	N
Locations tested	Measured values µSv/h	Verdict	Comments	

Supplementary information:

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

12.5.1	TABLE: Sound level	Form A.26	N
Locations tested	Measured values dBA	Calculated maximum sound pressure level	
At operator's normal position and at bystanders' positions			
a)			
b)			
c)			
d)			
e)			
Supplementary information:			

12.5.2	Ultrasonic pressure			N
Locations tested	Measured values		Comments	
	dB	kHz		
At OPERATOR'S normal position				
At 1 m from the ENCLOSURE				
a)				
b)				
c)				
d)				
e)				
NOTE – No limit is specified at present, but a limit of 110 dB above the reference pressure value of 20 µPa is under consideration for applicable frequencies between 20 kHz and 100 kHz.				
Supplementary information:				

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Clause	Requirement - Test	Result – Remark	Verdict

13.2.2	**TABLE: Batteries**	**Form A.27**	**P**
	Battery load and charging circuit diagram:		—

	Battery type ..... :	AA	—
	Battery manufacturer/model/catalogue No. ..... :	Various	—
	Battery ratings ..... :	1.5V DC per each	—
	Reverse polarity instalment test	Although reverse polarity instalment is possible, but no heat/fire are generate.	P

Single component failures	Verdict	
Component	Open circuit	Short circuit
8 x 1.5V AA size batteries (Reverse polarity instalment test)	Appliance still operable and no heat/fire is generated (visual check)	---
8 x 1.5V AA size batteries (short-circuit test)	---	Heat generated from batteries and tester enclosure are 109,6°C & 34,7°C, enclosure no explosion or leakage during testing, also batteries compartment have cover on it. So user cannot touch or even user can touch, he/she would not be endangering. (Visual check)
Supplementary information:		

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Clause	Requirement - Test	Result – Remark	Verdict

14.3	**TABLE: Over temperature protection devices**	**Form A.28**	**N**

Reliability test

Component	Type (note)	Verdict	Comments

NOTE:
NSR = non-self-resetting (10 times)
NR = non-resetting (1 time)
SR = self-resetting (200 times)

Supplementary information:

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EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

4.4.2.6	**TABLE: Mains transformer**	**Form A.29**	**N**
4.4.2.6.1	Short circuit		
14.7.1	MAINS transformers tested outside equipment		
Type..... :			—
Manufacturer ..... :			—
Test in equipment			
Test on bench			
Test repeated inside equipment (see 14.7)			
Optional – Insulation class (IEC 60085) of the lowest RATED winding ..... :			—

Winding identification				
Type of Protector for winding (Note 1)				
Elapsed time				
Current, A primary				
secondary				
Winding temperature, °C primary				
(see Note 2) secondary				
Tissue paper / cheesecloth OK ? (Pass / Fail)				
Voltage tests (see Note 3)				
primary to secondary	_____ V ____			
primary to core	_____ V ____			
secondary to secondary	_____ V ____			
secondary to core	_____ V ____			
Verdict				

Note 1: Primary fuse - PF / ( ) A
Secondary fuse - SF / ( ) A
Overtemperature protection - OP / ( ) °C
Impedance protection - Z

Note 2: Indicate method of measurement TC = with thermocouple
R = resistance method
If resistance method is used,record resistance in cold and warm condition in FormA.20B!

Note 3: Record the voltage applied and the type of voltage (r.m.s. / d.c. / peak) and for results use NB = no breakdown or B = breakdown

Supplementary information:

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Clause	Requirement - Test	Result – Remark	Verdict

4.4.2.6	**TABLE: Mains transformer**				**Form A.30**	**N**
14.7.2	Overload tests (for mains transformers)					
Type..... :						—
Manufacturer ..... :						—
Test in equipment						
Test on bench						
Test repeated inside equipment (see 14.7)						
Optional – Insulation class (IEC 60085) of the lowest RATED winding ..... :						—
Winding identification						
Type of Protector for winding (Note 1)						
Elapsed time						
Current, A primary						
secondary						
Winding temperature, °C primary						
(see Note 2) secondary						
Tissue paper / cheesecloth OK ? (Pass / Fail)						
Voltage tests (see Note 3)						
primary to secondary	_____ V ____					
primary to core	_____ V ____					
secondary to secondary	_____ V ____					
secondary to core	_____ V ____					
Verdict						

Note 1: Primary fuse - PF / ( ) A
Secondary fuse - SF / ( ) A
Overtemperature protection - OP / ( ) °C
Impedance protection - Z

Note 2: Indicate method of measurement TC = with thermocouple
R = resistance method
If resistance method is used,record resistance in cold and warm condition in FormA.20B!

