APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

VOLTRONIC POWER TECHNOLOGY CORP.

UPS

Model(s): Galleon 2K, Galleon 3K

Prepared For : **VOLTRONIC POWER TECHNOLOGY CORP.**
12/F-2, No. 296, Sec. 1, Nei-Hu Road, Taipei, Taiwan R.O.C

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TEST REPORT

EN 62040-1
Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS

Report Reference No.....:	E0902005S-1
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Approved by (name + signature).....:	William Guo
Date of issue.....:	October 26, 2011
Total number of pages.....:	64 pages
Testing Laboratory.....:	SHENZHEN EMTEK CO., LTD.
Address.....:	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China
Testing location / address.....:	Same as above
Applicant's name.....:	VOLTRONIC POWER TECHNOLOGY CORP.
Address.....:	12/F-2, No. 296, Sec. 1, Nei-Hu Road, Taipei, Taiwan R.O.C
Test specification:	
Standard .....:	EN 62040-1: 2008
Test procedure.....:	Compliance with EN 62040-1: 2008
Non-standard test method……..:	N/A
Test Report Form No. .....:	IEC62040_1A
Test Report Form(s) Originator.....:	TÜV Rheinland Japan Ltd.
Master TRF .....:	Dated 2011-10

Test item description.....:	UPS
Trade Mark.....:	VOLTRONIC POWER
Manufacturer.....:	VOLTRONIC POWER (SHENZHEN) TECHNOLOGY CORP. 1-4F, Building 3, YuSheng Industrial Park, No. 467, Section Xixiang, National Highway 107, Xixiang, Bao An Dsitrict, Shenzhen, China
Model/Type reference .....:	GALLEON 2K, GALLEON 3K
Ratings .....:	Model: GALLEON 2K Input: 208Vac-240Vac, 50/60Hz, 9.6A, 1Φ Output: 208Vac-240Vac, 50/60Hz,1Φ Capacity: 2000VA/1600W Model: GALLEON 3K Input: 208Vac-240Vac, 50/60Hz, 14.4A, 1Φ Output: 208Vac-240Vac, 50/60Hz,1Φ Capacity: 3000VA/2400W

Test item particulars ..... :	
Equipment mobility..... :	[X] movable [] stationary [] for building-in
Connection to the mains..... :	[] pluggable equipment [X] permanent connection [] detachable power supply cord [] non-detachable power supply cord
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 [] OVC III [] OVC IV [] other:
Mains supply tolerance (%) or absolute mains supply values ..... :	208Vac(-10%), 240Vac(+10%) of input voltage considered
Tested for IT power systems ..... :	[] Yes [X] No
IT testing, phase-phase voltage (V) ..... :	NA
Class of equipment ..... :	[X] Class I [] Class II [] Not classified
Considered current rating (A) ..... :	16A
Pollution degree (PD) ..... :	[] PD 1 [X] PD 2 [] PD 3
IP protection class ..... :	IP20
Altitude during operation (m) ..... :	Up to 2000
Altitude of test laboratory (m) ..... :	below 2000
Mass of equipment (kg) ..... :	26kg for model GALLEON 2K, 28kg for model GALLEON 3K
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing..... :	
Date of receipt of test item..... :	October 08, 2011
Date(s) of performance of tests ..... :	October 08, 2011 to October 26, 2011

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.
Standard EN 62040-1:2008 is to be used in conjunction with EN 60950-1:2006, which is referred to in this TRF as "RD".

General product information:

1. The equipment is an on-line type of uninterruptible power supply for general use with information technology equipment.

2. The UPS is designed as primary, therefore, clearances, creepage distances and distances through insulation from input, output, control circuits to the RS232/USB of the PC interface are dimensioned for reinforced insulation and suitable distance through inulation. Therefore, the transformer TX1, U6, U7 and U8 on CNTL PCB are reinforced insulation.

The test samples are pre-productin without any serial number.

3. Model difference description:

All models are designed with same control logic, constructions, Main PCB, CNTL PCB, Input EMI PCB, Charger PCB and Panel PCB except model name, input current and output ratings.

Below is the differences comparison table:

Item	**Model GALLEON 2K**	**Model GALLEON 3K**
Battery	12V/7AH*6	12V/9AH*6
Breaker	10A/250VAC	16A/250VAC(I/P) 10A/250CAV*2(O/P)
Inlet	IEC/10A/250VAC	IEC/16A/250VAC
I/P Powercord	GE type 10A, 250V	GE type 16A, 250V
Inverter IGBT	HGTG5N120BND*4	AP30G120ASW*4
BUS Capacitor	470UF/450V*4	680UF/450V*4
Converter transformer	41-040057-00G	41-040056-00G
DC fuse (F2, F3)	125Vdc, 20A	125Vdc, 30A

4. Max. operating temperature is 40°C.

Summary of testing:

The product has been tested according to standard EN 62040-1: 2008.

- Tests performed on the bench
- Maximum ambient temperature: +40°C
- Tested for moderate conditions
- EUT is designed for altitudes not exceeding 2000 m.

This series of UPS generally uses the same circuit diagrams, therefore, input tests, heating tests and abnormal tests were conducted on models GALLEON 2K and GALLEON 3K with different converter transformers, MOSFETs and IGBT etc. Unless otherwise specified, the tests are conducted on model GALLEON 3K considered the worst condition.

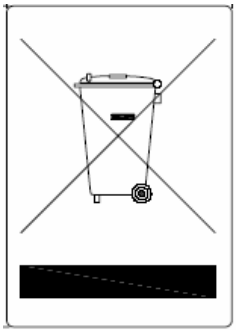
Copy of marking plate:

1. Rating label for model GLLEON 3K:

2. Rating label for model GLLEON 2K:

3. Trademark “VOLTRONIC POWER” was silk-printed on the external enclosure of the equipment.

4. Waste symbol label:



5. Battery warning label for model GLLEON 2K

CAUTION:

- The lead acid battery may cause chemical hazard
- The battery presents a risk of energy hazard.
- For disposal instructions for the battery,see user manual.

Number and type of battery: 6EA
Nominal voltage of total battery string: 72V
Nominal capacity of total battery string: 7.0Ah

6. Battery warning label for model GLLEON 3K

CAUTION:

- The lead acid battery may cause chemical hazard
- The battery presents a risk of energy hazard.
- For disposal instructions for the battery,see user manual.

Number and type of battery: 6EA
Nominal voltage of total battery string: 72V
Nominal capacity of total battery string: 9.0Ah

7. Warning label on outer enclosures

CAUTION:

- For operation read user manual including safety warnings first!
- This unit may be opened by authorized technicians only!
- Even when switched off there is a hazardous voltage on the batteries side!
- Lead acid battery in the inside of the enclosure!
- Isolate Uninterruptible Power Supply (UPS) before working on this circuit!

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL CONDITIONS FOR TESTS		P
4.5	Components		P
	Comply with IEC 62040-1 or relevant component standard	(see appended table 4.5)	P
1.5.2/RD	Evaluation and testing of components	Certified components are used in accordance with their ratings, certifications and they comply with applicable parts of this standard. Components not certified are used in accordance with their ratings and they comply with applicable parts of IEC 609501 and the relevant component standard. Components, for which no relevant IEC-standard exists, have been tested under the conditions occurring in the equipment, using applicable parts of IEC 60950-1.	P
1.5.3/RD	Thermal controls	No thermal control.	P
1.5.4/RD	Transformers	Transformers used are suitable for their intended application and comply with the relevant requirements of the standard and particularly Annex C/RD.	P
1.5.5/RD	Interconnecting cables	The interconnecting cable to PC is carrying only SELV voltage on a low energy level.	P
1.5.6/RD	Capacitors bridging insulation	Between lines: X2 capacitor according to IEC 60384-14: 1993 with 21 days damp heat test was used.	P
1.5.7/RD	Resistors bridging insulation	Refer to below:	P
1.5.7.1/RD	Resistors bridging functional, basic or supplementary insulation		P
1.5.7.2/RD	Resistors bridging double or reinforced insulation between a.c. mains and other circuits	No resistors bridging double or reinforced insulation.	N
1.5.7.3/RD	Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable	No bridging resistors	N
1.5.8/RD	Components in equipment for IT power systems	TN power system	N
4.6	Power interface		P
1.6.1/RD	AC power distribution systems	TN power system	P

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6.2/RD	Input current	Highest normal load according to 1.2.2.1/RD for this equipment is the charging of empty battery and operation with the maximum specified output load. (see appended table 4.6)	P
4.6 1.6.4/RD	Neutral conductor	Neutral is insulated from earth with basic insulation throughout the equipment. O/P neutral is not isolated from I/P neutral.	P

4.7	Marking and instructions		P
4.7.1	General	See below.	P
4.7.2	Power rating	The required marking is located on the outside surface of the equipment.	P
	Input rated voltage/range (V)..... :	208V-240V~	P
	Input rated current/range (A) ..... :	9.6A for model GALLEON 2K, 14.4A for model GALLEON 3K	P
	Input symbol for nature of supply (d.c.) ..... :	Not connected to DC supply.	N
	Input rated frequency/range (Hz)..... :	50/60	P
1.7.1/RD	Number of Input phases and neutral ..... :	1Φ with Neutral	P
	Output rated voltage/range (V) ..... :	208-240Vac	P
	Output rated current/range (A) ..... :	Not marked.	N
	Output rated power factor, (if less than unity, or active power and apparent power or active power and rated current) ..... :		N
1.7.1/RD	Number of output phases and neutral ..... :	1Φ with Neutral	P
	Output rated active power (W) ..... :	1600W for model GALLEON 2K, 2400W for model GALLEON 3K	P
	Output rated apparent power (VA) ..... :	2000VA for model GALLEON 2K, 3000VA for model GALLEON 3K	P
	Output symbol for nature of supply (d.c.) ..... :	No d.c. output.	N
	Output rated frequency/range (Hz) ..... :	50/60 Hz	P
	Ambient operating temperature range (C) ..... :	40℃	P
	Manufacturer's name or trademark or identification mark ..... :	VOLTRONIC POWER	P
	Type/model or type reference ..... :	GALLEON 2K, GALLEON 3K	P
	Symbol for Class II equipment only ..... :	The equipment is Class I.	N
	Other symbols ..... :	The additional marking does not give rise to misunderstandings.	P
	Certification marks ..... :	CE	P

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Instructions for units with automatic bypass / maintenance bypass, additional input a.c. supply, or external batteries, having text "See installation instructions before connecting to the supply" ..... :	See caution label	P
4.7.3	Safety instructions	The user manual contains information for operation, installation, servicing transport, storage and technical data.	P
4.7.3.1	General	Considered	P
4.7.3.2	Installation ..... :	Installation instructions are available to the user in User's Manual.	P
	Location in a restricted access location only ..... :	Instruction manual provided. Not for restricted access location.	P
	Permanent connector UPS ..... :	Instruction manual provided.	P
	Pluggable type A or Pluggable type B UPS ..... :	Pluggable equipment type A	P
4.7.3.3	Operation ..... :	The suitable information list in the user manual when operate the UPS. Not for restricted access location.	P
4.7.3.4	Maintenance..... :	The instruction of maintenance is only included in the service manual.	P
4.7.3.5	Distribution related backfeed..... :	Backfeed protection provided externally to the UPS.	P
4.7.4 1.7.4/RD	Main voltage adjustment ..... :	No voltage selector	N
	Methods and means of adjustment; reference to installation instructions ..... :	No voltage selector	N
4.7.5 1.7.5/RD	Power outlets ..... :	Relevant information provided on the marking that is affixed near the outlets.	P
4.7.6 1.7.6/RD	Fuse identification (marking, special fusing characteristics, cross-reference) ..... :	Marking near holders for fuses: Battery fuses: F2, F3: 20A, 125Vdc x 2 (for model GALLEON 2K) F2, F3: 30A, 125Vdc x 2 (for model GALLEON 3K) Input breaker: 10A, 250V (for model GALLEON 2K) 16A, 250V (for model GALLEON 3K)	P
4.7.7 1.7.7/RD	Wiring terminals	Refer below:	P

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Clause	Requirement + Test	Result - Remark	Verdict
1.7.7.1/RD	Protective earthing and bonding terminals ..... :	The earthing terminal is marked with the standard earthing symbol (60417-2-IEC-5019) near the terminal.	P
1.7.7.2/RD	Terminals for a.c. mains supply conductors	The AC terminal is marked with L, N, G symbol near the terminal.	P
1.7.7.3/RD	Terminals for d.c. mains supply conductors	AC main supplied	N
4.7.8	Battery terminals :	The terminal of batteries is marked with standard symbol (IEC 60417, No. 5005 and No. 5006).	P
4.7.9 1.7.8/RD	Controls and indicators	See below	P
1.7.8.1/RD	Identification, location and marking :	The function of controls affecting safety is obvious without knowledge of language etc.	P
1.7.8.2/RD	Colours :	For LCD provided, located on the front panel	P
1.7.8.3/RD	Symbols according to IEC 60417 :	The function switch is marked " " (IEC 60417-1 No. 5010).	P
1.7.8.4/RD	Markings using figures :	No controls affecting safety are using figures.	N
4.7.10 1.7.9/RD	Isolation of multiple power sources :	Only one external supply of hazardous voltage of energy (via appliance inlet).	N
4.7.11 1.7.2.4/RD	IT power systems	TN power system.	N
4.7.12	Protection in building installation	The protection does not rely upon building installation. The protection is provided by circuit breakers.	P
4.7.13 5.1/RD	High leakage current (mA) .....:	Leakage current of the equipment does not exceed 3.5mA. However due to the connected load has influence on the overall earth leakage current, a corresponding statement was provided in the User's Manual.	P
4.7.14 1.7.10/RD	Thermostats and other regulating devices	No thermostats or other regulating devices.	N
4.7.15 1.7.2.1/RD and 1.7.8.1/RD	Language(s) .....:	Instructions and markings shall be in a language acceptable for the country where the equipment is to be used. English user manual provided.	

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Clause	Requirement + Test	Result - Remark	Verdict
4.7.16 1.7.11/RD	Durability of markings	The label was subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15s and then again for 15s with the cloth soaked with petroleum spirit. After this test there was no damage to the label. The marking of the label did not fade. There was neither curling nor lifting of the label edge.	P
4.7.17 1.7.12/RD	Removable parts	Marking is not on the removable parts.	P
4.7.18 1.7.13/RD	Replaceable batteries	The battery is not placed in an operator access area. The required warning is in the safety manual.	P
	Language(s) .....:	Instructions and markings are in English.	
4.7.19 1.7.2.5/RD	Operator access with a tool..... :	All areas containing hazard(s) are inaccessible to the operator.	P
4.7.20	Battery	Pluggable equipment type A UPS with integral batteries.	P
	Clearly legible information .....:	Warning label attached on the outside surface of External battery pack. Information clearly legible	P
	Battery type .....:	Lead-Acid	P
	Nominal voltage of total battery (V) .....:	Stated on rating user's manual.	P
	Nominal capacity of total battery (optional) .....:	Stated on rating user's manual.	P
	Warning label .....:	Warning language with information: Caution: Lead-acid battery inside the enclosure, it may cause chemical hazard. The battery may presents a risk of electric shock and energy hazards. For disposal instructions for the battery, see user's manual.	P
	Instructions .....:	The sufficient information about the battery was given in the user's manual.	P
2.1.1.5/RD	Protection against energy hazards	No energy hazard in operator access area. Checked by means of the test finger.	P
4.7.21 1.7.2.4/RD	Installation instructions	Detailed information regarding external interfaces (USB, RS232 and modem / phoneline connection) provided in the User's Manual.	P

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict
5	FUNDAMENTAL DESIGN REQUIREMENTS		P
5.1	Protection against electric shock and energy hazards		P
5.1.1 2.1.1/RD	Protection for UPS intended to be used in operator access areas	Refer below:	P
2.1.1.1/RD	Access to energized parts	There is adequate protection against operator contact with bare parts at ELV or hazardous voltage or parts separated from these with basic or functional insulation only (except protective earth). No hazardous voltages exceeding 1000V a.c. or 1500V d.c. Checked by test finger, test probe and test pin.	P
	Test by inspection :	Complies	P
	Test with test finger (Figure 2A) :	Complies	P
	Test with test pin (Figure 2B) :	Complies	P
	Test with test probe (Figure 2C) :	No TNV circuits	N
2.1.1.2/RD	Battery compartments	Inside the battery compartment only primary circuits.	N
2.1.1.3/RD	Access to ELV wiring	No internal wiring at ELV accessible to the operator.	N
	Working voltage (Vpeak or Vrms); minimum distance through insulation (mm)		
2.1.1.4/RD	Access to hazardous voltage circuit wiring	No operator accessible hazardous voltage circuit wiring.	N
2.1.1.5/RD	Energy hazards :	The user accessible USB and TNV phoneline ports are isolated from the hazardous energy level of the battery inside the UPS.	P
2.1.1.6/RD	Manual controls	Operator only has access to bare parts of SELV circuits.	P
2.1.1.7/RD	Discharge of capacitors in equipment	The capacitance of the input circuits>0.1uF, refer to list of critical components.	P
	Measured voltage (V); time-constant (s) :	(See appended table 5.1.1)	
2.1.1.8/RD	Energy hazards – d.c. mains supply	The equipment is not connected to d.c. mains supply	N
	a) Capacitor connected to the d.c. mains supply :		N
	b) Internal battery connected to the d.c. mains supply :		N
2.1.1.9/RD	Audio amplifiers :	No such parts.	N
5.1.2 2.1.1.5 c) /RD	Protection for UPS intended to be used in service access areas	Checked by inspection, unintentional contact is unlikely during service operations.	N
	Hazardous energy level		N

