Test Report

On Behalf of

Zhejiang Solid Electric Co., Ltd.

Product Name:	**Automatic Voltage Regulator/Stabilizer**
Trademark:	SOLID®
Model:	**TND-0.5KVA TND-2KVA, TND-3KVA, TND-5KVA, TND-10KVA, TND-15KVA, TND-20KVA, TND-30KVA, TND-40KVA, TNS-6KVA, TNS-9KVA, TNS-15KVA, TNS-30KVA, TNS-40KVA, TNS-50KVA, TNS-60KVA, TNS-75KVA, TNS-100KVA**
Prepared For: Address:	**Zhejiang Solid Electric Co., Ltd.** No.77, Hengjing East 1 Road, Shangyou Industrial Zone, Liushi Town, Yueqing 325600, Wenzhou City, Zhejiang Province, China.
Prepared By: Address:	**Shenzhen BCTC Technology Co., Ltd.** No.101, Yousong Road, Longhua New District, Shenzhen, Guangdong P.R.China
Test Date:	**Aug. 02, 2016–Aug. 16, 2016**
Date of Report:	**Aug. 16, 2016**
Report No.:	**BCTC-FY160801629S**

TEST REPORT
EN 61010-1:2010
Safety requirements for electrical equipment for measurement, control, and laboratory use
Part 1: General requirements

Report Reference No. ..... :	BCTC-FY160801629S
Date of issue ..... :	Aug. 16, 2016
Total number of pages ..... :	44 pages
CB Testing Laboratory ..... :	Shenzhen BCTC Technology Co., Ltd.
Address ..... :	No.101, Yousong Road, Longhua New District, Shenzhen, Guangdong P.R.China
Applicant's name ..... :	Zhejiang Solid Electric Co., Ltd.
Address ..... :	No.77, Hengjing East 1 Road, Shangyou Industrial Zone, Liushi Town, Yueqing 325600, Wenzhou City, Zhejiang Province, China.
Test specification:	
Standard ..... :	EN 61010-1: 2010
Test procedure ..... :	LVD
Non-standard test method……..:	N/A
Test Report Form No. ..... :	IEC61010_1J
Test Report Form(s) Originator ..... :	VDE Testing and Certification Institute
Master TRF ..... :	2013-11

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

Test item description ..... :	Automatic Voltage Regulator/Stabilizer
Trade Mark ..... :	SOLID®
Manufacturer ..... :	Zhejiang Solid Electric Co., Ltd.
Address ..... :	No.77, Hengjing East 1 Road, Shangyou Industrial Zone, Liushi Town, Yueqing 325600, Wenzhou City, Zhejiang Province, China.
Model/Type reference ..... :	TND0.5KVA
Ratings ..... :	See the following marking plate

Name and address of the testing laboratory: **Shenzhen BCTC Technology Co., Ltd.**
No.101, Yousong Road, Longhua New District, Shenzhen, Guangdong P.R.China

Date of Test: **Aug. 02, 2016–Aug. 16, 2016**

Prepared by(Engineer): Mary Zhang

Mary Zhang

Reviewer(Quality Manager): Levi Li

Levi Li

Approved&Authorized Signer(Manager) : Awen He

Artwork of marking plate:

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

Automatic Voltage Regulator/Stabilizer
Model: TND0.5KVA
Input: 150-250VAC, 50-60Hz, 2.2A
Output: 250VAC, 50-60Hz , Max. 500W

Zhejiang Solid Electric Co., Ltd.

Made in China

Remark on above marking:
1.The height of CE symbols is more than 5 mm;
2.The height of WEEE symbols is more than 7 mm.

Test item particulars ..... :	
Type of item ..... :	Laboratory
Description of equipment function ..... :	Automatic Voltage Regulator/Stabilizer
Connection to MAINS supply ..... :	Detachable cord set /
Overvoltage category ..... :	II
POLLUTION DEGREE ..... :	II
Means of protection ..... :	Class I (PE connected)
Environmental conditions ..... :	Normal
For use in wet locations ..... :	No
Equipment mobility ..... :	Portable
Operating conditions ..... :	Continuous
Overall size of the equipment (W x D x H) ..... :	See user manual
Mass of the equipment (kg) ..... :	<5kg
Marked degree of protection to IEC 60529 ..... :	IP20

Possible test case verdicts:

- test case does not apply to the test object ..... : N (N/A)
- test object does meet the requirement ..... : P (Pass)
- test object does not meet the requirement ..... : F (Fail)

Testing

Date of receipt of test item ..... : Aug. 02, 2016

Date (s) of performance of tests ..... : Aug. 02, 2016–Aug. 16, 2016

General remarks:

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

1, All models are same as TND0.5KVA except model no. and power difference, All tests are conducted on the TND0.5KVA.

EN 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	TESTS		P
4.4	Testing in single fault conditions		P
4.4.1	Fault tests		P
4.4.2	Application of single fault conditions		P
4.4.2.1	single fault conditions not covered by 4.4.2.2 to 4.4.2.14		—
4.4.2.2	Protective impedance		P
4.4.2.3	Protective conductor		P
4.4.2.4	Equipment or parts for short-term or intermittent operation		N
4.4.2.5	Motors		—
	– stopped while fully energized		N
	– prevented from starting		N
	– one phase interrupted (multi-phase)		N
4.4.2.6	Capacitors		P
4.4.2.7	Mains transformers		P
4.4.2.7.2	Short circuit		P
4.4.2.7.3	Overload		P
4.4.2.8	Outputs		P
4.4.2.9	Equipment for more than one supply		N
4.4.2.10	Cooling		—
	– air holes closed		N
	– fans stopped		N
	– coolant stopped		N
	– loss of cooling liquid		N
4.4.2.11	Heating devices		N
	– timer overridden		N
	– temperature controller overridden		N
4.4.2.12	Insulation between circuits and parts		N
4.4.2.13	Interlocks		N
4.4.2.14	Voltage selectors		N
4.4.3	Duration of tests		—
4.4.4	Conformity after application of fault conditions		N

5	MARKING AND DOCUMENTATION		PP
5.1.1	Required equipment markings		—
	– visible from the exterior; or		P
	– visible after removing cover or opening door		P
	– visible after removal from a rack or panel		P
	Not put on parts which can be removed by an operator		P
	Letter symbols (IEC 60027) used		P
	Graphic symbols (IEC 61010-1: Table 1) used		P
5.1.2	Identification		
	Equipment is identified by:		—
	a) Manufacturer's or supplier's name or trademark		P
	b) Model number, name or other means	See label	P
	Manufacturing location identified		P
5.1.3	Mains supply		P
	Equipment is marked as follows:		—
	a) Nature of supply:		—
	1) a.c. rated mains frequency or range of frequencies..... :		—
	2) d.c. with symbol 1 ..... :		—
	b) rated supply voltage(s) or range..... :		—
	c) Max. rated power (W or VA) or input current ..... :		—
	The marked value not less than 90 % of the maximum value	(see Form A.2)	P
	If more than one voltage range:		—
	Separate values marked; or		N
	Values differ by less than 20 %	(see Form A.2)	N
	d) operator-set for different rated supply voltages:		—
	Indicates the equipment set voltage		N
	Portable equipment indication is visible from the exterior		N
	Changing the setting changes the indication		N
	e) Accessory mains socket-outlets accepting standard mains plugs are marked:		—
	With the voltage if it is different from the mains supply voltage ..... :		—
	For use only with specific equipment		P
	If not marked for specific equipment it is marked with:		—

	The maximum rated current or power; or		P
	Symbol 14 with full details in the documentation		P
5.1.4	Fuses		P
	Operator replaceable fuse marking (see also 5.4.5) ..... :		—
5.1.5	Terminals, connections and operating devices		N
5.1.5.1	General		—
	Where necessary for safety, indication of purpose of terminals, connectors, controls and indicators marked		N
	If insufficient space, symbol 14 used		N
	Push-buttons and actuators of emergency stop devices and indicators:		—
	– used only to indicate a warning of danger; or		N
	– the need for urgent action		N
	– coloured red		N
	– coded as specified in IEC 60073		N
	Supplementary means of coding provided, if meaning of colour relates (see IEC 60073):		—
	– to safety of persons; or		N
	– safety of the environment		N
5.1.5.2	terminals		—
	Mains supply terminal identified		N
	Other terminal marking:		—
	a) functional earth terminals (symbol 5 used)		N
	b) protective conductor terminals:		—
	Symbol 6 is placed close to or on the terminal; or		N
	Part of appliance inlet		N
	c) terminals of control circuits (symbol 7 used)		N
	d) Hazardous live terminals supplied from the interior		N
	Standard mains socket outlet; or		N
	Ratings marked; or		N
	Symbol 14 used		N
5.1.6	Switches and circuit breakers		P
	If disconnecting device, off position clearly marked		P
	If push-button used as power supply switch:		—
	– symbol 9 and 15 used for on-position		P
	– symbol 10 and 16 used for off-position		P
	– pair of symbols 9, 15 and 10, 16 close together		P

