



TEST REPORT

EN IEC 62040-1

Applicant's name:	Shenzhen Youwei Energy Technology Co., Ltd.	
Address:	602 Building B, Fuzhen Industrial Zone, Changfeng Road, Guangming District, Shenzhen	
Manufacturer:	Shenzhen Youwei Energy Technology Co., Ltd.	
Address:	602 Building B, Fuzhen Industrial Zone, Changfeng Road, Guangming District, Shenzhen	
Product name:	Uninterruptible Power System	
Trade Name:	HIGHIDEA® 海迪尔	
Model Name:	ET1K	
Listed Models:	LT500,LT1000 ,LT1500 ,LT1000S,MT650, MT1000B,MT1000, MT1500,MT2000, ET2K,ET3K,ET1KR,ET2KR,ET3KR,ET1KRS,ET2KRS,ET3KRS,ET6KRS,ET10KRS, 31ET10KRS	
Ratings :	AC 220V, 50Hz, 800W, 1KVA	
Standard:	EN IEC 62040-1:2019/A2:2025	
Date of sample receipt:	April 26, 2026	
Date of testing:	April 26, 2026 to May 7, 2026	
Date of issue:	May 7, 2026	
Result:	PASS	
Compiled by (position+printed name+signature):	File administrators Jiayi Luo	
Supervised by (position+printed name+signature):	Technique principal Peter peng	
Approved by (position+printed name+signature):	Manager Jim he	
This device described above has been tested by YCT, and the test results show that the equipment under test (EUT) is in compliance with the 2014/30/EU requirements, And it is applicable only to the tested sample identified in the report.		



Test item particulars:	
Equipment mobility.....:	<input checked="" type="checkbox"/> movable <input type="checkbox"/> stationary <input type="checkbox"/> for building-in
Connection to the mains.....:	<input checked="" type="checkbox"/> pluggable equipment <input type="checkbox"/> permanent connection <input checked="" type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord
Operating condition.....:	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location	<input checked="" type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location
Over voltage category (OVC)	<input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other:
Mains supply tolerance (%) or absolute mains supply values	220Vac(+/-10%) of input voltage considered
Tested for IT power systems	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
IT testing, phase-phase voltage (V)	220Vac
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Not classified
Considered current rating (A)	N/A
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IP20
Altitude during operation (m)	Up to 2000
Altitude of test laboratory (m)	below 2000
Mass of equipment (kg)	<7Kg
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A N equal to N / A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.	
Throughout this report a comma (point) is used as the decimal separator.	





General product information:

1. The equipment is an off-line type of Uninterruptible Power System for general use with information technology equipment.

2. Model difference description:

All models are designed with same control logic and constructions. Unless otherwise stated, all tests were performed on model ET1K which means the typical model.

Summary of testing:



The product has been tested according to standard EN IEC 62040-1:2019/A2:2025

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

Copy of marking plate:

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

1. Rating label for model ET1K:

Uninterruptible Power System Model: ET1K AC 220V, 50Hz, 800W, 1KVA HIGHIDEA® Trade Mark : 海迪尔   Shenzhen Youwei Energy Technology Co., Ltd. Made In China
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2. Warning label on outer enclosures

<p>Caution:</p> <ul style="list-style-type: none">● For operation read user manual including safety warnings first!● This unit may be opened by authorized technicians only!● Lead acid battery in the inside of the enclosure!● The battery may present a risk of electric shock and energy hazards.● Risk of explosion if battery replaced by an incorrect type. For battery information, see user's manual.● For disposal instructions of the battery, see user's manual.● See installation instructions before connecting to the supply. <p>WARNING</p> <ul style="list-style-type: none">● ISOLATE UNINTERRUPTIBLE POWER SUPPLY (UPS) BEFORE WORKING ON THIS CIRCUIT.
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4	GENERAL CONDITIONS FOR TESTS	P
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4.3	Components		P
1.5.1/RD	General		
	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 60950-1 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.	N
1.5.4/RD	Transformers	No safety isolating transformer.	N
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	230V considered, for Norway only	P

