APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

MPP SOLAR INC

Inverter/ Charger

Model Number: PIP 4048MS

Prepared for	:	MPP SOLAR INC
Address	:	4F, NO. 50-1, SECTION 1, HSIN-SHENG S. RD. TAIPEI, TAIWAN
Prepared by	:	MPP SOLAR INC
Address	:	4F, NO. 50-1, SECTION 1, HSIN-SHENG S. RD. TAIPEI, TAIWAN

Date of Test	:	Aug. 10, 2013 to Sept. 5, 2013
Date of Report	:	Sept. 5, 2013
Report Number	:	LVD-E20130905S

TEST REPORT

EN 60950-1

Information technology equipment - Safety -

Part1:General and safty requirements

Reference No.……:	LVD-E20130905S
Compiled by.....:.....	Bonnie_Xiong
Approved by.....:.....	Fredricker_Wang
Date of issue……:.....	Sept. 5, 2013
Contents……:.....	74 pages

Testing laboratory

Name…….. : DONGGUAN NTC CO.,LTD

Address…….. : Buliding D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, P.R. China

Testing location…….. : Same as above

Client

Name.....: MPP SOLAR INC

Address…….. : 4F, NO. 50-1, SECTION 1, HSIN-SHENG S. RD. TAIPEI, TAIWAN

Test specification

Standard..... : EN 60950-1: 2006+A11: 2009+A1: 2010+A12:2011

Procedure deviation..... ..... : N.A.

Non-standard test method..... : N.A.

Test item Description..... : INVERTER CHARGER

Trademark..... : N/A

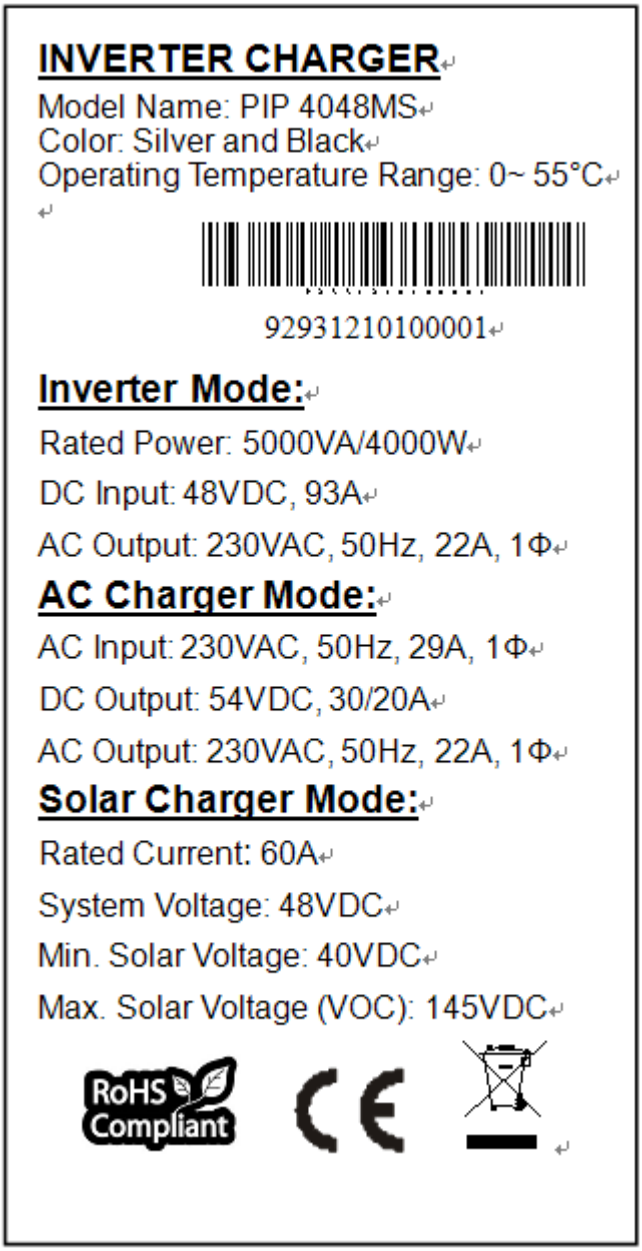
Model and/or type reference..... : PIP 4048MS

Manufacturer..... : Same as applicant

Address…….. : Same as applicant

Rating (s)……..: See the copy of marking plate for detail

Copy of marking plate:



Particulars: test item vs. test requirements

Equipment mobility……..…..:	[]Movable []stationary []for building-in [X]fixed
Connection to the mains……...:	[]pluggable equipment []permanent connection []detachable power supply cord [X]considered in the final system
Operating condition…… :	[X]Continuous []rated operating/resting time
Access location…….....:	[X]operator accessible []restricted access location
Over voltage category (OVC)……...…:	[]OVC Ⅰ [X]OVC Ⅱ []OVCⅢ []OVCⅣ []other:
Mains supply tolerance(%)…… :	220Vac(-10%),240Vac(+10%) of input voltage considered
Tested for IT power systems..... :	[] Yes [X] No
IT testing,phase-phase voltage(V).....:	N.A.
Class of equipment.....:	[X]Class I []Class Ⅱ []Not classified
Considered current rating (A)…….....:	See rating label
Pollution degree(PD)……...…:	[] PD1 [X] PD2 [] PD3
Protection against ingress of water…… ..:	IP20
Altitude during operation(m)……:	Up to 2000
Altitude of test laboratory(m)……..…..:	Below 2000
Mass of equipment(kg).....:	9.4kg

Test case verdicts

Test case does not apply to the test object.....: N(.A.)

Test case does meet the requirement.....: P(ass)

Test item does meet the requirement.....: F(ail)

Testing

Date of receipt of test item.....: Sept. 5, 2013

Date(s) of performance of test.....: Aug. 10, 2013 to Sept. 5, 2013

General remarks

The test results presented in this report relate only to the object tested.

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

"(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.

General product information:

- These equipments were general designed for using with information technology equipment.
- These models are identical in the circuit diagram and main PCB layout and with the same construction.
- The main difference was shown in table 1 and in table 1.5.1 and rated marking plate.
- Double/reinforced insulation provided between primary circuits and SELV circuits by safety isolation transformer and sufficient clearances and creepage distances within the unit.

Summary of testing:

- Tests performed on the wall.
- Maximum ambient temperature: +55℃
- Tested for moderate conditions.
- EUT is designed for altitudes not exceeding 2000m.

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Clause	Requirement – Test	Result - Remark	Verdict

1	GENERAL		P
1.5	Components		P
1.5.1	Comply with IEC 950 or relevant component standard	Component which were found to affect safety aspects comply with the requirements of this aspects of the relevant IEC component standards. (see appended table 1.5.1)	P
1.5.2	Evaluation and testing of components	Components which are certified to IEC and/or national standards are used correctly within their ratings. Components not covered by IEC standards are tested under the conditions present in the equipment.	P
1.5.3	Thermal controls		N
1.5.4	Transformers	Transformers used were suitable for their intended application and comply with the relevant requirements of the standard.	P
1.5.5	Interconnecting cables		N
1.5.6	Capacitors bridging insulation	X2 capacitors according to IEC 60384-14: 1993. (see appended table 1.5.1)	P
1.5.7	Resistors bridging insulation		P
1.5.7.1	Resistors bridging functional, basic or supplementary insulation		P
1.5.7.2	Resistors bridging double or reinforced insulation between a.c. mains and other circuits	R194, R185, R196, R187, R193, R184, R195, R186.	P
1.5.7.3	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable		N
1.5.7.4	Accessible parts	See 2.4	P
1.5.8	Components in equipment for IT power systems	TN power system.	P
1.5.9	Surge suppressors		P
1.5.9.1	General	(see appended table 1.5.1)	P
1.5.9.2	Protection of VDRs		P
1.5.9.3	Bridging of functional insulation by a VDR		P
1.5.9.4	Bridging of basic insulation by a VDR		N

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Clause	Requirement – Test	Result - Remark	Verdict
1.5.9.5	Bridging of supplementary, double or reinforced insulation by a VDR		N
1.6	Power interface		P
1.6.1	AC power distribution systems	For connection to TN power system.	P
1.6.2	Input current	(see appended table 1.6.2)	P
1.6.3	Voltage limit of hand-held equipment	This appliance is not a hand-held equipment	N
1.6.4	Neutral conductor	Neutral conductor is basic insulated from earth and body of the equipment.	P
1.7	Marking and instructions		P
1.7.1	Power rating	See the copy of marking plate or below for detail	P
	Rated voltage(s) or voltage range(s) (V)	1): 230Vac for AC Charger mode. 2): 48Vdc for Inverter mode	P
	Symbol for nature of supply, for d.c only		P
	Rated frequency or frequency range (Hz)	1): 50Hz, 2): DC Supplied	P
	Rated current (mA or A)	1): 29A 2): 93A	P
	Manufacturer's name or trade-mark or identification mark	Refer to page 1	P
	Model identification or type reference	Axpert KS-5000	P
	Symbol for Class II equipment only	Class I equipment.	N
	Other marking and symbols	Additional marking was not given mis-understanding.	N
1.7.2	Safety instructions and markings	The user manual contains information for operation, installation, servicing transport, storage and technical data.	P
1.7.2.1	General		P
1.7.2.2	Disconnect devices	AC input connector used, Should be considered in the final system.	N
1.7.2.3	Overcurrent protective devices		P

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Clause	Requirement – Test	Result - Remark	Verdict
1.7.2.4	IT power distribution systems	TN power distribution systems	N
1.7.2.5	Operator access with a tool	All areas containing hazard(s) are inaccessible to the operator.	P
1.7.2.6	Ozone	The equipment does not produce Ozone.	N
1.7.3	Short duty cycles	Equipment is designed for continuous operation.	N
1.7.4	Supply voltage adjustment	No voltage selector.	N
	Methods and means of adjustment; reference to installation instructions		N
1.7.5	Power outlets on the equipment	AC output connector	P
1.7.6	Fuse identification (marking, special fusing characteristics, cross-reference)	Circuit breaker provided.	P
1.7.7	Wiring terminals	See below	P
1.7.7.1	Protective earthing and bonding terminals	The earth terminal is marked with the standard earth symbol near the terminal	P
1.7.7.2	Terminal for a.c. mains supply conductors	Should be considered in the final system.	N
1.7.7.3	Terminals for d.c. mains supply conductors	Should be considered in the final system.	N
1.7.8	Controls and indicators	See below	N
1.7.8.1	Identification, location and marking		N
1.7.8.2	Colours		N
1.7.8.3	Symbols according to IEC 60417		N
1.7.8.4	Markings using figures		N
1.7.9	Isolation of multiple power sources		N
1.7.10	Thermostats and other regulating devices	No thermostats and other regulating devices	N
1.7.11	Durability	The marking withstands required tests	P
1.7.12	Removable parts	No required markings placed on removable parts.	N
1.7.13	Replaceable batteries		N
	Language .....:		_

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Clause	Requirement – Test	Result - Remark	Verdict
1.7.14	Equipment for restricted access locations	Operator is not instructed to use a tool in order to gain access to operator access area.	N
2	PROTECTION FROM HAZARDS		P
2.1	Protection from electric shock and energy hazards		P
2.1.1	Protection in operator access areas		P
2.1.1.1	Access to energized parts		P
	Test by inspection		P
	Test with test finger (Figure 2A)		P
	Test with test pin (Figure 2B)		P
	Test with test probe (Figure 2C)		P
2.1.1.2	Battery compartments		N
2.1.1.3	Access to ELV wiring	No ELV wiring in operator accessible area.	P
	Working voltage (V); distance (mm) through insulation .....:		_
2.1.1.4	Access to hazardous voltage circuit wiring	Insulation of internal wiring not operator accessible.	P
2.1.1.5	Energy hazards	No energy hazard at operator accessible SELV interfaces.	P
2.1.1.6	Manual controls	No conductive controls or handles or alike provided.	N
2.1.1.7	Discharge of capacitors in equipment	No risk of electric shock.	P
	Time-constant (s); measured voltage (V) .....:	(see appended table 2.1.1.7)	_
2.1.1.8	Energy hazards - d.c. mains supplies	Not connected to DC mains supply.	N
	a) capacitor connected to the dc mains supply		N
	b) internal battery connected to the dc mains supply		N
2.1.1.9	Audio amplifiers	No audio amplifier	N
2.1.2	Protection in service access areas		N
2.1.3	Protection in restricted access locations		N
2.2	SELV circuits		P

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Clause	Requirement – Test	Result - Remark	Verdict
2.2.1	General requirements	The secondary circuits were tested as SELV.	P
2.2.2	Voltages under normal conditions (V)	Not exceed 42.4V peak or 60Vdc in SELV circuit under normal operation.	P
2.2.3	Voltages under fault conditions (V)	Single fault cause did not excessive voltage in accessible SELV circuits. (see appended table 2.2.2 and 5.3)	P
2.2.4	Connection of SELV circuits to other circuits		N
2.3	TNV circuits		N
2.3.1	Limits		N
	Type of TNV circuits.....:		_
2.3.2	Separation from other circuits and from accessible parts		N
2.3.2.1	General requirements		N
2.3.2.2	Protection by basic insulation		N
2.3.2.3	Protection by earthing		N
2.3.2.4	Protection by other constructions		N
2.3.3	Separation from hazardous voltages		N
	Insulation employed .....:		_
2.3.4	Connection of TNV circuits to other circuits		N
	Insulation employed .....:		_
2.3.5	Test for operating voltages generated externally		N
2.4	Limited current circuits		P
2.4.1	General requirements		P
2.4.2	Limit values	See appended table	P
	Frequency (Hz) .....:		P
	Measured current (mA) .....:		P
	Measured voltage (V).....:		P
	Measured circuit capacitance (nF or μF) .....:		_

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Clause	Requirement – Test	Result - Remark	Verdict
2.4.3	Connection of limited current circuits to other circuits	SELV circuits as limited current circuit connected to primary via bridging components	P
2.5	Limited power sources		N
	a) inherently limited output		N
	b) linear or non-linear impedance limited output		N
	c) regulating network limited output under normal operating and single fault condition		N
	d) overcurrent protective device limited output		N
	Max. output voltage (V), output current (A), apparent power (VA) ..... :		N
	Current rating of overcurrent protective device (A)		N
2.6	Provisions for earthing and bonding		P
2.6.1	Protective earthing	Protection should be considered in the final system.	N
2.6.2	Functional earthing	See below	P
2.6.3	Protective earthing conductors and protective bonding conductors	Protective bonding conductors have sufficient current-carrying capacity.	P
2.6.3.1	General		P
2.6.3.2	Size of protective earthing conductors	Power supply cord not provided with the equipment, refer to summery of testing	N
	Rated current (A), cross-sectional area (mm^2), AWG ..... :		–
2.6.3.3	Size of protective bonding conductors	Evaluation by test of sub-clause 2.6.3.4, rated current below 16A.	P
	Rated current (A), cross-sectional area (mm^2), AWG ..... :		--
2.6.3.4	Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min)	<0.1Ω, see appended table 2.6.3.3	P
2.6.3.5	Colour of insulation	Yellow-and-Green	P
2.6.4	Terminals		P

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Clause	Requirement – Test	Result - Remark	Verdict
2.6.4.1	General	AC Connector as protective earth terminal.	P
2.6.4.2	Protective earthing and bonding terminals		P
	Rated current (A), type and nominal thread diameter (mm)..... :		–
2.6.4.3	Separation of the protective earthing conductor from protective bonding conductors		N
2.6.5	Integrity of protective earthing		N
2.6.5.1	Interconnection of equipment	No interconnection of equipment	N
2.6.5.2	Components in protective earthing conductors and protective bonding conductors	There are no switches or overcurrent protective devices in the protective earthing/bonding conductors.	P
2.6.5.3	Disconnection of protective earth		P
2.6.5.4	Parts that can be removed by an operator	No operator removable parts with protective earth connection except supply cord.	P
2.6.5.5	Parts removed during servicing	Protective earthed parts cannot be removed in a way which impairs safety. Should be condidered when building in the final system.	P
2.6.5.6	Corrosion resistance	No risk of corrosion.	P
2.6.5.7	Screws for protective bonding	Adequate connection of protective bonding.	P
2.6.5.8	Reliance on telecommunication network or cable distribution system		N
2.7	Overcurrent and earth fault protection in primary circuits		P
2.7.1	Basic requirements	Protective device is integrated in the equipment, see also sub-clause 5.3.	P
	Instructions when protection relies on building installation	Protective device is integrated in the equipment, see also sub-clause 5.3.	P
2.7.2	Faults not covered in 5.3.7		N
2.7.3	Short-circuit backup protection	Adequate protective device.	P

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Clause	Requirement – Test	Result - Remark	Verdict
2.7.4	Number and location of protective devices	Over current protection by one built-in circuit-breaker.	P
2.7.5	Protection by several devices	Only one protective device. See sub-clause 2.7.4.	N
2.7.6	Warning to service personnel		N
2.8	Safety interlocks		N
2.8.1	General principles	No safety interlocks.	N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
2.8.5	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches and relays		N
2.8.7.1	Contact gaps		N
2.8.7.2	Overload test		N
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test		N
2.8.8	Mechanical actuators		N
2.9	Electrical insulation		P
2.9.1	Properties of insulating materials	Suitable material according to their thermal electrical and mechanical properties.	P
2.9.2	Humidity conditioning	Humidity treatment performed for 48 hrs.	P
	Relative humidity (%), temperature(°C).....:	25℃, 93%	P
2.9.3	Grade of insulation	The adequate levels of safety insulation is provided and maintained to comply with the requirements of this standard.	P
2.9.4	Separation from hazardous voltages	See below	P
	Method(s) used .....:	Method 1 and 2	–
2.10	Clearances, creepage distances and distances through insulation		P
2.10.1	General		P

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Clause	Requirement – Test	Result - Remark	Verdict
2.10.1.1	Frequency	Considered	P
2.10.1.2	Pollution degrees	Pollution degree 2.	P
2.10.1.3	Reduced values for functional insulation	The functional insulation complied with clause 5.3.4	P
2.10.1.4	Intervening unconnected conductive parts		P
2.10.1.5	Insulation with varying dimensions		N
2.10.1.6	Special separation requirements		N
2.10.1.7	Insulation in circuits generating starting pulses		N
2.10.2	Determination of working voltage	(see appended table 2.10.2)	P
2.10.2.1	General		P
2.10.2.2	RMS working voltage	(see appended table 2.10.2)	P
2.10.2.3	Peak working voltage	(see appended table 2.10.2)	P
2.10.3	Clearances	(see appended table 2.10.3 and 2.10.4)	P
2.10.3.1	General		P
2.10.3.2	Mains transient voltages	Normal transient voltage considered.	P
	a) AC mains supply		P
	b) Earthed DC mains supplies		N
	c) Unearthed DC mains supplies		N
	d) Battery operation		N
2.10.3.3	Clearances in primary circuit	(see appended table 2.10.3 and 2.10.4)	P
2.10.3.4	Clearances in secondary circuits	Only the functional insulation in secondary circuits complied with clause 5.3.4	N
2.10.3.5	Clearances in circuits having starting pulses	The circuit will not generating starting pulse.	N
2.10.3.6	Transients from an a.c. mains supply	Considered.	P
2.10.3.7	Transients from a d.c. mains supply	Not connected to d.c. mains supply.	N
2.10.3.8	Transients from telecommunication networks and cable distribution systems	Not connected to telecommunication networks and cable distribution systems	N
2.10.3.9	Measurement of transient voltages	Normal transient voltage considered.	N

