TEST REPORT

IEC 61010-2-033

Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use

Part 2-033: Particular Requirements for Hand-Held Multimeters for Domestic and Professional Use, Capable of Measuring Mains Voltage

Report Number.....:	HPT-231012L1413S
Date of issue.....:	Oct.18, 2023
Total number of pages.....:	25 Pages
Name of Testing Laboratory preparing the Report.....:	Shenzhen Huapin Testing Technology Co., Ltd.
Applicant's name.....:	Shenzhen Hongda Electronic Technology Co., Ltd
Address.....:	3rd Floor, Building A, Industrial Zone, Yingrenshi Station, Bao'an District, Shenzhen
Test specification:	
Standard.....:	EN IEC 61010-2-033:2021/A11:2021 EN 61010-1:2010/A1:2019
Test procedure.....:	CE-LVD
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC61010_2_033B
Test Report Form(s) Originator.....:	UL(US)
Master TRF.....:	2020-03-20
Test item description.....:	Multimeter
Trade Mark(s).....:	N/A
Manufacturer.....:	Same applicant
Model/Type reference.....:	XL830L, MAS830L, DT830B, DT830D, DT9205A, VC830L, DT266, 1AC-D, VC-890DL, DT9205A+
Ratings	9VDC,1000mA from external battery

Testing procedure and testing location:

Testing Laboratory.....:	**Shenzhen Huapin Testing Technology Co., Ltd.**
Address.....:	Room 302, Comprehensive Building, Songbai Industrial Park, No 4, Yangyong Industrial Road, Tangxiayong Community, YanluoStreet, Bao'an District , Shenzhen.
Date of Test.....:	Oct.12, 2023 to Oct. 18, 2023
Tested by (name + signature).....:	Evan Guo
Reviewed by (name + signature).....:	Kevi Cai
Approved by(name + signature).....:	Lody Guo

List of Attachments (including a total number of pages in each attachment): **Attachment 1: Photos, 3 pages.**	
Summary of testing:	
Tests performed (name of test and test clause): All applicable tests.	**Testing location:** Shenzhen Huapin Testing Technology Co., Ltd. Room 302, Comprehensive Building, Songbai Industrial Park, No 4 , Yangyong Industrial Road, Tangxiayong Community, YanluoStreet, Bao'an District , Shenzhen.
Summary of compliance with National Differences (List of countries addressed): European group differences. (No deviation) ☒ **The product fulfils the requirements of** EN IEC 61010-2-033:2021/A11:2021 EN 61010-1:2010/A1:2019	

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Multimeter

Model: XL830L

Input: 9VDC,1000mA from external battery

Shenzhen Hongda Electronic Technology Co., Ltd

3rd Floor, Building A, Industrial Zone, Yingrenshi Station, Bao'an District, Shenzhen

Made in China

Remark on above marking:

1, The height of CE symbols is more than 5 mm;

2, The height of WEEE symbols is more than 7 mm;

Test item particulars..... :	Multimeter
Classification of installation and use..... :	Portable appliance
Supply Connection..... :	Battery operated
..... :	Class III
Possible 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..... :	2023-10-12
Date (s) of performance of tests..... :	2023-10-12 to 2023-10-18

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies)..... : Same manufacturer

General product information and other remarks:

1. Battery supply: 9VDC,1000mA.
2. All the models are identical to testing model except for model name.

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Clause	Requirement – Test	Result - Remark	Verdict
5	**Marking and Documentation**		P
5.1.2	Identification		P
5.1.5.1	General		P
	If necessary for safety, indication of the purpose of TERMINALS, connectors, controls, and indicators are marked		P
	Where insufficient space, symbol 14 is used.		P
5.1.5.2	TERMINALS		P
	d) HAZARDOUS LIVE TERMINALS supplied from the interior of the hand-held multimeter are marked with the voltage, current, charge or energy value or range, or;		P
	- marked with symbol 12 of Table 1		N/A
	aa) TERMINALS supplied from other TERMINALS which could be HAZARDOUS LIVE, with symbol 12 or 14 of Table 1		N/A
5.1.5.101	Measuring circuit TERMINALS		P
	Marked with rated voltage to earth		N/A
	Each pair or set of measuring circuit TERMINALS are marked with RATED voltage or current or both		P
	TERMINALS RATED for MAINS are marked “CAT III and/or “CAT IV”	CAT III	P
	Alternate markings are used for measuring circuit TERMINALS that do not exceed the levels of 6.3.1		P
	Markings are not used for dedicated measuring circuit TERMINALS, but a means for identification is provided		P
	TERMINALS markings are visible with connectors and TERMINALS mated		P
5.2	Warning markings		P
	Warning markings are visible in NORMAL USE		P
	Warning marking is placed on or near the particular part		P
	Symbols and text correct dimensions and colour.... :		--
	a) Symbols min. 2,75 mm and text 1,5 mm high and contrasting in colour with background		N/A
	b) Symbols or text moulded, stamped or engraved in material min. 2,0 mm high		N/A
	0.5 mm depth or raised if not contrasting in colour		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	If necessary, marked with symbol 14		P
	Statement to isolate or disconnect if access by using a tool to HAZARDOUS LIVE parts is permitted		P
5.4.1	Hand-held multimeter is accompanied by documentation for safety purposes in an accepted language for OPERATOR or RESPONSIBLE BODY		P
	Safety documentation in a selected language for service personnel authorized by the manufacturer		N/A
	aa) indication that probe assemblies are appropriately RATED for MEASUREMENT CATEGORY III or IV and have a suitable voltage RATING for the circuit to be measured		P
	bb) information about each relevant MEASUREMENT CATEGORY (see 5.1.5.101)		P
	If the hand-held multimeter has multiple MEASUREMENT CATEGORY RATINGS, the documentation clearly identifies MEASUREMENT CATEGORIES where the hand-held multimeter may be used or must not be used		N/A
6	**PROTECTION AGAINST ELECTRIC SHOCK**		P
6.5.1	General		P
	ACCESSIBLE parts are prevented from becoming HAZARDOUS LIVE by the primary means of protection and supplemented by one of: ..... :		P
	a) SUPPLEMENTARY INSULATION (see 6.5.3)		N/A
	b) Current or voltage limiting device (see 6.5.6)		P
	c) REINFORCED INSULATION (see 6.5.3)		N/A
	d) PROTECTIVE IMPEDANCE (see 6.5.4)		N/A
6.6	Connections to external circuits		P
6.6.101	Measuring circuit TERMINALS		P
	Conductive parts of unmated measuring circuit TERMINAL are separated by at least.....:		—
	a) For TERMINALS with voltage RATING up to 1000Va.c. or 1500Vd.c. the applicable CLEARANCE AND CREEPAGE DISTANCE of Table 101		P
	b) For TERMINALS with voltage RATING exceeding 1000Va.c. or 1500Vd.c., 2.8mm for the CLEARANCE and CREEPAGE DISTANCE.		N/A
	These TERMINALS also withstand the voltage test of 6.8 with voltage equal to the RATED voltage of TERMINAL multiple by 1.25		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
6.6.102	Specialized measuring circuit TERMINALS		N/A
	Components, sensors, and devices for connecting to specialized measuring circuit TERMINALS are not both ACCESSIBLE and HAZARDOUS LIVE, in either NORMAL CONDITION or SINGLE-FAULT CONDITION		N/A
	Accessible parts did not exceed the levels of 6.3.1 and 6.3.2.....:	See appended Table 6.6.102	N/A
6.7.1.3	CREEPAGE DISTANCES		N/A
	CREEPAGE DISTANCES according to material group I used		N/A
	CREEPAGE DISTANCES according to material group I used for the insulating materials of the TERMINALS connected only to a hand-held probe assembly complying with Part 031		N/A
6.7.1.5	Requirements for insulation according to type of circuit		N/A
	A) 6.7.2 MAINS circuits of OVERVOLTAGE CATEGORY II up to nominal supply voltage of 300 V		N/A
	B) 6.7.3 secondary circuits separated from circuits defined in a) by transformer		N/A
	C) K.1 MAINS circuits of OVERVOLTAGE CATEGORY III and IV or OVERVOLTAGE CATEGORY II over 300 V		N/A
	D) K.2 secondary circuits separated from circuits defined in c) by transformer		N/A
	E) K.3 circuits having one or more of:		N/A
	1) maximum TRANSIENT OVERVOLTAGE above the level of MAINS CIRCUIT		N/A
	2) WORKING VOLTAGE is the sum of more than one circuit or a mixed voltage		N/A
	3) WORKING VOLTAGE includes recurring peak voltage, may include non-sinusoidal or non-periodic waveform		N/A
	4) WORKING VOLTAGE with a frequency above 30 kHz		N/A
	5) MEASURING CATEGORY do not apply to MEASURING CIRCUIT		N/A
	f) K.101 for measuring circuits MEASUREMENT CATEGORY II AND IV		N/A
6.9.101	Hand Held multimeter RATINGS		N/A
	Measuring circuit TERMINALS are RATED min. 300 V a.c. r.m.s. to earth, and;		N/A
	MEASUREMENT CATEGORY III or IV.		P