Note 3: Record the voltage applied and the type of voltage (r.m.s. / d.c. / peak) and for results use NB = no breakdown or B = breakdown

Supplementary information:

EN 61010-1			
Clause	Requirement - Test	Result – Remark	Verdict

16.1	**TABLE: Current measuring circuits**	**Form A.31**	**N**

These tests are 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	Verdict	Comments

Supplementary information:

b) Range changing switches

Type / Model	Maximum rated current of switch A	Cycling test Verdict	Comments

Supplementary information:

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Clause	Requirement - Test	Result – Remark	Verdict

16.2	**TABLE: Multifunctional meters and similar equipment**	**Form A. 32**	**N**
	Operating conditions ..... :		—
	Maximum RATED voltage applied (V) ..... :		—
	Measurement category ..... :		—
	Test source limit (KVA) ..... :		—

Function	Range	Verdict

Supplementary information:

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Clause	Requirement - Test	Result – Remark	Verdict
II	**Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-31: Safety requirement for hand-help probe assemblies for electrical measurement and test (EN 61010-2-31: 2002)**		P
4.4	Testing in SINGLE FAULT CONDITION (SFC)		P
4.4.2.1	Probe assembly for short term or intermittent operation		N
4.4.2.2	Outputs shall be shorted of type B and C assemblies	Type A probe assembly	N
4.4.2.3	Insulation below basic shall be shorted	No such insulation	N
4.4.2.4	Components in type B or C assemblies shall be shorted	Type A probe assembly	N
5	MARKING AND DOCUMENTATION		P
5.1.2	Identification; probe assembly is identified by:		P
	- if designed for use only with a specific model of equipment, either by marking on the probe assembly or in the documentation	Only for one special equipment	N
	- model number, name or other means as minimum for type B and C	Type A probe assembly	N
	- if designed for use only with a specific model of equipment, either by marking on the probe assembly or in the documentation	In the documents	P
5.1.3	Fuses		N
	Operator replaceable fuse marking (with voltage Rating and breaking capacity) if probe assemblies which contain fuses	No fuse	N
5.1.4	If required for safety terminals, connectors and controls shall be indicated	Terminals identified	P
5.1.5	Double insulation equipment shall be marked with symbol 7	See EN 61010-1 report	P
5.1.6	The rating for CAT I and rating and marking for CAT II, CAT III and CAT IV shall be marked	CAT I equipment, probe assembly is an output and measures the voltage drop, therefore voltage marking not required.	P
5.2.	Warning markings		N

EN 61010-1 / EN 61010-2-31			
Clause	Requirement - Test	Result – Remark	Verdict
	Symbol 10 necessary for the protection of the probe assembly and applied close to the part	Not required.	N
	Symbol 10 necessary for accessing part which are hazardous life after using a tool	Not required.	N
5.3	Durability of marking	No marking on test leads	N
5.4	Documentation		P
5.4.1	a) technical specification		P
	b) Instruction for use		P
	c) Name or address of manufacturer for technical assistance	See EN 61010-1 report.	P
	d) Information specified in 5.4.2 to 5.4.4		P
5.4.2	Ratings	The equipment is for ground continuity measurements.	N
5.4.3	Operation		P
	a) Identification of operating controls		P
	b) Instruction for interconnections		P
	c) Limits for intermittent operations		N
	d) Explanation of symbols used	Symbol 10 used, see also EN 61010-1 report.	P
	e) Instructions for replacement of consumables		N
	f) Measurement category		N
	g) For CAT I a warning shall be given not to use the equipment within the other measurement categories	The test leads are only for output and measure the voltage drop.	N
	h) Instruction for cleaning if required	No cleaning required.	N
5.4.4	Maintenance	No maintenance required.	N
	Rating for fuses in the documents	No fuses	N