4.6	Power interface		P
1.6.1/RD	AC power distribution systems	TN power system	P
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 1.7.1/RD	Power rating	The required marking is located on the outside surface of the equipment.	P
	Input rated voltage/range (V).....:	220Vac	P
	Input rated current/range (A).....:	See rating label	P
	Input symbol for nature of supply (d.c.)		P
	Input rated frequency/range (Hz).....:	50Hz	P
	Number of Input phases and neutral.....:	1Φ with Neutral	P
	Output rated voltage/range (V)	220Vac	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
	Number of output phases and neutral.....:	1Φ with Neutral	P
	Output rated active power (W)	See rating label	P
	Output rated apparent power (VA)	See rating label	P
	Output symbol for nature of supply (d.c.)	No d.c. output.	N
	Output rated frequency/range (Hz).....:	See rating label	P
	Ambient operating temperature range (°C).....:	0-40°C	P
	Rated short-time withstand current (I _{cw}) or rated conditional short-circuit current (I _{cc})		N
	Manufacturer's name or trademark or identification mark	See rating label	P
	Type/model or type reference.....:	See rating label	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
	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.....	Not permanently connected UPS.	N
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)	Same markings used for all models as below: Marking near holders for fuses: input breaker: 10A/250V	P
4.7.7 1.7.7/RD	Wiring terminals	Refer below:	P
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	L, N symbol is marked near the AC inlet.	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	For 230V IT power system only	P
4.7.12	Protection in building installation	The protection does not rely upon building installation. The protection is provided by input fuse used in AC inlet.	P
	Rated short-time withstand current (I_{cw})		N
	Rated conditional short circuit current (I_{cc})		N
	a) If higher I_{cp} stated ≤ 10 kA		N
	a) If higher I_{cp} stated > 10 kA		N
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.	

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	No such parts.	N
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.....	No operator accessible area that needs to be accessed by the use of a tool.	N
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 and connection of supply and loads provided in the user's manual.	P

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 (V_{peak} or V_{rms}); 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 :	No energy hazard at operator accessible SELV interfaces (RJ45 port and RS232 port).	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 $> 0.1 \mu F$, 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
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	See below	--
	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:	Backfeed protection provided by relay Ry01 plus corresponding control circuit. The relay provides a contact gap of 3.0 mm minimum between each contact gap. The backfeed protection circuit works reliably in normal and single-fault condition.	P
	Air gap is employed for backfeed protection		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 :		
2.3.5/RD	Test for operating voltages generated externally		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 μ F) :		
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 (RJ45 and RS232) is signal port only, no test required.	N
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)		
	Use of integrated circuit (IC) current limiters		N

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		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
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 (mm ²), AWG :	Refer to 2.6.3.4/RD.	
2.6.3.4/RD	Resistance of earthing conductors and their terminations; resistance (Ω), 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

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		P
5.4.1	General	Only one external supply of hazardous voltage or energy (via appliance inlet).	P
3.4/RD	Disconnection from the mains supply		P
3.4.1/RD	General requirement		P
3.4.2/RD	Disconnect devices	Appliance coupler used disconnect device.	P
3.4.3/RD	Permanently connected equipment		N
3.4.4/RD	Parts which remain energized	Adequate protection provided to service personnel during backup and maintenance mode.	P
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	The plug / appliance inlet and coupler disconnected both poles simultaneously.	P
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	SELV circuits connect only to SELV circuits and Hazardous Voltage circuits to Hazardous circuits.	P
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

2.7.4/RD	Number and location of protective devices	Over current protection by one input breaker.	P
2.7.5/RD	Protection by several devices	Only one protective device provided.	P
2.7.6/RD	Warning to service personnel :	No double-pole fusing inside this pluggable equipment type A UPS.	N
5.5.2	Basic requirements	Equipment relies on fuse protection of the building installation in regard to L to N short-circuits. Over current protection is provided by the built-in circuit breaker.	P
5.5.3	Battery circuit protection	Ungrounded batteries inside the UPS. Protection against overcurrent by three fuses in parallel in the plus pole of the battery supply circuit of the UPS or battery cabinet.	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
5.5.4	Short-time withstand current		N
5.5.4.1	General		N
5.5.4.2	Modes of operation		N
5.5.4.3	Test procedure		N
5.5.4.3.1	General application		N
	Rated UPS output current/(r.m.s) (A)		N
	Prospective test current/(r.m.s) (A)		N
	Typical power factor		N
	Initial asymmetric peak current ration (I_{pk} / I_{cw}) .. :		N
	Minimum duration of prospective test current (cycles 50/60 Hz)		N
5.5.4.3.2	Exemption from testing		N