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Clause	Requirement + Test	Result - Remark	Verdict
5.1.3 2.1.1.5 c) /RD	Protection for UPS intended to be used in restricted access areas	Not for restricted access area	N
	Hazardous energy level		N
5.1.4	Backfeed protection		
	Shock hazard after de-energization of a.c. input for UPS	No shock hazard	P
	Measured voltage (V); time-constant (s) :	(see appended table 5.8)	
	Description of the construction :	The backfeed protection is achieved through the backfeed relay RY1, the current transformer CT3, and the converter transformer which provides reinforce insulation between the primary and secondary circuits.	P
5.1.5	Emergency switching device	Not mandatory for pluggable UPS.	N
5.2	Requirements for auxiliary circuits		P
5.2.1 2.2/RD	Safety extra low voltage circuit - SELV	See below:	P
2.2.1/RD	General requirements	SELV limits are not exceeded under normal condition.	P
2.2.2/RD	Voltages under normal conditions (V) .....:	Within SELV limits. (See appended table 5.2.1)	P
2.2.3/RD	Voltages under fault conditions (V) .....:	Within SELV limits. (See appended table 5.2.1)	P
2.2.4/RD	Connection of SELV circuits to other circuits .....:	SELV circuits are only connected to other SELV and protective earth.	P
5.2.2 2.3/RD	Telephone network voltage circuits - TNV	Refer below:	N
2.3.1/RD	Limits	No TNV circuits, cl. 2.3/RD	N
	Type of TNV circuits :		
2.3.2/RD	Separation from other circuits and from accessible parts		N
2.3.2.1/RD	General requirements		N
2.3.2.2/RD	Protection by basic insulation		N
2.3.2.3/RD	Protection by earthing		N
2.3.2.4/RD	Protection by other constructions :		N
2.3.3/RD	Separation from hazardous voltages		N
	Insulation employed :		
2.3.4/RD	Connection of TNV circuits to other circuits		N
	Insulation employed :		

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Clause	Requirement + Test	Result - Remark	Verdict
2.3.5/RD	Test for operating voltages generated externally		N
	Test with test probe (Figure 2C) :		N
5.2.3 2.4/RD	Limited current circuits	No limited current circuits, cl. 2.4/RD.	N
2.4.1/RD	General requirements		N
2.4.2/RD	Limit values		
	Frequency (Hz) :		
	Measured current (mA) :		
	Measured voltage (V) :		
	Measured circuit capacitance (nF or μF) :		
2.4.3/RD	Connection of limited current circuits to other circuits		N
5.2.4 3.5/RD	External signalling circuits	Refer to below:	P
3.5.1/RD	General requirements	Considered.	P
3.5.2/RD	Types of interconnection circuits :	SELV circuits.	P
3.5.3/RD	ELV circuits as interconnection circuits	No ELV interconnections.	N
3.5.4/RD	Data ports for additional equipment	Data ports (RS232 or USB) are signal port only, no test required.	P
5.2.5 2.5/RD	Limited power source	No limited power source.	N
	a) Inherently limited output		N
	b) 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), max. output current (A), max. apparent power (VA) .....:		
	Current rating of overcurrent protective device (A)		
5.3	Protective earthing and bonding		P
5.3.1	General	See below.	P
2.6/RD	Provisions for earthing and bonding	Appliance coupler and outlets used	P
2.6.1/RD	Protective earthing	Reliable connection of relevant conductive parts to the PE terminal (via green/yellow insulated wires).	P
2.6.2/RD	Functional earthing	No functional earthing.	N
2.6.3/RD	Protective earthing and protective bonding conductors	Through appliance coupler and outlets used	P
2.6.3.1/RD	General	Compliance checked.	P

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Clause	Requirement + Test	Result - Remark	Verdict
2.6.3.2/RD	Size of protective earthing conductors	Appliance inlet used	P
	Rated current (A), cross-sectional area (mm^2), AWG :	(see appended tabel 4.5)	
2.6.3.3/RD	Size of protective bonding conductors	Refer to 2.6.3.4/RD.	P
	Rated current (A), cross-sectional area (mm^2), AWG :	Refer to 2.6.3.4/RD.	
	Protective current rating (A), cross-sectional area (mm2), AWG :	Refer to 2.6.3.4/RD.	
2.6.3.4/RD	Resistance of earthing conductors and their terminations; resistance ( ), voltage drop (V), test current (A), duration (min):	(See appended table 5.3.1)	P
2.6.3.5/RD	Colour of insulation :	All insulated protective earth conductors are used colored green and yellow.	P
2.6.4/RD	Terminals	See below.	P
2.6.4.1/RD	General	See below.	P
2.6.4.2/RD	Protective earthing and bonding terminals	Adequate protective earth connection, see also Subclause 2.6.3.4/RD and 3.3/RD	P
	Rated current (A), type, nominal thread diameter (mm) :		
2.6.4.3/RD	Separation of the protective earthing conductor from protective bonding conductors	Separate PE and protective bonding conductor used.	N
2.6.5/RD	Integrity of protective earthing	See below.	P
2.6.5.1/RD	Interconnection of equipment	The unit has its own earthing connection. PE terminals of outlets reliably connected to PE terminal of unit	P
2.6.5.2/RD	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/RD	Disconnection of protective earth	Appliance inlet used	P
2.6.5.4/RD	Parts that can be removed by an operator	Appliance inlet, earthing connected before and disconnected after hazardous voltage. No other operator removable parts.	P
2.6.5.5/RD	Parts removed during servicing	It is not necessary to disconnect earthing except for the removal of the earthed part itself.	P
2.6.5.6/RD	Corrosion resistance	All safety earthing connections in compliance with Annex J.	P
2.6.5.7/RD	Screws for protective bonding	No such screw	N

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Clause	Requirement + Test	Result - Remark	Verdict
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system	Protective earthing is not rely on cable distribution system.	N
5.3.2 2.6.1/RD	Protective earthing	Accessible conductive parts are reliably connected to protective earth terminal	P
2.10/RD	Clearances, creepage distances and distances through insulation	See clause 5.7	P
4.2/RD	Mechanical strength	See clause 7.3	P
5.2/RD	Electric strength	See clause 8.2	P
5.3.3	Protective bonding	Refer also to 2.6.3.4/RD	P
5.4	AC and d.c. power isolation		N
5.4.1	General	Only one external supply of hazardous voltage or energy (via appliance inlet).	N
3.4/RD	Disconnection from the mains supply	Appliance coupler used disconnect device.	N
3.4.1/RD	General requirement		N
3.4.2/RD	Disconnect devices		N
3.4.3/RD	Permanently connected equipment		N
3.4.4/RD	Parts which remain energized	No parts remain energized after the disconnect device is pull out.	N
3.4.5/RD	Switches in flexible cords	No such construction.	N
3.4.6/RD	Number of poles - single-phase and d.c. equipment		N
3.4.7/RD	Number of poles - three-phase equipment	Single-phase only.	N
3.4.8/RD	Switches as disconnect devices		N
3.4.9/RD	Plugs as disconnect devices		N
3.4.10/RD	Interconnected equipment		N
3.4.11/RD	Multiple power sources		N
5.4.2	Disconnect devices	Refer to cl. 3.4.2/RD.	N
5.5	Overcurrent and earth fault protection		P
5.5.1	General	See below.	P
2.7.3/RD	Short-circuit backup protection	Pluggable equipment with type A. Building installation is considered as providing short circuit backup protection.	P

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Clause	Requirement + Test	Result - Remark	Verdict
2.7.4/RD	Number and location of protective devices …….:	Over current protection by one built-in input fuse. Protection devices in the building installation considered as providing sufficient protection against earth faults.	P
2.7.5/RD	Protection by several devices	Only one protective device provided.	P
2.7.6/RD	Warning to service personnel :	With for the mains socket being of non-reversible type, hazard may be still present in the equipment after the input circuit breaker opens. However, as it is considered that the plug to the mains will be disconnected during service work. No markings were needed.	N
5.5.2	Basic requirements	Equipment relies on 16A rated input fuse or circuit breaker of the wall outlet installation protection of the building installation in regard to L, N short circuit and for L to PE earth fault. Over current protection is provided by the built-in device AC fuse.	P
5.5.3	Battery circuit protection	Ungrounded battery inside the UPS. Required fuses against - overcurrent: 1 - earth fault: 1 Protection against overcurrent by DC fuse in the positive pole of the battery. However earth faults will be covered by devices in the building installation.	P
5.5.3.1	Overcurrent and earth fault protection	See below.	P
5.5.3.2	Location of protective device	The fuses are directly located behind the supply wire of the battery. The charger circuit is located in the battery circuit before the fuses. For the charger circuit there are no hazardous conditions under any simulated fault conditions. See appended table.	P
5.5.3.3	Rating of protective device	The rating of the fuses inside the UPS provides adequate safety protection during abnormal and/or fault conditions.	P
5.3.1/RD	Protection against overload and abnormal operation	(see appended table 8.3)	P

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Clause	Requirement + Test	Result - Remark	Verdict
5.6	Protection of personnel – Safety interlocks *(No safety interlock provided for operator protection since there are no liable hazards capable of harming the operator during operation).*		N
5.6.1	Operator protection	See below	N
2.8/RD	Safety interlocks	No safety interlocks.	N
2.8.1/RD	General principles		N
2.8.2/RD	Protection requirements		N
2.8.3/RD	Inadvertent reactivation		N
2.8.4/RD	Fail-safe operation		N
2.8.5/RD	Moving parts		N
2.8.6/RD	Overriding		N
2.8.7/RD	Switches and relays		N
2.8.7.1/RD	Contact gaps (mm) :		N
2.8.7.2/RD	Overload test		N
2.8.7.3/RD	Endurance test		N
2.8.7.4/RD	Electric strength test	(see appended table 8.2)	N
2.8.8/RD	Mechanical actuators		N
5.6.2	Service person protection	See below.	P
5.6.2.1	Introduction	Considered	P
5.6.2.2	Covers	It is unlikely that during the removal of any covers service personnel may touch hazardous voltage or energy.	P
5.6.2.3	Location and guarding of parts	Only the exchange of the battery is considered as possible servicing. A risk of injury is unlikely for the service personnel.	P
5.6.2.4	Parts on doors	The UPS is designed with only screwed enclosure parts.	P
5.6.2.5	Component access	No component access during operation mode necessary.	N
2.8.3/RD	Inadvertent reactivation	No servicing in operation mode necessary.	N
5.6.2.6	Moving parts	No hazardous moving parts.	N
5.6.2.7	Capacitor banks	The capacitors provided can produce energy level way below 20 joules.	P
5.6.2.8	Internal batteries	The terminals of the battery connections are isolated and covered so that it is unlikely to bridge the terminals of the battery during servicing or its replacement.	P

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Clause	Requirement + Test	Result - Remark	Verdict

5.7 2.10/RD	Clearances, creepage distances and distances through insulation		P
2.10.1/RD	General	See 2.10.3/RD, 2.10.4/RD and 2.10.5/RD.	P
2.10.1.1/RD	Frequency .....:	Considered.	P
2.10.1.2/RD	Pollution degrees .....:	II	P
2.10.1.3/RD	Reduced values for functional insulation	The functional insulations comply with 5.3.4/RD a) and c)	P
2.10.1.4/RD	Intervening unconnected conductive parts	Considered.	P
2.10.1.5/RD	Insulation with varying dimensions	No such transformer used.	P
2.10.1.6/RD	Special separation requirements	Special separation is not used.	N
2.10.1.7/RD	Insulation in circuits generating starting pulses	No such circuit generating starting pulses.	N
2.10.2/RD	Determination of working voltage	(See appended table 5.7)	P
2.10.2.1/RD	General	See below.	P
2.10.2.2/RD	RMS working voltage	(See appended table 5.7)	P
2.10.2.3/RD	Peak working voltage	(See appended table 5.7)	P
2.10.3/RD	Clearances	See below. Annex G/RD was not considered.	P
2.10.3.1/RD	General	Annex F/RD and minimum clearances considered.	P
2.10.3.2/RD	Mains transient voltages	See below.	P
	a) AC mains supply .....:	Equipment is Overvoltage Category II.	P
	b) Earthed d.c. mains supplies .....:	Not intended for d.c. mains supplies	N
	c) Unearthed d.c. mains supplies :	Not intended for d.c. mains supplies	N
	d) Battery operation :	Dedicated battery used.	P
2.10.3.3/RD	Clearances in primary circuits	(see appended table 5.7)	P
2.10.3.4/RD	Clearances in secondary circuits	(see appended table 5.7)	P
2.10.3.5/RD	Clearances in circuits having starting pulses	No such circuit generating starting pulses.	N
2.10.3.6/RD	Transients from a.c. mains supply :	Considered.	P
2.10.3.7/RD	Transients from d.c. mains supply :	Not connected to d.c. mains supply.	N
2.10.3.8/RD	Transients from telecommunication networks and cable distribution systems :	No TNV circuits	N
2.10.3.9/RD	Measurement of transient voltage levels	Measurement not relevant	N
	a) Transients from a mains supply		N
	For an a.c. mains supply :		N

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Clause	Requirement + Test	Result - Remark	Verdict
	For a d.c. mains supply :		N
	b) Transients from a telecommunication network :		N
2.10.4/RD	Creepage distances	(see appended table 5.7)	P
2.10.4.1/RD	General	See below.	P
2.10.4.2/RD	Material group and comparative tracking index	Material IIIb is used.	P
	CTI tests.....	CTI rating for all material of min. 100.	
2.10.4.3/RD	Minimum creepage distances	(see appended table 5.7)	P
2.10.5 /RD	Solid insulation	Solid or laminated insulating materials having adequate thickness are provided.	P
2.10.5.1/RD	General	See below.	P
2.10.5.2/RD	Distances through insulation	(see appended table 5.8)	P
2.10.5.3/RD	Insulating compound as solid insulation	Approved opto-couplers, see appended table 4.5	P
2.10.5.4/RD	Semiconductor devices	No semiconductor devices.	N
2.10.5.5/RD	Cemented joints	No cemented joint.	N
2.10.5.6/RD	Thin sheet material – General	See below.	P
2.10.5.7/RD	Separable thin sheet material	Thin sheet material in form of polyester tape used in RS232 transformer, converter transformer TX1: A. RS232 transformer interleaved insulation (reinforce insulation) B. RS232 transformer outer windings to core (basic insulation)	P
	Number of layers (pcs).	A, 3 layers B, 2 layers	--
	Electric strength test	AC 3000V for each layer of insulation (See appended table 5.8)	
2.10.5.8/RD	Non-separable thin sheet material	Not used.	N
2.10.5.9/RD	Thin sheet material – standard test procedure		N
2.10.5.10 /RD	Thin sheet material – alternative test procedure		N
	Electric strength test		
2.10.5.11 /RD	Insulation in wound components	See cl. 2.10.5.12/RD	N
2.10.5.12 /RD	Wire in wound components	Triple insulated wiring is not used for supplementary or reinforced insulation.	N
	Working voltage :		