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Clause	Requirement – Test	Result - Remark	Verdict
	a) transients from a mains supply		N
	For an a.c. mains supply		N
	For a d.c. mains supply		N
	b) Transients from a telecommunication network		N
2.10.4	Creepage distances		P
2.10.4.1	General	Considered.	P
2.10.4.2	Material group and comparative tracking index		P
	CTI tests.....:	Material group IIIb is assumed to be used.	P
2.10.4.3	Minimum creepage distances	(see appended table 2.10.3 and 2.10.4)	P
2.10.5	Solid insulation	Solid or laminated insulating material having adequate thickness are provided.	P
2.10.5.1	General	Considered.	P
2.10.5.2	Distance through insulation	(see appended table 2.10.5)	P
2.10.5.3	Insulating compound as solid insulation	No such construction used.	N
2.10.5.4	Semiconductor devices	No such component used.	N
2.10.5.5	Cemented joints	Not used.	N
2.10.5.6	Thin sheet material	Thin sheet material in form of polyester tape used in transformer.	P
2.10.5.7	Separable thin sheet material		P
	Number of layers (pcs).....:	3 layers	P
2.10.5.8	Non-separable thin sheet material	Not used.	N
2.10.5.9	Thin sheet material-standard test procedure	Not used.	N
	Electric strength test		_
2.10.5.10	Thin sheet material-alternative test procedure	(see appended table 2.10.5)	P
	Electric strength test	(see appended table 2.10.5)	P
2.10.5.11	Insulation in wound components	Not used.	N
2.10.5.12	Wire in wound components		N
	Working voltage		N
	a) basic insulation not under stress		N
	b) basic, supplemetary, reinforced insulation		N

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Clause	Requirement – Test	Result - Remark	Verdict
	c) compliance with Annex U		N
	Two wires in contact inside wound component; angle between 45° and 90°		N
2.10.5.13	Wire with solvent-based enamel in wound components	No wire with solvent-based enamel in wound components.	N
	Electric strength test.....:		N
	Routine test		N
2.10.5.14	Additional insulation in wound components	No additional insulation used.	N
	Working voltage		N
	- basic insulation not under stress		N
	- supplemetary, reinforced insulation		N
2.10.6	Construction of printed boards	See below.	P
2.10.6.1	Uncoated printed boards	(see appended table 2.10.3 and 2.10.4)	P
2.10.6.2	Coated printed boards		N
2.10.6.3	Insulation between conductors on the same inner surface of a printed board		N
2.10.6.4	Insulation between conductors on different surfaces of a printed board		N
	Distance through insulation		N
	Number of insulation layers (pcs)		N
2.10.7	Component external terminations		N
2.10.8	Tests on coated printed boards and coated components		N
2.10.8.1	Samples preparation and preliminary inspection		N
2.10.8.2	Thermal conditioning.....:		N
2.10.8.3	Electric strength test		N
2.10.8.4	Abrasion resistance test		N
2.10.9	Thermal cycling	No special insulation in order to reduce distance.	N
2.10.10	Test for pollution degree 1 environment and for insulating compound		N
2.10.11	Tests for semiconductor devices and for cemented joints	No such device used.	N
2.10.12	Enclosed and sealed parts	For relay, see appended table 1.5.1	P

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Clause	Requirement – Test	Result - Remark	Verdict
3	WIRING, CONNECTIONS AND SUPPLY		P
3.1	General		P
3.1.1	Current rating and overcurrent protection	Adequate cross sectional areas on internal wiring.	P
3.1.2	Protection against mechanical damage	Wire ways are smooth and free from edges. Wires are adequately fixed to prevent excessive strain on wire and terminals and avoiding damage to the insulation of the conductors.	P
3.1.3	Securing of internal wiring	Internal wirings is secured against excessive strain, loosening of terminals and damage to the conductor insulation.	P
3.1.4	Insulation of conductors	Insulation on internal conductors is considered to be of adequate quality and suitable for the application and the working voltage involved.	P
3.1.5	Beads and ceramic insulators	No beads or similar ceramic insulators on conductors.	N
3.1.6	Screws for electrical contact pressure		N
3.1.7	Insulating materials in electrical connections	All current carrying and safety earthing connections are metal to metal	P
3.1.8	Self-tapping and spaced thread screws	No self-tapping and spaced thread screws used.	N
3.1.9	Termination of conductors	Terminations can not become displaced so that clearances and creepage distances can be reduced.	P
	10 N pull test	Conducted.	P
3.1.10	Sleeving on wiring	Sleeves are used as supplementary insulation.	P
3.2	Connection to a.c. mains supply		P
3.2.1	Means of connection		P
3.2.1.1	Connection to an a.c. mains supply	The equipment is provided with an ac connector.	P

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Clause	Requirement – Test	Result - Remark	Verdict
3.2.1.2	Connection to a d.c. mains supply	The equipment is not for connection to a d.c. mains supply. Only connection dc supply	N
3.2.2	Multiple supply connections	AC mains supply and dc supply	P
3.2.3	Permanently connected equipment		N
	Number of conductors, diameter (mm) of cable and conduits .....:		–
3.2.4	Appliance inlets	AC input connector provided. Should be considered in the final system.	N
3.2.5	Power supply cords		N
3.2.5.1	AC power supply cords	Power supply cord is not provided with the equipment, refer to summary of testing.	N
	Type .....:		N
	Rated current (A), cross-sectional area (mm^2), AWG.....:		N
3.2.5.2	DC power supply cords		N
3.2.6	Cord anchorages and strain relief	Equipment provided with an ac input connector and dc input connector	N
	Mass of equipment (kg), pull (N) ... .:		N
	Longitudinal displacement (mm) .....:		N
3.2.7	Protection against mechanical damage	Should be considered in the final system.	N
3.2.8	Cord guards		N
	Diameter or minor dimension D (mm); test mass (g) .....:		–
	Radius of curvature of cord (mm) .....:		–
3.2.9	Supply wiring space		N

3.3	Wiring terminals for connection of external conductors		N
3.3.1	Wiring terminals	Should be considered in the final system.	N
3.3.2	Connection of non-detachable power supply cords		N

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Clause	Requirement – Test	Result - Remark	Verdict
3.3.3	Screw terminals		N
3.3.4	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm^2)....:		_
3.3.5	Wiring terminal sizes		N
	Rated current (A), type and nominal thread diameter (mm)....:		_
3.3.6	Wiring terminals design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N
3.4	Disconnection from the mains supply		P
3.4.1	General requirement		N
3.4.2	Disconnect devices	Should be considered in the final system.	N
3.4.3	Permanently connected equipment		N
3.4.4	Parts which remain energized		P
3.4.5	Switches in flexible cords		N
3.4.6	Number of poles - single-phase and d.c. equipment		N
3.4.7	Number of poles -three-phase equipment		N
3.4.8	Switches as disconnect devices		N
3.4.9	Plugs as disconnect devices		N
3.4.10	Interconnected equipment		N
3.4.11	Multiple power sources		N
3.5	Interconnection of equipment		N
3.5.1	General requirements		N
3.5.2	Types of interconnection circuits		N
3.5.3	ELV circuits as interconnection circuits		N
3.5.4	Data ports for additional equipment		N
4	PHYSICAL REQUIREMENTS		P
4.1	Stability		N
	Angle of 10°....:		N

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Clause	Requirement – Test	Result - Remark	Verdict
	Test: force (N) .....:		N
4.2	Mechanical strength		P
4.2.1	General	Tests performed and passed. Results see below. After the tests, unit complied with the requirements of sub-clauses 2.1.1, 2.6.1, 2.10 and 4.4.1.	P
4.2.2	Steady force test, 10 N	10N applied to components.	P
4.2.3	Steady force test, 30 N		N
4.2.4	Steady force test, 250 N	250N applied to outer enclosure. No energy or other hazards.	P
4.2.5	Impact test	No hazard as a result from steel ball impact test.	P
	Fall test.....:	No hazard as a result from steel ball impact test.	P
	Swing test.....:	No hazard as a result from steel sphere ball swung test.	P
4.2.6	Drop test: height (mm)	No required for this equipment.	N
4.2.7	Stress relief	Metal enclosure	N
4.2.8	Cathode ray tubes	No cathode ray tube.	N
	Picture tube separately certified		–
4.2.9	High pressure lamps	No high pressure lamp provided.	N
4.2.10	Wall or ceiling mounted equipment; force (N)	The force applied 279N to products, there is no damaged	P
4.3	Design and construction		P
4.3.1	Edges and corners	Edges and corners of the enclosure are rounded.	P
4.3.2	Handles and manual controls; force (N)		N
4.3.3	Adjustable controls	No adjustable controls.	N
4.3.4	Securing of parts	Mechanical fixings in such a way designed that they will withstand mechanical stress occurring in normal use.	P
4.3.5	Connection by plugs and sockets	No mismatch of connectors.	P

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Clause	Requirement – Test	Result - Remark	Verdict
4.3.6	Direct plug-in equipment	Not direct plug-in type.	N
	Torque (Nm) ..... :		_
	Compliance with the relevant mains plug standard ..... :		_
4.3.7	Heating elements in earthed equipment	No heating elements provided.	N
4.3.8	Batteries		N
	- overcharging of a rechargeable battery		N
	- unintentional charging of a non-rechargeable battery		N
	- reverse charging of a rechargeable battery		N
	- excessive discharging rate for any battery		N
4.3.9	Oil and grease	Insulation is not exposed to oil, grease etc.	N
4.3.10	Dust, powders, liquids and gases		P
4.3.11	Containers for liquids or gases	No containers for liquid or gases in the equipment	N
4.3.12	Flammable liquids	The equipment does not contain flammable liquid.	N
	Quantity of liquid (l)		_
	Flash point (°C)		_
4.3.13	Radiation		P
4.3.13.1	General		P
4.3.13.2	Ionizing radiation	No ionising radiation.	N
	Measured radiation (pA/kg) ..... :		N
	Measured high-voltage (kV) ..... :		N
	Measured focus voltage (kV) ..... :		N
	CRT markings ..... :		N
4.3.13.3	Effect of ultraviolet (UV) radiation on materials	No ultraviolet radiation.	N
	Part, property, retention after test, flammability classification		N
4.3.13.4	Human exposure to ultraviolet (UV) radiation		N
4.3.13.5	Lasers (including LEDs)		N
	Laser class ..... :		_
4.3.13.6	Other types		N

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Clause	Requirement – Test	Result - Remark	Verdict
4.4	Protection against hazardous moving parts		N
4.4.1	General		N
4.4.2	Protection in operator access areas		N
4.4.3	Protection in restricted access locations		N
4.4.4	Protection in service access areas		N
4.5	Thermal requirements		P
4.5.1	General		P
4.5.2	Temperature rises	(see appended table 4.5)	P
	Normal load condition per Annex L.....:		P
4.5.3	Temperature limits for materials	(see appended table 4.5)	P
4.5.4	Touch temperature limits	(see appended table 4.5)	P
4.5.5	Resistance to abnormal heat	(see appended table 4.5)	P
4.6	Openings in enclosures		P
4.6.1	Top and side openings	See appended table 4.6.1	P
	Dimensions (mm) .....:		_
4.6.2	Bottoms of fire enclosures	Installed in not burning parts	P
	Construction of the bottom, dimension (mm).....:		_
4.6.3	Doors or covers in fire enclosures	No doors or covers in fire enclosure.	N
4.6.4	Openings in transportable equipment	Not transportable equipment.	N
4.6.4.1	Constructional design measures		N
	Dimensions (mm) .....:		_
4.6.4.2	Evaluation measures for large openings		N
4.6.4.3	Use of metallized parts		N
4.6.5	Adhesives for constructional purposes	No adhesive used for constructional purposes.	N
	Conditioning temperature (°C), time (weeks).....:		_
4.7	Resistance to fire		P
4.7.1	Reducing the risk of ignition and spread of flame	See below.	P
	Method 1, selection and application of components wiring and materials	Use of materials with the required flammability classes.	P

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Clause	Requirement – Test	Result - Remark	Verdict
	Method 2, application of all of simulated fault condition tests		N
4.7.2	Conditions for a fire enclosure		P
4.7.2.1	Parts requiring a fire enclosure		P
4.7.2.2	Parts not requiring a fire enclosure		N
4.7.3	Materials		P
4.7.3.1	General	Components and materials have adequate flammability classification. For details see table 1.5.1	P
4.7.3.2	Materials for fire enclosures	Metal enclosure	P
4.7.3.3	Materials for components and other parts outside fire enclosures	No parts outside the fire enclosure.	N
4.7.3.4	Materials for components and other parts inside fire enclosures	Internal components except small parts are minimum V-2 material.	P
4.7.3.5	Materials for air filter assemblies	No air filters in the equipment.	N
4.7.3.6	Materials used in high-voltage components	No parts exceeding 4kV.	N
5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		P
5.1	Touch current and protective conductor current		P
5.1.1	General	Test conducted in accordance with 5.1.2 to 5.1.7	P
5.1.2	Configuration of equipment under test (EUT)		P
5.1.2.1	Single connection to an a.c. mains supply		P
5.1.2.2	Redundant multiple connections to an a.c. mains supply	No multiple power sources.	N
5.1.2.3	Simultaneous multiple connections to an a.c. mains supply	No multiple power sources.	N
5.1.3	Test circuit	Using figure 5A	P
5.1.4	Application of measuring instrument	Measuring instrument D1 is used.	P
5.1.5	Test procedure	The touch current was measured form primary to enclosure.	P
5.1.6	Test measurements		P
	Supply voltage (V) ..... :	(see appended table 5.1)	_

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Clause	Requirement – Test	Result - Remark	Verdict
	Measured touch current (mA) ..... :	(see appended table 5.1)	_
	Max. allowed touch current (mA) ..... :	(see appended table 5.1)	_
	Measured protective conductor current (mA).....:		_
	Max. allowed protective conductor current (mA)..:		_
5.1.7	Equipment with touch current exceeding 3.5 mA:	The touch current does not exceed 3.5mA.	N
5.1.7.1	General		N
5.1.7.2	Simultaneous multiple connection to the supply		N
5.1.8	Touch currents to telecommunication networks and cable distribution systems and from telecommunication networks		N
5.1.8.1	Limitation of the touch current to a telecommunication network or to a cable distribution system	No test necessary.	N
	Supply voltage (V) ..... :		_
	Measured touch current (mA) ..... :		_
	Max. allowed touch current (mA) ..... :		_
5.1.8.2	Summation of touch currents from telecommunication networks		N
	a) EUT with earthed telecommunication ports		N
	b) EUT whose telecommunication ports have no reference to protective earth		N
5.2	Electric strength		P
5.2.1	General	(see appended table 5.2)	P
5.2.2	Test procedure	(see appended table 5.2)	P
5.3	Abnormal operating and fault conditions		P
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors		N
5.3.3	Transformers	(see appended Annex C)	P
5.3.4	Functional insulation	Short-circuited, results see appended table 5.3.	P
5.3.5	Electromechanical components	No electromechanical components.	N

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Clause	Requirement – Test	Result - Remark	Verdict
5.3.6	Audio amplifiers in ITE	No audio amplifier in equipment.	N
5.3.7	Simulation of faults	Results see appended table 5.3	P
5.3.8	Unattended equipment		N
5.3.9	Compliance criteria for abnormal operating and fault conditions	See below	P
5.3.9.1	During the tests	No fire or molten metal occurred and no deformation of enclosure during the tests.	P
5.3.9.2	After the tests	No reduction of clearance and creepage distances. Electric strength test is made on functional, basic and reinforced insulation.	P
6	CONNECTION TO TELECOMMUNICATION NETWORKS		N
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements		N
	Supply voltage (V) ..... :		N
	Current in the test circuit (mA) ..... :		_
6.1.2.2	Exclusions		N
6.2	Protection of equipment users from overvoltages on telecommunication networks		N
6.2.1	Separation requirements		N
6.2.2	Electric strength test procedure		N
6.2.2.1	Impulse test		N
6.2.2.2	Steady-state test		N
6.2.2.3	Compliance criteria		N
6.3	Protection of the telecommunication wiring system from overheating (The circuit is not intended to supply other units via telecommunication wiring system.)		N
	Max. output current (A) ..... :		N

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Clause	Requirement – Test	Result - Remark	Verdict
	Current limiting method.....:		N
7	CONNECTION TO CABLE DISTRIBUTION SYSTEMS		N
7.1	General	Not connected to cable distribuition system.	N
7.2	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment		N
7.3	Protection of equipment users from overvoltages on the cable distribution system		N
7.4	Insulation between primary circuits and cable distribution systems		N
7.4.1	General		N
7.4.2	Voltage surge test		N
7.4.3	Impulse test		N
A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		N
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		N
A.1.1	Samples, material.....:		N
	Wall thickness (mm).....:		_
A.1.2	Conditioning of samples; temperature (°C).....:		N
A.1.3	Mounting of samples		N
A.1.4	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D .....:		_
A.1.5	Test procedure		N
A.1.6	Compliance criteria		N
	Sample 1 burning time (s).....:		_
	Sample 2 burning time (s).....:		_
	Sample 3 burning time (s).....:		_
A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		N
A.2.1	Samples, material.....:		N
	Wall thickness (mm).....:		_

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Clause	Requirement – Test	Result - Remark	Verdict
A.2.2	Conditioning of samples; temperature (°C)		N
A.2.3	Mounting of samples		N
A.2.4	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C ..... :		_
A.2.5	Test procedure		N
A.2.6	Compliance criteria		N
	Sample 1 burning time (s)..... :		_
	Sample 2 burning time (s)..... :		_
	Sample 3 burning time (s)..... :		_
A.2.7	Alternative test acc. to IEC60695-11-5, cl. 5 and 9		N
	Sample 1 burning time (s)..... :		_
	Sample 2 burning time (s)..... :		_
	Sample 3 burning time (s)..... :		_
A.3	Hot flaming oil test (see 4.6.2)		N
A.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N
B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		N
B.1	General requirements		N
	Position ..... :		_
	Manufacturer ..... :		_
	Type ..... :		_
	Rated values ..... :		_
B.2	Test conditions		N
B.3	Maximum temperatures		N
B.4	Running overload test		N
B.5	Locked-rotor overload test		N
	Test duration (days) ..... :		_
	Electric strength test: test voltage (V) ..... :		_
B.6	Running overload test for DC motors in secondary circuits		N