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Clause	Requirement – Test	Result - Remark	Verdict
	The RATED voltage of measuring circuit TERMINALS is equal to or higher than the RATED voltage to earth		N/A
14	**Components and subassemblies**		P
14.101	Probe assemblies and accessories		P
	Probe assemblies and accessories within the scope of IEC 61010-031, and current sensors within the scope of IEC61010-2-032.		N/A
	Probe assemblies and accessories meet IEC 61010-031.....:		P
101	**Measuring circuits**		P
101.1	General		P
	The hand-held multimeter provides protection against HAZARDS resulting from NORMAL USE and REASONABLY FORESEEABLE MISUSE as specified below.....:		—
	a) Current measuring circuit does not interrupt the circuit being measured during range changing, or during the use of current transformers without internal protection (see 101.2)		P
	b) Electrical quantity for any TERMINAL does not cause a HAZARD when it is applied to compatible TERMINAL in any possible manner (see 101.3)		P
	c) Any interconnection does not cause a HAZARD even if the documentation or markings prohibit the interconnection (see 6.6)		N/A
	d) Other HAZARDS results from REASONABLY FORESEEABLE MISUSE are addressed by RISK assessment (see Clauses 16 and 17)		N/A
	e) A TEMPORARY OVERVOLTAGE or a TRANSIENT OVERVOLTAGE applied on the measuring circuit TERMINALS does not cause a HAZARD		N/A
101.2	Current measuring circuits		P
	When range changing takes place, there is no interruption which could cause a HAZARD.....:	See appended Table 101.2	N/A
	Current transformers without internal protection are adequately protected from interruption.....:	See appended Table 101.2	N/A
101.3	Protection against mismatches of inputs and ranges		P
101.3.1	No HAZARD arises when the highest RATED voltage or current is applied to any compatible TERMINAL		P