5.6	Protection of personnel – Safety interlocks <i>(No safety interlock provided for operator protection since there are no liable hazards capable of harming the operator during operation).</i>		P
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



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	See 5.3.4.	N
2.10.1.4/RD	Intervening unconnected conductive parts	No such part.	N
2.10.1.5/RD	Insulation with varying dimensions	No such transformer used.	N
2.10.1.6/RD	Special separation requirements	No TNV	N
2.10.1.7/RD	Insulation in circuits generating starting pulses	No such circuit.	N
2.10.2/RD	Determination of working voltage		P
2.10.2.1/RD	General	The rms and the peak voltage were measured with unit connected to a 240V TN power system. Pollution Degree 2 and Overvoltage Category II considered.	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		P
2.10.3.1/RD	General	Annex F/RD and minimum clearances considered.	P
2.10.3.2/RD	Mains transient voltages		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		P
2.10.3.4/RD	Clearances in secondary circuits		P
2.10.3.5/RD	Clearances in circuits having 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		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
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	Approved optocoupler complies to IEC 60747-5-2 with dti≥0.4mm used.	P
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	Used in transformer and over heatsink	P
	Number of layers (pcs).		--
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		N
	Working voltage :		
	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 45° and 90° :	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	Pollution Degree 2	N
2.10.11/RD	Tests for semiconductor devices and cemented joints	Approved optocoupler used. No other parts to be tested.	P
2.10.12/RD	Enclosed and sealed parts	No hermetically sealed component.	N

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

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.	N
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 (mm ²), AWG	3Gx0.75mm 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
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 (mm ²)..... :		
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		N
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
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.	N
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		P
4.4.1/RD	General	DC fan located at primary 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.	N
4.4.4/RD	Protection in service access areas	See 4.4.1	P
4.4.5/RD	Protection against moving fan blades		N
4.4.5.1/RD	General		N
	Not considered to cause pain or injury. a)		N
	Is considered to cause pain, not injury. b)		N
	Considered to cause injury. c)		N

4.4.5.2	Protection for users		N
	Use of symbol or warning		N
4.4.5.3	Protection for service persons		N
	Use of symbol or warning		N
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 :		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		N

7.5	Resistance to fire		P
4.7/RD			
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	(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
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		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
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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	No motors	N
5.3.3/RD	Transformers	No isolating transformer.	N
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
5.3.9.1/RD	During the tests		P
5.3.9.2/RD	After the tests		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		N
6.1/RD	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1/RD	Protection from hazardous voltages		N
6.1.2/RD	Separation of the telecommunication network from earth		N
6.1.2.1/RD	Requirements		N
	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		N
6.2.1/RD	Separation requirements		N
6.2.2/RD	Electric strength test procedure		N
6.2.2.1/RD	Impulse test		N
6.2.2.2/RD	Steady-state test		N
6.2.2.3/RD	Compliance criteria		N
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	This power supply is not considered for connection to TNV.	P
3.5.2/RD	Types of interconnection circuits	Interconnection circuits of SELV through the connector. No ELV interconnection circuits.	P
3.5.3/RD	ELV circuits as interconnection circuits		N
3.5.4/RD	Data ports for additional equipment	Data ports (RJ45 and USB) is signal port only, no test required.	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)	P
2.10.3.4/RD	Clearances in secondary circuits	(see appended table 5.7)	P
2.10.4/RD	Creepage distances		P
2.10.4.1/RD	General		P
2.10.4.2/RD	Material group and comparative tracking index		P
	CTI tests.....		
2.10.4.3/RD	Minimum creepage distances		P
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	Ringling 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