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Clause	Requirement – Test	Result - Remark	Verdict
B.6.1	General		N
B.6.2	Test procedure		N
B.6.3	Alternative test procedure		N
B.6.4	Electric strength test: test voltage (V)		N
B.7	Locked-rotor overload test for DC motor in secondary circuits		N
B.7.1	General		N
B.7.2	Test procedure		N
B.7.3	Alternative test procedure; test time (h)		N
B.7.4	Electric strength test: test voltage (V)		N
B.8	Test for motors with capacitors		N
B.9	Test for three-phase motors		N
B.10	Test for series motors		N
	Operating voltage (V) ..... :		N
C	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		P
	Position ..... :	See table 1.5.1	_
	Manufacturer ..... :		_
	Type ..... :		_
	Rated values ..... :		_
	Method of protection ..... :		_
C.1	Overload test	See appended table 5.3	P
C.2	Insulation	See appended table 5.2	P
	Protection from displacement of windings ..... :	See appended table C.2	P
D	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)		P
D.1	Measuring instrument	As in figure D1 used.	P
D.2	Alternative measuring instrument	Not used.	N
E	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13) Thermocouple method used.		P
F	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10 and Annex G)		P

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Clause	Requirement – Test	Result - Remark	Verdict
G	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		N
G.1	Clearances		N
G.1.1	General		N
G.1.2	Summary of the procedure for determining minimum clearances		N
G.2	Determination of mains transient voltage (V)		N
G.2.1	AC mains supply		N
G.2.2	Earthed d.c. mains supplies		N
G.2.3	Unearthed d.c. mains supplies		N
G.2.4	Battery operation		N
G.3	Determination of telecommunication network transient voltage (V)		N
G.4	Determination of required withstand voltage (V)		N
G.4.1	Mains transients and internal repetitive peaks		N
G.4.2	Transients from telecommunication networks		N
G.4.3	Combination of transients		N
G.4.4	Transients from cable distribution systems		N
G.5	Measurement of transient levels (V)		N
	a) Transients from a mains supply		_
	For an a.c. mains supply		_
	For a d.c. mains supply		_
	b) Transients from a telecommunication network		_
G.6	Determination of minimum clearances .....:		N
H	ANNEX H, IONIZING RADIATION (see 4.3.13)		N
J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		N
	Metal used .....:		_
K	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.8)		N
K.1	Making and breaking capacity		N
K.2	Thermostat reliability; operating voltage (V)		N
K.3	Thermostat endurance test; operating voltage (V):		N

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Clause	Requirement – Test	Result - Remark	Verdict
K.4	Temperature limiter endurance; operating voltage (V)		N
K.5	Thermal cut-out reliability		N
K.6	Stability of operation		N
L	ANNEX L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.2)		N
L.1	Typewriters		N
L.2	Adding machines and cash registers		N
L.3	Erasers		N
L.4	Pencil sharpeners		N
L.5	Duplicators and copy machines		N
L.6	Motor-operated files		N
L.7	Other business equipment		N
M	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		N
M.1	Introduction		N
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringing signal		N
M.3.1.1	Frequency (f)..... :		N
M.3.1.2	Voltage (V) ..... :		N
M.3.1.3	Cadence; time (s), voltage (V) ..... :		N
M.3.1.4	Single fault current (mA) ..... :		N
M.3.2	Tripping device and monitoring voltage		N
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2	Tripping device		N
M.3.2.3	Monitoring voltage (V)		N
N	ANNEX N, IMPULSE TEST GENERATORS (see 1.5.7.2, 1.5.7.3, 2.10.3.9, 6.2.2.1, 7.4.2, 7.4.3 and Clause G.5)		N
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N
Q	ANNEX Q, Voltage dependent resistors (VDRs) (see 1.5.9.1)		P

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Clause	Requirement – Test	Result - Remark	Verdict
	a) Preferred climatic categories		P
	b) Maximum continuous voltage		P
	c) Pulse current		P
R	ANNEX R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		N
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6.2)		N
R.2	Reduced clearances (see 2.10.3)		N
S	ANNEX S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		N
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N
T	ANNEX T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		N
U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		N
U.1	Wire construction		N
U.2	Type tests		N
U.2.1	Electric strength		N
U.2.2	Flexibility and adherence		N
U.2.3	Heat shock		N
U.2.4	Retention of electric strength after bending		N
U.3	Tests during manufacture		N
U.3.1	Routine testing		N
U.3.2	Sampling tests		N
V	ANNEX V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1)		P
V.1	Introduction		P
V.2	TN power distribution systems		P
V.3	TT power distribution systems		N
V.4	IT power distribution systems		N

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Clause	Requirement – Test	Result - Remark	Verdict
W	ANNEX W, SUMMATION OF TOUCH CURRENTS		N
W.1	Touch current from electronic circuits		N
W.1.1	Floating circuits		N
W.1.2	Earthed circuits		N
W.2	Interconnection of several equipments		N
W.2.1	Isolation		N
W.2.2	Common return, isolated from earth		N
W.2.3	Common return, connected to protective earth		N
X	ANNEX X, MAXIMUM HEATING EFFECT IN TRANSFORMER TESTS (see clause C.1)		P
X.1	Determination of maximum input current		P
X.2	Overload test procedure		P
Y	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)		N
Y.1	Test apparatus	No ultraviolet light.	N
Y.2	Mounting of test samples		N
Y.3	Carbon-arc light-exposure apparatus		N
Y.4	Xenon-arc light exposure apparatus		N
Z	ANNEX Z, OVERVOLTAGE CATEGORIES (see 2.10.3.2 and Clause G.2)		N
AA	ANNEX AA, MANDREL TEST (see 2.10.5.8)		N
BB	ANNEX BB, CHANGES IN THE SECOND EDITION		P
EN 60950-1: 2006 --COMMON MODIFICATIONS			
Contents	Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations		--

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Clause	Requirement – Test	Result - Remark	Verdict

General	Delete all the "country" notes in the reference document according to the following list:						--
	1.4.8	Note 2	1.5.1	Note 2 & 3	1.5.7.1	Note	
	1.5.8	Note 2	1.5.9.4	Note	1.7.2.1	Note 4, 5 & 6	
	2.2.3	Note	2.2.4	Note	2.3.2	Note	
	2.3.2.1	Note 2	2.3.4	Note 2	2.6.3.3	Note 2 & 3	
	2.7.1	Note	2.10.3.2	Note 2	2.10.5.13	Note 3	
	3.2.1.1	Note	3.2.4	Note 3.	2.5.1	Note 2	
	4.3.6	Note 1 & 2	4.7	Note 4	4.7.2.2	Note	
	4.7.3.1	Note 2	5.1.7.1	Note 3 & 4	5.3.7	Note 1	
	6	Note 2 & 5	6.1.2.1	Note 2	6.1.2.2	Note	
	6.2.2	Note 6.	2.2.1	Note 2	6.2.2.2	Note	
	7.1	Note 3	7.2	Note	7.3	Note 1 & 2	
	G.2.1	Note 2	Annex H	Note 2			
1.3.Z1	Add the following subclause: 1.3.Z1 Exposure to excessive sound pressure The apparatus shall be so designed and constructed as to present no danger when used for its intended purpose, either in normal operating conditions or under fault conditions, particularly providing protection against exposure to excessive sound pressures from headphones or earphones. NOTE Z1 A new method of measurement is described in EN 50332-1, Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 1: General method for "one package equipment", and in EN 50332-2, Sound system equipment: Headphones and earphones associated with portable audio equipment - Maximum sound pressure level measurement methodology and limit considerations - Part 2: Guidelines to associate sets with headphones coming from different manufacturers.						N
1.5.1	Add the following NOTE: NOTE Z1 The use of certain substances in electrical and electronic equipment is restricted within the EU: see Directive 2002/95/EC						N
1.7.2.1	Add the following NOTE: NOTE Z1 In addition, the instructions shall include, as far as applicable, a warning that excessive sound pressure from earphones and headphones can cause hearing loss						N

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Clause	Requirement – Test	Result - Remark	Verdict

2.7.1	Replace the subclause as follows: Basic requirements To protect against excessive current, short-circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as parts of the equipment; b) for components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation; c) it is permitted for PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, to rely on dedicated overcurrent and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.	N
2.7.2	This subclause has been declared 'void'.	--
3.2.3	Delete the NOTE in Table 3A, and delete also in this table the conduit sizes in parentheses.	--
3.2.5.1	Replace "60245 IEC 53" by "H05 RR-F"; "60227 IEC 52" by "H03 VV-F or H03 VVH2-F"; "60227 IEC 53" by "H05 VV-F or H05 VVH2-F2". In Table 3B, replace the first four lines by the following: | Up to and including 6 | | 0,75 [a)] | | Over 6 up to and including 10 | (0,75) [b)] 1,0 | | Over 10 up to and including 16 | (1,0) [c)] 1,5 | In the conditions applicable to Table 3B delete the words "in some countries" in condition [a)]. In NOTE 1, applicable to Table 3B, delete the second sentence.	N
3.3.4	In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following: | Over 10 up to and including 16 | 1,5 to 2,5 | 1,5 to 4 | Delete the fifth line: conductor sizes for 13 to 16 A.	N

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4.3.13.6	Add the following NOTE: NOTE Z1 Attention is drawn to 1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz. Standards taking into account this Recommendation which demonstrate compliance with the applicable EU Directive are indicated in the OJEC.	--
Annex H	Replace the last paragraph of this annex by: At any point 10 cm from the surface of the OPERATOR ACCESS AREA, the dose rate shall not exceed 1 µSv/h (0,1 mR/h) (see NOTE). Account is taken of the background level. Replace the notes as follows: NOTE These values appear in Directive 96/29/Euratom. Delete NOTE 2.	N
Biblio-graphy	Additional EN standards.	--

ZA	NORMATIVE REFFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS	N

ZB	SPECIAL NATIONAL CONDITIONS	N
1.2.4.1	In **Denmark**, certain types of Class I appliances (see 3.2.1.1) may be provided with a plug not establishing earthing conditions when inserted into Danish socket-outlets.	N
1.5.7.1	In **Finland**, **Norway** and **Sweden**, resistors bridging BASIC INSULATION in CLASS I PLUGGABLE EQUIPMENT TYPE A must comply with the requirements in 1.5.7.1. In addition when a single resistor is used, the resistor must withstand the resistor test in 1.5.7.2	N
1.5.8	In **Norway**, due to the IT power system used (see annex V, Figure V.7), capacitors are required to be rated for the applicable line-to-line voltage (230 V).	N
1.5.9.4	In **Finland**, **Norway** and **Sweden**, the third dashed sentence is applicable only to equipment as defined in 6.1.2.2 of this annex.	N

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1.7.2.1	In **Finland**, **Norway** and **Sweden**, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: In Finland: "Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan" In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag" In Norway and Sweden, the screen of the cable distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building, therefore the protective earthing of the building installation need to be isolated from the screen of a cable distribution system. It is however accepted to provide the insulation external to the equipment by an adapter or an interconnetion cable with galvanic isolator, which may be provided by e.g. a retailer. The user manual shall then have the following or similar information in norwegian and swedish language respectively, depneding on in what country the equipment is intended to be used in: "Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-1)" NOTE In Norway, due to regulation for installations of cable distribution systems, and in Sweden, a galvanic isolator shall provide electrical insulation below 5MHz. The insulation shall withstand a dielectric strength of 1,5kV r.m.s., 50Hz or 60Hz, for 1min. Translation to norwegian (the Swedish text will also be accepted in Norway): "Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et kabel –TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel –TV nettet installeres en galvanisk isolator mellom utstyret og kabel –TV nettet." Translation to Swedish: "Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel –TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel –TV nät galvanisk isolator finnas mellan utrustningen och kabel –TV nätet".		N

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1.7.5	In **Denmark**, socket-outlets for providing power to other equipment shall be in accordance with the Heavy Current Regulations, Section 107-2-D1, Standard Sheet DK 1-3a, DK 1-5a or DK 1-7a, when used on Class I equipment. For STATIONARY EQUIPMENT the socket-outlet shall be in accordance with Standard Sheet DK 1-1b or DK 1-5a. For class II equipment the socket outlet shall be in accordance with standard sheet DKA 1-4a.	N
2.2.4	In **Norway**, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.	N
2.3.2	In **Finland**, **Norway** and **Sweden** there are additional requirements for the insulation. See 6.1.2.1 and 6.1.2.2 of this annex.	N
2.3.4	In **Norway**, for requirements see 1.7.2.1, 6.1.2.1 and 6.1.2.2 of this annex.	N
2.6.3.3	In the **United Kingdom**, the current rating of the circuit shall be taken as 13 A, not 16 A.	N
2.7.1	In the **United Kingdom**, to protect against excessive currents and short-circuits in the PRIMARY CIRCUIT of DIRECT PLUG-IN EQUIPMENT, tests according to 5.3 shall be conducted, using an external protective device rated 30 A or 32 A. If these tests fail, suitable protective devices shall be included as integral parts of the DIRECT PLUG-IN EQUIPMENT, so that the requirements of 5.3 are met.	N
2.10.5.13	In **Finland**, **Norway** and **Sweden**, there are additional requirements for the insulation, see 6.1.2.1 and 6.1.2.2 of this annex.	N
3.2.1.1	In **Switzerland**, supply cords of equipment having a RATED CURRENT not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets: SEV 6532-2.1991 Plug Type 15 3P+N+PE 250/400 V, 10 A SEV 6533-2.1991 Plug Type 11 L+N 250 V, 10 A SEV 6534-2.1991 Plug Type 12 L+N+PE 250 V, 10 A In general, EN 60309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and socket-outlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998: SEV 5932-2.1998 Plug Type 25 3L+N+PE 230/400 V, 16 A SEV 5933-2.1998 Plug Type 21 L+N 250 V, 16 A SEV 5934-2.1998 Plug Type 23 L+N+PE 250 V, 16 A	N

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3.2.1.1	In **Denmark**, supply cords of single-phase equipment having a rated current not exceeding13 A shall be provided with a plug according to the Heavy Current Regulations, Section 107-2-D1. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with standard sheet DK 2-1a or DK 2-5a. If poly-phase equipment and single-phase equipment having a RATED CURRENT exceeding 13 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations, Section 107-2-D1 or EN 60309-2.	N
3.2.1.1	In **Spain**, supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to UNE 20315:1994. Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993. CLASS I EQUIPMENT provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994. If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2.	N
3.2.1.1	In the **United Kingdom**, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug, shall be fitted with a 'standard plug' in accordance with Statutory Instrument 1768:1994 - The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those regulations. NOTE 'Standard plug' is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug.	N
3.2.1.1	In **Ireland**, apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to I.S. 411 by means of that flexible cable or cord and plug, shall be fitted with a 13 A plug in accordance with Statutory Instrument 525:1997 - National Standards Authority of Ireland (section 28) (13 A Plugs and Conversion Adaptors for Domestic Use) Regulations 1997.	N
3.2.4	In **Switzerland**, for requirements see 3.2.1.1 of this annex.	N
3.2.5.1	In the **United Kingdom**, a power supply cord with conductor of 1,25 mm2 is allowed for equipment with a rated current over 10 A and up to and including 13 A.	N
3.3.4	In the **United Kingdom**, the range of conductor sizes of flexible cords to be accepted by terminals for equipment with a RATED CURRENT of over 10 A up to and including 13 A is: • 1,25 mm^2 to 1,5 mm^2 nominal cross-sectional area.	N

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4.3.6	In the **United Kingdom**, the torque test is performed using a socket outlet complying with BS 1363 part 1:1995, including Amendment 1:1997 and Amendment 2:2003 and the plug part of DIRECT PLUG-IN EQUIPMENT shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.13, 12.16 and 12.17, except that the test of 12.17 is performed at not less than 125 °C. Where the metal earth pin is replaced by an Insulated Shutter Opening Device (ISOD), the requirements of clauses 22.2 and 23 also apply.	N
4.3.6	In **Ireland**, DIRECT PLUG-IN EQUIPMENT is known as plug similar devices. Such devices shall comply with Statutory Instrument 526:1997 - National Standards Authority of Ireland (Section 28) (Electrical plugs, plug similar devices and sockets for domestic use) Regulations, 1997.	N
5.1.7.1	In **Finland**, **Norway** and **Sweden** TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for the following equipment: • STATIONARY PLUGGABLE EQUIPMENT TYPE A that ○ is intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, for example, in a telecommunication centre; and ○ has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR; and ○ is provided with instructions for the installation of that conductor by a SERVICE PERSON; • STATIONARY PLUGGABLE EQUIPMENT TYPE B; • STATIONARY PERMANENTLY CONNECTED EQUIPMENT.	N
6.1.2.1	In **Finland**, **Norway** and **Sweden**, add the following text between the first and second paragraph of the compliance clause: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either - two layers of thin sheet material, each of which shall pass the electric strength test below, or - one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. If this insulation forms part of a semiconductor component (e.g. an optocoupler), there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition - passes the tests and inspection criteria of 2.10.11 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.10 shall be performed using 1,5 kV), and	N

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	- is subject to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV. It is permitted to bridge this insulation with a capacitor complying with EN 132400:1994, subclass Y2. A capacitor classified Y3 according to EN 132400:1994, may bridge this insulation under the following conditions: - the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 132400, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 60950-1:2006, 6.2.2.1; - the additional testing shall be performed on all the test specimens as described in EN 132400; - the impulse test of 2,5 kV is to be performed before the endurance test in EN 132400, in the sequence of tests as described in EN 132400.	
6.1.2.2	In **Finland**, **Norway** and **Sweden**, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT, PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a SERVICE PERSON.	N
7.2	In **Finland**, **Norway** and **Sweden**, for requirements see 6.1.2.1 and 6.1.2.2 of this annex. The term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.	N
7.3	In **Norway** and **Sweden**, there are many buildings where the screen of the coaxial cable is normally not connected to the earth in the building installation.	N
7.3	In **Norway**, for installation conditions see EN 60728-11:2005.	N

ZC	A-DEVIATIONS (informative)	N
1.5.1	**Sweden** (Ordinance 1990:944) Add the following: NOTE In Sweden, switches containing mercury are not permitted.	N
1.5.1	**Switzerland** (Ordinance on environmentally hazardous substances SR 814.081, Annex 1.7, Mercury - Annex 1.7 of SR 814.81 applies for mercury.) Add the following: NOTE In Switzerland, switches containing mercury such as thermostats, relays and level controllers are not allowed.	N