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Clause	Requirement – Test	Result - Remark	Verdict
	TERMINALS that are not similar types or TERMINALS that can be accessed only by use of a tool do not need to meet 101.3.1		P
	The hand-held multimeter provides one of the following protections against HAZARDS.....:		—
	a) Use of certified overcurrent protection device (see 101.3.2), or;		N/A
	b) Use of uncertified current limitation device, impedance, or combination of both (see 101.3.3)		N/A
101.3.2	Protection by a certified overcurrent protection device.....:	See appended Table 101.3.2	P
	Overcurrent protection device certified by an independent laboratory and all of the following requirements are met		N/A
	a) RATED at least as high as the highest a.c. and d.c. voltages of any measuring TERMINAL		N/A
	b) The RATED time-current characteristic (speed) is appropriate to prevent HAZARD from any possible combination of input voltages, TERMINALS, and range selection		P
	c) RATED breaking capacities exceed the possible a.c. and d.c. short-circuit currents		P
	Additionally, spacings surrounding the overcurrent protection device are sufficiently large to prevent arcing		P
101.3.3	Protection by uncertified current limitation devices or by impedances.....:	See appended Table 101.3.3	P
	Devices are capable of safely withstanding, dissipating, or interrupting the energy in the case of REASONABLY FORESEEABLE MISUSE		P
	An impedance used for limitation of current meets one or more of the following.....:		N/A
	a) Single component is constructed, selected, and tested for protection against relevant HAZARDS		N/A
	1) the component is RATED for the max voltage that may be present in NORMAL CONDITION or during the REASONABLY FORESEEABLE MISUSE event;		P
	2) if a resistor, it is RATED for twice the power dissipation that may result in NORMAL CONDITION or from the REASONABLY FORESEEABLE MISUSE event;		N/A
	3) meets the applicable CLEARANCE and CREEPAGE requirements of Annex K for BASIC INSULATION		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	b) A combination of components		N/A
	1) withstands the max. voltage that may be present in NORMAL CONDITION or during the REASONABLY FORESEEABLE MISUSE event;		N/A
	2) is able to dissipate the power that may result in NORMAL CONDITION or from the REASONABLY FORESEEABLE MISUSE event;		N/A
	3) meets the applicable CLEARANCE and CREEPAGE requirements of Annex K for BASIC INSULATION		N/A
101.3.4	Test leads for the tests of 101.3.2 and 101.3.3		N/A
	Test leads specified by the manufacturer are used		P
	If the manufacturer has not specified the test leads, tests performed with test leads that meet the following specifications		N/A
	a) length = 1 m;		N/A
	b) cross section of the conductor = 1,5 mm², stranded copper wire;		N/A
	c) hand-held multimeter connector compatible with the measuring circuit TERMINALS;		N/A
	d) connection to the test voltage source via bare wire into suitable screw TERMINALS or thimble connectors (twist-on wire connectors) or equivalent means of providing a low impedance connection;		N/A
	e) arranged as straight as possible;		N/A
	Permanently connected test leads supplied by the manufacturer are used without modification		N/A
101.4	Protection against MAINS overvoltages		
	Minimum CLEARANCE and CREEPAGE equivalent to BASIC INSULATION between MAINS -connected conductive parts of opposite polarity		N/A
	Measuring circuit TERMINALS of a voltage measuring circuit withstand the applicable TRANSIENT OVERVOLTAGE with the voltage measurement function selectors set for the proper function and range, without damage which could cause a HAZARD.....:	See appended Table 101.4	N/A
	Impulse voltage applied while circuit working under conditions of NORMAL USE in combination with the MAINS voltage		N/A
	No HAZARD arise. No flashover of CLEARANCE or breakdown of solid insulation occurs during the test.		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	Partial discharge indicated by a step in the resulting wave occur earlier successive impulse.		N/A
102	Indicating devices		N/A
102.1	General		N/A
102.2	Battery Level		N/A
	A voltage value displayed by the hand-held multimeters is not affected by the expected variation of its battery voltage..... :	See appended Table 102.2	N/A
102.3	Over-range		N/A
	The display gives unambiguous indication of over-range value..... :	See appended Table 102.3	N/A
102.4	Permanent overvoltage		N/A
	The hand-held multimeter is able to withstand permanent overvoltages and continue to give an unambiguous indication of any HAZARD LIVE voltages up to the max. RATED voltage.....:	See appended Table 102.4	N/A
	The value of overvoltage applied to the TERMINALS is based on the TERMINALS' RATED voltage (V)..... :		—
	a) RATED voltage up to 1 000V a.c. r.m.s. the overvoltage value is RATED voltage multiplied by 1.9 without exceeding 1 100V a.c. r. m. s.;		N/A
	b) RATED voltage above 1 000 Va.c. r. m. s., the overvoltage value is the RATED voltage multiplied by 1.1;		N/A
	c) RATED voltage d.c., the overvoltage value is the RATED voltage multiplied by 1.1.		N/A
Annex K.3	**INSULATION FOR CIRCUITS NOT ADDRESSED IN 6.7, K.1, K.2 OR K.101**		P
K.101	Insulation requirements for measuring circuits of MEASUREMENT CATEGORIES III and IV		N/A
K.101.1	General		N/A
K.101.2	CLEARANCES		P
	For hand-held multimeter intended to be powered from the circuit being measured, CLEARANCES for MAINS CIRCUIT are designed according to the requirements of the RATED MEASUREMENT CATEGORY		N/A
	Additional marking requirements in 5.1.5.2 and 5.1.5.101		N/A
	CLEARANCES for measuring circuits of MEASUREMENT CATEGORIES II, III, IV meet Table K.101		P