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

B/RD	Annex B, Motor tests under abnormal conditions (see 4.7.2.2/RD and 5.3.2/RD)		N
B.1/RD	General requirements	No motors	N
	Position		N
	Manufacturer		N
	Type		N
	Rated values		N
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)		N
	Electric strength test: test voltage (V)		N
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)		N

C/RD	Annex C, Transformers (see 1.5.4/RD and 5.3.3/RD)		N
	Position	No isolating transformer.	N
	Manufacturer		N
	Type		N
	Rated values		N



	Method of protection.....:		N
C.1/RD	Overload test		N
C.2/RD	Insulation		N
	Protection from displacement of windings.....:		N

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
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F/RD	Annex F, Measurements of clearances and creepage distance (see 2.10/RD and Annex G/RD)		P
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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

H	Annex H, Guidance on protection against ingress of water and foreign objects (see IEC 60529)		N
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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 relevant tests.	P
L.5	Reference non-linear load		N
L.5.1	Test method		N
L.5.2	Connection of the non-linear reference load		
L.5.3	Connection of the non-linear reference load		N

M	Annex M, Ventilation of battery compartments		P
---	--	--	---



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
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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
V.3/RD	TT power distribution systems		P
V.4/RD	IT power distribution systems		P



4.5	TABLE: list of critical components				P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾
Input Fuse	Walter Electronic Co., Ltd.	Fast acting	T10A/250VAC	UL VDE	UL VDE
All PCB	GuangDong ChaoHua Technology Co.;Ltd	--	22F	UL	UL
Enclosure	ShenZhen XinLiang Crafts Co.,Ltd.	--	HIPS	--	--
Connector (CN01/CN4)	SHENZHEN ZIHENG TECHNOLOGY DEVEL OPMENTCO.,LTD	1121S-3P	2A/250V	UL94-V0	UL
X2 Capacitor (C34)	Ultra Tech Xiphi Enterprise Co.,ltd	HQ474K275N 04SBY	0.47 μ F,275VAC	IEC 60384-14	VDE
X2 Capacitor (C11)	Shenzhen Jinghao Capacitor CO.,LTD	CBB62B	0.1 μ F,280VAC	IEC 60384-14	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)	I _{rated} (A)	P (W)	Fuse #	P (VA)	Condition/status	
198/50Hz	4.04	--	800	Input breaker	785	Charging of empty batteries and rated 100% output load.	
198/60Hz	4.03	--	800	Input breaker	784	Ditto	
220/50Hz	3.65	--	800	Input breaker	786	Ditto	
220/60Hz	3.65	--	800	Input breaker	788	Ditto	
240/50Hz	3.36	--	800	Input breaker	789	Ditto	
240/60Hz	3.35	--	800	Input breaker	787	Ditto	
Supplementary information: Tested on model ET1K							

5.1.1 and 2.1.1.7/RD	TABLE: discharge of capacitors in the primary circuit				P
Condition	t _{calculated} (s)	t _{measured} (s)	t _{u@0V} (s)	Comments	
L-N	--	0.75	--	V _i =372V, 37% of V _i =137.64V, No load applied	
Note(s): Tested on model ET1K					

5.1.4	TABLE: Backfeed protection test			P
Condition	Voltage measured (V)/current (mA)			Comments
	L-N	L-G	N-G	
No load	0.040mA	0.048mA	0.050mA	Battery mode, Normal
Full load	0.041mA	0.065mA	0.050mA	Ditto
No load	0.045mA	0.055mA	0.035mA	Battery mode, Abnormal condition (_Q6 D-S_ short circuit)
Full load	0.040mA	0.056mA	0.048mA	Battery mode, Abnormal condition (_Q6 G-D_ short circuit)
Note(s): Tested on model ET1K				

5.2 2.2.2/RD	TABLE: insulation / hazardous voltage measurement			N/A
Transformer	Location	max. Voltage		Voltage Limitation component
		V peak	V d.c.	
Note(s):				