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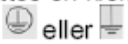
1.7.2.1	**Denmark** (Heavy Current Regulations) Supply cords of CLASS I EQUIPMENT, which is delivered without a plug, must be provided with a visible tag with the following text: Vigtigt! Lederen med grøn/gul isolation må kun tilsluttes en klemme mærket  If essential for the safety of the equipment, the tag must in addition be provided with a diagram, which shows the connection of the other conductors, or be provided with the following text: "For tilslutning af de øvrige ledere, se medfølgende installationsvejledning."	N
1.7.2.1	**Germany** (Gesetz über technische Arbeitsmittel und Verbraucherprodukte (Geräte- und Produktsicherheitsgesetz – GPSG) [Law on technical labour equipment and consumer products], of 6th January 2004, Section 2, Article 4, Clause (4), Item 2). If for the assurance of safety and health certain rules during use, amending or maintenance of a technical labour equipment or readymade consumer product are to be followed, a manual in German language has to be delivered when placing the product on the market. Of this requirement, rules for use even only by SERVICE PERSONS are not exempted.	N
1.7.5	**Denmark** (Heavy Current Regulations) With the exception of CLASS II EQUIPMENT provided with a socket outlet in accordance with the Heavy Current Regulations, Section 107-2-D1, Standard Sheet DK 1-4a, CLASS II EQUIPMENT shall not be fitted with socket-outlets for providing power to other equipment.	N
1.7.13	**Switzerland** (Ordinance on chemical hazardous risk reduction SR 814.81, Annex 2.15 Batteries) Annex 2.15 of SR 814.81 applies for batteries.	N
5.1.7.1	**Denmark** (Heavy Current Regulations, Chapter 707, clause 707.4) TOUCH CURRENT measurement results exceeding 3,5 mA r.m.s. are permitted only for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B.	N

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Tables

1.5.1	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Metal enclsure	--	--	min. thickness: 1.5mm	--	Test in appliance
AC terminal blocks	SHENZHEN SUCCEED ELECTRONICS TECHNOLOGY CO., LTD.	TR-6N-01-3P-BK	600V, 50A	UL 1059	UL E332956
DC terminal blocks	SHENZHEN SUCCEED ELECTRONICS TECHNOLOGY CO., LTD.	TR-6N-01-2P-BK	600V, 50A	UL 1059	UL E332956
Power Switch	Rong Feng Industrial Co., Ltd	RF-1033	250Vac, 6A	EN 61058-1	VDE 40021707, UL E94138
Circuit breaker	TOPSTONE CORP (E244552)	L1	125/250Vac, 40A	EN 60934:2001	TUV RH(R 50046704)
DC Fan	ADDA CORPORATION	AD0812XB-A7BGP	DC12V, 0.55A	UL 507	UL E132139
Bigger choke 1 and 2 (fixed to enclosure)	Voltronic Power	41-110135-00G	130°C	IEC/EN 60950-1	Test in appliance
Mylar	SHIN-ETSU CHEMICAL CO LTD	TC-(xxxx)TCI	V-0, 0.2mm, 150°C	UL 94	UL E48923
Internal wiring	VEGA TECHNOLOGIES INDUSTRIAL (AUSTRIA) CO	1015	10AWG, 105°C	UL758	UL E189529
Alternate	YONG HAO ELECTRICAL INDUSTRY CO LTD	1015	10AWG, 105°C	UL758	UL E240426
Alternate	Various	Various	Min. 10AWG, 105°C	UL758	UL
Heat shrink tube	CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD	CB-HFT	600V, 125°C	UL224	UL E180908
Alternate	Various	Various	Min. 600V, 125°C	UL224	UL
For Main board(16-500242-00G)					
Varistor (MOV1)	BRIGHTKING (SHENZHEN) CO., LTD	561KN20	300Vac, 385Vdc	EN 61051-1, IEC61051-2/A1, UL 1449	VDE UL E327997
Y-Cap (C59, C60)	JUHONG ELE CO	JA	1000pF, min. 250Vac, min. 85°C	IEC 60384-14	VDE UL E253194
Alternate	Various	Various	1000pF, min. 250Vac, min. 85°C	IEC 60384-14	VDE UL
Y-Cap (C119, C120, C121, C122, C52, C53, C70, C71)	JUHONG ELE CO	JA	Max. 10000pF, min. 250Vac, min. 85°C	IEC 60384-14	VDE UL E253194
Alternate	Various	Various	Max. 10000pF, min. 250Vac,	IEC 60384-14	VDE UL

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			min. 85°C		
X-Cap(C87)	FARAD ELECTRONICS CO., LTD	PXK	Max. 0.22uF, min. 250Vac, min. 100°C	IEC 60384-14	VDE UL E247953
Alternate	Various	Various	Max. 0.22uF, min. 250Vac, min. 100°C	IEC 60384-14	VDE UL E247953
X-Cap(C49)	FARAD ELECTRONICS CO., LTD	PXK	Max. 0.47uF, min. 250Vac, min. 100°C	IEC 60384-14	VDE UL E247953
Alternate	Various	Various	Max. 0.47uF, min. 250Vac, min. 100°C	IEC 60384-14	VDE UL E247953
Relay (RY1, RY2, RY3, RY4)	SONG CHUAN PRECISION CO., LTD	832HA-1A-F-C	277Vac,40A	EN 60255-23, EN 61810-1, EN 61810-5, UL508.	UL E88991
E-Cap(C40, C41)	--	--	470uF, 500Vac, 105°C	--	--
IGBT(QB2, QD2, QA1, QC1, Q28, Q27, Q29, Q30, Q31, Q32,)	--	--	45A, 600V	--	--
Mosfet (Q19, Q13, Q18, Q23, Q24, Q11, Q17, Q20, Q38, Q21, Q22, Q12, Q40, Q26, Q25, Q14)	--	--	120A, 75V	--	--
Thermistor (NTCCN4-HS3, NTCCN8-HS1)	Lattron Co., Ltd	LNTA153@W*	15Kohm at 25°C	UL 1434	UL E306546
Chock(L2)	CLICK	41-110111-00G	130°C	IEC/EN 60950-1	Test in appliance
Chock(L4)	Voltronic Power	SP36123B-00SS	130°C	IEC/EN 60950-1	Test in appliance
Chock(L1)	Voltronic Power	41-110103-00G	130°C	IEC/EN 60950-1	Test in appliance
Current transformer (CT1)	Voltronic Power	41-020027-00G	130°C	IEC/EN 60950-1	Test in appliance
Current transformer (HCT1)	Voltronic Power	41-025003-00G	130°C	IEC/EN 60950-1	Test in appliance
Opto coupler (U8, U13, U11, U17, U18)	COSMO ELECTRONICS CORP	K1010	Int. CR / Ext. CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, 55/115/21	IEC 60747-5-2: 1997 + A1: 2002	VDE 101347 UL E169586
Transformer (TX1)	CLICK	41-070237-00G	Class F(155°C)	IEC/EN 60950-1	Test in appliance
--Bobbin	E I DUPONT DE NEMOURS & CO INC	410	V-0, 200°C, Min. 0.51mm thickness	UL 94	UL E34739
--Insulation tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PF	180°C	UL 510	UL E165111
--Margin tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PF	180°C	UL 510	UL E165111

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--Magnet wire	PACIFIC ELECTRIC WIRE & CABLE (SHENZHEN) CO LTD	PEWF/U, UEWN/U	155°C	UL 1446	UL E201757
Alternate	TAI-I ELECTRIC WIRE & CABLE CO LTD	UEWF	155°C	UL 1446	UL E85640
--Tubing	GREAT HOLDING INDUSTRIAL CO LTD	TFL	200°C	UL 224	UL E156256
--Varnish	JOHN C DOLPH CO	BC-346A	Min. 200°C	UL 1446	UL E317427
Alternate	ELANTAS ELECTRICAL INSULATION ELANTAS PDG INC	V1630FS	Min. 155°C	UL 1446	UL E75225
Transformer (TX10, TX11)	CLICK	41-070183-00G	Class B	IEC/EN 60950-1	Test in appliance
Transformer (TX5, TX8)	Rong Chyuan Technology Corporation	EE16	Class B	IEC/EN 60950-1	Test in appliance
- Triple insulated wire	FURUKAWA ELECTRIC CO., LTD	TEX-E	130°C	UL 2353	UL E206440
Transformer (TX7)	CLICK	41-070184-00G	Class B	IEC/EN 60950-1	Test in appliance
Transformer (TX6)	CLICK	41-070185-00G	Class B	IEC/EN 60950-1	Test in appliance
Transformer (TX2)	CLICK	41-070186-00G	Class B	IEC/EN 60950-1	Test in appliance
Transformer (TX9)	CLICK	41-070194-00G	Class B	IEC/EN 60950-1	Test in appliance
DC fuse (F3)	LITTELFUSE AUTOMOTIVE GMBH	BTF1	200A, 58Vdc	UL 248-1 UL 248-14	UL E211637
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB6160	V-0, 130°C	UL94	UL E123995
Alternate	Various	Various	V-0 or better, Min. 130°C	UL94	UL
Charge board(16-500244-00C)					
Opto coupler (U6, U8)	COSMO ELECTRONICS CORP	K1010	Int. CR / Ext. CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, 55/115/21	IEC 60747-5-2: 1997 + A1: 2002	VDE 101347 UL E169586
Relay (RY1)	SONG CHUAN PRECISION CO., LTD	897P1-1AH-C	14Vac,70A	IEC/EN 60950-1	Test in appliance
X-Cap(C5)	FARAD ELECTRONICS CO., LTD	PXK	Max. 0.1uF, min. 250Vac, min. 100°C	IEC 60384-14	VDE UL E247953
Alternate	Various	Various	Max. 0.1uF, min. 250Vac, min.	IEC 60384-14	VDE UL E247953

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Tables

			100°C		
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB6160	V-0, 130°C	UL94	UL E123995
Alternate	Various	Various	V-0 or better, Min. 130°C	UL94	UL
Mini board(16-500237-00G)					
Transformer (TX1)	Rong Chyuan Technology Corporation	41-070193-00G	Class B	IEC 60950-1	Test in appliance
-Triple insulated wire	FURUKAWA ELECTRIC CO., LTD	TEX-E	130°C	UL 2353	UL E206440
Opto coupler (U1, U2)	COSMO ELECTRONICS CORP	K1010	Int. CR / Ext. CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, 55/115/21	IEC 60747-5-2: 1997 + A1: 2002	VDE(101347) UL(E169586)
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB5150	V-0, 130°C	UL94	UL E123995
Board 16-600056-00G					
Transformer (TX1)	Rong Chyuan Technology Corporation	41-070209-00G	Class B	IEC/EN 60950-1	Test in appliance
--Bobbin	SUMITOMO BAKELITE CO LTD	PM-9820	V-0, 130°C, Min. 0.51mm thickness	UL 94	UL E41429
--Insulation tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PZ	130°C	UL 510	UL E165111
--Margin tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	WF	130°C	UL 510	UL E165111
--Magnet wire	SHENZHEN DAYANG INDUSTRY CO LTD	xUEW-NY	130°C	UL 1446	UL E176101
--Tubing	ZEUS INDUSTRIAL PRODUCTS INC	TFE-TW-300	300V, 200°C	UL 224	UL E64007
Opto coupler (U3,U5,U6)	COSMO ELECTRONICS CORP	K1010	Int. CR / Ext. CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, 55/115/21	IEC 60747-5-2: 1997 + A1: 2002	VDE(101347) UL(E169586)
Alternate	COSMO Electronics Corporation	KPC 357 NT	Int. CR / Ext. CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, Min. 100°C	DIN EN 60747-5-2: 2001-01	VDE 40014684
Y-Cap (C37, C10,C11,C38)	JUHONG ELE CO	JA	Max. 10000pF, min. 250Vac, min. 85°C	IEC 60384-14	VDE UL E253194
Alternate	Various	Various	Max. 10000pF, min. 250Vac,	IEC 60384-14	VDE UL

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Tables

			min. 85°C		
Varistor (MOV1, MOV2)	JOYIN CO LTD	14N471K	300Vac, 385Vdc	EN 61051-1, IEC61051-2/A1, UL 1449	VDE UL E325508
Relay (RY1, RY2)	NEC TOKIN CORP	897P1-1AH-C	12Vdc, 133mA	EN 60255-23, EN 61810-1, EN 61810-5, UL508.	UL E73266 TUV
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB5150	V-0, 130°C	UL94	UL E123995
Alternate	Various	Various	V-0 or better, Min. 130°C	UL94	UL
Board 16-500243-00G					
Opto coupler (U1,U3,U7,U8,U9,U10)	COSMO ELECTRONICS CORP	K1010	Int. CR / Ext. CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, 55/115/21	IEC 60747-5-2: 1997 + A1: 2002	VDE(101347) UL(E169586)
Alternate	COSMO Electronics Corporation	KPC 357 NT	Int. CR / Ext. CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, Min. 100°C	DIN EN 60747-5-2: 2001-01	VDE 40014684
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB5150	V-0, 130°C	UL94	UL E123995
Alternate	Various	Various	V-0 or better, Min. 130°C	UL94	UL
Board 16-500271-00G					
Transformer (TX1, TX2)	Rong Chyuan Technology Corporation	41-070209-00G	Class B	IEC/EN 60950-1	Test in appliance
--Bobbin	SUMITOMO BAKELITE CO LTD	PM-9820	V-0, 130°C, Min. 0.51mm thickness	UL 94	UL E41429
--Insulation tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PZ	130°C	UL 510	UL E165111
--Margin tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	WF	130°C	UL 510	UL E165111
--Magnet wire	SHENZHEN DAYANG INDUSTRY CO LTD	xUEW-NY	130°C	UL 1446	UL E176101
--Tubing	ZEUS INDUSTRIAL PRODUCTS INC	TFE-TW-300	300V, 200°C	UL 224	UL E64007
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB5150	V-0, 130°C	UL94	UL E123995
Alternate	Various	Various	V-0 or better, Min. 130°C	UL94	UL
Board 16-000285-00G					
Opto coupler (U2)	COSMO	K1010	Int. CR / Ext.	IEC 60747-5-2:	VDE(101347)

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	ELECTRONICS CORP		CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, 55/115/21	1997 + A1: 2002	UL(E169586)
Alternate	COSMO Electronics Corporation	KPC 357 NT	Int. CR / Ext. CR / Dti. ≥6,5 mm / ≥6,5 mm / >0,4 mm, Min. 100°C	DIN EN 60747-5-2: 2001-01	VDE 40014684
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB5150	V-0, 130°C	UL94	UL E123995
Alternate	Various	Various	V-0 or better, Min. 130°C	UL94	UL
PCB (for board16-000225-00G-A, 16-000290-00G-A)	KINGBOARD LAMINATES HOLDINGS LTD	KB5150	V-0, 130°C	UL94	UL E123995
Alternate	Various	Various	V-0 or better, Min. 130°C	UL94	UL
Note:					

1.6.2	TABLE: electrical data(in normal conditions)					P
Fuse#	Irated(A)	U(V)	P(W)	I(A)	Ifuse(A)	condition/status
For AC Charger mode:						
Circuit breaker	–	207Vac/ 50Hz	5850	31.2	31.2	Rated output load
Circuit breaker	29	230Vac/ 50Hz	5800	28.5	28.5	Rated output load
Circuit breaker	–	253Vac/ 50Hz	5900	25.5	25.5	Rated output load
For Inverter mode:						
--	93	48.0Vdc	4500	95	–	Rated output load
Note (s):						

1.7.11	TABLE: durability of marking test			P
Location	Checked by	Times	Result	
External enclosure	Water	15s	No any curling and still legibility	
External enclosure	Petroleum spirit	15s	No any curling and still legibility	
Supplementary information:				

2.1.1.5 c1)	TABLE: max. V, A, VA test (Energy hazardous measurement)			N
Voltage (rated) (V)	Current (rated) (A)	Voltage (max.) (V)	Current (max.) (A)	VA (max.) (VA)

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Tables

–	–	–	--	--
Supplementary information: Battery terminal				

2.1.1.5 c2)	TABLE: stored energy (Energy hazardous measurement)	N
Capacitance C (µF)	Voltage U (V)	Energy E (J)
--	--	--
Supplementary information:		

2.1.1.7	TABLE: capacitance discharge test			P
Condition	T calculated (s)	Tmeasured (s)	Comments	
L-N	—	253ms	Vp=364V, 37% of Vp=134.7V	
Supplement information: Supplied with 253V/50Hz, test without load.				

2.2	TABLE: evaluation of voltage limiting components in SELV circuits		P
Component (measured between)	Maximum voltage (V) (normal operation)		Voltage limiting components
	Vpeak	Vd.c.	
TX1(for mini board) Pin 8 to 7	38.8	--	–
TX1(for mini board) Pin 6 to 7	38.4	--	–
Fault test performed on voltage limiting components	Voltage measured (V) in SELV circuits (Vpeak or Vd.c.)		
Supplementary information: s-c=short circuit.			