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Clause	Requirement + Test	Result - Remark	Verdict
	a) Basic insulation not under stress :		N
	b) Basic, supplementary, reinforced insulation :		N
	c) Compliance with Annex U :		N
	Two wires in contact inside wound component; angle between 45º and 90º :	Insulation sheets and tapes used to relieve mechanical stress at crossover points.	N
2.10.5.13 /RD	Wire with solvent-based enamel in wound components	No wire with solvent-based enamel in wound components.	N
	Electric strength test	(see appended table 8.2)	
	Routine test		N
2.10.5.14 /RD	Additional insulation in wound components	No additional insulation used.	N
	Working voltage :		
	- Basic insulation not under stress :		N
	- Supplementary, reinforced insulation :		N
2.10.6/RD	Construction of printed boards	See below.	P
2.10.6.1/RD	Uncoated printed boards	(see appended table 5.7)	P
2.10.6.2/RD	Coated printed boards	No such part.	N
2.10.6.3/RD	Insulation between conductors on the same inner surface of a printed board	No such part.	N
2.10.6.4/RD	Insulation between conductors on different layers of a printed board	PCB layout does not serve as insulation barrier.	N
	Distance through insulation		N
	Number of insulation layers (pcs) :		N
2.10.7/RD	Component external terminations	No such part.	N
2.10.8/RD	Tests on coated printed boards and coated components	No such part.	N
2.10.8.1/RD	Sample preparation and preliminary inspection		N
2.10.8.2/RD	Thermal conditioning		N
2.10.8.3/RD	Electric strength test		
2.10.8.4/RD	Abrasion resistance test		N
2.10.9/RD	Thermal cycling		N
2.10.10/RD	Test for Pollution Degree 1 environment and insulating compound	Approved opto-couplers, see appended table 4.5	P
2.10.11/RD	Tests for semiconductor devices and cemented joints	No such device used.	N
2.10.12/RD	Enclosed and sealed parts	Approved opto-couplers, see appended table 4.5	P

6	Wiring, connections and supply		P
6.1	General	Considered.	P

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Clause	Requirement + Test	Result - Remark	Verdict
6.1.1	Introduction	Considered.	P
3.1/RD	General	See below.	P
3.1.1/RD	Current rating and overcurrent protection	All internal wires are UL recognized wiring which is PVC insulated. Rated VW-1, 600V, minimum 105°C. Internal wiring gauge is suitable for current intended to be carried. Internal wiring for primary power distribution protected against overcurrent by built-in input fuse.	P
3.1.2/RD	Protection against mechanical damage	Wireways 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/RD	Securing of internal wiring	Internal wiring is secured against excessive strain, loosening of terminals and damage to the conductor insulation.	P
3.1.4/RD	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/RD	Beads and ceramic insulators	No beads or similar ceramic insulators on conductors.	N
3.1.6/RD	Screws for electrical contact pressure	Electrical and earthing connections screwed two or more complete threads into metal. No screws of insulating material for electrical and earthing connections, or where supplementary or reinforced insulation could be impaired by a metal replacement.	P
3.1.7/RD	Insulating materials in electrical connections	All current carrying and safety earthing connections are metal to metal.	P
3.1.8/RD	Self-tapping and spaced thread screws	Self-tapping screws provided in inverter circuit and earthing bonding.	P
3.1.9/RD	Termination of conductors	All conductors are reliable secured by the use of solder pins or glue or other mechanical fixing means. No risk of stranded conductors coming loose.	P
	10 N pull test	Break away or pivot on its terminal is unlikely.	P

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Clause	Requirement + Test	Result - Remark	Verdict
3.1.10/RD	Sleeving on wiring	Sleeving used to provide supplementary/ reinforce insulation.	P
6.1.2	Dimensions and rating of busbars and insulated conductors		P
6.2	Connection to power		P
6.2.1	General provisions for connection to power		P
3.2.2/RD	Multiple supply connections	Only one supply connections.	P
3.2.3/RD	Permanently connected equipment	Pluggable equipment type A	N
	Number of conductors, diameter of cable and conduits (mm) .....:		
3.2.4/RD	Appliance inlets	The appliance inlet complies with IEC/EN 60320. The power cord can be inserted without difficulties and does not support the unit.	P
3.2.5/RD	Power supply cords	See below.	P
3.2.5.1/RD	AC power supply cords	Approved power cord set with suitable electrical ratings for use in the UPS.	P
	Type .....:	PVC insulated power cord type H05VV-F or IEC 60227 (designation 60227 IEC 53	
	Rated current (A), cross-sectional area (mm²), AWG .:	3G 0.75mm^2 with a rating of at least 10A	
3.2.5.2/RD	DC power supply cords	Not connected to DC power supply cords.	N
3.2.6/RD	Cord anchorages and strain relief		N
	Mass of equipment (kg), pull (N) .....:		
	Longitudinal displacement (mm) .....:		
3.2.7/RD	Protection against mechanical damage	No parts under this unit likely to damage the power supply cord. Enclosure without sharp edges.	P
3.2.8/RD	Cord guards	Appliance inlet and outlets used.	N
	Diameter or minor dimension D (mm); test mass (g) .:		
	Radius of curvature of cord (mm).....:		
6.2.2	Means of connection :	Appliance inlet.	P
	More than one supply connection :	Single voltage range supply connection.	N
6.3	Wiring terminals for external power conductors *(No wiring terminals for external power conductors)*		N
3.3/RD	Wiring terminals for connection of external conductors		N

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Clause	Requirement + Test	Result - Remark	Verdict
3.3.1/RD	Wiring terminals		N
3.3.2/RD	Connection of non-detachable power supply cords		N
3.3.3/RD	Screw terminals		N
3.3.4/RD	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross-sectional area (mm2).....:		
3.3.5/RD	Wiring terminal sizes		N
	Rated current (A), type, nominal thread diameter (mm) .....:		
3.3.6/RD	Wiring terminal design		N
3.3.7/RD	Grouping of wiring terminals		N
3.3.8/RD	Stranded wire		N
7	Physical requirements		P
7.1	Enclosure	Adequate protection against risk of fire, electric shock, injury to persons and hazardous energy level.	P
7.2 4.1/RD	Stability		P
	Angle of 10	All models of the UPS do not overbalance when tilted to an angle of 10 degree.	P
	Test force (N) :		N
7.3 4.2/RD	Mechanical strength		P
4.2.1/RD	General	Tests performed and passed. Results see below. After the tests, unit complied with the requirements of sub-clauses 2.1.1/RD, 2.6.1/RD, 2.10/RD and 4.4.1/RD.	P
4.2.2/RD	Steady force test, 10 N	10 N applied to components.	P
4.2.3/RD	Steady force test, 30 N	30 N applied to parts inside the UPS.	P
4.2.4/RD	Steady force test, 250 N	250 N applied to outer enclosure. No energy or other hazards.	P
4.2.5/RD	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 result from steel sphere ball swung test.	P

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Clause	Requirement + Test	Result - Remark	Verdict
4.2.6/RD	Drop test; height (mm) :	Drop test not applicable	N
4.2.7/RD	Stress relief test	Test is carried out at 70°C / 7h. No risk of shrinkage or distortion on enclosures due to release of internal stresses.	P
4.2.8/RD	Cathode ray tubes	CRT(s) not used in the equipment.	N
	Picture tube separately certified :		N
4.2.9/RD	High pressure lamps	No high pressure lamps in the equipment.	N
4.2.10/RD	Wall or ceiling mounted equipment; force (N) :	No wall or ceiling mounted equipment	N
7.4	Construction details		P
7.4.1	Introduction	Considered.	P
4.3.1/RD	Edges and corners	All edges and corners are rounded and/or smoothed.	P
4.3.2/RD	Handles and manual controls; force (N) ..... :	No loosening of any knobs.	P
4.3.3/RD	Adjustable controls	No hazardous adjustable controls.	P
4.3.4/RD	Securing of parts	No loosening of parts impairing creepage distances or clearances is likely to occur.	P
4.3.5/RD	Connection by plugs and sockets	No mismatch of connectors, plugs or sockets possible.	P
4.3.7/RD	Heating elements in earthed equipment	No heating elements provided.	N
4.3.11/RD	Containers for liquids or gases	The equipment does not contain flammable liquids or gases.	N
4.4/RD	Protection against hazardous moving parts	No moving parts.	P
4.4.1/RD	General	DC fan located at secondary circuit. The enclosure of the unit provide as fan guard. Test finger applied to openings. No fan blade accessible.	P
4.4.2/RD	Protection in operator access areas :	See 4.4.1	P
4.4.3/RD	Protection in restricted access locations :	Not for restricted access locations.	P
4.4.4/RD	Protection in service access areas	See 4.4.1	P
4.5/RD	Thermal requirements	Considered	P
4.5.1/RD	General	See below.	P
4.5.2/RD	Temperature tests	(See appended table 7.7)	P
	Normal load condition per Annex L :		
4.5.3/RD	Temperature limits for materials	(See appended table 7.7)	P
4.5.4/RD	Touch temperature limits	(See appended table 7.7)	P

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Clause	Requirement + Test	Result - Remark	Verdict
4.5.5/RD	Resistance to abnormal heat :		P
7.4.2	Openings	(See appended table 7.4.2)	P
7.4.3	Gas Concentration	The ventilation by openings exceeds the required airflow. Refer to Annex M.	P
7.4.4	Equipment movement		P
7.5 4.7/RD	Resistance to fire		P
4.7.1/RD	Reducing the risk of ignition and spread of flame	Use of materials with the required flammability classes	P
	Method 1, selection and application of components wiring and materials	Method 1 is used. No excessive temperatures. No easily burning materials employed. Safety relevant components used within their specified temperature limits.	P
	Method 2, application of all of simulated fault condition tests		N
4.7.2/RD	Conditions for a fire enclosure	See below.	P
4.7.2.1/RD	Parts requiring a fire enclosure	Will having the following parts: Components in primary The fire enclosure is required.	P
4.7.2.2/RD	Parts not requiring a fire enclosure	The fire enclosure is required to cover all parts.	N
4.7.3/RD	Materials	See below.	P
4.7.3.1/RD	General	PCB rated V-0. See appended table.	P
4.7.3.2/RD	Materials for fire enclosures	Metal enclosure. (See appended table 4.3)	P
4.7.3.3/RD	Materials for components and other parts outside fire enclosures	See sub-clause 4.7.2/RD	N
4.7.3.4/RD	Materials for components and other parts inside fire enclosures	Internal components except small parts are V-2, HF-2 or better.	P
4.7.3.5/RD	Materials for air filter assemblies	No air filters in the equipment.	N
4.7.3.6/RD	Materials used in high-voltage components	No parts exceeding 4kV.	N
7.6	Battery location		P
7.6.1	Battery location and installation	Batteries are located inside the UPS enclosure.	P
7.6.2	Accessibility and maintainability	Maintenance free battery. The battery is connected by quick connect terminals (no necessary tightening).	P

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Clause	Requirement + Test	Result - Remark	Verdict
7.6.3	Distance	The temperature of the electrolyte and the gas emission are within the limits of this standard.	P
7.6.4	Case insulation	No Ni-Cd battery used inside.	N
7.6.5	Wiring	The protection of connecting wiring complies with subclause 6, details see there.	P
7.6.6	Electrolyte spillage	Sealed maintenance free battery, the emission of electrolyte is unlikely.	P
7.6.7	Ventilation	Comply with Annex M.2	P
7.6.8	Charging voltage	Protective circuit to prevent excessive charging voltages occurring under any single fault condition. See sub-clause 8.3	P
7.7	Temperature rise		P
4.5/RD	Thermal requirements	Considered	P
4.5.1/RD	General	See below.	P
4.5.2/RD	Temperature tests	(See appended table 7.7)	P
	Normal load condition per Annex L .....:		—
4.5.3/RD	Temperature limits for materials	(See appended table 7.7)	P
4.5.4/RD	Touch temperature limits	(See appended table 7.7)	P
4.5.5/RD	Resistance to abnormal heat .....:	(See appended table 7.4)	P
8	Electrical requirements and simulated abnormal conditions		P
8.1	General provisions for earth leakage		P
5.1.1/RD	General	Test conducted in accordance with Sub-clause 8.1	P
5.1.7/RD	Equipment with touch current exceeding 3,5 mA		P
8.2 5.2/RD	Electric strength		P
5.2.1/RD	General	(see appended table 8.2)	P
5.2.2/RD	Test procedure	(see appended table 8.2)	P
8.3	Abnormal operating and fault conditions		P
8.3.1	General	Considered.	P
5.3.1/RD	Protection against overload and abnormal operation	(See appended table 8.3)	P
5.3.2/RD	Motors	(See appended Annex B)	P
5.3.3/RD	Transformers	(See appended Annex C)	P

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Clause	Requirement + Test	Result - Remark	Verdict
5.3.4/RD	Functional insulation :	Complies with a) and c).	P
5.3.5/RD	Electromechanical components	No electromechanical components in secondary circuits.	N
5.3.9/RD	Compliance criteria for abnormal operating and fault conditions	No fire or molten metal occurred and no deformation of enclosure during the tests. No reduction of clearance and creepage distances. Electric strength test is made on basic, supplementary and reinforced insulation.	P
8.3.2	Simulation of faults	(See appended table 8.3)	P
8.3.3	Conditions for tests	(See appended table 8.3)	P
9 6/RD	Connection to telecommunication networks		P
6.1/RD	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		P
6.1.1/RD	Protection from hazardous voltages		P
6.1.2/RD	Separation of the telecommunication network from earth		P
6.1.2.1/RD	Requirements	No bridging components between TNV circuit and earth, only creepage and clearance distance applied.	P
	Supply voltage (V) .....:		
	Current in the test circuit (mA) .....:		
6.1.2.2/RD	Exclusions .....:		N
6.2/RD	Protection of equipment users from overvoltages on telecommunication networks		P
6.2.1/RD	Separation requirements	Basic insulation between TNV-3 circuit and accessible parts and SELV interfaces and earthing.	P
6.2.2/RD	Electric strength test procedure	See subclause 6.2.2.2/RD	P
6.2.2.1/RD	Impulse test		N
6.2.2.2/RD	Steady-state test	For details see sub-clause 6.1.2.1/RD	P
6.2.2.3/RD	Compliance criteria	Complied for test of subclause 6.2.2.2/RD	P
6.3/RD	Protection of the telecommunication wiring system from overheating		N
	Max. output current (A) .....:		
3.5/RD	Interconnection of equipment		N
3.5.1/RD	General requirements		N
3.5.2/RD	Types of interconnection circuits .....:		N
3.5.3/RD	ELV circuits as interconnection circuits		N

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Clause	Requirement + Test	Result - Remark	Verdict
3.5.4/RD	Data ports for additional equipment		N
2.1.3/RD	Protection in restricted access locations		N
2.3.1/RD	Limits		N
	Type of TNV circuits.....:		
2.3.2/RD	Separation from other circuits and from accessible parts		N
2.3.2.1/RD	General requirements		N
2.3.2.2/RD	Protection by basic insulation		N
2.3.2.3/RD	Protection by earthing		N
2.3.2.4/RD	Protection by other constructions .....:		N
2.3.3/RD	Separation from hazardous voltages		N
	Insulation employed.....:		
2.3.4/RD	Connection of TNV circuits to other circuits		N
	Insulation employed.....:		
2.3.5/RD	Test for operating voltages generated externally		N
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system		N
2.10.3.3/RD	Clearances in primary circuits	(see appended table 5.7)	N
2.10.3.4/RD	Clearances in secondary circuits	(see appended table 5.7)	N
2.10.4/RD	Creepage distances		N
2.10.4.1/RD	General		N
2.10.4.2/RD	Material group and comparative tracking index		N
	CTI tests.....:		
2.10.4.3/RD	Minimum creepage distances		N
M/RD	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1/RD)		N
M.1/RD	Introduction		N
M.2 /RD	Method A		N
M.3/RD	Method B		N
M.3.1/RD	Ringing signal		N
M.3.1.1/RD	Frequency (Hz) .....:		
M.3.1.2/RD	Voltage (V) .....:		
M.3.1.3/RD	Cadence; time (s), voltage (V) .....:		
M.3.1.4/RD	Single fault current (mA) .....:		
M.3.2/RD	Tripping device and monitoring voltage .....:		N
M.3.2.1/RD	Conditions for use of a tripping device or a monitoring voltage		
M.3.2.2/RD	Tripping device		N
M.3.2.3/RD	Monitoring voltage (V) .....:		N

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Clause	Requirement + Test	Result - Remark	Verdict
A/RD	Annex A, Tests for resistance to heat and fire		N
A.1/RD	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2/RD)		N
A.1.1/RD	Samples.....:		
	Wall thickness (mm).....:		
A.1.2/RD	Conditioning of samples; temperature (C) .....:		N
A.1.3/RD	Mounting of samples .....:		N
A.1.4/RD	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D .....:		
A.1.5/RD	Test procedure		N
A.1.6/RD	Compliance criteria		N
	Sample 1 burning time (s).....:		
	Sample 2 burning time (s).....:		
	Sample 3 burning time (s).....:		
A.2/RD	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/RD and 4.7.3.4/RD)		N
A.2.1/RD	Samples, material.....:		
	Wall thickness (mm).....:		
A.2.2/RD	Conditioning of samples; temperature (°C) .....:		N
A.2.3/RD	Mounting of samples .....:		N
A.2.4/RD	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C .....:		
A.2.5/RD	Test procedure		N
A.2.6/RD	Compliance criteria		N
	Sample 1 burning time (s).....:		
	Sample 2 burning time (s).....:		
	Sample 3 burning time (s).....:		
A.2.7/RD	Alternative test acc. to IEC 60695-11-5, cl. 5 and 9		N
	Sample 1 burning time (s).....:		
	Sample 2 burning time (s).....:		
	Sample 3 burning time (s).....:		
A.3/RD	Hot flaming oil test (see 4.6.2/RD)		N
A.3.1/RD	Mounting of samples		N
A.3.2/RD	Test procedure		N
A.3.3/RD	Compliance criterion		N