5.1.7	Equipment protected by double insulation or reinforced insulation		P
	Protected throughout (symbol 11 used)		P
	Only partially protected (symbol 11 not used)		P
5.1.8	Field-wiring terminal boxes		N
	If terminal or enclosure exceeds 60 °C:		—
	Cable temperature rating marked ..... :		—
	Marking visible before and during connection or beside terminal		N
5.2	Warning markings		P
	Visible when ready for normal use		P
	Are near or on applicable parts		P
	Symbols and text correct dimensions and colour:		—
	a) symbols min 2,75 mm and text 1,5 mm high and contrasting in colour with background		P
	b) symbols and text moulded, stamped or engraved in material min. 2,0 mm high and		P
	0,5 mm depth or raised if not contrasting in colour		P
	If necessary marked with symbol 14		P
	Statement to isolate or disconnect if access by using a tool to hazardous live parts is permitted		P
5.3	Durability of markings		P
	The required markings remain clear and legible in normal use	(see Form A.3)	P
5.4	Documentation		P
5.4.1	General		P
	Equipment is accompanied by documentation for safety purposes for operator or responsible body		P
	Safety documentation for service personnel authorized by the manufacturer		P
	Documentation necessary for safe operation is provided in printed media or		P
	in electronic media if available at any time		P
	Documentation includes:		—
	a) intended use		P
	b) technical specification		P
	c) name and address of manufacturer or supplier		P
	d) information specified in 5.4.2 to 5.4.6		P
	e) information to mitigate residual risk (see also subclause 17)		P

	f) accessories for safe operation of the equipment specified		P
	g) guidance provided to check correct function of the equipment, if incorrect reading may cause a hazard from harmful or corrosive substances of hazardous live parts		P
	h) instructions for lifting and carrying		P
	Warning statements and a clear explanation of warning symbols:		—
	– provided in the documentation; or		P
	– information is marked on the equipment		P
5.4.2	Equipment ratings		P
	Documentation includes:		—
	a) Supply voltage or voltage range ..... :		—
	Frequency or frequency range ..... :		—
	Power or current rating ..... :		—
	b) Description of all input and output connections in accordance to 6.6.1 a)		P
	c) rating of insulation of external circuits in accordance to 6.6.1 b)		P
	d) Statement of the range of environmental conditions (see 1.4)		P
	e) Degree of protection (IEC 60529)		P
	f) If impact rating less than 5 J:		—
	IK code in accordance to IEC 62262 marked; or		N
	symbol 14 of table 1 marked, with		N
	rated energy level and test method stated		N
5.4.3	Equipment installation		N
	Documentation includes instructions for:		—
	a) assembly, location and mounting requirements		N
	b) protective earthing		N
	c) connections to supply		N
	d) permanently connected equipment:		—
	1) Supply wiring requirements		N
	2) If external switch or circuit-breaker, requirements and location recommendation		N
	e) ventilation requirements		N
	f) special services (e. g. air, cooling liquid)		N
	g) instructions relating to sound level		N

5.4.4	Equipment operation		P
	Instructions for use include:		—
	a) identification and description of operating controls		P
	b) positioning for disconnection		P
	c) instructions for interconnection		P
	d) specification of intermittent operation limits		P
	e) explanation of symbols used		P
	f) replacement of consumable materials		P
	g) cleaning and decontamination		P
	h) listing of any poisonous or injurious gases and quantities		P
	i) risk reduction procedures relating to flammable liquids (see 9.5)		P
	j) risk reduction procedures relating burn from surfaces permitted to exceed limits of 10.1		P
	Additional precautions for IEC 60950 conforming equipment in regard to moistures and liquids		P
	A statement about protection impairment if used in a manner not specified by the manufacturer		P
5.4.5	Equipment maintenance and Service		P
	Instructions for responsible body include:		—
	Instructions sufficient in detail permitting safe maintenance and inspection and continued safety:		—
	Instruction against the use of detachable mains supply cord with inadequate rating		P
	Specific battery type of user replaceable batteries		P
	Any manufacturer specified parts		P
	Rating and characteristics of fuses		P
	Instructions include following subjects permitting safe servicing and continued safety:		—
	a) product specific risks may affect service personnel		P
	b) protective measures for these risks		P
	c) verification of the safe state after repair		P
5.4.6	Integration into systems or effects resulting from special conditions		P
	Aspects described in documentation		P

6	PROTECTION AGAINST ELECTRIC SHOCK		P
6.1	General	(see Form A.14 and A.15)	P

6.1.1	Requirements		P
	Protection against electric shock maintained in normal condition and single fault condition		P
	accessible parts not hazardous live		P
	Voltage, current, charge or energy below the limits in normal condition and in single fault condition between:		—
	accessible parts and earth		P
	two accessible parts on same piece of the equipment within a distance of 1,8 m		N
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.11		P
6.1.2	Exceptions		P
	Following hazardous live parts may be accessible to an operator:		—
	a) parts of lamps and lamp sockets after lamp removal		N
	b) parts to be replaced by operator only by the use of tool and warning marking		N
	Those parts not hazardous live 10 s after interruption of supply		N
	Capacitance test if charge is received from internal capacitor		N
6.2	Determination of accessible parts		P
6.2.1	General		P
	Unless obviously determination of accessible parts as specified in 6.2.2 to 6.2.4		P
6.2.2	Examination		P
	– with jointed test finger (as specified B.2)		P
	– with rigid test finger (as specified B.1) and a force of 10 N		P
6.2.3	Openings above parts that are hazardous live		P
	– test pin with length of 100 mm and 4 mm in diameter applied		P
6.2.4	Openings for pre-set controls		P
	– test pin with length of 100 mm and 3 mm in diameter applied		P
6.3	Limit values for accessible parts		P
6.3.1	Levels in normal condition	(see Form A.5)	—
	a) Voltage limits less than 33 V r.m.s. and 46,7 V peak or 70 V d.c.		P
	for wet locations voltage limits less than 16 V r.m.s. and 22,6 V peak or 35 V d.c.		P

	Voltages are not hazardous live the levels of:		—
	b) Current less than 0,5 mA r.m.s. for sinusoidal, 0,7 mA peak non-sinusoidal or mixed frequencies or 2 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz		P
	for wet locations measuring circuit A.4 used		P
	70 mA r.m.s. when measured with circuit A.3 for higher frequencies		P
	or		—
	c) Levels of capacitive charge or energy less:		—
	1) 45 µC for voltages up to 15 kV peak or d.c. or line A of Figure 3		N
	2) 350 mJ stored energy for voltages above 15 kV peak or d.c.		N
6.3.2	Levels in single fault condition	(see Form A.6)	—
	a) Voltage limits less than 55 V r.m.s. and 78 V peak or 140 V d.c.		P
	for wet locations voltage limits less than 33 V r.m.s. and 46,7 V peak or 70 V d.c.		P
	Voltages are not hazardous live the levels of:		—
	b) Current less than 3,5 mA r.m.s. for sinusoidal, 5 mA peak non-sinusoidal or mixed frequencies or 15 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz		P
	for wet locations measuring circuit A.4 used		P
	500 mA r.m.s. when measured with circuit A.3 for higher frequencies		P
	or		—
	c) Levels of capacitive charge or energy less line B of Figure 3		N
6.4	Primary means of protection		P
6.4.1	Accessible parts prevented from being hazardous live by one or more of following means:		—
	a) enclosures or protective barriers (see 6.4.2)		P
	b) basic insulation (see 6.4.3)		P
	c) Impedance (see 6.4.4)		N
6.4.2	enclosures or protective barriers		—
	– meet rigidity requirements of 8.1		P
	– meet requirements for basic insulation, if protection is provided by insulation		P

	– meet requirements of 6.7 for creepage and – clearances between accessible parts and – hazardous live parts, if protection is provided by – limited access		P
6.4.3	Basic insulation		—
	– meet clearance, creepage distance and solid – insulation requirements of 6.7		P
6.4.4	Impedance		—
	Impedance used as primary means of protection meets all of following requirements:		—
	a) limits current or voltage to level of 6.3.2		N
	b) rated for maximum working voltage and the amount of power it will dissipate		N
	c) clearance, creepage distance between terminations of the impedance meet requirements of basic insulation of 6.7		N
6.5	Additional means of protection in case of single fault condition		P
6.5.1	Accessible parts are prevented from becoming hazardous live by the primary means of protection and supplemented by one of:		—
	a) protective bonding (see 6.5.2)		P
	b) supplementary insulation (see 6.5.3)		P
	c) automatic disconnection of the supply (see 6.5.5)		P
	d) current- or voltage-limiting device (see 6.5.6)		P
	Alternatively one of the single means of protection is used:		—
	e) reinforced insulation (see 6.5.3)		P
	f) protective impedance (see 6.5.4)		N
6.5.2	Protective bonding	(see Form A.7, A.8, A.9, A.10 or A.11)	P
6.5.2.1	Accessible conductive parts, may become hazardous live in single fault condition:		—
	Bonded to the protective conductor terminal; or		P
	Separated by conductive screen or barrier bonded to protective conductor terminal		P
6.5.2.2	Integrity of protective bonding		—
	a) protective bonding consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		P
	b) Soldered connections:		—
	Independently secured against loosening		P

	Not used for other purposes		P
	c) Screw connections are secured		P
	d) protective bonding not interrupted; or		P
	exempted as removable part carries mains supply input connection		P
	e) Any movable protective bonding connection specifically designed, and meets 6.5.2.4		P
	f) No external metal braid of cables used (not regarded as protective bonding)		P
	g) If mains supply passes through:		—
	Means provided for passing protective conductor;		P
	Impedance meets 6.5.2.4		P
	h) Protective conductors bare or insulated, if insulated, green/yellow		P
	Exceptions:		—
	1) earthing braids;		N
	2) internal protective conductors etc.;		N
	Green/yellow not used for other purposes		P
	terminal suitable for connection of a protective conductor, and meets 6.5.2.3		P
6.5.2.3	Protective conductor terminal		—
	a) Contact surfaces are metal		P
	b) Appliance inlet used		P
	c) For rewirable cords and permanently connected equipment, protective conductor terminal is close to mains supply terminals		P
	d) If no mains supply is required, any protective conductor terminal:		—
	Is near terminals of circuit for which protective earthing is necessary		P
	External if other terminals external		P
	e) Equivalent current-carrying capacity to mains supply terminals	(see Form A.7)	P
	f) If plug-in, makes first and breaks last		N
	g) If also used for other bonding purposes, protective conductor:		—
	Applied first;		P
	Secured independently;		P
	Unlikely to be removed by servicing		P
	h) Protective conductor of measuring circuit:		—