5.2 2.2.3/RD	TABLE: insulation / SEL voltage measurement			N/A
Location	Voltage measured (V)	Comments		
Note(s):				

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 (mΩ) / voltage drop(V)	Comments	
I/P earth (inlet)→O/P earth (outlet)	50mΩ	Test current of 32A for 120s	
Supplementary information:			

7.5 and 8.3	TABLE: fault condition tests					P
	ambient temperature (°C)				25°C,if not otherwise stated	
	model/type of power supply				ET1K	
	manufacturer of power supply				See nameplate for details	
	rated markings of power supply				See nameplate for details	
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
Q5 d-s on PFC PCB	s-c	220V	1 sec	Input breaker	0	Unit shutdown. FUSE opened, Q7, Q6 and Q8 damaged. No hazards.
AC- Output	o-l	220	1 hr	Input breaker	6.2	EUT shut down within 30s at condition of overload 169%. PCB near Q8 is 40.6°C, Ambient is 25.5°C.
AC- Output	o-l	Battery mode	47 min 36 sec	Input breaker	--	EUT shutdown immediately within 5s at condition of overload 105%. No hazard. PCB near Q8 is 35.3°C. Ambient is 23.2°C.
AC-Input	s-c	220	Imme	Input breaker	-	Input breaker opened.EUT turn to battery mode immediately. Recoverable.
AC- Output	s-c	220	Imme	Input breaker	0	EUT shutdown. recoverable
AC- Output	s-c	Battery mode	Imme	Input breaker	--	EUT shutdown. recoverable
Ventilation openings	Blocked	240	6min	Input breaker	6.0	After 6 minutes, EUT is protected by thermal control and turn to bypass. No hazard. PCB near Q8 is 71.0°C.Ambient is 25.5°C.
Ventilation openings	Blocked	Battery mode	10min	F4	--	After 10 minutes, EUT is protected by thermal control. No hazard. PCB near Q8 is 47.5°C. Ambient is 23.7°C.

Fan	Locked	220	1hr 7min	Input breaker	6.0	After 5 minutes, EUT alarm for fan and turn to by pass. Recoverable after fault removed. No hazard. PCB near Q8 is 35.9°C, Ambient is 23.4°C.
Fan	Locked	Battery mode	3min 20sec	F4	--	EUT alarm and EUT is protected by thermal control. No hazard. PCB near Q8 is 42.0°C. Ambient is 24.2°C.

Note(s):
s-c means short circuit. o-l means overload. o-c means open circuit.

5.8 2.10.2/RD	TABLE: working voltage measurement	N/A	
Location	RMS voltage (V)	Peak voltage (V)	Comments

Note(s): Input voltage: __220__V, __50__Hz

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)
Unit						
Primary to PE	<420	<250V	2.0	4.0	2.5	4.0
PCB traces between contacts of backfeed relay RLY2	<420	<250V	1.9	3.0	2.5	3.0
Backfeed relay						
Coil to contacts for reinforce insulation	<420	<250	2.0	9.5	2.5	10
Contacts opening per pole for basic insulation	<420	<250	1.9	8.06	2.5	9.1
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⁾	
Plastic enclosure	<420	250	3000Va.c.	0.4	1.5	
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	
Primary to earth (mains inlet & outlet conductor to earth)	AC	1500V	No	
Primary to plastic enclosure with metal foil	AC	3000V	No	
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		N/A
Allowed impression diameter (mm)		£ 2 mm	
Part	Test temperature (°C)	Impression diameter (mm)	
Supplementary information:			

7.4.2,	Table: Enclosure opening measurements		P
Location	Size (mm)	Comments	
Top	None	No openings.	
Bottom	None	No openings.	
Side	None	No openings.	
Front	None	No openings.	
Rear	Width 1.0mm opening	6x7 provided.	
Supplementary information:			

7.5	Table: Resistance to fire					P
Part	Manufacturer of material	Type of material	Thickness (mm)	Flammability class	Evidence	
Supplementary information: See table 4.5						