2.4.2	TABLE: limited current circuit measurement				P
Condition	Voltage (V)	Current (mA)	Freq. (Hz)	Limit (mA)	Comments
Inverter mode					
L-N	0.67	0.34	50	0.7	Normal
L-GND	0.87	0.44	50	0.7	Normal
N-GND	0.84	0.42	50	0.7	Normal
L-N	1.02	0.51	50	0.7	Short-circuited R185
L-GND	1.09	0.55	50	0.7	Short-circuited R185
N-GND	1.14	0.57	50	0.7	Short-circuited R185

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Tables

L-N	1.01	0.51	50	0.7	Short-circuited R184
L-GND	1.21	0.61	50	0.7	Short-circuited R184
N-GND	1.08	0.51	50	0.7	Short-circuited R184
AC Charge mode					
PV+ - PV-	0.42	0.21	50	0.7	Normal
Supplementary information:					

2.5	TABLE: limited power source				N
Circuit output tested:					
Measured Uoc (V) with all load circuits disconnected: Uoc=					
Measuring position	Isc (A)		VA		
	Meas.	Limit	Meas.	Limit	
–	–	--	–	–	
Supplementary information: s-c=short-circuit; o-c=open circuit					

2.6.3.4	TABLE: ground continue test				P
Location	Resistance measured (mΩ)	Voltage measured (V)	Current applied (A)	Duration (min)	
PE pole to Metal enclosure	27.6	–	58	2	
Supplementary information:					

2.10.2	Table: working voltage measurement		P
Location	Peak voltage (V)	RMS voltage (V)	Comments
For main board			
TX1 Pin 1 to Pin 3	430	240	–
TX1 Pin 1 to Pin 4	**444**	286	Max. Peak for TX1
TX1 Pin 2 to Pin 3	435	**287**	Max. RMS for TX1
TX1 Pin 2 to Pin 4	444	254	–
TX5 Pin 1 to Pin 5	93.0	11.7	–
TX5 Pin 1 to Pin 6	79.0	7.9	–
TX5 Pin 1 to Pin 7	44.0	28.0	–
TX5 Pin 1 to Pin 8	10.0	36.1	–
TX5 Pin 4 to Pin 5	**97.0**	**40.3**	Max. Peak and RMS for TX5

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Clause	Requirement – Test	Result - Remark	Verdict

Tables

TX5 Pin 4 to Pin 6	84.0	30.7	–
TX5 Pin 4 to Pin 7	33.0	7.8	–
TX5 Pin 4 to Pin 8	47.0	13.3	–
TX8 Pin 1 to Pin 5	87.0	35.4	–
TX8 Pin 1 to Pin 6	74.0	26.7	–
TX8 Pin 1 to Pin 7	40.0	8.9	–
TX8 Pin 1 to Pin 8	30.0	9.8	–
TX8 Pin 4 to Pin 5	**93.0**	**40.3**	Max. Peak and RMS for TX8
TX8 Pin 4 to Pin 6	78.0	28.9	–
TX8 Pin 4 to Pin 7	34.0	8.9	–
TX8 Pin 4 to Pin 8	49.0	13.3	–
TX2 Pin 7 to 4	**521**	**300**	Max. Peak and RMS for TX2
TX2 Pin 9 to 4	514	300	–
TX2 Pin 7 to 2	14.5	8.3	–
TX2 Pin 9 to 2	28.0	9.6	–
TX9 Pin 1 to Pin 5	36.0	13.2	–
TX9 Pin 1 to Pin 6	28.0	8.9	–
TX9 Pin 1 to Pin 8	132	45.9	–
TX9 Pin 1 to Pin 11	120	44.5	–
TX9 Pin 1 to Pin 9	133	45.2	–
TX9 Pin 1 to Pin 12	132	46.1	–
TX9 Pin 3 to Pin 5	108	48.0	–
TX9 Pin 3 to Pin 6	132	55.0	–
TX9 Pin 3 to Pin 8	132	48.9	–
TX9 Pin 3 to Pin 11	145	54.6	–
TX9 Pin 3 to Pin 9	140	50.6	–
TX9 Pin 3 to Pin 12	**160**	**65.3**	Max. Peak and RMS for TX9
TX6 Pin 1 to Pin 5	60.0	44.2	–
TX6 Pin 1 to Pin 6	61.0	44.7	–
TX6 Pin 1 to Pin 8	164	89.7	–
TX6 Pin 1 to Pin 11	164	89.1	–
TX6 Pin 3 to Pin 5	60.0	43.2	–
TX6 Pin 3 to Pin 6	60.0	43.5	–
TX6 Pin 3 to Pin 8	164	89.2	–

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Tables

TX6 Pin 3 to Pin 11	**164**	**90.1**	Max. Peak and RMS for TX6
U8 Primary to Secondary	50.3	9.2	–
U13 Primary to Secondary	64.0	9.3	–
U11 Primary to Secondary	56.3	22.1	–
U17 Primary to Secondary	70.3	12.0	–
U18 Primary to Secondary	57.0	15.6	–
Note(s):			

2.10.3 and 2.10.4	TABLE: clearance and creepage distance measurements					P
clearance cl and creepage distance dcr at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	Cl (mm)	Required dcr (mm)	Cr (mm)
Primary circuits to PE through:	420	250	2.0	See below	2.5	See below
-under C52, C53, C59, C60, C70, C71				3.3		3.3
-under C122, C119				3.8		3.8
-under C120				3.7		3.7
-under C121				4.0		4.0
Primary circuits to SELV circuits through PCB on main board	420	250	4.0	See below	5.0	See below
-under U8, U11, U13, U17				5.4		5.4
-under U18				5.5		5.5
-under TX9	420	250	4.0	>10	5.0	>10
-under TX6	420	250	4.0	5.2	5.0	5.2
-under TX2	521	300	4.8	>6.0	6.0	>6.0
-under TX1	444	287	4.6	>10	5.8	>10
-under TX5, TX8	420	250	4.0	7.6	5.0	7.6
Primary circuits to SELV circuits through PCB on mini board	420	250	4.0	See below	5.0	See below
-under U1, U2				4.7		>5.4
-under TX1	420	250	4.0	5.7	5.0	5.7

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Clause	Requirement – Test	Result - Remark	Verdict

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Supplementary information:
1. See appended table C.2 for internal distances of transformer.
2. 10N test performed component and internal wire.

2.10.5	TABLE: distance through insulation measurement				P
Distance through insulation (DTI) at/of:	Upeak (V)	U rms (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)
Opto-couplers	<420	<250	3000	0.4	≥0.4[1)]
Supplementary information:					
1) Approved component. For details refer to table 1.5.1.					

4.3.8	TABLE: Batteries								N
The tests of 4.3.8 are applicable only when appropriate battery data is not available									N
Is it possible to install the battery in a reverse polarity position?									N
	Non-rechargeable batteries			Rechargeable batteries					
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging	
	Meas. Current	Manuf. Specs.		Meas. Current	Manuf. Specs.	Meas. Current	Manuf. Specs.	Meas. Current	Manuf. Specs.
Max. Current during normal condition	--	--	--	–	–	--	–	--	–
Max. Current during fault condition	--	--	--	–	–	--	–	--	–

Test results:		Verdict
- Chemical leaks	--	N
- Explosion of the battery	--	N
- Emission of flame or expulsion of molten metal	--	N
- Electric strength tests of equipment after completion of tests	--	N
Supplementary information:		

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Tables

4.5	TABLE: temperature rise measurements					N
	test voltage (V)	A : 207V AC charger mode B : 253V AC charger mode C : 48V Inverter mode D : Battery discharger mode				
	t1 C)	--	–	--	–	
	t2 (C)	--	--	--	–	
Maximum temperature T of part/at:		T (°C)				Allowed T_{max} (°C)
		A	B	C	D	
Input connector near "L"		33.7	32.7	42.6	40.7	105
For main board						
Varistor MOV1 body		36.6	34.9	42.7	41.0	85
C87 body		30.1	29.5	32.0	31.1	125
L4 coil		67.7	66.4	79.8	71.9	130
C46 body		36.3	34.9	40.8	38.9	100
Relay RY1 coil		54.3	49.6	44.2	42.5	105
Relay RY2 coil		52.8	48.3	59.4	57.1	105
C90 body		34.3	33.9	33.1	32.7	125
CT1 coil		54.0	47.4	60.6	58.2	110
L1 coil		30.8	30.2	47.7	45.0	130
L2 coil		38.3	36.4	62.0	59.8	130
C70 body		32.6	32.2	55.3	54.8	85
PCB under Q16		38.1	37.0	50.8	48.4	130
PCB under Q18		84.2	77.0	38.7	38.2	130
PCB under Q20		72.5	67.0	36.6	36.1	130
HCT		39.6	37.8	35.1	33.6	100
C84 body		45.7	45.6	44.6	44.5	125
TX5 coil		51.0	47.9	33.3	32.5	110
TX5 core		47.2	44.1	31.2	30.6	110
TX2 coil		31.0	30.0	27.7	27.2	110
TX2 core		30.6	29.5	28.1	27.5	110
TX1 coil		92.1	82.1	56.0	57.8	130
TX1 core		86.2	78.6	47.4	48.6	130
C9 body		78.1	72.6	33.6	33.4	125

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Clause	Requirement – Test	Result - Remark	Verdict

Tables

U8 body	37.0	36.4	35.3	34.9	100
PCB under Q3	43.8	41.7	40.6	39.2	130
PCB under Q9	31.5	30.5	31.4	31.0	130
PCB under Q12	66.5	61.8	35.8	35.3	130
PCB under F3	59.3	55.3	36.1	35.3	130
Charge board					
RY1 coil	42.3	40.2	32.2	31.4	105
U6 body	41.4	39.3	31.5	30.7	100
16-500243-00G board					
TX1 coil	42.5	40.4	32.8	32.1	110
TX1 core	42.5	40.4	32.7	32.1	110
RY2 coil	42.8	40.7	32.8	32.0	105
Board 16-500271-00G-E					
TX1 coil	41.6	40.0	34.6	33.1	110
TX1 core	42.4	40.7	35.3	33.7	110
16-600056-00G-F board					
RY1 coil	29.0	28.4	27.5	27.3	105
RY2 coil	29.2	28.5	27.5	27.2	105
Varistor MOV2	28.7	27.8	27.3	26.9	85
Optocoupler U3	29.2	28.9	28.3	27.8	100
Y-capacitor C10	28.7	28.0	27.4	27.1	125
Y-capacitor C38 body	28.8	27.9	27.4	27.0	125
TX1 coil	29.2	28.5	27.8	27.7	110
TX1 core	29.2	28.6	27.8	27.7	110
PCB under TX1	29.2	28.6	27.8	27.7	130
PCB under Q8	29.1	28.7	28.2	27.9	130
PCB under Q14	28.9	28.5	28.0	27.7	130
PCB near BAT+	29.3	28.5	27.8	27.4	130
E-capacitor C8	29.4	28.7	28.1	27.7	105
Battery wire (connected to BAT+)	29.3	28.5	27.6	27.2	105
Internal wire bigger inductor 1	29.1	28.6	28.0	27.9	105
Bigger inductor 1 coil (fixed to enclosure)	28.6	28.2	27.7	27.4	130
Bigger inductor 2 coil (fixed to enclosure)	28.6	28.2	27.7	27.5	130
R232 board(16-500245-00G)					

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Tables

TX1 coil	42.5	40.3	32.2	31.6	110
TX1 core	42.9	40.7	32.5	31.7	110
AC output wire inside	41.9	40.1	35.8	34.1	105
Enclosure top outside near Main board	31.6	30.5	28.7	27.8	70
Enclosure bottom outside near Main board	39.8	38.9	32.5	31.4	70
Ambient	28.9	27.5	27.3	26.8	–

Temperature rise ΔT of winding:	R1 (Ω)	R2 (Ω)	ΔT (K)	allowed ΔT (K)	insulation class
–	–	–	--	--	--
–	–	–	--	--	--

Supplementary information:

1) T shall not exceed (Tmax +Tamb-Tma), see clause 1.4.12

T: is the temperature of the given part measured under the prescribed test condition;

Tmax: is the maximum temperature specified for compliance with the test;

Tamb: is the ambient temperature during test;

Tma: is the maximum ambient temperature during permitted by the manufacturer's specification, see below 2)

2) The maximum ambient temperature is 55℃

4.5.5	TABLE: ball pressure test of thermoplastics		P
	required impression diameter (mm) ..... :	≤ 2 mm	–

Part	Test temperature (°C)	Impression diameter (mm)
Plastic material of connector	125	1.5
Transformer Bobbin	125	1.1
Supplementary information:		

4.6.1 and 4.6.2	TABLE: openings	P

Location	Size (mm)	Comments
Top	–-	No openings
Side	Φ=3.4mm	Circularity openings provided, no hazardous live parts exposed to the openings
Bottom	30mmX1.8mm	Rectangle openings provided, no hazardous live parts exposed to the openings

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Tables

Front	---	No openings
Back	Φ=3.4mm	Circularity openings provided, no hazardous live parts exposed to the openings
Supplementary information:		

4.7	TABLE: resistance to fire				N
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence
–	–	--	--	--	--
Supplementary information:					

5.1.6	TABLE: touch current measurement		P
Measured between:	Measured (mA)	Limit (mA)	Comments/conditions
L/N	2.02	3.5	To metal enclosure
L/N	0.02	0.25	To output terminals
Supplementary information: Vin=253V/50Hz			

5.2	TABLE: electric strength tests, impulse tests and voltage surge tests		P
Test voltage applied between:	Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes/No
L and N of input (without fuse)	AC	1500	No
Primary circuits to COM circuits	AC	3000	No
Primary and enclosure	AC	1500	No
TX1 primary and secondary(Main board)	AC	3000	No
TX1 primary and core(Main board)	AC	1500	No
TX1 secondary and core(Main board)	AC	1500	No
TX2 primary and secondary(Main board)	AC	3000	No
TX2 primary and core(Main board)	AC	1500	No
TX2 secondary and core(Main board)	AC	1500	No
TX5 primary and secondary(Main board)	AC	3000	No
TX5 secondary and core(Main board)	AC	3000	No
TX6 primary and secondary(Main board)	AC	3000	No
TX6 primary and core(Main board)	AC	1500	No
TX6 secondary and core(Main board)	AC	1500	No
TX9 primary and secondary(Main board)	AC	3000	No

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TX9 primary and core(Main board)	AC	1500	No
TX9 secondary and core(Main board)	AC	1500	No
TX1 primary and secondary(Mini board)	AC	3000	No
TX1 secondary and core(Mini board)	AC	3000	No
Mylar	AC	3000	No
Supplementary information:			

5.3	TABLE: fault condition tests		P
	Ambient temperature (°C)	25, if not specify	–
	Power source for EUT: Manufacturer, model/type, output rating	–	–

Component No.	Fault	Supply votage (V)	Test time	Fuse #	Fuse current (A)	Observation
Ventilation	Block	230	1h36 min	–	28.5	Unit temperature sable, no hazards, no damaged. The Max. Temperature: For main board: CT1 coil: 75.8°C, TX1 coil: 83.7 °C, TX2 coil: 45.7 °C, TX5 coil: 47.7° C; For board 16-500243-00G: TX1 coil: 38.0°C; For board 16-500271-00G-E: TX1 coil: 49.3°C; For board 16-600056-00G-F: TX1 coil: 44.0°C; For board16-500245-00G: TX1 coil: 33.5°C, Ambient: 29.4°C.
Fan 1	Lock	230	30min	–	28.5	Unit temperature sable, no hazards, no damaged. The Max. Temperature: For main board: CT1 coil: 72.4°C, TX1 coil: 99.0 °C, TX2 coil: 41.1 °C, TX5 coil: 48.8° C; For board 16-500243-00G: TX1 coil: 45.8°C; For board 16-500271-00G-E: TX1 coil: 48.3°C; For board 16-600056-00G-F: TX1 coil: 38.6°C, For board16-500245-00G: TX1 coil: 44.7°C, Ambient: 31.5°C.

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Fan 2	Lock	230	30min	–	28.5	Unit temperature sable, no hazards, no damaged. The Max. Temperature: for main board: CT1 coil: 72.7°C, TX1 coil: 99.5 °C, TX2 coil: 46.2 °C, TX5 coil: 46.1°C; For board 16-500243-00G: TX1 coil: 43.6°C; For board 16-500271-00G-E: TX1 coil: 46.8°C; for board 16-600056-00G-F: TX1 coil: 39.8°C; For board16-500245-00G: TX1 coil: 43.1°C, Ambient: 31.3°C.
AC Output (AC Charge mode)	S-C	230	10min	–	0.15	Unit shutdown immediately, the AC input circuit breaker operated, no damaged, no hazards.
DC Output (AC Charge mode)	S-C	230	10min	–	0.03	Unit shutdown immediately, the DC fuse opened, no hazards.
AC output (Inverter mode)	S-C	48Vdc	10min	–	0.15	Unit shutdown immediately, no damaged, no hazards.
Test on main board						
Q36 Pin 2-3	S-C	230	10min	–	0.03	Unit shutdown immediately, no damaged, no hazards
Q36 Pin 2-3	S-C	48Vdc	10min	–	0.15	Unit shutdown immediately, no damaged, no hazards
Q37 Pin 2-3	S-C	230	10min	--	28.43	R242 damaged, no hazards.
Q37 Pin 2-3	S-C	48Vdc	10min	--	94.74	R242 damaged, no hazards.
C37	S-C	230Vac	10min	--	28.51	Normal operation, no damaged, no hazards.
C37	S-C	48Vdc	10min		95.3	Unit shutdown immediately, damaged, no hazards
Test on board 16-600056-00G-F						
C8	S-C	48Vdc	10min	–	95.3	Normal operation, no damaged, no hazards.
C8	S-C	230Vac	10min	--	28.52	Normal operation, no damaged, no hazards.
Q8 Pin 2-3	S-C	48Vdc	10min	–	95.3	Unit shutdown immediately, no damaged, no hazards
Q8 Pin 2-3	S-C	230Vac	10min	–	0.03	Unit will word in fault mode, no damaged, no hazards
Q14 Pin 2-3	S-C	48Vdc	10min	–	0.15	Unit shutdown immediately, no damaged, no hazards
Q14 Pin 2-3	S-C	230Vac	10min	–	0.03	Unit will word in fault mode, no damaged, no hazards

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Clause	Requirement – Test	Result - Remark	Verdict

Tables

Supplementary information: S-C = short circuit; O-C = open circuit; O-L= over load After all fault condition test, the samples passed the dielectric voltage test.