	1) Current rating equivalent to measuring circuit terminal;		P
	2) protective bonding: not interrupted by any switch or interrupting device		P
	i) functional earth terminals allow independent connection		P
	j) If a binding screw used for Protective conductor terminal:		—
	Suitable size for bond wire		P
	Not smaller than M 4		P
	At least 3 turns of screw engaged		P
	Passes tightening torque test		P
	k) Contact pressure not capable being reduced by deformation of materials		P
6.5.2.4	Impedance of protective bonding of plug-connected equipment		—
	Impedance between protective conductor terminal and each accessible part where protective bonding is specified, is:		—
	– less than 0,1 Ohm; or	0.02 Ohm	P
	– less than 0,2 Ohm if equipment is provided with non-detachable cord		N
6.5.2.5	Bonding impedance of permanently connected equipment		—
6.5.2.6	Transformer protective bonding screen		—
	Transformer provided with screen for protective bonding:		—
	screen bonding consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses (see 6.5.2.2 a)		P
	screen bonding with soldered connection (see 6.5.2.2 b) is:		P
	– Independently secured against loosening		P
	– Not used for other purposes		P
6.5.3	Supplementary and reinforced insulation		P
	Meet clearance, creepage distance and solid insulation requirements of 6.7		P
6.5.4	Protective impedance		N
	Limits current or voltage to level of 6.3.1 in normal and to level of 6.3.2 in single fault condition		N

	clearance, creepage distance between terminations of the impedance meet requirements of double or reinforced insulation of 6.7		N
	The protective impedance consists of one or more of the following:		—
	a) appropriate single component suitable for safety and reliability for protection, it is:		—
	1) rated twice the maximum working voltage		N
	2) resistor rated for twice the power dissipation for maximum working voltage		N
	b) combination of components		N
	Single electronic device not used as protective impedance		N
6.5.5	Automatic disconnection of the supply		N
	a) rated to disconnect the load within time specified in Figure 2		N
	b) rated for the maximum load conditions of the equipment		N
6.5.6	Current- or voltage-limiting devices		N
	Device complies with all of:		—
	a) rated to limit the current or voltage to the level of 6.3.2		N
	b) rated for the maximum working voltage; and		N
	rated for the maximum operational current if applicable		N
	c) clearance, creepage distance between terminations of the impedance meet requirements of supplementary insulation of 6.7		N
6.6	Connections to external circuits		N
6.6.1	Connections do not cause accessible parts of the following to become hazardous live in normal condition or single fault condition:		—
	– the external circuits		N
	– the equipment		N
	Protection achieved by separation of circuits; or		N
	short circuit of separation does not cause a hazard		N
	Instructions or markings for each terminal include:		—
	a) rated conditions for terminal		N
	b) Required rating of external circuit insulation		N
6.6.2	Terminals for external circuits		N

	Terminals which receive a charge from an internal capacitor are not hazardous live after 10 s of interrupting supply connection	(see Form A.5)	N
6.6.3	Circuits with terminals which are hazardous live		N
	These circuits are:		—
	Not connected to accessible conductive parts; or		N
	Connected to accessible conductive parts, but are not mains circuits and have one terminal contact at earth potential		N
	No accessible conductive parts are hazardous live		N
6.6.4	Accessible terminals for stranded conductors		N
	No risk of accidental contact because:		—
	– Located or shielded		N
	– Self-evident or marked whether or not connected to accessible conductive parts		N
	Accessible terminals will not work loose		N
6.7	Insulation requirements	(see Form A.14)	P
6.7.1	The nature of insulation		—
6.7.1.1	Insulation between accessible parts or between separate circuits consist of clearances, creepage distances and solid insulation if provided as protection against a hazard		P
6.7.1.2	Clearances		—
	Required clearances reflecting factors of 6.7.1.1		P
	Equipment rated for operating altitude greater than 2000 m correction factor of Table 3 of 61010-1 applied		P
6.7.1.3	Creepage distances		—
	Required creepage distances reflecting factors of 6.7.1.1 a) to d)		P
	CTI material group reflected by requirements		P
	CTI test performed		P
6.7.1.4	Solid insulation		—
	Required solid insulation reflecting factors of 6.7.1.1 a) to d)		P
6.7.1.5	Requirements for insulation according to type of circuit		—
	a) 6.7.2 mains circuits of overvoltage category II up to nominal supply voltage of 300 V		P
	b) 6.7.3 secondary circuits separated from circuits defined in a) by transformer		P
	c) K.1 mains circuits of overvoltage category III and IV or overvoltage category II over 300 V		P

	d) K.2 secondary circuits separated from circuits defined in c) by transformer		P
	e) K.3 circuits having one or more of:		—
	1) maximum transient overvoltage is limited to known level below the level of mains circuit		P
	2) maximum transient overvoltage above the level of mains circuit		P
	3) Working voltage is the sum of more than one circuit or a mixed voltage		N
	4) Working voltage includes recurring peak voltage, may include non-sinusoidal or non-periodic waveform		N
	5) Working voltage with a frequency above 30 kHz		N
6.7.2	Insulation for mains circuits of overvoltage category II with a nominal supply voltage up to 300 V		P
6.7.2.1	Clearances and creepage distances		—
	Values for mains circuits of Table 4 are met		P
	Coatings to achieve reduction to pollution degree 1 comply with requirements of Annex H		P
6.7.2.2	Solid insulation		—
6.7.2.2.1	Withstands electrical and mechanical stresses in normal use and all rated environmental conditions of 1.4		P
	Equipment passed voltage tests of 6.8.3 with values of Table 5		P
	Complies as applicable:		—
	a) enclosure or protective barrier of Clause 8		P
	b) moulded and potted parts requirements of 6.7.2.2.2		P
	c) inner layers of printed wiring boards requirements of 6.7.2.2.3		N
	d) thin-film insulation requirements of 6.7.2.2.4		N
6.7.2.2.2	Moulded and potted parts		—
	Conductors between same two layers are separated by at least 0,4 mm after moulding is completed		P
6.7.2.2.3	Inner insulating layers of printed wiring boards		—
	Separated by at least 0,4 mm between same two layers		P
	Reinforced insulation have adequate electric strength; one of following methods used:		—
	a) thickness of insulation is at least 0,4 mm		P

	b) insulation is assembled of minimum two separate layers, each rated for test voltage of Table 5 for basic insulation		P
	c) insulation is assembled of minimum two separate layers, where the combination is rated for test voltage of Table 5 for reinforced insulation		P
6.7.2.2.4	Thin-film insulation		—
	Conductors between same two layers are separated by applicable clearances and creepage distance of 6.7.2.1		N
	Reinforced insulation have adequate electric strength; one of following methods used:		—
	a) thickness through the insulation at least 0,4 mm		N
	b) insulation is assembled of min two separate layers, each rated for test voltage of Table 5 for basic insulation		N
	c) insulation is assembled of min three separate layers, where the combination of two layers passed voltage tests of 6.8.3 with values of Table 5 for reinforced insulation		N
6.7.3	Insulation for secondary circuits derived from mains circuits of overvoltage category II up to 300 V		P
6.7.3.1	Secondary circuits where separation from mains circuits is achieved by a transformer providing:		—
	– reinforced insulation		P
	– double insulation		P
	– screen connected to the protective conductor terminal		P
6.7.3.2	Clearances		—
	a) meet the values of Table 6 for basic insulation and supplementary insulation; or		P
	twice the values of Table 6 for reinforced insulation		P
	or		—
	b) pass the voltage tests of 6.8 with values of Table 6;		—
	with following adjustments:		—
	1) values for reinforced insulation are 1,6 times the values for basic insulation		P
	2) if operating altitude is greater than 2000 m values of clearances multiplied with factor of Table 3		P
	3) minimum clearance is 0,2 mm for pollution degree 2 and 0,8 mm for pollution degree 3		P
6.7.3.3	Creepage distances		—

	Based on working voltage meets the values of Table 7 for basic and supplementary insulation		P
	Values for reinforced insulation are twice the values of basic insulation		P
	Coatings to achieve reduction to pollution degree 1 comply with requirements of Annex H		P
6.7.3.4	Solid insulation		—
6.7.3.4.1	Withstands electrical and mechanical stresses in normal use and all rated environmental conditions of 1.4		—
	a) Equipment passed voltage test of 6.8.3.1 for 5 s with values of Table 6 for basic and supplementary insulation		P
	values for reinforced insulation are 1,6 times the values of basic insulation		P
	b) if working voltage exceeds 300 V, equipment passed voltage test of 6.8.3.1 for 1 min with a test voltage of 1,5 times working voltage for basic or supplementary insulation		P
	value for reinforced insulation are twice the working voltage		P
	Complies as applicable:		—
	1) enclosure or protective barrier of Clause 8		N
	2) moulded and potted parts requirements of 6.7.3.4.2		N
	3) inner layers of printed wiring boards requirements of 6.7.3.4.3		N
	4) thin-film insulation requirements of 6.7.3.4.4		N
6.7.3.4.2	Moulded and potted parts		—
	Conductors between same two layers are separated by applicable distances of Table 8		N
6.7.3.4.3	Inner insulation layers of printed wiring boards		—
	Separated by at least by applicable distances of Table 8 between same two layers		N
	Reinforced insulation have adequate electric strength; one of following methods used:		—
	a) thickness at least applicable distance of Table 8		N
	b) insulation is assembled of minimum two separate layers, each rated for test voltage of Table 6 for basic insulation		N
	c) insulation is assembled of min two separate layers, where the combination is rated for 1,6 times the test voltage of Table 6		N
6.7.3.4.4	Thin-film insulation		—