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Clause	Requirement – Test	Result - Remark	Verdict
	Hand-held multimeter rated to operate at an altitude greater than 2000 m, correction factor of Table K.1 of 61010-1 applied		N/A
	Voltage tests of 6.8.3.1 or 6.8.3.3 of 61010-1		N/A
K.101.3	CREEPAGE DISTANCES		P
	The requirements of K.2.3 of 61010-1 applied		N/A
K.101.4	Solid insulation		P
K.101.4.1	General		N/A
K.101.4.1.1	Solid insulation withstands the electrical and mechanical stresses that may occur in NORMAL USE in all RATED environmental conditions (see 1.4) during the intended life of the hand-held multimeter..... :	See appended Table K.101.4	N/A
	The manufacturer should take the expected life of the hand-held multimeter into account when selecting insulating materials.		N/A
K.101.4.1.2	Test voltage values for testing the long-term stress of solid insulation are calculated ..... :	See appended Table K.101.4	N/A
K.101.4.1.3	Solid insulation also meets the following requirements as applicable		N/A
	a) solid insulation used as an ENCLOSURE or PROTECTIVE BARRIER, the requirements of Clause 8		N/A
	b) moulded and potted parts, the requirements of K.101.4.2		N/A
	c) insulating layers of printed wiring boards, the requirements of K.101.4.3		N/A
	d) thin-film insulations, the requirements of K.101.4.4		N/A
K.101.4.2	Moulded and potted parts		N/A
	Conductors located between same two layers moulded together are separated by at least the applicable minimum distance of Table K.105		N/A
K.101.4.3	Insulating layers of printed wiring boards		N/A
	For BASIC INSULATION, SUPPLEMENTARY INSULATION and REINFORCED INSULATION, conductors located between the same two layers is separated by at least the applicable minimum distance of Table K.105.		N/A
	REINFORCED INSULATION have adequate electric strength; one of the following methods are used:		N/A
	a) thickness at least the applicable value of Table K.105.		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	b) insulation is assembled from at least two separate layers, each RATED for test voltage of Table K.102 to K.103 for BASIC INSULATION		N/A
	c) insulation is assembled from at least two separate layers, where the combination is RATED for test voltage of Table K.102 to K.103 for REINFORCED INSULATION		N/A
K.101.4.4	Thin-film insulation		N/A
	Conductors between same layers are separated by at least the applicable CLEARANCES and CREEPAGE DISTANCE of K.101.2 and K.101.3		N/A
	REINFORCED INSULATION have adequate electric strength; one of the following methods are used:		N/A
	a) thickness at least the applicable value of Table K.105		N/A
	b) insulation consists of at least two separate layers, each RATED for test voltage of Table K.102 to Table K.10 for BASIC INSULATION		N/A
	c) insulation consists of at least three separate layers, where the combination of two layers passed adequate voltage tests		N/A
	a.c. Voltage tests of K.101.4.1.1		N/A

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Clause	Requirement – Test	Result - Remark	Verdict

TABLE: Testing in SINGLE FAULT CONDITION – Results			**Form A.1**	
Fault No.	Fault description	Td 4.4.3 (NOTE)	How was test terminated Comments	Meets 4.4.4
1	Protective impedance	--		P
2	Protective conductor	--	Fuses used	N/A
3	Equipment or parts for short-term or intermittent operation	--	Continuously operation	N/A
4	Motors	--	No motors	N/A
5	Capacitors	--	No motors capacitors	N/A
6	Mains transformers attach drawing of mans Txs showing all protective devices	--	No mains transformers	N/A
7	Outputs	--	No outputs	N/A
8	Equipment for more than one supply	--	Supply by 6V⎓ battery Supply by external circuit	P
9	Cooling - air holes closed - fans stopped - coolant stopped	--	No cooling provisions	N/A
10	Heating devices - timer overridden - temperature controller overridden - loss of cooling liquid - overfilled or empty or both	--	No heating devices	N/A
11	Insulation between circuits and parts	--	See appendix table 4.4	P
12	Interlocks	--	No interlocks	N/A
13	Voltage selectors	--	No voltage selectors	N/A
Supplementary information:				

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Clause	Requirement – Test	Result - Remark	Verdict

TABLE: Durability of markings					**Form A.3**	P
Marking method (see NOTE)					Agent	
1) Adhesive label					A Water	
2) Ink printed					B Isopropyl alcohol 70%	
3) Laser marked					C (specify agent)	
4) Film-coated (plastic foil control panel)					D (specify agent)	
5) Imprinted on plastic (moulded in)					E (specify agent)	
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)					1), 3)	
MAINS supply (5.1.3)					N/A	
Fuses (5.1.4)					3)	
Terminals and operating devices (5.1.5.2)					3)	
Switches and circuit breakers (5.1.6)					3)	
Double/reinforced equipment (5.1.7)					2)	
Field wiring Terminal boxes (5.1.8)					N/A	
Warning marking (5.2)					1), 2)	
Battery charging (13.2.2)					Non-chargeable battery used	
Method	Test agent	Remains legible	Label loose	Curled edges	Comments	
		Verdict	Verdict	Verdict		
1/2/3	A/B	P	P	P	Clearly legible	
Supplementary information:						

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Clause	Requirement – Test	Result - Remark	Verdict