C.2	Safety isolation transformer		P
	Construction details:		
Transformer TX1			
Mfr.: see table 1.5.1			
Type: see table 1.5.1			
All transformers are identical except for Vendor name			
Recurring peak voltage		444V	
Required clearance for reinforced			
insulation (from table 2K and 2L)		4.6mm	
Effective voltage rms		287V	
Required creepage for reinforced			
insulation (from table 2N)		5.8mm	
Measured min. creepages			
Location		inside (mm)	outside (mm)
pri-sec		>6.0	>6.0
sec-core		>3.0	>3.0
pri-pri		>3.0	>3.0
Measured min. clearances			
Location		inside (mm)	outside (mm)
pri-sec		>6.0	>6.0
sec-core		>3.0	>3.0
prim-core		>3.0	>3.0
Construction:			
Concentric windings on EE55 type core. Three layers of insulation tape Between primary winding and secondary winding . Three layers of insulation tape wrapped over bottom core. The winding leads soldered to lead pins moulded in bobbin.			
Pin numbers			
Prim.		1→2	
Sec.		4→F →3	
Bobbin			
Material		See appended table 1.5.1	
Thickness		See appended table 1.5.1	

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Tables

Electric strength test	
With AC 3000V after humidity treatment	
Result	Pass

C.2	Safety isolation transformer		P
	Construction details:		
Transformer TX2			
Mfr.: see table 1.5.1			
Type: see table 1.5.1			
All transformers are identical except for Vendor name			
Recurring peak voltage		521V	
Required clearance for reinforced			
insulation (from table 2K and 2L)		4.8mm	
Effective voltage rms		300V	
Required creepage for reinforced			
insulation (from table 2N)		6.0mm	
Measured min. creepages			
Location		inside (mm)	outside (mm)
prim-sec		6.0	>6.0
sec-core		3.0	>3.0
prim- core		3.0	>3.0
Measured min. clearances			
Location		inside (mm)	outside (mm)
prim-sec		6.0	>6.0
sec-core		3.0	>3.0
prim-prim		3.0	>3.0
Construction:			
Concentric windings on EEL16 type core. Three layers of insulation tape Between primary winding and secondary winding. Three layers of insulation tape wrapped over bottom core. The winding leads soldered to lead pins moulded in bobbin.			
Pin numbers			
Prim.		7→8 →9	
Sec.		2→4	
Bobbin			
Material		See appended table 1.5.1	
Thickness		See appended table 1.5.1	
Electric strength test			

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Tables

With AC 3000V after humidity treatment	
Result	Pass

C.2	Safety isolation transformer		P
	Construction details:		
Transformer TX5 /TX8			
Mfr.: see table 1.5.1			
Type: see table 1.5.1			
All transformers are identical except for Vendor name			
Recurring peak voltage		420	
Required clearance for reinforced			
insulation (from table 2K and 2L)		4.0mm	
Effective voltage rms		250V	
Required creepage for reinforced			
insulation (from table 2N)		5.0mm	
Measured min. creepages			
Location		inside (mm)	outside (mm)
pri-sec		>5.0	>5.0
sec-core		—	>2.5
pri- core		—	>2.5
Measured min. clearances			
Location		inside (mm)	outside (mm)
pri-sec		>5.0	>5.0
sec-core		—	>2.5
prim-core		—	>2.5
Construction:			
Concentric windings on EE16 type core. Three layers of insulation tape Between primary winding and secondary winding . Three layers of insulation tape wrapped over core. The winding leads soldered to lead pins moulded in bobbin.			
Pin numbers			
Prim.		1→4	
Sec.		5→6, 7 →8	
Bobbin			
Material		See appended table 1.5.1	
Thickness		See appended table 1.5.1	
Electric strength test			
With AC 3000V after humidity treatment			

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Tables

Result	Pass

C.2	Safety isolation transformer		P
	Construction details:		
Transformer TX6			
Mfr.: see table 1.5.1			
Type: see table 1.5.1			
All transformers are identical except for Vendor name			
Recurring peak voltage		420	
Required clearance for reinforced			
insulation (from table 2K and 2L)		4.0mm	
Effective voltage rms		250V	
Required creepage for reinforced			
insulation (from table 2N)		5.0mm	
Measured min. creepages			
Location		inside (mm)	outside (mm)
prim-sec		>6.0	>6.0
sec-core		>3.0	>3.0
prim-prim		>3.0	>3.0
Measured min. clearances			
Location		inside (mm)	outside (mm)
prim-sec		>6.0	>6.0
sec-core		>3.0	>3.0
prim-core		>3.0	>3.0
Construction:			
Concentric windings on EEL16 type core. Three layers of insulation tape Between primary winding and secondary winding, Three layers of insulation tape wrapped over bottom core. The winding leads soldered to lead pins moulded in bobbin.			
Pin numbers			
Prim.		1→2→3, 5→6	
Sec.		8→11	
Bobbin			
Material		See appended table 1.5.1	
Thickness		See appended table 1.5.1	
Electric strength test			
With AC 3000V after humidity treatment			
Result		Pass	

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Tables

C.2	Safety isolation transformer		P
	Construction details:		
Transformer TX9			
Mfr.: see table 1.5.1			
Type: see table 1.5.1			
All transformers are identical except for Vendor name			
Recurring peak voltage		420	
Required clearance for reinforced			
insulation (from table 2K and 2L)		4.0mm	
Effective voltage rms		250V	
Required creepage for reinforced			
insulation (from table 2N)		5.0mm	
Measured min. creepages			
Location		inside (mm)	outside (mm)
prim-sec		>6.0	>6.0
sec-core		>3.0	>3.0
prim-prim		>3.0	>3.0
Measured min. clearances			
Location		inside (mm)	outside (mm)
prim-sec		>6.0	>6.0
sec-core		>3.0	>3.0
prim-core		>3.0	>3.0
Construction:			
Concentric windings on EE28 type core. Three layers of insulation tape Between primary winding and secondary winding Three layers of insulation tape wrapped over bottom core. The winding leads soldered to lead pins moulded in bobbin.			
Pin numbers			
Prim.		1→2→3, 5→6	
Sec.		8→9→11→12	
Bobbin			
Material		See appended table 1.5.1	
Thickness		See appended table 1.5.1	
Electric strength test			
With AC 3000V after humidity treatment			
Result		Pass	

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Tables

C.2	Safety isolation transformer		P
	Construction details:		
Transformer TX1			
Mfr.: see table 1.5.1			
Type: see table 1.5.1			
All transformers are identical except for Vendor name			
Recurring peak voltage		420	
Required clearance for reinforced			
insulation (from table 2K and 2L)		4.0mm	
Effective voltage rms		250V	
Required creepage for reinforced			
insulation (from table 2N)		5.0mm	
Measured min. creepages			
Location		inside (mm)	outside (mm)
pri-sec		>5.0	>5.0
sec-core		—	>2.5
pri- core		—	>2.5
Measured min. clearances			
Location		inside (mm)	outside (mm)
pri-sec		>5.0	>5.0
sec-core		—	>2.5
prim-core		—	>2.5
Construction:			
Concentric windings on EE10 type core. Three layers of insulation tape Between primary winding and secondary winding . Three layers of insulation tape wrapped over core. The winding leads soldered to lead pins moulded in bobbin.			
Pin numbers			
Prim.		1→4	
Sec.		6 →7 →8	
Bobbin			
Material		See appended table 1.5.1	
Thickness		See appended table 1.5.1	
Electric strength test			
With AC 3000V after humidity treatment			
Result		Pass	

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Photos

Fig. 1 System overall view (I)

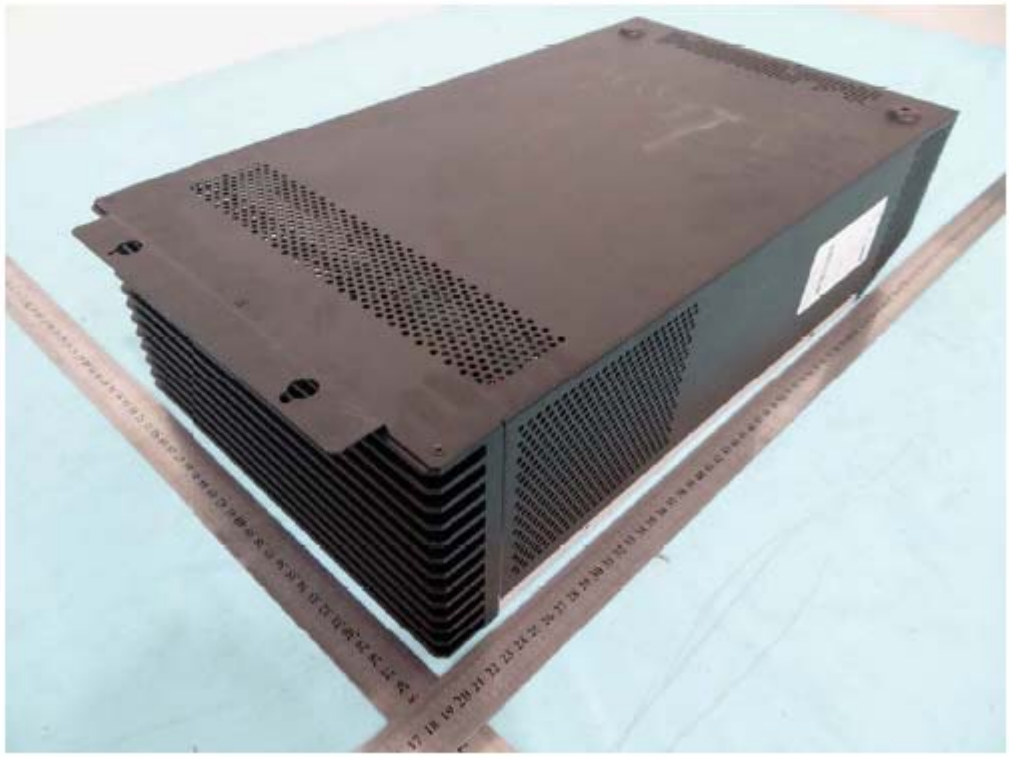

Fig. 2 System overall view (II)

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Photos

Fig. 3 Front view

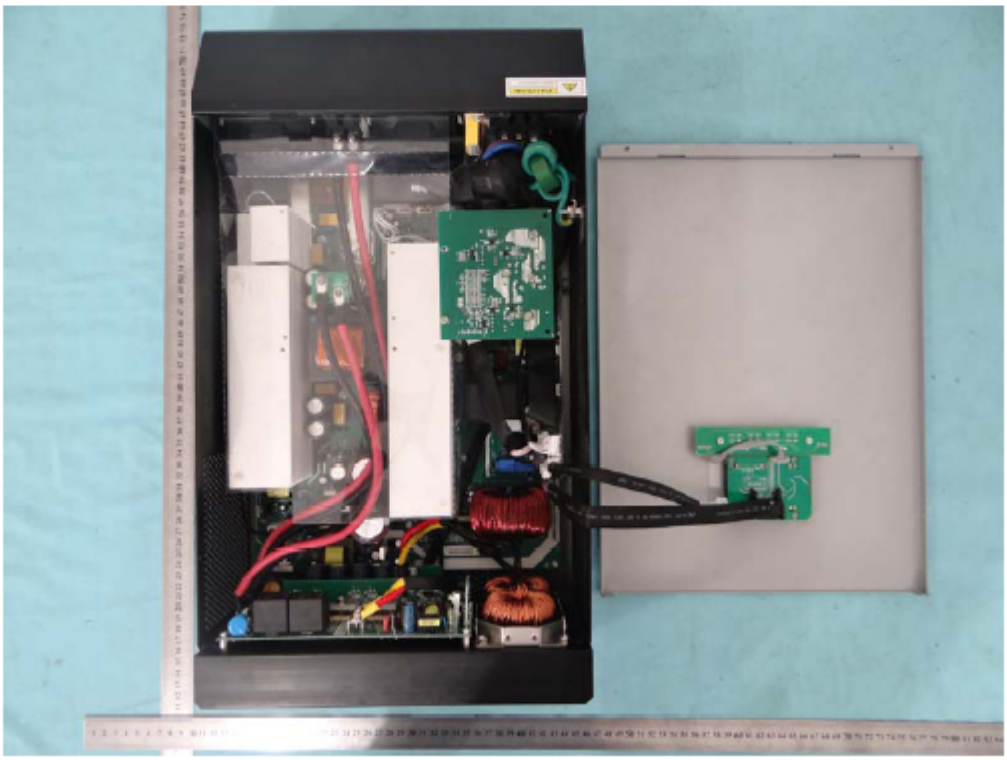

Fig. 4 Internal view(I)

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Clause	Requirement – Test	Result - Remark	Verdict

Photos

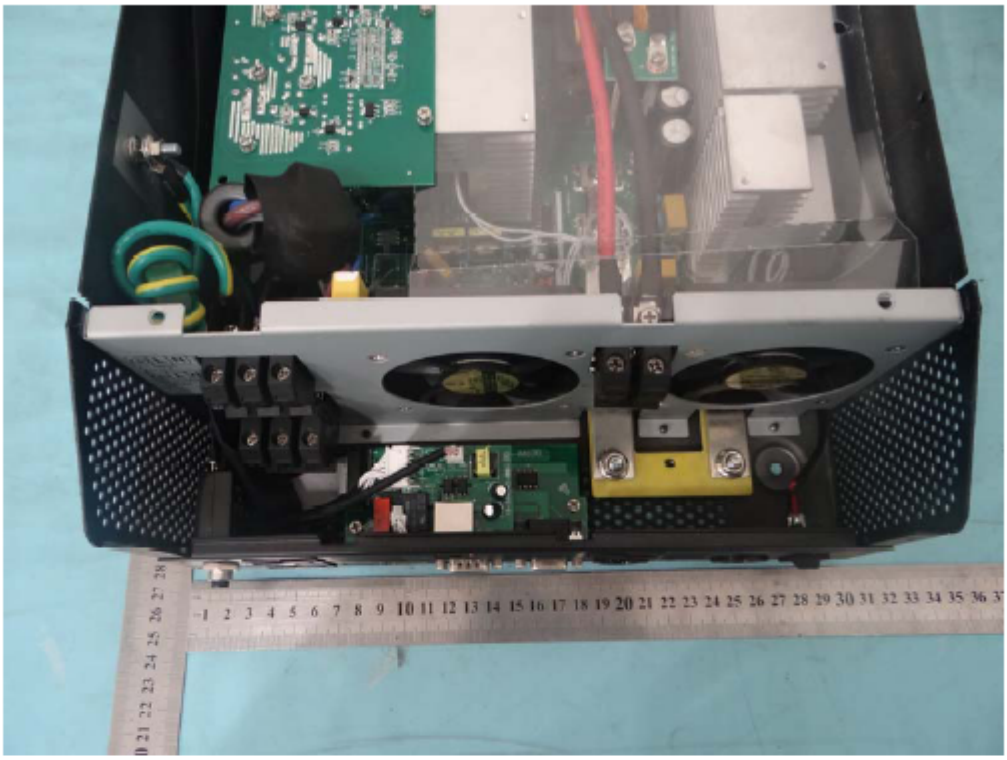

Fig. 5 Internal view(II)

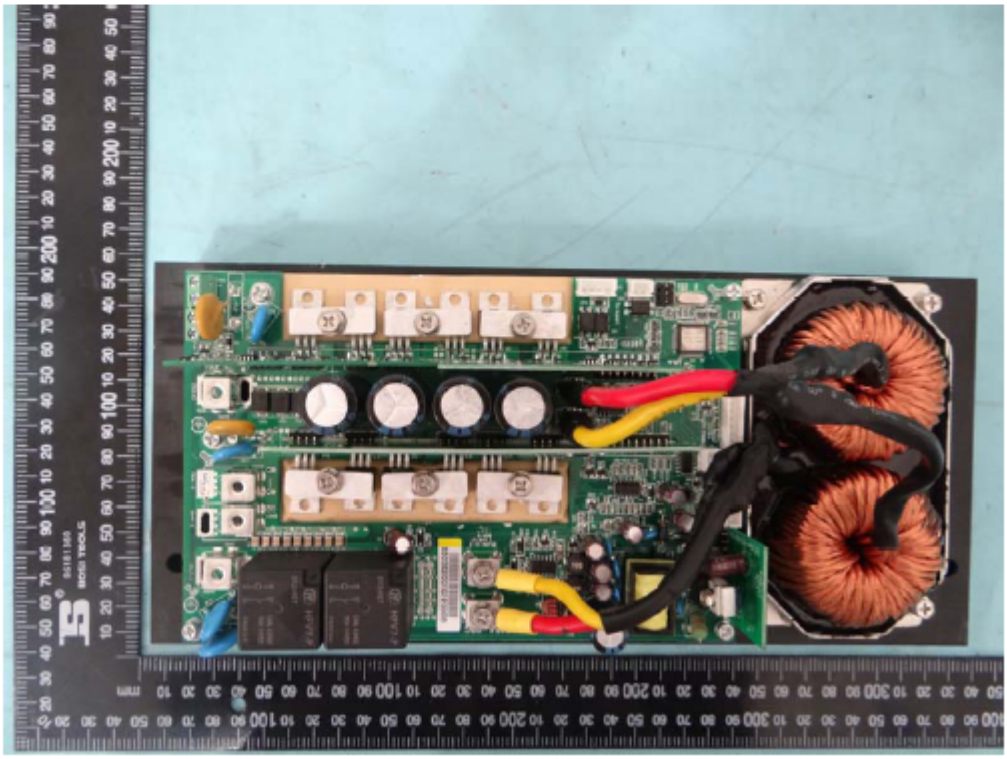

Fig. 6 Internal view(II)

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Photos

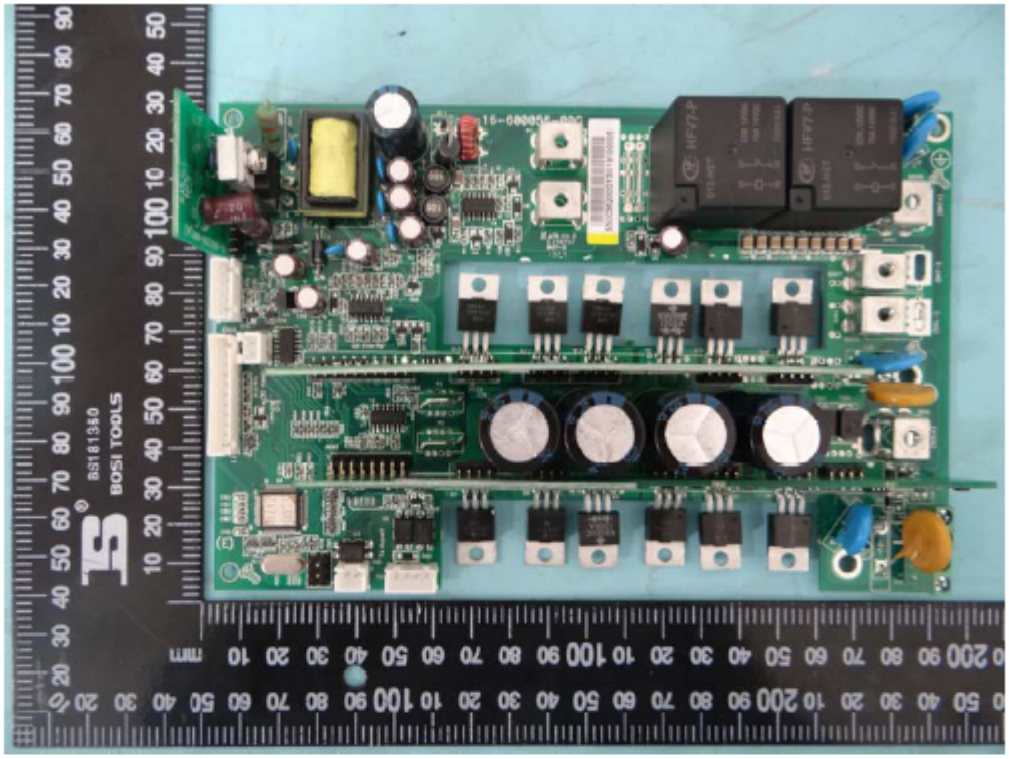

Fig. 7 PCB view (I)