	Conductors between same two layers are separated by applicable clearances and creepage distance of 6.7.3.2 and 6.7.3.3		N
	Reinforced insulation have adequate electric strength; one of following methods used:		—
	a) thickness at least applicable distance of Table 8		N
	b) insulation is assembled of min. two separate layers, each rated for test voltage of Table 6 for basic insulation		N
	c) insulation is assembled of min. three separate layers, where the combination of two layers passed voltage tests with 1,6 time values of Table 6:		—
	a.c. test of 6.8.3.1; or		N
	d.c. test of 6.8.3.2 for circuits stressed only by d.c. voltages		N
6.8	Procedure for dielectric strength tests		P
6.9	Constructional requirements for protection against electric shock		P
6.9.1	If a failure could cause a hazard:		—
	a) security of wiring connections		P
	b) screws securing removable covers		P
	c) accidental loosening		P
	d) clearances and creepage distances not reduced below the values of basic insulation by loosening of parts or wires		P
6.9.2	Insulating materials		P
	Material not to be used for safety relevant insulation:		—
	a) easily damaged materials not used		P
	b) non-impregnated hygroscopic materials not used		P
6.9.3	Colour coding		P
	Green-and-yellow insulation shall not be used except:		—
	a) protective earth conductors;		P
	b) protective bonding conductors;		P
	c) potential equalization conductors;		P
	d) functional earth conductors		P
6.10	Connection to mains supply source and connections between parts of equipment		P
6.10.1	Mains supply cords		—
	rated for maximum equipment current (see 5.1.3 c)		P
	Cable complies with IEC 60227 or IEC 60245		P

	Heat-resistant if likely to contact hot parts		P
	Temperature rating (cord and inlet)..... :		—
	Green/yellow used only for connection to protective conductor terminals		P
	Detachable cords with IEC 60320 mains connectors:		—
	Conform to IEC 60799; or		P
	Have the current rating of the mains connector		P
6.10.2	Fitting of non-detachable mains supply cords		—
6.10.2.1	Cord entry		—
	a) inlet or bushing with a smoothly rounded opening; or		N
	b) insulated cord guard protruding >5 D (diameter)		N
6.10.2.2	Cord anchorage		—
	Protective earth conductor is the last to take the strain		N
	a) cord is not clamped by direct pressure from a screw		N
	b) knots are not used		N
	c) cannot push the cord into the equipment to cause a hazard		N
	d) no failure of cord insulation in anchorage with metal parts		N
	e) not to be loosened without a tool		N
	f) cord replacement does not cause a hazard and method of strain relief is clear		N
	Push-pull and or torque test		N
6.10.3	Plugs and connectors		N
	Mains supply plugs, connectors etc., conform with relevant specifications		N
	If equipment supplied at voltages below 6.3.2.a) or from a sole source:		—
	Plugs of supply cords do not fit mains sockets above rated supply voltage		N
	Mains type plugs used only for connection to mains supply		N
	Plug pins which receive a charge from an internal capacitor		N
	Accessory mains socket outlets:		—
	a) marking if accepts a standard mains supply plug (see 5.1.3e)		N
	b) input has a protective earth conductor if outlet has earth terminal contact		N

6.11	Disconnection from supply source		P
6.11.1	Disconnects all current-carrying conductors		P
6.11.2	Exceptions		P
6.11.3	Requirements according to type of equipment		—
6.11.3.1	Permanently connected equipment and multi-phase equipment		N
	Employs switch or circuit-breaker		N
	If switch or circuit-breaker is not part of the equipment, documentation requires:		—
	a) switch or circuit-breaker to be included in building installation		N
	b) suitable location easily reached		N
	c) marking as disconnecting for the equipment		N
6.11.3.2	Single-phase cord-connected equipment		N
	Equipment is provided with one of the following:		—
	a) switch or circuit-breaker		N
	b) appliance coupler (disconnectable without tool)		N
	c) separable plug (without locking device)		N
6.11.4	Disconnecting devices		P
6.11.4.1	Disconnecting device part of equipment		P
	Electrically close to the supply		P
	Power-consuming components not electrically located between the supply source and the disconnecting device		P
	Except electromagnetic interference suppression circuits permitted to be located on the supply side of the disconnecting device		P
6.11.4.2	Switches and circuit-breakers		P
	When used as disconnection device:		—
	Meets IEC 60947-1 and IEC 60947-3		P
	Marked to indicate function..... :		—
	Not incorporated in mains cord		P
	Does not interrupt protective earth conductor		P
6.11.4.3	Appliance couplers and plugs		P
	Where an appliance coupler or separable plug is used as the disconnecting device (see 6.11.3.2):		—
	Readily identifiable and easily reached by the operator		P
	Single-phase portable equipment cord length not more than 3 m		P

	Protective earth conductor connected first and disconnected last		P

7	PROTECTION AGAINST MECHANICAL HAZARDS		P
7.1	Equipment does not cause a mechanical hazard in normal nor in single fault condition		P
	Conformity is checked by 7.2 to 7.7		P
7.2	Sharp edges		P
	Easily touched parts are smooth and rounded		P
	Do not cause injury during normal use and		P
	Do not cause injury during single fault condition		N
7.3	Moving parts		N
7.3.1	Hazards from moving parts limited to a tolerable level with the conditions specified in 7.3.2 and 7.3.5		N
	Risk assessment in accordance with 7.3.3 carried out		N
7.3.2	Exceptions		N
	Access to hazardous moving parts permitted under following circumstances:		—
	a) obviously intended to operate on parts or materials external of the equipment		N
	inadvertent touching of moving parts minimized by equipment design (e .g. guards or handles)		N
	b) If operator access is unavoidable outside normal use following precautions have been taken:		—
	1) access requires tool		N
	2) statement about training in the instructions		N
	3) warning markings on covers prohibiting access by untrained operators		N
	or symbol 14 with full details in documentation		N
7.3.3	Risk assessment for mechanical hazards to body parts		P
	Risk is reduced to a tolerable level by protective measures as specified in table 12		P
	Minimum protective measures:		—
	A. Low level measures		P
	B. Moderate measures		P
	C. Stringent measures		P
7.3.4	Limitation of force and pressure		P
	Following levels are met in normal and single fault condition:		—

	Continuous contact pressure below 50 N / cm² with force below 150 N		P
	Temporary force below 250 N for an area at least of 3 cm² for a maximum duration of 0,75 s		P
7.3.5	Gap limitations between moving parts		N
7.3.5.1	Access normally allowed		—
	If levels of 7.3.4 exceeded and body part may be inserted minimum gap as specified in table 13 assured in normal and in single fault condition		N
7.3.5.2	Access normally prevented		—
	Maximum gap as specified in table 14 assured in normal and in single fault condition		P
7.4	Stability		P
	Equipment not secured to building structure is physical stable		P
	Stability maintained after opening of drawers etc. by automatic means, or		P
	warning marking requires the application of means		P
	Compliance checked by following tests as applicable:		—
	a) 10° tilt test for other than handheld equipment		P
	b) multi-directional force test for equipment exceeds height of 1 m and mass of 25 kg		P
	c) downward force test for floor-standing equipment		P
	d) overload test with 4 times maximum load for castor or support that supports greatest load		P
	e) castor or support that supports greatest load removed from equipment		P
7.5	Provisions for lifting and carrying		N
7.5.1	Equipment more than 18 kg :		—
	Has means for lifting or carrying; or		N
	Directions in documentation		N
7.5.2	Handles and grips		—
	Handles or grips withstand four times weight		N
7.5.3	Lifting devices and supporting parts		—
	Rated for maximum load; or		N
	tested with four times maximum static load		N
7.6	Wall mounting		N
	Mounting brackets withstand four times weight		N
7.7	Expelled parts		N
	Equipment contains or limits the energy		N

	Protection not removable without the aid of a tool		N

8	RESISTANCE TO MECHANICAL STRESSES		P
8.1	Equipment does not cause a hazard when subjected to mechanical stresses in normal use		P
	Normal protection level is 5 J		P
	Levels below 5 J but not less than 1 J are acceptable if all of following criteria are met:		—
	a) lower level justified by risk assessment of manufacturer		P
	b) equipment installed in its intended application is not easily touched		P
	c) only occasional access during normal use		P
	d) IK code in accordance to IEC 62262 marked or symbol 14 used with full information in the documentation		N
	for non-metallic enclosures rated below 2 °C ambient temperature value chosen for minimum rated temperature		P
	impact energies between IK values, the IK code marked for nearest lower value		P
	Conformity is checked by performing following tests:		—
	1) static test of 8.2.1		P
	2) impact test of 8.2.2 with 5 J except for hand-held equipment		P
	if impact energy not selected to 5 J alternate method of IEC 62262 used		P
	3) drop test of 8.3.1 or 8.3.2 except for fixed equipment and equipment with mass over 100 kg		P
	Equipment rated with an impact rating of IK 08 that obviously meets the criteria		P
	After the tests inspection with following results:		—
	– hazardous live parts above the limits of 6.3.2 not accessible		P
	– insulation pass the voltage tests of 6.8		P
	i) no leaks of corrosive and harmful substances		P
	ii) enclosure shows no cracks resulting in a hazard		P
	iii) clearances not less than their permitted values		P
	iv) insulation of internal wiring remains undamaged		P
	v) protective barriers not damaged or loosened		P
	vi) No moving parts exposed, except permitted by 7.3		P

	vii) no damage which could cause spread of fire		P
8.2	Enclosure rigidity test		P
8.2.1	Static test		P
	– 30 N with 12 mm rod to each part of enclosure		P
	– in case of doubt test conducted at maximum rated ambient temperature		P
8.2.2	Impact test		P
	Impact applied to any part of enclosure causing a hazard if damaged		P
	Impact energy level and corresponding IK code ..... :		—
	Non-metallic enclosures cooled to minimum rated ambient temperature if below 2 °C		P
8.3	Drop test		P
8.3.1	Other than hand-held and direct-plug-in equipment		P
	Tests conducted with a drop height or angle of..... :		—
8.3.2	hand-held and direct-plug-in equipment		—
	Non-metallic enclosures cooled to minimum rated ambient temperature if below 2 °C		P
	Drop test conducted with an height of 1 m		P