7.7	TABLE A: maximum temperature rises			P
	test voltage (V) :	See below.		--
	T1 (°C) :	--		--
	t2 (°C) :	--		--
MODEL: ET1K				
Temperature rise dT of part/at:	T (°C)			Allowed Tmax (°C)
	220V/60Hz	220V/50Hz	Battery mode	
Input L wire	48.3	49.4	46.5	80
CT1AX	79.7	52.2	73.5	130
X2- capacitor (C11)	59.1	50.5	58.2	100
X2- capacitor(C34)	49.2	48.2	47.6	85
E-capacitor (C24)body	48	49.2	45	105
RY04	72.3	61.2	41.2	130
RY03	73.5	62.3	41.3	130
RY02	72.5	62.6	42.2	130
RY01	73.6	61.8	41.4	130
PCB near Q8	61.2	61.0	62.7	130
Transformer	74.3	71.3	43.2	110
Outlet	55.5	47.4	54.9	70
Battery body	46.1	47.6	48.2	70
Heatsik of Mosfet Q5	97.5	57.6	94	130
Plastic enclosure in front	41.5	40.7	41.4	95
Plastic enclosure near battery(outside)	45.1	40.6	44.9	70
Battery wire(+)	58.8	48.2	53.9	105
Ambient	40.0	40.2	40.2	--
Note(s): The temperatures were measured under worst case normal mode defined in 1.2.2.1/RD and as described in sub-clause 1.6.2/RD and at voltages as described above.				



8.1	TABLE: earth leakage current			P
Condition	L® terminal A (mA)	N ® terminal A (mA)	Limit (mA)	Comments
Unit on	2.5	2.9	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 plastic enclosure (with foil)
Supplementary information: Supply with 264V/60Hz.				

C.2	Safety isolation transformer		N/A
Construction details:			
Transformer: T1			
Mfr.: See appended table 4.5			
Type: See appended table 4.5			
All transformers are identical except for type designation, and wire gauge and number of turns in secondary winding.			
Recurring peak voltage			
Required clearance for reinforced insulation (from table 2K and 2L)			
Effective voltage rms			
Required creepage for reinforced insulation (from table 2N)			
Measured min. creepages			
Location	inside (mm)	outside (mm)	
prim-sec			
prim-core			
sec-core			
prim-prim	%	%	
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 $Q = (0.054 \text{ m}^3/\text{Ah}) * n * I * C$	
	where: K1 : constant factor of $28 \text{ h} * \text{cm}^2/\text{m}^3$ 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 :2 (3 cells per battery) C :7 Ah $A > 28 \text{ h} * \text{cm}^2/\text{m}^3 * (0.054 \text{ m}^3/\text{Ah}) * n * 0.2 \text{ A}/100 \text{ Ah} * C$ $A > 0.127\text{cm}^2$	
	Verdict	
	The size of ventilation openings in battery cabinet exceeds the required airflow by far.	