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EN 61010-1 / EN 61010-2-31			
Clause	Requirement - Test	Result – Remark	Verdict
6	PROTECTION AGAINST ELECTRIC SHOCK		P
6.1.1	Exceptions: a) Parts intended to be replaced by the operator which may be hazardous live only with warning marking in accordance with 5.2 b) Probe tips which comply with 6.4.4	Probe tip meets 6.4.4	P
6.2	Determination of accessibleparts		P
6.2.1	General examination	See report EN 61010-1	P
6.2.2	Openings for pre-set controls	No such parts	N
6.3	Permissible limits for accessible parts		P
	Measurements on probe assemblies are carried out in accordance with figures 4	Complied	P
6.3.1	Values in normal conditions	See report EN 61010-1	P
6.3.1.1	Voltage	See report EN 61010-1	P
6.3.1.2	Current		N
6.3.1.3	Capacitance		N
6.3.2	Values in single fault conditions	See report EN 61010-1	P
6.3.2.1	Voltage	See report EN 61010-1	P
6.3.2.2	Current		N
6.3.2.3	Capacitance		N
6.4	Insulation requirements for protection against electric shock		P
6.4	Insulation requirements for protection against electric shock	b) reinforced insulation incorporated.	P
6.4.1	Connectors		P
	a) Fully mated connectors		P
	i) connectors are not intended to be hand-held after connection shall be insulated by BASIC INSULATION	>20mm	P
	ii) connectors are intended to be hand-held during test shall be insulated by DOUBLE or REINFORCED INSULATION		N
	b) partially mated connectors shall pass the voltage test 6.8 for BASIC INSULATION between the probe tip and a standard test finger electrode	>20mm	P

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EN 61010-1 / EN 61010-2-31			
Clause	Requirement - Test	Result – Remark	Verdict
	c) unmated connectors except locking type, parts which are live shall ...		N
	i) not be accessible	Terminal is not accessible, connected part to test lead is not energized.	P
	...pass the voltage test of 6.8 with 1.25 times of the rated voltage if the working voltage is over 1kVac or 1.5kVdc		N
	ii) Basic Insulation shall be incorporated in unmated socket or stackable connectors		N
	c) does not apply for screw type connectors were the current is limited by an protective impedance consisting of high integrity components		N
6.4.2	Hand-held parts other then connectors		P
	hand-held parts of probe assembly shall meet the requirements of DOUBLE or REINFORCED INSULATION	All hand-held parts are reinforced insulated	P
	-test voltage based on the RATED voltage	Considered 130Vac	P
	-type B assemblies' test voltage based on the RATED voltage but is not less than 500V	Type A assembly	N
	-type B assemblies' test voltage of the reference connector based on the Rated voltage of the assembly divided by the divider ratio, but is not less 500V		N
	-type C' test voltage for the reference connector based on the RATED voltage of its if the voltage level exceeds the levels of 6.3.1.1		N
6.4.3	Cables shall meet the requirements for DOUBLE or REINFORCED INSULATION based on ...		P
	...125V or the maximum Rated voltage of the assembly for type A	Type A, 130Vac was considered	P
	... 500V or the Rated voltage of the assembly divided by the divider ratio for type B		N
	... 125V or the Rated voltage of the assembly divided by the divider ratio for type C		N
6.4.4	PROBE TIP		P
	barrier shall be fitted to provide a protective distance to the probe tip	No barriers fitted, during use not intended for hand-held use	P

EN 61010-1 / EN 61010-2-31			
Clause	Requirement - Test	Result – Remark	Verdict

	CLEARANCE and CREEPAGE between probe tip and the hand-held side	>5mm	P
	except spring-loaded squeeze probes provided that:	No spring loaded probe assembly	N
	a) the spring loaded mechanism prevent the operator touching hazardous life parts		N
	b) CLEARANCE and CREEPAGE distance shall be 45mm longer than the required barrier		N
	if insulated crocodile and similar clips are used there shall be an indication of the limit of safe access	Indication is ring on insulation material	P
	the probe tip of type A assemblies shall not be longer than 19mm, except crocodile clips	14mm	P