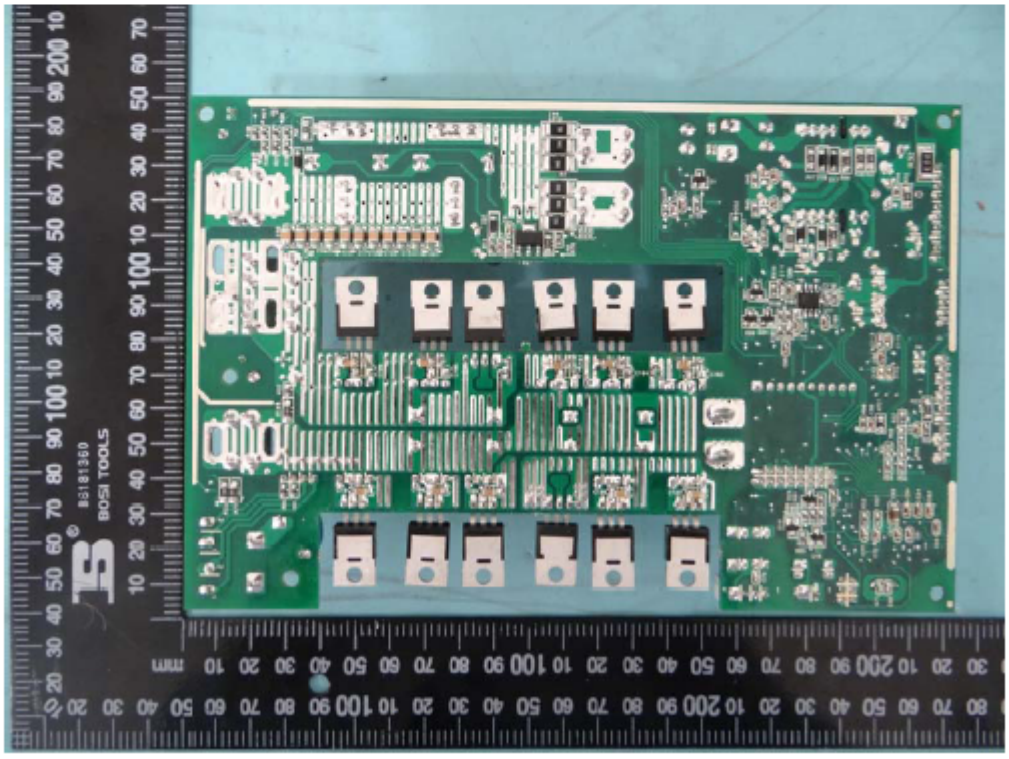

Fig. 8 PCB view (II)

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Photos

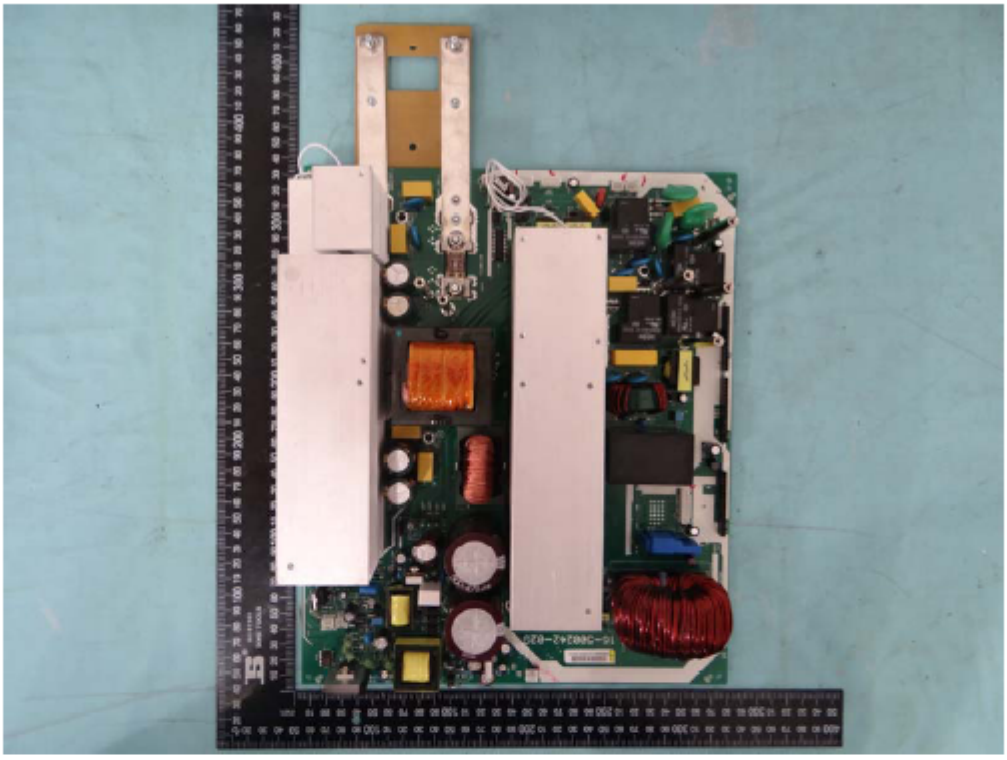

Fig. 9 PCB view (III)

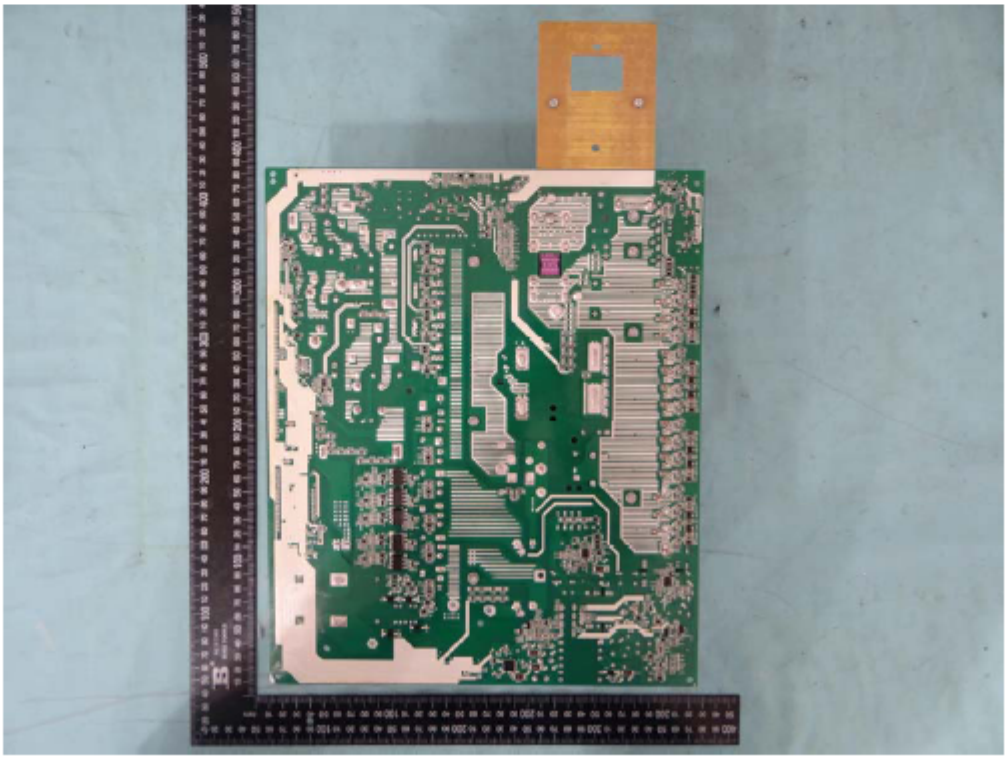

Fig. 10 PCB view (IV)

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Clause	Requirement – Test	Result - Remark	Verdict

Photos

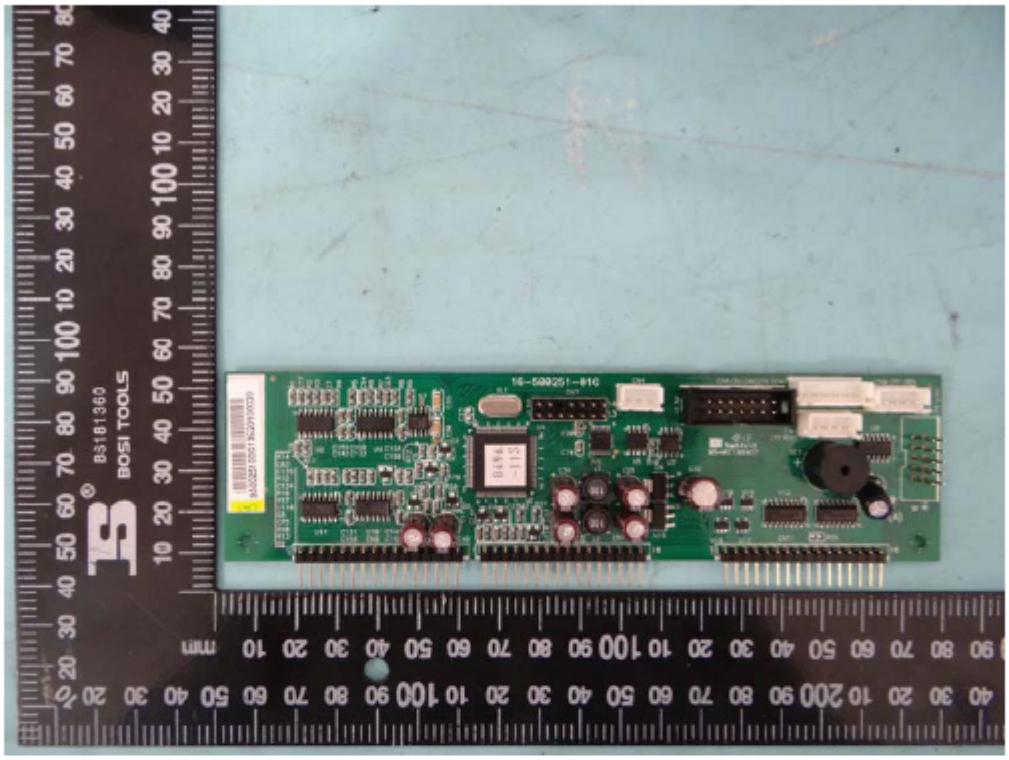

Fig. 11 PCB view (V)

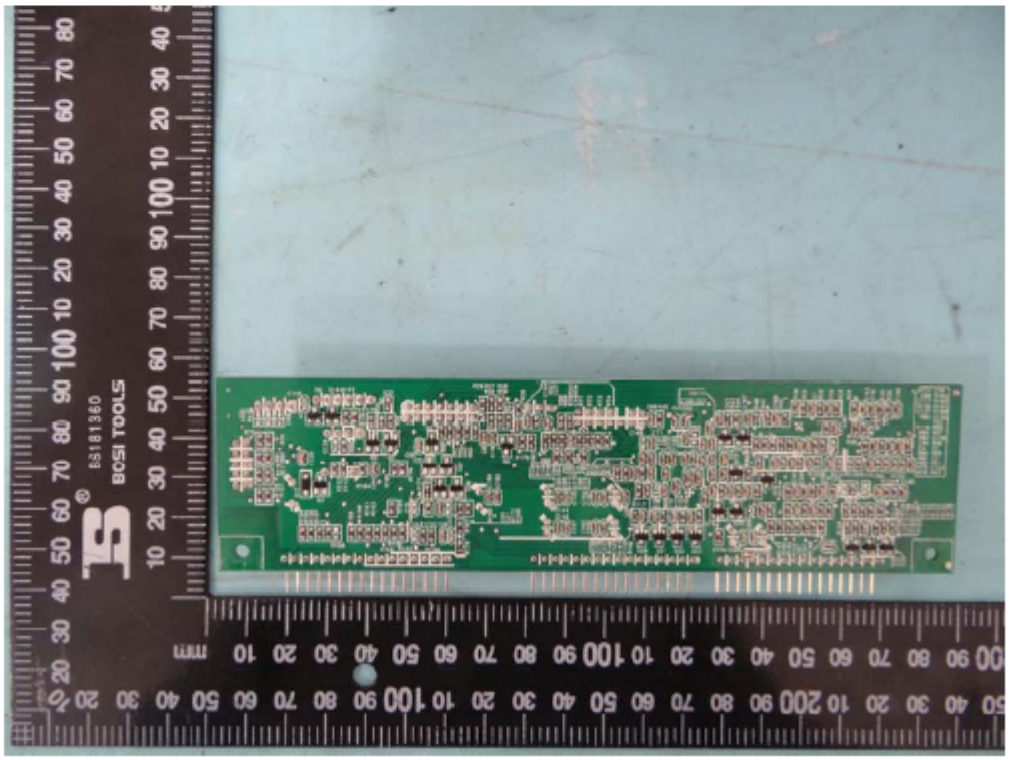

Fig. 12 PCB view (VI)

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Clause	Requirement – Test	Result - Remark	Verdict

Photos

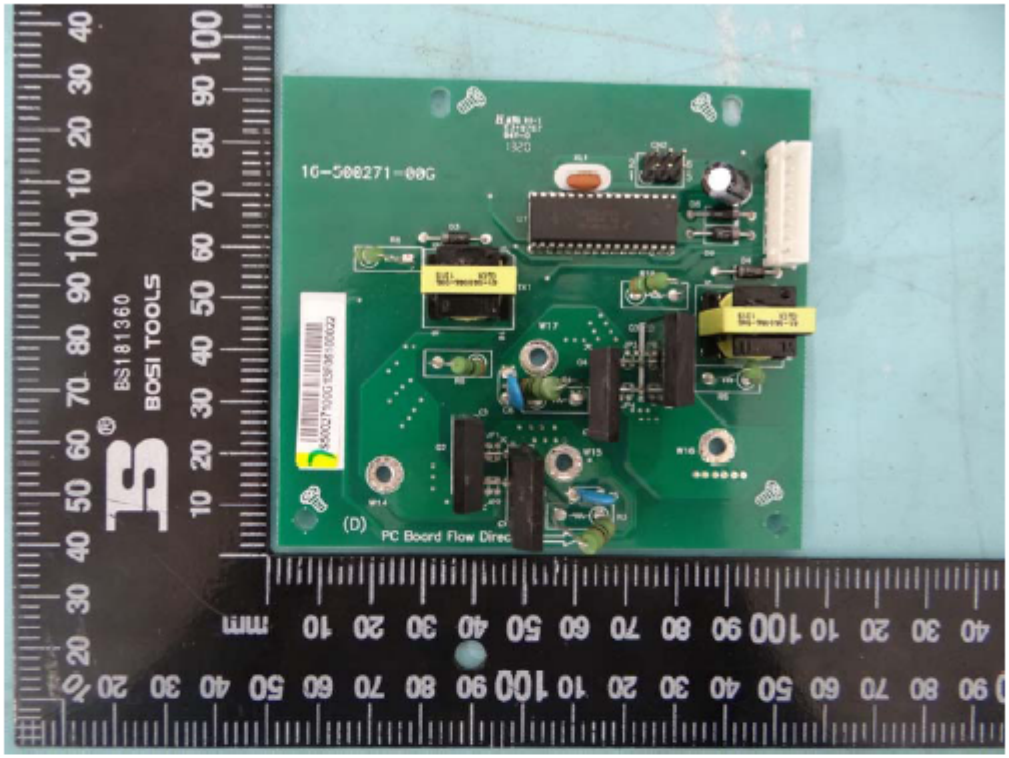

Fig. 13 PCB view (VII)

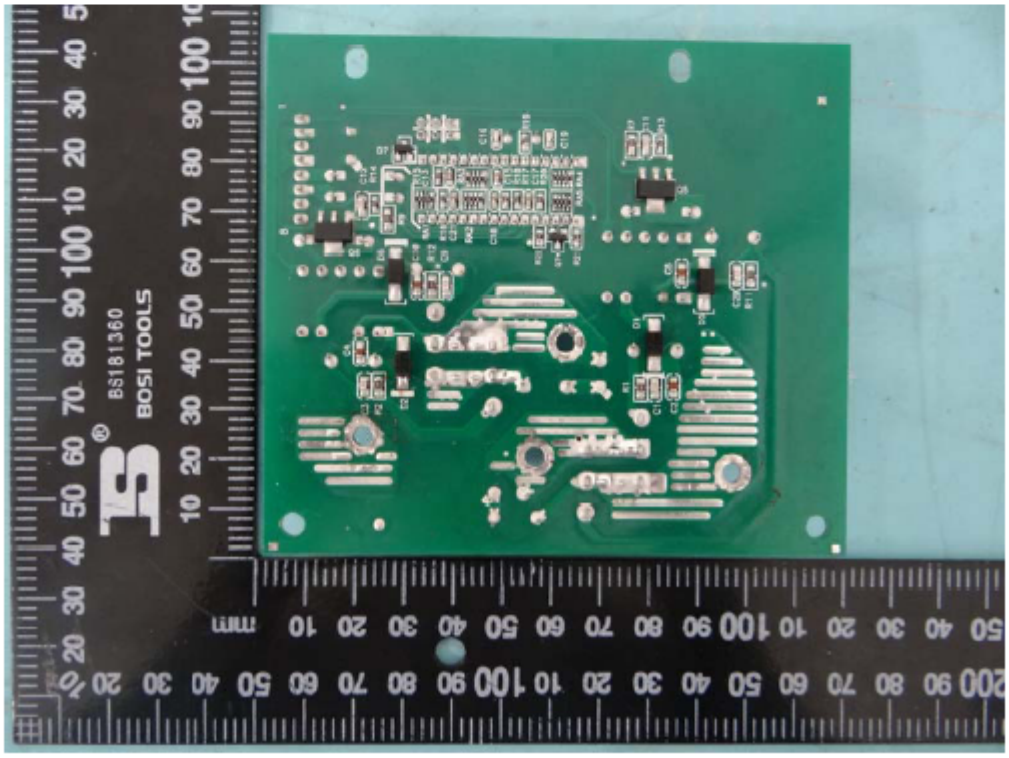

Fig. 14 PCB view (VIII)

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Photos

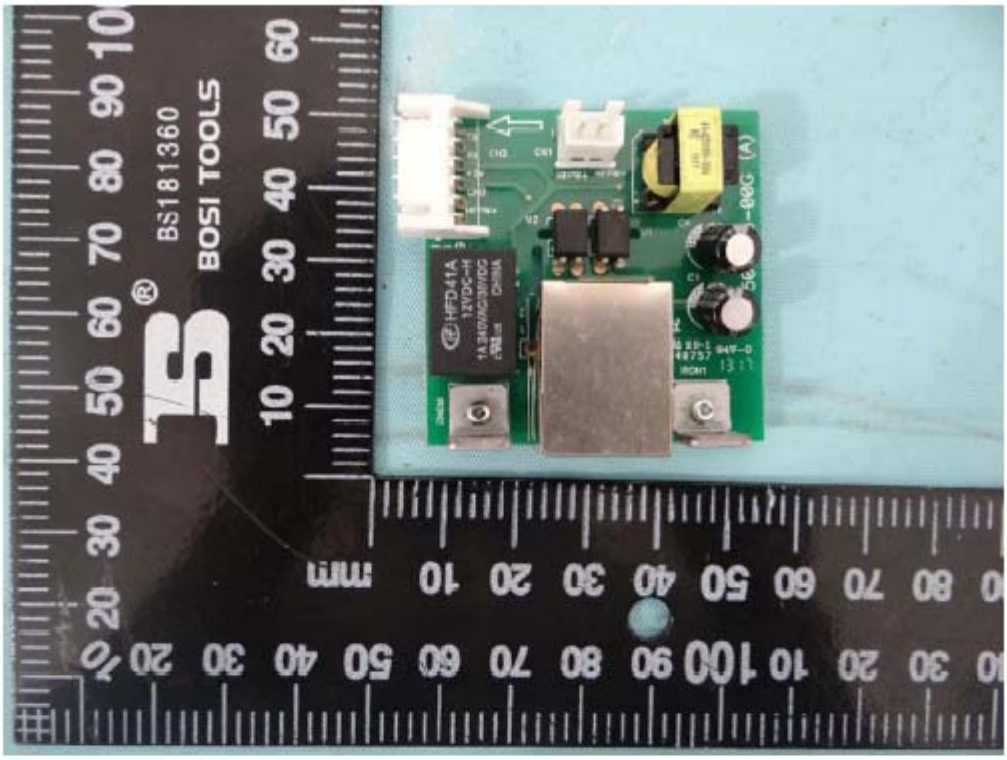

Fig. 15 PCB view (IX)