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Clause	Requirement + Test	Result - Remark	Verdict
B/RD	Annex B, Motor tests under abnormal conditions (see 4.7.2.2/RD and 5.3.2/RD)		P
B.1/RD	General requirements	All fans are separately certified, see list of critical components. Only fan block test performed, for temperature, see fault condition tests	P
	Position .....:		
	Manufacturer .....:		
	Type .....:		
	Rated values .....:		
B.2/RD	Test conditions		N
B.3/RD	Maximum temperatures		N
B.4/RD	Running overload test		N
B.5/RD	Locked-rotor overload test		N
	Test duration (days) .....:		
	Electric strength test: test voltage (V) .....:		
B.6/RD	Running overload test for d.c. motors in secondary circuits		N
B.6.1/RD	General		N
B.6.2/RD	Test procedure		N
B.6.3/RD	Alternative test procedure		N
B.6.4/RD	Electric strength test; test voltage (V) .....:		N
B.7/RD	Locked-rotor overload test for d.c. motors in secondary circuits		N
B.7.1/RD	General		N
B.7.2/RD	Test procedure		N
B.7.3/RD	Alternative test procedure		N
B.7.4/RD	Electric strength test; test voltage (V) .....:		N
B.8/RD	Test for motors with capacitors		N
B.9/RD	Test for three-phase motors		N
B.10/RD	Test for series motors		N
	Operating voltage (V) .....:		
C/RD	Annex C, Transformers (see 1.5.4/RD and 5.3.3/RD)		P
	Position .....:	TX1 on CNTL PCB	
	Manufacturer .....:	See table 1.5.1	
	Type .....:	See table 1.5.1	
	Rated values .....:	See table 1.5.1	

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Clause	Requirement + Test	Result - Remark	Verdict
	Method of protection .....:	By protection circuit	
C.1/RD	Overload test	(see appended table 5.3)	P
C.2/RD	Insulation	(see appended tables 5.2 and C2)	P
	Protection from displacement of windings .....:	By bobbin and insulation tape	P
D/RD	Annex D, Measuring instruments for touch current tests (see 5.1.4/RD)		P
D.1/RD	Measuring instrument		P
D.2/RD	Alternative measuring instrument		N
E/RD	Annex E, Temperature rise of a winding (see 1.4.13/RD)		N
F/RD	Annex F, Measurements of clearances and creepage distance (see 2.10/RD and Annex G/RD)		P
G/RD	Annex G, Alternative method for determining minimum clearances		N
G.1/RD	Clearances		N
G.1.1/RD	General		N
G.1.2/RD	Summary of the procedure for determining minimum clearances		N
G.2/RD	Determination of mains transient voltage (V)		N
G.2.1/RD	AC mains supply .....:		N
G.2.2/RD	Earthed d.c. mains supplies .....:		N
G.2.3/RD	Unearthed d.c. mains supplies .....:		N
G.2.4/RD	Battery operation .....:		N
G.3/RD	Determination of telecommunication network transient voltage (V) .....:		N
G.4/RD	Determination of required withstand voltage (V)		N
G.4.1/RD	Mains transients and internal repetitive peaks .....:		N
G.4.2/RD	Transients from telecommunication networks .....:		N
G.4.3/RD	Combination of transients		N
G.4.4/RD	Transients from cable distribution systems		N
G.5/RD	Measurement of transient voltages (V)		N
	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
G.6/RD	Determination of minimum clearances .....:		N

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Clause	Requirement + Test	Result - Remark	Verdict
H	Annex H, Guidance on protection against ingress of water and foreign objects (see IEC 60529)		N
I	Annex I, Backfeed protection test		P
I.1	General		P
I.2	Test for pluggable UPS	Backfeed relay provided.	P
I.3	Test for permanently connected UPS		N
I.4	Load-induced change of reference potential		N
I.5	Solid-state backfeed protection (see clause 7.1-7.5 of IEC 62040-2 and clause 7.1-7.2 of IEC 62040-3)		N
J/RD	Annex J, Table of electrochemical potentials (see 2.6.5.6/RD)		P
	Metal(s) used .....:	Copper plated with tin and soldering lead.	
K/RD	Annex K, Thermal controls (see 1.5.3/RD and 5.3.8/RD)		N
K.1/RD	Making and breaking capacity		N
K.2 /RD	Thermostat reliability; operating voltage (V) .....:		N
K.3/RD	Thermostat endurance test; operating voltage (V) ..:		N
K.4/RD	Temperature limiter endurance; operating voltage (V) .....:		N
K.5/RD	Thermal cut-out reliability		N
K.6/RD	Stability of operation		N
L	Annex L, Reference loads		P
L.1	General		P
L.2	Reference resistive load		N
L.3	Reference inductive-resistive load		
L.4	Reference capacitive-resistive loads	Worst case power factors as specified by the manufacturer maintained during the relevanttests.	P
L.5	Reference non-linear load		N
L.5.1	Test method		N
L.5.2	Connection of the non-linear reference load		
M	Annex M, Ventilation of battery compartments		P

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Clause	Requirement + Test	Result - Remark	Verdict
M.1	General	Sufficient openings and a suitable arrangement of components (relays) are provided in such a way that a local concentration of hydrogen and oxygen is not possible. No requirement regarding the separation of operational arcing parts from battery vents/valves.	P
M.2	Normal conditions	See M.1 above.	P
M.3	Blocked conditions	See appended table 8.3.	P
M.4	Overcharge conditions		N
N	Annex N, Minimum and maximum cross-sections of copper conductors suitable for connection (see 6.3)		N
U/RD	Annex U, Insulated winding wires for use without interleaved insulation (see 2.10.5.4/RD)		N
V/RD	Annex V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1/RD)		P
V.1/RD	Introduction		P
V.2/RD	TN power distribution systems	See sub-clause 1.6.1/RD.	P

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Whole unit					
Battery (six provided, model 3kVA)	YUASA	NPW45-12	12V, 45W/Cell, HB	--	UL MH28204
(Alternative)	SHIMASTU ELECTRONIC TECHNOLOGY LTD	NP 9.0-12	12 V, 9AH, HB	--	UL MH28269
(Alternative)	SHENZHEN CENTER POWER TECHNOLOGY CO LTD	CP1208	12 V, 9AH, HB	--	UL MH25860
(Alternative)	SHENZHEN LEOCH BATTERIES TECHNOLOGY CO LTD	DJW12-10	12 V, 9AH, HB	--	UL MH26866
(Alternative)	CSB	HR 1234W	12V, 34W, HB	--	UL MH14533
(Alternative)	SHENZHEN RITAR POWER CO LTD	RT1290	12 V, 9AH, HB	--	UL MH28539
Battery (six provided, model 2kVA)	YUASA	NPW36-12	12V, 36W/Cell, HB	--	UL MH28204
(Alternative)	SHIMASTU ELECTRONIC TECHNOLOGY LTD	NP 7.2-12	12 V, 7.2AH, HB	--	UL MH28269
(Alternative)	SHENZHEN CENTER POWER TECHNOLOGY CO LTD	CP1207	12 V, 7AH, HB	--	UL MH25860
(Alternative)	SHENZHEN LEOCH BATTERIES TECHNOLOGY CO LTD	DJW12-7.2	12 V, 7.2AH, HB	--	UL MH26866
(Alternative)	CSB	GP 1272 28W	12V 28W	--	UL MH14533
(Alternative)	CSB	GP 1272	12V 7.2AH	--	UL MH14533

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
(Alternative)	SHENZHEN RITAR POWER CO LTD	RT1270	12V, 7AH, HB	--	UL MH28539
Appliance inlet(for IEC type, model 3KVA)	RONGFENG	SS-3B	AC250V, 16A	EN60320-1	VDE
(Alternative)	TECX-UNIONS Technology Corporation	TU-320-W	AC250V, 16A	EN60320-1	TUV
(Alternative)	Rich Bay Co., Ltd.	R-305SN2	AC250V, 16A	EN60320-1	VDE
Appliance inlet(for IEC type, model 2KVA)	RONGFENG	SS-120	AC250V, 10A	EN60320-1	VDE
(Alternative)	TECX-UNIONS Technology Corporation	TU-301-S	AC250V, 10A	EN60320-1 IEC60320-1	VDE
(Alternative)	Shenzhen Delikang Electronics Technology Co. Ltd.	CDJ-3	AC250V, 10A	EN60320-1	VDE
(Alternative)	Rich Bay Co., Ltd.	R-301SN	AC250V, 10A	EN60320-1	VDE
Appliance outlet	RONGFENG	742W-3P-15-C3NA	AC250V, 10A	EN60320-1	VDE
(Alternative)	TECX-UNIONS Technology	TU-302-S3	AC250V, 10A	EN60320-1	VDE
(Alternative)	Shenzhen Delikang Electronics Technology Co. Ltd.	CDJ-3-2	AC250V, 10A	EN60320-1	VDE
(Alternative)	Rich Bay Co., Ltd.	R-302G3	AC250V, 10A	EN60320-1	VDE
Enclosure	LG CHEMICAL LTD	AF310, AF310HT, AF312C	V-0, 80℃, Min. thickness 2.5mm	--	UL E67171
(Alternative)	CHIMEI	PA765A PA757A	V-0, 80℃, Min. thickness 2.5mm	--	UL E56070

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Switch knob	LG CHEMICAL LTD	AF310, AF310HT, AF312C	V-0, 80℃, Min. thickness 2.5mm	--	UL E67171
(Alternative)	CHIMEI	PA765A PA757A	V-0, 80℃, Min. thickness 2.5mm	--	UL E56070
Heat-shrinkable tube	Various	Various	600, 125℃	--	UL
Ouput terminal block	SCED	WP-03P	3P 24A	--	VDE
Main board					
Inverter IGBT (Q7, Q8, Q13, Q14)	APEC	AP30G120ASW	1200V, 30A	--	--
PFC IGBT	infineon	IGW30N100T	1000V,30A	--	--
Converter MOSFETs	IR	IRF3710	100V, 57A	--	--
PCB	Various	Various	V-0, 130℃	--	UL
Enclosure	LG CHEMICAL LTD	AF310, AF310HT, AF312C	V-0, 80℃, Min. thickness 2.5mm	--	UL E67171
(Alternative)	CHIMEI	PA765A PA757A	V-0, 80℃, Min. thickness 2.5mm	--	UL E56070
Switch knob	LG CHEMICAL LTD	AF310, AF310HT, AF312C	V-0, 80℃, Min. thickness 2.5mm	--	UL E67171
(Alternative)	CHIMEI	PA765A PA757A	V-0, 80℃, Min. thickness 2.5mm	--	UL E56070
Battery fuse (F2, F3 for model 3KVA)	HOLLYFUSE	65NM-300H	125Vdc, 30A	--	UL E156471
(Alternative)	BUSSMANN	ABC-30-R	125Vdc, 30A		UL E19180
Battery fuse (F2, F3 for model 2KVA)	HOLLYFUSE	65NM-200H	125Vdc,20A	--	UL E156471
(Alternative)	BUSSMANN	ABC-20-R	125Vdc,20A		UL E19180
Input fuse (F1 for model 3KVA)	HOLLYFUSE	65NM(P)-200H	250Vac,20A	--	UL E156471

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
(Alternative)	BUSSMANN	ABC-V-20-R	250Vac,20A		UL E19180
Input fuse(F1 for model 2KVA)	HOLLYFUSE	65NM(P)-150H	250Vac,15A	--	UL E156471
(Alternative)	BUSSMANN	ABC-V-15-R	250Vac,15A		UL E19180
Fuse on charger	HOLLYFUSE	42NM(P)-030H2	250Vac,2A	--	UL E156471
(Alternative)	SUN FUSE	5RP-G	250Vac,2A		UL E166522
Fuse on super charger	HOLLYFUSE	50F-063H	250Vac,6.3A	--	UL E156471, VDE
(Alternative)	BUSSMANN	S500-6.3-R	250Vac,6.3A	EN60127-1 EN60127-2	UL E19180 VDE
Input breaker for model 3KVA	KUOYUH W L ENTERPRISE CO LTD	88-16-P1B14-P0W	AC250V, 16A	--	UL E155159
(Alternative)	RONG FENG INDUSTRIAL CO LTD	RFMB	AC250V, 16A	--	UL E142783
(Alternative)	YEU SHENG ELECTRIC CO	MB	AC250V, 15A	--	UL E209138, TUV
Input breaker for model 2KVA	SCHURTER AG	T9-611P	10A, 240VAC	--	UL E71572, TUV
Input Relay (RY1)	Song Chuan Precision Co., Ltd	841-P-2A-C-H	12VDC, 25A/220VAC	--	TÜV, UL E88991
(Alternative)	XIAMEN HONGFA ELECTROACOUSTIC CO LTD	HF116F-1/012DA-2HTFW	12VDC, 25A/220VAC	--	UL E134517 TUV R50031086
Output relay (RY2)	Song Chuan Precision Co., Ltd	793-P-1C-F	6VDC 16A/240VAC 1C;	--	TÜV, UL E88991
(Alternative)	XIAMEN HONGFA ELECTROACOUSTIC CO LTD	HF14FW/006-ZTF	6VDC 16A/240VAC 1C;	--	UL E134517, VDE

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Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Varistor (MOV1)	Joyin Company Ltd.	JVR14N511K	511Vdc	CECC 42000/A1, 1978 CECC 42200/A1, 1986 CECC 42201/A1, 1986 IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE
(Alternative)	Thinking Electronic Industrial Co., Ltd.	TVR14511K	510Vdc	CECC42000/ A1:1978, CECC42200/ A1:1986, CECC42201/ A1:1986	VDE
(Alternative)	Ceramate Techn. Co., Ltd.	GNR 14D511K	510Vdc	CECC42000/ A1:1978, CECC42200/ A1:1986, CECC42201/ A1:1986	VDE
(Alternative)	Ceramate Techn. Co., Ltd.	NFV 14D511K	510Vdc	CECC42000/ A1:1978, CECC42200/ A1:1986, CECC42201/ A1:1986	VDE
(Alternative)	Centra Science Corp.	CNR-14D511K	510Vdc	CECC42000/ A1:1978, CECC42200/ A1:1986, CECC42201/ A1:1986	VDE
Converter transformer TX2 (for model 3KVA)	Click technology(shenzhen) CO.LTD	41-040056-00G	Class B	--	Tested in appliance
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-040056-00G	Class B	--	Tested in appliance
(Alternative)	ZHUHAI LION CO.,LTD	41-040056-00G	Class B	--	Tested in appliance

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Converter transformer TX2 (for model 2KVA)	Click technology(shenzhen) CO.LTD	41-040057-00G	Class B	--	Tested in appliance
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-040057-00G	Class B	--	Tested in appliance
(Alternative)	ZHUHAI LION CO.,LTD	41-040057-00G	Class B	--	Tested in appliance
Choke (L6)	Click technology(shenzhen) CO.LTD	41-020003-00G	130℃	--	Tested in equipment
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-020003-00G	130℃	--	Tested in equipment
(Alternative)	ZHUHAI LION CO.,LTD	41-020003-00G	130℃	--	Tested in equipment
Choke (L7)	Click technology(shenzhen) CO.LTD	41-020004-00G	130℃	--	Tested in equipment
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-020004-00G	130℃	--	Tested in equipment
(Alternative)	ZHUHAI LION CO.,LTD	41-020004-00G	130℃	--	Tested in equipment
Choke (L9)	Click technology(shenzhen) CO.LTD	41-020003-00G	130℃	--	Tested in equipment
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-020003-00G	130℃	--	Tested in equipment
(Alternative)	ZHUHAI LION CO.,LTD	41-020003-00G	130℃	--	Tested in equipment
CT transformer (CT3)	Click technology(shenzhen) CO.LTD	41-020003-00G	Class B	--	Tested in equipment
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-020003-00G	Class B	--	Tested in equipment
(Alternative)	ZHUHAI LION CO.,LTD	41-020003-00G	Class B	--	Tested in equipment