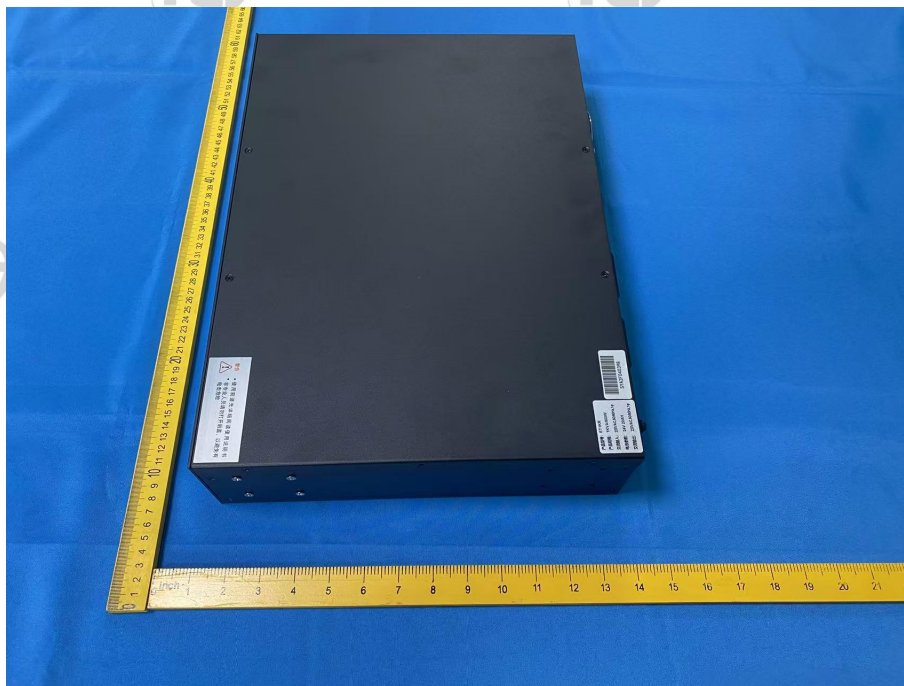
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ZA	<p>NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS</p> <p>The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.</p> <p>Note: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD Applies.</p> <table border="1"> <thead> <tr> <th>Publication</th> <th>Year</th> <th>Title</th> <th>EN/HD</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>IEC 60364-4-42</td> <td>-¹⁾</td> <td>Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60417</td> <td>Data-base</td> <td>Graphical symbols for use on equipment</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60529</td> <td>-¹⁾</td> <td>Degrees of protection provided by enclosures (IP Code)</td> <td>EN 60529 + corr. May</td> <td>1991²⁾ 1993</td> </tr> <tr> <td>IEC 60664</td> <td>Series</td> <td>Insulation coordination for equipment within low-voltage systems</td> <td>EN 60664</td> <td>Series</td> </tr> <tr> <td>IEC/TR 60755</td> <td>-¹⁾</td> <td>General requirements for residual current operated protective devices</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60950-1 (mod)</td> <td>2005</td> <td>Information technology equipment - Safety - Part 1: General requirements</td> <td>EN 60950-1</td> <td>2006</td> </tr> <tr> <td>IEC 61000-2-2</td> <td>-¹⁾</td> <td>Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems</td> <td>EN 61000-2-2</td> <td>2002²⁾</td> </tr> <tr> <td>IEC 61008-1 (mod)</td> <td>-¹⁾</td> <td>Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules</td> <td>EN 61008-1 + A11</td> <td>2004²⁾ 2007</td> </tr> <tr> <td>IEC 61009-1 (mod)</td> <td>-¹⁾</td> <td>Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules</td> <td>EN 61009-1 + corr. July + A11</td> <td>2004²⁾ 2006 2008</td> </tr> <tr> <td>IEC 62040-2</td> <td>2005</td> <td>Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements</td> <td>EN 62040-2 + corr. November</td> <td>2006 2006</td> </tr> <tr> <td>IEC 62040-3 (mod)</td> <td>1999</td> <td>Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements</td> <td>EN 62040-3</td> <td>2001</td> </tr> </tbody> </table> <p>¹⁾ Undated reference. ²⁾ Valid edition at date of issue.</p>		Publication	Year	Title	EN/HD	Year	IEC 60364-4-42	- ¹⁾	Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects	-	-	IEC 60417	Data-base	Graphical symbols for use on equipment	-	-	IEC 60529	- ¹⁾	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 ²⁾ 1993	IEC 60664	Series	Insulation coordination for equipment within low-voltage systems	EN 60664	Series	IEC/TR 60755	- ¹⁾	General requirements for residual current operated protective devices	-	-	IEC 60950-1 (mod)	2005	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1	2006	IEC 61000-2-2	- ¹⁾	Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems	EN 61000-2-2	2002 ²⁾	IEC 61008-1 (mod)	- ¹⁾	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules	EN 61008-1 + A11	2004 ²⁾ 2007	IEC 61009-1 (mod)	- ¹⁾	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules	EN 61009-1 + corr. July + A11	2004 ²⁾ 2006 2008	IEC 62040-2	2005	Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements	EN 62040-2 + corr. November	2006 2006	IEC 62040-3 (mod)	1999	Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements	EN 62040-3	2001		—
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