9	PROTECTION AGAINST THE SPREAD OF FIRE		P
9.1	No spread of fire in normal and single fault condition	Metal enclosure used	P
	Mains supplied equipment meets requirements of 9.6 additionally		P
	Conformity is checked by minimum one or a combination of the following (see Figure 11):		—
	a) Single Fault test of 4.4; or		P
	b) Application of 9.2 (eliminating or reducing the sources of ignition); or		P
	c) Application of 9.3 (containment of fire within the equipment)		P
9.2	Eliminating or reducing the sources of ignition within the equipment		P
	a) 1) Limited-energy circuit (see 9.4); or		P
	b) 2) basic insulation provided for parts of different potential; or		P
	Bridging the insulation does not cause ignition		P
	c) Surface temperature of liquids and parts (see 9.5)		P
	d) No ignition in circuits designed to produce heat		P

9.3	Containment of the fire within the equipment, should it occur		P
9.3.1	Spread of fire outside equipment reduced to a tolerable level if:		—
	a) Energizing of the equipment is controlled by an operator held switch		P
	b) Enclosure is conform with constructional requirements of 9.3.2; and		P
	Requirements of 9.5 are met		P
9.3.2	Constructional requirements		—
	a) Connectors and insulating material have flammability classification V-2 or better	(see table 1 or Form A.23)	P
	b) Insulated wires and cables are flame retardant (VW-1 or equivalent)	(see table 1 or Form A.23)	P
	c) Enclosure meets following requirements:	(see Form A.22)	—
	1) Bottom and sides in arc of 5 ° (see Figure 13) to non-limited circuits (9.4) meets:		—
	i) no openings; or		P
	ii) perforated as specified in table 16; or		P
	iii) metal screen with a mesh; or		P
	iv) baffles as specified in Figure 12		P
	2) Material of enclosure and any baffle or flame barrier is made of:		—
	Metal (except magnesium); or		P
	Non-metallic materials have flammability classification V-1 or better	(see table 1 or Form A.22)	P
	3) Enclosure and any baffle or flame barrier have adequate rigidity		P
9.4	Limited-energy circuit	(see Form A.24)	P
	a) Potential not more than 30 r.m.s. and 42,4 V peak, or 60 V dc		P
	b) Current limited by one of following means:		—
	1) Inherently or by impedance (see table 17); or		P
	2) Overcurrent protective device (see table 18); or		P
	3) A regulating network limits also in single fault condition (see table 17)		P
	c) Is separated by at least basic insulation		P
	Fuse or a nonadjustable electromechanical device is used		P
9.5	Requirements for equipment containing or using flammable liquids		N

	Flammable liquids contained in or specified for use with equipment do not cause spread of fire	(see Form A.25)	N
	Risk is reduced to a tolerable level:		—
	a) The temperature of surface or parts in contact with flammable liquids is 25 °C below fire point		N
	b) The quantity of liquid is limited		N
	c) Flames are contained within the equipment		N
	Detailed instructions for risk-reduction provided		N
9.6	Overcurrent protection		P
9.6.1	Mains supplied equipment protected		P
	Basic insulation between mains parts of opposite polarity provided		P
	Devices not in the protective conductor		P
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase)		P
9.6.2	permanently connected equipment		N
	Overcurrent protection device:		—
	Fitted within the equipment; or		N
	Specified in manufacturer's instructions		N
9.6.3	Other equipment		—
	Protection within the equipment		N

10	EQUIPMENT TEMPERATURE LIMITS AND RESISTANCE TO HEAT		P
10.1	Surface temperature limits for protection against burns		P
	Easily touched surfaces within the limits in normal and in single fault condition:	(see Form A.26A)	—
	– at an specified ambient temperature of 40 °C		N
	– for equipment rated above 40 °C ambient temperature limits not exceeded raised by the difference to 40 °C		N
	Heated surfaces necessary for functional reasons exceeding specified values:		—
	– Are recognizable as such by appearance or function; or		N
	– Are marked with symbol 13		N
	– Guards are not removable without tool		N
10.2	Temperatures of windings		P
	Limits not exceeded in:	(see Form A.26B)	—
	normal condition		P

	single fault condition		P
10.3	Other temperature measurements		P
	Following measurements conducted if applicable:		—
	a) Value of 60 °C of field-wiring terminal box not exceeded		P
	b) Surface of flammable liquids and parts in contact with this liquids		P
	c) Surface of non-metallic enclosures		P
	d) Parts made of insulating material supporting parts connected to mains supply		P
	e) Terminals carrying a current more than 0,5 A		P
10.4	Conduct of temperature tests		P
10.4.1	Tests conducted under reference test conditions and manufacturer's instructions		P
10.4.2	Temperature measurement of heating equipment		P
	Tests conducted in test corner		P
10.4.3	Equipment intended for installation in a cabinet or wall		P
	Equipment built in as specified in installation instructions		P
10.5	Resistance to heat		P
10.5.1	Integrity of clearance and creepage distances		P
10.5.2	Non-metallic enclosures		P
	Within 10 min after treatment:		—
	Equipment subjected to suitable stresses of 8.2 and 8.3 complying with criteria of 8.1		P
10.5.3	Insulating material		P
	a) Parts supporting parts connected to mains supply		P
	b) Terminals carrying a current more than 0,5 A		P
	Examination of material data; or		P
	in case of doubt:		P
	1) Ball pressure test; or		P
	2) Vicat softening test of ISO 306		P

11	PROTECTION AGAINST HAZARDS FROM FLUIDS		N
11.1	Protection to operators and surrounding area provided by equipment		N
	All fluids specified by manufacturer considered		N
11.2	Cleaning		N
11.3	Spillage		N

11.4	Overflow		N
11.5	Battery electrolyte		N
	Battery electrolyte leakage presents no hazard		N
11.6	Specially protected equipment		N
11.7	Fluid pressure and leakage		N
11.7.1	Maximum pressure ..... :		—
	Maximum pressure of any part does not exceed Prated		N
11.7.2	Leakage and rupture at high pressure		—
	Fluid-containing parts subjected to hydraulic test if.... :		—
	a) product of pressure and volume > 200 kPal; and		N
	b) pressure > 50 kPa		N
	Parts of refrigerating systems meets pressure-related requirements of IEC 60335-24 or IEC 60335-2-89		N
11.7.3	Leakage from low-pressure parts		N
11.7.4	Overpressure safety device		N
	Does not operate in normal use		N
	a) Connected as close as possible to parts intended to be protected		N
	b) Easy access for inspection, maintenance and repair		N
	c) Adjustment only with tool		N
	d) No discharge towards person		N
	e) No hazard from deposit of discharged material		N
	f) Adequate discharge capacity		N
	No shut-off valve between overpressure safety device and protected parts		N

12	Protection against radiation, including laser sources, and against sonic and ultrasonic pressure		N
12.1	Equipment provides protection		N
12.2	Equipment producing ionizing radiation		N
12.2.1	Ionizing radiation		N
12.2.1.1	Equipment meets the following requirements:		—
	a) if intended to emit radiation meets requirements of 12.2.1.2; or		N
	tested, classified and marked in accordance to IEC 60405		N

	b) if only emits stray radiation meets requirements of 12.2.1.3		N
12.2.1.2	Equipment intended to emit radiation		—
	Effective dose rate of radiation measured ..... :		—
	If dose rate exceeds 5 µSv/h marked with the following:		—
	a) symbol 17 (ISO 361)		N
	b) abbreviations of the radionuclides..... :		—
	c) with maximum dose at 1 m; or..... :		—
	with dose rate value between 1 µSv/h and 5 µSv/h in m ..... :		—
12.2.1.3	Equipment not intended to emit radiation		—
	Limit for unintended stray radiation of 1 µSv/h at any easily reached point kept ..... :		—
12.2.2	Accelerated electrons		—
	Compartments opened only by the use of a tool		N
12.3	Ultraviolet (UV) radiation		N
	No unintentional hazardous escape of UV radiation:		—
	– checked by inspection; and		N
	– evaluation of risk assessment documentation		N
12.4	Microwave radiation		N
	Power density does not exceed 10 W/m2 ..... :		N
12.5	Sonic and ultrasonic pressure		N
12.5.1	Sound level		—
	No hazardous sound emission		N
	Maximum sound pressure level measured and calculated for maximum sound power level as specified in ISO 3746 or ISO 9614-1		N
	Instruction describes measures for protection		N
12.5.2	Ultrasonic pressure		N
	Equipment not intended to emit ultrasound does not exceed limit of 110 dB between 20 kHz and 100 kHz		N
	Equipment intended to emit ultrasound:		N
	Outside useful beam does not exceed limit of 110 dB between 20 kHz and 100 kHz		N
	If inside useful beam above values exceeded:		—
	Marked with Symbol 14 of table 1		N
	and following information in the documentation:		—
	a) dimensions of useful beam		N
	b) area where ultrasonic pressure exceed 110 dB		N

	c) maximum sound pressure inside beam area		N
12.6	Laser sources		N
	Equipment meets requirements of IEC 60825-1		N

13	PROTECTION AGAINST LIBERATED GASES AND SUBSTANCES, EXPLOSION AND IMPLOSION		N
13.1	Poisonous and injurious gases and substances		N
	No poisonous or injurious gases or substances liberated in normal condition		N
	Attached data/test reports demonstrate conformity		N
13.2	Explosion and implosion		N
13.2.1	Components		N
	Components liable to explode:		—
	Pressure release device provided; or		N
	Apparatus incorporates operator protection (see also 7.7)		N
	Pressure release device:		—
	Discharge without danger		N
	Cannot be obstructed		N
13.2.2	Batteries and battery charging		—
	If explosion or fire hazard could occur:		—
	Protection incorporated in the equipment; or		N
	Instructions specify batteries with built-in protection		N
	In case of wrong type of battery used:		—
	No hazard; or		N
	Warning by marking and within instructions		N
	Equipment with means to charge rechargeable batteries:		—
	Warning against the charging of non-rechargeable batteries; and		N
	Type of rechargeable battery indicated; or		N
	Symbol 14 used		N
	Battery compartment design		N
	Single component failure		N
	Polarity reversal test		N
13.2.3	Implosion of cathode ray tubes		N
	If maximum face dimensions > 160 mm ..... :		—
	Intrinsically protected and correctly mounted; or		N

	enclosure provides protection:		N
	If non-intrinsically protected:		—
	Screen not removable without tool		N
	If glass screen, not in contact with surface of tube		N