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Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
X2 Capacitor (C3)	Dain Electronics Co. Ltd.	MPX	AC275V, 2.2uF	EN132400: 1995-03, IEC60384-14	VDE
(Alternative)	Tenta Electric Industrial Co. Ltd.	MEX	AC275V, 2.2uF	IEC60384-14	VDE
(Alternative)	Farad Electronics Co. Ltd	PXK	AC275V, 2.2uF	IEC60384-14	VDE
(Alternative)	Shenzhen shengxin capacitor co LTD	MEX	AC275V, 2.2uF	IEC60384-14	VDE
Y2 Capacitor (C5, C6)	Various	Various	AC250V, 10000pF	EN132400: 1995-03, IEC60384-14	VDE
Y2 Capacitor (C1, C2)	Various	Various	AC250V, 4700pF	EN132400: 1995-03, IEC60384-14	VDE
Charger transformer	Click technology(shenzhen) CO.LTD	41-040049-00G	Class B	--	Tested in equipment
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-040049-00G	Class B	--	Tested in equipment
(Alternative)	ZHUHAI LION CO.,LTD	41-040049-00G	Class B	--	Tested in equipment
CNTL board					
RS232 transformer (TX1)	Click technology(shenzhen) CO.LTD	BCK1601-821	Class B	--	Tested in equipment
Optocoupler (U5, U6, U8, U9, U10, U12, U22, U23, U24, U25)	COSMO Electronics Corporation	KP1010	Dti>0.4mm	--	VDE
(Alternative)	EVERLIGHT	EL817	Dti>0.4mm	--	VDE
(Alternative)	NEC	PS2561	Dti>0.4mm	--	VDE
Input EMI board					
X2 Capacitor (C3)	Dain Electronics Co. Ltd.	MPX	AC275V, 2.2uF	EN132400: 1995-03, IEC60384-14	VDE
(Alternative)	Tenta Electric Industrial Co. Ltd.	MEX	AC275V, 2.2uF	IEC60384-14	VDE

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
(Alternative)	Farad Electronics Co. Ltd	PXK	AC275V, 2.2uF	IEC60384-14	VDE
(Alternative)	Shenzhen shengxin capacitor co LTD	MEX	AC275V, 2.2uF	IEC60384-14	VDE
Varistor (MOV1, MOV2)	Joyin Company Ltd.	JVR14N511K	511Vdc	CECC 42000/A1, 1978 CECC 42200/A1, 1986 CECC 42201/A1, 1986 IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE
(Alternative)	Thinking Electronic Industrial Co., Ltd.	TVR14511K	510Vdc	CECC42000/ A1:1978, CECC42200/ A1:1986, CECC42201/ A1:1986	VDE
(Alternative)	Ceramate Techn. Co., Ltd.	GNR 14D511K	510Vdc	CECC42000/ A1:1978, CECC42200/ A1:1986, CECC42201/ A1:1986	VDE
(Alternative)	Ceramate Techn. Co., Ltd.	NFV 14D511K	510Vdc	CECC42000/ A1:1978, CECC42200/ A1:1986, CECC42201/ A1:1986	VDE
(Alternative)	Centra Science Corp.	CNR-14D511K	510Vdc	CECC42000/ A1:1978, CECC42200/ A1:1986, CECC42201/ A1:1986	VDE
Y2 Capacitor (C1, C2)	Various	Various	AC250V, 4700pF	EN132400: 1995-03, IEC60384-14	VDE

EN 62040-1			
Clause	Requirement + Test	Result - Remark	Verdict

4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Common choke (L1)	Click technology(shenzhen) CO.LTD	41-110005-00G	130℃	--	Tested in equipment
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-110005-00G	130℃	--	Tested in equipment
(Alternative)	ZHUHAI LION CO.,LTD	41-110005-00G	130℃	--	Tested in equipment
Output EMI board					
X2 Capacitor (C1, C4)	Dain Electronics Co. Ltd.	MPX	AC275V, 2.2uF	EN132400: 1995-03, IEC60384-14	VDE
(Alternative)	Tenta Electric Industrial Co. Ltd.	MEX	AC275V, 2.2uF	IEC60384-14	VDE
(Alternative)	Farad Electronics Co. Ltd	PXK	AC275V, 2.2uF	IEC60384-14	VDE
(Alternative)	Shenzhen shengxin capacitor co LTD	MEX	AC275V, 2.2uF	IEC60384-14	VDE
Y2 Capacitor (C2, C3)	Various	Various	AC250V, 1000pF	EN132400: 1995-03, IEC60384-14	VDE
Common choke (L1)	Click technology(shenzhen) CO.LTD	41-110006-00G	130℃	--	Tested in equipment
(Alternative)	MYLAR ELECTRONICS CO.,LTD.	41-110006-00G	130℃	--	Tested in equipment
(Alternative)	ZHUHAI LION CO.,LTD	41-110006-00G	130℃	--	Tested in equipment
Fuse (F1)	HOLLY	65NM(P)-200H	20A 250VAC	--	UL
Power cord set					
DE Plug	Dura HexaTrans Electrical Co.	DHT33	AC250V,10A	VDE 0620-1	VDE
(Alternative)	Well Shin technology co. LTD	DHT33	AC250V,10A	VDE 0620-1	VDE
(Alternative)	Nanke Electrical Co. LTD	DHT33	AC250V,10A	VDE 0620-1	VDE

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4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity[1])
Connector	Dura HexaTrans Electrical Co.	DHT35	AC250V,10A	VDE 0620-1	VDE
(Alternative)	Well Shin technology co. LTD	DHT35	AC250V,10A	VDE 0620-1	VDE
(Alternative)	Nanke Electrical Co. LTD	DHT35	AC250V,10A	VDE 0620-1	VDE
Cable	Dura HexaTrans Electrical Co. LTD	H05VV-F	3G 0.75mm^2	VDE 0281-5	VDE
(Alternative)	Well Shin technology co. LTD	H05VV-F	3G 0.75mm^2	VDE 0281-5	VDE
(Alternative)	Nanke Electrical Co. LTD	H05VV-F	3G 0.75mm^2	VDE 0281-5	VDE
Supplementary information: An asterisk indicates a mark that assures the agreed level of surveillance.					

4.4 1.6.2/RD	TABLE: Electrical data (in normal conditions)					P
U (V)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
Tested on 3kVA model						
187.2V/ 50Hz	14.5	--	2738	16A	25.44	Charging of empty batteries and rated 100% output load.
208V/50Hz	13.1	14.4	2744	16A	25.69	Ditto
240V/50Hz	11.4	14.4	2746	16A	22.39	Ditto
254.4V/ 50Hz	10.9	--	2785	16A	22.88	Ditto
187.2V/ 50Hz	14.6	--	2739	16A	19.98	Ditto
208V/50Hz	13.1	14.4	2742	16A	20.17	Ditto
240V/60Hz	11.39	14.4	2745.5	16A	20.31	Ditto
254.4V/ 60Hz	10.97	--	2783	16A	20.65	Ditto

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4.4 1.6.2/RD	TABLE: Electrical data (in normal conditions)					P
U (V)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
Tested on model 2kVA						
187.2V/ 50Hz	9.93	--	1856	10A	22.82	Charging of empty batteries and rated 100% output load.
208V/50Hz	9.01	9.6	1870	10A	23.59	Ditto
240V/50Hz	7.74	9.6	1852	10A	20.97	Ditto
254.4V/ 50Hz	7.45	--	1852	10A	21.56	Ditto
187.2V/ 50Hz	9.92	--	1855	10A	18.44	Ditto
208V/50Hz	9.01	9.6	1871	10A	19.01	Ditto
240V/60Hz	7.742	9.6	1851	10A	19.43	Ditto
254.4V/ 60Hz	7.448	--	1853	10A	19.72	Ditto
Supplementary information:						

5.1.1 and 2.1.1.7/RD	TABLE: discharge of capacitors in the primary circuit			P
Condition	τ calculated (s)	τ measured (s)	t u→ 0V (s)	Comments
Power switch on (L-N)	--	0.02	0.14	Vi=346V, 37% of Vi=128V, No load applied
Power switch off (L-N)	--	0.03	0.15	Ditto
Note(s): Tested on model **3kVA**				

5.2.1 and 2.2.2/RD	TABLE: SELV measurement (under normal conditions)			N
Transformer	Location	Voltage (max.) (V)		Voltage Limitation Component
		V peak	V d.c.	
Supplementary information:				

5.2.1 and 2.2.3/RD	TABLE: SELV measurement (under fault conditions)		N
Location	Voltage (max.) (V)	Comments	

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Supplementary information:

5.2.3 and 2.4.2/RD	TABLE: Limited current circuit measurement					N
Location	Voltage (V)	Current (mA)	Freq. (kHz)	Limit (mA)	Comments	
Supplementary information:						

5.2.5 and 2.5/RD	TABLE: Limited power source measurement			N
	Limits	Measured	Verdict	
According to Table 2B/2C (normal condition)				
current (in A)				
apparent power (in VA)				
According to Table 2B/2C (single fault condition)				
current (in A)				
apparent power (in VA)				
Supplementary information:				

5.3.1 and 2.6.3.4/RD	TABLE: Resistance of earthing measurement		P
Location	Resistance measured (m) / voltage drop(V)	Comments	
I/P earth (inlet)→O/P earth (outlet)	4	Test current of 32A for 120s	
I/P earth (inlet)→metal enclosure	7	Test current of 32A for 120s	
Supplementary information: Tested on 3kVA model			

5.5 and 8.3	TABLE: Abnormal operating and fault conditions		P
	ambient temperature (°C)	See below	
	model/type of power supply	Integral part of equipment.	
	manufacturer of power supply	See below	
	rated markings of power supply	See page 4	

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Clause	Requirement + Test	Result - Remark	Verdict

5.5 and 8.3	TABLE: Abnormal operating and fault conditions					P
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Tested on model 3kVA						
Q20 c-e	s-c	Battery mode	10min	F2, F3	--	Unit work continuously. No abnormal.
CT2 secondary	s-c	240 V	10min	Breaker	11.4	Unit work continuously. No abnormal.
Q7 c-e	s-c	240V	1s	Breaker	--	F1 opened, Q7, Q8, Q13, Q14 damaged. No hazards.
Q2 D-S	s-c	Battery mode	1s	F2, F3	--	F2, F3 opened. Q2, Q4, Q5, Q9, Q6, Q10, Q11, Q12 damaged. No hazards.
CE1	s-c	Battery mode	1s	F2, F3	--	UPS shutdown immediately. F2, F3 opened. No hazards.
TX1 pin 6-7 (on CNTL board)	s-c	240 V	10min	Breaker	11.4	Unit work continuously. No abnormal.
TX1 pin 8-9 (on CNTL board)	s-c	240 V	10min	Breaker	11.4	Unit work continuously. No abnormal.
Output	o-l	240 V	4h	Breaker	12.2	UPS shutdown when loaded to 125% of rated output load. RY1 coil=54.2℃, RY2 coil=62.0℃, Converter transformer TX2 winding=30.2℃, battery=30.6℃, L6 coil=85.8℃, L7 coil=97.2℃, ambient=29.3℃, No hazards.
Output	o-l	Battery mode	5min 56sec	F2, F3	--	UPS shutdown when loaded to 110% of rated output load. RY1 coil=50.1℃, RY2 coil=61.7℃, Converter transformer TX2 winding=43.1℃, battery=37.8℃, L6 coil=58.7℃, L7 coil=38.7℃, ambient=29.1℃, No hazards.
Output	s-c	240 V	1s	Breaker	--	UPS shutdown immediately. Fuse F1 opened, No hazards.
Output	s-c	Battery mode	1s	F2, F3	--	UPS shutdown immediately. No hazards.

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Clause	Requirement + Test	Result - Remark	Verdict

5.5 and 8.3	TABLE: Abnormal operating and fault conditions					P
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Ventilation openings	Block-ed	240 V	40min	Breaker	11.4	After 40mins, unit switched to bypass mode. RY1 coil=68℃, RY2 coil=77.2℃, Converter transformer TX2 winding=36.6℃, battery=37.2℃, L6 coil=112℃, L7 coil=105.5℃,ambient=29.0℃, No hazards.
Ventilation openings	Block-ed	Battery mode	5min 32sec	F2, F3	--	UPS discharge till stutdown. RY1 coil=49.4℃, RY2 coil=53.3℃, Converter transformer TX2 winding=52.1℃, battery=42.3℃, L6 coil=69.5℃, L7 coil=38.3℃, ambient=29.3℃, No hazards.
Fan	Lock-ed	240 V	4h	Breaker	11.4	Work normally. RY1 coil=61.8℃, RY2 coil=87.1℃, Converter transformer TX2 winding=35.3℃, battery=36.6℃, L6 coil=112.8℃, L7 coil=127.3℃,ambient=29.6℃, No hazards.
Fan	Lock-ed	Battery mode	5min	F2, F3	--	UPS discharge till shutdown. RY1 coil=48.2℃, RY2 coil=65.1℃, Converter transformer TX2 winding=69.0℃, battery=43.7℃, L6 coil=101.0℃, L7 coil=93.8℃, ambient=30.0℃, No hazards.
Tested on 2kVA model						
Output	o-l	240 V	4h	Breaker	8.4	UPS shutdown when loaded to 125% of rated output load. RY1 coil=71.3℃, RY2 coil=59.8℃, Converter transformer TX2 winding=29.1℃, battery=30.2℃, L6 coil=69.0℃, L7 coil=68.5℃, ambient=28.8℃, No hazards.
Output	o-l	Battery mode	5min	F2, F3	--	UPS shutdown when loaded to 110% of rated output load. RY1 coil=71.2℃, RY2 coil=59.8℃, Converter transformer TX2 winding=29.1℃, battery=30.1℃, L6 coil=69.0℃, L7 coil=68.5℃, ambient=28.0℃, No hazards.
Output	s-c	240 V	1s	Breaker	--	UPS shutdown immediately. Fuse F1 opened, No hazards.
Output	s-c	Battery mode	1s	F2, F3	--	UPS shutdown immediately. No hazards.

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5.5 and 8.3	TABLE: Abnormal operating and fault conditions					P
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation
Supplementary information: All faults are started during normal operation unless otherwise stated; and after each fault condition, a electric strength test is followed, the unit not breakdown. s-c: short circuit; o-c: open circuit; o-l: overload						

5.7 and 2.10.2/RD	Table: Working voltage measurement		P
Location	RMS voltage (V)	Peak voltage (V)	Comments
Tested on 3kVA model			
TX1 on CNTL board			
Pin 1-6	10.8	20	Line mode and rated output load.
Pin 2-6	17	42	Ditto
Pin 3-6	2.72	16	Ditto
PIN 4-6	14.7	34	Ditto
Pin 1-7	17.1	40	Ditto
Pin 2-7	10.5	32	Ditto
Pin 3-7	13.9	52	Ditto
Pin 4-7	2.25	28	Ditto
Pin 1-8	15.8	51.2	Ditto
Pin 2-8	26.9	72	Ditto
Pin 3-8	12.1	37.2	Ditto
Pin 4-8	26.7	70.8	Ditto
Pin 1-9	10.3	31.6	Ditto
Pin 2-9	16.4	50.8	Ditto
Pin 3-9	1.59	26.8	Ditto
Pin 4-9	14.8	44	Ditto
Pin 1-10	15.2	47.2	Ditto
Pin 2-10	10.5	38.4	Ditto
Pin 3-10	11.9	46.4	Ditto
Pin 4-10	3.84	35.2	Ditto
Supplementary information:			

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5.7 and 2.10.4/RD	TABLE: Clearance and creepage distance measurements					P
Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Whole unit						
Metal enclosure to bare pin of battery terminal	<420	<250V	2.0	12.2	2.5	>12.2
Heatsink on Main board to earthed enclosure after 250N force	<420	<250V	2.0	8.2	2.5	>8.2
Main board						
Primary trace to PE	<420	<250V	2.0	4.0	2.5	4.0
Primary pin to earthed metal plate	<420	<250V	2.0	7.2	2.5	>7.2
PCB traces between contacts of backfeed relay RY1	<420	<250V	1.9	8.06	2.5	9.6
Input EMI Board						
Primary traces to earthed traces nder inlet	<420	<250	2.0	2.7	2.5	2.7
Primary traces to earthed traces nder Y2-cap C1, C2	<420	<250	2.0	3.0	2.5	3.0
Primary traces to earthed traces nder Y2-cap C2	<420	<250	2.0	3.6	2.5	3.6
Primary pin to earthed metal plate	<420	<250V	2.0	5.7	2.5	>5.7
CNTL Board						
Primary trace to secondary trace under U5, U9, U8, U6, U10	<420	<250	4.0	6.8	5.0	6.8
Primary trace to secondary trace under U12, U22, U23, U25, U24	<420	<250	4.0	6.8	5.0	6.8
Primary trace to secondary trace under TX1	<420	<250	4.0	7.6	5.0	7.6
Primary winding to secondary winding of TX1	<420	<250	4.0	5.0	5.0	5.0
Primary winding to core of TX1	<420	<250	2.0	2.5	2.5	2.5
Secondary winding to core of TX1	<420	<250	2.0	2.5	2.5	2.5
Primary pin to earthed metal plate	<420	<250V	2.0	11.1	2.5	>11.1
Backfeed relay						
Coil to contacts (Song Chuan: 841-P-2A-C-H) for reinforce insulation	<420	<250	2.0	9.5	2.5	10

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5.7 and 2.10.4/RD	TABLE: Clearance and creepage distance measurements					P
Clearance (cl) and creepage distance (cr) at/of/between:	U peak (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required cr (mm)	cr (mm)
Contcts opening per pole [3] (Song Chuan: 841-P-2A-C-H) for basic insulation	<420	<250	1.9	8.06	2.5	9.6
Supplementary information: 1. A minimum clearance of 2.0mm for each contact pair had been provided (required according to sub-clause 5.1.4: 1.4mm minimum). 2. All internal wires soldered on PCB are additional crimped with connectors for soldering. Shrink tubings are used to cover the tab connectors.						