TABLE: List of ACCESSIBLE parts		**Form A.4**	P
Exceptions			—
Determination of ACCESSIBLE parts			—
Item	Description	Determination method (NOTE 5)	Exception under 6.1.2 (NOTE 4)
1	Enclosure	V,R,J	N/A
2	Scale panel	V,R,J	N/A
3	Function selection switch	V,R,J	N/A
4	Insulation part of measuring terminal	-	N/A
5	Probe cable	V,R	N/A
6	Probe handheld part	V,R,J	N/A
7	Battery(accessible part after open of the compartment with a screw driver)	-	Exception in 6.1.2 b of EN 61010-1
8	Probe tip	-	Exception in 6.1.1 b of EN 61010-031

NOTE 1 – Test fingers and pins are to be applied without force unless a force is specified (see 6.2.2)
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 6.4).
NOTE 4 – Capacitor test may be required (see Form A.5).
NOTE 5 – The determination methods are:
V = visual; R = rigid test finger; J = jointed test finger; P3 = pin 3 mm diameter; P4 = pin 4 mm diameter.

Supplementary information:

IEC 61010-2-033			
Clause	Requirement – Test	Result - Remark	Verdict

TABLE: Insulation requirements- Clearances and Creepages			**Form A.15**	P
Examination	6.5.4	Protective impedance		—
ENCLOSURES and protective barriers	6.5.6	Current- or voltage-limiting device		—
Impedance	9.6.1	BASIC INSULATION between opposite polarity		—

Area	Location (See Form A.14)	Insulation type (NOTE 1)	WORKING VOLTAGE (NOTE 2)			Clearance		Creepage		CTI	Verdict	Comments
			RMS [V]	Peak [V]	Frequency [kHz]	Required [mm]	Measured [mm]	Required [mm]	Measured [mm]			
A	Between live parts in V, R or A to accessible edge	BI	--	1000V~	50Hz	8.0	8.8	10.0	12.6	<600	P	--
B	Between parts of V and parts of GND under rotary switch	BI	--	1000V~	50Hz	8.0	8.7	10.0	12.6	<600	P	--
C	Between live parts and enclosure edge	RI	--	1000V~	50Hz	14.3	15.5	20.0	21.9	<600	P	--
D	Between live parts to fixing Screw for enclosure	RI	--	1000V~	50Hz	14.3	15.5	20.0	21.9	<600	P	--
E	Between live part inside probe and handheld part	RI	--	1000V~	50Hz	14.3	15.5	20.0	21.9	<600	P	--

NOTE 1 – refer to Form A.14 for type of insulation shown in the insulation diagram NOTE 2 - to be used for definition of required insulation (see Form A.14)

Input supply voltage…….:	1000	V	50	Hz

Supplementary information:

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Clause	Requirement – Test	Result - Remark	Verdict

TABLE: Insulation requirements- Clearances and Creepages			**Form A.16**	P
ENCLOSURES or PROTECTIVE BARRIERS	9.6.1	Overcurrent protection basic insulation between MAINS parts		—
Mechanical resistance to shock and impact	10.5.1	Integrity of CLEARANCES and CREEPAGE distances		—

Area	Location (See Form A.14)	Insulation type	Mechanical tests (NOTE)					Test at max.	Measured after test (if required)		Verdict	Comments
			Applied force	Rigidity (8.2)		Drop (8.3)		RATED ambient	Clearance	Creepage distance		
			N	Static (8.2.1)	Impact (8.2.2)	Normal (8.3.1)	Hand-held/ Plug-in	(10.5.1)	mm	mm		
A	Between live parts in V, R or A to accessible edge	BI	10N	30N	--	--	1m	40 °C	11.8	11.8	P	--
B	Between parts of V and parts of GND under rotary switch	BI	10N	30N	--	--	1m	40 °C	12.8	12.8	P	--
C	Between live parts and enclosure edge	RI	10N	30N	--	--	1m	40 °C	21.6	21.6	P	--
D	Between live parts to fixing Screw for enclosure	RI	10N	30N	--	--	1m	40 °C	21.5	22.0	P	--
E	Between live part inside probe and handheld part	RI	10N	30N	--	--	1m	40 °C	24.0	24.3	P	--

NOTE – Refer to Form A.18 for dielectric strength tests following the above tests.