14	COMPONENTS AND SUBASSEMBLIES		P
14.1	Where safety is involved, components and subassemblies meet relevant requirements		P
14.2	Motors		N
14.2.1	Motor temperatures		N
	Does not present a hazard when stopped or prevented from starting; or		N
	Protected by over-temperature or thermal protection device conform with 14.3		N
14.2.2	Series excitation motors		N
	Connected direct to device, if overspeeding causes a hazard		N
14.3	Overtemperature protection devices		P
	Devices operating in a single fault condition		P
	a) Reliable function is ensured		P
	b) Rated to interrupt maximum current and voltage		P
	c) Does not operate in normal use		P
	If self-resetting device used to prevent a hazard, protected part requires intervention before restarting		P
14.4	Fuse holders		P
	No access to hazardous live parts		P
14.5	Mains voltage selecting devices		N
	Accidental change not possible		N
14.6	Mains transformers tested outside equipment		P
14.7	Printed circuit boards		P
	Data shows conformity with V-1 of IEC 60695-11-10 or better; or		P
	Test shows conformity with V-1 of IEC 60695-11-10 or better		N
	Not applicable for printed wiring boards with limited-energy circuits (9.4)		N
14.8	Circuits or components used as transient overvoltage limiting devices		N
	Test conducted between each pair of mains supply terminals		N

	No hazard resulting from rupture or overheating of the component:		—
	– no bridging of safety relevant insulation		N
	– no heat to other parts above the self-ignition points		N

15	PROTECTION BY INTERLOCKS		N
15.1	Interlocks are designed to remove a hazard before operator exposed		N
15.2	Prevention of reactivation		N
15.3	Reliability		N
	Single fault unlikely to occur; or		N
	Cannot cause a hazard		N

16	HAZARDS RESULTING FROM APPLICATION		N
16.1	Reasonably foreseeable misuse		N
	No hazards arising from settings not intended and not described in the instructions		N
	Other cases of reasonably foreseeable misuse addressed by risk assessment		N
16.2	Ergonomic aspects		N
	Factors giving rise to a hazard the risk assessment is reflecting those aspects:		—
	a) limitation of body dimensions		N
	b) displays and indicators		N
	c) accessibility and conventions of controls		N
	d) arrangement of terminals		N

17	RISK ASSESSMENT		P
	Risk assessment conducted, if hazard might arise and not covered by Clauses 6 to 16		P
	Tolerable risk achieved by iterative documented process covering the following:		—
	a) Risk analysis		P
	Identifies hazards and estimates risk		P
	b) Risk evaluation		P
	Plan to judge acceptability of resulting risk level based on the estimated severity and likelihood of a risk		P
	c) Risk reduction		P

	Initial risk reduced by counter measures;		P
	Repeated risk evaluation without new risks introduced		P
	Risks remaining after risk assessment addressed in instructions to responsible body:		—
	Information contained how to mitigate these risks		P
	Following principles in methods of risk reduction applied by manufacturer in given order:		—
	1) Risks eliminated or reduced as far as possible		P
	2) Protective measures taken for risks that cannot be eliminated		P
	3) User information about residual risk due to any defect of the protective measures		P
	Indication of particular training is required		P
	Specification of the need for personal protective equipment		P
	Conformity checked by evaluation of the risk assessment documentation		P

ANNEX F	ROUTINE TESTS		P
	Manufacturer ´s declaration		P

ANNEX H	QUALIFICATION OF CONFORMAL COATINGS FOR PROTECTION AGAINST POLLUTION		N
H.1	General		N
	Conformal coatings meet the requirements of Clause H.2 and H.3.		N
H.2	Technical properties		N
	Technical properties of conformal coatings are suitable for the intended application. In particular:		—
	a) Manufacturer indicate that it is a coating for PWBs;		N
	b) rated operating temperature include the temperature range of the indicated application;		N
	c) CTI, insulation resistance and dielectric strength are suitable for the intended application;		N
	d) Coating have adequate UV resistance, if it is exposed to sunlight;		N
	e) Flammability rating of the coating is at least the required flammability rating of the applied PWB.		N
H.3	Qualification of coatings		N
	Coating complies with the conformity requirements.		N

ANNEX K	INSULATION REQUIREMENTS NOT COVERED BY CLAUSE 6.7	(see Form A.15 and A.18)	N
			N

5.1.3c)	TABLE: Mains supply	Form A.2	P
	Marked rating	150-250VAC V	—
	Phase.....	Single phase	—
	Frequency	50-60Hz Hz	—
	Current	2.2 A	—

Test No.	Voltage [V]	Frequency [Hz]	Current [A]	Power [W]	Power [VA]	Comments
1	135	50	2.3	596.2	--	--
2	135	60	2.3	593.5	--	--
3	150	50	2.2	585.7	--	--
4	150	60	2.2	579.3	--	--
5	250	50	1.7	556.2	--	--
6	250	60	1.7	553.2	--	--
7	275	50	1.5	550.0	--	--
8	275	60	1.5	546.6	--	--

5.3	**TABLE: Durability of markings**	**Form A.3**	P

Marking method (see NOTE)	Agent
1) Adhesive label	A Water
2) Ink printed	B Isopropyl alcohol 70%
3) Laser marked	C (specify agent)
4) Film-coated (plastic foil control panel)	D (specify agent)
5) Imprinted on plastic (moulded in)	E (specify agent)

NOTE – Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

Marking location	Marking method (see above)
Identification (5.1.2)	2
MAINS supply (5.1.3)	2
Fuses (5.1.4)	2

5.3	TABLE: Durability of markings	Form A.3	P

Marking method (see NOTE)	Agent
1) Adhesive label	A Water
2) Ink printed	B Isopropyl alcohol 70%
3) Laser marked	C (specify agent)
4) Film-coated (plastic foil control panel)	D (specify agent)
5) Imprinted on plastic (moulded in)	E (specify agent)

NOTE – Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

Marking location	Marking method (see above)
Terminals and operating devices (5.1.5.2)	/
Switches and circuit breakers (5.1.6)	2
Double/reinforced equipment (5.1.7)	/
Field wiring Terminal boxes (5.1.8)	/
Warning marking (5.2)	2
Battery charging (13.2.2)	/

Method	Test agent	Remains legible	Label loose	Curled edges	Comments
		Verdict	Verdict	Verdict	
2	A	legible	No loose	No Curled	--
2	B	legible	No loose	No Curled	--

6.8	TABLE: Dielectric strength tests	Form A.18	P
4.4.4.1 b)	Conformity after application of SINGLE FAULT CONDITIONS[1]		P
6.4	Primary means of protection[2]		P
6.6	Connections to external circuits		P
6.7.	Insulation requirements[2] (see Annex K)		P
6.10.2	Fitting of non-detachable MAINS supply cords[1]		N
9.2 a) 2)	Eliminating or reducing the sources of ignition within the equipment		N
9.4 c)	Limited-energy circuit		N
9.6.1	Overcurrent protection basic insulation between MAINS - parts		N
	Test site altitude .....:	<2000m	—
	Test voltage correction factor (see table 10).....:	250V	—

Location or references from			Working voltage	Test voltage	Comments (NOTE)	Verdict

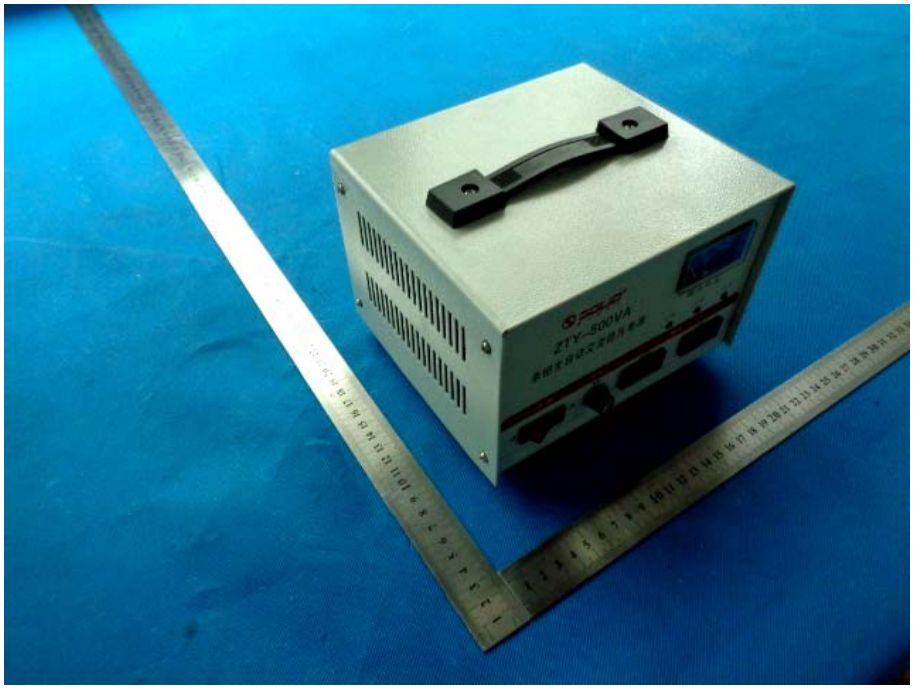
6.8	**TABLE: Dielectric strength tests**		**Form A.18**	P
Input to metal enclosure		1500V	No breakdown	P
Input to switch		3000V	No breakdown	P