5.8, 2.1.1.3/RD and 2.10.5.1 /RD	TABLE: Distance through insulation measurements				P
Distance through insulation (DTI) at/of:	U peak (V)	U r.m.s. (V)	Test voltage (V)	Required DTI (mm)	DTI (mm)
Heat-shrinkable tube	<420	250	3000Va.c.	0.4	>0.4 [1]
Supplementary information: * See appended table 4.5.					

6, 8.2 and 9	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
All models			
Primary to Secondary (mains inlet&outlet conductor to USB connector)	AC	3000Va.c.	No
Primary to TNV circuits (mains inlet&outlet conductor to TNV phoneline connector)	AC	3000Va.c.	No
TNV circuits and USB connector	AC	1500Va.c.	No
Primary to earth (mains inlet&outlet conductor to earth)	AC	1500Va.c.	No
Primary winding to secondary winding of RS232 transformer TX1	AC	3000Va.c.	No
Primary winding to core of RS232 transformer TX1	AC	1500Va.c.	No
Secondary winding to core of RS232 transformer TX1	AC	1500Va.c.	No
1 layer insulation tape used in RS232 transformer	AC	3000Va.c.	No

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Supplementary information: Test after humidity treatment, heating test, and each fault condition test of 8.3.

7.4, 4.5.5/RD	TABLE: Ball pressure test of thermoplastic parts		P
	Allowed impression diameter (mm) ..... :	≤ 2 mm	

Part	Test temperature (°C)	Impression diameter (mm)
Bobbin of converter transformer	125	0.9
Bobbin of CT3	125	0.8

Supplementary information:
Other relevant thermoplastic parts are Phenolic type that is accepted without further tests for test temperatures not exceeding 125°C

7.4.2,	Table: Enclosure opening measurements	P

Location	Size (mm)	Comments
Top	None	No openings.
Bottom	None	No openings.
Side	2.8mm round openings	314x2 provided.
Front	None	No openings.
Back	--	Only DC fan ventilation openings provided on back. Metal net provide as fan guard.

Supplementary information:

7.5	Table: Resistance to fire	P

Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence
Enclosure	LG CHEMICAL LTD	AF310, AF310HT, AF312C	Min. thickness 2.5mm	V-0	UL
(Alternative)	CHIMEI	PA765A PA757A	Min. thickness 2.5mm	V-0	UL
Switch knob	LG CHEMICAL LTD	AF310, AF310HT, AF312C	Min. thickness 2.5mm	V-0	
(Alternative)	CHIMEI	PA765A PA757A	Min. thickness 2.5mm	V-0	

Supplementary information:

7.7	TABLE: Temperature test		P
	Supply voltage (V) ..... :	See below	

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	Ambient T_{min} (ºC) ..... :		
	Ambient T_{max} (ºC) ..... :		

7.7	TABLE: Temperature test						P
Maximum measured temperature T of part/at::		T (ºC)					Allowed T_{max} (ºC)
		198V/50 Hz	254.4V/ 50Hz	0V (Battery mode)	--	--	
Tested on 3KVA model							
Inlet		51.7	49.1	44.7	--	--	70
Outlet		46.9	46.8	42.5	--	--	70
I/P Circuit breaker		66.9	57.1	46.9	--	--	70
O/P breaker		52.8	52.4	44.4	--	--	70
MOV2 on PCB 16-80016-00G		60.8	62.4	49.5	--	--	85
Y2-cap C2 on PCB 16-80016-00G		62.1	55.5	48.8	--	--	125
L1 winding on PCB 16-80016-00G		107.7	86.4	57.2	--	--	130
Y2-cap C1 on PCB 16-800018-00G		55.9	50.7	47.2	--	--	85
L1 winding on PCB 16-800018-00G		67.1	61.3	48.4	--	--	130
Fan		49.9	48.6	47	--	--	70
Relay RY1 coil on PCB 16-300018-00G		66.1	65.7	60.3	--	--	130
Relay RY2 coil on PCB 16-300018-00G		78.7	73.5	71.9	--	--	130
X2-cap C3 on PCB 16-300018-00G		55.3	52.7	48.7	--	--	100
RY1 coil on PCB 16-300018-00G		90.9	88.6	74.4	--	--	130
Input “L” wire		55.9	50.6	45.7	--	--	105
TX2 winding on PCB 16-300018-00G		42.1	41.7	53.3			110
TX1 winding on PCB 16-300018-00G		61.4	60.9	65.8	--	--	110
TX1 coil on 16-800010-00G		60.1	59.8	57.5	--	--	110
TX1 coil on 16-800007-00G		46.7	47	49.5	--	--	110
Battery wire ‘+”		41.2	41.4	40.8	--	--	105
Battery		44.2	42.1	48	--	--	70/55
Optocoupler U1 on PCB 16-300018-00G		49.8	48.1	45.4	--	--	100
Optocoupler U24 on PCB 16-800001-00G		48.6	48.5	47.7	--	--	100
TX1 winding on PCB 16-800001-00G		50	50	48.9	--	--	110
C19 on PCB 16-300018-00G		52.3	48.8	51.5	--	--	70
L6 on PCB 16-300018-00G		90.5	94.2	68.9	--	--	130
L7 on PCB 16-300018-00G		116.7	91.2	80.5	--	--	130

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7.7	TABLE: Temperature test					P
Maximum measured temperature T of part/at::	T (ºC)					Allowed T_{max} (ºC)
	198V/50 Hz	254.4V/ 50Hz	0V (Battery mode)	--	--	
L9 on PCB 16-300018-00G	102.2	107.4	98.8	--	--	130
CE1 on PCB 16-300018-00G	41.5	41.3	66.8	--	--	105
PCB near D19 on PCB 16-300018-00G	41.2	41.4	62.1	--	--	130
Heat sink of Q1 on PCB 16-300018-00G	67.5	57.0	74.8	--	--	130
Heat sink of Q8 on PCB 16-300018-00G	65.5	78.6	63.4	--	--	130
Heat sink of Q3 on PCB 16-300018-00G	81.5	57.2	51.5	--	--	130
Heat sink of Q2 on PCB 16-300018-00G	54.4	55.0	56.6	--	--	130
Heat sink of D15 on PCB 16-300018-00G	40.9	41.6	46.6	--	--	130
TX1 winding on PCB 16-800008-00G	42.2	42.3	49.0	--	--	110
TX2 winding on PCB 16-800008-00G	41.7	41.6	46.6	--	--	110
Enclousure-inside near converter transformer	40.6	40.9	44.6	--	--	--
Enclousure outside new button	40.7	40.9	40.7	--	--	95
Top enclouse	41.5	41.5	42.7	--	--	70
Ambient	39.8	39.5	39.8	--	--	--
Tested on 2kVA model						
Inlet	47.8	50.7	46.7	--	--	70
Outlet	45.2	43.7	43.9	--	--	70
Circuit breaker	47.4	50.6	45.6	--	--	70
Input ‘L’ wire	48	51.9	46.2	--	--	105
CT1 winding on PCB 16-300018-00G	48.2	50.5	50.5	--	--	110
Relay RY1 coil on PCB 16-300018-00G	83.3	87.6	65.4	--	--	130
Relay RY2 coil on PCB 16-300018-00G	71.6	75.5	70.7	--	--	130
Relay RY1 coil on PCB 16-300021-00G	44.2	43.3	43.5	--	--	130
L6 on PCB 16-300018-00G	81.4	76.7	82.8	--	--	130
L7 on PCB 16-300018-00G	75.4	89.6	73.9	--	--	130
L9 on PCB 16-300018-00G	87.2	82	85.1	--	--	130
TX2 winding on PCB 16-300018-00G	41.9	41.7	65.2	--	--	110
TX1 winding on PCB 16-300018-00G	79.7	42	61.8	--	--	110
Battery wire “+’’	41	40.6	40.9	--	--	105
Battery	43	44.2	47.6	--	--	70/55
TX1 on PCB 16-800008-00G	41.9	41.5	45.2	--	--	110

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7.7	TABLE: Temperature test						P
Maximum measured temperature T of part/at::		T (ºC)					Allowed T_{max} (ºC)
		198V/50 Hz	254.4V/ 50Hz	0V (Battery mode)	--	--	
TX1 on PCB 16-800010-00G		56.1	55.9	54.9	--	--	110
HS1 on PCB 16-800010-00G		51.6	52.6	51.9	--	--	130
TX1 on PCB 16-300018-00G		57.3	76.8	62.5	--	--	110
X2-cap C3 on PCB 16-300018-00G		49.6	53.2	50.3	--	--	100
C19 on PCB 16-300018-00G		48.5	50.1	53.7	--	--	70
E-cap CE1 on PCB 16-300018-00G		41.3	40.7	55.5	--	--	105
E-cap C10 on PCB 16-300018-00G		44.6	44.8	52.9	--	--	105
T1 winding on pcb 16-800007-000G		46.6	45.5	49.4	--	--	110
Heat sink HS6 on on PCB 16-300018-00G		57.2	64.7	63.9	--	--	130
HS2 on PCB 16-300018-00G		44.7	45.5	55.9	--	--	130
HS5 on PCB 16-300018-00G		68.4	58.8	64.5	--	--	130
Optocoupler U1		47.1	48.7	46.9	--	--	100
PCB near D19, on PCB 16-300018-00G		41.0	41.2	58.1	--	--	130
TX1 on PCB 16-800001-00G		49.0	49.0	50.4	--	--	110
Fan		46.7	48.4	50.0	--	--	70
MOV2 on PCB 16-80016-00G		52.2	61.7	51.6	--	--	85
Y2-cap C2 on PCB 16-80016-00G		47.9	54.2	48.0	--	--	85
L1 winding on PCB 16-80016-00G		63.8	88.2	627.2	--	--	130
Y2-cap C1 on PCB 16-800018-00G		47.5	52.4	51.0	--	--	85
L1 winding on PCB 16-800018-00G		51.8	54.1	52.3	--	--	130
Enclosure outside near button		40.2	40.8	40.2	--	--	95
Enclosure Top		40.6	41.3	41.4	--	--	70
Ambient		40.4	40.0	39.9	--	--	--
Supplementary information:							

Temperature T of winding:	t_1 (°C)	R_1 (Ω)	t_2 (°C)	R_2 ((Ω)	T (°C)	Allowed T_{max} (°C)	Insulation class

Supplementary information:
The maximum ambient temperature permitted by the manufacturer's specification is 40°C.

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Clause	Requirement + Test	Result - Remark	Verdict

8.1	TABLE: earth leakage current				P
Condition		L→ terminal A (mA)	N → terminal A (mA)	Limit (mA)	Comments
Unit on		2.45	3.4	3.5	Switch “e” open ,L/N to PE, no load
Unit on		0.005	0.005	0.25	Switch “e” close , L/N to front panel (with foil)
Unit on		0.01	0.01	0.25	Switch “e” close ,L/N to RS232/USB port
Unit on		0.001	0.001	0.25	Switch “e” close ,L/N to TNV port
Supplementary information: Supply with 254.4V/60Hz.					

C.2	Safety isolation transformer		P
Construction details:			
Transformer TX1 on CNTL PCB			
Mfr.: see table 1.5.1			
Type: see table 1.5.1			
All transformers are identical except for type designation, and wire gauge and number of turns in secondary winding.			
Recurring peak voltage		<420V	
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		5.0	>5.0 (between sec. pin and pri. winding)
prim-core		2.5	2.5 (between prim. pin and core.)
sec-core		2.5	2.5 (between sec. pin and core.)
prim-prim		%	%
Measured min. clearances			
Location		inside (mm)	outside (mm)
prim-sec		5.0	>5.0 (between sec. pin and pri. winding)
prim-core		2.5	2.5 (between prim. pin and core.)

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Clause	Requirement + Test	Result - Remark	Verdict

sec-core	2.5	2.5 (between sec. pin and core.)
prim-prim	%	%
Construction:		
Concentric windings on EE16 type core. At least one layer insulation between primary and secondary windings. The primary windings and secondary winding were soldered to lead pins moulded in bobbin.		
Pin numbers		
Prim.	1 2, 3 4	
Sec.	6 7, 8 9 10	
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	

M	Ventilation of battery compartments	P
	The required dimension for the ventilation openings will be calculated with the following formula:	
	$A > K1 * Q$ with $Q = (0.054\ m^3/Ah) * n * I * C$ where: K1 : constant factor of 28 h * cm^2/m^3 Q : airflow in m^3/h n : number of battery cells I : constant factor (0,2A/100Ah for valve regulated lead acid batteries) C : nominal capacity of the battery	
	With the specific data for the UPS the following dimension for the ventilation openings is required:	
	External battery pack n : 6 cells per battery x 8 battery =64 C : 9 $A > 28\ h * cm^2/m^3 * (0.054\ m^3/Ah) * n * 0.2\ A/100\ Ah * C$ $A > 0.193\ cm^2$	
	Verdict	
	The size of ventilation openings in battery cabinet exceeds the required airflow by far.	

Pictures

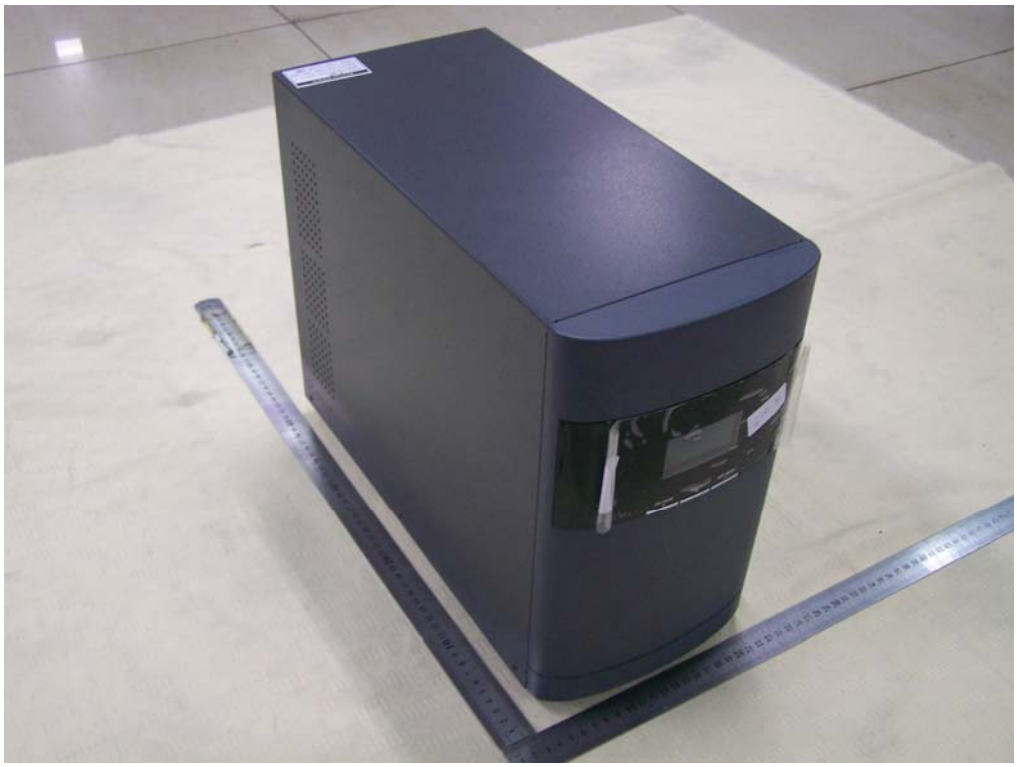

Fig. 1 – Overview (I)

Fig. 2 – Overview (II)