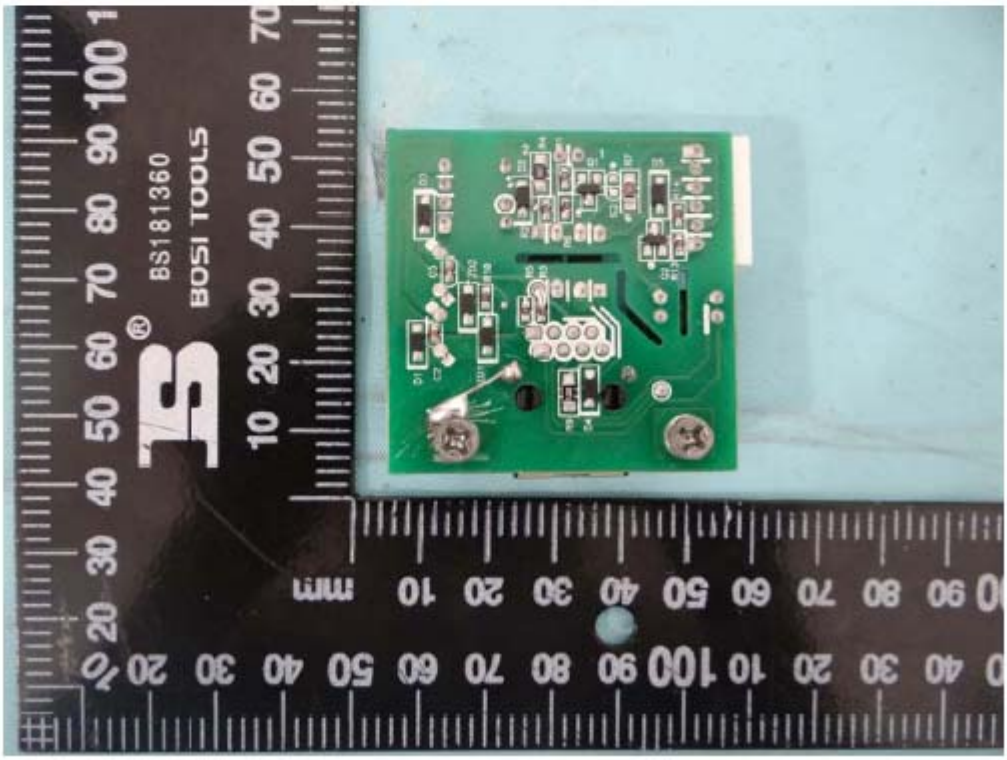

Fig. 16 PCB view (X)

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Photos

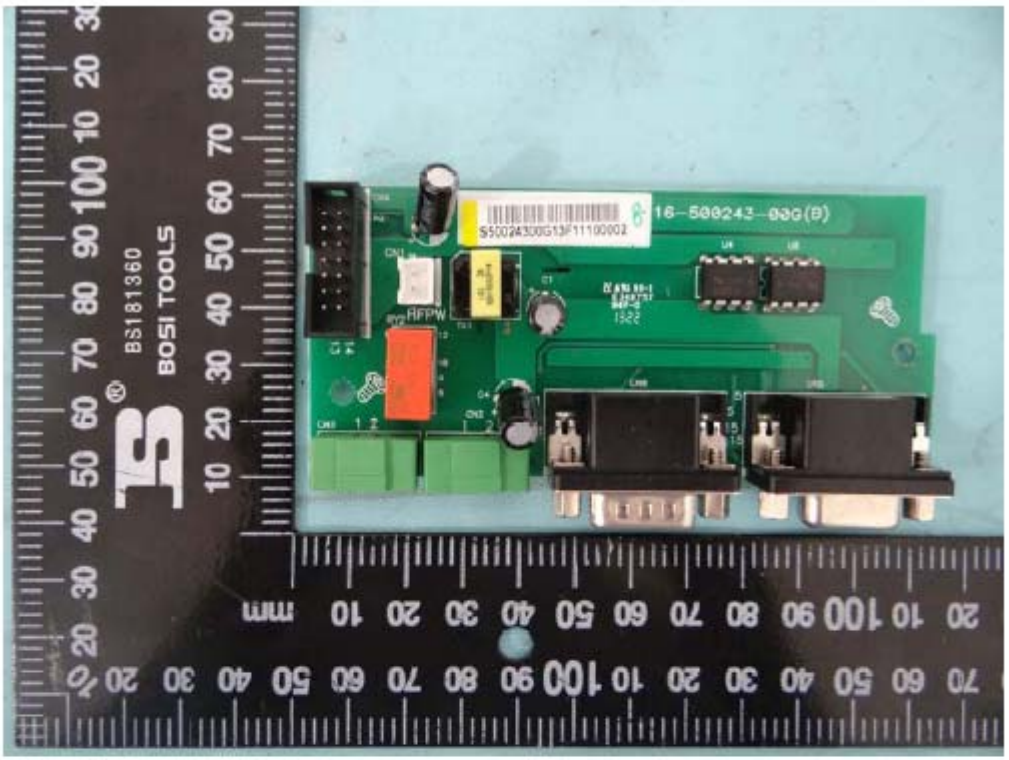

Fig. 17 PCB view (XI)

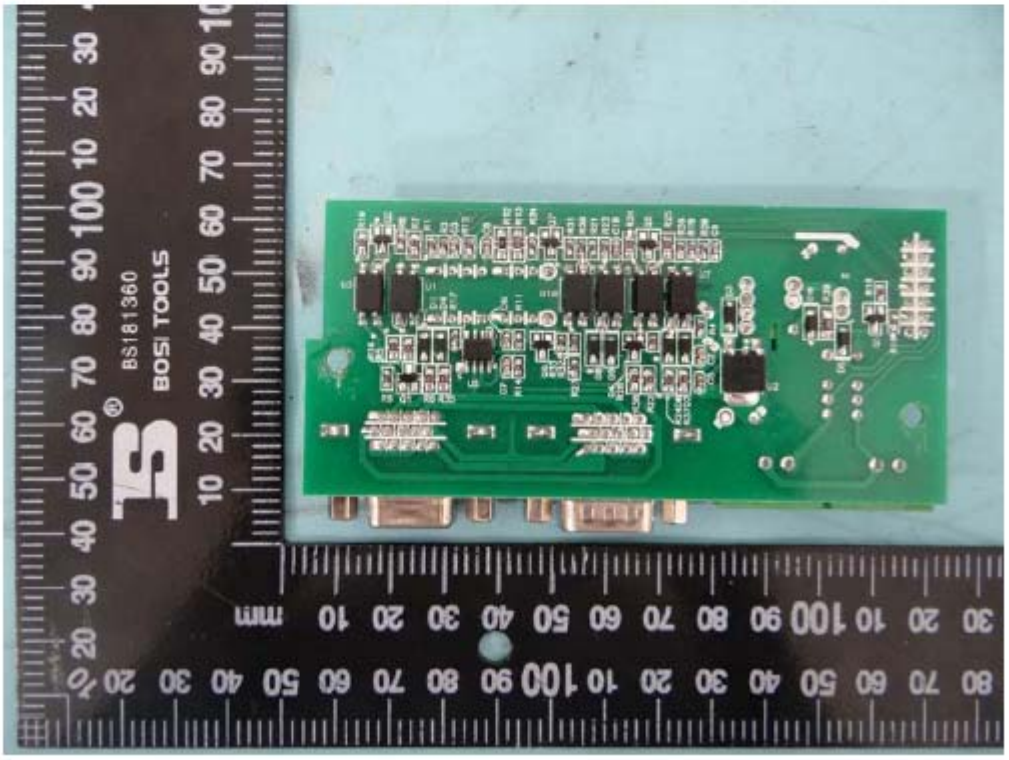

Fig. 18 PCB view (XIII)

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Photos

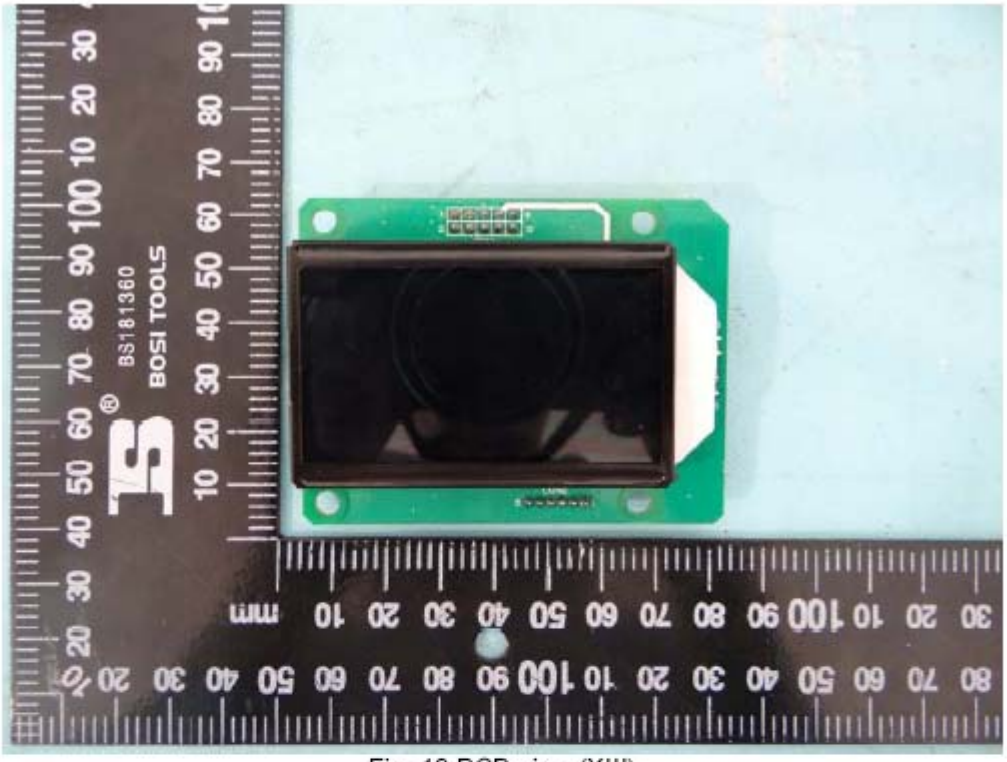

Fig. 19 PCB view (XIII)

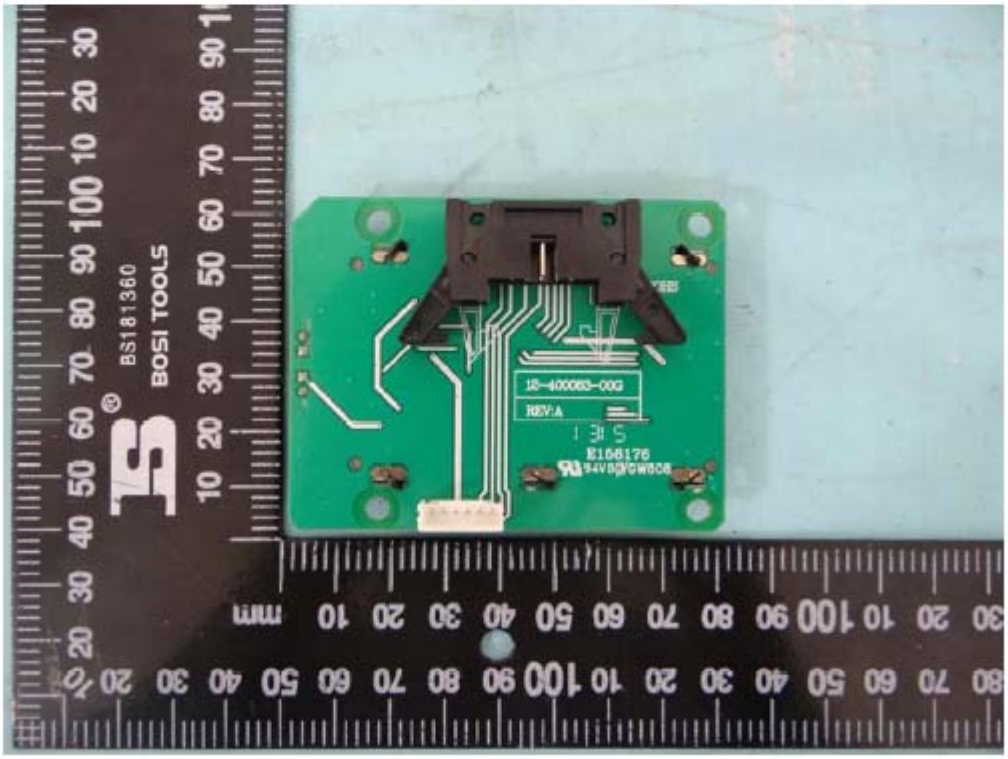

Fig. 20 PCB view (XIV)

EN 60950-1			
Clause	Requirement – Test	Result - Remark	Verdict

Photos

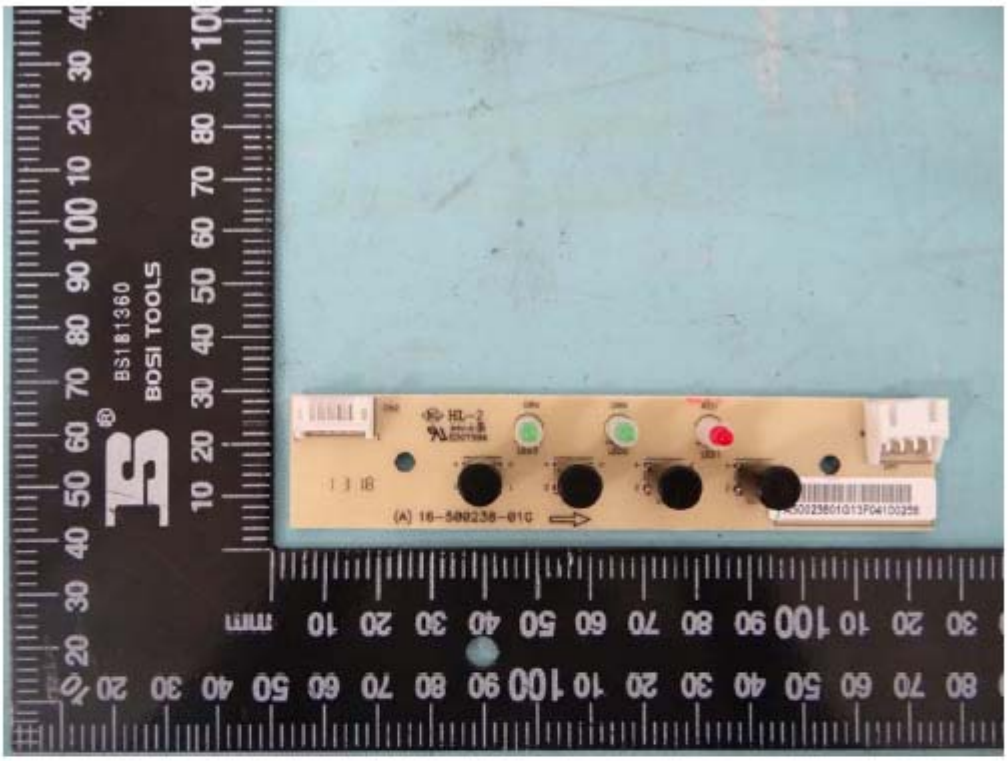

Fig. 21 PCB view (XV)

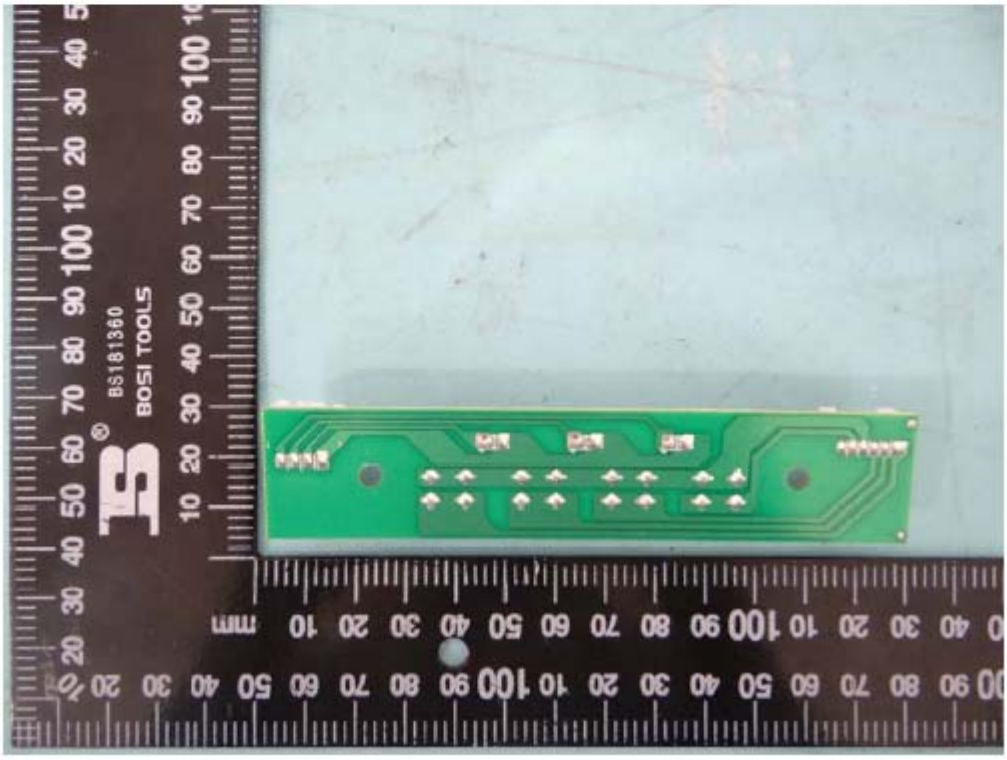

Fig. 22 PCB view (XVI)