10.	**TABLE : Temperature Measurements**		**Form A.26A**	P
Operating conditions:				
Frequency	50 Hz	Test room ambient temperature (ta) .. :	25.3°C	
Voltage	275 V	Test duration ..... :	3 h 20 min	

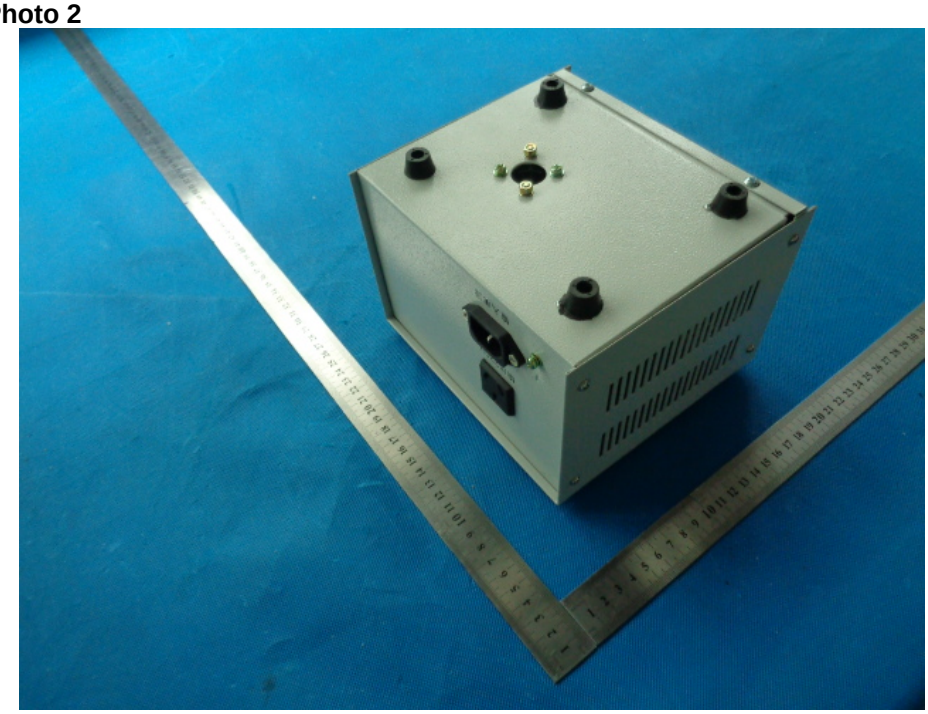
Part / Location	t_{max} [°C]	Verdict	Comments
AC inlet	46.8	70	--
Switch	41.2	85	--
Internal wire	37.1	80	--
e-cap. C1	42.8	105	--
PCB near D2	64.2	130	--
PCB near U1	54.9	130	--
Transformer winding	85.2	110	--
Transformer core	81.0	110	--
PCB near Q1	61.2	130	--
Metal enclosure	38.4	50	--

Photo Documentation:

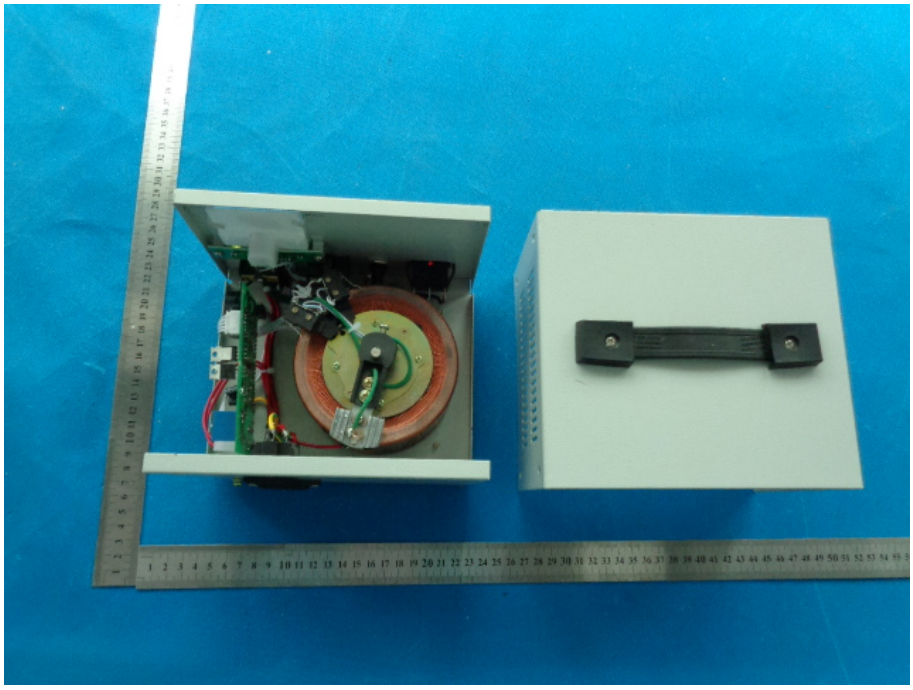
EUT Photo 1



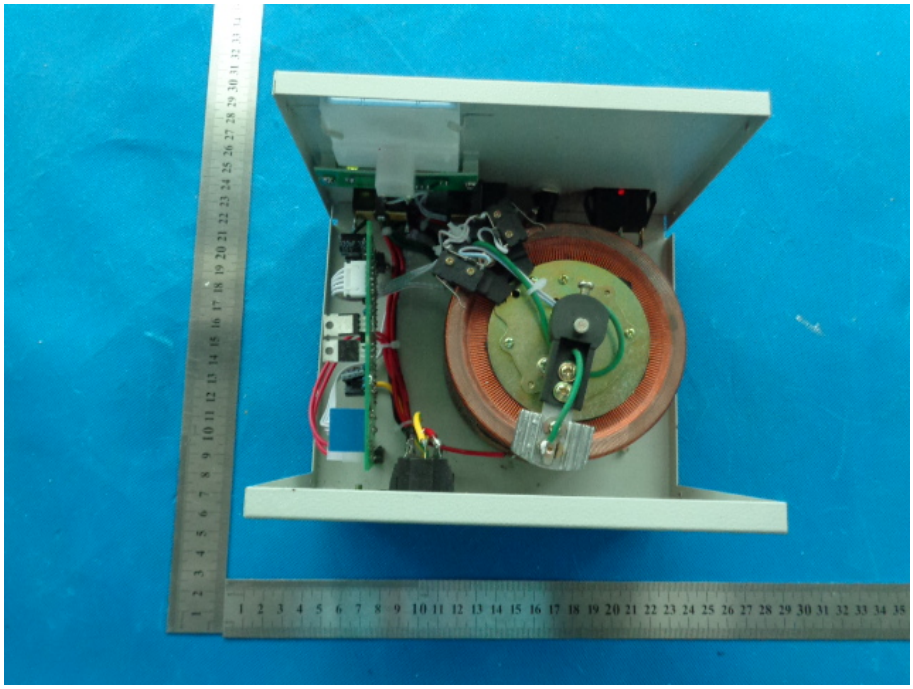
EUT Photo 2



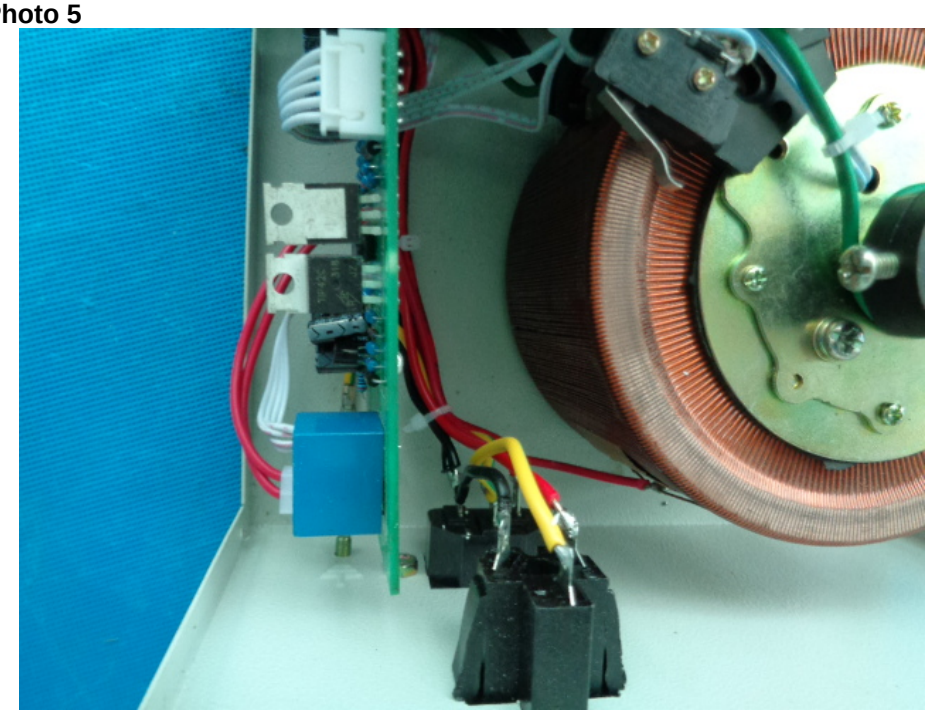
EUT Photo 3



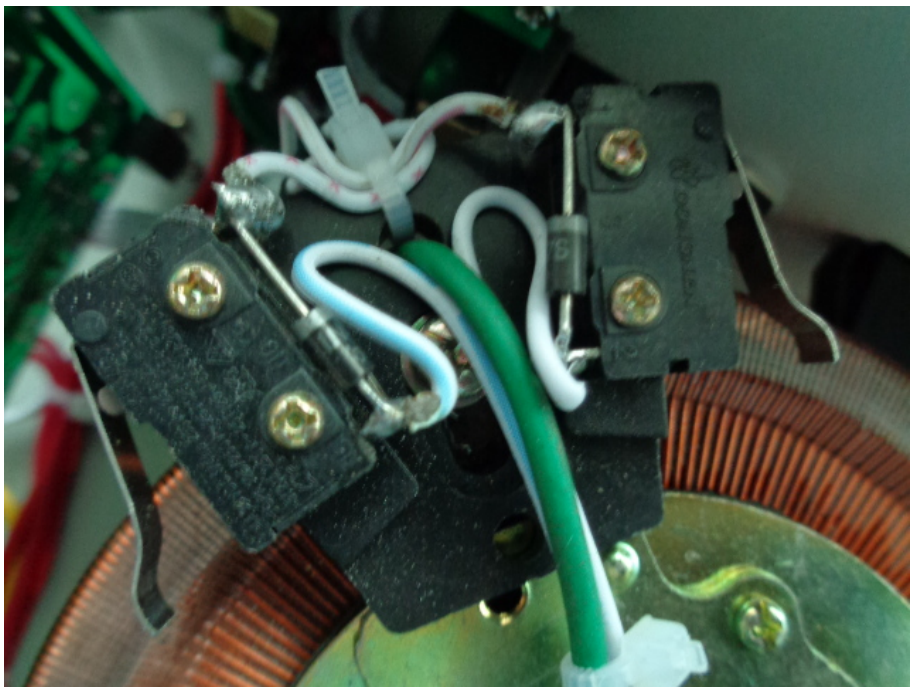
EUT Photo 4



EUT Photo 5



EUT Photo 6



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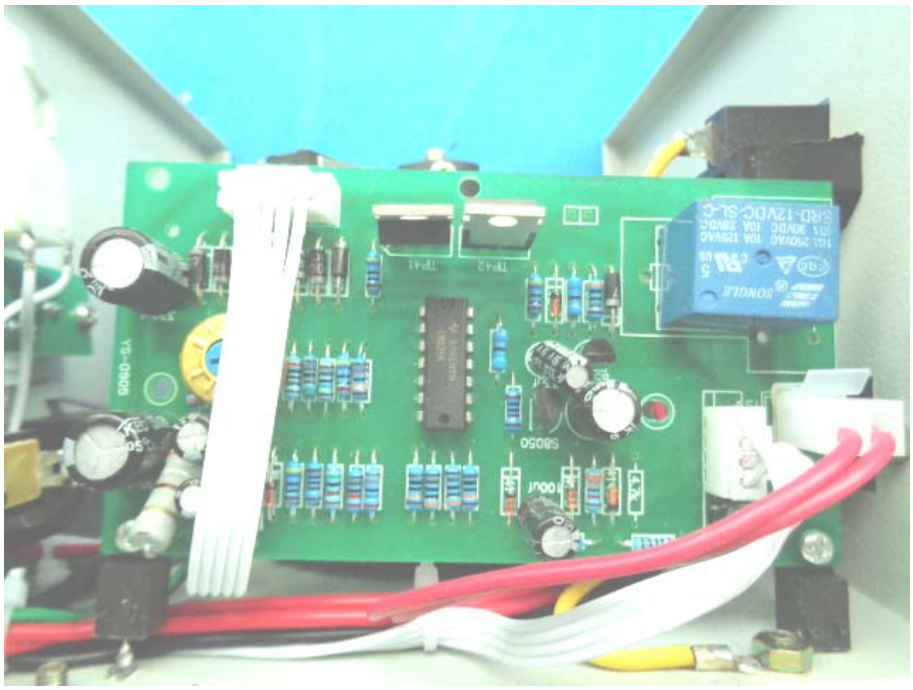

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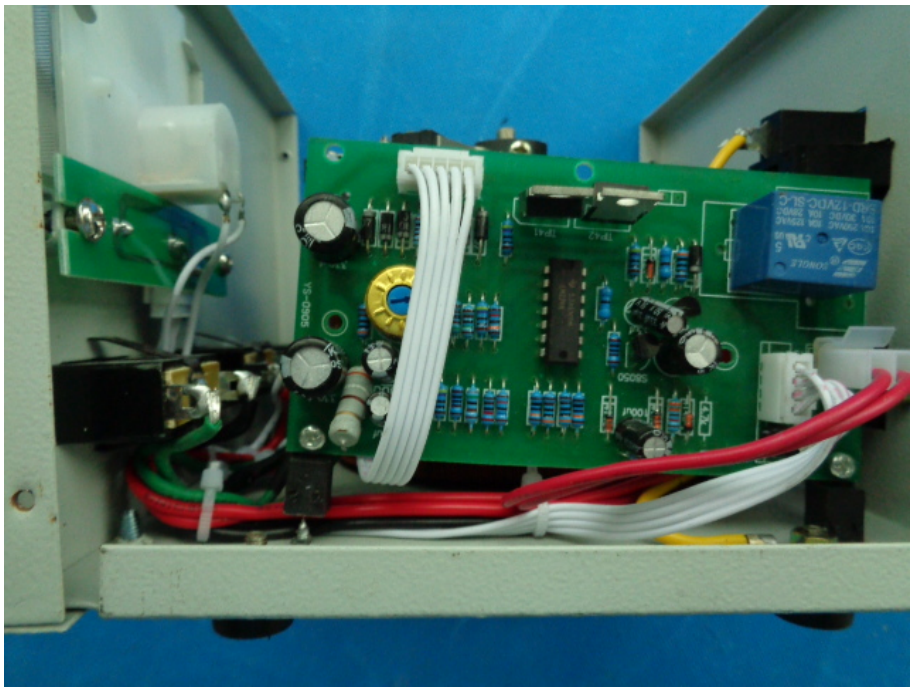

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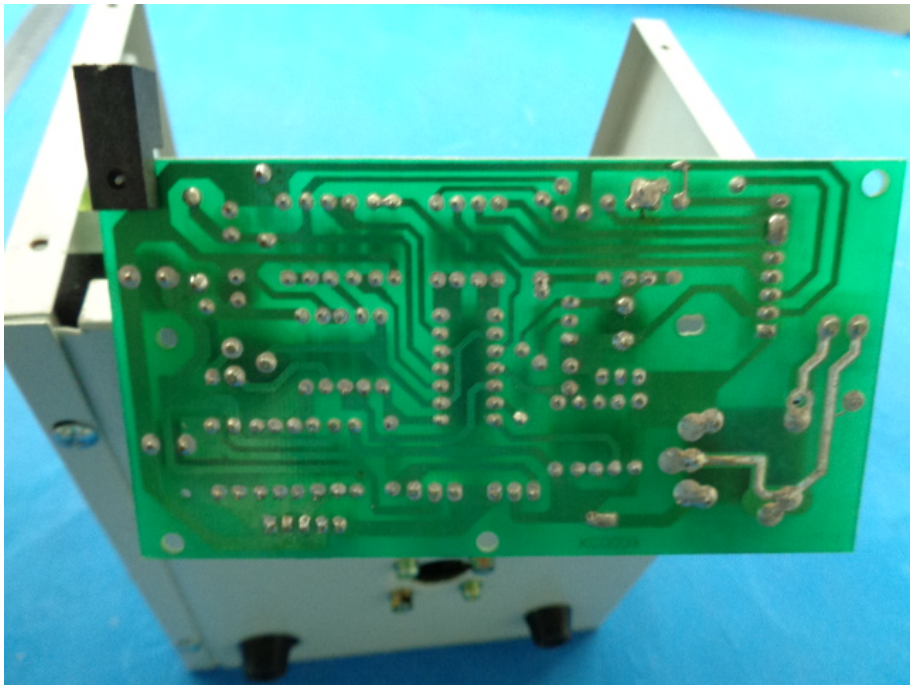
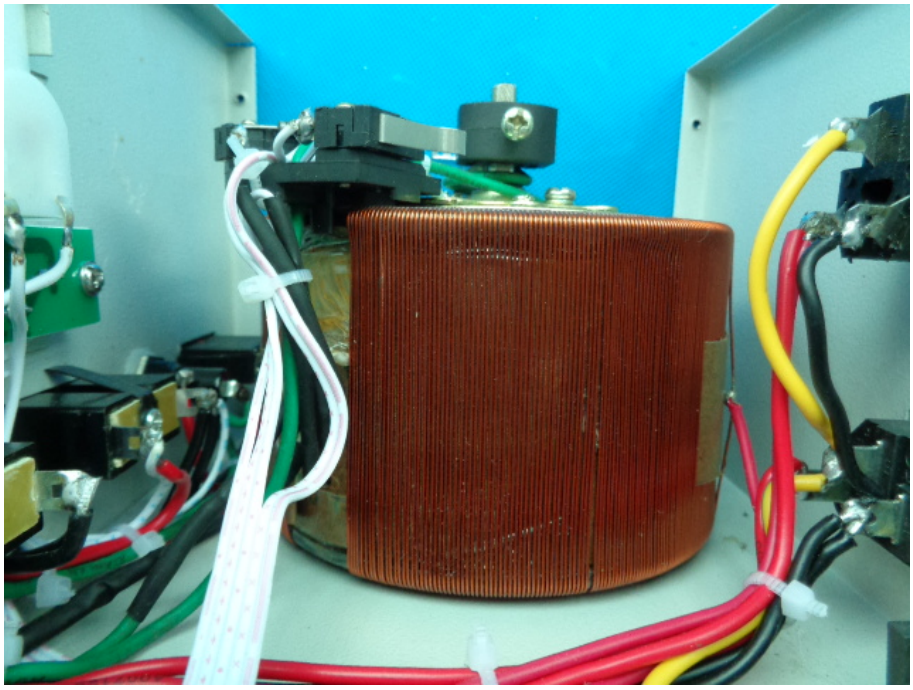


EUT Photo 10



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