6.4.5	Double and reinforced insulation		P
6.4.6	Protective impedance	Not incorporated	N
6.5.	Clearance and creepage distances		P
6.5.1.1	Clearances		P
6.5.1.2	Creepage distances		P
6.5.2	Measuring circuits	CAT I	P
6.5.2.1	Clearance values for II, III and IV	CAT I	N
6.5.2.2	Clearance values for I	Uw = √2x130Vac ≡ 184Vpeak U_M = Uw + Ut Ut = 0V F=(1,25 Uw/Um)-0,25 F=1 D2=0.01mm 0.2mm required	P
6.5.3	Creepage distances	3,2mm required	P
6.6	Dielectric strength test		P
6.6.1	Reference test earth	a), b), c) considered, see report EN 61010-1	P
6.6.2	Humidity pre-conditioning	See report EN 61010-1	P

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EN 61010-1 / EN 61010-2-31			
Clause	Requirement - Test	Result – Remark	Verdict
6.6.3	Conduct of tests	See report EN 61010-1	P
6.6.4	Voltage tests	992Vac required, see EN 61010-1 reports	P
6.7	Constructional requirements for protection against electric shock		P
6.7.1	General		P
6.7.2	Enclosures with double or reinforced insulation	See report EN 61010-1	P
6.7.3	Corona an partial discharge		N
6.7.4	Cable attachment	No damage or reducing of clearance and creepage distances	P
6.7.4.1	Pull Test	18AWG, 36N applied	P
6.7.4.2	Flexing/Pull test	10N, 10000 times	P
6.7.4.3	Rotating flexing test	250 swings	P
7	PROTECTION AGAINST MECHANICAL HAZARDS		P
	Handling of PROBE ASSEMBLIES during normal use shall not lead to hazard (except PROBE TIPS)	no sharp edges or the like	P
8	MECHANICAL RESISTANCE TO SHOCK AND IMPACT		P
	After the tests of 8.1 to 8.3:	See IEC 61010-1 report	P
9	EQUIPMENT TEMPERATURE LIMITS AND PROTECTION AGAINST THE SPREAD OF FIRE	See IEC 61010-1 report	P
10	RESISTANCE TO HEAT		P
10.1	Integrity of clearance and creepage distances		P
10.2	Resistance to heat of PROBE ASSEMBLIES		P
	after the treatment, the PROBE ASSEMBLY shall cause no hazard and shall pass 6.6, 8.1, 8.2 and 8.3	All tests passed	P
11	PROTECTION AGAINST HAZARDS FROM FLUIDS		N
11.1	General		N

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EN 61010-1 / EN 61010-2-31			
Clause	Requirement - Test	Result – Remark	Verdict
11.2	Cleaning	No cleaning with fluids	N
11.3	Specially protected probe assemblies		N
12	COMPONENTS		P
12.1	General		P
12.2	Fuses		N
12.3	High-integrity components		N
12.3.1	Resistors used in protective impedance		N

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TÜV Rheinland Hong Kong Ltd.

Precision Mastech Enterprises Co.
Ms. Connie Keung
-
Room 1709, Hewlett Centre
52 Hoi Yuen Road
Kwun Tong, Kowloon
Hong Kong

Date : 21.05.2003
Our ref. : JCH 01
Your ref.:

Ref : AN Certificate of Conf. Low Voltage D.

Type of Equipment : (Earth Tester)
Model Designation : See Certificate
Certificate No. : AN 50017933 0001
Report No. : 14001596 001

Dear Ms. Connie Keung,

We herewith confirm that a sample of the above mentioned technical equipment has been tested and was found to be in accordance with the relevant requirements.

Enclosed please find your Certificate of Conformity.

We appreciate your kind support and would like to offer our assistance and continuous services in the future.

With kind regards,

Certification Body

Dipl.-Ing. F. Nispel

Enclosure