Pictures

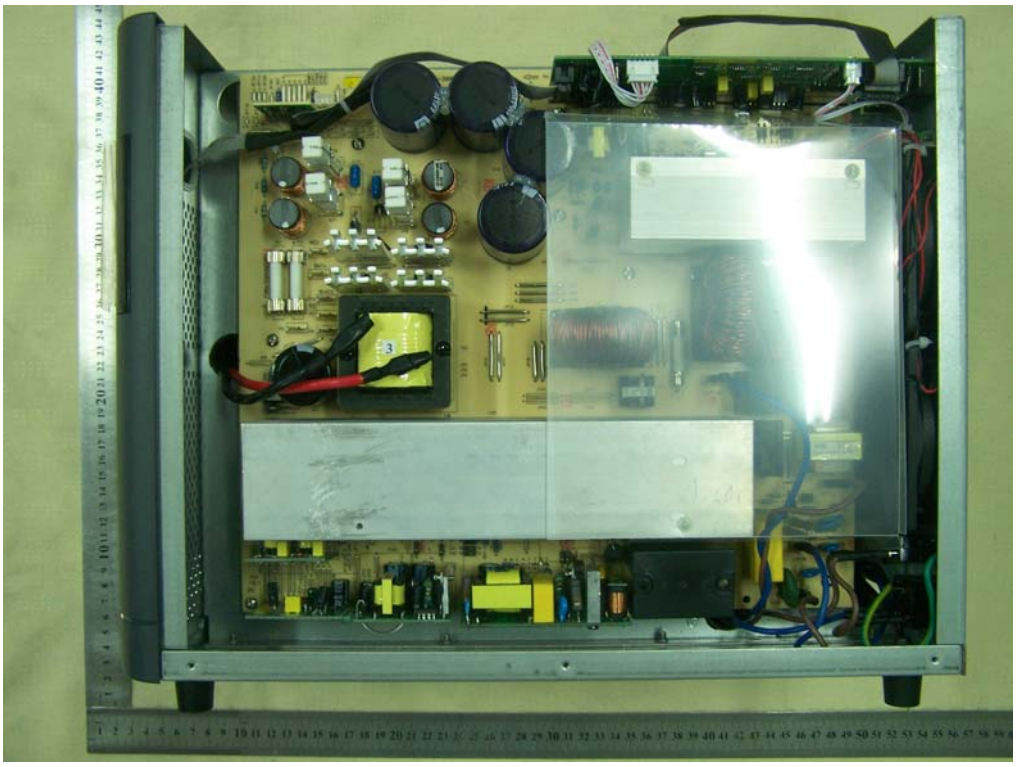

Fig. 3 – Inside view (I)

Fig. 4 – Inside view (II)