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Clause	Requirement – Test	Result - Remark	Verdict

TABLE: Insulation requirements- Clearances and Creepages			**Form A.16**	P
ENCLOSURES or PROTECTIVE BARRIERS	9.6.1	Overcurrent protection basic insulation between MAINS parts		—
Mechanical resistance to shock and impact	10.5.1	Integrity of CLEARANCES and CREEPAGE distances		—

Area	Location (See Form A.14)	Insulation type	Mechanical tests (NOTE)					Test at max.	Measured after test (if required)		Verdict	Comments
			Applied force	Rigidity (8.2)		Drop (8.3)		RATED ambient	Clearance	Creepage distance		
			N	Static (8.2.1)	Impact (8.2.2)	Normal (8.3.1)	Hand-held/ Plug-in	(10.5.1)	mm	mm		
Supplementary information:												

9	**TABLE: Protection against the spread of fire**			**Form A.22**
Item	Source of HAZARD or area of the equipment considered (circuit, component, liquid etc.)	Protection Method (9.1 a, b or c)	Protection details	Verdict
1	Measuring circuit	9c	Insulated wire of VW-1,PCB of V-0,Enclosure of V-0,insulation of probe assembly:V-0,Terminal insulation of V-0	P
2	Battery	9c	Battery compartment material of V-0	P
3	Other circuit on PCB	9c	PCB of V-0,enclosure of V-0	P
Supplementary information:				

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Clause	Requirement – Test	Result - Remark	Verdict

TABLE : Temperature Measurements			**Form A.26A**	P
Surface temperature limits – NORMAL CONDITION and / or SINGLE FAULT CONDITION				P
Temperature of windings – NORMAL CONDITION and / or SINGLE FAULT CONDITION				N/A
Other temperature measurements				P
Operating conditions:	Load: t the multimeter measuring the current 10A for 10s every each 15minutes According to the instruction specified by the manufacturer.			
Frequency..... :	Hz	Test room ambient temperature (ta)....:	25.0 °C	
Voltage.....:	V	Test duration..... :	2 h 10 min	

Part / Location	t_m [°C]	t_c [°C]	t_{max} [°C]	Verdict	Comments
PCB	33.3	--	130+25-40=115	P	
Panel	29.1	--	80+25-40=65	P	
Batter body	28.0	--	Ref.	P	
Enclosure(outside)	27.4	--	60+25-40=45	P	
Enclosure (inside)	27.9	--	60+25-40=45	P	
Ambient	25.0	--	--	--	

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.26B for details of winding temperature measurements

Supplementary information:

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Clause	Requirement – Test	Result - Remark	Verdict

24.1	TABLE: Components information			P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Mark(s) of conformity[1])
Enclosure	NINGBO LG YONGXING CHEMICAL CO LTD	FR-500A	V-0	UL E203955
PCB	MEIZHOU KEJIE INTEGRATED CIRCUIT CO LTD	KJ-1	V-0, 130°C	UL E255694
Test lead wire	HERWELL ELECTRIC WIRE CO LTD	1032	22AWG, VW-1, 90°C 1000vAC/1200VDC	UL E301305
Plastic lens	SABIC INNOVATIVE PLASTICS US L L C	940(f1)	V-0	UL E121562

NOTE
1 List all different manufacturers of the above components
2 May include electrical, mechanical values
3 List licence no or method of acceptance
4 asterisk indicates mark assuring agreed level of surveillance

ATTACHMENT 1:
PHOTO-DOCUMENTATION

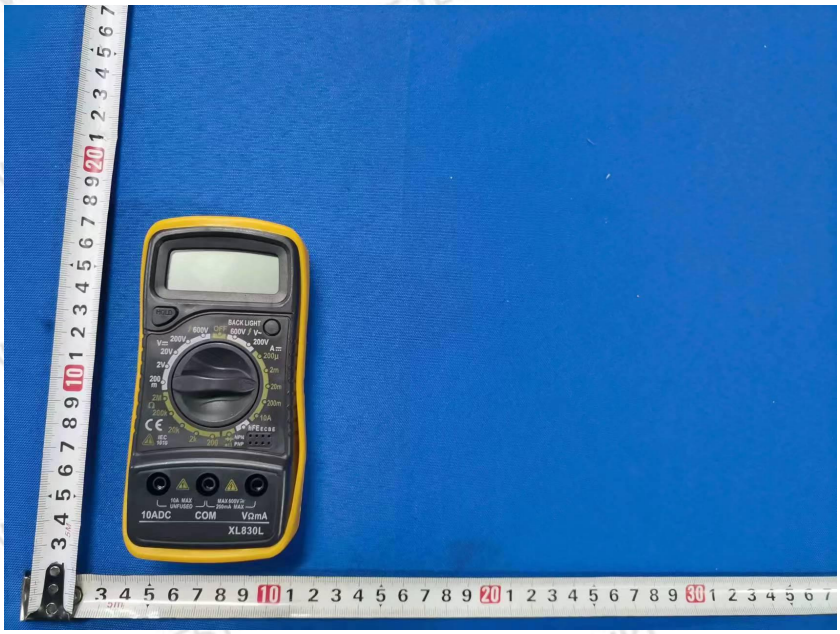

Photo.1

Photo.2

Photo.3

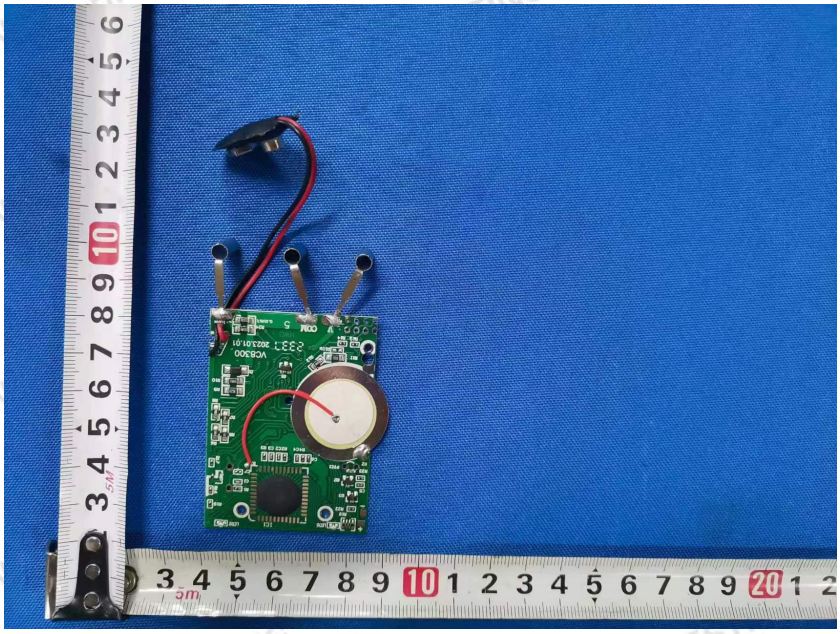

Photo.4

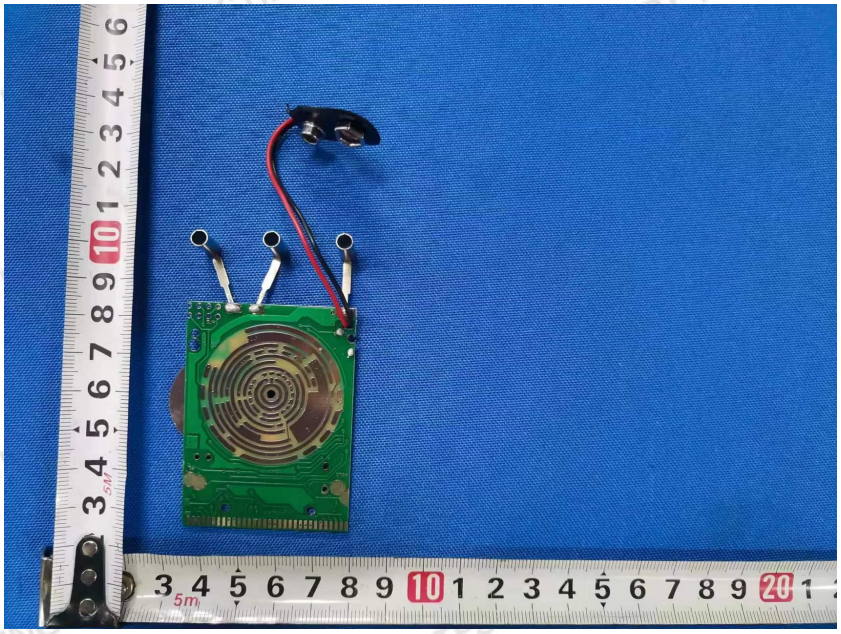

Photo.5

※※※※※ **END OF REPORT** ※※※※※