Pictures

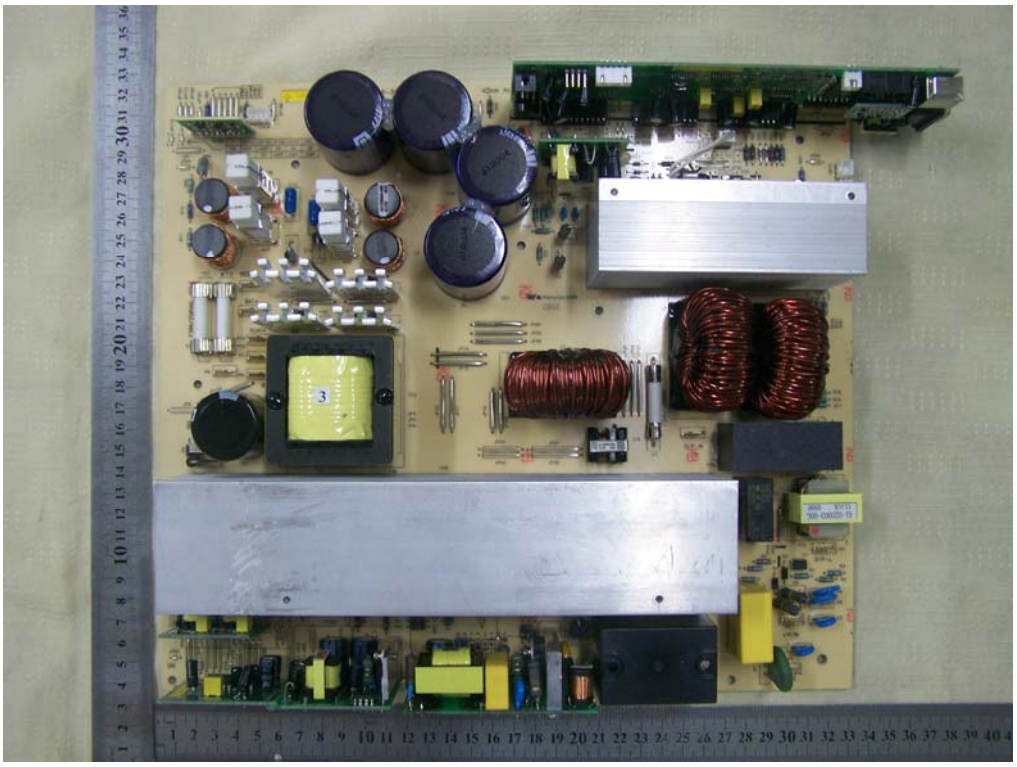

Fig. 5 – Mains PCB, components side view

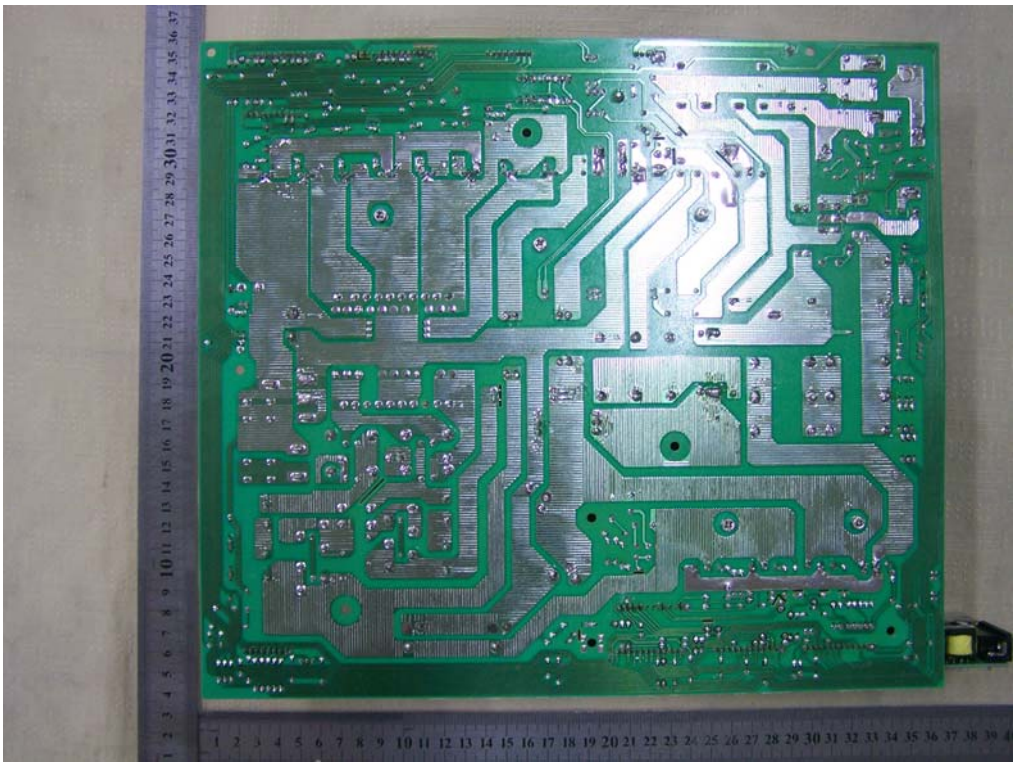

Fig. 6 – Mains PCB, traces side view

Pictures

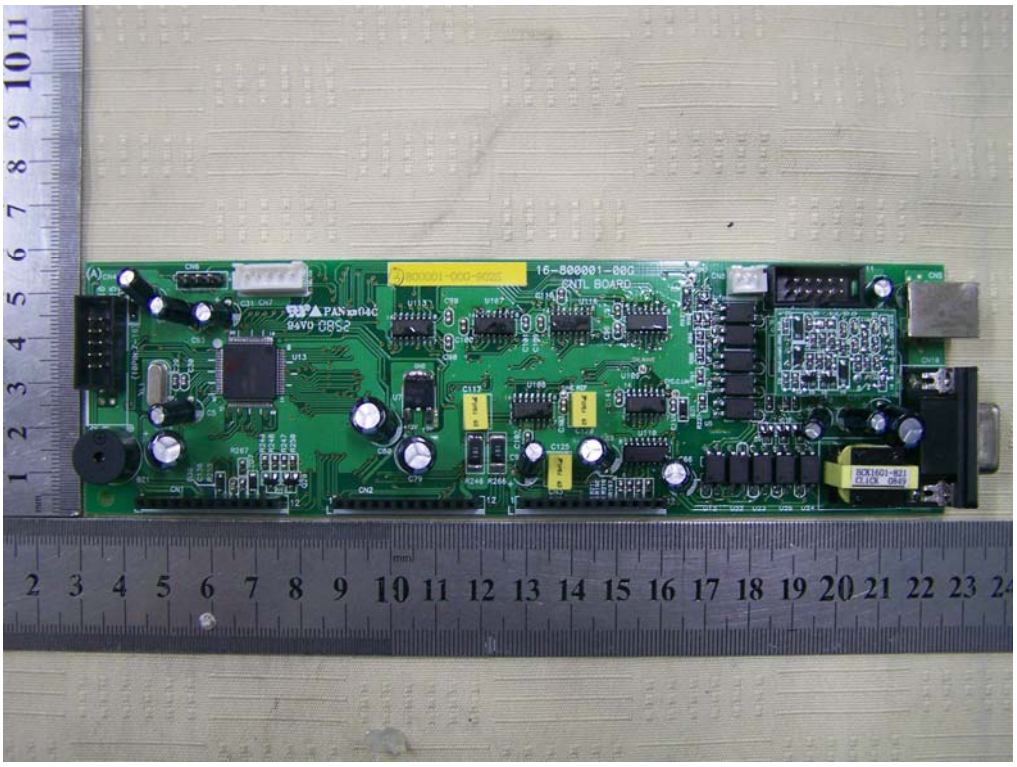

Fig. 7 – CNTL PCB, components side view

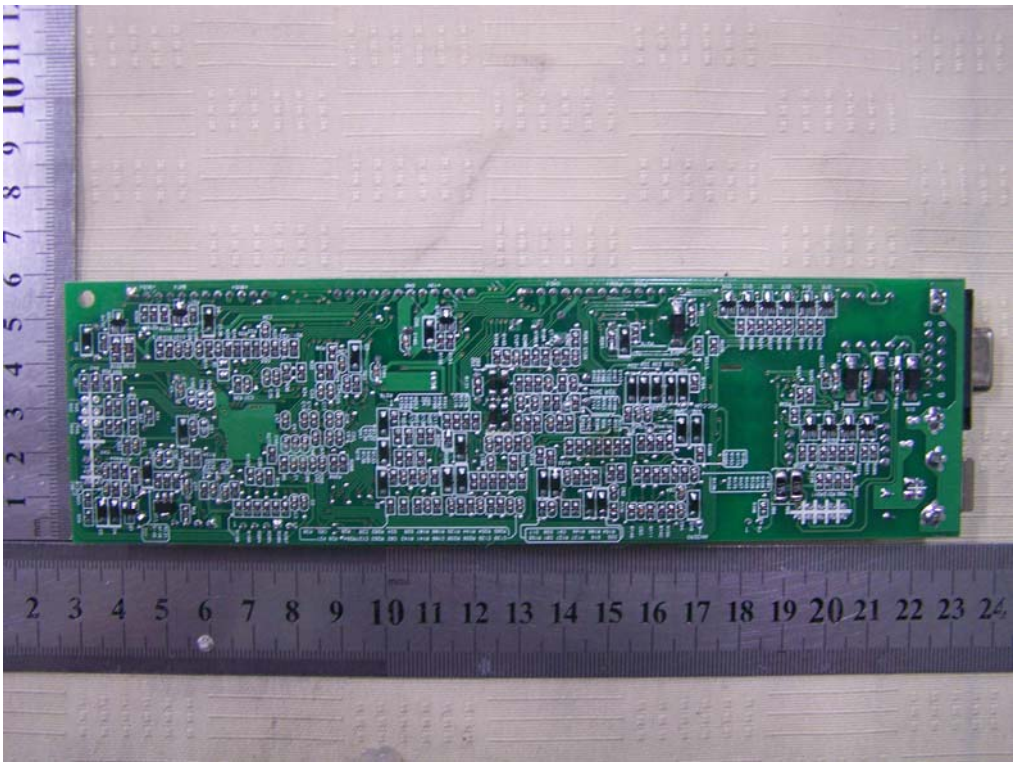

Fig. 8 – CNTL PCB, traces side view

Pictures

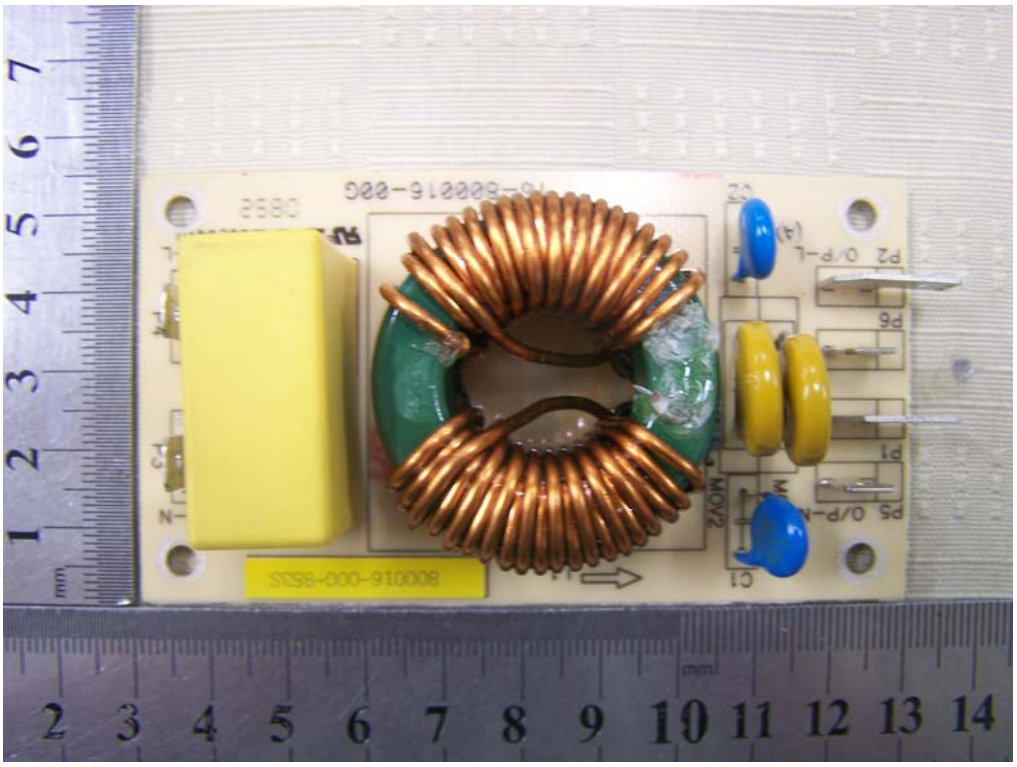

Fig. 9 – Input EMI PCB, components side view

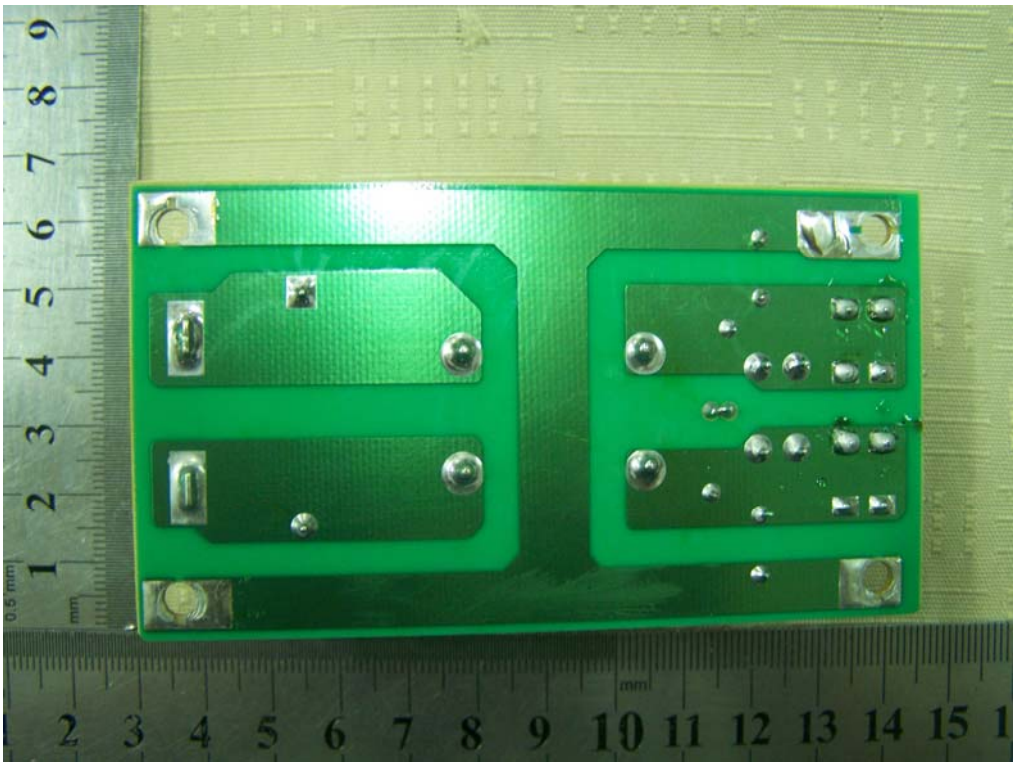

Fig. 10 –Input EMI PCB, traces side view

Pictures

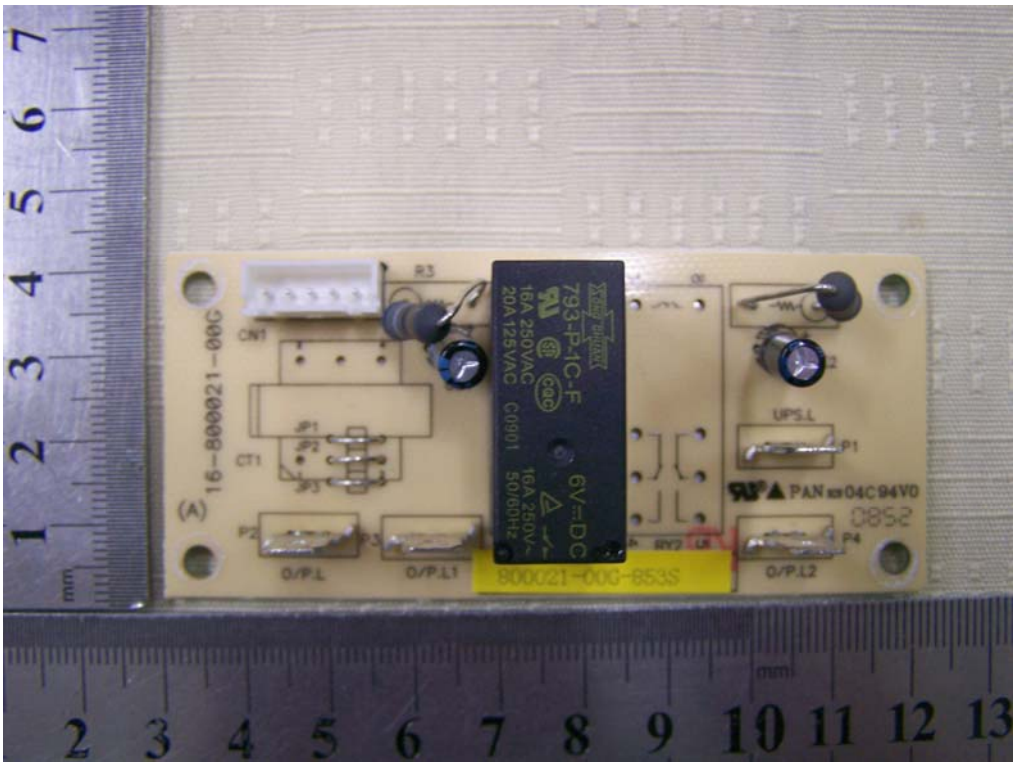

Fig. 11 – Output PCB, components side view

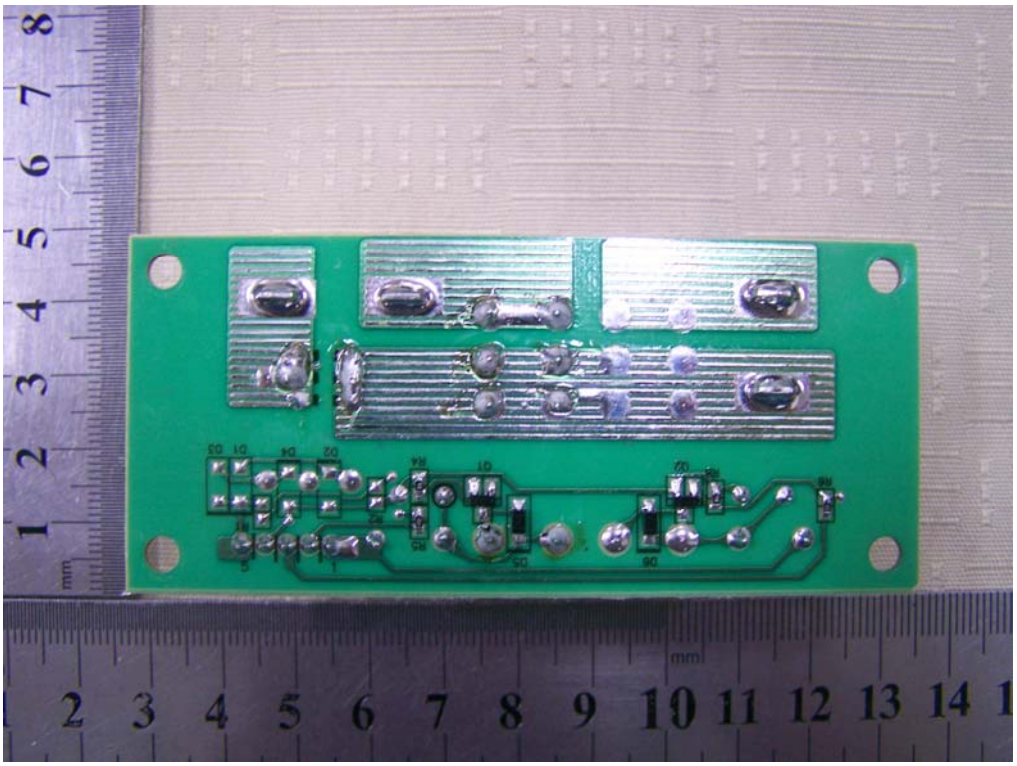

Fig. 12 –Output PCB, traces side view

Pictures

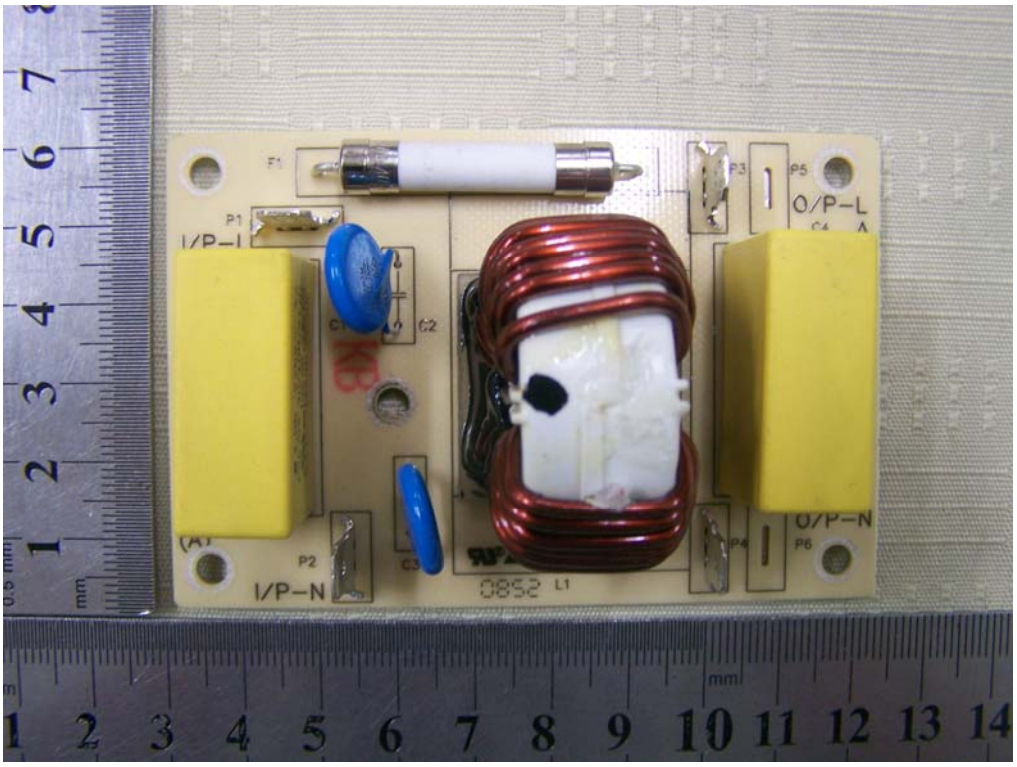

Fig. 13 – Output EMI PCB, components side view

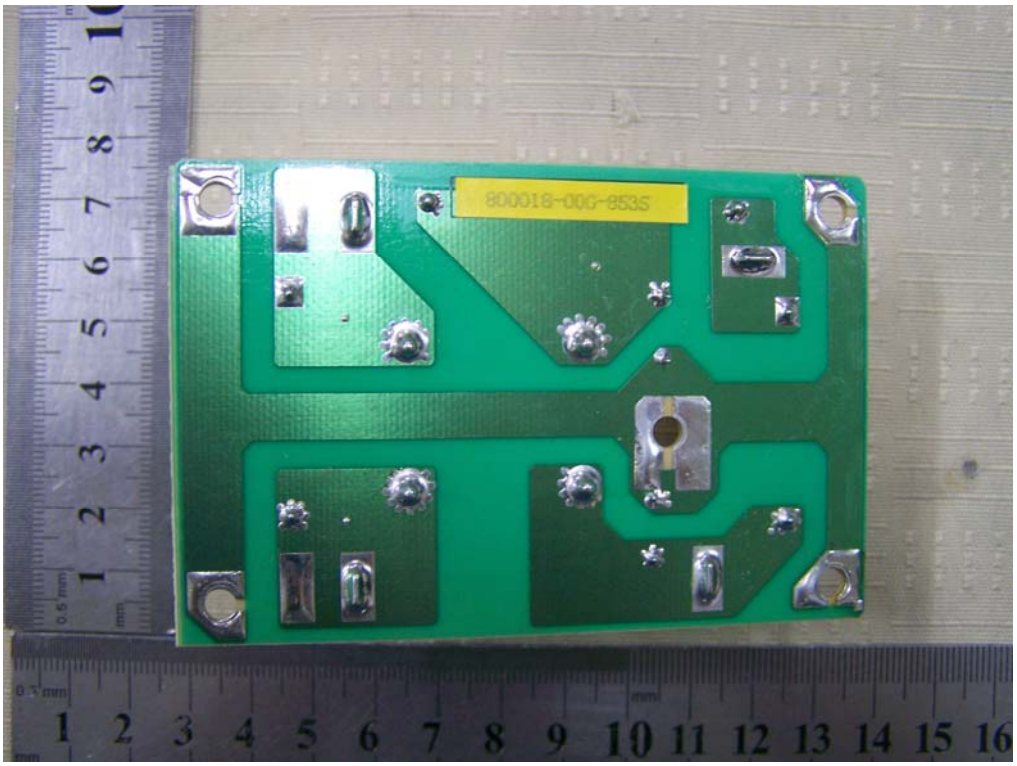

Fig. 14 – Output EMI PCB, traces side view

Pictures

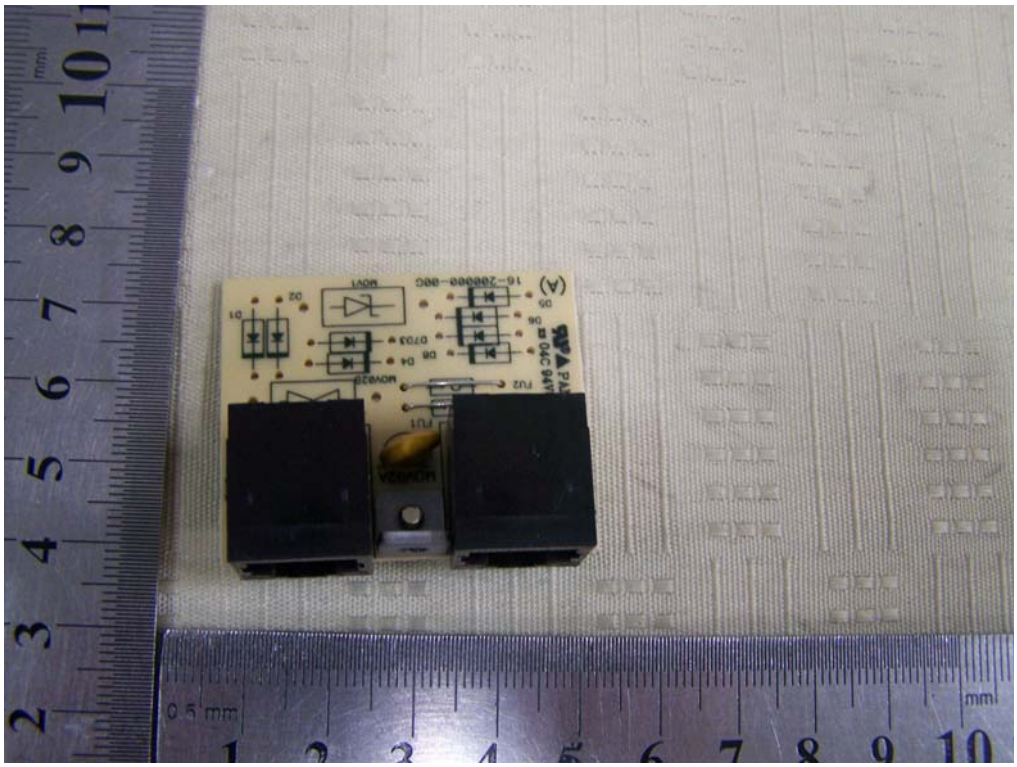

Fig. 15 – TNV circuit PCB, components side view

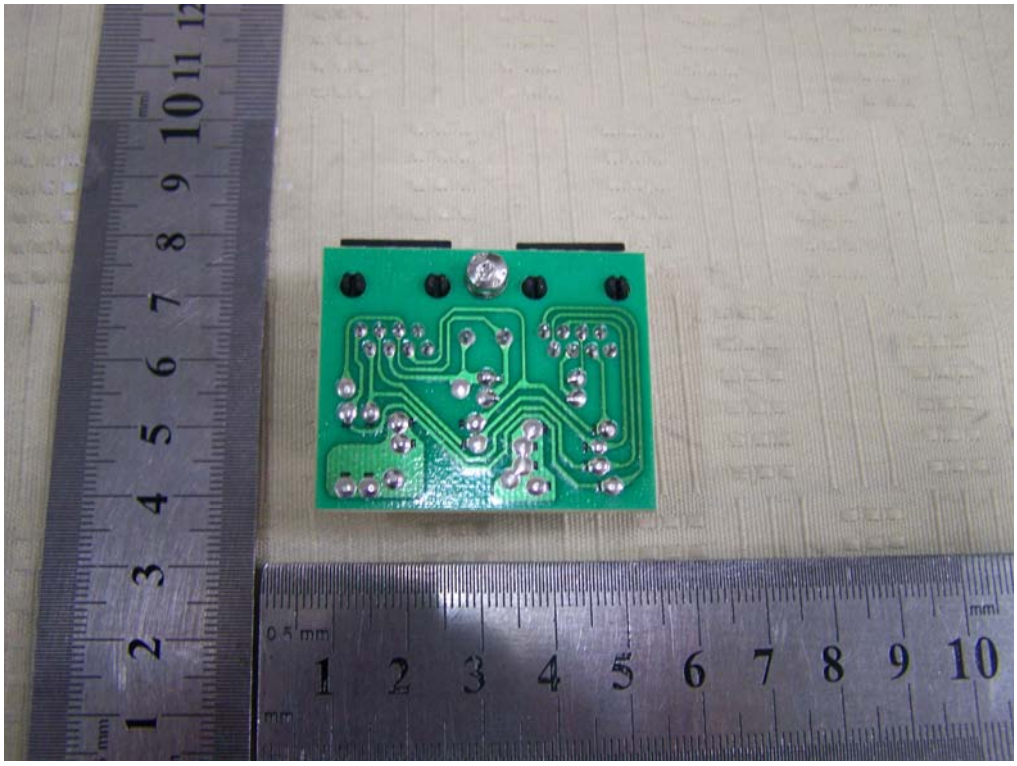

Fig. 16 –TNV circuit PCB, traces side view